

148

REPORT ON THE  
MAGNETOMETER SURVEY  
of the  
ALPHA NORTHEAST & NORTH GROUPS  
THE CARDIFF MINING CO. LTD.  
HIGHLAND VALLEY, B. C.

January 3, 1957.

F.J. Hemsworth.

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INTRODUCTION

This report describes the procedure and results of a magnetometer survey of the Alpha Northeast and Alpha North groups of mineral claims, owned by The Cardiff Mining Company Limited. The report and accompanying map are submitted in compliance with the Mineral Act claiming geophysical work for assessment credit for one year on the claims enumerated in the text of the report.

Previously a similar survey had been completed on the adjoining Alpha-Scotty groups of claims. This information is supplementary to the first report, and the map covers the survey of the claims to the northeast and north.

LOCATION AND PROPERTY

The Alpha groups are situated in the Highland Valley Copper Camp, in the Kamloops Mining Division, about 35 miles southeast of Ashcroft, B.C. The geographical position is latitude N  $50^{\circ} 28'$ , longitude W  $120^{\circ} 58'$ .

The Alpha Nos. 9-16 claims were staked by the writer for the company, and constitute an addition to the original Alpha-Scotty claims. After the claims were surveyed, the Alpha No. 5 fraction was staked for the company by F.W. Reger.

A list of the mineral claims which this survey covers is given below:

<u>Name</u>	<u>Date Recorded</u>	<u>Record No.</u>
<u>Alpha Northeast Group</u>		
Alpha No. 9	August 14, 1956	24384
Alpha No. 10	August 14, 1956	24385
Alpha No. 11	August 14, 1956	24386
Alpha No. 12	August 14, 1956	24387
Alpha No. 13	August 14, 1956	24388
Alpha No. 14	August 14, 1956	24389
<u>Alpha North Group</u>		
Alpha No. 5 Fraction	August 22, 1956	24464
Alpha No. 15	August 14, 1956	24390
Alpha No. 16	August 14, 1956	24391

