

2888

A GEOLOGICAL REPORT

ON THE

"ANDREW" GROUP OF MINERAL CLAIMS

LIARD MINING DIVISION, B.C.

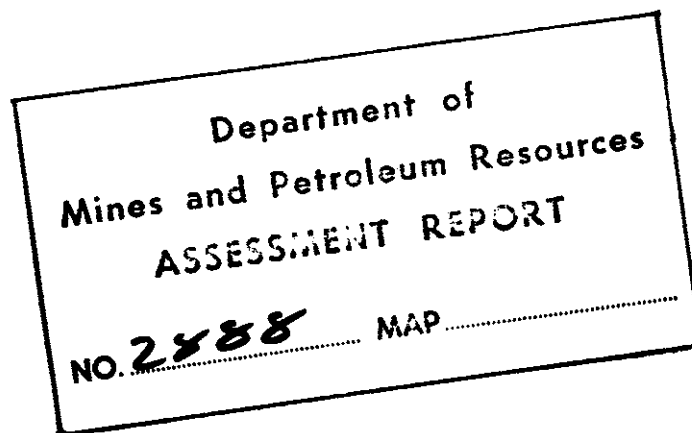
Latitude 58° 10' N

Longitude 125° 19' W

FOR

94K / 3E

ACROLL OIL AND GAS LTD.



BY

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

STOKES EXPLORATION MANAGEMENT CO. LTD.

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INTRODUCTION

From August 1, 1970 to August 15, 1970 a 5 man team of field personnel carried out a photogeological, geological and intense surface prospecting program on the "ANDREW" group of claims owned by Acroll Oil & Gas Ltd. and located in the Liard Mining Division, British Columbia. The period of field work represents 35 man days while airphoto interpretation represents 3 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 "ANDREW" 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 deposits. A total of over 100 copper occurrences have been located to date, including those of Churchill Copper Corp. Ltd., Davis-Keays Mining Co. Ltd., Windermere Exploration Ltd.,

General (Cont'd)

Copperline Mines Ltd., Bralorne Pioneer Mines Ltd. and others.

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

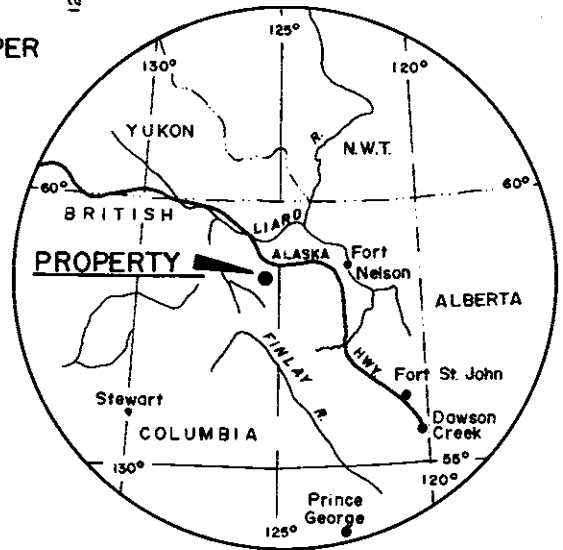
Windermere Exploration Ltd., adjacent to the subject property, is presently continuing an exploration and evaluation program on the Bronson Vein, one of the company's 10 holdings in the area.

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 and assess vein structures.

The Acroll Oil & Gas Ltd. property is located in the immediate area of Windermere Exploration Ltd. and Copperline Mines Ltd.

↑
DAVIS- KEAYS
20 miles

↑
CHURCHILL COPPER
15 miles



ANDREW
GROUP
↙

9	10	29	30	49	50
7	8	27	28	47	48
5	6	25	26	45	46
3	4	23	24	43	44
1	2	21	22	41	42

58° 08'

58° 08'

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2888 MAP # 1

ACROLL OIL & GAS LTD
LOCATION MAP
LIARD MINING DIVISION
FORT NELSON AREA, B.C.

