

92F/14W

L50-121 NE  
Claim: Dominion Chromium Property  
Owner: J.W. Oakes, Vancouver, B.C.  
Engineer: Howard L. Banting

November 15, 1947.

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REPORT ON  
A MAGNETOMETER SURVEY ON  
PART OF THE PROPERTY OF THE  
DOMINION CHROMIUM PROPERTY  
ASHCROFT MINING DIVISION  
KAMLOOPS DISTRICT  
PROVINCE OF BRITISH COLUMBIA

by

November 15th, 1947

H. L. Banting B.A.

## INTRODUCTION

During the months of June and July 1947, a Geophysical Survey was carried out on the Dominion Chromium Property at Cache Creek, British Columbia. This property, which consists of 11 mining claims and 2 fractional claims is recorded in the name of J. W. Oakes, of Vancouver, B.C. The magnetometer survey, described in this report, was undertaken in an attempt to delineate pods and lenses of massive chromite that occur in the belt of serpentine which intrudes the Cache Creek Formation. Along one gulch, in the northern part of the property, blocks of float chromite and one kidney of massive chromite, in place, in the serpentine had been located. Previous sampling of this chromite from the "Chrome pit" showed an average content of 40.4%  $\text{Cr}_2\text{O}_3$  and 13.4%  $\text{FeO}$ . A preliminary magnetic survey carried out in 1939 by the America Askania Corporation, Houston, Texas, revealed several interesting anomalies believed related to deposits of chromite and a detailed magnetometer survey was recommended to appraise the economic possibilities of the chromite deposits.

## SUMMARY

Three magnetic anomalies were outlined and enclosed by the survey, which are located well within certain masses of serpentine and these anomalies appear to have a general dip to the south-west. Laboratory magnetic susceptibility tests, assay results, as well as the observed fact that several belts of serpentine yielded a uniform magnetic profile similar to the enclosing sediments, leads to the conclusion that the occurrence of magnetite within the serpentine bodies is limited and that sufficiently large lenses or pods of massive chromite would give a relatively low order anomaly within the serpentine, due to the fact that depending on the iron content chromite is feebly magnetic. Considering all the data available from previous drilling records, the occurrence of blocks of chromite float, and the serpentine pit exposing a massive chromite kidney, it is suggested that additional lenses and pods of massive chromite will be located, which may have a direct relationship with the observed anomalies. To establish this relationship a program of diamond drilling has been recommended to probe the anomalies within the serpentine masses in order to estimate the possible tonnage of chromite ore that occurs on this mining property.

LOCATION

The property, known as the Dominion Chromium Group, is located west of and adjoining the Caribou Highway at Cache Creek, B.C. in the Ashcroft Mining Division, Kamloops District, being approximately 225 miles north-east of Vancouver. The 11 claims and 2 fractions, which form a solid block, are not crown granted and extend westward from the Caribou Highway up the slopes and former benches of the Bonapate River.

ACCESSIBILITY

The property is readily accessible by motor car or truck. From Vancouver the train or bus can be taken to Ashcroft, a divisional point on the C.N.R., and thence by car about 7 miles north to Cache Creek, where a short road branching off the Caribou Highway leads to the south-east part of the mining claims.

TOPOGRAPHY

The topography is rugged and mountainous with the former river benches traversed by several deep gulches due to seasonal erosion. In one particular gulch blocks of chromite float were reported as having been found back in 1918 but recent cloud bursts have since altered and partially filled in the course of this gulch. The central part of the property which contains the anomalies is represented by a comparatively flat river bench beyond which to the west the timber line starts on the rising hills. The type of topography is well illustrated by a series of photographs appearing in the appendix of this report.

GENERAL GEOLOGY

The geology of the area has recently been reported on by the Geological Survey of Canada. Reference is made to a Preliminary Report by S. Duffell issued in 1947 and entitled "Ashcroft Map Area, British Columbia".

The mining claims are located in a north-south trending belt of rocks of late Palaeozoic Age, locally known as the "Cache Creek Group" and which consist of andesite; hornblende, chlorite, talc and quartz - mica schists; chert, argillite, quartzite and limestone. This belt occupies the medial part of the Ashcroft map area, varies in width up to 20 miles, and is more than 40 miles long. Within this belt of rocks at least four chromite deposits are known associated with intrusive masses of serpentine.

