5416

104B/8E & 8W ; 104B/9E & 9W

part 1 of 2

Geology and Geochemistry of Mitch, Ray, Ted, Patty and Ran Mineral Claims, Sulphurets Creek Property, 56° 30'N, 130° 15'W, Unuk River Area, Skeena Mining Division, British Columbia.

An Assessment Report on 1974 Program on New Mitch and Mitch No. 12 Claim Groups.

by Ed. Kruchkowski
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for Granduc Mines, Limited (N.P.L.)

January 31, 1975

Ed Kruchkowski

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APPENDICES

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PART I
General Remarks

1. Introduction

During the 1974 field season, geological mapping and bedrock geochemical sampling techniques were applied to claims of the New Mitch and Mitch No. 12 claim groups, Sulphurets Creek area, Skeena Mining Division, British Columbia. This report includes a description of work done, geological observations and interpretations and a discussion of silver lead and molybdenum geochemical data.

Geochemical evaluation of the Sulphurets Creek property is incomplete and therefore conclusions stated in this report are considered to be partial and preliminary.

2. Claims

Names, record numbers and anniversary dates of claims of the New Mitch and Mitch No. 12 claim groups are detailed in Appendix 1.

Figure 3 illustrates the locations of the various claims.

3. Logistics and Personnel

1974 field work on the Sulphurets Creek property was done by a three-man crew in the period July 8 to August 31. The crew and field equipment were transported from Vancouver to Stewart, B. C. by company-owned truck and upon completion were similarly returned to Vancouver. Stewart, the closest town, was the base for services and supplies and an Alouette III turbine helicopter based there was used as required for service trips and camp moves. For safety and convenience, daily radiotelephone contact was maintained with stations at Stewart and at Schaft Creek camp.

Personnel and their qualifications are detailed in Appendix 2 of this report.

Erik Ostensoe, Chief Geologist for Granduc Mines, Limited (N.P.L.), organized the field program, participated in much of its execution and supervised and participated in office studies and preparation of maps and reports.

Ed. Kruchkowski, Geologist, did much of the field work, and then, in the office, compiled the base maps, examined all samples with the aid of a binocular microscope, selected samples for comprehensive test analyses, cut and catalogued small slices of each sample, plotted geological data and chemical analyses and prepared final geological and geochemical maps.

Rick Ford was an able and willing field assistant.

The data on which this report was based was primarily compiled by Ed. Kruchkowski. Erik Ostensoe was responsible for its organization and collaborated with Mr. Kruchkowski in writing the various sections.

Assistance in evaluating the field program and determining the significance of the multi-element analyses was obtained from personnel of Chemex Labs, Ltd. and Montgomery, Wolfe and Associates. In particular, the help of Messrs. Bruce Brown and Hart Bichler, chemists, and Joseph H. Montgomery, consulting geologist, was appreciated.

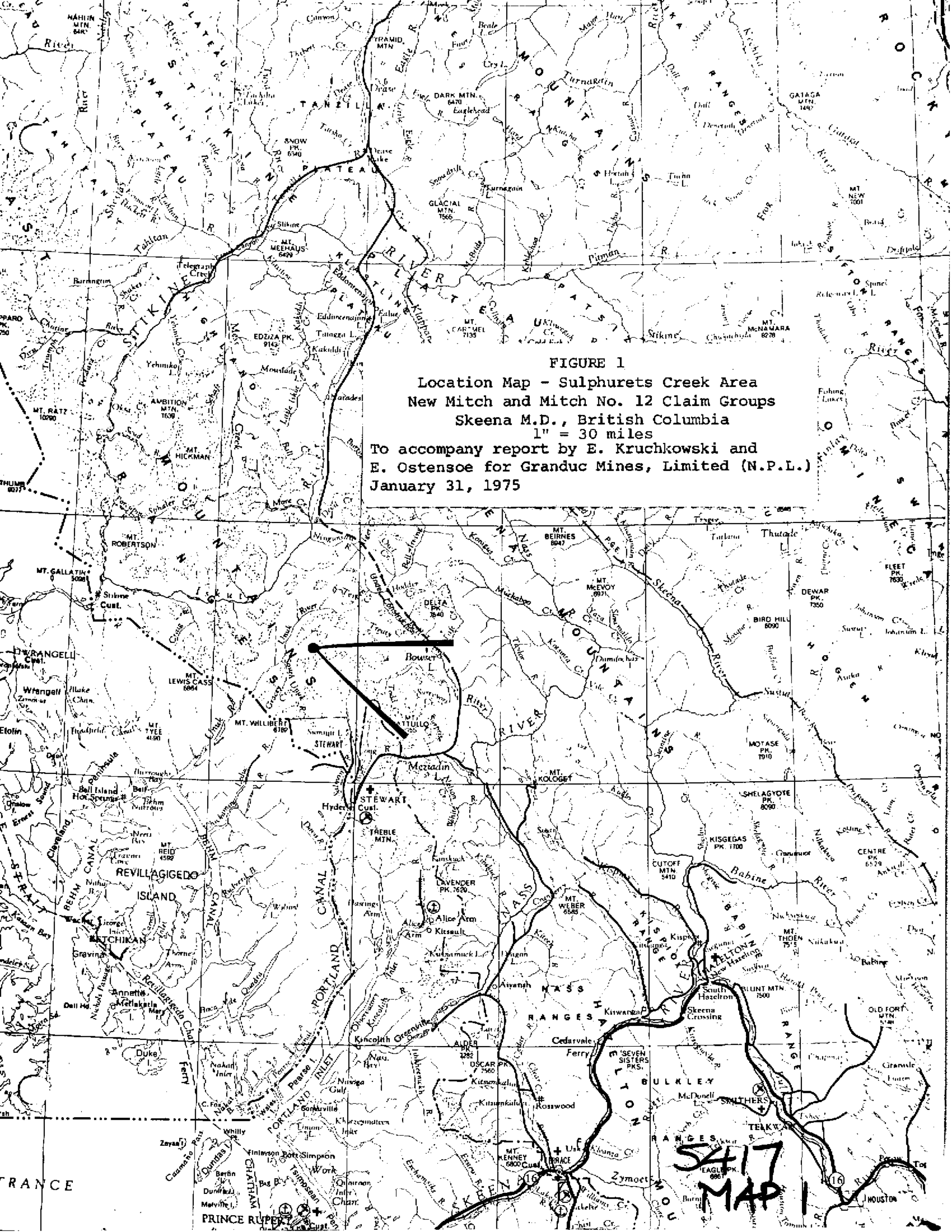

FIGURE 1
Location Map - Sulphurets Creek Area
New Mitch and Mitch No. 12 Claim Groups
Skeena M.D., British Columbia
1" = 30 miles
To accompany report by E. Kruchkowski and
E. Ostensoe for Granduc Mines, Limited (N.P.L.)
January 31, 1975

