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# GEOLOGY SOIL COPPER & GROUND MAGNETICS WAY MINERAL CLAIMS

Way 1-20, Way Fraction, Granada M.L (4 mi NW of Midway B.C.)

49°02'N; 118°51'W

BONUS RESOURCES LTD (NPL) Charles A.R. Lammle P. Eng.

Sept 23 - Oct 15, 1972



# 3920

GEOLOGY, SOIL COPPER AND GROUND MAGNETICS

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for

BONUS RESOURCES LTD. (NPL) Vancouver, B.C.

bу

Department of

Mines and Petroleum Resources

ASSESSMENT REPORT

NO 3920

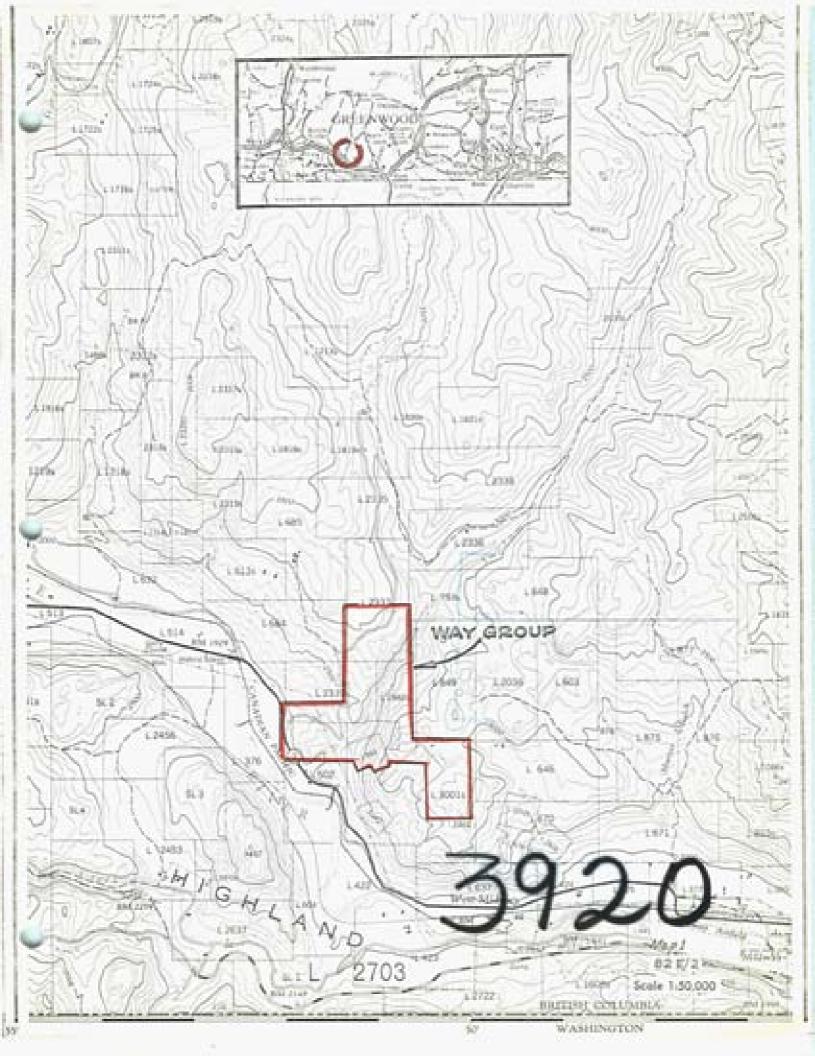
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Charles A. R. Lammle

October 15, 1972

Work carried out: Sept. 23 - Oct. 15, 1972





Department of
Mines and Petroloum Resources
ASSESSMENT REPORT

3920

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Charles A.R. Lammle, P. Eng.

GEOLOGY, SOIL COPPER AND GROUND MAGNETICS

#### WAY MINERAL CLAIMS

Midway 82 E 2 B.C.