SCALE 1"=4000'

SEP 30 1970

125° 13'

CLAIMS

Acroll Oil & Gas Ltd. has 30 contiguous mineral claims in the Liard Mining Division, British Columbia. The following is a list of these claims with their respective record numbers and record dates:

<u>Claims</u>	<u>Record No.</u>	<u>Record Date</u>
ANDREW 1 - 10	42205 - 42214	March 9, 1970
ANDREW 21 - 30	42225 - 42234	March 9, 1970
ANDREW 41 - 50	42245 - 42254	March 9, 1970

Witness posts were used in many instances to claim favourable areas which were, because of topography and climatic conditions, 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. Coordinates of the property are 58°10' N latitude and 125° 19' W longitude. Usual access is by helicopter from either Mile 442 or Mile 392 on the 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

Location and Access (Cont'd)

mill site of Churchill Copper Corp. Ltd. A helicopter can be taken from the Churchill air strip 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 air strip has been built on a glacial wash on the Gataga River on the eastern portion of the property. The strip is presently 500 feet long but an extension to 1500 feet would not be difficult. The rocks here are relatively small in size and a D4 "Cat" would have no trouble building an air strip. The shaley glacial debris forms a very solid base easily capable of supporting medium weight aircraft of EC3 size equivalent.

CLIMATE

The climate of the area is sub-arctic. This climatic belt is characterized by relatively short summers and long cold dry winters. January, the coldest month, has a mean

Climate (Cont'd)

minimum temperature of 55° below zero while July, the hottest month, has a mean monthly temperature of 60° F. with a 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 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 which inhabits the lower reaches of talus slopes and washouts. Above timberline, alpine moss, grass and flowers grow on the more gentle slopes.

TOPOGRAPHY

The property lies in the westernmost, sub-province of the

Topography (Cont'd)

Rocky Mountains physiographic belt, the Sentinel Ranges. This range trends NW to SE, extending from Muncho Lake into Tuchodi Lake, a distance of 75 miles with a width of up to 30 miles. The Sentinel Range terminates in the west in Gataga River which marks the limit of the Rocky Mountain Ranges. High peaks in the surrounding area are numerous. Churchill Peak, the highest, rises to over 9000 feet ASL. Elevations on the property range from 4500 feet ASL to 8000 feet ASL. There is much evidence of Pleistocene glaciation and some small hanging glaciers still remain. Some prominent characteristic glacial features noted in the region were U-shaped valleys, cirques, aretes, hanging valleys and many glacial sediments. Glacial debris fills most of the valley floors, the lower slopes are talus covered and the upper slopes are steep with many vertical cliffs.

On the Acroll Oil & Gas Ltd. property deep glacial debris of the Gataga River bed covers a large portion of the property. The Gataga River here is relatively slow running and very dirty. The river here is generally too deep to cross in the area of the property, but can be

Topography (Cont'd)

forded a mile or two upstream where it spreads out of its channel to form a braided stream. In that area it is possible to cross at most times without going into water over 3 feet deep.

PHOTO GEOLOGY

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 investigated and assessed 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 the rocks exposed in the Sentinel Ranges are 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.

Regional Geology (Cont'd)

The Proterozoic units in the area consist of thinly bedded, often slaty cleaved, medium to dark grey-black, calcareous shales and siltstones. Minor fine grained sandstone lenses are sometime present. These strata are cut by grey diabase dykes, which average about 15 feet thick but may exceed 50 feet widths in some areas. Overlying these 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 are not cut by dykes and 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 subject areas. 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

Regional Geology (Cont'd)

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.

The three zones of Proterozoic sediments are characterized by the existence of sub-parallel basic igneous dykes and related quartz-carbonate veins, which cut them but not the younger sediments. The most western zone trends along the W 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. On occasion, dyke intersections were

Regional Geology (Cont'd)

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 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, serpentized 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 mineral is usually chalcopyrite with minor bornite, secondary malachite and azurite are seen 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 zones 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 shear zones associated with dykes and therefore, likely persist to considerable depth. The zones are observed to be extremely variable in width over short distances. Thus the search

Regional Geology (Cont'd)

for length potential is the major factor in exploration and length potential is far more significant than the width in evaluating any particular showing.