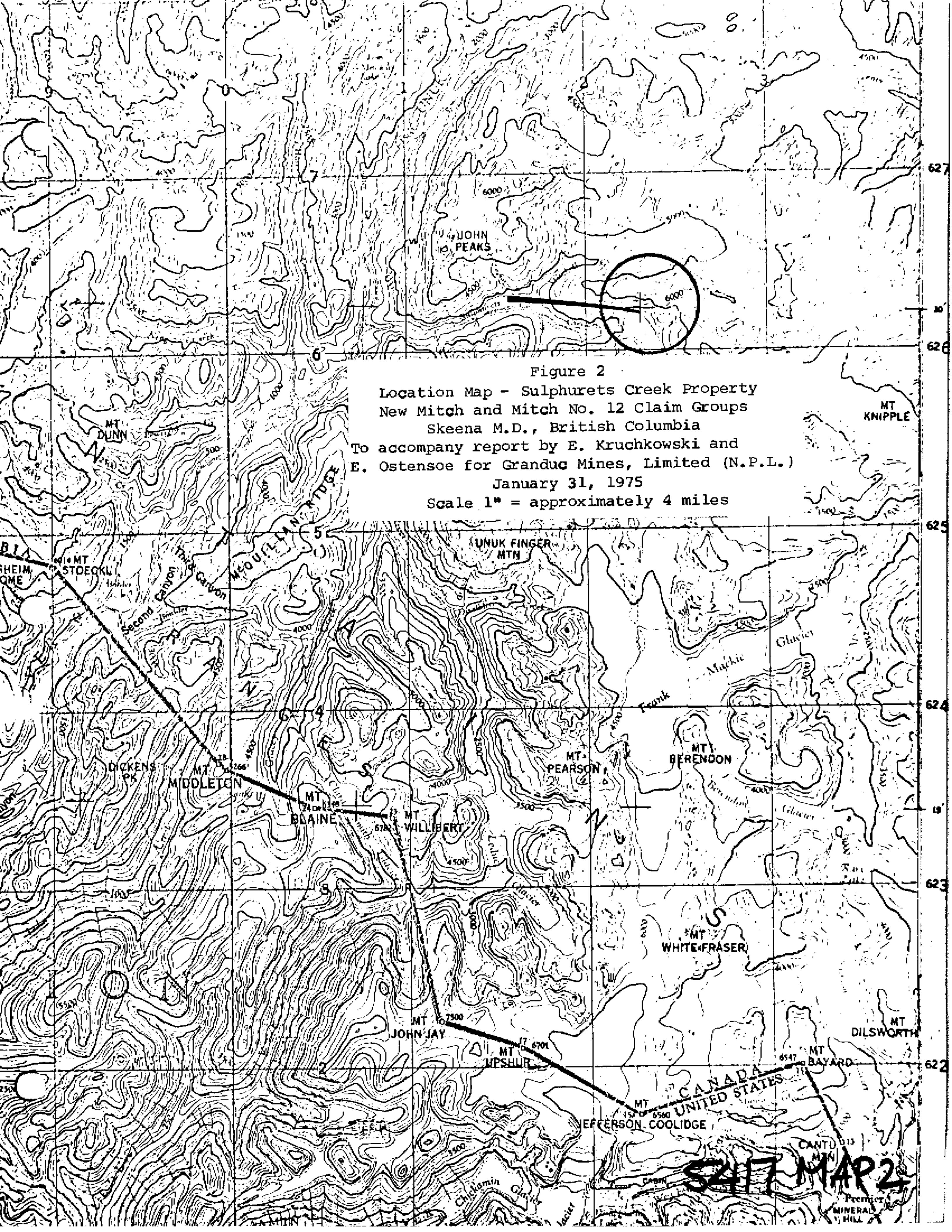

Figure 2
Location Map - Sulphurets Creek Property
New Mitch and Mitch No. 12 Claim Groups
Skeena M.D., British Columbia
To accompany report by E. Kruchkowski and
E. Ostensoe for Granduc Mines, Limited (N.P.L.)
January 31, 1975
Scale 1" = approximately 4 miles

4. Work Program

595 samples of bedrock material were collected at, or as close as possible to, points on a 400 foot square pattern grid. This sampling work was the primary objective of the 1974 field program and followed closely recommendations made by F. Forgeron, Geochemist, in 1968 and H. Bichler and B. Brown, chemists, in 1971.

Sampling necessitated establishment of chain and compass lines on which grid points were marked by collored and labelled flagging ribbon. Samples consisted of one to two pounds of chips or chunks representative of reasonably unweathered in situ material. Where necessary, fresh rock was exposed by detonating a small charge of dynamite placed on outcrop or in overburden.

Brief descriptions of the sample location, rock type, structures, if any, and any unusual features, were noted at each sample site. In areas of permanent snow, inaccessible cliffs, treacherous slopes and heavy soil or moraine, samples were frequently unobtainable or were taken from sites as much as 200 to 300 feet from the grid points. In all cases data were plotted at actual sample site locations rather than at the grid points.

The initial grid point (i.e. sample No. 1), located for convenience near the first camp site in the central part of the grid, was designated 4000N, 4000E to conform with arbitrary coordinates established by an earlier plane table survey. Grid lines were extended to the approximate boundaries of the claim group. Sufficient claim survey data was not available in the field to permit accurate determination of claim boundaries and as a consequence some samples (not included in this report) were taken outside of the claim groups.

In early August, 1974 Joseph H. Montgomery, Ph.D. P.Eng., spent 5 days on the claim groups, reviewing field techniques and gathering representative samples for spectrographic analyses. Dr. Montgomery had worked on the property in 1960 and is thoroughly familiar with geochemical theory and techniques. He recommended slight modifications that were incorporated into field procedures. Five samples selected from various parts of the property area were spectrographically analysed by Can Test Ltd., Vancouver, B. C. (Appendix 3).

Upon completion of field work, all samples were taken to the company's Vancouver office where a thorough examination of each sample using a binocular microscope and other standard aids, was carried out. Details of rock type, textures, structures, inherent magnetism, ultraviolet fluorescence, reaction to hydrochloric acid and any peculiar features, were recorded on appropriately numbered library cards. A rock chip of approximately two square inches was cut from each sample and filed in a numbered envelope as a permanent record. Geological notes, both field and office, supplemented by previous work of G. W. H. Norman, R. V. Kirkham, Erik Ostensoe, Roy Wares and E. W. Grove, were compiled on a comprehensive geological map (Figure 4).

Eighteen bedrock samples and two trench samples were selected as a suite representative of the rock types and their altered and mineralized phases, and were analysed for the following twenty-four elements: Copper, Molybdenum, lead, zinc, silver, nickel, cobalt, calcium, strontium barium, vanadium, rubidium, chromium, manganese, tungsten, fluorine, gold, sodium, potassium, iron, arsenic, antimony, mercury and bismuth. (Appendix 4). No useful patterns of either major or minor non-metallic element distribution were recognized.

Analytical methods and data for content of lead, silver and molybdenum in all pertinent samples (Appendix 5) are discussed in a subsequent section of this report. All analytical work was done by Chemex Labs. Ltd., North Vancouver, British Columbia.

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PART II
Geology

1. Introduction

The Sulphurets Creek mineralized zone lies between the Coast Igneous Complex and the Bowser Sedimentary Basin in a regional structural element described by Grove (1968) as the Bear River Uplift. Bowser Assemblage lapilli tuffs, conglomerates and basalt flows of Middle Jurassic to Lower Cretaceous age are present east and northeast of the zone. The mineralized zone occurs in epiclastic rocks, flows and marine sediments that have been intruded by a complex of syenitic, dioritic and granitic bodies collectively referred as the Mitchell Intrusions.

The structurally complex Sulphurets and Mitchell Creek areas are further complicated by extnsive silicification, sericitization and pyritization and by weathering effects. Thrust and tear faults have been identified but displacements are in most cases obscured or as yet unresolved.

Occurrences of potentially valuable economic minerals have been found in several parts of the mineral claims but are only partially delineated. Figure 4 of this report illustrates geological units and structural features of the New Mitch and Mitch No. 12 claim groups.

2. Syenitic and Related Rocks

On the basis of variations in microcline and quartz contents Kirkham identified three main types of syenitic intrusions: (1) albite syenite including hornblende plagioclase porphyry, (2) syenite, and quartz syenite grading into granite and (3) crosscutting granite. Potash feldspar occurs sparcely in the albite syenite, is an essential constituent in the syenite - quartz syenite and occurs in a microperthitic form as the only feldspar in the granite. Progressive differentiation is a possible mechanism suggested by Kirkham to account for variations in amounts of potash feldspar relative to plagioclase. The apparent total lack of calcic plagioclase may have resulted from sodium metasomatism subsequent to initial crystal formation or may reflect a somewhat uncommon condition of a calcium deficient magma.

As shown on the accompanying geological map (Figure 4) the 1974 field work and subsequent office studies enabled a four-fold division of syenitic rocks: syenites, trachyte flows, granite and cataclastic syenite.

The main occurrence of the syenitic intrusions is a probable sill complex of holocrystalline and porphyritic syenite on the ridge between Sulphurets and Mitchell Glaciers. Alaskitic purple-hued variations occur in the same area but reasons for the contrasting color phases have not been determined.

The porphyritic syenite commonly consists of euhedral and subhedral pink and white microcline microperthite and subhedral white albite phenocrysts in a greenish phaneritic groundmass composed of albite and altered mafic minerals. Phenocrysts are mostly 2 to 5 mm in length but very coarse grains up to 20 mm in length are occasionally present. Mafic minerals seldom comprise more then 20% of the rock and commonly are less than 5%. microcline microperthite grains exhibit oscillatory zoning visible without aid of magnification and frequently have a core of plagioclase. On occasion grains of plagioclase and mafic minerals have been engulfed by the zoned material.

Syenites rich in mafic minerals are usually magnetic with 1 to 2% visible magnetite grains. Country rocks adjacent to syenites of all descriptions are also commonly magnetic.

Trachytes were mapped in the southeastern portion of the rock sample grid where they are thought to be hypabyssal intrusions. Similar rocks, possibly extrusive equivalents of the trachytes, are included in the andesitic agglomerate unit. Kirkham distinguished greater amounts of albite and lesser amounts of microcline in trachyte as compared to syenite. Both rock types are commonly porphyritic but unlike the syenite, the trachyte contains hornblende phenocrysts, and has a dark green aphanitic matrix. Feldspar phenocrysts in the trachyte usually are numerous, euhedral and closely similar in size (in the 2 to 4 mm range) in contrast to a scattering of corroded grains of varying size in the syenite. Weak epidote alteration, pervasive throughout the trachyte, is likely a deuteric phenomenon.

