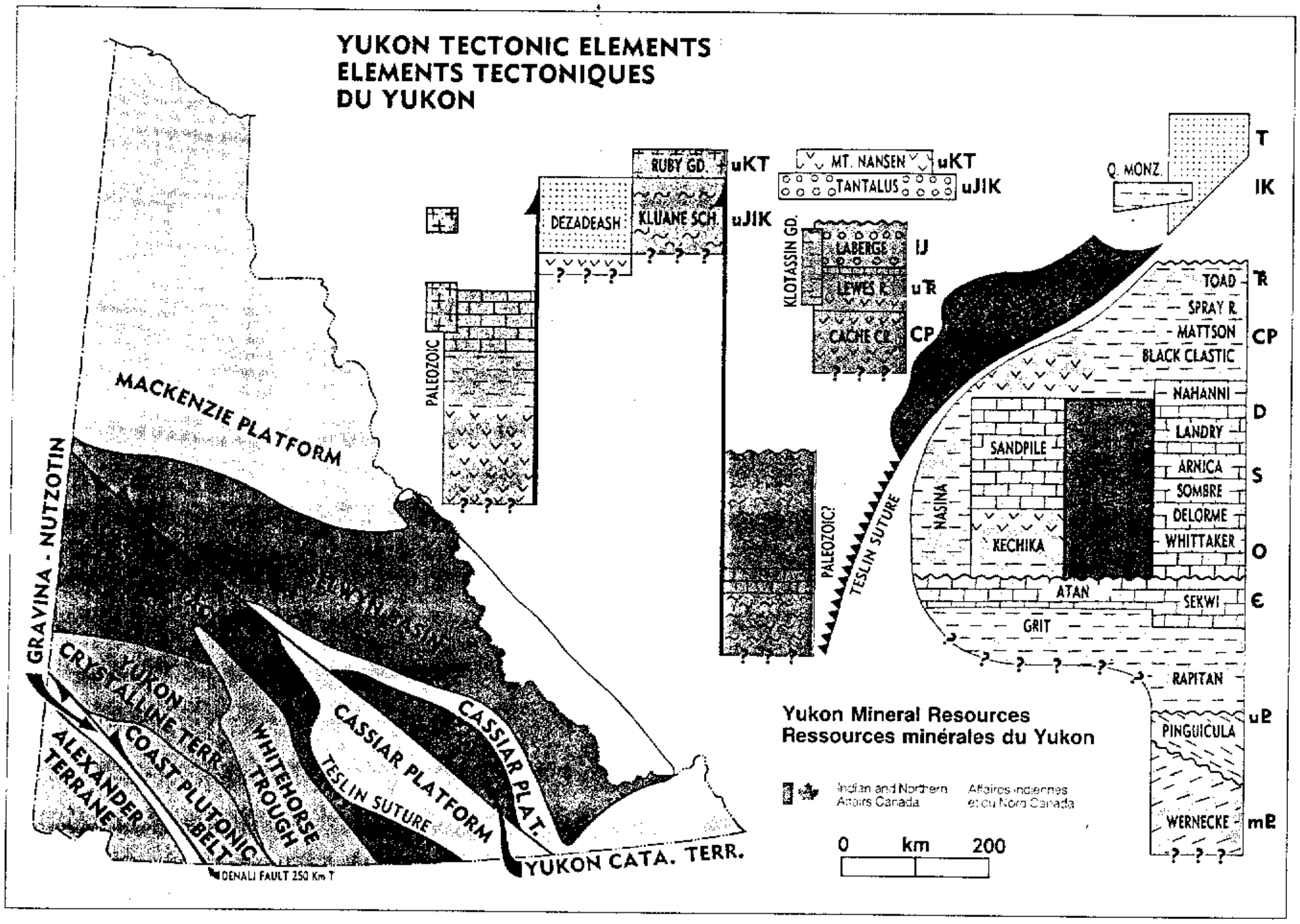
YUKON

GEOLOGY and EXPLORATION 1979-80



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COVER:

An explanation of the cover can be found on pages 8 to 16 of this volume. A postcard of the cover map and diagram is available from the Geology Section at the Northern Affairs office in Whitehorse.

Yukon
GEOLOGY and
EXPLORATION 1979-80

Geology Section
Department of Indian and
Northern Affairs
Whitehorse

PREFACE

This volume follows earlier annual Mineral Industry Reports for Yukon published by the Department of Indian Affairs and Northern Development. In addition to the summaries of work by exploration companies found in those earlier publications this volume contains reports on the geology of mineral deposits and mineral districts under active investigation by Geologists of the Department. This volume further includes a set of maps showing most known mineral occurrences in relation to the mineral and placer claims in good standing with references to descriptions of each occurrence. It is intended to keep these maps up-to-date and to produce them annually as a convenient inventory of occurrences. This volume contains material for two years effectively bringing this report series up-to-date. The new title for the report is intended to more accurately reflect its content.

D. Tempelman-Kluit
Regional Geologist

Whitehorse, July 5, 1981

CONTENTS

YUKON GEOLOGY AND EXPLORATION 1979 AND 1980

Introduction

This volume contains reports by geologists of the Department of Indian and Northern Affairs on the geology of Yukon mineral deposits and mineral districts under active investigation. It also includes summaries of work done in Yukon during 1979 and 1980 by mineral exploration companies. This volume follows earlier annual Mineral Industry Reports for Yukon published by the Department of Indian and Northern Affairs and by the Geological Survey of Canada.

The geological reports present the results of field work done during 1979 and 1980 on projects begun, continued or completed in that time. The aim of these reports is to provide authoritative descriptions of the geology of mineral showings or districts based on first-hand field study. Most of these studies focus on areas of current economic interest, but some concern districts or deposits where geological problems require study. Most reports are by geologists on the Department's staff, but studies by others on contract to carry out specific work, are included. The geological reports are grouped in the first part of this volume and are ordered alphabetically by author. They are a convenient key to the range and nature of the Geology Section's work.

Summaries of exploration work are grouped in the second part of this volume. They are based on reports submitted to the department for assessment credits by exploration companies. Some of these are amplified by replies to questionaires sent to exploration companies by the Geology Section and by responses to enquiries by the staff. Each summary has been edited and approved for publication by the company that filed the work. The emphasis in the summaries is on the nature and the results of work done. References to published descriptions of the geology are included. For new showings, where no description is published a summary based on regional data is given.

The reports and summaries of work done are keyed to a set of maps which are reductions of the 1:250,000 topographic maps of Yukon. The maps show three features in relation to the topography. They include the location of known mineral occurrences with a key naming them. The key also gives the most recent literature reference describing the occurrence. The mineral occurrences are taken from the Yukon Resource Atlas commissioned by the Yukon Territorial Government and have been brought up to date for 1979 and 1980. The maps also show the areas covered by mineral and placer claims in good standing and the areas covered by leases to prospect for placer and coal. Mineral claims staked during 1980 are distinguished from those located earlier to emphasize areas that will focus future exploration. The claim information derives from the maps of the Department of Indian Affairs Supervising Mining Recorder. Finally, the maps indicate the secondary access roads and winter tote trails as shown in the Yukon Resource Atlas with additions from the files of the Land Use Section DIAND. Blue print copies of these maps at 1:250,000 scale are available from the Geology Section.

The maps are ordered according to the National Topographic System and the work summaries and records of new staking also follow this order. Thus each map precedes a section describing 1979-1980 activity within that area. Each report on a property includes the National Topographic System reference number keying it to the relevant 1:50,000 scale map-area. The number beside the NTS relates to the property location on the index map. Latitude and longitude further define the location. The name reported is that given by the original discoverer or staker; it may not match that of the present claims. Repetition of names is avoided by assigning a unique name where the claim name is not diagnostic.

The geological, geochemical and geophysical reports accepted for credit as assessment work by the Department of Indian and Northern Affairs may be of interest to exploration geologists. An index to mining assessment reports, including those that are confidential and those available for inspection, is available from the department. Assessment reports are released for public inspection six months after the claims (on which the work was carried out) have lapsed.

The Geology Section

The Geology Office sells topographic, geological, aeronautical, and land-use maps, as well as Geological Survey of Canada publications, covering Yukon and adjacent parts of B.C., and the N.W.T. A library of G.S.C., B.C. Dept. of Mines, Alaska Bureau of Mines, U.S.G.S. Alaska publications, and geological texts and journals is available for consultation. Open file reports of the Geological Survey of Canada that concern Yukon are available for viewing. Air photos, covering Yukon from (latitude 60°to 65°), are available for use in the office as is the latest catalogue of Yukon air photos from the National Air Photo Library. A current list of good prints of the 1972-1977 satellite (LANDSAT) imagery of the Yukon is included in the Air Photo catalogue. The office also has a LANDSAT mosaic of the Cordillera on display and a collection of colour LANDSAT photos of the Yukon.

The H.S. Bostock Core Library, across the street from the Geology Office, contains drill core from Yukon mining properties. Some core is available for inspection and some is confidential. The core library contains working quarters equipped with diamond saws, a core splitter, a vibrating polisher, rock staining facilities and fume hood. A petrographic microscope, with capability for transmitted and reflected light, and a binocular microscope are also situated in the core library. The Geology Office presently has the following technical equipment: McPhar Spectra 44 (four channel) gamma-ray spectometer, ultraviolet lamps and two GR-101A scintillometers. The equipment and instruments are available for use by industry personnel by arrangement with the core librarian. We have a Spillsbury and Tindall SBX-121 Radiotelephone base station installed in our office to allow radio contact on 4441 MHz during business hours.

The Geology Section staff includes four geologists, an office manager, core librarian and a secretary. Grant Abbott joined the Section as geologist in June, 1980, Virginia Klaver became office manager in September, 1980 and Frank Gish joined us in October, 1980 as core librarian.

Our current staff includes (from left) Dirk Tempelman-Kluit, Regional Geologist; Ruth Debicki, Geologist; Grant Abbott, Geologist; Virginia Klaver, Office Manager; Jim Morin, Geologist; Frank Gish, Map Sales and Core Librarian; Julie Broeren, Secretary (not shown).

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Of the four geologists on our staff, three are concerned with studies of specific areas or deposit types while the regional geologist visits mineral properties under active investigation not examined by the other staff. Grant Abbott mapped the general area of Seagull Batholith to document the geological setting of the tin deposits and skarns found there. This part of the Yukon has become a focus for the search for tin in recent years, but no up-to-date geological map or descriptions of the numerous occurrences were available. Abbott's report on the results of the work is included; he plans to finish this study next summer with one or two weeks of field work. Abbott began work near MacMillan Pass in 1980, and intends to spend most of the summer of 1981 mapping there at 1:50,000 scale to produce a geological map and description with emphasis on the stratabound lead-zinc and barite deposits. Reports on the geology of the Bailey, IVO and Mt. Hundere areas by Abbott are based on work he did before joining the department.

Ruth Debicki produced some of the assessment report summaries in this report and prepared entries for the index to mining assessment reports. She spent several weeks examining placer operations in 1980, and intends to continue this work in 1981 to increase the stratigraphic and heavy mineral data on these deposits. She organized a successful "Placer Mining Forum" in Whitehorse to inform placer miners of new techniques and to promote the exchange of ideas between them.

Jim Morin spent several weeks near Hopkins lake examining skarn occurrences and mapping regionally metamorphosed strata at the edge of the Coast Plutonic Belt. He continued his study of the McMillan or Quartz Lake deposit in Proterozoic strata east of Watson Lake. He further examined a number of Yukon's lode gold occurrences asociated with the Mount Nansen group in the Dawson Range and sampled some of these deposits extensively to study their chemical characteristics. The results of his studies and of two others begun earlier by him are reported herein.

Dirk Tempelman-Kluit spent the summer visiting active properties and supervising the field work of students under contract and employed by the Department. Properties visited include the Holly, Pluto, Clip, Styx, Marn, Jove, Thor, Termuende, Blue Lite, Val, Vera, Craig, Sian, Ray Gulch and Dublin Gulch.

Pam Reid, a Ph.D candidate at University of Miami, completed the first summer of a two year study of the Upper Triassic carbonate buildups in Laberge map-area under the contract to the Department and her report on the season's results is included. Philippe Erdmer, a Ph.D. student at Queen's University, completed his second summer's work mapping the cataclastic rocks of Teslin Suture Zone in detail and reported on the results. Charlie Roots, a graduate student at Carleton University, mapped the geology of Montana Mountain and of the old Conrad mining camp and studied the gold bearing quartz-arsenopyrite veins in the intermediate volcanics of the Mount Nansen Group.

MINERAL PRODUCTION AND EXPLORATION

Mining is Yukon's main industry. During each of 1979 and 1980 three mines produced roughly $300 million of concentrate (gross value). Table I lists the production figures for both years and compares them to equivalent data for 1978. The amount of metal produced over the three years has remained relatively constant, but the value of the product increased substantially because of increased metal prices. The production represents an annual per capita output of roughly $13,000, an order of magnitude above the national average. Tables II, III and IV detail production of Yukon's present operating mines.

Placer gold production, based on royalty returns and expressed as fine grams increased from 581,331 in 1978 to 793,127 in 1979 and 1,646,713 in 1980. The gross value of this production in 1980 amounted to $35 million. The proportion of the contribution to Yukon's mineral output by the placer industry has increased from 1.5% in 1978 to 10% in 1980, a jump of nearly an order of magnitude. Placer production now rivals the gross value of concentrate produced by United Keno Hill Mines.

If producing mineral concentrates is Yukon's first industry, mineral exploration is its second. Expenditures on exploration increased from $18 million in 1978 to $29 million in 1979 and to $36 million in 1980, with an additional $3 million spent in coal exploration during 1980.

During 1978, 9710 mineral claims were staked. In 1979, this rose to 11,223 claims and in 1980 10,892 mineral claims were recorded. Placer claims for the same three years rose from 1,097 to 2,686 to 3,592, and placer leases rose from 222 to 463 to 941 respectively.

Exploration was carried on by many large and small companies in all parts of Yukon. The emphasis in exploration remained with drilling and intensive property evaluation (Table V). Comparatively few companies had the massive reconnaissance programs seen in the mid-seventies. The interest in tin, tungsten and molybdenum continued and the emphasis on uranium exploration of a few years ago has all but disappeared. Copper prospecting remained generally lacklustre with United Keno Hill the notable exception in the Minto area. The long term interest in lead and zinc was strong as in previous years. The most significant change in the exploration pattern was the increased emphasis on precious metals, particularly gold, and much of the work here was focused on the Dawson Range. The most exciting results of exploration in 1980 were the success of Canada Tungsten Mining Corp. Ltd. on Potato Hills and the success of Pan Ocean Oil Ltd. in enlarging reserves on the JASON near MacMillan Pass.

Several companies are proceeding with development or predevelopment work. Cyprus Anvil is bringing the Grum and Vangorda deposits into production and United Keno Hill Mines Ltd. is developing the Venus mine near Carcross. Hudson Bay Mining and Smelting are doing predevelopment underground work on their Tom property near MacMillan Pass. Amax and Logtung Resources are similarly going underground on their Logjam Creek deposit, and at Howard's Pass Placer Development is going underground.

A more comprehensive report of exploration activity entitled "Yukon's Mineral Industry 1980 - An Overview" was published by the Department of Indian and Northern Affairs earlier.

TABLE I

MINERAL PRODUCTION, YUKON TERRITORY

		1978*	1979*	1980*
Gold (lode)	$	7,354,000	5,835,000	19,200,000
grams		1,026,000	523,353	908,550
Gold**(placer)	$	4,167,000	8,819,000	34,799,000
grams*		581,346	790,949	1,646,717
Silver	$	29,405,000	47,713,000	108,725,000
grams		148,000,000	125,172,604	137,565,148
Lead	$	65,466,000	104,625,000	76,636,000
kg		80,643,000	79,744,650	70,154,178
Zinc	$	75,481,000	115,989,000	94,137,000
kg		98,506,000	120,291,108	97,935,887
Cadmium	$	590	------	------
kg		96	------	------
Copper	$	18,066,000	18,670,000	28,504,000
kg		11,012,000	7,931,060	10,879,636
Asbestos	$	32,404,000	Clinton Creek	
tonnes		63,000	Mine closed	
Coal				
tonnes		26,000	25,356	11,634
Gross Value (excl. coal)		232,343,590	301,651,000	362,001,000

*dollar values determined using average metal price during year, according to Canadian Mining Journal figures.

**placer gold production based on royalty paid on crude gold, adjusted to reflect fine gold content.

SUMMARY OF OPERATIONS OF CYPRUS ANVIL MINES LTD.

The company holds some 1600 claims in the Anvil district. Extensive exploration drilling was conducted on several targets in 1979 and 1980. Twenty-eight holes totalling 18,174.2 m were drilled in 1979. Eighteen totalling 14,089.6 m were on the DY deposit. Three totalling 1426.2 m were near the Faro orebody. One, 288.9 m long was on the TIE claims. One, 320.1 m long was on the SEA claims. One, 319.4 m long was on the SB claims, and four totalling 1730.0 m were on the DY claims. Nineteen holes totalling 16,665.1 m were drilled in 1980. Thirteen totalling 12,629.5 m were on the DY deposit. Four totalling 2,728.4 were in the Swim Lakes area. One 825.9 m long was on the JANICE claims, and one 483.3 m long was on the north side of the Anvil Batholith.

Morin et al 1980 (p. 40-41) includes earlier operating summaries.

TABLE II

Anvil Mine:	1978	1979	1980
Tonnes Waste Mined	20,070,405	15,267,893	18,101,034
Tonnes Ore Mined	3,052,695	3,013,160	2,780,085
Tonnes Milled	3,280,000	2,823,827	2,825,108
Daily Average Milled	9,426	8,129	7,723
Mill Heads:			
Lead (%)	3.2	3.3	3.0
Zinc (%)	5.1	5.3	4.5
Silver (gm/tonne)	34.3	-	42.5
Metal Production:			
Lead (kg)	87,849,327	77,017,788	67,941,825
Zinc (kg)	136,348,310	119,911,944	97,522,844
Silver (gm)	66,262,546	41,009,473	71,128,673
Gold (gm)	111,255	30,402	221,111
Metal Sales:			
Revenue from shipments (000's $)	140,221	209,499	199,718
Ore Reserves at year end:			
Tonnes (000,000's)	34.2	32.0	27.3
Lead (%)	3.0	3.1	2.9
Zinc (%)	5.6	4.8	4.4
Silver(gm/tonne)	approx40.0	37.0	35.0

1979 figures adjusted for 29 days' work stoppage.

TABLE III

SUMMARY OF OPERATIONS OF WHITEHORSE COPPER MINES LTD.

	1978	1979	1980
Tonnes Mined	841,406	849,362	778,184
Tonnes Milled	782,992	829,455	772,864
Daily Average Milled (tonnes)	2,194	2,278	2,367
Mill Heads:			
Copper (%)	1.40	1.12	1.58
Gold (gm/tonne)	.75	.58	.86
Silver (gm/tonne)	7.76	6.33	9.48
Metal Production:			
Copper (kg)	9,490,632	7,931,060	10,728,041
Gold (gm)	541,814	492,951	687,439
Silver (gm)	5,524,950	5,255,598	7,473,336
Metal Sales:			
Net Smelter Return ($)	18,000,000	23,500,000	32,000,000
Ore Reserves at year end:			
Tonnes	2,387,462	2,096,525	1,671,051
Copper (%)	1.57	1.50	1.40
Gold (gm/tonne)	.79	.79	.79
Silver(gm/tonne)	7.87	7.87	7.87

1980 Reserves: Other Deposits

	Tonnes	%Pb	%Zn	gm/tonne Ag
Firth-Grum	27,800,000	3.1	4.9	48
(open pit mineable)	(15,600,000)	(3.1)	(5.0)	(47)
Vangorda	6,100,000	3.5	4.6	50
Swim	4,300,000	3.8	4.7	47
DY	14,700,000	5.6	7.1	84

Coal Division:	1978	1979	1980
Waste Mined (tonnes)	--	373,294	83,080
Coal Produced	26,000	25,356	11,634

Underground workings closed May 29, 1978 due to spontaneous heating taking place in old workings. The mine was sealed off.

The company holds some 700 claims in the district. In 1979, twenty-four exploration holes totalling 2820.0 m were drilled. Most of these were on or near the Cowley Park Deposit and resulted in the discovery of the Cowley Park South deposit. Other holes were drilled on the Brown Cub, Kodiak Cub, North Star and Arctic Chief Deposits but only traces of mineralization were intersected.

In 1980, 52 holes totalling 9,372.0 m were drilled. Most were on the Cowley Park South Zone where about 181,818 tonnes of reserves grading 2.3% Cu have been proven. Several narrow good grade zones were intersected on the Arctic Chief Deposit. A 33.9 m intersection on the North Star Deposit grades 0.5% Cu. The intersection is 390 m below surface. A 115 m intersection on the War Eagle deposit grades 0.3% Cu. Holes were also drilled on the Brown Cub, Spring Creek and War Eagle Deposits but only traces of mineralization were intersected.

A report detailing the mining, exploration and geology of the Whitehorse Copper Belt for the period 1967-1980 by Dave Tenney was recently published by D.I.A.N.D. Gregg Morrison completed his thesis at University of Western Ontario entitled "Setting and origin of Skarn deposits in the Whitehorse Copper Belt".

TABLE IV

SUMMARY OF OPERATIONS OF UNITED KENO HILL MINES LTD.

Summary of Production from Keno Hill-Galena Hill Mines:

	1978	1979	1980
Tonnes Mined	127,424	155,361	95,067
Tonnes Milled	81,722	111,685	79,655
Daily Average Milled (tonnes)	326	406	388*
Mill Heads:			
Silver (gm/tonne)	1,224	818	789
Lead (%)	5.5	3.7	3.4
Zinc (%)	0.8	0.6	0.8
Metal Production:			
Silver (gm)	90,741,633	78,907,533	58,963,139
Lead (kg)	3,448,912	2,726,862	2,212,353
Zinc (kg)	11,971	379,164	413,043
Cadmium (kg)	171	--	--
Metal Sales:			
Revenue from Shipments ($)	18,162,909	53,226,219	31,742,000
Ore Reserves at year end:			
Tonnes	99,517	299,951	435,811
Silver (gm/tonne)	1,364	998	846
Lead (%)	4.9	4.3	3.4
Zinc (%)	0.9	--	--

* adjusted for strike of 122 days.

Production from Individual Mines by United Keno Hill Mines

1979

Mines	Silver Grade (gm/t)	Tonnes Milled	Drifts & Crosscuts (metres)	Raises (metres)	D.D.
ELSA	1234	4,969	296.3	37.6	295.7
KENO	631	13,971	545.2	174.2	--
NO CASH	693	9,225	--	59.7	459.3
RUBY	926	8,676	--	--	--
HUSKY	1210	20,951	373.1	154.5	1009.5
SIME & BERMINGHAM	681	53,893	-----------Open Pits-----		
Total		111,685	1214.6	426.0	1764.5

1980

Mines	Silver Grade (gm/t)	Tonnes Milled	Drifts & Crosscuts (metres)	Raises (metres)	D.D.
SILVER KING	459	250	-----Open Pit-----		--
ELSA	789	4169	--	16.8	2777.3
COMSTOCK KENO	--	--	144.5	--	--
KENO	583	8809	89.3	11.9	89.3
NO CASH	607	5325	--	25.3	--
RUBY	782	6786	11.4	--	--
HUSKY	1317	16166	390.1	--	--
SIME & BERMINGHAM	651	38150	-----Open Pits		--
Total		79,655	635.3	54.0	2866.6

Reserves of Individual Mines at Year End:

Mine	1979 Reserves (tonnes)	1979 Silver Grade (gm/t)	1980 Reserves (tonnes)	1980 Silver Grade (gm/t)
ELSA	19,051	--	11,714	1008
COMSTOCK KENO	8,372	1029	8,372	1029
KENO	39,114	830	27,668	809
NO CASH	13,182	902	17,518	819
RUBY	12,734	1128	10,836	998
HUSKY	50,850	1505	47,258	1330
SIME&BERMINGHAM	104,738	790	73,188	904
OTHER OPEN PIT RESERVES	10,976	--	133,755	--
OTHER UNDERGROUND RESERVES	40,934	--	105,502	--
Total	299,951	--	435,811	--

The company controls nearly 1100 claims on Keno and Galena Hills. Exploration in 1979 and 1980 included overburden (percussion) drilling (22,920 m in 1979, 11,004 m in 1980), diamond drilling (4,225.2 m in 1979, 1818.3 m in 1980), surface stripping and trenching.

In 1979, one hundred percussion holes totalling 3591 m were drilled on the SIME Vein in preparation for open pitting. Other drilling outlined economic mineralization over a 135 m strike length on the Calumet No. 11 vein and over a 60 m strike length on the Calumet No. 4 vein. The Calumet No. 1 vein was also drilled and ore was outlined over the entire length at depths of 6 m to 42.0 m.

Three diamond drill holes tested for deep ore beneath the bottom level of the Husky No. 1 Mine in 1979 but failed to intersect any. Twelve holes were drilled on the Southwest Husky vein system. Ore totalling 20,856 tonnes grading 899.46 gm/tonne silver was outlined above the 250 level and 9,429 tonnes grading 1511.64 gm/tonne silver were outlined below the 250 level.

In 1980, overburden drilling was conducted in the Silver King No. 2, Silver King Mine, Lucky Queen and Bellekeno veins. One hole on the Silver King No. 2 assayed 1497.96 gm/tonne silver over 4.5 m. About 9091 tonnes grading 1422.72 gm/tonne silver were outlined at the Silver King Mine.

A small ore shoot containing 6818 tonnes grading 1422.7 gm/tonne silver was outlined in a footwall zone of the Lucky Queen Vein. About 14,545 tonnes of open pit ore grading 707.94 gm/tonne silver were outlined on the Bellekeno "48" vein. Also in 1980, the Calumet 1-15 vein was stripped and sampled. Highly oxidized ore was outlined over a 9 m width on the footwall and 4.5 m width on the hanging wall of a 27 m wide structure.

Earlier production is summarized in Morin et al (1980) p. 7.

TABLE V

DIAMOND DRILL REPORTS SUBMITTED FOR ASSESSMENT CREDIT

Mining District	1978 holes	1978 metres	1979 holes	1979 metres	1980 holes	1980 metres
Dawson	0	0	3	1204	15	1629
Mayo	77	6,329	20	2830	310	29899
Watson Lake	*	10,816	28	6380	102	14,700
Whitehorse	73	8,932	58	14278	93	17,618
Total	--	26,077	109	24692	520	65,432

*number of holes not given in records.

ACKNOWLEDGEMENTS

It is a pleasure to acknowledge the contribution of a number of individuals whose work is incorporated in this volume. Preliminary typing of the manuscript was done by Virginia Klaver, Julie Broeren and Eileen Hase. The line drawings that illustrate this volume were drafted by Laurie Butterworth, Ian Stallabrass and Bob Lewis. The set of mineral locality maps was drawn by Angie Lange and typesetting of the manuscript by Jane Gaffin. Barb Preston advised on layout and production. Craig Hart, Diane Sylvestre and Monica Smith proofread the manuscript. Craig Hart further helped with layout and the index to this volume.

GEOLOGY AND MINERAL DEPOSITS OF SOUTHERN YUKON

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INTRODUCTION

This report includes a summary of the mineral exploration history of Yukon, an outline of the geology of its southern part, and brief descriptions of the most important mineral occurrences. The report brings together current ideas of the geology and examines the metal deposits in this context. This account is intended as an introduction to exploration geologists, prospectors and interested laymen to provide an overview of Yukon's mineral industry. It is not a source of detailed data, or an exhaustive treatment; references to sources are included.

Yukon's mineral resource base is broad with world class reserves of zinc-lead (Anvil and Howard's Pass), important stores of copper (Casino, Minto), a near monopoly in tungsten (Cantung, Mactung, Logtung, Dublin Gulch), a significant molybdenum deposit (Red Mountain) and a range of smaller gold, silver, tin, asbestos and barite occurrences. Only three districts are presently being mined.

EXPLORATION HISTORY

Mineral exploration in Yukon has evolved from an early stage of searching out high grade precious metals occurrences to exploring for large, relatively low grade deposits of base metals. In Yukon this switch came later than elsewhere in North America, partly because of the physical isolation in the early part of the century and because of its psychological remoteness. Exploration for gold and silver lodes began in the Territory following the Klondike Rush and attention focussed in the Wheaton and Conrad districts. In 1919, high grade silver mineralization was discovered on Keno Hill near Mayo. With the exception of some small rich occurrences of copper (in the Whitehorse copper belt) exploration concentrated on the precious metals and until the early 1950's Yukon was considered as a place with small high-grade silver deposits, but precious little else.

Opening of the Alaska Highway removed the physical and psychological distance of the Yukon and was soon followed by discovery of the Tom, Wellgreen (1952), and Vangorda (1953), which deposits stirred the imagination of prospectors. Although none of these occurrences were economic, they indicated an unrecognized potential for base metals in Yukon making it interesting to larger companies for the first time.

There followed a decade of regional prospecting that grew in intensity, and which resulted in discovery of the Clinton Creek, (18 million tonnes asbestos, 1957), Swim, (9 million tonnes 10% combined zinc and lead, 1963) and New Imperial (4.5 million tonnes 1.5% copper, 1964) deposits, and which culminated with finding of the Faro orebody, (57 million tonnes 10% combined zinc and lead, 1965).

Discovery of the Faro sparked the first massive exploration rush in Yukon (Figure 1) and in 1966 and 1967 large and small companies swarmed the Anvil Range. As is often the case, the rush itself contributed no significant discoveries, and the exploration interest in the Anvil district cooled. Nevertheless, this stampede started the Territory on the rush phase in its exploration history and signalled a decade of grassroots exploration.

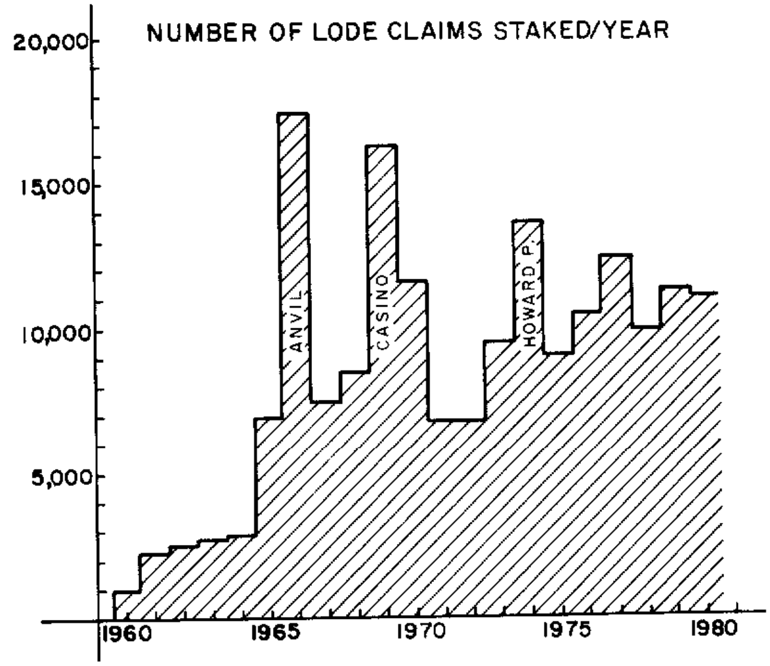


Figure 1a
New Lode Claims staked annually in Yukon between 1960 and 1980.

Recognition in 1968 of a large, low grade copper-molybdenum deposit near silver-lead showings known earlier, led to the Casino rush in the Dawson Range in 1969 and 1970. This exploration surge again involved large and small companies alike, and led indirectly to two subsequent discoveries (Minto and Williams Creek). Although the Casino deposit is presently uneconomic, it widened the metals base for Yukon exploration and indicates a potential for further finds of this type.

The third exploration rush in Yukon began as quietly as its predecessors with the finding in 1972 near Summit Lake, of fine-grained lead-zinc mineralization of a type not recognized before in Yukon, and in rocks not thought to be productive. This time exploration surged into the Mackenzie mountains, the most remote part of the Territory. This rush was also spurred by a change in politics in British Columbia that drastically altered the exploration interest there. This third rush, led directly to finding of two significant showings (Goz and Gayna) and a number of less important occurrences. It confirmed the Howard's Pass area as the second major lead-zinc district of Yukon. The Grum deposit (1974), the fourth in the Anvil district, was discovered almost incidentally at this time as a result of systematic drilling in the Anvil district.

The DY, another deposit in the Anvil Range was found in 1976 following careful follow-up work and drilling.

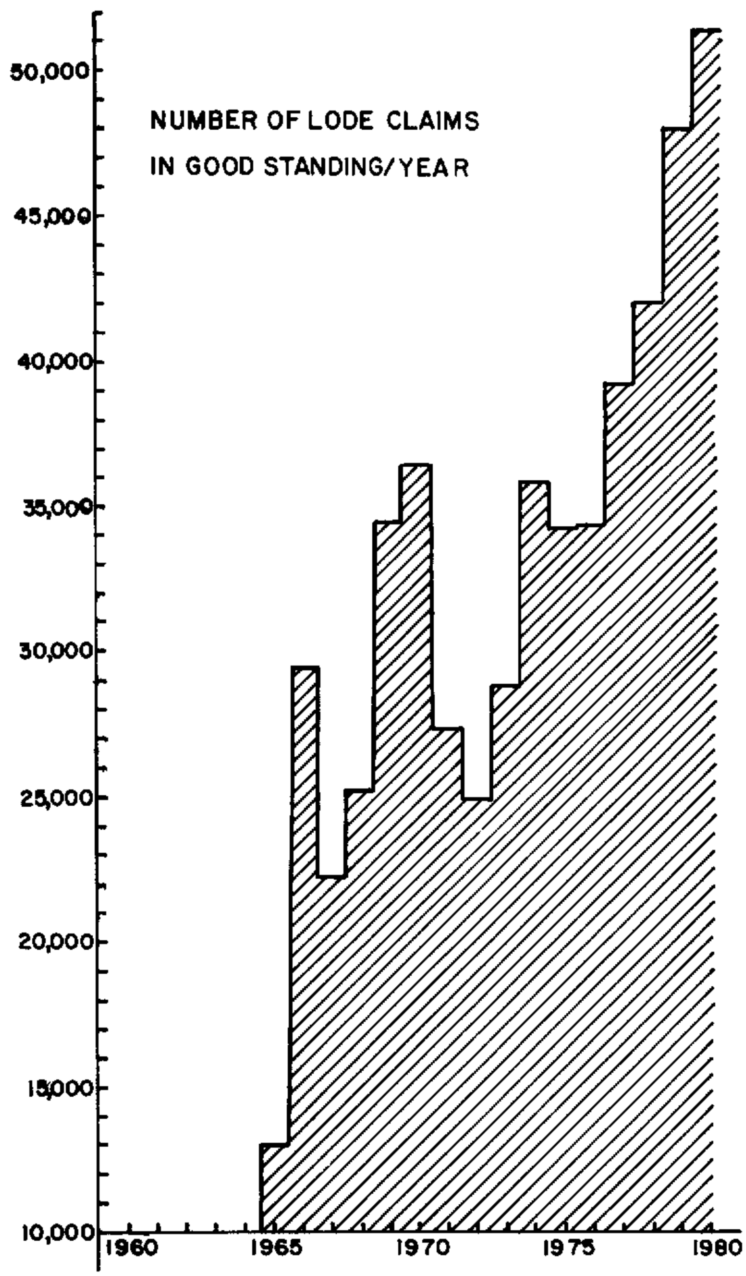


Figure 1b
Yukon Lode Claims in good standing between 1960 and 1980

In the mid-seventies, exploration shifted from the carbonate rocks of Mackenzie Platform to the shales of Selwyn Basin and the Jason, a stratabound lead-zinc deposit, was discovered in 1975. Later in the decade grass roots exploration declined in favour of more concentrated property work with increasing emphasis on drilling. As a result Logtung, Red Mountain and Clear Lake were found on old properties.

Mineral production in Yukon reflects the exploration history with an appropriate time lag (Figure 2). Before 1965, the mines at Keno and Galena Hill were Yukon's sole producers, and for decades accounted for the total annual output of mineral concentrates to a value of about $15 million. Opening of Clinton Creek* (1968, 2500 tpd), added $10-$15 million a year, and production at New Imperial, which began the same year (1968, 2000 tpd), added $10 million annually. However, opening of the Anvil Mine (1969, 6000 tpd) overshadowed these developments , and led to a quantum jump in annual production so that Yukon now produces in the order of $300 million a year. Although this is a modest 1-1/2% of Canadian mineral production the figure has been increasing and the per capita production from minerals of the Territory (about $15,000) is the highest in the country.

GEOLOGY OF SOUTHERN YUKON

This introduction emphasizes the main elements of the geology of southern Yukon and intends to set the stage for the descriptions of mineral deposits that follow. The geology is treated in four steps: its subdivisions, their stratigraphy, the deformation and metamorphism and the overlap suites. Subdivisions of the geology are outlined in a sketch map and relations between the entities summarized. Stratigraphic columns giving the main divisions for each element follow and the important plutonic suites are characterized. The style of deformation and metamorphism are briefly treated. Sedimentary and volcanic units that overlap more than one element are indicated.

Southern Yukon is sliced into three parts by two northwest trending strike-slip faults, the Tintina and Denali faults (Figure 3) which localized 450 km and 250 km of dextral slip respectively during the Tertiary. Tectonic elements northeast of the Tintina fault recur southwest of it, but the Denali fault separates discrete terranes and probably follows a fundamental suture in most of Yukon. Both strike-slip faults localize narrow grabens which are Pliocene physiographic trenches. Tintina Trench is along Tintina fault and Shakwak Trench is along the Denali.

The geology includes two discrete parts (Figure 3); northeasternmost are strata deposited on the ancient North American continent and southwest of it are rocks formed as part of a Mesozoic arc on a foreign continental fragment now accreted to North America. The two parts are further divided (Figure 4) and the ancient North American element includes four subdivisions that are laterally intergradational and deposited as facies belts next to one another. These four parts are Mackenzie Platform, Selwyn Basin, Cassiar Platform and Nasina Shelf. The accreted part is also split into four entities northeast of Denali fault, namely the Yukon Cataclastic Complex, Whitehorse Trough, Yukon Crystalline Terrane and Coast Plutonic Complex. Southwest of the Denali are the Alexander Terrane and Gravina-Nutzotin Belt.

Subdivisions used here correspond closely to the classic divisions of the Canadian Cordillera. The Mackenzie Platform, as used here, is the Mackenzie Fold Belt. Selwyn Basin, Cassiar Platform, Nasina Shelf and Yukon Cataclastic Complex were grouped together in the classic Omineca Belt while Whitehorse Trough and Yukon Crystalline Terrane relate to the Intermontane Belt.

* The Clinton Creek mine was closed in 1978.

Stratigraphy of the Ancient North American Margin

Stratigraphy of the four ancient North American elements is given in Figure 4 and the lateral equivalence of units is indicated. Stratigraphic names in common use or lithologic descriptors are used to distinguish units. Mackenzie Platform includes a thick section of Precambrian clastic strata containing two angular unconformities. A thick Cambrian to Devonian carbonate succession overlies these, and Mississippian and younger clastic rocks (Imperial Formation) cover this carbonate in turn. Selwyn Basin includes shale, chert and basaltic volcanics, the so-called Road River Group, equivalent to thick carbonate on Mackenzie Platform. The Grit Unit, Atan and Sekwi Formations, beneath the Road River, resemble strata in the adjacent Platforms. The Devono-Mississippian "Black Clastic" or Earn Group, characteristically a chert conglomerate, is much thicker than, but equivalent to, the Imperial Formation. It is overlain by a condensed section of Carboniferous and Permian fine-grained clastics. Cassiar Platform exposes a succession dominated by Silurian and Devonian carbonate rocks resembling those in Mackenzie Platform. These overlie calcareous shale with intercalated volcanics of the Kechika Group; equivalents of the Road River. Mississippian strata are clastics like those of the Imperial Formation and Earn Groups to the northeast, but contain important accumulations of trachyte and felsic plug domes. A condensed upper Paleozoic succession of limestone and calcareous siltstone is seen in Cassiar Platform and Selwyn Basin. Upper Triassic calcareous siltstone lies disconformably across the older rocks in Mackenzie Platform, Selwyn Basin and Cassiar Platform. The only important regional unconformity seen across the three elements separates Lower Cambrian and Upper Cambrian or Lower Ordovician strata. Nasina Shelf includes three variably metamorphosed units laterally traceable into Cassiar Platform. Upper Paleozoic strata are absent.

Strata in the ancient North American elements were thrust to the northeast and folded during Late Jurassic and Early Cretaceous time. The rocks generally lack penetrative structures and the intensity of the deformation decreases toward the northeast. There is no evidence of earlier folding in the Paleozoic rocks, but the strata are locally cut by Mississippian normal faults. Precambrian strata of the Wernecke Supergroup were folded before deposition of the Pinguicula Group.

Only the southwestern elements of ancient North America are regionally metamorphosed. Metamorphism was of the Barrovian type (moderate temperature and pressure) and occurred through the Late Jurassic and Early Cretaceous.

Yukon Cataclastic Complex

Yukon Cataclastic Complex contains three assemblages of highly sheared and metamorphosed rocks that are not a stratigraphic sequence, but a structural stack (Figure 4). Shearing was penetrative enough that the units lack stratigraphic integrity. The rocks range from ultramylonite and blastomylonite, products of ductile deformation, to less strained equivalents so that the parent rocks are locally preserved. Lithologic units within the stack lack lateral continuity and can not be traced into either adjoining tectonic subdivision. Moreover, extensive sheets of the sheared rocks are thrust over the less deformed ancient North American strata of the Nasina Shelf and Cassiar Platform. The internal stratigraphy, depositional relations and age of the three units are unknown.

The three assemblages occur in consistent stacking order except where disrupted by younger faults. At the base are quartz muscovite schist and interleaved chlorite schist derived from sedimentary and volcanic rocks. This is the Klondike Schist or Nisutlin Allochthonous Assemblage. Structurally above it, Anvil Allochthonous Assemblage, includes amphibolite and serpentinite, a sheared ophiolite. Highest structurally is a slice of biotite granodiorite schist, a ductile deformed plutonic suite called Simpson Allochthonous Assemblage.

Metamorphism in Yukon Cataclastic Complex occurred with ductile deformation in the Late Triassic and Early Jurassic. The rocks locally contain eclogite and blueschist minerals which indicate extreme pressure but low or moderate temperatures of metamorphism.

Intermontane Belt and Yukon Crystalline Terrane

Whitehorse Trough contains three important units: the Cache Creek, Lewes River and Laberge Groups (Figure 4). The Cache Creek is a Pennsylvanian, Permian and Triassic basalt, limestone and chert unit. It is overlain by Upper Triassic basalt of the Lewes River Group. Thick reef buildups with fossil sponges, corals and algae make up the Upper Lewes River Group locally. The Laberge is a Lower Jurassic conglomerate and sandstone derived from the volcanic Lewes River and its plutonic roots.

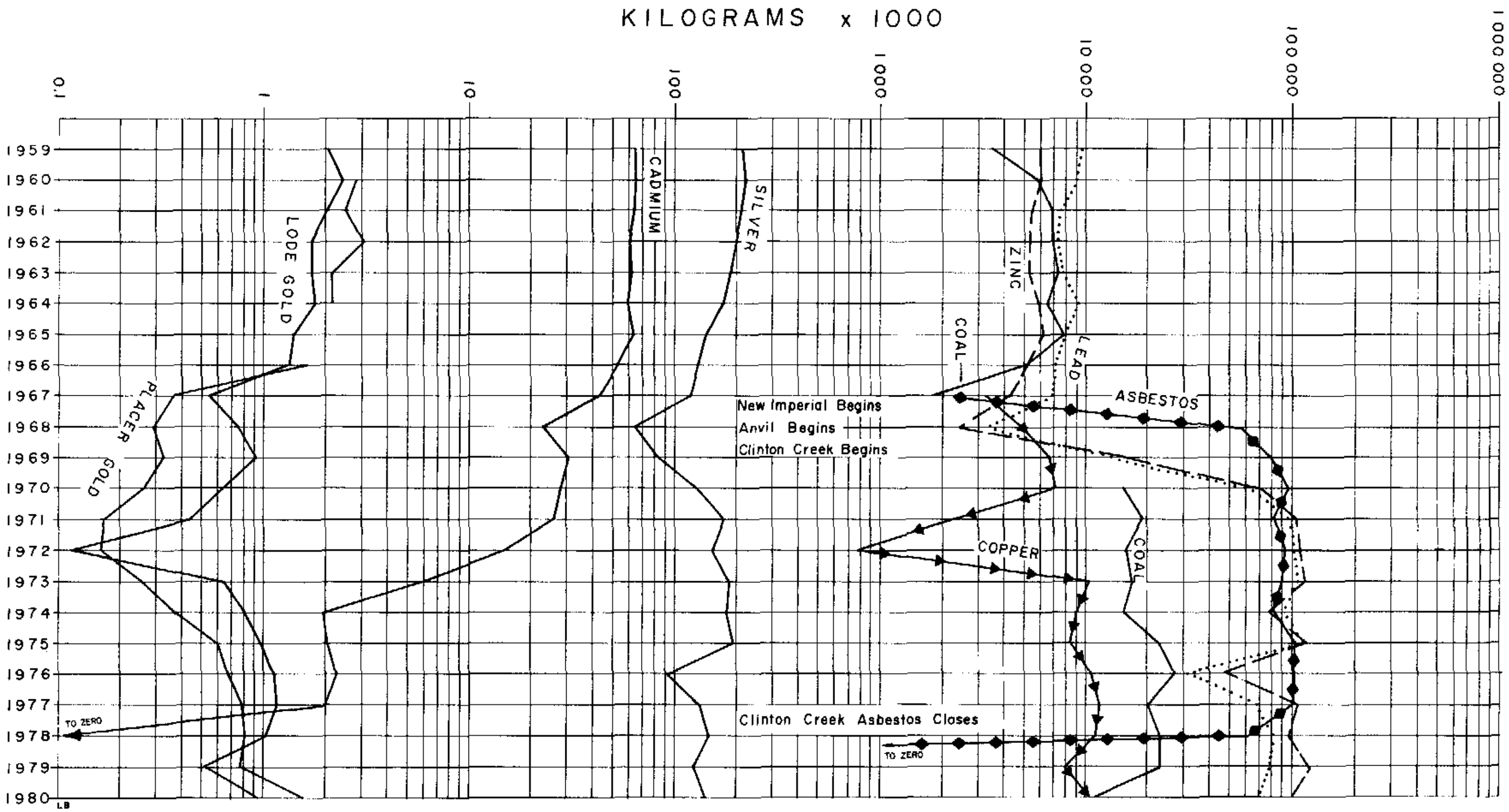
Four units of metamorphic rocks make up Yukon Crystalline Terrane. In sequence upward they are a biotite schist, a marble, a graphitic quartzite and an amphibolite and ultramafic unit. The age of the rocks is unknown, but they likely represent a metamorphosed stratigraphic succession. They are homotaxial with the sequence in Nasina Shelf and it is tempting to consider the two broadly equivalent. Yukon crystalline Terrane was metamorphosed in the Paleozoic? by a Barrovian style event with folding, but no shearing.

Strata of Whitehorse Trough were probably deposited on, or at the edge of the matamorphic rocks of Yukon Crystalline Terrane, but the relations are obscured by young faults. Plutonic rocks that are considered the roots of the Lewes River volcanics intrude Yukon Crystalline Terrane. The Tantalus Formation, an Upper Jurassic to Lower Cretaceous conglomerate, dominated by resistate clasts, lies unconformably across Yukon Crystalline Terrane and Whitehorse Trough strata.

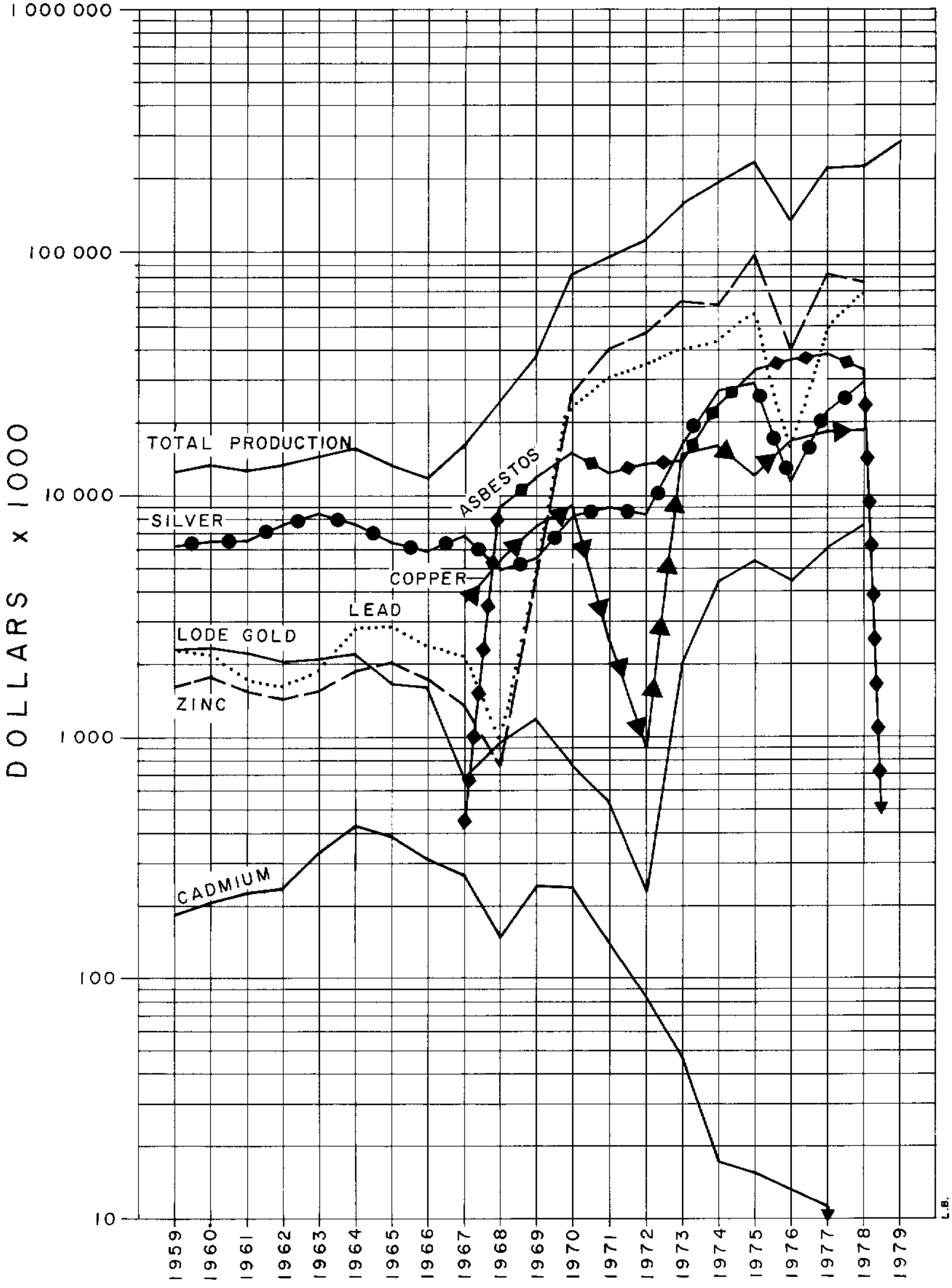
The Coast Plutonic Belt in Yukon contains one stratigraphic unit, the Kluane Schist, a biotite schist of Buchan metamorphic type (moderately high temperature and low pressure) intruded and metamorphosed by Ruby Range Batholith. The Kluane Schist can be traced into strata that resemble the Jurassic and Lower Cretaceous Dezadeash Group.

Intrusive Rocks

Plutonic rocks in southern Yukon can be divided into three lithologically distinct groups with restricted distribution (Figure 5). Oldest are hornblende granodiorite (Klotassin Suite) and related pink quartz monzonite intruded in the Upper Triassic and Middle Jurassic respectively. They form large



<u>Figure 2a & 2b</u>
Yukon mineral production for 1960 - 1980 (note semi-logarithmic scale).


1 000 000
100 000
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1 000
100
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DOLLARS x 1000
TOTAL PRODUCTION
ASBESTOS
SILVER
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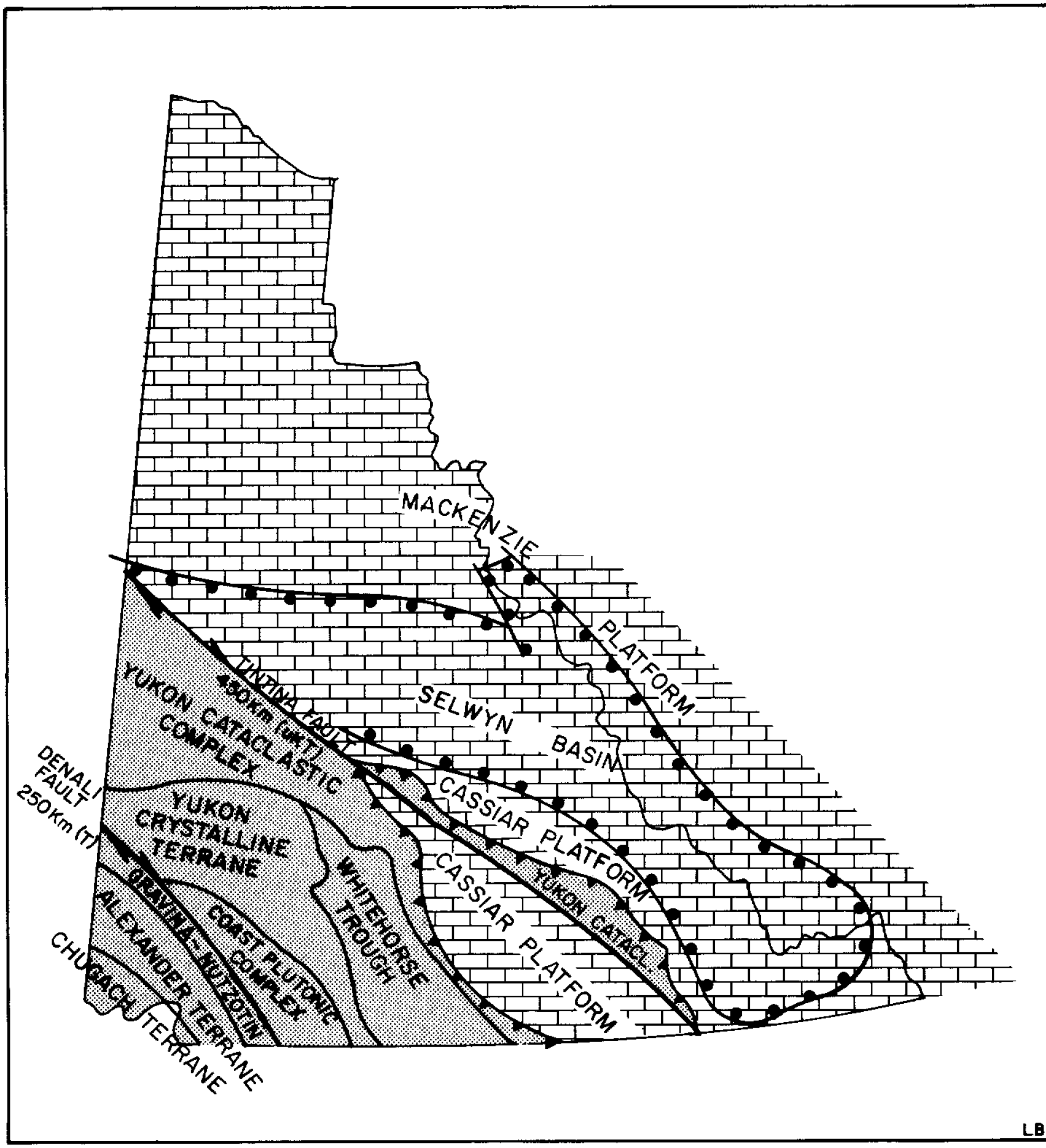


Figure 3
Sketch map of Yukon showing the subdivisions of the ancient North American margin on the northeast (brick pattern) and elements of the accreted southwest part (shaded).

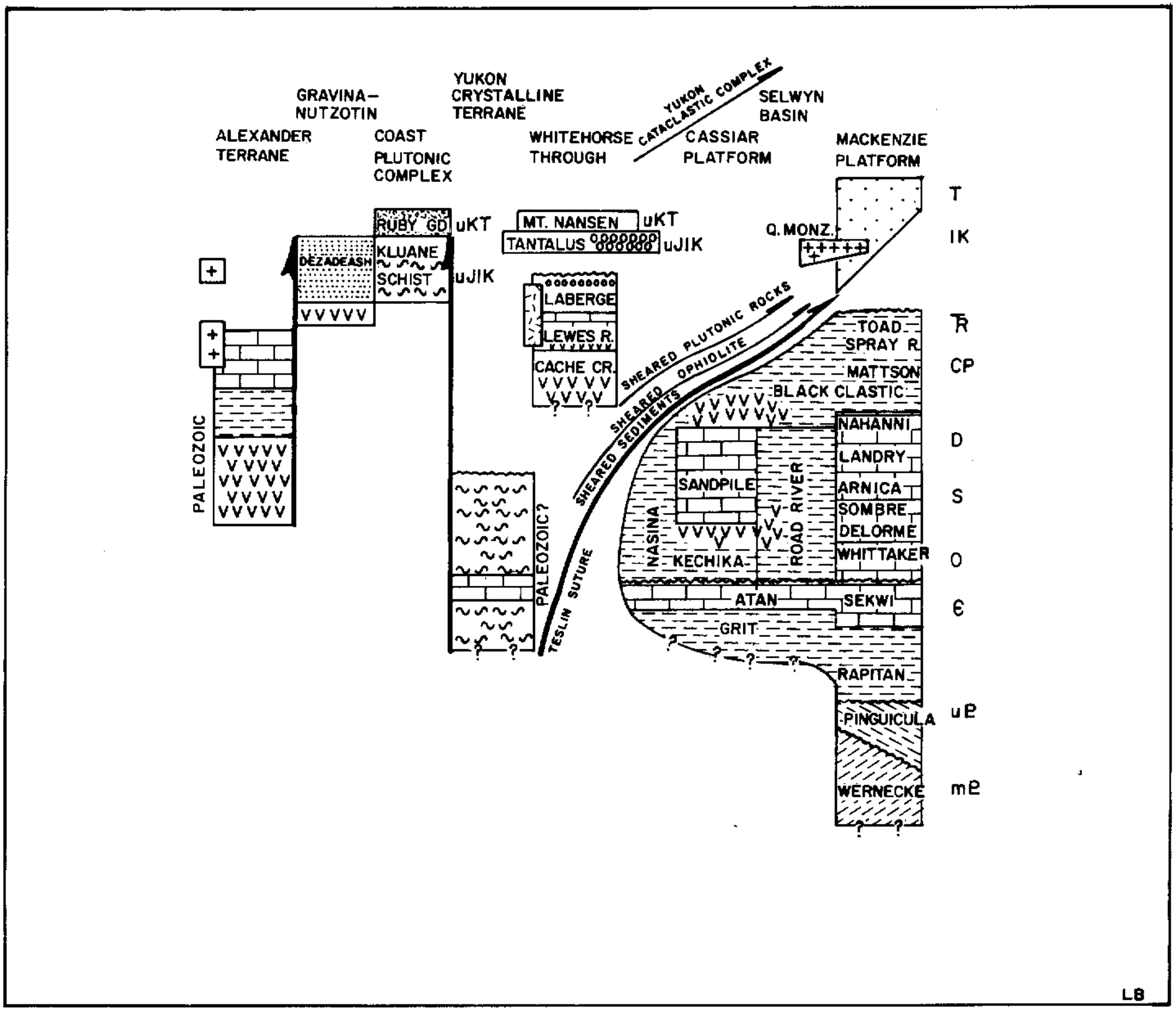


Figure 4

Columns showing the main stratigraphic units of the tectonic elements in Figure 3. Relations between elements are shown schematically.

discordant batholiths confined to Yukon Crystalline Terrane and parts of Whitehorse Trough. The hornblende granodiorite may be the subvolcanic root of the Lewes River volcanics.

The areally most extensive plutonic rocks are biotite quartz monzonite that cooled between 120 and 90 Ma, about the Early Cretaceous. This set, the classic Omineca Belt granites, is confined to the ancient North American elements with minor intrusions in Yukon Cataclastic Complex. The suite shows a general variation in mode of occurrence from northeast to southwest. In Selwyn Basin and parts of Mackenzie Platform are small, discordant plugs that have forcefully invaded and thermally metamorphosed the surrounding unmetamorphosed strata. Southwestward in Cassiar Platform and Nasina Shelf the plutonic suite forms large concordant batholiths with wide mantles of lit par lit gneiss centred on regional metamorphic culminations, which are arched up passively around the intrusions. The large batholiths of quartz monzonite are considered to be dominantly in situ melts derived by metamorphism of sedimentary rocks and the small discordant plutons are considered the mobilized parts of such melts intruded higher in the sequence.

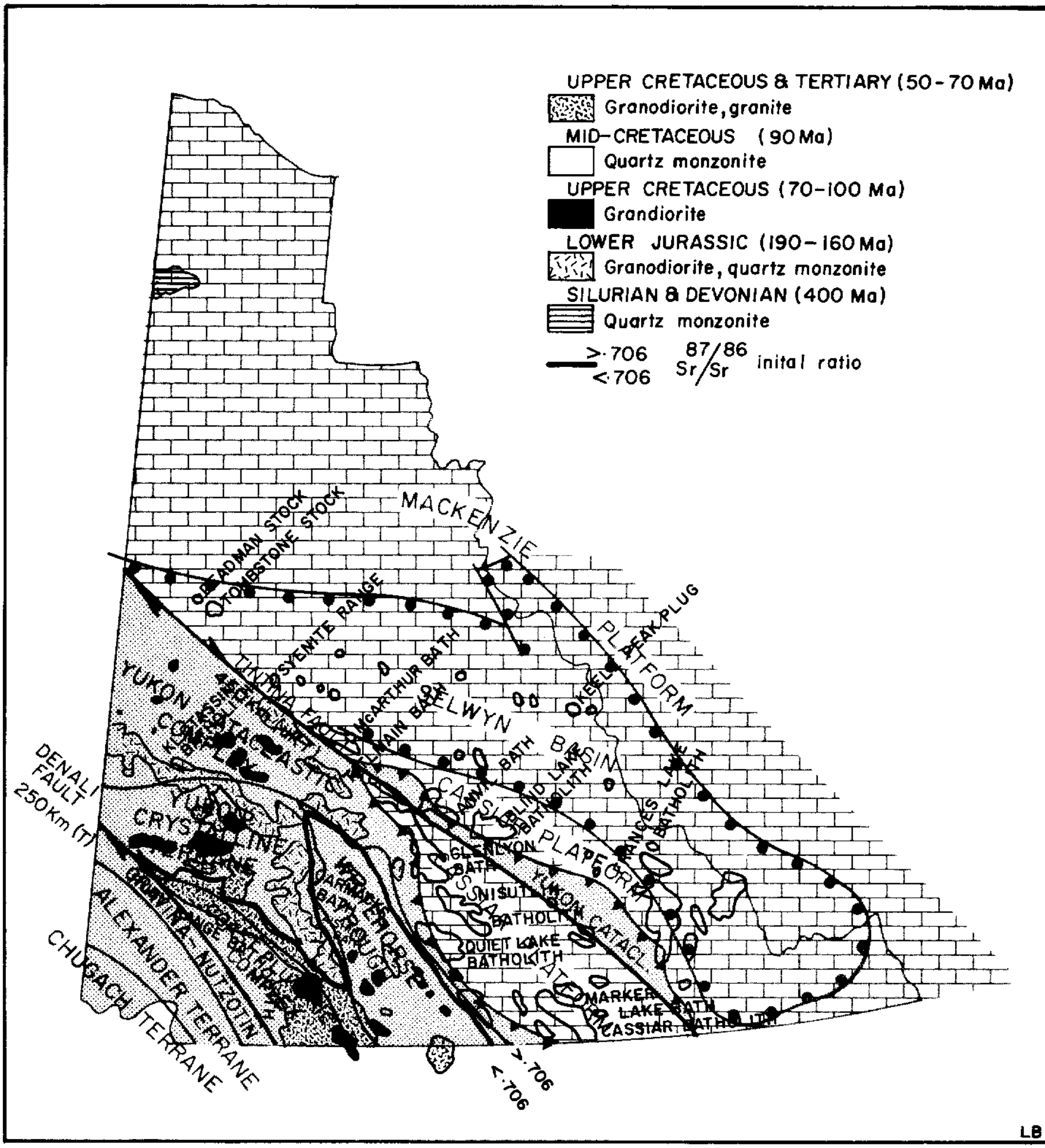


Figure 5

Sketch maps of the distribution of plutonic rocks in relation to the tectonic elements. The mid-Cretaceous suite is restricted essentially to the northeastern ancient North American margin and the other granitic rocks are confined to the accreted terrane.

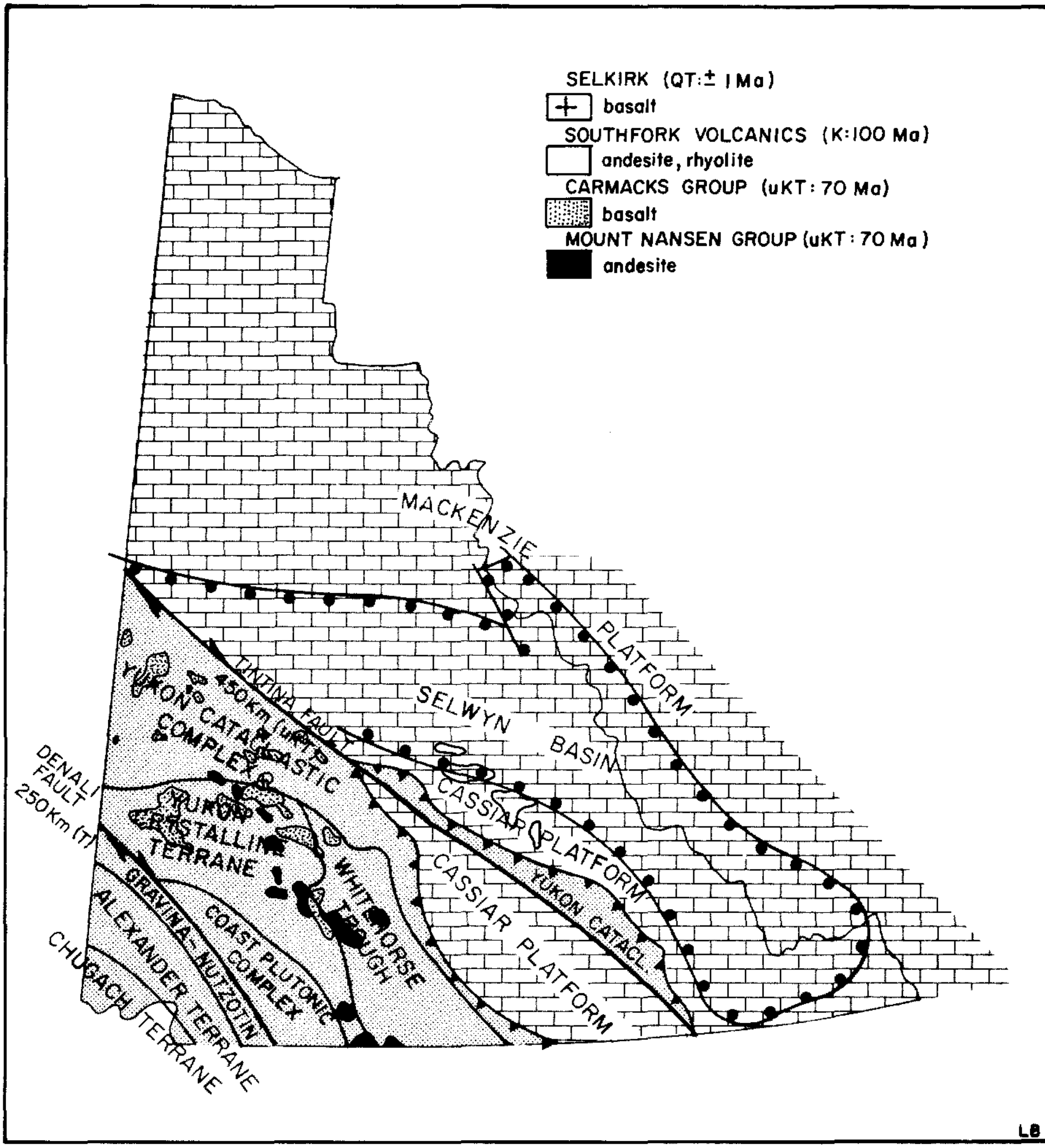


Figure 6
Sketch map of the distribution of Late Cretaceous and Tertiary volcanic rocks in relation to the tectonic elements.

The third set of granitic rocks includes hornblende granodiorite and alaskite-biotite granite respecively, the Ruby Range and Nisling Alaskite suites. They give radiometric cooling ages of about 60 Ma (Paleocene). Both suites are restricted to the Coast Plutonic complex and Yukon Crystalline Terrane. The granodiorite forms large heterogeneous batholiths and the alaskite occurs as small cross-cutting plutons.

The Upper Triassic and Paleocene suites are I type granites, derived by partial melting from oceanic crust; the Early Cretaceous quartz monzonite is S type, generated from continental crust and sedimentary strata by partial melting. Initial Sr_{87}/Sr_{86} ratios determined from the suites bear this out (Figure 5).

Cretaceous and Younger Volcanic Rocks

Four groups of Cretaceous and younger volcanic rocks are known in southern Yukon (Figure 6). Oldest are the probably mid-Cretaceous South Fork Volcanics. These andesites occur in a restricted area and are extrusive equivalents of the Cretaceous quartz monzonite. Most extensive are the Mt. Nansen and Carmacks volcanics. The first are explosive, intermediate to acid volcanics intruded through and laid across parts of the Yukon Crystalline Terrane, Whitehorse Trough and Coast Plutonic Complex. The Mt. Nansen Group is equivalent to the Hutshi and Skukum Groups; all are Paleocene and give radiometric ages between 70 and 55 Ma. The Carmacks Groups is a sequence of basalt flows and breccias, also of Paleocene age, that overlies the Mt. Nansen Group conformably and is extruded onto parts of Yukon Crystalline Terrane and Yukon Cataclastic Complex.

The Selkirk lavas and their equivalents, the Tuya (near Watson Lake) and Miles Canyon (near Whitehorse) are columnar jointed olivine basalt flows intercalated with Pleistocene glacial deposits. They form scattered small outcrops between the Tintina and Shakwak Trenches.

SOURCES OF ORIGINAL DATA

Geological maps are the basic data used in all aspects of mineral exploration. The initial mapping and the task of keeping the maps up to date is the job of the Geological Survey of Canada. Complete coverage of the bedrock geology at a scale 1:250,000 is now published, but the maps vary in vintage and completeness and therefore in current usefulness. Some maps are based on rapid reconnaissance, others on exhaustive study. Furthermore, understanding of Cordilleran evolution has changed in the last decade. Many of the areas need extensive remapping with revisions in the light of this new understanding. A list of the most recently published maps with subjective assessments of their current status follows:

NTS	Name	Reference and Status
95 C	La Biche	Map 1380 A by: R.J.W. Douglas, 1976. Status OK.
95 D	Coal River	Map 11-1968 by: H. Gabrielse, 1968. Minor revision needed.
95 E	Flat River	Map 1313 A and Memoir 366 by: Gabrielse, Roddick, Blusson. Minor revision needed.
95 L	Glacier Lake	Map 1314 A and Memoir 366 by: Gabrielse, Roddick, Blusson. Minor revision needed.
105 A	Watson Lake	Map 19-1966 by: H. Gabrielse, 1966. Revision needed.
105 B	Wolf Lake	Map 10-1960 by: W.H. Poole, J.A. Roddick and L.H. Green. Preliminary uncoloured map. Remapping needed.
105 C	Teslin	Map 1125 A and Memoir 326 by: R. Mulligan, 1963. Remapping needed.
105 D	Whitehorse	Map 1093 A and Memoir 312 by: J.O. Wheeler, 1961. Minor revision needed.
105 E	Laberge	Open File 578 by: D. Tempelman-Kluit, 1978. Minor revision needed.
105 F	Quiet Lake	Open File 486 by: D. Tempelman-Kluit, 1977. OK.
105 G	Finlayson Lake	Open File 486 by: D. Tempelman-Kluit, 1977. OK.
105 H	Frances Lake	Map 6-1966 by: S. L. Blusson, 1966. Major revision needed.
105 I	Nahanni	Open File 689 by: S.P. Gordey, 1980. OK.
105 J	Sheldon Lake	Map 12-1961 by: J. A. Roddick and L. H. Green, 1961. Remapping needed.
105 K	Tay River	Map 13-1961 by: J. A. Roddick and L. H. Green, 1961. Remapping needed.
105 L	Glenlyon	Map 1221 A and Memoir 352 by: R.B. Campbell, 1967. Revision needed.
105 M	Mayo	Map 890 A by: H. S. Bostock, 1947. Remapping needed.
105 N	Lansing	Open File 205 by: S.L. Blusson, 1974. Remapping needed.
105 O	Niddery Lake	Open File 205 by: S.L. Blusson, 1974. Remapping needed.
106 B	Bonnet Plume	Open File 205 by: S.L. Blusson, 1974. Remapping needed.
106 C	Nadaleen River	Open File 205, 206 by: S. L. Blusson, 1974. Remapping needed.
106 D	Nash Creek	Map 1282 A and Memoir 364 by: L. H. Green, 1972. Revision needed.

NTS	Name	Reference and Status
106 E	Wind River	Open File 279 by: D.K. Norris, 1975. Minor revision needed.
106 F	Snake River	Open File 279 by: D. K. Norris, 1975. Minor revision needed.
115 A	Dezadeash	Map 1019 A and Memoir 268 by: E. D. Kindle, 1953. Revision needed.
115 B	Kaskawulsh	Map 1143 A by: J.O. Wheeler, 1963.
115 F/G	Kluane	Map 1177 A and Memoir 340 by: J. E. Muller, 1967. Revision needed.
115 H	Aishihik Lake	Map 17-1973 and Paper 73-41 by: D. Tempelman-Kluit, 1974. Minor revision needed.
115 J/K	Snag	Map 10-1973 and Paper 73-41 by: D. Tempelman-Kluit, 1974. Minor revision needed.
115 N	Stewart River	Map 18-1973 and Paper 73-41 by: D. Tempelman-Kluit, 1974. Minor revision needed.
115 O	Ogilvie	Map 711 A by: H. S. Bostock, 1942. Remapping needed.
115 P	McQuesten	Map 1143 A by: H. S. Bostock, 1964. Remapping needed.
116 A	Larsen Creek	Map 1283 A and Memoir 364 by: L. H. Green, 1972. Revision needed.
116 B/C	Dawson	Map 1284 A and Memoir 364 by: L. H. Green, 1972. Revision needed.
116 F/G	Ogilvie	Open File 715 by: D.K. Norris, 1980. OK.
116 H	Hart River	Open File 279 by: D.K. Norris, 1975. OK.
116 I	Eagle River	Open File 715 by: D.K. Norris, 1980. OK.
116 J/K	Porcupine River	Open File 715 by: D.K. Norris, 1980. OK.
116 O/N	Old Crow	Open File 715 by: D.K. Norris, 1980. OK.
116 P	Trail River	Open File 715 by: D.K. Norris, 1980. OK.

The Geological Survey of Canada also undertakes syntheses of the regional geology and detailed studies of areas where geological problems require closer mapping. Recent synetheses include the 1:1,000,000 scale Geological Map of MacMillan River area (Open File 209) covering essentially all of southern Yukon and the Tectonic Assemblage map of the Canadian Cordillera (Open File 572). An overlay of the assemblage map also shows the important mineral deposits (Open File 573). A synthesis and model for the evolution of Yukon geology is given in G.S.C. Paper 79-14. Detailed mapping has been done in the Keno-Galena Hills area, the Anvil district and Tombstone area north of Dawson.

Descriptions of Yukon's mineral deposits can be found in a variety of publications of the Geological Survey of Canada and the Department of Indian Affairs and Northern Development. Many of the original reports are out of print, but they are reprinted in Bostock (1957). Mining and exploration development of the Territory during the period 1934 to 1940 were described by Bostock (1935, 1936, 1937, 1938, 1939, 1941). Between 1940 and 1960 no information was published. A report detailing this period and based on the unpublished summaries of mining recorders is being readied for publication by the Geology Section DIAND. Following 1960 developments have been reported annually. Reports for the period 1960-1970 are authoritative accounts of the geology of properties based on first-hand examination published as G.S.C. Papers; for 1960 and 1961 (Skinner 1961, 1962), for 1962 to 1965, Green and Godwin (1963, 1964) and Green (1965, 1966) and for 1966 to 1968, Findlay (1967,1969, 1969a).

In 1969 the role of reporting on mineral development devolved on the Department of Indian Affairs and Northern Development. The emphasis shifted to documenting exploration work done rather than first-hand accounts of the geology with a description of work performed. For 1969 to 1972 reports are by Craig and others (1972, 1975), for 1973 to 1975 by Sinclair and others (1975, 1975a); for 1976 by Morin and others (1977); for 1977 by Marchand and others (1978) and for 1978 by Morin and others (1980).

MINERAL OCCURRENCES

The following section characterizes the most important known mineral occurrences in Yukon, grouping them by commodity and by geological setting. Stratabound zinc-lead deposits and silver-lead-zinc veins, examined first, are essentially confined to strata of the ancient North American elements. Copper porphyries and skarns and gold lodes are restricted to the accreted terrane. Tungsten, tin and some molybdenum are associated with the Cretaceous quartz monzonite confined to the ancient North American elements. The stratigraphic setting of asbestos, barite, coal and iron deposits is also examined.

Tonnage and grade figures quoted in the text are the most recent available from published sources; they are rough guides to scale for comparison of the deposits.

DEPOSITS OF THE ANCIENT NORTH AMERICAN MARGIN

Stratabound Zinc-Lead

Zinc-lead occurs in five stratigraphic associations in Yukon (Figure 7). Four are in strata deposited on the ancient North American margin and the fifth is in accreted rocks. The four include Anvil-Howard's Pass type in Cambro-Ordovician strata, Tom-MM type in Mississippian beds, Quartz Lake type in the Grit Unit and Goz type in Lower Cambrian dolomite. Although of different age the first three, economically the most important, may have similar origins. The deposits occur in a variety of facies and differ in their post-mineralization history.

Five deposits are known in a 30 km long belt in the Anvil district.

Faro	57 m tonnes	5.72% Zn	3.40% Pb	37 gm/t Ag
Vangorda	10.3 m tonnes	4.96% Zn	3.18% Pb	51 gm/t Ag
DY	14.7 m tonnes	7.1 % Zn	5.6 % Pb	84 gm/t Ag
Grum	26 m tonnes	6.43% Zn	4.07% Pb	52 gm/t Ag
Swim	4.3 m tonnes	4.7 % Zn	3.8 % Pb	47 gm/t Ag

All are medium-to coarse-grained massive pyrite-sphalerite-galena lenses that dip moderately to the southwest (Tempelman-Kluit, 1972). On small and large scales the mineralization is conformable with the deformed and transposed bedding of the surrounding Cambro-Ordovician phyllite. The phyllite belongs in the Kechika Group of Cassiar Platform; in Anvil district this unit contains considerable interbedded volcanic tuff with which the deposits may be genetically related. The mineralization occurs on the southwest side of a 60 km long metamorphic-structural culmination, Anvil Arch, a feature related to the Early Cretaceous quartz monzonite. The deposits are regionally metamorphosed; the degree of metamorphism varies, matching that of the host rocks.

Several other occurrences, the JA-Sunset, Maxi (Marchand et al 1978, p. 64, p. 90) and Fin, have conformable sphalerite-galena in black slate probably equivalent to the Kechika Group. Although they are small they may be guides to further sulphides: all are close to the southwest edge of Selwyn Basin.

Three deposits, the Anniv, OP and XY (Marchand et al 1978, p. 69) are known at Howard's Pass (Summit Lake) near the N.W.T. border. They are lenses of extremely fine-grained galena-sphalerite, conformable with bedding in enclosing black graphitic slate. The slate is Ordovician and Silurian and part of the Road River Group; it lacks interbedded volcanics unlike Anvil. The deposits lie at the northeast edge of Selwyn Basin, near the boundary with Mackenzie Platform. Unlike the Anvil deposits and host rocks those at Howard's Pass are essentially unmetamorphosed, but a steeply dipping slaty cleavage cuts the rocks and the mineralization is partly mobilized into this cleavage. Howard's Pass reserves are in the order of several hundred million tonnes, but as yet no reliable figures have been published. Unlike Anvil, lead predominates over zinc and silver is a minor component.

A second set of stratabound zinc-lead deposits, the Tom-Jason (Carne, 1976), MM (Morin, 1977, p. 83-97) and Clear Lake occur in Mississippian strata of varied facies. The Tom-Jason are two physically separate galena-sphalerite-barite lenses in black shale of the lower Earn Group or "Black Clastic". Both are near the northeast margin of Selwyn Basin. Reserves at Tom are about 8 million tonnes with 8.5% lead and zinc each and 90 gm/t silver. The MM is in Cassiar Platform southwest of Tintina Fault. Its host are Mississippian felsic volcanics intercalated with black slate of the "Black Clastic", the same rocks as the Tom-Jason. The sequence is folded and imbricated by gently south dipping thrust faults. Three lenses of coarse-grained pyrite-sphalerite-galena-barite, each some metres thick and comformable with the transposed bedding , are known. The deposits and host are metamorphosed next to Nisutlin Batholith, an Early Cretaceous quartz monzonite.

At Clear Lake, fine-grained pyrite-sphalerite-galena occur conformably in black slate intercalated with volcanic rocks immediately south of Tintina Fault. The host is correlated with Mississippian strata of the Earn Group like those at MM, but differs in being unmetamorphosed. The deposit is speculated to contain 25 million tonnes of massive pyrite with subeconomic zinc-lead: a 13 m drill intersection grades 18.3% Zn, 2.15% Pb and 58.6 gm/t Ag.

Another type of lead-zinc deposit is characterized by the Quartz Lake or McMillan (Green, 1966, p. 72-74, Sinclair et al, 1976, p. 154-155), 80 km northeast of Watson Lake. Greenish grey slate of the upper "Grit Unit" (Late Proterozoic) is host to comformable fine-grained pyrite-sphalerite mineralization. The rock and sulphides are essentially unmetamorphosed, but bedding is transposed so that the mineralization is disrupted. One million tonnes of 10% Zn, 5% Pb, 56 gm/t material is known. The Matt Berry (Findlay, 1967, p. 63) has lenses of galena, sphalerite and pyrite enclosed by quartz mica schist. It may be the metamorphosed equivalent of Quartz Lake as the schist is likely the regionally metamorphosed "Grit Unit". The rocks are metamorphosed at the margin of the Frances Lake culmination related to Lower Cretaceous arching west of the Frances Lake Batholith. At Matt Berry about 400,000 tonnes of 9% Zn, with 133 gm/t silver are indicated.

Several carbonate breccia hosted zinc-lead ocurrences are known in Mackenzie Platform; that at Goz Creek (Reeve, 1977) is an important example. Pale coloured, coarsely crystalline sphalerite with minor galena occurs as fracture fillings and breccia matrix within dolomite of the Lower Cambrian Sekwi or

Backbone Ranges Formation. The mineralization may be Mississippi Valley type or it may be emplaced in zones brecciated by fluids under pressure. The Goz may be more properly considered part of the cavity filling type of mineralization instead of the stratabound type. Drill indicated reserves are 11 million tonnes at 8% Zn with minor lead and essentially no silver.

The fifth zinc-lead type is exemplified by the Holly showing 50 km west of Dawson. Medium-grained sphalerite and galena are confined to a quartz rich layer conformable with the flaser fabric in quartz muscovite schist. The host is Nisutlin Alochthonous Assemblage of the Yukon Cataclastic Complex. The mineralized layer is less than a metre thick, but can be traced for hundreds of metres. Zinc predominates over lead and silver content is low. The mineralization was probably mobilized with quartz during stages of ductile strain and was sheared and metamorphosed in later stages. Several like occurrences are known, but all appear small with limited potential. Other examples are the Fyre (Findlay, 1967, p. 59) and Hoo (Sinclair and Gilbert, 1975, p. 85) in the Pelly Mountains. Each is a tectonically dismembered, sheared and recrystallized sulphide deposit. While the Holly is a sheared remobilized sulphide the Fyre and Hoo are sheared metamorphosed deposits still in their original host rocks.

Vein and Fracture Filling Silver-Lead-Zinc Deposits

Like the stratabound zinc-lead deposits the silver bearing lead-zinc veins are largely restricted to the ancient North American margin (Figure 7). They are found in various strata within or close to Selwyn Basin and range from fracture fillings to breccia zones. Silver veins occur in three districts, the Keno-Galena Hills camp, the Pelly Mountains and the Nadaleen range. Isolated deposits scattered widely beyond these districts are Mt. Hundere, Bomber, Mosquito Creek, Logjam and Plata. None of the vein occurrences are associated with, or demonstrably mobilized from the known massive sulphide bodies. The highest silver grades are found in the Keno-Galena Hills camp and other silver mineralization is traditionally compared to it. Silver to lead ratios at Keno-Galena Hill average 120:1 (gm/t silver: % lead). In most other districts in Yukon this ratio is nearer 30:1.

Yukon's silver mineralization is probably Late Cretaceous or Tertiary. That at Keno-Galena Hills, the Nadaleen Range, the Pelly Mountins and the Plata is alike and may be of roughly the same age. None of the mineralization is enclosed by strata with which the mineralization is genetically related and the ores are not deformed although the enclosing rocks generally are. This implies the mineralization post-dates the mid-Cretaceous deformation. The same absence of deformation is seen at the Bomber and Mosquito; host rocks at the Bomber are Cretaceous and those at Mosquito were strained in the Middle Jurrassic. Plutonic or volcanic rocks that might be mineralizing agents are absent at all the camps or far from the ores. The silver may be hydrothermally emplaced from host rock fluids circulating from the surface without an introduced energy source.

Veins on Keno-Galena Hills (Boyle, 1965) follow near vertical, northeast trending faults in a southward dipping sequence of the Keno Hill Quartzite, a Lower Cretaceous orthoquartzite. The veins pinch out in the underlying "Lower Schist", an Upper Jurassic phyllite and in the overlying "Upper Schist", a thrust sheet of Nisutlin Allochthonous Assemblage. A number of strong veins have been found. Some like the Hector-Calumet and Comstock-Porcupine systems can be traced on strike for four km or more and have been mined to depths of 300 m below surface. Mineralization consists of early pyrite, arsenopyrite and quartz followed by more voluminous sphalerite, galena, argentiferous tetrahedrite and locally ruby or wire silvers in siderite gangue. The district has been mined from innumerable workings since 1916 and 5,602 tonnes of silver, 252,954 tonnes of lead and 137,772 tonnes of zinc have been extracted to date.

The Keno-Galena Hills camp is on the south limb of the McQuesten Anticline, a broad east-northeast trending fold with 10 km amplitude, broken along its hinge by the vertical McQuesten fault. On the north limb of the anticline are several occurrences such as the Shanghai and UR (Green, 1965, p. 19) where silver is found in lead-zinc veins within Keno Hill Quartzite. The structures are as promising as those on Keno Hill, but the mineralization is poorer in silver. Lookout is a property on Mt. Haldane west of Galena Hill, (Green, 1965, p. 16-18) where the same type of silver mineralization is found in fractures in Keno Hill Quartzite.

Twenty-five km northwest of Galena Hill are the Peso and Rex (Green, 1965, p. 20-22) veins, two strong east trending structures with a paragenesis like that in the Keno-Galena Hill camp except that it contains jamesonite as a common constituent. The veins cut highly sheared metamorphosed rocks of Nisutlin Allochthonous Assemblage (Upper Schist) and are part of the system of mineralized veins that contain gold in the valley of Dublin Gulch. Some 140,000 tonnes grading 648 gm/t Ag and 3.7% Pb have been proved by drilling.

In the Davidson Range, 30 km northeast of Keno Hill, are several properties with silver bearing galena veins. They include the Rambler, Forbes, Cameron and Clark (Craig and Laporte, 1972, p. 19-20). All are enclosed in Keno Hill Quartzite except the Clark which is hosted by slate and gritty strata that may be Upper Paleozoic. Roughly 300,000 tonnes grading between 180 and 300 gm/t silver with about 5.5% lead and 5% zinc are indicated and inferred at the Clark.

The Val, Vera and Craig (see elsewhere this report) are the main properties in the Nadaleen Range. As in the Pelly Mountains coarse crystalline galena and sphalerite with minor argentiferous tetrahedrite occur as irregular lenses and as fillings of weak fractures in a variety of strata to which they are genetically unrelated. Vera host rocks are ankeritic algal laminated dolomite of the Gillespie Lake Group (Proterozoic); on the Val they are light grey, sugary dolomite of the Cambrian to Devonian Mackenzie Platform and at the Craig showings the veins are hosted in silicified dolomite that is probably Paleozoic. At the Vera about 270,000 tonnes, with roughly 300 gm/tonne silver have been blocked out.

Lenses of massive galena and argentiferous tetrahedrite occur in folded and thrust faulted Paleozoic sedimentary rocks within Selwyn Basin on the Plata property (Morin et al, 1977, p. 111-114). The mineralized lenses follow irregular brecciated zones and are not fracture fillings; they lack structural control. Bulk samples from three showings returned between 5000 and 7500 gm/tonne silver and 70% lead.

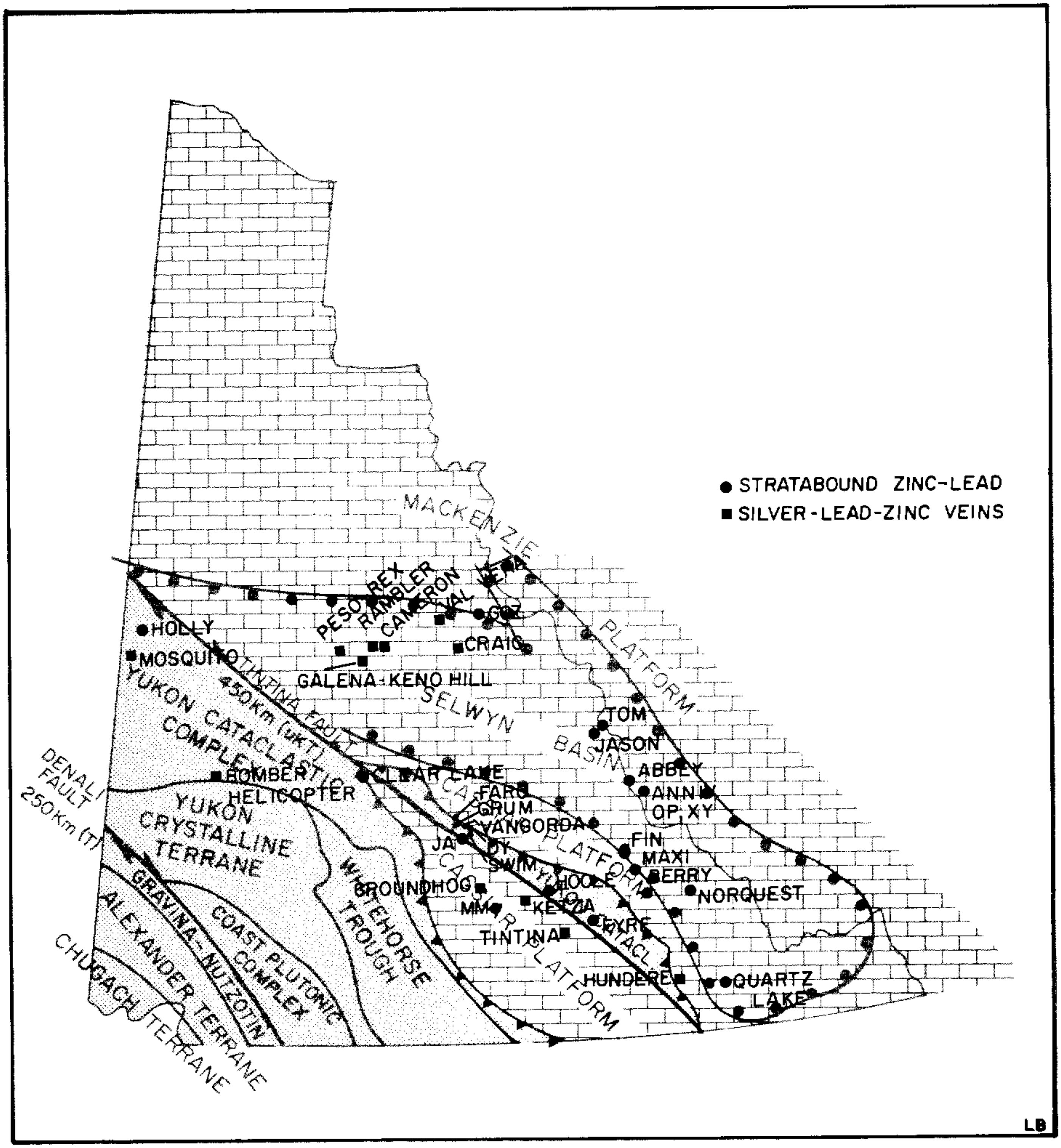
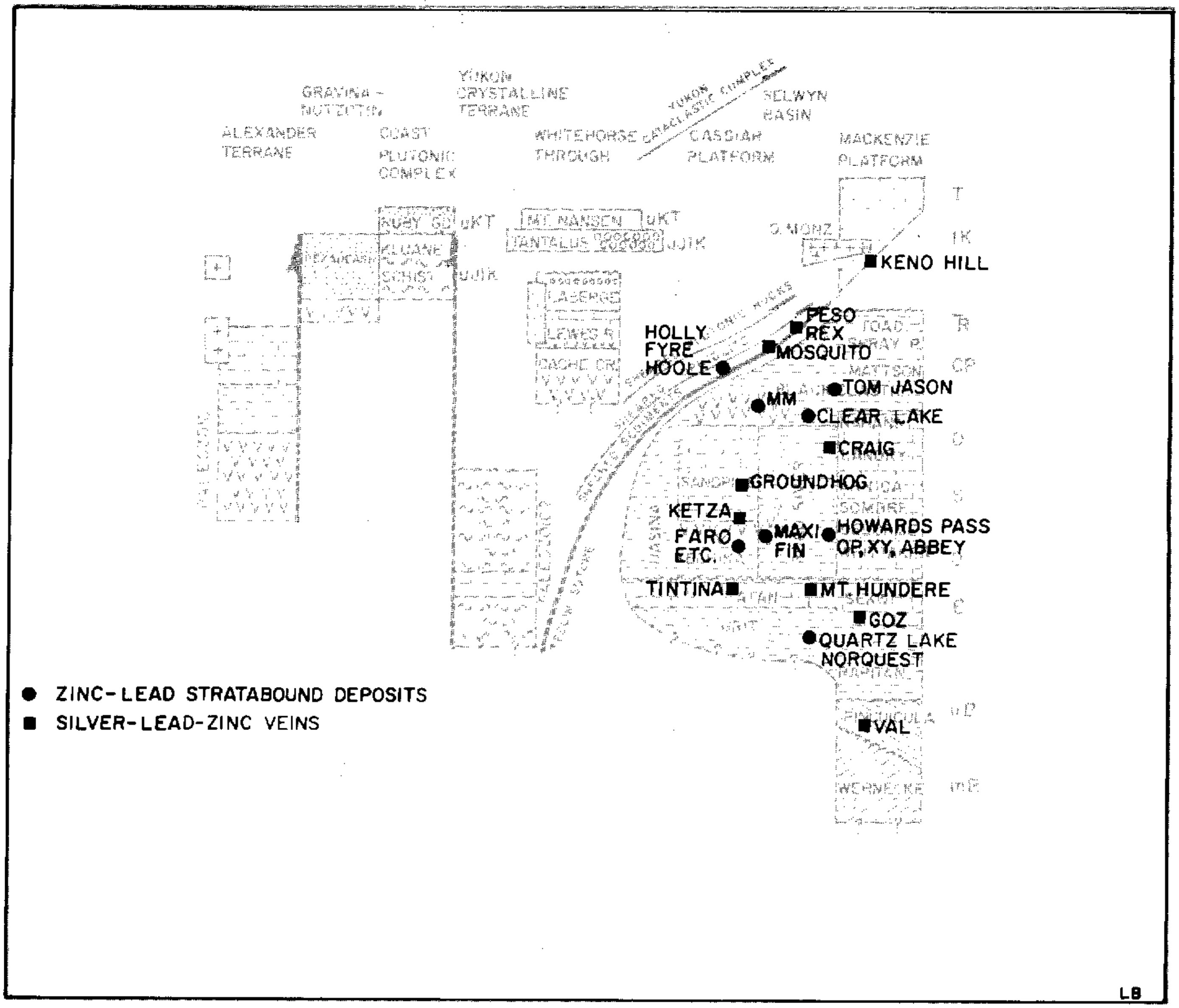


Figure 7a & 7b

Sketch map and columnar sections to show the distribution of stratabound zinc-lead deposits and silver-lead-zinc veins in relation to the tectonic elements. Note that these deposits are restricted to the ancient North American margin.



The most encouraging silver properties in the Pelly Mountains are Tintina, Ketza and Groundhog. At Tintina (Green and Godwin, 1963, p. 26-29) coarse-grained galena and brown sphalerite with argentiferous tetrahedrite occurs as irregular shaped and variously oriented lenses and fills small veins. The host is limestone of the Lower Cambrian Atan Formation in Cassiar Platform. It is repeated by northeast directed thrust faults and folded, and a Cretaceous quartz monzonite plug intrudes the limestone about 1 km north of the showings. Some 90,000 tonnes with 620 gm/t silver, 6% lead and 10% zinc are indicated.

At Ketza River (Green, 1966, p. 64-68) medium-grained galena and sphalerite with argentiferous tetrahedrite in a gangue of siderite and quartz fill irregular fractures and form pods in various Paleozoic strata of Cassiar Platform. Some mineralization is in phyllite of the Kechika Group, some in Siluro-Devonian dolomite and siltstone and another showing is in Devono-Mississippian slate and volcanic rocks. In the "A vein" about 170,000 tonnes are indicated with 12% lead and 527 gm/t silver.

On the Groundhog (Findlay, 1969, p. 46-47), 30 km west of Ketza, massive coarse-grained galena with minor pyrite in quartz siderite gangue occurs as irregular fracture fillings or lenses enclosed by Siluro-Devonian dolomite (Sandpile Formation in Cassiar Platform). A 60 x 5 m shoot grading 266 gm/t silver and 14.7% lead has been outlined.

At Mount Hundere (see elsewhere this report and Abbott, 1977), 55 km north of Watson Lake, a lens of massive coarsely crystalline galena and sphalerite, is crudely conformable with bedding in Lower Cambrian limestone of the Atan Formation. The showings are exposed in a structural culmination that may lie above a covered intrusion and as such they may be mantos or skarns rather than vein occurrences. About 71,000 tonnes with 73.1 gm/t silver, 15.6% lead and 18.9% zinc have been outlined.

The Bomber, Helicopter and Mosquito differ from the other silver bearing veins because they are in strata that are part of the accreted system. This type of mineralization has escaped intensive exploration so far. Mineralogically they resemble other silver -lead-zinc deposits but the host rocks differ. The Bomber-Helicopter (Findlay, 1967, p. 32-34) showings in the Dawson Range are a series of silver bearing veins in wide sheared zones near Casino. On the Bomber is a 45 m wide, northwest trending, near vertical shear zone with several subparallel mineralized veins which are up to 3 m wide locally. The shear zone cuts equigranular medium-grained saussuritized biotite hornblende granodiorite in a Cretaceous part of Klotassin Batholith. The veins contain lenses of massive sulphides, mainly galena with less sphalerite, pyrite and chalcopyrite in quartz barite gangue. A 50-tonne hand sorted sample of mineralization contained 4991 gm/t silver and 68.0% lead. The Helicopter is like the Bomber, and in the same host. The mineralization may be genetically related to the Mount Nansen Group and to the Casino porphyry copper occurrences.

At Mosquito Creek (Craig and Laporte, 1972, p. 32-34), 60 km west of Dawson, silver bearing galena veins cut the Pelly Gneiss. Two northeast trending veins 1/2 to 1 m wide are known. One, traced discontinuously for about 1000 m, has average grades of 707 gm/t silver, 0.96 gm/t gold and 19.95 lead for 50 m along the vein. The Pelly Gneiss is a Devonian granodiorite metamorphosed and partly mobilized in the Cretaceous. Near the showings the rocks are invaded by a small monzonite plug, probably subvolcanic to the Carmacks basalt and therefore Paleocene. The mineralization may be genetically related to this plug.

DEPOSITS IN THE ACCRETED SYSTEMS

Copper Skarns, Porphyries and Massive Sulphides

In contrast to the zinc-lead deposits and the silver bearing veins, which are confined essentially to ancient North American strata, copper concentrations occur largely in the accreted arc system (Figure 8). Four important groups and one minor type are known. Whitehorse copper type are skarns in Upper Triassic limestone, Casino type are porphyry coppers associated with the Late Cretaceous to Tertiary Mount Nansen group, Minto type are porphyries in Triassic hornblende granodiorite and Hart River is a massive sulphide in Proterozoic volcanics.

Whitehorse Copper skarns are developed in a 15 km long belt from dolomite of the Lewes River Group where it is intruded by Cretaceous hornblend granodiorite on the west side of Whitehorse Trough (Kindle, 1964). Two skarns, a grossular-diopside-tremolite mixture and a magnetite rich variety are found. Copper occurs in both as massive lenses or disseminations of bornite and chalcopyrite with less common minerals such as valeriite. Gold is present locally as are scheelite and molybdenite. Copper in the skarns is concentrated by the granodiorite, but whether the metal is derived from this intrusive or from the invaded sedimentary and volcanic rocks is unknown. Volcanics of the Lewes River Group have exceptional copper backgrounds. Lewes River limestone continues far northwest of Whitehorse and is locally invaded by granodiorite, but although skarns exist they lack significant copper.

Seven deposits were mined in the copper belt between 1900 and 1920 and 153,000 tonnes of high grade were shipped. From 1964 to November, 1980 the Whitehorse copper belt has produced 8.5 million tonnes of ore at an average grade of 1.40% copper from the Little Chief, Arctic Chief, War Eagle, Black Cub and Keeweenaw deposits.

Several small skarns, genetically unrelated to the Whitehorse copper type, but similar in mineralogy are known near Hopkins Lake. They are chalcopyrite, bornite lenses in tremolite-diopside skarn made from possibly Cambrian marble in Yukon Crystalline Terrane next "Klotassin Suite" granodiorite.

Casino type are classic porphyries (Sinclair, 1978) and include several deposits: besides Casino (Craig and Laporte, 1972, p. 55-57) itself are Mt. Cockfield (Craig and Laporte, 1972, p. 64), Cash (Marchand et al , 1978, p. 70-71), Yukon Revenue (Craig and Laporte, 1972, p. 79-84) and Mount Nansen in the Dawson Range. Each contains disseminated chalcopyrite and molybdenite within subvolcanic parts of the Late Cretaceous to Paleocene Mount Nansen Group. Casino has 160 million tonnes at 0.37% copper and 0.04% molybdenum and at Cash, an area 2500 m x 800 m has dissseminated chalcopyrite and molybdenite at about 0.2% copper equivalent.

Minto type (Sinclair, 1977) includes Minto, Williams Creek (Abbott, 1971) and STU (this report elsewhere) in a 40 km long belt northeast of Carmacks. The occurrences are identical, consisting of chalcopyrite and bornite disseminated in biotite rich zones within foliated hornblende granodiorite. The granodiorite makes up Carmacks Batholith a pluton of Upper Triassic to Lower Jurassic Klotassin granodiorite intruded in Yukon Crystalline Terrane. The pluton may be the deeply eroded root of the Lewes River volcanics. At each occurrence several mineralized zones, conformable with the foliation in the granodiorite, are known. These zones are generally a few metres wide and one or two hundred metres long; at Minto they dip moderately, but at Williams Creek dips are steep. The deposits may be genetically related to an event that metasomatized the rocks emplacing K-feldspar widely about Middle or Late Jurassic time. Reserves at Minto are 6.5 million tonnes at 1.86% copper, 3.2 gm/t silver, 0.46 gm/t gold and at Williams Creek 14.5 million tonnes at 1% copper with low silver and gold.

Hart River (Morin, 1978) is a steep-dipping 30 m thick, 200 m long lens of massive pyrite, pyrrhotite, sphalerite and chalcopyrite in siliceous black argillite of the Proterozoic Gillespie Lake Group. The strata are invaded by diabase dikes, and basalt is interbedded with the host rocks, so that the deposit may have a proximal exhalative origin. About 520,000 tonnes with 1.45% copper, 3.65% zinc, 0.87% lead, 45 gm/t silver and 1.25 gm/t gold have been proven.

The Pike (Findlay, 1967, p 60-62) is an interesting occurrence of veinlets and disseminated arsenopyrite, chalcopyrite, pyrite, galena and sphalerite at the edge of a small quartz feldspar porphyry belonging with the South Fork Volcanics. As the only known showing in these rocks it is an untested indicator of their potential. The mineralized zone is estimated to contain 2,250 tonnes per vertical foot averaging 0.6% copper and 70 gm/t silver.

Gold Veins

Gold lodes in Yukon occur in four districts: on Montana Mountain near Carcross, in the Mount Nansen area west of Carmacks, on Dublin Gulch north of Mayo and in the Klondike (Figure 8). At Montana and Mount Nansen the mineralization is in, and probably genetically related to, the Late Cretaceous to Paleocene Mount Nansen Group; in the other districts the enclosing rocks are incidental hosts. Three occurrences outside the main camps are the AJ, Cache Creek and Moosehorn. Mount Nansen and Montana gold is in some of the youngest felsic volcanics laid across the accreted part of the Cordillera; that in the Klondike is part of the Mesozoic subduction complex accreted to North America. At the AJ and Dublin Gulch the host rocks differ and are incidental, the gold is likely derived from, and mobilized by, Cretaceous quartz monzonite that had no extrusive component. The most exciting possibilities are with the Klondike type which may be as widespread as their host.

Montana Mountain near Carcross hosts a number of gold bearing quartz sulphide veins mined at various times since early this century (Green, 1966, p. 55-60; Findlay, 1967, p. 46-50; also see elsewhere this report). Arctic Caribou, Big Thing and Peerless are the main properties on the north side of the mountain and Venus and Vault are part of a more southerly vein system. The veins range from narrow discrete, single structures, to wider stockworks of branching veinlets and contain pyrite, arsenopyrite and sphalerite with minor galena and chalcopyrite in quartz gangue. Well mineralized zones average 30 gm/t gold and 500 gm/t silver. The Arctic Caribou vein system dips gently or moderately northwest and is enclosed in medium-grained hornblende granodiorite, a Paleocene plutonic phase of the Mount Nansen Group. The Venus vein, traced for 1500 m, dips moderately west-northwest in intermediate to acid volcanic rocks of the Mt. Nansen Group. Reserves at Venus (1980) are 108,000 tonnes with 6.84 gm/t gold and 205.3 gm/t silver with lead, zinc and cadmium values.

Gold veins of the Mount Nansen district include the Laforma and Guder on Freegold Mountain, and the Webber, Huestis and Brown-McDade near Mount Nansen 25 km south. Most of these deposits were high graded in the mid-sixties.

At Laforma (Green, 1965, p. 28-31) gold occurs in a northeast trending quartz vein that cuts Jurassic granodiorite invaded by Paleocene quartz-feldspar porphyry dikes. About 60,000 tonnes at 13 gm/t gold are probable. Several similar showings are known of which Guder is one of the most promising. On the Webber (Green, 1965, p. 35-36) two steeply southwest dipping veins, ranging from a single structure to a branching stockwork 2 or 3 m across the containing quartz with arsenopyrite, pyrite, galena and sphalerite are found. Average grade of the veins is 12 gm/t gold and 690 gm/t silver. The host rock is schist of Yukon Crystalline Terrane that is most likely Late Precambrian, but these schists are cut by quartz feldspar porphyry dikes (Mount Nansen Group) with which the mineralization is associated. The Huestis, just southwest of the Webber, has the same host rocks and vein mineralization of the same mineralogy and grade, but the veins dip steeply northeast.

At Brown-McDade (Findlay, 1969, p. 35-38), 2 km to the east of Webber, a steeply southwest dipping shear zone in Middle Jurassic biotite quartz monzonite carries lenses of quartz with arsenopyrite and pyrite. Gold is concentrated in the footwall. About 50,000 tonnes at 11.5 gm/t gold and 183 gm/t silver proven and probable were known in 1970. The mineralization is probably related to the Tertiary Mount Nansen Volcanics nearby and not the enclosing quartz monzonite.

On the south side of Dublin Gulch is a branching network of quartz arsenopyrite veins that cut sheared metamorphic rocks (Nisutlin Assemblage) on the northern flank of the Potato Hills stock, a Cretaceous quartz monzonite. The vein system can be traced for 2.5 km although individual veins are only 100 or 200 m long. Veins have sharp boundaries and are between 10 cm and 1 m wide. Most trend northeast and dip moderately northwest. Gold values between 10 and 30 gm/t gold, over widths near 1 m, are common. (MacLean, 1914, p. 128-158). The veins contain quartz, arsenopyrite, pyrite and gold and are generally oxidized with much scorodite. Jamesonite, like that in the silver bearing Peso and Rex veins, 6 km to the west, is found in the centres of some of the veins. Mostly likely the mineralization of the argentiferous Peso-Rex and the auriferous Dublin Gulch vein systems is genetically related to the Potato Hills Stock.

The Lone Star is the best known lode gold occurrence in the Klondike (McLean, 1914, p. 20-37). Irregular white quartz lenses or "sweats", as much as a metre thick, are interfoliated with quartz muscovite schist (Klondike Schist) and contain gold in a 200 m long, 3 m wide zone. The quartz lenses make up about a quarter of the rock and contain disseminated pyrite and gold. The property was mined in 1910; 2300 tonnes milled averaged between 5 and 6 gm/t gold. The Mitchell and Violet Groups (Bostock, 1957, p. 348-349) also in the Klondike, have gold in quartz lenses in the Klondike Schist like the Lone Star. The occurrences are not simple veins, but structurally disconnected, transposed remnants of veins sweated from the schist while it was sheared and metamorphosed about the Early or Middle Jurassic. In this respect the deposits resemble Holly type lead-zinc occurrences. The gold was probably mobilized from the enclosing schist with the quartz. Minor gold values are also found in the schist. Quartz lenses like those that contain the gold are widespread in the Klondike Schist and this suggests the possibility of mineralization elsewhere in these rocks.

At the AJ (Morin et al, 1977, p. 142) and Thor (this report) several arsenopyrite bearing quartz veins cut hornfelsed slate and quartzite of the Grit Unit (Late Proterozoic). The showings are at the east and west margins of the Antimony Mountain stock, a Cretaceous quartz monzonite. The veins are between 1/2 and 2 m wide and may average near 30 gm/t gold with some silver. Similar mineralization with the same gold content is known on the Thor claims at the northwest side of the Antimony Mountain stock in the same host. Like that at Dublin Gulch the veins are probably related to the quartz monzonite.

On Cache Creek (Skinner, 1961, p. 34-40) in the Pelly Mountains a 200 m long, 4 m wide lens of pyrrhotite, arsenopyrite, pyrite and chalcopyrite is found near a fault that separates Lower Cambrian limestone from Eocambrian, greenish grey slate. About 70,000 tonnes grading 10 gm/t gold are known. The

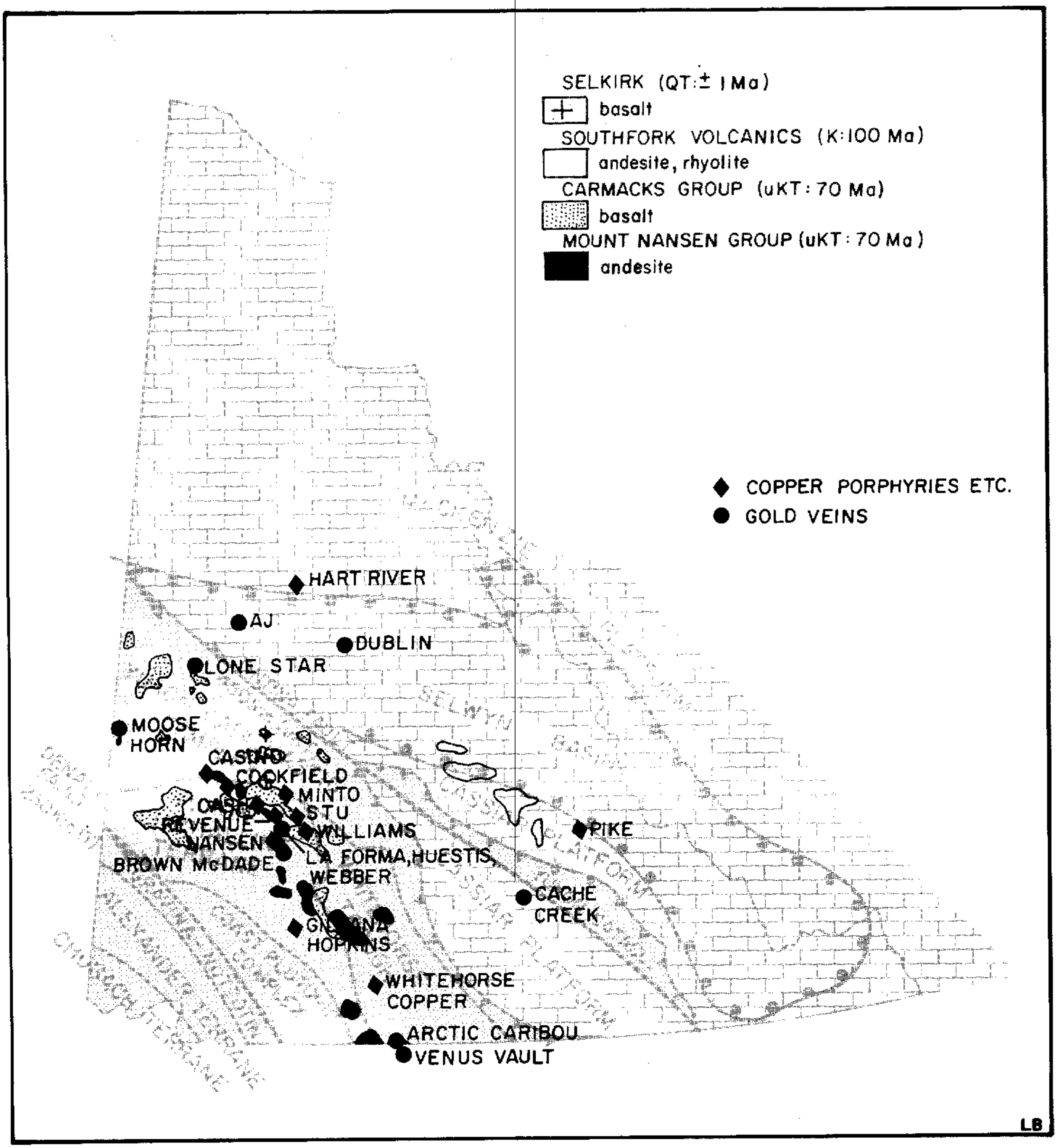
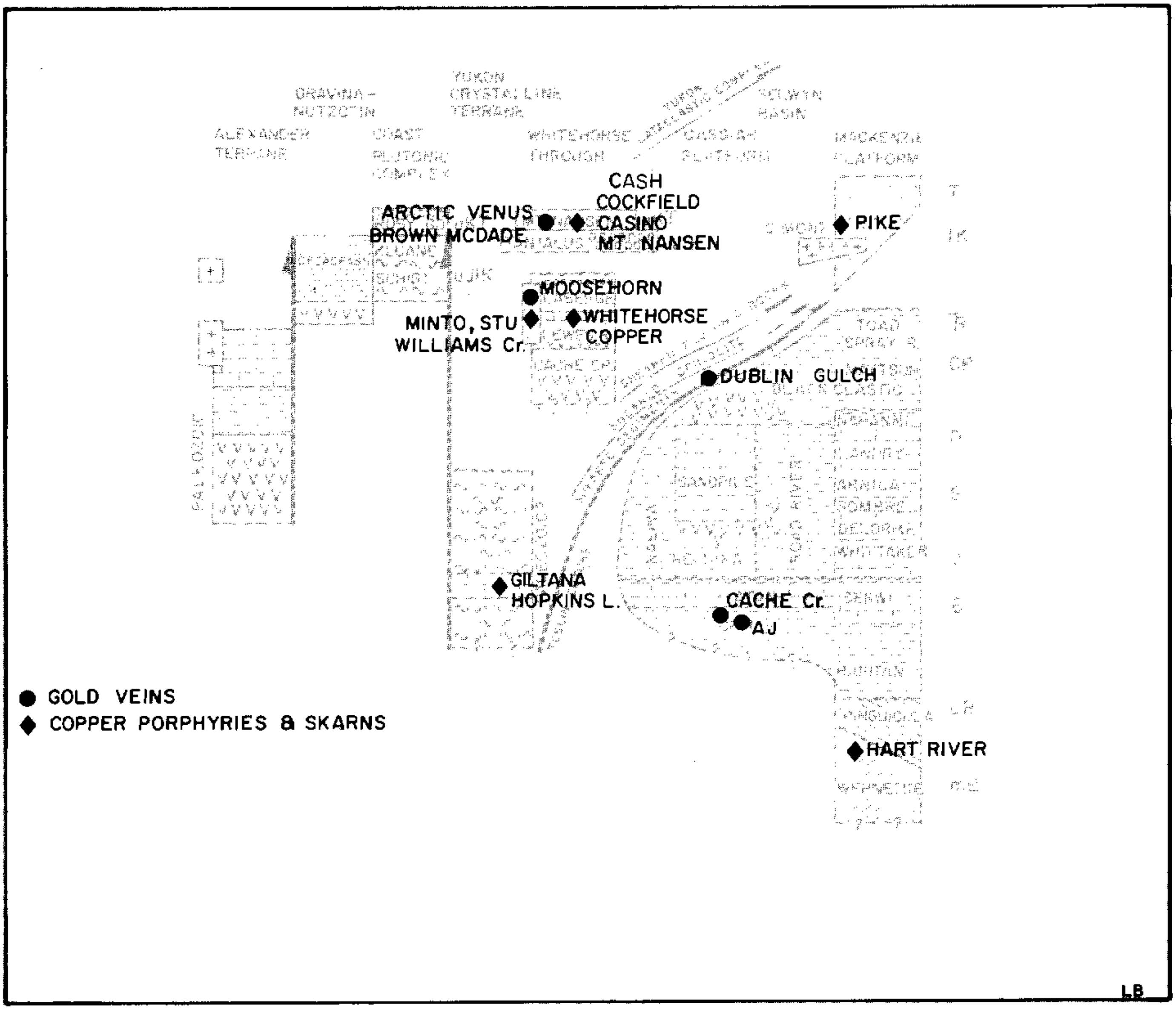


Figure 8a & 8b

Sketch map and columnar sections to show the distribution of copper and gold deposits in relation to the tectonic elements. Note that these occurrences cluster in the accreted terranes. Contrast this with Figure 7.



mineralization is probably fracture controlled and may be related to the silver showings of the Ketza area.

Auriferous quartz veins with arsenopyrite, galena, boulangerite and sphalerite are known in the Moosehorn Range (Morin et al, 1977, p. 33-46). The veins trend generally northwest, are 10 or 20 cm wide, and cut granodiorite that is part of the composite Klotassin Batholith. Gold values between 30 and 250 gm/t gold have been obtained across the veins. The host rocks are incidental and the mineralization may be related to Tertiary hornblende porphyry dikes that cut the Mesozoic granodiorite and which are part of the Carmacks Group.

The potential for bulk tonnage gold in Yukon is perhaps best in areas of known vein occurrences and peripheral to porphyry copper-molybdenum showings. Both these criteria suggest that the Mount Nansen Group warrants careful prospecting. The Klondike Schist is a second important target unit for such occurrences. Strata peripheral to some of the Cretaceous quartz monzonite plugs may stand a close look for bulk gold.

DEPOSITS ASSOCIATED WITH CRETACEOUS QUARTZ MONZONITE

Tungsten, tin and molybdenum deposits in Yukon are spatially and genetically associated with the Cretaceous quartz monzonite intruded in the ancient North American margin (Figure 9). From northeast to southwest a gross zoning of these deposits is evident. Most tungsten occurrences are found at the margins of the small discordant plutons in the northeastern part of the quartz monzonite belt. Tin occurrences are known only in the central and southwestern parts of the plutonic belt and molybdenum, with tungsten, is found in the southwest part where the large semiconcordant batholiths occur. The reason for this deposit zoning is not known.

Tungsten

Yukon has an unusual number of significant tungsten deposits including Mactung (Findlay, 1969b, p. 52-53; Sinclair and Gilbert, 1975, p. 19-20; Harris, 1977) Potato Hills (elsewhere this report) and Logtung (Marchand et al, p. 78). A current producer, Cantung (Blusson, 1968), is just outside Yukon in the Northwest Territories. Other Yukon occurrences include the Boot and Marmot south of Finlayson Lake, the Bailey south of Frances Lake (elsewhere this report), Stormy Mountain (Skinner, 1961, p. 41-42) and Risby (Morin et al, 1980, p. 37-38) in the Pelly Mountains, the Clea and IVO (elsewhere this report) northwest and southeast of Cantung respectively and the Fidler on the Yukon-B.C. border. Each occurrence is intimately associated with a quartz monzonite pluton of the extensive mid-Cretaceous suite that is confined to the ancient North American part of the Cordillera. Cantung, Mactung and IVO are next to comparatively small discordant plutons at the northeast edge of Selwyn Basin and Potato Hills, Boot, Risby, Bailey and Stormy are at the margins of the more concordant, larger intrusions near the southwest side of Selwyn Basin or in Cassiar Platform.

In most showings (i.e. Cantung, Mactung, IVO, Risby, Bailey, Storm and Clea) tungsten occurs as scheelite in massive, coarse-grained garnet diopside tremolite skarn with pyrrhotite and minor chalcopyrite. The skarns are developed from calcareous strata, mostly shaly parts of the Lower Cambrian Atan and Sekwi Formations or the limy shale of the Cambro-Ordovician Kechika Group-Rabbitkettle Formation. Few tungsten bearing skarns are developed from the thick Siluro-Devonian carbonate or in other limestones intruded by the quartz monzonite.

The Potato Hills, Boot and Marmot showings are also closely associated with Cretaceous quartz monzonite plutons, but their hosts are not the Lower Paleozoic ancient North American strata. Instead the highly sheared rocks of Yukon Cataclastic Complex thrust above the "in place" strata contain the skarns. At Potato Hills limy horizons (but not the marbles) within Nisutlin Allochthonous Assemblage are converted to tungsten skarn and at the Boot a part of Anvil Allochthon that originated as basalt has been transformed to skarn. The skarns have similar mineralogy to the others, but are not the massive rocks of the other deposits and tend to be fine-grained; many retain the strongly layered fabric of their cataclastic precursor.

Logtung (Marchand et al, 1977, p. 78) and Fidler differ from the other tungsten showings in their geology. Logtung is a porphyry deposit with scheelite and molybdenite disseminated in a stockwork of quartz veins in one of the Seagull intrusions, a quartz monzonite stock of the Cretaceous suite. Logtung has its host rocks and porphyry style in common with the Red Mountain molybdenite occurrence. At Fidler, quartz veins with wolfranite, galena, cassiterite, scheelite, fluorite, pyrite and minor other sulphides cut Lower Cambrian limestone (Atan Formation) northeast of the Cassiar Batholith, but no intrusive rocks are exposed nearby.

The size of some of the deposits is indicated in the following table.

Mactung: indicated 27,000,000 tonnes 0.9% WO_3.
Bailey: indicated 270,000 tonnes @ 0.96% WO_3.
Stormy: probable 13,500 tonnes @ 0.73% Mo or
15,300 tonnes @ 1.5% WO_3.
Cab-Risby: possible 310,000 tonnes @ 1.02% WO_3.
Potato Hills: possible-probably more than 5,000,000
tonnes @ 0.5% WO_3.
Logtung: geological 160,000,000 tonnes @ 0.12%
WO_3 0.052% MoS_2.
Fidler: geological 30x30 m @ 8.45% WO_3.

Several small chalcopyrite bearing skarns near Hopkins Lake also contain some scheelite (see elsewhere this report). They are hosted in a probable Lower Cambrian marble metasomatized next to an intrusion of the Triassic Klotassin suite within the accreted terrane. These occurrences in Yukon Crystalline Terrane are a second tungsten belt in Yukon, genetically unrelated to the Cretaceous quartz monzonite with which the others are associated.

Tin

Cassiterite is known near the Seagull Batholith in southern Yukon and in the Dublin Gulch-McQuesten area north of Mayo. In both areas the tin is spatially associated with the Cretaceous granite and quartz monzonite. None of the occurrences are explored sufficiently to be sure of their size. The occurrence on Tin dome (Dublin Gulch) is the best documented (Thompson, 1945). Here tourmaline and cassiterite occur in narrow fractures between fragments in an irregular shaped breccia zone. The incidental host rocks are schist of Nisutlin Allochthon on the north side of the Potato Hills Stock and the mineralization is genetically related to it. Though not drilled, the showing has been explored on surface and mineralization is known over an area 60 m x 250 m. The host rocks are fresh and the mineralization stops abruptly at fracture edges. Cassiterite in the McQuesten area occurs in skarns near small basic intrusive bodies.

Two showings near the northwest end of Seagull Batholith (see elsewhere this report) illustrate the variety of mineralization styles seen there. The JC is a cassiterite bearing skarn within limy strata of Nisutlin Allochthon above the gently dipping contact of the quartz monzonite. The MC has a swarm of parallel, cosely spaced fractures, each a few millimetres wide partly filled with cassiterite, within thermally metamorphosed schists above Seagull Batholith.

