1843

GEOPHYSICAL REPORT

on the

AEROMAGNETIC SURVEY

of the

Darke Lake Property

(Glad and Cache Claims)

situated

Some 10 Miles N.W. of Summerland, B.C.

and centered at

Latitude 49°45'N ; Longitude 119°53'W

N.T.S. 82 E/12W, 13W

and on behalf of

KOPOROK MINES LTD.

Vancouver, B.C.

Field Work February 28, 1969

Instrument Operator

J. Pasche of

Geo-X Surveys Ltd.

Report By:

D. R. Cochrane, P. Eng.

James Cerne, M.S.

Glen E. White, B.Sc.

March 21, 1969,
Vancouver, B.C.

604-685-4296
TELEX 04-50404

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

1843

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SUMMARY/CONCLUSIONS/RECOMMENDATIONS

Late in February, 1969, Geo-X Surveys Ltd. completed 83 line miles of detailed aeromagnetic surveying on a mineral property situated 10 miles west of Summerland in the Okanagan area of Southern B.C., and on behalf of Koporok Mines Ltd.

The survey was completed in a Cherokee/300 fixed wing aircraft equipped with a Varian V4937A proton total intensity magnetometer and Varian SDV4991 digital recorder. Flight line location was by 35 m.m. strip photography and terrain clearance recorded (analog) by a Bonzar pulse altimeter. The 25 cross flight lines were curved but in general north directed, and averaged 600 feet apart. Data processing was conducted by personnel and equipment for Geo-X Surveys, Co-ordinate Aerial Surveys and IBM, all of Vancouver.

The total field isomagnetic plan (see Figure #4) was plotted at 1":1,000' by a computer-plotter unit which contoured at 25 gamma intervals.

Total magnetic field intensity ranged from a low of 57600 to a high of 58061 gammas.

The magnetic terrain is relatively symmetrical about a magnetic linear/axis which trends N.W. through the survey area. This magnetic linear is apparently related to an axis of change in overall physiographic directions, most prominently displayed by the change in direction of Okanagan Lake, and reflected by the "V" shaped flank of the hill over

which the survey was conducted. The physiographic directional change axis in turn, is coincident with the central axis of a tounge of a Valhalla (granodiorite) intrusive. The intensity, and to some extent, complexity, of the geomagnetic field increases to the north and to the south away from this linear magnetic low axis. This probably indicates increasing complexity of the intrusive away from the central core towards the boundary phases. Additional magnetic linears and disturbances form a rectilinear pattern over the area surveyed and the pattern is most prominent over the Cache claims. Steep magnetic gradients have developed along or close to some of these linears.

Three areas, designated anomalies #1 to #3, are characterized by response in excess of 58000 gammas. Two of these are situated near the north end of the Cache group, and the third near the southwest boundary of the Glad group.

Investigation as to the cause of the magnetic linears, steep magnetic gradients and magnetic highs is recommended. A comprehensive program including geological mapping with ground magnetometer followup work may be most expedient.

Respectfully Submitted,

PROFESSIONAL ENGINEER PROVINCE OF B.C. D. R. COCHRANE

D. R. Cochrane,
P. Engineer.

James Cerne,
Geophysicist.

Glen E. White,
Geophysicist.

INTRODUCTION

On February 28, 1969, Geo-X Surveys Ltd. of Vancouver, British Columbia, on behalf of Koporok Mines Ltd., conducted an airborne magnetometer survey over a group of claims in the Brenda-Peachland area, Osoyoos Mining Division, Province of British Columbia.

A total of 82.7 line miles of total intensity airborne magnetometer surveying was completed. This report describes the instrumentation, field procedure and data processing, and discusses the results obtained.

