

REPORT ON
SOIL GEOCHEMISTRY
BRIAN BORU PROSPECT
BRIAN BORU GROUP (GAM I to IV claims)

Omineca Mining Division, 93 M/4E
Lat. $55^{\circ} 04'$ - Long. $127^{\circ} 37'$

Asarco Exploration Company of Canada, Ltd.
(owner & operator)

by

D. H. OLSON

21 October 1980

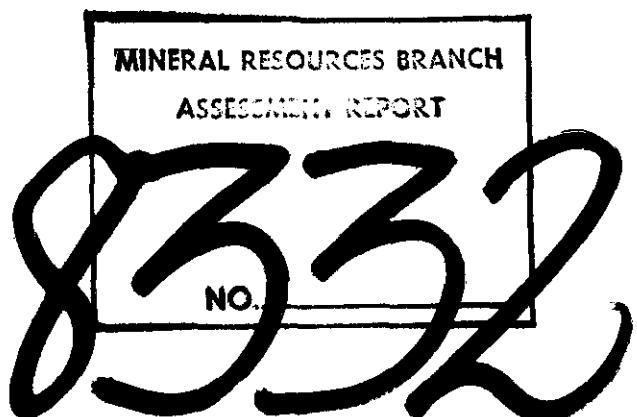


TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	1
LOCATION AND ACCESS	1
CLAIMS	1
WORK DONE	2
GEOLOGY	2
GEOCHEMISTRY	3
CONCLUSIONS	3
REFERENCES	5
FIGURES	
Figure 1	- Location Map
Figure 2	- Claim location Map
Figure 3 - 6	- Histograms Ag, Pb, Zn, & Cu
Figure 7 - 10	- Cumulative Frequency plots Ag, Pb, Zn & Cu
Figure 11	- Geology - Regional
Figure 12	- Geology - GAM Claims
Figure 13	- Sample location Map
Figure 14	- Ag in soils
Figure 15	- Pb in soils
Figure 16	- Zn in soils
Figure 17	- Cu in soils
APPENDICES	
Appendix "A"	- 1980 Expenditures Brian Boru Prospect
Appendix "B"	- Assays
Appendix "C"	- Analytical Procedures
Appendix "D"	- Certificate

SUMMARY

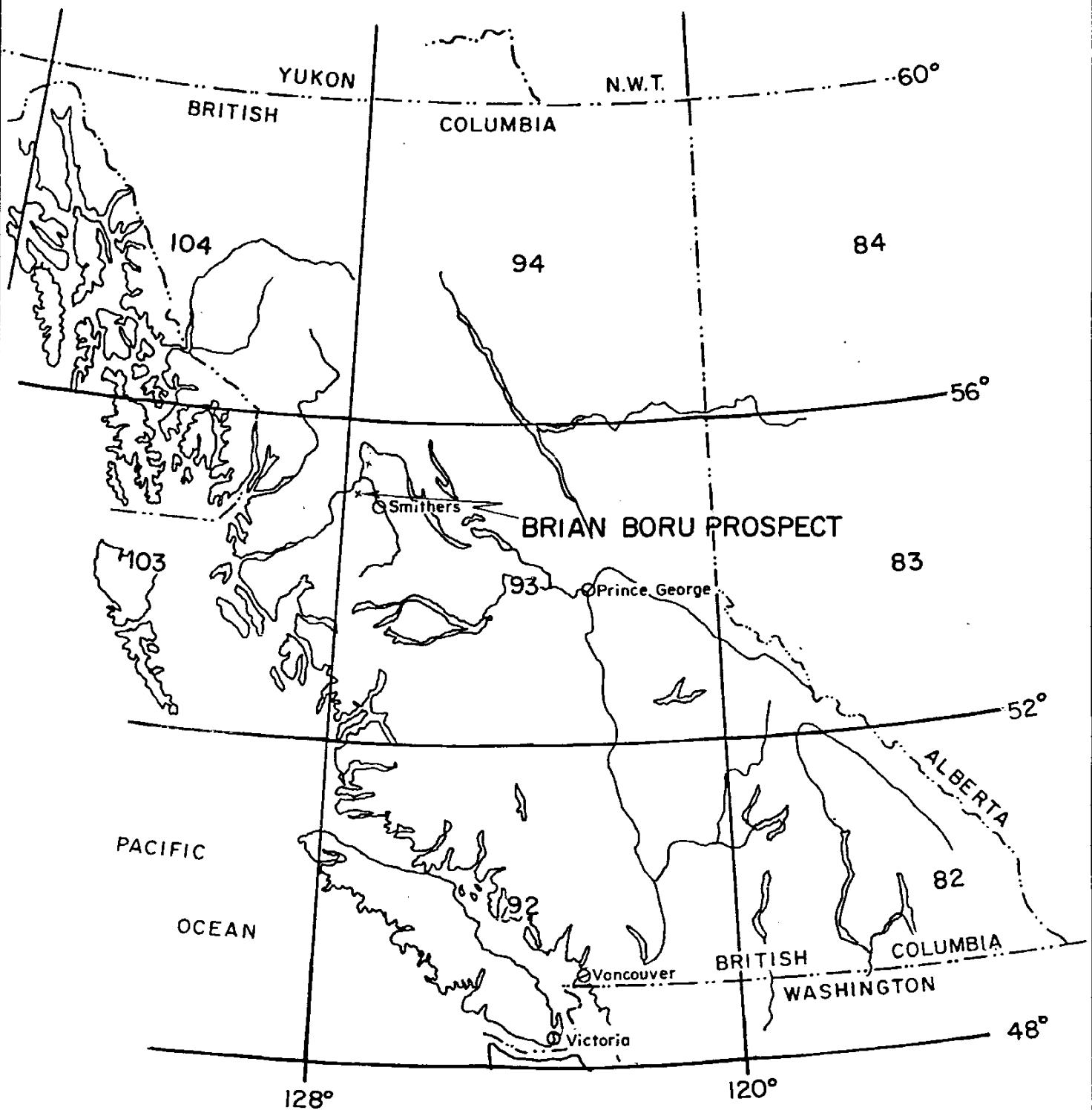
During July 8 to 23, 1980, 156 soil samples were collected from the GAM I, II, & III claims and analyzed for Ag, Cu, Pb, and Zn. This work has delineated a number of soil anomalies which are anomalous in Ag, Pb, Zn, & Cu. Additional work in the form of geophysical surveys, (magnetic and induced potential) and diamond drilling is recommended to extend the investigation of the anomalies.

LOCATION AND ACCESS

The Brian Boru Prospect is located 19.5 kilometers south of New Hazelton, B.C., near $55^{\circ} 04' N$ - $127^{\circ} 37' W$ in 93M/ 4E, Omineca Mining Division; Figures 1 & 2. The GAM I to IV claims which straddle the South Fork of Brian Boru Creek cover moderately steep terrain which is in part heavily forested. Elevations on the GAM Claims range from 1160 meters to 2116 meters. Access is by helicopter from New Hazelton or Smithers.

CLAIMS

<u>Claim</u>	<u>Units</u>	<u>Month of</u>	<u>Record</u>	<u>No.</u>	<u>Group</u>
		<u>Record</u>			
GAM I	6	Aug.	1937)	
GAM II	6	Aug.	1976)	Brian Boru
GAM III	10	Oct.	2177)	Group
GAM IV	4	Oct.	2178)	



