DETERMINATION REPORT

ENVIRONMENTAL (GREEN) INVESTMENTS FUND LTD.

DETERMINATION OF THE BIOGAS UTILIZATION FOR GENERATING OF ELECTRICITY AND HEAT AT THE FARMS OF UKRAINIAN DAIRY COMPANY LTD.

PROJECT NO. JI VAL.0202
DATE: 24/06/2010

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Date of Issue:	**Project Number:**
24/06/2010	JI.Val.0202
Project Title:	
Determination of the biogas utilization for generating of electricity and heat at the farms of Ukrainian Dairy Company Ltd.	
Organisation:	**Client:**
SGS United Kingdom Limited	Environmental (Green) Investments Fund Ltd.
Publication of PDD for Stakeholders Consultation	
Commenting Period:	05/05/2009 to 03/06/2009
First PDD Version and Date:	Version 1 dd. 18/02/2009
Final PDD Version and Date:	Version 7 dd. 27.01.2010

Summary:

SGS United Kingdom Ltd. has made a determination of the JI project activity "**BIOGAS UTILIZATION FOR GENERATING OF ELECTRICITY AND HEAT AT THE FARMS OF UKRAINIAN DAIRY COMPANY LTD**". The scope of determination is the independent and objective review of the project design document, baseline study and monitoring plan and other relevant document of the project. The information in this document is reviewed against the requirements of Decisions 16 and 17 CP7 of the Marrakech Accords and Article 6 of the Kyoto protocol and subsequent guidance from JI supervisory committee.

The overall validation process, from Contract Review to Determination Report & Opinion, was conducted using internal procedures.

The first output of the validation process is a list of Corrective Actions Requests, Further Action Requests and Clarification Requests (CAR, FAR and CL), presented in Annex 3 of this document. Taking into account this output, the project proponent revised its project design document. The report is based on the findings of document reviews, the stakeholder consultation process and responses from the project participants to the findings raised in this report. This report should not be read without reference to the annexed Determination protocol, Findings overview and Local assessment checklist.

One CAR remains outstanding. CAR 1 is based on the finding that no documented approval is available from the Parties involved.

2 FARs were raised. FAR 26 was raised to ensure that monitoring procedure will be adopted consistently by project owner before the first crediting period. FAR 27 was raised to justify personal responsibility for monitoring execution and personal training that will have been carried out before first crediting period start.

On the basis of these findings, this report provides the justification for the recommendation of a Qualified Determination Opinion.

In summary, it is SGS's opinion that the proposed JI project activity correctly applies CDM methodologies AMS III.D. version 14 and AMS I.C version 13 for the selection of a baseline scenario, demonstration and assessment of additionality and for calculating and monitoring of emission reductions. The proposed project activity meets the relevant UNFCCC requirements for the JI with the exception of country approvals (CAR 1).

Subject:		
JI Determination		
Validation Team:		
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Abbreviations

AIE	Authorized Independent Entity
AMS	Approved Methodology Small scale
B0	m^3 CH4/kg VS (capacity of volatile solid transformed to methane)
BOD	Biological Oxygen Demand
CAR	Corrective Action Request
CCM	Combined Cumulative Method
CCP	Climate Change Program
CER	Certified Emission Reduction
CH4	Methane
CL	Clarification request
CO2	Carbon dioxide
COD	Chemical Oxygen Demand
COD/BOD	ratio of Chemical Oxygen Demand and Biological Oxygen Demand used as criterion of aerobic conditions
DNA	Designated National Authority
DO	Dissolved oxygen
DVM	Determination and Verification Manual
EF	Emission Factor
EGIF	Environmental (Green) Investment Fund - project developer
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
FAR	Following Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
KP	Kyoto Protocol
MCF	Methane Conversion Factor (capacity of facility to produce methane)
MP	Monitoring Plan
NAS	National Academy of Science
NPV	Net Present Value
ODA	Official Development Assistance
PDD	Project Design Document
PP	Project Proponent
UDC	Ukrainian Dairy Company
UNFCCC	United Nations Framework Convention on Climate Change
VS	Volatile Solids produced daily per swine head
VVM	Validation and Verification Manual

Conversion Factors and Definitions

Global Warming Potential (GWP) of CH4 is equal to 21 (IPCC 2006)
CH4 density at room temperature (20 ºC) and 1 atm pressure is equal to 0.00067 t/m3 (AMS III.D version 14)
Annual methane conversion factor (MCF) for uncovered anaerobic lagoon - 0.66 IPCC guidelines 2006
Model correction factor to account for model uncertainties is equal to 0.94 (AMS III.D version 14)

Standardized Grid Emission Factor for Ukraine – 0.896 tCO2/MWh (Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5, 02 February 2007) developed by Global Carbon B.V.and validated by TUV SUD) /27/

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1 INTRODUCTION

1.1 Objective

The Environmental (Green) Investment Fund has commissioned SGS to make a determination of the Biogas Utilization for Generating of Electricity and Heat at the Farms of Ukrainian Dairy Company Ltd project with regard to the relevant requirements for JI project activities. The determination serves as design verification and is a requirement for all projects developed by Environmental (Green) Investments Fund Ltd . The purpose of a determination is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Determination is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emission reduction units (ERUs).

UNFCCC criteria refer to the Kyoto Protocol Article 6 criteria and the Guidelines for the implementation of Article 6 of the Kyoto Protocol as agreed in the Marrakech Accords.

1.2 Scope

The determination scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. SGS has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the determination, focusing on the identification of significant risks for project implementation and the generation of ERUs.

The determination 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 project design.

The main documents reviewed as part of scope:

- Terms of Reference
- Project Design Documents
- Baseline study
- Monitoring Plan
- Environmental Impact Assessment

A list of all documents is provided under paragraph 6

1.3 GHG Project Description

The suggested JI project foresees construction and putting into operation biogas plants at two dairy farms owned by Ukraine Dairy Company. Farm #1 is located in the Kiev region village Veliky Krupil and contains 4,000 heads of cattle livestock. Total installed power and heat capacities of the projected biogas plant at Farm #1 are equal to 0.955 MW and 1.085 MW respectively. The farm #2 is located in the Chernigov region village Komarivka. It contains 6,000 heads of cattle. The total installed power and heat capacities of the projected biogas plant at Farm #2 are equal to 1.875 MW and 2.058 MW respectively. At

both farms biogas generated in anaerobic digesters will be supplied to the cogeneration plant for generating electric energy and heat.
Project implementation will result in emission reduction generated from two sources – changing of manure management system that envisages anaerobic digesters application and utilization of captured methane for energy production instead of uncontrolled methane emissions from anaerobic lagoons, and substitution of electricity from power grid by energy produced by biogas plant that will be used for internal power and heat consumption. Total amount of CO2 emission reduction estimated for the first crediting period from 2009 to 2012 is equal to 203,286 t CO2.

2 METHODOLOGY

The determination consists of the following three phases:

1. A desk review of the project design documentation;
2. Follow-up interviews with project stakeholders and site visit;
3. The resolution of outstanding issues and the issuance of the final determination report and opinion.

Document review and interviews are the most important means of verification used in the process by the validation team.

The site visit was carried out to verify assumptions in the baseline. Additional information is required to complete the determination, which may be obtained through telephone and face-to-face interviews with key stakeholders (including the project developers and Government and NGO representatives in the host country).

The determination protocol is used as checklist during the assessment. There are cross references between the complete determination protocol in Appendix 2 and other documents used by the validation team like Appendix 1 local checklist and Appendix 3 findings overview.

Findings established during the determination can either be seen as a non-fulfilment of determination protocol 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) determination protocol requirements have not been met; or
iii) there is a risk that the project would not be accepted as a JI project or that emission reductions will not be verified.

The term Clarification may be used where:

iv) additional information is needed to fully clarify an issue.

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

- It organises, details and clarifies the requirements a JI project is expected to meet;
- It ensures a transparent determination process where the independent entity will document how a particular requirement has been validated and the result of the determination.

The determination protocol consists of three tables (see tables 1, 2 and 3). The different columns in these tables are described below (see tables 1, 2 and 3).

The completed determination protocol is enclosed in Annex 2 to this report.

Determination Protocol: Mandatory Requirements			
Requirement	**Reference**	**Conclusion**	**Cross reference**
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**), 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 determination report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent determination process.

Table 1 - Mandatory Requirements

Determination Protocol: Requirement Checklist				
Checklist Question	**Reference**	**Means of verification (MoV)**	**Comment**	**Draft and/or Final Conclusion**
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in six different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	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 **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification** is used when the independent entity has identified a need for further clarification.

Table 2 - Requirement Checklist

Determination Protocol: 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**	**Determination conclusion**
If the conclusions from the draft determination are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the independent entity should be summarised in this section.	This section should summarise the independent entity's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Table 3 - Resolution of Corrective Action and Clarification Requests

2.1 Review of Documents

The PDD submitted by the PP and additional background documents related to the project design and baseline were reviewed.

The determination is performed primarily as a document review of project documents which are either publicly available or submitted by the client and additional background documents related to the project design and baseline. The assessment is performed by the lead assessor, an expert and local assessor using a determination protocol and local checklist.

2.2 Follow-up Interviews

In the period from 24/06/2009 to 25/06/2009, the validation team performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Companies EGIP, UDC and Ukrbudinvest were interviewed. The main topics of the interviews are summarized in Table 4 Interview topics.

Table 4 Interview topics

INTERVIEWED ORGANIZATION	INTERVIEW TOPICS
EGIP YURI PYROZHENKO – CCP EXPERT	➢ TECHNOLOGY TO BE IMPLEMENTED; ➢ INVESTMENT ANALYSIS PARAMETERS; ➢ EMISSION REDUCTION CALCULATION;
EGIP MARINA BEREZNITSKA – CCP EXPERT	➢ ENVIRONMENTAL ASPECTS OF PROPOSED ACTIVITY; ➢ BASELINE AND ALTERNATIVE ANALYSIS; ➢ MONITORING PROCEDURES;
UKRAINIAN DAIRY COMPANY ARKADY TRAVKOV – CHIEF ENGINEER	➢ PROJECT LOCATION; ➢ PERSONNEL TRAINING; ➢ COMPLIANCE TO LOCAL LEGAL REQUIREMENTS; ➢ LOCAL STAKEHOLDERS CONSULTATIONS;
UKRAINIAN CONSTRUCTION COMPANY (UKRBUDINVEST) VICTOR MIRONOV – CHIEF ENGINEER	➢ INVESTMENTS AND CONTRACTS FOR CONSTRUCTION; ➢ PROJECT IMPLEMENTATION TIMETABLE; ➢ OFFICIAL PERMISSIONS AND RESOLUTIONS FROM LOCAL AUTHORITIES

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the determination was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for the positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by the validation team were resolved during communications between the PP and the validation team. To guarantee the transparency of the determination process, the concerns raised and responses given are summarized in chapter 3 below and documented in more detail in the determination protocol in Appendix 2.

Since modifications to the project design were necessary to resolve the concerns of the validation team, the PP decided to revise the documentation and resubmitted the project design documentation on

18/02/2009 – first version PDD (Published for international stakeholders)

19/10/2009 Version: 02

23/11/2009 Version: 03

01/12/2009 Version: 04

12/01/2009 Version: 05

25/01/2010 Version: 06

03/03/2010 Version: 07

After reviewing the revised and resubmitted project documentation, the validation team issued this final draft determination report and opinion.

3 DETERMINATION FINDINGS

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

1) The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the determination protocol in Appendix 2

2) Where the validation team had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Clarification or Corrective Action Request, respectively, has been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the determination protocol in Appendix 2. The determination of the project resulted in twenty Corrective Action Requests and nine Clarification Requests.

3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and the validation team to resolve these Clarification or Corrective Action Requests are summarized.

4) The conclusions of the determination are presented.

The final determination findings relate to the project design as documented and described in the revised and resubmitted project design documentation.

3.1 Project design

The project activity involves installation of facilities achieving methane recovery and utilizing generated biogas for power and heat production at two dairy farms with 4,000 and 6,000 heads of cattle. The project will result in GHG emission reduction due to both abatement of GHG emission from anaerobic lagoons which proposed to be substituted by digesters with methane recovery system and substitution of electricity from grid (including electricity used for heating) by power and heat produced by biogas combusting co generators. Final sludge after digesting should be stored under aerobic conditions and then applied for soil fertilization.

The project is proposed to be implemented at the two cattle farms – at village Veliky Krupil in Kiev region and at village Komarivka in Chernigov region. The project location was checked out during the site visit. At Farm #1 (Veliky Krupil) project envisage reconstruction of existing cattle farm with extension of farm capacity from 2,000 to 4,000 heads of cattle. In contrast it is proposed to build a new cattle farm designed for 6,000 heads of cattle livestock. Accordingly to project timeline discussed with project owner and general contractor farm #1 should be commissioned in 2009 and farm #2 should start working in 2010. Farm #1 has been commissioned on 01/09/2009 according to commissioning statement /76/.

Both farms are designed to manage livestock under confined conditions over the year. Flush-flume manure removal system is to be installed at farms.

The biogas plant project at the farm #1 Veliky Krupil includes the following equipment:

1/ one receiving reservoir with volume of 765 m^3 for manure collecting and mixing before inflow to digesters,

2/ three digesters with volume of 2,400 m^3 each, inner diameter of 24 m and inner height of 6 m. Digesters are operated under temperature 34-37°C. The hydraulic retention time for manure in digesters is 25-30 days. Digesters are equipped with mechanical mixing system and heaters;

3/ one open reservoir of 64.99 m3 volume for out flow final sludge collecting;

4/ four open reservoirs for final sludge storage with volume of 12,500 m^3 equipped with mechanical mixing system to avoid anaerobic digestion of final sludge.

Three power and heat cogenerators with installed power capacity of 0.33 kW each and heat capacity of 395 kW each will be installed to utilize biogas. In emergency biogas will be flared at the singular candle designed for flaring of 500 m3 of biogas per hour. As per the project documentation emergency biogas flaring is planned to be not longer than 24 hours per year.

Project of biogas plant at farm #2 (Komarivka) includes similar components: one receiving reservoir with volume of 1,525 m^3, six digesters with volume of 2,400 m^3 and five reservoirs for final sludge storage with volume of 25,000 m^3 each. Generated biogas will be utilized by three cogeneration units with total installed power capacity of 3*625= 1,875 kW and with thermal capacity of 3*686=2,058 kW. Installed capacity was supported by project design /12/ and technical description of cogenerators /54/. In case of emergency biogas will be flared at two open flaring candles designed for flaring of 300-400 m^3/hour of biogas.

Project also envisages using diesel as back-up fuel in case of emergency cease of biogas supply at both farms. It is proposed to consume power from grid for digesters operation during first 60 days after manure is loaded into digesters for methane production start.

Location of both farms and technical details of project implementation at farm #1 were checked out during site visit and confirmed with project documentation /12/ and project charts /16/ approved by the local authorities /75/ as required by law.

CAR 1 was raised to ensure official approval of proposed activity by Parties involved. It was found that according to national Ukrainian procedure of JI project registration /10/ LoA should be issued after positive determination opinion from AIE is submitted to national DFP. The letter of Endorsement # 903/23/7 dd 31.10.2008 has been received by SGS during site visit /11/. Thus CAR 1 has been left open until LoAs are issued by both Ukraine and Switzerland.

CL 31 was raised to determine the length of the crediting period in years and months and express its starting date in DD.MM.YYYY format as required by quidance to application of PDD template. After discussion under this CAR starting date of project implementation was defined as 15/07/2008 when the construction work was started /42/. The start of crediting period was defined to be 01/11/2009 the date after 60 days of start up period since biogas plant at farm #1 was put into operation 01/09/2009 /76/. The length of crediting period was defined as 3 years and 2 months (from 01/11/2009 to 31/12/2012). As the starting date and length of first crediting period was supported by reliable evidences – permit for construction work start dd. 15/07/2008 /42/ and commissioning certificate dd. 01/09/2009 /76/ respectively CL 31 was closed.

Project implementation timetable was checked and confirmed during site visit. Construction works at farm #1 was started after official permit issuance on 15/07/2008 /42/. Biogas plant at farm #1 was commissioned on 01/09/2009 accordingly to commissioning certificate /76/ issued by local authorities. Construction works at farm #2 (Komarivka) was started on 26/05/2009 when the relevant official permit /43/ was issued.

CAR 11 was raised in order to justify starting date which was defined as 05/07/2008 in first version of PDD. Basing on the documentary evidence collected on site starting date was corrected and CAR 11 was closed.

Duration of first crediting period is 4 years 2009 – 2012 that is less than proposed operation lifetime of equipment defined to be equal to 10 years. In order to gain a confidence in correct definition of lifetime **CL 23** was raised. In response to this CAR project proponent provided the informational note from equipment supplier - company Zorg Ukraine /71/ signed by General director of Zorg-Ukraine confirming 10 year long equipment operational lifetime in the case all technical requirements and operational conditions are met and maintenance and repairing works are carried out timely. The lifetime of equipment (10y) was supported with reliable evidence /71/ and CAR 23 was closed.

CL 4 was raised to confirm the technical details of project proposed to be implemented at farm #2. Responding to this CL the PPs provided the extract from the project design /47/ approved by positive conclusion of State Expertise /48/ along with technical specification of cogeneration units /54/. Technical details of farm #2 were found to be supported with transparent evidence and CL4 was closed out.

CAR 14 was raised to clarify the technical description of preliminary receiving reservoir given in PDD. Particularly it was of main concern to ensure that total manure storage time does not exceed 24 hours. In the reply the PP provide comprehensive description of preliminary reservoir which was crosschecked against project documentation /12/ and were found to be consistent. Preliminary reservoir is designed to avoid any methane emissions from manure and equipped with mechanical mixers. Total time of manure retaining in preliminary reservoir does not exceed 24 hours as the manure is pumped out from reservoir 8 - 48 times per day as it was confirmed by equipment supplier Zorg Ukraine Company /80/. Provided information was found to be sufficient and CAR 14 was closed out.

It was notified during the site visit and consequent review of project documentation submitted by proponent /12/ that final sludge outgoing from biogas plant is stored in the lagoons that initially was designed as aerobic and retrofitted for final sludge storage without any significant changes in its depth and size. **CAR 6** was raised to ensure aerobic conditions are retained in these reservoirs and that there is no methane emission from anaerobic decay of outstanding organic matters in storage reservoirs and following soil application of final sludge. Responding to this issue the PP provided the final sludge management procedure adopted in UDC. it was clarified that final sludge is to be stored in lagoons with maximum load level of 2 m. Maximum storage time – 6 months (reservoirs shall be totally emptied twice per year and partial pumping shall be applied while sludge is consumed for soil fertilization). To retain aerobic conditions in storage reservoirs mechanical mixing with HOULE pump and injector basing on tractors John Deere 8430 shall be applied at both farms 8 hours per day (2,920 hours per year). As it was confirmed by equipment supplier /89/ this pumping technology provides effective mixing of final sludge in storage reservoirs. Emissions from diesel combustion by tractors were considered as project emissions in calculation of emission reductions.
To ensure the final sludge is stored under aerobic conditions the regular testing of chemical content of final sludge (DO and COD/BOD ratio) shall be used. Sampling scheme includes several points covering all reservoir area where samples shall be collected from different depths to gain an objective estimation of oxygen saturation in whole volume of final sludge. Sampling procedure is developed accordingly to standardized laboratory methods practiced in Ukraine /86/, /87/, /88/.
Final sludge outlet from the biogas plant is proposed to be used as soil fertilizer at fields managed by UDC. Total area of soil application for Farm #1 is 1051.2 ha and for Farm #2 – 1576.8 ha. Density of sludge application is 0.1-0.4 ton of nitrogen per ha (about 50 -200 ton of final sludge per ha depending on agricultural crop considering the nitrogen content). Accordingly to internally established procedure for final sludge management /66/ final sludge is to be applied at each plot of land once per 2-3 year to avoid overfertilization. After fertilization soil is to be plowed. The information regarding final sludge storage and soil application was included into PDD version 5 and crosschecked against relevant documentary evidence /66/, /89/. The proposed final sludge management procedure was considered by Expert and CAR 6 was closed on the basis of his opinion that the aerobic conditions for final sludge storage and soil application was ensured.

As per information obtained during site visit declaration of intentions containing project description dd. 11/01/2008 was submitted for discussion to local stakeholders /39/. Project was considered by local administration with participation of public representatives on 17/01/2008 /49/. Executive committee of administration issued the positive decision /40/ dd. 07/02/2008 on allowance of projecting works and land allocation. **CL 22** was raised to request the minutes or summary of the stakeholders consultations on implementation of part 2 of project (at farm Komarivka). The minutes of the meeting in administration of village Komarivka, Borznyanskiy district, Chernigov region dd. 27/02/2008 /70/ contains the decision to allow the construction of the farm with 6,000 heads of cattle capacity. No negative comments were provided.The evidence to confirm stakeholder consultation (minutes of meeting dd. 17/01/09 for farm #1 and 27/02/09 /70/ for farm #2) were reviewed during the local assessment and was found to be reliable and acceptable in terms of the JI requirements. Thus CAR22 was closed.

CAR 25 was raised to justify inconsistency between identification of the PP given in table A.3 and annex 1 to the PDD version 1. Answering this CAR proponent clarified that Switzerland is the second party of project and relevant correction was introduced in the PDD version 5. The request of LoA from Switzerland was incorporated into CAR 1 and CAR 25 was closed.

CAR 30 was raised to ensure the completeness of information provided in PDD version 1.
Under CAR 30 proponent was requested to justify inconsistency between the details of Project Participants on page 6 of the PDD and Annex 1 of the PDD. After revision information presented in Annex 1 of PDD version 6 was corrected and inconsistency with section A.3 was rectified. Version 6 of PDD was found consistent and CAR 30 was closed out

3.2 Baseline

3.2.1 Applicability of baseline methodologies

Project envisages construction of biogas plants on two cattle farms instead of anaerobic lagoons and generation of electricity and heat to substitute the power that would be supplied from power grid. Thus project envisages two components improving of manure management system and substitution of electricity from regional power grid by power produced by biomass-based co-generating systems. AMS III.D version 14 /92/ and AMS I.C version 13 /93/ methodologies were used to determine the corresponding components of baseline – manure management system (AMS III.D component) and electricity consumption from grid (AMS I.C component). Applicability criteria for AMS I.C was checked and confirmed with reliable evidence.

Applicability criteria for AMS I.C /93/:

1/ *Cogeneration system supply Electricity and thermal energy for on-site consumption.*

On/site use of energy produced by cogeneration plant is envisaged by the project /12/. Total power intake (wattage) of equipment installed at farm #1 (Veliky Krupil) after proposed extension will be equal to 1100 kW accordingly to working project of farm /12/. Both cogeneration units pose total power generating capacity of 955 KW /12/.

Thus all energy produced is likely to be consumed by farm.

2/ *For co-fired systems, the total installed/rated thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel does not exceed 45 MW thermal considering the conversion factor of 1:3 for converting electrical energy to thermal energy;*

Project proposes installation of two cogenerators with power capacity of 955 KW and thermal capacity of 1081 KW at farm #1 supported by project design /12/ and 3 cogenerators with total power capacity of 625kW*3=1,875 kW and 686KW*3=2,058 kW of heat capacity at farm #2 (supported with technical description of cogenerators /54/). Total installed power capacity is equal to about 2.8 MW and total heat capacity is equal to about 3.1 MW. Thus applicability criteria are met as the installed capacity of units is far less than established limits.

Applicability criteria for AMS III.D /92/:

This methodology is applicable as the proposed activity involves the replacement of existing anaerobic manure management systems in cattle farms to achieve methane recovery and destruction by combustion in cogeneration units or flaring of the recovered methane.

1/ The livestock population in the farm is managed under confined conditions;

As confirmed during site visit milk cows are confined inside the covered cow-sheds equipped of mechanical and water flush manure removing system at the farm #1 Velyky Krupil. The same design is proposed for farm #2.

2/ Manure or the streams obtained after treatment are not discharged into natural water resources;

The direct manure discharge into water bodies is prohibited by law and is not considered in official standard procedure of dairy farm operation /19/ provided to SGS and reviewed during desk review.

3/ The annual average temperature of baseline site where anaerobic manure treatment facility is located is higher than 5 ℃,

The annual average temperature of baseline site is higher than 5 ℃ and values 7.4 and 8.4 ℃ for Chernigov and Kiev regions respectively as it was confirmed by official reports from Ukrainian National Hydrometeorology service /25/, /26/.

4/ In the baseline scenario the retention time of manure waste in the anaerobic treatment system is greater than 1 month, and in case of anaerobic lagoons in the baseline, their depths are at least 1 m;

Officially approved procedure for manure management /19/ requires the manure to be stored in lagoons during 6 months and more. The depth of anaerobic lagoons is 4 m as it was mentioned in official conclusion of State Expertise of Project Working Documenntation /13/.

5/ No methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario.

Anaerobic lagoons only proposed to be used for manure management in baseline that is in accordance with manure management standard /19/. No methane recovery and utilization took place in previous practice of manure management in UDC.

6/ The final sludge must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures (not resulting in methane emissions) must be ensured.

Final sludge proposed to be handled in the lagoons designed for anaerobic storage of raw manure. Mechanical mixing of final sludge is proposed to retain aerobic conditions. Effectiveness of mixing is confirmed by equipment supplier /89/.

7/ Technical measures shall be used to ensure that all biogas produced by the digester is used or flared.

Project envisages installation of flares at both farms to combust the surplus of biogas in case of biogas utilization at cogeneration units is interrupted or in emergency. Direct venting of biogas into atmosphere is prohibited by local legislation. The compliance of project activity to all applicable local requirements is confirmed by Conclusions of State Expertise for farm #1/75/ and farm #2 /48/.

Nevertheless it was impossible to ensure the absence of biogas venting into atmospheare during site visit (the construction works had not been completed at the time of site visit) review of working project documentation for biogas plant installation /12/ demonstrates that project design does not envisage direct biogas venting into atmosphere. All components of biogas plant where digesting processes take place, including receiving tanks, digesters, pipelines etc are designed hermetical to ensure abatement of biogas leaks. The official statement of biogas plant commissioning /76/ confirms the compliance of the biogas plant to design documentation.

According to Determination and Verification Manual /91/ SGS should have checked applicability criteria specified by AMS III.D version 14 /92/ which is the most recent valid version for the time of the PDD submission for publication on the UNFCCC JI website.

Supplimental criteria specified in AMS III.D version 15 were also checked as the delay in transportation of manure from barns to digesters may constitute additional methane emissions:

8/ The storage time of the manure after removal from the animal barns, including transportation, should not exceed 24 hours before being fed into the anaerobic digester.

According to project design /12/ the manure from barns is immediately supplied into preliminary receiving tank and then pumped into digesters. Project proponent has demonstrated that time of manure handling in receiving tank is far less than 24 because according to information provided by equipment supplier Zorg Ukraine Company /80/ the manure should be pumped out from receiving tank 8 - 48 times per day.

CAR 17 was raised to clarify why small scale methodologies were used considering the annual average project emissions exceeds 60,000 tones of CO2. Answering this issue project proponent has explained that project includes two small scale components for emission reduction achieving – changing of manure management system to avoid methane emissions from anaerobic lagoons and substitution of electricity that would had been consumed from power grid in the absence of project activity. Small scale criteria are met for each component of project. Avoided methane emissions from anaerobic lagoons proposed to be not more than 31,540 t CO2 per year and total installed capacity of cogeneration units is equal to 5,279 MW.
CAR 17 was closed as applicability criteria for both applied methodologies are met.

Accordingly to AMS III.D the only possible baseline is manure management system including anaerobic lagoons. This practice is in line with National Standard for manure management /19/.
For AMS I.C component of project the most plausible alternative is import of power from the grid where it is generated using fossil fuels. Before project implementation electricity had been imported from grid at the farm #1 that was observed during site visit. **CAR 28** was raised to clarify what manure management system is envisaged by alternative scenario 2. Responding to CAR 28 proponent clarified that scenario 2 envisages storage of manure in anaerobic lagoons in accordance with standard practice. Section B2 of PDD version 6 /1f/ was amended and CAR 28 was closed.
CAR 18 was raised to justify why two baselines for manure management and renewable energy production were established in PDD version 1 /1a/. After the discussion with PP unified baseline was chosen with AMS III.D and AMS I.C components defined and calculated separately. It was demonstrated by review of ER calculation that used approach did not result in double counting of baseline emissions. CAR18 was closed.