PROPERTY GEOLOGY

The "ANDREW" claims lie in a highly favourable geologic environment. All the sediments recorded were of Proterozoic age and mainly of calcareous dark grey siltstone and shale. Although glacial debris covers nearly one-quarter of the property, sufficient geological data was obtained to extrapolate the geology through this glacial area. The sediments are thinly laminated and are fine grained. The strata strike N - S and dip gently to the west. Dip ranged from 5° to a maximum of 30° in a westerly direction. The sediments were siliceous with calcareous cementing in most parts of the property. No evidence of fossils was noted on the property.

Several basic dykes were noted to cut through the property. They were all nearly vertical and striking approximately north and south. Augite and plagioclase make up the main portions of the diabase dyke composition.

Property Geology (Cont'd)

Biotite, pyrite and magnetite are also evidenced in varying amounts. In places, weathering of these iron minerals gives a distinctive red brown staining to the dyke rock. Epidote, an alteration mineral, was common to the dykes in zones of shearing. The dykes are much more resistant to weathering than the surrounding calcareous sediments and thus often readily recognizable by their relief. On the ANDREW property which is largely covered by glacial debris, this relief pattern made it possible to trace the dykes down below timberline and find outcrop that would probably have been missed by conventional random traverses.

'In place' mineralization was not located on the property although some highly mineralized float was found in creek A-06 at the south end of the property. The source of this float was found farther upstream on staked ground. Mineralization is also known to occur north of the property on other staked ground. Thus although the property is in a highly favourable area for mineralization the depth of overburden makes exploration too expensive at present.

SUMMARY

The 30 claims of Acroll Oil & Gas Ltd. are located in an area of known copper vein properties such as Windermere Exploration Ltd., Churchill Copper Corp., Davis-Keays Mining Co. and Copperline Mines. Structurally, the property is located along a Proterozoic meta-sedimentary fault block trending NNE. The formations within this block strike N-S and dip gently to the W. The sediments are relatively unfolded shales, mudstones and argillites which give good depth potential to any vein system.

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.

Thus, the property is in an area of positive economic potential because the claims area covers solely Proterozoic formations with several dykes trending NNW through them. However, the depth of overburden on most of the property makes further exploration very expensive and should only

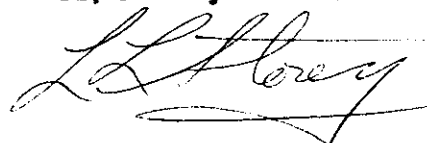
Summary (Cont'd)

be considered if new zones are delineated on surrounding properties. Then a program including an EM survey should be considered to try to locate veins under the overburden.

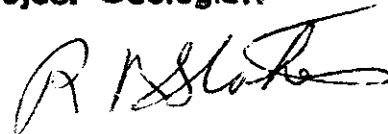
RECOMMENDATIONS

At present, no economic sized 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 re-appraisal of results be made, reviewing the 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 30, 1970.

CERTIFICATION

I, F. 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 Acroll Oil & Gas Ltd.



F. B. Stokes, P.Eng.

September 30, 1970.