ASARCO

Vancouver

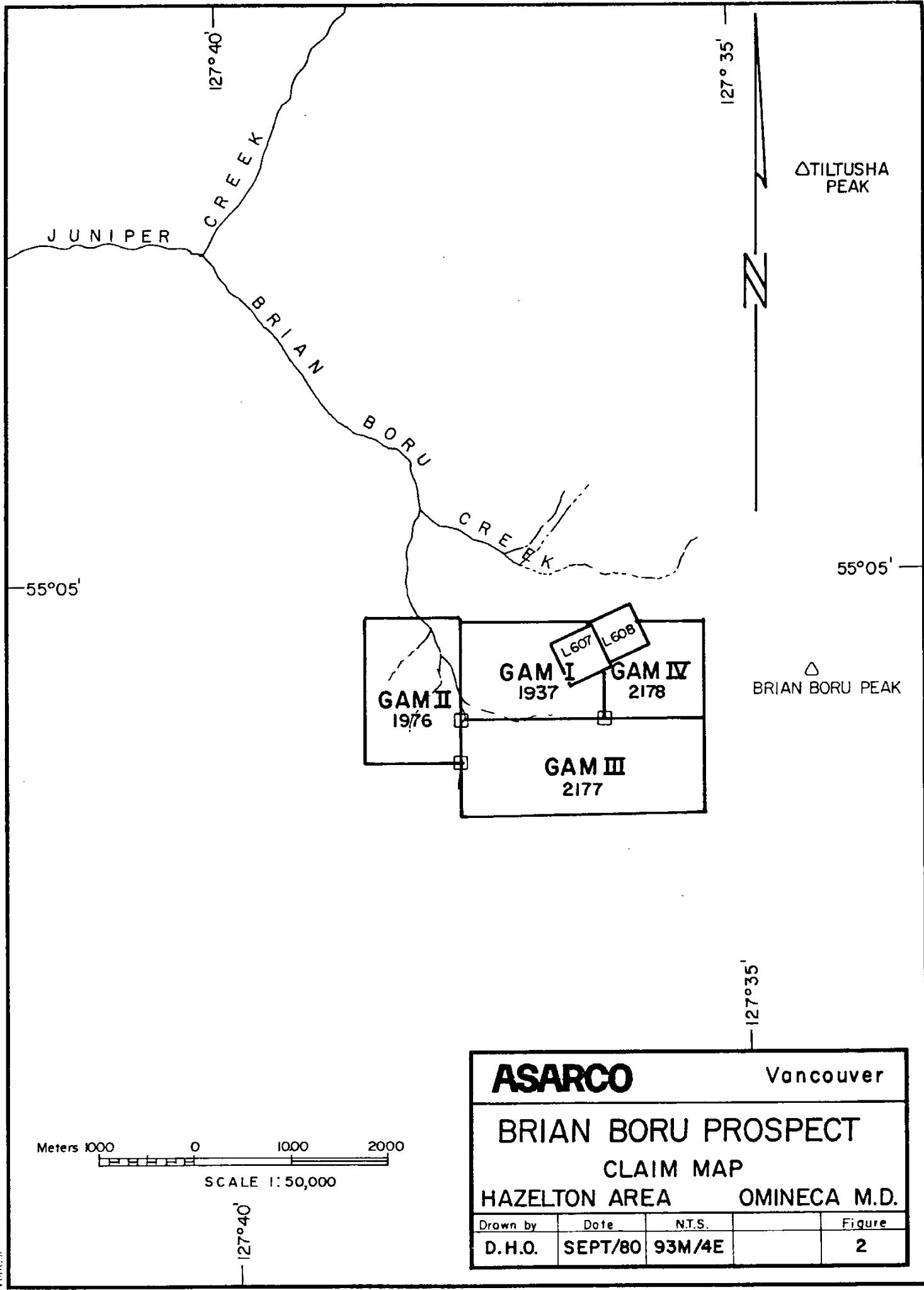
BRIAN BORU PROSPECT

LOCATION MAP

HAZELTON AREA

OMINECA M.D.

Drawn by	Date	N.T.S.		Figure
D.H.O.	SEPT/80	93M/4E		I



WORK DONE

Two people spent a total of 32 work days establishing a 50 meter grid and collecting 156 soil samples from the GAM I, II, & III claims.

The cost of carrying out the geochemical soil survey is itemized in Appendix "A".

GEOLOGY

The area of interest in the vicinity of the GAM Claim Group lies approximately 5.7 Km. west of the south end of the Rocher Deboule stock of Cretaceous age. See Figures 11 and 12. The GAM Claim Group is underlain by rocks of the Upper Jurassic and Lower Cretaceous Hazelton Group, which includes the Brian Boru and the Red Rose Formations. Rocks constituting the Brian Boru Formation are varicoloured porphyritic andesite flows and breccias, tuffs, minor volcanic sandstone and conglomerate. Within the Red Rose Formation, greywacke, shale siltstone and hornfelsic equivalents, make up the rock assemblage. The general trend of the volcanic rocks is northwesterly with a flat to moderate dip to the northeast. Sedimentary rocks of the Red Rose Formation were noted to trend northwesterly to northeasterly with shallow dips to the northeast and east. Within the grid area outcrops are sparse.

Traversing the grid and the GAM II claim is the northwesterly trending, normal CAP Fault which forms the contact between the Brian Boru and Red Rose Formations.

Mineralization consists of sphalerite, galena and chalcopyrite along with pyrite which occur in altered porphyritic andesite within the confines of the GAM I & II claims in the vicinity of some old pits and trenches. The mineralized rock which occurs as float, was not observed in outcrop.

GEOCHEMISTRY

A total of 156 soil samples were collected from the GAM I, II, & III claims during July and August, 1980. All samples were obtained from the "B" soil horizon.

Background, threshold and anomalous levels for the geochemical data were determined using frequency distribution histograms and cumulative frequency plots as shown in Figure 3 to 10 inclusive. Sample data and analytical results are given in Appendix "B" and are shown on accompanying maps as Figures 13 to 17 inclusive.

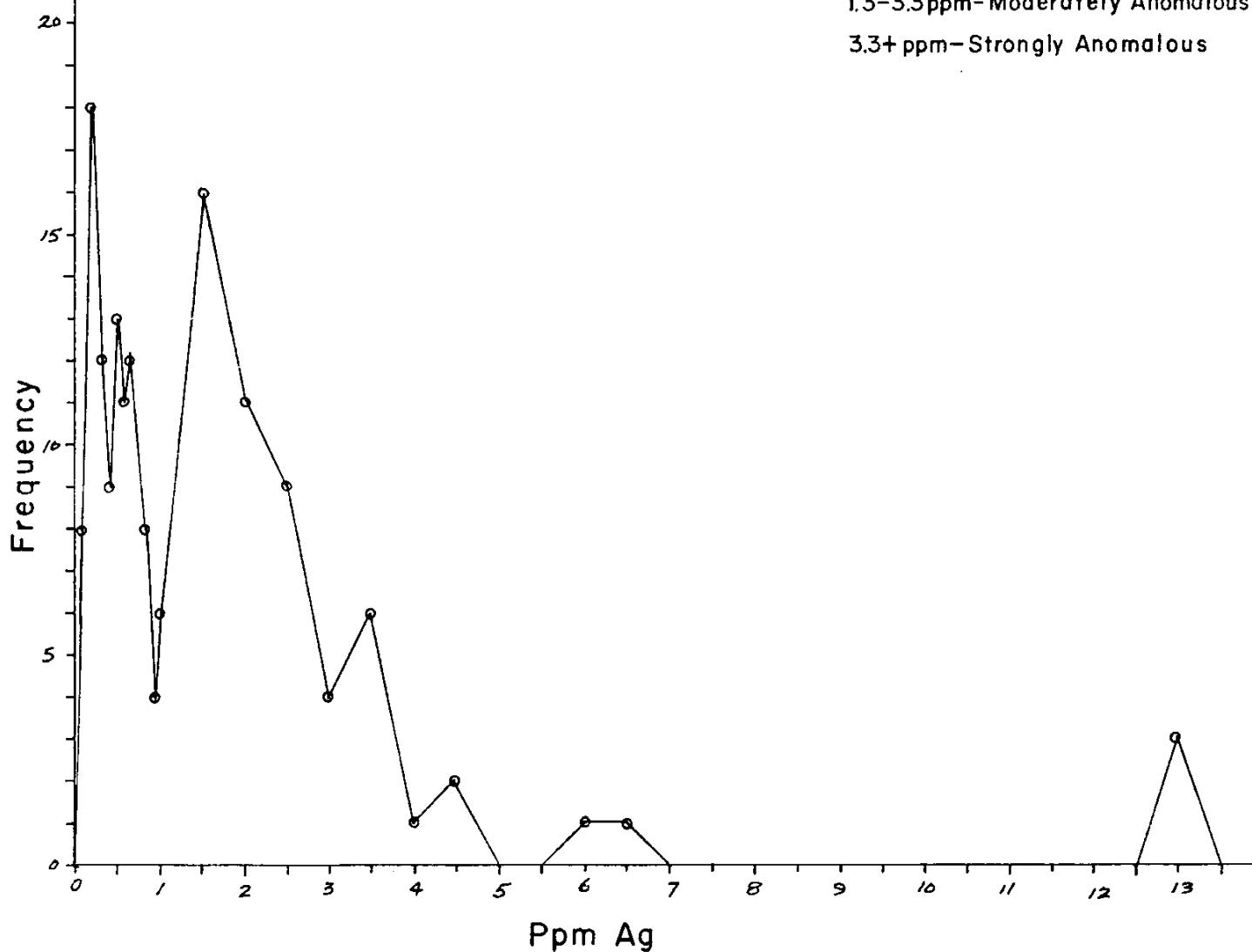
CONCLUSIONS

Parameters for background, threshold, and anomalous values for soils on the GAM I, II, & III claims are determined as follows:

