CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.

SECTION A. General description of the small-scale project activity

A.1. Title of the small-scale project activity:

>>
PARAMOUNT INTEGRATED CORPORATION Methane Recovery and Electricity Generation.
Version 4
Completed 30 October 2006

A.2. Description of the small-scale project activity:

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The Paramount Integrated Corporation methane recovery and electricity generation project (hereafter, the "Project") developed by Philippine Bio-Sciences Co., Inc. (hereafter referred to as the "Project Developer" or "PhilBIO") is an anaerobic digestion (AD) swine wastewater treatment project at the Paramount Integrated farrow to finish swine farm located in Bgy. Callos, Peñaranda, Nueva Ecija, Luzon, Philippines (hereafter referred to as the "Host Country"). The project is hosted by the Paramount Integrated Corporation.

The Paramount Integrated farm operation is a 100% tunnel ventilated system with normal scraping and hose down cleaning of waste. The farm manages waste with a series of concrete lagoons (oxidation ponds). This material degrades anaerobically in the facility's lagoon system producing significant amounts of methane. Due to the high load, the majority of methane emissions are produced in the first two ponds.

The Project Developer will implement a turnkey 'covered in-ground anaerobic reactor' (CIGAR) that will utilise organic material currently treated in the wastewater ponds to produce biogas. The CIGAR system will treat organically laden waste-water to reduce the amount of COD (Chemical Oxygen Demand) contained prior to the waste water reaching the main pond system. The biogas produced in the project's anaerobic digester will be used to generate electricity for use on site. Currently the farm operates its own diesel engine generator, as there is no access to the electric grid. 440,000 litres of fuel oil will be displaced annually with renewable biogas, which will be utilised in generators to produce electricity.

Development of the Paramount Integrated Project will directly reduce greenhouse gas emissions produced by the release of methane from the concrete lagoons, and by carbon dioxide from the diesel engine generator currently in use on the farm. With an estimated average annual electricity production of 715,400 kWh, and a projected annual biogas offtake of 803,000 m^3, the Project will reduce emissions by 7,582 tonnes of CO_2 equivalent per year.

The Project is helping the Host Country fulfil the sustainable development goals outlined in Philippine Agenda 21. The project at Paramount Integrated will act as a clean technology demonstration project within the wastewater management sector, which could be replicated across the Philippines and the region;

- The project is an important capacity building activity, demonstrating the use of a new financial mechanism for funding of the renewable energy and waste management sector via the CDM;
- The project increases diversity and security of energy supplied through energy self sufficiency;
- The project will result in significant reduction in levels of BOD, COD and TSS and in turn will result in cleaner effluents. These effluents can be recycled on-site or off-site as irrigation water thereby benefiting the adjoining communities. Benefits shall also accrue to the communities in terms of cleaner water ways;
- The project will make the farm more competitive and thus ensure long term employment to the local residents, be a source of local taxes for the LGU which in turn will improve delivery of basic services to the community;
- The multiplier effect of this investment is likely to bring additional benefits, such as employment opportunities, particularly in the agro-industrial sector;
- The project will make use of methane rich biogas through a closed loop process, thereby reducing greenhouse gas emissions; and,
- The project will improve local air quality and significantly reduce odour, which in turn will directly benefit the adjoining communities.

A.3. Project participants:

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Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be indicated using the following tabular format.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant
The Government of the Philippines (host)	Paramount Integrated Corporation	No
The Government of the Philippines (host)	Philippine BioSciences Co., Inc. (PhilBIO)	No
United Kingdom of Great Britain and Northern Ireland	EcoSecurities Ltd. Oxford, UK	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

Note: *When the PDD is filled in support of a proposed new methodology (forms CDM-NBM and CDM-NMM),* at least the host Party(ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.

A.4. Technical description of the small-scale project activity:

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The 'covered in-ground anaerobic reactor', or 'CIGAR', breaks down organic contaminants through a three-step biological process where wastewater is treated in the absence of oxygen. The wastewater is stored in the reactor for at least 30 days where specialized bacteria consume the waste and release methane that is utilized as biogas for on-site electricity generation (see figure 1).

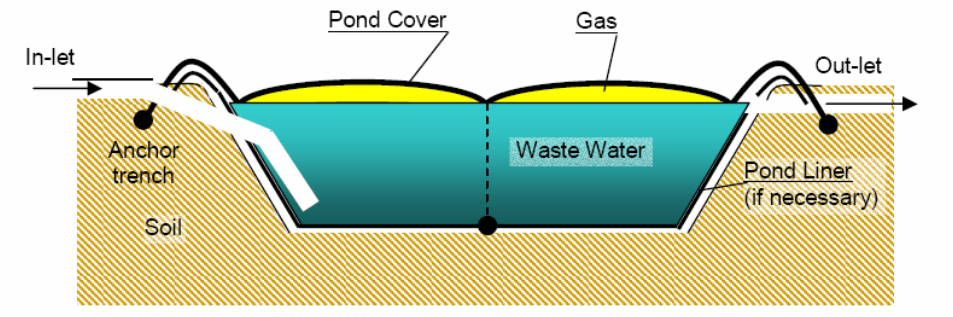

Figure 1: CIGAR pond reactor[1]

HDPE (High Density Polyethylene) liners and covers are used to provide for a 'gas seal' to prevent leachate from escaping to the underground aquifer and to prevent methane from escaping to the atmosphere. The CIGAR system is 'covered' 100% of the time with 1.0mm HDPE liners. This process results in at least 95% destruction of harmful BOD, and 80% reduction of COD. Suspended solids, color and dissolved solids are all improved in the CIGAR. Longer retention time (number of days in the CIGAR) at 35 degrees Celsius kills off all pathogenic material. The effluent is then sent to the existing ponds, where it is aerated through a facultative lagoon process as per the original design of the ponds. Methane gas makes up at least 60% of the biogas by volume. In the CIGAR for Paramount Farm, the average biogas off-take will be approximately 2,200 cubic meters per day. The biogas will be used to generate electricity for the farm through two parallel 75kW biogas engines.

