2217

GEOPHYSICAL REPORT

on an

AIRBORNE MAGNETOMETER SURVEY

of the

Deadwood Mining Camp

with particular reference to the

45 Claims and Leases known as the

ANACONDA BLUE AND MOTHERLODE GREEN GROUPS

Owned by

AABRO MINING and OILS LTD.

of Vancouver, B.C.

situated near

Greenwood Mining Division, British Columbia

N.T.S. 82 E/2

Latitude 49°05'N; Longitude 118°45'W.

Airborne Survey Conducted February 28 and March 29, 1969

by

GEO-X SURVEYS LTD.

Report by:

D. R. Cochrane, P. Eng.
James Cerne, M.S.
G. E. White, B. Sc.

April 21, 1969.

604-685-4296
TELEX 04-50404

GEO-X SURVEYS LTD. 627 HORNBY STREET, VANCOUVER 1, B.C.

2217

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SUMMARY-CONCLUSIONS/RECOMMENDATIONS

Late in February and again in March 1969, 83 line miles of total field aeromagnetic surveying was completed over the Deadwood Camp located immediately west of Greenwood, B.C. It was conducted on behalf of a consortium of companies. This report is with particular reference to the 45 located mineral claims, leases and crown grants owned by Aabro Mining and Oils Ltd.

The survey was completed in a Cherokee 6-300 fixed wing aircraft equipped with a Varian V4937A proton precession magnetometer (±1 gamma), SDV4991 digital recorder and analog chart recorders. Flight line positioning was facilitated by 35 mm strip photography matched to mosaics prepared from Government air photos (see accompanying Figure No. 4).

A total of 35 flight lines were contour flown and the flight pattern is quite complex and arcuate. The proton sensor bird terrain clearance averaged 450 feet.

Processing of the data was conducted by personnel and equipment from Geo-X Surveys Ltd., Co-ordinate Aerial Surveys Ltd. and IBM - all of Vancouver, B.C. The accompanying isomagnetic total field plan (see Figure 5) was plotted at a scale of 1":1000' by a computer-plotter unit which contoured at 100 gamma intervals on the west half of the sheet and 25 gammas intervals on the east half.

Deadwood is an historic mining area and part of the famous Boundary Mining Camp which reached a height of activity

early in the century with production from dozens of mineral properties. Ore was transported on a network of local railways to any one of three smelters operating at that time. Many of the deposits are replacement skarn type consisting of magnetite, chalcopyrite, pyrrhotite, and pyrite with associated gold values. A typical magnetic target therefore may be expected to be a sharp "thumb print" magnetic spike.

The average total field intensity in the Deadwood area was found to be 58032 gammas and maximum range response was -229 to +952 gammas about this mean. A frequency histogram of 1230 magnetic observations accompanies this report (Figure 3) and shows a positive skewed distribution with a slight departure from log-normality at 58200 gammas.

Two broad magnetic divisions may be distinguished on the isomagnetic plan. The eastern division is a low to moderate total field response area of gentle magnetic relief. The western division is a low to high intensity response area of complex and sharp relief. The division boundary, designated A-A' is not extremely well defined but coincides with a major normal fault zone mapped by J. W. H. Monger. (G.S.C. paper 67-42). The eastern magnetic division, very generally speaking, is underlain by Paleozoic metasediments and volcanics intruded by Mesozoic acidic plutons. The contact between the two is not easily magnetically discernible. The western magnetic division of the map sheet is underlain by Tertiary volcanics.

Many magnetic linears are present and form rectilinear patterns in the western and curved patterns in the eastern division. A major magnetic linear trending northwest across

the Motherlode - Deadwood Valley (designated B-B') also transects the major subdivision boundary A-A'.

The Aabro property is characterized by quite complex magnetic response and patterns. An east by northeast trending magnetic ridge which trends through the Motherlode pit is a dominant feature and is disrupted by a northwest trending magnetic linear. This linear, named C-C' may indicate the presence of a major fault. Its northwest projection coincides with the north portion of linear A-A'.

A total of seven magnetic peaks were encountered over Aabro's Greenwood properties and these are contained in six anomalously high areas. One of the most prominent is in and around the Motherlode pit and former mill site. The anomaly actually consists of two magnetic "bumps", No. 1 (a) which is 222 gammas above average, and No. 1 (b) some 163 gammas above average. In view of the known type of mineralization in the anomaly No. 1(b) area, the amplitude is not overly impressive, and severe attenuation of the response, with elevation, may therefore be considered a magnetic characteristic of the area.

Anomaly No. 2 is situated on the MT - 10 claim, a located claim a short distance west of the main claim groups. It reaches an anplitude of 58677 gammas and is the southern portion of a north trending positive magnetic ridge.

The isomagnetic plan accompanying this report can provide valuable information about the subsurface lithology and structure. A general graphic interpretation of the map is presented as Figure 6 and is intended only as an

overall guide to some of the major magnetic features. The implications of some of the magnetic prominences are immediately apparent, and investigation as to the cause of the six positive magnetic anomalies herein described is recommended. In addition, the investigation of other magnetic features, perhaps not quite as distinctive, is suggested since it will at least contribute to the general geological knowledge of this mining area. Furthermore, it is possible that other types of deposits in addition to the known variety are present within the area surveyed. Therefore, the additional features on which the authors suggest ground investigation include:

(i) the magnetic linears, and linear intersections.

(ii) areas with magnetic patterns and responses similar in nature to those exhibited over known mineralized zones.

(iii) other unusual features such as steep magnetic gradients or rapid change in magnetic trend directions.

Respectfully submitted,

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. R. COCHRANE

D. R. Cochrane, P. Eng.

James Cerne, M.S.

G.E. White, B. Sc.

