DETERMINATION REPORT

CCGS LLC

DETERMINATION OF THE MODERNIZATION OF OJSC "SOLOMBALA PPM" ENERGY-GENERATING FACILITIES TO REDUCE FOSSIL FUEL CONSUMPTION, ARKHANGELSK, RUSSIAN FEDERATION

REPORT NO. RUSSIA-DET/0108/2011

REVISION NO. 01

BUREAU VERITAS CERTIFICATION

Determination Protocol on JI project

Modernization of OJSC “Solombala PPM” energy-generating facilities to reduce fossil fuel consumption, Arkhangelsk, Russian Federation

Date of first issue: 27/05/2011	Organizational unit: Bureau Veritas Certification Holding SAS
Client: CCGS	Client ref.: Mr. Mikhael Yulkin

Summary:

Bureau Veritas Certification has made determination of the project “Modernization of OJSC “Solombala PPM” energy-generating facilities to reduce fossil fuel consumption, Arkhangelsk, Russian Federation” located in City of Arkhangelsk, Russian Federation on the basis of UNFCCC criteria for the JI, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the Host Country criteria.

The determination scope is defined as an independent and objective review of the project design document, 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) follow-up on-site interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final determination report and opinion. The overall determination, from Contract Review to Determination Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The first output of the determination process is a list of Corrective Actions Requests (CAR) and Clarification Requests (CL), presented in Appendix A. Taking into account this output, the project proponent revised its project design document.

In summary, it is Bureau Veritas Certification’s opinion that the project correctly applies Guidance on criteria for baseline setting and monitoring and meets the relevant UNFCCC requirements for the JI and the relevant host country criteria.

Report No.: RUSSIA-det/0108/2011	Subject Group: JI	
Project title: Modernization of OJSC “Solombala PPM” energy-generating facilities to reduce fossil fuel consumption, Arkhangelsk, Russian Federation		
Work carried out by: Vladimir Lukin – Team Leader, Lead Verifier		
Work verified by: Leonid Yaskin – Internal Technical Reviewer		
Work approved by: Leonid Yaskin – Operational Manager		
Date of this revision: 27/05/2011	Rev. No.: 01	Number of pag- 99

Abbreviations

AIE	Accredited Independent Entity
BVC	Bureau Veritas Certification
BWW	Bark and Wood Wastes
CAR	Corrective Action Request
CHPP	Combined Heat Power Plant
CL	Clarification Request
CO_2	Carbon Dioxide
DDR	Draft Determination Report
DR	Document Review
EIA	Environmental Impact Assessment
ERU	Emission Reduction Unit
GHG	Greenhouse House Gas(es)
HFO	Heavy Fuel Oil
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
LoA	Letter of Approval
NCV	Net Calorific Value
NPV	Net Present Value
OJSC	Open Joint Stock Company
PDD	Project Design Document
PP	Project Participant
PPM	Pulp and Paper Mill
RF	Russian Federation
SPPM	Solombala Palp and Paper Mill
tCO2e	Tonnes CO2 equivalent
UNFCCC	United Nations Framework Convention for Climate Change

Table of Contents ***Page***

1 INTRODUCTION 4
1.1 Objective 4
1.2 Scope 4
1.3 Determination team 4
2 METHODOLOGY 5
2.1 Review of Documents 5
2.2 Follow-up Interviews 6
2.3 Resolution of Clarification and Corrective Action Requests 6
3 PROJECT DESCRIPTION 7
4 DETERMINATION CONCLUSIONS 11
4.1 Project approvals by Parties involved (19-20) 11
4.2 Authorization of project participants by Parties involved (21) 12
4.3 Baseline setting (22-26) 12
4.4 Additionality (27-31) 15
4.5 Project boundary (32-33) 17
4.6 Crediting period (34) 17
4.7 Monitoring plan (35-39) 18
4.8 Leakage (40-41) 21
4.9 Estimation of emission reductions or enhancements of net removals(42-47) 22
4.10 Environmental impacts (48) 23
4.11 Stakeholder consultation (49) 23
4.12 Determination regarding small scale projects (50-57) 24
4.13 Determination regarding land use, land-use change and forestry (LULUCF) projects (58-64) 24
4.14 Determination regarding programmes of activities (65-73) 24
5 SUMMARY AND REPORT OF HOW DUE ACCOUNT WAS TAKEN OF COMMENTS RECEIVED PURSUANT TO PARAGRAPH 32 OF THE JI GUIDELINES 24
6 DETERMINATION OPINION 24
7 REFERENCES 26
DETERMINATION PROTOCOL 29

1 INTRODUCTION

Limited Liability Company CCGS (hereafter referred as CCGS) has commissioned Bureau Veritas Certification to determine “Modernization of OJSC “Solombala PPM” energy-generating facilities to reduce fossil fuel consumption, Arkhangelsk, Russian Federation” project (hereafter referred ‘the project’) located in city of Arkhangelsk, Russian Federation.

This report summarizes the findings of the determination of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

The determination serves as project design verification and is a requirement of all projects. The determination is an independent third party assessment of the project design. In particular, the project's baseline, the Monitoring Plan, and the project’s compliance with relevant UNFCCC and host country criteria are determined in order to confirm that the project design, as documented, is sound and reasonable, and meets the stated requirements and identified criteria. Determination is a requirement for all JI projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emissions reductions units (ERUs).

UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

1.2 Scope

The determination scope is defined as an independent and objective review of the project design document, the project’s baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

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

1.3 Determination team

The determination team consists of the following personnel:

Vladimir Lukin
Bureau Veritas Certification Team Leader, Climate Change Lead Verifier

This determination report was reviewed by:

Leonid Yaskin
Bureau Veritas Certification, Internal reviewer

2 METHODOLOGY

The overall determination, from Contract Review to Determination Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a determination protocol was customized for the project, according to the version 01 of the Joint Implementation Determination and Verification Manual, issued by the Joint Implementation Supervisory Committee at its 19 meeting on 04/12/2009. The protocol shows, in a transparent manner, criteria (requirements), means of determination and the results from determining the identified criteria. The determination protocol serves the following purposes:

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

The completed determination protocol is enclosed in Appendix A to this report.

2.1 Review of Documents

The original Project Design Document (PDD) v.1.0 dd. 16/12/2010 submitted by project developer CCGS on 17/12/2010 for determination and additional background documents related to the project design and baseline, i.e. country Law, Guidelines for users of the joint implementation project design document form, Guidance on criteria for baseline setting and monitoring, Kyoto Protocol to be checked by an Accredited Independent Entity were reviewed and corrective action requests were reported.

To address Bureau Veritas Certification corrective action requests, CCGS revised the original PDD and resubmitted it as v. 1.1 on 10/03/2011 followed by v.1.2 dd. 07.04.2011, and v. 1.3 dd. 24/05/2011.

The determination findings presented in this report relate to the project as described in the PDD versions 1.0, 1.1, 1.2 and 1.3.

2.2 Follow-up Interviews

On 21/02/2011 Bureau Veritas Certification visited the project site where interviews with the project participants, and project owners: OJSC Solombala PPM (project operator) and CCGS (project developer), were performed to confirm selected information about the technical and economic characteristics and parameters of the project GTPP and to clarify issues identified in the review of the PDD v.1.0. Interviewed representatives of SPPM and CCGS are listed in References. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
SPPM CCGS	• Project history; • Technical parameters of the project; • Project boundary; • Baseline setting; • Additionality; • ER calculation; • Monitoring plan; • EIA; • Stakeholders’ consultation process.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the determination 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.

Corrective Action Request (CAR) is issued, where:

(a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

(b) The JI requirements have not been met;

(c) There is a risk that emission reductions cannot be monitored or calculated.

The determination team may also issue Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable JI requirements have been met.

The determination team may also issue Forward Action Request (FAR), informing the project participants of an issue that needs to be reviewed during the verification.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

3 PROJECT DESCRIPTION (excerpts from PDD v.1.3)

The project aim

The project is aimed at retrofitting energy-generating facilities of OJSC “Solombala Pulp and Paper Mill” (SPPM) with a view to reducing its fossil fuel (coal and heavy fuel oil) consumption through employment of up-to-date technologies of bark and wood wastes (BWW) utilisation for energy generation with termination of BWW dumping.

Substitution of fossil fuel with renewable biomass, which BWW is, and reduction of biomass dumping volumes bring about greenhouse gas (GHG) emission reductions.

Situation prior to the project implementation

The principal product of SPPM is market pulp. Pulp cooking uses pulp chips, the production of which yields large quantities of BWW, including bark, sawdust and screenings of pulpchips. BWW is also a by-product of timber production.

The available BWW are a difficult-to-burn fuel due to their high moisture content and non-uniform particle size distribution. This is especially true about bark, whose moisture content may reach up to 70% and the size of particles may vary from several millimeters to several decimeters. Furthermore, bark combustion is made more challenging by the high tar content. Since BWW utilization as fuel entails numerous difficulties, there are extensive BWW dumping areas next to every saw mill in the Arkhangelsk Region. The saw mills’ heat demand is generally met by fossil fuel combustion at the sawmill itself and/or by outside energy supplying companies.

Prior to commencement of the project Solombala PPM was firing a limited amount of sawdust and chip screenings (in the order of 100 thousand dense m^3 per year), including supplies from the neighbouring wood working enter-

prises of Arkhangelsk which do not have their own wood wastes utilization capacities. Sawdust and chip screenings were fired in utilizing steam boiler No.1 of CKTI-40-34x2 type located in CHPP-1 of SPPM. This boiler was fitted with a sloping grate. Bark combustion was not technically possible in this boiler. Any attempt to burn bark in boiler No.1 led to rapid slagging of the boiler and even caused its breakdown. Moreover, even when sawdust and chip screenings were fired, the technological shortcomings of the boiler made it necessary to co-fire heavy fuel oil in order to sustain the combustion process (up to 30% by heat release), which was the reason of the low efficiency of the boiler in terms of wood waste utilization quantities.

Because the wood waste combustion capacities were limited and bark combustion was not technically possible, large quantities of surplus BWW were produced at SPPM production site and neighbouring enterprises. These wastes had to be transported to dumping areas for disposal. Steam in CHPP-1 was mainly produced by heavy fuel oil and coal-fired boilers.

The baseline scenario

The baseline scenario assumes that without the joint implementation mechanism and sale of GHG emission reductions the Mill would have continued its BWW handling and energy generation practices without any grave barriers at least up until 2012.

Further use of the existing energy capacities can meet the SPPM’s heat requirements. Technical condition of utilizing boiler No.1 is such that its operation can be maintained at the same level for a number of years by carrying out relatively inexpensive routine maintenance. This means that some amount of sawdust and chip screenings produced at the Mill and supplied from the outside can be utilized for steam production purposes without incurring any large and risky capital expenditure.

Bark as well as surplus sawdust and chip screenings would have continued to be disposed at the dump which does not violate any Russian environmental regulations, does not entail significant costs and is historically a practice that is widely used in wood processing industry of Arkhangelsk and Russia, in general.