The project uses CIGAR anaerobic digestion technology utilizing HDPE, a high quality, resilient plastic with a long history of durability in sunlight and rainy weather. The product, HUITEX from Taiwan, is made from carbon black resins from Chevron Singapore. The power plant is a combination of a quality power train engine from General Motor with 3-phase Magna Marathon or Stamford Electric Generator. It is a dual-fuel system for LPG and biogas where LPG could be used in case of bio-digester failure, in addition to the existing diesel fueled generators.

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

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Philippines

A.4.1.2. Region/State/Province etc.:

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Nueva Ecija

A.4.1.3. City/Town/Community etc:

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Bgy. Callos, Peñaranda

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):

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The project is located in the municipality of Peñaranda, in the province of Nueva Ecija in central Luzon in the north central region of the Philippines. The address of the project is: Paramount Integrated Corporation, Bgy. Callos, Peñaranda, Nueva Ecija.

[1] Source: "Cost Estimation of Biogas Plants in Piggeries: A Manual for Hog Raisers", prepared by the Development Bank of the Philippines.

A.4.2. Type and category(ies) and technology of the small-scale project activity:

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The category for the project activity according to the UNFCCC's published "Appendix B - Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activities" is:

- Type I.A (reference AMS-I.A version 08) – "*Electricity generation by the user"* – for the electricity generation component; and,
- Type III.D (reference AMS-III.D version 09) – *"Methane recovery"* – for the methane recovery component.

The project conforms to project category III.D since the project both reduces anthropogenic emissions by sources, directly emits less than 15 kilotonnes of carbon dioxide equivalent annually, and results in emission reductions lower than 25,000 tCO2e annually. The project activity conforms to project category I.A. since the renewable generating unit will supply an individual user with a small amount of electricity and the capacity will not exceed 15 MW. A detailed discussion of the technology of the project activity can be found in Section A.4.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

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In the absence of the project activity, *fugitive* emissions of methane from the pond system and *direct* emissions from the diesel engine generator power plant would continue unabated. The project will engineer a more sustainable waste treatment solution that dramatically reduces fugitive methane emissions, and makes available carbon neutral biogas for electricity generation. Under the business as usual scenario there would be continuing release of methane from the pond system and continued diesel generation from the on-site power plant. The current market situation and common practice in the industry is discussed in greater detail in Section B.3.

It is unlikely that anaerobic digestion projects would be developed in the Host Country in the absence of the project activity due to unfavourable market conditions and the existence of significant technological and market barriers for such projects. To date there has been limited development of such projects in the Host Country. In addition, the proposed project activity faces significant barriers to investment that drives a continuation of the prevailing business practice in the Host Nation. These barriers are discussed and further elaborated in Section B.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

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Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emissions reductions shall be indicated using the following tabular format.

For type (iii) small-scale projects the estimation of project emissions is also required.

Years	Annual estimation of emission reductions in tonnes of CO2e
Year 2006	7,582
Year 2007	7,582
Year 2008	7,582
Year 2009	7,582
Year 2010	7,582
Year 2011	7,582
Year 2012	7,582

*After the initial 7-year crediting period, the baseline will be reassessed, generating a new estimate of emissions reductions yet to be determined.	
Total estimated reductions (tonnes of CO2e)	53,074
Total number of crediting years	7 (renewable up to 21 years)
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	7,582

A.4.4. Public funding of the small-scale project activity:

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The project has not received and is not seeking public funding.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

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Based on the information provided in Appendix C, this Project is not a debundled component of a larger project activity since the project participants have not registered nor operated another project in the region surrounding the project boundary.

SECTION B. Application of a baseline methodology:

B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

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Project activity type I.A (reference AMS-I.A version 08) – *Electricity generation by the user*; and,

Project activity type III.D (reference AMS-III.D version 09) - *Methane recovery.*

B.2 Project category applicable to the small-scale project activity:

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The baseline calculation for the Paramount Integrated project follows the procedures as outlined in Appendix B of the simplified modalities and procedures for small-scale CDM project activities for categories:

- I.A (AMS-I.A version 08) - "*Electricity generation by the user"* - for the electricity generation component of the project activity; and,

- III.D (AMS-III.D version 09) - "*Methane recovery*" - for the methane recovery component of the project activity.

This selection is appropriate because the alternative to the project activity would be to continue with the business as usual scenario. This scenario would continue to manage waste water through the existing anaerobic pond system, and would continue to generate electricity with the diesel generating unit exclusively supplying Paramount farm.

- *Electricity Generation (AMS-I.A)*

For the electricity generation component of the project activity, the baseline has been calculated according to project activity type I.A which states:

The energy baseline is the fuel consumption of the technology in use or that would have been used in the absence of the project activity.

The emissions baseline is the energy baseline… times the CO_2 emissions coefficient for the fuel displaced. IPCC default values for emission coefficients may be used.

- *Methane Recovery (AMS-III.D)*

For the methane recovery component of the project activity, the baseline has been calculated according to project activity type III.D, which states:

"The emission baseline is the amount of methane that would be emitted to the atmosphere during the crediting period in the absence of the project activity.

The baseline shall cover only the capture … that would not have happened in the absence of the project activity".