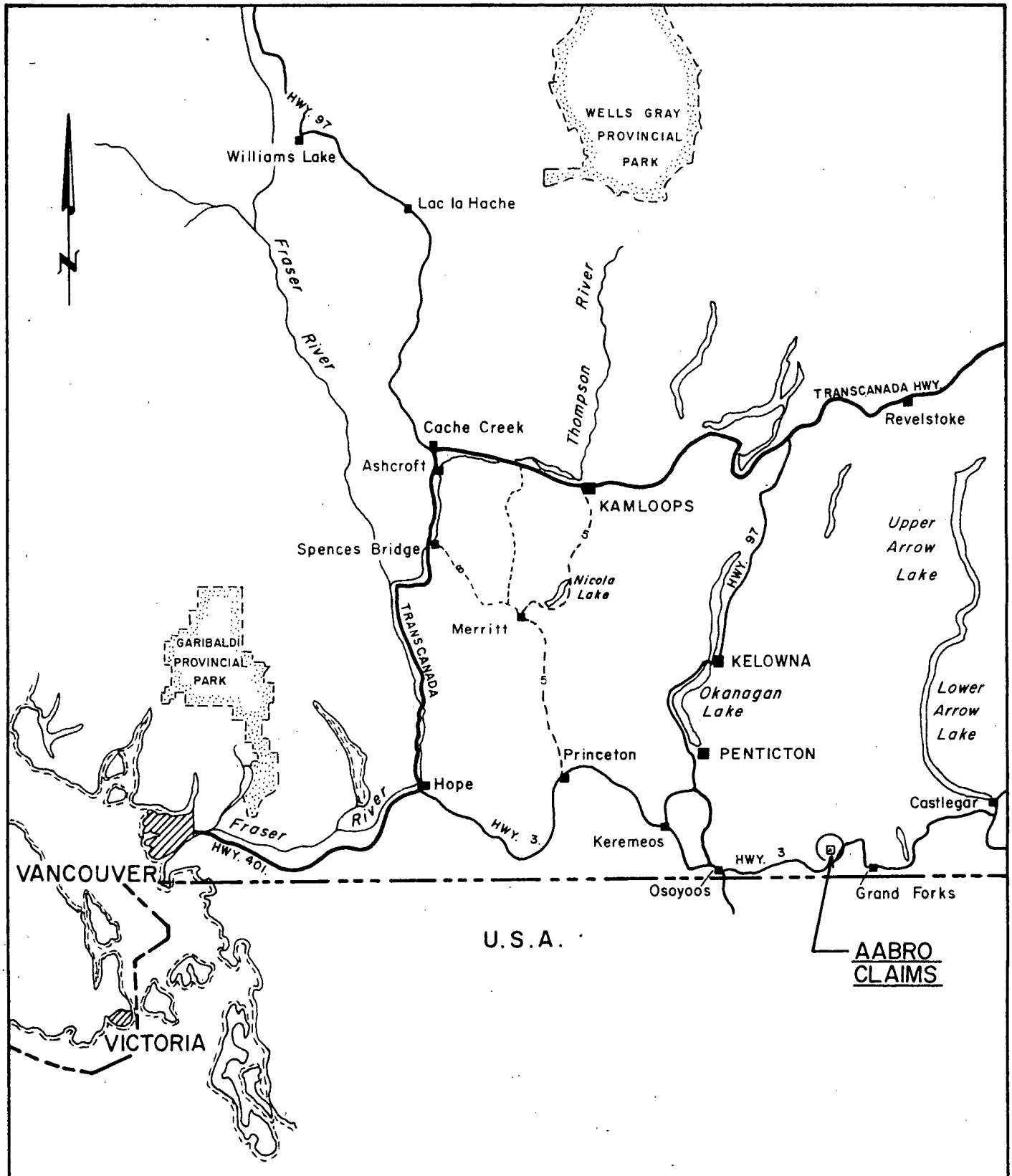
INTRODUCTION

On February 28 and March 29, 1969, a total of 83 line miles of an airborne magnetometer survey was completed over an historic mining area situated immediately west of the City of Greenwood and known as the Deadwood Camp. The survey was conducted on behalf of a number of mining companies owning mineral properties in the vicinity. This report discusses the aeromagnetic results (a) in general over the entire Deadwood Camp and (b) in detail, the Anaconda Blue and Motherlode Green Groups owned by Aabro Mines. It includes information describing the instrumentation and the field and data processing procedures which were employed on the survey.

LOCATION AND ACCESS

The 45 claim mineral property is centred about three miles up Deadwood Creek, from the City of Greenwood, B.C. The Motherlode Mine is some 3½ miles west along a railway grade from Greenwood and lies at an elevation of 3450 feet above sea level. Normal access is via a dirt road from the Southern Trans Canada Highway. Various old wagon roads permit easy 4 x 4 access to most of the claims and leases.

The National Topographic System reference square for the area is 82 E/2. The latitude is 49°06' and longitude 118°43' west.



AABRO MINING & OILS LTD.
GREENWOOD AREA - GREENWOOD M. D.
BRITISH COLUMBIA

LOCATION MAP

GEO – X SURVEYS LTD.

DRAWN R.K.	DATED APR. 21/69	FIG. NO. 1
CHECKED	JOB NO. 1071	

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NO. 2217 MAP #1

CLAIMS AND OWNERSHIP

The Greenwood properties of Aabro consist of some 44 contiguous located mineral claims, crown grants and mineral leases grouped into the Anaconda Blue and Motherlode Green Groups, and a separate located claim, not included in or adjoining either group and situated about one and one half claims west of the main groups. It is west along Deadwood Creek. The claims and leases are held by Aabro Mining and Oils Ltd., registered office, 204-569 Howe Street, Vancouver 1, B.C. (Telephone 604-681-5561).

A table of Aabro's mineral property holdings over which the aeromagnetic survey here-in described was conducted is as follows:

MOTHERLODE GREEN GROUP	Description	Record No.
Located Claims	Birthday Fr.	14997 R
	M. T. 4	27036
	Hound No. 1 Fr.	22643
	M. T. 16 Fr.	27281
	Ragnarock Fr.	22451
	Hardscrabble Fr.	19473
Crown Grants	Greyhound	L 1014
	St. Lawrence	L 1255
	Great Hopes	L 6025
	C.O.D.	L 928
	Sunset	L 788
	Motherlode	L 704
	Crown Silver	L 789
	Sunflower	L 916
	Primrose	L 927
	Ten Brock	L 1221
	Florence Fr.	L 1470
	Don Julio Fr.	L 1283
	Offspring	L 1254

		Description	Record No.
Leases	M 189	Butte City	L 1230
		Toronto	L 1013
	M 294	Gold Bug	L 895
		St. Eugene Fr.	L 2321
	M 122	Peacock	L 1243
	M 306	Plutonia	L 884

