

# GM 42953

MONTAUBAN PROPERTY

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1211-0948

MUSCOCHO EXPLORATIONS LIMITED  
MONTAUBAN PROPERTY  
MONTAUBAN, QUEBEC

**Ministère de l'Énergie et des Ressources**  
Service de la Géoinformation  
Date: 13 AOÛT 1982  
No G.M.: 42953

Submitted by:  
D.S.M. Consultants Limited  
April 1982

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SUMMARY

Muscocho Explorations Limited holds the mineral rights to a group of 18 claims, 1 Special Permit and 1 Mining Concession in the Montauban area of Quebec.

Of several Gold and Base Metal Zones known on the property, the North Gold Zone is the one under current exploration and development. Exploration programmes carried out by Soquem and Muscocho from 1975 to December 1981, consisted of surface trenching, and diamond drilling and underground drifting, crosscutting, raising, slashing, diamond drilling and sampling on the 250, 260 and 280 metre levels.

The results of all exploration programmes are now being tabulated and computerized so that accurate ore estimates can be made.

It is recommended that the underground exploration be continued with test stoping and bulk sampling in order to determine the structural picture, the best mining methods and the sampling necessary to maintain grade control.

It is also recommended that a portable modular test mill be erected on the property to process the bulk sample and material already extracted so that the extent and quality of the mineral resources of the North Gold Zone can be determined.

If the test milling, bulk sampling and ore reserve calculations indicate a viable operation, consideration should then be given to adapting the test mill for production and to placing the mine on a regular production schedule.

LOCATION & ACCESS - LOCAL RESOURCES

The Montauban property is located 80 kilometers west of Quebec City and can be reached by a paved highway which crosses the property between the North and South Gold Zones. There are several nearby towns and one of them, Montauban-les-Mines, lies partly on the property.

The Canadian National rail line passes a short distance north of the property with sidings available at Notre-Dame-des-Anges, seven kilometers north of the property, and Harvey Junction 21 kilometers west of the property.

A Hydro Quebec power line crosses the property and a sub-station rated at 25 KV/4160 V with a capacity of 2000 KVA has been installed.

Because the property is located in a settled area near a major city, all normal supplies and services are readily available.

PROPERTY

The Montauban Property is approximately 492.6 hectares (1,226.8 acres) located in Montauban and Chavigny townships and the Grondines West Seigneurie in Portneuf County, Quebec. The property consists of the following mining claims:

<u>CLAIM</u>	<u>AREA</u>	<u>TOWNSHIP</u>
S.P. 69	186.90	Montauban
C.M. 410	34.56	Montauban
859	4.00	Montauban
1136	17.20	Montauban
1139	17.20	Montauban
1511	13.40	Montauban
19818-3	15.30	Montauban
19818-4	15.30	Montauban
19818-5	15.30	Montauban
24960-1	16.00	Montauban
26203-1	15.50	Montauban
26203-2	15.50	Chavigny
26203-3	15.50	Chavigny
26203-4	15.50	Chavigny
26203-5	15.50	Chavigny
36094-1	16.00	Montauban
36094-2	16.00	Montauban
36094-3	16.00	Montauban
36094-4	16.00	Montauban
36094-5	16.00	Montauban

Total 492.66 hectares

All mining claims are registered with the Ministry of Energy and Resources, Quebec.

MONTAUBAN - HISTORY OF MINING ACTIVITIES

Lead and zinc mineralization were first discovered in the Montauban area by Elzéar Gauthier in 1910 and in 1911 Pierre Tétrault acquired the mining rights, built a 150 ton per day mill and mined small quantities of ore from transverse veins. The "Zinc Company Ltd.", a subsidiary of the "Weedon Mining Company", took over the property and operated the mine from 1914 to 1921, erecting a 200 tpd flotation mill and a roasting circuit in 1916. Discontinued in 1921 when the lease on the property expired, mining operations were resumed by the Pierre Tétrault Estate in 1922. In 1924, the property was leased to the "British Metals Corporation" who improved the plant and operated until 1929. The lease reverted to the Tétrault Estate in 1929 and production was resumed during the period 1935 to 1937.

War requirements during 1942 to 1944 saw the operation of the mine by Siscoe Metals under contract to the Wartime Metals Corporation.

Title to the property reverted to the Tétrault Estate in 1944, and in 1948 Anacon Lead Mines Ltd. resumed mining operations and built a 1000 tpd mill which operated until 1955.

The land to the north of the Tétrault property was explored by several companies from 1928 to 1951. United Montauban Mines built a 500 tpd mill in 1951 and started mining operations. A sharp drop in zinc prices forced suspension of the operations after 100,000 tons were mined.

Ghislau Mining Corporation took over the Anacon (Tétrault) property in 1958 and reprocessed tailings from previous mining operations. Ghislau Mining also did considerable surface diamond drilling before operations closed in 1965.

The mining concession covering the southern Anacon property, was revoked in 1972 and a special permit was issued to Marcel Poulin who optioned it to other parties.

Muscocho Explorations Limited acquired the southern property in 1974. In 1975, Muscocho optioned the northern, United Montauban, property from its successor company, Satellite Metal Mines Limited. This was the first time that all of the known deposits were held by one company.

Total production from the Tétrault-Anacon property has been 2,655,588 tons of ore. The average recovery was 4.53% zinc, 1.54% lead, 0.02 oz. gold and 2.50 oz. silver per ton.

Total production from the northern, United Montauban-Satellite property has been 100,309 tons which averaged 2.88% zinc, 1.03% lead, 0.01 oz. gold and 1.00 oz. silver per ton.

The base metal reserves on the two properties are 761,934 tons (691,226 metric tonnes) averaging 3.46% zinc, 1.07% lead, 0.016 oz. gold and 1.13 oz. silver per ton, while gold reserves were estimated at 316,343 (286,986 metric tonnes) of 0.225 oz. gold and 1.07 oz. silver per ton (Lee 1965).



GENERAL GEOLOGY AND STRUCTURE\*

The Montauban deposits lie within the Grenville Structural Province. The rocks of the general mine area range from quartzofeldspathic gneisses to biotite hornblende gneisses and belong to the newly named Montauban Group (Rondot, 1978). Based on field observations by Pyke (1977), and Rondot (1978) in conjunction with the geochemical comparisons by Stamatelopoulou-Seymour (1975) the Montauban Group has been interpreted as a shallow marine volcanic series. A generalized stratigraphic column is found as Figure III.

The area has been regionally metamorphosed to the amphibolite facies. Migmatites are present but not common within the mine area. The gneisses are underlain and partially intruded by a variety of rocks including granite, quartz diorite, pegmatite and gabbro.

The structural overprint on the area is difficult to discern. The metamorphic overprint has made lithological correlation difficult. It is agreed (Pyke, Rondot) that two periods of folding and possibly a third have occurred. The first period developed strong north-south trending folds which in the case of the North Gold Zone seem to be overturned. The second period was later and produced weak, east-west trending cross folds.

Very few faults have been found in the area, however the two most prominent lie 10 miles to the northeast of the deposits and strike north-northwest.

\*Based on a Report by M. Jensen, Montauban Geologist.

