MINAS BASIN
PULP AND POWER COMPANY LIMITED

Hantsport, Nova Scotia, Canada

GHG Emission Reductions Quantification Report

Prepared by

L2I Financial Solutions

August 19th 2008

Quantification Group Letter

Consultant en solutions financières
Financial Solutions Consultant

June 11th, 2008

Fondation Carbon Quantum.
Mr. Roger Fournier
President
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Saint-Lambert (Québec) J4P 1L3

Sir,

Our firm was appointed to write a GHG emission reduction report for *Minas Basin Pulp & Power Company Limited*. We produced the report according to the ISO-14064 part 2 standards.

We consider the report being a true and fair view of the GHG emission reductions situation at Minas considering the time spent on research via official sources, discussions with the customers and the level of assurance is deemed to be reasonable.

Confident in the hope that everything complies with your requirements, we remain,

Yours very truly,

L2I Financial Solutions

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Acronymes

CH_4	Methane
CO_2	Carbon dioxide
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
N2O	Nitrogen oxide
OTC	Over-The-Counter
SSR	sources, sinks and reservoirs
tCO_2	Tonnes carbon dioxide equivalent
VER	Verified Emission Reduction

EXECUTIVE SUMMARY

Project title
Minas Basin GHG emission reductions

Project Type and methodology
The greenhouse gas emission reductions project has been done according to *ISO 14064-2 standard Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.* IPCC methodology – 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2 Energy – has been use to calculate the emission reduction.

Project location
The project is located in Hantsport, Nova Scotia, Canada.

Minas Basin
53, Prince Street
P.O. Box 401
Hantsport, Nova Scotia, Canada
B0P 1P0

Latitude: 45° 3'59.16"N
Longitude: 64°10'28.57"W

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Hantsport, Nova Scotia, Canada

L2I Financial Solutions
Contact: Yves Legault
President
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St-Lambert, Québec, Canada

Project description
The project consists in quantifying greenhouse gas emissions attributed to the enhancement of more energy efficient manufacturing equipments. Thus the company emission will be calculated and a baseline scenario will be use as comparison to get the net emission reduction.

Starting and ending date
The project starts in January 2003 and end in December 2006. The year 2002 is use for calculating a intensity factor before the project starting date, and thus use it for quantifying the baseline scenario GHG emissions from the pulp and paper production per year.

Emission reductions present and future

Table 1 - GHG offsets (CCX) and VER (OTC) per year

Allowance	OTC
Year	**tCO_2 equiv.**
Goods	**VER**
2003	**5 121**
2004	**17 402**
2005	**9 780**
2006	**19 359**
Total	**51 662**

Table 2 - Future VER (OTC) and GHG offsets (CCX) Objectives

Allowance	OTC
Year	**tCO_2 equiv.**
2007	19 359
2008	19 359
2009	19 359
2010	19 359
Projected Total	**77 436**

INTRODUCTION

Minas Basin Pulp & Power Company Limited (Minas) was founded in 1927 in Hantsport Nova Scotia. The company is located 45 minutes from the ice free Port of Halifax and it has overnight access by road to few Canadian provinces and New England. Minas Basin is specialized in recycled paperboard products such as linerboard and coreboard. Their annual capacity can reach 100,000 metric metric tonnenes. It uses 100% recycled fibre as feedstock for its production.

In 2002 Minas decided to change some equipment in its production process in order to reduce its energy consumption. These changes were operational in January 2003. It eliminated Paper Machine #1 and proceeded with a total enhancement of Paper Machine #2 increasing speed and drying capacity. Minas Basin also focuses on protecting the environment. In addition of the 100% recycled fibre used as feedstock, they operate two hydro generation facilities to supply electricity to the paperboard mills reducing electricity demand from energy fuel power plants. They also have a corporate policy that states that they will meet or even exceed all environmental standards and regulations.

1.0 GENERAL REQUIREMENT

1.1 Relevant GHG Schemes and Methodology

ISO 14064-2 : 06 standards and IPCC methodology - 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2 Energy- are used as good practice to identify sources, sinks and reservoirs (SSRs) for the project and baseline scenario. They also served as good practice guidance to quantify, monitoring and report GHG emissions and emission reductions.

2.0 PROJECT DESCRIPTION

2.1 Project description

This project consists in quantifying greenhouse gas emissions attributed to the enhancement of speed and drying capacity of Paper Machine. Thus the company emission will be calculated and a baseline scenario will be use as comparison to get the net emission reduction.

