

REPORT ON THE
PORCUPINE GROUP
OF
MINERAL CLAIMS

TO
AMALGAMATED RESOURCES LTD.

VANCOUVER, B.C.

BY
SHERWIN F. KELLY

APRIL 30, 1966

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PORCUPINE GROUP OF
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SHERWIN F. KELLY
GEOPHYSICIST AND GEOLOGIST

REPORT TO
AMALGAMATED RESOURCES LTD.
ON ITS
PORCUPINE GROUP

LOCATION AND ACCESS.

The Porcupine Group of 36 mineral claims is located on the east side of the Merritt-Princeton highway, ten miles southeast of Merritt. The square group of claims extends north and east of the north end of Corbett Lake, the co-ordinates being Latitude $50^{\circ} 2' N$, and Longitude $120^{\circ} 35' W$. Access from the highway is via a good dirt road which extends easterly through the southern part of the claims; a branch turns off to the north, up-hill, to the shaft area. In good weather the latter is negotiable by car; in wet weather, four-wheel drive is needed.

CLAIMS.

The Porcupine group of mineral claims, consists of 36 claims arranged in a square, with N-S and E-W boundaries. They are Porcupine Nos. 1 to 36, all grouped as Porcupine #1 Group. The claims were staked in 1962 and 1963 by Sherwin F. Kelly, John McGoran and Diane Gillespie, and by them sold to Amalgamated Resources Ltd. on April 25, 1963. The record numbers and validity dates are:-

Porcupine nos. 1-20,	record nos. 19301-19320,	valid to Nov. 27, 1967
" " 21-24,	" " 21779-21782,	" " Dec. 31, 1966
" " 25-36	" " 20557-20568,	" " Apr. 30, 1967

Porcupine nos. 21-24 had been allowed to lapse, and were later re-staked.

TOPOGRAPHY AND TIMBER.

The claims lie in a region typical of the Interior Plateau, consisting of rolling upland pastures, at an elevation of 3500 to 4500 feet. There are scattered stands of open timber, largely firs and poplars. Timber for mining purposes is therefore available.

CLIMATE AND WATER.

The climate is typical of this area of the "Dry Belt"; precipitation is not heavy and the climate is generally mild. In winter, two or three feet of snow can be expected, and the temperature seldom goes below zero for any length of time; winter operations are perfectly feasible. Water is not abundant, but the stream feeding Corbett Lake passes through the claims, which also include the north end of Corbett Lake. There are minor streams and sloughs in the upland area, from which water for drilling is obtainable. Water is therefore available.

LABOR AND TRANSPORTATION.

The town of Merritt, which is the center of operations for the Craigmont Mine, lies only ten miles away, via paved highway. Labor is available there, and in the surrounding area.

The Kettle Valley line of the Can. Pac. Ry. serves Merritt. Fifty miles north of Merritt, via paved highway, the town of Kamloops is served by the main lines of both CPR and CNR, and the Trans-Canada Highway.

GEOLOGICAL SETTING.

The claims are underlain by volcanic flows and tuffs, and minor sediments, of the Nicola Series of Triassic age. Where exposed, these are relatively thin bedded, of the order of a few feet to a few tens of feet in thickness. The tuffs are moderately coarse, frequently brown to reddish, and only a few feet thick. The flows are generally andesitic, often exhibit broken flow tops with considerable calcification, and some are strongly amygdaloidal. The amygdules are often much elongated, especially near the flow bases, and consist mostly of silica with some calcite on occasion. Copper mineralisation is found disseminated in the flows, and occupying fine fractures.

The prevailing strike is about N30° E, and the dip is southeasterly, at approximately -35°.

MINERALISATION.

The copper mineralisation consists of chalcopyrite, bornite and chalcocite. These are found finely disseminated in the andesitic flows, and occupying hair-line fractures. Near surface, native copper occurs, and can often be found on the dump of the old shaft. Malachite and azurite have developed on many of the fragments on the dump, and have been turned up in the course of trenching. These products of oxidation appear and disappear in the mineralised intervals in the trenches, according to the precipitation and the weather. Except where dug up in the trenches, or on the dump, malachite is rarely visible, and azurite is hardly ever seen.

