

1709

GEOPHYSICAL REPORT

on the
Airborne Magnetometer Survey
of the
134 full sized
Toe, Elk, Top, and Tip Claims
and situated
Between Quatse River and Rupert Inlet
Port Hardy Area
Nanaimo M. D.
Vancouver Island, B. C.

and centered at
Latitude 50°39' North; Longitude 127°35' West

and 93 6 12

on behalf of

Emperor Mines Ltd. and
Winco Mining and Explorations Limited

Airborne Survey September 30 and October 1, 1968

by

GEO-X SURVEYS LTD.
Vancouver, B. C.

Report By:

J. P. Cerne, M.S.

D. R. Cochrane, P. Eng

November 14, 1968.



604-685-4296
TELEX 04-50404

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

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SUMMARY and CONCLUSIONS

On September 30 and October 1, 1968, Geo-X Surveys Ltd. of Vancouver, B.C., completed a total of 148.1 line miles of an airborne magnetometer survey, on 134 Tip, Top, Elk and Toe claims, situated in the Port Hardy area, Vancouver Island. The survey was carried out in a "Cherokee 6" fix winged aircraft equipped with a Varian V4937A proton magnetometer unit and SDV4991 digital recording system. A total of 41 cross lines were flown in a general south west direction and averaged 3.3 miles in length, 500 feet apart and at a nominal terrain sensor head clearance of 550 feet. Three tie lies, flown in a northwest direction cross the previously described flight line system. Initial data reduction was completed by Geo-X Surveys, and final base map preparation by Co-Ordinate Aerial Surveys Ltd. Final isomagnetic map preparation was undertaken by Computech Research Ltd. of Tucson, Arizona.

The final airborne magnetometer plan (Figure 7, accompanying this report) is at a scale of 1":1000 feet, contoured in 100 gamma intervals, and covers an area approximately $5\frac{1}{2}$ miles long (east-west), 4 miles wide (north-south).

Magnetic background is approximately 56,600 gammas, and maximum range from just over 57,400 gammas and to just below 56,300 gammas.

Dominant magnetic trends are west to northwest, with a well developed northeasterly cross trend. The aeromagnetic sheet may be divided into two magnetic subdivisions (a) a high response magnetic complex centered in the southwest corner of the area surveyed, (b) a low amplitude magnetic plain situated in the north half of the area surveyed. Area (a) is believed to be underlain by the Bonanza Group rocks and (b) by the Karmutson Group rocks.

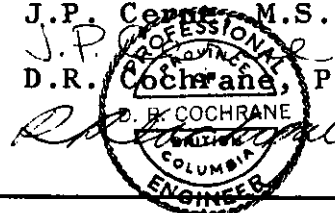
Magnetic trends, disturbances and boundaries, form a rectilinear pattern, and some of these indicate faults and possibly specific lithologic units. Others will require ground investigation to determine their causes. A general interpretation of the data is presented graphically in Figure 8, and textually in the "Discussion of Results" section of this report.

A total of five positive magnetic anomalies and families are described; the most prominent is anomaly #1 (a). It has a maximum local amplitude of 880 gammas, and may be approximated by a northeast trending line of poles (or steeply dipping dike) which is near surface, and has a susceptibility contrast equivalent to 4% magnetite, at a 500 foot "dike" width.

Further investigation is recommended of the 5 magnetic anomalies herein described, and selected anomalous lows.

Respectfully submitted,

J.P. Cochrane, M.S.
D.R. Cochrane, P. Eng.



INTRODUCTION

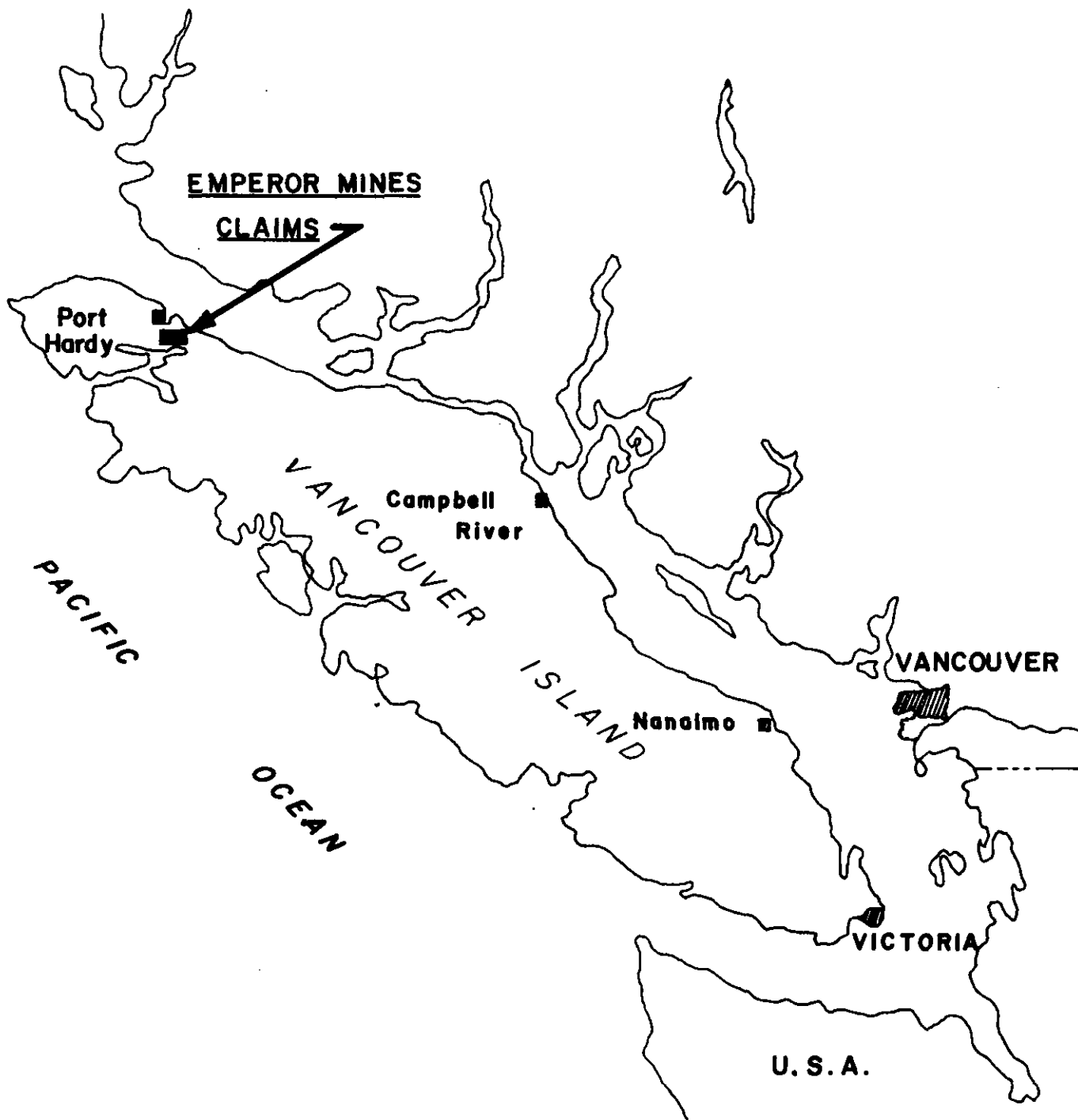
On September 30 and October 1, 1968, Geo-X Surveys Ltd. of Vancouver, B.C. completed a total of 148.1 miles of an airborne magnetometer survey on mineral claims in the Port Hardy area, Nanaimo Mining Division. The survey was completed on behalf of Emperor Mines Ltd. and Winco Mining and Exploration N.P.L.

This report describes the instrumentation, field procedure and data processing, and discusses the results of the airborne magnetometer work.

LOCATION and ACCESS

The property is situated about 6 miles south-southeast of Port Hardy, on the north end of Vancouver Island, British Columbia. Access is gained by the Coal Harbour road (4 miles south) and a network of logging roads into the claims area.

Travel to Port Hardy is via logging roads from the south, or by aircraft from Vancouver. The claims are centered approximately 4 air miles due north of the east end of Rupert Inlet.



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PORT HARDY AREA, NANAIMO M.D., B.C.

