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BRITISH NEWFOUNDLAND EXPLORATION LIMITED

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GEOCHEMISTRY AND GEOLOGY OF THE MV CLAIM GROUP

MAYO MINING DISTRICT, YUKON TERRITORY

105-O-5, 105-O-6

63° 20' N 131° 35' W

FEB 12 1979

By

K.B. McHale

090436

Field Period June 1 to September 7, 1978

Report Period September 15 to December 31, 1978

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of

$ 32,000.00

J A Main

Resident Geologist or
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B. R. BAXTER
Supervising Mining Recorder

for Commissioner of Yukon Territory

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MV MAPS

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SUMMARY AND RECOMMENDATIONS

The 1978 field program on the MV claims consisted of geological mapping, geochemical soil sampling and prospecting. The results of the program are as follows:

1. The MV claims are underlain primarily by the Road River Formation. The formation can be divided into three lithologic units:

   (i) Upper black chert-cherty shale of Devonian age,

   (ii) Middle pyritic fissile shale of Silurian-Devonian age,

   (iii) Lower calcareous unit consisting of interbedded black chert, calcareous shale and limestone of Ordovician-Silurian age.

   Outcrop on the property is less than one percent and the geology is further complicated by an east-west trending isoclinal folding. The calcareous unit is stratigraphically equivalent with the "Howard's Pass Formation" which contains the Placer-Essex, Pb-Zn stratiform mineralization.

2. The calcareous unit has surface secondary white zinc bearing carbonate coatings and in places contains tetrahedrite bearing nodules. The source of the secondary zinc has not been located. The tetrahedrite mineralization is thought to be related to a pre-lithification mineralizing episode.

3. The background metal content (Pb,Zn) of the rocks of the calcareous unit of the Road River Formation are higher than the other units of the Road River Formation.

4. Multi-element (Pb, Zn, Mo) soil geochemical anomalies were outlined over areas underlain by the calcareous unit of the Road River Formation.

5. Certain soil and stream silt geochemical anomalies over lithologies other than the calcareous unit of the Road River Formation can be explained by hydromorphic processes or accumulation and concentration by Mn-Fe oxides or organic complexing.

It is recommended that the soil geochemical anomalies underlain by the calcareous horizon of the Road River Formation be tested for possible economic zinc-lead sulphide mineralization by diamond drilling.

RBMcHale

INTRODUCTION

Location (Figure A)

The claim group MV 1 to 160 is located in the Hess Mountains, on the north side of the Hess River, approximately 160 kilometres north of Ross River in the Yukon Territory. The co-ordinates of the property are 63° 20' N, 131° 35' W on topographic map sheets 105-O-5 and 105-O-6.

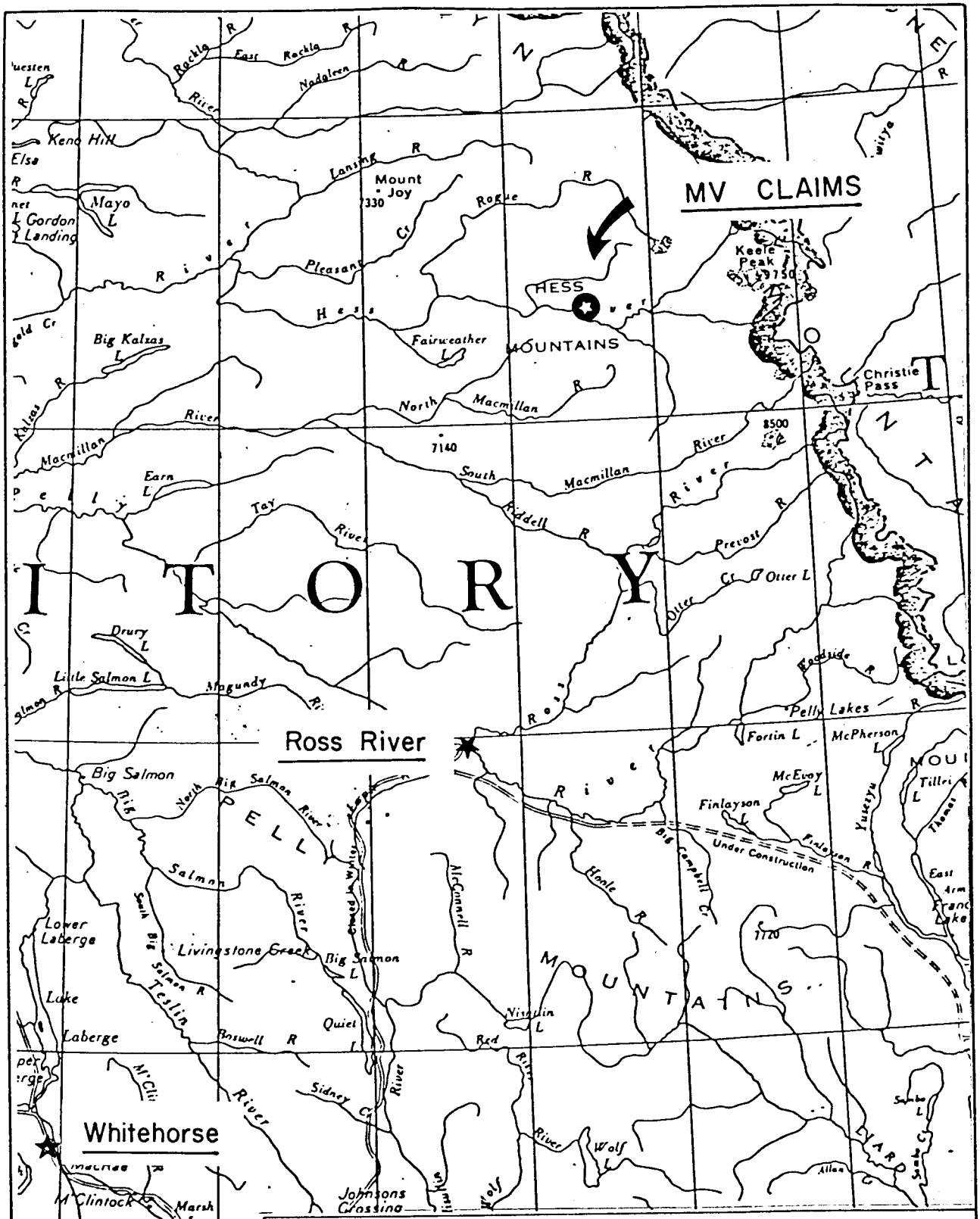
Access

The property is accessible by helicopter and fixed wing float aircraft from Mayo and Ross River. Both Jake Lake (9.6 kilometres east of the property) and Niddery Lake (6.4 kilometres southeast of the property) are suitable for fixed wing aircraft.

The North Canol Road is 64 kilometres southeast of the property. A winter road (constructed in 1973 by Atlas Exploration Ltd.) starts at the Canol Road and runs across the lower slopes of the claim group.

Topography and Vegetation

Elevations range from 750 metres to 1500 metres and local relief is moderate. The higher slopes above 1300 metres elevation are covered with grasses, heather and a few stunted spruce, balsam and willow. The eastern half (east of Line 104E) has been burned and now has pockets of spruce, balsam and alder with the majority of the burned area covered by willow vegetation. The areas of discontinuous permafrost have a thick cover of mosses and the predominant trees are spruce with minor willow. Balsam growth is predominant on the upper slopes to tree line.



British Newfoundland Exploration Limited

Location Map – MV Claims, YUKON TERRITORY

Date: Dec. 1978	SCALE: 1: 2,000,000	DRAWN BY: K.B.M.
	MAP REF:	TRACED BY:
	MAP No.:	CHECKED BY:

Fig. A

Field Program

Geochemical and geological surveys were conducted on the claims during 1978. The field crews were employees of British Newfoundland Exploration Limited, Stirling Expediting Services and Australian Mining & Smelting Canada Minerals Ltd.

The principals included in the program were:

Mr. K.B. McHale, Project Geologist,
British Newfoundland Exploration Limited,
704 - 602 West Hastings Street,
Vancouver, B.C. V6B 1P2

Dr. G.J. Dickie, Senior Geologist,
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704 - 602 West Hastings Street,
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Dr. G.P. Lozej, Consulting Geologist,
73 Ellerbeck Street,
Toronto, Ontario. M4K 2V2

Mr. N.N. Gow, Vice-President, Technical,
AM&S Canada Minerals Ltd.,
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Ms. D.E. McHale, Geologist,
British Newfoundland Exploration Limited,
704 - 602 West Hastings Street,
Vancouver, B.C.

Mr. A. Reeves, Field Assistant,
Vancouver, B.C.

Mr. G. Didier, Prospector,
Vancouver, B.C.

PROPERTY GEOLOGY (Figure 1)

The property is underlain by an Ordovician to Middle Devonian sedimentary sequence of the Road River Formation and the "Black Clastics" unit. Outcrop exposure on the claims is less than one percent.

The Road River Formation consists of black chert, cherty shale, grey pyritic fissile shale, grey calcareous shale and limestone. The formation can be subdivided into three units:

1. an upper black chert-cherty shale,

2. a middle pyritic fissile shale,

3. a lower calcareous unit of interbedded black chert, calcareous shale and limestone.

The section is similar to that at Howard's Pass where the Placer-Essex properties are located.

The contact with the overlying "Black Clastics" unit is located just north of the claims. The contact is poorly exposed and its true nature is not determinable. Data from regional mapping has shown that the contact may be conformable, disconformable or faulted.

The "Black Clastics" unit consists of sandstone, siltstone, calcareous arenite and minor limestone. Thin beds with fossil debris and wood fragments are present in the succession. The "Black Clastics" are lithologically similar to the Nation River Formation in the western Yukon and Alaska and are of the same geologic age (Upper Devonian to Mississippian).

Structure

The regional strike of the strata is northwesterly with dips to the northeast and southwest. The beds have undergone at least two stages of folding, with the dominant stage forming east-west asymmetric folds, most evident in the Road River strata. The fine grained units of the Road River Formation were more readily deformed into tight folds than the coarser grained "Black Clastics" strata. The other stage of deformation was a broad open folding along north-south trending axes. The lack of outcrop limits any detailed structural reconstruction of the geologic section.

Mineralization

Mineralization consisting of hydrozincite and smithsonite coatings and tetrahedrite-bearing nodules is confined to the calcareous unit of the Road River Formation. Based on data derived from regional mapping, it appears that this calcareous horizon is correlative with the "Howard's Pass Formation" which is the informally named calcareous shale-limestone unit that contains the stratiform lead-zinc mineralization on the XY, ANNIV and OP properties of Placer-Essex.

Secondary iron sulphates (melanterite $FeSO_4$ $7H_2O$ and ? fibroferrite $FeSO_4(OH)$ $5H_2O$) are present on some of the pyrite rich shales. The sulphates are derived from the decomposition of pyrite.

SURVEY CONTROL

Ninety kilometres of soil sampling was done over the MV claims using a cut-line grid for control. The grid was established by compass and chaining and further ground control was supplied by using topographically contoured orthophoto maps prepared at a scale of 1:10000.

The east-west base lines and the north-south tie lines (totalling 38.2 kilometres) were cut and picketed. Line spacing was normally 400 metres but was reduced to 200 metres where a closer spaced grid was desired. Sample spacing was 50 metres with some trial sampling at 25 metre intervals on two lines. The north-south sample lines were run in by compass and topofil and the stations were marked with flagging. A corrected grid map was drawn up on the orthophoto topographic base map and used for compilation of the analytical data.

GEOCHEMISTRY

Sampling

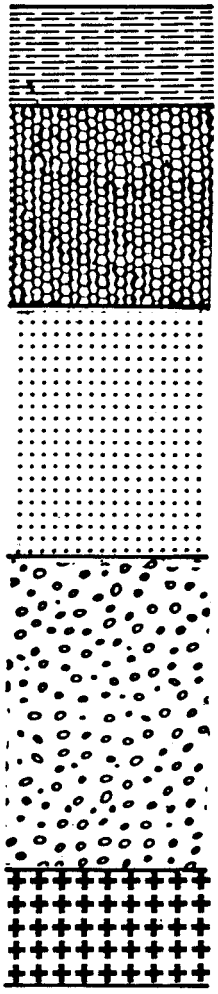
Collection of soil samples from a specific horizon was not possible due to the nature of soil development on the property. Environments that were encountered include bog-muskeg, permafrost, alluvium and glacial till.

On the upper slopes of the property a skeletal soil has been developed. The soil layer, with indistinct horizons, is thin and contains abundant rock fragments.

In a few places, a poorly developed podzol (see Figure B) soil profile was present in the non permafrost areas. Where possible, the B horizon of this profile was sampled.

The major environmental condition that prevented collection of samples from a uniform horizon was permafrost. The lower slopes of the property are underlain by "discontinuous" permafrost covered by a thick blanket of mosses (up to 40 cm). There was little or no "Active Zone"* in these areas where the permafrost was insulated by thick moss cover. The depth of permafrost varied from a few centimetres to greater than 50 centimetres. In the areas of thick permafrost, the samples usually contained abundant organics with minor silt and clay. In some localities

PODZOL SOIL PROFILE



A_0 Organic debris, fully destroyed

A_2 Whitish grey coloured, sand-silt textured horizon, maximum eluviation of clay, iron oxide and/or organic matter

B Brown-orange brown, clayey textured, maximum accumulation of silicate clay minerals, precipitated iron, manganese oxides and humus

C Breakdown of parent material

D Bedrock

BRINEX LTD.

