REPORT

on

THE COTTONBELT PROPERTY

for

GREAT NORTHERN MINES & PETROLEUMS LTD. N.P.L.

809 - 525 Seymour Street
Vancouver, B. C.

by

Alfred R. Allen, P. Eng.

Allen Geological Engineering Ltd.
519 - 409 Granville Street
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KAMLOOPS M. D.

B. C.

INTRODUCTION

During the 1962-63 field seasons the writer acted as consultant and field supervisor for an exploration programme on the Cottonbelt property. Valuable information was acquired from the files of F.W. Geurnsey and A. St. Claire Brindle, mining consultants, who had, over the years, directed work on the property. Surface and underground workings were opened, re-surveyed and re-sampled. Geological mapping, geophysical surveying and diamond drilling were completed over selected parts of the property. Since that time little or no work has been done except periodic examinations which included limited prospecting and geological and geophysical surveying.

This report is based upon the writer's experience on the ground, data acquired from the files of engineers in charge of early field programmes and numerous data available from provincial and federal agencies.

The object of the report is to compile a resume of all available data, and in lieu of current exploration and mining economics outline a programme of work deemed most suitable for the development of the property.

LOCATION AND ACCESSIBILITY

The property is located in south central British Columbia, north of Shuswap Lake. It is north of Ratchford Creek on the east side of the Seymour River.

West longitude 118° - 50' and north latitude 51° - 28' intersect on the property.

Access is from Sicamous, a Canadian Pacific Railway divisional point on the south end of Shuswap Lake. It is 27 miles by water up Shuswap Lake from Sicamous to the old settlement of Seymour Arm. There is a logging road 10 miles north to the forks, and from there it is 12 miles to the property by trail.

TOPOGRAPHY

The area is mountainous. The claims extend from the summit of Grace Mountain, elevation 6000 feet above sea level, down the ridged and wooded slopes northwest to Blair Creek, 2500' elevation. Deep Creek flows through a steep-walled valley, across the northeast boundary of the property, into Blais Creek.

The upper showings on the Cottonbelt and Joe claims are on the open grass-covered gentle slopes of Grace Mountain, whereas the

showings on the McLeod and Copper King zones are on the timber covered and steeper slopes drained by Deep Creek.

Blais Creek flows into the Seymour River, which drains south into Seymour Arm of Shuswap Lake, elevation 1,135 feet above sea level.

HISTORY

The mineral deposits on Grace Mountain were known to a few prospectors prior to 1900, and by 1913 Wm. Brewer of the B.C. Department of Mines had reported as follows:

1. Numerous open cuts had exposed long narrow veins of sulphide mineralization.

2. A 60-foot adit tunnel had been driven on the vein on the Cottonbelt claim.

3. Six hundred feet below the Cottonbelt, the Bass shaft had been sunk on an incline 50 feet on a well mineralized vein.

4. On the Copper King, 2000 feet below the Bass shaft, a copper-silver bearing quartz vein had been exposed by one large and several small open cuts.

5. Numerous trenches, open pits and a 65-foot adit tunnel had opened up the McLeod zone for 2000 feet.

In 1926 H.G. Nicholes, B.C. Department of Mines engineer, reported the following work completed by Cottonbelt Mines Ltd., under the direction of F.W. Guernsey:

Six thousand five hundred feet of the Cottonbelt zone was probed by 16 diamond drill holes to slope depths of 270 to 370 feet. The total drilling amounted to 3,333 feet.

In 1928 Number 1 tunnel was 306 feet, Number 2 extended to 855 feet and these connected by a 150-foot winze on the vein. Three hundred feet lower in elevation, Number 3 adit was 420 feet long. Number 4, a 100-foot crosscut and 200-foot drift under the Bass shaft tested the vein at that level.

In 1951-52 Seymour Mines had the property re-surveyed, re-sampled and the McLeod zone tested by 19 diamond drill holes under the direction of the writer. A magnetometer survey was conducted over part of the property by D.R. Clark of U.B.C.

