

GEOCHEMICAL AND GEOPHYSICAL REPORT

ON THE GUN $1-20$, BID $1-46$, MAR $1-48$, PIT $1-18$

MINERAL CLAIMS - RECORD NOS. $97565-97696$.

TCHENTLO LAKE AREA - OMINECA M. D


FOR

DENISON MINES LIMITED
$B Y$
P. PISANI AND K. G. SANDERS,P.ENG.

December 31,1971


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## INTRODUCTION

An exploration program was conducted in the July, 1971 - Octber 1971 period over the Chuchi property. The program was supervised by Denison Mines Limited and included soil, sampling (by Woodcock Consultants Ltd, and Denison Mines Limited, magnetometer survey (by Denison Mines Limited ) and I. P. survey (by Seigel Associates Ltd. ). This report deals with the results, of the soil sampling and magnetometer survey. A separate report with the I. P. results is being produced.

## LOCATION AND ACCESS

The property is located to the North of the East end of Tchent10 Lake, 60 miles NNW of Fort St. James. It can be reached by aircraft on floats from Fort $S t$. James or by boat from the Nation Lakes lodge ( on the gravel road connecting Fort $S t$. James with Manson Creek ). The P.G.E. railroad now in construction passes about 20 miles to the South-West.

## CLAIMS DATA

The Chuchi property comprises 132 claims; optioned to Denison Mines Limited. They were recorded on March 3, 1971.

| NAME | RECORD | STAKED BY |
| :---: | :---: | :---: |
| GUN 1-20 | 97565-97584 | M. Bratlien |
| BID 1-20 | 97585-97604 | T. H. Cross |
| BID 21-40 | 97605-97624 | M. Bratlien |
| BID 41-46 | 97625-97630 | T. H. Cross |
| MAR 1-22 | 97631-97652 | T. H. Cross |
| MAR 23-48 | 97653-97678 | M. Bratlien |
| PIT 1-14 | 97679-97692 | T. H. Cross |
| PIT 15-18 | 97693-97696 | M. Bratlien |

## GEOGRAPHY

The property falls at the border between the Nechako Plateau and the Omineca Mountains. It is characterized by a very gentle

topography: from the Tchentlo Lake level (elevation 2,800') the ground slowly rises to 3,500 , with a slope gradient of $5^{\circ}$. In the Northern half of the property a series of drumlins and groovings elongated to the ESE reflects the direction of the ice movement. Drumlins are usually about $50^{\prime}$ high and consist of unsorted gravel and sand. Some of them however, particularly around the Klawli River canyon, are constituted by sub-angular fragments of rock, of very consistent composition, and were presumably formed by the crushing of outcrops by the advancing ice. A well developed terrace is recognizable about $50^{\prime}$ above the present level of the lake.

A consistent mantle of superficial drift covers most of the property. In the Southern half it consists of fairly well sorted sand and silt of glacial lake origin and, as evidenced in the deep cut of Ahadatay Creek, it exceeds 100 in thickness. In the Northern half it consists of glacial till with occasional erratics and it is thinner, presumably in the $50^{\prime}$ range and less than that in the North Eastern corner. The attached sketch ( see Fig. 2. L gives an idea of the probable overburden thickness and it is based on observations along the Ahadatay Creek cut, on outcrops and float distribution and on the nature of the drift.

Poorly drained soil covers large portions of the property. Groovings between drumlins are usually seepage areas with thick alder vegetation and swampy, stagnant depressions are common to the North. Both in seepage and swampy areas organic material is abundant in the soil.

## GEOLOGY

The property is underlain by the Hogem batholith of the Omineca intrusions, believed to be of Upper Jurassic or Lower Cretaceous age ( see G.E. Armstrong - Fort St. James Map Area - G.S.C. Mem. 252 ). The predominant rock type is a medium grained, locally porphyritic, grey to pink granodiorite, grading into syenite by
for gradual increase of pink orthoclase and decrease of quartz and plagioclase. Hornblende and biotite, in about the same amount, are the dominant femic constituents. Numerous veins of coarse pink orthoclase, with some quartz, averaging 1 " in thickness and oriented at random, cut across the intrusive body. About l mile to the North of the Northern end of the property the Hogem batholith is in contact with older volcanics of the Takla Group ( Upper Triassic ).