Only two samples of granite were taken during the 1974 program but Kirkham and Wares both recognized granite as an important "end-member" of the Mitchell Intrusions. Crosscutting relationships of granite with the syenite, described by Kirkham, were not recognized. The granite is distinguished by overall dark red to light purple color, visible quartz and low content of ferromagnesian minerals. It is holocrystalline with subhedral and anhedral feldspars and siliceous matrix. Feldspars are mostly red with white cores and are microcline microperthite and perthite. Quartz, calcite and chlorite veinlets cut the granite.

Cataclastic syenite occurs on the south slope of Mitchell Valley in close proximity to the trace of the Sulphurets Fault. It typically consists of a mixture of granulated to mylonitized syenite and fragments of coarse brecciated syenite. Quartz is abundant in the matrix portion and exceptionally forms as much as 50% of the total rock. Color varies from dark red to light grey, dependent upon the intensity of alteration that has attended the tectonic event. The broadest area of cataclasis corresponds to the intersection of the Sulphurets Fault and steep angle north - south faults.

3. Andesitic and Dioritic Rocks

At Sulphurets Creek the distinction between intrusive and extrusive phases of chemically similar rocks is made with difficulty, especially where complicated by faulting alteration and weathering. Four subdivisions of the andesitic/dioritic rocks were established:

1) andesitic tuff - includes crystal and lithic tuff and interbedded tuffaceous sediments of andesitic composition.

2) andesitic agglomerate - coarse fragmental rocks with tuffaceous matrix; includes epiclastic rocks.

3) diorite/andesite dykes and sills

4) hornblende diorite porphyry

Andesite flows were not recognized.

Andesitic tuff and related tuffaceous sediments are abundantly distributed on the north side of the Sulphurets Valley and, together with agglomeratic and epiclastic material, form an arcuate wedge marginal to and partly assimilated by the syenite pluton. On the south side of Mitchell Valley tuffaceous rocks are less common but fragmental varieties persist.

Crystal tuff members have angular crystal grains and fragments in a microcrystalline groundmass whereas lithic tuffs are composed of small rock fragments in a tuffaceous matrix. Bedding is frequently obscured by alteration. Colors vary from light green to grey. Alteration is variable and includes a weak silicification and development of epidote, chlorite and calcite. Near the syenite pluton potash metasomatism of the tuffaceous andesite has created a pink colored crystalline rock that can scarcely be distinguished from intrusive rock. The andesitic agglomerate with coarse fragments and tuffaceous matrix may easily be confused with some of the coarser clastic sedimentary rocks.

Andesite dykes and sills are mostly too small to show on the accompanying geology map. Those occurrences shown were poorly defined in the field and require additional study. It seems probable that some are actually small plutons, or were feeders to the enclosing volcanic debris.

The andesite is green, dense, holocrystalline and generally lacks internal structures. Feldspar phenocrysts are occasionally present. Chloritic alteration is pervasive in some dykes whereas others are completely unaltered. Calcite, epidote and minor amounts of magnetite are also variable components.

Dioritic dykes have characteristics similar to those of the andesite dykes but are lighter in color and coarser grained. Essential minerals are feldspar and hornblende. Micas were noted in only one occurrence.

Hornblende diorite porphyry is present in several areas on the slopes immediately north of Sulphurets Glacier. The rock type is distinctive, having up to 30% euhedral and subhedral hornblende phenocrysts in a dense finely crystalline feldspathic matrix. Hornblende grains may be aligned and are commonly chloritized. Pyrite is moderately abundant in the unit, commonly in massive veinlets.

4. Clastic Sedimentary Rocks

a) Greywacke

Greywackes are present in all parts of the Sulphurets Creek area. Lithic greywacke, in which rock fragments exceed detrital feldspar grains is predominate in the southwestern portion of the 1974 grid whereas feldspathic greywacke is most abundant in the eastern and northwestern portions.

Feldspathic greywacke has about 30%, and occasionally up to 60%, feldspar, both as subangular detrital grains and phenocrysts in rock fragments. As is characteristic of greywackes by definition, sorting is poor with particles ranging from silt and clay size through coarse sand and pebble size. Colors vary from green to grey-green, usually influenced by weak chloritization of the rock flour "paste" matrix. Chert fragments commonly comprise 10% of the lithic varieties of greywacke. In addition to chlorite, carbonate and particularly epidote are common products of alteration.

b) Arenite

On the basis of field and office studies it was possible to distinguish between greywackes, described above and arenites. The latter unit includes very siliceous detrital rocks with less than 10% argillaceous matrix. At Sulphurets Creek the rock is typically a massive grey fine grained pyritic quartz-rich rock without good bedding features. Quartzitic-, feldspathic and lithic-arenite subdivisions were attempted depending upon the nature of dominant components. For map illustration purposes the unit includes wackes which are similar rocks with more than 10% argillaceous matrix.

North of Sulphurets Glacier close to the Sulphurets Fault, the arenite is particularly massive and strongly pyritic. Details are further obscured by silicification, perhaps representing a minor metamorphic redistribution of quartz, and by weathering, staining and leaching of the pyrite. Similar appearing rocks occurring south of Mitchell Glacier have been identified by thin - section studies (Brown) as silicified syenite and some uncertainty exists concerning the distribution of the rock type. Sericite, and less commonly chlorite and epidote, are other alteration minerals recognized in the arenite.

The arenite unit does not outcrop in the hanging wall of the Sulphurets Fault. A lateral change eastward from the Fault from arenite to wacke to greywacke is thought to represent a facies change. In the past this transition was interpreted as a stratigraphic succession, which lead to a somewhat different geologic model.

c) Argillite, Siltstone and Chert

A thick sequence of argillite siltstone and chert beds occupies the southeastern portion of the 1974 project area. These rocks appear to underlie the arenite unit and include minor amounts of wackes, arenites, tuffs and trachytes. In general they are thinly bedded and well indurated or weakly hornfelsed. The argillites are black, pyritic and calcareous, the siltstones, grey, siliceous or cherty, and the cherts are usually grey and highly fractured. Thin limestone lenses were noted, particularly in the upper portion of the unit. Chlorite, sericite and epidote are present throughout.

d) Black Shales, Argillites and Conglomerate

An extensive unit of shales, argillites and conglomerates lies west and northwest of the Sulphurets Creek claims. They exhibit distinctly lower grades of metamorphism and may unconformably overlie the more altered and sheared rocks. On the accompanying map the contact is drawn as a possible fault structure. The rock unit is very extensive in the area but received little attention during the 1974 program.

5. Regional Metamorphic Rocks

Strongly foliated talc-sericite-chlorite-quartz schists are exposed at lower elevations near Mitchell Glacier. Three types were distinguished during mapping and sampling but the series is apparently unique in its occurrence and no satisfactory means of relating these rocks to the contrasting overlying units was found.

a) Talc-sericite - chlorite Schist

Soft, grey, talc-sericite-chlorite schist is present at the toe of Mitchell Glacier. Feldspar porphyroblasts are crudely banded and in places give a near-gneissic appearance to the rock. Kirkham identified this rock as an altered syenite on the basis of sericite pseudomorphically replacing feldspars but this is inconsistent with the nearby presence of weakly altered syenite.

b) Quartz-Sericite Schist

A very light colored schistose rock containing quartz and sericite with small quantities of pyrite outcrops on the south side of Mitchell Glacier just east of the claim block. This is thought to represent a highly altered argillaceous sedimentary unit. Similar rocks are known to extend several thousand feet in an easterly direction.

c) Chlorite Schist

Green chlorite schist outcrops near the southeastern edge of Mitchell Glacier. It is weakly magnetic and contains only a small amount of pyrite. This rock type may represent a very thoroughly regionally metamorphosed sedimentary unit.

6. Structural Geology

Norman, Kirkham, Wares and Grove have all attempted to summarize the structural geologic features of the Sulphurets Creek area. All have encountered difficulty relating the various structural elements including bedding foliation, schistosity, elongation of intrusive bodies, alignment of dykes, juxtaposition of disparate rock types and trends of linear features, faults, apparent faults and disconformities.

The 1974 field program was primarily directed to the bedrock geochemical sampling but some new structural data was also acquired. The essentials have been incorporated in Figure 4. Notable revisions of structure include recognition of a series of vertical north-south faults strongly developed both north of Sulphurets Glacier and south of Mitchell Glacier. These are truncated by the trace of Sulphurets Fault and thus pre-date that structure. These faults are intimately associated with the conspicuously gossaned siliceous arenites and the cataclastic syenite. Further study of these steeply dipping faults may help decipher the alteration and mineralization patterns.

The arcuate allochthonous syenite pluton has been emplaced by thrust or oblique thrust displacement on the plane of the Sulphurets Fault. The presence of similar syenitic rocks as dykes, sills and small plutons elsewhere in the area underlying the Sulphurets Fault suggests that displacement has been of relatively small magnitude.