During the last decade some exploratory work has been done in conjunction with general examinations of the showings. Limited magnetometer and geochemical investigations have been made at and on the extensions of the northwesterly showings.

PROPERTY

The mineralized area is adequately covered by the following located mineral claims:

Shuswap 1 to 30 inclusive, Record Nos. 48967 to 48996
Snow 1 to 6 inclusive, Record Nos. 64940 to 64945.

GEOLOGY

The area is underlain by gneissic, schistose and limestone rocks of the Shuswap Complex. Granitic rocks outcrop two miles from the property. Pegmatitic dykes outcrop on the property. These banded rocks strike north 20 to 30 degrees west and dip 30 to 40 degrees southwest. Numerous parallel bedded veins, mostly associated with limestone bands, occur over a two-mile length and vertical range of 3500 feet. Sulphide mineralization and magnetite occur as zones within the veins in a gangue of quartz, altered silicates and carbonates.

Although not yet mapped in detail, there are some indications that fracturing and folding on the lower northwest end of the zone may have produced an environment amenable to extensive mineral deposition.

The principal mineralized zones, partially outlined by shallow exploratory workings, are named the Cottonbelt, McLeod and Copper King.

THE COTTONBELT ZONE

A vein system has been intermittently exposed for more than 12,000 feet in plan and 2,000 feet elevation, extending over the southwest flank of Grace Mountain, from near the summit half way down to Blais Creek. The width of the vein system exposed to date averages 4 feet on

the surface and 2 feet where encountered at shallow depths by tunnels and diamond drill holes. The widest intersections are 12 to 14 feet.

Five large open pits and three shallow shafts and numerous small pits have been excavated on the vein. In addition, adit tunnel No. 1 is 306 feet long and has 60 feet of backs at the face. One hundred feet lower, No. 2 adit tunnel is 855 feet long. Both are drifts on the vein and they have been connected by a 150-foot winze underground. No. 3 adit drift is 300 feet lower in elevation than No. 2, and is 420 feet long. Just below the Bass shaft, a 50-foot incline on the vein 3000 feet slope distance from the No. 2 portal, the No. 4 adit is a 100-foot crosscut and 200-foot drift to the southeast.

Drilled from the hangingwall side, over a length of 6,500 feet, 16 diamond drill holes intersected the vein 270 to 370 feet slope distance below the surface.

Forty-five samples taken by the writer from surface and underground workings averaged 6.2% lead, 2.7% zinc and 1.9 ounces of silver per ton.

There are believed to be at least three unexplored parallel veins near the Cottonbelt vein described above.

THE McLEOD ZONE

The McLeod zone lies about 1,500 feet northeast of the Cottonbelt near the top of the steep southwest side of Deep Creek valley. The vein has been intermittently exposed for a length of 2,000 feet. The lowest exposure is 2,400 feet below the highest showing on the Cottonbelt zone. The zone strikes north 25 degrees west and dips 35 degrees southwest. The hangingwall is chiefly dark biotite gneiss and the footwall crystalline limestone. Where intersected by surface workings and a short adit tunnel, the vein averages 4-1/2 feet wide. The widest section is 14 feet.

Mineralized sections of the vein contain galena and sphalerite, along with magnetite and lesser pyrite and chalcopyrite in a gangue composed of quartz, oxidized and carbonated wall rock and altered silicates.

Nineteen short diamond drill holes, totalling 2,340 feet, were located to test the McLeod zone at shallow depths.

Surface sampling by the writer averaged 5.39% lead, 6.51% zinc and 3.05 ounces of silver per ton.

THE COPPER KING ZONE

Little or no work has been done on the Copper King zone since the early prospectors opened it up in several places.

It is located southwest of the McLeod zone and northeast of the northwesterly extension of the Cottonbelt zone. The lowest exposure is about 800 feet above Deep Creek near the confluence with Blais Creek.

