GEOCHEMICAL REPORT ON THE HILL AND RJ CLAIMS

82E/13E

By
P.E. Fox, Ph.D., P.Eng.

November 7, 1972

Location: West side Okanagan Lake, ~~7 miles north Kelowna, B.C.~~
50 00N, 119 30W
~~For Dawood Mines Ltd. (NPL)~~
Work done: October 5 - 22, 1972
~~Claims: HILL 1 - 6 RJ 1 - 4~~
Vernon Mining Division

3931

3934

GEOCHEMICAL REPORT ON THE HILL AND RJ CLAIMS

Vernon Mining Division

By

P.E. Fox, Ph.D., P.Eng. (BC)

FOX GEOLOGICAL CONSULTANTS LTD

For

J.R. Dawson

DAWOOD MINES LTD (NPL)

Merritt, B.C.

November 7, 1972

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3934 MAP .....

TABLE OF CONTENTS

ILLUSTRATIONS

APPENDICES

INTRODUCTION

This report is an evaluation of geochemical work done on the HILL and RJ claims between October 5 and October 22, 1972. The survey consisted of 291soil samples collected by a two-man crew working under the supervision of Mr. J.R. Dawson of Merritt, B.C. The writer spent one day on the property to evaluate local conditions.

Maps and related drafting services were provided by Mr. Dawson.

LOCATION AND ACCESS

The RJ and HILL claims are situated in the Vernon mining Division seven miles northwest of Kelowna on the west side of Okanagan Lake a few miles from Wilson's Landing (Figure 1). Jenny Creek is situated on the south part of the property and drains easterly to Okanagan Lake. Logging roads and other roads refurbished by Mr. Dawson provide access to most points. The claims can be reached by the Bear Lake mainline from Wilson's Landing and Branch number three, which leaves the mainline four miles from the junction of Westside Road and Bear Lake Road.

OWNERSHIP

The HILL and RJ claims were staked by J.R. Dawson and recorded on November 22,1971. They are situated in the Vernon Mining Division, and form part of a larger block of contiguous claims. The HILL and RJ claims were grouped into

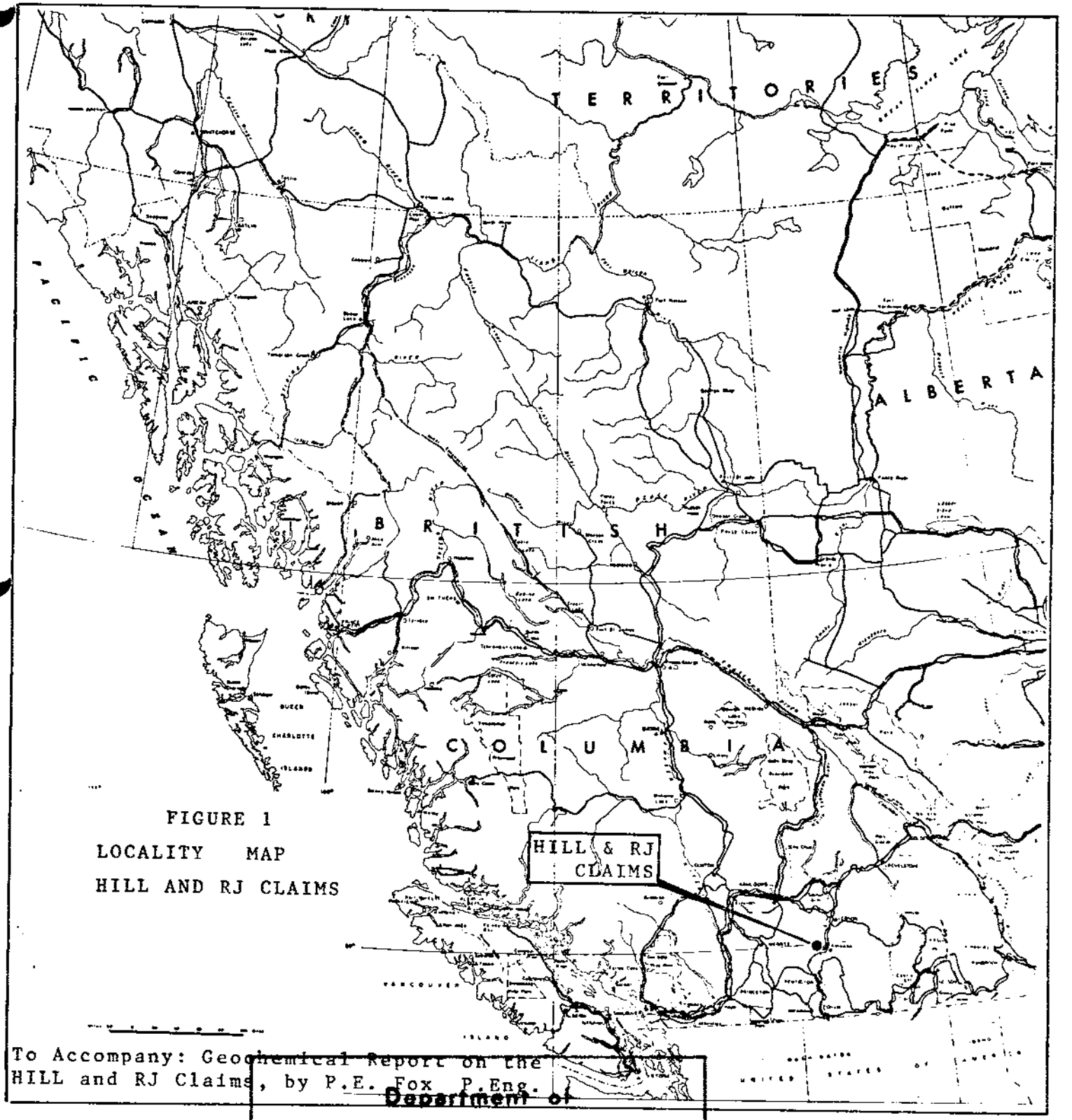

FIGURE 1
LOCALITY MAP
HILL AND RJ CLAIMS

To Accompany: Geochemical Report on the
HILL and RJ Claims, by P.E. Fox P.Eng.

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3934 MAP #1

the TOWER group on October 19th. Dawood Mines Ltd. (NPL) purchased the claims and are now owners of the property. Mr. Dawson is the president and manager of the Company.

The following list notes expiry dates and record numbers for the HILL and RJ claims. Assessment work described in this report will extend due dates two years(November 22, 1974).

Claim	Record No.	Due Date
HILL 1 - 6 incl.	16183-16188	Nov. 22,1972
RJ 1 - 4 incl.	16179-16182	Nov. 22,1972

GEOLOGICAL SETTING

Rocks underlying the survey area belong to the Cache Creek group (Permian) and younger plutonic rocks of Mesozoic age. Cache Creek rocks consist of a northwesterly striking, steeply dipping sequence of argillite, chert, quartzite and tuff. These rocks are hornsfelsed, intensely fractured, and variably mineralized with pyrite, pyrrhotite, and minor quantities of chalcopyrite. Granitic rocks are of two types: medium grained hornblende diorite generally concordant with enclosing Cache Creek strata, and a light coloured, hypidiomorphic-granular biotite-hornblende tonalite and granodiorite. The latter underlies the northern part of the survey area, and the diorite outcrops north and east of the Blue Hawk adit.

Several quartz veins that carry variable amounts of gold, silver and copper occur on the property and were

explored by early workers. Old surface trenches are still visible and several of the veins were of sufficient tenor to explore by underground workings. The Blue Hawk adit, which was developed by the Blue Hawk syndicate of Kelowna, is situated on the RJ #1 claim. Veins contain pyrite, galena, and minor amounts of chalcopyrite.

GEOCHEMICAL SURVEY

Soil samples were collected along a grid system previously established by Mr. Dawson. Samples were taken on grid lines on 100-foot intervals. Soil samples were collected by a two-man crew directly supervised by Mr. Dawson, who has acquired experience and competence in geochemical field techniques. A mattock was used to collect sample material, which was obtained from one to two feet below a thin layer of forest litter. Samples are from the B soil horizon were it could be recognized. Soils, however, are poorly developed; only rarely are B horizons clearly evident, and were present has formed in glacial till overlying pyritic rocks of the Cache Creek sediments. Elsewhere soil materials are brown forest earths developed on glacial till.

Overburden is generally two to three feet thick on the eastern half of the grid but thickens westward. Caliche horizons are fairly common, and are particularly evident in soils formed on thick talus slopes north of Jenny Creek

and east of the Blue Hawk adit.

Samples were stored in paper bags and submitted to Amax Exploration in Burnaby, B.C. for analysis. Samples were analyzed for pH (every fourth sample), Cu,Mo,Ni,Co,Mn, Fe,Ag,Zn and Pb. A total of 291 samples were analyzed.

RESULTS

Analyses performed by the Amax laboratory are listed in Appendix I. Analyses for Cu,Pb,Zn,Fe and Ni are plotted on four maps in Figures 2,3, and 4. Maps show sample sites, analytical results, claim boundaries and grid lines. Analytical methods used by the Amax Laboratory are included as Appendix II.

Figure 5 is a frequency histogram showing copper content of soils in the survey area. Samples appear to form a mixed or polymodal distribution: one apparently due to pyritic Cache Creek rocks, and a second related to granitic rocks underlying the northern part of the grid. Figure 6 is a cumulative per cent graph for copper. Two number populations are clearly evident. Threshold concentrations appear to be in the range 100 to 140 ppm, and amounts greater than 140 ppm are thought to be clearly anomalous.