#### GENERAL DESCRIPTION OF THE AREA

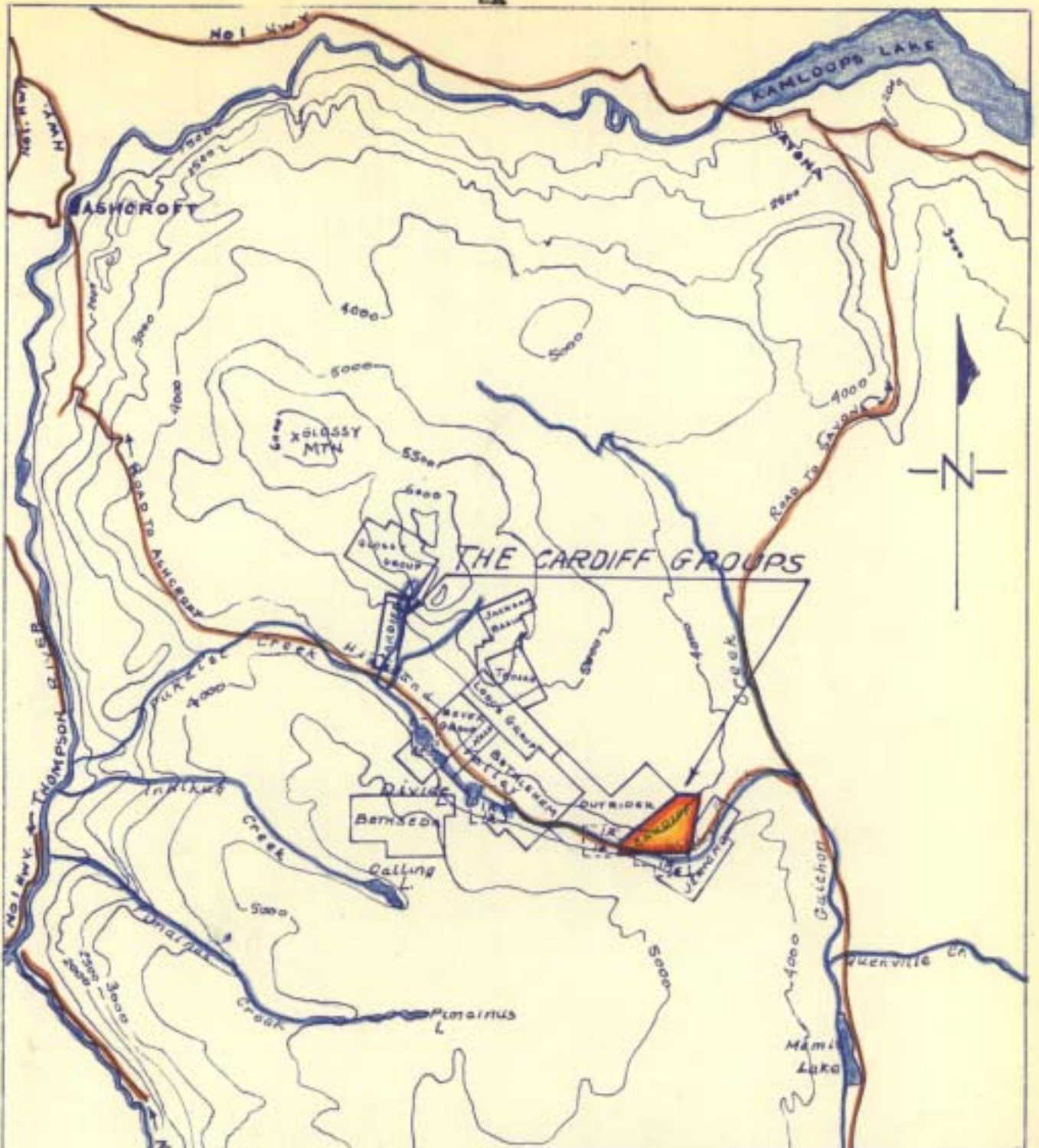
The Highland Valley is a generally southeast-trending valley having an average elevation of between four and five thousand feet (see included topographical map). It is drained by two creeks; the southeast half by Witches Brook which joins Guichon Creek, the northwest by Pukaist Creek which flows from Divide Lake northwest to the Thompson River.

The entire valley, except for some of the ridges that surround it, is covered by glacial drift. Near the creek bottom this drift achieves considerable depth. One diamond drill hole, drilled about one half mile southeast of the Cardiff property and next to the creek was reported to have cut over 250 feet of glacial overburden. All companies working in the Highland Valley agree that glacial overburden is the major hindrance to exploration.

The Highland Valley is serviced by a dirt road, maintained by the Department of Public Works, that runs from Ashcroft through the valley to Merritt.

#### DESCRIPTION OF CARLIFF PROPERTY

The Alpha northeast and north groups lie north of Indian Reserve No. 15. They are



Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT

THE CARDIFF MINING CO. LTD.  
 TOPOGRAPHICAL MAP OF  
 HIGHLAND VALLEY AREA SHOWING  
 APPROXIMATE LOCATION OF  
 MAJOR CLAIM GROUPS.  
 SCALE 1" = 4 MI.

