ARIS SUMMARY SHEET

istrict Geologist, Smithers Off Confidential: 89.04.14

ASSESSMENT REPORT 17299 MINING DIVISION: Omineca

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ROPERTY:       Round Mountain-R.M.
LOCATION:      LAT   57 22 09      LONG   127 14 45
               UTM   09  6359629  605501
               NTS   094E06E  094E06W
CLAIM(S):      Round Mountain,R.M. Fr.
OPERATOR(S):   Cyprus Metals Can.
UTHOR(S):      Tompson, W.D.
EPORT YEAR:    1987, 319 Pages
COMMODITIES
EARCHED FOR:   Gold,Silver
EOLOGICAL
SUMMARY:         The east side of the claim area is underlain by argillized
            volcanic rocks which were originally porphyritic trachy-andesite.
            The west side of the claim is underlain by greenish andesite porphyry
            which is locally brecciated and contains quartz stockworks.
WORK
DONE:       Geochemical,Geophysical,Geological,Physical
            GEOL     1.0 ha
                Map(s) - 36; Scale(s) - 1:10 000,1:2000,1:1000,1:200
            IPOL     7.6 km
                Map(s) - 5; Scale(s) - 1:2500,1:1000
            LINE     7.2 km
            ROCK   124 sample(s) ;AU,AG
                Map(s) - 1; Scale(s) - 1:200
            SOIL   454 sample(s) ;AU,AG
                Map(s) - 2; Scale(s) - 1:5000,1:1000
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CYPRUS METALS CANADA

TOODOGGONE PROJECT

Exploration of Cassidy Claim Groups 1 and 2
and Mineral Claims, Round Mountain and R. M. Fraction
Toodoggone Gold-Silver District
Omineca Mining Division, British Columbia

N.T.S. 94 E/6

Lat. 57° 23' N., Long. 127° 15' W.

Willard D. Tompson

December 30, 1987

Part 1 of 3

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LIST OF ILLUSTRATIONS (cont'd)

Figures (cont'd)

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Geochemical surveys, geophysical surveys, backhoe trenching and diamond drilling were conducted on the G.W.P. claims and Cassidy claim groups 1 and 2 during the summer of 1987.

Both reconnaissance geochemical soil surveys and detailed soil surveys show significant gold and/or silver anomalies in areas where bedrock is mantled by overburden.

Induced polarization surveys disclosed several high resistivity anomalies in areas underlain by unknown thicknesses of glacial till. Anomalies identified as "zones D and E" are believed to lie along the projected extension of the Cliff Creek zone, which is being explored by Cheni Gold Mines, Ltd. and which reportedly contains mineable reserves of 463,000 tonnes grading; silver, 7.61 oz./T and gold, 0.170 oz./T.

VLF resistivity surveys were conducted in an area east of Moosehorn Creek. Several anomalies were checked by trenching and diamond drilling. Black chalcedonic quartz was dug from hand trenches, but the source was not verified. The best assay from the black quartz is: gold, 12.40 g/T, silver, 1010 g/T. Black chalcedonic quartz in drill holes carried low values, but is believed to lie near the top of the epithermal system.

Backhoe trenches failed to intersect veins which were discovered by drilling in 1986. However, poor trenching conditions are believed to be largely responsible for the lack of success.

Six of eleven drill holes encountered significant intersections of mineralized rock. Other drill holes encountered zones of black and grey quartz veins and quartz breccia with epithermal textures, but with low values.

An exploration program for 1988 is recommended, including soil and forest humus geochemical surveys, induced polarization surveys and diamond drilling. Estimated cost of the proposed exploration program is $455.352.

Exploration of Cassidy Claim Groups 1 and 2
Toodoggone Gold-Silver District
Omineca Mining Division, British Columbia

PROPERTY AND LOCATION

Cassidy Groups 1 and 2 lie near the center of the Toodoggone gold-silver district in the northern interior of British Columbia (Figures 1 and 2). The Toodoggone area achieved prominence when the Baker gold-silver mine commenced production in 1980.

Toodoggone River (Figures 3 and 4) is the most prominent landmark in the immediate vicinity of the claims, although the surrounding country contains many prominent landmarks, including the beautiful, broad, flat-topped Edozadelly Mountain which lies 11 kilometers westerly from Cassidy Group 1. Toodoggone River rises 7 kilometers west of Cassidy Group 1 and flows easterly. The claims occupy a broad area on both sides of the river, through 4 kilometers of its length.

Near the center of Cassidy Groups 1 and 2, latitude is $57^{\circ}23'$ N. and longitude is $127^{\circ}14'$ W. Magnetic declination is N.$26^{\circ}30'$ E.

Cassidy Groups 1 and 2 lie at elevations from 1180 meters in Toodoggone River valley, to 1626 meters at the top of Round Mountain in the south part of mineral claims, Round Mountain and G.W.P. No. 28. Relief is moderate.

Toodoggone district lies 300 kilometers north of Smithers, B.C. Access is by fixed wing aircraft to Sturdee airstrip and thence by helicopter to the Company's base camp at Moosehorn Creek, 23 kilometers northerly from Sturdee.

Figure I.

CYPRUS METALS CANADA

Toodoggone Project

Map of British Columbia showing Location of Toodoggone Area

WILLARD D TOMPSON November 20, 1986

Km 0 100 200 400 600 Km

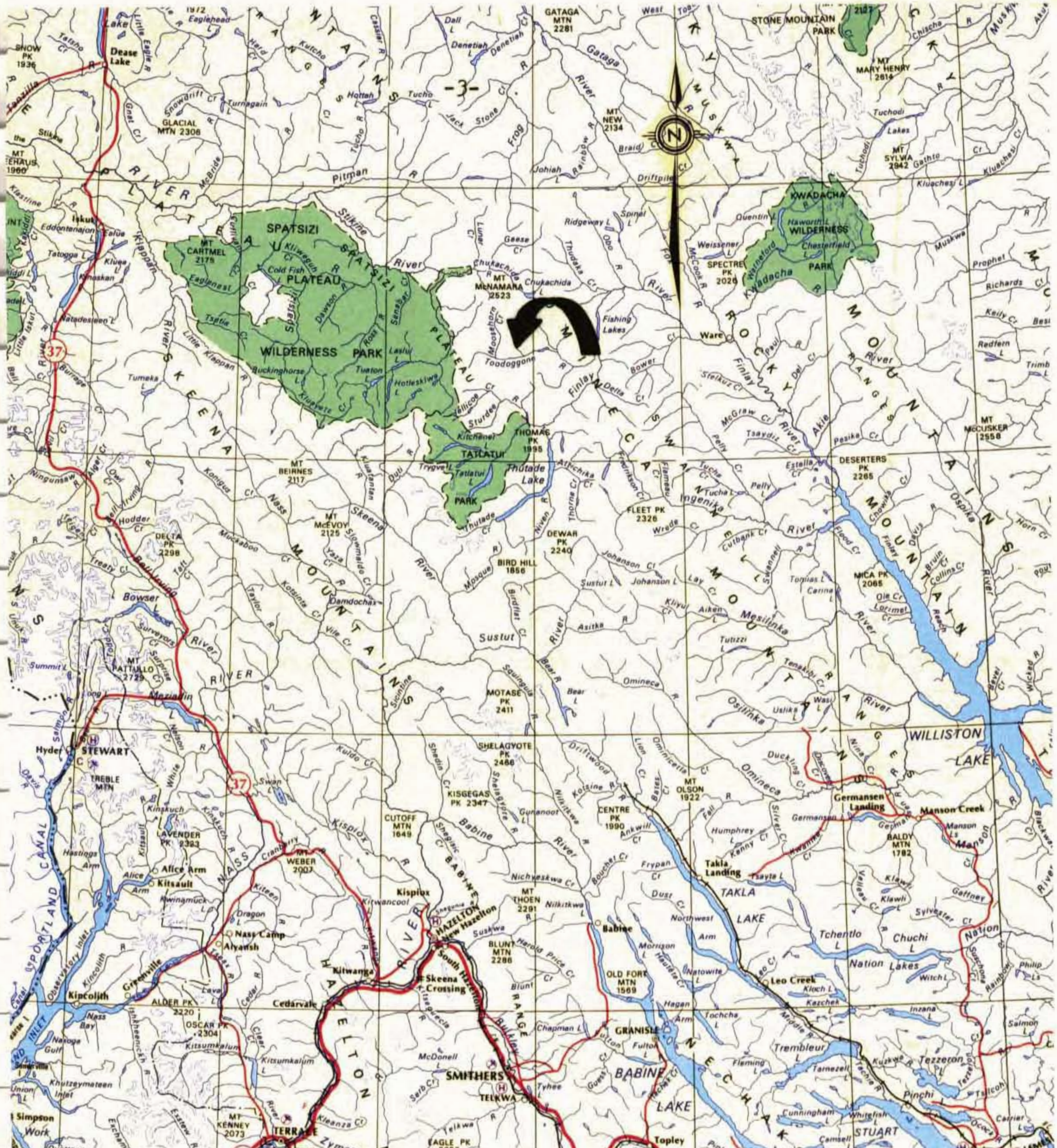


Figure 2 - Map of a portion of northern British Columbia showing Toodoggone district.

SCALE – 1: 2 000 000

Kilometres 20 0 20 40 60 80 100 120 140 160 180 200 Kilometres

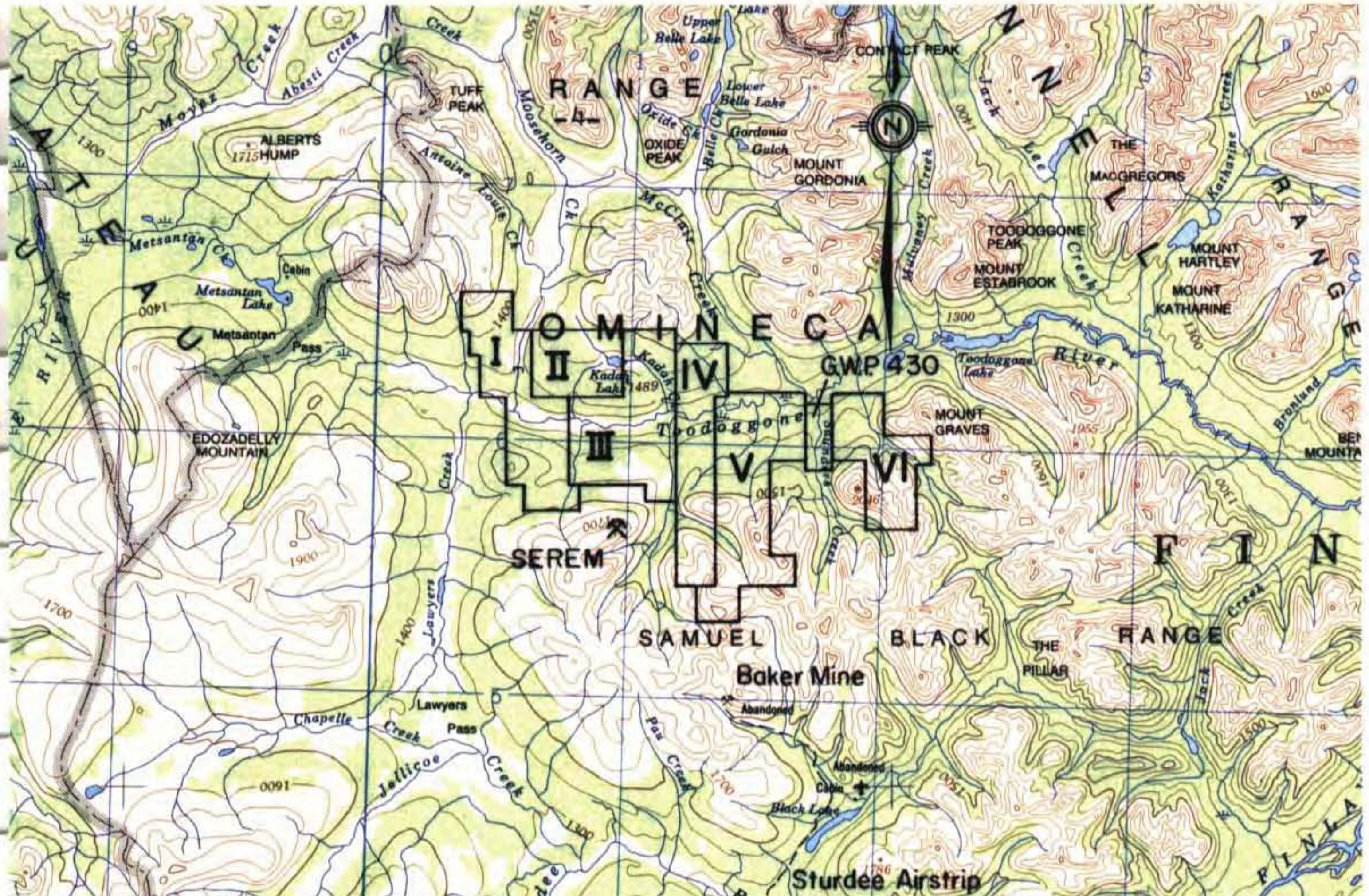


Figure 3. - Map showing Cassidy groups 1 to 6 and claim, G.W.P. 430.