2.2 Project location

The project is located in Hantsport, Nova Scotia, Canada.

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2.3 Inputs and sources of input

Paper recycled fibres are the only input in their production. It comes mainly from domestic, commercial and industrial waste.

2.4 GHG general information

The main greenhouse gases responsible for global warming are: carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O), hydrofluorocompound (HFC), perfluorocarbon (PFC), sulphur hexafluoride (SF_6).

A large amount of carbon is released to the atmosphere as fossil energy is consumed. Petroleum and coal are the principal sources of GHG emissions related to this consumption. By changing to more energy efficient manufacturing equipment, the project avoids emissions from energy consumption and help to reduce the releasing of CO_2 to the atmosphere.

2.5 Project technologies and products

Minas goes through different stages to get its final products. It uses old corrugated containers as furnish. This recycling effort diverts more than 100,000 metric tonnenes of waste from landfill per year and spares thousands of trees every year. The pulp goes through a paper machine following by the winding process. The corrugators' bridge is the final step to get their product: linerboard.

2.6 Identification of Minas greenhouse gas

The main greenhouse gases identified in Minas production are: carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O).

2.7 Recycled linerboard

Linerboard is a type of paperboard used in making corrugated carmetric tonnes. Minas is one of the smaller paperboard producer in North America but the only producer in Eastern Canada.

2.8 Project proponents and relevant stakeholders

L2I Financial Solutions
Contact: Yves Legault
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St-Lambert, Québec, Canada

2.9 Project consultant

The environmental impact assessment was performed by L2I Financial Solutions.

L2I Financial Solutions is a firm specialized in non-traditional corporate financing. These past two years, we have developed an expertise for the quantification of carbon credit. In that capacity, we help companies to count, quantify and accrue their carbon credits and ensure their selling. Our expertise consists of elaborating calculation methodologies to quantify the emissions based on reputable international principles. The reports are drafted in accordance with the following guidelines: ISO 14064, CCX and the Over-The-Counter Market (OTC).

2.10 Summary environmental impact assessment

An environmental impact analysis is not required for this GHG project. There are no negative environmental impacts resulting from the proposed project.

By producing a 100% recycled product for the market place, Minas contribute to spare thousands of trees, save millions gallons of water, prevent thousands of cubic meters of landfill volume and thousand metric tonnenes of air pollution every year. By operating renewable, ecological hydro sites, Minas also avoid to consume hundreds of gigawatt hours of electricity originating from fossil fuel power plants.

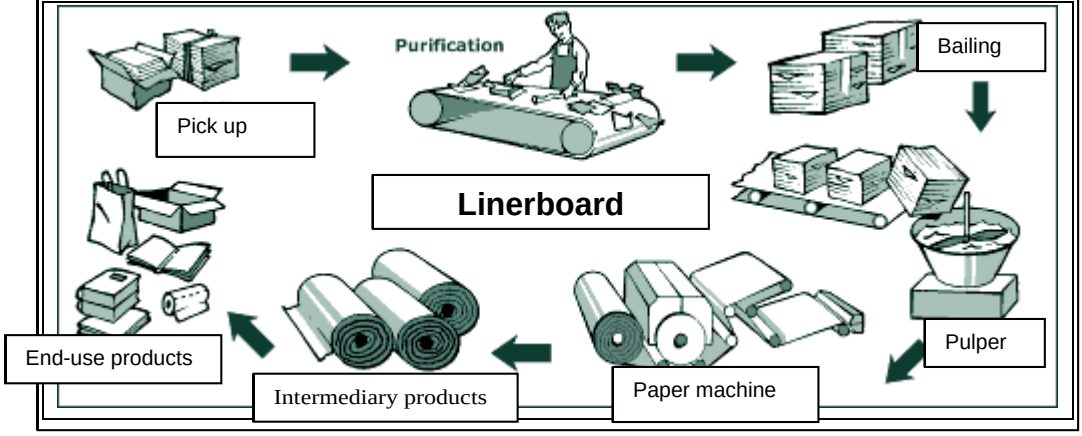
3.0 DETERMINING THE BASELINE

The baseline is the most appropriate and best estimate of a reference scenario for which the project can be compared to. The baseline scenario covers the same temporal range as the project.

