5730

1975 GEOPHYSICAL REPORT

on the

WALHACHIN PROPERTY

Mineral Claims Chief #'s 15,17,18,20,28-34,37-48 incl.

located in

South Central British Columbia

in the

Kamloops Mining Division

approximately

32 miles West of Kamloops

at coordinates 50°45' Lat.; 121°00' W. Long.

Owned by

BP MINERALS LIMITED

Work by

Eagle Geophysics Limited

Work Period

December 3-20, 1974

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INTRODUCTION

The Walhachin mineral property is located in south central British Columbia approximately 32 miles west of Kamloops. The property consists of the Ursus, Geo and Chief mineral claims owned by BP Minerals Limited and is being investigated for the possibility of a copper deposit. During the period December 12-20, 1974 a total of 7.0 line miles of induced polarization/resistivity surveying and 7.7 line miles of ground magnetometer surveying were completed over the property. The field work was executed by Eagle Geophysics and BP Minerals personnel.

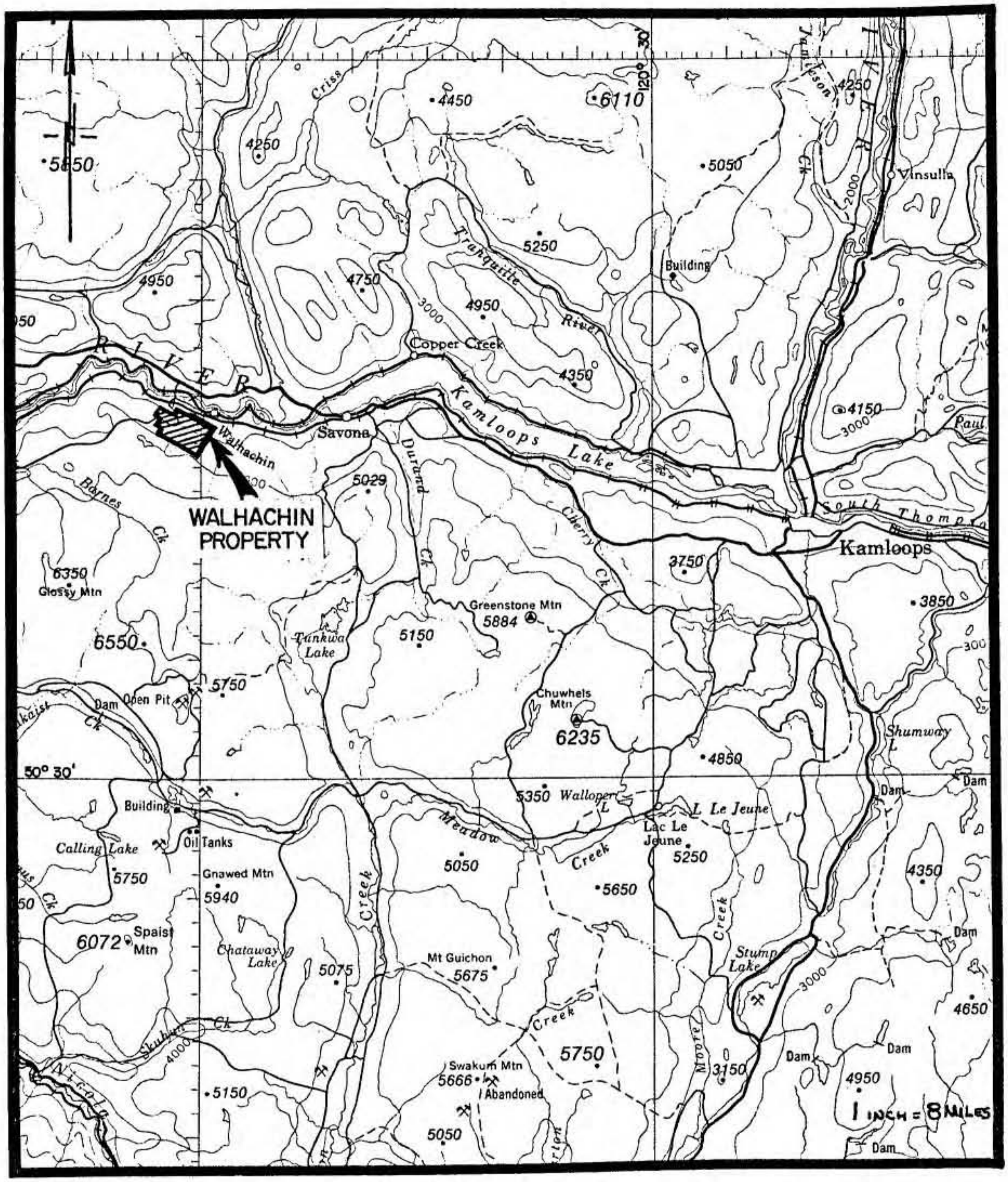
The following report and interpretation of the geophysical results were prepared by Garry M. DePaoli on a consulting basis for BP Minerals Limited.

Location and Access

The Walhachin property is situated in south central British Columbia approximately 32 miles west of Kamloops and a few miles southwest of the small settlement of Walhachin. (See Location Map Figure 1). It lies within the Kamloops Mining Division at $50^{o}45'$ north latitude, $121^{o}00'$ west longitude within NTS block 92 I/11. The Trans-Canada Highway and the main CPR and CNR railway lines pass close to the northern boundary of the property. Several good four wheel drive roads provide easy access.

Grid Control

The control grid consists of 8.1 miles of picketed, flagged and chained lines. The baseline is 2200 feet long



Department of
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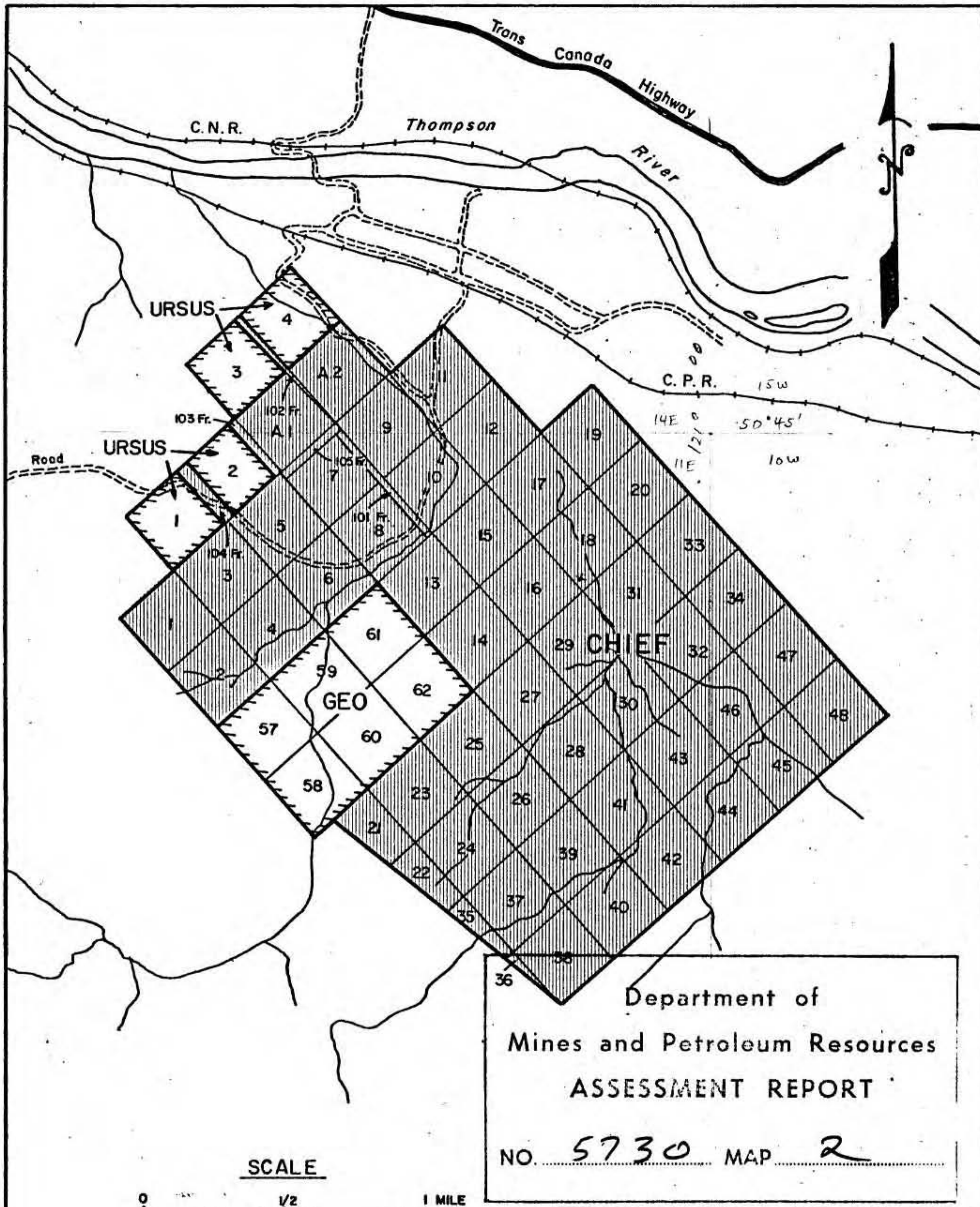
and strikes east-west. Ten perpendicular cross lines extend 1000 feet south and 2400 to 2600 feet north of the baseline. The two most westerly grid lines are spaced 400 feet apart while the remainder occur at 200-foot intervals.