CLAIMS

Cassidy Group No. 1 is made up of 7 claims containing 72 units. Cassidy Group No. 2 has 35 units in 2 claims (Figure 4).

Legal corner posts of the claims which comprise Cassidy Groups 1 and 2 were surveyed during the summer of 1987, by McWilliam, Whyte, Goble and Associates. Trig stations, photo points and legal corner posts were incorporated into the survey which were then plotted on topographic maps at scale 1:10,000 (Plate 1).

Cassidy Group No. 1

Claim Name	Record Number	Units
G.W.P. No. 27	3514	18
G.W.P. No. 28	3515	12
G.W.P. No. 30	3517	20
G.W.P. No. 40	3519	8
G.W.P. No. 42	3898	12
Bear	3899	1
Doug's	3897	1

Cassidy Group No. 2

Claim Name	Record Number	Units
G.W.P. No. 29	3516	20
G.W.P. No. 34	3518	15

Other Company holdings in the Toodoggone mining area include Cassidy Group 3, 4, 5 and 6 and other mineral claims.

Claim Name	Record Number	Units
Round Mountain	8499	12
R. M. Fraction	8622	1
G.W.P. No. 454	8550	5
G.W.P. No. 357	8560	12
G.W.P. No. 430	7302	20

Cassidy Group No. 3

Claim Name	Record Number	Units
G.W.P. No. 220	7567	16
G.W.P. No. 240	7569	20
G.W.P. No. 250	7570	18
G.W.P. No. 260	7571	18

Cassidy Group No. 4

Claim Name	Record Number	Units
G.W.P. No. 130	7558	6
G.W.P. No. 150	7560	12
G.W.P. No. 170	7562	12
G.W.P. No. 210	7566	15
G.W.P. No. 230	7568	16

Cassidy Group No. 5

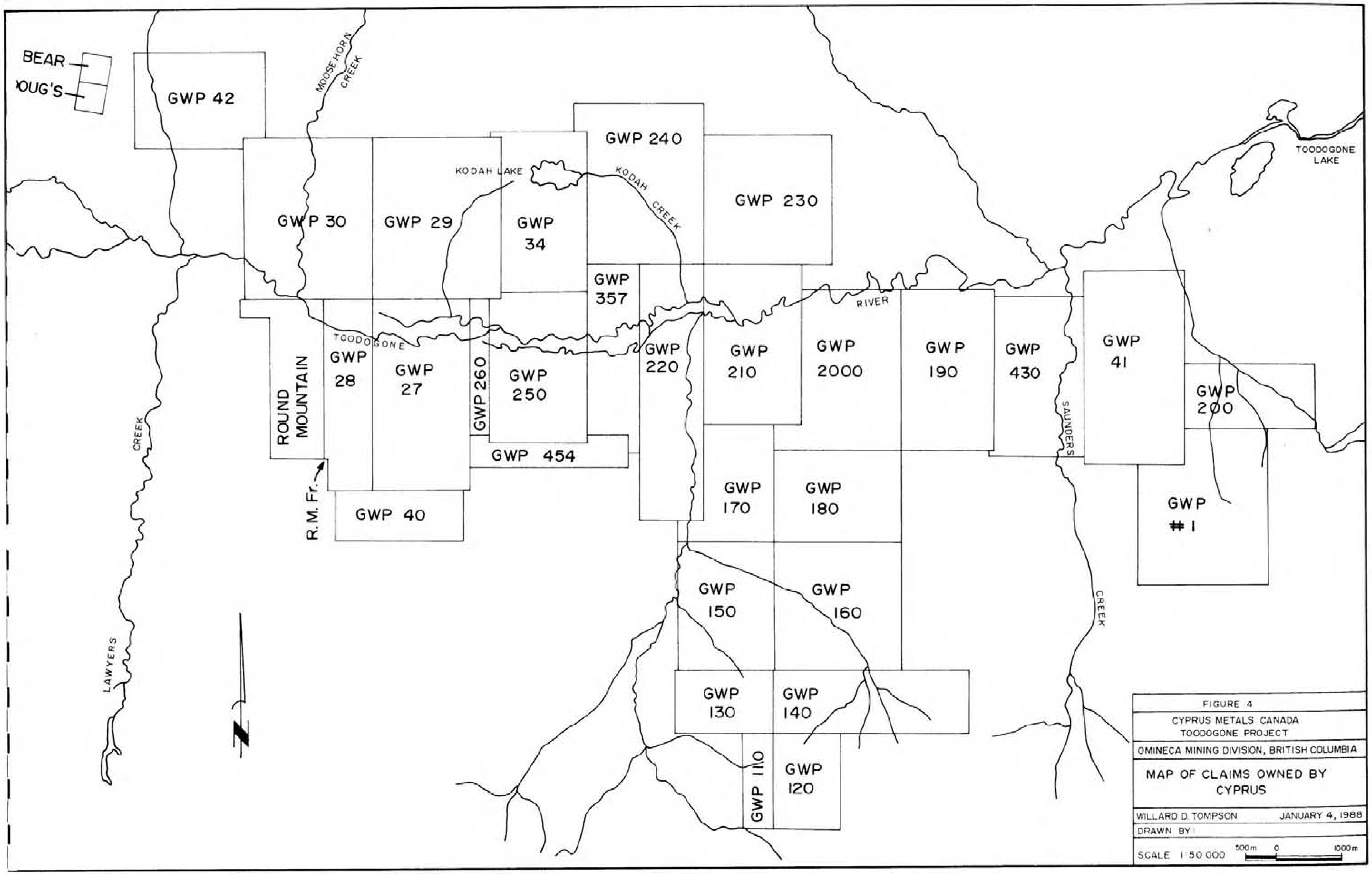
Claim Name	Record Number	Units
G.W.P. No. 110	7556	3
G.W.P. No. 120	7557	6
G.W.P. No. 140	7559	12
G.W.P. No. 160	7561	16
G.W.P. No. 180	7563	16
G.W.P. No. 190	7564	15
G.W.P. No. 2000	7565	20

Cassidy Group No. 6

Claim Name	Record Number	Units
G.W.P. No. 1	2870	20
G.W.P. No. 41	3520	18
G.W.P. No. 200	4731	8

OWNERSHIP

The claims are owned by Cyprus Metals (Canada) Ltd., whose address is #1810 - 1055 West Hastings Street, Vancouver, B.C. The work done in 1987 was performed by Cyprus.


BEAR
OUG'S
GWP 42
MOOSE HORN CREEK
GWP 240
KODAH LAKE
KODAH CREEK
GWP 230
GWP 30
GWP 29
GWP 34
GWP 357
TODOGONE
RIVER
TOODOGONE LAKE
ROUND MOUNTAIN
GWP 28
GWP 27
GWP 260
GWP 250
GWP 220
GWP 210
GWP 2000
GWP 190
GWP 430
GWP 41
GWP 200
SAUNDERS CREEK
GWP 454
R.M. Fr.
GWP 40
GWP 170
GWP 180
GWP #1
GWP 150
GWP 160
GWP 130
GWP 140
GWP 110
GWP 120
LAWYERS CREEK
FIGURE 4
CYPRUS METALS CANADA
TOODOGONE PROJECT
OMINECA MINING DIVISION, BRITISH COLUMBIA
MAP OF CLAIMS OWNED BY CYPRUS
WILLARD D. TOMPSON
JANUARY 4, 1988
DRAWN BY
SCALE 1:50 000
500 m
0
1000 m

HISTORY

The claims of Cassidy Groups 1 and 2 were staked during the winter of 1980-81 by agents for Great Western Petroleum, Ltd., a British Columbia company based at that time in Vancouver, B.C.

During the summer of 1981 Great Western Petroleum, Ltd., conducted extensive geological and geochemical work on all of the claims.

Cassidy Resources, Ltd. owned the claims in 1985 and conducted geological mapping and trenched and sampled silicified outcrops.

The Cassidy claim groups were optioned by Cyprus Metals Canada in 1986 and Cyprus conducted work on the claims during 1986.

First recorded work in the Toodoggone area was for placer gold along the lower portions of Belle Creek near its confluence with Toodoggone River. During the 1930's, a large camp was established near the mouth of Belle Creek and some placer mining was done in the shallow canyon of Belle Creek about 4 or 5 kilometers upstream from the camp.

In 1968, Kennco Explorations (Canada) Ltd. conducted a geochemical survey on the Chapelle property, 15 kilometers southwesterly from Toodoggone Lake. In 1970 they conducted a geochemical survey on their Lawyers property, which lies 12 kilometers west-southwesterly from Toodoggone Lake.

The Chapelle property was optioned to Conwest Exploration Company, Ltd. in 1973 and Conwest drove a 530 foot (161.1 m) adit to the vein. In 1975 the Chapelle property was optioned to DuPont of Canada Exploration Ltd. and they diamond drilled and conducted geophysical surveys (Barr, 1978). The Baker Mine (renamed from Chapelle) went into production in 1980 with reserves of 100,000 tons of ore containing 0.92 ounces of gold and 18.7 ounces of silver per ton. That ore was mined during the ensuing 3 years.

Kennco optioned the Lawyers property to Serem, Ltd., in 1979. From 1979-1985 Serem conducted extensive underground work on the Amethyst Gold Breccia zone and trenched and drilled the Cliff Creek and Dukes Ridge zones. Cheni Gold Mines Ltd. was organized to operate the Lawyers project and during 1987 conducted extensive diamond drilling as well as pre-production clearing and construction. The extension of the Omineca Mining Road reached the camp in October, 1987. Mineable ore reserves are reported to be:

Zone	Tons	Ag(oz/T)	Au(oz/T)
AGB	498,900	7.69	0.243
Cliff Creek	463,300	7.61	0.170
Duke's Ridge	75,400	6.59	0.230

Other major exploration projects in the Toodoggone district during 1987 were conducted by; Canasil Resources, Ltd., Energex Minerals, Ltd., Esso Minerals Canada, Multinational Resources, Inc., St. Joe Canada, Inc. and Western Horizon Resources, Ltd.

GENERAL GEOLOGY OF THE TOODOGGONE AREA

This description of the general geology of the Toodoggone mining area is summarized from the works of those who have mapped the geology of the Toodoggone volcanic rocks and the surrounding area.

The volcanic sequence was named by Carter (1971, p. 63). Carter described the rocks as follows:

> "A sequence of volcanic rocks, Jurassic or younger in age, and here informally called the Toodoggone volcanic rocks, unconformably overlie Takla Group in the western part of the area. The Toodoggone rocks, which may be several hundred feet thick, include red to green or grey dacite and latite porphyry flows and pyroclastic rocks."

He showed the age to be 186 ± 6 million years.

Gabrielse, Dodds and Mansy (1975) mapped the Toodoggone River quadrangle (N.T.S. 94E) which includes the area underlain by the Toodoggone volcanic rocks. They show a northwesterly-striking band of volcanic rocks, which is up to 17 kilometers wide and 90 kilometers long, extending from Kemess Creek on the south to Chukachida River on the north. The Toodoggone volcanic rocks are bounded on the east by coeval hornblende-quartz diorite plutons, which are known as the "Omineca Intrusions" and on the west by the Upper Cretaceous Sustut group.

Schroeter (1981, pp. 124-131) described the regional geology, structure and mineral prospects of the area. He identified four principal subdivisions of Toodoggone volcanic rocks:

1. Lower volcanic division - purple agglomerates, and grey to purple dacite tuffs.
2. Middle volcanic division - rhyolites, dacites, "orange" crystal to lithic tuffs and quartz-feldspar porphyries.
3. Upper volcanic-intrusive division - grey to green to maroon crystal tuffs and quartz-eye feldspar porphyries.
4. Upper volcanic-sedimentary division - lacustrine sedimentary rocks, stream bed deposits and possible fanglomerate and interbedded tuffs.