#### INTRODUCTION

During September 1972, I was commissioned by Bonus Resources Ltd., Vancouver, B.C., to carry out a preliminary exploration program on its Way Group of mineral claims, a copper prospect located at Ingram Creek, approximately 4 miles northwest of Midway, B.C. Work carried out under this program followed the recommendations made by Egil Livgard, P. Eng., in his preliminary examination report of Dec. 3, 1971, and consisted of an airphoto study, preliminary claims survey, and detailed geological, soil copper and ground magnetic surveys. These surveys, carried out during the interval Sept. 23 - Oct. 15, 1972, were controlled by a grid system of eastwest survey lines spaced at 400' intervals. The object of the work was to determine the lateral extent of, and exploration possibilities on two separate types of potential host rocks on the property - calcium silicate skarn and intrusive rocks.

This report will describe the work completed and the results obtained. Conclusions and recommendations will be presented for consideration.

#### SUMMARY

The Way Group copper prospect of Bonus Resources Ltd. (NPL), located 4 miles northwest of Midway, B.C., has responded with encouragement to the detailed geological geochemical and magnetic work carried out pursuant to recommendations by Egil Livgard, P. Eng. A large, strong soil copper anomaly - the Granada Anomaly - with values generally above 220 ppm, on anintrusive contact at the stratigraphic level of the favourable host rock horizon - the Brooklyn formation which hosted copper ores at Phoenix and Greenwood - and centrally within a broad propylitic alteration aureole, and also, along a strong air photo lineament, is an attractive and intriguing exploration target that requires and justifies further definitive exploration work. A smaller geochemical anomaly - the Way 13 Anomaly - has fewer correlating features, but requires some additional work as well. Further detailed geological and prospecting work, induced polarization surveys, some bulldozer trenching, and 5 BQWL diamond drill holes have been recommended for a second stage program. The estimated cost of the recommended program is \$45,000.

#### CLAIMS

The property consists of 21 located claims and the Granada Crown Grant, the latter being held by Mineral Lease M 419. The located claims Way 1-20 were staked Nov. 18, 1971, by J.J. Oberbillig. Way Fraction was staked by myself. Details of the claims are tabulated below:

CLAIM	RECORD NO.	TAG	ANNIVERSARY
WAY 1-20	35634-653	297833 <sup>M</sup> -852 <sup>M</sup>	DEC 3, 1972
WAY FRACTION	<b>~</b> -	81709 <sup>M</sup>	OCT 2, 1973

GRANADA CROWN GRANT L. 869 47.3 Acres held by mineral lease M. 419

(renewable 21 year lease subject to \$24 annual rental and \$192 annual work during first 10 years.)

The configuration of these claims is shown on Map 2, attached. Several of the posts marking out the crown grant were found. Some of the posts of the Way Claims positioned in open grass land were not found, but sufficient were found to define the perimeter of the property approximately.

#### LOCATION AND ACCESS (Map 1)

The property is located on the lower portion of Ingram Creek, immediately north of B.C. Highway 3, about 4 miles northwest of the small sawmill community of Midway, B.C. Ingram Creek is about 40 highway miles east of Osoyoos, B.C., or alternatively 16 miles west of Greenwood, B.C.

Ranch and old logging roads provide convenient access to the claims from the highway. Two hydroelectric power lines cross the property as does a natural gas pipe line. A branch line of Canadian Pacific Railroad parallels Kettle River immediately south of the property. Ingram Creek, though flowing in a steep canyon, has sufficient water for exploration purposes.

#### HISTORY AND PREVIOUS WORK

During the period 1894 - 1900, Edwin S. Graham explored and had crown granted a number of claims on Ingram Creek, among which were;

TEXAS	L. 662	32.02 Acres	April 30, 1897
POTTER PALMER	L. 661	47.18	April 29, 1897
GRANADA	L. 896	47.30	June 8, 1898
NORMANDY	L. 1537	31.37	April 19, 1900
BANK OF ENGLAND	L. 1536		

and subsequently the area of these claims became known as "Graham's Camp". Several old open cuts or short shafts, and a few old adits in the area attest the exploration efforts made in those years. Only the Granada and Texas Crown Grants have been maintained in good standing.