	(0 - 0.4 ppm	- background
	(0.5 - 0.6 ppm	- threshold
Ag	(0.7 - 1.2 ppm	- weakly anomalous
	(1.3 - 3.3 ppm	- Moderately anomalous
	(3.3 + ppm	- strongly anomalous

ANOMALIES
(156 Samples)

- 0-0.4ppm-Background
- 0.5-0.6ppm-Threshold
- 0.7-1.2ppm-Weakly Anomalous
- 1.3-3.3ppm-Moderately Anomalous
- 3.3+ ppm-Strongly Anomalous



ASARCO

Vancouver

BRIAN BORU PROSPECT

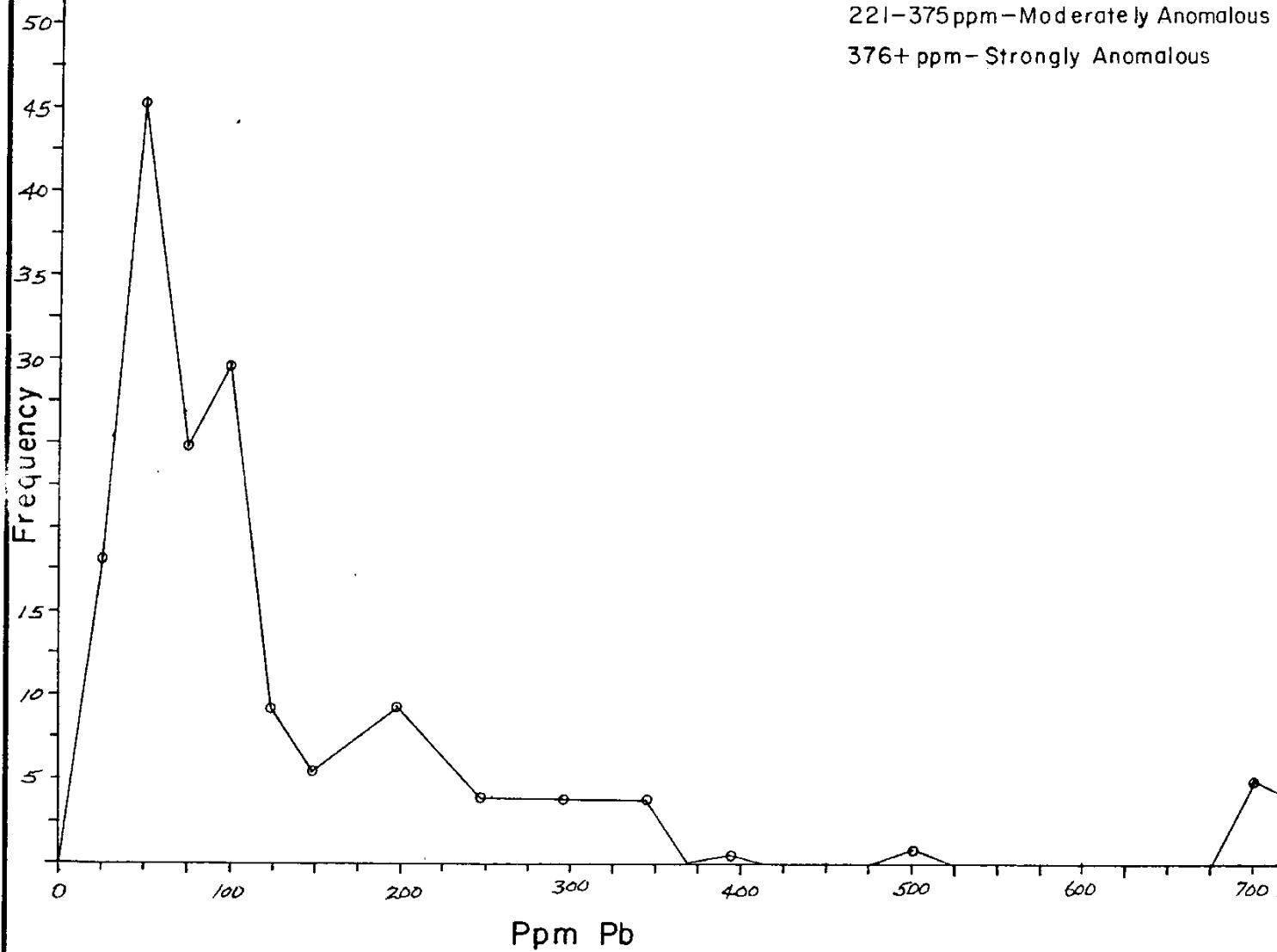
HISTOGRAM-SOILS

HAZELTON AREA OMINNECA M.D.

Drawn by	Date	N.T.S.		Figure
D.H.O.	SEPT/80	93M/4E		3

ANOMALIES (156 Samples)

0-60ppm—Background
61-85ppm—Threshold
86-220 ppm—Weakly Anomalous
221-375 ppm—Moderately Anomalous
376+ ppm—Strongly Anomalous



ASARCO

Vancouver

BRIAN BORU PROSPECT
HISTOGRAM-SOILS
HAZELTON AREA OMINeca M.D.

Drawn by	Date	N.T.S.		Figure
D.H.O.	SEPT/80	93M/4E		4

ANOMALIES

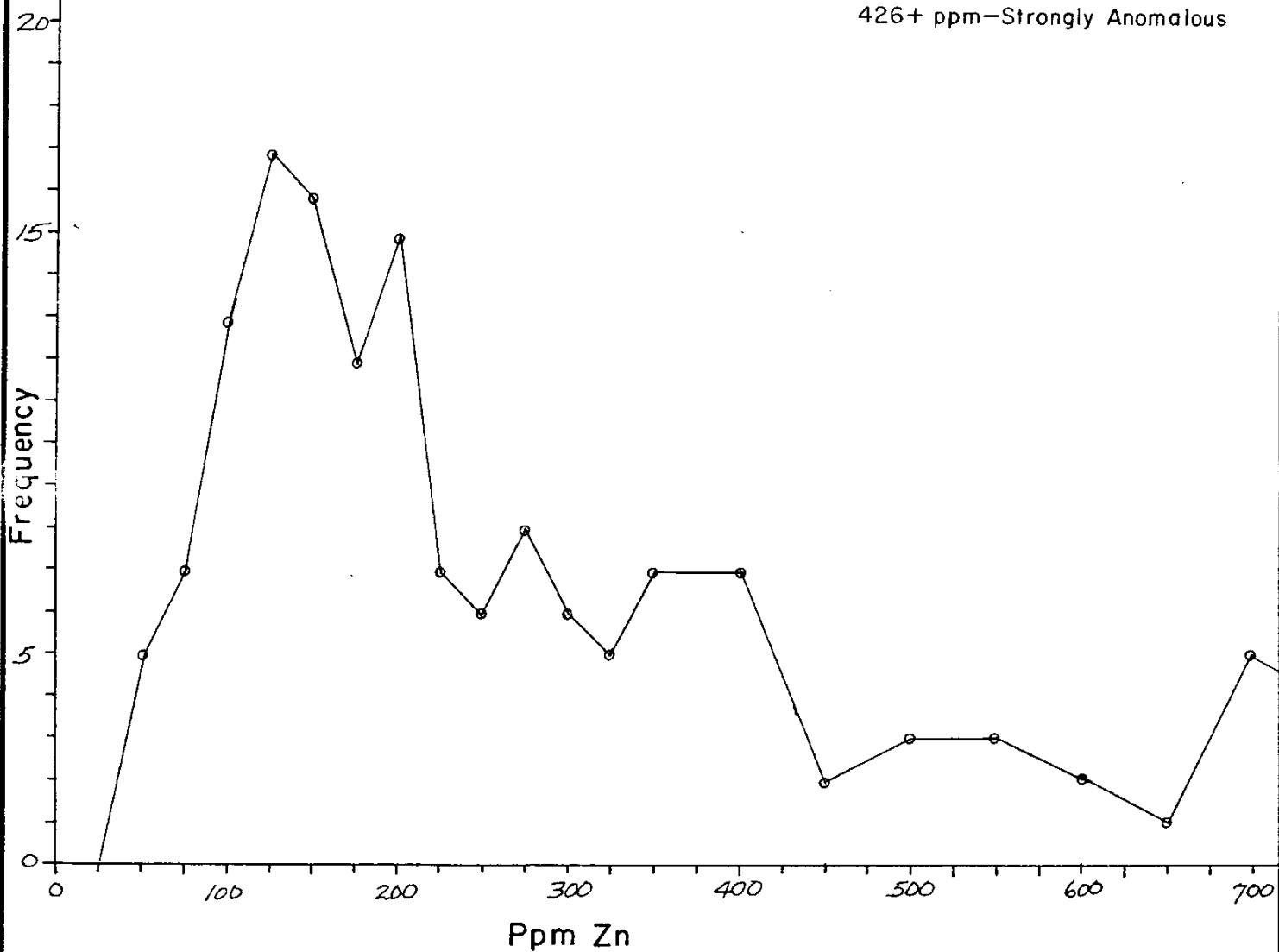
(156 Samples)