DATE: NOV. 1978 FIG. 8

the permafrost sample consisted of "C horizon". On south and west facing slopes, the strongest development of permafrost occurred below 1000 metres elevation, while on north facing slopes, it is present below 1250 metres elevation. The areas of permafrost terrain and related soils with high organic content (>50%) are shown in Figure 2. Appendix I contains further details on permafrost terrain.

In the areas underlain by alluvial deposits along the Hess River, the soil samples consisted of recently deposited clay, sand, silt and gravel. Also on the lower slopes, alluvial deposits from braided streams are present.

The presence of a volcanic ash layer resulted in further sampling problems. The sub-recent volcanic ash was deposited over a large part of the Yukon Territory and Alaska. The site of the crater is located approximately 540 kilometres southwest of the MV claim group at the foot of the Natazhat glacier in the Yukon Territory. Radiocarbon dating of peat overlying the ash has given ages of 1520 to 1750 years. Work by Doyle and Fletcher[1] showed that the metal content of the ash layer is much lower (by a factor of up to 10) with respect to the enclosing soil horizons. Examination of the soil samples showed that the occurrence of ash is more prevalent on the western half of the claim block. The presence of ash in the analyzed portion of the sample would result in a dilution of the actual contained metal values compared to an uncontaminated sample. The effect of volcanic ash contamination of the samples is discussed under analytical results for the various metals.

[1]Journal of Geochemical Exploration,
Vol. 4, No. 1, 1975, pg. 83.

The samples were collected in Kraft paper envelopes and sent to a commercial analytical laboratory. Standard sample preparation and geochemical analytical procedures were used by the laboratory and are outlined below. The soil samples were normally analyzed for Pb, Zn, Cu, Ag, Mo, Mn, Fe, Co and Ni. Rock samples were analyzed for Pb, Zn, and if warranted, for Ag and Ba.

Analytical Procedures for Mo,
Cu, Pb, Zn, Ag*, Ni, Co, Mn, Fe

Sample Preparation:
Soil samples are dried at 75°C and sieved to -80 mesh.
Rock samples are ground to -100 mesh.

Digestion:
A .50 gram sample is digested with dilute aqua regia in boiling water bath and diluted to 10 ml with demineralized water.

Determination:
All the above elements are determined by Atomic Absorption from the solution. *With background correction.

Geochemical Analysis of Ba:
A .100 gram sample is digested hot with NaOH and EDTA solution. The solution is analyzed for Ba by Atomic Absorption.

DISCUSSION

Analytical

The analytical data for the various elements were treated statistically. Cumulative Percent Frequency Graphs were prepared for each element (see Figures C to K and Tables I to IX) to determine background and anomalous values for each element. The results are summarized in Table X. The anomalous areas for each element were then outlined on the individual soil geochemical maps. Single station anomalies were not outlined to avoid unrealistic anomaly patterns. The anomalous areas were then examined for soil environment, bedrock geology and other element levels for evaluation. The various elements and their geochemical significance will be discussed below.

Zinc (Figure 3)

The zinc content in the soil does not correlate strongly to any soil type. In general, the analytical values of samples that were reported to contain volcanic ash were lower than surrounding non-volcanic ash samples. The amount of dilution of the samples is not determinable as the quantity of ash in the soil analyzed is not known. In some cases where volcanic ash was reported in the sample the dilution effect appears to have been negligible. Organic rich samples over the permafrost terrain do not seem to show an increased accumulation of zinc.

The major zinc anomalies are underlain by the calcareous horizon of the Road River Formation. The strongest anomaly (Zn #1) is located north of Sandpiper Lake and is coincident with other

metals which will be discussed later. Secondary zinc carbonates have been found as coatings on the rocks. The soil anomaly reflects this secondary zinc mineralization, the source of which has not yet been determined.

Lead (Figure 4)

As with zinc, lead content in soil samples with volcanic ash is lower than that in non-ash samples. This relation is very tentative with many samples showing the reverse effect. Again the dilution factor is unknown and this prevents any definitive statement on the effect of volcanic ash in any given sample.

The major lead anomaly (Pb #1) is located north of Sandpiper Lake (see Figure 4) and is coincident with the Zn #1 anomaly. The source of the lead anomaly has not been located.

Manganese (Figure 5)

In general, the high manganese values (up to 40,000 ppm) in the soil samples are directly related to the organic rich soils in permafrost areas. Some of the high manganese values appear to be not entirely caused by this environment and may be related to some other factor. The anomalous zones, designated Mn #1 and Mn #2 are underlain by the calcareous horizon of the Road River Formation and are associated (coincident?) with Pb and Zn soil geochemical anomalies. Although the soils contain, in places, up to 40% organic matter, it is felt that the association of the Mn anomalies with the other base metal anomalous zones indicate a possible relationship to primary lead-zinc sulphide mineralization.

The manganese does not appear to be acting as a scavenger of metal cations except for the metals cobalt and nickel. This characteristic of manganese was also noted by R.J. Allan and E.H.W. Hornbrook[2].

Iron (Figure 6)

The iron content does not show a marked concentration in the organic rich soils. The anomalous iron concentrations are normally underlain by pyritic fissile shale. There are some anomalous values (Line 148E, Station 27 to 28N) that are related to introduced pyrite associated with the aplitic intrusive dike at this location.

In summary, iron content reflects lithologic rock types and is not related to possible economic mineralization.

Copper (Figure 7)

The copper content in soils does not show a correlation with high organic content. The anomalous values on Line 148E, 27 to 28N are related to elevated background values in bedrock reflecting the hydrothermal effect of the aplitic intrusive.

The weak anomaly, located north of Sandpiper Lake (Cu #1) may be related to the bedrock source of the Pb-Zn anomaly. Minor

[2]Exploration Geochemistry Evaluation Study in a Region of Continuous Permafrost, N.W.T., Canada, R.J. Allan and E.H.W. Hornbrook, Geochemical Exploration, CIMM Vol. 11, 1971.

tetrahedrite was found in float in this area. Tetrahedrite nodules were found in the cherts and shales of the calcareous unit of the Road River Formation but the presence of this sulphosalt is not reflected in the soils.

Molybdenum (Figure 8)

There are two areas of molybdenum soil anomalies and a scattering of single station anomalous values. Anomaly Mo #1 is a four station anomaly on Line 148E and has Mo values up to 176 ppm. The anomaly is believed to be related to the aplitic intrusive at this locality.

Anomaly Mo #2 is located north and west of Sandpiper Lake on Lines 120, 122, 124, 126 and 128E and is associated with Pb, Zn, Mn and Cu soil geochemical anomalies. The source of the Mo soil anomaly may be related to original mineral concentrations in the calcareous shale horizon of the Road River Formation at this locality. Enhanced molybdenum values in black shales are generally attributed to sorption of molybdenum from sea water by sediments collecting in anaerobic, stagnant basins.

The single station anomalous values are underlain by pyritic fissile shale, black chert and cherty shale. On the west half of the property, the single station anomalous values may be, in part, related to the aplitic dike that cuts through this area.

Silver (Figure 9)

On the eastern half of the property there are a number of single station or line anomalies. These are underlain by black chert-cherty shale and pyritic fissile shale of the Road River

Formation with quartz veining in some localities. There are a few single station anomalies over the calcareous horizon. The line anomaly on 158E, 26N to 28N is related to the aplite dike and quartz veining in the interbedded black chert-cherty shale and carbonaceous shale.

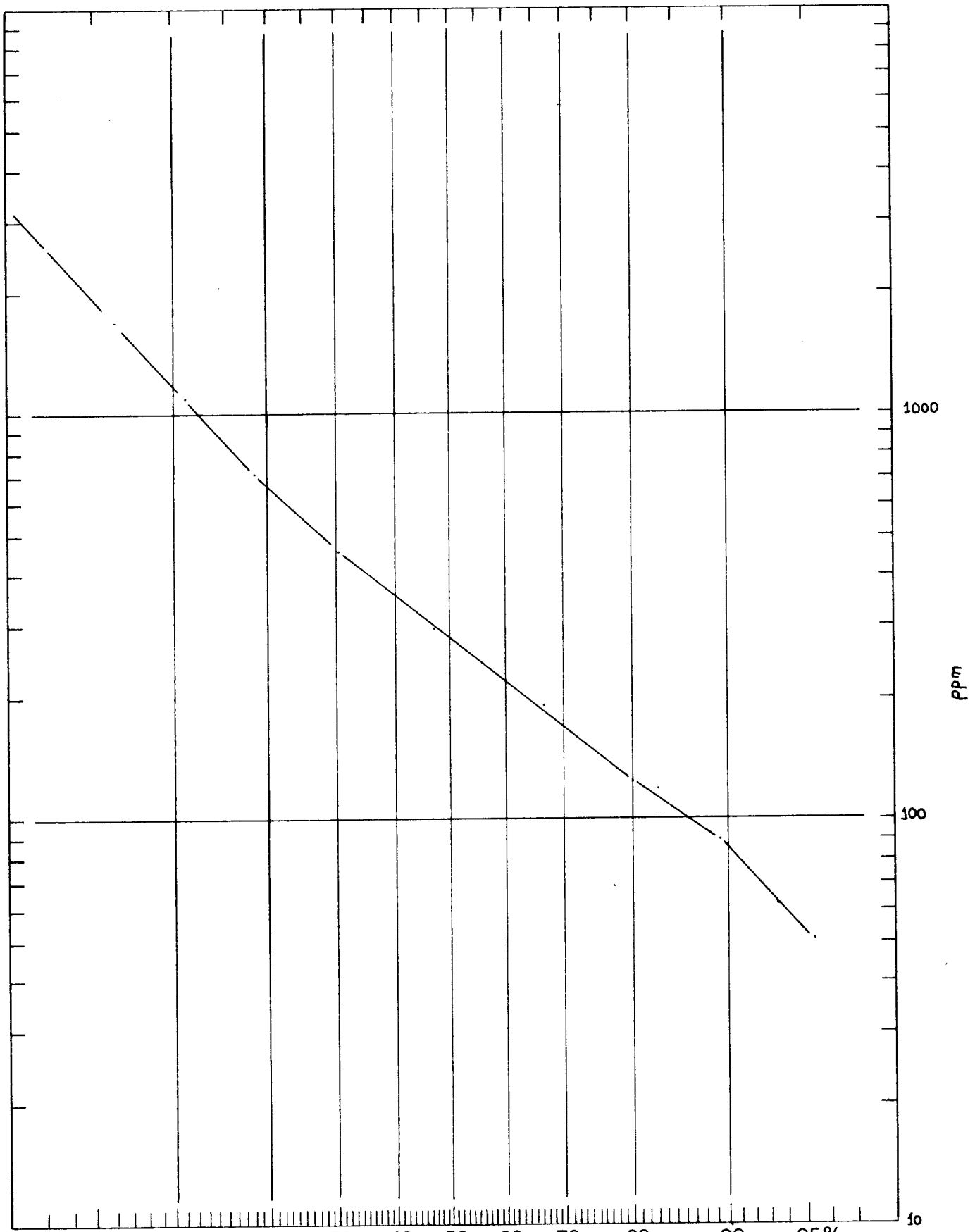
The anomalous values between lines 136E and 151+50E are probably related to accumulation and concentration in the soils over pyritic ferrous ? rocks containing trace amounts of silver. Some of the spot highs may be related to minor tetrahedrite mineralization in buried quartz calcite veins. However, the tetrahedrite mineralization near Line 148E, 19N is not reflected in the soils.

On the western half of the property numerous single station anomalies are underlain by black chert-cherty shale and pyritic fissile shale. Again there is an association with aplite dikes and Fe stained quartz veining.

In summary, it is felt that the silver anomalies reflect a higher background silver content in the pyritic rocks related either to sedimentary or hydrothermal processes and a further concentration of the silver in the overlying soils. Analyses of bedrock in some of the anomalous areas do not indicate the presence of possible economic mineralization.