3.1 Baseline scenario

The chosen baseline scenario uses a defined intensity factor (GHG/ metric tonne of production) based on year 2002 energy-consuming equipments (Paper Machine No 1 & No 2) since the new equipment was operational in January 2003. It's important to compare the project GHG emissions with the same paper production (metric tonne) in the baseline scenario, this is why we had to use an intensity factor based on the year 2002 (GHG/ metric tonne of production). Therefore, the baseline GHG emission is calculated using the actual production per year (2003-2006) and the intensity factor defined in 2002.

Figure 1 : Paper production



[1]

[1] http://www.fostplus.be/tpl/page.cfm?pagID=25

4.0 IDENTIFYING GHG SOURCES, SINKS AND RESERVOIRS RELEVANT FOR THE BASELINE AND PROJECT SCENARIO

To calculate what would be the GHG emissions from the production with the old paper machine we must use an intensity factor based on the year 2002. GHG and emission factors have been taken from Environment Canada - National Inventory Report 1990-2005.

4.1 Selection and Identification of GHG sources, sinks and reservoirs

The emission sources come from the use of oil and electricity for the recycled paper production.

Gases involved in the baseline and project scenario are: carbon dioxide (CO_2), methane (CH_4) and nitrogen oxide (N_2O).

Figure 2: Project and Baseline Scenario Sources

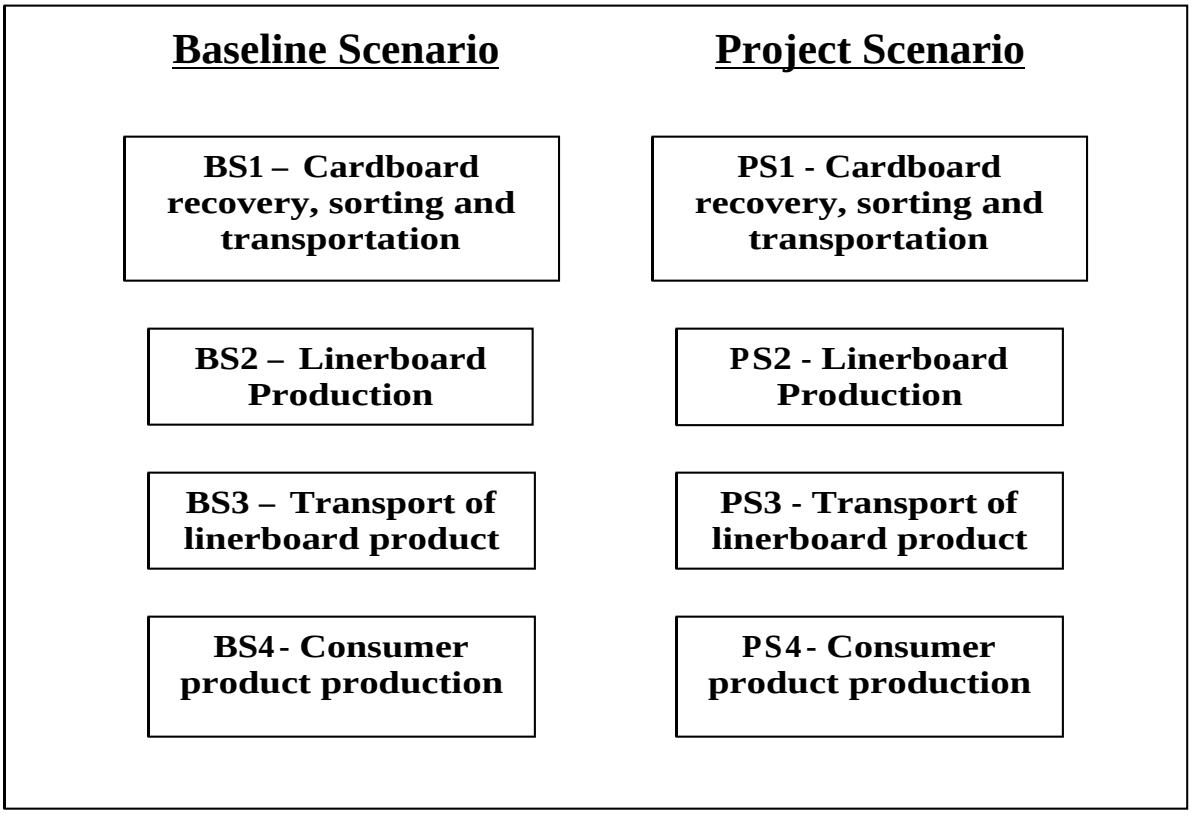


Table 3 - Emission sources comparison (metric metric tonne of CO_{2e})

