KENNCO EXPLORATIONS, (WESTERN) LIMITED

REPORT ON GEOLOGICAL SURVEY

LEN NO. 1, 2, 3 GROUPS
(Len Mineral Claims 1-12, 15-26, 29-47, 49, 51-58, 60, 61, 68-70, 72-75, 84 Fr.)

Situated between Sweeney Lake and Tahtsa Reach,
Omineca Mining Division,
British Columbia

53° 127° NE

June 2 to August 10, 1970

By

R. W. Stevenson, P. Eng.
M. R. Hegge

October 8, 1970

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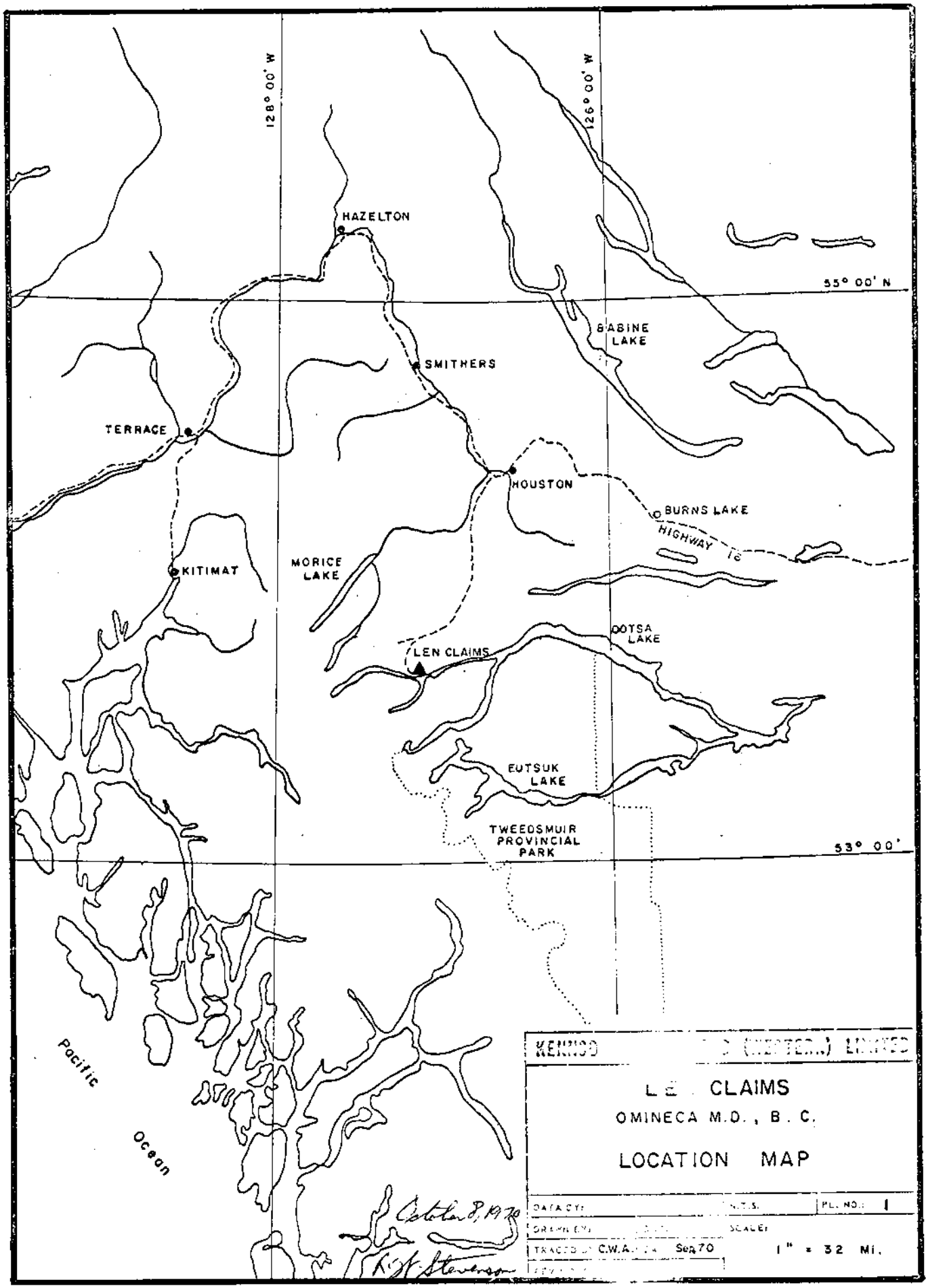
LIST OF ILLUSTRATIONS


