Voluntary Carbon Standard 2007.1

VALIDATION REPORT OF

PANJIN RICE HUSK THERMAL ENERGY GENERATION PROJECT

Report No: SINGAPORE/005-2/2010

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Validation of Panjin Rice Husk Thermal Energy Generation Project	
Client:	Project Title:
Wilmar International Ltd.	Panjin Rice Husk Thermal Energy Generation Project

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Summary:
Bureau Veritas Certification has performed the validation of Panjin Rice Husk Thermal Energy Generation Project owned by Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd, which is located in Panjin City, Liaoning Province, P.R.China, on the basis of Voluntary Carbon Standard (VCS) 2007.1, as well as criteria given to provide for consistent project operations, monitoring and reporting. The validation scope is defined as an independent and objective review of the project description, the project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) on-site visit and follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. The Project involves installation of a green-field rice husk based power and heat system at Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd. The system includes two boilers each with the capacity of 15MT/hour capable of generating medium pressure (3.82MPa) superheated steam at 450°C, and one set of 6 MW steam condensing turbine that is likely to be optimally run at 3 MW. The aim of the Project is the installation of a biomass fired project to meet the demand of steam and electricity, which will reduce the GHG emissions using biomass residues. The first output of the validation process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in Annexure-II. Taking into account this output, the project proponent revised its project design document. In summary, it is BVC's opinion that the Project correctly applies the approved small-scale CDM baseline and monitoring methodology AMS-I.C version 16 and meets the relevant VCS 2007.1 requirements for the CDM and the relevant host country criteria.

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Abbreviations

AFCE	Authorized Financial Capital Expenditure
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
DOE	Designated Operational Entity
EF	Emission Factor
EPC	Engineer, Procure, Construct
GHG	Green House Gas(es)
KPMG	KPMG Advisory Services Pte Ltd, in Singapore
NCV	Net Calorific Value
NPV	Net Present Value
PD	Project Description
PP	Project Proponent
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Voluntary Carbon Standard
VCS 2007.1	Voluntary Carbon Standard 2007.1
VCU	Voluntary Carbon Unit

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1 Introduction

Wilmar International Ltd. has commissioned Bureau Veritas Certification (hereafter referred to as "**BVC**") to validate the VCS project of Panjin Rice Husk Thermal Energy Generation Project (hereafter referred to as "**the Project**"), owned by Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd. (the Project Proponent, hereafter referred to as "**the PP**"), which is located in Panjin City, Liaoning Province, P.R. China.

This report summarizes the findings of the validation of the Project, performed on the basis of Voluntary Carbon Standard (VCS) 2007.1 criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

The validation serves as project description verification and is a requirement of all projects. The validation is an independent third party assessment of the project description. In particular, the Project's baseline, the monitoring plan (MP), and the Project's compliance with relevant Voluntary Carbon Standard 2007.1 are validated in order to confirm that the project design, as documented, is sound and reasonable, and meets the stated requirements and identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the Project and its intended generation of Voluntary Carbon Units (VCU).

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the project description, the Project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against VCS 2007.1 and associated interpretations.

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

The criteria used in validation were to assess the project description against the requirements of VCS 2007.1, VCS Program Guidelines dated on 18/11/2008 and associated documents.

1.3 VCS project Description

The Project is located at Panjin City, Liaoning Province, P.R. China, with the geo-coordinate of 41°14'56.87"N (41.24913°N) and 122°0'37.56"E (122.01043°E).

The Project involves installation of a green-field rice husk based power and heat system to supply steam to the steam customer, and to supply electricity to the local

grid as the peak load plant. The PP will purchase rice husks mainly from the “Yihai Kerry (Panjin) Oils, Grains and Foodstuffs Industries Co., Ltd” that is also the consumer of steam (“steam customer”) and from the surrounding areas if required. The Project includes two boilers each with the capacity of 15MT/hour capable of generating medium pressure (3.82 MPa) superheated steam at 450°C. During the commissioning of Phase I (since 19/10/2009), the Project is designed to generate 15 MT/hour steam with one boiler. It could be increased to 30 MT/hour steam by commissioning of Phase II (assuming two years from commissioning of Phase I) and also drive the steam turbine generator for power generation as the peak load plant.

The purpose of the Project is the installation of a biomass fired power and heat plant to meet the demand of steam and electricity, and avoid consumption of fossil fuel. Project details were verified during onsite visit and BVC confirms that the Project details are correct.

1.4 Level of assurance

The validation has been carried out by reviewing the PD and ascertaining that it meets the VCS 2007.1. On-site visit was carried out from 29/01/2010 to 01/02/2010, and client and stakeholders were interviewed. Documents such as Business license, Authorized Financial Capital Expenditure (AFCE), rice husk purchase contract, steam purchase contract, and main equipment contracts were reviewed to verify the information given in PD. The validation opinion is assured provided the credibility of all above.

2 Methodology

The validation is as a desk review and on-site visit including discussions and interviews with selected experts and stakeholders.