In 1981, Schroeter (1982) conducted some preliminary geochemical studies. He observed:

1. Three main classes of rocks are: varicolored andesitic and dacitic pyroclastic tuffs which are overlain by trachytic pyroclastic tuffs.
2. The ratio K_2O/Na_2O increases toward mineralization.
3. Sulfur values are very low.
4. Trace elements are not enhanced toward mineralization.
5. The overall Ag:Au ration is 20:1.

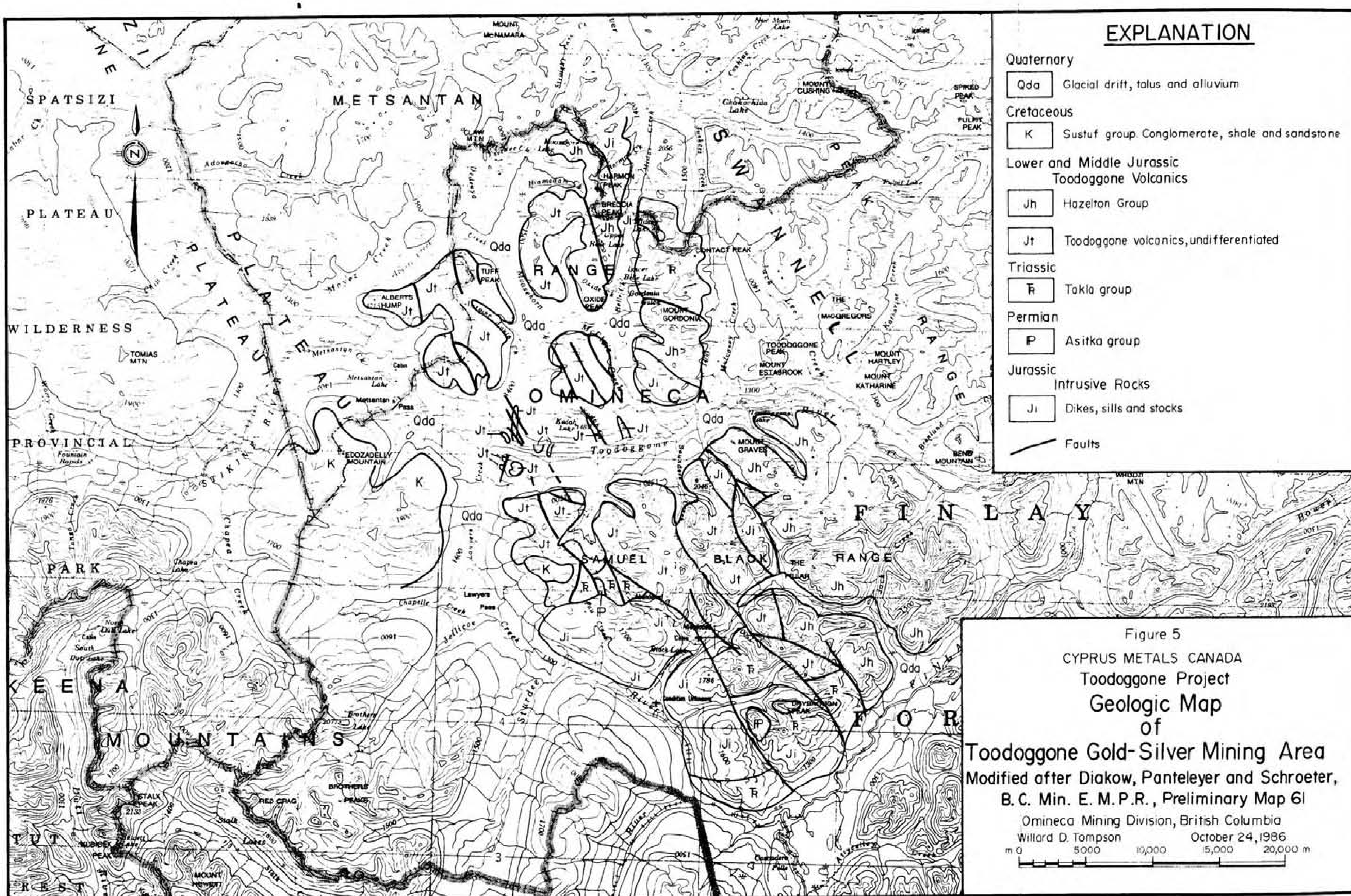
Panteleyev (1982) commenced systematic geologic mapping of the Toodoggone rocks in 1981. He started his mapping south of Finlay River in 1981 and in 1982 he mapped an area north of Finlay River between Sturdee River and Toodoggone River (Panteleyev, 1983).

Diakow (1983) examined the stratigraphy, structure and hydrothermal alteration of two types of precious metal occurrences in the Toodoggone; (1) quartz stockworks and veins which are discordant and transect bedding at high angles and (2) pervasive siliceous zones which are strataform and stratabound.

In 1985, Diakow, Panteleyev and Schroeter produced a geological map of the Toodoggone River area. Figure 5 (p. 12) is a geological map at scale 1:250,000 which is generalized and reduced from Diakow, Panteleyev and Schroeter (1985).

Permian Asitka Group

The oldest rocks in the map area are Permian crystalline limestones of the Asitka group. Barr (1978) shows that Asitka rocks were thrust upon Triassic Takla rocks during Jurassic time.


EXPLANATION
Quaternary
Qda Glacial drift, talus and alluvium
Cretaceous
K Sustut group. Conglomerate, shale and sandstone
Lower and Middle Jurassic
Toodoggone Volcanics
Jh Hazelton Group
Jt Toodoggone volcanics, undifferentiated
Triassic
Ŧr Takla group
Permian
P Asitka group
Jurassic
Intrusive Rocks
Ji Dikes, sills and stocks
Faults
Figure 5
CYPRUS METALS CANADA
Toodoggone Project
Geologic Map
of
Toodoggone Gold-Silver Mining Area
Modified after Diakow, Panteleyer and Schroeter,
B.C. Min. E.M.P.R., Preliminary Map 61
Omineca Mining Division, British Columbia
Willard D. Tompson
October 24, 1986
m 0 5000 10,000 15,000 20,000 m
SPATSIZI
PLATEAU
WILDERNESS
PROVINCIAL
PARK
METSANTAN
PLATEAU
OMINECA
RANGE
SWANNELL RANGE
FINLAY
SAMUEL
BLACK
RANGE
MOUNTAINS
MOUNT McNAMARA
CLAW MTN
TOMIAS MTN
HARMON PEAK
BRECCIA PEAK
CONTACT PEAK
TUFF PEAK
ALBERTS HUMP
OXIDE PEAK
MOUNT GORDONIA
TOODOGGONE PEAK
MOUNT ESTABROOK
THE MACGREGORS
MOUNT HARTLEY
MOUNT KATHARINE
MOUNT CUSHING
SPIKED PEAK
PULPIT PEAK
EDOZADELLY MOUNTAIN
MOUNT GRAVES
THE PILLAR
BEND MOUNTAIN
WHODZI MTN
DRYBROUGH PEAK
BROTHERS PEAKS
RED CRAG
STALK PEAK
MOUNT HEWITT
Lawyers Pass
Metsantan Pass
Chapelle Creek
Toodoggone River

Barr (1978) in his work at the Chapelle gold-silver deposit (Baker mine) shows that the Takla group is made up of four principal units:

1. Tremolite andesite prophyry. Typically contains large euhedral phenocrysts of tremolite in a dark grey aphanitic matrix. This is the oldest unit of Takla rocks.
2. Fine grained andesite. Massive light green to greenish-grey.
3. Dark grey porphyritic feldspar andesite.
4. Pyroclastic breccia composed of lapilli-sized multi-colored clasts of fine grained andesite in a fine-grained beige to grey-green matrix.

Upper Triassic Takla Group

The Takla group of volcanic rocks is the earliest of the Mesozoic extrusions in the area and reflects the beginnings of a period of volcanism which persisted through Lower Jurassic time when the Toodoggone volcanic rocks were deposited.

Lower and Middle Jurassic Toodoggone Volcanic Rocks

Carter (1971) and Panteleyev (1983) show that the Toodoggone volcanic rocks were deposited over a period of 20 million years from 200 to 180 Ma. Panteleyev (1983, p. 143) identified six map units of Toodoggone volcanic rocks between Sturdee River and Toodoggone River.

Diakow, Panteleyev and Schroeter (1985) in their preliminary map of the Toodoggone area, recognize nine map units with several mappable subdivisions of Toodoggone volcanic rocks:

1. Addogatcho Creek formation
2. Moyez Creek volcaniclastics
3. Lawyers-Metsantan quartzose andesite
4. Mafic flow and tuff unit
5. McClair Creek formation
6. Tuff Peak formation
7. Toodoggone crystal ash tuff and flows
8. Grey dacite
9. Hazelton group.

Upper Cretaceous Sustut Formation

The Triassic Takla rocks and the Jurassic Toodoggone rocks are overlain on the west by sandstones and conglomerates of the Upper Cretaceous Sustut formation. Sustut rocks are part of the Bowser assemblage and here, lie near the eastern margin of the Bowser Basin.

Physiography of the Toodoggone Area

Physiography of the Toodoggone area was sculptured by the movement of ice during Recent glaciation. Valleys were undoubtedly full of ice at the climax of the "little ice age", about 450 years ago (Holland, 1964, p. 105). Remnants of glaciers still exist in a few cirques. Valleys are "U" shaped and glacial moraines, kames and eskers are widespread. Glacial erratics occur throughout the area. A common rock-type which occurs as erratics is a chert-quartz pebble conglomerate. Similar chert-quartz pebble conglomerate beds occur along the Skeena River 100 kilometers to the southwest.

Toodoggone River occupies a broad "U" shaped valley (Figures 6 and 7) with gravel terraces up to 1100 meters wide. Toodoggone River was first formed by a valley glacier and then became a major drainage channel as it carried meltwater eastward from the waning glaciers.

Figure 6

Photograph of Toodoggone River valley,
looking westerly

Figure 7

Photograph, looking northerly from Round Mountain, across Toodoggone River valley toward Moosehorn Canyon. Cyprus base camp in middle distance.

GEOLOGY OF CASSIDY GROUPS 1 AND 2

Description of Rocks

Cassidy groups 1 and 2 were mapped at scale 1:10,000 (Tompson, 1986). The claim area has a veneer of unconsolidated deposits covering bedrock through about 95 percent of the area; alluvial stream deposits, glacial till and various colluvial and talus deposits.

The most widespread rock type underlying Cassidy groups 1 and 2 is porphyritic trachyandesite. These rocks commonly contain orthoclase and plagioclase phenocrysts which are prominent orange to salmon-pink in color and up to 8 mm in diameter. Matrix is fine grained and greenish to purplish in color. Other trachyandesite flows occur which contain pale pink feldspar phenocrysts.

Fine grained tuffs and lapilli tuffs are locally interbedded with the trachyandesite flows.

Grey to brown, medium grained, to very fine grained epiclastic tuffs, greywacke and black, fissle shale occur near the mouth of Moosehorn Creek and along the south bank of Toodoggone River east of Moosehorn Creek.

Hydrothermal Alteration

Hydrothermal alteration appears to occur along structural zones which strike north-northwesterly. However, the distribution of the altered rocks is not well known due to a scarcity of outcrops.

Advanced potassic alteration is present in drill holes 87-1 to 87-5 and in rocks dug from trenches 1-6 and trench 8.

Potassic alteration was also noted in drill core from holes drilled in 1986; 86-1, 86-2, 86-5 to 86-7, and 86-12. Silicification and pyritization commonly occur with the feldspathized rocks.

Rocks which display argillic alteration are widespread along the structural zones noted above. A large occurrence of heavy grey to buff clay, which is believed to be of hydrothermal origin was trenched in 1986 (Tompson, 1986, pp. 61-63). Tentative megascopic identification of alunite was made at these occurrences.

Topographic Relations

Moosehorn Canyon

Moosehorn Creek originates at Moosehorn Lake, 21 kilometers north of Moosehorn Canyon. The creek flows south for 19 kilometers through a drift filled valley (Figure 7) at a gradient of about 12 meters per kilometer. It then traverses resistant trachyandesite flows and some pyroclastic rocks for a distance of 2 kilometers, maintaining about the same gradient. The creek then crosses a N.30°W. fault, where it makes a 7 meter waterfall, and encounters the faulted and argillized rocks of Moosehorn Canyon. These rocks are more easily eroded than the fresh trachyandesite and the gradient of the creek steepens to 47 meters per kilometer for 1.5 kilometers, where the creek flows into Toodoggone River.