LOCATION MAP

GEO-X SURVEYS LTD.

DRAWN R.K.

DATE NOV. 14, 1968

FIG NO. 1

CHECKED *JAL*

JOB NO. 1057

CLAIMS and OWNERSHIP

The Elk, Tip, Toe and Top groups of claims are located in the Nanaimo Mining Division, between Port Hardy and the east end of Rupert Inlet; and Keogh River and the Coal Harbour road.

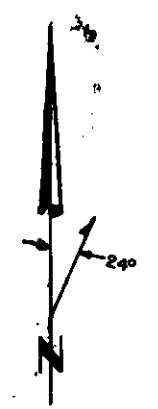
The survey was conducted on behalf of Emperor Mines Ltd. and Winco Mining and Exploration Limited - registered office, #48 - 845 Hornby Street, Vancouver, B.C.

The claims data is as follows:

<u>Claim Name and Number</u>	<u>Registration Number</u>
Tip #1 to #24	22504 to 22527
Top #1 to #12 #17 to #30	20085 to 20110
Toe #1 to #38	22528 to 22563, 23024, 23025
Elk #35 to #74 #79 to #84	22464 to 22503 23018 to 23023

There is a total of 134 claims in a contiguous block, approximately 23 claims long (east-west) and 8 claims wide (north-south).

The aeromagnetic survey was conducted over the above described "located" mineral claims.



TOE 36	TOE 34	TOE 32
TOE 35	TOE 33	TOE 31

TOE 38	TOE 20	TOE 18	TOE 16	TOE 14	TOE 12
TOE 37	TOE 19	TOE 17	TOE 15	TOE 13	TOE 11

TIP 24	TIP 22	TIP 20	TIP 18	TIP 16	TIP 14	ELK 57	ELK 59	ELK 61	ELK 63	ELK 65	ELK 79	ELK 81	ELK 83	ELK 56	ELK 54	ELK 52	ELK 50	ELK 48					
TIP 23	TIP 21	TIP 19	TIP 17	TIP 15	TIP 13	ELK 58	ELK 60	ELK 62	ELK 64	ELK 66	ELK 80	ELK 82	ELK 84	ELK 55	ELK 53	ELK 51	ELK 49	ELK 47					
TIP 12	TIP 10	TIP 8	TIP 6	TIP 4	TIP 2	TOP 17	TOP 19	TOP 21	TOP 23	TOP 25	TOP 27	TOP 29	TOE 21	TOE 23	TOE 25	TOE 27	TOE 29	TOE 10	TOE 8	TOE 6	TOE 4	TOE 2	
TIP 11	TIP 9	TIP 7	TIP 5	TIP 3	TIP 1	TOP 18	TOP 20	TOP 22	TOP 24	TOP 26	TOP 28	TOP 30	TOE 22	TOE 24	TOE 26	TOE 28	TOE 30	TOE 9	TOE 7	TOE 5	TOE 3	TOE 1	
						TOP 1	TOP 3	TOP 5	TOP 7	TOP 9	TOP 11	ELK 67	ELK 69	ELK 71	ELK 73	ELK 46	ELK 44	ELK 42	ELK 40	ELK 38	ELK 36		
						TOP 2	TOP 4	TOP 6	TOP 8	TOP 10	TOP 12	ELK 68	ELK 70	ELK 72	ELK 74	ELK 45	ELK 43	ELK 41	ELK 39	ELK 37	ELK 35		



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PORT HARDY AREA, NANAIMO MD, BRITISH COLUMBIA

CLAIM MAP

GEO-X SURVEYS LTD.

DRAWN D.E.Y.	DATE NOV.14,1968	FIG. NO. 2
CHECKED <i>RL</i>	JOB NO. 1057	

GEOLOGY

In the general area of the mineral claims, six units of rock are recognized in outcrop by Government surveys. The lowermost unit is the Karmutsen Formation, (basalt flows, and pillow lavas) which may be up to approximately 10 000' thick and are designated Middle to Upper Triassic. Resting on this unit is the massive Upper Triassic Quatsino Limestone, 400' to 3000' thick. The Quatsino is followed by the Bonanza Formation, an Upper Triassic to Middle Jurassic sequence of porphyritic andesite agglomerates and tuffs about 6000' thick. Unconformably overlying the Bonanza Formation is a series of poorly dated sandstones, with minor conglomerates, thin coal seams, and marine shales. Intruding the Karmutsen, Quatsino and Bonanza, but not the latest units, are several small granitic plutons. Finally, there are sporadic occurrences of Tertiary lava flows.

The Karmutsen, Quatsino and Bonanza Formations comprise probably the total sequence of deposits in a north-west trending eugeosyncline which was rejuvenated in the Middle Triassic. Following the eugeosyncline came a period of uplift and geantclinal warping, still following the regional north-west trend. Very little folding of rocks took place, but rather the arch was established by blockfaulting.

Mainly the faults follow the regional north-west trend, but in the Holberg Inlet - Rupert Inlet area, the trend becomes dominantly east-west. Occasional faults are at right angles to the regional trend. There have been no intrusives reported in the claims area; however, one is described to the immediate south-west.

GEOMORPHOLOGY

The mineral claims are situated in the Nahwitti Lowland division of the Coastal Trough. The topography is characterized by lowland plains and low rolling hills. The Nahwitti Lowland was not subjected to the degree of uplifting that the Coast and Insular Mountains were, so that in the Pleistocene the continental glaciers completely over-rode the area. Glaciation is therefore the major geomorphic agent, and bedrock competency is the most important factor in the development of topography. The hilly and topographically higher part of the area covered by the claims is underlain by the relatively resistant Karmutsen and Bonanza Formations, and the low-lying plains in the north-east corner of the area are underlain by the soft Cretaceous rocks. The topographic lineation which is marked by the edge of the hilly area apparently corresponds to the contact between the volcanics and the sandstones.

The major movement of the over-riding ice-sheet was in the south-westerly and westerly directions, which is reflected in pronounced lineaments in these directions. The lineations consist, in part, of roches moutonnee. It is often difficult to relate topographic lineaments to faulting, in the area mainly as a result of the overpowering erosional effect of the continental ice-sheet.

REFERENCES

Holland, Stuart S.: Landforms of British Columbia, A Physiographic Outline; B.C. Department of Minerals, and Petroleum Resources, Bulletin #48, p. 34, 45, (1964).

Sutherland Brown, A.: Tectonic History of the Insular Belt of British Columbia; C.I.M. Special Volume #8, Tectonic History and Mineral Deposits of the Western Cordillera, p. 83, (1966).

Muller, J. E.: Port McNeill Area and Nanaimo Basin, Vancouver Island; G.S.C. Paper 67-1, Part A, Report of Activities, May to October, 1966, p. 81, (1967).

AIRBORNE FIELD PROCEDURE

The amplitude of the earth's magnetic field was measured and recorded along 44 flight lines at an average terrain clearance of 550 feet. The 41 cross lines have a general northeast-southwest bearing with an average separation of 500 feet. The three tie lines were flown roughly in a northwest-southeast direction. The survey was completed in a fixed wing aircraft, towing an airfoil sensor. A Varian proton magnetometer, digital and chart recorders, camera and altimeter were mounted in the aircraft, and the magnetometer and chart recorder continuously measured and recorded the magnetic field. The terrain clearance was recorded by use of a Bonzar Pulse Type radar altimeter. At regular intervals, a timing circuit triggered the 35 mm strip film camera and marked the event on the chart record. Each photograph corresponds with a fiducial number. 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. The punch tape, chart and strip photograph processing is described in the following section. Instrument specifications are described in Appendix IV.

AIRBORNE DATA PROCESSING

The data processing procedure consisted of three overlapping steps which may be discussed under the following headings:

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

I. Flight Line X-Y Positioning:

From the aircraft, while the lines were being flown, rough positioning of flight lines was facilitated by reference to government aerial photographs of the area. In the office, the beginning and end of the flight lines were positioned on the government photos, using the strip photographs and the original rough positioning. With the beginning and end of the lines marked, the strip photos were sent on to Co-Ordinate Aerial Surveys Ltd., of Vancouver, B.C. where they transferred the flight lines onto a mosaic prepared from the government photos. A final base map was prepared, showing flight lines in relation to physical features. An X-Y coordinate system was superimposed on the base map, with +Y north and +X east (see Figure 6). Thus, every position along a flight line may be defined in terms of X (number of feet east of the origin) and Y (number of feet north of the origin) and will have a

corresponding magnetic value in gammas.