DISCUSSION

Copper content of soils in the survey area are plotted and coded in Figure 2 (blue for positive ranges and

FIGURE 5

FREQUENCY HISTOGRAM
FOR COPPER
HILL and RJ CLAIMS

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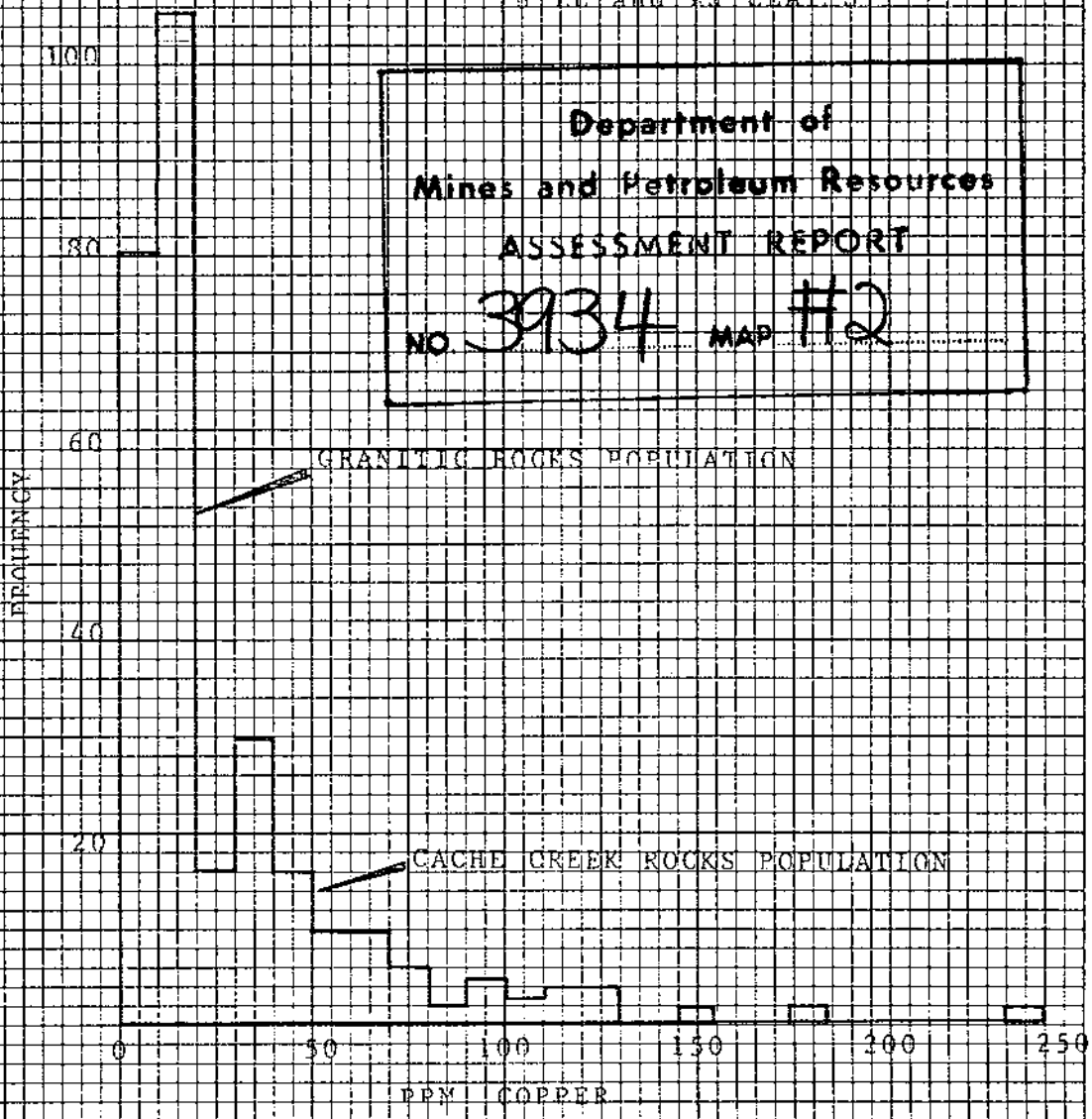
ASSESSMENT REPORT
NO. 3934 MAP #2



To Accompany: Geochemical Report on the Hill and RJ Claims, By P.E. Fox P.Eng. November 1972

EUGENE DIETZGEN CO.
MADE IN U. S. A.
NO. 340R-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

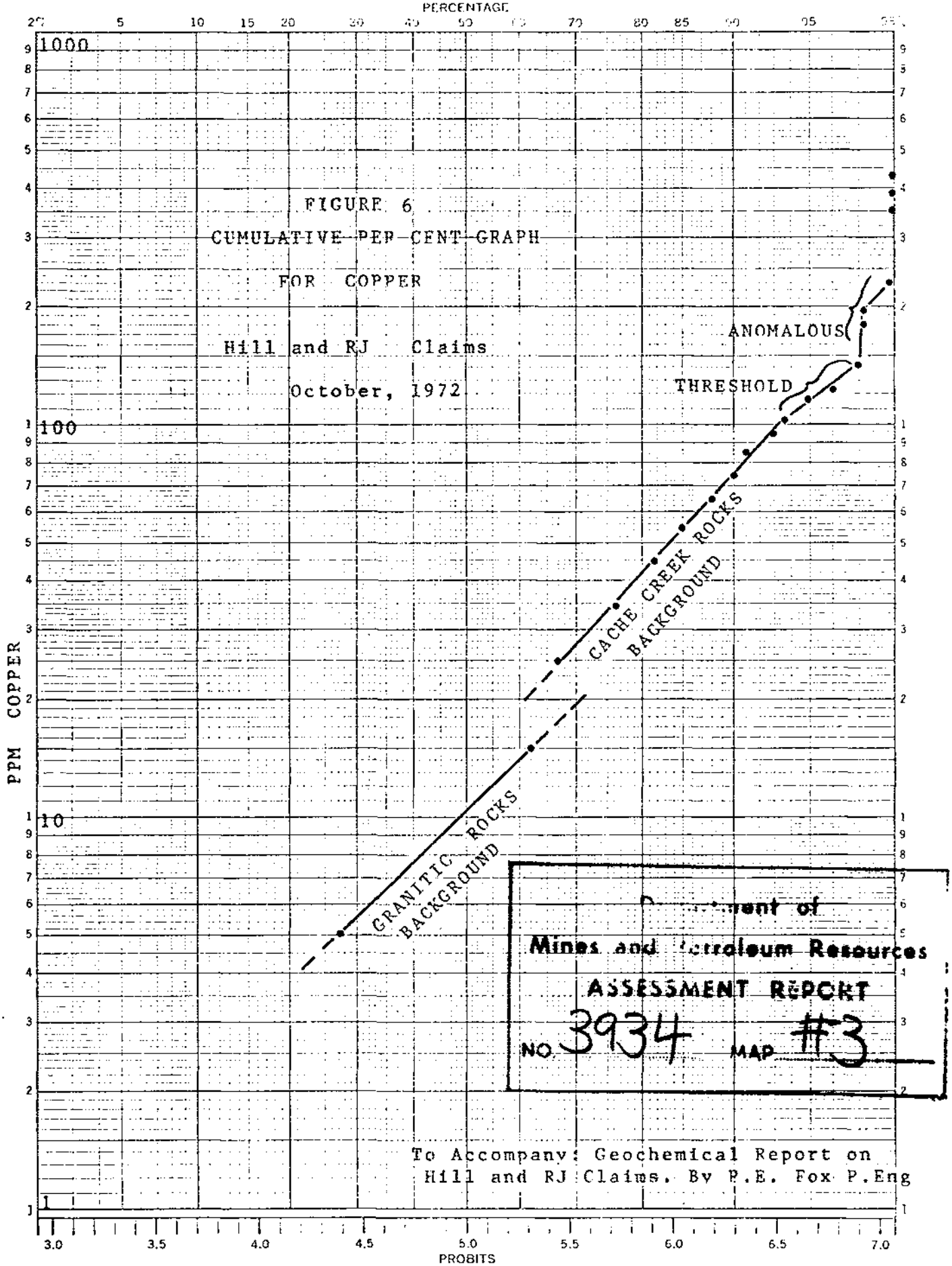


FIGURE 6

CUMULATIVE PER CENT GRAPH

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Hill and RJ Claims

October, 1972

...ment of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3934 MAP #3

To Accompany: Geochemical Report on
Hill and RJ Claims. By P.E. Fox P.Eng

PROBABILITY 46 8080
X 3 LOG CYCLES MADE IN U.S.A.
KEUFFEL & ESSER CO.

orange for anomalous concentrations). A low contrast anomaly appears to exist on grid lines 0+00N and 8+00N east of the baseline. This area also corresponds to relatively high amounts of associated silver, up to 1.5 ppm. There is also a general increase of iron and nickel contents on the east side of the grid between 4+00S and 12+00N. This relatively metal-rich overburden corresponds to east-facing slopes on which caliche-rich talus material is abundant. The Blue Hawk mine and surface pits and trenches are also nearby upslope from the metal-rich soils.

Soil anomalies on the southeast part of the grid area can be attributed to one or several of the following conditions:

1. Accumulation of copper, silver, zinc and iron, on caliche-rich talus slopes.

2. Dispersion of metals into soil material from mineralized veins covered by overburden.

3. Relatively high metal content in underlying diorite and sediments of the Cache Creek formation.

Accumulation of metals on talus slopes is a distinct possibility and it is thought that this is the major cause for the relatively high metal content of overburden materials east of the Blue Hawk adit.

Prepared by

FOX GEOLOGICAL CONSULTANTS LTD.

P.E. Fox, Ph.D., P.Eng.

November 7, 1972

STATEMENT OF WORK PERFORMED

The following personnel were employed on the geochemical survey described in this report.

Peter Johnson, Merritt, B.C. - October 5th to October 22th, 18 days collecting soil samples under contract.

David Dawson, Merritt, B.C. - October 5th to October 22nd. 18 days collecting soil samples under contract.

J.R. Dawson, Merritt, B.C. 5½ days between October 5th and November 10. Supervision of field crews, drafting and pertinent maps.

P.E. Fox, Ph.D., P.Eng. 635 Victoria St. Kamloops, B.C. Field examination October 22nd. Preparation of report under contract.

P.E. Fox, Ph.D., P.Eng.

November 7, 1972

EXPENDITURES

Personnel:	
Peter Johnson and David Dawson, soil sample collection under contract plus expenses.	$600
J.R. Dawson. Supervision and drafting. 5½ days at $50 per day	275
P.E. Fox, Ph.D. P.Eng. Field examination. one day at $150 per day	150
P.E. Fox, Ph.D. P.Eng. Preparation of report under contract	300
Accomodation and board:	
20 mandays at $6.00 per day	120
Equipment:	
flagging, sample bags	25
Vehicle Rental:	
10 days at $10 per day	100
Analyses:	
291 samples at $3.00 per sample	873
TOTAL EXPENDITURES	$2,443

I hereby certify that the above statement is a true representation of expenditures incurred for the geochemical survey on the HILL and RJ claims conducted from October 5 to October 22, 1972.