The terrain both east and west of Moosehorn Creek slopes moderately southward toward Toodoggone River. The surface throughout is covered by a thin mantle of glacial drift and some isolated remnants of paleogravels of Moosehorn Creek.

Round Mountain

Round Mountain lies about 1.5 kilometers south of Toodoggone River and 1.5 kilometers east of Lawyers Creek. It is a prominent topographic feature and is not officially named, so in this report, it is called "Round Mountain" in allusion to its shape. Its highest point lies at 1615 meters. The area of the mountain which lies above 1450 meters in elevation is above treeline and stands out as a nearly symmetrical round hill about 1700 meters in diameter. Bedrock is exposed intermittently throughout the area above 1550 meters, but below this elevation, bedrock is covered by talus, glacial drift and vegetation.

Toodoggone River

Toodoggone River, as it traverses Cassidy Groups 1 and 2, flows east-southeasterly. The river valley is flat (Figures 6 and 7) and is from 450 to 1100 meters wide. The valley is full of boulders and gravel, most of which were deposited as glaciers receded, and which have been reworked as the river traversed back and forth across the valley floor. Thickness of the valley fill is believed to be about 100 to 125 meters near the mouth of Moosehorn Creek.

The steeper, north-facing slopes on the south side of Toodoggone River provide bedrock exposures of Toodoggone volcanic rocks in mineral claims, G.W.P. Nos. 27, 28 and Round Mountain claim.

Kodah Lake

Kodah Lake occupies a slight debris-filled depression 2.5 kilometers north of Toodoggone River. The terrain slopes moderately toward Toodoggone River at an average grade of about 10 percent. The entire area is covered by glacial drift.

Structures

A strong system of faults strikes across the claims in a N.20°W. to N.30°W. direction. Two faults which are recognized and named on the Lawyers property, appear to occur on Cassidy groups 1 and 2.

The Attorney Fault

Vulimiri, Tegart and Stammers (1985) show that at the Lawyers Amethyst Gold Breccia deposit, the Attorney fault is post mineral and limits the gold breccia zone at its northern terminus. The fault strikes about N.30°W. and dips near vertical. Where exposed in a road cut, the zone of intensely shattered and gougey rock is more than 10 meters wide.

The Attorney fault is shown by Vulimiri, Tegart and Stammers (1985, p. 151) to extend over a distance of nearly 40 kilometers, from Baker Mine on the south, to Adoogacho Creek on the north.

Schroeter (1981, p. 125) suggests that the Attorney fault is part of a deep-seated system of volcanic centers along a gold-silver rich geological province. Late stage hydrothermal activity associated with those volcanic centers, produced the epithermal gold-silver deposits of the Toodoggone.

The Attorney fault zone crosses Moosehorn Creek about 1000 meters north of Toodoggone River. There appears to be at least three principal fracture planes in the fault zone over a width of 500 to 600 meters.

Cliff Creek Fault

The Cliff Creek fault lies about 2200 meters west of the Attorney fault and strikes approximately N.20°W. to

N.30°W., and thus is about parallel to the Attorney fault. The Cliff Creek fault is large and is locally mineralized with quartz, gold, silver and some pyrite. It appears to extend onto the G.W.P. No. 40 and G.W.P. No. 28 claims from the Law 3 claim of Cheni Gold Mines, Ltd.

MINERALIZATION AND ALTERATION

Two principal zones of mineralization are recognized on Cassidy groups 1 and 2. These are referred to (Tompson, 1986, p. 20) as the Moosehorn zone and Round Mountain zone.

Moosehorn Zone

The Moosehorn zone is so named because it was first recognized in the walls of Moosehorn Canyon. The zone is believed to be part of the large regional structural zone that extends from Baker Mine, northwesterly to the mineral deposits of Energex Minerals, Ltd. near Alberts Hump, a distance of 27 kilometers. It is a complex structure and not well understood where it crosses the Cassidy claim groups. The occurrences in and near Moosehorn Canyon were described by Tompson in 1986 (pp. 20-24).

Field work during 1987 shows that there are at least two distinct veins in the Moosehorn zone, where it was explored east of Moosehorn Creek. The veins are of different character, mineralogy and attitude and are about 120 to 150 meters apart, so will be described separately. For purposes of convenience, they will herein be called, "Moosehorn East vein" and "Moosehorn West vein".

Moosehorn East Vein

The Moosehorn East vein is not known to occur in outcrops. Its presence was first indicated by large, angular float occurrences south of coordinate, L.10+005.-2+00E. The best assays from float samples are (Plate 7):

Au(g/T)	Ag(g/T)
12.40	1010.0
10.40	1280.0

The vein is composed mostly of black, chalcedonic quartz, quartz breccia and grey quartz. Fine grained pyrite occurs in amounts up to 5 percent as subhedral grains disseminated through the quartz.

Trench number 1 intersected a black, chalcedonic quartz vein which assayed; gold, 0.54 g/T; silver, 63 g/T.

Diamond drill holes 87-1, 87-3, 87-5 and 87-11 intersected black chalcedonic quartz veins:

D.D.H. No	From	To	Width	Assay (g/T) Au	Ag
87-1	76.7	77.2	0.5	0.01	10.0
87-3	36.6	37.8	1.2	0.66	42.5
87-5	47.0	48.3	1.3	0.19	23.7
87-11	21.6	22.2	0.6	0.02	3.8
87-11	61.3	61.7	0.4	0.12	4.0
87-11	63.4	65.0	1.6	0.01	2.6

It is shown on the geological sections of the respective drill holes that all intersections are at nearly right angles with the axes of the core. Thus, the black, chalcedonic quartz veins apparently dip at about 45 degrees to the east. Trace of the veins then must lie to the west of existing trenches. Therefore, the veins which produced the black quartz breccia float having high gold-silver values, were not intersected in the drill holes.

Moosehorn West Vein

The Moosehorn West vein was discovered in 1986 in drill hole 86-8 near the collar of the hole, the intersection being from 7 to 10 meters. Weighted assay of the 3-meter intersection is; gold, 1.59 g/T; silver, 339 g/T. The 3-meter interval contains a 2-meter wide quartz vein and is bounded above by 1/2 centimeter of red clay and below by 2 centimeters of grey clay, quartz and pyrite. The vein was also intersected in D.D.H. 86-12 at 105 meters below the surface and in D.D.H. 87-2 at a distance of 85 meters below surface.

The vein does not occur in outcrop, as the area is covered with one to 4 meters of glacial debris. Trenches 3, 4 and 5 were cut to intersect the vein, but except for a short interval of quartz at the baseline in trench 3, the trenches did not encounter the vein in bedrock. However, large volumes of grey, angular vein quartz were dug from overburden in each of the trenches.

The quartz is grey, chalcedonic quartz and quartz breccia with several stages of veining. Quartz banding and vugs are common. Pyrite is disseminated through much of the quartz in volumes of less than one percent. Limonite stain is present throughout the rocks. Some relatively promising assays came from trench samples (Plate 10):

Trench No.	Sample No.	Assays (g/T) Au	Ag
3	13548	1.70	30.2
3	13556	0.74	40.2
3	13317	0.58	102.5
4	13560	2.79	310.0
4	13561	0.95	81.7
5	13576	3.14	180.0
5	13577	2.00	107.0
5	13598	4.25	283.0
5	13599	2.40	116.0
5	13600	2.85	210.0

It is apparent from the map of trenches 3, 4 and 5 (Plate 10) and from the sections of D.D.H. 86-7 and 87-4 (Plates 22 and 27) that the vein may exist in the eastern portions of the trenches where bedrock was not exposed, or the vein may lie at a short distance to the east of the trenches.

Zone of Clay Alteration

A strong lineament occurs at coordinates, L.4S.-0+93W., striking N.30oW. A small and very straight valley occupies the lineament and is a prominent physiographic feature when observed from the air or from the ground. Volcanic rocks, probably originally trachyandesite, are thoroughly argillized over a width in excess of 6 meters. A width of at least 4 meters of massive, cream colored clay occurs and probably reflects the proximity of a conduit along which hydrothermal fluids were transported.

Alteration of the Round Mountain Zone

Geology of the Round Mountain area was described by Tompson in 1986 (pp. 24-26 and Plate IV).

Two principal areas of alteration occur (Plate 4). On the east side of Round Mountain an area of argillization strikes north-northwesterly and is exposed over a length of about 200 meters and a width of 150 meters. The rocks were probably porphyritic trachyandesite, as evidenced by a few relict textures of feldspar phenocrysts. However, the rocks are composed mostly of clay and sericite with a few areas of silicification. Rock sampling of the area of alteration is described below in this report (p. 29 and Plates 5 and 6).

On the west side of the mountain the area is underlain by andesite porphyry. The rock is greenish in color and locally is strongly brecciated. Andesite porphyry has a green fine-grained matrix. Orthoclase occurs in volumes up to 5 percent. Plagioclase laths are 0.5 to 2 mm in length with a few up to 5 mm. Hornblende phenocrysts are up to 3 mm long. Quartz occurs as round grains scattered through the rock in volumes of about 0.5 percent.

A zone of quartz stockworks and silicification strikes northerly across this area and is exposed intermittently over a length of 500 meters. White to greyish chalcedonic quartz veinlets occur with many vugs containing tiny euhedral quartz crystals. Seven rock samples of silicified andesite had low values; gold, 0.03 ppm and silver, 0.4 ppm.

EXPLORATION OF CASSIDY GROUPS 1 AND 2

A five-phase exploration program was employed on Cassidy groups 1 and 2:

1. Geochemical soil surveys
2. Outcrop sampling
3. Backhoe trenching, hand trenching and bedrock sampling
4 Geophysical surveys
5. Diamond drilling

Geochemical Surveys

The geochemical exploration program consists of two parts:

1. Reconnaissance grid sampling of soils at a sample interval of 25 x 100 meters

2. Detailed soil sampling in areas where anomalous gold and/or silver values were discovered. A sample interval of 10 x 25 meters was used in the detailed survey.

All analytical work was done by Min-En Laboratories Ltd., 705 West 15th Street, North Vancouver, B.C.

All samples were analyzed for gold and silver:

Element	Method
Gold	Wet A.A.
Silver	Multi acid A.A.

Reconnaissance Grid Soil Surveys

Baseline No. 3

A baseline known as Baseline 3 was cut, chained and picketed over a length of 3700 meters (Plates 1 and 2) along the eastern slopes of Round Mountain. It lies at a distance of 1400 meters west from Baseline No. 1 which was cut in 1986 (Tompson, 1986, p. 29).

Grid lines were cut, chained and picketed at 200 meter intervals from Baseline 3. Nineteen grid lines were prepared having a cumulative length of 50,400 meters, making a total of 54,100 meters of cut lines on Baseline 3.

From a possible 2128 sample sites on the grid, 1630 samples were collected. Nearly 500 sample sites were missed, due mostly to swampy conditions at the sample sites. The distribution of gold and silver geochemical analyses from those samples is as follows:

Gold		Silver	
> 200 ppb,	8 samples	> 4 ppm,	22 samples
101 - 200 ppb,	11 samples	2 - 4 ppm,	94 samples
50 - 100 ppb,	22 samples	1 - 2 ppm,	546 samples
< 50 ppb,	1,589 samples	< 1 ppm,	968 samples
TOTAL	1,630 samples		1,630 samples

An inspection of Plate 2 shows samples with anomalous gold and/or silver values scattered throughout the grid area. They display rude clusterings near the north and south ends and near the west-central portion of the grid area.

The grid area has moderate to low relief. Overburden depth varies from nil in small areas of Round Mountain, to probably several meters of depth throughout most of the grid area.

Two factors exist which render interpretation of the geochemical soil survey difficult and uncertain:

1. Widespread distribution of unconsolidated deposits including glacial till and talus debris.
2. Much of the grid area lies downslope, as well as along strike from the Cliff Creek gold-silver zone which is being explored by Cheni Gold Mines, Ltd. Much mineralized quartz float exists in alpine terrain at the Cliff Creek exposures and some may be distributed downslope in the area of the soil survey.

Nine sample sites were selected in which anomalous values in gold and/or silver occur and these were tested with close spaced grid sampling:

Center of Detailed Sample Grid

Sample Coordinates	Gold (ppb)	Silver (ppm)
2+00N.-2+00W.	150	0.4
2+00S.-4+50W.	120	2.7
4+00S.-4+00W.	5	10.0
6+00S.-8+50E.	160	4.0
6+00S.-4+00W.	20	3.8
9+25S.-0+00	230	1.9
14+00S.-1+75E.	10	0.3
14+00S.-1+75W.	640	0.7
18+00S.-9+25E.	1300	1.2

Baseline No. 4

Baseline No. 4 lies in the northwestern part of Cassidy Group 1 on the west side of Moosehorn Creek (Plate 3). The baseline strikes N.28°W. and is 1000 meters long. Six grid lines from the baseline have a total length of 6000 meters.