### NORTH GOLD ZONE

The geology of the Montauban Gold Zone, or the North Gold Zone, is quite simple. A series of quartzofeldspathic gneisses including garnet-cordierite- and anthophyllite - rich members host the north gold zone. These rocks strike approximately north-south and dip from 40 to 70 degrees to the east. This series of gneisses appears to be on the east limb of an overturned syncline.

Generally, the degree of regional metamorphism has obscured all of the primary textures and nature of the rocks in the immediate mine area but just west of the mine, pillow remnants have been mapped by Pyke.

Early writers regarded the Montauban deposits as either contact metamorphic or pyrometasomatic in origin. In light of recent work (Pyke, Rondot, St.-Seymour) it is probable that the mineralization (both gold and base metal) is contemporaneous with the enclosing lithologies and that the mineralization was deposited within a shallow marine environment. The gold zones are related to the mined base metal zones below both mineralogically and structurally. Further work is required to establish the origin of these deposits, however a volcanogenic environment with an extensive metamorphic overprint has best explained the features found at Montauban.

The following is a generalized stratigraphic succession of the rocks within the mine, from east to west or from oldest to youngest. The units are strongly intercalated and range internally from biotite-rich to cordierite-rich. Each individual unit is named for the minerals of maximum abundance.

### Biotite-Cordierite (Garnet) Gneiss

This is the uppermost unit exposed. This medium to coarse grained, soft unit consists of a series of intercalated, biotite gneisses and biotite-cordierite gneisses with thin garnet-rich horizons. Generally this zone is not mineralized but occasionally carries weak sulphides.

### Cordierite Anthophyllite Gneiss

Underlying (but younger than) the biotite-rich unit is the pale green, coarse grained anthophyllite-rich unit. The unit ranges from 1.5 - 11.0 metres wide and generally marks the position of the gold-bearing zone. Again, the relative proportion of minerals within the unit varies but most contain anthophyllite. Sulphides are often present and range from 2 to 10%. Chalcopyrite, pyrite, pyrrhotite, galena and sphalerite are present.

### Cordierite-Biotite Gneiss

This hard, fine grained gneiss consists of a quartz - biotite-rich matrix with porphyroblasts of cordierite. On the average, this unit is quite competent. Some sulphides are present but these are generally found along fractures.

### Quartz-feldspathic Gneiss

This is the lower-most or youngest member exposed. These continuous quartz-feldspar-rich beds are visible with minor intercalated quartz-biotite gneisses. No mineralization has been encountered within this unit.

### Intrusives-Pegmatite

Narrow, east-west trending, south dipping pegmatite dykes are found throughout the zone. The pegmatites are coarse grained, containing large quartz and plagioclase crystals with large "books" of muscovite to 15%. No offsets have been noted along the dykes.

### Intrusives-Amphibolite

Narrow amphibolite dykes have been found within the North Gold Zone. These generally follow the strike and dip of the gneisses, and show no mineralization.

### STRUCTURE

As stated earlier, the gneisses form a series of east-dipping units on the east limb of an overturned syncline. Due to this folding, much of the rocks have experienced some drag folding. Minor drag folds are visible within the units underground. Both "right" and "left-hand" drags have been mapped. In several cases larger drag folds were encountered at various depths. On these larger folds smaller drags were visible within the fold limbs. To date, the sense of the folds is not understood but further underground development should clarify that situation. The drag folds range in size from a few centimetres to 20 M in magnitude. Often the folded units thicken at the fold crests and troughs. The drag folds trend roughly north-south and appear to plunge approximately 50° to the south. Weak cross folds, trending east west have yielded a slight undulation along strike.

Many small shears, along and across strike, were encountered underground. At no time was any displacement along these shears noted. No major faults have been encountered.

### FORM OF THE DEPOSIT

The Montauban North Gold Zone consists of a single "stratabound" sheet, which strikes N20E and dips from 45 to 85 degrees East, and is hosted by the cordierite-anthophyllite gneiss.

The gold zone has a drill tested strike length of 770 M and has been traced from surface to the 240 M elevation, a total of 80 M. The zone is best described as a single sheet, averaging 2 M in thickness which dips gently to the east at depth, steepens above the 260 M elevation and becomes vertical to west dipping at the 310 M elevation.

The gold zone appears to be continuous and also appears to occur in the hangingwall of the previously mined, much wider, sulphide zone.

The gold zone is folded along with the enclosing lithologies. The sheet has been drag folded both in large and small scale folds. Large scale folds have folded the zone into repetition yielding much thicker gold rich "pods". The limbs between these folds are also folded. Weaker cross folds have given the zone a weak east-west undulation.

The mineralized zone consists mainly of fine grained, non-visible free gold with some silver and a few cases where the gold is mixed with silver. In a few areas sulphides are present in substantial quantities, however on average they are weakly disseminated within the zone. Chalcopyrite is quite common, occasionally with cubanite in exsolution. Sphalerite and galena are also present, often well-crystallized and found within small veinlets. Pyrite is disseminated throughout the zone. To date one area of coarse native gold has been encountered, yielding flakes of gold with some silver. The gold zone is difficult to distinguish underground due to the fine grained mineralization and is further complicated by the presence of the sulphides and the visual impact of the micaceous minerals and therefore assaying is necessary to define the limits of the zone.

RESULTS OF MUSCOCHO-SOQUEM EXPLORATION PROGRAMMES

In 1975, Muscocho Explorations Limited covered the North Gold Zone with Magnetometer and Radem surveys and drilled 21 surface diamond drill-holes (1,301.82M).

In June 1978, an agreement with Soquem was signed, followed by Soquem carrying out the following exploration programmes:

1978 - 37 surface drill holes 2030.87M

Following the 1970 drilling programme Soquem (1979) reported indicated geological reserves of 500,417 metric tonnes averaging 8.33 grammes of gold and 21.7 grammes of silver per tonne. For purposes of mining, Soquem estimated mining reserves in the North Gold Zone of 317,601 metric tonnes averaging 6.6 grammes gold and 19.8 grammes of silver per tonne plus possible additional reserves of 83,000 tonnes.

1980 ) - 15 surface trenches  
      ) - 24 surface drill holes 1135.62M  
      ) - 10 underground drill holes 356.93M

Underground Exploration

Portal	3052M <sup>3</sup>
Ramp	422 x 4.25 x 2.90M
Crosscutting	80 x 4.25 x 2.90M
Drifting	285 x 1.56 - 3.4 x 2.0 - 2.9M
Raising	90 x 2.0 x 2.0
1981 -	21 underground drill holes 728.68M

In July 1981, Canadian Mine Services submitted a proposal for pre-production development at the request of Muscocho Explorations Limited.

By mutual agreement between Muscocho and Soquem, Soquem relinquished the management of the joint venture on 12 August, 1981, in favour of Muscocho.

Soquem also decided not to participate in any additional expenditures.

1981	-	Muscocho Programme	
		146 Surface drill holes	5253.M
		Underground Exploration	
		246M of drifting on the 250,260 and 280 levels	
		Slashing	1105.3M <sup>3</sup>

The Soquem and Muscocho underground programmes have resulted in stock piles of:

13,353	-	tonnes ore	3.98 grams Au/tonne
24,755	-	tonnes waste	

The underground exploration programme as proposed by Canadian Mine Service is continuing.

The results of the 1981 drill programme are listed in the following table.