A 1916 government report described the Copper King as follows:

"An open cut shows a zone of mixed quartz, schist and limestone (marble) at least 30 feet wide dipping into the mountain at 40 degrees. A six foot band of quartz shows good mineralization with chalcopyrite. A sample of 20 tons from the dump ran: Gold and silver, traces; copper 3.0%, iron 6.0%; silica 84.4%, sulphur 4% and calcium exide 1.0%."

A tunnel 30 feet long exposed similar mineralization. Two hundred feet to the southeast a 20-foot zone of similar mineralization was exposed, and an additional 350 feet showed 6 feet of sparsely mineralized quartz. In a northwesterly direction from the large open cut and adit tunnel there are open cuts for 800 feet showing quartz and sulphide mineralization.

Samples taken from three open pits by the writer assayed as follows, across close to 5 feet each:

Sample	Gold Ounces/Ton	Silver Ounces/Ton	Copper %
1	.005	0.10	3.95
2	.010	0.25	4.35
3	.005	0.10	3.85

GEOPHYSICAL INVESTIGATIONS

In 1952 Dr. R.A. Clark of the University of British Columbia conducted a magnetometer test on a surveyed grid over the McLeod and Cottonbelt zones. Results are summarized as follows:

(a) An extension northwesterly of the McLeod zone for 500 feet is indicated.

(b) The Copper King zone produced interesting results which warrant checking by other means.

(c) The ore shoots or lenses exposed by adit drift tunnels 1, 2 and 3 and the shaft are on the same vein.

(d) Two previously unknown ore shoots on the Cottonbelt vein are indicated and should be checked by additional exploratory work.

(e) Parallel to the Cottonbelt vein, three additional veins are indicated, near the northwest and central sections of the zone.

A soil sampling survey conducted in 1965 resulted in the outlining of one large anomalous zone on the lower northwest extension of the Cottonbelt zone and two smaller anomalous zones on the steep bank of Deep Creek northwest from the McLeod zone.

Geophysical survey results indicate that additional exploratory work is required on all known zones on the property.

DIAMOND DRILLING

Two diamond drill programmes have been undertaken on the Cottonbelt property.

In 1926, 6,500 feet of the Cottonbelt vein was drilled on the hangingwall side by sixteen holes totalling 3,333 feet in length. Fifteen of the holes intersected the vein at slope depths of 270 to 370 feet. Intersections were 4 to 12 feet, true widths.

On the McLeod zone nineteen holes were drilled in 1952 for a total of 2,340 feet. Hole lengths were from 36 to 170 feet. With the standard X-Ray equipment used vein material was found very difficult to core, but vein material similar to that exposed on the surface was encountered in most of the holes.

SUMMARY AND CONCLUSIONS

Three periods of active exploration have been separated by years of inactivity on the Cottonbelt property. The discovery period resulted in extensive trail and camp construction and shallow surface excavating to expose the Cottonbelt, McLeod and Copper King zones. The 1925-28 period saw underground work and diamond drilling completed on the Cottonbelt zone by the Cottonbelt Mines. The 1952-53 activity included re-sampling, re-surveying, geophysical surveying and diamond

drilling on the McLeod zone.

The Cottonbelt and McLeod zones contain narrow but very long shoots of silver-lead-zinc mineralization in remarkably uniform and persistent veins lying parallel to the bedding planes of limestone and schist and gneiss of the Shuswap Complex. A parallel but more siliceous Copper King zone contains chalcopyrite. Geophysical investigations point to important extensions and parallel zones on the property.

It is concluded that the property warrants a major exploration programme.

RECOMMENDATIONS

It is herewith recommended that exploration be conducted on the property in two phases, namely, an early intensive period with several programmes carried on concurrently, and a second phase, comprised chiefly of detailed geophysical work and diamond drilling, all to be completed before the end of the current field season.