GENERAL GEOLOGY (after A.R. Findlay)

Regionally the property broadly coincides with the northern border of the Guichon Batholith. The Upper Triassic Guichon Batholith is a composite oval pluton, approximately 40 miles long, which is composed of quartz monzonite, granodiorite and quartz diorite. It is in contact with volcanic rocks of the Upper Triassic Nicola group in the vicinity of Walhachin, and with sedimentary and volcanic rocks of the Permian Cache Creek group around Ashcroft. The Guichon Batholith and the Nicola and Cache Creek rocks are overlain by large areas of tertiary Kamloops group volcanic and sedimentary rocks around Walhachin.

Much of the western and northern parts of the property is underlain by Nicola group rocks which consist largely of andesite and basalt flows with some interbedded limestone. Most of the survey area is dominated by a large body of hornblende diorite which has intruded the Nicola rocks and may connect with the Guichon Batholith, under tertiary cover, to the south. The hornblende diorite has been intruded by a body of quartz syenite-quartz monzonite and associated intrusive breccia, and by a small quartz porphyry pluton.

Copper minerals occur widely in minor amounts, in particular in pyritised Nicola andesites, in a vein of massive magnetite, and in a skarn at a diorite-limestone contact. The



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Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5730 MAP 2

BP Minerals Limited

CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M.D, B.C.

SCALE as shown		NTS 92 I 11	FIG. 2
DRAWN	DATE OCT. 1975	PROJ. 505	
To accompany report:			

most prospective copper occurrence contains disseminated chalcopyrite in intrusive breccia bodies on the west side of lower Rattlesnake Creek.

INDUCED POLARIZATION SURVEY

Introduction and Theory

Induced polarization measurements were undertaken to determine the lateral and vertical distribution of sulphides within 400 feet of ground surface over the grid area. Apparent resistivity data taken concurrently is useful in inferring overburden depths, defining abrupt lithological changes and assessing the importance of any IP effects obtained.

The term induced polarization means the electrical separation (i.e. separation of charges) induced by an electric field. The cause of this polarization is changes in the mobilities of ions within a rock. At the interface between zones of different mobilities, excesses or deficiences of ions occur; the concentration gradients developed oppose the current flow and cause a polarizing effect. When mineral grains block the pore passages of rocks and a current is applied, a concentration of ions builds up at the electrolyte (water)-metal interface while awaiting an electrochemical reaction which must occur before the electric charge can be transferred from an ion in the electrolyte to a free electron in the metal. The forces which oppose the current flow are said to polarize the interface and the added voltage necessary to drive the current across this barrier is known as "overvoltage".

In the pulse-transient or time domain method that was employed, the interfaces within the rock were polarized by applying a steady direct current. The current was then abruptly terminated and measurement was made of the small decaying voltage caused by the polarized charges returning to equilibrium.

Instrument and Procedure

The IP equipment employed was a time domain measuring system developed and manufactured by Huntec Limited of Toronto, Ontario.

The system consists of a transmitter, a motor generator and a Mark III receiving unit incorporating a digital display readout for chargeability measurements.

The transmitter, which provides a maximum of 7.5 kw D.C. to the ground, obtains its power from a 7.5 kw, 400 cycle, 3 phase Leland alternator driven by an Onan gasoline engine. The cycling rate of the transmitter was 2 seconds current "on" and 1 second current "off" with the pulses reversing continuously in polarity.

The Mark III receiver presents digitally four individual (M) values of the decay curve at each station. The (M) value reading is the ratio of (V_s) divided by (V_p) expressed as a percentage. The quantity (V_p) is displayed separately.

The delay time (t_d) may be set to 15, 30, 60, 120 or 240 milliseconds; similarly the integration interval (t_p) may be set to 20, 30, 40, 50 or 60 milliseconds. This provides for twenty-five different sets of values for each of the four sample points.

For this survey the delay time (t_d) was fixed at 60 milliseconds and the integrating interval (t_p) at 40 milliseconds.

The apparent chargeability (M_a) in milliseconds is obtained by summing the (M) factors, weighted for their individual integrating times as follows:

$$M_a = t_p \times 10^{-2} \sum (M_1 + 2M_2 + 4M_3 + 8M_4) \text{ milliseconds.}$$

The apparent resistivity (P_a) in ohm-metres is obtained by dividing (V_p) by the measured current (I_g) and multiplying by a factor (K) which is dependent on the geometry of the array used. The absolute value of (V_p) is obtained by multiplying the digital voltmeter reading by the scale factor of the input attenuator.

For comparison purposes with other time domain systems the chargeability data obtained with the present Huntec equipment used on this survey is numerically 2.3 times greater than data obtained with the earlier Huntec equipment common in the early 1960's. Furthermore the present data is approximately equivalent numerically to data obtained with standard Newmont equipment presently manufactured by Scintrex Limited.

The pole-dipole array was used for this IP survey. With this array the current electrode C_1 and the two potential electrodes P_1 and P_2 are moved in unison along the lines to be surveyed. The second current electrode is grounded an "infinite" distance away, which is at least ten times the distance between C_1 and P_1, for the largest electrode separation. The dipole length (x) is the distance between P_1 and P_2. The electrode separation (nx) is the distance between C_1 and P_1 and is equal to or some multiple of the distance between P_1 and P_2.

The dipole length (x) determines mainly the sensitivity of the array, whereas the electrode separation (nx) determines mainly the depth of penetration of the array for a body of some particular size, shape, depth, and true chargeability.

The cross lines were surveyed with a dipole length (x) equal to 200 feet and measurements of apparent chargeability and apparent resistivity were made for the first and second electrode separations, that is for n = 1 and n = 2. Measurements were taken at 200-foot station intervals.

Presentation of Data

Contoured plan maps of first and second separation apparent resistivity and apparent chargeability are displayed in Figures 3, 4, 5 and 6 respectively. An interpretation of the data is presented in Figure 8.

Results and Interpretation

The most intense induced polarization response was obtained in the northeastern portion of the grid. The highest chargeability values obtained were of the order of 40 milliseconds at coordinates 28+00E, 18+00N. This anomaly, labelled IP anomaly #1, in Figure 8, remains open to the east. It is interpreted to reflect a source of 2-3% total sulphides by volume. Intermediate resistivities of 200 ohm-metres are associated with the anomaly. Bedrock exposures within the anomaly along Rattlesnake Creek consist of hornblende diorite and quartz porphyry containing ubiquitous pyrite and are characterized by a yellow-brown limonite stain due to weathering. This pyrite mineralization within these intrusive rocks would appear to be the major source of the IP response.

A weak induced polarization response of the order of 20 milliseconds is observed on the plan chargeability N = 2 map. This has been labelled IP anomaly #2 on Figure 8. Chargeability values are lower on the first separation N = 1 plan indicating that the intensity of sulphides have increased with depth. The total sulphide content indicated, however, is within the range of 1 - 1½% by volume. This chargeability feature is associated with relatively high apparent resistivities above 500 ohm-metres. Hornblende diorite is mapped in the immediate vicinity and Nicola volcanics are exposed further to the west just off the grid area in a small tributary of Brassie Creek. Increased pyrite concentrations possibly associated with the diorite Nicola contact is attributed to be the source of this response.

The northern portion of the survey area generally has a slightly above background chargeability response. In Figure 8 the dashed line reflects this change. North of this line an average bedrock sulphide content of 1% by volume is interpreted.

The apparent resistivity plan maps display north-northwest and northsouth trends which are best displayed in the Plan Resistivity N = 1 Map. These trends and the apparent resistivity zones they differentiate are shown in Figure 8. Higher apparent resistivities are noted west of the north-northwest trend. The decrease in apparent resistivities to the east may be caused by an increase in overburden and also an increase in porosity related to increase fracturing caused by faulting along Rattlesnake Creek.

The lowest apparent resistivity values were obtained in the southeast corner of the grid. These low values correlate well with siltstones, sandstones and conglomerate units of the Tertiary Coldwater group.

GROUND MAGNETOMETER SURVEY

Introduction and Theory

A ground magnetometer survey was undertaken to aid in the geological interpretation of drift covered areas.

The magnetism of all rocks is controlled by their content of ferromagnetic material, e.i. substances possessing a relatively high susceptibility and capable of acquiring permanent magnetization. Often intrusions are accompanied by widespread hydrothermal alteration zones in which ferromagnetic minerals, principally magnetite, may be redistributed in such a way that the altered zone is characterized by a distinctive magnetic signature.