GOLD INTERSECTIONS ON 1981 DRILL PROGRAM

<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m)	<u>REMARKS</u>
147	1620 N	---	---	West of zone?
145	1610 N	---	---	West of zone?
146	1600 N	---	---	West of zone?
144	1600 N	---	---	West of zone?
143	1590 N	10.01 - 11.0	1.2 /1.0	
140	1580 N	---	---	
136	1570 N	5.9 - 7.0	3.6 /1.1	
137	1570 N	---	---	
135	1560 N	---	---	
138	1560 N	15.2 - 16.5	5.43/1.3	
134	1550 N	5.0 - 7.0	3.8 /2.0	
139	1550 N	17.0 - 19.0	3.8 /2.0	
132	1535 N	10.0 - 12.0	2.75/2.0	
133	1535 N	12.0 - 13.0	2.0 /1.0	
131	1520 N	10.0 - 12.0	5.55/2.0	
130		Not on Zone		
141	1510 N	2.0 - 3.0	7.0 /1.0	
124	1510 N	12.0 - 15.0	8.63/3.0	
125		Not on Zone		
116	1500 N	6.0 - 9.8 19.35 -21.5	7.46/3.8 3.93/2.15	
115	1490 N	6.0 -11.0	8.18/5.0	
129	1490 N	---	---	



<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m)	<u>REMARKS</u>
114	1480 N	5.00- 7.0	2.5 / 2.0	
142	1480 N	22.0 -23.0	9.2 / 1.0	
112				Not drilled
113	1460 N	10.84-12.0	12.2 / 1.16	
111	1450 N	---	---	
110	1440 N	40.0 -43.88	9.95/3.88	Finished in zone
109	1420 N	32.0 -34.0	2.8 /2.0	Finished in zone
		36.0 -39.0	5.23/3.0	
128	1420 N	---	---	
108	1400 N	---	---	
127	1390 N	31.0 -32.0	1.5 /1.0	
107	1380 N	---	---	
105	1360 N	7.0 - 8.0	3.5 /1.0	
		15.0 -16.0	3.9 /1.0	
106	1360 N	6.9 - 8.0	3.5 /1.1	
		26.0 -28.0	21.1 /2.0	
104	1350 N	12.0 -14.0	3.25/2.0	
126	1350 N	15.0 -16.1	1.3 /1.1	
102	1325 N	11.0 -14.0	6.8 /3.0	
		22.0 -24.0	3.8 /2.0	
103	1325 N	---	---	
100	1315 N	8.5 -10.5	7.00/2.0	Finished in zone *
		19.35-24.93	3.30/5.58	
101	1315 N	18.0 -19.0	1.8 /1.0	
97	1270 N	22.0 -24.0	4.5/2.0	
98	1245 N	10.0 -22.5	10.28/12.5	Finished in zone
99	1245 N	23.7 -24.0	3.00/ 0.3	

\*1 oz/ton equivalent

<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m)	<u>REMARKS</u>
1	1235 N	7.60 - 8.55 30.68 -32.64	9.60/ .95 12.58/ 1.96	
2	1210 N	28.89 -30.00 36.10 -38.75	7.54/ 1.11 18.62/ 2.65	
3	1210 N	20.12 -24.0	6.84/ 3.88	Finished in zone
4	1175 N	16.93 -19.30 24.5 -26.0	14.02/ 2.37 7.20/ 1.50	Finished in zone
5	1175 N	27.0 -29.49	14.87/ 2.49	*
7	1145 N	2.0 - 5.0	17.6 / 3.0	*
8	1145 N	31.5 -34.0	15.77/ 2.5	
6	1130 N	5.0 - 9.0	13.04/ 4.0	
9	1115 N	5.0 - 9.0	5.8/ 4.0	
10	1115 N	4.0 -10.0	14.32/ 6.0	
11	1105 N	17.0 -22.0 38.0 -41.14	6.16/ 5.0 13.5 / 3.14	Finished in zone
12	1105 N	2.35-19.60	5.08/17.25	
13	1095 N	14.75-16.75	14.3 / 2.0	
14	1095 N	Not on zone		
15	1082.5 N	1.52- 6.0	8.22/ 4.48	
16	1082.5 N	5.35-12.0	4.72/ 6.65	
17	1082.5 N	10.0 -13.0 28.0 -29.0	5.9 / 3.0 5.9 / 1.0	
18	1070	4.61- 6.0 14.0 -15.11	8.23/ 1.39 6.17/ 1.11	
19	1058	19.0 -21.0	4.35/ 2.0	
20	1058	37.2 -39.2	3.1 / 2.0	

\*1 oz/ton equivalent

<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m)	<u>REMARKS</u>
21	1045 N	Not on zone		
22	1045 N	31.0 - 37.0	4.37/6.0	
23	1035 N	35.0 - 36.0	2.1 /1.0	
24	1025 N	32.0 - 33.33	3.3 /1.33	
25	1025 N	12.0 - 13.0	4.2 /1.0	
26	1015 N	---	---	
27	1015 N	18.0 - 20.0	3.1 /2.0	
28	1015 N	18.0 - 20.0	7.35/2.0	
29	1005 N	23.0 - 24.0	4.5 /1.0	
34	1005 N	58.0 - 59.0	5.6 /1.0	
35	1005 N	42.5 - 46.5	5.40/4.0	
36	985 N	15.0 - 18.0	7.7 /3.0	
37	985 N	18.0 - 21.0	4.6 /3.0	
43	985 N	30.8 - 41.0	6.46/10.2	
44	985 N	54.0 - 57.0	5.9 /3.0	
38	975 N	20.0 - 21.0	6.8 /1.0	
39	965 N	17.89- 19.41	21.29/1.52	
82	965 N	31.4 - 34.0	9.43/2.6	
45	965 N	36.0 - 49.41	8.09/13.41	
46	965 N	39.0 - 42.9	6.88/3.9	*
41	<sup>945</sup> <del>955</del> N	1.9 - 10.0	9.87/8.1	
42	955 N	29.8 - 30.8	3.33/1.0	
47	955 N	38.0 - 40.0	4.2 /2.0	
52	935 N	20.5 - 22.08	34.29/1.58	*

\*1 oz/ton equivalent

<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m)	<u>REMARKS</u>
51	935 N	32.0 - 35.9	11.02/3.9	*
48	935 N	40.45 - 46.0 48.0 - 50.0	11.44/5.55 3.25/2.0	
49	925 N	1.69 - 8.0	21.78/6.31	*
50	925 N	35.0 - 36.0	3.5 /1.0	
53	925 N	40.0 - 51.0	6.64/11.0	*
54	915 N	40.0 - 45.0	5.7 /5.0	
55	915 N	43.0 - 51.04	4.23/8.04	Finished in zone
61	915 N	---	---	
56	905 N	6.75 - 9.75	2.2 /3.0	
57	905 N	19.0 - 20.0 40.0 - 43.0	6.1 /1.0 8.07/3.0	
58	905 N	36.5 - 39.5 45.3 - 46.3	11.03/3.0 5.4 /1.0	
59	905 N	34.5 - 48.0	6.67/13.5	
60	905 N	---	---	
63	892 N	32.0 - 33.0	6.1/1.0	
72	892 N	55.0 - 56.0	19.9 /1.0	
66	892 N	36.0 - 37.8 43.3 - 48.3	6.9 /1.8 11.25/5.0	
62	892 N	---	---	
64	885 N	22.0 - 24.3	14.15/2.3	
65	885 N	37.0 - 38.0	4.7 /1.0	
71	885 N	---	---	
70	885 N	36.0 - 43.0	3.39/7.0	

