ASSESSMENT REPORT

1990 AIRBORNE GEOPHYSICAL SURVEY

ON THE

PURCELL PROPERTY

FORT STEELE MINING DIVISION
BRITISH COLUMBIA
NTS 82F/E, 9E

Latitude 49° 30'N
Longitude 116° 04'W

OPERATOR: Swift Minerals Ltd.
OWNER: Chapleau Resources Ltd.

R. S. VERZOSA, P.Eng.
Director

SWIFT MINERALS LTD.
Vancouver, British Columbia

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INTRODUCTION

The Purcell Property, located approximately 20km east of Cranbrook, B.C. in the Fort Steele Mining Division, comprises 51 mineral claims of 450 units. In December, 1989 Swift Minerals Ltd. entered into an option agreement with Chapleau Resources Ltd. whereby Swift, through option payments and work commitments, would earn a 60% interest in the property. During March, 1990 Swift Minerals Ltd. commissioned Aerodat Limited to carry out an airborne geophysical survey over certain parts of the Purcell property. The purpose of the survey was to provide preliminary data to a ground follow-up evaluation.

This report summarizes the geological setting of the property and includes a proposal for further work.

Location and Access

The Purcell property is located approximately 20km east of Cranbrook, B.C. in the Fort Steele Mining Division. It is centered at latitude 49° 30'N and longitude 116° 04'W (Figure 1) and covers a sizable area between Perry Creek and the Moyie River. The property is accessible by an all-weather logging road along Perry Creek from the Kimberley-Cranbrook highway at the Wycliffe junction or by an all-weather logging road along the Moyie River from the Lumberton junction.

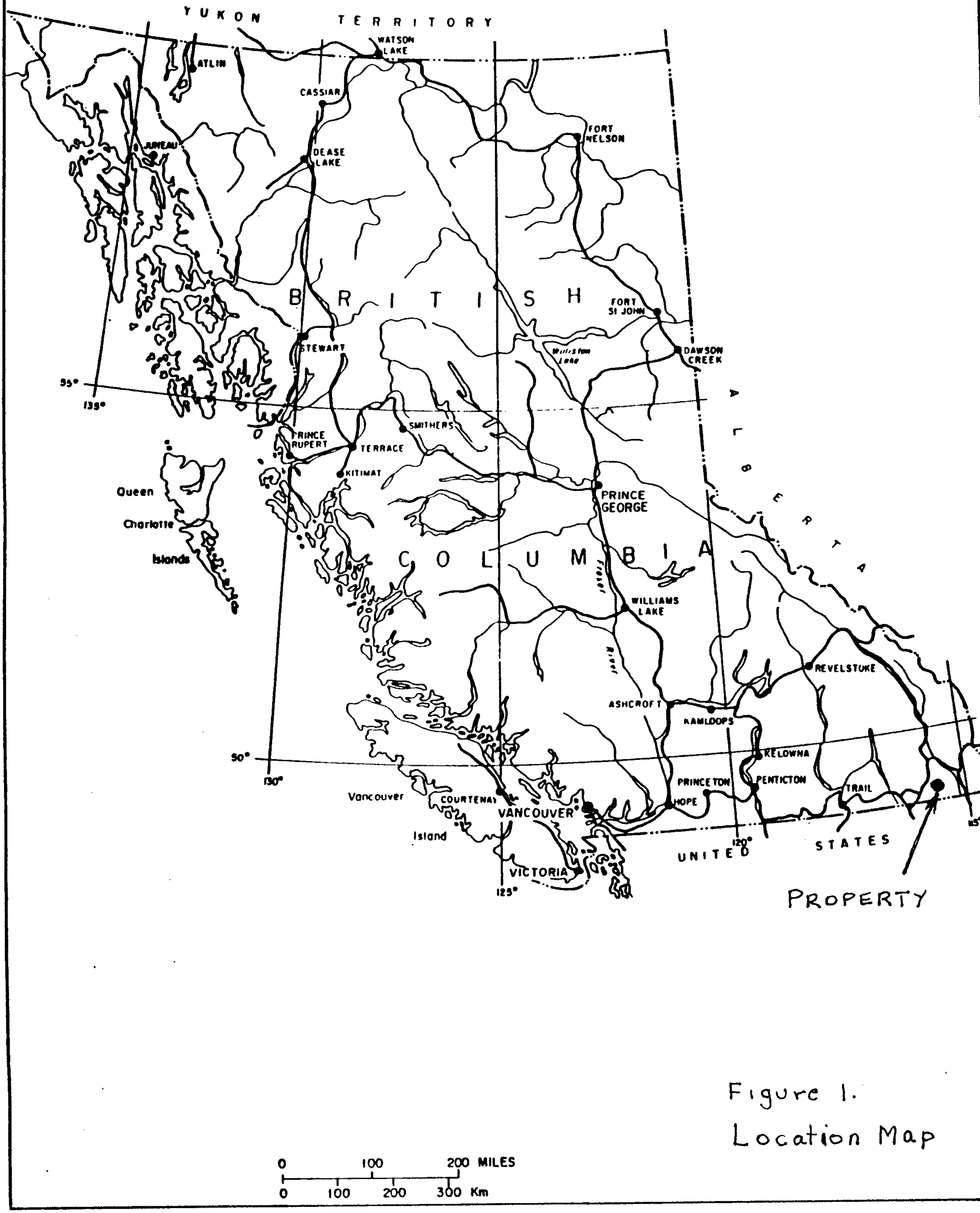


Figure 1.
Location Map

Physiography

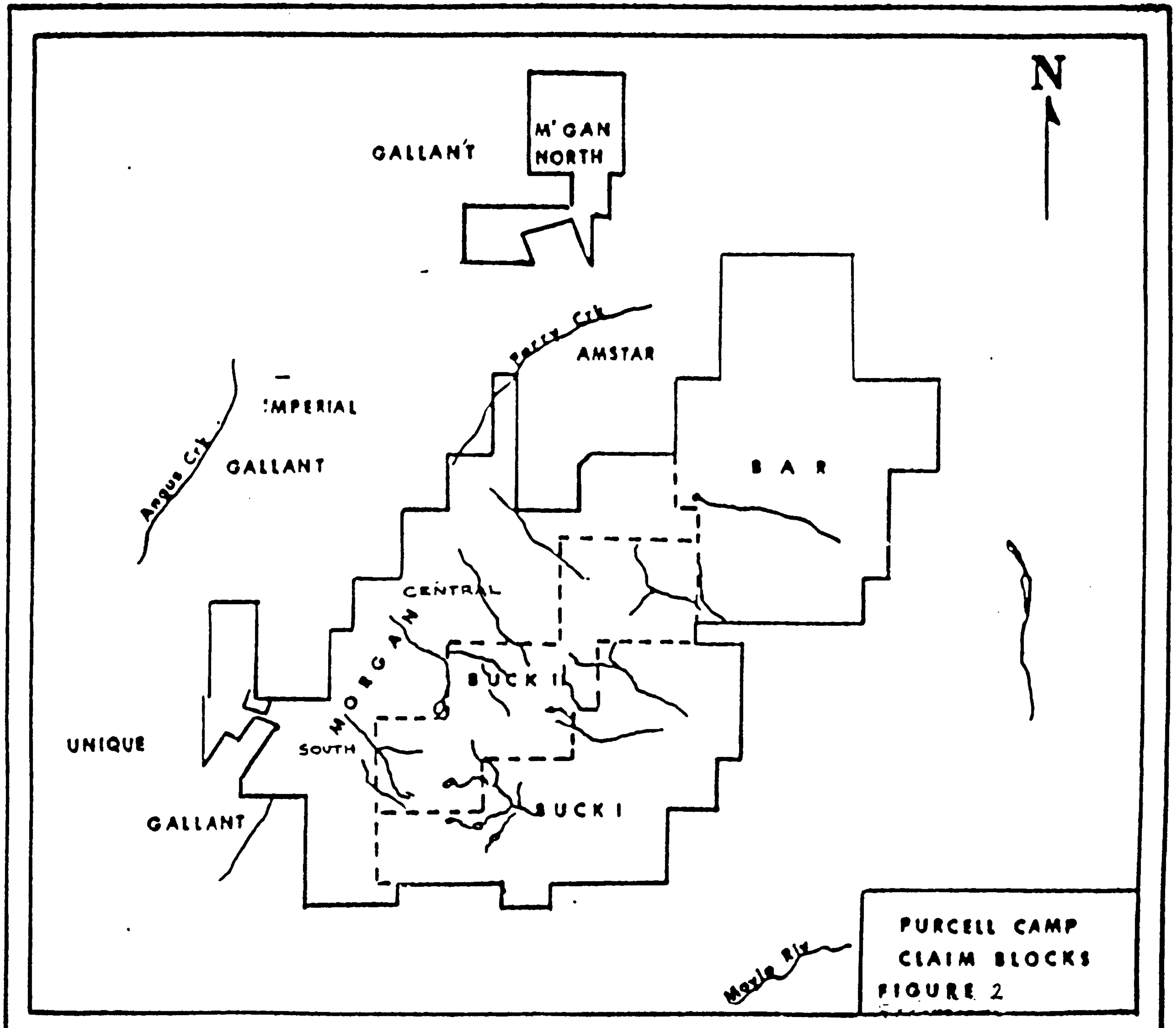
Relief on the property is approximately 750m, rising steeply from the narrow valleys along Perry Creek and the Moyie River to the highest point in the area at Grassy Mountain at 2491m. The area abounds stands of spruce, larch, lodgepole, pine, fir, white pine and thick underbrush. Precipitation is high (80-180cm) while snow is considered moderate. The climate in the area is typical of the interior of British Columbia characterized by dry and hot summers and long cold winters. The main drainage systems are provided by Perry Creek and the Moyie River.

Property Definition

The Purcell property consists of four groups of claims, the Morgan Claims, Buck I Claims, Buck II Claims and the Bar Claims, all in the Fort Steele Mining Division, British Columbia, (Figure 2). The claim groups are owned by three individuals and Chapleau Resources Ltd. The status of the various claims is included as Appendix II.

History

The Perry Creek and the Moyie River drainages were the scene of intense activity for placer mining at the turn of the century. The numerous adits, shafts and hand trenches in the area attest to the degree of prospecting undertaken in the past. Some of the work was fairly extensive, e.g., the



PURCELL CAMP
CLAIM BLOCKS
FIGURE 2

Running Wolf mine on France Creek drove 1000 feet of adits, the Homestake, a 560-foot adit and a 60-foot shaft and the Montezuma, a 2000-adit. More recently, exploration has taken the form of geochemical, geophysical and drilling programs by various companies such as Gallant Gold Mines, Amstar Ventures, Imperial Metals, Cominco, Goldpac and Delta Resources. In 1987, Chapleau Resources Ltd., undertook a prospecting, geochemical, trenching and geological mapping program on the entire Purcell property resulting in the identification of areas with potential for low-grade gold, as well as sediment-hosted massive sulfide mineralization.

