MacDONALD CONSULTANTS LTD.
SUITE 12 - 425 HOWE STREET, VANCOUVER 1, B.C.

Report on the

K-Cu 1 - 45 and K-Cu 48 - 56

Mineral Claims

located at

Kletsan Creek

in the

Whitehorse Mining Division, Y. T.

for

White River Mines Ltd. (N.P.L.)

102 - 569 Howe Street

Vancouver 1, B. C.

by

MacDonald Consultants Ltd.

12 - 425 Howe Street

Vancouver 1, B. C.

H. Wober, P. Eng.

Vancouver, B. C.

September 10, 1968

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INTRODUCTION

The K-Cu 1 - 45 and K-Cu 48 - 56 mineral claims are located at Kletsan Creek in the Yukon Territory close to the Alaskan Border.

The report is based on the study of maps, airphotographs, reports published by the Geological Survey of Canada, and engineering reports published in a prospectus by Silver City Mines Ltd. (N.P.L.) earlier this year.

The writer visited the original K-Cu 1 - 24 claims on March 24, 1968, staked the additional claims, and was present during the 1968 exploration program for the period from July 18 to July 24.

PROPERTY

The property consists of a continuous block of 54 mineral claims which are recorded at the office of the Mining Recorder in Whitehorse, Y. T. as follows:

Name	Grant No.
K-Cu #1 - 24 incl.	Y21564 - Y21587
K-Cu #25 - 45 & #48 - 56	Y24077 - Y24106

The writer checked the location and staking of the original K-Cu 1 - 24 claims and supervised the staking of the K-Cu 25 - 45 and 48 - 56 claims. During the Summer program all metal tags were affixed to the claim posts. All claims are staked in accordance with the requirements of the Yukon Quartz Mining Act.

LOCATION AND ACCESS

The property is located at latitude 61° 35' and longitude 140° 57' at the head of Kletsan Creek between the Natazhat Glacier and the Alaska Border.

The nearest point for suitable highway access is Milepost 1168 on the Alaska Highway which is 250 miles from Whitehorse and 300 miles from the seaport

of Haines, Alaska.

Silver City Mines Ltd. which is presently exploring its property at Upper Canyon on the White River, has built a tote trail to the location of their operation which is within 16 miles of the K-Cu Claim Group. This tote trail is used by Silver City Mines for winter access.

HISTORY

The head of Kletsan Creek is the site of the first discovery of native copper in the upper White. The locality was first visited by C. W. Hayes and Lieutenant Schwatka in 1891. They found small nuggets of native copper a few ounces in weight in the Creek.

This placer copper deposit on Kletsan Creek was again visited in 1899 by A. H. Brooks and in 1902 by James Lindsay. (G.S.C. Memoir 50, "Upper White River District, Yukon," by D. D. Cairnes, 1915.)

The discovery of native copper at Upper Canyon in the banks of White River drew attention away from the Kletsan placer deposits in the early years of this century.

Silver City Mines Ltd. (N.P.L.) is presently developing the area on and around the old "Discovery Copper Grant." According to published statements and engineering reports in their prospectus 1968, encouraging results have been obtained.

The significance of the Upper White River basin as a potential copper province has long been recognized by D. D. Cairnes and others.

To the best knowledge of the writer no mineral claims have ever been staked over the showing of native copper nuggets in the gravels at the head of Kletsan Creek. The Indians are known to have dug copper nuggets of varying sizes from

the gravels of Kletsan Creek and other creeks of the area for many decades.

TIMBER AND WATER

The property is situated at an elevation of 4,500 to 6,000 feet and is entirely above timberline. Timber is growing in abundance in the flood-planes of the Generc (Klutlan) and White Rivers although only protected areas grow timber big enough for use in a mining operation.

GENERAL GEOLOGY

The Kluane Lake Mapsheet is divided into two major complexes by the Shakwak Trench, a NW - SE striking regional structure which is considered "The hinge line between two crustal blocks along which occurred differential vertical movement of many thousand feet,. . ." (Muller).

