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GEOLOGICAL AND GEOCHEMICAL AND PHYSICAL

REPORT FOR ASSESSMENT CREDIT ON THE

TOP CLAIM GROUP

Swift Lake Area, B.C. 59° 131° N.W.

MASTODON-HIGHLAND BELL MINES LTD.

Vancouver, B. C.
November 16, 1967

J.B.P. Sawyer

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GEOLOGICAL AND GEOCHEMICAL AND PHYSICAL REPORT FOR ASSESSMENT CREDIT ON THE TOP CLAIM GROUP Swift Lake Area, B. C.

I. INTRODUCTORY

The TOP group consists of forty (40) claims: TOP 42, 44, 50, 52; 65 to 81 inclusive; 83, 85, 87, 89; 91 to 96 inclusive; 107 to 112 inclusive; 125, 127, 129. They are in the Atlin Mining Division, approximately five miles east of Swift Lake. The claims are between 4,000 and 5,000 feet, largely above timberline, and outcrop is abundant. (See Fig. 1).

The claims were staked after an examination yielded evidence of copper mineralization (chalcopyrite) in association with skarn in a generally favourable geological setting. The work here reported was performed between June 1st and August 31st, 1967, and is a combination of physical, geological and geochemical work.

Transportation to the property, which lies approximately nine miles south of the Alaska highway, was by helicopter. All men and equipment were flown in from Mile 759, where the highway crosses the Smart River.

II. GEOLOGY

The only published geological map covering the area of the TOP claims is that showing the results of reconnaissance mapping along the Alaska highway by C.S. Lord, G.S.C. Paper 44-25. This map indicates the area to be underlain by pre-Carboniferous metamorphic rocks,

predominantly gneisses and schists, with less abundant quartzites, limestones, and dolomites. More recent, but as yet unpublished, mapping by the Geological Survey of Canada (H. Gabrielse et al, Jennings River map sheet) includes the greater part, if not all, of the area of the claim group within a band of Permo-Carboniferous metamorphic rocks of the greenschist facies. These may be equivalent to the rocks of Unit 7 mapped in the south-western corner of the Wolfe Lake map sheet (G.S.C. Map 10 - 1960 by Poole, Green and Roddick).

The geology in the vicinity of the principal mineralization is shown in Fig. 5.

The principal mineralization occurs on a gentle ridge formed of metamorphosed calcareous and siliceous sediments which exhibit all variations from pure limestone to pure quartzite.

There are two main types of limestone, a buff-weathering, light coloured rock and a dark-weathering, bluish rock. Both of these have evidently been recrystallized and the bluish limestone is usually coarsely crystalline. The limestones show a network of green amphibole stringers which in places appear to follow old bedding planes but, in other instances, cut across them.

Sandy, limy, or relatively pure argillites form thin bands locally and, in addition, arkose and feldspathic quartzite are represented here and there. Amphibole is well developed in the region of Line 72N, 67E - 75E (TOP 108) where, in places, the rocks are dark green and retain only traces of the original rock structure and composition.

A characteristic of most of the metaquartzites is the presence of rather large "eyes" of generally bluish quartz in a finer-grained granular matrix. Their presence in any rock was used as a basis for assuming that the rock, however greatly altered now, originated as a quartzite.

Thus, grouped with the metaquartzites on the geological map, (Fig. 5), are both coarse amphibole-rich rocks and a greenish magnetite-bearing schist, both of which carry occasional large quartz eyes. Pyrite, in minor amounts, is the only sulphide mineral present in these rocks.

As will be seen from the attitudes shown on Fig. 5, the beds dip gently southwestward. The southwestern slope of the ridge is a dip slope.

Diopside-garnet skarn complexes are dispersed through the upper horizons of perhaps 100 feet of thickness of the mixed limy series, Fig. 5, Unit 1, but it was not possible to tie them down to one or more definite beds.

Rocks included in these complexes include: hybrid banded skarn material, free epidote and epidote-rich material, fine-grained dark-green amphibole rock, a magnetite -rich type weathering to goethite or limonite, milky quartz, two types of coarse-grained skarn and occasional calcite veins.

The "hybrid" skarn is typically fine-grained, and banded or streaky, with dark amphibole alternating with lighter layers or streaks or more siliceous material.

This fine grained, dark-green member of the complex is made up chiefly of actinolite and chlorite, with a little epidote and varying amounts of magnetite.