GEOLOGICAL SETTING

The Purcell property is within the Purcell anticlinorium, a localized geological sub-province lying just east of the Kootenay Arc. The core of the anticlinorium is underlain by the so-called Purcell Supergroup that includes a succession of up to 11 kilometres of dominantly fine-grained clastic rocks, as well as, carbonate rocks both of Proterozoic age, (Figure 3). The anticlinorium is cut by numerous late faults that trend northeasterly. The immediate area of the Purcell property is underlain by rocks of the Aldridge, Creston and Kitchener Formations. Diorite sills are present in the Aldridge Formation and diorite dikes, some of which contain magnetite, cut all three formations. Cretaceous quartz

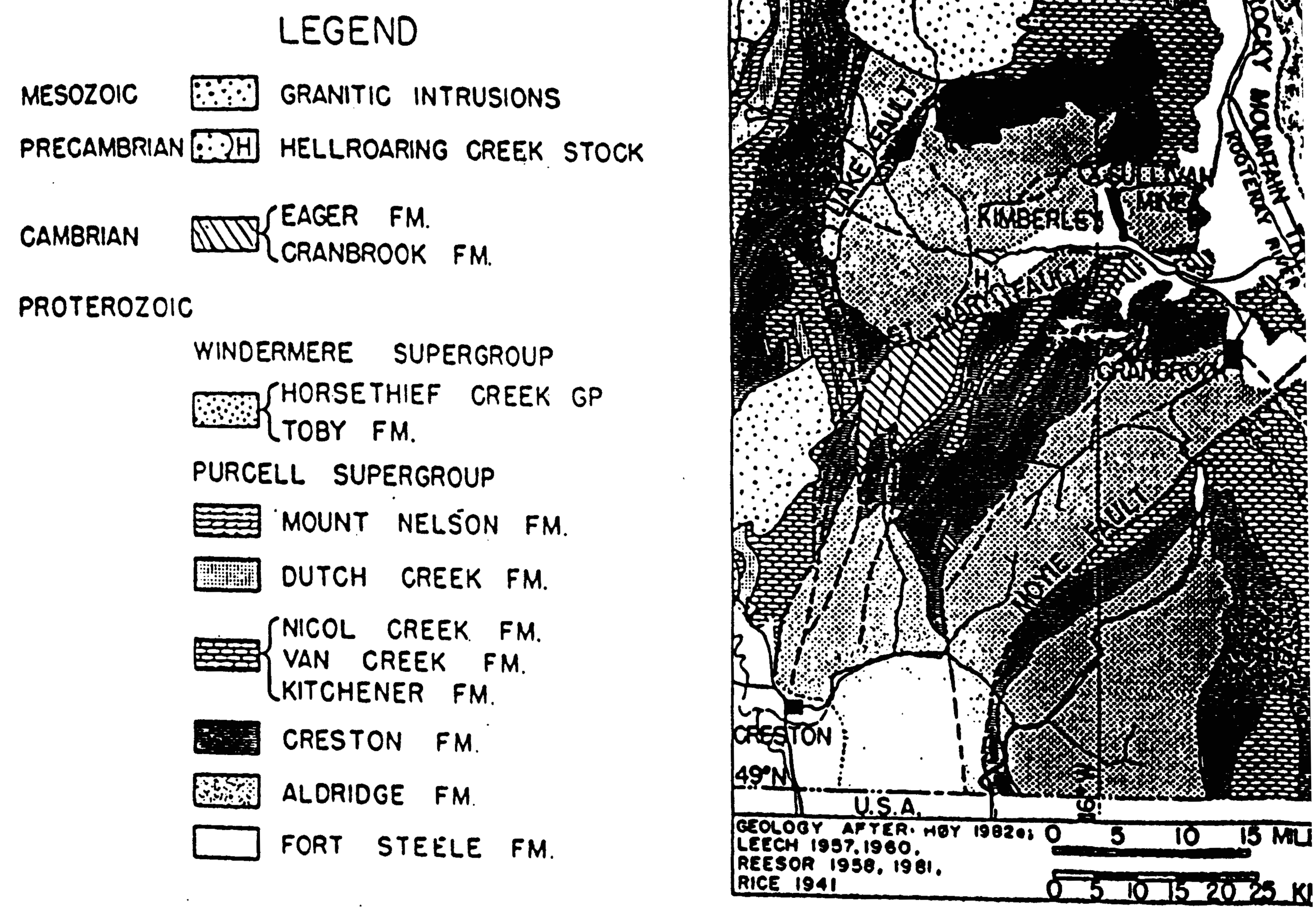


FIGURE 3. Regional Geology - Cranbrook Area (after Hamilton et al, 1983)

monzonite and granodiorite stocks both occur on the east and west side of the property respectively. Structure on the Purcell property is dominated by north-northeasterly normal faults that dip steeply to the west. Some of the faults may be high-angle thrust faults. The prominent alignment of the tributaries of Perry Creek and Moyie River may reflect west-northwest cross-faults. However, gold mineralization may be more related to the northeasterly faults.

Widespread quartz veining, silicic, argillic, chloritic and carbonate alteration are evidence of epithermal and mesothermal mineralization on the property. Base and precious metal mineralization in quartz veins appear related to syenite dikes, all of which can be attributed to a common hydrothermal event.

In the area of the airborne survey, particulary in the vicinity of Wuhun Creek several anomalous values in arsenic, copper, gold, lead and silver were found in stream sediments. It would be important to note that a carbonate-altered diorite float discovered in Wuhun Creek and carrying abundant arsenopyrite assayed up to 0.05 oz/ton gold. The arsenopyrite-bearing float was traced to a nearby magnetic diorite

AIRBORNE SURVEY

The results of the airborne survey is appended with this report. The geophysical responses measured were magnetic and electromagnetic. The gold mineralization in diorite in the Wuhun Creek area may be related to coincident magnetic high, VLF-EM, and resistivity low near the intersection of northwesterly and northerly faults in Figure 3 of the Aerodat report.

RECOMMENDATIONS

The immediate area of Wuhun Creek appears prospective. A program of semi-detailed geological mapping, with emphasis on the altered diorite, to be followed by trenching is recommended.

STATEMENT OF COSTS

Airborne Geophysical Survey	$8,400.00

CERTIFICATE

I, Ruben S. Verzosa, of Langley, British Columbia, hereby certify that:

1. I am an independent Consulting Geologist with an office at 23064 - 50th Avenue, Langley, B.C., V3A 7N6.

2. I am a graduate of the University of the Philippines with the degree of Bachelor of Science in Geology (1957)

3. I have been a member of the Association of Professional Engineers of British Columbia since 1970.

4. I have been practising my profession as a geologist for more than 25 years.

5. The work carried out on the Purcell property was under my direct supervision.

6. This report is based upon a study of all available data on the property.

7. I am president and director of Swift Minerals Ltd.

December, 1990
Vancouver, British Columbia

R. S. Verzosa, P.Eng
Consulting Geologist

APPENDIX I

Report on Combined Helicopter-Borne Magnetic, Electromagnetic and VLF-EM Survey of the Cranbrook Property, Kootenay Land District, B.C. by Aerodat Limited

REPORT ON COMBINED HELICOPTER-BORNE MAGNETIC, ELECTROMAGNETIC AND VLF-EM SURVEY OF THE CRANBROOK PROPERTY KOOTENAY LAND DISTRICT, BRITISH COLUMBIA

FOR
SWIFT MINERALS LTD.
BY
AERODAT LIMITED
May 4, 1990

J9022

George Podolsky, P. Eng.
Consulting Geophysicist

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(Scale; 1:20,000)

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   prepared from Department of Energy, Mines and Resources, Surveys Mapping Branch topographic maps (NTS Series #82 F/8, Grassy Mountain Sheet, and #82 F/9, Pyramid Mountain Sheet, Edition 3; Scale 1:50,000), with registration marks referenced to the UTM grid.

2. **FLIGHT LINE MAP;**
   showing all flight lines and fiducials with the base map.

3. **AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP;**
   showing flight lines, fiducials and magnetic trends with the base map.

4. **TOTAL FIELD MAGNETIC CONTOURS;**
   showing magnetic values contoured at 2 nanoTesla intervals, flight lines and fiducials with the base map.

5. **VERTICAL MAGNETIC GRADIENT CONTOURS;**
   showing magnetic gradient values contoured at 0.05 nanoTeslas per meter intervals, flight lines and fiducials with the base map.

6. **APPARENT RESISTIVITY CONTOURS;**
   showing Apparent Resistivity values, calculated for 4,600 Hz data, contoured at 0.1 log(ohm-m) intervals, flight lines and fiducials with the base map.

7. **VLF-EM TOTAL FIELD CONTOURS;**
   showing contoured Total Field VLF values contoured at 1% intervals, flight lines and fiducials with the base map.

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Swift Minerals Ltd. ("Swift") of Toronto, Ontario, by Aerodat Limited under a contract dated March 9, 1990.

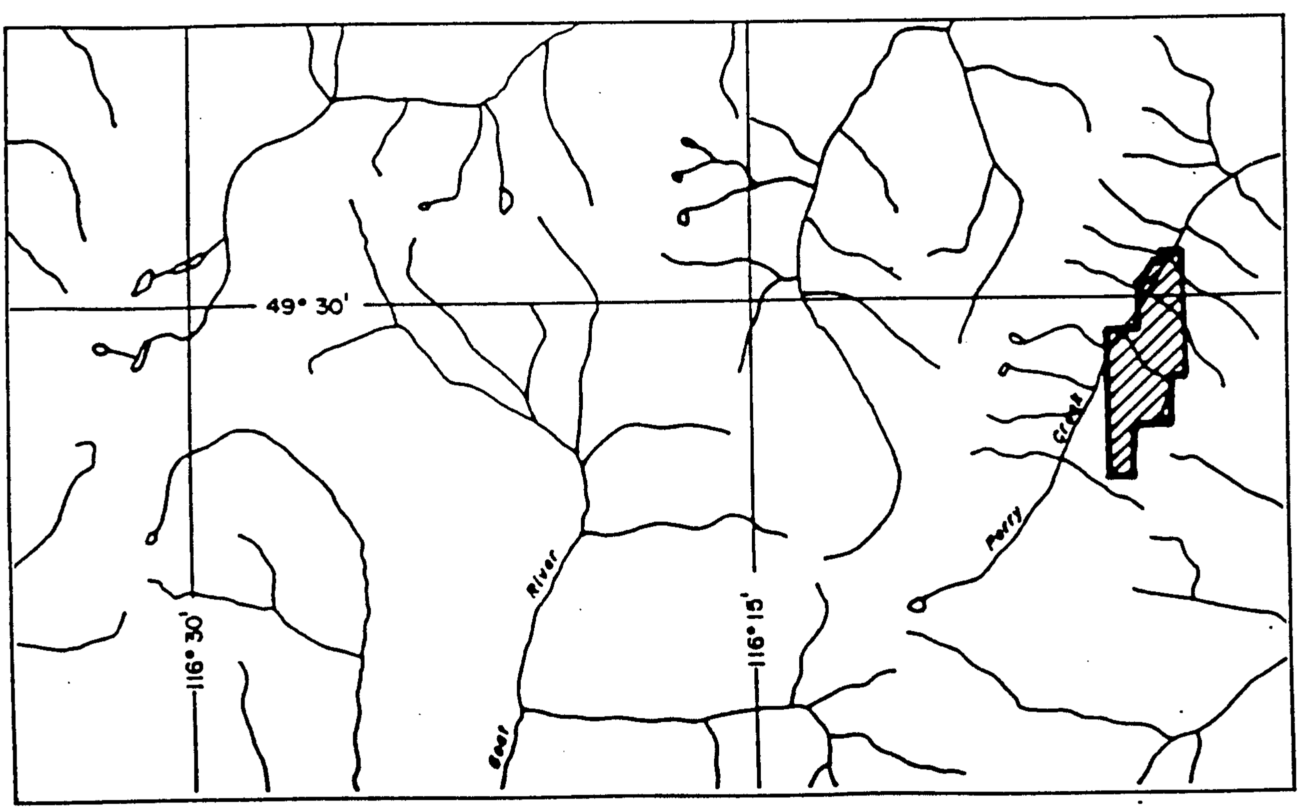
Equipment operated included a four frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a power line monitor, a video tracking camera and an altimeter. Electromagnetic, magnetic, and altimeter data were recorded both in digital and analog form. Positioning data were encoded on the VHS format video tape. Visual checks of position were also recorded on the flight path navigation map by the operator during the flight.