2. 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 sheets and the punch tape were then sent to Computech Research Ltd., of Tucson, Arizona.

3. Contour Plotting.

Computech Research Ltd. 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 magnetometer readings were plotted and evenly spaced in straight line segments. The data was then contoured by a computer - plotter unit at a contour interval of 100 gammas.

DISCUSSION of RESULTS

The isomagnetic plan is presented as Figure 7; (at a scale of 1" to 1000 feet, contoured at 100 gamma intervals). The reader is referred to this map for the following discussion:

Individual values ranged from a low of less than 56,300 gammas to a high of just over 57,400 gammas, (total range of over 1100 gammas). The majority of the area surveyed is characterized by response in the range $56,600 \pm 200$ gammas.

A considerable contrast in magnetic response is apparent between: (a) the south and south-west sections flown (characterized by relatively high response, and steep magnetic gradients) and (b) the north section of the area flown, (characterized by low magnetic values and low order magnetic gradients).

Government geological surveys of the area, indicate that these two aeromagnetic divisions are responses to different lithologic series. The high contrast magnetic complex to the south and south-west indicating response from the Bonanza Group (Upper Triassic to Jurassic(?) shale, limestone and andesite), and the north section, essential a magnetic "low-land," indicating response from the Karmutson Group (triassic basaltic lava and breccia).

The aerial magnetic plan is characterized by rectilinear trends, disturbances, and boundaries, and the most prevailing trend in a north west by west direction. There is a well developed and intersecting secondary set of trends in a north-easterly direction. Some of these trends may indicate faults, specific lithologic units etc., whereas

others will require ground investigation to determine their cause (see Figure 8, General Interpretation).

Iso-magnetic areas have been categorized in the following manor, on the Emperor Mines property:

<u>Designation</u>	<u>Value</u>
Anomalously low	less than 56400 gammas.
Weak high	between 56800 and 56999 gammas.
Moderately high	between 57000 and 57199 gammas.
Strong high	greater than 57,200 gammas.

Based on this classification, and the shape and extent of "high" areas, a total of five anomaly families will be discussed here. In descending order of amplitude (and priority) they have the following characteristics:

CHARACTERISTICS of FIVE ANOMALY FAMILIES

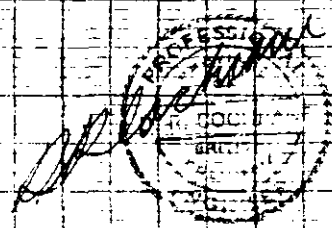
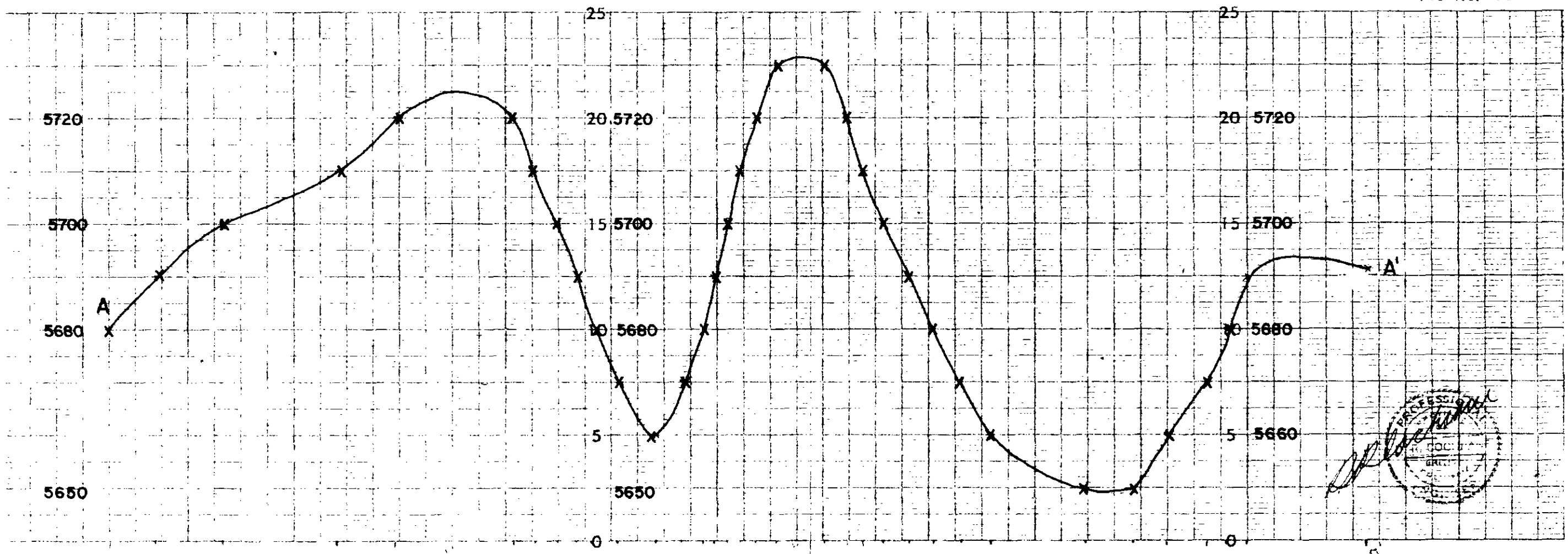
DESIGNATION	LOCATION	MAXIMUM AMPLITUDE	EXTENT
Anomaly #1 (a):	S.W. corner claims, Tip, 3,4,5, & 6 claims	57300 (+)	1500' long, 800M wide
Anomaly #1 (b):	S.W. corner of claims Tip #7 claim	57300 (+)	
Anomaly #2	S.W. corner of claims Tip #10,12,19, & 21 claims	57200 (+)	2400' long, 800' wide
Anomaly #3 (a):	S.W. center section of property	56800 (+)	500' diameter
Anomaly #3 (b):	S.W. center section of claims	56800 (+)	
Anomaly #4	S.W. center section of claims	56900 (+)	400' diameter
Anomaly #5	Center south section	56800 (+)	

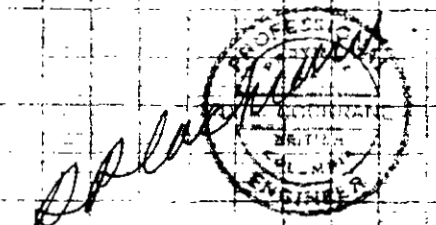
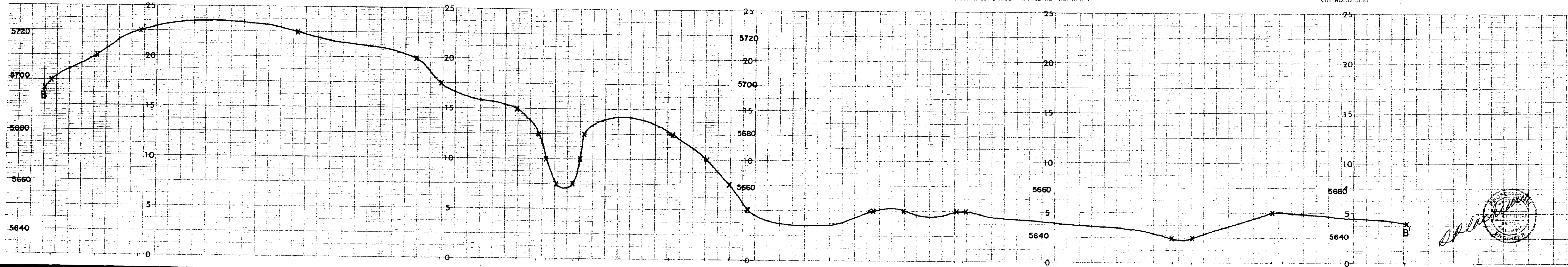
Within the claim boundaries, aeromagnetic anomaly #1 is the most prominent "high". It lies along a positive magnetic ridge trending north east near the south west corner of the claims group, and is characterized by twin peaks, designated #1 (a) and #1 (b) respectively. The magnetic gradient is quite steep to the north of #1 (a), where the field decreases to below 56500 gammas. The maximum amplitude of the anomaly is 880 gammas. Calculations (modified $\frac{1}{2}$ width rule, Peters Rule and curve matching) indicate that the anomaly #1 (a) causitive body may be represented as a line of poles, (steeply dipping, relatively narrow, vertical slab or dike, striking magnetic $\beta = 36^\circ$). It is apparently near the surface, and may be represented as a dike-like body, 500 feet wide with a susceptibility contrast of 0.0122 c.g.s. units (equivalent to approximately 4% magnetite).