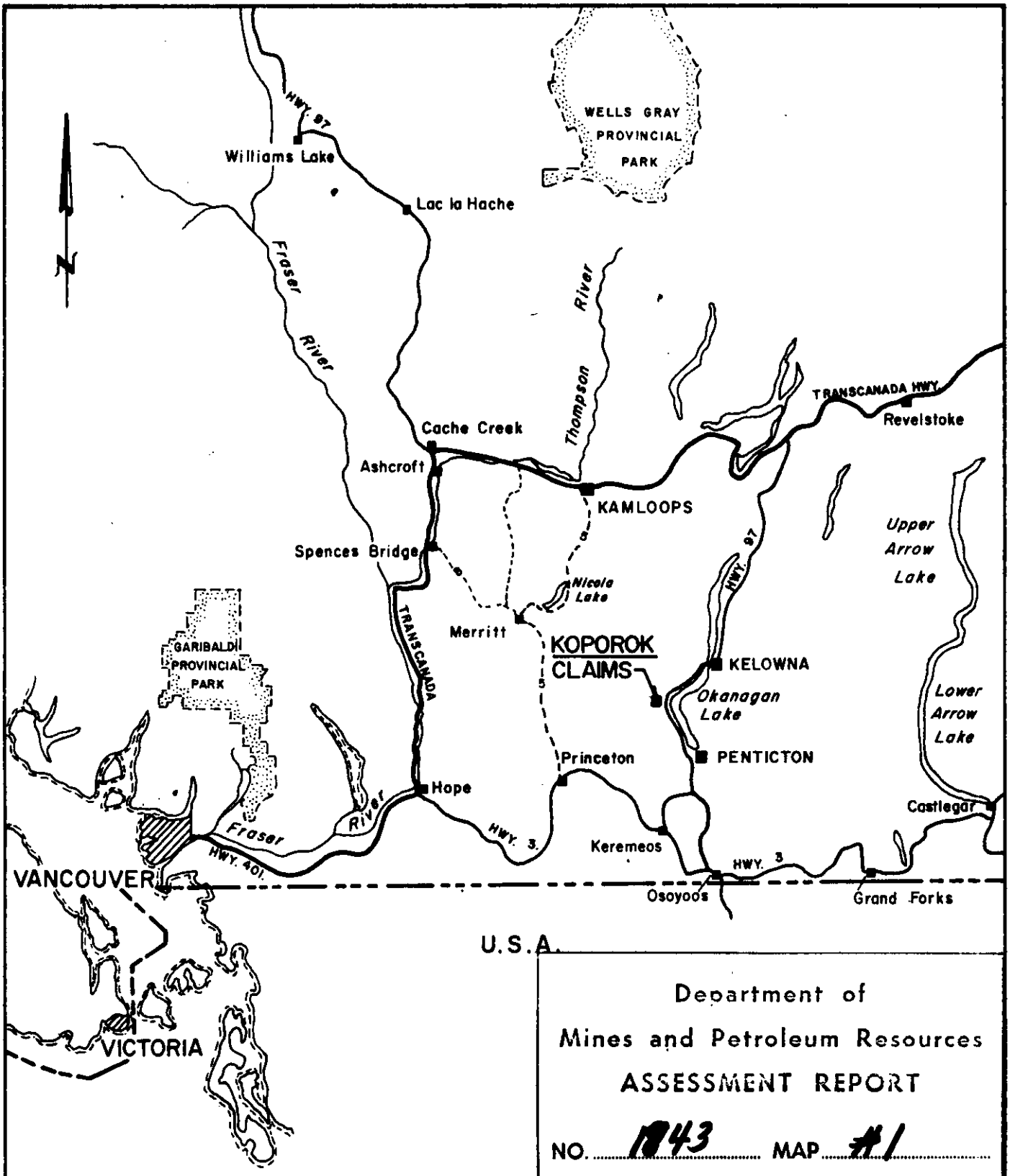
LOCATION AND ACCESS

The group of claims covered by this report is centered at latitude 49°45'N and longitude 119°53'W near Darke Lake Provincial Park. The Brenda Mines site is just to the west of the claim group. Peachland is some 10 miles to the northeast.

Access to the property is by motor vehicle on gravel roads from Peachland or Summerland, B.C.

CLAIMS AND OWNERSHIP

The property in the Brenda-Peachland area on which the airborne magnetometer survey was conducted consists of some 74 mining claims listed as follows:



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 1143 MAP #1

KOPOROK MINES LTD.
BRENDA-PEACHLAND AREA-OSOYOOS M.D.
BRITISH COLUMBIA

LOCATION MAP

GEO – X SURVEYS LTD.

DRAWN R.K.	DATED MAR. 27/69	FIG. NO. 1
CHECKED AAL	JOB NO. 1072	

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 1843 MAP #2

CACHE GROUP

32	34	36	38	40
31	33	35	37	39
21	22	23	24	30
17	18	19	20	29
16	7	8	9	28
15	3	4	10	27
14	2	1	12 Fr.	26
13	6	5	11	25

GLAD GROUP

33	34	22	21		
27	28	11	12		
29	30	13	14	1	2
31	32	15	16	3	4
		17	18	5	6
		19	20	7	8
		23	24	9	10
		25	26		

Copied From Claim Map Supplied By Client and/or
B.C. Government Claim Map

0 4500 9000 13500
FEET

KOPOROK MINES LTD.
BRENDA-PEACHLAND AREA-OSOYOOS M.D.
BRITISH COLUMBIA

CLAIM MAP

GEO – X SURVEYS LTD.