Reconnaissance soil sampling produced 422 samples from a possible 481 sites. Two samples contained greater than 100 ppb gold and one sample contained greater than 1 ppm silver.

Detailed Geochemical Soil Surveys

'B' horizon sampled at 15-31 cm depths.

Nine grid areas, 200 x 200 meters were soil sampled at localities from Baseline No. 3 in which anomalous gold and/or silver values were found. A 10 x 25 meter sample array was maintained. Thus, nine lines were sampled on each detailed grid, each line producing 21 sample sites or a possible 189 samples per grid. The detailed soil sample maps are shown in Figures 8 to 16. Total samples collected was 1570 from a possible 1701 sample sites.

Distribution of gold and silver values in each of the detailed grids is as follows:

Figure Nos.	Coordinates at Centre of Grid	Number of Samples: Gold (ppb) >200	Gold (ppb) 100-200	Gold (ppb) 50-100	Silver (ppm) >4	Silver (ppm) 2-4	Silver (ppm) 1-2	Total Samples
8	2+00N.- 2+00W.	0	1	4	0	4	40	188
9	2+00S.- 4+50W.	1	3	2	0	15	57	188
10	4+00S.- 4+00W.	0	0	0	9	64	77	185
11	6+00S.- 8+50E.	3	3	2	0	14	75	181
12	6+00S.- 4+00W.	1	0	2	11	72	82	179
13	9+25S.- 0+00	0	0	2	0	12	65	162
14	14+00S.- 1+75E.	2	2	0	0	3	30	147
15	14+00S.- 1+75W.	4	0	1	0	12	83	154
16	18+00S.- 9+25E.	1	3	5	0	8	43	186
	Total samples	12	12	18	20	204	552	1570

It is noted that silver analyses tend to be higher on the detailed grids which lie to the west of the baseline. Much of the terrain west of Baseline No. 3 lies above treeline and has a very thin veneer of unconsolidated deposits whereas east of the baseline, overburden is much thicker rendering interpretation of geochemical data more difficult.

Outcrop Sampling

Rock exposures on the easterly part of Round Mountain (Plate 4) display advanced argillic alteration (Plate 5) with minor local quartz veining. Rock samples were taken from bedrock or from residual rock debris covering bedrock. Continuous chip samples were collected along one or two meter intervals and bagged in 12 by 18 inch, 6 mil. plastic bags and identified with appropriate sample tags. Each sample weighed about 3 to 4 kilograms (6.6 - 8.8 pounds).

Assays from these samples are shown on Plate 6. Gold and silver values are mostly low, the highest being in an area of quartz veining at the northwest corner of the sample area where the gold assay is 2.59 ppm with silver at 2.0 ppm.

It is noted that the sample area is only about 100 x 100 meters with scattered, sparse rock exposures.

Float Sampling

Black, chalcedonic quartz float was discovered in an area of low relief about 850 meters east of Moosehorn Creek and 750 meters north of Toodoggone River. Coordinates with respect to Baseline No. 1 are, 10+00S.-2+00E. The float occurs along a strike of N.40°W. through about 155 meters length (Plate 7).

The highest assay of the float samples is; gold, 7.02 g/T and silver, 273 g/T. Distribution of assays for 23 float samples is as follows:

Gold (g/T)		Silver (g/T)	
> 1.0	3 samples	> 10.0	15 samples
0.5 - 1.0	1 sample	5.0 - 10.0	7 samples
0.25 - 0.5	1 sample	2.5 - 5.0	0 samples
< 0.25	18 samples	< 2.5	1 sample
TOTAL	23 samples		23 samples

Hand Trenching and Sampling

Two occurrences of black chalcedonic quartz breccia were trenched by hand. Both are near L.10+00 south from Baseline No. 1. Coordinates are: 10+20S.-2+01E. and 10+30S.-2+03E. Thus the two occurrences are only 10 meters apart. Each is a large block of black, chalcedonic quartz breccia, about 1.2 to 1.6 meters in diameter. They initially were thought to be bedrock, but were found after trenching, to be detached. Five samples from the quartz breccia blocks are encouraging (Plate 7):

Sample Number	Au(g/T)	Ag(g/T)
13539	0.20	15.9
13540	0.16	11.2
13595	12.40	1010.0
13596	2.95	345.0
13597	10.40	1280.0

The source of the large blocks is not known. However, they are distributed along a north-northwest strike, which is the principal strike of structures in the area. Furthermore, all fragments are sharp and angular and were probably transported to their present locations by downslope creep in response to gravity.

Backhoe Trenching and Sampling

A backhoe was brought to the Moosehorn Creek area from St. Joe Canada Ltd., a distance of about 10 kilometers. The trip took about 14 hours, including time lost when the machine upset in difficult terrain. Toodoggone River was crossed easily about 1200 meters east-southeast from the mouth of Moosehorn Creek.

Eight trenches were dug (Plate 8) for a cumulative length of 237 meters. Average width is 1.2 meters, with depth varying from 1.5 to 3.3 meters. Maximum useful depth was found to be 2 meters. Slope of trenches varies from 5 to 19 degrees.

Backhoe trenching proved to be of limited benefit:

1. Steep-walled, deep trenches are unsafe for workers who are mapping and sampling.
2. Bedrock surfaces must be cleaned by hand in order to adequately map and sample bedrock. Sloughing walls commonly make it impossible to clean bedrock.
3. The backhoe does not penetrate bedrock; it cleans only to bedrock surface, thus there are no vertical, fresh walls to examine.
4. Irregular bedrock surfaces impound water, and make water-covered areas which are difficult or impossible to map and sample.

Trench No. 1, 10+00S.-2+50E.
and
Trench No. 2, 10+30S.-2+25E.
Baseline No. 1

Geology and results of sampling for backhoe trenches 1 and 2 are shown on Plate 9.

The trenches were cut as a result of the discovery of black chalcedonic quartz (described above) and a coincident EM-16R anomaly of 2000 OM.

The map of trench number 1 shows that gold and silver values increase to the west of a prominent structural plane which strikes about N.30W. Rocks to the west of the structural plane are strongly feldspathized and silicified. Rocks through a 12 meter section of the trench assayed; gold, 0.23 g/T and silver, 19.1 g/T. A black chalcedonic quartz vein in those rocks averaged; gold, 0.42 g/T and silver, 52.1 g/T over 1/2 meter width.

Rocks through a 6 meter section of trench number 2 assayed; gold, 0.42 g/T and silver 30.1 g/T. The walls of the trench were caving and prohibited further sampling of trench 2.

Trench No. 3, 7+50S. at Baseline No. 1

Diamond drill hole 86-8 (drilled in 1986) encountered 6.6 meters of vein quartz and quartz breccia at interval 3.6 to 10.2 meters. Trench number 3 was designed to intersect the quartz zone beneath overburden, which proved to be about 1.5 meters deep. However, bedrock exposures in the trench were very poor and mapping and sampling were achieved with only limited success. However, much quartz occurred in muck which was dug from the trench and muck samples of quartz were taken in addition to the limited bedrock samples. Assays of the samples are summarized below:

Samples Moiled From Bedrock, Trench 3

Sample Number	Width (m)	Au(g/T)	Ag(g/T)
13316	1	0.46	54.4
13317	1	0.58	102.5
13318	1	0.09	17.5
13319	1	0.26	8.2
13352	1	0.10	12.0
13353	1	0.03	4.3
13354	1	0.12	10.2
13355	1	0.10	5.8

Samples Dug From Bottom of Trench Wall, Trench 3

Sample Number	Width (m)	Au(g/T)	Ag(g/T)
13309	2	0.21	17.5
13310	2	0.56	36.0
13311	2	0.40	44.5
13312	2	0.31	20.0
13313	2	0.23	16.0
13314	2	0.88	10.1
13315	1.7	0.14	38.2
13341	2	0.05	10.0
13342	2	0.01	8.0
13343	2	0.02	6.2
13344	2	0.04	4.3
13345	2	0.01	3.8

Muck Samples of Vein Quartz, Trench 3

Sample Number	Muck	Au(g/T)	Ag(g/T)
13546	M	0.15	44.0
13547	M	0.24	25.8
13548	M	1.70	30.2
13549	M	0.20	39.7
13550	M	0.37	42.6
13551	M	0.05	20.0
13556	M	0.74	40.2
13557	M	0.37	40.0
13558	M	0.66	48.6
13559	M	0.20	5.7

It is immediately apparent from the position of the samples in the trench (Plate 10) that those east of the water-filled part of the trench are part of a vein system and those to the west are not, and in all probability the water filled section in the trench represents a clay filled footwall which was easier to dig than other rocks in the trench.

Trench No. 4, 8+00S. at Baseline No. 1

Trench number 4 was designed to search for the continuation of the vein system which is believed to be represented by the vein quartz in trench 3. As in the other trenches, caving and sloughing of trench walls, with the presence of water made mapping and sampling very difficult.

A summary of assay values of samples from trench 4 is shown below:

Samples Moiled From Bedrock, Trench 4

Sample Number	Width (m)	Au(g/T)	Ag(g/T)
13565	1	0.17	5.4
13566	1	0.16	3.2
13567	1	0.23	11.4
13569	1	0.18	2.2
13570	1	0.01	4.3
13571	1	0.19	8.1
13572	1	0.03	10.0
13573	1	0.01	8.6
13574	1	0.01	2.2

Muck Samples of Vein Quartz, Trench 4

Sample Number	Muck	Au(g/T)	Ag(g/T)
13560	M	2.79	310.0
13561	M	0.95	81.7
13562	M	0.29	37.5
13563	M	0.24	9.0
13564	M	0.28	13.8
13568	M	0.14	14.1

Trench No. 5, 8+50S. at Baseline No. 1

Trench number 5 was designed to test an area in which large volumes of sharply angular quartz float contain high gold and silver values (Tompson, 1986, Fig. 48). Assays from those samples are shown below:

Sample Number	Width (m)	Au ppb	Ag ppm	Ag oz/T
8+10S.-0+15W.	Grab	5000	>50	21.48
84450	Grab	1100	>50	1.81
84377	Grab	7400	>50	5.74
84378	Grab	7200	>50	9.76

Large volumes of angular grey vein quartz occur in surface debris at 8+50S.-0+02E. from Baseline No. 1. These fragments of quartz were believed to lie above a quartz vein, but trenching showed that they are detached.

The walls in trench number 5 stood sufficiently well to permit hand cleaning of the bedrock surface prior to mapping and sampling. The quartz vein which was expected to lie beneath the angular quartz float was not found in the trench. It is noted that the quartz was found at the surface only and was not distributed through 1.5 to 2.0 meters of overburden which covered bedrock.

Assays of rocks from trench number 5 are as follows:

Samples Moiled From Bedrock, Trench 5

Sample Number	Width (m)	Au(g/T)	Ag(g/T)
13320	2	0.01	6.5
13321	1	0.20	4.6
13322	1	0.07	4.2
13323	1	0.03	5.7
13324	1	0.04	5.5
13325	1	0.01	2.6
13326	1	0.02	4.0
13327	2	0.27	20.0
13328	2	0.01	7.7
13329	2	0.01	5.0
13330	2	0.04	4.5

Muck Samples of Vein Quartz, Trench 5

Sample Number	Muck	Au(g/T)	Ag(g/T)
13575	M	0.78	37.8
13576	M	3.14	180.0
13577	M	2.00	107.0
13578	M	0.38	4.0
13579	M	1.53	64.0
13580	M	3.50	178.0
13598	M	4.25	283.0
13599	M	2.40	116.0
13600	M	2.85	210.0

Trench No. 6, 11+06S.-2+30E., Baseline No. 1

Black chalcedonic quartz float was found at 11+09S.-2+10E., Baseline No. 1. Those float samples are shown on Plate 7, sample numbers 18483-18487.

The walls of trench number 6 (Plate 11) did not stand well enough to permit mapping of the floor or walls of the trench. Large volumes of black, grey, pink and buff quartz breccia were dug from the trench and samples were taken of the quartz.

