2923

A GEOLOGICAL REPORT

ON THE

"A" GROUP OF MINERAL CLAIMS

LIARD MINING DIVISION, B.C.

Latitude 58°15' N Longitude 125°17' W

FOR

ZENITH MINING CORP. LTD. (NPL)

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 2923 MAP .....

BY

L. L. Storey, Geologist
F. B. Stokes, P.Eng.

STOKES EXPLORATION MANAGEMENT CO. LTD.

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ILLUSTRATIONS AND MAPS

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INTRODUCTION

From July 1, 1970 to August 25, 1970 a 5 man team of field personnel carried out a photogeological, geological and intense surface prospecting program on the 'A' group of claims owned by Zenith Mining Corp. Ltd. (NPL) and located in the Liard Mining Division, British Columbia. The period of field work represents 37 man days while airphoto interpretation represents 5 man days. This report is a compilation of the data obtained from these various work programs. The purpose of the programs was to evaluate the economic potential of the property.

GENERAL

The 'A' group of claims is situated in one of the most active areas of mineral exploration in the province of British Columbia. The property is located some 100 miles WSW of Fort Nelson in the Churchill Peak area, a region which has a number of proven copper veins. A total of over 100 copper occurrences have been located to date, including those of Churchill Copper

Corp. Ltd., Windermere Exploration Ltd., Copperline Mines Ltd., Braiorne Pioneer Mines Ltd., and others.

Churchill Copper Corp. Ltd. has a 1000 TPD mill in operation and nearby Deavis-Keays is going ahead with construction, on a feasibility report recommendation for a 1000 TPD mill. Both ore bodies are in the range of 2,000,000 tons of proven ore grading 3% to 5% copper.

Windermere Exploration Ltd., adjacent to the subject property, is presently continuing an exploration and assessment program on the Bronson Vein, one of the company's 10 holdings in the area.

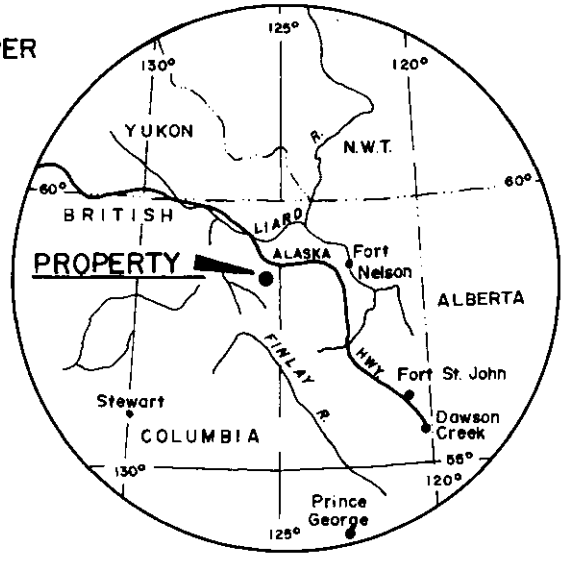
Copperline Mines has discovered 3 veins within a width of 100 feet. The ore grades from 1% to 6% copper with associated silver values. The company is carrying out a trenching program to further expose vein structures.

Zenith Mining Corp. Ltd. property is located in the immediate area of Windermere Exploration Ltd. and Copperline Mines Ltd.

125° 17'

DAVIS – KEAYS
20 miles

CHURCHILL COPPER
15 miles



A 333	A 334	A 23	A 24	A 99	A 100	A 347	A 348	A 367	A 368
A 331	A 332	A 21	A 22	A 97	A 98	A 345	A 346	A 365	A 366
A 329	A 330	A 19	A 20	A 95	A 96	A 343	A 344	A 363	A 364
A 327	A 328	A 17	A 18	A 93	A 94	A 341	A 342	A 361	A 362
A 325	A 326	A 15	A 16	A 91	A 92	A 339	A 340	A 359	A 360

58° 15'

58° 15'

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2923 MAP #1

ZENITH MINING CORP. LTD
LOCATION MAP
LIARD MINING DIVISION
FORT NELSON AREA, B.C.