Molybdenum

Several porphyry copper occurrences in which molybdenite is an important constituent along with chalcopyrite are known in the Dawson Range. These include Casino, Cash and Mount Cockfield which occur within Mount Nansen group subvolcanic strata (Sinclair, 1978). Other deposits with significant molybdenite as the second mineral are the scheelite-molybdenite porphyry at Logtung and the skarn of Stormy Mountain. These deposits, characterized elsewhere are related genetically to the Cretaceous quartz monzonite.

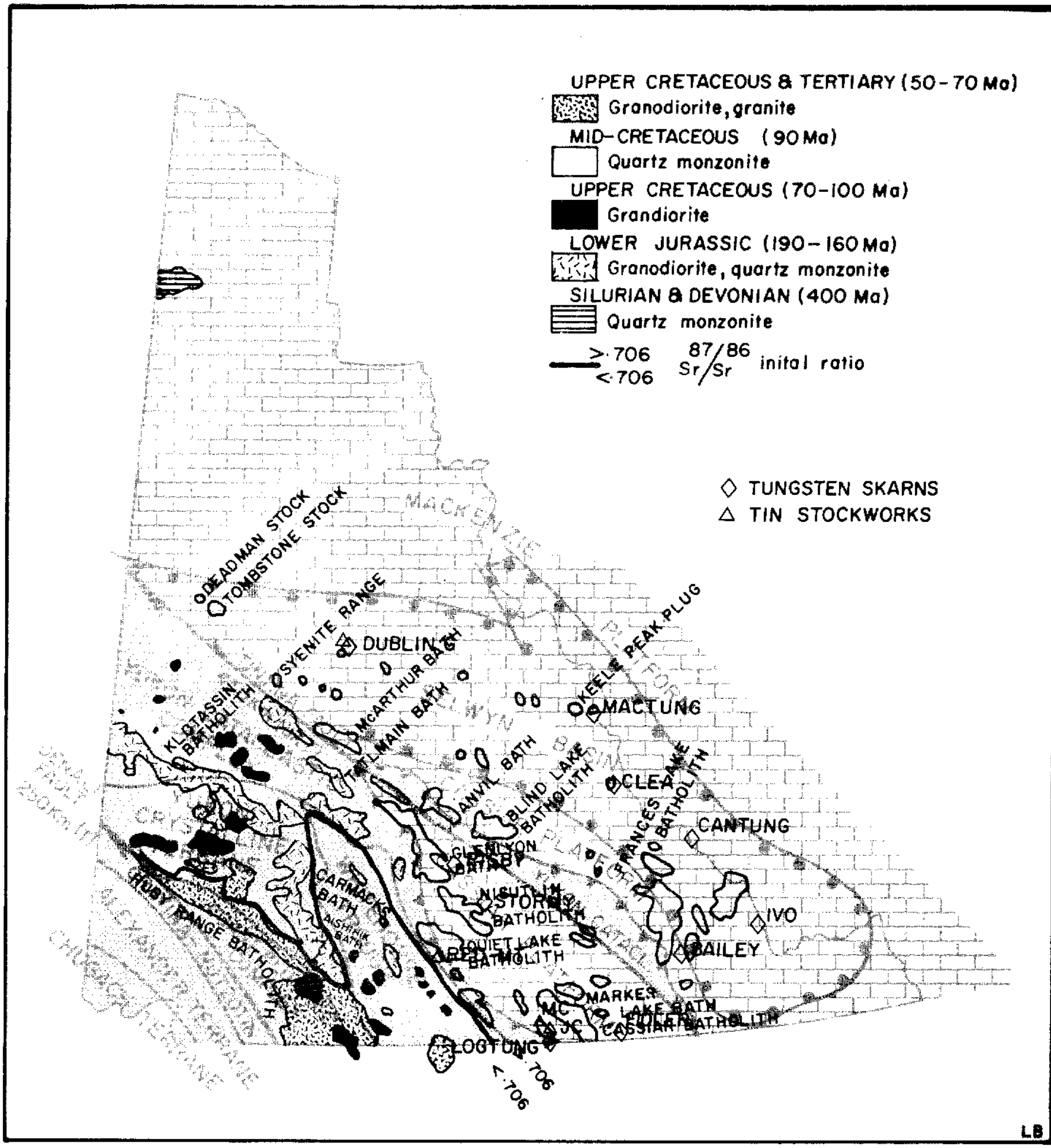


Figure 9

Sketch map to show the distribution of tungsten and tin deposits in relation to the plutonic rocks and tectonic elements. Occurrences of tungsten and tin are related to the mid-Cretaceous quartz monzonite that intrudes the ancient North American margin.

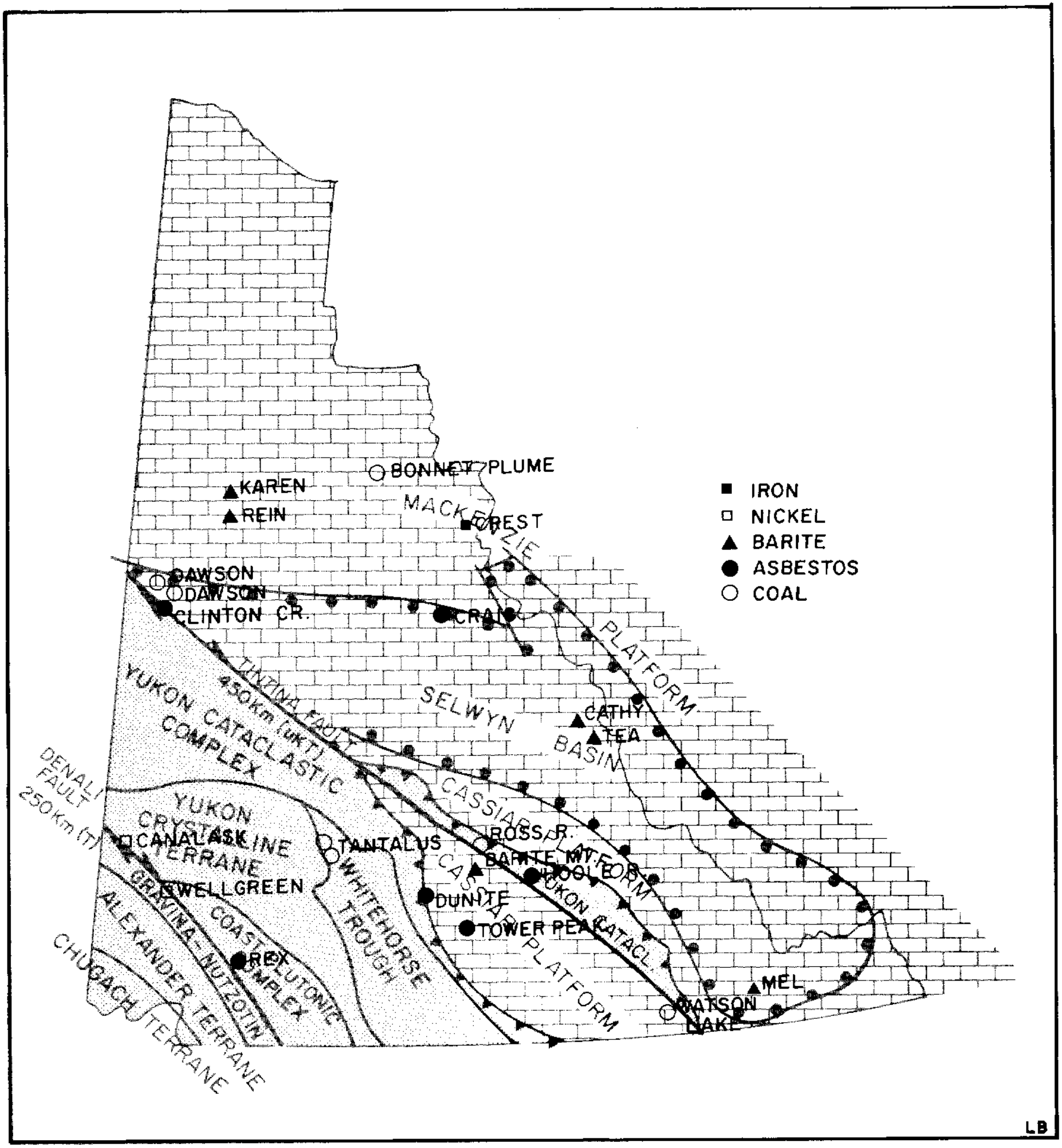
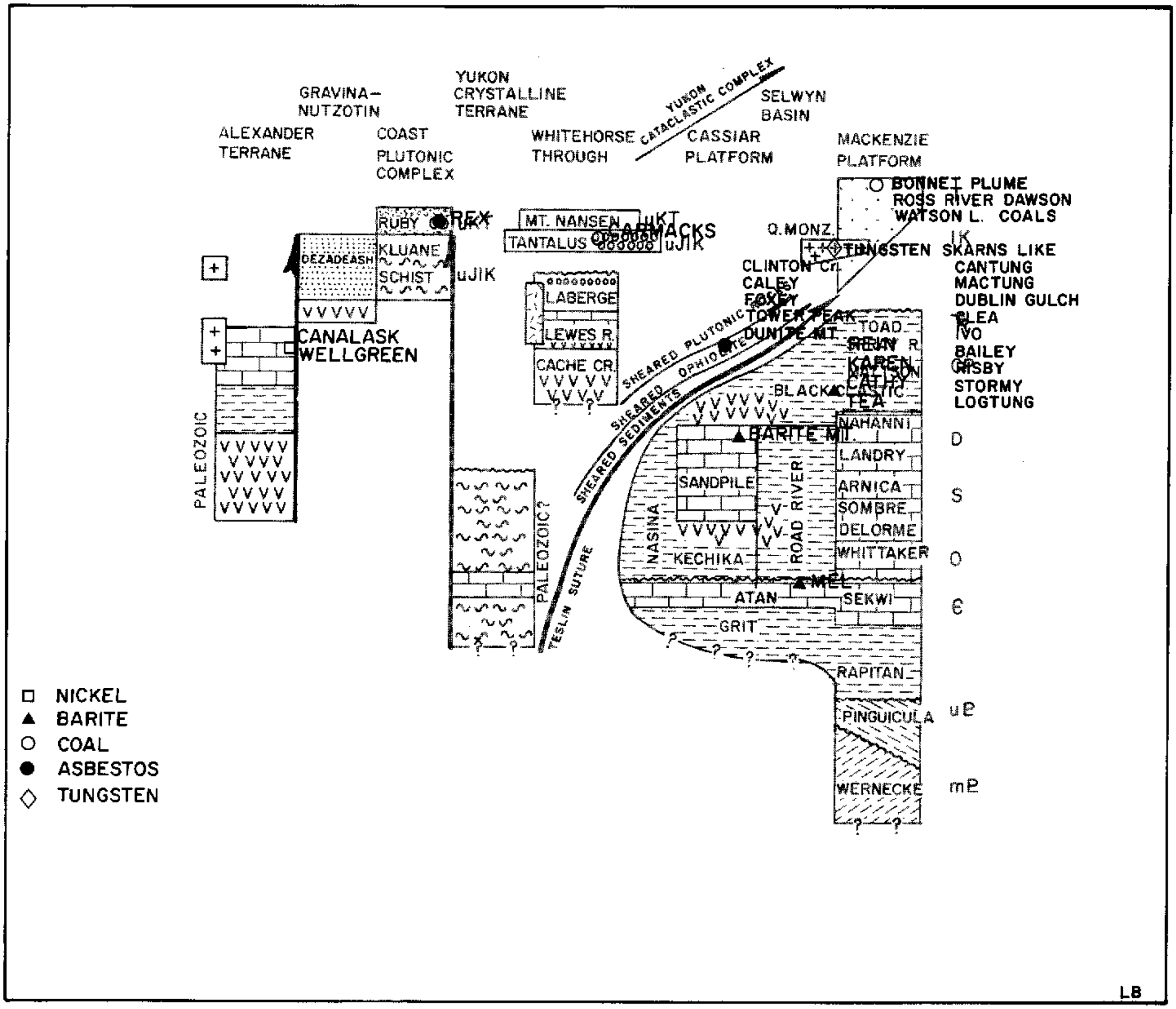


Figure 10a & 10b
Sketch map and columnar sections to show the distribution of iron, nickel, barite, asbestos and coal deposits.


GRAVINA–NUTZOTIN
YUKON CRYSTALLINE TERRANE
YUKON CATACLASTIC COMPLEX
SELWYN BASIN
ALEXANDER TERRANE
COAST PLUTONIC COMPLEX
WHITEHORSE THROUGH
CASSIAR PLATFORM
MACKENZIE PLATFORM
BONNET PLUME
ROSS RIVER DAWSON
WATSON L. COALS
TUNGSTEN SKARNS LIKE
CANTUNG
MACTUNG
DUBLIN GULCH
RUBY
REX
DEZADEASH
KLUANE SCHIST
uJIK
MT. NANSEN
TANTALUS
CARMACKS
Q.MONZ.
CANALASK
WELLGREEN
LABERGE
LEWES R.
CACHE CR.
CLINTON Cr.
TOWER PEAK
DUNITE MT.
SHEARED PLUTONIC
SHEARED OPHIOLITE
SHEARED SEDIMENTS
TEESLIN SUTURE
PALEOZOIC
PALEOZOIC?
BLACK
BARITE MT.
SANDPILE
ROAD RIVER
NASINA
KECHIKA
ATAN
GRIT
MEL
TOAD
NAHANNI
LANDRY
ARNICA
SOMBRE
DELORME
WHITTAKER
SEKWI
RAPITAN
PINGUICULA
WERNECKE
STORMY
LOGTUNG
BAILEY
D
S
O
Є
uP
mP
NICKEL
BARITE
COAL
ASBESTOS
TUNGSTEN
LB

Red Mountain (Craig and Laporte, 1972, p. 121) is Yukon's sole molybdenite deposit per se. A stockwork of quartz veins within quartz monzonite is host to disseminated molybdenite and pyrite with few other sulphides. An area 1000 m x 300 m contains nearly 0.1% MoS_2 to depths about 1000 m. The quartz monzonite host is an outlying stock of the Quiet Lake Batholith and is part of the Cretaceous suite associated with the ancient North American margin. As such, Red Mountain is genetically comparable to the Logtung deposit.

MISCELLANEOUS OTHER DEPOSITS

Iron

Crest (Dahlstrom, 1972; Green and Godwin, 1963, p. 15-18) is an iron deposit estimated to contain 30 or 40 billion tonnes of strippable, high phosphorous ore with 40% to 50% iron. It is at the headwaters of Snake River near the Northwest Territories border (Figure 10). Hematite and jasper iron formation occur in 120 m interval in the lower part of the Rapitan Group. The Rapitan is a Proterozoic pebbly mudstone of possible glacial origin correlated roughly with the "Grit Unit" and deposited on the ancient North American element in Mackenzie Platform. The unit is unconformably overlain by Ordovician dolomite and only erosional remnants are preserved beneath this unconformity in the area of interest. Crest, Yukon's sole iron deposit, is presently too remote for mining and its high phosphorous is a problem in smelting.

Nickel

Two nickel deposits, Wellgreen (Campbell, 1977) and Canalask (Findlay, 1969, p. 65-68) occur 60 km apart in the Kluane Ranges immediately southwest of Shakwak trench (Figure 10). They are in serpentinized ultramafic sheets within Permian sedimentary and volcanic strata. Nickeliferous pyrrhotite with pentlandite, sphalerite, pyrite and chalcopyrite forms massive lenses and are disseminated in the volcanic rocks. Wellgreen contained 650,000 tonnes with 2.05% nickel, 1.42% copper before mining. During 1972-1973, 170,000 tonnes with 2.30% nickel, 1.40% copper, 2.02 gm/t platinum and 0.073% cobalt were milled.

Asbestos

Deposits of asbestos are associated with four sets of ultramafic rocks. Most showings are in bodies of the areally extensive alpine-type ophiolites that are part of the Anvil Allochthonous Assemblage of Yukon Cataclastic Complex (Figure 10). They include the Clinton Creek (Htoon, 1976) and several other showings near Dawson (Foxy, Caley, Tjop), the Tower Peak, Hoole River and Dunite Mountain showings in the Pelly Mountains and small occurrences south and west of Frances Lake. Cassiar Asbestos, in northern B.C. also belongs to this group. In all the showings asbestos occurs as fillings of irregularly oriented fractures of varied width that post-date the strain fabric in the serpentinite. The host rocks are probably Late Paleozoic and the asbestos was likely emplaced during final tectonism when the strata were thrust over the ancient North American margin about the Jura-Cretaceous.

Two or three small showings northeast of Marsh Lake are in ultramafics associated with the Pennsylvanian-Permian Cache Creek Group of Whitehorse Trough. The Rex near Haines Junction (Findlay, 1967, p. 55-56) is enclosed by the third ultramafic suite, an Alaskan type body (?) of Cretaceous age within the Coast Plutonic Complex. Like those near Marsh Lake the peridotite lacks the penetrative strain fabric that characterizes many of the ultramafics in Anvil Allochthon. Finally, asbestos is known in serpentinized peridotite of Early Paleozoic (?) age near the northern edge of Selwyn Basin where the Dawson fault exposes possible oceanic material that floors part of the Basin (Craig property).

Barite

Yukon's barite occurrences include the Mel, Barite Mountain, Tea, Karen, Rein, Cathy and Barite; none are currently being mined. They include bedded and vein types, but all are in ancient North American Paleozoic strata close to the edges of Selwyn Basin (Figure 10). The bedded variety includes the Tea, Cathy (Sinclair et al, 1976, p. 29), Rein and Barite occurrences, where thin-bedded to laminated fine-grained, light grey barite forms stratum-confined lenses within black slate stratigraphically low in the Mississippian "Black Clastic" or Earn Group. The lenses can be traced laterally for hundreds of metres and are commonly tens of metres thick. They interfinger with the barren strata laterally and up section and the barite is simply a facies of the black slate unit. The bedded deposits are stratigraphically and geographically close to the Tom-Jason bedded lead-zinc-silver-barite deposits (Carne, 1979). Two showings of the same type and in the same host rocks are known in the Pelly Mountains northwest of Mount Cook. The Tea contains about a quarter million tonnes of direct shipping barite with a specific gravity of 4.24 and the Barite showing has 2.7 million tonnes of 84% barite with 12.14% SiO_2. Several barite lenses are known on the Rein where a million tonnes or more of barite occur close to the surface.

The Mel (Carne, 1976)is a vertical lens of coarse-crystalline, white, sparry barite with galena and sphalerite. It is sandwiched between the Lower Cambrian Sekwi Formation (limestone) and calcareous slate of the Kechika Group (Cambro-Ordovician). Although it follows a stratigraphic contact there is no interfingering of mineralized and unmineralized strata and the deposit is hydrothermally mobilized. Some of the wall rocks contain disseminated sulphides and barite and this may be the source of the mobilized lens of massive barite. About 5 million tonnes grading 52.1% barite with 2.05% lead and 5.6% zinc are indicated at the Mel.

On Barite Mountain (Green and Godwin, 1964, p. 41) south of Ross River a dozen steep dipping veins of coarsely crystalline white barite between 30 cm and 3m thick cut Siluro-Devonian dolomite of Cassiar Platform. The veins are confined to a fractured zone that is the hanging wall of a thrust bringing the carbonate above the lower black slate of the Earn Group. The mineralization may be mobilized from a stratigraphic source in the slate into the fractured carbonate above the thrust. If so, mobilization occurred about the Early Cretaceous. Size is limited, but the veins are essentially pure barite.

Coal

Coals occur in three stratigraphic associations in Yukon: subbituminous coal in Eocene strata along Tintina Trench, thermal coal in Late Cretaceous rocks of Bonnet Plume basin and bituminous coal in the Jura-Cretaceous Tantalus Formation of Whitehorse Trough (Figure 10). A list and general review of Yukon coal occurrences is given by Campbell, 1967.

The coals in Tintina Trench are found in immature clastic Eocene strata near Dawson, Ross River and Watson Lake. The coals formed in swamps and are enclosed in fluviatile strata deposited in strike-slip controlled basins along Tintina Fault. Although these coal deposits may be small, their size is incompletely known. They are the subject of a recent study by D. Long, 1980. Subbituminous coal is also known south of Dawson on Matson Creek in Eocene (?) beds and near Big Salmon and just 10 km northwest of Carmacks in Pliocene lake beds.

The largest coal deposit in Yukon occurs as three near-horizontal seams within Late Cretaceous and Early Tertiary fluviatile beds deposited in the fault controlled Bonnet Plume basin (Long, 1978). The deposit has been drilled on a 1 km grid and more than 200 million tonnes of thermal grade high voltile, low ash, low sulphur coal has been outlined.

Between Carmacks and Braeburn and west of Whitehorse showings of coking coal are found in fluviatile chert grain conglomerate of the Tantalus Formation. One deposit at Tantalus Butte, near Carmacks, has been mined intermittently since early this century, first to supply fuel for Yukon River steamers and in the last decade to dry zinc-lead concentrates of the Faro mill. Minor coal is known in the upper nonmarine part of the Jurassic Laberge Group.

Uranium

Uranium in Yukon occurs in two associations, in or around heterolithic breccia pipes that cut Proterozoic strata and as veins in or near the Cretaceous intrusive rocks. Breccia pipe deposits (Morin et al, p. 101-107) (Archer and Schmidt, 1978) (Bell and Delaney, 1977) include the Nor, Loon, Igor, Thor, Bond, Pterd and Otter in the Wernecke and Richardson mountains. The pipes predate the Rapitan Group and are therefore Proterozoic. They are subcircular in plan and a km or two across. The host rocks are thin-bedded shale siltstone and dolomite of the Wernecke and Pinguicula Groups. Breccia in the pipes contains a variety of clasts of the Proterozoic strata in fine matrix that lacks an introduced volcanic component. The pipes host two types of mineralization. The early phase is interstitial to breccia fragments and is dominated by hematite and chalcopyrite and locally includes cobaltite. The later mineralization includes pitchblende and brannerite which occur in narrow irregular fractures that cut the breccia. The occurrences are interesting prospects, but are presently subeconomic.

Uranium occurrences related to the Cretaceous intrusions include the Ting, Noting and A and AB properties 40 km north of Dawson and the Jove a similar distance to the south. Those north of Dawson have uraninite in narrow fractures within tinguaite, a distinctive phase of the Tombstone and Deadman stocks. These plutons are dominantly syenite unlike the quartz monzonite that makes up most of the other intrustions of the same age. The occurrences are subeconomic. The Jove contains metaautunite in fractures within sheet-like intrusions of Cretaceous quartz monzonite that cut the Pelly Gneiss.

References

See BIBLIOGRAPHY this volume.

GEOLOGY OF SEAGULL TIN DISTRICT

J. G. Abbott

Introduction

The Seagull District is in south-central Yukon, next to the British Columbia border in map-sheet 105 B. The area is noted for its tungsten, tin, molybdenum, lead, zinc, gold and silver bearing skarn, vein and porphyry deposits which are associated with Cretaceous intrusions. Previous mapping was done by Poole in the early 1950's, at 1:250,000 scale (G.S.C. map 10-1960). New mapping at 1:50,000 scale was started by the writer in 1980 and in the light of new information and concepts, has resulted in a reinterpretation of the geology and a clearer definition of the geologic setting of the mineral deposits. Further work is planned for 1981.

Thirty days were spent in the field by G. Abbott and eight days by D. Tempelman-Kluit. Marshall Smith of Dupont Corp. and Bob Kuehnbaum of Canadian Occidental Minerals kindly made contract helicopters available and provided other invaluable support. Cam Stephen of DC Syndicate, Fred Harris of Amax and Alf Randal of Western Mines are thanked for their cooperation and support.

GEOLOGY

Geological Setting

The Seagull District is underlain by rocks of Cassiar Platform, Yukon Cataclastic Complex and by two suites of Mesozoic intrusions (Tempelman-Kluit, 1979). Cassiar Platform, which underlies the northeast part of the area comprises a narrow belt of miogeoclinal sedimentary rocks that range from Late Proterozoic to Mississippian. Yukon Cataclastic Complex underlies most of the area and consists of a thick, intensely sheared and tectonically interleaved sequence of clastic, carbonate, volcanic and intrusive rocks. The Cataclastic Complex is a tectonic melange, deformed during the early Mesozoic, within a westward dipping subduction zone far from North America. These rocks were obducted onto Cassiar Platform and other parts of the North American craton during arc-continent collision in mid Mesozoic time. The older intrusive suite includes a variety of mafic and ultramafic rocks of probable Jurassic age. Although only locally and weakly sheared, they are thought to be derived from subducted oceanic crust and are probably allochthonous. The younger group ranges from quartz monzonite to granite in composition, includes Cassiar Batholith, Seagull Batholith and Logtung Stock and gives K/Ar ages of about 100 Ma.

These intrusions are thought to have formed by anatectic melting of continental crust in response to tectonic thickening and loading by the allochthonous cataclastic rocks.

The geology of the Seagull Area is shown in Figure 1.

AUTOCHTHONOUS STRATA (CASSIAR PLATFORM)

The stratified autochthonous rocks form a narrow, faulted, steep westerly dipping sequence between Cassiar Batholith and Yukon Cataclastic Complex (Figures 1 and 2).

The cataclastic rocks are locally interleaved with the metasedimentary rocks considered part of the platformal sequence. Most faults dip steeply southwest and trend northwest. Strata generally young to the southwest, but the faults cut out and repeat units. The two senses of movement may indicate two generations of structures, but the nature of the fault zone is poorly understood.

The oldest rocks are divided into two units (PlЄslq, PlЄs) and are typical of strata belonging to the "Grit Unit" or Windermere Super-Group which underlies parts of central Yukon and eastern British Columbia. Unit PlЄslq is probably the oldest, and is exposed next to Cassiar Batholith within a broad, northwest trending syncline. The unit consists mainly of moderately resistant, brown weathering, quartz muscovite , biotite ± andalusite schist, quartzite and quartz - feldspar grit with lesser calcite cemented quartzite quartz grit and minor amphibolite. Buff, lime cemented quartz pebble conglomerate and thinly laminated buff and grey weathering limestone about 50 m thick are minor components of the unit.

The second belt of Late Proterozoic rocks (PlЄs) is in a fault bounded block and includes moderately resistant, brown weathering, grey-green phyllite with lesser siltstone and quartzite. Thickness of both units is unknown, but elsewhere, similar rocks reach thicknesses of several kilometres.

Massive, buff and grey weathering limestone and dolomite of unit lЄc is equivalent to part of the Atan Group in northern British Columbia. It probably overlies the shale of unit PlЄs conformably but is fault bounded in most places and forms discontinuous lenses between 2 m and 100 m thick.

Recessive, buff weathering, thin-bedded, dark grey calcareous slate, phyllite, and argillaceous limestone (unit uЄOc) occurs in three large, fault bounded lenses. Near the small stock south of Rudy Lakes, these rocks are altered to pale green, thinly laminated calc-silicate hornfels. The unit is typical of parts of the "Kechika Group" which is widespread within the Pelly and Cassiar mountains where it reaches thicknesses of 1000 m or more. In most places the Kechika Group unconformably overlies older rocks and grades upward into black shale.

Two units (OSDqc and uDMs) overlie the Kechika Group strata in the Seagull District. These strata are equivalents of several distinct map-units. The oldest rocks are probably Ordovician and Silurian and consist of recessive black, graphitic slate equivalent to unit OSsl. It is intercalated with orange weathering, brownish-green, lime cemented volcaniclastic rocks of Ordovician and Silurian age equivalent to unit OSv and moderately resistant, blue-grey weathering, thin-bedded to massive, fetid limestone and dolomite equivalent to the Middle Devonian McDame Formation (mDc). Total thickness is between 100 and 200 m.

Recessive, siliceous, graphitic slate (uDMs) of Late Devonian and Mississippian age has been mapped with unit OSDgc in the belt between Hidden and Crescent Lakes because it is difficult to distinguish from older Ordovician black slate. Further northwest the same rocks form a distinct unit faulted against allochthonous mafic and ultramafic rocks. Elsewhere in Cassiar Platform, equivalent rocks are associated with chert grit, pebble conglomerate, bedded barite and felsic volcanics.

SHEARED TRANSPORTED ROCKS (YUKON CATACLASTIC COMPLEX)

Yukon Cataclastic Complex is exposed within a broad, northwest trending synform defined by foliation and lithologic units. The synform is 30 km across and the thickness of the complex, measured across foliation and lithologic layering is about 7 km.

Style of deformation is the main characteristic of the Cataclastic Complex. Most mappable units appear to be part of a uniformly dipping stratigraphic sequence with few folds, but rock units lack lateral continuity and have knife sharp tectonic contacts. The complex is an intensely sheared sequence of lenses or "fish" with little stratigraphic integrity. In most rock types, degree of development of penetrative fabrics varies drastically. In places primary fabrics are preserved, but over distances of a few metres or centimeters an intense foliation or finely laminated flaser fabric is developed. The rocks range from schist to blastomylonite to phyllonite depending upon the degree of recrystallization. In general, rocks on the northeast side of Seagull Batholith have undergone higher grade metamorphism than those on the southwest side.

Stratigraphic relations between the units are unknown, and the following description is based on the observed sequence from lowest to highest, starting at the eastern margin of the complex.

Recessive weathering, dark green chlorite schist, laminated dark green or purplish green feldspathic amphibolite, serpentinite with minor diorite and light grey marble (unit CPav)form the lowermost unit within the complex. These rocks are faulted against black shale of unit uDMs across a steep west dipping fault and occur as tectonic lenses within the shale.

Sheared intrusive rocks of the Ram Stock (PMqm) are in sharp contact greenschist of unit CPav. The predominant rock type is distinctive, homogenous, coarse-grained, equigranular hornblende quartz monzonite and granodiorite (Figure 3). In most places, hornblende is altered to chlorite and plagioclase is saussuritized. Fracturing is ubiquitous and a strong foliation defined by discrete cleavage planes and crude alignment of minerals is common (Figures 4 and 5). Along the eastern margin of the stock within a narrow zone mapped separately as unit PMqm, the original rock fabric is obliterated and transformed to rusty weathering, buff mylonite (Figure 6). Near Hidden Lake, this mylonite is separated from the main part of the stock by a sliver of chlorite schist (CPav). Similar sheared zones occur in other parts of the stock.

Distinct, resistant, grey weathering, intensely foliated hornblende granodiorite, quartz diorite and lesser amphibolite (PMgd) occur in a narrow band southwest of Ram Stock. Foliation is well developed and defined by alignment of mineral grains. In most places the unit is fairly homogenous, but it is locally well banded with spectacular, rootless isoclinal folds up to 50 cm across (Figure 7). The only evidence of an intrusive relationship between the granodiorite and Ram Stock are a few narrow leucocratic dikes that cut the granodiorite.

Most of the Cataclastic Complex includes clastic sedimentary rocks divided into six subunits (PMs 1-6). Variations are subtle and contacts gradational and/or tectonic.

Unit PMs1 occurs in the eastern part of the complex. It is in sharp contact with unit PMgd but grades upwards or westwards into unit PMs2. The unit is moderately resistant and brown to grey weathering and includes several rock types. Characteristic and most common is fine-grained, purplish-grey quartz feldspar hornblende biotite muscovite schist. Other rock types include grey-green siliceous chlorite muscovite schist, light grey quartzite, finely laminated, light green siliceous calc-silicate, minor amphibolite and thin marble bands. The marble is commonly altered to coarse-grained, well laminated garnet epidote skarn. The skarns are generally less than a meter thick but are laterally extensive. Locally, they contain sphalerite, chalcopyrite and fluorite. The unit is generally massive but locally well laminated. Bedding was not seen and the protolith is unknown.

Unit PMs2 is gradational with PMs1 and more siliceous. Moderately resistant, massive, light brown-grey weathering, quartz feldspar muscovite schist and massive grey quartzite are the characteristic rock types. Locally quartz grit is present but for the most part, like unit PMs1 primary textures are not preserved. Grey green calc-silicate schist and black graphitic siliceous schist are lesser components. Massive, white or light buff limestone lenses are common and increase in size and number "upsection". The larger lenses are separated as unit CPc.

Dark brown weathering, resistant, massive quartzite quartz sandstone, and grey phyllonite, with lesser grey weathering quartz feldspar grit, quartz or chert pebble conglomerate (Figure 9), chert and minor recessive black graphitic phyllonite, grey limestone and purple and green volcanics of Unit PMs3 underlie the southeastern part of the map-area. The metamorphic grade of these rocks is generally lower than that of units PMs1 and stretched clasts in coarser-grained rocks and locally, bedding are preserved.

Unit PMs4 is confined to the southwest corner of the map-area east of Smart River near the Logtung property. It is recessive and characterized by the predominance of black, graphitic, siliceous "phyllite". The graphitic phyllite grades into grey and brown "shaly" phyllite and is interbedded with thick massive grey quartzite and light grey and buff weathering limestone, dolomitic limestone up to 30 m thick and minor black limestone beds less than 1 m thick.

Unit PMs5 resembles unit PMs3 and consists mainly of dark brown to grey weathering greenish grey to dark grey impure quartz sandstone, siltstone, and shale with minor quartz and quartz feldspar grit, dark green cherty tuff or volcanics and thin-bedded grey siliceous limestone (Figure 10). Unlike unit PMs3, chert and coarse clastic rocks were not observed.

Resistant, black weathering, chert pebble conglomerate grit and black graphitic phyllite of unit PMs6 are exposed along Screw and Partridge Creeks. The chert conglomerate contains clasts of black and grey chert and rounded, coarse-grained green quartz sandstone clasts up to 20 cm across (Figure 11).

Mappable carbonate rocks are included in unit CPc, but several stratigraphic horizons are present. The most extensive carbonate is at the head of Screw Creek (Figure 12). It is folded and/or repeated by moderately dipping thrust faults, but one relatively undisturbed section is between 500 and 600 m thick. Unlike most other localities, penetrative fabrics are weak or absent (Figure 13) but faulting is too intense to permit accurate measurement of the section.

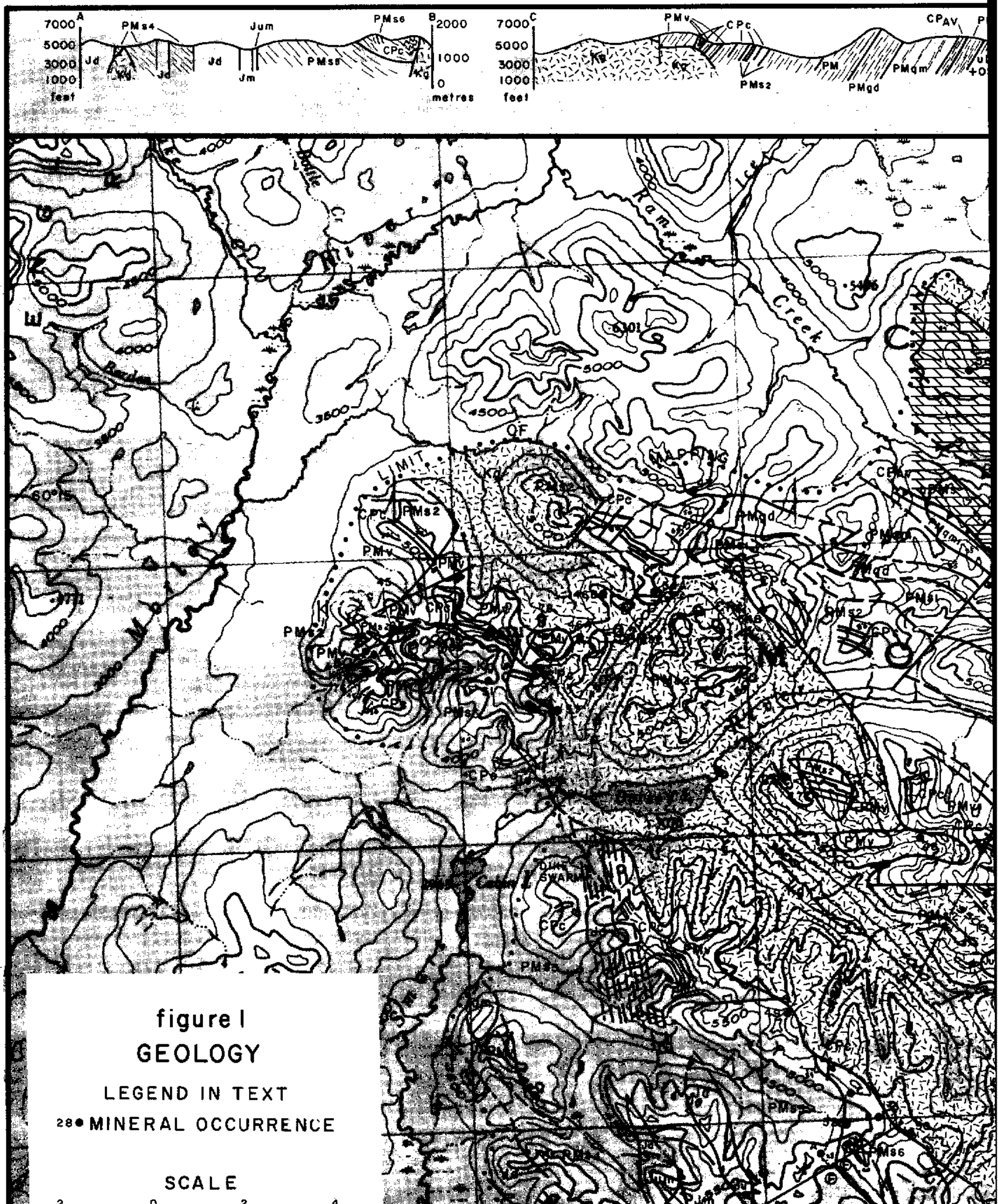
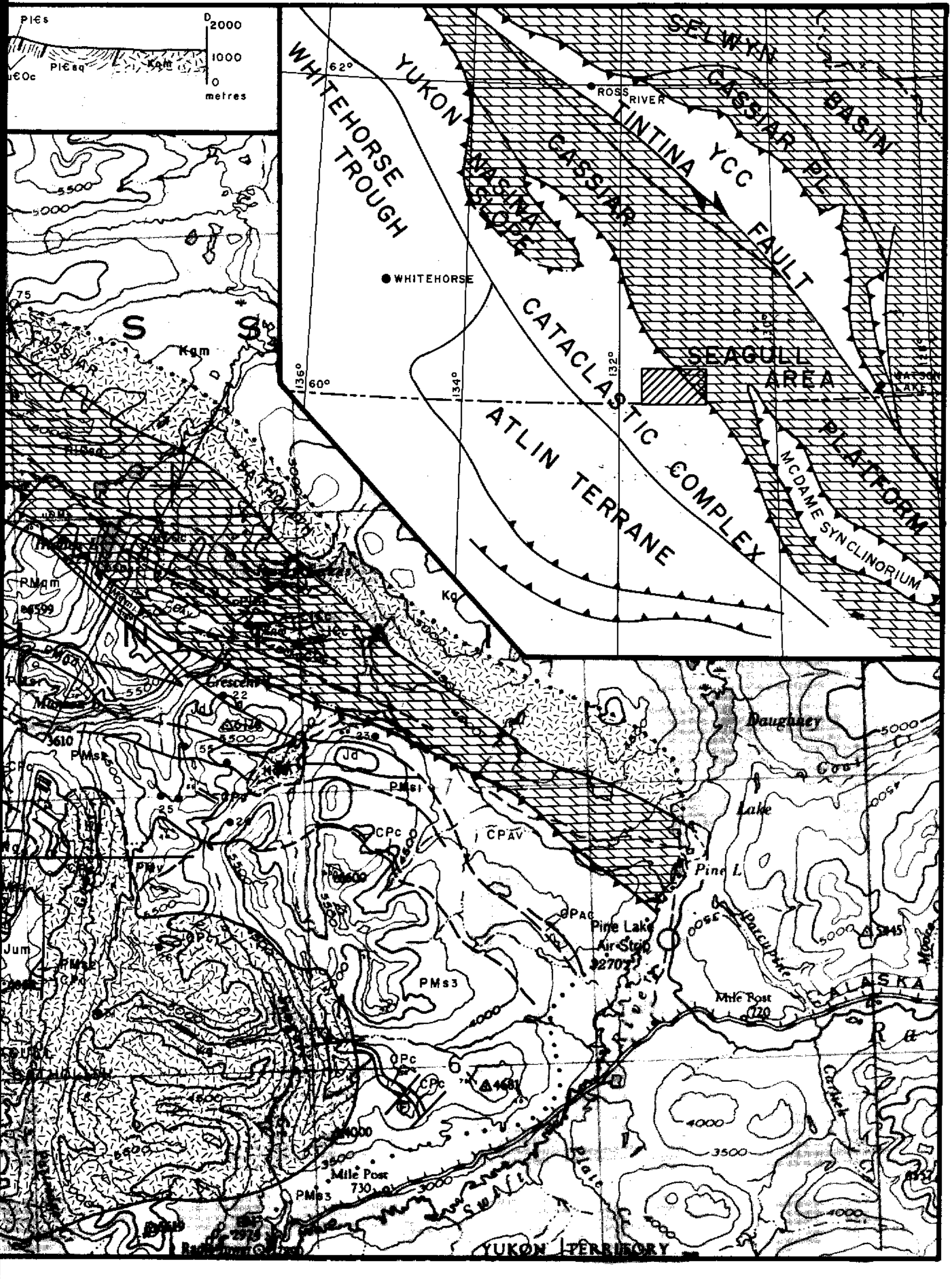


figure I
GEOLOGY
LEGEND IN TEXT
28● MINERAL OCCURRENCE
SCALE



SELWYN BASIN
CASSIAR PL.
YCC
TINTINA FAULT
ROSS RIVER
WHITEHORSE TROUGH
YUKON
NASINA SLOPE
CASSIAR
WHITEHORSE
CATACLASTIC COMPLEX
ATLIN TERRANE
SEAGULL AREA
PLATFORM
MCDAME SYNCLINORIUM
62°
60°
136°
134°
132°
2000
1000
0
metres
Daughney
Lake
Pine L
Pine Lake Air Strip
Mile Post 720
Mile Post 730
ALASKA
YUKON TERRITORY
PMs3
CPc
CPAV
Jd
Kgm

LEGEND
(to accompany Figure 1)

Intrusive Rocks

CRETACEOUS

Kqm Cassiar Batholith; blocky, grey weathering equigranular, medium-to coarse-grained biotite quartz monzonite

Kg Seagull Batholith, Logtung Stock; grey and locally rusty weathering porphyritic, fine-to medium grained biotite granite, quartz monzonite.

JURASSIC (?)

Jm Grey, medium-to coarse-grained hornblende monzonite, grading to syenite.

Jd Grey fine-to medium-grained hornblende diorite grading locally to gabbro.

Jum Dark grey-green coarse-grained dunite, gabbro and pyroxenite, locally includes diorite.

YUKON CATACLASTIC COMPLEX

CARBONIFEROUS AND (?) YOUNGER

PMqm Ram stock; resistant, medium grey weathering coarse-grained hornblende quartz monzonite and granodiorite; feldspar saussuritized and hornblende chloritized. Rocks are variably foliated and sheared. Intense shear zones (PMqml) weather rusty.

PMgd Resistant, grey weathering, strongly foliated hornblende granodiorite and/or quartz diorite, amphibolite.

PMs 1-6 Foliated, fine-and locally coarse-grained clastic rocks, contacts between units are gradational and in part sheared.

S 1 Resistant, dark grey weathering purplish quartz feldspar muscovite, chlorite hornblende schist, finely laminated dark purple and green siliceous schist, lesser grey quartzite and minor thin bands of impure limestone and amphibolite bands.

S 2 Moderately recessive, massive light brown-grey weathering quartz feldspar muscovite schist, quartzite; minor quartz grit, limestone, grey green calc-silicate schist, black graphitic, siliceous, schist.

S 3 Resistant, brown and locally dark grey weathering grey quartzite, with lesser quartz feldspar grit, quartz sandstone and grey phyllonite, quartzite pebble conglomerate, chert and minor purple and green volcanics, recessive graphitic phyllonite, grey limestone.

S 4 Recessive black, graphitic phyllite: thin interbeds of black fetid limestone, light grey limestone and dolomite, massive grey quartzite.

S 5 Moderately resistant, dark brown to grey weathering greenish grey to dark grey quartzite, sandstone, siltstone, shale; minor quartz feldspar grit, thin-bedded grey siliceous limestone, dark grey cherty tuff or volcanics.

S 6 Black graphitic siliceous phyllonite; resistant chert grain grit, sandstone, and conglomerate.

PMv Resistant, dark grey weathering, massive fine-grained purple and green intermediate to basic volcanics, minor quartz feldspar schist of PMs.

CARBONIFEROUS AND PERMIAN

CPav Recessive, dark green chlorite schist, well laminated, purplish green feldspathic amphibolite, serpentinite and minor light grey marble.

CARBONIFEROUS

CPc Resistant, buff and grey weathering, medium-to thick-bedded sandy dolomite and limestone; minor quartzite, chert may include several stratigraphic horizons.

CASSIAR PLATFORM

LATE DEVONIAN AND MISSISSIPPIAN

uDMs Recessive black, graphitic slate

ORDOVICIAN, SILURIAN AND DEVONIAN

OSDqc Undivided; Middle Devonian McDame Formation (mDc) blue grey weathering, thin-bedded to massive, fetid, limestone and dolomite; Ordovician (?) and Silurian (OSv), orange weathering, brownish green, lime-cemented volcaniclastic rocks and Ordovician and Silurian (OSsl) recessive black slate

LATE CAMBRIAN AND ORDOVICIAN

u€Oc Recessive, buff weathering, thin-dark grey slate and argillaceous limestone.

EARLY CAMBRIAN

l€c Atan Group buff to orange weathering, massive dolomite and limestone

LATE PROTEROZOIC AND/OR LOWER CAMBRIAN (?)

Pl€sq Windermere Super-Group Moderately resistant, brown weathering green phyllite and micaceous quartzite

Pl€slq Moderately resistant, brown weathering, green biotite muscovite quartz feldspar schist, pale green quartz muscovite schist, buff or grey weathering limestone.

Figure 2
Looking south, between Hidden and Rudy Lakes at the best exposed cross-section through miogeoclinal strata of Cassiar Platform. Most units are fault bounded although the stratigraphic sequence is normal.

The following is a section with estimated thickness.

Unit	Description	Thickness
PMs6	Black slate, chert conglomerate, grit.	
	?Fault?	
	Thick-bedded, medium grey and locally light orangy brown dolomite. Irregular nodules and lenses of light grey chert form bands parallel to bedding. Fossils abundant in top 10 m.	250 m
	Fine-grained maroon to green volcanics overlying thin-bedded black and orange sandy green dolomite with abundant angular chert fragments and crinoid columnals.	5-10 m
CPc	Medium-bedded, light grey and yellowish grey dolomite. Thin bands of chert nodules are abundant and quartzite and chert grit beds less than 1 m thick occur locally.	150 m
	Massive to thin-bedded grey limestone, middle part gritty to conglomeratic with limestone and chert clasts. Coral rich bed less than 1 m thick at base.	50 m
	?Fault?	
	Recessive, brown weathering, black cherty argillite with a few interbeds of grey limestone less than 1 m thick and minor brown limy siltstone.	90 m
	?Fault?	
	Medium-bedded, light grey dolomite and limestone.	15 m
	?Fault?	
PMs5	Highly sheared shaly, silty grey quartzite interbedded with dark green, cherty tuff and minor thin beds of grey and buff weathering siliceous limestone.	

The lateral continuity of the carbonate is unknown. Southeast, along the ridge between Partridge and Screw Creeks, the same rocks are massive, buff and grey weathering limestone with abundant angular chert clasts. Large crinoids more than a centimeter across and corals are conspicuous. Most other thick carbonates may be the same horizon, but are generally less than 50 m thick, have an intense penetrative fabric and are repeated by thrust faults (Figures 14 and 15). Most are white siliceous marble commonly interlayered with highly sheared nodules and bands of chert. Corals identical to those near the base of the undeformed section on Screw Creek were collected between the MC and JC properties northwest of Dorsey Lake.

Fossils collected from the four localities mentioned above were examined by E.W. Bamber of the G.S.C. Two collections, one from the top of the section shown in Figure 13 and the other from the ridge east of Screw Creek were tentatively assigned Early to Middle Carboniferous ages.

Some thin limestone lenses intercalated with clastic sediments of units PMs3 and PMs5 are younger. The largest of these is exposed in the southeast corner of the map-area east of Seagull Creek. It is weakly deformed internally, less than 15 m thick, well bedded with variable thickness, light buff and grey weathering, with abundant small crinoids and locally contains small grey chert or quartzite lenses. Conodonts of middle Pennsylvanian age (identified by M. Orchard of the Geological Survey of Canada) were obtained from

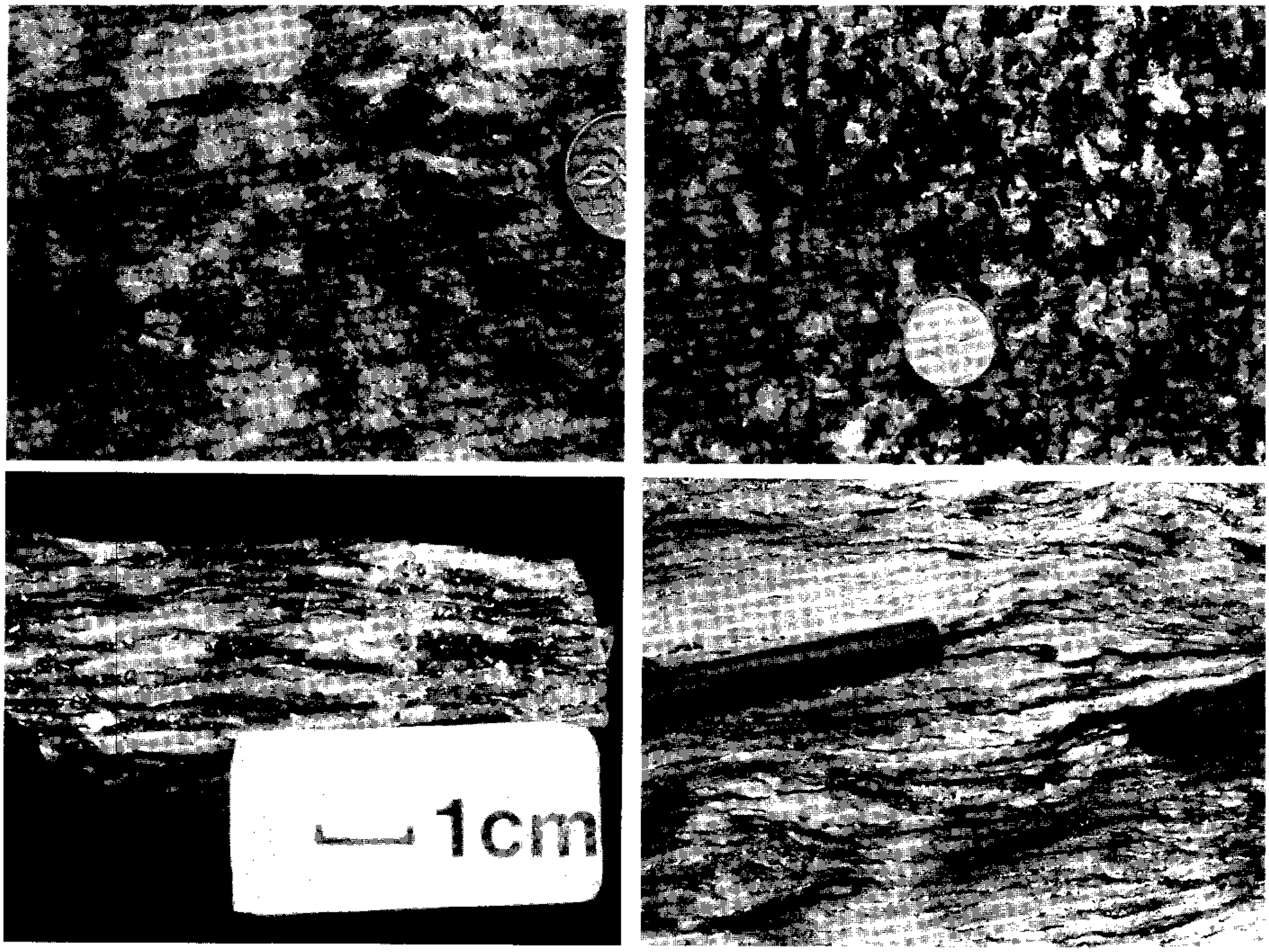


Figure 3-6
Variations in degree of development of penetrative fabric within the Ram Stock. (3) Unfoliated hornblende quartz monzonite (4) weak alignment of mineral grains (5) flaser fabric (6) mylonite. The transition from undeformed rock to mylonite occurs over a few meters in places and can be seen laterally as well as across the fabric.

this horizon as well as from a thin limestone band intercalated with sandstone, tuffaceous chert and volcanics immediately below the early to middle Carboniferous carbonate at the head of Screw Creek.

Volcanic rocks of unit PMv occur close to the carbonate rocks of Unit CPc and are interbedded at the headwaters of Screw Creek. The volcanics are resistant, massive, dark grey-green weathering within and outside the hornfels aureole of Seagull Batholith. Fresh surfaces are medium green or purplish grey. Textures vary from tuffaceous or volcaniclastic with angular clasts up to 2 cm across (Figure 16) to massive. Most commonly, primary textures are obliterated by a fine flaser fabric (Figure 17). Rocks with this fabric are commonly purple and green banded and resemble some of the metasedimentary rocks of the cataclastic complex.

Intrusive Rocks

Poole (1960) divided the intrusive rocks into four units (13,14,15 and 16) ranging from Jurassic to Tertiary in age. This work has shown two groups, a Jurassic (?) ultramafic and mafic suite and a Cretaceous granite and quartz monzonite suite.

The mafic and ultramafic rocks form small elongated, north to northwest trending bodies and dike swarms with sharp, steep contacts and narrow hornfels aureoles. Most of the intrusions are unfoliated and cut the regional grain. Some hornblende diorite bodies within the dike swarm on the west side of Seagull Batholith are weakly sheared and a few are intensely foliated.

Composition varies from pyroxenite, peridotite and minor serpentinite (Jum) through gabbro and diorite (Jd) (Figure 18) to monzonite and syenite (Jm) (Figure 19). Most intrusions are hornblende ± biotite with

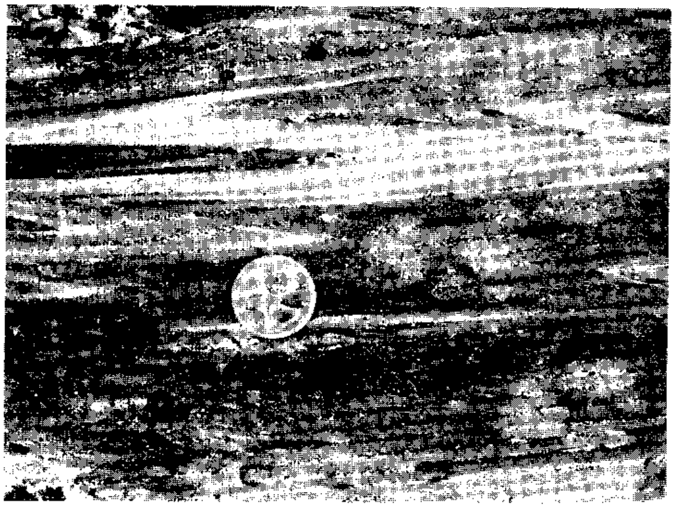


Figure 7
Rootless isoclinal folds defined by leucocratic bands within amphibolite of unit PMgd, northwest of Munson Lake.

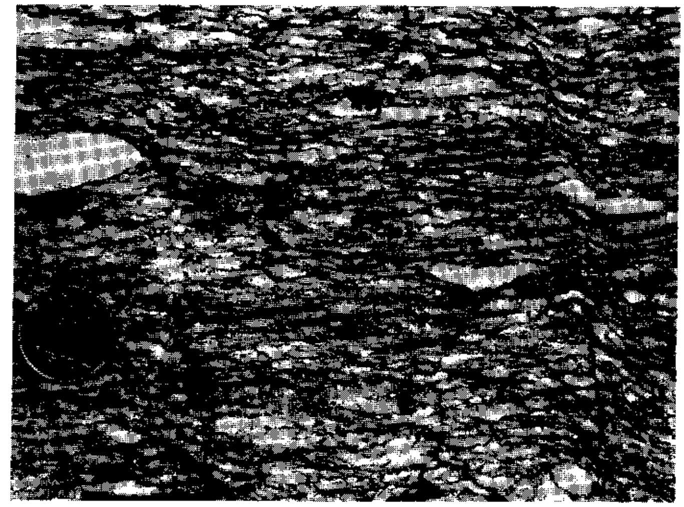


Figure 9
Sheared quartzite (?) pebble conglomerate from unit PMs3 near the Alaska Highway.

Figure 8
Well developed flaser fabric within siliceous clastic rocks of unit PMs1 northwest of Munson Lake (Pen point gives scale).

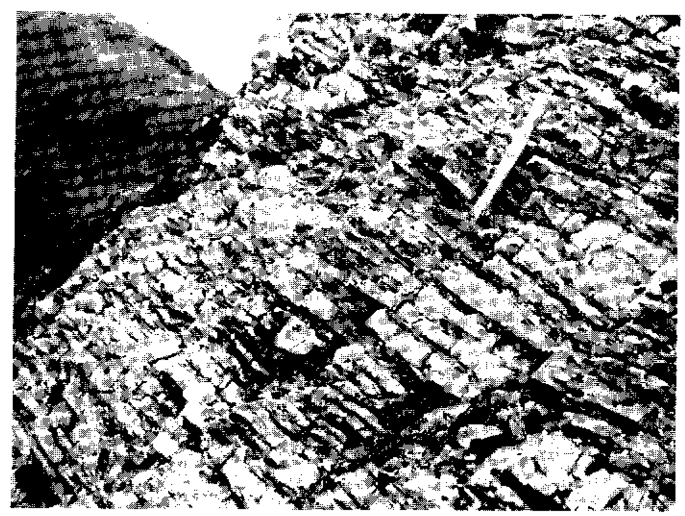


Figure 10
Relatively undeformed interbedded quartz sandstone, shale and sandy limestone from unit PMs5 between Logjam and Screw Creeks.

variable grain size and mafic content. All three main phases occur as discrete parts of a composite stock at the head of Logjam Creek. These rocks are coarse-grained and equigranular, except for parts of unit Jm which are coarse-grained with distinctive, euhedral potash feldspar megacrysts up to 3 cm long. Along the west side of the stock ultramafic inclusions occur within hornblende diorite. Monzonite intrudes the diorite. This order of emplacement is also indicated by the zoning with ultramafic and mafic rocks near the margins of the stock and monzonite and syenite in the center.

Hornblende and/or feldspar porphyry and fine-grained equigranular grey dikes are commonly associated with and locally occur within the coarser grained diorites. The relationship between the dikes and diorite is uncertain.

The ultramafic and mafic rocks are not dated within the map-area, but to the south in Jennings River map-area, Gabrielse obtained K/Ar ages of 182 my from similar diorite and granodiorite of the Nome Lake and Simpson Peak Batholiths and the Plate Creek Stock.

The Cretaceous intrusions are compositionally and spatially disparate from the mafic rocks. They vary in size from the Logtung Stock, less than a km across to the Cassiar Batholith more than 25 km across. They contain more than 20% quartz and are mainly massive, blocky, grey weathering, homogenous, coarse-grained,

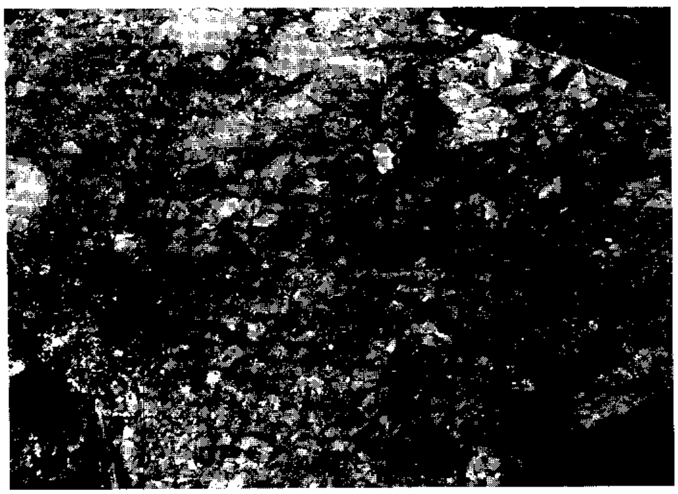


Figure 11
Chert and sandstone clast conglomerate from unit PMs6 at the head of Screw Creek. (Hammer head gives scale)

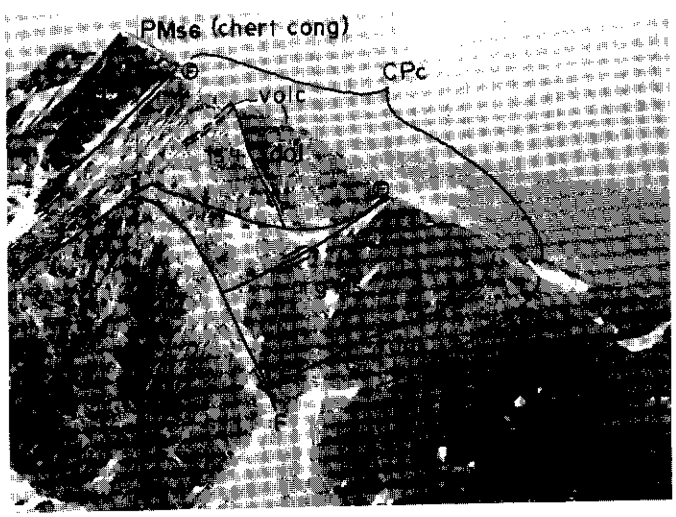


Figure 12
Looking south to a relatively undeformed section of Carboniferous limestone CPc at the head of Screw Creek. The limestone contains fossils of probable early Carboniferous age and tectonically overlies quartz sandstone, shale and limestone of unit PMs5 that contain late Carboniferous conodonts.

equigranular biotite quartz monzonite (Kgm).

By contrast the Seagull Batholith (Kg) displays a variety of textures and includes biotite granite and locally quartz monzonite. Porphyries with rounded quartz and/or angular potash feldspar grains up to a centimeter across, in a fine-grained groundmass are characteristic (Figure 20). These rocks are commonly miarolitic and contain clots and narrow veinlets of tourmaline. The porphyries are most common in northwest parts of the batholith where small roof pendants cap hilltops suggesting that the intrusion is barely unroofed. Further southwest, coarser grained more equigranular textures similar to those of the quartz monzonite are common. Plagioclase is more abundant in these rocks although they are mainly granite (Figure 21). The variations in composition and texture are probably gradational although detailed mapping may define discrete phases.

In most places, contacts of the Cretaceous intrusions dip steeply. Exceptions are drill indicated, moderately dipping contacts beneath the Logtung porphyry tungsten molybdenum deposit beneath roof pendants at the northwest end of the Seagull Batholith and a large area northwest of Dorsey Lake next to the Seagull Batholith. There valley floors are underlain by granite while the surrounding mountains expose intensely hornfelsed country rocks that are host to the two most important tin occurrences in the district, the MC and JC properties.

Rusty and grey weathering hornfels aureoles extend over a kilometer from the margins of the Logtung Stock and Seagull Batholith. In contrast, rocks in contact with the Cassiar Batholith are metamorphosed to andalusite bearing schist.

Figure 13
Relatively undeformed dolomite (CPc) with chert nodules, from the carbonate section shown in Figure 13.

Structure

The complex fault zone within Cassiar Platform and the eastern margin of Yukon Cataclastic Complex dominates the structural pattern of the area. The fault zone may include three types of faults: 1) thrust faults related to final emplacement of Yukon Cataclastic Complex, 2) right lateral transcurrent faults, 3) normal faults related to uplift of Cassiar Batholith. These possibilities are not mutually exclusive.

Thrust faults are suggested by repeated units within Cassiar Platform and the interleaved autochthonous and allochthonous rocks. Such thrusts are most likely related to the final emplacement of Yukon Cataclastic Complex.

The fault zone may also be the continuation of the steeply dipping fault zone, traced for more than 100 km along the west margin of Cassiar Batholith by Gabrielse (1969) in Jennings River map-area.

The fault cuts the batholith and is marked by intense shearing and cataclasis, in a zone up to 2 km wide. This brittle shearing is younger than, and unrelated to, the pervasive recrystallized cataclastic fabric of Yukon Cataclastic Complex. The fault zone can be traced into the Seagull Area and can be seen in a borrow pit at mile 718 on the Alaska Highway near Carlick and Porcupine Creeks. If the fault zone continues northwestward, it is not within Cassiar Batholith and may pass between Hidden and Rudy Lakes. In this projected trace the fault zone may be a set of discrete faults or a zone of highly sheared rocks.

Gabrielse (1980) has evidence in Jennings River map-area for right lateral movement along the fault. In the Yukon, the fault has not been traced nothwestward past the Seagull Area and significant movement cannot be documented. Strike-slip could account for the repetition of map units in the Seagull Area.

Normal movement is also possible along the fault zone although there is little direct evidence. In the Seagull Area, normal movement may account for missing parts of the sequence and for the steeply dipping contact between autochthonous and allochthonous rocks. Normal movement younger than granite emplacement may also explain the contrast in apparent level of emplacement between the high level porphyritic granites of Seagull Batholith and deeper level equigranular quartz monzonites of Cassiar Batholith.

Vertical, northeast and east trending normal faults cut rocks as young as the Seagull Batholith (Cretaceous). Vertical east trending veins and fracture zones within the batholith and surrounding rocks host tin occurrences related to the intrusion and northeast trending, vertical, polymetallic veins are related to the Logtung porphyry deposit. The faults, fractures and veins may be related. If so, they probably formed during the late stages of emplacement of the Cretaceous intrusions.

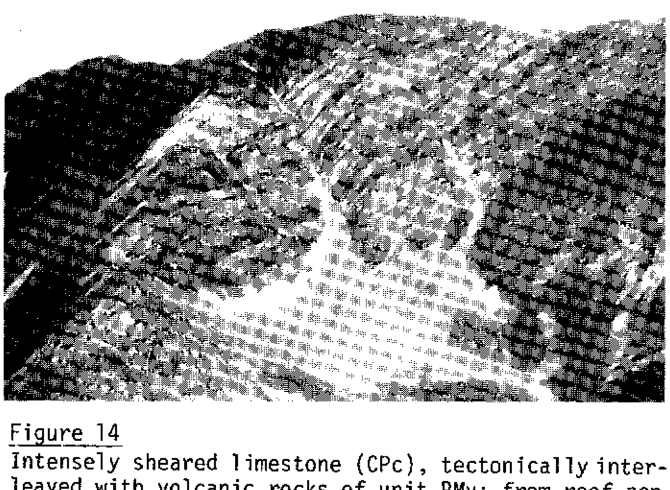


Figure 14
Intensely sheared limestone (CPc), tectonically interleaved with volcanic rocks of unit PMv; from roof pendant east of Dorsey Lake. The limestone is probably equivalent to that shown in Figure 12. The fabric developed here on the scale of a mountain is analaguous to that developed on hand specimen scale in figs. 5, 6, or 9.

Figure 15
Intensely sheared, cherty limestone (CPc) northwest of Dorsey Lake on the MC property. Corals found close by in these rocks are the same as those from the carbonate shown in Figure 12.

Figure 16
Volcaniclastic fragments within relatively undeformed volcanic rocks of unit PMv west of Goddart Creek.

Discussion

Areas in northern British Columbia and Yukon underlain by rocks belonging to or equivalent to Yukon Cataclastic Complex are now accurately defined (Figure 1). However, correlation of map units within the complex and interpretation of depositional environments are difficult because of the internal deformation and the likelihood that unrelated rock units are tectonically juxtaposed or interleaved. This is particularly true of areas where this style of deformation may occur, but has not been recognized.

The three allochthonous suites comprising Yukon Cataclastic Complex farther north in the Pelly Mountains (Tempelman-Kluit, 1979) have rough correla-

Figure 17
Intensely sheared volcanic rocks of unit PMv west of Goddart Creek.

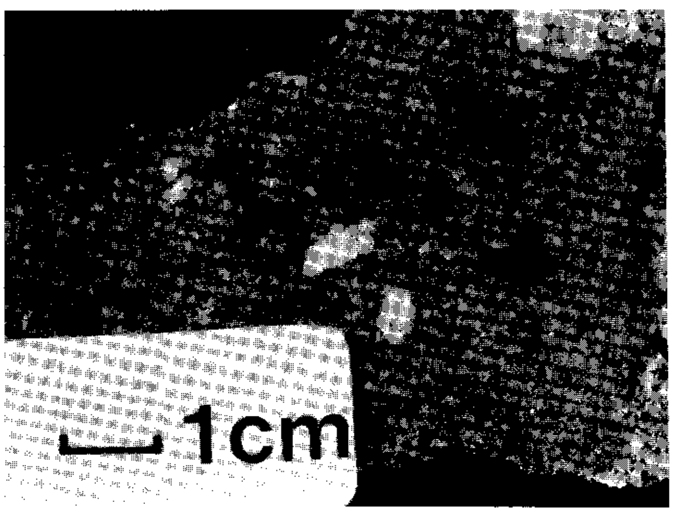


Figure 18
Porphyritic biotite granite from the northwest end of the Seagull Batholith.

tives in the Seagull Area. Unit CPav is thus a volcanic, ultramafic and carbonate unit probably equivalent to the Anvil Allochthonous Assemblage, the foliated intrusions of the Ram Stock (PMgm) and unit PMgd, to Simpson Allochthonous Assemblage and the clastic, carbonate and volcanic rocks of units PMs1-6, CPc and PMv to Nisutlin Allochthon. The stacking order in the Pelly Mountains, with Nisutlin Allochthon at the base, overlain by Anvil Allochthon, and Simpson Allochthon is not seen in the Seagull Area. Pennsylvanian and Triassic fossils have been obtained from Nisutlin Allochthon in the Pelly Mountains and rocks younger than those in the Seagull Area may be present.

Most map units belonging to Yukon Cataclastic Complex in the Seagull Area extend southward into Jennings River map-area. There, sedimentary rocks predominate and form thick, extensive sequences that Gabrielse divided into three map units (units 10 (Oblique Creek

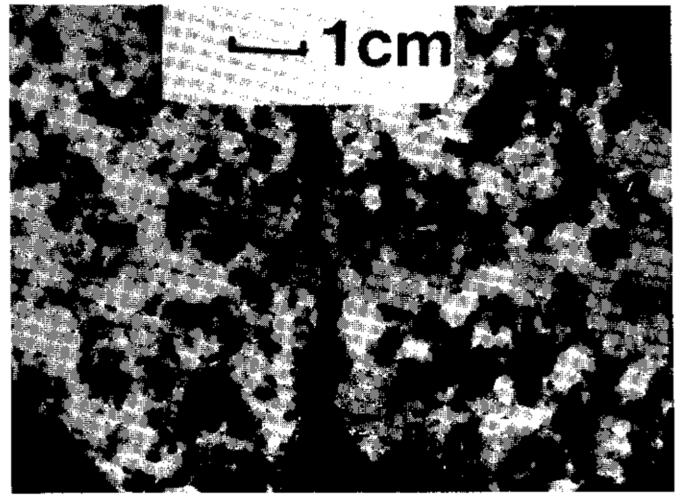


Figure 19
Coarse-grained biotite granite from the center of the Seagull Batholith (Kg) on the right. Coarse-grained biotite quartz monzonite (Kqm) from Cassiar Batholith on the left. The rocks are essentially identical and are closely related.

Figure 20
Hornblende diorite (Jd) from the composite stock at the head of Logjam Creek. The bottom sample is stained.

Figure 21

Syenite or monzonite (Jm) with tabular K-feldspars in crude trachytoid alignment from the composite stock at the head of Logjam Creek.

Formation), 11 and 12) of Carboniferous age. All or some of these may be represented in the Seagull Area. Anvil Allochthon (CPav) is represented to the west of Cassiar Batholith, by greenstone and metadiorite of the Sylvester Group (unit 7). Gabrielse also describes sheared leucocratic sills within the volcanic rocks of the Sylvester Group that may be equivalent to Simpson Allochthon (Ram Stock).

The Sylvester Group is exposed east of Cassiar Batholith in McDame map-area as a klippe within McDame Synclinorium, less than 30 km southwest of the Seagull Area probably includes rocks equivalent to Anvil and Nisutlin Allochthons. The Sylvester Group, as originally mapped includes allochthonous and autochthonous rocks (Morganti, 1977). Here the name refers only to the allochthonous rocks. It contains basaltic volcanics, like those within Anvil Allochthonous Assemblage (Gabrielse, 1962, Morganti, 1977). Sedimentary rocks equivalent to Nisutlin Allochthon may be represented by carbonate rocks that yield Late Mississippian, Middle Pennsylvanian and Mid Permian fossils.

Some or all parts of Yukon Cataclastic Complex in the Seagull Area may correlated with other probable allochthonous or "suspect" Terranes further south along the eastern margin of the Canadian Cordillera. These include Nina Creek, Slide Mountain and Milford-Kaslo Assemblages (Morganti, 1977, Coney and others, 1980).

The dissimilarity of rocks within Yukon Cataclastic Complex and those within the North America Platform indicates that the two are foreign to one another. The thickness and disparity of rock types with a narrow age range and style of deformation with the complex indicate that it represents an accreted wedge, that was deformed within a subduction zone at the outer margin of a volcanic arc. However, the origin of the components and particularly their relationships remain uncertain. Although Anvil Allochthon has been interpreted as a fragment of oceanic crust, it may be an assemblage of volcanic and ultramafic rocks deposited on or within a sequence of sedimentary rocks of oceanic aspect. The shallow water carbonate, black shale, and quartzite within Nisutlin Allochthon suggest deposition under relatively stable conditions of a platform environment. However, other components of this environment are absent in Nisutlin Allochthon. Instead, the platformal rocks are interleaved with thick impure clastic strata with a deeper water flyschoid aspect. Similar Triassic and Jurassic rocks that belong to the Nisutlin Allochthonous Assemblage further north are thought to have been shed from an active arc into its adjoining subduction zone (Tempelman-Kluit, 1979). The Pennsylvanian fossils from limestone within the clastic rocks of Nisutlin Allochthonous Assemblage in the Seagull Area do not support this correlation and the origin of these rocks remains uncertain.

Mineral Deposits

Base metal bearing skarns, veins and porphyry deposits within the Seagull Area are related to mid-Cretaceous intrusions. Variations between deposits are in part, related to differences in level of emplacement and to spatial relationships of the intrusions. Tungsten bearing skarns are associated with relatively deep quartz monzonite of Cassiar Batholith and tin occurrences to high level granites of the Seagull Batholith. The most significant tin deposits occur in wall rocks above flat lying intrusive contacts. Iron and zinc rich skarns are probably genetically related to Seagull Batholith, but are far from intrusive contacts. The Logtung tungsten-molybdenum porphyry occurs at the top of a small quartz monzonite stock possibly exposed at a level between that of Seagull and Cassiar Batholiths.

The deposit descriptions are included with others for properties located on Wolf Lake Map Sheet.

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A NEW GEOLOGICAL MAP OF MT. HUNDERE AND THE AREA NORTH

by G. Abbott

This summary of geological studies in the Mt. Hundere area of central Watson Lake map sheet (105 A) was undertaken as part of a Master's thesis completed at Queen's University in 1977 (Abbott, 1977). Field work was carried out for five weeks in 1973 and one week in 1974 while the writer was employed by the Geological Survey of Canada. Mapping was extended during August, 1978 while the writer was employed by Archer, Cathro and Associates and CUB Joint Venture (Cassiar Asbestos Corporation Ltd., Highland-Crow Resources Ltd., and Union Carbide Canada Ltd.). These companies have given permission to publish information obtained during the period.

The area is underlain by one of the better exposed and more complete sequences of Paleozoic and Mesozoic rocks known within Cassiar Platform north of Tintina Fault. Previous work includes preliminary 1:250,000 scale mapping by Gabrielse (1966). This study resulted in a more precise definition of the stratigraphy and style and timing of deformation within Cassiar Platform in southeastern Yukon.

The geology of Mt. Hundere is shown in Figure 1. A map of north central Watson Lake map-area that includes later work is shown in Figure 2. The description of rock units in the Table of Formations is based mainly on the earlier work. The stratigraphy is not detailed here. It is like that in other parts of Cassiar Platform and the reader is referred to reports by Gabrielse (1963), Gordey (in press) and Tempelman-Kluit (1977a,b) for descriptions.

In central Watson Lake map-area, late Proterozoic through Triassic miogeoclinal strata of Cassiar Platform are exposed in a window beneath a cover of late Paleozoic, transported, sheared sedimentary, volcanic and ultramafic rocks of the Anvil Allochthonous Assemblage (Tempelman-Kluit, 1978). The window and cover are folded into a north trending arch, cored in the north by Cretaceous quartz monzonite. A smaller dome within the larger arch centered about Mt. Hundere may be cored by an intrusion at depth. Normal faults which localized uplift during granitic intrusion are prominent features within the Mt. Hundere arch and at the south end of Billings Batholith.

The rock units have different styles of deformation. Cambrian and Ordovician phyllite are complexly deformed internally and are thermally metamorphosed. At least two sets of penetrative, small scale structures are developed. The oldest predate thermal metamorphism and are related to regional deformation, but the youngest are closely related to thermal metamorphism and developed during granitic intrusion arching and uplift. Silurian and younger rocks are deformed into broad open folds, accompanied by axial plane cleavage. The degree of development of cleavage within the Silurian and younger rocks is progressively weaker up section and Triassic rocks are internally undeformed. The folds and axial plane cleavage within the Silurian and younger rocks formed in response to the same stress that formed the older set of small scale structures within Cambro-Ordovician strata. The contrast in style and intensity of deformation results from the competence difference and depth of burial of the older rocks, during regional deformation.

Legend
(to accompany Figures 1 and 2)

CRETACEOUS

Kqmp Porphyritic biotite quartz monzonite
Kqm Equigranular biotite quartz monzonite

CARBONIFEROUS AND/OR PERMIAN

ANVIL ALLOCHTHONOUS ASSEMBLAGE

CPav Massive, resistant green and grey tuffaceous argillite, grey and white siliceous tuff

TRIASSIC AND OLDER(?)

PŦsc Dark brown and grey weathering, calcareous shale, siltstone, silty limestone; may locally include Mt

MISSISSIPPIAN

Mt Recessive, reddish-orange weathering well laminated chert, cherty tuff

MIDDLE (?) AND UPPER DEVONIAN, MISSISSIPPIAN AND YOUNGER (?)

uDMsg Black and rusty weathering shale, siltstone, quartz wacke,chert pebble conglomerate

UPPER SILURIAN (?) AND LOWER DEVONIAN

SDc Dark grey, fetid platy limestone,thick-bedded, buff weathering sandy dolomite; dolomitic quartzite

SILURIAN

Ss Thinly laminated, brown, grey and buff weathering calcareous or dolomitic siltstone, silty dolomite, dolomite

Sq Massive, resistant, blue-grey orthoquartzite

CAMBRIAN AND/OR ORDOVICIAN

u€Oc Thinly laminated or nodular calcareous, grey and brown phyllite and silty limestone: alters to thinly laminated green and purple calc-silicate hornfels

u€Osl Dark grey-brown weathering biotite-muscovite schist

LOWER CAMBRIAN AND OLDER (?)

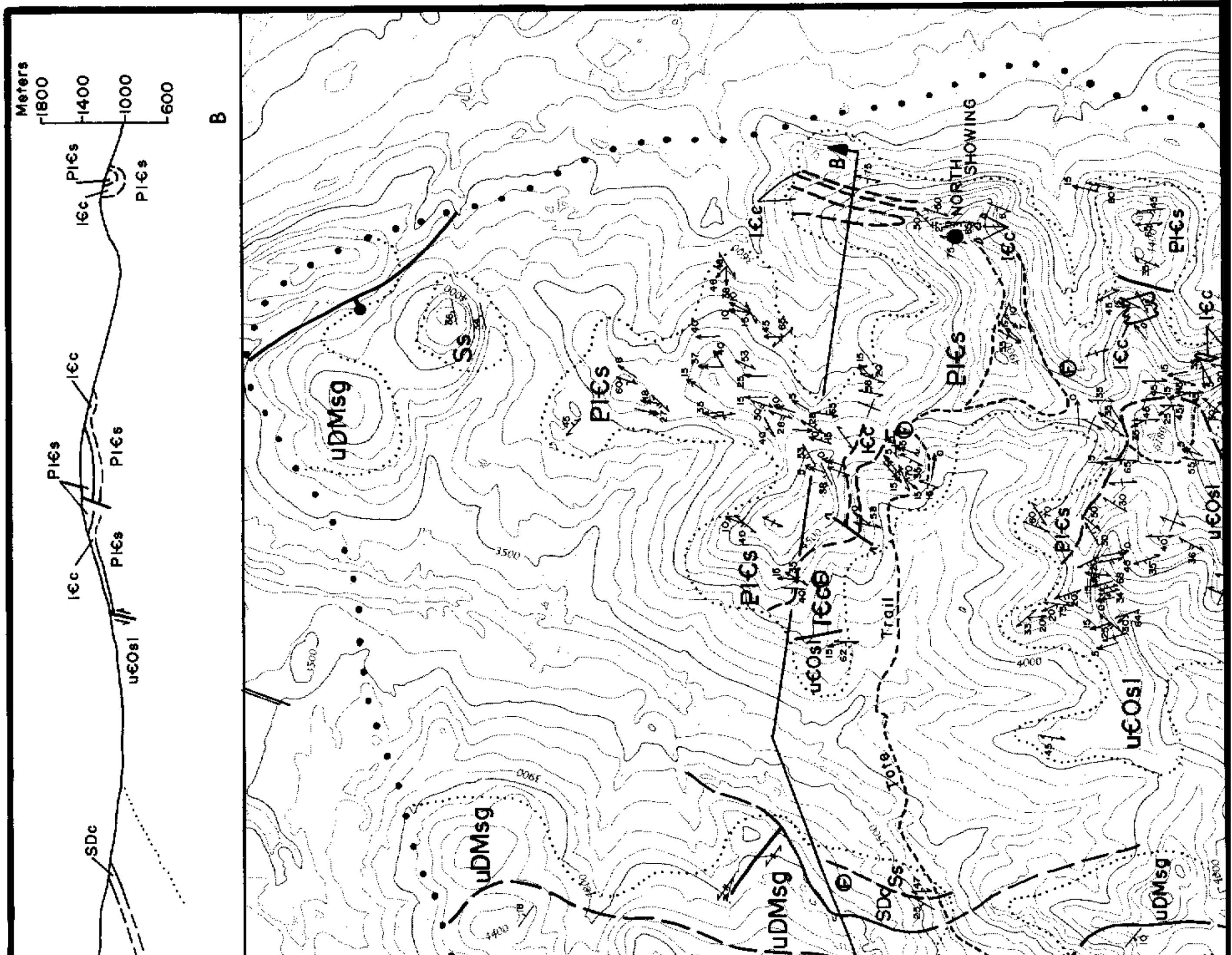
l€c Massive, blue-grey limestone

Hl€s Silver, greenish-grey tuffaceous phyllite, brown and grey micaceous and/or calcareous phyllite, black quartzose phyllite, minor greenstone; may locally include €Osl and €Ocsl

HADRYNIAN AND LOWER CAMBRIAN (?)

"Grit Unit"

Hl€g Quartz feldspar grit, slate, massive siliceous limestone, maroon and green slate


Meters
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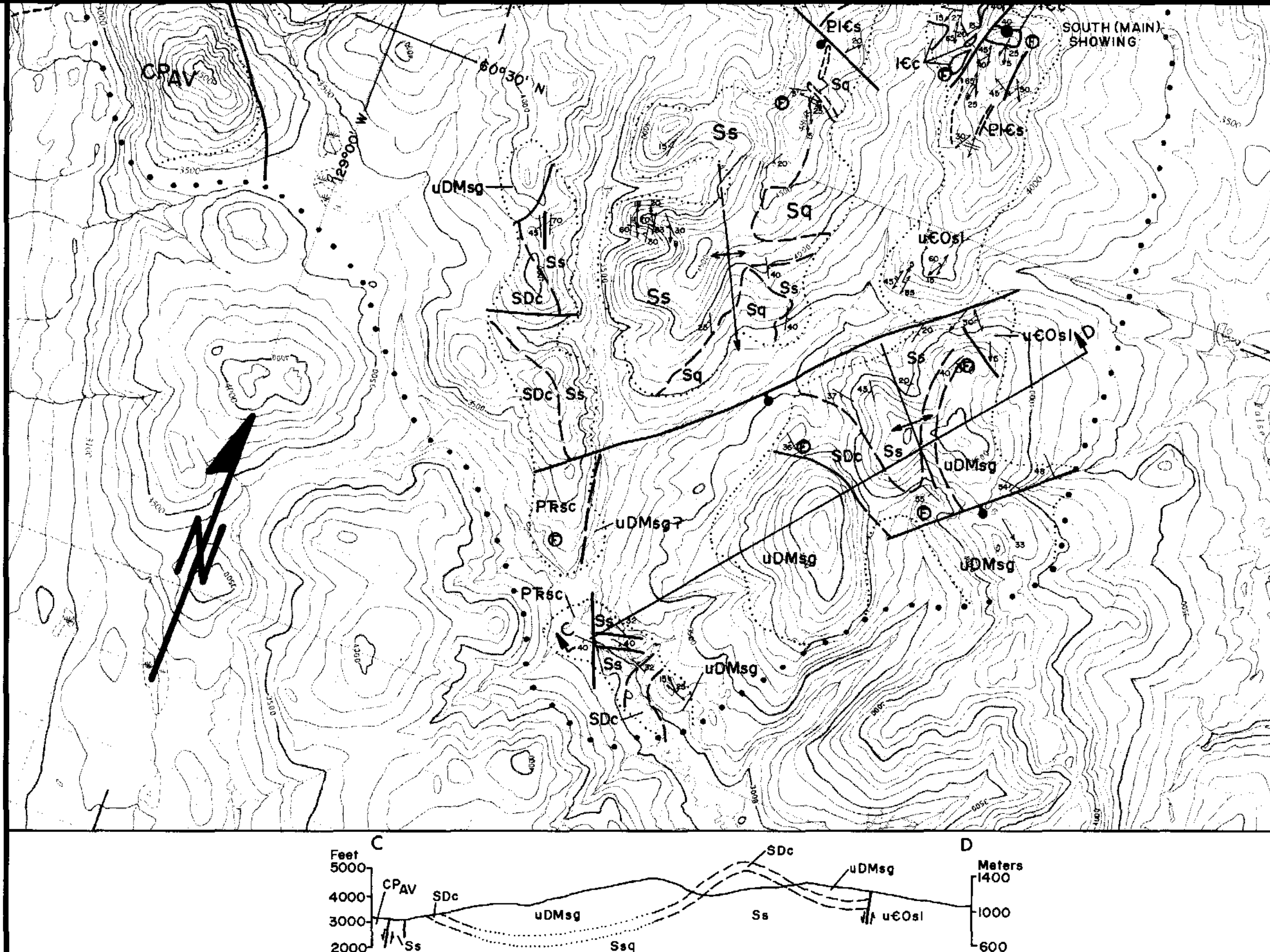
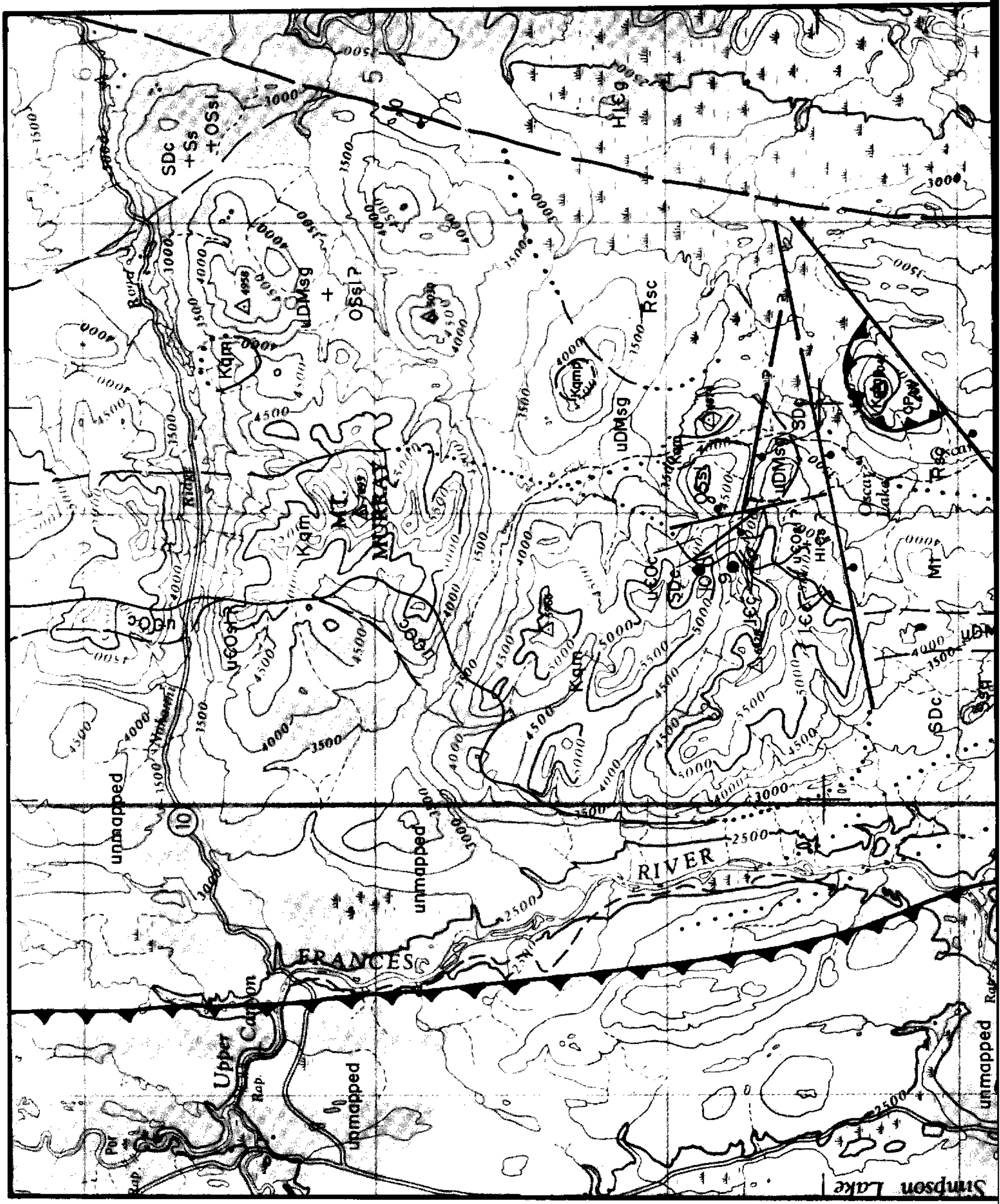


Fig. 1 GEOLOGY Mt. Hundere Area


unmapped
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RIVER
FRANCES
Upper Canyon
Simpson Lake
MT. MURRAY
Rsc
uDMsg
SDc
Kam
10

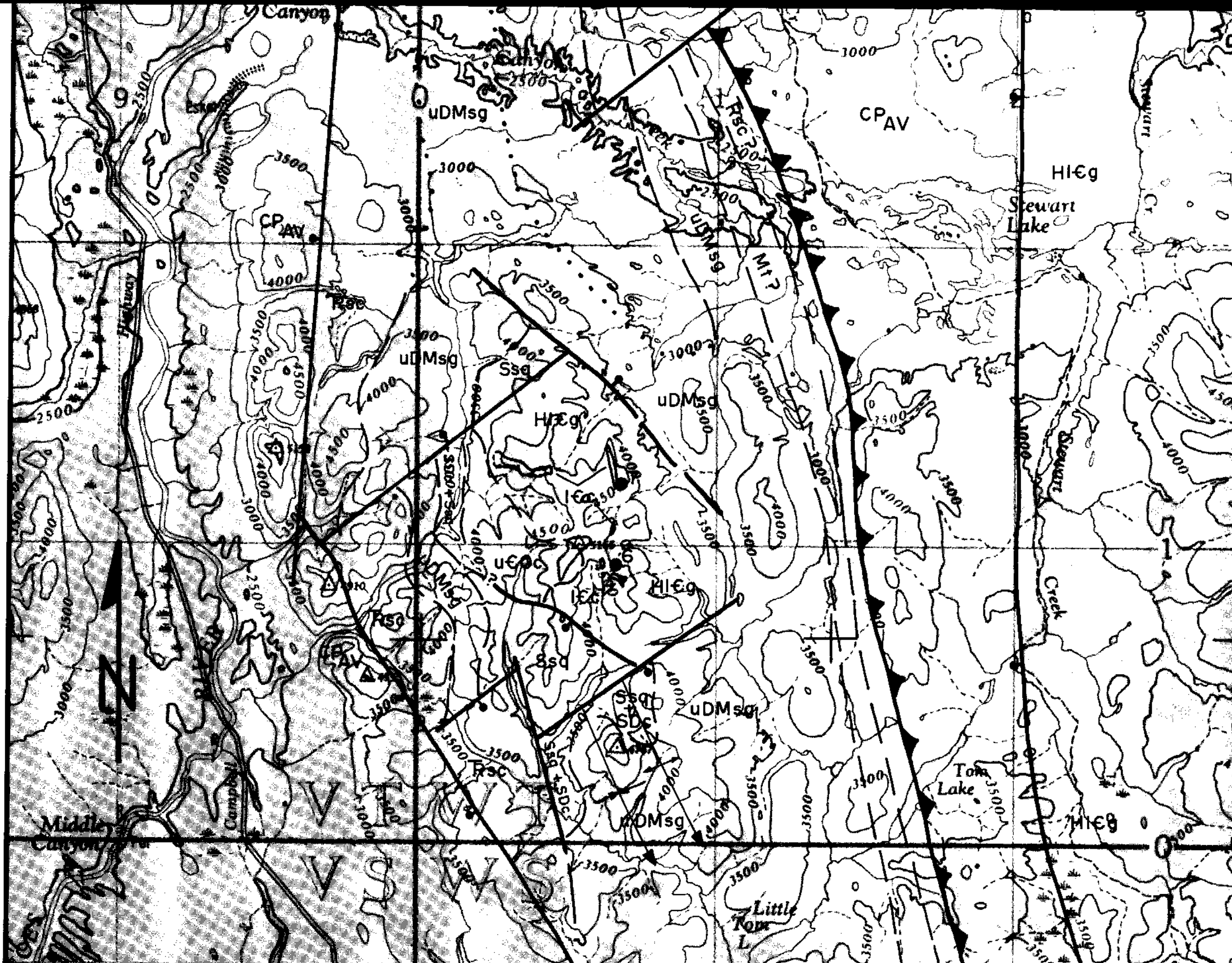

Fig. 2 GEOLOGY Central Watson Lake Area

Limit of mapping

Limit of outcrop and locally derived felsenmeer

Geological boundary (defined, approximate, assumed)

S_o, bedding, tops known (inclined, horizontal), tops unknown (inclined)

S_1, cleavage, crenulation cleavage; may include S_2 (horizontal, inclined, vertical)

S_2, crenulation cleavage

L_1, crenulation axes, intersection of S_o/S_1, may include L_2

L_2, crenulation axes, intersection of S_1/S_2, minor fold axes

Syncline, anticline

Fault (defined, approximate, dot on down thrown side)

Fossil locality

Sulphide occurrence

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A NEW GEOLOGICAL MAP OF THE UPPER COAL RIVER AREA

by

G. Abbott

The area shown in Figure 1 at the headwaters of the Coal River in map sheets 95 D and E was remapped during 1978 and 1979. The writer was employed by Archer, Cathro and Associates to conduct a regional exploration program for CUB Joint Venture (Cassiar Asbestos Corporation Ltd., Highland-Crow Resources Ltd. and Union Carbide Canada Ltd.) and these companies have given permission to publish this information.

The reader is referred to Gabrielse and Blusson, 1969, Gabrielse et al, 1973 for an outline of the regional geologic setting and for descriptions of map units. Units used in this study are those of Gabrielse et al, 1973 and are characterized in the legend for Figure 1.

Figure 2 is a schematic cross-section through the southern part of the area illustrating probable facies relationships between the map-units. Remapping indicates the following revisions to the earlier work:

1. Resistant massive grey siliceous limestone exposed in two isolated knobs east of Coal River are included with the "Grit Unit" (Hc). The northernmost of these exposures was originally mapped by Gabrielse and others (1973) as unit C and considered Cambrian, but they are unlike other rocks within that unit. The limestone was briefly examined and may belong to the Sekwi Formation rather than the "Grit Unit". The till covered areas surrounding the limestone are probably underlain by clastic rocks of the "Grit Unit".

   East of Coal River, immediately south of the map-area coarse-grained clastic rocks of the "Grit Unit" are overlain by grey phyllite with minor quartz sandstone, limestone and dolomite of the "Phyllite Unit" (H€). In other areas maroon and green shale dominate the upper part of the "Grit Unit". The maroon and green shale may change facies to grey phyllite along a boundary that roughly follows the Coal River. Hoffman and Cecile have documented similar facies relationships in Niddery Map-Area (105 O).

2. On the east flank of the broad anticline, east of Coal River, originally included in the Sekwi Formation (€s) and "Phyllite Unit" (€H) are correlated with the Backbone Ranges Formation. The Backbone Ranges Formation underlies the Sekwi Formation in the Mackenzie Mountains (Gabrielse et al, 1973). Figure 3 is an estimated section through these rocks. Only the middle and upper members of the Backbone Range Formation are represented. The upper member consists of the quartz sandstone, phyllite and minor limestone and the middle member, the underlying dolomite with lesser phyllite, quartzite and limestone.

   The Backbone Ranges Formation changes facies to the "Phyllite Unit" from east to west across the anticline. On the western limb, phyllite predominates, quartz sandstone is a minor component and carbonate strata are less than 50 meters thick and absent in places.

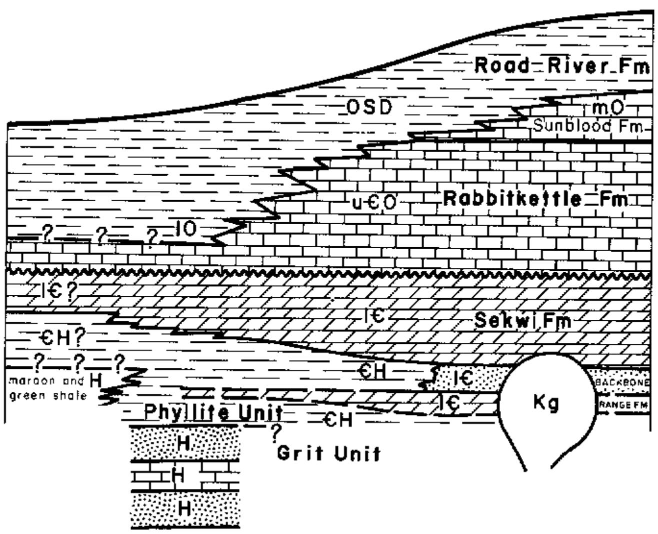
3. Lower Ordovician conodonts (identified by M. Orchard of the G.S.C.) were collected west of the Coal River from recessive, thin-bedded fetid grey graphitic limestone mapped as unit C by Gabrielse. This unit includes recessive, black graphitic shale and is the Road River Formation (OSDr). To the east, along the Rock River, the Road River Formation overlies platformal limestone of the Middle Ordovician Sunblood Formation. Thus, Middle Ordovician carbonate rocks and at least some Lower Ordovician carbonates of the Rabbitkettle Formation change facies across the anticline, to basinal shales.

4. A large low lying area east of the Coal River is underlain by previously unmapped Cretaceous granodiorite and two other small recessive intrusions were found outside the map-area. One intrusion is immediately south of the area east of the Coal River and the other is exposed on both sides of the Coal River north of Quartz Creek about 30 km south of the map-area. These intrusions are unusual because most Cretaceous intrusions in eastern Yukon are resistant and well exposed. Similar unmapped stocks may occur elsewhere and have implications in the search for skarn deposits.

5. A young normal fault is inferred along the drift covered floor of Coal River valley. Rocks of the "Phyllite Unit", intruded by granodiorite east of the Coal River, are metamorphosed to andalusite bearing schist and have a gently west dipping foliation. On the west side of the valley, the Road River Formation consists of low grade phyllite. The difference in age and metamorphic grade of rocks on opposite sides of the valley suggests that the east side is raised relative to the west following granite emplacement.


N
S
Kam
OSDr
€H
€brl
€s
€brd
mOe
COr ?
RIVER
MACKENZIE
5500
5000
4000
3500

FIG 2
SCHEMATIC CROSS SECTION
W UPPER COAL RIVER AREA E



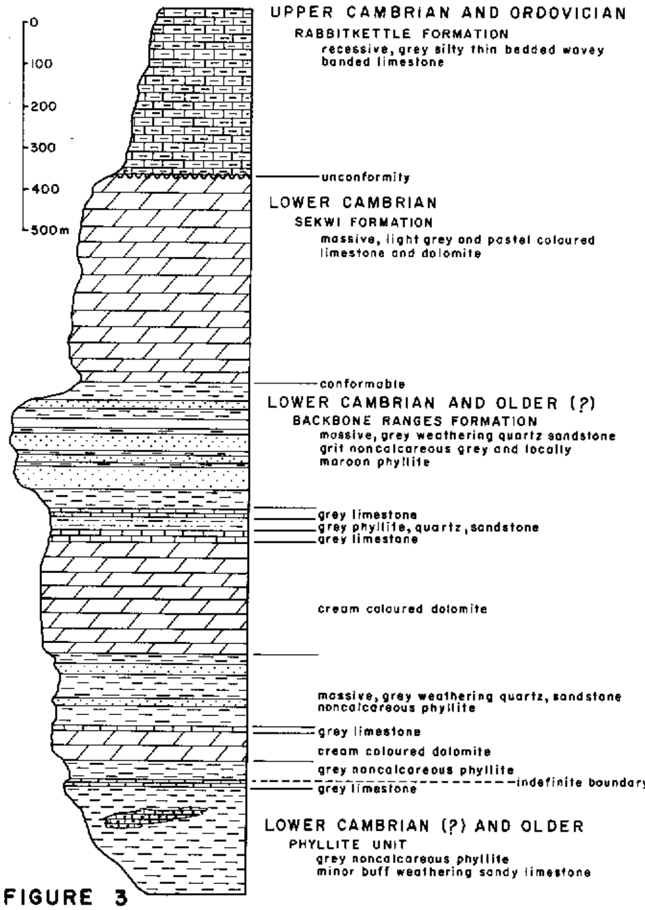


FIGURE 3

LEGEND

(to accompany Figures 1 and 2)
(modified from Gabrielse, 1973)

CRETACEOUS

K Medium-grained equigranular to porphyritic biotite quartz monzonite and granodiorite

ORDOVICIAN, SILURIAN AND LOWER DEVONIAN

ROAD RIVER FORMATION

OSDr Recessive black pyritic phyllite, shale, thin-bedded, black, argillaceous limestone, pale olive green, shaly limestone, grey and black chert.

MIDDLE ORDOVICIAN

SUNBLOOD FORMATION

mOs Dark and light grey dolomite, pink, mottled limestone, orange-brown sandstone

UPPER CAMBRIAN AND LOWER ORDOVICIAN

RABBITKETTLE FORMATION

u€Or Wavy banded,silty limestone, platy impure limestone

LOWER CAMBRIAN

SEKWI FORMATION

€s Massive, light grey and pastel coloured limestone and dolomite

BACKBONE RANGES FORMATION

€brq Massive, grey weathering, greenish grey quartz sandstone, phyllite, and minor maroon phyllite, grey limestone and sandy to pebbly limestone

BACKBONE RANGES FORMATION

€brd Massive light cream to pink weathering dolomite, minor limestone

BACKBONE RANGES FORMATION

€brl Massive grey limestone, sandy to pebbly limestone, minor orangy-brown weathering sandy limestone

"PHYLLITE UNIT"

€H Greenish-grey phyllite, minor quartz sandstone, grey or buff limestone, sandy limestone

(?) LOWER CAMBRIAN AND HADRYNIAN

"GRIT UNIT"

H Grey coarse-grained quartz sandstone, pebble conglomerate, phyllite, brown weathering calcareous quartz-feldspar grit

"GRIT UNIT"

Hc Resistant, massive grey limestone and dolomite

Geological boundary (defined approximate, assumed)

Fault (defined, approximate, dot on downthrown side)

Syncline, anticline

●7 Mineral occurrence

REFERENCES

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RARE EARTH ELEMENTS IN THE GUANO-GUAYES SKARN PROPERTY PELLY MOUNTAINS, YUKON TERRITORY

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ABSTRACT

The Guano-Guayes property, in the St Cyr Range of the Pelly Mountains, covers a skarn about 300 m wide, 70 m thick and 1100 m long. Contact metasomatism of Silurian to Devonian carbonate rocks formed the skarn adjacent to a mafic rich syenite stock coeval with the Seagull Creek volcanic rocks of probably Mississippian age.

Forty Guano-Guayes property rock samples were analysed for rare earth elements (REE) by neutron activation. REE values from syenite, normalized to chondritic values, have a pattern comparable to, but slightly higher than, those from standard crustal rocks. Dikes, cogenetic with syenite, intrude sedimentary rocks within and near the contact metamorphic aureole. These dikes are dark-coloured and originally contained up to 25% zircon, which is now partly altered. The zircon is enriched in total REE and relatively enriched in light REE compared to the syenite, probably by selective partioning of REE during crystallization of zircon. REE patterns in the skarn and sedimentary rocks suggest that fluids circulated through the syenite and carried trace amounts of REE from the dikes into either skarn or sedimentary rocks.

Introduction

The Guano-Guayes skarn property (NTS: 105F 8 W 1/2 61°29'N, 132°25'W) is in the Pelly Mountains of the Yukon Territory about 50 km south of Ross River. Access to the property is by helicopter only. The main skarn crops out on the side of a north-facing cirque, well above timberline. The property is registered in the name of Archer, Cathro and Associates, Ltd., Vancouver, B.C.

Prospecting for uranium in the skarn, spurred by discoveries of small, sporadic and highly radioactive areas, disclosed the presence of REE in abnormally high quantities. The Guano-Guayes property is the first documented occurrence of a high concentration of REE in the Yukon Territory, and one of only a few known REE-bearing skarns (Mary Kathleen in Australia is another; Whittle, 1960).

Studies were undertaken to determine the potential for a mineable deposit in the skarn and to define the origin of the occurrence. A qualitative field test for REE, was used during mapping, and 40 rock samples were analysed by neutron activation.

This study was financially supported by the Department of Indian and Northern Affairs. This report and a thesis, by Chronic submitted to UBC as partial fulfillment for a graduate degree in geology, are the results.

Geology of the Guano-Guayes Skarn

Geology of an area including the Guano-Guayes skarn is shown in Figure 1. Stratified rocks in the area consist of a series of Silurian to Devonian (Tempelman-Kluit, 1977) carbonate rocks of Cassiar platform which contain abundant pelmatozoan stems, indicating they formed in a reef environment. A minor detrital component is represented by shaly beds and thin fine-grained orthoquartzite. Sedimentary rocks are intruded by a Mississippian syenite stock. The syenite consists of 40% to 90% orthoclase in laths to several centimeters long and up to 60% mafic minerals mostly altered to biotite. Two types of dike ("melagranite" and "mafic") cut sedimentary rocks and skarn near the intrusive contact. Melagranite dikes are 5 cm to 5 m thick and can be traced a few tens of meters. They are fine-to medium-grained and contain 10% to 60% euhedral orthoclase, 15% diopside-hedenbergite or arfvedsonite, 5% to 70% (average 20) poikiloblastic quartz, and 3% to 15% euhedral zircon as equidimensional grains a few millimeters across. Mafic dikes, usually 10 to 20 cm thick and a few tens of meters long, contain 40% to 70% very fine-grained actinolite and 15% to 25% zircon and allanite 0.01 to 2 mm in diameter. The contact metamorphic aureole, divisible into three units, developed in a 450 m wide band of the sedimentary rocks next to the southeast edge of the stock. The three contact metamorphic units (Figure 1), from the intrusive contact outward, are: (A) banded quartz-muscovite hornfels, (B) dark green diopside-phlogopite-calcite-tremolite-sphene skarn, and (C) pale green diopside-phlogopite-calcite skarn.

Field Test for REE

The field test for REE, developed by Rose (1976) was used while mapping. According to Rose, the test is sensitive enough to detect a REE deposit if one were present but this is not supported by this study. Results were erratic and positive more often over apparently unaltered sedimentary rocks than in most of the skarn. Neutron activation analyses of 40 samples were made to check the tests. Table I, compares total REE analysed by neutron activation with the field test results. Samples 8F, from a melagranite dike and 12A from carbonate-rich skarn best illustrate the disparity of results.

Neutron Activation Analysis for REE

Forty rock samples from the Guano-Guayes property (sample locations are on Figure 1) were analysed for nine REE (La, Ce, Nd, Sm, Eu, Tb, Dy, Yb and Lu) by neutron activation analysis. R. G. V. Hancock at the SLOWPOKE Reactor, The University of Toronto, analysed the rocks.

Rocks selected for analysis include two mafic and five melagranite dike samples from the skarn, six syenite samples from the main intrusive body, 22 skarns and five sedimentary rocks. These were chosen to: 1. check the accuracy of the field test for REE, 2. define REE contents in different rock types, 3. compare sediments and syenite as possible sources for REE, and 4. provide an even distribution of analyses over the property. Analytical results grouped by rock types are presented in Table I.

TABLE I

RARE EARTH ELEMENT (REE) VALUES IN PPM[1, 2] AND RESULTS OF FIELD TESTS, GUANO AND GUAYES PROPERTIES, PELLY MOUNTAINS, Y.T.

Sample	Rock Type	^{57}La	^{58}Ce	^{60}Nd	^{62}Sm	^{63}Eu	^{65}Tb	^{66}Dy	^{70}Yb	^{71}Lu	Total	Field Test[3]
K30	Mafic Dike	4980.	3070.	4300.	930.	103.	170.	1066.	790.	71.6	20400.	+++
S50	Mafic Dike	4460.	6150.	3300.	450.	46.3	61.	397.	230.	16.	15100.	++
Mean	Mafic Dike	4720.	7110.	3800.	690.	75.	116.	730.	510.	44.	17800.	
8A	Melagranite Dike	410.	940.	380.	39.0	4.99	3.9	33.	30.	1.9	1840.	+
8F	Melagranite Dike	610.	2660.	1000.	19.9	8.74	6.3	50.	21.	2.0	4380.	-
9D	Melagranite Dike	1860.	2950.	1400.	153.	8.2	11.	68.	42.6	3.3	6500.	+++
P1B[5]	Melagranite Dike	64.5	121.	64.	10.1	0.72	0.8	6.3	8.0	1.25	276.	+++
CC17	Melagranite Dike	806.	2300.	480.	166.	3.8	3.5	12.0	22.2	2.26	3820.	-
Mean	Melagranite Dike	920.	2210.	815.	94.	6.4	6.	46.	29.	2.4	4130.	
M21	Syenite	37.	79.	28.	5.89	0.32	0.9	10.6	9.3	1.07	172.	+++
M27	Syenite	77.	210.	89.	9.47	2.37	0.60	5.7	3.5	0.40	398.	++
M3[4]	Syenite	66.	180.	84.	8.03	1.45	0.79	6.7	4.4	0.56	352.	-
N5[4]	Syenite	39.	120.	69.	7.06	1.48	0.69	4.8	3.4	0.42	246.	-
N6	Syenite	47.5	214.	120.	7.42	1.80	1.2	9.6	4.0	0.61	406.	-
N10[4]	Syenite	64.	165.	48.	9.94	1.80	0.80	6.0	3.6	0.49	299.	-
Mean	Syenite	55.	160.	73.	7.80	1.54	0.82	7.2	4.7	0.59	311.	
8D	Skarn	60.	170.	120.	13.5	1.03	0.97	7.8	5.5	0.56	380.	-
8E	Skarn	88.	200.	41.	22.5	1.19	0.81	7.5	7.0	0.66	369.	+++
8K	Skarn	30.9	65.	84.	8.97	0.85	0.8	6.7	4.4	0.48	202.	+++
9B[4]	Skarn	18.	25.	22.	3.48	0.39	<0.15	1.13	<0.04	0.10	70.	++
10	Skarn	117.	165.	96.	15.4	6.9	1.4	12.3	10.8	1.16	426.	++
12A	Skarn	17.	46.	<7.	4.04	0.57	0.37	3.0	1.7	0.19	80.	+++
12C	Skarn	24.	60.	30.	4.08	0.76	0.39	3.2	1.6	0.21	124.	+++
P1C	Skarn	22.	60.	38.	4.44	0.62	0.47	2.9	1.7	0.25	130.	+++
P2A[4]	Skarn	18.	54.	20.	9.16	0.64	0.47	3.6	1.9	0.23	108.	+++
P3D[5]	Skarn	580.	1540.	490.	38.2	10.9	2.6	24.	14.	1.3	2700.	++
P5A[4]	Skarn	4.	25.	16.	1.54	0.51	0.37	1.0	0.5	0.26	49.	+++
P5C[4]	Skarn	25.	49.	23.	2.78	0.59	0.28	2.1	1.1	0.16	104.	+++
P6C	Skarn	12.2	11.	27.	0.45	0.19	<0.1	<0.6	0.4	<0.05	52.	+++
P7A	Skarn	35.5	58.	22.	2.34	0.26	0.3	1.7	3.4	0.54	124.	+++
P7D	Skarn	3.9	25.	<5.	1.01	0.37	<0.1	0.8	0.3	0.11	45.	++
P8B	Skarn	17.	84.	66.	15.6	0.64	0.5	4.2	4.1	0.53	203.	+
P11A	Skarn	12.	9.4	7.	0.56	<0.18	<0.1	<0.4	0.25	0.06	<16.	+++
Q13C	Skarn	69.2	123.	11.	16.3	4.6	1.4	12.7	6.8	0.67	245.	+++
DD1	Skarn	11.2	31.	5.	8.25	0.85	0.9	7.8	4.3	0.36	69.	-
DD23[6]	Skarn	296.	336.	53.	8.35	2.8	1.9	24.0	31.6	2.93	756.	+++
Mean	Skarn	32.	70.	35.	7.5	1.2	0.54	4.4	3.1	0.37	152.	
1A	Hornfels	30.	53.	17.	4.85	0.38	0.5	3.1	2.3	0.21	111.	+
3B[5]	Hornfels	900.	1860.	340.	40.6	15.75	2.8	27.	15.	1.5	3200.	-
Mean	Hornfels	30.	53.	17.	4.85	0.38	0.5	3.1	2.3	0.21	111.	
R4E	Dolomite	4.5	5.3	1.6	1.60	0.30	0.2	1.2	1.3	0.16	16.2	+
S8D	Quartzite	4.4	12.	6.	0.89	0.40	≤0.1	1.0	1.1	0.15	≤26.	+
W21	Dolomite	6.6	12.	5.	1.36	0.34	0.2	2.0	0.8	0.10	28.	+++
X2A	Dolomite	6.6	15.	≤4.	2.26	0.37	0.1	2.4	1.3	0.13	≤32.	+++
X13A	Dolomite	3.5	4.5	≤4.	0.50	0.17	0.1	0.7	0.3	0.07	≤14.	
Mean	Sedimentary rocks	5.1	9.7	≤7.	1.29	0.30	≤0.1	1.5	1.0	0.32	≤26.	
	Standard deviation[2]	0.5	1.	2.	0.04	0.07	0.1	0.3	0.2	0.03		

1. All REE analysis done by R.G.V. Hancock, SLOWPOKE reactor, The University of Toronto, Ontario.
2. Accuracy for Nd and Tb values is approximately 20 percent. Otherwise, counting error is one standard deviation for all samples except dikes. For dike samples, counting statistical errors are approximately one percent of the value shown.
3. Field test (Rose, 1976) is qualitative: blank = not analysed, - = not detected, + = fairly positive, ++ = definitely positive, +++ = extremely positive.
4. REE values shown are averages of two analyses.
5. REE analyses are questioned due to conflict with petrological data and are not used in this study.
6. REE values are anomalous to other samples in the group and are not used in calculating mean values.

TABLE II

STATISTICAL[1] COMPARISON OF ROCK-TYPE REE GROUPS, GUANO-GUAYES AREA, PELLY MOUNTAINS, Y.T.
Calculations show $t_{independent}$ [2] and corresponding confidence levels[3]

Units		La	Ce	Sm	Eu	Dy	Tb	Lu
Melagranite Dikes Compared to Syenite df = 8	$t_{independent}$	3.39	5.81	2.89	4.82	5.65	5.91	6.30
	percent confidence level	99 to 99.9	>99.9	98	99 to 99.9	>99.9	>99.9	>99.9
Syenite compared to Skarn df = 28	$t_{independent}$	1.68	3.45	0.12	0.48	2.02	1.03	1.11
	Percent confidence level	80 to 90	99 to 99.9	<80	<80	90 to 95	<80	<80
Skarn compared to Sedimentary rocks Df = 21	$t_{independent}$	1.79	2.31	2.03	1.11	1.67	1.59	1.87
	percent confidence level	90 to 95	95 to 98	90 to 95	<80	80 to 90	80 to 90	90 to 95
Syenite compared to Sedimentary Rocks Df = 9	$t_{independent}$	6.33	6.32	0.99	4.00	5.30	3.51	4.16
	percent confidence level	>99.9	>99.9	<80	99 to 99.9	>99.9	99 to 99.9	99 to 99.9
Mafic Dikes Compared to Melagranite Dikes Df = 4	$t_{independent}$	7.44	5.50	4.08	3.90	3.34	2.80	2.43
	percent confidence level	99 to 99.9	99 to 99.9	98 to 99	98 to 99	95 to 98	95 to 98	90 to 95

1. Mathematical notation is standard.

2. The formula used for $t_{independent}$ includes a correction for comparison of groups of different variance, and is

$$t_{independent} = \frac{\bar{X} - \bar{Y}}{\sqrt{\left[\frac{(n_X-1)SD_X^2 + (n_Y-1)SD_Y^2}{n_X + n_Y - 2}\right]\left[\frac{1}{n_X} + \frac{1}{n_Y}\right]}}$$

3. The confidence level defines the amount of certainty that the difference between the two groups is large in relation to the standard deviation of the distribution of differences between sample means ($S_{\bar{x}_1 - \bar{x}_2}$).

Interpretation of Data

REE analyses were separated into groups by rock type. Calculations of t independent were used to evaluate (Table II) whether the means of the groups have statistically different REE contents. Results indicate that rock groups are analytically discrete. Cumulative probability graphs (Sinclair, 1976) were used to test whether or not contact metamorphic rocks contain REE from more than one subgroup or source. No natural subdivisions are found.

Mean total analysed REE differs for each lithologic group. Syenite-related dikes contain one to two orders of magnitude more total REE than syenite. Contact metamorphic rocks and sedimentary rocks contain 50% and 5% respectively of the REE found in syenite. Comparison of Guano-Guayes REE to standards (Table III) reveals that: the syenite contains more total REE than average granitic rock local strata have one sixth the total REE of an average shale, and contact metamorphic rocks on the property have the same amount as average shale.

REE patterns for Guano-Guayes and standard rocks, showing variations within the lanthanide series between different rock types, are illustrated in figures 2 and 3. Figure 2 shows the Guano-Guayes rock groups normalized to chondrites. Values are higher than for chondrites, and are richer in light REE than in heavy REE compared to chondrites. If chondrites are truly representative samples of premordial material similar to the original composition of the unfractionated earth, and if light REE have not been locally concentrated by metamorphism, REE patterns of these rocks illustrate the generally extensive fractionation of large-ion elements in the crust. Note in Figure 2 that the negative inflection of the patterns at Ce for sedimentary rocks and skarn is not seen for syenite. This may indicate slight depletion in Ce in original sediments caused by their precipitation from sea water which has a negative Ce peak when normalized to chondrites (Figure 3).

Comparison of Guano-Guayes rocks in figure 2 to shales (an estimate of normal crustal rocks) in figure 3 shows similar patterns. Syenite and skarn patterns are similar to normal crust both in shape and magnitude. Sedimentary rocks contain relatively less light REE and also less total REE when compared to crustal rocks. The similarity between REE curves and values of syenite and contact metamorphic rocks compared to local sedimentary rocks suggest common ancestry for REE in syenite and host rocks. This implies that fluids carried significant amounts of REE from syenite into the contact metamorphic rocks, adding to their REE content and influencing REE patterns.

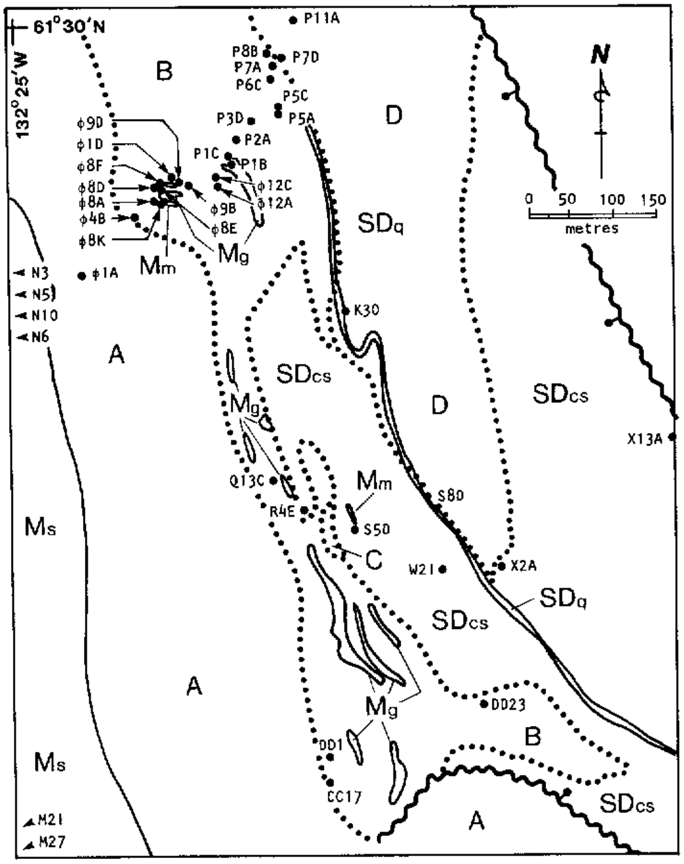

Figure 1. General geology and sample sites on the Guano-Guayes property, Y.T. SDcs-Si-Silurian-Devonian shaly carbonate rocks; Ms-Mississippian syenite; Mg-Mississippian melagranite dike; A-banded quartz-muscovite hornfels; B-dark green diopside, phlogopite -calcite, tremolite, sphene, skarns; C-pale green diopside-phlogopite, calcite skarn. Sample sites are labelled (Table I).

The granite standard and the Guano-Guayes intrusive rocks have relative Eu depletions. This depletion is most pronounced in dike rocks from the property. Coincident enrichment in light REE and depletion in Eu can result from fractional crystallization of magmas: lighter, larger REE ions partition into the residual melt in preference to the heavier REE, and divalent Eu^{+2} leaves the melt early to fill Ca^{+2} sites in feldspars (Higuchi and Nagasawa, 1969). Metamorphic mobilization is known to cause enrichment of light REE, but not depletion of Eu (Wood et al, 1976). Since both light REE enrichment and Eu depletion is seen in dikes relative to syenite, the dikes most likely formed from a more extensively fractionated melt than that which produced the syenite.

REE have very large partition coefficients for zircon, (eg. 10 to 400 for Ce according to Nagasawa, (1970), and enrichment in total REE in the dikes compared to syenite could be a function of the high zircon content of the dikes. Patterns for dikes show relative enrichment in heavy REE expected using Nagasawa's partition coefficients behavior in zircons is uncertain.

Differences in patterns between the two types of dikes could be due to more extensive fractionation for the formation of mafic dikes than for melagranite dikes or to different mineralogy and consequent effect on partition coefficients. The identification of the mafic dike REE mineral as zircon is uncertain, since grains are small and significantly metamict.

The occurrences of REE in the Guano-Guayes property in fine-grained zircon and even finer-grained secondary minerals disseminated in a massive dike rock renders separation difficult. No uranium anomalies were detected on the property. One percent total REE is not economic. Present North American demands for REE are more than met by the Mountain Pass Mine in California, where REE minerals constitute roughly 30% of the rock.

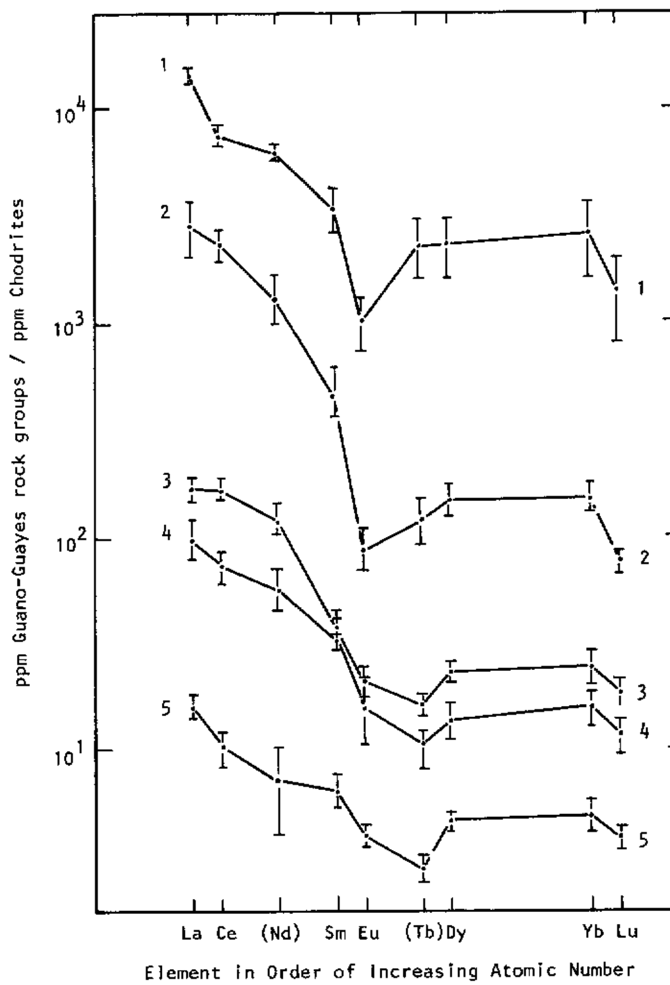

Figure 2. REE patterns for rocks from the Guano-Guayes property, Y.T., normalized to chondritic meteorites. Error bars represent the standard error of the mean. Curve 1 represents mafic dikes, 2 represents melagranite dikes, 3 represents syenite, 4 represents skarn and 5 represents unaltered sedimentary rocks.

