ARGENT NOS. 1-39 C.G. Lab 6310-16

GEOCHEMICAL SURVEY OF

FOR: SILVER DEBENTURE MINES LTD. (N.P.L.)

PHOTO GEOLOGICAL TARGET AREA #3

DEBENTURE CREEK AREA 54° 126° NW

Author D.A. CHAPMAN

September 18 - 21, 1967

93 L-15

D. A. CHAPMAN & ASSOCIATES LIMITED.

1643

REPORT ON

GEOCHEMICAL SURVEY

PHOTO GEOLOGICAL TARGET AREA #3

DEBENTURE CREEK SILVER-LEAD PROSPECT

54° 126° NW.

BY

D.A. CHAPMAN & ASSOCIATES LIMITED
#2 - 515 Granville Street
Vancouver 2, B.C.
Telephone 685-3281

NOVEMBER, 1967.

HEAD OFFICE

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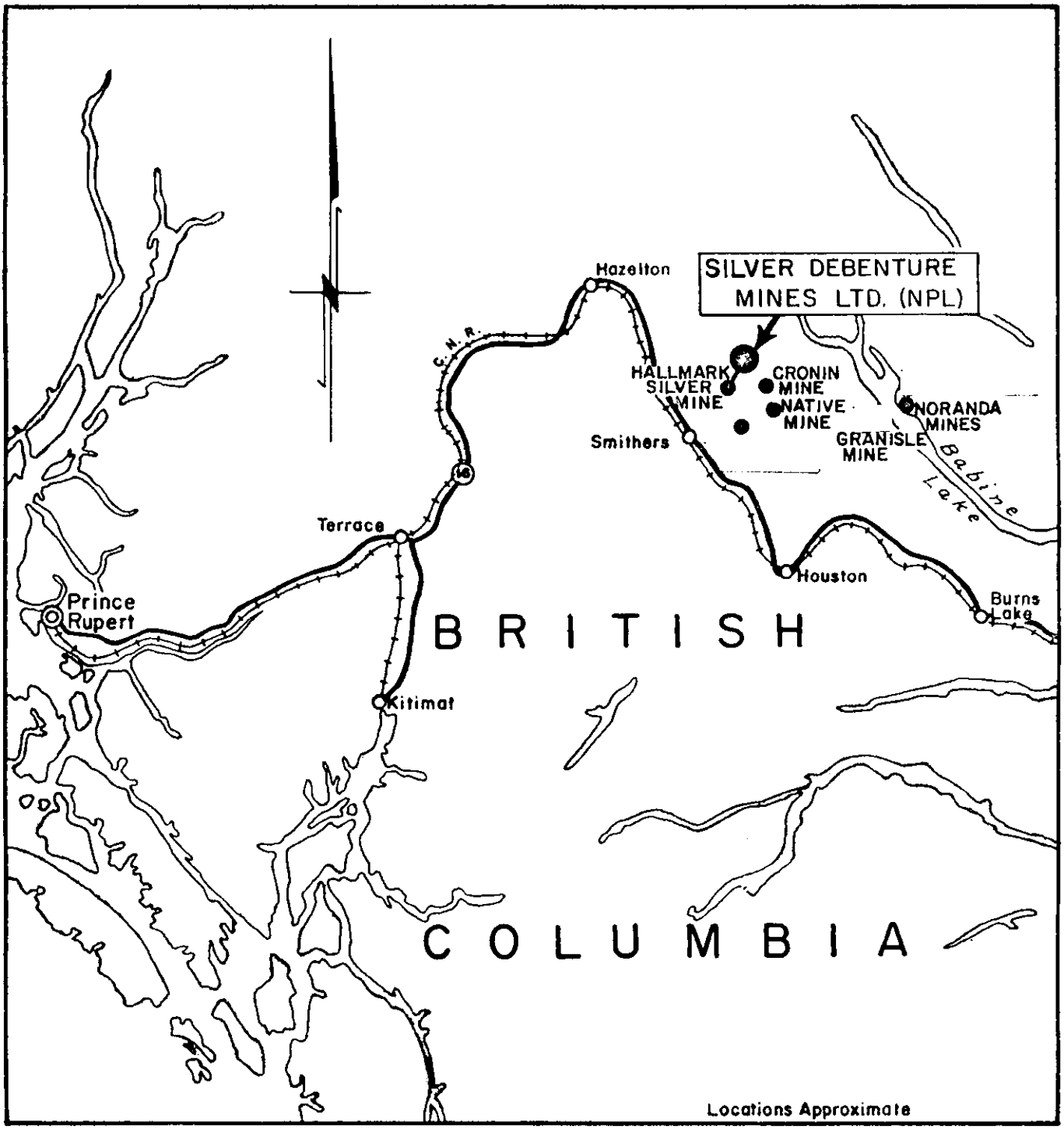


LOCATION MAP OF
HALLMARK and DEBENTURE
PROPERTIES, SMITHERS, B.C.

-11-

SILVER DEBENTURE MINES
LTD. (NPL)

B.A. Chapman & Associates Limited
#2 - 515 GRANVILLE STREET - VANCOUVER 2, B.C.
Telephone 685-3281

GEOCHEMICAL SURVEY

PHOTO GEOLOGICAL TARGET AREA #3

DEBENTURE CREEK SILVER-LEAD PROSPECT

54° 126° S.E.

September 18 - 21, 1967.

GEOCHEM COMMENTS

A definitive trend of anomalous THM values strikes approximately N 08° W, which is parallel or coincidental with the strike of the breccia fault exposed to the north in the creek floor at a lower elevation.

A frequency distribution curve was plotted and is shown with the accompanying map. The regional threshold appears to be about 115 ppm THM with a standard deviation of 15 ppm.

The local threshold was estimated at 140 ppm. Thus values above 145 ppm THM are considered to be anomalous.

The samples were treated at T.S.L. Laboratories in Vancouver. The method of extraction was by Hot HNO_3 acid extraction and THM ppm determined by Atomic Absorption Spectrophotometer.

I. SOIL COLLECTION METHOD

The geochem target area was selected from air photo interpretation.

A soil sample was taken every 300 feet along the baseline until the target area was reached to provide a reasonable cross-section of normal soil metallic content for approximately 3,600 feet of length.

The baseline was paced along a compass bearing of S 24° W and flagged.

The target area is noticeably void of trees, particularly above Station 10. At what appears to be an intersection of fractures in a blocky pattern, ground slump is appreciable and focuses at Station 10.

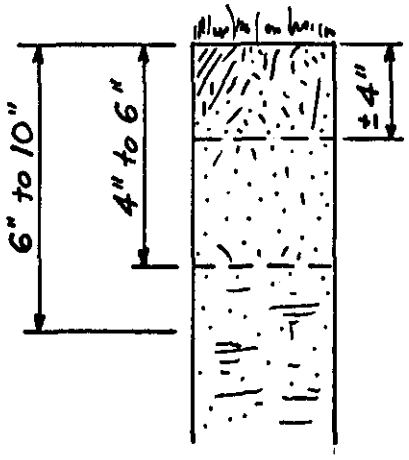
Offset lines within the target area were paced with a compass approximately every 60 feet and sample sites were marked and flagged.