In the old shaft, malachite extends only a few feet down dip, and the mineralisation below this thin, oxidised zone consists of the sulphides mentioned, with chalcopyrite predominating. The dissemination is so fine as to be misleading, and sometime escapes observation. Pyrite is quite sparse. Examination of the cores of holes drilled near the shaft, confirms the above observations.

PRE-COMPANY EXPLORATION.

The shaft above-mentioned, is an inclined one which goes down the dip to a depth of about 60 ft. It was reportedly sunk between 1900 and 1910 by a rancher named Corbett. The bottom twenty feet are usually under water. The rock traversed is a much fractured andesite, with a thin mud seam between it and the overlying, red tuff. In spite of the intense fracturing, the shaft walls and back, have stood, with no support and almost no sloughing, for half a century. No record has been found of this early exploration.

In 1957 or 1958, Columbia Explorations Ltd. drilled two, short diamond drill holes in the vicinity of the shaft, following an electromagnetic survey in 1957 by Shield Mining Surveys Ltd. of Ottawa. The results of these holes are not known, and the core has not been found.

The electromagnetic survey covered an area about a mile square, and revealed a series of linear anomalies of varying strength, all trending in the direction of the formations. One of the longest, although not strongest of these anomalies, extends, for a distance of 3,000 feet, right through the shaft, which is at the midpoint. The anomaly evidently corresponds to the andesitic flow known to be well mineralised in the shaft zone. Flanking this anomaly, are

numerous others, possibly a dozen, varying in length from a few hundred feet to 3,000 feet, and all parallel.

Three thousand feet to the east, is another group of anomalies which extends, with interruptions, for a length of 6,000 feet and with the same strike as the first group. They are all strong electrical axes, and individually measure between a few hundred and a thousand feet in length.

Shield Mining Explorations recommended that these anomalies be checked by other methods, such as spontaneous polarisation and soil analysis, because they may have been caused, in part, by water-soaked structures, such as shear zones or bedding contacts. Except for the two drill holes mentioned and four shallow pits, now sloughed in, no checking or testing of these anomalies was carried out prior to the acquisition of the claims by Amalgamated Resources Ltd.

AMALGAMATED'S EXPLORATION.

Minor geophysical work by spontaneous polarisation, extensive trenching and considerable drilling, have been carried out on this property by Amalgamated Resources Ltd., since 1963. The walls of the shaft have been sampled on numerous occasions, both before and after Amalgamated acquired the property.

A number of geologists and engineers have sampled the shaft walls, usually by five and a half foot channel samples from floor to back, at various intervals down the shaft. These yielded assays from 0.60% to 2.80% copper. Random chip samples were taken of the walls, under my direction. Those on the north wall assayed 2.10% copper, and from the south wall, 2.15% copper. The overall average of channel and chip samples, from the collar to water level (at 40ft.) was 1.79%.

Drilling was started by Amalgamated Resources in the shaft area, under the direction of Paul Polischuk. The first two diamond drill holes were collared near the shaft, and drilled parallel to it, down the dip, to check the values found in the shaft walls. The first hole passed from hanging to foot wall, revealing a mineralised formation about eleven feet thick. Assays on thirty-two feet of core ran from 0.65% to 2.50% copper. The weighted average assay for the sampled sections (one ten foot section was not assayed) was 1.38% copper. The second hole went straight down the dip for 60 feet. Assays ran from 0.65% to 2.70% copper, with a weighted average of 1.65% copper.

Evidence from these drill holes, and from sampling the shaft, indicates that the upper 25 feet of the ore-bearing bed, are low in copper, doubtless due to atmospheric leaching. Below that mark, copper values increase. This is an important point to be kept in mind when inspecting outcrops or trench exposures that appear poorly mineralised.