128° 00' W
126° 00' W
55° 00' N
53° 00'
HAZELTON
SMITHERS
TERRACE
KITIMAT
MORICE LAKE
HOUSTON
BURNS LAKE
HIGHWAY 16
BABINE LAKE
OOTSA LAKE
LEN CLAIMS
EUTSUK LAKE
TWEEDSMUIR PROVINCIAL PARK
Pacific Ocean
October 8, 1970
K. F. Stevenson
KENNCO
L E CLAIMS
OMINECA M.D., B. C.
LOCATION MAP
DATA BY:
N.T.S.
PL. NO.: 1
DRAWN BY:
SCALE:
TRACED BY C.W.A.
Sept 70
1" = 32 Mi.

INTRODUCTION

Location and Access

The Len No.'s 1 to 58 and 60 to 84 claims are located at approximately 53°40'N, 127°10'W, between Tahtsa Reach and Sweeney Lake, in the Omineca Mining Division, British Columbia (Plate 1). Access is via the Tahtsa Lake forestry road south from Houston, a distance of approximately 75 miles, and then along a three-mile bulldozed road into the property. The area can also be reached by helicopter either from Smithers, 78 miles due north, or Burns Lake, 90 miles to the northeast.

Topography

The Len claims are situated around Huckleberry Mountain along eastern edge of the Coast Range. The area is moderately rugged and elevations range from 2800 feet near Tahtsa Reach to 5000 feet at the top of Huckleberry. Forest cover is moderate to light and consists mainly of balsam, spruce, and lodgepole pine.

GEOLOGICAL SURVEY

Survey Control

Prior to field work, B. C. Government air photos were obtained at a scale of one inch = 1320 feet and photos covering the property were enlarged to one inch = 400 feet. From these enlargements, a topographic map with contour intervals of 25 feet was prepared by McElhanney Surveying & Engineering Ltd., Vancouver, B.C.; drainage and other physical features were also included on the final map. Blackline prints of the photo enlargements and the topographic maps provided acceptable horizontal and vertical control for geological surveys at a scale of one inch = 400 feet in areas where more accurate methods of control were not available.

The principal survey control for mapping consisted of a grid system with a 16,500-foot east-west trending base-line which cut across the southern half of the property. Cross lines were established at regular intervals along the base-line with pickets or flagging positioned at 100-foot intervals along all lines. The west-central portion of the grid system had been previously established in 1963 with cross lines at 500-foot intervals; 1970 work consisted of rechaining and repicketing this portion and then extending the grid, mainly to the east, with cross lines at 800-foot intervals. The exact position of the base-line had been previously surveyed with respect to a survey monument at the peak of Huckleberry Mountain and it was possible to locate accurately the grid system on the topographic map.

Access to most of the property while mapping was by foot although some tractor-trails were later established.

Outcrop or rock exposed in trenches is present on 51 of the 62 claims which were mapped in 1970.

Geological work was conducted under the supervision of R. W. Stevenson, P.Eng. The geological mapping and the writing of this report were done by M. R. Hegge, who is registered as a Professional Geologist in the Province of Alberta. M. H. Holtby, a fourth year geological student at the University of B.C., assisted in the mapping.