The validation including:

- Desk review with client (Wilmar International Ltd.) and consultant (KPMG Advisory Services Pte Ltd, in Singapore, hereafter referred to as “KPMG”) on 21/01/2010 in Beijing
- Site visit and conducted discussions and interviews with client, consultant, the PP and stakeholders from 29/01/2010 to 01/02/2010

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

2.1 Review of Document

The PD submitted by the client (Wilmar International Ltd.) and additional background documents related to the project design and baseline, i.e. Approved methodology, Voluntary Carbon Standard 2007.1 were reviewed.

The validation findings presented in this report relate to the Project as described in the PD version 0 dated 14/12/2009 [1].

To address BVC corrective action and clarification requests, the PD was revised to version 1 and resubmitted on 27/08/2010 [2].

The list of documents reviewed is presented in Annexure-I.

2.2 Follow-up Interviews

BVC performed site visit and interviews with client, consultant and project stakeholders to confirm selected information and to resolve issues identified in the document review. On-site visit was carried out from 29/01/2010 to 01/02/2010. Meeting was also held with client and consultants from KPMG in Beijing on 21/01/2010. Representatives from the client, consultants and project stakeholders were interviewed. The main topics of the interviews are summarized in Table 1 and personnel interviewed are given in Table 2.

Table 1 Interview Topics

Interviewed Organization	Interview Topics
Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd. (the PP)	➢ Project Design and Implementation ➢ Project background information. ➢ Project technology, operation, maintenance and monitoring capability. ➢ Project monitoring and management plan. ➢ Stakeholder consultation process. ➢ Project approval status (incl. EIA approval, CDM project approval status) ➢ Biomass residue utilization development in the area ➢ Policies related to biomass residue utilization projects
Wilmar International Ltd. (Parent Company of the PP)	
KPMG (the Consultant)	➢ Applicability of selected methodology. ➢ Baseline determination. ➢ Emission reductions calculation. ➢ Monitoring plan.
Local Stakeholders	➢ Project background in details ➢ Stakeholder comments ➢ Social and environmental impact of the Project

Table 2: Name of Person Interviewed.

Interviewed Organization	Person Interviewed
Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd. (the PP)	Mr. Li Chao
Wilmar International Ltd.	Mr. Joshua Lim Chian Yieh
KPMG	Mr. Rahul Kar Ms. Catherine Yeo
Local Stakeholders	Ms. Wang Hongqun Mr. Li Fengxiang

2.3 Resolution of any material discrepancy

The objective of this phase of the validation is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the project design. List of corrective action request, clarifications is presented in Annexure-II of the report.

Corrective Action Request (CAR) is issued, where:

i) There are mistakes in PD that have direct impact on project results.

ii) Validation protocol requirements have not been met.

iii) There is a risk that the Project would not be able to deliver (high quality) VCUs.

BVC may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

3 Validation Findings

3.1 Project Design

BVC recognizes the initiative of the PP in helping country fulfill its goals of promoting sustainable development. The Project employs installation of two boilers each with the capacity of 15MT/hour, a steam turbine and a generator with an installed capacity of 6 MW and designed to operate at 3MW as the peak load plant. The rice husk based boiler system applied in the Project is a new technology developed in-house based on commercialization of a new concept established by Harbin Industrial University [11]. The Project contributes to GHG emissions by using renewable energy to displace technologies using fossil fuels.

Project start date is the date when the Project began reducing GHG emissions i.e

commissioning of the Project on 19/10/2009 [12]. The crediting period is 10 years, which started from 01/01/2010. The Project is expected to be operational for at least 15 years. The Project is designed to generate 15 MT/hour steam with one boiler in Phase I (since 19/10/2009), and then increased to 30 MT/hour steam during Phase II (expected to start from 2011) with a set of steam turbine generator with the installed capacity of 6 MW and designed to operate in 3MW. The estimated average annual emission reductions are expected to vary between 33,438 tCO_2e (with electricity generation) and 59,533 tCO_2e (without electricity).

The PP has provided the evidence of proof of title through the right of use arising by virtue of the "Business license of Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd." [6]. BVC reviewed the document and confirms the ownership of the PP.

The Project has not created any other forms of environmental credits. Currently in China, the other environmental credit that could have been created is Certified Emission Reductions (CER) under the CDM process. By checking the database of CDM projects [25] and regulation of CDM in China [26], BVC confirmed that the Project has not and will not involve in the CDM program.

As per VCS 2007.1, the scope of VCS program includes:

- All six Kyoto Protocol greenhouse gases;
- All technologies supported by an approved VCS Program methodology, including AFOLU project types as set out on www.v-c-s.org;
- Any approved GHG Programs;
- Project category (ies) which is part of an approved GHG Program;
- Project methodologies, not part of an approved GHG Program, when approved under the VCS program under double approval process;

The Project is installation of biomass based plant producing both steam and electricity. The project uses CDM approved methodology AMS-I.C (Version 16, dated 04/12/2009) (Thermal energy production with or without electricity). And the Project started from 19/10/2009, the Project crediting period also started from 01/01/2010. Thus the Project is eligible under VCS 2007.1.