J.R. Dawson

J.R. Dawson
November 7, 1972

CERTIFICATE

I, Peter Edward Fox, certify to the following:

1. I am a consulting geologist residing at 827 Sicamore Drive, Kamloops, B.C. with offices at 204-635 Victoria St. Kamloops, B.C.
2. I am a Professional Engineer registered with the Association of Professional Engineers of British Columbia.
3. My academic qualifications are:

   B.Sc., M.Sc. Queens University, Kingston, Ontario, Ph.D. Carleton University, Ottawa, Ontario.
4. I have been engaged in geological, geochemical and mining work work for seven years since graduation.
5. I have no interest, direct or indirect, in the properties of Dawood Mines Ltd (NPL).
6. I give my permission to publish this report in a prospectus or other literature dealing with the claims herein reviewed.

Kamloops, British Columbia
November 7, 1972

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P.E. Fox, Ph.D., P.Eng.

APPENDIX I

3 ✓

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 1972 TYPE SAMPLES SOIL GRID

PROJECT TOWER GROUP. 514 LOCATION DAWOOD MINES STD

REQUESTED BY J.R. DAWSON / T. GODFREY DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	0+00-100W		1	74	22	18	660	3.4	0.5	100	18			01
02	200W		1	52	32	20	720	3.2	0.5	108	16			02
03	300W		1	60	44	20	480	3.4	0.5	104	16			03
04	400W	5.4	1	50	36	24	600	3.4	0.5	120	16			04
05	500W		1	66	36	20	520	3.5	.5	84	16			05
06	600W		1	42	24	20	700	2.9	.5	22	12			06
07	700W		1	20	16	16	800	2.4	.5	96	12			07
08	800W	5.7	1	27	20	16	800	2.5	.5	88	12			08
09	900W		1	20	14	16	760	2.5	.5	72	12			09
10	1000W		1	18	16	12	720	2.7	<	72	14			10
11	1100W		1	16	16	16	660	2.5	<	68	12			11
12	1200W	6.2	1	40	22	20	600	3.5	<	64	12			12
13	1300W		1	20	16	16	580	2.3	<	60	12			13
14	1400W		1	38	28	18	580	2.3	<	100	14			14
15	1500W	6.0	1	22	20	16	640	2.3	<	88	10			15
16	0+00-100E		1	122	28	28	620	4.6	.5	92	20			16
17	200E		1	116	28	24	520	4.2	.5	84	16			17
18	300E		1	120	36	22	740	4.0	.5	112	16			18
19	400E	6.8	1	148	30	32	1000	4.9	1.0	120	20			19
20	500E		1	127	28	36	920	6.7	1.0	104	22			20
21	600E		1	70	32	28	940	4.4	1.0	100	18			21
22	700E		1	360	16	40	800	9.7	.5	68	8			22
23	800E	6.9	1	176	36	28	720	5.6	1.0	108	16			23
24	900E		1	104	32	28	1120	5.0	1.0	144	20			24
25	1000E		1	180	20	32	840	7.4	.5	116	24			25
26	1100E		1	72	16	12	400	3.1	.5	52	16			26
27	1200E	7.1	1	127	28	28	740	5.9	1.5	116	32			27
28	1300E		1	150	36	20	620	4.9	1.0	98	20			28
29	1400E		1	84	20	20	420	4.2	1.0	64	20			29
30	1500E	6.8	1	56	30	24	500	5.1	1.0	124	20			30
31	16N-1+00E		1	14	18	12	520	2.2	.5	92	16			31
32	2E													32
33	3E		1	36	28	14	640	3.1	1.0	140	16			33
34	4E	5.8	1	20	22	12	520	2.9	.5	100	16			34
35	5E		1	20	20	12	360	3.2	.5	128	18			35
36	6E		1	32	28	12	340	3.2	.5	104	16			36
37	7E		1	37	32	16	280	3.2	.5	116	14			37
38	8E		1	52	38	20	560	3.5	1.0	156	16			38
39	9E	5.7	1	52	28	18	560	2.6	.5	156	16			39
40	G.S.		4	42	12	8	160	2.4	.5	24	20			40

COMMENT:

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31

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 1972 TYPE SAMPLES Soil GRID

PROJECT Tower Group LOCATION Dawood Mines

REQUESTED BY J. R. Dawson/T. Godfrey DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	16N-10E		1	44	34	20	560	3.2	.5	164	16			01
02	11E		1	44	32	16	320	3.8	.5	128	16			02
03	12E		1	48	44	24	1120	3.5	.5	304	20			03
04	13E	6.1	1	28	32	12	380	2.6	.5	152	14			04
05	14E		4	84	86	30	420	5.7	.5	248	24			05
06	15E		1	24	24	10	240	2.6	.5	64	12			06
07	16N-200E	6.1	1	16	20	8	520	2.3	.5	132	12			07
08	24N-BL		1	20	12	10	280	2.6	.5	96	14			08
09	24N-1E		1	8	10	8	440	1.7	.5	54	8			09
10	2E		1	8	10	8	280	1.6	.5	42	10			10
11	3E		1	16	14	12	520	1.7	.5	64	12			11
12	4E	6.1	1	8	10	8	540	1.7	.5	68	8			12
13	5E		1	12	14	8	1360	1.8	.5	174	10			13
14	24N-100W		1	14	14	12	720	2.1	.5	80	14			14
15	200W		1	16	16	16	920	2.7	.5	140	12			15
16	300W		1	10	12	8	640	2.3	.5	62	6			16
17	400W	5.9	1	8	12	6	280	1.8	.5	40	8			17
18	500W	x	1	8	16	10	360	1.9	.5	56	10			18
19	600W		1	8	12	7	240	2.3	.5	40	8			19
20	700W		1	10	12	12	220	2.3	.5	40	10			20
21	800W	5.6	1	16	16	12	580	2.6	.5	96	12			21
22	900W	x	1	20	18	14	920	2.2	.5	134	12			22
23	1000W		1	12	16	12	640	2.2	.5	124	14			23
24	1100W		1	8	12	8	380	1.8	.5	52	10			24
25	1200W	6.2	1	8	12	10	300	2.1	.5	40	8			25
26	24N-100E		1	6	8	8	280	2.2	.5	56	10			26
27	200E		1	8	14	12	320	3.0	.5	48	12			27
28	300E		1	24	20	12	320	2.1	.5	66	12			28
29	400E		1	10	16	10	280	2.2	.5	74	12			29
30	500E	6.1	1	12	16	10	960	2.0	.5	156	8			30
31	600E		1	10	16	8	460	2.2	.5	68	10			31
32	700E		1	12	14	8	560	1.9	.5	96	10			32
33	800E		1	12	12	10	440	2.2	.5	116	16			33
34	900E	6.3	1	10	14	8	480	2.0	.5	100	14			34
35	1000E		1	12	14	8	520	1.9	.5	100	14			35
36	1100E		1	12	16	10	500	2.1	.5	104	12			36
37	1200E		1	12	12	8	1240	1.9	.5	160	12			37
38	1300E		1	72	16	10	760	1.7	.5	64	14			38
39	1400E	6.5	1	12	16	8	300	2.5	.5	52	12			39
40	G9		16	252	14	6	140	1.0	.5	450	364			40

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32

AMAX EXPLORATION INC. ANALYTICAL REPORT (3)

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 1972 TYPE SAMPLES Soil Grid

PROJECT Toher Group LOCATION Dawood Mines

REQUESTED BY J.R. Dawson/T. Godfrey DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	24N-1500E		1	8	10	10	200	1.9	.5	44	8			01
02	28N-1E		1	6	8	10	320	1.8	.5	50	8			02
03	2E		1	6	10	8	440	1.8	.5	72	2			03
04	3E		1	12	14	12	900	2.5	.5	112	10			04
05	4E	6.7	1	8	14	12	520	2.2	.5	96	12			05
06	5E		1	9	14	10	420	2.6	.5	82	12			06
07	6E		1	12	12	10	1040	2.1	.5	108	12			07
08	7E		1	12	18	14	640	3.2	.5	120	16			08
09	8E	6.4	1	12	12	16	520	3.4	.5	160	18			09
10	9E		1	8	10	8	440	2.0	.5	76	10			10
11	10E		1	10	10	12	840	2.2	.5	116	14			11
12	11E		1	10	14	8	220	2.7	.5	64	12			12
13	12E	6.1	1	24	14	12	2640	2.4	.5	332	20			13
14	13E		1	8	10	8	920	1.9	.5	26	14			14
15	14E		1	10	12	8	1200	2.1	.5	136	12			15
16	15E	6.3	1	12	20	14	600	2.9	.5	100	16			16
17	28N-100W		1	8	12	12	680	1.9	.5	104	16			17
18	200W		1	8	12	8	440	2.3	.5	92	16			18
19	300W		1	8	10	8	500	1.8	.5	58	12			19
20	400W	6.6	1	10	10	8	320	2.0	.5	44	12			20
21	500W		1	6	10	12	360	2.2	.5	44	12			21
22	600W		1	8	10	12	260	2.2	.5	48	8			22
23	700W		1	8	2	8	620	1.8	.5	70	10			23
24	800W	6.1	1	12	12	12	420	2.1	.5	60	12			24
25	900W		1	12	8	8	520	2.0	.5	72	8			25
26	1000W		1	10	10	10	460	2.2	.5	64	10			26
27	1100W		1	10	12	10	320	2.1	.5	68	12			27
28	1200W	6.2	1	12	10	12	420	2.5	.5	64	8			28
29	1300W		1	10	10	12	640	2.1	.5	68	12			29
30	1400W		1	9	10	10	660	2.1	.5	76	12			30
31	1500W													31
32	32N-1E		1	12	14	12	900	2.7	.5	152	12			32
33	2E		1	8	8	8	620	1.8	.5	124	4			33
34	3E		1	8	12	12	960	2.4	.5	120	8			34
35	4E	6.3	1	9	14	12	400	2.4	.5	76	8			35
36	5E		1	8	16	12	600	3.1	.5	94	14			36
37	6E		1	10	16	12	820	2.8	.5	160	14			37
38	7E		1	12	14	12	820	1.8	.5	128	16			38
39	8E	6.2	1	12	12	14	1760	2.7	.5	248	12			39
40	G10		12	>400	16	14	320	2.8	1.0	24	20			40