Geology

Regional

The Len claim groups are situated in a transitional zone between the Coast Range and the interior Nechako Plateau. This area is underlain mainly by Middle Jurassic volcanic and sedimentary rocks assigned to the Hazelton Group. These rocks trend in a northwesterly belt along the eastern contact of Upper Jurassic and later intrusive rocks collectively termed the Coast Range Intrusives.

The Hazelton Group has been divided by Duffell (1952) into a "lower mainly volcanic division; a middle, mainly marine sedimentary division; and an upper, dominantly volcanic division". Satellite intrusions of the main Coast Range Intrusives locally occur within the belt of Hazelton rocks; it is in an environment such as this that the Len claim groups occur.

Local

Approximately 25 percent of the rocks underlying the Len claims are exposed (Plate 2). Except for local intrusives, the property is underlain entirely by rocks of the upper two divisions of the

Hazelton Group. Andesite, dacite, and tuffaceous equivalents of the upper division comprise 90 percent of the exposed Hazelton rocks and overlie conglomerate, greywacke, quartzite, argillite, chert and arkose of the middle sedimentary division. Exposures are best at higher elevations where lesser overburden cover exists, although some talus is prevalent in these areas. Glacial drift cover south towards Tahtsa Reach is relatively heavy and locally may range up to 150 feet in depth.

Original structures, such as bedding planes, within the Hazelton rocks have been obscured in almost all areas by metamorphism or alteration. Contacts between the different units are usually gradational and interfingering beds appear to be common.

Andesite, and a tuffaceous equivalent, locally termed a dark grey tuff, are the most common rocks exposed - particularly at the extreme north and south ends of the property. Breccia, tuffaceous greywacke and some acidic pyroclastics are commonly interbedded with the dark grey tuff and were not mapped separately. A light grey, feldspathic tuff of probable dacitic composition is the second most common rock type and is well exposed on the south slope of Huckleberry Mountain; interbedded feldspathic breccia and dark grey tuff is prevalent near contacts with the andesitic rocks. Of the sedimentary rocks, the best-exposed sequence, near the peak of Huckleberry Mountain, consists of pyritic, black argillite which apparently overlies thinly bedded chert and arkose observable on the north slope of the mountain. Conglomerate and overlying conglomeratic greywacke at the southwest corner of the property may be basal beds of the sedimentary division as the conglomerate appears to become better sorted and mature as one proceeds south or toward the base of the section.

A quartz diorite stock of probable Early Tertiary age intrudes the Hazelton rocks in the west-central portion of the property. Although exposed only in trenches, the stock appears to be texturally and mineralogically zoned; porphyritic textures and a greater amount of mafic minerals are prevalent near the periphery while the central core is granitic-textured and slightly more acidic in composition. Biotite and/or hornblende feldspar porphyry, biotite diorite porphyry and lamprophyre dykes occur around the periphery of the stock and appear to be genetically related to the stock. Similar dykes occur in the eastern portion of the property; these are not related to a single large stock but one, or possibly two, small plugs of poorly-exposed biotite feldspar or granodiorite porphyry. One of the plugs, approximately 300 feet in diameter, is partially uncovered by trenching but the second is geophysically indicated only. Two separate, diorite dykes were also uncovered in this area. Local alteration is not a function of the composition of the emplaced dykes or plugs since the intruded Hazelton rocks near these features are always highly fractured and altered in a similar manner. Weathering has preferentially attacked these fractured and altered Hazelton rocks; in the eastern part of the property, glacial drift has preserved remnants of feldspathic tuff which locally have been completely converted to clay minerals to depths of up to ten feet.

Lithology

Hazelton Group - marine, sedimentary sequence

Conglomerate is best exposed south of the quartz diorite stock; it is composed of subangular to subrounded pebbles and cobbles of tuff, andesite, chert, and granitic material in a dark, fine-grained groundmass composed mainly of volcanic debris; the conglomerate becomes more sorted lower in the stratigraphic sequence.