The missing quantity of steam would have been produced in CHPP-1 by heavy fuel oil and coal-fired boilers, whose technical condition does not cause any concerns and allow to operate their capacities without any constraints.

The project scenario

The project envisages replacement of heavy fuel oil fired boiler No.5 of KM-75-40 type (CHPP-1) with a boiler fitted with a fluidized bed furnace extension designed for BWW combustion, enhancement of the boiler’s nominal

output to 90 t/h, replacement of the ash handling equipment and construction of a new system for BWW handling, preparation and feeding to CHPP-1 for combustion.

The suppliers of the main equipment are LLC “INEKO” (boiler with fluidized bed furnace extension), Saalasti OY, Finland (BWW preparation for combustion), LLC “Energomashtechnologia” (electrostatic precipitator).
Boiler No.1 after the project implementation continues its operation, firing sawdust and chip screenings.

The expected results of the project*:

- The project enables additional utilization of 262 thousand dense m3 of BWW per year for heat and electricity generation purposes by allowing bark combustion, as well as by increasing efficiency and volumes of sawdust and chip screenings combustion. This means that dumping of BWW from SPPM’s production site and neighbouring wood working enterprises is almost completely avoided.
- Reduction in the proportion of fossil fuel in SPPM’s fuel mix. Reduction in heavy fuel oil consumption – by 31 thousand tonnes per year; reduction in coal consumption – by 26 thousand tonnes per year.
- Optimization of the Mill’s energy generation scheme, enhancement of its reliability and cost effectiveness.
- Mitigation of negative environmental impact, including reduction in GHG emissions by 259.0 thousand tCO2e per year.

The project history

The decision to launch this project was made by the Mill’s management on the 10th of December 2000 by signing with CJSC “AMU Sevzapenergomontazh” a contract on replacement of KM-75-40 boiler unit No.5 of CHPP-1.

At the time of the decision making the planned cost of project implementation (including construction of BWW preparation facility) was estimated at RUR 128.7 million (USD 4.6 million).

Originally the boiler No.5 replacement project involved installation of a wet flue gas treatment system based on an emulsifier and multicyclone ash collectors. This flue gas treatment system was selected on account of its relative cheapness (compared to the cost of electrostatic precipitator). However, operation of the retrofitted boiler showed that the emulsifier was unable to achieve its treatment targets. Moreover, inefficient gas treatment caused rapid slagging of the boiler, consequently heat exchange surface shrank and the boiler efficiency dropped. In 2007 the wet flue gas treatment system of boiler No.5 was substituted with an electrostatic precipitator. At the time

* Figures are given as an average for the period 2008-2012

when the decision was made to implement the project the Mill did not expect that the gas treatment system would have to be replaced.
Table A.3-1 below shows the dates when the project components were officially accepted for commissioning, specifying the actual capital expenditure per component.

Table A.3-1. Commissioning dates of the project components and their actual costs

Project components	Commissioning dates	Costs, million RUR
Replacement of heavy fuel oil steam boiler No.5 of KM-75-40 type with installation of fluidized bed furnace extension for BWW combustion, and replacement of ash collecting equipment	30.06.2003	131.3
Construction of a facility for BWW handling, preparation and feeding for combustion to CHPP-1	30.09.2004	77.2
Replacement of a wet flue gas treatment system of steam boiler No.5 and installation of an electrostatic precipitator	29.12.2007	42.3
Total project investments		250.8

When taking the decision to implement the project, the management of SPPM from the very beginning considered the possibility of implementing it as a carbon project in order to mobilize the required financing resources and ensure acceptable return on investments.

In March 2000 Solombala PPM held a technical meeting where it discussed replacement of one of the heavy fuel oil boilers of CHPP-1 and its conversion to wood wastes combustion. At the meeting it was stated that the project would lead to GHG emission reductions and that sale of emission reductions using the joint implementation (JI) mechanism provided for by Article 6 of the Kyoto Protocol would allow to reduce considerably the project payback period.

The same year SPPM management submitted an application to the Executive Directorate of National Pollution Abatement Facility (NPAF) for obtaining financing for the investment project aimed at the Mill reconstruction for the purpose of bark and wood wastes utilization and reducing energy requirements of the pulp production process. The submitted documents contained an estimation of expected GHG emission reductions. The investment project was approved by the Supervisory Board of NPAF. It took into ac-

count the fact that the project falls under the category of GHG emission reduction projects. The NPAF ED recommended SPPM to start preparing the documentation which is necessary to implement the project in accordance with the joint implementation scheme with a foreign partner.

The issues pertaining to JI project preparation were discussed with different companies, including Autonomous Non-Commercial Organization “Environmental Investment Center” (ANO “EIC”) (2000-2006), Camco International (2007-2009), CCGS LLC (2010).

It is worth mentioning that in 2001 specialists of ANO “EIC” made the first attempt to set the baseline for the BWW utilization project, and developed a preliminary inventory of GHG emissions at SPPM for the period 1990-2000. In 2004 ANO “EIC” elaborated for demonstration purposes the project design document and a proposal for participation in the project aimed at identification of potential Joint Implementation Projects in Russia organized by the Agency of Direct Investments financed by the Government of Luxemburg.

4 DETERMINATION CONCLUSIONS

In the following sections, the conclusions of the determination are stated.

The findings from the desk review of the original project design documents and the findings from interviews during the follow up communications are described in the Determination Protocol in Appendix A.

The Corrective Action Requests are stated, where appropriate, in the following sections and are further documented together with Clarification Requests in the Determination Protocol in Appendix A. The determination of the Project resulted in 15 Corrective Action Requests, 12 Clarification requests.