Anomaly #1 (b) is similar to #1 (a) but may in fact be more related to an approximately north trending wide-spread high to the south of #1 (b).

Anomaly #2 is a rather broad arch of positive magnetic values trending north east at the extreme west end of the claim group. Profile A-A' shows anomaly #2 and #1 (a) in cross section.

PROFILE A-A'







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NANAIMO M.D.
JOB NO. 1057

FIG. 4

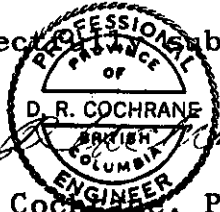
Aeromagnetic anomaly family #3, contains twin peaks designated #3 (a) and 3 (b) respectively. The peak values of 3 (a) and (b) are considerably less than their counterparts #1 (a) and (b), however, they have similar trends and magnetic settings.

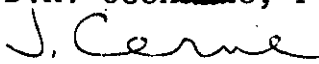
Aeromagnetic anomaly #4 is a partially isolated +56900 isomagnetic area which is an apophysis of the main body of high response situated to the south west. It is illustrated in profile on magnetic section B-B'.

Aeromagnetic anomaly #5, located on or near the Top #22 claim. This relatively weak magnetic positive response is of special interest because of its proximity to an assumed fault.

The anomalous magnetic low responses should not be overlooked as to possible interest, but will not be discussed here, since the body of economic significance situated west of the Emperor Mines property is associated with a magnetic positive.

Respectfully submitted,


D.R. Cochrane, P. Eng.


J. Cerne, M.S.

November 15, 1968.
Vancouver, B. C.

APPENDIX I

PERSONNEL

Name: PITRE, Raymond L.

Education: Grade XII Diploma.

Experience: 5 years bush experience - Ground Magneto-
meter surveys and prospecting.

Commercial Pilot's Licence since 1964.

Airborne Magnetometer surveys since summer
of 1967.

6 years General Business Management.

APPENDIX I

PERSONNEL

Name: COCHRANE, Donald Robert

Education: B.Sc. - University of Toronto
M.Sc.(Eng.) - Queen's University

Professional Associations: Professional Engineer of British Columbia,
Ontario and Saskatchewan.

Jr. member of C.I.M.M., member of G.A.C.,
M.A.C. Geological Engineer.

Experience: Engaged in the profession since 1962 while
employed with Noranda Exploration Co. Ltd.,
Quebec Cartier Mines Ltd., Meridian Explor-
ation Syndicate.

Presently employed as Engineer with Geo-X
Surveys Ltd.

Experience in West Indies, Latin America,
South America, United States 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 Labora-
tory, Graduate Research Asst.

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

APPENDIX I

PERSONNEL

Name: WILSON, Norman George Robert

Education: Junior Matriculation equiv., Grade 13 Math.
2nd Year National Electrical Engineering.

Experience: 12 years Royal Air Force - Radar Technician.
6 months British Government Communications -
Radio Technician.

Presently employed by Geo-X Surveys Ltd.,
since October 22nd, 1967 doing Induced Polar-
ization, Electromagnetic and Magnetometer
Surveys under Professional supervision.

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 Emperor Mines Ltd. - Winco Mining & Explorations Ltd. project.

A. FIELD WORK

R. L. Pitre	Navigator	Sept. 30, Oct. 1/68
N. Wilson	Flight Operator	Sept. 30, Oct. 1/68

B. DATA PROCESSING & REPORT PREPARATION

N. Wilson	Geophysicist	Oct. 19,20
J. Cerne	Geophysicist	Oct. 2,4,21-22/68 Nov. 8/68
D. R. Cochrane	P. Eng.	Nov. 8,9,12-15/68
S. L. Sandner	B. Sc.	Oct. 19,20/68

C. DRAFTING & REPRODUCTION

R. Key	Draftsman	Sept. 11,12,30/68 Oct. 4,8,19,21-25, 28,29/68 Nov. 12,14,15/68
D. Yip	Draftsman	Oct. 4,19,21-25,28, 30,31/68 Nov. 1,4,12-15/68
J. Carvajal	Draftsman	Oct. 2-4/68 Nov.14,15.
M. Abrey	Secretary	Nov. 15/68

APPENDIX III
COST BREAKDOWN

As per contract between Geo-X Surveys and Emperor Mines Ltd., and Winco Mining and Exploration Limited, dated September, 1968, for airborne magnetometer survey of the Tip, Elk, Top and Toe claim groups.

148.1 line miles including:

Air Photo Mosaic
Base Map Preparation
Topographic Map Preparation
Preliminary Data Processing
Computer Data Processing
Report Preparation

148.1 line miles at \$86.43 per line mile.

Inclusive Total Price:

\$12,800.00



S. L. Sandner,
President.

V-4937A Magnetometer System Specifications

Performance Specifications

RANGE:

20,000 to 100,000 gamma* (worldwide)

*100,000 gammas=1 oersted=1 gauss (permeability=1)

1 gamma = 10^5 gauss.

ACCURACY:

\pm part in 10^4 in a 100,000 gamma field. The proton constant, 23.4875 is known within 8ppm (NBS, October, 1963) Inherent accuracy is therefore 10ppm. Reference Frequency Stability: Typically 5 ppm per year.

SENSITIVITY:

$\pm \frac{1}{2}$ and ± 1 gamma in any field. (Determined by the ± 1 count sensitivity of the electronic counter).

SAMPLING RATE:

0.5, 1.0 and 1.5 seconds; manual and "clock" operation permits any other timing sequence.

Power Requirement

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

Environmental Temperature

Magnetometer Console: -4°F to 120°F; 0-90% relative humidity.

Analog Recorder: 0°F to 120°F; 0-90% relative humidity.

Digital Recorder: 0°C to 50°C; relative humidity 90% maximum. Console and recorders are mounted inside aircraft.

Airborne Sensor: -40°F to 120°F.

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

Counter Digital

Analog converter

FOR DIGITAL RECORDING:

BCD 1-2-4-8-(four line output)

"0" 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 navigational equipment.

FOR 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 $\frac{1}{2}$ -gamma sensitivity.

APPENDIX V

FLIGHT DATA AND OPERATORS REPORT

Property Emperor - Winco Job 1057 Date Sept. 30/68

Oct. 1/68

Operator R. L. Pitre Flight Elevation 550

Direction Flown N.E. - S.W. Air Speed 110 mph Chart Scale _____

Weather Clear 1st day - Cloudy 2nd day.