3.2 Baseline

3.2.1 Baseline Methodology

The Project uses CDM approved methodology AMS-I.C (Version 16) "Thermal energy generation with or without electricity". The Project falls under Type I, Renewable energy projects, C: Thermal energy for the user, as per Appendix B to the simplified modalities and procedures for small scale Clean Development Mechanism (CDM) project activities.

As per AMS-I.C (Version 16), the project boundary is the physical, geographical site of the project equipment producing the renewable energy. The boundary also extends to

facilities consuming energy generated by the system.

The applicability of the chosen baseline methodology has been adequately addressed in the Project description. BVC has checked the applicability conditions of AMS-I.C and found that are satisfied as following:

1) The Project will exclusively use rice husk (with a new renewable energy based technology) to produce thermal energy thereby avoiding the use of coal as the most likely fossil fuel.

   BVC has checked the technical parameter of the boiler [18] and found it applies the rice husk as fuel, and the Project satisfied the condition.

2) The total thermal energy generation capacity of the project equipment is 42.3 MW which is less than the limit of 45 MW as specified in AMS-I.C (version 16).

   BVC has computed the value according to Steam Table [27] and found the Project satisfied the condition.

3) The Project is not a co-fired system. Rice husks will exclusively be used to fire the boilers without the use of other fuels.

4) The contract [17] between the PP and steam consumer specifying that only the PP can claim emission reductions from the energy displaced is provided. Meanwhile, the electricity generated will be sold to the Northeast Power Grid (NEPG), which is owned by the government and is not involved in emission reductions projects development.

BVC has checked the contract [17] and confirm it is appropriate, and the Project satisfied the condition.

5) The Project does not seek to retrofit or modify any existing facility for renewable energy generation.

6) The Project is not charcoal based biomass energy generation project.

No deviations to the methodology or any revision is required in the Methodology, and the methodology is applicable for the Project.

3.2.2 Baseline Scenario

According to AMS-I.C (Version 16), project activity generating both steam and electricity including cogeneration shall use one of the baseline scenario options as per para 12 of methodology, which are listed as below:

Accordingly, project participant considered eight options for baseline.

Option a) Electricity is imported from the grid and steam is produced using coal fired steam boiler.

Option b) Electricity is produced in an on-site captive coal fired power plant (with a possibility of export to the grid) and steam is produced using coal fired boiler;

Option c) A combination of Option 1 and Option 2;

Option d) Electricity and steam are produced in a cogeneration unit using coal fired

boiler (with a possibility of export of electricity to the grid/other facilities and/or thermal energy to other facilities);

Option e) Electricity is purchased from the grid and/or generated in an on-site captive coal fired power plant (with a possibility of export to the grid), while steam is produced from biomass fired boiler,

Option f) Electricity is generated in an on-site captive biomass based power plant (with a possibility of export to the grid) and/or imported from the grid, while steam is produced using coal fired boiler;

Option g) Electricity and steam are produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to the grid or other facilities and without a possibility of export of steam to other facilities);

Option h) Electricity and steam produced in a co-fired system.

In compliance with mandatory laws and regulations in China, coal-fired plants with a capacity of 135 MW or less are prohibited from development in large grid such as provincial grids [33]. Hence, option b) and option c) are excluded, since the coal-fired power plant with equivalent power output as the Project only has the capacity of 3 MW.

At an early stage of development, the technology of biomass fired systems is not considered mature in China. Biomass fired systems are not the prevailing practice due to uncertainty of technology performance. Therefore, option e), option f), option g) and option h) are excluded.

Option a) and option d) are possible baseline scenarios for the Project. Baseline emissions are calculated for each of them, as illustrated below:

For Option a), as stated in the PD, 18.5 MT/hour of steam is required to generate 3MW electricity, the steam sold to steam consumer would be 11.5 MT/hour (2*15-18.5 MT/hour). To provide equivalent output as the Project, the baseline scenario would be importing electricity of 24,000 MWh (3MW*8,000 hours) from North East Power Grid (NEPG) and supplying steam of 92,000MT(11.5 MT/hour * 8, 000 hours) by using coal fired boiler.

The baseline emissions for steam generation part are calculated using clause 15 in AMS I.C (version 16).

$BE_{thermal,CO2,y} = (EG_{thermal,y}/\eta_{BL,thermal}) * EF_{FF,CO2}$

$EG_{thermal,y}$ is calculated based on the difference in total steam enthalpy and total feed water enthalpy times multiplied by annual steam quantity.

Steam enthalpy (superheated at 3.82 MPa and 450^{o}C) = 3,332.52 kJ/kg

Feed water enthalpy (saturated at 0.103 MPa and 104^{o}C) = 419 kJ/kg

Annual steam quantity = 11.5 MT/hour * 8,000 hours = 92,000 MT

$EG_{thermal,y}$

= (92,000 MT) * (3,332.52 kJ/kg – 419 kJ/kg) * (10^3 kg/MT) * (TJ/10^9 kJ)

= 268.04 TJ

$EF_{FF,CO2}$ = 94.6 tCO_2/TJ, as per IPCC

$\eta_{BL,thermal}$ = 100%, as per Clause 18(c) of AMS I.C (version 16)

$BE_{thermal,CO2,y}$ = (268.04 TJ/100%) * (94.6 tCO_2/TJ) = 25,357 tCO_2e.