The number between brackets at the end of each section corresponds to the DVM paragraph

4.1 Project approvals by Parties involved (19-20)

The project has no approval by the Parties involved. Russian Federation is defined as Host country. Other parties involved had not been defined at the stage of determination but will be defined within 12 moths after LoA is issued by Russia. The absence of LoA was reported in **CAR 01** left still open.

4.2 Authorization of project participants by Parties involved (21)

The participation of SPPM is not authorized by the Parties involved as LoA has not been issued.

The authorization is expected to be made through the issuance of LoA.

4.3 Baseline setting (22-26)

- PDD v.1.3 explicitly indicates that baseline was set in accordance with appendix B of the JI Guidelines /29/ and with the Guidance on criteria for baseline setting and monitoring Version 01 /30/ (hereinafter referred to as JI specific approach).

JI specific approach

PDD sec. B.1 provides a detailed theoretical description in a complete and transparent manner, as well as justification, that the baseline is established by:

- listing and describing future scenarios available for the project owner SPPM and selecting the most plausible one;
- taking into account sectoral reform initiatives, local fuel availability, the economic situation in the project sector, availability of capital for the implementation of alternatives, local availability of technologies and techniques, skills and know-how regarding alternatives;
- In a transparent manner with regard to the choice of the JI specific approach and related methodologies, assumptions, parameters, data sources and key factors for baseline setting, which are listed in tabular format in Section B.1 and summarized in Annex 2 PDD;
- taking into account of the uncertainty and using a conservative assumption with regard to the multi-project electricity grid emission factor;
- in such a way that ERUs cannot be earned for decreases in activity levels outside the project or due to force majeure;
- by drawing on the list of standard variables contained in appendix B to “Guidance on criteria for baseline setting and monitoring”.

The proposed project activity claims emission reduction due to both:

- avoidance of methane emissions from anaerobic decay of biomass wastes (BWW) that proposed to be utilized instead of being dumped to landfill;
- partial substitution of fossil fuels (coal and HFO) by biomass.

Following alternatives were identified for BWW handling:

- W1. Continuation of the current situation (BWW disposal to the landfill);

- W2. Use of BWW as fuel for heat and power generation at Arkhangelsk CHPP;
- W3. Use of BWW as feedstock for the Hydrolysis Plant;
- W4. Project activity without joint implementation mechanism.

Following the alternative analysis two scenarios W1 and W2 were left as plausible ones.

Alternatives W2 (BWW utilization at Arkhangelsk CHPP) and W3 (utilization of BWW as the feedstock for the Hydrolysis Plant) were rejected. First was rejected as technically impossible: boilers at the Arkhangelsk CHPP are not fitted for solid fuel combustion. This information was confirmed by the review of publicly available sources /31/.

Alternative W3 was recognized to be non viable as the hydrolysis plant nearby SPPM are barely operational and could not ensure reliable BWW utilization.

Five alternatives for heat generation were considered as follows:

- H1 Continuation of the current situation;
- H2. Reduction in coal and heavy fuel oil consumption by CHPP-1 and purchase of the lacking amount of heat from external suppliers;
- H3. Installation of a new coal-fired boiler in CHPP-1;
- H4. Switching CHPP-1 to natural gas;
- H5. Project activity without joint implementation mechanism.

Only H1 and H2 were considered as plausible.

It was explicitly demonstrated that scenarios H2, H3 and H4 are not technically or economically feasible. Alternative H2 is not viable as since 1990s the low pressure steam supply from the CHPP is ceased due to economical reasons and the steam pipelines were decommissioned. Even being rehabilitated the steam supply system from CHPP would not be capable to provide the steam with required characteristics. This rationale was found acceptable and was confirmed through the interviews held on site with SPPM’s key energy staff /9i/. Alternative H3 was rejected based on the economical and technical grounds as the operational costs for coal based energy generation is far more expensive than the HFO based one. Alternative H4 is rejected on the technical grounds. There was no available gas main pipeline system in Archangelsk at the time when decision to commence the project were adopted (2000 y) which might be used as NG source for SPPM.

Based on the analysis of alternatives and taking into account the results of the investment analysis presented in Section B.2, a conclusion is made that continuation of current situation with BWW landfilling and covering of the heat demands by existing heat generating capacity is the most plausible alternative.

Outstanding issues related to the Project description and Baseline setting (22-26), PP’s response and the AIE conclusion are summarized in Appendix A (refer to CARs 02 - 10, and CLs 01 - 11.

The issued CARs and CLs concern:

- Description of the measures to be implemented at Boiler #1 as the part of proposed activity (CAR 02);
- Justification of the tendency of the company to diverse the fuels consumption (CAR 03);
- Justification of the parameters used for baseline emission estimation and the baseline technical parameters (CAR 04);
- Justification of the claim of proportional reduction of coal/HFO consumption (CAR 05);
- Justification of limiting condition for baseline emission (BWW consumption in the baseline could not exceed that in project scenario (CAR 06);
- Justification of emissions from BWW transportation and preparation (CAR 07);
- Difference between approaches to calculate the baseline and project BWW based heat generation at boiler #1 (CAR 08);
- Justification of conservativeness of HFO based heat production estimation for boiler #1 (CAR 09);
- Justification of bark consumption values used for ex-ante estimation (CAR 10);
- Justification of possibility to continue boiler #5 operation for the crediting period (CL 01).
- Consistency in description of the measures proposed to be implemented: rehabilitation vs. replacement of boiler #5 (CL 02);
- Justification of possibility to reach the same level of heat out put for baseline and the project in view of enhancement of boiler’s installed capacity as the result of project (CL 03);
- Clarification on whether the flue gas treatment system installation is the part of the project (CL 04);
- Project history description (CL 05);
- Baseline equipment operational lifetime (CL 06);
- Clarification how the risk of enhanced investment could had been considered at the time of decision making (CL 07);
- Description Technical risk related to the project implementation (CL 08);

- Justification of baseline equipment’s capability to meet the local heat demands (CL 09);
- Clarification on whether enhanced consumption of BWW by SPPM causes any decrease in other BWW based activities outside the project boundary (CL 10);
- Heat export and heat and power flow chart (CL 11).