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AMAX EXPLORATION INC. ANALYTICAL REPORT (4)

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 1972 TYPE SAMPLES Soil Grid

PROJECT TOWER GROUP LOCATION DAWOOD MINES

REQUESTED BY J.R. DAWSON / T. GODFREY DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	32N- 9E		1	14	28	10	840	2.6	1.0	204	20			01
02	10E		1	8	12	10	560	2.5	.5	92	12			02
03	11E		1	8	10	8	480	1.7	.5	98	12			03
04	12E	6.2	1	8	14	8	880	1.5	.5	72	12			04
05	13E		1	20	12	8	800	1.8	.5	44	8			05
06	14E		1	12	10	6	560	1.8	.5	56	10			06
07	15E	6.4	1	8	12	10	1080	2.3	.5	92	14			07
08	32N- 1W		1	8	10	8	620	2.0	.5	72	10			08
09	2W		1	12	8	10	980	2.0	.5	104	10			09
10	3W		1	14	8	8	1220	2.0	.5	94	12			10
11	4W	6.4	1	14	6	10	820	2.1	.5	70	12			11
12	5W		1	12	8	10	920	1.9	.5	96	12			12
13	6W		1	10	8	8	520	2.0	.5	60	10			13
14	7W		1	10	10	8	800	2.1	.5	78	28			14
15	9W	6.3	1	12	10	8	840	2.0	.5	70	12			15
16	10W		1	12	8	8	720	2.1	.5	62	12			16
17	11W		1	8	4	8	560	2.0	.5	62	8			17
18	12W		1	10	6	8	680	2.2	.5	80	10			18
19	13W	6.2	1	8	8	10	600	2.2	.5	62	10			19
20	14W		1	6	6	6	620	1.6	.5	62	8			20
21	15W		1	8	8	8	800	2.1	.5	90	10			21
22	B.L	6.3	1	12	10	8	600	2.4	.5	52	12			22
23	36N- 1E		1	10	10	10	760	2.1	.5	54	10			23
24	2E		1	10	12	10	880	2.1	.5	66	12			24
25	3E		1	12	12	6	960	1.7	.5	104	16			25
26	4E	6.2	1	10	12	6	640	1.5	.5	52	12			26
27	5E		1	8	12	8	440	1.7	.5	48	12			27
28	6E		1	12	16	12	1360	2.0	.5	144	16			28
29	7E		1	8	14	6	880	1.7	.5	68	10			29
30	8E	6.1	1	8	16	8	920	2.0	.5	78	14			30
31	9E		1	16	20	8	1340	2.3	.5	128	16			31
32	10E		1	10	16	8	720	2.0	.5	60	14			32
33	11E		1	12	14	8	720	1.7	.5	76	12			33
34	12E	6.5	1	10	12	6	720	1.6	.5	44	10			34
35	13E		1	8	10	8	400	2.0	.5	48	14			35
36	14E		1	12	20	16	1200	3.3	.5	148	20			36
37	15E	6.5	1	14	14	12	1520	2.2	.5	208	14			37
38	36N- B.L		1	12	10	8	1140	2.3	.5	84	12			38
39	100W		1	12	8	8	920	2.0	.5	96	12			39
40	G 6		48	372	—	22	390	1.7	3.5	330	>400			40

COMMENT:

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34

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 1972 TYPE SAMPLES Soil Grid

PROJECT TOWER GROUP LOCATION DAWOOD MINES

REQUESTED BY J.R. DAWSON / T. GODFREY DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	36N- 200W		1	8	6	10	720	2.2	.5	52	12			01
02	300W		1	10	8	12	940	2.1	.5	78	12			02
03	400W	5.3	1	6	4	8	460	2.3	.5	62	12			03
04	500W		2	10	4	10	960	2.1	.5	120	12			04
05	600W		1	8	8	10	660	2.3	.5	72	12			05
06	700W		1	8	10	10	620	2.1	.5	64	12			06
07	800W	6.2	1	8	8	10	920	1.9	.5	64	12			07
08	900W		1	10	12	14	760	2.6	.5	90	14			08
09	1000W		1	8	8	8	680	2.0	.5	72	10			09
10	1100W	5.5	1	8	8	10	720	1.8	.5	70	10			10
11	40N- 1E		1	8	8	12	1400	2.3	.5	90	14			11
12	7E	6.3	1	16	10	8	960	1.8	.5	62	12			12
13	40N- 100W		1	20	8	8	860	1.8	.5	58	10			13
14	200W	6.3	1	8	8	8	560	2.1	.5	56	10			14
15	40N- 200E		1	20	12	12	1600	2.5	.5	168	18			15
16	300E		1	12	12	14	1360	2.4	.5	164	16			16
17	400E		1	12	18	14	800	2.9	1.0	128	18			17
18	500E	6.1	1	18	16	14	480	2.6	1.0	100	16			18
19	600E		1	12	16	12	1200	2.2	.5	168	16			19
20	800E		1	12	8	8	1560	1.5	.5	52	12			20
21	900E		1	8	8	6	620	1.8	.5	54	10			21
22	1000E	6.3	1	10	12	10	560	2.0	.5	68	12			22
23	1100E		1	12	16	14	640	2.5	1.0	120	16			23
24	1200E		1	12	10	10	800	1.6	.5	52	12			24
25	1300E		1	12	12	14	1040	2.2	.5	94	14			25
26	1400E	6.1	1	12	12	8	720	1.8	.5	60	12			26
27	1500E		1	16	20	14	1620	2.6	.5	140	20			27
28	400N- 100W		1	52	20	22	1120	2.9	.5	104	16			28
29	200W		1	48	16	12	760	2.6	.5	72	14			29
30	300W		1	52	20	20	1040	2.8	.5	96	14			30
31	400W	6.1	1	36	20	12	1120	2.3	.5	92	14			31
32	500W		1	26	20	14	1460	2.2	.5	80	12			32
33	600W		1	20	12	16	960	2.4	.5	120	14			33
34	800W	6.0	1	20	16	16	720	2.3	.5	78	14			34
35	900W		1	16	16	16	1040	2.6	.5	96	14			35
36	1000W		1	14	14	14	920	2.0	.5	92	12			36
37	1100W		1	20	12	16	920	2.7	.5	120	10			37
38	1200W	5.8	1	14	12	14	800	1.4	.5	102	10			38
39	1300W		1	12	10	14	1080	2.4	.5	116	12			39
40	G7		28	188	220	12	120	5.0	.5	76	82			40

COMMENT:

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35

AMAX EXPLORATION INC. ANALYTICAL REPORT (6)

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct 13, 1972 TYPE SAMPLES Soil Grid

PROJECT Tower Group LOCATION Dawood Mines

REQUESTED BY J. R Dawson/T. Tedrey DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	400N-1400W		1	20	18	16	920	2.4	1.0	118	16			01
02	1500W	6.3	1	18	16	16	800	2.6	.5	100	16			02
03	400N-100E		1	42	16	17	820	2.4	.5	70	12			03
04	200E		1	138	32	34	1720	4.2	.5	252	24			04
05	300E		1	54	22	16	680	2.8	.5	102	12			05
06	400E	6.2	1	46	24	17	1040	3.7	.5	84	16			06
07	500E		1	62	24	24	1420	3.6	.5	168	22			07
08	600E		1	62	22	20	1200	3.3	1.0	98	20			08
09	700E		1	94	22	32	1640	4.9	1.0	132	24			09
10	800E	6.3	1	100	24	36	1360	5.6	1.0	132	22			10
11	900E		2	72	40	32	1920	4.6	1.0	160	20			11
12	1000E		1	76	46	27	1420	4.0	1.0	132	20			12
13	1100E		1	64	54	24	1200	3.5	1.0	144	20			13
14	1200E	6.3	1	37	22	14	1240	1.9	.5	100	14			14
15	1300E		1	40	36	20	780	2.7	.5	132	16			15
16	1400E		1	48	66	24	680	2.4	1.0	258	14			16
17	1500E	6.0	1	56	40	20	960	2.7	1.0	177	16			17
18	800N-100W		1	52	28	17	620	2.2	1.0	104	16			18
19	200W		1	50	28	17	640	2.5	1.0	98	16			19
20	300W		1	32	24	12	520	1.7	.5	66	10			20
21	400W	6.2	1	14	12	16	760	2.6	.5	120	14			21
22	500W		1	16	12	12	1400	1.7	.5	154	16			22
23	600W		1	36	24	16	760	2.5	.5	102	14			23
24	700W		1	104	26	27	800	4.0	1.0	102	12			24
25	800W	6.1	1	36	20	16	600	2.7	.5	80	12			25
26	900W		1	46	24	16	360	2.9	.5	74	12			26
27	1000W		1	48	24	17	640	3.0	.5	100	16			27
28	1100W		1	28	20	16	620	2.5	.5	120	12			28
29	1200W	5.7	1	20	20	14	320	2.6	.5	94	14			29
30	1300W		1	32	20	16	640	2.6	.5	88	12			30
31	1400W		1	32	22	14	280	2.7	.5	68	12			31
32	800N-100E		1	34	26	20	1400	2.9	.5	124	16			32
33	200E		1	48	22	17	920	2.7	.5	92	14			33
34	300E		1	36	20	17	600	2.2	.5	67	12			34
35	400E	6.5	1	44	28	19	900	2.7	.5	130	14			35
36	500E		1	62	32	26	1420	3.6	1.0	136	22			36
37	600E		1	40	22	20	560	2.1	1.0	110	18			37
38	700E		1	154	24	44	1000	6.4	1.5	144	20			38
39	800E	6.2	1	100	30	32	460	4.3	1.0	116	16			39
40	1500W		1	22	16	16	360	2.4	.5	64	12			40

COMMENT:

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36

AMAX EXPLORATION INC. ANALYTICAL REPORT (7)

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 1972 TYPE SAMPLES Soil GRID