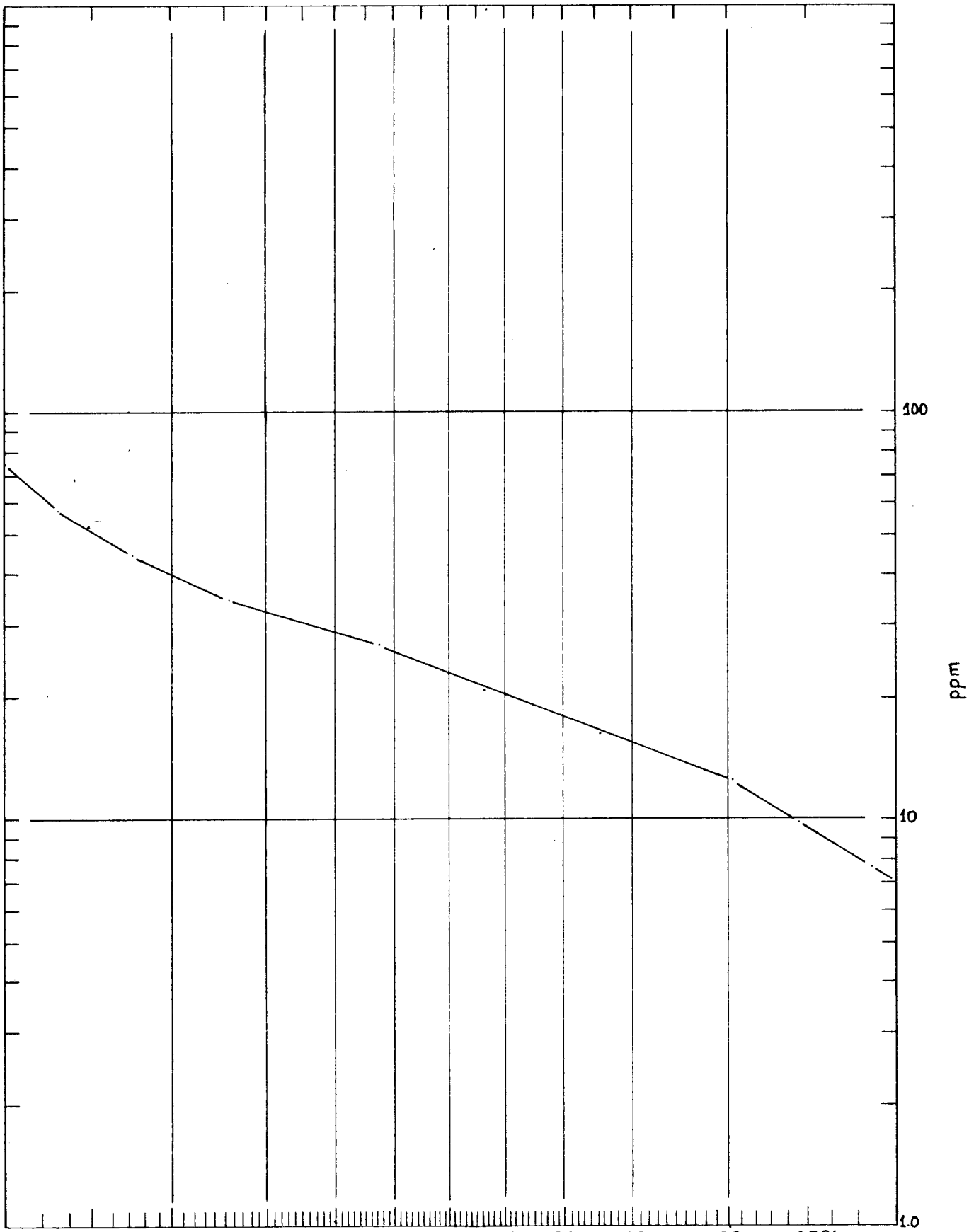
Cobalt (Figure 10)

The anomalous values (> 34.5 ppm) occur as single station anomalies and are all associated with anomalous manganese samples. The anomalous values are probably related to absorption and concentration by the Mn in the soils.



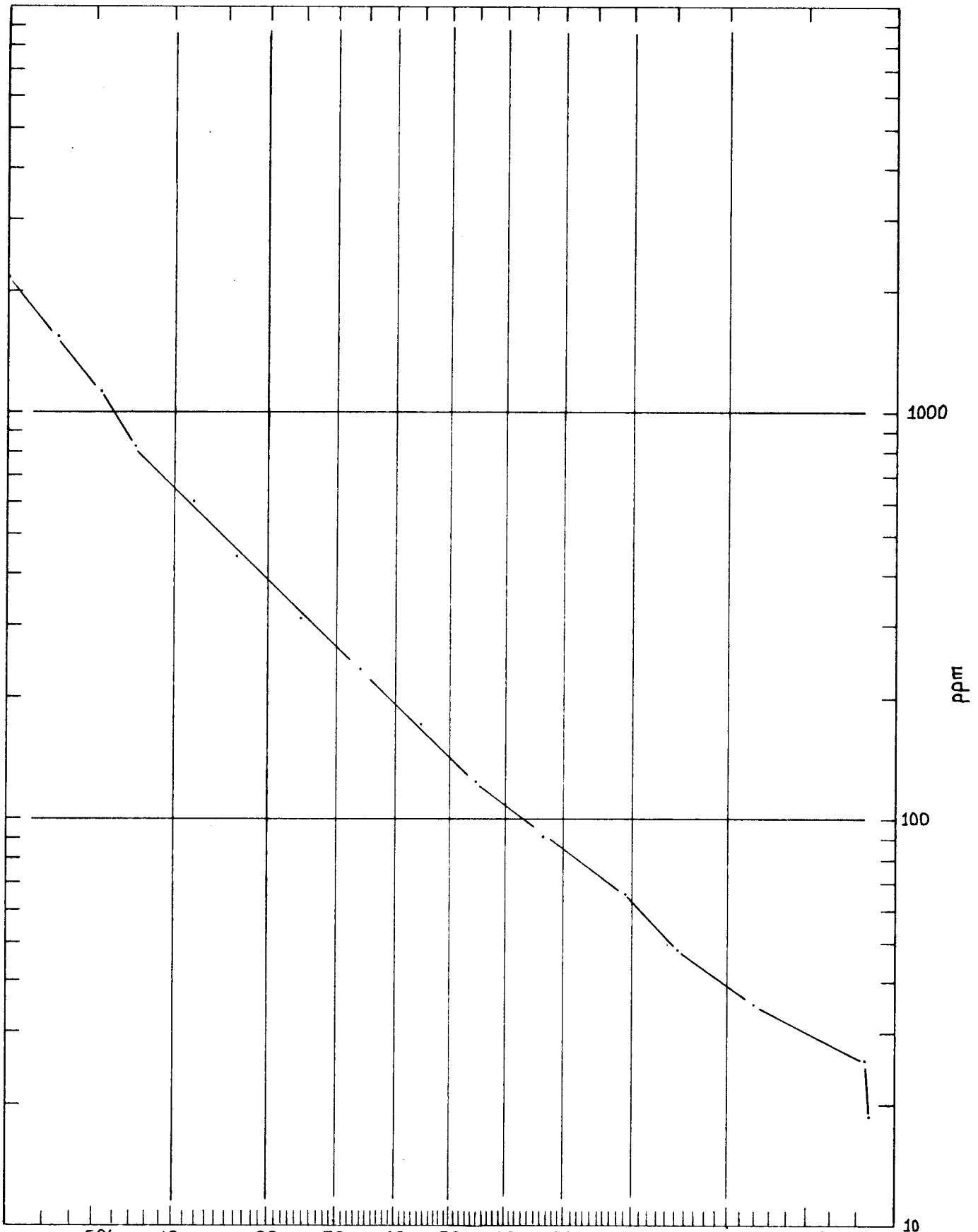
Cumulative Percent Frequency Graph
Soil Geochemistry
Zinc

Fig. C



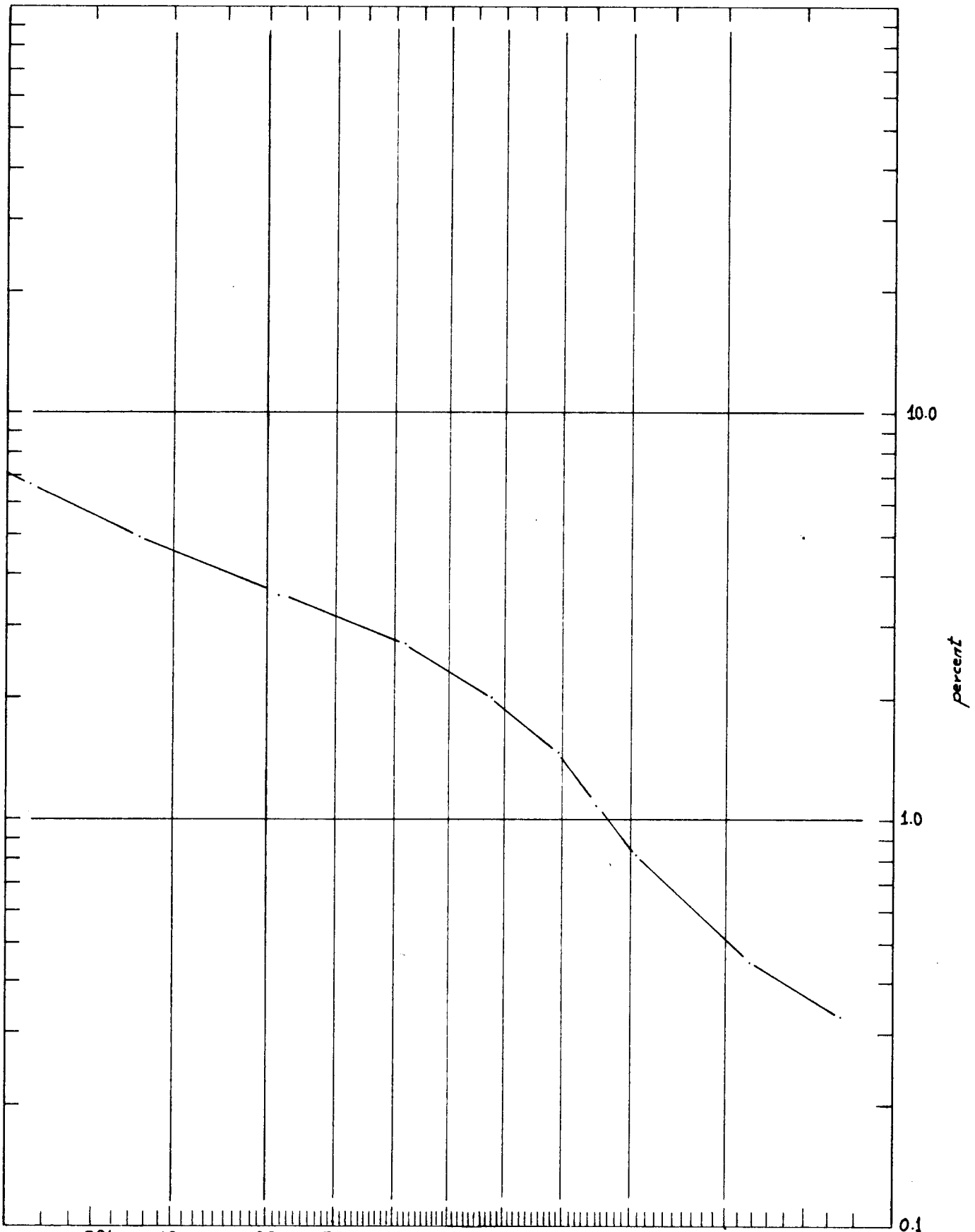
Cumulative Percent Frequency Graph
Soil Geochemistry
Lead

Fig D



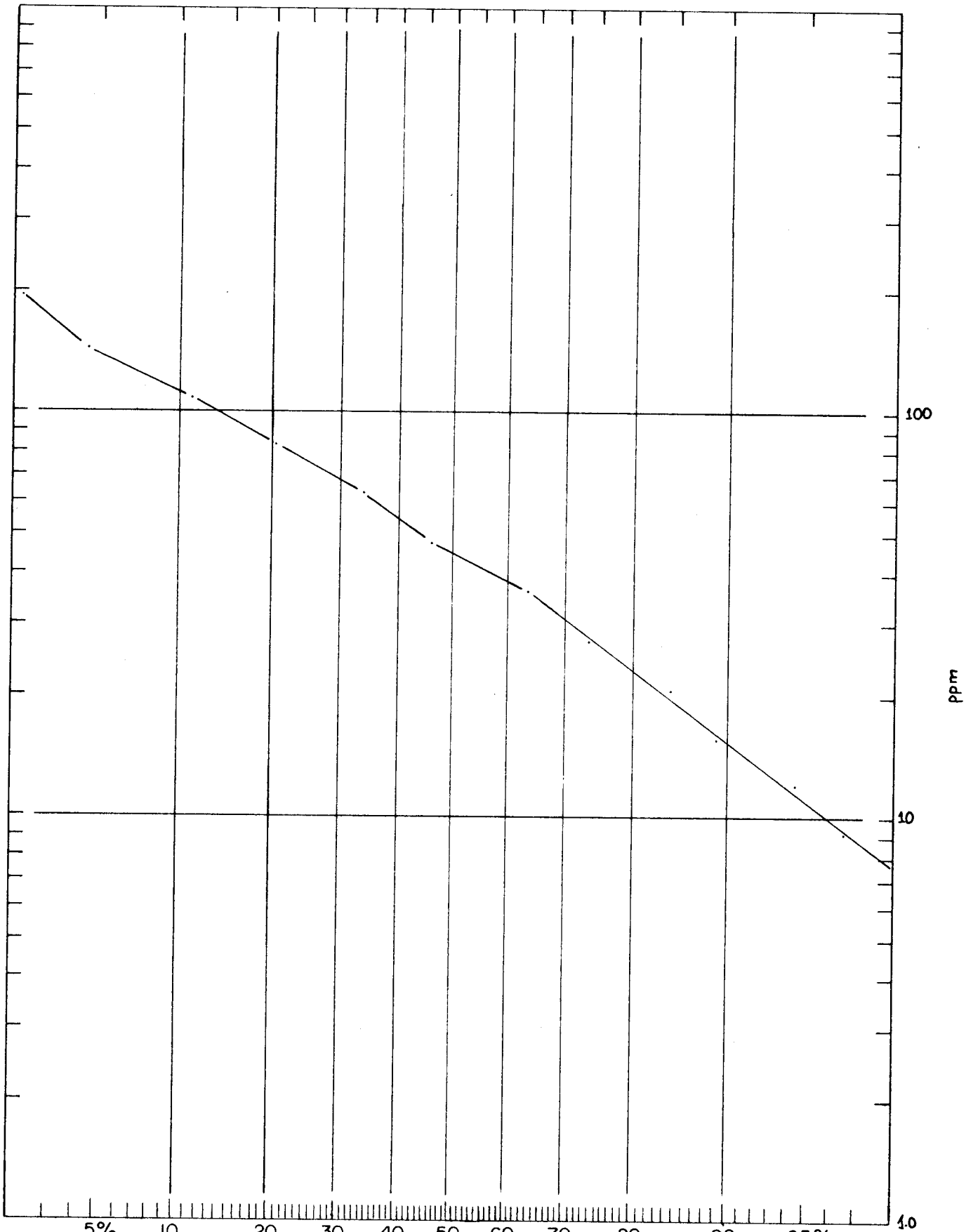
Cumulative Percent Frequency Graph
Soil Geochemistry
Manganese