Baseline scenario		**Project scenario**	
	Emission factors - No project -		Emission factors - Project -
BS1: Cardboard recovery, sorting and transportation	Related sources not modified by the project	**PS1:** Cardboard recovery, sorting and transportation	Related sources not modified by the project
BS2: Linerboard Production	Quantified sources BS1 et BS2 Oil : 3.08 X 10^{-3} Elect. production: 3.5 X 10^{-6} Elect. consumption: 7.63 X 10^{-3}	**PS2:** Linerboard Production	Quantified sources PS1 et PS2 Oil : 3.08 X 10^{-3} Elect. prod.: 3.5 X 10^{-6} Elect. cons: 7.63 X 10^{-3}
BS3: Transport of linerboard product	Related sources not modified by the project	**PS3:** Transport of linerboard product	Related sources not modified by the project
BS4: Consumer product production		**PS4:** Consumer product production	

BS : CO_2 emission source, baseline scénario
PS : CO_2 emission source, project scenario

5.0 QUANTIFYING GHG EMISSIONS

5.1 Choice of methodology

The choice of methodology of quantification has been done among all recognized methodologies available like Intergovernmental Panel on Climate Change (IPCC), Environment Canada and recognized quantification protocols.

We have based our quantification on IPCC methodology that is found in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2 – Energy[2]. But for the baseline scenario, we had to use an intensity factor based on the energy consumption and the paper production of 2002, because the linerboard production is different from one year to another.

IPCC methodology takes into consideration the emissions related to the following gas:

- CH_4
- CO_2
- N_2O

Based on this methodology, we can conclude than Minas is responsible and own the emission reductions and emissions avoided of these products.

5.2 Methodology description and justification

Calculation of total emission reduction (TR) is the difference between the old Paper Machine GHG intensity factor and the new Paper machine intensity factor for the project production. Three types of data are used: specific GHG emission factors, intensity factors since 2002 energy consumption and paper production, and quantity (metric tonnes) for each types of energy (oil and electricity). Quantity is provided by Minas. Specific emission factors for each energy are available through Environment Canada - National Inventory Report 1990-2005[3]. And the intensity factor (GHG/ paper production) is calculated with the energy consumption data and the paper production since 2002. The following table shows the different emission factors:

Table 4 : Baseline and project emission factors

	CO_2		CH_4		N_2O	
Oil (Bunker C)	3080	g / L	0,12	g / L	0,064	g / L
Oil (Bunker C)	0,00308	t / L	1,20E-07	t / L	6,40E-08	t / L
Electricity - Hydro production	3,5	Kt CO2e/TWh	3,50E-06	t CO_{2e} / KWh		

[2] IPCC Guidelines for National Greenhouse Gas Inventories (2006), volume 2 – Energy;
[3] Environment Canada - National Inventory Report 1990-2005 .

Electricity - Nova Scotia	0,763	**Kg CO2e/KWh**	0,000763	**t CO2e/KWh**
Intensity Factor	1,36	**t CO_{2e}/ metric tonne product**		

This type of methodology has been chosen since the production is not the same from one year to another. We could not compare the GHG emissions of 2002 with the other years since Minas Basin didn't have the same production. This is why we used the intensity factor of 2002, reference year, to estimate the baseline scenario GHG emission for each subsequent year's.

5.3 Set-up formula to calculate the emissions

Total reduction (TR)

Total GHG reduction is the difference from the project intensity factor and the baseline intensity factor multiplied by the project production since 2003.

$$TR = (IF2002 - IF200x) * P_{project}$$

IF2002= Intensity factor before the project was in place. (t CO_{2e} / metric tonne production);
IF200x= Intensity factor for each year since 2003. (t CO_{2e} / metric tonne production);
$P_{project}$= Project production per year since 2003 (metric tonne).

Baseline Intensity factor

This formula takes into consideration the production and the GHG emissions that would be generated by the old equipments for the year 2002, before the project was implemented.

$$IF2002 = [(Q_{OB} * EFO_{CO2}) + (Q_{OB} * EFO_{CH4}) + (Q_{OB} * EFO_{N2O}) + (Q_{EPB} * EF_{EP}) + (Q_{ECB} * EF_{EC})^{4}] / P2002$$