Muck Samples of Vein Quartz, Trench 6

Sample Number	Muck	Au(g/T)	Ag(g/T)
13583	M	0.86	28.1
13584	M	0.20	14.0
13585	M	0.14	11.9
13586	M	0.01	4.0
13587	M	0.06	24.2
13588	M	0.04	1.6

Trench No. 7, 11+45S.-2+50E., Baseline No. 1

Trench number 7 (Plate 11) was cut in a willow covered area and did not reach bedrock.

Trench No. 8, 12+00S.-2+00E., Baseline No. 1

Trench number 8 (Plate 11) was cut for the purpose of testing a resistivity anomaly which was found with an EM-16R survey. The trench is on a southwest-facing hill slope with a slope of nearly 20 degrees. Overburden is loose rubble with some water and tends to flow into the trench as digging proceeds with the result that only a small portion of the trench was cleared for inspection and sampling. The bottom of the trench is glacially polished porphyritic trachyandesite with a few scattered black quartz veinlets. Bedrock was observed through only 7 meters of the 26 1/2 meter length of the trench.

Exploration Targets Identified in EM-16R Surveys

VLF resistivity surveys were conducted along the same prepared grid lines from which soil surveys were made. Equipment used was Geonics EM-16R VLF resistity meter.

Signals from transmitters in Seattle, Washington, at azimuth 162° and from Hawaii, azimuth 220°, were utilized in the survey. Baseline azimuth is 152°.

Readings were taken at 12 1/2 meter intervals on grid lines spaced 100 meters apart.

Anomalies, Baseline No. 1

Plates 12 and 13 are contour maps of apparent resistivity on the survey grid from Baseline No. 1. Plates 14 to 17 are contour maps of part of the survey grid on Baseline No. 3.

Preliminary diamond drilling of the anomalous areas on Baseline No. 1 is described below in this report (pp. 41 to 59).

Overburden depth throughout the survey area of Baseline No. 1 is known to vary from about 1.5 meters to 4.5 meters, but northward from the anomaly at coordinates 3+00S. to 4+00S.-2+00E. overburden probably becomes thicker, as suggested by the flat, swampy terrain.

Anomaly on Baseline No. 3

Plates 14 to 17 are contour maps of apparent resistivity on the grid of Baseline No. 3 south of Toodoggone River, and on the north flank of Round Mountain.

The contours of a 1000 ohm-meter anomaly strike about N.40^{o}W. over a length of 200 meters. A prominent gossan with quartz veins, pyrite and sparse galena mineralization occurs on Cheni Gold Mines' Kodah No. 2 claim, 250 meters, on strike from the anomaly.

<u>Induced Polarization Surveys</u>

Induced polarization surveys were conducted by White Geophysical Inc. of Richmond, British Columbia. The surveys were conducted on the prepared grid of Baseline No. 3, and the following discussion refers to coordinates of Baseline No. 3.

The report of the survey and results were prepared by Markus Seywerd, geophysicist with White Geophysical and were condensed for use in this report.

Multipole Induced Polarization Survey

Approximately 10 kilometers of line were surveyed with a = 25 m, and one kilometer of line was surveyed at a = 12 1/2 m.

The following is from Seward's report (1987):

"The multipole induced polarization method is a technique which exploits the rapid signal acquisition and processing capabilities available with current micro computer technology. With this technique the potential field information is obtained through a multiconductor cable having 36 takeouts at 25 meter intervals. The cable is presently configured as up to six end and position interchangeable cables of 150 meter length. The takeouts are addressed by the 40 channel multiplexer assembly in a specially configured HP-3497A data acquisition system as 25 meter to 275 meter dipoles. The data acquisition system is driven by a HP-85 computer, allowing the data to be stacked in the computer for a number of cycles at full precision until a criteria is reached. Ten windows on the secondary voltage are compiled, as well as the primary voltage information. Time zero is sensed by direct reference to the transmitter timing circuitry. The cable is scanned simultaneously in groups of five dipoles and the decay curves presented graphically for acceptance and logging or rejection and rescan by the operator. The data is logged on digital tape cartridges and is readily accessed in the field in order to produce pseudo-sections. These tapes are read by a HP-9845 computer for further processing and production of final report ready sections.

The primary field power is provided by a Huntec MK IV 2.5 kw transmitter operated in time domain mode which is driven by a 400 Hz, 120 volt three phase motor generator. The transmitted signal is an alternate cycle reversing current pulse of two second on and two second off time. The current is introduced into the ground through two current electrodes for each scan of the potential cable. By scanning the cable for each of several current stake positions both along the cable and off the ends of the cable a strong measure of redundancy of coverage of a given depth point is assured. The stacking of this multiple scan information in the computer results in an improved determination of the geoelectric section.

The apparent resistivity is obtained from the ratio of the primary voltage measured on the potential dipole during the current on part of the cycle to the current flowing through the current electrodes. A geometric factor is computed from the electrode locations to arrive at the apparent resistivity, measured in ohm-meters.

The apparent chargeability is calculated from the ten secondary voltage windows as the area under the secondary decay curve and is measured in milliseconds."

Results of Survey

Several zones of high resistivity were identified by the induced polarization survey:

Zone	Coordinates N-S	E-W	Length of Anomaly
A	13+00N.	2+00W.	200
B	13+00N.	1+30W.	100
B	12+00N.	0+60W.	100
C	14+00S.	6+50E.	
D	14+00S.		200
D	12+00S.	1+70W.	
E	18+00S.	0+60W.	
F	18+00S.	6+50E.	
G	18+00S.	7+50E.	
H	44+00S.	0+00E.	
I	44+00S.	6+50E. & 7+60E.	
J	44+00S.	13+40E.	
K	44+00S.	16+00E.	
L	44+00S.	21+30E.	
M	44+00S.		
N	44+00S.	25+30E.	
O	44+00S.	28+50E.	
P	44+00S.	31+30E.	

Sewerd (1987) concluded:

"The Multipole Induced Polarization Survey was very successful in delineating several zones of high apparent resistivity. All of these zones warrant further investigation. These zones should all be trenched, probably with a backhoe, to determine in what they are sourced.

Experience in the Toodoggone has shown that the silicious zones vary greatly in gold content along strike making it prudent to sample along the entire strike. If this trenching proves successful in locating the silicified zones a follow-up IP survey can be run to guide trenching and delineate further trenching/drilling targets along strike."

Zones "I" to "P" occur on Cassidy group 3 and are shown on maps of Cassidy group 3.

Diamond Drilling

Eleven diamond drill holes (Figure 17) were drilled in testing two quartz zones:

1. Diamond drill holes 87-2, 87-3 and 87-4 were drilled to test the quartz vein which was discovered in drill hole 86-8 (in 1986) and which was explored with trenching in 1987 (Plates 8, 10 and 18-23).

2. Diamond drill holes 87-5, 87-6 and 87-7 tested the area in which black chalcedonic quartz float was found. Geophysical surveys with EM-16R disclosed anomalies in the same localities (Plates 8, 12, 13 and 25-27).

3. Diamond drill holes 87-1, 87-8, 87-9, 87-11 and 87-12 were drilled to test EM-16R anomalies (Plates 8, 12, 13, 22, 23 and 28-33).

Drill core was logged on descriptive-graphic forms at scale 1:10 (1 inch = 8.3 feet). Rock types, structures, textures and alteration were recorded. Silicified and feldspathized intersections were identified for splitting and sampling. Drill hole 87-10 had no mineralized intersections (Plate 34).

Descriptive Logs of Drill Holes

Geological information is summarized in descriptive logs of diamond drill holes 87-1 to 87-11, which appear on pages 43 to 56.

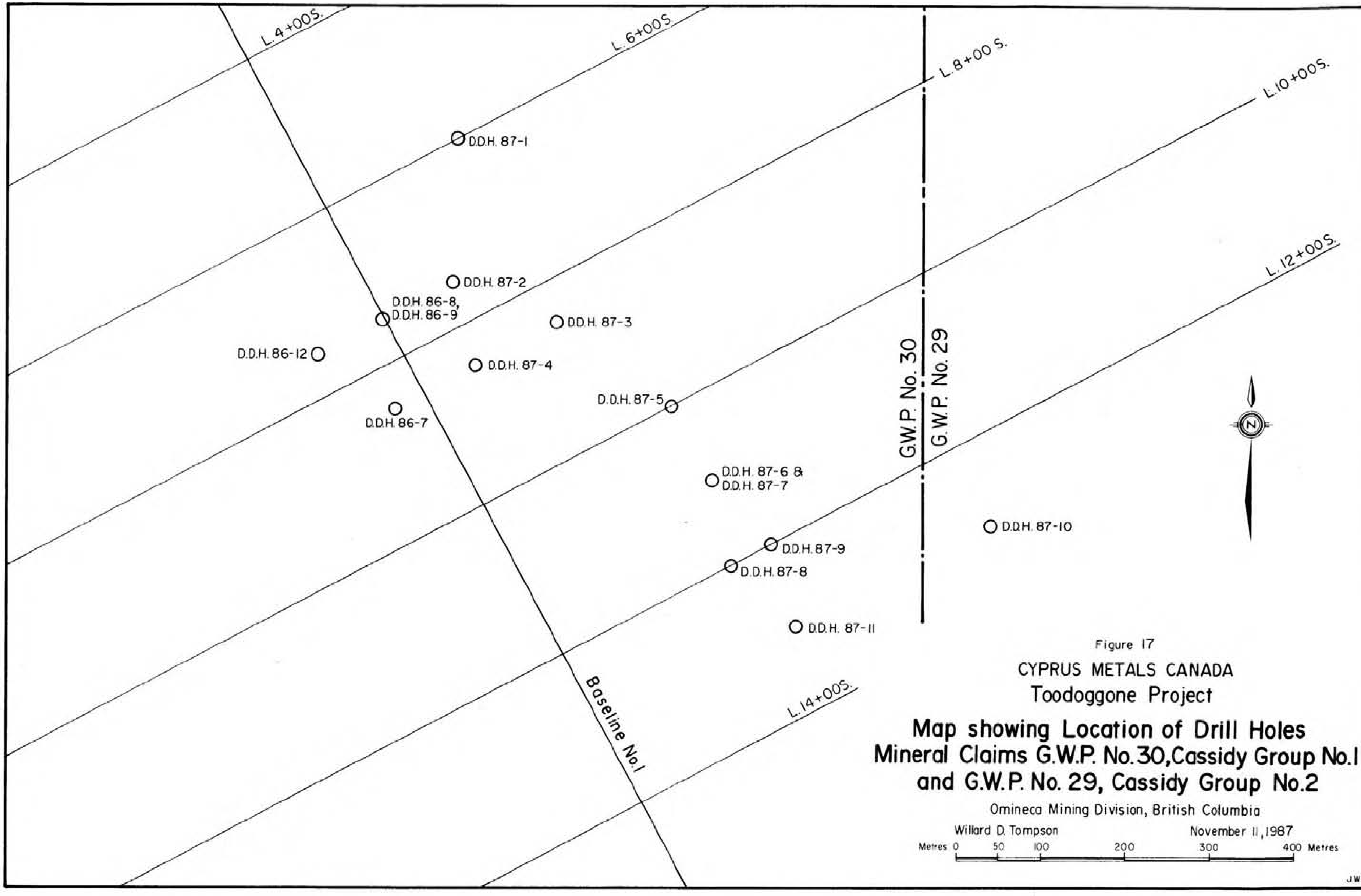


Figure 17

CYPRUS METALS CANADA

Toodoggone Project

Map showing Location of Drill Holes Mineral Claims G.W.P. No. 30, Cassidy Group No. 1 and G.W.P. No. 29, Cassidy Group No. 2

Omineca Mining Division, British Columbia

Willard D. Tompson — November 11, 1987

Diamond Drill Hole 87-1
Descriptive Log

Coordinates: 6+00S.-1+75E.
Elevation: 1250 m.
Bearing: S. 62°W.
Dip: 45°
Dates: Aug. 27 - Aug. 28, 1987
Length: 112.2 m

Interval		
From	To	Description of Rocks
0	4.8	Overburden
4.8	14.5	Porphyritic trachyandesite. Large (up to 3 mm) pink feldspar (orthoclase and plagioclase) phenocrysts. Prominent salmon-pink color. Ferromagnesian minerals are bright and glossy.
14.5	17	Fine grained, purplish trachyandesite.
17	32.5	Porphyritic trachyandesite with large, salmon-pink feldspars.
32.5	35.4	Fine grained, purplish trachyandesite.
35.4	69.8	Porphyritic trachyandesite with large pink feldspars. Strong limonite staining with brecciation at 43 m and 48 m. Some fracturing at 50 m.
69.8	69.9	Strong fault plane, 10 cm clay.
69.9	76.7	Porphyritic trachyandesite. Strongly feldspathized and silicified. Black chalcedonic quartz veins and grey quartz veins, mostly 2 to 3 mm wide.
76.7	77.2	Black, grey and red chalcedonic quartz vein.
77.2	87.5	Porphyritic trachyandesite. Strongly feldspathized and silicified. Many grey quartz veins and red jasperoid veins 1 to 4 mm wide. Trace magnetite.
87.5		Fault. Grey and brown clay.