\*1 oz/ton equivalent

<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m/)	<u>REMARKS</u>
69	875 N	41.0 -45.0	5.75/5.0	Finished in zone
68	875 N	---	---	
67	875 N	---	---	
73	865 N	29.0 -30.0	6.2/1.0	Finished in zone
75	865 N	40.0 -42.0	5.1/2.0	
76	865 N	47.0 -49.0 52.0 -55.0	6.55/2.0 5.7 /3.0	Finished in zone
74	865 N	---	---	
77	855 N	42.0-45.0	3.53/3.0	
78	845 N	25.6 -27.6	5.6 /2.0	
79	845 N	44.0 -45.0	1.8 /1.0	
80	845 N	47.0 -49.0 51.0 -52.15	5.25/2.0M 4.9 /1.15	Finished in zone
81	845 N	57.0 -58.0	18.7/1.0	
82	830 N	11.6 -12.1 15.6 -16.2	3.4/ .5 5.5/ .6	
83	830 N	11.0 -12.0 19.5 -22.0 29.0 -30.0	8.2/1.0 6.18/2.5 15.00/1.0	
84	830 N	29.0 -31.0	3.3 /2.0	
85	830	42.0 -46.0 50.0 -51.0	7.8 /4.0 5.4 /1.0	
86	815	11.0 -13.0	2.75/2.0	
88	815	46.0 -48.0	3.15/2.0	Finished in zone
89	815	56.0 -57.0	5.2 /1.0	
87	815	---	---	

<u>HOLE NO.</u>	<u>SECTION</u>	<u>INTERVAL</u>	<u>INTERSECTION</u> (g/t/m)	<u>REMARKS</u>
90	805 N	4.0 - 6.0	6.65/2.0	
		11.0 -14.0	5.47/3.0	
		16.0 -19.0	4.03/3.0	
91	805 N	20.0 -21.28	2.6 /1.28	
92	805 N	39.0 -40.0	12.2/1.0	
		43.0 -47.0	4.4/4.0	
93	790 N	---	---	
94	790 N	23.0 -24.0	1.7/1.0	
95	790 N	49.0 -50.0	2.5/1.0	Finished in zone?
96	775 N	---	---	
117	760 N	25.2 -25.8	3.3/0.6	
118	745 N	---	---	
119	715 N	21.5 -22.7	2.0/1.2	
120	700 N	---	---	
121	690 N	26.0 -27.0	2.3/1.0	
122	675	---	---	
123	660	12.0 -15.0	1.4/3.0	

### MILL TESTS

During the Muscocho and Soquem exploration programmes, metallurgical test work on drill core samples has been carried out by Lakefield Research and the pilot plant and laboratories of the Department of Energy and Resources, Quebec.

In 1981, a bulk underground sample of 528 tonnes was tested at the Mineral Research Centre of the Ministry of Energy and Resources, Quebec.

The most recent test work was performed in late 1981 by the Pamour Area Metallurgical Laboratory on an underground bulk sample. This head sample assayed:

<u>Au g/T</u>	<u>Ag g/T</u>	<u>Cu %</u>	<u>Pb %</u>	<u>Zn %</u>
9.6	15.1	.24	.21	.07

Cyanidation tests indicate a 98% gold recovery and a 61% silver recovery and they conclude "The Gold is efficiently recovered from this ore by direct cyanidation and there should be no problems in reaching high recoveries if a cyanidation circuit is adopted" (C.Vos, 1981).

The previous cyanidation tests performed by Muscocho and Soquem gave similar results.

Pilot plant tests are currently being carried out by Lakefield Research (February 1982).

## ORE RESERVES

As stated previously, Soquem have estimated the geological reserves of the North Gold Zone at 500,417 metric tonnes, averaging 8.33 grammes gold and 21.7 grammes silver per tonne and the mining reserves at 317,601 metric tonnes, averaging 6.6 grammes gold and 19.8 grammes silver per tonne.

The 1981 drilling programme was carried out to provide additional data where information was lacking and to trace the North Gold Zone an additional 375 metres to the North. These results are tabulated earlier in this report.

Muscocho Explorations Limited, in conjunction with Control Data of Toronto and Vancouver, is now using the 'Mineval' geostatistical ore modelling technique to calculate the ore reserves on the North Gold Zone.

The gold and silver assays from 322 drill holes (predominantly from recent Soquem and Muscocho drilling programmes) are being used to create a model of the body. A statistical analysis of the gold assays indicates a well-defined gold-bearing envelope containing all significant gold values. Within this envelope, a geostatistical evaluation of the data provides information used for the influence and weighting of all surrounding assays with respect to a given block. This technique, known as 'kriging' assigns a gold and silver value to 4m x 2m x 2m blocks for the Montauban deposit.

The tabulation of all these blocks within the gold-bearing envelope will provide gold-silver ore reserve estimates at various cut-off grades that will be more accurate than the conventional polygonal approach to ore reserve calculations.



This data can also be used to provide detailed level plans to assist bulk sampling and stope planning.

A manual calculation of the ore reserves by Muscocho, in February 1982, using a 4 gram cut-off grade has outlined a high-grade gold zone within the mineralized envelope of 156,590 metric tonnes that averages 10.14 grams of gold per tonne.

Using an 8 gram cut-off grade, a high grade core of 87,783 metric tonnes occurs that averages 13.98 grams of gold per tonne.

As stated earlier in this report, no recent work has been done on the South Gold Zone. These reserves are 88,967 metric tonnes averaging 6.48 grams gold 68.23 grams of silver. The drill indicated length of this zone is 475 metres and the known reserves all lie within 65 metres of the surface. A separate ramp would be required to gain access to this zone for mining. An examination of the records indicates that additional drilling of this zone is required and the possibility of increasing this tonnage is considered excellent.

## CONCLUSIONS AND RECOMMENDATIONS

From previous mining operations and recent exploration programmes by Muscocho and Soquem and the present Muscocho exploration programme, the Montauban North Gold Zone extends for 800 metres, with possible extensions to the north and south.

Detailed ore reserve calculations are currently being prepared using computer techniques to provide detailed figures and various cut-off grades and to aid future mine planning.

As the gold zone cannot be defined visually and the structure is complex in parts of the zone, it is recommended that the underground work consist of bulk sampling in order to work out the structure, the testing necessary to maintain grade control and optimum mining methods.

It is also recommended that a portable modular test mill be set up on the property to process the bulk sample and gold-bearing material extracted from drifts and raises. This test work is required to determine the extent and quality of the mineral resources of the Montauban North Gold Zone.

If the test milling, mining, and ore reserve calculations indicate a viable operation, consideration should then be given if the test mill can be adapted for full scale production, or the installation of a permanent production mill. If funds are available, it is also recommended that surface exploration be carried out on the north and south extensions of the main North Gold zone, and the South Gold Zone. Surface exploration should follow the complete compilation and evaluation of all the data.