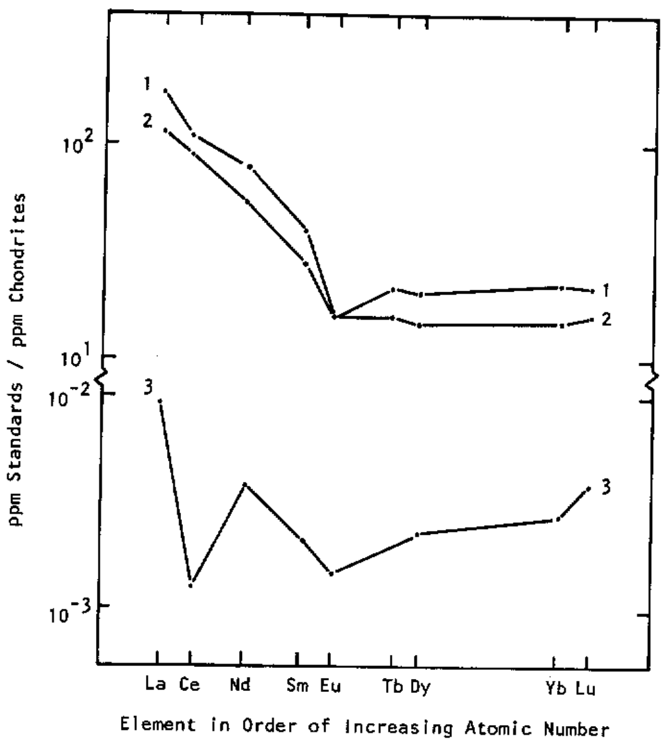

Figure 3. REE patterns for standard REE value normalized to chondrites. Curve 1 represents granitic rocks (Haskin et al, 1968), 2 represents post-Archean Australian sediments (Nance and Taylor, 1976), and 3 represents 100 m deep Pacific Ocean water (Goldberg et al, 1963).

Conclusions

1. The area investigated is not economic. REE occur in concentrations of about 1% in syenite-related dikes which cut contact metamorphic rocks. They are concentrated in fine-grained zircon and even finer-grained secondary silicates and phosphates. Concentration of REE-rich minerals from the rocks and extraction of REE from these minerals is difficult. Only traces of uranium are found in the area.

2. Rock types can be characterized by their REE content.

3. Syenite and contact metamorphic rocks contain REE of approximate upper crustal concentration and pattern, suggesting an upper crust source. REE were concentrated by igneous processes. Eu depletion in the igneous rocks suggests that fractional crystallization of plagioclase took place during the formation of syenite and dike melt, before separation of the melt from a parent magma. REE in carbonate rocks reflect their sea-water origin and some crustal impurities.

4. REE originally partitioned into zircon from syenite or syenite-related melt. Fractionated melt formed REE-bearing minerls in dikes cutting contact metamorphic rocks. There was no significant movement of REE-containing fluids from dikes into contact metamorphic rocks. Time of formation and intrusion of REE-enriched melt as dikes relative to formation and intrusion of syenite melt is uncertain.

5. The syenite stock was the source of fluids which flowed through contact metamorphic rocks, depositing enough REE of syenitic origin to significantly increase REE quantities and overprint REE patterns within them.

TABLE III

STANDARD REE VALUES IN PPM

Elements	1 Chondrites	2 Granite Rocks	3 Shales	4 Ocean
La	.32	55.	38.	.0029
Ce	.94	104.	80.	.0013
Nd	.60	47.	32.	.0023
Sm	.20	8.	5.6	.0042
Eu	.075	1.1	1.1	.000114
Tb	.050	1.1	.77	--
Dy	.31	6.2	4.4	.00073
Yb	.19	4.3	2.8	.00052
Lu	.031	.68	.50	.00012
Totals:	2.72	227.	165.	.0122

1. Average of 22 chondritic meteorites, Hermann (1971).

2. Haskin et al, (1968).

3. Average of Post-Archean Australian sediments (an estimate of upper crustal values), from Nance and Taylor (1976).

4. Average for 100 m deep Pacific Ocean Water, Goldberg et al, (1963).

COMPARATIVE STUDIES OF CATACLASTIC ALLOCHTHONOUS ROCKS IN McQUESTEN, LABERGE AND FINLAYSON LAKE MAP-AREAS

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INTRODUCTION

The recent tectonic synthesis of central Yukon by Tempelman-Kluit (1979) outlines the affinity of several groups of cataclastic rocks which are mostly preserved as allochthonous sheets.

The subduction zone processes thought to have produced these rocks generated high pressure metamorphic mineral assemblages which, if preserved, can be used to correlate lithologies and explain their history. Detailed comparison of portions of the allochthonous sheets may thus contribute to exploration efforts.

Three areas previously surveyed at 1:250,000 were mapped at 1:50,000 in the summer of 1980: the White Mountains of McQuesten map-area, the Big Salmon Range south of Teraktu Creek in Laberge map-area and an area northeast of Fire Lake in Finlayson Lake map area. Terrains in the White Mountains and near Fire Lake are thought to have been almost adjacent to each other until the Late Cretaceous or Early Tertiary when dextral strike slip movement on Tintina Fault separated them by about 450 kilometres. On strike with these two areas, the Teraktu Creek area exposes similar rocks in klippen but also in the steeply dipping suture zone thought to be the source of the transported sheets. A location map is given in Figure 1.

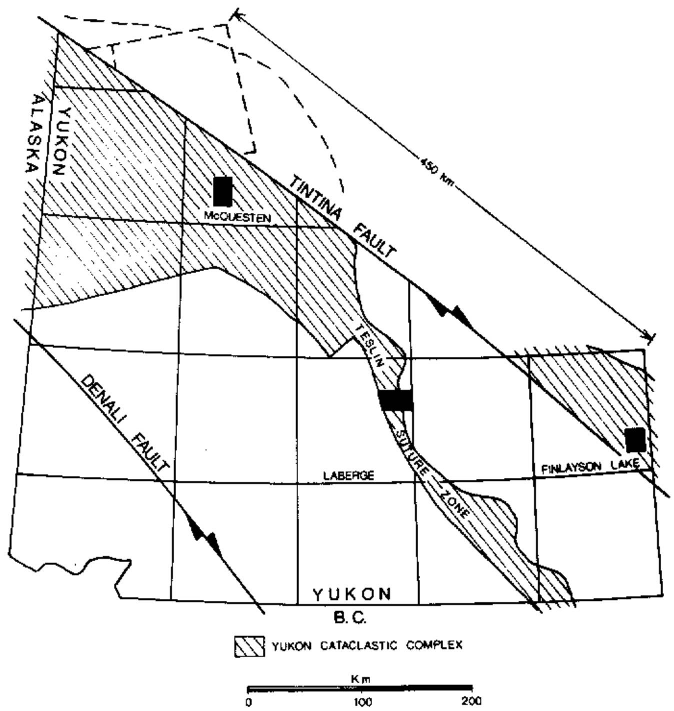

Figure 1
Location of the three mapped areas.

Field and Analytical Studies

Field work from fly camps was carried out for approximately one month in each area. Special attention was paid to metamorphic indicators and high strain textures during mapping. Field results are presented below. Microprobe mineral and whole rock geochemical analyses, as well as fabric studies are in progress. A series of K-Ar age determinations is also planned.

Paul Price provided assistance in the field. Members of the Whitehorse DIAND Geology Section helped solve logistical problems; Cominco Ltd. and Archer, Cathro and Associates conveniently made their helicopters available on several occasions.

This work forms the basis of a Ph.D. study at Queen's University. Field work was financially supported by DIAND's geology section.

Results

a. White Mountains

Figure 2 shows the geology of the mapped area (compare with Bostock, 1964). A key to lithological symbols used in the maps and sections of this report is given in Table 1.

The two klippen of ultramafic rocks (CPAub; unit 12 of Bostock) that cap Flat Top and Rough Top Mountains are part of a single thrust sheet over 400 metres thick in places. However, the adjacent smaller bodies of unit 12 shown by Bostock are mostly hornblende-rich rocks that also contain feldspar and quartz, and should not be included in the ultramafic unit. The two bodies on the south extremity of nearby Tonsure Mountain are hornblende diorite and quartz feldspar porphyry respectively.

In the serpentinized assemblage, rare schistose zones outline a shallow-dipping fluxion structure, but a few steep dips are also present. There is no apparent relation between these zones and the near-horizontal sole of the klippen.

The garnet amphibolite (CPAa) and related lithologies included in Anvil Allochthon are both underlain and overlain by rocks of Nisutlin Allochthon (Klondike Schist). This suggests intimate structural interleaving of these allochthons before or during transport.

In the Klondike Schist (PPk) compositional layering (S_0), the flaser fabric (S_1) and the axial surface to rare contained isoclines (S_2) are parallel. This strong set of fabrics is affected in a few outcrops by small upright folds of random orientation. The generally horizontal cataclastic foliation of the orthogneisses (PMgdm) northwest of Flat Top klippe suggests that the faulted contact with rocks to the southeast is steep, although lack of outcrop prevents its observation.

All metamorphic mineral assemblages observed in the area belong to the upper greenschist and amphibolite facies. No concentration of economic minerals were noted.

b. Teraktu Creek

The mapped area is shown in Figure 3 (compare with Tempelman-Kluit, 1978, 1979).

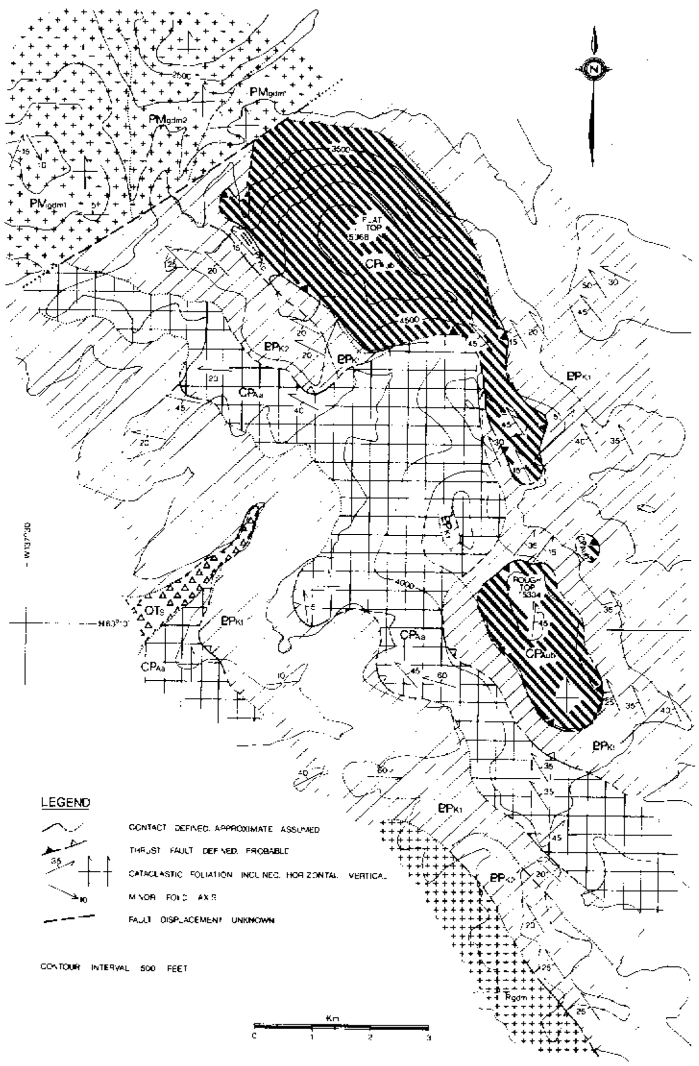

Figure 2
Geology of the White Mountains, McQuesten map area. The key to rock types is given in Table I.

Proposed correlation of autochthonous shelf facies (Nasina Facies) with the cataclastic graphitic lithologies (OSDqcl) of Nisutlin Allochthon seems justified; most protoliths of the other cataclastic assemblages may be identified in the future in similar proximity to Teslin Suture Zone. Complex structural interleaving and discontinuity of the cataclastic assemblages appears even more common than previously thought and further supports the view that Teslin Suture Zone is a sheared tectonic melange.

Parautochthonous thrusting of unsheared "North American" rocks over Anvil Allochthon in the klippe was contemporaneous with, or shortly followed transport of the mylonitized rocks since the high angle fault on the west side of the klippe truncates a parauthochthonous thrust.

Axes of minor upright folds in some suture zone outcrops have an average attitude of 340, 20. These folds affect the three parallel main fabrics of both Nisutlin and Anvil Allochthons (compositional layering (S_0), fluxion structure or cataclastic foliation (S_1), axial surfaces to isoclines folding the first two (S_2) and have produced a crenulation schistosity (S_3) that obliterates the earlier fabrics in places. Some of the steeply west-dipping or vertical foliations recorded may be this later schistosity. However, the marked east-dipping fabric at the west edge of the suture zone is the cataclastic foliation (S_1).

Observed metamorphic mineral assemblages belong to the upper greenschist facies but appear to be retrograde. A lens of retrograded eclogite approximately 30 metres wide crops out east of the small mass of ultramafic rock in the west portion of the mapped area. Whole rock analyses are comparable to those of the type C Faro eclogite (see Tempelman-Kluit, 1970) and diagnostic thin section textures such as atoll garnets are present. Further analytical studies of the high pressure minerals are in progress.

c. Money Klippe

A map of Money Klippe, situated northeast of Fire Lake, is given in Figure 4 (compare with Tempelman-Kluit 1977, 1979).

The gabbro unit (CPAb) overlies both units of Simpson Allochthon in places, and is overlain by it elsewhere. This implies either that the order of structural superposition is not always the same for the allochthonous assemblages, or that the gabbro belongs to Simpson Allochthon which is unlikely because significant amounts of serpentinite and sheared basalt are locally included in the gabbro.

Although the internal fabric of the various allochthonous sheets is steeper in places than the faults that separate the units, the cataclastic foliation commonly conforms to the upper and lower contacts of each unit. Few minor folds occur in any of the foliated rocks.

Observed metamorphic assemblages belong to the greenschist facies and seem to be mostly retrograde.

Vertical joints and vertical colour banding (layering) are visible on cliff faces near the centre of the Cretaceous volcanic plug (KTqfp) that invades Money Klippe. At the margins of the plug the volcanics overlie the cataclastic rocks in at least one place (the contact is probably close to vertical elsewhere). No regolith is visible at the contact, but neither is any significant thermal alteration of the underlying rock. This suggests that the present level of exposure corresponds approximately to the base of the now eroded subaerial volcanic edifice.

The volcanic rocks locally host finely disseminated pyrite and chalcopyrite, and small epidotized hematite-carbonate pods. In the cataclastic rocks, minor zones of disseminated pyrite in units PPkl and CPAv seem to occur preferentially near thrust contacts, but appear unpromising.

SUMMARY

Field observations of comparable lithologies, mylonitic textures and metamorphic grade support correlation between the mapped areas of the three assemblages of sheared and cataclastic rocks in the allochthonous sheets and Teslin Suture Zone.

Structural relations on the regional scale outlined by Tempelman-Kluit (1979) are complicated by interleaving and repetition of the allochthons on the

Figure 3

Geology of the area south of Teraktu Creek, Laberge map area and diagramatic section along A-B. Key to rock types given in Table I.

Figure 4
Geology and cross-section of Money Klippe, Finlayson Lake map area. Key to rock types given in Table I.

WHITE MOUNTAINS

PLEISTOCENE

QTs — Selkirk Series: black, dark brown or grey olivine and augite basalt; andesite; occur as flows and breccias

TRIASSIC? OR OLDER

TRgdm — Massive grey weathering medium-grained biotite and hornblende granite and granodiorite

DEVONIAN TO TRIASSIC?

PMgdm — (1) Resistant light green weathering orthogneiss derived from granodiorite to quartz diorite; mylonite and ultramylonite;
(2) Light rusty weathering mylonite orthogneiss probably derived from a protolith closely related to that of (1)

CARBONIFEROUS AND PERMIAN? (POSSIBLY OLDER)

CPAub — Resistant dun brown to orange weathering massive dunite and peridotite

CPAa — Banded medium- to coarse-grained garnet amphibolite and hornblende gneiss; equigranular hornblende dioritic gneiss; biotite hornblende garnet schist

AGE UNKNOWN

PPK — Klondike Schist
(1) Light rusty weathering white to pale green muscovite quartz schist and blastomylonite; metaquartzite; chlorite schist; minor amphibolite
(2) dark graphitic siliceous phyllite and slate

PPKc — White to grey weathering resistant massive fine-grained marble; included as small lenses in PP_K

TERAKTU CREEK

SIMPSON ALLOCHTHONOUS ASSEMBLAGE

DEVONIAN TO TRIASSIC?

PMgom — Resistant grey weathering medium to coarse-grained hornblende granodiorite gneiss, and protomylonite and augen gneiss derived from it; complete gradation from orthogneissic protolith to cataclasite and mylonite can be observed in many outcrops

ANVIL ALLOCHTHONOUS ASSEMBLAGE

CARBONIFEROUS AND PERMIAN? (POSSIBLY OLDER)

CPAub — Resistant dun brown and orange weathering massive dunite, peridotite and pyroxenite; serpentinized equivalents are also present

CPAv — Resistant dark green mostly fine-grained to aphanitic basalt; amphibolite; greenstone; Yand derived mylonite and blastomylonite

NISUTLIN ALLOCHTHONOUS ASSEMBLAGE

AGE UNKNOWN

PPK — Klondike Schist
Buff weathering pale green muscovite quartz blastomylonite, sericite quartz schist and muscovite quartzite; minor chlorite schist and graphitic micaschist

OSDqct — Recessive grey to black flaser graphitic metaquartzite and graphitic phyllite; presumed to be the cataclastic equivalent of OSDqc

SDc — Very resistant grey and buff weathering fine- to medium-grained white marble; thought to be the cataclastic equivalent of SDd

AUTOCHTHONOUS

SILURIAN AND LOWER DEVONIAN NASINA FACIES

SDd — Resistant light grey medium-bedded dolomitized sandstone and dolomite; minor silty and sandy beds

SDdq — Resistant buff weathering thick bedded sandy dolomite and dolomitic sandstone

Sq — White weathering medium-grained thick bedded orthoquartzite; gradational to SDdq

OSDqc — Recessive dark grey to black limy thin-bedded graphitic siltstone; impure quartzite; silty shale

MONEY KLIPPE

CRETACEOUS

KTqtp — Fresh, acid and intermediate subvolcanic and volcanic rocks of two main types:
(1) dark weathering aphanitic dacite, porphyritic hornblende andesite, fine-grained amphibolite
(2) rusty or mauve weathering rhyolite, quartz feldspar porphyry

DEVONIAN TO TRIASSIC?

PMgdm — Massive resistant grey weathering hornblende granodiorite; both a protoclastic phase, with original texture, and orthogneissic and mylonitic equivalents are present

Mqmp — Massive resistant grey to pink weathering porphyritic biotite quartz monzonite, generally weakly recrystallized; locally shattered, but lacking cataclastic texture

CARBONIFEROUS AND PERMIAN? (POSSIBLY OLDER)

CPAb — Dark grey weathering resistant massive medium- to coarse-grained pyroxene gabbro; includes minor CP_{As} undifferentiated

CPAv — Resistant dark green aphanitic basalt; fine-grained amphibolite; minor gabbro; and derived mylonite, and ultramylonite. Includes very minor grey carbonate lenses

CPAs — Yellow-green weathering serpentinite

AGE UNKNOWN

PPK — Klondike Schist
(1) Light rusty weathering white to pale grey muscovite quartz blastomylonite; chlorite quartz blastomylonite; muscovite quartzite
(2) Very dark siliceous phyllite and amphibole chlorite schist

Pc — Parautochthonous(?) white weathering resistant massive light grey marble; has well-developed flaser fabric

Table I
Key to lithologies in maps and sections (Figures 1 to 3).

scale of present mapping.

Although rare, high pressure mineral assemblages support the current model of evolution; they were mostly obliterated by retrograde greenschist facies metamorphism.

No significant new mineral occurrences were noted in the strained rocks.

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ISOTOPIC AGE DETERMINATIONS OF SOME METAMORPHIC AND IGNEOUS ROCKS FROM CLINTON CREEK AREA, YUKON

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INTRODUCTION

This is a report of new isotopic age determinations from near the Clinton Creek asbestos deposit. It is abstracted from a thesis presented as partial fulfilment for an M.Sc. degree in geology at UBC by the author (Htoon, 1979). The study was financially supported by the Department of Indian and Northern Affairs and a preliminary progress report on the study was published by the Department in Htoon (1976).

Clinton Creek asbestos deposit is 77 kilometres northwest of Dawson City on Clinton Creek in Yukon Territory.

Yukon Metamorphic Complex of Ordovician to Devonian age (470 Ma, Rb - Sr date) covers most of the Clinton Creek area. The most prominent metamorphism of the area occurred in Permian time (245 to 278 Ma, K-Ar dates). The intensity and style of deformation of the ultramafic bodies and country rocks indicate that the ultramafic rocks were probably emplaced during the Permian. Tintina fault is a weak zone along which the alpine ultramafic bodies of Clinton Creek were tectonically emplaced. These bodies were folded and metamorphosed with the country rocks. During latest Cretaceous-earliest Tertiary time (64.9 Ma, K-Ar date) the area was intruded by acid intrusive rocks. The youngest undeformed and fresh basalt is probably of Selkirk volcanics equivalent.

Three phases of deformation were delineated. The oldest and most complex occurred during the Permian, with the initial movement of the Tintina fault. Small, tight isoclinal folds characterize this phase. The structural trend (300° to 315°) is roughly parallel to the Tintina Trench. Later deformation has modified the orientation of fold axes of this phase (190° to 350°). The second deformation gave rise to large, south verging recumbent folds with trends between 270° to 290°. The third deformation gave rise to a regional antiform.

The Porcupine and Snow Shoe ultramafic bodies are mined for chrysotile asbestos. A few other ultramafic bodies contain appreciable chrysotile-fibre, but not of adequate quantity to be mined. Most of the ultramafic bodies are sheared or massive, and devoid of chrysotile-fibre. With less than 75 percent serpentinite there is no chance of commercial mineralization. Closely spaced fractures are essential to provide openings for chrysotile-fibre formation in ore grade concentrations. Chrysotile-fibre bearing serpentinized ultramafic masses within the enclosing argillite or at the contact of argillite and other rocks carry ore grade or substantial amount of chrysotile-fibre.

Although most chrysotile-fibre formed as fracture fillings, evidence for replacement is seen locally. The main phase of mineralization was probably Late Cretaceous when acid intrusive rocks intruded the area. These intrusions may have provided aqueous solutions to react with the existing serpentine along fractures resulting in deposition of chrysotile-fibre in an essentially closed system.

Eight samples of the Nasina Quartzite and Klondike Schist and one of a small granodiorite plug were collected during 1975 and 1976 as part of a project to investigate the geology of the Clinton Creek asbestos deposit. The regional geology of the area studied is described by L. H. Green (1972). Figure 1 shows the location of the samples in relation to the local geology and Table I and II give the results of potassium argon and rubidium-strontium analysis of the rocks.

POTASSIUM - ARGON DATA

Potassium - argon results and sample data are listed in Table I. The oldest potassium-argon date from the metamorphic rocks is 278 Ma (Early Permian) for hornblende separated from amphibolite (Pzq). The date may represent the main episode of metamorphism because hornblende is the least likely mineral to suffer argon loss during later reheating or slow cooling (York and Farquhar, 1972). Although muscovite is less retentive than hornblende the date for muscovite from quartz-muscovite schist (Pzq) supports a Permian age (245 ± 8 Ma) for metamorphism. The Early Jurassic date for a hornblende actinolite mixture (Table I: MH 122 - 191 ± 7 Ma) from greenstone (Pzq) provides a minimum age of metamorphism. In thin section this hornblende exists as relatively coarse grains and actinolite as finer grains mixed with epidote, a product of alteration of the hornblende. Hence, the date (191 ± 7 Ma) may not be the age of metamorphism, but a result of partial or total argon loss during retrogressive alteration.

Biotite from a granodiorite (Kb) stock that intrudes the metamorphic rocks yielded a latest Cretaceous-earliest Tertiary age (Table I: Sp 21A - 64.9 ± 2.3 Ma). The granodiorite and the age determined is within the range of ages for the Nisling Range alaskite suite (Tempelman-Kluit, 1975).

RUBIDIUM - STRONTIUM DATA

Rubidium-strontium analyses, listed in Table II, are plotted in Figure 2. An isochron (line A) is given by two greenstone samples (MH-101 and MH-122) and four schist whole rock samples (MH-61, MH-81A, MH-105, MH-112). The Permian age (255.8 ± 22.3 Ma) indicated is comparable to the metamorphic age of the potassium-argon data (245 ± 8 to 278 ± 10 Ma). This is confirmed in figure 2 by line B, a reference line drawn using the initial ratio indicated by the rubidium-poor greenstone sample (Table II: MH-101) and a slope given by the oldest metamorphic date determined by potassium-argon (278 ± 10 Ma). Initial ratios defined by lines A and B are 0.7082 and 0.7080, respectively, and are higher than the initial ratio 0.7060 are expected for Paleozoic eugeosynclinal sediments. The high initial ratios of lines A and B probably reflect extensive metamorphic resetting (Hart, 1962).

One sample differs isotopically from the other six analysed (Table II and Figure 2). It gives a model date of 470 Ma (Figure 2: line C) if an initial ratio of 0.7040 is assumed.

Rubidium - strontium data for biotite granodiorite (Sp 21A) are listed in Table II. As the rock differs from other dated (Rb-Sr) samples, it is not included in calculating the isochrons in Figure 2.

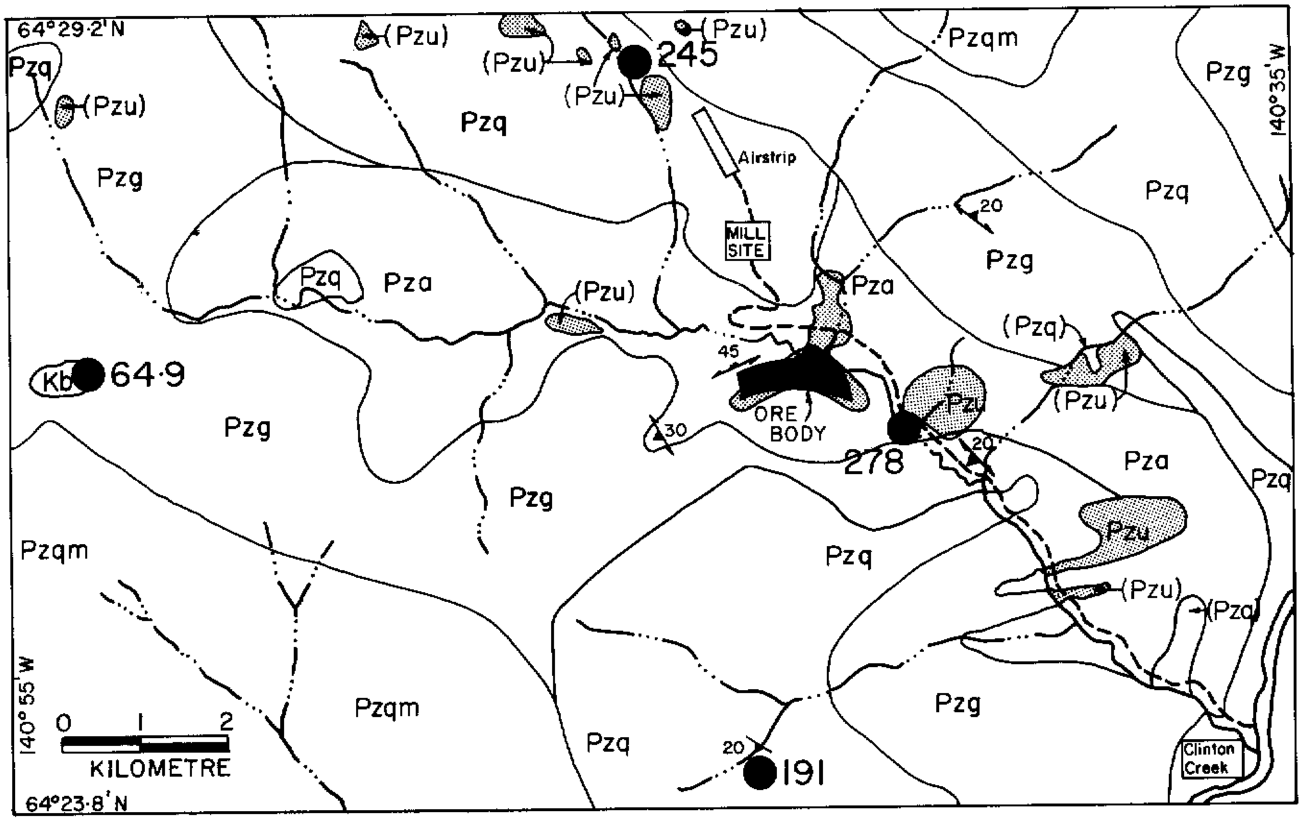

Figure 1
Geology of the Clinton Creek area. Kb= biotite granodiorite; Pzu= serpentinite; Pza= argillite, limestone and sandstone; Pzg= greenstone and quartz-muscovite-chlorite schist; Pzq= quartz-muscovite schist; Pzgm= muscovite -biotite schist; = K-Ar and Rb-Sr sample site; = geological contact.

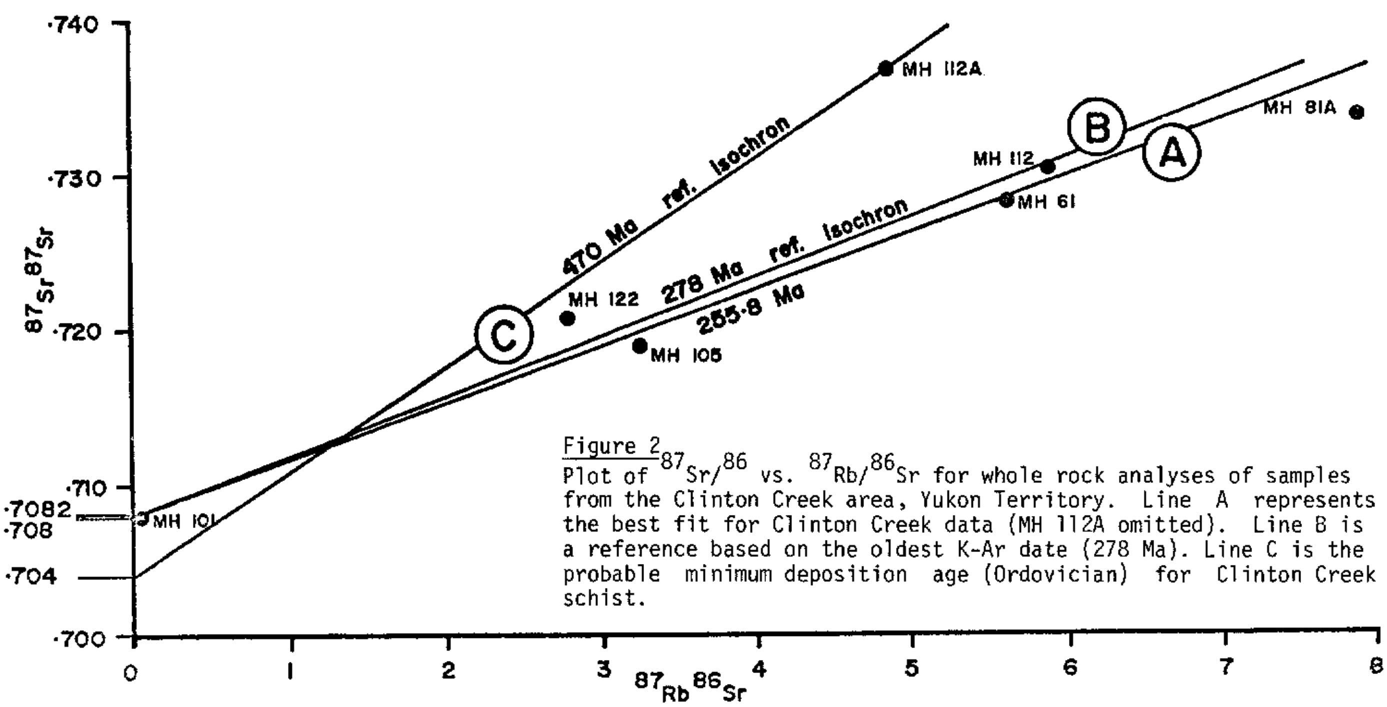

Figure 2
Plot of $^{87}Sr/^{86}$ vs. $^{87}Rb/^{86}Sr$ for whole rock analyses of samples from the Clinton Creek area, Yukon Territory. Line A represents the best fit for Clinton Creek data (MH 112A omitted). Line B is a reference based on the oldest K-Ar date (278 Ma). Line C is the probable minimum deposition age (Ordovician) for Clinton Creek schist.

TABLE I POTASSIUM - ARGON ANALYTICAL DATA[a]

Sample No.[b]	Location[b] Lat.(N); Long.(W)		Rock unit: Rock name[b]	Mineral dated	%K + S[c]	$^{40}Ar^*$ / ^{40}Ar total[d]	$^{40}Ar^*$ ($10^{-5}cm^3$STP/g)[d]	Apparent age (Ma)[e]	Time
Sp 21A	64°27'	140°54'	Kb: biotite granodiorite	biot.	5.60±.01	0.812	1.475	64.9±2.3	Late Cretaceous[f,g]
MH 62	64°27.5'	140°41.2'	Pzq: amphibolite	hb.	0.152±.001	0.629	0.182	278±10	Early Permian[f]
MH 105	64°29'	140°45.5'	Pzq: quartz-muscovite schist	musc.	6.06±.06	0.910	6.31	245±8	Early Permian[f]
MH 122	64°24'	140°40'	Pzg: greenstone	hb-act.	0.674±.009	0.898	0.542	191±7	Early Jurassic[f]

a. All analyses done in Geochronology Laboratory, Department of Geological Sciences, The University of British Columbia, K by K. L. Scott, Ar by J. E. Harakal.
b. See Figure 2-12.
c. "S" is one standard deviation of quadruplicate analysis.
d. 40 Ar* means radiogenic argon.
e. Constants used in model age calculations: $K_e = 0.585 \times 10^{-10} yr^{-1}$; $K_B = 4.72 \times 10^{-10} yr^{-1}$; 40K/K=0.0119 atom present.
f. Time designations after Armstrong (1978).
g. Time designations after Obradovich and Cobban (1974).

TABLE II RUBIDIUM-STRONIUM DATA FOR ANALYSED WHOLE ROCK SAMPLES[a]

Sample No.[b]	Location[b] Lat.(N); Long.(W)		Rock unit: Rock name	Rb (ppm)	Sr (ppm)	$^{87}Rb/^{86}Sr$[c]	$^{87}Sr/^{86}Sr$[d]
MH 61	64°26.8'	140°41.3'	Pzq: quartz-muscovite schist	80.0	41.2	5.63	0.7279
MH 81A	64°25.4'	140°38.7'	Pzg: quartz-muscovite-chloride schist	69.0	25.3	7.90	0.7330
MH 101	64°29.4'	140°45'	Pzg: greenstone	1.8	278	0.019	0.7080
MH 105	64°29'	140°45.5'	Pzq: quartz-muscovite schist	27.1	24.1	3.25	0.7188
MH 112	64°24.7'	140°37.4'	Pzq: quartz-muscovite schist	129	63.3	5.89	0.7300
MH 112A	64°24.7'	140°37.4'	Pzqm: quartz-muscovite-biotite schist	37.7	22.5	4.85	0.7365
MH 122	64°24'	140°40	Pzg: greenstone	122	127	2.78	0.7209
Sp 21A	64°27'	140°54'	Kb : biotite granodiorite	131	1020	0.377	0.7065

a. All analyses done in the Geochronology Laboratory, Department of Geological Sciences, The University of British Columbia by K. L. Scott.
b. See Figure 2-12.
c. One standard deviation error in measurement is (±2%).
d. One standard deviation error in measurement is (±.00015).

ELEMENT DISTRIBUTION IN YUKON GOLD-SILVER DEPOSITS

by

J. A. Morin

Introduction

One third of the gold and gold-silver deposits in Yukon were examined and sampled in 1980 to establish a framework of geology and rock chemistry from which variations within and between deposits could be detected and evaluated. Lithologic units within the vein systems were grab and chip sampled and 155 rock samples were analyzed for Au, Ag, B, Mn, Cu, Zn, As, Se, Tl, Pb, Bi, Sb, Te, W, Hg, Mo and Cd - elements commonly associated with precious metal deposits. A problem which prevented systematic sampling of many deposits is the lack of underground access and the locally intense oxidation of vein outcrops. The most complete suite of samples was collected underground from the Venus Mine.

Three aspects of the rock geochemistry are discussed:

1) different levels of element concentration in the deposits and implications regarding pathfinder elements;
2) distribution of elements in deposit types;
3) element distribution in specific deposits.

The geology of the deposits is summarized from published works and interpreted in light of recent theories on gold deposits. This report emphasizes common features of the deposits and several genetic models.

The deposits are classified below:

1) Epithermal veins and disseminations
2) Mesothermal veins and mantos
3) Contact skarns
4) Exhalative massive sulphides

Acknowledgements

This paper has benefited greatly by comments from colleagues, especially from the constructive criticism and editing of D. J. Tempelman-Kluit. Friendly co-operation of K. Watson and J. McFaull, United Keno Hill Mines, is greatly appreciated.

Epithermal Type

Epithermal gold mineralization occurs in central and western Yukon with hypabyssal and subaerial felsic volcanic rocks of the Late Cretaceous to Early Tertiary Mt. Nansen Group (e.g. Rainbow, Freegold Mountain, Mt. Nansen, Tinta Hill, Montana Mountain, Figure 1). The hypabyssal volcanics probably acted as a heat source that drove local thermal convection cells. Features of the deposits include:

- surface to near surface accumulations of chalcedony and chalcedony breccia with country rock clasts;
- fissure filling quartz-sulphide veins with open space crystal growth, vugs, cockscomb texture;
- wall rock alteration of argillic and/or propylitic facies, commonly accompanied by disseminated pyrite;
- vein mineral assemblages including quartz, pyrite, galena, sphalerite, arsenopyrite, stibnite, tetrahedrite and various sulphosalts;
- disseminated gold associated with breccia and stockwork in felsic plugs.

These veins commonly have a quartz-rich and a sulphide-rich zone. They may be simple with one representative of each zone (e. g. MD vein, Venus Mine) or symmetrical with sulphide-rich sides and a quartz-rich core (e.g. Venus vein). Analyses of chip samples across nine cross-sections of epithermal veins demonstrate that elements occur in definite portions of the veins. Wallrocks are enriched relative to country rocks in Zn, Au, Ag, Mn, Tl, B and Pb. The quartz-rich and sulphide-rich zones contain high Pb, Cd, Au, Ag, Hg, Zn and Cu contents, with the former zone also rich in W and the latter in As, Sb, Mo (Figure 2).

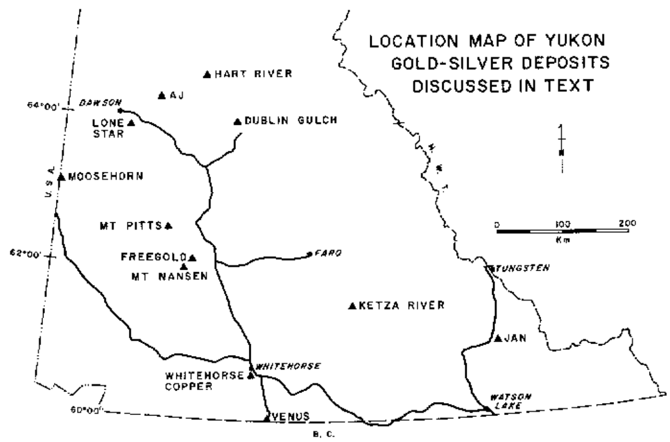

Figure 1
Location map of gold-silver deposits.

Mt. Pitts Area (115 I)

The Mt. Pitts area is 90 km west northwest of Carmacks. Granitic and metamorphic rocks of Paleozoic to Mesozoic age (Figure 3) are overlain by intermediate to mafic volcanics of the Carmacks Group (Tempelman-Kluit, 1974).

A north trending shear zone in the granitic and metamorphic rocks is the locus of intense argillization and silicification. The zone, up to 165 m wide, locally contains massive chalcedony in veins, chalcedony matrix breccia with clasts of completely argillized country rock and pods of chalcedony with internal horizontal layering (Figures 4 and 5). Argillization of the granitic country rock extends up to 30 m on either side of the zone. On the Rainbow claims (Sinclair et al, 1976, p. 143), one sample of sheared schistose granite assayed 5.5 g/t Au, though most of the other samples contain less than 0.3 g/t Au.

Grab samples were taken of altered granodiorite, massive and layered chalcedony and breccia with few anomalous results. Breccia contains 740 ppb Hg and layered chalcedony 77 ppb Au.

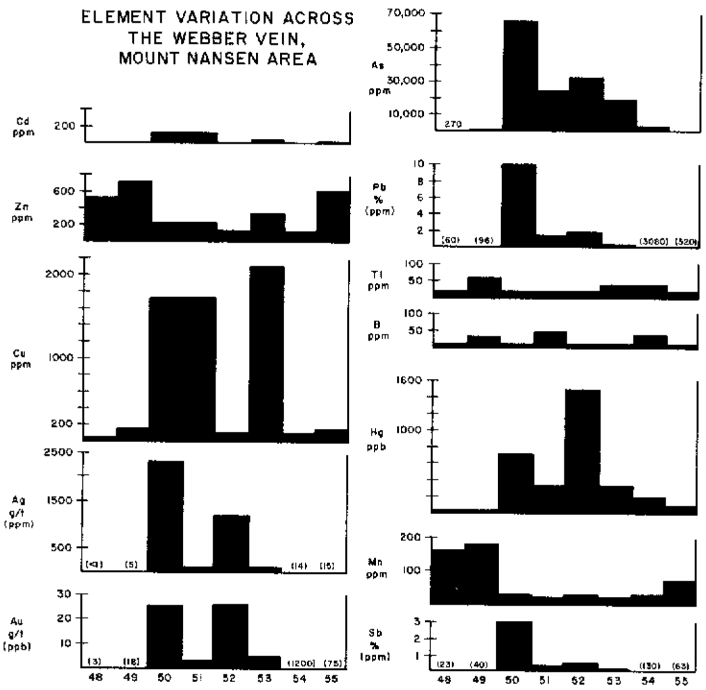

Figure 2
Element variation in chip samples across the Webber Vein, a typical epithermal vein (see Figure 9). Note the gangue-rich core (#51) flanked by sulphides. No significant variation exists for Se (below 10 ppm), Mo (<2 to 44 ppm), W (<1 to 6 ppm) and Te (0.1 to 5.3 ppm).

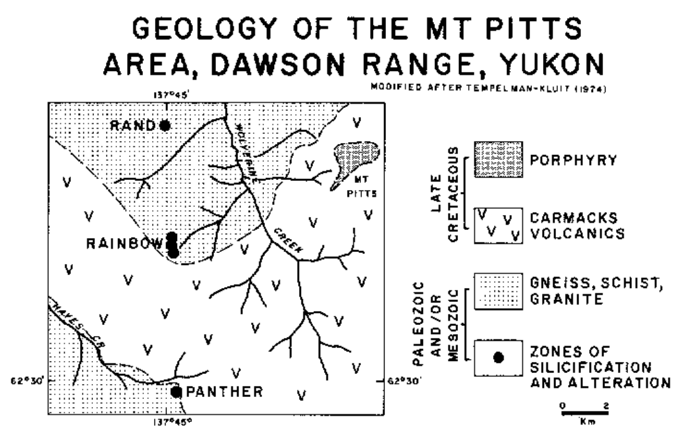

Figure 3
General geology of the Mt. Pitts area. Three zones of silicification and alteration are located along a linear zone.

Freegold Mountain Area (115 I, 31,32,33,34,etc.)

Freegold Mountain is underlain by two Tertiary quartz porphyry plugs which intrude gneiss, granodiorite and syenite of Paleozoic and Mesozoic age (Figure 6). Geological mapping and a discussion of the local economic geology and showings is given by Johnston (1937). Several types of mineralization are present - skarn, vein, disseminated porphyry and breccia pipe.

Skarn is developed in amphibolite on the northeast part of Freegold Mountain close to rhyolite dykes, the main showings being the Margarete and Augusta. It includes the asemblage: actinolite; magnetite-actinolite ± minor pyrite, chalcopyrite; garnet-epidote; diopside-calcite. Extensive trenching and diamond drilling of the skarn were carried out in the middle 1970's by Dynasty Exploration. Several vein systems are developed on Mount Freegold - Red Fox, Laforma, Rambler, Emmons Hill. They are hosted in all rock types except rhyolite porphyry which commonly occurs as dykes adjacent to the veins. Quartz, the main constituent in the veins, commonly occurs as an early white variety that is locally brecciated and enclosed in a matrix of bluish grey quartz and sulphides. Disseminated sulphide mineralization is present on Rambler Hill and on the northeastern side of Freegold Mountain on the Peerless property.

Breccia pipes are present on the Gold Star property on the northeastern side of Freegold Mountain.

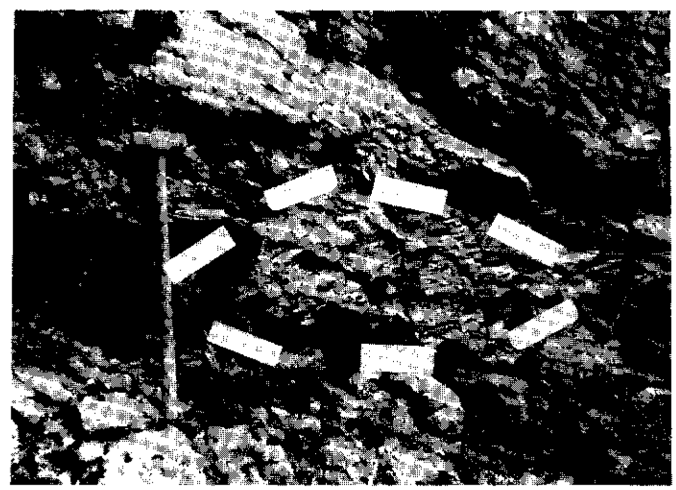

Figure 4
Outcrop of chalcedony breccia with lens of layered chalcedony outlined, Rainbow property, Mt. Pitts area.

Red Fox (115 I 32)

The Red Fox is a vein of coarse-grained steely argentiferous galena on the northwest side of Freegold Mountain. It is a southeast trending vertical vein about 15 cm thick bordered by a subparallel zone of white quartz veinlets several millimetres to centimetres thick. The sulphide-rich zone changes over several metres above and below to a mixture of white and bluish grey quartz with minor sulphides. Country rock is quartzite with numerous dykes of porphyritic rhyolite and locally, a contact between these two rock types is occupied by the vein. Vugs with quartz and fluorite occur within the nearby quartzite.

Element associations are Ag,Pb in the quartz-rich zones and Ag,Cu,Pb,Mo,(Hg),(Sb),(Bi) in the sulphide-rich zones. Ag ranges up to 578 g/t with a corresponding Pb content of 50.6%.

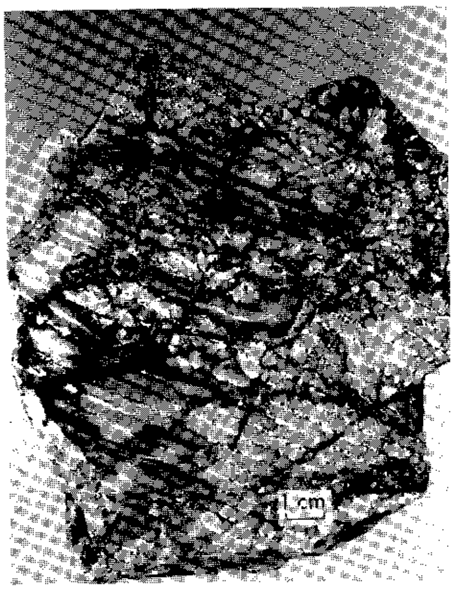

Figure 5
Chalcedony breccia from the Rainbow property. Note the angular argillized fragments (light coloured) in a matrix of massive and layered chalcedony.

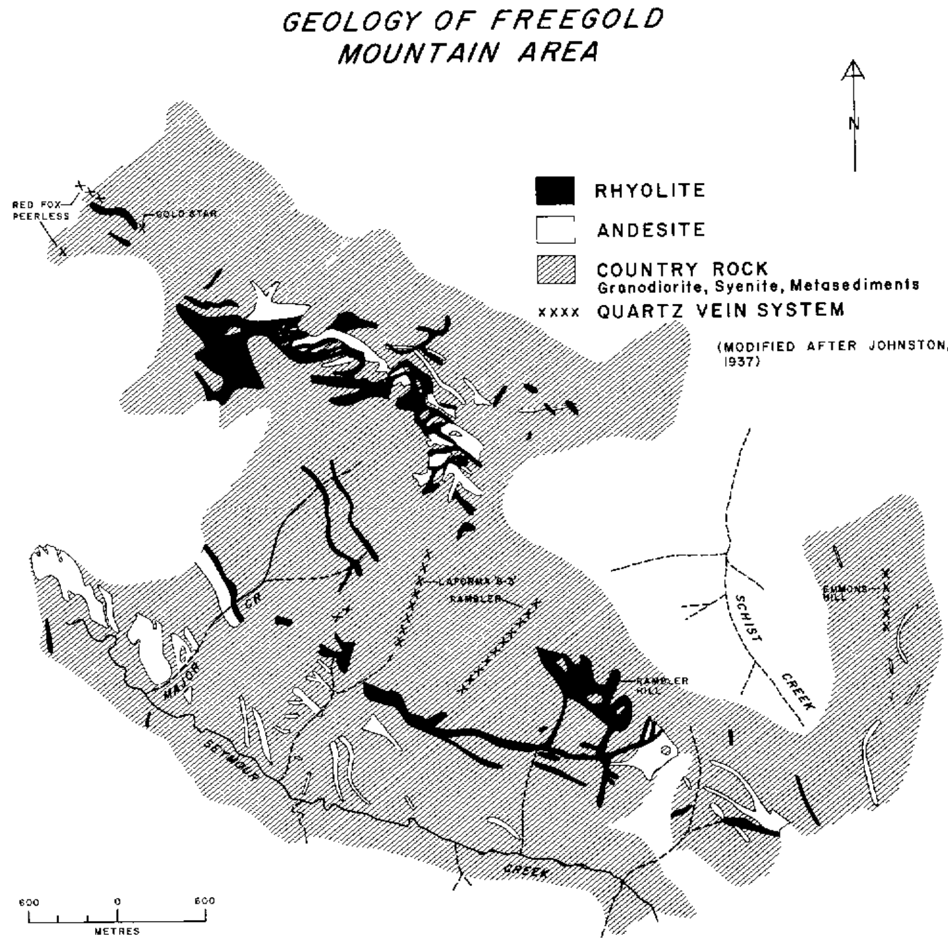

Figure 6
Geological map of Freegold Mountain.

Gold Star

The Gold Star is 400 m east of the Red Fox. It is a small quartz porphyry plug with white quartz veins and associated breccia pipes up to 30 m diameter. The breccia pipes are made of quartz and rhyolite matrix with clasts of argillized rhyolite, gneiss and quartz.

Element associations include Ag with minor Pb and Au, Ag, As with lesser Pb, Sb, W, Bi.

Laforma (115 I 34)

The original showing on the Laforma Group was staked in 1931 and development work has been done intermittently since (N.M.I. 115 I/6, Au-1; Sinclair et al, 1976, p. 139-142).

It is a north-northeast striking vertical quartz vein in massive coarse-grained biotite granodiorite. The vein occurs over a distance of 800 metres horizontally and at least 280 metres vertically. In the granodiorite, widespread alteration of pale green to white argillic facies has taken place near the quartz vein. Fractured and sheared white milky quartz is the main variety in trenches above the adits but equal amounts of bluish grey and white quartz occur near the adits. In the first trench above the number 1 adit, quartz breccia with milky white quartz clasts is enclosed in a pyritic blue-grey quartz matrix.

Underground development led to production from January 1939 to June 1940 with 44.69 kg of gold produced and from June 1965 to February 1966 with 50.07 kg of gold and 17.73 kg silver produced. In 1966, reserves were estimated at 63,640 tonnes grading 15.1 g/t Au, calculated for a 1.68 m mining width.

Element associations are Au,Ag, (As) and Pb. The highest gold value is 2.7 g/t (#23) and the highest silver 289 g/t (#13).

Rambler Vein System (115 I)

The Rambler vein system (Sinclair et al, 1976, p. 139-142) trends northeasterly and is vertical, traced over a distance of 1100 m with a width ranging from several centimetres to three metres.

It includes two quartz veins in granodiorite. Commonly, creamy white to honey to pale green rhyolite and quartz porphyry (breccia, flow banded and massive varieties) occur adjacent to the quartz veins. Three types of quartz are present - milky white quartz, blue grey quartz, commonly with minor disseminated pyrite, and rare pale creamy green chalcedonic quartz. Breccia is common in or adjacent to the veins. Clasts of white quartz occur in a pyritic blue grey quartz matrix and in rhyolite. Quartz crystal lined vugs are common, especially in the thicker veins. Pyrite, the most common sulphide mineral, occurs in quartz and makes up less than 5%. Coarse crystals of stibnite were noted in one trench.

Element associations are Au, Ag, Pb; Au, As; Au, Ag (As); Ag,(Pb),(Sb), and Au, Ag, As,(Cu)(Sb). Noteworthy are the relatively low Au values and corresponding high Ag - up to 489 g/t and Sb, up to 2.32%.

Rambler Hill (115 I)

Immediately east of the Rambler vein system a rhyolite-quartz porphry intrudes granodiorite. The plug is obscured by overburden to the north and east and its outcrop area is elliptical in plan, 850 metres by 350 metres. Its main constituent is massive honey coloured aphanitic rhyolite and porphyritic rhyolite with medium-grained quartz phenocrysts. Within the rhyolite are clasts of syenite and granodiorite ranging from a hundred metres to a few mm across. Pebble breccia with rhyolitic matrix and rounded clasts of syenite, granodiorite, schist and country rock is abundant and forms dykes intrusive into the rhyolite and surrounding country rock. Minor pyrite and arsenopyrite as fine-grained disseminations and veinlets are common in the breccia and in the large included blocks.

Diamond drilling in 1975 intersected 2.3 g/t Au, 11.6 g/t Ag over 21 m and 0.6 g/t Au, 2.7 g/t Ag over 152 m (Sinclair et al, 1976, p. 139-142). Rhyolite pebble breccia was analyzed (#25) and is anomalous only in Pb (220 ppm).

Emmons Hill (115 I 35)

Emmons Hill is a northerly trending spur off the eastern side of Freegold Mountain. North striking biotite-quartz-feldspar gneiss intercalated with amphibolite and minor feldspathic quartzite are intruded by white aplite and pegmatite dykelets. Feldspar-hornblende porphyry and quartz porphyry dykes are also seen. The first dykes are grey to greyish green and crowded with more than 60% phenocrysts and the latter pale whitish green with rare phenocrysts of quartz.

Antimony-lead mineralization occurs 300 m north of the hilltop where it is poorly exposed in a 240 m long bulldozer trench (Figure 7). The area surrounding the mineralization is covered and bedrock is seen only in a trench and nearby dump of a shallow shaft. In the trench, numerous feldspar-hornblende porphyry dykes several meters to more than ten meters thick intrude biotite-quartz-feldspar schist and amphibolite. No alteration was noted in country rocks next to the dyke but adjacent to the mineralized zone, the rocks are altered to pale green argillic facies. Mineralization consists of quartz veins (#3,4) and several types of breccia. These include:

- greyish rounded quartz clasts in a coarse-grained stibnite and galena matrix (#7,8);
- angular white quartz clasts in a black, very-fine grained sulphide-mineral bearing, siliceous "sinter";
- dark brown siderite (?) clasts in a grey carbonate (ankerite?) ± barite matrix (#2,6);
- minor clasts of black sinter enclosed by a quartz matrix (#9).

Vugs in the breccia are commonly lined with quartz crystals, though brown carbonate crystals coat vugs in siderite breccia. Other minerals include crystalline white barite, anglesite (?) and a red to reddish brown mineral associated with stibnite. The quartz veins occur 50 to 100 meters north of the breccia and are mainly barren, though minor fine-grained disseminated pyrite occurs in some. The area of the trench and dump mineralized float defines the mineralized zone. Distance between the 1980 drillhole and the mineralized zone in the trench is about 120 meters, a minimum for the length of the discontinuous zone. The width is at lest 10 meters, the distance between the trench and the old shaft.

Element associations in the vein material include Hg, Pb, Sb, $BaSO_4$; Hg, As; Au, Hg, Sb and Au, Ag, Zn, Pb, Mn, $BaSO_4$, (Sb), suggesting they are products of a high level, low temperature hydrothermal system. Pale green argillized wallrock schist (#5) next to a mineralized vein contains 13,000 ppb Hg and 6,600 ppm As, but less than 1 ppb Au, indicating extreme element fractionation in the system at the level exposed.

A rusty weathering conformable pod of disseminated pyrite in schist up to 0.3 meters thick and more than 1 meter long occurs at the contact between amphibolite and schist near the hill top. It contains no anomalous metal concentrations (#1).

Mount Nansen Area (115 I 39,40)

The Mount Nansen gold-silver deposits are 45 km west of Carmacks and 25 km south of Freegold Mountain. Placer gold was discovered in 1899 on Nansen Creek (Cairnes, 1915) and the lode deposits were found later in the early 1940's (Green and Godwin, 1963 p. 23). Several vein systems cut metamorphic rocks of the Yukon Group, granitic intrusives of Mesozoic age and

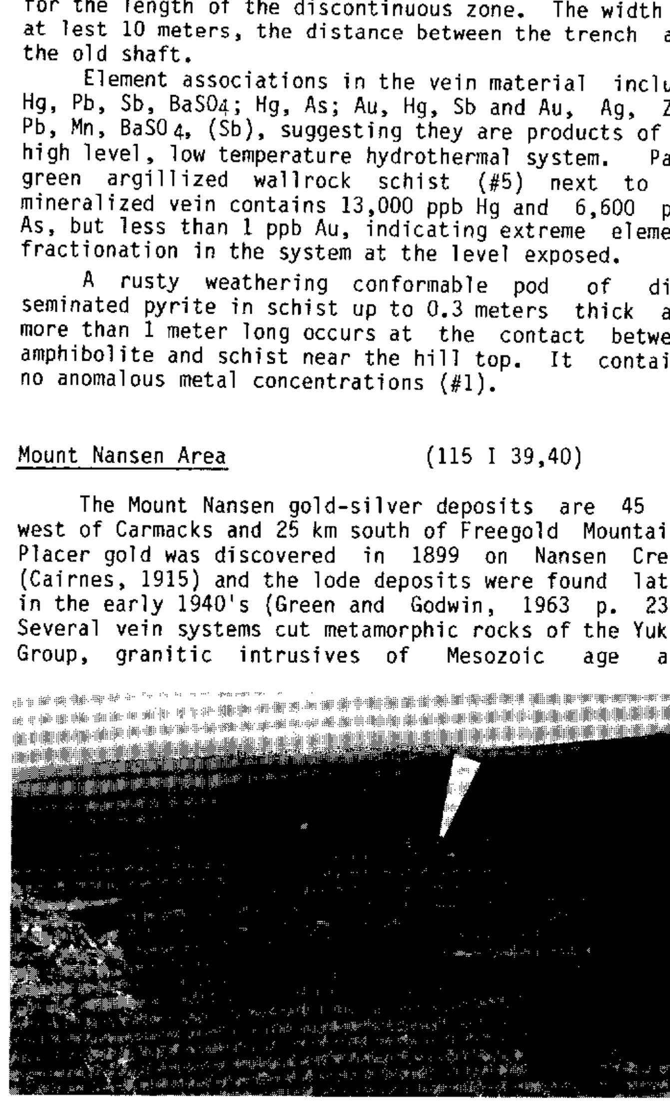

Figure 7
Northward view of Emmons Hill. Old shaft is located northeast of central trench next to northernmost dump. Country rock in foreground is biotite-quartz-feldspar gneiss.

Cretaceous to Early Tertiary rhyolite porphyries. They consist largely of quartz-arsenopyrite-pyrite-galena-sphalerite and several silver-bearing minerals (Saager and Bianconi, 1971). Two vein systems have been explored: the Webber-Huestis and the Brown-McDade. The Webber-Huestis is an en echelon system about 1.2 km long cut by two levels of adits at either end - the Webber Creek vein at the northwest and the Huestis vein at the southeast (N.M.I. 115-1/3, Ag-1).

Seven months of underground production from September 1968 to April 1969 resulted from six years of property work. Poor mill recovery terminated the project and ore reserves estimated October 31, 1969 are 182,000 tonnes of 11.3 g/t Au and 445 g/t Ag with an additional 91,000 tonnes inferred.

Two km east of the Huestis vein, the Brown-McDade vein system was staked in 1945 and drilled the following year (NMI 115-1/3, Au-1). An adit was constructed in 1947 and high-grade zones delimited, but financing difficulties terminated the project that year. Further work in the late 1960's led to a 1970 estimate of proven and probable reserves at 32,000 tonnes of 12.7 g/t Au and 202 g/t Ag with approximately 20,000 tonnes of possible ore.

Webber Vein (115 I 40)

The Webber Vein is the western extension of the Huestis vein at the Mount Nansen Mines property (Figure 8). The vein, exposed at surface, is symmetrical with sulphide enriched sides and a quartz core (Figure 9). Wall rock is argillized and limonitized porphyritic rhyolite of the Mount Nansen group. High Ag, Au, Pb, Sb, As, Hg, Cu and low Tl, Mn, B, Cd and Zn characterize the vein. A lens of black metallic mineral (#56) gave high Ag and As values - 934 g/t Ag and 41000 pm As, but relatively low values for other elements, suggesting that it contains native silver. The main element association in the vein is Au, Ag, Pb, As, Sb, (Te).

Huestis Vein (115 I 40)

The Huestis Vein is the eastern extension of the Webber Vein and was the main target exploited by Mount Nansen Mines in 1968. Underground workings are not accessible and surface pits are highly oxidized. Representative samples were collected from spillage at the ore car dumping site.

The geochemistry is described by Saager and Bianconi (1971) and Coope in Bradshaw (1975) and geology and work history by Findlay (1969 a, p. 35-38, 1969 b, p. 23-25).

The vein is characterized by high precious metal values - up to 246 g/t Au (#60) and up to 2226 g/t Ag (#4). In addition, Zn, As, Sb and Pb are locally high. The metal values change from sample to sample, the most common associations being Au, As (Mn), and Au, Ag, Zn, Sb, Pb (As), (Te).

Unaltered biotite-quartz-feldspar gneiss (#45) and biotite quartzite (#46) were anlayzed and are anomalous in Pb (240 ppm and 72 ppm). Au of #45 was also high at 49 ppb compared to only 2 ppb for #46. Argillically altered gneiss closer to the vein is also anomalous in Pb at 140 ppm (#47).

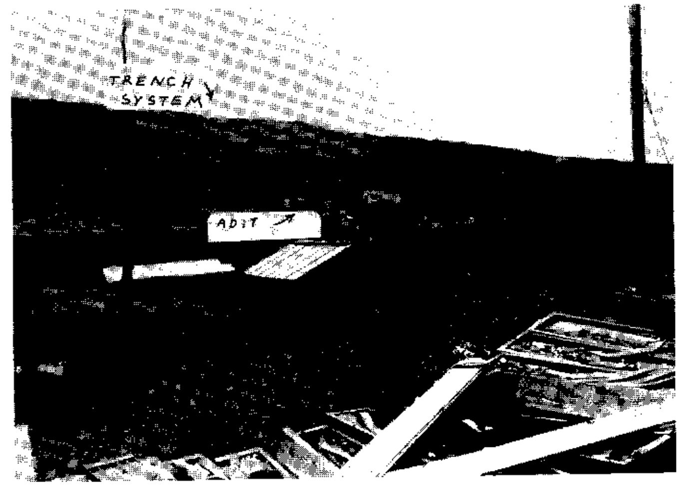

Figure 8
Eastward view of the adit and trenches in the Webber vein.

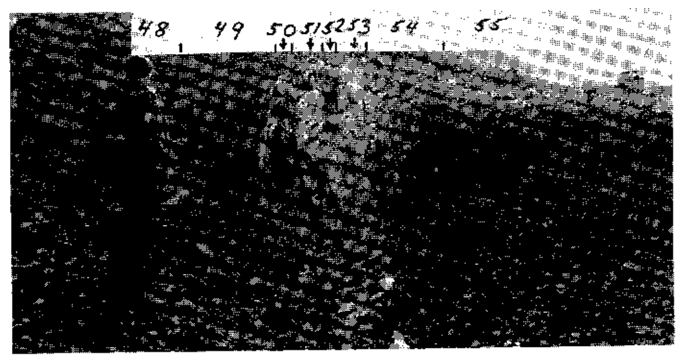

Figure 9
Trench above the adit in the Webber vein, samples 48-55.

Brown-McDade Vein (115 I 39)

The Brown-McDade vein system 1.8 km east of the Huestis Vein is a series of parallel quartz veins in a coarse-grained equigranular hornblende syenite. East-trending bulldozer trenches expose the oxidized veins with limonitic and manganiferous wallrocks (Figure 10). Three samples were taken - two of pyritic fine-grained bluish grey quartz (#65,67) and one of the pyritic grey to black rhyolite dykes (#66) that commonly occur at the sides of the quartz veins. Gold and silver are present in one of the pyritic quartz samples (#65) whereas the other (#67) contains only minor amounts of zinc.

Tinta Hill (115 I 37)

The Tinta Hill property 6.4 km east of Freegold Mountain was discovered in 1930. Since then it has been trenched, drilled and worked underground (N.M.I., 115-I/7, Pb-1). The last drill-indicated ore estimate in 1975 is 5589 tonnes per vertical metre grading 2.6

g/t Au, 183 g/t Ag, 4.71% Pb, 6.03% Zn, 0.37% Cu and 0.049% Cd.

Granodiorite hosted quartz-sulphide veins occur in a near vertical N 61°W trending shear zone 1220 m long and open at both ends. 1974 exploration work suggests there are two and possibly three sub-parallel mineralized zones. The main vein is 0.9 to 1.8 m wide and contains pyrite, galena, sphalerite, chalcopyrite, tetrahedrite with some gold and silver. Pyrite, chalcopyrite, azurite and malachite occur within the wall rocks as veinlets and disseminations. Wall rock alteration is argillic and propylitic.

Samples were taken of core from an intersection along diamond drill hole 74-16. They show the polymetallic vein system contains high Pb, Zn, Cu, Ag, Cd, Mo, Sb, Hg and low Mn, As, Tl, B.

Figure 10
Trench across Brown-McDade vein system looking westerly. Note zones of limonite and manganese stain zones adjacent to lighter coloured areas of rhyolite and quartz veins, sample sites 65-67. Huestis mine building and vein system in background.

Montana Mountain Area 105 D (5,6,7,8,9)

Fourteen km south of Carcross on the west side of Windy Arm, this area is famous for containing numerous precious metal veins (Figure 11). They were discovered around the turn of the century and saw several short-lived attempts at production since 1905.

Numerous minerals are reported from the veins, but quartz, arsenopyrite, pyrite, galena and sphalerite dominate. Hostrocks are volcanics of the Mount Nansen Group and a biotite quartz monzonite dated at 64 Ma (Morrison, 1979, Roots, this volume).

The largest deposit is the Venus vein, being actively developed by United Keno Hill Mines for production in 1981. Estimated reserves are 109,090 tonnes of 233 g/tonne Ag, 7.5 g/tonne Au with values in lead, zinc and cadmium. As part of the present study, the Venus, MD, Montana, Vault, Arctic and Peerless veins were sampled (See Roots, 1981, this volume).

Venus (105 D 5)

The Venus vein is enclosed in massive to poorly jointed andesite of the Mount Nansen Group. It ranges from 0.3 meters to 2 meters thick, is about 1,000 meters long and is bounded by a zone of propylitized, silicified and argillized wall rock up to several meters thick. Argillic alteration is particularly intensive in the upper level of the mine in the hanging wall above the main ore shoot. The vein is symmetrical with a quartz and pyrite core flanked by arsenopyrite-galena-sphalerite-quartz. Sections across the vein at three different levels indicate zoning of certain elements (Figure 12). Increasing Au, Cu, As, Sb and decreasing Ag, Zn, Cd, Bi and Pb with elevation is demonstrated (Figure 13). The wallrocks are rich in some of the metallic elements and show consistent variation with elevation - Tl and Au increase upward and Pb decreases (Figure 12). The Au/Ag ratio, useful as an indicator of zonation in other epithermal deposits, was investigated. It increases with elevation in the wall rocks and in the vein.

Wallrock alteration varies. It includes silicification, argillization, pyritization and carbonatization which affects one or more meters on either side of the vein. In addition, a locally extensive zone of clay mineral alteration is present on the 2800 foot level in the hangingwall above the upper portion of the main ore shoot. Models for epithermal deposits include vertical zoning similar to that found at Venus (Buchanan, 1980, Ewers and Keays, 1977). A more thorough picture of the element and wallrock alteration zoning at Venus might allow interpretations of the position of ore shoots in the vein system and the depth from the paleosurface during mineralization.

MD Vein

The MD vein is intersected by the 2800 foot level of the Venus underground workings. The vein includes a sulphide-zone with arsenopyrite and pyrite and a quartz-rich zone with wallrocks of limonitized and argillized andesite. Its relationship and possible equivalence to the Venus vein is unknown and is not clarified by its metal contents.

Vault

The surface trace of the Venus vein to the north has been followed by several adits on the south side of Pooly Canyon. These are referred to as the Vault Mine, where two adit areas were chip sampled - the Upper Vault and the Lower Vault.

The Upper Vault shows element concentrations like those of the lower levels of the Venus vein - ie high Pb, Zn, Cu, As, and low Au/Ag.

A barren quartz vein about 3 m above the adit to the Lower Vault was sampled. Metal concentrations are uniformly low except for relatively high trace amounts of Tl and B in wallrocks.

Montana Mine (105 D 6)

The Montana Mine is 3.3 km north-northwest of the Venus Mine on the upper surface of Montana Mountain (Figure 14). Some underground development was carried

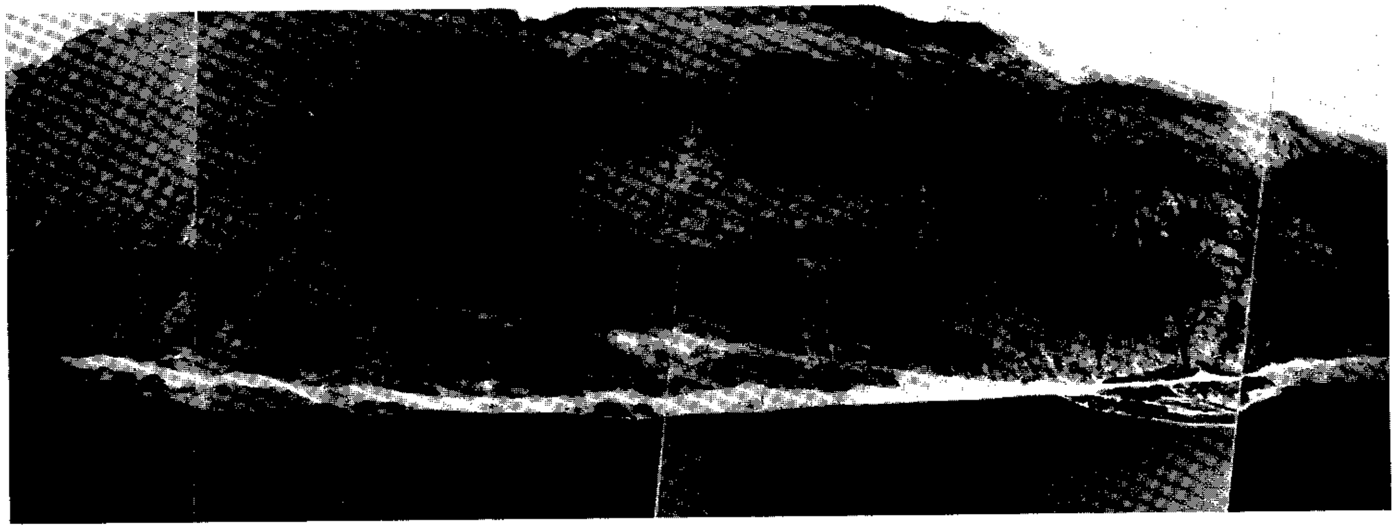

Figure 11
View west across Windy Arm of Montana Mountain showing the Venus workings low in the center and Pooley Canyon on the right with the townsite of Conrad on the delta at its mouth.

out in 1967 (Findlay, 1969 a, p. 60-61).

The Montana Mine section shows similar element concentrations to those of lower levels of a vein system - ie relatively high Pb, Zn and low Au/Ag, As, Tl.

Klondike District 115 O-N (38)

The Klondike Schist is muscovite-quartz-chlorite schist with abundant conformable lenses of white quartz. It forms most of the bedrock in the Klondike and cobbles derived from it constitute the gold-bearing gravels. A general assumption has been that the gold is derived from quartz veins in Klondike Schist. However, some of the lode gold showings are associated with the following:

- discordant auriferous base metal sulphide bearing quartz veins;
- areas of disseminated pyrite and zones of clay mineral alteration in Klondike Schist;
- proximity to rhyolite dykes of probable early Tertiary age.

The most significant known lode gold showing in the Klondike is the Lone Star discovered in 1897 in the middle of the placer camp. This deposit has features mentioned above and gold at the Lone Star and in other parts of the Klondike may be of high level epithermal origin (Gleeson, 1970). Work on the Lone Star in 1912 and 1914 led to production of 7668 tonnes grading about 6.8 g/t Au and 1.7 g/t Ag. No substantial exploration has been conducted on the property since 1931, but in 1980, a resistivity survey was conducted and diamond drilling is planned for 1981.

Samples were collected from the mine area: argillized sericite schist enriched in Au (up to 350 ppb), Mn (up to 590 ppm), As (up to 2400 ppm) and Tl (up to 100 ppm); pyritic sericite schist rich in Au (310 ppb) and As (2400 ppm). Limonitized contact breccia beside a rhyolite dyke is high in As (2500 ppm) and sampled quartz vein material has up to 3900 ppb Au, 2100 ppm As and 0.45% Pb.

Mesothermal Type

Mesothermal deposits are characterized by the absence of cockscomb texture and open space structures. Veins are commonly homogeneous in composition with massive interlocking networks of quartz and ore minerals. Quartz and arsenopyrite with varying amounts of galena, sphalerite and sulphosalts form the typical vein assemblage. The veins follow fractures with no specific lithologic association other than proximity to granitic stocks. In addition to veins, conformable massive sulphide lenses or mantos occur in limestone. Mesothermal deposits contain relatively high Au/Ag ratios and minor base metals. Veins are rich in Au, Ag, As, Pb, Sb, Te and locally Cu and the wallrock in Mo, B, As and Pb (Figure 15).

Dublin Gulch Area 106 D (15,19)

The Dublin Gulch area includes a cluster of Cretaceous granitic intrusives in phyllite, quartzite, marble and quartz-mica schist. Along the south side of Dublin Gulch, several east to northeast trending quartz-arsenopyrite (sulphosalt) veins occur along fractures in metasedimentary rocks on the west side of the Potato Hills granodiorite stock. These veins were explored underground in the early 1900's (Maclean, 1914).

In 1980, Canada Tungsten, uncovered the old workings and dug new trenches. They discovered new veins and extensions of known veins. The linear vein system is aligned with the Peso-Rex silver-lead-antimony vein swarm, 6 km to the west.

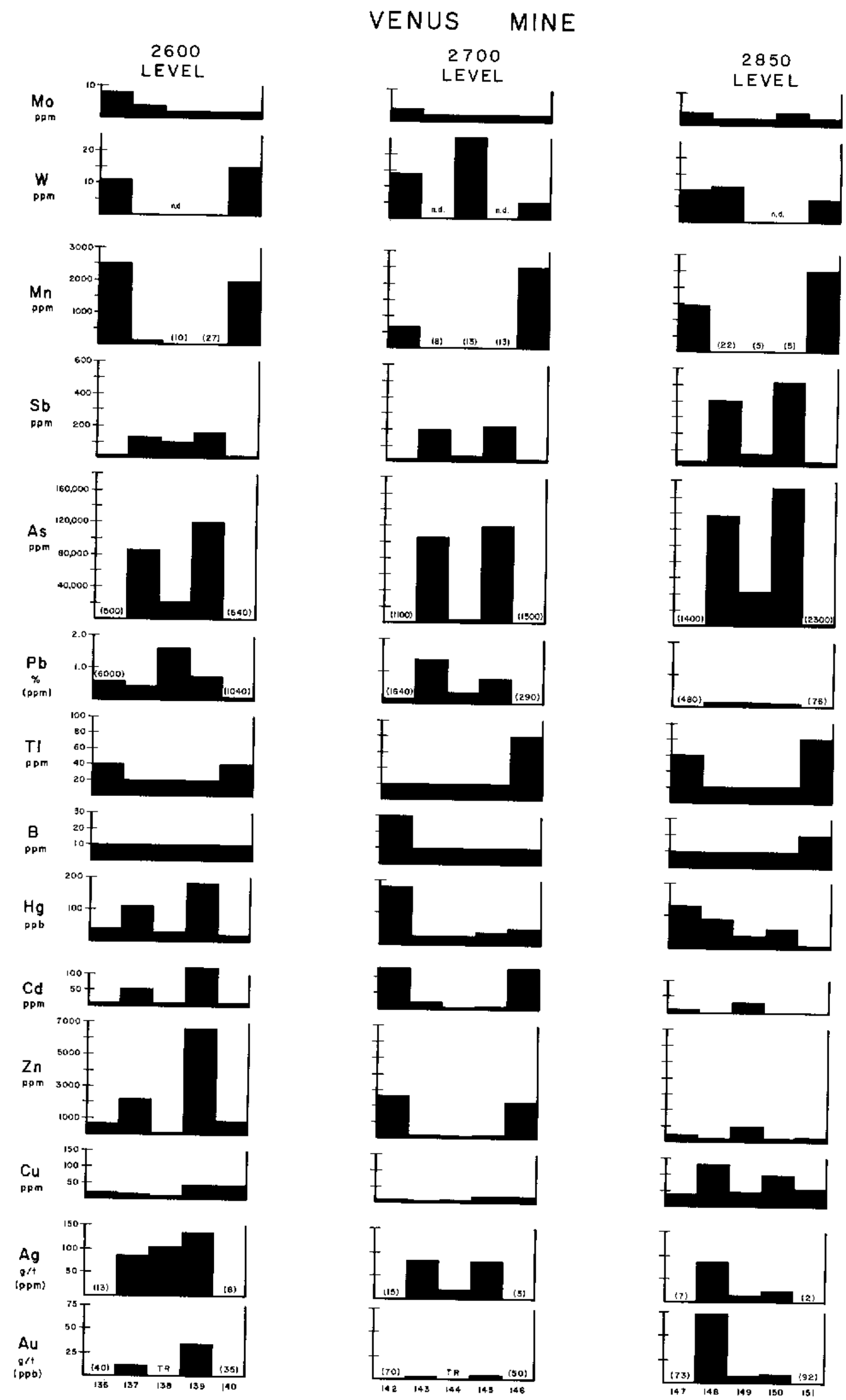

Figure 12
Element variation in chip samples across the Venus vein at three different levels. Not shown are Se, Bi and Te (see Appendix).

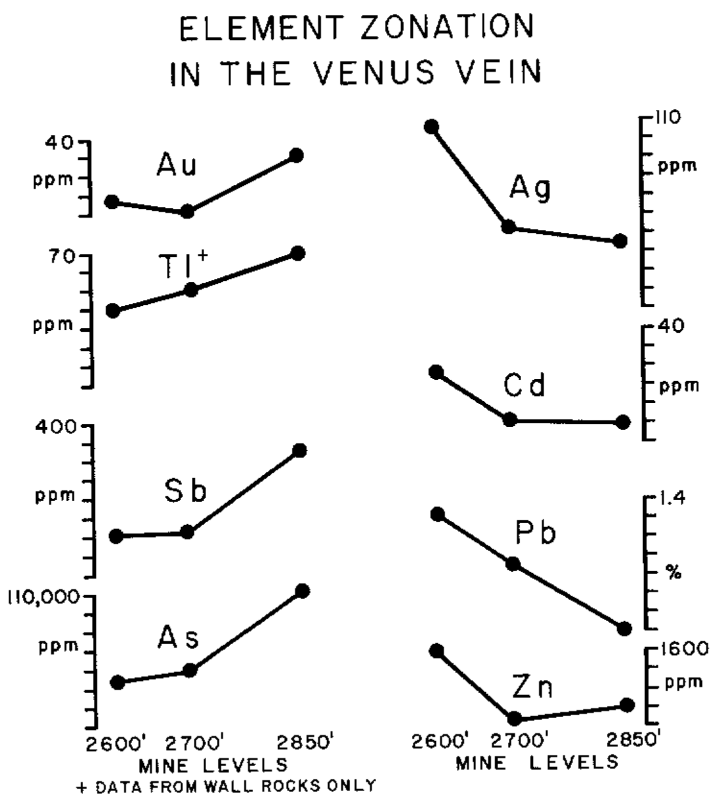

Figure 13
Element zoning in the Venus vein. The concentration of each element was determined from chip samples across the vein on three levels in the mine. The concentrations show a trend to increasing gold, antimony and arsenic and decreasing silver, cadmium, lead and zinc upward in the vein. Thallium data is the average of the hanging wall and footwall values on each level.

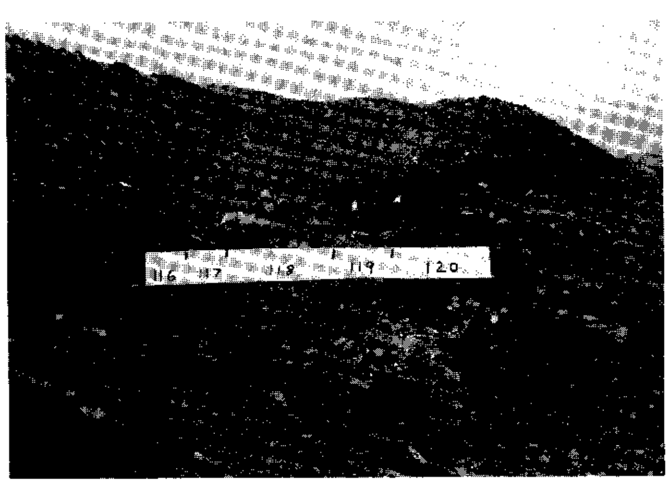

Figure 14
Trench along Montana vein, 70 m north-northeast of 1968 adit portal, Montana Mine - sample site #116-120.

Cabin Vein 106 D (19)

The Cabin vein, one of those south of Dublin Gulch, was sampled in this study. It consists of quartz-arsenopyrite-scorodite-limonite and less commonly sulphosalts. Its quartzite wallrock is silicified and altered to a quartz-sericite assemblage. High Au, As, Pb, Ag, Sb, Hg, Bi, Te and low Mn, Tl, B, Cd, Zn, Cu, Sn characterize the vein (Figure 15). Mo is relatively high and wallrocks are high in As, Pb, Tl and B.

Antimony Mountain Area 116 B-C (1,73,74,81)

Antimony Mountain, 60 km east of Dawson City derives its name from quartz-stibnite bearing veins within an aplite dyke that intrudes syenite (Green, 1972, p. 142).

Thor

Several quartz-arsenopyrite-pyrrhotite veins cut metasedimentary rocks on the west side of the Antimony Mountain Stock. They are traced for several tens of metres, up to 1 m wide and were drilled by Anaconda in 1980 (4 holes totalling 1000 m). Analyses of two grab samples show element associations of Au, Ag, As, B, Pb, Sb, Bi, Te (#103, 104). Precious metal values are as high as 7.2 g/t Au and 421 g/t Ag.

A J Vein 116 B-C (73, O'Brien)

The A J vein, on the east side of Antimony Mountain granodiorite stock, cuts quartzite. It was discovered in 1966 and explored by Conwest Exploration Company Ltd. through geophysics, trenching and diamond drilling (N.M.I., 116-B/8, Au-1). Vein mineralogy is arsenopyrite-quartz-pyrite-tourmaline. High Au, As, B, Hg, Sb, Te and low Mn, Pb, Tl, Cd, Zn, Cu, Ag characterize the vein.

Moosehorn Range 115 O-N (5)

Quartz veins in the Moosehorn Range just east of the Alaska-Yukon border carry pyrite, galena, sphalerite, arsenopyrite, boulangerite and native gold (Figure 16). They are emplaced in massive and foliated equiganular granodiorite and have altered wallrock to a quartz-sericite-chlorite-pyrite assemblage. The veins occupy joints in the massive granodiorite, range from 5 to 50 cm thick and are up to 300 m long. A representative drill intersection in veins with free gold is not possible, but the best intersection from 1975 driling was 256 g/t Au and 40 g/t Ag over 15 cm (Morin, 1977 in Morin et al, 1977, p. 33 to 54.)

Ketza River Area 105 F (17, Boom)

The Ketza River or Boom showing in the Pelly Mountains consists of an almost flat lying concordant mass of massive pyrrhotite, pyrite and arsenopyrite in Lower Cambrian limestone (Figure 17). Vein stockworks of quartz and of calcite occur, but only minor local silicification is seen. Breccia is present consisting of limestone, pyrite and quartz clasts in a matrix of massive pyrrhotite. The manto is discontinously exposed over 1200 m and a drilled off portion in 1959

ELEMENT VARIATION ACROSS ONE-HALF OF THE CABIN VEIN, DUBLIN GULCH

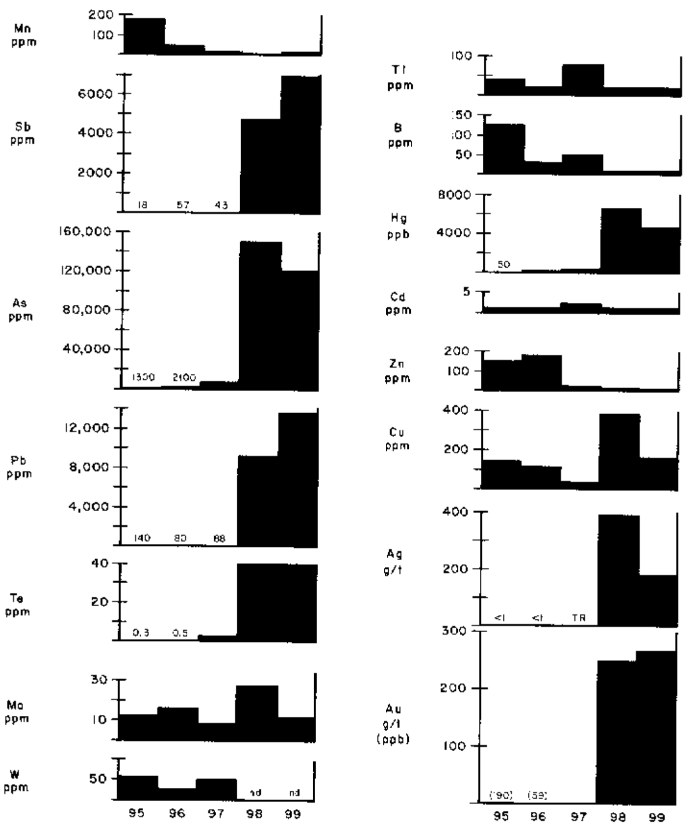

Figure 15
Element variation in chip samples across the northern half of the Cabin vein, a typical mesothermal vein in the Dublin Gulch area. Analyses 95, 96 and 97 are wallrock, 98 and 99 vein material. Not shown are Sn which does not exceed 3 ppm, Bi which is high in the vein (up to 2880 ppm), and Se which is below detection limits of 10 ppm. In contrast to epithermal veins, mesothermal veins are relatively homogeneous.

has an estimated tonnage of 68200 tonnes of 12 g/t Au. Best drill intersection is 38.6 g/t Au over 10.7 metres.

A diamond drill intersection through the manto was sampled and analyzed. Silver is absent and the only metal of economic interest is gold which reached values to 9.6 g/t. Up to 66000 ppm As and minor Cu, Sb, Bi, (Pb) accompanies the gold. The limestone hangingwall is rich in Zn and Cd and the footwall contains up to 63 ppb Au.

Contact Skarns 105 D (49); 105 H (1)

Skarns are widespread in Yukon but few carry noteworthy amounts of gold. However, Whitehorse Copper Mines produced about 690,000 grams of gold and 7,500 kg silver last year from a copper-rich magnetite-calcsilicate skarn in Triassic limestone at its contact with a granodiorite batholith (Tenney, 1981). Data on the skarn's geochemistry is given in Boyle (1979). Reserves are in the order of 1 to 2 million tonnes of 1 1/2% Cu, 8.6 g/tonne Ag and 0.9 g/tonne Au.

The JAN showing in eastern Yukon has a similar style of mineralization and a chip sample across 3 meters assayed 6.8 g/tonne Au, 6.8 g/tonne Ag and 0.70% Cu (N.M.I., 105 H/1, Cu-1).

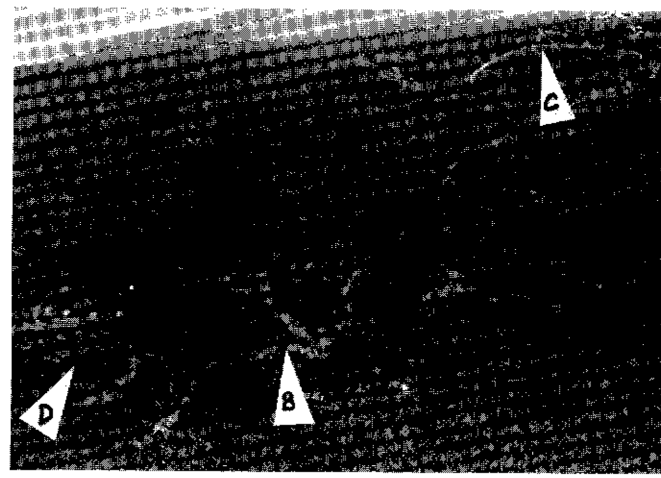

Figure 16
Aerial view of diamond drill sites and trenches on the east side of the Moosehorn Range 1975. Main vein zones indicated (see Morin, 1976). All the rock in view is granodiorite.

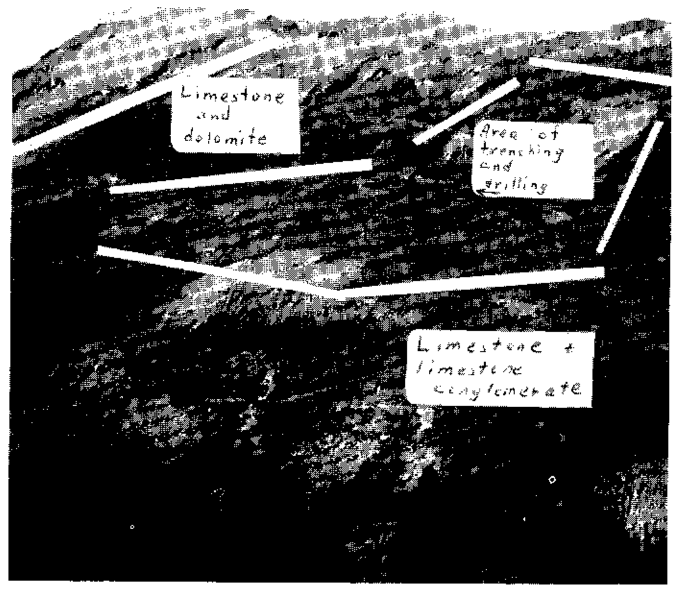

Figure 17
Aerial view looking north of the Ketza River Mines property. The manto underlies the area of trenching and drilling. Rocks dip gently to the south-southeast (bottom left corner).

Exhalative Massive Sulphides 116 A (8)

Most massive sulphides in Yukon are rich in lead, zinc, silver and notably deficient in gold. Hart River in north central Yukon with about 500,000 tonnes of 1.45% Cu, 3.65% Zn, 0.87% Pb, 49.6 g/tonne Ag and 1.4 g/tonne Au is an exception. This shale-hosted deposit is Upper Proterozoic (1238 or 1288 Ma Pb-Pb date) and consists of a lens of massive and layered pyrite, pyrrhotite, chalcopyrite, sphalerite and galena with a footwall vein stockwork and a lateral chert facies (Morin, 1978, in Morin et al, 1978, p. 22-24). The chert zone carries precious metals, e.g., one intersection over 3 meters assayed 20.5 g/tonne Au and 88.9 g/tonne Ag (Figure 18). In addition an auriferous massive sulphide with associated oxide facies occurs in the Pelly Mountains - the Fire Lake deposit (Morin, 1981, this report).

Variation in Element Concentration

A wide variation in element concentration is seen in the rocks analyzed. This is expected because the samples include wallrock, gangue and mineralization. Most of the element concentrations can be usefully compared to background country rock data analyzed by Tempelman-Kluit and Currie (1978), referred to in this paper as literature data. They reported on the rock geochemistry of the Aishihik Lake, Snag and Stewart River map areas in the Yukon Crystalline Terrane. More than 80% of the samples in the present study are from the Yukon Crystalline Terrane.

The following list and figures 19 and 20 demonstrate the variation of the individual elements.

Silver is high in the samples, 89% being greater than or equal to the literature anomaly threshold of 0.9 ppm. The main silver bearing minerals encountered

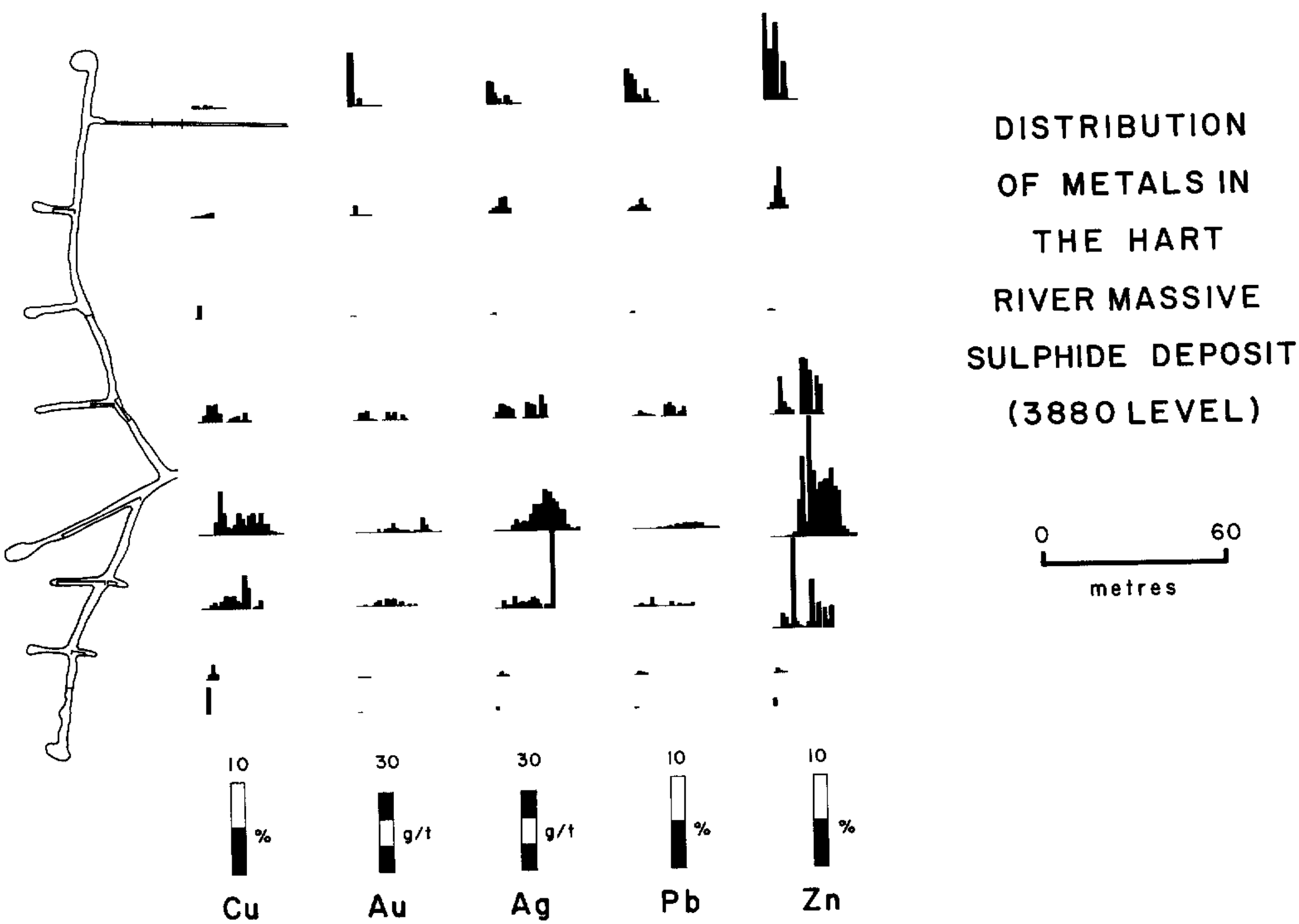

Figure 18
Distribution of Cu, Au, Ag, Pb, Zn in the Hart River massive sulphide deposit. Channel samples taken across intervals shown on the 3880 level by Hart River Mines Ltd. in 1970. The topmost interval is a horizontal drill hole intersection.

are the various sulphosalts and galena.

Arsenic is also high, 96% exceeds the 12 ppm threshold and 40% exceeds 2,000 pm.

Lead is very high in the samples, 93% exceed or equal the literature anomaly threshold of 20 ppm. 28% of the samples range from 1,000 ppm to the highest value encountered, 506,000 ppm. Main carriers of lead are galena and the various sulphosalts.

Zinc is moderately high in the samples, 51% being above the literature anomaly threshold of 112 ppm. The highest value is 213,000 ppm. Main mineral carrier is sphalerite and in the zone of oxidation, smithsonite and hydrozincite.

In their study of the Keno Hill District, Gleeson and Boyle (1980) suggest an anomaly threshold of 9 ppm for antimony. The present study indicates 93% of the samples are greater than 9 ppm, 40% being above 100 ppm and 15% above 1,000 ppm, the highest value being 326,000 ppm. Stibnite and sulphosalts are the main mineral carriers.

Manganese background levels are not available for this region. However, manganese is a rock forming element and one of the standard major elements determined in rock analyses. Inspection of 19 analyses of volcanic rocks from Montana Mountain (Roots, 1981) demonstrates a MnO range from 0.02% to 0.21%. Using the upper value of 0.21% as a crude estimate of background anomaly threshold, only 7% of the samples from the present study are above the threshold. Accordingly, the gold-silver deposits studied are low in manganese. The highest value is 40,300 ppm and mineral carriers include sphalerite, pyrite, arsenopyrite and galena in addition to secondary minerals in the zone of oxidation - limonite and wad (Levinson, 1974, p. 67).

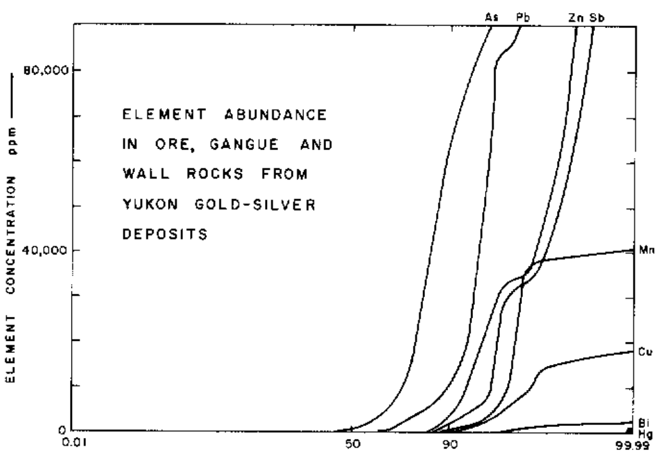

Figure 19

Cumulative frequency diagram illustrating the abundance of arsenic, lead, zinc, antimony, manganese, copper, bismuth and mercury.

Copper is relatively deficient in the samples, only 34% are above the literature anomaly threshold of 80 ppm. The highest value is 17,000 ppm in an assemblage of arsenopyrite-quartz-tourmaline and chalcopyrite from the THOR claims on Antimony Mountain (#103). Main mineral carriers are probably some of the sulphosalts.

Bismuth is reported by Boyle as "a common associate of gold in some hypogene deposits, although it is generally present in only small amounts (less than 5 ppm) in most gold ores." (1979, p. 147). Few literature data are available for background estimate of bismuth and the greater than or equal to 5 ppm value was employed as an estimate of threshold. 40% of the samples are above 5 ppm, and the highest value is 2885 ppm in a massive arsenopyrite phase of the Cabin vein at Dublin Gulch (#98).

Mercury is high in the samples, 77% being above the literature anomaly threshold of 23 ppb. 17% of the samples range from 500 ppb to the highest value 46,000 ppb from limonitic barite on Emmons Hill of Freegold Mountain (#2).

Boron is rarely above 10 ppm, the level of detection. The highest value is 1.3% B in a tourmaline-bearing breccia of quartz and arsenopyrite (#83).

Cadmium is high in sulphide mineralized rock and is commonly below the level of detection, 1 ppm, in other rocks. Highest value is 7,700 ppm in a sphalerite-galena phase of the Vault Mine vein (#129).

Gold is high; 90% of the samples exceed 10 ppb. The highest value is 267 g/t Au in the massive limonite centre of the Cabin Vein, Dublin Gulch (#99).

Tungsten is erratic, most samples range from 3 to 15 ppm and the highest value is 55 ppm in quartzite wallrock next to the Cabin vein, Dublin Gulch (#95).

Molybdenum shows no consistent association. Normal values are 4 ppm or less, the highest value of 72 ppm in arsenopyrite-quartzite vein breccia from the AJ showing on Antimony Mountain (#81).

Thallium has a normal range from the level of detection (20 ppm) to 40 ppm. It tends to be higher in altered wallrock and the highest value is 120 ppm in rhyolite-quartz breccia from the Gold Star area on Freegold Mountain (#33).

Tellurium is low in most rocks, 64% less than 2 ppm. The higher values are mainly in the mesothermal deposits, the highest being 150 ppm in massive arsenopyrite (#85) from the AJ showing on Antimony Mountain.

Selenium is uniformly 10 ppm or below. 30 ppm is present in baritic manganiferous breccia on Emmons Hill of Freegold Mountain (#6).

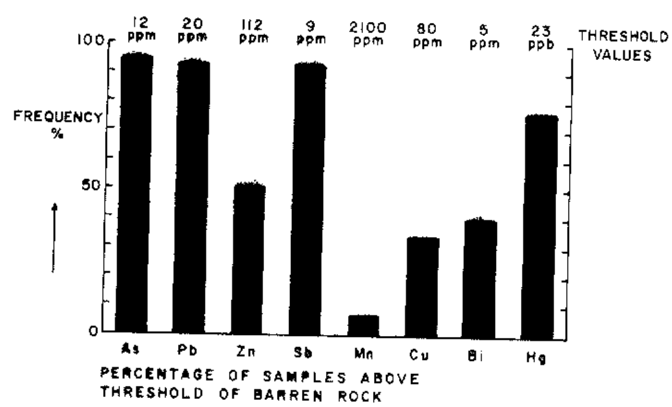

Figure 20

Histogram depicting the percentage of samples with above threshold values of As, Pb, Zn, Sb, Mn, Cu, Bi and Hg.

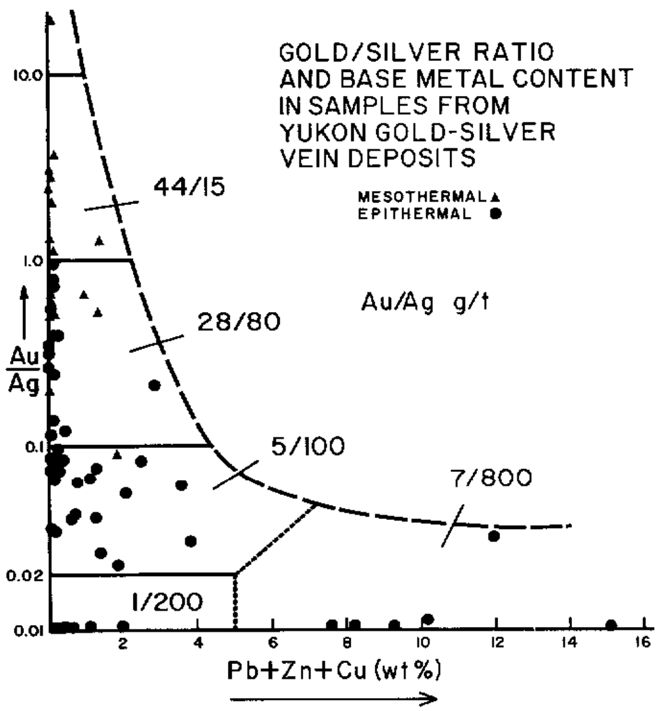

Figure 21
The gold-silver ratio (log scale) versus the weight percent of base metals (Pb + Zn + Cu arithmetic scale). Average gold and silver values (grams per tonne) are shown for five arbitrary sub-areas, for example 44/15 indicates average value of 44 g/t Au and 15 g/t Ag from the sub-area 1.0 to 10.0 Au/Ag. Note that as the base metal content increases, gold decreases and silver increases. Samples depicted are from epithermal and mesothermal deposits only.

Discussion

Sequence of concentration levels, frequency of above threshold values, and relative mobilities in the primary environment are important factors in detemining which of the above elements are the best rock geochemical pathfinders.

The levels of metal concentration in the gold-silver deposits is plotted on a cumulative frequency graph in Figure 19. In order of decreasing abundance, the sequence of metals is arsenic - lead - zinc - antimony - manganese - copper - bismuth - mercury.

More than 90% of the samples are above As, Pb and Sb thresholds, for Hg that figure is 77% and for Zn, Bi, Cu and Mn less than 51% (Figure 20)

Fluid inclusion studies of epithermal deposits show that the associated hydrothermal fluids are commonly neutral to weakly alkaline. Inspection of Andrews - Jones mobility chart in Levinson (1974, p. 143) shows the following relative mobilities in neutral to alkaline waters:

Medium	-	As
Low	-	Pb, Bi, Sb, Mn
Very low to immobile	-	Zn, Hg, Au, Ag, Cu

As, Pb and Sb are considered to be the best pathfinders for Au-Ag deposits in the present study.

Samples with mineralization were plotted on binary diagrams to determine natural subdivisions between deposits. The Au/Ag ratio versus sum of base metals shows natural groupings and trends (Figure 21):

- low Au/Ag, high base metal
- low Au/Ag, low base metal
- high Au/Ag, low base metal

Samples from epithermal deposits tend to span the range between all three groups, but those from the mesothermal deposits have high Au/Ag - low base metal. This reflects the relatively homogeneous composition of mesothermal veins in contrast to the wide intra-vein variation of epithermal deposits. Perhaps this indicates that fluids change rapidly in composition in response to varying P-T-X parameters in the epithermal environment whereas the more stable mesothermal environment promotes uniform compositions. The sympathetic relationship between silver and the base metals is also illustrated.

Samples from epithermal veins can be collected from different portions of the vein system and accordingly can vary in composition. They tend to occupy an area that approximates a triangle on this plot, with apices at the maximum and minimum Au/Ag values and the maximum base metal value. The bulk composition of the vein lies within the triangle. Using the thesis of vertical zonation, the composition of a vein should decrease in base metals toward the origin and then veer upward as the Au/Ag ratio increases (Buchanan, 1980).

List of Samples Analyzed

1. Biotite-quartz-feldspar schist with 5% disseminated pyrite - Emmons Hill.
2. Limonitic barite (30.9% $BaSO_4$) - Emmons Hill, dump near old shaft.
3. Quartz vein with disseminated pyrite - Emmons Hill, trench.
4. Quartz vein with limonite streaks - Emmons Hill, trench.
5. Pale green argillized rhyolite porphyry next to lens of massive mineralization - Emmons Hill, trench.
6. Breccia with barite matrix (43.4% $BaSO_4$) - Emmons Hill, dump near old shaft.
7. Breccia with quartz clasts set in stibnite matrix - Emmons Hill, dump near old shaft.
8. Breccia with quartz clasts set in stibnite-galena-barite matrix (18.5% $BaSO_4$) - Emmons Hill, dump near old shaft.
9. Breccia with quartz clasts set in black fine-grained pyritic matrix - Emmons Hill.
10. Breccia with limonite and argillized granodiorite set in quartz matrix - Laforma G3 Vein, trench.
11. Milky white quartz vein material - Laforma G3 Vein, trench.
12. Oxidized granodiorite adjacent to quartz vein - Laforma G3 Vein, trench.
13. Bluish-grey quartz vein with minor disseminated pyrite - Laforma G3 Vein, dump near No. 2 adit.
14. Milky white and bluish-grey quartz vein hosted in granodiorite - Rambler vein, trench.
15. Bluish-grey quartz with lenses of very fine-grained pyrite - Rambler Vein, trench.
16. Breccia with rhyolite clasts set in rhyolite and quartz matrix adjacent to vein in #15 - Rambler Vein, trench.
17. Breccia with clasts of white quartz set in matrix of bluish-grey pyritic quartz - Rambler Vein, trench.
18. White quartz vein and breccia with rhyolite clasts in white quartz matrix - Rambler vein, trench.
19. Milky white quartz vein with minor stibnite - Rambler Vein, trench.
20. Granodiorite flooded with thin white quartz veinlets - Rambler Vein, trench.
21. Breccia with milky white quartz clasts set in matrix of pyritic bluish-grey quartz - Rambler Vein, trench.
22. Milky white quartz vein with lenses of bluish-grey quartz with minor pyrite and arsenopyrite - Rambler Vein, trench.
23. Breccia with milky white quartz clasts set in bluish-grey pyritic quartz matrix - Laforma G3 Vein, trench.
24. Bluish-grey pyritic quartz - Laforma 'G3' Vein, dump near #1 Adit.
25. Rhyolite pebble breccia dyke - Rambler Hill.
26. Argillized granodiorite with minor pyrite and chalcopyrite disseminations and veinlets - Red Fox Vein Area.
27. White and bluish-grey quartz vein with galena - Red Fox Vein, 4 m downslope from massive galena facies.
28. Massive coarse-grained foliated galena - Red Fox Vein.
29. Quartzite with quartz-fluorite lined vugs - Red Fox Vein, trench.
30. Quartzite with quartz-fluorite lined vugs - Red Fox Vein, trench.
31. White quartz vein in quartzite xenolith in quartz-feldspar porphyry - Gold Star Area.
32. Breccia of gneiss, quartz and porphyry clasts in leached siliceous boxwork matrix with scorodite - Gold Star Area.
33. Breccia of rhyolite clasts set in white quartz matrix - Gold Star Area, trench.
34. Breccia of rhyolite clasts set in quartz matrix and cut by numerous quartz veinlets - Gold Star Area, trench.
35. Argillized granodiorite - Rainbow Area, trench.
36. Massive white chalcedony - Rainbow Area, trench.
37. Layered chalcedony from a lens within chalcedony breccia - Rainbow Area.
38. Breccia with clasts of argillized granodiorite set in chalcedony matrix - Rainbow Area.
39. Breccia with clasts of chalcedony in black siliceous matrix - Rainbow Area.

Tinta Hill, Drill Core Section #40-44

40. Argillized granodiorite with minor disseminated pyrite, sphalerite-galena veinlets with Mn stain adjacent to vein - Tinta Hill, core from DDH 74-16, 53.2 m - 53.4 m.
41. White milky quartz with lens-like veinlets of galena and vein breccia with clasts of grey quartz in matrix of milky quartz and galena - Tinta Hill, core from DDH 74-16, 54.0 m - 54.1 m sample from vein at 53.4 - 55.5 m.
42. Argillized earthy granodiorite with minor disseminated pyrite cut by veinlets of galena, sphalerite and grey quartz - Tinta Hill, core from DDH 74-16, 55.0 m - 55.2 m.
43. Moderately argillized granodiorite with brown weathering rind around core - Tinta Hill, core from DDH 74-16, 51.8 m - 52.0 m.
44. Weakly propylitized granodiorite with brown weathering mafics (epidote, chlorite), cloudy milky grey feldspar and very minor disseminated pyrite and hematite (?) - Tinta Hill, core from DDH 74-16, 69.2 m - 69.4 m.
45. Unaltered biotite-quartz-feldspar gneiss 30 m west of Webber Vein - Mounta Nansen Area.
46. Unaltered biotite quartzite 30 m west of Webber Vein - Mount Nansen Area.
47. Rusty weathering altered gneiss in vicinity of vein - Mount Nansen Area, several metres from vein.

Section across Webber Vein in trench above adit, #48-55

48. Limonitized and argillized rhyolite - 1 to 2 m north of vein, chip sample across 1 m.
49. Heavily limonitized and argillized rhyolite, Mn stain abundant - 0 to 1 m north of vein, chip sample across 1 m.
50. Quartz with lenses of fine-grained black metallic minerals - northern portion of vein, chip sample across 0.2 m.
51. Swarm of quartz and limonite veinlets in highly argillized rhyolite - chip sample across 0.3 m of vein south of 50.
52. Quartz with lenses of fine-grained metallic minerals - chip sample across 0.15 m of vein south of 51.
53. Swarm of quartz veinlets in altered rhyolite - chip sample across 0.15 m of vein south of 52.
54. Argillically altered rhyolite, limonitized along fractures - chip samples across 0.6 m of wall rock south of 53.
55. Argillized and limonitized rhyolite with abundant manganese stain - chip sample across 1 m of hostrock south of 54.
56. Quartz with lens of massive fine-grained black metallic minerals - Webber Vein, trench sample 15 m east of trench section #48-55.
57. Quartz-scorodite-arsenopyrite vein material - Webber Vein, sample from dump near adit portal.
58. Vein breccia with creamy white quartz clasts set in a bluish-grey quartz matrix - Huestis Vein, dump near adit portal.
59. Vein breccia with creamy white quartz clasts set in a bluish-grey quartz matrix - Huestis Vein, dump near adit portal.
60. Coarse-grained massive arsenopyrite-sulphosalt vein material - Huestis Vein, dump near adit portal.
61. As in 60, sample from same boulder.
62. White quartz vein with coarse-grained pyrite, galena and sphalerite - Huestis Vein, dump near adit portal.
63. Argillized wallrock with swarm of quartz veinlets - Huestis Vein, dump near adit portal.
64. Banded quartz and sulphides - Huestis vein, dump near adit portal.
65. Bluish-grey quartz with disseminated pyrite - Brown-McDade, trench across vein system.
66. Grey to black rhyolite dyke with disseminated pyrite - Brown-McDade, trench across vein system, dyke is adjacent to quartz vein #65.
67. Bluish-grey quartz with disseminated pyrite - Brown-McDade, trench across vein system, sample collected from vein 6 m west of #65.

Ketza River Mines - Core from a vertical diamond drill hole, 9.15 m to 19.82 m, #68-79.

68. Dark grey fine-grained massive, homogeneous, carbonaceous limestone hangingwall - 0.30 m.
69. Massive fine-grained pyrrhotite with minor lenses of grey fine-grained limestone and one lens of coarse-grained pyrite - 0.20 m.
70. Dark grey fine-grained limestone with abundant veinlets of fine-grained pyrrhotite with minor coarse-grained pyrite - 1.52 m.
71. Massive pyrrhotite with numerous veinlets of white quartz and clasts of silicified limestone - 0.61 m
72. Massive white quartz vein with veinlets of pyrrhotite and clasts of limestone - 0.36 m.
73. Dark grey fine-grained limestone with abundant veinlets of white calcite and pyrite - 0.46 m.
74. Breccia with clasts of pyrite, calcite, limestone and quartz set in matrix of massive pyrrhotite - 0.56 m.
75. Pale grey fine-grained limestone with a stockwork of pyrrhotite and pyrite veinlets - 0.51 m.
76. Breccia with clasts of limestone and pyrite in massive pyrrhotite matrix - 0.61 m.
77. Breccia with clasts of limestone in coarse-grained white calcite matrix with disseminated pyrite, all cut by minor pyrite veinlets - 0.76 m.
78. Breccia with clasts of dark grey limestone cut by veinlets of white calcite and set in a massive pyrite matrix - 0.30 m.
79. Conglomerate with lenticular clasts of dark grey finely layered limestone set in a matrix of brownish-grey limestone, all cut by a stockwork of white calcite veinlets, stylolites common - 0.61 m.
80. Breccia with clasts of quartzite in leached matrix of black very fine-grained sulphides and tourmaline - AJ showing on east wall of creek, north side of vein, grab sample across 1.3 m.
81. Breccia with clasts of quartzite in matrix of arsenopyrite - AJ showing on east wall of creek, occurs as lenses within #80.
82. Breccia with quartzite clasts set in massive arsenopyrite and scorodite - AJ showing on east wall of creek, chip sample across 1 m.
83. Breccia with lenses of quartz and massive arsenopyrite in highly leached matrix of black very fine-grained sulphides and tourmaline - AJ showing on east wall of creek, grab sample across 0.8 m at south side of vein.
84. Sheet fractured quartzite with arsenopyrite, pyrite and tourmaline in fractures - AJ showing on west wall of creek, grab sample.
85. Massive arsenopyrite - AJ showing on west wall of creek, grab sample.
86. Massive arsenopyrite, quartz and chalcopyrite - AJ showing on west wall of creek.
87. Contact breccia with clasts of pale green rhyolite enclosed in limonite-clay matrix - Lone Star Mine, trench 1.2 km north of mill building.
88. Yellow orange weathering quartz-muscovite schist with disseminated pyrite - Lone Star Mine, dump east of mill building.
89. Grey weathering quartz-muscovite schist with disseminated pyrite and argillic alteration - Lone Star Mine, dump east of mill building.
90. White quartz vein material with very minor pyrite - Lone Star Mine, dump east of mill building.
91. White quartz vein material with very minor pyrite - Lone Star Mine, dump east of mill building.
92. Heavily argillized quartz-muscovite schist - Lone Star Mine, trench 100 m northwest of mill building.
93. White vein quartz with limonite and galena - Lone Star Mine Area, float beside road 800 m north-northwest of mill building.
94. Heavily argillized quartz-muscovite schist - Lone Star Mine, trench east of road, 1.2 km north of mill building.

Trench on Cabin Vein, Dublin Gulch, 1.31 m Section across north half of vein, #95-#99.

95. Thinly bedded quartzite host rock with manganese stain - Cabin Vein, Dublin Gulch, chip sample across 0.5 m of wallrock spaced 0.5 to 1.0 m on north side of vein.
96. Quartzite wallrock with limonite stain - Cabin Vein, Dublin Gulch, chip sample across 0.5 m of wallrock on north side of vein.
97. Vein breccia with quartzite clasts in siliceous and argillic matrix with veinlets of sulphosalt (?) and scorodite - Cabin Vein, Dublin Gulch, chip sample across 0.2 m thick north side of vein.
98. Massive arsenopyrite-scorodite-quartz - Cabin Vein, Dublin Gulch, chip sample across 6 cm between #97 and #99.
99. Massive limonite core of vein - Cabin Vein, Dublin Gulch, chip sample across 5 cm of vein centre on south side of #98.
100. Banded arsenopyrite-rich vein material - Cabin Vein, Dublin Gulch, grab sample from trench.
101. Breccia with clasts of quartz set in pale green chalcedony - Cabin Vein, Dublin Gulch, grab sample from trench.
102. Quartz-tourmaline vein material - Cabin Vein, Dublin Gulch, grab sample from trench #23.
103. Massive arsenopyrite with minor quartz, tourmaline and chalcopyrite - Antimony Mountains, THOR claims, grab sample.
104. Arsenopyrite, quartz, tourmaline and chalcopyrite - Antimony Mountain, THOR claims, grab sample.
105. Quartz-feldspar fissure filling in Taku volcanics - Montana Mountain.
106. Green quartz-feldspar fissure filling in andesitic vent breccia - Montana Mountain.
107. Purple dyke/fissure filling in andesitic vent breccia - Montana Mountain.
108. Black fissure filling in andesitic vent breccia - Montana Mountain.
109. Vein breccia with white quartz clasts set in a matrix of bluish-grey quartz with minor arsenopyrite, pyrite and sulphosalts - Peerless, dump near adit portal.
110. Weakly argillized quartz monzonite with veinlets of carbonate-quartz and quartz-pyrite and minor disseminated pyrite - Peerless, dump near adit portal.
111. Weakly propylitized quartz monzonite with veinlets of carbonate-quartz - Peerless, dump near adit portal.
112. White quartz vein material with disseminated pyrite and bands of sphalerite and of arsenopyrite - Peerless, dump near adit portal.
113. Banded dark grey quartz and sulphides (arsenopyrite, galena) - Big Thing Vein, dump near adit portal.
114. Dark grey quartz with bands, lenses, veinlets and disseminations of pyrite and arsenopyrite - Big Thing Vein, dump near adit portal.
115. Vein centre with white quartz cockade structure and major disseminated pyrite, arsenopyrite and very minor chalcopyrite - Big Thing Vein, dump near adit portal.

Section across vein in trench located 70 m north-northeasterly of 1968 adit portal, Montana Mine, #116-120.

116. Limonitized andesite hostrock with minor manganense stain - Montana Mine, chip sample across 1 m is west of #117.

List of Samples Analyzed (Cont.)

117. Extensively propylitized (epidote) andesite wallrock cut by numerous quartz veinlets and some cavities - Montana Mine, chip sample across 1 m between 116 and 118.
118. White quartz vein with abundant quartz-lined cavities, locally with chalcedony infilling - Montana Mine, chip sample across 2 m between 117 and 119.
119. Massive epidote wallrock alteration - Montana Mine, chip sample across 1 m between 118 and 120.
120. Dark brownish green oxidized fractured andesite hostrock - Montana Mine, east of 119, chip sample across 1 m.
121. Bluish-grey quartz with finely disseminated arsenopyrite and pyrite (?) - Montana Mine, dump near portal of 1968 adit.
122. White quartz with disseminated arsenopyrite and pyrite (?) - Montana Mine, dump near portal of 1968 adit.
123. White quartz vein, sheets with cockade structure - Vault Mine, sheeted vein outcrop between upper and lower adits.
124. Jarositic and manganiferous altered dacite porphyry wallrock - Vault Mine, sample site as in #123.
125. Argillically altered dacite porphyry wallrock - Vault Mine, sample site as in #123.

Vault Mine, Section across Upper Adit Portal #126-132.

126. Heavily oxidized and argillized dacite porphyry hangingwall - chip sample across 15 cm.
127. Galena-rich upper portion of quartz vein - chip sample across 8 cm.
128. Milky white quartz in centre of vein with cockade structure and cavities - chip sample across 20 cm.
129. Sphalerite-galena-rich limonitic zone at base of vein - chip sample across 6 cm.
130. Oxidized and argillized dacite porphyry footwall - chip sample across 16 cm.
131. Argillically altered, manganese stained dacite porphyry wallrock - chip sample across 30 cm of wallrock below #130.
132. Argillically altered, manganese stained dacite porphyry wallrock - chip sample across 30 cm of wallrock above #126.
133. Breccia with chalcedony clasts set in chalcedony matrix - float on trail to Vault Vein, south side of Pooly Canyon.
134. Massive chalcedony with minor carbonate - float on trail to Vault Vein, south side of Pooly Canyon.
135. Tourmaline breccia - Montana Mountain.

Venus Mine - Section across vein underground at the 2600 ft. level reservoir, #136-140.

136. Altered andesite hangingwall with a few one centimetre thick quartz veinlets - chip sample across 30 cm.
137. Banded pyrite and quartz in upper part of vein - chip sample across 8 cm.
138. Massive white quartz with minor cavities and pyrite lenses in central part of vein - chip sample across 30 cm.
139. Banded pyrite and quartz in lower part of vein - chip sample across 8 cm.
140. Altered andesite footwall with a few thin quartz veinlets - chip sample across 30 cm.
141. Andesite cut by 2 cm thick veinlet of calcite and chalcedonic quartz - 2600 ft. level.

Section on the 2700 ft. level, near the entrance of the south drift beside the waste pass.

142. Altered andesite hangingwall - chip sample across 30 cm.
143. Banded arsenopyrite and pyrite in upper part of vein - chip sample across 16 cm.
144. Quartz-rich core of vein - chip sample across 30 cm.
145. Banded arsenopyrite-pyrite in lower part of vein - chip sample across 16 cm.
146. Altered andesite footwall - chip sample across 30 cm.

Section on 2850 ft. level, north drift, 7.6 m north of survey station 2855.

147. Altered andesite hangingwall cut by a few thin pyrite and quartz veinlets - chip sample across 30 cm.
148. Banded pyrite-arsenopyrite in upper part of vein - chip sample across 16 cm.
149. Banded quartz-arsenopyrite-rich vein core - chip sample across 14 cm.
150. Pyrite-arsenopyrite-rich lower part of vein - chip sample across 16 cm.
151. Altered andesite footwall - chip sample across 30 cm.

MD Vein on 2800 ft. level

152. Limonitized altered andesite hangingwall with minor sulphides - chip sample across 16 cm.
153. Massive arsenopyrite-pyrite upper part of vein - chip sample across 4 cm.
154. Massive quartz lower part of vein - chip sample across 4 cm.
155. Limonitized altered andesite footwall - chip sample across 16 cm.