The baseline emissions for electricity generation part would be calculated by applying latest China-Grid Emission Factor that was issued by DNA of China on 02/07/2009 [30]. For NEPG, $EF_{grid,OM,y}$ equals to 1.1293 tCO_2/MWh and $EF_{grid,BM,y}$ equals to 0.7242 tCO_2/MWh.

In accordance with "Tool to calculate the emission factor for an electricity system" (version 02), emission factor is calculated as:

$EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$

For biomass projects, the default weights are as follows: w_{OM} = 0.5 and w_{BM} = 0.5:

$EF_{grid,CM,y}$ = 1.1293 *0.5 + 0.7242*0.5=0.92675 tCO_2/MWh

$BE_{power,\ CO2,y}$=24,000 MWh * 0.92675tCO_2/MWh=22,242 tCO_2.

$BE_{total,CO2,y}$= $BE_{thermal,CO2,y}$ + $BE_{power,\ CO2,y}$ =25,357 + 22,242 = 47,599 tCO_2e.

For option d):

As per clause 17 of AMS I.C (version 16), the baseline emission is calculated as per following.

$BE_{cogen,CO2,y} = [(EG_{PJ,thermal,y} + EG_{PJ,electrical,y} * 3.6)/\eta_{BL,cogen}) * EF_{FF,CO2}$

$EG_{PJ,electrical,y}$ = 24,000 MWh

Annual steam quantity = 92,000 MT (268.04 TJ)

$EF_{FF,CO2}$ = 94.6 tCO_2/TJ, as per IPCC

$\eta_{BL,cogen}$ = 100%, as per Clause 18(c) of AMS I.C (version 16)

$BE_{cogen,CO2,y}$

= (((268.04 TJ) + (24 GWh * 3.6 TJ/GWh))/100%) * (94.6 tCO_2/TJ)

= 33,530 tCO_2e

Thus, its baseline emissions are calculated to be 33,530 tCO_2e.

Compared with the option a), the baseline emissions of option d) are less. Hence, it is appropriate and conservative to select option d) as the baseline scenario. In the absence of the Project, baseline scenario with reference to para.12(d) would most likely have been implemented, which is the use of coal (fossil fuel) to produce steam and electricity with steam supplied to another facility and export of electricity to the grid.

BVC has checked the procedure to identify the baseline scenario of the Project, and confirm the baseline scenario of option d) for the Project is reasonable and conservative.

3.2.3 Additionality

The Project Test has been applied to demonstrate the Project is additional. In the final version of PD, the project test was properly followed.

Step 1: Regulatory Surplus

BVC has checked the law, statute or other regulatory framework, and found the project is not mandated by any enforced law, statute or other regulatory framework.

Step 2: Implementation Barriers

The Project faces implementation barrier, including investment barrier/institutional barrier and technological barrier.

With respect to **investment barrier/institutional barrier**:

As per the news in Hexun [31], the biomass energy generation companies are making loss in China due to high capital investment, lower technological efficiency (as compared to fossil fuel based technologies) and the lack of substantial benefits from implementing such projects. Through the similar market analysis done in such economic reports, investors have become very unwilling to provide funding to such project (i.e. biomass energy generation industry) due to the high financial risks.
In addition, the PP as a Foreign Invested Enterprise (FIE) faces difficulty in securing bank loans. Such difficulty in securing external loans is demonstrated in a journal written by US International Trade Commission [32] which highlights the challenges due to limited capital access and restrictive foreign exchange control system in China. The journal is also supported by a survey study by PricewaterhouseCooper where FIEs confirm the difficulties posed by the foreign exchange control system and limited access to local capital. FIEs have also identified financial and tax issues, and particularly the regulation of capital and earnings, as one of the greatest challenge of investing in China. In addition, the report also cited difficulties in obtaining loans and banking services that are inadequate to meet demand.
Due to the aforesaid financial barriers, the PP sought financial assistance from another independent group company to invest in the project. The investing company provided funding in view of the VCU revenue expected to be generated through VCS registration of the project, as the VCU revenue mitigates some of the project investment risks. Therefore, the VCU revenue helped in overcoming the investment/institutional barrier.
Therefore, BVC has confirmed the Project faced investment/institutional barriers that can be overcome by the additional revenues associated with the generation of VCUs.

With respect to **technological barriers**, the rice husk based system, as a new technology based on commercialization of a new concept established by Harbin Industrial University [18]. Significant risks are associated with commissioning, operation

and maintenance of the newly developed technology on a green-field project site. And, due to the lack of labor who understands the new technology, PP had to train local labor possessing necessary skills and knowledge.

Therefore, based on above demonstration that in accordance with *Project Test* and t*he general guidance to the small-scale CDM methodologies, information on additionality (attachment A to appendix B)* and supported by reliable data sources, it is the opinion of BVC that the Project is thus additional.