The soils were collected by a trowel which was cleaned after each sample and taken from a consistent horizon which the writer believes to be the B zone (see diagram and descriptive notes).

II. CLASSIFICATION OF THE SOIL

Order	-	Zonal soils
Suborder	-	Light coloured podzolized soils of timbered regions
Great Soil Group	-	Brown podzolic soils

III.



A_1 -- organic debris only partially decomposed, dark horizon, organic rich.

A_2 -- light coloured horizon faint or absent, generally loose structure.

B -- brown to orange brown same accumulation of clay minerals and organic matter generally loose structure.

Soils from the area can be described generally as soils of the upper footslope of a soil catena.① They are derived for the most part from the argillaceous bedrock and rhyolites above them.

① Soil catena - sequence of soil types dependant on slope and drainage for transportation and not glaciation. (Milne 1936)

GEOCHEMICAL COMPILATION NOTES

The soil samples were first treated for Total Heavy Metal content to determine if an indicative geochem reaction existed. The positive indications warranted the cost of specific metals extraction (Cu, Pb, Zn) to analyze the nature of the dispersion by examination of the ratios of their relative content (e.g. the mobile zn/THM factor). It was reasoned that the Pb content would be more specific with regard to orientation and proximity to source, whereas zinc would be more uniformly proportional to the areal distribution of metallic content in the soil. Therefore, the higher zn/THM ratio would indicate anomalous trends of THM values specifically related to metallic content of Tetrahedrite and Galena -- the known forms of mineralization that have been found in this area to date.

This abnormal proportion appears to orient in one direction (N 5^{o} - 10^{o} W) whereas the Zn ppm isogram and Pb ppm isogram orient along two, low angle conjunctive patterns, which may agree with observations regarding mineralization that were noted in the tunnel to the west -- e.g. there appears to be two orientations of mineralization along the fracture systems, one which is dominantly Ag-Pb and a second intersecting system carrying Zn-Pb. This relationship is noted A on Figure 2, which shows a distinct Pb-Zn anomaly corresponding with a normal THM ratio indicating a possible dual system.

T.S.L. LABORATORY TREATMENT OF SOIL SAMPLES

The samples were dried at a temperature of 200^{o} F. and then screened through a -80 mesh. The screen used is nylon and contained by an aluminum holder.

THM, SPECIFICS (Cu, Pb, Zn)

A one gram sample from the screened portion is treated with 50% HCl acid and digested for one hour at 212^{o} F. and then made up to a final volume of 10 mm.

The results are compared with fresh standards in the same media which are prepared daily and metallics ppm are determined by Atomic Absorption Spectrophotometer.

RECONNAISSANCE GEOLOGY

The rocks in this region are composed of Upper Jurassic Sedimentary and Volcanic Rocks of the Hazelton Group.

In the area of the geochem survey, rhyolite flows and dacite are exposed to the northwest and due west of the target locale. A halo of rock alteration is exposed in the basin immediately north of the target area. This basin forms the south wall of Debenture Creek. At an elevation approximately 500 feet below the target, a distinct breccia fault is exposed in the creek floor of the basin which strikes N 08° W and appears to dip near vertical. To the west of this fault, volcanic porphyry with pyrite is in situ.

The target area is covered with overburden except for the exposures at its northern periphery. This exposure indicates shear movement and is altered rhyolite. The area of distinct slump within the target is roughly 300 feet by 800 feet and geomorphological expression of the fracture system is apparent and would appear to focus about Station 10.

The sedimentary beds are assumed to underly the rhyolite flows and dip to the west and it was reasoned that the fracture systems in these beds were the most probable for a replacement zone which may express itself at the surface of the rhyolites by reaction faults due to changes in volume by replacement and/or the effects of ground waters.

The possibility of a mineralized breccia between Stations 9 and 10 is indicated by the geochem results, but may only be the avenue for transportation vertically of hydromorphic ground waters from a possible replacement zone. A lateral seepage displacement along the contact and at a much lower elevation may be indicated by the anomalous THM value of Station #1 (159 ppm).

CONCLUSIONS

1. The lithology and structural environment of the region is analogous to most of the known silver deposits of South America and in particular to the East Tintic District in Utah, U.S.A.

2. Sub-rhyolite shear and fissure systems related to pre-ore folding should respond to geochemical and geophysical techniques.

RECOMMENDATIONS

1. A ground magnetometer survey of the sample area.
2. A survey by induction methods to profile the indicated target and provide the depth requirements for drilling.
3. Continued prospecting by ground examination and geochemical techniques.