Greywacke exposed on the north slope of Huckleberry is grey-green and composed mostly of tuffaceous material and chert fragments; tuffaceous greywacke is common elsewhere on the property.

Quartzite is usually fine to medium-grained, white to light buff-grey and locally exhibits its darker, impure horizons.

Arkose on the north slope of Huckleberry is medium-grained, orange-grey and exhibits strong bedding.

Argillite overlying the arkose is very fine-grained, black and exhibits pseudoconchoidal fracturing; local disseminated pyrite up to one percent by volume causes a bright red-brown colour on weathered surfaces.

Hazelton Group - upper volcanic sequence

Feldspathic tuff is fine to medium-grained, very light greenish-grey and appears to be equivalent to a dacite in composition; feldspar crystals may occur up to 1/8 inch in diameter and locally the rock can grade into a breccia. It is commonly composed of 55-70% feldspar, 15-20% quartz and 5-20% mafic minerals. Most varieties of this rock type are exposed on the south side of Huckleberry; although an altered, fine-grained type is most prominent.

Dark grey tuff is the most common rock type exposed on the property; it is generally dark grey, fine-grained, and appears to be mainly andesitic in composition; interbedded andesite is common; local hornfelsic varieties occur near the quartz diorite stock and other intrusive rocks; intense fracturing and alteration is prevalent in these areas.

Andesite is dark grey-green and fine to medium-grained; it locally exhibits phenocrysts of plagioclase in a dark microcrystalline groundmass; chloritization of mafic minerals is common.

Early Tertiary(?) and Later

Porphyritic biotite, quartz diorite and quartz diorite porphyry is generally light grey to pinkish grey and weathers to a buff colour; textures vary from granitic in the core of the stock to porphyritic at the periphery; phenocrysts of plagioclase with smaller grains of quartz, biotite, hornblende and local orthoclase occur in a finer grained groundmass of the same composition; the rock is locally cut by numerous quartz and quartz-orthoclase veinlets, up to one and one-half inches in width, which trend in all directions; sericite, orthoclase and biotite haloes are common along these veinlets. An age of 62-69 m.y. was obtained by a K-Ar determination on a sample of biotite from the porphyry. This would date the intrusion as Early Tertiary.

Biotite diorite porphyry is light green-grey to mottled dark grey and exhibits granitic to porphyritic textures; phenocrysts of plagioclase and biotite occur in a dark groundmass of plagioclase, biotite, minor quartz and traces of orthoclase, hornblende and pyrite; it occurs mainly as dykes and sills near the periphery of the quartz diorite stock; it appears to be genetically related to the stock.

Diorite occurs as dykes up to 25 feet wide at two localities in the eastern part of the property; the rock is green-grey and weathers readily to a rusty brown-grey; it is fine to medium-grained and consists primarily of plagioclase and 30 to 35 percent ferromagnesian minerals - mostly hornblende, augite(?), chlorite and up to two percent magnetite; it appears to be older than the feldspar porphyry dykes in the area.

Biotite and/or hornblende feldspar porphyry occurs mainly as one to 20-foot wide dykes; generally pinkish-grey with phenocrysts of feldspar, biotite and/or hornblende in a groundmass of similar composition; these dykes appear to be a later phase of the quartz diorite in the vicinity of the stock; biotite feldspar porphyry dykes are common elsewhere on the property.

Lamprophyre dykes are the youngest intrusive rocks near the quartz diorite stock as they locally intrude all rock types; they are dark grey-green and fine-grained; local larger grains of plagioclase, orthoclase, quartz and biotite are identifiable in a very fine-grained groundmass.