Drawn D.E.Y.	Dated MAR. 27/69	Fig.No. 2
Checked	Job No. 1072	

NAME OF CLAIM		RECORD NO.(S)
Cache No.	1 Fraction	15735
" Nos.	1-4 incls.	13211-13214 incl.
" No.	5	13608
" Nos.	6 & 7	13605 - 13606
" No.	8	13609
" No.	9	13607
" No.	10	13610
" Nos.	11-16	14069 - 14074 incl.
" Nos.	17-24	15727 - 15734 incl.
" Nos.	25-28	15747 - 15750 incl.
" Nos.	29-30	16002 - 16003
" Nos.	31-39	16451 - 16459 incl.
Glad Nos.	1-4	16004 - 16007 incl.
" Nos.	5-12	16461 - 16468 incl.
" Nos.	13-34	16677 - 16698 incl.

The survey was conducted on behalf of Koporok Mines Ltd., registered office 925 West Georgia Street, Vancouver, B.C.

GENERAL SETTING

The mineral claims are situated in the Thompson Plateau subdivision of the Interior Plateau Physiographic division of British Columbia. It is, in general, a gently rolling upland of relatively low to moderate relief. Topographic relief within the immediate area is moderate, the highest point being some 5,700 feet above m.s.l. and lowest point about 3,000 feet. The claims are situated along the east sloping flank of a north trending arcuate ridge. The claims, and area surveyed, cover a rather unusual physiographic feature; that of a sharp directional change which is most prominent when viewing Okanagan Lake. This sharp change in the direction of topographic features is reflected on the "V" shaped hill flank on which the Cache and Glad groups are located.

AIRBORNE FIELD PROCEDURE

The total intensity of the geomagnetic field was measured and recorded along 25 flight lines, at an average terrain clearance of 400 feet. The flight lines have a NW/SE bearing over the southern group of claims, and a NE/SW bearing over the northern group of claims, with an average separation of 600 feet.

The survey was flown 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 continuously 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 recorded with a Bonzar pulse type radar altimeter.

Solar flare warnings and predictions, issued daily by the Space Disturbance Forecast Center 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. A final base map was prepared, showing flight lines in relation to physical features. Geo-X personnel superimposed an X-Y coordinate system on the base map, with +Y north and +X east (see Figure 3). Thus, every position along a flight line was defined in

terms of X (number of feet east of the origin) and Y (number 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. The listing was examined and compared 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 variation 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 with the punch tape to IBM.

4. Contour Plotting

IBM fed the punch tape to its 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 data sampling interval along the flight lines was roughly 160 feet and every

other data point was plotted. The magnetometer readings were evenly spaced along the line segments and contoured by a computer-plotter unit at a contour interval of 25 gammas.

RESULTS/DISCUSSION/INTERPRETATION

Introductory:

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 subsurface geology (even in heavily drift covered areas). Aeromagnetic surveys provide new knowledge of the type, general attitude, configuration and complexity of the geosuperstructure 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. When it comes to interpretation, however, there are two factors which can exert considerable influence. The first is geologic control, which reduces the number of variables that the interpreter must consider. The second is 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 the effect of topography, or changing depth of burial). In addition, interpretation techniques (explaining the data) must be flexible enough to be revised in the light of new geological, geochemical or geophysical information.

This Survey:

A total intensity isomagnetic field plan is presented as Figure 4. The horizontal scale is 1":1,000' (approximately). The planimetry has been derived from uncontrolled airphoto mosaics. Some distortion is inevitable. The map depicts the intensity of the geomagnetic field present at the given nominal altitude on the particular flight day.

A general graphic interpretation accompanies this report and is designated Figure 5. 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.

Basic Statistics:

The recorded total intensity range was between 57600 and 58061 gammas. The arithmetic mean of a small sample of the 990 points used was 57804 gammas and standard deviation

115 gammas. The majority of the area is characterized by response between 57700 and 57800 gammas.

General Description:

In order to facilitate description of the isomagnetic map, morphological terms were employed. Figure 4 therefore may be regarded as a contoured "magnetic" surface or "scape" (magnetic terrain) complete with magnetic gradients, hills, valleys and linears.