### LOCAL GEOLOGY

The claims are underlain for the most part by interbedded black argillaceous shales with minor andesite, chert, and limestone of late Palaeozoic age and classified as the "Cache Creek Group".

The Cache Creek formation has been locally intruded by a great body of peridotite now almost completely serpentinized. The serpentine has been highly crushed and finely fractured, varying in type from a shiny blue serpentine to a dull green variety, and in the vicinity of anomaly "A" is rather heavily bleached to a white colour.

Within the serpentine mass and at a point 750' north-east of the "A" base line on picket line 6E, a kidney of massive chromite has been exposed by blasting a pit in the serpentine. This lenticular showing has an average width of 3'. Several tons of ore have already been removed from the pit for testing purposes. Blocks of massive chromite float have been found in a gulch just west of the showing and it would appear that this float did not all originate from the above pit. No samples of disseminated chromite in serpentine have been found, to the writer's knowledge, on this property.

On Geological Sketch Map No. 2 all the outcrops found during the survey are outlined, but no attempt has been made to show the strike, dip, or folding of the Cache Creek rocks as they are highly folded and correlation from outcrop to outcrop was difficult. The sketch map is intended to only show the relative distribution of the serpentine masses within the Cache Creek Group.

### RESULTS OF THE SURVEY

All the results of the magnetic survey are plotted on Map No. 1 drawn on a scale of 1 inch equals 200 feet. Contours of equal vertical magnetic intensity have been drawn at intervals of 3,000, 2,500, 2,000, 1,500, 1,000, 900, 800, 700, 600, 550, 500 and 0 gammas, with the observed anomalies marked A, B, and C. Beside each measurement station the magnetic value is shown in relation to the base station located at a point 0-0 on the "A" base line, whose magnetic value was arbitrarily chosen as 600 ✓.

On Map No. 2 a geological sketch map shows the distribution of serpentine outcrops to the Cache Creek Formation prepared from notes taken on the magnetic survey.

On Map No. 3 all cross section lines are shown in magnetic graphic profile with the corresponding topography on an 11' roll of graph paper. (This roll of graph paper showing the various profiles only accompanies the original report.) The continuations of the anomalies from line to line are marked and designated to correspond with Map No. 1.

Technical details regarding the procedure followed in performing the survey will be found in the appendix.

#### DISCUSSION OF RESULTS

Within the highly shattered and crushed shiny blue serpentine masses, three well defined magnetic anomalies were outlined and are noted on Map No. 1, as "A", "B", and "C".

Anomaly "A" is almost circular in outline and appears to dip in part to the south. The central part of the anomaly is traversed by a gulch which appears to represent a north south trending fault. Within the 2,000 gamma contour in the extreme south part of the anomaly is the massive chromite kidney previously described as revealed by blasting a pit in the serpentine along the side of the gulch wherein blocks of chromite float have been found.

Anomaly "B" is quite narrow and strikes north south with a dip to the south-west. Massive chromite is reported to have been encountered at the bottom of a hole drilled to the west on the east side of anomaly "B". Great difficulty was reported in the drilling of this hole and it is suggested that the hole was drilled down the dip of a lens of chromite. The chromite intersection would appear to have been encountered within or close to the 2,000 gamma contour of anomaly "B".

Anomaly "C" while of much greater length and width than "B" has the same uniform dip to the south-west and for over 80% of its 2,200' length is covered by comparatively shallow overburden. A maximum depth of 30' of drift is suggested. Scarcity of outcrops along its strike length prevents surface examination for lenses or pods of chromite within the 2,000 gamma contour areas. Topography corrections across this large anomaly were negligible, as it occurs under a comparatively flat river bench. At a point 400' north-east of the "A" base line and just to the east of picket line No. 26E there is a minor east west fault which appears to alter the direction of strike of the anomaly. During the course of the survey mining claims Stan No. 1 and Stan No. 2 were staked to include the south-easterly extension of the "C" anomaly.