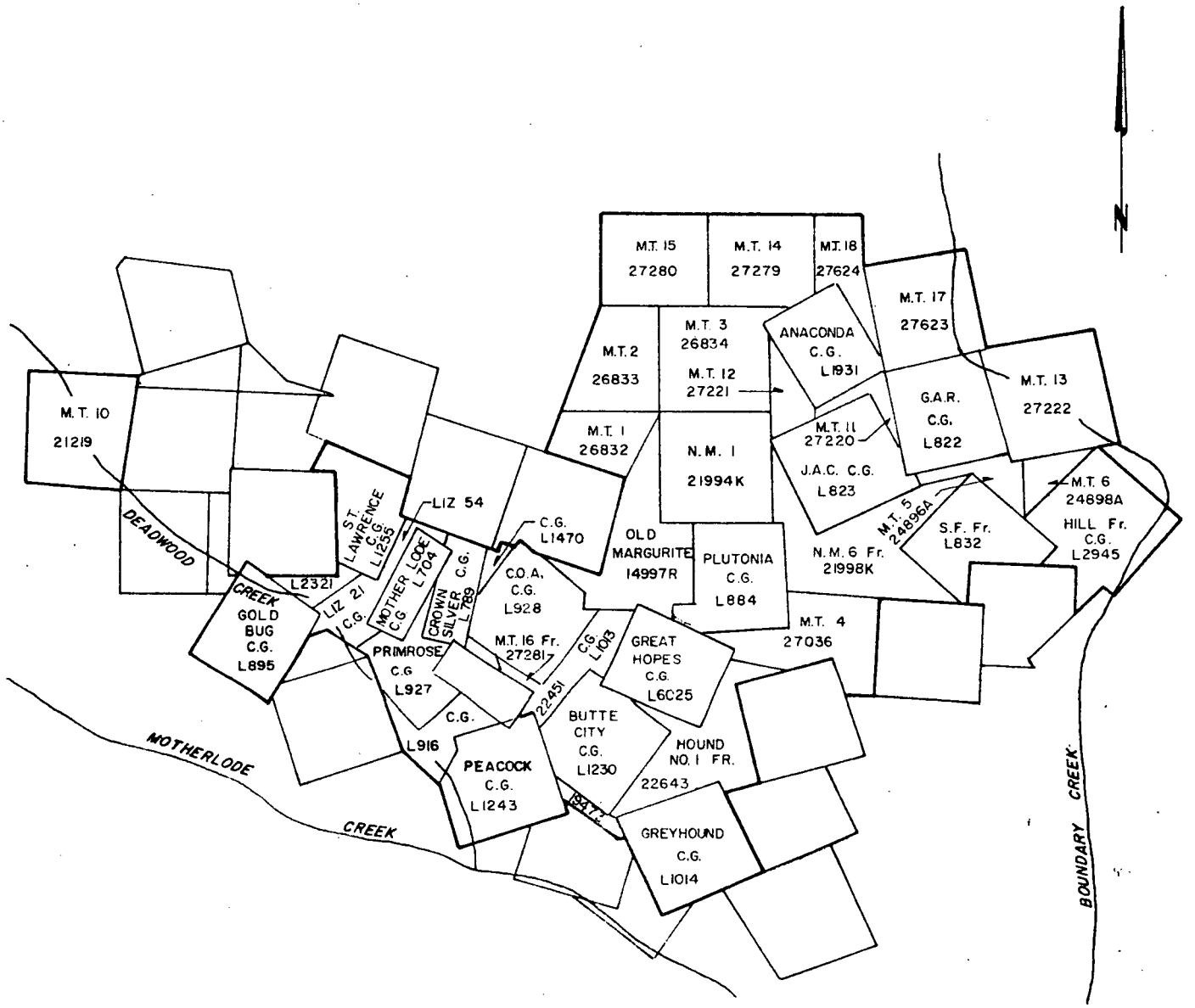
ANACONDA BLUE GROUP

Located Claims	M.T.L	26832
	M.T.2	26833
	M.T.3	26834
	M.T.5	24896 A
	M.T.6	24898 A
	M.T.11	27220
	M.T.12	27221
	M.T.13	27222
	M.T.14	27279
	M.T.15	27280
	M.T.17	27623
	M.T.18	27624
	N.M.1	21994 K
	N.M.6 Fraction	21998 K
Crown Grants	Anaconda	L 1931
Leases M307	J.A.C.	L 823
	G.A.R.	L 822
M315	S.F. Fraction	L 832
	Hill Fraction	L 2945

UNGROUPED

MT10	27219

The mineral claims map for the area is designated 82 E/2 and is available for viewing at any Mining Recorders Office. The old mineral reference map for the area showing old crown grants is number six (6). A sketch of the Aabro Greenwood Properties, compiled from all available data, accompanies this report and is designated Figure 2.



Copied From Claim Map Supplied By Client

0 2100 4200 6300

FEET (APPROX.)

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NO. 2217 MAP #2

AABRO MINING & OILS LTD.
GREENWOOD AREA - GREENWOOD M. D.
BRITISH COLUMBIA

CLAIM MAP

GEO – X SURVEYS LTD.

Drawn D.E.Y.	Dated APR. 21/69	Fig.No. 2
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GENERAL SETTING

The Deadwood area is a part of the famous and historical Boundary Mining Camp, which, early in the 1900's was one of the major copper producing centres in Canada. The mining history of the area dates back to before the turn of the century and coincides with the discovery of placer gold in Boundary Creek about 1862. Mining activity culminated in 1913 at which time 1,250,000 tons of ore were mined and shipped; three copper smelters and many miles of railway line were in operation in the Boundary area.

Physiographically, the Deadwood Camp lies on the east flank of the southern portion of the Midway Range of the Monashee Mountain system of the Interior of British Columbia. It is a transitional area between the relatively gentle rolling surface of the Okanagan Highlands to the west and the rugged mountainous terrain of the Selkirk Ranges to the east. In keeping with its transitional setting, it often displays characteristics of both. Locally, however, it exhibits steep to moderately steep topographic gradients in tributary valleys and in major valleys between the elevation of 2500 feet and 4000 feet (above sea level) and a rather rolling, "domed" surface above this elevation. The majority of the local mountain peaks are less than 5000 feet in elevation above sea level. The Deadwood Camp lies within a "horseshoe shaped" height of land drained to the southeast by the Deadwood and Motherlode (Copper) Creeks. The open

end of the horseshoe is near the confluence of the Deadwood and Boundary Creeks at Anaconda (smelter site) just south of the City of Greenwood, at an elevation of 2400 feet. The topographic apex is Copper Mountain, elevation just over 4900 feet, situated some 5½ miles northwest of this point. To the north of the valley is Deadwood Ridge; to the west Ingram Ridge; and to the south and southeast a spur of Ingram Ridge, which in itself, is a spur of Copper Mountain.

J. W. Monger (G.S.C. Paper 67-42) has reported that one of the first geological observations in the map area was by Bauerman (G.S.C. Report Prog. 1882-84 pt. B) who noted the abundance of "porphyritic dykes, greenstones, syenites and elvans" which penetrated slates and greenstones. Basically, his statement remains true to this day. Monger indicates the following:

"Early Tertiary rocks of the Greenwood area consist of a lower sequence of predominantly clastic rocks and a comformable upper sequence of mainly extrusive rocks, the middle part of which is of middle Eocene age. Extensive normal faulting, with fault displacements ranging from a few inches to more than 5,000 feet, generally accompanied by tilting, has affected all of these rocks and they now occur in fault blocks, and in many places are isolated from equivalent rocks by upfaulted older rocks."

He further states:

"The lower sequence, the continental Kettle River Formation (Daly, 1912, p. 394), lies unconformably on a basement composed of late Palaeozoic and early Mesozoic sedimentary, volcanic and generally low-grade metamorphic rocks, intruded by Cretaceous grandodiorite and granite, and consists of a discontinuous basal conglomerate above which are volcanic sandstone and siltstone, acidic pyroclastic rock, acidic lava, shale and relatively minor conglomerate."

Copper-gold mineralization in the Greenwood area is Pre-Cenozoic and often related (spatially at least) to Juro-Cretaceous (Coast Range) intrusives. Much of the ore mined to date has been from replacement (Skarn) type deposits. In many places, the mineralization is conformable to bedding and is most abundant in carbonate rich bands.

AIRBORNE FIELD PROCEDURE

The total intensity of the geomagnetic field was measured and recorded along 35 flight lines, at an average terrain clearance of 450 feet. The flight pattern was complex since the area was contour flown. Flight tracks are graphically displayed on accompanying Figure No. 4.

The survey was conducted in a fixed wing aircraft, towing an airfoil sensor. A proton magnetometer, digital and chart recorders, camera and altimeter were mounted in the aircraft. The magnetometer and chart recorder measured and recorded the magnetic field intensity. At one

second intervals, the field amplitude and fiducial number were recorded on punch tape by the digital recording system. At 30 second intervals, the time and line number were punched on the tape. At two second intervals, a split image camera simultaneously photographed (1) the terrain, and (2), the clock and fiducial display panel. Thus, each terrain photograph is bordered by a photograph of the clock and fiducial number.

The terrain clearance was measured with a Bonzar pulse type radar altimeter and recorded by a V2000 chart recorder.

Solar flare warnings and predictions, issued daily by the Space Disturbance Forecast Centre in Boulder, Colorado, were used to schedule the flight during a magnetically quiet period.

The punch tape, chart and strip photograph processing is described in the following section. Instrument specifications are in Appendix IV.

DATA PROCESSING

The data processing procedure consisted of four steps, discussed under the following headings:

1. Flight line X-Y positioning.
2. Editing of the paper tape.
3. Tabulation of critical fiducial numbers and their X-Y coordinates.
4. Contour plotting.

I. Flight Line X-Y Positioning:

From the aircraft, while the lines were being flown, the flight lines were roughly positioned on government aerial photographs. In the office, the beginning and end of each flight line was marked on the strip photographs. The strip photos were then sent on to Co-ordinate Aerial Surveys Ltd. of Vancouver, where the flight lines were transferred onto a mosaic prepared from the government photos. Geo-X personnel superimposed an X-Y coordinate system on the flight line mosaic with Y north and X east (see Figure 4). Thus, every position along a flight line was defined in terms of +X (number of feet east of the origin) and +Y (numoer of feet north of the origin), and has a corresponding magnetic value in gammas.