SCALE 1"=4000'

125° 17'

CLAIMS

Zenith Mining Corp. Ltd. (NPL) owns 50 contiguous claims in the Liard Mining Division, British Columbia. The following is a list of these claims with their respective record numbers and record dates:

Claim No.	Record No.	Record Date
A 15 - 24	43131 - 43140	March 19, 1970
A 91 - 100	43207 - 43216	March 19, 1970
A 325 - 334	43441 - 43450	March 19, 1970
A 339 - 348	43455 - 43464	March 19, 1970
A 359 - 368	43475 - 43484	March 19, 1970.

Witness posts were used in may instances to claim areas which, because of adverse topographic and climatic conditions, were inaccessible during the period of staking.

LOCATION AND ACCESS

The claim group is located some 100 air miles WSW from Fort Nelson, British Columbia near Churchill Peak. Co-ordinates of the property are 58°15' N Latitude and 125°17' W Longitude. It is accessible by helicopter from either Mile 442 or Mile 392 on the

Location and Access (Cont'd)

Alaska Highway. At these two points lodging can be obtained. An alternative route is offered via a secondary road branching from Mile 401, Alaska Highway, to an airstrip near the mill site of Churchill Copper Corp. Ltd. A helicopter can be taken from the Churchill airstrip to the property, a distance of some 20 miles. Copperline Mines Ltd. plans to improve their extension of the Churchill road which will shorten the air distance. Okanagan Helicopter Co. Ltd. has a base located at the Fort Nelson Airport. Flying time from Fort Nelson to the property is approximately one hour in a Bell 206A Jet Ranger, 5 place turbine helicopter. It should also be noted that a light plane airstrip could be easily built and maintained on the glacial wash 3 miles north-northwest of the property. The rocks here are relatively small in size and a D4 'Cat' would have no trouble building an airstrip. The shaley glacial debris froms a very solid base easily capable of supporting medium weight aircraft of DC3 size equivalent.

CLIMATE

The climate of the area is sub-arctic. This climatic

Climate (Cont'd)

belt is characterized by relatively short summers and long cold dry winters. January, the coldest month, has a mean minimum temperature of 55° below zero while July, the hottest month, has a mean monthly temperature of 60°F with maximum around 95°F. Freeze-up commences in mid-October and break-up begins in late April, limiting the field season to just over 4 months. It is noteworthy that snow fell 3 times at an elevation of 5,000 feet during the month of July, 1970. These 3 inch falls, however, melted within a day. Precipitation ranges from 12 to 20 inches and snowfall totals 4 to 5 feet per year.

VEGETATION

Timberline in the area ranges from 4500 feet to 5000 feet ASL. Thus trees are confined to the low lying areas of streams and glacial valleys. The vegetation is mixed, with alpine fir, balsam fir and spruce being dominant. Dwarf birch is the principal shrub and inhabits the lower reaches of talus slopes and wash-outs. Above timberline, alpine moss, grass and flowers

Vegetation (Cont'd)

grow. The Zenith Mining Corp. Ltd. property is almost entirely above treeline.

TOPOGRAPHY

The property lies in the westernmost, sub-province of the Rocky Mountains physiographic belt, the Sentinel Range. This range trends NW to SE, extending from Muncho Lake to Tuchodi Lake, a length of 75 miles and a width of up to 30 miles. The Sentinel Range terminates to the west at the Gataga River which marks the limit of the Rocky Mountains. High peaks are common in the surrounding areas. Churchill Peak, the highest in the area, rises to over 9000 feet ASL. Elevation on the property range from 5000 feet ASL to 8000 feet ASL. There is much evidence of Pleistocene glaciation and some small hanging glaciers still remain. Some prominent glacial features noted in the region include U-shaped valleys, cirques, aretes, hanging valleys and glacial sediments. Glaciotalus debris fills much of the valley floors, the lower slopes are talus covered and the upper slopes are steep with many vertical cliffs.