Rock exposures are very scarce, representing less than 1\% of the whole property. Scattered outcrops occur to the Northern end of the property and along the deep gulley cut by Ahadatay Creek. The intrusion is unaltered and undisturbed, except in places along Ahadatay Creek: here the granodiorite is slightly silicified, kaolinized and chloritized and dis plays evidence of shearing in the form of slikensides and moderate fracturing; minor limonite staining is present. Along the road, between lines 16 E and 24 E a little malachite staining in the pegmatitic pink orthoclase was observed. A very well defined set of joints runs from E-W to N. 70 W S.70E. Other sets of joints, not so well defined and of variable orientation, cut the rock into blocks about l' in size.

## GEOCHEMISTRY

GEOCHEMICAL ENVIRONMENT - As seen in the "Geography" chapter, the area is characterized by flat topography, thick glacial or lacustrine drift and frequently poor drainage. The table below summarizes the features of a typical soil profile:

| COLOUR | TEXTURE | THICKNESS | HORIZON | REMARKS |
| :--- | :--- | :--- | :--- | :--- |
| Dark brown | Silty | $2 "$ | $A_{0}$ | Highly organic |
| Dark brown-black | Clayish | $4^{\prime \prime}-8^{\prime \prime}$ | $A_{1}$ | Often organic |
| Light grey | Sandy | $2^{\prime \prime}$ | $A_{2}$ | Often absent |
| Brown-orange | Sandy or Silty |  | $B$ |  |

In seepage areas the " $\mathrm{A}_{1}$ " horizon is usually thicker, often exceeding 10". This soil would fall into the podzolic soil type.

SAMPLING PATTERN - The whole property was covered by a grid of blazed and chained lines spaced at $800^{\prime}$ intervals and running N. 30 E. A total of 52.6 miles lines were laid . and sampled at $200^{\prime}$ spacing. On the bases of the results an area corresponding to about $10 \%$ of the property was selected for more detailed work. Over such an area the lines were sampled every 100' and 5.2 additional miles of intermediate lines were laid and sampled at $100^{\prime}$ spacing. 1,384 soil samples were collected in the first phase and 397 in the second, for a total of 1,781.

SAMPLING PROCEDURE - Soil samples were collected with a shovel at a depth of up to $14^{\prime \prime}$ and packed in water-resistant kraft. envelopes. The "B" horizon was sampled wherever feasible. However, where the unusual thickness of the "A" horizon pre vented from reaching it (in about $15 \%$ of the sites ), "Ao" or " $A_{1}$ " samples, often heavily contaminated with organic material, were collected.

SAMPLE PREPARATION AND ANALYSIS - The analyses were conducted in the Vancouver laboratory of Bondar-Clegg and Co. Ltd. The samples were dried in infra-red heated oven at $40^{\circ}$ to $50^{\circ} \mathrm{C}$. and sifted to -80 mesh. Cu was extracted from the sample in hot aqua-regia and determined by atomic absorption spectrophotometry.

PRESENTATION OF DATA - Cu values were plotted on $1^{\prime \prime}=400^{\prime}$ plates ( $W-1, W-2, E-1, E-2$ ) and contoured at 50 and 100 p.p.m. intervals. Samples collected in the " $A_{0}$ " or " $A_{1}$ " horizon were bracketed.

fig. 3

HISTOGRAM
CUMULATIVE FREQUENCY

$$
\begin{array}{ll}
0---0 & B " \text { SAMPLES }(1,213) \\
0----0 & A \prime \text { ' SAMPLES }(171)
\end{array}
$$

Cu p.p.m.