2. Editing of the Paper Tape:

A listing of the contents of the paper tape was made by IBM of Vancouver. Geo-X personnel examined the listing and compared it with the analog record as a guard against possible machine or operator error. The magnetic readings for areas of flight line intersection were compared as a check on the time variations of the geomagnetic field.

3. Tabulation of Critical Fiducial Numbers:

The first and last fiducial number on each line were tabulated along with their X-Y coordinates. In addition,

points where the flight line changed direction were tabulated along with the appropriate fiducial number. The tabulated information was keypunched onto computer cards and sent to IBM.

4. Contour Plotting:

IBM fed the punch tape to a 360/40 computer, along with the X-Y coordinates of the start, end, and any changes of direction that may have occurred in the flight line. The magnetometer readings were evenly spaced along the line segments and contoured by an IBM 1130 with Calcomp drum plotter, at a contour interval of 100 gammas on the western 10,000 feet of the map area, and 25 gammas on the remaining area. The data sampling interval along the flight lines was roughly 160 feet and every other data point was plotted. The final isomagnetic plan was produced by consideration of some 1230 discrete magnetic observations.

RESULTS-DISCUSSION/INTERPRETATION

Introduction

Since ferromagnetic susceptibility and natural rock magnetism change measurably from one rock type to another, accurate detailed mapping of the geomagnetic field often provides valuable information about the sub-surface geology (even in heavily drift covered areas). Aero-magnetic surveys provide new knowledge of the type, general attitude; configuration and complexity of the geo-superstructure

MAGNETOMETER DISTRIBUTION ANALYSIS

INTERVAL	GT OR =	LESS THAN
1	57600.00	57700.00
2	57700.00	57800.00
3	57800.00	57900.00
4	57900.00	58000.00
5	58000.00	58100.00
6	58100.00	58200.00
7	58200.00	58300.00
8	58300.00	58400.00
9	58400.00	58500.00
10	58500.00	58600.00
11	58600.00	58700.00
12	58700.00	58800.00
13	58800.00	58900.00
14	58900.00	59000.00

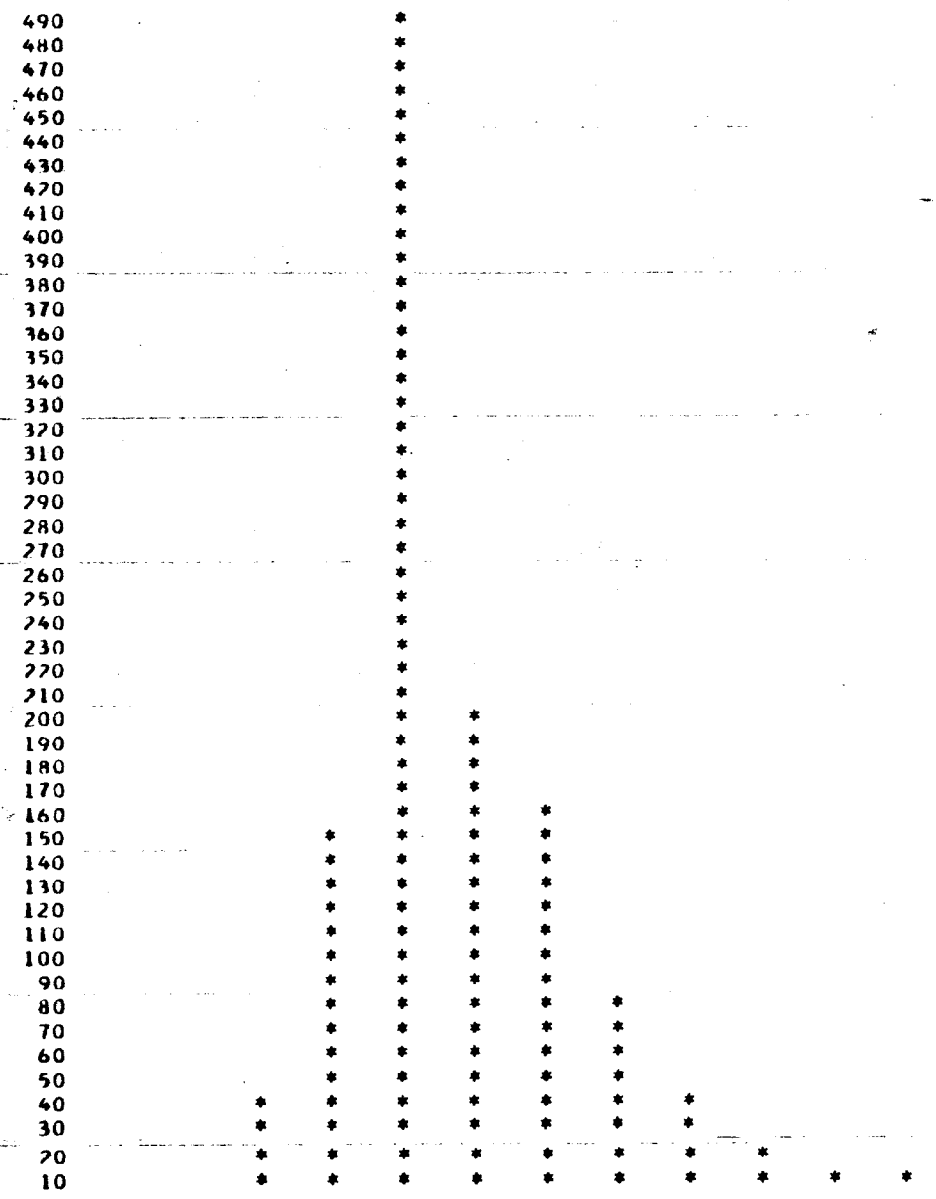
MEAN GAMMA 58032. STD. DEV. 170.14 MIN 57703. MAX.58985.

HISTOGRAM 1

TOTAL OBS 1230.