Page 1 of 4

LINE NUMBER	(THOUSANDS OF FEET)		FIDUCIAL NUMBER	LENGTH MILES
	X	Y		
1	-1.0	10.6	000	
	9.6	16.4	031	2.33
2	8.7	14.5	039	
	-3.0	8.1	058	2.55
3	0.8	14.0	061	
	7.6	16.7	078	1.39
4	9.1	15.7	080	
	4.2	12.2	089	
	-1.4	9.7	098	2.32
5	-3.4	8.7	101	
	1.8	10.5	108	
	9.5	14.4	118	2.67
6	9.1	14.5	119	
	-0.5	8.3	135	2.17
7	0.1	8.9	137	
	5.1	11.6	144	
	12.7	14.7	155	2.65
8	12.6	14.4	156	
	8.1	12.5	165	
	0.0	7.1	185	2.95

LINE NUMBER	(THOUSANDS OF FEET)		FIDUCIAL NUMBER	LENGTH MILES
	X	Y		
9	-2.0	6.0	186	
	7.8	11.0	197	
	10.4	12.1	200	
	25.3	19.4	218	6.34
10	19.7	16.6	219	
	13.5	13.8	227	
	8.6	12.5	232	
	5.2	9.3	238	
	1.5	6.8	244	3.95
11	18.7	16.6	245	
	13.3	13.8	254	
	6.9	9.2	264	
	0.2	5.4	273	4.28
12	-0.6	4.7	274	
	6.2	8.5	281	
	12.8	14.2	289	
	15.9	16.4	293	
	22.3	20.3	300	5.28
13	15.7	13.9	301	
	1.9	4.9	325	2.76

Total number of X, Y, Z points _____

Total number of line miles _____

Signed _____

APPENDIX V

FLIGHT DATA AND OPERATORS REPORT

Property _____ Job _____ Date _____

Operator _____ Flight Elevation _____

Direction Flown _____ Air Speed _____ Chart Scale _____

Weather _____

Page 2 of 4

LINE NUMBER	(THOUSANDS OF FEET)		FIDUCIAL NUMBER	LENGTH MILES
	X	Y		
14	1.8	4.8	326	
	8.8	8.8	331	
	17.6	17.1	339	
	22.1	19.9	348	4.10
15	16.0	13.9	349	
	13.5	12.0	353	
	7.6	7.1	362	
	4.2	5.1	366	2.78
16	3.1	4.8	367	
	9.8	8.5	381	
	13.4	11.8	391	
	19.8	16.3	407	3.84
17	21.0	16.1	409	
	14.2	12.0	422	
	12.5	10.1	426	
	4.8	4.5	443	3.80
18	6.8	5.2	444	
	13.3	8.4	453	
	19.9	13.1	463	
	26.4	18.4	474	4.88

LINE NUMBER	(THOUSANDS OF FEET)		FIDUCIAL NUMBER	LENGTH MILES
	X	Y		
19	23.9	19.1	475	
	13.7	7.7	505	
	13.4	6.5	508	
	11.9	5.3	512	
	9.6	4.7	517	
	6.8	3.7	523	3.88
20	6.2	5.8	524	
	12.9	8.5	539	
	19.8	12.5	555	2.90
21	23.9	17.0	556	
	10.2	4.5	584	3.52
22	9.1	2.3	585	
	15.4	9.9	599	
23	26.9	16.4	622	
	20.4	9.9	637	
	10.6	3.6	657	3.97
24	10.2	1.5	658	
	15.7	8.1	670	
	27.7	16.9	695	4.45
25	28.3	16.1	696	
	19.5	7.4	714	
	12.9	2.3	727	4.10

Total number of X, Y, Z points _____

Total number of line miles _____

Signed _____

APPENDIX V

FLIGHT DATA AND OPERATORS REPORT

Property _____ Job _____ Date _____

Operator _____ Flight Elevation _____

Direction Flown _____ Air Speed _____ Chart Scale _____

Weather _____

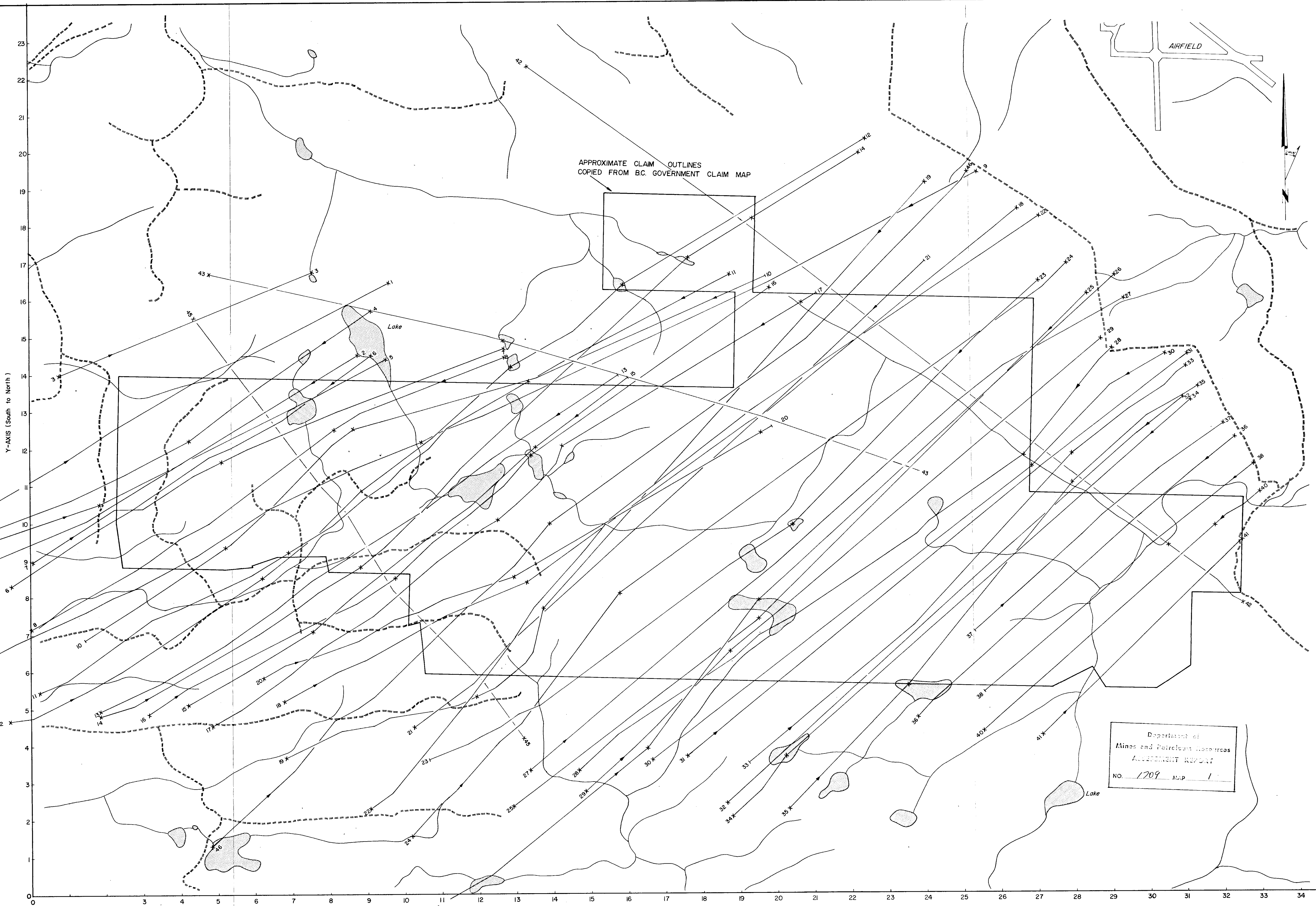
LINE NUMBER	(THOUSANDS OF FEET)		FIDUCIAL NUMBER	LENGTH MILES
	X	Y		
26	9.9	-0.9	728	
	16.5	3.9	738	
	19.5	7.9	745	
	29.0	16.6	764	4.94
27	13.3	3.3	767	
	24.7	13.1	794	
	29.2	15.9	818	3.86
28	28.9	14.6	819	
	26.5	11.7	829	
	14.6	3.3	872	3.46
29	14.8	2.7	873	
	18.7	6.5	888	
	28.6	14.9	926	3.46
30	30.3	14.5	927	
	26.8	11.5	941	
	16.6	3.6	983	3.37
31	17.5	3.7	984	
	30.9	14.5	022	3.27
32	30.8	13.3	026	
	18.6	2.4	064	3.09

LINE NUMBER	(THOUSANDS OF FEET)		FIDUCIAL NUMBER	LENGTH MILES
	X	Y		
33	19.2	3.5	065	
	23.6	7.2	079	
	27.8	11.8	093	
	30.9	14.1	104	2.99
34	31.0	13.2	105	
	20.2	3.7	133	
	18.7	2.1	150	2.95
35	20.3	2.3	151	
	23.4	5.6	163	
	27.8	11.0	183	
	31.2	13.6	195	3.01
36	32.2	12.2	196	
	23.7	4.7	226	2.15
37	25.2	7.0	227	
	31.9	12.6	256	1.66
38	32.7	11.5	257	
	25.5	5.4	285	1.78
40	32.9	10.7	315	
	31.6	9.8	341	
	25.5	4.3	345	1.85
41	27.0	4.2	346	
	32.4	7.8	371	1.42