The cost of the recommended underground exploration programme, test mill and surface compilation and exploration is estimated as follows:

	<u>Minimum</u>	<u>Maximum</u>
1. Underground bulk Sampling	490,187	916,387
2. Installation of Modular Test Mill and 1½ months operation	<u>1,645,000</u>	<u>1,645,000</u>
	2,135,187	2,561,387

The above cost estimates for the test mill installation and operation are from estimates submitted by Mining Corporation.

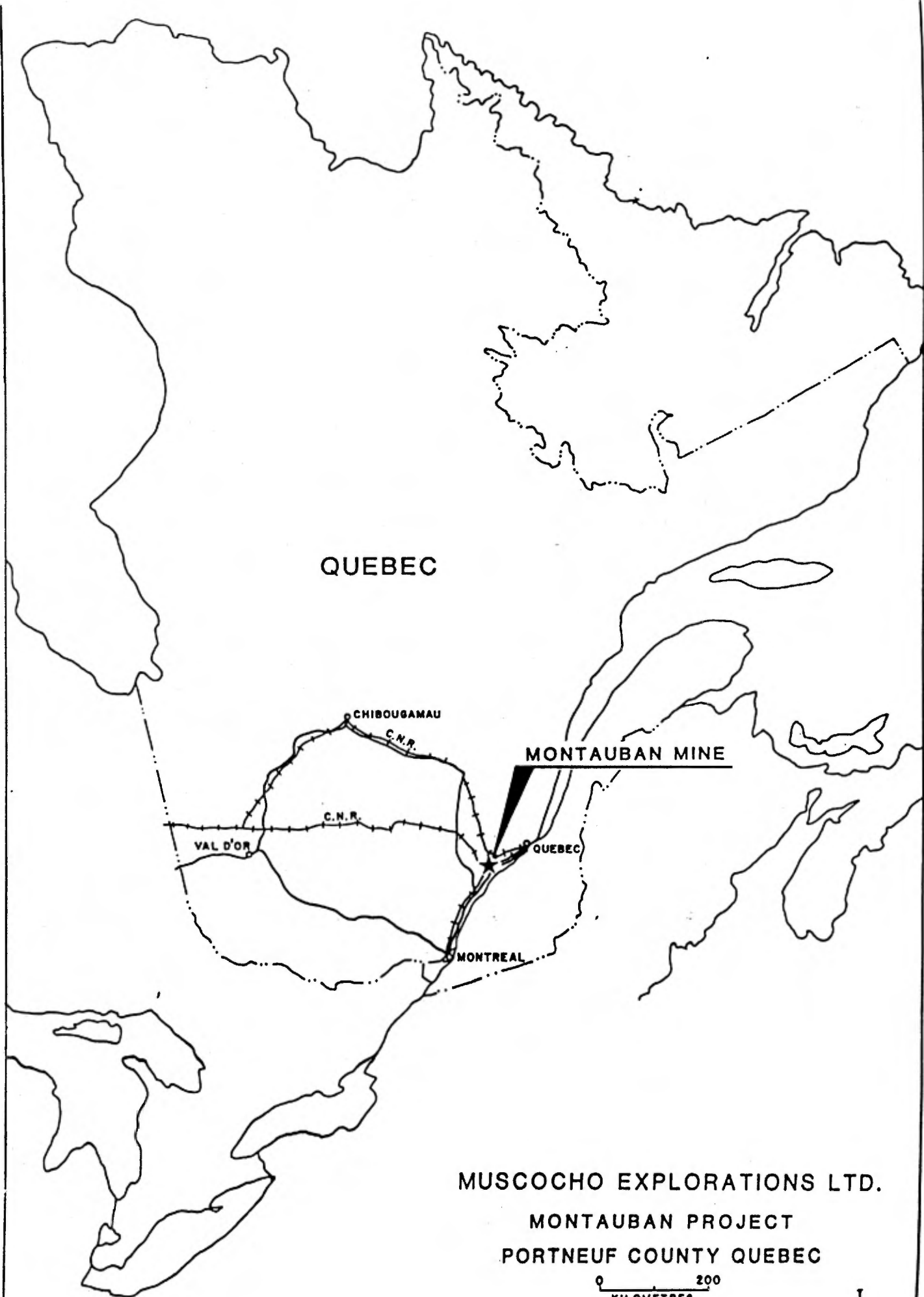
Gold produced during the test milling could be sold as required to cover additional test milling, underground test stoping and additional exploration.