4.4 Additionality (27-31)

The approach described in paragraph 2 (a) of Annex 1 to the “Guidelines on criteria for baseline setting and monitoring” /30/ was chosen to demonstrate that reduction in greenhouse gas emissions from sources achieved by the project is additional to that which might have otherwise occurred. Application of this approach is presented in sec. B.2 PDD in stepwise mode as follows:

Step 1. Analysis of project alternatives

Taking into account the measures to achieve emission reduction – BWW utilization and replacement of fossil fuel based heat generation by biomass based one the alternative analysis includes consideration of two respective groups of scenarios separately.

Four alternatives were identified for the BWW handling including BWW damping to landfill, BWW use as the feedstock for CHPP and Hydrolysis Plant and the project without being registered as JI.
Five scenarios were identified for heat generation to meet SPPM’s heat demands including: continuation of current situation, heat export from external sources, new coal boiler installation, switch to natural gas based heat production and the Project activity not being realized as JI.

As the outcome from alternative analysis two plausible alternatives were selected: continuation of the current situation for the both PWW handling and heat generation, and project activity not being registered as JI.

Both selected alternatives respect the Host country legal requirement. At the time of decision making no local initiatives or legal incentives existed which could motivate the project implementation.

Step 2. Investment analysis

Investment analysis was applied to demonstrate that the project not being registered as JI is not financially attractive and hence unlikely to be the baseline.

The benchmark analysis was used as the method for investment analysis. The benchmark IRR value was determined on the basis of official investment

attractiveness evaluation methodology /32/. Using the input values and risk estimation effective on the data of decision making the benchmark was calculated as 20%.

The project financial indicators – IRR and NPV were calculated as presented in the traceable financial model provided to BVC /3/. The key input values including total investment USD 4.596 million were determined on the basis of Project Feasibility Study /8/, and the CAPEX breakdown /16/ provided to determiner on site and confirmed through the interview with SPPM financial specialist /4i/. The price for coal (341.51 RUR/t) and for HFO (1941.70 RUR/t) are confirmed through the review of the National statistic Agency database as published at the website /17/ and the analysis of oil products market /18/. The prices for sawdust for 2000 y are confirmed by the information provided by the deputy Director in charge of economy /19/.

In order to gain traceability in evaluation of investment effectiveness CAR 11 was raised. PP was requested to justify the conservativeness of the input values used for investment analysis, and the parameters used for the benchmark determination. Finally all input values were substantiated by the provision of reliable evidence as mentioned above. It was confirmed that the input values reflect the real expectations had existed at the time of decision making. CAR 11 was closed.

The sensitivity analysis with ±10% variation range for the key investment parameters (CAPEX, total savings from reduced coal and HFO consumption, coal/HFO proportion) was selected to support the reliability of investment analysis outcome. The sensitivity analysis confirms that the conclusion regarding the financial non-attractiveness is robust to reasonable variations in the critical assumptions.

Step 3. Common practice analysis

Common practice analysis was applied to demonstrate that the activity similar to the proposed project is not widely spread in the region. It was stated that the technology similar to the project (fluidized bed furnace) had not been implemented in the Russia by the time of project start. The common practice analysis outcome was confirmed through the interviews held during site visit and the review of publicly available information at the official regional websites.

JI mechanism was seriously considered as a possible source for project financing as confirmed by the minutes of technical meeting held on 3/03/2000 /26/. The first attempt to establish the baseline for proposed project was undertaken in 2001 /27/. Since that time SPPM has been undertaking regular and consistent actions to seek JI status.

Outstanding issues related to Additionality (27-31), PP’s response and the AIE conclusion are summarized in Appendix A (refer to CAR 11 and CL 12).

The issued CAR and CL concern:

- justification of conservativeness of input values used for investment analysis (CAR 11);
- rationale for the common practice analysis (CL 12).

4.5 Project boundary (32-33)

JI specific approach

The project boundary encompasses all anthropogenic emissions by sources of greenhouse gases which are:(i) under the control of the project participants; (ii) reasonably attributable to the project; and (iii) significant.

The project envisages two measures to achieve GHG emission reduction to be implemented at CHPP-1:

- Enhancement of BWW based fraction in total heat production at CHPP-1 through replacement of HFO firing boiler #5 by BWW firing one;
- Avoidance of methane emissions from biomass anaerobic decomposition decomposition through the utilization of BWW at modernized CHPP-1.

The delineation of the project boundary and the gases and sources included are appropriately described and justified in the PDD. Following emission sources were included into the project boundary:

- CO2 emission from HFO combustion at CHPP-1;
- CO2 emission from coal combustion at CHPP-1;
- CH4 and NO2 emissions from BWW combustion.

The relevance of project boundary delineation was checked and confirmed through the site visit. There are no any other emission sources attributable to the project inside the physical project location.