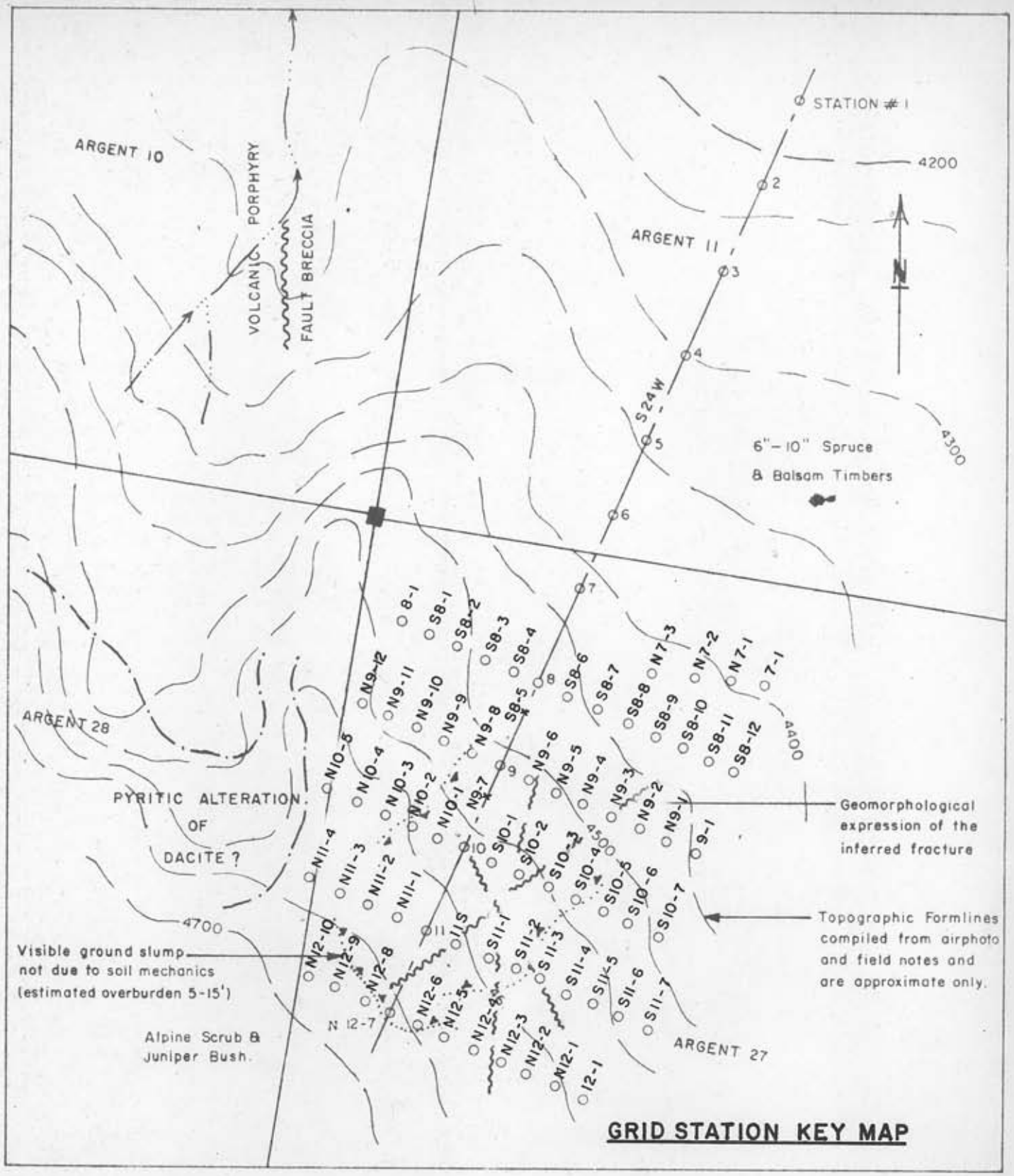
Respectfully submitted,

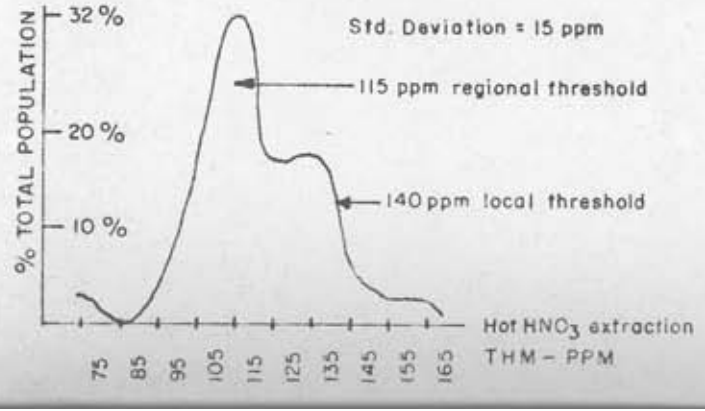
D.A. CHAPMAN & ASSOCIATES LIMITED,

D.A. Chapman.

DAC/jm

November, 1967.





SILVER DEBENTURE MINES LTD. (NPL)

Physiography and Reconnaissance Geology
To accompany a report of a Geochem Survey
by D.A. CHAPMAN and M. MESSNER

ARGENT No. 27 CLAIM - DEBENTURE CK.
SMITHERS AREA, OMENICA M.D., B.C.

Scale: 1" = 300'

Compiled by: D.A. Chapman & Associates Ltd
October, 1967. D.A. Chapman

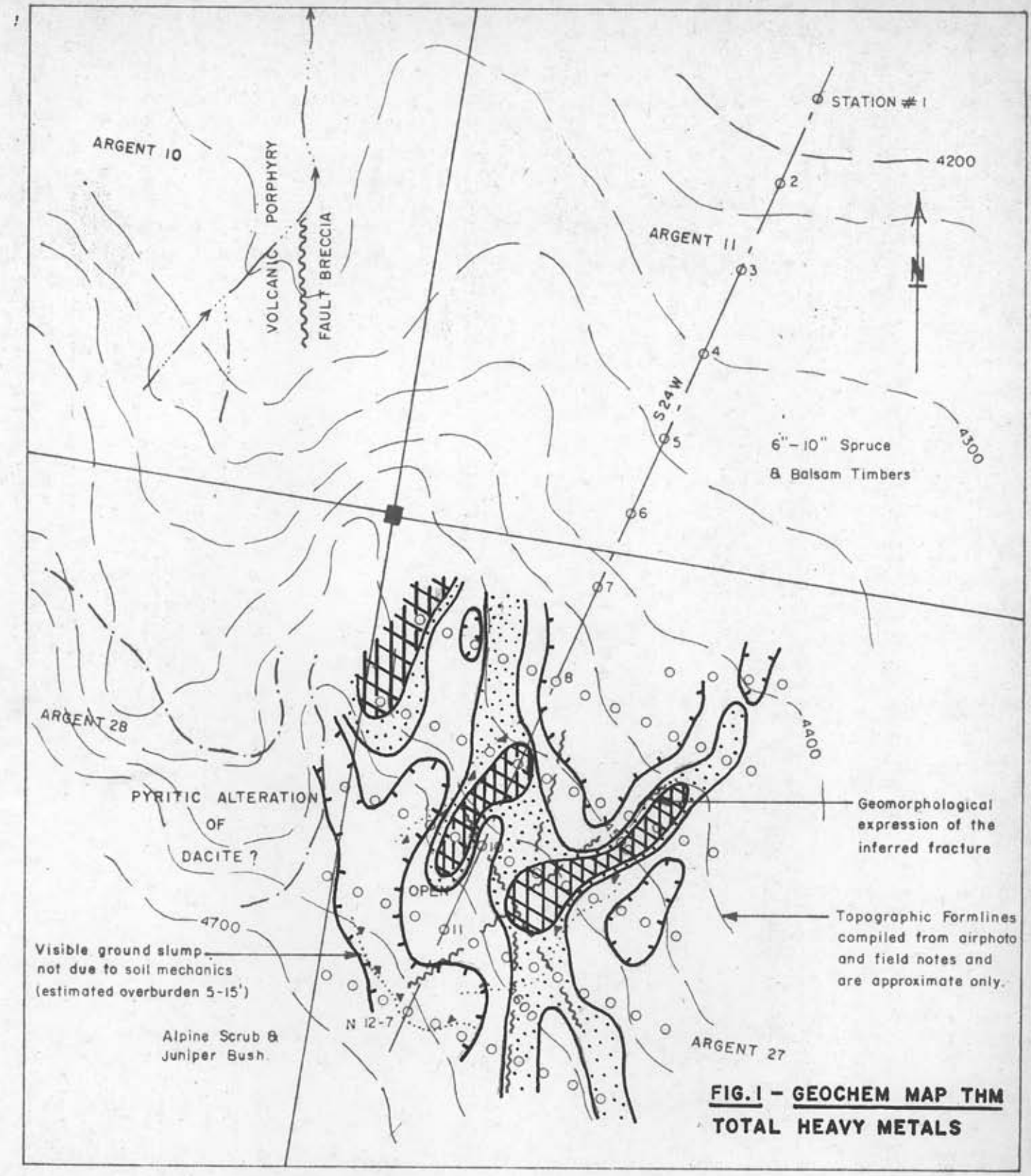
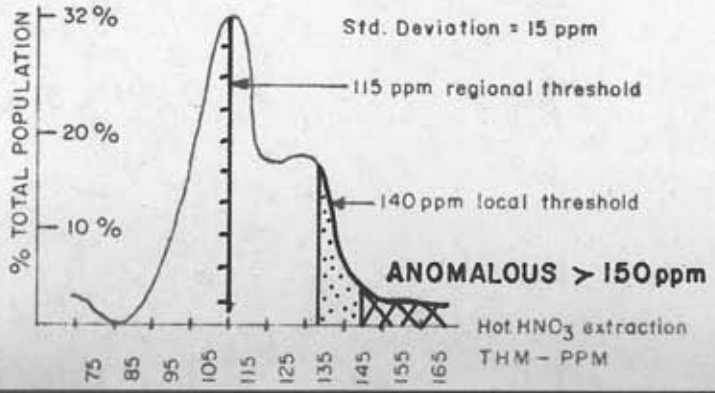