SCHEDULE A

A preliminary programme to provide basic detailed information upon which the larger programme can be planned, and started as soon thereafter as possible.

		Estimated Cost
1.	Mobilizition of crew, equipment and supplies, and establishment of one or more camps	$ 3,000.00
2.	Detailed prospecting over selected areas	1,500.00
3.	On selected areas, magnetometer and soil sampling, on a surveyed grid	10,000.00
4.	Stripping and trenching to check the occurrence of mineralized zones and extensions of same	3,500.00
5.	Using portable equipment, such as the gasoline-driven "pack sack" type drills, check the mineralized zones at shallow depths	4,500.00
6.	Core drilling, using AX equipment, 1500 feet	15,000.00
7.	Job supervision, local transportation and support	5,000.00
8.	Consulting, office and overhead	2,500.00
9.	Contingencies	5,000.00
	Estimated total costs	$ 50,000.00

SCHEDULE B

Contingent upon results obtain from Schedule A, and started soon enough to be completed by November 1st, 1966:

		Estimated Cost
1.	Geophysical surveying sufficient to produce a detailed map of the mineralized zones on the property	$ 10,000.00
2.	Diamond drilling on the three main zones of mineralization sufficient to formulate plans for underground investigations, 8000 feet	66,000.00
3.	Job supervision, local transportation and support	10,000.00
4.	Consulting, office and overhead	4,000.00
5.	Contingencies	10,000.00
	Estimated total costs	$ 100,000.00

Respectfully submitted,

ALLEN GEOLOGICAL ENGINEERING LTD.

Alfred R. Allen, M.A.Sc., P. Eng.

519 - 409 Granville St.,
Vancouver, B. C.
May, 1966.

REFERENCES

1. British Columbia Minister of Mines
Annual Reports, 1913, 1922, 1926, 1927, 1928

2. F.W. Guernsey, Maps and Files

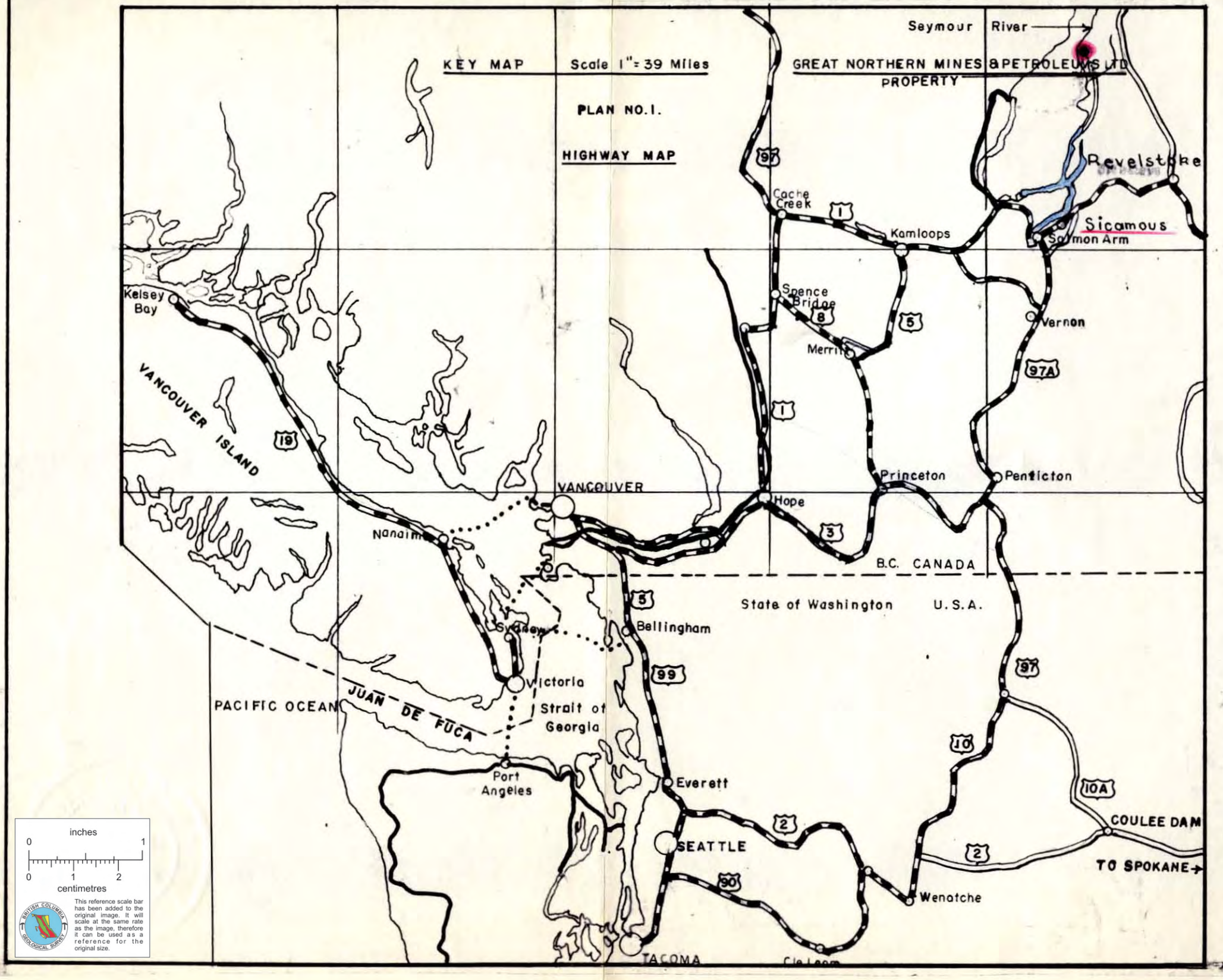
3. A. St. Claire Brindle, Maps, Files, Personal Communications