Baseline emission sources include:
- CO2 emission from HFO combustion at CHPP-1;
- CO2 emission from coal combustion at CHPP-1;
- CH4 emissions from anaerobic decay of the bark which would have been disposed to landfill without the project;
- CH4 emissions from anaerobic decomposition of sawdust and wood cheep screening that would have occurred without the project.

Based on the assessment of the project documentation, the AIE hereby confirms that the identified boundary and the selected sources and gases are justified for the project activity.

Outstanding issues related to Project Bpiundary (32-33), PP’s response and the AIE conclusion are summarized in Appendix A (refer to CAR 12).

The issued CAR 12 concern the inclusion of N2O and CH4 emissions from wood waste combustion. After additional calculation made on the basis of IPCC 2006 default emission factors for BWW these emission sources were recognized significant and included into ER calculation.

4.6 Crediting period (34)

The starting date of the project is determined as 10/12/2000 being the date of the contract signing for replacement of boiler No.5 with CJSC “AMU Sevzapenergomontazh” /22/.

PDD v.1.3 sec. C.2 states the expected operational lifetime of the project in years and months, which is 20 years or 240 months - less than length of life cycle for solid fuel firing boilers determined on the basis of National Technical Standard /12/.

PDD sec. C.3 states the length of the first crediting period in years and months, which is 5 years (60 months), starting from 01/01/2008, which is after the date the first emission reductions generated by the project.

No areas of concern as to crediting period were identified.

4.7 Monitoring plan (35-39)

The PDD, in its monitoring plan section, explicitly indicates that JI specific approach regarding monitoring has been applied in accordance with Appen-

dix B of the JI Guidelines /29/ and with the JISC Guidance on criteria for baseline setting and monitoring Version 01 /30/.

JI specific approach

The monitoring plan adequately specifies the indicators, constants and variables used that are reliable, valid and provide transparent picture of the emission reductions to be monitored.

1/ The monitoring plan describes the parameters to be monitored to estimate the project and baseline emissions:

- Mass consumption of coal in CHPP-1;
- Mass consumption of heavy fuel oil in CHPP-1;
- Average net calorific value of coal;
- Average net calorific value of heavy fuel oil;
- Volumetric consumption of sawdust in CHPP-1;
- Volumetric consumption of chip screenings in CHPP-1;
- Volumetric consumption of bark in CHPP-1;
- Total heat production by boilers at CHPP-1.

2/ The parameters not to be monitored but determined only once and available at the stage of determination, including those taken from 2006 IPCC guidelines /33/:

- CO_2 emission factor for coal;
- CO_2 emission factor for heavy fuel oil;
- CH_4 emission factor for BWW;
- N_2O emission factor for BWW;
- The Global Warming Potential for CH_4;
- The Global Warming Potential for N_2O;

Parameters determined on the basis of the Methodology to determine Methane and nitrous oxide emissions from biomass waste stockpiles /34/.

- Lignin fraction of C for BWW;
- Decomposition rate constant for BWW;
- Organic carbon content in BWW on dry basis;
- Conversion factor from kg carbon to landfill gas quantity;
- Methane Generation factor;
- Percentage of the stockpile under aerobic conditions;

- Methane oxidation factor;
- Methane concentration biogas;
- Bark moisture content;
- Moisture content of sawdust and chip screenings;
- Methane density;

Parameters determined on the basis of measurements of fuel characteristics, technical characteristics of boilers and operational historical data provided by SPPM:

- Average net calorific value of sawdust and chip screenings;
- Average net calorific value of bark;
- Density of bark at standard moisture content (i.e. at absolute moisture content of 12%);
- Density of sawdust and chip screenings at standard moisture content (i.e. at absolute moisture content of 12%);
- Nominal steam output of boiler No.1;
- Maximum annual number of running hours of boiler No.1;
- Minimum proportion of heavy fuel oil for flame stabilization in boiler No.1;
- Heat content of fresh steam at standard parameters;
- Heat content of feed water at nominal parameters;
- Efficiency of coal combustion in CHPP-1 boilers;
- Efficiency of heavy fuel oil combustion in CHPP-1 boilers;
- Efficiency of sawdust and chip screenings in boiler No.1;
- Maximum average annual specific production of heat from sawdust and chip screenings in CHPP-1 recorded during three years prior to the commissioning of replaced boiler No.5;
- Minimum proportion of heavy fuel oil for flame stabilization in boiler No.1
- Consumption of heavy fuel oil in CHPP-1 during the year *y* in 2000-2002;
- Coal consumption in CHPP-1 during the year *y* in 2000-2002;
- Total heat production by CHPP-1 boilers in 2000-2002.

The monitoring plan draws on the list of standard variables contained in appendix B of “Guidance on criteria for baseline setting and monitoring” /30/

developed by the JISC, as appropriate (project and baseline emissions and their components, and relevant emission factors).

The Monitoring system was checked during site visit. It includes all necessary equipment being maintained and calibrated according to national standards /35/.

Authority/responsibility distribution for the Monitoring functions and the operational and management structure are defined by the internal order dd. 29/11/2007 /21/ and explicitly described in the PDD.

- Organizational issues – the Head of Environmental monitoring service;
- Collection, handling and transmission of monitoring data – Chief energy engineer;
- Calibration and maintenance of metering equipment – the Head of metrological department;
- Internal audit - the Head of quality control service.

On the whole, the monitoring report reflects good monitoring practices appropriate to the project type.

Outstanding issues related to Monitoring plan (35-39), PP’s response and the AIE conclusion are summarized in Appendix A (refer to CARs 13-14).