FIG. 1 – GEOCHEM MAP THM
TOTAL HEAVY METALS



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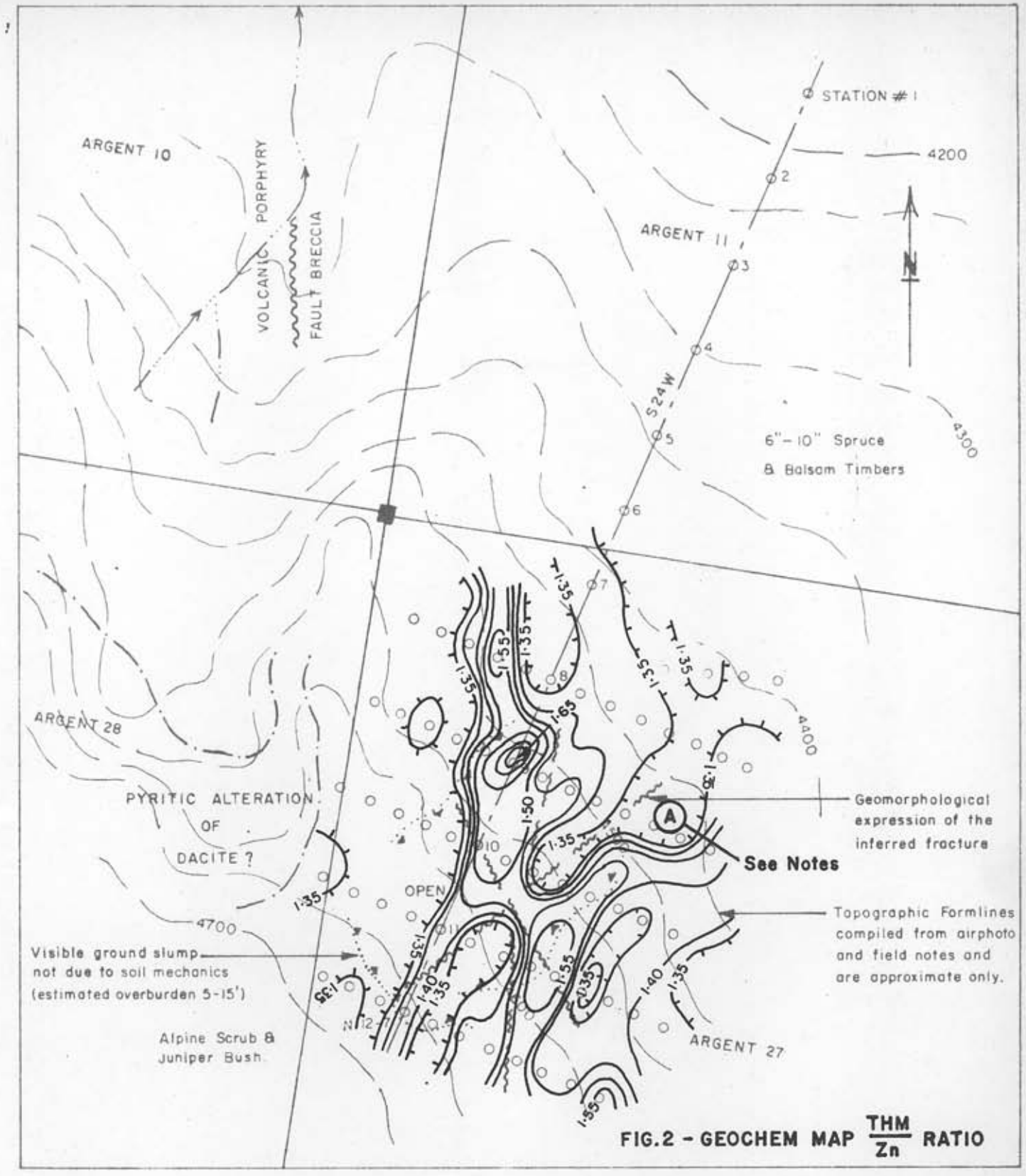