0-170 ppm-Background

171-210 ppm-Threshold, Possibly
Anomalous

211-425 ppm-Moderately Anomalous

426+ ppm-Strongly Anomalous



ASARCO

Vancouver

BRIAN BORU PROSPECT

HISTOGRAM-SOILS

HAZELTON AREA

OMINECA M.D.

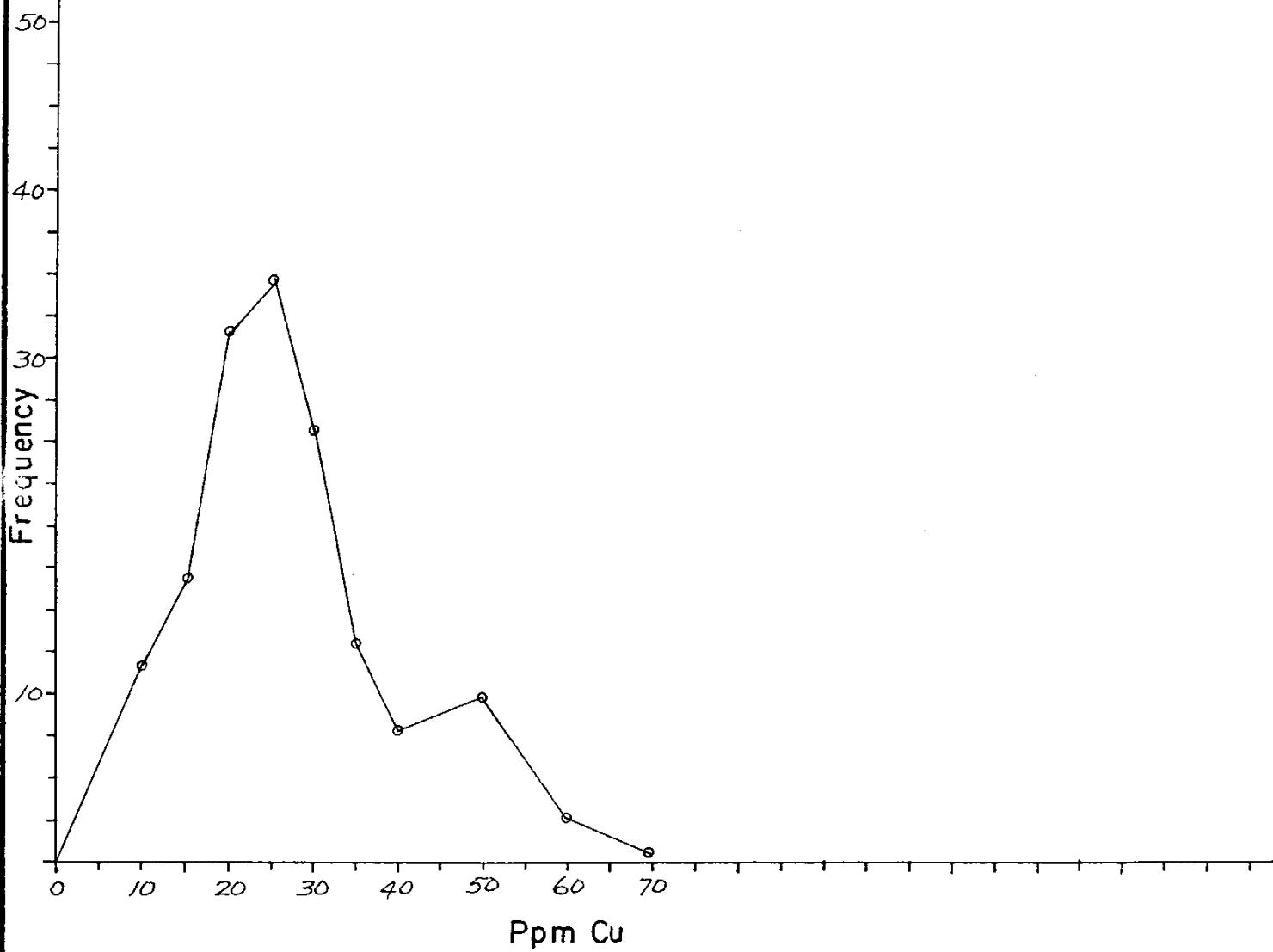
Drawn by	Date	N.T.S.		Figure
D.H.O.	SEPT/80	93M/4E		5

ANOMALIES
(156 Samples)