Fig. E



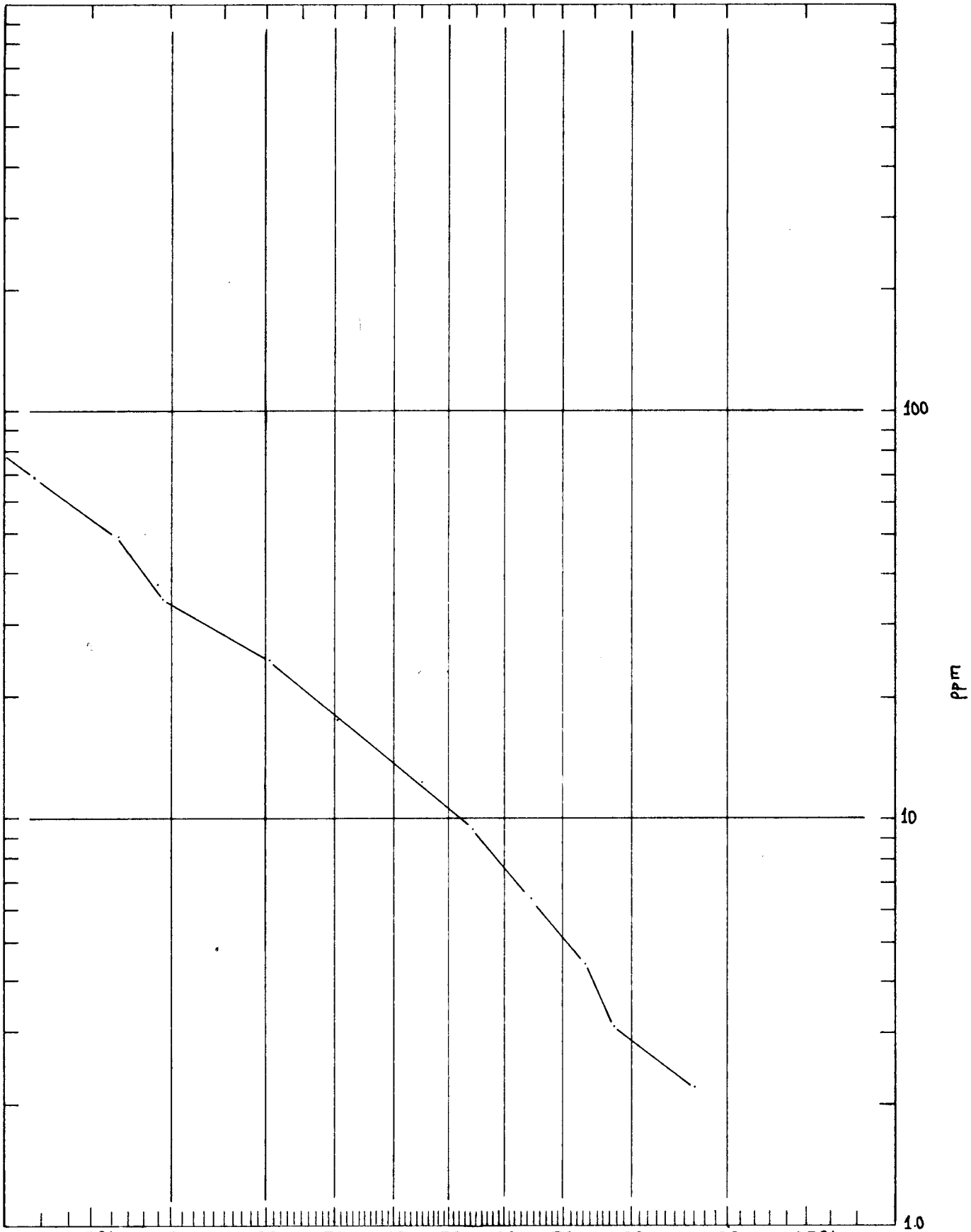
Cumulative Percent Frequency Graph
Soil Geochemistry
Iron

Fig. F



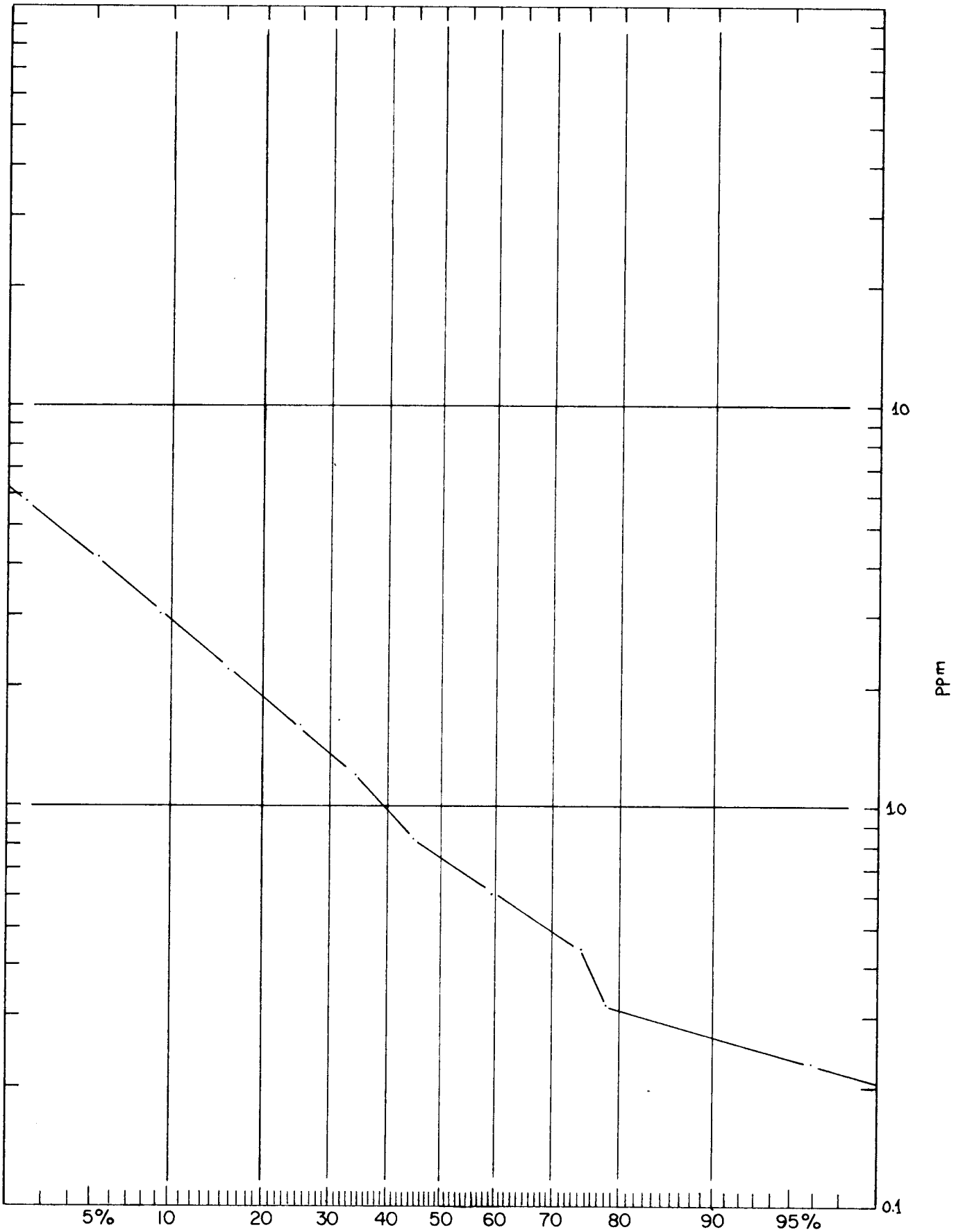
Cumulative Percent Frequency Graph
Soil Geochemistry
Copper

Fig. G



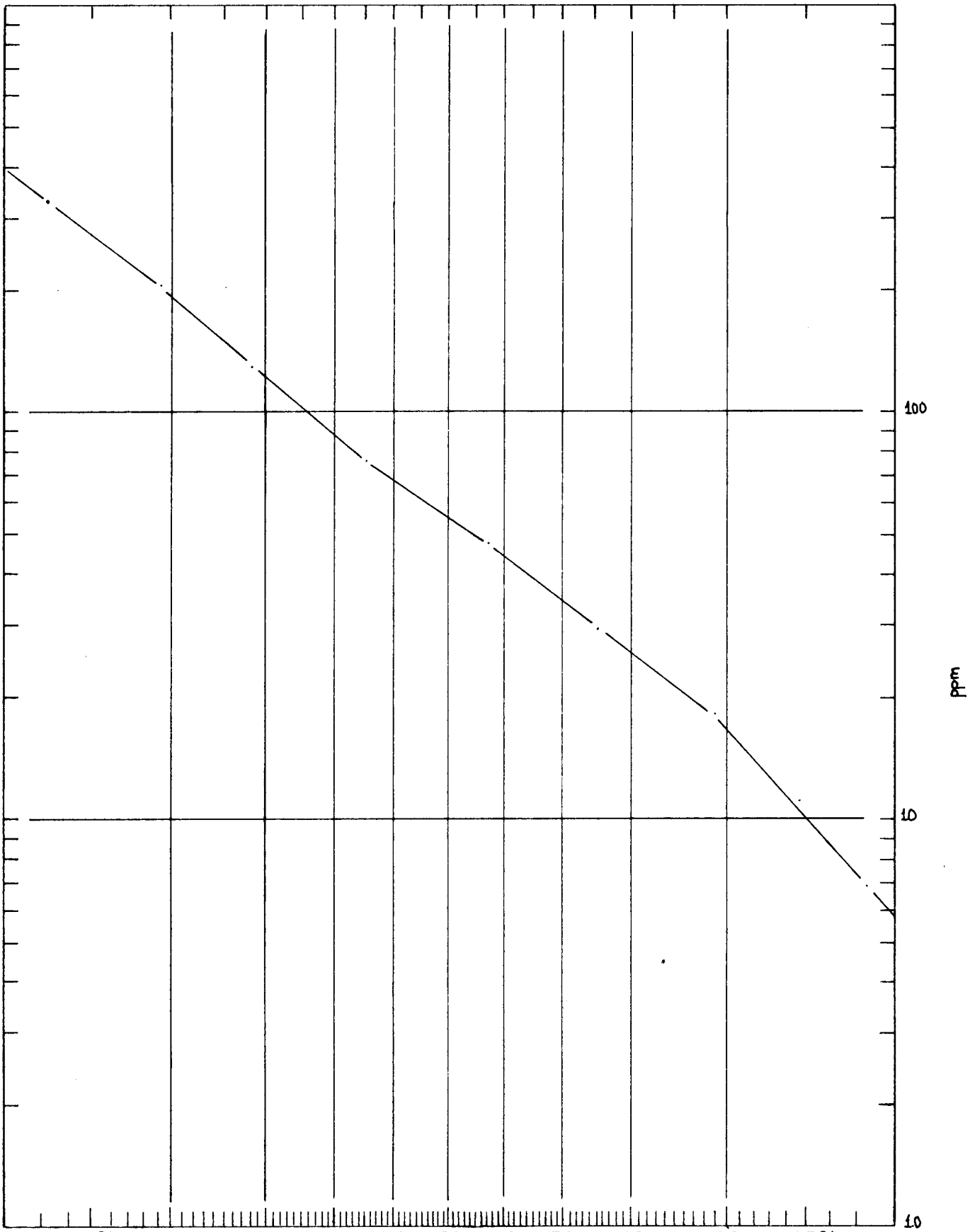
Cumulative Percent Frequency Graph
Soil Geochemistry
Molybdenum