Analytical Results

Analysis	Sample No.	Remarks	Au g/t	Au ppb	B ppm	Mn ppm	Cu ppm	Zn ppm	As ppm	Se* ppm	Tl** ppm	Pb ppm	Pb %	Bi ppm	Sb ppm	Te ppm	W ppm	Hg ppb	Mo ppm	Ag ppm	Ag g/t	Cd ppm
1	4	Emmons Hill	-	7	<10	62	110	48	170	10	-	8	-	0.2	3.6	0.1	5	120	8	1	-	<1
2	6	" "	-	91	10	35	18	0.02%	2100	10	-	-	0.60	0.5	1500	0.7	9	46000	4	-	4.5	trace%
3	7A	" "	-	<1	<10	54	18	49	230	10	-	44	-	<0.1	21.0	<0.1	5	540	12	<1	-	<1
4	7B	" "	-	1	10	22	23	28	210	-	60	24	-	0.1	38.0	<0.1	4	540	4	<1	-	<1
5	8	" "	-	<1	10	63	30	490	6600	-	40	36	-	1.0	180	2.3	7	13000	4	<1	-	<1
6	9	" "	1.0	39	<10	40100	29	0.93%	1300	30	60	-	2.88	0.2	200	0.4	1	1400	4	-	3.4	0.01%
7	10	" "	1.7	-	10	640	17	290	n.d.	-	-	-	0.02	3.3	0.94%	6.0	n.d.	32000	<2	-	trace	<1
8	11	" "	1.4	-	<10	37100	45	15800	n.d.	-	80	-	7.72	0.9	0.63%	3.3	n.d.	2500	<2	-	137.4	100
9	12	" "	-	81	100	550	23	830	300	10	40	1120	-	0.2	120	<0.1	3	570	20	9	-	6
10	14	Laforma 'G3'	-	14	75	150	5	160	180	-	-	600	-	0.3	140	<0.1	6	480	<2	2	-	1
11	15	" "	-	110	<10	58	22	43	190	-	-	230	-	0.6	68.0	<0.1	2	100	<2	3	-	<1
12	17	" "	-	8	10	420	54	70	260	10	-	48	-	1.6	45.0	<0.1	7	100	<2	<1	-	<1
13	48	" "	trace	-	200	360	10	100	470	-	-	88	-	0.2	27.0	0.1	4	20	4	-	289.3	1
14	19	Rambler Vein	-	600	10	130	33	350	2700	10	-	720	-	1.4	190	0.7	4	230	8	7	-	6
15	22	" "	2.1	-	<10	55	51	160	9600	-	-	160	-	28.0	300	3.0	6	130	4	-	trace	<1
16	23	" "	-	9500	15	75	80	170	1900	-	-	240	-	2.1	210	0.6	5	620	4	10	-	<1
17	24	" "	2.4	-	<10	44	56	220	10000	-	40	200	-	24.0	270	2.6	3	220	6	-	25.0	4
18	25	" "	trace	-	<10	110	130	100	1800	-	-	720	-	6.0	380	0.5	<1	90	4	-	61.6	3
19	26	" "	trace	-	10	35	57	220	n.d.	10	-	140	-	2.1	2.32%	0.3	n.d.	60	<2	-	30.1	3
20	27	" "	-	1100	<10	30	53	66	550	-	20	280	-	2.8	300	0.2	4	100	4	15	-	<1
21	28	" "	3.4	-	<10	12	640	150	4500	-	-	144	-	14.2	2200	4.5	n.d.	1600	4	-	489.1	3
22	29	" "	1.4	-	<10	18	20	39	12000	-	-	44	-	4.0	200	3.3	n.d.	80	4	-	393.3	1
23	30	Laforma 'G3'	2.7	-	40	12	53	50	3700	10	20	60	-	12.0	140	1.0	5	80	20	-	109.1	<1
24	31		trace	-	10	21	410	48	4600	10	20	92	-	140	150	1.2	<1	80	12	-	13.7	<1
25	43	Rambler Hill	-	64	60	130	9	53	660	-	-	220	-	4.4	84.0	0.1	3	30	4	2	-	2
26	32	Red Fox	trace	-	<10	310	21	38	110	10	-	20	-	1.4	37.0	<0.1	11	20	8	-	trace	<1
27	33		-	550	<10	28	400	540	n.d.	n.d.	n.d.	-	5.40	n.d.	n.d.	n.d.	n.d.	1900	76	-	96.4	2
28	34		-	650	<10	3	3340	880	230	-	-	-	50.6	120	1400	<0.1	n.d.	310	12	-	578	42
29	35		-	48	30	34	60	21	340	-	20	3840	-	1.2	78.0	0.1	5	60	4	14	-	<1
30	35A		-	52	10	17	120	45	790	-	-	3280	-	1.2	120	0.2	4	70	8	14	-	3
31	36	Gold Star	-	4	15	8	18	16	180	-	20	1200	-	0.9	44.0	<0.1	8	30	4	15	-	1
32	37		-	9500	<10	28	81	25	120000	-	-	820	-	170	1800	n.d.	<100	140	4	18	-	<1
33	38		-	130	100	4	18	14	1500	-	120	190	-	0.9	88.0	0.2	6	50	4	2	-	1
34	39		-	450	25	13	58	38	3700	-	-	1120	-	7.3	290	0.7	3	180	8	6	-	3
35	98A	Rainbow	-	<1	<10	120	3	33	37	-	20	24	-	0.5	27.0	<0.1	1	30	4	<1	-	<1
36	98B		-	13	<10	9	2	26	18	-	-	20	-	0.1	35.0	<0.1	4	20	<2	2	-	<1
37	98C		-	77	<10	10	4	20	270	-	-	20	-	0.2	66.0	<0.1	3	40	4	<1	-	<1
38	98D		-	2	10	120	6	35	68	-	-	36	-	0.4	40.0	0.2	6	20	8	<1	-	<1
39	98E		-	6	<10	26	35	14	72	-	40	24	-	0.3	46.0	0.2	7	740	4	<1	-	<1
40	99A	Tinta Hill	1.0	-	15	7600	79	2.89%	740	-	-	-	0.70	1.4	120	<0.1	12	500	12	-	17.1	0.02%
41	99B		9.6	-	10	1400	8800	4.27%	980	-	-	-	10.0	24.0	2500	<0.1	n.d.	1600	52	-	954.2	0.05%
42	99C		2.1	-	50	920	560	1.97%	450	-	-	-	0.49	0.7	250	<0.1	7	500	8	-	24.6	0.01%
43	99D		-	30	40	1350	42	330	32	10	60	180	-	0.2	30.0	<0.1	2	70	4	1	-	<1
44	99E		-	7	<10	520	15	100	16	-	-	440	-	0.2	17.0	<0.1	<1	30	4	2	-	<1
45	50A	Webber	-	49	<10	82	13	19	180	-	20	240	-	0.1	17.0	<0.1	2	<10	4	1	-	1
46	50B		-	2	<10	74	11	24	84	-	-	72	-	0.5	16.0	0.5	5	10	<2	<1	-	1
47	51		-	16	10	25	19	22	150	-	-	140	-	0.7	19.0	n.d.	3	<10	4	1	-	<1
48	52A		-	3	10	160	53	520	270	10	20	60	-	0.4	23.0	n.d.	5	40	<2	<1	-	3
49	52B		-	18	35	180	160	730	1000	-	60	96	-	0.7	40.0	0.3	1	40	<2	5	-	5
50	52C		26.0	-	<10	29	1740	220	66000	-	-	-	10.0	12.9	3.00%	0.9	n.d.	720	<2	-	2346	120
51	52D		3.4	-	50	25	1730	220	24000	-	-	-	1.23	3.5	0.38%	5.3	n.d.	340	<2	-	130	110
52	52E		26.7	-	10	29	110	140	33000	-	-	-	1.84	n.d.	0.56%	n.d.	n.d.	1500	<2	-	1231	6
53	52F		6.5	-	10	23	2120	360	19000	-	40	-	0.38	3.1	0.05%	3.6	n.d.	340	4	-	135.4	35
54	52G		-	1200	40	33	98	120	3000	-	40	3080	-	0.9	130	0.7	<1	200	<2	14	-	3
55	52H		-	75	<10	76	170	630	540	-	-	520	-	0.6	63.0	0.1	6	100	4	15	-	10
56	53		3.4	-	<10	96	650	1400	41000	-	40	2360	-	5.1	0.49%	8.8	n.d.	620	4	-	933.7	43
57	56		32.8	-	<10	55	18	43	87000	-	-	-	0.03	12.0	0.06%	26.0	n.d.	140	20	-	trace	<1

Analytical Results (Cont.)

Analysis	Sample No.	Remarks	Au g/t	Au ppb	B ppm	Mn ppm	Cu ppm	Zn ppm	As ppm	Se* ppm	Tl** ppm	Pb ppm	Pb %	Bi ppm	Sb ppm	Te ppm	W ppm	Hg ppb	Mo ppm	Ag ppm	Ag g/t	Cd ppm
58	57A	Huestis	10.3	-	< 10	4000	34	1310	22000	-	-	1080	-	3.7	290	9.0	n.d.	170	4	-	26.0	18
59	57B		10.3	-	10	40300	19	150	23000	-	-	600	-	3.7	300	8.3	n.d.	530	4	-	26.0	< 1
60	58A		245.6	-	< 10	280	460	2.39%	n.d.	10	-	-	0.42	4.6	30.0%	15.0	n.d.	460	4	-	1183	0.02%
61	58B		34.2	-	< 10	7200	480	0.37%	n.d.	-	-	-	0.69	1.6	32.6%	2.2	n.d.	280	4	-	513	0.01%
62	59		16.4	-	< 10	830	770	3.33%	11000	-	-	-	8.54	1.2	0.29%	3.8	n.d.	180	4	-	506.2	0.04%
63	61		-	47	< 10	60	15	76	62	-	-	230	-	0.1	180	0.1	< 1	< 10	4	2	-	< 1
64	62		9.6	-	< 10	470	6700	3.48%	72000	-	-	-	3.51	4.5	3.15%	38.0	n.d.	1700	4	-	2226	0.06%
65	63	Brown McDade	10.3	-	10	30	1020	790	7500	-	-	960	-	16.0	1200	3.0	46	160	4	-	141.9	11
66	64		-	3600	20	15	310	240	2700	-	60	920	-	8.1	480	1.1	4	170	4	15	-	3
67	65		0.3	-	10	1700	89	1330	1500	-	-	300	-	< 0.1	110	1.4	< 1	320	4	-	trace	20
68	101	Ketza River	-	6	< 10	190	29	3060	10	-	-	24	-	1.4	0.3	< 0.1	1	< 10	< 2	< 1	-	37
69	102		trace	-	< 10	180	1320	300	430	-	-	20	-	32.0	2.8	< 0.1	1	< 10	< 2	-	trace	3
70	103		1.7	-	< 10	1890	920	240	3600	-	-	16	-	20.0	6.2	0.7	13	< 10	4	-	trace	4
71	104		2.1	-	< 10	720	480	84	4000	-	-	20	-	80.0	6.0	0.8	15	< 10	4	-	trace	< 1
72	105		9.6	-	< 10	440	460	62	16000	-	-	20	-	320	28.0	4.4	n.d.	< 10	4	-	trace	1
73	106		-	490	< 10	460	7	20	590	-	-	16	-	8.8	3.1	0.3	< 1	< 10	8	< 1	-	< 1
74	107		6.8	-	< 10	480	940	31	61000	-	-	20	-	120	130	17.0	n.d.	< 10	4	-	trace	< 1
75	109		1.7	-	< 10	2650	630	34	34000	-	-	16	-	36.0	80.0	11.0	n.d.	< 10	4	-	trace	< 1
76	110		4.8	-	< 10	290	1330	45	64000	-	-	24	-	140	53.0	14.0	n.d.	< 10	4	-	trace	< 1
77	111		trace	-	10	23	26	16	150	-	-	4	-	1.4	1.3	< 0.1	1	40	4	-	trace	< 1
78	113		5.5	-	< 10	730	130	28	66000	-	-	380	-	110	170	19.0	n.d.	20	4	-	trace	< 1
79	114		-	63	15	980	12	21	720	-	40	32	-	7.3	5.5	0.2	3	< 10	4	1	-	1
80	115	AJ	8.2	-	8900	16	21	18	84000	-	-	12	-	40.0	250	17.0	n.d.	1900	20	-	trace	< 1
81	116		105	-	1700	5	330	23	n.d.	-	-	48	-	1000	1200	99.0	n.d.	1500	72	-	7.5	< 1
82	117		40.4	-	65	5	580	30	n.d.	-	-	44	-	600	1400	93.0	n.d.	12000	24	-	trace	< 1
83	118		6.8	-	13000	5	58	8	70000	-	-	44	-	28.0	470	29.0	n.d.	620	56	-	10.3	3
84	120		13	-	12000	10	130	12	n.d.	-	-	76	-	88.0	490	29.0	n.d.	6800	20	-	14.7	< 1
85	121A		57.8	-	1300	5	59	15	n.d.	-	-	36	-	600	1600	150	n.d.	480	32	-	trace	< 1
86	121B		12.3	-	75	15	1490	42	n.d.	-	-	68	-	230	390	29.0	n.d.	10	12	-	trace	1
87	125	Lone Star	-	32	10	720	19	10	2500	-	-	16	-	< 0.1	14.0	0.2	< 10	10	< 2	1	-	< 1
88	126		-	310	< 10	60	24	16	2400	-	40	12	-	7.0	14.0	0.8	< 10	20	< 2	< 1	-	< 1
89	127		-	260	< 10	590	48	120	2400	-	-	16	-	5.9	14.0	0.5	< 10	20	< 2	1	-	2
90	128		-	310	10	75	25	52	2100	-	-	16	-	7.4	11.0	0.7	< 10	20	< 2	1	-	< 1
91	129		-	3900	10	26	43	36	1800	-	40	280	-	7.8	13.0	0.7	< 10	40	< 2	5	-	2
92	131		-	79	10	76	10	39	140	-	100	36	-	1.4	2.3	< 0.1	2	10	< 2	< 1	-	3
93	132		2.7	-	10	36	9	68	88	-	-	-	0.45	12.5	3.1	< 0.1	4	290	< 2	-	22.6	2
94	133		-	350	< 10	71	9	10	940	-	-	8	-	3.0	5.7	0.3	4	10	< 2	< 1	-	1
95	135	Cabin Vein	-	190	125	180	140	150	1300	-	40	140	-	1.0	18.0	0.3	55	50	12	< 1	-	1
96	136		-	59	30	44	110	180	2100	-	-	80	-	1.8	57.0	0.5	25	210	16	< 1	-	1
97	137		1.4	-	50	11	32	22	7000	-	80	88	-	5.1	43.0	2.4	51	420	8	-	trace	2
98	138		249	-	< 10	7	380	13	150000	-	-	9200	-	2880	4700	40.0	n.d.	6500	28	-	390	< 1
99	139		266.8	-	< 10	13	160	10	120000	-	-	13600	-	2440	6900	40.0	n.d.	4600	12	-	178	< 1
100	140		107	-	< 10	4	87	14	n.d.	-	-	13200	-	600	4000	40.0	n.d.	2000	12	-	209	< 1
101	142		55	-	< 10	5	10	10	n.d.	-	-	400	-	40.0	620	n.d.	n.d.	260	4	-	21.5	1
102	143		-	880	300	23	13	24	2400	-	-	340	-	24.0	63.0	1.0	< 10	60	4	1	-	< 1
103	147	Thor	7.2	-	4300	13	17000	0.05%	n.d.	-	-	-	0.09	880	0.09%	96.0	n.d.	580	20	-	80.4	trace%
104	148		1.7	-	1600	8	13500	0.05%	n.d.	-	-	-	0.59	560	0.26%	140	n.d.	270	8	-	420.7	trace%
105	R-23-6		-	81	25	950	65	38	440	-	-	1720	-	1.2	52.0	< 0.1	2	220	4	13	-	< 1
106	R-19-20		-	38	200	58	20	20	120	-	-	150	-	3.1	63.0	< 0.1	4	< 10	< 2	< 1	-	1
107	R-19-2E		-	5	200	520	38	64	220	-	20	40	-	1.0	7.6	< 0.1	< 1	< 10	8	1	-	< 1
108	R-38-3		-	1	14000	140	10	9	43	-	20	12	-	10.6	11.0	< 0.1	4	< 10	4	< 1	-	< 1
109	66	Peerless	trace	-	10	32	25	320	42000	10	-	-	0.19	88.0	740	22.0	< 1	20	4	-	trace	4
110	67		-	100	10	740	37	940	1500	-	20	260	-	1.1	69.0	1.5	26	50	8	10	-	< 1
111	68		-	35	< 10	370	25	540	64	-	40	170	-	1.5	61.0	< 0.1	22	100	4	14	-	< 1
112	69		1.4	-	< 10	200	71	530	47000	-	-	-	0.06	32.0	140	22.0	n.d.	70	12	-	20.9	10
113	72	Big Thing	0.7	-	< 10	25	320	190	32000	-	-	-	0.09	11.5	150	15.0	29	30	24	-	20.2	< 1
114	73		1.4	-	< 10	80	77	120	31000	-	-	-	0.03	11.5	130	15.0	< 1	10	8	-	18.5	< 1
115	74		1.7	-	< 10	8	2000	130	76000	-	-	-	0.12	80.0	900	30.0	n.d.	200	4	-	226	< 1
116	75	Montana Mine	-	17	< 10	990	31	1830	630	-	40	88	-	2.2	38.0	0.4	< 1	40	4	8	-	10
117	76		-	900	10	26	200	630	8100	-	-	7200	-	2.0	330	3.0	50	50	4	14	-	38
118	77		3.8	-	< 10	19	100	19800	480	-	-	880	-	0.4	50.0	0.2	8	240	8	-	69.1	13
119	78		-	64	40	18	59	1250	3500	-	-	8800	-	0.7	110	1.5	9	120	4	13	-	48
120	79		-	25	< 10	800	19	1030	57	-	-	92	-	0.2	16.0	< 0.1	< 1	120	< 2	17	-	25
121	83		3.1	-	< 10	14	90	140	12000	-	-	720	-	2.1	69.0	4.5	n.d.	140	4	-	22.6	11
122	84		1.7	-	< 10	22	120	100	21000	-	-	-	0.02	3.9	87.0	8.3	n.d.	40	4	-	14.7	< 1
123	86	Vault	trace	-	10	80	6	55	600	-	20	36	-	0.3	17.0	0.3	9	30	4	-	trace	< 1
124	87		-	26	80	360	5	170	2100	-	80	84	-	0.9	21.0	1.2	7	20	8	2	-	< 1
125	88		-	23	70	470	3	89	1400	-	-	88	-	1.4	17.0	0.7	12	40	8	1	-	< 1
126	89		-	120	75	19	8	900	470	-	40	388	-	0.3	27.0	0.2	6	50	4	3	-	10
127	90		trace	-	< 10	7	110	310	3200	-	-	-	8.21	2.9	320	1.9	< 1	40	28	-	90.3	29
128	91		trace	-	< 10	5	14	84	320	-	-	210	-	0.3	24.0	0.2	5	30	< 2	-	trace	7
129	92		0.7	-	< 10	240	540	13000	4000	-	-	-	3.71	3.0	570	0.9	< 1	3000	12	-	434.3	7700
130	93		-	180	75	14	27	1660	1500	-	-	1880	-	0.5	56.0	0.7	6	60	4	16	-	66
131	94		-	34	100	750	43	7000	730	10	-	200	-	0.3	46.0	0.5	15	80	8	5	-	110
132	95		-	9	50	970	6	2090	360	10	-	140	-	0.3	18.0	< 0.1	6	50	4	2	-	35
133	96	Venus trace	-	6	20	60	6	63	190	10	-	40	-	0.2	15.0	< 0.1	5	20	4	1	-	< 1
134	97		-	2	10	400	3	75	16	-	60	28	-	0.5	12.0	< 0.1	4	30	4	< 1	-	< 1
135	100 R-19-2	Montana Mtn.	-	5	9500	380	5	72	48	-	40	120	-	2.0	31.0	< 0.1	4	30	< 2	2	-	1
136	V-1	Venus 2600'	-	40	< 10	2530	22	700	500	-	40	6000	-	1.5	20.0	0.2	11	40	8	13	-	12
137	V-2		11.6	-	< 10	150	17	2220	86000	-	-	-	0.44	130	130	31.0	n.d.	110	4	-	90	54
138	V-3		trace	-	< 10	10	11	43	21000	-	-	-	1.61	16.9	100	5.4	n.d.	30	< 2	-	104	11
139	V-4		34.9	-	< 10	27	46	6600	120000	-	-	-	0.73	190	160	4.0	n.d.	180	< 2	-	134	120
140	V-5		-	35	< 10	1990	44	810	640	-	40	1040	-	1.1	13.0	0.2	15	20	< 2	8	-	9
141	V-6		-	130	< 10	690	15	58	660	-	-	96	-	1.8	20.0	0.2	8	30	< 2	3	-	< 1
142	V-7	Venus 2700'	-	70	30	660	11	2610	1100	-	-	1640	-	2.4	12.0	0.3	14	180	4	15	-	130
143	V-8		3.4	-	< 10	8	6	170	106000	-	-	-	1.36	20.0	200	4.0	n.d.	30	< 2	-	83.5	24
144	V-9		trace	-	< 10	13	8	110	4100	-	-	-	0.34	3.3	32.0	1.2	25	30	< 2	-	20.5	7
145	V-10		5.1	-	< 10	13	21	180	119000	-	-	-	0.77	12.0	220	4.0	n.d.	40	< 2	-	81.7	8
146	V-11		-	50	10	2530	19	2200	1500	-	80	290	-	1.8	13.0	< 0.1	5	50	< 2	5	-	130
147	V-12	Venus 2850'	-	73	10	1450	37	400	1400	-	60	480	-	1.2	18.0	< 0.1	10	130	4	7	-	10
148	V-13		73.5	-	< 10	22	130	180	147000	-	-	-	0.13	12.0	400	63.0	11	90	< 2	-	87.6	< 1
149	V-14		7.9	-	< 10	5	43	950	42000	-	-	-	0.13	14.2	64.0	7.2	n.d.	40	< 2	-	16.4	31
150	V-15		9.6	-	< 10	5	96	200	171000	-	-	-	0.10	30.0	510	12.0	n.d.	60	4	-	26	< 1
151	V-16		-	92	20	2500	52	230	2300	10	80	76	-	1.3	19.0	1.7	7	10	< 2	2	-	< 1
152	V-17	Venus-MD 2800'	-	350	25	120	9	76	4900	-	40	440	-	3.0	39.0	n.d.	4	20	< 2	7	-	< 1
153	V-18		3.1	-	< 10	27	30	60	65000	-	-	-	0.24	22.3	200	< 0.1	n.d.	80	< 2	-	32.2	< 1
154	V-19		trace	-	< 10	11	5	9	2800	-	-	-	0.02	1.2	28.0	0.7	5	20	< 2	-	trace	< 1
155	V-20		-	140	15	1300	12	90	7200	-	-	360	-	3.7	27.0	1.8	n.d.	20	4	4	-	< 1

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115 I/7 Pb-1
116 B/8 Au-
105 H/1 Cu-1

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A NOTE ON ROCK GEOCHEMISTRY OF THE CLEAR LAKE MASSIVE SULPHIDE

by

J. A. Morin

Introduction

In 1978, a drillhole discovery of a barite associated massive sulphide was made on the SUE claims by Conwest Exploration in central Yukon. The discovery followed 13 years of regional and property work toward the search for a shale hosted massive sulphide body. This report presents geochemical data from some drill core of the massive sulphide. Further information is available in a thesis presently being completed at the University of Waterloo (McColl, 1981).

The SUE claims form a large block between the Pelly and MacMillan Rivers, 96 km south of Mayo and 238 km north of Whitehorse. Access is by aircraft to a 900 m long airstrip next to the deposit (Figure 1). A 1966 winter tote road from Pelly Crossing to Detour Lakes was extended in 1975 to the north central part of the claim group.

Regional Geology

Rocks on the property are cut by the Tintina Fault which separate them into a northern block and a southern block (Figure 2). The northern block consists of volcanic and minor sedimentary rocks of the Anvil Range Group, whereas the southern block consists of clastic and carbonate sedimentary rocks, possibly of the Askin Group (Campbell 1967). The deposit occurs in the southern block within black shale and siltstone, chert pebble conglomerate, lapilli tuff, chert and limestone - an assemblage similar to the lower portion of the Earn Group (Campbell, 1967, p. 49-54). Supracrustal rocks are intruded by Cretaceous granitic rocks which flank the SUE property to the southeast (Glenlyon Batholith), west (Tummel Basin Batholith) and southwest (Tatchun Hills Batholith). Extensive overburden covers the property.

Deposit Geology

Lithologic information is solely from diamond drill core. Tuff and black shale overlie and are intercalated with the massive sulphide unit and chert underlies the sulphides. Drill hole 79-19 (Figure 3) shows the sequence of units above and below mineralization. Bedded barite was intersected in drilling (DDH 79-26), but the relation of the barite and massive sulphides is unknown. The structure is not determined, but the rocks trend north-east and dip moderately east (Figure 2).

Rock Geochemistry

Samples are from the drill hole that gives the most representative section through the deposit, DDH 79-19 (Figure 3), and from other holes which encountered different rock units. Nine rock samples from drill core were analyzed for the standard major and minor oxides, $BaSO_4$ and selected trace elements - gold, vanadium, manganese, cobalt, nickel, copper, zinc, arsenic, strontium, molybdenum, silver, barium, mercury, lead, chromium, zirconium, tin, antimony, tungsten and yttrium, the latter six elements being below detection limits. Four samples of tuff, one of shale, two of chert, one of barite and one of a felsic dyke were analyzed (Table I). Two samples of massive sulphide were analyzed for copper, lead, zinc, silver and the trace elements.

Basal chert (#8,9) and capping tuff (#3) from DDH 79-19 contain high levels of mercury, lead and arsenic. The chert is also high in SiO_2, FeO and Mo and the tuff in TiO_2, P_2O_5, Zn and Ba. The black shale (#12) above the tuff is geochemically normal.

Tuff forms a laterally persistent unit and three samples (#14, 15, 16) from DDH 79-15 are high in Ti, P and Ba. Chemically analyzed $BaSO_4$ in the tuff ranges from 1.43% to 2.31%. Silica-poor tuff (#15,16) is high in Ca and Mn and silica-rich tuff (#3, 14) relatively high in Pb.

A sample of interlayered barite and pyrite from DDH 79-26 gives relatively high values in Sr and Hg and the dyke rock is a potassic andesite. The two rocks poorest in Ba are from below the massive sulphides (#8,9) and rocks above the sulphides are relatively rich in Ba and probably indicate nearby barite deposition. The massive sulphides are richer than the host rocks in yttrium, antimony, gold and arsenic. Mercury in the massive sulphides is high - 35,000 and 19,000 ppb, and is not directly relatable to sphalerite content.

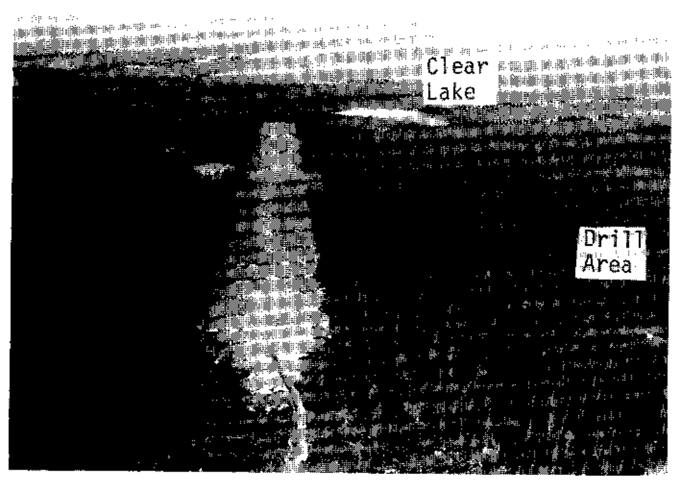

Figure 1
View north of the Clear Lake Property. Drilling activity was concentrated east of the airstrip and south of Clear Lake. Note the lack of outcrop on the property.

Discussion

Clear Lake is a proximal exhalative massive pyritic sulphide deposit between a basal chert and tuff and black pyritic shale cap. The massive sulphide about 100 meters thick is relatively undiluted by sediments and probably indicates rapid deposition close to an exhalative vent. The earliest exhalite deposited was chert with minor pyrite. Sedimentary breccia with clasts of massive sulphides, chert and argillite in a massive suphide matrix indicates an environment where the surface of deposition was marked by slopes and

CHEMICAL ANALYSES OF ROCKS FROM THE CLEAR LAKE MASSIVE SULPHIDE DEPOSIT

	1	3	8	9	12	14	15	16	18	6*	7*
Si02	4.83	49.1	86.1	77.5	76.7	59.3	26.8	25.1	58.3	n.d	n.d
Al03	2.02	20.2	1.53	2.07	12.1	19.3	12.7	9.94	14.4	n.d	n.d
Ca0	0.23	1.05	0.58	2.56	0.44	1.45	15.0	24.7	5.35	n.d	n.d
Mg0	0.00	0.16	0.08	0.00	0.38	0.33	1.21	1.07	2.46	n.d	n.d
Na20	0.28	0.08	0.00	0.00	0.00	0.07	0.00	0.00	0.06	n.d	n.d
K20	0.04	4.12	0.32	0.46	2.75	3.67	2.08	1.77	3.17	n.d	n.d
Fe0	0.94	5.11	4.11	6.76	1.09	1.42	11.7	3.37	3.18	n.d	n.d
Mn0	0.06	0.12	0.12	0.17	0.10	0.13	0.61	0.38	0.17	n.d	n.d
Ti02	0.08	4.00	0.10	0.21	0.58	3.62	2.34	1.78	0.58	n.d	n.d
P205	0.01	0.67	0.01	0.03	0.18	0.54	0.63	0.58	0.14	n.d	n.d
L.O.I.	4.00	7.54	3.54	5.62	3.92	4.69	19.77	19.15	9.00	n.d	n.d
SUM	12.6	92.8	96.9	96.1	98.4	94.7	94.2	88.3	97.1		
Au ppb	2	5	1	4	1	3	2	1	3	50	14
V ppm	n.d	470	65	70	500	440	270	200	100	n.d	n.d
Mn ppm	8	25	110	440	26	210	3900	2100	480	100	130
Co ppm	1	44	2	2	1	46	24	20	8	5	1
Ni ppm	6	74	27	22	18	43	31	44	9	71	8
Cu ppm	8	67	75	86	40	97	54	57	29	TR	nil
Zn ppm	17	12,300	72	290	120	110	27	19	49	23%	0.11%
As ppm	4	49	41	45	9	31	17	7	21	200	110
Sr ppm	400	170	30	30	60	180	190	270	190	10	10
Mo ppm	2	2	25	42	2	2	2	2	2	190	24
Ag ppm	1	2	2	2	1	1	1	1	1	86.9 g/t	9.6 g/t
Ba ppm	5000	5000	1700	700	2050	5000	5000	5000	2800	300	1200
Hg ppm	240	760	670	2400	40	40	40	20	30	35000	19000
Pb ppm	2	260	160	150	3	56	12	10	14	3.45%	0.06%
BaS04 %	76.5	1.43	n.d	n.d	n.d	2.31	1.50	1.90	n.d	n.d	n.d

<u>* NOTE:</u> Samples 6 and 7 were also analyzed for the following (all in ppm):
#6: Y-20, W-3, Sb-130, Sn-15, Zr-50, Cr-40
#7: Y- 10, W-5, Sb-23, Sn- 3, Zr-20, Cr-180

<u>SAMPLES</u>

#1 - Interlayered fine grained barite and pyrite, DDH 79-26 @ 343.8 m
#12- Black argillite, DDH 79-19 @ 85.3 m
#3 - Fissile greenish-grey tuff and pyrite lenses, DDH 79-19 @ 121.6 m
#14- Lapilli tuff, DDH 79-15 @ 94.2 m
#15- Lapilli tuff with grey argillaceous clasts in a carbonate-rich matrix, DDH 79-15, @ 90.2 m
#16- Lapilli tuff with black fine grained shard-shaped clasts in a carbonate-rich matrix, DDH 7915 @ 110.0 m
#6 - Massive sphalerite, pyrite and galena, DDH 79-19 @ 214.0 m
#7 - Breccia with pyrite clasts in graphitic argillite matrix, DDH 79-19 @ 230.1 m
#9 - Grey chert breccia with clasts of massive pyrite and black chert, DDH 79-19 @ 232.8 m
#8 - Grey vuggy stylolitic chert and pyrite layers, DDH 79-19 @ 237.9 m
#18- Pale grey fine grained intermediate dyke, DDH 79-17 @ 51.5 m

Analysts - X - Ray Assay Laboratories, Toronto slumped material could be transported and deposited into the massive sulphide exhalite. The end of exhalative activity may be marked by barite which forms an upper and flanking facies to the massive sulphides. Chemistry of the exhalites changes from the base upwards along a general trend outlined in Figure 4.

This trend shows that Hg, Pb and As are high in the waxing and waning stages of the main sulphide event. Barite appears to be late in the exhalative activity.

The high Ti and P and high K_2O/Na_2O ratio of the tuffs infer a volcanic parentage with alkaline chemistry. Alkaline basalts from the Red Sea yield values up to 3.05% TiO_2 and 0.68% P_2O_5 (Manson 1967). Geological and geochemical characteristics of the Clear Lake massive sulphide deposit are consistent with its formation in a rifting environment.

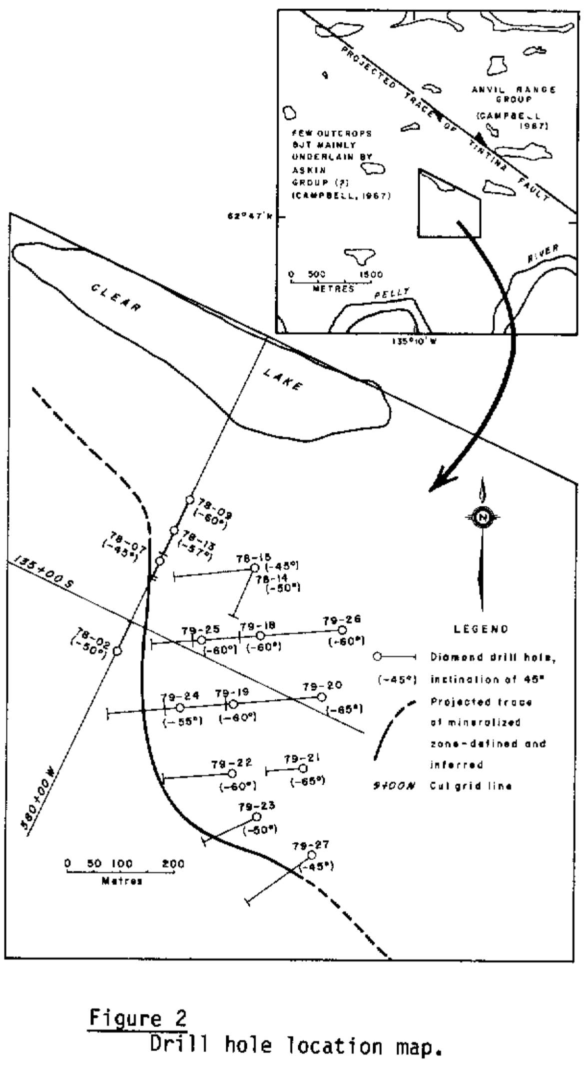

Figure 2
Drill hole location map.

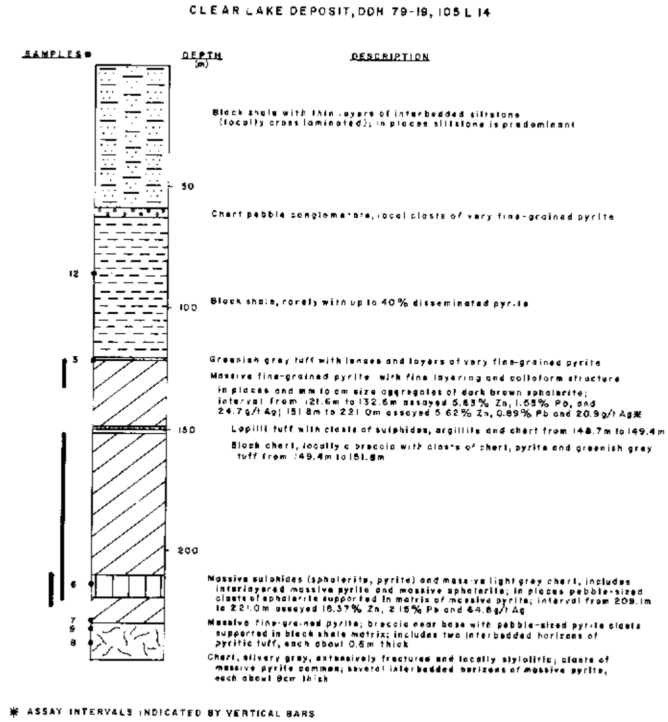

Figure 3
Drill hole section, DDH 79-19.

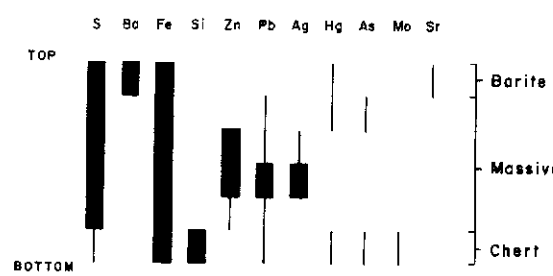

Figure 4
Compositional variation in the Clear Lake deposit.

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MODEL OF MINERALIZATION RELATED TO CAULDRON FACIES SYENITE IN THE PELLY MOUNTAINS

J.A.Morin

Introduction

The Mississippian volcanic rocks and associated mineralization in the Pelly Mountains were studied by J. Morin during 1979 and 1980. Alkaline and calc-alkaline Mississippian volcanic rocks lie above Paleozoic platform strata of carbonate, volcanic and minor fine-grained clastic rocks (Morin, 1977; Tempelman-Kluit, 1977 b).

The volcanic belt can be divided into four facies designated by lithology:

1) Cauldron facies - represented by hypabyssal syenite intrusions.

2) Proximal facies - coarse volcaniclastics.

3) Distal facies - fine-grained volcaniclastics, lava flows and ash flows.

4) Sedimentary-volcanic facies - abundant chert and argillite intercalated with fine-grained volcaniclastics.

A model is proposed here that relates cauldron facies geology to the associated mineralization.

Cauldron Facies Geology

The cauldron facies is represented by near surface intrusions of syenite in a linear cluster at the western border of the volcanic belt. Five syenite bodies, circular to oval in plan, lie between Seagull Creek and McConnell River, where they intrude volcanic and sedimentary rocks ranging from Lower Silurian to Mississippian (Figure 1). The bodies range from 1.5 km diameter to oval-shaped 12.5 by 3 km, account for 60% of the cauldron area and may be interconnected at depth. They exhibit marked variation in structure, texture and composition from core to border.

	Core Zone	Border Zone
Structure	massive	highly fractured, local flow layering, breccia pipes
Texture	medium to coarse-grained equigranular	fine-grained to aphanitic.
Composition	'normal' syenite	rich in potassium, siderite, quartz, pyrite.

Skarn is developed where the syenite intrudes carbonate sedimentary rocks, eg. GUANO showing. Minor mafic dykes occur within the syenite and roof pendants of country rock are common within the syenite. Where only the apex of a syenite is exposed, it is surrounded by syenite autobreccia. Beyond the border of the syenite, the country rock hosts syenite dykes concentrically arranged about the intrusive. The dykes are fine-grained to aphanitic with chilled margins and range from less than a metre to 30 m thick. They are commonly replaced by siderite and are locally vesicular, indicating intrusion at shallow depth.

Syenite occurs elsewhere in the belt as circular isolated plugs ranging from 1 km to 2 km in diameter. The plugs are generally fine-grained to aphanitic and similar to the border zones of large syenite bodies in the cauldron facies. Pervasive quartz vein stockwork is developed in one plug at the headwaters of Cloutier Creek (Figure 1).

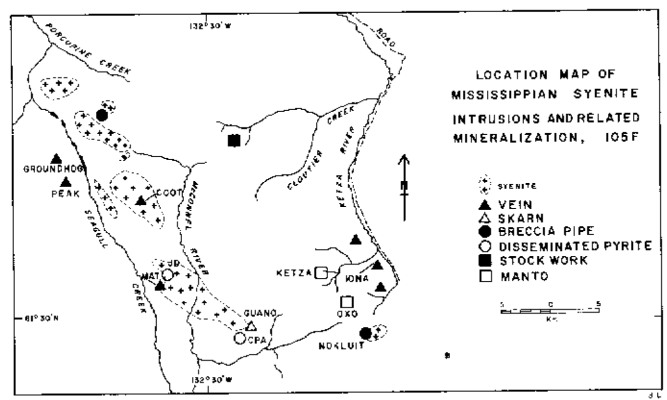

Figure 1

Location map of Mississippian syenite intrusions and related mineralization.

Syenite Mineralization Model

Veins, skarns, breccia pipes, disseminated pyrite gossans, stockwork and replacement mantos can be related to the syenite in a conceptual model (Figure 2).

Upon intrusion , a shell of aphanitic to fine-grained trachyte with variable thickness is formed (Figure 3). The shell is locally massive or flow-layered but is more commonly fractured and

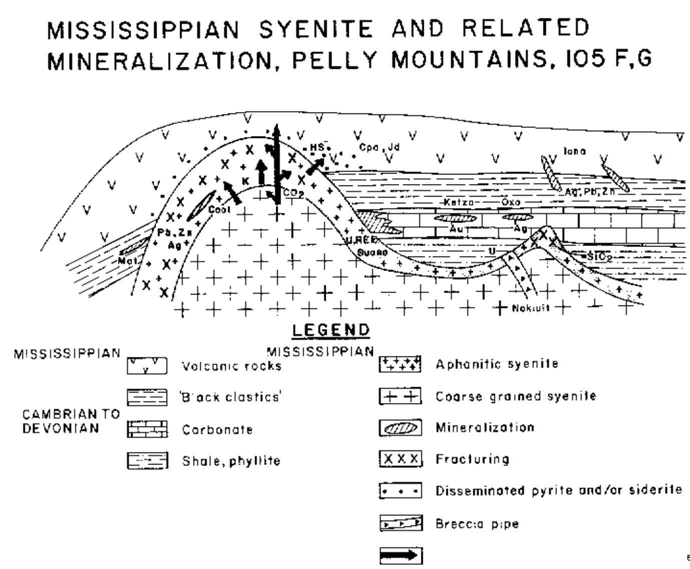

Figure 2

Schematic diagram of the relationship between syenite and mineralization.

sheared. Creamy grey to pink and white in colour, it has been subjected to potassium metasomatism and contains up to 14% K_2O. Locally, coarse-grained syenite next to the trachyte shell is also K-metasomatized.

Sulphur metasomatism took place in the trachyte shell and more commonly in the adjacent country rock. At these sites, the presence of disseminated pyrite is responsible for large prominent barren gossans (Figure 4). Sulphur was also localized where breccia pipes formed with a phlogopite-pyrrhotite matrix.

Carbon dioxide was driven into the following: 1) coarse-grained syenite adjacent to the trachyte shell and ferromagnesian minerals were replaced by siderite; 2) the trachyte shell where siderite fills fractures, shear zones and amygdules, and occurs as disseminations (Figure 5); 3) country rocks as disseminated siderite and; 4) channels in the trachyte shell forming breccia pipes with a siderite matrix and anomalous uranium and rare earth elements. Carbonate in contact with syenite is altered to skarn and marble locally rich in uranium and rare earth elements.

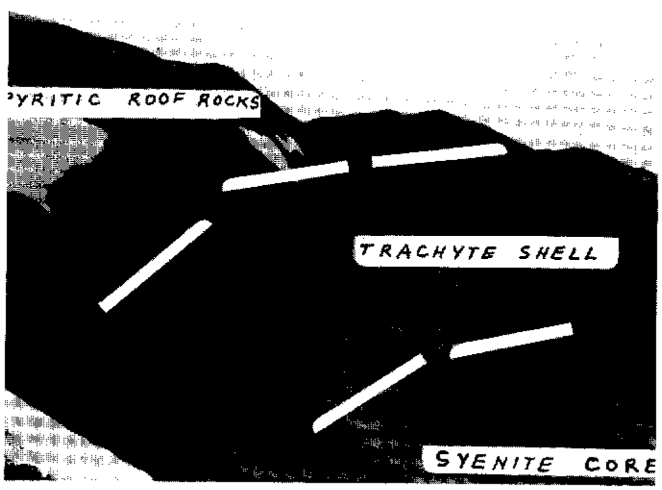

Figure 3

Contact between Porcupine Creek syenite stock and overlying roof rocks of pyritic tuff and tuff breccia. Light coloured area is K-metasomatized shell of aphanitic trachyte and coarse-grained syenite overlying unaltered coarse-grained syenite.

Silica is distributed within the trachyte shell as fracture fillings, but where volatile pressures built up, as in an apical portion of a plug, quartz vein stockworks are developed (Figure 6).

Lead, zinc and silver are associated with quartz and siderite in pods and veins in the trachyte shell and in country rocks. Where base and precious metal solutions moved through carbonate, sulphide mantos formed.

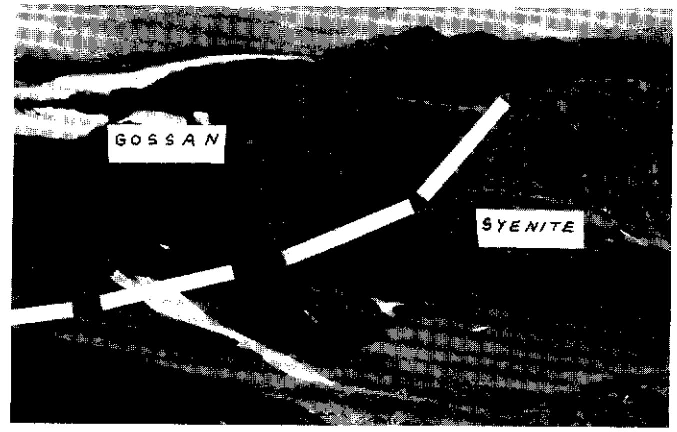

Figure 4

Western contact of the McConnell River syenite stock with felsic volcanic rocks, JD claims. A prominent gossan is developed over the volcanic rocks by oxidation of stock's pyritic halo.

Figure 5

Layering of siderite and K-metasomatized trachyte due to gas streaming of carbon dioxide in trachyte shell, SW contact zone of Porcupine Creek syenite stock.

Figure 6

Quartz vein stockwork in the trachyte shell of Porcupine Creek syenite stock.

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VOLCANOGENIC IRON AND BASE METAL OCCURRENCES IN KLONDIKE SCHIST

by

J. A. Morin

The term "Klondike Schist" describes metamorphosed igneous and sedimentary rocks first described from the Klondike area (McConnell, 1905; Green, 1972; Metcalfe, 1981) and latterly from south central Yukon (Tempelman-Kluit, 1979). This paper describes the geology and chemistry of selected iron and base metal occurrences in Klondike Schist and proposes a model to assist further exploration for and evaluation of this type of mineralization. Four mineralized occurrences were examined in 1978, three on the northeast side of Tintina Fault in the Pelly Mountains - Fire Lake, North Lakes and Wolverine Lake (see index map 105 G) and one southwest of the Tintina Fault, the Boundary prospect west of Dawson.

Fire Lake 105 G (22)

Discovered in 1960, the prospect is 2 km northeast of Fire Lake and 132 km southeast of Ross River. The mineralized showings are on the relatively flat floor of a west facing cirque at an elevation of 1463 m. Structurally below the mineralized horizon is chlorite-quartz schist and amphibolite and above, biotite-quartz-feldspar phyllite and gneiss (Figure 1).

The mineralized unit trends west-northwest for 760 m, dips moderately north and ranges from 1.5 to 12 metres thick. The eastern part contains massive pyrite with minor quartz and chalcopyrite (Figures 2,3) and the west part consists of quartz-magnetite-chlorite chalcopyrite iron formation, both dynamically and thermally metamorphosed (Figure 4).

Two drill programs were conducted - 806 m in 35 holes during 1961 by Cassiar Asbestos Corporation and 590 m in 6 holes in 1966 by Atlas Exploration (Figure 5). Geochemistry, geophysics and geological mapping were conducted in both programs (Skinner, 1961, p. 42, 1962, p. 39-40; Findlay, 1967, p. 59-60). The 1966 geochemical soil sampling for Cu, Pb and Zn disclosed anomalies coincident with the outcrops of mineralization or downslope from them.

Ground magnetic and electromagnetic surveys overlap, with the magnetic anomaly approximately twice the area of the other anomaly. The anomaly distribution probably indicates that the oxide facies lies mainly on the north side of the iron formation lens (Figure 5). Geological mapping and prospecting were conducted by Amax in 1977 (Hitchins, 1977; Morin et al 1979, p. 85).

Cassiar concentrated on the sulphide-rich eastern end of the deposit, where they dug several trenches and drilled numerous holes. Skinner (1961) reported that a 1.5 m wide band of pyrite and chalcopyrite from this area assayed 3 and 4 percent copper.

Diamond drill hole 66-3, near the eastern end of the deposit, yielded the best intersection - 12.5 m between 16.2 and 28.7 m at 0.81% Cu, 0.2 gm/tonne Au and 5.1 g/t Ag. The mineralized rock was described by Sadlier-Brown (1966) as banded magnetite-bearing quartzite with up to 20% disseminated sulphides (pyrite, pyrrhotite, chalcopyrite). Samples from the magnetite and the sulphide-bearing iron formation were analyzed (Table 1). Gold is associated with the sulphide iron formation where an average of three samples gave 766 ppb; the average of four samples of magnetite iron formation gave 28 ppb Au. Silver also is higher in the sulphide iron formation, and copper is high in both facies.

Figure 1
Fire Lake - Westward looking panorama showing the mineralized area.

North Lakes PACK 105 G (21)

The North Lakes property is 15 km north of the Fire Lake showings and 3 km southwest of the North Lakes. It was investigated through two drill holes in August of that year by Conwest (Skinner, 1962).

The mineralization is exposed in the cliff face of a northwest facing cirque at an elevation of 1753 metres (Figure 6). It lies above chlorite schist and below quartz-muscovite-biotite gneiss and biotite-quartz-feldspar-calcite schist. Black biotite quartzite and interbeddedd white quartzite (metachert?) encloses the massive sulphide lenses. The massive sulphides include pyrrhotite and pyrite, locally they are largely chalcopyrite-sphalerite and sphalerite-galena. The main showing is about 30 m long and between 0.3 and 2.5 m thick. Specimens of massive sulphide in talus include breccia of quartzite and pyrite clasts in a pyrrhotite and pyrite matrix (Figure 7). This indicates brecciation of host rocks and remobilization of sulphides after the metamorphic fabric was imposed on the gneiss and quartzite. Locally, the massive sulphides form boudins in quartzite.

Copper, zinc, lead, silver and manganese are relatively abundant in the massive sulphides (Table 2), but gold content is low.

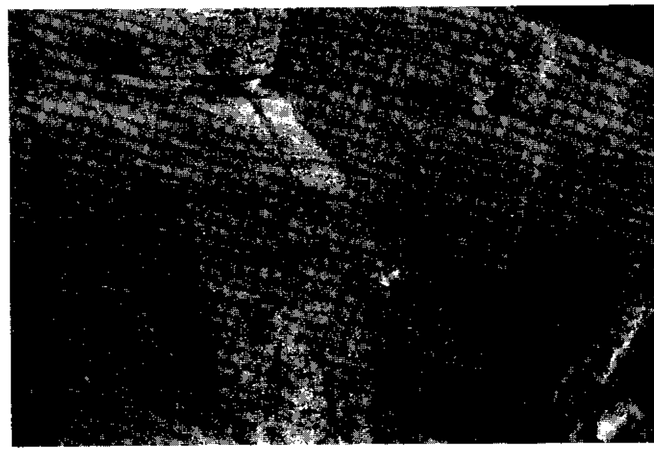


Figure 3
Fire Lake - Cataclastically deformed, highly foliated massive pyrite with flaser structure. Differential weathering results from varying quartz concentrations.

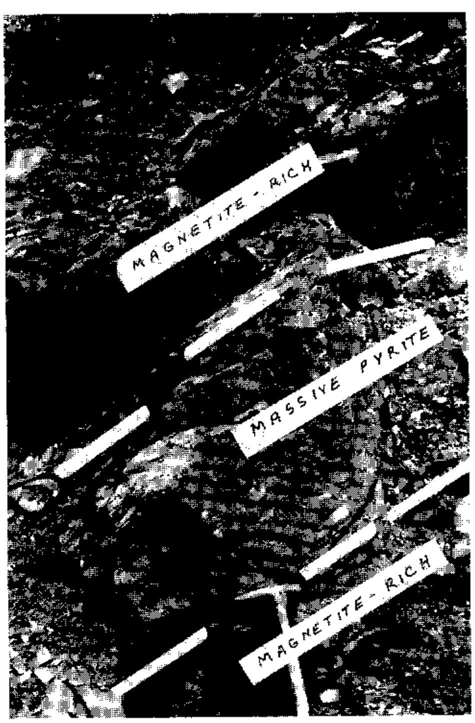


Figure 2
Fire Lake - Southernmost outcropping of iron formation. Foliated massive pyrite is conformable with magnetite-quartz-chlorite iron formation.

Figure 4
Fire Lake - Northernmost outcrop of magnetite-rich iron formation in contact with chlorite schist.

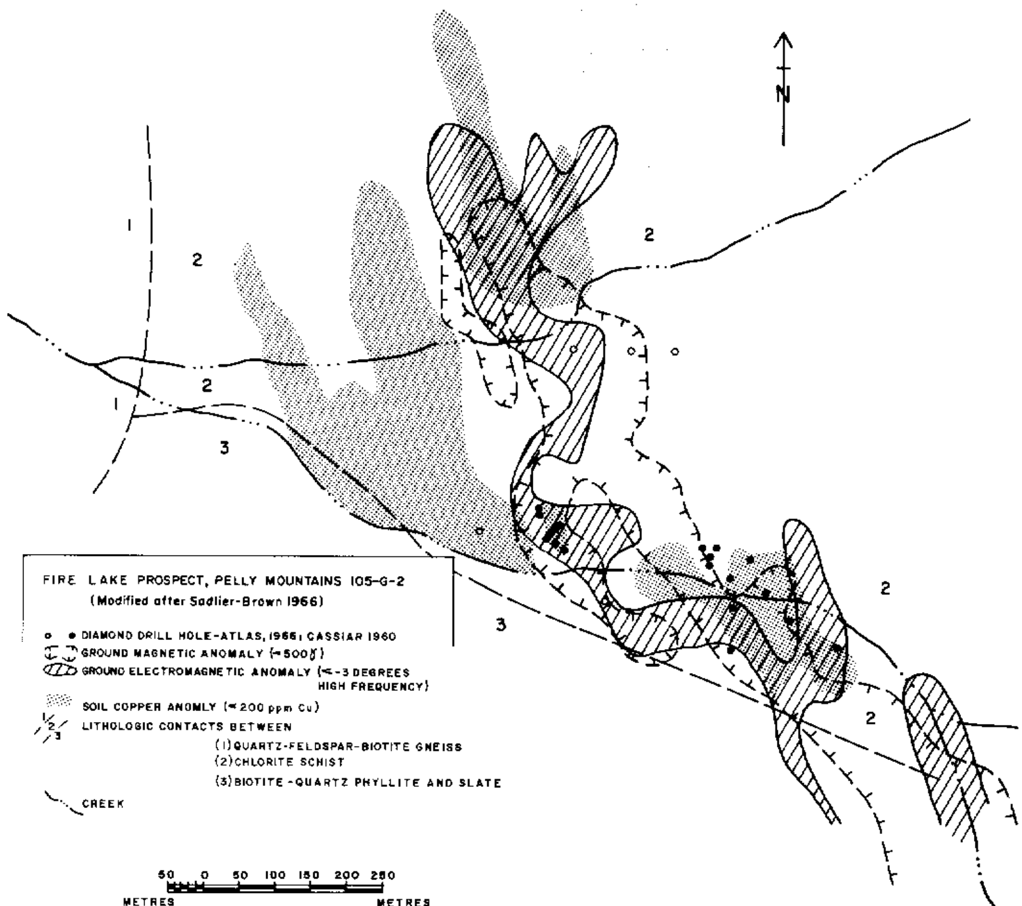


Figure 5
Compilation map of the Fire Lake prospect, including diamond drilling, magnetic, electromagnetic, geochemical surveys and geology.

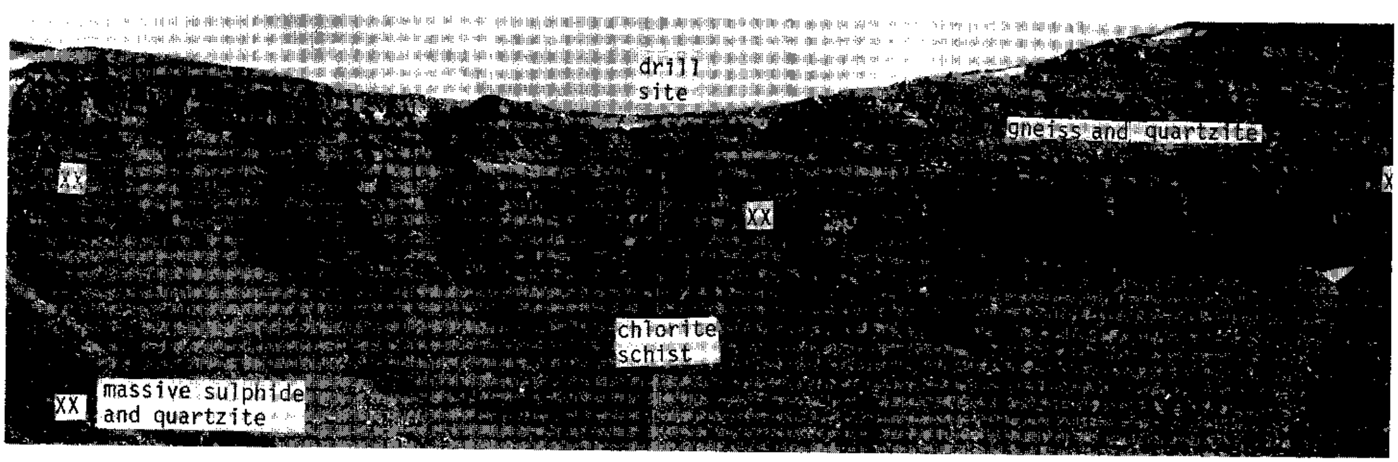


Figure 6
North Lake - Eastward looking view of cirque with showing. The prominent horizontal layering is cataclastic foliation of Nisutlin Allochthon.

Wolverine Lake (FETISH 105 G (44)

The Wolverine Lake property is 23 km east of the North Lakes showing and 135 km southeast of Ross River (Sinclair et al, 1975, p. 155). A total of 215 metres of diamond drilling in two holes was conducted in 1974.

The general sequence on the property is shown below and in Figure 8:

Top	Andesite
	Interbedded black slate and chert
	Pebble conglomerate
	Quartzite
	Magnetite iron formation
	Gossan
	Chlorite Schist
Base	Black siliceous slate

The gossan is in the chlorite schist and consists of limonite with minor malachite and milky white quartz veins. It continues for 240 metres below the quartz-magnetite iron formation and suggests a footwall stockwork zone. Drilling disclosed the mineralized unit to be talc-sericite-chlorite schist with thin bands of chalcopyrite and/or sphalerite along the foliation. Mineralized intersections were 19.8 m with 4.0 m of 0.2% Cu, 0.26% Zn, and 12.5 m with 4.7 m of 0.24% Cu and 0.22% Zn.

Boundary

The Boundary property is 1 km west of the Alaska-Yukon border near Boundary, Alaska and is underlain by a metamorphosed volcano-sedimentary sequence trending east and dipping gently to the south (Figure 9). It consists, from bottom to top, of a lower chlorite-feldspar-quartz schist overlain by quartz-muscovite-feldspar schist and is in turn overlain by intercalated sericite schist, quartzite, black slate and brown crystalline dolomite. A concordant limonite gossan is in the quartz-muscovite-feldspar schist near its contact with the lower chlorite-feldspar-quartz schist. A sample of the gossan rubble is reported to assay 0.52% Cu, 2.6% Pb, 0.043% Zn and 154 gm/tonne Ag (Private company report).

Chemical Analyses

Twenty-one rocks from the four deposits were analyzed for major and trace elements and five others for trace elements only (Table I and II). The samples were subdivided into siliceous metasedimentary rocks (8), magnetite-bearing iron formation (6), massive sulphides (6) and mafic metavolcanic rocks (6).

Major and Minor Elements

Siliceous metasedimentary rocks and magnetite iron formation were plotted on a ternary plot of FeO (total) vs SiO_2 vs $Al_2O_3 + K_2O + Na_2O$ (Figure 10). The iron-silica side reflects the chemical exhalative component and the alumina-alkali apex reflects the clastic components. The plots show that Fire Lake was originally cherty iron formation, Wolverine Lake - cherty iron formation and chert, North Lakes - cherty pelite, and Boundary - cherty pelite and chert. Cherty pelite formed from silica exhalations and detrital pelitic clastic material together or from rhyolite or rhyolitic tuff. Average rhyolite of geosynclines

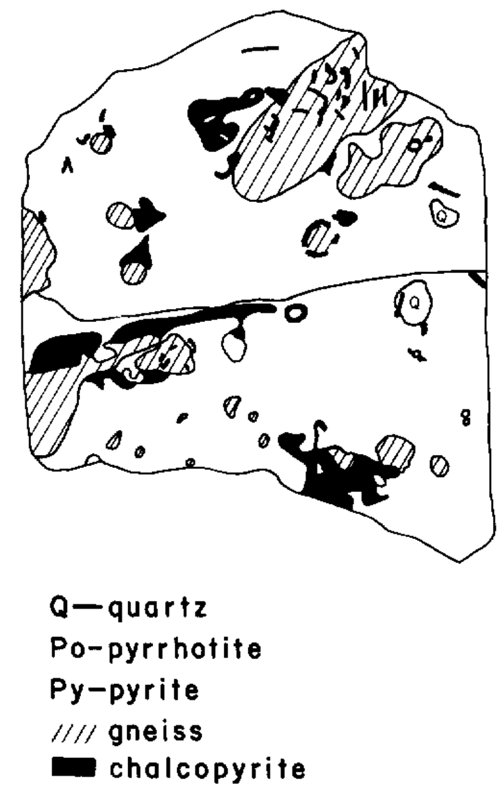
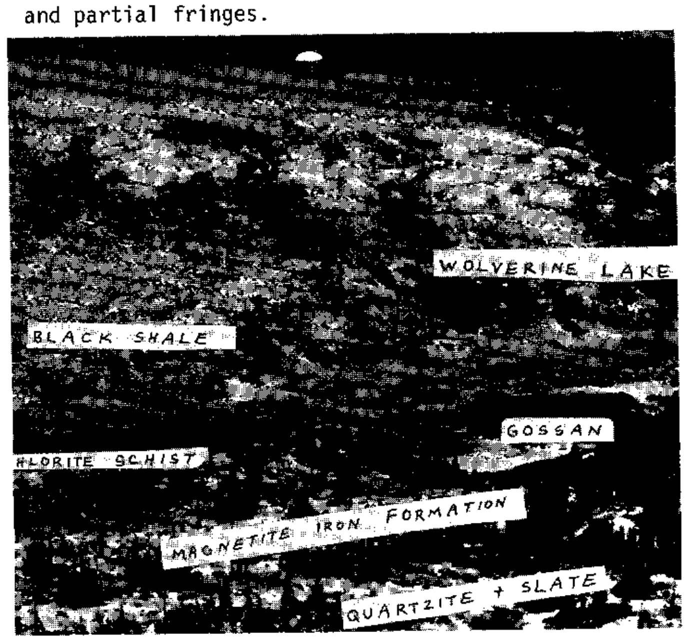


Figure 7

North Lakes - Tracing of a hand specimen of breccia crudely banded with an upper pyrrhotite matrix and a lower pyrite matrix. Clasts are of biotite quartz -feldspar gneiss and quartz (outlined in sketch) and pyrite (not shown in sketch). Chalcopyrite is associated with the lithic clasts as fracture fillings and partial fringes.



(Ronov and Yaroshevsky, 1969) plots in the same area on the ternary plots. Felsic volcanism may be related to mineralization at the North Lakes and Boundary prospects.

Mafic schists from each prospect were plotted on the ternary AFM diagram (Figure 10). Most samples plot near average oceanic tholeiitic basalt (Ronov and Yaroshevsky, 1969) and may be metabasalt and meta-andesite. A chlorite schist from the Wolverine Lake property (#12) was collected where quartz veinlets and copper mineralization are present only a few metres from overlying cherty magnetite-bearing iron formation. Low K_2O and negligible Na_2O values indicate it probably suffered hydrothermal alteration.

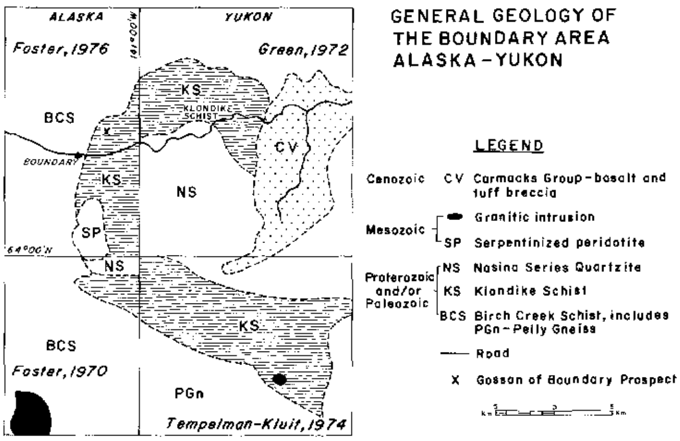


Figure 9
Generalized geological map of the Boundary area.

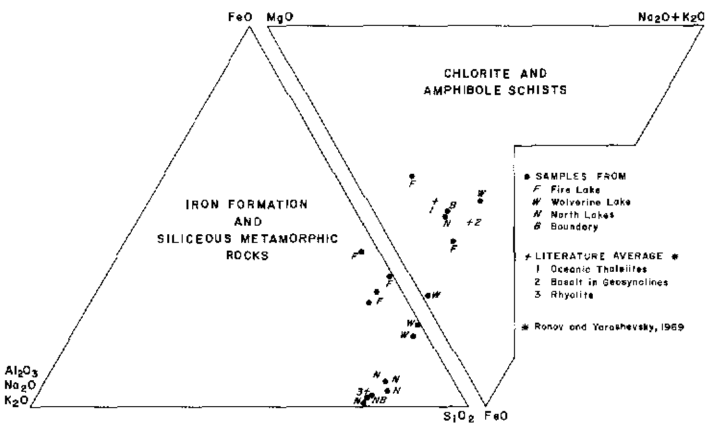


Figure 10
Chemical variation diagrams for rocks associated with base metal mineralization in Klondike Schist.

Trace Elements

Gold is high in the massive sulphides and low in the other rocks. It is most abundant in massive pyrite from Fire Lake (560 to 1060 ppb Au), but base metal-rich massive sulphides from North Lakes contain less, 13 to 340 ppb Au. Magnetite-bearing iron formation from Wolverine Lake contains less than 1 ppb Au (average of 2 samples) and from Fire Lake 18 ppb Au (average of 4 samples). Host rocks contain negligible amounts of gold - 8 siliceous metamorphic rocks averaging greater than 2 ppb and 6 mafic schists about 3 ppb.

Semiquantitative spectrographic analysis for trace elements reveal that the massive sulphides are characterized by two different metal associations, Fire Lake and North Lakes are rich in Cu, whereas Fire Lake is also high in Co, Au and North Lakes in Cd, Bi, Pb, Mn, Zn, Ag. Fire Lake may be like volcanogenic auriferous massive pyrite deposits in western Quebec (Latulippe, 1980) and North Lakes like Paleozoic base metal-rich volcanogenic deposits (Stanton, 1972). Magnetite iron formation at Fire Lake is high in Cu, Au, Ti and that at Wolverine Lake is barren.

Model of Mineralization

Showings of stratabound mineralization in Klondike Schist are metamorphosed and deformed to the same degree as the enclosing rocks. Chlorite or actinolite schist commonly forms the footwall with slate, phyllite and biotite-quartz-feldspar gneiss in the hangingwall. Quartzite and siliceous iron formation form a discrete horizon adjacent to or intercalated with the sulphide-rich unit and concentrations of copper are commonly accompanied by concentrations of base and precious metals.

The common features suggest similar origins. A volcanogenic exhalative model similar to the Besshi type in Japan is proposed (Kanehira and Tatsumi, 1970). It involves a basalt seafloor onto which hypogene hydrothermal fluids are introduced and on top of which sulphide- and/or siliceous-rich sediments are deposited from exhalations. Variations in the oxidation level and metal concentration immediately above the seafloor may have governed sulphide-oxide facies equilibria (Figure 11).

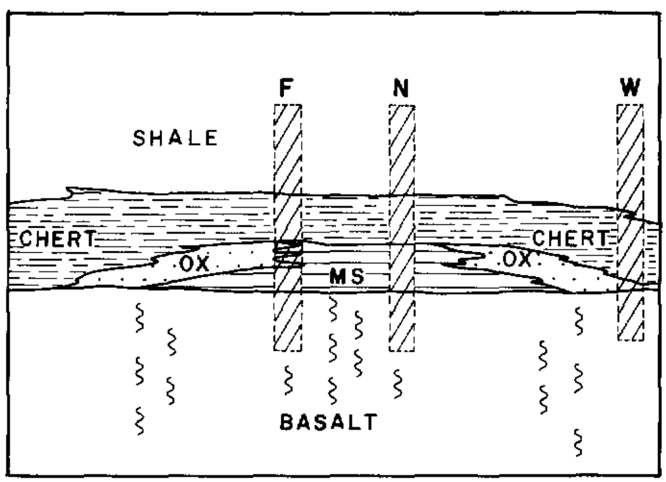


Figure 11
Sketch relating showings at Fire Lake (F), North Lakes (N) and Wolverine Lake (W) to vertical and lateral primary facies changes in a volcanogenic model.

The fabric of the ore and host rocks now reflect only the high temperature and the severe stress to which they have been subjected. Metamorphism has remobilized, reconcentrated and totally recrystallized the metal-bearing phases. Triple-point foam texture characterizes the strongly foliated massive pyrite from the Fire Lake deposit (Figure 12). At North Lakes,

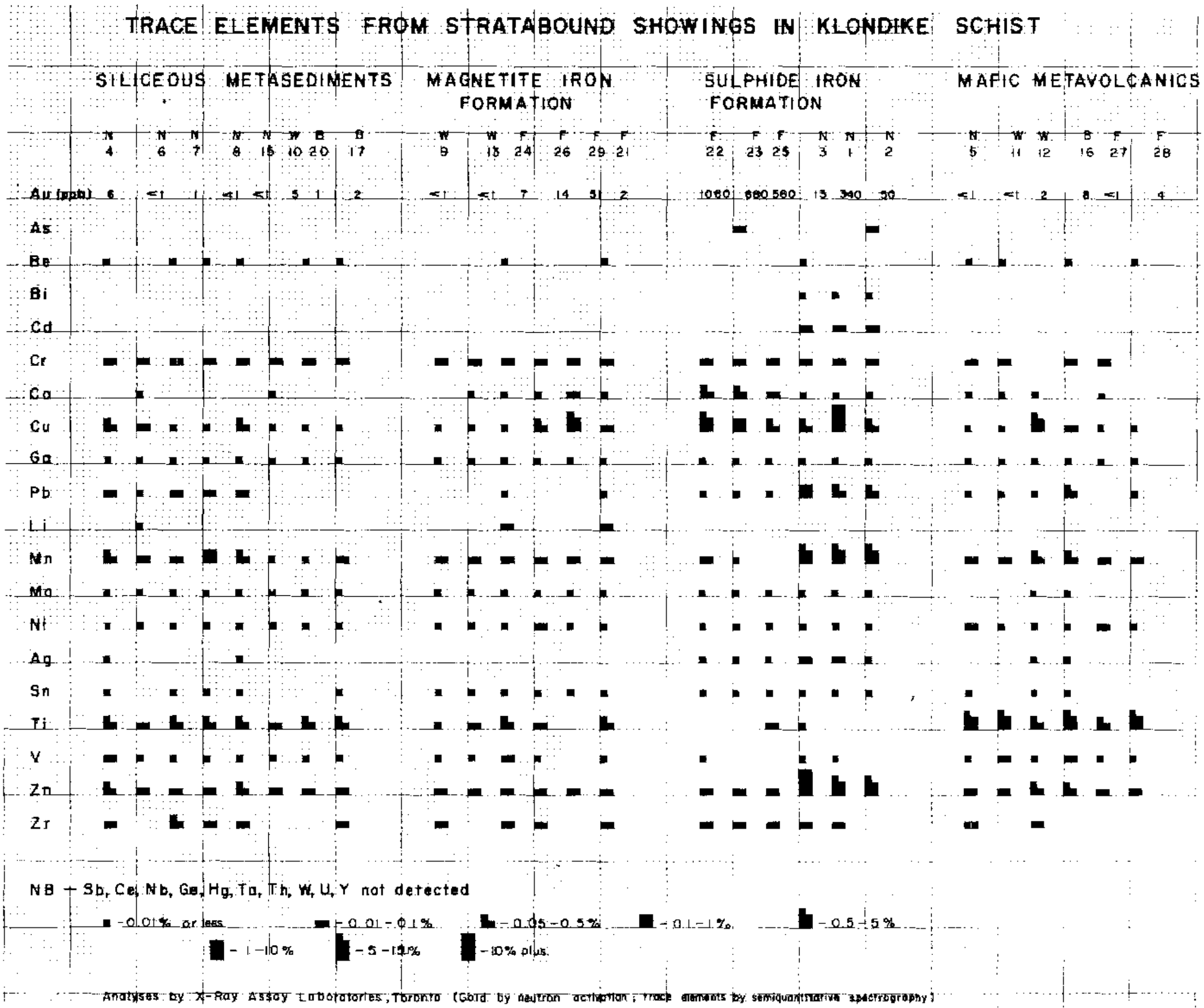
Table I

MAJOR AND MINOR ELEMENTS FROM STRATABOUND SHOWINGS IN KLONDIKE SCHIST

	SILICEOUS METASEDIMENTS								MAGNETITE IRON FORMATION						SULPHIDE IRON FORMATION	MAFIC METAVOLCANICS					
	N 4	N 6	N 7	N 8	N 15	W 10	B 20	B 17	W 9	W 13	F 24	F 26	F 29	F 21	N 3	N 5	W 11	W 12	B 16	F 27	F 28
SiO2	65.5	72.1	70.6	71.3	65.4	93.6	95.8	73.2	77.1	53.9	58.5	48.9	61.3	58.0	31.5	49.6	49.5	58.8	59.6	50.2	42.5
Al2O3	10.8	14.9	14.1	11.0	13.3	1.22	2.26	14.1	0.48	2.19	4.64	4.29	0.93	6.79	3.70	14.7	16.1	10.0	13.5	13.3	22.3
CaO	4.51	0.90	2.58	5.05	3.16	0.09	0.10	0.81	0.43	0.29	0.32	0.15	0.71	0.40	0.50	9.91	8.93	0.20	0.39	7.98	10.1
MgO	1.76	0.15	1.52	1.40	2.04	0.07	0.17	0.82	0.07	0.00	1.37	2.63	0.38	1.96	0.25	7.04	5.44	6.24	6.58	11.3	5.54
Na2O	0.05	5.91	2.09	0.10	1.76	0.04	0.02	2.89	0.00	0.05	0.00	0.56	0.00	0.00	0.16	2.93	3.06	0.00	3.16	3.17	1.52
K2O	2.41	1.60	3.72	3.45	2.61	0.19	0.46	3.29	0.02	0.05	0.81	0.03	0.03	1.79	0.70	0.43	2.03	0.28	0.07	0.19	1.24
FeO	5.40	0.97	2.17	3.50	5.01	1.33	0.41	2.41	21.1	12.5	27.2	38.4	32.0	24.4	25.2	10.4	9.12	16.1	9.54	9.57	11.1
MnO	0.18	0.08	0.06	0.41	0.22	0.01	0.00	0.07	0.01	0.03	0.03	0.02	0.01	0.05	0.34	0.20	0.15	0.21	0.23	0.19	0.12
TiO2	0.58	0.10	0.37	0.35	0.38	0.07	0.11	0.22	0.03	0.13	0.27	0.08	0.03	0.40	0.1	1.48	1.87	0.31	1.11	0.29	1.43
P2O5	0.06	0.02	0.05	0.09	0.06	0.02	0.05	0.04	0.24	0.04	0.07	0.00	0.00	0.11	0.32	0.15	0.25	0.07	0.18	0.02	0.25
L.O.I.	5.56	1.16	1.90	3.27	3.25	0.97	0.67	2.19	0.05	0.65	1.07	1.18	0.61	1.43	11.1	1.25	2.99	5.36	4.46	2.45	2.25
TOTAL	97.4	98.4	99.4	100.3	97.8	97.7	100.1	100.3	101.9	71.3	97.3	100.5	99.5	98.0	73.8	99.3	100.4	99.4	100.3	99.6	99.7

Analyses by X-Ray Assay Laboratories, Toronto

Table II



remobilized chalcopyrite fills fractures and occurs in pressure shadows adjacent to larger grains. Pyrite from Wolverine Lake demonstrates minor oxidation (Figure 13) but no oxide pseudomorphs were observed after sulphides and the magnetite is not thought to have formed by oxidation of sulphides. Despite the metamorphism and cataclasis, the gross association of units may be primary - i.e. metal-rich oxide and sulphide exhalites, chert, basalt, pelite. Primary facies may be reflected in the distribution of the mineralized units and prospecting efforts should consider them as possibilities.

Figure 12
Photomicrograph of massive pyrite with triple point foam texture indicating complete recrystallization. Field of view 1.5mm x 1.0mm.

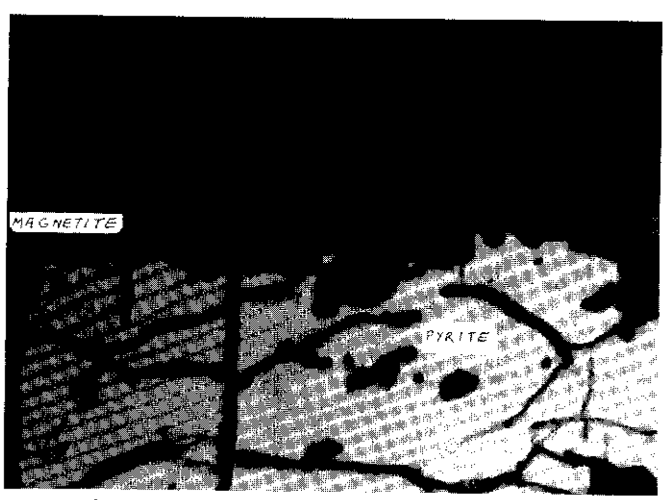


Figure 13
Photomicrograph of magnetite-quartz iron formation from Wolverine Lake, showing pyrite oxidized to magnetite along grain boundaries and fractures. Field of view approximately 0.7mm x 0.5mm.

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GEOLOGY AND MINERALIZATION OF THE HOPKINS LAKE AREA, 115 H 2, 3, 6, 7

by J. A. Morin

Introduction

The Hopkins Lake area was mapped and mineral showings were examined and sampled in June, 1980. Mapping was done on a 1:25,000 scale enlargement of a 1:61,000 aerial photo. Previous geological mapping in the area is by Cairnes (1927) and Tempelman-Kluit (1974).

Sampling was done to establish metal contents in mineral showings, in sites of earlier prospecting activity, e.g, trenches, pits, blast rubble, in unexplained limonitic gossans and unmineralized tactite.

Between 70 and 80 rocks were analyzed for Au, Cu, Zn, Mo, Ag, Sn, W, Pb and a few for Cd and frequency histograms were prepared for each metal (Table I).

Present Work

Two companies were active in the area during 1980. Union Carbide Exploration maintained a base camp on the land bridge at Hopkins Lake from which they conducted a helicopter reconnaissance for tungsten-bearing skarn mineralization. New Ridge Mines did percussion drilling on the Franklin Creek property east of Hopkins Lake.

General Geology

Hopkins Lake area is part of the Yukon Crystalline Terrane, an area of metamorphosed Paleozoic and older supracrustal rocks intruded by Mesozoic granitic rocks and overlain by volcanic rocks of Cenozoic age (Tempelman-Kluit, 1974).

Supracrustal Rocks

Supracrustal rocks are represented by quartz-mica gneiss, quartzite, marble and amphibolite. Greyish-brown weathering and grey on fresh surface, the gneiss has medium-to coarse-grained flakes of mica aligned along the gneissosity and 2 to 5 mm thick bands of quartz and minor feldspar are between these mica-rich layers. The rock commonly breaks along the foliation and fragments display a lustrous sheen. Interbedded with the gneiss is quartzite, a grey to pinkish-brown weathering rock with a grey to white fresh surface. It is fine-to medium-grained, massive and forms beds from several centimeters to three meters thick.

Marble occurs in beds 20 to 30 meters thick, though thinner beds are seen locally. The rock weathers to a greyish-white and is white on fresh surfaces. A vague foliation parallel to the gneissosity of the enclosing rocks is common. Thicker beds are continuous, but some thin beds are boudinaged and form a horizon of discontinous lenses (Figure 2). The marble is altered to calc-silicate skarn near intrusive rocks. Skarn minerals include tremolite, actinolite, epidote, diopside, magnetite, garnet, pyrite and chalcopyrite.

Amphibolite occurs within the sequence as beds 10 to 30 meters thick made up of coarse-grained dark green hornblende with minor feldspar and biotite. The weathered surface is black and fresh surface dark green. A prominent schistosity defined by aligned amphibole and biotite, grades to a gneissic fabric with increasing feldspar.

Intrusive Rocks

Intrusive rocks have been assigned to five groups:

- granodiorite northeast of Hopkins Lake
- granodiorite west of Giltana Lake
- feldspar-hornblende + (biotite) porphyry dykes
- quartz-feldspar-biotite porphyry dykes
- pegmatite and aplite dykes

Northeast of Hopkins Lake, brownish grey weathering, grey biotite-hornblende granodiorite forms an elongate northwest trending stock, part of the Aishihik Batholith (Figure 11). The granodiorite is massive, homogeneous, medium-grained equigranular and prominently jointed.

A K-Ar date on hornblende from the granodiorite gave 268 ± 19 Ma (W. D. Sinclair, Personal Communication, 1980).

Heterogeneous granodiorite generally like that east of Hopkins Lake also forms a northwest trending body west of Giltana Lake (Figure 1). Massive medium-to coarse-grained diorite and gabbro and strongly foliated granodiorite are present in the body. Relations between these intrusive rocks are obscure but mafic inclusions occur in the felsic bodies suggesting the mafic phases are older. A K-Ar date of hornblende from the Giltana Lake body gave 68.3 Ma (Tempelman-Kluit and Wanless, 1975). The relatively young age is probably due to argon release upon metmorphism accompanying the intrusion of the Nisling Range alaskite suite. Along the northern contact, the granodiorite is intrusive to quartz-mica gneiss and marble.

North trending porphyry dikes intrude the supracrustal rocks and granodiorite. The commonest is greenish-grey weathering grey felspar-hornblende ± biotite porphyry from one meter to several hundred meters wide. Phenocrysts from 1 to 4 mm across form from 10 to 60% of the rock. The porphyries are massive, prominently jointed and have chilled margins. Thick dikes have a medium-grained equigranular texture and dioritic composition in the centre. Where the dikes intrude marble, actinolite and biotite are developed in a zone 10 to 20 cm thick. Hornblende from a dike east of Hopkins Lake was dated by the K-Ar method at 89.9 ± 8.2 Ma (W. D. Sinclair, Personal Communication, 1980).

Quartz-feldspar-biotite porphyry, white pegmatite and aplite dikes also occur. The pegmatite occurs as pods and irregular dikes by the aplite forms planar dikes.

Structure

Quartz-mica gneiss, amphibolite and marble have pervasive gneissosity and schistosity that trends north-northwest. Crenulated foliation, hinge zones of minor folds and some metamorphic minerals such as hornblende form lineations that plunge northerly at shallow angles. Few minor folds were observed. In quartz-mica schist west of Hopkins Lake, overturned isoclinal minor folds occur with a shallow plunge to the north.

GEOLOGICAL MAP OF THE HOPKINS LAKE AREA

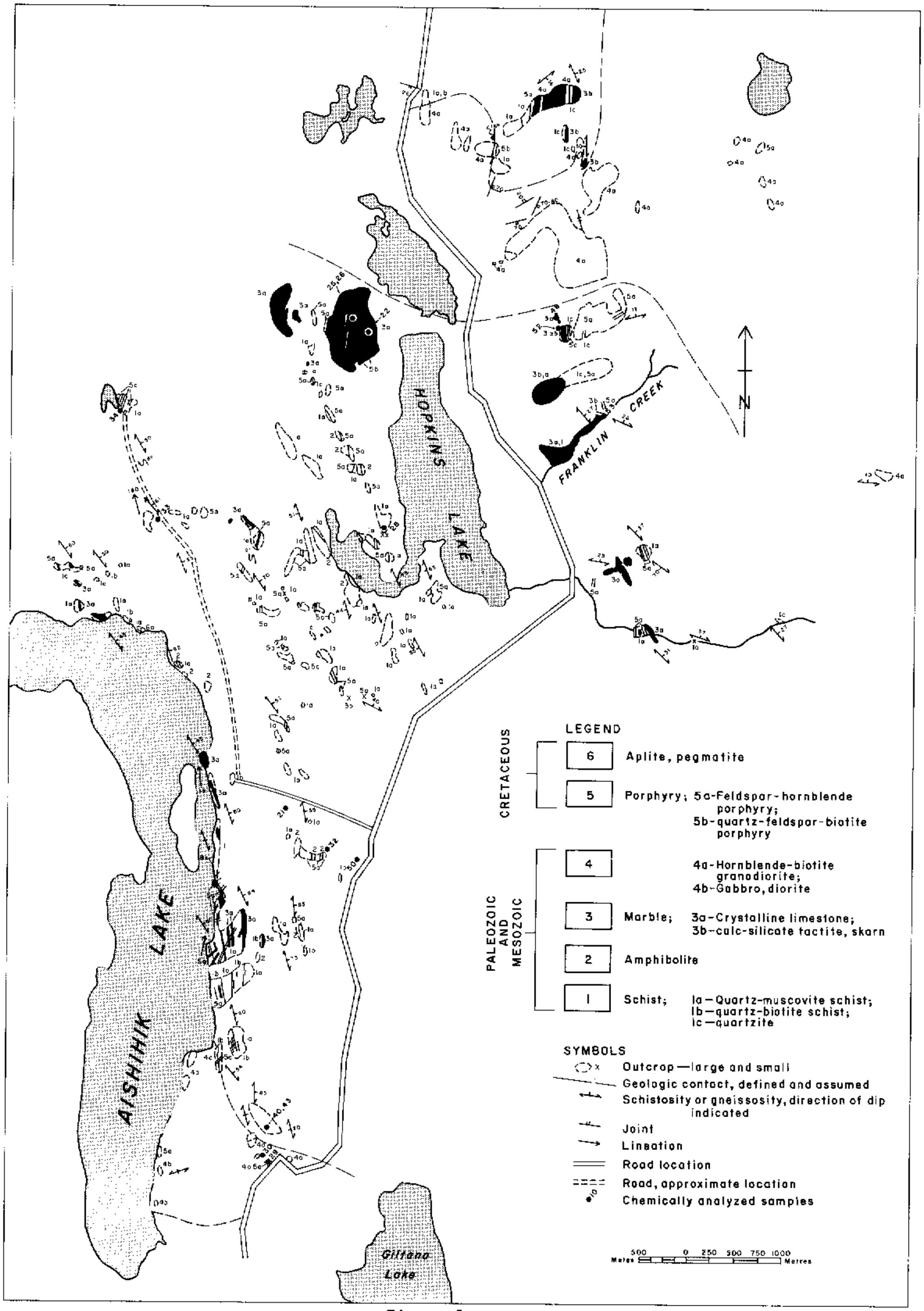

Figure 1

Geological map of Hopkins Lake area.
Base traced uncorrected from aerial photographs.

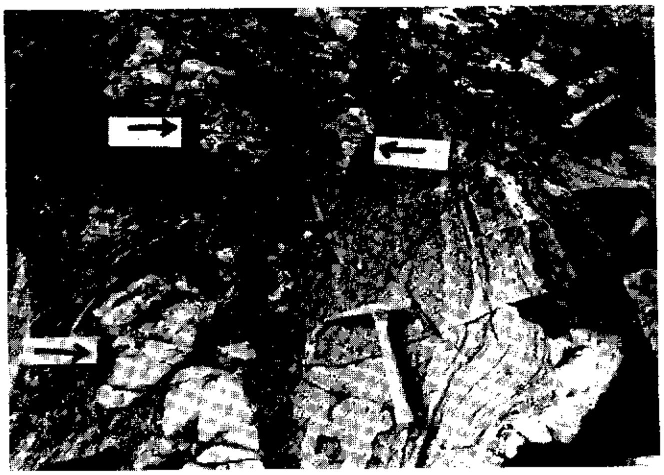

Figure 2
Boudins of marble (indicated by arrows) enclosed in quartz-mica schist, southeast shore of Aishihik Lake.

The pervasive foliation trends north-northwesterly and the rocks dip moderately to the east, suggesting that the supracrustal sequence is isoclinally folded on a regional scale.

The marble horizons may indicate repetition of beds, but hosted in a lithologically monotonous sequence as they are, no such repetition has been proven.

Economic Geology

Mineralization in the Hopkins Lake area is related to skarns near the contacts of granodiorite stocks and feldspar porphyry dikes. In addition minor pyrite and chalcopyrite occur disseminated in feldspar porphyry.

Franklin Creek (Hopkins Lake East) Showings — Copper 115 H (14)

The showings were first described by Cairnes (1927, p. 12). He named Hopkins and Giltana Lakes, but since his work, these names have been reversed.

Two showings, one on Franklin Creek, the other north of Franklin Creek are described. The first is exposed on the north side of the canyon of Franklin Creek (Figures 3, 4, 5). It is a 15 m thick rusty weathering mineralized dark green actinolite-diopside-rich horizon that dips gently east and is overlain by barren green calc-silicate and underlain by barren marble. Mineralization includes coarse-grained patchy chalcopyrite and pyrrhotite disseminated and along fractures. Magnetite-rich skarn forms the upper ten centimeters of the horizon.

The second showing 1 km north of that in Franklin Creek (Figure 6) is along the contact of a white marble and a pale green gneissic siliceous calc-silicate which dips 15° easterly. Mineralization includes magnetite calc-silicate with disseminated and banded chalcopyrite in pods 10 to 70 cm thick and up to several meters long. Both skarns are south of the granodiorite and are close to a porphyry dike with disseminated chalcopyrite and magnetite. From Franklin Creek towards the granodiorite, the marble is increasingly metamorphosed.

The showings were evaluated by Whitehorse Copper Mines in 1977 and 1978 through a ground magnetic survey and diamond drilling of 15 holes for a total of 1788 meters. The best intersection was DDH TH-2, 18.59 m at 1.94% Cu (Figure 7), (Morin et al. 1978, p. 69, 1980, p. 46).

In 1980, New Ridge Mines drilled 24 percussion holes for a total of 1631 meters and did ground magnetometer and EM 16 surveys. Drill sludge samples were analyzed in 3 m sections for Cu and occasionally for Au and Ag. The mineralized zone was extended to the northwest.

Sampling in the present study shows the cupriferous skarn rich in Ag and Au and anomalous in Zn and Sn.

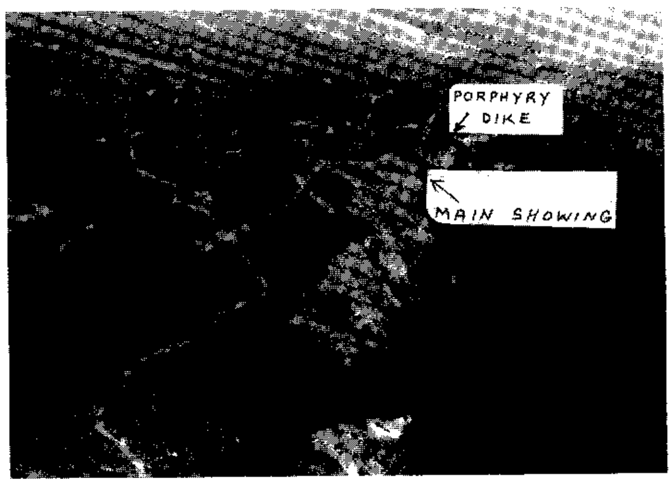

Figure 3
Aerial view of Franklin Creek looking east. Whitehorse Copper drill access road shown, along with creek showing and porphyry dated at 89.9 Ma.

Giltana Lake Showings — Copper, Molybdenum 115 H (11)

A northwest trending granodiorite underlies Giltana Lake (Figure 8). At its northern contact, it intrudes quartz-mica gneiss and marble. Skarn occurs intermittently along the contact from Giltana Lake to Aishihik Lake. Minor pyrite and rare molybdenite occur in the skarn which also has anomalous tungsten values. A short distance (250 m) south of the contact, rare patchy, coarse grained molybdenite and chalcopyrite are disseminated over several centimeters in massive granodiorite. The plagioclase is locally altered to a pale green colour and chlorite is developed along fracture surfaces. About 125 m east along the roadside, minor trenching has uncovered quartz-mica gneiss intruded by a feldspar-hornblende porphyry dike. White quartz veins several centimeters thick, carrying minor chalcopyrite and pyrite are localized along fractures in the granodiorite. These rocks are also anomalous in Ag, Pb, Zn and W.

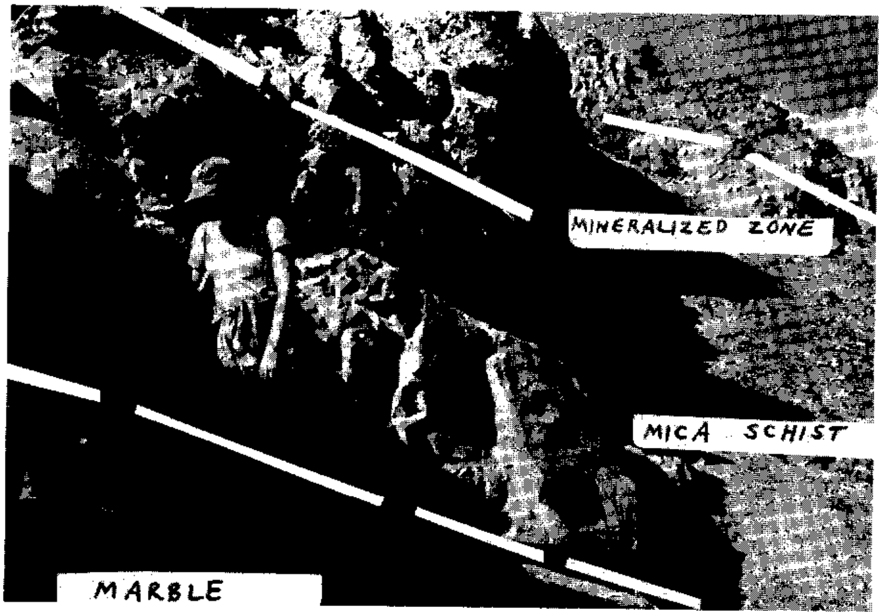

Figure 4
Main showing of copper mineralized calc-silicate interbedded with mica schist-marble sequence at Franklin Creek.

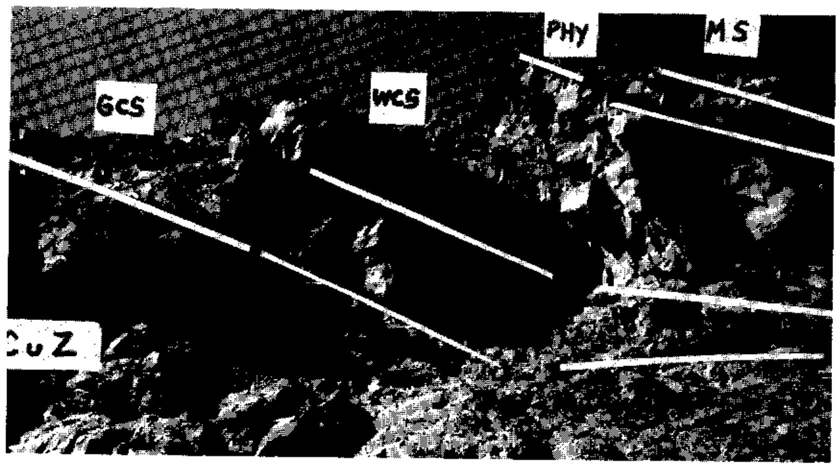

Figure 5
Upper portion of the copper-mineralized zone at Franklin Creek: MS-mica schist; PHY-phyllite, WCS-white calc-silicate; GCS-green diopside-actinolite calc-silicate; CuZ-copper mineralized zone.

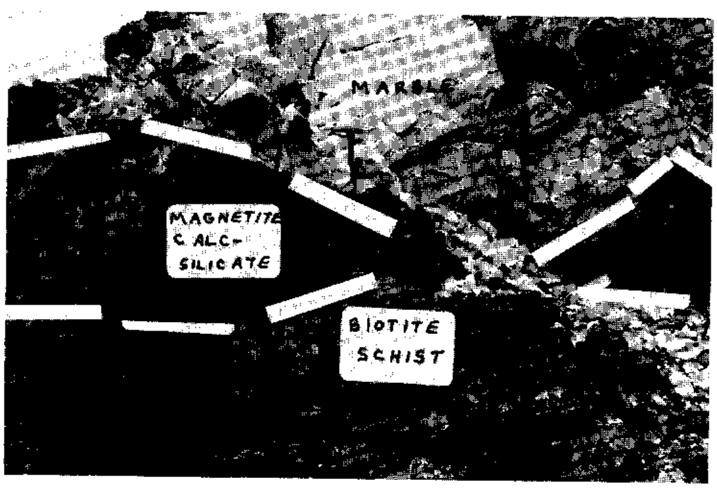

Figure 6
Showing north of Franklin Creek with stratabound boudins of magnetite-chalcopyrite-calcsilicate stained by azurite and malachite.

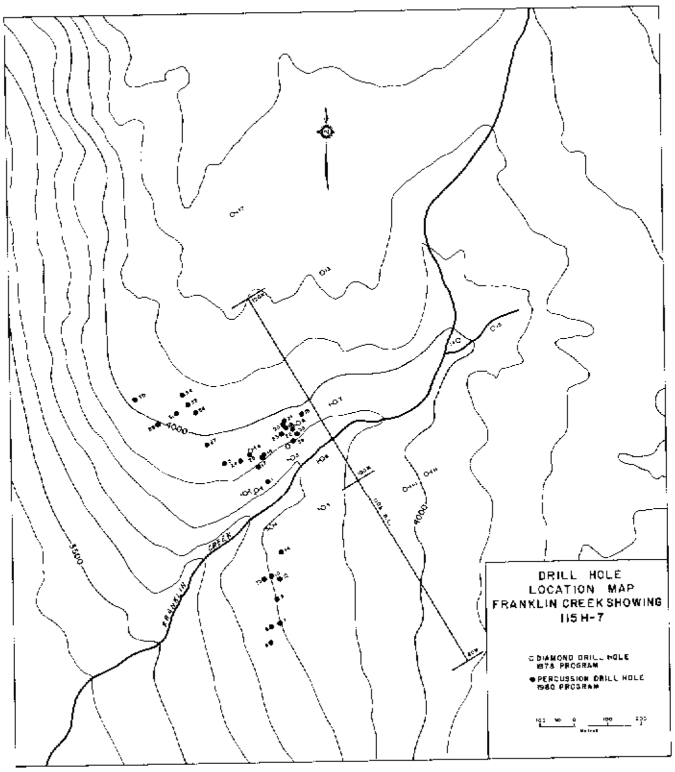

Figure 7
Drill hole location map of Franklin Creek property.

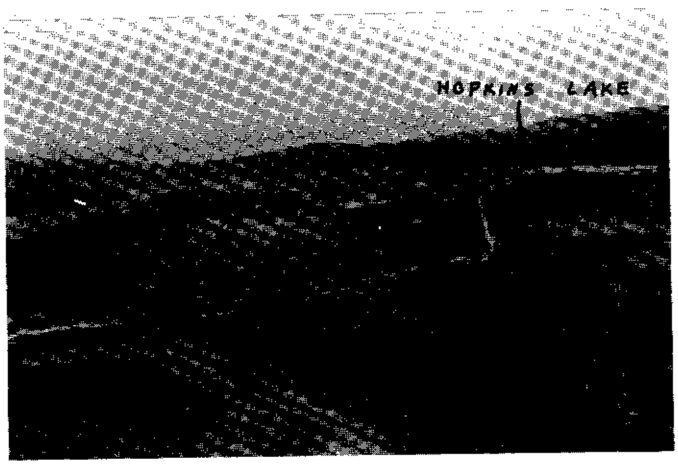

Figure 8
Aerial view to the northwest of the Giltana Lake area: minor molybdenite in contact skarn and rarely along fractures in granodiorite. Minor molybdenite in northernmost trenched area.

Hopkins Lake West Showings

The hill west of Hopkins Lake is made up of a marble intruded by several thin feldspar porphyry dikes (Figure 9). Pods of skarn are irregularly spaced along the porphyry-marble contact and contain patchy concentrations of chalcopyrite along fractures. They contain anomalous amounts of Ag, Mo, Pb, Zn and W.

Sekulmun Lake Showing

Zinc
115 H (16)
(61° 31'N, 137° 33'W)

On the east shore of Sekulman Lake, concordant skarns and limonitic quartzite are interbedded with marble. Massive homogeneous quartz-feldspar-biotite porphyry intrudes the sequence and crops out 150 m south of the showing. The marble is well laminated with alternating dark grey and white laminae and dips gently northwest under the lake.

Two types of skarn are present-whitish-green garnet diopside skarn with disseminated pyrite, sphalerite, chalcopyrite and streaky lenses of magnetite and diopside-actinolite skarn with streaky lenses of massive sphalerite (Figure 10). They range from 0.3 m to more than 8 m thick and are exposed over 40 m. Sphalerite is black in the skarn but medium brown in fracture fillings in marble. The rocks also contain anomalous Au, Sn and W.

Property work includes considerable diamond drilling done in 1979 and 1971 (Tempelman-Kluit, 1974). The showing was discovered in 1969, and claimed by Yreka Mines as the CAD Group (Figure 11). Soil sampling, magnetometer, EM 16, Ronka MK4 and IP surveys were conducted in 1969-70. Eight diamond drill holes (865.2 m) were drilled to test zinc and/or copper soil anomalies and two holes (242.4 m) were drilled north of the showing on the lakeshore, both of which intersected zinc mineralization:

DDH Y-1 9.15 m of 0.56% Zn from 79.27-88.42 m
DDH Y-3 4.58 m of 1.84% Zn from 94.51-99.09 m

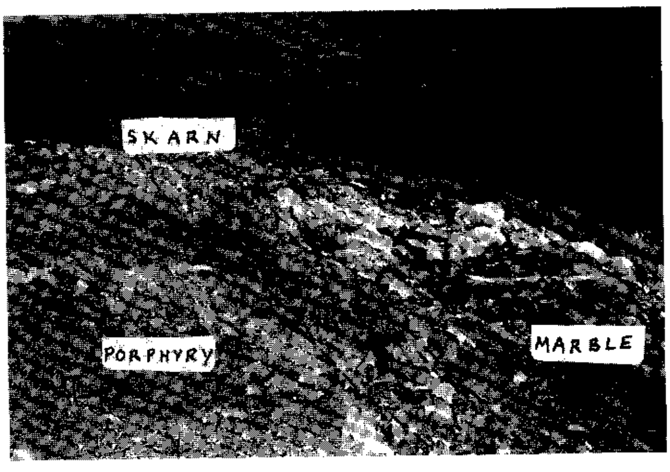

Figure 9
Copper-mineralized skarn showing on the hill west of Hopkins Lake.

Moraine Showing

Tungsten
115 H (10)
(61° 03'N, 136° 43'W)

The Moraine showing is on a hill on the east side of the Nordenskiold River, 6 km north of Moraine Lake. Two concordant skarns, north and south, are developed in marble interbedded with biotite-quartz-feldspar gneiss (Figure 12). Skarn minerals are epidote-garnet-actinolite-magnetite-quartz-calcite with minor scheelite, molybdenite and chalcopyrite. Irregular dikes of feldspar porphyry, granodiorite, diorite, pegmatite and alaskite intrude the rocks.

In the late 1960's the BALL 1-8 claims owned by Messrs. Riba and Papp covered the property. In 1967, it was optioned and and the north skarn was extensively trenched, but no values of interest were determined (B. Norris, 1969). In 1969, the claims were optioned by Union Carbide, who also staked the contiguous RED claims 1-5 to the north. Magnetometer survey, geological mapping and bulldozer trenching and channel sampling programs were conducted in 1969. The skarn is about 100 m from north to south and 45 m from east to west. Twenty-two channel samples weighing about 13 kg each were taken from the south skarn and assayed for WO_3. They ranged from 0.01% to 0.30% WO_3, with an average of 0.07% WO_3. They also contain anomalous Cu, Ag, Au, Zn, Mo and Sn.

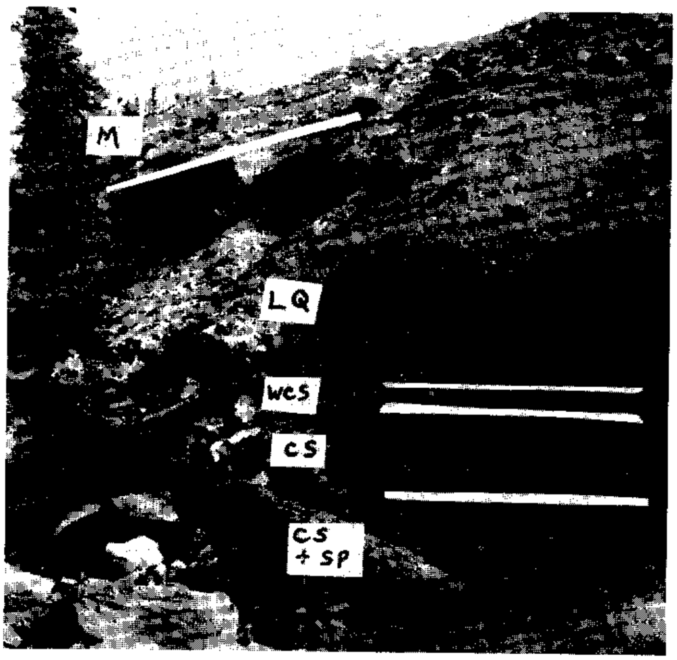

Figure 10
Main showing on east shore of Sekulmun Lake: M-marble, LQ-limonitic quartzite, WCS-whitish green calc-silicate (garnet-diopside?), CS (+sp)-apple green actinolite-rich calc-silicate, (with flaser lenses of massive sphalerite and pyrite).

Miscellaneous Other Sites

Several sites where former prospecting activity was in evidence were sampled. Southwest of Hopkins Lake (HL-28A), a pit blasted in amphibolite exposed several white quartz veins mineralized with trace chalcopyrite and pyrrhotite. The quartz vein is anomalous only in Cu. Numerous prospect pits are located near a tote trail 3 km south of Hopkins Lake, (Figure 1). Immediately northwest of the junction, a 50 x 30 m area has been stripped by bulldozer. Biotite schist and marble are here intruded by a granodiorite porphyry dike and a 15 cm pyrrhotite-garnet-actinolite-chalcopyrite skarn horizon is developed in the marble. The skarn is enriched in Cu and W (HL-50B). West of the junction 500 m, a 2 meter thick skarn zone is crossed by the trail and has been exposed by several small blast pits. It is made up of actinolite-garnet-diopside, very minor pyrite and rare chalcopyrite and is anomalous in Cu and to a much lesser extent in Mo, Sn, W (HL-32).

Further west along the trail (#12, 115 H), 1 km from the junction, a bulldozer trench exposes a garnetiferous mica schist interbedded with a sulphide skarn-bearing marble horizon. The skarn is enriched in Au, Ag and anomalous in Pb (HL-33A, B). Nearby, a limonitic stained amphibolite with very minor disseminated pyrrhotite was found to be anomalous in Cu and W (HL-21B). On the east side of a V-shaped lake at the end of the tote trail, biotite-quartz-feldspar-actinolite schist is intruded by numerous rusty

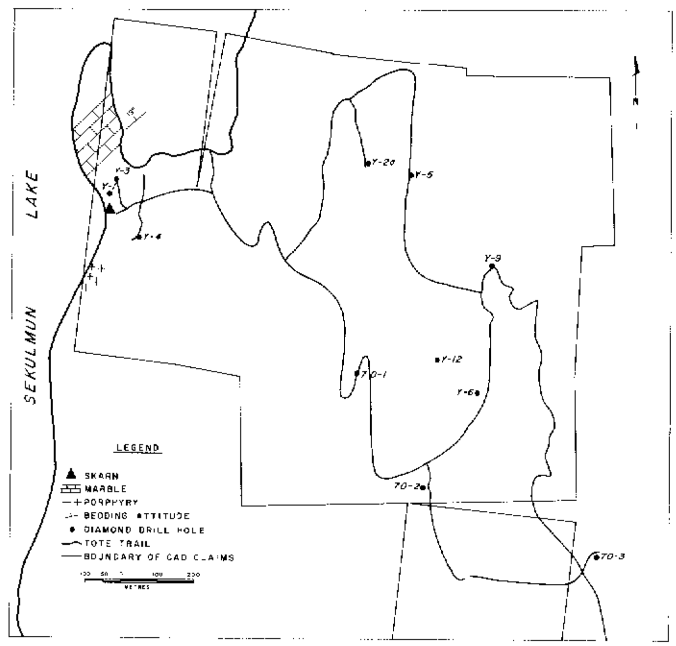

Figure 11
Drill hole location map of the Sekulmun Lake showing area.

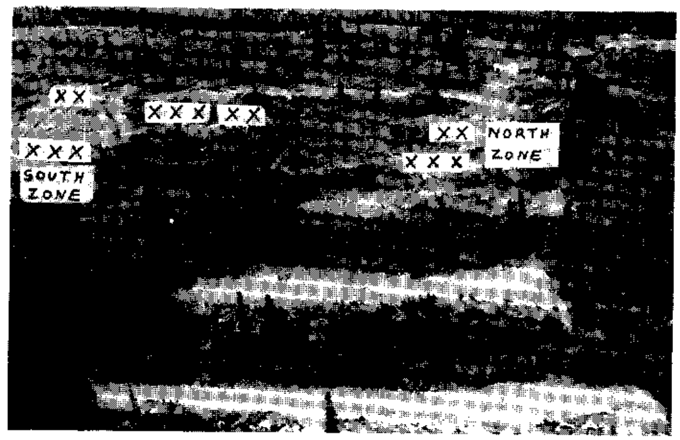

Figure 12
Aerial view of trenches on the MORAINE property. Skarn exposures indicated by XX.

Table I

METAL CONTENT OF SHOWINGS AND LIMONITIC OCCURRENCES, HOPKINS LAKE AREA

	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm	Mo ppm	Sn ppm	W ppm
Threshold	90	5	300	25	110	30	3	15
% above threshold	8	11	30	7	12	16	15	17
Franklin Creek								
48	--	--	410	--	--	--	5	--
52 -Cp	830	6	9700	--	--	--	12	--
53C-Cp	1300	10	29400	--	330	--	10	--
53C-Cp	1000	11	33700	--	280	--	10	--
53D	170	--	--	--	--	--	--	--
Giltana								
29A-Cp	--	12	7200	32	--	--	--	25
29D-Cp	--	11	20000	76	190	160	--	22
29F-Cp	--	--	2360	--	--	--	--	--
29G-Cp	--	--	1460	--	--	--	--	--
30A-Cp,Mo	--	--	1360	--	--	3300	--	--
40B	--	--	--	--	--	--	--	41
40C	--	--	--	--	--	--	--	17
40D	--	--	--	--	--	32	--	--
40F	--	--	--	--	--	600	--	120
43	--	--	--	--	--	88	--	--
43A	--	--	--	--	--	--	3	--
Skarn West of Hopkins Lake								
22 -Cp	--	--	4400	36	200	--	--	100
25 -Cp	--	5	6800	--	120	--	--	24
26 -Cp	--	--	800	--	--	1000	--	--
Sekulmun								
54 -Sp	190	--	--	--	71600	--	--	110
55	--	--	--	--	180	--	30	--
Moraine								
56 -Cp	270	11	13600	--	190	32	25	800
57	--	--	--	--	110	44	--	800
Tote Trail Junction								
50B	--	--	1000	--	--	--	15	430
Pit SW of Hopkins								
28A	--	--	300	--	--	--	--	--
Corral Road								
32B	--	--	--	--	--	--	3	--
32D	--	--	420	--	--	44	--	30
32E	--	--	380	--	--	--	--	--
32F	--	--	350	--	--	--	--	--
NW Corral Road								
33A	630	--	--	--	--	--	--	--
33B	--	5	--	28	--	--	--	--
Amphibolite								
21B	--	--	600	--	--	--	--	39
Lake Show at Road End								
34B	--	--	320	--	--	60	5	--
NE of Hopkins								
37A-Cp	--	--	1610	--	--	680	--	47
37B-Cp	--	--	16300	--	--	110	--	--
Tactite E Shore Aishihik								
12A	--	--	--	--	--	--	3	--
12E	--	--	--	--	--	--	3	--
13A	--	--	--	48	--	--	5	--

Analyses by X-Ray Assay Laboratories, Toronto
Cp-chalcopyrite-bearing Sp-sphalerite-bearing Mo-molybdenite-bearing

weathering feldspar hornblende porphyry dikes. The finer grained phase of the dike is mineralized with trace amounts of pyrite and chalcopyrite and possibly molybdenite and schist in contact with it (HL-34B) is anomalous in Cu, Mo, Sn.

Northeast of Hopkins Lake, biotite-actinolite-magnetite (chalcopyrite) skarn is developed in schist next to a dacite porphyry dike (HL-37). The skarn is enriched in Cu, Mo and anomalous in W.

Several zones of unmineralized tactite are irregularly distributed along trend of the marble units. They have widely varying mineral assemblages each of which was sampled individually. Only two of the tactites exceeded threshold, both on the east shore of Aishihik Lake (HL-12, 13).

Zone HL-12, is diopside-garnet-epidote-calc-silicate that occurs at the contact of marble with a hornblende porphyry body and is weakly anomalous in Sn. Zone HL-13 is garnet-diopside-calcite skarn located next to a hornblende porphyry dyke and is anomalous in Pb.

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THE McMILLAN DEPOSIT - A STRATABOUND LEAD-ZINC-SILVER DEPOSIT IN SEDIMENTARY ROCKS OF UPPER PROTEROZOIC AGE

J.A.Morin

Introduction

The McMillan deposit is in the southern portion of the Logan Mountains, 65 km NE of Watson Lake. It is 5 km southwest of Quartz or Hulse Lake and is also referred to as the Quartz Lake deposit. Access is by float plane to Quartz Lake and on a tote trail to the property.

History

History of the deposit is summarized in the following excerpt from D. H. Olson's presentation to the Sixth Geoscience Forum in Whitehorse (Olson, 1978).

"Historically, the first apparent discovery of the McMillan deposit was in 1892 by prospectors from the Cassiar Gold Fields. Re-discovery of the outcrop was by K. E. McMillan who staked the Dorothy claim in 1930 and re-staked the property as South Nahanni and Dorothy claim in 1948. Noranda optioned the property late in 1948, and in turn optioned the property to New Jersey Zinc in 1949 and 1950. During this period, New Jersey Zinc carried out trenching and geologic mapping of the outcrops along Quartz Creek. After termination of the latter option, Noranda and American Smelting and Refining Company entered into a joint venture, and a new Company named the Liard River Mining Company, Limited was later formed. Asarco Incorporated, as the Company is presently named, holds the major interest in this Company. Fringe staking was carried out by Prospectors Airways in 1954 and by Redfort Syndicate in 1965. In 1966 and 1967, Redfort Syndicate carried out airborne mag and EM surveys on the fringing claims, and established several geophysical anomalies which were tested by Fort Reliance Minerals who drilled 6 drill holes during the 1968 season.

Work to date by Liard River Mining Company, Limited includes 93 drill holes totalling 7004.5 m, extensive E.M. surveys during 1953, 1954 and 1955, and I.P. survey during 1967, a geochemical soil survey during 1967 and 1968 and a legal survey in 1972, whereby several key claims were taken to lease in 1973.

Noranda again optioned the property in 1975, staked additional claims and explored the main showing with a gravity survey and 27 drill holes totalling 2530.2 m. During 1976, the line cutting, soil sampling, CEM and VLF and gravity surveys were conducted on the new claims. Two additional holes totalling 265.2 m were drilled to test gravity anomalies east of the main mineral zone in 1977." In 1980, a major drilling program was conducted in the area west and south of the north deposit main zone, holes totalling 1871 m.

The ground south of Quartz Lake held by Liard River Mining Company was allowed to lapse and in 1973 was restaked as the PORKER claims for the Hyland Joint Venture (Sinclair et al, 1976, p. 155-156).

General Geology

Hadrynian rocks occur in a north trending synclinorium up to 50 km wide with a core of Lower Paleozoic sedimentary rocks. The Hadrynian "Grit Unit" includes fine-to coarse-grained siliciclastic rocks with minor intercalated limestone and fine grained argilliclastics and limestone form the Cambrian and Ordovician inlier. Cretaceous granitic rocks intrude the belt (Gabrielse and Blusson, 1969).

A homocline about 7 km thick of the "Grit Unit" is exposed south of Quartz Lake (Figure 1). The rocks strike northwest and dip moderately northeast.

Coarser clastic rocks account for well over half of the "Grit Unit" in the area and form resistant blocky, pale grey, brown and white ledge-forming outcrops. Well rounded quartz grains 1 mm to 2 cm across form most of the rock (40-90%) and they are set in a matrix of similar composition. Differences in grain size and clast mineralogy result in several rock types: quartzose sandstone, argillaceous sandstone, feldspathic sandstone and quartz pebble conglomerate. These clastic rocks occur as beds and channel lenses from 0.3 m to 100 m thick interbedded with argillite.

The argillite is dark grey on fresh surfaces and generally weathers brownish grey. It is commonly phyllitic with well preserved layering of alternate light and dark grey layers less than 1 mm to 1 cm thick. In the northern part of the area, argillite is greenish grey weathering. Fine-grained black limestone occurs in beds a few tens of meters thick which locally contain siderite.

Local Geology

Rocks hosting the deposit at the top of the grit sequence consist of argillite, sandstone, limestone and massive sulphides (Figure 2 a,b,c).

Thin-bedded to laminated creamy buff and maroon argillite makes up Unit A (Figure 3).

Argillite interlayered with sandstone of similar thickness, forms a transitional rock, Unit B.

Medium grey fine-grained quartz sandstone, Unit C, forms layers from one millimetre beds to massive beds that are several tens of centimetres thick.

Unit E consists of grey limestone and limestone breccia in beds from 0.3 to 20 meters thick. The limestone is massive and fine-grained with veinlets of white calcite. It contains beds of intraformational breccia consisting of sandstone, argillite and limestone clasts in a limestone matrix.

Lenses of massive coarse-grained siderite up to 200 meters long occur within the pale grey limestone south of Quartz Lake (Figure 4).

Dark grey to black, commonly graphitic argillite with interlayers and clasts of fine-grained white quartzite forms Unit F, the lowest unit cut in drilling. The rock is sheared and lenticles of white sandstone may indicate an original sequence of alternating thin (several mm to several cm) layers of sandstone and graphitic argillite. Thin (several mm to several cm) layers of fine grained massive pyrite are common throughout the unit.

Mineralization includes concordant and discordant types. Concordant mineralization mainly consists of beds of massive sulphides with sphalerite, galena and carbonate (siderite?) with minor sulphosalts. They range in thickness from one centimetre to several meters and are exposed along Mine Creek in the main showing area. They form individual strata within argillite. The lateral continuity of the massive sulphides is limited and locally massive pyrite terminates sharply and the bed continuation is limestone. The limestone may be barren or may contain disseminated galena, sphalerite and pyrite. The massive pyrite beds

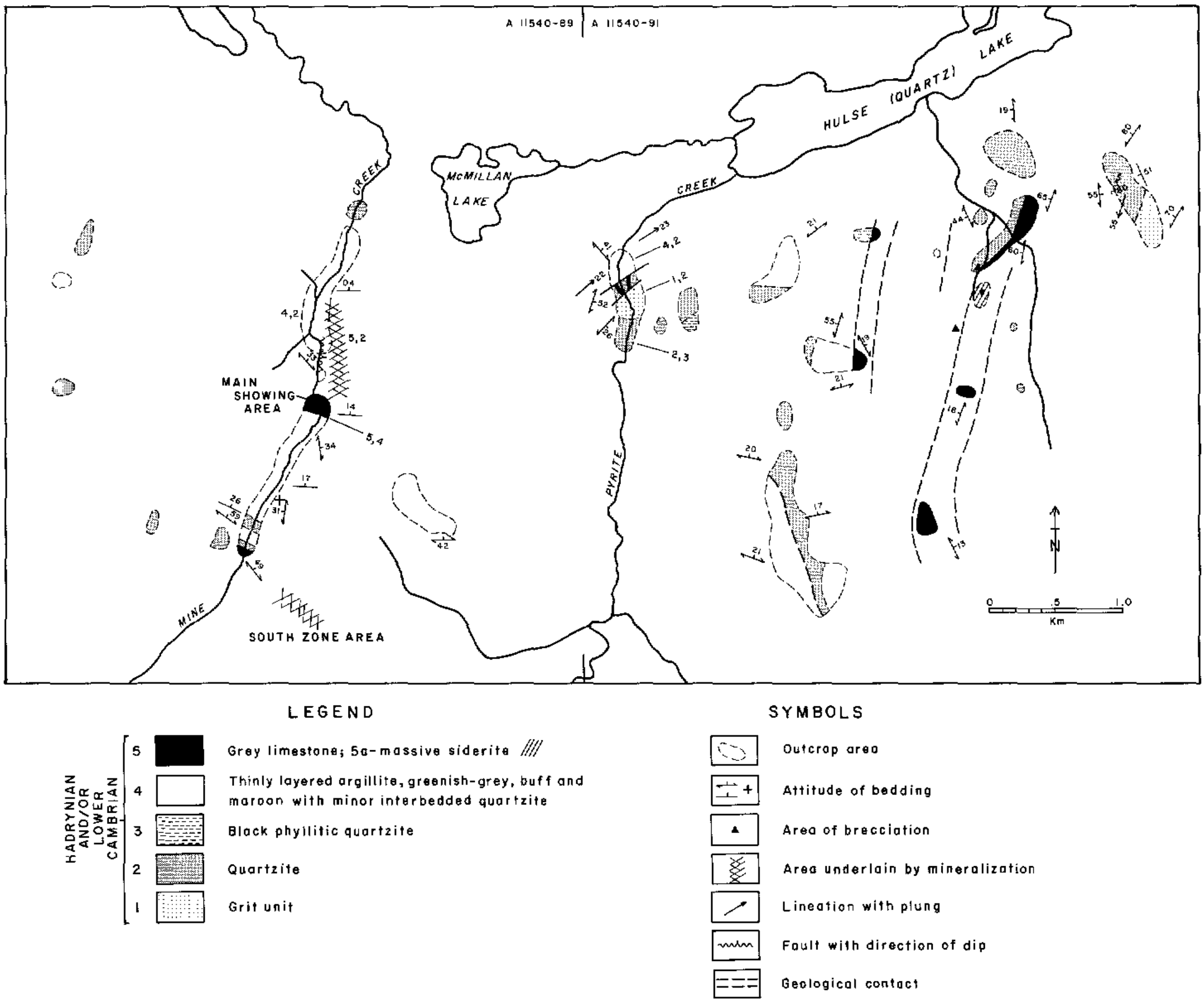

Figure 1
Geological map of Quartz Lake area. Base traced uncorrected from aerial photographs.

are associated with greenish grey argillite, quartzite, limestone and thin beds of massive galena and sphalerite.

Sedimentary structures present in the massive sulphide beds include layering, graded bedding, and possible scour pits. Size and distribution grading is locally exhibited by pyrite grains in sandstone and massive sulphide beds (Figures 5 a,b,c). A large scour pit that may be termed a channel is developed in the surface of a meter thick massive pyrite bed at the main showing. The channel is about 0.3 m deep and 1 m wide and infilled with sandstone (Figure 6).

Massive pyrite also occurs in a chaotic conglomerate with quartzite clasts in a black argillite matrix (Unit F). The conglomerate is deformed and is referred to as breccia. Pyrite is common as fine-grained disseminations, flaser lenses, masssive pyrite clasts and beds of massive pyrite, locally finely laminated and from one to tens of cm thick. Galena and sphalerite are absent.

Discordant mineralization is widespread and consists of veins and veinlets that cut layering and cleavage. Quartz-siderite is the most common vein filling and is abundant south of the main showing. Veins to one meter thick occur within the argillite up to one km south of the deposit. Wall rock alteration in the maroon argillite is a colour transition from maroon to pink to greyish green next to the vein. This transition is seen above the north zone deposit where the greenish grey alteration forms a halo up to 30 m meters thick.