NO. **148** MAP #1 To ACCOMPANY REPORT BY F.J. HEMSWORTH

*F. J. Hemsworth*

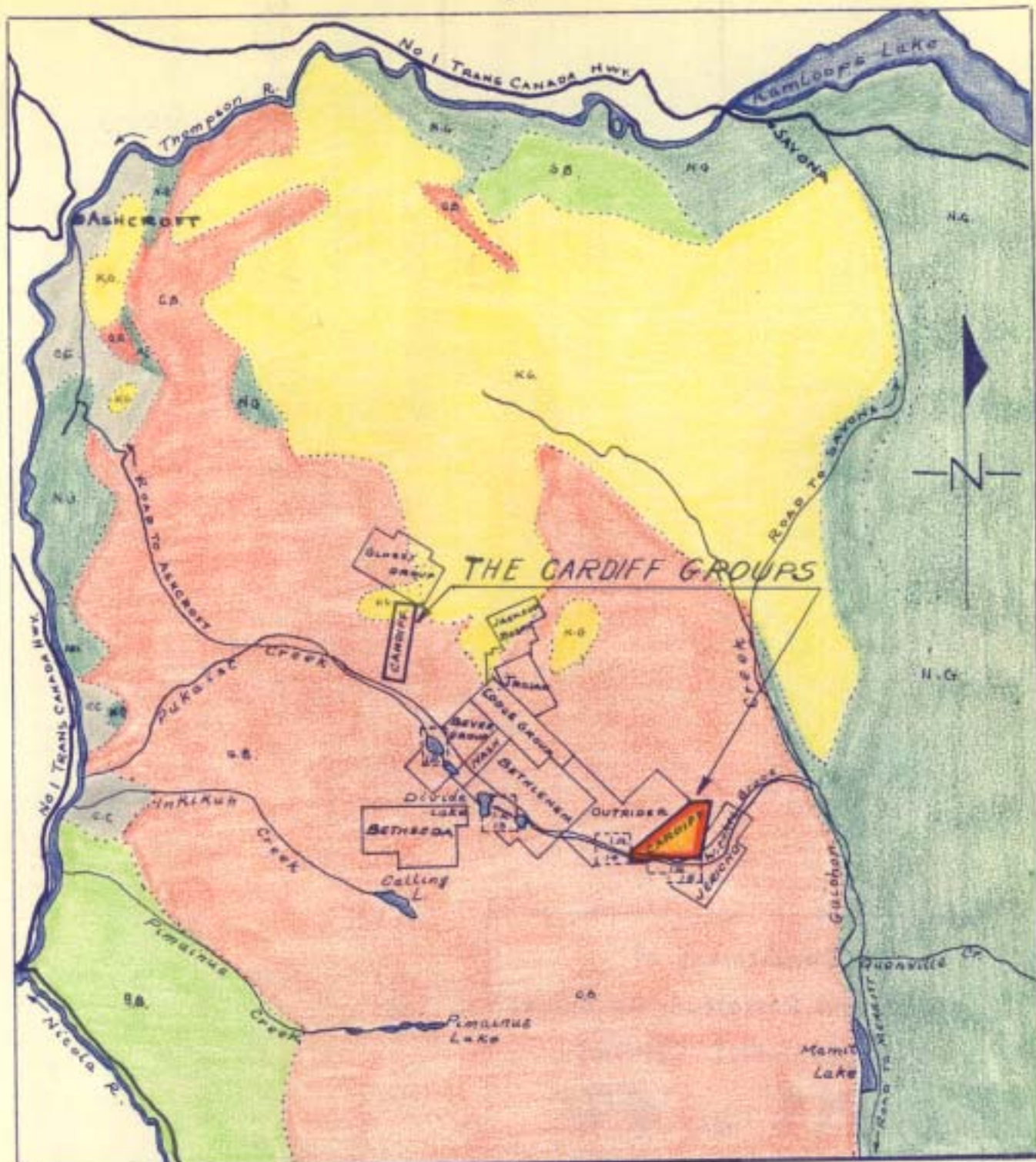
bounded on the south and west by the Alpha and Scotty groups, on the north by "Duvan" claims and on the east by the Jericho Mines claims. The terrain rises gradually to the north. The property is cut by a few south-trending gulleys, which are the result of glaciation or old water courses, but for the most part the surface is comparatively even. Except for the upper end, the area of the claims is almost entirely covered with overburden. A quartz diorite ridge outcrops intermittently at the top or north part of the property.