3.2.2 Additionality

Selection of alternatives

The alternatives that provide outputs or services comparable with the proposed JI project activity were identified in accordance with AMS III.D version 14 and AMS I.C version 13 for the both respective components of project. They include:
(a) the proposed project activity undertaken without being registered as a JI project activity for both AMS I.C and AMS III.D components;
(b) continuation of the current situation with application of anaerobic lagoons as the manure management system wich is the only possible alternative for AMS III.D component, and
(c) continuation of the current practice of electricity import from the regional power distribution grid for AMS I.C component.
Identified alternative scenarios are realistic and credible as they are in compliance to the National Standard regulating construction and operation of cattle farms /19/.

Compliance to national legislation and sectoral policies

As it was demonstrated by review of the applicable national normative enactments particularly the Ukrainian national laws “On the Protection of Environment” /44/ “On Wastes” /45/ and “On Alternative Sources of Energy” /46/ as well as the review of actual trends in agricultural sector /23/ all identified alternatives are in compliance with mandatory legislation and Ukrainian national and national/sectoral policies.
Baseline was identified as continuation of current practice including usage of anaerobic lagoons as the main component of manure management and consumption of electricity from regional power grid.
In order to support the baseline choice and demonstrate that project activity does not represent the likely baseline scenario both barrier analysis and investmentment analysis were undertaken.

Investment analysis

Investment analysis was undertaken in accordance with Annex to methodological “Tool for the demonstration and assessment of additionality” (Guidance on the assessment of the Investment Analysis, version 02) to demonstrate that project activity undertaken without being registered as JI is not economically feasible and therefore cannot be considered as likely baseline scenario.
The benchmark analysis (Option III) was applied to test the financial additionality of the project. Other options - the simple cost analysis and investment comparison analysis are not applicable due to project specifics – generation of benefits other than JI revenues and absence of another similar activity wich can be used for investment comparison.
The discount rate equal to 16.1% was selected as the benchmark for investment analysis. The estimation of discount rate was performed using simplified Combine Cumulative Method (CCM) considering the official refinancing rate equal to 7,1% in EUR actual on the date when investment decision was elaborated 27/12/2007 /50/, and 9% - risk premium including two components: country/sectoral specific risk and company specific risk. The company specific risk is estimated as 4% with reference to relevant economical study /74/. The risk of investments into the agricultural sector of economy was estimated as 5% on the basis of research of economical environment in Ukraine /85/.
Investment analysis was performed taking into account following major financial assumptions, which were supported by reliable documentary evidence

Project costs /15/	7,560,000.0 EUR
Operational costs /77/	105,000.0 EUR/year
Rate of Euro exchange /73/	7.5 UAH/EUR
Electricity cost /33/	44.52 Euro/MWh
Scrap metal price /83/	188.1 EUR/tonne

As the result of investment analysis it has been demonstrated that project activity undertaken without being registered as JI is not economically feasible (IRR is equal to 12.8% that is less than the selected benchmark and NPV is negative -733,710.6 EUR). The sensitivity analysis undertaken with ±10% deviations of capex and electricity prices indicates that project activity would not became economically feasible and could not be considered as possible baseline scenario under explored range of deviations.

CAR 24 was raised to clarify the following issues raised on the basis of project review by financial expert:

1/ *PP was requested to specify the project operational costs and the incomes from electricity substitution along with relevant supportive documents*.
In the reply to this issue PP has provided detailed breakdown of operation costs confirmed by Chief of Executive Board of LLC Ukrainian Dairy Company /77/. Also proponent has revised investment analysis considering the power price conservatively assumed to be equal to 44.52 EUR/MWh that was found consistent based on analysis of relevant evidence /33/.

2/ *The PP was requested to consider depreciation and taxation effects in cash flows.*
According to Ukrainian legislation taxation of income consists of 25% /72/. Annual depreciation value was calculated using linear method and considered in investment analysis.

3/ *Proponent was requested to justify the period taken for investment analysis which was chosen to be more than operation lifetime.* Investment analysis was adjusted to cover the period of 15 years corresponding to operation lifetime finally.

4/ *Proponent was asked to identify whether there are project residual values or continuity values and to consider these values as cash inflow in investment analysis.*
In answer to this issue investment analysis was revised considering residual value of equipment to be equal to cost of scrap at the end of technical lifetime of the co-genration units after 15 years that estimated as 25 thousand EUR. The residual cost of equipment was taken to be equal to total weight of steel components (134.6 t) multiplied by scrap price 188.1 EUR/tonne taken from relevant scrap market research /83/.

The technical lifetime for the main project equipment is determined as 15 years according to explanations from co-geration module manufacturer (Interviews /5/ and /6/). The local supplier has clarified that operational lifetime of whole equipment of biogas plant is 15 years. At the end of this period the co-generation modules are at the end of their technical lifetime and concrete constructions are useless.

5/ PP was requested to clarify the approach used for project discount rate estimation. It was specified that discount rate was estimated using standard cumulative combined method (CCM).

6/ Sensitivity analysis of all key parameters was requested from PP.
Sensitivity analysis was undertaken for capital investments, operational costs, electricity price and amount of electricity production.

7/ To gain more clarity in investment analysis PP was requested to divide the analysis of project with ERUs and without ERUs. The investment analysis was amended accordingly and presented in revised Excel sheet version 4 /6/ and all further versions of the excel file..

Approaches used for investment analysis were checked out by financial expert and found consistent (see discussion on CAR 10 below) thus CAR 24 was closed.

Finally all requested changes are reflected in the revised investment analysis (ref 6a) and the final version of the PDD (Ref /1i/). The investment and sensitivity analysis are transparent and supported with objective evidence. The results are approved by SGS expert. The financial calculations are correct and they do show mathematical additionallity.

The benchmark investment analysis is applied to demonstrate additionality. Based on the result of investment analysis it was demonstrated that project activity is not financially feasible per se and is not a likely scenario without JI status. Project was considered additional.

CAR 10 was raised to request substantiation of annual income from displaced electricity which assumed to be constantly equal to 929,000 EUR for whole crediting period.

Efficiency of heaters was not considered while calculating the amount of displaced electricity.

Amount of displaced electricity was recalculated taking into consideration 68% of electric heaters efficiency reflected in the technical documentation of heaters /68/. Investment analysis and ER calculation spreadsheet were updated accordingly.

After revision of investment analysis the discount rate was reconsidered from 11% to 16.1% due to inclusion of sector specific risk estimated as 5% on the basis of risk factors depicted in market study /85/. PP is requested to revise calculation sheet and PDD in order to provide clear explanation of discount rate chosen and eliminate inconsistency between figures at pages 24 and 25 and calculation sheet. PP have made relevant corrections to avoid inconsistency in documentation and submitted revised version of PDD and financial analysis with clear explanation of parameter chosen. Approach to determine discount rate was checked by financial expert and found consistent.

Two components of risk premium - country/sectoral specific risk and company specific risk were determined on the basis of relevant financial researches. The company specific risk equal to 4% is supported with article Grounding of the method of calculations the discount rate in domestic practice by Kotova M.V., Shapoval S.S. /74/. The risk of investments into the agricultural sector of economy was estimated as 5% on the basis of research of economical environment in Ukraine 'Doing business with Ukraine, Global market briefings'. Third edition by Dr. Marat Terterov /85/. The total investment risk is 9% (4% project + 5% sector risk).

The size of the residual value of the PA, the increased lifetime of the PA to 15 years along with additional revenues and additional costs for the first main overhaul of the co-generation units after 7.5 years have no significant impact on the additionality assessment.

Above mentioned references were checked and found reliable and CAR 10 was closed.

Barrier analysis

There were four barriers identified for proposed activity including barrier associated with prevailing practice, legislative barrier, investment barriers and technological barrier.
Barriers associated with prevailing practice were generally defined as the lack of similar activity in Ukraine. Legislative barrier was associated with the presence of official standard prescribing anaerobic lagoons as the only plausible type of manure management and the absence of normative enactments encouraging renewable energy production. Investment barrier was related with project unprofitability supported by investment analysis and technology barrier was related as possible difficulties of operation of biogas plant that presumably might be associated with lack of operation practice in the country.

Nevertheless several biogas plants were operated in Ukraine and the discussion on common practice, barriers which prevent the project implementation and additionality was not clear. . **CAR 19** was raised as the barrier argumentation was not persuasive in following points:

1. The barriers associated with prevailing practice including technology barrier should be reliable in absence of the similar activity but description given in section B.2 PDD version 1 /1a/ as well as the results of site visit indicated the presence of several biogas plants in Ukraine before project start and thus existing of the relevant operation experience.

2. The legislative barrier defined as the lack of legal incentives to develop biogas projects does not constitute an overwhelming constraint to project implementation.

Considering above reasons barrier analysis does not demonstrate sufficiently that project activity would not be realized without JI revenues. Thus barrier analysis was removed from revised PDD version 6 /1f/ and the investment analysis remains the only barrier to demonstrate additionality.

Common practice analysis

Common practice analysis was undertaken to confirm the project activity is not the business as usual for Ukraine. It was stated that two biogas projects were realized in Ukraine in Soviet period, but their operation was interrupted and as of now there is only one biogas plant operated in Ukraine (biogas plant at swine farm “Elenovka” constructed with attraction of grant from government of Netherlands). Common practice description was confirmed by analytic review “Usage of methane emissions from wastes for biogas production” /24/ submitted by proponent on site and by analysis of standard manure management procedure /19/ where the anaerobic lagoons were only prescribed as possible manure management. Thus it was confirmed that project activity is not in line with common practice whereas the anaerobic lagoons are the most common form of manure management in Ukraine.

In order to ensure the relevance of all references given in PDD the proper link to Key World Energy Statistics 2007 was requested through **CAR 29.** Replying to this CAR proponent has provided the proper web link /90/. Information was reviewed and found consistent. Thus CAR 29 was closed out.

3.3 Monitoring Plan

Project proponent has used the approved CDM monitoring methodologies AMS III.D and AMS I.C to develop the monitoring plan for the estimation of project and baseline emissions for both AMS III.D and AMS I.C components. The applicability criteria for baseline and monitoring methodology were analysed in detail and the results were presented in the previous chapter and determination protocol in Appendix 2. The monitoring plan is described in section D of the PDD /1/.
The monitoring plan includes the data necessary for the ex-post determination of emission reductions achieved by the project activity including direct measurement of the amount of methane fuelled and flared as well as the amount of electricity and heat produced by cogeneration units.

To determine the volume of methane combusted the volume of biogas recovered, fuelled and flared will be monitored with flow meters. Analyses of the methane fraction in the biogas will be performed in the laboratory of the Gas Institute of Ukrainian NAS. Monitoring plan envisages continuous measurement of temperature and pressure of the biogas will be used to determine the density of methane combusted. The flare efficiency proposed to be determined on the basis of estimated time in which the gas is combusted in the flare, multiplied by the efficiency of the flaring process which is assumed to be equal to 50% as defined by methodology which is very conservative.
To estimate baseline emissions the amount of manure coming into a manure management system, dry matter and ASH content will be monitored. For this purposes tests of manure will be performed annually. For biomass based renewable energy generation that will displace electricity from an electricity distribution system (grid) the baseline emissions are determined as the product of electrical energy expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor.
Therefore accordingly to AMS I.C monitoring plan includes metering the energy produced including both heat and energy production.
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It was notified during site visit that gas metering system had not been installed at the inflow to biogas flaring system. **CAR 13** was raised to justify how the emissions from biogas flaring would be estimated during monitoring period. In the response to this CAR the PP informed that gas flow meter serial #0002118 was installed on the inflow pipeline of flare on 1/10/2009. This information was officially confirmed by equipment supplier Zorg Ukraine /63/. CAR 13 was closed.

In order to get clearance in level uncertainty and timely performed calibration of metering equipment used for monitoring purposes all certificates for meters were requested through **CL3.** Responding to this CL proponent has provided certificates and technical descriptions for all installed metering equipment including **gas flow meters RGK-Ex**, /32/ **pressure sensors** (IS-20-S, S1, ECO-1 WIKA) /36/ and **temperature sensors** (TR10-C WIKA) /35/, and manual and technical description for **System of biogas quality control** SGK-1 –/59/. All documents confirm that meters were calibrated and their uncertainty level does not exceed 2%. Thus the low level of uncertainty was confirmed by reliable sources and CL 3 was closed.

CL 9 was raised in order to ensure the appropriate uncertainty level for heat meter Supercom-01-SKS-3, “Techprilad”, belonging to second class of quality as it was stated in manufacturer’s certificate /37/. Accordingly with referred National Ukrainian standard DSTU #3339-96 this class of heat meters quality #2.5 corresponds to uncertainty level from 2.5% to 5.5% depending upon the difference in temperature of heated and returned water. Maximum uncertainty corresponds to lowest difference equal to 3 ºC that is unrealistic under normal load. The difference between heated and returned water for cogeneration units is higher and equal to 15-20º C under 75-100% load accordingly to technical specification /54/. Thus the level of uncertainty of heat monitoring equipment seems acceptable and CL 9 was closed.

CL 21 was raised to specify QA/QC procedure for the proposed monitoring of emission reductions. In the response to this CL proponent has submitted to SGS internal monitoring manual /64/ developed to implement the monitoring plan. Monitoring manual includes following QA/QC procedures applicable to monitoring of emission reductions.

Draft monitoring procedure was provided to the validation team:

- emergency preparedness

In case of emergency (interruption of biogas inflow to cogeneration units) electricity at cogenerators will be produced by combustion of fossil fuel (diesel). It was assumed that total time of such situation will not exceed 24 hours per year. Project envisages installation of two cogeneration units at farm #1 and three units at farm #2. Maintenance, reparing and service works will be carried out on each unit separately at different times. The situation when all units installed at a farm are not working seems to be unlikely. Nevertherless this situation was considered in project documentation /12/ and the time for elimination of

such an accident was conventionally determined as 24 hours per year for each farm. Accordingly to the monitoring plan project emissions generated by fuel consumption in case of emergency will be calculated *ex-post* on the basis of actual amount of combusted diesel.

- calibration of monitoring equipment

Monitoring procedure contains list of metering equipment and template of registration log for calibration records. Periodicity of calibration is determined by reviewed standards and equipment manuals. Heat counters and gas flowmeters shall be calibrated once per 2 years (/37/,/32/). Used methodologies AMS III.D ver. 14 and AMS I.C ver.13 do not contain certain requirements to calibration periodicity

- maintenance of monitoring equipment and installations

Monitoring procedure states the responsibility for meters which shall be maintened accordingly to relevant manuals.

- monitoring, measurements and reporting

Monitoring procedure defines responsibility of operation staff for making measurments and recording of monitoring results of parameters prescribed by monitoring plan.

- day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)

The list of data to be registered during monitoring in Monitoring procedure corresponds to those in monitoring plan. Monitoring procedure envisage appointment of the senior operator, duty operator and chemistry analyst who are responsible for the gathering and handling of initial monitoring data.

- dealing with possible monitoring data adjustments and uncertainties.

Accordingly to monitoring procedure the project owner – Ukrainian Dairy Company shall allocate person who will be responsible for data handling, reporting and checking before they will be applied for emission reduction calculation. Monitoring procedure envisages crosschecking of all data inputed by hands against relevant records

- review of reported results/data

Review of reported data shall be performed by Project developer – EGIP wich is also responsible for monitoring report issuing.

- internal audits of GHG project compliance with operational requirements where applicable

Internal audits are not envisaged by monitoring procedure.

- project performance reviews before data is submitted for verification, internally or externally

As it was stated in monitoring manual project owner is responsible for all possible changes in project performance that may affect emission reduction calculation.

- corrective actions in order to provide for more accurate future monitoring and reporting

corrective actions are not applicable because internal audit procedure is not envisaged by Monitoring manual.

To ensure that the relevant procedures described in monitoring manual will be adopted and properly implied by project operator **CL 21 was transformed into FAR 26**.

The PP was informed about the risks: “It is the risk of the PP that the monitoring might be not verifiable due to wrong/ not sufficient MP and procedures.”

Two aspects related to auxiliary diesel consumption – consideration of CO2 emissions from diesel combustion in ER calculation and monitoring of volume of diesel consumed were discussed under **CAR 7.** The discussion of first issue related to ER calculation is presented bellow in the Chapter Emission Reduction Calculation. While discussing the monitoring of diesel consumption project proponent was requested to provide the details of diesel consumption metering system (types of meter, uncertainty, calibration) implied to determine diesel consumption by autonomous diesel generator used at the start up stage of biogas plant as the relevant information had not been included into monitoring plan and draft monitoring procedure.

It was clarified by proponent that diesel consumption of generator Magnum G400 VSA is estimated on the basis of diesel volume at fuel tank that is screened at the front panel of engine /78b/. Level sensor is not an object for calibration. The events of storage tank filling will be fixed in monitoring logbook and can be crosschecked against fuel purchasing receipts.

The monitoring system of diesel consumption by the autonomous diesel generator was found to be consistent.

Total amount of diesel consumption is reflected as single parameter in monitoring plan (P17)

Actual emissions from fossil fuel consumption will be calculated *ex-post* according to the monitoring results of operation in emergency state and amount of diesel fuel used.
Diesel consumption for the calculation of project emission is taken into account as required and CAR 7 was closed.

Under **CL 8** proponent was requested to specify national standards and regulations defining QA/QC procedures applicable to proposed monitoring. It was explained that QC procedure for most parameters included into the monitoring plan is defined by national standard of manure management /19/. That was confirmed by review of this document. Also the internal monitoring procedure /64/ developed by project owner for monitoring of emission reductions reflects authority/responsibility distribution along data processing from initial collection to final emission reduction report. CL 8 was transformed into FAR 26 : Adequacy and adoption of developed monitoring procedure shall be further checked during the first verification.

CL 20 was raised to get clarity in distribution of authority and responsibility between people involved in project implementation and monitoring. Monitoring procedure /64/ provided by proponent in responce to this CAR determines the personal responsibility of senior operator, operator on duty and laboratorial chemist for maintaining biogas plant and monitoring including maintanance of monitoring equipment, gathering, registration and archiving of initial monitoring data in hard copy and digital forms, collecting and transportation of samples to laboratories for tests, test results registration etc.
Calibration of meters shall be performed by the authorized entity - Ukrainian Center for Standardization and Metrology on the contract basis.
The certain personal responsibility for above mentioned monitoring functions shall be determined in relevant internal orders after adoption of monitoring manual and personal employers instructions shall contain respective provisions. This is a matter of checking at verification stage. This point was included in FAR 27 and CL20 was closed.

The client was informed about the potential risk for the periodic verification of emission reductions. It may occur that ERs will not be verifiable due to deficits in relevant procedures.

3.4 Calculation of GHG Emissions

Project activity includes change of manure management system from anaerobic lagoon to biogas plant (AMS III.D component) and displacement of electricity that would be imported from regional grid by heat and power generated by biogas running cogenerators (AMS I.C component). According to methodology project boundary attributable to AMS III.D shall comprise physical, geographical site(s) of the livestock and manure generation and management systems, and the facilities which recover and flare/combust or use. Specifically to the project it comprises the territory of farms including livestock handling places, manure transportation system, biogas plant, cogenerators, flares and final sludge storage reservoirs.

Project boundary attributable to AMS I.C encompasses the site of the project equipment producing the renewable energy (cogeneration units) and the all facilities consuming energy generated by the system and the processes or equipment that is affected by the project activity (own energy consumption by farms and biogas plants).

The methane emissions from anaerobic manure decaying in lagoons were determined as baseline emissions attributable to AMS III.D component and the CO2 emissions from combustion of fossil fuel at concluded to grid thermoelectric power stations used for generation of amount electricity which is equal to that generated by biogas plant.

Project GHG emission sources attributable to AMS III.D component are the following:

1/Physical leakage of biogas in the manure management systems including production, collection and transport of biogas to the cogeneration units or flares;

2/ Emissions from biogas flaring;

3/ Emissions from use of fossil fuels or electricity for the operation of all the installed facilities including emissions from electricity consumption during 60 days of biogas plants start-up period, auxiliary diesel consumption in case of emergency and diesel consumption by tractor basing pumps used for final sludge mixing to maintain aerobic conditions for its storage.

Project emissions attributable to AMS I.C component (renewable energy generation) assumed to be zero.

Leakages are not considered accordingly to both methodologies used.

AMS III.D baseline emissions were calculated as CO2 equivalent of methane emissions from anaerobic lagoons using GWP of methane equal to 21. Methane emissions were determined as livestock population multiplied by amount of volatile solid excreted with dairy cattle manure daily, amount of days when project is operated, maximum methane producing capacity for dairy cattle manure, methane conversion factor for anaerobic lagoons, methane density and correction factor for considering uncertainties.
Emissions were calculated assuming 100% fraction of dairy cattle manure handled using anaerobic lagoons and using default values obtained IPCC guidelines 2006 for maximum methane producing capacity (0.24 m3 CH4/kg dm), and methane conversion factor for uncovered anaerobic lagoon (0.66 considering annual average ambient temperature to be less than 10ºC as confirmed by data reported by central geophysical laboratory /26/) and default values for methane density (0.67 kg/m3) and correction factor of uncertainty (0.94) obtained from AMS III.D.
The value of volatile solid excreted with dairy cattle manure was calculated on the basis of Ukraine's national methodology published in National inventory report /22/ on the basis of ASH content and manure excretion rate.

Other assumptions used for ex-ante ER estimation were checked during desk review of documentation and confirmed with relevant evidence as reflected in table bellow:

Population farm #1	4,000 heads	project documentation for farm #1 /12/
Population farm #2	6,000 heads	information letter from project owner /15/ and project documentation for farm #2 /47/
dry matters content	5.90 %	obtained from physical and chemistry analysis performed by scientific and industrial laboratory of hygiene of animals and ecology of cattle breeding named A.K. Skorokhod'ko dd.24/04/2008 /29/
Ash content	0.1485 %	
Average annual temperature	<10	Data reported by central geophysical laboratory /26/
methane content in biogas	65.97%	Laboratory analysis of biogas content performed by lab of Ucrainian Institute of Gas dd. 02/06/09 /31/.

Baseline emissions from the AMS I.C component were estimated as amount of electricity that would be imported from grid multiplied by grid emission factor. Value of grid emission factor was obtained from the Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5, 02 February 2007) developed by Global Carbon B.V. /27/ approved by National DFP and validated by TUV SUD dd. 17/08/2007 /27/. This study contains the estimation of grid emission factor for Ukraine for 2006-2012 that is concluded to be 0.807 tCO2/MWh on the basis of reference was validated during site visit and found reliable.

Baseline emissions for displaced electricity from power distribution system is calculated with the method determined by AMS I.C and AMS I.D as kWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.
Project envisages production of heat on biomass running cogenerators and the baseline for heat production is determined as generation of equivalent amount of heat with electric heaters. The baseline emissions were determined as emissions from consumption of electricity from grid by electric heaters.
It was assumed conservatively the 20% of both power and heat production will be consumed for project own needs including heating of digesters, operation of mixers lighting etc. The wattage of auxiliary

electrical equipment installed at biogas plant at farm #1 is equal to 152.3 kW accordingly to project design/12/ that comprises of about 15.9% of power installed capacity of cogeneration units (995kW). Thus 20% of own power consumption was considered as conservative assumption.
As per AMS III.D version 14 the emission reduction shall be defined as the lowest value among difference between baseline and project emissions estimated ex-post and difference between CO2-equivalent of captured/destroyed/used gainfully methane and emissions from fossil fuel combustion to produce equivalent quantity of energy consumed. The calculations of emission reduction were grounded on the difference between baseline and project emissions. **CAR 12** was raised to justify the approach used for preliminary calculation of emission reduction. Answering this CAR proponent has clarified that the *ex-ante* approach was used for the prediction of emission reductions as the difference between baseline emissions and project emissions. According to the Monitoring Plan emission reductions will be calculated following the approach depicted by AMS III.D *ex-post.* The approach to ER was checked out by expert and fount consistent with methodology. Basing on his conclusion CAR 12 was closed.

CARs 15 and 16 were raised in order ensure of the sources and methodology used for the estimation of ash and dry matter content of manure, biogas content, efficiency of electric boilers and thermal demands of fermenters.
Lab test report dd. 18/04/2008 on the analysis of dry content, ASH, wet, organic solids, and other components in two samples of manure /29/ have been submitted to SGS. Original data of dry content and ASH are in compliance with those used in calculation of baseline emissions. During the discussion regarding CAR 15 it was further clarified that the manure testing periodicity once per year is sufficient to provide the representative estimation of manure content in view that cattle feed remains stable all year round that was confirmed by official Sanitary and Epidemic Conclusion /67/.
Answering CAR 16 project proponent provided the evidence confirming the Standardized method Intergovernmental Standard GOST 23781-87 *"Natural combustible gases. Chromatographic method for determination of component composition"* /81/ is used.
Uncertainty of testing method defined as gage repeatability and reproducibility accordingly to relevant standard method /81/ should not be more than 0.3%.
Technical details of project for farm #2 were confirmed by extract from Project design /47/ and description of biogas running cogenerator unit JMC-312 GS-B.L by equipment supplier /54/.
efficiency of electric heaters was confirmed with provided manufacturer's certificate /68/ The total power demand of digester including equipment operational demands and heating demands constitutes 274.480 kW per year pursuant to information provided by equipment supplier /63/. Provided evidence was found reliable and sufficient to confirm asuumptions used in Emission reduction calculation and CARs 15 and 16 were closed on the basis of expert opinion.

CAR 5 was raised to justify the flare efficiency that was assumed to be equal to 100% in ER calculation sheet. As a result of discussion PP applied 50% default value of flare efficiency that was in line with approved methodology AMS III.D ver. 14 then CAR 5 was closed.

CAR 7 to ensure that emissions from autonomous diesel generators and power consumption by biogas plant at the initial stages were considered as the project emissions and that the emissions from diesel inceneration will be monitored appropriately. The aspects related to monitoring were discussed above in Chapter 3.3. Discussing the auxiliary consumption of diesel and power import for the start up of biogas generation under CAR 7 proponent has clarified that starting mode for biogas plant presumes step-by-step putting into operation of fermenters. According to the official letter #282/1 of 09.10.09 from the equipment supplier /63/ electrical energy from the grid was used. In particular, consumption of electricity by engines of pumps and mixers was 33600 kWh for the period 60 days. Additionally for initial heating of fermenters consumption of electricity was 259200 kWh for the same period. Totally 292800 kWh of electricity from the grid was used to put into operation of biogas plant at farm #1 (Velykyi Krupil'). Value of electricity consumption from the gird for farm #2 constitutes 585600 kWh.
According to data from project documentation \18\ in emergency conditions it is envisaged that diesel generator should work. Generator at farm #1 will consume 0,413 t of diesel/day. Generator at farm #2 will use 0,681 t of diesel/day.
This data were checked against information provided by equipment supplier and found consistent. ER calculation was revised to consider diesel consumption as the source of emissions. Following the

discussion of diesel consumption monitoring was presented in chapter 3.3. of this report in details. After all issues were adressed CAR 7 was closed.

3.5 Environmental Impacts

In accordance with paragraph 33 (d) of the Guidelines for the implementation of Article 6 of the Kyoto Protocol /94/, an EIA should be performed in accordance with the requirements of the host country.

It was clarified during local assessment that EIA is required by National Law of Ukraine "On the Protection of Environment" dd. 25/06/1991 #1264-XII /44/. The official approval is required by Ukrainian National Law on State Environmental Expertise dd. 09/02/1995 No 45/95-BP /53/.

EIAs /18/ for projects proposed at both farms was developed as to meet relevant requirements of National Environment legislation of Ukraine. At the moment of the site visit the project documentations for both farms is being passed through State Expertise procedure as per interview with the PPs /int. 3/.

As part of getting State approvals for the proposed JI project, project participants have documented the environmental impacts of the project as part of the working project documentations for both farms.

Following adverse environmental effects caused by project are considered in EIA

- emissions from biogas combustion at both flare and cogenerators,
- emissions from diesel combustion which is used as emergency fuel,
- soils and ground waters pollutions.

Reviewed EIAs for both farms declared that all environmental requirements defined by national legislation shall be met.

The studies of dispersion of harmful substances emitted from sources placed on the territory of farms have been developed as required by law and included into EIAs/18/ /47/. According to these studies the concentration of pollutants including ash, nitrogen oxide, carbon monoxide and sulfur dioxide at boundaries of sanitary protective zone that covers area of 300 m outside each farm boundary as required by law will not exceed relevant established norms for ambient concentration. Therefore as stated in EIAs pollutant emissions into atmosphere from both farms are considered insignificant and their impact on the atmosphere is negligible even on local scale that was confirmed by relevant State Expertise Conclusions /48/ /75/. Thus there is no expectable transboundary impact from proposed activity.

At the moment of site visit project documentations for both farms is being passed through State Expertise procedure as per interview with PPs.