This airborne survey, over part of a block of claims held by Swift and located about 20 kilometres west of Cranbrook, in southeastern British Columbia, was flown on March 18, 1990. One flight was required to complete the survey with flight lines oriented at azimuths of 000-180 degrees and flown at a nominal spacing of 150 metres. Coverage and data quality were generally considered to be within the specifications described in the contract. The purpose of the survey was to record electromagnetic, magnetic and VLF-EM data. Approximately 77 line kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Swift.

2. SURVEY AREA LOCATION

The survey area is depicted on the index map shown below. The area is centred at Latitude 49 degrees 29 minutes north, Longitude 116 degrees 05 minutes west, UTM 100,000 metre grid reference NE668812, Zone 11U (NTS Series #82 F/8, Edition 3, Scale 1:50,000, Grassy Mountain Sheet), and is located about 24 kilometres south-southwest of the town of Kimberly, in the Kootenay Land District of southern British Columbia.

The survey block covers the relatively steep eastern flank of the Perry Creek valley, with maximum relief of about 2,000 feet from the base of the valley at Perry Creek to the southern extremities of the flight area. Access to the area is limited to an unimproved road along Perry Creek that appears to connect with paved roads to the north.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

Aerospatiale A-Star 350B helicopter, (CG-PHQ), owned and operated by Peace Helicopters Limited, was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

3.2 Equipment

3.2.1 Electromagnetic

The electromagnetic system was an Aerodat 4-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4,600 Hz and two horizontal coplanar coil pairs at 4,175 Hz and 32 kHz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 4 frequencies with a time constant of 0.1 seconds. The electromagnetic bird was towed 30 metres below the helicopter.

3.2.2 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measured the total field and quadrature components of two selected transmitters, preferably oriented at right angles to one another. The sensor was towed in a bird 12 metres below the helicopter. The transmitters monitored were NLK, Jim Creek, Washington, broadcasting at 24.8 kHz for the "Line" station and NSS, Annapolis, Maryland broadcasting at 21.4 kHz for the "Ortho" station, depending on availability and suitability of transmission.

3.2.3 Magnetometer

The magnetometer employed was a Scintrex Model VIW-2321 H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument was 0.1 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 12 metres below the helicopter.

3.2.4 Magnetic Base Station

An IFG-2 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.5 Radar Altimeter

A King Air KRA-10 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

3.2.6 Tracking Camera

A Panasonic video camera was used to record flight path on VHS video tape. The camera was operated in continuous mode and the fiducial numbers and time marks for cross reference to the analog and digital data were encoded on the video tape.

3.2.7 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data were recorded:

Channel	Input	Scale
CXI1	935 Hz Coaxial Inphase	2.5 ppm/mm
CXQ1	935 Hz Coaxial Quadrature	2.5 ppm/mm
CXI2	4600 Hz Coaxial Inphase	2.5 ppm/mm
CXQ2	4600 Hz Coaxial Quadrature	2.5 ppm/mm
CPI1	4175 Hz Coplanar Inphase	10 ppm/mm
CPQ1	4175 Hz Coplanar Quadrature	10 ppm/mm
CPI2	32 kHz Coplanar Inphase	20 ppm/mm
CPQ2	32 kHz Coplanar Quadrature	20 ppm/mm
PWRL	Power Line	60 Hz
VLT	VLF-EM Total Field, Line	2.5%/mm
VLQ	VLF-EM Quadrature, Line	2.5%/mm
VOT	VLF-EM Total Field, Ortho	2.5%/mm
VOQ	VLF-EM Quadrature, Ortho	2.5%/mm

RALT	Radar Altimeter	10 ft./mm
MAGF	Magnetometer, fine	2.5 nT/mm
MAGC	Magnetometer, coarse	25 nT/mm

3.2.8 Digital Recorder

A DGR-33 data system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Recording Interval
EM System	0.1 seconds
VLF-EM	0.2 seconds
Magnetometer	0.2 seconds
Altimeter	0.2 seconds

4. DATA PRESENTATION

4.1 Base Map

A topographic base map at a scale of 1:20,000 was prepared from the NTS maps as a screened mylar base.

4.2 Flight Path Map

The flight path map was recovered visually using the colour video tapes recorded during the survey.

The flight path map showing all flight lines, is presented on a Cronaflex copy of the topographic base map, with time and navigator's manual fiducials for cross reference to both the analog and digital data.

4.3 Airborne Electromagnetic Survey Interpretation Map

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major sferic events and the reduce system noise.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further enhanced by the application of a low pass digital filter. It has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 0.25 seconds. This low effective time constant permits maximum profile shape resolution.

Following the filtering process, a base level correction was made. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the interpretation of the electromagnetics. An interpretation map was prepared showing flight lines, fiducials and peak locations of anomalies and conductor axes (where present). The data have been presented on a Cronaflex copy of the topographic base map.

4.4 Total Field Magnetic Contours

The aeromagnetic data were corrected for diurnal variations by adjustment with the recorded base station magnetic values. No correction for regional variation was applied. The corrected profile data were interpolated onto a regular grid at a 25 metre true scale interval using an Akima spline technique. The grid provided the basis for threading the presented contours at a 2 nanoTesla interval.

The contoured aeromagnetic data have been presented on a Cronaflex copy of the topographic base map.

4.5 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was calculated from the gridded total field magnetic data. Contoured at a 0.05 nT/m interval, the gradient data were presented on a Cronaflex copy of the base map.

4.6 Apparent Resistivity Contours

The electromagnetic information was processed to yield a map of the apparent resistivity of the ground.

The approach taken in computing apparent resistivity was to assume a model of a 200 metre thick conductive layer (i.e., effectively a half space) over a resistive bedrock. The computer then generated, from nomograms for this model, the resistivity that would be consistent with the bird elevation and recorded amplitude for the 4600 Hz coaxial frequency pair used. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres true scale interval using an Akima spline technique. The contoured apparent resistivity data were presented on a Cronaflex copy of the base map with the flight path.

4.7 VLF-EM Total Field

The VLF-EM signals from NLK (Jim Creek, Washington), broadcasting at 24.8 kHz, were compiled as contours in map form and presented on a Cronaflex overlay of the base map along with flight lines. The orthogonal VLF data from NSS (Annapolis, Maryland), broadcasting at 21.4 kHz, was not utilized in the compilation as the line direction data set was complete. The orthogonal data remains valid, and may be processed at a later date. The data was recorded on the analog records and on digital tape.

5. INTERPRETATION

5.1 Geology

No geologic or geophysical data, detailed or regional, were supplied to Aerodat by Swift. According to published regional geologic maps, the areas lie within a mixed assemblage of sedimentary and volcanic rocks. The nearest mineral producers appear to have been Cominco's vast Sullivan Mine (lead, zinc, silver) and several small deposits in the immediate area, about 26 km north-northeast of the area. No discussions have been held with representatives of Swift as to the mineralization being sought or the expected targets. The report therefore makes no attempt to speculate on the manner in which the geophysical data might bear on the economic aspects of the area flown or its geology.

5.2 Magnetics

The magnetic data from the high sensitivity cesium magnetometer provide virtually a continuous magnetic reading when recording at two-tenth second intervals. The system is also noise free for all practical purposes.

The sensitivity of 0.1 nanoTeslas (nT) allows for the mapping of very small inflections in the magnetic field, resulting in a contour map that is equal to or exceeds ground data in quality and accuracy. Both the fine and coarse magnetic traces were recorded on the analog charts.

The Total Field magnetic map indicates that two rather deep-seated magnetic highs, at the north and south end of the area, are separated by an east-west to west-northwesterly trending magnetic low. A narrow, somewhat segmented magnetic trend occurs along the north end of this low. This latter trend appears to be fairly close to surface whereas the larger magnetic body to the north is from 150 to 200 metres below the surface, possibly outcropping toward the north end along the steep river valley. The inferred structures shown on the Interpretation map were taken from the Vertical Gradient map.

5.3 Vertical Gradient Magnetics

The gradient data may normally be regarded as a pseudolithologic map as it is believed to provide an excellent rendition of the outline of the underlying magnetic bodies. However, the tendency for gradient trends to be emphasized along directions orthogonal to the flight lines should be borne in mind in analyzing and compiling the gradient data. Nevertheless, a compilation of the magnetic trends from the gradient map onto a geologic map at a suitable scale should prove helpful.

Magnetic trends have been shown on the Interpretation map. These suggest that the large magnetic high toward the north end of the survey area may actually consist of a series of east-west trending bodies. (Conversely, the trends may mark the edges of a larger source.) The faulting inferred from the Vertical Gradient map was generally compatible with the interpretation of the Total Field data.

5.4 Electromagnetics

The electromagnetic data were first checked by a line-to-line examination of the analog profiles. Record quality was generally good with only some system noise present on the 4,600 Hz coaxial trace. Most of this was removed from the plotted traces by an appropriate smoothing filter. Where and if present, anomalies were picked off both the analog records and the plotted profile traces of the multi-frequency responses, using the vertical sheet conductor model as a guide. This helped in weeding out most of the responses due to noise. Surficial responses or those responses from obvious surficial sources, such as lakes or swamps, were not selected. Each conductor or group of conductors was evaluated on the bases of magnetic (and lithologic, where applicable) correlations apparent on the analog and profile data and from the topographic map, man made or surficial features not obvious on the analog charts.

No anomalies of any description were recorded over the area flown, this included bedrock conductors, possible bedrock conductors, surficial conductors, or inverted inphase anomalies due to bedrock magnetization.

5.5 Apparent Resistivity

The Apparent Resistivity map may be regarded as a map of the changes in surficial conductance. The resistivity low in the north central part of the area corresponds to the Perry Creek valley and the cross-cutting Waverley Creek and probably represents a slight build-up of stream sediments along the valley. Offsets in the magnetic patterns in this area may be indicative of structural disturbance but more magnetic coverage of a regional nature is required for a better interpretation of the data.

5.6 VLF-EM Total Field

The predominant east-west VLF trends - that is, in the approximate direction of the VLF transmitter - over the survey area are a characteristic of VLF responses over areas of generally high background resistivities. The hilly terrain also created quite severe topographic effects. For this reason, the writer has not attempted to use any of the VLF data in the interpretation of this airborne survey although it should be noted that there is some support for the inferred west-northwesterly structural trends shown on the Interpretation map.