Fig. H



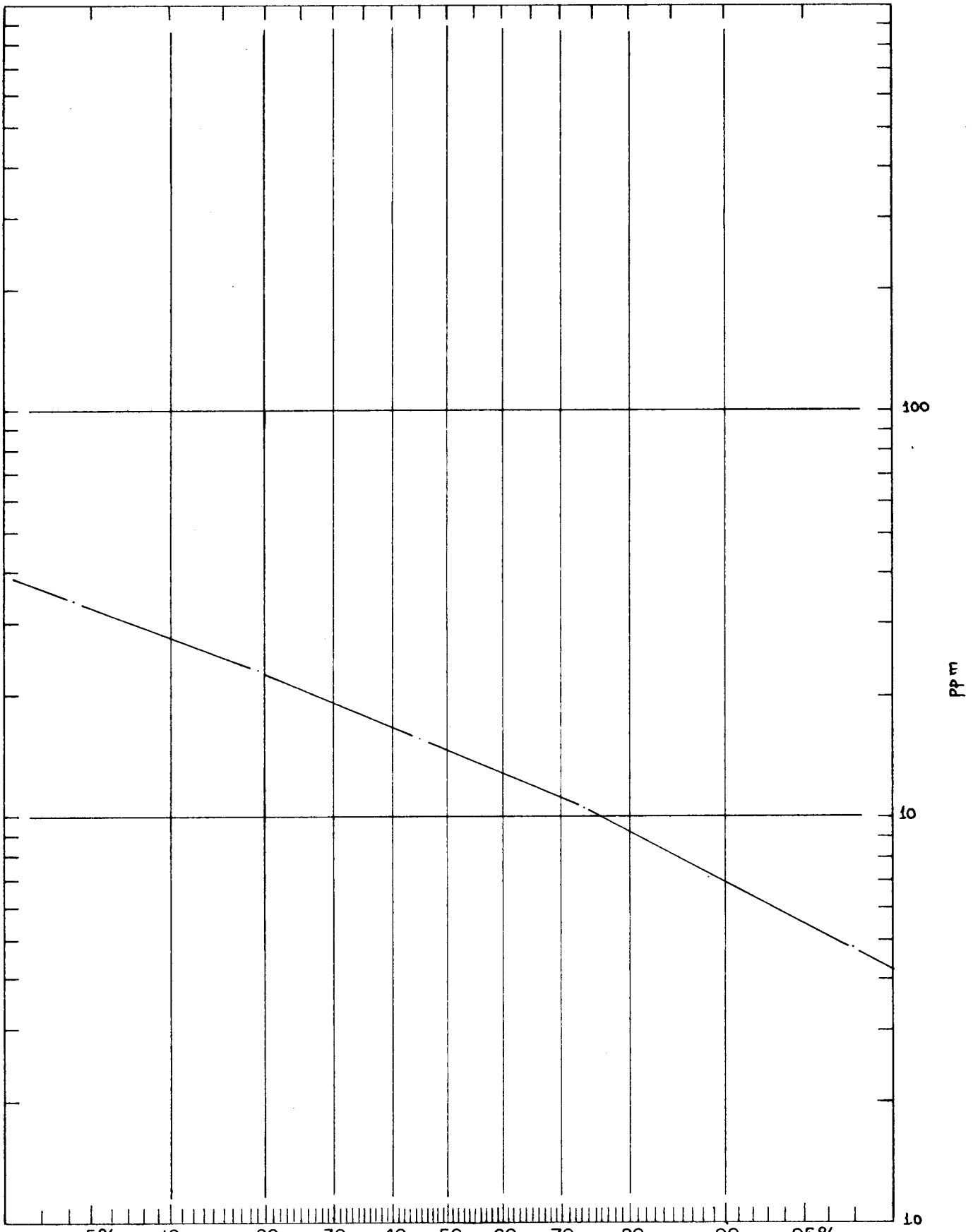
Cumulative Percent Frequency Graph
Soil Geochemistry
Silver

Fig I



Cumulative Percent Frequency Graph
Soil Geochemistry
Nickel

Fig. J



Cumulative Percent Frequency Graph
Soil Geochemistry
Cobalt

Fig. K

TABLE I

FREQUENCY DATA FOR ZINC SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = 0.19 N = 1882

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
4.37	23442.3	1	.05	.05
4.18	15135.6	2	.11	.16
3.99	9772.4	2	.11	.27
3.80	6309.6	5	.27	.54
3.61	4073.8	13	.69	1.23
3.42	2630.2	34	1.81	3.04
3.23	1698.2	57	3.03	6.07
3.04	1096.5	91	4.84	10.91
2.85	707.9	139	7.39	18.30
2.66	457.1	223	11.85	30.15
2.47	295.1	3.6	16.79	46.94
2.28	190.5	376	19.98	66.92
2.09	123	247	13.12	80.04
1.90	79.4	173	9.19	89.23
1.71	51.3	115	6.11	95.34
1.52	33.1	52	2.76	98.08
1.33	21.4	21	1.12	99.20
1.14	13.8	11	.58	99.78
0.95	8.91	4	.21	99.99

TABLE II

FREQUENCY DATA FOR LEAD SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = .21 N = 1934

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
2.31	204.2	3	.16	.16
2.20	158.5	3	.16	.32
2.09	123.0	6	.31	.63
1.98	95.5	12	.62	1.25
1.87	74.1	15	.78	2.03
1.76	57.5	32	1.65	3.68
1.65	44.7	68	3.52	7.20
1.54	34.7	162	8.38	15.58
1.43	26.9	425	21.98	37.56
1.32	20.9	360	18.61	56.17
1.21	16.2	372	19.23	75.4
1.10	12.6	289	14.94	90.34
.99	9.8	83	4.29	94.63
.88	7.6	53	2.74	97.37
.77	5.9	15	.78	98.15
.66	4.6	28	1.45	99.60
.54	3.5	1	.05	99.65
0.32	2.1	6	.31	99.96
0.11	1.3	1	.05	100.01

TABLE III

FREQUENCY DATA FOR MANGANESE SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = 0.14 N = 1932

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
5.15	14125.4	5	.26	.26
4.01	10327.6	3	.16	.42
3.88	7533.6	2	.10	.52
3.74	5495.4	3	.16	.68
3.60	4008.7	6	.31	.99
3.47	2924.2	8	.41	1.4
3.33	2133.1	12	.62	2.02
3.19	1555.9	27	1.40	3.42
3.06	1135.1	33	1.71	5.13
2.92	827.9	38	1.97	7.10
2.78	603.9	89	4.61	11.71
2.64	440.6	83	4.30	16.01
2.51	321.4	163	8.44	24.45
2.37	234.4	185	9.50	34.03
2.23	171	208	10.77	44.80
2.10	124.7	195	10.09	54.89
1.96	90.9	232	12.06	66.95
1.82	66.4	234	12.11	79.06
1.68	48.4	120	6.21	85.27
1.55	35.3	130	6.73	92.00
1.41	25.8	100	5.18	97.18
1.27	18.8	3	.16	97.34
1.14	13.7	53	2.74	100.08

TABLE IV

FREQUENCY DATA FOR IRON SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = 0.13 N = 1889

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
1.34	21.88	1	.05	.05
1.21	16.22	1	.05	.10
1.08	12.02	2	.11	.21
.95	8.91	9	.48	.69
.82	6.61	37	1.96	2.65
.69	4.90	94	4.98	7.63
.56	3.63	266	14.08	21.71
.43	2.69	384	20.33	42.04
.30	1.99	302	15.99	58.03
.17	1.47	225	11.91	69.94
.04	1.09	96	5.08	75.02
- .09	0.81	110	5.82	80.84
- .22	.60	136	7.20	88.04
- .35	.45	74	3.92	91.96
- .48	.33	84	4.45	96.41
- .61	.25	59	3.12	99.53
- .74	.18	-	-	99.53
- .87	.13	9	0.48	100.01

TABLE V

FREQUENCY DATA FOR COPPER SOIL GEOCHEMISTRY
PROPERTY: M V CLAIMS

Log_{10} Interval = 0.12 N = 1833

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
2.76	575.44	2	.11	.11
2.64	436.52	2	.11	.22
2.52	331.13	4	.22	.44
2.40	251.19	11	.60	1.04
2.28	190.55	20	1.09	2.13
2.16	144.54	43	2.35	4.48
2.04	109.65	121	6.60	11.08
1.92	83.18	169	9.22	20.30
1.80	63.10	251	13.69	33.99
1.68	47.86	221	12.06	46.05
1.56	36.31	323	17.62	63.67
1.44	27.54	188	10.26	73.93
1.32	20.89	197	10.75	84.68
1.20	15.85	81	4.42	89.1
1.08	12.02	98	5.35	94.45
0.96	9.12	39	2.13	96.58
.84	6.92	35	1.91	98.49
.72	5.25	24	1.31	99.8
.60	3.98	-	-	99.8
.48	3.02	4	0.22	100.02

TABLE VI

FREQUENCY DATA FOR MOLYBDENUM SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = 0.15 N = 1797

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
2.29	194.9	4	.22	.11
2.14	138.1	11	.61	.83
1.99	97.7	18	1.00	1.83
1.84	69.2	18	1.00	2.83
1.69	48.9	47	2.62	5.45
1.54	34.7	69	3.84	9.29
1.39	24.6	202	11.24	20.53
1.24	17.4	177	9.85	30.38
1.09	12.3	270	15.03	45.41
0.94	8.7	160	8.90	54.31
0.79	6.2	190	10.57	64.88
0.64	4.4	159	8.85	73.73
0.49	3.1	74	4.12	77.85
0.34	2.2	166	9.24	87.09
0.19	1.6	232	12.91	100.00

TABLE VII

FREQUENCY DATA FOR SILVER SOIL GEOCHEMISTRY

PROPERTY: MV CLAIMS

Log_{10} Interval = 0.14 N = 1764

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
1.32	20.9	1	.06	.06
1.18	15.1	1	.06	.12
1.04	10.9	7	.40	.52
.90	7.9	15	.85	1.37
.76	5.8	21	1.19	2.56
.62	4.2	48	2.72	5.28
.48	3.02	68	3.85	9.13
.34	2.2	117	6.63	15.76
.20	1.6	168	9.52	25.28
0.06	1.2	162	9.18	34.46
-0.08	.83	185	10.49	44.95
-0.22	.60	255	14.46	59.41
-0.36	.44	271	15.36	74.77
-0.50	.32	60	3.40	78.17
-0.64	.23	314	17.80	95.97
-0.78	.17	71	4.02	99.99

TABLE VIII

FREQUENCY DATA FOR NICKEL SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = .21 N = 1763

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
3.26	1819.7	1	.06	.06
3.15	1412.5	3	.17	.23
2.94	870.9	5	.28	.51
2.73	537.0	15	.85	1.36
2.52	331.1	33	1.87	3.23
2.31	204.2	107	6.07	9.3
2.10	125.9	157	8.91	18.21
1.89	77.6	299	16.96	35.17
1.68	47.9	392	22.23	57.4
1.47	29.5	319	18.09	75.49
1.26	18.2	239	13.56	89.05
1.05	11.2	101	5.73	94.78
0.84	6.9	45	2.55	97.33
0.63	4.3	34	1.93	99.26
0.42	2.6	12	.68	99.94
0.21	1.6	1	.06	100.00

TABLE IX

FREQUENCY DATA FOR COBALT SOIL GEOCHEMISTRY
PROPERTY: MV CLAIMS

Log_{10} Interval = 0.17 N = 1800

Interval				
Log_{10}	Arithmetic	N	Class %	Cumulative %
2.55	354.8	1	.06	.06
2.38	239.9	-	-	.06
2.21	162.2	-	-	.06
2.04	109.6	4	.22	.28
1.87	74.1	3	.17	.45
1.70	50.1	13	.72	1.17
1.53	33.9	55	3.06	4.23
1.36	22.9	266	14.78	19.01
1.19	15.5	468	26.00	45.01
1.02	10.5	518	28.78	73.79
.85	7.1	266	14.78	88.57
.68	4.8	151	8.39	96.96
.51	3.2	11	.61	97.57
.34	2.2	39	2.17	99.74
.17	1.5	5	.28	100.02

TABLE X

STATISTICAL ANALYTICAL RESULTS

SOIL GEOCHEMISTRY

Metal	Inflection Point(s)	Category
Zn	700 ppm	Anomalous
Pb	44 ppm	Anomalous
Mo	34.5 ppm	Anomalous
Cu	145 ppm	Anomalous
	94 145 ppm	Possibly Anomalous
Ag	4.2 ppm	Anomalous
	2.2 4.2 ppm	Possibly Anomalous
Mn	700 ppm	Anomalous
Fe	4.5%	Anomalous
Co	33 ppm	Anomalous
Ni	270 ppm	Anomalous
	145 270 ppm	Possibly Anomalous

Nickel (Figure 11)

The anomalous nickel values in the soils are correlatable with high manganese values. The anomalous nickel values are a result of concentration as the result of absorption by manganese oxides and are not related to significant sulphide mineralization.

Ptarmigan Creek Area (Figure 13)

In this area, on the western half of the property, a geochemical phenomenon is present that warrants further discussion. Stream silt sampling analytical results were one of the main reasons for the staking of the property in late 1977. The original silt samples and re-samples outlined a creek highly anomalous in zinc. The zinc values ranged from 1750 to 21,000 ppm. The associated lead values were low (5 to 12 ppm).

In September of 1977, the claim lines were soil sampled with a 50 metre sample spacing. Soil sample results from claim line D (see Figure) which runs down through the anomalous creek, also showed a zone of high zinc values (880 to 16,000 ppm) with low lead values (5 to 15 ppm).

In June, 1978 Line D was re-sampled on a 25 metre sample spacing and the analytical results showed a fairly good correlation with the 1977 values. During the re-sampling it was noted that the sample sites from 15+00S to 16+75S were all located very close to the stream channel and were in the broad gentle stream depression.