Preliminary State expertise conclusion for farm #1 /13/ was not positive and reflects some issues requiring further revision of project. Issues raised by State Expertise are not related with technical specification and environmental aspects of proposed project activity. At the time of site visit proponents informed that all issues raised by preliminary expertise had been addressed and the final approval was issued in August 2009.

Official approval of EIA for both parts of the project designed as separate projects as required by law was requested through **CAR 2**.

In the response proponent has provided official positive conclusion for farm #2 (Komarivka) approved by State Expertise 22/05/2009 /47/ and addendum to State Expertise Conclusion # 09V N 04-2120-14185 issued 31/08/2009 /75/ for farm #1 confirming the compliance to normative enactments after amendments requested by preliminary State Expertise.

Thus compliance of project to applicable regulations and laws regulating environmental impact was officially approved by State Expertise that was confirmed by relevant evidence and CAR 2 was closed.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

4.1 Description of how and when the PDD was made publicly available

SGS United Kingdom Ltd. published the project documents on UNFCCC website under <http://ji.unfccc.int/JI_Projects/DB/VG60RPWCLM3N0STAQSUC1GDXCHCB8I/PublicPDD/9OPMIKACANWW47N04TNT3RKGNO8DKF/view.html> and invited comments from 05/05/2009 to 03/06/2009 by Parties, stakeholders and accredited observers.

No comments were received.

4.2 Compilation of all comments received

No comment received

4.3 Explanation of how comments have been taken into account

Not applicable

5 DETERMINATION OPINION

Qualified determination opinion

SGS United Kingdom Ltd. has performed a determination of the JI project activity "Biogas utilization for generating of electricity and heat at the farms of Ukrainian Dairy Company Ltd.". The determination was performed on the basis of UNFCCC criteria and host country 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 SGS with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for JI and all relevant host country criteria with the exception of approval from both Parties involved which are Ukraine (host country) and Switzerland (investing party) CAR 1 remains open until LoAs from Parties involved are not available.

By changing of manure management system and displacing fossil fuel-based electricity with electricity generated from a renewable source emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the investment demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions i.e. 203,286 tCO_2e as total from 1st November 2009 to 31st December 2012 during JI 1st commitment period.

The determination has revealed that the project has not received approval of the Parties involved in the project activity. CAR 1 remains open. Two FARs were raised to ensure that monitoring procedures will be adopted before the start of the crediting period and persons will be defined with issuing of relevant order and employer manuals.

On the basis of these requests, this report provides the justification for the recommendation of a Qualified Determination Opinion.

The determination is based on the information made available to SGS and the engagement conditions detailed in the report. The determination has been performed using a risk based approach as described above.

SGS UK Ltd. cannot guarantee the accuracy or correctness of this information. Hence, SGS UK Ltd. can not be held liable by any party for decisions made or not made based on the determination opinion.

6 REFERENCES

Category 1 Documents:

/1a/ PDD Biogas utilization for generating of electricity and heat at the farms of Ukrainian Dairy Company Ltd. Version 01. dd. 18/02/2009

/1b/ PDD Version: 02. Date: 19/10/2009

/1c/ PDD Version: 03. Date: 23/11/2009

/1d/ PDD Version: 04. Date: 01/12/2009

/1e/ PDD Version: 05. Date: 12/01/2009

/1f/ PDD Version: 06. Date: 25/01/2010

/1g/ PDD Version: 07. Date: 27/01/2010

/1h/ PDD Version: 07. Date: 03/03/2010

/1i/ PDD Version: 07. Date: 15/06/2010

/2a/ ER calculation spread sheets Version: 01 Date: 19/10/2009

/2b/ ER calculation spread sheets Version: 02. Date: 22/11/2009

/2c/ ER calculation spread sheets Version: 03. Date: 03/12/2009

/2d/ ER calculation spread sheets Version: 04. Date: 29/12/2009

/2e/ ER calculation spread sheets Version: 05. Date: 27/01/2010

/3/ Investment analysis calculation spread sheets version 1. Date: 19/06/2009

/4/ Investment analysis calculation spread sheets version 2. Date: 19/10/2009

/5/ Investment analysis calculation spread sheets version 3. Date: 30/12/2009

/6/ Investment analysis calculation spread sheets version 4. Date: 27/01/2010

/6a/ Investment analysis calculation spread sheets Version 6. Date 26.04.2010

/7/ Not allocated (reserved for LoA Host Party)

/8/ Not allocated (reserved for LoA Sponsor Party)

/9/ Not allocated (reserved for MoC)

Category 2 Documents:

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/10/ DECREE No. 206 dated February 22, 2006 On Approval of the Procedure of Drafting, Review, Approval and Implementation of Projects Aimed at Reduction of Anthropogenic Emissions of Greenhouse Gases (title is restated by the Decree of the Cabinet of Ministers of Ukraine No. 718 dated August 20, 2008) As amended by the Decrees of the Cabinet of Ministers of Ukraine No. 392 dated April 17, 2008 and No. 718 dated August 20, 2008).
http://ji.unfccc.int/UserManagement/FileStorage/OVYPM9FQNK4D0GWUHI7X512RSETACZ

/11/ Letter of Endorsement issued by Ukrainian Ministry of Environmental Protection (original languish - Ukrainian) dd. 31/10/2008 No. 903/23/7

/11a/ translation into English of letter of Endorsement

/12/ The working project of biogas plant at Kiev region, Zgurovsky district, village Velyky Krupil, dairy farm, volume 1. Explanatory note 3-022-08-PZ developed by Zorg Ukraine 2008 y.

Project Feasibility Study Reconstruction with extension of dairy farm at Velikiy Krupil Zgurivskiy district, Kievskiy region 81-07PZ Explanatory note vol. 1.

/13/ State Expertise Conclusion 09V-04-2120-14185 dd. 13/04/2009

/14/ Agreement for cogeneration equipment purchasing between LLC Ukrbudinvest and LLC "Zorg Ukraine". #08022 dd.12/06/2008

/15/ 'The List of Data for JI project preparation' annex 1 to the agreement on PDD development between Ukrainian Dairy Company and Environmental Green Investment found #08/08-08 dd. 08/08/2008

/16/ General charts of both proposed farm#1 and farm #2 projects (annexes to working projects) that have been got acquainted on site. Copies have not being collected due to large size

/17/ National Electronic Registry of Anthropogenic Emissions and Absorption of Greenhouse Gases of Ukraine

http://www.carbonunitsregistry.gov.ua/

/18/ EIA for project realized at farm #1 (Veliky Krupil) developed as the separate value of project documentation 'Reconstruction with extension of existing dairy farm at village Velyky Krupil, Zgurivsky district, Kiev region' by institute "UkrNDIagroproject".

/19/ National construction standard: Technological Designing Departmental Regulations of Agro-Industrial Complex (ВНТП-АПК) 09.06 "Systems of manure removal, treatment, preparation and usage", Kyiv-2006, AIC Ukraine.

/20/ State Statistical observation form #24 is approved by order issued by State statistical body #173 dd. 03/06/2008

/21/ Note "On the information for GHG inventorying" #4809/10/3-5 dd. 24/04.07 issued by Ukrainian National Environmental protection ministry

/22/ Ukrainian National inventory report of GHG emissions and their absorption by sinks in 1990-2006 (project) Kiev 2008 http://menr.gov.ua/documents/Nac_zvit_p_parn_gazy_90-061.pdf

http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/x-zip-compressed/gbr_2008_nir_15apr.zip

/23/ Ukrainian Agricultural Sector on the way to European Integration: Monograph/ Authors: M. Betliy and others: edited by O.M. Borodina – Uzhgorod: IBA, 2006. – 496 p.

/24/ E.M. Rodina, Sh.A. Iliasov, Z.A. Abaykhanova. Usage of methane emissions from wastes for biogas production // Bulletin KRSU. – 2003. – No 6.

/25/ Construction norms and regulations 2.01.01-82 «Construction Climatology and Geophysics». Decree of the Gosstroy of the USSR of 21.7.82 #188. Published: Official edition, Ministry of Construction - M: GP CPP (ГП ЦПП), 1996.

/26/ Official note issued by national Hydrometeorology service #1-12/-2295/05-828 dd.18/11/2008

/27/ Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5, 02 February 2007) developed by Global Carbon B.V.

/28/ Report on the Study of biogas combustion system implementation approved by Director of Institute of Gas (Ukrainian National Academy of Science) dd. 2008

/29/ Protocol of physical and chemistry analysis performed by scientific and industrial laboratory of hygiene of animals and ecology of cattle breeding named A.K. Skorokhod'ko dd.24/04/2008

/30/ Equipment purchasing contract #022 dd. 06/02/2008 concluded between LLC "Ukrbudinvest" and LLC "Zorg-Ukraine"

/31/ Laboratory analysis of biogas content performed by lab of Ukrainian Institute of Gas dd. 02/06/09 /

/32/ Gas meter certificate type: RGK-EX date of manufacturing 19/06/2008

/33/ Informational note #773 dd.11/12/2008 issued by Ukrainian Dairy Company on power consumption in 2008 y.

/34/ Order #1440 dd.23/12/2008 issued by Ukrainian National Committee of Electricity Regulation "on power tariffs for 2009 y"

/35/ Resistance thermometers, model TR30 manual

/36/ pressure meters certificates

#ECO-1 45672 manufactured Nov.2008

#S-11 45669 manufactured Nov.2008

#IS-70-5 45676 manufactured Nov.2008

/37/ Heat counter "Supercom-01-SKS-3" technical description.

/38/ Certificate of compliance of UDC Quality management system to ISO 9001:2000 #SIC.02.008.220 dd.26/12/2008 valid till 25/11/2010

/39/ The declaration of intentions of farm extension at Veliky Krupil dd. 11/01/2008 issued by Ukrainian Dairy Company approved of head of local administration.

/40/ Decision #13 dd.07/02/2008 of Executive Committee of Veliky Krupil local administration on allowance to perform the reconstruction with extension of Dairy Farm.

/41/ Announce of biogas plant commission at Veliky Krupyl

http://www.abercade.ru/research/industrynews/577.html

/42/ Permit #12 to construction works start for farm at village Veliky Krupil issued by Kiev regional architectural and construction supervision body dd.15/07/2008

/43/ Permit #324-p to construction works start on the farm at village Komarivka issued by Chernigov regional architectural and construction supervision body dd.26/05/2009

/44/ Law of Ukraine "On the Protection of Environment" of 25.06.1991 #1264-XII,

/45/ Law of Ukraine "On Wastes" of 05.03.1998 #187/98-BP

/46/ Law of Ukraine "On Alternative Sources of Energy" of 20.02.2003 #555-IV.

/47/ Project documentation "Dairy farm for 6,000 cows (6600 cattle places) at Komarivka village, Borznyansly district, Chernigov region". Volume 2 EIA developed in 2008

/48/ Positive conclusion of State Construction Expertise on the project "Dairy farm for 6,000 cows (6600 cattle places) at Komarivka village, Borznyansly district, Chernigov region" #216-2008/181 dd.22/05/2008

/49/ Minutes of stakeholders meeting at Veliky Krupil local administration with participation of JSC UDC representatives dd. 17/01/2008

/50/ Minutes of JSC UDC participants meeting #23/07 dd. 27/12/2007

/51/ Law of Ukraine #113/98-VR dd. 11/02/1998 On metrology and metrological activity

/52/ Letter from Institute of Gas of National Academy of Science #97/10-496 dd.14/09/09 confirming the competency of laboratory testing the biogas content

/53/ Law of Ukraine on State Environmental Expertise dd. 09/02/1995 No 45/95-BP

/54/ Technical description of module JMC-312 GS-B.L
/55/ Act of the State Commission on the adoption of the completed construction object, Velykyi Krupil
/56/ Statement on putting into operation on rotor gas-meter RGK-Ex
/57/ Statement on putting into operation on electrical meter Siemens
/58/ Certificate on meter station of a generated heat (Supercom-01-SKS-3, SME "Techprilad")
/59/ Certificate on System of gas control
/60/ Statement on putting into operation on System of gas control
/61/ Installed gas control system photo
/62/ Engineering requirements on System of gas control (SGK-1)
/63/ Letter from Zorg company #282/1 from 09/09/2009
/64/ Monitoring instruction for "Biogas utilization for generating of electricity and heat at the farms of Ukrainian Dairy Company Ltd" project, draft
/64 a/ Monitoring procedure (translation into english)
/65/ Zorg business plan for Velyky Krupil farm
/66/ final sludge management procedure
/67/ Scientific conclusion made by the State Department "Institute of hygiene and medical ecology named after O.M. Marzeev of the Ukrainian Academy of Medical Sciences" #22.2/354 of 28 January 2008
/68/ Extract from technical documentation for Leo FB heater
/69/ "Tool for the demonstration and assessment of additionality", Version 05.2
/70/ Minutes and a summary of stakeholders comments for Farm 2 (Komarivka, Chernigiv region)
/71/ Letter from Zorg company #375 from 07/12/2009
/72/ Law of Ukraine "On enterprises profit taxation" #335/94 of 28.12.94, article 10

/73/ Print page #2 from National Bank website, http://www.bank.gov.ua/STATIST/DAILY/2009/Procentlastb_2009.htm
/74/ / Kotova M.V., Shapoval S.S. Grounding of the method of calculations the discount rate in domestic practice. – Economichny prostir. - 2009 r. №22/1, c. 92-98.
/75/ Positive conclusion from State Expertise, farm 1
/76/ The statement (act) of acceptance of completed construction of biogas plant with cogeneration module JMC-312 GSBL 01/09/2009
/77/ Letter from UDC #726
/78/ Technical description of diesel metering system /a/, photo /b/
/79/ Minutes of JSC UDC participants meeting #23/07 dd. 27/12/2007, ENGLISH
/80/ Letter from Zorg company #311 from 19/11/2009
/81/ Standard with description of methodology for biogas analysys
/82/ Law of Ukraine "On Waste"
/83/ Prices on scrap metal (residual cost) on the moment of investment decision
/84/ Gyunter L.I., Goldfarb L.L. Methantanks – Moscow, Stroyizdat, 1991 - 128p.
/85/ Doing business with Ukraine, Global market briefings. Third edition. Consultant editor Dr. Marat Terterov
/86/ "Instructions on laboratory monitoring of waste disposal plants at cattle-breeding complexes", M., "Kolos", Part I – 1982, Part II – 1983 and Part III – 1984.
/87/ E.M. Kigel. Exploitation of sewage disposal plants. K: "Budivel'nyk", 1978. – 143 p.
/88/ Research and treatment of waste water sludge/Tereschyuk A.I. – Lvov: Vyscha Sh. Izd-vo pry Lvov. un-te, 1988. – 148 p.

/89/ Commercial proposal for manure mixing system from GEA WestfaliaSurge GmbH
/90/ Key World Energy Statistics 2007, IEA
http://www.iea.org/textbase/nppdf/free/2007/Key_Stats_2007.pdf

/91/ Determination and Verification Manual (version 1) http://ji.unfccc.int/Ref/Documents/DVM.pdf
/92/ AMS III.D version 14
http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_73YN6I9YJNAT05U4J7TK9Y

OUH9W8ER

/93/ AMS I.C version 13

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_YL0327DQSKVFXYQREWRT3VNR58402G

/94/ Decision 9/CMP.1 Guidelines for the implementation of Article 6 of the Kyoto Protocol

http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2

/95/ Information on technical lifetime of equipment from regional equipment supplier Zorg company

/95a/ Translation of Ref 95 in English (Zorg letter trans.doc)

Persons interviewed:

/1/ Yuri Pyrozhenko – EGIP CCP expert

/2/ Marina Bereznitska – EGIP CCP expert

/3/ Arkady Travkov – Ukrainian Dairy Company, Chief Engineer

/4/ Victor Mironov – Ukrainian Construction Company (Ukrbudinvest)

/5/ Michael Zainer - GE Energy; Service Sales Manager; Jenbacher gas engines

/6/ Thomas Hofer - GE Energy; GE Power & Water

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APPENDIX 1: LOCAL ASSESSMENT

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
1. The LoA from Host Country	/10/ /11/	DR	According to the Ukrainian National procedure of JI project preparation /10/ in order to receive a letter of approval, an installation owner shall submit to the NEIA (national DFP) an application, determination report, project design documentation and accompanying documents. Therefore the letter of approval will be issued by focal point after determination report submission. The letter of Endorsement has been received on site /11/ on Ukrainian along with translation into English /11a/.	CAR 1 Pending 1/ Letter of approval;	
2. Check national systems for the estimation of greenhouse gas emissions by sources and removals by sinks	/17/	DR	Ukrainian register of Carbon Units is in working mode at the moment. The web site of Ukrainian registry of carbon units /17/ is available accordingly with reference on national DFP website.	ok	yes
3. The project details of biogas plant as described in PDD for farm #1 village Velyky Krupil	/15/ /16/	DR	Project layout, size and number of lagoons have been checked visually on site and on the projects charts reviewed in EGIP office (this charts cannot be collected on site as their copies are too large). Following data are confirmed documentarily: equipment — value — reference farm #1 at Veliky Krupil' The receiving reservoir — capacity is 765м^3, height – 3 m, inner width – 24 m). — /15/ /12/ fermenters (3 units) — inner diameter 24 m and inner height 6 m. using capacity 2400 м3, The fermenter operates under (temperature — /12/	ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			34-37°C). The hydraulic retention time for manure in a fermenter is 25-30 days. Open reservoir volume 64.99 m^3 /12/		
4. Technical specifications of cogenerators for farm #1 village Velyky Krupil	/12/ /13/ /14/	DR	Following parameters of biogas running cogeneration units installed at the farm #1 (Velikiy Krupil') have been checked and confirmed by Working project /12/, State Expertise conclusion /13/ and contract for equipment purchaising /14/ **COGENERATION UNIT (1) JMC 208 GS-B.L** ELECTRIC POWER, KW 330 /12//13/ HEATING CAPACITY, KW 395 /12//13/ GAS SPENDING NM^3/H 170 /12//13/ **COGENERATION UNIT (2) JMC 312 GS-B.L** ELECTRIC POWER, KW 625 /12/ /13/ /14/ HEATING CAPACITY, KW 686 /12/ /13/ /14/ GAS SPENDING NM^3/H 313 /13/ /14/ /16/	CAR 2 closed (positive final State expertise conclusion was provided) CL 3 PP is asked to provide the detailed controlling and measuring equipment description for all cogeneration units included in project. closed after review of certificates on monitoring equipment	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
5. The project details of biogas plant and Technical specifications of cogenerators as described in PDD for farm #2 situated at village Komarivka	/15/	DR	All technical details of proposed project activity implemented in farm #1 (Veliky Krupil') have been submitted by project owner (Ucrainian Doier Company Ltd) to JI project documentation developer (Environmental Green Investment found) in annex to agreement for JI project preparation /15/. Working Project for farm #2 (Komarivka) has already been developed and at the moment of site visit is passed through the architecture and construction expertise. Specification and technical details of biogas units proposed to be installed at Komarivka are contained in annex 1 to agreement between UDC and EGIF on PDD development #08/08-08 dd.08/08/2008 /15/.	CL4 PP is asked to provide the documentary evidences confirming technical details of project at Komarivka farm. closed documentation was provided	yes
6. The number, size and layout of lagoons The manure removing system	/16/ /12/ /19/	DR	Layout of project, numbers, construction and size of lagoons for both farms #1 (Veliky Krupil) and #2 (Komarivka) has been checked out against general charts developed and annexed to relevant Working Projects. Information reflected in PDD completely corresponds to those reflected at the charts annexed to working project. No inconsistency was visually observed at the sites. The lagoon design is in line with official requirements specified by National construction standard /19/. The water flush manure removing system is applied at the farm #1 (Veliky Krupil) in accordance with proposal issued by Terborg Agro company. Total volume of manure is proposed to be of about 400 m^3 per day (11780 m^3/year, including 4123 m^3/year – from existing farm and 7657 $м^3$/year) /12/. As per interview with PP / int.3/ the same manure removing system will be installed at the farm #2 (Komarivka).	ok	
7. The determination of baseline. Its	/19/	DR	There is the national standard /19/ regulating application	ok	Yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
compliance to applicable National regulations.			of lagoons for manure achieving and storing. This document contains official requirements for manure handling in lagoons ensuring anaerobic conditions during the time period not less then 6 months. Thus the application of anaerobic lagoons deemed to be usual practice of farm operation in Ukraine.		
8. Reliability of references and data sources are mentioned in PDD	/18/ /19/ /20/ /21/ /22/ /23/ /24/ /25/ /26/ /27/	DR	1/ State Statistical observation form #24 approved by order of State statistical body #173 dd. 03/06/2008 /20/ is referred in PDD as basic informational source for country specific data of cattle population. All farms obligated to submit this filled form with actual population data to State statistical service on the monthly, quarter and year basis. The data presented in PDD are obtained from the note issued by National Environmental protection ministry /21/ and National Inventory Report of anthropogenic emissions from sources and absorption by sinks of Ukraine for 1990 – 2006 dd. 2008 y /22/ 2/ Ukrainian Agricultural Sector on the way to European Integration: Monograph/ Authors: M. Betliy and others: edited by O.M. Borodina – Uzhgorod: IBA, 2006. – 496 p. The referred document was submitted on site. 3/ Key World Energy Statistics 2007, IEA proper link is http://www.iea.org/textbase/nppdf/free/2007/Key_Stats_2007.pdf 4/ and 10/ National Inventory Report of anthropogenic emissions from sources and absorption by sinks of Ukraine for 1990 – 2006 dd. 2008 y is available at UNFCCC website /22/. 5/Copy of Technological Designing Departmental Regulations of Agro-Industrial Complex (ВНТП-АПК) 09.06 “Systems of manure removal, treatment,	ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			preparation and usage", Kyiv-2006, AIC Ukraine was collected on site /19/. 6/ and 9/ http://tables.finance.ua/ru/credit_deposit/credit_nat/~/ua/usd/1/10000/1/3/6/12/1/1 - link is valid 7/Guidance on criteria for baseline setting and monitoring, version 01 (Joint Implementation Supervisory Committee) - available at the UNFCCC website. 8/ E.M. Rodina, Sh.A. Iliasov, Z.A. Abaykhanova. Usage of methane emissions from wastes for biogas production // Bulletin KRSU. – 2003. – No 6. referred article was submitted on site. Its hard copy is available on Russian /24/. Referred article does contain detailed description of biogas project at Dnepropetrovsky region and general description of manure management practice in Ukraine and biogas installations application as well consistent with those reflected in PDD. submitted 11/ Construction norms and regulations 2.01.01-82 «Construction Climatology and Geophysics». Decree of the Gosstroy of the USSR of 21.7.82 #188. Published: Official edition, Ministry of Construction - M: GP CPP (ГП ЦПП), 1996. /25/ This document contains official data of average annual temperature applicable for projecting and construction. Pursuant this document the average annual temperature in Kiev region is about 7.2 ^{0}C. Also the average annual temperature in both Kiev and Chernigov region is reflected in official note provided by national Hydrometeorology service /26/. The average value of 7.4^o C was reported for Chernigov region and 8.4^{0}C –for Kiev region for 2006 y. For the data set from 1990 to 2005 the average annual temperature in these regions was not less than 7.1^{o}C		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			12/ Model correction factor to account for model uncertainties as of 0.94 is obtained from AMS III.D. 13/ Study "Standardized emission factors for the Ukrainian electricity grid" (Version 5, 02 February 2007) developed by Global Carbon B.V. and validated by TUV SUD dd. 17/08/2007 /27/ was submitted on site. This study does contain the estimation of grid emission factor for Ukraine for 2006-2012 that is concluded to be 0.807 tCO2/MWh. Reference is relevant. 14/ -15/ EIA for project realized at farm #1 (Veliky Krupil) developed as the separate value of project documentation 'Reconstruction with extension of existing dairy farm at village Velyky Krupil, Zgurivsky district, Kiev region' has been submitted on site /18/.		
9. Assumptions used for GHG emission reduction calculation (se also Q 12)	/29/ /30/	DR	Emissions from biogas flaring are not considered as project emissions. As it was argued by PP 100% flaring efficiency is declared by technical study issued by Gas Institute /28/.	CAR 5 closed (50 % of flare efficiency was used)	yes
10. The applicability of methodology need to be checked properly for each item mentioned in the meth and get the assurance of what is given in PDD and site condition with documentary evidence.	/12/ /19/ /25/ /26/		*Applicability of AMS III.D* *1/ The livestock population in the farm is managed under confined conditions*; Heifers are confined inside the covered cow-sheds equipped of mechanical and water flush manure removing system. This was observed visually at the farm #1 Velyky Krupil. Calves are managed at open places constantly with separate manure removing system that is not related to project. *2/ Manure or the streams obtained after treatment are not discharged into natural water resources*; There is no water bodies around farm Veliky Krupyl. The	ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			direct manure discharge into water bodies is prohibited by law and don't considered in official standard procedure of dairy farm operation /19/. *3/ The annual average temperature of baseline site where anaerobic manure treatment facility is located is higher than 5 ℃*, The annual average temperature of baseline site is higher than 5 ℃ and values 7.4 and 8.4 ℃ for Chernigov and Kiev regions respectively as it was confirmed by official reports from Hydrometeorology service /25//26/. *4/ In the baseline scenario the retention time of manure waste in the anaerobic treatment system is greater than 1 month, and in case of anaerobic lagoons in the baseline, their depths are at least 1 m*; Technological Designing Departmental Regulations of Agro-Industrial Complex 09.06 "Systems of manure removal, treatment, preparation and usage" /19/ requires the manure storage in lagoons not less then 6 months. *5/ No methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario*. Anaerobic lagoons only proposed to be used for manure management in baseline that is in accordance with operation standard /19/. No methane recovery and utilization took place in previous practice of manure management in farm #1. *6/ The final sludge must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures (not resulting in methane emissions)*		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			must be ensured. Final sludge proposed to be handled in the same lagoons as the row manure in previous practice. Aerobic handling of final sludge and the absence of conditions for methane production shall be controlled by estimation of biological oxygen demand in 5 days (BOD). /int.1/. Regalement of lagoons operation should be further developed and used to gain a confidence that final sludge will be stored under aerobic conditions. *7/ Technical measures shall be used (including a flare for exigencies) to ensure that all biogas produced by the digester is used or flared*. Flaring is proposed to be used for biogas utilization in accordance with working project /12/. *Applicability criteria for AMS I.C.* 1/ *Cogeneration system may supply one of the following:* *(a) Electricity to a grid;* *(b) Electricity and/or thermal energy (steam or heat) for on-site consumption or for consumption by other facilities;* *(c) Combination of (a) and (b).* Onsite use of energy produced by cogeneration plant is envisaged by the project /12/. Total power demands of farm #1 (Veliky Krupil) after proposed extension are defined as 1100 kW in Working project of farm /12/. Project envisages installation of two cogenerators with total capacity of 955 KW of power capacity and thermal capacity of 1081 KW Thus all energy produced is likely to be consumed by	CAR #6 PP is asked to substantiate how aerobic conditions of final sludge will be ensured considering the final sludge will be stored in the same lagoons which had been used for row manure anaerobic storage before project. closed: mechanical mixing will be used.	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			farm. 2/ *For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal (see paragraph 5 for the applicable limits for cogeneration project activities).* *If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.* It is proposed to install two cogenerators of 955 KW of power capacity and thermal capacity of 1081 KW at farm #1 /12/ and 3 cogenerators with total power capacity of 1875 kW and 2058 kW		
11. project boundary need to be clearly demarcated	/12/	DR	For farm #1 project boundary covers emission sources related to biogas plant and lagoons operations as described in Project design /12/. The auxiliary diesel running power station is envisaged by Project documentation /12/. This station was not mentioned in PDD. Project Design documentation is not available for the farm #2 project.	CL 7 closed CL 4 closed	Yes
12. Assumptions used for emission reduction calculation both BE and PE:			assumption: / verified value: / supporting docs:		yes
Population farm #1	/12/	DR	4,000 / 3,800 / project of farm extension /12/	ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS			Draft Concl Local assessor	Final Concl Lead Assessor
Population farm #2	/15/	DR	6,000	6,000	data submitted from UDC /15/	ok	yes
Amount of manure excreted	/29/	DR	5.90	5.90	actually this value reflects the average dry matters content of manure in %% that were obtained from phisical and chemistry analysis performed by scientific and industrial laboratory of hygiene of animals and ecology of cattle breeding named A.K. Skorokhod'ko dd.24/04/2008 /29/	ok	yes
Ash content in the manure	/29/	DR	0.1485	0.1485	obtained from phisical and chemistry analysis performed by scientific and industrial laboratory of hygiene of animals and ecology of cattle breeding named A.K. Skorokhod'ko dd.24/04/2008 /29/	ok	yes
Volatile solid excretion	/22/	DR	5.0	5	Method is in line with those reported in National inventory report /22/	ok	yes
Maximum methane producing capacity		DR	0.24	0.24	IPCC guidelines 2006	ok	yes
Conversion factor		DR	0.67	0.67	IPCC guidelines 2006	ok	yes
Average annual temperature	/26/	DR	<10	7.4-8.4	Data reported by central geophysical laboratory /26/	ok	yes
MCF for uncovered anaerobic lagoon depending on temperature		DR	0.66	0.66	IPCC guidelines 2006	ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS			Draft Concl Local assessor	Final Concl Lead Assessor
MS fraction of manure handled using anaerobic lagoon system		DR	100%	100% of lacting cows with out calves	All lacting cows are managed under confined conditions. Calves are not considered.	ok	yes
Biogas content	/31/	DR	O2 N2 CH4 CO2 H2O	0% 2.46% 65.97% 29.61% 1.96%	Laboratory analysis of biogas content performed by lab of Ucrainian Institute of Gas dd. 02/06/09 /31/. To confirm the competency of laboratory the letter from GAS institute was submitted /52/.	CL 4 closed	yes
Correction factor	AMS III.D	DR	0.94	0.94	Data reflected in AMS III.D	ok	yes
Annual amount of electricity which will be displaced by the electrical energy produced in cogenerator for farm #1.	/12/	DR	7,640	7,640	this data were obtained supposing 955 MW /12/ of installed capacity working during 8,000 hours per year	ok	yes
Annual amount of electricity which will be displaced by the electrical energy produced in cogenerator for farm #2.	/47/	DR	12,624	N/A	Project documentation is requested	CL 4 closed	yes
own power consumption of biogas plant	/12/	DR	20%	16%	working project /12/ specify projects own consumption as of 152.3 kW that is comprise of about 15.9% of produced power (152.3/955*100%=15.94%) Thus 20% level of own consumption can be accepted as conservative.	ok	yes
Emission factor	/22/	DR	0.896	0.896	Study “Standardized emission factors for the Ukrainian electricity grid” (Version 5, 02 February 2007) developed by Global Carbon B.V. /22/	ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS			Draft Concl Local assessor	Final Concl Lead Assessor
Annual amount of electricity which will be displaced by the thermal energy produced in cogenerator (boilers heating) for farm #1	/12/	DR	8,647	8,647	this data were obtained supposing 1081 MW /12/ of installed thermal capacity of cogenerators working during 8000 hours per year	ok	yes
Annual amount of electricity which will be displaced by the thermal energy produced in cogenerator (boilers heating) for farm #2	/47/ /56/	DR	13,584	N/A	Project documentation is requested	CL 4 closed	yes
Portion of thermal energy produced consumed for own needs	/15/	DR	20%	N/A	thermal demands for fermentors and digesters heating were not specified in working project and only declared by UDC /15/	CAR 16 closed	yes
Coefficient of efficiency of electric heating unit		DR	0.68	N/A	documentary evidance to substantiate the electric boiler efficiency (certificates) were requested	CAR 16 closed	yes
13. Project implementation schedule, authority and responsibility distribution for project implementation	/14/ /30/ /42/ /43/		Project of biogas plant installation at the farm #1 (Veliky Krupil) is realized by general contractor LLC UkrBudInvest accordingly with contract #212 dd. 16/06/2008 /30/ Construction was officially allowed since 15/07/2008 /42/. The permit for project realization at farm #2 (Komarivka) was issued 26/05/2009. The subcontractor and equipment supplier is LLC Zorg Ukraine acting in accordance with contract #08022 /14/ Contracts for project realization at farm #2 had not been concluded at the time of site visit. Detailed project implementation schedule is requested.			CAR 11 closed	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
14. In case project is partially under implementation then for the implemented part get confirmation that meth is correctly applied in case it is a proposed project, to be on safer side, from the detailed project report and from management documentary evidence has to be collected	/12/		The description of project implementation at the farm #1 given in PDD is in line with working project /12/. (see above for details). The documentary evidence for proposed project activity at the farm #2 have been requested	CL 4 closed Farm #2 project documentation was provided	yes
15. Check for all the non-monitoring and monitoring parameters and is correctly incorporated in the PDD. Check for the monitoring plan which need to be elaborative to get a confirmation that QA/QC will be met, monitoring frequency will be followed at traceability of data will be in place.	/12/	DR	Detailed monitoring procedure will be elaborated shortly and submitted to SGS as per information from PP /int. 2/. Project design /12/ includes autonomous power production at diesel power station (installed capacity of 120 kW) for auxiliary consumption. GHG emissions from diesel combustion by power generator are not considered in Monitoring Plan.	CL 8 closed CAR 7 closed	yes
16. Have conservative assumptions been used to calculate project GHG emissions?	/28/	DR	Sources for all assumptions used for ER calculation please see Q13. The conservativeness of the flaring efficiency assumption is not clear 1/ Emissions from biogas flaring assumed to be zero on the basis of the Study of biogas combustion system … /28/. Referred report does contain the statement that the biogas going to flaring is completely combusted (100% effectiveness). But at the same time report reflects the nonzero concentration of carbohydrates in exhaust gases.	CAR 5 closed	yes
17. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/32/ /35/ /36/ /37/	DR	1/ gas flow meter RGK-Ex (applied both for gas consumption on cogenerators and flare) consequent calibration –after 2 years; initial calibration 16.12.2008, uncertainty -1.06% /32/ 2/ thermometer TR30 (Manufacturer WIKA GmbH)– Uncertainty -0.5%-1.0%; Sensors were calibrated before	CL 9 closed	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS			Draft Concl Local assessor	Final Concl Lead Assessor
			installation as confirmed by certificate /35/. 3/ manometer EC0-1, S-11, IS-70-5 uncertainty 0.5-1% /36/ 3/ power meter – characteristics are pending. 4/ heat counter Supercom 01-SKS-3 the uncertainty level – 2, consequent calibration after two years /37/.				
18. Potential leakage effects beyond the chosen project boundaries. The equipments being installed in the project activity will be verified if they have been purchased new or transferred from somewhere.	/14/ /30/	DR	Installed equipment is new as it is established by contract between general contractor LLC UkrBudInvest and equipment supplier – LLC "Zorg Ukrain" /14/ /30/. There is no other source of unconsidered leakage effect found.			ok	yes
19. Check the assumptions used for investment analysis		DR	assumption:	verified value:	supporting docs:		
• Project costs, EUR	/15/		7,560,000	7,560,000 EUR	/15/	ok	yes
• Operational costs, EUR/year	/15/		105,000	105,000	/15/	ok	yes
• Displacement of electricity EUR	/33/ /34/		929,000	n/a	/12/, /33/, /34/	CAR 10 closed assumption of electricity prices was reconsidered	finally 1880587 €
• Implied discounting coefficient			10.0%	N/A	N/A	CAR 24 closed	finally revised to 16.1 %
• bank interest rate in national currency			23%	N/A	N/A	CAR 24 closed	yes
• bank interest rate in EUR			16%	N/A	N/A	CAR 24 closed	yes
20. Check the environmental monitoring system (procedures)	/19/	DR	The Environmental monitoring system is completely described in national standard of manure management /19/. It includes: surface and ground waters monitoring,			ok	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			and soil fertilization (dose of manure or final flush used for soil fertilization).		
21. Training of operational personnel (procedures)	/14/ /14a/	DR	Personnel training shall be performed by equipment supplier (Zorg – Ukraine) in accordance with paragraph #7.1.6. of contract for biogas plant /14a and paragraph #1.2 for cogeneration unit.	ok	yes
22. Emergency preparedness	/12/ /19/	DR	General requirements for emergency preparedness are defined by national standard regulating manure management /19/.	ok	yes
23. calibration of monitoring equipment	/32/, /35/, /36/, /37/	DR	procedures is defined by equipment manuals /32/, /35/, /36/, /37/	ok	yes
24. maintenance of monitoring equipment and installations	/32/, /35/, /36/, /37/	DR int.	procedures is defined by equipment manuals /32/, /35/, /36/, /37/	ok	yes
25. monitoring, measurements and reporting		DR	procedure has not been developed yet	Cl 21 transformed to FAR 26	FAR 27
26. day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)		DR	procedure has not been developed yet	Cl 21 transformed to FAR 26	FAR 27
27. possible monitoring data adjustments and uncertainties; review of reported results/data		DR	procedure has not been developed yet	Cl 21 transformed to FAR 26	FAR 27
28. internal audits of GHG project compliance with operational requirements where applicable	/38/	DR	Internal audits is integrated part of the Quality Management System that has been certified at Ukrainian Dairy Company 2008 y /38/	Cl 21 transformed to FAR 26	FAR 27
29. project performance reviews before data is submitted for verification, internally or externally		DR	procedure has not been developed yet	Cl 21 transformed to FAR 26	FAR 27