5.7 Discussion & Recommendations

The gradient map may be regarded as a pseudo-lithologic map and should be compiled with available geology. Gross stratigraphic outlines may be determined from the Total Field map.

On the basis of the results of this survey, no recommendations for further geophysical work over this area can be made although if warranted by geology, Induced Polarization profiles could be run over areas where geologic conditions warrant. Ground VLF is not recommended due to topography. Ground magnetic coverage is not considered to be necessary as the airborne data is of sufficient quality and accuracy although this magnetic data should be integrated with the regional data or with additional airborne magnetic coverage.

LICENSED PROFESSIONAL ENGINEER
G. PODOLSKY
PROVINCE OF ONTARIO

Respectfully submitted,

George Podolsky, P. Eng.
Consulting Geophysicist
for
AERODAT LIMITED
May 4, 1990

J9022

APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat four frequency system utilizes two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at two widely separated frequencies and the horizontal coplanar coil pair is operated at a frequency approximately aligned with one of the coaxial frequencies.

The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical" property of the response is largely a function of the conductor's shape and orientation with respect to the measuring transmitter and receiver.

Electrical Considerations

For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for a non-magnetic vertical half-plane model on the accompanying phasor diagram. Other physical models will show the same trend but different quantitative relationships.

The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth at selected anomalies. The results of this calculation are presented in table form in Appendix II and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, may be strongly magnetic, its conductivity and thickness may vary with depth and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

Most overburden will have an indicated conductance of less than 2 mhos; however, more conductive clays may have an apparent conductance of say 2 to 4 mhos. Also in the low conductance range will be electrolytic conductors in faults and shears.

The higher ranges of conductance, greater than 4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to sulphide or graphite bearing rocks.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors; sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant consideration in association with minor conductive sulphides, and the electromagnetic response only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly, but minor accessory sulphide mineralization could provide a useful indirect indication.

In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization; however, a moderate to low conductance value does not rule out the possibility of significant economic mineralization.

Geometrical Considerations

Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes. As the dip of the conductor decreased from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.

As the thickness of the conductor increases, induced current flow across the thickness of the conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible. As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1*.

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8* times greater than that of the coaxial pair.

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor; a pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8*.

Overburden anomalies often produce broad poorly defined anomaly profiles. In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ration of 4*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.

* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground to depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical cross-over shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.

APPENDIX II

PERSONNEL

FIELD

Flown	March, 1990
Pilot	C. Armstrong
Operator	S. Arstad

OFFICE

Processing	M. Chong-Foo G. MacDonald
Report	G. Podolsky

APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, GEORGE PODOLSKY, certify that:

1. I am registered as a Professional Engineer in the Province of Ontario and work as a Professional Geophysicist.

2. I reside at 172 Dunwoody Drive in the town of Oakville, Halton County, Ontario.

3. I hold a B. Sc. in Engineering Physics from Queen's University, having graduated in 1954.

4. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past thirty-five years.

5. I have been an active member of the Society of Exploration Geophysicists since 1960 and hold memberships on other professional societies involved in the minerals extraction and exploration industry.

6. The accompanying report was prepared from published or publicly available information and material supplied by Swift Minerals Ltd. and Aerodat Limited in the form of government reports and proprietary airborne exploration data. I have not personally visited the specific property.

7. I have no interest, direct or indirect, in the property described nor in Swift Minerals Ltd.

8. I hereby consent to the use of this report in a Statement of Material Facts of the Company and for the preparation of a prospectus for submission to the Ontario Securities Commission and/or other regulatory authorities.

LICENSED PROFESSIONAL ENGINEER
G. PODOLSKY
PROVINCE OF ONTARIO

Signed,

George Podolsky, P. Eng.
GEOPOD Associates Inc.

J9022
Oakville, Ontario
May 4, 1990

APPENDIX II

CLAIM TENURE

CLAIM STATUS

TABLE 1

MORGAN GROUP

SOUTH BLOCK

CLAIM NAME	REC. #	RECORDED DATE	EXPIRY DATE	# UNITS
LDM 1	751	SEPT. 5/79	SEPT. 5/90	4
LDM 2	962	JULY 4/80	JULY 4/90	4
LDM 4	1769	APRIL 26/83	APRIL 26/90	4
LDM 5	1940	SEPT. 20/83	SEPT. 20/90	8
LDM 6	1954	SEPT. 30/83	SEPT. 30/90	8
LDM 7	2624	MAY 28/86	MAY 28/90	4
LDM 8	2874	APRIL 21/87	APRIL 21/90	2
LDM 9	2590	MARCH 14/86	MARCH 14/90	12
LDM 10	2591	MARCH 14/86	MARCH 14/90	8
LDM 11	2592	MARCH 14/86	MARCH 14/90	6
LDM 12	2609	APRIL 21/86	APRIL 21/90	3
			TOTAL UNITS	**63**

CENTRAL BLOCK

RACKI 5	2326	NOV. 26/84	NOV. 26/90	10
RACKI 6	2380	APRIL 22/85	APRIL 22/90	9
RACKI 8	2450	AUG. 30/85	AUG. 30/90	9
RACKI 9	2451	AUG. 30/85	AUG. 30/90	3
RACKI 12	2593	MARCH 14/86	MARCH 14/90	2
RACKI 16	2648	JULY 2/86	JULY 2/90	1
RACKI 17	2649	JULY 2/86	JULY 2/90	1
RACKI 7	3017	NOV. 9/87	NOV. 9/90	20
RACKI 14	2610	APRIL 25/86	APRIL 25/90	12
RACKI 15	2611	APRIL 25/86	APRIL 25/90	6
RACKI 18	2873	APRIL 21/87	ARPIL 25/90	8
			TOTAL UNITS	**81**

NORTH BLOCK

RACKI 2	3015	OCT. 5/87	OCT. 5/90	3
RACKI 3	3016	OCT. 5/87	OCT. 5/90	2
RACKI 4	2307	OCT. 22/84	OCT. 22/90	10
RACKI 10	2557	JAN. 14/86	JAN. 14/90	12
RACKI 11	2558	JAN. 14/86	JAN. 14/90	1
			TOTAL UNITS	**28**

BAR I GROUP

CLAIM NAME	REC. #	RECORDED DATE	EXPIRY DATE	# UNITS
PALM	1862	JULY 4/83	JULY 4/90	6
CRYSTAL	2271	SEPT. 24/84	SEPT. 24/90	20
LUCKY BAR 1	3002	OCT. 8/87	OCT. 8/90	4
LUCKY BAR 2	3003	OCT 8/87	OCT. 8/90	18
STEEL 1	3092	MAY 16/88	MAY 16/89	18
			TOTAL UNITS	66

LODE GROUP

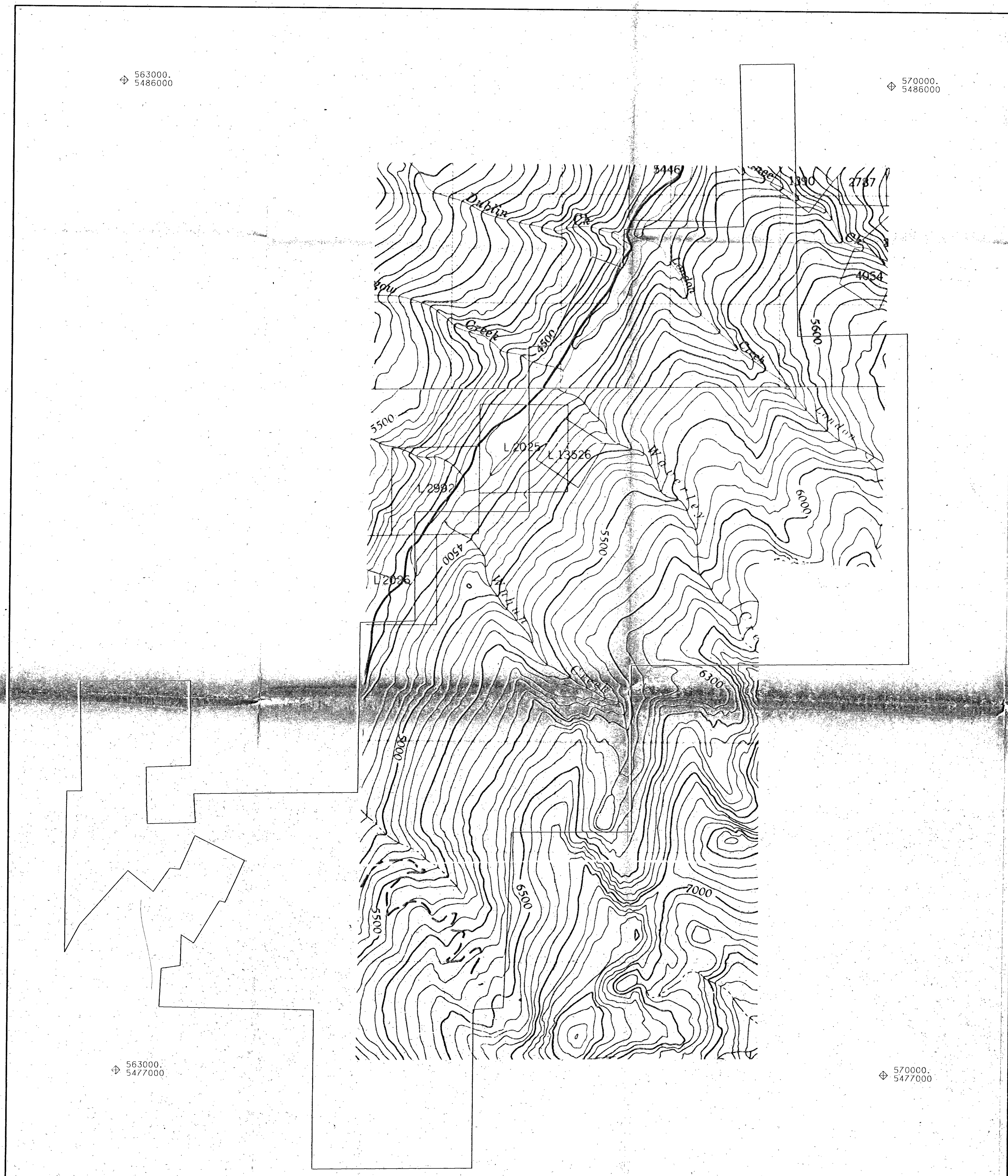
BAR	1896	AUG. 12/83	AUG. 12/90	16
BAR LODE	1925	SEPT. 8/83	SEPT. 8/90	4
BAR LODE 2	1926	SEPT. 8/83	SEPT. 8/90	1
BAR LODE 3	1927	SEPT. 8/83	SEPT. 8/90	1
LUCKY BAR 3	3004	OCT. 8/87	OCT. 8/90	20
STEEL 2	3093	MAY 16/88	MAY 16/89	18
			TOTAL UNITS	60

BUCK GROUP II

BUCK 6	2928	JUNE 15/87	JUNE 15/90	20
BUCK 8	2929	JUNE 15/87	JUNE 15/90	3
BUCK 9	2930	JUNE 15/89	JUNE 15/90	15
BUCK 10	2931	JUNE 15/87	JUNE 15/90	8
BUCK 11	2926	JUNE 15/87	JUNE 15/90	8
BUCK 13	2927	JUNE 15/87	JUNE 15/90	8
			TOTAL UNITS	62