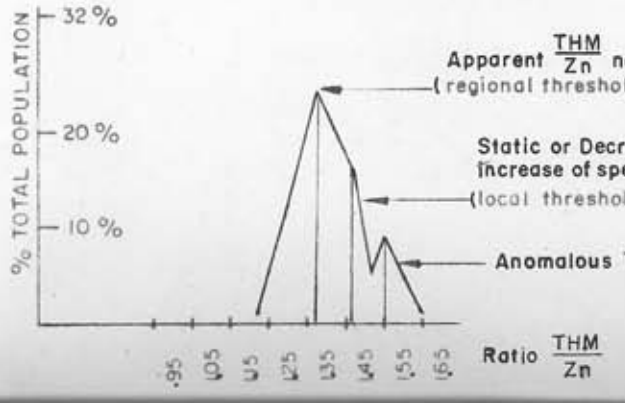

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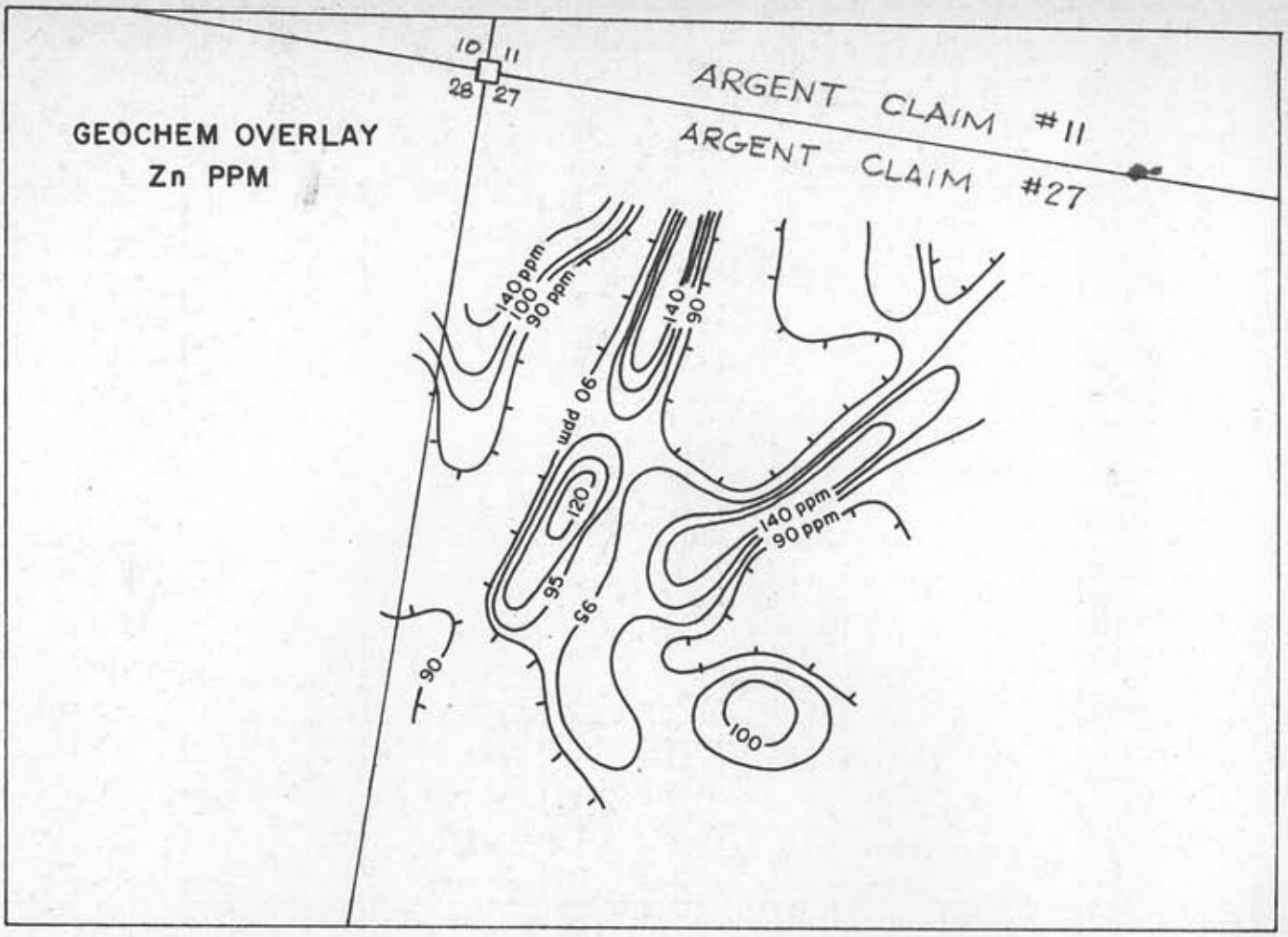
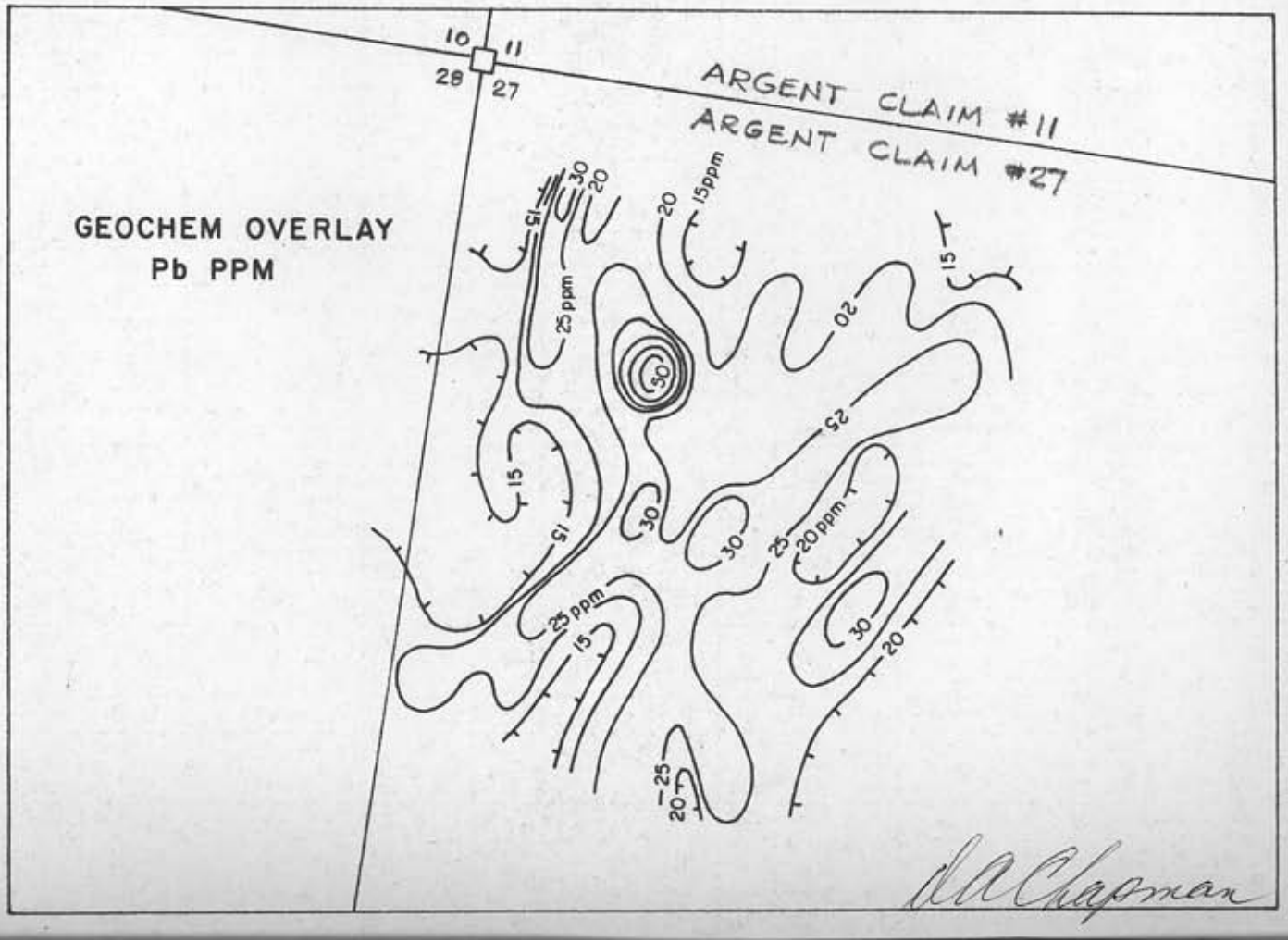

GEOCHEM OVERLAY
Zn PPM
10
11
28
27
ARGENT CLAIM #11
ARGENT CLAIM #27
140 ppm
100
90 ppm
140
90
90 ppm
120
95
95
90
140 ppm
90 ppm
100


GEOCHEM OVERLAY
Pb PPM
10
11
28
27
ARGENT CLAIM #11
ARGENT CLAIM #27
30
20
15
15ppm
20
25 ppm
30
25
15
15
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30
25
20 ppm
25 ppm
15
30
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25
20

dA Chapman

SILVER DEBENTURE MINES LTD. (N.P.L.)

GEOCHEM SURVEY BY

D.A. CHAPMAN AND M.B. MESSNER

GEOLOGICAL TARGET NO. 3 (PHOTO MAG)

G E O C H E M F I E L D N O T E S

ARGENT CLAIMS

(#1 - 39 Incl.)