Furthermore, terms borrowed from fabric and textural analysis may be embodied in the description, but have identical connotations. The reader is referred to Figure 4 and 5 for the following discussion.

INTERPRETATION

In general, the magnetic surface is crudely symmetrical about a magnetic linear herein designated A-A', Linear A-A' is a magnetic trough which extends N.W. through the Glad group. The intensity of the geomagnetic field increases northerly and southerly from this trough. The highest values encountered during the course of the survey are situated near the north boundary of the Cache claims. A corresponding, but not quite as high amplitude magnetic complex is located near the south boundary of the Glad claims.

The magnetic linears (including magnetic boundaries and lines of disturbance) form a rectilinear pattern and are

most pronounced on the Cache group. Several of these (those that are extremely distinct) have been lettered B-B' etc. A rather interesting series of steep magnetic cliffs or gradients is present along some of these linears and is especially noticeable in two areas.

(a) along, or close to linear D-D' and

(b) along linear E-E'

These linears are sub-parallel and trend slightly east of north.

Three areas of abnormally high response have been designated anomalies one to three inclusive. They are all characterized by values exceeding 58000 gammas. Anomaly one is situated in the northwest corner of the Cache claims and the contours are unclosed north and west. Anomaly #1 is a large amplitude high but is situated in relatively gently rolling magnetic terrain, which, therefore, suggests the anomaly is more regional than local in aspect. Anomaly #2 is situated near the northeast end of the Cache claims and unclosed contours extend to the north. Anomaly 2 is over 2000 feet long and up to 1000 feet wide and lies between two magnetic linears which trend through the Cache claims.

Anomaly #3 is a very sharp "thumb print" magnetic high located on the southwest boundary of the Glad group. The area (in excess of 58000 gammas) is approximately 500 feet in diameter. The steep magnetic gradients surrounding

this magnetic peak suggest a local, near surface causal body.

A general summary, conclusions, and recommendations are presented in the first section of this report.

Respectfully submitted,

PROFESSIONAL ENGINEER OF BRITISH COLUMBIA D. R. COCHRANE

D. R. Cochrane,
Professional Engineer.

Glen E. White,
Geophysicist.

James Cerne,
Geophysicist.

APPENDIX I

PERSONNEL

Name:	COCHRANE, Donald Robert
Education:	B.Sc. - University of Toronto M.Sc. (Eng.) - Queen's University
Professional Associations:	Professional Engineer, registered in British Columbia, Ontario, Saskatchewan. Member of 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: 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:	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:	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 Koporok Mines Ltd. (N.P.L.) airborne magnetometer survey project.

A. FIELD WORK

G. E. White	Navigator	Feb. 27, 1969
J. Pasche	Flight Operator	Feb. 27, 1969

B. DATA PROCESSING AND REPORT PREPARATION

G. E. White	Geophysicist	Feb. 22, March 7, 10
J. Cerne	Geophysicist	March 4, 7, 10, 11, 12, 1969.
D. R. Cochrane	P. Eng.	March 19, 23, 24, 25, 26, 1969.

C. DRAFTING AND REPRODUCTION

R. Key	Draftsman	March 5, 13, 14, 17
D. Yip	Draftsman	Feb. 21, 28 March 10,13,17,19, 25, 26, 28, 1969.
J. Carvajal	Draftsman	March 17, 20, 28

APPENDIX III

COST BREAKDOWN

As per contract between Koporok Mines Ltd. (N.P.L.), dated February 21, 1969, for airborne magnetometer survey of the Cache and Glad groups of claims:

Geo-X 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

82.7 line miles at $78.50 per line mile

INCLUSIVE TOTAL PRICE.....$6,500.00

S. L. Sandner,
President.

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

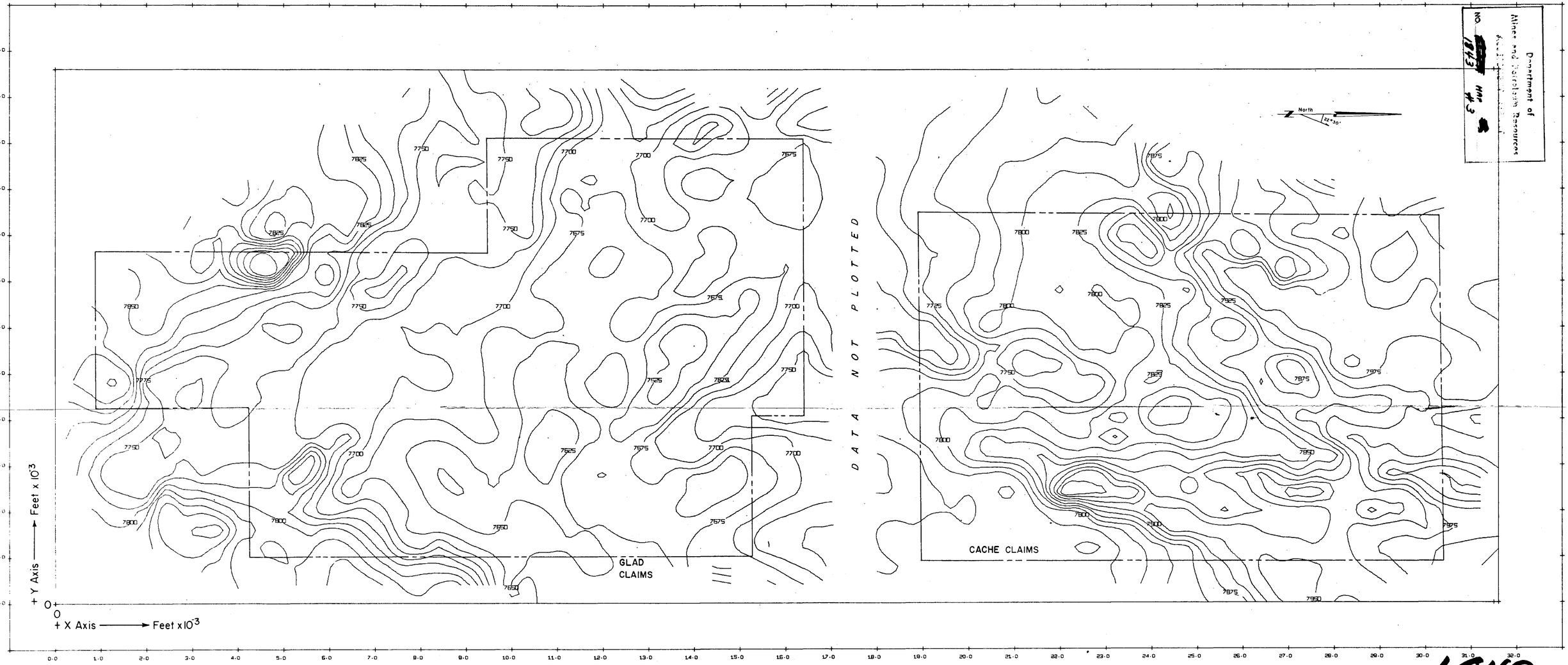
Type:	Neyhard Automax 35 m.m. pulse camera
Model:	G-2 with auxiliary data box
Pulse Rate:	Up to 10 frames per second
Film Format:	0.738" x 0.738" square picture with 0.200" x 0.738" data area.
Magazine:	Mitchell 400 foot 35 m.m.
Lenses:	(a) 17 m.m. F/14 Super-Takumar Fish-eye (b) 35 m.m. F/2.0 Super 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



NOTE. VARIAN PROTON MAGNETOMETER V4937A
VARIAN DIGITAL RECORDER SDV 4991
TOTAL INTENSITY, ADD 50,000 GAMMAS
EPOCH 1969.16
CONTOUR INTERVAL 25 GAMMAS

1000 0 1000 2000 3000
FEET

1843

KOPOROK MINES LTD
BRENDA-PEACHLAND AREA, OSOYOOS M.D.
BRITISH COLUMBIA

AIRBORNE ISOMAGNETIC PLAN

TOTAL FIELD IN GAMMAS 50,000 (1)

TO ACCOMPANY THE GEOPHYSICAL REPORT ON THE AEROMAGNETIC SURVEY OVER GLAD & CACHE CLAIM GROUPS OWNED BY KOPOROK MINES LTD
BY DONALD R COCHRANE, P ENG & JAMES CERNE & GLEN WHITE, GEOPHYSICISTS
VANCOUVER, BRITISH COLUMBIA

GEO - X SURVEYS LTD.