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
30. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/18/ /47/	DR	EIAs for project realized at farm #1 (Veliky Krupil) and farm #2 (Komarivka) have been developed as the parts of relevant project documentations - /18/ and /47/ respectively. In accordance with national procedure of environmental impact assessment there are following impacts considered in the both EIAs : • emissions from biogas combustion at both flare and cogenerators, • emissions from diesel combustion which is used as emergency fuel, • soils and ground waters pollutions, The reduction of methane, hydrogen sulfide and ammonia emissions due to biogas utilization on biogas plant are proposed by the project. Thus it was concluded that total emissions will not exceed established norms for emissions before reconstruction. The EIA for Velyky Krupil was considered by State Expertise among other project documentation. Its official conclusion did not indicate any discrepancies with normative requirements /13/. The EIA for biogas plant at the farm #2 (Komarivka) shall be approved by State Expertise conclusion (positive) /48/.	ok	yes
31. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/18/ /47/ /53/ /int. 3/	DR int.	EIAs /18/ were developed as to meet relevant requirements of National Environment legislation of Ukraine. At the moment of site visit project documentations for both farms is being passed through State Expertise procedure as per interview with PPs /int. 3/. The official approval is required by National Law on State	Pending positive State Expertise conclusion CAR 2 closed (state expertise conclusion	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			Environmental Expertise dd. 09/02/1995 No 45/95-BP /53/	was provided)	
32. Will the project create any adverse environmental effects? Does the project comply with environmental legislation in the host country?	/18/	DR	Following adverse environmental effects caused by project are considered in EIA • emissions from biogas combustion at both flare and cogenerators, • emissions from diesel combustion which is used as emergency fuel, • soils and ground waters pollutions, EIA declares that all environmental requirements of above mentioned issues shall be met. It shall be confirmed by State Expertise conclusion.	CAR 2 closed	yes
33. Are transboundary environmental impacts considered in the analysis?	/18/ /47/	DR	The study of spread of harmful substances emitted from sources placed on the territory of farms has been developed as required by law and included into EIAs/18/ /47/. Accordingly with this study the concentration of harmful substances on the boundary of Sanitary protective zone shall not exceed established norms. Therefore somewhat transboundary impact is actually impossible.	ok	yes
34. Have identified environmental impacts been addressed in the project design?	/18/ /47/	DR	Environmental Impact assessment /18/ /47/ was performed as the part of project design.	ok	yes
35. Have relevant stakeholders been consulted?	/39/ /40/ /49/	DR	Farm #1 (Veliky Krupil) Declaration of intentions containing project description dd. 11/01/2008 was submitted for discussion to local administration /39/. Project was considered by local administration with participation of public representatives 17/01/2008 /49/. Executive committee of administration was issued the positive decision /40/ dd. 07/02/2008 on allowance of projecting works and land allocation.	CAR 22 closed	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
			Farm #2 relevant information was requested.		
36. Does the project design engineering reflect current good practices? Does the project 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?	/41/	DR	As per information reflected in open Internet sources /41/ http://www.abercade.ru/research/industrynews/577.html this project propose the new technology for Ukraine and is deemed a pilot project for alternative fuel utilization. More over the manure processing capacity of about 400 tonnes per day is one of biggest project for Ukraine and Europe.	ok	yes
37. Documentary evidence for the start date of the project.	/42/	DR	As per PDD the starting date of the building and assembly works at Farm 1: 05.07.2008. But the permit for construction works was issued on 15/07/2008 /42/.	CAR 11 Starting date as reflected in PDD should be justified. closed after revision of PDD	yes
38. Check the common practice	/24/	DR	Common practice of biogas usage is described in the relevant analytic review /24/ presented by PP on site. The largest biogas project was described in PDD – it is biogas plant in Dnepropetrovsky region with total capacity of 80 tonnes of manure per day. All Ukrainian biogas projects are financed by foreign investors.	ok	yes
39. Comments raised by methodological expert: *Based on the PDD furnished, I understand Farm 1 is implemented and Farm 2 is in process of implementation. Please check thoroughly on animal count, the Bo values (its reference of calculation as well), technology applied. Please check as per AMS III.D the basic requirement of the methodology. Confirm temp is more than 5 oC and applicability*	/12/ /15/ /22/ /25/ /26/	DR	Population livestock data were checked against project design /12/ for farm #1 and confirmed by official note /15/ for farm #2. B_o value is confirmed by National inventory report /22/. Technical description of project given in PDD was checked against the project design /12/ and found consistent. Applicability criteria of AMS III.D were discussed above (see Q 10).	CAR 12 At the start up stage of biogas plant power from autonomous diesel generator was used for project own needs. GHG emissions from diesel generator envisaged by Project Design shall be considered	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
of meth. The anaerobic treatment require temp in the range of 35to 37 degree. Confirm how client is going to meet this in the fermentor during the project start up and during regular operation of the plant.			Average temperature in region is more than 5º as per review of historical data presented by national Meteorology agency /25/, /26/ As per project design /12/ the anaerobic conditions (mesophilous – 34-37ºC) in digesters are proposed to be ensured with heating system that is incorporated into walls and bottom of digesters and uses energy produced by cogenerators. At the start up stage of biogas plant power from autonomous diesel generator was used for digester heating.	as project emissions (this source is directly related to project activity). closed diesel consumption was considered	
40. *During days gas is not used for power generation, how they are going to check of volume of gas flared. Purity of gas also need to be confirmed from PP wrt the claims made in PDD.*	/31/		With out cogeneration biogas proposed to be flared. But flowmeter had not been installed at the flare at Veliky Krupil (farm #1) by the time of site visit. The gas quality was estimated with gas chromatograph that is confirmed by relevant protocol of lab analysis performed by Gas Institute of Ukraine 02/06/2009 /31/.	CAR 13 Gas metering system has not been installed to measure the volume of gas going to flare. The method and source for estimation of emissions from biogas flaring for the period since biogas production start should be justified. closed after installation statement was submitted	yes
41. *How far is the project activity and fermentor in particular from the farm land? Check if they have a storage tank to hold the manure coming from the farm land. From the PDD it appears that manure from the farm land is directly charged into reactor – this may not be true and is not*	/12/		As per the project documentation /12/ (as well as visual observation at the farm #1) biogas plant is situated at the territory of farm. There is a preliminary storage reservoir to homogenize and store the manure before entering into the digester.	CAR 14 Please update the PDD with the technical description of preliminary storage reservoir closed PDD was	yes

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
possible in real sense.				updated	
42. *I see no aerobic treatment in the project and hence understand manure will applied to land. This need to be confirmed and ensure no methane generation on application of manure on land. It is should be in line with the meth. However the diagram on page 10 of PDD shows open reservoir. Please check up what for it is.*	/12/		Review of the project design /12/ showed that final flush after digesters proposed to be stored in the open reservoirs that previously were used as anaerobic lagoons. As per interview with PPs /int. 3/ the aerobic conditions will be ensured by chemical analysis of substrata (concentration of BOD). Solids from reservoir proposed to be used as fertilizers.	CAR 6 closed	yes
43. *What the PP is going to do with the anaerobic open lagoon. How they will ensure that nothing is put into it. What about the existing manure in the anaerobic lagoon?*	/int. 3/		Existing open lagoons proposed to be used for storage of final flush from biogas digesters. As per interview with farm owners /int.3/ lagoons shall be fully emptied before final flush will be charged to them.	CAR 6 closed	yes
44. *Check for all monitoring and non monitoring parameters are correctly used in PDD. For those parameters not be monitored and claimed by PP re-confirm its correctness.*			All parameters are described have been checked and found consistent with exception of 1/diesel used at autonomous power generator 2/ amount of flared biogas Please see Q12 for details.	CAR 7 , 13 closed	yes
45. *Schematically monitoring plan is given, try to get it on how and who will do what work in write up for better understanding. Ensure persons involved in project activity are trained for regular monitoring and testing works. There is no clarity from the diagram on where the authorized persons will be placed and how they will ensure quality reporting.*			Detailed monitoring procedure has not been developed yet. It was requested from PP.	CAR 21 transformed to FAR 27	FAR 27

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl Local assessor	Final Concl Lead Assessor
46. *Please get it confirmed if it was mandatory for PP to go for the project activity? Please also check on the statement in PDD: The project complies with requirements of the current regulatory legal acts in the area of environmental protection (the Law of Ukraine "On the Protection of Environment" of 25.06.1991 #1264-XII, the Law of Ukraine "On Wastes" of 05.03.1998 #187/98-BP and the Law of Ukraine "On Alternative Sources of Energy" of 20.02.2003 #555-IV).*	/44/, /45/, /46/		the Ukrainian Laws "On the Protection of Environment" dd. 25.06.1991 #1264-XII /44/, "On Wastes" of 05.03.1998 /45/ #187/98-BP and "On Alternative Sources of Energy" of 20.02.2003 #555-IV /46/ were reviewed. There were no obligations regarding compulsory implementation of proposed project activity,	ok	yes

MoV: DR = Desk review, Int. = interview

Appendix 2 Determination Protocol

Table 1 Participation Requirements for Joint Implementation (JI) Project Activities

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
1. The project shall have the approval of the Parties involved	DR	Kyoto Protocol Article 6.1 (a) /10/ /11/ /11a/	According to the Ukrainian National procedure of JI project preparation /10/ in order to receive a letter of approval, an installation owner shall submit to the NEIA (national DFP) an application, determination report, project design documentation and accompanying documents. Therefore the letter of approval will be issued by focal point after determination report submission. The letter of Endorsement has been received on site /11/ on Ukrainian along with translation into English /11a/.	CAR 1 open	Pendin g LoAs
2. Emission reductions, or an enhancement of removal by sinks, shall be additional to any that would otherwise occur	DR	Kyoto Protocol Article 6.1 (b)	See table 3 below: additionality assessment	y	y
3. The sponsor Party shall not aquire emission reduction units if it is not in compliance with its obligations under	DR	Kyoto Protocol Article 6.1 (c)	No information available yet if the sponsor Party is in compliance with its	pending	y

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
Articles 5 & 7			obligations under Articles 5 & 7. DFP sponsor Party: **Federal Office for the Environment (FOEN)** **Climate Unit, Swissflex** CH-3003 Berne Switzerland **Mr. Yvan Keckeis** Phone: +41 31 324 7184 Fax: +41 31 323 0367 Email: swissflex@bafu.admin.ch The Federal Office for the Environment (FOEN) is the responsible Office for the implementation of the Kyoto Protocol's legal requirements in Switzerland. For the flexible mechanisms, a national Secretariat called Swissflex has been established within the Climate Unit of the FOEN. Activities relating to the implementation of the flexible mechanisms as well as the examination and approval of project proposals are coordinated by an inter-departmental working group called IDA-Swissflex.		

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
			Besides FOEN, the members of this group are drawn from the Swiss Federal Office of Energy (SFOE), the State Secretariat for Economic Affairs (seco) and the Swiss Agency for Development and Co-operation (SDC). The national Secretariat represents the Swiss Designated National Authority (DNA) under the Clean Development Mechanism (CDM) as well as the Designated Focal Point (DFP) under Joint Implementation (JI).		
4. The acquisition of emission reduction units shall be supplemental to domestic actions for the purpose of meeting commitments under Article 3	DR	Kyoto Protocol Article 6.1 (d)	pending CARs and CLs closure (table 3 below)	closed	y
5. Parties participating in JI shall designate national focal points for approving JI projects and have in place national guidelines and procedures for the approval of JI projects	DR	Marrakech Accords, JI Modalities, §20 The Ukrainian National Environmental Investment Agency website	Ukraine national designated focal point is National Environmental Investment Agency of Ukraine as reflected at UNFCCC website. National procedure for JI projects approval is DECREE No. 206 dated 22/02/2006.	y	y

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
		http://ji.unfccc.int/UserManagement/FileStorage/OVYPM9FQNK4D0GWUHI7X512RSETACZ	'On Approval of the Procedure of Drafting, Review, Approval and Implementation of Projects Aimed at Reduction of Anthropogenic Emissions of Greenhouse Gases' available at http://ji.unfccc.int/UserManagement/FileStorage/OVYPM9FQNK4D0GWUHI7X512RSETACZ For Switzerland see Point 3 above.		
6. The host Party shall be a Party to the Kyoto Protocol	DR	Marrakech Accords, JI Modalities, §21(a)/24 http://unfccc.int/parties_and_observers/parties/items/2225.php	Ukraine has ratified the Kyoto Protocol on 12 April 2004 Source: http://unfccc.int/parties_and_observers/parties/items/2225.php	y	Y
7. The host Party's assigned amount shall have been calculated and recorded in accordance with the modalities for the accounting of assigned amounts	DR	http://www.carbonunitsregistry.gov.ua/en/publication/content/671.htm	National Electronic Registry of Anthropogenic Emissions and Absorption of Greenhouse Gases of Ukraine is at place and available at http://www.carbonunitsregistry.gov.ua/en/publication/content/671.htm National registry was	y	Y

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
			adopted by Governmental decree # 28/05/2008 N 504 On forming and maintenance of National Electronic registry of anthropogenic emissions and adsorptions of GHG.		
8. The host Party shall have in place a national registry in accordance with Article 7, paragraph 4	DR	Marrakech Accords, JI Modalities, §21(d)/24	National registry is at place (see above)	y	Y
9. The project design document shall be made publicly available and Parties, stakeholders and UNFCCC accredited observers shall be invited to, within 30 days, provide comments	DR	http://ji.unfccc.int/JI_Projects/DeterAndVerif/Verification/PDD/index.html	The PDD has been made publicly available on the UNFCCC JI website under <http://ji.unfccc.int/JI_Projects/DeterAndVerif/Verification/PDD/index.html> from 05 May 2009 to 03 June 2009 and comments have been invited through the Climate-L mailing list The project specific information is available under http://ji.unfccc.int/JI_Projects/DB/VG60RPWCLM3N0STAQSUC1GDXCHCB8I/PublicPDD/9OPMIKACANWW47N04TNT3RKGNO8DKF/view.html	y	y
10. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, in accordance with procedures as	DR	Marrakech Accords, JI Modalities, §33(d)	Documents on Environmental effects from both parts of the project were submitted to validator	CAR 2 closed	y

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
determined by the host Party 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		/47/ /75/	and checked out during site visit (Q33-37) CAR 2 The official approval is required by National Law on State Environmental Expertise dd. 09/02/1995 No 45/95-BP The EIA for farm #2 (Komarivka) was approved by State Expertise 22/05/2009 /47/ . Project implementation at farm #2 was confirmed by addendum to State Expertise Conclusion # 09V N 04-2120-14185 issued 31/08/2009 /75/.		
11. The baseline for a JI project shall be the scenario that reasonably represents the GHG emissions or removal by sources that would occur in absence of the proposed project	DR	Marrakech Accords, JI Modalities, Appendix B	pending CARs and CLs closure	closed	Y
12. 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	DR	Marrakech Accords, JI Modalities, Appendix B /19/	CAR 18 Two separate baselines were established for each I.C and III.D component. Baseline description was revised. Baseline was established considering national polices and laws (see local check list Q7) application of anaerobic lagoons is usual	CAR 18 closed	Y

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
			practice of farm operation in Ukraine as confirmed by review of relevant national standard /19/		
13. The baseline methodology shall exclude to earn ERUs for decreases in activity levels outside the project activity or due to force majeure	DR	Marrakech Accords, JI Modalities Appendix B	No indication that project is claiming to earn ERUs for decreases in activity levels outside the project boundary or due to force majeure.	y	Y
14. The project shall have an appropriate monitoring plan	DR	Marrakech Accords, JI Modalities, §33(c)	Please see table 5 Pending closure of CAR and CLs ## 3, 8, 9, 13, 20, 21.	closed	Y
15. Does the PDD use accurate and reliable information that can be verified in an objective manner?	DR	/43/ /47/ /48/ /54/	Referred docs used in PDD were checked on site (Q 8). **CL4** Please provide the documentary evidences confirming technical details of project at Komarivka farm (approved Explanatory note of Project Design). project details at farm 2 were confirmed by Feasibility Stady and cogenerators. **CAR 14** Please update the PDD with the technical description of preliminary	CL 4 closed CAR 14 closed	y

REQUIREMENT	MoV	Ref	Comment	Draft finding	Concl
			storage reservoir. PDD was updated.		
16. Will the project result in fewer GHG emissions than the baseline scenario?	DR	PDD /1/	Yes project envisages reduction of GHG emissions in two ways – by avoidance of methane emissions from anaerobic lagoons and by substitution of electricity consumed from power grid.	y	y

2 BASELINE METHODOLOGY(IES)

Flow chart	Answer	Next step
Does the project use an CDM approved baseline methodology	Yes	Complete table 2A
	No	Complete table 2B

Table 2A Application of approved methodology

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
1.					
2.1 Does the project meet all the applicability criteria listed in the methodology	/89/ /92/ /93/	DR	Yes. Applicability criteria for AMS III.D were checked ,see local check list Question 10 **CAR 6** PP is asked to substantiate how aerobic	CAR 6 closed CAR 17	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			conditions of final sludge will be ensured considering the final sludge will be stored in the lagoons which initially had been designed as anaerobic. Mechanical mixing is proposed to be used to avoid the anaerobic decay of final sludge. Effectiveness of mechanical mixing is confirmed by equipment supplier /89/. **CAR 17** Estimated total emission reduction is 76375 t CO2 for 2010 -2012. Please justify why SSMs are used. There are two different components of project – abatement of methane emissions from anaerobic lagoons (III.D component) and substitution of electricity from grid (I.C component). Annual emission reduction caused by AMS III.D component is less than 60,000 ton and total installed capacity of AMS I.C component is less than 15 MW.	closed	
2.2 Is the project boundary consistent with the approved methodology	/12/	DR	Yes Project boundary was checked on site. Local check list Question 11. **CL 7** Application of diesel running power station included in project design of farm extension /12/ and its technical parameters should be further specified. GHG emissions from diesel generator envisaged by Project Design were considered as project emissions. ERs were revised.	CL 7 closed	y
2.3 Are the baseline emissions determined in accordance with the methodology described	/29/ /92/	DR	Yes Baseline emissions are determined using formulae of methodology AMS III.D. The	CAR 15 closed	Y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			approach used for volatile solid calculation is taken from Ukraine's National Inventory Report on GHG emissions and absorption for 1990-2006. Full text is available in Russian at UNFCCC web site: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php **CAR 18** Two baselines - for III.D component and for I.C component were defined in PDD. PP was asked to justify why united baseline comprising two emission sources could not be applied? PDD was revised and the single baseline was applied. **CAR 15** PP was requested to provide the report of lab tests used for identification values of a dry matter fraction in manure and ash fraction performed in April 2008 along with lab certificate. It is explained that feed ration remains unchanged and livestock is handled in the constant conditions all year round. It is acceptable that manure characteristics will also be constant. Lab test report dd. 18/04/2008 on the analysis of dry content, ASH, wet, organic solids, and other components in two samples of manure /29/ has been submitted to SGS. Original data of dry content and ASH are in compliance with those used in calculation of baseline emissions.	CAR 18 closed	
2.4 Are the project emissions determined in accordance with	/28/	DR	Yes	CAR5	Y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
the methodology described	/12/ /92/		The formulae used for project emission calculation is in line with AMC III.D. and I.C **CAR 5** Emissions from biogas flaring assumed to be zero (100% efficiency) on the basis of the Study of biogas combustion system /28/ performed by Ukrainian institute of gas in 2008 and therefore not considered in project emission calculation instead of 50% as defined by AMS III.D. ER calculation was revised assuming 50% of flare efficiency. **CL 7** Autonomous diesel generator was used for project own needs at the initial stage of biogas plant operation /12/. GHG emissions from diesel generator envisaged by Project Design was considered in ER calculation as additional project emission source.	closed CL 7 closed	
2.5 Is the leakage of the project activity determined in accordance with the methodology described	/92/ /93/	DR	Yes both small scale methodologies used AMS III.D and AMS I.C do not require consideration of leakages .	y	Y
2.6 Are the emission reductions determined in accordance with the methodology described	/92/	DR	Yes **CAR 12** As per the methodology the emission reduction shall be defined as the lowest value among difference between baseline and project emissions estimated ex-post and difference between CO2-equivalent of captured/destroyed/used gainfully methane and	CAR 12 closed	Y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			emissions from fossil fuel combustion to produce equivalent quantity of energy consumed. But ER calculations in excel sheet are based on the difference between baseline and project emissions. Please justify that this value is less than difference between CO2-equivalent of methane captured and fossil fuel combustion related emissions caused by heat and power energy consumption by project equipment. Ex-ante calculation used for the prediction of PE of emission reductions is in line with meth. However, as per the meth the emissions during monitoring phase have to be taken ex-post as is reflected in the Monitoring Plan.		
2.7 Has the methodology been applied exactly as defined including formulas and the application of the formulas to calculate emissions and emission reductions	/92/ /93/ /18/ /63/ /76/	DR	Yes, ER from both III.D and I.C components of project are calculated accordinglto relevant methodologies. Pending **CAR 5**, **CAR 7** and **CAR 12** closure.	CARs 5, 7, 12 closed	Y
2.8 Are all the data sources clear and are references to documents publicly available and cited fully in the PDD	/29/ /81/ /58/ /54/ /68/ /63/	DR	Yes. Referred docs used in PDD were checked on site (local check list Q 8). **CAR 15** lab tests of dry matter fraction in manure (f_d) and ash fraction (ASH) were requested. confirmed with report /29/. **CAR 16** following evidence were requested: 1/ <u>methodology of biogas content lab testing</u> Standardized chromatographic method	CAR 15 and CAR 16 closed	Y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			Intergovernmental Standard GOST 23781-87 *"Natural combustible gases. Chromatographic method for determination of component composition"* /81/ is used 2/ Project details for farm #2 Described in PDD technical details of project at farm #2 are confirmed by extract from Project design /58/ and Technical description of biogas running cogenerator unit JMC-312 GS-B.L /54/. 3/ efficiency electric boiler for water heating. Technical details of electric heaters used are confirmed with provided manufacturer's certificate /68/. 4/ thermal demands of fermenters and digesters Total power demand of digester including equipment operational demands and heating demands constitutes 274.480 kW per year pursuant to injury provided by equipment supplier /63/.		