D.A. CHAPMAN & ASSOCIATES LIMITED
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Vancouver 2, B.C.
Telephone 685-3281

SEPTEMBER, 1967.

SILVER DEBENTURE MINES LTD. (N.P.L.)

GEOCHEM SURVEY BY D.A. CHAPMAN

GEOLOGICAL TARGET NO. 3 (Photo Mag)

SEPTEMBER, 1967

RECCE LINE #1 - #11
BEARING S 24° W

OFFSET AT #11
BEARING S 66° E (N 66° W)

STATION	DEPTH	ASSAY VALUES THM ppm	Cu ppm	Pb ppm	Zn ppm	Ratio: THM/Zn	SOIL REMARKS
Baseline							
1	10"	159	28	20	118	1.34	Clay
2	8"	116	20	15	87	1.34	Dark brown, fine, dry
3	8"	109	18	12	85	1.28	Brown, minor humis, partially loose structure, dry
4	6"	115	16	14	89	1.29	Brown, minor humis, partially loose structure, dry
5	6"	105	19	10	78	1.34	Light brown, minor humis, partially loose structure, dry
6	6"	117	15	9	90	1.30	Reddish brown, minor humis, partially loose structure, dry
7	6"	109	12	15	80	1.36	Brown, minor humis, partially loose structure, dry
8	6"	100	16	13	80	1.24	Light brown, minor humis, partially loose structure, wet
9	8"	165	16	50	100	1.65	Grey, clay, minor humis, damp
10	10"	136	25	20	90	1.51	Black-grey, clay, semi-organic, damp
11	6"	129	14	25	90	1.43	Light brown, minor humis, partially loose structure, dry

STATION	DEPTH	ASSAY VALUES THM ppm	Cu ppm	Pb ppm	Zn ppm	Ratio: THM / zn	SOIL REMARKS
7-1	6"	119	15	15	95	1.25	Brown, minor humis, partially loose structure, dry
N 7-1	6"	108	17	13	85	1.28	Brown, minor humis, partially loose structure, dry
N 7-2	6"	137	25	20	95	1.44	Brown, minor humis, partially loose structure, dry
N 7-3	6"	123	10	17	92	1.34	Grey brown, minor humis, partially loose structure, dry
8-1	6"	128	16	15	96	1.33	Brown, minor humis, partially loose structure, damp
S 8-1	8"	192	18	29	152	1.27	Brown, minor humis, partially loose structure, damp
S 8-2	8"	120	10	20	85	1.41	Brown, minor humis, partially loose structure, damp
S 8-3	8"	113	10	24	73	1.55	Light brown, minor humis, partially loose structure, damp
S 8-4	8"	145	12	20	109	1.34	Brown, minor humis, partially loose structure, damp
S 8-5	8"	125	11	21	90	1.39	Brown, minor humis, partially loose structure, damp
S 8-6	8"	92	11	17	67	1.37	Brown, minor humis, partially loose structure, dry
S 8-7	6"	122	12	24	90	1.36	Brown, minor humis, partially loose structure, dry
S 8-8	6"	110	13	19	81	1.36	Brown, minor humis, partially loose structure, dry (f)
S 8-9	6"	113	12	22	84	1.35	Brown, minor humis, partially loose structure, dry
S 8-10	6"	119	12	22	90	1.32	Brown, minor humis, partially loose structure, dry

STATION	DEPTH	ASSAY VALUES THM ppm	Cu ppm	Pb ppm	Zn ppm	Ratio: THM / Zn	SOIL REMARKS
S 8-11	6"	138	13	28	100	1.38	Brown, minor humis, partially loose structure, dry
S 8-12	8"	132	13	28	96	1.38	Brown, minor humis, partially loose structure, damp
9-1	6"	135	17	20	91	1.48	Grey brown, minor humis, partially loose structure, dry
N 9-1	6"	120	12	15	90	1.33	Brown, minor humis, partially loose structure, dry
N 9-2	6"	171	15	25	140	1.22	Brown, minor humis, partially loose structure, dry
N 9-3	6"	118	14	20	90	1.31	Light brown, minor humis, partially loose structure, dry
N 9-4	6"	111	15	20	80	1.39	Brown, minor humis, partially loose structure, dry
N 9-5	6"	118	10	20	81	1.46	Red brown, minor humis, partially loose structure, dry
N 9-6	6"	120	10	20	85	1.41	Brown, minor humis, partially loose structure, dry
N 9-7	10"	126	20	20	90	1.40	Clay, minor humis, wet
N 9-8	8"	131	20	25	91	1.44	Clay, minor humis, wet
N 9-9	8"	118	12	22	89	1.32	Clay, minor humis, wet
N 9-10	6"	119	15	28	85	1.40	Brown, minor humis, partially loose structure, damp
N 9-11	8"	146	25	15	115	1.26	Brown, minor humis, partially loose structure, damp
N 9-12	6"	172	20	21	140	1.22	Brown, minor humis, partially loose structure, damp

STATION	DEPTH	ASSAY VALUES THM ppm	Cu ppm	Pb ppm	Zn ppm	Ratio: THM / zn	SOIL REMARKS
N 10-1	6"	160	15	15	125	1.28	Brown, minor humis, partially loose structure, dry
N 10-2	8"	104	15	10	85	1.22	Brown, minor humis, partially loose structure, damp
N 10-3	6"	100	12	19	80	1.25	Brown, minor humis, partially loose structure, damp
N 10-4	6"	117	10	12	90	1.30	Brown, minor humis, partially loose structure, damp
N 10-5	6"	105	12	10	88	1.20	Red brown, minor humis, partially loose structure, damp
S 10-1	8"	145	33	29	97	1.50	Brown, clay, minor humis, dry
S 10-2	6"	144	12	23	111	1.30	Brown, minor humis, partially loose structure, damp
S 10-3	6"	201	19	33	151	1.33	Light brown, minor humis, partially loose structure, wet
S 10-4	6"	121	16	25	80	1.51	Brown, minor humis, partially loose structure, damp
S 10-5	8"	115	11	20	80	1.44	Brown, minor humis, partially loose structure, dry
S 10-6	8"	117	6	20	84	1.39	Brown, minor humis, partially loose structure, dry
S 10-7	6"	120	15	30	84	1.43	Red brown, minor humis, partially loose structure, dry

ASSAY VALUES

STATION	DEPTH	THM ppm	Cu ppm	Pb ppm	Zn ppm	Ratio: THM/Zn	SOIL REMARKS
N 11-1	6"	126	18	14	100	1.26	Brown, minor humis, partially loose structure, damp
N 11-2	6"	102	15	5	88	1.16	Brown, minor humis, partially loose structure, damp
N 11-3	6"	75	10	5	63	1.20	Brown, minor humis, partially loose structure, dry
N 11-4	6"	118	15	14	85	1.39	Red brown, coarse, dry
S 11	6"	127	15	16	96	1.32	Light brown, minor humis, partially loose structure, dry
S 11-1	6"	120	13	20	90	1.33	Grey brown, minor humis, partially loose structure, dry
S 11-2	6"	139	20	25	90	1.55	Grey, clay, minor humis, wet
S 11-3	10"	139	23	20	91	1.55	Grey, clay, semi-organic, damp
S 11-4	6"	132	12	22	98	1.35	Grey, brown, minor humis, partially loose structure, dry
S 11-5	6"	138	18	24	98	1.41	Grey, brown, minor humis, partially loose structure, dry
S 11-6	8"	133	19	22	96	1.39	Brown, black, semi-organic, damp
S 11-7	6"	128	10	18	94	1.36	Brown, fine, dry