Three short holes (nos. 4, 5, 6) were drilled within a distance of about 75 ft. northeast and southeast of the shaft, inclined westerly at roughly 60° to cut the mineralised bed at about right angles. They returned well-mineralised intersections from 10 ft. to 12 ft. thick, assaying from 3.25% copper across 10 feet, to 6.25% copper across 12 feet. Hole #7 was spotted about 175 ft. southeasterly from the shaft. Although deeper than the previous ones (129 ft.) it did not go quite deep enough to encounter the down-dip extension of the mineralised bed in the shaft. Nevertheless, at approximately 50 ft. stratigraphically above the anticipated position of the shaft bed, it intersected 5½ ft. of mineralised andesite assaying 1.20% copper. Thus, it offers evidence that there are other copper-bearing horizons above, and possibly below, the one in the shaft.

Extensive trenching was then carried out, totalling 2,475 linear feet of bulldozed trenches about 16 ft. wide. "The greater part of the trenching cross-cut the mineralised beds, within a span of about 1,000 ft. with the inclined shaft about in the middle. This showed the first copper-bearing bed to extend at least over that length with both ends still open. It also demonstrated that there are probably other mineralised beds in this series of Nicola flows, above and below the first one investigated", as stated in my report of July 23, 1964.

Diamond drill hole #9 was drilled under a trench exposure 400 ft. SSW of the shaft, and intersected 7 ft. of vein material assaying 1.90% copper. Nearer the shaft, DDH #10 drilled beneath a good trench exposure 200 ft. southwesterly from the shaft, and cut 5 ft. assaying 0.37% copper; a grab sample from the trench assayed 1.30% copper.

DDH #11 was spotted to test a small spontaneous polarisation anomaly some 670 ft. north of the shaft, and stratigraphically below the shaft bed. A five-foot section assayed 0.15% copper, but was not far below bedrock surface, and gave evidence of considerable leaching. Further testing is indicated in this vicinity. Holes #10 and #11 were sampled by me.

Drill hole #12 was a check hole, collared 65 ft. east of the shaft and drilled to a depth of 101 ft. From bedrock to the bottom, the assays ranged between a low of 0.09% and a high of 1.65% copper. The entire 94 ft. from bedrock to the bottom of the hole, gave a weighted average of 0.32% copper. The 20 ft. from bedrock to 27 ft. averaged (weighted) 0.16%; from 27 to 32½ it was 0.89%; the weighted average for the 8½ feet from 32½ to 41 ft., was 1.50% copper. The next 7½ feet to 48½ ft. depth, gave a weighted average of 0.33% copper. This entire 41½ foot section, from 7 feet to 48½ ft. showed a weighted average of 0.56% copper. Below 48½ ft. the values ranged between 0.09% and 0.23% copper. This core was logged and split by me in collaboration with Gordon Bubb, at that time (summer, 1965) resident engineer for Emrex Mining Co. Ltd.

Drill hole #13, collared 114 ft. south of #12, drilled only 25 ft., and has yet to be completed.

In my report of July 23, 1964, I stated that:-
"The span along strike covered by the present drilling pattern, from DDH #4 to #9, is 460 ft. The results may be considered representative for a length of 520 ft., for ease of calculation. The average length of mineralised core (strongly mineralised) recovered is 10 ft. If the mineralised formation extends to a depth equal to 2/3 of the strike length assumed above, i.e. 2/3 of 520 ft., or 346 ft., then in the block 520 ft. long, 10 ft. thick and 346 ft. deep, there would be 138,400 tons of copper-bearing formation. To arrive at an average value for this block, the high percentage of copper (6.35% across 12 ft.) encountered in DDH No. 4, was arbitrarily cut to 3.25%. This was the value returned from DDH No. 6, about the same distance the other side of the shaft. The average assay of the DDH core in this pattern, then comes to 2.51% copper." If the assays from DDH #10 and #12 are included, the average value works out at 2.03% copper. The occurrence may then be geologically inferred of 138,000 tons of copper-bearing formation averaging 2.03% copper. This refers to the one bed only, and is confined to the volume existing within a short radius of the shaft.