The greenish-brown skarn has a characteristic pink colour on the weathered surface. It typically carries brown or pink garnet, diopside, epidote, magnetite, calcite and/or quartz.

The full dimensions of most of the skarn zones are obscure but exposures seem to be about 20 - 30 feet long. Total width of skarn complexes from quartzite to quartzite in the walls is also variable, from a few feet to perhaps fifty feet.

Intrusive rocks in the area are limited to a few porphyry and basic dikes.

III. MINERALIZATION

Mineralization on this property consists of chalcopyrite and pyrite with very minor bornite. A representative chip sample over an area of approximately 60 feet by 25 feet on Claim 92 returned an assay of 0.69% copper. In the same claim area chalcopyrite occurs in pinkish to pinkish-green diopside-garnet skarn. A grab sample of this material returned an assay of 0.87% copper. Highly chloritic rocks locally carry significant amounts of chalcopyrite. The more rusty zones contain considerable pyrite, some pyrrhotite in places, and generally only minor chalcopyrite.

Molybdenite occurs in minor amounts associated with chalcopyrite in skarn type rocks. It has been found in hand specimens from one or two locations in the area of the main showings on Claim 92 and in minor amounts in all of the samples cut from the trenches. Anomalous molybdenum values were obtained from some soil samples tested for this metal. Anomalous values were also detected in sediment samples collected from the stream which drains eastwards from the northern end of the prominent north-easterly trending ridge off Claim 81.

Magnetite is most abundant in skarn but also occurs in very minor amounts with the sulphides in some of the quartzite bands adjacent to skarns.

Sulphide mineralization also occurs along the northern flank of the main north-easterly trending ridge. Rusty areas in the cliff face are due to pyritic zones of mineralization which in places carry chalcopyrite and pyrrhotite. A grab sample of this material from Claim 65 returned an assay of 0.34% copper. The host rocks here are predominantly dark green, highly chloritic rocks of the greenschist metamorphic facies.

Chalcopyrite occurs in highly siliceous, sheared rocks, (probably impure metaquartzites) along the steep cliff face immediately south of Claim TOP 79.

IV. GEOCHEMICAL SAMPLING

A control grid, consisting of 25 miles of line, was cut over the claim group. A further approximately 50 miles of line were cut on adjoining ground to obtain a better idea of the geology and the background material of the soil.

Soil samples were collected at 100 foot intervals along the cut lines, except on the higher ground at the eastern side of the property where soil cover is lacking. (See Fig. 6).

Samples were also collected at approximately 100 foot intervals along pace and compass lines, spaced 800 feet apart, and positioned between the cut lines over that part of the grid lying between 32N and 104N, and between 50E and 140E, also in one or two other places where greater detail in sampling seemed desirable.

An ordinary ship's auger, to which an extended handle had been welded, was used to collect the samples which were bagged in standard Caneco Kraft, 3½ inch by 10 inch, envelopes. All samples were sent to the Company field office in Whitehorse where they were dried and screened through 80 mesh nylon screening. The minus 80 mesh fractions were shipped to the Toronto laboratories of Barringer Research Limited for analysis. Total copper analyses, using the bisulphate fusion-biquinoline method, were carried out on every sample. A few lines of samples were also analysed for molybdenum, using the fusion-thiocyanate method, in order to obtain an idea of the order of values which might be expected. All the results are plotted on a base map on a scale of 1 inch equals 400 feet, (see Fig. 6).

Values in excess of two hundred (200) parts per million total copper are taken as anomalous, and the contours at 200 p.p.m., 500 p.p.m., and 1,000 p.p.m., have been drawn in. These results indicate the presence of a discontinuous, broad zone of anomalous values from near the south boundary of the claim group in the area of base line 110 East , extending for about 7,000 feet in a north-north-westerly direction and covering the general area of claims TOP 95, 78, 93, 94, 109, 110, 92, 107, 108, 125. Within this bread zone are several areas of higher concentrations of copper ions with peak values well in excess of 1,000 p.p.m. total copper (5 times back ground). The highest value is 3,620 p.p.m. - greater than 18 times background.

The soil cover is quite variable on the claim group and difficulties were experienced in consistently sampling the same horizon. This is reflected in Fig. 6 by the patchy nature of the anomalous copper zones.

Background value for molybdenum in soils appears to be of the order of two to three parts per million. Several anomalous values, with a maximum up to 15 times background, show up from the small number of samples tested for molybdenum.