Diamond drilling of the "C" anomaly in areas within or close to the 2,000 gamma contour could therefore on the basis of observations made on anomalies "A" and "B", yield substantial tonnages of massive chromite either in kidneys, pods or lenses.

A study of the magnetic contour map would suggest that cross faulting with an east west displacement of about 800' may have been responsible for the present position of anomalies "B" and "C".

The serpentine outcrops seen from the highway in the gulch at the north end of the property did not show any magnetic anomalies and could not be distinguished magnetically from the enclosing Cache Creek rocks.

In both anomalies "A" and "C" it was at first suggested that the anomaly outline might conform to the outline of the serpentine mass but midway through the survey it became evident that the anomalies were well within the outcrop limits of the serpentine mass. Thus the serpentine mass in which anomaly "A" is located extends at least 400' farther to the south-west while two drill holes just north of the "A" base line would indicate that the serpentine within which the "C" anomaly occurs extends at least 500' beyond the north-west end of the anomaly and may in fact be continuous with the serpentine mass enclosing anomaly "A". The absence of any magnetic reaction whatsoever over the large serpentine outcrops at the northern end of the property would indicate that the magnetite content is unusually low for a serpentine body.

Laboratory magnetic susceptibility tests were made on various serpentine samples from all anomalies and these tests showed a uniformly and quite low magnetic iron content with no erratic results due to concentrations of finely disseminated magnetite. No magnetite was identified in any of the hand specimens of serpentine examined.

Complete records for previous diamond drilling operations were not available, but it is definitely known that two shallow and three deep holes were drilled, four of which were drilled into the serpentine mass. Only one hole is regarded to have partially tested the observed anomalies. This hole, as previously mentioned, encountered a massive intersection of chromite at the bottom of the hole beneath anomaly "B".

RECOMMENDATIONS

In order to test the observed anomalies and establish their exact relationship with the occurrence of pods and lenses of massive chromite within the serpentine mass, seven sectional lines have been marked on Map No. 1 to be explored by a diamond drilling program.

Hole No. 1 has been located to test the nature of anomaly "A" and also to intersect at depth the chromite kidney exposed in a surface pit.

Hole No. 2 to test that part of anomaly "A" where the serpentine is highly fractured and bleached in appearance.

Hole No. 3 to test anomaly "B" and re-check the massive chromite intersection previously reported in drilling operations.

Holes No. 4 to 7 inclusive, to explore the serpentine mass in anomaly "C" lying under shallow overburden, for additional lenses or pods of massive chromite that may similarly occur within or close to the 2,000 gamma contour and which anomaly could yield a substantial tonnage of chromite due to its great length and width.

Should further lenses of chromite be located during the course of this preliminary drilling program it is suggested that consideration be given to the drilling of vertical holes near points of highest magnetic intensity within the 2,000 gamma contour. Surface trenching and stripping should be carried out on anomaly "C" from the east end westward.

To carry out the above exploration program and to appraise the observed anomalies in terms of massive chromite ore bodies an expenditure not exceeding \$25,000 would be required.



## APPENDIX

### TECHNICAL DETAILS OF THE MAGNETOMETRIC SURVEY

#### 1. AREA SURVEYED

The Dominion Chromium property at Cache Creek British Columbia which consists of 11 mining claims and 2 fractions was partially covered by magnetometer survey being limited in coverage by rugged topography at the east side of the property near the Caribou Highway and on the west side by steeply timbered hills. Several of the claim posts were not located during the survey and on Map No. 2 the claim lines are omitted, but the position is shown for all claim posts that were located. The survey covered all of mining claims Mac No. 1, Mac No. 2, Mac No. 5, Mae No. 7, Mae Fraction No. 1, and portions of mining claims Mac No. 3, Mac No. 4, Mac No. 6, Mae Fraction No. 2, Mae No. 8, Mae No. 9, Stan No. 1, and Stan No. 2.

#### 2. PERIOD OF SURVEY

The geophysical survey commenced on June 24th, 1947 and field measurements were completed on July 17, 1947. All magnetic equipment used in the survey was flown by T.C.A. from Toronto to Vancouver and thence transported by bus to Ashcroft via the Fraser Canyon Highway. From Ashcroft equipment was moved by taxi 7 miles north to Cache Creek.