April 1982  
Toronto, Ontario

  
D.S.M. Consultants Limited

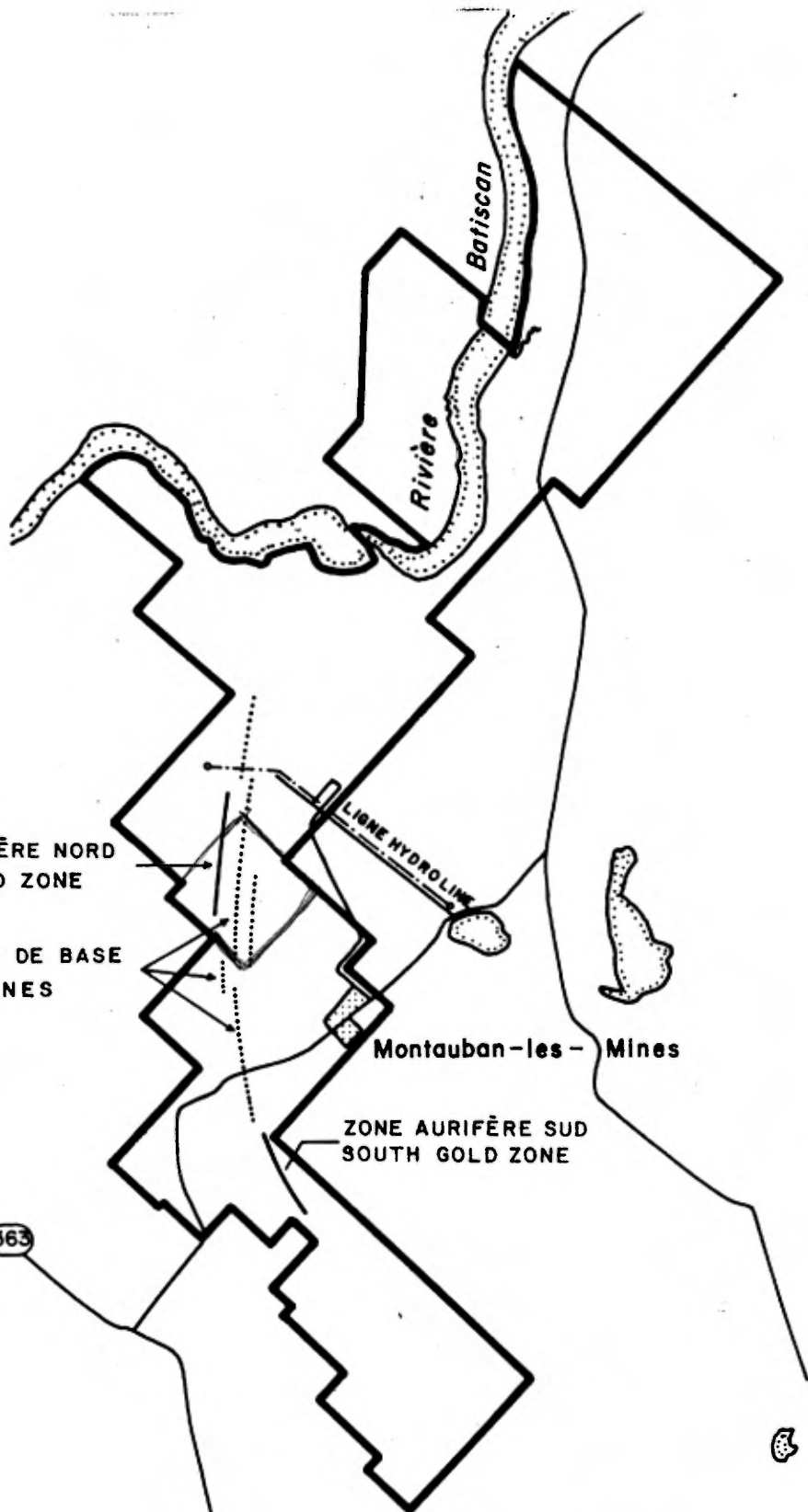
LIST OF ILLUSTRATIONS

- I LOCATION MAP
- II PROPERTY MAP SHOWING CORE & BASE METAL ZONES
- III STRATIGRAPHIC SECTION OF THE MONTAUBAN GROUP
- IV FOLD PATTERN IN THE ANACON ZONE
- V NORTH GOLD ZONE - SECTION 925N
- VI NORTH GOLD ZONE - UNDERGROUND DEVELOPMENT



MUSCOCHO EXPLORATIONS LTD.  
MONTAUBAN PROJECT  
PORTNEUF COUNTY QUEBEC

0 200  
KILOMETRES



ZONE AURIFÈRE NORD  
NORTH GOLD ZONE

ZONE DE MÉTAUX DE BASE  
BASE METAL ZONES

LIGNE HYDROLINE

Montauban-les-Mines

ZONE AURIFÈRE SUD  
SOUTH GOLD ZONE

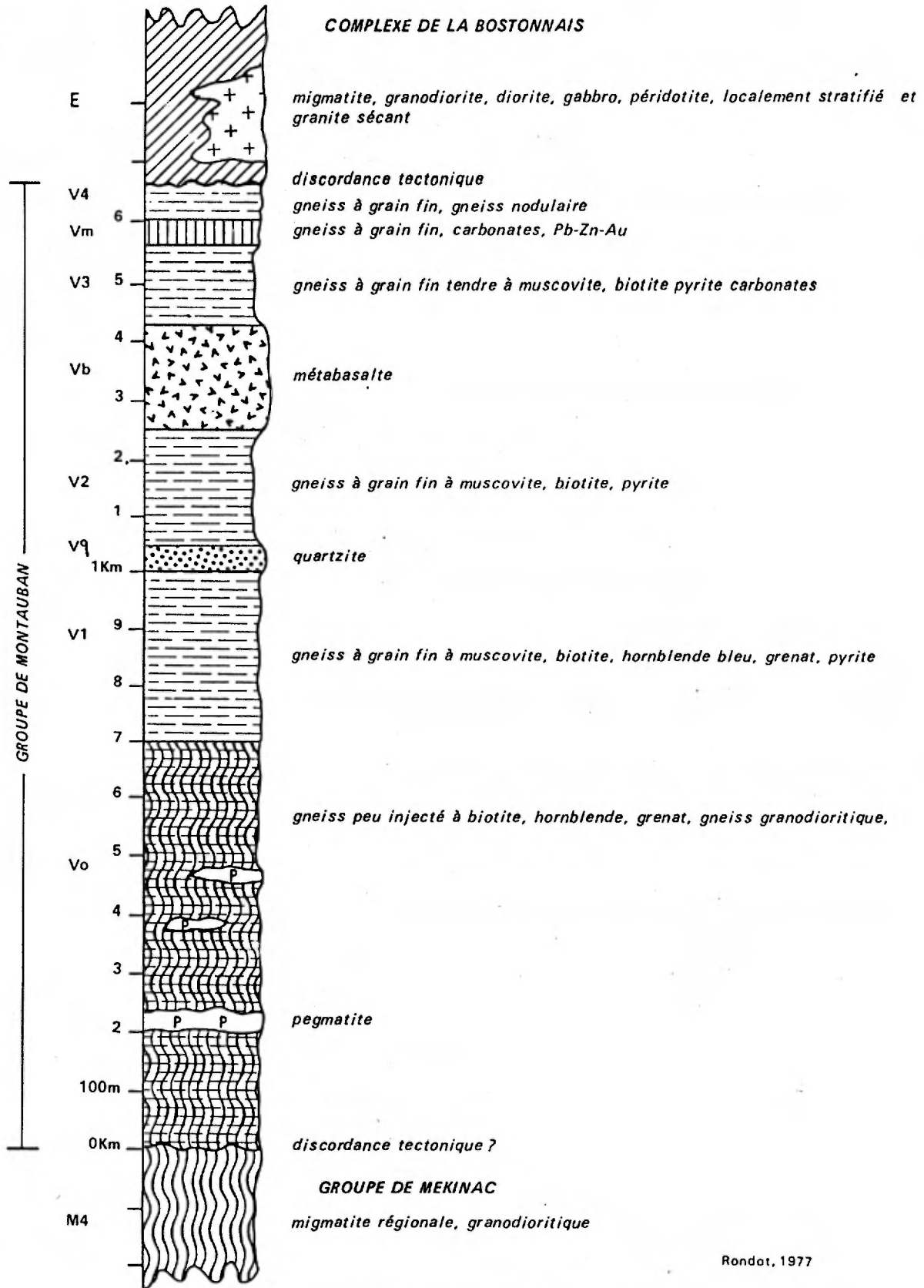
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LES EXPLORATIONS MUSCOCHO LTÉE  
MUSCOCHO EXPLORATIONS LTD.