The project is eligible for both type I.A and type III.D because the project includes both methane recovery and electricity generation by the user.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

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The project conforms to project category III.D since the project both reduces anthropogenic emissions by sources, directly emits less than 15 kilotonnes of carbon dioxide equivalent annually, and results in emission reductions lower than 25,000 tCO2e annually. The project activity conforms to project category I.A. since the renewable generating unit will supply an individual user with a small amount of electricity and the capacity will not exceed 15 MW. A detailed discussion of the technology of the project activity can be found in Section A.4.

MARKET SITUATION & NATIONAL POLICIES:

The Philippines has approximately 5 million farms and over 8 million pigs, and it has been estimated that the amount of livestock manure produced is 28,960 tonnes per day or 10.1 million tonnes per year. The bulk of the pig population comes from the smallholder farm which accounts for about 85% of the total hog inventory. According to the Philippine Bureau of Agricultural Statistics, the livestock industry grew by about 3 percent in 2003, with the hog sector as the major contributor. Hog production represents about 80 percent of the total Philippine livestock industry. In 2003, the swine sector grew by 4 percent. Due to continued strong domestic consumption of pork, hog production will likely continue to grow at a rate of 3 to 4 percent in 2005 and beyond despite increased feed cost in the world market. Filipinos are large consumers of swine meat and are known to generally prefer pork to chicken or beef.[2]

The industry faces a number of obstacles including the spread of economically devastating diseases, high marketing and transaction costs, erratic supply of imported feed ingredients, supplements and biologics, and the limited availability of genetically superior breeding stock.[3]

The main regulatory agencies that monitor the industry are the Bureau of Animal Industry (BAI) and the National Meat Inspection Commission (NMIC) under the Philippine Department of Agriculture. Environmental regulations are monitored and enforced by the Department of Environment and Natural

[2] Moog, F. A. , "Promotion and utilization of polyethylene biodigester in smallhold farming systems in the Philippines", Research Division, Bureau of Animal Industry, Manila, Philippines, 1997

[3] Abuel-Ang, Pia, "Philippines Livestock and Products Annual 2004", USDA Foreign Agricultural Service, September 2004

Resources (DENR). The primary environmental laws applicable to the project are the Clean Water Act (2003) and the Clean Air Act (1999).

ADDITIONALITY:

According to Attachment A to Appendix B of the simplified modalities and procedures for CDM small-scale project activities, evidence as to why the proposed project is additional is offered under the following categories of barriers: (a) investment barrier, (b) technological barrier, and (c) prevailing practice.

a) Investment Barrier

Small swine farms, such as Paramount Integrated, have a difficult time securing financing for the implementation of biogas waste water management projects. The following factors contribute to the investment barrier which these projects face:

- *Perceived Risk* - Most local banks are not interested in these projects primarily because of lack of knowledge and experience with the technology.
- *Current Practice* - The current pond based treatment method is considered standard operating practice in the Philippines and the region for wastewater treatment. Moreover, for the Project Owner the current pond system (business as usual scenario) is extremely financially attractive, given that it works to required specification and requires virtually no management input to achieve the key parameters. All required land is appropriated and the current system has sufficient capacity to handle additional waste.
- *Lowest Cost* - The current system represents the lowest cost option, with the only cost being the opportunity cost of alternative land use.

The inclusion of CER revenues has therefore become an important part of the Project Developer's implementation and financing strategy.

(b) Technological Barrier:

The predominant and known technology for piggery waste water management in the Philippines is through a series of lagoons (oxidation ponds).[4] Biological treatment of wastewater to produce biogas is a new and relatively unknown technology in the host country. The lack of available knowledge and confidence in the technology, especially among small privately owned swine farms, makes this type of development difficult to establish. As a result, most swine farm owners view this technology as risky and prefer to maintain their farms in the traditional fashion. This risk is reflected in the fact that there are fewer than ten projects of this type in the host country. Moreover, many farmers are concerned that a bio-digester project is too complex to operate and maintain. The anaerobic digestion and biogas system utilized in the project scenario is quite different than previous experience in the Philippines. The project scenario represents a more technologically advanced alternative to the business as usual scenario, and one that carries higher perceived risk.

Anaerobic digestion systems are perceived as relatively high risk, being based upon the function of a biological system that is neither 100% characterised, nor performance guaranteed. The biological system is at constant risk of chemical shocks that can wipe out the anaerobes and biological activity (and subsequently the waste management and energy production regimes, which are both key to commercial operations). AD systems require constant and ongoing precise management of a variety of elements, water flows, pH levels etc. In general, they are perceived as a risky solution. Overall, the project scenario involves higher perceived risks due to the performance uncertainty and a low market share of the new technology.

[4] "Cost Estimation of Biogas Plants in Piggeries: A Manual for Hog Raisers", prepared by the Development Bank of the Philippines.

(c) Prevailing Practice:

The CIGAR technology utilized in the project activity is not common practice in the Philippines and represents a higher risk alternative to the business as usual scenario. At present, pond treatment is standard practice in the Philippines and the region for swine farms. There is little experience of utilising aerobic or anaerobic technologies in a Philippine context, and therefore these are not considered a high management priority. The highest priority for most in the sector is the management of their waste discharges to simply maintain compliance with local regulation. From the operator's perspective, the lagoon system is a cheap and sufficient way to clean the waste water.

SUMMARY:

The current and expected practice in the host nation, which relies almost exclusively on pond based waste water treatment facilities for piggeries, as well as the combination of lack of access to financing and perceived risks of the selected technology, clearly demonstrate that the Paramount Integrated project is additional and therefore not the baseline scenario. The prohibitive barriers that exist in the Philippines are confirmed by the observed trend in current piggery waste water management practices.

The barrier analysis above clearly demonstrates that the most plausible baseline scenario is the prevailing practice of pond systems. The most significant barriers facing the project activity are technology familiarity, perceived risk of the technology and the relative lack of investment interest among the key business constituency.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

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The project boundary is defined as the notional margin around a project within which the project's impact (in terms of carbon emission reductions) will be assessed. As referred to in Appendix B for small-scale project activities:

- The project boundary for type I.A (AMS-I.A) is the physical, geographical site of the generating unit and the equipment that uses the electricity produced.