0-40 ppm—Background

41-60 ppm—Threshold

61+ ppm—Anomalous



ASARCO

Vancouver

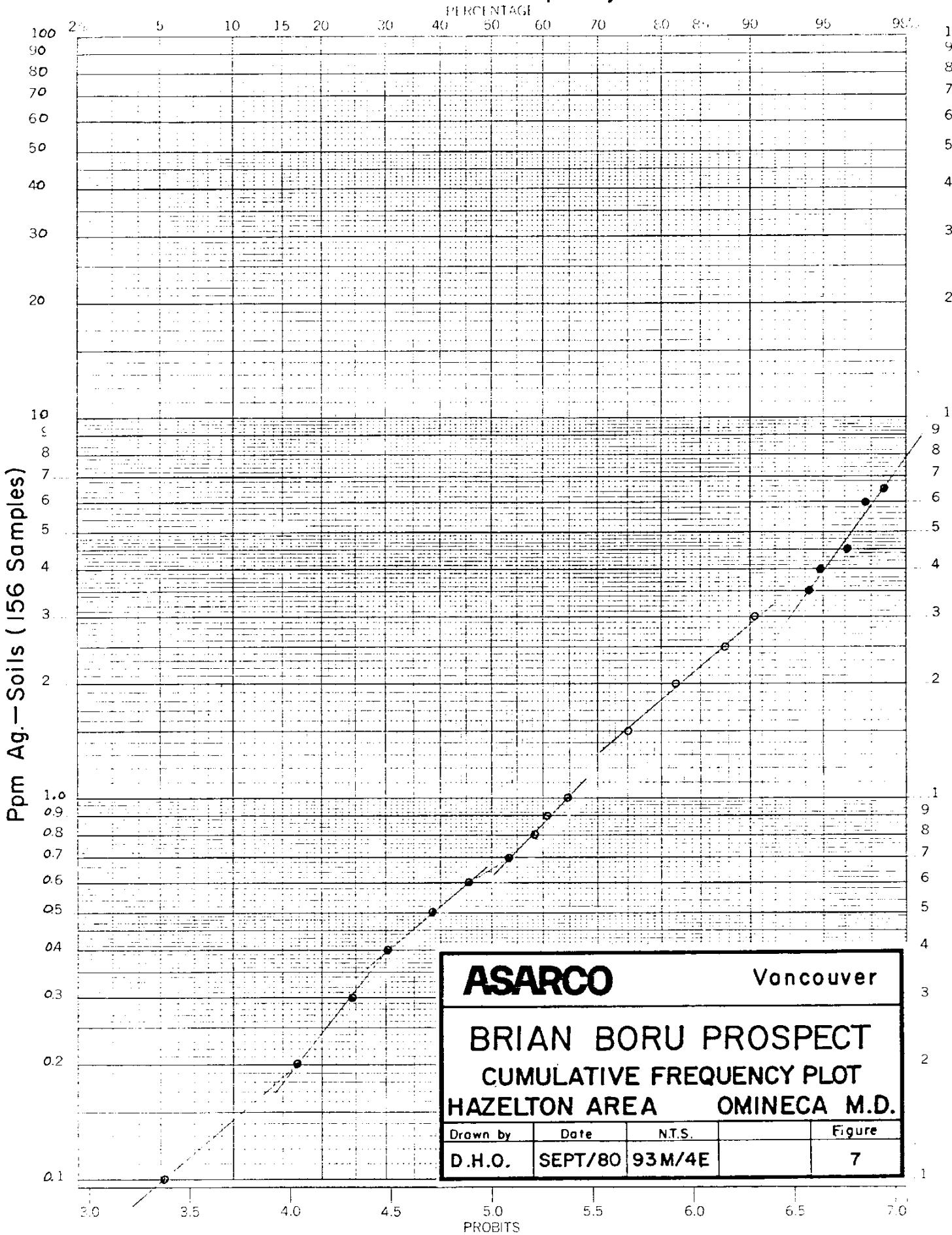
BRIAN BORU PROSPECT

HISTOGRAM-SOILS

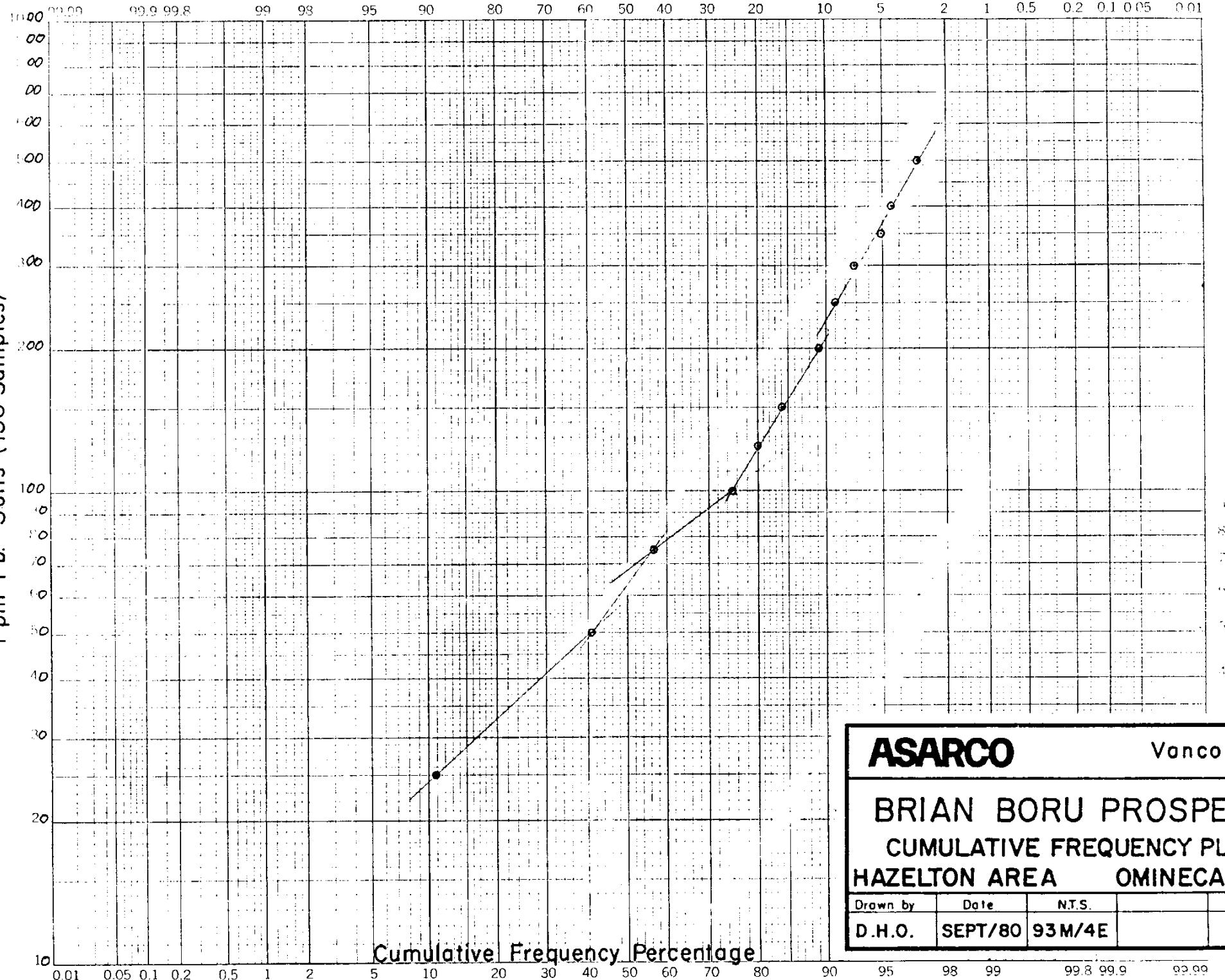
HAZELTON AREA OMINeca M.D.

Drawn by	Date	N.T.S.		Figure
D.H.O.	SEPT/80	93M/4E		6

Cumulative Frequency



Ppm Pb - Soils (156 Samples)