Trends of schistosity in metamorphic rocks near Mitchell Glacier are oriented east-west whereas the foliation in bedded rocks overlying the Sulphurets Fault trends northerly to northwesterly. This juxtaposition of attitudes permits several structural explanations, the one favored at present requires rotation of the thrust block.

The strongly developed east-west "grain" in the metamorphic rocks is at variance with prevailing Cordilleran and local northwesterly trends but appears consistent with Grove's statement:

"Structurally, the mineralized zone, - - - - - - - - - - -
lies near the northwest end of an elongate regional dome".

7. Alteration

Crudely defined zones with specific assemblages of alteration minerals are present in the Sulphurets Creek area. Hydrothermal, regional and dynamic metamorphic effects are recognizable and obvious alteration minerals include quartz, albite, sericite, chlorite, epidote, calcite and pyrite.

Regional-scale albitization is present and is attributed to sodium metasomatism by circulation of sea water (à la W.S Fyfe) or to alkaline solutions emanating from the intrusive complex. Albite occurs as the only feldspar in many of the Sulphurets Creek area rocks and it also is present in veinlets.

Albite also occurs in association with sericite, presumably reflecting low temperature metasomatism by solutions containing both sodium and potassium. Turner and Verhoogen suggest that required temperatures would be 400°C or less. Higher temperature alteration with production of potash feldspar rather than sericite is confined to the areas very close to syenite and related intrusive bodies.

Sericite is most abundant in the arenite and quartz-sericite schist and it is likely that the latter rock type is derived from the arenite. Outside of the present map area Wares reported a siliceous dome or quartz stockwork enveloped by a sericitic assemblage perhaps indicative of a hydrothermal phase of silica and potassium alteration.

Weak chloritization is pervasive throughout the map area wherever the necessary ferromagnesian components were available. Epidote, calcite and quartz are commonly associated with chlorite, an assemblage consistent with the greenschist facies of regional metamorphism.

Sulfurization or sulfur metasomatism has resulted in formation of a very extensive pyritic zone, mainly within the arenite and quartz-sericite schist units, and in pervasive pyritization of much of the remainder of the sedimentary and volcanic rocks. The reaction model invoked for the area hypothesizes reactions between magmatically derived hydrothermal or gaseous sulfur compounds and iron-bearing components of both sedimentary and volcanic rocks. Igneous rocks, though normally somewhat pyritic, appear to have escaped much involvement.

Some of the feldspathic greywacke and some of the trachyte contains significant amounts of epidote. Epidote has partially or totally replaced feldspar grains and presumably was also formed by saussuritization of finer matrix material.

Talc-chlorite-sericite schist and attendant quartz stockworks in Mitchell Valley are attributed to greenschist facies CO_2 metasomatism. This process seems feasible as it can release quantities of quartz. The hydrothermal source of quartz referred to above is not inconsistent with this model though one can offer no obvious source for the CO_2.

8. Mineralization

The ubiquity of weathering products of pyrite in the Sulphurets Creek area is recognized in the geographic designation. In addition to pyrite, other sulfide minerals are pyrrhotite, chalcopyrite, molybdenite, sphalerite, galena and tetrahedrite. The present authors cannot confirm the reported presence of ruby silver minerals. With the exception of pyrrhotite, all minerals are of possible economic significance. Todate, most attention has been directed to several areas of copper mineral occurrences and to molybdenite values. Areas of greatest potential include the quartz-rich arenite and cataclastic syenite units that underlie the Sulphurets Fault. The arenite has been explored and sampled by numerous trenches and by several short diamond drill holes; the cataclastic syenite has not been sampled in any systematic fashion but exhibits primary and secondary copper minerals.

PART III
Geochemistry

1. Introduction

In addition to the obvious formidable problems created by a remote location, a hostile climate and rugged topography, exploration of the Sulphurets Creek property has been hampered by the more favorable and manageable problem of size. The dimensions of the area favorable for mineral exploration are about 5 miles (8.0 km) north-south and 3 miles (4.8 km) east-west. In order to plan and carry out systematic efficient exploration it is necessary to identify and assign priorities to various portions within the area. Although bedrock exposures are generally good, the primary tool in this process, geology, is somewhat handicapped by the blanket of iron oxide minerals that obscure the potentially valuable sulfides. Leaching and enrichment of metals has also occurred.

Prior to 1974 mapping, silt sampling, trenching and drilling had been applied to the Sulphurets Creek property. In accord with recommendations by both Bondar - Clegg (1968) and Chemex Labs Ltd. (1971) a program of bedrock sampling was commenced during July 1974. The objective of the survey was to apply multi-element analysis to the bedrock samples to identify primary, and possibly secondary, dispersion patterns around potential ore zones. The intent was to sample initially on a 400 foot square grid pattern to be followed by a 200 foot pattern in areas of unusual interest.

2. Orientation Surveys

During June 1968, Fabian Forgeron, Ph.D., of Bondar-Clegg & Company Ltd. carried out an orientation geochemical survey in part of the Sulphurets Creek property. 67 samples of which 17 were bedrock samples; 14, stream sediments and 26, talus fines; were analysed for cold citrate extractable copper, hot acid extractable copper, lead, zinc and silver, pyrosulfate fusion and thiocyanate colorimetric determination of molybdenum. The survey determined that geochemical techniques could be used to indicate the presence of ore grade mineralization. The problem of scavanging of trace amounts of metal by sorption and by co-precipitation with hydrated ferric oxides to give anomalous metal valves tended to partially discount the effectiveness of sampling unconsolidated and surficial material. Of significance with respect to this report were Forgeron's observations that "Bedrock analyses indicate that copper gives a broadly anomalous halo around known copper mineralization and that molybdenum and silver give more restricted halos which may be useful in providing target sites over broad bedrock copper anomalous (sic)" and "there is a copper-lead-zinc association in the talus fines which may be indicative of bedrock sources of silver".

In 1971 H. Bichler and B. Brown of Chemex Labs Ltd. analysed one pyritic sample and one sample with low values in both pyrite and copper and reviewed Forgeron's report in order to provide a second opinion regarding rock geochemistry at the Sulphurets Creek property. They concluded that severe ratio inversions were recognizable and that a program of rock geochemistry would provide useful elemental zoning data.

While the 1974 sampling program was in progress Joseph H. Montgomery, Ph.D.,P.Eng., was commissioned to carry out a further field orientation study and to check and advise on the suitability of field methods being employed. He selected five samples of varied lithology which were analysed for 34 elements by semi-quantitative emission spectrographic techniques.

After completion of field work, twenty rock samples representative of major rock units, irrespective of mineralization, were selected and analysed for twenty-four elements (see page and Appendix 3). Because of the variety of rock and alteration environments involved, it is probable that an insufficient number of samples was analysed. Apparently anomalous lead, molybdenum and silver values appeared to be consistently related to areas of known copper mineralization and all samples were subsequently analysed for those elements.

3. Analytical Procedures

Samples consisting of between one and two pounds of fresh or reasonably unweathered bedrock were submitted to Chemex Labs Ltd. After passing through a jaw crusher and a gyratory crusher, the sample was split through a "Jones" splitter to obtain about 250 grams of material. The latter quantity was pulverized in a contamination-free ring pulverizer to -100 mesh size. Accurately weighed ten gram and 0.5 gram portions were then prepared and digested.

The 10 gram sample was ashed at 550°C then twice heated to dryness in aqua regia. The resulting residue was dissolved in 25% hydrochloric acid and aspirated through Varian Techtron Atomic Absorption Spectrophotometer. Two readings were obtained: one for silver (Ag^{++}) and the other for the interference factor which was then subtracted from the first quantity to give a net corrected value for silver content.

The 0.5 gram sample was digested using 3 ml. of 70% perchloric acid and 2 ml. of concentrated nitric acid for two and one-half hours at 203°C. The solution was then diluted with distilled water to 25 ml volume, and heavy particles were allowed to settle out. The clear solution was processed through the atomic absorption unit and readings were obtained for lead and molybdenum.

4. Treatment of Data

Geochemical data were plotted on base maps prepared on scale of one inch to 800 feet (243 m). On the base maps each sample site is identified by a small numbered circle and the particular geochemical value is plotted nearby using a slightly larger italicized script.

It was found that in all cases geochemical values exhibited great variation, due, presumably, to the range of rock types present and to the varying alteration and mineralization histories to which the area as a whole has been subjected. Consequently contouring was designed to express relative abundances of metals rather than to be statistically defensible in the strictest sense.

For convenience parts of the geochemical maps were colored to reflect arithmetic multiples of abundances of metals: Yellow indicates metallic ion present in above general background levels for the area, probably little economic significance; blue - anomalous values, possibly close to economically significant mineralization; green - significantly anomalous quantities of metallic ion present in the rock; red - a high concentration of metallic ion.

