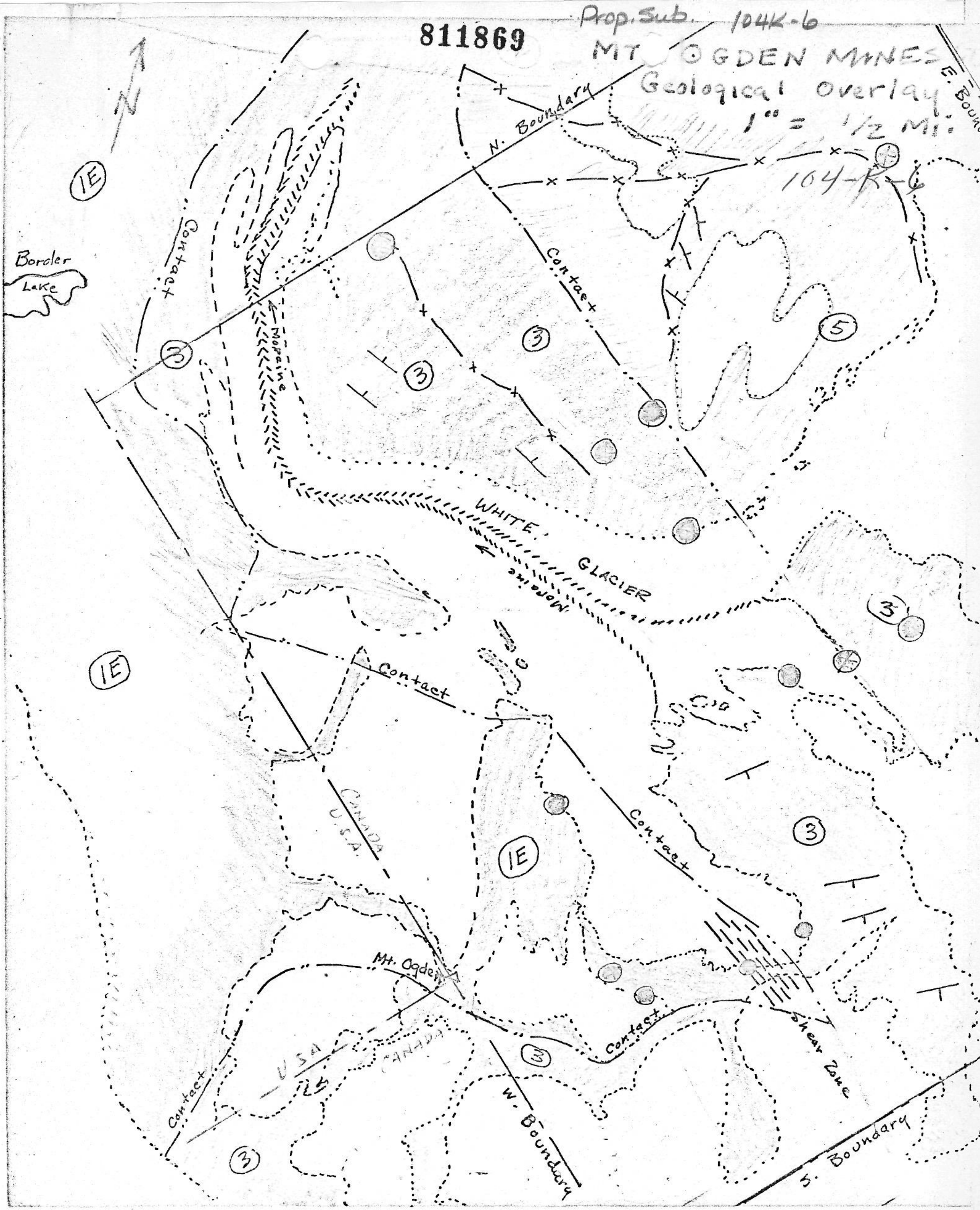
811869
Prop. Sub. 104K-6
MT. OGDEN MINES
Geological Overlay
1" = 1/2 Mi.
104-K-6
N
1E
Border Lake
Contact
N. Boundary
E. Boundary
Moraine
3
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WHITE GLACIER
Contact
CANADA
U.S.A.
Mt. Ogden
Shear Zone
W. Boundary
S. Boundary
USA
CANADA

GEOPHYSICAL REPORT
MAGNETIC AND ELECTROMAGNETIC METHODS
PAT GROUP, ATLIN, M.D.