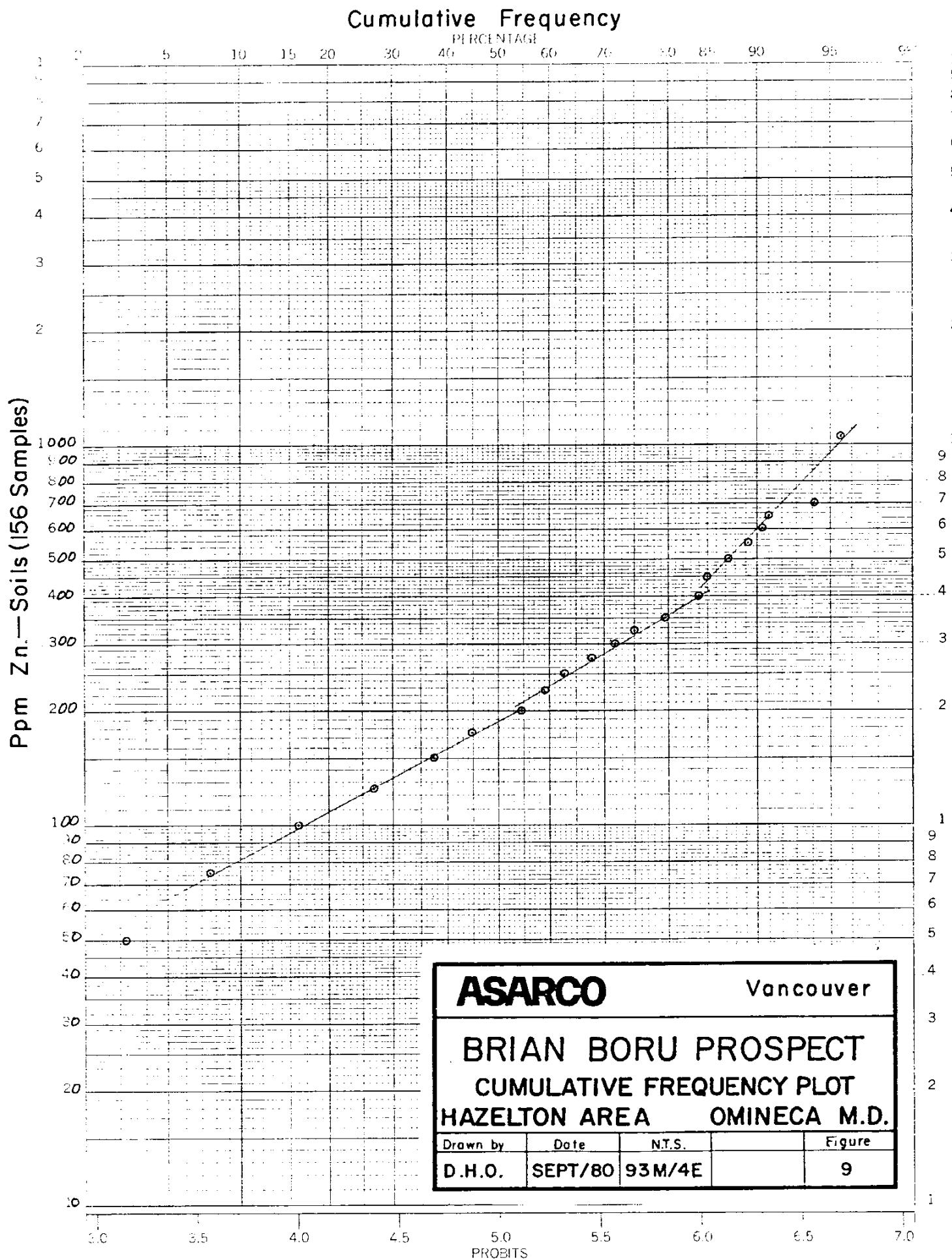


ASARCO

Vancouver

BRIAN BORU PROSPECT
CUMULATIVE FREQUENCY PLOT
HAZELTON AREA OMINeca M.D.

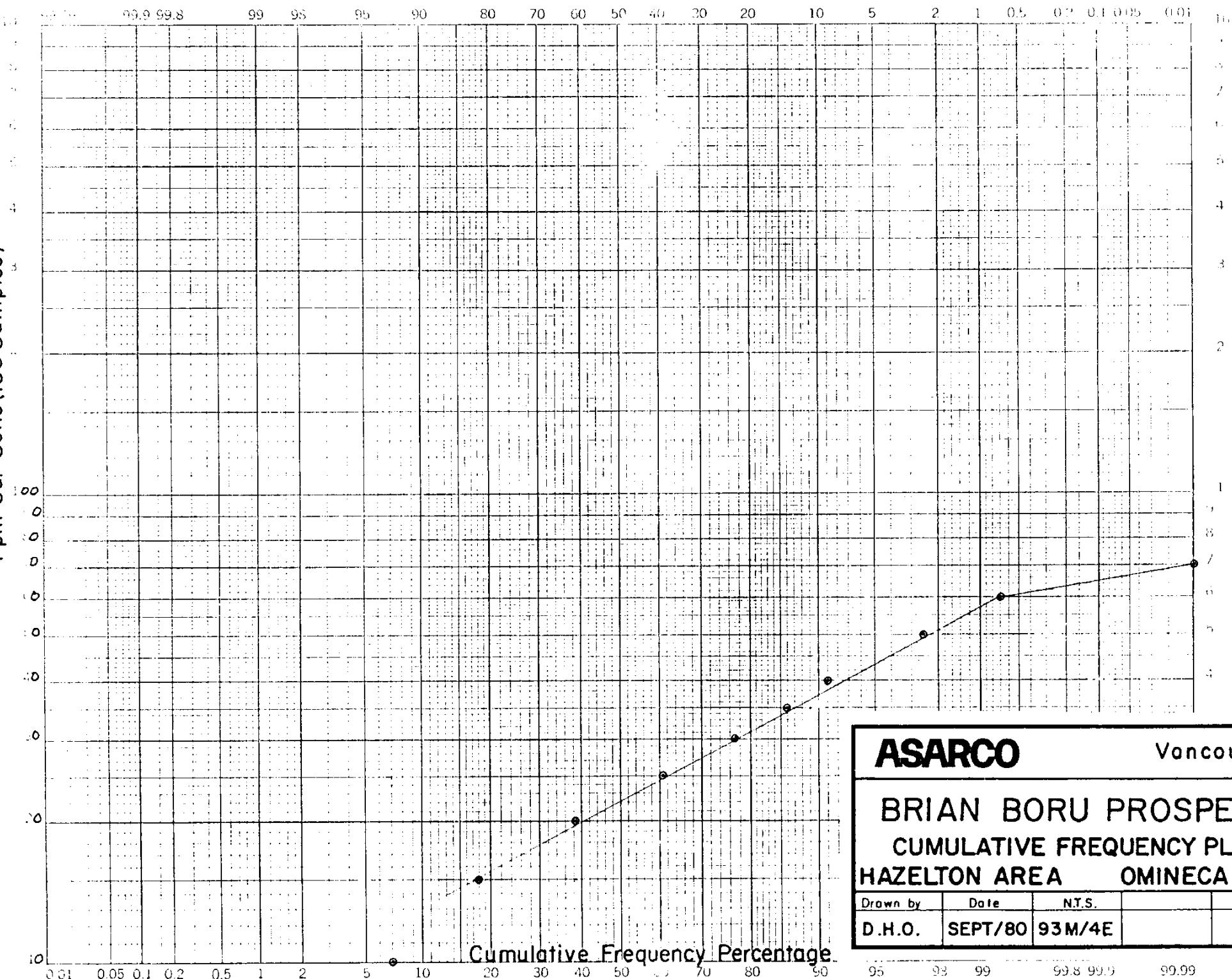
Drawn by	Date	N.T.S.	Figure
D.H.O.	SEPT/80	93M/4E	8



PROBABILITY X 2 LOG CYCLES
EFFECTIVE INTERVAL PERIOD

46 8040

Ppm Cu.-Soils (156 Samples)



ASARCO

Vancouver

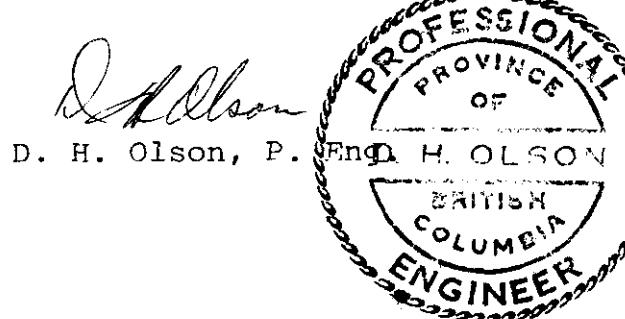
BRIAN BORU PROSPECT
CUMULATIVE FREQUENCY PLOT
HAZELTON AREA OMINeca M.D.

Drawn by	Date	N.T.S.	Figure
D.H.O.	SEPT/80	93M/4E	10

	(0 - 60 ppm	- background
	(61 - 85 ppm	- threshold
Pb	(86 - 220 ppm	- weakly anomalous
	(221 - 375 ppm	- moderately anomalous
	(376 + ppm	- strongly anomalous
	(0 - 170 ppm	- background
	(171 - 210 ppm	- threshold or weakly anomalous
Zn	(211 - 425 ppm	- moderately anomalous
	(426 + ppm	- strongly anomalous
	(0 - 40 ppm	- background
Cu	(41 - 60 ppm	- threshold
	(61 + ppm	- anomalous

The strongest anomalous values for Ag, Pb, & Zn occur within the GAM I & II claims. See Figures 14 to 17. Anomalous values for the elements Ag, Pb & Zn are generally coincident. The stronger anomalous values for Pb and Ag appear to be very closely related whereas the values for Zn tend to be more widespread and have a northwesterly trend. The highest values for Ag, Pb & Zn occur down slope from the old trenches which reveal mineralized float containing sphalerite, galena, and chalcopyrite.

The soil anomalies for the elements Ag, Pb, and Zn are open up slope to the west and easterly across Brian Boru Creek. Future exploration should be directed toward delimiting these anomalies and towards testing of the established anomalies by trenching and or diamond drilling.



REFERENCES

Kindle, E. D., 1954: G.S.C. Memoir 223 Mineral Resources, Hazelton and Smithers Areas, Cassiar and Coast Districts, British Columbia.

O'Neill, J. J., 1919: Canada Department of Mines, Memoir 110. Preliminary Report on the Economic Geology of Hazelton District, British Columbia.