The northeastern part is formed by the formations of the Yukon Plateau, the southwestern part in which the property is located is comprised by the formations of the St. Elias Mountains. In the southwestern and southern part of the mapsheet the St. Elias Mountains are heavily glaciated and rise to 17,000 feet in elevation. A series of thrust faults parallel to the Shakwak Trench subdivide the formations of the St. Elias Mountains and caused a repetition of formation sequence.

Devonian to Lower Cretaceous volcanics and to a varying degree metamorphosed sediments were intruded by intermediate to acid (granitic) intrusions of Upper Cretaceous and early Tertiary Age. At upper Tertiary times great parts of the area were covered by a thick layer of volcanics. Intensive folding and faulting has taken place. All the formations generally follow the trend of the regional faulting.

ECONOMIC GEOLOGY

Several significant discoveries of mineralization have been made in the

area in the past.

The three most important ones are the Canalask Property at Lower Canyon, the Nickel-Copper-Platinium deposit of Hudson Bay Mining and Smelting at the head of Quill Creek and, recently published reports indicate an important discovery of Copper-sulphide mineralization in place at Upper Canyon, White River, the site of the original discovery in 1905 of considerable amounts native copper in veins and in the banks of the river. The latter property is presently developed by United Pemetex Ltd. which is jointly owned by Central-Del Rio Oils Limited and Silver City Mines Ltd.

The Canalask and Quill Creek deposits are similar in occurrence. Both are series of lens shaped bodies of nickel-copper sulphides in rocks of the Cache Creek Group (Unit 10, after Muller) related to steeply dipping ultra-mafic intrusions consisting of peridodite dunite and gabbro. Detailed descriptions of both properties are to be found in G.S.C. Publications. (See Literature Index).

The geology at the head of Kletsan Creek shows a striking resemblance to the geology at the Silver City property. The 1967 exploration program on Silver City's property resulted in the discovery of "a well mineralized zone in bedrock." The mineralization in a zone 39.0 feet wide consists of chalcocite with lesser amounts of native copper, occurring as veinlets up to 1½ inches wide and as fairly heavy disseminations." (Silver City Prospectus, 1968)

Host rock for the mineralization at Silver City's property is amygdaloidal volcanic rock of Upper Triassic age belonging to the Mush Lake Group. The mineralization appears to be controlled by fault structures in this formation.

GEOLOGY OF THE K-CU CLAIM GROUP

Cache Creek Group - The northern part of the claim group is underlain by Cache Creek limestone (Permian) about 500 feet thick. It is thick bedded (6 inches to 3 feet), fine grained to dense, with grey-to-buff-mottled weathering surface, and contains some crinoid stems up to a quarter of an inch in diameter (Muller).

Mush Lake Group - To the south this limestone is unconformably overlain by Mush Lake volcanics and sedimentary rocks, which represent the most southwesterly fault block containing Triassic formations. J. E. Muller gives a very detailed description of the basal part of the Mush Lake group at this locality. The lower part of this sequence, directly overlying the Permian limestone is described in G.S.C. Memoir 340, p. 49, J. E. Muller.

Younger sills of gabbro of Upper Permian or triassic age are reported to occur in the Mush Lake formation at the head of Kletsan Creek.

St. Clare Group - Southwest of the property in the triangle between the Alaskan border and Natazhat Glacier red brown basalts and andesites of Tertiary Age (St. Clare Group) overlie the Mush Lake formation.

Volcanic Ash - A sub recent volcanic eruption, the center of which is assumed to be at the foot of Natazhat Glacier, fell on large parts of Yukon Territory and Alaska. Thick layers of it cut by streams and creeks occur on the east facing slopes of the ridges at the head of Kletsan Creek and cover also the eastern part of the property. They have been a major exploration obstacle in the past in other parts of the Yukon and also at Upper Canyon of White River. However, modern exploration methods have partly overcome this problem.

STRUCTURAL GEOLOGY

A southwest dipping thrust fault parallel to and terminating the same type of formations to the northeast as the Generc-Tchawsahmon Fault Scarp at Upper Canyon, White River is postulated by Muller at the head of Kletsan Creek. Its exact location is obscured under a layer of glacial drift, talus and volcanic ash which also masks the eastern extension of the unconformable contact between Cache Creek limestone and Mush Lake formations.