Total number of X, Y, Z points _____

Total number of line miles _____

Signed _____



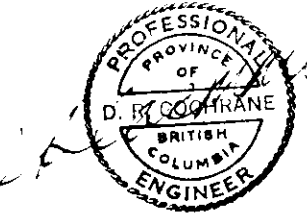
Department of
 Mines and Technical Surveys
 AEROMAGNETIC REPORT
 NO. 1709 MAP 1

10 → Flight Line
 Flight Line Number
 Direction Flow

APPROXIMATE CLAIM OUTLINES
 COPIED FROM B.C. GOVERNMENT CLAIM MAP

X - AXIS (West to East)
 THOUSANDS
 OF FEET

1000 0 1000 2000 3000
 FEET

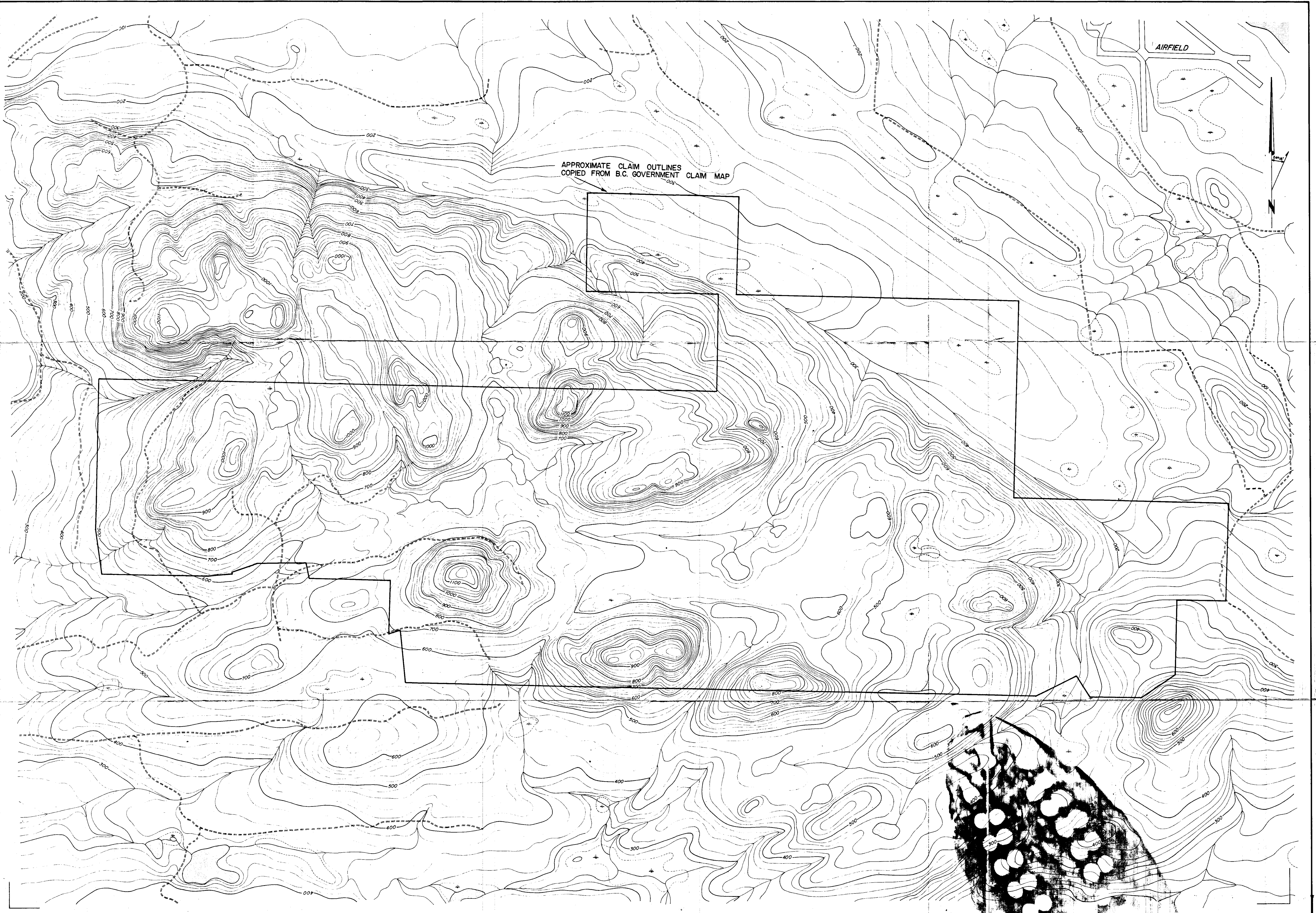


1709

EMPEROR MINES LTD. WINCO MINING & EXPLORATIONS LTD. PORT HARDY AREA, NANAIMO MD BRITISH COLUMBIA			
FLIGHT LINE PLAN			
DRAWN	DEY	JOB NO	FIG NO
CHECKED	NOV 4, 1968	1057	6

TO ACCOMPANY THE GEOPHYSICAL SURVEY ON THE AEROMAGNETIC SURVEY ON THE TOP, T1E, T0E & ELK GROUP OF CLAIMS OWNED BY EMPEROR MINES LTD. & WINCO MINING & EXPLORATION LTD. SITUATED IN THE PORT HARDY AREA, IN THE NANAIMO MINING DIVISION, BRITISH COLUMBIA BY DONALD R. COCHRANE, PROFESSIONAL ENGINEER, VANCOUVER BRITISH COLUMBIA DATED NOVEMBER 1968.

g GEO - X SURVEYS LTD.



APPROXIMATE CLAIM OUTLINES
COPIED FROM B.C. GOVERNMENT CLAIM MAP

AIRFIELD



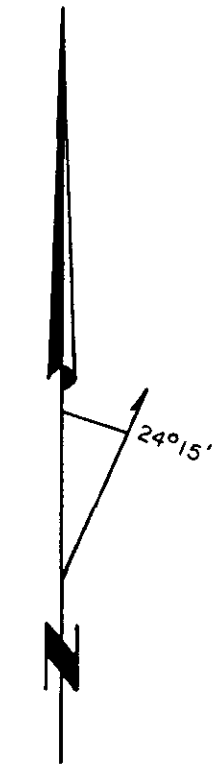
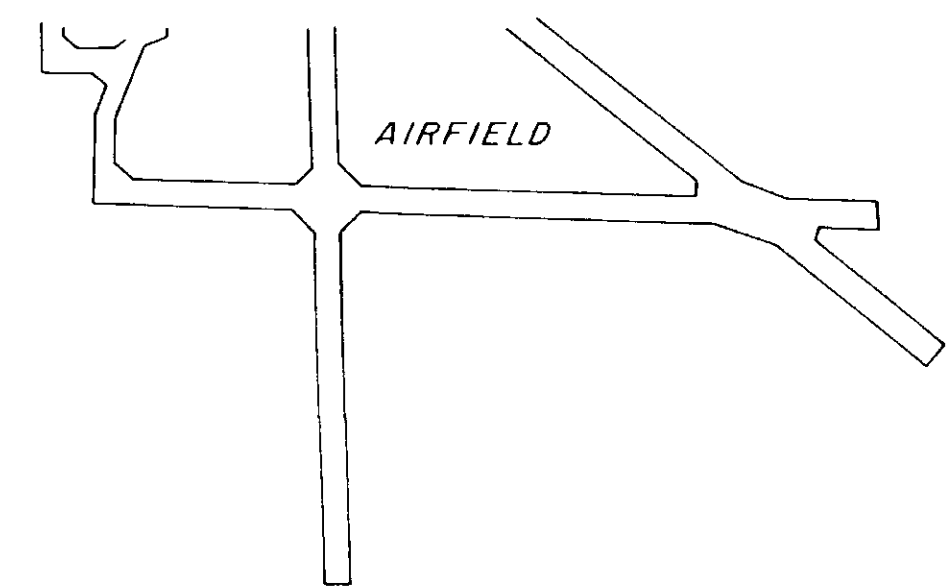
[Handwritten Signature]
1709

EMPEROR MINES LTD.
WINCO MINING & EXPLORATIONS LTD.
PORT HARDY AREA, NANAIMO M.D., BRITISH COLUMBIA

TOPOGRAPHY MAP (2)