5. Geochemistry of Lead

Values obtained for lead in bedrock geochemical samples are plotted on Figure 5. The lower detection limit for lead in the analytical method employed is 2 ppm. Values recorded in the surveyed area range from <2 to 1387 ppm. The majority of values are less than 20 ppm and a 2 factorial multiple of 20 was used as the contour interval, viz. 20, 40, 80, 160 ppm.

No anomalous (i.e. 20 ppm or greater) lead values were obtained in the surveyed area south of Sulphurets Glacier. The lead content of syenite located on top of the ridge between Sulphurets and Mitchell Glaciers is very low whereas the sedimentary rocks exposed on the south-facing slopes from the toe of Sulphurets Glacier to the Hanging Glacier produced a high proportion of weakly to moderately anomalous samples and a wide scattering of samples abnormally high in lead.

A zone of very high lead content occurs south of Mitchell Glacier in the vicinity of steeply dipping faults and the trace of Sulphurets Fault. This coincides with an area of cataclastic syenite and rather intense quartz and sericite alteration within which trace amounts of galena have been recorded. North of Sulphurets Glacier where copper mineralization has been investigated by trenching and drilling, lead is generally present in quantities only slightly above background.

6. Geochemistry of Silver

Values obtained for silver in bedrock geochemical samples are plotted on Figure 6. The lower detection limit for silver in the analytical method employed is 0.2 ppm. Values recorded in the survey area ranged from <0.2 to 46 ppm and a 2 factorial multiple of 1 was used as the contour interval, viz. 1, 2, 4, 8 ppm.

Weakly to moderately anomalous silver values were obtained in the surveyed area south of Sulphurets Glacier, and strongly anomalous values extend across the claim group along the south and west end of Mitchell Glacier coincident with outcroppings of sericite-pyrite alteration imposed on arenite. Elsewhere significant silver values are erratically distributed over much of the slope between Sulphurets Glacier and the ridge top. High silver values do not invariably coincide with areas of known copper mineralization. As with lead, the silver content of syenite is low or only very weakly anomalous.

7. Geochemistry of Molybdenum

Values obtained for molybdenum in bedrock geochemical samples are plotted on Figure 7. The lower detection limit for molybdenum in the analytical method employed is 1ppm. Values recorded in the survey area ranged from <1 to 340 ppm. and a 2 factorial multiple of 10 was used as the contour interval, viz. 10, 20, 40, 80 ppm.

Anomalous molybdenum values obtained south of the Hanging Glacier are not related to any known mineralization or intrusive source and the host rock is greywacke and chert. North of Sulphurets Glacier abnormally high quantities of molybdenum occur in zones closely related to the trace of Sulphurets Fault, and near the contact between syenite and epiclastic volcanic rocks. Neither structural feature is well defined by the molybdenum values. South of Mitchell Glacier, as is the case for the pattern of lead and silver, the lower contact between the cataclastic syenite and the serricite-pyrite altered arenite is conspiculously defined by molybdenum. Samples from the arenite unit downstream from the snout of Mitchell Glacier are the most enriched in molybdenum, perhaps again reflecting proximity to the trace of Sulphurets Fault. Two isolated but strongly anomalous samples are no. 535, south of Mitchell

Valley and no. 572, north of Mitchell Valley. Both represent phyllitic pyrite-rich shear zones of rather insignificant dimensions.

PART IV
Conclusions

During 1974 the Sulphurets Creek property was further explored by geological mapping and by geochemical analysis of bedrock samples. A significantly revised geological map was prepared and the various rock types were better defined. The distribution patterns of lead, silver, and molybdenum in bedrock were found to reliably reflect major fault structures and, less reliably, the occurrence of copper minerals. Several previously unrecognized areas of anomalous metal content in bedrock were indicated.

The methods employed in carrying out the 1974 program were found to be effective in indicating areas of little potential and highlighting areas of some possible interest. The surveys should be expanded to cover the balance of the mineral claims and closer spaced sample grids should be established on several of the presently known anomalies.

APPENDICES

APPENDIX I - Mineral Claim Groups

1. New Mitch Group

Claim Name	Anniversary Date	Record No.
Mitch 1	February 1	36316
Mitch 2	"	36317
Mitch 3	"	36318
Mitch 5	"	36320
Mitch 6	"	36321
Mitch 7	"	36322
Mitch 8	"	36323
Mitch 9	"	36324
Mitch 10	"	36325
Mitch 11	"	36326
Patty 1	August 7	29541
Patty 2	"	29542
Patty 3	"	29543
Patty 4	"	29544
Patty 5	"	29545
Ray 1	May 31	18907
Ray 2	"	18908
Ray 3	"	18909
Ray 4	"	18910
Ray 5	"	18911
Ray 6	"	18912
Ray 7	"	18913
Ray 8	"	18914
Ray 9	"	18915
Ray 10	"	18916
Ray 11	"	18917
Ray 12	"	18918
Ray 13	"	18919
Ray 14	"	18920
Ray 19	"	18925
Ray 20	"	18926
Ray 22	"	18928
Ray Y Fraction	August 6	21133
Ran 50	September 15	32236

2. Mitch No. 12 Group

Claim Name	Anniversary Date	Record No.
Mitch 12	February 1	36327
Mitch 13	"	36328
Mitch 14	"	36329
Mitch 15	"	36330
Mitch 16	"	36331
Ted 1	May 27	18999
Ted 2	"	19000
Ted 3	"	19001
Ted 4	"	19002
Ted 6	"	19004
Ted 15	"	19013
Ted 16	"	19014
Ted 17	"	19015
Ted 18	"	19016
Ted 19	"	19017
Ted 31	"	19193
Ted 32 Fraction	"	19194
Ran 40	June 29	31453
Ran 41	"	31454
Ran 42	"	31455
Ran 43	"	31456
Ran 44	"	31457
Ran 45	"	31458
Ran 46	"	31459
Ran 47	"	31460
Ran 48	"	31461
Ran 49	"	31462
Lee 1	June 26	32794
Lee 2	"	32795
Lee 3	"	32796
Lee 4	"	32797

APPENDIX II - Statement of Qualifications

The professional qualifications of technical personnel engaged in the work reported on herein, are detailed below:

1. Ed Kruchkowski, B.Sc., Geologist - completed B.Sc. course at University of Alberta (Edmonton) in May 1972; in summers of 1969, 1971 and 1972 employed by Hecla Operating Company in Schaft Creek area as coresplitter, soil sampler and geologist respectively. In 1970 employed by consultant and assigned to projects in southeastern British Columbia. Employed by Hecla Operating Company as geologist from May, 1973 to June, 1974 and assigned to projects at Mess Creek, B. C. and Bute Inlet, B. C. under the direction of Erik Ostensoe and P. I. Conley, P.Eng. Employed by Granduc Mines, Limited (N.P.L.) from July, 1974 to present as geologist in charge of work on Sulphurets Creek property.

2. E. A. Ostensoe, B.Sc. (Hons.), Member: CIMM, Association of Exploration Geochemists; Geologist - completed B.Sc. Honours course at University of British Columbia in 1960 and course requirements of M.Sc. at Queen's University in 1966; employed by Newmont Mining Corporation of Canada Ltd., under direction of Dr. G. W. H. Norman, P.Eng., from May 1960 through August 1964 as field geologist in Granduc Mine area, B. C., by Mount Billings Venture in south-eastern Yukon in summer 1965, by Scud Venture (Asarco) in Iskut River area, B.C. in summer 1966 and by Granduc Mines, Limited (NPL) and Hecla Mining Company of Canada Ltd. from October 1966 to present as Chief Geologist and Exploration Supervisor under the direction of P. I. Conley, P.Eng.

3. Rick Ford, field assistant, high school graduate, previously employed by Hecla Mining Company of Canada Ltd. at Mt. Horetzky and at Schaft Creek, B. C. Trained in field techniques of I.P. surveys, geochemical surveys and prospecting.

A P P E N D I X 3

Spectrographic Analyses

Can Test Ltd.

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Montgomery Wolf & Associates,
805 - 850 West Hastings Street,
Vancouver, B. C.

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Telex 04-507737

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES CERTIFICATE

File No. 8118 A

Date Aug. 22, 197

We hereby Certify that the following are the results of semi quantitative spectrographic analyses made on samples submitted.