~~**Table 2B Baseline methodology not using an approved CDM methodology**~~

~~CHECKLIST QUESTION~~	~~Ref.~~	~~MoV*~~	~~COMMENTS~~	~~Draft Concl.~~	~~Final Concl.~~

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
1. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
1.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
1.1.1. Is the discussion and selection of the baseline methodology transparent?					
1.1.2. Are all aspects related to direct and indirect GHG emissions captured in the project design?					
1.1.3. Does the baseline methodology specify data sources and assumptions?					
1.1.4. Does the baseline methodology sufficiently describe the underlying rationale for the algorithm/formulae used to determine baseline emissions (e.g. marginal vs. average, etc.)					
1.1.5. Does the baseline methodology specify types of variables used (e.g. fuels used, fuel consumption rates, etc)?					
1.1.6. Does the baseline methodology specify the spatial level of data (local, regional, national)?					
1.1.7. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?					
1.1.8. Has the baseline been determined using conservative assumptions where possible?					
1.1.9. Has the baseline been established on a project-specific basis?					
1.1.10. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
1.1.11. Have the major risks to the baseline been identified?					
2. Calculation of GHG Emissions by Source **2.** *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
2.1.1. Are the GHG calculations documented in a complete and transparent manner?					
2.1.2. Have conservative assumptions been used to calculate project GHG emissions?					
2.1.3. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?					
2.1.4. Are potential leakage effects beyond the chosen project boundaries properly identified?					
2.1.5. Have these leakage effects been properly accounted for in calculations?					
2.1.6. Does the methodology for calculating leakage comply with existing good practice?					
2.1.7. Are the calculations documented in a complete and transparent manner?					
2.1.8. Have conservative assumptions been used when calculating leakage?					
2.1.9. Are uncertainties in the leakage estimates properly addressed?					
2.1.10. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?					

Table 3 Additionality

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
3.					
3.1 Is the discussion and selection of the baseline transparent?	/1/ /92/ /93/	DR	Yes, Baseline selection is transparent **CAR 18** There are two baselines established for the project initially. PDD was revised and unified baseline was chosen were III.D and I.C components were identified and calculated separately **CAR 28** Discussion of alternatives not sufficient. Methane recovery is not mentioned in description of Scenario 2. PDD was revised.	CAR 18 closed CAR 28 closed	y
3.2 Is the discussion on the additionality clear and have all assumptions been supported by transparent and documented evidence	PDD /34/ /85/	DR	Yes Assumptions used for benchmark investment analysis were checked during site visit (see local checklist Q19). The barrier analysis was used additional to the investment analysis to substantiate the additionality (and removed from PDD finally). 1. The barrier, associated with prevailing practice should show the absence of the same activity. Nevertheless description given in section B.2 shows that there is relevant experience in operation of other biogas plants in Ukraine. Please justify. 2. The legislative barrier emphasizes that before green tariff adoption national legislation had not possessed any incentives to develop biogas projects. But it also hardly can constitute an overwhelming constraint to project	CAR 19 closed CAR 10 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			implementation. **CAR 19** both above mentioned barriers do not unambiguously show that project activity would not be realized without JI revenues. Barrier description was removed from PDD. **CAR 10** was raised to request substantiation of annual income from displaced electricity which assumed to be constantly equal to 929,000 EUR for whole crediting period. Efficiency of heaters was not considered while calculating amount of displaced electricity. Amount of displaced electricity was recalculated taking into consideration 68% of electric heaters efficiency and found consistent. Investment analysis and ER calculation spreadsheet were updated accordingly. After revision of investment analysis the discount rate was reconsidered from 11% to 16.1% due to inclusion of sector specific risk estimated as 5% on the basis of risk factors depicted in market study /85/. PP was requested to revise calculation sheet and PDD in order to provide clear explanation of discount rate chosen and eliminate inconsistencies between figures at pages 24 and 25. PDD was revised to avoid inconsistency and explanation of discount rate chosen was incorporated into PDD and financial analysis excel sheet.		
3.3 Does the selected baseline represent the most likely	/19/	DR	Yes, the usage of anaerobic lagoons is the	y	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
scenario among other possible and/or discussed scenarios?			common practice in Ukraine that is confirmed by review of local standard for manure management /19/. The compliance of baseline to local legislation was checked and confirmed during site visit (see local checklist)		
3.4 Is it demonstrated/justified that the project activity itself is not a likely baseline scenario	/33/ /85/	DR	Yes. Investment analysis was undertaken to demonstrate that proposed activity is financially unfeasible and thus cannot be considered as possible baseline scenario. All financial assumptions were checked against evidence provided by PP and found consistent. **CAR 10** PP was requested to justify power price value used in calculation spreadsheet accordingly to evidence provided /33/. Also PP was requested to revise financial analysis considering efficiency of baseline electric heaters while calculating savings from displaced electricity. Financial analysis and ER calculation spreadsheets were revised accordingly. While revising investment analysis PP has reconsidered the discount rate value. Initially it was defined as 11% based on 4% - risk premium. After revision discount rate was defined to be equal to 16.1 % considering additional national and sector specific risks of investment defined to be equal to 5% in accordance with economical study /85/. PP has argued that initially only project specific risk was considered. PP was requested to include proper explanation	CAR 10 closed CAR 19 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			of discount rate chosen and relevant reference into PDD and excel sheet and adjust the inconsistency between discount rate values at pages 24 and 25 of PDD. PDD was revised to avoid inconsistency and explanation of discount rate chosen was incorporated into PDD and financial analysis excel sheet. **CAR 19** Barrier analysis in PDD version 1 was not persuasive. 1. The barrier related to prevailing practice cannot be accepted due to insufficient common practice analysis. 2. The legislative barrier emphasizes that before green tariff adoption national legislation had not possessed any incentives to develop biogas projects. But it also hardly can constitute an overwhelming constraint to project implementation. Barrier analysis was removed from alternative discussion.		
3.5 Are all the data sources clear and are references to documents publicly available and cited fully in the PDD	/90/	DR	**CL 29** Request for the proper link to Key World Energy Statistics 2007 referred in PDD. The link was provided and information was reviewed and found consistent: http://www.iea.org/textbase/nppdf/free/2007/Key_Stats_2007.pdf /90/	CL 29 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl

4 MONITORING METHODOLOGY(IES)

Flow chart	Answer	Next step
Does the project use an CDM approved monitoring methodology	Yes	Complete table 4A
	~~No~~	~~Complete table 4B and table~~

Table 4A Application of an approved Monitoring methodology

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
4.					
4.1 Does the project meet all the applicability criteria listed in the monitoring methodology	/1/ /92/ /93/	DR	Yes. Applicability criteria for AMS III.D and AMS I.C were checked on site (local check list Q 10). **CAR 6** raised to gain a confidence in aerobic storage of final sludge. Aerobic conditions are retained by application of mechanical mixing. **CAR 17** Small scale criterion – emission reduction less than 60,000 t CO2 is not met as total ERs from project is more, but this is not relevant: AMS III.D component of projectannual emission reduction not more than 31540 t CO2 thus criterion for small scale is met.	CAR 6 closed CAR 17 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			AMS I.C component propose installation of cogeneration units with total installed capacity of 5.3 MW thus criterion of small scale is met. Project does not envisage import of electricity into the grid as the total electricity demand of farms is less than total installed capacity. The direct discharge of manure or final sludge into the open water flows is unlikely because both farms are situated outside surface water protective zone of nearest rivers (confirmed by EIAs for both projects) and there is a legal obligation to prevent the pollution of surface water by manure.		
4.2 Does the PDD provide for the monitoring of the baseline emissions as required in the monitoring methodology	/1/ /92/ /93/	DR	Yes, all parameters mentioned in methodology are included into MP.	y	y
4.3 Does the PDD provide for the monitoring of the project emissions as required in the monitoring methodology	/1/ /37/ /63/	DR	Yes. All parameters mentioned in methodology are included into MP. **CL 9** Please specify what uncertainty level corresponds to 2nd quality class of heat meter (please refer relevant standard). Accordingly with referred National Ukrainian standard DSTU #3339-96 /37/ class of heat meters quality #2.5 corresponds to uncertainty level from 2.5% to 5.5%. **CAR 13** Gas metering system has not been installed to measure the volume of gas going to flare. The method and source for estimation	CL 9 closed CAR 13 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			of emissions from biogas flaring for the period since biogas production start should be justified. Gas flow meter serial #0002118 has been installed on the inflow pipeline of flare on 1/10/2009 as it was informed by statement issued by Zorg Ukraine company /63/. Project emission from utilization of diesel in generators is taken into account.		
4.4 Does the PDD provide for the monitoring of the leakage as required in the monitoring methodology	/1/ /92/ /93/	DR	Yes. Leakages were not considered accordingly to methodologies.	y	y
4.5 Has the methodology been applied exactly as defined including formulas and the application of the formulas to calculate emissions and emission reductions	/92/	DR	Yes, conservative calculations. Pending **CAR 5; CAR 7** and **CAR 12** closure. **CAR 5**: project emissions from biogas flaring were reconsidered taking into account 50% flare efficiency /92/. **CAR 7**: emissions from diesel generator for start up was considered as project emissions. **CAR 12**: Ex-ante calculation used for the prediction of PE of emission reductions is in line with meth. During monitoring period emissions has to be taken ex-post as it reflected in the Monitoring Plan.	CAR 5; closed CAR 7; closed CAR 12 closed	y
4.6 Does the PDD provide for Quality Control (QC) and Quality Assurance (QA) Procedures as required in the monitoring methodology	/1/ /32/ /36/ /37/ /59/	DR	Procedures are not specified in PDD **CL 3** Please provide the detailed description and certificates for controlling and measuring equipment for all cogeneration units included in project. Documentation for the following monitoring	CL3 closed CL8 transformed into	Yes FAR 26 FAR 27

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			equipment were received: **gas-meters RGK-Ex**, /32/ **pressure sensors** (IS-20-S, S1, ECO-1 WIKA) and **temperature sensors** (TR10-C WIKA) installed on fermenters - /36/ and /35/ respectively **heat counter** (Supercom-01-SKS-3, SME "Techprilad") – /37/, **System of biogas quality control** SGK-1 – manual and technical description /59/ with following uncertainty levels: methane -1.1% CO2 – 1.4% H2S – 0.006 % **CL 8** Detailed monitoring procedure is not in place. Please explain what national regulations and/or internal standards are used to ensure quality system. Draft of monitoring procedure was provided. **FAR 26 & 27** Adequacy and adoption of Monitoring procedure shall be checked during the first verification.	FAR 26 & 27	

~~**Table 4B Monitoring methodology not using an approved CDM methodology**~~

~~CHECKLIST QUESTION~~	~~Ref.~~	~~MoV*~~	~~COMMENTS~~	~~Draft Concl.~~	~~Final Concl.~~

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
4.1 Monitoring Methodology It is assessed whether the project applies an appropriate baseline methodology.					
1.1.1. Does the monitoring methodology reflect good monitoring and reporting practices?					
1.1.2. Is the selected monitoring methodology supported by the monitored and recorded data?					
1.1.3. Are the monitoring provisions in the monitoring methodology consistent with the project boundaries in the baseline study?					
1.1.4. Have any needs for monitoring outside the project boundaries been evaluated and if so, included as applicable?					
1.1.5. Does the monitoring methodology allow for conservative, transparent, accurate and complete calculation of the ex post GHG emissions?					
1.1.6. Is the monitoring methodology clear and user friendly?					
1.1.7. Does the methodology mitigate possible monitoring errors or uncertainties addressed?					
1.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
1.2.1. 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 project boundary during the crediting period?					
1.2.2. Are the choices of project GHG indicators reasonable?					
1.2.3. Will it be possible to monitor / measure the specified project GHG indicators?					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
1.2.4. Will the indicators enable comparison of project data and performance over time?					
1.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
1.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?					
1.3.2. Have relevant indicators for GHG leakage been included?					
1.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?					
1.3.4. Will it be possible to monitor the specified GHG leakage indicators?					
1.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
1.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline emissions during the crediting period?					
1.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?					
1.4.3. Will it be possible to monitor the specified baseline indicators?					

Table 5 Monitoring plan

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
5.					
5.1 Monitoring of Sustainable Development Indicators/ Environmental Impacts	/1/	DR	The monitoring of surface and ground waters monitoring, and soil fertilization as well as ERs.	y	y
5.1.1 Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	No, not applicable.	y	y
5.1.2 Is the choice of indicators for sustainability development (social, environmental, economic) reasonable?	/1/	DR	The monitoring of surface and ground waters monitoring, and soil fertilization as well as ERs.	y	y
5.1.3 Will it be possible to monitor the specified sustainable development indicators?	/1/	DR	Not applicable.	y	y
5.1.4 Are the sustainable development indicators in line with stated national priorities in the Host Country?	/19/	DR	Yes. The Environmental monitoring system was checked on site (local check list Q 23) and found to be in compliance with national standard of manure management /19/. It includes: surface and ground waters monitoring, and soil fertilization (dose of manure or final flush used for soil fertilization).	y	y
5.2 Project Management Planning	/12/ /19/ /32/, /35/, /36/, /37/ /14/	DR	Relevant procedures were checked during site visit (see local checklist Q 21-29).	y	y
5.2.1 Is the authority and responsibility of project management clearly described?	/78/	DR	Pending Detailed monitoring procedure has to be further developed and adopted at the farms.	CL21 transformed	FAR 26

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
				to FAR 26	
5.2.2 Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/19/	DR	Pending Authority/Responsibility distribution was not described clearly. **CL 20** Please provide the authority/responsibility distribution for both project implementation and monitoring performance along with organizational chart (the organigram is preferable form of performance). The draft monitoring manual was developed in Ukrainian language and submitted to SGS /19/. Personal authority and responsibility distribution for each step of monitoring data processing including data collecting, handling, checking, calculation, reporting, meters calibration and maintenance indicated in revised Monitoring Plan. CL 20 was transformed into **FAR 27**.	CL 20 transformed to FAR 27	FAR 27
5.2.3 Are procedures identified for training of monitoring personnel?	/14a/	DR	Pending Personnel training shall be performed by equipment supplier (Zorg – Ukraine) in accordance with paragraph #7.1.6. of contract for biogas plant /14a/ and paragraph #1.2 for cogeneration unit. **FAR 27** Evidence of trainings for personal engaged into monitoring processes shall be checked during first verification.	CL21 is closed	FAR 27

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
6.2.1	Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/19/	DR	General requirements for emergency preparedness are defined by national standard regulating manure management /19/.	y	y
6.2.2	Are procedures identified for calibration of monitoring equipment?	/32/, /35/, /36/, /37/	DR	Procedures is defined by equipment manuals /32/, /35/, /36/, /37/.	CL21 closed	y
6.2.3	Are procedures identified for maintenance of monitoring equipment and installations?	/32/, /35/, /36/, /37/	DR	Procedures is defined by equipment manuals /32/, /35/, /36/, /37/.	CL21 closed	y
5.2.4	Are procedures identified for monitoring, measurements and reporting?	/19/	DR	Pending General monitoring procedure was developed and its adoption shall be checked during verification.	CL21 closed FAR 26	FAR 26
5.2.5	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/19/	DR	Pending General monitoring procedure was developed and its adoption shall be checked during verification.	CL21 closed FAR 26	FAR 26
5.2.6	Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/19/	DR	Pending General monitoring procedure was developed and its adoption shall be checked during verification	CL21 closed FAR 26	FAR 26
5.2.7	Are procedures identified for review of reported results/data?	/19/	DR	Pending General monitoring procedure was developed and its adoption shall be checked during verification.	CL21 closed FAR 26	FAR 26
5.2.8	Are procedures identified for internal audits of GHG project compliance with operational requirements	/38/	DR	Pending Internal audits is integrated part of the Quality	CL21 closed	FAR 26

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
where applicable?			Management System that has been certified at Ukrainian Dairy Company 2008 y /38/ - shall be checked on verification stage **FAR 26**.	FAR 26	
5.2.9 Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/19/	DR	Pending General monitoring procedure was developed and its adoption shall be checked during verification.	CL21 closed FAR 26	FAR 26
5.2.10 Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/38/	DR	Pending Corrective actions performance shall be an integrated part of the Quality Management System that has been certified at Ukrainian Dairy Company 2008 y /38/.	CL21 closed FAR 26	FAR 26

Table 6 Environmental Impacts (Ref PDD Section F and relevant local legislation)

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
6. 6.1 Has an analysis of the environmental impacts of the project activity been sufficiently described?	/18/	DR	Yes EIA was checked on site (local checklist Q30)-	y	y
6.3 Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/18/ /53/ /13/ /75/ /47/ /43/	DR	Yes Local assessment results: EIAs /18/ were developed as to meet relevant requirements of National Environment legislation of Ukraine. At the moment of site visit project documentations for both farms is being passed through State Expertise procedure as per interview with PPs /int. 3/.	CAR 2 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			CAR 2 The official approval of EIA is required by National Law on State Environmental Expertise dd. 09/02/1995 No 45/95-VR /53/. Preliminary State expertise conclusion for farm #1 /13/ was not positive and reflects some issues requiring further revision of project. Issues raised by State Expertise are not related with technical specification and environmental aspects of proposed project activity. The final approval of project by State Expertise is expected to be issued at the beginning of July 2009. Official approval of EIA for both parts of the project designed as separate projects as required by law was requested. The EIA for farm #2 (Komarivka) was approved by State Expertise 22/05/2009 /47/ and construction works were officially allowed on 26/05/2009 /43/. Compliance of project implementation for farm #1 to normative enactments after amendments requested by State Expertise is confirmed by addendum to State Expertise Conclusion # 09V N 04-2120-14185 issued 31/08/2009 /75/ and submitted by PP. Project is officially approved by State Expertise that confirms its compliance to applicable regulations and laws.		
6.4 Will the project create any adverse environmental effects?	/47/ /75/	DR	Yes. Local assessment result (Q32 local check list). Following adverse environmental effects caused by project are considered in EIA:	CAR 2 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			• emissions from biogas combustion at both flare and cogenerators, • emissions from diesel combustion which is used as emergency fuel, • soils and ground waters pollutions. EIA declares that all environmental requirements of above mentioned issues shall be met. It was confirmed by State Expertise conclusion.		
6.5 Are transboundary environmental impacts considered in the analysis?	/18/ /47/.	DR	Yes. Local assessment results (Q 33) The study of dispersion of harmful substances emitted from sources placed on the territory of farms has been developed as required by law and included into EIAs/18/ /47/. Accordingto this study the concentration of harmful substances on the boundary of sanitary protective zone shall not exceed established norms. Therefore somewhat transboundary impact is actually impossible.	y	y
6.6 Have identified environmental impacts been addressed in the project design?	/18/ /47/	DR	Yes Environmental Impact assessment /18/ /47/ was performed as part of project design.	y	y
6.7 Does the project comply with environmental legislation in the host country?	/47/ /75/	DR	Yes. Compliance to local legislation must be supported by positive State Environmental Expertise which conclusion is still pending. Positive state expertise conclusions were provided.	CAR 2 closed	Y

Table 7 Comments by local stakeholders (Ref PDD Section G)

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
7. 7.1 Have relevant stakeholders been consulted?	/39/ /49/ /70/	DR	Yes, all national requirements for stakeholder consultation are fulfilled. This issue was the matter of checking during site visit (see local checklist Q 35). Farm #1 (Veliky Krupil) Declaration of intentions containing project description dd. 11/01/2008 was submitted for discussion to local administration /39/. Project was considered by local administration with participation of public representatives 17/01/2008 /49/. Executive committee of administration has issued the positive decision /40/ dd. 07/02/2008 on allowance of projecting works and land allocation. Farm #2 (Komarivka) relevant information was requested. **CL 22** Please provide the minutes or summary of stakeholders consultations on implementation of part 2 of project (at farm Komarivka) The minutes of meeting in administration of village Komarivka, Borznyanskiy district, Chernigov region dd. 27/02/2008 /70/ that contain the decision to allow the construction of farm with 6,000 heads of cattle capacity. No negative comments were provided.	CL 22 closed	yes
7.2 Have appropriate media been used to invite comments by local stakeholders?	/70/	DR	Yes Pending CAR 22 closure	CAR 22 closed	y
7.3 If a stakeholder consultation process is required by	/70/	DR	Yes, the stakeholder consultations arranged as	CAR	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?			either public hearing, open meeting, or announcement in press are required in accordance with clause 11 of Ukrainian Law of State Environmental Expertise. Public hearings for project implementation at farm Veliky Krupil were conducted (see local checklist Q 35 for details). Information regarding rest part of project (Komarivka) is requested in **CAR 22**. The minutes of meeting in administration of village Komarivka, Borznyanskiy district, Chernigov region dd. 27/02/2008 /70/. No negative comments were provided.	22 closed	
7.4 Is a summary of the stakeholder comments received provided?	/70/	DR	Yes. Pending **CAR 22.**	CAR 22 closed	y
7.5 Has due account been taken of any stakeholder comments received?	/70/	DR	Yes. As per minutes of stakeholder meeting there was no negative comment on implementation of project at farm Veliky Krupil. Relevant information for farm Komarivka was provided /70/.	CAR 22 closed	y

Table 8 Other requirements

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
8. 8.1 Project Design Document					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
8.1.1 Editorial issues: does the project correctly apply the PDD template and has the document been completed without modifying/adding headings or logo, format or font.	/1/	DR	PDD template is used correctly.	ok	y
8.1.2 Substantive issues: does the PDD address all the specific requirements under each header. If requirements are not applicable / not relevant, this must be stated and justified	/1 d/	DR	Yes. The details of Project Participants on page 6 PDD and Annex 1 PDD are not consistent. PDD was revised accordingly. Information presented in Annex 1 of PDD v.6 was corrected. CAR 30 was raised on inconsistency.	CAR 30 closed	y
9. 8.2 Technology to be employed					
8.2.1 Does the project design engineering reflect current good practices?	/41/	DR	Yes, local assessment result Q36: This project proposes a new technology for Ukraine and is deemed a pilot project for alternative fuel utilization. Moreover the manure processing capacity of about 400 tonnes per day is one of biggest projects for Ukraine and Europe /41/.	Y	y
8.2.2 Does the project 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?	/41/	DR	Yes As per information reflected in open Internet sources /41/ http://www.abercade.ru/research/industrynews/577.html This project proposes a new technology for Ukraine and is deemed a pilot project for alternative fuel utilization.	Y	y
8.3 Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/41/	DR	No. Project activity hardly to be substituted during	y	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			crediting period because: 1/ there is no more efficient manure management system that could be used in perspective /41/. 2/ The substitution of technology is not economically feasible until the payback period is over.		
8.2.4 Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/14/	DR	Yes, local assessment results (local check list Q 21. Personnel training shall be performed by equipment supplier (Zorg – Ukraine) in accordance with paragraph #7.1.6. of contract for biogas plant /14a and paragraph #1.2 for cogeneration unit.	y	y
8.3 Duration of the Project/ Crediting Period					
8.3.1 Are the project's starting date and operational lifetime clearly defined and reasonable?	/42/	DR	As per PDD the starting date of the building and assembly works at Farm 1: 05.07.2008. But the permit for construction works was issued on 15/07/2008 /42/. **CAR 11** Starting date of project implementation defined as 05/07/2008 in PDD should be justified. Permission for construction work start was issued on 15/07/2008. PDD was revised.	CAR 11 closed	y
8.3.2 Is the assumed crediting time clearly defined and reasonable?	/76/	DR	Yes. Crediting period is defined as 4 years (2009-2012). **CL31** Please state the length of the crediting period in years and months and express its	CL 31 closed	y

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			starting date in DD.MM.YYYY format As response to CL the crediting period is stated to continue from 01/11/2009 to 31/12/2012. The start of crediting period was defined to be on the 01/11/2009 the date after 60 days of start up period since biogas plant at farm #1 was put into operation 01/09/2009. Confirmed with commissioning certificate /76/.		
8.3.3 Does the project's operational lifetime exceed the crediting period	/71/	DR	Yes **CL 23** Please substantiate the duration of project lifetime which is defined as 10 years. PP has presented the official informational note from equipment supplier - company Zorg Ukraine /71/ that confirm the 10 year long equipment operational lifetime in the case all technical requirements and operational conditions are met and maintenance and repairing works are carried out timely.	CL 23 closed	y

~~**Table 9 Additional requirements for AR projects (based on CDM requirements)**~~

~~CHECKLIST QUESTION~~	~~Ref.~~	~~MoV*~~	~~COMMENTS~~	~~Draft Concl~~	~~Final Concl~~
~~10.1 Does the PDD specifically consider impacts on biodiversity and natural ecosystems, in addition to socio-economic and environmental impacts?~~					
~~10.2 Are management activities, including harvesting cycles and verification programmes chosen to avoid a systemic~~					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
verification of peaks in carbon stocks?					
10.3 Has the project undergone international public consultation for a period to 45 days?					
10.4 Have selected carbon pools been be ignored in accordance with the conditions described in Para 21 of Decision 19/CP.9 and does the project avoid double counting?					
10.5 Has a project lifetime of 20 years renewable three times or 30 years been selected?					
10.6 Does the monitoring plan take account of issues related to biodiversity and natural ecosystems identified elsewhere in the PDD?					
10.7 Is the application of lCERs and tCERs accounting regimes consistent with Sections J and K and Decision 19/CP.9?					
10.8 Note Appendix B highlighting the differences in the PDD, the PDD template for AR projects and the guidelines, available at http://cdm.unfccc.int/Reference/Documents					

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APPENDIX 2

FINDINGS FROM VALIDATION OF *JI VAL. 0202*

BIOGAS UTILIZATION FOR GENERATING OF ELECTRICITY AND HEAT AT THE FARMS OF UKRAINIAN DAIRY COMPANY LTD.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
1	CAR	LoA request Please provide the letter of approval from Host country	1.0
Date: 08.10.09, Author: Maryna Bereznytska Accordingly with Ukrainian National procedure of JI project preparation /10/ in order to receive a letter of approval, an installation owner shall submit to the NEIA (national DFP) an application, determination report, project design documentation and accompanying documents. Therefore the letter of approval will be issued by focal point after determination report submission. The letter of Endorsement # 903/23/7 from 31.10.2008 has been submitted during site visit /11/ in Ukrainian along with translation into English /11a/.			
Date: 22/10/09 Vladimir Lukin CAR 01 remains open until LoAs from both Ukrainian and Switzerland DFPs are issued.			
JG 04/11/2009: remains open			

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
2	CAR	EIA approval from local authorities. The official approval of EIA is required by National Law on State Environmental Expertise dd. 09/02/1995 No 45/95-VR. State expertise conclusion for farm #1 /13/ is not positive and reflects some issues requiring further revision of project. Issues raised by State Expertise are not related with technical specification and environmental aspects of proposed project activity. The final approval of project by State Expertise is expected to be issued at the beginning of the July 2009. Please provide the official approval of EIA for both parts of the project, designed as separate projects as required by referred law.	6.3
Date: 08.10.09, Author: Maryna Bereznytska Please find an extract from EIA for Farm 2 (Komarivka, Chernigiv region) with assessment of pollutants dispersion in the atmosphere and the assessment results analysis /47/; positive state expertise conclusion for the Farm 2 (Komarivka, Chernigiv region) project documentation including EIA issued by Specialized State expertise organization – Central Service of Ukrainian state construction expertise (Chernigiv branch) /48/; Permission for construction works implementation issued by Inspection on State architectural and building control in Chernigiv region /43/, Act of the State Commission on the adoption of the completed construction object, Velykyi Krupil /55/			

Date: 22/10/09 Vladimir Lukin The EIA for farm #2 (Komarivka) was approved by State Expertise 22/05/2009 /47/ and construction works were officially allowed on 26/05/2009 /43/. We are not able to confirm compliance to legislation for project implementation on farm #1 due to absence of positive conclusion from State Expertise. CAR 02 remains open
JG 04/11/2009: remains open
Date: 19/11/09 Author: Maryna Bereznytska Please find attached the positive conclusion from State Expertise for farm #1, Velykyi Krupil /75/.
Date: 25/11/09 Auditor Vladimir Lukin Compliance to normative enactments after amendments requested by state Expertise is confirmed by addendum to State Expertise Conclusion # 09V N 04-2120-14185 issued 31/08/2009 /75/ and submitted by PP. Project is officially approved by State Expertise that confirms its compliance to applicable regulations and laws. Can be closed.
JG 10/12/2009: official EIA approval Farm 1 is validated. CAR 2 is closed out.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
3	CL	Monitoring plan Please provide the detailed description and certificates for controlling and measuring equipment for all cogeneration units included in project.	4.6
Date: 08.10.09, Author: Maryna Bereznytska Please find detailed description and certificates for controlling and measuring equipment for cogeneration units and fermenters within the project: stationary gas-meters that installed (rotor gas-meter RGK-Ex) at the places of external pipeline conjunction with a flare candle and generator \32\,\56\ pressure sensors (IS-20-S, S1, ECO-1 WIKA) that installed on fermenters, calibration of units has been carried out, operation is permitted with 1% allowance\36\, temperature sensors (TR10-C WIKA) that installed on fermenters, calibration of units has been carried out, operation is permitted with the range of indicators -50 ... +250 C0\35\, meter station of a generated heat (Supercom-01-SKS-3, SME “Techprilad”) is located at the heat pipeline site between a generator and heating center in technical premises, checked every 2 years\37\, electrical meter \57\ System of gas control\59\,\60\, \61\, \62\.			

