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PRELIMINARY STUDY OF TWO PEAT BOGS

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Preliminary Study of Two Peat Bogs

Located at Baie Comeau, Quebec

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Introduction:

Between 1965 and 1968, the Peat Bog Division of the Quebec Department of Natural Resources had investigated a certain number of bogs located between the Manicouagan River and Outardes River in the Baie Comeau Area on the north shore of the St. Lawrence. This work has located and investigated a series of bogs which are probably the largest in the world and have proven the existence of vast reserves of a quality of peat moss which is also considered the best of the world based on its unusual and very high physical and chemical properties.

While the Department of Natural Resources was conducting their investigation, this entire territory had been subtracted from staking. At the request of Avilla International Explorations Ltd., an Order in Council was voted and the territory became open to staking in November 1971. An area of approximately 8000 acres was effectively acquired by the Company covering the two largest and best bogs in the area referred to in the index map as Bog No. 1 and 4.

The Department of Natural Resources has put at the disposal of the Company its very expensive reports, maps and analyses of the bog along with its own estimates of investments and operating costs required to bring it into production on a profitable commercial basis.

The present document is really a covering letter introducing data supplied by the Government, especially by the Chief of the Peat Bog Division, Mr. Antoine Simard, who supplied all the data and test results contained in the attached reports.

1. Peat Bog Industry:

The Province of Quebec is the largest peat producer among the ten province of Canada and its production accounts for nearly 40% of the total Canadian production. The last statistics available dating back to 1968 show that the Province was producing more than 110,000 tons of peat moss per year, 90% of which is exported to the United States. The latests statistics found under Market show the extent of the market increase since that time. In the last ten years, the use of peat moss has become vastly more popular, to a point where the Province of New Brunswick, which was producing a very small quantity of peat moss ten years ago, has today a production which is almost equal to that of Quebec. Based on these figures, it can be stated that the average annual increase in the market for the last ten years has been in the order of 15,000 tons per year.

As stated, most of the buyers are located in the United States and a list of the main buyers is attached to the present report.

It is estimated that the market could be vastly developed, especially in the Carolinas, Virginia, Florida, Texas and other south-western States, especially if the peat moss was transported to various central locations in each of these areas by low cost water transportation.

2. Reserves and Quality:

The peat moss is separated into two main bogs located respectively at Pointe Lebel and Pointe-Aux-Outardes. The Pointe Lebel bog is by far the largest and covers approximately 75% of the high grade peat moss located in these two areas.

The full extent of both bogs has been completely investigated by the Technicians from the Department of Natural Resources, who have taken some soundings and samples of the moss on a close grid pattern over the full extent of the bog. The reserves and grade of the moss is described hereafter:

A. The Point Lebel Peat Bog

This bog covers an area of 5,980 acres developed into four zones, having average depths of good quality moss from 7.4 to 12.0'. The volume of commercial peat moss extractable from two cuts over this bog is estimated at 85,250,000 bags of 6 cubic feet each. Over large areas, a third and fourth cut will be possible and it is expected that total reserves extractable will likely reach the order of 140,000,000 bags. The presently recognized reserves of 85,250,000 bags are equivalent to more than 500,000,000 cubic feet or almost exactly 3.5 million tons of peat moss. The probable reserves of 140 million bags would be equivalent to 5.8 million tons of peat moss.

The quality of this moss has been assessed by extracting 102 representative samples from 29 different locations and testing this moss for its P.H. degree, its water absorption power, its ash content, its commercial value and microscopic examination. In order to be of high quality, a peat must have a P.H. which is less than or close to 3.5, a ratio of water to peat moss larger than 12 and an ash content not exceeding 2%. It will be seen on examining Table 1 of the attached report that the P.H. of the Pointe Lebel moss is excellent being very close to 3.5 and wandering away from that ideal acidity only at depth when samples were extracted from the bottom of the bog into some other types of soils. The water retention power is excellent and probably averaging above 18 to 19 times its weight. The ash content is excellent, constantly below 2% and averaging actually closer to 1%. The commercial value is indicated everywhere as being very good and the microscopic examination indicates that this peat moss is essentially sphagnum of a light colour which is considered the best possible grade.