May 19, 1967
C. B. Selmser, P. Eng.

INTRODUCTION:

These surveys were made over an area of more than 156 claims in the Atlin Mining Division, 13 miles southeast of Tulsequah, B.C. The area encompasses a rectangle whose sides are 3.2 by 3.8 miles and is situated at the international boundary between Alaska and British Columbia.

Access to the area consists of a gravel road from the Trans-Canada Highway at Whitehorse to Atlin, B. C. From there transportation must be made with an aircraft to an emergency flying field near Tulsequah.

Living accommodation was provided for the survey party at the Polaris Taku Mine under the caretakership of Mr. E. Feldman. The helicopter used for the survey was also based at the mine with enough fuel for the survey dumped at the airstrip.

The route flown from the mine to the property followed the Taku River valley to the Sittakanay River valley. The aircraft then turned east and flew between Sittakanay Mountain on the north and Wright Peaks on the south. At the parting of Sittakanay Glacier a turn was made to the south and the property was reached at the head of the glacier.

WORK SUMMARY:

The work commenced on the 7th of May in the morning and a 2 hour flight was made on the property. The next flight was made in the afternoon for another 2 hour period. On the morning of the 8th of May another 2 hour flight was made and the airborne magnetometer survey was finished. At midday another 2½ hour flight was made at which time the airborne magnetometer survey was made. The crew was at the mine on the 6th of May but only one short reconnaissance survey could be made before the weather deteriorated.

Three days, May 3, 4 and 5 were spent moving personnel and supplies into the area. May 9th was used to ship equipment and personnel back to Vancouver, which is the base of operations of the survey company.

CONDITIONS OF THE SURVEY:

During the first part of the survey, when the magnetic survey was made, high winds were encountered over the survey area. This made flying conditions for a flight elevation of 100 feet above the terrain very difficult. On the last lap of the survey the weather was very clear and wind conditions were very favourable.

The elevation at the fork of the Taku and Sittakanay Rivers is about 250 feet above mean sea level, while the elevation of Mount Ogden is about 7,500 feet. Elevations throughout the area are exceedingly steep, which made it obligatory to use a helicopter as the transport medium.

INSTRUMENTATION:

The magnetometer used was a type 592 ELSEC Proton Magnetometer manufactured by the Littlemore Scientific Engineering Company, Railway Lane, Littlemore, Oxford, England. This instrument has a range of 24,000 to 78,000 gamma and a sensitivity of ± 0.5 gamma. This, being a proton type instrument, misorientation errors are at a minimum, which is obligatory when flying an airborne survey in mountainous country. This instrument reads out the total magnetic intensity of the earth's field, which in the area flown was approximately 54,000 gamma.

The electromagnetic instrumentation consisted of a receiver, earphones and search coil manufactured by E. J. Sharpe Instruments of Canada, Limited. The gaussed rotor of the aircraft furnished the transmission field for producing an audio electromagnetic signal. This technique is amply described in the reference attached to this report by the author.

GENERAL GEOLOGY:

The youngest sedimentary rocks in the area are the Stuhini group of Upper Triassic age. These consist of various sedimentary types containing volcanic andesites. The top 500 feet of this group contains Tuff, greywacke, argillite, sandstone, and conglomerate. The lower part, which is credited with a thickness of 2,000 to 4,500 feet, dominantly consists of greywacke, tuff, volcanic breccia, and andesite flow rocks. These beds are prominently displayed in the northeast corner of the area.