The issued CARs concern:
- National standards applicable to the monitoring system (CAR 13);
- Monitoring data storage time (CAR 14);

4.8 Leakage (40-41)

JI specific approach
The leakage effect is the net change of anthropogenic GHG emissions outside the project boundary caused by the proposed project activity including following emission sources:

- fugitive emissions of CH_4 from production, processing, storage, handling and distribution of fossil fuels used by transport vehicles and energy sources of the Mill;
- transportation of additional quantity of BWW to the Mill for combustion (compared to the baseline scenario), CO2 emissions from combustion of fossil fuel;

- emissions of CO2 related to additional energy consumption for fuel preparation as a result of the project.

CO_2 emissions from fossil fuel combustion by tracks transporting additional quantity of BWW to the Mill are calculated on the basis of average distance from possible BWW supplier to mill, volume of BWW and technical characteristics of tracks. These emissions were estimated as less than 1% of total emissions generated by the project and hence neglected
CO_2 emissions of related to additional energy consumption for fuel preparation as a result of the project were calculated on the basis of additional electricity consumption for BWW preparation and average heat consumption for heavy fuel oil heating and electricity consumption for coal pulverization avoided due to reduction of fossil fuel consumption. Calculation made on the basis of reliable operational data explicitly demonstrates that project activity does not enhanced net GHG emissions outside the project boundary.

No outstanding issues related to Leakage (40-41) are identified.

4.9 Estimation of emission reductions or enhancements of net removals (42-47)

JI specific approach

The PDD indicates the assessment of emissions in the baseline scenario and in the project scenario as the approach chosen to estimate the emission reductions generated by the project.

The PDD provides the ex ante estimates of emission reductions from the project (within the project boundary), which values 1,294,943 tCO2e for the crediting period;

The estimates referred to above are given:

- On an annual basis;
- From 01/01/2008 to 31/12/2012;
- On a source-by-source basis;
- For CO2, CH4 and N2O as GHG emitted.
- In tonnes of CO2 equivalent, using global warming potentials defined by decision 2/CP.3.

ER is estimated using the formulae provide in used for calculating the estimates referred above, which are Formulae in Sections B.1, D.1.1.2, D.1.1.4 are consistent throughout the PDD. Input data for calculations and the calculations per se are presented on the spreadsheet /2/ in transparent and re-

producible manner. Verifiers observed the final calculations as accurate. The results are summarised in Section E.

For calculating the estimates referred to above, key factors defined in the monitoring plan influencing the project and baseline emissions were taken into account, as appropriate.

The estimation referred to above is based on conservative assumptions and the most plausible scenario in a transparent manner.

Outstanding issues related to Estimation of emission reduction (42-47) PP’s response and the AIE conclusion are summarized in Appendix A (refer to CAR 15).

CAR 15 was issued to request the ER calculation made in any form allowing tracing of formulae and parameters used and reproduction of calculation (excel sheet file). ER calculations were provided in transparent and reproducible manner in excel file /2/. No issues were raised concerning application of formulae and approaches prescribed in PDD.

4.10 Environmental impacts (48)

The project contributes to sustainable development of Arkhangelsk Region by reduction of BWW disposal at the landfill and respectively reduction of methane emissions from its anaerobic decay.

Air Pollutant emissions into the atmosphere being subject for control and monitoring according to the relevant national standards and norms are within established limits as it was checked through the site visit.

In order to reduce air pollutant emissions the exhaust gases treatment system including electrostatic gas precipitator was installed at CHPP-1. Finally the project leads to diminish of total air pollutant emissions.

The foreseen Environmental impacts caused by the project activity are in compliance to the applicable legal requirements and limits as recognized in the EIA developed as the part of project design that underwent official procedure of State Expertise and was confirmed by its positive conclusion /25/.

No areas of concern as to Environmental Impacts are identified.

4.11 Stakeholder consultation (49)

Proposed project activity is not liable to Stakeholder consultation is not required for this type of project activity according to Russian legislation. In-

formation on the project was made publicly available. Formal endorsement was issued by the State Committee on Environmental Protection /28/. No negative comments from the local stakeholders have been received as confirmed by the interview with PP held on site.

No area of concern as to Comments by Local Stakeholders were identified.

4.12 Determination regarding small scale projects (50-57) (Not applicable)

4.13 Determination regarding land use, land-use change and forestry (LULUCF) projects (58-64) (Not applicable)

4.14 Determination regarding programmes of activities (65-73) (Not applicable)

5 SUMMARY AND REPORT OF HOW DUE ACCOUNT WAS TAKEN OF COMMENTS RECEIVED PURSUANT TO PARAGRAPH 32 OF THE JI GUIDELINES

No comments, pursuant to paragraph 32 of the JI Guidelines, were received.

6 DETERMINATION OPINION

Bureau Veritas Certification has performed a determination of the «Modernization of OJSC “Solombala PPM” energy-generating facilities to reduce fossil fuel consumption, Arkhangelsk, Russian Federation» project. The determination was performed on the basis of UNFCCC criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

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

Using investment analysis and common practice analysis the project participants proved that the project activity itself is not the baseline scenario.

Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented and maintained as designed, the project is likely to achieve the estimated amount of emission reductions.

The review of the project design documentation and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria.

The determination revealed two pending issues related to the current determination stage of the project: the issue of the written approval of the project and the authorization of the project participant by the host Party. If the written approval and the authorization by the host Party are awarded, it is our opinion that the project as described in the Project Design Document, Version 1.3 meets all the relevant UNFCCC requirements for the determination stage and the relevant host Party criteria.

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

7 REFERENCES

Category 1 Documents:

Documents provided by Project developers that relate directly to the GHG components of the project.