REFERENCES

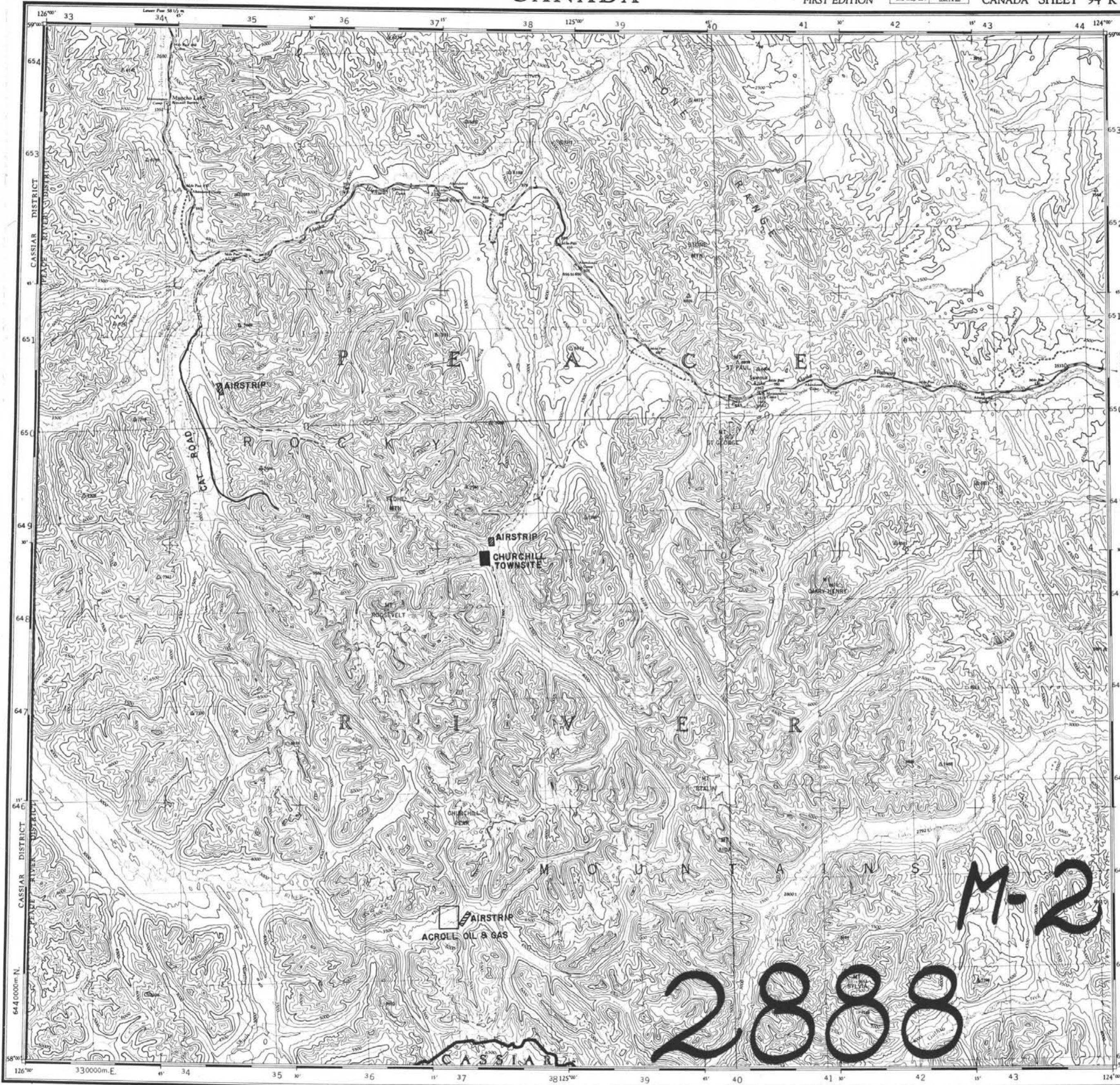
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APPENDIX I

COST BREAKDOWN

1. PAYROLL: Wages & Salaries			
Bilquist, R.	8 days @ \$30.00	\$240.00	
Gallagher, R.	5	22.50	112.50
Sinden, D.	5	22.50	112.50
Carney, F.	5	22.50	112.50
Kenderline, J.	5	22.50	112.50
Storey, L.L.	4	70.00	280.00
Stokes, R.B.	2	100.00	200.00
			<u>1,170.00</u>
WCB, CPP, UIC, fringe benefits			<u>98.70</u>
			\$1,268.70
2. ENGINEERING FEES			212.50
3. TRANSPORTATION			
Helicopter charter			
8 hrs @ \$150/hr plus fuel surcharge			1,298.50
4. CAMP MAINTENANCE			
Groceries, expediting, freight, phone			297.70
5. EQUIPMENT			
Tents, lumber, field supplies, radio rental, etc.			112.80
6. AIRPHOTOS, DRAFTING, MAP REPRODUCTION			182.50
			<hr/>
		TOTAL	<u>\$3,372.70</u>
			<hr/> <hr/>



Department of
Minerals and Petroleum Resources
ASSESSMENT REPORT
No. 2888 MAP *AK*