STATION	DEPTH	ASSAY VALUES THM ppm	Cu ppm	Pb ppm	Zn ppm	Ratio: THM/Zn	SOIL REMARKS
12-1	6"	139	25	21	90	1.55	Grey, brown, minor humis, partially loose structure, damp
N 12-1	6"	129	18	25	90	1.43	Grey, brown, minor humis, partially loose structure, damp
N 12-2	6"	129	15	20	90	1.43	Brown, minor humis, partially loose structure, damp
N 12-3	6"	140	20	25	92	1.52	Brown, minor humis, partially loose structure, damp
N 12-4	6"	135	15	26	95	1.42	Brown, minor humis, partially loose structure, dry
N 12-5	6"	107	15	20	75	1.43	Brown, minor humis, partially loose structure, dry
N 12-6	6"	62	8	10	50	1.24	Brown, minor humis, partially loose structure, dry
N 12-7	6"	105	15	20	75	1.40	Brown, minor humis, partially loose structure, dry
N 12-8	6"	103	10	18	93	1.11	Brown, minor humis, partially loose structure, dry
N 12-9	6"	120	13	24	89	1.35	Light brown, minor humis, partially loose structure, dry
N 12-10	6"	120	14	20	92	1.31	Brown, minor humis, partially loose structure, dry

B. A. Chapman & Associates Limited

#2 - 515 Granville St.,
Vancouver 2, B.C.

DEBENTURE CREEK SILVER-LEAD PROSPECT

SMITHERS AREA, BRITISH COLUMBIA

REPORT ON AIR PHOTO TECTONIC INTERPRETATION

The area studied by air photos is 19 miles north-northeast of Smithers, British Columbia. The claims straddle the north and south ridges of Debenture Creek and cover a length east along the creek from its headwaters approximately 2.5 miles. The claim group, including the crown grants, number 38 in all.

Claim Name	Lot Number
Debenture	6310
Galena	6311
Mogul	6312
B. and M.	6313
Right Rim	6314
Bison	6315
Center Fraction	6316

Argent #1 to #31 inclusive.

The study of the aerial photography was completed in January, 1967. The tectonics were annotated on clear overlays to cover B.C. 20 chain (1320'=1") photographs, No. 2415:23 for the south half and No. 2414:75 for the north half.

REMARKS AND HYPOTHESIS:

1. Flow bedding or bedding appears to strike approximately N. 25° - 35° W. indicating a probable regional axis in this general direction.

2. The apparent regional dip of the flow bedding is to the southwest at approximately 45°.

3. A system of shear faults appear to strike north-northeast and dip steeply to the west.

4. If the shears are related to the regional cleavage, a synclinal axis is in the direction of the dip and to the west.

5. A transcurrent fault antithetic to the regional strike forms the Debenture Creek Valley. The fault system would appear to horsetail from the headwaters indicating a general slip direction to the west and into the valley floor. This form of faulting is deep seated and can produce many structures to contain ascending hydrothermal emanations.

6. The collapse features observed along the valley walls could be caused by intrusions along this deep seated fault zone with the most probable location for a possible stock in the valley floor at the junction of the above faults to the east.

CONCLUSIONS:

Three target areas are suggested by the interpretation:

1. A broad zone along the south wall parallel to Debenture Creek. The focal point of collapse would appear to occur approximately 1,000 feet to the west of the present adit.

(a) Structures that strike from the valley floor in a westerly direction up the wall should be examined (horsetails at approximately S. 45° W.).

(b) Structures that parallel the Debenture Creek fault.

(c) Structures that are perpendicular to the Debenture Creek fault.

2. The area approximately 3/4 of a mile east of the present showings and in the valley floor (possible stock or pipe).

3. The third possible target is due south of No. 2. The complex fracture patterns warrant prospecting.

The object of an air photo interpretation is basically an attempt to understand the relationships of the major fault patterns in terms of regional geology and local complexities. Its purpose is to aid the geologist and the prospector in tracing known mineral showings so that they can be expanded. Secondly, favourable geological targets of the entire area are noted for future prospecting.

D.A. CHAPMAN & ASSOCIATES LTD.,

D.A. Chapman.

DAC/jm

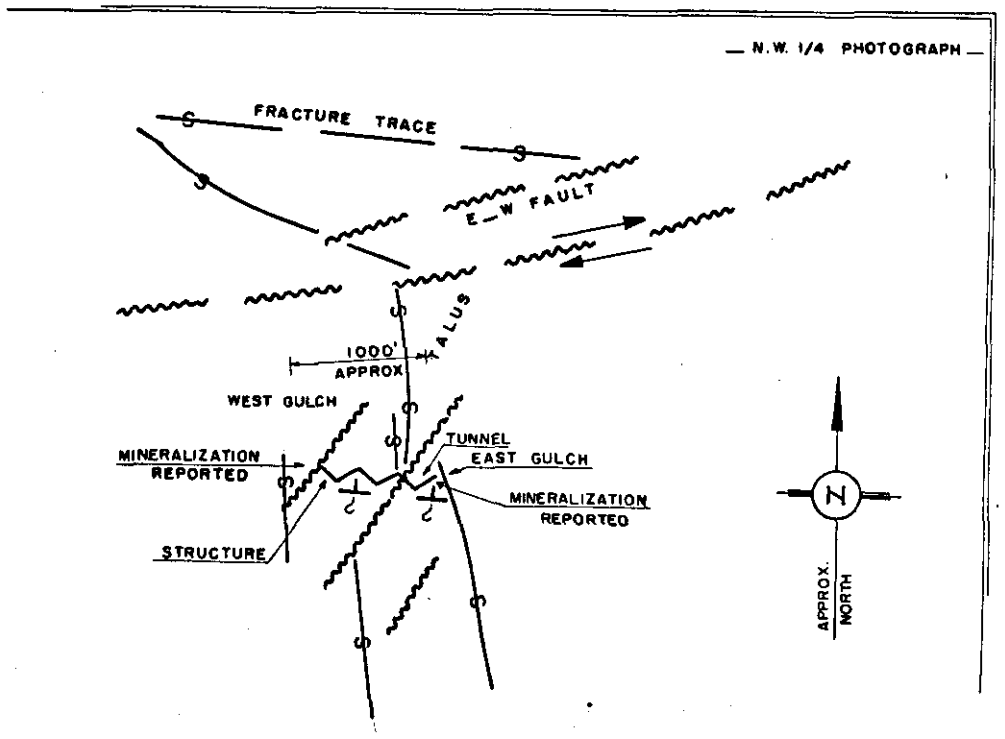
The sketch on the following page has been compiled from the aerial photographic interpretation in conjunction with field information.