- The project boundary for type III.D (AMS-III.D) projects is the physical, geographical site of the methane recovery facility.

For the purposes of this analysis, different boundaries were applied in relation to the elements contributing to project and baseline emissions:

- Electricity and Fuel Oil Displacement/ Emissions: The boundaries are assumed to be the geographical site of the generating unit and the equipment that uses the electricity produced at the Paramount Integrated facility.

- Wastewater Methane Emissions/ Mitigation: The boundaries are assumed to be physical, geographical site of the methane recovery facility at the Paramount Integrated facility.

B.5. Details of the baseline and its development:

As specified in Appendix B:

- The appropriate baseline for project category Type I.A (AMS-I.A) is found in paragraphs 6 and 8.
- The appropriate baseline for project category Type III.D (AMS-IIID) is found in paragraphs 5, 6, and 7.
- Date of completing the final draft of this baseline section *(DD/MM/YYYY)*: 13/09/2006
- Name of person/entity determining the baseline:

The baseline study was prepared by:

2E Carbon Access - Tel: +1-212-356-0160 (contact: Eron Bloomgarden, eron@ecosecurities.com, and/or Nicholas Dreves, nick@ecosecurities.com). 2E Carbon Access is not a project participant.

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

>>

C.1.1. Starting date of the small-scale project activity:

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01/07/2005 *(DD/MM/YYYY)*

C.1.2. Expected operational lifetime of the small-scale project activity:

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Expected operational lifetime of the project activity: *(in years and months, e.g. two years and four months would be shown as: 2y-4m.)*

21y-0m

C.2. Choice of crediting period and related information:

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C.2.1. Renewable crediting period:

>>

C.2.1.1. Starting date of the first crediting period:

>>

01/11/2006

C.2.1.2. Length of the first crediting period:

>>

7y-0m

C.2.2. Fixed crediting period:

>>

C.2.2.1. Starting date:

>>

C.2.2.2. Length:

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SECTION D. Application of a monitoring methodology and plan:

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D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

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Metering the electricity generated and monitoring the amount of methane used as fuel or combusted as described in Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The approved monitoring methodologies applied to this project are as follows:

AMS-I.A – (11.b) Monitoring shall consist of metering the electricity generated by all systems of a sample thereof.

AMS-III.D – (9) The amount of methane recovered and used as fuel or combusted shall be monitored; and, (11) Flow meters, sampling devices and gas analysers shall be subject to regular maintenance, testing and calibration to ensure accuracy.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

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The methodology was selected as suggested by the Simplified Monitoring Methodologies for small-scale CDM projects. Measuring the amount of methane recovered and metering the amount of electricity generated are the most appropriate methods of monitoring the project activity.

D.3 Data to be monitored:

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ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	*Electricity Generation of the Project*	*E*	*KWh*	*M*	*Continuous*	*100%*	*Electronic and paper*	*Crediting period plus 2 years*	*Electricity will be metered through the use of an electricity meter supplied by Fuji Denki of Japan.*
2	*Electricity Use of the Project*	*Ep*	*KWh*	*M*	*Continuous*	*100%*	*Electronic and paper*	*Crediting period plus 2 years*	*If none or not enough electricity is generated during a year, the CO2 emissions associated with this electricity use will be estimated based on the calculated electricity consumption of the project equipment This electricity consumption will be metered through the use of an electricity meter.*
3	*Biogas recovered and used as fuel*	*M*	*m3/ day*	*M*	*Continuous*	*100%*	*Electronic and paper*	*Crediting period plus 2 years*	*Biogas will be monitored through the use of a biogas flow meter supplied by Fluid Components International of the United States.*
4	*Backup diesel consumption*	*C*	*L*	*M*	*Continuous*	*100%*	*Electronic and paper*	*Crediting period plus 2 years*	*It is anticipated that the electricity of the farm will be met entirely through the project activity. However in the case that it does not, backup diesel consumption will be monitored.*
5	*Backup LPG consumption*	*C*	*L*	*M*	*Continuous*	*100%*	*Electronic and paper*	*Crediting period plus 2 years*	*It is not anticipated that the backup LPG generation capcity of the digester genset will be utilized. However, in the case that it is, consumption will be monitored in the same manner as diesel consumption.*
6	*Methane content of biogas*	*MC*	*%*	*M*	*Quarterly (monthly, if necessary)*	*Sample*	*Electronic and paper*	*Crediting period plus 2 years*	*The methane content of the combusted gas will be analysed either online or with quarterly sample by using gas*

									analyses. In the event that the methane content of the quarterly samples vary significantly, monthly samples will be taken.
7	*Generator efficiency*	*Gef*	*%*	*M*	*Quarterly*	*Sample*	*Electronic and paper*	*Crediting period plus 2 years*	*The generator efficiency is defined as the fraction of time in which the gas is combusted in the generator, multiplied by the efficiency of the generating process. For the purpose of the PDD CER estimates, an ex ante 90% efficiency is assumed. Actual monitored % Gef will be monitored and used to calculate CERs.*

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

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Data	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.3.1, D.3.2., D.3.3.	Low	Meters will be subject to regular maintenance and testing regime to ensure accuracy.
D.3.4 & D.3.5	Low	Fuel consumption data has a low level of uncertainty; it is easy to monitor and record.
D.3.6 & D.3.7	Low	The methane content of the combusted gas will be analysed with quarterly samples. In the event of a high level of deviation among quarterly samples, the methane concentration will be measured with greater frequency. A gas analyzer will be used to sample the biogas and measure the CH_4 fraction of biogas.