PROJET MONTAUBAN PROJECT  
COMTÉ PORTNEUF COUNTY

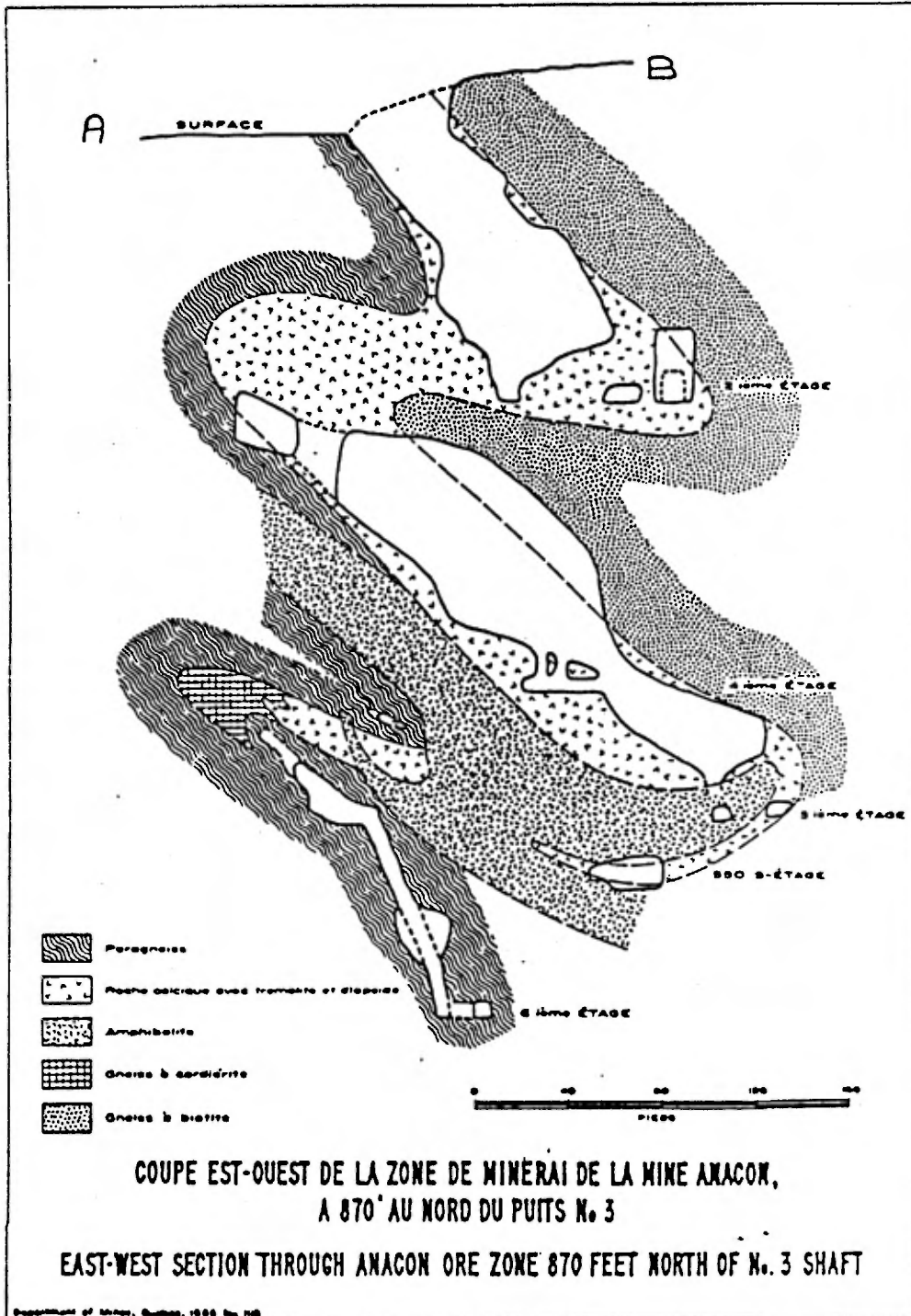
QUÉBEC

0 400  
METRES



Echelle stratigraphique du groupe de Montauban.