TO ACCOMPANY THE GEOPHYSICAL SURVEY ON THE AEROMAGNETIC SURVEY ON THE
TOP, TIP, TOE & ELK GROUP OF CLAIMS OWNED BY EMPEROR MINES LTD & WINCO MINING & EXPLORATIONS LTD.
SITUATED IN THE PORT HARDY AREA, IN THE NANAIMO MINING DIVISION, BRITISH COLUMBIA
BY DONALD R. COCHRANE, PROFESSIONAL ENGINEER, VANCOUVER BRITISH COLUMBIA
DATED NOVEMBER 14, 1968

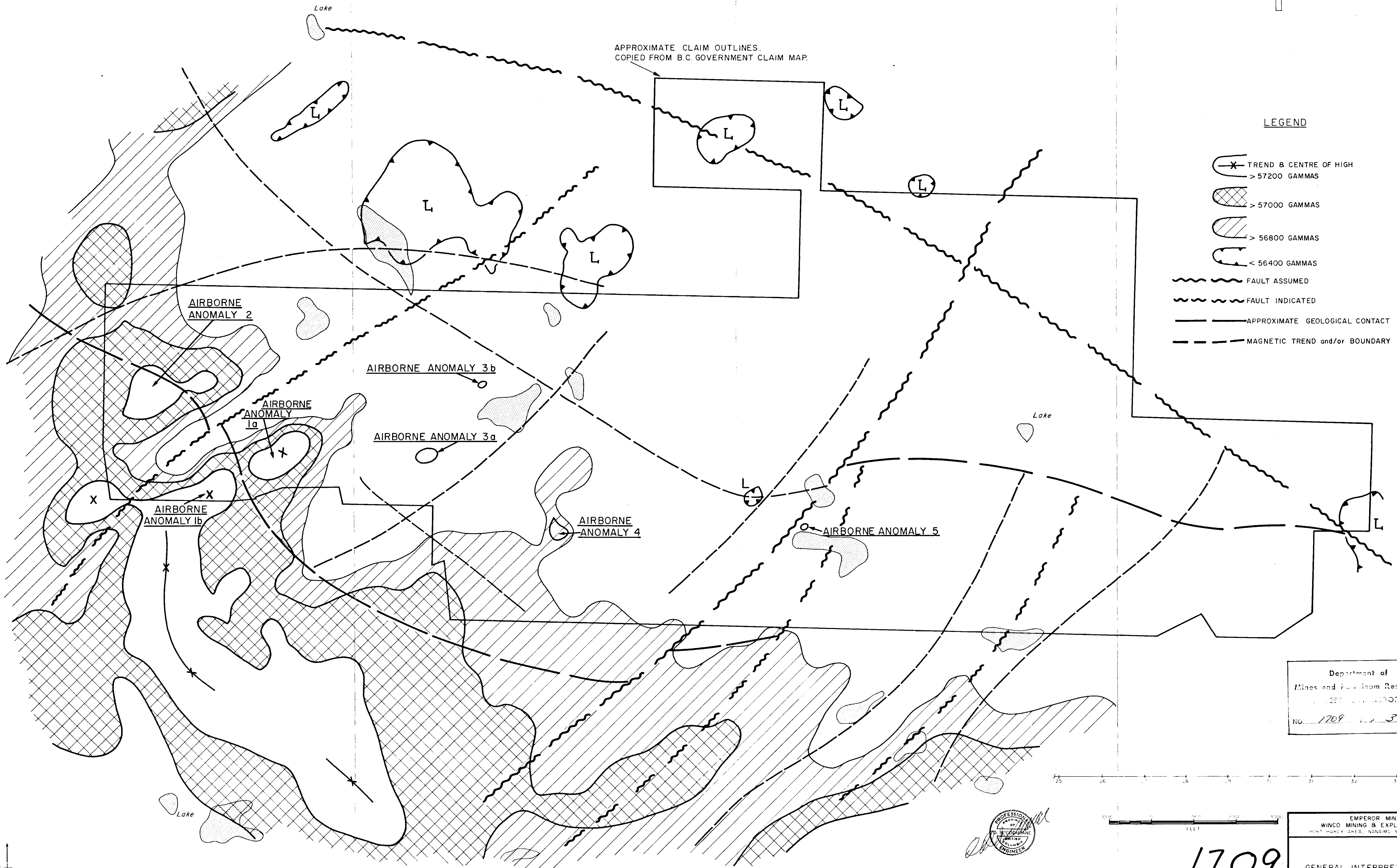
g	GEO - X SURVEYS LTD.			
	DRAWN	CO-ORDINATE AERIAL	JOB NO.	FIG. NO.
	DATED	NOV. 14, 1968	1057	3
CHECKED	<i>[Handwritten Signature]</i>			



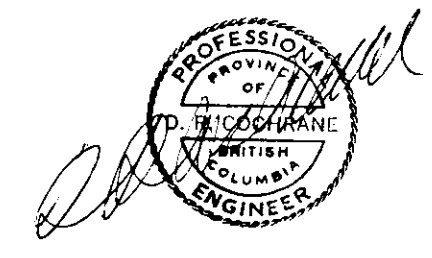
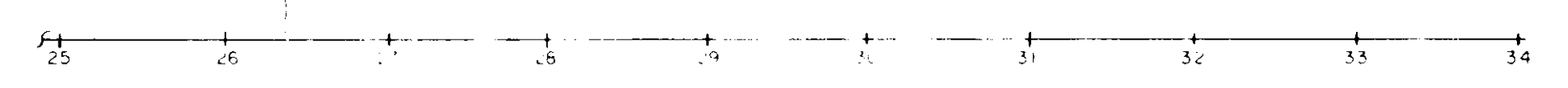
APPROXIMATE CLAIM OUTLINES.
COPIED FROM B.C. GOVERNMENT CLAIM MAP.

LEGEND

- TRENDS & CENTRE OF HIGH
> 57200 GAMMAS
- > 57000 GAMMAS
- > 56800 GAMMAS
- > 56400 GAMMAS
- < 56400 GAMMAS
- FAULT ASSUMED
- FAULT INDICATED
- APPROXIMATE GEOLOGICAL CONTACT
- MAGNETIC TREND and/or BOUNDARY