V. TRENCH SAMPLING

On claims 92, 107, and 108, surface indications dictated a more thorough physical sampling, and trenches were excavated for this purpose. Sampls from the trenches were assayed for copper, molybdenum and gold in the Whitehorse, Yukon assay office. Results are as shown in Fig. 3 as a tabulation of values.

VI. CONCLUSION

The geochemical and physical sampling of the TOP group of mineral claims confirmed the presence of scattered copper-molybdenum mineralization, but unfortunately it is not considered economically exploitable at the present time.

Respectfully submitted,

J. B. P. Sawyer.

STATEMENT OF QUALIFICATIONS

I, J.B.P. Sawyer, hereby certify:

1. That I am a graduate in geology of the University of Manchester (BSc. Hons. Geol. 1953) and of the University of Western Ontario (MSc. 1957).

2. That I have been practising my profession continuously for the past fourteen years, including twelve years in exploration work.

3. That I am presently employed as Chief Geologist for Husky Syndicate which is engaged in mineral exploration in the Yukon and northern British Columbia, and that for the nine years prior to February 1966 I was employed as Maritimes Supervisor for Noranda Exploration Company Limited.

4. That I am a Fellow of the Geological Association of Canada, a Junior Member of the Canadian Institue of Mining and Metallurgy, a Member of the Mineralogical Association of Canada.

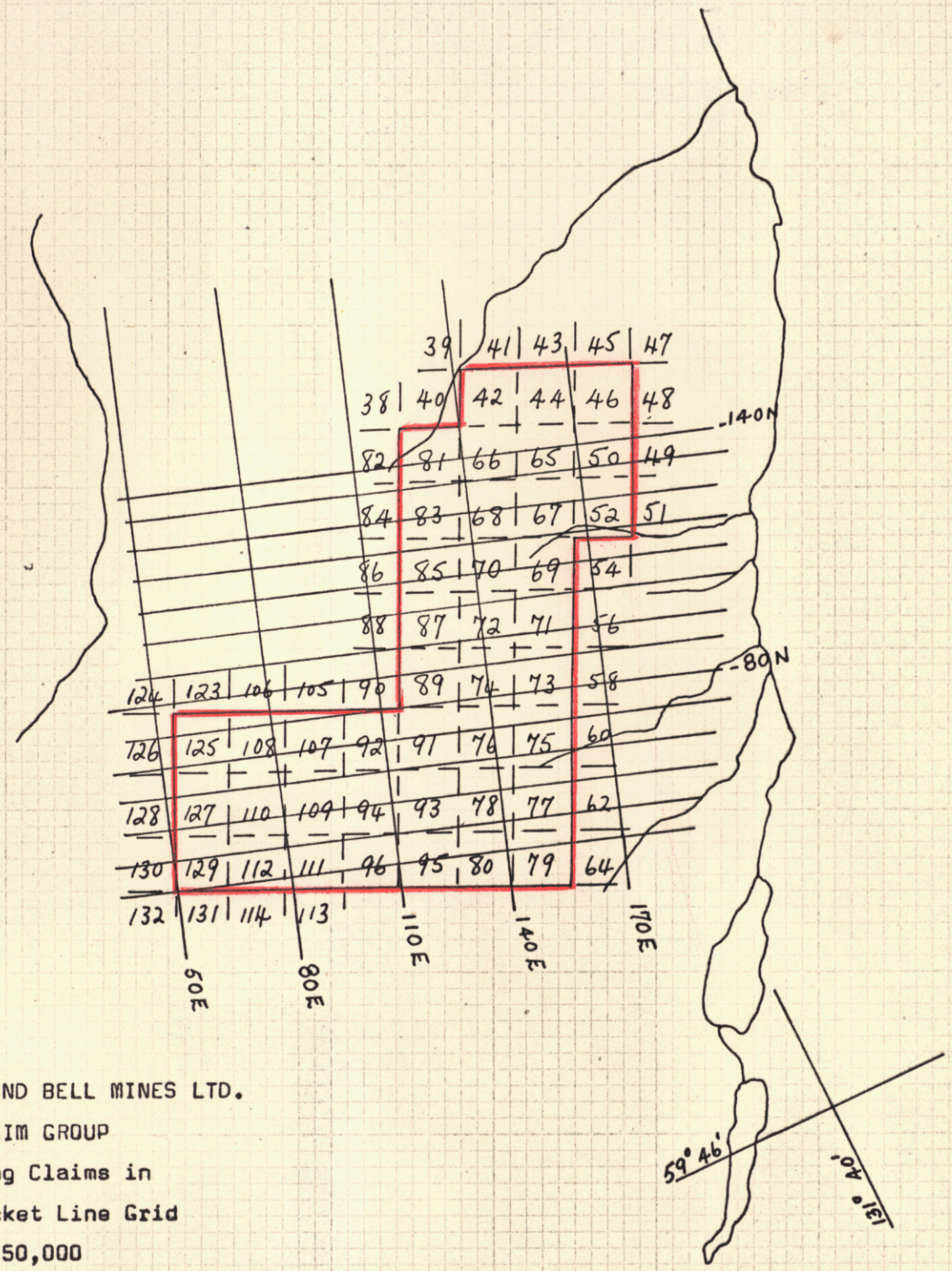
5. That I am preparing an application for registration as a Professional Geological Engineer with the British Columbia Association of Professional Engineers and expect to be admitted as a Member of that Association.