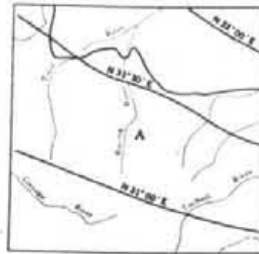
ACROLL OIL AND GAS LTD.
Location Map
"Andrew" Claim
LIARD MINING DIVISION
Sept. 30, 1970

GRID ZONE DESIGNATION		TO GIVE A STANDARD REFERENCE ON THIS SHEET TO RELATED GRID METERS	
10° W	10° V	CADA	CVIDV
40	650	40	650
NOTE: THE SMALLER FIGURES OF GRID NUMBER, WHEN ON THE LEFT OF THE FULL COORDINATE, INDICATE THE FULL COORDINATE OF THE GRID NUMBER.		STANDARD REFERENCE: CV 85 89	

TEN THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 10

TUCHODI LAKES
SHEET 94 K
FIRST EDITION

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 neighboring red lines, those at the lines marked A, the declination is between 30' 31" E and 30' 32" E. The magnetic declination of the compass needle are decreasing 1 minute annually.

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

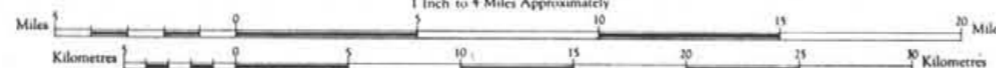
Universal Transverse Mercator Projection

REFERENCE

Symbol	Description	Symbol	Description
—	Road, Hard Surface, All Weather	—	More than 2 Lines, Any No. 2 Lines
- - -	Lower Surface, All Weather	—	2 Lines, Any No. 2 Lines
- - -	Less than 2 Lines, All Weather	- - -	Dry Wash
- - -	Cart Track, Trail	- - -	Cart Track
- - -	Single Track	- - -	Trail
- - -	Boundary, International	- - -	Boundary, Major
- - -	Province or State	- - -	Province or State
- - -	County or District	- - -	County or District
- - -	Reservation, Indian, Military, etc.	- - -	Reservation, Indian, Military, etc.

TUCHODI LAKES
BRITISH COLUMBIA

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

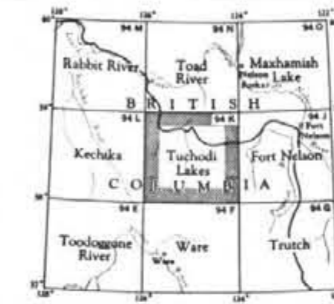


Copies may be obtained from
The Map Distribution Office,
Dept. of Mines and Technical Surveys,
Ottawa.

Contour Interval 500 Feet
All Elevations in Feet above Mean Sea Level
North American Datum 1927
February 1951









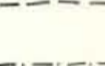
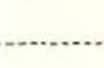


REFERENCE

Symbol	Description	Symbol	Description
—	Horizontal Control Point	—	Spot Elevation, in feet
—	Contour, Elevation	—	Forest, undisturbed
—	Depression	—	Swamp or Marsh
—	Clearing or Open Field	—	W.L. 125
—	Stream, Intermittent	—	Ferry
—	Dam	—	Lighthouse
—	Airfield, on Land	—	Moat
—	Water	—	Shoal
—	Landing Ground	—	Power Transmission Line



NOTE: On the above index the sheets published are shown in red.

LEGEND

-  DIABASE DYKE (pyroxene, amphibole)
-  PROTEROZOIC SEDIMENTS
-  GREEN SILTSTONE (very fine grain)
-  GREY SHALE
-  GLACIAL WASH
-  MINERALIZED (chalcopyrite) QUARTZ-CARB. FLOAT
-  BEDDING ATTITUDE vertical
-  BEDDING ATTITUDE other
-  GEOLOGICAL CONTACT defined
-  GEOLOGICAL CONTACT inferred
-  TIMBER LINE
-  TALUS BOUNDARY