Instrument and Procedure

The magnetometer used to carry out this work was a Sharpe M.F.-1 fluxgate magnetometer, manufactured by Sharpe Instruments of Canada Limited, now the instrument manufacturing division of Scintrex Limited, Toronto, Ontario. The instrument measures variations in the vertical component of the earth's magnetic field to ± 10 gammas on the most sensitive scale.

Measurements were made at 100-foot station intervals along all cross lines and along fill in cross lines 8E and 4E on the south side of the baseline. Corrections for diurnal variations of the earth's magnetic field were made to these measurements by tying in to previously established base stations at intervals not exceeding two hours. By surveying in this manner, on days when the diurnal changes are small, it is generally possible to repeat any reading on the property to within ± gammas.

Presentation of Data

An isomagnetic plan map is presented in Figure 7 having a 500-gamma contour interval. An interpretation of the magnetic results is displayed in Figure 8. Major magnetic boundaries, possible faults, and lineaments have been interpreted.

Results and Interpretation

Magnetic anomaly #1 in the southwest corner of the map area indicates the highest magnetic susceptibility. It is 3500 gammas above background and was obtained in an overburden covered area immediately adjacent to a mapped hornblende diorite intrusive mass. The anomaly may reflect a localized concentration of magnetite within the hornblende diorite or more likely a magnetite skarn assemblage at the margin of the intrusion.

Magnetic anomaly #2 represents a magnetic boundary greater than 500 gammas above background which encompasses anomaly #1. It is coincident with the major hornblende diorite intrusive mass. Since other outcroppings of hornblende diorite do not always have a high magnetic response it would appear that this phase of the intrusion has an increased mafic and/or magnetite content.

Magnetic anomaly #3 is a subtle magnetic low. It trends west-northwest and has been targeted because of its association with disseminated chalcopyrite mineralization in intrusive breccia bodies within Rattlesnake Creek.

The predominant magnetic lineaments trend northwest and northeast as shown in Figure 8. One possible northeast fault bounding the west side of anomaly #7 is suggested.

CONCLUSIONS AND RECOMMENDATIONS

The induced polarization anomalies obtained can be explained by observed or inferred pyrite mineralization within intrusive rock types. Chargeability values obtained over disseminated chalcopyrite in intrusive breccia bodies in the southern part of Rattlesnake Creek indicate a total sulphide content of less than 1% by volume.

Mapped outcrops of intrusive breccia to date occur along a very narrow northwest trending zone some 900 feet in length. The magnetic low obtained in the ground survey suggest that these breccias may extend laterally up to 600 feet west of Rattlesnake Creek.

No significant exploration targets are offered by the data. One somewhat puzzling trend is the increase in chargeabilities and interpreted pyrite content in the northern portion of the grid. At present it would appear that the pyrite mineralization in the northern grid is unrelated to the disseminated chalcopyrite in the intrusive breccias. In view of the regional position of the property and the realization that porphyry copper deposits within the Guichon Batholith contain relatively low total sulphides further detailed geological mapping is warranted along Rattlesnake Creek to ensure that no mineral zoning exists between the chalcopyrite and pyrite. If no encouragement is obtained no further work is recommended.

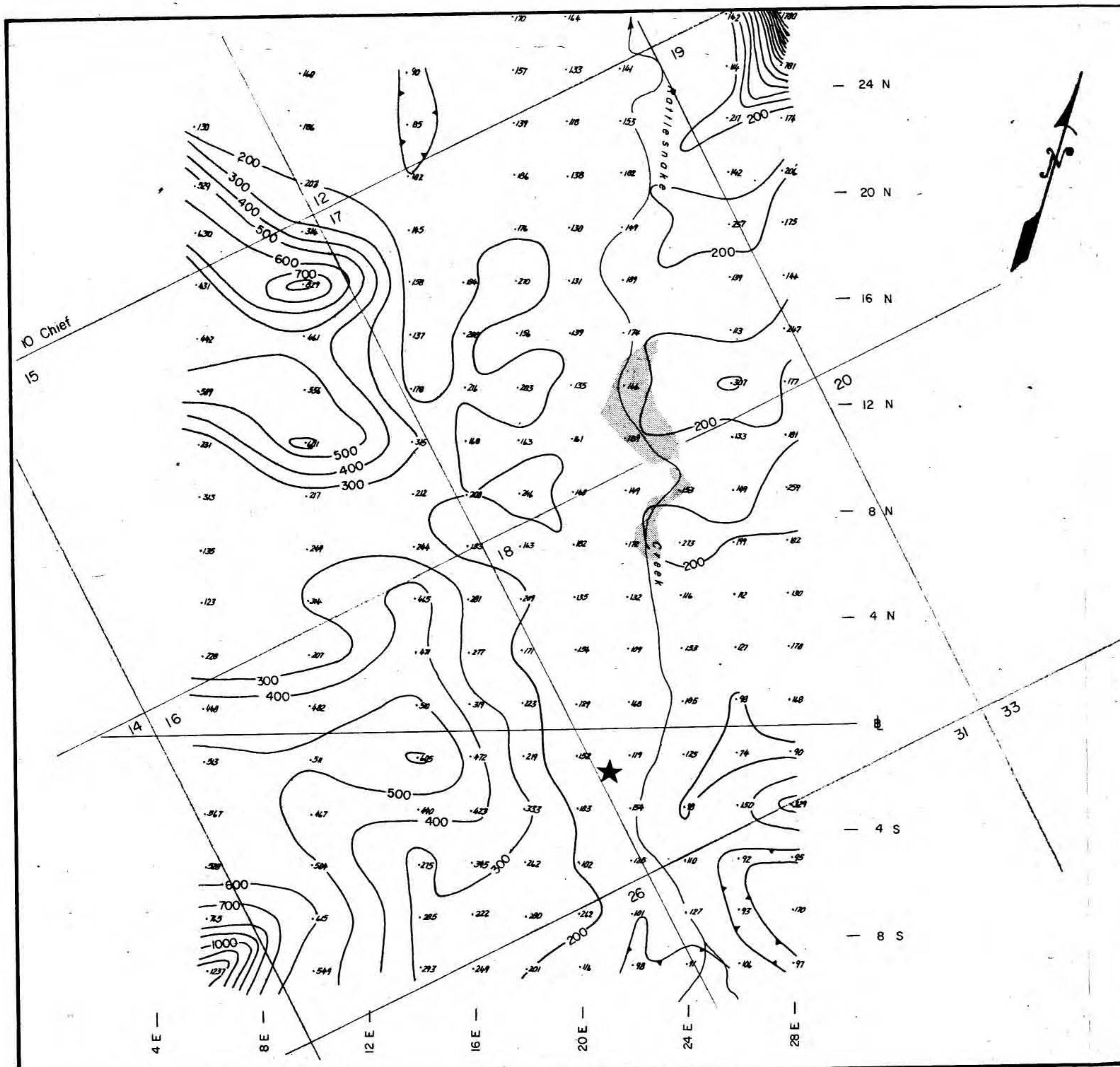
Respectfully submitted,

Garry M. DePaoli
Geophysicist, B.Sc.

November 4, 1975
Vancouver, B.C.

Supervision

D.K. Mustard, P.Eng.