FREQUENCY 0 40 155 490 207 161 80 47 23 11 10 5 0 1

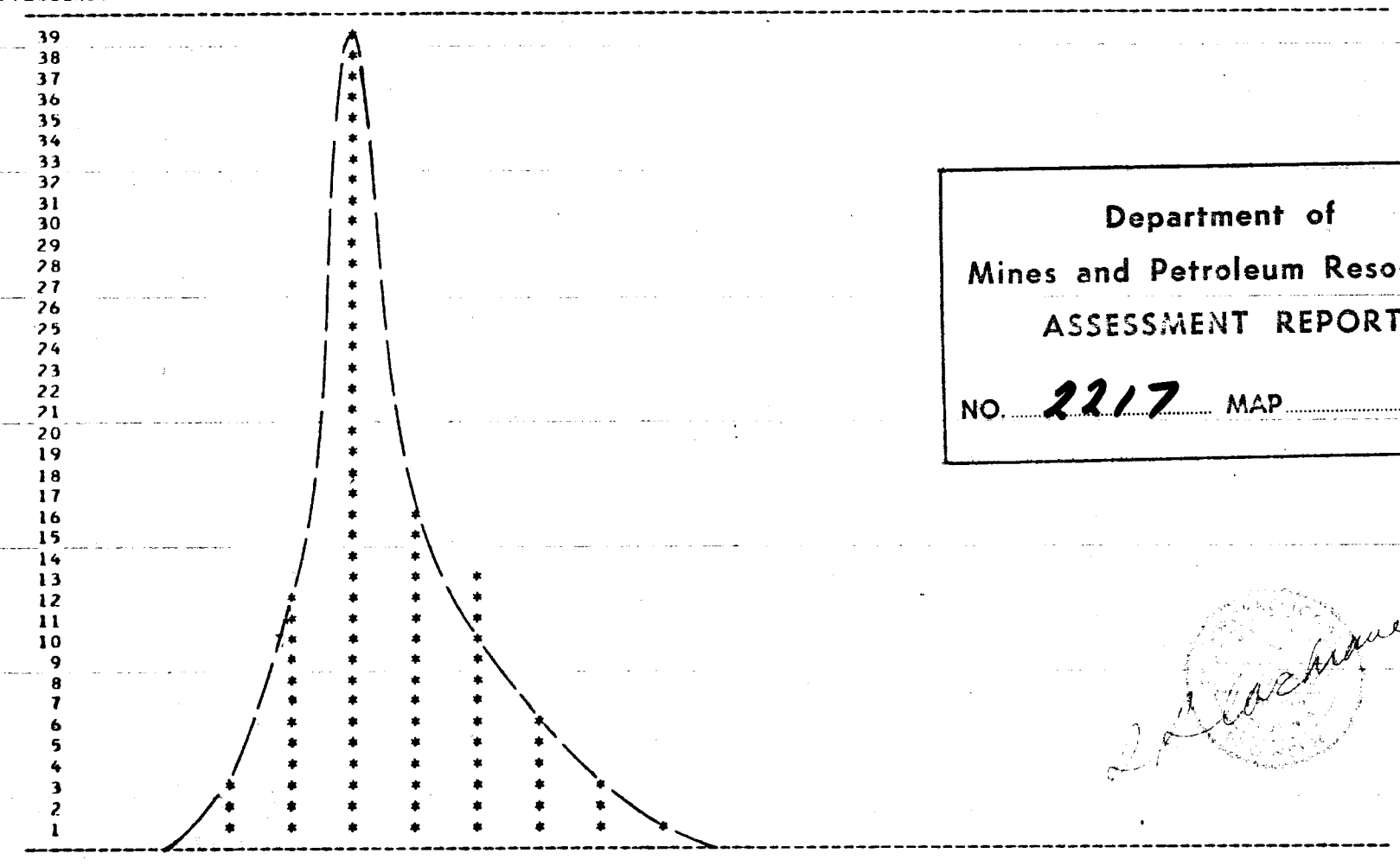
EACH * EQUALS 10 POINTS



HISTOGRAM 2

TOTAL OBS 100.

FREQUENCY 0 3 12 39 16 13 6 3 1 0 0 0 0 0



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END OF ANALYSIS

FIG. 3 FREQUENCY DISTRIBUTION HISTOGRAM

and often identifies local elements which sometimes indicate ore. Aeromagnetic prospecting can be applied to the delineation of buried contacts and disruptions, the location of areas of possible plutonic differentiation and its varied products. Considerable speed and accuracy is inherent in this survey. There are, however, often several choices available (especially with particular magnetic effects) during the conversion of these geophysical data into usable geological concepts. This conversion is greatly facilitated, and the ambiguity reduced, in two basic ways. The first is geologic control, which reduces the number of variables that the interpreter must consider. The second is electronic data analysis, which is essentially the use of filtering techniques. Filtering can remove noise, regional variation, and the effects of various physical phenomena (such as some of the effects of topography, or changing depth of burial). This latter method, however, still requires translation into geological concepts. The interpretation of the magnetic data contained herein is a synoptic one and is intended to provide a framework within which a more particular view may be accommodated as (or if) additional geological information becomes available.

Morphological terms have been employed in order to easily discuss and describe the isomagnetic map. Thus the map may be regarded as a contoured magnetic surface or "scape" (terrain) complete with gradients, hills, valleys, ridges and linears. This eliminates the necessity of designing a parallel word system.

A general graphic interpretation accompanies this report and is designated Figure 6. It is basically a "manual" qualitative analysis of the magnetic features rather than a "computational" quantitative one. Considerable reference has been made to the aerial photography, available geology and geophysics in the preparation of the interpretation map.

DISCUSSION/INTERPRETATION

A total intensity isomagnetic field plan is presented as Figure 5. The horizontal scale is 1";1000' (approximately) and is correct to the accuracy of the air-photo mosaic (from which the physiographic features were outlined). Some distortion is inevitable, especially in areas of rugged terrain. The map depicts the intensity of the geomagnetic field present at the given nominal altitude on the particular flight days.

A frequency distribution histogram of 1230 magnetic observations, with class intervals equal to the contour (100 gamma) intervals, is presented as Figure 3. The calculated arithmetic mean is 58032 and standard deviation 170 gammas. This is considered normal for this particular magnetic latitude area. Maximum response was 58985 and minimum 57703 gammas. The histogram shows a very prominent mode lying between 57900 and 58000 gammas and it contains 39% of the total population. Similarly, reference to Figure 5 indicates that the largest section of the area surveyed is characterized by intensities between 57900 and

58000 gammas. The distribution of magnetic values is positively skewed and classically log-normal. Thus, it may be inferred that the magnetic susceptibility of the different rock types is not significantly different and that a small portion of the area surveyed exhibits abnormally high intensities. There is a slight departure from log-normality in class interval No. 6 (58100 to 58200 gammas) and it is a suggestion of inhomogeneity, (i.e. that two magnetic families and therefore two significantly different rock type families are present within the area surveyed). The upper boundary of class interval No. 6, the 58200 contour then, may serve as a rough guide to a geological contact and separating two magnetic families. Based on this contour, and Monger's mapping (see G.S.C. Paper 67-42), the Deadwood Area may be divided into two broad magnetic divisions. The eastern division, east of line A-A' on Figure 6, is characterized by low to moderate total field intensities and a small range of magnetic values. The surface is gentle and only slightly rolling. The western division, west of line A-A' on Figure 6, is characterized by low to high total field intensities and a large range of magnetic values. The surface is relatively rough and complex.

The boundary between these two magnetic divisions is not sharp by all means, but rather gradational from the relatively gentle magnetic relief of the east to the relatively sharp relief of the west.

The boundary A-A' does, however, lie close to the aforementioned 58200 contour interval. Much of the western magnetic division is characterized by intensities in excess of 58200 gammas and the eastern division by intensities less than this value. This line also lies close to a major normal fault zone mapped by Monger which divides the area into two geological families: the eastern area, underlain by Paloezoic metasediments and volcanics intruded by Mesozoic pluton; and the western area underlain predominantly by tertiary volcanics. There is a change in the character of the magnetic response evident between the northern sector of the western magnetic area and the southern. The south sector is a lower amplitude surface and a well developed rectilinear pattern of northwest and northeast trending magnetic linears are apparent. These linears may indicate faults. A rather arcuate pattern of magnetic linears characterizes the eastern magnetic area. The predominant direction is roughly north. A rather unusual linear feature is a northwest by west trending magnetic low axis designated B-B' in Figure 6. It is one of the few trends which transects line A-A' and is common to both magnetic terrains.

The Crown Silver and Silver Dome property lies within a relatively gentle magnetic terrain. One of the most notable features is a north-northwest trending magnetic depression which culminates at the south end of

the property in a well developed less than 57800 gamma magnetic low, and at the north end in two smaller sized less than 57800 gamma zones. To the east and west of this magnetic trough, the intensity increases and attains a maximum response of just over 58200 gammas in four well defined areas. These are designated magnetic highs No. 1 through No. 4 inclusive. Three of these are situated to the west of boundary A-A' and one to the east. A fifth magnetic high (un-named) is situated close to the southeast corner of Lone Star No. 2 claim.