J.B.P. Sawyer.

November 16, 1967

Location Sketch - McKinnon Option, Swift Lake Area, B. C.
Scale 1:250,000

Fig. 1



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TOP CLAIM GROUP

Sketch showing Claims in

Relation to Picket Line Grid

Scale 1:50,000

Fig. 2

Tabulation of Trenching Data Fig. 3

TRENCH SYSTEM	CLAIM NO.	LOCATION	DIMENSIONS OF TRENCH	VOLUME EXCAVATED	WIDTH OF SAMPLE CUT	ASSAY Cu.%	ASSAY Mo.%	ASSAY Au.Oz.	SAMPLE NO.
1	108	80 ft. on bearing N10°E from 72N,72E	35'× 2'×1.5'	105 cu.ft.	Not sampled	-	-	-	-
2	108	12 ft. on bearing S75°W from 80E,75N	40'× 5'× 2'	100 cu.ft.	20 ft.	0.40	0.026	Trace	G.C. 17
3	108	approx. L. 72N, 82E → 83E	10'× 3'× 3'	90 cu.ft.	Not sampled	-	-	-	-
			10'×2.5' ×1'	25 cu.ft.	Not sampled	-	-	-	-
			22'× 5'× 2'	220 cu.ft.	Not sampled	-	-	-	-
4	107	540 ft. on bearing N15°E from 64N,86E	5'× 3'× 8'	120 cu.ft.	5 ft.	0.15	0.013	Trace	G.C. 14
5	107	515 ft. on bearing N15°E from 64N,88E	40'× 2'× 3'	240 cu.ft.	12 ft.	0.98	0.017	0.005	G.C. 13
6	107	440 ft. on bearing N15°E from 64N,95E	15'× 5'× 1'	75 cu.ft.	10 ft.	0.58	0.032	0.005	G.C. 5
			28'× 4'× 4'	448 cu.ft.	8 ft.	0.45	0.059	0.005	G.C. 4
7	92	270 ft. on bearing N15°E from 64N,97E	45'× 5'× 4'	900 cu.ft.	5 ft. vert.	0.29	0.017	Trace	G.C. 1
			16'× 4'× 3'	192 cu.ft.)	2 ft.	0.05	0.03	Trace	G.C. 2
				)	10 ft.	0.78	0.045	0.005	G.C. 3
8	92	180 ft. on bearing N15°E from 64N,103E	35'× 2'× 2'	140 cu.ft.)	10 ft.	0.68	0.03	0.01	G.C. 6
				)	10 ft.	0.70	0.03	0.10	G.C. 7
			25'× 3'× 2'	150 cu.ft.)	15 ft.	0.29	0.013	Trace	G.C. 8
				)	18 ft.	0.18	0.022	Trace	G.C. 9
9	92	90 ft. on bearing N15°W from 64N,103E	29'× 2'× 4'	232 cu.ft.)	8 ft.	0.64	0.026	0.005	G.C. 10
				)	7 ft.	0.18	0.026	Trace	G.C. 12
10	92		31'× 3'× 3'	279 cu.ft.)	7ft.	0.58	0.017	0.01	G.C. 15
				)	21 ft.	0.60	0.017	0.02	G.C. 16
			4'× 2'× 4'	32 cu.ft.	Not sampled	-	-	-	-

Total Number of Trenches = 16

Total Volume of Rock Excavated = 3,348 cubic ft. = 124 cu. yds.