PHOTOGEOLOGY

An airphoto interpretation program was carried out in conjunction with geologic mapping and surface prospecting. The study searched for zones of weakness and dyke formation as economic copper deposits are related to them. Such zones were evaluated in the field. Air photograph interpretation is reliable due to the almost entire absence of vegetation on the steep mountain sides and the distinct lithologic expression of the various rock units.

REGIONAL GEOLOGY

All rock exposed in the Sentinel Ranges is of sedimentary origin except for the basic dykes which intrude only the oldest (Proterozoic) strata. The meta sedimentary sequence exposed trends N to NNW and ranges in age from Late Precambrian to Early Ordovician. The Proterozoic units in the area consist of thinly bedded, often slatey cleaved, medium to dark grey-black, calcareous shales and siltstones. These strata are cut by grey-green diabase dykes, which average 15 feet thick but occasionally exceed 50 feet in width. Overlying these

Regional Geology (Cont'd)

units are Paleozoic sediments of Early Cambrian Age. These are characterized by brown weathering conglomerates, sandstones and shales with thick lenses of impure limestone. These sediments, which are not cut by dykes, strike approximately N to NNW with a shallow westerly dip. They form an angular unconformity with the underlying Proterozoic strata. Units younger than Lower Cambrian were not exposed in the project area. The Proterozoic strata in the region studied consists of three sub-parallel zones with a general NNW trend.

Only the western and central Proterozoic zones were examined but it is assumed that the eastern zone is similar. The two zones were examined in varying detail with the western one receiving most work. It was found to be overlain by unconformable Paleozoic sediments on the west and bounded by a thrust fault on the east. To the east of this thrust fault Paleozoic sediments were again exposed and noted to be unconformably overlying the Proterozoic sediments of the centre zone.

Regional Geology (Cont'd)

The three zones of Proterozoic sediments are characterized by the presence of sub-parallel basic igneous dykes and related quartz-carbonate veins, which cut them but not younger sediments. The most western zone trends along the west side of the Toad River and continues south through the Fortune Channel property, and also Windermere's Bronson property.

The centre zone contains the mines of Churchill Copper Corp. and Davis-Keays Mineral Co. and also Copperline Mines main property. This zone crosses the Alaska Highway at Mile 436. The eastern zone was not examined but is assumed to be similar.

The dykes have been noted to strike in two directions, northwest and northeast, with the northwesterly trend far more common, and on occasion dyke intersections are observed. These intrusions often have reported strike lengths of over three miles. The dykes average 15 feet wide and dip vertically or steeply to the west,. As mentioned earlier, the dykes cut only the Proterozoic

Regional Geology (Cont'd)

and not the younger sediments. The presence of dykes is the main criterion for recognition of the favourable Proterozoic units in airphoto studies and preliminary reconnaissance.

The dyke contact with the country rock is generally sharp and there is little evidence of contact metamorphism. Rock alteration from dyke emplacement is generally restricted to those dyke contacts where shearing and brecciation are in evidence. The wall rocks may become siliceous, talcose, serpentinized and show calcite remobilization.

Of economic importance is the copper mineralization found in quartz carbonate veins and vein systems which are associated with the dykes. In these veins, the copper minerals are usually chalcopyrite, with minor bornite. Secondary malachite and azurite were observed in weathered surface zones. The carbonate in the mineralized veins is generally ankerite. Although minor copper occurrences have been noted in lower Paleozoic strata, all major quartz-carbonate veins are related to basic igneous dykes which only cut the Proterozoic units.

Regional Geology (Cont'd)

This fact was used as a basis for efficient prospecting. The results of detailed prospecting on this basis showed that all major dyke systems have related copper mineralization although it was often only in very sub-economic occurrences. The dykes and vein systems have similar attitudes which are constant in certain parts of the area examined.