A general graphic interpretation accompanies this report and is designated accompanying Figure No. 6.

Respectfully submitted,

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. R. COCHRANE

D. R. Cochrane, P. Eng.

James Cerne

James Cerne, M.S.

Glen Whitte, B. Sc.

Aabro's Greenwood properties lie within an area which changes magnetic character and relief quite rapidly. One of the most prominent features is an east by northeast trending magnetic ridge which exhibits maximum intensity in and around the Motherlode Mine area. The anomalous zones at the end of this ridge are designated magnetic highs No. 1 (a) and 1 (b) and attain amplitudes of +58254 and +58195 gammas respectively. A small bump near the end of the ridge is named anomaly No. 6. This ridge is disrupted by a northwest trending magnetic linear named C-C' which is apparently an extension of the north segment of the A-A' linear. Linear C-C' may indicate the presence of a major fault. One of the most prominent magnetic peaks present in the Deadwood area was located on or close to Aabro's MT 10 claim. The maximum amplitude attained at the anomaly No. 2 peak was 58677 gammas, some 645 gammas above the average. This anomaly is situated near the south end of a magnetic ridge, trending north and exhibiting considerable relief. However, it is located, presumably, in an area underlain by tertiary volcanics.

Magnetic high No. 3 is located on or close to the G.A.R. mineral lease. This anomaly is circular in plan and attains a total field intensity of 58143 gammas, just over 100 gammas above average.

Magnetic high's no. 4 and No. 5 are situated close to the east and northeast property boundaries and have maximum amplitudes of 58189 and 58178 gammas respectively.

The above described information is presented in map form in Figure No. 6.

Respectfully submitted,

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. R. COCHRANE

D. R. Cochrane, P. Eng.

James Cerne

James Cerne, M.S.

G. E. White, B.Sc.

APPENDIX I

PERSONNEL

NAME:	COCHRANE, Donald Robert
EDUCATION:	B.A.Sc. - University of Toronto M.Sc. (Eng.) - Queen's University
PROFESSIONAL ASSOCIATIONS:	Professional Engineer, (P. Eng.), registered in British Columbia, Ontario, Saskatchewan. M.C.I.M.M., M.E.I.C., M.G.A.C., M.M.A.C.
EXPERIENCE:	Engaged in the Profession since 1962 while employed with Noranda Exploration Co. Ltd., Quebec Cartier Mines Ltd., Meridian Exploration Syndicate. Experience in West Indies, Central and South America, U.S.A. and Canada.

APPENDIX I

PERSONNEL

Name:	WHITE, Glen E.
Education:	B.Sc. Geophysics - Geology University of British Columbia.
Professional Associations:	Associate member of Society of Exploration Geophysicists.
Experience:	Pre-Graduate experience in Geology-Geochemistry-Geophysics with Anaconda American Brass.
	Since Graduation in 1966 in Geophysics - Geology, has obtained experience in Mining Geophysics with Sulmac Explorations Ltd.
	Airborne Geophysics with Spartan Air Services consulting on second derivative.
	Micro-Gravity project with Velocity Surveys Ltd.
	Recently acted as mining Geophysicist and technical Sales Manager in the Pacific north-west for W.P. McGill and Associates.
	Presently employed as Airborne and Mining Geophysicist with Geo-X Surveys Ltd.
	Active experience in all Geologic provinces of Canada has been obtained.

APPENDIX I

PERSONNEL

NAME: CERNE, James

EDUCATION: B.S. Geology (June 1967)
Case Institute of Technology - Cleveland, Ohio.

M.S. Geophysics (August 1968)
California Institute of Technology - Pasadena, California.

EXPERIENCE: July 1965 - June 1967 - Metallurgy Dept., Case Institute of Technology - Student Asst.

June - September 1967 - N.A.S.A. Manned Spacecraft CNT. Lunar and Earth Sciences Div., Geophysics Group, Houston, Texas.

September 1967 - August 1968 - California Institute of Technology, Seismological Laboratory, Graduate Research Asst.

September 1968 - present. Employed by Geo-X Surveys Ltd. as Geophysicist.

APPENDIX I

PERSONNEL

Name: PASCHE, Juergen

Education: Mittelschule - equivalent to Grade 12. Completed apprenticeship as precision mechanic with Carl Zeiss - Graduate Electrical Technology.

Experience: 3 years - Electro-Technician with SIEMENS of Braunschweig, Germany.

3 1/2 years - Seismic Party Chief with PRAKLA Association for practical deposit research in Germany - including field experience in Switzerland, Italy, and North Africa.

APPENDIX I

PERSONNEL

Name: KEY, Robert A.

Education: Grade XII Diploma.

1 year Petroleum Geology at the Institute of Technology and Arts in Calgary.

Experience: 2 years in Steam Heating Design Drafting.

12 years with Mobil Oil Canada Limited, Senior Draftsman.

APPENDIX I

PERSONNEL

Name: YIP, David Edward

Education: Grade 12 - Majors: Science, Mathematics, Social Studies and Industrial Arts.
Lake Cowichan Secondary School

1 year - Vancouver Vocational Institute - Drafting Training.

Experience: Presently employed by Geo-X Surveys Ltd. since November 27, 1967 as Draftsman.

APPENDIX II

PERSONNEL AND DATES WORKED

The following Geo-X Surveys Ltd. personnel were employed on the Aabro Mining & Oils Ltd. airborne magnetometer survey project.

A. FIELD WORK

G. E. White	Navigator	February 28, 1969 March 29
J. Pasche	Flight Operator	February 28, 1969 March 29

B. DATA PROCESSING AND REPORT PREPARATION

G. E. White	Geophysicist	February 21, 1969 March 4
J. Cerne	Geophysicist	Mar. 4, 12, 13, 14, 17, 18, 25. April 3, 7, 8.
D. R. Cochrane	P. Eng.	Mar. 10, 11, 12. April 1-4, 14-18, 21.

C. DRAFTING AND REPRODUCTION

R. Key	Draftsman	Jan. 17, 1969 Feb. 17, 19, 27. March 4, 13. April 9, 10, 14, 15,16,17,18,19,21-24
D. Yip	Draftsman	Jan. 15, 1969 Feb. 18, 21, 26, 27, 28. Mar. 3, 4, 5, 18, 20, 24. April 7,14-19,21-24.
J. Carvajal	Draftsman	Feb. 17, 19, 1969 March 26. April 3, 10, 21-24.

Declared before me at the City

of Vancouver, in the

Province of British Columbia, this 9

day of February, 1970, A.D.

F. M. Shaw

Vice Pres. Cabo Mining & Oil Ltd.

L. Jeannotte

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

SUB-MINING RECORDER

APPENDIX III

COST BREAKDOWN

The following is a cost breakdown for an Airborne Magnetometer Survey conducted over the Anaconda Blue and Motherload Green Claim Groups by Geo-X Surveys Ltd. through an Agreement with Aabro Mining & Oils Ltd. dated February 27, 1969.

Geo-X Surveys provided the following for an all inclusive price.

(a) Air Photo Mosaic

(b) Aeromagnetic Survey Coverage

(c) Base Map Preparation

(d) Preliminary Data Preparation

(e) Computer Data Processing

(f) Report Preparation

20.4 Line Miles at $117.50 per Line Mile

ALL INCLUSIVE TOTAL PRICE $2,400.00

S.L. Sandner, President.

Declared before me at the City of Vancouver, in the Province of British Columbia, this 9 day of February, 1970, A.D.