Element	Symbol	1	2	3	4	5
Aluminum	Al	Major	1.	3.	6.	5.
Antimony	Sb	ND	ND	ND	ND	ND
Arsenic	As	ND	ND	ND	ND	ND
Barium	Ba	0.08	Trace	0.02	0.02	0.02
Beryllium	Be	ND	ND	ND	ND	ND
Bismuth	Bi	ND	ND	ND	ND	ND
Boron	B	0.002	0.002	Trace	0.005	Trace
Cadmium	Cd	ND	ND	ND	ND	ND
Calcium	Ca	Major	0.5	2.	1.	1.
Chromium	Cr	0.02	0.04	Trace	0.01	Trace
Cobalt	Co	Trace	Trace	ND	ND	ND
Copper	Cu	0.01	0.04	0.06	0.05	*
Gallium	Ga	ND	ND	ND	ND	ND
Gold	Au	Trace	Trace	Trace	Trace	Trace
Iron	Fe	6.	3.	2.	5.	3.
Lead	Pb	0.05	Trace	0.01	0.01	0.01
Magnesium	Mg	4.	0.05	1.	1.	1.
Manganese	Mn	0.3	0.02	0.2	0.005	0.03
Molybdenum	Mo	ND	0.005	ND	0.03	0.01
Niobium	Nb	ND	ND	ND	ND	ND
Nickel	Ni	0.01	Trace	Trace	0.005	0.003
Potassium	K	Trace	Trace	Trace	Trace	Trace
Silicon	Si	Matrix	Matrix	Matrix	Matrix	Matrix
Silver	Ag	0.001	Trace	0.003	0.001	Trace
Sodium	Na	4.	Trace	5.	0.5	3.
Strontium	Sr	0.1	Trace	0.01	0.08	0.02
Tantalum	Ta	ND	ND	ND	ND	ND
Thorium	Th	ND	ND !	ND	ND	ND
Tin	Sn	ND	ND	ND	ND	ND
Titanium	Ti	0.8	0.05	0.1	0.6	0.4
Tungsten	W	ND	ND	ND	ND	ND
Uranium	U	ND	ND	ND	ND	ND
Vanadium	V	0.07	0.04	0.03	0.01	0.01
Zinc	Zn	ND	ND	ND	ND	ND

Sample Identification

Sample 1: MS-1 Pb-Zn-pyrite
Sample 2: MS-2 Qtz-ser-pyrite
Sample 3: MS-3 Syenite
Sample 4: MS-4 Mo zone
Sample 5: MS-5 Cu zone.

Percentages of the various elements expressed in these analyses may be considered accurate to within plus or minus 35 to 50% of the amount present.

Semi-quantitative spectrographic analytical results for gold and silver are normally not of a sufficient degree of precision to enable calculation of the true value of ores. Therefore, should exact values be required, it is recommended that these elements be assayed by the conventional Fire Assay Method. Quantitative and Fire Assays may be carried out on the retained pulp samples.

Silicon, aluminum, magnesium, calcium and iron are normal components of complex silicates.

MATRIX — Major constituent
MAJOR — Above normal spectrographic range
TRACE — Detected but minor amounts
N.D. — Not detected
* — Suggest assay (above 0.3%

All results expressed as Percent

Note: Pulps retained one week.

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Multi-element Analyses

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SAMPLE NO. :	PPM Copper	PPM Molybdenum	PPM* Lead	PPM Zinc	PPM* Silver	PPM Nickel	PPM Cobalt
9	1000	7	8	34	0.4	26	22
21	52	1	24	65	0.2	58	20
27	175	1	6	32	0.2	52	22
46	13	< 1	2	41	<0.2	24	22
83	1120	10	2	60	0.8	54	48
91	28	< 1	8	45	2.0	52	20
134	33	< 1	22	57	0.4	20	18
160	52	5	8	20	0.4	16	12
182	1240	7	10	98	1.0	54	20
186	110	< 1	4	86	0.4	24	34
339	76	1	6	18	1.6	18	12
365	1160	10	6	30	1.6	58	28
408	33	3	98	375	2.8	36	20
442	186	1	4	75	1.2	32	32
476	1000	2	6	28	0.4	16	16
503	920	2	2	52	0.4	82	30
557	1240	20	< 2	105	1.6	18	20
601	197	< 1	4	22	0.2	18	12
12501	14000	120	52	55	1.8	24	20
12505	2080	11	22	127	0.8	32	18

CERTIFIED BY: Hart Bichler

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SAMPLE NO. :	% Calcium	PPM Strontium	PPM Barium	PPM Vanadium	PPM Rubidium	PPM Chromium	PPM Manganese
9	0.31	20	320	460	390	880	88
21	2.53	410	1000	150	170	760	720
27	2.82	625	1800	390	235	360	600
46	1.39	310	840	305	235	320	1035
83	1.85	115	180	330	285	920	470
91	1.85	160	200	230	285	1320	1615
134	2.00	340	6000	250	210	680	1110
160	0.25	125	3180	240	290	920	336
182	4.44	80	1080	180	285	360	1815
186	3.48	900	4200	420	105	200	1260
339	0.48	15	600	245	340	1080	426
365	3.06	210	760	290	295	920	540
408	0.07	<5	240	345	330	2320	119
442	1.92	135	240	470	380	1240	925
476	0.65	200	7700	300	240	680	500
503	2.81	280	2550	470	320	400	1110
557	0.88	60	3850	280	235	720	1185
601	3.31	260	3950	270	230	1080	960
12501	0.28	80	400	260	265	80	310
12505	2.88	200	520	210	135	80	1185

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SAMPLE NO. :	% Iron	PPM Arsenic	PPM Antimony	PPB Mercury	PPM* Bismuth
9	6.72	140	6	190	< 2
21	3.34	85	2	80	< 2
27	5.00	15	< 2	50	< 2
46	3.68	42	< 2	30	< 2
83	5.80	27	< 2	40	< 2
91	3.26	100	2	30	< 2
134	3.52	25	< 2	65	< 2
160	2.08	29	< 2	50	< 2
182	3.52	27	< 2	80	< 2
186	5.50	5	< 2	65	< 2
339	2.40	23	< 2	20	< 2
365	3.08	22	< 2	50	< 2
408	2.76	230	2	565	< 2
442	4.54	60	2	65	< 2
476	2.32	5	< 2	65	< 2
503	5.00	15	4	90	< 2
557	5.40	6	2	50	< 2
601	1.36	3	2	40	< 2
12501	3.16	37	18	30	< 2
12505	3.26	7	8	30	< 2

*Corrected

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SAMPLE NO.	PPM Tungsten	PPM Fluorine	PPB Gold	% Sodium	% Potassium
9	12	320	560	0.15	7.38
21	12	270	<30	4.35	1.88
27	40	600	30	4.45	2.44
46	30	320	<30	4.65	2.31
83	16	580	500	3.55	3.31
91	12	540	205	5.57	3.26
134	16	320	<30	4.45	4.00
160	10	590	130	2.05	5.25
182	<8	830	405	0.07	2.38
186	16	400	<30	4.50	2.50
339	8	380	700	0.43	2.31
365	10	420	80	3.40	5.12
408	<8	180	130	0.07	2.06
442	20	350	80	0.31	3.94
476	16	420	50	3.90	5.12
503	20	1200	<30	2.49	1.57
557	8	680	540	0.60	3.19
601	<8	500	<30	3.20	3.60
12501	<8	1260	870	1.15	5.62
12505	<8	530	1020	6.25	1.62

CERTIFIED BY: R. Baxter

A P P E N D I X 5

Lead, Silver and Molybdenum Analyses

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Rock Geo. Project

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
1	12	72	1.2
2	3	16	5.2
3	< 1	8	0.2
4	7	58	9.0
5	1	24	2.6
6	5	38	0.4
7	3	46	0.4
8	2	6	0.6
10	1	22	0.2
11	3	< 2	0.8
12	12	< 2	2.2
13	2	4	0.8
14	1	10	0.6
15	10	8	1.2
16	3	4	2.0
17	< 1	10	<0.2
18	2	4	0.6
19	< 1	22	4.6
20	< 1	4	<0.2
22	< 1	12	1.0
23	< 1	4	<0.2
24	4	10	0.4
25	4	< 2	0.2
26	6	6	0.2
28	12	2	0.8
29	2	8	0.4
30	2	< 2	1.2
31	1	< 2	0.4
32	< 1	16	0.4
33	< 1	18	<0.2
34	< 1	6	<0.2
35	< 1	10	<0.2
36	6	14	0.8
37	< 1	500	1.6
38	1	280	14.
39	< 1	12	0.2

*Corrected

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SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
52	< 1	< 2	0.6
53	2	12	1.8
54	3	4	0.2
55	1	18	0.8
56	< 1	8	0.2
57	3	130	3.2
58	2	48	1.2
59	55	6	0.8
60	< 1	6	0.2
61	2	10	<0.2
62	1	8	0.6
63	1	4	<0.2
64	7	14	0.4
65	1	4	1.0
66	6	30	1.8
67	1	34	<0.2
68	1	26	<0.2
69	1	22	0.2
70	2	16	<0.2
71	< 1	14	<0.2
72	8	2	1.2
73	1	6	0.2
74	7	10	1.2
75	< 1	6	0.2
76	4	8	0.2
77	13	6	0.8
78	6	8	0.6
79	50	6	2.0
80	6	260	46.
81	30	< 2	1.0
82	21	89	1.0
84	3	8	0.8
85	14	< 2	0.2

*Corrected

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ATTN:

Rock Geo. Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
86	27	14	1.0
87	2	18	0.2
88	1	8	0.2
89	255	50	4.8
90	5	24	2.0
92	2	6	0.4
93	2	12	0.2
94	< 1	6	0.2
98	2	8	0.2
99	< 1	30	1.2
100	1	22	1.0
101	1	12	3.0
102	40	14	0.6
103	< 1	38	1.2
104	6	18	1.0
105	3	60	0.8
106	< 1	8	0.6
107	< 1	2	< 0.2
108	1	4	1.4
109	6	< 2	0.6
110	< 1	4	2.4
111	1	24	2.2
112	< 1	2	0.8
113	< 1	< 2	0.2
114	< 1	2	1.0
115	2	< 2	0.8
116	< 1	< 2	0.2
117	1	< 2	0.2
118	3	6	1.0
119	9	< 2	1.4
120	72	< 2	1.4
121	14	< 2	0.6
122	4	4	0.2
123	15	14	0.8
124	1	12	0.8
125	6	< 2	0.8
126	11	10	0.6

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ATTN:

Rock Geo. Project

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
127	< 1	8	0.6
128	1	46	0.6
129	2	12	1.4
130	1	2	0.2
131	13	4	1.0
132	2	1125	22.
133	2	24	1.0
135	< 1	6	1.2
136	3	8	0.6
137	6	6	0.4
138	< 1	8	0.6
139	< 1	16	2.0
140	2	12	1.8
141	< 1	8	< 0.2
142	< 1	4	0.2
143	47	2	0.6
144	10	4	< 0.2
145	5	4	< 0.2
146	< 1	4	< 0.2
147	1	4	0.8
148	1	4	0.2
149	1	4	5.0
150	2	6	0.6
151	1	12	< 0.2
152	< 1	40	0.4
153	< 1	6	< 0.2
154	< 1	16	0.2
155	< 1	10	< 0.2
156	1	< 2	0.2
157	13	60	3.2
158	11	2	1.0
159	5	4	0.4
161	2	10	0.2
162	3	8	0.6
163	2	2	2.6
164	< 1	2	0.8
165	< 1	2	< 0.2
166	< 1	2	< 0.2
167	< 1	2	0.2
168	< 1	8	0.8

*Corrected

CERTIFIED BY: ....

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212 [illegible]
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CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28855
INVOICE NO. 13297
RECEIVED Dec. 12/74
ANALYSED Dec. 16/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings,
Vancouver 8, B. C.

ATTN

Rock Geo. Project

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
169	<1	4	0.2
170	<1	2	0.2
171	1	< 2	< 0.2
172	41	< 2	0.8
173	2	2	< 0.2
174	90	< 2	0.8
175	<1	<2	0.2
176	<1	34	1.0
177	2	12	0.6
178	12	2	1.0
179	<1	38	1.8
180	<1	14	1.4
181	5	16	1.2
183	3	8	1.2
184	1	700	14.4
189	4	8	<0.2
190	50	2	0.6
191	1	< 2	0.4
192	<1	8	0.8
201	<1	10	1.4
202	<1	78	0.8
203	2	70	5.4
204	1	20	1.0
205	25	30	0.4
206	7	2	0.8
207	3	2	0.6
208	96	6	<0.2
209	17	52	0.8
210	4	12	<0.2
211	1	10	0.4
215	<1	566	2.4
216	1	8	1.0
217	3	16	1.0
218	1	14	<0.2

*Corrected

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: H.L.Shef.

CHEMEX LABS LTD.

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28866
INVOICE NO. 13323
RECEIVED Jan. 3/75
ANALYSED Jan. 23/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver, B. C.

ATTN:

Rock Geo. Project

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
219	1	4	0.6
226	1	10	< 0.2
227	1	4	< 0.2
228	2	4	0.4
229	2	10	0.4
230	3	54	0.8
231	2	10	0.2
232	<1	6	0.4
238	<1	6	1.0
239	2	4	< 0.2
240	<1	10	0.2
241	1	12	0.6
242	8	44	0.2
243	2	1330	2.8
244	1	8	0.6
245	1	22	0.4
246	5	22	0.2
247	7	<2	0.2
248	2	4	0.4
249	1	52	0.4
250	2	6	0.2
251	1	4	0.4
252	2	10	1.6
253	5	12	0.8
254	3	6	0.6

*Corrected

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: ....

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CERTIFICATE OF ANALYSIS

TO: Granduc Mines Ltd.,
2009 - 1177 W. Hastings
Vancouver 8, B. C.

CERTIFICATE NO. 26667
INVOICE NO. 13323
RECEIVED Jan. 3/75
ANALYSED Jan. 23/75

ATTN:

Rock Geo Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
255	3	4	0.4
256	1	32	0.6
257	<1	36	0.8
258	<1	20	0.6
259	<1	16	0.4
260	15	48	0.6
261	6	8	1.2
262	1	24	1.0
263	1	12	1.2
264	1	6	0.6
265	10	22	0.4
266	4	2	0.8
267	1	4	0.2
268	<1	4	< 0.2
269	<1	6	< 0.2
270	<1	4	0.2
271	<1	2	0.2
272	<1	38	1.2
273	5	6	0.6
274	2	8	0.6
275	1	6	0.4
276	<1	14	0.6
277	<1	12	0.2
278	1	44	1.2
279	2	6	0.8
280	<1	6	0.6
281	<1	12	0.4
282	<1	8	0.4
283	4	8	1.0
284	<1	4	0.4
285	<1	50	1.0
286	<1	12	0.4
287	2	4	0.2
288	<1	4	< 0.2
289	8	4	0.4
290	<1	8	0.2
291	1	28	1.2
292	<1	10	0.2
293	16	24	4.4
294	2	8	0.8
Std.	25	50	

*Corrected

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: H.L. Shaf...

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28663
INVOICE NO. 13323
RECEIVED Jan. 3/75
ANALYSED Jan. 23/75

TO: Granduc Mines Ltd.,
2009 - 1177 W. Hastings,
Vancouver, B. C.

ATTN:

Rock Geo. Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
295	1	8	0.6
296	5	2	1.8
297	2	4	0.5
298	5	4	1.6
299	2	< 2	1.2
300	< 1	2	1.4
301	9	< 2	0.4
302	4	2	0.8
303	6	2	0.4
304	9	2	1.2
305	10	< 2	0.2
306	< 1	6	0.6
307	< 1	2	< 0.2
308	2	4	0.2
309	1	12	0.4
310	< 1	< 2	0.2
311	1	8	0.6
312	34	48	1.0
313	2	12	0.2
314	1	4	< 0.2
315	1	20	0.4
316	< 1	4	< 0.2
317	1	10	< 0.2
330	< 1	6	< 0.2
331	1	10	0.6
333	2	< 2	0.4
334	< 1	2	0.2
Std.	25	50	

*Corrected

CERTIFIED BY: H. J. Lhr...

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CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE: 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28669
INVOICE NO. 15323
RECEIVED Jan. 3/75
ANALYSED Jan. 23/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver, B. C.

ATTN:

Rock Geo. Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
335	2	4	0.2
336	< 1	8	0.4
337	< 1	4	0.2
338	1	6	0.2
340	7	4	1.2
351	< 1	2	1.0
352	8	10	0.2
353	2	2	0.2
354	1	20	0.2
355	< 1	8	< 0.2
356	105	6	0.8
357	26	14	1.6
358	6	10	0.4
359	5	10	0.2
360	1	8	< 0.2
361	< 1	10	0.8
362	1	8	0.2
363	2	6	0.2
367	2	6	0.2
368	< 1	4	0.2
369	< 1	4	< 0.2
370	< 1	8	0.2
371	1	4	0.4
372	< 1	16	0.6
373	1	8	0.4
374	1	6	0.6
376	29	10	1.6
376	9	4	1.0
Std.	25	48	

*Corrected

CERTIFIED BY: [signature]

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[illegible]
NORTH VANCOUVER, B.C.
CANADA [illegible]
TELEPHONE [illegible]
AREA CODE: 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28870

INVOICE NO. 13339

RECEIVED Jan. 3/75

ANALYSED Jan. 29/75

TO:
Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver 8, B. C.

ATTN:

Rock Geo. Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
380	4	6	0.2
381	15	14	0.8
382	< 1	14	0.4
383	3	18	0.6
384	< 1	4	4.0
385	< 1	6	0.6
386	9	12	0.6
387	1	12	0.6
388	1	8	0.8
389	< 1	8	0.6
390	< 1	8	0.4
391	< 1	10	0.8
392	< 1	16	0.8
393	< 1	58	0.6
394	< 1	4	0.2
395	1	6	0.2
396	2	2	1.2
397	2	10	2.2
398	5	2	1.0
416	< 1	6	0.2
417	1	14	0.6
Std.	25	48	11.4

*Corrected

CERTIFIED BY:

CHEMEX LABS LTD.