PROJECT TOWER GROUP LOCATION DAWOOD MINES

REQUESTED BY J.R. DAWSON/T. GODFREY DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	800N 900E		1	62	28	30	560	4.7	1.0	102	22			01
02	1000E		1	92	40	36	540	4.8	1.0	100	18			02
03	1100E		1	52	24	20	1140	2.6	.5	158	16			03
04	1200E	6.0	1	118	80	40	1080	4.0	1.0	112	18			04
05	1300E		4	382	46	44	760	4.6	1.5	100	22			05
06	1400E		6	*440	72	48	1020	5.7	1.5	98	22			06
07	1500E	6.2	4	236	70	36	800	4.3	1.5	104	28			07
08	1200N-100W		1	24	28	16	560	2.1	.5	104	16			08
09	200W		1	14	16	14	340	2.1	.5	88	12			09
10	300W		1	16	18	14	760	2.0	.5	124	14			10
11	400W	5.3	1	16	20	16	820	2.8	.5	132	14			11
12	500W		2	64	42	22	720	2.9	1.0	152	18			12
13	600W		1	22	24	16	880	2.3	.5	112	18			13
14	700W		1	38	24	16	760	2.5	.5	100	16			14
15	800W	5.8	1	32	22	12	520	2.7	.5	96	18			15
16	900W		1	24	20	16	960	2.1	.5	104	16			16
17	1000W		1	32	20	18	640	2.7	.5	96	16			17
18	1100W		1	40	22	20	600	2.7	.5	102	16			18
19	1200W	6.3	1	24	22	16	840	1.9	.5	104	12			19
20	1300W		1	34	34	18	440	3.3	.5	96	14			20
21	1400W		1	8	20	14	280	1.2	.5	116	12			21
22	1500W	6.1	1	40	60	26	420	3.4	.5	128	12			22
23	1200N-100E		1	32	30	20	760	2.6	.5	140	16			23
24	200E		1	36	42	24	520	3.0	.5	116	16			24
25	300E		1	30	36	20	640	2.4	.5	128	14			25
26	400E	5.9	1	22	40	20	560	2.2	.5	84	16			26
27	500E		1	36	52	24	340	3.4	1.0	72	16			27
28	600E		2	50	40	22	220	3.3	.5	58	14			28
29	700E		1	36	40	20	360	3.2	1.0	76	16			29
30	800E	6.0	3	76	44	20	240	3.6	1.0	74	20			30
31	900E		4	80	48	20	360	3.4	1.0	114	16			31
32	1000E		4	47	36	18	320	2.7	.5	76	12			32
33	1100E	4.9	1	52	76	24	1600	3.4	1.0	136	20			33
34	1600N-100W		1	16	20	14	600	1.9	.5	100	12			34
35	1600N-200W		1	14	18	16	780	2.0	.5	140	12			35
36	300W		1	18	20	16	520	2.4	.5	98	12			36
37	400W	6.5	1	16	24	14	800	2.4	.5	90	10			37
38	500W		1	16	28	16	1200	2.3	.5	154	12			38
39	600W		1	12	16	12	640	1.9	.5	116	10			39
40	G8		4	40	12	10	120	2.3	.5	84	20			40

COMMENT:

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29-1

AMAX EXPLORATION INC. ANALYTICAL REPORT (8)

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE Oct. 13, 72 TYPE SAMPLES Soil Grid

PROJECT TOWER GROUP LOCATION DAWOOD MINES

REQUESTED BY J. R. DAWSON/T. GODFREY DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	1600N-700W		1	12	12	12	420	2.1	.5	80	12			01
02	800W	6.3	1	12	12	12	440	2.1	.5	80	12			02
03	900W		1	14	12	12	520	2.2	.5	92	12			03
04	1000W		1	14	12	12	580	2.1	.5	104	12			04
05	1100W		1	12	12	10	580	2.0	.5	68	10			05
06	1200W	6.3	1	32	24	14	360	2.6	.5	88	12			06
07	1300W		1	20	16	14	840	2.0	.5	92	16			07
08	1400W		1	16	20	12	280	2.2	.5	120	16			08
09	1500W	6.5	1	16	20	14	880	2.2	.5	120	16			09
10	2000N-100W		1	8	16	8	560	1.7	.5	176	14			10
11	200W	6.3	1	12	16	12	560	2.1	.5	216	14			11
12	2000N-100E		1	4	8	10	260	2.2	.5	46	12			12
13	200E		1	10	18	12	440	2.0	.5	142	14			13
14	300E		1	10	16	10	380	1.7	.5	124	14			14
15	400E	6.3	1	8	14	10	480	2.0	.5	120	12			15
16	500E		1	12	28	12	920	2.1	.5	240	12			16
17	600E		1	6	20	10	380	1.8	.5	196	10			17
18	700E		1	12	20	12	660	2.1	.5	152	12			18
19	800E	5.6	1	22	40	22	1140	2.5	.5	214	16			19
20	G7		22	196	224	12	120	1.1	.5	20	68			20
21														21
22														22
23														23
24														24
25														25
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40														40

COMMENT:

DATE SAMPLES RECEIVED 2nd Nov. 1972

DATE REPORTS MAILED 31st Oct. 1972

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APPENDIX II

Procedures for Collection and Processing of Geochemical Samples

Analytical Methods for Ag, Mo, Cu, Pb, Zn, Fe, Mn, Ni, Co and W in sediments and soils; Mo, Cu, Zn, Ni and SO_4^{--} in waters.

Amax Exploration, Inc.
Vancouver Office.

September 1970

R.F. Horsnail

SAMPLE COLLECTION

Soils

B horizon material is sampled and thus organic rich topsoil and leached upper subsoil are avoided. Occasionally organic rich samples have to be taken in swampy depressions.

Samples are taken by hand from a small excavation made with a cast iron mattock. Approximately 200 gms of finer grained material is taken and placed in a numbered, high wet-strength, Kraft paper bag. The bags are closed by folding and do not have metal tabs.

Observations as to the nature of the sample and the environment of the sample site are made in the field.

Drainage Sediments

Active sediments are taken by hand from tributary drainages which are generally of five square miles catchment or less. Composite samples are taken of the finest material available from as near as possible to the centre of the drainage channel thus avoiding collapsed banks. More than one sample is taken if marked mineralogical or textural segregation of the sediments is evident.

Some 200 gm of finer material is collected unless the sediment is unusually coarse in which case the weight is increased to 1 kg. Samples are placed in the same type of Kraft paper bag as are employed in soil sampling. Water samples are taken at all appropriate sites. Approximately 100 mls are sampled and placed in a clean, screw sealed, polythene bottle. Observations are made at each site regarding the environment and nature of the sample.

Rock Chips

Composite rock chip samples generally consist of some ten small fragments broken from unweathered outcrop with a steel hammer. Each fragment weighs some 50 gms. Samples are placed in strong polythene bags and sealed with non-contaminating wire tabs. Samples are restricted to a single rock type and obvious mineralization is avoided.

Soil, sediment and rock samples are packed securely in cardboard boxes or canvas sacks and dispatched by road or air to the AMAX geochemical laboratory in Vancouver.

SAMPLE PREPARATION

Packages of samples are opened as soon as they arrive at the laboratory and the bags placed in numerical sequence in an electrically heated sample drier (maximum temperature 70°C).

After drying soil and sediment samples they are lightly pounded with a wooden block to break up aggregates of fine particles and are then passed through a 35 mesh stainless steel sieve. The coarse material is discarded and the minus 35 mesh fraction replaced in the original bag providing that this is undamaged and not excessively dirty.

Rock samples are exposed to the air until the outside surfaces are dry; only if abnormally wet are rocks placed in the sample drier. Rock samples are processed in such manner that a fully representative ½ g sample can be obtained for analysis. The entire amount of each sample is passed through a jaw crusher and thus reduced to fragments of 2 mm size or less. A minimum of 1 kg is then passed through a pulverizer with plates set such that 85% of the product will pass through a 100 mesh

screen. Where samples are appreciably heavier than 2 kg the material is split after jaw crushing by means of a Jones splitter. After pulverizing the sample is mixed by rolling on paper and is then placed in a Kraft paper bag.

SAMPLE DIGESTION

Digestion tubes (100 x 16 mm) are marked at the 5 ml level with a diamond pencil. Tubes are cleaned with hot water and concentrated HCl. 0.5 g samples are weighed accurately, using a Fisher Dial-O-Gram balance, and placed in the appropriate tubes.

To each of the samples thus prepared are added 2 ml of an acid mixture comprising 15% nitric and 85% perchloric acids. Racks of tubes are then placed on an electrical hot plate, brought to a gentle boil ($\frac{1}{2}$ hour) and digested for $4\frac{1}{2}$ hours. Samples unusually rich in organic material are first burned in a porcelain crucible heated by a bunsen burner before the acid mixture is added. Digestion is performed in a stainless steel fume hood.

After digestion tubes are removed from the hot plate and the volume is brought up to 5 ml with deionized water. The tubes are shaken to mix the solution and then centrifuged for one minute. The resulting clear upper layer is used for Cu, Mo, Pb, Zn, Ag, Fe, Mn, Ni and Co determination by a Perkin-Elmer 290B atomic absorption spectrophotometer. Analytical procedures are given on the following pages.

ANALYTICAL PROCEDURES

Silver

1. Scope - This procedure covers a range of silver in the sample from less than .5 to 1000 ppm

2. Summary of Method - The sample is treated with nitric and perchloric acid mixture to oxidize organics and sulphides. The silver then is present as perchlorate in aqueous solution. The concentration is determined by atomic absorption spectrophotometer

3. Interferences - Silver below 1 gamma/ml is not very stable in solution. Maintaining the solution in 20% perchloric prevents silver being absorbed on the glass container. Determination must be completed on the same day as the digestion.

   Samples high in dissolved solids, especially calcium, cause high background absorbance. This background absorbance must be corrected using an adjacent Ag line.