Generally associated with areas of concordant mineralization are veinlets of quartz-pyrite and galena-sphalerite. They are most common at the main showing in the interbedded limestone, argillite and quartzite. East of Pyrite Creek, minor veinlet

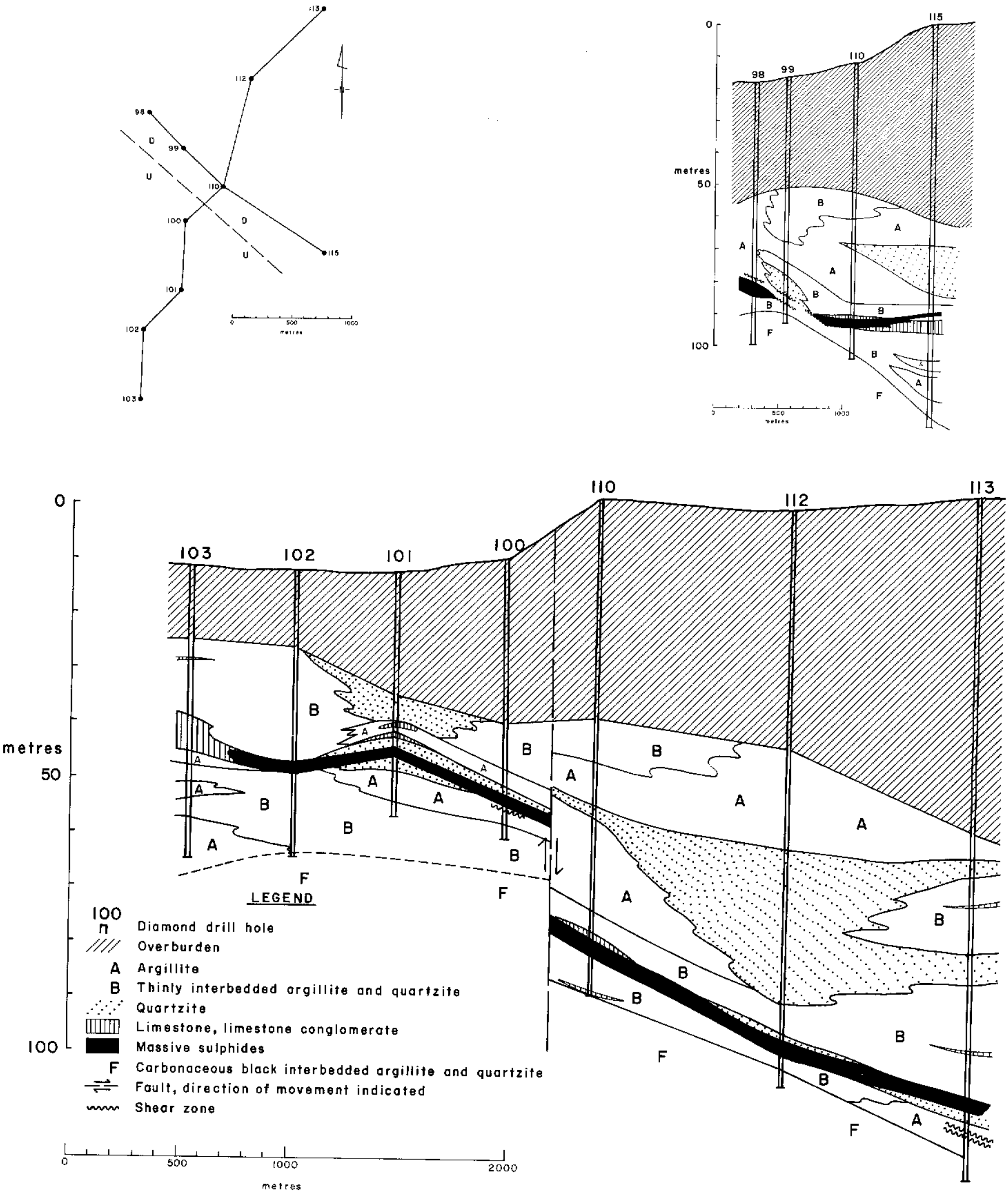

Figure 2
a) Cross section through the North zone of the McMillan deposit b) Longitudinal section c) Plan view showing location of drill holes illustrated in 2 a,b.

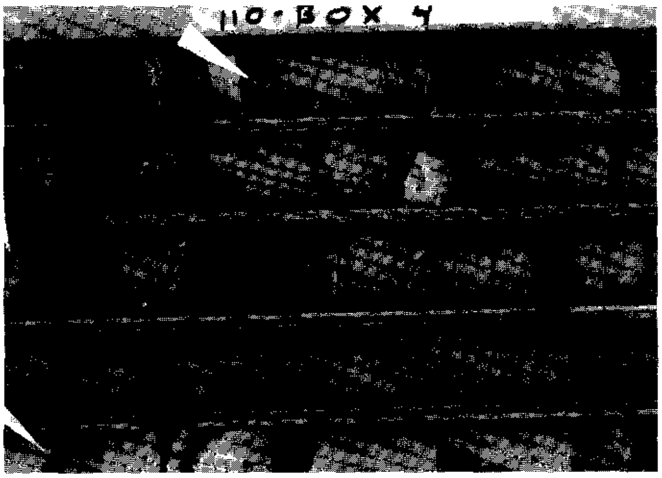

Figure 3
Creamy buff to greenish grey, well layered argillite in drill core. Note the loadcasts (indicated by arrows) and absence of sandstone.

Figure 4
Southward view of the PORKER property. The hillside is a pale grey limestone bed (LS) which encloses a concordant siderite lens (S).

mineralization occurs in fractured sideritic quartzite. Quartz-siderite breccia is developed in quartzite 2.5 km east of Pyrite Creek.

Mine Creek Main Showing

Mine Creek cuts the top of the McMillan deposit. Barren grey limestone and limestone conglomerate overlie interbedded argillite, limestone, massive sulphides and quartzite (Figure 6).

The interbedded limestone grades laterally to massive pyrite and massive galena and sphalerite or to limestone with disseminated galena and sphalerite. Quartzite is not as common in the Main showing as in the drill core mineralized intersections and limestone predominates at the Main Showing.

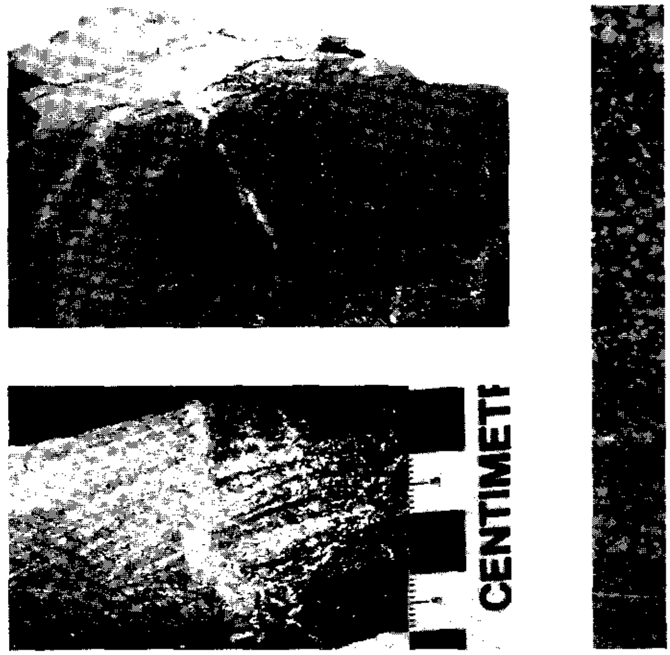

Figure 5a
Specimen of a massive pyrite bed from main showing on Mine Creek. Argillite and massive pyrite are both transected by quartz veinlets. Note the layering and graded bedding.

Figure 5b
A series of photomicrographs across 1cm of massive pyrite illuminated by reflected light. Pyrite grains (light coloured) demonstrate well developed graded bedding. Area shown is from massive pyrite specimen in Figure 5a.

Figure 5c
Massive sulphide horizon with laminated galena and sphalerite cut by veinlet of pyrite.

Origin

Models for the origin of the McMillan deposit are two - A), the mineralization was hydrothermally introduced into a carbonate-rich post depositional sequence and selected limestone beds were replaced by sulphides and siderite or that B) the mineralization was hydrothermally introduced onto a seafloor and sulphides and siderite were precipitated as lateral facies equivalents of limestone.

The following features are interpreted according to both models:

1) Sedimentary structures in massive sulphides indicate water transport of primary precipitated sulphides or selective replacement of calcite grains of calcarenite and calcilutite so that original structures (layering, graded bedding) are preserved.
2) Restriction of massive sulphides to individual beds indicates primary sedimentary deposition of sulphides or replacement of limestone bounded by relatively impermeable argillite or quartzite beds.

3) Lens-like extension of quartzite into massive pyrite indicates channel erosion of the pyrite horizon or the replacement model would suggest that only the limestone was replaced and the quartzite was left in place with its original channel shape (Figure 6). On Pyrite Creek, lenses of quartzite project into the top of the underlying limestone, suggesting that sandstone deposition commenced with small channels.

4) Proximity of quartz-siderite ± pyrite veining to concordant sulphide horizons suggests that veins and veinlets are pathways of metal solutions to the seafloor surface or to carbonate beds during replacement.

5) Conformable lenses of siderite associated with limestone suggest that a primary sedimentary facies relationship exists between pyrite, siderite and limestone or that iron solutions moving through limestone react with the wallrock to form siderite-rich zones.

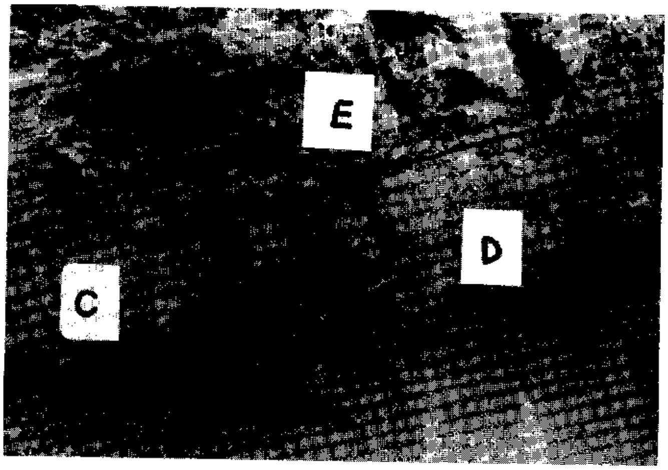

Figure 6
Main showing outcrop on Mine Creek. Massive pyrite (D) is overlain by argillite and limestone (E) and by sandstone (C). The sandstone occupies a concave depression in the massive pyrite. The depression may be a scour pit formed in a primary massive suphide sediment and filled with sandstone or it may be a scour pit formed in a limestone, infilled with sandstone and not replaced by pyrite.

Comparison with Similar Deposits

Most stratabound deposits in Selwyn Basin are attributed to syngenetic origins. However, deposits similar in mineralogy and geologic setting to the McMillan deposit are thought to be of a replacement type origin, e.g. the Park City District, Utah (Barnes and Simos, 1968, Lindgren, 1933). These deposits include an interbedded carbonate-clastic sequence and a nearby igneous intrusion. The carbonate rocks commonly host bedded mineralization and the clastic rocks host veins and breccias thought to be related. Wall rocks are silicified and gangue may be dolomite, quartz, calcite, barite, fluorite and iron-manganese carbonates (Lindgren, 1933). At Park City, free carbon is present

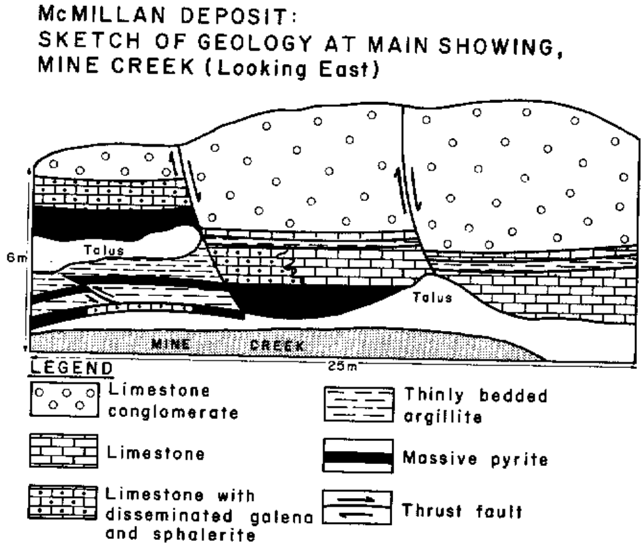

Figure 7
Sketch of geology at the main showing on Mine Creek.

in the limestone and is thought to have been a sulphide precipitating influence. The limestone was replaced by metal-rich hydrothermal solutions emanating from a nearby igneous intrusion or associated hydrothermal system (Proffett, Jr., 1979).

In comparison, at the McMillan deposit, carbonates are interbedded with fine-grained clastics, but no igneous intrusion occurs nearby. However, 2 km east of Quartz Lake, a marmorized limestone of Hadrynian age may indicate the presence of a nearby buried igneous intrusion. Quartz-carbonate veins are common in the clastic rocks near the McMillan deposit and a quartz-siderite matrix breccia pipe occurs on the PORKER claims, 1.5 km south of Quartz Lake. Wall rock alteration is limited to a bleached halo above and below the deposit and gangue minerals are carbonate (siderite?) and quartz. Minor sooty bitumen occurs in the limestone conglomerate at the main showing, but no bitumen was noted in drill core sections of limestone.

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REPORT OF FIELD WORK ON THE UPPER TRIASSIC REEF COMPLEX OF LIME PEAK, LABERGE MAP AREA, YUKON

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ABSTRACT

Field study has shown that the Upper Triassic carbonates at Lime Peak are a series of framework reefs which have shed debris into a surrounding basin. The reefs are up to 150 m thick and are dominated by spongiomorphs, tabulozoans and sponges. They bear little resemblance to those previously described in the Triassic of North America.

INTRODUCTION

The Upper Triassic carbonates of the Whitehorse trough are discontinuous, lenticular bodies that stretch northwest-southeast across the Laberge map-area in a belt approximately 30 km wide. Tozer (1958) and Wheeler (1961) attributed the irregular nature of the carbonates to erosional unconformities but Tempelman-Kluit (1978 a) proposed that the irregular carbonates are reefs. Such reefs would be unusual because they are over 100 m thick, whereas previously documented Triassic reefs in North America are generally less than 10 m (Stanley, 1979). The carbonates may, in fact, be unlike others in North America because the Mesozoic sediments of the Whitehorse trough are an allochthonous terrain which formed as a forearc basin and was juxtaposed against North America only in mid-Jurassic time (Tempelman-Kluit, 1979).

The Triassic is a turning point in the history of reef building because it marks the first appearance of scleractinian corals, the major reef builders of the Cenozoic. Most of our knowledge about this period comes from studies in Europe where Triassic reefs are well-developed. Early reports of Triassic reefs in western North America, such as Smith (1912) and Muller (1936) documented the fauna, but gave little information about the nature of the bodies. Stanley (1979) re-examined many of the localities and observed that most of the buildups were thin accumulations dominated by corals and spongiomorphs and which did not attain much relief above the sea floor. An occurrence of thick, well-developed reefs in the Yukon would be a valuable source of new information about the critical Triassic period.

The field study of Lime Peak in the summer of 1980 was the first step in a detailed facies analysis and faunal investigation of the Upper Triassic carbonates of the Laberge map-area. Lime Peak is located near the southeast end of the Lake Laberge, approximately 40 km northeast of Whitehorse (see Figure 1). Eight weeks were spent mapping Lime Peak (access by helicopter from Whitehorse) and four weeks were spent preparing rocks for thin sections and acetate peels at the Department of Indian Affairs and Northern Development. Petrographic study of samples collected is presently underway at the University of Miami. Field examination of other carbonates in the Laberge map-area in the summer of 1981 will test the generality of the depositional model developed at Lime Peak.

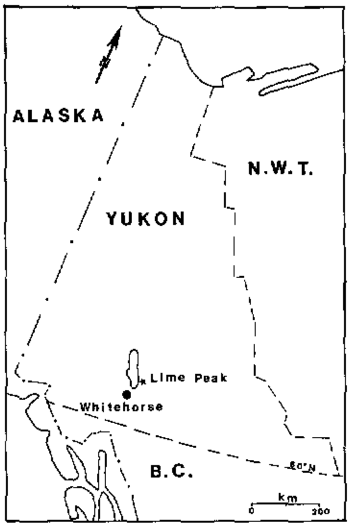

Figure 1
Index map showing the location of Lime Peak, Yukon.

General Geology

The Laberge map-area has been mapped at a reconnaissance scale by Bostock and Lees (1938) and Tempelman-Kluit (1978 b). The Upper Triassic carbonates are included with volcanic-clast conglomerate and greywacke in the Lewes River group, the youngest Mesozoic strata of Whitehorse trough. Tozer (1958) studied the stratigraphy of the Lewes River group and divided the clastic and carbonate rocks into seven formations ranging in age from Karnian to Norian. The Lewes River group overlies green Triassic andesite and is succeeded by Lower Jurassic greywacke, shale and granite-clast conglomerate of the Laberge formation and Upper Jurassic-Lower Cretaceous chert-pebble conglomerate of the Tantanlus formation.

Results of Field Study

Lime Peak extends northeast along Thomas Lake about 3.5 km and north of the lake about 3 km. The mountain complex was mapped using air photo A10559 - 124 and photographs such as that in Figure 2. A topographic base map is being prepared from the air photo.

The mountain can be divided into an eastern section with a general attitude of 120°/ 40°SW and a western section with an attitude of 175°/ 35°SW. A fault separates the two halves on the north side of the mountain, but the expression of this fault on the south face is not clear; it may die out in a breccia or it may extend as shown in Figure 2. The displacement on this fault is unknown, but other faults show minor displacement. Tertiary feldspathic dikes intrude the Triassic carbonate along many of the narrow gullies in Figure 2.

The four main rock types recognized in the field are 1) a massive light grey-brown limestone, 2) a bedded limestone, 3) a dark, shaly limestone and 4) a limestone breccia. The distribution of these rock types on the south face of the mountain is shown in Figure 2; their main characteristics are summarized below.

The massive limestones vary in thickness from several meters to 150 m. The lithology of these limestones varies from peloidal mud to organic framestone composed of spongiomorphs, tabulozoans and calcareous

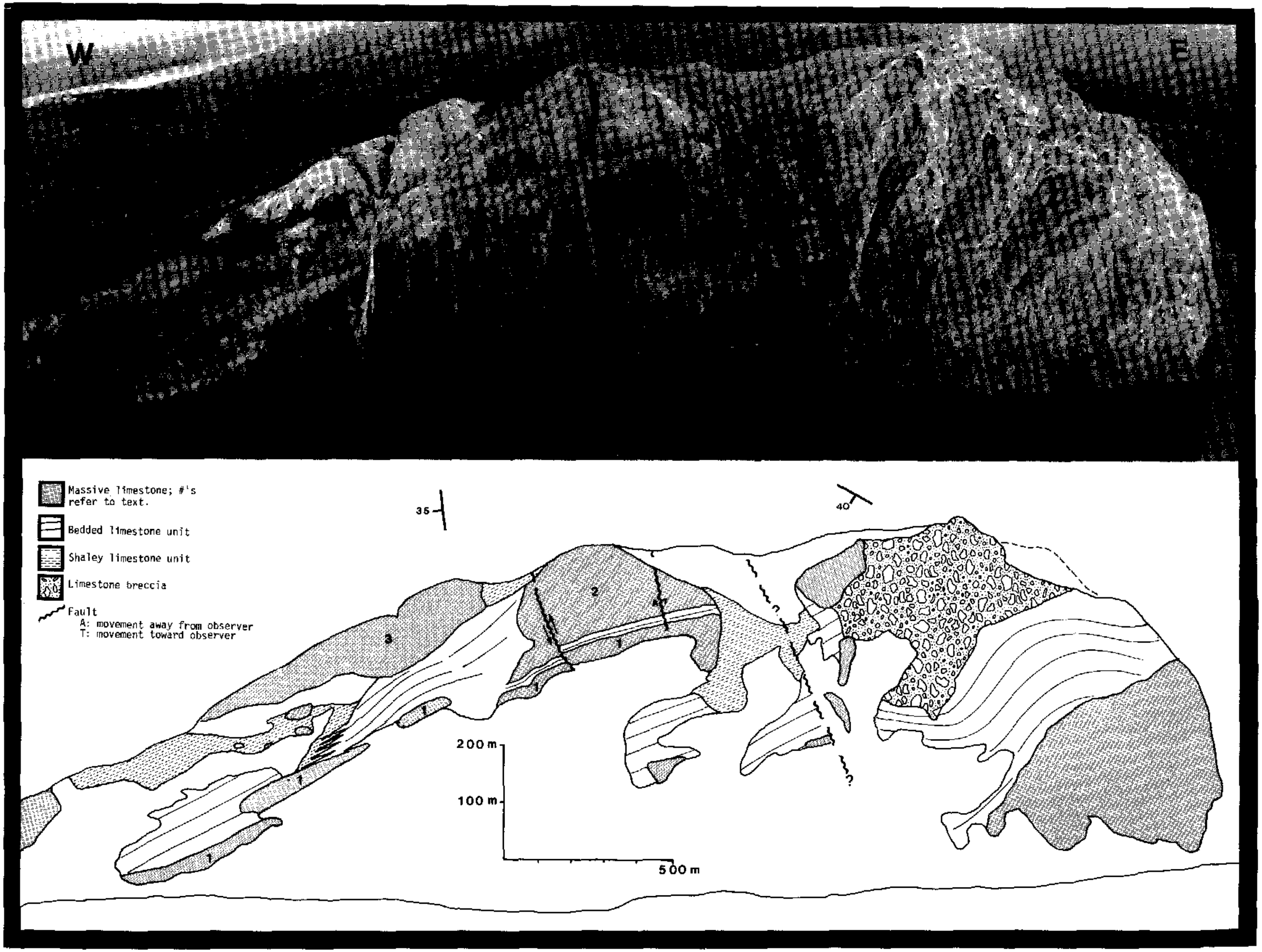

Figure 2
Distribution of main rock types on the south face of Lime Peak.

sponges with lesser amounts of coral, brachipods, molluscs and echinoderms. The skeletons of the framestone are commonly encrusted and bound by dark biogenous alfal (?) coatings and voids are lined with radial fibrous cements and filled with sediment. Fossils include two species of spongiomorph; calcareous sphinc tozoan sponges of the families Vericillitidae, Sebargasiidae Ploytholosiidae and Cystothalamiidae; calcareous inozoan sponges; and corals of the genera Elysastraea, Margarastraea, Montlivaltia Thamnasteria and Thecosmilia. Some of the fossils and textures of the massive limestone are shown in Figure 3.

ments and forams alternate with bioclastic packstone of thin-shelled bivalves and broken skeletal debris. Silicification of the skeletons is common. Poorly preserved ammonites are found rarely in silty laminate.

The limestone breccia has not been studied in detail. It is extensive, but is confined to the eastern section of the mountain where it truncates the adjacent unbrecciated limestones. Angular to rounded clasts of massive and bedded limestone occur in a reddish matrix. The clasts average less than 30 cm, but range up to about a meter.

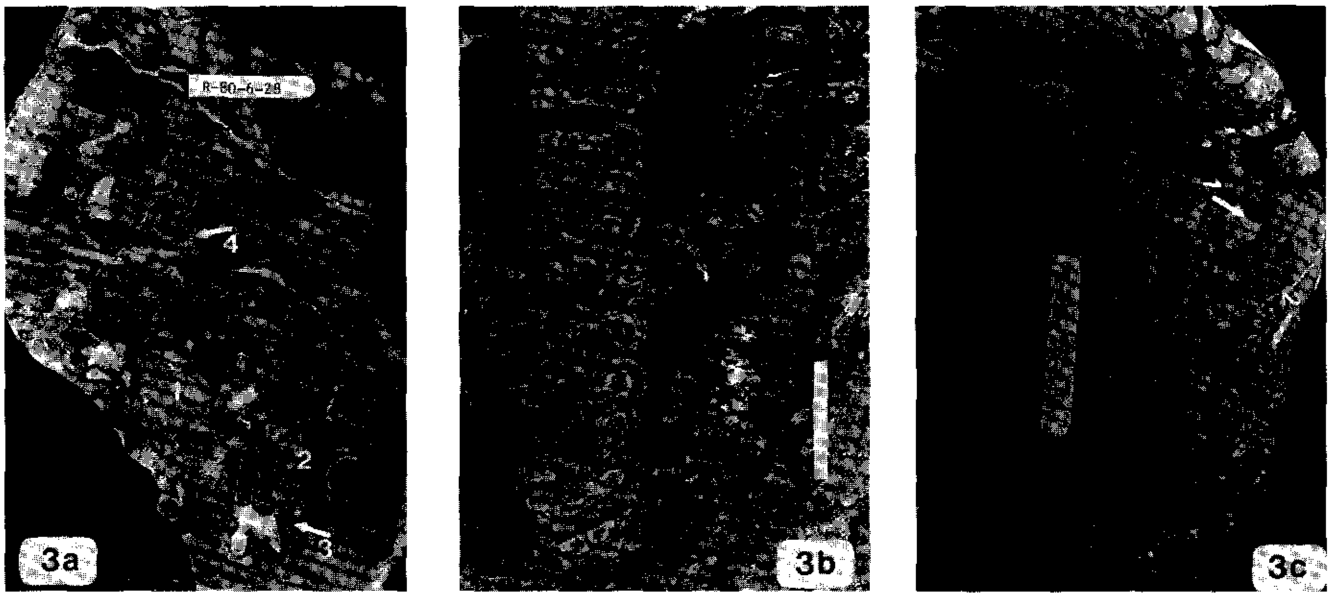

Figure 3

Textures and fossils from the massive limestone unit: 3a A polished slab showing spongiomorphs (1) and tabulozoans (2) bound by dark biogenous coats (3); voids are infilled with cement (4) (sample label is 3 cm long). 3b. A weathered surface showing a sphinctozoan sponge (bar is 1 cm long). 3c A weathered surface showing a sphinctozoan sponge (1) encrusted by a tabulozoan (2) (sample label is 3 cm long).

The bedded limestone unit consists of light coloured beds 1-6 m thick interbedded with darker beds 25-50 m thick. The thicker beds are packstones of broken skeletons similar in composition to those in the massive limestone in a dark, muddy, non-peloidal matrix. Some of the thick beds dip away from the massive limestone (see Figure 2) and pass into sub-horizontal beds that grade eastward into the shaly limestone. The thinner, dark beds of the bedded unit contain abundant encrusting Spongiomorpha gibbosa and branched Spongiomorpha ramosa, commonly in growth position, as well as thick-shelled pelecypods (Ostrea?), large gastropods, sponges and corals. Skeletons in this unit are commonly silicified. Representative fossils are shown in Figure 4; the dictyid hexactinellid sponge (Figure 4a) is the first reported in the Triassic of North America.

The dark shaly limestone unit consists of alterating sections several meters thick of recessive weathering shaly limestone and more resistant thin bedded limestone. The thin beds are 10 to 50 cm thick and are characterized by yellow weathering ribbons of dolomitized and silicified limestone 2 to 4 cm thick. Muddy layers rich in sponge spicules and organic matter with minor amounts of sand-sized echinoderm frag-

Interpretation

Distinct depositional environments are represented by the first rock types. The framework structure of the massive limestone, shown by biogenous encrustation, void filling cement and internal sediments, indicates that these accumulations were ecologic reefs. The thick beds of the bedded limestone unit, which contain broken and jumbled fossils of the same composition as the massive limestone, are interpreted to be sheets of debris transported from the reefs. The initial dip of some of the thick beds indicates that the debris was deposited on a slope and that the adjacent reefs may have had considerable relief. The intervening darker beds of the bedded unit contain a varied fauna with several attached elements, showing that organisms colonized the debris beds. The shaly limestone with abundant sponge spicules and organic matter is an accumulation of fine detritus from the reef and its surroundings in an off-reef, "basinal" environment. The coarser bioclastic layers of this unit record the periodic influx of the distal facies of the transported debris which accumulated in thick beds on the slope. The fourth rock type, the limestone breccia, which cuts across original depositional pat-

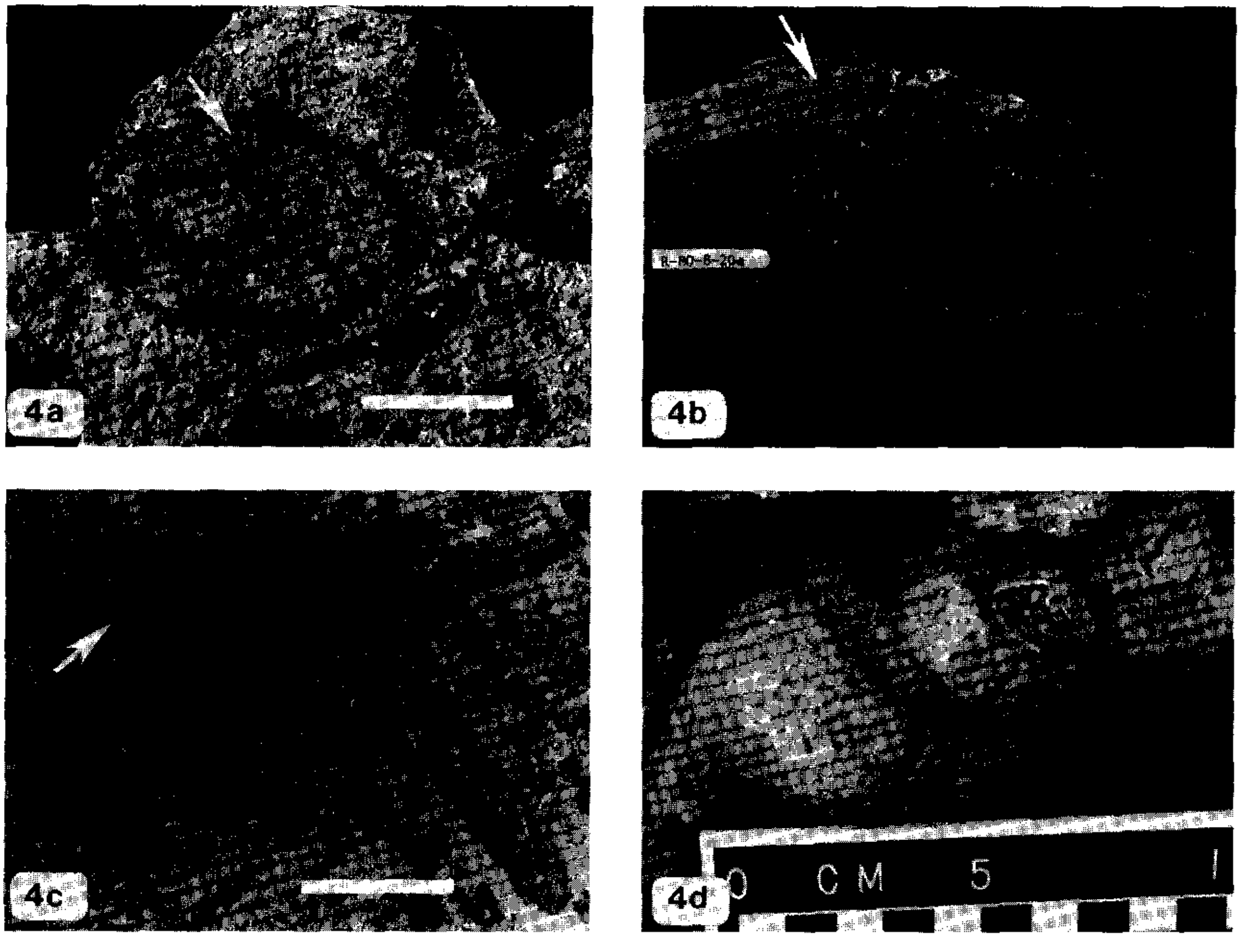

Figure 4

Fossils from the bedded limestone unit: 4a. A dictyid hexactinellid sponge (bar is 1 cm long). 4b. A thick shelled pelecypod (sample label is 3 cm long). 4c. An inozoan sponge (bar is 3 cm long). 4d. A large gastropod.

terns, is considered to be a secondary feature caused by dewatering of the shaly beds or karst solution and collapse.

Based on the interpretation of individual rock types, three stages of growth are recognized in the western section of Lime Peak. Initial development of lensoid reefs (#1 on Figure 2) each about 25 m thick, was followed by the growth of a much larger reef (#2 on Figure 2) about 150 m thick which shed an apron of debris to the west. In the third stage, another thick reef (#3 on Figure 2) grew on the debris of the first thick reef and the system prograded to the west. The relationship of the eastern and western sections of Lime Peak is not clear, and is complicated by the presence of the breccia zone which obliterates much of the original depositional story in the east. The lowest massive accumulation and thick-bedded limestones in the eastern section may represent an older system upon which the western section is built.

The study at Lime Peak confirms the reefoid nature of the carbonates proposed by Tempelman-Kluit (1978 a). The reefs are much thicker than any previously reported in North America and are dominated by spongiomorphs, tabulozoans and sponges rather than by spongiomorphs and corals. Because of these unusual characteristics and the excellent exposure of a complete facies zonation of reef, slope and basin, Lime Peak provides an unparalleled opportunity to study Triassic reefs in North America, as well as a depositional model for other carbonates in the Whitehorse trough.

Acknowledgements

Jennifer O'Brien provided invaluable field assistance and companionship throughout the summer. Discussion with G. D. Stanley, T. Tozer, L. Krystyn, M. Orchard, D. Tempelman-Kluit, G. Abbott and G. Morrison, all of whom visited Lime Peak this summer, was useful. George Stanley, in particular, aided in fossil identification. Field work was supported by a contract from DIAND to the University of British Columbia under the supervision of W. C. Barnes. I am particularly grateful to J. Keith Rigby for aid in fossil identification and for enthusiastic encouragement. R. N. Ginsburg critically reviewed this report.

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THE GEOLOGY OF THE RAPID CREEK - BIG FISH RIVER PHOSPHATIC IRON FORMATION NORTHERN RICHARDSON MOUNTAINS, YUKON

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During the 1979 field season, the writer and Dr. L. C. Coleman spent three weeks in the area collecting samples for geochemical and paleontological studies and examining some stratigraphic relationships in the phosphatic iron formation.

Laboratory study of the materials collected during the past two field seasons is continuing. After initial petrographic examination of thin sections of the material, identifications of minerals are being confirmed by x-ray diffraction methods and their compositions determined by electron microprobe analysis. Bulk compositions of a selected suite of specimens are being determined by whole rock analysis to determine patterns of elemental migration during the formation of rare phosphate minerals in these rocks. An attempt at determining physical conditions at the time of formation of these minerals is being made by studying oxygen isotopes and fluid inclusions.

While the age previously reported for this deposit is middle Albian (upper Lower Cretaceous), invertebrate fossils recovered by the writer have been identified by J. A. Jeletzky (Geological Survey of Canada) as lower Albian. A single fossil vertebra recovered from these rocks indicates an Upper Cretaceous age.

The phosphatic iron formation has been investigated from two sections: the first is on Big Fish River (Lat. 68°28'N and Long. 126°29'W) and the second is on Rapid Creek (Lat. 68°46'N and Long. 136° 34'W). At Big Fish River, the formation consists of three units of cyclicly interbedded sideritic mudstone and shale separated by two units of grey montmorillinitic shale. The formation is bounded by angular unconformities and was probably deposited in relatively shallow water.

At Rapid Creek, the formation is somewhat thicker and consists of interbedded shales, pelletal and non-pelletal phosphatic mudstone, and pelletal phosphorites and carbonates. The lower portions of the section is characterized by five coarsening-upward sequences capped by conglomeratic slump deposits. The pelletal beds are thought to have formed by storm wave generated transportation and redeposition of collophane muds from further upslope to the east. The conglomeratic slump deposits are believed to have been earthquake generated and to have been deposited too quickly to have been phosphatized.

The rare phosphates at Big Fish River are confined to the lower portion of the section and consists of spherulitic phosphate nodules which contain satterlyite, maricite, wolfeite, vivianite, ludlamite, carbonate-apatite, quartz, and pyrite. Some of these nodules are recrystallized replacements of ammonites and pelecypods. Veins are relatively rare and contain mainly quartz, arrojadite and vivianite.

Nodules are absent near Rapid Creek. Veins contain a variety of minerals and show a paragenetic sequence from anhydrous to hydrous to hydrated forms and from magnesium-rich to iron-rich compositions. Vein mineralization is mainly developed in two horizons in the section. The lower horizon is laterally variable and contains lazulite, apatite, whiteite, messelite and baricite. The upper horizon can be traced over 15 km and consists of arrojadite, kryzhanovskite, ludlamite, vivianite, metavivianite, gormanite and wardite.

Aspects that set this phosphatic iron formation apart from others are:

- the association of abundant phosphorus and iron; these two elements are usually mutually exclusive in sedimentary settings.

- the high paleolatitude of formation (about 80'N);most phosphorites formed less than 40° from the equator.

- the location of the deposit in a tectonically active environment; other phosphorites formed on very stable shelves.

- the occurrence of apparently high temperature minerals in an area of relatively low matamorphic grade; lazulite and augelite normally occur in upper amphibolite to granulite facies rocks or in pegmatites.

- the dominant minerals making up the rocks are satterlyite (a new mineral) and arrojadite; all other phosphorites are composed of collophane (amorphous calcium phosphate) or carbonate--flourapatite.

The final report on this work is now completed as an M.Sc. thesis.

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GEOLOGICAL SETTING OF GOLD-SILVER VEINS ON MONTANA MOUNTAIN

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Introduction

Montana Mountain is a highland with rugged cirques and rubble-covered plateaux south of Carcross, Yukon, approximately 110 km by road from Whitehorse. It has a long history of prospecting and mining ventures, but no detailed study of the geology is generally available. Gold and silver veins were discovered on the mountain west of Windy Arm (Tagish Lake) in 1901. Until 1915 the Windy Arm mining camp flourished, with extensive development at the Montana, Venus, Vault and Pride of Yukon mines (Figure 1). Stone ruins, tramline towers and overgrown trails are reminders of the booming past. The Venus-Vault vein, of pyrite, arsenopyrite and galena in quartz, proved the largest and most continuous system, has been worked intermittently in the 1920's, 1946 and the late 1960's. Road were built from Carcross to Venus and also to the Arctic Caribou Mine in Big Thing Valley about 1966. United Keno Hill Mines Limited has recently renovated the lower Venus Mine. This report reflects the renewed mining interest in the region. It is intended to serve as an outline of the mineral prospects and geological features of the Montana Mountain area.

Regional Geology

The Montana Mountain area lies at the western edge of the Intermontane Belt, where the Whitehorse Trough overlies the Atlin Terrane . The Coast Plutonic Belt extends to Bennett Lake, 10 km west of Montana Mountain.

The basement rocks are Mississippian to Pennsylvanian mafic volcanic flows considered to be basal units of the Atlin Terrane (Monger, 1975). The flows are overlain by poorly bedded or massive carbonate that forms pale grey-weathering mountains east of Windy Arm. This terrane is related to the Cache Creek Group, and has been interpreted by Monger and other workers as oceanic crust and reef complexes built west of the North American craton.

The Whitehorse Trough is an elongate Mesozoic basin containing volcanic and sedimentary rocks, largely derived from the southwest. Volcanic flows, pyroclastic deposits and limestone reef complexes are collectively termed the Lewes River Group. It is overlain by the Jurassic Laberge Group. Tempelman-Kluit (1979) proposed that the Whitehorse Trough is a fore-arc basin and that the Coast Plutonic Belt is the reactivated root of the associated arc. He interpreted the basin and arc as an allochthonous terrane that collided with cratonic North America in late Jurassic and Cretaceous time. The resulting Teslin Suture is north-south depression about 90 km west of Montana Mountain.

Volcanic rocks of the Mount Nansen and Carmacks Groups unconformably overlie Cretaceous and older rocks in the Dawson Range (northwest of Whitehorse) and along the western flank of the Whitehorse Trough. The Carmacks Group contains basalt flows which are younger than, and in part coeval with, Mount Nansen acid to intermediate plugs (Tempelman-Kluit, 1980). Feldspar porphyry dikes and plugs common in the Dawson Range are considered to be subvolcanic equivalents of the Mount Nansen Group by Tempelman-Kluit. Similar dikes cut volcanic rocks correlated with the Mount Nansen Group on Montana Mountain, 250 km southeast of the Dawson Range.

Volcanic complexes of Early to Mid-Tertiary age at Mount Skukum and on the West Arm of Bennett Lake, the latter described by Lambert (1974), are respectively 40 km northwest and 20 km west of Montana Mountain. Judging from the descriptions these rocks differ from the volcanic assemblage in the study area. Both complexes consist predominantly of pyroclastic units deposited on granitic rocks. On a broader scale these groups of volcanic rocks have been correlated by Tempelman-Kluit (1974) on the basis of their structural relations. The Sloko volcanic province is the general term used by Aitken (1959) and Souther (1976) to refer to the calc-alkaline volcanic rocks of northern British Columbia and southern Yukon, that range in age from 73 my (Grond, 1980) to 50 my (Lambert, 1974).

Mineralized quartz veins are common along the eastern margin and outliers of the Coast Plutonic Belt. The veins are fault fissures in granitic rocks or older units (Wheeler, 1961). The Wheaton River district, north of Bennett Lake, contains many abandoned workings. Minor sulphides, including molybdenite and stibnite, occur in aplite dikes and quartz veins near Mount Skukum and in the Bennett Lake Complex. Economically significant veins have been found on Montana Mountain. On Freegold Mountain and near Mount Nansen in the Dawson Range, gold and silver-bearing quartz veins are similar in setting and character to the Venus vein of Montana Mountain.

Geology of Montana Mountain

Montana Mountain is in southern Whitehorse map area (Wheeler, 1961). Paleozoic volcanic rocks of Atlin Terrane and clastic rocks of the Laberge Group occur along the margins of the area mapped (Figure 2). Cretaceous intermediate volcanic rocks of the Mount Nansen Group intrude this basement within a roughly circular area about 7 km in diameter and are referred to as the Montana Mountain Volcanic Complex. The northern margin of the complex is metamorphosed by a granite pluton related to the Coast Plutonic Belt. Porphyritic rhyolite dikes intrude the Mount Nansen Group and adjacent Laberge strata. Quartz veins, some with economic mineralization, cut the granite and Mount Nansen volcanic rocks.

Atlin Terrane (Probable Nakina Formation)

Amphibolite with thin interlayered limestone and chert crops out northeast of Montana Mountain. The predominantly volcanic formation is probably Mississippian in age, and considered by Monger (1975) to be one of the oldest units of the Cache Creek Group. Wheeler (1961) referred these rocks of Atlin Terrane to the Taku Group and the rocks may correlate with the Nakina Formation of Atlin map area.

Non-fragmental volcanic rocks are the commonest rocks of the Taku Group study area. They are described by Wheeler (1961) as having uralitized clinopyroxene phenocrysts in a chloritic groundmass. In a

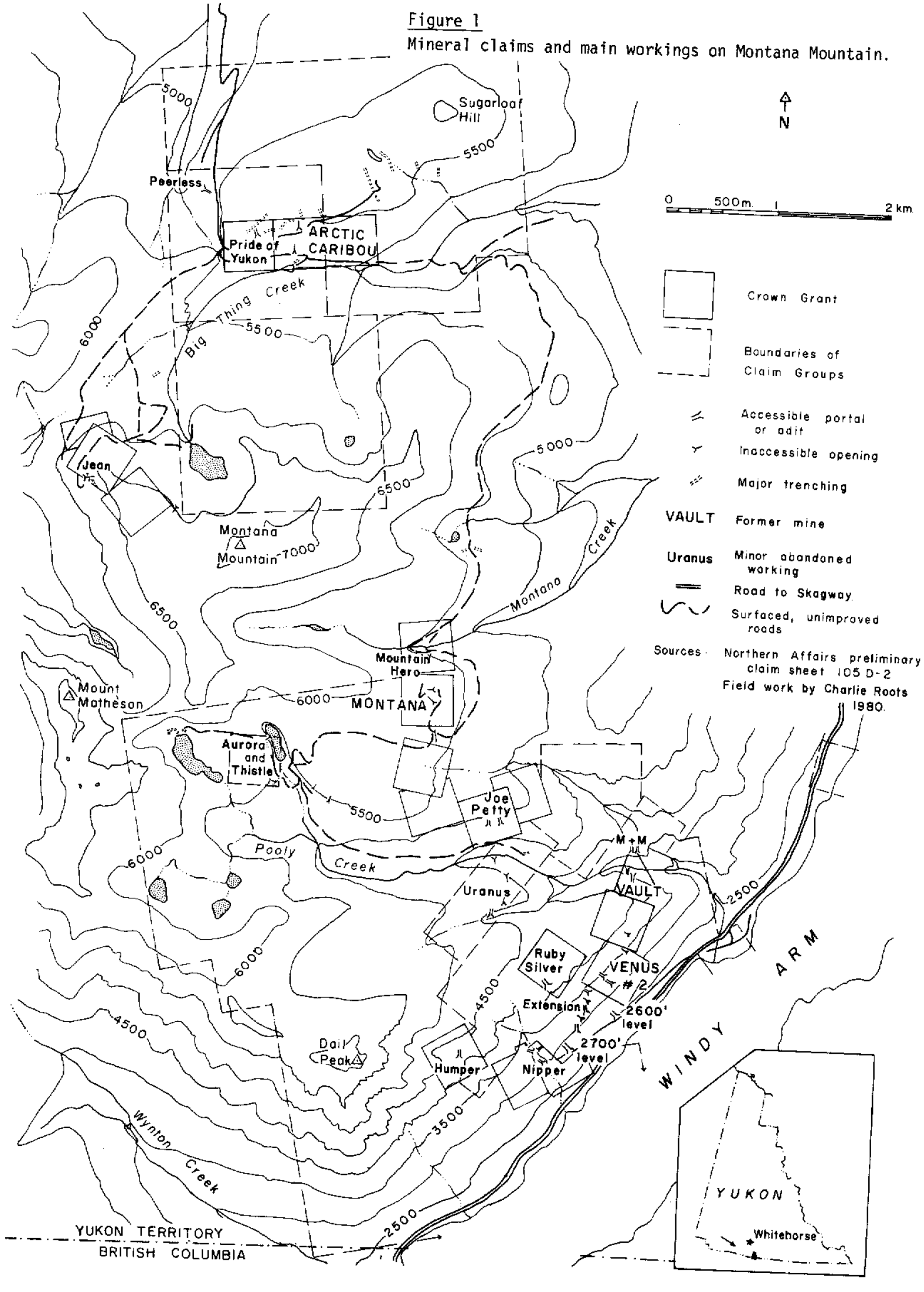


Figure 1
Mineral claims and main workings on Montana Mountain.

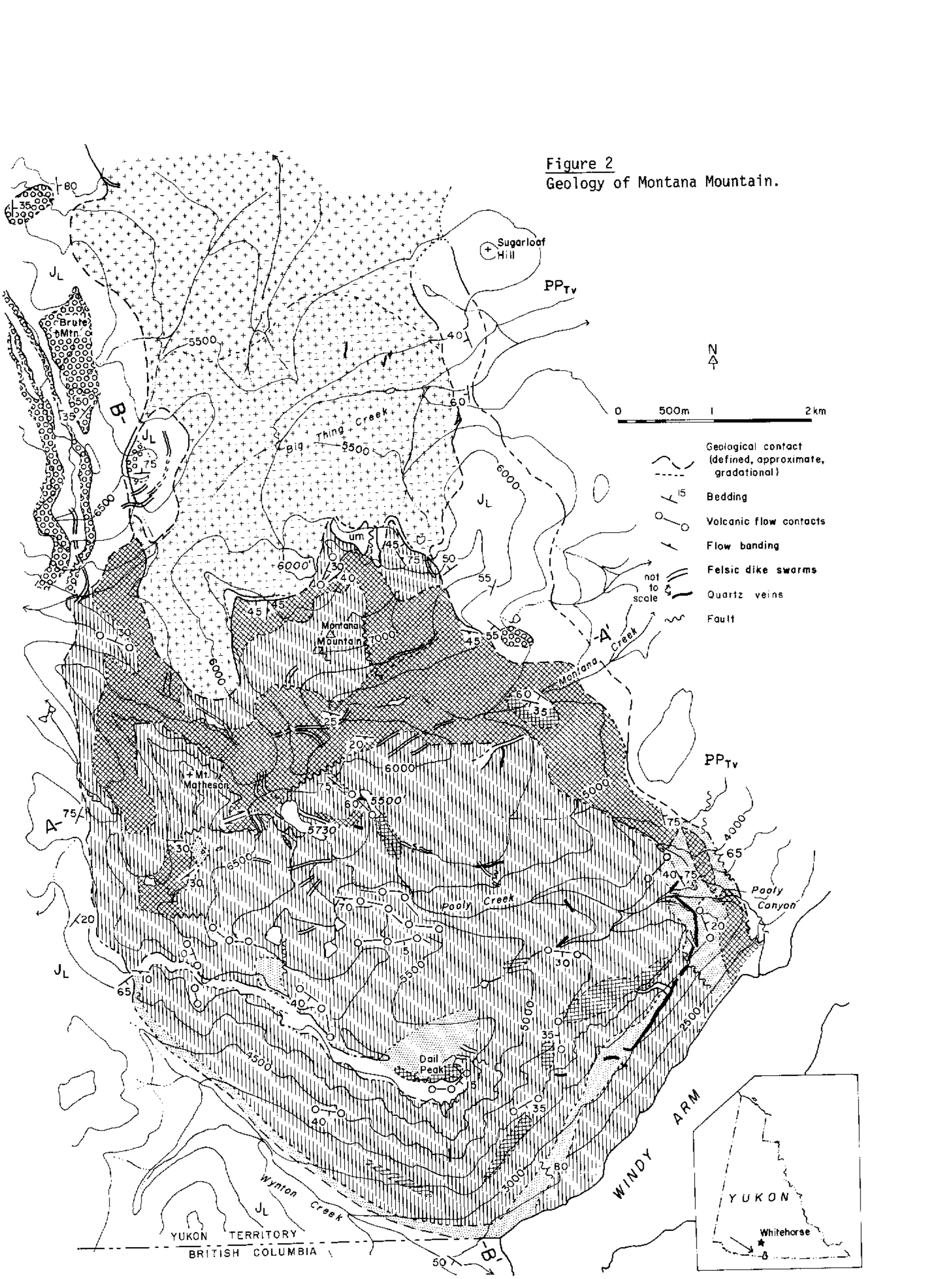
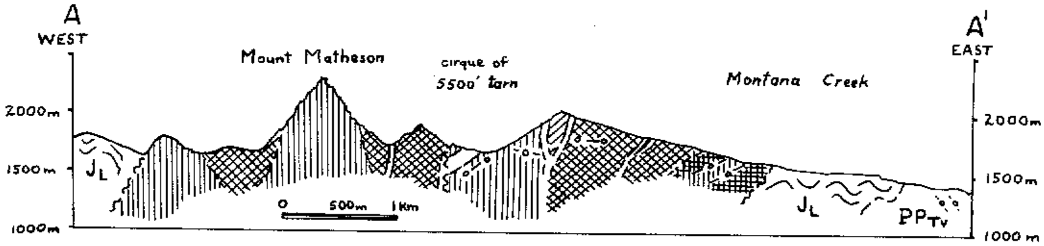
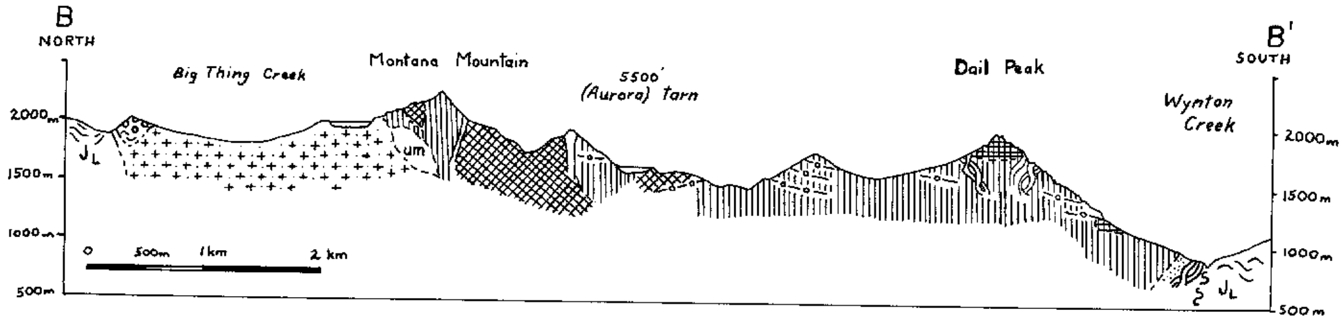


Figure 2
Geology of Montana Mountain.





LEGEND

EARLY TERTIARY

COAST RANGE INTRUSIONS

biotite - hornblende granodiorite

chlorite granite (with mauve quartz)

Intrusive contact

MIDDLE OR LATE CRETACEOUS

MOUNT NANSEN GROUP

rhyolite and silicified volcanic rocks

heterolithic breccia; locally interpreted as debris flows and pyroclastic deposits

intermediate volcanic flows and plugs

flow-banded intrusion breccia

Intrusive, and locally unconformable contact

LOWER JURASSIC

LABERGE GROUP

J_L siltstone, greywacke

conglomerate lenses

Unconformity

PENNSYLVANIAN or PERMIAN

ATLIN TERRANE, probably NAKINA FORMATION

PP_{Tv} mafic volcanic flows and breccia

BASAL UNIT (?) of Atlin Terrane

um serpentinized gabbro

	Elevation A.S.L.	Conditions of Workings	History, Development, Production, if reported	Economic Sulphide Minerals	Nature of Vein	Nature of Host Rock	Remarks
AURORA and THISTLE adits	5500' 5600' 5250'	Adits caved, lost by bulldozer probing	1907 - 18 m adit; many blastpits and trenches 1970 - bulldozer clearing of portal with large dump	minor aspy, ga in dumps	Adit at 5500' lake level-vein 2-5 cm, 250°/ 80°N most dip N: oxidized trace Blue quartz in float	crosscuts light green flows, breccia	Thistle mentioned in private report as more northerly. Stonehouse ruins S of 5500' tarn
ARCTIC/CARIBOU (Big Thing) Mines	5100' 5300'	2 partly iced portals, bulldozer trenching	1905 - minor; 1965 upper crosscut, 1050 m workings 1968 - lower portal Prod:67-68 14,300 oz. Au:425,963 oz Ag in 55,943 tons	aspy, minor cp, ga, also moly, stibnite	Several veins discovered; avg. 235°/ 30°NW approx. horizon, 0-4 m, cut by flat faults. Blue-grey quartz assoc. with mineralization	mauve altered granite, with 10 m wide envelope of white clay, pyrite alteration	Molybdenite, some aspy in alteration envelope. Blue-grey quartz more richly mineralized, replaces white quartz
HUMPER adits, trenches	4200'	Line of partly caved adits, deep trenches	1910 - 1914 approx., inclined shafts to 4 m	scorodite on dump, ga, pyrg, steph reported	Pink and grey quartz vein, 30 cm wide, 275°/50°N over 200 m. Dark grey gouge along middle of vein	light grey siliceous flow,porphyry quartz dike envelope 2-4 m wad, goethite alteration	overgrown switchback trail to base of cliffs
JEAN adit and bulldozer cuts	6320' to 6500'	Iced adit, good exposure in cuts	staked 1936, trenching;1960-68 m. crosscut, extensive bulldozer scraping; 1970 - minor D.D.	in dump, aspy, ga, layers sph	White quartz minor blue-grey quartz, calcite, chalcedony surface trace suggests 330°/55°N	altered granite, yellowish, clay alteration chlorite clots, silvery very sericite, py in alteration	
JEAN trenching, (600 m N of 6000' + tarn)	5700'	Snow-covered until August	? 1950's;bulldozer trenching,drill platform, 10 m long, 1.5 m cut	minor arsenopyrite in cut	No quartz noted	chlorite-alteration granite, yellow clay zone, with aspy in seams, veinlets	may be the Jean Claim described by Wheeler (1960)
JEAN adit, trenching (450 m SW of 6000' ± tarn)	6430'	Iced adit; snow-covered until August	Discovery claim post, 1905. Adit 10 m, circa 1950's; large dump suggests buried workings	aspy, ga, sph on dump	Minor white quartz	intrusion breccia type,w/ chlorite, mauve fissures; about 200 m S of granite contact	not previously reported; age unknown Only working on N side of volcanic complex
JOE PETTY adit	6370'	Accessible	1905, adit w/ 15 m drift;6m inclined shaft,trenches. Poss. Prod: several tons.1968-bulldozer nearby hillside	only malachite noted, ga, "Ag minerals" reported	White quartz, very oxidized; shearing of vein in general 10-30 cm, 270°/60°N, traceable 200 m	grey intermediate flows,w/ breccia and vesicular horizons; 2 m oxidized envelope	Vein appears parallel to flow contacts. Blue-grey quartz in sheared portions
M and M mine (MacKenzie & Mann)	3750'	Accessible, in rubble cliffs	1907, 1914 trenching, and 3 adits, to 30m. Prod: 5-6 tons	aspy, pyrh on dump rep:steph, freibergite	Persistent qtz. vein,10-30 cm; 190°/25-55°W,50 m.	porphyry intermediate flow possible breccia body, with felsic dike sheets	Vein splays at NE and into steep fault. Yellow and black oxidation stringer quartz association
MONTANA adit and mine	5850'	Both portals iced, vein exposed in trench.	1905-1912 inclined shaft-210 m drift Prod: minor 1967-240 m drift,bulldozer scraping	aspy, ga on dump rep:argentite,freibergite	White qtz. .5-1.5 m, 170°/37°W, surface trace 60 m. Minor chalcedony w/ vein. Mineralization reported on hanging wall	massive, dark greenflow, silicified breccia. Porphyritic rhyolite dike at N end	Oxidized alteration envelope well exposed; consists of 1-2 m Mn-coated jarosite clay
MOUNTAIN HERO adit	5520' 6000'	Portal caved	1905-1912 -90 m crosscut, tramline development. Several pits at 6000' new rubble covered; large dumps	none at adit aspy, ga on hillside	No vein apparent-expected continuation of Montana not discovered; dark brown oxidized qtz. in higher dumps	light grey "digested" breccia, porphyritic and massive rocks	upper terminus of tramline to Conrad townsite, Windy Arm. No ore discovered, never used; abandoned equipment
NIPPER adits	2925' 2600'	3 adits accessible	1906 - #1 (upper), 10 m crosscut N side, 12 m drift S, side #2 (lower) large dump, reported 15 m crosscut, 10 m winze	banded aspy, ga rich in lower dump	Grey qtz. common; upper is 5-20 cm, 280°/50°N, approx. 50 m trace, with qtz. stringers. Lower reported 15-20 cm width	grey silicified andesite, mostly oxidized. 1-3 alt. env.-wad, jarosite clay, py, qtz. string	
PEERLESS adit	5100'	Reported sealed in tunnel	1905-1911 - numerous blast pits (adit?) in talus E 1930, 1965 - 710 m adit driven at 125°to Pride of Yukon orebody	aspy, ga, sph, tet on large dump	Small veins reported encountered in crosscut; abun. blue-grey qtz. alt. env. of white clay w/ py, aspy	granite,mauve alt. phase,chlorite clots replace mafic minerals	occupied cabin, D.D. core near entrance. Some core of fine laminated sediments; edge of pluton nearby
PRIDE OF YUKON mine	5700'	Incline accessible, bulldozer scraping	1905 -Prod:1910-1912 - 2600 oz. Au: 69,941 oz. Ag in 2525 tons. Total 255 m internal workings. Dump removed	reported:aspy,minor ga, cp, stibnite	Reported fissure vein and env. 0.7-4m thick, dipping NW	surface: oxidized, Mn-stained altered granit with chlorite clots	
RUBY SILVER/ Red Deer adit	4400'	Adit accessible	1907(?) - private interests, adit at least 5 m. Blast pits, trenching on Red Deer(s) 1929(?) Rich ore removed from dump	ga, pyrg on dump high assay values of vein	White qtz, grey gouge 15-40 cm, 175°/ 35°W. traced 15 m. Red Deer vein 210°/ 30°NW may be extension	oxidized porph. rhyolite; probably dike	very high grade silver vein
URANUS adit	4310' (Pooly Cr.) to 4500'	N adits caved, S reported accessible	1905-S. fork adit 55 m. 1908 adit near Pooly Cr. unsuccessful vein traced near crest, hand trenching on slope	aspy, ga in dumps pyrg reported	White qtz, reported 30-130 cm, possibly 160°/ 40°SW, traced 400 m. Dolomite (?) in vein. Much scorodite	breccia and streaked silicified intermediate to felsic? flows.	early reports exaggerated, as with Joe Petty
VAULT mine	3450' 3340'	2 adits accessible	1906-1912 - extensive development tramlines. Adits 140 m	VENUS VEIN: aspy, ga, sph, with minor tetrahedrite, cpy,pyrg. Reported: -chalcocite, -cerrusite -stibnite also 0.09% Cd in 1970.Common zoning from centre of vein to wall:arsenopyrite,pyrite & quartz,quarts crystals,pyrite & quartz arsenopyrite,wall alteration.	Sugary and crystalline banded white qtz, 7-50 cm, 170°/ 35°W at tunnel entrance qtz stringer veinlets near creek.	pink weathering grey trachyte other felsic dike rocks common 5 m wide oxidized, by envel.	N end of 2 km Venus Vein; pinches out in creek where fracture pattern changes. Galena lenses reported, vein oxidized near surface.
VENUS #1, 2	4000' appx. 3300' 3100'	shaft covered near cliff house. Mine portals O.K.	Extensive underground deve.,especially #2, approx. 685 m of workings Prod: 1905-1916, 1920:1725 oz. Au 184,410 oz. Ag in 16,000 tons.		Qtz vein well banded, persistent, 20-120 cm wide, ranges 190°-230°/ 35°W. Slickened, with gouge	dark green andesite, massive and breccia, with felsic dikes subparallel to surface trace.	Alteration contains Yukonite (Fe-As oxide)
VENUS EXTENSION	3000'	Shaft caved, portal accessible	1914 - drift 100 m. 1922 - shaft		Vein 50-80 cm, 195°/50°W at surface reported flatter at depth 10 cm clay boundaries, scorodite coated.	brown-khaki silicified andesite, also breccia	Numerous portals, trenches to S along trace of Venus Vein. 2900 level-major workings;diorite on dump
VENUS MINE 2600,2700 levels	2580' 2700'	Main entrances. United Keno Hill Mines Limited	1966 by Venus Mines Limited, Prod: 11,037 oz. Au: 344,107 oz. Ag in 64,926 tons. Workings on 2600,2650, 2700,2800 levels over 1 km of vein		Vein 1-2 m width, dip changes from 45°W in N to 20°W further S, makes 60°bend and disappears W	green intermediate volcanics; partly assimilated breccias some foliated rock, possibly tuffaceous	Zoning, paragenesis, alteration described in Ralfs, 1975. 1977 proven reserves 77,600 tons, 2.11% Pb: 7.2 oz/ton Ag: 1.38% Zn: 0.27 oz/ton Au
Abbreviations:		N-north, S-south E-east, W-west	Prod-production D.D.-diamond drilling	Sulfide Minerals: py-pyrite; ga-galena aspy-arsenopyrite; sph-sphalerite tet-tetrahedrite	pyrg-pyragerite (ruby silver) steph-stephanite (black silver) cp-chalcopyrite	minz-mineralization seric-sericite alt-alteration	env-envelope qtz-quartz gy-grey

TABLE I

Geological notes and development on major workings, Montana Mountain area cirque north of Pooly Canyon, layers with contrasting weathering charactertistics suggest groups of flows that dip steeply northeast.

A prominent reddish brown-weathering plug of ultramafic rocks, part of the Taku Group, occurs 1 km north of Montana Mountain between Mount Nansen volcanic rock and an Early Tertiary granitic pluton (Figure 2). It includes medium-grained 2-pyroxene gabbro, that varies in grain size. Serpentine veinlets are abundant near the margins, and picrolite and magnetite are spectacularly developed. The external contact of the plug is a several metre-wide sheared zone commonly occupied by mafic dikes.

Laberge Group

Lower Jurassic conglomerate and shale of the Laberge Group flank the western boundary of the volcanic complex and comprise a narrow strip between the Nakina Formation and the later granitic and volcanic units. Brute Mountain, a craggy ridge in the northwest part of the study area, provides fine exposures. Wheeler (1961, p. 59) measured a section of 1100 m of siltstone and argillite, with greywacke increasing upward in the section and capped by 400 m of massive conglomerate. Conglomerate occurs as 1 to 2 m thick layers that can be traced for a kilometre or more, and as 50 to 300 m lenses that interfinger with greywacke along strike. The conglomerate is composed of rounded porphyritic mafic volcanic clasts (a lithology of the Lewes River Group) and granitic pebbles, mixed with more angular fragments of greywacke, chert and quartzite. Clasts range from 5 to 10 cm, the largest observed being a well-rounded granite boulder 30 cm in diameter. Wheeler (1961) interpreted the upper section as an alluvial fan deposit.

Fine clastic sediments of the Laberge Group are characterized by a reddish weathering rind formed from the mafic volcanic detritus. Generally they are dark greywacke and fine laminated siltstone, with rip-up clasts of argillite.

Wheeler (1961, p. 31) stated that the contact between Atlin Terrane and the Mesozoic rocks is not exposed in Whitehorse map-area, and the boundary between the two assemblages is generally thought to be faulted (Aitken, 1959; Morrison and others, 1979). On Montana Mountain, an unconformable contact of the Nakina Formation with steeply dipping Laberge siltstone is exposed in Big Thing Creek at an elevation near 1500 m. A 20 cm layer of oxidized chert is the top of the volcanic unit. No penetrative fabric is observed in the Laberge siltstone, or in the porphyritic greenstone. The contact can be traced in rubble as far as the south tributaries of Montana Creek, and does not appear to be faulted.

Montana Mountain Volcanic Complex (Mount Nansen Group)

The Montana Mountain Complex was mapped by Wheeler (1961) and its volcanics were included in the Hutshi Group. Use of this term has been discontinued in favour of better defined volcanic nomenclature from adjacent map areas (Tempelman-Kluit, 1978). The rocks on Montana Mountain resemble those of Mount Nansen and belong to the Mount Nansen Group, named by Bostock (1936) in the Carmacks area. The Mount Nansen Group includes a variety of breccias and has distinctive massive volcanics. The Montana Mountain volcanic complex has steep intrusive outer contacts and contains felsic dikes characteristic of the Mount Nansen Group. The complex is considered equivalent in character and age to Mount Nansen.

The massive rocks are of intermediate composition, and fine-grained, dark green to grey. Feldspar phenocrysts, from 2 to 6 mm long, may form up to 30% of the massive rocks. Dark coloured rocks are usually magnetic, and some layered units contain fine acicular rosettes of augite. The majority of the rocks are altered from original andesites to clinozoisite and chlorite-rich greenstone.

Breccias are the commonest rocks on Montana Mountain and show a range in composition and texture. Three groups are distinguished: a) intrusion breccias; b) pyroclastic deposits; c) debris flows. Intrusion breccias consists of volcanic fragments in a disrupted matrix. They contain massive, fine-grained volcanic clasts and matrix comprising more than 50% of the rock. Fresh surfaces are dark and fragment margins obscure where partial assimilation has occurred. The breccia contains 20% to 50% unsorted fragments ranging from granules to large blocks, but average 30 cm across. Large clasts may be well-rounded, but most small pieces are angular, many with thin projections. Most are dark green to light grey, probably of intermediate composition, although porphyritic and banded volcanic clasts are included. Reaction with the matrix is shown by many clasts with epidotized rims, and locally centers contain chloritic alteration. The matrix is siliceous and recrystallized, now largely consisting of green amphibole and chlorite. Contacts with surrounding massive rocks are steep and may represent a gradual decrease in brecciation away from the intrusive pipe.

Fine laminated zones interpreted as flow layering are common in large bodies of intrusion breccia. In an exposure 250 m southwest of Jean tarn at an elevation near 2000 m coarse-to fine-grained layers and irregular bands of mauve cherty rock can be traced 50 m and interfinger with unsorted breccia in both directions.

The breccias are interpreted as the lining around volcanic centers formed during repeated explosive pulses. They commonly show intrusive contacts and fragments and flow layering are locally truncated by similar breccia.

Breccias that may be pyroclastic deposits are well exposed on Dail Peak. Lapilli of amygdaloidal maroon and greenish basalt make up a breccia without matrix. Some clasts may be collapsed viscous fragments suggesting the rock formed as welded tuff. Textures interpreted as crossbedding and rip-up clasts have been observed.

Poorly sorted and weakly layered heterolithic fragmental rocks occur locally as near the Mountain Hero prospect. They contain chips of blue quartz and chert in a greywacke-like matrix. These breccias contain more clasts than the intrusive type and thin layering is more regular. The breccias may be debris flow deposits resulting from gravity slides.

Prominently orange weathering felsic dikes intrude the Montana Mountain Complex. Some of these are swarms of crosscutting dikes along 5 to 15 m wide sheared zones. The dikes are trachyte or latite and contain 15% to 25% potassium feldspar, as equant and fine acicular crystals. They are the latest volcanic rocks in the area.

Age of the Volcanic Complex

The Laberge Group is well dated as Lower and Middle Jurassic (Wheeler, 1961). Fine-grained siliceous layers contain lingulids, ammonites and plant debris near the saddle of Brute Mountain ridge. Because the Mount Nansen Group intrudes Laberge strata, the lower age limit for the volcanic complex is Middle Jurassic.

A granitic pluton intrudes the complex along Big Thing Creek. Biotite quartz monzonite from near the north end of the study area was dated by Morrison and others (1979) by K-Ar methods at 64.3 + 2.2 Ma. This determination is partway between the ages of a Late Cretaceous (75 Ma) and an Eocene (55 Ma) plutonic suite identified by Morrison; he questioned its accuracy.

Mount Nansen rocks in the Miners Range were dated 72.4 ± 2.5 Ma with K-Ar methods by Grond (1980). The other age determination for the Group is 58.4 Ma (K-Ar) from the Snag map area (Tempelman-Kluit and Wanless, 1975). Nisling Range alaskite, recognized as subvolcanic equivalent and feeders for Mount Nansen bodies in the Dawson Range by Tempelman-Kluit, ranges from 67 to 52 Ma (Rb-Sr and K-Ar methods). Grond suggests that the Mount Nansen Group may be older than previously thought, and the relations from Montana Mountain support this. Morrison concluded that subvolcanic intrusions and volcanic activity were probably related to protracted plutonism of the Late Cretaceous suite. In contrast, the explosive, largely acidic volcanism at Mount Skukum and on the West Arm of Bennett Lake are 50 Ma, and related to the Eocene suite. The Montana Mountain Volcanic Complex was probably developed 65 to 70 million years ago.

Coast Intrusions

The north end of the volcanic complex is intruded by granitic rocks. Fresh medium-grained quartz monzonite weathers pinkish at the northern limit of the study area. Its estimated mode is 20% quartz, 15% potassium feldspar, 55% plagioclase, 5% hornblende, 4% biotite and 1% greenish amphibole. Salmon orange calcite veining and massive to gneissic xenoliths of dioritic composition are common.

The pluton changes in composition near its contact with the Mount Nansen volcanic rocks. At the Peerless adit, about 2 km north of the contact, mafic minerals are replaced by chloritic clots, and quartz has a dark purplish hue. In Big Thing Valley, the rock contains 20% qaurtz, 50% potassium feldspar, 25% plagioclase and 5% chlorite. It is white weathering, and lightly oxidized over wide areas, where it resembles quartzite. This quartz monzonite is referred to as the "mauve alteration phase" because of the dark hues in quartz.

Near quartz veins, feldspar is reduced to white clay. Mafic minerals are lacking, so that chlorite and purplish quartz dominate the rock. Interstitial pyrite occurs within several metres of the vein.

At the contact with the volcanic complex, a 4 to 5 m thick zone of iron-stained, greenish-brown fine-grained aplite borders the mauve alteration phase. The rock resembles alaskite. Dikes of aplite extend into the volcanic rocks, and into clastic strata of the Laberge Group. Acicular rosettes of a black mineral, probably tourmaline, are scattered in these dikes. Drusy chalcedony fills fractures and openings in the alaskite.

Quartz Veins

The main quartz veins on Montana Mountain are shown in Figure 3. The Venus vein is the largest and has been traced on surface more than 2 km with widths near 3.5 m and down dip extent of 800 m. Most veins are 5 to 250 m long. The quartz veins cut the volcanic rocks and quartz syenite and follow sharp fractures or faults; they may show slickensided surfaces on the hanging wall. Veins along Windy Arm dip moderately west; other veins in the pluton and central part of the complex dip northwest and north respectively.

Most veins contain white quartz; sulphides locally comprise a large portion of the widest veins. Quartz is coarsely crystalline or massive, and in places saccharoidal. Comb structure is well developed, with crystals ranging from 0.1 to 4 cm across. The Venus vein shows characteristic symmetrical mineral zoning about the vein's centre with arsenopyrite on both walls followed by quartz and pyrite toward the centre and galena and sphalerite in the middle. There is open space in the centre of some veins.

The quartz veins have hydrothermal halos of oxide and clay minerals in the surrounding rocks like small scale alteration zones around porphyry copper deposits. Volcanic rocks near veins weather orange brown and are commonly silicified, in contrast to plutonic rocks that are white or dark green, and rich in kaolin and mica. Figure 4 shows some alteration patterns observed at old workings.

Acknowledgements

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See BIBLIOGRAPHY this volume.

GEOLOGY, MINERALIZATION, AND K-AR AND RB-SR ISOTOPIC STUDY OF THE RAM ZINC-LEAD-SILVER PROPERTY YUKON PLATEAU, SOUTHWEST YUKON TERRITORY
(105 D 4)

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ABSTRACT

The RAM zinc-lead-silver property in southwest Yukon Territory (105 D 4) is on the contact between metamorphic rocks of the Yukon Crystalline Terrane and foliated granitic rocks of the Coast Plutonic Complex. Both are intruded by an Eocene granitic stock. The metamorphic rocks, predominantly biotite-quartz pelitic schists, with amphibolite, marble, graphitic phyllite and foliated metagranite, may be partly Precambrian and are modified by metamorphism. Foliated granodiorite to quartz diorite of the Coast Plutonic Complex intrudes the metamorphic rocks. Rb-Sr analyses of two of these granitic rocks give a possible whole rock date for foliated granite of 143 Ma (initial $^{87}Sr/^{86}Sr$ ratio of 0.7068), and a maximum age of 200 Ma, while K-Ar dating of hornblende and biotite separates from a granodiorite gives 106±4 Ma and 53.7±1.9 Ma, respectively. An Eocene, porphyritic microgranite stock (Rb-Sr whole rock date: 43 Ma with assumed initial $^{87}Sr/^{86}Sr$ ratio of 0.705) discordantly crosscuts the older rocks on the property, and has probably reset the biotite K-Ar date in the granodiorite.

Mineralization on the property includes small skarns (maximum size 15 m x 6 m) with disseminated sphalerite and galena, in metasedimentary rocks of the Yukon Crystalline Terrane, near the Eocene stock. Assay of grab samples from the showings average 53.8 gm/t silver, 4.35% zinc, and 2.20% lead.

Introduction

The RAM zinc-lead-silver skarn property (Figure 1) is within the western part of the Yukon Plateau (Bostock, 1948), in the Whitehorse map-area (105 D 4:Wheeler, 1961), 71 km southwest of Whitehorse and 1.5 km northeast of Primrose Lake. The property, between 1150 m and 1850 m elevation, can be reached by helicopter from Whitehorse or by fixed-wing aircraft to nearby Primrose Lake. A winter trail along the Watson River valley lies approximately 9.5 km east of the property.

E. Kreft, of Whitehorse, staked the original seven RAM claims in 1976 and added an eighth claim in 1977. United Keno Hill Mines Ltd. optioned the property in 1977 and carried out detailed geological and soil geochemical surveys in 1978 on these eight claims (Figure 2). Subsequently, seven trenches totalling 104 m in length were excavated by hand to examine the soil geochemical anomalies, ten lines totalling 4.1 km were surveyed with a V.L.F. EM-16 instrument, 37 claims were added to the property, and regional geological and soil geochemical surveys were conducted over the new claims.

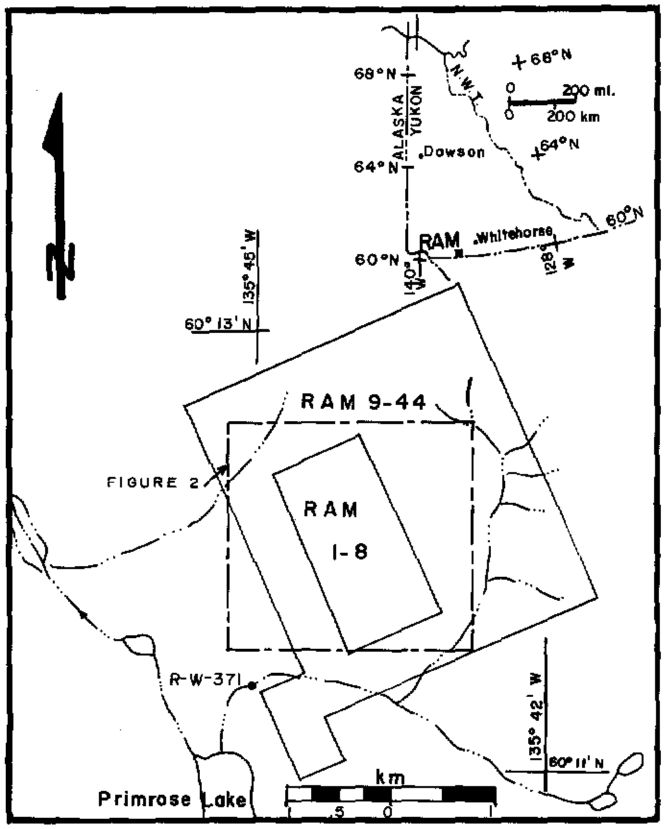

Figure 1 Location map of RAM claim group, Y.T., and location of claim blocks. R-W-371 is a sample location not shown on Figure 2. Area shown in Figure 2 is outlined.

Geology of the RAM (1 to 8) Property

The RAM property is (Figures 1 and 2) on the contact between metamorphic rocks of the Yukon Crystalline Terrane (Unit 1), and intrusive rocks of the Coast Plutonic Complex (Unit 2). Porphyritic microgranite (Unit 3) intrudes the rocks.

The Yukon Crystalline Terrane comprises a discontinuous belt of northwest trending, foliated and folded metasedimentary rocks, in which schistosity generally parallels compositional banding (Wheeler, 1961). Foliation generally strikes east-southeast and dips steeply.

On the RAM, the metamorphic rocks are subdivided (Figure 2) into biotite-quartz pelitic schist (Unit 1a), amphibolite (Unit 1b), marble (Unit 1c), and graphitic phyllite (Unit 1d).

Medium-grained, biotite-quartz pelitic schist (Unit 1a) is the dominant rock type. Unit 1a contains 25% to 40% mafic minerals, and is commonly segregated into distinct felsic and mafic bands up to 6 cm wide. Thin sections show that the schist consists of 40% polygonized quartz and 35% equigranular feldspar, two-fifths of which is potassium feldspar. Mafic-rich bands commonly contain equal amounts of biotite and opaques, some of which is graphite, aligned along foliation planes. Epidote and apatite are common accessory minerals.

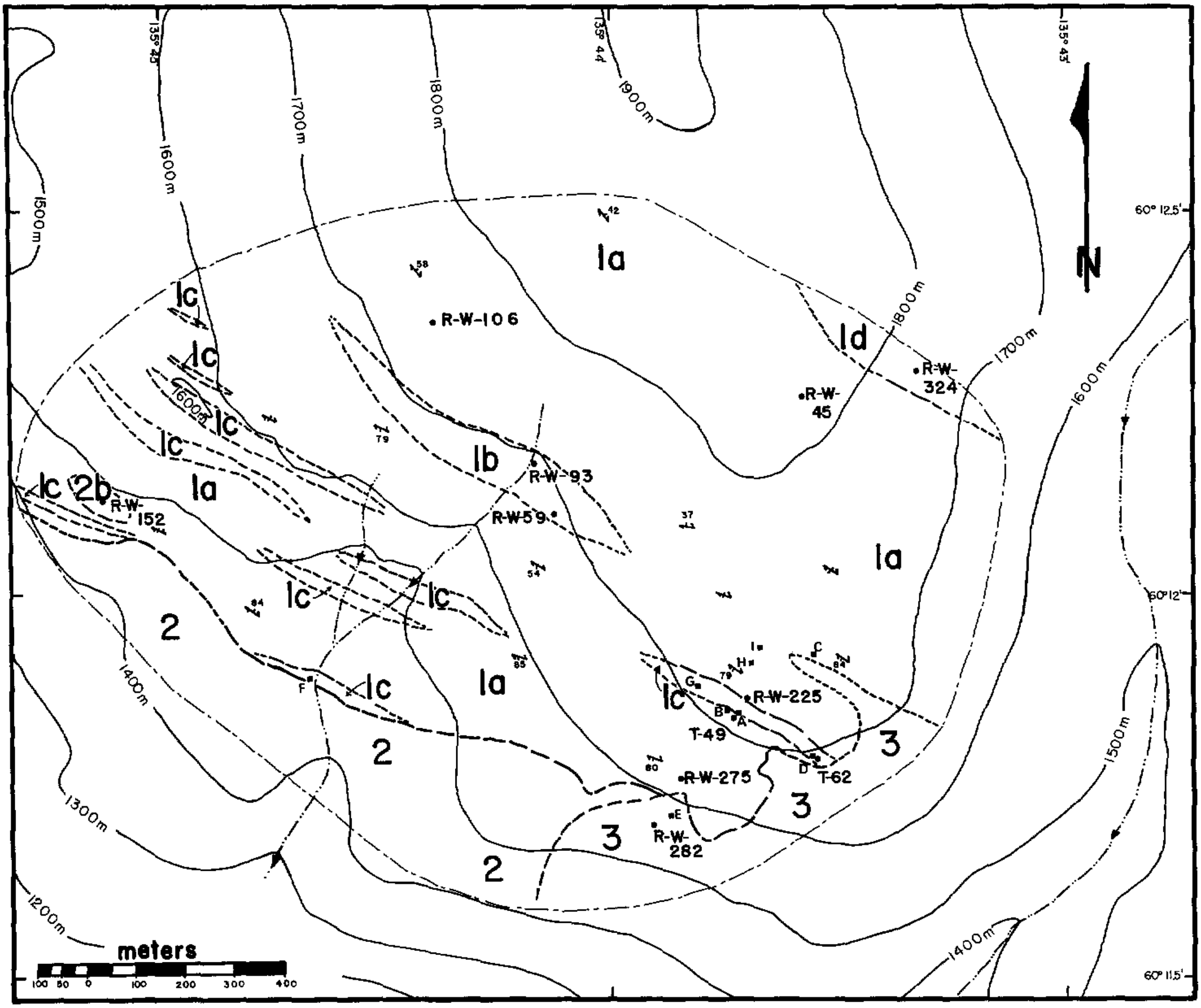

Figure 2 Detailed geology of the RAM claim group Y.T., with mineralized showings and sample locations. (See text for detailed description of rock units). Unit 3 is leucocratic porphyritic microgranite; Unit 2 is foliated granodiorite; Unit 2b is foliated leucocratic granites; Unit 1a is medium-grained biotite-quartz pelitic schist; Unit 1b is fine-grained amphibolite; Unit 1c is medium-grained marble; Unit 1d is fine-grained graphitic phyllite. Contour interval is 100 m; long-short dashed line is boundary of area mapped; solid circles are sample locations, and solid squares denote the location of zinc-lead-silver or copper-molybdenum mineralization.

Foliated meta-granite, intruded into the Yukon Crystalline Terrane early in its history (see geochronometry), was identified in thin sections, but not differentiated from the pelitic schists of Unit 1a during mapping. The sample location is noted on Figure 2 (R-W-225), but the extent of the unit is not known. This material consists of gneissic bands of intergrown quartz (25%), plagioclase (An , 20%), and potassium feldspar (15%), separating irregular segregations of a mafic mixture that might be replacing amphibole. The mafic mixture contains mats of biotite (15%), mixed with carbonate and sericite (15%), sphene (5%), and opaque material (5%). Accessory epidote is present, and traces of zircon occur in the biotite.

Amphibolite (Unit 1b), a green-black, very fine-grained, schistose unit, consists of about 70% amphibole, intergrown with 10% quartz and 10% plagioclase (An_{30}). Opaque material, some of which is graphite, makes up 10 % of the rock; accessory apatite is found. Schistosity, and fracture planes perpendicular to schistosity, are well developed.

Grey to white, medium-grained marble (Unit 1c) occurs in bands up to 45 m in width. Due to recessive weathering, individual bands could not be followed more than 350 m. The marble-schist contacts are gradational and sharp. Occasional lenses of mediumgrained feldspar and quartz, a few cm in diameter, occur in the marble near the porphyritic intrusive (Unit 3). Garnet-diopside skarn occurs in the marble near the porphyritic intrusive and is closely associated with sulphide mineralization.

Graphitic phyllite (Unit 1d) is a black, fine-grained siliceous rock. It is restricted to the northeast corner of the area mapped. In thin section, the rock is seen to consist of very fine grained quartz (30%), and feldspar (10% potassium feldspar and 15% untwinned plagioclase), with 35% opaque material, and 10% biotite. The main opaque component is graphite, which together with biotite, defines the foliation of the rock.

Granitic rocks of the Coast Plutonic Complex (Unit 2) include medium-grained, foliated granodiorite to quartz diorite. They intrude the metamorphic rocks in the southwest part of the map-area. The granitic rock contains 30% quartz and 50% feldspar, dominantly An plagioclase. Up to 10% of the feldspar is potassium feldspar that occurs as interstitial grains. Biotite and hornblende comprise 20% of this rock, and occur as poikilitic grains up to 5 mm long.

A foliated leucocratic granite intrusive pod (Unit 2b), near the metasedimentary rock-granodiorite contact (Figure 2), shows cataclastic texture in thin section. It is composed of 30% quartz, and 65% microcline, orthoclase and perthite. The rock also contains 5% chloritized and sericitized biotite which locally hosts zircon.

An unfoliated, leucocratic, porphyritic micro-granite stock (Unit 3) intrudes Units 1 and 2 (south-east corner of Figure 2). Intrusive contacts are steep, and metasedimentary rocks within 50 m of the contact are finer grained, less schistose, and more siliceous than those further from the intrusion. Phenocrysts of orthoclase and grey quartz, up to 3 mm across, make up 20% of the microgranite. Less than 4% mafic minerals (mainly biotite) are present. The very fine grained groundmass is myrmekitic and sericitized.

Mineralization

Seven zinc-lead-silver-bearing skarns were found in the metasedimentary rocks within 300 m of the porphyry contact (Unit 3). These showings (Figure 2:A, B, C, D, G, H, I) consist of zones from 1 to 6 m wide, of disseminated sphalerite and galena, associated with garnet, epidote, diopside and quartz. Several were located by trenching soil geochemical anomalies. The largest showing (Figure 2:A) is a silicified pod about 15 m long and 6 m wide, within marble, at the contact with schist.

It consists of 2 m wide marginal bands of disseminated mineralization in silicified skarn (which resembles material found in the smaller skarn occurrences), around a core of pale green, fine-grained siliceous rock containing sphalerite and galena as fine disseminations and blebs up to 3 cm in diameter. Average silver values are higher in the marginal bands (131 gm/tonne) than in the core (25.3 gm/tonne), and zinc assays are higher in the core (15.78% zinc) than in the margins (0.93% zinc). Lead, copper, and cadmium values are low throughout the showing. Assay values of grab samples from these showings are as high as 269.82 gm/tonne 12.9% lead, 31.6% zinc, 0.43% cadmium, 2.3% copper, and 0.025% WO_3, with average values of 1.73 oz. silver/ton, 2.29% lead, 4.35% zinc, 0.07% cadmium, 0.51% copper and 0.017% WO_3 (assays from United Keno Hill Mines Ltd., company reports, 1977, 1978).

Minor malachite was found at the contact between granodiorite and the metasedimentary rocks (Figure 2:F), and in the microgranite (Figure 2:E). The second occurrence is in porphyritic microgranite and consists of traces of malachite along fractures over a 10 square meter area, that is within an orange-weathering gossan 300 m in diameter. Malachite stained material assayed .34 gm/tonne, 0.27% copper and 0.002% molybdenum (assays from United Keno Hill Mines Ltd., company reports, 1977, 1978).

Geochronometry

Twelve samples (Table 1) were analysed for Rb, Sr, and Sr isotopic composition. Within this suite, eight samples are from metamorphic rocks, and four are from intrusive rocks. K-Ar analyses (Table 2) were done on biotite and hornblende separates from the granodiorite.

Samples of the metamorphic rocks include: three biotite-quartz pelitic schists (Unit 1a: R-W 106, R-W-275, T-49): one foliated metagranite (Unit 1a: R-W-225): two amphibolites (Unit 1b: R-W-93, R-W-59): one marble (Unit 1c: T-62): and one graphitic phyllite (Unit 1d: R-W-324). Figure 3 indicates that the marble (T62) and one amphibolite sample (RW59) have gained radiogenic Sr during metamorphism. The other amphibolite (RW93), with the lower $^{87}Sr/^{86}Sr$ ratio (0.7066), approximates an initial ratio expected for volcanic or sedimentary rocks. The true initial ratio for the suite may be lower, but is not better specified by the data. Two reference isochrons, Precambrian (1200 Ma), and Middle Jurassic (162 Ma, as calculated for sample R-W-324), are plotted on Figure 3.

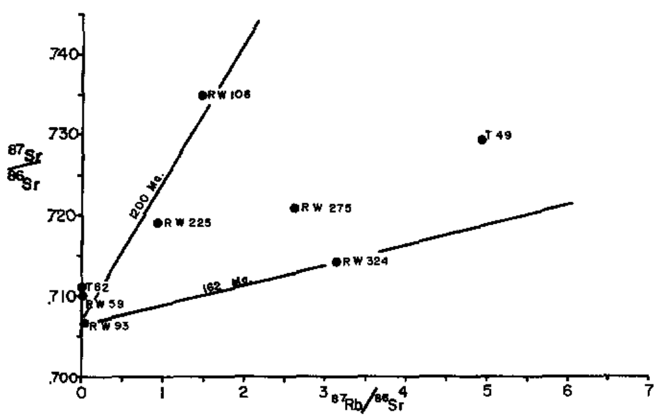

Figure 3. Plot of $^{87}Rb/^{86}Sr$ and $^{87}Sr/^{86}Sr$ ratios for eight samples from the Yukon Crystalline Terrane. Two reference isochrons, using an initial $^{87}Sr/^{86}Sr$ ratio of 0.7066 (based on sample R-W-93), are plotted, one for 162 Ma (as calculated for sample R-W-324), and one for 1200 Ma.

Table I Rubidium-Strontium Data for Analysed Whole Rock Samples[a] RAM Claim Group, Whitehorse Map Sheet (105 D 4), Yukon Territory.

Sample[b] No.	Location[b] Lat. (N); Long.(W)	Rock Unit[b]: Rock Name	Sr (ppm)	Rb (ppm)	87Sr/86Sr	87Sr/86Sr
R-W-106	60°12.3':135°44.3'	1a: biotite-quartz schist	65.7	33.5	0.7349	1.47
R-W-225	60°11.9':135°63.6'	1a: foliated meta-granite	339	130	0.7191	0.944
T-49	60°11.7':135°43.5'	1a: biotite-quartz schist	52.4	89.7	0.7294	4.96
R-W-275	60°11.8':135°43.7'	1a: biotite-quartz schist	94.3	86.3	0.7210	2.65
R-W-59	60°12.1':135°44.1'	1a: amphibolite	233	2.17	0.7102	0.027
R-W-93	60°12.2':135°44.1'	1b: amphibolite	152	3.06	0.7066	0.058
T-62	60°11.8':135°42.7'	1c: marble	273	1.87	0.7110	0.020
R-W-324	60°12.3':135°43.3'	1d: graphitic phyllite	20.7	22.6	0.7143	3.16
R-W-371	60°11.6':135°45.0'	2 : foliated granodiorite	425	64.4	0.7077	0.438
R-W-152	60°12.1':135°45.0'	2b: foliated granite	188	134	0.7110	2.06
R-W-45	60°12.2':135°43.5'	altered dike[c]	422	89.4	0.7055	0.613
R-W-282	60°11.7':135°43.8'	3 : porphyritic microgranite	16.9	168	0.7262	28.9

a All analyses done in the Geochronology Laboratory, Department of Geological Sciences, The University of British Columbia.

b See Figures 1 & 2.

c Crosscutting dike, not shown as separate unit on map.

Table II Potassium-Argon Analytical Data[a] RAM Claim Group, Whitehorse Map Sheet (105 D 4), Yukon Territory.

Sample[b] No.	Location[b] Lat.(N): Long.(W)	Rock Unit[b]: Rock Name	Mineral dated	%K	40Ar*[c] / 40Ar total	40Ar*[c] (10-5cm3 STP/g)	Date (Ma)[d]	Geologic Time
R-W-371	60°11.6':135°45.0'	2: foliated granodiorite	biotite	6.74	0.893	1.4267	53.7±1.9	Eocene
R-W-371	60°11.6':135°45.0'	2: foliated granodiroite	hornblende	0.955	0.865	0.4038	106±4	Early Cretaceous

a All analyses done in the Geochronology Laboratory, Department of Geological Sciences, The University of British Columbia.

b See Figures 1 & 2.

c "Ar*" indicates radiogenic argon.

d Constants used: Steiger and Jager (1977) $K_{\lambda\varepsilon}$= 0.581 x 10-10 yr-1: $K_{\lambda\beta}$= 4.962 x 10 - 10 yr - 1: 40K/K - 1.167 x 10 - 4.

The pelitic schists can be interpreted as old rocks reset to varying degrees following a complex thermal history, until emplacement of the Coast Plutonic Intrusions. However, samples R-W-225 and R-W-106 suggest a possible Precambrian age for some units of the Yukon Crystalline Terrane. Data from L. Werner (personal communication, 1979), for pelitic schists of the region west of Atlin Lake, B.C., yield similar Precambrian Rb-Sr whole rock dates, while Wasserburg et al. (1963) report Precambrian whole rock Rb-Sr dates (up to 1170 Ma) for the Birch Creek Schist, found throughout the Yukon-Tanana Upland, in Alaska.

These data imply that part of the Yukon Crystalline Terrane and its extensions into northern B.C. and eastern Alaska, may be old (at least 1100 to 1200 Ma). The whole rock chemistry of pelitic schists analysed in this study has been reset to varying degrees by metamorphism at least until Jurassic and possibly to Eocene time. Similar scattered results (whole rock Rb-Sr dates, 664 to 1170 Ma) were reported by Wasserburg et al. (1963), indicating that the entire belt has undergone a complex thermal history.

Two foliated samples of Coast Plutonic Complex (Table 1: R-W-371, R-W-152) define an isochron of 143 Ma, with an initial $^{87}Sr/^{86}Sr$ ratio of 0.7068 (Figure 4). This result is essentially a single point whole rock date for the foliated granite, based on the speculative assumption of equal age and initial isotopic composition for the granodiorite and granite. Using an assumed low initial ratio of 0.705, a model age of 200

Ma is calculated for the granite, which would be a likely maximum age for this material. K-Ar analysis of granodiorite (Table 2: R-W-371) a hornblende date of 106+4 Ma, and a biotite date of 53.7±1.9 Ma. The biotite has been resent by an Eocene thermal event which did not remove as much argon from the more retentive hornblende. The 106 Ma (K-Ar, hornblende) date would be a minimum age for the granodiorite. The foliated plutonic rocks are likely Jurassic, early Cretaceous.

A Rb-rich, Sr-poor sample of porphyritic micro-granite (Table 1:R-W-282) gives an Eocene Rb-Sr model date of 43 Ma, using an assumed low initial ratio of 0.705 (Fig. 4). The non-foliated, altered dike (Table 1: R-W-45) also has a low initial ratio and might lie along the same Eocene isochron (Figure 4). Emplacement of the Eocene microgranite likely caused resetting of the biotite in the foliated Coast Plutonic Complex granodiorite.

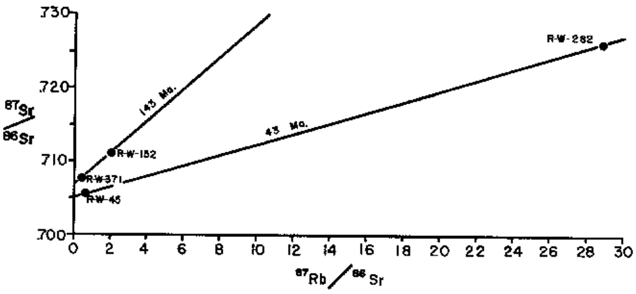

Figure 4. Plot of $^{87}Sr/^{86}Sr$ and $^{87}Sr/^{86}Sr$ ratios for four intrusive rock samples from Units 2 and 3, Coast Plutonic Complex and Eocene intrusives, respectively. Two reference isochrons are plotted; 43 Ma, as calculated for sample R-W-282, using an initial $^{87}Sr/^{86}Sr$ ratio of 0.705; and 143 Ma, as defined by samples R-W-152, with an initial $^{87}Sr/^{86}Sr$ ratio of 0.7068.

Acknowledgements

We thank R. E. Van Tassell and R. J. Joy, United Keno Hill Mines Ltd., Exploration Department, Whitehorse, for the field support of this project, and for permission to use company data. Financial assistance for the laboratory work was provided by the Department of Indian and Northern Affairs, Whitehorse. Geochronometry was carried out in the U.B.C. laboratories, with the assistance of K. L. Scott (K, Rb, and Sr analyses). J.E. Harakal did the Ar analyses.

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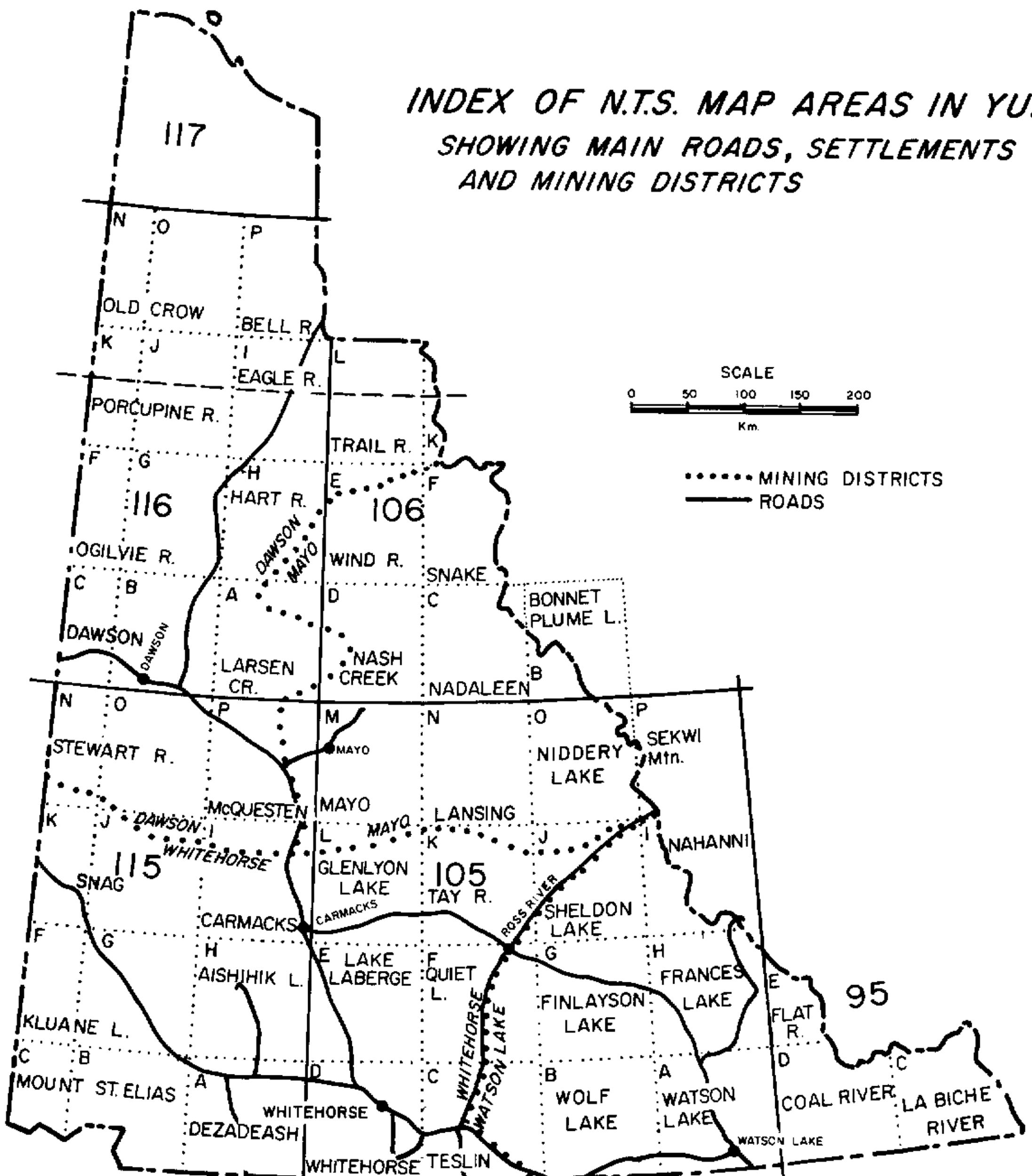
INDEX OF N.T.S. MAP AREAS IN YUKON

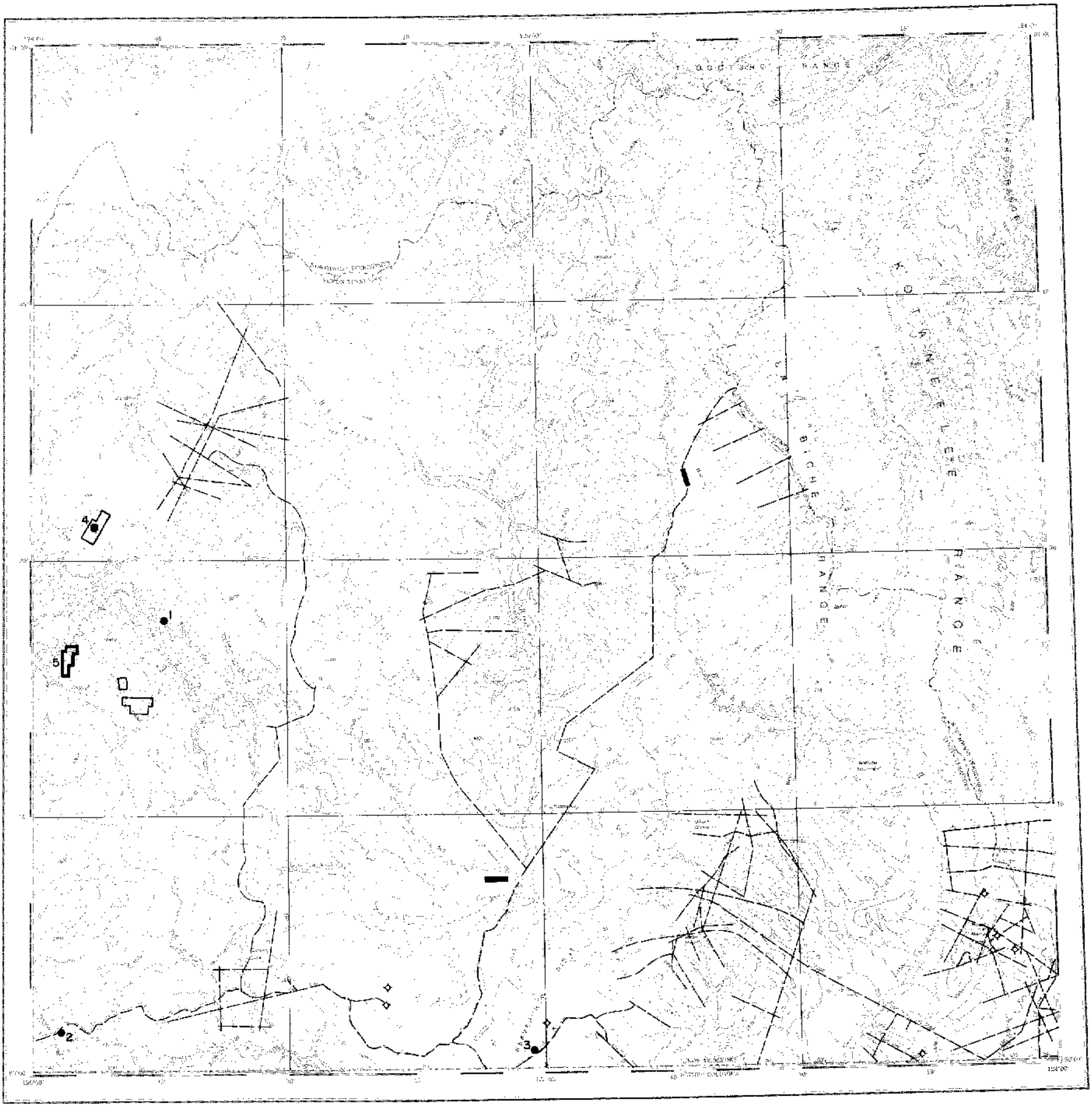
SHOWING MAIN ROADS, SETTLEMENTS AND MINING DISTRICTS



SUMMARIES OF ASSESSMENT WORK, DESCRIPTIONS OF MINERAL PROPERTIES, AND MINERAL CLAIMS STAKED IN 1980.

Reports and summaries of work done are keyed to a set of maps which are reductions of the 1:250,000 topographic maps of Yukon. The maps show three features in relation to the topography. They include the location of known mineral occurrences with a key naming them. The key also gives the most recent literature reference describing the occurrence. The mineral occurrences are taken from the Yukon Resource Atlas commissioned by the Yukon Territorial Government and have been brought up to date for 1979 and 1980. The maps also show the areas covered by mineral and placer claims in good standing and the areas covered by leases to prospect for placer and coal. Mineral claims staked during 1980 are distinguished from those located earlier to emphasize areas that will focus future exploration. The claim information derives from the maps of the Department of Indian Affairs Supervising Mining Recorder. Finally, the maps indicate the secondary access roads and winter tote trails as shown in the Yukon Resource Atlas with additions from the files of the Land Use Section DIAND. Blue print copies of these maps at 1:250,000 scale are available from the Geology Section.

The maps are ordered according to the National Topographic System and the work summaries and records of new staking also follow this order. Thus each map precedes a section describing 1979-1980 activity within that area. Each report on a property includes the National Topographic System reference number keying it to the relevant 1:50,000 scale map-area. The number beside the NTS relates to the property location on the index map. Latitude and longitude further define the location. The name reported is that given by the original discoverer or staker; it may not match that of the present claims. Repetition of names is avoided by assigning a unique name where the claim name is not diagnostic.



LA BICHE RIVER

YUKON TERRITORY - NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
○72 .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	◇ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

LA BICHE RIVER MAP-AREA (NTS 95 C)

NO.	PROPERTY NAME	REFERENCE
1	POOL	Barium Vein Occurrence
2	TROPICAL	Barium-Lead-Zinc Occurrence
3	BEAVERCROW	DIAND Files Log of SOBC Shell Beavercrow Well K-2 (Drilled 1963)
4	TING	This Report
5	VISTA	This Report

TING
St. Joseph Explorations

Lead, Silver, Zinc
Vein
95 C 12 (4)
(60°31'N,125°53'W)

Reference: Morin et al (1980, p.50)

Claims: TING 1-21

Source: Summary by R. Debicki from assessment report 090640 by J.C. Harrison.

Current Work and Results:

During 1979, magnetic, induced polarization resistivity, MAX-MIN and VLF electromagnetic and soil geochemical surveys were carried out. The MAX-MIN electromagnetic survey did not locate conductors below known mineralization, but distinguished areas of conductive graphitic shale beneath overburden. The VLF electromagnetic survey identified known mineralization and two possible vein structures. Known mineralization, and chargeable graphitic shale were outlined by the IP and resistivity surveys.

Mineralization is in a 2.5 m wide vein exposed for 65 m and hosted by brecciated sandstone at a sandstone-syenite contact. Surface outcrops are oxidized, and contain secondary lead and zinc minerals. Two trenches dug to 1.5 m on the vein failed to reach fresh mineralization. A chip sample from one trench contains 4.60% lead, 0.27% zinc, 65.7 gm/tonne silver and trace gold.

Soil samples taken at 25 m intervals along lines 100 m apart were analyzed for lead, zinc, silver, and molybdenum. A lead-zinc anomaly roughly coincident with a MAX-MIN electromagnetic anomaly occurs along a suspected fracture zone.

VISTA
Silver Standard Mines Limited

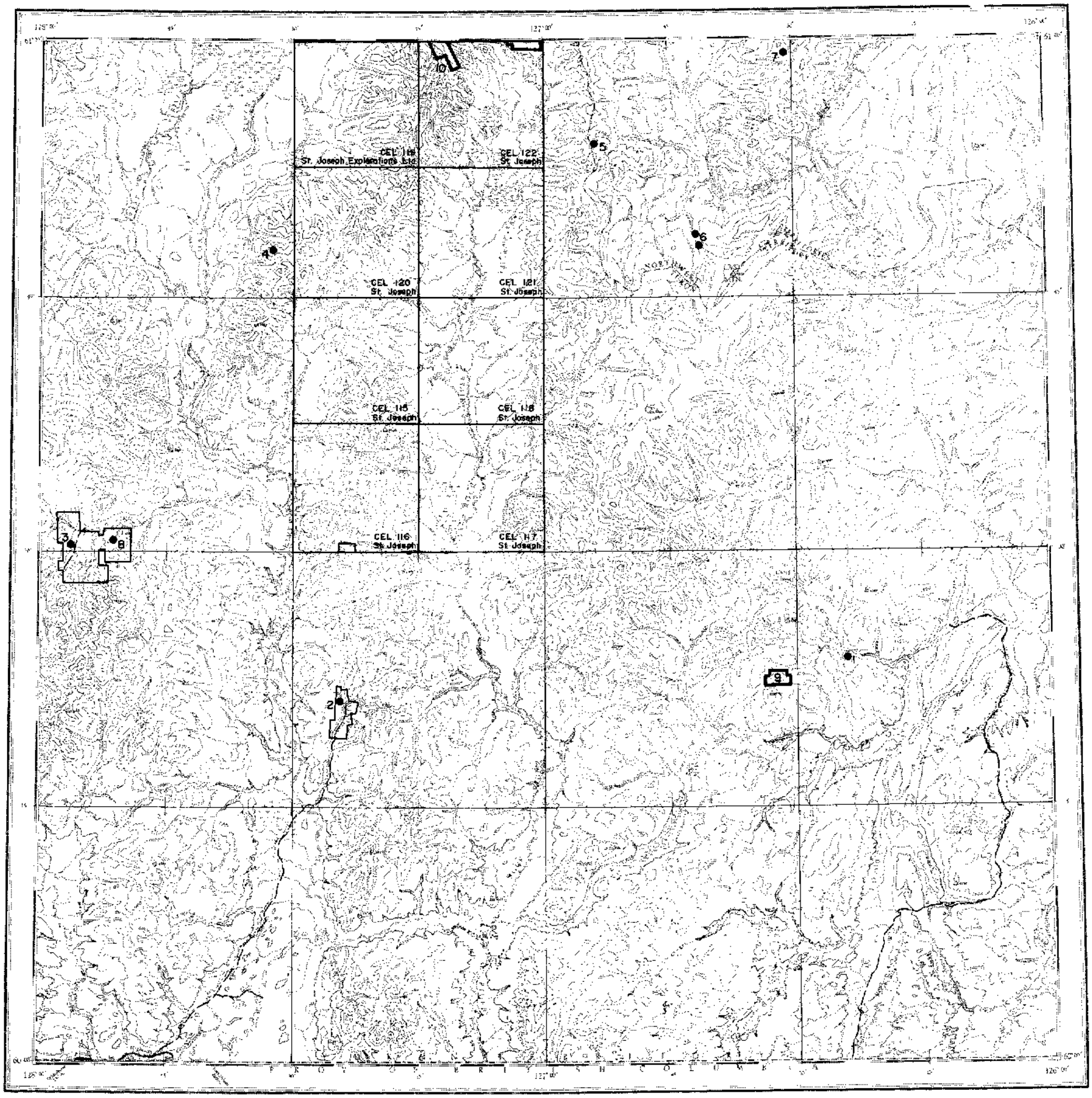
Unmineralized Target
95 C 5 (5)
(60°23'N,125°50'W)

Claims: VISTA 1-16, SID 1-6

Source: Summary by D. Tempelman-Kluit from assessment reports 090663 and 090664 by D. G. Leighton.

Current Work and Results:

The claim groups are underlain by syenite (Cretaceous?), which intrudes a variety of Paleozoic strata. The claims are of interest for possible uranium and rare earths associated with the intrusion. Seven shallow drill holes totalling 70 m were drilled.



COAL RIVER

YUKON TERRITORY – NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	▬▬ .... Placer Leases in good standing (Jan. 1981)	— — — .... Tote Trail
O72 .... Unmineralized Target	++++ .... Placer Claims in good standing (Jan. 1981)	——— .... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	◇ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	▬ .... Airstrip

COAL RIVER MAP-AREA (NTS 95 D)

NO.	PROPERTY NAME	REFERENCE
1	GUSTY	G.S.C., Pap. 68-38, p. 16
2	MEL	This Report
3	McMILLAN	This Report
4	CHU	Skarn Lead-Zinc Occurrence
5	GABE	G.S.C., Pap. 68-38, p. 16
6	LAST	G.S.C., Pap. 69-1, pp. 21-23
7	STONEMARTEN	G.S.C., Pap. 69-1, pp. 21-23
8	PORKER	This Report
9	WOLF	This Report
10	SPORK	This Report

MEL
St. Joseph Explorations
Limited

Lead, Zinc, Barite
Stratiform
95 D 6 (2)
(60°21'N,127°40'W)

References: Sinclair and Gilbert (1975, p. 82-83); Sinclair et al (1975, p. 152-153); Carne (1976); Morin et al (1979, p. 74, 1980, p. 50)

Claims: MEL 11-16, JEAN 1-20, SOVI 1-6, WET 1-32

Source: Summary by G. Abbott of drill logs by D. Miller in assessment report 090793.

Current Work and Results:

Twelve holes totalling 3086.1 m were drilled in 1979 on the JEAN 1 to 4 claims. Holes 7-12 were submitted for assessment. Widths of intersections and barite grades are below average for the deposit, although lead and zinc grades are above average.

SPORK
Archer, Cathro and
Asssociates Limited;
Cassiar Asbestos
Corporation Limited;
Highland-Crow
Resources Limited;
Union Carbide
Canada Limited

Unmineralized Target
95 D 14,95 E 3 (10)
(60°00'N,127°14'W)

Claims: SPORK 1-24

Source: Summary by G. Abbott of assessment report 090737 by C.A. Main and R.J. Cathro.

Current Work and Results:

The claims are underlain by glacial till but cover the assumed contact between previously unmapped Lower Cambrian limestones of the Sekwi Formation and Cretaceous granodiorite. The limestone is deformed into an overturned southwestward verging syncline. The granite must contact the limestone near the hinge of the fold.

The SPORK claims were staked in June, 1980 and partially explored with magnetometer and VLF electromagnetic surveys. Readings were taken at 25 or 12.5 m intervals on lines spaced 200 m apart. The preliminary results were inconclusive.

1980 MINERAL CLAIMS STAKED

GABE

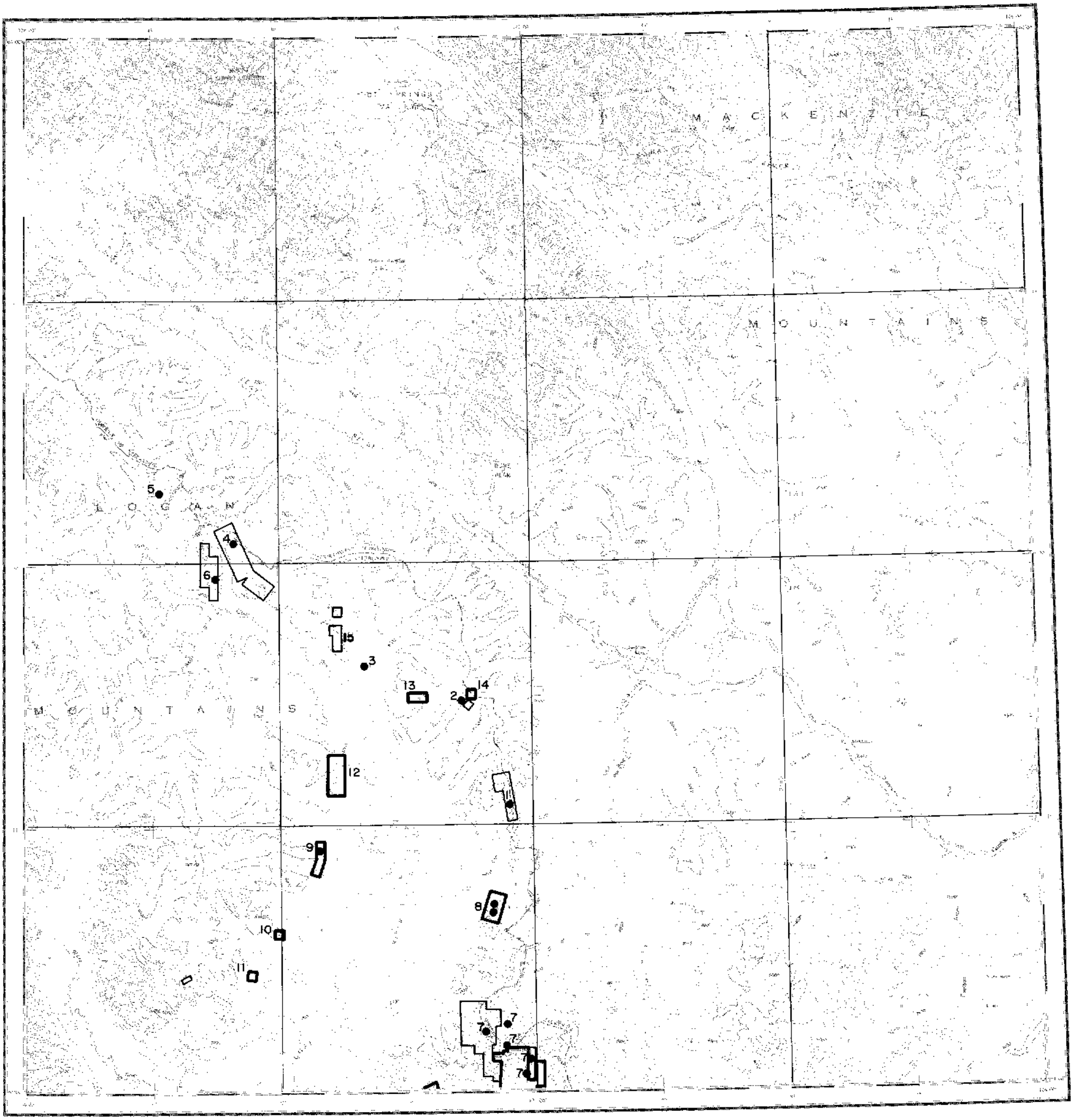
95 D 11 (5)
(60°24'N,125°56'W)

Claims 1980: THOR (22)

WOLF
Locana Mining Corporation
B. Ashbury

95 D 7 (9)
(60°22'30"N,126°32'W)

Claims 1980: WOLF (8); CUB (8)



FLAT RIVER

YUKON TERRITORY – NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

FLAT RIVER MAP-AREA (NTS 95 E)

NO.	PROPERTY NAME	REFERENCE
1	TWIN	Copper-Silver-Lead-Zinc-Gold Vein G.S.C., Pap. 61-23, p. 46
2	KOMISH	Skarn Tungsten Occurrence
3	MARION	G.S.C., Pap. 64-52, p. 28 G.S.C., Pap. 64-1, p. 81
4	HEATHER	G.S.C., Pap. 69-55, pp. 51-52
5	CAESAR	Skarn Tungsten Occurrence
6	CHARLIE	This Report
7	IVO	This Report
8	SNEET	This Report
9	FYIQ	This Report
10	JOSE	This Report
11	NOWA	This Report
12	HOGIE	This Report
13	CREAM	This Report
14	LABELLE	This Report
15	ROSE	This Report

CHARLIE
Archer, Cathro and Associates Limited

Tungsten Molybdenum Skarn
95 E 5,12 (6)
(61°29'N,127°37'W)

CUB Joint Venture

Reference: Gabrielse *et al* (1973)

Claims: CHARLIE 1-40.

Source: Summary by R. Debicki from assessment report 090541 by G. Abbott.

Current Work and Results:

The CHARLIE claims were staked in May, 1979 for CUB Joint Venture (Cassiar Asbestos Corporation Limited, Highland-Crow Resources Limited, and Union Carbide Canada Limited). The claims cover two small scheelite-bearing skarns discovered by Union Carbide in 1971, but were never staked or examined in detail.

Geological and soil geochemical surveys were done during 1979. The claims are underlain by Upper Proterozoic to Middle Cambrian sedimentary rocks including thin-bedded silty limestone of the Rabbitkettle Formation, and by non-calcareous greygreen phyllite, brown weathering phyllite, nodular limestone, massive limestone, brown shale and argillite. The sedimentary rocks are intruded by a steeply dipping tabular body of Cretaceous porphyritic quartz monzonite from 600 to 1400 m thick. The contacts of the intrusion are sharp, but irregular. Hornfels is developed in phyllite adjacent to the contact. Two small, massive, dark brown garnet-diopside skarns about 50 m apart, and each about 50 m by 10 m in size also occur at the contact. They contain disseminated scheelite and molybdenite, and grade 0.1% WO_3 across 7 m and 0.14% WO_3 across 5 m with low molybdenum, copper, silver and gold values.

Covered portions of the intrusive-country rock contact were soil sampled at 50 m intervals along lines 100 m apart to determine whether scheelite-bearing skarns are present. The 153 samples were pulverized, and analyzed for tungsten and copper. The survey indicates that several small, low-grade skarns similar to those exposed could be present in the covered area, but that the potential for large, well mineralized skarns is low.

IVO
Archer, Cathro and Associates; Highland-Crow Resources Limited; Cassiar Asbestos Corporation Limited; Union Carbide Canada Limited

Tungsten Skarn
95 E 3 (7)
(61°03'N,127°05'W)

Reference: Abbott (this volume).

Claims: IVO 1-212

Source: Based on property visit and mapping by G. Abbott and an assessment report 090730 by C. A. Main and R. J. Cathro.

Description:

The property covers a small, fairly recessive weathering, Cretaceous quartz monzonite stock and its margins. The stock occupies the core of a broad, open north trending anticline up to 8 km across and intrudes grey weathering, massive quartz sandstone, limestone, sandy limestone, dolomite and minor grey phyllite of the Backbone Ranges Formation (1Ɛbr) and grey phyllite with minor quartz sandstone and sandy limestone of the "Phyllite Unit" (ƐH). The facies boundary between the two formations passes through the center of the property and quartz sandstone, and carbonate rocks predominate on the east side and phyllite on the west. The stock also intrudes massive light grey limestone of the overlying Sekwi Formation in the southeast corner of the property. The sedimentary rocks are cut by northeast and east trending normal faults. The sense of displacement on the faults indicates that they are related to doming and uplift about the intrusion. The stock appears to be barely unroofed and much of the contact with enclosing rocks is gently dipping.

Seven small scheelite-bearing skarns occur in place or in float on the property. All are at the granite contact, five within sandy to pebbly limestone of the Backbone Ranges Formation, one within dolomite of the Backbone Ranges Formation and one within limestone of the Sekwi Formation. Massive dark brown and green garnet-pyroxene skarn with variable amounts of pyrrhotite is typical. Pyrrhotite is locally abundant in small massive pods.

Only the Main Showing, located in a roof pendant near the center of the property, appears to be of significant size. The showing is exposed in float and felsenmeer at the crest of a gentle ridge above timberline. Float is exposed intermittently within a narrow southwest trending zone about 140 m long and 5 to 20 m wide. A few nearby outcrops indicate a 60° southeasterly dip. The zone is faulted off to the northeast and disappears beneath overburden to the southwest. The showing occurs near the margin of the pendant and cannot be longer than 200 m. Depth to the granite contact is less than 50 m. Random chip samples from float assayed between 0.26 and 0.50% WO_3 and selected specimens assayed as high as 2.51% WO_3.

Current Work and Results:

CUB Joint Venture prospected the IVO area in 1978 to look for scheelite-bearing skarn float found in 1971 by a Union Carbide prospector. The IVO 1-128 claims were staked between May and September, 1979 and explored with mapping, trenching and grid soil geochemical and soil panning surveys. About 450 samples were taken at 100 m intervals on lines 200 m apart and at 25 or 50 m intervals on lines 100 or 50 m apart near showings. Soil samples were analysed for tungsten and copper. Pan samples were examined with an ultraviolet light and scheelite grains counted.

Geochemical and panning results correlate well with an anomalous threshold of 20 ppm being roughly equivalent to 50 grains of scheelite in a pan. Three large irregular anomalies with values between 20 and 100 ppm tungsten and 50 and 100 grains scheelite were outlined. Each is associated with a showing.

The IVO 129-212 claims were staked between June and September, 1980 and were explored with grid soil panning and geochemical surveys. Samples were collected at 530 sites at 100 m spacing on lines 200 m apart and analysed for tungsten, copper and molybdenum. The property was explored with magnetometer and VLF-electromagnetic surveys with readings taken at 25 m intervals on lines 200 m apart. The magnetometer, geochemical and panning surveys outline a coincident anomaly at the intrusive - Sekwi formation contact in the southeast corner of the property. The anomaly is more than 3 km long with magnetic values from 200 to 2800 gammas. Anomalous panning and geochemical values are sporadic in this zone but range from 50 to 1000 grains scheelite, 20 to 80 ppm tungsten and 4 to 16 ppm molybdenum. The main showing is expressed as a strong magnetic anomaly, and another magnetic anomaly about 800 m long occurs nearby.

SNEET — Tungsten Skarn
Archer, Cathro and Associates Limited: Cassiar Asbestos Corporation Limited; Highland-Crow Resources Limited; Union Carbide Canada Limited
95 E 3 (8)
(61°19'N,127°05'W)

Reference: Abbott (this volume).

Claim: SNEET 1-12; SNOT 1-12

Source: Summary by G. Abbott of assessment report 090736 by C. A. Main and R. J. Cathro.

Current Work and Results:

The property is underlain by Lower Cambrian and older phyllite, quartitze and minor sandy limestone (ЄH).

The claims were staked in the summer of 1980 to cover tunsten panning anomalies from earlier surveys. The property was explored with reconnaissance soil geochemistry and panning surveys. Sample lines are parallel to topographic contours. Panning concentrates from streams draining the property contain up to 80 grains of scheelite but pan concentrates from soils contain less than 6 grains. Silt and soil samples were analyzed for molybdenum, lead, zinc and tungsten, but returned low values.