Diamond Drill Hole 87-1 (cont'd)

Interval		
From	To	Description of Rocks
87.5	94.5	Porphyritic trachyandesite. Silicified and containing red jasperoid. Rock is strongly brecciated.
94.5	98.2	Rock is mostly secondary K-spar with a few quartz veins.
98.2	102.4	Rock composed of greenish clays, containing a few scattered pyrite cubes. Trace quartz veining.
102.4	112.2	Rock is composed mostly of secondary K-spar with a few minor quartz veins.
112.2		End of hole.

Diamond Drill Hole 87-2

Descriptive Log

Coordinates: 7+50S.-0+89E.
Elevation: 1237 m
Bearing: S. 62°W.
Dip: 45°
Dates: Aug. 28 - Aug. 29, 1987
Length: 152.4 m

Interval From	To	Description of Rocks
0	8.2	Overburden
8.2	52.5	Porphyritic trachyandesite. Large salmon-pink feldspar (orthoclase and plagioclase) phenocrysts up to 3 mm in section. Matrix is greyish and fresh. Some scattered pyrite in matrix.
52.5	56.0	Zone of brecciation with clay alteration.
56.0	57.0	Quartz vein.
57.0	68.6	Porphyritic trachyandesite with large pink feldspars.
68.6	88.0	Porphyritic trachyandesite has scattered quartz veins. Most are 1 to 4 mm and are blue-grey in color.
88.0	90.0	Purplish colored, hematite stain on core. Rock is porphyritic trachyandesite.
90.0	110.0	Porphyritic trachyandesite. A few scattered calcite veinlets from 107 to 110 and minor quartz.
110.0	125.4	Porphyritic trachyandesite contains a few scattered quartz veinlets.
125.4	143.5	Porphyritic trachyandesite is brecciated and silicified. Contains scattered quartz veins.
143.5	144.7	Blue-grey quartz vein.
144.7	152.4	Porphyritic trachyandesite is brecciated and silicified. Contains 4 to 10 mm quartz veins.

Diamond Drill Hole 87-3

Descriptive Log

Coordinates: 8+50S.-1+75E.
Elevation: 1240 m
Bearing: S. 62°W.
Dip: 45°
Dates: Aug. 30 - Aug. 31, 1987
Length: 115.2 m

Interval From	To	Description of Rocks
0	6.1	Overburden
6.1	36.6	Porphyritic trachyandesite; contains pink orthoclase and plagioclase phenocrysts up to 4 mm in section. Matrix is fine grained and buff colored. Ferromags are slightly chloritized.
36.6	37.8	Black chalcedonic quartz breccia and quartz vein. Contains fragments of feldspathized wall rock. Much of quartz is grey to dark grey rather than black. Much v.f.g. pyrite.
37.8	45.0	Buff colored, medium grained rock composed of K-spar with dark grey to black quartz veins from 1 mm to 10 mm wide.
45.0	51.0	Rock composed of pink K-spar.
51.0	53.0	Changing from K-spar rock back to dark, porphyritic trachyandesite.
53.0	72.0	Porphyritic trachyandesite with propylitic alteration.
72.0	77.7	Feldspathized porphyritic trachyandesite. Red color.
	77.7	Strong fracture.
77.7	80.1	Feldspathized porphyritic trachyandesite.
80.1	85.5	Fracture system. Much clay, greenish to grey color.
85.5	92.2	Porphyritic trachyandesite with intense fracturing and much clay.

Diamond Drill Hole 87-3 (cont'd)

Interval From	To	Description of Rocks
92.2	103.7	Quartz breccia. Quartz is blue-grey in color and makes up about 20 to 30 percent of rock.
103.7	115.2	Porphyritic trachyandesite.

Diamond Drill Hole 87-4
Descriptive Log

Coordinates: 8+50S.-0+65E.
Elevation: 1211 m
Bearing: S. 62°W.
Dip: 45°
Dates: Aug. 31 - Sept. 1, 1987
Length: 80.1 m

Interval		
From	To	Description of Rocks
0	8.5	Overburden
8.5	36.5	Porphyritic trachyandesite. Large salmon-pink feldspars.
36.5	49.0	Porphyritic trachyandesite. Grey, fine grained matrix with large salmon-pink feldspars. Contains 0.5 percent very fine grained disseminated pyrite. Minor quartz veinlets.
49.0	61.0	Propylitic alteration of porphyritic trachyandesite. White quartz veins 2 mm to 20 mm wide with some brown jasperoid veins and from 56 to 61, a few banded, amethystine quartz veins.
61.0	67.5	Porphyritic trachyandesite with propylitic alteration.
67.5	74.0	Propylitic alteration of porphyritic trachyandesite with a few quartz veins and some brecciation.
74.0	80.1	Propylitic alteration diminishes. A few calcite veinlets from 76.

Diamond Drill Hole 87-5

Descriptive Log

Coordinates: 10+00S.-2+50E.
Elevation: 1235 m.
Bearing: S. 62°W.
Dip: 45°
Dates: Sept. 1 - Sept. 2, 1987
Length: 90.8 m

Interval		
From	To	Description of Rocks
0	3.0	Overburden
3.0	27.1	K-spar and porphyritic trachyandesite breccia. Rock composed of porphyritic trachyandesite flow and breccia fragments and fragments of bright pink K-spar rock. Some K-spar phenocrysts have whiteish-grey centers with K-spar reaction rims. May denote K-spar metasomatism following argillization.
27.1	31.1	Bright pink K-spar rock with relict breccia texture.
31.1	35.0	Porphyritic trachyandesite breccia.
35.0	39.5	K-spar and porphyritic trachyandesite breccia
39.5	47.0	Pink K-spar rock with 0.5 percent fine grained, disseminated pyrite. Black quartz veins and breccia 45 to 47.
47.0	48.3	Black chalcedonic quartz.
48.3	67.5	Buff colored, K-spar rock with stockworks of small pyrite films and disseminated pyrite.
67.5	73.9	Rock becomes slightly darker color, but is mostly K-spar and pyrite.
73.9	75.2	Intense fracturing with much clay.
75.2	76.6	Porphyritic trachyandesite. Propylitic alteration.
76.6	88.5	Pink K-spar rock.

Drill Hole 87-5 (cont'd)

Interval		
From	To	Description of Rocks
88.5	90.8	Porphyritic trachyandesite with pale pink feldspar phenocrysts. Matrix is fine grained and purplish. A few tiny reddish apatite crystals and masses.

Diamond Drill Hole 87-6

Descriptive Log

Coordinates: 11+00S.-2+50E.
Elevation: 1222 m
Bearing: S. 62°W.
Dip: 45°
Dates: Sept. 2 - Sept. 3, 1987
Length: 81.4 m

Interval		
From	To	Description of Rocks
0	6.1	Overburden
6.1	12.0	Porphyritic trachyandesite breccia.
12.0	58.5	Porphyritic trachyandesite. May be partly tuffaceous.
58.5	60.0	Rock is shattered.
60.0	73.5	Porphyritic trachyandesite becomes pinkish due to secondary K-spar, but not complete alteration. Some brecciation and grey and black quartz veins, 2 mm to 20 mm wide. Narrow, black quartz veinlets 72.5 to 75.
73.5	81.4	Relatively fresh porphyritic trachyandesite.

Diamond Drill Hole 87-7

Descriptive Log

Coordinates: 11+00S.-2+50E.
Elevation: 1222 m
Bearing: S. 62°W.
Dip: 60°
Dates: Sept. 3 - Sept. 3, 1987
Length: 100.0 m

Interval		
From	To	Description of Rocks
0	5.5	Overburden
5.5	8.3	Porphyritic trachyandesite
8.3	9.4	Dark grey-brown jasperoid and 25 cm fault plane with 4 cm clay.
9.4	55.0	Porphyritic trachyandesite breccia. Pink color from secondary K-spar, 8.5 to 20. Fault with 1 cm clay at 55.0
55.0	72.0	Porphyritic trachyandesite. Plagioclase phenocrysts altered to green clay. Propylitic alteration.
72.0	72.6	Fault plane with clay.
72.6	81.0	Fine grained, pinkish trachyandesite(?) with much secondary K-spar(?).
81.0	87.0	Dark grey volcanic breccia. Andesite(?) breccia.
87.0	94.0	Brown and pink K-spar breccia with stockworks of grey quartz veins.
94.0	95.0	Fault
95.0	100.0	Porphyritic trachyandesite

Diamond Drill Hole 87-8

Descriptive Log

Coordinates: 12+00S.-2+25E.
Elevation: 1206 m
Bearing: S. 62°W.
Dip: 60°
Dates: Sept. 4 - Sept. 5, 1987
Length: 99.1 m

Interval From	To	Description of Rocks
0	3.5	Overburden
3.5	10.5	Porphyritic trachyandesite(?). Pink color, mafic minerals are sericitized.
10.5	54.6	Porphyritic trachyandesite breccia. Rock is dark greenish color.
54.6	64.5	Porphyritic trachyandesite(?) with black chalcedonic quartz veins which vary from 5 mm wide to 70 cm wide. All transect core at nearly right angles. Host rock contains abundant K-spar.
64.5	75.0	Porphyritic trachyandesite. Buff to pinkish color. Feldspar phenocrysts are salmon-pink in color. Matrix is fine grained; mafics are chloritized.
75.0	99.1	Porphyritic trachyandesite. Feldspar phenocrysts are light pink color. Matrix is fine grained, purplish.

Diamond Drill Hole 87-9
Descriptive Log

Coordinates: 12+00S.-2+78E.
Elevation: 1226 m
Bearing: S. 62°W.
Dip: 45°
Dates: Sept. 5 - Sept. 5, 1987
Length: 51.2 m

Interval		
From	To	Description of Rocks
0	2.2	Overburden
2.2	15.0	Porphyritic trachyandesite(?). Pink color. Mafics are sericitized. Large salmon-pink feldspar phenocrysts.
15.0	33.0	Same rock as above, but is darker color. Contains some patches of calcite.
33.0	51.2	Porphyritic trachyandesite breccia. Contains fragments of fine grained trachyandesite(?).

Diamond Drill Hole 87-10

Descriptive Log

Coordinates: 13+00S.-5+20E.
Elevation: 1221 m
Bearing: S. 62°W.
Dip: 45°
Dates: Sept. 5 - Sept. 6, 1987
Length: 68.6 m

Interval		
From	To	Description of Rocks
0	6.1	Overburden
6.1	68.6	Porphyritic trachyandesite. Feldspar phenocrysts are light pink color. Mafics are chloritized. Locally small masses of calcite. All assay values are very low.

Geology of the Drill Holes

The geology of the drill holes is shown in the geological sections of the eleven drill holes; Plates 18, 20, 22, 24, 26, 28, 30, 32 and 34.

Seven rock types are identified in the drill core although most are believed to have compositions which are close to trachyandesite or latite:

1. Porphyritic trachyandesite with large orange to salmon-pink orthoclase and plagioclase phenocrysts. Matrix is fine grained and commonly greenish or greyish. Mafic minerals are commonly chloritized.
2. Porphyritic trachyandesite with pale pink feldspars. Matrix is fine grained and purplish.
3. Trachyandesite breccia. Composed of fragments of porphyritic trachyandesite and fine grained, grey trachyandesite.
4. Fine grained purplish trachyandesite.
5. Porphyritic trachyandesite and K-spar breccia.
6. Rock composed mostly of K-spar.
7. Andesite breccia.

Rocks displaying argillic alteration are widespread through the area of the drill holes, as are rocks which show propylitic alteration.

Drill holes numbers 87-1, 87-3, 87-5, 87-7, 87-8, 87-9 and 87-11 contain significant intersections of rocks which are mostly replaced by secondary (hydrothermal) K-spar. The K-spar rocks are mostly reddish in color and are composed largely of K-spar, quartz and a trace of very fine grained pyrite. They are commonly medium grained but may be fine grained. Core from D.D.H. 87-11 contains a stockworks(?) of very fine grained pink K-spar.