3.3 Monitoring Plan

Monitoring Plan of the Project is as per AMS-I.C (Version 16), which is a CDM approved methodology. BVC considers the monitoring plan to be compliant with the requirements of the methodology. The reasons are as follows:

1). In the case of steam energy, methodology requires direct measurement of flow, temperature, pressure to determine enthalpy of the steam. The monitoring parameters include measuring flow of steam and temperature and pressure of steam (after boiler outlet) that is delivered to steam turbine or HP steam to MP steam conversion system.
Temperature and pressure of the steam and steam flow rate will be recorded hourly.

2). AMS-I.C (Version 16) requires that, if more than one type of biomass fuel is consumed, each shall be monitored separately. Only rice husk is used in the Project, and the amount of its consumption is listed as the monitoring parameter.

3). Temperature of feed water (at atmospheric pressure) entering the boilers will be recorded hourly

4). Electricity generation will be recorded by the grid company and monthly electricity invoices will be issued, which is the source of exported electricity.

5). Quantity of rice husk supplied by the Yihai Kerry (Panjin) Oils and Grains Industries Co., Ltd, the parameter will be monitored and will be crosschecked by the purchase invoice.

The PP will form a monitoring team responsible for carrying out the monitoring and maintaining records of all the monitored data. The team will also be responsible to carry out monitoring equipments calibration and maintenance.

By onsite visit and interview with the PP, BVC confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by the Project can be reported ex-post and verified.

3.4 Calculation of GHG Emissions

The emission reductions are being claimed for electricity and steam generation.

Baseline Emissions:

During Phase I, one 15 MT/hour rice husk based boiler is put into operation and producing steam. Baseline emissions are calculated using para.15 in AMS-I.C (Version 16). Steam enthalpy is correctly determined as per steam table [27] and is used to calculate the net thermal energy of steam supplied by the Project ($EG_{thermal,y}$), which is calculated based on the difference in total steam enthalpy and total feed water enthalpy multiplied by annual steam quantity. A default value of 100% is selected as the efficiency of the plant using coal ($\eta_{BL,thermal}$) and CO_2 emission factor of coal ($EF_{FF,CO2}$) is using IPCC 2006 data. The 8,000 operating hours per year for the Project is reasonable. The calculation shows that the baseline emissions in Phase I are expected to be 33,074 tCO_2e.

During Phase II, two 15 MT/hour boiler will be put into operation and the Project will operate in power and heat supply mode (steam delivered to the steam customer and 3 MW electricity exported to the grid). Baseline emissions are calculated using para 17 in AMS-I.C (Version 16). The conversion factor of 3.6 TJ/GWh is used to convert electrical energy to thermal energy. The efficiency of power and heat plant, CO_2 emission factor of coal and steam enthalpy have been correctly used and computed. The baseline emissions are calculated to be 33,530 tCO_2e. When the Project only produces steam without any electricity generation, the baseline emissions in Phase II will be twice that of Phase I, i.e., 66,148 tCO_2e.

Project Emissions:

The Project consumes rice husk and its combustion will not lead to GHGs emissions. No on-site consumption of fossil fuels and electricity is attributable to the Project. Wood, which is a carbon neutral fuel, is used for start-up operation of boilers. There are no other significant emissions associated with the Project within the project boundary. Therefore, the project emissions are considered zero.

Leakage:

The rice husks consumed by the Project are purchased from the “Yihai Kerry (Panjin) Oils, Grains and Foodstuffs Industries Co., Ltd” that is also the steam consumer. The PP has conducted a biomass survey [16] and the survey results show that quantity of biomass available in the region (within 200km radius from the Project) is more than 25% of than the quantity of biomass that is utilized including the Project.

According to AMS I.C. (Version 16), if biomass residues are transported over a distance of more than 200 kilometers due to the implementation of the project, this leakage source attributed to transportation shall be considered. Currently rice husk is procured mainly from neighbor rice mill. Therefore, leakage source due to transportation can be neglected.

And according to Attachment C to Appendix B: General guidance on leakage in biomass project activities (version 03) of indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activities, this leakage attributable to competing uses for biomass can be neglected for the rice husk consumed by the Project will be only provided by the neighbor rice mill Yihai Kerry (Panjin) Oils, Grains and Foodstuffs Industries Co., Ltd, which will only supply rice husk to the Project, and there will be no competing demand for the rice husk.

Since project emissions and leakage emissions are both zero, the annual emission reductions (ER_y) are equal to baseline emissions. The range of average annual emission reductions over the fixed 10-year crediting period is 33,438 tCO_2e (with electricity generation) to 59,533 tCO_2e (without electricity generation).

BVC is of the opinion that the emission reduction calculations are correct and in line with requirements of AMS-I.C (Version 16).

3.5 Environmental Impact

The environmental impact caused by the Project has been analyzed in the PD, including air quality, water quality, noise and solid waste. And Environmental Protection Bureau of Panjin has issued EIA approval (Document: Pan Huan Fa [2008] No.195) on 17/07/2008 [9].

EIA report states that these impacts are within an acceptable limit by implementing measures of pollution control. BVC therefore confirms that the Project will not have significant impact on the regional environment.

3.6 Comments by Stakeholders

The Local Stakeholders consultation meeting for the Project was conducted at the Project site before the start of the Project, when 50 questionnaires were distributed to the participants. The responses showed that the majority of stakeholders supported the Project, even though some people were concerned on the environmental impact during construction phase, which could be reduced by applying advanced technology and environmental protection measures as per the EIA.