STATEMENT OF EXPENDITURES

Contract Line Cutting:-				
34.6 miles @ $120.00 per mile				$4,152.00
Geochemical Analyses:-				
Barringer Research -				
1,814 spls. for total Cu. @ $1.00			1,814.00	
255 spls. for total Mo. @ 2.50			637.50	2,451.50
Assaying:-				
Whitehorse Assay Laboratory				291.00
Helicopter Costs:-				
Frontier Helicopters Ltd. -				
37 hrs. 35 mins. @ $135.00 / hr.			4,973.75	
Coast Range Airways Ltd. -				
3.1 hrs. @ $135.00 / hr = 418.50				
4.0 hrs. @ 127.00 / hr = 508.00			926.50	5,900.25
Supplies:-				
Food			490.75	
Miscellaneous			327.96	818.71
Equipment Rental:-				
Atlas Copco Cobra-Drill				279.30
				13,892.76
Personnel:-				
J. J. Crowhurst, B.Sc.,P.Eng.	3 days@	$ 50.00/day	150.00	
G.A. Checklin, B.Sc.,Geol.	45 days@	1,000.00/mo.	1,500.00	
J.B.P. Sawyer, M.Sc.,Geol.	17 days@	35.00/day	595.00	
V. Brown-John, Prospector	80 days@	25.00/day	2,000.00	
K. Midan, Sampler, Prospector	74 days@	16.00/day	1,184.00	
R. St.Croix, Prospector	32 days@	20.00/day	640.00	
B. Fox, Labourer	11 days@	25.00/day	275.00	
J. Sheldon, Labourer	3 days@	25.00/day	75.00	
D. Porter, Labourer	27 days@	20.00/day	540.00	6,859.00
Total Expenditures:-				$20,851.76

T.L. 140N
L. 136N
L. 128N
L. 120N
L. 112N
L. 104N
L. 96N
L. 88N
TL. 80N
L. 72N
L. 64N
L. 56N
L. 48N
L. 40N
TL. 32N

38 40 42 44
82 81 66 65
84 83 68 67
86 85 70 69
88 87 72 71
106 105 90 89 74 73
144 143 126 125 108 107 92 91 76 75
146 145 128 127 110 109 94 93 78 77 62 61
148 147 130 129 112 111 96 95 80 79 64 63
150 149 132 131 114 113

89+00N
81+00N
73+00N

N N

67 — REFERS TO TOP CLAIM NUMBER 67

APPROX. BOUNDARY OF TOP CLAIMS

To accompany Geological, Geochemical & Physical Report on TOP CLAIM GROUP, Atlin M.D. dated Nov. 16th 1967, by J.B.P. SAWYER

J.B.P. Sawyer

HUSKY SYNDICATE

McKINNON OPTION

SMART RIVER AREA
BRITISH COLUMBIA

LINE CUTTING PLAN

CHECK BY: J.B.P.S.
DRAWN BY: R.S.C.
SCALE: 1 INCH = 400'
DATE: JUNE 67

B.L. 20 E
B.L. 50 E
B.L. 80 E
B.L. 110 E
B.L. 140 E
B.L. 170 E

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Mines and Petroleum Resources
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B.L. 50 E

B.L. 60 E

B.L. 110 E

88+00 N

80+00 N

72+00 N

64+00 N

56+00 N

48+00 N

106 105 90 89

126 125 108 107 92 91

128 127 110 109 94 93

130 129 112 111

MAIN RIDGE

Gully

Gully

QFT

FFT

Camp

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10

QFT QUARTZ PORPHYRY INTRUSIVE

FFT FELSPAR PORPHYRY INTRUSIVE

4 BASIC INTRUSIVES

3 SKARN COMPLEX

2 METAQUARTZITES (INCL. AMPHIBOLITIC DERIVATIVES, SCHIST ETC.) (PREDOMINANT).

1 LIMESTONES (PREDOMINANT).

40 STRIKE & DIP OF BANDING (≡ ORIGINAL BEDDING).

T10 TRENCH SYSTEM

Fig. 5

HUSKY SYNDICATE
McKINNON OPTION

GEOLOGICAL MAP OF THE MAIN MINERALIZED AREA

SCALE: 1 INCH = 400 FT.