FYIQ — Lead,Zinc,Copper Skarn
Archer, Cathro and Associates Limited; Cassiar Asbestos Corporation Limited; Highland-Crow Resources Limited; Union Carbide Canada Limited
95 E 3 (9)
(61°13'N,127°26'W)

Reference: Abbott (this volume).

Claims: FYIQ 1-16

Source: Summary by G. Abbott of assessment report 090735 by C. A. Main and R. J. Cathro.

Current Work and Results:

The claims are along the margin of a Cretaceous granodiorite batholith but are underlain mainly by metasedimentary rocks exposed in a glacial outwash channel that parallels the intrusive contact. The metasediments dip moderately eastward away from the granite contact. Limestone and dolomite of the Cambro-Ordovician Rabbitkettle Formation (ЄOr) or Lower Cambrian Sekwi Formation (lЄs) are overlain by argillite of the Road River Formation (OSDr).

One outcrop 15 m wide exposes erratically disseminated galena, sphalerite, pyrite and chalcopyrite in pale green cherty calcsilicate. Assays reached 3.05% combined lead and zinc, 5.1 gm/tonne silver. Galena and sphalerite also occur within crosscutting veins.

The property was explored in 1980 with grid soil geochemistry. About 100 samples were collected at 50 m intervals on lines spaced 100 m apart. A patchy, coincident lead and zinc anomaly over 800 m long and up to 150 m wide was outlined. Anomalous values range from 200 to 10,000 ppm lead and 500 to less than 10,000 ppm zinc with backgrounds of 40 ppm lead and 100 ppm zinc.

ROSE
Noranda Exploration
Company Limited

Tungsten Skarn
95 E 6 (15)
(61°26'N,127°23'W)

References: Gabrielse et al (1973); Morin et al (1980, p. 51)

Claims: ROSE 1-40

Source: Summary by R. Debicki from assessment report 090539 by G. MacDonald.

Current Work and Results:

Minor scheelite occurs in garnet-diopside-calcite-wolastonite skarn formed in thin bedded limy shale of the Road River and Rabbitkettle Formation. Morin (1980) gives a summary description.

During 1979, soil samples were collected at 100 m intervals along lines 100 m apart. The 184 samples were analaysed for copper, lead, zinc, tungsten and molybdenum, and 46 were also analyzed for tin. One moderate, coincident copper-lead-zinc anomaly of unknown origin and a tungsten anomaly related to an extensive skarn were indentified.

1980 MINERAL CLAIMS STAKED

JOSE
Archer, Cathro
CUB Joint Venture

95 E 4 (10)
(61°09'N,127°30'W)

Claims 1980: JOSE (4)

NOWA
Archer, Cathro
and Associates

95 E 4 (11)
(61°06'30"N,127°33' W)

Claims 1980:

HOGIE
Cyrpus Anvil
M. Mardus et al

95 E 6 (12)
(61°18'N,127°23'W)

Claims 1980: HOGIE (32)

CREAM
Archer, Cathro
and Asssociates

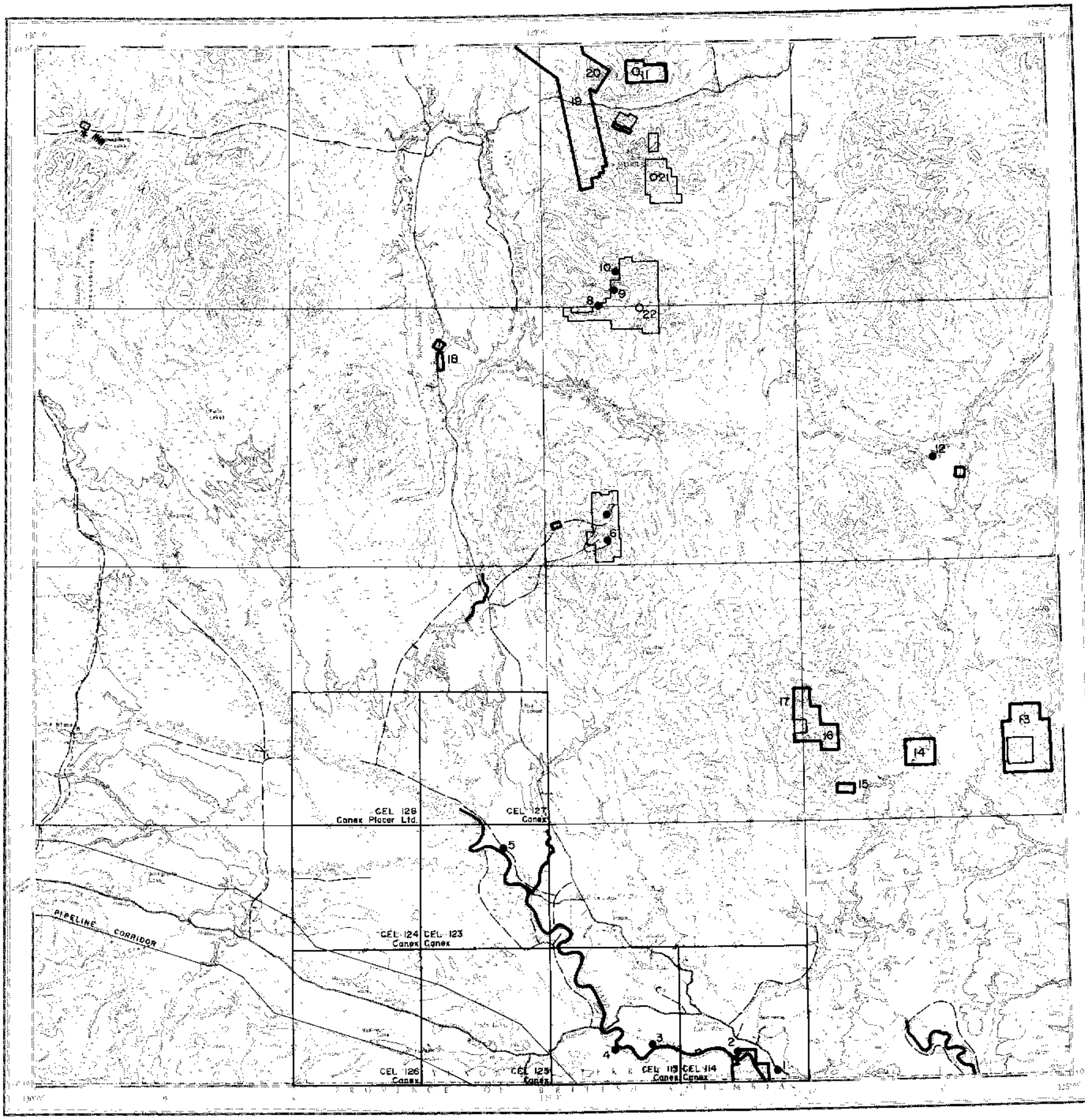
95 E 6 (13)
(61°22'30"N,127°13'W)

Claims 1980: CREAM (8)

LABELLE
Eclipse Mining Corporation

95 E 6 (14)
(61°22'30"N,127°07'W)

Claims 1980: LABELLE (4)



WATSON LAKE

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 ....Mineral Deposit or Occurrence see Key on facing page

○72 ....Unmineralized Target

......Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

......Mineral Claims staked in 1980

.......Placer Leases in good standing (Jan. 1981)

.......Placer Claims in good standing (Jan. 1981)

CEL..........Coal Exploration Lease

CML..........Coal Mining Lease

.......Tote Trail

.......Driveable Road

............Oil or Gas Well

.........Airstrip

WATSON LAKE MAP-AREA (NTS 105 A)

NO.	PROPERTY NAME	REFERENCE
1	WATSON	G.S.C., Annual Report, 1887-88, Vol. III, pt. B, p. 99
2	NAZO	G.S.C., Annual Report, 1887-88 Vol. III, pt. B, p. 99, This Report.
3	CAROL	G.S.C., Pap. 44-25, p. 19
4	ALBERT	G.S.C., Pap. 44-45, p. 19
5	SAWMILL	G.S.C., Pap. 44-45, p. 19
6	HUNDERE	This Report
7	RITCO	G.S.C., Pap. 67-40, pp. 65-66
8	OSCAR	Skarn Tungsten-Copper-Molybdenum
9	PAT	This Report
10	MARTIN	Skarn Tungsten-Copper
11	NOTT	This Report
12	WARBURTON	Silver-Lead-Zinc-Copper Vein
13	HYLAND	This Report
14	TILL	This Report
15	LING	This Report
16	TOMMY	This Report
17	CELESTIAL	This Report
18	FALSE	This Report
19	KLUNK	This Report
20	BLACK	This Report
21	MURRAY	This Report
22	PEGASEUS	This Report

NAZO
St. Joseph Explorations Limited
J. Melnychuck
Logan Mines Limited

Barite, Lead, Zinc, Silver Vein
105 A 2 (2)
(60°01'N,128°37'W)

References: Bostock (1948); Gabrielse (1966).

Claims: ROMAN 1-45

Source: Summary by R. Debicki from assessment report 090689 by V. Cukor and assessment report 090575 by D. A. Hendry, and by G. Abbott from assessment report 090639 by D. Miller.

History:

The ROMAN claims cover a 3 to 4 m wide barite vein exposed in a 15 m high bluff along the Liard River. The claims were optioned by J. Melnychuck to St. Joseph Explorations Limited in 1979. The showings on the claims have been known for many years and have been staked and explored intermittently since at least 1953. The only known previous work has been sampling for assay purposes.

Current Work and Results:

Geological, and preliminary soil, stream sediment and rock geochemical surveys were done on the claims in 1979. Several chip samples were assayed.

The claims are underlain by black carbonaceous rusty shale, creamy to grey pyritic and argillaceous chert, and buff to rusty weathering grey phyllite commonly containing calcite veins. One thick and several smaller coarsely crystalline white barite veins conformable to the foliation in the black shale are exposed on the banks of the Liard River. The average of assays of 2 chip samples across the 4 m thick vein is 19.7% barium, 0.88% lead, 0.25% zinc, and 3.1 gm/tonne silver. The average of assays of two chip samples across a 30 cm wide quartz vein is 0.17% lead, 14.44% zinc, 0.34% copper, 9.9 gm/tonne silver, and less than 0.04% barium.

The stream sediment samples reflect the mineralization associated with the veins. Soil samples outline an extension of the barite vein. The rock samples indicate that the black shale is not enriched in the metals which occur in the veins.

A grid soil geochemical survey was done by St. Joseph Explorations during 1980. Samples were collected at 193 sites, 25 m intervals along lines 100 m apart. Values reached 19 ppm lead and 436 ppm zinc. None was demonstrably anomalous.

Logan Mines Limited drilled two holes totalling 123.1 m on the claims during 1980 as a condition leading to an option on the property. The holes were designed to intersect and sample the vein along strike from its exposure. The first hole intersected 1.3 m of quartz-rich vein material with minor silver, lead, zinc and barite contents. The second hole intersected a wide fractured zone with quartz-filled fractures. Three pyrite bands across 0.8 m contain minor gold, silver and zinc. In view of the results obtained in the first two holes, a proposed third hole was not drilled, and the option was not exercised.

HUNDERE
Cima Resources
Limited

Lead,Zinc,Silver
Skarn
105 A 10 (6)
(61°31'N,128°53'W)

References: Green and Godwin (1963, p. 33-34, 1964, p. 44-45); Findlay (1967, p. 65-66); Dawson and Dick (1978); Abbott (this volume)

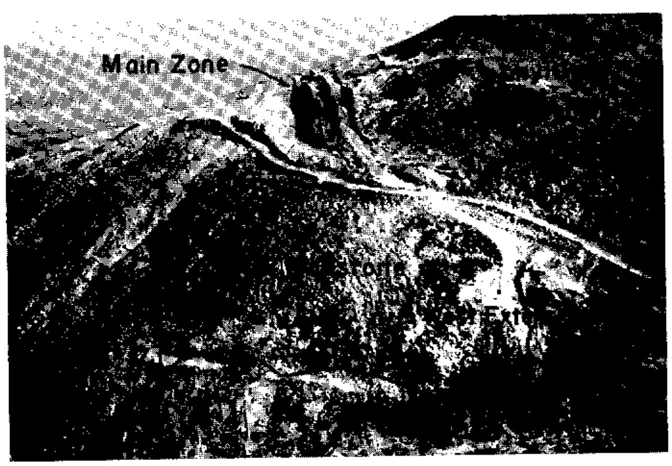
Claims: MICA 1-12; CIMA 1-102

Source: Summary by G. Abbott from assessment report 090527 by W. S. Read and assessment report 090584 by R. Kidlark.

Current Work and Results:

The CIMA and MICA claims were staked in 1979. The South or Main Zone was explored with bulldozer trenches and a series of 18 closely spaced drill holes totalling 468.1 m. In 1980, 26 holes totalling 970 m were drilled on the "West Extension" of the "Main Zone" and the "East Zone", located about 60 m east of the Main Zone. The latest H. A. Simon's (International) Limited, feasibility study has reported the following proven geological reserves.

Location	Tonnes	%lead	%zinc	gm/tonne silver
1979 Main Zone	69,099	15.6	18.9	73.4
1980 West Extension of Main Zone	54,910	11.52	13.15	65.6
1980 East Zone	122,500	4.6	7.0	90.5



Looking south to the Main Zone on Mt. Hundere. Mineralization has been traced by drilling beneath the limestone cap almost to the West Extension which is exposed on surface out of the picture.

PAT (BAILEY)
Canada Tungsten
Mining Company

Tungsten, Copper
Skarn
105 A 10, 15 (9)
(60°45'N,128°20'W)

References: Craig and Milner (1975, p. 120); Sinclair et al (1975, p. 151); Dawson and Dick (1978, p. 289); Abbott, this report

Claims: BAILEY 1-87; OSCAR 1-4

Source: G. Abbott spent part of a day on the property.

History:

The BAILEY deposit was explored with 10 holes totalling 721.5 m in 1974 and 23 holes totalling 2360.7 m in 1975. Proven reserves total 405454.5 tonnes grading 1.00% WO_3. Copper grades average less than 0.1% but reach 0.25% in places.

Description:

The BAILEY tungsten deposit and several smaller skarns A and C zones occur within Early or Middle Paleozoic limestone at the steep easterly dipping contact with the Mt. Billings Batholith. Metasedimentary rocks that underlay most of the property were originally mapped as the Upper Devonian and Mississippian "Black Clastic" unit (Gabrielse, 1966) but are all older and include at least three regionally distinct groups of rock. These are: (1) homogenous, rusty, grey weathering quartz-biotite schist (uЄOsl), that contain a few lenses of massive grey limestone (uЄO) up to 400 m long and 30 m thick. The schist and limestone somewhat resemble nearby Lower Cambrian rocks at Mt. Hundere and may be that old; (2) black graphitic phyllite (OSsl) containing small lenses of massive grey limestone (SDc) and quartzite (Sq) and (3) thick, massive to well laminated grey limestone (SDqc) underlies the northwestern part of the property. All units are bounded by a series of steep easterly dipping faults and stratigraphic relations are now known.

MURRAY
M. C. Stephan Explorations
Limited

Unmineralized
Target
105 A 15 (21)
(60°52'N,128°45'W)

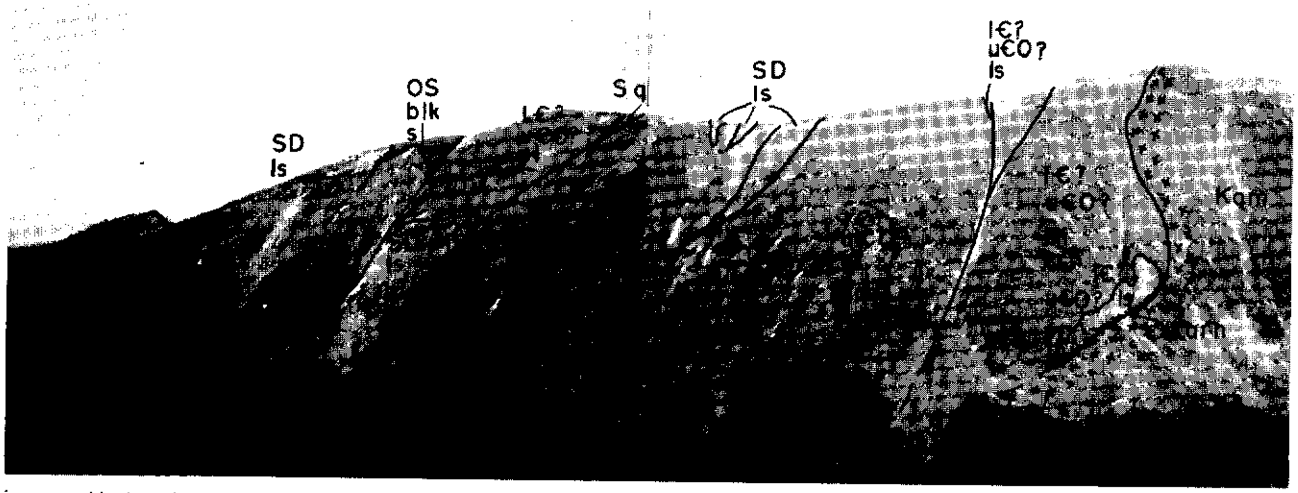
References: Morin et al (1980, p. 51-52); Abbott (this volume)

Claims: RAY 1-64

Source: Summary by G. Abbott from assessment report 090670 by P. Walcott.

Current Work and Results:

The claims were explored in September, 1980 with induced polarization and magnetic surveys. The magnetometer survey confirmed the magnetic anomalies found in an earlier survey. The anomalies are at the eastern margin of the Billings Batholith. There is no corresponding I.P. response.



Looking south to the Bailey Deposit. Rock units are labelled as in the map accompanying Abbott's description of Mt. Hundere (see elsewhere this report).

PEGASEUS
Paymaster Mines Limited

Unmineralized
Target
105 A 10,15 (22)
(60°44'N,128°48'W)

Reference: Abbott (this volume)

Claims: PEGASEUS 1-32; PEG 1-72

Source: Summary by G. Abbott of assessment report on the PEGASEUS claims by J. Ostler and 1981 geophysical report 090801 by R. Fingland.

Current Work and Results:

The claims are covered largely by overburden but are probably underlain by biotite muscovite hornfels (u€Osl), interbedded black shale, quartzite, limestone and dolomite (SDqc) and interbedded black shale, chert grit and conglomerate (uDMsg).

The PEGASEUS claims were staked in September, 1978 and explored in 1979 with mapping and a magnetometer survey. Readings were taken at 31 m intervals on lines spaced 460 m apart. Results were inconclusive. The PEG 1-72 claims were staked in September, 1979. J. C. Turner conducted linecutting in 1980. Airborne magnetometer and VLF electromagnetic surveys were flown over both claim groups in April, 1981. Flight lines were flown at 20 m intervals and 60 m ground clearance. Several small, scattered, low amplitude anomalies were outlined.

1980 MINERAL CLAIMS STAKED

NAZO
Charlie Pete et al
105 A 2 (2)
(60°01'N,128°37'W)

Claims 1980: ROMAN (29)

NOTT
Alex Black
105 A 15 (11)
(60°59'N,128°89'30"W)

Claims 1980: QUEEN (40)

HYLAND
Cyprus Anvil
105 A 8 (13)
(60°19'N,128°02'W)

Claims 1980: GS(96); SF (28)
Staking around HY group.

TILL
Cyprus Anvil
105 A 8 (14)
(60°19'N,128°16'W)

Claims 1980: TILL (42)

LING
G.E. Stephen et al
105 A 8 (15)
(60°17'N,128°25'W)

Claims 1980: STAR (8)

TOMMY
George Stephen
105 A 8 (16)
(60°20'N,128°27'W)

Claims 1980: TOMMY (24)

CELESTIAL
Cyprus Anvil
105 A 8 (17)
(60°21'N,128°30'W)

Claims 1980: MOON (52)
Staking around Sun claims

FALSE
R. Schilling
D. Roxborough
G. E. Stephen
105 A 11 (18)
(60°42'30"N,129°12'W)

Claims 1980: REG (2); ROXY (2); ROSS (4)

KLUNK
Cyprus Anvil
105 A 15 (19)
105 H 2,3
(60°59'N,128°57'W)

Claims 1980: KLUNK (468)

BLACK
Alex Black
105 A 15 (20)
(60°58'N,128°53'W)

Claims 1980: KING (30)

WOLF LAKE

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	▬▬ .... Placer Leases in good standing (Jan. 1981)	— — — ....Tote Trail
○72 .... Unmineralized Target	++++++ .... Placer Claims in good standing (Jan. 1981)	———— .... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	✧ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	▬ .... Airstrip

WOLF LAKE MAP-AREA (NTS 105 B)

NO.	PROPERTY NAME	REFERENCE
1	LORD	G.S.C., Pap. 44-25, p. 17
2	STERLING	Silver-Lead-Zinc-Copper-Gold Vein
3	LUCK	This Report
4	FIDDLER	This Report and G.S.C., Pap. 66-31, pp. 80-82
5	LENA	Silver-Lead Vein
6	DALE	G.S.C., Pap. 66-31, p. 79
7	HOLLIDAY	Silver-Lead-Zinc-Tin Vein
8	TROY	Copper Occurrence
9	CARLICK	
10	SHILSKY	Skarn Copper
11	KUBIAK	Lead-Zinc Vein
12	BLACK ROCK	Silver-Lead-Zinc-Copper Vein
13	KODIAK	G.S.C., Pap. 65-19, p. 44
14	HARDTACK	G.S.C., Pap. 65-19, p. 44
15	KERNS	Silver-Lead-Zinc-Copper-Tungsten Vein
16	MEISTER	Copper Vein
17	NITE	Skarn Tungsten-Molybdenum-Zinc
18	MID	This Report
19	AURORA	This Report
20	ALMOST	Tungsten Occurrence
21	HIDDEN	Skarn Lead-Zinc-Copper-Tungsten
22	ATOM	Skarn Zinc-Lead-Silver-Bismuth
23	BAR	MIR, 1969 & 1970, Vol. 1, pp. 137-138
24	BOM	G.S.C., Pap. 66-31, pp. 76-79
25	MUNSON	G.S.C., Pap. 66-31, pp. 76-79
26	PARTRIDGE	G.S.C., Pap. 64-54, p. 14
27	GEM	Topaz Vein
28	VAL B	Zinc-Silver-Lead Vein
29	LOGJAM	G.S.C., Pap. 68-68, pp. 83-85
30	LOGTUNG(BERYL)	Tungsten Vein
31	J.C.(VIOLA)	Skarn Copper-Silver-Zinc
32	POG	Silver-Lead Vein
33	TROUT	Iron Vein
34	MUNG	Copper Porphyry
35	IRVINE	G.S.C., Pap. 55-21
36	TUNG	Skarn Tungsten
37	MOOSELICK	MIR, 1969 & 1970, Vol. 1, pp. 138-139
38	DOME	G.S.C., Pap. 66-31, p. 84
39	OLD GOLD	G.S.C., Pap. 67-40, p. 64
40	RAINBOW	Copper Vein
41	PORCUPINE	Asbestos
42	OULETTE	DIAND, Mines and Minerals Activities, 1971, p. 73
43	ZAC	MIR, 1973, p. 80
44	BOY	This Report
45	MC	This Report
46	DU	This Report
47	I	This Report
48	SIN	This Report
49	VH	This Report
50	SLOUCE	This Report
51	SKIN	This Report
52	MW	This Report
53	MUN	This Report
54	CAN	This Report
55	STQ	This Report
56	HL	This Report
57	FUR	This Report
58	COM (54-59)	This Report
59	COM (45-53)	This Report
60	CABIN	This Report
61	TOOT	This Report
62	AIDAHO	This Report
63	ANT	This Report
64	LICK	This Report
65	GOAT	This Report
66	BESSIE	This Report
67	CARIBOU	This Report
68	OAKE	This Report
69	URSUS	This Report
70	LOGAN	This Report
71	MOOSE	This Report
72	TEAM	This Report
73	LITTLE MOOSE	This Report
74	WOLF	This Report
75	ICE	This Report
76	PLUG	This Report
77	PONT	This Report
78	ZINC	This Report
79	ELLE	This Report
80	HOT	This Report

FIDDLER,LUCK
S.E.R.E.M. Limited
Amax of Canada Limited
Pan Ocean Oil Limited

Tungsten,Lead,
Zinc, Silver
Molybdenum Veins
105 B 1 (3,4)
(60°07'N,130°27'W)

Reference: Little (1959, p. 37); Poole et al (1960); Green and Godwin (1963, p. 31-32);Green (1966, p. 80-82);Craig and Laporte (1972, p. 134-137); Craig and Milner (1975, p. 106); Sinclair et al 1975, p. 159); Morin et al (1979, p. 77); Morin et al (1980, p. 52-53)

Claims: BNA 1-6; MORN 1-4; SEVEN 1-2; A and B 1-4, 3-4; FR 7-32; BUG 5-8; ULY 1-4; RAY 1-8; AL 1-6; PIGGY 1-72; JA-P 1-4; PIG 1-4

Source: Summary by R. Debicki from assessment report 090688 by S. E. Parry.

History:

The property was first explored for tungsten in 1943 and has been explored several times since, but little work was done between 1962 and 1975. An account of the geology is given in Craig and Laporte (1972) and Craig and Milner (1975) under the LUCK group.

Current Work and Results:

Diamond drilling was done on the property in 1979. During 1980, one hole 561 m deep was drilled adjacent to the adit opened by Yukon Tungsten Corporation Syndicate and a second hole 458 m deep was drilled on an adjoining claim. The holes intersected limestone, phyllite and hornfels with traces of scheelite and skarn with a few cross cutting quartz veins. The best mineralized section was 38 m of skarn containing 0.067% WO_3.

ATOM
G. Robertson

Zinc Skarn
105 B 3 (22)
(60°11'N,131°13'W)

References: Craig and Milner (1975, p. 108-109); Dawson and Dick (1978); Dick (1979); Dick and Robinson (1979); Abbott (this volume)

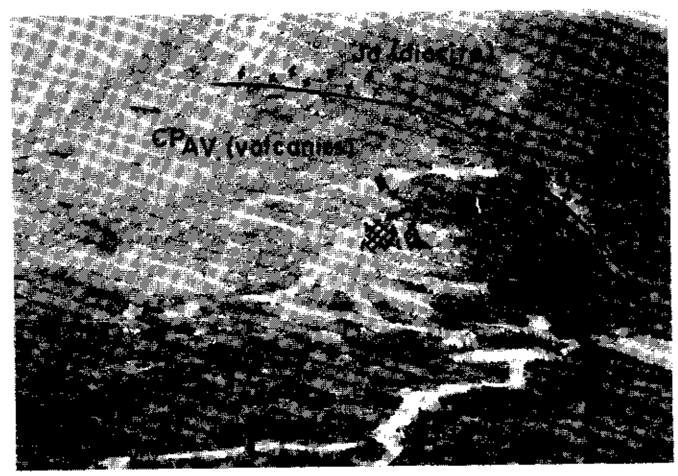
Claims: LAKE 1-4; REG 3-4; KELLY 1-8; LORI 1-8

Source: G. Abbott briefly examined the property. History from Northern Cordillera Mineral Inventory.

Current Work and Results:

The ATOM claims were originally staked in 1946 by Hudson Bay Mining and Smelting and explored with trenching and diamond drilling in 1947. Gulliver Mining and Exploration restaked with the DELL claims in 1965 and with the TWIN and VAN claims in 1966. Boswell River Mines staked the BIRD claims in 1968 and performed bulldozer trenching that year. The showing was explored with geochemistry, airborne and ground geophysics and geological mapping in 1969 and 1970 as part of the DAN group. (Craig et al 1975, p. 108-109). The occurrence was restaked in 1974 with the REG claims, owned by E. Pollard and in 1980 with the KELLY, LORI and LAKE claims owned by G. Robertson.

Skarn is exposed in two bulldozer trenches cut into coarse talus above timberline. Well banded, coarse-grained pyroxene-amphibole-magnetite-garnet-epidote skarn occurs in several poorly defined zones less than 4 m wide and 75 m long. The unusual, chlorine rich mineralogy is described by Dick and Robinson (1980). Coarse-grained black sphalerite and minor chalcopyrite occur erratically throughout the deposit, but mainly with magnetite and dark green pyroxene. Massive sphalerite occurs locally, but consistent high grades are unlikely.



Looking south to Atom Occurrence. The size and location of skarns is shown approximately.

Skarn replaces thinly laminated, light grey calcsilicate and well banded, but intensely hornfelsed greenstone of Anvil Allochthon (ЄPav). The enclosing rocks are dominantly metavolcanic and significant size is unlikely. The deposit trends northerly across the northwesterly striking and steep southwesterly dipping regional fabric. Relatively unaltered hornblende diorite (Jd) bounds the skarn on the south. Mineralization may be related to the diorite, or the more distant Cretaceous intrusions.

BAR
A. Mercier

Zinc,Silver,Lead
Skarn
105 B 3 (23)
(60°10'N,131°08'W)

References: Craig and Laporte (1970, p. 137-138); Craig and Milner (1975, p. 108-109); Dawson and Dick (1979); Abbott (this volume)

Claims: SING 1-8

Source: G. Abbott spent part of one day on the property. History from Northern Cordillera Mineral Inventory.

History

B. Paulin restaked the ED claims in 1974, E. Polland with the DAVE claims in 1975, G. Allen with the COM claims in 1979 and A. Mercier with the SING claims in 1980.

Description:

Skarn is exposed in two bulldozer trenches spaced 300 to 400 m apart in an overburden covered area below timberline. The northwestern trench exposes a steep southwesterly dipping 4 m wide band of massive pyrrhotite accompanied by a thin band of fine-grained, dark green amphibole (?) skarn with minor chalcopyrite along the hanging wall. About 50 m northeast, across strike, a 4 m wide zone of pale green, thinly laminated calcsilicate and minor dark green pyrrhotite-rich skarn replaces thinly laminated white marble. Two skarn bands are also exposed in the second trench located along strike, southeast of the first. The upper or most southerly zone consists of about 3 m of steep, southerly dipping, massive magnetite with lesser light brown skarn containing coarse magnetite grains. The lower zone, about 50 m north of the first consists of two separate bands separated by about 4 m of white marble. Three metres of rusty, pyrrhotite-rich, pale green calcsilicate with minor sphalerite and galena comprises the upper zone. The lower is brown weathering massive green epidote or garnet skarn.

The skarns occur within hornfelsed metavolcanic rocks of Anvil Allochthon (ЄPAv). Most are dark, finely laminated purple and green cataclasite. Dark green chloritic rocks, in places with white feldspathic bands and sheared hornblende diorite are common. The skarns are probably hosted by small tectonic lenses of marble common to this unit. The deposit was interpreted as a stratabound volcanogenic sulphide during the late 1960's but the author considers it metasomatic. Mineralization may be related to either hornblende diorite exposed less than 200 m south of the showings or Cretaceous quartz monzonite, 3 km to the west.

A typical pod of massive pyrrhotite with lesser sphalerite on the BAR property. The sulphides occur within dark green amphibole skarn and calcsilicate rocks that are the altered equivalents of the Anvil Allochthonous Assemblage (CPav).

BOM
E. Erickson

Zinc,Silver,Lead
Skarn
105 B 3 (24)
(60°09'N,131°13'W)

References: Gower (1952, p. 28-30); Craig and Milner (1975, p. 108-109); Green (1966, p. 76-79); Mulligan (1975, p. 80); Dick (1978, 1979); Abbott (this volume)

Claims: MOD 1-4

Source: G. Abbott briefly examined the property. Some history from Northern Cordillera Mineral Inventory.

History and Description

The showing was restaked as the MOD claims in 1963 by E. Erickson, acquired by Boswell River Mines in 1968 and bulldozer trenched in 1968 and 1969. E. Erickson presently holds 4 MOD claims that cover the showing. These were surrounded by the Road Group in 1980 by the D. C. Syndicate (Dome, Cominco) who explored with mapping and geochemical surveys (assessment report 090798).

A zone of massive black sphalerite, pyrrhotite and galena between 2 and 4 m wide and about 80 to 100 m long is exposed in bulldozer trenches across the floor of a valley. A thin band of grey marble, coated black with manganese occurs along the hanging wall of the massive sulphides. Barren, dark green amphibole skarn occurs in a trench at the east end of the showing. Other reported minerals, not seen in hand specimens, include minor magnetite, chalcopyrite, arsenopyrite, pyrite, marcasite, stannite, ludwigite, pyrargyrite and tetrahedrite. There are no nearby outcrops, but the showing occurs within one of a series of carbonate lenses up to 50 m thick that occur along strike to the northwest and southeast. Cretaceous biotite-quartz monzonite is exposed about 2 km to the northeast.

STQ (Munson)
Logtung Resources Limited;
Amax Potash Limited

Tin Greisen
105 B 3 (25,55)
(60°10'N,131°08'W)

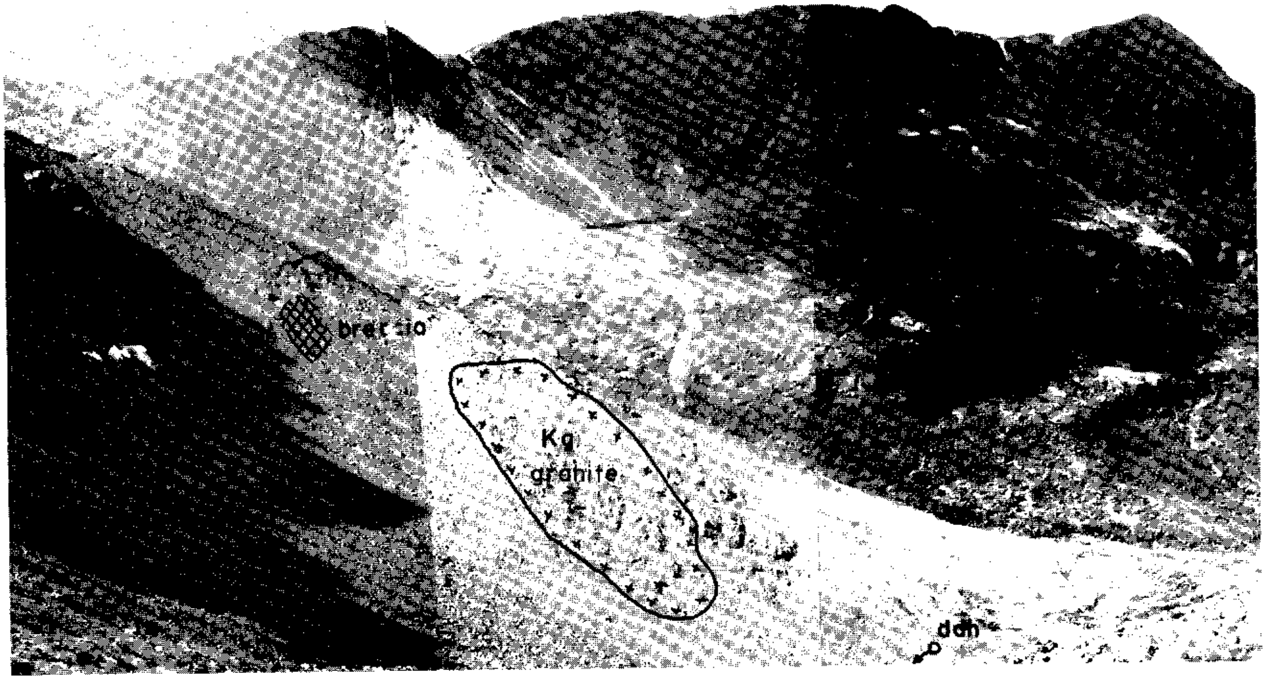
References: Green (1966, p. 76-79); Craig (1975, p. 108-109); Dawson and Dick (1978); Dick (1979); Morin et al (1979, p. 55)

Claims: STQ 1-114

Source: G. Abbott briefly examined the property and summarized assessment report 090472 by J. C. Hodgson of Amax.

History

The STQ 1-32 claims were staked in 1977 by Cordilleran Engineering for the Minex-1977 Limited Partnership. After mapping and geochemical sampling Minex optioned the property to Amax Potash Ltd. and transferred its interest to Logtung Resources Ltd. Amax performed mapping, geophysical and geochemical surveys and drilled one hole 247 m deep in 1978 before dropping the option. The STQ 33-114 claims were staked by Amax in 1978 over the former Munson property of the DAN group staked in 1968 by Boswell River Mines.



Looking southeast to the western plug on the STQ property. Cassiterite occurs with arsenopyrite and chalcopyrite in the altered breccia.

Description

On the STQ 1-32 claims, tin and minor tungsten molybdenum and copper mineralization are associated with two biotite granite and quartz monzonite outliers of the Seagull Batholith. The two plugs are about 2 km apart and poorly exposed above timberline in talus and outcrop. Only the more important West Zone was examined by the writer.

In the West Zone, cassiterite occurs in breccia and quartz veins at the margin of a rusty weathering, fine-to medium-grained, equigranular biotite granite or quartz monzonite plug less than 100 m across and circular in plan. Surface exposures are pervasively altered to clay, but unaltered, equigranular to sub-porphyritic biotite granite was intersected in drill core and may be a younger phase.

Mineralized breccia occurs within dark purplish grey, amphibole rich cataclasite (PMsl) at the southeast margin of the stock. The breccia is exposed in talus over an area less than 5 m wide and 50 m long. Breccia fragments are angular country rock, up to 10 cm across and are bleached and/or altered to clay. The matrix is mainly a white, fine-grained miarolitic phase of the intrusion (?) and locally contains tourmaline rosettes. Acicular tourmaline, fine-grained hematite, minor chalcopyrite and fluorite also occur in the breccia matrix as irregular open space fillings, clots and veinlets. An unidentified hard dark grey metallic mineral is also common in grains up to 1 cm across. Other shiny, brownish-black, fine-grained crystalline aggregates seen in some specimens were tentatively identified as cassiterite. The breccia was not intersected in the hole drilled beneath it at 45°.

Irregularly oriented tourmaline-quartz veins without cassiterite are common near the stock. Hodgson reports a small area of cassiterite-bearing quartz veins 20 m east of the main breccia. Amax also reports traces of molybdenite along fractures cutting the granite seen in drill core.

The East lug or zone is about 130 m across and consists of barren, poorly exposed fine- to medium-grained biotite-quartz monzonite. Minor scheelite is reported within widely spaced quartz and quartz-amphibolite veins peripheral to the stock.

The Munson occurrence on the STQ 33-114 consists of two showings exposed above timberline in the floor or a broad cirque along strike northwest of the BOM occurrence. The showings are spaced about 500 m apart, within the same discontinuous limestone horizon. the western showing is exposed within one of several trenches and is surrounded by large talus blocks and rubble of hornfelsed siliceous mylonite and minor calcsilicate (PMs). A pod of massive black sphalerite and pyrrhotite about 3 m long and 2 m wide occurs next to a rib of massive, coarse-grained garnet-pyroxene -amphibole skarn about 2 m wide. The skarn contains traces of scheelite and powellite. Minor galena and arsenopyrite are also reported. The eastern showing occurs at the foot of a talus slope and consists of two patches of massive pyrrhotite less than 2 m wide. There is no outcrop nearby and the size of the showing is unknown. This occurrence has not been previously reported, but old bulldozer trails, trenches and one diamond drill hole were seen.

PARTRIDGE
DuPont of Canada
Exploration Limited

Tin Skarn
105 B 3 (26)
(60°06'N,131°15'W)

References: Morin et al (1980, p. 54); Abbott (this volume)

Claims: VAL 1-30

Source: G. Abbott mapped nearby and summarized a 1980 assessment report by F. M. Smith.

Current Work and Results:

The claims were staked in 1978 and explored with geological mapping and geochemical surveys in 1978 and with mapping and minor assaying in 1979.

Sampling in 1979 confirmed low grades of tin within skarn developed in a small pendant of limestone (CPc).

GEM
McCrory Holdings

Topaz, Pegmatite
105 B 3 (27)
(60°04'N,131°09'W)

Claims: MBKT -16

Sources: Northern Cordillera Mineral Inventory. G. Abbott mapped nearby.

History and Description:

The property was originally staked as the GEM claims by J. R. Shields in 1961. L. Trantman restaked with the CONE claims in 1969 and H. Komish with the HAL claims in 1972. The MBKT claims were staked by T. McCrory and others in 1979. The claims were explored with six hand trenches in 1979 and some prospecting in 1980.

The property straddles a steep north trending ridge above timberline and is underlain by well exposed granite of the Seagull Batholith. A steep, east trending fault marked by a rusty zone cuts the granite near the reported showing.

Topaz was reported within pegmatite in the granite. Prospecting in 1979 and 1980 failed to find the showing, but a few small fragments of topaz were reported in talus.

VAL (B)
DuPont of Canada
Exploration Limited

Tin Vein
Zinc Skarn
105 B 3 (28)
(60°06'N,131°22'W)

References: Morin et al (1980, p. 54); Northern Cordillera Mineral Inventory; Abbott (this volume)

Claims: VAL 31-127

Source: Summary by G. Abbott from a 1980 assessment report by F. M. Smith.

Current Work and Results:

The DEAR and PEAK claims were staked in 1969 by Rip Van Mining Ltd. DuPont staked the VAL claims in 1978 and explored with mapping geochemistry in 1978 and 1979 and mapping and chip sampling in 1980. Rip Van explored sphalerite and minor galena bearing skarns. Cassiterite found by DuPont occurs within vertical east trending quartz-tourmaline veins that cut Seagull Batholith.

LOGJAM
Rebel Developments

Gold, Silver,Lead
Zinc Vein
105 B 4 (29)
(60°02'N,131°06'W)

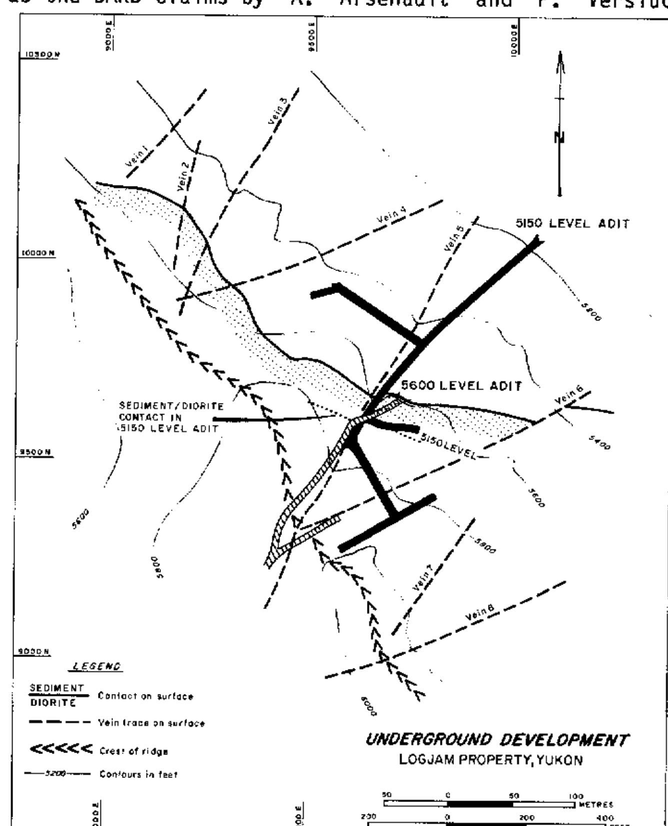
References: Skinner (1962, p. 36); Green and Godwin (1964, p. 47-48); Findlay (1968, p. 83-85)

Claims: BARB 1-24; TOP 1-52

Source: G. Abbott briefly visited the property and summarized a 1979 report by R. J. Cathro for Rebel Developments.

Current Work and Results:

The property was last explored extensively in 1966 and 1967 when about 763 m of underground exploration was conducted on two levels. The property was restaked as the BARB claims by A. Arsenault and P. Versluce



Modified from a report dated 5 Sept./79 by R.J CATHRO

(A.M.P. Exploration) in 1973 and optioned to Darva Resources between 1974 and 1977. More BARB claims were added in 1974 but only minor rehabilitation work was performed. In 1979 the property was optioned to Rebel Developments who built a new 5 km access road from the Logtung property in 1980.

The 8 polymetallic gold and silver bearing veins on the property form a steeply dipping northeast and north-northeast trending conjugate set that trend toward the related, Logtung porphyry molybdenum-tungsten deposit 1.6 km to the south. Sheeted, steeply dipping northeast trending polymetallic veins also occur within the Logtung deposit.

LOGTUNG (BERYL)	Tungsten,
Logtung Resources;	Molybdenum
Amax of Canada	Porphyry
Limited	105 B 4 (30)
	(60°00'N,131°36'W)

Reference: Morin et al (1980, p. 56)

Claims: LOG 1-138

Source: G. Abbott mapped nearby and briefly examined the property.

Current Work and Results:

The Logtung property was discovered in 1976 by Cordilleran Engineering for the Bath-1976 Uranium Partnership during follow-up of tungsten silt anomalies. The property was transferred to Logtung Resources and optioned to Amax in 1977. Amax explored with mapping, geochemical and geophysical surveys and drilled 14 holes totalling 2,840 m in 1977. Amax drilled 19 holes totalling 4,064 m in 1978 and 7 holes totalling 1830 m in 1979.

The Logtung porphyry deposit occurs at the northern margin of a Cretaceous quartz monzonite stock about 1 km across. The stock intrudes interleaved, thinly laminated siliceous limestone and quartzite (PCc) about 50 m thick and rusty weathering hornfelsed dark grey phyllonite (PMs4). The limestone is altered to pale green calcsilicate and medium brown and green garnet-pyroxene skarn. Rock units dip moderately southwestward. The deposit occurs at the northern margin of the stock mainly within the metasedimentary rocks. The intrusive contact was intersected in drill core and dips 45° north within the deposit. Most of the stock consists of coarse-grained porphyritic biotite-quartz monzonite. A set of dikes within the deposit, consist of a variety of leucocratic quartz porphyries, quartz-feldspar porphyries and fine-grained felsite.

Scheelite, molybdoscheelite and molybdenite occur in three modes. The darker garnet-pyroxene skarn is host to disseminated scheelite, molybdoscheelite and lesser molybdenite. The most significant mode is a quartz vein stockwork that includes several generations of crosscutting fractures and veinlets. At least some stockwork veinlets crosscut the skarn. The third and youngest type of mineralization is a set of sheeted, vertical, northeast trending polymetallic quartz veins that can be traced past the area of stockwork and skarn mineralization.

The property was explored in 1980 with an underground decline 550 m long and 11 drill holes totalling 3135 m. Bulk samples were taken for metallurgical testing and assay. Current reserves are 179,000,000 short tons grading 0.13% WO_3 and 0.052% MoS_2.

Scheelite and molybdenite bearing quartz vein stockwork within leucocratic, quartz porphyry on Logtung property.

J.C.(VIOLA)	Tin Skarn
D.C. Syndicate	105 B 4 (31)
	(60°12'N,131°41'W)

References: Morin et al (1980, p. 57); Abbott (this volume)

Claims: JC 1-82

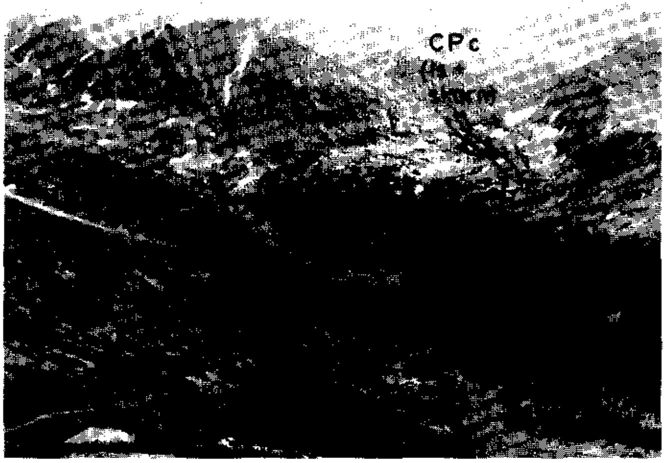
Source: G. Abbott briefly visited the property and summarized assessment reports 090462 and 090567 by J. C. Stephen.

History

The property was explored with mapping, magnetometer, geochemical surveys in 1978, 1979 and 1980. The showings were sampled along 18 hand trenches in 1978. Eight holes totaling about 880 m were drilled in 1979 and 14 holes totaling 913 m were drilled in 1980. A magnetometer survey was continued in 1980.

Description

Tin-bearing skarn is developed within calcsilicate rocks and limestone (CPc) that are interleaved with intensely hornfelsed, sheared silceous sediments (PMs5) and volcanic rocks (PMv). The metasedimentary rocks dip gently to moderately southwards and are underlain along a gently dipping contact by leucocratic granite of the Seagull Batholith. The floors of most nearby valleys are underlain by granite and drill holes on the property intersect the intrusion between 30 and 100 m below surface.



Looking east to the main tin-bearing skarn on the JC property.

The skarn zone has been traced by drilling and on surface for 600 m. Thicknesses of skarn intersected in drill core range from about 5 to 38 m although separate narrow bands are also present in some holes. The skarn is apparently concordant with enclosing metasedimentary rocks and dips moderately south.

Skarn is typically massive, fine- to medium-grained and consists primarily of various proportions of medium brown garnet, olive green pyroxene and dark green to dark blue-green to black amphibole. In places the amphibole replaces pyroxene and occurs in crosscutting veinlets, but elsewhere is interstitial to other minerals. Magnetite, arsenopyrite, chalcopyrite, sphalerite, pyrrhotite, fluorite and traces of scheelite occur irregularly throughout the skarn and crosscussing veinlets. Magnetite forms massive monomineralic zones in a few places. Coarse-grained fluorite, axinite, siderite, muscovite and pyrite greisen occur locally.

Tin-bearing minerals were not observed by the writer, but are reported to be mainly cassiterite with malayaite, stannite and stanniferous tetrahedrite. Minor axinite, beryl and apatite are also reported.

IRVINE	Unmineralized
Comaplex Resources	Target
International Limited;	105 B 11 (35)
Dayton Creek	(60°38'N,131°12'W)
Silver Mines Limited	

Claims: COM 21-26

Source: Summary by R. Debicki from assessment report 090604 by G. Allen.

Current Work and Results:

The COM 21-26 claims are underlain by Lower Cambrian quartzite and siliceous schist. Previous work on the property includes at least one drill hole and one trench.

The claims were prospected briefly in 1979, and the old trench, which measures 10 m by 1.8 m by 0.9 m deep, was examined. It was dug in carbonaceous siliceous schist with highly limonitic and manganiferous portions. No fresh mineralization was seen in the trench or elsewhere on the claims.

TUNG	Tungsten Skarn
Regional Resources Limited	105 B 9,10 (36)
	(60°35'N,130°30'W)

Claims: ON 1-50

Source: Summary by G. Abbott of assessment report 090573 by C. Verley.

History

The property partly covers ground that was originally staked in 1971 as the TUNG claims by Wolf Lake Joint Venture (Rayrock Minerals, Ashland Oil and CIGOL). Mapping and grid soil sampling were conducted in 1972.

Description

The property is underlain by Lower Cambrian or older quartz-feldspar-biotite-muscovite schist, biotite muscovite schist and minor limestone near the northwestern margin of a Cretaceous quartz monzonite batholith. Pegmatite dikes and sills about 100 m wide are common in the metasediments.

Scheelite and powellite-bearing garnet-pyroxene skarn is developed along the margins of a steeply dipping 7 m thick limestone horizon. The skarn is exposed in float for about 300 m along strike over widths between 1 and 6 m. Rare molybdenite, galena and sphalerite are also reported. Garnet-pyroxene skarn with minor scheelite, pyrrhotite and rare chalcopyrite is also reported in lime cemented metagrits. Scheelite occurs locally as coarse-grained disseminations in pegmatite, along fractures and in quartz veins.

Current Work and Results

The ON claims were staked by Logan Joint Venture in 1979 to cover tungsten anomalies from the Geological Survey of Canada, Uranium Reconnaissance Program (Open File Report 563).

Mapping, grid soil geochemistry and chip sampling were performed that year. Assays of chip samples across the mineralized skarn float range from 0.13 to 0.52% WO_3.

ZAC
Comaplex Resources
International Limited;
Dayton Creek
Silver Mines Limited

Copper
105 B 11 (43)
(60°32'N,131°15'W)

Claims: COM 1-12

Source: Summary by R. Debicki from assessment report 090605 by K. G. Lintott.

Current Work and Results:

The COM 1-12 claims are underlain by a north-trending sequence of Cambrian and earlier biotite schist and quartzite.

Geological mapping and prospecting were done during 1979. The results of a geochemical survey of the area done by Hudson Bay Exploration and Development Company Limited, available for examination at the Mining Recorder's office, were used to select favourable areas for examination.

The claims are underlain by calcareous quartzite, phyllite and dolomite which strikes north and dips 70° to 80° west. A 150 m thick serpentinite unit appears to be conformable with the bedding of the metasedimentary rocks.

Two mineralized zones were examined. Both were trenched and drilled before. One zone consists of weakly disseminated pyrite and chalcocite in silicified dolomite. The other consists of weakly gossaned mylonite and breccia with malachite and chalcocite.

BOY
Comaplex Resources
International Limited;
Dayton Creek
Silver Mines Limited

Lead Vein
105 B 7 (44)
(60°18'N,130°41'W)

Claims: COM 60-75

Source: Summary by R. Debicki from assessment report 090652 by G. B. Allen.

Current Work and Results:

The claims were staked to cover a mineralized occurrence exposed in the bank of a creek.

During 1979, the property was prospected briefly. It is underlain by medium-grained, light to medium grey granite and granodiorite of the Cassiar Batholith. Local areas of shearing and pegmatite are present. The mineralized occurrence consists of galena and pyrite in quartz veins hosted by highly fractured granite. The veins are thin and discontinuous, and the mineralized area appears to be of limited extent. No other mineralization was found.

M.C.
DuPont of Canada
Exploration Limited

Tin Vein
Zinc Skarn
105 B 4 (45)
(60°12'N,131°45'W)

References: Morin et al (1978, p. 57); Abbott (this volume)

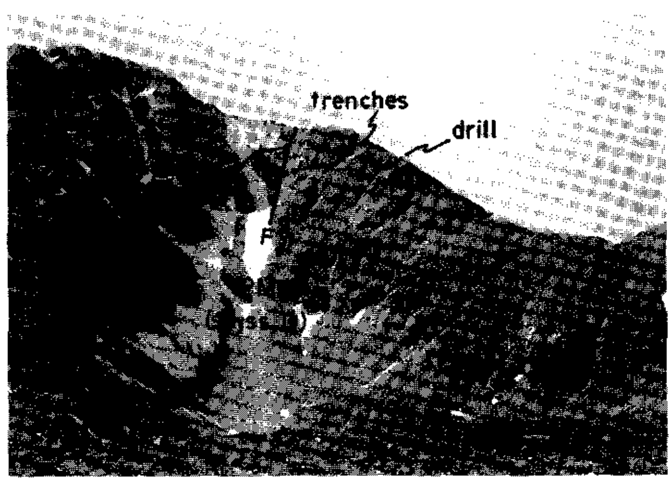
Claims: MC 1-118; SWIFT 1-100; JILL 1-8; SLIDE 1-24; SLIP 1-50

Source: G. Abbott briefly visited the property and summarized 1979, 1980 and 1981 assessment reports 090470, 090557 and 090714 by F. M. Smith.

Current Work and Results:

The property was explored by DuPont with geological mapping, geochemical surveys and trenching in 1979 and 1980. Four holes totalling 952 m were drilled in 1980.

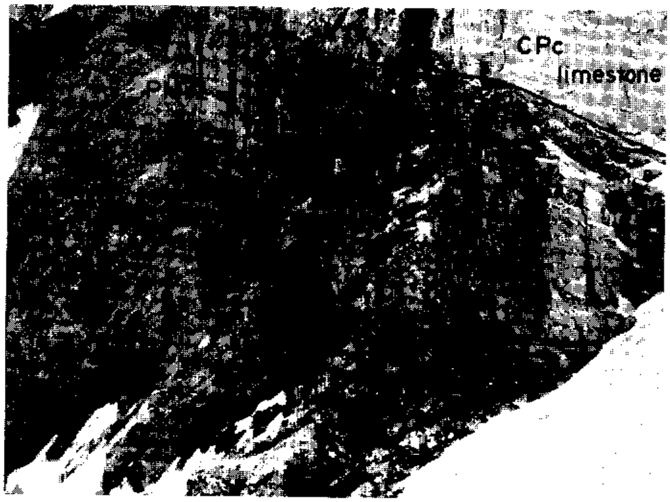
The mineralized area is underlain by hornfelsed highly sheared black siliceous shale, chert conglomerate and calcareous quartzite (PM2); highly sheared, thinly laminated purple and green volcanics and less intensely deformed rocks with volcaniclastic textures preserved (PMv). These rocks are tectonically interleaved with sheared limestone and siliceous limestone (CPc).



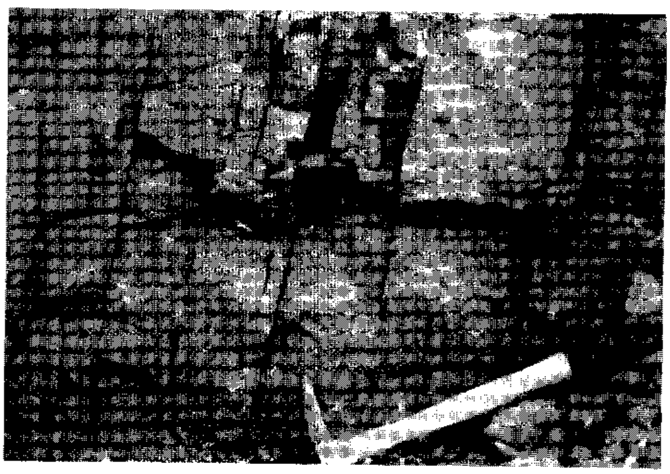
Looking south to the main tin bearing zones on the MC property. Cassiterite occurs mainly in vertical east trending fractures.

Two tin showings, the Main Zone and the Sheeted Vein Zone are 15 m apart and exposed along the west wall of a north facing cirque. Two trenches across the Main Zone, each about 28 m long expose an irregular, patchy pale green sileceous, pyroxene skarn bounded on the south by a steeply south dipping quartz vein up to several metres wide. The quartz in the vein is vuggy, fine-grained and sugary and contains abundant calcite clay and disseminated pyrite. Fine-grained cassiterite, chalcopyrite and sphalerite are reported to occur erratically within the vein.

The Sheeted Vein Zone is exposed in trenches over a width of about 50 m and consists of closely spaced (less than 10 cm) vertical, east trending fractures and narrow veinlets. Most fractures appear to be barren, but some are reported to contain pyrite, chalcopyrite, sphalerite, galena, magnetite and cassiterite. Assay results from chip samples taken across the zone by DuPont indicate that mineralization is erratically distributed.



Looking east on the MC property from trenches shown in Figure 1 to vertical east trending fracture system that hosts tin mineralization. The field of view is about 50 m across.



Fractures in trenches on MC property. Note lack of alteration and vein filling, yet these are the fractures containing cassiterite.

DU
DuPont of Canada
Exploration Limited;

Tin Vein
105 B 4 (46)
(60°12'N,131°35'W)

<u>Reference:</u> Morin <u>et al</u> (1980, p. 58)

<u>Claims:</u> DU 1-252

<u>Source:</u> G. Abbott mapped nearby and summarized assessment reports 090557 and 090714 by F. M. Smith.

<u>Current Work and Results:</u>

The claims were explored with mapping, geochemical sampling and trenching in 1979 and with mapping, trenching and diamond drilling in 1980.

Tin-bearing quartz veins occur within Seagull Batholith in two areas; Eccles Ridge (A) and the Plateau Zone (B). Veins are vertical, trend east, vary in width from 1 cm to 4 cm and can be traced up to 100 m. A chip sample by DuPont across one vein assayed 0.61% tin over 20 cm. Distribution of both veins and cassiterite is erratic.

I
DuPont of Canada
Exploration Limited

Copper, Tungsten,
Molybdenum
Porphyry (?)
105 B 5 (47)
(60°15'N,131°33'W)

<u>Reference:</u> Geological Survey of Canada Open File 563, 1979.

<u>Claims:</u> TB 1-24

<u>Source:</u> G. Abbott mapped nearby and summarized assessment report 090608 by F. M. Smith.

<u>Description:</u>

The I claims were staked by DuPont in June, 1979 to cover a geochemical anomaly from the G.S.C.'s Uranium Reconnaissance Programme. The claims were explored with geological mapping and geochemical surveys in 1979 and allowed to expire. The property was restaked as the TB claims by T. Carter and others in 1981.

<u>Current Work and Results:</u>

The property was not examined by the writer but is underlain by sheared and altered quartz monzonite of the Ram Stock (PMqm) and thinly laminated feldspathic amphibolite (PMgd).

The anomaly derives from a hydrothermally altered, gossan zone within the Ram Stock that measures about 400 by 200 m. Pyrite, chalcopyrite and minor scheelite and powellite occur along fractures and in quartz veins. Similar mineralized fractures and veins containing molybdenum were found in talus.

SIN
DuPont of Canada
Exploration Limited

Tin Vein
105 B 3 (48)
(60°07'N,131°26'W)

References: Morin et al (1980, p. 55); Abbott (this volume)

Claims: SIN 1-116

Source: G. Abbott mapped nearby and summarized assessment report 090557 by F. M. Smith.

Current Work and Results:

The property was explored by DuPont with mapping, prospecting and geochemical surveys.

A tin anomaly more than 1 km long along the south facing slope of a cirque is defined by values in soil ranging from 200 ppm to 0.26% tin. The anomaly is associated with a leucocratic phase of the Seagull Batholith. Tin has been found in a few pieces of quartz-tourmaline vein float and in an altered sample of the intrusion containing veins and disseminations of quartz, tourmaline, flourite and muscovite.

VH
DuPont of Canada
Exploration Limited

Tungsten Skarn
105 B 3 (49)
(60°06'N,131°29'W)

References: Morin et al (1980, p. 54); Abbott (this volume)

Claims: VH 1-66

Source: G. Abbott summarized 1980 assessment report 090557 by F. M. Smith.

Current Work and Results:

The claims were briefly prospected in 1979. Small skarns with traces of scheelite occur where limestone (CPc) is in contact with granite of Seagull Batholith at the southwest end of the claims.

SLOUCE
DuPont of Canada
Exploration Limited

Tin Skarn
105 B 3 (50)
(60°04'N,131°23'W)

Claims: SLOUCE 1-142

Source: G. Abbott mapped nearby and summarized assessment report 090803 by F. M. Smith.

Current Work and Results:

The SLOUCE claims were staked by DuPont in 1978 to cover tin and tungsten geochemical anomalies. The property was explored with geological mapping, rock sampling and trenching in 1979 and mapping and chip sampling in 1980. T. Carter and others restaked with the B T Claims in 1981.

Five small skarns occur within limestone (CPc) at or near the contact with Seagull Batholith. The skarns occur over a length of 400 m near the western margin of the claims group. Tourmaline, magnetite ±amphibole and chalcopyrite skarn assaying up to 1.20% tin occurs in a zone less than 0.5 m wide at the granite contact. The extent of the zone is unknown. Garnet, amphibole ± tourmaline, axinite, calcite skarn with minor scheelite and molybdenite occurs in small erratic zones within the limestone.

SKIN
DuPont of Canada
Exploration Limited

Tin Vein
105 B 3 (51)
(60°04'N,131°17'W)

References: Morin et al (1980, p. 53); Abbott (this volume)

Claims: SKIN 1-55

Source: Summary by G. Abbott of assessment report by F. M. Smith.

Current Work and Results:

The claims were explored by DuPont with mapping, prospecting and geochemical surveys in 1979.

Prospecting of areas with anomalous tin values in soils resulted in the discovery of two small tin-bearing quartz-sericite-arsenopyrite veins that cut the Seagull Batholith.

MW
D.C. Syndicate

Tin, Zinc Skarn
Lead, Silver Vein
105 B 3 (52)
(60°03'N,131°28'W)

References: Morin et al (1980, p. 53); Abbott (this volume)

Claims: MW 1-48

Source: G. Abbott briefly examined the property and summarized assessment reports 090458 and 090593 by J. C. Stephen

History:

D. C. Syndicate (Dome, Cominco) carried out geological mapping, hand trenching and soil and rock geochemistry in 1978 and 1979 and mapping, soil and rock geochemistry and magnetometer survey in 1980.

Description:

There are three small showings on the property: a lead-zinc-silver vein (A), zinc-bearing skarn (B) and tin-bearing skarn (C). The zinc skarn was not visited.

The vein (A) occurrence is poorly exposed above timberline in sparse outcrop and a hand trench in talus. The area is underlain by moderately east dipping, coarse-grained gritty quartz sandstone, grey phyllonite, minor orange brown weathering dolomite and green cherty tuff (PMs5).

Mineralization seen by the writer occurs within a steep southeast dipping irregular vein less than 1 m wide and exposed for about 10 m. Galena, sphalerite and minor pyrite are irregularly distributed within a coarse-grained gangue of calcite and dolomite. Massive barite is reported, but was not seen. Chip samples by J. Turner of D. C. Syndicate give average assays of 1.46% lead, 2.37% zinc and 17.67 gm/tonne silver.

A second trench about 10 m west of the first was sloughed but is reported to contain a second vein with minor galena, sphalerite, pyrite and chalcopyrite. Galena and sphalerite are also reported in minor amounts along fractures in wall rocks.

Both skarn showings occur near Seagull Batholith within intensely folded, well bedded limestone, dolomite and quartzite of unit CPc. Spectacular chevron folds within the carbonate are local features related to granite emplacement.

The B showing is exposed above timerline along a dip slope. The skarn apparently occurs within a thin volcanic hoizon interlayered with the carbonate sequence, is separated by about 100 m of limestone and quartzite from granite and dips moderatley southwestward away from the contact. The skarn is poorly exposed but may reach 2 or 3 m in thickness and can be traced down dip for about 250 m. Strike length is unknown. Sphalerite and minor chalcopyrite occur within epidote-magnetite and epidote-garnet skarn. Selected specimens contain several percent zinc but overall grades are low.

Tin-bearing skarn is exposed in two small hand trenches about 100 m apart and located on a rubble covered, grassy slope about 1 km northwest of the zinc skarn. The one trench visited is about 2 m wide and 4 m long. Speckled, dark green pyroxene skarn forms patches veinlets and irregular replacements within massive, white, coarse-grained marble. Skarn preferentially replaces limestone along steeply dipping fractures that trend at 30°.

Arsenopyrite is abundant, but occurs erratically as massive patches and disseminations. Minor chalcopyrite and sphalerite were observed in one specimen.

Thin section and X-ray examinations of tin rich specimens were examined by J. McLeod for D.C. Syndicate and found to contain mainly diopside, nordenskioldine ($CaSnB_2O_6$), and arsenopyrite with minor calcite, wollastonite, fluorite, danburite ($CaBSi_2O_6$), malayaite, cassiterite, tetrahedrite, stannite, sphalerite, bismuth, bornite and chalcocite.

MUN — Tin, Zinc, Tungsten Skarn
D.C. Syndicate — 105 B 3 (53)
(60°10'N,131°19'W)

References: Morin et al (1980, p. 55); Abbott (this volume)

Claims: MUN 1-80

Source: G. Abbott mapped nearby and summarized assessment report 090446 and 090565 by J. C. Stephen.

Current Work and Results:

The property was explored by D. C. Syndicate (Dome, Cominco) with mapping, prospecting and rock geochemistry in 1979 and 1980. Showings were trenched in 1980.

A large area of talus (PMs5) in the southeast part of the claim block is anomalous in tin. None has been located in place, but four small low grade sphalerite, scheelite and malayaite-bearing garnet-pyroxene skarns are located along a north facing cirque wall about 0.4 km to the north. Strong, vertical, east trending fractures, containing quartz, tourmaline, clay and minor arsenopyrite are also reported here.

CAN — Tin Skarn
D.C. Syndicate — 105 B 4 (54)
(60°13'N,131°32'W)

References: Morin et al (1980, p. 58); Abbott (this volume)

Claims: CAN 13-22, 29-56

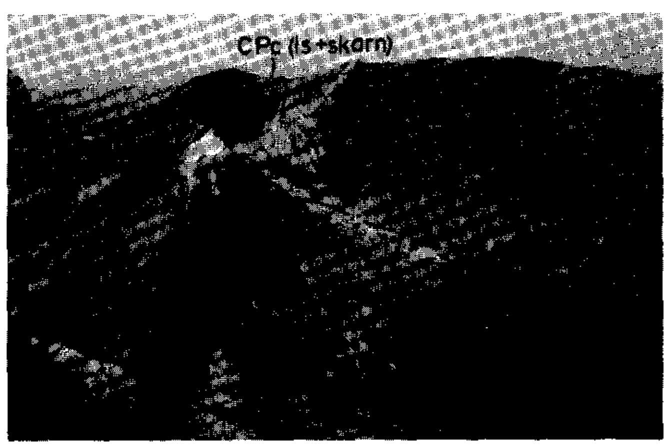
Source: G. Abbott briefly examined the property and summarized assessment reports 090460 and 090594 by J. C. Stephen.

Description

Tin-bearing skarn is well exposed above timberline along a ridge crest at the western end of the claim group location (54 A). Several skarn lenses replace moderately southwest dipping limestone (CPc) interlayered with hornfelsed siliceous cataclasites (PMs2). Biotite granite of the Seagull Batholith (Kg) underlies the metasedimentary rocks along a gently dipping contact less than 50 m below the top of the ridge, and a leucocratic phase of the intrusion forms a sill, up to 7 m thick, within the metasedimentary rocks. An unusual steep, northwesterly trending 20 m wide dike of fine-grained grey, quartz-biotite-feldspar porphyry cuts the rock and bisects the skarn.

Skarn is well developed in several bands between 1 and 15 m thick. Lateral continuity of each zone is not certain, but total strike length reaches 300 m. The gently dipping granite contact indicates the down dip extension is less than 70 m.

Skarn mineralogy varies, but massive reddish-brown garnet, massive magnetite and coarse-grained dark green amphibole predominate. An unidentified, lustrous black, crudely acicular, weakly magnetic mineral is also common. Well developed crystals of epidote, green garnet and light purple axinite are also present.



Looking north to tin-bearing skarn on CAN property. Skarn occurs in thin discontinuous concordont bands within the limestone.

Tin-bearing minerals have not been identified but assays average about 0.2% Sn.

At the eastern end of the property, a different magnetite-garnet skarn less than 3 m wide carries low grade disseminated scheelite (54 B).

Current Work and Results:

The CAN claims were staked in 1977 by the D.C. Syndicate (Dome, Cominco) after skarn was discovered during follow-up of tungsten anomalies in stream sediments. The claims were explored with mapping, geochemistry and rock sampling in 1978, 1979 and 1980.

HL	Tungsten Skarn
Logtung Resources Limited	105 B 6 (56)
	(60°17'N,131°20'W)

Reference: Morin et al (1979, p. 59)

Claims: HL 1-126

Source: G. Abbott spent two days on the property, one with Alf Randal of Western Mines.

History

The HL 1-48 claims were staked by Cordilleran Engineering for Swift River Resources in June, 1978 to protect tungsten geological anomalies discovered in 1977. Four more claims were staked in September, 1978 and another 74 in the spring of 1979 for a total of 126.

In 1978 and 1979, work consisted of prospecting, mapping and soil geochemistry. Western Mines optioned the property in 1980 and conducted grid soil sampling, mapping and bulldozer trenching.

Description

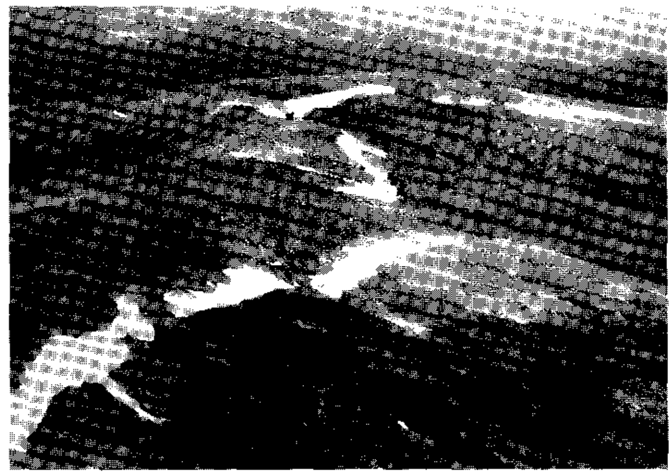
The property is mainly above timberline along a gently-rolling west-northwest trending ridge. Outcrop and felsenmeer are scarce and talus is restricted to a narrow band along the northeast side of the ridge crest. Overburden is thin and soil geochemistry is probably effective over most of the property.

The property is underlain by metasedimentary rocks of map unit Plfsq and is bounded to the northeast by quartz monzonite of the Cassiar Batholith. Limited structural data suggests that bedding is folded into a broad, open west-northwest trending syncline about 2 km across.

Brown weathering, purple quartz muscovite, biotite-andalusite schist, overlain by about 30 m of buff weathering calcite cemented quartz pebble conglomerate and thinly laminated buff and grey weathering limestone are the oldest rocks. Mapping by C. Verley of Cordilleran Engineering shows that they overlie massive- to thin-bedded grey limestone along the northwestern end of the property next to Cassiar Batholith.

Brown weathering biotite-muscovite quartzite, quartz-feldspar grit and alusite-bearing quartz-feldspar biotite muscovite schist with lesser lime-cemented quartzite, biotite chlorite schist, pale green quartz muscovite schist and minor amphibolite overlies the limestone and conglomerate.

Mineralization, observed by the writer, occurs within distinctive, massive, pale grey-green calcsilicate rock speckled with light brown garnet and light green (?) amphibole. These rocks were originally lime cemented quartzite and occur as 10 cm to 1 m thick interbeds within mica schist, quartzite and grit.



Looking northwest across the HL property. Crosses mark the approximate locations of scheelite bearing float. Circled crosses show in place mineralization in bulldozer trenches. Quartz monzonite of the Cassiar Batholith is exposed immediately to the right of the picture.

The calcareous quartzite is common, but is only locally mineralized. Scheelite is found discontinuously in talus along the northeast side of the ridge for a distance of 4 km. Twelve trenches were cut up slope from mineralized float and over nearby geochemical anomalies. Mineralization was found in two places, spaced 200-300 m apart along strike. In both trenches, scheelite occurs mainly within beds less than 1 m wide that contain discontinuous bands from 1 cm to 10 cm thick.

Individual hand specimens reach grades of 1 - 2% WO_3, but overall grades are low. The bands are defined only by the presence of scheelite and otherwise are similar to the enclosing calcsilicate. Scheelite is disseminated as irregularly shaped or elongated grains parallel to foliation. Minor scheelite also occurs along fractures and narrow quartz veins.

Geological anomalies are generally weak, erratic and confined to known areas of mineralization and the property appears to have little economic potential.

Origin:

C. Verley and other geologists have suggested that the HL deposits are syngenetic, stratabound and similar to those in the eastern Alps of Austria (i.e Felbertal). The main characteristic supporting this theory is: the distance of mineralization from exposed granite (1 km), no obvious metasomatic skarn associated with scheelite, confinement of mineralization of one rock type (not necessarily one stratigraphic horizon), occurrence of mineralization in discrete bands and alignment of scheelite grains parallel to foliation which suggests an origin predating deformation and metamorphism, as well as the occurrence of amphibolite in the section.

Evidence against the syngenetic theory includes: the erratic distribution of mineralization, widespread occurrence of barren rocks similar to those which host mineralization and presence of scheelite along late veins and fractures. Other features common to known syngenetic tungsten deposits are absent. These include association with abundant volcanic rocks and association with antimony and mercury. Calcareous quartzite similar to that which hosts the HL deposits is widespread elsewhere within the Grit Unit but is apparently unmineralized.

FUR	Unmineralized
E. Johnson	Target
L. Peever	105 B 4 (57)
	(60°10'N,131°38'W)

Claims: FUR 1-12

Source: Summary by R. Debicki from assessment report 090524 by E. H. Johnson.

Current Work and Results:

The claims were recorded in July, 1978. They are underlain by metamorphosed Devono-Mississippian strata, and by granite rocks of the Cretaceous Seagull Batholith. (See study by Abbott, this volume, for more comprehensive data.)

Work done in 1978 and 1979 included prospecting, geological mapping and geochemical analysis of rock samples. The metasedimentary rocks consist of quartzite, chert and calcsilicate hornfels. Two phases of granitic rocks have been recognized. Small apophyses and dikes of fine-grained reddish hornblende granodiorite intrude the country rocks. The main body of the batholith on the claims is leucocratic quartz monzonite. The hornfels is considered to be the most favourable host for tin, tungsten and molybdenum mineralization. Whole rock geochemical analyses of 17 hornfels samples for tin, and 13 for tin, tungsten and molybdenum returned low results.

COM	Lead, Zinc
Comaplex Resources	105 B 7,10 (58)
International Limited	(60°30'N,130°33'W)

Claims: COM 54-59

Source: Summary by R. Debicki from assessment report 090525 by K. G. Lintott.

Current Work and Results:

The claims were staked after a prospector found mineralized float in Hydra Creek.

The claims were prospected briefly in 1979. Muscovite and granite with minor inclusions of metasediments occurs on the ground. No mineralization was seen in place, although several angular to subrounded boulders 0.3 x 0.6 x 0.6 m of massive galena and sphalerite in fragmented muscovite granite occurs in the creek bed.

COM	Unmineralized
Comaplex Resources	Target
International Limited;	105 B 10 (59)
Dayton Creek	(60°32'N,130°35'W)
Silver Mines Limited	

Claims: COM 45-53

Source: Summary by R. Debicki from assessment report 090653 by G. B. Allen.

Current Work and Results:

The COM 45-53 claims lie immediately north of the headwaters of Cabin Creek, and 120 km west-northwest of Watson Lake. Hudson Bay Exploration and Development Company Limited has carried out geochemical surveys in the area previously. Trenching has also been done on the claims.

A brief survey was done on the claims in 1979. Sites for examination were selected after the results of the geochemical surveys done by Hudson Bay were examined in assessment report files. The claims are underlain by granodiorite of the Cassiar Batholith, and by siliceous schist and "black, weathered, sooty material" (graphitic schist?). Galena-bearing granodiorite and pyrite-galena-spahlerite black, weathered, sooty material were exposed in the old trenches. No new mineralization was found.

CABIN	Unmineralized
S.E.R.E.M. Limited	Target
	105 B 9,10 (60)
	(60°41'N,130°32'W)

Claims: CABIN 1-170

Source: Summaries by R. Debicki from assessment report 090528 by M. Stammers and G. Abbott from assessment report 090673 by T. Lee.

Current Work and Results:

The claims were staked in June, 1979 to cover an area favourable for tunsten and greisen mineralization. They are underlain by Late Proterozoic to Early Cambrian metasedimentary rocks considered to be Grit Unit equivalents and by Cretaceous granodiorite to quartz monzonite outlier of the Cassiar Batholith.

In 1979, the property was mapped and sampled. Stream sediments were collected from Cabin and Sayea Creek, and the 22 samples and a heavy mineral fraction of each were analyzed for tungsten, molybdenum, uranium, silver, gold and tin.

The Grit Unit equivalent is comprised of quartz-biotite schist, quartzite and garnet-diop-side-tremoline skarn on the claims. The plutonic rocks range from porphyritic biotite-quartz monzonite to granodiorite.

In 1980, the property was explored with mapping, grid geochemistry and magnetometer survey. Over 700 soil samples were collected at 25 and 50 m intervals on lines spaced 250 m apart and analysed for tungsten, tin, gold and molybdenum. Magnetometer readings were taken at 25 m intervals on lines spaced 250 m apart.

CARIBOU
Regional Resources
Limited

Molybdenum
Porphyry (?)
105 B 7 (67)
(60°23'N,130°43'W)

Claims: CARIBOU 1-32

Source: Summary by G. Abbott from geophysical report 090716 by P. A. Cartwright for Cordilleran Engineering.

Current Work and Results:

The claims are underlain by poorly exposed lower Cambrian or older schist and metagrit intruded by Cretaceous (?) medium-grained quartz-feldspar porphyry and fine-grained leucocratic intrusive rock. Quartz-sericite-pyrite alteration occurs pervasively and along fractures in both types of intrusions. Float containing molybdenite in quartz veins and as disseminations within altered intrusive rock has been found.

The property was staked by Cordilleran Engineering in March, 1980 for Regional Resources and explored with mapping, geochemical surveys and induced polarization, resistivity and magnetic surveys.

OAKE
Regional Resources
Limited

Unmineralized
Target
105 B 7 (68)
(60°16'N,130°37'W)

Claims: OAKE 1-16

Source: Summary by G. Abbott from assessment report 090675 by C. Verley.

Current Work and Results:

The property is underlain by Lower Cambrian or older greenish phyllite, quartzite, grit and thin-bedded, grey argillaceous limestone.

The claims were staked in March, 1980 by Cordilleran Engineering for Regional Resources to cover lead and zinc soil geochemical anomalies. The property was optioned to Amax Minerals Exploration and explored with mapping and grid soil geochemical surveys. Samples were collected at 374 sites at 50 m intervals on lines spaced 200 m apart. No significant anomalies were found.

LOGAN
Regional Resources
Limited

Lead, Zinc, Silver,
Tin Vein
105 B 7,8,9 (70)
(60°30'N,130°28'W)

Claims: LOGAN 1-114

Source: Summary by G. Abbott from assessment reports 090571 and 090717 by C. Verley.

Current Work and Results:

The claims lie on the contact between Lower Cambrian and older (?) metasediments and Cretaceous, medium-grained biotite-muscovite granodiorite containing coarse pegmatite lenses. The granodiorite is cut by a northeast trending 12 m wide felsite dike.

Mineralization occurs on the LOGAN 1-6 claims in several localities as float and in place at the Main Vein Showing. There, several parallel quartz veins with a total width of about 1.5 m are exposed in a trench less than 6 m long. The veins are zoned, with coarse-grained sphalerite, arsenopyrite ± chalcopyrite ± carbonate in the center and quartz containing disseminated sphalerite and arsenopyrite on the outside. Sphalerite and arsenopyrite also occurs along veinlets and fractures within the felsite dike 75 m north of the Main Vein. Silicified breccia containing felsite fragments is 75 m north of the dike. The breccia locally contains minor sphalerite and galena.

The LOGAN 1-36 claims were staked in 1979 and were explored that year with prospecting, mapping, trenching, soil geochemistry, and test magnetometer, electromagnetic, induced polarization and resistivity surveys. Soil samples were taken at 360 sites at 50 m intervals on lines 200 m apart on the LOGAN 1-6 and analysed for copper, lead, zinc, silver and copper. Chip samples taken across the vein average 5.23% zinc, 0.58% copper, 0.02% lead and 53.63 gm/tonne silver over 1.5 m. Two grab samples from the silicified breccia assayed 0.33 and 1.42% tin and 150.85 and 508 gm/tonne silver. Mineralized quartz vein float has also been found elsewhere in linear easterly and northeasterly trending topographic depressions.

Soil geochemistry outlined several anomalies that are roughly coincident with the Main Vein felsite dike and silicified breccia. Anomalous values are greater than 110 ppm copper, 125 ppm lead, 850 ppm zinc, 3.5 ppm silver and 100 ppm tin with backgrounds of less than 40 ppm copper, 60 ppm lead, 400 ppm zinc, 1.5 ppm silver and 60 ppm tin.

Geophysical tests were conducted along one line across the showings. Induced polarization anomalies are associated with the Main Vein and felsite. Other tests were inconclusive.

The LOGAN 37-114 claims were added in 1980 and explored with a soil geochemistry survey. Samples were collected at 777 sites at 50 m intervals on lines 200 m apart and were analysed for copper, lead, zinc molybdenum, silver and tungsten. There were no significant anomalies.

MOOSE
Regional Resources
Limited

Unmineralized
Target
105 B 8 (71)
(60°25'N,130°18'W)

Claims: MOOSE 1-42

Source: Summary by G. Abbott from assessment report 090676 by C. Verley.

Current Work and Results:

The MOOSE claims are underlain by poorly exposed Lower Cambrian or older schist, quartzite and quartz-feldspar sandstone, grit and conglomerate intruded by Cretaceous pegmatite dikes and Tertiary diabase sills. Minor galena is reported in quartz veinlets from one locality and in a sheared brecciated zone from another. The MOOSE claims were staked in March, 1980 to cover lead and zinc stream and soil geochemical anomalies obtained in 1979. Amax Minerals Exploration optioned the property. Cordilleran Engineering conducted exploration on the ground with mapping and geochemical surveys in which 903 samples were collected at 50 m intervals on lines 200 m apart. Analysis for copper, lead, zinc, molybdenum and silver revealed erratic anomalies in lead, zinc and silver. One anomaly about 600 m long and between 50 m and 200 m wide may be of interest. Anomalous values are between 45 and 164 ppm lead, 271 and 1660 ppm zinc and 0.3 and 5.6 ppm silver.

TEAM — Zinc, Tungsten,
S.E.R.E.M Limited — Skarn
105 B 10/15 (72)
(60°43'N,130°46'W)

Claims: TEAM 1-120

Source: Summary by J. Morin from assessment report 090786 by T. Lee.

Current Work and Results:

The claims are located in the Cassiar Mountains, 130 km northwest of Watson Lake. Claims TEAM 1-98 were staked in May, 1980 and 99-120 in August, 1980. they are underlain by metasedimentary rocks of Late Proterozoic to Early Cambrian age in intrusive contact with a Mesozoic biotite-quartz monzonite to granodiorite stock. Mineralization consists of scheelite-sphalerite-bearing contact skarns with garnet-pyroxene, quartz-pyroxene and quartz-rich assemblages.

Geological mapping, bedrock sampling and soil and stream sediment geochemical sampling programs were conducted during summer 1980. Tungsten and zinc soil and stream sediment anomalies were the most useful in locating and defining mineralized skarn zones.

LITTLE MOOSE — Zinc, Lead,
Regional Resources Limited — Copper Float
105 B 8 (73)
(60°26'N,130°26'W)

Claims: EAGLE 1-32

Source: Summary by G. Abbott from assessment report 090601 by C. Verley and geophysical report 090715 by P. A. Cartwright.

Description

The claims are underlain by poorly exposed Lower Cambrian or older buff weathering limestone less than 50 m thick interbedded with biotite-muscovite-feldsapar-quartz schist. Pyrite, sphalerite and galena occurs on fracture surfaces in a small outcrop near the center of the claim group. Massive sulphide float was found nearby.

Current Work and Results:

The EAGLE claims were staked in 1979 and were explored that year with mapping, soil geochemistry and induced polarization and resistivity surveys in 1979. The massive sulphide float returned assays up to 3.70% zinc, 1.15% lead, 0.71% copper, 72.6 gm/tonne silver. Other massive pyrrhotite boulders found in several localities have low values in copper and silver.

A lead anomaly in soils is associated with the showing and float. The anomaly parallels the foliation in bedrock, is 1500 m long, about 150 m wide and has values between 100 and 400 ppm over a background of about 60 ppm.

In 1980 the claims were explored with Induced Polarization, Vertical Loop Electromagnetic, Vertical Field Magnetic Surveys, Resistivity and Magnetometer Surveys. Five I.P. anomalies were outlined but other methods gave inconclusive results.

WOLF — Zinc, Lead,
Regional Resources Limited — Copper, Silver
Stratabound
105 B 9 (74)
(60°33'N,130°02'W)

Claims: WOLF 1-52

Source: Summary by G. Abbott from 1980 assessment report 090566 by C. Verley.

Current Work and Results:

The property is mainly underlain by poorly exposed Lower Cambrian and older pale orange to rusty weathering muscovite-biotite-garnet schist and biotite-muscovite-quartz-feldspar schist. Rusty weathering, pale green carbonate muscovite-chlorite-sulphide schist is intercalated with these rocks and is host to mineralization. Three mineralized horizons are exposed over a stratigraphic thickness of about 20 m in a creek cut near the center of the property. The lower and upper horizons are at the base of the exposed section and a third zone occurs at the top. Within the upper and lower horizons, fine-grained sphalerite, lesser coarse-grained galena and minor pyrite occur as lenses and irregular laminations 2 to 10 mm thick parallel to foliation. The third zone consists of fine-grained pyrite with minor chalcopyrite and galena in a quartz-carbonate-muscovite matrix. Part of this zone is a breccia of uncertain origin. Scheelite occurs in some fragments.

The WOLF claims were staked in 1979 by Cordilleran Engineering for Regional Resources who explored later that year with mapping, grid soil geochemistry and test geophysical surveys. A chip sample across the lower horizon assayed 4.65% zinc, 3.05% lead, 0.06% copper and 38.1 gm/tonne silver over 84 cm. The upper horizon 1.3 m above the lower assayed 0.84% zinc, 0.60% lead, 0.01% copper and 7.4 gm/tonne silver. A grab sample from the third horizon of pyrite schist assayed 12.7 gm/tonne silver, 1.80 gm/tonne gold, 0.22% WO_3 and 0.08% copper. The size of the zone is not reported.

The soil geochemical survey consisted of 549 samples taken on a grid at 50 m intervals over 273 line kilometers. Spotty copper, lead, zinc and silver anomalies occur on a zone about 2000 m long and 300 m wide that passes through the showing. Anomalous values are greater than 15 ppm copper, 40 ppm lead, 100 ppm zinc and 0.5 ppm silver and background is less than 11 ppm copper, 30 ppm lead, 60 ppm zinc and 0.3 ppm silver.

In 1980 the claims were explored with Induced Polarization, VLF-EM and Total Field Magnetic Surveys. Four I.P. anomalies were outlined including one near mineralization. There were no anomalies from other methods.

ICE
Canadian Occidental Petroleum

Unmineralized Target
105 B 6 (75)
(60°18'N,131°22'W)

Reference: Geological Survey of Canada Open File 563

Claims: ICE 1-30

Current Work and Results:

The claims were staked by Canadian Occidental Petroleum to cover uranium anomalies from the G. S. C. Uranium Reconnaissance Program. The claims were explored with mapping and geochemical surveys later in the year.

The claims are underlain by biotite-quartz monzonite of Cassiar Batholith.

PLUG
D.C. Syndicate

Unmineralized Target
105 B 4 (76)
(60°13'N,131°39'W)

Reference: Morin et al (1980, p. 58)

Claims: PLUG 1-12

Source: G. Abbott mapped nearby and summarized assessment report 090456 by J. C. Stephen.

Current Work and Results:

The claims were staked to cover a small plug of Cretaceous granite during a staking rush and were explored by D. C. Syndicate (Dome, Cominco) with geological mapping and geochemical surveys in 1978 and 1980. Magnetometer surveys and rock chip samples were also carried out in 1980. No significant mineralization has been found on the claims but three small areas with weakly anomalous tin values have been outlined.

PONT
DuPont of Canada Exploration Limited

Unmineralized Target
105 B 3 (77)
(60°11'N,131° 20'W)

References: Morin et al (1980, p. 56); Abbott (this volume).

Claims: PONT 114-136

Source: G. Abbott mapped nearby and summarized assessment report 090557 by F. M. Smith.

Current Work and Results:

The property was explored by DuPont with mapping and prospecting in 1979. No mineral occurrences have been reported. The claims are mainly underlain by a roof pendant of intensely sheared and tectonically interleaved limestone (CIs) and volcanics (PMv).

ZINC
D.C. Syndicate

Unmineralized Target
105 B 4 (78)
(60°13'N,131°39'W)

Reference: Morin et al (1980, p. 58)

Claims: ZINC 1-16

Source: G. Abbott mapped nearby and summarized assessment reports 090457 and 090778 by J. C. Stephen.

Current Work and Results:

The claims were explored by D. C. Syndicate (Dome, Cominco) with mapping and geochemistry and rock chip sampling in 1979 and 1980. Tin is reported in east trending fractured zones within granite of Seagull Batholith which underlies most of the property. The fracture zones are manganese stained and contain quartz, tourmaline and minor pyrite, sphalerite, galena and arsenopyrite.

ELLE
Eldorado Nuclear Limited

Unmineralized Target
105 B 9 (79)
(60°37'N,130°21'W)

Claims: ELLE 1-139

Source: Summarized by D. Tempelman-Kluit from assessment report 090624 by D. Pare.

Description:

The claims were staked in 1979 to cover a strong geochemical anomaly related to six airborne scintillometer anomalies discovered in 1977. Medium-grained porphyritic biotite-quartz monzonite of one of the Cretaceous Logjam intrusions underlies much of the claims. The stock is similar to, and genetically related to, Seagull Batholith.

Current Work and Results:

A ground radiometric survey over a grid of 3.2 x 0.5 km shows the background count for the quartz monzonite. Seven anomalies were defined. A soil geochemical survey showed that some of the radiometric anomalies have corresponding geochemical response.

HOT
Amax of Canada Limited

Tungsten Skarn
105 B 1 (80)
(60°00'N,130°07'W)

Claims: HOT 1-80

Source: Summary by D. Tempelman-Kluit from assessment report 090681 by G. W. Booth, J. L. LeBel and A. C. Hitchins.

Description:

The claims were staked in 1979 following reconnaissance stream panning in the general area. Preliminary mapping was carried out the same year. Northwest trending Early Paleozoic calcareous sedimentary rocks of Cassiar Platform underlie the region. On the claims they are intruded by small dikes and porphyries of the Cassiar Batholith (Cretaceous) which have metamorphosed and altered the strata. Scheelite is finely disseminated through the metamorphosed rocks and occurs with pyrrhotite and pyrite.

Current Work and Results:

During 1980, 632 soil samples were collected and analysed for tungsten, molybdenum, copper, lead, zinc, iron, manganese, silver and gold. Tungsten values correspond closely with known concentrations of scheelite in bedrock and eight anomalous zones with an average value of 100 ppm tungsten were outlined. The anomalous areas trend northwest and follow the most intensely metasomatized parts of the succession. Pan and silt sampling were done, but the results are generally discouraging. Only one of 27 pan concentrates contained 100 grains scheelite. Thirty-three rock chip samples were analysed and these also show that tungsten is confined to the calcsilicate rocks. A very low frequency electromagnetic survey over the claims defined a number of anomalies and a magnetic survey similarly turned up a host of narrow magnetic highs. The EM and magnetic anomalies cluster over the area of most intense calcsilicate development. The property probably covers a shallowly buried intrusion.

1980 MINERAL CLAIMS STAKED

MID
R. Bailey et al

105 B 7 (18)
(60°20'N,130°42'W)

Claims 1980: CMC (24)

AURORA
Alex Black

105 B 7 (19)
(60°22'N,130°50'W)

Claims 1980: RINGO (8)

TOOT
Cordilleran Engineering
Regional Resources Limited

105 B 1 (61)
(60°01'N,130°14'W)

Claims 1980: MID (160)

IDAHO
Atlas Mine and Mill Supply
C. Wilman et al

105 B 1 (62)
(60°02'N,130°23'W)

Claims 1980: IDAHO (64)

ANT
Klondike Silver Mines

105 B 2 (63)
(60°01'N,130°32'W)

Claims 1980: ANT (64); BRU (36)

LICK
Canadian Occidental
Petroleum Limited

105 B 2 (64)
(60°02'N,130°16'W)

Claims 1980: LICK (55)

GOAT
Canadian Occidental Petroleum
Limited

105 B 2 (65)
(60°10'N,130°38'W)

Claims 1980: GOAT (86)

BESSEY
Len Peever, B. Kennedy
M. Anderson, G. Hawkins

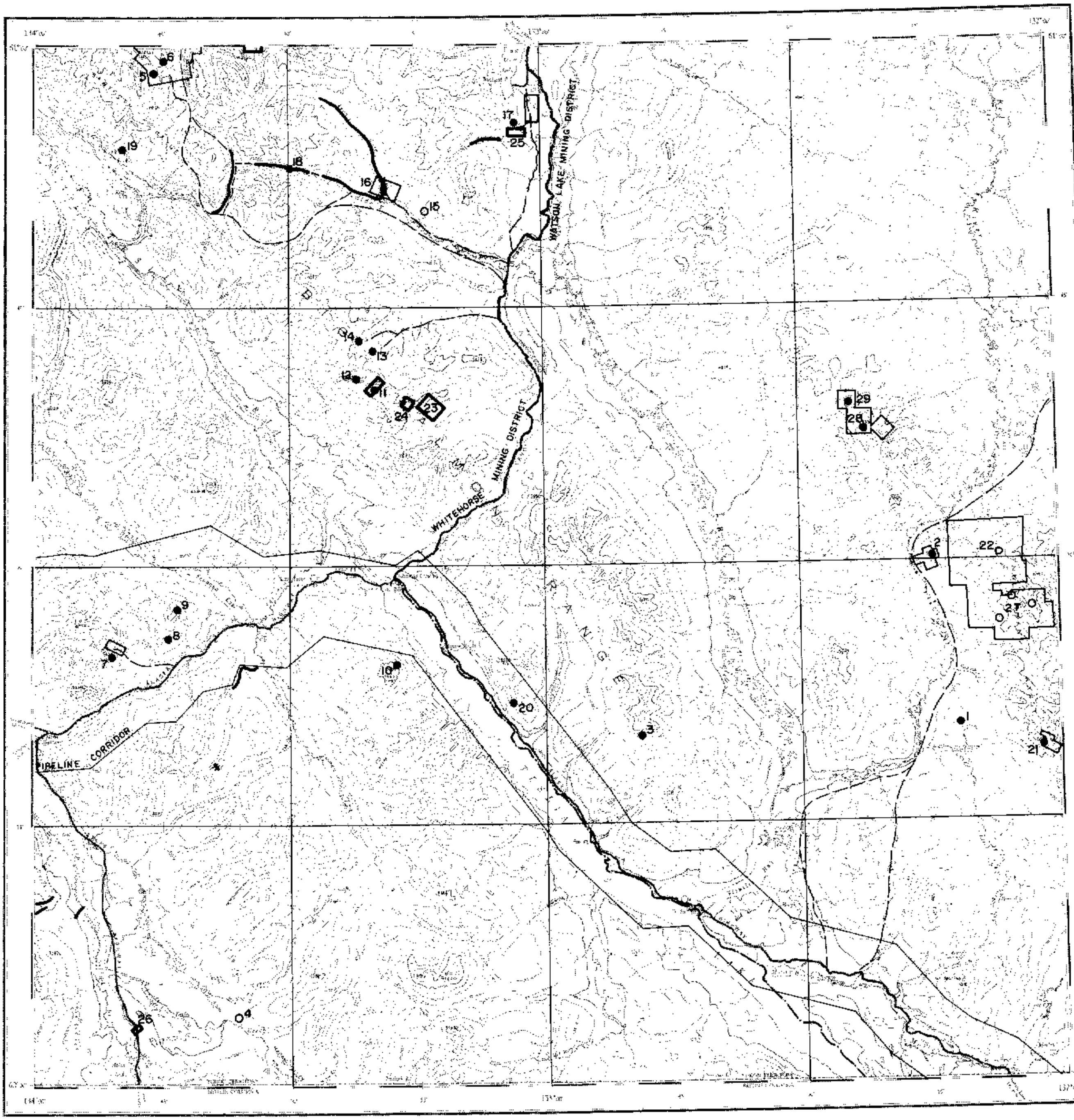
105 B 2 (66)
(60°12'N,130°35'W)

Claims 1980: BESSEY 1-8; A 1-8; B 1-8, C 1-8

URSUS
S.E.R.E.M.
Limited

105 B 8 (69)
(60°28'N,130°22'W)

Claims 1980: URSUS (164)



TESLIN
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

O72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

TESLIN MAP-AREA (NTS 105 C)

NO.	PROPERTY NAME	REFERENCE
1	KITCHEN	Silver-Lead Vein
2	SMEG	This Report
3	LINCOLN	G.S.C., Mem. 326, p. 78 G.S.C., Economic Geology Series, No. 16
4	TARFU	
5	SLATE	Silver-Lead-Zinc Vein
6	RED MOUNTAIN	MIR, 1969 & 1970, Vol. 1, pp. 121-122
7	RIBA	Asbestos
8	SEAFORTH	Asbestos
9	SQUANGA	Asbestos
10	HAYES PEAK	G.S.C., Mem. 326, p. 78
11	GUNSIGHT	Asbestos, This Report
12	MOOSE HILL	G.S.C., Mem. 203, p. 24
13	MARLIN	Manganese Occurrence
14	MT. GRANT	Copper Vein
15	DRY	
16	IRON CREEK	Silver-Gold Occurrence
17	LINDSAY	MIR, 1969 & 1970
18	SIDNEY	G.S.C., Mem. 326, p. 77
19	ROSY	G.S.C., Pap. 36-2, p. 6
20	DEADMAN	Silver-Lead Vein
21	McCLEERY	Skarn Copper-Iron
22	ABBA	This Report
23	FORSURE	This Report
24	CHRIS	This Report
25	LINDSAY	This Report
26	LISA	This Report
27	MICH	This Report
28	ORK	This Report
29	MINDY	This Report

SMEG
D. C. Syndicate

Lead, Zinc,Silver
Stratabound
105 C 8,9 (2)
(60 38'N,132° 22'W)

Reference: Morin et al (1980, p. 59-60)

Claims: BAR 1-20

Source: Summary by G. Abbott from assessment report 090651 by J. C. Stephen.

Current Work and Results:

Four holes totalling 335 m were drilled in June, 1980. Grey-green chert, cherty argillite, quartzite and minor barite were intersected in all holes. One hole intersected massive pyrite in several zones up to 3.7 m in width below the barite horizon.

Low values in silver and zinc were obtained.

ABBA
Urangesellschaft Canada
Limited

Unmineralized
Target
105 C 8,9 (22)
(60°30'N,132°08'W)

Claims: ABBA 1-270

Source: Summary by R. Debicki from assessment report 090502 by J. B. Williams.

Description:

The ABBA claims were staked in 1978 following a reconnaissance multi-media sampling survey. They are underlain by Permo-Carboniferous limestone, slate, phyllite, quartzite and chert and by high level Cretaceous granitic rocks. Skarns are present at some locations along the intrusive-country rock contact.

Current Work and Results:

During 1979 geological, water and stream sediment geochemical and radiometric surveys were carried out. The geological survey differentiated four phases of granitic rocks. The outer portion of the pluton consists of equigranular to porphyritic biotite granite with biotite-rich layers, and lacks biotite-rich xenoliths. Porphyritic aplite cuts the pluton. The youngest intrusive phase is a red aplite apparently spatially related to faults. It contains xenoliths of both the "outer" and "inner" granites, and has fractures and stockworks containing hematite, limonite, silica, fluorite and occasionally uranium mineralization and molybdenite.

Water samples were analysed for uranium. Stream sediment samples were analysed for uranium, and some were analysed for copper, molybdenum, lead, zinc, iron and manganese. Four anomalous areas were identified, three of which are associated with springs.

Radiometric surveys were carried out over the four geochemical anomalies. Localized radiometric highs were identified with the springs. A broader high, the fourth anomalous area of the geochemical survey, was related to uranium mineralization along a fracture. No uranium mineralization was found.

MICH
Eldorado Nuclear

Unmineralized
Target
105 C 8 (27)
(60°27'N,132°03'W)

Claims: MICH 1-224

Source: Summary by D. Tempelman-Kluit from assessment report 090625 by D. Pare.

Current Work and Results:

The claims were staked in spring and summer of 1979 to cover a strong geochemical anomaly. The property is underlain by a Cretaceous (?) porphyritic biotite-quartz monzonite batholith that intrudes Paleozoic metasedimentary strata. The batholith forms the core of the Englishman's Range, is a member of the Cassiar intrusions and is probably a continuation of the Seagull Batholith. Narrow rusty fractures in the quartz monzonite have above average radioactive response. No primary uranium mineralization is known.

The property was mapped and soil, silt, water and heavy mineral samples were collected during 1979. Detailed radiometric and soil geochemical surveys were carried out on five grids with lines 100 m apart and sample stations on 100 m centers.

ORK
D.C. Syndicate
(Dome, Cominco)

Copper Skarn
105 C 9 (28)
(60°38'N,132°22'W)

Claims: ORK 1-36

Source: Summary by G. Abbott from assessment report 090667 by J. C. Stephen.

Current Work and Results:

The property is underlain by highly sheared Mississippian (?) chert pebble conglomerate, greywacke, quartzite, argillite and white to dark grey limestone. Dikes of aplitic granite and pegmatite, intrude the metasediments and the margins of the limestone horizon are altered to pyroxene-garnet skarn. Arsenopyrite, pyrite, pyrrhotite and minor chalcopyrite occur sporadically in the skarn.

The claims were staked by D.C. Syndicate (Dome, Cominco) late in 1979 to cover arsenopyrite-bearing skarn and moderately anomalous stream silts. The property was briefly prospected in 1980. Forty-five soil and talus samples and 25 rock specimens were analysed for zinc, tin, molybdenum and tungsten. Results are inconclusive.

MINDY
Newmont Exploration of
Canada Limited

Lead, Zinc, Silver
Skarn
105 C 9 (29)
(60°39'N,132°25'W)

Reference: Mulligan (1963)

Claims: MINDY 17-32

Source: Summary by J. Morin from assessment report 090776 by J. Nebocat.

Description:

The claims were staked in August, 1980 and are underlain by sedimentary rocks of Mississippian age (Unit 3, Mulligan, 1963) and intruded by granitic rocks of Cretaceous age. Mineralization consists of disseminated and locally banded sphalerite, galena and arsenopyrite in a northeast trending skarn unit situated between limestone and biotite hornfels.

Current Work and Results:

During summer 1980, geological mapping (1:2,500), grab sampling and soil geochemical sampling programs were conducted. The mineralized skarn was traced over a strike length of 360 m, the highest grade grab sample assaying 10.02% lead, 0.02% zinc, 209 gm/tonne silver, 0.12% barite and negligible tungsten, tin values. Forty soil samples were collected at 40 m intervals along lines spaced 50 m apart and in the mineralized area, 40 more were collected at 20 m intevals along lines spaced 25 m apart. A coincident lead, zinc, tin anomaly and an isolated tungsten anomaly were determined over the skarn.

1980 MINERAL CLAIMS STAKED

GUNSIGHT
Keith Dye, Mitchell Henry

105 C 11 (11)
(60°40'N,133°20'W)

Claims 1980: KID (8)

FORSURE
Cominco

105 C 11 (23)
(60°39'N,133°12'W)

Claims 1980: FORSURE (20)

CHRIS
C. Henry

105 C 11 (24)
(60°39'N,133°16'W)

Claims 1980: CHRIS (4)

LINDSAY
R. J. Lindsay et al

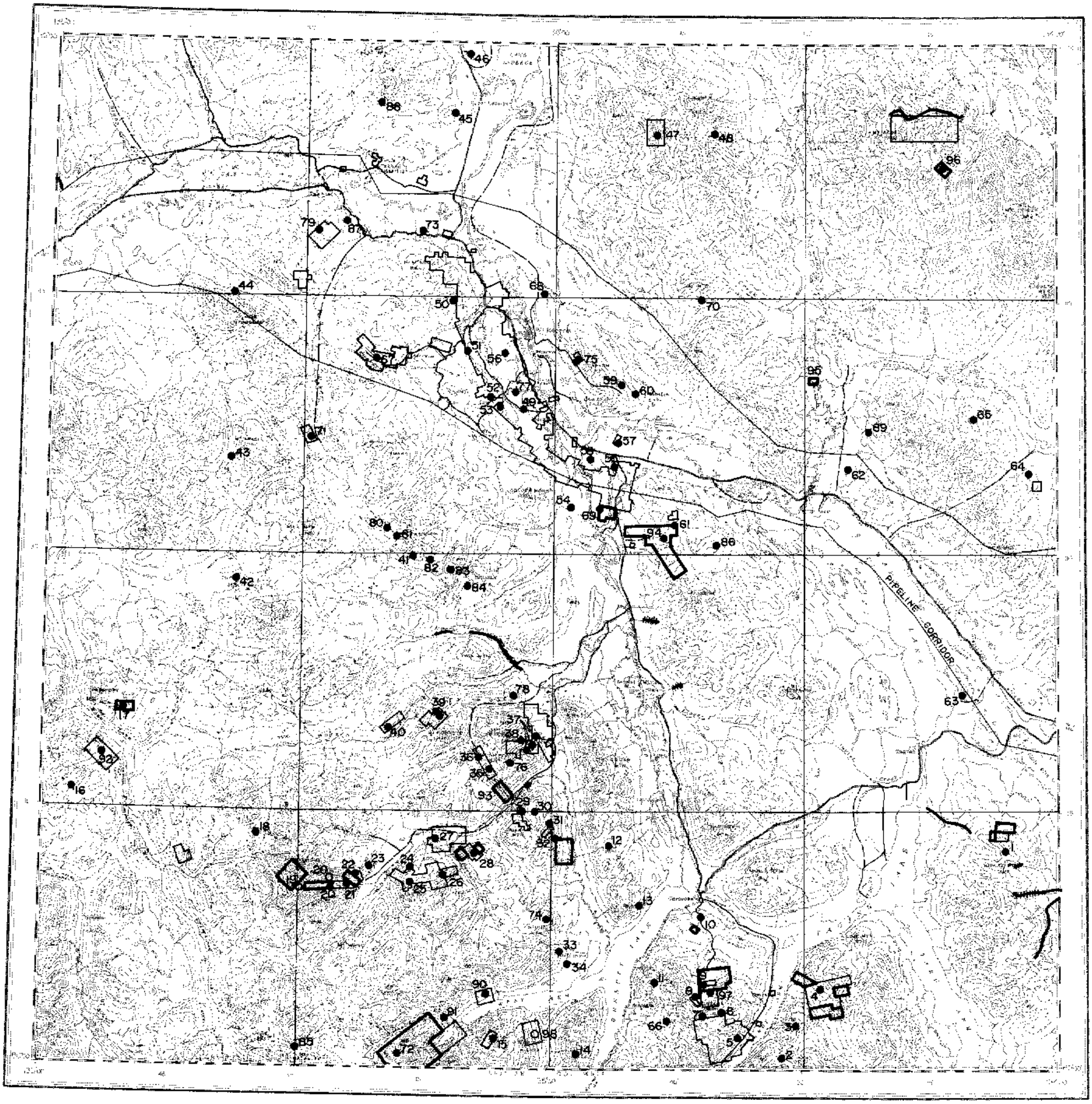
105 C 14 (25)
(60°55'N,133°03'W)

Claims 1980: LINDSAY (8)

LISA

105 C 14 (26)
(60°03'N,133°48'W)

Claims 1980: LISA (2)



WHITEHORSE

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
O72 .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	◇ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

WHITEHORSE MAP-AREA (NTS 105 D)

NO.	PROPERTY NAME	REFERENCE
1	JUBILEE	This Report
2	LULU	G.S.C., Pap. 69-55, p. 39
3	MILLET	Copper
4	LIME	This Report
5	VENUS	Gold-Silver-Lead-Zinc Vein
6	MONTANA	G.S.C., Pap. 68-68, pp. 60-61
7	THISTLE	Gold-Silver-Lead-Zinc-Copper Vein
8	JEAN	G.S.C., Pap. 64-36, pp. 39-40 G.S.C., Pap. 68-68, p. 61
9	BIG THING	This Report
10	CARCROSS	G.S.C., Pap. 68-68, p. 62
11	KNOB HILL	G.S.C., Mem. 234, p. 143
12	WABONA	Zinc Vein
13	COLLEGE GREEN	Copper Vein
14	FINGER	Copper Occurrence
15	LATREILLE	This Report
16	PRIMROSE	Skarn Zinc
17	ROSE	This Report
18	BOSTOCK	G.S.C., Mem. 234, p. 38
19	CHARLESTON	This Report
20	BERNEY	This Report
21	MT. REID	G.S.C., Mem. 218, pp. 12-13
22	SKUKUM	G.S.C., Pap. 68-68, pp. 56-57 MIR, 1971-1972, p. 55
23	MORNING	G.S.C., Mem. 234, pp. 36-37
24	GODDELL	Antimony-silver vein
25	PORTER	G.S.C., Mem. 234, pp. 37-38
26	BECKER-COCHRAN	G.S.C., Pap. 66-31, pp. 52-55
27	FLEMING	G.S.C., Mem. 312, p. 142 G.S.C., Mem. 31, pp. 140-145
28	MT. ANDERSON	This Report
29	TALLY-HO	G.S.C., Mem. 312, pp. 108-110
30	MT. WHEATON	G.S.C., Mem. 312, pp. 122-123
31	BUFFALO	This Report
32	MT. STEVENS	G.S.C., Mem. 312, pp. 121-122
33	CROMWELL	Silver-Lead-Copper Vein
34	MILLHAVEN	
35	GOLD HILL	G.S.C., Summary Report, 1915, p. 43
36	GOLD REEF	G.S.C., Mem. 312, p. 123 G.S.C., Mem. 31, pp. 111-112
37	UNION MINES	G.S.C., Mem. 312, pp. 135-136
38	MT. BUSH	G.S.C., Mem. 31, pp. 145-147
39	LEGAL TENDER	G.S.C., Mem. 31, pp. 112-113
40	ALLIGATOR	Copper-Molybdenum Porphyry
41	WHITEHORSE COAL	MIR, 1969-1970, p. 158
42	MUD	G.S.C., Pap. 68-68, pp. 54-55
43	ARKELL	MIR, 1971-1972, p. 43
44	INGRAM	G.S.C., Mem. 312, pp. 136-137
45	CUTOFF	Silver-Gold Vein
46	EFFIE	Asbestos
47	POW	This Report
48	ACE	Silver-Gold-Lead-Zinc-Copper Vein
49	WHITEHORSE COPPER	G.S.C., Pap. 63-41 MIR, 1973, pp. 74-77
50	TREMAR	MIR, 1969 & 1970, p. 113
51	WING	
52	QUINALTA	Skarn Copper
53	POLAR	G.S.C., Pap. 63-41, pp. 35-36
54	VAL	Copper-Molybdenum Occurrence
55	DUGDALE	G.S.C., Pap. 68-68, p. 54
56	TOPAZIOS	G.S.C., Pap. 69-55, p. 34
57	LEWES RIVER	G.S.C., Pap. 69-55, pp. 34-35
58	WALCOTT	
59	GOLCONDA	Copper-Silver-Lead Vein
60	GRONK	Skarn Copper
61	NIP	Skarn Copper
62	M'CLINTOCK	G.S.C., Mem. 312, p. 143 MIR, 1971-1972, p. 45
63	MARSH	Nickel-Cobalt-Copper Magmatic
64	LAVALEE	Asbestos
65	MICHIE	Chromium-Asbestos Magmatic
66	RAILROAD	Silver Vein
67	JACKSON	MIR, 1971-1972, p. 52
68	IMP	Copper Occurrence
69	BUCHANAN	This Report
70	WHEELER	
71	HARNIAK	Copper-Silver-Gold Vein
72	SHAW	This Report
73	ALLISON	
74	OPULENCE	Antimony Vein
75	BOBO	
76	DONKEY	Silver-Lead-Zinc-Gold-Copper Vein
77	DAWN	
78	INCO	Copper-Molybdenum Porphyry
79	SUITS	MIR, 1974, pp. 144-145
80	FISH LAKE	Coal
81	LUSCAR	Coal
82	PTARMIGAN	G.S.C. Report 982, 1908, pp. 20-21
83	COAL RIDGE	Coal
84	BERESFORD	G.S.C. Report 982, 1908, pp. 20-21
85	BOUDETTE	G.S.C., Mem. 312, p. 143
86	COMBS	Gold Vein
87	MIDGETT	Copper Vein
88	GEE	This Report
89	TONY	Lead-Silver-Zinc Vein
90	WEST	This Report
91	PART	This Report
92	PROSE	This Report
93	POMPEI	This Report
94	LORNE	This Report
95	JAVA	This Report
96	GAMMON	This Report
97	ART	This Report
98	MUNROE	This Report

LIME
Canex Placer Development

Molybdenum
Porphyry
105 D 1 (4)
(60°04'N,134°28'W)

Claims: CLOUD 1-81

Source: Diamond drilling logs submitted by Canex Placer for assessment 090696.

Current Work and Results:

The CLOUD 1-48 claims were staked in the spring of 1979 by El Paso Energy Corporation and optioned to Canex Placer. Canex staked the CLOUD 48-81 claims in the fall of 1980 and drilled three holes totalling 447.3 m. The property covers a Cretaceous quartz monzonite stock that intrudes upper Paleozoic chert, limestone and volcanic rocks of the Taku Group. Molybdenite and pyrite are associated with a quartz vein stockwork in the intrusion.

LATREILLE
Anaconda Exploration Limited

Copper, Molybdenum
Porphyry
105 D 3 (15)
(60°02'N,135°07'W)

Reference: Lambert, 1974

Claims: CIRQUE 1-8

Source: Summary by D. Tempelman-Kluit from assessment report 090727 by G. Carlson.

Description:

This claim group covers a showing discovered in 1969 and is exposed in a cirque 60 km south of Whitehorse. Mineralization is located on the northeast contact of the Bennett Lake cauldron subsidence complex. This complex includes Cretaceous acid intrusive and extrusive strata. Chalcopyrite, bornite and molybdenite with minor pyrite are finely disseminated through the breccias, mainly the matrix, and also occur in irregular narrow fractures and veins.

Current Work and Results:

The mineralized rock face was chip sampled and samples analysed for copper and molybdenum. Highest copper and molybdenum values are 1475 ppm and 417 ppm respectively while more common values for these metals are in the range 100-300 ppm copper and 30-50 ppm molybdenum.

ROSE
United Keno Hill Mines Limited

Lead, Zinc, Silver
Skarn
105 D 5 (17)
(60°21'N,135°51'W)

References: Cairns (1910, 1916); Wheeler (1961); Morrison (1979); Morin et al (1980, p. 35)

Claims: DEB 1-28

Source: Summary by R. Debicki from assessment report 090490 by K. Watson and R. J. Joy, and assessment report 090518 by R. J. Joy.

Current Work and Results:

The claims were staked in 1978 to cover lead-zinc-silver mineralization in limestone skarn.
Work begun in 1978 was continued in 1979. Soil geochemical, magnetometer and EM-16 surveys were carried out over parts of the property not examined in 1978. Nine trenches were dug on the two main mineralized zones.
Samples for the soil geochemical survey were collected at 1204 sites on a 30 m by 90 m grid, and were analysed for lead, zinc, silver and copper. Values are generally low.
The magnetometer survey indicates the distribution of granodiorite on the claims. A northeast-trending magnetic low over the mineralized zone may reflect a thickening of the limestone horizon in that area.
The electromagnetic survey outlines the extension of a strong conductor interpreted in 1978 as being a fault or shear zone. A second conductor identified in 1979 may reflect the granodiorite-metasediment contact.
The mineralized zones which were trenched consist of lenses of massive galena with sphalerite which are surrounded by lower grade material in white to light green skarn. The lenses are approximately 21 m and 24 m long. The best chip sample from a trench contained 319.2 gm/tonne silver, 18.91% lead and 9.9% zinc across 2.5 m.

CHARLESTON
NAT Joint Venture;
Chevron Canada Limited;
Armco Mineral Exploration Limited;
Archer, Cathro and Associates Limited

Unmineralized
Target
105 D 3,4 (19)
(60°12'N,135°30'W)

Reference: Wheeler (1961, p. 126-127)

Claims: NOMEN DUBIUM 1-24

Source: Summary by D. Tempelman-Kluit from assessment report 090740 by E.P. Onasick and A.R. Archer.

Current Work and Results:

The claims staked in 1980 are close to the old Charleston showing (Mascot Group of Wheeler, 1961), but do not cover it. Quartz-biotite schist with quartite, minor amphibolite and amphibolitic gneiss underlies the claims. These rocks are part of Yukon Crystalline Terrane and are possibly Late Proterozoic. Elsewhere in the area these metamorphic rocks are intruded by equigranular biotite-hornblende granodiorite and are overlain by volcanic rocks of the Skukum or Mount Nansen Groups. The Charleston is a gold-bearing quartz vein containing pyrite and galena.
During 1980, 64 soil samples were collected on a 400 m grid and anlaysed for gold, silver and arsenic. Response for gold and silver is erratic.

BERNEY
NAT Joint Venture;
Chevron Canada Limited;
Armco Mineral
Exploration Limited;
Archer, Cathro and
Associates Limited

Unmineralized
Target
105 D 3 (20)
(60°11'N,135°22'W)

Reference: Cairnes (1916, p. 47)

Claims: NORML 1-8

Source: Summary by D. Tempelman-Kluit from assessment report 090738 by E.P. Onasick and A.R. Archer.

Current Work and Results:

The Wheaton River district is known for vein occurrences of precious metals and sulphosalts many of which were explored early this century. The present claims, staked in 1980, lie between the old Mt. Reid and Skukum showings and do not cover known mineralization. Rocks include purple and green basalt and volcanic breccia of the Late Cretaceous or Early Tertiary Skukum Group, a correlative of the Mount Nansen Group. Mineralization is genetically related to these volcanic rocks.

Nineteen soil samples were collected in a 800 m by 300 m area and analysed for gold, silver and arsenic. Five samples returned assays above 80 ppb gold with more than 100 ppm arsenic. Gold seems to be associated with quartz veins and prospecting for quartz veins is recommended.

MOUNT ANDERSON
W. Kuhn

Gold, Silver Vein
105 D 3 (28)
(60°12'N,135°09'W)

Reference: Cairnes (1910, p. 53; 1910, p. 45-46); Wheeler (1961, p. 124-125)

Claims: TAM 1-13

Source: Summary by R. Debicki from assessment report 090598 by W. Kuhn.

Description:

The TAM 1-4 claims were staked in July, 1978. Claims TAM 5-8 were staked in May, 1979 and TAM 9-13 added in 1980. They lie on the crest of Mt. Anderson, just south of the Wheaton River. There is road access to the claims.

A vein gold-silver occurrence has been known on the claims since at least 1909. Much digging and trenching have been done on the vein since, and trial shipments of ore have been made.

Current Work and Results:

A 900 m x 200 m grid with lines and stations 25 m apart was established in 1979, and magnetometer and soil geochemical surveys were carried out. The magnetometer survey results have a poorly-developed north-south trend which reflects the vein. The results of the soil geochemical survey were spotty, but anomalous values were apparently related to the vein. Several rock samples were assayed. The best gold and silver values were 58.8 gm/tonne and 1678.5 gm/tonne respectively.

POW
Hudson Bay Exploration
and Development Company
Limited

Copper, Tungsten
Skarn
105 D 15 (47)
(60°55'N,134°50'W)

Claims: GAR 1-24

Source: Summary by R. Debicki from assessment report 090622 by D. A. Downing.

Description:

The claims lie 13 km southeast of the southeast end of Lake Laberge, at the headwaters of Cap and Joe Creeks. They are underlain by chalcopyrite and scheelite-bearing garnet-diopside-apatite skarn developed in calcareous rocks of the Triassic Lewes River Group at their contact with intrusive rocks.

Current Work and Results:

During 1979, 81 soils samples were collected along 7.5 line-km of grid on the claims. The samples were analysed for lead, silver, copper, molybdenum and tungsten. Coincident anomalous values were obtained for copper, lead and silver. A few weakly anomalous tungsten values were also obtained.

WEST
E & B Explorations
Limited

Uranium
105 D 3 (90)
(60°04'N,135°07'W)

Reference: Morin et al (1980, p. 34)

Claims: WEST 1-12

Source: Summary by R. Debicki from assessment report 090607 by R. R. Culbert.

Current Work and Results:

A soil geochemical survey was done in 1979 to evaluate high uranium in swamp deposits on the claims. Auger samples were collected at 52 sites. Half metre intervals from the auger samples were analysed by low energy gamma-ray spectroscopy for uranium, thorium, radium-226 and lead-214. The radium and lead contents were converted to uranium equivalents. The results of the survey indicate that uranium being concentrated in the swamp deposits comes from through-going uraniferous water with unknown, upslope provenance.

PART
E & B Explorations Limited;
D.G. Leighton and Associates Limited

Uranium
105 D 3 (91)
(60°02'N,135°12'W)

Reference: Lambert (1974)

Claims: PART 1-32

Source: Summary by R. Debicki from assessment report 090592 by R. R. Culbert.

Description:

The property is on the Bennett Lake caldera of Eocene age, and straddles a tectonic lineament with vertical displacement. The movement on the lineament likely took place in the Eocene.

Soil and stream sediment and ground radiometric surveys were carried out in previous years on the claims. Two radiometric anomalies were found associated with the major lineaments. Uranium geochemical anomalies occur over quartz monzonite. A native silver with gold occurrence was found in galena-bearing altered volcanic rocks.

Current Work and Results:

During 1979, three BQ holes totalling 345 m were drilled to test for uranium mineralization associated with the major lineaments, where radiometric anomalies were previously identified. The holes intersected sheared quartz monzonite with mafic and aplitic dikes. The sheared rock ranges from fresh gouge to blastomylonite. The core was examined with a scintillometer, but no section was considered sufficiently radioactive to warrant assay.

ART
T.R.V. Minerals Corporation

Gold, Silver Veins
105 D 2 (97)
(62°02'N,134°40'W)

Reference: Roots (this volume)

Claims: ART 1-16

Source: Summary by R. Debicki from assessment report 090595 by J. R. Poloni.

Description:

The ART claims, staked in March, 1975, are on the north slope of Montana Mountain. The property has been explored intermittently since 1920 when a vein 1125 m long and 12 m wide was discovered. Several smaller veins sub-parallel to the main one and each approximately 120 m farther from it are present south of the main vein.

The area is underlain by volcanic rocks of the Paleozoic Taku Group, sedimentary rocks of the Triassic-Jurassic Laberge Group, and granite to granodiorite of the Jurassic or Early Cretaceous Coast Range Batholith. The veins consist of grey to white quartz with arsenopyrite, pyrite, galena, sphalerite and chalcopyrite in fissures in the granodiorite.

Current Work and Results:

Three BQ drill holes totalling 155 m were completed on the claims in 1979. They intersected granodiorite with disseminated pyrite and pyrrhotite, and strongly oxidized zones. One hole intersected iron-stained quartz stringers beneath a "bleached" zone in the granodiorite. The best intersection contains 2.12 gm/tonne gold and a trace of silver across 3.65 m.

MUNROE
E & B Exploration Limited

Unmineralized Target
105 D 3 (98)
(62°02'N,132°02'W)

Reference: Morin (1980, 34 p.)

Claims: MUN 1-20

Source: Summary by D. Tempelman-Kluit from assessment report 090609.

Current Work and Results:

The claims were prospected to discover the source of the strong uranium and molybdenum geochemical anomalies discovered in 1978. Uranium anomalies are fed by water of unknown origin and no mineralization was found. The property may have some potential for molybdenite concentrations.