Date: 22/10/09 Vladimir Lukin following evidence were submitted to confirm the metering equipment details: **gas-meters RGK-Ex** used for metering of gas utilised for energy generation and flaring – certificate and statement of installation dd. 01/10/2009, /32/ **pressure sensors** (IS-20-S, S1, ECO-1 WIKA) and **temperature sensors** (TR10-C WIKA) installed on fermenters - certificates with calibration records (/36/ and /35/ respectively) **heat counter** (Supercom-01-SKS-3, SME "Techprilad") – technical description and statement of installation dd.10/10/2009 /37/, **System of biogas quality control** SGK-1 – manual and technical description /59/ with following uncertainty levels: methane -1.1% CO2 – 1.4% H2S – 0.006 % Thus we can confirm the compliance of metering equipment to those required by monitoring plan. CL 03 can be closed.
JG 04/11/2009: closed

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
4	CL	Technical details of project Please provide the documentary evidences confirming technical details of project at Komarivka farm #2 (approved Explanatory note of Project Design).	15
Date: 08.10.09, Author: Maryna Bereznytska Please find an extract from Volume 2 of Project Design for Farm 2 (Komarivka, Chernigiv region)/47/; positive state expertise conclusion for the Farm 2 (Komarivka, Chernigiv region) Project Design including EIA issued by Specialized State expertise organization – Central Service of Ukrainian state construction expertise (Chernigiv branch) /48/; Permission for construction works implementation issued by Inspection on State architectural and building control in Chernigiv region on the base of Project Design document /43/.			
Date: 22/10/09 Vladimir Lukin We can not confirm technical details and equipment specification on the basis of EIA. Please provide extract from General explanatory note of Project Design to confirm technical details. CL 04 remains open JG 04/11/2009: remains open			
Date: 09/11/09 Auditor Vladimir Lukin Technical details of project for farm #2 were confirmed by Technical description of JMC-312 /54/ GS-B.L provided by PP on 03/11/2009 CL can be closed.			
Date: 10/12/2009 Jochen Gross Technical details of farm #2 are transparent now and supported with transparent evidence. CL 4 is closed out			

Date: 23/09/2009 Raised by: Jayachandran Nair /Vladimir Lukin

No.	Type	Issue	Ref
5	CAR	project emissions After AMS III.D there is only one of two following options for estimation of flare process efficiency when enclosed flare used: (a) To adopt a 90% default value or (b) To perform a continuous monitoring of the efficiency. For open flare 50% default value shall be used. But emissions from biogas flaring assumed to be zero (100% efficiency) on the basis of the Study of biogas combustion system /28/ performed by Ukrainian institute of gas in 2008 and therefore not considered in project emission calculation. Referred report does contain the statement that the biogas going to flaring is completely combusted (100% effectiveness). But at the same time the report reflects the nonzero concentration of carbohydrates in exhaust gases. PP is requested to proof validity and conservativeness of 100% flaring effectiveness assumption and rectify the inconsistency with the PDD that assumes 50% of flare efficiency.	2.4

Date: 08.10.09, Authors: Maryna Bereznytska and Yuriy Pyrozhenko
Emission reductions values in PDD are revised and 50% of flare efficiency is considered in project emission calculation taking into account conservative point of view in accordance with AMS III.D.
Based on Gas Institute data it was assumed that nominal biogas consumption makes up 500 m3/h (conservative assumption). Project emissions from biogas flaring are in the range of 149-5505 t CO2-eq for the period 2009-2012.
Please find attached Excel file with recalculations of project emissions and emission reductions\3\.

Date: 22/10/09 Vladimir Lukin
Calculation sheet was revised and emissions from flaring were considered.
Please clarify why total duration of flaring for farm #2 is assumed to be 1 day in 2009, 2011 and 2012 and 61 days in 2010. If these days are reserved for the start up which planned to be in 2010 why the 1 day is reserved for flaring in 2009 y.
Supposing second farm proposed to be commissioned in 2010 it seems hardly expectable any project emissions in 2009.
CAR 5 remains open

Date: 11.11.09 Author: Yuriy Pyrozhenko
Biogas flare at a candle takes place only in the emergency situation. The duration of its operation in emergency state, according to technical documentation elaborated by UKRNDIAGROPROEKT is 24 hours per year. Additionally, in accordance with specifications of biogas plant it is presumed that during 60 days (start up stage) biogas will be combusted at flare candle. Total duration of flaring for farm #2 wasn't assumed to be 1 day in 2009 (this value is included erroneously in emission reductions calculation and doesn't influence on ER values). In any case revised Excel file with ER calculations does not include data about 1 day of emergency situation in 2009 for farm #2 (was sent to SGS 23.10.09) /76/.

Date: 25/11/09 Auditor: Vladimir Lukin

ER Calculation in Excel spreadsheet v3. dd. 23/11/2009 was revised and found consistent.

CAR 5 can be closed.

Date: 21/12/2009 Nair, Jayachandran

closure confirmed

Date 23/12/2009: Jochen Gross

Project emissions from flaring are taken into account with 50% flare efficiency (conservative approach) in revised calculation sheet. Car 5 closed out.

Date: 23/09/2009 Raised by: Jayachandran Nair/Vladimir Lukin

No.	Type	Issue	Ref
6	CAR	project emissions Please clarify how aerobic conditions of final sludge storage will be ensured while the final sludge proposed to be stored in the same lagoons which had been used for raw manure anaerobic storage before project implementation.	2.1.

Date: 07.10.09, Author: Yuriy Pyrozhenko
According to Work project for Velykyi Krupil' /12/ technical digestion limit amounts to 40-45% of organic substance. It means that quantity of organic matter in digested manure should be equal to 55-60%. In this case organic matter will be in mineralized and bound state /24/ and methane emissions will not occur.
Another way to determine whether methane emissions still occur from digested substance is to measure ratio of COD to BOD. If this ratio is bigger than 1 – no methane emissions occur, less than 1 – methane emissions are still occurring (expert judgment).
According to PDD monitoring plan, regular physical-chemical analysis of digested biomass will be performed to ensure that methane emissions are not occurring.
Parameters that will be monitored include: dry matter and ash fractions in manure, COD and BOD.

Date: 22/10/09 Jayachandran Nair /Vladimir Lukin/
As it was stated in project documentation /12/ 40-45% of organic solids are transformed to methane.
1/ Please substantiate why the rest of volatile solid can not be anaerobically digested with methane generation and why the partial binding of biomass will prevent the anaerobic condition.

2/ Please explain the application of COD/BOD ratio as an indicator of aerobic/anaerobic conditions with reference to relevant publications in open sources. (Expert judgement only is not acceptable as proof). Please describe the measures to retain this ratio not less than 1.

3/ Please provide comprehensive explanation how aerobic conditions will be retained (what measures will be implemented to avoid anaerobic decay of remaining organic substances in the final flush causing methane emissions in storage reservoirs).

4/Also as far as the soil application of the final sludge (as fertilizer) is proposed please provide the description of proper conditions and procedures to ensure the absence of methane emissions as required by methodology.

CAR 6 remains open
JG 04/11/2009: remains open

Date: 19/11/09 Author: Maryna Bereznytska
The next measures will be implemented to avoid anaerobic decay of remaining organic substances after degistors: mechanical mixing with a tractor John Deere 8430, HOULE pump and injector barborator 8 hours per day /77/.

Date: 25/11/09 Auditor: Vladimir Lukin.

1/, 2/ and 4/ were not answered.

3/ Project proponents has presented the official letter #726 dd.23/11/2009 to confirm that mechanical mixing with pumping during 8 hours per day is applied to retain aerobic conditions in final sludge out flowing biogas plant.

Please provide calculation of emissions associated with this process (2920 hours of tractors' engine work per year at each farm).

Remains open

Date: 01/12/09 Author: Yuriy Pyrozhenko

1/ The organic matter is in stabilized form and methane emissions are not occurring in completely digested manure (L.I. Gyunter, L.L. Gol'dfarb. Biodigesters, M: Stroyizdat, 1991. – 128 p.). In Work project for Farm 1, the value of technical digestion limit that amounts to 40-45% of organic substance for cattle manure is proposed. This value can be used as a basis for determination whether manure is completely fermented or not. As a rule, fermented sludge is characterized as stabilized when 90% from technical digestion limit is achieved. Therefore, methane emissions will not occure if remaining amount of organic matter in digested sludge is in the range of 60-64% from total quantity of organic substance in fresh manure at the inlet of biogas plant. If amount of organic matter is more than 64% - some emissions can still take place. To avoid anaerobic decay of remaining organic matter at the outlet of biogas plant mechanical mixing with a tractors John Deere 8430, HOULE pump and injector barborator 8 hours per day (2 920 hours per year) will be implemented at both Farms.
During the digestion process carbon is converted to carbonates and bicarbonates that are not belong to volatile compounds. Substantial part of organic nitrogen is converted to mineral forms (NH2 amid is converted to NH4 and connected with dissolved CO2). It leads to increase of alkalinity of the system and as a consequence – decreasing of C:N ratio.
Stabilized sludge is characterized by C:N ratio that equals to or less than 10 (optimal C:N ratio for methanogenesis is in the range of 16-19).
Besides, process of biomass digestion is accompanied by gradual accumulation of NH3, which belongs to inhibitors of methanogenesis (Parkin G.F. Fundementals of anaerobic digestion of waste water sludge. Environ. engineering. -1986, #5, p. 867-920).

2/ Each type of sludge is characterized by initial COD/BOD ratio. According to investigations data (L.I. Gyunter, L.L. Gol'dfarb. Biodigesters, M: Stroyizdat, 1991. – 128 p.) portions of COD and BOD that are lost during the digestion process make up 40-60% and 60-90% accordingly from COD, BOD values in initial sludge. High COD/BOD ratio means that the organic matter is in stabilized form (methane emissions are not occuring).
The amount of organic matter in digested manure as well as C:N and COD/BOD ratios will be the subject of regular monitoring.

4/ The proper soil application (not resulting in methane emissions) of the final sludge will be ensured. In particular, this sludge will be spread on the fields uniformly by small portions avoiding over-application and under-application

Revised Excel files with ER calculations as well as financial analysis that considering additional project emissions from tractors are attached.

04/12/2009 Vladimir Lukin

1/ It was requested to explain whether the remaining part of volatile solids after biogas production can not be further digested anaerobically in storage lagoons.
Proving the impossibility of methane emissions from digested sludge PP uses to reference book L.I. Gyunter, L.L. Gol'dfarb. Biodigesters /85/ where stated that methane does not realize from completely digested manure.
Review of referred source confirms that digestion processes may continue until 40-70% of ash free matters are digested, or 40-60% COD, or 60-90% BOD which are used as criteria of stabilization.
The technical level of digesting is established on 40-45% according to project documentation but it does not exclude theoretical possibility of remaining methane emission from final sludge (supposing the technical level 40-45% is on the lowest end of possible one 40-70%).
The theoretical substantiation of limitation of digesting with increase of NH4 content (criterion -C:N ratio) and alkalinity is acceptable but it has no relation to discussion.
Thus reaching of technical limit does not give assurance that further methane emissions are impossible

from final sludge and therefore application of measures to retain aerobical conditions in final sludge storage reservoir.

It can only be acceptable the aerobic conditions are retained in storage lagoons with application of mechanical mixing.

2/ Referred source does not confirm directly that COD/BOD < 1 is the criterion of aerobic conditions.
3/ This issue has already been discussed (for details see my comment from 25/11/2009) – closed.
4/ the spreading of final sludge on the surface of fields as fertilizer seem to be acceptable because it does not retain conditions for anaerobic digestion.

21/12/09 Jayachandran Nair

PP has ensured incorporation of mechanical aerators to avoid anaerobic condition. This is acceptable if the PP can substantiate that the applied technology is sufficient to continuously maintain aerobic condition for final outlet.

Also the sampling method and procedure may essentially affect the results of tests undertaken to ensure that final sludge is keeping under aerobic conditions.

Details of sampling and testing process shall be incorporated into PDD.

21/12/09 Vladimir Lukin

1/ PP has presented the final sludge management procedure /85/:

Storage reservoirs operation
Level of final sludge in storage reservoirs shall not be more than 2 m.
Maximum storage time – 6 months (reservoirs shall be emptied twice per year).
Pumping capacity – 113.4 m^3 /hour

Soil application:
total area of soil application for Farm #1 – 1051.2 ha and for Farm #2 – 1576.8 ha.
Density of sludge application is 0.1-0.4 ton of nitrogen per ha (about 50 -200 ton of final sludge per depending on agricultural crop. Application frequency is once per 2-3 year for each plot of land.
After application of final sludge soil shall be plowed.

PP is requested to provide:
1/ the information from equipment supplier confirming the pumping technology is sufficient to retain aerobic conditions in the reservoirs used for final sludge storage.
2/ sampling procedure for tests to ensure aerobic conditions in storage reservoir.

Please indicate in PDD how the aerobic conditions for final sludge proposed to be retained and how this shall be controlled during crediting period including sampling procedure used for final sludge testing.

CAR still open and can be closed after relevant updating of PDD.

Date 23/12/2009: Jochen Gross

CAR 6 remains open

Date: 29/12/09 Author: Yuriy Pyrozhenko, Maryna Bereznytska

1)The pumping technology is sufficient to retain aerobic conditions in lagoon with fermented mass. One pump turns over 912 m3 of manure per working day (8h), tractor moves by lagoon perimeter.

2) Sampling and sample analysis are carried out in accordance with established zootechnics procedures

and on the basis of "Instructions on laboratory monitoring of waste disposal plants at cattle-breeding complexes"/86/. Samples of fermented mass are separated on non-permanent, average and audit assays. Non-permanent sample of fermented mass is picked out in one sitting in definite terms. It characterizes composition and quality of fermented mass both at the place of sample splitting and through the time. Average sample is obtained by the ways of mixing of a few non-permanent assays that are picked up in one or several places, at different levels and time. Lower-range value of average sample that is taken for analysis is called average laboratory sample. This sample is stored in a correspondent package (as a rule in glass jars) that prevents changes in humidity, composition and properties. Audit assay is a part of non-permanent or average sample (reserve sample). Reserve sample is used during retests of audit analyses, for comparison etc. Sampling of fermented mass is applied with the expectation of obtaining of the most accurate characteristics of investigated volume (universal set).
Sampling of fermented mass is carried out:

- with the help of triers;
- at different depth;
- in a few places that are characterized by effective mixing and hit of foreign matter is impossible (at the outlet of biogas plant and in open tank);
- every year during the whole month;
- every 10 minutes 3 times per day (1 hour in the morning, afternoon and evening) during the whole month every year;
- in equal volumes (approximately 1 liter) /87/

Samples are put into the glass or polyethylene jars. Covers of jars are wrapped up with polyethylene film, compact paper and tied up by twine. Labels with specification of date and place of sampling, title of biogas plant, surname and position of person responsible for sampling are attached to each jar. Samples of fermented mass are registered in special journal. Sample of fermented mass is placed into the clean laboratory glassware, hermetically closed up with cork and stored at temperature not higher than 4-5℃. Working life of sample should not exceed 24 hours /88/.
Laboratory analysis of each sample is performed 3 times to reduce uncertainties.

3) The information on how the aerobic conditions for final sludge is to be retained and how this shall be controlled during crediting period including sampling procedure used for final sludge testing is reflected in PDD.

Date: 11/01/10 Vladimir Lukin
1/ PP has replied that nevertheless pumping technology is not initially envisaged for aerobic conditions this technology provides effective mixing of final sludge in storage reservoirs. This was confirmed with proposal for equipment issued by supplier /89/.

2/ It was underlined that sampling procedure for aerobic conditions control was established accordingly to official procedure of sampling used for manure and wastewater monitoring /86/ /87/ and /88/. Section D3 of PDD was updated with detail procedures of final sludge storage, soil application and sampling of final sludge for laboratory monitoring to ensure aerobic conditions of final sludge storage.
Sampling procedure includes collection of samples from different depth and from different sites in each lagoon to obtain objective results of oxygen saturation in whole volume of sludge.

Thus CAR can be closed out.

Date: 25/01/2010 Nair, Jayachandran

closure confirmed

Date 25/01/2010 Jochen Gross

The calculation of project emissions is transparent now.
CAR 6 closed

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
7	CAR	Project emissions/boundary At the start up stage of biogas plant power from autonomous diesel generator is used for project own needs. Application of diesel running power station indicated in project design of farm extension /12/ and its technical parameters should be further specified. GHG emissions from diesel generator envisaged by Project Design shall be considered as project emissions (this source is directly related to project activity).	2.4.

Date: 07.10.09, Author: Yuriy Pyrozhenko
Starting mode for biogas plant presumes step-by-step putting into operation of fermenters. According to the official letter #282/1 of 09.10.09 from the company-supplier of biogas equipment for the project (Zorg) /63/ electrical energy from the grid instead of power from diesel generator was used.
In particular, consumption of electricity by engines of pumps and mixers was 33600 kWh for the period 60 days. Additionally for initial heating of fermenters consumption of electricity was 259200 kWh for the same period. Altogether 292800 kWh of electricity from the grid was used to put into operation of biogas plant at Farm 1 (Velykyi Krupil'). Value of electricity consumption from the gird for Farm 2 constitutes 585600 kWh.
According to data from EIA /18/ in emergency conditions it is envisaged that diesel generator should work.
In accordance with EIA data generator at Farm 1 will consume 0,413 t of diesel/day. Generator at Farm 2 will use 0,681 t of diesel/day.
Project emissions from use of fossil fuels and electricity for the operation of all the installed facilities (PE_{power}) were calculated in accordance with requirements of methodology AMS III.D and are in the range of 3,4-476 t CO2 for the period 2009-2012.
Please find attached Excel file with recalculated project emissions and emission reductions.

Date: 23/10/09 Vladimir Lukin

PP provided the official statement from technical director /63/ of company Zorg Ukraine (equipment supplier) confirming the following assumptions used in project emissions calculation:
start up phase duration – 60 days
Power consumption for mixers and pumps – 33600 kW
Power consumption for initial digester heating – 259200 kW
Total power consumption during working regime – 274480 kW.
All this energy was consumed from power grid for the farm #1 Velikiy Krupil' during start up period.
Diesel consumption by generators (0.413 t/day – for 1st farm and 0.681 t/day – for 2nd farm).

During crediting period the expected total emissions from power consumption from all sources (DG and grid) are ranged from **3.41 t CO2** (minimum in 2011- 2012 yy when the power is consumed only from DGs running only one day per year on both farms in case of emergency: 1.29+2.12=3.41 tCO2) to **476.41 t CO2** (maximum in 2010 y when power is consumed by farm #2 from grid during 60 days – 473 tCO2 plus one day DGs emergency operation at both farms – 3.41 tCO2)

Please provide details of diesel consumption metering system (types of meter, uncertainty, calibration). Neither monitoring plan nor draft monitoring procedure contains relevant information.

CAR 7 remains open

JG 04/11/2009: remains open

Date: 19/11/09 Author: Maryna Bereznytska

To ensure the monitoring of diesel consumption the next information is fixed in the Monitoring Journal /19/: simply filling in of each tank of diesel generator fuel, the degree of its filling (the per cent on the front panel of the generator) and hours of work. Fuel consumption is to be calculated according to the technical characteristics of the generator Magnum G400 VSA - 120 l per 5 hours /78a/. Built-in electronic sensor of fuel tank filling degree is not subject to calibration /78b/.
Date: 25/11/09 Auditor Vladimir Lukin The technical documentation of generator Magnum G400 VSA – 120 has been presented /78a/. As it is mentioned there the generator is equipped with embedded sensor of storage tank fullness. The level of storage tank is screened at the front panel of engine /78b/. Level sensor is not an object for calibration. The events of storage tank filling shall be fixed in monitoring logbook and can be crosschecked against fuel purchasing receipts. Thus the monitoring system of diesel consumption has been checked and found consistent and transparent. CAR 7 can be closed after PDD updating
Date 22/12/09 Vladimir Lukin Total amount of diesel consumption is reflected as single parameter in monitoring plan (P17) including consumption of fuel by cogenerator units, fuel consumption by local generators, and fuel consumption by tractor used for manure mixing. Proponent is requested to specify in PDD how this parameter will be calculated. Remains open until PDD is updated.
Date 23/12/2009: Jochen Gross CAR 7 remains open
Date: 29/12/09 Author: Maryna Bereznytska PDD is updated (p.15, D.1.1.2.).
Date: 11/01/10 Vladimir Lukin PDD ver. 5 was updated with following text: Actual emissions from fossil fuel consumed will be calculated $ex-post$ according to the monitoring results of operation in emergency state and amount of diesel fuel used. To ensure the monitoring of diesel consumption the next information is fixed in the Monitoring Journal: simply filling in of each tank of diesel generator fuel, the degree of its filling (the percent on the front panel of the generator) and hours of work. Fuel consumption is to be calculated according to the technical characteristics of the generator Magnum G400 VSA - 120 liters per 5 hours. Built-in electronic sensor of fuel tank filling degree is not subject to calibration. This information transparently shows the procedure of fuel consumption calculation and confirmed with objective evidence /78/. CAR can be closed as PDD is updated accordingly.
Date: 25/01/2010 Jochen Gross Diesel consumption for the calculation of project emission is taken into account as required. It is assumed that the diesel fillings will be reported in volume unit [l] as indicated for the fuel consumption on page 42 PDD v5.

CAR 7 closed with comment

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
8	CL	Monitoring procedure Detailed monitoring procedure is not in place. Please explain what national regulations and/or internal standards are used to ensure quality system.	4.6
Date: 08.10.09, Author: Maryna Bereznytska Detailed instruction on emission reductions monitoring under the Project is under consideration of Ukrainian dairy company management. Please find attached draft of the document. It is expected to have the confirmed instruction at 29-30 of November 2009 \64\.			
Date: 23/10/09 Vladimir Lukin The draft monitoring procedure was submitted to SGS on 21/10/09 /19/. Procedure reflects authority/responsibility distribution along data processing from initial collection to final emission reduction report. Adequacy and adoption of developed Monitoring procedure shall be checked during the first verification (FAR 26). Detailed review is under CAR 21. CL 8 can be closed.			
JG 04/11/2009: closed			

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
9	CL	Monitoring of project emissions - uncertainty Please specify what uncertainty level corresponds to 2nd quality class of heat meter (please refer to relevant standard)	4.3
Date: 08.10.09, Author: Maryna Bereznytska The uncertainty level of heat meter on heat quantity measurements is defined in accordance with State standard of Ukraine #3339-96 /37/			
Date: 23/10/09 Vladimir Lukin Accordingly with referred National Ukrainian standard DSTU #3339-96 class of heat meters quality #2.5 corresponds to uncertainty level from 2.5% to 5.5%. Explanation acceptable and CL can be closed.			
JG 04/11/2009: closed			

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
10	CAR	Investments	3.2

		Assuming 7640 MWh of annual power production and 8647 MWh of heating production (see Q 13) and power price of about 29.3 EUR/MWh for 2008 y (as confirmed by information note #773 dd. 11/12/2008 /33/) annual income from power displacement should be expected not to exceed 489,000 EUR. Prices for 2009 y established by order #1440 dd.23/12/2008 issued by National Committee on Power Regulation /34/ are ranged from 39.6 – 53.2 EUR/MWh. Even taking these prices into consideration annual savings from power displacement should not exceed 870,000 EUR. Please justify annual income from displaced electricity which assumed to be constantly equal to 929,000 EUR for the whole crediting period, based on 35 €/MWh, see file "NPV IRR final comments.xls"	

Date: 07.10.09, Author: Yuriy Pyrozhenko
Annual income of 929,000 EUR was directly taken from PIN and based on a preliminary estimate of amount of electricity produced in co generators as well as electricity price 60 EUR/MWh \65\. Value of 60 EUR/MWh is higher than prices for 2008 and 2009 according to National Committee on Power Regulation data and consequently not reliable enough. Considering this, it was decided to recalculate annual income from displaced electricity based on electricity prices that are presented in inquiry #773 of 11.12.08 from UDC about electricity consumption at Farm 1 for the period January-March 2008 \33\. In accordance with inquiry during above mentioned period 666300 kWh of electricity was consumed to the sum of 223130 UAH. Simple average rate of EUR exchange for January-March 2008 – 7,52\66\. Therefore:
223130 UAH / 666300 KWh x 1,000 / 7,52 = 44,52 EUR/MWh (conservative assumption).
This value is within the range of prices established by order #1440 dd. 23/12/2008 issued by National Committee on Power Regulation.
Please find attached Excel file with revised financial analysis/4/

Date: 23/10/09 Vladimir Lukin

The power price of 44.52 EUR/MWh is confirmed by official information note /33/ issued by UDC and seems acceptable. This informational note reflects the current power cost in 2008 y at the moment when decision of project implementation was adopted:

Financial analysis /4/ was revised accordingly.

Thus CAR 10 can be closed.

JG 04/11/2009: pending

Open question from LA: does this information source reflect the situation at date of investment decision?
After EB guidance: investment decision will be based on the relevant information available at the time of the investment decision and not information available at an
earlier or later point in time

Date: 25/11/09 Vladimir Lukin
The power price of 44.52 EUR/MWh is confirmed by official information note /33/ issued by UDC. This informational note reflects the current power expenses and total power consumption in 2008 y.
Usually the power price for the forthcoming year is established at the end of previous year. Therefore at the moment of adoption of project implementation decision this price had already been adopted.

Annual amount of displaced electricity is calculated as the electricity produced without 20% for own needs and heating energy produced by cogeneration plant also without 20% for self heating.
Both electricity and power annual production is calculated as the power and heating installed capacity multiplied by number of hours of operation per year.

PP is requested why the efficiency of electric heater of 68% is not taken into account in calculation of electricity displaced due to heat production.
Real amount of electricity displaced by heat production shall be calculated taking into account efficiency of

electric heater that would be used in the absence of project. Hence total amount of displaced electricity will be higher than those calculated in ER sheet. This will affect financial indicators.