It is intended to convey the possible attitudes of the veins in relation to the topography and the most probable location of outcrop.

The suggested pertinent structures must be confirmed by field investigation.

D.A. CHAPMAN & ASSOCIATES LIMITED.

Air Photo Interpretation:
Interpreted structures from
Air Photo B.C. 2414:75
Approx. Scale 1" = 1320'



D. A. CHAPMAN & ASSOCIATES LTD.
#2 - 515 Granville St.
Vancouver 2, B. C.

I N V O I C E

Geochemical Survey

GEOCHEM SURVEY COSTS

Compilation of report data including air photo interpretation, drafting, reproduction, field examination and supervision	$1,000.00
2 Men at $100.00 per day (3 days x 2 x $100.00) (Sept. 18-31/67)	600.00
Helicopter (2 trips)	160.00
T.S.L. Laboratory (Soil Preparation & Assay)	224.20
TOTAL COST	$1,984.20

Paid D A C.

Declared before me at the City of Vancouver, in the Province of British Columbia, this 12 day of July 1968, A.D.

D A Chapman

S. Jeannotte

A Commissioner for Taking Affidavits within British Columbia or
A Notary Public in and for the Province of British Columbia.

SUB-MINING RECORDER?

N

Cr.

Debenture

Cr.

Synclinal Fold Axis (E-M)

E-M ANOMALY

EAST GULCH FAULT

BASELINE

4000

4500

5000

5500

Volcanic Porphyry - minor pyrite

Breccia Fault - N 08° W (vertical)
Exposed in creek.

Geochem Baseline

TARGET AREA Nº 3
ANOMALOUS FRACTURE DENSITY
COINCIDING MAGNETIC (AIRBORNE)
AND GEOCHEMICAL (THM)
ANOMALY

ADIT - See detail mapping of tunnel and vein exposure

Mineralized float found in talus slope

CROWN GRANTS

ARGENT CLAIMS

Apparent ground slump associated with many breccia pipes, observed within the target area.

CONTACT (E-M)

93

92

SILVER DEBENTURE MINES LTD. (NPL)

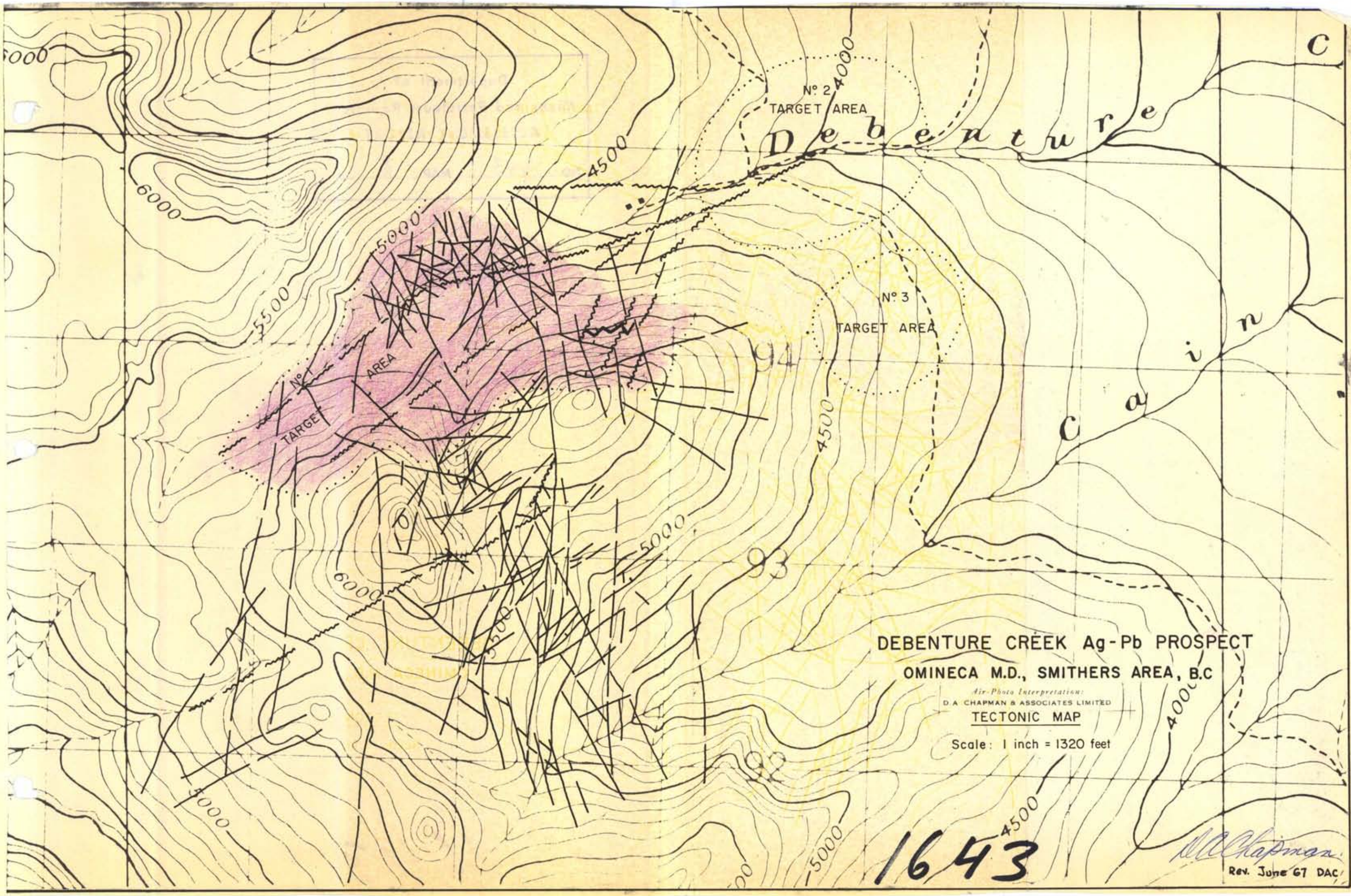
RECONNAISSANCE MAP OF DEBENTURE CK. Ag PROSPECT SMITHERS AREA, OMENICA M.D., B.C.

COMPILED FROM AIRBORNE GEOPHYSICAL, GROUND PROSPECTING AND GEOCHEM SURVEYS

MAP SCALE : ONE INCH EQUALS 1320 FEET

BY: D.A. CHAPMAN & ASSOCIATES LTD. October 15, 1967

D.A. Chapman


6000
5500
5000
4500
4000
Nº 2
TARGET AREA
Debenture
Nº 3
TARGET AREA
Nº 1
TARGET
AREA
94
93
92
Cain
DEBENTURE CREEK Ag-Pb PROSPECT
OMINECA M.D., SMITHERS AREA, B.C
Air-Photo Interpretation:
D.A. CHAPMAN & ASSOCIATES LIMITED
TECTONIC MAP
Scale: 1 inch = 1320 feet
1643
Rev. June 67 DAC