Calculations, plotting, drafting, interpretations, laboratory tests, assay result, and all reports were completed in Toronto during the months of August, September, and October.

#### 3. PERSONNEL

All magnetic measurements were taken by H.L. Banting with L. Park acting as assistant.

#### 4. PICKET LINE MILEAGE

At the beginning of the magnetic survey 70,560 lineal feet of picket line had been run and chained. During the course of the survey many extra lines were run to better outline anomalies "A" and "B" and the network of stations was extended to the southeast to enclose anomaly "C". This additional work totalled 19,200 lineal feet. Thus for the survey the total distance of picket line run and chained was 17 miles. Within the area surveyed there were less than 20 small trees and thus with no tree cutting necessary the sectionlines had only to be run out by pickets and chained.

5. TOPOGRAPHY

In addition to recording the magnetic measurements at each field station the approximate elevation from station to station was noted, with the highway marked on the map assumed to have an elevation of 0 feet thus the highest point within the area surveyed was estimated to be approximately 450' above the level of the Caribou Highway. On map No. 3 the profile of magnetic intensity along each picket line is shown together with the corresponding topography plotted on a vertical scale of 1 inch equals 400'.

6. NETWORK OF MEASUREMENT STATIONS

The network of stations consists in a series of numbered pickets placed 50' to 100' apart along picket lines striking North 50° East at 200' intervals and which are at right angles to the "A" base line.

7. CLASSIFICATION OF MAGNETIC MEASUREMENTS

Base stations		2
Stations of main network	(200' x 100')	455
Stations of main network	(200' x 50')	547
Extra stations in anomaly areas	(100' x 50')	387
Check measurements on bases		46
Check measurements on independent field stations		26
Total measurements performed		1,405

8. MAGNETOMETRIC SURVEY

Field readings were taken with a Vertical Magnetic Force Variometer (Watt), measuring the variations of the vertical component of the earth's magnetic field.

All plotted gamma values for the individual stations were referred to an arbitrarily chosen magnetic base station located on a flat river bench and designated on the map as "Base Station" at a point 0-0 on the "A" base line, with the arbitrary value of 600 ✓ to which all field measurements were tied.

At this station the instrument was calibrated and found to have a scale constant of 33.3 ✓ per scale division.

3.

P. cont'd

The instrument had been previously set to ensure precision with internal adjustments effected so as to practically annul its temperature coefficient, thus eliminating all errors due to temperature changes.

Diurnal magnetic variations were reduced to a minimum by re-reading a magnetic base station approximately every hour and the average error calculated from 26 check measurements on independent field stations showed the survey to be accurate within  $\pm 6$   $\gamma$ . During the period of the survey no major magnetic storms occurred and consequently the diurnal corrections did not exceed  $\pm 40$   $\gamma$ .

Respectfully submitted.

*Howard L. Banting*

Howard L. Banting  
"Consulting Geologist"

Toronto, Ont.  
November 15th, 1947.



1. Gulch leading westward off Caribou Highway, Cache Creek, B. C., in which blocks of chromite float were originally discovered in 1918.