Thus CAR remains open

Date: 23/12/09 Jochen Gross / Vladimir Lukin

Annual amount of displaced electricity is calculated as the electricity produced without 20% for own needs and heating energy produced by cogeneration plant also without 20% for self heating.
Both electricity and power annual production is calculated as the power and heating installed capacity multiplied by number of hours of operation per year.

This calculations presented in the table bellow:

			2009	2010	2011	2012	total for 2009-2012
#1	Annual amount of electricity which will be displaced within the project (taking into account that 20% of electrical energy produced will be spend on biogas plant work)	MWh	1100.2	6093.7	6093.7	6093.7	19381.2
#2	Annual amount of electricity which will be displaced within the project (taking into account that 20% of thermal energy produced will be spend on biogas plant work)	MWh	1245.3	6897.6	6897.6	6897.6	21938.2
#3	total for farm 1 =#1+#2	MWh	**2345.5**	**12991.3**	**12991.3**	**12991.3**	**41319.4**
#4	Annual amount of electricity which will be displaced within the project (taking into account that 20% of electrical energy produced will be spend on biogas plant work)	MWh	0.0	9210.5	10068.9	10068.9	29348.3
#5	Annual amount of electricity which will be displaced within the project (taking into account that 20% of thermal energy produced will be spend on biogas plant work)	MWh	0.0	9910.9	10834.6	10834.6	31580.1
#6	total for farm 2 =#4+#5	MWh	**0.0**	**19121.4**	**20903.5**	**20903.5**	**60928.4**
#7	total for both farms #3+#5	MWh	**2345.5**	**32112.7**	**33894.8**	**33894.8**	**102247.8**
#8	power cost	EUR/MWh	44.5	44.5	44.5	44.5	44.5
#9	income from electricity displacement =#6*#7	EUR	**104420.4**	**142965.9**	**150899.6**	**150899.6**	**455207.1**

The line #9 reflects the annual income from electricity displacement. These results roughly correspond to those obtained in calculation spreadsheet. (somewhat deviation was appeared due to rounding to decimals).

PP is requested why the efficiency of electric heater equal to 68% is not taken into account in calculation of electricity displaced due to heat production. Thus CAR 10 remains open

Date: 29.12.09, Author: Yuriy Pyrozhenko
Please find attached Excel file with revised calculations where efficiency of electric heater equal to 68% is taken into account. In addition to that the revised benchmark was used in calculations. Unfortunately in previous version the one component of risk rate within the methodology of risk assessment described in /74/, Kotova M.V., Shapoval S.S. Grounding of the method of calculations the discount rate in domestic practice. – Economichny prostir. - 2009 r. №22/1, c. 92-98. was not taken into account. The revised benchmark value is 16.1%. In accordance with the study /74/ the risk rate or premium for risk consists of two components – the risk of investing in region and sector of economy and the risk of investing in a company (enterprise). Only the second type of risk was taken into account in previous calculations with value in accordance with table 1/74/. The first type of risk can be identified only by means of expert assessment method. In revised calculations the risk rate 5% is used for the first kind of risk. It reflects risk of investing into Ukraine, agricultural sector and includes the following factors /Doing business with Ukraine, Global market briefings. Third edition. Consultant editor Dr. Marat Terterov/. According to numerous international studies major obstacles to innovation activities in Ukraine are:
- Instability and complexity of public administration
- Uncertainty of economic environment
- Uncertainty in the law
- High level of corruption
- Tax burden
- Problems with VAT refunds

Date: 11/01/10 Vladimir Lukin

1/ Amount of displaced electricity were recalculated taking into consideration 68% of electric heaters efficiency and found consistent. Investment analysis and ER calculation spreadsheet were updated accordingly.

2/ Explanation of sector specific risk is confirmed with referred publication: Doing business with Ukraine, Global market briefings. Third edition. Consultant editor Dr. Marat Terterov /85/.

Acceptable and can be closed.

Date: 27/01/2010 David Diaz

The figure for investment risk assumption value (Cell B20 in the ERU calculations) has been changed from 4% to 9% in the new version of the excel file, keeping the same source.
article by Kotova, Shapoval /74/
If the original value of the source is the right one, and you keep the 4% figure, the new NPVs of the without ERUs scenario become positive, and thus not additional.

In the last version of PDD (page24) new value of discount rate 16.1% remains unexplained

27/01/10 Vladimir Lukin

Simplified CDM method
I = R+ Inf + G, (for low values of parameters)
is used for discount rate estimation Accordingly to referred article by Kotova and Shapoval /ref #74/
Where:
R – refinancing rate
I - discount factor,
Inf - inflation coefficient,
G - risk premium including two components: country and sectoral specific risk and company specific risk. In previous version of investment analysis only company specific risk estimated as 4% was used.
Additional estimation of 5% risk of investments into the sector of economy was made on the basis of investigation /Doing business with Ukraine, Global market briefings. Consultant editor Dr. Marat Terterov/ /ref #85/.

Please revise PDD and Excel sheet and include clear explanation of discount rate chosen in these documents.

CAR is reopened on the basis of expert opinion.
Date: 27.01.10, Author: Yuriy Pyrozhenko Please find attached PDD, version 7, and Excel sheet with included clear explanation of calculated discount rate 16.1%.
Date 28/01/10 David Diaz The new versions of the documents are ok. The values for industry premiums and sources seem reliable. CAR can be considered closed.
Date: 29/01/2010 Jochen Gross The investment and sensitivity analysis are transparent and supported with objective evidence. The results are approved by SGS expert. CAR 10 is closed out.
CAR 10 was re-opened in April 2010 due to changes of investment analysis as result of CAR#24 (see below).
Date 06/05/2010 David Diaz, Financial expert The change in lifetime and replacement of equipments is reflected in the revised investment analysis (ref 6a). The financial calculations are correct and they do show mathematical additionallity. Regarding the robustness of the analysis I like to state that the sensitivity analysis shows borderline evidence of these.
Date: 29/01/2010 Jochen Gross The investment and sensitivity analysis are transparent and supported with objective evidence. The results are approved by SGS expert. CAR 10 is closed out again.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
11	CAR	Starting date Starting date of project implementation defined as 05/07/2008 in PDD should be justified. Permissions for construction work start were issued on 15/07/2008.	8.3.1.
Date: 07.10.09, Author: Yuriy Pyrozhenko According to permission #12 from 15.07.2008 for execution of construction work on reconstruction with expansion of existent dairy farm in Velykyi Krupil' village /42/, starting date of project should be 15.07.2008. Corrected date will be included in final version of PDD.			
Date: 22/10/09 Vladimir Lukin PDD was corrected accordingly. JG 04/11/2009: pending			
Date: 09/11/09 Vladimir Lukin The date of project start is defined as 15/07/2008 when the works were started after official permit. As per definition given in JI glossary the starting date is "*the date on which the implementation or construction or real action of the project begins*". The intention of project implementation (extension of farm) at Veliky Krupil was declared 11/01/2008 by			

Ukrainian Dairy Company /39/. Please provide evidence of preliminary JI consideration when decision of project realization was adopted. CAR remains open
Date: 19/11/09 Author: Maryna Bereznytska Please find inclosed evidence of preliminary JI consideration when decision of project realization was adopted – investment decision in English /79/.
Date: 25/11/2009 Auditor: Vladimir Lukin Ref 79 is the Minutes (protocol) of the shareholders' meeting of "Ukrainian Dairy Company" Ltd № 23/07 dd. 27/12/2007. Accordingly to these minutes "Kyoto protocol flexible mechanism financing" was considered as one of necessary financial sources for project implementation. Minutes reflects discussion of alternatives – manure disposal in lagoons with traditional scheme of energy supply and biogas plant construction and risks associated with all of them as well. For instance it was underlined that the constraints for biogas plant construction are the unavailability of national equipment manufacturers and suppliers of the equipment and high capital expenses. It was decided to apply the biogas plant considering the possibility of JI revenues. The referred minutes of shareholders meeting where decision of project implementation was adopted meet the requirements to prior consideration of possible carbon revenues specified in EB 49 Annex 22. CAR can be closed
JG: 23/12/2009 The start date of the project activity is 15/07/2008, the date of construction start. The date was confirmed by Ref /42/. This is in compliance with the JI glossary. The early consideration of JI by the investor was supported with the minutes of a shareholder meeting (Ref 79) CAR 11 is closed out

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
12	CAR	application of methodology As per the methodology the emission reduction shall be defined as the lowest value among difference between baseline and project emissions estimated ex-post and difference between CO2-equivalent of captured/destroyed/used gainfully methane and emissions from fossil fuel combustion to produce equivalent quantity of energy consumed. But calculations are grounded on the difference between baseline and project emissions. Please justify that this value is less than difference between CO2-equivalent of methane captured and fossil fuel combustion related emissions caused by heat and power energy consumption by project equipment.	2.6.
Date:18.10.09, Authors: Maryna Bereznytska, Yuriy Pyrozhenko According to methodology AMS III.D emission reductions are estimated ex ante (ERex-ante) as the difference between baseline emissions (paragraph 9) and project emissions (paragraph 17 of methodology). Results of ERs estimations from PDD are based on this formula. Emission reductions calculation based on monitored data will be defined as the lowest value among difference between baseline and project emissions estimated ex-post and difference between CO2-equivalent of captured/destroyed/used gainfully methane and emissions from fossil fuel combustion to produce equivalent quantity of energy consumed.			

Date: 23/10/09 Vladimir Lukin The ex-ante approach was used for the prediction of emission reductions. According to the Monitoring Plan emission reduction will be calculated following the approach depicted by AMS III.D ex-post. CAR 12 can be closed.
04/11/2009: Jochen Gross Discussion sounds plausible
Date: 11/01/2010 Nair, Jayachandran Ex-ante calculation used for the prediction of PE of emission reductions is in line with meth. However, as per the meth the emission during monitoring phase has to be taken ex-post as it is reflected in the Monitoring Plan.
25/01/2010: Jochen Gross CAR 12 is closed after expert approval. Predicted ERs are calculated according to AMS III.D

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
13	CAR	monitoring of project emissions Gas metering system has not been installed to measure the volume of gas going to flare. The method and information source for estimation of emissions from biogas flaring should be justified, for the period since biogas production start.	4.3

Date: 08.10.09, Author: Maryna Bereznytska Emission reductions values in PDD are revised taking into account 60 day period of putting into operation of fermenters and CHP \63\. 50% of flare efficiency is considered in new project emission calculation for 60 days\3\. Gas metering system has been installed to measure the volume of gas going to flare, please find attached Statement on gas meter installation\56\.
Date: 23/10/09 Gas flow meter serial #0002118 has been installed on the inflow pipeline of flare on 1/10/2009 as it was informed by statement issued by Zorg Ukraine company /63/. Amount of biogas produced was estimated as 500 m3/day pursuant to research performed by Institute of Gas (120,000 m3 per 60 days of start up works) /52/. Supposing average methane content (about 65.97%) daily methane flaring was assumed to be 330 m3/day whereas daily methane production calculated on the basis of livestock, excretion rate, Vs content and Methane producing capacity is 480 m3/day. Please justify the conservativeness of applied approach to estimation of flaring emissions. It can be acceptable that initial biogas production during start up period was lower than that proposed during consequent time, but it shall be substantiated comprehensively otherwise methane production calculated following methodology should be used. Issue shall be left open
JG 04/11/2009: I have the same thinking, response from PP is not sufficient. Finding remains open
Date: 21.11.09 Author: Yuriy Pyrozhenko Comment to the cell in the Excel file with ER calculations contains a mistake. In place of 500 m3/hour it was shown 500 m3/day. The comment is changed. This fact had not an impact on calculations results /76/. According to research performed by the Institute of Gas nominal capacity of flare candle constitutes 500 m^3/hour (or 12,000 m^3/day for Farm 1 and 18,000 m^3/day for Farm 2). Amount of methane that is supposed to be flared was calculated based on fraction of methane in biogas (65,97%) and for Farms 1 and 2 makes

up 7916 m^3/day and 11875 m^3/day correspondingly.
Date: 25/11/09 Auditor: Vladimir Lukin As indicated in ER calculation v.4 the project emission from flare is 500 m^3/hour or 12,000 m^3/day for farm #1 and 18,000 m^3/day for farm #2 that is more than assumed values of daily production of biogas. This is conservative. Thus acceptable. CAR can be closed
Date: 22/12/09 Nair, Jayachandran CAR 13 can be closed Actual value of gas flared biogas may differ from those proposed on the basis of candle capacity (500 m3/hour) and this may affect calculated CER on the verification stage. This estimation may deem conservative if actual volume of biogas flared is less than 500 m3/hour. After stabilization of biogas generation the real biogas outflow may exceed proposed value.
Date 23/12/2009: Jochen Gross CAR 13 is closed out following expert confirmation.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
14	CAR	technical details of project Please update the PDD with the technical description of preliminary storage reservoir.	15.
Date: 08.10.09, Author: Yuriy Pyrozhenko Technical description of preliminary storage reservoir is presented in PDD (page 14): “The receiving reservoir has an oval shape (the tank capacity is 765 м3, height – 3 m, inner width – 24 m). The tank is made of a reinforced concrete on sulphate-resistant cement with the side thickness 0,2 m, fossil for 2,7 m into the land. From the outside the sides are isolated by the two layers of damp course and have variable height depending on the level of filling, inside they are protected from corrosion with special foam that is stuck on mastic and has variable height depending on the level of filling. The tank bottom and sides have a built-in heating system and heating insulation. For protection heating insulation system from negative affect of environment the sides have a metal trimming. The receiving tank has a reinforced ferro-concrete plate 0,18 m thick as its cover. The plate reduces losses of heat and biogas from the tank” \12\.		
Date: 23/10/09 Vladimir Lukin Given description corresponds to working project. Please substantiate if the storage time of the manure after removal from the animal barns including preliminary reservoir will not exceed 24 hours before being fed into the anaerobic digester as required by methodology. How this will be ensured on the basis of manure inflow rate? CAR remains open.			
JG 04/11/2009: remains open			
Date: 19/11/09 Author: Maryna Bereznytska			

The receiving tank has a reinforced ferro-concrete plate 0,18 m thick as its cover. The plate reduces losses of heat and biogas from the tank. Inside there are two hydrokinetic mixers that are put into manure mass to mix substance with the aim of its homogenization. The tank is cleaned from remnants of manure and insoluble elements by their pumping with the help of vacuum tun 8-48 times per day. From the receiving tank manure is transported under pressure to the fermenter via the pipe system. The storage time for manure in receiving tank is less than 24 hours /80/.
Date: 25/11/2009 Auditor: Vladimir Lukin The construction of preliminary reservoir does not envisage long term storage of manure (exceeding 24 hours as required by methodology) volume of manure shall be exchanged 8-48 times per day that is confirmed by the letter from equipment supplier. Also the methane emission from preliminary reservoir is prevented by concrete lid. Can be closed.
Date: 13/11/2009 Nair, Jayachandran Can be closed on the basis of justification given in FO.
Date 23/12/2009: Jochen Gross CAR 14 is closed out following due to expert confirmation.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
15	CAR	baseline emissions Please provide the report of lab tests used for identification values of a dry matter fraction in manure (f_d) and ash fraction (ASH) performed in April 2008 along with lab certificate. Please justify how the representativeness of this data can be ensured for the whole year?	2.8.

Date: 08.10.09, Author: Yuriy Pyrozhenko According to AMS III.D methodology VS values depend on genetic source of the production operations livestock as well as formulated feed rations. All dairy cows at Farm 1 belong to Holstein breeds from Germany. For Farm 2 an agreement between Ukrainian Dairy Company and companies from Germany and Hungary that assume delivery of Holstein breeds has been already signed. Feeding of the same type is envisaged in UDC Farms during the year (cows are not pastured)\67\. Therefore, in PDD monitoring plan it is proposed to perform measurements of f_d and ASH once a year.
Date: 23/10/09 Vladimir Lukin It is explained that livestock will be handled in the same conditions and feed ration all the year round (as it was reflected in official Sanitary –Epidemiologic conclusion). Therefore there is no reason to change of manure characteristics during the year. This explanation seems acceptable.
JG 04/11/2009: story sounds plausible but evidence in form of lab report is still missing. Finding remains open.
Date: 09/11/09 Auditor Vladimir Lukin

Lab test report dd. 18/04/2008 on the analysis of dry content, ASH, wet, organic solids, and other components in two samples of manure /29/ has been submitted to SGS. Original data of dry content and ASH are in compliance with those used in calculation of baseline emissions. CAR can be closed
Date: 21/12/2009 Nair, Jayachandran CAR can be closed based on justification given in FO. The cattle feed remains the same and it is confirmed with documentary evidence provided by independent third party – Sanitary and Epidemic Conclusion /67/. Performing of multiply tests is encouraged in order to gain confidence that manure characteristics are not changed over the different seasons.
Date: 23/12/2009 Jochen Gross CAR 15 is closed out following expert confirmation.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
16	CAR	baseline and project emissions To substantiate assumptions used for baseline and project emissions calculation please provide following evidence: 1/ methodology of biogas content lab testing 2/ Project documentation for farm #2 Komarivka 3/documentary evidence to substantiate the efficiency of electric boiler (certificate) 4/ thermal demands for fermentors and digesters heating	2.8

Date: 08.10.09, Author: Maryna Bereznytska Please find attached evidences: 1/ Letter from Gas Institute with description of methodology and equipment of biogas content lab testing/52/, 2/ Extract from Project documentation for farm #2 Komarivka/4/, 3/Copy of boiler technical passport with data on the efficiency of electric boiler /68/, 4/ thermal demands for fermenters and digesters heating stipulated in Letter of company Zorg that installed and maintain the biogas plant in Krupil /63/.
Date: 23/10/09 Vladimir Lukin 1/ As per the informational note issued by Ukrainian Institute of Gas /52/ the chromatographic method was used for biogas content testing. Equipment – Gas chromatograph Agilent # 6890N, Testing conditions: gas – argon, columns: MOLSIV 15m length – for light gases and PLOTQ 15m length – for carbohydrates, temperature: +200 Cº. Please clarify if the standardized testing methodology used and provide evidence to confirm appropriate uncertainty level of testing. 2/ Described in PDD technical details of project proposed to be implemented on farm #2 Komarivka are confirmed by extract from Project design /58/ and Technical description of biogas running cogenerator unit JMC-312 GS-B.L /54/. 3/ Technical details of electric heaters used are confirmed with provided manufacturer's certificate/68/ - acceptable 4/ Total power demand of digester including equipment operational demands and heating demands constitutes 274.480 kW per year pursuant to injury provided by equipment supplier /63/. - acceptable JG: 04/11/2009: CAR 16 remains open

Date: 23.11.09, Author: Maryna Bereznytska The standardized testing methodology was used with Gas chromatograph Agilent # 6890N and the uncertainty level of testing was in accordance with standard /81/ .
Date: 25/11/09 Auditor: Vladimir Lukin Standardized method Intergovernmental Standard GOST 23781-87 *"Natural combustible gases. Chromatographic method for determination of component composition"* /81/ is used Gage repeatability and reproducibility of method as defined in standard is to be less than 0.3%. Information acceptable and CAR 16 can be closed. [Acceptance and close out]
Date: 22/12/09 Nair, Jayachandran Can be closed.
Date23/12/2009: Jochen Gross CAR 16 is closed out following expert confirmation.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
17	CAR	application of baseline methodology The project does not fulfil the applicability criteria for AMS III.D (less than 60,000 t CO_2 / year). Please justify why SSM approach / AMS III.D is used.	2.1.

Date: 08.10.09, Author: Yuriy Pyrozhenko AMS III.D methodology is applicable if measures are limited to those that result in aggregate emission reductions of less than or equal to 60,000 t CO2 eq. annually **from all type III components** of the project activity. Emission reductions from methane recovery in animal manure management systems for the period 2009-2012 are in the range of 409-32101 t CO_2 eq. for 2 farms. That's why SSC methodology was used.
Date:23/10/09 Vladimir Lukin AMS III.D envisages the different types of measures resulted in emission reduction which shall be treated as the different component liable to different methodologies. In particular if the recovered methane is used for thermal or electrical energy generation directly that component of the project activity shall use a corresponding category under Type I (AMS III.D paragraph 5). The limitation of aggregate emission reductions by 60 kt of CO2 equivalent is only applicable to Type III components of the project activity (paragraph 7). Therefore formally this approach is in line with methodology and seems acceptable. CAR 17 can be closed.
JG 04/11/2009 CAR 17 closed.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref

18	CAR	Baseline Project uses two baselines. Both of them do not contradict each other and look supplemental. Therefore in fact there is the single scenario including two emission sources – anaerobic decay of manure and fuel combustion to produce electricity that would be consumed in the absence of project activity. Please justify why united baseline comprising all emission sources could not be applied? Please present your approach how you ensure that double counting of ERs does not take place.	3.1.

Date: 08.10.09, Author: Yuriy Pyrozhenko
Each of two emission sources corresponds to separate SSC methodology (AMS III.D and AMS I.C).
Each methodology establishes different limitations. According to AMS III.D methodology measures are limited to those that result in aggregate emission reductions of less than or equal to 60 kt CO2 equivalent annually. AMS I.C methodology requires that thermal generation capacity should be less than 45 MW.
The proposed project is in line with these SSC methodologies, because:

1. Emission reductions from methane recovery in animal manure management systems for the period 2009-2012 are in the range of 372-32101 t CO_2-eq.
2. Total generation capacity of 5 co generators at two Farms makes up 5,3 MW

Two above mentioned baselines can not be combined because of different requirements and limitations of SSC methodologies.
Concerning double counting, Annex 2 of PDD presents quality control procedures for data used in calculations of baseline emissions and consequently emission reductions.

Date: 23/10/09 Vladimir Lukin

1/ Pursuant to the Guidance On Criteria For Baseline Setting And Monitoring the baseline for a JI project shall cover emissions from all gases, sectors and source categories listed in Annex A of the Kyoto Protocol, and anthropogenic removals by sinks, within the project boundary.
No one of two baselines delineated in PDD covers ALL emission sources attributable to project.

To gain compliance with above requirements and also to gain transparency in estimation of baseline emission it would be better to define single baseline with separate delineation of I- and III-type emission sources.

2/ Please include into Excel sheet the calculation emission reduction AMS III.D and AMS I.C components separately.
It is not traceable from calculation how lowest (372 t CO2) and highest (32105 t CO2) estimation of emission reduced from manure management system was obtained.

3/ Following information is necessary to be reflected in PDD and substantiated with relevant evidence:

i/ produced heat and power utilization manner

ii/ Is there any possibility of releasing of manure or final sludge discharge from the project activity into natural stream?

Revision of PDD is necessary.

JG. 04/11/2009: CAR 18 remains open

Date: 21.11.09 Author: Yuriy Pyrozhenko
1/ PDD was revised. Single baseline was defined with separate delineation of I- and III-type components.

2/ Calculations of emission reductions in Excel sheets are now presented separately for components III.D and I.C. Please see attached revised Excel file where the lowest (409 t CO2) and the highest (32 101 t CO2) emission reduction values for III.D components presented /76/. 3/ i/ Information about produced heat and power utilization manner is described in PDD (see pages 14 and 20), electricity consumption for farm #1 is 1.3 MW per hour /77/ ii/ Unapproved discharge and disposal of wastes within the boundaries of water protection zones and zones of sanitary conservation as well as in other places that could lead to danger for the environment and people health is prohibited according to Ukrainian legislation (the Law of Ukraine "On Wastes" of 05.03.1998 #187/98-BP, article 33) /82/. In any case, Farms of Ukrainian Diary Company Ltd. are situated within the normative limits from lakes and rivers as well as water protection zones and zones of sanitary conservation /77/.
Date: 25/11/09 Auditor Vladimir Lukin 1/ version 3 of PDD dd. 23/11/2009 contains delineation of united baseline (Power supply from regional grid and storage of manure in anaerobic lagoons) with identification of components attributable to AMS I.C and AMS III.D methodology. – acceptable. 2/ ER Calculation spreadsheet was revised. Latest version of ER calculation spreadsheet v.3 dd. 22/11/2009 contains separate calculation of emission reduction coming from AMS III.D and AMS I.C components of project activity. - acceptable. 3/ i/ Following text found at the page 14 of PDD: "Wires for electric power supply (of farm) are joined to the cogeneration unit electrical compartment" does not mean uniquely that cogeneration unit can not supply power into the grid. Please clarify. - open ii/ Provided evidence – the letter from general contractor – ZORG Ukraine /77/ does confirm that the projects are not situated in the water protective zone of surface water flows and the direct discharge of manure into them is prohibited by National legislation (Law of wastes /82/. Thus acceptable. CAR remains open (3. i/)
Date: 02.12.09 Author: Marina Bereznytska The electrical energy consumption for both farms of UDC is more then total electrical capacity of installed within the project co generators /77/. For example for Farm 1 it amounts to 1.3 MW/h and 0.955 MW/h accordingly. This information confirms the fact that the electricity will be consumed only for own needs of farms and will not be soled (please see revised PDD, p.14).
Date: 04/12/2009 Vladimir Lukin: *It was confirmed wile reviewing both information provided by plant owner /77/ and the project design /12/ that total capacity consuming by all electrical equipment at farm 1 (1.3 MW) is less than installed capacity of cogeneration unit (0.955 MW). Thus power export seems unlikely because power will be consumed in-house.* . MW*h is used instead of MW to express capacity of equipment in PDD. Please rectify. Also: PDD page 19: heat capacity of co generators 2,0 and 3,3 MW•h at Farms 1 and 2 correspondingly. MW*h is not applicable to express capacity. This is energy output units. Please justify. CAR 18 can be closed after revision of PDD.
Date23/12/2009: Jochen Gross

Closure of finding pending PDD revision
Date: 28.12.09 Author: Marina Bereznytska PDD is revised.
Date: 08/01/10 Vladimir Lukin PDD was revised accordingly and energy units were rectified in PDD version 5. CAR can be closed out.
Date 25/01/2010: Jochen Gross Baseline approach is in compliance with AMS III.D and AMS I.C. It is ensured by QA/QC procedure that double counting can't take place.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
19	CAR	Additionality (barrier analysis) The PDD does not show that described barriers appear to be invincible for project implementation and that JI status is the only condition that makes the project feasible. Please justify how barriers prevent the implementation of the project and why the JI status is necessary to overcame them. 1. The prevailing practice barrier can not be accepted due to insufficient common practice analysis. The description given in section B.2 shows that there is relevant experience in operation of other biogas plants in Ukraine. Please justify. 2. The legislative barrier emphasizes that before green tariff adoption national legislation had not possessed any incentives to develop biogas projects. But it also hardly can constitute an overwhelming constraint to project implementation.	3.2.

Date: 09.10.09, Author: Yuriy Pyrozhenko
In USSR time a few small biogas plants have been working in Ukraine. In particular, biogas plants with volume of reactor 15m3 at battery farm "Kyivs'ka" as well as biogas plant at sovkhoz "Rossiya" (swine farm) with volume of reactor 170 m3 per day were built.
But after USSR disintegration these biogas plants stopped their work\24\.
So far, only one biogas plant is functioning in Ukraine. This biogas plant was built at swine farm "Elenovka" (Dnipropetrovs'k region) and includes 2 reactors with volume 1,000 m3 each. Biogas plants as a rule are very expensive. The possibility to construct biogas plant in Elenovka emerged only thanks to grant from government of Netherlands. The source of funding for UDC biogas project is bank credit. Hence Elenovka and UDC biogas projects have different sources of financing. Construction of biogas plants is not funding from Ukrainian government and there is no state program concerning development of biogas projects in Ukraine\24\.
Biogas technologies for utilization of cattle, swine and poultry manure differ from each other. There is no relevant experience in Ukraine in constructing of biogas plant with utilization of cattle manure. Therefore, the proposed project is the first of its kind \69\.
According to Technological designing departmental regulations of Agro-Industrial Complex cattle manure after removal from confinements should be stored during 6 month in lagoons paved with waterproof film\19\. UDC Farms comply with these requirements and therefore do not need to change the practice of manure management.
According to above mentioned information, without financial instruments of Kyoto protocol, farmers,

including UDC, will not change common practice of manure storage in lagoons. In Austria federal agricultural organisations and banks provide financial support to the biogas projects. Denmark government subsidises biogas projects (20% from construction estimate). In case Ukraine will have governmental subsidising or financial support from banks and other institutions, biogas projects will become profitable even without revenues from selling of ERUs. In many countries (Austria, Germany, Switzerland, Italy etc.), including Ukraine, green tariffs have been already adopted. Biogas projects that presume selling of electrical energy gained from renewable biomass to the grid, as a rule, will also become profitable without Kyoto protocol mechanisms. In case of UDC all electricity produced in co generators from biogas will go on farms own needs. That's why green tariffs were not considered in additionality analysis.
Date: 23/10/09 Vladimir Lukin The technological barrier is comprehensively described in the given reply and confirmed with relevant evidence: Scientific research "Use of Methane Emissions from Wastes for Biogas Production" by E.M. Rodina, Sh. A. Ilyasov, and Z. A. Abaikhanova / journal "Vestnik KRSU" v.6 2003. /24/ Legislative barrier seems not to be applicable to prove additionality because of following: 1/There are no legal requirements or whatever official regulations that prevent implementation of proposed activity or constitute any additional constraints; and 2/the absence of State financial stimulation can not constitute the overwhelming barrier for project implementation. Other financial aspects of proposed activity can make such a project profitable but all of them are already discussed in investment analysis and there is no need to present them as separate barrier. Please revise PDD accordingly.
JG: 04/11/2009: Many project developers make use of multiple arguments for the demonstration of additionality. This is always an area with a huge potential for critical comments like: *"Why do you list several arguments, is your main argument not strong enough?"* In this case the additionality of your project would be strongly questionable. To avoid this situation the easiest way is to delete all minor arguments from the PDD and focus on the main argument for the demonstration of the additionality. Unfortunately I'm not able to check the last PDD version. I assume the barrier analysis is only a voluntary assessment step. Therefore it should be deleted to make the additionality assessment more transparent. CAR 19 remains open
Date: 23.11.09 Author: Yuriy Pyrozhenko PDD is changed. Only investment barrier is left.
Date: 25/11/09 Auditor Vladimir Lukin Barrier analysis of all barriers has been removed from PDD ver. 3 dd. 23/11/2009 thus discussion became inapplicable. Benchmark Investment analysis is the only to substantiate additionality. CAR 19 can be closed.
Date 11/12/2009: Jochen Gross Barrier analysis is deleted in final PDD. CAR19 closed out

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
20	CL	Monitoring procedure	5.2.2.