During the site visit from 29/01/2010 to 01/02/2010, interviews were held with local stakeholders (as per details in Table 2 above).

The stakeholders appreciated the Project, for which has provided employment opportunities to local residents and reduced environmental pollution of thermal plant and dumped rice husk. No negative comments were received from the stakeholders regarding the Project.

4 Validation Conclusion

Bureau Veritas Certification has performed the validation of Panjin Rice Husk Thermal

Energy Generation Project owned by Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd., which applied the methodology AMS-I.D. version 16. The validation was conducted on the basis of VCS 2007.1 and host country criteria and also on the criteria given to provide for consistent Project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) on-site visit and follow-up interviews with local stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

Through detailed analysis of the Project, it is concluded that the Project is likely to result in reductions of GHG emissions. The Project Test and the general guidance to the small-scale CDM methodologies, information on additionality (attachment A to appendix B) have been applied to demonstrate that the Project is not a plausible baseline scenario. Emission reductions attributable to the Project are hence additional to any that would occur in the absence of the Project. Given that the Project is implemented and maintained as designed, the Project is likely to achieve the estimated the average annual emission reductions vary between 33,438 tCO_2e (with electricity generation) and 59,533 tCO_2e (without electricity generation) over the chosen 10-year crediting period.

The review of the project description (version 0) and the subsequent follow-up interviews have provided BVC with sufficient evidence to determine the fulfillment of stated criteria. The PD (version 1) was subsequently revised on 27/08/2010 to resolve the issues raised during the interviews and subsequent interactions. In our opinion, the Project correctly applies and meets the relevant VCS 2007.1 requirements.

The validation is based on the information made available to us and the engagement conditions detailed in this report.

ANNEXURE – I

REFERENCES-1

[1]. PD version 0 dated 14/12/2009

[2]. PD version 1 dated 27/08/2010

[3]. National Renewable Energy Law issued by NDRC of China effective from 01/01/2006.
http://www.gov.cn/flfg/2005-06/21/content_8275.htm

[4]. Tentative Management Measures for Price and Sharing of Expenses for Electricity Generation from Renewable Energy (Document No. NDRC Energy [2006] No.7)

[5]. Notice on Coal-electricity Price Linkage in Northeast China Power Grid published by NDRC (Document No. Fa Gai Jia Ge [2005] No.666)

[6]. Business license of Yihai Kerry (Panjin) Bio-Cogeneration Co., Ltd.

[7]. In-principal approval to operate the Project issued by Panjin City government dated 20/05/2008

[8]. Evidence of Company name change

[9]. EIA approval (Pan Huan Fa [2008] No.195) issued by Liaoning Province Environmental Protection Bureau on 17/07/2008

[10]. AFCE for the Project approved on 31/07/2008

[11]. Purchase contract for two 15MT/hour rice husk boilers

[12]. Daily report of the rice husk boiler operating since 19/10/2009

[13]. Rice husk purchase agreement between PO and Yihai (Panjin) Oils, Grains and Foodstuffs Industries Co., Ltd

[14]. Steam purchase agreement between PP and Yihai (Panjin) Oils, Grains and Foodstuffs Industries Co., Ltd

[15]. EPC contract

[16]. Rice husk assessment study in the region

[17]. Contract between the PP and Yihai (Panjin) Oils, Grains and Foodstuffs Industries Co., Ltd specifying that only the PP can claim emission reductions from the energy displaced by the Project

[18]. Technical parameter of the rice husk boiler

[19]. NPV calculation sheet

[20]. Emission Reduction Calculation sheet of the Project

[21]. NCV of rice husk measured by Thermal and Environmental Engineering Center of Harbin Institute of Technology

[22]. Anhui Steam Cost Report for Oct.2009, Jiamusi Boiler Cost Report

[23]. The Group's Steam Cost Report for Oct.2009

[24]. 50 questionnaires of local Stakeholders survey

[25]. Database of CDM projects:
http://cdm.ccchina.gov.cn/web/index.asp
http://www.cdmpipeline.org/

[26]. CDM Projects Management Rules in China
http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=458

[27]. Steam Table
http://www.spiraxsarco.com/resources/steam-tables/superheated-steam.asp

[28]. http://news.xinhuanet.com/english/2004-05/31/content_1499172.htm

[29]. China Electric Power Yearbook of 2009

[30]. Notification of China-Grid Emission Factor issued by NDRC on 02/07/2009
http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf

[31]. http://news.hexun.com/2010-07-11/124210745.html

[32]. http://www.usitc.gov/publications/332/journals/access_to_capital_china.pdf

[33]. Notice on Strictly Prohibiting the Installation of Fuel-fired Generation with the Capacity of 135MW or below issued by the General Office of the State Council, Decree No. 2002-6
http://www.gov.cn/gongbao/content/2002/content_61480.htm

REFERENCES-2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents.