There is little historical data available for the period between these early years and the 1960's. Geological Survey of Canada personnel worked in the area from 1953 to 1957. In 1959 Granby Mining Co's Phoenix Division took up leases on the Texas and Granada and optioned other staked claims in the area. They carried out photo-controlled geological mapping and some diamond drilling on "Lois" and "Bornite" claims, southeast of the Way property, and now no longer in good standing. Utah Construction Co. reportedly did some drilling on the "Bornite" claims as well. There is no available record for this drilling; and I have seen no old diamond drill sites on the mapped portion of Way Property. Texas Gulf Sulphur Co. staked claims in the area in 1968 and carried out detailed plane-table controlled mapping and soil sampling of an area to the south of the Way Property. A portion of their geochemical work covers part of Way Claims 17 - 20, and this is shown on Map 3.

Egil Livgard, P. Eng., examined the Way Property on Nov. 19, 1971. and outlined a program to explore the ground.

#### BACKGROUND GEOLOGY

The south-central portion of British Columbia around Midway is underlain by the Triassic Anarchist Group of sedimentary and volcanic rocks. These have been invaded by a succession of Mesozoic to Tertiary granitic rocks. Conglomerates, sandstones and shales of the Tertiary Kettle River Formation overlie, and trachyte, latite, and andesite flows of Phoenix Volcanic Group, in turn, covers most of the other rock groups. Erosional processes have in places exposed "windows" of the older units.

The Anarchist group and some of the intrusives are economically important. Granby's Phoenix orebodies, and the former Greenwood orebodies -- Ore Denoro, Snowshoe, Old Ironsides, Stemwinder, Greyhound, Motherlode -- lay in a skarned, impure limestone unit, the Brooklyn Formation, within the Anarchist Group. These orebodies consist of irregular replacement bodies containing chalcopyrite, pyrite, and magnetite within the skarn. Rock above and below the limestone horizon consists of a distinctive chert-pebble conglomerate, locally called Sharpstone conglomerate.

#### LOCAL GEOLOGY (Map 2)

The Way Property at Ingram Creek covers a large portion of a "window" of Anarchist Group exposed through the overlying sediments and lavas. These Triassic rocks consist for the most part of Sharpstone Conglomerates with an intercalated horizon of impure skarned limestone. This assemblage has been intruded successively by a variety of granitic rocks in several small irregular bodies. Pyrite occurs fairly extensively in the conglomerate and other rocks around one intrusive plug. Pyrite, chalcopyrite and magnetite occur sporadically in the skarn horizon as small discontinuous replacements. Gross aspects of the geology are simple, but the detailed geological picture is complex. The individual rock types depicted on Map 2 are described below in order of decreasing age:

#### ROCK TYPES

Skarn, Marble, Limestone - White to light gray, massive to thick bedded limestone, commonly metamorphosed to light coloured marble, and in places metasomatized to a garnet-epidote-iron skarn. In places this skarn is characterized by pyroxene and/or amphibole and is generally easily recognized by its prominent rusty outcrop. Pyrite, chalcopyrite and magnetite are present sporadically at a few small discontinuous showings. On Way Group only one relatively thin (20'?) horizon of this unit is exposed, but to the south, however, appreciably more of this rock type is present.

Greywacke, Hornfelsic greywacke - Green to gray, fine grained to aphanitic, thick bedded sedimentary rocks often gradational into conglomerate. The unit is frequently hornfelsed into hard flinty rocks of dacite composition and contains in places several percent of fine disseminated pyrite. Outcrops are blocky, resistant, and rusty where the rocks are pyritized.