		The responsibilities are not transparent. Please detail the authority/responsibilities for project implementation and monitoring performance along with organizational chart (the organigramme is preferable form of performance)	
Date: 08.10.09, Author: Maryna Bereznytska Detailed instruction on emission reductions monitoring under the Project is under consideration of Ukrainian dairy company management. Please find attached draft of the document \64\. It is expected to have the confirmed instruction at 29-30 of November 2009.			
Date: 23/10/2009 Vladimir Lukin The draft monitoring manual was developed on Ukrainian languish and submitted to SGS. Please incorporate the description of personal authority and responsibility distribution for each step of monitoring data processing including data collecting, handling, checking, calculation, reporting, meters calibration and maintenance into PDD / Monitoring Plan. CL 20 remains open			
JG: 04/11/2009: CL 20 remains open			
Date: 22.11.09, Author: Maryna Bereznytska Please find revised draft monitoring manual /19/.			
Date: 02.12.09, Author: Maryna Bereznytska Personal employers' trainings evidences as for monitoring instruction with respective provisions will be provided during the first verification.			
Date: 04/12/2009 Vladimir Lukin & Jochen Gross CL 20 is transformed into FAR 27: Evidence of trainings for personal engaged into monitoring processes shall be checked during first verification.			

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
21	CL	Monitoring procedure Please provide adopted monitoring procedure (manual) including following sections: • emergency preparedness (for cases where emergencies can cause unintended emissions) • calibration of monitoring equipment • maintenance of monitoring equipment and installations • monitoring, measurements and reporting • day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) • dealing with possible monitoring data adjustments and uncertainties • review of reported results/data • internal audits of GHG project compliance with operational requirements where applicable • project performance reviews before data is submitted for verification, internally or externally • corrective actions in order to provide for more accurate future monitoring	5.2.

		and reporting	

Date: 08.10.09, Author: Maryna Bereznytska
Detailed instruction on emission reductions monitoring that includes all these items within the Project is under consideration of Ukrainian dairy company management. Please find attached draft of the document \64\. It is expected to have the confirmed instruction at 29-30 of November 2009.

Date: 23/10/09 Vladimir Lukin
Draft Monitoring procedure was provided to SGS

- emergency preparedness

Monitoring procedure envisage fossil fuel combustion for power production during 24 hours per year. Project emissions in emergency proposed to be calculated on the basis of combusted diesel.

- calibration of monitoring equipment

Monitoring procedure contains list of metering equipment and template of registration log for calibration records. All equipment proposed to be calibrated with periodicity defined in relevant manuals and national standards. Responsible person shall be defined by project owner – UDC.

- maintenance of monitoring equipment and installations

Monitoring procedure states the responsibility for meters maintenance accordingly with the metering equipment manuals.

- monitoring, measurements and reporting

Pursuant to Monitoring procedure operation staff obligated to perform necessary monitoring and measuring as defined by monitoring plan and make necessary records in monitoring logbook.

- day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)

The list of data to be registered during monitoring in Monitoring procedure corresponds to those in Monitoring plan. Templates of log books for monitoring data shall be developed as annexes to Monitoring procedure. Monitoring procedure envisage appointment of Senior operator, duty operator and chemistry analyst who are responsible for the gathering and handling of initial monitoring data.

- dealing with possible monitoring data adjustments and uncertainties.

Accordingly to Monitoring Procedure Project owner – Ukrainian Dairy Company shall allocate person who will be responsible for data handling, reporting and checking before they will be applied for emission reduction calculation. Monitoring procedure envisages crosschecking of all data inputed by hands against relevant records

- review of reported results/data

Review of reported data shall be performed by Project developer – Foundation of green investments who is also responsible for issuing of monitoring report.

- internal audits of GHG project compliance with operational requirements where applicable

Internal audits are not envisaged by Monitoring procedure.

- project performance reviews before data is submitted for verification, internally or externally

Project owner is responsible for all possible changes in project performance that may affect emission reduction calculation.

- corrective actions in order to provide for more accurate future monitoring and reporting

corrective actions are not applicable because internal audit procedure is not envisaged by Monitoring manual.

Please provide details of meters used for diesel consumption estimation.

JG: 04/11/2009:

The client was informed about the potential risk for the periodic verification of emission reductions. It may occur that ERs will not be verifiable due to deficits in relevant procedures.

To ensure that the procedures are implemented and adequate FAR 26 is raised.

CL 21 remains open with respect to meter details for diesel consumption

Date: 19/11/09 Author: Maryna Bereznytska

To provide the diesel consumption estimation the next information is fixed in the Monitoring Journal /19/: simply filling in of each tank of diesel generator fuel, the degree of its filling (the per cent on the front panel of the generator) and hours of work. Fuel consumption is to be calculated according to the technical characteristics of the generator Magnum G400 VSA - 120 l per 5 hours /78a/. Built-in electronic sensor of fuel tank filling degree is not subject to calibration /78b/.
Date: 23/12/2009 Auditor Vladimir Lukin The diesel consumption metering procedure was discussed in details under CAR 7. PP is requested to specify the formulae for calculating of diesel consumption in PDD. CL 21 can be closed and further discussion of diesel consumption monitoring is transferred to CAR 7.
JG: 23/12/2009: The client was informed about the potential risk for the periodic verification of emission reductions. It may occur that ERs will not be verifiable due to deficits in relevant procedures. CL 21 is transformed into FAR 26 to ensure the relevant monitoring procedures are officially approved and implemented Further discussion of diesel consumption monitoring is transferred to CAR 7.

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
22	CL	Stakeholders consultation Please provide the minutes of the consultation and a summary of stakeholders comments on implementation of part 2 of project (at farm Komarivka) Please specify what medias were involved to announce the project and to collect the comments from stakeholders.	7.1
Date: 08.10.09, Author: Maryna Bereznytska Please find the attached Minutes and a summary of stakeholders comments for Farm 2 (Komarivka, Chernigiv region)\70\			
Date: 23/10/09 Vladimir Lukin The minutes of meeting in administration of village Komarivka, Borznyanskiy district, Chernigov region dd. 27/02/2008 that contain the decision to allow the construction of farm with 6,000 heads of cattle capacity. No negative comments were provided. CL can be closed.			
JG 04/11/2009 stakeholder consultation is not required similar to CDM. Therefore it is acceptable. Finding closed.			

Date: 23/09/2009 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
23	CL	project lifetime Please substantiate the project lifetime which is defined as 10 years and provide relevant documentary evidence.	8.3.3

Date: 08.10.09, Author: Maryna Bereznytska Biogas plant on Farm 1 (Krupil, Kyiv region) within the project is the first installation of this type in Ukraine, the Biogas plant is the complex installation consisting of various units that have different lifetime periods. But as the complex installation it will have a lifetime of 10 years in accordance with assessment of the manufacturing company ZORG \71\
Date: 23/10/09 Vladimir Lukin PP has presented the official informational note from equipment supplier - company Zorg Ukraine /71/ that confirm the 10 year long equipment operational lifetime in the case all technical requirements and operational conditions are met and maintenance and repairing works are carried out timely. CL can be closed.
JG: CL 23 pending further information from Vladimir
04/12/2009 Vladimir Lukin The evidence provided by PP is the official informational note issued by equipment supplier and signed by General director of Zorg-Ukraine /71/. Equipment supplier has clarified that operational lifetime of whole equipment of biogas plant is 10 years nevertheless some components such as concrete reservoirs can be operated for longer time. 10 year long operation lifetime is confirmed.
JG: 11/12/2009: lifetime of equipment (10y) is supported with reliable evidence. CL 23 closed out

Date: 24/09/2009 Raised by: Jochen Gross/David Diaz/Vladimir Lukin

No.	Type	Issue	Ref
24	CAR	Additionality / investment analysis 1/ Please provide the breakdown of the project operational costs and specify the incomes for electricity selling along with relevant supportive documents. 2/ Please consider depreciation and taxation effects in cash flows. 3/ Please clarify why the investment analysis covers more than 10 years whereas lifetime is defined as 10 years? 4/ Please consider the project residual values or continuity values as cash inflow in investment analysis, if any. 5/ Please provide the ground for project discount rate estimation and substantiate 10% discount rate used in the NPVs calculations whereas bank interest is 23%? 6/ Please include sensitivity analysis of all key parameters. 7/ Investment analysis is not quite legible. it would be better to divide the analysis of project with ERUs and without ERUs.	3.2

Date: 16.10.09, Author: Yuriy Pyrozhenko
1/ Electricity price of 60 EUR/MWh was revised. Recalculated price is based on inquiry #773 of 11.12.08 from UDC about electricity consumption at Farm 1 for the period January-March 2008 and amounts to 44,52 EUR/MWh (conservative assumption)\33\. Income from electricity displacement for the period 2009-2018 is in the range of 104425-1509068 EUR (average for the period – 1360670 EUR).
Breakdown of the project operational costs, EUR

Parameters	Farm 1	Farm 2
Fermenters maintenance	15 000,0	22 500,0

Cogenerators maintenance	15 000,0	22 500,0
Staff Salary	12,000,0	12,000,0
Other	3 000,0	3 000,0
Total	45 000,0	60 000,0

2/ Annual depreciation value calculated using linear method amounts to 756000 EUR. According to requirements of "Tool for the demonstration and assessment of additionality" (version 05.2)\29\ depreciation has been only taken into account for the calculation of the taxes and is not included in the cash flow. According to Ukrainian legislation, taxation of income makes up 25%\72\.
3/ Revised investment analysis covers only project live circle (10 years)\71\.
4/ Residual value should be considered as a cash inflow in the final year and only in case when capital expenditures have not been fully devalued\69\. Life circle of proposed biogas project amounts to 10 years and depreciation values were calculated for this period. Consequently, it is envisaged that at the end of the period capital expenditures will be fully devalued.
5/ Project discount rate 10% was revised. Recalculated project discount rate amounts to 11,2%.
This revised value was calculated as a sum of Euro deposit rate for the moment of investment decision-making of 27th December 2007 \73\ and investment risk \74\.
6/ Among all key parameters only revenues from electricity displacement constitutes more than 20% of total project revenues, that's why for this parameter sensitivity analysis has been done.
Sensitivity analysis covers a range of +10% and -10%.
Results of analysis are as follows:
- with revenues from selling ERUs (+10%) IRR and NPV are 16,1% (discount rate is 11,2%) and 1174285 EUR accordingly;
- with revenues from selling ERUs (-10%) IRR and NPV are 11,4% and 46708 EUR accordingly;
- without revenues from selling ERUs (+10%) IRR and NPV are 9,6% and -405976 EUR accordingly;
- without revenues from selling ERUs (-10%) IRR and NPV are 5,1% and -1533553 EUR accordingly.
Therefore, even taking into account +/-10% for electricity cost the proposed project is profitable with revenues from selling ERUs and unprofitable without Kyoto protocol mechanisms.

7/ The recommendation has been taken into account.
Please find attached Excel file with revised financial analysis \4\

23/10/09 Vladimir Lukin /David Diaz

1/ The power price of 44.52 EUR/MWh was confirmed by informational note provided by UDC /33/ and found consistent.

Please substantiate the breakdown of operational costs with relevant evidence.

2/ Taxation of income makes up 25% is confirmed by Ukrainian national law on profit taxation implemented by order #VR 335/94 dd. 28/12/94 /72/,

3/ Investment analysis was revised. 10 years long period was used.

4/ It is necessary to clarify that the "full devaluation" concept. In project evaluation this is referred to commercial values of assets. In other words it could be possible to find assets that have no book value (fully devaluated for tax purposes) that still have some commercial value. Usually book value and commercial values are different; Please clarify that the project will have **no commercial value** (residual value).

5/ Euro deposit rate – 7.1% for the moment of investment decision-making of is confirmed by banks statistical reporting data on deposit rate on 27th December 2007 presented by PPs /73/. Investment risk is assessed using CCM (cumulative construction method). Referred source /72/ does not contain certain estimation of risk (4.1%). It is not clear how this value was obtained. Please clarify and specify all assumptions used for risk estimation along with relevant evidence.

6/ The variance in power production (+/- 10 %) was not included into sensitivity analysis.
Please update investment analysis accordingly

7/ Investment analysis was updated with different sheets where the financial indicators for project were

calculated either with or without ERU selling. Points 1/, 4/, 5/ and 6/ remain open.
JG 04/11/2009: finding remain open [Acceptance and close out]
Date: 21.11.09 Author: Yuriy Pyrozhenko 1/ Please find the relevant evidence for breakdown of operational costs /77/. 4/ It is expected that in 2018 the residual value of biogas equipment at Farms 1 and 2 will be equal to the cost of metal constructions (scrap metal). Cost of scrap metal at Ukrainian home market on the moment of Investment decision-making (December 2007) amounted to 188 EUR/t. Weight of biogas plants metal constructions (co generators, pumps and mixers) at both Farms constitutes 135 t. Residual value of assets calculated based on above mentioned values makes up 25 thousand EUR /84/. 5/ Risk value was slightly revised in accordance with data from published sources (Kotova M.V., Shapoval S.S. Grounding of the method of calculations the discount rate in domestic practice. – Economichny prostir. - 2009. №22/1, p. 92-98). In risk rate usually the following risks are considered: insufficient diversification of production; insufficient diversification of market, size of enterprise (investment risks into the small enterprises), country risk, and insufficient information about perspectives of project realization. Taking into account specificity of business in Ukraine, in methodology (Kotova M.V., Shapoval S.S. Grounding of the method of calculations the discount rate in domestic practice. – Economichny prostir. - 2009. №22/1, p. 92-98) it is proposed to use risk value that is the middle of the range of 3-5%. Hence, for the current project risk value that makes up 4% was used. 6/ Updated sensitivity analysis that covers variance in power production as well as Capex and Opex (+/-10%) is presented in revised PDD and Excel sheets /83/.
Date: 04/12/2009 Auditor Vladimir Lukin 1/ Additionally requested operational cost breakdown is confirmed by Chief of Executive Board of LLC Ukrainian Dairy Company (letter #726 dd. 23/11/2009) /77/ 4/ related to CAR 23 . can be closed because discussion is continued under CAR 22. Cost of scrap metal has been added to financial analysis and confirmed with /84/ 5/ Provided reference – article written by Kotova M.V., Shapoval S.S. /74/ confirms that cumulative constructing method (CCM) is used to define discount rate. 6/ Sensitivity analysis was updated in PDD and calculation sheet. . All references /74/, /77/, /84/ have been checked and found consistent. Calculation spread sheet was revised accordingly. CAR can be closed. [Acceptance and close out]
Date: 26/10/2009 David Diaz Depreciation effects are now correctly included in the analysis The Cumulative Constructing Method (CCM) is valid for the estimation of the mentioned discount rate, thus point has been now correctly addressed and can be considered closed. The sensitivity analysis is OK. [Acceptance and close out]
23/12/09 Vladimir Lukin

CAR 24 can be closed

Date 23/12/2009: Jochen Gross

CAR#24 is closed out based on expert approval.
[Acceptance and close out]

Date 22/03/2010 Jochen Gross

CAR#24 is re-opened during SGS internal review stage due to different expert opinions on residual value of the project activity at the end of a 10 year period. The residual value, equal to the scrap price of the equipment at the end of the 10 year period, is in contrast to information from other project activities. SGS experts have seen calculation with residual values up to 40% of the total investment at the end of a 10 year period. If a 40 % share of total investment is assumed as residual value of your project, the IRR becomes nearly equal to the benchmark applied.

Please answer the following question:
The open question is now, why is the residual value of your project equal to the scrap price, or with other words, why your equipment is at the end of the technical lifetime after a 10 year period?

Date 09/04/2010 Author: Maryna Bereznytska

In accordance with official data from company-supplier of equipment technical lifetime of co generators consisting of biogas plants amounts to 60000 operating hours (7,5 years in conditions of the project). In connection with this, cost of co generators major overhauls was included in financial analysis. For Farm 1 the overhaul is planned in 2016, for Farm 2 - in 2017 (financial expenditures will constitute 730000 and 1570000 EUR correspondingly) /Zorg letter #140 from 23/04/2010/ and /Excel file with financial Analysis/.

Ukrainian experts would like to draw the attention of SGS to the fact that the installation of biogas plant for electricity and heat production is the first project of its kind in Ukraine. This project has several barriers including technical one (please see PDD, p.27) that may affect operation lifetime.
The local specific operation conditions that may reduce operation lifetime of equipment in Ukraine in comparison with any other sites are the following:

- The lack of biogas plants operating experience within the similar projects in Ukraine.
- The local climatic conditions specifically the seasonal temperature difference that leads to unsteady equipment load across the year.

Comparative analysis of temperature conditions between Ukraine and Germany is presented in the table bellow:
Average value

month	Ukraine (Kyiv)	Germany (Berlin)
July	+19.5	+16
January	-4.3	+0,5

http://pogoda.ru.net/climate/33345.htm
http://www.worldweather.org/016/c00059.htm

Date 07/05/10 Vladimir Lukin, Jochen Gross

On the basis of discussion of investment analysis PP has reconsidered the investment analysis to apply more realistic technical lifetime of equipment - 15 years instead of 10 years on the basis of information provided by Regional equipment supplier Zorg company /95/. The financial assessment period was expanded up to 15 years. Also the costs of periodic capital repairs after 8 years of operation were included into revised investment analysis version 6 (Ref 6a).
It was confirmed by information available at the website of the authorized affiliate of GE Jenbacher in Ukraine - Company Sinaps /http://www.cogeneration.com.ua/ru/support/service/schedule/type2-3/ that after 7.5 years (60000 operational hours) the engines should be replaced or overhauled.

As per information provided by equipment manufacturer the overhaul of engines is performed by the

manufacturer GE Jenbacher in Austria only (interviews /5/ & /6/) .

After analysis of all available information gathered from Project proponents, equipment supplier and equipment manufacturer the following points in investment analysis should be further clarified:

1/ Operation time of the entire biogas plant is not limited to the lifetime of cogeneration units as the practice of maintenance provided by GE Jenbacher prescribes periodical replacement/overhaul of engines. Thus the residual value of all parts of plants including concrete constructions should be transparently estimated taking into account possibility of prolongation of their usage behind 15 years long period.

2/ Neither equipment supplier nor equipment manufacturer have confirmed that the residual value of cogeneration units after 15 years long operation could be estimated as the scrap metal price. Thus this assumption should be further clarified. Residual value of engines should be estimated transparently on the basis of replaced engines price. Information support from equipment manufacturer who provides this service will be helpful in this regard.

CAR#24 Remains open

Date: 02/06/10, Author: Yuriy Pyrozhenko

In accordance with official data from the authorized affiliate of GE Jenbacher in Ukraine - Company Sinaps, the cost of major overhaul of co generators at Farm 1 (Kiev region, Zgurovskiy district, Velykiy Krupol) will be about 730 000 EUR. Repairs will be carried out by the representatives of authorized affiliate of GE Jenbacher in Ukraine - Company Sinaps directly at project site (UDC dairy farm).
As biogas plant is an integral complex, exploitation of it's separate parts after the end of technical life time is not possible and the price of all metal constructions including co generators after 15 years of operation will be equal to the cost of scrap metal.

(Project participant response)

Date: 03/06/2010 Jochen Gross

Point 1/ remains open.

Point 2/ is addressed by the answer from the PP. The supplier Sinaps confirmed the argument that the bio gas engine from Jenbacher and all metal construction are at the end of its technical lifetime after 15 y and that the residual value is equal to the cost of scrap material.

This is also confirmed by interview with the manufature of the co-generation modules GE Jenbacher, Austria.

Date: 15/06/10, Author: Maryna Bereznytska (Project participant response)

For the purpose of financial estimations the residual value of concrete constructions of the biogas plant was accepted as zero taking into account possibility of prolongation of their usage behind 15 years long period assessment. Below presented options of depreciated fermenters usage were analyzed:

Option #	Description	Explanation
1	to disassemble, replace and sell to other company for biogas plant or for other needs	Fermenters are made of reinforced concrete on the base of sulfate-resistant cement with a wall thickness of 0,2 m and it is digged into the ground on 2.7 m. The main disadvantage of this part of biogas plant - it is fundamental building of very specific design. It is impossible to disassemble and move fermenters without complete loss of its functionality. Accordingly, it is impossible to sell used fermenters without part of the Farm land selling; the banks don't accept such a construction as collateral when granting loans.
2	to use for other own needs	It should be noted that destructive processes that reduce the carrying capacity and reliability of reinforced concrete foundations and structures such as fermenter during the term of exploitation have the multiparameters character: this is the impact of soil and climatic factors of the environment and the influence of vibrations from the action of wind loads and other

		specific (eg, biochemical) operational conditions of reservoirs for manure digestion. The used fermenters after 15 years of intensive operation are to be a subject to specific diagnosis before decision making as for its possible application as a fundament of some new construction for own needs of the Farm. This specific diagnosis includes a survey of technical and corrosion condition of reinforced concrete structures by means of ultrasonic methods for determining the strength of concrete, vibration methods for evaluating the mechanical properties of reinforced concrete fermenters, as well as electrochemical methods for determining the corrosion status of reinforcement and the bare metal, located in the ground. Application of ultrasonic methods for assessing the strength of concrete is based on the existence of a stable dependence of the parameters of ultrasonic vibration in the concrete on the condition of the structure, the availability and accumulation in it of any defects or damage. With the advent of these defects decreases the strength of concrete and appropriately varies the speed (time) ultrasound propagation in concrete. The investigations of these parameters have high cost and expertise conclusion as for applicability of these parameters levels for usage in new construction will be costly taking into account high probability of negative result obtaining. There is no need to use fermenters as manure storages because the Farm has sufficient quantity of special designed in accordance with Ukrainian norms lagoons for manure storage. The used reservoirs for manure digestion could not be also used as reservoirs for fodder from sanitation point of view.

The possible selling price of the rest of non-metallic parts does not exceed additional is assembling expenditures (not included in project costs) Thus the residual value of these parts is equal to zero too.

Date: 23/06/2010 Jochen Gross

The corrections requested with respect to the investment analysis were addressed by PP. The points 1 to 7 were closed out.

1/ The operational cost breakdown is confirmed by Ref /77/. The income was specified mainly with the power price of 44.52 EUR/MWh which was confirmed by Ref /33/.

2/ Taxation of income of 25% is confirmed by Ref. /72/,

3/ The investment horizon is finally 15 years equal to the lifetime of the main equipment.

4/ The residual value of the PA is considered in the financial analysis and confirmed by Ref. /84/ and the explanation in the revised PDD v 7 from 15/06/2010.

5/ The 16.1% discount rate and the methodology for this parameter are approved by financial expert

6/ & 7/ The sensitivity and investment analysis are approved by financial expert

CAR #24 is closed out

Date: 24/09/2009 Raised by: Jochen Gross

No.	Type	Issue	Ref
25	CAR	parties involved The application of Table A.3 is not as intended. It introduces Germany as Project Participant. The Project Participants presented in Annex 1 are different. Please provide consistent information in all documents. Please correct the table.	3.2
Date: 16.10.09, Author: Yuriy Pyrozhenko			

Data about project participants were revised. At the moment Environmental Green Investments Fund (Ukraine) and Rutek Trading AG (Switzerland) are considered as project participants. Consistent data about project participants in Table A.3 and Annex 1 will be used in final version of PDD.
JG 04/11/2009: Pending. If 2 Parties are presented in PDD we need LoAs from both.
Date: 09/11/09 Vladimir Lukin PDD was updated. The request of LoA from Switzerland is incorporated into CAR 1. CAR 25 can be closed.
Date 11/12/2009: Jochen Gross Pending LoA Switzerland is incorporated into CAR 1. CAR 25 closed

Date: 23/10/2009 Raised by: Vladimir Lukin/Jochen Gross

No.	Type	Issue	Ref
26	FAR	Monitoring procedure Adequacy and adoption of Monitoring procedure shall be checked during the first verification.	
Date: Author:			
Date: Auditor [Acceptance and close out]			

Date: 23/10/2009 Raised by: Vladimir Lukin/Jochen Gross

No.	Type	Issue	Ref
27	FAR	Monitoring procedure Certain persons responsible for monitoring functions shall be appointed with relevant orders after adoption of Monitoring manual and their Personal employers instructions shall contains respective provisions. Evidence of trainings for personal engaged into monitoring processes shall be checked during first verification.	
Date: Author:			
Date: Auditor			

[Acceptance and close out]

Date: 24/09/2009 Raised by: Jochen Gross

No.	Type	Issue	Ref
28	CAR	alternative analysis PDD page 23: Discussion of alternatives not sufficient. Methane recovery is missing in description of Scenario 2 – Import of electricity from the grid .	3.2

Date: 28.12.09 Author: Marina Bereznytska
PDD is revised. Scenario 2 – Import of electricity from the grid and the manure management system without changes.

Date: 12/01/10 Vladimir Lukin

Alternative 2 Description was justified in PDD version 5. It was underlined that manure management system (anaerobic lagoons) would remain unchanged under this alternative.

CAR can be closed

Date 25/01/2010 Jochen Gross

The analysis of alternative project scenarios is complete now.
CAR 28 closed out

Date: 25/01/2010 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
29	CAR	PDD completeness Please provide reference to Key Word Energy statistic referred in PDD page 4 .	3.5

Date: 25.01.10 Author: Marina Bereznytska
Key World Energy Statistics 2007, IEA
proper link is http://www.iea.org/textbase/nppdf/free/2007/Key_Stats_2007.pdf
.

Date: 25.01.10 Vladimir Lukin

The link to Key World Energy Statistics 2007, IEA was provided. Information was checked and found consistent.

CAR can be closed

Date: 27/01/10 Jochen Gross

closed

Date: 25/01/2010 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
30	CAR	PDD completeness	8.1.2.

		The details of Project Participants on page 6 PDD and Annex 1 PDD are not consistent.	

Date: 25/01/10 Author: Marina Bereznytska
Annex 1 was revised. please see PDD v.6
.

Date: 25/01/10 Vladimir Lukin

PDD was revised accordingly. Information presented in Annex 1 of PDD v. 6 is in compliance to those given in A.3. section.

CAR can be closed

Date: 27/01/10 Jochen Gross

Closed

Date: 25/01/2010 Raised by: Jochen Gross/Vladimir Lukin

No.	Type	Issue	Ref
31	CL	Starting date of crediting period Please, state the length of the crediting period in years and months and express its starting date in DD.MM.YYYY format	8.3.2.

Date: 25/01/10 Author: Marina Bereznytska
Section C.3 was revised. please see PDD v.6
.

Date: 25/01/10 Vladimir Lukin

The start of crediting period was defined to be on the 01/11/2009 the date after 60 days of start up period since biogas plant at farm #1 was put into operation 01/09/2009. Confirmed with commissioning certificate /76/.

CL can be closed

Date: 27/01/10 Jochen Gross

closed
[Acceptance and close out]