Diamond Drill Hole 87-11

Descriptive Log

Coordinates: 13+00S.-2+60E.
Elevation: 1195 m
Bearing: S. 62°W.
Dip: -45°
Dates: Sept. 6 - Sept. 6, 1987
Length: 67.2 m

Interval		
From	To	Description of Rocks
0	5.5	Overburden
5.5	21.6	Porphyritic trachyandesite breccia. Brownish color.
21.6	22.2	Vein. Black chalcedonic quartz.
22.2		Porphyritic trachyandesite breccia to end of hole.
	25.5	K-spar flooding. Pink, fine grained K-spar veins.
26.0	28.0	Scattered grey quartz veins.
	34.5	K-spar flooding
36.0	61.3	Quartz veins scattered through rock. Veins are grey quartz and black chalcedonic quartz.
61.3	61.7	Black and grey quartz breccia.
	63.0	10 cm black quartz vein.
63.4	65.0	Black quartz breccia.
65.0	67.2	Porphyritic trachyandesite breccia.

Mineralized Intersections in Drill Holes

Six of the drill holes encountered significant intersections of mineralized rock. Additionally, drill holes 87-8 and 87-11 encountered zones of black and grey chalcedonic quartz veins and breccia with epithermal textures (e.g. vugs and banding) in which gold and silver values are very low. The widest of these quartz veins is in drill hole 87-11 where a black chalcedonic quartz vein is 1.6 meters wide.

The mineralized intersections from diamond drill holes 87-1 to 87-11 are summarized below.

Plates 19, 21, 23, 25, 27, 29, 31 and 33 are assay cross sections of drill holes 87-1 to 87-9 and 87-11.

Mineralized Intersections in Drill Core

Drill Hole	Intersection (m)		Width	Assays	
Number	From	To	(meters)	Au(g/T)	Ag(g/T)
87-1	35.0	38.0	3.0	0.21	157.7
87-1	69.8	73.0	3.2	0.54	16.0
87-1	69.8	97.0	27.2	0.08	9.9
87-1	104.0	108.0	4.0	0.23	33.0
87-2	56.0	57.0	1.0	1.42	46.0
87-2	118.0	119.0	1.0	1.20	28.2
87-2	143.5	144.7	1.2	9.00	251.0
87-2	145.0	152.0	7.0	0.30	16.8
87-3	36.6	37.8	1.2	0.66	42.5
87-3	39.0	46.0	7.0	0.23	9.4
87-3	97.0	100.0	3.0	0.40	8.9
87-4	68.0	71.0	3.0	0.86	44.2
87-4	75.0	76.0	1.0	0.40	38.0

Mineralized Intersections in Drill Core (cont'd)

Drill Hole Number	Intersection (m) From	To	Width (meters)	Assays Au(g/T)	Ag(g/T)
87-5	42.0	44.0	2.0	0.15	14.0
87-5	44.0	49.0	5.0	0.79	59.0
87-5	49.0	55.0	6.0	0.30	19.3
87-5	58.0	61.0	3.0	0.51	25.3
87-5	63.0	64.0	1.0	1.52	30.4
87-7	84.0	86.0	2.0	0.19	18.6
87-8	54.0	64.5	10.5	0.01	1.1
87-11	58.0	65.0	7.0	0.03	2.0

CONCLUSIONS

Several promising targets are recognized as a result of the geochemical and geophysical surveys and from the drilling program.

Exploration Targets Identified In Geochemical Soil Surveys

Several clusters of sample sites are shown to contain anomalous amounts of gold and/or silver in the soils (Plate 2).

For purposes of convenience these are discussed (following) according to the mineral claim(s) in which they occur.

and 11 of 29 contain 2.4 to 14.2 ppm silver. Part of this anomaly is verified by a detailed sample grid (Figure 11).

A strong anomaly in central G.W.P. No. 40 (Plate 2) may represent a continuation of the anomaly in G.W.P. 27 and 28, but is separated from it by more than 500 meters of swamp. Of 17 samples, 2 contain 115 and 320 ppb gold and 4 contain 2.3 to 5.2 ppm silver.

In southwestern G.W.P. No. 40, 3 samples in a group of 8 have anomalous gold and/or silver values (Plate 2).

Detailed soil surveys centered at single site anomalies (Figures 15 and 16) L.14+00S.-1+75W. and L.18+00S.-9+25E. have many samples with anomalous gold and/or silver values.

Exploration Targets Identified in Induced Polarization Surveys

Seyward (1987) shows several zones of high resistivity in the surveyed areas. Of particular interest are his "zones D and E". It is noted that these zones lie nearly on strike from the Cliff Creek zone of Cheni Gold Mines, Ltd. (See map, Plate V by Tompson, 1986). Heavy concentrations of limonite occur in a swampy area on baseline 3, about 100 meters S.40E. from "zone E".

Geochemical Anomalies in Mineral Claim Round Mountain, Record Number 8499

A group of anomalous samples occur in a crescent shaped area in northern Round Mountain mineral claim (Plate 2). Two anomalous gold analyses (135 and 140 ppb) and 13 anomalous silver analyses (2 - 14.2 ppm) of 35 samples from the area, constitute the anomaly.

Near the center of mineral claim Round Mountain, an anomalous area occurs along the margins of a swamp. Only one of 47 samples contains anomalous (160 ppb) gold values, but 21 contain 2 to 4.4 parts per million of silver.

A large area at the south end of Round Mountain claim contains samples with anomalous gold and/or silver values. The anomalous area extends eastward to G.W.P. No. 28 claim and southward to Silver Pond claim. There are 155 possible sample sites in the area, but only 118 samples were collected, the other sample sites being occupied by swamps. Three samples have gold values greater than 100 ppb and 32 samples contain from 2 to 10 ppm silver. These anomalies are verified by detailed soil surveys, as shown on Figures 8, 9, 10, and 12.

Geochemical Anomalies in Mineral Claims G.W.P. Numbers 27, 28 and 40

Near the center of mineral claim G.W.P. No. 28 (Plate 2) 8 of 30 samples define a subtle anomaly in which silver analyses range from 2.4 to 4.1 ppm.

A strong, north-striking anomaly occurs along the boundary of G.W.P. numbers 27 and 28. Sample sites are interrupted by two swamps, but 2 of 29 samples contain 160 and 300 ppb gold

RECOMMENDATIONS

Geochemical Surveys

Forest Humus Survey

Three magnetic lows occur west of Kodah Lake in an area of low relief where bedrock is covered by an undetermined thickness of glacial till.

It is recommended that a geochemical survey be conducted over those areas, sampling the forest humus layer as described by Curtin and others (1968). They found that lode gold deposits which are concealed beneath colluvial and glacial cover are delineated by gold anomalies in the forest humus layer (mull).

Detailed Soil Surveys

Several areas which were sampled from Baseline No. 3 produced multiple samples which are anomalous in gold and/or silver. Eight of the areas are described previously in this report, but some other areas are not yet sampled in detail. Coordinates of those areas are:

L.19S. to L.20S.,	4+00E. to 6+00E.
L.3S. to L.4S.,	8+50E. to 10+00E.
L.13N. to L.16N.,	4+00E. to 7+00E.
L.9S.,	7+00E. to 9+00E.

It is recommended that these anomalous areas be sampled on a 10 x 25 meter grid. The detailed sampling will produce about 1700 samples.

Induced Polarization Surveys

The large zone of alteration which is exposed in Moosehorn Canyon strikes about N.30°W. across mineral claims, G.W.P. 28 and 30. Glacial till covers bedrock to depths of 1 to 4 meters or more throughout most of the area. EM-16R resistivity surveys in part of that area are described on pages 37 to 38 of this report and were effective in identifying resistivity anomalies where overburden depths are shown to be 1 to 2 meters. Throughout most of the area however, overburden is more than 2 meters thick, limiting the effectiveness of EM-16R equipment.

Therefore it is recommended that the area from L.4+00N. to 12+00S. on Baseline No. 1, and from 2+00E. to 2+00W. be surveyed with induced polarization equipment in order to identify linear resistors (quartz veins) and conductors beneath the overburden.

Diamond Drilling

A diamond drilling program of 7000 feet (2134 m) is recommended which is equal to the total drilling done during 1986 and 1987. It is proposed that 6000 feet (1829 m) be drilled on the Moosehorn East and Moosehorn West zones and that 1000 feet (305 m) be drilled in the anomalies near Round Mountain which were identified in the induced polarization survey of 1987.

ESTIMATE OF COSTS
OF EXPLORATION PROGRAM

Geochemical Surveys

It is proposed that 375 samples will be collected in the forest humus geochemical survey (p. 62). Estimated cost of the survey is as follows:

Sampling and grid line preparation, $3.50 per sample	$ 1,313
Assays, $13.00 per sample	4,875
Support costs; supervision, board and room, plotting, $4.80 per sample	1,800
Transportation, $3.45 per sample	1,294
Total for humus survey:	$ 9,282

Ten detailed grid soil surveys will produce 1700 samples. Cost of these surveys are expected to be:

Sampling and grid line preparation, $3.50 per sample	$ 5,950
Assays, $11.00 per sample	18,700
Support costs; supervision, board and room, plotting, $4.80 per sample	8,160
Transportation, $3.45 per sample	5,865
Total for detailed grid soil surveys:	$38,675
TOTAL COSTS FOR GEOCHEMICAL SURVEYS:	$47,957

Diamond Drilling

It is anticipated that both BQ and NQ wireline equipment will be used in the drilling program. Contract rates are expected to be $21.00 and $23.00 respectively. Contractor's field costs (fuel, long water lines, diamond loss, etc.) are estimated to be $11.00 for each drill. The cost of the drill program (7000 feet) is expected to be:

Drill contract	
4000 feet @ $21.00	$ 84,000
3000 feet @ $23.00	69,000
Contractors field costs @ $11.00 per foot	77,000
Support costs; supervision, planning, plotting, core logging, drafting	16,000
Assays, 750 @ $11.15	8,363
Core boxes, core racks, sampling supplies	4,500
Helicopter charter for moving drill and supplies, including mobilization and demobilization	40,000
Fixed-wing aircraft for mobilization, demobilization and drill supplies	6,000
Air freight	1,000
Board and room for drill crew and company representatives	11,000
TOTAL FIELD AND LABORATORY COSTS FOR 7000 FEET OF DRILLING:	$316,863

Induced Polarization Surveys

It is recommended that 40 line kilometers of induced polarization surveys be conducted on Cassidy groups 1 and 2 (p. 63). Estimated costs of the surveys are as follows:

Wages for crew, 26 days @ $855 per day	$22,250
Room and board for crew 26 days @ $200 per day	5,200
Instrumentation, 26 days @ $200 per day	5,200
Computer plots, drafting, interpretation, reproductions and report	6,000
Transportation, including mobilization, demobilization and travel during tenure of survey	10,000
TOTAL COST FOR INDUCED POLARIZATION SURVEYS:	$48,650

Additional Costs Related to the Exploration Program

Some costs will be incurred which are not addressed in the cost estimates outlined previously:

Camp cook, wages, 110 days @ $140 per day	$15,400
Expediting	7,000
Rental, diesel generator	2,500
Fuel for camp	3,500
Reactivate camp	1,500
Aircraft charter during mobilization	2,700
TOTAL SUPPORT COSTS:	$32,600

Cost of the exploration program for 1988 may be summarized as follows:

Geochemical surveys	
Forest humus survey	$ 9,282
Detailed grid soil surveys	47,957
Induced polarization surveys	48,650
Diamond drilling	316,863
Various support costs	32,600
ESTIMATE OF TOTAL COSTS FOR THE PROPOSED 1988 EXPLORATION PROGRAM:	$455,352

Respectfully submitted,

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CERTIFICATE

I, Willard D. Tompson, of Smithers, British Columbia, do hereby certify:

1. THAT I am a consulting geologist residing at Van Gaalen Road, Smithers, British Columbia;

2. THAT I hold a Master of Science Degree (Geology) from Montana State University;

3. THAT I am a Fellow of the Geological Association of Canada;

4. THAT I have practiced my profession for more than 29 years;

5. THAT I managed the field exploration program which is described in this report and that I planned the work described herein in consultation with Company management personnel and that I supervised the work in the field;

6. THAT I have not received, directly or indirectly, nor do I expect to receive any interest, direct or indirect, in the property of the Company nor any affiliate of the Company, nor do I beneficially own, directly or indirectly any securities of the Company or any affiliate of the Company;

7. THAT this report may be used for any corporate purpose the Company deems necessary.

Dated at Smithers, British Columbia this 30th day of December, 1987.

Willard D. Tompson,
Consulting Geologist