A monitoring team will make regular site audits to ensure that monitoring and operational procedures are being observed in accordance with the monitoring plan and monitoring protocol.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

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Shift Operator → Shift Manager → Farm General Manager

The farm owner will be responsible for operations, maintenance, and monitoring (OMM), also responsible for monitoring biogas production and electricity generation as part of standard operating procedure for the project activity. EcoSecurities has developed a monitoring workbook that the farm owner will use to input all required monitoring data. Both electronic and paper copies will be kept for back-up purposes, and transferred to EcoSecurities on a monthly basis. Additionally, calibration and maintenance records of the flow meter and gas analyzer will be maintained.

The OMM personnel will be skilled technicians, and any additional training required to ensure accurate and effective monitoring will be provided by EcoSecurities' monitoring experts prior to project commissioning. This training will include equipment operation, data monitoring and recording (including how to reconcile any adjustments and/or data uncertainties), reporting, internal audits of GHG project based operational requirements, operation, calibration, maintenance, and emergency procedures, project performance review, and corrective actions.

Calibration of required equipment will be performed by the technology provider or a trained representative. Procedures will be implemented before project commissioning,

As per the Simplified Procedures for SSC Project Activities AMS-III.D paragraph 8, no leakage calculation is required.

D.6. Name of person/entity determining the monitoring methodology:

2E Carbon Access - Tel: +1-212-356-0160 (contact: Eron Bloomgarden, eron@ecosecurities.com, and/or Nicholas Dreves, nick@ecosecurities.com). 2E Carbon Access is not a project participant.

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

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E.1.1 Selected formulae as provided in appendix B:

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For AMS-I.A:
The emissions baseline is the energy baseline … times the CO2 emission coefficient for the fuel displaced.

For AMS-III.D:
Annual methane capture from biogas times the global warming potential (GWP) of methane (21 tCO_2 / tonne methane).

E.1.2 Description of formulae when not provided in appendix B:

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E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

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For AMS-I.A:

While it is anticipated that the electricity of the farm will be met entirely through the project activity, thus eliminating all diesel fuel consumption, the project will account for fuel use if insufficient electricity is generated by the project activity and a backup diesel generator needs to be operated. If the backup is used, project emissions will be calculated according to the amount of diesel fuel consumed by the generator multiplied by the emissions coefficient for diesel. If another fossil fuel is used, the appropriate emissions coefficient will be used as provided by the IPCC.

Project emissions are given by:

$$E_{project} = C_{diesel} * EF_{diesel}$$

Where:

$E_{project}$: Project emissions (t CO_2e / year)
C_{diesel}: consumption of diesel fuel used in project scenario (tonnes) by backup generator

EF_{diesel}: Standard emission coefficient for diesel fuel oil (3.1772 t CO_2 / tonne of fuel[5]).

For AMS-III.D:
Total GHG emissions due to the project activity will be 10% of the total methane captured:

[5] 1996 IPCC Guidelines for national greenhouse gas inventories.

$$FM_{project} = FM_{baseline} * 0.10$$

Where:

$FM_{project}$: Project fugitive methane emissions (t CO_2e / year)
$FM_{baseline}$: Baseline fugitive methane emissions (t CO_2e / year)

Therefore;

$FM_{project}$ = **7,709** (tonnes CO_2e/year) * 0.10 =**771 tCO_2e/year.**

These project emissions are comprised of methane leaks in the gas handling system, from incomplete combustion in the electricity generator, and from potential anaerobic processes in the aerobic lagoons.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

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For AMS-I.A:
As per the Simplified Procedures for SSC Project Activities AMS-I.A paragraph 8, no leakage calculation is required since the equipment is not being transferred to or from another activity.

For AMS-III.D:
As per the Simplified Procedures for SSC Project Activities AMS-III.D paragraph 8, no leakage calculation is required.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

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Project emissions + Leakage = Project Activity Emissions

Therefore;

771 (tCO2e/year) + 0 (tCO2e/year). = 771 tCO2e/year

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

>>

For AMS-I.A:

Baseline electricity generation emissions are given by:

$$E_{baseline} = E * CEF_{diesel} \div 1000$$

Where:

$E_{baseline}$: Baseline electricity generation emissions (t CO_2e / year)
E: Net electricity produced in the project scenario (KWh)

CEF_{diesel}: emission coefficient for diesel generator - (0.9 kg CO_2 / KWh)[6].

For AMS-III.D:
Baseline fugitive methane emissions are:

$$FM_{baseline} = MC_{BIO} * GWP_{CH4}$$

Where:

$FM_{baseline}$: Baseline fugitive methane emissions (t CO_2e / year)
MC_{BIO}: Total annual methane captured from biogas (tonne / year)
GWP_{CH4}: Global warming potential of methane (tCO_2 / tonne methane)

Therefore, total baseline emissions ($TB_{emissions}$) are:

$TB_{emissions} = FM_{baseline} + E_{baseline}$

For AMS-I.A:

Baseline emissions of the electricity generation component of project activity are:
715,400 (KWh) * 0.9 (kg CO_2 / KWh) ÷ 1000 = **644 tonnes CO_2e/year**

For AMS-III.D:
Baseline emissions of the methane component of the project activity are:
367.09 (tonne / year) * 21 (tCO_2 / tonne) = **7,709 tonnes CO_2e/year**

Total baseline emissions:
644 (AMS-I.A) + 7,709 (AMS-III.D**) = 8,353 tonnes CO_2e/year**

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

>>
Total emissions reductions = Total baseline emissions – Total project emissions

Therefore, total emissions reductions from the project activity are:
8,353 (tonnes CO_2e/year) – 771 (tonnes CO_2e/year) = **7,582 tonnes CO_2e/year)**