Silver AA Settings P.E. 290

Lamp - Ag

Current 4 ma position 3

Slit 7 A

Wavelength 3281A Dial 287.4

Fuel - acetylene - flow - 14

Oxidant - air - flow - 14

Burner - techtron AB 51 in line

Maximum Conc. 3 to 4x

Calibration

1. Set 1 gamma/ml to read 40 equivalent to 20 gamma/gm

   Factor $\frac{1}{2}$ x meter reading

   Check standards

   4, 10, 20, 40 ppm Ag in sample

2. Set 15 gamma/ml to 100 equivalent to 100 ppm

   Check standards

   40, 100 ppm

   Factor directly in ppm Ag

3. Rotate burner to maximum angle

   Set 10.0 gamma/ml Ag to read 100

   Check standards

   100, 200, 400, 1000 ppm Ag

   Factor 10x scale reading

4. Samples higher than 1000 ppm should be re-analyzed by assay procedure

5. Background correction for sample reading between 1 to 5 ppm

   Calibrate AA in step 1

   Dial wavelength to 300 (peak)

   Read the samples again

   Subtract the background reading from the first reading

Standards

1. 1000 gamma/ml Ag - 0.720 gm Ag_2SO_4 dissolved in 20 mls $Hx10_3$ and dilute to 500 mls

2. 100 gamma/ml Ag - 10 mls of above + 20 mls $HClO_4$, dilute to 100 mls

3. Recovery spiked standard

5 gamma/ml Ag - 5 mls 100 gamma/ml dilute to 100 mls with "mixed" acid

Working AA Standards

Pipette .2, .5, 1, 2, 5, 10 mls of 100 gamma/ml and 2, 5 mls 1.000 gamma/ml dilute to 100 mls with 20% $HClO_4$. This equivalent to 4, 10, 20, 40, 100, 200, 400, and 1000 ppm Ag in the sample .50 gm diluted to 10 mls.

Recovery Standard

Pipette 2 mls of .5 gamma/ml Ag in mix acids into a sample and carry through the digestion. This should give a reading of 20 ppm Ag + original sample content.

Follow the general geochemical procedure for sample preparation and digestion.

For low assay Ag, the same procedure is used. Ag is then calculated in oz/ton.

1 ppm = .0292 oz/ton

conversion factor

oz/ton = .0292 x ppm Ag

Zn Geochemical AA Setting

Lamp Zn

Current 8 #3 Slit 20A

Wave length 2133 Dial 84.9

Fuel - Acetylene Flow 14

Oxidant - Air Flow 14

Burner - P.E. short path 90°

Range

0 - 20 gamma/ml Factor 4x - 0 to 400 ppm

0 - 50 gamma/ml Factor 10x -0 to 1000 ppm

For Waters - Burner AB- 51 in line 1 gamma/ml read 100 to give 0 to 1000 ppb

High Zn Burner Boling in line. Wavelength 3075. Dial 250 Slit 7A

Fuel 14 Air 14.5

0 to 1000 gamma/ml read 0 to 20 Factor 400 x

Pure Standard 10,000 gamma/ml

1 gm Zn dissolved, H_2O, HCl, HNO_3, $HClO_4$, fumed to $HClO_4$ - make up to 100 mls H_2O

1000, 100 gamma/ml and 100 ml by dilution in 20 % $HClO_4$

0 to 200 gamma/ml Zn use combined Cu, Ni, Co, Pb, Zn standards

Pipette

1, 2, 3, 5, 8, 10 mls of 10,000 gamma/ml - dilute to 100 mls with 20% $HClO_4$ to give

100, 200, 300, 500, 800, 1000 gamma/ml Zn for high standards

Co Geochemical AA Setting

Lamp - 5 multi element

Current 10 #4 Slit 2A

Wavelength 2407 Dial 133.1

Fuel - Acetylene Flow 14

Oxidant - Air Flow 14

Burner - AB 51 in line

Range

0 - 10 gamma/ml read 100 Factor 2 x reading to 200 ppm

0 - 20 gamma ml read 100 Factor 4 x reading to 400 ppm

Burner at maximum angle

0 - 100 gamma/ml read 100 Factor 20 x reading to 2000 ppm

0 - 200 gamma/ml read 100 Factor 40 x reading to 4000 ppm

Standards - 1000 gamma/ml

1.000 gm cobalt metal dissolved in HCl, HNO, and fumed into $HClO_4$, dilute to 1 liter

Pipette

1, 2, 10, 20 mls into 100 ml vol flasks diluted to mark with 20% $HClO_4$

This gives

10, 20, 100, 200 gamma/ml Co

Mixed - combination standards of Cu, Ni, Co, Pb, Zn

of

1, 2, 5, 10, 20, 30, 50, 80, 100, 150, 200 gamma/ml are used for calibration

Mn Geochemical AA Setting

Lamp Multi element Ca, Ni, Co, Mn Cr

Current 10 #4 Slit 7A

Wave length 4030.8 Dial 425.2

Fuel - Acetylene Flow 14.0

Oxidant - Air Flow 14.0

Burner - P.E. short path (or AB 50)

Range

0 - 100 gamma/ml Factor 20x - 0 to 2000 ppm

0 - 200 gamma/ml Factor 40x - 0 to 4000 ppm

Burner 90°

0 - 1000 gamma/ml Factor 200x - 0 to 20,000 ppm

0 - 2000 gamma/ml Factor 400x - 0 to 40,000 ppm

EDTA Extraction - use AB 51 in line

0 - 20 gamma/ml Factor 4x - 0 to 400 ppm

Standards

Fisher 10,000 gamma/ml (ml)

10x Dilution 1000 gamma/ml

Pippette

.5, 1, 2, 3, 5, 8, 10, ml of 1000 gamma/ml

2, 3, 5, 8, 10, 15, 20 ml of 10,000 gamma/ml dilute to 100 mls with 20% $HClO_4$. This gives

5, 10, 20, 30, 50, 80, 100, 200, 300, 500, 800, 1000, 1500, 2000 gamma/ml.

Mo Geochemical AA Setting

Lamp ASL H/C Mo

Current 5 #5 Slit 7A

Wavelength 3133 Dial 260.2

Fuel - Acetylene Flow 12.0 to give 1" red feather

Oxidant - Nitrous oxide Flow 14.0

Burner - AB 50 in line

Caution read the operation using N_2O and acetylene flame at end of general AA procedure

Range

0 - 10 gamma/ml Factor 2x - 0 to 200 ppm

Rotate burner to max. angle

0 - 50 gamma/ml Factor 10 x 0 to 1000 ppm

0 - 100 gamma/ml Factor 20 x 0 to 2000 ppm

Standards 1000 gamma/ml

Dissolve .750 gms MoO_3 (acid molybdic) with 20 mls H_2O, 6 lumps NaCH, when all dissolved, add 20 mls HCl, dilute to 500 mls 100 gamma/ml - 10 x dilution

Pipette

.2, .5, 1, 2, 3, 5, 8, 10 mls of 100 gamma/ml

2, 3, 5, 8, 10 mls of 1000 gamma/ml add 5 mls 10% $AlCl_3$ and dilute to 100 mls with 20% $HClO_4$

This gives

.2, .5, 1, 2, 3, 5, 8, 10, 20, 30, 50, 80, 100 gamma/ml Mo

Fe Geochemical AA Setting

Lamp - Fe

- Do not use multi element Fe

Current 10 #4 Slit 2A

Wavelength 3440.6 Dial 317.5

Fuel - Acetylene Flow 14.0

Oxidant - Air Flow 14.0

Burner - PE Short Path 90°

Range

0 - 5000 gamma/ml 0.1 x % - 0 to 10.0%

0 - 10,000 gamma/ml 0.2 x % - 0 to 20.0%

Higher Fe - 10 x dilution

Standards 10,000 gamma/ml

Weigh 5.000 gms iron wires, into beaker, add H_2O, HCl, HNO_3, $HClO_4$, heat to $HClO_4$ fumes. Add $HClO_4$ to 100 mls + 100 mls H_2O, warm, dilute to 500 mls

Pipette

1, 5, 10, 20, 30, 50, 80 mls 10,000 gamma/ml dilute to 100 mls with 20% $HClO_4$ to give

100, 500, 1000, 2000, 3000, 5000, 8000 gamma/ml to be equivalent to .2, 1.0, 2.0, 4.0, 6.0, 10.0%, 16.0% Fe in geochem sample

Ni Geochemical AA Setting

Lamp P.E. H/C. Ni or multi element Cu, Ni, Co, Mn, Cr

Current 10 #4, Slit 2A

Wave length 3415 Dial 312.5

Fule - Acetylene Flow 14.0

Oxidant - Air Flow 14.0

Burner AB 51 in line

Range

0 - 20 gamma/ml Factor 4x - 0 - 400 ppm

0 - 100 gamma/ml Factor 20x - 0 - 2000 gamma

45° 0 - 200 gamma/ml Factor 40x - 0 - 4000 ppm

0 - 500 gamma/ml Factor 100x - 0 - 10,000 ppm

Ni in waters and very low ranges

Wave length 2320 Dial 113

Range 0 - 5 gamma/ml Factor 1x - 0 - 100 ppm

Standards 10,000 gamma/ml

1.000 gm pure Ni metal dissolved in HCl, HNO_3, $HClO_4$ to perchloric fumes, dilute to 100 ml H_2O

1000 gamma/ml and 100 gamma/ml Successive 10x dilutions in 20% HCl

1, 2, 5, 8, 10 mls of 100 gamma/ml

2, 5, 8, 10 mls 1000 gamma/ml

2, 5, 8, 10 mls 10,000 gamma/ml - dilute to 100 mls in 20% HClO4. This gives

1, 2, 5, 8, 10, 20, 50, 80, 100, 200, 500, 800, 1000 gamma/ml

Combined Standards - Cu, Ni, Co, Pb, Zn is used as a working standard

Cu Geochemical AA Setting

Lamp Single Cu or

5 multi element

Current 10 for multi element #4 Slit 7A

4 for single #3 Slit 7A

Wavelength 3247 Dial 280

Burner Techtron AB 51 (For Cu in natural waters)

P.E. Short Path (For geochem)

Fuel Acetylene Flow 14

Oxidant Air Flow 14

Range

0 - 5 gamma/ml Factor 1x to 100 ppm (for low Cu)

0 - 20 gamma/ml Factor 4x to 400 ppm

Burner 90°

0 - 200 gamma/ml Factor 40x to 4000 ppm

Wavelength 2492 Dial 147

Burner in line

Range

0 - 1000 gamma/ml Factor 200x to 20,000 ppm

0 - 2000 gamma/ml Factor 400x to 40,000 ppm

Higher range than 40,000 ppm requires 10x dilution

Standards

10,000 gamma/ml

1.000 gm metal powder, H_2O, HCl, HNO_3 until dissolved, add $HClO_4$, fume dilute to 100 mls