1980 MINERAL CLAIMS STAKED

JUBILEE
H & D Holdings

105 D 1 (1)
(60°13'30"N,134°07'W)

Claims 1980: JM (10)
Added to older Jubilee claims (6)

BIG THING
Cloyd Hogdson *et al*
Darryl Bruns

105 D 2 (9)
(60°05'N,134°40'W)

Claims 1980: AG (24); AU (8)

ROSE
T.A. Worbetts

105 D 5 (17)
(60°21'N,135°51'W)

Claims 1980: TIPY BAR (8)

CHARLESTON
Archer, Cathro and Associates

105 D 3/4 (19)
(60°11'N,135°31'W)

Claims 1980: NOMENDUBIUM (24)

BERNEY 105 D 3 (20)
Jon T. Millhouse (60°10'30"N,135°56'W)

Claims 1980: JON (6); MIKE (8); NORML (8)
Added to older WH (8) and RACA (4)

PORTER 105 D 3 (25)
Sanfred Resources Ltd. (60°12'30"N,135°09'W)

Claims 1980: TAM (8)
Added to older TAM (6)

MT. STEVENS 105 D 2 (32)
Ken Orleski (60°12'30"N,134°58'30"W)

Claims 1980: JL (24)

BUCHANAN 105 D 10 (69)
(60°32'30"N,134°57'W)

Claims 1980: ELKE (8); HARV (6)

SHAW 105 D 3 (72)
Kenco Exploration (60°01'N,135°16'W)

Claims 1980: GOAT (115)

GEE 105 D 14 (88)
E. D. Brethour (60°26'N,135°21'W)

Claims 1980: KALI (2)

POMPEI 105 D 6 (93)
(60°16'N,135°16'W)

Claims 1980: REX (8)

LORNE 105 D 7/10 (94)
Branigan Holdings (60°31'N,134°47'W)

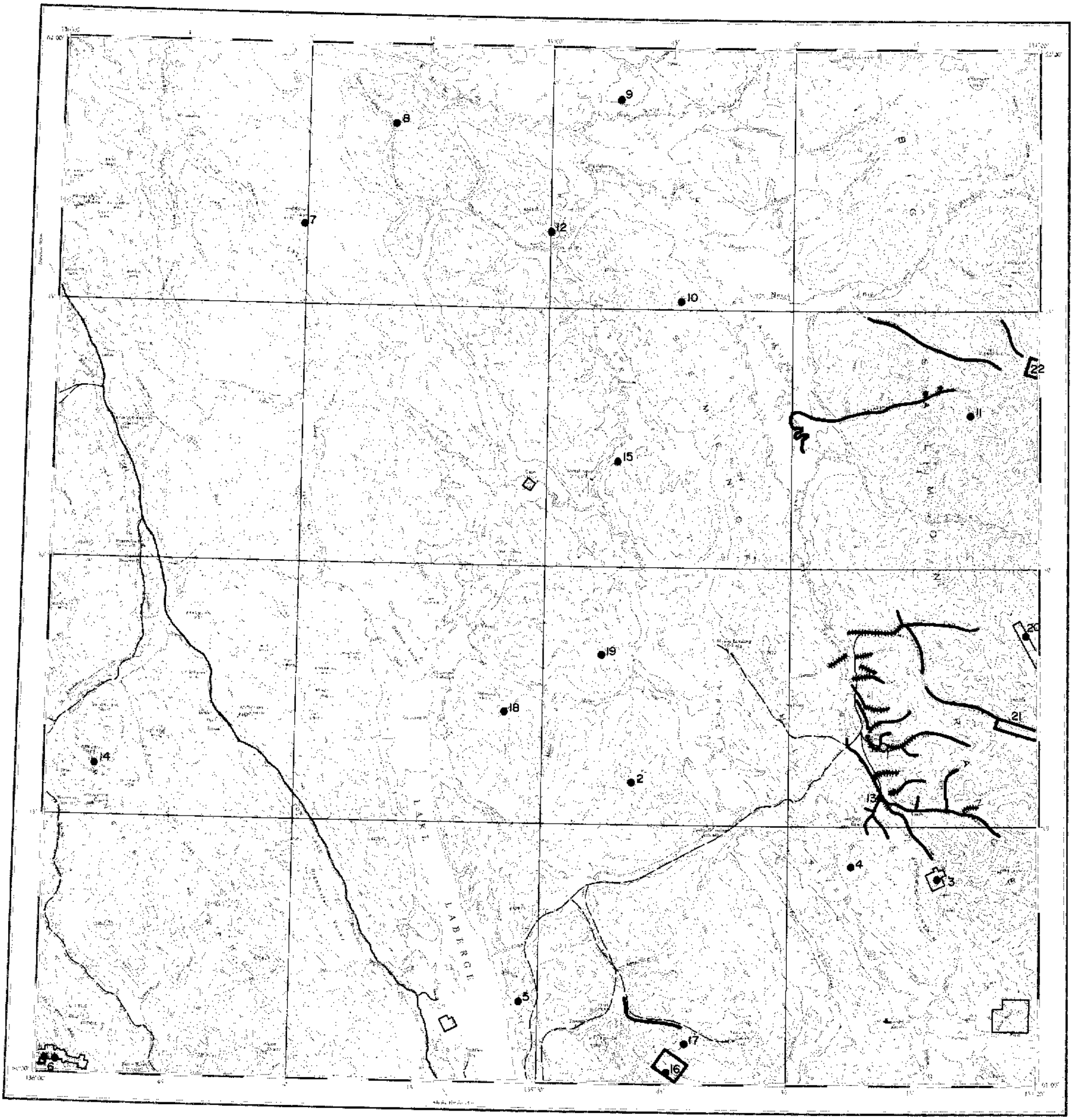
Claims 1980: LES (38); RIA (40); TOM (4)

JAVA 105 D 9 (95)
Val Scheck (60°40'N,134°29'W)

Claims 1980: JAVA (4)

GAMMON 105 D 16 (96)
R. Kazac (60°52'N,134°13'W)

Claims 1980: GAMMON (6)



LABERGE

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

- ●61 .... Mineral Deposit or Occurrence see Key on facing page
- O72 .... Unmineralized Target
- .... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980
- .... Mineral Claims staked in 1980
- .... Placer Leases in good standing (Jan. 1981)
- .... Placer Claims in good standing (Jan. 1981)
- CEL .... Coal Exploration Lease
- CML .... Coal Mining Lease
- .... Tote Trail
- .... Driveable Road
- ✧ .... Oil or Gas Well
- .... Airstrip

LABERGE MAP-AREA (NTS 105 E)

NO.	PROPERTY NAME	REFERENCE
1	FLOAT	Gold-Silver-Copper-Lead Vein
2	TUV	Copper-Molybdenum Porphyry
3	LOON	MIR, 1969 & 1970, pp. 119-120
4	BEE	Copper Occurrence
5	LABERGE	G.S.C., Pap. 68-68, pp. 55-56
6	TAKHINI	Skarn Copper
7	PACKERS	Skarn Copper-Iron
8	CLAIRE	G.S.C., Mem. 217, p. 16
9	WALSH	G.S.C., Mem. 217, p. 16
10	SEMENOF	Copper-Gold-Silver Vein
11	ILLUSION	DIAND, Mines and Minerals Activities, 1971, p.19
12	CASSIAR BAR	Copper-Silver Occurrence
13	SYLVIA	Lead-Zinc-Gold-Silver-Copper Vein
14	CORDUROY	Coal
15	HOOTALINQUA	Coal
16	HIG	This Report
17	LORI	Molybdenum-Copper Porphyry
18	MUSTARD	Gold Vein
19	BACON	Copper-Molybdenum Porphyry
20	HAL	This Report
21	YETI	This Report
22	FOG MOUNTAIN	This Report

HAL
Amax of Canada Limited

Tungsten Skarn
105 E 8 (20)
105 F 5
(60°24'N,133°56'W)

Claims: HAL 1-60

Source: Summary by R. Debicki from assessment report 090618 by A.C. Hitchins.

Current Work and Results:

The HAL claims halfway between Ross River and Whitehorse, at the headwaters of Dycer Creek, were staked in 1979 to cover the 14 km-long contact between the Cretaceous Dycer Creek Stock and a Lower Cambrian succession of schist and carbonate rocks.

Geological, and soil, stream sediment and rock geochemical surveys were carried out on the claims in 1979. The western part of the property is underlain by the Lower Cambrian biotite-muscovite-quartz-feldspar schist with bands and lenses of light- to medium-grey crystalline-calcite marble. Minor irregular patches and bands of tan weathering dolomite are present in the marble. The eastern part of the property is underlain by sub-porphyritic to porphyritic biotite-quartz monzonite of the Dycer Creek Stock with occasional quartz and quartz-sericite bands. The Dycer Creek Stock may be an offshoot of the larger quiet Lake Batholith, exposed 6 km to the south. Where the schist is adjacent to the quartz monzonite, the contact is gradational. Where the marble is in contact with the quartz monzonite, garnet-pyroxene-pyrrhotite skarn is developed. Skarns also occur in marble horizons as much as 75 m from the contact, but only where marble also occurs at the contact.

Mineralization occurs as scheelite-bearing garnet-pyroxene-pyrrhotite skarns, and rarely as narrow bornite-malachite-pyrite veinlets in siliceous marble. The scheelite is present as crystals and disseminations associated with 2% to 50% pyrrhotite. The presence of pyrrhotite does not guarantee the presence of scheelite. Grab samples of skarn contain up to 2% WO_3. One particularly rich pyrrhotite boulder contains 13% WO_3.

The geochemical surveys outlined several anomalies in talus and soil downslope from mineralized skarn, and two anomalies downslope from overburden-covered areas.

1980 MINERAL CLAIMS STAKED

HIG
J. Carson et al

105 E 2 (16)
(61°01'N,134°44'W)

Claims 1980: AJAX (29)
Added to existing (16)

YETI
Brenda Ek
J. Davidson
Mack Henry

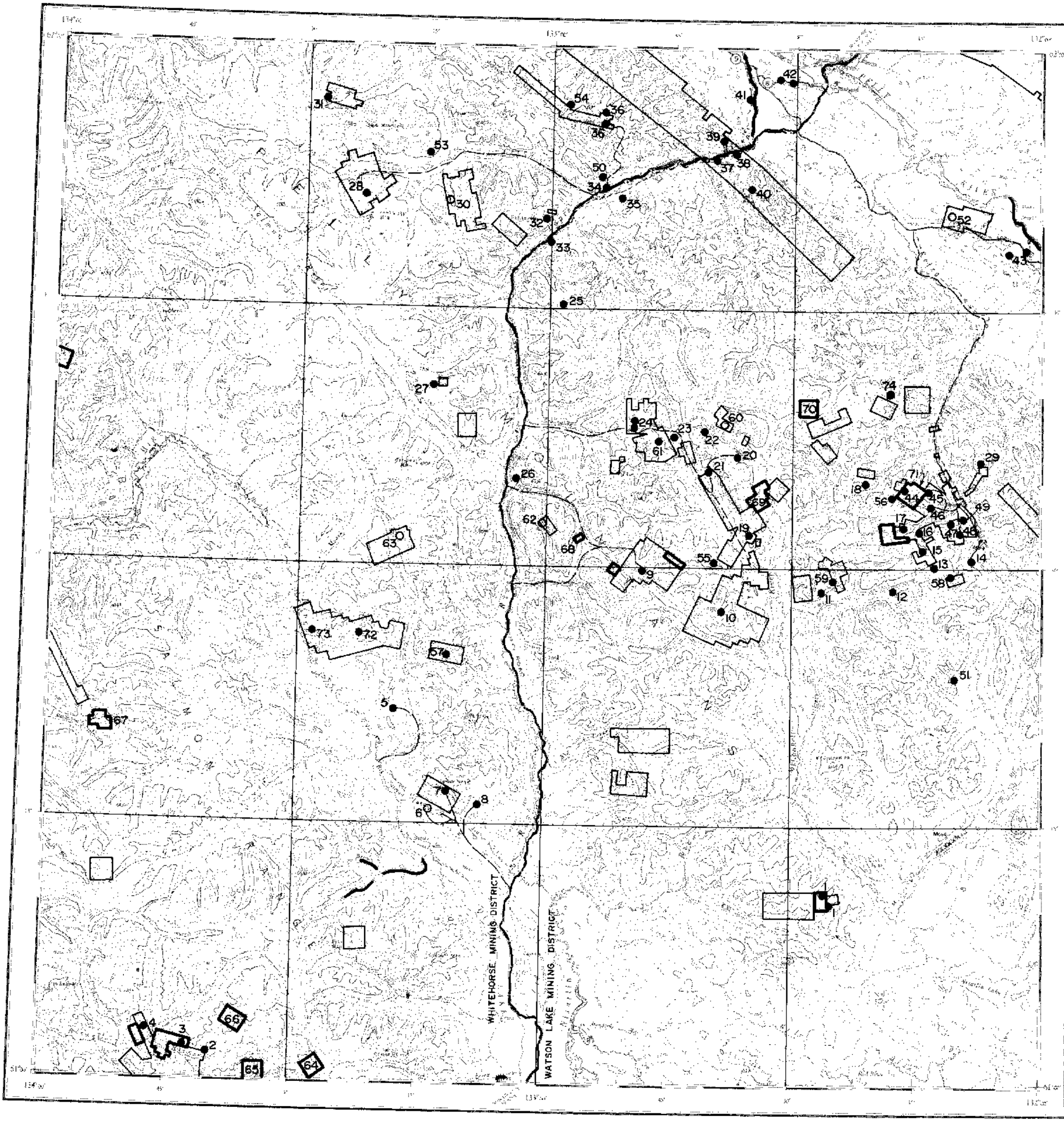
105 E 8 (21)
(60°21'N,134°02'W)

Claims 1980: KEITH (8); YETI (4); GOLDEN MACK (8)

FOG MOUNTAIN
Amoco Canada Petroleum Co. Ltd.

105 E 9,105 F 12 (22)
(60°42'N,134°00'W)

Claims 1980: FOG MOUNTAIN (20)



QUIET LAKE
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

- ●61 .... Mineral Deposit or Occurrence see Key on facing page
- O72 .... Unmineralized Target
- .... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980
- .... Mineral Claims staked in 1980
- .... Placer Leases in good standing (Jan. 1981)
- .... Placer Claims in good standing (Jan. 1981)
- CEL .... Coal Exploration Lease
- CML .... Coal Mining Lease
- .... Tote Trail
- .... Driveable Road
- .... Oil or Gas Well
- .... Airstrip

QUIET LAKE MAP-AREA (NTS 105 F)

NO.	PROPERTY NAME	REFERENCE
1	MOLLY	This Report
2	MOBS	G.S.C, Pap. 66-31, pp. 60-62
3	WOPUS	This Report
4	GOPHER	G.S.C., Pap. 66-31, pp. 60-62
5	IOLA	Copper-Lead-Zinc Occurrence
6	VODKA	Asbestos
7	TOWER PEAK	Asbestos
8	DODY	Asbestos
9	STORMY	This Report
10	MM	MIR, 1976, pp. 83-97
11	CPA	This Report
12	SONNY	Silver-Lead Vein
13	KAY	G.S.C., Pap. 68-68, pp. 76-77
14	SHARON	G.S.C., Pap. 68-68, pp. 76-77
15	OXO	G.S.C., Pap. 65-19, pp. 42-43 and This Report
16	KOPINEC	Copper Vein
17	BOOM	G.S.C., Pap. 61-23, p. 39
18	OPERATION	Copper Occurrence
19	BOX	This Report
20	GRAYLING	G.S.C., Pap. 64-36, pp. 41-42
21	COXALL	Copper Vein
22	TYRO	Zinc-Silver-Copper-Lead Vein
23	HAYDN	Silver-Lead-Copper-Zinc-Gold Vein
24	GROUNDHOG	G.S.C., Pap. 69-55, pp. 46-47
25	ROCKY	Asbestos
26	PONY	G.S.C., Pap. 45-21, p. 24
27	HAM	Skarn Tungsten
28	RISBY	MIR, 1969 & 1970, Vol. 1, pp. 125-126
29	AMBROSE	Copper-Silver Vein
30	TUB	Lead-Zinc-Copper-Tungsten Occurrence
31	EVA	This Report
32	BARITE MTN.	G.S.C., Pap. 64-36, pp. 40-41 G.S.C., Pap. 75-1A
33	McNEE	G.S.C., Pap. 45-21, p. 24
34	CANUSA	Lead-Silver-Gold Vein
35	CYR	G.S.C., Map 7 - 1960
36	MT. COOK	G.S.C., Pap. 75-1A, p. 48
37	LAPIE	G.S.C., Pap. 45-21, p. 25
38	WATERFALL	G.S.C., Pap. 45-21, p. 25
39	DANGER	G.S.C., Pap. 45-21, p. 25
40	MT. ROSS	G.S.C., Pap. 45-21, p. 25
41	TRENCH	G.S.C., Pap. 45-21, p. 21
42	WHISKY LAKE	G.S.C., Pap. 67-40, p. 89
43	BRUCE LAKE	G.S.C., Pap. 64-36, pp. 42-43
44	MT. MISERY	Silver-lead-Copper Vein
45	KEY 3	G.S.C., Pap. 66-31, pp. 64-68 G.S.C., Pap. 69-55, pp. 44-46
46	LAP 10	G.S.C., Pap. 69-55, pp. 44-46
47	HOEY	G.S.C., Pap. 69-55, pp. 44-46
48	STUMP	G.S.C., Pap. 69-55, pp. 44-46
49	KETZA RIVER	This Report
50	MAGUNDY	Silver-Lead Vein
51	HOGG	Copper Vein
52	CHUNG	
53	ASKIN	Barite Stratabound
54	DIRK	Barite Stratabound
55	CONNELL	
56	FURY	
57	OBVIOUS	This Report
58	NOKLUIT	This Report
59	GUANO	This Report
60	TAKU	This Report
61	H	This Report
62	FIRST	This Report
63	LAST	This Report
64	BR	This Report
65	MMM	This Report
66	TIM	This Report
67	RPP	This Report
68	ADDY	This Report
69	JDX	This Report
70	McCASH	This Report
71	TOOTS	This Report
72	HIDDEN	Skarn Tungsten
73	AYDUCK	Skarn Tungsten
74	CLO	This Report

MOLLY
Brenda Mines Limited

Molybdenum, Tungsten Skarn
105 F 1 (1)
(61°11'N,132°25'W)

Reference: Green and Godwin 1964, p. 45-46)

Claims: MIJ 1-4, 7-8; JOA 1-6

Source: Summary by R. Debicki from assessment report 090497 by A. R. Pollmer.

Description:

The MIJ claims were staked in 1978 and the JOA claims in 1979 over previously known mineral occurrences. As early as 1960-1961, geological mapping, trenching and diamond drilling were done on the property by Conwest Exploration Limited. The area is underlain by an east-west trending, southerly dipping sequence of sandstone, siltstone and limestone intruded by porphyritic pink quartz monzonite.

Current Work and Results:

A brief geological examination in 1979 showed the mineralization includes molybdenite, scheelite and powellite along fractures and disseminated within garnet-diopside-tremolite skarn along the intrusive contact. An apparently conformable band of massive pyrrhotite, pyrite and minor chalcopyrite, about 1 m thick, occurs in sedimentary rocks near the skarn.

STORMY
Rio Alto Exploration Limited

Molybdenum, Tungsten Skarn
105 F 7,10 (9)
(61°29'N,132°48'W)

References: Skinner 1961 (p. 41-42); Morin et al (1979, p. 79)

Claims: PM 1-4; MP 1-108

Source: Summary by G. Abbott of a 1980 assessment report by P.S. White and a 1980 report by D. Hoy.

History:

Jason Explorers Limited performed surface trenching, prospecting, mapping and geochemical sampling in 1967 and 1968. Marvin Sherman restaked with the PM claims in 1975 and explored with mapping and geophysical surveys the following year. Noranda Exploration conducted minor geochemical surveys in 1977.

Current Work and Results:

Rio Alto optioned the property in 1979 and staked the MP claims. Geological surveys were conducted over 50 km of cut line. Underground workings were reopened. The A zone was resampled and a 270-680 kg sample grading about 5.0% MoS_2 was obtained from mill testing. The B zone was resampled on surface.

In 1980, the company explored with mine rehabilitation, mapping, a grid soil geochemical survey, magnetometer and radiometric surveys and diamond drilling. Ten new small showings, weakly mineralized with molybdenite and scheelite were found. Soil samples were collected at 2500 sites at 25 m intervals on lines spaced 75 m apart and analysed for molybdenum, tungsten, copper, tin uranium and iron. Anomalous values ranged from 6 to 85 ppm molybdenum and 10 to 315 ppm tungsten. No meaningful anomalies were obtained from analyses of other elements. Tungsten and molybdenum anomalies are restricted to the area of known significant mineralization with the exception of one molybdenum anomaly in an area underlain by granite. Results of the magnetometer and radiometric surveys were negative. Three holes confirmed intersections previously encountered on the B and C zones. Five holes were drilled on other small showings and geochemical anomalies. The best intersection was 0.005% MoS_2 and 0.350% WO_3 over 1 m.

BOX
Northern Horizon Resource Corporation

Unmineralized Target
105 F 10 (19)
(61°33'N,132°35'W)

Reference: Marchand et al (1978, p. 79-80)

Claims: JDX 1-24

Source: Summary by D. Tempelman-Kluit from assessment report 090674 by L. D. Nicholl.

Current Work and Results:

The claims were staked in 1980 to cover geology considered favourable for lead-zinc mineralization related to felsic volcanics like that on the MAT claims. The geology of the claims was mapped.

EVA
Risby Tungsten Mines Limited

Tungsten Skarn
105 F 14 (31)
(61°56'N,133°24'W)

Claims: EVA 1-29

Source: Summary by R. Debicki from assessment report 090496 by J. M. McAndrew.

Description:

The EVA claims were staked in 1978 following review of a 1979 sampling and prospecting program done in the area by J. M. Bremner for Atlas Explorations Limited. The report of that program described a chip sample of skarn which assayed 1.66% WO_3.

The area is underlain by a thick sequence of Silurian to Devonian sedimentary and metamorphic rocks which strike northwest and dip 30° to 60° northeast. The sedimentary and metamorphic rocks are intruded by the mid-Cretaceous Fox Mountain Stock, and by related aplite, felsite and quartz monzonite dikes.

Current Work and Results:

Geological and ground magnetic surveys were done in 1979. Several trenches were also dug. Phyllite, schist, quartzite, black shale and slate, chert and biotite-quartz monzonite underlie the claims. Six skarns along a strike length of 780 m were identified. Two zones are mainly calcsilicate skarn with low scheelite. Two consist of massive pyrrhotite, with traces of scheelite. The remaining two skarns consist of fine- to coarse-grained scheelite up to 0.5 x 1 cm in size in massive pyrrhotite. The best grab sample contains 2.92% WO_3. The best chip sample from trenches dug on the skarn zones contains 1.70% WO_3, 0.10% copper, 0.37% lead and 1.03 gm/tonne gold over an area of 1 m x 9 m.

The magnetic survey was done because of the association of scheelite with pyrrhotite. Twelve anomalies were identified, two of which coincide with known ares of mineralization. The remaining ten anomalies are in overburden-covered areas.

No work was done on the claims during 1980.

REO	Unmineralized
J. Atkinson;	Target
W. Besner and	105 F 9 (near 44)
D. MacPheat	(62°34'N,132°15'W)

Claims: REA (11 total)

Source: Summary by D. Tempelman-Kluit from assessment report 090719 by C. R. Eastman.

Current Work and Results:

No mineralization is known on the claims but they adjoin the TOOTS group which covers the Mt. Misery lead-zinc showing (44 on the accompanying map). A soil geochemical survey and bedrock chip sampling were carried out and 23 samples were analysed. Lead values range between 160 and 9 ppm and silver values from 0.3 to 1.1 ppm.

KETZA RIVER	Silver,Lead,Gold
Iona Silver	Veins
Mines Limited	105 F 9 (49)
	(61°32'N,132°10'W)

References: Skinner (1961); Green (1966); Findlay (1967, 1969 a,b); Morin et al (1980, p. 61)

Claims: CAMP 1-6; DUB 1-8; GEM 1-6; A 1-8; B 1-8;9 Fr, 10 Fr; C 1-8; D 1-4; HOPE 1-6, 7 Fr, 8 Fr; PETE 1-3; OK 1-11

Source: Summary by R. Debicki from assessment reports 090563 and 090650 by P. H. Sevensma.

Current Work and Results:

An area on the OK claims which appear to be of interest based on the results of an extensive, 5200 sample reconnaissance soil geochemical survey done in 1968 was selected for more detailed examination in 1979. Prospecting, and a soil geochemical survey with samples spaced at 15 m intervals, were carried out. The prospecting discovered gold-silver-bearing float which assayed 4.8 gm/tonne gold, 475.5 gm/tonne silver, 13.9% lead and 0.60% zinc and silver-lead vein mineralization in situ. The vein is 18 cm wide, exposed over a length of 9.1 m, and grades 4895.5 gm/tonne silver, 0.2 gm/tonne gold, 73.8% lead and 0.70% zinc.

The 185 samples collected during the soil geochemical survey were analysed for silver, gold, lead and zinc. Strong coincident anomalies trending slightly east of north, parallel to the most common orientation of veins in the area, were noted.

Bulldozer trenches were dug on the A 1, 3, 5 and 7 claims where high lead-in-soil values had been identified by previous soil geochemical surveys. All areas trenched exhibit permafrost, so work was conducted intermittently to permit thawing. The trenches were up to 2.4 m deep, but did not encounter bedrock. Heavily oxidized rock of local derivation found in one trench had finely disseminated galena, and carried out lead, zinc and silver values.

OBVIOUS	Tungsten Skarn
Archer, Cathro and	105 F 6 (57)
Associates Limited;	(61°24'N,133°15'W)
CUB Joint Venture	

Claims: OBVIOUS 1-32

Source: Summary by R. Debicki from assessment report 090537 by G. Abbott.

Description:

The OBVIOUS claims were staked in July, 1978 for the CUB Joint Venture (Cassiar Asbestos Corporation Limited, Highland-Crow Resources Limited and Union Carbide Canada Limited), to cover three creeks with anomalous scheelite. One creek also contains high -grade scheelite-bearing float.

The claims overlie the contact between porphyritic quartz monzonite of the Cretaceous Nisutlin Batholith, and southwest-dipping black graphitic shale, shaly dolomite, coarsely crystalline limestone, bedded dolomite, calcareous schist and quartzite of the Ordovician-Silurian Nasina Group. Tertiary porphyry dikes intrude the quartz monzonite and the metasedimentary rocks.

Current Work and Results:

In 1979, prospecting, geological mapping and magnetometer surveys were carried out. Soil samples were collected at 320 sites. Part of each sample was subjected to standard geochemical analysis for tungsten, copper, lead and molybdenum, while the bulk of the sample was panned. The pan concentrates were examined under ultra-violet light and the scheelite grains counted.

A narrow float train was found in a steep talus slope, but mineralization was not located in place. Scheelite is present in magnetite-rich skarn with average grades of 1.5% to 6.0% WO_3 and in garnet-diopside skarn hosting disseminated pyrrhotite and chalcopyrite with average grades of 0.2% to 0.5% WO_3. The soil geochemical and soil panning surveys outlined several weak anomalies, but the surveys were considered ineffective because of poor soil development.

NOKLUIT — REE, Thorium, Niobium
Archer, Cathro and Associates Limited; Chevron Canada Limited
105 F 8 (58)
(61°27'N,132°11'W)

Reference: Morin et al (1977, p. 190-191; 1979, p. 80)

Claims: NOKLUIT 1-8

Source: Summary by R. Debicki from assessment report 090577 by A. R. Archer.

Current Work and Results:

The claims lie west of Ketza River, 58 km south of Ross River. The geology and mineralization of the property are described by Morin et al (1979), and by J. Morin (this volume).

Work on the property in 1979 was done to determine the rare earth and niobium potential of areas other than the radioactive zones tested in 1976 and 1977. Widely spaced rock chip samples were collected from 27 sites underlain by syenite and 18 sites underlain by country rocks, and were analysed for tin, tungsten, gold, uranium, thorium, niobium, tantalum, potassium and 16 rare earth elements. Although the syenite contains anomalous amounts of rare earth elements and niobium, it lacks high grade sections. One zone grades 1.2% rare earth elements and 0.5% niobium across 10 m.

GUANO — REE, Niobium
Archer, Cathro and Associates Limited; Kerr Addison Limited
105 F 8,9 (59)
(61°30'N, 132°25'W)

Reference: Chronic (1977) and this report.

Claims: GUANO 1-22; GUAYES 22-30

Source: Summary by R. Debicki from assessment report 090574 by A. R. Archer.

Current Work and Results:

The GUANO property lies 10 km east of Seagull Creek, and 58 km south of Ross River. The claims are registered in the name of Archer, Cathro and Associates Limited on behalf of Ukon Joint Venture (Chevron Canada Limited and Kerr Addison Limited). Geological and radiometric surveys of the claims were carried out in 1975, 1976 and 1977. The geology is described by Chronic elsewhere in this report.

Radiometric and rock chip geochemical surveys were carried out in 1979, to determine whether significant rare earth elements or niobium concentrations occur in the dark green skarn. The 102 rock chip samples were anlaysed for potassium, uranium, thorium, niobium, tungsten, tin, gold and 16 rare earth elements. Some samples were also analysed for tantalum. The only significant geochemical and radiometric anomalies occur where the vein-like mineralization had been identified by previous work. The best chip sample collected in 1979 contained 0.13% rare earth elements and 0.09% niobium across 50 m.

TAKU — Lead, Zinc Target
Noranda Exploration Company Limited;
105 F 10 (60)
(61°38'N, 132°38'W)

Reference: Morin et al (1980, p. 63)

Claims: TAKU 1, 2, 23, 45-57, 59; SEQUOIA 1-8

Source: Summary by R. Debicki from assessment report 090576 by G. MacDonald.

Current Work and Results:

The property is in the St. Cyr Range of the Pelly Mountains between Seagull Creek and McConnell River. A summary description is given by Morin (1980). During 1979, additional soil geochemical work was done. The 297 samples were analysed for lead, zinc, copper and molybdenum. Anomalies identified in 1978 were confirmed and further defined by the 1979 survey.

H — Lead, Zinc, Silver Veins
Noranda Exploration Company Limited; Canol Mines Limited
105 F 10 (61)
(61°37'N, 132°48'W)

Reference: Morin et al (1980, p. 63)

Claims: H 1-27; PEAK 33-37

Source: Summary by R. Debicki from assessment reports 090529, 090572 and 090701 by G. MacDonald.

Description:

The claims are held by Noranda Exploration under option from Canol Mines. The area is underlain by Upper Cambrian to Mississippian limestone, dolomite, shale and phyllite. Galena in dolomite breccia is known on the PEAK group. Mineralized float has been found at several sites on the H claims.

Current Work and Results:

Geological and geochemical surveys were carried out during 1979. Four BQ diamond drill holes totalling 229.8 m were drilled. They intersected laminated graphitic to cherty shale, chert, siltstone and andesite. A "stockwork" breccia with quartz-siderite-dolomite-pyrite matrix contains some lead-zinc-silver mineralization. Road construction totalled 1.5 km. Three trenches were dug to 3 m deep, but failed to reach bedrock.

Geochemical and VLF electromagnetic surveys were done during 1980. Three BQ holes totalling 266.1 m were drilled. Most of the work done in 1979 and 1980 was done on claims H 1-4.

FIRST
Archer, Cathro and
Associates Limited;
CUB Joint Venture

Unmineralized
Target
105 F 10 11 (62)
(61° 33'N,133° 00'W)

Claims: FIRST 9-16

Source: Summary by R. Debicki from assessment report 090547 by G. Abbott.

Current Work and Results:

The claims were staked in 1979 to cover a 55 ppm tungsten in stream sediment anomaly identified in Geological Survey of Canada, Open File Report 564. They were staked by Archer, Cathro and Associates for CUB Joint Venture (Cassiar Asbestos Company Limited, Highland-Crow Resources Limited and Union Carbide Canada Limited). The claims are not contiguous with the FIRST 1-8 group.

During 1979, geological and soil geochemical surveys were carried out to identify the source of the stream sediment geochemical anomaly. The claims are underlain by Lower Cambrian massive, grey weathering silty limestone in light brown weathering biotite -muscovite schist and by medium-grained granodiorite of the Cretaceous Nisutlin Batholith. Minor barren pale garnet-diopside skarn occurs near the granite-limestone contact.

The 95 soil samples were analysed for lead and tungsten. No anomalies were identified. No source for the anomalous value reported by the Geological Survey of Canada could be identified.

LAST
Archer, Cathro and
Associates Limited;
CUB Joint Venture

Unmineralized
Target
105 F 11 (63)
(61°32'N,133°19'W)

Claims: FIRST 1-8

Source: Summary by R. Debicki from assessment report 090554 by G. Abbott.

Current Work and Results:

The claims were staked in 1979 to cover two lead-zinc-silver anomalies identified by Geological Survey of Canada, Open File Report 564. They were staked by Archer, Cathro and Associates for CUB Joint Venture (Cassiar Asbestos Company Limited, Highland-Crow Resources Limited and Union Carbide Canada Limited).

Geological and soil geochemical surveys were carried out on the claims in 1979 in an attempt to identify the source of the stream sediment geochemical anomalies. The claims are underlain by Late Proterozoic to Early Paleozoic rusty weathering biotite-muscovite schist and grey weathering mediumgrained marble and by medium-grained Cretaceous and/or Tertiary granodiorite or quartz monzonite, which occur as dikes and sills. Minor amounts of siliceous skarn occur at intrusive-marble contacts. No mineralization was noted.

The 62 soil samples were analyzed for lead, zinc amd tungsten. A few, small lead anomalies were identified, but they were too low and scattered to be significant. No source for the stream sediment geochemical anomalies reported by the Geological Survey of Canada was found.

CLO
Canada Occidental
Petroleum Limited

Unmineralized
Target
105 F 9 (74)
(60°40'N,132°18'W)

Claims: CLO 1-20

Source: Summary by G. Abbott from assessment report 090628 by E. J. Sacks.

Description:

The property is underlain by Cambrian and Ordovician schistose greenstone (uЄOsl) and Silurian and Devonian dolomite and quartzite (SDdq), that are thrust upon upper Devonian and Mississippian pyritic, siliceous volcanics and slate (uDMs, Mt). All units occur within a broad, east trending syncline.

Current Work and Results:

The property was staked in June, 1979 to cover geochemical anomalies from the Geological Survey of Canada Uranium Reconnaissance Program (Open File 564). The property was prospected and heavy mineral concentrate and silt and water were collected and analysed for copper, molybdenum, lead, zinc, silver, uranium, thorium, tin and tungsten.

The original URP anomaly of 21,000 ppm barium, 225 ppm lead, 610 ppm zinc and 0.6 ppm silver could not be duplicated. Highest values for each element were 98 ppm copper, 3 ppm molybdenum, 120 ppm lead, 50 ppm zinc, 2.0 ppm silver, 1 ppm uranium, 35 ppm thorium, 1 ppm tin and 1 ppm tungsten. The high values do not occur in the same sample.

1980 MINERAL CLAIMS STAKED

WOPUS
Arnold Mullin et al
105 F 4 (3,4)
(60°02'N,133°44'W)

Claims 1980: GE (14)

BR
Amoco Canada Petroleum Co. Ltd.
105 F 3 (64)
(61°01'N,133°27'W)

Claims 1980: BR (7)
Added to existing (9)

MMM
105 F 4 (65)
(61°00'N,133°34'W)

Claims 1980: MMM (16)

TIM
Amoco Canada Petroleum Co. Ltd.
105 F 4 (66)
(61°03'N,133°37'W)

Claims 1980: TIM (20)

JDX
Northern Horizon Resources Ltd.
105 F 10 (69)
(60°34'N,132°34'W)

Claims 1980: JDX (24)

McCASH
M. Cashin et al
105 F 9 (70)
(60°39'30"N,132°28'W)

Claims 1980: McCASH (16)

TOOTS
George Kavens
105 F 9 (71)
(60°34'N,132°15'W)

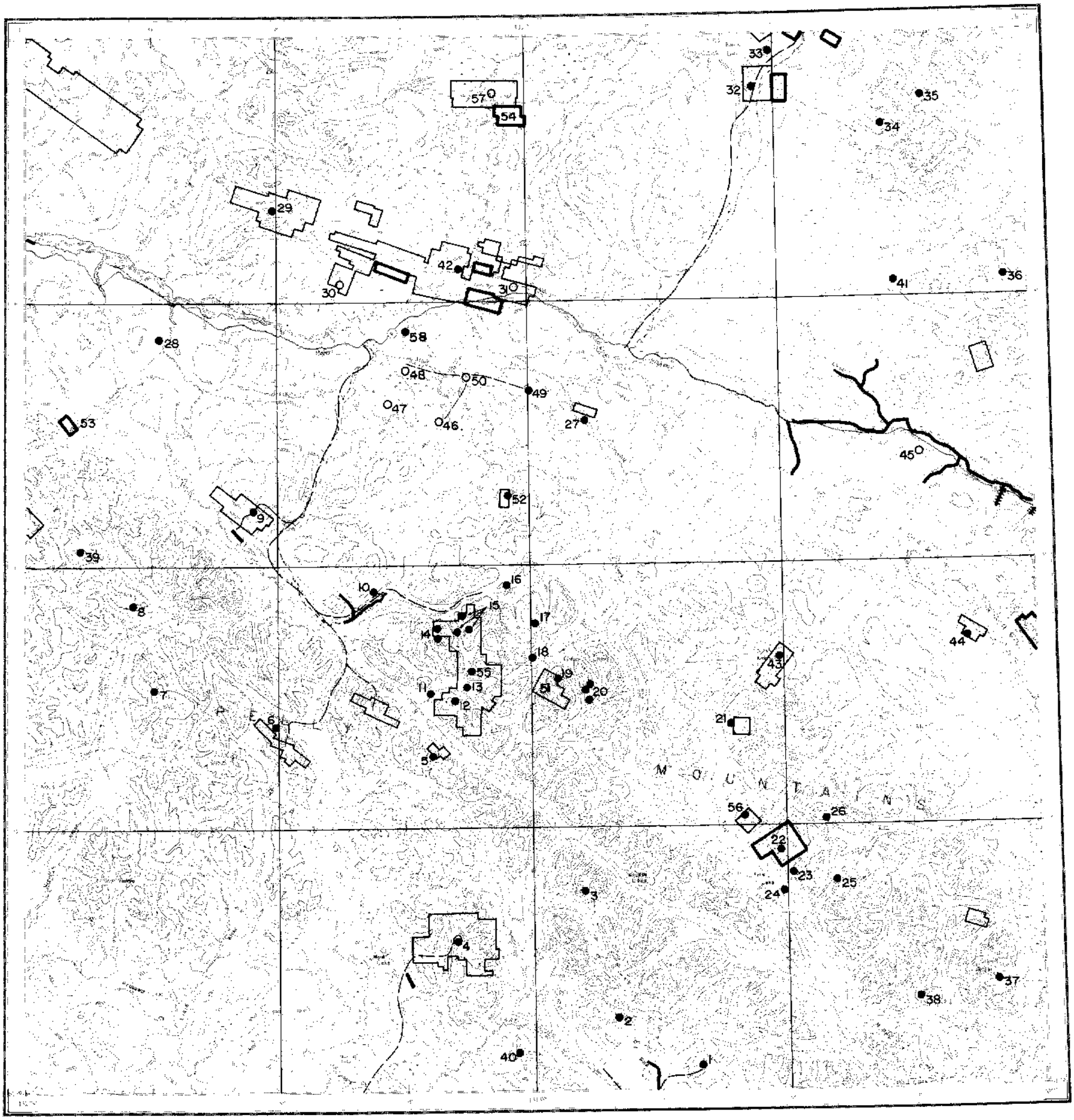
Claims 1980: TOOTS (24)

RPP
R. Zajac et al
105 F 5 (67)
(61°20'30"N,133°53'W)

Claims 1980: RPP (19)

ADDY
M. Woods
105 F 10 (68)
(61°31'30"N,132°56'W)

Claims 1980: ADDY (2)



FINLAYSON LAKE
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
O72 .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	◇ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

FINLAYSON LAKE MAP-AREA (NTS 105 G)

NO.	PROPERTY NAME	REFERENCE
1	MONT	G.S.C., Pap. 67-40, pp. 64-65
2	BLUEBERRY	Silver-Lead-Zinc-Copper-Tungsten Vein
3	SLAM	Zinc-Copper Vein
4	TINTINA	G.S.C., Pap. 63-38, pp. 26-29 MIR, 1974, pp. 156-158
5	PLUMB	Lead-Zinc-Silver Vein
6	FH	Silver-Lead-Zinc-Copper Occurrence
7	McNEIL	Copper
8	AXE	MIR, 1969-1970, p. 131
9	HOO	MIR, 1973, pp. 85-86
10	EL	G.S.C., Pap. 68-68, p. 79
11	PICK	Silver-Lead Vein
12	GRASS	Molybdenum-Tungsten Vein
13	SANDERS	Skarn Lead-Zinc-Copper
14	RILEY	Copper-Lead Vein
15	ZIELINSKI	Lead-Zinc-Copper-Silver Vein
16	RIVIERA	Copper-Zinc Stratabound
17	GYP	Lead-Zinc-Copper Vein
18	GEE	Lead Vein
19	PIT	Zinc-Copper-Silver-Gold Vein
20	ROB	Copper-Lead-Silver Vein
21	PACK	This Report
22	FYRE	This Report
23	TOP	Silver-Lead-Zinc Vein
24	DUB	G.S.C., Pap. 67-40, pp. 59-60
25	MM	Skarn Copper
26	VINCENT	Copper Vein
27	BOT	Asbestos
28	PUP	Asbestos
29	CHOW	Lead-Zinc-Silver Vein
30	DOL	
31	CAMPBELL	G.S.C., Pap. 1097, p. 50
32	PHIL	This Report
33	PAY	G.S.C., Pap. 6868, pp. 81-83
34	RIS	Copper Vein
35	SPUD	G.S.C., Pap. 74-1A, p. 44
36	JAKE	Silver-Lead-Zinc Vein
37	MAP	Silver-Lead Vein
38	WATERS	Silver-Lead Vein
39	ZIMMER	Copper
40	INGS	Copper Vein
41	HARMAN	MIR, 1973, p. 88
42	ELECTRIC	This Report
43	MYDA	This Report
44	FETISH	This Report
45	QUANDARY	
46	FREGERG	
47	FLIN	
48	FLON	
49	HUDSON	
50	AIRBORNE	
51	TOKE	This Report
52	FOG	This Report
53	STARR	This Report
54	GONZO	This Report
55	BOOT	This Report
56	HOWDEE	This Report
57	DWONK	This Report
58	EAGLE	This Report

PACK
Chevron Canada Limited

Zinc, Copper, Stratabound
105 G 7 (21)
(61°16'N,130°34'W)

Reference: Skinner (1962, p. 40-41)

Claims: OUTLAW 1-16

Source: Summary by D. Tempelman-Kluit from assessment report 090732 by U. Schmidt and R. J. Cathro.

Current Work and Results:

The present claims were staked in 1979 by Archer, Cathro and Associates Limited for Chevron Canada to cover a copper-zinc massive sulphide ocurrence drilled in 1961 by Conwest. The claims were mapped and the showing was sampled. The showing is a narrow pyritic zone with sphalerite and chalcopyrite. It is traced for 20 m on surface and is 0.3 to 1.5 m thick and has given assays ranging near 1% copper, 2-3% zinc and 15 gm/tonne silver. The showing is enclosed in phyllonite and other cataclastic rocks and the mineralization is comformable with the foliation. The mineralization has suffered the intense shearing and subsequent recrystallization that the host rocks have experienced.

PHIL
Brinex Limited;
Ogilvie Joint Venture

Lead, Zinc, Copper
Stratabound
105 G 15,16 (32)
(61°57'N,130°30'W)

References: Wheeler et al (1960b); Tempelman-Kluit (1977b); Morin et al (1979, p. 89)

Claims: BOB 1-74

Source: Summary by R. Debicki from assessment report 090606 by K. B. McHale.

Current Work and Results:

The BOB claims on the east side of Fortin Lake were staked for Ogilvie Joint Venture (Brinex Limited, AM & S Canada Limited, Ventures West Minerals Limited, Mitex Mines Limited and Mitsubishi Metal Corporation) in 1974. The geology and work done from 1967 to 1977 are described in Morin et al. In 1978, induced polarization, resistivity and gravity surveys were done to define drill targets. Extensive east trending anomalies, parallel to the strike of underlying strata, were identified by the induced polarization survey. Claims BOB 57-74 were staked to cover extensions of the strongest anomalies.

Three holes totalling 442.9 m were drilled in February and March, 1980 to test the down-dip extension of known mineralization, and the induced polarization anomalies identified in 1978. The holes intersect dark grey-black phyllite, with minor quartz-sericite phyllite, siltstone and phyllitic limestone. Disseminated fine-grained pyrite occur in all units, and may be responsible for the induced polarization anomalies. Galena-sphalerite-chalcopyrite mineralization is found only in the hole drilled to test surface mineralization to depth. Mineralization occurs as veins or blebs with quartz-calcite gangue in quartz-sericite phyllite. The phyllite is similar to the rocks hosting the Faro orebody. The best mineralization grades 6.20% zinc, 0.51% lead, 23.6 gm/tonne silver and 0.1 gm/tonne gold across 1.8 m.

A MAX-MIN electromagnetic survey was done to further delineate anomalies identified during 1977. The results of the 1977 survey could not be repeated.

MYDA
Chevron Canada Limited

Tungsten Skarn
105 G 7 (43)
(61°24'N,130°31'W)

Reference: Sinclair and Gilbert (1975, p. 87)

Claims: LENA 1-42

Source: Summary by D. Tempelman-Kluit from assessment report 090734 by U. Schmidt and R. J. Cathro.

Current Work and Results:

The claims cover a tungsten showing in skarn that was previously staked as the Myda property. The claims are underlain by cataclastic rocks of Nisutlin Allochthon with a gently dipping flaser fabric and these are intruded on the east side of the claims by a biotite-quartz monzonite plug. A proton magnetometer survey was run along six reconnaissance lines in 1980 to explore for iron-rich skarns which might carry tin or tungsten.

TOKE
Archer, Cathro and Associates Limited

Unmineralized Target
105 G 7 (51)
(61°23'N,130°59'W)

Reference: Morin et al (1978, p. 86)

Claims: TOKE 1-36

Source: Summary by R. Debicki from assessment report 090600 by C. V. Dyson.

Current Work and Results:

The claims lie in the St. Cyr Range of the Pelly Mountains, immediately southeast of Grass Lake, and 112 km southeast of Ross River. They were staked in 1977 to cover uranium soil geochemical anomalies located during a 1976 regional reconnaissance survey.

A ground VLF electromagnetic survey was carried out in 1979. Several weak conductors, probably related to fault structures or conductive clay layers in overburden were identified.

FOG
Archer, Cathro and Associates Limited

Tungsten Skarn
105 G 11 (52)
(61°34'N,131°03'W)

Claims: FOG 1-8

Source: Summary by R. Debicki from assessment report 090570 by A. R. Archer and U. Schmidt.

Current Work and Results:

The FOG claims were staked in 1978 to cover a tungsten skarn located by regional stream sediment panning and prospecting.

Geological, soil and soil pan concentrate geochemical surveys were carried out on the property in 1979. The area is underlain by flat-lying scheelite-bearing skarn in calcsilicate gneiss and marble near the eastern margin of a Cretaceous porpyritic quartz monzonite stock. The gneiss and marble are part of an Upper Proterozoic or Lower Paleozoic biotite-garnet-muscovite schist sequence. Two areas of mineralization have been located. In one, scheelite is disseminated in a well developed banded garnet-vesuvianite-pyroxene skarn. Samples of the skarn contain 0.20% WO_3 across 1 m and 0.23% WO_3 across 1.5 m. The other mineralized area carries coarse disseminations and thin veinlets of scheelite in less altered gneiss and marble.

The 110 samples collected during the goechemical survey were analyzed for tungsten, tin and gold. Pan concentrates of each samples were examined and visual estimates of the scheelite in the concentrates were made. Several sporadic, weak tungsten anomalies were identified in the areas of known mineralization.

BOOT
Chevron Canada Limited

Tungsten Skarn
105 G 6 (55)
(61°26'N,131°10'W)

References: Morin et al (1979, p. 86; 1980, p. 65); Tempelman-Kluit (1980).

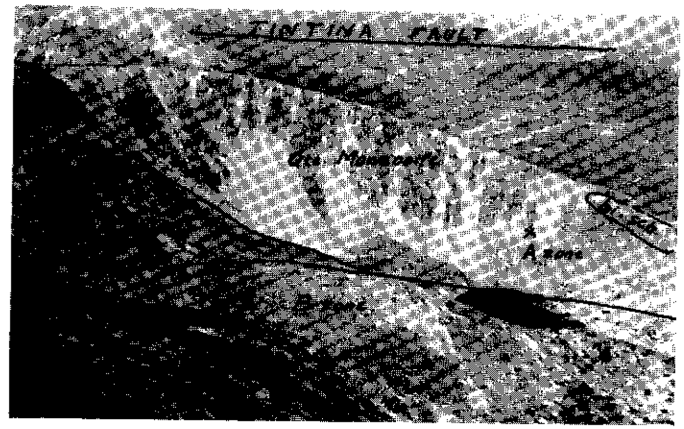
Claims: BOOT 1-284; MARMOT 1-24

Source: By D. Tempelman-Kluit based on property visit.

Description:

The BOOT and MARMOT claims, 100 km southeast of Ross River were staked in 1977 and 1978. They cover tungsten showings discovered by night lamping following reconnaissance stream panning by U. Schmidt of Archer, Cathro and Associates. The writer visited the property for two days in August and was guided in the field by U. Schmidt.

Strongly foliated mafic schist, considered part of Anvil Allochthonous Assemblage (Tempelman-Kluit, 1980) underlies much of the claims. The rocks include amphibolite, amphibolitic gneiss, chlorite schist and augen gneiss. These rocks occur in a structural sequence with augen gneiss at the base and the more mafic rocks above. The lithologic units are discontinuous laterally and have sharp boundaries with adjacent units on surfaces parallel with the foliation. The rocks lack primary igneous and sedimentary fractures and a penetrative closely spaced flaser fabric that dips moderately southwest is their dominant fabric. Anvil



View of the Boot Zone cirque showing regionally metamorphosed mafic volcanic rocks that are host to a scheelite-bearing skarn next to a small discordant quartz monzonite plug. The A Zone was found by night lamping on the talus slope.

Allochthon is part of a set of transported rocks thrust above the edge of ancient North America about the Jura-Cretaceous, but sheared in the early Jurassic from rocks that may have formed as oceanic crust in the late Paleozoic and Triassic.

An intrusion of porphyritic biotite-quartz monzonite at least 1 km across, invades the regionally metamorphosed sheared rocks at Boot cirque. This intrusion is part of the extensive Cretaceous suite and has sharp contacts with the country rocks. It has invaded them forcefully and has thermally metamorphosed the country rocks close to the intrusion. Skarn is developed locally from the amphibolite. Scheelite occurs in this skarn and in calcsilicate rocks close to the margins of the small plug. The scheelite is scattered irregularly through the rock and shows no control by the relict foliation that is commonly visible in the "calcsilicate skarn". The scheelite occurs without sulphide minerals and the rock locally has excellent grade.

Current Work and Results:

The following is summarized from assesssment reports 090558 and 090728 by U. Schmidt and R. J. Cathro for 1979 and 1980 respectively. Ten BQ holes for a total 1410 m were drilled in Boot cirque in 1979. Drilling focussed on the A and B zones with 263 m, the deepest hole drilled. The B zone has an average width of 42 m with a length of 82 m. A further eight BQ holes were drilled on the Boot claims in Boot cirque during 1980. Total drilling was 900 m with one hole 293 m deep. Drilling problems caused by poor water return precluded completion of several holes to target depth.

The claims were mapped in detail and an excellent set of geological maps were produced. In addition, grid panning of soils was carried out over parts of the claims.

HOWDEE
Chevron Canada Limited

Tungsten Skarn
105 G 7 (56)
(61°15'N,130°35'W)

Claims: HOWDEE 1-16

Source: Summary by D. Tempelman-Kluit from assessment report 090733 by U. Schmidt and R. J. Cathro.

Description:

The HOWDEE claims are underlain by schist and gneiss of unknown age that are part of Nisutlin Allochthonous Assemblage (Tempelman-Kluit, 1980). These highly sheared metamorphic rocks have a gently dipping flaser fabric and are intruded by Cretaceous quartz-feldspar porphyry sills and by a small quartz monzonite plug. Scheelite without sulphides is disseminated through the metamorphic rocks next to quartz veins and silicified margins of fractures.

Current Work and Results:

A geochemical survey was carried out over part of the claims and 169 soil samples were panned and geochemically analysed for tunsten and tin. The threshold panning value for scheelite from a 2.5 kg sample is considered to be 200 fine grains and this corresponds to roughly 5 ppm tungsten. Several anomalous areas were identified. One of these relates to a known showing, but the others are unexplained. Tin background is 3 ppm and no anomalies were found.

DWONK
Cyprus Anvil Mining Corporation

Unmineralized Target
105 G 14 (57)
(61°57'N,131°04'W)

Claims: DWONK 47-48

Source: Summary by D. Tempelman-Kluit from assessment report 090654 by L. C. Pigage.

Current Work and Results:

Three holes for a total 705 m were drilled to test a stratigraphic target.

EAGLE
Allan Carlos and G. Havvig

Lead, Zinc Stratabound
105 G 14 (58)
(61°43'N,131°15'W)

Reference: Morin et al (1980, p. 66)

Claims: EAGLE 1-68

Source: Summary by D. Tempelman-Kluit from assessment report 090725 by A. Carlos.

Current Work and Results:

Previous work on the property consists of an airborne magnetic and electromagnetic survey, prospecting and limited trenching.

In 1980, a total of 50 km of E.M. surveys was conducted over the property with further trenching. The ground survey delineates an east-west conductor. Trenching exposed galena and sphalerite in quartz-chlorite-sericite-hornblende phyllite near the footwall contact of the conductive zone.

1980 MINERAL CLAIMS STAKED

FYRE
Welcome North Mines Limited

105 G 1/2 (22)
(61°14'N,130°30'W)

Claims 1980: KONA (68)

PHIL

105 G 16 (32)
(61°57'N,130°29'W)

Claims 1980: BOB (27 additional)

ELECTRIC
Hudson Bay Exploration

105 G 14 (42)
(61°46'N,131°05'W)

Claims 1980: BIG (40 in two groups); BINGO (16)

STARR

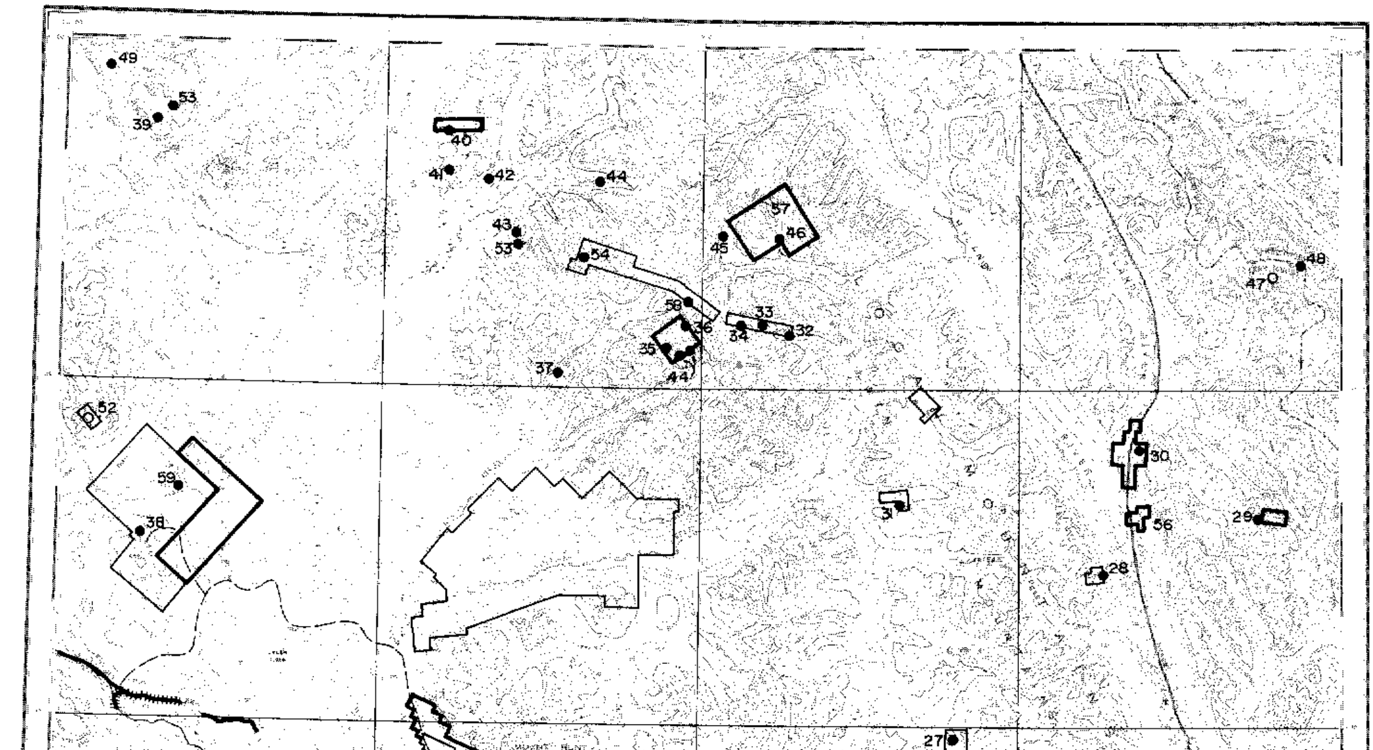
105 G 12 (53)
(61°36'N,131°55'W)

Claims 1980: RUSH (8)

GONZO
Cyprus Anvil Mines

105 G 14 (54)
(61°26'N,131°02'W)

Claims 1980: GONZO (24)



FRANCES LAKE
YUKON TERR.–NORTHWEST TERR.

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

O72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

FRANCES LAKE MAP-AREA (NTS 105 H)

NO.	PROPERTY NAME	REFERENCE
1	JAN	This Report
2	MIDAS	This Report
3	FLIP	This Report
4	DC	G.S.C., Pap. 66-31, p. 72
5	MIKO	MIR, 1969 & 1970, pp. 133-134
6	GLENNA	Skarn Silver-Lead-Zinc-Copper-Tungsten
7	STEELE	MIR, 1973, pp. 81-82
8	MAX	MIR, 1973, pp. 81-82
9	FRANCES	Copper Vein
10	LIND	Asbestos
11	DOUG	Copper Vein
12	TUCHITUA	This Report
13	EKO	Asbestos-Jade
14	DIM	Asbestos
15	MAY	G.S.C., Pap. 66-31, p. 72
16	MAPEL	Copper-Lead-Zinc Vein
17	MATT BERRY	This Report
18	FLUKE	This Report
19	CANYON	Skarn Silver-Lead-Zinc
20	STU	G.S.C., Map 6
21	TERRY	Skarn Tungsten
22	CORRIE	Copper Occurrence
23	BLACK JACK	This Report
24	FIR TREE	This Report
25	MONTSE	Skarn Tungsten
26	RON	G.S.C., Pap. 66-31, pp. 68-71
27	HELEN	G.S.C., Map 6 - 1966
28	BROD	This Report
29	RAIN	This Report
30	ROAD	G.S.C., Pap. 67-36, Figure 1
31	TOY	Skarn Silver-Lead-Zinc-Copper
32	BR	Skarn Tungsten-Copper
33	TANYA	MIR, 1971 & 1972, p. 117
34	GUY	G.S.C., Pap. 67-36, Figure 1
35	THOR	This Report
36	BROTEN	Skarn Tungsten-Copper-Molybdenum
37	TUSTLES	Copper Occurrence
38	TED	This Report
39	NARCHILLA	Skarn Tungsten-Copper-Lead-Zinc
40	LEE	This Report
41	YUSEZYU	G.S.C., Map 6 - 1966
42	DODGE	Skarn Molybdenum
43	TILLEI	Molybdenum-Tungsten Porphyry
44	HITCH HIKER	Silver-Lead-Zinc Vein
45	ZEUS	Skarn Lead-Zinc-Tungsten
46	CHAP	Skarn Tungsten
47	ALM	Skarn Lead-Zinc
48	BUS	G.S.C., Pap. 61-23, p. 46
49	TIM	Skarn Lead-Zinc-Copper
50	SUSAN	Lead-Zinc Occurrence
51	LAN	This Report
52	TIN	This Report
53	VIKING	This Report
54	WOAH	This Report
55	JULIA	This Report
56	TINY	This Report
57	AURORA	This Report
58	TAI	This Report
59	FIN	This Report
60	CAL	This Report

JAN
Majestic Mining
Corporation

Gold, Copper
Skarn
105 H 1 (1)
(61°04'N,128°15'W)

Claims: PRINCESS 1-4

Source: Summary by R. Debicki from assessment report 090534 by D. W. Tully.

Current Work and Results:

The PRINCESS claims were recorded in July, 1978. They are underlain by northwest trending metasedimentary Cambrian or older rocks intruded by a Cretaceous quartz monzonite batholith. The adjacent PATRICIA claims carry copper and gold-bearing pyrite, pyrrhotite and chalcopyrite in skarns within a limestone. The mineralization has been explored intermittently since the 1960's. Pyrite and pyrrhotite are also known in skarns north of the PRINCESS claims.

A preliminary geological survey of the claims was carried out in 1979. Some fine-grained phyrrhotite was found in a schistose pelite.

FLIP
Cominco Limited

Silver, Lead, Zinc
Copper, Tungsten
Skarn
105 H 2 (3)
(61°08'N,128°40'W)

Reference: Morin et al (1978, p. 90)

Claims: MTB 1-69

Source: Summary by G. Abbott from a 1980 assessment report by A. Mawer.

Current Work and Results:

Pyroxene-garnet-epidote skarn is developed along the contact between limestone and hornfelsed shale and quartzite of uncertain age. Two northeast trending skarns with unknown dips were intersected. Both are exposed over a strike length of about 300 m. One zone is open to the southeast. Sphalerite, galena and chalcopyrite occur as disseminations and massive lenses with the skarn.

In 1979, 8 bulldozer trenchs totalling about 13,500 cubic m and about 600 m in length were excavated. Work was conducted on the MTB 1, 3 and 4 claims. Widths of skarn sampled range from 1.3 to 2.7 m. Assays range from 0.3 gm/tonne silver, 0.01% copper, 0,.23% lead, 0.17% zinc, 0.01% WO_3 over 2.7 m to 432 gm/tonne silver, 3.04% copper, 20.5% lead, 19.6% zinc, 0.73% WO_3 over 1.3 m.

TUCHITUA
Archer, Cathro and
Associates Limited;
Teslin Joint Venture

Asbestos
105 H 5 (12)
(61°17'N,129°47'W)

Claims: HIRALPH 1-8; TISNOT 1-16

Source: Summary by R. Debicki from assessment report 090578 by A. R. Archer.

History:

The TUCHITUA property was staked in 1979 for Teslin Joint Venture (Cassiar Asbestos Corporation Limited, Cominco Limited and Exploram Minerals Limited). Two small chrysotile asbestos occurrences are exposed. The northwest (TISNOT) occurrence was staked in 1958 as the PORKPINE and EKO claims, in 1959 as the GEN claims, in 1960 as the DIM claims, and in 1976 as the GREEN STUFF claims. In 1960, the claims were mapped and 19 X-ray holes totalling 147 m were drilled by Wescan Developments Limited. A tote trail was built in 1971 by K. Ebner, and several tons of "jade" were shipped in recent years. The southeast (HIRALPH) occurrence was staked as the GEN claims in 1959, the PATSY claims in 1964 and the SOWDEN claims in 1970. It was hand pitted in 1960.

Current Work and Results:

Geologic and ground magnetic surveys were carried out over the claims in 1979. The claims are underlain by a pale green weathering, medium green, magnetic, well serpentinized alpine-type sill-like peridotite hosted by Paleozoic (?) metavolcanic rocks and argillite. Asbestos fibres in the peridotite rarely exceed 3 mm in length, but fibres up to 9 mm and 5 mm long were seen at the TISNOT and HIRALPH occurrences, respectively. Outcrop is poor and the 17.85 line-km magnetic survey was used to delineate the extent of the peridotite. The survey outlined one or more sheet-like structures dipping southwest over a strike length of more than 3 km. Serpentinite in the overburden-covered areas is considered to have potential for economic chrysotile occurrences.

Soil samples were collected at 635 sites for future analysis.

MATT BERRY
Cominco Limited

Lead, Zinc
Stratabound
105 H 6,11 (17)
(61°27'N,129°25'W)

Reference: Craig and Milner (1975, p. 122-123)

Claims: BARB 1-74, 501 Fr, 502 Fr

Source: Summary by D. Tempelman-Kluit from assessment report 090669 by A. B. Mawer.

Current Work and Results:

This property has been known since the late thirties and has been explored at various times since. During 1980, Cominco drilled five holes for a total 1229.4 m to test the ground.

FLUKE
Tungco Resources
Corporation

Skarn Lead, Zinc
Silver, Tungsten
105 H 7 (18)
(61°17'N,128°14'W)

Reference: Green (1966, p. 68-71)

Claims: TIN 1-16; MAR 8; SCREE 1-23; RIETA 1-24; LITE 1-16

Source: Summary by D. Tempelman-Kluit from assessment report 090702 by D. W. Tulley.

Current Work and Results:

This property was explored in the mid-sixties for stratabound lead-zinc occurrences and in 1972 scheelite bearing skarns were discovered. In 1977, six short holes were drilled and extensive bulldozer trenching was done in 1979. Eight holes totalling 408 m were drilled in September, 1979. In May - June, 1980, 305 m of BQ drilling were done in four holes. Four garnet-diopside skarns are known on the property in Paleozoic metasedimentary rocks next to a Cretaceous quartz monzonite intrusion. The skarns contain magnetite, pyrrhotite, sphalerite, galena, chalcopoyrite and scheelite. The drilling tested the skarns and intersected mineralization in several holes. Assays range from 3 to 15 gm/tonne silver, .05% to 2% zinc, 0.1% to 0.3% copper, 0.1% to 1% lead and trace to 0.3% WO_3.

BLACK JACK, FIR TREE
New Jersey Zinc Exploration
Company Limited;
Shell Canada Resources
Limited

Lead, Zinc
Stratabound
105 H 8 (23,24)
(61°22'N,120°23'W)

References: Findlay (1967, p. 62); Green (1965, p. 45)

Claims: BRYAN 1-16, 25-36; PEDRO 1, 3, 5, 6; ANN 4, 6-9, 11, 14, 19, 25; WINE 1, 2, 4

Source: Summary by D. Tempelman-Kluit from assessment report 090691 (anonymous).

Current Work and Results:

The road to the property from Mile 58 on the Cantung Highway was bulldozed to remove slide material and 18 km of surveyed line were cut to provide control for future exploration on the showings.

BROD
Delphi Resources
Limited

Lead, Zinc, Silver
Skarn
105 H 9 (28)
(61°36'N,128°22'W)

Reference: Craig and Milner (1975, p. 119)

Claims: BEAR 1-2

Source: Summary by R. Debicki from assessment report 090599 by B. J. Price.

Current Work and Results:

The claims are underlain by Proterozoic clastic metasedimentary rocks and by Cretaceous granitic rocks. Limy units in the metasediments are recrystallized or altered to skarn. Numerous skarn hosted tungsten and lead-zinc-silver occurrences are known in the area.

In 1978, the claims were mapped and a mineralized zone was sampled. The property is underlain by interbedded phyllite and recrystallized limestone and by granodiorite to diorite sills. Skarn has developed near limestone-intrusive contacts. One skarn is strongly mineralized with pyrite, pyrrhotite, sphalerite and galena over an area of 3 x 15 m. Chip samples across the zone contain 5 to 10% combined lead and zinc and 17 to 68 gm/tonne silver. Low copper, gold and tungsten values were also obtained.

TED
Sovereign Metals
Corporation

Barite Stratabound
105 H 12 (38)
(61°36'N,129°52'W)

Claims: TAN 1-96

Source: Summary by R. Debicki from assessment report 090475 by T. C. Scott and assessment report 090619 by D. A. Yeager and C. K. Ikona.

Description

The TAN claims lie 8 km northwest of the northwest end of Frances Lake. Claims 1-72 were staked in March, 1978 to cover an area of anomalous zinc values in stream sediments. Claims 73-96 were staked later to cover adjacent barite occurrences originally discovered by T. Skonseng.

The claims are underlain by Siluro-Devonian dolomite, quartzite and silty dolomite considered to be equivalent to the Road River Formation, and by Upper Devonian shale, chert, quartzite, greywacke, black graphitic shale, black fetid limestone, limestone, dolomite and calcareous siltstone considered to be equivalent to the Canol Formation. Barite in beds 1 to 25 m thick is interbedded with the calcareous siltstone.

Current Work and Results:

In March and April, 1979, a D7E bulldozer was used to construct a tote road 19 km from the Campbell Highway to the claims, and to expose one barite occurrence in trenches. Seven hand trenches were dug across a lens exposing it along a strike length of 79 m and across widths of 1 to 4 m. The zone grades 85 to 95% barite, and is calculated to contain approximately 725 tonnes of barite per vertical metre. The vein appears to extend along strike under overburden. Another zone 195 m long consists of a quartz-barite-calcite vein stockwork. Numerous occurrences of barite float were also found.

LAN
Asarco Exploration
Company of Canada,
Limited

Lead, Zinc, Silver
Skarn
105 H 1 (51)
(61°00'N,128°02'W)

Claims: LAN 1-14

Source: Summary by R. Debicki from assessment report 090494 by J. Collins et al.

Description:

The claims were staked to cover a copper-lead-zinc-silver anomaly identified by a regional stream sediment geochemical survey carried out in 1978. They cover Hadrynian clastic and carbonate rocks intruded by a batholith of Cretaceous granodiorite to quartz-feldspar-biotite porphyry. Mineralization consists of disseminated pyrite and pyrrhotite in some of the intrusive rocks, and pyrrhotite, galena and sphalerite in epidotediopside-wollastonite skarn. The skarns are generally less than 15 cm thick, and associated with a carbonate horizon. Mineralization in the skarns is patchy, sporadic and discontinuous along the strike and down dip. Bands of magnetite up to 2 m wide occur in the skarn zones.

Current Work and Results:

In 1979, geological mapping at 1:5000 scale was done and 17 stream sediment samples were collected and analyzed for copper, lead, zinc, silver and tungsten. The best two grab samples assayed 0.08% copper, 10.92% lead, 0.09% zinc and 800.6 gm/tonne silver from a massive pyrrhotite-galena float boulder, and 0.06% copper, 5.5% lead, 17.4% zinc and 43.11 gm/tonne silver from a hydrozincite-plumbojarosite-galena-bearing lens of altered carbonate about 50 cm wide and 6.1 m long.

TIN
Pamicon Developments
Limited

Unmineralized
Target
105 H 12 (52)
(61°43'N,129°57'W)

Claims: TIN 1-8

Source: Summary by R. Debicki from assessment report 090620 by D. A. Yeager and C. K. Ikona.

Current Work and Results:

The TIN claims were staked in March, 1979. They are underlain by a Siluro-Devonian succession of dolomite, quartzite and silty dolomite thought to be correlative with the Road River Formation.

In October, 1979, a preliminary geochemical survey of the claims was done. One rock sample and 25 stream sediment samples were analyzed for lead, zinc and silver. The lead and silver values are at background levels, but many of the zinc values are anomalous.

VIKING
Rio Tinto Canadian
Exploration Limited

Silver, Lead, Zinc
Skarn
105 H 13 (53)
(61°57'N,129°52'W)

Claims: VIKING 1-5

Source: Summary by R. Debicki from assessment report 090498 by R. S. Hewton.

Current Work and Results:

The claims were recorded in 1978 to cover a gossan on a northfacing slope 5 km east of Ptarmigan Lake. They are underlain by fine-grained clastic and carbonate metasedimentary rocks of Proterozoic age. Mineralization occurs in a 20 m thick pyrite-sericite phyllite horizon bounded by quartzite. It consists of discontinuous pods and bands of sphalerite and galena concordant with the schistosity, and is reflected by a patchy gossan up to 15 m wide and 80 m long. The thickest pod is 1 m thick and the longest is 2 m.

Work in 1979 consisted of a geological examination, geochemical soil sampling, prospecting and chip sampling of the gossan. A total of 131 soil samples were collected along a grid with lines spaced 150 m apart and sample intervals every 50 m. They were analyzed for lead, zinc, silver and copper and disclosed several sporadically distributed anomalies. Eleven sections across the gossan were chip sampled. Most sections gave low assays, with the highest being 74.9 gm/tonne silver, 0.34% lead and 3.67% zinc across 1.5 m. The best grab sample assayed 985.3 gm/tonne silver, 15.4% lead, 10.6% zinc, 0.12% copper and trace gold.

WOAH, TAI
Rio Tinto Canadian
Exploration Limited

Tungsten Skarn
105 H 14 (54,58)
(61°50'N,129°10'W)

References: Dawson and Dick (1978); Morin et al (1980, p. 68)

Claims: WOAH 1-62; TAI 1-20

Source: Summary by R. Debicki from assessment report 090516 by D. C. Durgin.

Current Work and Results:

The WOAH 1-56 and TAI 1-20 claims were staked in 1977 by Welcome North Mines Ltd., and optioned to Riocanex in 1978. Riocanex staked the WOAH 57-72 claims in 1978.

Prospecting, geological mapping, rock chip geochemistry, diamond drilling and assaying were done in 1979. Rock chips collected at closely spaced sample sites along a grid were initially analyzed for molybdenum and tungsten. The molybdenum values were so consistently low that the remainder of the 819 samples were analyzed only for tungsten. The average tungsten value of the rock chips was 0.05% WO_3.

The geological mapping at 1:5000 and 1:20000 established that the skarn-bearing limy horizons are generally less than 1 m thick. Rare lenticular pods 10 to 15 m thick were probably the precursors to the larger skarn bodies. The scheelite in the skarns is present as disseminated grains, and occasionally as clots and subhedral crystals to 2 cm in diameter.

Six BQ drill holes totalling 351.1 m were drilled through mineralized skarns. Outcrops, drill-hole based cross sections, and assays of core show the skarn bodies to be tabular, moderately dipping with small xenoliths enclosed in granite. The average tungsten grade of the skarns in drill core are less than 0.02% WO_3.

FIN
Cominco Limited

Lead, Zinc
Stratabound
105 H 12 (59)
(61°40'N,123°50'W)

Claims: FIN 1-455

Source: Summary by G. Abbott from assessment report 090658 by S. R. Legget.

Current Work and Results:

The property is underlain by poorly exposed, interbedded laminated mudstone, siltstone, sandstone grit and conglomerate of probable Middle Paleozoic age. Lead-zinc mineralization is associated with carbonaceous mudstone and siltstone.

The FIN 1-56 claims were staked in September, 1978 to cover an outcrop of mineralized shale. The property was explored later that year and in 1979 with mapping, soil geochemistry and trenching. In 1979, 1200 soil samples were collected at 25 m intervals along lines spaced 100 to 300 m apart. The FIN 57-268 claims were staked in September, 1979 and the FIN 269-455 in 1980. Six holes totalling 697 m were drilled on the FIN 23, 24, 25 and 26 claims in 1980.

Coincident lead-zinc anomalies measuring 200 m x 1000 m are centered on claim 24 near mineralization. Spotty silver anomalies were obtained in the same area. Anomalous thresholds were 500 ppm zinc, 200 ppm lead and 3.0 ppm silver.

CAL
Shell Canada Resources Limited

Unmineralized
Target
105 H 8 (60)
(61°23'N,128°27'W)

References: Findlay (1966); Dawson and Dick (1978)

Claims: CAL 1-80

Source: Summary by J. Morin from assessment report 090780 by W. A. MacLeod.

Description:

The claims are in the Logan Mountains, 10 km west along a tote trail starting from km 94.4 on the Nahanni Range Road. They were staked in April, 1980 and surround a property hosting the Norquest lead-zinc showings - the FIR TREE and the BLACK JACK. North-northwesterly trending clastic metasedimentary rocks of probable Upper Proterozoic age underlie the property. Intrusive to the sequence are intermediate to felsic apophyses of the Cretaceous Mount Billings Batholith as dikes, sills and small stocks.

Current Work and Results:

Geological mapping and stream sediment geochemical sampling programs were conducted during summer 1980. A total of 34 samples were analyzed for copper, lead, zinc and tungsten. No anomalous tungsten values were determined although several anomalous copper, lead and zinc values were located downstream from the BLACKJACK and FIR TREE showings.

1980 MINERAL CLAIMS STAKED

MIDAS
Newline Resources Ltd.
105 H 1 (2)
(61°06'N,128°15'W)

Claims 1980: ZULU (16)

BLACK JACK
Shell Canada Resources
105 H 8 (23)
(61°30'N,128°23'W)

Claims 1980: CAL (44)
By Shell Canada. Fringe staking around the old Black Jack showing.

RAIN
Conquest Exploration Ltd.
105 H 9 (29)
(60°39'30"N,128°06'W)

Claims 1980: SUN (8)

ROAD
N. Anderson
J. Peters
K. Peters
105 H 8 (30)
(61°42'N,128°20'W)

Claims 1980: ANDY (8); STAR (8); BEE (8); BAM (3); HUEY (3)

THOR
Union Carbide
Welcome North Mines Limited
105 H 14 (35)
(61°47'N,129°02'W)

Claims 1980: RENA (32)

LEE
Melvin Jack
R. Schmidt
105 H 14 (40)
(61°56'30"N,129°23'W)

Claims 1980: STAR (16); NORTH (8)

JULIA
Welcome North Mines Ltd.
Julia A. O'Connor et al
105 H 5 (55)
(61°25'N,130°00'W)

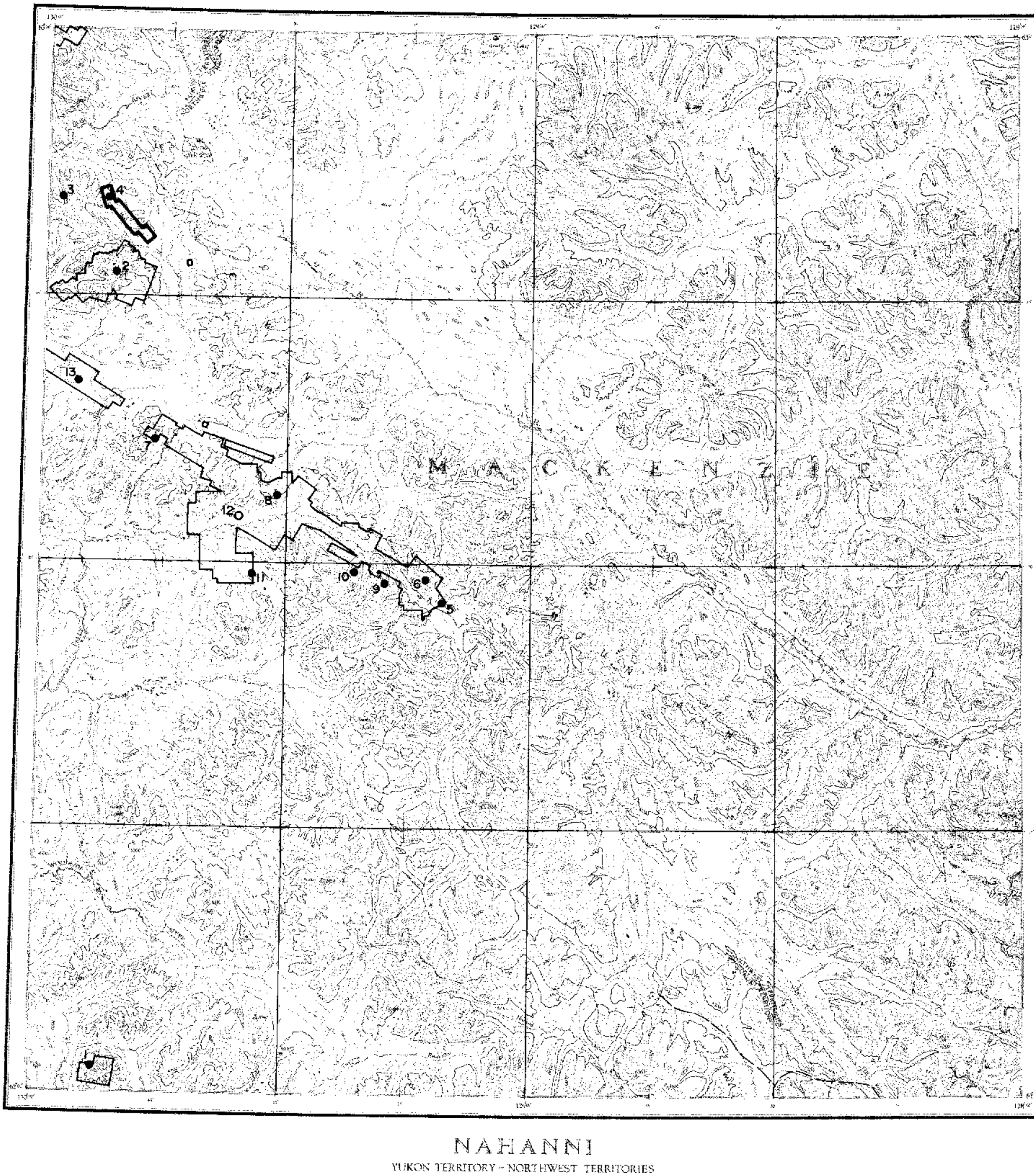
Claims 1980: JULIA (60)

TINY
W. Cottin
D. Roxborough
R. Schilling
105 H 9 (56)
(60°38'30"N,128°19'W)

Claims 1980: TRACY (4); LUCKY (4); TINY (2)

AURORA
Welcome North Mines Ltd.
Union Carbide
105 H 15 (57)
(60°52'N,128°53'W)

Claims 1980: AURORA (114)



NAHANNI

YUKON TERRITORY – NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

◇ .... Oil or Gas Well

.... Airstrip

NAHANNI MAP-AREA (NTS 105 I)

NO.	PROPERTY NAME	REFERENCE
1	NAR	Copper-Lead-Silver-Zinc Vein
2	OMO	This Report
3	BIRR	G.S.C., Pap. 69-55, p. 50
4	NOM	MIR, 1974, pp. 165-166, This Report
5	HOWARD'S PASS	MIR, (N.W.T.), 1973 and This Report
6	SHIELD	MIR, 1974, pp. 160-161
7	ORO	MIR, 1973, pp. 96-98
8	WISE	Lead-Zinc-Silver Stratabound
9	WINKIE	MIR, 1974, pp. 161-162
10	NESS	MIR, 1973, pp. 96-97
11	DIANNE	MIR, 1974, p. 163
12	RITZ	This Report
13	ABBEY	This Report

OMO
Placer Development Limited;
Essex Minerals Limited

Tungsten, Copper, Zinc Skarn
105 I 13 (2)
(62°46'N,129°52'W)

Reference: Morin (1980, p. 70)

Claims: CLEA (182 total)

Source: Drill logs for assessment 090705.

Current Work and Results:

During 1979, 14 BQ holes were drilled for a total of 852 m on the CLEA 4 and CLEA 63 and 68 fractions.

RITZ
Cominco Limited

Unmineralized Target
105 I 5, 12 (12)
(62°31'N,129°32'W)

Reference: Morin et al (1980, p.68)

Claims: RITZ 1-84, 129-200, 221-264

Source: Summary by R. Debicki from assessment report 090504 by A. R. Scott and assessment report by R. W. Lane.

Current Work and Results:

The claims staked in July, 1977 and geological mapping, geochemical soil sampling and test geophysical surveys were conducted. Two weak VLF electromagnetic conductors were determined which are coincident with lead-zinc geochemical anomalies, but no magnetic anomalies were determined. Further geochemical and geophysical surveys were carried out during 1978. Geological surveys were done over a 3 km^2 area of the claim group during 1979.

A 10.2 line-km MAX-MIN horizontal loop electromagnetic survey, and a 3.4 line-km gravity survey were carried out over portions of the claims. The electromagnetic surveys confirmed the presence of conductors identified by the 1978 survey and identified two additional conductors. Two gravity highs, not related to topography, were located. One is a single station anomaly.

A 49.9 line-km soil geochemical survey was carried out over parts of the claims. The 1995 samples were anlayzed for lead, zinc and mercury. Anomalous values were those in excess of 75 ppm lead, 1000 ppm zinc and 600 ppb mercury. The soil geochemical anomalies were tested by three NQ diamond drill holes totalling 700 m. The diamond drilling does not explain the anomalies it tested.

ABBEY
Itsi Joint Venture
(St. Joseph Exploration Limited;
Union Oil Company of Canada Limited;
Aquitaine Company of Canada Limited

Stratbound Lead, Zinc
105 I 12,J 9 (13)
(62°40'N,129°56'W)

References: Morin et al (1980, p. 72); Gordey, Geological Survey of Canada Open File 689; Morganti (1979)

Claims: ABBEY (198)

Source: Summary by G. Abbott from assessment report 090646 by R. Cathro.

Current Work and Results:

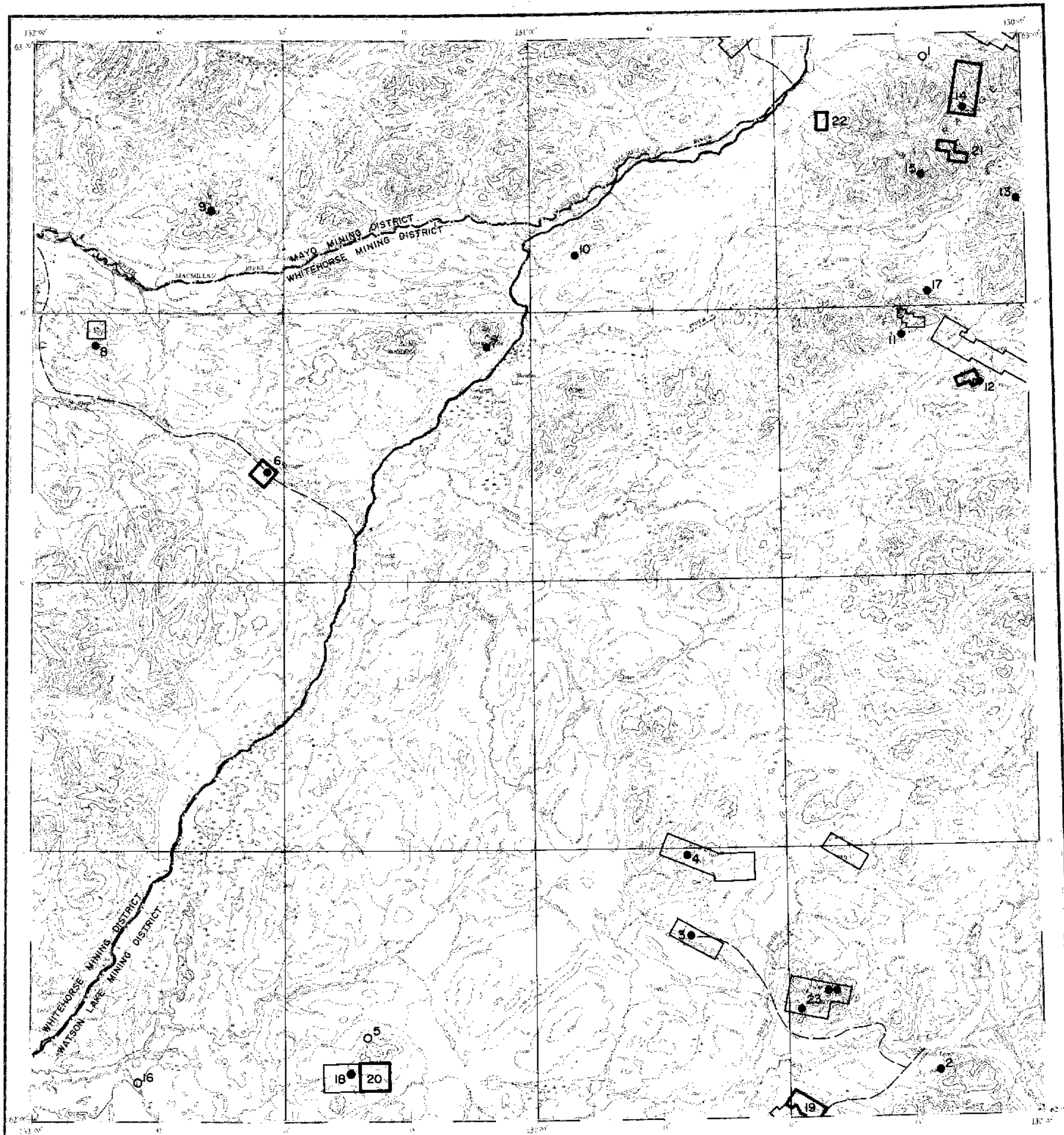
Four diamond drill holes totalling 624.5 m were drilled in the spring of 1980. The holes tested stratigraphy and EM conductors on three sections along a strike length of 10 km. The holes intersected chert conglomerate and wacke, graphitic cherty argillite and siliceous mudstone of Gordey's siliceous shale unit (muDpt) and wispy mudstone, carbonaceous, graphitic, calcareous laminated cherty mudstone, graphitic cherty, mudstone and graphitic and pyritic siliceous shale of the Road River Formation (OSpt).

Graphitic and siliceous mudstone more than 100 m thick was intersected within the Road River Formation. These rocks are lithologically similar to those which host the Howard Pass deposit, but are thicker. Litho -geochemical assays showed the presence of anomalous lead and zinc in some sections of graphitic mudstone. The best assay was 585 ppm lead, 3350 ppm zinc and 78 ppm copper for 1.5 m of graphitic mudstone in Hole 80-A4 but no sulphide mineralization was seen.

1980 MINERAL CLAIMS STAKED

NOM 105 I 13 (4)
Trident Resources (62°49'N,129°51'W)

Claims 1980: SEL (32)



SHELDON LAKE
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

O72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

...... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

...... Tote Trail

..... Driveable Road

.... Oil or Gas Well

.... Airstrip

SHELDON LAKE MAP-AREA (NTS 105 J)

NO.	PROPERTY NAME	REFERENCE
1	FULLER	
2	BILL	G.S.C., Pap. 68-68, p. 81
3	PIKE	G.S.C., Pap. 68-68, p. 80
4	NORKEN	G.S.C., Pap. 63-38, pp. 30-31
5	TAC	Copper-Molybdenum Porphyry
6	DRAGON	G.S.C., Pap. 61-23, p. 43, This Report
7	MT. SHELDON	G.S.C., Pap. 45-21, p. 25
8	RIDDELL	MIR, 1971 & 1972, pp. 105-106
9	SPEARHEAD	MIR, 1971 & 1972, p. 33
10	ROG	MIR, 1971 & 1972, p. 123
11	CLYDE	MIR, 1969 & 1970, Vol. 1, p. 128
12	PREVOST	MIR, 1973, pp. 118-119, This Report
13	GUN	G.S.C., Pap. 69-55, p. 50
14	ITSI	This Report
15	COSTIN	Silver-Lead-Zinc Vein
16	CAROLYN	Coal
17	VARISCITE	MIR, 1974, pp. 166-167
18	HENCH	This Report
19	PPR	This Report
20	CLINGON	This Report
21	WILSON	This Report
22	EMPTY	This Report
23	TRAFFIC	This Report

ITSI
Silver Sceptre Mines Limited

Silver, Lead, Zinc
Copper, Arsenic,
Tin Vein
105 J 16 (14)
(62°56'N,130°07'W)

Claims: RY 1-72

Source: Summary by G. Abbott from assessment report 090779 by G. Giroux and J. Montgomery.

History and Description:

The RY 1-8 claims were staked by Seamus Young in the spring of 1979 and explored with 10 small hand trenches later that year.

The claims are underlain by a steeply dipping, southeasterly trending sequence of middle Paleozoic chert and black shale at the contact with Cretaceous granodiorite. Three northeasterly trending quartz veins between 0.2 m and 2.5 m wide and exposed for lengths of 20 m to 200 m are located near the center of the property. The veins contain pyrite, arsenopyrite, pyrrhotite, chalcopyrite and galena.

Current Work and Results:

Silver Sceptre staked the RY 9-72 claims in late winter, 1980 and explored with mapping, grid geochemical, magnetometer, EM-16 surveys and rock sampling. Nine hundred, sixty-eight soil samples were collected at 50 m intervals on lines spaced 100 m apart and were analyzed for copper, lead, silver and tin. Two hundred, seventy-two samples were analyzed for zinc and silver. Coincident lead, silver, copper and tin anomalies were obtained near the mineralized veins. Other small, erratic anomalies occur elsewhere on the property. The No. 2 vein, the largest, was chip sampled over a strike length of 250 m in 15 locations with widths between .6 and 2.5 m. The weighted average of assays was 0.47% lead, 0.13% zinc, 0.2% copper, 48.9 gm/tonne silver, 0.97% arsenic and 0.16% tin. Vein No. 1 was sampled in 3 locations along a strike length of 30 m. Widths varied from 2 m to 4 m. Assays gave a weighted average of 1.939% lead, 1.50% zinc, 0.11% copper, 60.0 gm/tonne silver, 0.03% arsenic and 0.77% tin. Vein No. 3 was sampled in 2 locations over a 20 m strike length and 0.2 m and 0.7 m widths. Assays gave a weighted average of 0.09% copper, 0.17% lead, 0.12% zinc, 20.1 gm/tonne silver, 0.14% arsenic and 0.31% tin. Known mineralization was not detected by the magnetometer and EM-16 surveys although a magnetite vein was found.

HENCH
St. Joseph Explorations Limited

Lead, Zinc, Silver
Veins
105 J 3 (18)
(62°02'N,131°22'W)

Reference: Morin et al (1980, p. 71)

Claims: HENCH 1-48

Source: Summary by R. Debicki from assessment report 090526 by D. A. Hendry and J. L. Wright.

Current Work and Results:

The claims are underlain by Paleozoic calcareous grey phyllite which contains thin quartz veins with sphalerite, galena and chalcopyrite. During the summer of 1979, magnetometer, Horizontal Loop MAX-MIN electromagnetic and VLF electromagnetic surveys were carried out along 30.2 km of line. Soil geochemical surveys of the anomalies and IP surveys of selected anomalies were also done. Three Horizontal Loop electromagnetic anomalies are potentially significant. The 141 sample soil geochemical survey outlined several sporadic anomalies.

Five BQ drill holes totalling 556.3 m were completed in 1980. They tested the main geophysical and geochemical anomalies with generally negative results. Visible economic minerals hosted by hornfelsed shale within the metamorphic aureole of a granitic intrusive were seen in one hole.

WILSON
Silver Sceptre Mines
Limited

Unmineralized
Zone
105 J 16 (21)
(62°56'N,130°24'W)

Claims: WILSON 1-16

Source: Summary by G. Abbott from assessment report 090779 by G. Giroux and J. Montgomery.

Current Work and Results:

The WILSON claims were staked in late winter of 1980 to cover the contact between middle Paleozoic black shale and chert and Cretaceous granodiorite. The property was explored later in the year with mapping and reconnaissance soil geochemical and magnetometer surveys. Fifty-six soil samples were collected at 50 m intervals on 5 widely spaced lines and were analyzed for lead, zinc, silver, copper, gold and tin. Erratic anomalous values were obtained for all elements.

EMPTY
Silver Sceptre Mines
Limited

Unmineralized
Target
105 J 16 (22)
(62°56'N,130°24'W)

Claims: FULLER 1-8

Source: Summary by G. Abbott from assessment report 090779 by G. Giroux and J. Montgomery.

Current Work and Results:

The property was staked in late winter, 1980 by Silver Sceptre and explored later that year with mapping and grid soil geochemistry and magnetometer surveys. The property overlies the poorly exposed contact between middle Paleozoic black shale and chert and Cretaceous granodiorite. One hundred, seventy soil samples were collected at 50 m intervals on lines 200 m apart and were analyzed for lead, zinc, silver, arsenic, copper and tin. Local, erratic anomalies were obtained for all elements except copper.

TRAFFIC
Getty Canadian Metals
Limited

Silver, Lead, Zinc
Veins
105 J 1 (23)
(62°07'N,130°22'W)

Claims: MARYLOU 1-96

Source: Summary by D. Tempelman-Kluit from assessment report 090704 by S. Clemmer.

Description:

The claims are 110 km west of Ross River and were staked in 1979 following reconnaissance prospecting of geochemical stream sediment anomalies. Several new mineral showings were discovered. The area is underlain by coarse clastic sedimentary rocks and intercalated slate of the Proterozoic "Grit Unit", which are intruded by small plugs of porphyritic biotite-quartz monzonite (Cretaceous).

The showings are similar and consist of lenses and cavity fillings of sulphides in the hornsfelsed country rocks close to the intrusive bodies. On the peak of Traffic Mountain are several lenses of massive arsenopyrite, galena, sphalerite and chalcopyrite up to 2 m thick and traced for 10 m. The lenses are within a 12 m thick quartzite bed and may be breccia or cavity fillings. Scorodite and limonite stains the showing. An assay reported by the company of a chip sample across 2 m returned 454 gm/tonne silver, 1.01% copper, 5.10% lead and 1.96% zinc. Mineralization is genetically connected with the intrusive bodies, but may be hydrothermally mobilized from a stratabound occurrence. The showings resemble others in the northeast corner of Finlayson Lake map-area (i.e. JAKE).

Current Work and Results:

Emphasis of the 1979 program was on intial prospecting of the claims with sampling and assaying and with follow-up prospecting to discover the source of float. Silt sampling and minor soil sampling were also done. Silt sampling defined threshold levels of 1.5 ppm silver, 100 ppm copper, 55 ppm lead and 275 ppm zinc. The silt sampling defined three anomalous areas that coincide roughly with the contacts of the small intrusions near which the showings also occur.

1980 MINERAL CLAIMS STAKED

DRAGON
Archer Cathro and Associates
CUB Joint Venture

105 J 12 (6)
(62°36'N,131°03'W)

Claims 1980: DRAG (16)

PREVOST
J. Carson
Kelvin Energy Limited

105 J 9 (12)
(62°41'N,130°06'W)

Claims 1980: DANCER (8)

PPR
B. MacDonald et al

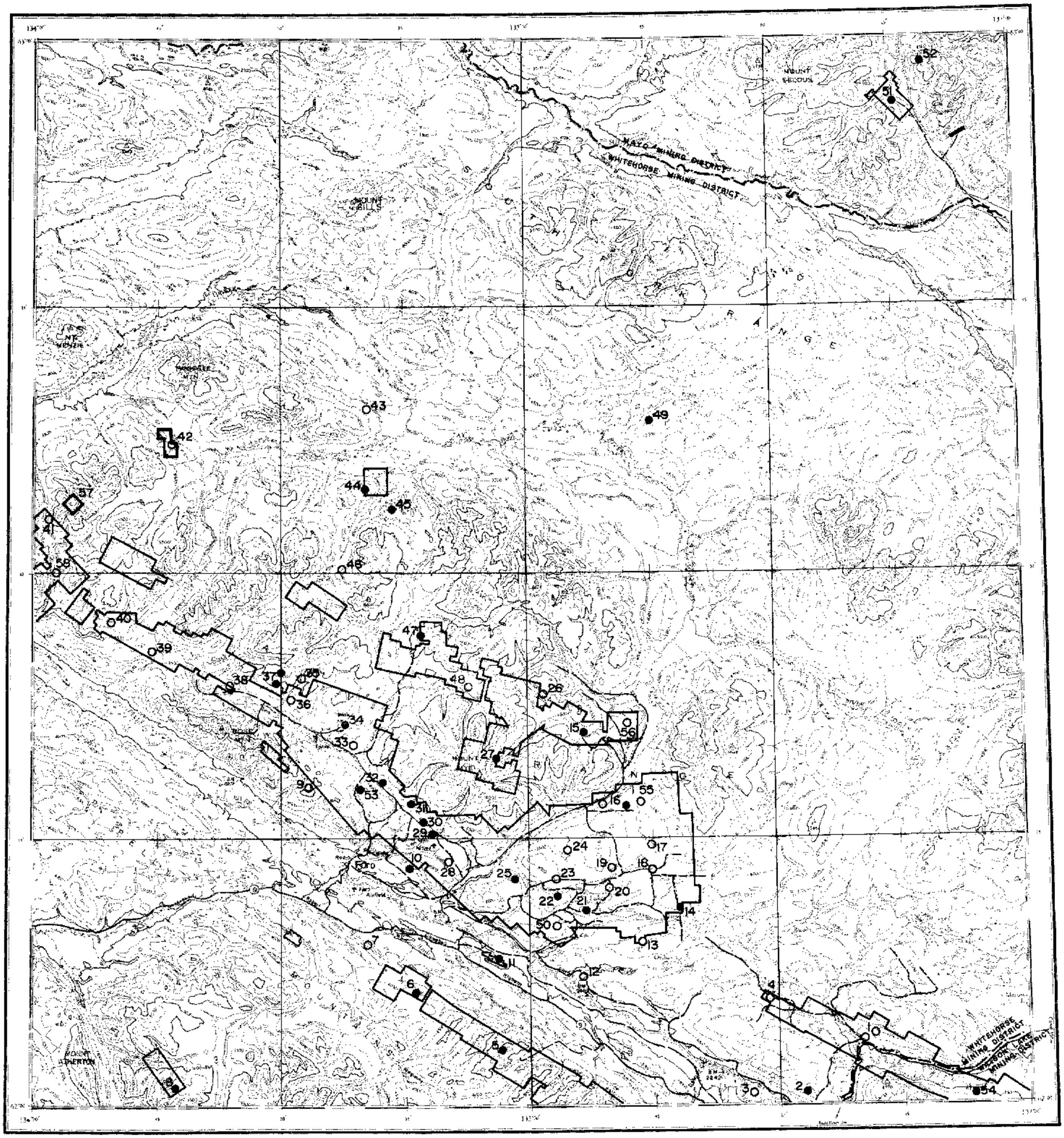
105 J (19)
(62°01'N,130°28'W)

Claims 1980: PPR (32); PRP (26)

CLINGON
Getty Mines
S. Clemmer et al

105 J 3 (20)
(62°02'N,131°21'W)

Claims 1980: CLINGON (42)



TAY RIVER

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●[61] .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
○[72] .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	.... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

TAY RIVER MAP-AREA (NTS 105 K)

NO.	PROPERTY NAME	REFERENCE
1	TENAS	This Report
2	RAGS	G.S.C., Mem. 200, p. 18
3	PEN	
4	OLGIE	
5	FARGO	Lead-Zinc Occurrence
6	LYN	This Report
7	CASCA	MIR, 1974, pp. 135-136
8	THOMAS	Skarn Zinc Occurrence
9	TAKU	
10	NESBITT	Copper Occurrence
11	BOBCAT	Limestone Stratabound
12	HOLLY	
13	SOCK	G.S.C., Pap. 67-40, p. 36 G.S.C., Bull. 208
14	SPUR	G.S.C., Pap. 68-68, pp. 47-48
15	ADAMSON	G.S.C., Pap. 68-1A, pp. 43-52 MIR, 1974, p. 132
16	BETA	G.S.C., Pap. 65-19, pp. 36-37
17	BLIND	G.S.C., Pap. 67-40, pp. 40-41 MIR, 1973, p. 54
18	CUB	G.S.C., Pap. 65-19, pp. 36-37
19	NASTY	G.S.C., Pap. 65-19, pp. 36-37 MIR, 1971 & 1972, pp. 92-93
20	ABRAHAM	MIR, 1971 & 1972, pp. 92-93
21	SEA	G.S.C., Pap. 65-19, pp. 36-37
22	BS	MIR, 1973, p. 58
23	BLACKWOOD	MIR, 1974, p. 135
24	BEA	G.S.C., Pap. 68-68, pp. 46-47
25	SWIM	G.S.C., Bull. 208, pp. 42-43 MIR, 1974, p. 134
26	O'CONNOR	G.S.C., Pap. 67-40, pp 39-40
27	MUR	Silver-Lead-Zinc Vein
28	SHRIMP	G.S.C., Pap. 65-19, pp. 37-38
29	VANGORDA	G.S.C., Bull. 208, pp. 46-47 G.S.C., Pap. 64-36, pp. 31-32
30	GRUM	MIR, 1974, pp. 130-131
31	KULAN	G.S.C., Bull. 208 32
32	KIM	G.S.C., Pap. 68-68, p.45
33	LO	
34	FARO	G.S.C., Bull. 208, pp. 49-65 MIR, 1974, pp. 128-129
35	FLAGSTONE	
36	BRIDEN	G.S.C., Pap. 68-68, p. 45
37	JACOLA	Silver-Lead-Zinc Vein
38	CROWN	
39	LORNA	MIR, 1973, pp. 56-57
40	RESERVE	MIR, 1971 & 1972, pp. 98-99
41	COWARD	Lead-Zinc Occurrence
42	COLT	MIR, 1971 & 1972, pp. 99-100, This Report
43	OWL	MIR, 1969 & 1970, pp. 93-94
44	KEGLOVIC	MIR, 1974, p. 133
45	IVAN	MIR, 1974, p. 133
46	SHANNON	G.S.C., Pap. 68-68, p. 45
47	REBEL	MIR, 1971 & 1972, pp. 93-95
48	KANGAROO	MIR, 1974, p. 129
49	TEDDY	Skarn Zinc Occurrence
50	SIROLA	
51	LAD	Silver-Lead-Zinc-Copper Vein
52	SOLO	MIR, 1969 & 1970, pp. 97-98
53	CESSNA	
54	CHAPLIN	MIR, 1974, p. 137
55	RUTH	This Report
56	DOT	This Report
57	BRAB	This Report
58	FISHHOOK	This Report

TENAS
DuPont of Canada
Exploration Limited

Unmineralized Zone
105 K 1, 105 G 13
105 F 16 (1)
(61°55'N,131°55'W)

References: Morin *et al* (1979, p. 62-63, 1980, p. 40)

Claims: T 1-290, 300-327, 350-357, 401-826; BAR 1-18; MAT 1-44; TENAS 1-41, 100-101 Fr; WOP 1-66, 500-501 Fr; BELL 15, 16 Fr

Source: Summary by R. Debicki from assessment report 090579 by K. J. MacLean.

Current Work and Results:

The claims straddle the North Canol Road approximately 10 km north of Ross River. They were staked in 1974, 1976 and 1977. Descriptions of the geology of the property and work done in 1977 and 1978 are given in Morin *et al* (1979, 1980).

Twenty holes totalling 3412.5 m were drilled in 1979. The deepest hole reached 304.5 m. Andesite, rhyolite, tuffaceous rock, greywacke and argillite were intersected. Low copper, lead and zinc values were cut. The MAT and BAR claims were returned to Welcome North Mines Ltd. early in 1980.

LYN
Sunexco Energy Corporation
Limited

Lead, Zinc Target
105 K 3 (6)
(62°06'N,133°15'W)

Reference: Craig and Milner (1975, p. 103-104

Claims: PUG 1-52; KEY 1-16

Source: Summary by D. Tempelman-Kluit from assessment report 090757 by D. C. Bingham.

Current Work and Results:

A gravity survey was conducted in 1980 to redefine anomalies indicated in earlier work. The target is massive sulphide mineralization like that in the Anvil district. Most rocks are Cambro-Ordovician calcareous schist correlative with the host phyllite in the Anvil district. The rocks are thermally metamorphosed. The line interval was 123 m with stations at 31 m intervals. Residual gravity differs strongly from the basic gravity data indicating the importance of the terrain correction. Several anomalies were found, but their amplitude is small (0.6 milligals). Five drill targets were established on the most promising anomalies.

RUTH
Welcome North Mines
Limited

Unmineralized
Target
105 K 7 (55)
(62°16'N,132°47'W)

Reference: Roddick and Green (1961a)

Claims: RUTH 1-8, 17-45, 47, 49, 51-56

Source: Summary by R. Debicki from assessment report 090487 by H. F. Foster and J. E. Betz and from information provided by Welcome North Mines Limited.

Current Work and Results:

The claims lie within the Vangorda belt, approximately 29 km east of Faro. They are underlain by schist and phyllite.

In 1979, a MAX-MIN electromagnetic survey was done to detect conductive zones, possibly related to massive sulphide mineralization. The survey outlined conductive material interpreted as a single highly folded graphitic zone with an over-all horizontal attitude. One BQ drill hole 124.4 m deep was completed.

DOT
Welcome North Mines
Limited

Unmineralized
Target
105 K 7 (56)
(62°22'N,132°47'W)

References: Tempelman-Kluit (1972); Morin *et al* (1979, p. 68, 1980, p. 45)

Claims: DOT 1-42

Source: Summary by R. Debicki from assessment report 090489 by H. F. Foster and J. E. Betz.

Current Work and Results:

The claims cover Cambro-Ordovician phyllite in the Anvil Range (unit 3 of Tempelman-Kluit, 1972), but no mineralization is known. During 1979, a MAX-MIN Horizontal Loop electromagnetic survey was carried out on the northwestern part of the claim group to determine whether conductors possibly related to massive sulphides are present. One strong conductive zone interpreted as representing conductive sedimentary strata was encountered. It appears to be an extension of a conductive zone identified by a 1979 EM survey done on the northeastern part of the claim group.

FISHHOOK
Amax Minerals Exploration;
Union Oil Limited;
Aquitaine Company of Canada
Limited

Unmineralized
Target
105 K 5,12 (58)
(62°31'N,134°03'W)

References: Morin *et al* (1979, p. 68-69; 1980, p. 44-45)

Claims: AM 1-194; BM 1-48; PM 1 Fr-8 Fr; TAY 1-80

Source: Summary by D. Tempelman-Kluit from assessment report 090506 by A. J. Wynne and J. P. Hawkins.

Current Work and Results:

The claims are underlain by graphitic phyllite like that in the nearby Anvil district. Work done in 1979 includes gravity, magnetic and electromagnetic surveys on grids in parts of the claims. The EM survey identified 14 strong conductors and coincident magnetic and gravity anomalies were defined. During 1980 nine holes were drilled for a total of 1400 m.

1980 MINERAL CLAIMS STAKED

COLT
C. Ollie et al

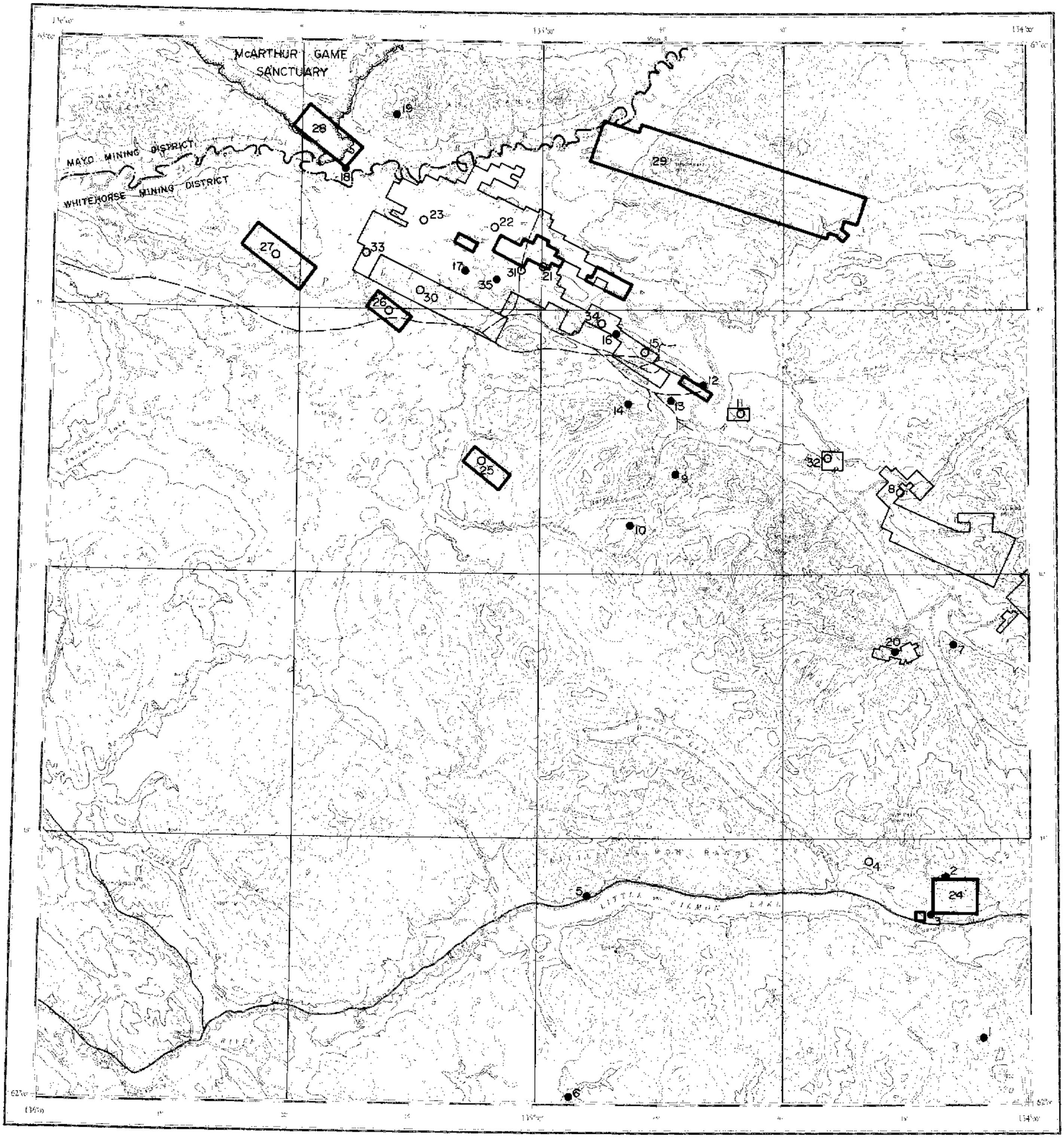
105 K 12 (42)
(62°37'N,133°43'W)

Claims 1980: TWO (16)

BRAB
W.E. Brereton

105 K 12 (57)
(62°34'N,133°55'W)

Claims 1980: BARB (9)



GLENLYON
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

GLENLYON MAP-AREA (NTS 105 L)

NO.	PROPERTY NAME	REFERENCE
1	LOKKEN	Skarn Zinc
2	LITTLE SALMON	G.S.C., Pap. 65-19, pp. 38-40
3	MOULE	G.S.C., Mem. 352, p. 81, This Report
4	TRUITT	
5	BRANDY	G.S.C., Mem. 352, p. 81
6	JUMPONT	MIR, 1969 & 1970, p. 156
7	GLENLYON LAKE	Copper-Lead Vein
8	HODDER	
9	HARVEY	G.S.C., Mem. 200, p. 18
10	TUMMEL	G.S.C., Mem. 352, p. 81
11	MUIR	This Report
12	HUB	G.S.C., Pap. 69-55, pp. 28-29
13	SEARFOSS	G.S.C., Pap. 69-55, pp. 28-29
14	FRONT	Copper-Silver Vein
15	GE	This Report
16	McCOWAN	G.S.C., Pap. 69-55, pp. 28-29
17	CLEAR LAKE	This Report
18	DUO	Coal
19	McARTHUR	Molybdenum-Copper-Tungsten Occurrence
20	FELIX	Skarn Zinc
21	KELLY	
22	TREDGER	
23	CONWEST	
24	DRURY	This Report
25	PETER	This Report
26	GRAF	This Report
27	HUGH	This Report
28	HANK	This Report
29	ONE HUMP	This Report
30	TUM	This Report
31	PELLY	This Report
32	SAP	This Report
33	RSVP	This Report
34	WHIP	This Report
35	HACHEY	Lead-Zinc-Copper

MUIR
Welcome North Mines Limited;
E & B Explorations Incorporated

Unmineralized Target
105 L 10 (11)
(62°39'N,135°35'W)

Reference: Findlay (1969, p. 28-29)

Claims: PDQ 1-20

Source: Summary by G. Abbott from assessment report 090747 by G. Rayner.

Current Work and Results:

The PDQ claims were staked in 1979 near the newly discovered Clear Lake deposit to cover an area thought to be underlain by favourable host rocks. The property was explored with a grid geochemical survey. Samples were collected at 100 m intervals on lines 400 m apart. Unfortunately, they were destroyed by fire at Whitehorse Assay Office.

GE
Welcome North Mines Limited;
E & B Exploration Incorporated

Unmineralized Target
105 L 10 (15)
(62°42'N,134°47'W)

Reference: Findlay (1969, p. 28-29)

Claims: VSE 1-75

Source: Summary by G. Abbott from assessment report 090743 by G. Rayner.

Current Work and Results:

The VSE claims were staked in 1979 near the newly discovered Clear Lake deposit to cover shale and tuff thought to be equivalent to Cambro-Ordovician rocks that host the Anvil orebody. The property was explored in 1980 with a grid geochemical survey. Samples were taken at 100 m intervals on lines 400 m apart and analyzed for copper, lead and zinc. Values are uniformly low.

CLEAR LAKE
Conwest Exploration Company Limited;
Essex Minerals Company Limited

Lead, Zinc, Silver Stratabound
105 L 10,11,12,13 14,15 (17)
(62°48'N,135°00'W)

References: Findlay (1977, p. 34); Sincalir et al (1967); Morin et al (1977, p. 164; 1979, p. 69; 1980, p. 45-46)

Claims: SUE (total of 1094 claims).

Source: Summary by R. Debicki from assessment report 090478 by C. K. O'Connor and G. R. Kent.

History and Description:

The claims form a north-northwest trending block between the Pelly and MacMillan Rivers, approximately 240 km north of Whitehorse. An airstrip suitable for ski or wheel-equipped aircraft was constructed on the property in 1979.

Parts of the current claim group were staked by Conwest Exploration Company Limited in 1966 following the Anvil discovery. The claims were restaked by Conwest in 1974 and held for several years by MacMillan Joint Venture, a consortium between Conwest and Essex Minerals Company Limited. Getty Mines Limited acquired Conwest's interest in the property in 1980.

Outcrop is scarce and geological data is generally lacking. Volcanic and sedimentary rocks of the Proterozoic to Paleozoic Anvil Range Group underlie the claims northwest of Tintina Fault. Southwest of the fault, the property is underlain by Silurian (?) and Devonian (?) sedimentary rocks.

Airborne magnetic and electromagnetic surveys were carried out over the claims in 1966-1967 and some diamond drilling was done. Between 1966 and 1977 extensive ground magnetic, electromagnetic, gravity, seismic and geochemical surveys were done. An airborne electromagnetic survey and 17 drill holes totalling 2531 m were completed in 1978. Low grade lead-zinc mineralization asssociated with massive pyrite was intersected.

Current Work and Results:

Ground magnetic and MAX-MIN electromagnetic surveys were carried out in March and April, 1979 over selected anomalies identified by the 1978 airborne electromagnetic survey. Elongate electromagnetic anomalies, generally without coincident magnetic anomalies, were outlined in four of the five target areas. The airborne electromagnetic anomaly over which the fifth target is situated was thought to reflect a source too deeply buried to be identified by the ground survey.

Ten diamond drill holes totalling 2481 m were completed. Massive sulphides with lead-zinc-silver values were intersected in 8 of the 10 holes. The mineralized zone is open along strike and at depth.

A MAX-MIN electromagnetic survey was carried out in August and September, 1979 over part of the claim group along strike from the strata hosting the mineralization to the east. Three anomalies were outlined. One, related to graphitic argillite, had been drilled previously. The other two are thought to be related to similar rocks.

Geological mapping of 20 claims at 1:4800 was done during 1980. Four claims were soil sampled. Gravity and MAX-MIN electromagnetic surveys were carried out over 40 claims. Several gravity anomalies and conductive horizons were identified.

PETER	Unmineralized
Welcome North Mines	Target
Limited	105 L 11 (25)
	(62°36'N,135°07'W)

Claims: PETER 1-40

Source: Summary by J. Morin from assessment report 090785 by G. H. Rayner.

Current Work and Results:

The claims were staked in May, 1980 to cover areas potentially favourable for shale hosted massive sulphide mineralization. They are covered by overburden and are probably underlain by sedimentary rocks of Mississippian and/or earlier age (Unit 9a, Campbell, 1967).

A soil geochemical sampling program was conducted during summer 1980. A total of 216 samples was collected employing a sample interval of 100 m along lines spaced 400 m apart. Samples were analyzed for copper, lead, zinc, but no anomalies were determined.

GRAF	Unmineralized
Welcome North Mines	Target
Limited	105 L 11,14 (26)
	(62°45'N,135°20'W)

Claims: GRAF 1-36

Source: Summary by J. Morin from assessment report 090784 by G. H. Rayner.

Current Work and Results:

The claims were staked in July, 1980 to cover areas potentially favourable for shale hosted massive sulphide mineralization. They are largely covered by overburden and are probably underlain by granitic rocks in intrusive contact with sedimentary rocks of Paleozoic age (Campbell, 1967). These claims were staked during the course of an airborne MAG-EM survey flown by Welcome North in May of 1980.

During summer 1980, a soil geochemical sampling program for copper, lead and zinc was conducted. A total of 190 samples was collected with sample intervals every 100 m along lines spaced 400 m apart. No significant anomalies were determined.

HUGH	Unmineralized Work
Welcome North Mines	Target
Limited	105 L 13,14 (27)
	(62°47'N,135°33'W)

Claims: HUGH 1-102

Source: Summary by J. Morin from assessment report 090783 by G. H. Rayner.

Current Work and Results:

The claims were staked in August, 1980 to cover areas potentially favourable for shale hosted massive sulphide mineralization. Underlying the area are schists and limestone of Mississippian and/or earlier age (Unit 6e, f, Campbell, 1967). These claims were staked during the course of an airborne MAG-EM survey flown by Welcome North in May of 1980.

During summer 1980, a soil geochemical sampling program was conducted with about 545 samples collected at 100 m intervals along lines spaced 400 m apart. Samples were assayed for copper, lead and zinc and no significant anomalies were determined.

HANK	Unmineralized
Pelly Project	Target
(Welcome North	105 L 14 (28)
Mines Limited;	(62°55'N,135°30'W)
E & B Explorations)	

Claims: HANK 101-190

Source: Summary by G. Abbott from assessment report 090797 by G. Raynor.

Current Work and Results:

The property is underlain by a poorly exposed sequence of shale and basic volcanic rocks mapped as the Anvil Range Group (unit 15) by Campbell (1967). The HANK claims were staked in the summer of 1980 to cover an area underlain by favourable host rocks for massive sulphides on the basis of airborne magnetic and electromagnetic surveys flown earlier in the year. The property was explored with a grid geochemical survey. Four hundred, eighty-six soil samples were collected at 100 m intervals on lines spaced 400 m apart and were analyzed for copper, lead and zinc. Results were discouraging.

TUM
Cominco Limited

Unmineralized
Target
105 L 14 (30)
(62°45'N,135°15'W)

Claims: TUM 1-198

Source: Summary by G. Abbott from assessment report 090665 by Ingo Jackish.

Current Work and Results:

The TUM claims were staked in the summer of 1979 to cover poorly exposed areas underlain by Cambro-Ordovician phyllite and volcanics, Siluro-Devonian dolomite and quartzite and possibly Devonian and Mississippian black slate and chert conglomerate. The Cambro-Ordovician rocks are potential hosts for Anvil type stratabound massive sulphides and the Devonian and Mississippian rocks are Clear Lake type massive sulphides.

The claims were explored in 1980 with a MAX-MIN Horizontal Loop electromagnetic survey. A magnetometer survey and gravity profiles over selectd EM anomalies.

The EM survey was conducted with a coil separation of 150 m and station intervals of 25 m on lines spaced 200 m apart. Anomalies were followed up with 50 and 100 m coil lengths. Magnetometer readings were taken at 25 m intervals on lines spaced 200 m apart. Gravity readings were taken at 25 m and 50 m intervals. The EM survey outlined several conductors but there was no correlation with the results of the magnetic and gravity surveys.

PELLY
Welcome North Mines Limited;
E & B Explorations Incorporated

Unmineralized
Target
105 L 14 (31)
(62°47'N,135°02'W)

Claims: PELLY 2-20

Source: Summary by G. Abbott from assessment report 090744 by G. Rayner.

Current Work and Results:

The PELLY claims were staked in 1979 near the Clear Lake deposit to cover an area thought to be underlain by favourable host rocks.

The property was explored with a grid geochemical survey. Samples were collected at 100 m intervals on lines 400 m apart and were analyzed for copper, lead and zinc. Values were uniformly low.

SAP
Welcome North Mines Limited;
E & B Explorations Incorporated

Unmineralized
Target
105 L 9 (32)
(62°36'N,135°24'W)

Claims: SAP 1-20

Source: Summary by G. Abbott from assessment report 090745 by G. Rayner.

Current Work and Results:

The SAP claims were staked in 1979 near the newly discovered Clear Lake deposit to cover an area thought to be underlain by favourable host rocks. The property was explored with a grid geochemical survey. Samples were collected at 100 m intervals on lines 400 m apart and were analyzed for copper, lead and zinc. Values are uniformly low.

RSVP
Welcome North Mines Limited;
E & B Explorations Incorporated

Unmineralized
Target
105 L 14 (33)
(62°48'N,135°21'W)

Claims: PVA 1-24; RSVP 1-32

Source: Summary by G. Abbott from assessment report 090748 and 090746 by G. Rayner.

Current Work and Results:

The PVA and RSVP claims were staked in 1979 near the Clear Lake deposit to cover an area thought to be underlain by favourable host rocks.

The property was explored with a grid geochemical survey. Samples were collected at 100 m intervals on lines 400 m apart and were analyzed for copper, lead and zinc. Values were uniformly low. Samples from the RSVP claims were destroyed by fire at Whitehorse Assay Office.

WHIP
Welcome North Mines Limited;
E & B Explorations Incorporated

Unmineralized
Target
105 L 10 (34)
(62°44'N,134°52'W)

Claims: WHIP 1-30

Source: Summary by G. Abbott from assessment report 090742 by G. Rayner.

Current Work and Results:

The WHIP claims were staked in 1979 near the newly discovered Clear Lake deposit to cover an area thought to be underlain by favourable host rocks. The property was explored in 1980 with a grid geochemical survey. Samples were collected at 100 m intervals on lines 400 m apart and were analyzed for copper, lead and zinc. Values are uniformly low.