4. Southern B.C., Map 127, Dawson 1877. G.S.C.

5. Southern B.C., Map 363, Dawson and Bowman, 1889 G.S.C.

6. Vernon Sheet, Map 1059A, Rice and Jones 1960
G.S.C. Mem. 296.

7. Shuswap Lake, Map 143A, Daly 1915, G.S.C. Mem. 68.



inches
0 1
0 1 2
centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

WIDTH	INS	SAMPLE NO.	AG. OZ.	PB. %	ZN. %
1·8		5001	1·20	6·0	0·36
54"					
30"					
24"					
60"					
84"		5002	1·20	2·50	1·0
CAVED					
36"		5003	1·45	3·50	3·60
CAVED					
30"		5035	3·60	12·80	2·50
36 TO 96"		5036	1·20	3·30	6·00
14"		5037 TO 5044	1·75	7·30	2·50
12"		5004 TO 5018	0·80	2·30	0·70
84"		5024 TO 5034	0·80	3·70	3·90
AV. 24+9		5038	1·30	3·80	1·30
		5039	1·30	3·00	0·80
		5040	1·10	2·00	3·00
		5041	1·40	9·50	3·90
		5042	2·80	2·35	TR
		5043	0·50	0·95	3·50
		5044	1·05	3·30	1·50
		5004	0·80	2·90	3·10
		5005	0·80	2·00	7·50
		5006	1·30	5·20	4·70
		5007	1·00	1·80	2·00
		5008	0·85	2·80	1·80
		5009	0·90	1·90	5·20
		5010	1·60	3·30	1·80
		5011	1·20	3·50	3·30
		5012	0·90	3·90	8·00
		5013	0·45	1·90	2·00
		5014	2·90	9·90	2·90
		5015	0·95	7·90	7·70
		5016	1·45	3·30	
AV. 21"		5017			
		5018			
30"		5045	2·00	2·80	2·50
4		5047	4·55	14·80	0·20
36"		5046	2·00	4·30	0·30
		5024	TR	2·30	3·50
		5025	0·30	1·30	2·20
		5026	1·20	3·50	4·20
		5027	0·90	4·40	4·80
		5028	1·30	5·60	9·00
		5029	2·65	8·70	9·00
		5030	1·60	4·20	12·50
		5031	2·40	8·50	2·30
		5033	0·50	1·30	5·20
		5034	1·30	4·00	

No.1.