#### REGIONAL GEOLOGY

The following report is taken from G.S.C. Memoir 262: "The entire Highland Valley is underlain by intrusives of the Guichon Batholith, which is considered to be Lower Jurassic in age (see included geological map). Except for a few local gabbroic phases along Guichon Creek the remainder of intrusives are classified as quartz diorite and granodiorite. The rocks are typically grey, with some pink and greenish-grey phases. Biotite mica and hornblende are abundant, and magnetite, zircon, sphene and apatite are accessory minerals. Near some of the copper bearing quartz veins that occur in this batholith, the rock has taken on a pinkish coloration. Under the microscope, this pink rock is seen to contain clear quartz, but the feldspar, which is mainly plagioclase, is altered. Hornblende is the common ferromagnesian mineral. Near other copper veins the granitic wall-rocks have been largely altered to sericite. In most places the batholith is massive, but it has been subjected to stresses that have caused shears to form in an east-west direction. Faults are common at or near the contacts, though none appear long."

#### LOCAL GEOLOGY

The depth of overburden on the majority of properties in the Highland Valley area makes structural determination very difficult. The only outcrop on the Cardiff group appears to be quartz diorite with a little larger percentage of hornblende than is usual. A jointing system over a east-west distance of some 600 feet has a north-south trend and dips between 60° and 70° east. A mineralized shear on the south side of



—LEGEND—

KAMLOOPS GROUP: Recent volcanics; basalt, rhyolite, andesite.	K.G.
SPENCER BRIDGE GROUP: Hard reddish lava.	S.B.
GUICHON CREEK BATHOLITH: Granite granodiorite, quartz diorite.	G.B.
NICOLA GROUP: Greenstones, agglomerates, minor argillites, limestones.	N.G.
CACHE CREEK GROUP: Greenstones chert, minor limestones.	C.C.

**THE CARDIFF MINING CO. LTD**

**GEOLOGICAL MAP  
OF  
HIGHLAND VALLEY AREA  
FROM  
MAP 1010A, ASHCROFT SHEET  
SCALE 1" = 4 MILES**

TO ACCOMPANY REPORT BY F. J. HEMSWORTH.

*F. J. Hemsworth*

the valley on the Jericho property has a similar strike and could possibly line up with this jointing system. Witches Brook might represent a geological feature but there does not seem to be any proof for this.

#### OTHER PROPERTIES

An investigation of properties in the Highland Valley on which mineralization has been located indicates a marked similarity of occurrence. It is thus reasonable to assume that if mineralization does occur on the Cardiff group, it should be in geological structures similar to those on other properties in the area and under similar geophysical anomalies. Consequently a brief study was made of some of the mineral occurrences in the valley as an aid to what to expect on Cardiff.

The Bethlehem property has probably done more exploration than any other property in the area. A combined programme of stripping, diamond drilling and geophysical work has been carried out to find the mineralized zones. It has been possible to correlate geophysical readings with ore in place.

The engineers at Bethlehem have found that the magnetometer is the most suitable geophysical instrument for locating mineralization on their claims. The results of diamond drilling have proven that there is a relation between magnetometer readings and copper mineralization. As elsewhere in the valley the copper mineralization is found in shear zones or fractures in the granodiorite. The low magnetometer readings result from a lack of magnetite, the theory being that, along mineralized fractures in the granodiorite, the magnetite has been converted to hematite.



## MAGNETOMETER SURVEY

### Survey of Grid

A baseline was laid out with a Brunton compass in an east-west direction along the southern boundary of the claims. The baseline was cut out and pickets set at 300-foot intervals. From each baseline picket, lines were cut at right angles in a north direction and pickets placed at 100-foot intervals along these side lines. The grid thus formed had 300 ft.-100 ft. dimensions.

The claim posts were surveyed with a transit and chain and tied in to a corner post of the No. 15 Indian Reserve. The road and any topographical features near the survey lines was noted. Other topographical features were picked up from the magnetometer grid lines.

### Type of Magnetometer Instrument

A model A-2 Sharpe magnetometer was used for this survey. This is a precision instrument having a sensitivity of 10 gammas, and incorporates the latest design features such as built-in aligning compass and temperature compensating device. The locking device for locking the field piece is of such a design that the machine can be subjected to rugged usage, without being put out of adjustment. About 150 readings can be taken a day on prepared grid lines.