EXPLORATION WORK CARRIED OUT IN 1968

a) Mapping and Prospecting

Main objective of the mapping and prospecting program was to investigate the placer occurrences and if possible trace them to their source or to come to conclusions in which area and geological environment the source may be located. The native copper was undoubtedly formed by supergene enrichment. This was observed by many others working in the general area and also at the property of Silver City Mines Ltd. Spreading out from the placer occurrences the entire area of the property was systematically prospected.

Overburden conditions and the cover of volcanic ash were studied with regard to their influence on the applicability of geochemical and geophysical exploration methods.

Approximately 30 lbs. of nuggets were collected from gravels of the West fork of Kletsan Creek above the mouth of the canyon where the native copper was visible on benches of bedrock in the creekbed. The size and shape of the nuggets and their distribution indicate that they have travelled for some distance and are most probably coming from the ice covered higher regions across the international boundary.

The more interesting finds were made in the stream run offs on the east facing slopes of the mountain ridge which dominates the property to the west

and along the boundary. On an earlier map of the area by J. E. Muller (19-1958) the Mush Lake volcanics at the head of Kletsan Creek are subdivided into a lower group of formations consisting of basalt, gabbro, and more sedimentary beds and into an upper member consisting of purple and green amygdaloidal andesite, basalt and volcanic breccias. The upper part is approximately 2,000 feet thick as against a total thickness of about 1,000 feet of the more sedimentary sections of the Mush Lake group. (G.S.C. Memoir 340, p. 49)

In the area underlain by the amygdaloidal andesites the following finds of float were made in the overburden:

1.) In a tributary of the southern fork of Kletsan Creek a large copper nugget was found weighing approximately 5 lbs. which is very ragged in shape and appears to have travelled a considerably shorter distance than the nuggets in the west fork. A second nugget weighing about 1 lb. was found nearby showing intergrowth with calcite as original gangue mineral making up for about 40% of the volume, another indication of a shorter travelling distance.

2.) Occassionally pieces of purple amydaloidal basalts were found containing grains of chalcocite and/or native copper.

3.) Several pieces of float of vein material were found consisting of calcite and chalcocite. One of the pieces showed purple amygdaloidal basalt as wall rock.

These finds are concentrated in the area encompassed by K-Cu 29 to 32 claims.

The interpretation of the finds in this area, however, are complicated by a heavy cover of overburden, consisting of old river gravels, glacial moraine material, (Ruby ice-sheet) and slope talus and a blanket of volcanic ash.

The projection of the northwest striking regional thrust fault runs through this area.

Silver City Mines uncovered the first significant zone of mineralization in place consisting of primary chalcocite mineralization in a very similar geological situation.

It is of interest to note that placer copper is also reported to occur in Big Boundary Creek which originates under Natazhat Glacier. This glacier marks the eastern boundary of the property and crosses the amygdaloidal portion of the Mush Lake volcanics in its upper part.

b.) Stream Silt Sampling

The two main forks of Kletsan Creek as well as all smaller tributaries cutting through the volcanic ash were investigated by stream silt sampling at 400 foot intervals.

The assaying was done by Bondar-Clegg & Co., 1500 Pemberton Avenue, North Vancouver, B. C. Hot aqua regia digestion and atomic absorption determination were used.

This work was done as a geochemical orientation survey to test the applicability of this method since soil sampling was ruled out by the presence of a layer of volcanic ash 3 - 10 feet thick.

The geochemical response in the West fork of Kletsan Creek was about twice as high as in the south fork. This is partly due to the presence of native copper in the gravels and partly due to the lesser water volume and stream velocity. The influence of the stream velocity was again noted in the response of the smaller tributaries which in turn was twice as high in values as the west fork. The response for each condition, however, was quite uniform without any marked peaks. The deep overburden, glacial till and the nature of the streams make an investigation of the metal distribution in bedrock by stream silt sampling quite difficult. The smaller tributaries run strong during the period of melting snow and not at all later in the season, which prohibits the forming of fine grained silts.

The lack of organic matter in the stream sediments under the climatic conditions on hand which tend to precipitate water-soluble copper salts may also be responsible for the failure of this method as an applicable tool.

c.) Geophysical Survey

A line grid was established in the area of immediate interest 3,200 by 6,000 feet. Line spacing is 400 feet with picket stations every 100 feet along the lines.