Q_{OB} = Oil quantity in the baseline scenario (liter);
Q_{EPb} = Electricity produced in the baseline scenario (KWh);
Q_{ECb} = Electricity consumed in the baseline scenario (KWh);
EFO_{CO2} = Heavy oil (Bunker C) CO2 emission factor (0.00308 t/liter)[5];
EFO_{CH4} = Heavy oil (Bunker C) CH4 emission factor (1.2 X 10^{-7} t/liter)[6];
EFO_{N2O} = Heavy oil (Bunker C) N2O emission factor (6.4 X 10^{-8} t/liter)[7];
EF_{EP} = Electricity produced emission factor (3.5X 10^{-6} t CO_{2e} per KWh)[8];
EF_{EC} = Electricity consumed emission factor (7.63 X 10^{-4} t CO_{2e} per KWh)[9];

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[4] IPCC Guidelines for National Greenhouse Gas Inventories (2006), volume 2 – Energy. chapter 2 stationary combustion, equation 2.1, p. 2.11

[5] Environment Canada - National Inventory Report 1990-2005 Table A12-2 p.653 Heavy Fuel Oil - Industrial 3080 g/l) 1000) 1000 = 0.00308 t/l CO2

[6] Environment Canada - National Inventory Report 1990-2005 Table A12-2 p.653 Heavy Fuel Oil - Industrial 0.12 g/l) 1000) 1000 = 1.2 X 10^{-7} t/l CH4

[7] Environment Canada - National Inventory Report 1990-2005 Table A12-2 p.653 Heavy Fuel Oil - Industrial 0.064 g/l) 1000) 1000 = 6.4 X 10^{-8} t/l N2O

[8] Hydro-Québec: Emissions de gaz à effet de serre des options de production d'électricité, Figure 1: moyenne des 2 coefficients d'émissions:hydraulique au fil de l'eau. 3.5 Kt CO2e/TWh * 1000 ⁄ 10^{9} = 3.5X 10^{-6} t CO_{2e}/KWh

[9] GHG Registries. Available at: http://www.ghgregistries.ca/emission_estimation_resources_f.cfm 0.763 Kg CO2e/KWh) 1000 = 7.63 X 10^{-4} t CO2e/KWh

P2002= Production for 2002 (metric tonne).

Project emissions

This formula takes into consideration the production and the GHG emissions that are generated by the new equipments since 2003.

$$IF200x = (Q_{OP} * EFO_{CO2}) + (Q_{OP} * EFO_{CH4}) + (Q_{OP} * EFO_{N2O}) + (Q_{EPP} * EF_{EP}) + (Q_{ECP} * EF_{EC}) / P_{project}$$

Q_{OP} = Oil quantity in the project (liter);
Q_{EPP} = Electricity produced in the project (KWh);
Q_{ECP} = Electricity consumed in the project (KWh);
EFO_{CO2} = Heavy oil (Bunker C) CO2 emission factor (0.00308 t/liter);
EFO_{CH4} = Heavy oil (Bunker C) CH4 emission factor (1.2×10^{-7} t/liter);
EFO_{N2O} = Heavy oil (Bunker C) N2O emission factor (6.4×10^{-8} t/liter);
EF_{EP} = Electricity produced emission factor (3.5×10^{-6} t CO_{2e} per KWh);
EF_{EC} = Electricity consumed emission factor (7.63×10^{-4} t CO_{2e} per KWh).

6.0 SUMMARY OF GHG EMISSIONS FROM THE BASELINE

Section 5.3 detailed formulas that must be used to calculate emissions related to the baseline scenario intensity factor. Here are the result calculations for the baseline scenario.

Calculation for emissions and reductions related to the project starts in 2002. This year have been chosen since it was the last where the old equipment was in operation.

Given that the aim of this emission reduction quantification report is to sell those credits on the Over The Counter (OTC) market, we have enough data to illustrate the effectiveness of the project scenario compare to the baseline scenario.

Table 5 – Baseline Intensity factor

	Production (t)	Total t CO_2e	Intensity (t CO2e/unit)
2002	74310,814	100877	**1,36**

7.0 SUMMARY OF GHG EMISSIONS FROM THE PROJECT

Section 5.3 also detailed formulas that must be used to calculate emissions related to the project scenario intensity factor. Here are the result calculations for the project scenario.

The project scenario calculations start with 2003 energy consumption numbers. The following table presents a summary of the project scenario intensity factors.

Table 6 - Summary of project scenario intensity factors

	Production (t)	Total t CO_2e	Intensity (t CO2e/unit)
2003	62592,415	79848	1,28
2004	78803,784	89575	1,14
2005	73130,965	89495	1,22
2006	82408,852	92511	1,12
Intensity			

8.0 QUANTIFYING GHG EMISSION REDUCTIONS

The total reduction of GHG emissions for this project is obtained by subtracting the project intensity factor to the baseline intensity factor multiplied by the project production.