The dykes and veins follow similar zones of weakness in the sediments and are approximately contemporaneous in deposition with the dykes, perhaps predating the veins. The zones which were easily intruded by the dykes also provide channelways for the copper bearing quartz-carbonate solutions. The more important deposits show evidence of shearing and brecciation, indicating that the dykes although not much older than the veins, probably enhanced the channelways and thus indirectly localized the major deposits. The important deposits of the area are in relatively advanced shear zones associated with dykes and, therefore, likely persist to considerable depth. The zones observed are extremely variable in width over short distances. Thus the search for length potential is the major factor in exploration and length potential is far moresignificant than the width in evaluating any particular showing.

PROPERTY GEOLOGY

The 'A' Block of mineral claims lies in a geologically interesting but economically unfavourable environment. Paleozoic formations, which are economically unfavourable, cover most of the property including Churchill Peak. The more promising Proterozoic formations are found only on the western edge of the property.

Thirteen different lithologic units were identified within the Paleozoic (Early Cambrian) exposures on the property. In stratographic succession the beds include:

Formation	Lithology	Approximate thickness in feet
Siltstone	light green, thin laminae friable, hematite stained slightly calcareous	200 - 300
Pebble Breccia	calcareous cementing, hematite stained, siltstone angular pebbled	200 - 300
Limestone	grey, well weathered dendritic manganese patterns	200 - 300
Quartzite	massive, fine grained white, feldspathic	300 - 400
Arkose	hematitic, siliceous, fine grained, minor quartz stringers	200

Property Geology (Cont'd)

Formation	Lithology	Approximate thickness in feet
Pebble Conglomerate	calcareous cementing calcareous siltstone pebbles	400 - 500
Siltstone	black grey, nodular calcarous, massive	600 - 700
Sandstone	brown, calcareous cement siliceous feldspathic fine grained	400 - 500
Siltstone	fine grained, rusty weathering siliceous cement.	200 - 300
Siltstone	dark grey to black, nodular calcareous, massive	400 - 500
Siltstone	massive, grey to white, siliceous, rusty, weathering, grading to quartzite	1000 - 1500
Dolomite	massive rusty weathering, white, calcite	500 + ?
Shale	black grey, blocky, slightly calcareous	1000 +

The majority of the Paleozoic strata strikes N and dips from 20° to 30° in a westerly direction. No evidence of fossils was encountered while traversing these sediments. The Cambrian basement was located approximately 2000 feet east of the 'A' claims.

Property Geology (Cont'd)

At this point the Paleozoic formations unconformably overlay the Proterozoic formations.

Proterozoic sediments are found again on the western edge of the property. These are the sediments which are favourable to dyke and mineralized vein intrusions. The dykes cut through only Proterozoic formations and truncate against the Paleozoic. The Precambrian sediments were mainly calcareous shales. They were thin bedded dark grey and fine grained. A thin bed of calcareous cemented conglomerate is located, as is a thin bed of feldspathic quartzite, on the mountain peak which borders the property. These appear to be intraformational lenses. Basic igneous dykes were not found to intrude the claim group. However, several dykes were seen to the west of the claims. A zone of quartz-carbonate stringers were found in the area of claims A329 to A332. Some of these stringers were mainly calcite. The average width of the stringers was 2 inches with some as large as 5 inches. No mineralization was found associated with these veinlets.

Trending N 35° W centrally through the property is a

Property Geology (Cont'd)

major thrust fault. This fault has caused the older Proterozoic formations to be uplifted and thrust over later era Paleozoic sediments. No lateral movement features were observed. This fault begins in the Toad River, passes on the west side of Churchill Peak and continues into the Gataga River. Deep talus and glacial wash covers the actual fault zone, therefore, it could not be examined in detail. Steep dips (50° - 80°) and fracturing were common to outcrops near the fault zone. To the north and south of the property some characteristic features of thrust faults, drag folds and highly folded sedimentary beds were found.

SUMMARY

The 50 claims of Zenith Mines Ltd. (NPL) are located in an area of known copper vein properties such as Windermere Exploration, Churchill Copper, Davis-Keays and Copperline Mines. Structurally the property is located along a Proterozoic meta-sedimentary fault block trending NNE. The formations within this block strike north-south and dip gently to the west. The sediments are relatively unfolded shales, mudstones and argillites which gives good depth potential to any vein system.