B. Pointe-Aux-Outardes

The peat bog located at Pointe-Aux-Outardes is lying geographically a few miles west from the Pointe Lebel bog and is equally easily reached by good road leading directly to the bog. It extends over an area of 2500 acres and has an

average depth of 9.5 cubic feet. However, the useful part of the bog covers 1700 acres with an average depth of 9.6 feet. This is the part that has been acquired by Avilla International Explorations Ltd.

The volume of the peat moss contained in this bog is estimated at 30 million bags of 6 cubic feet each or 180 million cubic feet. This is the equivalent of 1.27 million tons of high grade peat moss. Here again, it is expected that one or more additional cuts can be taken beyond this reserve and that total probable reserves are probably in the order of 45 to 50 million bags, equivalent to a total of 2 million tons of peat moss.

The quality of the peat moss in the Pointe-Aux-Outardes bog is again excellent and exceeds in grade the quality found at Pointe Lebel. As a matter of fact, it is estimated by the experts that the moss at Pointe-Aux-Outardes is likely the highest grade obtained anywhere in the world. The P.H. degree is almost constantly below the 3.5 level, whereas the water absorption power is extremely high, reaching up to a maximum of 34.28 times its weight in water. Such a water absorption power has never been found anywhere else in the world and exceeds the water absorption power of practically any other moss by almost 35%. The ash content is constantly very low and always way below the maximum 2% limit. The commercial value is good and very good in every single instance. The microscopic examination indicates the bog to be made up of sphagmum of a light colour which, of course, makes the best variety of peat moss and the most in demand.

When reading the attached report from the Department of Natural Resources, and especially when consulting the Tables describing the quality and analysis of the peat moss, care must be taken to note that the samples analyzed came from various depths within the deposit. It will be observed that whenever one single analysis yields poor results, it is always located at great depth and below the actual limit of the commercial moss. On the other hand, where ever samples were extracted from the actual stratum from which moss will be commercially produced, the grade is in every single instance of the very highest quality.

It should also be mentioned that only sphagnum moss will produce a good peat moss with a high water absorption, the right P.H. degree and a low ash content. It is remarkable that the peat moss at the Pointe Lebel and Pointe-Aux-Outardes bogs is essentially and exclusively light coloured (yellow) sphagnum of the very best character and that the said sphagnum moss is completely unaltered, having a perfect uniform colour and extremely light weight which, commercially speaking, adds to its quality.

The two bogs are very easily accessible by good roads and are covered by very little vegetation. Both are located within a few miles from the harbour of Baie Comeau on the north shore of the St. Lawrence which is extremely well equipped with an all year deep sea harbour with full loading facilities.

Markets:

The market for Canadian peat moss has been constantly increasing from year to year over the last 15 years. Statistics available as far as 1967 show that between 1956 and 1967 the production went from 128,000 tons to 280,000 tons. During that period the Province of Quebec production went from 40,000 tons to 111,000 tons, while the production from New Brunswick went from 14,000 to 19,000 tons. Detailed statistics are not available beyond 1967. However, the Department of Natural Resources statistics show that from 1967 - 1968 to 1971, the production in Quebec increased by 750,000 bags or 25%. Another good example of the expansion of the market is the fact that Western Peat Moss in New Brunswick started six years ago with an initial production of 300,000 bags per year and is presently producing more than 1.2 million bags per year.

Government experts estimate that the initial production should be based on a production of 300 carloads per year, each carload being 600 bags, or 25.5 tons, for a total of 180,000 bags or 7,500 tons per year. The plant should, however, be built large enough to handle production of 700 or 800 carloads per year with a ten hour shift, which production could be doubled by adding a second shift.

Preliminary estimates of costs and investment to complete such a mill with all ancillary facilities and to develop the bog to effect such production will be found hereafter. These figures have been established by the Department of Natural Resources and are conservative figures based on present costs established by studies of 35 different peat bogs in Quebec.