DRAWN	I B M	JOB NO	FIG NO
DATED	MAR. 27, 1969	1072	4
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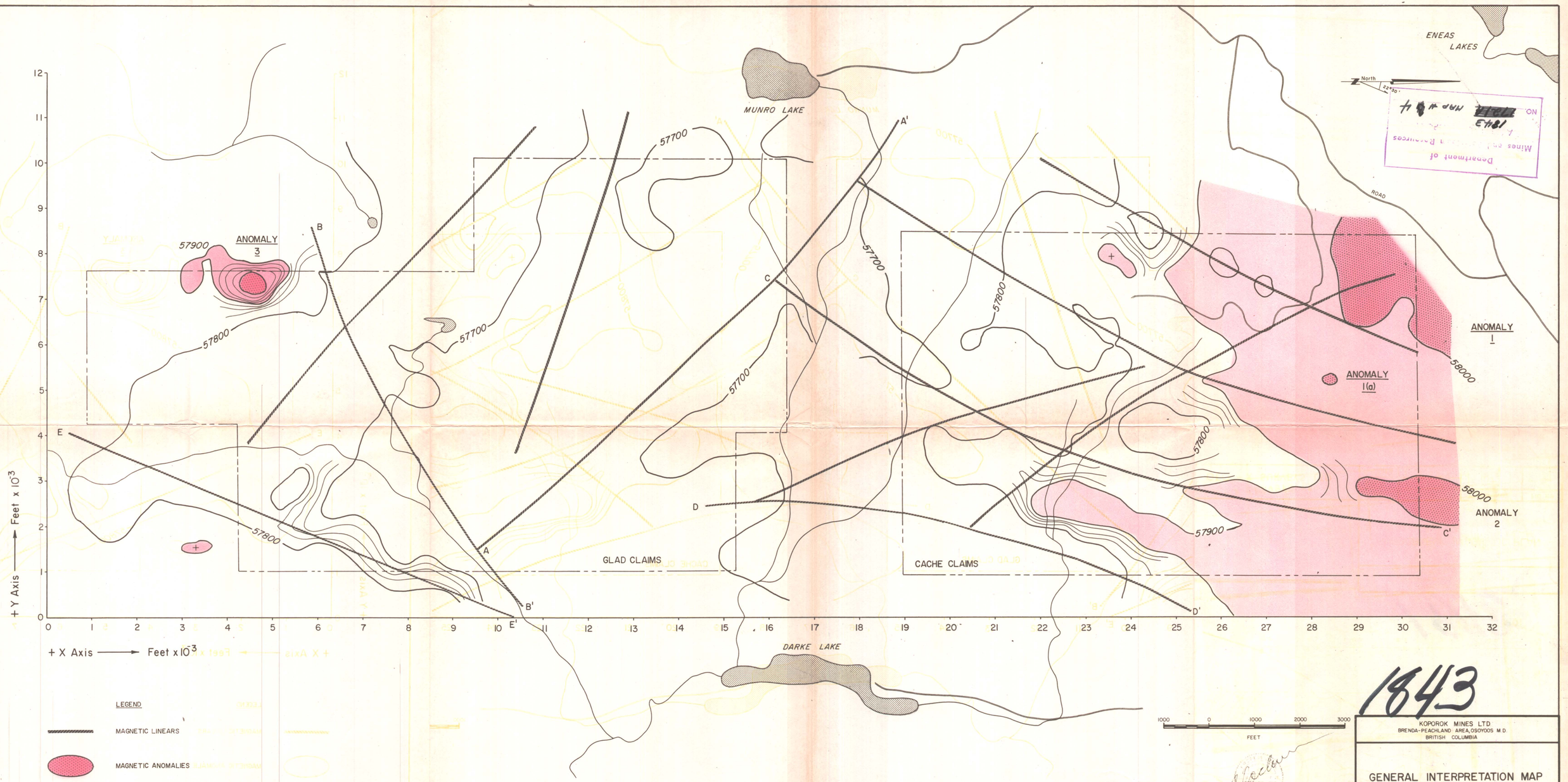

1843

KOPOROK MINES LTD.
BRENDA-PEACHLAND AREA, OSOYOOS M.D.
BRITISH COLUMBIA

GENERAL INTERPRETATION MAP

(2)

TO ACCOMPANY THE GEOPHYSICAL REPORT ON THE AEROMAGNETIC SURVEY OVER GLAD & CACHE CLAIM GROUPS OWNED BY KOPOROK MINES LTD
BY DONALD R. COCHRANE, P.ENG. & JAMES CERNE & GLEN WHITE, GEOPHYSICISTS
VANCOUVER, BRITISH COLUMBIA

GEO - X SURVEYS LTD.

DRAWN	D.E.Y.	JOB NO.	FIG. NO.
DATED		1072	5
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