A reconnaissance survey with a Crone EM Dual frequency instrument was carried out over the lines, which was successful in locating the position of the NW-striking thrust fault represented by a weakly conductive zone in the southeastern part of the grid.

The deep overburden and possibly lower sulphide concentration of the mineralization searched for require a method with a deeper penetration rate and higher sensitivity such as induced polarization.

RECOMMENDATIONS

The area at the head of Kletsan shows promise for the discovery of a commercial copper deposit. The high copper content of the primary copper mineralization which is in the order of 70% Cu for chalcocite would yield a high value concentrate which makes the transportation costs less stringent.

The geological conditions are similar to those of Silver City Mines Ltd. where significant mineralization has been uncovered by stripping and diamond drilling.

Further encouragement was given on the ground by prospecting and mapping during the past exploration season.

The following exploration program is, therefore, recommended:

Phase I

Extend the existing grid 1,500 feet to the south and 800 feet to the west to a total of 15.6 line miles.

An Induced Polarisation Survey is recommended over the entire line grid using the variable frequency method and several electrode pair separations.

Phase II

The results of the Induced Polarisation Survey should be followed up by a diamond drill program if warranted. It is estimated at this time that approximately 1,200 feet of AQ wireline drilling will be required to test any significant results of the I. P. Survey.

COST ESTIMATE

Phase I

I.P. Survey, 15.6 line miles, including 5.6 miles of lines, compilation of results and report.	$ 7,800.00
Supervision	1,000.00
Camp, Food, Equipment	1,000.00
Helicopter	1,500.00
Mobilization, Demobilization of crew and equipment from Vancouver to Whitehorse and Mile 1168 on the Alaska Highway	1,000.00
Air freight and Communications	200.00
Contingencies @ 10%	1,200.00
Total Phase I	$13,700.00

Phase II

1,200 feet AQ wireline diamond drilling	$12,000.00
Helicopter	4,500.00
Mobilization of drill equipment, fuel, supplies + crew from Whitehorse	1,500.00
Supervision	1,000.00
Camp, Food	3,000.00
Consulting, engineering, report + expenses	1,500.00

Phase II (cont'd)

Contingencies @ 10%	$ 2,300.00
Total Phase II	$25,800.00
Total Phase I & II	$39,500.00

SUMMARY AND CONCLUSIONS

The K-Cu 1 - 45 and 48 - 56 Mineral Claims are located at the head of Kletsan Creek near the Alaska border at the site of the first discovery of native copper in the White River basin.

The property is underlain by Cache Creek limestones and a sequence of sedimentary and volcanic strata belonging to the Mush Lake group the upper part of which consist of predominantly purple amygdaloidal volcanics.

The formations are terminated to the east by a regional thrust fault and to a great extent covered by talus, overburden, glacial till and a recent layer of volcanic ash.

Exploration work carried out in 1968 indicates that--although the source of the main placer deposits in the west fork of Kletsan Creek is probably located in Alaska--finds of float of native copper, chalcocite in calcite veinlets and grains of both in purple amygdaloidal volcanics on the east facing slope of the mountain ridge dominating the property come from a source nearby and should be further investigated.

The geological setting is strikingly similar to Silver City's property at Upper Canyon, White River, where primary copper sulphides consisting mainly of Chalcocite have recently been discovered.

An exploration program in two phases is recommended as outlined above

requiring $13,700.00 for Phase I and $25,800.00 for Phase II to a total of $39,500.00.

Respectfully submitted,

MACDONALD CONSULTANTS LTD.

H. Wober, P. Eng.

HW/st

LITERATURE

*A. H. Brooks, U. S. Geological Survey, 21st Annual Report, Part II, 1899-1900.

D. D. Cairnes, G. S. C. Memoir 50, Upper White River District, Yukon.

G. Cross, Newsletter No. 44, March 4, 1968.

D. C. Findlay, G. S. C. Paper 67-40, The Mineral Industry of the Yukon Territory and Southwestern District of Mackenzie, 1966.

*Moffit, F. H., and Knopf, Adolph, "Mineral Resources of the Nabesun-White River Districts, Alaska", U. S. Geological Survey Bulletin, P. 417, 1910.