### Field Work

Three men made up the magnetometer survey crew. One man carried the instrument set it up and took the readings. A second man set the course with a Brunton compass, paced the 100-foot intervals and recorded readings and topography. The third man was an axeman who slashed out the line and set up the pickets.

Starting at the baseline, a Brunton line was laid off perpendicular to the base and this line was slashed out until a paced distance of 100 feet was reached. Here a picket was put in, numbered and a magnetometer reading taken. The line was then carried forward another 100 feet and the procedure repeated. In this way the line was advanced until the end of the claims was reached. The fairly even topography

permitted a pacing accuracy of about 98% in the distance of over 6,000 feet.

### Taking readings

The method of taking magnetometer readings was as follows:

- (a) The instrument was first leveled with the circular spirit bubble.
- (b) Leveling was completed by adjusting the three thumb screws.
- (c) The field piece of the instrument was oriented at right angles to the earth's magnetic field by use of the auxiliary compass and locked in that position. The auxiliary compass was then locked.
- (d) One reading was taken with the head in this position. The head was then rotated 180° and another reading taken. These were recorded in the field note book along with the time.

### Corrections

#### (a) Diurnal

All readings were corrected for diurnal, or variations from time to time during the day. Since only one instrument was available for the job, a base station was set up near camp. One day was spent in taking readings every hour at this base station and a diurnal curve drawn from these readings. Diurnal corrections for readings taken on subsequent days were based on this curve.

#### (b) Day to Day

A reading was taken at the base station each day before leaving for the field and each day after field work was completed. The variation between the base reading on any particular day and the original base reading (corrected for diurnal variations) was the day to day correction. The diurnal and day to day corrections were added to each field reading to arrive at the corrected magnetometer reading.

### Mapping

The result of the magnetometer survey is shown on the map contained in the pocket at the back of the report. The magnetometer readings are represented on this map by a series of contour lines indicating the magnetic intensity in gammas. The contour lines were drawn through readings of equal intensity at 100 gamma intervals on a working plan on which the readings were plotted. The map was coloured in order to emphasize the distribution of readings which might indicate anomalies.

### CONCLUSIONS

A study of the map shows that normal readings were obtained over most of the map area, with the exception of the northwest section, on grid lines 9, 12, 15 between 3800 North and 6600 North. The interesting area where several high anomalies were recorded comprise the western portion of the Alpha No. 14, Alpha No. 5 Fraction, and Alpha No. 16 mineral claims.

The anomalous areas are generally areas of shallower overburden and even some quartz diorite outcrops. As would be expected there are higher readings in areas of light overburden and low reading in areas of heavy overburden. However the high readings indicate, in addition, a definite northerly-trending structure where the magnetite content of the rock is higher than normal. It is possible that in addition to a higher than usual percentage of magnetic minerals certain areas may carry some copper sulphide minerals.