DISCUSSION OF THE RESULTS - A histogram of the $C u$ values in the 1,384 samples collected during the first phase of the program has been prepared, indicating a background of 20 p.p.m. and a threshold of 50 p.p.m. (about $10 \%$ of the values are above the threshold). Several anomalies have been outlined, having limited surface extent, highly erratic values and not defined orientation. A very close correlation between anomalous areas and areas of poor drainage is evident. This fea-. ture is clearly shown by a comparison between the histograms of the "A' and "B" samples. Again assuming as a background the median value and as a threshold the lowest value of the top decile, the histogram ( see Fig.3) shows that for the"B" samples background and threshold are respectively 15 and 40 p.p.m., for the "A" samples 45 and 120 p.p.m. Obviously a strong Cu absorption activity of the organic material contained in the soil accounts for the striking difference of the two populations. Outside of the seepage areas, $C u$ values are low, except for occasional, isolated highs. The following observations can be made:
a. The outlined anomalies are non-significant, being a reflection of the nature of the soil rather than of a buried, mineralized source.
b. The anomalies only give a broad indication of the most favourable areas, by allowing a comparison between seepage areas with high copper content in the soil and others with low to medium content. By this criteria the central portion of the property ( where the I.P. survey has been conducted ) would appear to be the nost favourable one, al though differences in the thickness of the overburden and/or percentage of organic material in soil might be the main causes for the anomalies.
c. Where moderate thickness of the overburden and free drainage allow an effective use of geochemistry.
( ( in the Northern part of the property ), no anomalies have been located, except for a small one in the North-Western corner.
d. In the Southern part of the property, because of the extreme thickness of the overburden, geochemical results are believed to be unsignificant.
e. In the conclusion, geochemical survey has been ineffective, except for suggesting that the Northernmost portion of the property is presumably unfavourable for $C u$ mineralization and that the central portion (between lines 8 W and 44 W ) has possibly a better potential than the surrounding areas.

## MAGNETIC SURVEY

SURVEY PROCEDURE - Magnetic survey was conducted over the same 800' spaced lines used for soil sampling, for a total length of 52.6 miles. Readings were taken every 200 ' with a model MF-1 Fluxgate Magnetometer of Sharpe Instruments. A base station was established at the camp site and readings taken at the start and end of each day's survey. A daily drift of as much as 200 gammas was observed and proportionally distributed through the day readings. Some error has been introduced by the assump tion that the drift changes regularly through the day, but, considering the not very detailed nature of the survey, it is felt that the error does not affect the validity of the results.

PRESENTATION OF DATA - Corrected magnetic readings have been plotted on $1^{\prime \prime}=400^{\prime}$ plans (E-1, E-2, W-1, W-2); because of the rather erratic succession of the values, no attempt of contouring has been made. Magnetic profiles have been drawn, in order to allow an easier correlation between lines and to give a clearer picture of the anomalies.

DISCUSSION OF THE RESULTS - Magnetic highs and lows have been marked in the profiles and transferred to the plans; on the basథs of their magnitude and sharpness above background, a distinction has been made between definite and probable anomalies.

The most significant feature picked up by the magnetic survey is a well defined high, running around the centre of the property between lines 16 W and 24 E , and possibly extending beyond that up to the Western limit of the property. The shape of the high suggests a relatively narrow ( $200^{\prime}-400$ ? ) , steeply dipping source, probably a N. 60W-S.60E running shear zone, with associatated basic dykes. Between lines 32 W and 16 E , readings to the North raise $300-500$ gammas above the background, maybe reflecting a variation in the rock-type, such as an in crease in the granodiorite: syenite ratio. Other highs and lows have been recognized in the profiles, but since they do not show any obvious continuity into adjoining lines, no at tempt of correlation has been made.

The main conclusion to be drawn from the magnetic survey is the strong indication that shearing is well developed in the Chuchi property. This indication is encouraging, since is is known that in the adjoining properties, now being explored by Falconbridge Nickel Mines Lts. and Cyprus Exploration Corporation Ltd., ore is structurally controlled by shearing. While only one shear zone has been clearly picked up, other zones might well be present, which have not been recognized by the magnetic survey either because too narrow ( given the 200' interval and the thickness of the overburden only the major features are bound to be reflected in the readings) or not as long or with no association of basic dykes.

## SUMMARY AND CONCLUSION

An exploration program has been carried out over the Chuchi property during the summer and fall of 1971. The area is
underlain by granodiorite and syenite of the Omineca intrusions, showing slight and localized alteration and shearing and very minor mineralization. Because of the scarcity of the outcrops, geochemical and magnetic programs have been conducted over the whole property, in order ito supplement lacking geological information. Thick surficial drift and widespread poor drainage have greatly reduced the efficacy of the geochemical methods: general areas of possible better potent-, tial have been outlined, but no definite target has been recognized. Magnetic survey has indicated a rather strong struc tore running N. 60 W - S.60E ( presumably a steeply dipping shear zone ), thus confirming the assumption that this is the main structural trend in the area.