Department of
Mines and Petroleum Resources
1288 W. AIRPORT
NO. 1709



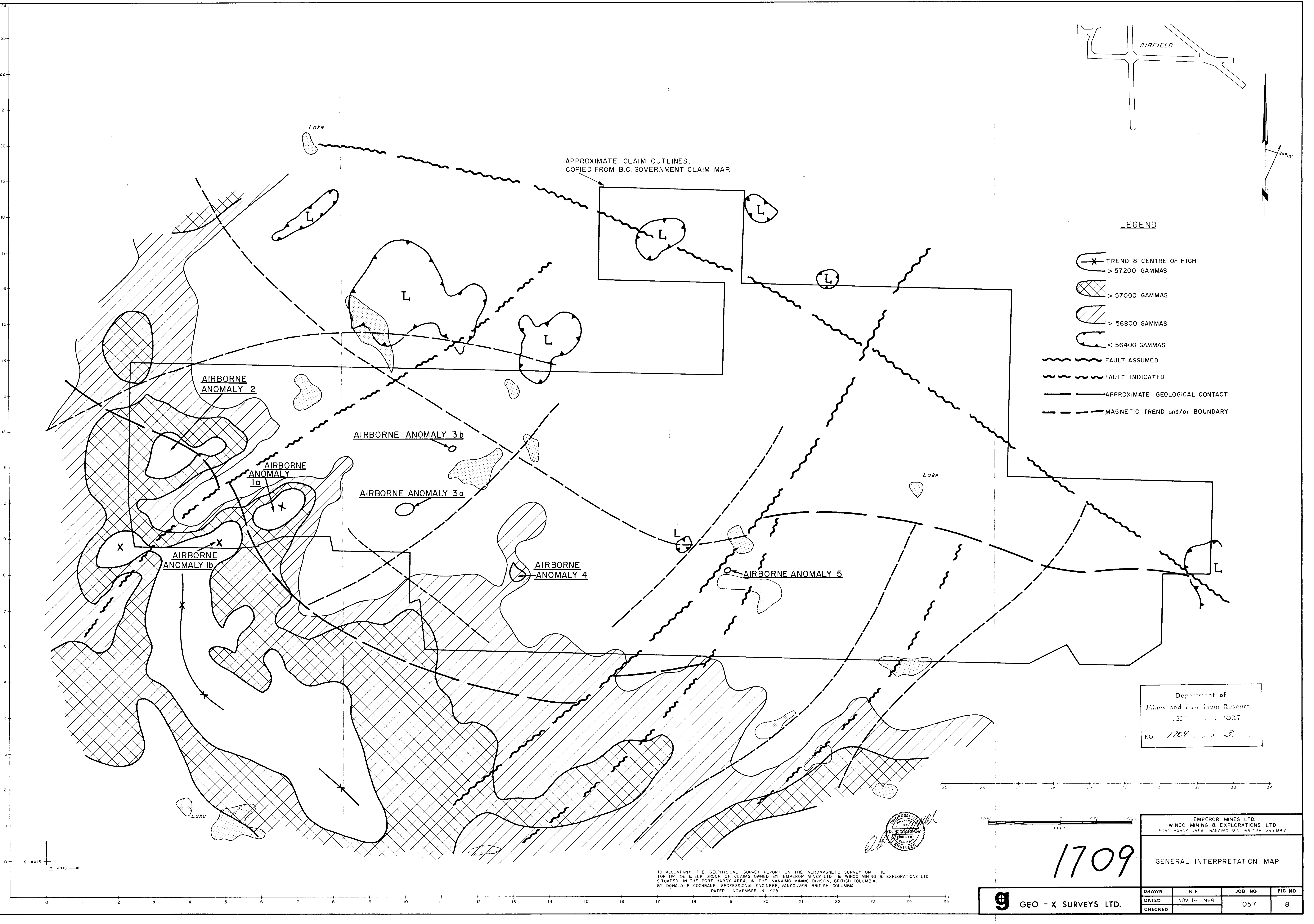
1709

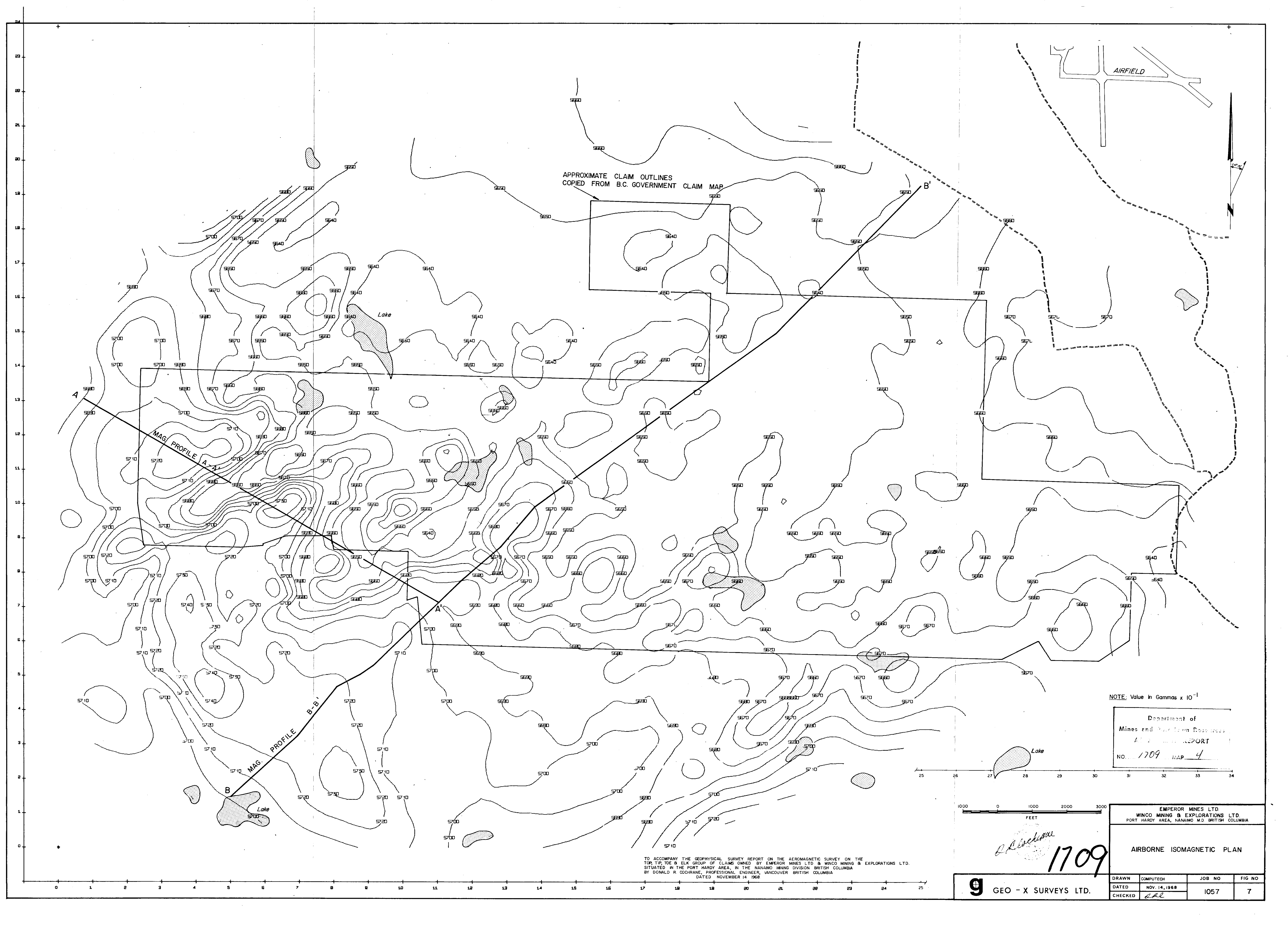
EMPEROR MINES LTD
WINCO MINING & EXPLORATIONS LTD
PORT HARDY AREA, NANAIMO M.D., BRITISH COLUMBIA

GENERAL INTERPRETATION MAP

TO ACCOMPANY THE GEOPHYSICAL SURVEY REPORT ON THE AEROMAGNETIC SURVEY ON THE
TOP TIP, JOE & ELY GROUP OF CLAIMS OWNED BY EMPEROR MINES LTD & WINCO MINING & EXPLORATIONS LTD
SITUATED IN THE PORT HARDY AREA, IN THE NANAIMO MINING DIVISION, BRITISH COLUMBIA,
BY DONALD R. COCHRANE, PROFESSIONAL ENGINEER, VANCOUVER BRITISH COLUMBIA
DATED NOVEMBER 14, 1968

g GEO - X SURVEYS LTD.	DRAWN	R.K.	JOB NO	FIG NO
	DATED	NOV 14, 1968	1057	8
	CHECKED			





APPROXIMATE CLAIM OUTLINES
COPIED FROM B.C. GOVERNMENT CLAIM MAP

NOTE: Value in Gammas x 10⁻¹

Department of
Mines and Geology
REPORT
NO. 1709 MAP 4

0 1000 2000 3000
FEET

TO ACCOMPANY THE GEOPHYSICAL SURVEY REPORT ON THE AEROMAGNETIC SURVEY ON THE
TOP, TIP, TOE & ELK GROUP OF CLAIMS OWNED BY EMPEROR MINES LTD & WINCO MINING & EXPLORATIONS LTD.
SITUATED IN THE PORT HARDY AREA, IN THE NANAIMO MINING DIVISION BRITISH COLUMBIA
BY DONALD R. COCHRANE, PROFESSIONAL ENGINEER, VANCOUVER BRITISH COLUMBIA
DATED NOVEMBER 14 1968

g GEO - X SURVEYS LTD.

EMPEROR MINES LTD. WINCO MINING & EXPLORATIONS LTD. PORT HARDY AREA, NANAIMO M.D. BRITISH COLUMBIA			
AIRBORNE ISOMAGNETIC PLAN			
DRAWN	COMPUTED	JOB NO.	FIG NO.
DATED	NOV. 14, 1968	1057	7
CHECKED	<i>DR</i>		

D.R. Cochran
1709