J. R. Shaw
Vice Pres. Cabo Mining & Dev. Ltd.

L. Jeannotte
~~A Commissioner for taking Affidavits within British Columbia or~~
~~A Notary Public in and for the Province of British Columbia.~~

SUB-MINING RECORDER

APPENDIX IV

SPECIFICATIONS OF THE V-4937A MAGNETOMETER SYSTEM

Performance

Range:	20,000 to 100,000 gamma (worldwide)
Sensitivity:	± 1/2 and ± 1 gamma in any field.
Sampling Rate:	manual and "clock" operation permits any timing sequence.

Power Requirements

22-30 V, 6 amps for magnetometer, 60 watts for analog recorder and 100 watt maximum for digital recorder.

Physical Specifications

Console:	size - 19 x 17 x 24 inches; Weight 68 lbs.
Analog Recorder:	dual channel - 15 x 10 x 10 inches, 30 lbs.
Scanner-coupler:	fucical counter, ident. control, 24 hr. clock, 40 lbs.
Recorder:	size - 14 x 11 x 28 inches; Weight 41 lbs.

Data Output

Digital Recording:	BCD 1-2-4-8 (four line output) "O" state - 18 to -30v through 100K ohms 1 state -1 to +3v through 100k ohms
Print Command:	Positive going 12 to 25v pulse; 15M second.
Auxiliary Channels:	A & B for radio altimeter and navigation equipment.
Analog Recording:	Galvanometric -1 mA full scale into 1500 ohms Potentiometric: 100mV full scale. Minimum load resistance 20K Full scale resolution of the least most significant digits of the total geomagnetic field 0-99, 0-999 at 1 gamma sensitivity; 0-49, 0-499 at 1/2 gamma sensitivity.

APPENDIX IV

Instrument Specifications

Camera

Type:	Neyhard Automax 35 m.m. pulse camera
Model:	G-2 with auxiliary data box
Pulse Rate:	Up to 10 frames per second
Film Format:	0.738" x 0.738" square picture with 0.200" x 0.738" data area.
Magazine:	Mitchell 400 foot 35 m.m.
Lenses:	(a) 17 m.m. F/14 Super-Takumar Fish-eye (b) 35 m.m. F/2.0 Super Takumar
Data Box:	(a) 24 hour Accutron Clock (b) Frame counter (c) Available for optional feature
Dimensions (less magazine):	8 3/8" high, 4 1/2" deep, 6 1/4" wide.
Weight (less lens and magazine):	12 lbs.

APPENDIX IV

Instrument Specifications

Aircraft

Type and Model:	Piper Cherokee Six - manufactured by Piper Aircraft, Lock Haven, Penn.
Mode:	Either wheel or float equipped, designed for quick change.
Power:	300 Lycoming Engine
Gross Weight:	3400 pounds
Empty Weight:	1668 pounds
Useful Load:	1732 pounds
Fuel Capacity:	86 gallons (U.S.)
Cargo Capacity:	Over 1300 pounds, 110 cubic feet, 6 people, cabin 4 feet wide and 13 feet long.
Performance at 2900 lb. Gross:	Take-off Run - 490 feet Climb - 1350 feet per minute Cruise - 170 mph

CONTOUR INTERVAL: 100 GAMMAS ← | → CONTOUR INTERVAL : 25 GAMMAS

APPROXIMATE CLAIM OUTLINES

NOTE VARIAN PROTON MAGNETOMETER V 4937 A
VARIAN DIGITAL RECORDER SDV 4991
TOTAL INTENSITY - ADD 50,000 GAMMAS
EPOCH 1969.16

2217

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2217 MAP #4

1000 0 1000 2000 3000
FEET (APPROX.)

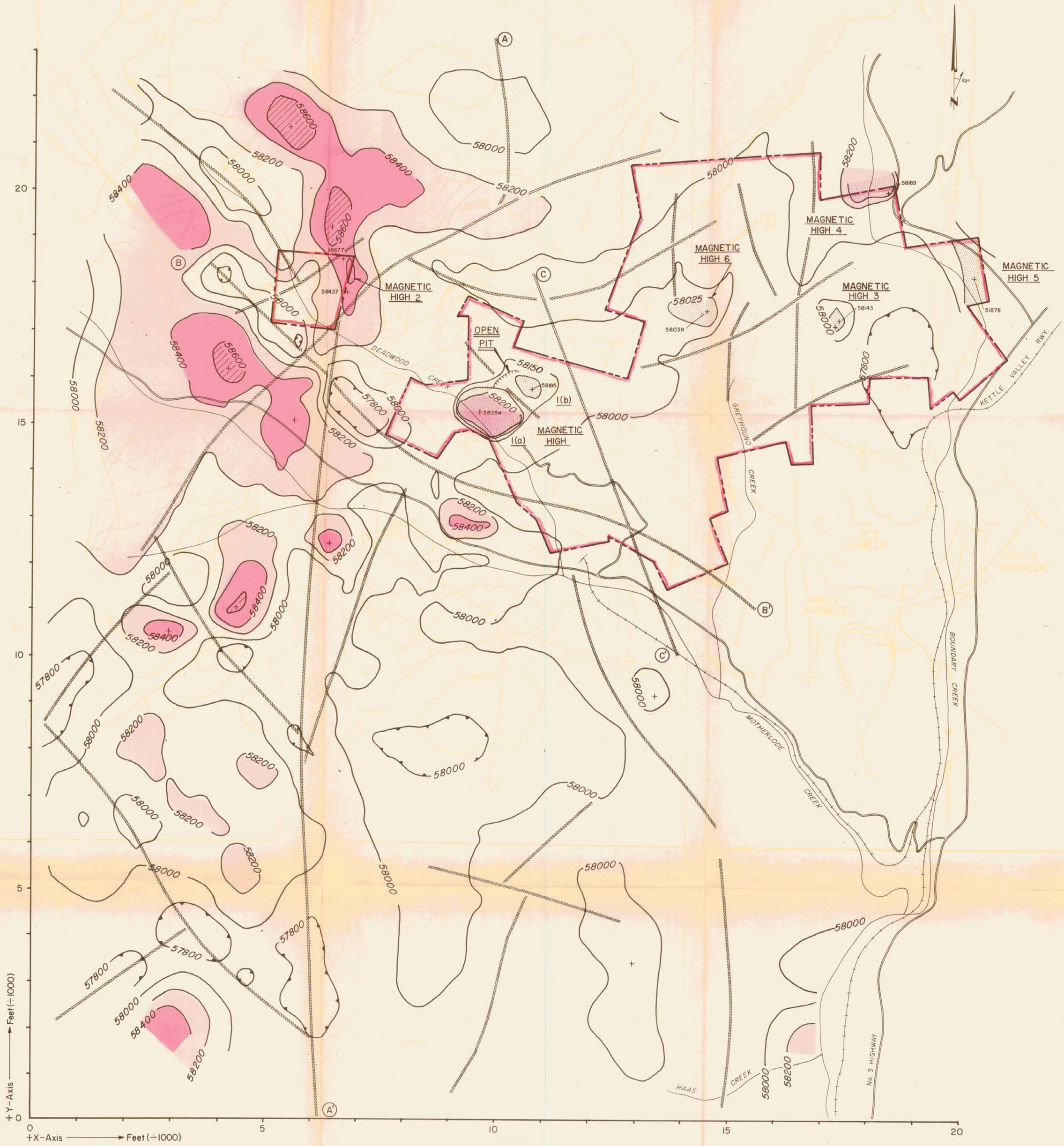
TO ACCOMPANY THE GEOPHYSICAL REPORT ON THE AEROMAGNETIC SURVEY OVER THE ANACONDA BLUE & MOTHERLODE GREEN GROUPS OF CLAIMS OWNED BY AABRO MINING & OILS LTD. BY DONALD R. COCHRANE, P.ENG.-JAMES CERNE & GLEN WHITE, GEOPHYSICISTS VANCOUVER, BRITISH COLUMBIA.