1 AMS-I.C Version 16 dated 18/12/2009

2 Attachment C to Appendix B, General guidance on leakage in biomass project activities version 03 (EB47, Annex28, 28/05/2009)

3 Attachment A to Appendix B, General guidance to the small-scale CDM methodologies, information on additionality

4 Voluntary Carbon Standard 2007.1; 18/11/2008

5 Program Guidelines 2007.1; 18/11/2008

6 VCS Program Update; 21/01/2010

ANNEXURE – II

RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
CAR-1. As per section 5.8 of *VCS 2007.1* and *VCS Program Update* on 21/01/2010, please follow the steps of **the project test** to demonstrate the additionality of the Project.	**Reply 1:** The assessment and demonstration of additionality is included in section 2.5 in the updated version of the PD (dated 8 February 2010). The 'Project Test' approach provided under clause 5.8 of the Voluntary Carbon Standard 2007.1 (18 November 2008) has been used. In this approach, the following steps as detailed in the PD have been used: Step 1: Regulatory Surplus Step 2: Implementation Barriers ➢ Investment barrier ➢ Technological barriers Step 3: Common Practice **Reply 2:** 1. The investment/institutional barrier in the PD has been further demonstrated with consideration that there were difficulties	**Comments on Reply 1:** The steps of the 'Project Test' have been applied in the updated PD to demonstrate the additionality of the Project. But, (1) Please further demonstrate the investment barrier in the PD, especially without the VCU revenue, whether the PP would get loan from the group. (2) For the common practice analysis, please state whether and how similar activities to the Project are identified in the local region, and if there are, please analyze whether essential distinctions exist between those and the Project. Any projects are considered similar "if they are in the same country/region and/or rely on a

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
	in securing available externally provided commercial funds (from local commercial banks) due to low and unreliable returns from China biomass projects and very limited access for private companies which do not fall into the prioritized sectors under the *Northeast China Revitalization* policy (for Liaoning Province) implemented since 2003. As a result, financing in the form of easier loans was availed from sister/group companies of the PP. Securing from such sources was easier based the revenue anticipated from sale of any VCU through implementation of the project. Thus, the significance of the VCU revenue is that it has resulted in removing the barriers (investment/institutional) by making funding possible to implement the project. The section of common practice has been removed as the methodology of AMS-I.C is not required to conduct the step.	broadly similar technology, are of a similar scale, and take place in a comparable environment", so coal-fired boiler systems/projects are not related with the similar projects. And the data source of similar projects should not be CDM related database. **Comments on Reply 2:** The revised PD have been checked and found appropriate. BVC has checked the methodology, the attachment A to appendix B, and the response to the common practice problem for small scale projects by Program Officer of VCSA, and confirmed the step of common practice for the Project is not necessary. **Hence, CAR-1 is closed.**

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
CAR-2. As per the AMS-I.C version 16, please revise the metering position of $Temp_{Steam}$ and P_{Steam} to the recipient's end. The amount of rice husk input and surplus rice husk in the region should also be monitored.	The metering provisions for steam parameters (temperature, pressure and flow) have been elaborated further (in sections 3.2 and 3.3) to specify that these correspond to steam delivered from the project activity. Provisions for monitoring biomass (rice husk) use in the project activity and rice husk availability in the region have also been included in sections 3.2 and 3.3.	BVC has checked that the metering position of $Temp_{Steam}$ and P_{Steam} has been revised in section 3.2 and 3.3 of the PD (version 1) to measure the parameters of steam received by on-site energy consumers. The parameters monitoring the quantity of rice husk consumption of the Project and quantity of rice husk available in the region has been included as well in the updated PD. **Hence, CAR-2 is closed.**
CL-1. The estimated annual emission reduction in section 1.3 of VCS-PD is inconsistent with the amount calculated in section 4.2. Please revise it.	The table format for the annual emission reduction in section 1.3 has been amended. The table in the updated PD (version 1 dated 27/08/2010) displays the minimum and maximum values for each period which derived from emission reduction with electricity generated and emission reduction without electricity generated, respectively. Based on designed outputs/demand for maximum steam or electricity, the annual	BVC has checked the annual emission reduction of the PD with and without electiricty generated, and found the requirement has been revised appropriately. **Hence, CL-1 is closed.**

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
	average emission reductions are expected to vary between 33,484 tCO_2e to 62,842 tCO_2e.	
CL-2. Please specify the exact start date of crediting period when the actual delivery of steam to process plants starts.	The start date of the crediting period, which is 19 October 2009, has been specified in Section 1.4 of the PD.	OK **CL-2 is closed.**
CL-3. Please provide more detailed information on the conditions prior to project initiation in section 1.7 of VCS-PD.	The conditions prior to project initiation have been further elaborated in section 1.7. It should be noted that the proposed project is a green-field project, where no prior energy generation activity similar to the project had occurred. In the VCS project, Phase I comprises operation of a 15 MT/hour boiler and Phase II comprises additional operation of another 15MT/hour boiler and a 6 MW steam turbine which is likely to optimally run at 3 MW. As per current practice in the region, rice husk from different rice mills are normally dumped outside rice mills and/or burnt. Some of the rice husk decays and the rest are taken away by local villagers for	BVC has checked the elaborate imformation on the conditions prior to project initation and found reasonable. **Hence, CL-3 is closed.**