E.2 Table providing values obtained when applying formulae above:

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For AMS-I.A: see section E.1.2.4 above

For AMS-III.D:

Methane Emissions	Description	Value	Unit	Source

[6] Project activity type I.A (reference AMS-I.A version 08) – *Electricity generation by the user,* paragraph 8.

from Manure Management at *Paramount Farm*	Methane content of 1m3 of biogas	0.64	m^3	measured
	Moles of gas in 1m3 at RTP (1mole=22.4 liters/mole)	44.64	moles / m^3	http://www.1728.com/stp.htm
	Methane in 1m3 biogas	28.57	moles / m^3	Calculated
	Methane in 1m3 biogas	457.14	g / m^3	Calculated (1mole=16g)
	Daily biogas offtake	2,200.00	m^3 / day	Estimated utizing US EPA AGSTAR model
	Annual biogas offtake	803,000.00	m^3 / year	Estimated utizing US EPA AGSTAR model
	Annual CH4 capture	367,085,714.29	g / year	Calculated
	Annual CH4 capture	367.09	tonne /year	Calculated
	GWP CH4	21.00	N/A	Approved Global Warming Potential for CH4
	Annual CO2e emissions reductions from CH4	**7,708.80**	**tonne CO_2e / year**	**$FM_{baseline} = MC_{BIO} * GWP_{CH4}$**

(AMS-I.A) + (AMS-III.D) = TOTAL BASELINE EMISSIONS

AMS-I.A (tonne CO_2e / year)	+	AMS-III.D (tonne CO_2e / year)	=	TOTAL EMISSIONS REDUCTIONS (tonne CO_2e / year)
644	+	**7,708.80**	=	**8,352.8**

SECTION F.: Environmental impacts:

F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

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The host country does not require an analysis of the environmental impacts of the project activity. The host country has issued the project a Permit to Operate.

It should be noted, however, that the project activity generates considerable environmental benefits. The CIGAR system decreases GHG emissions through two significant avenues. Prior to the project activity, Paramount Integrated relied on the use of a diesel generator and diesel fuel for electricity generation. With the implementation of the project activity, biogas collected from the degradation of swine-farm waste is used for electricity generation, thus eliminating the demand for diesel fuel. In addition to directly reducing the emission of GHGs by eliminating a source of fossil fuel combustion, the project activity captures methane (CH_4) from an industrial source, preventing its release into the atmosphere. Methane is an extremely potent GHG whose greenhouse warming equivalent is 21 times that of carbon dioxide (CO_2).

In addition to reducing GHG emissions, this closed system of energy production produces considerable improvements for waste management at Paramount Integrated Farm. Wastewater discharge from piggeries can be hazardous to aquatic ecosystems. The extent to which wastewater discharge threatens aquatic ecosystems depends on the amount of organic material and solid material contained within the wastewater as measured by biochemical oxygen demand (BOD), chemical oxygen demand (COD,

suspended solids, and color indicators. The CIGAR system, owing to its anaerobic digestions properties, reduces COD by approximately 80%, destroys approximately 95% of harmful BOD, diminishes suspended solids, and improves the color quality of the wastewater.

SECTION G. Stakeholders' comments:

G.1. Brief description of how comments by local stakeholders have been invited and compiled:

>>

MINUTES OF STAKEHOLDER CONSULTATIONS

PhilBIO, in cooperation of Pramount Integrated conducted a CDM stakeholders' meeting for Paramount's Covered In-Ground Anaerobic Reactor (CIGAR) biogas project for its application as a CDM project this 16 June 2006, 10:00 a.m. at the Barangay Hall of Callos, Peñaranda, Nueva Ecija. PhilBIO's Corporate Responsibility Manager, Mr. Ferdinand Larona (FL), gave the presentation and Ms. Marge Javillonar (MJ), also from PhilBIO facilitated the meeting.

The meeting was conducted in conformity with the requirement of the *United Nations Framework Convention on Climate Change (UNFCCC)* that clean technology projects that wish to be considered for CDM should have public consultations or stakeholders meetings.

Participants:

The stakeholders' meeting was well-attended with a number of participants coming from the LGUs and residents from Brgy. Callos.

The proof of invitation and complete list of attendees can be found as an attachment.

Purpose of the Meeting

The purpose of the stakeholders' meeting was to present the benefits of the CIGAR biogas project to the environment, swine farm owner and the community where Joliza Farm is located and to explain what CDM is and its processes, aims and benefits. The meetings wished to stress the conformity of the project in attaining the sustainable development goals of the country through the enhanced wastewater treatment system that is being utilized by Paramount Integrated. More importantly, the meeting served as a venue for stakeholders to ask questions or give comments about the project and CDM.

Agenda

The meeting started with an invocation led by a selected local participant. Then, a brief message was given by a representative from the Barangay Council.

The highlight of the meeting was a presentation on CDM by Mr. Ferdinand Larona. The presentation gave an overview of the issues concerning climate change; CDM and its processes, aims and benefits; and the CIGAR project and why it qualifies as a CDM project. The presentation focused on the following topics:

- Climate Change
- Clean Development Mechanism (CDM)
- The Process of CDM

- PhilBIO's Methane Gas Mitigation Technology
- The Paramount Integrated CDM Project

After the presentation, Mr. Larona conducted an open forum where a number of questions were asked and comments were voiced out. Further details will be found in succeeding texts.

After the open forum, the facilitator thanked the stakeholders and adjourned the meeting

G.2. Summary of the comments received:

>>
OPEN FORUM

Marge Javellonar (Philbio) : Who would like to raise questions or issues regarding the previous presentation? This will be your chance to air your concerns, and for us and the farm owners to address the issues…

Resident : Our concern is the wastewater being disposed to the creek by Paramount. We use the creek for fishing and bathing our animals. Are there chemicals…err…pig manure being discharged?