No.2.

No.3.

Cabin

Outcrops & Pits

Vein

Astronomic North

Bass Shaft

Plan of workings and assays of the COTTON BELT ZONE

6100'
6000'
5900'
5800'
5700'
5600'
5500'
5400'
5300'
5200'
5100'
5000'
4900'
4800'
4700'

No. 1 Tunnel

No. 2 Tunnel

No. 3 Tunnel

Bass Shaft 4900' 4800' 4700'

GREAT NORTHERN MINES AND PETROLEUMS LTD. (n.p.l.)

809–525 Seymour St., Vancouver, B.C.

To accompany Report ALLEN GEOLOGICAL ENGINEERING Ltd.,
Suite 519–402 Granville St., Vancouver, B.C. May 1966.

Section through workings COTTON BELT ZONE

inches
0 1 2
0 1 2 3 4 5
centimetres

BRITISH COLUMBIA GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

SCALE 1" = 300'
300' 0' 100' 200' 300' 600'

Plan No. 4. R.E.P.

19,000 N.

21,000 E.

20,000 E.

9061 4·2' 0·75 1·24 1·40
9060 1·2 -5·2-11·5 - 1·5

9080 - 2·5' - 2·65 - 4·42 - 0·65

9079 - 3·0' - 2·90 - 5·5 - 9·85
9078 - 4·4 - 2·65 - 1·1 - 5·2

9077 - 1·3' - 2·4 - 4·1 - 2·1

9076 - 40' - 2·40 - 4·86 - 8·4

9075 - 4·5' 2·15 - 3·88 - 7·9

9074 - 4·9 - 3·45 - 8·2 - 6·2

9073 - 7·0 - 2·0 - 4·1 - 7·35

9072 - 3·8' - 4·0 - 6·5 - 8·5

9071 - 1·5 - 0·78 - 3·5
0·8

9070 - 2·3 - 29 - 4·7 - 7·0

9069 - 1·6 - 2·0 - 3·78 - 6·5

9068 - 2·3 - 1·6 - 2·05 - 4·5

9067 - 5·0 - 6·5 - 11·0 - 16·0

9066 - 6·2 - 7·05 - 13·4 - 9·3

9065 - 9·0 - 2·8 - 5·4 - 4·2

9064 - 9·5' - 2·4 - 4·96 - 8·0

9063 - 5·5' - 2·9 - 5·72 - 4·5

9062 - 5·5' - 3·2 - 6·75 - 5·0

O D.D.H. No.7

O D.D.H. No.6

O D.D.H. No.5

O D.D.H. No.4

O D.D.H. No.3.

O D.D.H. No. 2.

Mc Leod Tunnel

O D.D.H. No.1.

St.A.

SAMPLES AS SHOWN

Sample No.	Width	Ag oz.	Pb%	Zn%
Weighted Average		3·05	5·39%	6·51%
Average width 4·7'				

GREAT NORTHERN MINES AND PETROLEUMS LTD. (n.p.l.)

809 - 525 SEYMOUR ST., VANCOUVER, B.C.

PLAN SHOWING LOCATION OF DIAMOND DRILL HOLES IN THE McLEOD ZONE,

Including chain & transit Survey of Main Vein Location - Surface sampling - Assays. on Shuswap Claims No's 20 & 17 including general Topography of area.

Scale 1" = 100'

To accompany report Allen Geological Engineering Ltd., Plan No. 3.
Suite 519 - 402 Granville St., Vancouver, B.C. May 1966, R.E.P.