Late in 1978, a grid was established over this area. Soil samples were collected on lines 200 metres apart with a sample spacing of 50 metres. The analytical results of the samples

from Lines 76E and 78E which are located on either side of Line D, did not, with one exception, correlate with the anomalous values. The only correlative sample was from station 72+50N Line 78E where the sample obtained was an organic silt sample rather than a soil sample and was within 5 metres of the 1977 stream silt location M801.

Discussion

The anomalous stream silt values and "soil" values (on Line D) are probably related to hydromorphic and pH changes in the stream depression. The silt anomaly starts where the water comes to the surface in the depression. The anomalous "soils" on Line D are considered to be more of silts in nature than soils.

Bedrock geology is poorly exposed in the area and the underlying geology has been determined mainly from rock fragments in the soil sample pits and poorly exposed outcrop. The area is underlain primarily by grey-brown weathering pyritic fissile shale of the Road River Formation with minor black chert and cherty shale. A weakly calcareous pyritic fissile shale unit can be projected to a location just north of the 1977 silt station number 1000. The profile of analytical values in the stream depression shows a decrease in zinc values with increasing distance downstream from the silt sample station number 1000. The silt samples upstream from the projected location of the calcareous pyritic shale unit contain much lower amounts of zinc by a factor of greater than 100. Therefore, the calcareous zone may be contributing to the zinc phenomenon in two ways:

1. The carbonate in the zone may be sufficient to raise the pH of the stream to a neutral or alkaline state

which would result in precipitation of zinc cations from the emerging groundwater.

2. The calcareous horizon may be supplying some of the zinc to the anomalous silts.

The low metal values in adjacent sample lines demonstrate that there is no lateral continuation of the anomaly and suggests that if the calcareous unit is a bedrock source for the zinc, the mineralization is very restricted.

It is more likely that the zinc anomaly located between lines 76E and 78E is a hydromorphic anomaly. The cause of the anomaly, although not provable with the available data, is believed to be a pH change from acid to alkaline where the creek water encounters the calcareous bedrock resulting in precipitation and concentration of zinc from solution. The water carrying the zinc will have passed through shales containing background amounts of zinc.

Rock Geochemistry (Figure 12)

In order to obtain data on metal background content, representative samples of the various lithologies were collected from outcrop and rock fragments in soil sample pits. The samples were analyzed for lead and zinc and where warranted, copper, silver and barium. Three basic lithologies were analyzed:

1. black chert-cherty shale,

2. pyritic fissile shale,

3. calcareous shale.

The samples were subdivided, based on lithology, and the averages for lead and zinc content were determined. The analytical data for the various lithologies are shown in Tables XI to XIII and the averages are shown in Table XIV.

Discussion

The analytical results of the rock geochemistry samples indicate that the lithologies of the calcareous unit contain elevated amounts of lead and zinc. This includes the calcareous shale and limestone as well as the black chert-cherty shale samples that were obtained from the calcareous unit. The elevated zinc values are, in part, related to zinc bearing white secondary carbonate coatings. The primary source of the zinc has not been determined. It could possibly be related to weathering and release of zinc from rocks with high background values and "fixing" in a carbonate environment. The other possible source is primary sulphide mineralization that is not exposed.

Barium analyses were done on the majority of samples obtained from the calcareous unit and indicate that the rocks contain moderately high background quantities of barium. Regional mapping has shown that this stratigraphic level does contain barite mineralization in places. Samples containing minor tetrahedrite mineralization have only slightly elevated amounts of copper and silver.

Rock samples obtained from areas with anomalous silver values in soils contain appreciably less quantities of the metal. This supports the hypothesis that the elevated silver values in the soils are related to concentrations by soil forming processes and not to sulphide mineralization of possible economic worth.

During the field season, a visit was made to the Placer-Essex XY deposit at Howard's Pass. While on the visit, representative rock chip samples were collected from the "Howard's Pass Formation". These were later analyzed for Pb, Zn and Ba to obtain information on the amounts of contained metals in a section of the Road River Formation containing known lead-zinc mineralization. The analytical results of these samples are shown in Table XV. It was hoped that these analyses would provide "fingerprint" data that could be used as a "standard" reference for evaluating other similar correlative stratigraphic sections of the Road River Formation. However, it can be seen from the results the metal content of the immediately overlying rocks does not reflect proximity to massive lead-zinc mineralization.

Respectfully Submitted

KBMcHale

KBMcHale

TABLE XI

ROCK GEOCHEMISTRY

MAIN LITHOLOGY: CALCAREOUS SHALE-LIMESTONE

PROPERTY: MV CLAIMS

Sample Number	Lithology	Pb ppm	Zn ppm	Ag ppm	Ba ppm	Cu ppm
3146	Calcareous shale, fragments in soil pit.	90	250	.4		
3145	Black calcareous shale-shaly limestone.	36	270	.4		
3144	White carbonate that occurs as very thin bands in shale.	96	58	.2		
25026	Grey limestone with calcite vein with minor tetrahedrite, malachite and quartz.	16	630	8.2	1800	1140
25013	Dark grey fine crystalline fetid limestone, cut by narrow quartz vein with minor tetrahedrite, sphalerite, smithsonite.	36	470			
7074	Calcareous "gossanous" fragments from soil pit.	28	194			
25030	Dark grey limestone, minor interbedded shale, calcite with minor malachite, azurite and smithsonite.	11	1800	1.6	-	108
25031	Interbedded limestone, shale, fissile shale and cherty shale; minor azurite, hydrozincite.	7	900	.7	-	102
25039	Limestone.	46	370	3.2	1200	390
25041	Calcareous shale-limestone and chert.	14	2450	1.2	3400	62
7068	Calcareous carbonaceous shale.	26	168			
7070	Dark grey calcareous shale.	36	500			
25038	Calcareous shale, minor black cherty shale.	12	1360	.7	2700	40
25040	Calcareous shale, minor black cherty shale.	14	2300	1.0	1300	62

TABLE XII

ROCK GEOCHEMISTRY

MAIN LITHOLOGY: PYRITIC FISSILE SHALE

PROPERTY: MV CLAIMS

Sample Number	Lithology	Pb ppm	Zn ppm	Ag ppm	Ba ppm	Cu ppm
25004	Medium-dark grey pyritic fissile shale.	10	230			
25008	Dark grey-black shale; disseminated and bands of pyrite; contact with dike.	36	90			
25012	Medium grey shale with pyritic silty interbeds, bands of quartz sandstone.	12	28			
25014	Dark grey fissile shale; moderate Fe staining.	18	35			
25018	Pyritic fissile shale with dolomite band with c.g. pyrite.	36	38			
25020	Grey pyritic shale.	10	48			
25023	Pyritic fissile shale.	7	88			
25025	Pyritic fissile shale.	4	200			
25027	Black pyritic shale-siltstone, abundant limonite filled pits and cavities.	14	120			
25028	Light grey-yellow orange brown fissile shale; minor thin bands of black chert.	74	14			
25054	Grey pyritic fissile shale.	6	142			
25082	Grey finely laminated siltstone-shale.	10	40			
25083	Medium-dark grey finely laminated pyritic shale.	10	30			
3119	Dark grey pyritic fissile shale, minor black cherty shale.	30	80	1.4		
3123	Grey pyritic fissile shale, calcareous along cleavage.	22	134	.1		

Sample Number	Lithology	Pb ppm	Zn ppm	Ag ppm	Ba ppm	Cu ppm
3142	Grey pyritic fissile shale with quartz vein breccia.	350	62	6.6		
3143	Green grey pyritic fissile shale.	22	40	.2		
3149	Dark grey pyritic carbonaceous shale and minor black cherty shale.	26	130	.4		
3148	Black-dark grey non calcareous shale.	19	132	.2		
25003	Grey pyritic shale.	10	128			
25019	Calcareous grey shale.	16	132			
7075	Grey shale.	32	118			
7076	Grey fissile shale.	14	96			
7061	Pyritic fissile shale.	42	106			
7060	Grey pyritic shale.	24	124			
7053	Pyritic fissile shale.	78	215			
7089	Pyritic fissile shale, rock fragments in soil pit.	44	440			
7054	Black carbonaceous shale, rock fragments in soil pit.	32	450			
7071	Grey-green grey pyritic fissile shale.	16	110			
25081	Grey pyritic fissile shale, minor dark grey limestone.	22	68			
24780	Pyritic fissile shale.	1	175			

TABLE XIII

ROCK GEOCHEMISTRY

MAIN LITHOLOGY: CHERT AND CHERTY SHALE

PROPERTY: MV CLAIMS

Sample Number	Lithology	Pb ppm	Zn ppm	Ag ppm	Ba ppm	Cu ppm
25011	Black cherty shale, porous py. nodules up to 3 cm.	30	74			
25017	Black pyritic cherty shale.	26	84	-	1320	-
*7062	Black chert, limestone, white carbonate coating; +ZnO.	24	790			
*7059	Black chert-cherty shale with white carbonate coating; +ZnO.	114	1400			
7055	Thin bedded black cherty shale.	94	600			
7057	Black chert-cherty shale, thin bedded, minor Fe staining	182	215			
7072	Black chert-cherty shale fragments in soil pit.	10	780			
*7056	Black chert-cherty shale; white carbonate coating, +ZnO.	12	1650			
3122	Black cherty shale and black shale, fragments in soil pit.	12	70	.7		
3121	Black cherty shale with minor Fe stained quartz veining.	26	12	.1		
3120	Black cherty shale, minor brown fissile shale; fragments in soil pit.	12	10	.9		
*25032	Thin bedded shale, cherty shale and chert, +ZnO.	8	1100	1.2	-	52
*25033	Fissile shale, white carbonate coating.	11	3500	1.0	1600	82
*25034	Shale, white carbonate coating.	12	1900	1.1	2400	110
*25035	Interbedded chert-cherty shale and limestone, moderate to strong rusty brown Fe staining.	11	2250	1.2	1600	92

Sample Number	Lithology	Pb ppm	Zn ppm	Ag ppm	Ba ppm	Cu ppm
*25036	Interbedded chert-cherty shale and limestone, moderate to strong rusty brown Fe staining.	12	1420	.8	2400	60
*25037	Interbedded chert-cherty shale and limestone.	12	2150	1.1	2100	56
*25042	Black chert-cherty shale.	13	1820	1.4	1400	64
*25043	Cherty shale.	12	1280	1.2	1000	78
*25044	Cherty shale.	17	2150	1.4	2200	92
*25045	Fissile cherty shale.	17	1450	1.0	1500	70
*25046	Well bedded calcareous cherty shale, moderate white carbonate coating; +ZnO.	18	1360	1.2	1800	68
*25047	Calcareous cherty shale.	13	1940	1.5	1300	112
*25048	Fissile cherty shale.	14	1540	1.9	1800	110
24778	Calcareous shale and cherty shale.	1	175			
24777	Calcareous shale and cherty shale.	1	142	-	1600	
7058	Black chert, limestone; white carbonate coating, +ZnO.	16	625			

*Sample from calcareous unit.

TABLE XIV

SUMMARY OF PB-ZN ROCK GEOCHEMISTRY

MV CLAIMS

Lithology	N	Average Pb ppm	Average Zn ppm
Pyritic fissile shale	30	23.2	126
Chert-cherty shale	27	27.0	1129.1
Calcareous shale-limestone	14	33.4	837.1

TABLE XV

MAIN LITHOLOGY "HOWARD'S PASS FORMATION"

PROPERTY: XY CLAIMS, HOWARD'S PASS

Sample Number	Unit and Lithology	Pb ppm	Zn ppm	Ba ppm
25088	Upper siliceous dark grey limestone	68	60	540
25087	Upper siliceous black cherty shale with limestone lenses and beds	24	90	400
25085	Upper siliceous black cherty shale with zinc carbonate coatings	320	900	300
25086	Active zone (top) mudstone-limestone with zinc carbonate coatings	62	730	420
25084	Active zone calcareous mudstone shale	40	540	460

APPENDIX I

PERMAFROST

Permafrost is defined exclusively on the basis of temperature. It refers to the condition of earth materials, such as soil, clay, silt, gravel, peat and rock, when their temperature remains continuously below $0^{o}C$. Permafrost includes ground which freezes in one winter and remains frozed through the following summer and into the next winter.

The permafrost region of the Earth is divided into two zones, continuous and discontinuous (see Figure 11-1). The division between these two zones is set at the $-5^{o}C$ isotherm of mean annual ground temperature, measured just below the zone of seasonal variation (depth of zero annual amplitude). The profile for the two zones are shown in Figure 11-2 and 11-3.

In the southern parts of the discontinuous zone, permafrost occurs in scattered patches and is confined to certain types of terrain. The most prevalent is peatland, north facing slopes, forested areas where increased shading from summer thawing and reduced snow cover enhance permafrost development. Permafrost in the discontinuous zone varies in thickness from a few centimetres to metres at the boundary of the continuous zone. Unfrozen ground is found below all permafrost regardless of its thickness.

Variations in permafrost are governed predominantly by local variations in microclimate, and such features of terrain as relief, vegetation, drainages, snow cover and soil type.

The active layer is that area above the permafrost table which is subject to annual freezing and thawing. Its thickness is governed by factors such as type of cover, and is thinnest where a blanket of moss and vegetation provide insulation.

Permafrost does not act as an impermeable barrier to water movement. Acid leaching is likely to be strong and in some cases because of the low pH resulting from decaying organic materials, the pH of soils can be as low as 3.5.

It is possible to have a great variation in geochemical values in permafrost terrain because of flushing (see Figure 11-7).