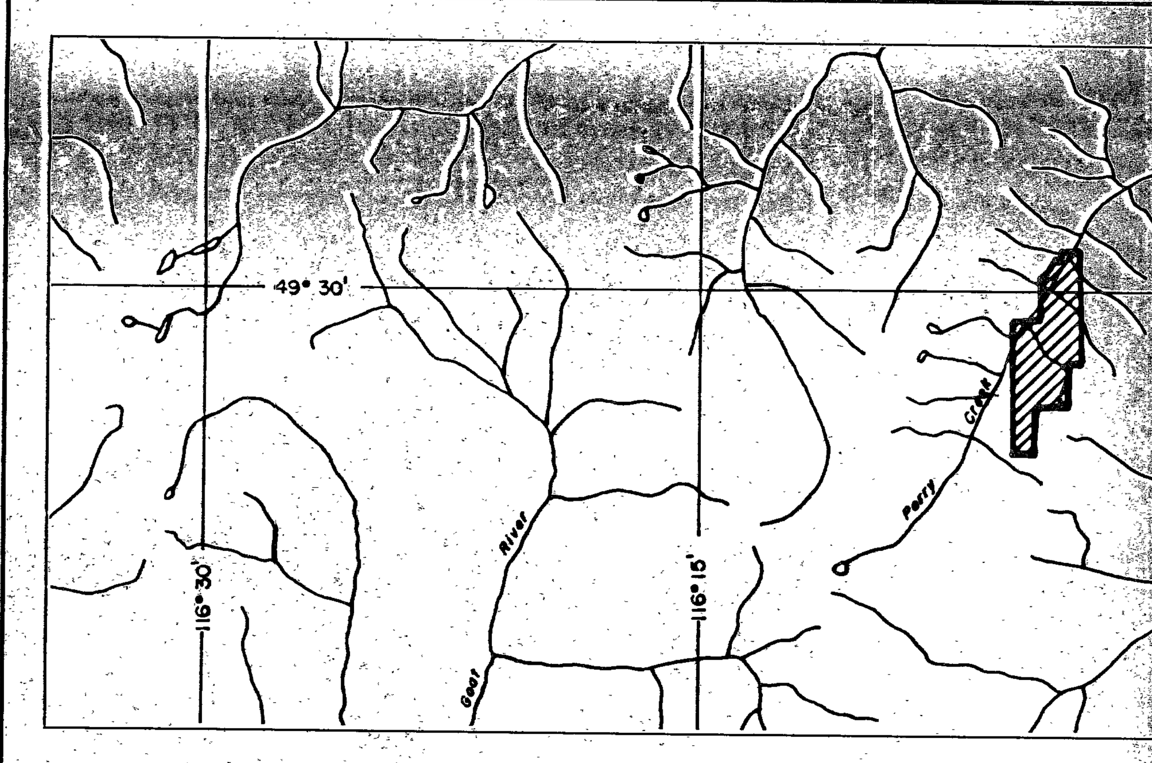
BUCK GROUP I

BUCK 1	2809	FEB. 25/87	FEB. 25/90	8
BUCK 2	2810	FEB. 25/87	FEB. 25/90	15
BUCK 3	2811	FEB. 25/87	FEB. 25/90	14
BUCK 4	2832	MARCH 17/87	MARCH 17/90	14
BUCK 5	2833	MARCH 17/87	MARCH 17/90	18
BUCK 12	2812	FEB. 25/87	FEB. 25/90	6
BUCK 14	2860	MARCH 30/87	MARCH 30/90	15
			TOTAL UNITS	90



GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169



SWIFT MINERALS LTD

BASE MAP

CRANBROOK

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet

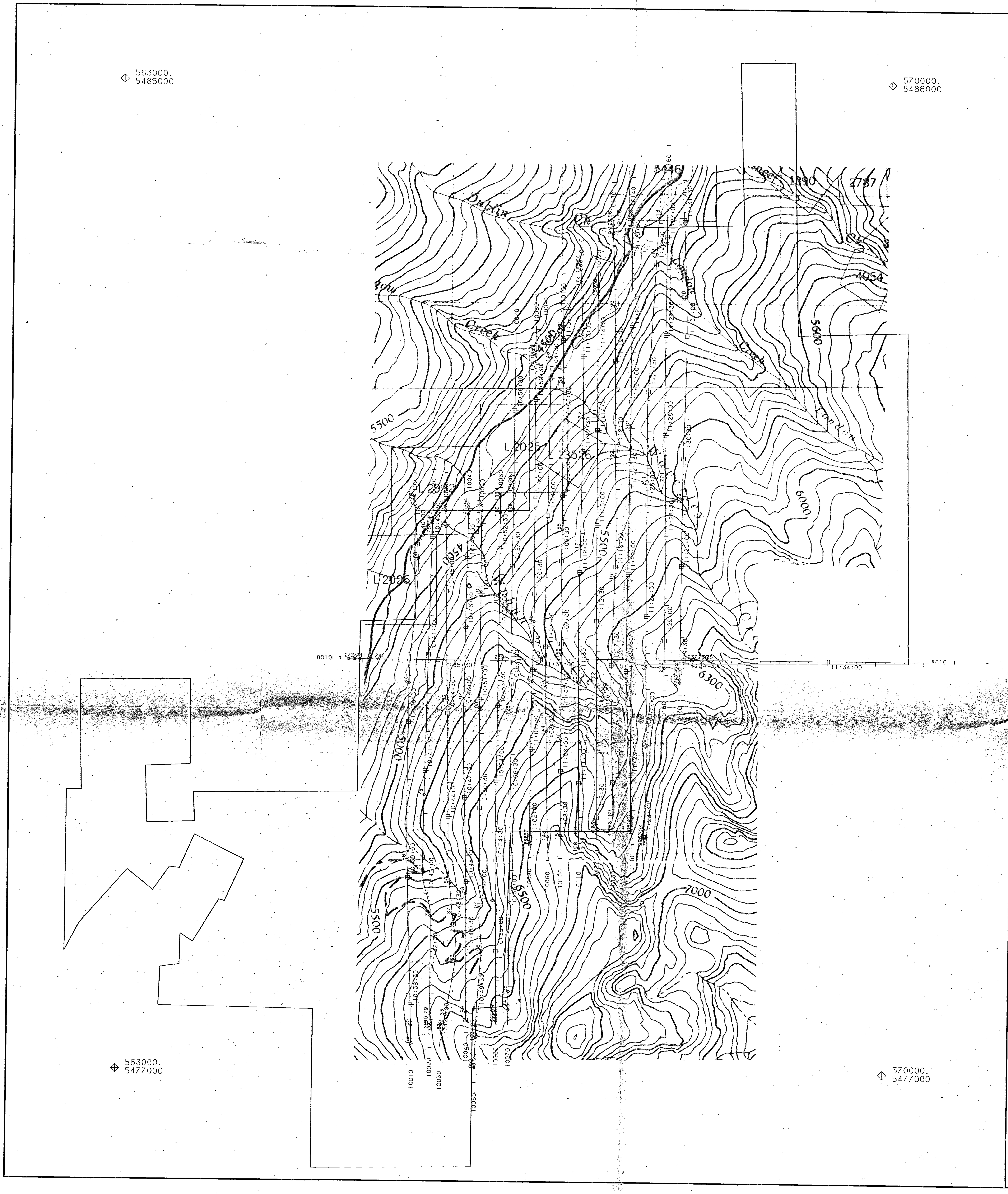
0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE: MAR 1990

NTS No: 82 F/8

MAP No: 1 J9022



Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 150m

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169

SWIFT MINERALS LTD

FLIGHT PATH

CRANBROOK

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet

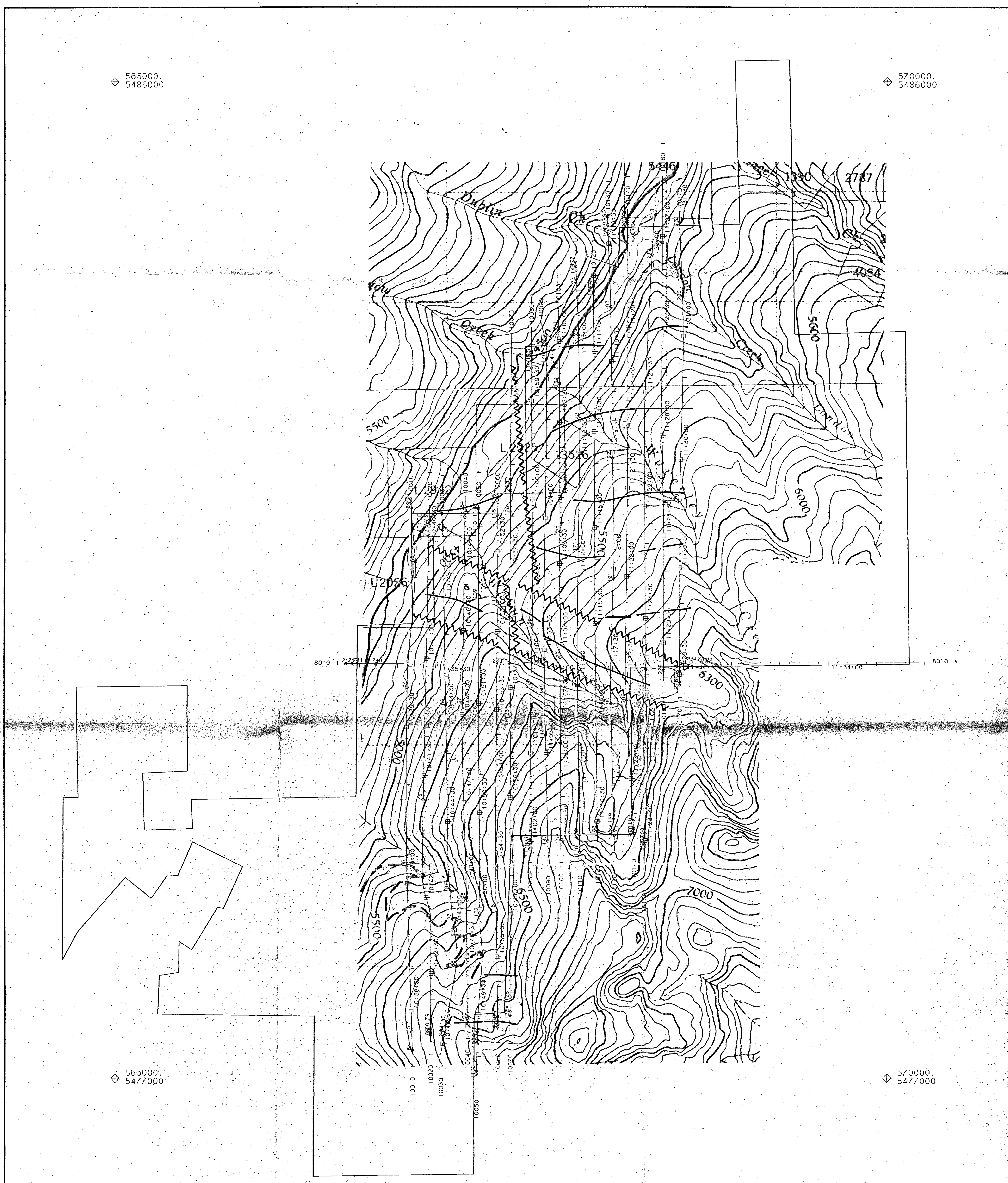
0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE: MAR 1990