The Stuhini group is underlain by Permian limestone beds, which have chert inclusions and have been silicified in places by alteration products.

The contact between the above groups is an unconformity. At least 5000 feet of the King Salmon group appears to be missing.

The main intrusive rock in this area is a quartz monzonite of late lower Cretaceous or early Upper Cretaceous age. This has formed into good sized batholithic bodies with numerous satellitic apophysis. This intrusive has welled up from deep levels stoping into the sediments leaving pendants of sedimentary rock suspended in the former melt. These features are very typical in the development of mineralized emplacements of sulphides.

In the moraine material in the valley, just north of the area, there is found Molybdenum sulphide, lead and zinc sulphides and calcopyrite associated with quartz carbonate veins. The mineral sequence given by Dr. F. A. Kerr (1) is that pyrite was the first mineral deposited in massive shoots and disseminated grains. This was accompanied by fluorite and calcite with quartz and albite. There followed a sequence of mineralization, which included chalcopyrite, galena and zinc blende. This often replaced the pyrite and some of the gangue minerals.

Some acidic dykes were seen to cut the sedimentary rocks. Their main constituent minerals are quartz and albite. The mineralization sometimes cuts these structures forming chalcopyrite and galena deposits.

A large regional fault seems to cross the area in an east and west direction. Since most of its length is covered with ice, it will be hard to trace in the area.

Mr. G. A. Noel (2) concludes that gold deposits that will be found in this district will be associated with the volcanic sedimentary belts of the Mesozoic era. Copper deposits, however, will be found in the Paleozoic rocks along bedding plane shears and in the proximity of intrusives of Mesozoic age.

There are no iron deposits present in this area. The low magnetic intensity changes verify this conclusion.

GEOPHYSICAL INTERPRETATION:

The magnetic changes denote for the most part the amount of magnetite contained in the various rocks as accessory minerals. When a second derivitive calculation is made of the ambient total magnetic readings a rough determination of the rock types found in the survey area can be made. The laboratory determinations (3) for the rocks of this area are as follows:

	(K) Susceptibility
Granite	c.g.s. units per 9.5×10^{-3} Cm.^{3}
Andesite	1.6×10^{-3} " "
Sediments	10^{-4} to 10^{-3}

It is readily seen that the sediments are non-magnetic; that the volcanics are moderately magnetic and that the acid intrusives are part way between. These properties along with the mathematical analysis are the basic means of differentiating the types of rocks. Zero contours will denote possible contacts. Plus values indicate volcanic rocks and minus values of 0 to -100 gamma denote granite intrusives. Minus values of -100 to -200 gammas denote sedimentary rocks.

It must be remembered when using an interpretation of this sort that often the sedimentary rocks may be greatly altered and granitized by the enveloping intrusive rock. This most likely is the case in this area where pendants of sedimentary rocks are immersed in the plutonic melt.

With regard to the electromagnetic survey, the tonal effect and change noted on the tape when played back in the oscilloscope shows that certain areas are more conductive than others. The out-of-phase condition of the route survey is about 30 electrical degrees, while the out-of-phase relationship for the conductive areas is nearly zero electrical degrees. At many of the locations shearing and gossan effects were noted. This could mean the presence of sulphide mineralization. Other alternatives could be wet bolder clay or graphite. Only follow up ground work will prove or disprove the locations.

<u>MAGNETIC AND ELECTROMAGNETIC SURVEY MAP</u>:

The dash and arrow lines are the paths followed in the magnetic surveys. The electromagnetic path only includes the outcrop areas and has twice the density of control. The magnetic control has been used to denote possible boundaries for the intrusives (1), the sediments (3), and the volcanics (5). All readings have been read within 100 feet of the surface.

The magnetometer was also run to and from the area to establish the magnetic datum and to give representative values over known rock types in the immediate area.