Although work to date has failed to produce any drilling target, it has not disproved the potential of the area. Additional exploration would be required for a final appraisal of the property. Keeping in mind that copper mineralization in the area is related to NW-SE running shear zones and that this appears to be the direction of shearing in the Chuchi property as well, it is felt that a reconnaissance I. P. program over the whole property, with lines to the N .30 E and spaced 1,600 , would not miss any economical sulphide concerntration, which presumably would be in the form of a long, nearrow, deep, steeply dipping body.

### 21.8. Sanders

K.G.Sanders, P. Eng.

December 31,1971
Phisavi
P.Pisani, Geologist

## PERSONNEL

K. G. Sanders, P. Eng.

Supervision in the field:
Aug. 26 to $28-3$ days @ $\$ 50.00 /$ day................ $\$ 150.00$
Interpretation and report:
2 days @ $\$ 50.00 /$ day...................................... 100.00
P. Pisani, Geologist

Magnetometer survey, supervision of line cutting \&
soil sampling:
Aug. 18 to Sept. 14, Oct. 7 to Oct. 20-42 days @
\$ $30.00 /$ day..................................................... $1,260.00$
Interpretation and report:
10 days @ $\$ 30.00 /$ day.................................... 300.00
K. Wilson, Geologist

Soil sampling:
Sept. 30 to Oct. 7 - 8days @ $\$ 30.00 /$ day.......... 240.00
J. Hudson, Helper

Line blazing, line cutting, soil sampling:
Aug. 18 to Sept. 14, Sept. 29 to Oct. $20-50$ days
@ $\$ 25.00 /$ day............................................... $1,250.00$

LINE BLAZING, LINE CUTTING, SOIL SAMPLING
Woodcock Consultants Ltd., per invoice ........... 5,697.52

CAMP EXPENSES AND TRANSPORTATION
Board: 200 men days @ $\$ 6.00 / \mathrm{man} /$ day............... $1,200.00$
Boat rental: Aug. 18 to Sept. 14 (including gas) 200.00
Chartered aircraft: 3 trips from Fort St. James
for groceries @ \$72.00/trip......................... 216.00
GEOCHEMICAL ANALYSES
Bondar - Clegg \& Co. Ltd., 1,781 Cu analyses @ \$1.20/analysis............................................... $\$ 2,137.20$
REPORT
Includes drafting and typing time, maps, reproduc- , tions etc................................................. 600.00
TOTAL ......................................................... $\$ 13,350.72$

This amount is prorated for assessment purpose as follows:

| Chuchi \#1 Group | $\$ 3337.68$ |
| :--- | :--- | ---: | ---: |
| Chuchi \#2 Group | 3337.68 |
| Chuchi \#3 Group | 3337.68 |
| Chuchi \#4 Group | 3337.68 |


K.G. Sanders, P. Eng.

December 31,1971


## GEOLOGIST'S CERTIFICATE

I, Paolo Pisani, of the district of North Vancouver, B.C. do hereby certify that:

1. I am a geologist and my permanent address is 303 - 900 Berkley Rd., North Vancouver, B.C.
2. I have received a degree in Geology at the University of Milano, Italy, in 1963.
3. I have practiced my profession in Canada for the past six years.
4. I am an employee of Denison Mines Limited and as such I have been personnaly involved in the exploration program over the Chuchi property.


December 31, 1971
North Vancouver,B.C.

## ENGINEERS CERTIFICATE

I, Kenneth G. Sanders of 1940 Limerick Place, North Vancouver. B.C., do hereby certify that:

1. I am a practicing Geological Engineer.
2. I am a graduate of the University of Toronto
( B. A. SC., 1949).
3. I have practiced my profession for the past 22 years.
4. I am a registered member of the Association of Professional Engineers of British Columbia.
5. I am an employee of Denison Mines Limited as a district Manager and as such I have personally supervised the geochemical and geophysical program over the Chuchi property.


December 31, 1971
North Vancouver, B.C.








## J.R. WOODCOCK CONSULTANTS LTD. RAGE 1. OF 2 <br> 1521 PEMBERTON AVENUE NORTH VANCOUVER, B.C., CANADA <br> PHONE: 988-2171 <br> November 1 1971

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