NTS No: 82 F/8

MAP No: 2 J9022



N

Flight Path

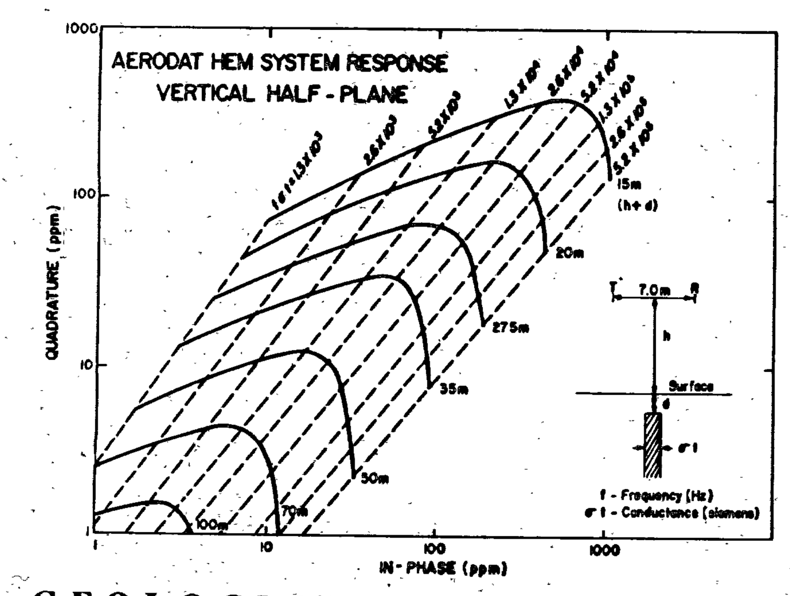
Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 150m

INTERPRETATION LEGEND

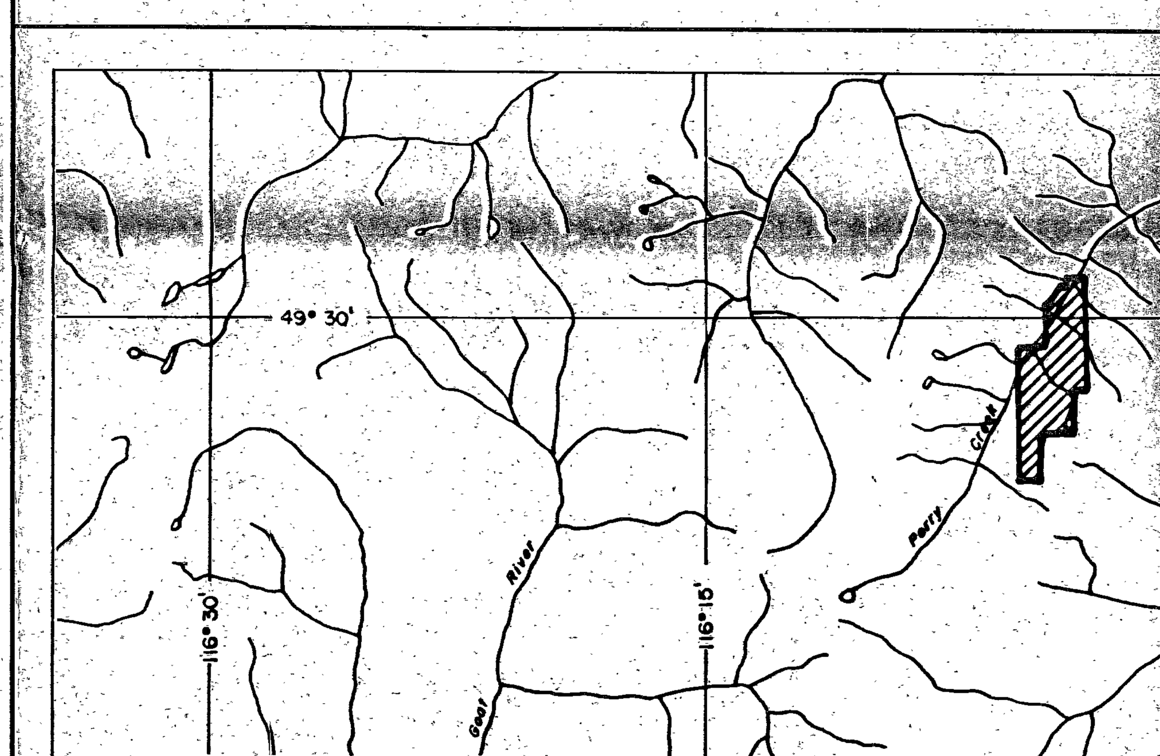
Faults - Inferred from Magnetic

Magnetic Trend



GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169



SWIFT MINERALS LTD

INTERPRETATION

CRANBROOK

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet

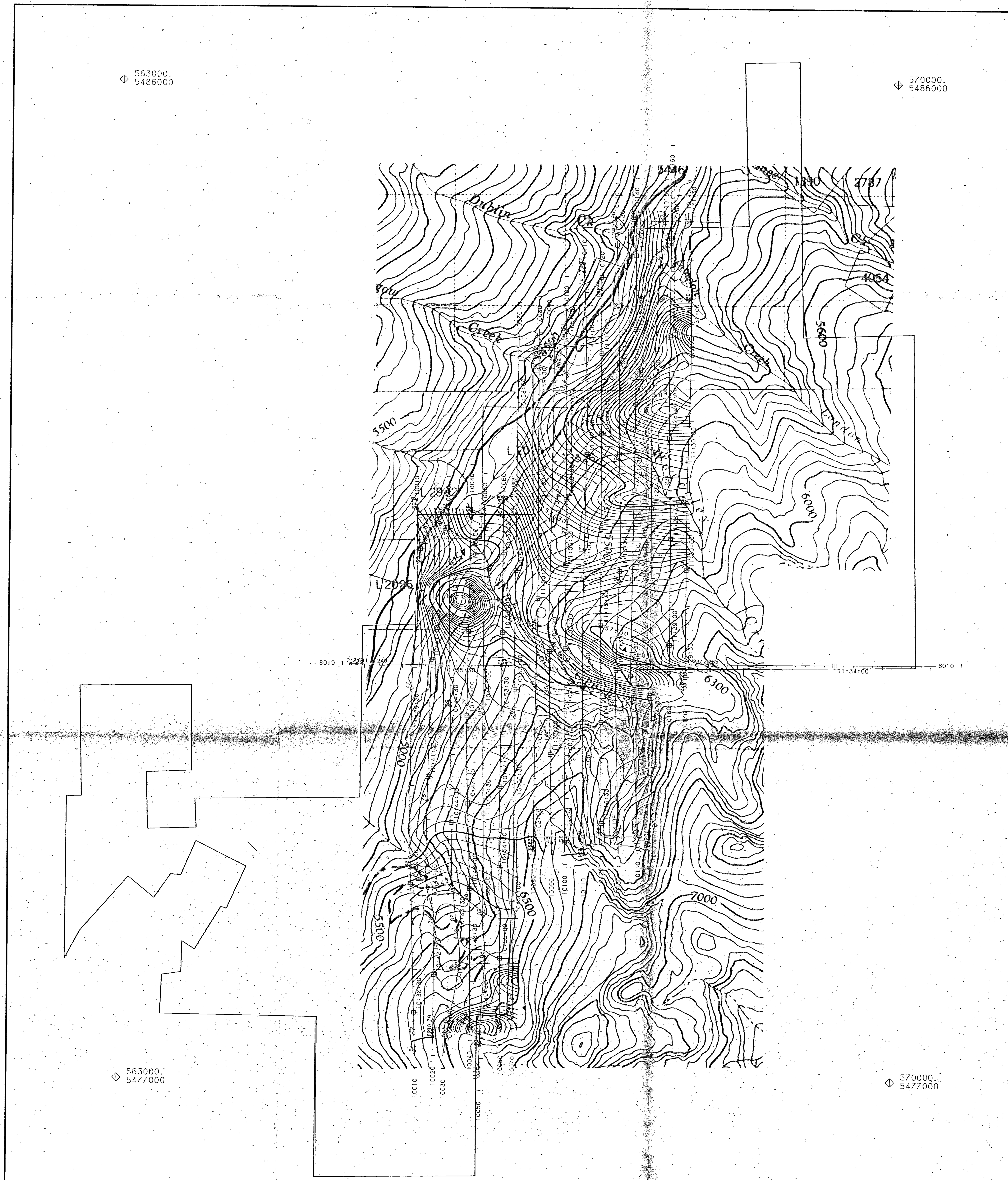
0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE: MAR 1990

NTS No: 82 F/8

MAP No: 3 J9022



N

Flight Path

Flight path recovery from VHS video tape.
Average terrain clearance 60m
Average line spacing 150m

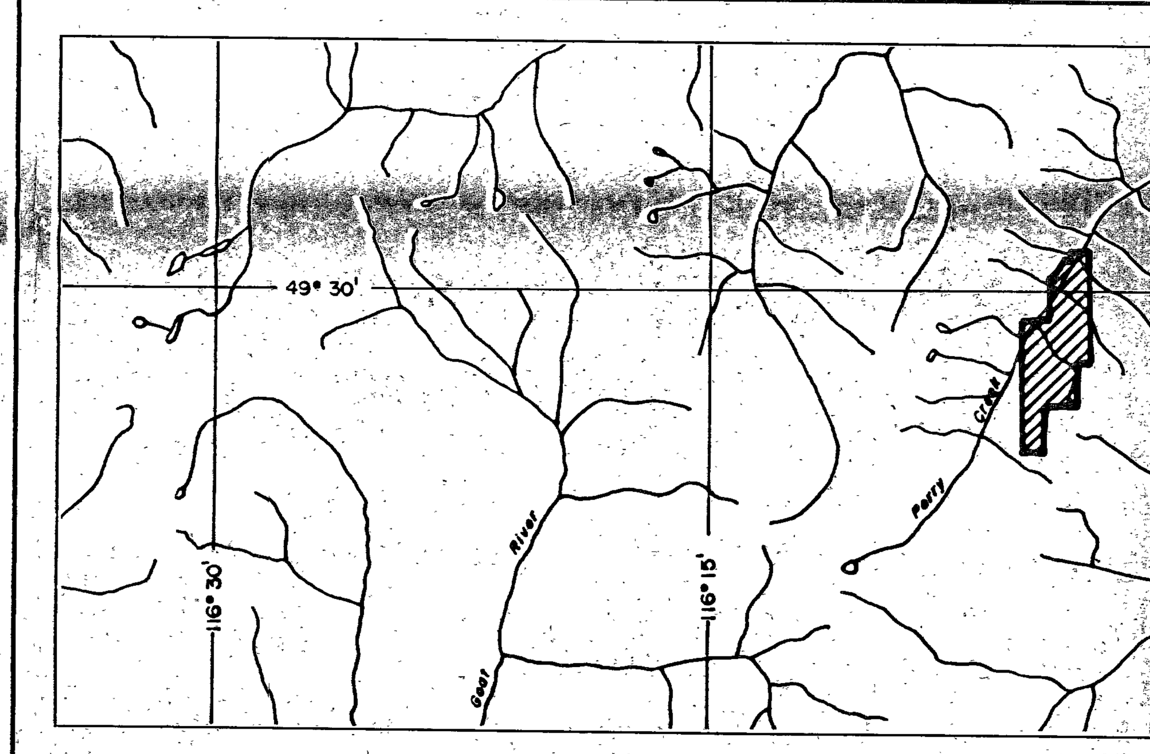
Magnetics

Total Field Magnetic Intensity Contours in nT.
Cesium high sensitivity magnetometer.
Sensor elevation 45m