G.A. CHECKLIN AUGUST 1967

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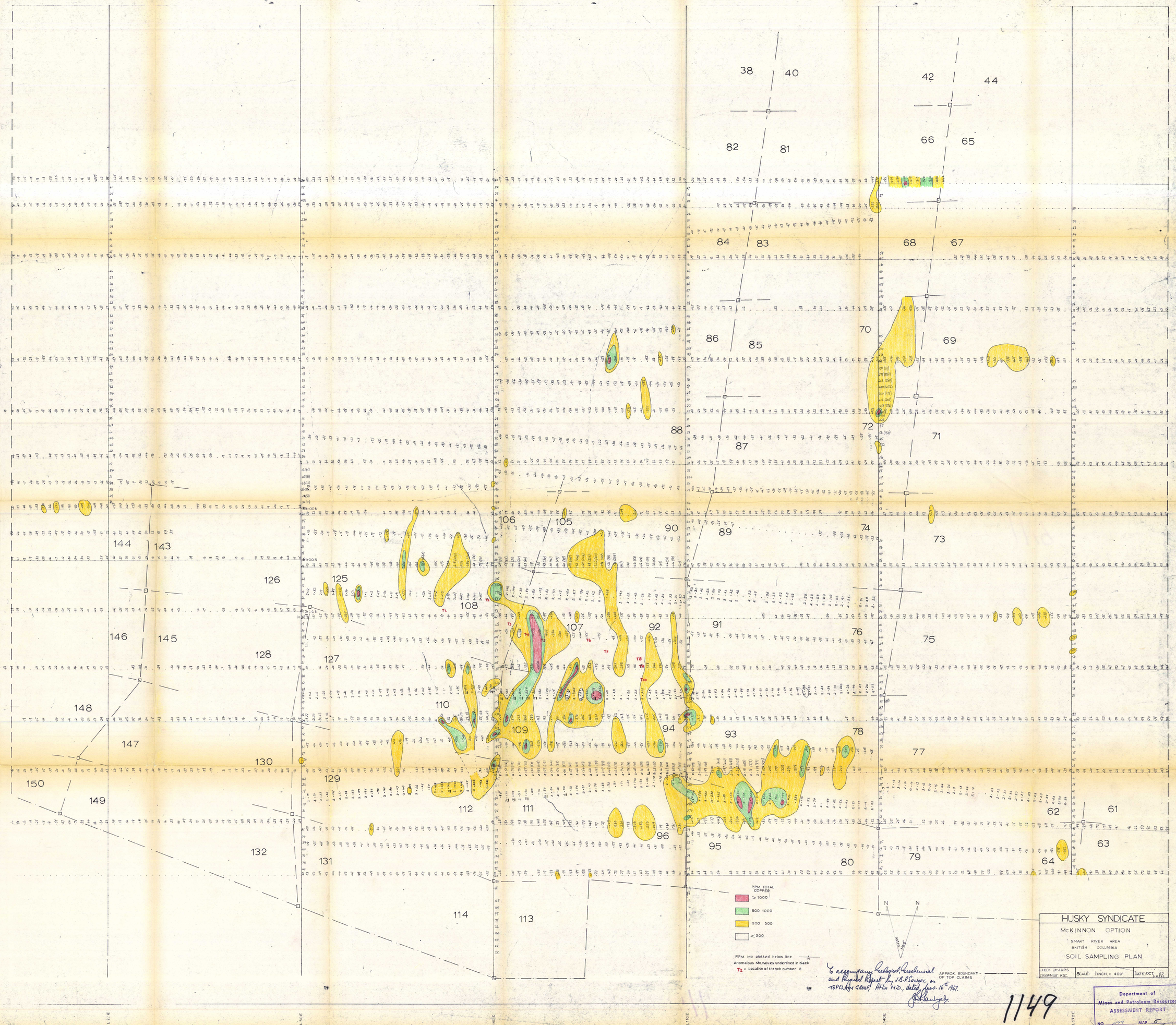
To accompany Report of Work by J.B.P. Sawyer, on TOP CLAIM GROUP, Atlin M.D. dated November 16th 1967. J.B.P. Sawyer



HUSKY SYNDICATE

McKINNON OPTION

SMART RIVER AREA
BRITISH COLUMBIA

SOIL SAMPLING PLAN

CHK'D BY J.B.P.S.
DRAWN BY R.S.C.

SCALE: 1 INCH = 400'

DATE: OCT. 67

To accompany Geological, Geochemical and Physical Report by J.B.P.Sawyer, on TOPCLAIMS GROUP, Atlin M.D., dated Jan. 16th 1967.

J.B.P. Sawyer

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