/1/ PDD “Modernization of OJSC “Solombala PPM” energy-generating facilities to reduce fossil fuel consumption, Arkhangelsk, Russian Federation”,
a/ Version 1.0, dd. December 16, 2010;
b/ Version 1.1, dd. March 10, 2011;
c/ Version 1.2, dd. April 07, 2011;
d/ Version 1.3, dd. May 24, 2011.

/2/ Emission reduction calculation in excel spread sheet
a/file SPPM_model_ru_v1.0 dd. 02/02/2011
b/ file SPPM_for audit_1.1_ru dd. 10/03/2011

/3/ Investment analysis calculation in excel spread sheet
a/file SPPM_model_ru_v1.0 dd. 02/02/2011

Category 2 Documents:

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

/4/ Commissioning Certificate for Boiler #5 dd. 25/06/2003

/5/ The overall testing certificate for boiler #5 dd. December’2002

/6/ Commissioning certificate for BWW handling and preliminary preparation shop dd.30/09/2002

/7/ Commissioning certificate for the electrostatic precipitator dd.30/09/2002

/8/ The Investment Project Conception “Technical Retrofitting of OJSC SPPM in

order to reduce energy consumption and adverse environmental impact”, developed by CJSC “Arkhgiprobum” in 2000.

/9/ State Environmental conclusion (positive) #272 dd.14/04/2003

/10/ The content of moisture in Bark and Wood Wastes BWW monthly averaged data for 2008-2010 signed by the Head of Quality Service Mr. Lukenchuk

/11/ Technical note of parameters of boilers’ operation at HPP-1 in 2000- 2010 signed by Senior Energy engineer Mr.Akishin

/12/ GOST 28269-89 Stationary steam boilers of great capacity. General technical requirements

/13/ CO 153-34.17.469-2003 The instruction on the prolongation of safe operation lifetime for the steam boilers with working pressure of 4.0 MPa inclusively and water heating boilers with water temperature over 115 °C

/14/ Fuel thermo-technical analysis reports (protocols) 2008-2010

/15/ Energy Strategy Concept of the Arkhangelsk Region Towards 2015”, Department of Economic Development of the Arkhangelsk Region, 2005

/16/ CAPEX breakdown effective on 01/04/2000

/17/ National statistic agency database

http://www.gks.ru/dbscripts/Cbsd/DBInet.cgi?pl=1904009

/18/ http://www.os1.ru/article/analiz/2001_06_A_2005_03_22-13_55_02/

/19/ National Report “Heat Supply in the Russian Federation: The options to overcome the crisis”

/20/ State statistical report “Information on the heat power plant for 2000-2010

/21/ The order on appointment of responsible for the monitoring of GHG emission reduction dd. 29/11/2007

/22/ The contract #44-00 dd. 10/12/2000 On the reconstruction of boiler KM-75-40 #5 at HPP-1

/23/ Heat/fuel balance extract from the project design.

/24/ Conception of investment project. Declaration on Environmental Impact developed by Arkhgiprobum dd.2000

/25/ State Environmental Expertise Conclusion (positive) on BWW receiving, Preparing and transportation shop #400 dd. 17/05/2004

/26/ The minutes of technical meeting on reconstruction of boiler #5 with transition to wood waste fueling dd.03/03/2000

/27/ Center of Environmental Investments Perspectives of realization of mechanisms of Kyoto Protocol to FCCC in Arkhangelsk region. 2001

/28/ The letter of endorsement issued by the State committee on Environmental protection in the Arkhangelsk region dd. 11/08/2000

/29/ Guidelines for the implementation of Article 6 of the Kyoto Protocol

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

/30/ Guidance on criteria for baseline setting and monitoring Version 01
http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

/31/ Arkhangelskaya CHPP general information
http://www.metaprom.ru/factories/arhan_tec.html

/32/ Governmental Resolution No. 1470 dd. 22 November 1997 “On approval of the procedure for tender-based provision of state guarantees out of the funds of the Russian Federation development budget and on approval of the statute on investment project efficiency assessment to be applied when the centralized investment resources of the Russian Federation development budget are allocated on a tender basis”

/33/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

/34/ Methane and nitrous oxide emissions from biomass waste stockpiles Prepared for PCF*plus* Research by *Biomass Technology Group BV*

/35/ National Standards applicable to the project activity and the monitoring system:
a/Federal Law No.102-FZ "On measurements uniformity assurance" dated 26.06.2008;
b/“Rules for electricity metering” dated September 26, 1996;
c/RD 34.09.102 “Rules for heat metering” dated 31.08.1995.

Persons interviewed:

List persons interviewed during the determination or persons that contributed with other information that are not included in the documents listed above.

/1i/ Mr. Alexander Samorodov, - CCGS, Director in charge of project development
/2i/ Mr. Dmitry Potashev, CCGS PDD developer
/3i/ Mr. Gregory Nefed’ev – SPPM, Head of Environmental dept.
/4i/ Mr. Andrei Plastinin – SPPM, Deputy Director on Economy
/5i/ Mrs. Tatiana Drobeshkina – SPPM, The Head of Environmental, OH&S service
/6i/ Mr. Stepan Medvedev - SPPM, The Head of Metering and Monitoring Instrumentation Dept.
/7i/ Mr. Stepan Kontsevoy – SPPM, Engineer in Technical Development Department
/8i/ Mr. Konstantin Ivanov – SPPM, The Head of Technical Development Department
/9i/ Mr. Alexander Akishin – SPPM, Chief Energy Engineer

- o0o -