Sharpstone Conglomerate - Light green to gray hard, resistant, conglomerate consisting of well sorted angular to subrounded fragments and pebbles of chert, jasper and dacite set in a fine, slightly limy, lithic matrix. Fragment size is generally  $\frac{1}{4} - \frac{1}{2}$  inch, but in places near the intercalated Brooklyn formation, limestone or marble blocks up to 1 foot in size may be present. Locally the rock is hornfelsed into a breccia, or in places to a dense flinty pyritic hornfels.

Serpentinite - Lustrous, black and green altered ultrabasic intrusive rock rich in accessory magnetite. Internal fabric suggests both intrusive and cataclastic origin.

Fine grained Monzonite - dull pink to brown, aphanitic to fine grained crystalline rocks composed largely of orthoclase and plagioclase. Mafic minerals are inconspicuous, and for the most part, the rock has a uniform, low magnetic susceptibility. Outcrop are hard and resistant.

Monzonite porphyry - dark gray variably magnetic, conspicuously porphyritic intrusive rock forming small irregular dykes and plugs. Phenocrysts composed of both plagioclase and orthoclase laths set in a fine grained to aphanitic matrix.

Biotite and Augite Monzonite, Syenite - equigranular, fine to medium grained intrusive rocks, apparently younger than those described above, composed of a mixture of orthoclase and plagioclase, approximately 10% fine black biotite, and 5% augite. Accessory magnetite occurs as disseminated grains and as rare massive clots up to ½ inch. Most outcrops exposed to weathering are soft, rounded and rusted.

Trachyte, Latite and andesite dykes - fresh looking fine grained, tan to gray occasionally porphyritic rocks probably representing late stages of the above described intrusive unit, and also, feeders to the overlying lavas.

Porphyritic Latite and Trachyte flows - conspicuously porphyritic tan to gray lavas similar in appearance and composition to the biotite-monzonite-syenite unit and also to the trachyte-latite dykes. Some of the individual flows have a relatively high but uniform magnetic susceptibility. The rock unit appears to contain some minor siltstone - shale horizons and is known to rest on appreciable thicknesses of other similar sediments - the Kettle River Formation.

Basalt dykes - black fine grained frequently amyg-duloidal, occasionally porphyritic rocks forming narrow dykes up to a few feet in width.

#### STRUCTURE

The transitional contact between sharpstone conglomerate and greywacke, and the complications caused by the successive irregular intrusions does not permit a very clear idea of the attitude of the bedded rocks. The skarned Brooklyn Formation, where exposed in Ingram Creek Canyon, suggests a west-northwest strike and fairly flat southeast dip. Local measured attitudes trending northeast with moderate northwest dips to the northwest do not support this. Mapping by Texas Gulf Sulphur on ground to the south shows a much greater abundance of the favourable marble-skarn horizon, and several northwest strikes with moderate northeast dips. These conflicting attitudes indicate the complexity of the detail in these bedded rocks. The outcrop distribution of these rocks, however, shows their general trend to be to the northwest.

Faults observed on the property are small and insignificant. A stronger fault extending southwest from the old homestead on Way 12 has been inferred to account for lithological discontinuity that extends from the vicinity of the old homestead southwest along a valley to the vicinity of the Texas Crown Grant.

The relationship of the old (Mesozoic) sediments and granitic rocks is complex as mentioned before, and the younger Phoenix Group lavas (and KETTLE River Formation) overly with marked angular unconformity.

#### ALTERATION AND MINERALIZATION

The principal type of alteration and mineralization known in the area is the calcium-silica-iron metasomatism of the limestone, that is, the skarn alteration. Locally this alteration, as at 4N, 50E, is so intense that it has affected the sharpstone conglomerate unit. Pyrite is the common iron mineral forming part of the skarn but in places magnetite, specularite, hematite and chalcopyrite occur as erratic irregular replacements of limestone. Amphibole and/or pyroxene minerals are locally well developed in the skarn.