1000 gamma/ml 10x dilution above in 20% $HClO_4$

2000 gamma/ml 20 mls 10,000 gamma/ml - dilute to 100 mls in 20% $HClO_4$

100 gamma/ml 10x dilution 1000 gamma/ml dilute to 100 mls in 20% $HClO_4$

200 gamma/ml 10x dilution 2000 gamma/ml dilute to 100 mls in 20% $HClO_4$

Pipette

1, 2, 3, 5, 8, 10 mls 100 gamma/ml - dilute to 100 mls with 20% $HClO_4$ to give 1, 2, 3, 5, 8, 10 gamma/ml

Combined standards Cu, Ni, Co, Pb, Zn

1, 2, 5, 10, 20, 30, 50, 80, 100, 150, 200 gamma/ml

Pb Geochemical AA Setting

Lamp ASL H/c Pb

Current 5 ma Slit 7A

Wave length 2833 Dial 208

Fuel - acetylene Flow 14

Oxidant - air Flow 14

Burner AB 51 in line

Range

0 - 20 gamma/ml to read 0 to 80. Factor 5x 0 to 500 ppm

0 - 200 gamma/ml to read 0 to 80. Factor 50x 0 to 5000 ppm

Standards - 10,000 gamma/ml

1.000 pure metal, dissolved in HNO_3, fumed to $HClO_4$ make up to 100 mls in 20% $HClO_4$

1000 gamma/ml and 100 gamma/ml Successive 10x dilutions in 20% $HClO_4$

Pipette

1, 2, 5, 8, 10 mls 100 gamma/ml

2, 5, 8, 10, 20 mls 1000 gamma/ml dilute to 100 mls in 20% $HClO_4$ this gives

1, 2, 5, 8, 10, 20, 50, 80, 100, 200 gamma/ml

Combined Standards Cu, Ni, Co, Pb, Zn, are used as working standards

W in Soils and Silts

Reagents and apparatus

Test tubes - pyrex disposable

Test tubes - screw cap

Bunsen Burner

Flux - 5 parts Na_2CO_3

4 parts NaCl

1 part KNO_3 pulverized to -80 mesh

7% $SnCl_2$ in 70% HCl

20% KSCN in H_2O

Extractant - 1 part tri-n-butyl phosphate

9 parts carbon tetrachloride

Standards

1000 gamma/ml W

.18 gms Na_2WO_4 $2H_2O$ dissolved in H_2O, make up to 100 mls

100 gamma/ml, 10 gamma/ml by dilution

Standardization

Pipette .5, 1, 2, 3, 5, 8, 10 ml of 10 gamma/ml

and 1.5, 2 mls of 100 gamma/ml - dilute to 10 mls

continue from step #4

Artificial colors - Nabob pure Lemon Extract, dilute with 1:1 ethanol and water to match. Tightly seal these for permanent standards

Procedure

1. Weigh 1.0 gram sample, add 2 gm flux, mix

2. Sinter in rotary for 2 to 3 minutes (Flux dull read for one minute)
3. Cool, add 10 mls H_2O, heat in sand bath to boiling, cool, let sit overnight
4. Stir, crush, and mix. Let settle
5. Take 2 ml aliquot into screw cap test tube
6. Add 7 mls $SnCl_2$, heat in hot water bath for 5 minutes (80°C)
7. Cool to less than 15°C
8. Add 1 ml 20% KSCN, mix (if lemmon yellow; compare color standard 10x)
9. Add $\frac{1}{2}$ ml extractant, cap, shake vigorously 1 minute
10. Compare color

Molybdenum in Water Samples

1. Transfer 50 mls to 125 separatory funnel
2. Add 5 ml .2% ferric chloride in conc HCl
3. Add 5 mls of mixed KSCN and $SnCl_2$
4. Add 1.2 mls isopropyl ether, shake for 1 minute, and allow phases to separate
5. Drain off water
6. Compare the color of extractant

Standardization

Pipette 0, .2, .5, 1, 2, 3, 4, 5, mls of 1 gamma/ml and 1, 1.5, 2, mls of 10 gamma/ml dilute to 50 mls with demineralized H_2O, and continue step #2.

This equivalent to

1, 4, 10, 20, 40, 60, 80, 100, 200, 300, 400 ppb Mo

Artificial color - Nabob orange extract dilute with 1:1 H_2O to methanol to match. Seal tightly

$SnCl_2$ - 15% in 15% HCl

300 gm $SnCl_2 \cdot 2H_2O$ + 300 mls HCl, until $SnCl_2$ dissolved dilute to 2 liters

KSCN - 5% in H_2O

Mixed $SnCl_2$ - KSCN

3 parts $SnCl_2$ to 2 parts KSCN

Water Samples Run for AA

1. Cu - 2 gamma/ml reads 80 scale therefore 1 unit = 25 ppb

2. Zn - 1 gamma/ml reads full scale therefore 1 unit = 10 ppb

3. Ni - 2.5 gamma/ml reads 50 scale therefore 1 unit = 50 ppb

Burner: long slot techtron burner in line

Sulphate in Natural Waters

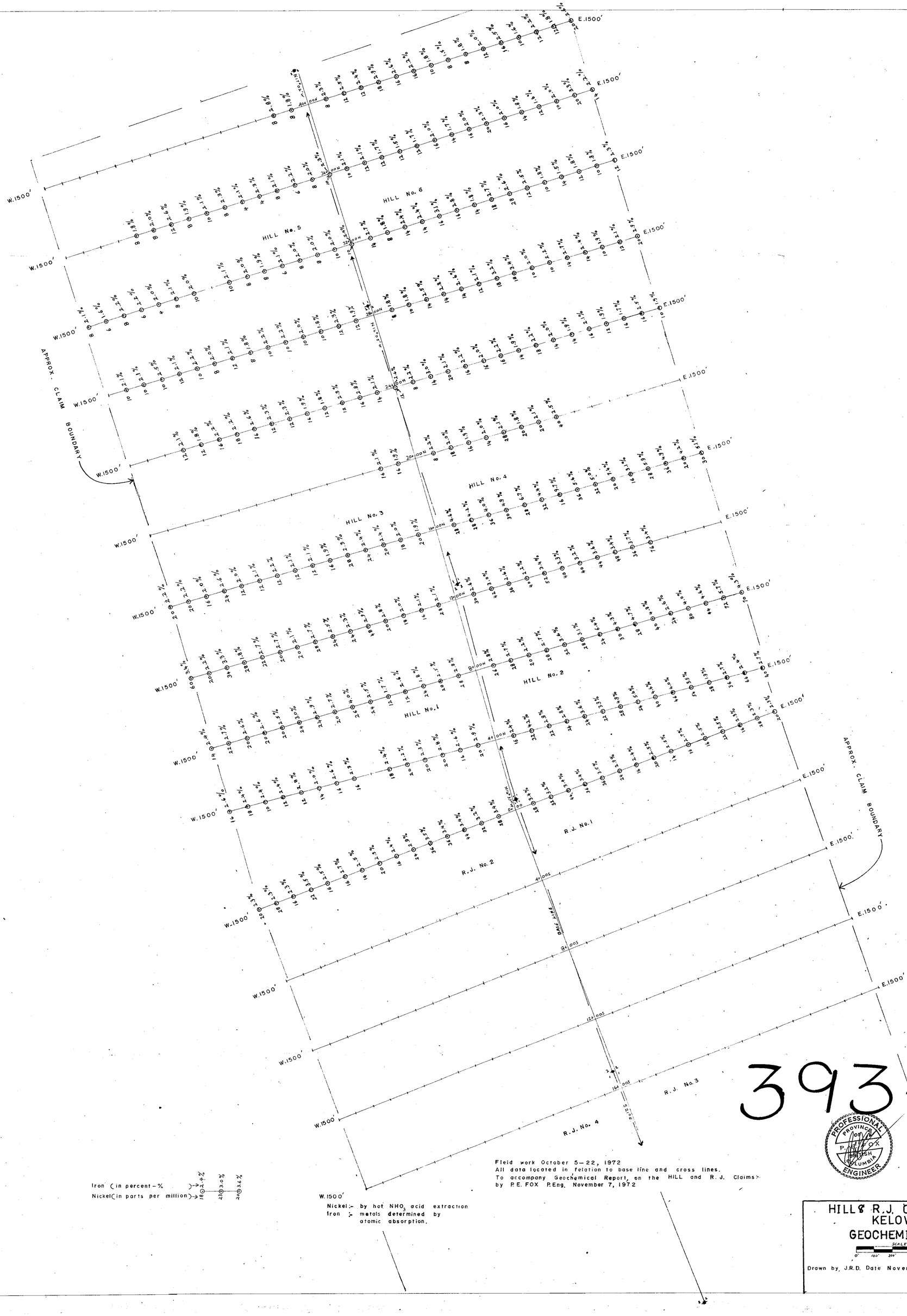
1. Pipette 0.5 ml sulphate reagent mix into a colorimetric tube
2. Add 5 ml water sample and mix
3. Read at 343 mμ against a demineralized water blank
4. Read again at 400 mμ and subtract from sulphate reading
5. Calculate ppm sulphate from the graph

Reagent

Dissolve 54 grams red mercuric oxide (J.T. Baker 2620- Can Lab) in 185 ml 70% perchloric acid and 20 ml H_2O, shake for one hour. Add 46.3 grams ferric perchlorate $[Fe(ClO_4)_3 \cdot 6H_2O]$ (GFS 39) and 47 grams aluminum perchlorate $[Al(ClO_4)_3 \cdot 8H_2O]$ (GFS 2) Add 400 ml water to dissolve, let settle overnight, decant into bottle and make to 1 liter

pH MEASUREMENTS

Soil and drainage sediment samples are dampened with water in a glass beaker to a pasty consistency. Demineralized water is used for this purpose as it has a low buffer capacity and thus does not influence the pH of the sample. Measurement is made with a Fisher Acumet pH meter. Electrodes are stored in buffer overnight. A 30 minute warm up time is allowed for the instrument each morning. A 10 ml aliquot is taken from water samples for pH measurement.