The iron sulphates melanterite, $FeSo_4.7H_2O$, and fibroferrite, $FeSO_4(OH).5H_2O$, are stable mineral phases in the permafrost environment.

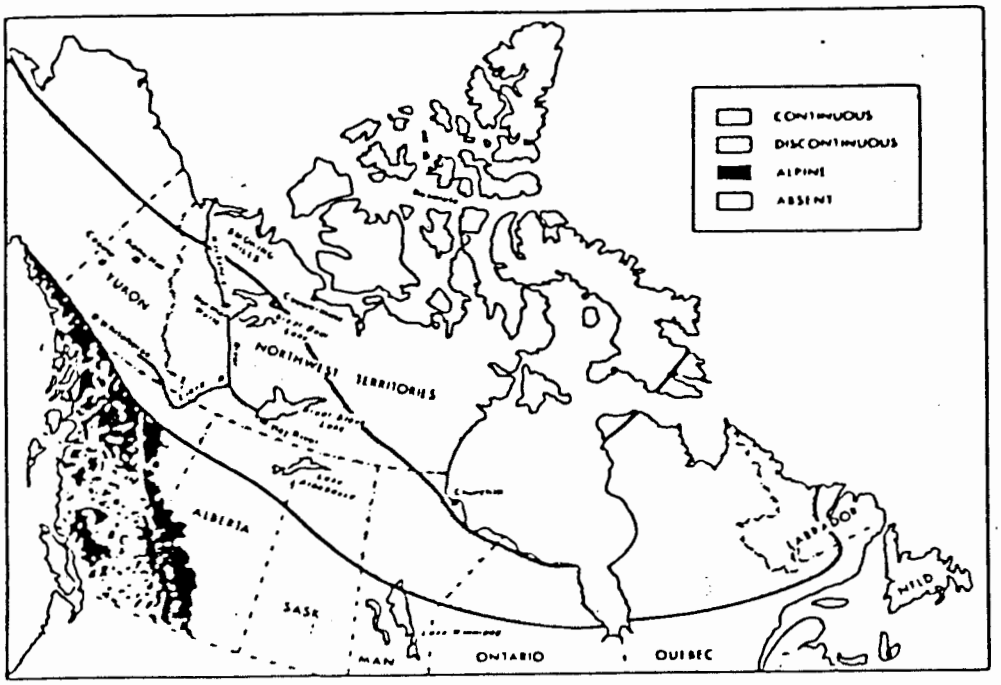


Fig. 11-1. Permafrost areas of Canada and Alaska. In British Columbia, the alpine permafrost areas indicated are at high altitudes (approximately 4800 ft at the Yukon border, and 7200 ft in the south). Not shown are patches of permafrost, for example in Saskatchewan, which are south of the permafrost limit, and mainly restricted to the drier portions of peatlands and peat bogs. Based mainly on R. J. E. Brown (1967).

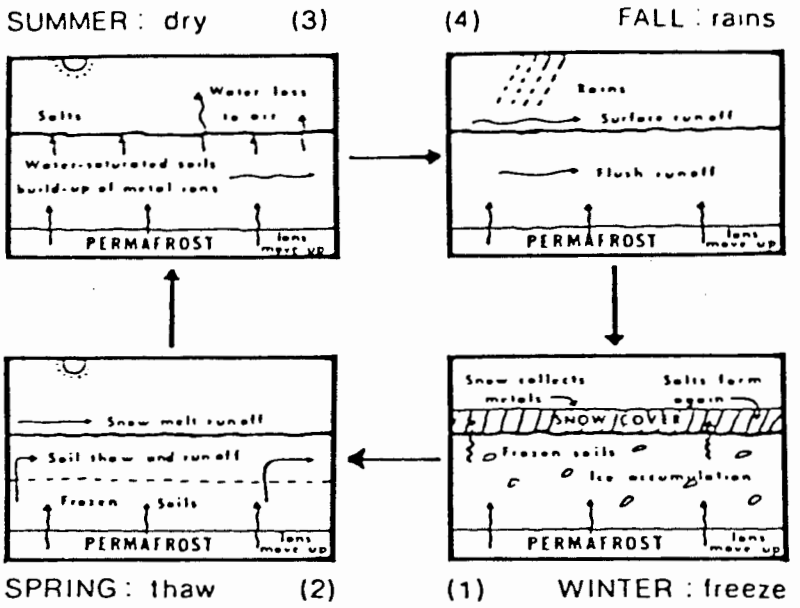


Fig. 11-7. Explanation of metal migration in permafrost. The basic process by which ions move upwards is probably ionic diffusion in solution. There is sufficient moisture in permafrost to allow capillary type migration to take place. (1) In winter the advance of the freeze front down from the surface and up from the permafrost causes metal cations (and anions) to concentrate in the frozen soil and subsequently to be moved to the surface where carbonate and sulfate crusts may form. The metals will also be moved into overlying snow. Thus there is a continuous accumulation over the winter months in the upper soil layers. (2) In spring the thaw flushes out the ions in the early runoff. As the thaw occurs only from the surface down, the process may take several weeks to leach the frozen soils. (3) In summer surface runoff has ceased, but subsurface migration may continue and carry dissolved material to the surface, where an ion build-up occurs again especially if the summer drought is long. (4) Fall rains complete the cycle, resulting in a flush runoff which may be as intense as the spring thaw under certain conditions. From Jonasson and Allan (1973).

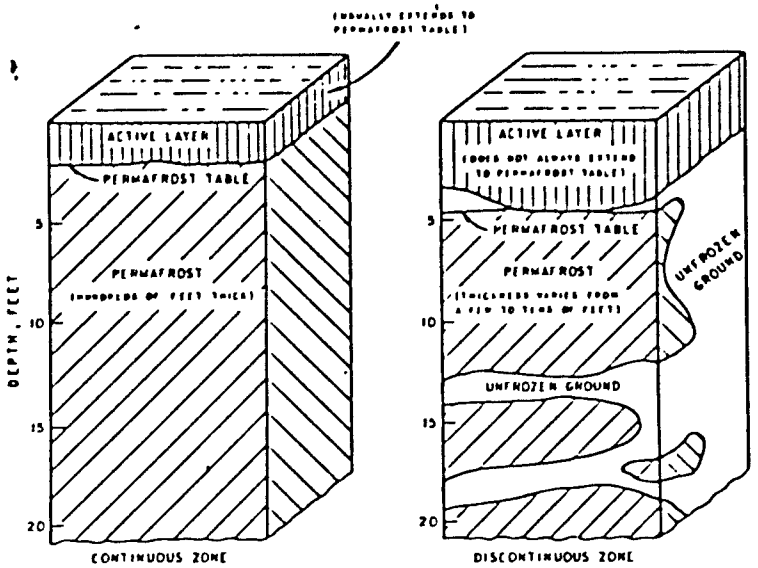


Fig. 11-2. Typical profiles in permafrost regions. From R. J. E. Brown (1970).

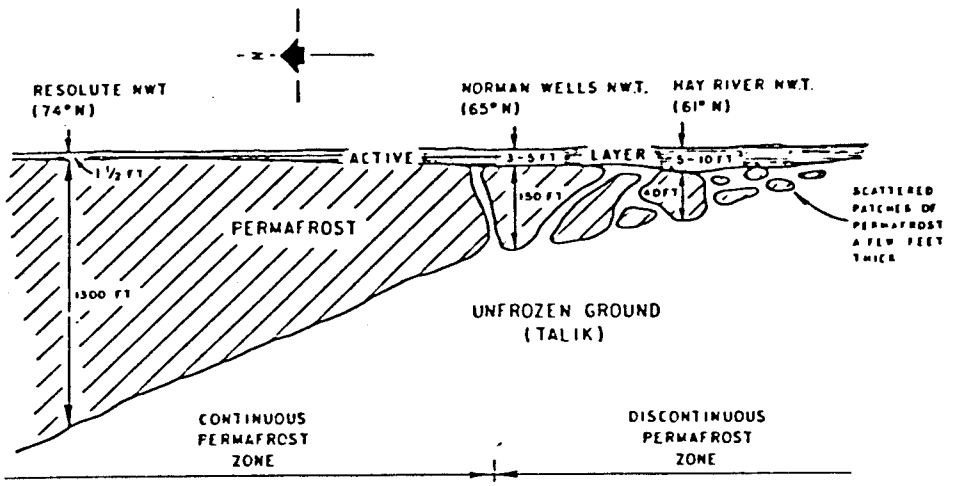


Fig. 11-3. Typical vertical distribution and thickness of permafrost in Canada. Locations at Resolute, Norman Wells and Hay River are shown on Fig. 11-1. From R. J. E. Brown (1970).

LEGEND

Upper Devonian

Ordovician – Middle Devonian

ROAD RIVER

- E — "Black Clastics"
- D — Pyritic fissile shale, minor sandstone
- C — Black chert – cherty shale
- B — Pyritic fissile shale
- A — Calcareous shale and limestone, minor black chert

Dip and strike

Syncline, Anticline

Geologic boundary, approximate where dashed

Elevations in meters
Contour interval 50 meters

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
INTERPRETATIVE GEOLOGIC MAP

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M., N.G., G.J.D.
	MAP NO. G78017-1	TRACED BY D.M.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP#
Doc # 090436
(60)

LEGEND

Areas outlined contain permafrost or soils that have 50% or more organic content

V Soil samples contain volcanic ash

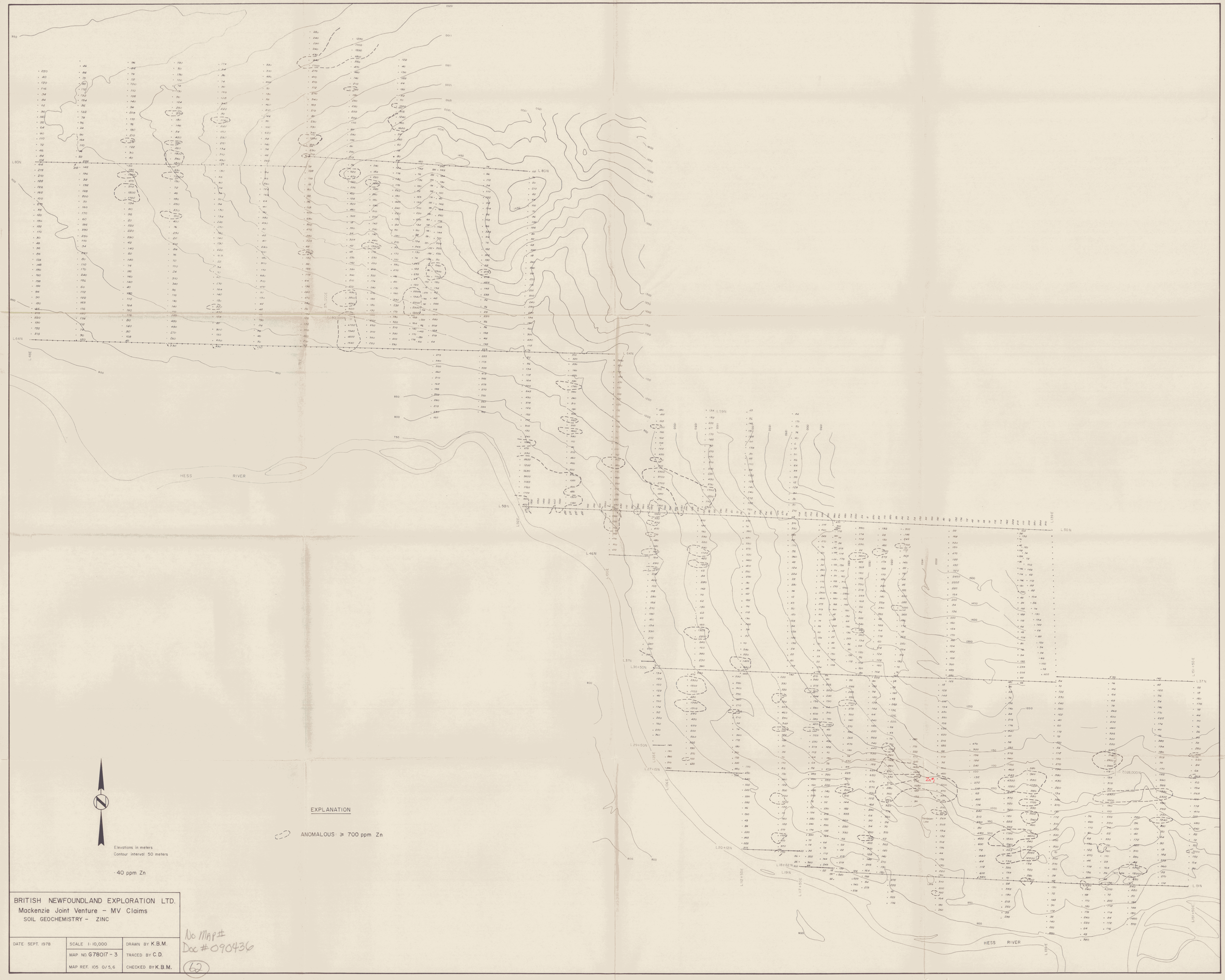
Elevations in meters
Contour interval 50 meters

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
PERMAFROST TERRAIN

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-2	TRACED BY K.B.M.
	MAP REF. 105 O/5,6	CHECKED BY