Map contours are multiples of those listed below
- 2 nT
- 10 nT
- 50 nT
- 250 nT
- 1000 nT

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169



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TOTAL FIELD MAGNETIC CONTOURS

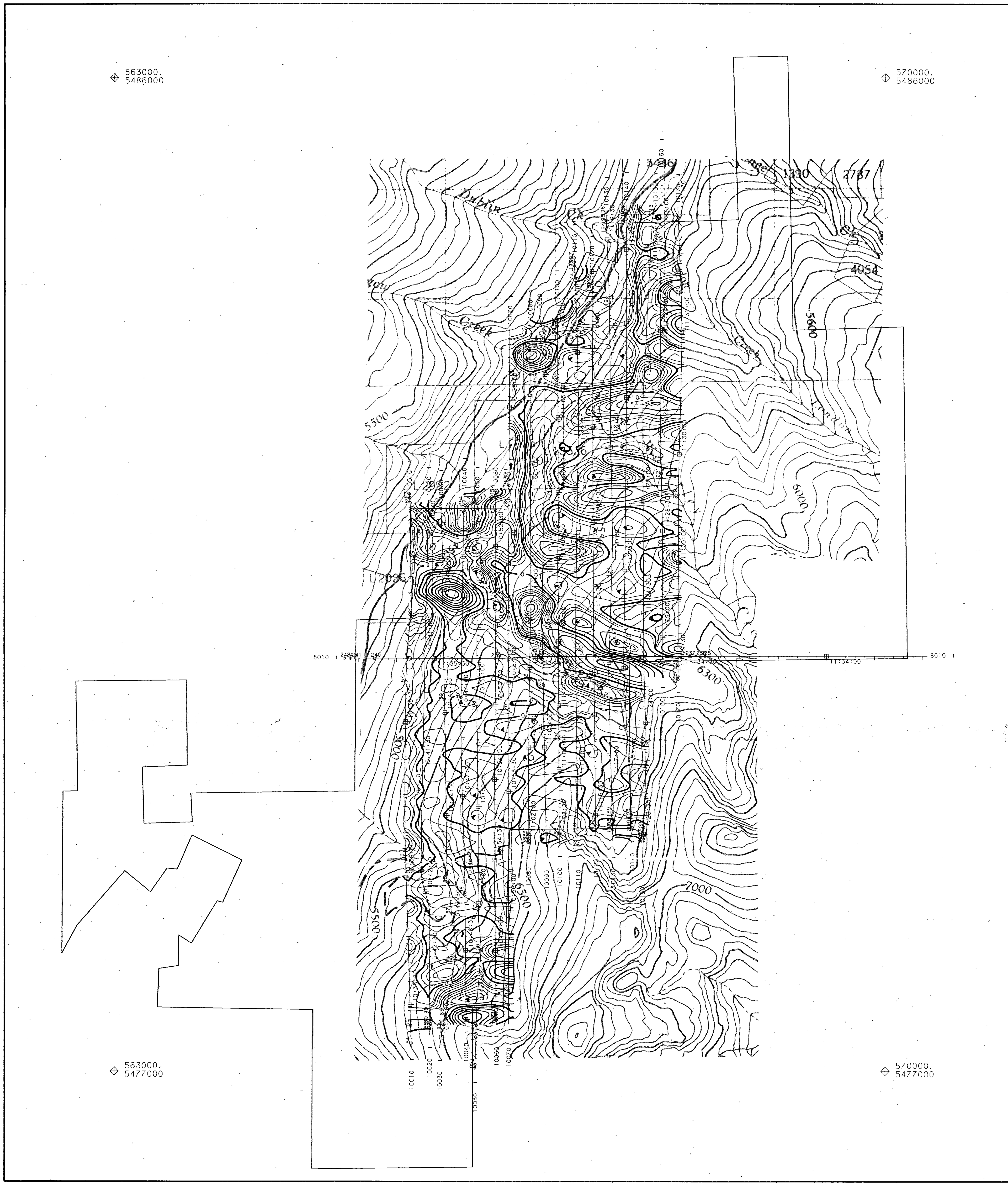
CRANBROOK
BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet
0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE: MAR 1990
NTS No: 82 F/8
MAP No: 4 J9022



N

Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 150m

Vertical Gradient

Vertical Magnetic Gradient calculated from the total field magnetic intensity in nT/m.

Cesium high sensitivity magnetometer.

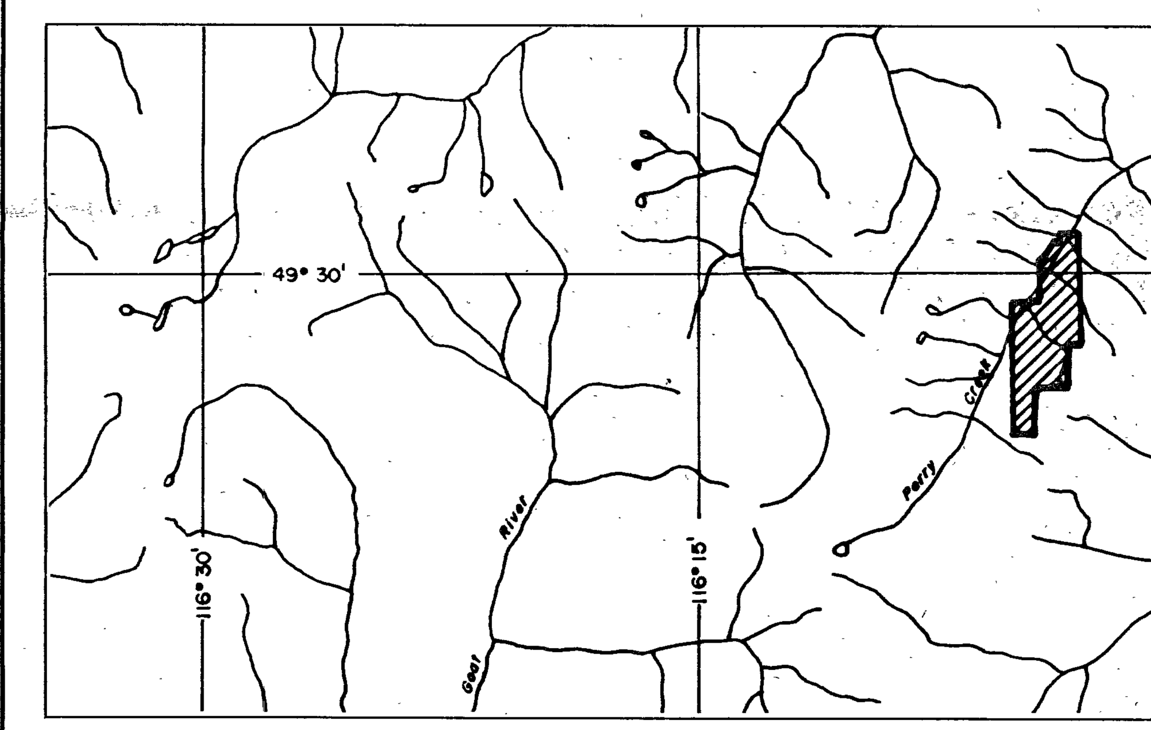
Sensor elevation 45m

Map contours are multiples of those listed below

- 0.05 nT/m
- 0.25 nT/m
- 1.00 nT/m
- 5.00 nT/m
- 25.00 nT/m

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169



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CALCULATED VERTICAL MAGNETIC GRADIENT

CRANBROOK

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet

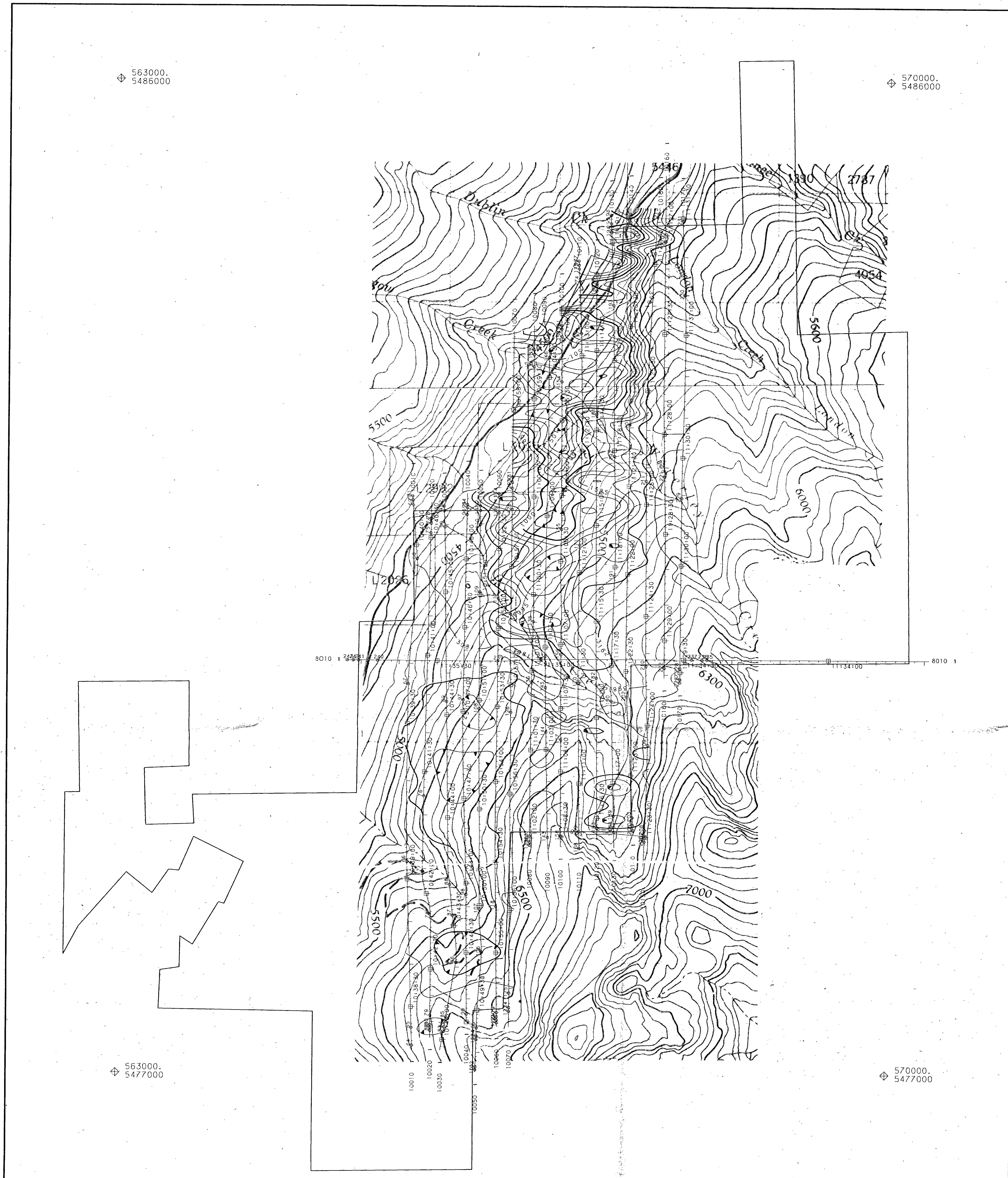
0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE: MAR 1990

NTS No: 82 F/8

MAP No: 5 J9022



N

Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 150m

Apparent Resistivity

Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.