Structure

The Hazelton Group rocks exposed on the ridges near the center of the property dip from 35 to 55 degrees to the south-southwest and appear to flatten slightly near Tahtsa Reach. They locally exhibit strong faulting and shearing; topographically-indicated faults are readily apparent on air photos. The most prominent fault directions trend approximately northeast and northwest. Two northeasterly trending shear zones occur on either side of the quartz diorite stock and appear to have controlled the emplacement of the intrusive; the shear zones dip steeply to the southeast. Drill core observations indicate that the stock is younger than the main period of movement but that later, minor disturbances have occurred. Hazelton rocks on either side of the shear zones are intensely fractured. The greater occurrence of older, sedimentary rocks south of the stock may indicate that uplift has occurred between the two shears and the intrusive occupies a horst-like feature.

North-northwesterly trending faults on the east half of the property separate feldspathic tuff and intruded, altered rocks from andesite and dark tuff on either side. On the north side of Huckleberry Mountain, a north-trending fault separates arkose and argillite on the east from andesite and interbedded tuffaceous greywacke on the west; the arkose and argillite dip steeply to the west while the andesite sequence dips toward the south.

Alteration

Rocks exposed on the property are most altered where fracturing is stronger - mainly in and around the quartz diorite stock and along shear zones and dykes.

In the quartz diorite stock, quartz veining, and potassic alteration are prominent, the latter characterized by local development of quartz, sericite, orthoclase and biotite. Some argillic alteration of the feldspars is also present. Vein-filling minerals of minor occurrence include calcite, fluorite, pyrite, gypsum and occasional zeolites such as stilbite.

The Hazelton rocks surrounding the stock are moderately to strongly hornfelsed; silicified veinlets, generally less than one-quarter of an inch wide, may locally coalesce to completely alter the original rock. Quartz, quartz-orthoclase, pyrite, calcite and gypsum veinlets are most common; quartz-orthoclase veinlets locally exhibit bleached haloes with further surrounding haloes of secondary biotite and magnetite. Talc and gypsum alteration is strongest in sheared rocks while actinolite is present in local recrystallized zones. Disseminated and fracture-filling pyrite and chlorite persists beyond all other alteration in the rocks surrounding the stock.

An area of quartz-sericite-pyrite alteration occurs in the eastern part of the property. The most altered rock is a highly fractured, very fine-grained feldspathic tuff which exhibits a central core of strong siliceous alteration, with some subsequent argillic alteration along fractures. Surrounding this central area is a periphery of less siliceous, hornfelsic rock which grades into a pyrite- and chlorite-altered halo where pyrite veinlets up to one-quarter inch wide are common.

Similar alteration haloes of a smaller scale exist along biotite feldspar porphyry dykes scattered throughout the eastern area.

The outer halo of disseminated pyrite, which occurs in Hazelton rocks surrounding the quartz diorite stock, coalesces with a similar halo which occurs around the altered eastern area; this results in a continuous band of rusty-weathering rocks across the central portion of the property. Chlorite alteration exists beyond the pyrite halo but eventually grades into epidote alteration which is pervasive throughout the remaining Hazelton rocks exposed on the property.

Mineralization

Copper and molybdenum mineralization on the Len claims is associated with the quartz diorite stock and the immediately surrounding Hazelton Group rocks. Some scattered mineralization, however, is also present in the eastern part of the property.

The quartz diorite stock is mineralized by fracture-filling and disseminated chalcopyrite; minor amounts of bornite, pyrite and molybdenite are also present. Limited surface oxidation has in places produced small quantities of copper carbonates. The better copper mineralization in the stock is associated with potassic alteration; orthoclase, secondary biotite, quartz and magnetite haloes along quartz-chalcopyrite veinlets is characteristic. Molybdenite is confined mainly to quartz veinlets; some minor amounts of disseminated material also exist.

The volcanic rocks immediately surrounding the stock exhibit the best copper and molybdenum mineralization on the property. The two shear zones flanking the stock appear to have structurally prepared the volcanics for mineralization; this consists of chalcopyrite, with minor pyrite and molybdenite, occurring mainly as blebs and clusters along steeply-dipping fractures. Disseminated chalcopyrite is also present but is usually confined only to brecciated zones. As in the stock, the best copper mineralization is associated with potassic

altered rocks. Molybdenite occurs mainly as blebs along quartz veinlets - sometimes with pyrite or fluorite. There appears to be no consistent relation between copper and molybdenum mineralization except for the similarity in alteration.