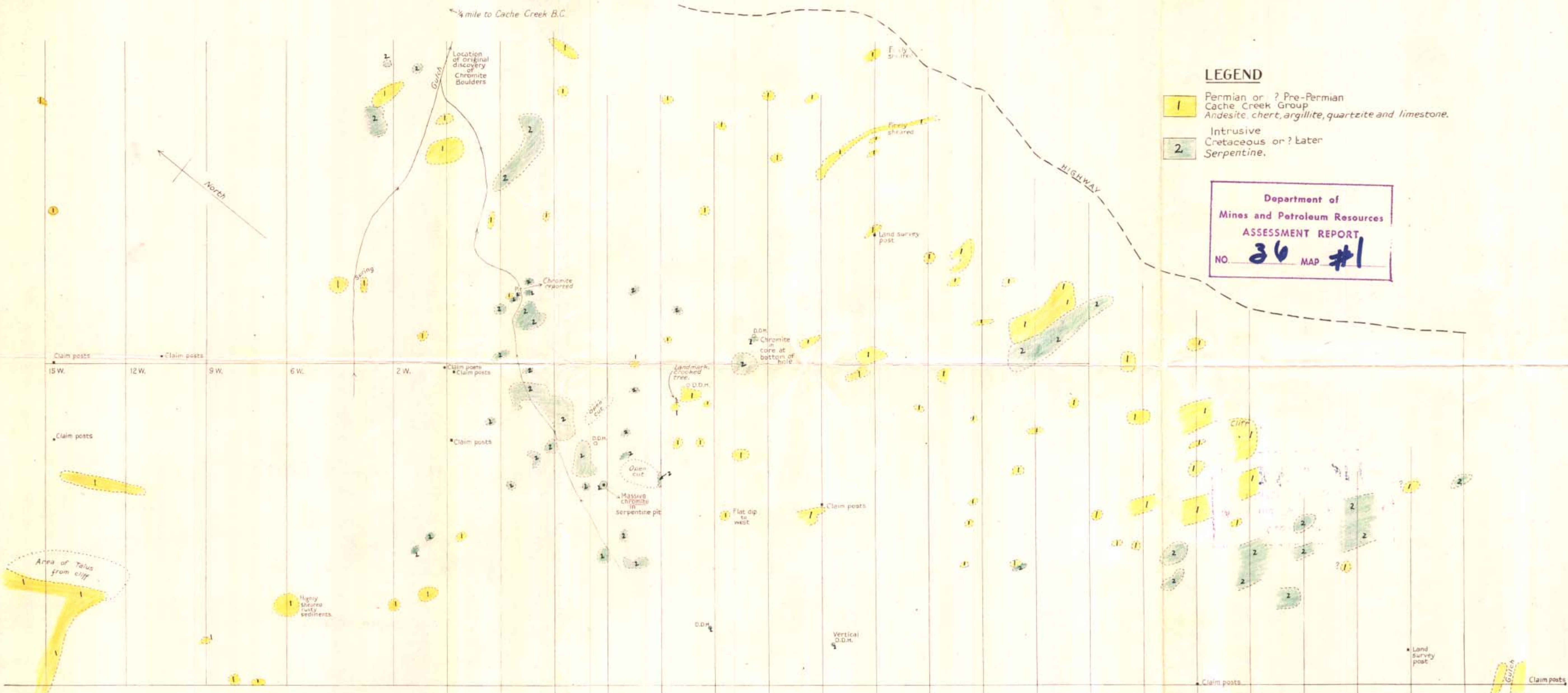
2. Small stock pile of massive chromite ore with the "Chrome Pit" in serpentine in the background.



3. Looking south from the base station on picket line 4E. The Chrome Pit in anomaly "A" lies just to the right of the crooked tree in the background. Note sage brush, cactus, and lack of timber.



4. Looking north from the same base station towards the valley of the Bonaparte River. Note the Trans-Canada Highway leading eastward from Cache Creek in the central part of the picture.



**LEGEND**

- 1 Permian or ? Pre-Permian Cache Creek Group  
Andesite, chert, argillite, quartzite and limestone.
- 2 Intrusive Cretaceous or ? Later Serpentine.

Department of  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 NO. **36** MAP #1

**MAP N°2**  
**GEOLOGICAL SKETCH MAP**  
 OF A PORTION  
 OF THE DOMINION CHROMIUM PROPERTY  
 IN THE ASHCROFT MINING DIVISION  
 KAMLOOPS DISTRICT  
 BRITISH COLUMBIA