The next table summarizes the resulting emission reductions achieved from the project.

Table 7 - Emission reductions

		Intensity difference 2002-200X (t CO2e/unit)	Production (metric tonne)	Reduction
	2003	0,08182	62592,415	5121
	2004	0,22082	78803,784	17402
	2005	0,13373	73130,965	9780
	2006	0,23491	82408,852	19359
Summary	**Total**			**51662**

9.0 GHG OFFSETS AND VERIFIED EMISSION REDUCTION (VER)

The GHG emission reduction allocation is done for every year that Minas was operating its new Paper Machine. Offsets will be VER (Verified Reduction Emission) available on the OTC.

Table 9 - GHG offsets (CCX) and VER (OTC) per year

Allowance Year	OTC tCO_2 equiv.
Goods	**VER**
2003	**5 121**
2004	**17 402**
2005	**9 780**
2006	**19 359**
Total	**51 662**

The VER forecast is based on Minas technology; no change will be implemented before a new, more efficient and more profitable manufacturing technology will be available. However due to the long-term Minas equipment useful life, it is expected that the company remains in the same situation until 2010.

Table 10 - Future VER (OTC) and GHG offsets (CCX) Objectives

Allowance	OTC
Year	tCO_2 equiv.
2007	19 359
2008	19 359
2009	19 359
2010	19 359
Projected Total	**77 436**

10.0 UNCERTAINTY AND LIMITS

Oil and electricity emission factors used in the calculations come from recognized sources: Environment Canada - National Inventory Report 1990-2005, Hydro-Québec and GHG Registries. Conditions in which those emission factors have been used allow our calculations to be in the same range as IPCC.

The intensity factor used for estimating the baseline emissions was not part of a recognized source, but in another hand, it was directly calculated from the data of Minas production and energy consumption. In a way, it's even more accurate then using a general factor.

No information has been found regarding Nova Scotia hydro electricity emission factor. This is the reason why the electricity production emission factor comes from Hydro-Québec which is a reliable source.

A revision of the different emission factors must be done each year in order to adjust the emission reduction if necessary.

The calculations are compliant with the results of similar projects in as much as the available data, from the company and recognized sources, are accurate.

All calculations are verifiable and are endorse by references.

We can conclude that the uncertainty is low since we followed the IPCC methodology found in 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

11.0 DATA COLLECTION AND MONITORING

Minas Basin consumes significant amounts of heavy fuel oil, to provide steam for the drying of paper, and electricity, to operate manufacturing machinery and equipment. Fuel oil is delivered by tanker truck, daily and signed receipt documents and supplier invoices are used to record and monitor purchases. The boiler house operation meters fuel usage, steam generation, boiler efficiency etc. and this information is collected in a computerized database daily. Fuel inventory is reconciled by physical dip of holding tanks each month.

Management reports on fuel consumption, cost and steam generation and use are distributed monthly to assist the optimization of operations. Steam utilization is an important cost element in the manufacture of paper, which is carefully monitored and forecast.

Electricity for the Mill is obtained from two sources; purchases from Nova Scotia Power (the provincial electrical utility) and from hydro generated at Minas Basin's five- megawatt generation facility, on the St.Croix River system. All electrical activity is carefully metered and recorded by a 24-hour operations staff and costs and consumption are reconciled monthly to utility invoices and production records. Monthly reports and review meetings are used by Management to assure operational efficiency and cost minimization.

During recent years Minas Basin has made considerable effort and investment to reduce energy consumption, to achieve both cost and environmental objectives. Timely, accurate record systems and continuous improvement efforts by Management have been successful in making notable progress.

12.0 ENVIRONMENTAL IMPACT ASSESSMENT

An Environmental Impact Assessment (EIA) is not necessary for Minas project as it respects Canadian environmental laws and regulations. Finally, the project is also providing sufficient information to answer the OTC market requirements concerning the environmental impacts.

13.0 CONCLUSION

An exhaustive study has been realized on Minas emission sources. We have considered all data that have an impact on CO_2 emission and reduction. Plant visit, production and energy consumption data as well as different studies as been examined and a rigorous analysis has been done of the company emissions situation.

ISO 14 064 part 2 standard has been followed in order to have this report register at the CSA level and for market trading use.

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