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NO. 5730 MAP 3

LEGEND

• 277 APPARENT RESISTIVITY IN OHM METERS

— 200 — APPARENT RESISTIVITY CONTOUR
LINEAR CONTOUR INTERVAL, 100 OHM METERS

★ COPPER OCCURRENCE

GOSSAN

OPERATOR: EAGLE GEOPHYSICS
HUNTEC MARK III TIME DOMAIN SYSTEM
POLE - DIPOLE ARRAY
DIPOLE LENGTH 200 FT., N = 1

SCALE

0 100 200 300 METERS
0 400 800 FEET

BP Minerals Limited

PLAN RESISTIVITY, N = 1

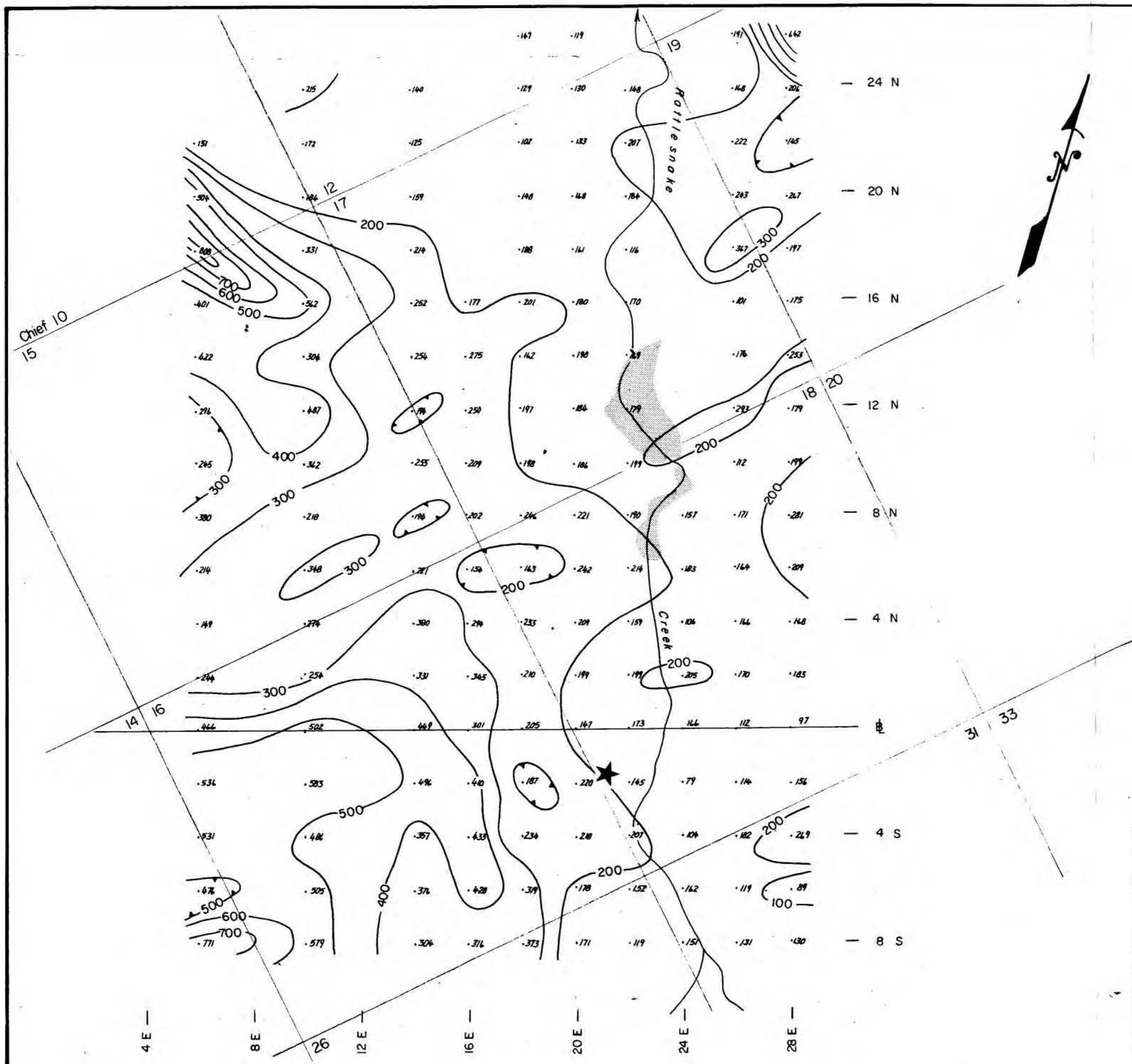
CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M. D., B.C.

SCALE as shown		NTS 92 I 11	FIG. 3
DRAWN	DATE OCT., 1975	PROJ. 505	

To accompany report: Geophysical Report on CHIEF Claims, Walhachin, by D.K. Mustard, P.Eng. & G.M. DePAOLI

D.K. Mustard P.Eng 4 Nov 1975



Department of
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ASSESSMENT REPORT
NO. 5730 MAP 4

LEGEND

.267 APPARENT RESISTIVITY IN OHM METERS

—200— APPARENT RESISTIVITY CONTOUR
LINEAR CONTOUR INTERVAL, 100 OHM METERS

★ COPPER OCCURRENCE

GOSSAN

OPERATOR: EAGLE GEOPHYSICS
HUNTEC MARK III TIME DOMAIN SYSTEM
POLE - DIPOLE ARRAY
DIPOLE LENGTH 200 FT., N = 2

SCALE

0 100 200 300 METERS
0 400 800 FEET

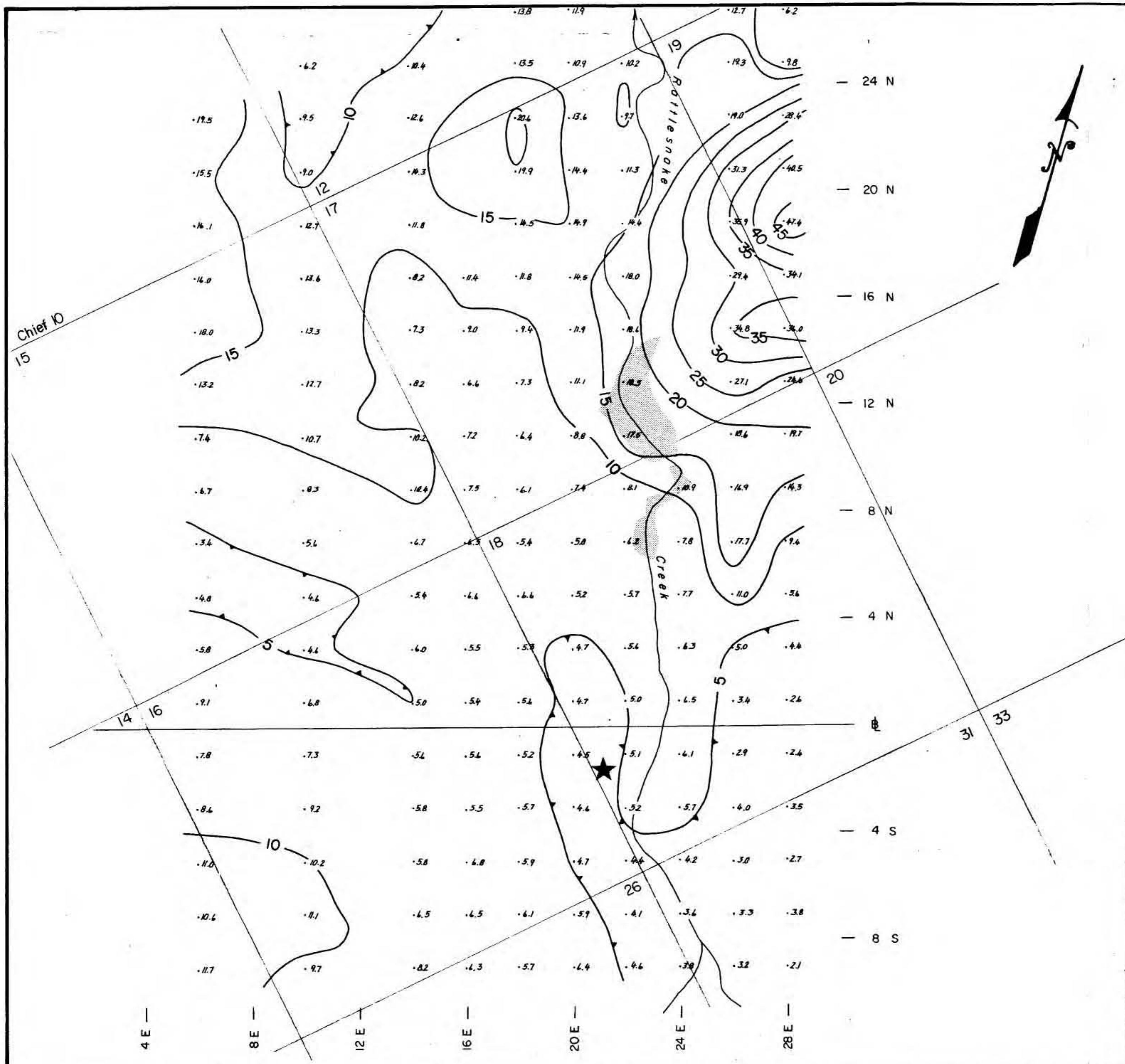
BP Minerals Limited

PLAN RESISTIVITY, N = 2

CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M. D., B.C.

SCALE as shown		NTS 92 I 11	FIG. 4
DRAWN	DATE OCT., 1975	PROJ. 505	
To accompany report: Geophysical Report on CHIEF Claims, Walhachin, by D. K. Mustard, P.Eng. & G.M. DePaoli			



Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5730 MAP 5

LEGEND

•27.1 APPARENT CHARGEABILITY IN MILLISECONDS

— 25 — APPARENT CHARGEABILITY CONTOUR LINEAR CONTOUR INTERVAL, 5 MILLISECONDS

★ COPPER OCCURRENCE

GOSSAN

OPERATOR: EAGLE GEOPHYSICS
HUNTEC MARK III TIME DOMAIN SYSTEM
POLE - DIPOLE ARRAY
DIPOLE LENGTH 200 FT., N = 1

SCALE

0 100 200 300 METERS
0 400 800 FEET

BP Minerals Limited

PLAN CHARGEABILITY, N = 1

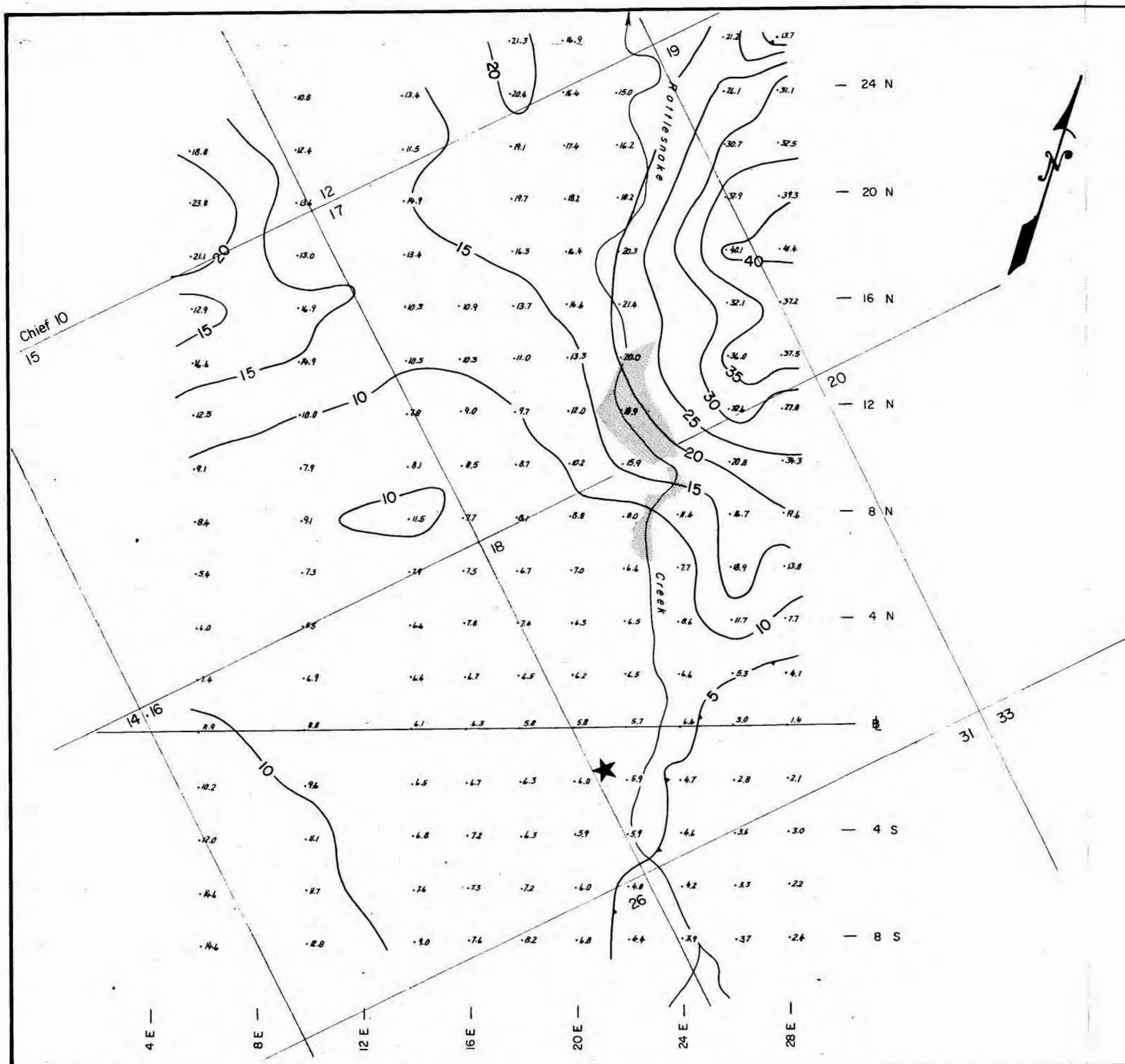
CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M.D., B.C.

SCALE as shown		NTS 92 I 11	FIG. 5
DRAWN	DATE OCT., 1975	PROJ. 505	

To accompany report Geophysical Report on CHIEF Claims, Walhachin, by D.K. Mustard, P. Eng. & G.M. DePAOLI

D.K. Mustard P.Eng. 4 Nov 1975



Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5730 MAP 6

LEGEND

.24.1 APPARENT CHARGEABILITY IN MILLISECONDS

— 25 — APPARENT CHARGEABILITY CONTOUR LINEAR CONTOUR INTERVAL, 5 MILLISECONDS

★ COPPER OCCURRENCE

GOSSAN

OPERATOR: EAGLE GEOPHYSICS
HUNTEC MARK III TIME DOMAIN SYSTEM
POLE-DIPOLE ARRAY
DIPOLE LENGTH 200 FT., N = 2

SCALE

0 100 200 300 METERS
0 400 800 FEET

BP Minerals Limited

PLAN CHARGEABILITY, N=2

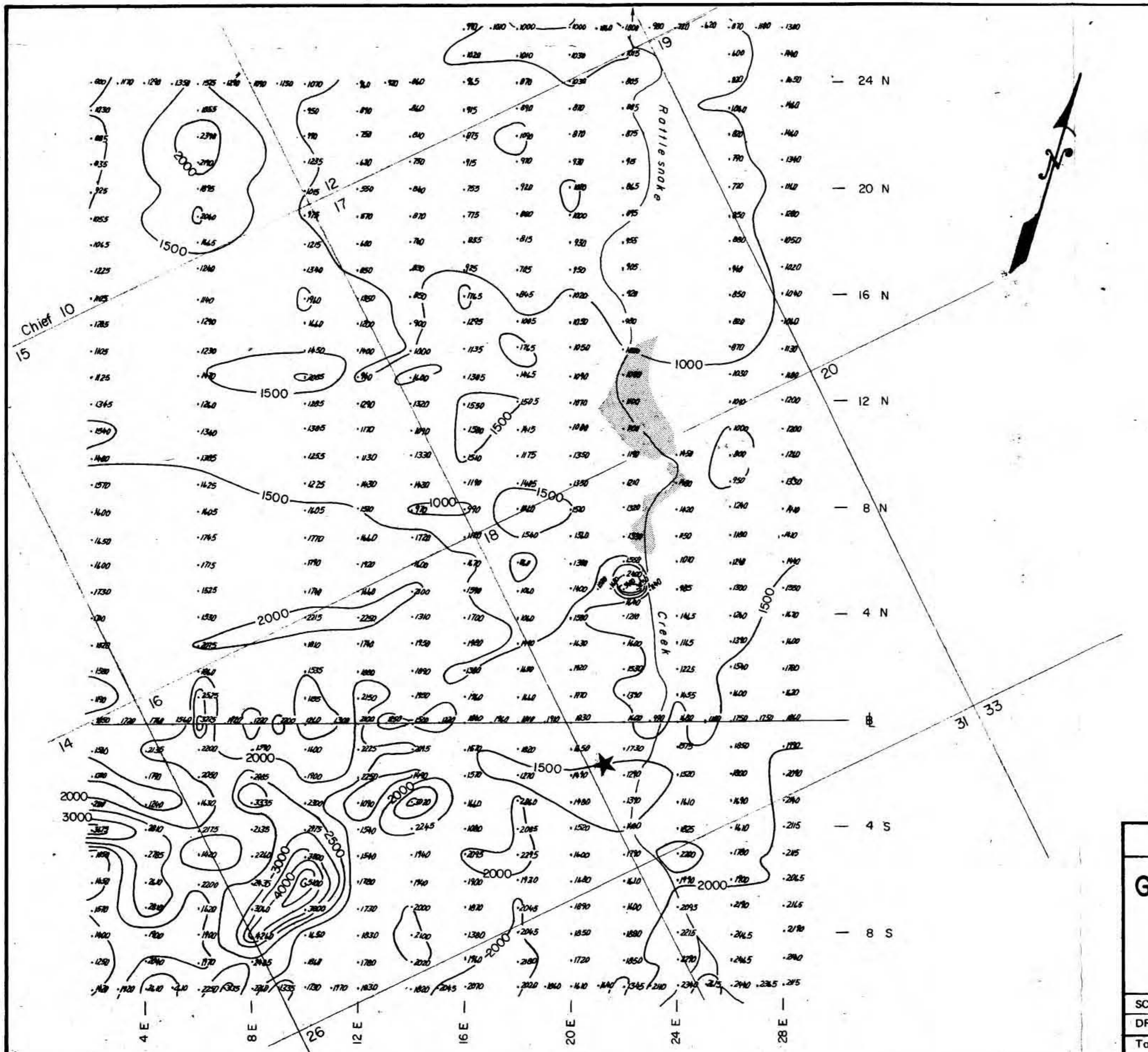
CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M.D., B.C.