SUMMARY (Cont'd)

The mineral deposits of the area are all of the same general type, that is, quartz-carbonate fissure veins which carry scattered and bleby copper in the form of chalcopyrite. All the mine-making copper mineralization occurs in veins in Proterozoic sediments. In almost all instances, green-brown diabase dykes attend or are intimately related to the veins. The property is in an area of positive economic potential. However, as most of the claim block is composed of Paleozoic sediments, no evidence of economic copper mineralization was found.

RECOMMENDATIONS

At present, no economic size ore zones have been discovered on the property. Work programs have been suspended. Prior to the expiry date of the claims it is recommended that a reappraisal of results be made, reviewing work programs carried out on surrounding properties. This information may delineate areas on the subject property which warrant further investigation.

Respectfully submitted:

L.L.Storey, B.Sc.
Project Geologist

R. B. Stokes, P.Eng.

September 23, 1970.

REFERENCES

Bell, R. T. (1968) Proterozoic Stratigraphy of Northeastern British Columbia. Geological Survey of Canada Paper 67 - 68

Carr, J. M. (1970) Personal Communication.

Keays, R. (1970) Personal Communication.

McLearn and Kindle (1950) Geology of Northeastern British Columbia, Geological Survey of Canada, Memoir 259.

Vail, J. R. (1957) Geology of the Racing River Area, British Columbia. Unpublished Master's Thesis, University of British Columbia.

CERTIFICATION

I, RONALD B. STOKES, do hereby certify that:

1. I am a practicing Professional Mining Engineer with offices at Suite 213 - 678 Howe Street, Vancouver 1, British Columbia and resident of Vancouver.

2. I am a graduate of Camborne School of Mines, Cornwall, England, 1952.

3. I have practiced Mining Engineering and Mining Exploration for eighteen years, fifteen of which were based in British Columbia.

4. I am a Member, in good standing, of the Association of Professional Engineers of the Province of British Columbia.

5. I am a Member of the Canadian Institute of Mining and Metallurgy and Associate Member of the Institution of Mining & Metallurgy, England, and the Australasian Institute of Mining & Metallurgy.

6. This report is based on study and interpretation of data assembled by personal examination on the property and work carried out under my supervision.

7. I have no direct, indirect or anticipated interest in Zenith Mining Corp. Ltd. (NPL).

R. B. Stokes, P.Eng.

September 23, 1970.