J. E. Muller, G. S. C. Memoir 340, 1967. Kluane Lake Map Area, Yukon Territory.

Silver City Mines Ltd., Prospectus, 1968.

*Quoted in G. S. C. Memoir 50, Upper White River District, Yukon.

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CERTIFICATE

I, Helmut Wober, with business and residential address in Vancouver, B. C. do hereby delcare:

1. I am a consulting mining engineer.
2. I am a graduate of the Montanistische Hochschule Leoben, Austria, 1963.
3. I am a registered Professional Engineer in the Yukon and British Columbia.
4. I have gained experience in mining and exploration in positions of responsibility with Nordisk Mineselskab A/S in East Greenland in 1961 and 1962, with United Keno Hill Mines from 1964 to 1966. I held the position of Chief Mine Geologist with United Keno Hill Mines when I resigned to join MacDonald Consultants Ltd., in May 1966.
5. I have personally studied all available information on the geology of the area described.
6. I do not have nor do I expect to have or benefitially own any interest direct or indirect in the properties or securities of White River Mines Ltd.

Respectfully submitted,

MACDONALD CONSULTANTS LTD.

H. Wober, P. Eng.

HW/st

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SUITE 12 - 425 HOWE STREET, VANCOUVER 1, B.C.

COST STATEMENT

Engineer Evaluation

Geophysical & Geochemical Work

White River Mines Limited

Claims K-CU 1-45 and K-CU 48-56

Kletsan Creek, Yukon

July, 1968	$6,623.00
August, 1968	6,695.45
September, 1968	574.25
	$13,892.70

For details see MacDonald Consultants Ltd. billings to White River Mines Limited and supporting copies of invoices, etc.

M.P. 1168

CANALASK PROPERTY

WHITE RIVER

WHITE

SILVER CITY

ALASKA HIGHWAY

RIVER

WHITE RIVER MINES

HUDSON BAY PROPERTY

DONJEK

ST. ELIAS MOUNTAINS

KLUANE LAKE

ALASKA

YUKON TERRITORY

141° 00'

61° 00'

N

DAWSON

WHITE RIVER MINES LTD (N.P.L.)

YUKON TERRITORY

ALASKA

WHITEHORSE

BRITISH COLUMBIA

PACIFIC OCEAN

WHITE RIVER MINES LTD. (N.P.L.)

MacDonald Consultants Ltd.

LOCATION MAP

SCALE	1:50000
DRAWN	H. W.
DATE	April 68
NO.	236-1

N A T A Z H A T G L A C I E R

LAKE

Cabins Old Placer Workings

KLETSAN CREEK

Boundary of grid on which GROUND E.M. SURVEY was carried out

LINE 0

LINE 16

LINE 32

Rd South

CAMP

141° 00' W

61° 35' N

YUKON TERRITORY
ALASKA

- Copper float
- x Silt Sample Location

GEOCHEMICAL ANALYSIS

- x 54 PPM Copper
- x 81/20/50 PPM Copper, Lead, Zinc

WHITE RIVER MINES LTD. (N.P.L.)	
MacDONALD CONSULTANTS LIMITED 11 — 425 HOWE ST. VANCOUVER 1, B.C.	
K-CU CLAIMS	
SCALE 1" = 800 feet DRAWN ghs DATE NOV 1968 NUMBER 236-6	Silt Sampling

36 34 32 30 28 26

37 35 33 31 29 27

LINE 0

LINE 4

LINE 8

LINE 12

LINE 16

LINE 20

LINE 24

LINE 28

LINE 32

-10°
0
+10°

CONDUCTOR AT DEPTH OVER 150'

HEAVY OVERBURDEN

GRAPHITE FLOAT

48 7 8 9 11 13

49 5 6 10 12 14

54 3 4

55 1 2

BASELINE

30 SOUTH

60 SOUTH

WHITE RIVER MINES LTD. (N.P.L.)

MacDONALD CONSULTANTS LIMITED
11 — 425 HOWE ST. VANCOUVER 1, B.C.

CRONE E.M. SURVEY

SCALE	1" = 400 feet
DRAWN	ghs
DATE	NOV. 1968
NUMBER	236-8

K-CU CLAIMS