A surface showing of copper mineralisation was found on the edge of a gully, some 700 or 800 feet westerly from the shaft. Fragments picked up from the surface assayed 0.20% copper. This horizon is probably 600 ft. stratigraphically below the shaft bed. Anomalies as yet incompletely defined, appeared in the S.P. work about 700 ft. ESE from the shaft, and 1700 ft. SE of the shaft. The corresponding beds would lie stratigraphically high above the shaft formation.

Closer to the shaft, trenching indicated at least one mineralised bed lying about 50 ft. below the shaft; DDH #7 as already mentioned, encountered one about fifty feet above the shaft formation. Three old test pits, sunk by Columbia Explorations east and

north of the shaft, were reported to have encountered copper, with assays from 0.15% to 1.1% copper (Report by R.E. Parkes, undated but probably 1956). Which of the four old pits now visible, were the three sampled, can not be determined. In any case, whichever three they are, they indicate mineralisation either above, or both above and below the main horizon in the shaft. These four shallow pits were probably sunk prior to the Shields electromagnetic survey and, although they did test the ground in the vicinity of the shaft, they were obviously not planned to test the E.M. anomalies.

The strong E.M. anomalies three thousand feet east of the shaft, imply another wide band of possibly mineralised horizons. These indications acquire new interest from the developments now proceeding on Qullchena Creek 3 miles east of the shaft. Exploration work there is reported uncovering a substantial diorite intrusive carrying disseminated copper and molybdenum mineralisation similar to that typical of the "porphyry coppers". This might be a source rock of the mineralisation in the Nicola Beds adjacent to it, in which case the nearer the beds to the source rock, the stronger the mineralisation is likely to be.

SUMMARY AND CONCLUSIONS.

Drilling and trenching in the vicinity of the old shaft, have demonstrated the existence of a mineralised andesitic flow carrying good values in copper, and about ten feet thick. Its presence has been revealed by trenching for a length of nearly 1,000 feet, with both ends still open. Limited drilling has so far proved a portion of this to a depth of 100 ft., with the down-dip extension still open. From these data, 138,000 tons of copper-bearing formation averaging about 2% copper, have been geologically inferred, in a volume within a small radius of the shaft.

Drilling and trenching have indicated other mineralised beds within a short distance stratigraphically above and below the one in the shaft. Surface showings and geophysical anomalies, both electromagnetic and spontaneous polarisation, warrant the expectation that additional mineralised beds may be found at greater distances east and west from the shaft; i.e., respectively considerably higher and lower, stratigraphically.

The results obtained, and the implied possibilities of this group of claims, apply warrant an extended and intensive exploration program to search for and develop, deposits of exploitable grade and tonnage.

This program should include further trenching, considerable diamond drilling and geological mapping together with geochemical soil analysis. A geophysical survey should extend over much of the area. Although the spontaneous polarisation method has yielded some anomalies, the reactions are of limited extent; consequently, in view of the disseminated character of the mineralisation, it would be advisable to test the applicability of the induced polarisation, or I.P. method.

The current increased activity in the Aspen Grove area, in which the Porcupine claims are located, and the continued shortage of copper which induces price increases in the metal, provide an added incentive to the efforts to bring this property into production soon. The following recommendations are therefore offered, with the suggestion they be implemented as soon as possible.

RECOMMENDATIONS.

An induced polarisation survey should be carried out over the entire property on a reconnaissance basis. A semi-detail program should be conducted in the vicinity of the shaft anomalies, and of the second band of E.M. anomalies at the eastern edge of the claim group. Where indicated, detail work should be completed. This will involve some 25 miles of grid line which will have to be laid out.