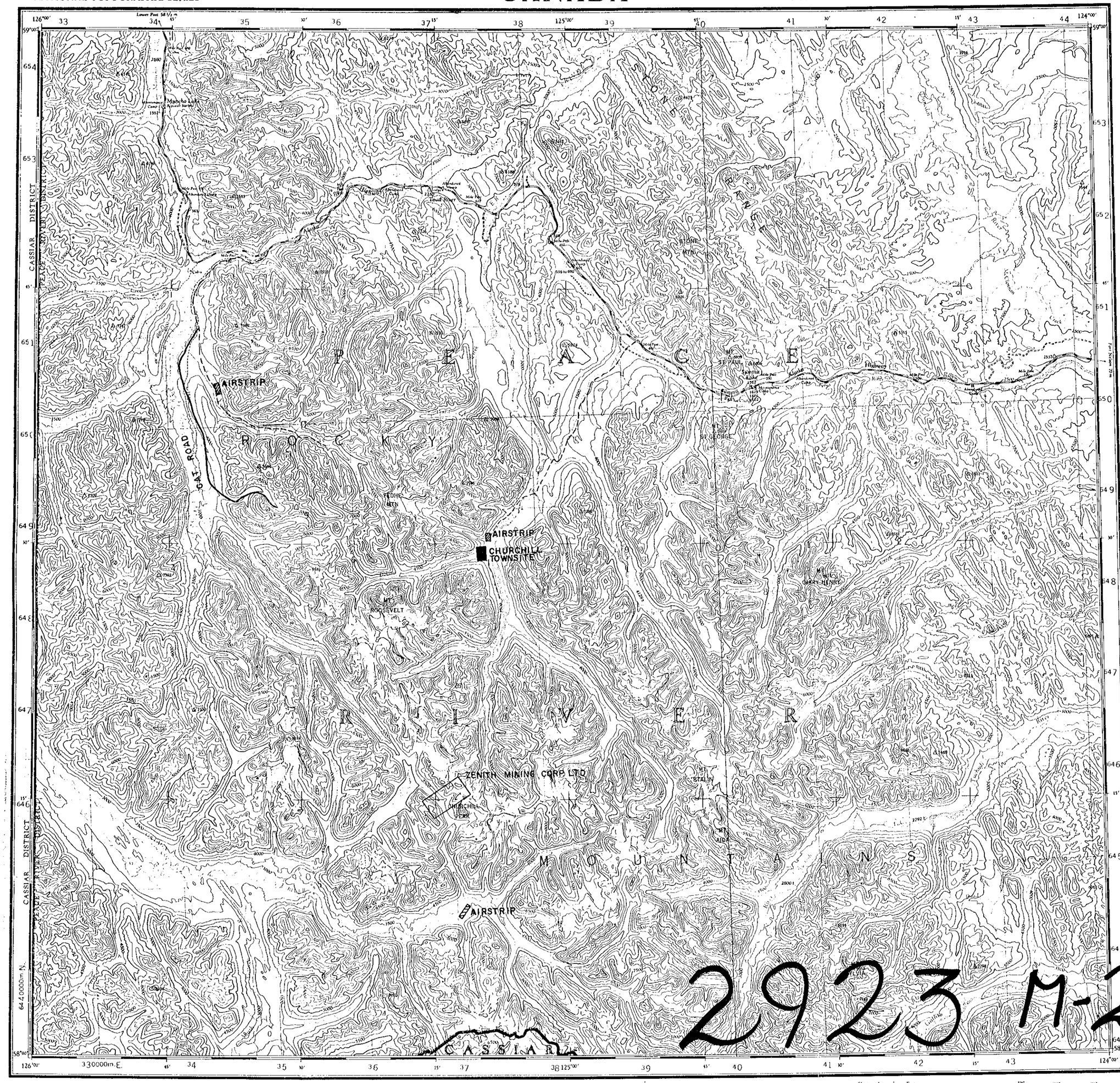
NATIONAL TOPOGRAPHIC SERIES

CANADA

FIRST EDITION

Refer to this Map as: 94 K EDITION 1 ASE SERIES A 502

CANADA SHEET 94 K



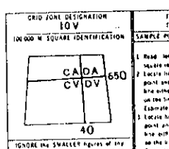
ZENITH MINING CORP. LTD. (NPL)

Location Map
'A' Claims

LIARD MINING DIVISION

Sept. 23, 1970

GRID ZONE DESIGNATION 10V
100 000 m SQUARE IDENTIFICATION



IGNORE the SMALLEST figures of any grid number (these are for finding the fine coordinates). Use ONLY the LARGER figures of the grid number, example 330000m.E.

TO GIVE A STANDARD REFERENCE ON THIS SHEET TO NEAREST 1 000 METERS

SAMPLE POINT HORIZONTAL CONTROL

1. Read letters identifying 100 000 meter square in which the point lies.
2. Locate two VERTICAL grid lines to LEFT of point and read LARGE figure following the line either at the top or bottom margin, or on the line itself.
   Estimate tenths from grid line to point.
3. Locate two HORIZONTAL grid lines BELOW point and read LARGE figure following the line either in the left or right margin, or on the line itself.
   Estimate tenths from grid line to point.

	CV
	8
	5
	8
	9

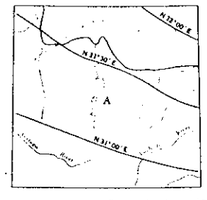
SAMPLE REFERENCE: CV 85 89

If reporting beyond 10° in any direction, prefix Grid Zone Designation as: 10V CV 8589

TEN THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 10

2923 M-2

THE DECLINATION OF THE COMPASS NEEDLE, 1954



The declination of the compass needle at any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighbouring red lines; thus at the place marked A, the declination is between N. 31° E. and N. 31° 30' E. The easterly declinations of the compass needle are decreasing 3 minutes annually.