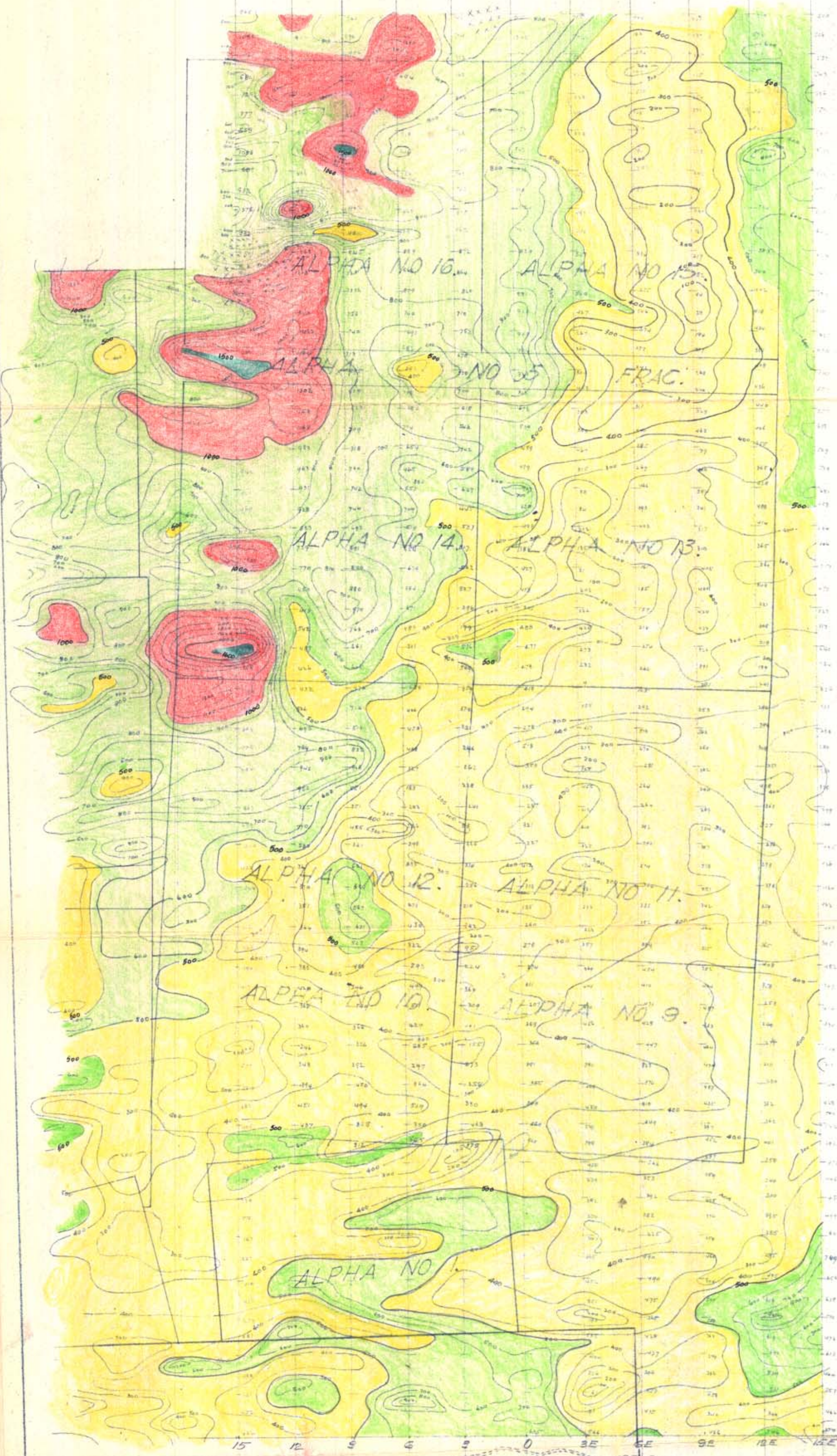
Further work on these claims should consist of stripping and trenching across the anomalous zones.

Respectfully submitted,

*F. J. Hemsworth*  
F.J. Hemsworth, P. Eng.

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INDIAN RESERVE NO 15.

THE CARDIFF MINING CO. LTD.

PLAN OF  
MAGNETOMETER SURVEY  
UPON THE NORTHEAST & NORTH  
CLAIMS. (ALPHA 9 TO 16 etc.)  
AT HIGHLAND VALLEY, KAMLOOPS  
MINING DIVISION. BRITISH COLUMBIA.

SCALE: 1 IN = 300 FT.

LEGEND

	0 TO 500 GAMMAS
	500 TO 1000
	1000 TO 1500
	OVER 1500

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 148 MAP #3

TO ACCOMPANY REPORT OF R. #148  
F.J. HEMSWORTH  
F.J. HEMSWORTH P. ENG.

#148  
MAP 3  
DEC 19TH 1956