INVESTISSEMENT POUR UNE EXPLOITATION INITIALE DE 200 ACRES

I- Déblaiement et drainage

Déblaiement de la surface (arracher les arbres et tondre)	$ 60. acre	
Drainage: grandes décharges	10. acre	
bandes de gisement	65. acre	
	135. acre X 200 acres=	$27,000./200 acres

II- Machineries pour exploitation

6 vacuums avec tracteurs	$48,000.	
4 wagons avec boites de 18 vgs^3	8,000.	
4 tracteurs usagés à $1500.	6,000.	
1 chargeur type backhoe utilisable pour le drainage	10,000.	
Roulant divers, pick-up, jeep	6,000.	
	78,000.	$78,000.
	390./acre	

III- Machineries diverses

Tondeuse John Deere	$ 2,800.	
Rotovatar 8'	1,600.	
	4,400.	$ 4,400.
	22./acre	

IV- Bâtisses

Moulin 25' X 45'	$18,000.	
Entrepôt 30' X 45'	16,000.	
Garage (entretien et rép. mach.)	20,000.	
	54,000.	$54,000.
	270./acre	

V- Machinerie et équipement de transformation et mise en marché

Moulange 48"	$ 5,500.	
Presses-2 de 4' cubes automat.	15,000.	Elec. $32,400.
2 de 6' cubes automat.	15,000.	Elec. 32,400.
Moteurs électriques	3,000.	
Installation électrique	6,500.	
Tamis	1,800.	
Convoyeurs et planchers roulants	9,000.	
	55,000.	Elec. 89,600.
	279./acre	448./acre

TOTAL avec presses automatiques $218,800.

ou 1,094./acre

TOTAL avec presses électriques 252,600.

ou 1,263./acre

VI- Main d'oeuvre

Production initiale possible 300 wagons.

Le moulin tel qu'équipé peut suffire jusqu'à une exploitation de 600 acres ou 700 à 800 wagons annuellement.
Seuls les items I et II nécessiteront de nouveaux déboursés pour le déblaiement, le drainage et la machinerie, de sorte que le coût total d'investissement à l'acre peut finalement s'abaisser à $800. environ.

1 gérant	$	200./sem.
1 contremaître		150./sem.
1 comptable		125./sem.
1 employé au moulin		150./sem.
4 hommes pour les 4 presses (1 homme par presse et 1200 sacs par jour par presse ou 160,000 sacs à 0.02)	12,800.	
5 hommes pour cinq vacuums		125./sem.
2 hommes sur entreposage des sacs		100./sem.
1 mécanicien		150./sem.
2 hommes pour transport de la tourbe du champ au moulin		100.
1 homme sur le chargeur		125.

TOTAL

19 hommes pendant 6 mois $ 73,600.

ORGANISMES A RENCONTRER A

HAUTFRIVE ET BAIE COMEAU

a) Conseil Régional de développement de la Côte Nord

Raphaël Hovington, président
Hauterive

b) Association forestière de la Côte Nord

J. Imbault, a.g.
Directeur-Gérant
Hauterive

c) Chambre de Commerce

R. Savard, agr.
Chef des Foresteries

NOTE:

It should be noted that climatic studies have shown that there is approximately twice as many dry and sunny days in Baie Comeau as in the peat bog areas located on the south shore of the St. Lawrence. Consequently, the peat moss in the Baie Comeau peat bogs is much drier than anywhere else. This means that the operation at Baie Comeau will enjoy twice as many working days as other bogs and that the productivity of the vacuum harvesters will be almost double the productivity of similar machines used elsewhere. Hence, where the vacuum harvestor generally picked up 35 carloads per year per vacuum, it is expected that on the Baie Comeau bog the same vacuum harvesters will pick up up to 70 carloads per year. For calculation purposes a capacity of 50 carloads per year has been used.

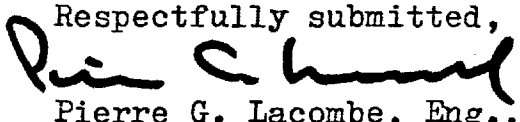
USES:

Peat is used mainly as a soil conditioner in horticulture, gardening, lawn making and some larger scale farming. However, several new uses and products are being developed through active research conducted in Ontario and Quebec. Some dramatic new progress will likely be made very shortly in the development of new products and uses for this material. The manufacturing know-how of these new products has been made available to Avilla and the possibility of manufacturing peat moss products for these new uses can open very substantial markets in the immediate future.

FINAL NOTE:

Due to the necessity of issuing a covering report for the enclosed French text, the present preliminary study has been written in a very short period of time. It is the author's intention to elaborate the present text into a full scale normal technical report to accompany the English translation of the attached French reports.

Respectfully submitted,



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PGL:JA