Surveyed, compiled, drawn and printed by the ARMY SURVEY ESTABLISHMENT R.C.E., 1949-54
Aerial photography by the R.C.A.F. 1948

Universal Transverse Mercator Projection.

REFERENCE

Road, Hard Surface, All Weather	More than 2 Lanes / Four No. 1 Lanes
" Loose Surface, All Weather	2 Lanes Wide or More
" " Less than 2 Lanes	All Weather / Dry Weather
Cart Track, Trail	Cart Track / Trail
Railway, Multiple Track	
" Single Track	
Boundary, International	
" Province or State	
" County or District	
" Reservations, Indian, Military, etc.	

TUCHODI LAKES

BRITISH COLUMBIA

Scale 1 : 250,000
1 Inch to 4 Miles Approximately

Miles 5 0 5 10 15 20 Miles
Kilometres 5 0 5 10 15 20 25 30 Kilometres

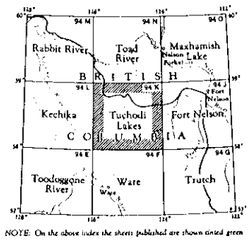
Copies may be obtained from
The Map Distribution Office,
Dept. of Mines and Technical Surveys,
Ottawa.

Contour Interval 500 Feet
All Elevations in Feet above Mean Sea Level.

North American Datum 1927
Preliminary 1951

REFERENCE

Horizontal Control Point	Spot Elevation, in feet 124
Contours, Elevation	Forest, undefined
" Depression	Swamp or Marsh
" Approximate	
Glacier or Snowfield	W.L. 125
Stream, Intermittent	Ferry / Mud / Sand
Dam / Falls	Lighthouse
Airfield: on Land ... Wat'r ...	Landing Ground, Anchorage
Power Transmission Line	



NOTE: On the above index the sheets published are shown tinted green

TUCHODI LAKES
SHEET 94 K
FIRST EDITION

PROTEROZOIC SEDIMENTS

PALEOZOIC SEDIMENTS

SNOW

FIELD

GLACIER

STRINGER

QUARTZ CARBONATE ZONE

SNOW

SLOPE

TALUS

TALUS & GLACIAL WASH

W.P

W.P

A-137

A-1371

Dark grey shale (blocky)

Green grey shale (highly fractured)

MORRAINE

MORRAINE

GLACIAL MORRAINE

SNOW FIELD

7500

7000

6500

6000

8000

LEGEND

PALEOZOIC

- Friable green siltstone (hematite stained)
- Pebble breccia (hematite staining, calcareous)
- Impure limestone (manganese dendrites well weathered)
- Fine grained quartzite (feldspathic)
- Hematitic arkose (minor qtz-carbonate stringers, siliceous cement)
- Pebble conglomerate, calcareous cement.
- Nodular siltstone, calcareous, dark grey.
- Sandstone, grey brown, fine grained, calcareous
- Siltstone (silica cement, hematite stained)
- Siliceous siltstone and quartzite (calcareous cement)
- Dolomite
- Shale (black to grey)

PROTEROZOIC

- Black to grey shales (fractured near fault zone, some quartz-carb. stringers to 4")
- Pebble conglomerate (thin bed)
- Feldspathic quartzite (fine grain)
- Thrust fault
- Outcrop pattern
- Talus boundary
- Bedding attitude
- Creek

MAP TO ACCOMPANY
GEOLOGICAL REPORT
ON THE
"A" CLAIM GROUP
LIARD MINING DIVISION
by
L.L.STOREY, Geologist
R.B.STOKES, P.Eng

M-3

2923

ZENITH MINING CORP. LIMITED

GEOLOGIC PLAN OF 'A' GROUP

LIARD MINING DIVISION

STOKES EXPLORATION MANAGEMENT CO. LTD

SCALE — 1"=1000 Ft

DATE — Sept 23, 1970