Good examples of the skarn alteration are present at the old open cuts at 48N, 8E and at 16N, IE. The rather weak pyrite-chalcopyrite mineralization at these localities are not typical however.

A relatively strong and uniform aureole of propylitic alteration characterized by epidote, chlorite, pyrite, calcite and some silica, extends as a halo outwards up to 1200' away from an intrusive stock of dense fine grained monzonite. The dotted line defining approximate limits for the pyrite halo on Map 2, outlines the approximate limit of this hydrothermal alteration. The old hand-dug pits at 27N, 6W and those at 2N, 30E expose rocks with strong alteration of this sort.

The northern contact of the fine grained intrusive Monzonite is gradational with sedimentary Anarchist rocks - either greywacke or sharpstone conglomerate - that are horn-felsed and propylitized to a degree preventing precise identification of the original rock.

#### PHOTO GEOLOGY

Vertical stereo-pair photographs were studied during the course of the field work. The photographs were found useful for orientation purposes, but very little geological information pertaining to the property was obtained. The boundary between Phoenix and Anarchist Groups

could be approximated, but no geological detail could be defined. A strong northerly lineament sub-paralleling the powerline at the west side of Texas C.G. was discovered.

#### SOIL COPPER

Part of the exploration work carried out on the Way Property consisted of a geochemical soil copper survey. Soil samples gathered total 646, and the analytical results are shown in graphical form on Appendix 1, and in plan on Map 3. Parts of the western portion of the property were previously sampled by Texas Gulf Sulphur (see Assessment Report 2049) and there was thus no need to duplicate this work. The Texas Gulf sampling and their analytical results for their work on what is now part of Way Property is shown on Map 3.

SOIL CHARACTER AND SAMPLING DETAILS - The Midway area of south-central B.C. is semi-arid and the consequent soils are chernozems, that is, they are powdery with a dark "A" horizon, an indistinct "B" horizon and a lighter coloured, limy "C" horizon derived from drift and bedrock. On steep rocky slopes the "A" horizon may be essentially non-existent, and in forested, areas only a few inches thick. On the open slopes and grassy bottomlands of Kettle River Valley the "A" horizon may exceed 1½' in depth. Some of these soils have developed on fluvial deltaic deposits of sand and gravel that once formed shorelines around a Pleistocene lake.

The soil samples were taken by hand from mattock holes dug to what was thought to be the top of the "B" horizon, or at least to the area of prominent colour change in the soil profile. In grassy areas, depth to this horizon was generally about 16 inches, but on rocky slopes this depth was much less, generally only 6 - 8 inches. In outcrop areas whatever soil was available for a sample was taken.

Samples were placed in labelled manila envelopes and forwarded to the laboratory of Bondar-Clegg for copper determination.

ANALYTICAL PROCEDURE - After drying, the samples were screened on 80 mesh stainless steel, and a ½ gram portion of the undersize digested in hot aqua-regia. Then, after homogenizing and diluting to a solution of 20% acid, the content of copper in the solute was determined by standard AA4 atomic absorption techniques, the hardware being maintained in calibration by the use of both prepared and natural-soil standards.

#### RESULTS OF SOIL COPPER SURVEY (Map 3)

Appendix 1, the graphical presentation of the results, shows the frequency distribution of the soil analyses. This chart theoretically should separate any discrete logarithmically distributed population of data, a particular population reporting as separate straight lines on the chart. Overlap between individual populations and imperfectly distributed data contributes to some rounding near the intersections. The intersections of the reconstructed straight line sections can be taken as population boundaries.

The chart can be used to separate the 646 Way analyses into three populations as follows:

- A. 10 33 ppm lower 82% of samples
- B. 34 -110 ppm middle 14%
- C. 110 + ppm higher 4%

The distribution of population A on Map 3 suggests this group of soils have been derived from Phoenix Group environment; population B appears to have been derived from Anarchist Group environment, and population C is assumed anomalous.