SCALE as shown		NTS 92 I II	FIG. 6
DRAWN	DATE OCT., 1975	PROJ. 505	

To accompany report: Geophysical Report on CHIEF Claims, Walhachin, by D.K. Mustard, P. Eng. & G.M. DePaoli

D.K. Mustard P.Eng 4 Nov 1975



Department of
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ASSESSMENT REPORT
NO. 5730 MAP 7

LEGEND

—1000— CONTOUR INTERVAL 500 GAMMAS

★ COPPER OCCURRENCE

GOSSAN

SCALE

0 100 200 300 METERS

0 400 800 FEET

BP Minerals Limited

GROUND MAGNETOMETER SURVEY

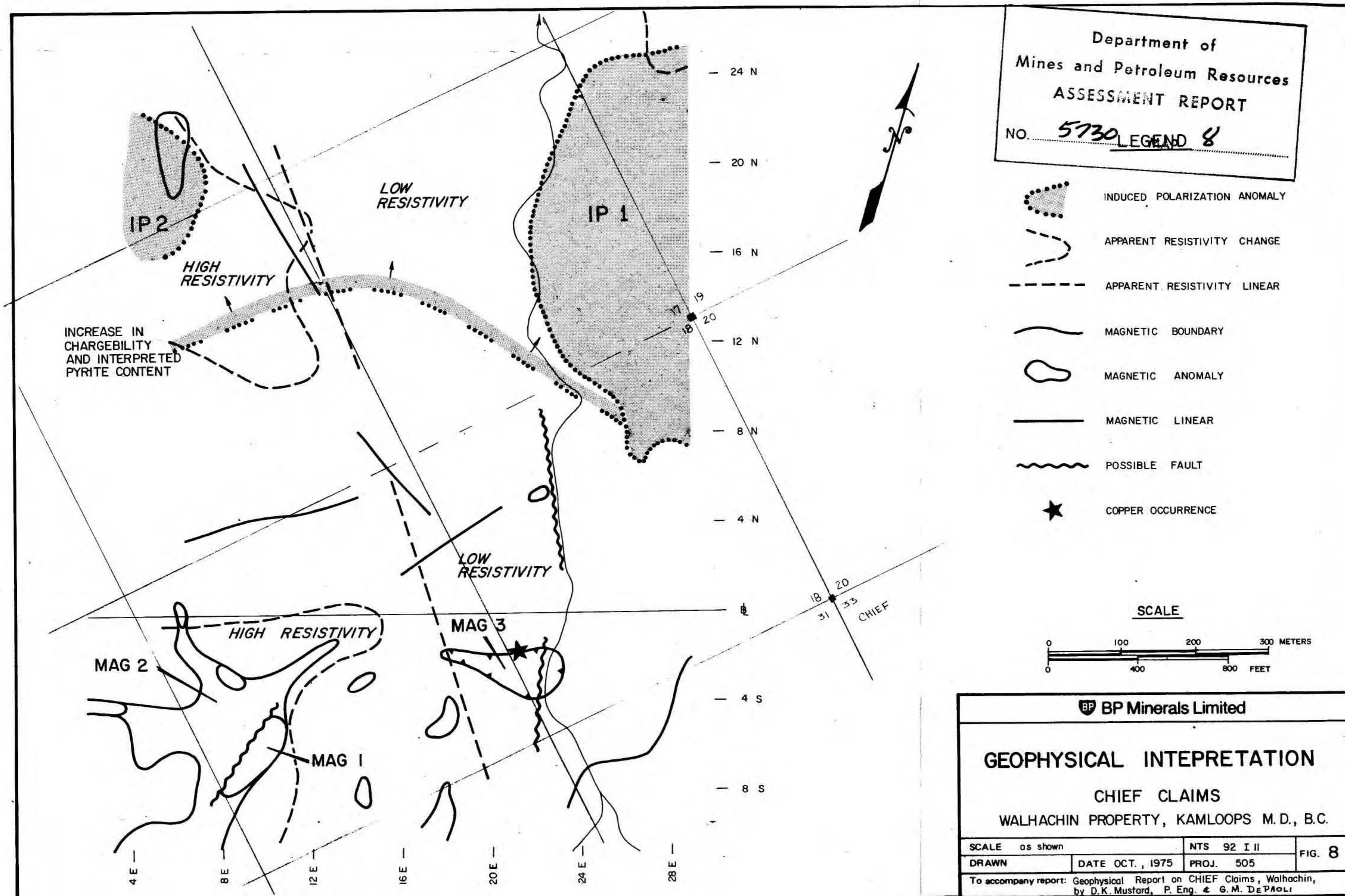
VERTICAL COMPONENT MEASUREMENTS

CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M.D., B.C.

SCALE as shown		NTS 92 I II	FIG. 7
DRAWN	DATE OCT., 1975	PROJ. 505	

To accompany report: Geophysical Report on CHIEF Claims, Walhachin, by D.K. Mustard, P.Eng. & G.M. DePaoli



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ASSESSMENT REPORT
NO. 5730 8

BP Minerals Limited

GEOPHYSICAL INTEPRETATION

CHIEF CLAIMS

WALHACHIN PROPERTY, KAMLOOPS M.D., B.C.

SCALE as shown		NTS 92 I 11	FIG. 8
DRAWN	DATE OCT., 1975	PROJ. 505	

To accompany report: Geophysical Report on CHIEF Claims, Walhachin, by D.K. Mustard, P. Eng. & G.M. DePaoli

D.K. Mustard P.Eng 4 Nov 1975

CERTIFICATION

I, Garry M. DePaoli, of the City of Burnaby, in the Province of British Columbia, HEREBY CERTIFY AS FOLLOWS:

1. That I am a graduate of the University of British Columbia, Vancouver, B.C., with a Bachelor of Science Degree in Combined Honours Geophysics and Geology (1969).

2. That I have practiced my profession as a Geophysicist continuously for the past 6 years in Northern Ontario, Quebec, Manitoba, Western USA, Alaska, Yukon Territories and British Columbia.

3. That I am a member in good standing of the Society of Exploration Geophysicists, the Geological Association of Canada, the Canadian Institute of Mining and Metallurgy, and the B.C. Society of Exploration Geophysicists.

4. That I have no interest directly or indirectly in the Walhachin property nor do I expect to receive any.

Garry M. DePaoli
Geophysicist, B.Sc.

November 4, 1975
Vancouver, B.C.

CERTIFICATION

I, John Lloyd, of 575 Lucerne Place in the District of North Vancouver, in the Province of British Columbia, do hereby certify that:-

1. I graduated from the University of Liverpool, England in 1960 with a B.Sc. in Physics and Geology, Geophysics Option.

2. I obtained the Diploma of the Imperial College of Science and Technology (D.I.C.), in Applied Geophysics from the Royal School of Mines, London University, in 1961.

3. I obtained the degree of M.Sc. in Geophysics from the Royal School of Mines, London University, in 1962.

4. I am a member of the Association of Professional Engineers in the Province of British Columbia, the Society of Exploration Geophysicists of America, the European Association of Exploration Geophysicists and The Canadian Institute of Mining and Metallurgy.

5. I have been practising my profession for the last twelve years.

6. I have no interest or shares in any property or securities of BP Minerals Limited nor do I expect to receive any.

John Lloyd, P. Eng.

Vancouver, B. C.

October, 1975

ASSESSMENT DETAILS

Work Summary

1) 8.14 miles of line cutting, flagging and chaining. December 3 - December 12, 1974.

2) 7.7 miles of ground magnetometer surveying. December 10 - December 15, 1974.

3) 7.0 line miles of induced polarization/resistivity surveying. December 12 - December 20, 1974.

4) Report Preparation and Interpretation. November 3-7, 1975.

Personnel

A.A. Ablett	-	Line cutting Contractor, Amex Exploration Services Ltd., #204-635 Victoria Street, Kamloops, B.C.
John Lloyd	-	Geophysicist, Eagle Geophysics Ltd., 575 Lucerne Place, North Vancouver, B.C.
L.D. Brydle	-	Geophysicist, Eagle Geophysics Ltd., 575 Lucerne Place, North Vancouver, B.C.
D.S. Coote	-	Geophysical Assistant, Eagle Geophysics Ltd., 575 Lucerne Place, North Vancouver, B.C.
D. Baker	-	Geologist, BP Minerals Limited 405-1199 West Pender Street, Vancouver, B.C.
Garry M. DePaoli	-	Consulting Geophysicist, Morrison & DePaoli, 5305 East Georgia Street, Burnaby, B.C.

Cost Statement

1)	Grid Preparation as per Amex Exploration Services Ltd. Invoice attached.	$ 895.40
2)	IP Survey as per Eagle Geophysics Ltd. Invoice attached.	4,587.08
3)	Grid and IP Survey Coordination and Ground Magnetometer Survey. D. Baker, December 2 - December 20,1974 19 days @ $24/day	456.00
4)	Morrison & DePaoli, Geophysical Surveying and Consulting as per invoice attached.	300.00
5)	Report typing, drafting and compilation.	300.00
	Total Cost to be applied for assessment	$6,538.48

AMEX EXPLORATION SERVICES LTD.

A. A. (AB) ABLETT
Confidential Work

BUS. 374-1123
RES. 376-7490
204, 635 VICTORIA STREET
BOX 286
KAMLOOPS, B.C.

December 20, 1974

BP Minerals Limited,
405-1199 West Pender Street,
Vancouver, B.C.

STATEMENT OF ACCOUNT

Re: Grid preparation, Chief Group mineral claims,
Walhachin Area, Kamloops Mining Division.