The intrusive in the northwest corner of the map area is a continuation of a large batholithic intrusive covering most of the

Wright Peaks area. The Volcanics in the northeast corner of the map area includes a large area covering Sittakanay Mountain. The contact with the limestone sediment is easily visible on the aerial photographs. A satellitic body of quartz monzonite is found in the southwest part of the map area and a large mass of limestone is pendant into the intrusive. The 3 electromagnetic anomaly locations shown in this satellitic intrusive may be deposits of molybdenum sulphide. The anomalies in the large sedimentary deposit of limestone are most probably replacement deposits of lead and zinc. The anomalies found in the volcanics are more apt to be vein deposits of quartz containing copper sulphides.

TOTAL MAGNETIC VARIATION MAP:

The ambient input values on this map have been calculated by drawing profiles across the sedimentary axis and using the values from the magnetic tapes. This distributes the control evenly over the area. This may also be performed by the IBM calculator to give a least squares fit for the data. The eighth mile corners are used for input data to the IBM calculator to give a second derivitive map for the area. Negative high values are colored blue and the positive high values are coloured red.

SECOND DERIVATIVE MAP:

The second derivative map has been calculated on the IBM system using the appropriate formula. All of the zero values on the Total Magnetic Variation Map have been carried forward and only values dealing with the sedimentary and volcanic separations are figured and entered on the map.

The configuration of the separations between the facies is representative of a deeper medium than that illustrated in Fig. 2. The latter gives the actual photo interpretation of the outcrops. The configuration of the present map gives structural representations which are independent of surface conformation.

The fault zone depicted in Fig. 2 is confirmed on this map and in addition some folding axes are developed in the north and south regions of the map. The intrusive appears to have entered the area from the east and west sides and to have intruded a satellitic mass in the southern sector. The largest sedimentary area is pendant near the centre of the area. The volcanics are infolded in the north and south portions being errosional reminents situated in synclinal folds.

CONCLUSION:

The (M) electromagnetic anomalies are thought to be representative of areas which might produce deposits of molybdenite. The (LZ) anomalies may be replacement zones in the limestone of zinc and lead minerals. The (Cu) anomalies are probably contact zones in mineralized quartz carbonate veins with copper minerals.

The fault zone probably dips steeply toward the north and the sedimentary contacts dip either northeast or southeast with shallow gradients. The shear zone seems to be nearly vertical.

RECOMMENDATIONS:

(1) That drilling be done from the shear zone toward the west working along the ridge and including the three EM anomalies in the intrusive satellite and any gossan areas.

(2) That all of the replacement zones in the limestone sediments be thoroughly prospected using the EM locations as a guide. Where warranted these zones should be drilled.

(3) That all of the contact zones in the andesite volcanics be prospected for copper showings. This would include all of the ridges in the northwest part of the area.

(4) That acid dikes be prospected in the sedimentary zones for fracturing and the deposition of the albite quartz veins.

Respectfully submitted,

GEO CAL LIMITED

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3. Handbook of Physical Constants - Birch p. 297

CERTIFICATE OF QUALIFICATIONS

The formal education of the author consists of undergraduate studies at Union College, Schenectady, N. Y., in engineering and science, with a degree conferred as B. Sc. Graduate study was taken at McGill University and at the University of Toronto in mining geology and geophysics with a degree conferred as M. Sc. He is qualified both in engineering geology and geophysics as a professional engineer.

The author has had some twenty years' experience in the fields of geology and geophysics doing exploration work throughout Canada. He has also worked for a short period of time in the Transvaal region of South Africa.

The author has been a member of the Association of Professional Engineers of Ontario, Alberta and British Columbia for the past 14 years. He is at present an active member of the Association of Professional Engineers of British Columbia with certificate No. 4683.

His knowledge of the property outlined in this report has been gained from the surveys. Reference has also been made to government reports and pertinent texts.

The author has no financial interest in this property other than the survey work, and is acting wholly as a consultant to the interested principal. Any remuneration received has been for expenses incurred during the survey and for his professional services.

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