Map 3 shows the location of the anomalous samples, a major anomalous collection along the west half of Granada Crown Grant - the Granada Geochem Anomaly - and a smaller anomaly on Way 13.

The Granada Anomaly as outlined by the 220 ppm contour - twice the Anarchist group threshold and seven times the Phoenix Group threshold - ranges in width from 400' to 900'. Its length as defined by this survey is 1800' and it is open for extension to the south. Assessment report 2049 shows this same anomaly to persist undiminished an additional 2000' to the south.

Way 13 geochem anomaly is 200' wide by 1000 long and its maximum is slightly more than twice Anarchist Group threshold.

#### GROUND MAGNETICS

The third portion of the exploration program was a ground magnetometer survey. The magnetic readings for the entire survey were taken by Siegfried Klumpp, a local high school graduate, 20 years of age and trained and supervised by myself.

INSTRUMENT AND SURVEY PROCEDURE The instrument used in the survey was the McPhar M 700 direct reading flux gate magnetometer, an instrument designed to measure variations in the vertical field of the earth's magnetic field. The sensitivity

of the instrument varies according to the selector range used - in this survey very nearly all the readings were taken on the 1K and 3K selector ranges on which the sensitivity is 20 and 50 gammas per scale division respectively.

Prior to commencing the survey the instrument was "zeroed" to ensure that the most sensitive range could be used over most of the property, then a collection of base stations were established to facilitate corrections for diurnal variation during the survey. Then the survey was carried out, systematically reading the instrument at 100 foot stations on the grid lines and periodically checking in at nearby base stations. Diurnal variations were found to be negligible considering the relatively high and irregular relief on the property.

Some of the factors which influence the earth's magnetic field and which are necessary considerations in magnetic work are listed below:

- 1. Variations in the amount of magnetic minerals in bedrock.
- 2. Variations in the amount of detrital magnetic minerals in overburden.
- 3. Concentrations of magnetic minerals.
- 4. Depth to the center of an anomalous magnetic material.
- 5. Alteration and/or destruction of magnetic minerals.
- 6. Combinations of the above.

#### RESULTS OF THE MAGNETIC SURVEY (Map 4)

The results of the survey, shown contoured on Map 4, can be delimited into three distinctive areas:

- Area 1 the area on the northwest side of Ingram Creek characterized by northeast trending magnetic features of moderate relief.
- Area 2 the southeastern portion of the surveyed area characterized by high, erratic relief, and
- Area 3 the area closely outlined by the propylitic aureole characterized by low order gentle relief.

The first clearly reflects northeast trending flows of Phoenix Group; the second, the northwest structural trend of the Anarchist Group and contained intrusive rocks; and the third appears to reflect the fine grained intrusive monzonite and its alteration halo. Linear highs T, U, and V reflect eroded edges of the Tertiary trachyte flows; the several magnetic highs marked S reflect serpentinite, intrusive into Anarchist Group; areas marked G reflect magnetite rich syenite and monzonite intrusives and have magnetic relief similar to the flows northwest of Ingram Creek; area Q is an area of low magnetic relief in the

center of which lies Way 13 Geochem Anomaly. The lithological discontinuity through which the inferred northeast fault has been placed is reflected in the magnetics and another similar discontinuity — trend W — is suspect from the magnetics. The strong single station low, L, cannot be readily explained, but it may have some di-polar relationship with the high associated with the serpentinite nearby to the west. The 500 gamma contour and trend of adjacent isomagnetic contours near locality P closely approximates the intrusive in this area. Slightly lower relief peripheral to this area can be attributed to destruction of magnetic minerals (conversion to pyrite) within the propylitic aureole.