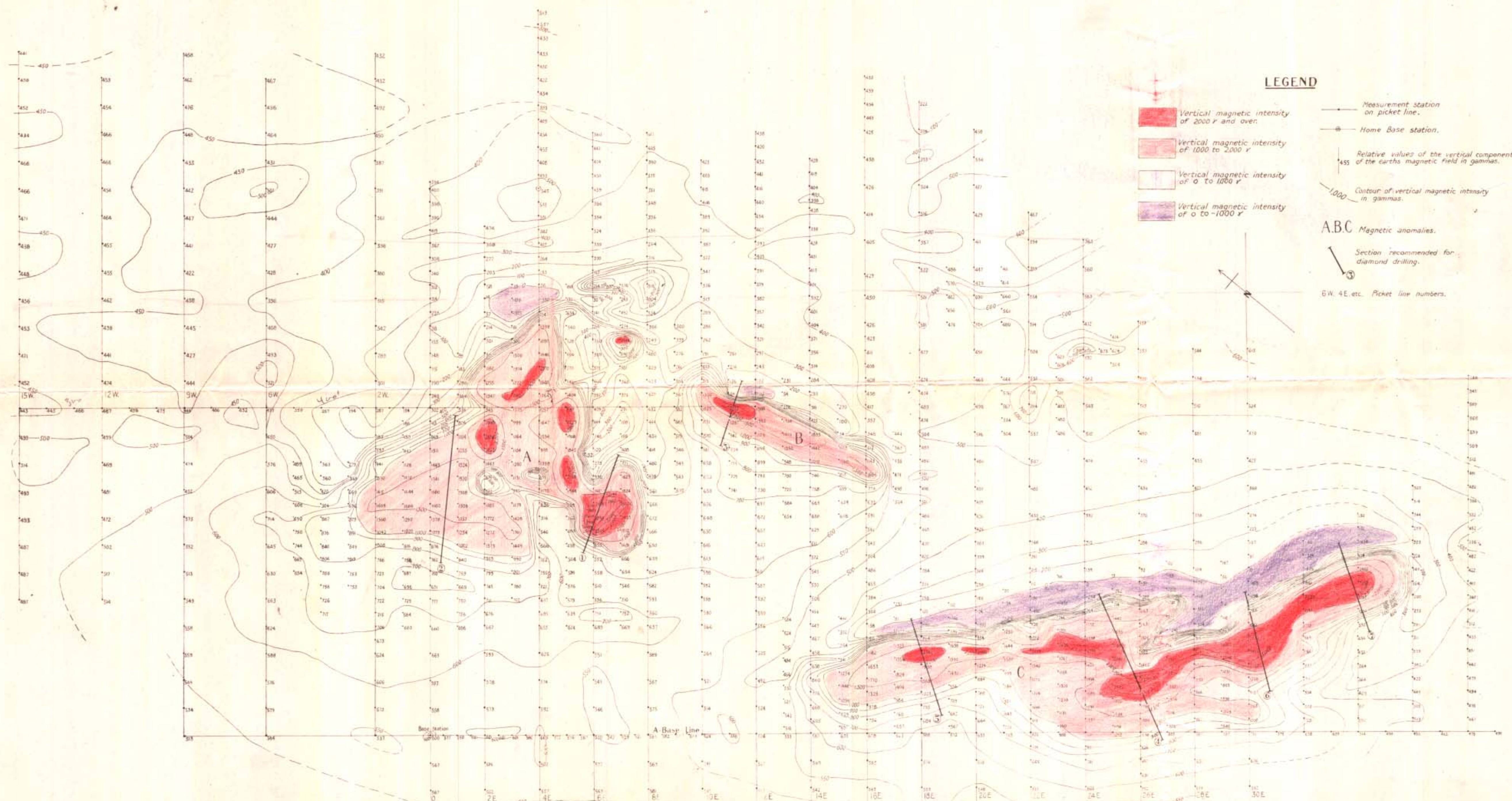
Showing distribution of serpentine  
 outcrops to the Cache Creek formation.

To accompany Magnetic Survey Map N°1.

Scale, 200 Feet = 1 inch  
 Oct 15<sup>th</sup> 1947  
 by H.L. Banting

**REPORT 36**  
**MAP 1**





**MAP N° 1**  
**MAGNETOMETER SURVEY**  
 OF A PORTION  
 OF THE DOMINION CHROMIUM PROPERTY  
 IN THE ASHCROFT MINING DIVISION  
 KAMLOOPS DISTRICT  
 BRITISH COLUMBIA  
 Scale, 200 Feet = 1 inch  
 Oct 15<sup>th</sup> 1947  
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 MAP 2  
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