No MAP#
Doc # 090436

(61)


L80N
L64N
L50N
L46N
L37N
L29+50N
L27+15N
L20+12N
L18+62N
L19N
L17+50E
L18E
L24E
L30E
L36E
L42E
L48E
L54E
L59E
L64E
L70E
L76E
L82E
L88E
L94E
L100E
L106E
L112E
L118E
L124E
L130E
L136E
L142E
L148E
L154E
L160E
L166E
L172E
L178E
L184E
L190E
L196E
L202E
L208E
L214E
L220E
L226E
L232E
L238E
L244E
L250E
L256E
L262E
L268E
L274E
L280E
L286E
L292E
L298E

EXPLANATION

ANOMALOUS: ≥ 44ppm Pb

Elevations in meters
Contour interval 50 meters

· 30 ppm Pb

No MAP#
Doc#090436
(63)

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY - LEAD

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-4	TRACED BY C. D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

L80N
L64N
L48E
L32E
L16E
L0E
L16E
L32E
L48E
L59N
L50N
L46N
L37N
L36+50N
L29+50N
L27+15N
L20+12N
L18+62N
L19N
L39E
L50N
L51+50E
L37N
L59E
L51+50E
L19N
L59+50E
L112+50E
L117+50E
L123E
L135E
L147E
L159E
L171E
L183E
L195E
L207E
L219E
L231E
L243E
L255E
L267E
L279E
L291E
L303E
L315E
L327E
L339E
L351E
L363E
L375E
L387E
L399E
L411E
L423E
L435E
L447E
L459E
L471E
L483E
L495E
L507E
L519E
L531E
L543E
L555E
L567E
L579E
L591E

EXPLANATION

ANOMALOUS : ≥ 4.5 % Fe

Elevations in meters
Contour interval 50 meters

· 2.0 % Fe

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY – IRON

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-6	TRACED BY C. D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No Map#
Doc # 090436
(65)



EXPLANATION

ANOMALOUS: ≥ 145 ppm Cu

POSSIBLY ANOMALOUS: ≥ 94 < 145 ppm Cu

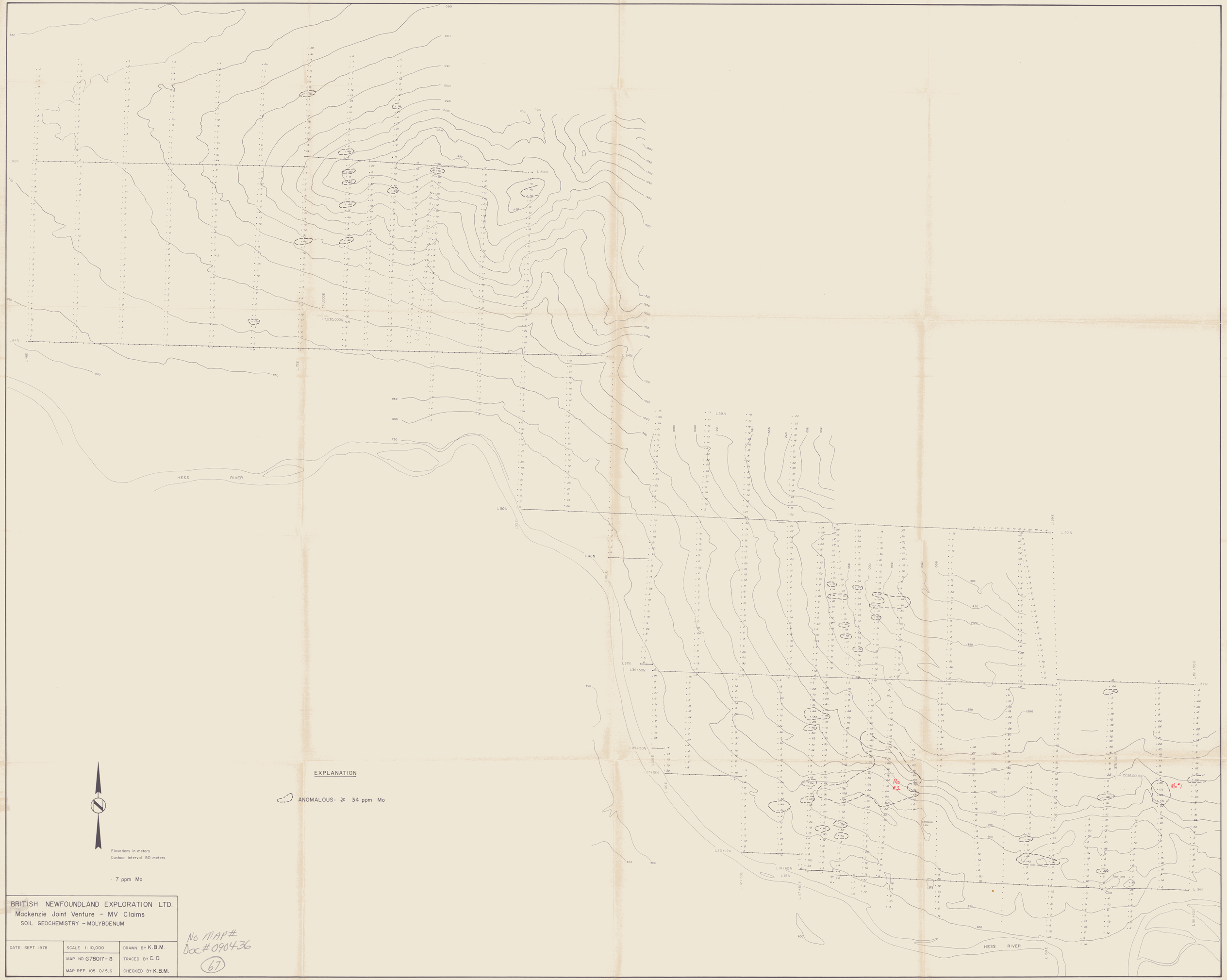
Elevations in meters
Contour interval 50 meters

· 23 ppm Cu

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY – COPPER

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-7	TRACED BY C. D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP#
Doc# 090436
66



BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY – MOLYBDENUM

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-8	TRACED BY C. D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP#
Doc#090436
67



BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY – SILVER

DATE: SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-9	TRACED BY C.D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP #
Doc # 090436
68



EXPLANATION

ANOMALOUS: ≥ 270 ppm Ni

POSSIBLY ANOMALOUS: ≥ 145 < 270 ppm Ni

Elevations in meters
Contour interval 50 meters

· 26 ppm Ni

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY – NICKEL

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G78017-10	TRACED BY C.D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP#
Doc # 090436
69



EXPLANATION

ANOMALOUS: ≥ 33 ppm Co

Elevations in meters
Contour interval 50 meters

· 18 ppm Co

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
SOIL GEOCHEMISTRY – COBALT

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G 78017-11	TRACED BY C.D.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP #
Doc # 090436
70

Geochemical Results – Tillicum Zone

SAMPLE NO.	WIDTH	Pb ppm	Zn ppm	Cu ppm	Ag ppm	Ba ppm
25030	1.35m	11	1800	108	1.6	—
25031	2.0	7	900	108	0.7	—
25032	2.2	8	1100	52	1.2	—
25033	4.3	11	3500	82	1.0	1600
25034	2.3	12	1900	110	1.1	2400
25035	2.2	11	2250	92	1.2	1600
25036	1.0	12	1420	60	0.8	2400
25037	1.5	12	2150	56	1.1	2100
25038	3.3	12	1360	40	0.7	2700
25039	1.3	46	370	390	3.2	1200
25040	2.1	14	2300	62	1.0	1300
25041	2.7	14	2450	62	1.2	3400
25042	2.3	13	1820	64	1.4	1400
25043	2.9	12	1280	78	1.2	1000
25044	2.0	17	2150	92	1.6	2200
25045	1.8	17	1450	70	1.0	1500
25046	3.3	18	1360	68	1.3	1800
25047	5.0	13	1940	112	1.5	1300
25048	1.8	14	1540	110	1.9	1800

DETAIL OF TILLICUM ZONE

FIG. A



Final Post

159 ⊠ 160

LEGEND

28-2200-14	Lead-zinc-silver values in ppm
NUMERALS	Rock geochem sample location points
LETTERS & NUMERALS	Silt sample location points
■	Sample from outcrop
○	Sample from rock fragments found in soil pit
△	Stream silt sample

Elevations in meters
Contour interval 50 meters

BRITISH NEWFOUNDLAND EXPLORATION LTD.
Mackenzie Joint Venture – MV Claims
ROCK GEOCHEMISTRY

DATE SEPT. 1978	SCALE 1:10,000	DRAWN BY K.B.M.
	MAP NO. G 78017-12	TRACED BY K.B.M.
	MAP REF. 105 O/5,6	CHECKED BY K.B.M.

No MAP#
Doc # 090436
(71)



elevations in meters
contour interval 100 meters

BRITISH NEWFOUNDLAND EXPLORATION LTD.

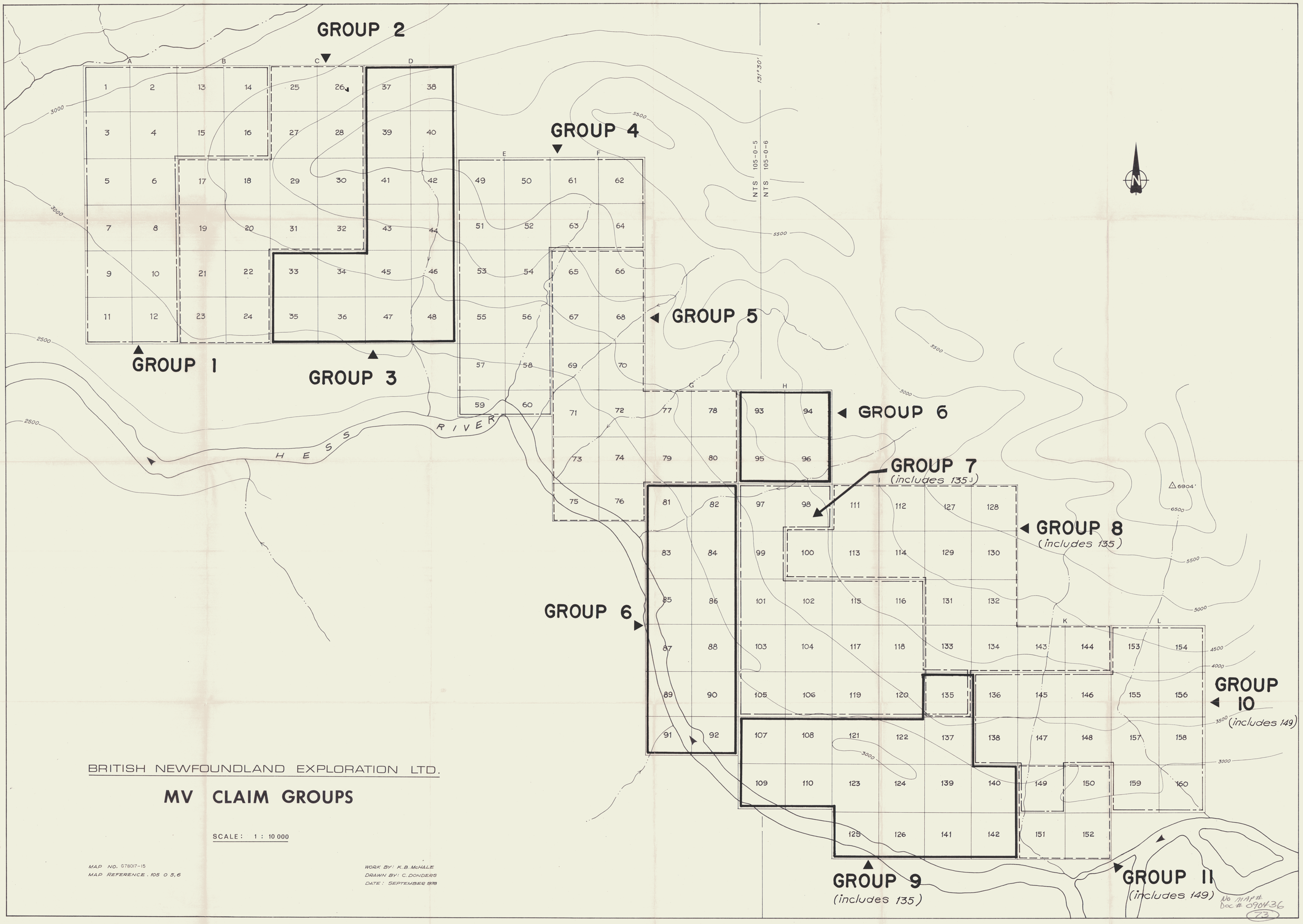
MV CLAIM GROUPS

SCALE: 1 : 10 000

MAP NO. G78017-14
MAP REFERENCE: 105 O 5,6

WORK BY: K.B. McHALE
DRAWN BY: C. DONDERS
DATE: SEPTEMBER 1978

No 11MAP #
Doc# 090436
72



BRITISH NEWFOUNDLAND EXPLORATION LTD.

MV CLAIM GROUPS

SCALE: 1 : 10 000

MAP NO. G78017-15
MAP REFERENCE. 105 O 5,6

WORK BY: K.B. McHALE
DRAWN BY: C. DONDERS
DATE: SEPTEMBER 1978

No MAP #
Doc # 090436
73