Ferdie Larona (Philbio) : With the project, the farm will use the CIGAR (Cover-in-ground anaerobic reactor) technology and they will now need the wastewater to recover methane. It might be possible that before this methane recovery project was implemented, the partially treated wastewater might have found its way to the creek. There might have been some residues left during past discharges and might still be evident in the creek.

Resident : We used to bath in the creek and wash our clothes there when Paramount was not yet here…But now, it can't be used for bathing and washing of clothes.

Ferdie Larona : Paramount cannot anymore discharge untreated effluent since as part of the CDM Project, they will have to comply with the Clean Water Act and Clean Air Act. DENR will monitor and implement the rules and regulations in the abovementioned laws. Hence, we will be assured that Paramount will operate within the prescribed limits set forth in the said laws. However, vigilance of the community members is still encourage, since you are within the area and can readily observe any marked changes in the environmental quality of the river/creek. The DENR may only conduct its monitoring twice a year or every three months……..We understand your concerns, but we also would like to emphasize that the rehabilitation of the river will take a while and cannot be undertaken overnight. We also would like to emphasize that this project is part of the effort of reviving/rehabilitating these water bodies.

Resident : How many years will it take to rehabilitate and revive the creeks?

Ferdie Larona : I don't have a data of the level of pollution of the creek and hence can't give you a definitive answer on how long it might take to rehabilitate it. And besides, we also recognize that there are other contributors of pollution to the creek aside from Paramount. The commitment of Paramount will be to discharge effluent that has already been treated and that pass the Standards set by the DENR.

Resident : For instance, if we gave Paramount a month and a half and the creek is still polluted can we file a case against them?

Ferdie Larona (Philbio) : The only case that can be filed against Paramount is when they violate provisions of the Clean Water Act and Clean Air Act, which will be based on testing done by the DENR. For instance, the Clean Water Act stipulates allowable levels of BOD, COD and TSS of the final effluent that will be discharged.

Resident : We observed that during heavy rains, the man-hole that they constructed overflows with wastewater from the farm…

Rene M. Mercado (Project Manager) : Good morning to all of you, I am the farm manager and we are grateful that Philbio is here to help address your concerns…And frankly cannot answer all your queries. And besides, if we address your concerns directly, especially about the pollution in the creek, we might be viewed as bias to the farm. We are glad that they presented about this project and helped us in explaining this project. We also would like to emphasize that as part of the Kyoto-Protocol CDM Project, we have also invested resources in this project in order to qualify in the CDM process and contribute to the emissions reduction. If you listened intently in the previous presentation, they have highlighted the negative effects if we will not implement the project. We, in Paramount, as we've discussed with the Mayor, is willing to have a dialogue on how we can address any problems that may arise as a result of our operations. And to answer the previous query about the discharge of untreated effluent by Paramount, we would like to emphasize that we do not intentionally discharge untreated wastewater. Although in some instances especially during heavy rains, there might be some overflows from our ponds. However, we assure you that the quality of these overflows are compliant with what is required by the law since these wastewaters have already been treated in the new (CIGAR) wastewater treatment system. Besides, our wastewater treatment system is composed of series of lagoons in addition to the AD which covers several hectares of land. And as explained by Philbio, the sides and the bed of the ponds as well as the AD are lined with HDPE to prevent leaching of the wastewater to the groundwater.

Residents : But in the past, before this project, there were instances of wastewater overflowing to the creek and even destroys our crops…

Margie Javellonar : We admit that in the past using the old technology of oxidation ponds, there might be some instances of wastewater overflows…and we cannot anymore remedy those past events. That is why Paramount was keen in the implementation of this project for the reason that it will solve the past problems of wastewater treatment and disposal.

Residents : We observed in the past that when that black wastewater comes out of the farm, there were some fishkills in the creek. We also observed that flies proliferate along the creek when paramount discharges the wastewater and there is this characteristic stench of the wastewater.

Resident : We have a suggestion that since you are expanding your sow levels, the biogas digester should be expanded accordingly to accommodate the additional wastes that will be generated.

Rene Mercado : We have already anticipated that and have incorporated it in our design.

Resident : Whenever we use the water from the creek for irrigation the crops are destroyed and we would like you to see the condition of the creek at this very moment, and that it is really polluted.

Ferdie Larona (Philbio) : As we've reiterated before, this might be due to residues left from the previous practice of Paramount and might have been washed out during heavy rains. And we also emphasize that

that is precisely what the project is addressing – to improve the quality of the wastewater being discharged to the creek.

Rene Mercado : We would like to respond to the comments that we intentionally discharge untreated wastewater. Our system is not like a dam structure that we can intentionally release wastewater to the creek. It is composed of series of ponds that further treat the wastewater coming from the AD.

Resident : How long have you been operating the biogas digester?

Ferdie Larona/Rene Mercado : We have been operating the biogas digester for almost a year.

Resident : Then why is that, that last year during heavy rains, the creek was still so dirty?

Ferdie Larona : As I've said earlier, it is possible that residues might have solidified in some areas on the stretch of the creek and when it swelled said residues might have been washed out.

RHU Representative : We understand the sentiments of the local residents here and we had a report in the past that the effluent from the farm caused the death of animals (carabao). We investigated together with the Department of the Agriculture (DA) and we were not sure of the cause. We therefore would like to request a copy of the water quality sampling of the effluent from the management of Paramount to prove that such effluents are not toxic. This will help us in explaining to the farmers. We visited the wastewater treatment plant of the farm and we observed that the system seems to work and we also noted that in the last pond there were fishes thriving. Nevertheless, we would like to request the management to provide us with the results of the wastewater analysis to help us explain to the farmers that indeed such wastewater is safe for disposal to the creek and even for use in agricultural crops for irrigation.