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

ACROLL OIL & GAS LTD

**GEOLOGIC PLAN
OF
ANDREW GROUP**

LIARD MINING DIVISION

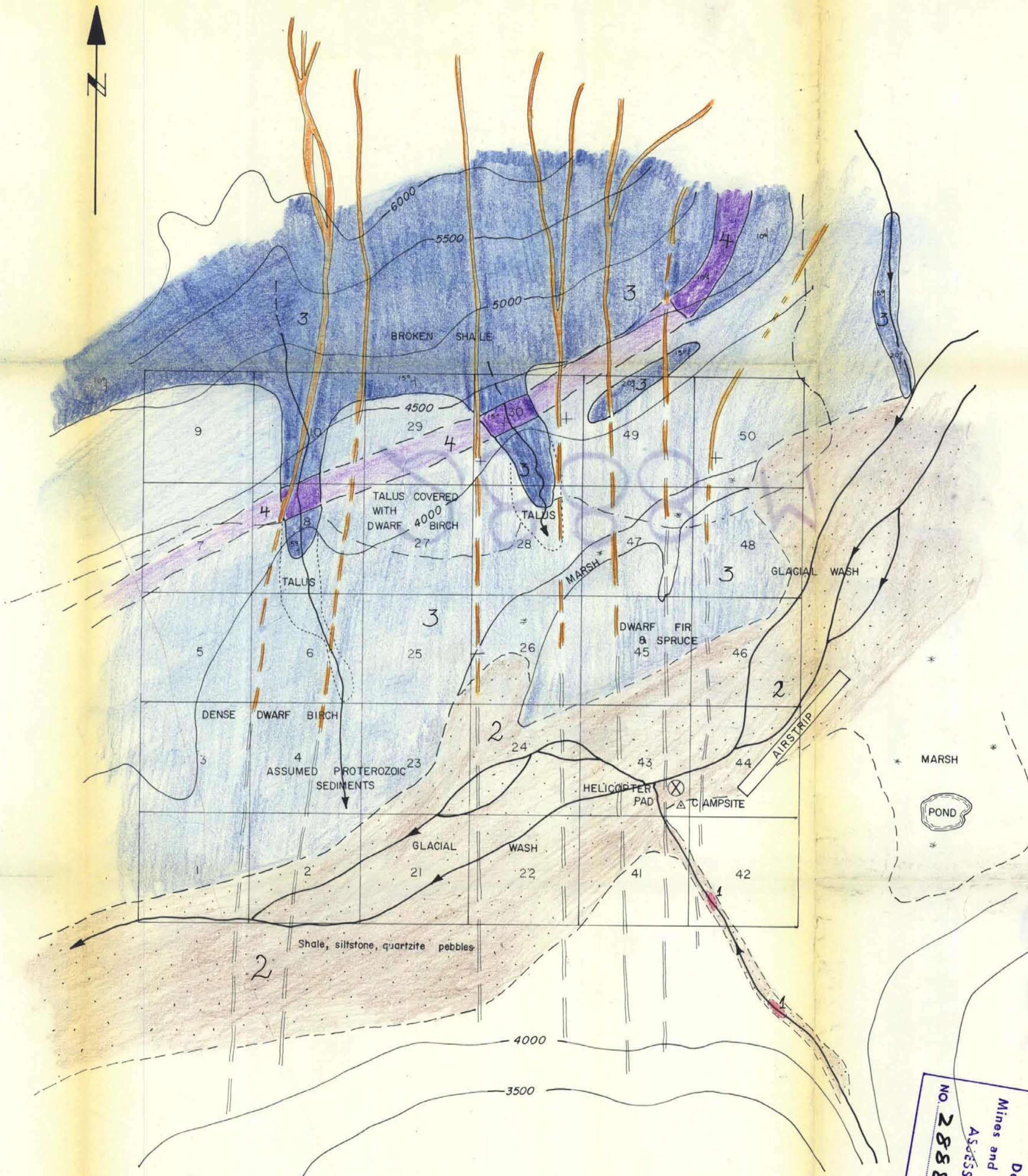
STOKES EXPLORATION MANAGEMENT CO LIMITED

SCALE - 1" = 1000'

DATE - Sept 30, 1970

28888 M-3

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO 2888
MAP #3



R. Stokes