Sutherland Brown, A, 1960: B.C. Department of Mines & Petroleum Resources, Bulletin No. 43, Geology of the Rocher Deboule Range.

Sinclair, A. J., 1974: Selection of Threshold Values in Geochemical Data using Probability Graphs; Journal Geochemical Exploration V.3 pp. 129-149.

APPENDIX "A"

EXPENDITURES - BRIAN BORU PROSPECT

GAM I, II, III & IV Claims

Omineca Mining Division

WAGES

S. Lear - July 8-23, 1980 (16 days @ \$43.75)=	\$ 700.00
K. Lear - July 8-23, 1980 (16 days @ \$29.69)=	475.00

TRANSPORTATION

Bell Jet Ranger Helicopter, July 8, 15, 23, 1980 Okanagan Helicopters Ltd.	=	1,786.40
---	---	----------

Truck Rental - Westminster Auto Leasing	=	200.85
---	---	--------

SUBSISTANCE

2 people for 16 days (July 8-23, 1980)	=	275.36
--	---	--------

ASSAYING

156 soil samples @ \$3.94 (analysed for Ag, Pb, Zn & Cu)	=	614.70
---	---	--------

DRAFTING & REPORT PREPARATION

5 days @ \$100 / day	=	500.00
----------------------	---	--------

<u>TOTAL GEOCHEMICAL SURVEY</u>	\$4,552.31
-------------------------------------	------------



File No. 80-608

Soils

Type of Samples

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

SAMPLE No.	Cu	Pb	Zn	Ag										
KL 80 - 1	34	95	260	1.4										1
2	9	22	64	.5										2
3	24	81	176	1.2										3
4	21	110	192	.9										4
5	23	130	350	.5										5
6	27	750	1200	1.9										6
7	23	79	230	.3										7
8	19	74	350	.3										8
9	28	41	180	.3										9
10	29	330	680	4.3										10
11	19	115	290	1.7										11
12	34	86	176	.6										12
13	66	1700	1700	3.2										13
14	52	114	330	.8										14
15	41	76	152	.6										15
16	36	76	220	.5										16
17	43	124	400	1.2										17
18	54	290	490	2.8										18
19	41	51	126	.7										19
KL 80 - 20	17	36	114	.7										20
														21
KL 80 - 21	36	70	170	2.2										22
22	33	38	140	.2										23
23	43	42	186	.1										24
24	27	55	180	.1										25
25	14	24	100	.7										26
26	30	38	360	.8										27
27	14	42	142	.1										28
28	11	32	76	.1										29
29	38	61	300	3.4										30
30	10	17	62	.8										31
31	12	19	56	.8										32
32	25	44	112	1.2										33
33	9	16	48	.5										34
34	23	50	148	.7										35
35	17	57	158	.2										36
36	18	17	94	.2										37
KL 80 - 37	29	48	130	.8										38
														39
														40

All reports are the confidential property of clients.
All results are in PPM.

DIGESTION:.....

DETERMINATION:.....

DATE SAMPLES RECEIVED July 19, 1980

DATE REPORTS MAILED July 31, 1980

ASSAYER

DEAN TOYE, B.Sc.

CHIEF CHEMIST

CERTIFIED B.C. ASSAYER

To: Asarco Exploration Co. of Canada Ltd., 852 E. Hastings St., Vancouver, B.C. V6A 1R6
phone: 253 - 3158

File No. 80-608

Type of Samples Soils

GEOCHEMICAL ASSAY CERTIFICATE

Disposition

2

SAMPLE No.	Cu	Pb	Zn	Ag											
KL 80 - 38	32	35	132	1.0											1
39	13	32	108	.7											2
40	15	40	80	.7											3
41	33	98	170	3.0											4
42	29	68	170	2.9											5
43	18	56	250	.5											6
44	15	54	178	.3											7
45	35	91	245	1.2											8
46	12	28	46	1.6											9
47	33	28	110	.8											10
48	19	34	60	1.1											11
49	12	13	65	.5											12
50	23	61	380	2.2											13
51	26	55	330	2.7											14
52	26	58	430	1.3											15
53	18	35	200	.7											16
54	41	52	220	2.5											17
55	43	87	242	2.1											18
56	56	3100	5100	27.0											19
57	32	258	870	2.5											20
58	43	168	1640	3.7											21
59	28	168	560	1.1											22
60	42	131	700	1.8											23
61	37	220	700	1.8											24
62	34	690	2550	3.4											25
63	25	80	182	.7											26
64	24	28	120	.2											27
65	37	91	320	1.0											28
66	26	210	1050	3.1											29
KL 80 - 67	42	116	490	1.9											30
															31
															32
															33
															34
															35
															36
															37
															38
															39
															40

All reports are the confidential property of clients
All results are in PPM.

DIGESTION:.....

DETERMINATION:.....

DATE SAMPLES RECEIVED July 19, 1980

DATE REPORTS MAILED July 31, 1980

ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER



To:

Asarco Exploration Co. of Canada Ltd.,
504 - 535 Thurlow St.,
Vancouver, B.C.
V6E 3L2

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B.C. V6A 1R6
phone: 253-3158

File No. 80-687

Type of Samples Soils

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Area of Property: Brian Boru

1	SAMPLE No.	Cu	Pb	Zn	Ag											
	KL80 - 68	7	9	31	.2											1
	69	30	69	218	1.3											2
	70	40	175	540	2.2											3
	71	11	23	41	.5											4
	72	27	105	218	.4											5
	73	24	36	115	.2											6
	74	28	18	102	.1											7
	75	40	92	208	1.5											8
	76	29	100	255	.4											9
	77	32	195	510	1.6											10
	78	21	46	208	.7											11
	79	23	24	108	.4											12
	80	26	490	1500	13.0											13
	81	26	129	680	2.2											14
	82	21	84	655	1.7											15
	83	23	57	178	.6											16
	84	27	312	555	3.4											17
	85	18	35	120	.5											18
	86	16	34	120	.5											19
	87	22	74	238	.4											20
	88	18	33	142	.2											21
	89	25	64	180	1.0											22
	90	18	124	254	.6											23
	91	17	35	174	.2											24
	92	28	78	162	1.8											25
	93	30	87	270	2.4											26
	94	20	43	150	1.0											27
	95	17	34	120	.3											28
	96	21	78	322	.6											29
	97	22	90	252	.6											30
	98	25	170	252	1.1											31
	99	25	186	255	.2											32
	100	49	730	3300	11.0											33
	101	22	64	290	1.4											34
	102	28	69	288	2.2											35
	103	22	67	112	1.0											36
	KL80 - 104	23	300	294	5.6											37
																38
																39
																40

All reports are the confidential property of clients
All results are in PPM.

DIGESTION:.....

DETERMINATION:.....

DATE SAMPLES RECEIVED July 26, 1980

DATE REPORTS MAILED Aug. 2, 1980

ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER



To: Asarco Exploration Co. of Canada Ltd.,

852 E. Hastings St., Vancouver, B.C. V6A 1R6

phone: 253 - 3158

File No. 80-687

Type of Samples Soils

GEOCHEMICAL ASSAY CERTIFICATE

Disposition

2

SAMPLE No.	Cu	Pb	Zn	Ag												
KL80 - 105	17	93	345	.6												1
106	20	360	400	.8												2
107	21	128	305	.4												3
108	20	38	158	.3												4
109	22	42	140	.6												5
110	22	114	232	.4												6
111	11	30	98	.2												7
112	18	43	196	.1												8
113	16	92	220	.5												9
114	22	22	122	.1												10
115	20	30	164	.2												11
116	14	35	200	.2												12
117	19	34	142	.5												13
118	25	37	168	.4												14
119	18	135	366	.1												15
120	20	96	300	.8												16
121	20	177	530	6.3												17
122A	10	40	60	1.0												18
122B	21	60	112	.6												19
123	20	94	126	.7												20
124	22	460	470	3.5												21
125	33	100	325	4.1												22
126	26	200	625	.7												23
127	28	128	342	.6												24
128	33	59	275	.3												25
129	26	64	340	.2												26
130	25	96	312	.2												27
131	28	92	368	.9												28
132	20	310	355	11.0												29
KL80 - 133	29	210	435	1.7												30
																31
																32
																33
																34
																35
																36
																37
																38
																39
																40

All reports are the confidential property of clients
 All results are in PPM.