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
	various domestic uses such as poultry feed, etc.	
CL-4. Please provide the PPs' roles and responsibilities including contact information of the PPs in section 1.15 of VCS-PD.	The PP's roles and responsibilities have been detailed in section 1.15 of the updated PD (version 1 dated 27/08/2010).	PP's roles and responsibilities including contact information have been described clearly in section 1.15 of PD version 1. **Hence, CL-4 is closed.**
CL-5. Please clarify if there will be leakage in the Project in section 4.4 of VCS-PD. And please provide authoritative evidence to demonstrate the quantity of available rice husk in the region.	As explained in section 1.9 of the updated PD (version 1 dated 27/08/2010), rice husk is procured mainly from a source located close to the project boundary (within 500 meters) and conveyance is by pipeline under suction to an intermediate silo for temporary storage avoiding development of any anaerobic conditions. No leakage emissions are anticipated. The evidence on the rice husk availability for the region has been provided to the DOE.	The assessment on rice husk availability in the region has been presented and verified that the quantity of rice husk available within 200 km radius is more than 25% of that is utilised by the Project. The rice husk consumed by the Project will be only provided by the neighbor rice mill Yihai Kerry (Panjin) Oils and Grains Industries Co., Ltd, which will only supply rice husk to the Project, and there will be no competing demand for the rice husk. Therefore, no leakage emissions should be considered. **Hence, CL-5 is closed.**

Draft report clarifications and corrective action requests by validation team	Summary of project owner response	Validation team conclusion
CL-6. Please make the complete schedule of the Project as per the VCS Project Description Template.	The project schedule has been updated in section 7 of the PD (version 1 dated 27/08/2010).	The complete schedule has been provided in the secion 7 of the PD version 1. **Hence,CL-6 is closed.**
CL-7. In the IRR/NPV spreadsheet version 3 dated 21/01/2010, (1). The project-IRR was applied, in which cash outflow the debt payment should not be taken into account. Please revise the IRR calculation. (2). Please provide the explanation why the O&M cost times inflation rate during all the operation period, but the steam revenue does not take inflation into account. (3). The interest expenses should be added back to net income when calculating cash flow from operating activities. (4). The residual value of equipments should be considered.	**Reply 1:** 1. NPV has been applied instead of project IRR. Debt repayment has been removed in the NPV calculation. 2. In the calculation of the NPV, inflation has not been applied to any revenue and cost items. 3. The interest expenses have been added back to the net income when calculating cash flow from operating activities. 4. Equipment is assumed to have zero residual value. **Reply 2:** The NPV calculation has been removed from the barrier demonstration.	The revised NPV spreadsheet has been checked and the 4 findings have been appropriately solved. And in the latest version of PD, the NPV calculation has been deleted, and the investment barrier has been demonstrated instead. **Hence, CL-7 is closed.**

ANNEXURE-III

Curricula Vitae of the DOE'S Validation Team Members

Mr. (Robin) Wang Jing	BVC, China	Technical Reviewer, CDM Lead Verifier He holds a Bachelor Degree in Gas & Heating Engineering. He was a Gas Engineer with over 10 years' experiences in oil and gas sector and building technology in P.R. China. Before joining BV in 2007, he gained two years of CDM audit experience in P.R China. He obtained the certificate of CDM Verifier, Lead Auditor for ISO 14001 and completed the course assessment for the ISO 14064:2006.

Ms. (Jasmine) Tang Xuemei	BVC, China	Team Leader, CDM Lead Verifier She holds a Master Degree in Environmental Engineering. Before joining BV in 2008, she gained two years of CDM technical working experience in P.R China. She obtained the certificate of CDM Lead Verifier, Lead Auditor for ISO 14001 and completed the course assessment for the ISO 14064:2006.

Mr. Liao Ling	BVC, China	Team Leader, CDM Lead Verifier He holds a Bachelor Degree in Atmosphere Science. Before joining BV in 2008, he gained two years of technical working experience of CDM in P.R China. He obtained the certificate of CDM Verifier, Lead Auditor for ISO 14001 and completed the course assessment for the ISO 14064:2006.

Mr. (Tony) Li Xingtong	BVC, China	Team Member, CDM Lead Verifier He holds a Master Degree in Landscape Ecology and Bachelor Degree in Environmental Engineering. Before joining BV in 2009, he gained one year of CDM technical experience in P.R China. He obtained the certificate of CDM Verifier, Lead Auditor for ISO 14001 and completed the course assessment for the ISO 14064:2006.

Ms. Li Jing	BVC, China	Team Member, CDM Verifier She holds a Master Degree in Environmental Management and a Bachelor Degree in Environmental Science. Before joining BV in 2009, She acquired professional experience in climate/renewable energy policy, U.S. wholesale power markets working for the leading consulting firm and international non-profit organization. Her expertise is market research and financial analysis, including asset valuation of independent power producers and renewable energy markets projection. She has obtained the certificates of CDM Lead Verifier, Lead Auditor for ISO 14001 and completed the course assessment for the ISO 14064:2006.