Some scattered copper mineralization also exists in the eastern part of the property. These occurrences consist of isolated chalcopyrite stringers in hornfelsic dark grey tuff and coincide with the inner margin of the strong pyrite-chlorite alteration halo in the area. Approximately 2000 feet farther east is an area exhibiting some arsenopyrite. Quartz and calcite veinlets, up to four inches wide and exhibiting arsenopyrite-chalcopyrite-pyrite-sphalerite mineralization, are exposed along a steep gully. The veinlets occur over an approximate area of 800 feet by 400 feet and are erratically spaced up to 40 feet apart. They trend parallel to the main local fracturing, however, and appear to be genetically related to the sulfides exposed elsewhere on the property.

STATEMENT OF COSTS INCURRED

The total cost of the geological survey on Len No. 1, 2, and 3 groups was as follows:

Topographic base map by McElhanney Surveying & Engineering Ltd.			$ 620.00
Chaining Lines:			
Wages & Board:			
M.R. Hegge	June 2	$35.00 + $5.00	40.00
M.H. Holtby	June 2-4	$21.00 + $5.00	78.00
E.A. Black	June 2-4	$18.00 + $5.00	69.00
D.R. Reid	June 3,4	$21.00 + $5.00	52.00
R.J. Beaty	June 2-4	$16.00 + $5.00	63.00
J.B. Cordonier	June 2	$18.00 + $5.00	23.00
Geology:			
Wages & Board:			
R.W. Stevenson	July 20;Aug.3,4,9,10	$35.00 + $5.00	200.00
M.R. Hegge	June 3,4,7,9,18-21; 23,25-28, July 7, 8,9,11,12,16,23,24		
	August 8	$35.00 + $5.00	880.00
M.H. Holtby	June 7,18-21; July 16, 20,28, August 4,9, 10	$21.00 + $5.00	286.00
M. Murison	July 16,20	$20.00 + $5.00	50.00
			$2,361.00

CLAIM DISTRIBUTION OF COSTS INCURRED

The costs of the geological survey were distributed among the three claim groups as follows:

Len No. 1 Group	$ 912.00
Len No. 2 Group	426.00
Len No. 3 Group	1,023.00
	$2,361.00

The amount expended on each claim in each group is as follows:

Len No. 1 Group:

Claim No.	Record Date	$ Geol. Work Each Claim	Years Applied
1	July 12	40	
2	"	40	
3	"	40	
4	"	40	
5	"	40	
6	"	40	
7	"	40	
8	"	40	
9	"	40	
10	"	40	
19	"	40	
20	"	40	
33 Fr.	July 30	24	
34 Fr.	"	24	
41 Fr.	August 15	24	
60	August 19	40	1
61	"	40	1
68	"	40	
69	"	40	1
70	"	40	1
72	"	40	1
73	"	40	
74	"	40	1
75	"	40	
62	"		1
64	"		1
66	"		1
		$912	

Len No. 2 Group:

Claim No.	Record Date	$ Geol. Work Each Claim	Years Applied
11	July 12	40	
12	"	40	
21	"	40	
22	"	40	
23	"	40	
24	"	40	
25	"	40	
26	"	40	
39 Fr.	August 15	24	
40 Fr.	"	24	
43 Fr.	"	29	
44 Fr.	"	29	
76	August 19		1
78	"		1
80	"		2
		$426	

Len No. 3 Group:

Claim No.	Record Date	$ Geol. Work Each Claim	Years Applied
15	July 12	40	
16	"	40	
17	"	40	
18	"	40	
29	August 24	40	
30	"	40	
31	"	40	
32	"	40	
35	August 2	40	
36	"	40	
37	"	40	
38	"	40	
42 Fr.	August 15	40	
45	August 18	40	
46	"	40	
47	"	40	
49	"	40	
51	"	40	