The extensions of the shaft occurrence, down-dip and along strike, within the length already indicates by trenching, should be determined by further diamond drilling on a semi-detail basis. Reconnaissance drilling needs to be conducted for the length of the anomalies beyond the present trenches, and on the band of anomalies to the east. This will require about 5500 feet of drilling, with AX equipment; nothing smaller should be envisaged.

Bulldozing will be necessary to investigate surface manifestations of formations causing geophysical anomalies. Rock trenching, by airdrilling and blasting, will occasionally be required.

The property should be mapped geologically, and concomitantly a soil survey should be conducted.

Facilities will be required on the property, such as a core shack and core rack, a tool shed, and a shelter for inclement weather. These should be constructed.

With two drills operating, the program should be completed in six months.

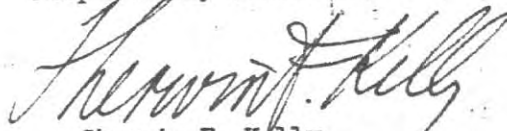
A foreman should be hired to run the day-to-day operations, and the overall program should be under the direction of a competent engineer or geologist.

To carry out the program outlined on page 8, the following allotment of funds is suggested.

Laying out grid.....	\$ 3,000
Induced polarisation survey.....	10,000
Diamond drilling.....	55,000
Assays.....	1,000
Bulldozing & rock trenching.....	3,000
Geol. mapping and core logging...	4,000
Geochem. soil survey.....	2,000
Core shack, tool shed, etc.....	1,000
Supplies and equipment.....	2,000
Transportation.....	1,000
Foreman.....	3,000
Engineering & supervision.....	5,000
Reserve for contingencies.....	<u>10,000</u>
	\$100,000

The results already obtained on this property, lend strong credence to the supposition that commercial copper deposits exist on these claims. The above program will serve to indicate and partially outline such occurrences, and if found, to define the further steps to be taken to delineate them completely and bring them into production.

Respectfully submitted,


Sherwin F. Kelly
Geologist & Geophysicist

P.O. Box 325,
Merritt, B.C.
April 30, 1966.

SHERWIN F. KELLY
GEOPHYSICIST AND GEOLOGIST

CERTIFICATE OF QUALIFICATIONS

I, Sherwin F. Kelly, residing at the Adelphi Hotel, in Merritt, B.C., certify that:-

I am a graduate in engineering from the University of Kansas, where I was awarded the degree of B.Sc. in Mining Engineering in 1917.

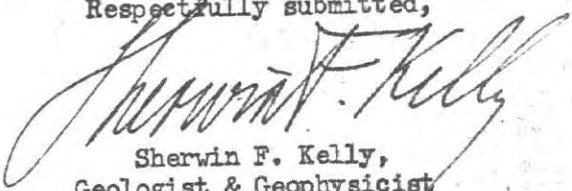
I followed post-graduate work in geology and mineralogy for five years, in Paris (at the Sorbonne, the Museum d'Histoire Naturelle, the Ecole des Mines), at the University of Kansas and the University of Toronto. I also instructed in those subjects at the University of Kansas and the University of Toronto.

I have practised as a geologist and geophysicist in North, Central and South America, and the Caribbean, since 1921.

This report on the Porcupine claims of Amalgamated Resources Ltd., is based on an examination of the area in 1961 and on close association with the exploration work on that property since 1964. Information has also been obtained from the undated report by R. E. Parkes, probably written in 1956, on file with Cominco, at Trail; from the report on the electromagnetic survey by Shield Mining Surveys of Ottawa, dated April 2, 1957, on file at the Mining Recorder's office in Merritt, B.C.; and from "Geology and Mineral Deposits of the Nicola Map Area", by W.E. Cockfield, Memoir 249 of the Geological Survey of Canada, 1948.

I am the owner of 85,200 registered shares of Amalgamated Resources, of which 66,600 are still escrowed.

Respectfully submitted,


Sherwin F. Kelly,
Geologist & Geophysicist

Adelphi Hotel,
P.O. Box 325,
Merritt, B.C.
April 30, 1966.