Marge Javellonar : Yes Sir, the farm manager will provide you with those laboratory results…Thank you sir…

Resident : We also observe that whenever we pass by the creek and wade across it, we get skin diseases. There was even an instance when one of us had contracted a fever and was diagnosed to be caused by dirty water from the creek (rat's urine).

Ferdie Larona : It is possible that he contracted leptospirosis a disease from rat's urine and caused by unsanitary environments.

Rene Mercado : In the farm we are very strict in terms of pest control especially rodents. Before we enter the farm, we undergo decontamination procedures and within the farm we practice and observe hygiene. Because if our area is not clean, pests might proliferate and may cause death of our pigs/sows.

Ornalyn C. Vengco (Operations Manager – Paramount) : How many backyards piggeries are within these areas? The reason I asked this is that the combined contribution of these small backyard farms might be significant and may have caused or exacerbated the pollution of the creek.

Resident : We don't think that we can compare the backyard farms to the Paramount piggery. The wastewater from the backyard farms cannot pollute the creek at its present level.

Marge Javellonar : Anyway, we will just request Paramount to provide the concerned agencies with the wastewater quality analysis of their effluents. They will provide the RHU with such results indicating that the wastewater is safe for disposal.
Resident : We should get a water sample from the creek…..

Marge Javellonar : The samples to be obtained should be from the effluent discharge point of Paramount and not in the creek.

Ferdie Larona : There are accepted protocols or procedures that have to followed in obtaining wastewater samples. For the farm, they obtain samples before the AD, after the AD and after the polishing ponds up to the final effluent discharge. Even the DENR will obtain samples from the effluent discharge to check their compliance with the Clean Water Act. They cannot obtain samples from the creek to check the compliance of Paramount since other sources might have contributed to the pollution loadings of the creek. Further, Paramount invites the stakeholders to visit their wastewater treatment system and see for themselves the fishes thriving in the final polishing lagoon of the farm.

Rene Mercado : During the time of Brgy. Captain Barlis, we investigated the potential sources of the effluents that drain to the creek. We observed in a portion of the creek that it was really dirty. We went afterwards to the farm and showed him the series of the ponds where only the first pond was filled up. There was still no wastewater to the final polishing pond.

Resident : In the past, when Paramount was not yet operational, we can still drink water from the creek…

Rene Mercado : Clear water does not necessarily mean clean water….We would like to emphasize that the effluent we are discharging meets the Standards…Besides, even if the stakeholders here will not request the wastewater quality laboratory results, we still have to meet the reporting requirements of the DENR for use to renew the permits of our wastewater treatment facility.

Resident : If that is the case, then where does the dirty wastewater come from?

Ornalyn Vengco : That was the question I earlier posed…Is the Paramount the only piggery here in the area? Are there other potential sources (backyard piggeries) that contribute to the pollution?

Residents : We think that the biggest piggery here is Paramount. There are no other big piggeries here that contribute to the pollution of the creek.

Rene Mercado : Even when the ponds overflow, as I've noted earlier, the quality of the water will still be in compliant with the regulations since it will still pass through the series of ponds and is therefore treated.

Resident : Then our question now is, where does the dirty wastewater come from?

Rene Mercado : That I cannot answer you…But we can form a group, with representatives from the various sectors and conduct our own investigation and trace the various sources of effluents that finally end up in the creek.

Resident : In the several years that Paramount is operating, why is it that it's only now that consultations are being conducted? Why didn't they implement this project at the very start of the operations.

Marge Javellonar : We would like emphasize that the accepted technology in the past in this country, not only here, is the use of oxidation ponds to treat the piggeries' wastewater. With the improvement in technology, we are now able to treat the wastewater more effectively and hence address the environmental problems that we have been discussing. This is just akin to the Pasig River in Metro Manila where in the past, its quality was really deteriorated. With the initiatives of the government, the river is now slowly being rehabilitated, though we might not see the results immediately.

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G.3. Report on how due account was taken of any comments received:

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Issues Raised	Response/Recommended Measures to Address the Issues
Discharge of wastewater by Paramount causing severe pollution in the nearby creek	Paramount countered that with the project, they even have fishes thriving in the last polishing pond of the plant. The new system now consists of an AD and a series of lagoons that further treats the wastewater from the AD. When the wastewater effluent is discharged, Paramount assured the stakeholders that such effluent shall be within the prescribe limits (BOD, COD, TSS, etc.) of effluent discharges based on the Clean Water Act.
Perception of the farmers that the wastewater discharged by Paramount in the nearby creek results to destruction in crops, death of animals, etc.	The RHU Representative suggested that a copy of the wastewater quality analysis should be submitted by Paramount to RHU and the respective LGUs to help explain to the farmers that such effluents are safe both to crops and animals.
Where could be the source of the offensive waste water if not from Paramount?	It was agreed that a group shall be formed composed of the representatives from the various sectors and conduct its own investigation. The team shall inspect other sources of effluents that drains to the creek.
The wastewater treatment system should incorporate any increase in capacity	Paramount and Philbio commented that the design of the wastewater treatment system has provisions for expansion should expansion of the farm be undertaken in the future.
Sampling should be undertaken along the creek to determine whether Paramount is contributing to the pollution is the said creek	It was agreed that such scheme cannot be undertaken by Paramount. The samples that will be tested should come from the effluent discharge (i.e. at the outfall of the last pond) and not the water from the creek. This is in consonance to the requirements of the EMB-DENR that effluents shall meet the Standards set out in the Clean Water Act. Sampling in the creek may not be representative of

	the quality of effluent of Paramount since other sources might be contributing to the pollution load in the creek.

Annex 1

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Not Applicable

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