#### CORRELATIONS

Several intriguing correlations have been established by the geological geochemical and magnetic work on Way Property. These are as follows:

1. The large strong Granada geochem anomaly (1800' NS by 400-900' in dimension with copper concentrations generally above 220 ppm) lies immediately east of a conspicuous airphoto lineament; and it straddles the intrusive contact between monzonite and the Anarchist Group sediments at the stratigraphic level of the favourable Brooklyn formation, all more or less centrally within, or along the axis of the propylitic aureole. The area of the anomaly is characterized by relatively flat, low order magnetic relief that has likely been created by the conversion of magnetite to pyrite. These features collectively are comparable to those that have been described at many large tonnage — low grade copper orebodies, and hence, in this terrane, they define a viable and intriguing exploration target.

The smaller Way 13 geochemical anomaly and associated magnetic area Q is relegated to a secondary priority because of the absence of the limestone horizon, the absence of a hydrothermal halo, and its smaller size. Some additional work at this site to more definitely determine its significance is necessary, however.

#### CONCLUSIONS AND RECOMMENDATIONS

Correlating geological, geochemical and magnetic data at Granada geochemical anomaly define an intriguing exploration target that requires and justifies a second stage of definitive exploration work. A secondary target - the Way 13 geochemical anomaly - warrants some additional work as well. Each anomaly should be thoroughly prospected, each should be delimited additionally by induced polarization work, and bulldozer trenching. The Granada (and possibly the Way 13) anomalies

should be depth tested by diamond drill. Five drill holes should be allowed for at this stage, but if results are encouraging, additional work will have to be considered.

 $\label{lem:Approximate costs} \mbox{ for the recommended second stage program are outlined below:}$ 

1.	Geological and prospecting work Accommodation and transportation	\$ 2,000 1,200
2.	Induced Polarization 6 mi @\$500/mi	3,000
3.	Bulldozer trenching 100 hours @\$37/hr	3,700
4.	BQ drilling 5 - 400' holes @\$16/ft includes assays, water haul	32,000
5.	Contingencies	3,100
	ESTIMATED COST OF RECOMMENDED WORK	\$ 45,000

Respectfully Submitted

CHARLES A.R. LAMMLE Oct. 15, 1972

## QUALIFICATIONS MAGNETOMETER OPERATOR

This is to advise that Mr. Siegfried Klumpp, Rock Creek, B.C., operator of the McPhar M700 instrument during the herein described survey on Way Group (82 & 2 c B.C.) was trained and supervised by me personally to perform his duties. I wish to advise that I consider him old enough, able enough, reliable enough, and conscientionis enough to perform the work, and is now a capable magnetometer operator.