DIGESTION:.....

DETERMINATION:.....

DATE SAMPLES RECEIVED July 26, 1980

DATE REPORTS MAILED Aug. 2, 1980

ASSAYER

DEAN TOYE, B.Sc.
 CHIEF CHEMIST
 CERTIFIED B.C. ASSAYER



To: Asarco Ltd., Co. of Canada Ltd.,
504 - 535 Thurlow St.,
Vancouver, B.C.
V6E 3L2

Ass & Trace Analysis
852 E. Hastings St., Vancouver, B.C. V6A 1R6
phone: 253 - 3158

File No. 80-832

Soils

Type of Samples

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Area of Property: Brian Boru

SAMPLE No.	Cu	Pb	Zn	Ag																
KL 80 - 134	11	48	180	.9															1	
135	16	86	128	1.7															2	
136	6	96	146	1.4															3	
137	7	83	150	.6															4	
138	19	49	112	.9															5	
139	31	46	132	.7															6	
140	21	84	180	1.2															7	
141	5	27	76	.3															8	
142	14	30	150	.4															9	
143	13	39	118	.5															10	
144	23	21	82	.2															11	
145	20	34	76	1.2															12	
146	11	30	84	.3															13	
147	7	19	50	.3															14	
148	38	56	156	1.1															15	
149	15	20	92	.3															16	
150	9	19	78	.4															17	
151	10	26	62	.2															18	
152	19	36	94	.2															19	
153	24	20	86	.3															20	
154	20	48	112	.5															21	
KL 80 - 155	25	65	172	.2															22	
																			23	
																			24	
																			25	
																			26	
																			27	
																			28	
																			29	
																			30	
																			31	
																			32	
																			33	
																			34	
																			35	
																			36	
																			37	
																			38	
																			39	
																			40	

All reports are the confidential property of clients
All results are in PPM.

DIGESTION:.....

DETERMINATION:.....

DATE SAMPLES RECEIVED Aug. 14, 1980

DATE REPORTS MAILED Aug. 20, 1980

ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER

[Signature]

APPENDIX "C"

ANALYTICAL PROCEDURES

Geochemical Analysis of Mo, Cu, Pb, Zn, Ag*, Ni, Co, Mn, Bi*, V, Fe, Cd*, & Sb*

Sample preparation

Soil samples are dried at 75⁰C 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 mls with demineralized water.

Determination

All the above elements are determined by Atomic Absorption from the solution.

* With background correction.

APPENDIX "D"

Certificate

I, D. H. Olson of 8125 Gray Avenue, Burnaby, B.C.
hereby certify;

1. I am a registered Professional Engineer in the Province of British Columbia.
2. I am a university graduate with the degree B.A. - Geology, University of British Columbia, 1950.
3. I have practiced my profession for the past 28 years.
4. I am presently employed as a Geologist with Asarco Exploration Company of Canada, Ltd.



D. H. Olson, P. Eng.

21 October 1980



127°45'

127°30'

LEGEND

PLEISTOCENE AND RECENT

// Drift and alluvium

PALEOCENE OR LATER

Andesite, basalt flows and dykes

PALEOCENE

9 Greywacke, shale, conglomerate, coal

CRETACEOUS

BULKLEY INTRUSIONS (5-8)

6-7 porphyritic granodiorite

7-quartz monzonite

8 Undivided

5 Diorite dykes

UPPER JURASSIC AND LOWER CRETACEOUS

HAZELTON GROUP (IN PART) (1-4)

4a Related sill

4 BRIAN BORU FORMATION: varicoloured porphyritic andesitic flows and

breccias, tuffs, minor volcanic sandstone and conglomerate

RED ROSE FORMATION (1-3)

3 MEMBER D: conglomerate, greywacke, shale, and hornfelsic equivalents

1-2 MEMBER B: shale, siltstone, and hornfels. 2-MEMBERS A and C: greywacke,

shale, siltstone, and hornfelsic equivalents; minor conglomerate and coal

SYMBOLS

Geological boundary; defined, approximate, assumed

Bedding; horizontal, inclined, vertical, overturned

Flow layering in volcanic rocks

Foliation, lineation in granitic rocks

Joints

Anticline; upright, overturned.

Syncline

Fault with movement

Glacial striæ, roche moutonnée

Fossil locality

Mining property (see list below)

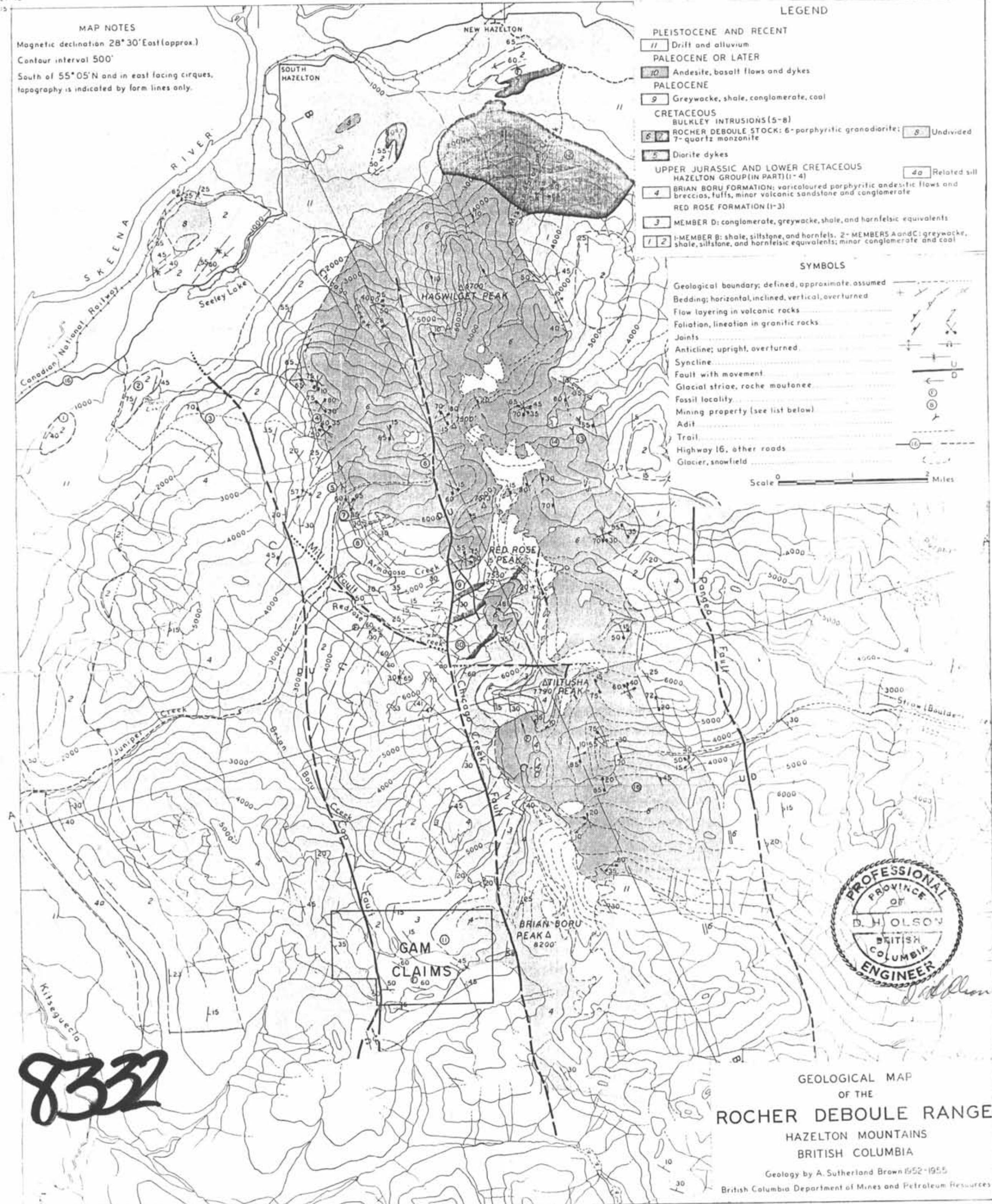
Adit

Trail

Highway 16, other roads

Glacier, snowfield

Scale 0 1 2 Miles



8332