Contouring in ohm*m at logarithmic intervals.

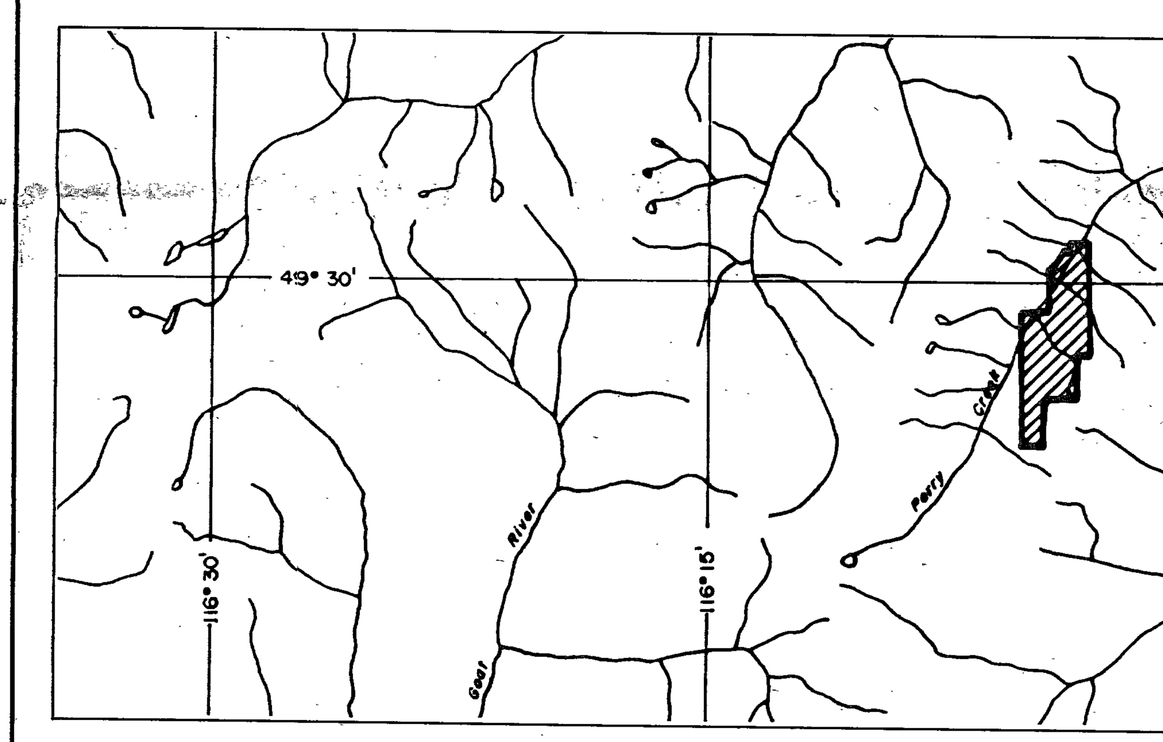
Sensor elevation 30m

Map contours are multiples of those listed below

thin line	0.10 log(ohm-m)
medium line	0.50 log(ohm-m)
thick line	1.00 log(ohm-m)

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169.



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APPARENT RESISTIVITY CONTOURS

CRANBROOK

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet

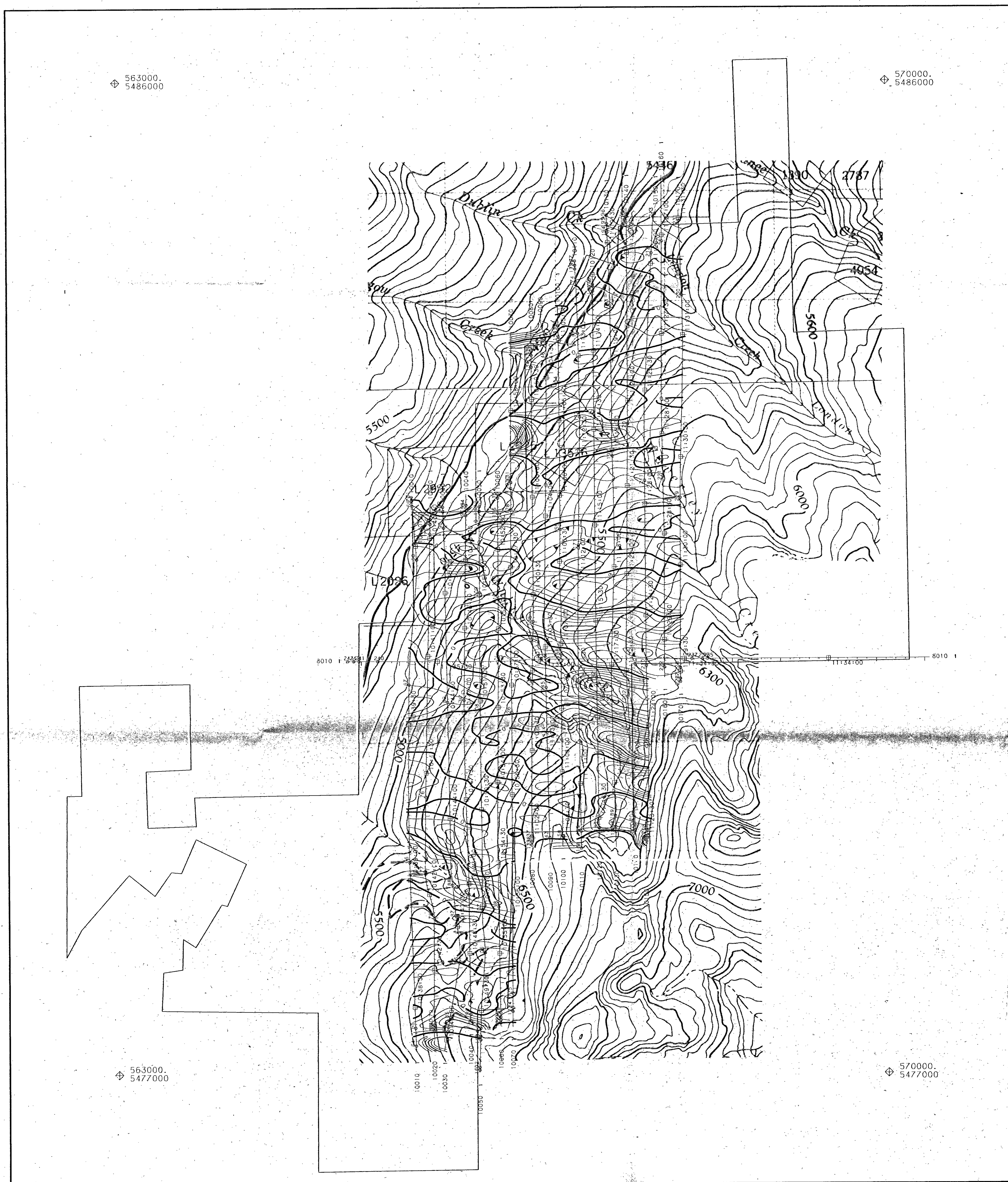
0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE: MAR 1990

NTS No: 82 F/8

MAP No: 6 J9022



N

Flight Path

Flight path recovery from VHS video tape.
Average terrain clearance 60m
Average line spacing 150m

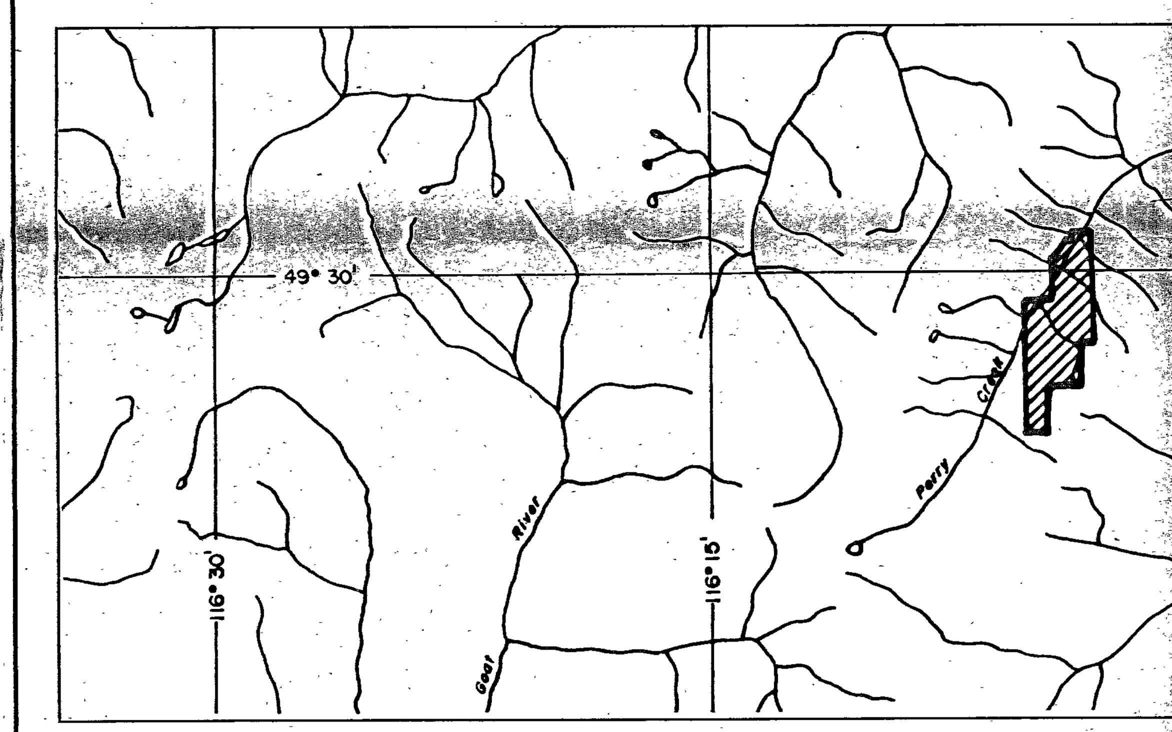
VLF-EM

VLF-EM Total Field Intensity in percent.
Station: NLK
Jim Creek, Washington
24.8 kHz
Sensor elevation 45m

Map contours are multiples of those listed below
1.00 %
5.00 %
25.0 %
100.0 %

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,169



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VLF-EM TOTAL FIELD CONTOURS

CRANBROOK

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 5280 Feet

0 200 400 1000 2000 Metres

AERODAT LIMITED

DATE:	MAR 1990
NTS No:	82 F/8
MAP No:	7 J9022