Chas. La Cammle
Oct 15 1972

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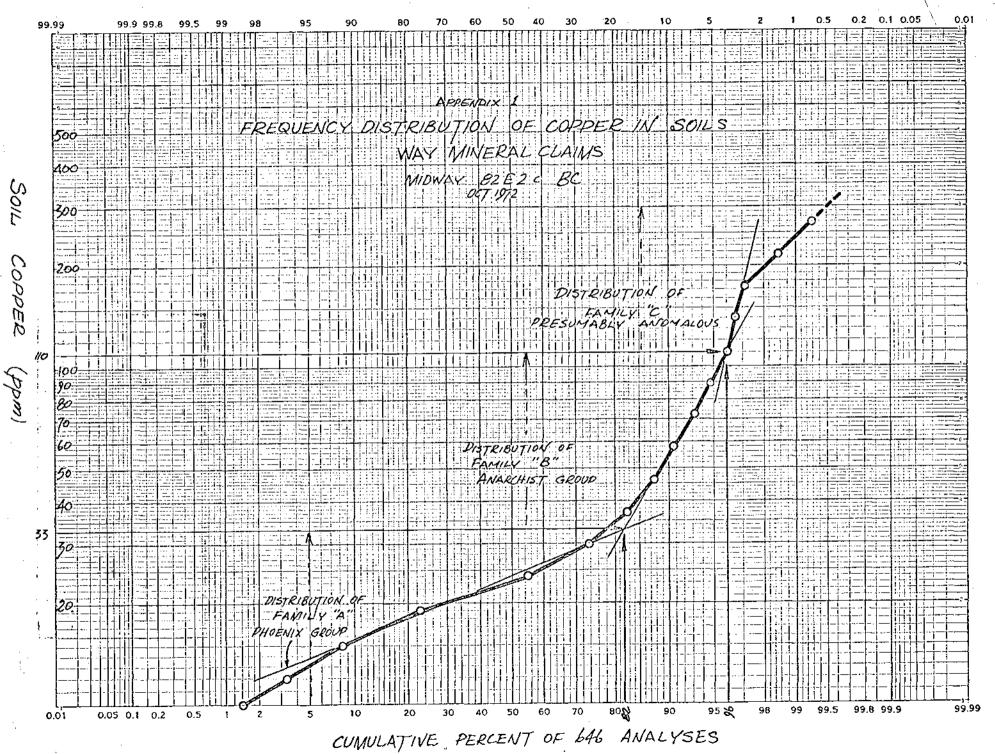
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Oct 15 1912 C.a.R. Lammle Itemized Statement of Workmen's Time Distribution and Expenditures Incurred. Way Property Midway Greenwood M.D. B.C. Fersonnell Costs. Sub Totals Grand Work. Dates Time \$210 John Sykes Sept 23-28 6@35 Reginald Broett 6@ 35 210 Lines Gell Broussell 6@35 210 Kaymond Thrasher. Sept 23 - 29 7@ 35 245 Lanmle (Superissin) Sept 23-24 150 2@75 materials misc. 26 1051.00 J. Sykes Geoch. Sept 30-Oct 4 SE 35 175 & Besett emistry 5@ 35´ 175 B. Broussell S@ 35 175 R. Thruster S@ 35 175 Lammle (super. rept.) Sept 30 3 Oct 3@75 225 analyses Bondar-Clags. 775 20 materials mese 3508 Siegfried Klumpp. Sept 25-045 11@40 440 Jan Jacobsen Sept 25-0013 Jemmfe (Super, rept.) Sept 25 3 Oct Mag Lental Mepher. 9@ 30 **2**70 3*@75* 225 125 materials & Misc. 22 1082.00 Geology. Lamme Sept 26-048 13@75 375 Lammer rept. 113600 2@75 Oct. 150 materials Price. 11 Maps Photos Printing Typing Xerox 5040 5110 Transportation 37022 5476,00 5476.00. ASSESSMENT CREDIT CLAIMED Declared before me at the , in the V ancouver Province of British Columbia, this Chas be Lammle day of October 1972

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MAP #5

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- 3. B.C. Minister of Mines Reports. 1894 1903, 1921
- 4. Little, H.W., G.S.C. Map 6-1957, Kettle River (East Half) 1957.
- 5. Livgard, Egil, Report on the Way Claims 1 20 and Granada Crown Grant, Dec. 3, 1971.

#### CERTIFICATE

I Charles A.R. Lammle of North Vancouver, B.C. hereby certify that:

- 1. I am a registered professional Geological Engineer residing at 939 Adderley St., North Vancouver, B.C.
- I am a graduate of the University of British Columbia.
   (BASc., Geol Eng., 1962.)
- 3. I have practiced my profession since 1962.
- 4. I have been a member of the Association of Professional Engineers of B.C. continuously since 1965.
- 5. I have no interest, direct or indirect, in the properties or securities of Bonus Resources Ltd. nor do I expect to receive any such interest for writing this report.
- I have based this report on the results of work carried out or supervised by myself during September and October, 1972.
- 7. I hereby grant Bonus Resources Ltd. (NPL) permission to use this report (Way Mineral Claims, Oct. 15, 1972. etc) for its corporate purposes.

Charles A.R. Lammle P.Eng. Oct. 15, 1972

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