Line No.		Footage North	Footage South
Line '0'		2600'	1000'
2W		2600'	1000'
4W		1000'	1000'
6W		2600'	1000'
8W		2600'	1000'
10W		2600'	1000'
12W		2400'	1000'
14W		2400'	1000'
16W		2400'	1000'
18W		2400'	1000'
22W		2400'	1000'
26W		2400'	1000'
B/L	2600'W		
	2600'	28400'	12000'

Total footage completed = 43,000' = 8.14 miles

Cost 8.14 miles @ $110.00 per mile = $895.40

Total requested = $895.40

Yours very truly,

A.A. Ablett,
Amex Exploration Services Ltd.

APPROVED FOR PAYMENT
CHARGE 80015
DATE 21 JAN 75 INTLS

EPHONE 6883XXX
988-6488

B P Minerals Limited
RECEIVED
JAN 17 1975

EAGLE GEOPHYSICS LIMITED

575 Lucerne Place, North Vancouver, B. C. (Vancouver, B.C.)

TO B P Minerals Limited,
405 - 1199 West Pender Street,
Vancouver 1, B. C.

Attention: Mr. D. K. Mustard

DATE January 10, 1975
TERMS: Net 10 days

Re: Clause	DESCRIPTION	AMOUNT
	Re: IP Survey Walhachin Area, B. C. As Per Letter Agreement Dated December 5, 1974	
1.	Lloyd, Brydle + IP Gear (see attachments)	
	8 Survey days @ $310.00 per day	$2,480.00
	2 Travel days @ 165.00 per day	330.00
	Shipping Charges (Panorex Services Ltd.)	18.25
2.	D. Coote (Helper)	
	10 days @ $40.00 per day	400.00
3.	Magnetometer Rental (Dec. 3 to Dec. 19 incl.)	
	17 days @ $10.00 per day	170.00
4.	Truck Charges: 1.43 weeks (10 days) @ $150.00/week	214.50
	Mileage Charges: 783 miles @ 0.12 per mile	93.96
	Gasoline Purchases: (see attachments)	119.90
5.	Dec. 20, 1974: Expense Report, J. Lloyd	27.40
	Hotel: Travelodge (Lloyd, Brydle, Coote & Baker)	299.39
	Meals: Wander Inn (Lloyd, Brydle, Coote & Baker)	364.55
	Plus 10% of Item 5.	69.13
	Total Payable	$4,587.08

APPROVED FOR PAYMENT
CHARGE 80015
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INVOICE № 1214

MORRISON & DEPAOLI
GEOPHYSICAL SURVEYING & CONSULTING

P.O. BOX 418,
GRAVENHURST, ONTARIO
POC 1GO.

5305 E. GEORGIA ST.,
BURNABY 2, B.C.,
V5B 1V3.

NOVEMBER 12, 1975.

BP MINERALS LIMITED,
1199 WEST PENDER STREET,
VANCOUVER, B.C.

RE: CONSULTING SERVICES WALHACHIN PROPERTY.

Report Writing and Interpretation of induced polarization and ground magnetic data over the Walhachin Mineral Property in the Kamloops Mining Division.
Garry M. DePaoli - November 3,4, 1975 @ $150.00 per day... $300.00

TOTAL NOW DUE AND PAYABLE $300.00

Please make payment to:

Dennis F. Morrison,
P.O. Box 418,
Gravenhurst, Ontario.
POC 1GO

Yours very truly,
Garry M. DePaoli
GARRY M. DEPAOLI.

GMD/gmd.

List of Claims

CHIEF Claims and Ownership
Mining Division: Kamloops

Claim No.	Record No.	Record Date
Chief 15	85591	19 Nov 1969
17	85593	"
18	85594	"
20	85596	"
28	85604	"
29	85605	"
30	85606	"
31	85607	"
32	85608	"
33	85609	"
34	85610	"
37	85613	"
38	85614	"
39	85615	"
40	85616	"
41	85617	"
42	85618	"
43	85619	"
44	85620	"
45	85621	"
46	85622	"
47	85623	"
Chief 48	85624	19 Nov 1969

Claims owned by BP MINERALS LIMITED
335 Eighth Avenue S.W.
Calgary, Alberta

Assessment work paid for by BP MINERALS LIMITED

APPENDIX 1

WALHACHIN PROPERTY

REPORT ON 1974 GEOLOGICAL MAPPING PROGRAM

Alastair R. Findlay

Vancouver Office

February 1975

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LOCATION AND ACCESS

The Walhachin property is situated on the south side of the Thompson Valley, approximately 32 miles west of Kamloops, and a few miles south and west of the small settlement of Walhachin. The Trans-Canada Highway, and the main C.P.R. and C.N.R. railway lines pass close to the northern boundary of the property. Several good four wheel drive roads provide easy access.

The map area described in this report varies in elevation from 1200 feet to 2600 feet. Open forest covers the southern fringe of this area, above an elevation of approximately 2300 feet. The greater part of the map area, however, is treeless, sagebrush covered, terrain. Brassie and Rattlesnake Creeks, which flow during the greater part of the year, occupy steep sided, locally precipitous gullies which are in part filled with thick brush.

PREVIOUS WORK

Supertest Investment and Petroleum Ltd. carried out geological mapping, soil sampling, I.P. and magnetometer surveys and diamond drilling during the period 1969-73. The coverage and results of this work are summarized in the BP report "Review of Work on the Walhachin Property" by J.S. Pomeroy (October 1972).

THE 1974 PROGRAM

BP Minerals completed a program of detailed geological mapping and soil sampling during May and October 1974. The results of the soil sampling will be described by S. Hoffman.

Geological mapping was carried out on a 1 inch=400 feet enlargement of the 1"=¼ mile B.C. Government airphotos. These enlargements provide the basis of the geological map which accompanies this report. Mr. John Lloyd of Eagle Geophysics Ltd. completed a 5-line mile I.P. survey, and magnetometer survey of the area around lower Rattlesnake Creek in November 1974.

REGIONAL GEOLOGY

The Thompson River Valley between Ashcroft and Walhachin broadly coincides with the northern border of the Guichon batholith. The Upper Triassic Guichon batholith is a composite oval pluton, approximately 40 miles long, which is composed of quartz monzonite, granodiorite and quartz diorite. It is in contact with volcanic rocks of the Upper Triassic Nicola Group in the vicinity of Walhachin, and with sedimentary and volcanic rocks of the Permian Cache Creek Group around Ashcroft. The Guichon batholith and the Nicola and Cache Creek rocks are overlain by large areas of Tertiary Kamloops Group volcanic and sedimentary rocks around Walhachin.

GEOLOGY OF THE PROPERTY

Nicola Group rocks, which consist largely of andesite and basalt flows and fragmental rocks, together with limestone, underlie much of the western and northern parts of the map area. The large body of hornblende diorite which has intruded the Nicola rocks probably connects with the Guichon batholith, under Tertiary cover, to the south. The hornblende diorite has been intruded by a body of quartz syenite-quartz monzonite and associated intrusive breccia, and by a small quartz porphyry pluton.

Copper minerals occur widely in minor amounts, in particular in pyritised Nicola andesites, in a vein of massive magnetite, and in a skarn at a diorite-limestone contact. However the most prospective copper occurrence contains disseminated chalcopyrite in intrusive breccia bodies on the west side of lower Rattlesnake Creek.

NICOLA GROUP

The Nicola Group is composed of andesite and basalt flows and fragmental rocks together with minor dacite, greywacke and limestone.

Volcanic Rocks

Andesite and basalt flows are typically medium to dark green, or black in colour. They generally contain phenocrysts of plagioclase, often accompanied by hornblende or augite, in a very fine grained groundmass. Fragmental rocks are, overall, less abundant than flow rocks, and consist largely of andesite and lapilli breccia. The finer grained tuffs are generally well banded, and are often silicified. Individual fragmental units reach a thickness of at least 150 feet on the hillside northwest of the mouth of Brassie Creek. Dacite forms a significant proportion of the Nicola Group volcanic rocks which outcrop between Brassie and Rattlesnake Creeks, north of D.D.H.73-2 and 73-4. This dacite contains phenocrysts of plagioclase, and minor quartz, in a pale to medium green groundmass, which is commonly silicified. The phenocryst quartz content averages a few percent, but locally reaches 10%. Greywacke outcrops of the west side of Brassie Creek in the vicinity of D.D.H.73-1 and 73-1A, and on the hillside to the northwest (around locality 149). This greywacke contains abundant feldspar and quartz clasts, and scattered rock fragments, chiefly of chert and andesite. Quartz clasts form up to 25% of the greywacke.

The Nicola volcanic rocks generally contain moderate to abundant amounts of fine grained disseminated magnetite. Pyrite occurs almost everywhere within the Nicola volcanic rocks, but generally in minor amounts. The Nicola volcanics intersected in most drill holes contain less than 1% pyrite, though a number of short sections, most less than 5 feet long, contain more than 5%. D.D.H.73-1A, however, intersected a considerable proportion of Nicola volcanic rocks containing more than 5% pyrite. Nicola volcanic rocks are almost everywhere affected by pervasive chloritisation. Abundant epidote occurs locally. Both flows and fragmental volcanic rocks are also locally affected by 'pink alteration', which may represent introduction of secondary K felspar. Such pink altered volcanics sometimes also contain abundant epidote.