Len No. 3 Group - cont'd

Claim No.	Record Date	$ Geol. Work Each Claim	Years Applied
52	August 18	40	
53	"	40	8
54	"	40	2
55	"	40	
56	"	40	
57	"	40	
58	"	40	
84 Fr.	September 9	23	
		$1,023	

M. R. Hegge - Author

Vancouver, B. C.
October 8, 1970

R. W. Stevenson, P.Eng. - Supervisor

REFERENCES

Duffell, S. (1952) Whitesail Lake Map-Area, British Columbia; Geol.Surv. Canada Mem. 299.

Hornbrook, E.H.W. (1970) Biogeochemical prospecting for copper in west-central British Columbia; Geol.Surv. Canada; paper no. 69-49.

LEGEND

Group Outlines

Outline of Group No. 1

Outline of Group No. 2

Outline of Group No. 3

Claim Number

Road, Trail

Cut Line

Trench

Survey Monument

D.D.H.-8 Diamond Drill Hole & Number of Hole

GEOLOGY

CENOZOIC

PLEISTOCENE & RECENT

Till, Gravel, Sand, Alluvium

MESOZOIC

LOWER TERTIARY & LATER (?)

Lamprophyre

Biotite and/or Hornblende Feldspar Porphyry

Diorite (Fine Grained)

Biotite Diorite Porphyry

Porphyritic Biotite Quartz Diorite, Biotite – Hornblende Quartz Diorite Porphyry

MIDDLE JURASSIC

HAZELTON GROUP – VOLCANIC SEQUENCE

Dark Grey Andesitic Tuff, Andesitic and Dacitic Flows, Breccias, Tuffaceous Greywacke, Minor Inter-bedded Acidic Pyroclastics Hornfelsic Varities

Light Grey Feldspathic or Dacitic Tuff and Breccia; Minor Interbedded Tuffaceous Greywacke and Andesitic Rocks; Hornfelsic Varieties

HAZELTON GROUP – MARINE, SEDIMENTARY SEQUENCE

Argillite, Locally Pyritic

Arkose

Conglomerate, Conglomeratic Greywacke

Undivided Quartzite, Greywacke, Chert and Conglomerate; Minor Interbedded Volcanic Breccia and Tuff

ALTERATION

Quartz – Sericite – Pyrite; Minor Argillic Alteration Along Fractures

Pyrite – Chlorite, Pyrite Composes 1 – 10 % of Rock Local Magnetite up to 10 %, Minor Siliceous Alteration

Outline of Pyrite Halo; Pyrite > 0.5% of Rock by Volume

Outline of Chloritic Halo,also First Appearance of Epidote Alteration

Approx. Outline of Potassic (Potash Feldspar & Secondary Biotite) Alteration

Outline of Area of Arsenopyrite Veinlets

Outline of Exposed Bedrock

Geologic Contact

Inferred Shear or Fault Zone

Attitude of Prominent Fracturing

Strike & Dip of Bedding

Vertical Strike

Tahtsa Reach

PROPERTY BOUNDARY OF LEN GROUP

To Accompany Geological Report by R. W. Stevenson P. Eng. on the LEN No. 1, 2 & 3 Groups, Situated between Sweeney Lake and Tahtsa Reach, Omineca, B.C. Dated Oct. 8, 1970.

October 8, 1970

R. W. Stevenson

KENNCO EXPLORATIONS (WESTERN) LIMITED

LEN CLAIMS

OMINECA M.D., B.C.

GEOLOGY

DATA BY: W. R. H.		N.T.S. 93 E - 11	FL. NO.: 1
DRAWN BY: J. G. L.	DATE: 20/10/70	SCALE:	
TRACED BY:	DATE:	1" = 400'	
REVISIONS:			