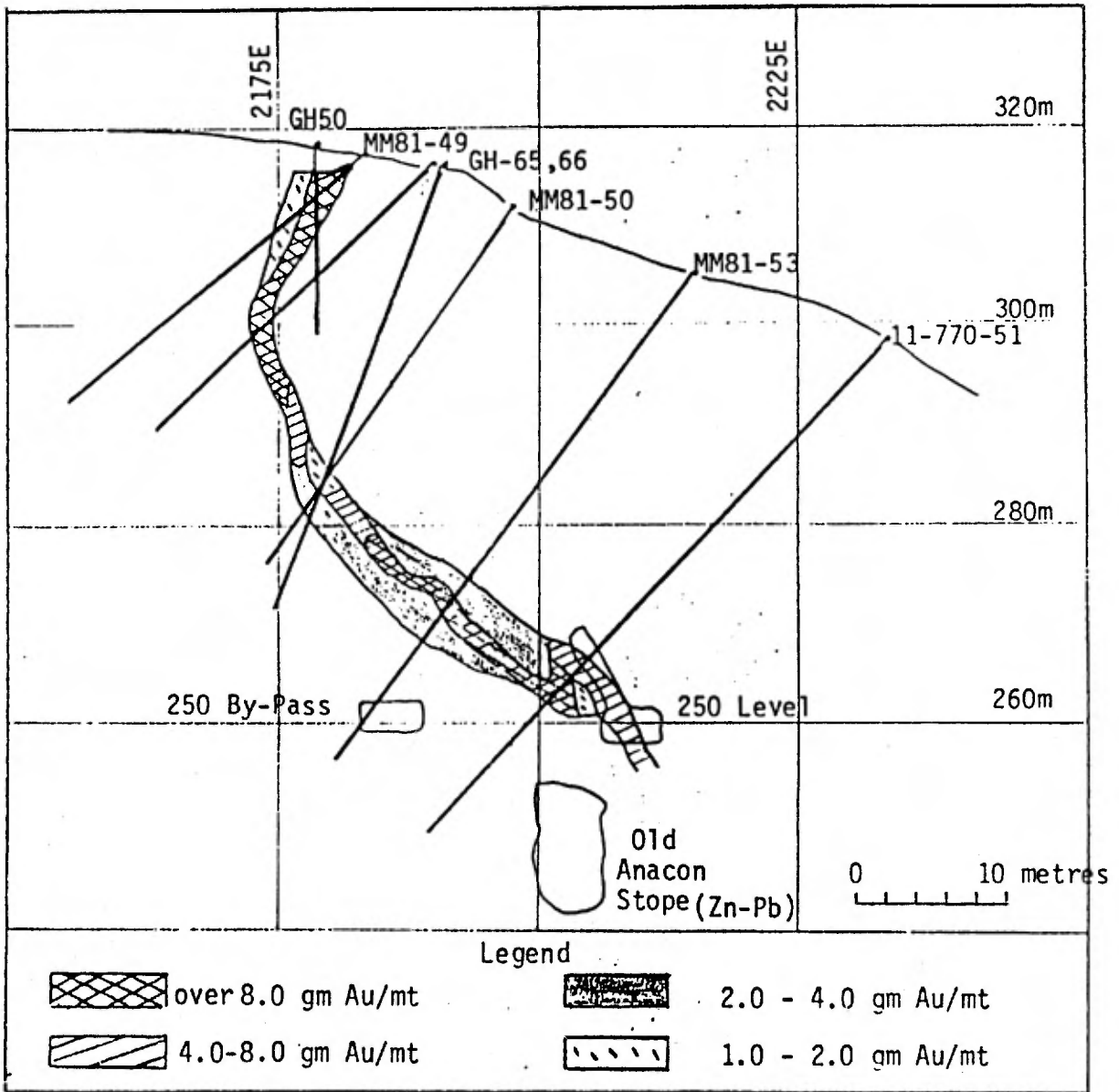
MONTAUBAN-LES-MINES



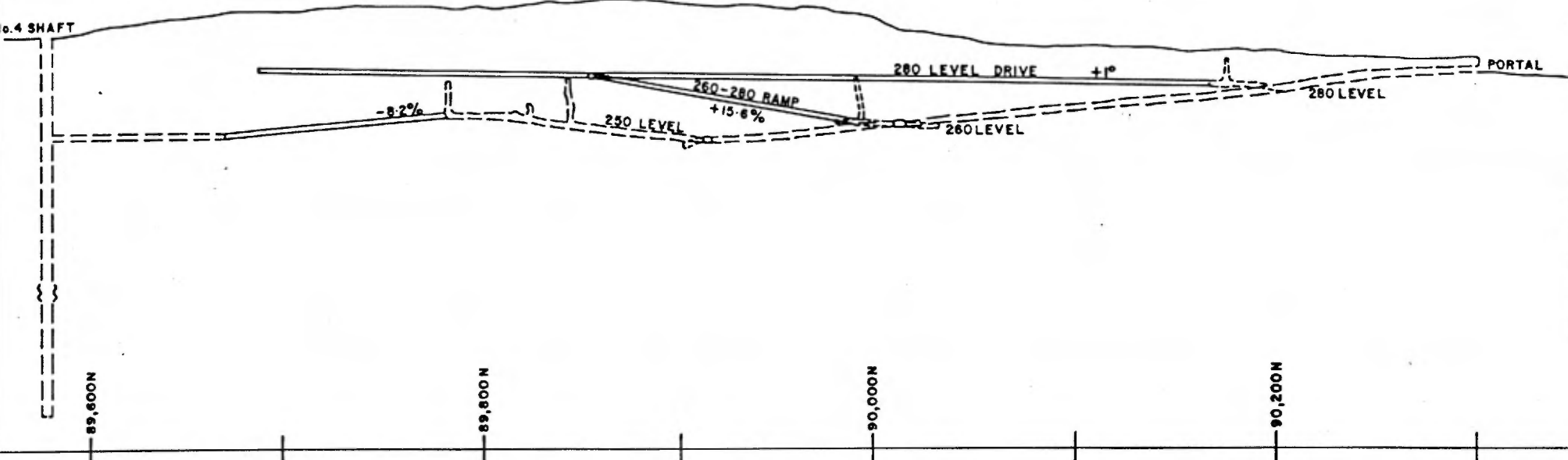


MUSCOCHO EXPLORATION  
 MONTAUBAN MINE

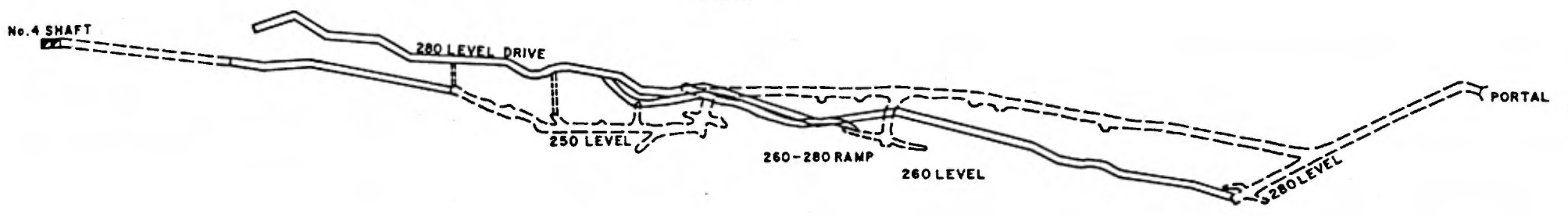
Section 925N



LONGITUDINAL SECTION



PLAN



LEGEND

- PREVIOUS EXCAVATIONS
- ===== PRESENT DEVELOPMENT

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MONTAUBAN MINE DEVELOPMENT  
PORTNEUF COUNTY QUEBEC

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# D.S.M. CONSULTANTS LIMITED

342 CARLTON STREET, TORONTO, ONTARIO M5A 2M2

416/923-9368

## LES EXPLORATIONS MUSCOCHO LIMITÉE

### ÉVALUATION ANNUELLE

#### 1. PROPRIÉTÉ AURIFÈRE DE MONTAUBAN

Ministère de l'Énergie et des Ressources  
Service de la Géoinformation

Date: 13 AOÛT 1986

No G.M.: 42953

Au cours de 1982, on a effectué les travaux de développement souterrains suivants dans la zone aurifère nord: 6,6 mètres de galerie d'accès, 2,4 mètres de galerie de raclage, 3,3 mètres cubes d'abattage et extraction de 39 mètres cubes de minerai, le tout au niveau 250. Ces travaux ont produit 3 902 tonnes de minerai (4 g d'or et plus par tonne), 4 833 tonnes de matériau à basse teneur (1,5 - 4 g d'or par tonne) et 5 779 tonnes de rebuts. Des échantillonnages supplémentaires ont été effectués aux niveaux 260 et 280.

Le puits n° 4 a été réparé, un laboratoire d'analyse par fusion a été installé, et le site et les fondations destinés à une installation modulaire de traitement d'une capacité de 250 tonnes par jour ont été préparés.

À la fin de 1982, les programmes de travaux souterrains de Soquem et Muscocho ont produit les accumulations de matériaux suivantes:

17 255 tonnes de minerai (4 g d'or et plus par tonne)  
4 833 tonnes de minerai à basse teneur (1 à 4 g d'or par tonne)  
33 534 tonnes de rebuts

En avril 1982, Muscocho Explorations a reçu les calculs effectués par Control Data Canada Limited à l'égard des réserves de minerai. Ces réserves géostatistiques de 660N à 1350N, une distance de 690 mètres (2264 pieds) sont les suivantes:

<u>Teneur de coupure g/t</u>	<u>Tonnes métriques</u>	<u>Grammes par tonne</u>	<u>Onces par tonne</u>
1,0	911 000	3,8	0,122
4,0	308 000	6,9	0,222
8,0	71 000	11,7	0,376

Le logiciel d'ordinateur permet d'obtenir les réserves de minerai à diverses teneurs qui peuvent faire l'objet d'une extraction, selon les prix de l'or.

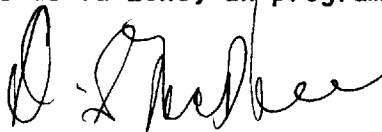
Les calculs manuels des réserves additionnelles établies sur la base de forages limités au voisinage de la surface dans l'extension nord du gisement de 1350N à 1560N, une distance de 200 mètres (656 pieds), sont les suivants:

<u>Teneur de coupure g/t</u>	<u>Tonnes métriques</u>	<u>Grammes par tonne</u>	<u>Onces par tonne</u>
4,0	12 244	7,73	0,249
8,0	5 539	12,25	0,394

Des travaux de forage-diamant additionnels sont nécessaires dans cette partie de la zone pour obtenir les renseignements nécessaires à l'égard de la continuité de la zone aurifère le long de la zone et aux limites inférieures du pendage.

Aucun forage n'a été effectué dans la zone aurifère sud depuis de nombreuses années. Ces réserves avaient antérieurement été estimées à 88 967 tonnes métriques, à une teneur moyenne de 6,48 grammes d'or. L'examen des données recueillies permet de conclure que des travaux de forage additionnels sont nécessaires dans cette zone pour évaluer convenablement son potentiel aurifère. L'objectif des travaux antérieurs était l'exploration de la zone à l'égard des métaux de base, et seules des analyses limitées avaient été effectuées à l'égard de l'or. On considère que la possibilité d'augmenter le tonnage de cette zone est excellente.

Des travaux limités de forage et d'analyse dans le secteur situé au sud de la principale zone aurifère nord, "la zone E", mettent en évidence des teneurs aurifères intéressantes sur une distance de 150 mètres. Pour procéder à l'évaluation totale de la zone, un programme de forage détaillé est nécessaire.



D. S. McPhee  
6 mai 1983