[illegible]
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28871
INVOICE NO. 13339
RECEIVED Jan. 3/75
ANALYSED Jan. 29/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver 8, B. C.

ATTN:

Rock Geo. Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
418	< 1	16	1.0
419	1	6	1.2
420	1	4	0.8
421	1	4	1.0
422	< 1	4	1.4
423	1	10	0.4
424	< 1	< 2	0.4
425	< 1	4	2.8
435	2	4	7.4
436	1	< 2	1.2
437	1	12	0.6
438	2	16	1.0
439	1	< 2	0.6
440	2	8	1.2
441	1	10	0.8
443	1	4	0.8
446	< 1	6	0.4
447	< 1	2	0.4
448	< 1	10	0.8
449	< 1	6	0.6
450	2	8	0.4
451	2	2	0.8
452	9	6	1.0
453	2	6	0.8
454	< 1	4	0.8
455	3	8	1.8
456	2	< 2	0.6
457	18	4	3.2
458	< 1	4	0.2
Std.	25	48	11.0

*Corrected

CERTIFIED BY: ....

CHEMEX LABS LTD.

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TELEPHONE 985-0648
AREA CODE 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28872
INVOICE NO. 13339
RECEIVED Jan. 3/75
ANALYSED Jan. 29/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver 8, B. C.

ATTN:

Rock Geo. Project

SAMPLE NO.	PPM Molybdenum	PPM Lead*	PPM Silver*
459	< 1	6	< 0.2
460	4	4	0.8
461	12	8	1.4
462	2	8	2.2
463	5	4	0.8
464	6	6	0.6
465	5	8	0.6
466	1	8	1.0
467	1	2	0.4
468	1	10	0.8
469	1	12	1.4
470	< 1	6	0.6
471	< 1	4	0.2
472	1	6	0.4
473	< 1	28	0.8
474	17	8	1.4
475	12	6	0.4
477	2	12	0.4
478	2	6	0.2
479	2	10	0.4
480	6	4	2.0
481	1	10	0.2
482	1	24	2.2
483	17	< 2	0.4
484	< 1	< 2	0.2
485	1	2	0.2
486	< 1	< 2	< 0.2
487	< 1	4	1.0
488	1	10	0.2
489	< 1	4	0.4
490	< 1	6	0.2
491	< 1	8	0.8
492	< 1	2	0.4
493	1	< 2	0.6
494	2	< 2	0.6
495	< 1	4	3.2
496	7	237	5.2
497	70	24	1.6
498	6	12	3.4
499	6	24	0.6
Std.	25	48	11.4

*Corrected

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: [signature]

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AREA CODE 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28873
INVOICE NO. 13339
RECEIVED Jan. 3/75
ANALYSED Jan. 29/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver 8, B.C.

ATTN:

Rock Geo. Project

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
500	12	12	2.4
501	170	2	1.0
502	4	< 2	0.6
504	1	2	0.4
505	4	2	0.6
506	110	2	2.4
507	6	20	1.8
508	3	6	0.8
509	< 1	2	0.2
510	1	4	0.2
511	2	2	0.6
512	2	< 2	0.8
513	1	< 2	0.6
514	3	< 2	1.0
515	< 1	4	0.8
516	1	54	0.6
517	< 1	6	0.6
518	< 1	6	0.6
519	1	4	0.6
520	< 1	212	1.2
521	8	12	1.6
522	3	12	0.6
523	< 1	2	0.4
524	5	4	0.4
525	11	6	0.8
526	2	4	1.2
527	1	14	1.0
528	10	14	1.4
529	7	768	10.8
530	3	44	3.8
531	3	24	1.2
532	4	4	2.4
533	1	14	1.6
534	1	< 2	1.0
535	180	660	36
536	2	6	1.0
537	1	2	1.6
538	3	8	1.6
539	29	270	2.4
540	2	161	4.2
Std.	25	46	11.8

*Corrected

CERTIFIED BY: [signature]

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28874
INVOICE NO. 13352
RECEIVED Jan. 3/75
ANALYSED Jan. 31/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver 8, B. C.

ATTN:

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
541	130	466	11.8
542	115	28	1.6
543	11	30	1.6
544	3	74	1.0
548	8	12	2.0
549	1	12	2.4
550	4	212	4.4
558	35	6	1.6
559	12	8	1.0
560	36	18	0.4
561	< 1	10	0.2
562	2	6	< 0.2
563	< 1	8	0.2
564	< 1	6	< 0.2
565	< 1	16	< 0.2
566	10	14	1.0
567	9	12	1.2
568	2	6	0.4
569	< 1	8	0.2
570	< 1	12	0.4
571	6	112	1.4
572	165	10	0.2
573	14	10	0.8
576	3	52	0.8
577	< 1	14	0.2
578	2	700	2.0
579	1	22	1.4
580	1	24	1.0
581	1	52	1.0
Std.	25	50	

*Corrected

CERTIFIED BY: ....

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NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE 985-0648
AREA CODE 604

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 28875
INVOICE NO. 13352
RECEIVED Jan. 3/75
ANALYSED Jan. 31/75

TO: Granduc Mines Ltd.,
#2009 - 1177 W. Hastings
Vancouver 8, B. C.

ATTN:

SAMPLE NO. :	PPM Molybdenum	PPM Lead*	PPM Silver*
582	23	30	1.0
583	235	88	4.4
584	12	76	0.6
585	230	106	9.4
586	32	84	2.4
587	6	30	1.0
588	28	46	3.0
589	180	161	4.0
590	340	1387	12.8
591	6	8	1.6
592	3	28	0.8
593	7	8	3.0
594	18	2	1.0
595	17	70	1.8
596	4	4	0.6
597	60	6	1.2
602	2	8	0.6
603	< 1	6	0.4
604	35	10	1.4
605	20	6	1.0
606	< 1	14	0.4
Std.			

*Corrected

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: [signature]

A P P E N D I X 6

Statutory Declaration of Expenditures

DOMINION OF CANADA: PROVINCE OF BRITISH COLUMBIA. TO WIT:	**In the Matter of**	Form B (Section 51) Mineral Act - Affidavit on Application to Record Work on mineral claims of the New Mitch and Mitch No. 12 Claim Groups, Sulphurets Creek, Upper Unuk River, Skeena Mining Div British Columbia

I, Erik A. Ostensoe

of Suite 2009, 1177 West Hastings Street, Vancouver

in the Province of British Columbia, do solemnly declare that the following is a full statement of costs incurred in carrying out geological and geochemical survey field work, orientation surveys and analyses, analytical work, preparation of rock slabs for permanent record, compilation work, and in the preparation of comprehensive engineering reports containing basic field data and analytical data and interpretations thereof, in the period July 8, 1974 to January 31, 1975:

1.	Field equipment and supplies, including camp gear, sampling tools, cobra drill, dynamite, etc.	$ 369.44
2.	Board costs for field personnel: 2 men for 55 field days, 1 man for 39 field days 149 field days @ $8.00 per day	1,192.00
3.	Helicopter costs: including mobilization, moves, service trips, including fuel and oil charges using Alouette III helicopter based at Stewart, B.C.	2,269.04
4.	Other transportation costs including 3/4 ton pickup truck used for mobilization and demobilization and including airfares on scheduled carriers	740.47
5.	Fees and expenses paid to geological engineer for consultation in the field and for preparation of recommendations regarding geochemical survey	563.78
6.	Repairs to rock saw	32.48
7.	Drafting services and supplies, dylar tracings, printing costs	961.84
8.	Analytical costs - orientation - 20 samples for 24 elements plus preparation @$45.25	903.00
9.	Analytical costs - routine - 577 samples for 3 elements plus preparation @ $4.25	2,452.25
10.	Wages, salaries and employee benefits - E. Kruchkowski, R. Ford, E. Ostensoe - including only that portion of payments attributable to work pertaining to mineral claims at Sulphurets Creek property	13,661.37
	Total Project Expenditures as detailed above	$23,145.67

Whereas the above detailed expenditures pertain to a total of 595 rock samples and to geological mapping and reconnaissance in an area larger than the New Mitch and Mitch No. 12 claim groups they may properly be apportioned on the basis of work done and the numbers of samples collected on the respective claim groups as follows:

a) to the 34 mineral claims of the New Mitch claim group: 268 of a total 595 samples or 45%, thus applicable costs are 45% of $23,145.67 or $10,415.55

b) to the 31 mineral claims of the Mitch No. 12 claim group: 220 of a total 595 samples or 37%, thus applicable costs are 37% of $23,145.67 or $8,563.90

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City of Vancouver, in the Province of British Columbia, this 5th day of March, 1975, A.D.

Erik A. Ostensoe
Erik A. Ostensoe

Jean Paul Sub mining Recorder
A Commissioner for taking Affidavits within British Columbia or A Notary Public in and for the Province of British Columbia.