Iron (in percent—%) → 1@2.4% 2@3.0% 2@3.6%
Nickel (in parts per million) → 18 23 24

Nickel:- by hot NHO_3 acid extraction
Iron :- metals determined by atomic absorption.

Field work October 5—22, 1972
All data located in relation to base line and cross lines.
To accompany Geochemical Report, on the HILL and R.J. Claims
by P.E. FOX P.Eng. November 7, 1972

3934 M-6

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — P.E. FOX

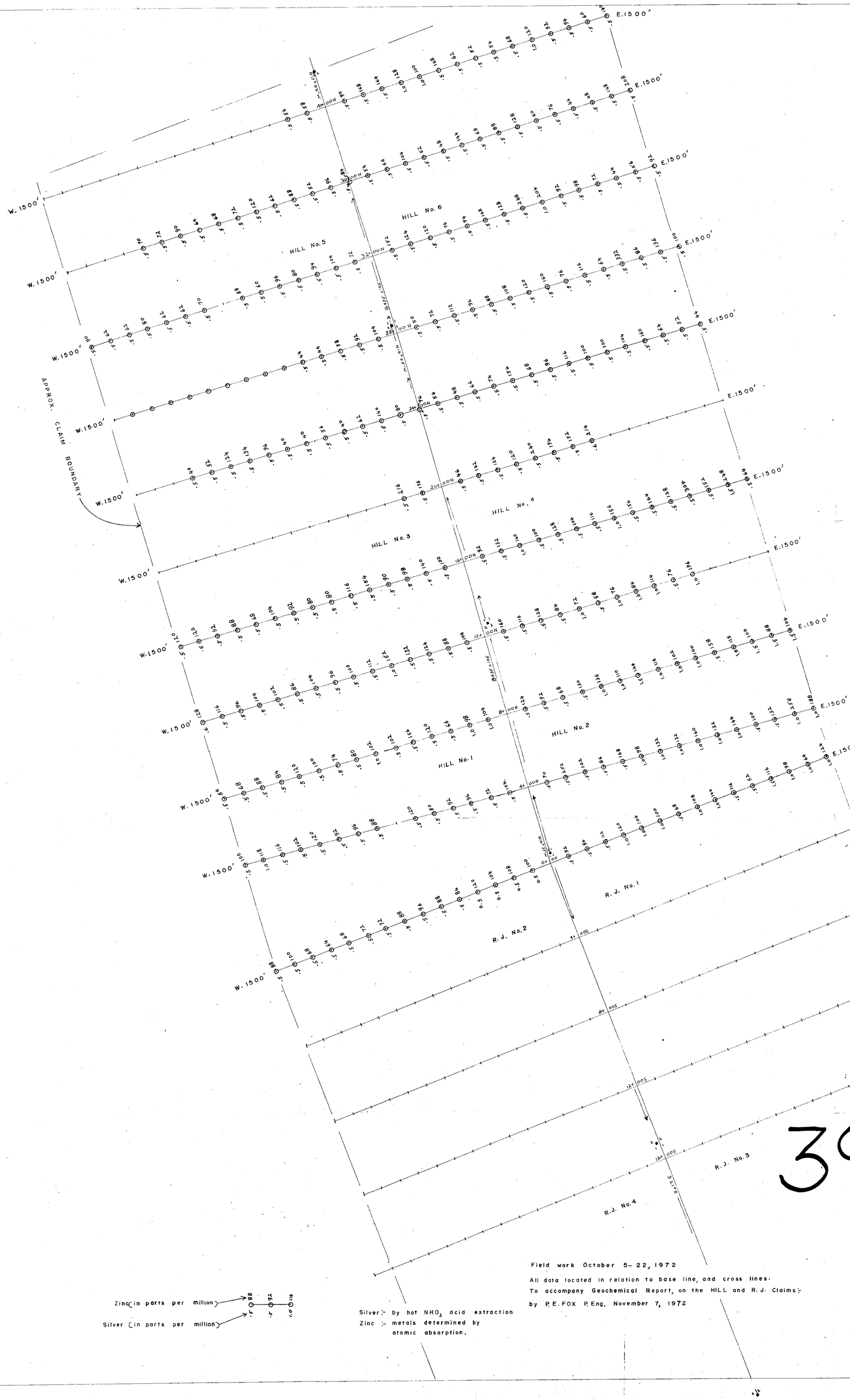
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3934 MAP #6

HILL & R.J. CLAIMS (49° 59' N. 119° 31' W.)
KELOWNA, B.C.
GEOCHEMICAL SURVEY

SCALE IN FEET
0 100' 200' 400' 800'
1" = 200'

Drawn by, J.R.D. Date November 7, 1972

Figure 4



Zinc (in parts per million)

Silver (in parts per million)

Silver :- by hot NHO_3 acid extraction
Zinc :- metals determined by atomic absorption.

Field work October 5- 22, 1972

All data located in relation to base line, and cross lines.
To accompany Geochemical Report, on the HILL and R.J. Claims:-
by P.E. FOX P.Eng. November 7, 1972

3934 M-5

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA P.E. FOX

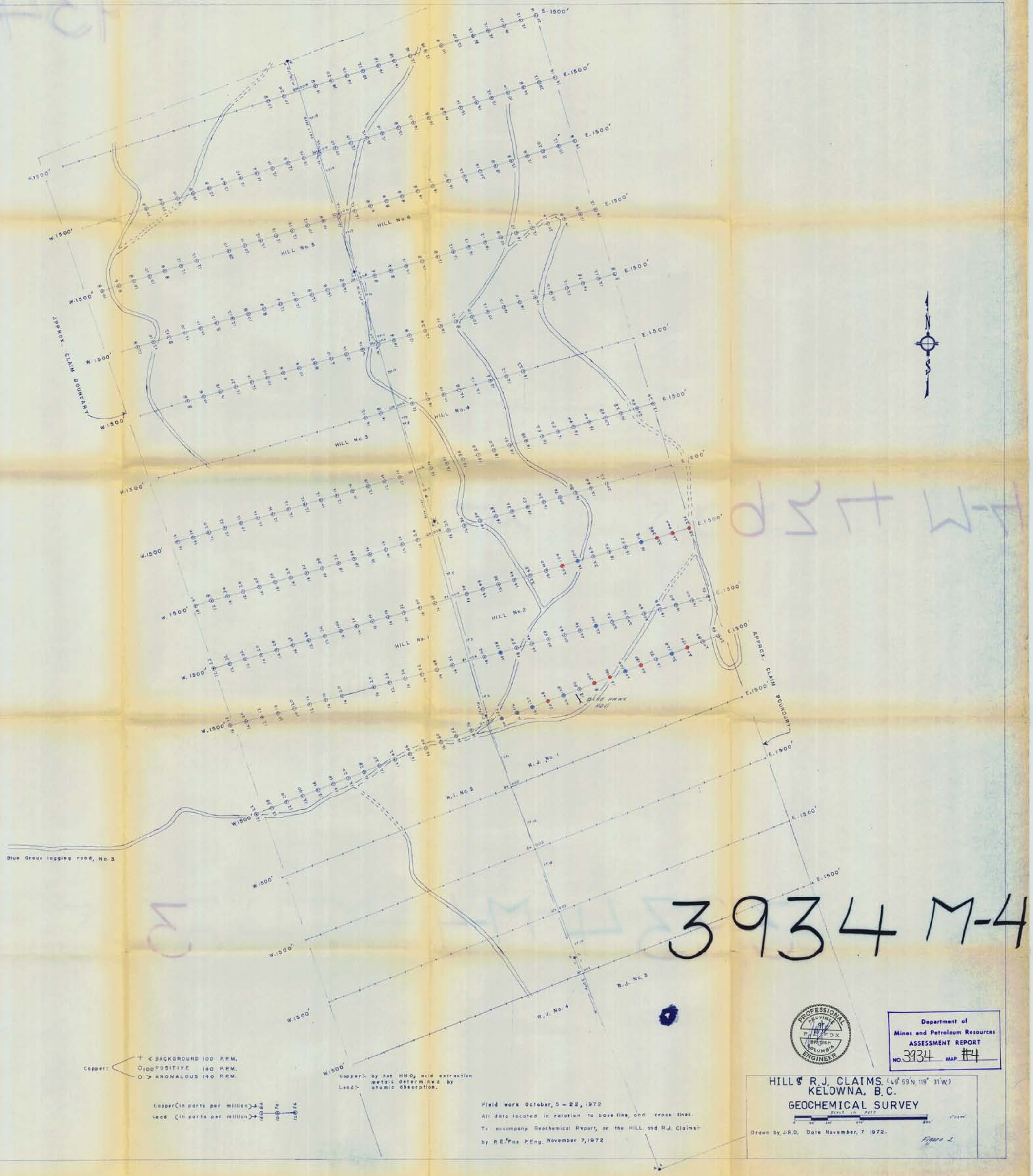
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3934 MAP #5

HILL & R.J. CLAIMS (49° 59'N. 119° 31' W.)
KELOWNA, B.C.
GEOCHEMICAL SURVEY

SCALE IN FEET
0' 100' 200' 400' 800'
1"=200'

Drawn by, J.R.D. Date November 7, 1972.

Figure 3


E. 1500'
W. 1500'
HILL No. 6
HILL No. 5
HILL No. 4
HILL No. 3
HILL No. 2
HILL No. 1
APPROX. CLAIM BOUNDARY
Blue Hawk No. 1
R.J. No. 1
R.J. No. 2
R.J. No. 3
R.J. No. 4
Blue Grous logging road, No. 3
Copper:- + < BACKGROUND 100 P.P.M.
O 100 POSITIVE 140 P.P.M.
O > ANOMALOUS 140 P.P.M.
Copper (in parts per million) 0 to 100 to 200
Lead (in parts per million) 0 to 10 to 20
Copper:- by hot HNO3 acid extraction metals determined by atomic absorption.
Lead:-
Field work October, 5 – 22, 1972
All data located in relation to base line, and cross lines.
To accompany Geochemical Report, on the HILL and R.J. Claims
by R.E. Fox P.Eng. November 7, 1972
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA R.E. FOX
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3934 MAP #4
HILL & R.J. CLAIMS. (49° 59' N. 119° 31' W.)
KELOWNA, B.C.
GEOCHEMICAL SURVEY
Drawn by J.R.D. Date November, 7 1972.
Figure 2

3934 M-4