Limestone

Five large bodies of limestone (map unit 6) occur within the Nicola Group volcanic rocks. The four bodies exposed in the southern part of the map area show steep dips, and are bounded on at least one side by faults; it is not known whether these bodies are parts of one unit which was broken up by faulting. The limestone body which outcrops in the vicinity of the adit is at least 200 feet thick, and the other three bodies in the southern part of the map area are probably of comparable thickness.

The limestone is typically a pale grey clean marble, with an average grain size of .5 and 2 mm, which contains narrow laminae and lenses of siliceous impurity whose orientation indicates the bedding attitude. A small body of siliceous green skarn, containing minor chalcopyrite and chalcocite, occurs beside the collar of D.D.H.73-4 at the contact between limestone and hornblende-diorite.

KAMLOOPS GROUP

Volcanic Rocks

Red-brown, grey and black basalt flows and fragmental rocks of the Kamloops Group occur within the southwestern corner of the map area. Two subvertical dykes of fine grained basalt with numerous calcite infilled amygdules cut Nicola volcanic rocks in the southern part of the map area (at note localities 52 and 124).

Coldwater Group

Conglomerate, minor sandstone and siltstone of the Coldwater Group underlie the southern and eastern borders of the map area. The Coldwater beds are generally subhorizontal.

INTRUSIVE ROCKS

Hornblende diorite underlies a large part of the map area, and may well extend south under Tertiary cover to connect with the Guichon batholith. In the northeastern part of the map area this diorite is cut by a small quartz syenite-quartz monzonite body and associated intrusive breccia bodies, and by a small quartz porphyry pluton. A small body of quartz diorite porphyry is exposed in the northeastern corner of the map area.

The age of the hornblende diorite is probably the same as that of the main mass of the Guichon batholith, Late Triassic. The intrusion of the quartz syenite-quartz monzonite and associated breccia bodies was, quite likely, one of the late intrusive events associated with emplacement of the diorite. The ages of the quartz porphyry and of the quartz diorite porphyry are not known; these plutons may have been emplaced in either Mesozoic or Tertiary time.

Hornblende Diorite

Hornblende diorite typically contains 20-30% hornblende, and between 5 and 15% K feldspar. The varieties rich in K feldspar may approach monzonite in composition. K feldspar can usually be distinguished from plagioclase by its pale pink hue. The hornblende diorite contains only very minor quartz, generally less than 1%, although a small body of hornblende diorite intersected in D.D.H.73-5 contains an average of 10% quartz. The hornblende diorite is typically equigranular with an average grain size of between .5 and 2 mm; locally, however, it has a subporphyritic texture and contains plagioclase and hornblende phenocrysts. Fine grained disseminated magnetite is ubiquitous and probably averages between 3 and 5%, although it locally exceeds 10%. Pyrite is rare, but occurs in trace amounts at scattered localities.

Widespread chloritisation of hornblende is the only significant hydrothermal alteration effect throughout most of the diorite. Diorite in widely scattered localities is affected by pervasive 'pink alteration', which may well indicate introduction of secondary K feldspar. The majority of diorite exposed around note locality 77 is affected by pink alteration, commonly accompanied by 'blurring' of primary igneous texture. A 90-foot intersection of diorite in D.D.H.5, part of a small pluton satellitic to the main hornblende diorite mass, is pervasively pink altered and contains abundant epidote. Diorite is strongly silicified in a few scattered localities, where silicification is probably related to structural deformation.

Hornblende diorite over a horizontal distance of approximately 500 feet adjacent to the southern border of the quartz porphyry in Rattlesnake Creek contains abundant pyrite and is commonly moderately clay altered and limonite stained. This alteration seems to be in large part a product of weathering, promoted by the decomposition of pyrite. Outcrops of hornblende diorite in this area which contain fresh pyrite are also only weakly altered. The strongly pyritised diorite south of the quartz porphyry pluton locally contains a network of quartz veins, many containing pyrite, as close spaced as 1 per 5 cm. The contact between hornblende diorite and Nicola volcanics, where observed, is sharp.

Quartz syenite-Quartz monzonite (map unit 2)

A small quartz syenite-quartz monzonite pluton, associated with several bodies of intrusive breccia is exposed along the west bank of Rattlesnake Creek. This pluton is at least 300 feet wide and is in fault contact with Coldwater Beds on its eastern side. The quartz syenite-quartz monzonite has a characteristic pink colour. It is in part porphyritic, containing scattered plagioclase phenocrysts in a very fine grained groundmass, and in part equigranular.

The average grain size ranges from less than .5 mm to 2 mm. The fine grained varieties often show a granophyric texture. The quartz syenite-quartz monzonite contains between 5 and 15% quartz and shows a rather variable K feldspar-plagioclase ratio. Some of the more quartz rich, plagioclase poor varieties may be of granite composition. The quartz syenite-quartz monzonite does not appear to have been affected by significant hydrothermal alteration, unless some proportion of the K feldspar is of secondary origin.

Intrusive breccia (map unit 3)

At least three bodies of intrusive breccia are associated with the quartz syenite-quartz monzonite body exposed on the west side of Rattlesnake Creek. These bodies of intrusive breccia contain disseminated chalcopyrite and are now considered to be the focus of exploration interest on the Walhachin property. The intrusive breccia contains clasts of diorite in a matrix of pink quartz syenite-quartz monzonite. The diorite clasts commonly exceed 5 cm. in size, and have a subangular to subrounded shape. They are composed of medium grained, equigranular hornblende diorite of similar lithology to the main hornblende diorite. The quartz syenite-quartz monzonite matrix resembles the quartz syenite-quartz monzonite within which the breccia bodies occur, although it seems to contain, overall, less K feldspar. The diorite clasts contain abundant disseminated magnetite, locally as much as 15%. Intrusive breccia is typically relatively unaltered.

The southernmost body of intrusive breccia is at least 50 feet wide, and is probably in contact with diorite along its southern border. The central body, which is the best exposed of the three, forms a subvertical dyke approximately ten feet wide, which has a strike length of at least 70 feet. Outcrops and suboutcrops of intrusive breccia were observed over a distance of at least 600 feet, northwest of the quartz syenite-quartz monzonite body. These outcrops and suboutcrops may represent either one large body of intrusive breccia, or several smaller bodies.

The similarity of the breccia matrix and the quartz syenite-quartz monzonite suggests that the quartz syenite-quartz monzonite and intrusive breccia were intruded into hornblende diorite at approximately the same time.

Quartz Porphyry (map unit 4)

The outcrops of quartz porphyry along the northern part of Rattlesnake Creek probably represent a single pluton, with a north-south dimension of at least 1500 feet. The quartz porphyry contains phenocrysts of rounded quartz and subhedral plagioclase in a very fine grained, highly siliceous groundmass. Quartz phenocrysts, typically 2-3 mm in diameter, generally form between 10 and 15% of the porphyry. The quartz porphyry contains ubiquitous minor pyrite, both disseminated and along fracture planes. The total pyrite content rarely exceeds 2%. Many quartz porphyry outcrops show a characteristic yellow-brown limonite stain, caused by the weathering of pyrite. The quartz porphyry is cut by numerous narrow quartz veinlets and stringers. The highly siliceous nature of the groundmass suggests that the porphyry has been affected by significant silicification. The contact between quartz porphyry and hornblende diorite is exposed in the bed of Rattlesnake Creek at note locality 119. Quartz porphyry here veins diorite and is thus clearly younger.

Quartz diorite porphyry

A body of quartz diorite porphyry, at least 100 feet across, is exposed in a railway cut in the northeast corner of the map area. Numerous plagioclase phenocrysts and scattered quartz eyes, both several mm across, occur in a very fine grained dark grey groundmass. The porphyry, which is relatively unaltered, contains disseminated magnetite and occasional trace pyrite. The relationship between this porphyry and the other intrusive rock units is not known.

STRUCTURE

Bedding in the Nicola Group rocks is indicated by banding in the interbeds of fine grained tuff, and by the attitude of lenses and laminae of siliceous impurity in limestone. Nicola volcanic rocks throughout most of the map area have a north-northwest strike, and dip to the westsouthwest at a shallow to moderate angle. Limestone typically dips more steeply, but also strikes, most often, in a northwesterly direction. A group of subparallel northwest trending faults cut Nicola Group rocks and hornblende diorite in the southern part of the map area. Their formation must have been accompanied by considerable displacement, because they form boundaries to thick limestone units. Both Nicola volcanic rocks and hornblende diorite are typically cut by close to moderate spaced joints, although Nicola volcanics are locally quite densely fractured. Joint and fracture directions are sometimes randomly oriented, though one or more joint sets are discernible in most outcrops. Two dominant joint and fracture sets are apparent in Nicola volcanic rocks, and in hornblende diorite throughout most of the map area. These sets have strikes of 45^{o} and 125^{o}. Dips of joint and fracture planes conforming to these sets are steep and variable in direction. The 125^{o} preferred strike is subparallel to the group of faults which cross the southern part of the map area.