GEO - X SURVEYS LTD.

AABRO MINING & OILS LTD.
GREENWOOD AREA-GREENWOOD M.D.
BRITISH COLUMBIA

AIRBORNE ISOMAGNETIC PLAN

DRAWN	I.B.M.	JOB NO	FIG NO
DATED	APRIL 21, 1969.	1071	5
CHECKED	DRC		



LEGEND

MAGNETIC LINEARS

> 58400 GAMMAS

> 58200 < 58400 GAMMAS

1000 0 1000 2000 3000

FEET (APPROX.)

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2217 MAP #5

2217

TO ACCOMPANY THE GEOPHYSICAL REPORT ON THE AEROMAGNETIC SURVEY OVER THE ANACONDA BLUE & MOTHERLODE GREEN GROUPS OF CLAIMS OWNED BY AABRO MINING & OILS LTD
BY DONALD P. COCHRANE, P. ENG. - JAMES SERNE & GLEN WHITE GEOPHYSICISTS
VANCOUVER, BRITISH COLUMBIA

GEO - X SURVEYS LTD.

AABRO MINING & OILS LTD.
GREENWOOD AREA - GREENWOOD M.D.
BRITISH COLUMBIA

GENERAL INTERPRETATION MAP

DRAWN	D.E.Y. & R.K.	JOB NO.	FIG. NO.
DATED	APRIL 21, 1969	1071	6
CHECKED	ARC		

DEADWOOD

MOTHERLODE

CREEK

AABRO

SPOKANE
NATIONAL
MINES

CREEK

AABRO MINING & OILS LTD.
45 CLAIMS

CREEK

BOUNDARY

RAILWAY

KETTLE VALLEY

TOWN LIMITS OF GREENWOOD

WEST COAST
RESOURCES LTD

SAN JACINTO
EXPLORATIONS
LTD.

CROWN SILVER &
SILVER DOME
MINES LTD.

BUCKHORN CREEK

JOLLY JACK CREEK

CHISHOLM
PROSPECTION
LTD.

0 1320 2640 3960
FEET

CLAIM BOUNDARIES ESTABLISHED FROM
B.C. GOVERNMENT CLAIM MAPS and/or
INFORMATION SUPPLIED BY CLAIM OWNERS

2217

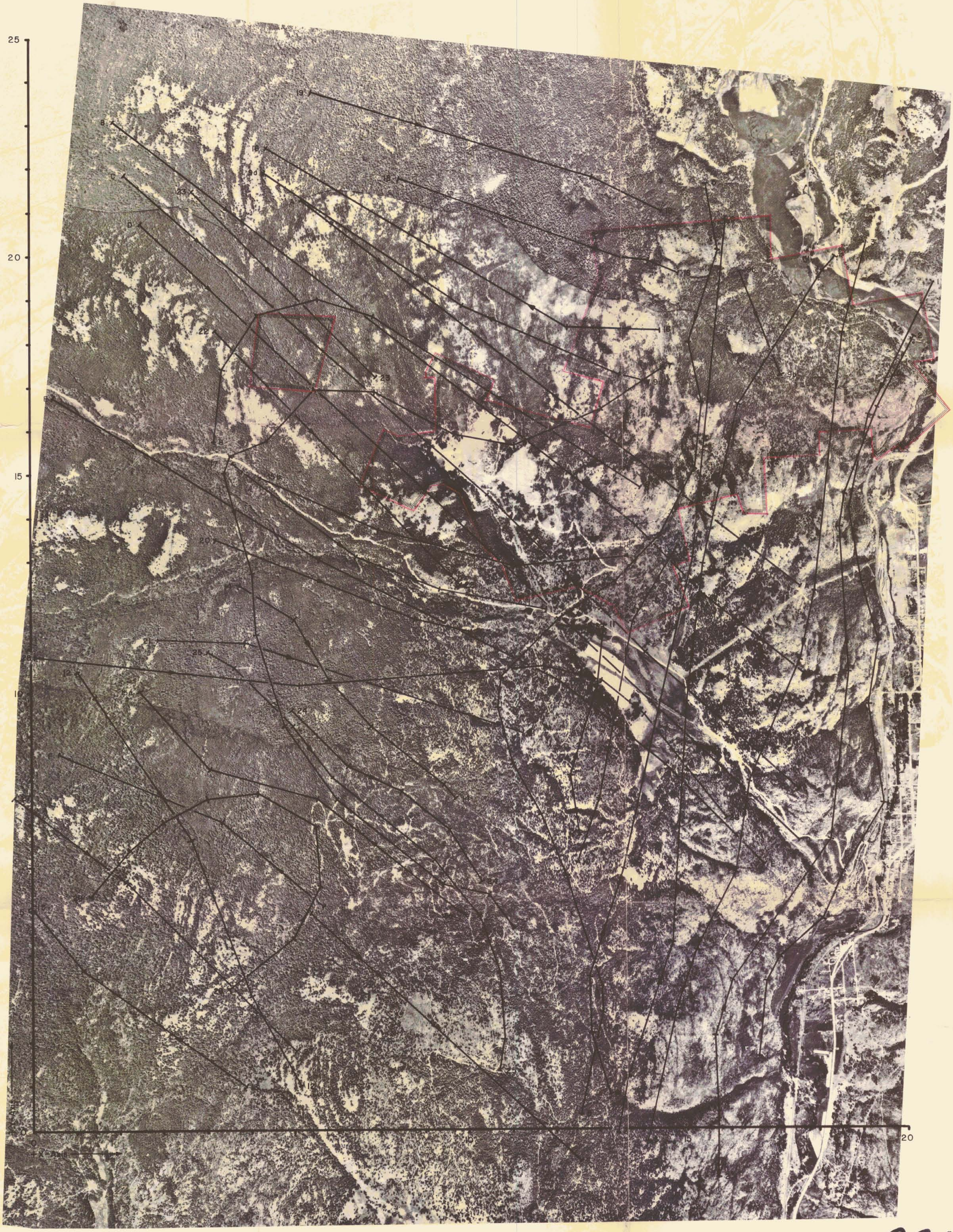
DEADWOOD CAMP AREA
GREENWOOD MINING DIVISION
BRITISH COLUMBIA

PROPOSED FLIGHT LINES
FOR
AERIAL SURVEY

Revised: Feb. 27/69

GEO – X SURVEYS LTD.

Drawn D.E.Y.	Dated	Fig.No.
Checked	Job No.	



0 1000 2000 3000
FEET (APPROX.)

22°

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. R. COCHRANE

TO ACCOMPANY THE GEOPHYSICAL REPORT ON THE AEROMAGNETIC SURVEY OVER THE ANACONDA BLUE & MOTHERLODE GREEN GROUPS OF CLAIMS OWNED BY AABRO MINING & OILS LTD.
BY DONALD R. COCHRANE, P. ENG.—JAMES CERNE & GLEN WHITE GEOPHYSICISTS
VANCOUVER, BRITISH COLUMBIA

2217

AABRO MINING & OILS LTD.
GREENWOOD AREA, B.C.
Fig. 4 FLIGHT LINES on AERIAL MOSIAC
GEO-X SURVEYS LTD.
JOB NO. 1071
(CLAIM OUTLINES APPROXIMATE)