1980 MINERAL CLAIMS STAKED

MOULE — 105 L 1 (3)
F. E. Algar — (62°10'30"N,134°13'W)

Claims 1980: VERNA (4)

CLEAR LAKE — 105 L 14,15 (17)
Getty Mines

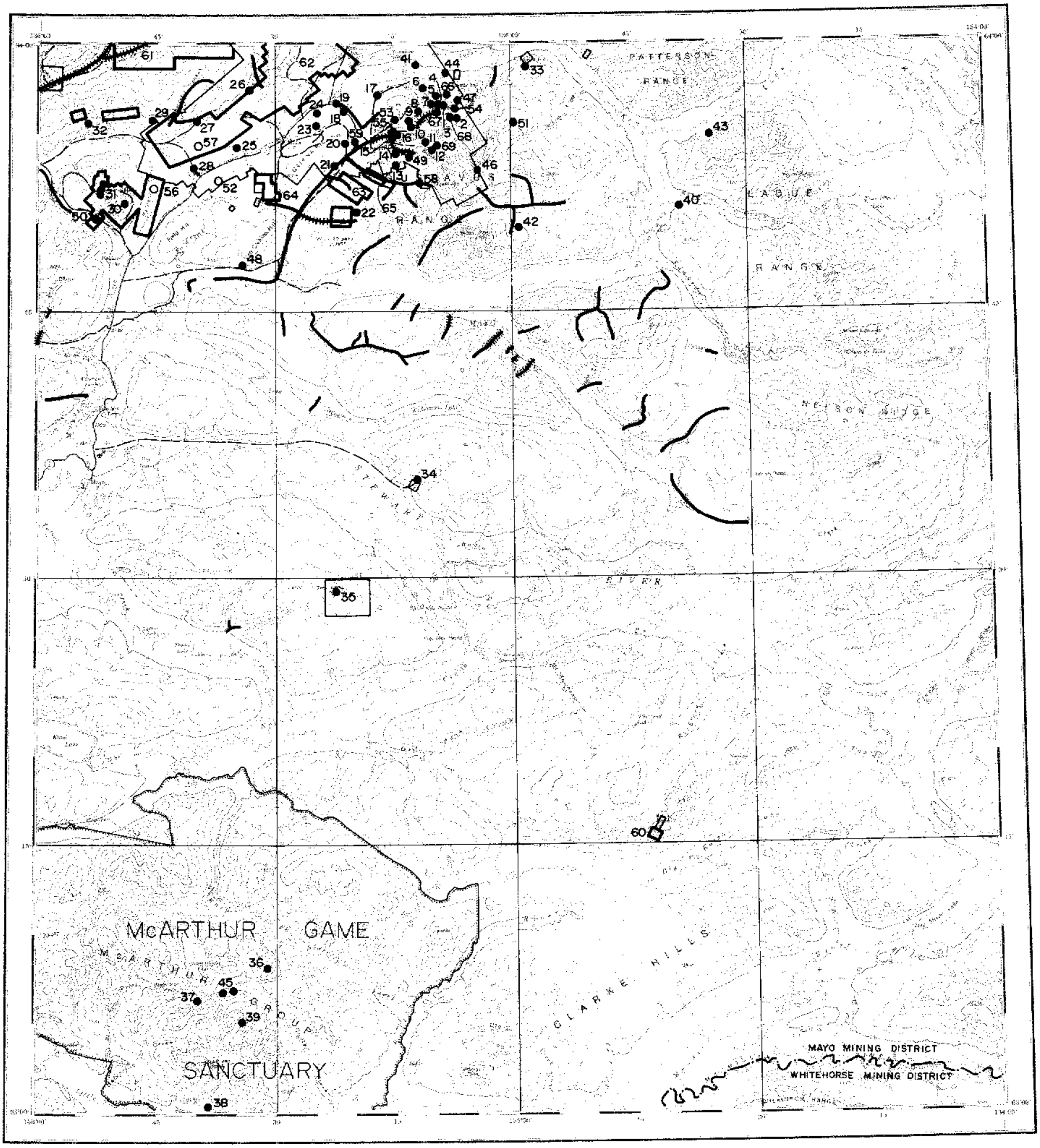
Claims 1980: GETA, B, C, D (134)
Restaking parts of SUE group

DRURY — 105 L 1 (24)
Cominco — (62°11'30"N,134°09'W)

Claims 1980: SALMON (80)

ONE HUMP — 105 L 15,16 (29)
Anaconda — (62°53'N,134°43'W)

Claims 1980: ACE (724)
Staking on stratigraphic targets.



MAYO
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 ....Mineral Deposit or Occurrence see Key on facing page

○72 ....Unmineralized Target

........Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

........Mineral Claims staked in 1980

........Placer Leases in good standing (Jan. 1981)

........Placer Claims in good standing (Jan. 1981)

CEL..........Coal Exploration Lease

CML..........Coal Mining Lease

........Tote Trail

........Driveable Road

........Oil or Gas Well

........Airstrip

MAYO MAP-AREA (NTS 105 M)

NO.	PROPERTY NAME	REFERENCE
1	UNITED KENO HILL	G.S.C., Bull. 111 MIR, 1974, pp. 10-12
2	FAITH	This Report
3	DUNCAN	G.S.C., Bull. 111, p. 56
4	GOLD QUEEN	G.S.C., Bull. 111, p. 52 G.S.C., Pap. 66-31, pp. 18-19
5	SILVER BASIN	G.S.C., Bull. 111. p. 51
6	NABOB #2	G.S.C., Bull. 111, p. 51
7	LADUE FRACTION	G.S.C., Bull. 111, p. 40
8	COMSTOCK	G.S.C., Bull. 111, pp. 39,40,42 G.S.C., Pap. 66-31, p. 15
9	APEX	G.S.C., Bull. 111, pp. 42-43
10	VANGUARD	G.S.C., Bull. 111, p. 47 G.S.C., Pap. 63-38, p. 11
11	HOMESTAKE	G.S.C., Bull. 111, pp. 52-53 G.S.C., Pap. 67-40, p. 22
12	CHRISTINE	G.S.C., Pap 68-68, p. 25
13	MO	Silver-Lead Vein
14	MAYBRUN	This Report
15	HOGAN	G.S.C., Bull. 111, pp. 46-47
16	RUNER	G.S.C., Bull. 111, pp. 46-47
17	WERNECKE	G.S.C., Pap. 69-55, p. 13
18	FORMO	G.S.C., Pap 63-38, p. 10 MIR, 1974, pp. 12-13
19	PADDY	MIR, 1969 & 1970, p. 14
20	EAGLE	This Report
21	FISHER	This Report
22	PARENT	
23	CREAM AND JEAN	G.S.C., Bull. 111, p. 78
24	NORD	MIR, 1969 & 1970, pp. 13-14
25	GERLITZKI	G.S.C., Pap. 63-38, pp. 8[illegible]
26	UR	G.S.C., Pap. 64-36, p. 13
27	SHANGHAI	G.S.C., Pap. 67-40, pp. 24-25
28	WAYNE	G.S.C., Pap. 68-68, p. 26
29	ARGENT	This Report
30	STREBCHUCK	Silver-Lead-Copper Vein
31	MT. HALDANE	This Report
32	LAYSIER	Silver-Lead Vein, This Report
33	COBALT	G.S.C., Mem. 357, p. 61
34	GORDON	MIR, 1973, pp. 16-17
35	TWO BUTTES	G.S.C. Open File Rep. 51 and This Report
36	SIDE SLIP	Skarn Copper
37	PIMA	Skarn Tungsten-Copper-Zinc
38	HOT SPRING	Silver-Lead Vein
39	LOST WERNECKE COPPER	
40	ROOP	G.S.C., Economic Geology Series No. 17, pp. 36-37
41	MOON	Silver-Lead Vein
42	MT. ALBERT	Silver-Lead Vein
43	McKIM	Silver-Lead Vein
44	NERO	Silver-Lead Vein
45	FRIESEN	Skarn Copper-Tungsten-Molybdenum-Silver-Gold
46	MT. HINTON	G.S.C., Pap. 68-68, p. 23
47	AVENUE	MIR, 1971 & 1972
48	CHANCE	Antimony Vein
49	YONO	Silver-Lead Vein
50	SUNDOWN	This Report
51	GUSTAVUS	Silver-Lead Vein
52	NEWRY	
53	CHRISTAL	This Report
54	SEGSWORTH	Silver-Lead-Zinc Vein
55	IRONCLAD	Silver-Lead-Zinc Vein
56	SINISTER	This Report
57	ZAP	This Report
58	W	This Report
59	AZTEC	This Report
60	FLO	This Report
61	WEASEL	This Report
62	FEEBLE	This Report
63	CLEAVES	This Report
64	ROSS	This Report
65	GAMBLER	This Report
66	BE No.1	This Report
67	BE No.2	This Report
68	BE No.3	This Report
69	BE No.4	This Report
70	DIAMOND	This Report

FAITH
Canada Tungsten Mining
Corporation Limited;
Bema Industries Limited

Silver, Lead Veins
105 M 14 (2)
(63°55'N,135°08'W)

References: Boyle (1965); Gleeson (1966a,b,d; 1967a,b)

Claims: AM 1

Source: Summary by R. Debicki from assessment report 090538 by T. M. Elliott.

Current Work and Results:

The AM claim lies 8 km east of Keno City and is underlain by the Keno Hill Quartzite. A preliminary geological survey was carried out over the claim by Bema Industries for Canada Tungsten during July, 1979. No outcrop was seen, but abundant talus and angular rock rubble indicates that the claim is underlain by light to medium grey quartzite with quartz veins from 8 cm to 18 cm across. Grab samples of quartz veins assayed less than 0.069 gm/tonne gold and less than 1.37 gm/tonne silver. A selected sample of galena and sphalerite-bearing vein quartz contains 0.75 gm/tonne gold, 224.78 gm/tonne silver and 1.19% lead.

MAYBRUN
Canada Tungsten Mining
Corporation Limited;
Bema Industries Limited

Silver Lead Vein
105 M 14 (14)
(62°54'N,135°14'W)

References: Boyle (1965); Gleeson (1966a,b,d; 1967a,b)

Claims: LEM 1-11

Source: Summary by R. Debicki from assessment report 090544 by T. M. Elliot.

Current Work and Results:

The claims lie 2 km east of Keno City and straddle Thunder Gulch, a tributary of Lightning Creek. Bema Industries carried out a preliminary geological survey on the claims for Canada Tungsten during 1979. Little outcrop is exposed, but the abundant talus and float represent bedrock. The north and west portions of the claim group are underlain by massive white to dark grey quartzite of the Cretaceous Keno Hill Formation. The beds are from 30 cm to 200 cm thick. Interbeds from 2 cm to 100 cm thick of graphitic phyllite and phyllite make up less than 10% of the rock. The south and east portions of the claims are underlain by quartz-sericite schist and graphitic schist of the Upper Schist Unit. Quartz boundins and veinlets occur in both units. Two grab samples of vein quartz assayed 2.05 gm/tonne silver with less than 0.07 gm/tonne gold and 6.84 gm/tonne silver with 1.37 gm/tonne gold.

LEM
Canada Tungsten Mining
Corporation Limited

Unmineralized
Target
105 M 14 (14,49)
(63°54'N,135°13'W)

Claims: LEM 1-11

Source: Summary by D. Tempelman-Kluit from assessment report 090726 by D. Bonnar, G. Norman and K. E. Northcote.

Description:

The claims, staked in 1977, are on Thunder Gulch 3 km east of Keno City. They are close to the Maybrun (14) and Yono (49) showings, but do not cover known mineralization. The claims are underlain by the Keno Hill Quartzite (Cretaceous) and Upper Schist; foliation in the rocks dips gently south. Some hand trenching has been done on the area of the claims, but no reference to this work is known.

Current Work and Results:

The geology was mapped and a soil geochemical survey conducted. Statistical evaluation of the soil geochemical data on the 343 samples analyzed give threshold levels of 84 ppm zinc, 1.5 ppm silver and 22 ppm lead. Several areas with anomalous lead, zinc and silver have been outlined on the claims. This, together with the host rock type, is considered sufficient to warrant further investigation mainly with an EM survey and by bulldozer trenching.

EAGLE
Teck Explorations Limited;
Archer, Cathro and
Associates Limited

Silver, Lead Vein
105 M 14 (20)
(63°54'N,135°22'W)

References: Boyle (1968).

Claims: SEPTEMBER 1-13

Source: Summary by R. Debicki from assessment report 090486 by A. R. Archer and from information provided by Teck Exploration Limited.

Description:

The thirteen claims in three groups were staked in 1978 to provide adit access protection to the Eagle Vein on the southeast flank of Galena Hill. The vein is one of the silver-lead-zinc veins that characterize the Keno Hill silver camp. The claims are underlain by Cretaceous thick bedded quartzite, thin bedded quartzite and chlorite schist.

Current Work and Results:

A soil geochemical survey was carried out on the claims in 1979. The survey lines were 100 m and 150 m apart. Sample spacing along the lines was 50 m. Samples were analyzed for lead, zinc and silver. Values obtained ranged from 20 to 80 ppm for lead with a high of 290 ppm, from 75 to 200 ppm for zinc with a high of 530 ppm and 0.1 to 0.8 ppm for silver. These values are considered to be normal background for the area and indicate that no mineralization exists at surface on the claims.

FISHER
Canada Tungsten Mining Corporation Limited; Bema Industries Limited

Unmineralized Target
105 M 14 (21)
(63°53'N,135°23'W)

References: Bostock (1947); Boyle (1965); Gleeson (1966 a, b, c, d; 1967c); Green (1971); Kindle (1962).

Claims: BRY 1-21, 24, 31-33

Source: Summary by R. Debicki from assessment report 090545 by M. D. Philpot.

Description:

The BRY claims were staked in 1979 over the southeast flank of Galena Hill and Duncan Creek. The area has been explored intermittently since the 1920's. Vein float bearing galena and tetrahedrite was reported in 1949 and 1950. Hand trenches and a 12 m deep shaft were dug at that time. In 1964, United Keno Hill Mines Limited carried out Horizontal Loop electromagnetic and soil geochemical surveys on the claims. Bulldozer trenches were dug in 1964 and 1965. Although weak soil geochemical anomalies were outlined and the old workings were located, no mineralization was noted. The area is of interest because it overlies the possible extension of the McLeod vein, one of the important vein faults in the area.

Current Work and Results:

Preliminary geological and geochemical surveys were carried out over the claims in 1979 by Bema Industries for Canada Tungsten. The area is underlain by thin to- thick-bedded light to dark grey quartzite, graphitic to siliceous phyllite, quartz-graphite schist and minor grey banded limestone up to 2 m thick. Quartzite horizons at the north end of the claim group are more thickly bedded than those at the south. The entire sequence is part of the Upper Schist Formation.

Soil and stream sediment geochemical surveys were carried out. The 104 soil samples were analyzed for lead, zinc, silver and tungsten. The 15 stream sediment samples were analyzed for lead and silver. Two small coincident silver anomalies were identified and several other soil geochemical anomalies were outlined. No mineralization was found at the old workings or elsewhere on the claims.

MOUNT HALDANE
Mayag Syndicate
B. Way; H. Ewing

Silver, Lead Vein
105 M 13 (31)
(63°52'N,135°52'W)

References: Boyle (1965); Findlay (1967); Morin et al (1980, p. 6)

Claims: AG 8-14; JO; MIDDLECOFF; RICKY; GOPHER; WHISTLER

Source: Summary by R. Debicki from assessment report 090623 by B. Way.

Description:

The claims are on the northwest side of Mount Haldane along Bighorn Gulch, about 30 km north of Mayo. The area has undergone extensive exploration since 1903. Development work was done on silver-lead mineralization on the claims in 1918-1920 and 1964-1967. More than 700 m of drifting and 56 m of shaft sinking and raise construction were done.

Current Work and Results:

During 1979, geological and soil geochemical surveys were done on the claims to find more lead-silver mineralization. The property is underlain by sericite schist, quartzite and minor greenstone of the Keno Hill Formation and by quartz-biotite porphyry. The quartzite is faulted and fractured. In the Bighorn Gulch area veins of argentiferous galena, sphalerite and siderite are localized by the fractures.

Soil samples were collected at 12 m intervals along lines 61 m apart. All 232 samples were analyzed for lead. Tin and tungsten analyses were also done on 42 samples. The analytical results indicate that lead mineralization does not occur in the survey area outside the mineralization that has been developed. Several weak tungsten anomalies were found near the quartz-biotite porphyry.

TWO BUTTES
DuPont of Canada Exploration Limited

Tungsten Skarn
105 M 6 (35)
(63°24'N,135°22'W)

Claims: W 1-24; TW 25-80

Source: Summary by D. Tempelman-Kluit from assessment report 090610 by J. C. Stephen and assessment report 090755 by L. Eccles.

Description:

The property was staked in 1979 to cover an acidic intrusive plug known to be anomalous for molybdenum and tungsten from a Geological Survey of Canada geochemical reconnaissance survey. The property was investigated in 1972 by Canada Tungsten and by CCH Resources in 1978.

A small irregular shaped plug of quartz-feldspar porphyry intrudes a variety of metasedimentary rocks. The porphyry is part of a Cretaceous quartz monzonite suite. It contains traces of pyrite, pyrrhotite and molybdenite and is locally weakly silicified and sericitized. Marble near the plug locally contains minor amounts of scheelite-powellite. Wolframite is known in some quartz veins.

Current Work and Results:

The property was mapped and prospected and soil and silt sampling programs were conducted in 1979. Electromagnetic and magnetometer surveys were also carried out. Tungsten values in soils vary to highs of 300 ppm and molybdenum values are generally in the range 2-10 ppm. Additional geological work and hand trenching were done in 1980.

CHRISTAL
United Keno Hill
Mines Limited

Silver, Lead Vein
105 M 14 (53)
(63°56'N,135°15'W)

Reference: Boyle (1965, p. 40)

Claims: KENNY

Source: Summary by R. Debicki from assessment report 090513 by T. Levicki.

Description:

The KENNY claim on the southwest slope of Keno Hill is underlain by Cretaceous quartzite and by Jurassic sericitic and graphitic schist. A northwest trending cross fault with a displacement of up to 122 m crosses the claim. Such faults are known to be important control structures for the silver-lead-zinc mineralization in the area.

Previous work on the property includes 1965 soil geochemical and electromagnetic surveys and trenching. This work identified a few weak anomalies. Mineralization in one of the three trenches grades to 20.5 gm/tonne silver, 4.88% lead and 1.6% zinc and 68.57 gm/tonne silver, 0.63% lead and 0.2% zinc.

Current Work and Results:

A soil geochemical survey with 30.5 m sample spacing was carried out in 1979. The 176 samples were analyzed for silver, lead and zinc. Three anomalies were identified. Re-sampling failed to confirm one. The second was found to be local and surrounded by lower values. The third anomaly is widespread, with values to 24.3 ppm silver and 714 ppm lead. It may reflect a southwesterly extension of the Keno No. 6 vein, 670 m away.

SINISTER
Canada Tungsten Mining
Corporation Limited;
Archer, Cathro and
Associates Limited

Unmineralized
Target
105 M 13 (56)
(63°52'N,135°46'W)

Reference: Bostock (1947); McTaggart (1950, 1960); Kindle (1955, 1962); Boyle (1965); Green (1971); Tempelman-Kluit (1964); Blusson (1978); Tessari (1979)

Claims: SIN 1-40; IS 1-32; TER 1-24

Source: By R. Debicki from assessment report 090546 by M. D. Philpot.

Description:

The claims are along the valley of Haldane Creek, and there is outcrop. The area is mostly overburden covered.

Areas adjacent to the claim group are underlain by rocks of the Lower Schist, Central Quartzite and Upper Schist Units of the Yukon Group. Greenstone sills and quartz monzonite to granodiorite stocks are intrusive into the Yukon Group rocks. Mineralization at the nearby Elsa camp is associated with main faults trending northeast to east-northeast, and less commonly, with cross faults trending north to northeast. The faults are best developed in the Central Quartzite Unit.

In 1962, a 30 line-km electromagnetic survey was done over the area. The results of the survey were interpreted to indicate north trending faults, and several other east-west trending conductors. An aeromagnetic survey was done over the area in 1970, followed by additional ground electromagnetic and magnetic surveys in 1971. East-west trending conductors were again identified.

Current Work and Results:

The claims were optioned to Canada Tungsten by Archer, Cathro in 1979. Work during 1979 was done to determine the extent of the favourble Central Quartzite Unit on the claims. Geological, electromagnetic and soil geochemical surveys were done. The claims are underlain by medium to dark grey phyllite and graphitic quartzite, grey-green siliceous phyllite, graphitic schist, massive quartzite and minor buff to grey limestone. Rocks of the Lower Schist, Central Quartzite and Upper Schist Units are all present.

The 45 line-km MAX-MIN electromagnetic survey helped infer the contacts between the units. It also indicates 3 north-northeast trending faults, and an east-west trending structure.

Soil samples were collected 50 m apart along lines spaced 150 m apart. All 111 samples were analyzed for mercury. Twenty-three were also analyzed for lead and zinc. Mercury in A horizon soils was used here because it is a useful geochemical indicator of mineralized veins at Keno Hill and Galena Hill. An anomaly coincident with a fault in rocks of the Central Quartzite Unit was outlined.

ZAP
Canada Tungsten Mining
Corporation

Unmineralized
Target
105 M 13,14 (57)
106 D 3,4
(63°54'N,135°40'W)

Claims: ZAP 1-627, 1000F-10862F

Source: By R. Debicki from assessment report 090564 by R. J. Barclay et al and reports 090800 and 090787 by M. D. Philpot.

Current Work and Results:

The claims were staked in February, 1979 over areas north and east of the lead-silver-bearing properties of United Keno Hill Mines Limited.

Work done during 1979 was designed to determine the extent of favourable horizons under overburden, and to evaluate the potential for mineralization on the claims. The area is underlain by graphitic schist, bedded quartzite, graphitic phyllite, argillite and schist of the Lower Schist, Central Quartzite and Upper Schist Units of the Yukon Group. The metasedimentary rocks are intruded by gabbroic sills and biotite -lamprophyre and quartz-feldspar porphyry dikes. A series of small Cretaceous quartz monzonite to diorite stocks is intruded along the hinge of McQuesten Anticline.

Rock and soil samples from known veins on adjacent properties were sampled and showed that mercury is present in sufficient amounts to be an indicator in soils of underlying mineralization.

A soil geochemical survey was done over both of the claims. Samples were collected at 412 sites spaced 50 m apart on lines 150 m apart and analyzed for mercury. Lead and zinc were also determined for 236 of the samples. Three significant mercury anomalies and four lead-zinc anomalies were identified. Anomalous values were those over 100 ppb mercury in A horizon soils, and those over 20 ppm lead and 150 ppm zinc in B horizon soils.

Stream sediment samples were collected from streams over the western half of the Hanson Lake intrusion, a 4 x 6 km body of coarse-grained quartz monzonite. Alteration zoning, including two areas of stockwork alteration, occurs in the western part of the pluton. The stream sediments were analyzed for tin, lead, zinc, silver, tungsten and molybdenum. Several anomalous tungsten and molybdenum values were obtained. Pan concentrates of stream sediments from the same area were analyzed for tin, iron, tungsten and molybdenum. Anomalous tin and tungsten values were obtained. Powellite, scheelite and magnetite were identified in the pan concentrates.

Magnetic and MAX-MIN electromagnetic surveys were done over 248 line-km of grid to identify graphitic horizons and infer geological structures below overburden. Three fault structures and one major conductor with coincident magnetic anomaly were identified. The feature with coincident magnetic anomaly has the geophysical characteristics of a pyrrhotite-bearing sulphide horizon.

Seismic profile surveys were run across the McQuesten River Valley to determine the depth to bedrock. Permafrost caused problems in interpreting the survey results.

In 1980, the property was explored with rotary overburden drilling, soil and lake geochemical surveys and a transit survey.

Two hundred, forty-three soil samples were collected from the A and B soil horizons at 100 m intervals along lines spaced 150 m apart. All soil samples were geochemically analyzed for silver, lead, zinc and mercury with the following results.

Metal	Soil Horizon	m	m+a	m+2a	m+3a
Silver	B	.2	.3	.4	.6
Zinc	B	78	115	152	188
Lead	B	13	19	25	31
Mercury	B	39	62	85	108
Siver	A	.2	.5	.8	1.1
Zinc	A	43	72	100	129
Lead	A	8	13	19	24
Mercury	A	69	108	142	179

m = Mean
a = Standard Deviation
m+a = Trend
All Values in ppm

m+2a = Threshold
m+2a m+3a = Possibly Anomalous
M+3a = Probably Anomalous

Mercury and silver values were higher in the A horizon and zinc and lead values were higher in the B horizon. Three small areas with coincident anomalous values for all elements and other sporadic anomalies were outlined. Seventy-four lake sediment samples were collected from 24 kettle lakes and geochemically analysed for silver, lead, zinc, copper and mercury with the following results.

Metal	m	m+a	m+2a	m+3a
Zinc	105	135	165	195
Lead	10	16	23	29
Silver	.34	50	70	80
Copper	22	33	44	55
Mercury	118	166	215	260

Two lakes gave anomalous values and in lead and copper the other in zinc, lead and copper.

Sixty-seven overburden holes were drilled and 53 reached bedrock. Holes were drilled at 150 m spacings on four lines spaced 700 m apart. Overburden samples were anlayzed for silver, lead, zinc, copper and gold over intervals between 0.5 and 6 m. The holes tested geochemical anomalies and determined the depth and type of overburden.

W
Canada Tungsten Mining
Corporation Limited

Unmineralized
Target
105 M 14 (58)
(63°52'N,135°11'W)

References: Boyle (1965); Findlay (1967); Boyle (1968)

Claims: W #1

Source: Summary by R. Debicki from assessment report 090485 by T. M. Eliott.

Current Work and Results:

The claim is underlain by part of the Upper Schist, a sequence of metamorphic rocks thrust northward over the Cretaceous Keno Hill Quartzite.

A geological reconnaissance was carried out in 1979. One conformable quartz lens in a zone approximately 5 m long and 0.4 m thick is the "discovery zone" for the claim. The zone was sampled to determine its gold and silver content, but no results are given.

GAMBLER
Canada Tungsten Mining
Corporation Limited

Unmineralized
Target
105 M 14 (65)
(63°57'N,135°20'W)

Claims: RAILROAD 1-40; ARC 1-8; WERNECKE 1-16

Source: Drill logs and trench plan submitted by BEMA Industries for assessment 090690.

Current Work and Results:

The claims were optioned by Canada Tungsten from Cro-Mur Mining Company. The property was explored with 20 bulldozer trenches and four diamond drill holes totalling 396.7 m. No significant intersections were encountered.

KENO HILL (BE 1,2,3,4)
Canada Tungsten Mining
Corporation Limited

Silver, Lead, Zinc
Veins
105 M 14 (66, 67)
(68, 69)
(63° 57'N,135° 02'W)

References: McTaggart (1960); Boyle (1965)

Claims: BE 1-279, 281-284, 285 Fr-322 Fr; a total of 321 claims.

Source: Summary by J. Morin from assessment report 090782 by C. D. Nordin and R. T. Holland.

Current Work and Results:

The claims on the north, south and east sides of Keno Hill were staked in February, 1979 and in August, 1980. Geology underlying the claims has been well documented by McTaggart (1960), and geochemistry by Boyle (1965).

During summer 1980, Bema Industries Limited conducted reconnaissance geological mapping, geochemical sampling and prospecting programs over the central and southern portions of the claim group. Four vein structures were discovered:

1) Located 800 m northeast of Caribou Hill. A 1.0 to 1.5 m wide vein breccia with limonite-manganese oxide-siderite; no anomalous rock geochemistry.

2) Located 500 m south of Caribou Hill. Manganese-limonite breccia vein float with rock geochemical values up to 670 ppm lead.

3) Located 900 m north of the headwater lake of Lightning Creek. A 1 to 2 m wide fracture zone with several quartz-limonite-pyrite veinlets; rock geochemical sample contains 5,900 ppm zinc, 21 ppm silver and 2,020 ppm lead.

4) Located 1500 m south of the mouth of McNeill Gulch. A 1 m wide fracture zone with several quartz-pyrite-limonite veinlets; rock geochemical sample contains 1,500 ppm zinc, 10.2 ppm silver, 143 ppm lead, 180 ppb gold.

In addition, known gold-bearing quartz-arsenopyrite-scorodite veins occur just south of the BE claims at the head of McNeill Gulch.

DIAMOND FR.
Canada Tungsten Mining
Corporation Limited

Unmineralized
Target
105 M 14 (70)
(63° 57'N,135° 11'W)

References: Boyle (1957; 1965)

Claims: DIAMOND Fr.

Source: Summary by R. Debicki from assessment report 090543 by T. M. Elliott.

Current Work and Results:

The claim was staked in April, 1979, to cover an area of approximately 550 square m of open ground at the head of Faro Gulch.

The area is underlain by light to medium grey Keno Hill Quartzite. The projection of the locus of the "Main Vein" fault of Keno Hill crosses the property.

In 1979, geological and soil geochemical surveys were carried out on the claim. No outcrops were found. The three samples taken during the soil geochemical survey gave only background values of lead, zinc and silver.

1980 MINERAL CLAIMS STAKED

ARGENT
B. Stewart et al
105 M 13 (29)
(63°56'N,135°50'W)

Claims 1980: ARGENT (16)
Restaking of old silver vein.

MT. HALDANE
M. H. Ewing
105 M 13 (31)
(63°52'N,135°53'W)

Claims 1980: JAM (7); Tie on 1980

LAYSIER
D. Stewart
105 M 13 (32)
(63°56'N,135°55'W)

Claims 1980: LAZIER (6)
Restaking of old silver vein.

SUNDOWN
R. Ewing
105 M 13 (50)
(63°50'N,135°53'W)

Claims 1980: AXE (8)

ZAP
Canada Tungsten
105 M 13,14
106 D 3,4 (57)
(63°57'N,135°30'W)

Claims 1980: ZAP (627)

FLO
Union Carbide
105 M 7 (60)
(63°15'30"N,134°43'W)

Claims 1980: WOLF (4)

WEASEL
Canada Tungsten
105 M 13
106 D 4 (61)
(64°00'N,135°45'W)

Claims 1980: WEASEL (210)

FEEBLE
Sheryl Wagner et al
105 M 14 (62)
(63°52'N,135°21'W)

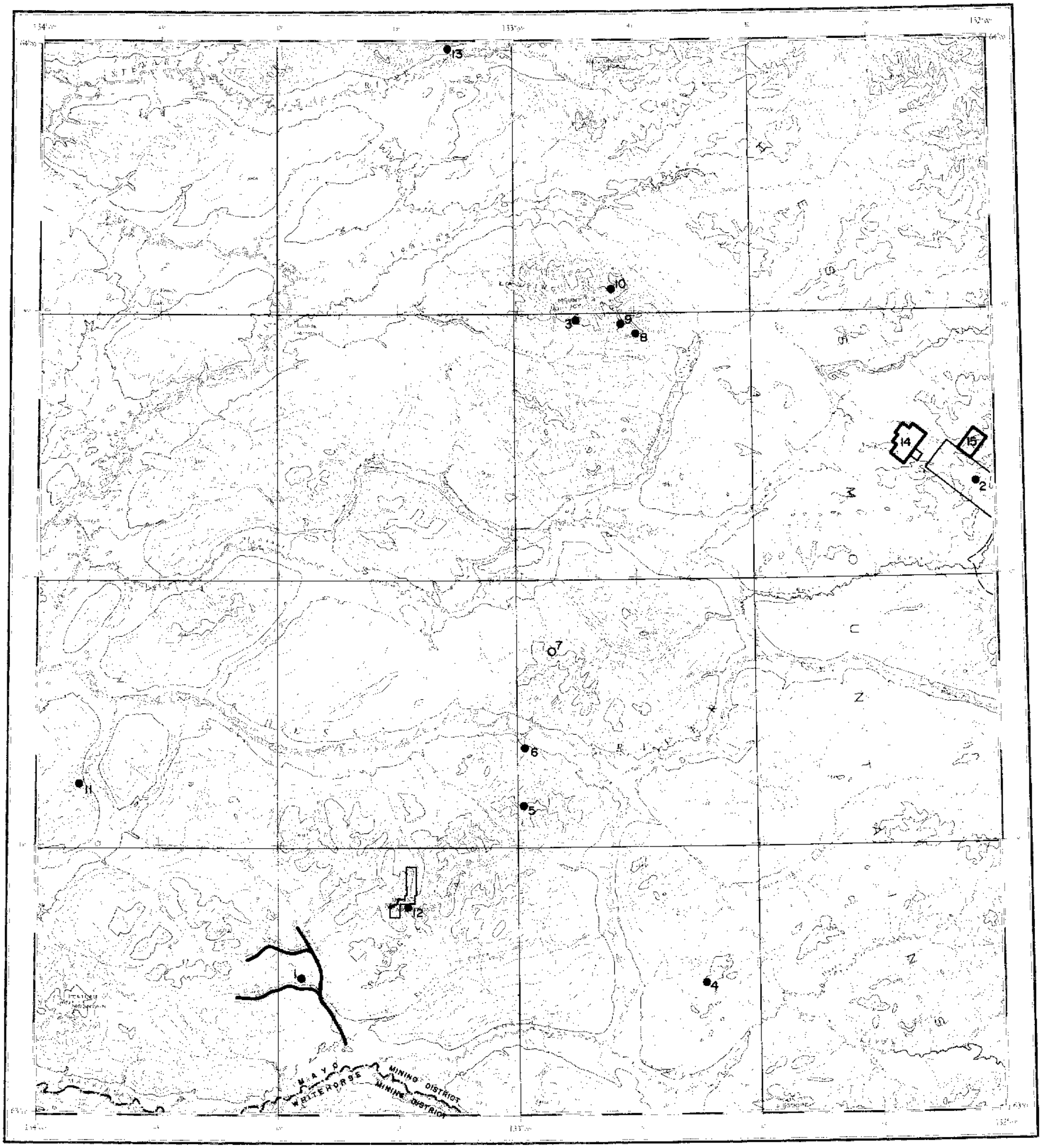
Claims 1980: B & F (32)

CLEAVES
W. Malicky
Evelyn French
105 M 13,14 (63)
(63°52'N,135°31'W)

Claims 1980: PINE (8); EV (8); SPRUCE (8)

ROSS
Jack Ross et al
105 M 14 (64)
(63°52'30"N,135°17'W)

Claims 1980: ROSS (10)



LANSING

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
O72 .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	✧ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

LANSING MAP-AREA (NTS 105 N)

NO.	PROPERTY NAME	REFERENCE
1	ARMSTRONG	G.S.C., Economic Geology Report 28, p. 74
2	GREG	MIR, 1974, pp. 17-18
3	JOY	Copper Occurrence
4	GOLF	Skarn Copper
5	ETZEL	Copper Vein
6	BRODELL	Copper Vein
7	PEBBLE	Lead Occurrence
8	DEAN	Lead Vein
9	AUREOLE	Copper Vein
10	BLOOM	Copper-Molybdenum-Lead-Cobalt Vein
11	PLEASANT	Skarn Copper-Tungsten-Silver
12	TONGUE	Skarn Tungsten-Copper-Tin
13	KIDD	Zinc Stratabound
14	FLATASA	This Report
15	SPIS	This Report

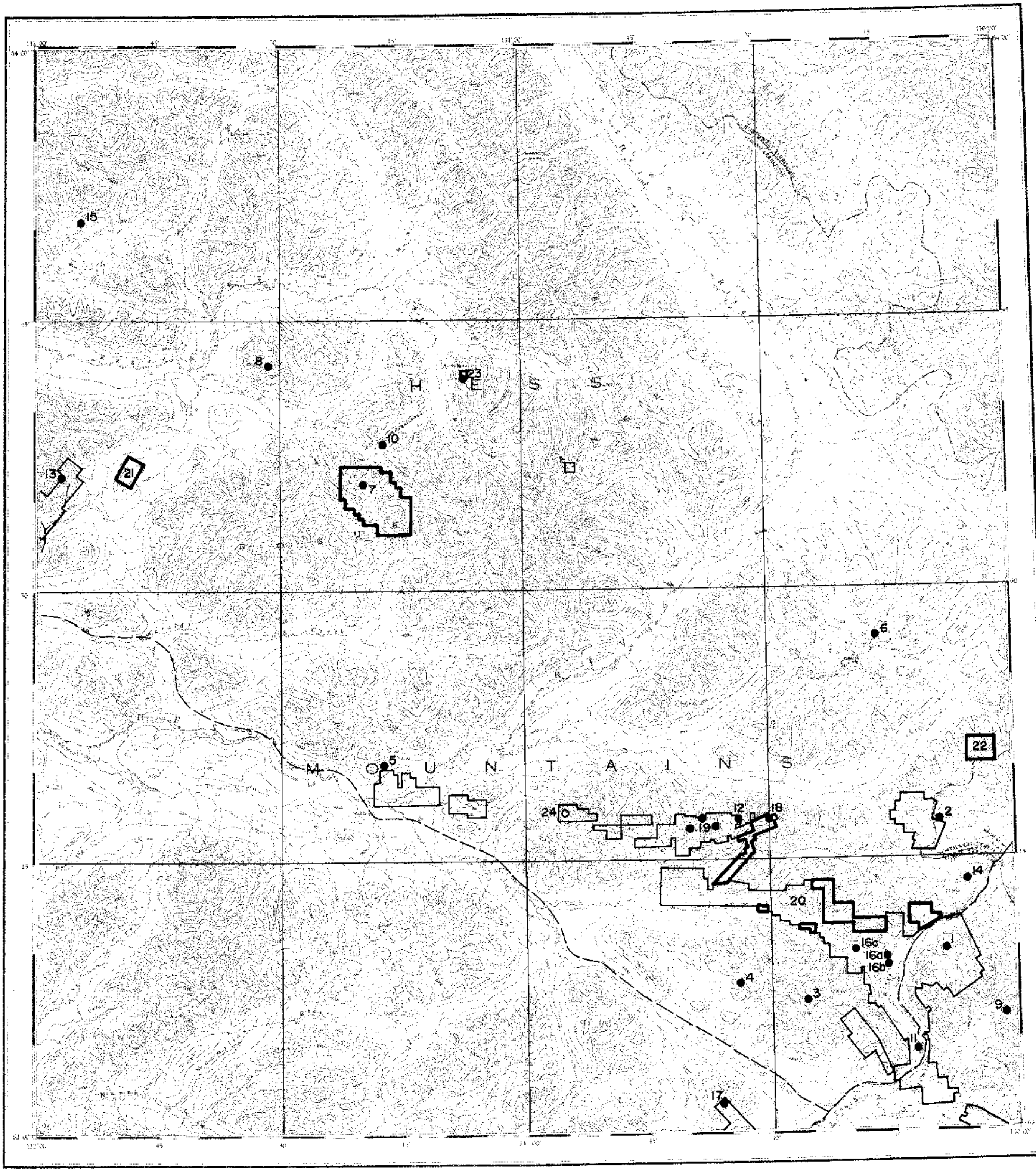
1980 MINERAL CLAIMS STAKED

FLATASA — 105 N 9 (14)
Archer, Cathro and Associates — (63°37'N,132°10'W)

Claims 1980: FLATASA (40)

SPIS — 105 N 9 (15)
Archer, Cathro and Associates — (63°37'N,132°02'W)

Claims 1980: SPIS (24)



NIDDERY LAKE

YUKON TERRITORY - NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

...... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

NIDDERY LAKE MAP-AREA (NTS 105 O)

NO.	PROPERTY NAME	REFERENCE
1	TOM	This Report
2	MACTUNG	MIR, 1976, pp. 20-22
3	JEFF	G.S.C., Pap. 71-1A, p. 73
4	ALP	Gold-Silver Vein
5	SCOT	MIR, 1971-1972, p. 18
6	KEELE	G.S.C., Pap. 71-1A, p. 73
7	EMERALD	G.S.C., Pap. 53-7, pp. 40-41 This Report
8	HORN	MIR, 1971-1972, p. 17
9	BEN	Zinc Stratabound
10	ARROWHEAD	Copper Vein
11	RACICOT	MIR, 1974, pp. 21-22
12	HESS	Barium Stratabound
13	INCA	MIR, 1974, p. 18
14	STANDARD	Lead-Zinc-Silver Occurrence
15	ODD	Lead-Zinc Stratabound
16	JASON	This Report
17	BROCK	Barite Stratabound
18	WALT	Barite Stratabound , This Report
19	TRYALA	Barite Stratabound
20	NIDD	This Report
21	BOBNOB	This Report
22	BORD	This Report
23	BEAUCHAMP	This Report
24	NEVE	This Report

TOM
Hudson Bay Exploration Development Company Limited

Stratabound Silver-Lead-Zinc
105 O 1 (1)
(63°08'N,130°06'W)

Reference: Morin et al (1980, p. 72)

Claims: TOM 147-183

Source: Summary by D. Tempelman-Kluit from assessment report 090678 by R. Stroshein.

Current Work and Results:

The claims were staked in August, 1979 to cover a possible southern extension of the mineralization on the main Tom Group. The geology was mapped during 1980 and a small soil sample grid established. Strata include, (from the base up) a grey weathering silty shale, a chert pebble conglomerate, a dark grey banded argillite, a silver-grey weathering carbonaceous argillite and a brown weathering siltstone. The upper unit is correlated with the Mississippian Imperial Formation and the lower units are considered equivalents of the Canol Formation. Tom mineralization occurs at the contact between the banded argillite and the silver grey weathering argillite. Geochemical sampling across this contact failed to locate near surface mineralization.

EMERALD
AGIP Canada Limited

Copper, Molybdenum Porphyry (?)
105 O 11 (7)
(63°35'N,131°16'W)

Reference: Wheeler (1953, p. 41)

Claims: ICE 1-122; FIRE 1-28

Source: Summary by G. Abbott from assessment report 090693 by D. Bailey and G. Wells.

Description:

The claims cover a small Cretaceous stock which intrusion includes four phases: equiganular medium-grained, hornblende-biotite granodiorite, medium- to coarse-grained hornblende syenite with flow foliation, porphyritic granodiorite and aplite dikes and its margins. The stock intrudes Paleozoic (?) buff and red weathering sandstone interbedded with dark grey shale. Molybdenite and chalcopyrite bearing potash feldspar, tourmaline, biotite, quartz veins and minor massive, chalcopyrite veins cut the stock. Chalcopyrite also occurs locally as disseminations and veinlets in the intrusion.

Current Work and Results:

The ICE 1-20 claims were staked in August, 1979 and explored in 1980 with prospecting, mapping, a radiometric survey, stream sediment sampling and rock sampling. Stream sediments were analyzed for copper, molybdenum, tungsten, uranium and tin but gave no significant anomalies. The ICE 21-122 and FIRE 1-28 claims were staked in 1980.

JASON	Zinc, Lead, Silver
Pan Ocean Oil Limited;	Barite Stratabound
Mitsubishi;	105 O 1 (16)
Ventures West	(63°10'N,130°10'W)

Reference: Morin et al (1977, p. 114; 1979, p..31; 1980, p. 8)

Claims: JASON 1-4, 7-39, 41-82, 84-135, 137, 141-240; MIKE 1-10; ACE 1-33, 35-40

Source: Drill logs submitted for assessment report 090712. G. Abbott visited the property with R. Bailes and P. Hubachuck.

Current Work and Results:

Ogilvie Joint Venture drilled 10 holes totalling 2182.36 m in 1979 and 20 holes totalling 4953.31 m in 1980. Detailed geological studies, grid soil geochemistry, a gravity survey and backhoe trenching were also conducted in 1979 and 1980. In 1980, the new End Zone (locality 16c) was discovered at the west end of the property and significant intersections were encountered on the South Zone (locality 16b). Unlike the Main Zone (locality 16a), the other deposit on the property, the South and End Zones are massive sulphide deposits, rich in pyrite and poor in barite. Both are vertical, trend northwest, and occur in black graphitic argillite near the base of the "Canol Formation". This is a lower stratigraphic horizon than the Main Horizon Zone or the nearby Tom West Zone of Hudson Bay Mining. The size of both deposits is still uncertain.

WALT	Barite
Baroid of Canada Ltd.	Stratabound
	105 O 7, 8 (18)
	(63°17'N,130°33'W)

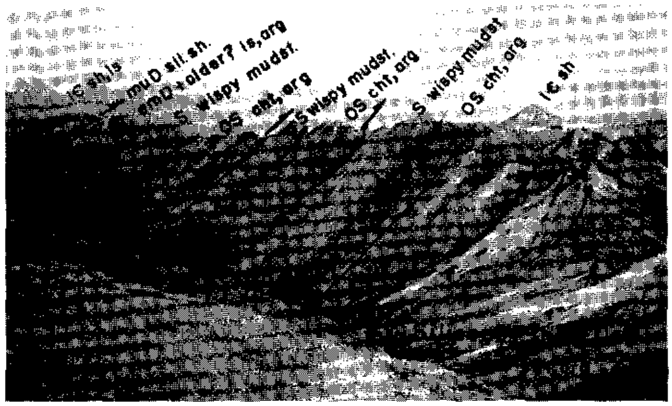
References: Gordey, G.S.C. Open File 689; Cecile, G.S.C. Open File 765.

Claims: CATHY 1-10; ROW 1-57

Source: G. Abbott visited the property and was guided by Dan Turner and Ray Dickerson of Baroid.

Description:

Several 1 to 30 m thick lenses of massive to thinly laminated, shaly barite are known on the property. The barite occurs within a 75 to 100 m thick sequence of blue-grey chert, cherty argillite, graphitic slate and minor limestone and chert conglomerate. These rocks are probably Middle and Upper Devonian and equivalent to Gordey's "Siliceous Shale" unit (muDpt). The barite

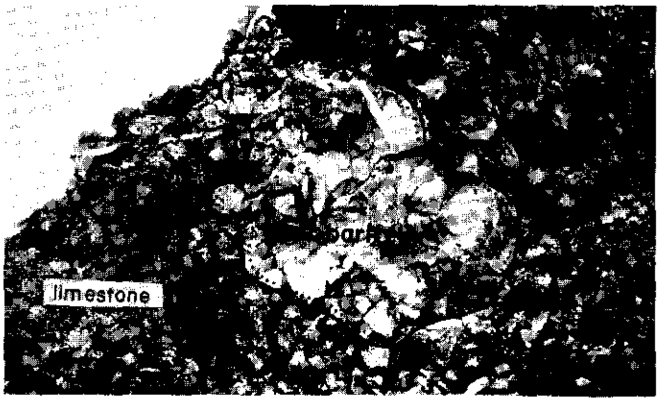


View east across Cathy Property showing southerly directed thrust fault, that interleave the siliceous shale unit, the Road River Formation and Lower Cambrian (?) strata.

View west across Cathy Property showing the main barite zone with over 450,000 tonnes of barite proven. Barite bearing limestone occurs at the top of the ridge above camp.

lenses occur enechelon and may be a single horizon disrupted by faults. Most barite is interbedded with cherty argillite, although a thin lens of conglomerate, comprised of angular cherty argillite fragments, occurs a short distance beneath barite at the eastern end of the property and some barite is associated with a lens of medium-grey and pinkish weathering massive limestone about 200 m long and up to 30 m thick. Much of the limestone occurs as breccia fragments within a limestone matrix. Barite occurs locally within the limestone matrix and in a discontinuous overlying horizon up to 2 m thick. Contacts between the limestone and barite are sharp.

The Siliceous Shale Unit is interleaved along a series of moderately dipping, southerly directed thrust faults with older and sedimentary rocks that include the Ordovician, Silurian and Devonian Road River Formation and Lower Cambrian and/or Ordovician strata. These rocks can be tentatively correlated with map -units described by Gordey and Cecile.



Massive irregular lens of barite within limestone breccia. The limestone is also shown in the previous figure.

The oldest exposed rocks are recessive buff and maroon weathering shale that belongs to the upper part of the "Grit Unit" (H1Єp). It is overlain by recessive, dull brown weathering, thinly laminated to thinly bedded greenish-grey and dark grey shale and minor buff weathering, thin-bedded grey limestone and grey weathering limestone conglomerate (lmЄp). Similar rocks described by Gordey are lower Cambrian and are facies equivalents of the Sekwi Formation. However, no fossils have been found locally within the unit and they may be as young as Ordovician.

The Road River Formation includes three subdivisions, each less than 50 m thick. The lower member (OSt) is mainly chert. Thick-bedded, brown weathering chert comprises the lower half of the member and silver-blue weathering, thin-bedded chert, cherty argillite and siliceous shale comprise the upper half. The middle member consists of resistant, orange-brown weathering wispy laminated mudstone (Sp) and the upper member includes minor dark grey to blue grey, thin-bedded chert and siliceous shale at the base and grades upward into tan and grey weathering thin-bedded earthy grey calcareous argillite and argillaceous limestone (SlDl). Elsewhere, the lower member ranges from Lower Ordovician to Early Silurian, the orange mudstone is Middle and Upper Silurian and the upper member gives ages as young as Early Devonian.

In one thrust slice Early to Early Middle Devonian conodonts were obtained from thin beds of light-grey limestone interbedded with dark-grey siliceous shale. These rocks were not distinguished from the Road River Formation in the field but may be equivalents of the Natla Formation (Cecile) or Grizzly Bear Formation (Gordey). The fossiliferous rocks are overlain by thin-bedded dark-grey siliceous shale and chert, probably equivalent to the "siliceous shale unit", although no barite was seen within them at this locality.

Rocks younger than the Siliceous Shale Unit do not occur locally but are probably the thick sequences of siltstone sandstone gritty chert pebble conglomerate and graphitic argillite that host the Tom and Jason stratabound lead-zinc-silver barite deposits.

Current Work and Results:

Baroid explored the property in 1980 with mapping and diamond drilling. Ten holes totalling 899.0 m were drilled within the Main Zone. This zone is up to 30 m thick and at least 150 m long. More than 450,000 tonnes of material with a specific gravity above 4.25 were outlined.

BEAUCHAMP — Molybdenum Vein
AGIP Canada Limited — 105 O 10 (23)
(63°37'N,130°54'W)

Claims: GOAT 1-4

Source: Summary by G. Abbott from assessment report 090694 by D. Beauchamp.

Current Work and Results:

The GOAT claims, staked in August, 1980, straddle the contact between Paleozoic argillite and quartzite and a small Cretaceous quartz monzonite stock. Minor pyrite and molybdenite occur within quartz-feldspar veins in the intrusion. Veins vary from 5 cm to 50 cm in width and strike 0° and dip 40°W or strike 110° and dip 30°S.

NEVE — Unmineralized Target
AGIP Canada Limited — 105 O 7 (24)
(63°18'N,130°55'W)

Claims: NEVE 1-16

Source: Summary by G. Abbott from assessment report 090706 by D. Beauchamp.

Current Work and Results:

The NEVE claims were staked in September, 1979 and explored in 1980 with mapping, prospecting and stream sediment geochemistry. The claims are underlain by interbedded grey carbonate, sandstone, black shale and chert pebble conglomerate of probable Middle and Upper Devonian age. Silt samples were taken at 200 m intervals from creeks draining the property and were analyzed for lead, zinc, copper, silver and barium. A few high zinc values up to 800 ppm and barium values up to 40,000 ppm were obtained but most values were low.

1980 MINERAL CLAIMS STAKED

TOM — 105 O 2 (1)
Hudson Bay Mining — (63°10'N,130°09'W)

Claims 1980: TS (29)

NIDD — 105 O 2 (20)
Cominco — (63°10'N,130°21'W)

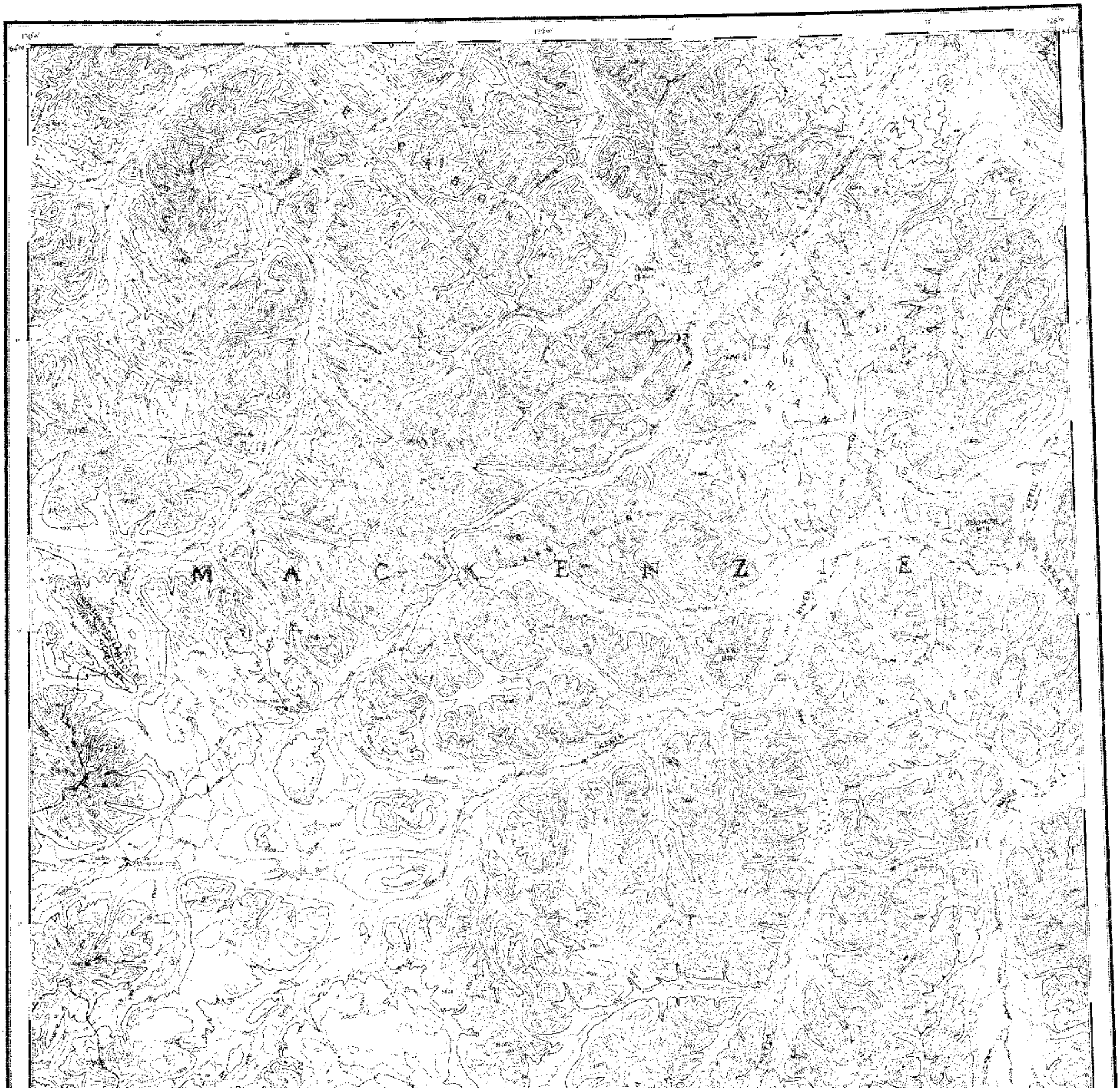
Claims 1980: NIDD (60)
Additional staking on same property.

BOBNOB — 105 O 12 (21)
Archer Cathro and Associates — (63°37'N,131°49'W)

Claims 1980: BOBNOB (24)

BORD — 105 O 8 (22)
Kelvin Energy — (63°21'N,130°04'W)

Claims 1980: BORD (30)

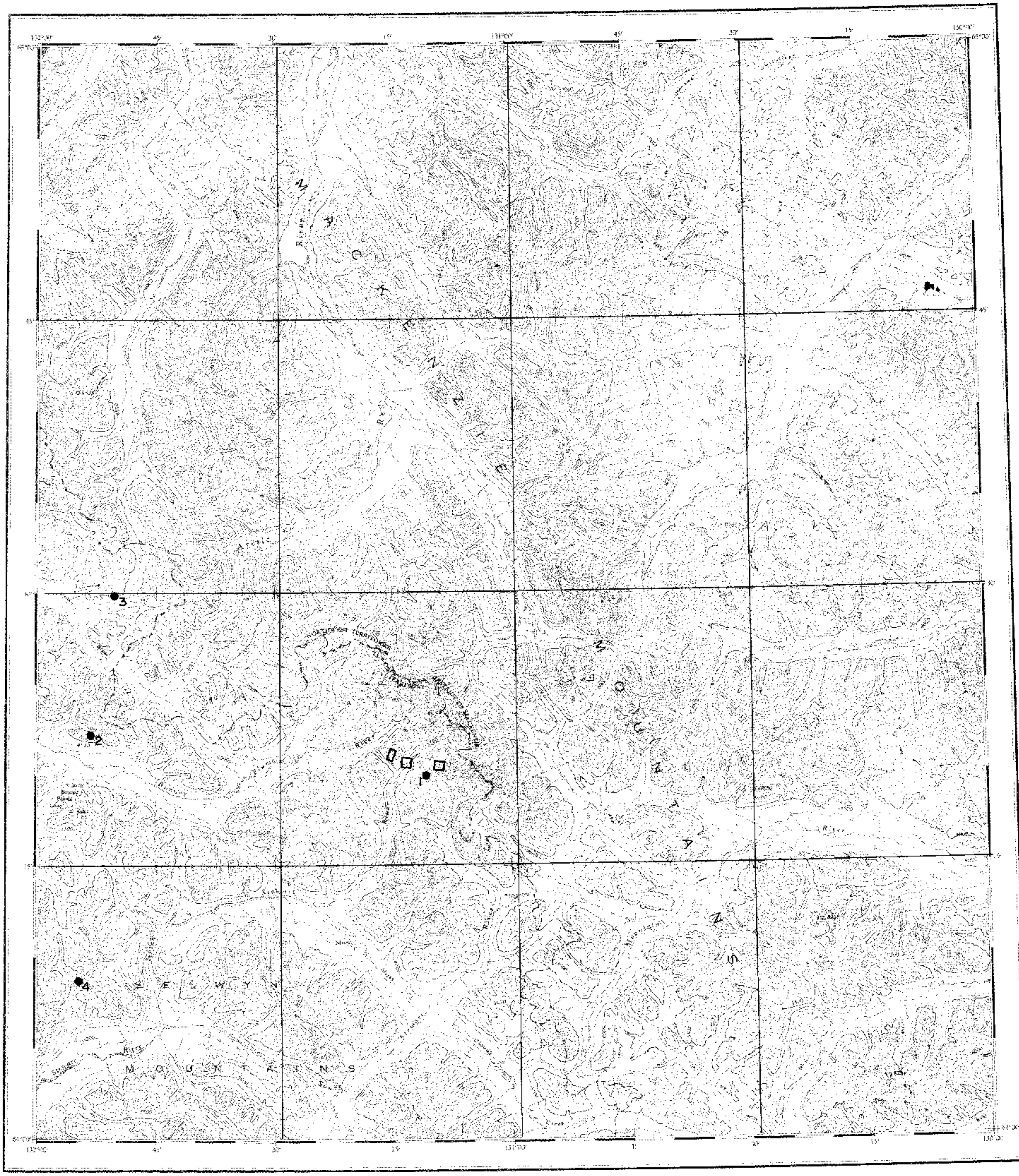


SEKWI MOUNTAIN

NORTHWEST TERRITORIES - YUKON TERRITORY

SEKWI MOUNTAIN MAP-AREA (NTS 105 P)

NO.	PROPERTY NAME	REFERENCE
1	MEHITABEL	Skarn Copper-Tungsten-Molybdenum



BONNET PLUME LAKE

YUKON – NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

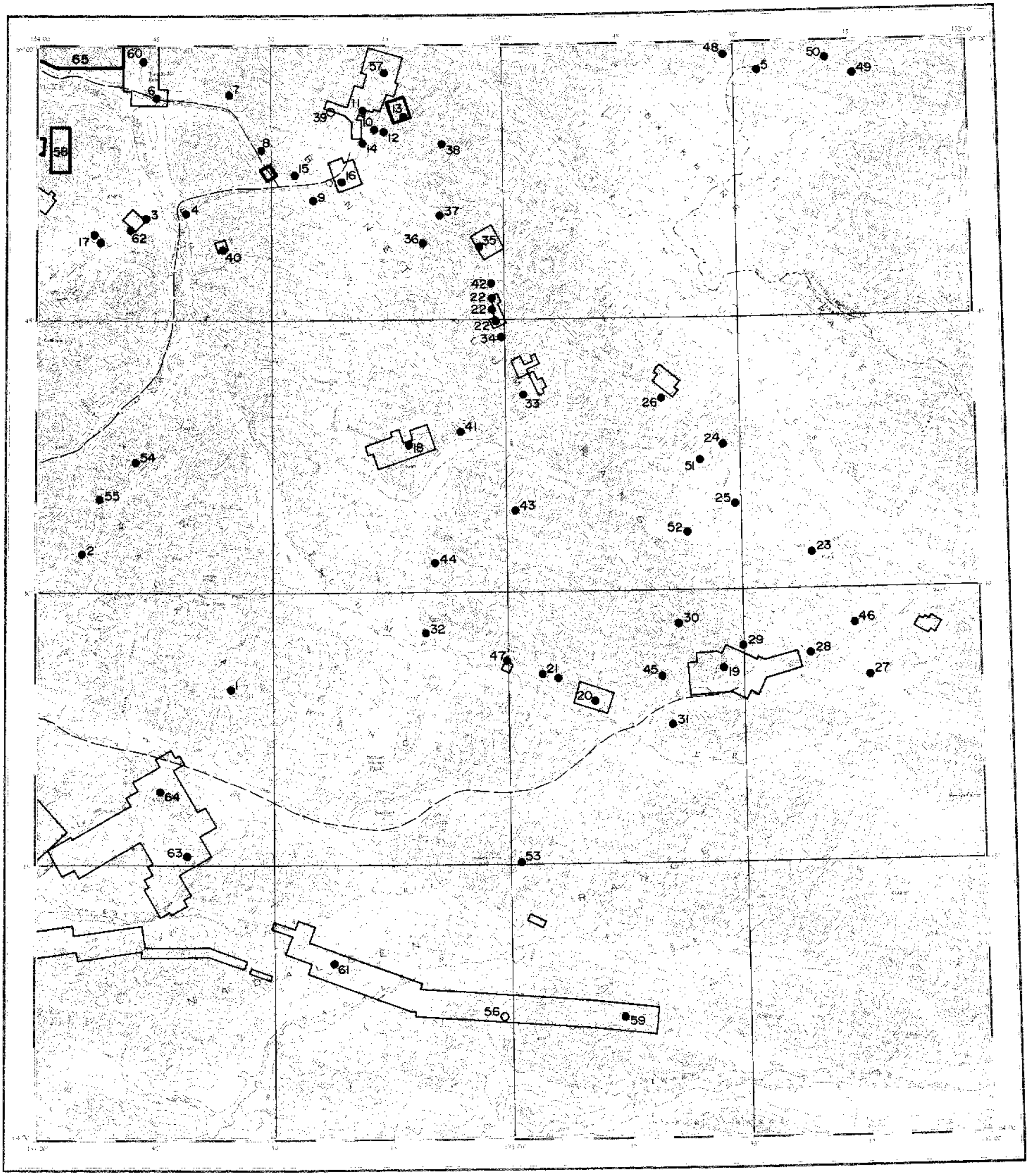
.... Driveable Road

.... Oil or Gas Well

.... Airstrip

BONNET PLUME LAKE MAP-AREA (NTS 106 B)

NO.	PROPERTY NAME	REFERENCE
1	ECONOMIC	MIR, 1974, p. 19
2	ANDY	G.S.C., Pap. 75-1A, pp. 240-241
3	NECO	Zinc-Lead Vein
4	BIRKELAND	Lead-Zinc



NADALEEN RIVER

YUKON TERRITORY – NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

◇ .... Oil or Gas Well

.... Airstrip

NADALEEN RIVER MAP-AREA (NTS 106 C)

NO.	PROPERTY NAME	REFERENCE
1	KOHSE	Copper Occurrence
2	SALUTATION	Copper-Cobalt Vein
3	GILLESPIE	Lead-Zinc Vein
4	GEORDIE	Lead-Zinc-Silver Occurrence
5	GILDERSLEEVE	G.S.C., Pap. 75-1A, p. 241
6	FAIRCHILD	This Report
7	BIBBER	Copper Vein
8	DOLORES	Copper-Silver-Cobalt Vein
9	KEY MOUNTAIN	Copper Vein, This Report
10	MAMMOTH	G.S.C., Pap. 69-55, pp. 16-17
11	CIRQUE	Copper-Cobalt-Silver Vein
12	PORPHYRY	G.S.C., Pap. 69-55, pp. 16-17
13	TETRAHEDRITE CREEK	Skarn Copper-Silver, This Report
14	AIRSTRIP	Copper
15	VULCAN	This Report
16	DOBBY	Copper Occurrence
17	KIDNEY	Copper Vein
18	CORN CREEK	MIR, 1974, pp. 52-54
19	GOZ CREEK	MIR, 1974, pp. 23-24
20	HARRISON	MIR, 1974, pp. 41-42
21	MUELLER	MIR, 1974, pp. 42-43
22	COB	MIR, 1973, p. 59
23	ZOG	Zinc Occurrence
24	GOODMAN	MIR, 1974, pp. 64-65
25	NEST	MIR, 1974, pp. 33-35
26	TOPOROWSKI	Zinc-Lead Stratabound
27	ANGLO	MIR, 1974, pp. 38, 40
28	GUS	MIR, 1974, pp. 36-39
29	GENTRY	MIR, 1974, pp. 24-28
30	CADET	MIR, 1974, pp. 29, 46
31	LOG	MIR, 1974, p. 34
32	MOUSE	MIR, 1974, pp. 40-41, 49-50
33	FRIGSTAD	MIR, 1974, pp. 55-57
34	SPECTROAIR	MIR, 1974, pp. 58-59
35	PROFEIT	MIR, 1974, pp. 60-61
36	POO	Lead-Zinc Vein
37	CARNE	MIR, 1974, pp. 61-62
38	DAN	MIR, 1974, p. 61
39	DOWSER	MIR, 1974, p. 63
40	LEARY	Zinc-Lead-Copper Vein
41	CANWEX	MIR, 1974, pp. 56-57
42	COAST	MIR, 1974, p. 60
43	BOB	Lead-Zinc Occurrence
44	BRENDON	MIR, 1974, p. 51
45	GAL	MIR, 1974, pp. 30-31
46	ENVOY	MIR, 1974, pp. 37, 39
47	TAPIN	MIR, 1974, p. 58
48	CAB	MIR, 1974, p. 65
49	BAK	Zinc-Lead Stratabound
50	MOGUL	MIR, 1974, p. 66
51	DUNE	Zinc-Lead Vein
52	SNAKE	Lead-Zinc Stratabound
53	McKELVIE	Zinc-Lead-Barium Vein
54	MARSHALL	Copper Occurrence
55	ALGAE	Copper Occurrence
56	LEAH	This Report
57	RAM	This Report
58	LFV	This Report
59	SIAN	This Report
60	OTTER	This Report
61	CRAIG	This Report
62	TOW	This Report
63	VAL	This Report
64	VERA	This Report
65	ELGEA	This Report

FAIRCHILD
Energex Minerals
Limited Mines Ltd.

Uranium, Copper
Breccia
106 C 13 (6)
(64°57'N,133°45'W)

References: Delaney (1978); Morin et al (1980, p. 11-12)

Claims: FAIRCHILD 1-8, 10-11, 13-34

Source: Summary by R. Debicki from assessment report 090596 by D. A. Yeager and C. K. Ikona.

Current Work and Results:

Ground radiometric measurements were used in 1979 to identify trenching targets. Several sites were identified, but only two, approximately 15 m apart, were trenched. The best grab sample from the trenches contains 0.072% U_3O_8. The mineralization consists of small, patchy zones of feldspathic, hematitic and uraniferous alteration in calcareous siltstone.

VULCAN
Pamicon Developments
Limited;
Pan Ocean Oils Limited;
Mountaineer

Uranium, Copper
Breccia
106 C 14 (15)
(64°53'N,133°20'W)

References: Norris (1975); Bell and Delaney (1977); Laznicka and Edwards (1979); Morin et al (1979, p. 41; 1980, p. 13)

Claims: ELK 23-90

Source: Summary by R. Debicki from assessment report 090585 by D. A. Yeager and C. K. Ikona.

Description:

The claims were staked in November, 1976 to cover a favourable uranium target. During 1977, reconnaissance geological and water geochemical surveys were done, and the claims were prospected. Additional geological and water and soil geochemical surveys were done in 1978.

Current Work and Results:

Spectrometer and VLF electromagnetic surveys were carried out over part of the claim group in 1979. The surveys were done to assess their usefulness in evaluating overburden-covered areas. Two anomalies were identified by the spectrometer survey; one may reflect a buried breccia.

Geological mapping and trenching were done during 1980.

LEAH	Unmineralized
Northair Mines Limited	Target
	106 C 2,3 (56)
	(64°06'N,133°00'W)

Reference: Morin et al (1979, p. 35-36)

Claims: LEAH 1-176, 175 A, 176 A, 177-206

Source: Summary by R. Debicki from assessment report 090520 by G. E. White.

Current Work and Results:

The claims are held by Newhawk Gold Mines Limited (formerly Highhawk Mines Limited), Tenajon Silver Incorporated (formerly Envoy Resources Limited), Hecate Gold Corporation and Suneva Resources (formerly Bow River Resources).

A reconnaissance MAX-MIN electromagnetic survey was carried out in 1979 on behalf of Northair Mines Limited. The survey was done along lines 200 m apart, over a number of strong lead-zinc-silver soil geochemical anomalies identified by a 1977 survey. Several strong conductors were identified. Some suggest conductive lithologies such as graphitic shale, others correlate to the geochemical anomalies.

RAM	Uranium, Copper
Pamicon Developments	Breccia
Limited	106 C 14 (57)
Pan Ocean Oil Limited;	(64°53'N,133°20'W)
Mountaineer Mines Limited	

References: Bell and Delaney (1977); Laznicka and Edwards (1979); Morin et al (1979, p. 41; 1980, p. 13)

Claims: RAM 1-48

Source: Summary by R. Debicki from assessment report 090589 by D. A. Yeager and C. K. Ikona.

Current Work and Results:

Ground radiometric and VLF electromagnetic surveys were carried out in 1979 to evaluate the possible extensions of the Main Zone mineralization, associated with a north-south trending shear zone. Possible extensions of the mineralization are covered by overburden. The surveys outline one known breccia and identify another possible breccia under overburden.

The trench on the Main Zone was enlarged and sampled. The mineralization associated with the north trending shear zone may be related to a second fracture system, and in particular to the intersections of the two systems. A continuous chip sample of 1.5 m along the bottom of the trench contains 0.193% U_3O_8.

SIAN	Silver, Lead, Zinc
Canadian Superior	Veins
Exploration Limited	106 C 2 (59)
	(64°07'N,132°45'W)

Reference: Morin et al (1979, p. 36)

Claims: SIAN

Source: Summary by D. Tempelman-Kluit from assessment report 090613 by R. G. Potter and report 090697 by S. C. Jones.

Current Work and Results:

In 1979, the known showings on the property were evaluated by mapping, sampling and trenching. The A and B showings have sphalerite disseminated in a silicified zone within dolomite. An assay for a 2.6 m section of a trench returned 0.42% lead, 2.78% zinc and trace silver. Similar mineralization of roughly the same grade occurs at the Bluff and C showings also on the property. The mineralization is similar to that at the CRAIG.

During 1980, one 240 m deep hole was drilled on the claims, but no significant mineralization was in the section and no further work is anticipated.

OTTER	Cobalt, Nickel,
Pan Ocean Oil Limited	Arsenide Veins
	106 C 13 (60)
	(64°59'N,133°47'W)

Reference: Morin (1980, p. 11)

Claims: OTTER 1-24

Source: Summary by D. Tempelman-Kluit from assessment report 090621 by J. Touborg.

Current Work and Results:

During 1979 the showings discovered earlier were mapped and sampled extensively and 603 m of HQ drilling was completed in four holes. A number of veins are known for 4 km along a north-northwest trending shear zone and the veins are concentrated in three clusters, the Otter Main Showings, and the Otter North A and B, further to the north. Veins within the clusters are named individually. They trend generally northeast and dip northwest and contain cobaltite, chalcopyrite, pyrite and arsenopyrite in a carbonate gangue. The country rocks between the veins contain disseminated fine-grained sulphides, mainly pyrite with less arsenopyrite and chalcopyrite. The veins can be traced for as much as 30 m and are up to 5 m wide. One fairly typical vein intersected in drilling grades 0.64% cobalt and 1.05% copper over 3 m and a 9 m drill intersection of the vein with the disseminated zone on both sides grades 0.24% cobalt and 0.53% copper.

CRAIG
Canadian Superior
Exploration Limited

Silver, Lead, Zinc
Veins
106 C 3,4 (61)
(64°09'N,133°20'W)

Reference: Marchand et al (1978, p. 37)

Claims: CRAIG

Source: Summary by D. Tempelman-Kluit based on property visit.

Introduction

The CRAIG group of 696 claims was staked in July, 1976 to cover several lead-zinc-silver showings and contiguous favourable strata. The claims are in the Wernecke Mountains between Nadaleen and East Rackla Rivers, 140 km northeast of Mayo. The writer visited the property during August, 1980 and was guided on the most significant showings by Shelly James, geologist, and Mike Jerema, prospector for Canadian Superior. At the time of this visit, drilling was continuing from a main camp on East Rackla River. The writer mapped part of the property during his visit. The property's earlier history is described by Marchand et al, 1978, p. 37).

Geology

Exposures are excellent and geological relations well displayed. The area is mountainous with moderate relief (about 1000 m). Peaks are rugged and separated by comparatively wide valleys.

The claims cover an important east trending fault, originally mapped and named the Dawson Thrust by Blusson (1974, 1978) and traced for 450 km into adjacent Nash Creek, Larsen Creek and Dawson (Green, 1972) map-areas. He considered that this fault carried Late Proterozoic strata of the "Grit Unit" northward over Early Paleozoic carbonate rocks and shale and that mineralization, localized in the hanging wall, was derived from shale in the footwall. This early interpretation needs modification.

The "Dawson Thrust" is a near vertical fault zone 3 or 4 km wide where mapped by the writer. It exposes serpentinized and quartz carbonate altered ultramafic rocks with basic volcanics, shale, limestone, chert and dolomite in a series of fault bounded lenses generally 1 or 2 km long and several hundred metres wide, which are arranged en echelon within the fault zone. The fault zone has indistinct boundaries; the degree of disruption decreases away from central parts of the fault zone. North of the fault zone is a gently north dipping succession of light grey dolomite interbedded with chert pebble conglomerate and minor dark grey slate. Near the fault this homocline is broken by faults and the strata deformed in tight folds. South of the fault is a moderately south dipping succession of greenish shale with interbedded limestone and other rocks. The ultramafic and volcanic rocks are confined to the disrupted zone, but the shale, limestone and chert within the fault zone are part of the southern panel and the dolomite belongs with strata north of it.

South of the fault zone are brown weathering moderately recessive, thin-bedded shale and argillite (Csg). Much of this unit is a dark olive green colour, but parts are grey. Locally, the shale is siliceous

Figure 1

View southward diagonally across the "Dawson Thrust". In the foreground are Paleozoic carbonate strata; the serpentinite, greenish shale and carbonate are in the distance. The west or Kill Zone showing is on the ridge at right.

and grades to grey chert and the green shale is interbedded with and laterally gradational to red shale. The red shale (Csr) occurs as zones up to 50 m thick within the greenish shale unit. It has a distinctive bright red colour on fresh surfaces and produces a dark wine red talus visible from afar. The red shale is distinguished on the map where thick enough, but thin beds are included in the greenish shale unit. A resistant platy to medium-bedded grey micritic limestone (Cls) with interbedded yellowish weathering fine-grained dolomite occurs in the greenish shale as members about 100 or 200 m thick. Though relatively thin and volumetrically minor the limestone and the shale are distinctive and prominent units that relieve the homogeneity of the greenish shale. Resistant weathering, medium to dark grey thick-bedded to massive sandstone (Css) is found as members up to 50 m thick within the greenish shale. Grain size varies from medium sand to granule (1 cm across) conglomerate with moderate rounding and sphericity and poor size sorting. Most grains (90%) are of clear and white monocrystalline quartz, but some red siliceous slate or jasper granules (up to 8%) and others of dark grey slate are also found. Medium grey thin-bedded or ribbon chert (Cch) occurs locally within the greenish shale as members several metres thick. The chert grades laterally to siliceous shale and greenish shale.

The base and top of the greenish shale succession is not seen. If this unit lies on the ultramafic and volcanic rocks with a structurally modified depositional contact and if this unit is not repeated internally at least 1500 m of these strata must be present. The several limestones, red shales and sandstone beds in the green shale unit most likely represent structurally repeated members of a succession that includes only one or two of each of these units. Further study will define the internal succession and thickness of the greenish shale and its several distinctive horizons.

The serpentinite of the fault zone (OSub)is a massive, medium green, dark green or black rock. Parts are resistant and weather a deep brown colour, other parts are recessive and produce characteristic shiny dark green talus. The serpentinite is made up entirely of serpentine group minerals and magnetite. Its ultramafic parent is not seen. Serpentinite locally has veins with large books of clinochlore; cross-vein asbestos was seen at several places. The serpentinite grades to deep brownish orange weathering "quartz carbonate rock" (OSqc). In places this is mapped separately, elsewhere it is not distinguished from the serpentinite. Quartz carbonate rock is resistant and made up of coarsely crystalline ankerite and/or ferrodolomite with irregular veinlets of quartz. The basaltic volcanic rock (OSv) is a massive, medium green chloritized and saussuritized rock locally with pillow-like structures and common calcite filled amygdules.

Strata north of the fault zone are thick-bedded white weathering resistant, coarsely crystalline dolomite (ODc) with interbedded black shale (Dsl) and chert conglomerate (Dcg). The chert conglomerate forms beds up to 30 m thick that grade laterally and across bedding into the dolomite. The conglomerate contains rounded ellipsoidal grey, buff and red chert grains that range from coarse sand to pebbles several centimeters across. The rock has a dolomite cement and the proportion of cement to clasts varies so that the rocks range from dolomite with minor detrital chert to chert conglomerate with carbonate cement.

Depositional Relations and Age:

The carbonate strata north of the fault zone contain crinoids and other fossils and are considered Paleozoic, probably Ordovician to Devonian. The dark shale and conglomerate intertongued with the carbonate is of like age. The carbonate strata are correlated with Early Paleozoic dolomite of the Mackenzie Mountains.

Serpentinite, quartz carbonate rock and basalt are intimately associated within individual fault slices and are assumed to be genetically related. They are speculatively assigned to the Ordovician and Silurian because they resemble parts of Green's (1972) unit 4 which is that age. The volcanic and ultramafic rocks are also correlated with Cecile's (in press) Marmot Formation and with Cambro-Ordovician basalt in the Pelly Mountains.

The greenish shale with interbedded limestone and minor quartz sandstone and chert is most likely Paleozoic. Strata that are lithologically similar, which are Mississippian occur in the Pelly Mountains and in the northern Anvil Range. Agglutinated foraminifera were recovered from a limestone in the greenish shale unit by M. Orchard of the Geological Survey of Canada. He considers these long ranging forms indicate the limestone is Silurian or younger and on this basis a late Paleozoic age is possible for the shale. The greenish shale unit may also be Silurian or Devonian and roughly equivalent to the Road River Group. The unit can be traced westward about 300 km to Dawson map-area. Green (1972) included the rocks in his map-unit 3, a Proterozoic formation.

The carbonate rocks are separated from the shale and volcanic rocks by a fault and the depositional relations are masked. The volcanic and ultramafic rocks are structurally mixed with the greenish shale and the first are considered the substrate on which the latter were deposited. Depositional relations are not preserved.

LEGEND

SOUTH OF DAWSON "THRUST"

PALEOZOIC?

Pd Resistant light grey massive silicified dolomite.

PALEOZOIC (POSSIBLY CARBONIFEROUS)

Csg Brown weathering, moderately recessive, thin-bedded dark olive green and grey shale and argillite.

Csr Red weathering, moderately recessive, thin-bedded red shale: laterally gradational to Csg.

Cls Resistant, thin-bedded to platy light grey and yellowish weathering limestone.

Css Medium-to thick-bedded resistant dark grey sandstone and grit with granules of quartz, slate and jasper.

Cch Medium grey, thin-bedded, light grey-green chert: laterally gradational to Csg.

ORDOVICIAN AND SILURIAN

OSv Resistant, dark green, massive basaltic volcanic rocks.

OSqc Resistant, massive, orange weathering quartz carbonate rock, an alteration of OSub.

OSub Moderately recessive green to black serpentinized alpine peridotite.

NORTH OF DAWSON "THRUST"

ORDOVICIAN TO DEVONIAN

ODc Resistant, thick-bedded, white weathering carbonate rocks, mostly dolomite.

ODd Resistant, thick-bedded, white dolomite: a member of ODc.

Dsl Thin-bedded black slate.

Dcg Resistant, thick-bedded chert granule conglomerate and grit with limestone matrix: laterally gradational to ODd.

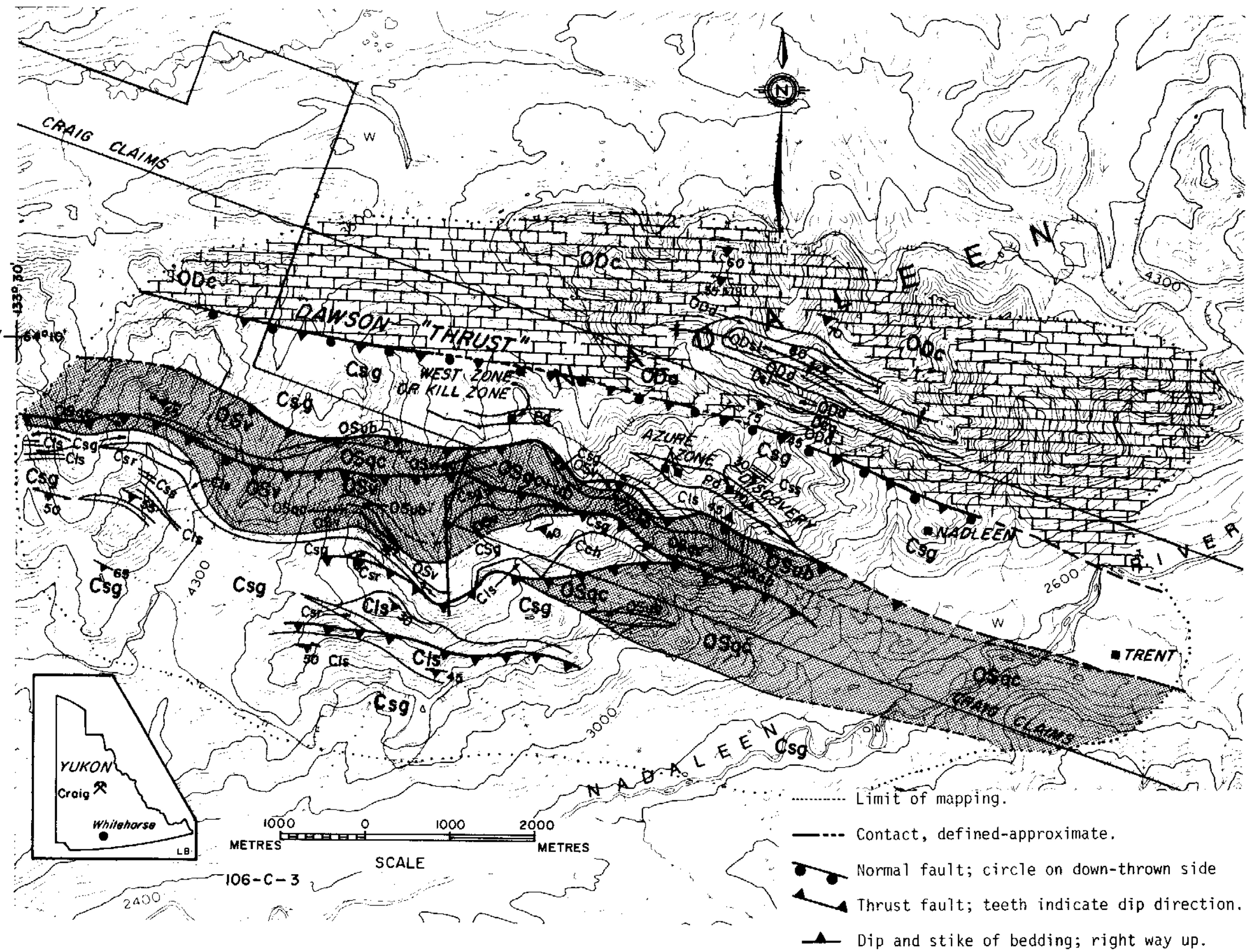


Figure 2

Geological sketch map of the CRAIG property (NTS 106 C)

Structural Geology:

Small scale slip surfaces and planar fabrics are developed pervasively within the fault zone regardless of rock type. The volcanic rocks are commonly cut by a spaced cleavage, but the serpentinite and quartz carbonate has irregular slip surfaces. The cleavage and slip surfaces generally dip steeply and are aligned roughly along the fault zone. On a small scale they have the same branching en echelon pattern exhibited by the faults on the map scale.

The greenish slate unit with its limestone and red slate south of the faults locally has a steep dipping, spaced cleavage at moderate angles to bedding. North of the fault zone the carbonate rocks lack minor structures.

A cross-section of the "Dawson Thrust" shows that this feature is a steep dipping fault zone with different strata dipping away on either side. The fault is not a single surface, but a series of interconnected slip faces spread over several kilometers. Ultramafic and volcanic rocks, interpreted as basement to the greenish slate unit, are in the fault zone and interleaved with the greenish slate. The southern side of the zone exposes the younger strata and is dropped relative to the northern side so that the fault is not a thrust. The "Dawson Thrust" lies at an important facies boundary and separates Early Paleozoic and older carbonate and other platform strata on the north from Paleozoic volcanic and ultramafic rocks and shale on the south. The fault zone is a hinge line and has controlled facies during the Early Paleozoic.

Mineralization:

Several showings of coarsely crystalline sphalerite and galena, in quartz stockworks enclosed by dolomite, are known at places on the Craig claims. Three of these showings were visited. At the Trent showings reddish brown sphalerite is sparsely and erratically distributed in an irregular shaped silicified zone of quartz fractures, up to a cm across, that is exposed on a small knoll perhaps 30 m across. The shape of the silicified zone has no apparent control such as a through-going fault.

At the Discovery showing a vertical northwest trending silicified zone up to 5 m wide can be traced discontinuously for about 100 m on a steep hillside. Coarsely crystalline galena and minor sphalerite are sporadically and irregularly distributed in the silicified zone. Drilling indicates that the zone has little chance of downward continuity beyond depths of 30 or 40 m (R. V. Beavon pers. comm., 1980). The silicified zone has poorly defined gradational boundaries with the dolomite. Locally silicification extends well into the wall rocks and minor galena-sphalerite can be found sporadically as much as 20 m from the main silicified zone. The silicified zone trends along the "Dawson Thrust" and is probably controlled by a fracture related to this regional fault system.

The West Zone (Figure 1), recognized at a distance by a "kill zone" of poor vegetation, is the most spectacular showing on the property. It is a lens of massive to nearly massive, coarsely crystalline galena with less sphalerite and minor tetrahedrite. The exposed part is roughly circular in plan and perhaps 7 m across. Several other less spectacular occurrences are known over a horizontal distance of 350 m and relief of 80 m. All occurrences are within a near vertical northwest trending silicified zone enclosed by a 150 m wide, 1 km long dolomite lens that trends northwest. The control on mineralization within the silicified zone is obscure and seems entirely erratic as does the localization and degree of silicification within the dolomite. The mineralization contains minor silver values according to company geologist R.V. Beavon although high lead-zinc assays can be obtained over fair widths.

In the three showings mineralization and silicification are closely associated and both are considered expressions of the mineralizing event. The mineralization was probably emplaced during the faulting and hydrothermally mobilized from a concentrated or disseminated source.

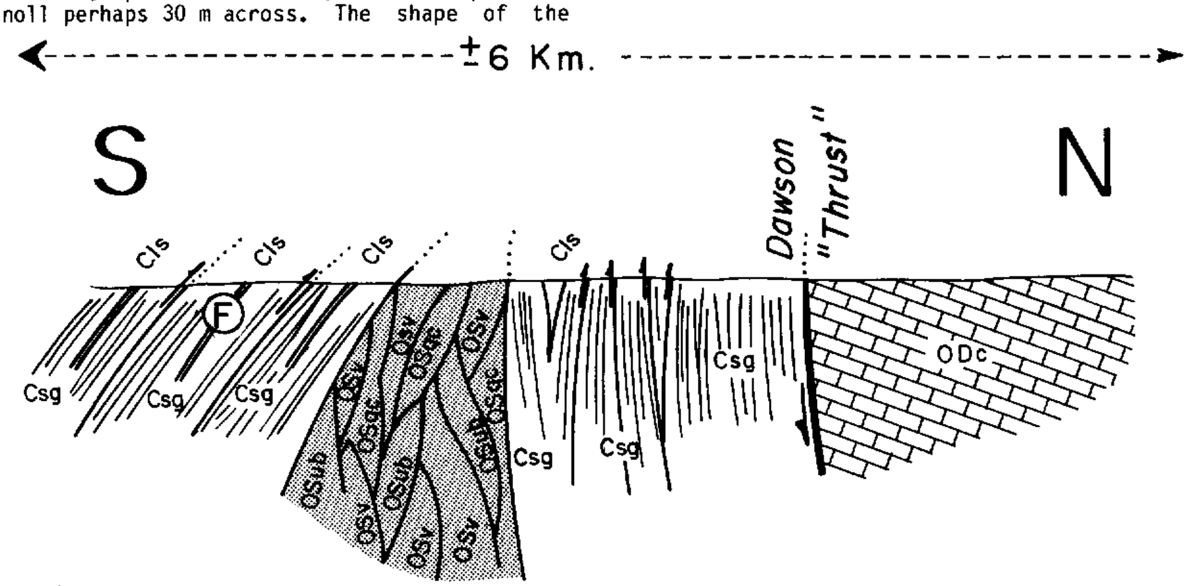


Figure 3

Schematic cross-section across the area of Figure 2 to show the probable relations of strata on the Craig property. The section is not to scale.

Regional Implications:

The "Dawson Thrust" can be traced west-northwestward to near Dawson and relations across it are essentially the same along its length. Ultramafic and volcanic rocks in the fault zone are interpreted as new crust extruded within an Early Paleozoic intracontinental rift whose northern boundary was the "Dawson Thrust". The southern boundary of this postulated rift may be the fault mapped by Roddick and Green (1962) and shown in Figure 4. On the northwest this structure is overlapped by the Robert Service Thrust, a Laramide Fault that obscures the normal movement. Further to the south the northern edge of Cassiar Platform, also considered to be fault controlled (Tempelman-Kluit, 1980), (Figure 4) may be a related structure.

Figure 5 is a set of hypothetical cross-sections that shows the possible development of the rift at the thinned Late Proterozoic continent edge. Figure 5-a portrays Proterozoic strata on the north deposited as a continental platform on thick continental crust. Equivalent continental terrace deposits, the "Grit Unit", were deposited on the slope to the south. During Ordovician and Silurian rifting the continental slope was isolated from the shelf and platform and new oceanic crust generated in the opening rift. At the same time the continental slope was faulted from the oceanic floor still farther south, but no new material was extruded here. The continental slope formed a southern step-like margin to the rift zone. Later in the Paleozoic the rift became inactive and filled with clastic sediment, but there is evidence of reactivation by faulting (Gordey, 1978) and felsic volcanism within part of the rift (Tempelman-Kluit, 1977) during the Mississippian. The Late Paleozoic sedimentary fill was also laid across the southern step of the rift and across part of Cassiar Platform. In the Mesozoic, strata continued to accumulate within and on the south step of the rift. During the Laramide strata deposited in the rift were thrust northward, imbricated and folded to their present geometry. Parts of the southern step were thrust northward over strata within the rift (Robert Service Thrust).

The rift zone is an aulacogen (Hoffman et al, 1974) initiated about the Ordovician and active during the Paleozoic. It influenced sedimentation through Paleozoic and Mesozoic time. The aulacogen may be related to breaking up of the western margin of North America about the Mississippian (Tempelman-Kluit, 1979). The aulacogen is comparable in size to the southern Oklahoma aulacogen. Hoffman et al (1974) define three stages in aulacogen evolution. Initial graben formation is followed by broad downwarping and culminates in post-geosynclinal compression. Figure 5 schematically shows these three stages for the present rift.

On the west the aulacogen is truncated obliquely by the Tintina Fault. It's offset continuation in Alaska southwest of Tintina Fault may be near Livengood where the Ordovician-Silurian fossil Creek volcanics interfinger with the Livengood Dome Chert forming the lower part of the rift fill (Chapman et al, 1980). Eastward the rift terminates in the Mackenzie Mountains and Early Paleozoic platform strata continue around its

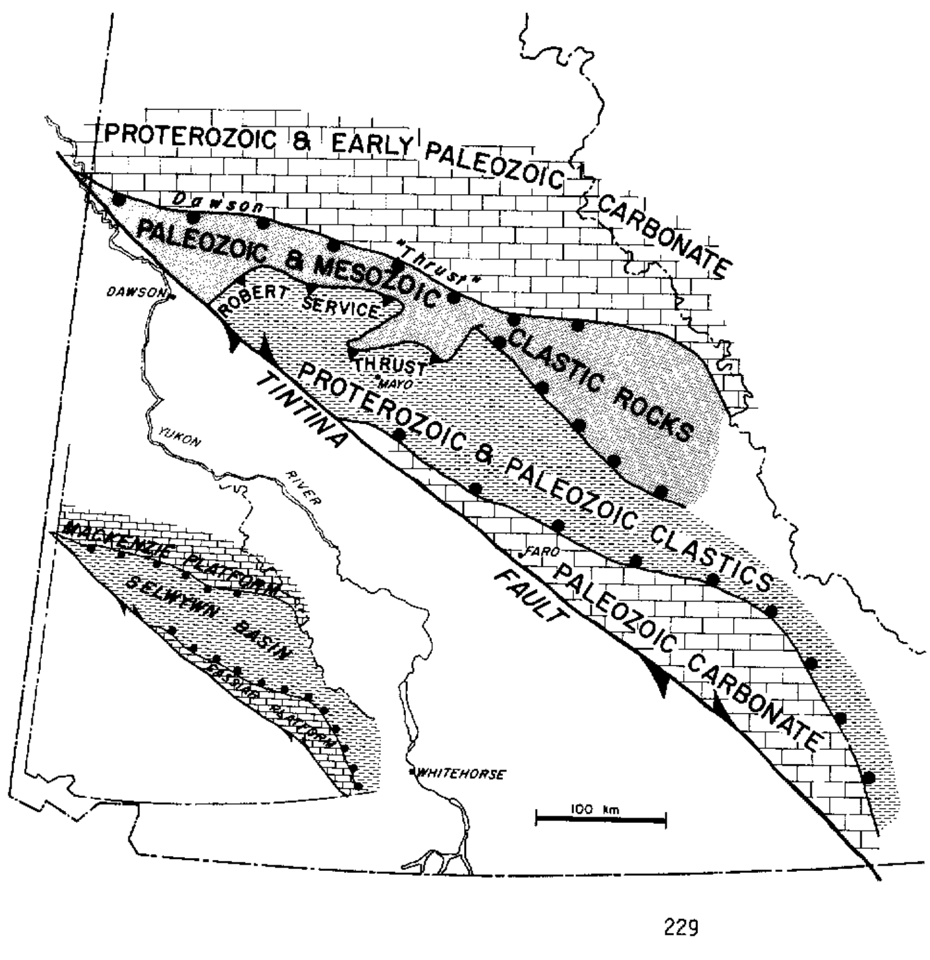


Figure 4

Sketch map showing regional relations of Selwyn Basin as a rift or failed arm.

terminus. M. P. Cecile (pers. comm., 1980 and in press) has named and defined the Misty Creek embayment at the northeast end of the aulacogen. It is a rectangular northwest trending shale filled trough surrouded by carbonate strata on three sides and formed about the Ordovician. It is filled with a Paleozoic strata much thicker than those on its margins. The Misty Creek embayment may be an arm of the aulacogen.

The aulacogen coincides essentially with Selwyn Basin and implies that feature is tectonically dominated, that the facies transitions at its margins are fault controlled and that its floor is thinned continental crust and Ordovician oceanic crust.

Economic Implications:

Known mineral deposits in Selwyn Basin occur around the margins of that feature. The Cambro-Ordovician stratabound zinc-lead deposits of the Anvil district (Faro, Grum, Vangorda, DY and Swim) are in volcanic bearing slate close to the southwest margin of Selwyn Basin. The Maxi, a stratabound zinc-lead prospect in Ordovician (?) black slate also occurs on the southwest margin. Howard's Pass deposits, large zinc-lead occurrences in Ordovician black slate, are at the northeast margin. The JA-Sunset occurrences are found at the southwest margin of Selwyn Basin in Cambro-Ordovician limy slate offset on the Tintina Fault. Known lead-zinc occurrences in Devono-Mississippian strata also occur near the aulacogen edges. The Tom-Jason zinc-lead-silver deposits are near the northeast edge and the MM deposit is near the strike-slip displaced southwest margin in Pelly Mountains. The deposits lack one to one relationship with specific sedimentary facies or rock units; instead they occur in a variety of strata at the aulacogen margins. This implies they may be genetically related to the deep fractures that cut the crust at these margins. Further search for new stratabound massive sulphides might therefore be concentrated near the aulacogen margins keeping in mind that the host rock facies is not a primary control or guide to mineralization.

The Ordovician-Silurian volcanic rocks that floor part of the aulacogen should be carefully prospected for lead-zinc occurrences and for copper-zinc stratabound deposits. The volcanics and associated ultramafic and quartz carbonate rocks deserve careful study for possible gold concentrations. Short-fibre asbestos was noted at two places in the serpentinite on the Craig property.

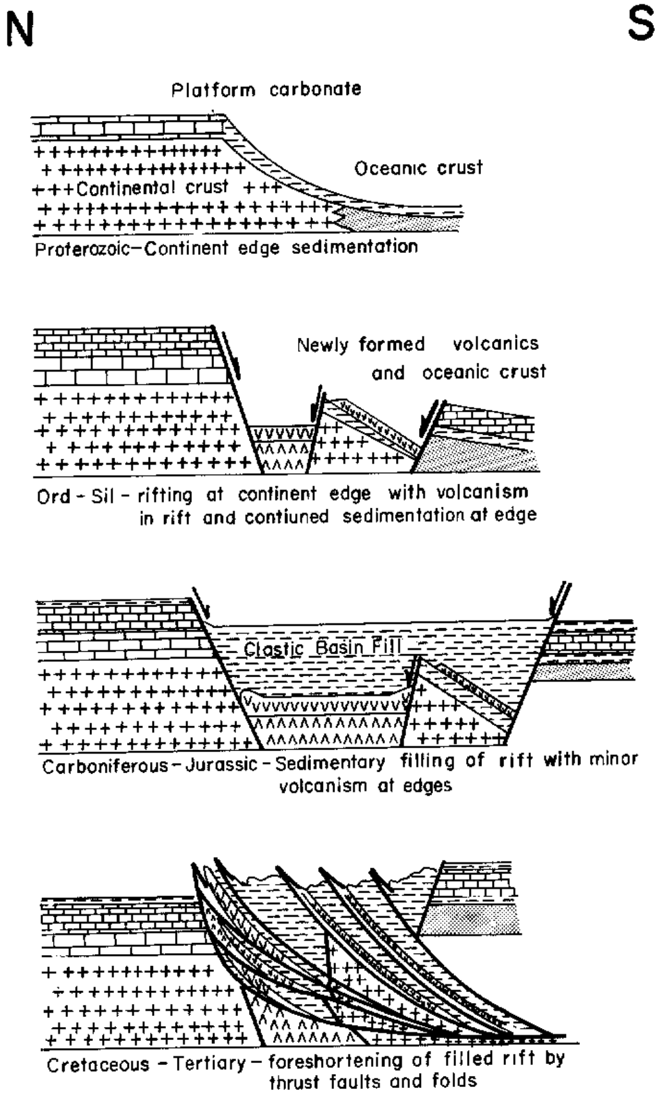


Figure 5

Sketches to show successive stages in the hypothetical development of Selwyn Basin as a rift.

Current Work and Results:

The following is summarized from assessment report 090672 by S. James. During 1980, nine holes totalling 1635 m were drilled on the property. Two holes were drilled on the West and Trent Zones each, and five on the Nadaleen Zone. West Zone drilling was intended to supplement work done in 1979 rather than further testing mineralization drilled in 1977. The best assay was 3.60% lead, 3.49% zinc and 39.5 gm/tonne silver over 1.5 m. On the Nadaleen and Trent Zones low grade mineralization was intersected with assays generally below 1% lead, 2% zinc and 15 gm/tonne silver.

References

CHAPMAN, R.M., WEBER, F.R. CHURKIN M. JR. AND CARTER, C. 1980. The Livengood Doma Chart, Anew Ordovician Formation in central Alaska, and its relevance to displacement on the Tintina Fault; USGS Prof. Paper 1126F.

HOFFMAN, P.F., DEWEY, J.F. AND BURKE, K. L974 Avalcogens and Their genetic relation to geosynclines, with a Proterozoic example from Great Slave Lake, Canada; Soc. Ec. Paleontologists and Mineralogists. Special Publication no. 19 p. 38-55

OTHER REFERENCES IN BIBLIOGRAPHY.

TOW
Wernecke Joint Venture;
Aquitaine Company of
Canada Limited;
Chevron Canada Limited;
Archer, Cathro and
Associates Limited

Uranium Breccia
106 C 13 (62)
(64°50'N,133°49'W)

Reference: Morin et al (1980, p. 11)

Claims: TOW 1-16

Source: Summary by G. Abbott from assessment report 090731 by D. Eaton and A. Archer.

Current Work and Results:

The property covers a Helikian sequence of thin-bedded, bleached argillite of the Quartet Group overlain by orange weathering, stromatolitic dolomite of the Gillespie Lake Group. A heterolithic breccia cuts both units. Several minor pitchblende, brannerite and separate, minor pyrite, hematite, chalcopyrite and malachite occurrences are located in and adjacent to the breccia.

The TOW claims were staked in 1978 to cover a pitchblende float occurrence found in 1976. The claims were explored with prospecting, mapping, grid radiometric and geochemical surveys in 1980. Two zones of anomalous radioactivity in talus were outlined at the southeast margins of the breccia. Zone A measures 30 m x 130 m and contains several specimens reaching 6 times background radioactivity. Zone B is an area 5 m x 100 m where 10% of the specimens have 2 to 25 times background radioactivity. Anomalous specimens reach 87 ppm U_3O_8 in Zone A and 480 ppm U_3O_8 in Zone B. Geochemical sampling did not accurately define the zones.

VAL, VERA
Prism Resources Limited

Silver, Lead, Zinc
106 C 5 (63, 64)
(64°16'N,133°45'W)
(64°18'N,133°44'W)

Source: By D. Tempelman-Kluit based on property visit.

Introduction

The VAL and VERA claim groups, 318 and 164 claims respectively are 135 km northeast of Mayo on Rusty Mountain. The properties have been extensively investigated by surface work and drilling during 1978, 1979 and 1980 because they contain silver bearing zinc and lead veins and fracture fillings in dolomite. The writer visited the properties for three days in August, 1980 and was guided on the VAL showings by George Sivertz and on the VERA occurrences by Don Penner, both geologists for Prism Resources. At the time of the visit, drilling had been completed on the VAL and was continuing on the VERA. The main camp was at Kathleen Lake, 30 km southwest of the claims.

Geology

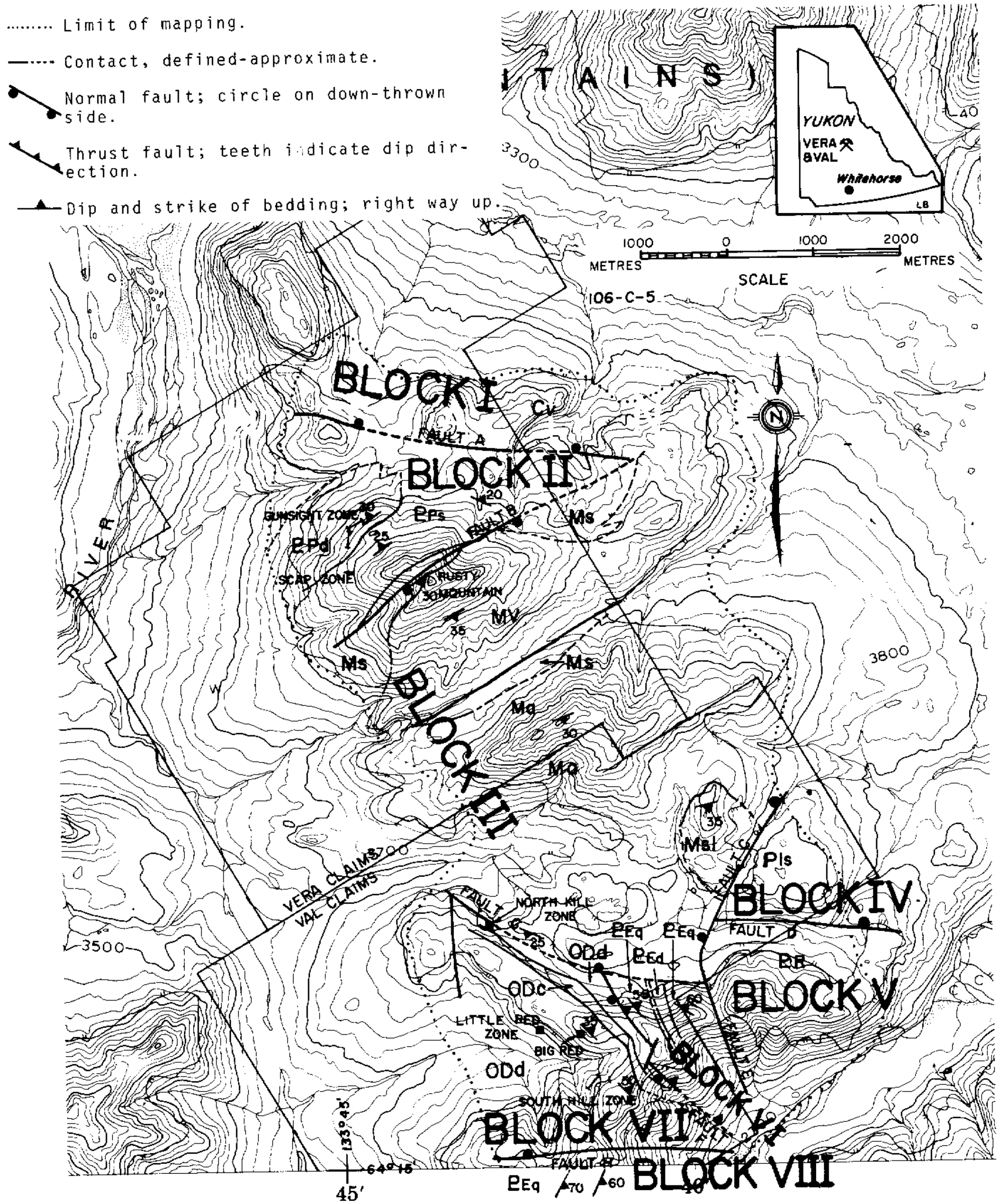
Outcrop in the area is excellent and vegetative cover minimal except in the valleys so that geological relations are well exposed. A preliminary regional geological map of the area (Blusson, 1974) shows Rusty Mountain is underlain by Hadrynian slate. Mapping by the writer suggests that a variety of strata of widely different ages and exposed in a series of fault blocks, make up Rusty Mountain. The mineral showings are confined to different strata in two of the fault blocks. The fault blocks are arbitrarily numbered from north to south and the faults are lettered to facilitate description.

Fault block I exposes greenstone like that in block III. Because of their lithology and the association of minor black slate, the greenstone in block I is tentatively assigned a Mississippian age. The rocks may be older Paleozoic.

Fault block II includes a moderately north dipping succession of thinly laminated orange to brown weathering ankeritic slate and interbedded laterally equivalent deep orange algal laminated and stromatolitic dolomite. The dolomite weathers more resistantly than the slate and the two rocks grade into one another so that all gradations from ankeritic slate to argillaceous dolomite can be seen. The slate is medium greenish grey on fresh surfaces and spotted with ankerite pits; its lamination is brought out by weathering. The primary dolomite is locally replaced by coarse sugary orange dolomite in which depositional features are obscured. The secondary dolomite is cut by common irregularly oriented planar fractures, a millimeter to a meter wide, filled with white quartz.

The orange dolomite and ankeritic argillite of fault block II may be part of the Wernecke Assemblage (Gillespie Lake Group) or the Pinguicula Group (formation B and D) (Eisbacher, 1978). Both units are Proterozoic.

Fault block III exposes a generally southward dipping succession of black slate, overlain by massive greenstone, in turn covered by more black slate, then by greenish siliceous argillite capped with brownish calcareous thinly laminated shale and siltstone. The black slate weathers moderately recessively to bluish-black colours. It is finely laminated and locally contains rusty weathering spots after pyrite. The slate is interbedded with lesser dark grey siltstone and fine-grained sandstone. About 50 m of the lower black slate are exposed south of fault B. The greenstone is a massive, resistant brown weathering rock. It is chloritized and saussuritized very finely crystalline diorite or gabbro most of which probably represents extrusive volcanic rocks. The rocks lack layering or depositional textures; their estimated thickness is 300 m. Black slate above the greenstone is like that below it, and may be 50 m thick. It grades upward to thin-bedded olive-green or applegreen siliceous finely laminated argillite, at least 300 m thick. The green argillite locally grades to greenish chert. The argillite weathers moderately resistant in brownish orange colours. The argillite unit contains interbeddedd slate like that of the underlying unit and is overlain by greyish-brown, slightly calcareous thin-bedded siltstone and slate. Although no fossils were found, the succession in fault block III is similar to that of Upper Paleozoic strata in the Pelly Mountains with which it is correlated. The black slates resemble parts of the Devono-Mississippian volcanics of the Pelly Mountains. Similarly the green siliceous argillite is closely like a cherty argillite that contains Mississppian fossils in central Yukon and the limy siltstone unit is like a thin unnamed Carboniferous unit (Csl of Tempelman-Kluit, 1977). The units occur



Geological map of the VAL and VERA claims.

LEGEND

PALEOZOIC?

Pls Light grey thick-bedded limestone.

DEVONO-MISSISSIPPIAN

Msl Brownish weathering calcareous laminated shale and siltstone.

Ma Greenish siliceous argillite, moderately recessive.

Mv Massive greenstone, altered fine-grained diorite - may be equivalent to Cv.

Ms Black slate.

ORDOVICIAN? CARBONIFEROUS?

Cv Greenstone, altered fine-grained diorite or gabbro, resistant, massive.

LOWER PALEOZOIC?

ODd Light grey weathering, resistant sugary dolomite, thick-bedded.

ODc Light orange weathering platy dolomite.

PROTEROZOIC

RAPITAN GROUP

ᵽR Brown weathering, resistant, thick-bedded conglomerate and sandstone.

FORMATION (E) OF PINGUICULA GROUP?

ᵽEq Resistant, thick-bedded, white weathering orthoquartzite.

ᵽEd Orange weathering, stromatolitic dolomite and brown shale.

PINGUICULA OR GILLESPIE LAKE GROUP?

ᵽPs Dull orange weathering, moderately resistant, greenish ankeritic shale, thinly laminated.

ᵽPd Bright orange weathering, ankeritic algal-laminated dolomite.

in the same sequence as seen in parts of the Pelly Mountains. The greenstone is probably equivalent to Green's (1972) unit 20a in adjacent Nash Creek map-area which he considered Cretaceous or possibly older.

Block IV exposes light grey, thick-bedded limestone. Its age and stratigraphic affiliation are not known. At least 250 m of brown weathering, resistant, thick-bedded conglomerate and sandstone, probably the lower part of the Rapitan Group (Eisbacher, 1978), is found as a nearly flat-lying sequence in fault block V.

Fault block VI exposes a steeply northeast dipping succession of orthoquartzite with minor interbedded stromatolitic dolomite and shale. Orthoquartzite, which dominates the section, is light grey to white, thick-bedded and resistant and medium-grained with ankerite cement. The lower orthoquartzite next to fault F is about 70 m thick and is overlain by 15 m of bright orange weathering algal-laminated to stromatolitic dolomite and then by about 50 m of dark grey shale in turn covered by 200 m or more of orthoquartzite. The dolomite succession is correlated with formation E of the Pinguicula Group. It is also exposed in fault block VIII.

A moderately northeast dipping succession of medium to light grey, resistant, laminated sugary dolomite, at least 400 m thick is seen in block VII. In the upper exposed part, this unit includes a 30 m thick light orange weathering platy dolomite. Much of the grey dolomite is secondary or diagenetic and primary depositional textures are rare. The unit includes irregular shaped zones of breccia that crudely follow bedding more commonly than they cut it. The dolomite in block VII is probably lower Paleozoic, but this correlation is tentative.

Structural Geology

Rocks on the claim group are unmetamorphosed and lack closely spaced cleavage, minor folds and other penetrative minor structures. Spaced cleavage, seen locally in slates, dips steeply and is generally at large angles to bedding. The structure of the area is simple, involving large tilted fault-bounded blocks that have escaped internal strain.

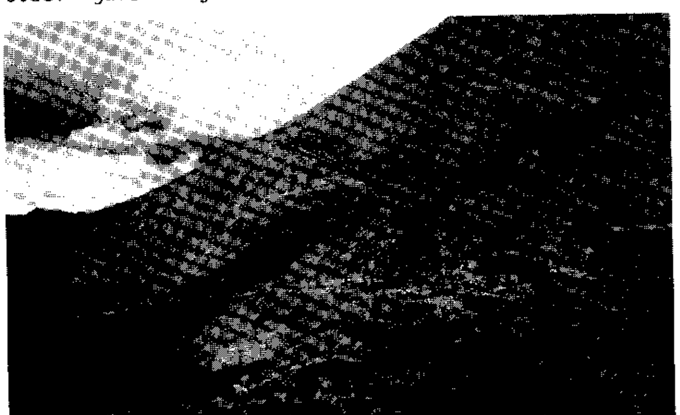
If the suggested correlations are valid, the faults separating the blocks have had very considerable movement. For example, faults A, B, C and G juxtapose Devono-Mississippian and Proterozoic strata with stratigraphic omission in the order of two kilometers. Most of the faults probably dip steeply with normal movement, but fault F, which dips northeast, is a reverse or thrust fault.

No stratigraphic data are available in the immediate area to define the time of movement. The faulting may be Cretaceous or Tertiary or alternately may be Mississippian. Gordey (1978) has cited evidence that some normal faults, 300 km to the southeast, are that age. The irregular fault pattern and probable normal movement imply that the faults are related to extension and therefore that they may be mainly Mississippian and not of Laramide age. Whether the faults represent old structures reactivated in the Cretaceous is unknown, but the absence of penetrative deformation, which might be expected with a Cretaceous event, suggests this unlikely.

Mineralization

Mineralization consists of sphalerite and galena with silver values in a carbonate gangue. Economically interesting quantities of metal occur in fracture controlled veins on the VERA and VAL claims, and several other occurrences of spectacular, but lensy mineralization are found on the Val group. The mineralization contains less silver than that of Keno Hill both in absolute terms and in relation to lead. Silver:lead ratios (gm/tonne silver; percent lead) at Keno Hill average near 120:1 and in this district they are about 30:1.

The veins on the Vera claims are confined to fault block II and include the Gunsight and Scarp Zones. These are near vertical, northeast trending fractures or fracture zones, probably with minor displacement, that can be traced within the algal-laminated dolomite for nearly 400 m. Mineralization is irregularly distributed within the zones in lenses or shoots, one 100 m long and a second 175 m long. It can be followed to similar depths and locally attains true widths near 10 m. The mineralization consists of coarsely crystalline galena and sphalerite with some tetrahedrite and minor chalcopyrite and pyrite in a coarsely crystalline gangue of dolomite, manganiferous siderite or ankerite and quartz. The vein is oxidized; limonite and pyrolusite are developed at the surface from siderite. Sphalerite is partly leached. Galena commonly contains about 3,000 gm/tonne silver and samples of sheared or "steel" galena may contain near 10,000 gm/tonne.



View to the east of trenching on the VERA claims showing the trace of the two main mineralized zones, the Scarp and Gunsight. Host rocks are orange weathering dolomite of the Pinguicula Group.

On the Val claims, mineralization occurs in four areas named the South Hill, Big Red, Little Red and North Kill zones. The South Hill zone is economically most interesting. It is a northeast striking fracture zone that dips steeply southeast (045/75 SE) which can be traced a maximum length of 200 m. Drilling indicates the structure is mineralized to similar depths. Locally the average assay width is about 3 m. The vein is estimated to average about 1% lead and 5% zinc with between 150 and 300 gm/tonne silver. Mineralization consists of crystalline light greenish yellow to reddish honey coloured sphalerite and less galena in a gangue of white or off-white, coarsely crystalline dolomite. Traces of tetrahedrite and pyrite are seen

View of part of the VAL claims showing the main structure on the South Hill Zone and the trenching and drill platforms to test the mineralization.

and finely fibrous jamesonite is intergrown with delicate quartz crystals at depth in late cavities and vugs.

The Big Red, Little Red and North Kill zones are irregular shaped, discontinuous lenses of coarsely crystalline red and honey coloured sphalerite with galena in a gangue of quartz and ankeritic dolomite and enclosed by the light grey dolomite unit. Although the mineralization is spectacular it lacks continuity and unlike that of the South Hill Zone is not structurally confined. Instead, much of this mineralization is spatially associated with irregular zones of dolomite breccia. No significant tonnage has been proven on these zones.

The age of mineralization is unknown, but the relation between mineralization and fracture and breccia zones in strata of different ages implies genetic and time ties between mineralization and faulting. Perhaps faulting promoted and localized fluid movement and brecciation with concomitant mineralization in (?) Mississippian (?) time. The breccias that host mineralization most likely formed through fluid pressure fracturing of the rocks. They lack the characteristics of fault breccias.

Previous Work

The Vera claims were staked in July, 1978 following reconnaissance prospecting. Geochemical sampling, mapping and hand trenching with sampling followed and 27 holes (1682 m total) were drilled in 1979 to test strike and depth continuity of mineralization. Parts of the property were trenched by bulldozer. A further 43 holes were drilled in 1980 and more trenching was done. About 850,000 tonnes of drill indicated reserves, of which 262,000 tonnes have been drilled at fairly close spacing, have been blocked out (NM, Ocober 2, 1980).

The Val group, staked in July and August, 1978, covers silver-lead-zinc showings found by regional prospecting. During 1978, the showings were trenched and a soil and silt geochemical survey was conducted. The soil geochemical results reflect known mineralization well, but do not pinpoint new mineralization. Ten short holes totalling 680 m were drilled. In 1979, 15 holes for a total of 1380 m were drilled. Much of the drilling concentrated on the South Hill Zone.

Another 9 holes for 1300 m total were drilled in 1980.

It is surprising that these well exposed showings were not discovered before. There is no record of earlier staking, but it may be that prospectors working for Wernecke knew these occurrences as long as fifty years ago.

Current Work and Results

During 1980, 42 holes were drilled on the Vera group and 9 on the Val for a total of 4,300 m.

1980 MINERAL CLAIMS STAKED

KEY MOUNTAIN — 106 C 13 (9)
B. Goodliffe — (64°53'N,133°30'W)

Claims 1980: BARB (4)

TETRAHEDRITE CREEK — 106 C 14 (13)
J. Hajek et al — (64°56N',133°13'W)

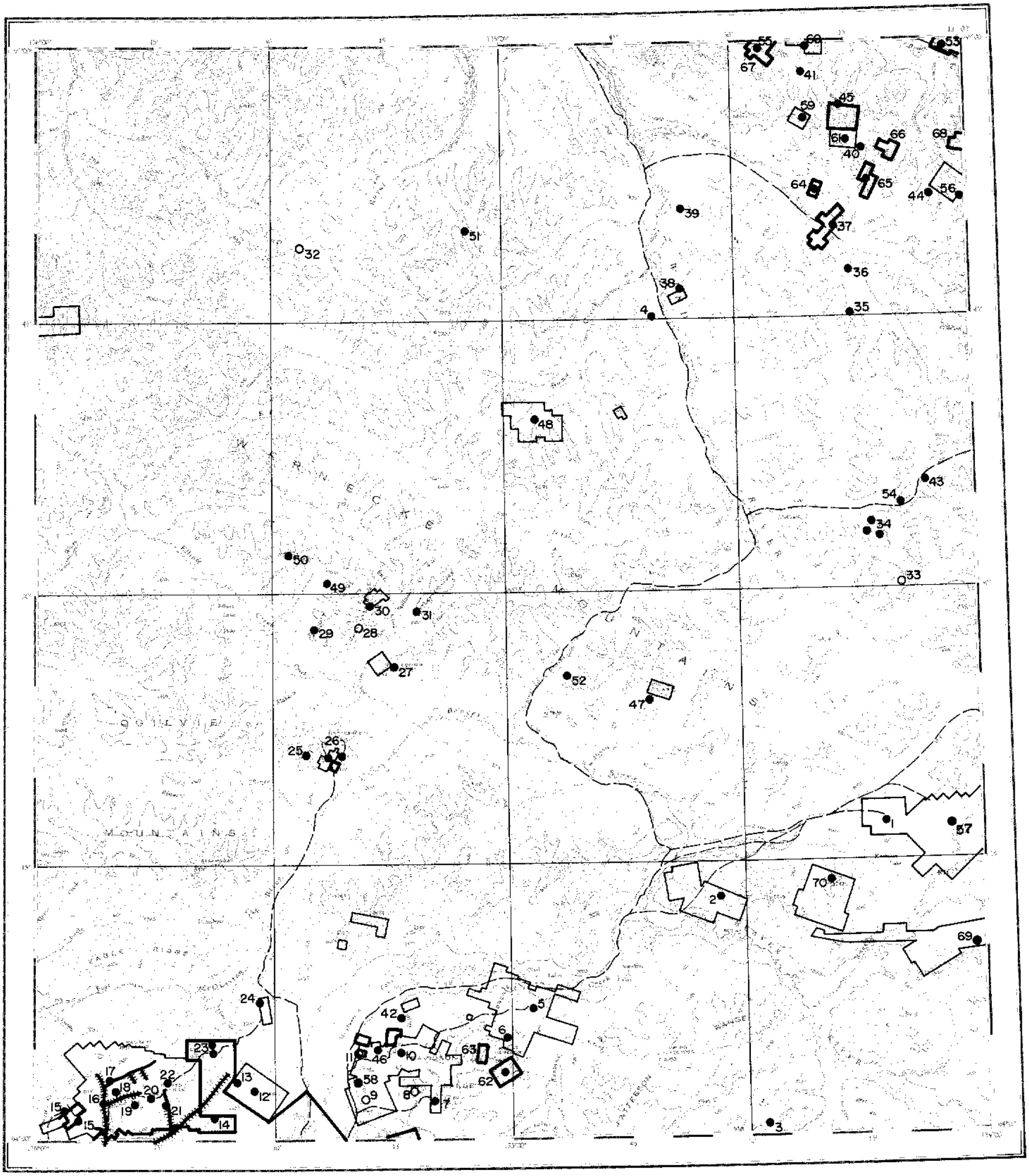
Claims 1980: IOTA (16)

LFV — 106 C 13 (58)
Pan Ocean Oil — (64°49'N,133°58'W)

Claims 1980: LFV (40)

ELGEA — 106 C 13 (65)
Pan Ocean Oil — (64°59'N,133°55'W)

Claims 1980: EAGLE (161)



NASH CREEK

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	O72 .... Unmineralized Target
Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	Mineral Claims staked in 1980
.... Placer Leases in good standing (Jan. 1981)	.... Placer Claims in good standing (Jan. 1981)
CEL .... Coal Exploration Lease	CML .... Coal Mining Lease
.... Tote Trail	.... Driveable Road
.... Oil or Gas Well	.... Airstrip

NASH CREEK MAP-AREA (NTS 106 D)

NO.	PROPERTY NAME	REFERENCE
1	KATHLEEN	G.S.C., Mem. 364, p. 132
2	NOW	This Report
3	MARG	Lead-Zinc-Silver-Copper Stratabound
4	WEN	G.S.C., Mem. 364, p. 139
5	CLARK	MIR, 1973, pp. 15-16 MIR, 1969-1970, pp. 19-20
6	CAMERON	G.S.C., Mem. 357, pp. 63-64 MIR, 1974, pp. 16-17
7	STAND-TO	G.S.C., Pap. 69-55, pp. 13-14
8	FORBES	G.S.C., Summ. Rept. 1921, Pt. A
9	SPRING	MIR, 1971-1972, p. 30
10	RAMBLER	G.S.C. Summ. Rept., 1921, Pt. A. pp. 4-5 and This Report G.S.C., Mem. 357, p. 63
11	RUSTY	
12	ERIN	MIR, 1969-1970, pp. 16-17
13	GWAIHIR	This Report
14	SKATE	G.S.C., Pap. 66-31, pp. 16-17
15	PESO	G.S.C., Pap. 65-19, pp. 20-22 Can. Mining J., Vol. 8, pp. 104-106 and This Report
16	BARKER	G.S.C., Bull. 111, p. 84
17	MEILECKE	Silver-Lead Vein
18	SHEPPARD	G.S.C. Economic Geology Report No. 28, pp. 73-74
19	DUBLIN GULCH	This Report
20	POTATO HILLS	G.S.C. Economic Geology Series No. 17, pp. 21-29, 34-36 MIR, 1971-1972, pp. 24-25
21	RAY GULCH	This Report
22	ELLIS	G.S.C., Pap. 63-38, p. 15
23	LYNX	G.S.C., Pap. 63-38, p. 15 and This Report
24	LUCKY STRIKE	G.S.C., Mem. 364, p. 137
25	WHITE HILL	G.S.C. Summary Report, 1924, Pt. A
26	McKAY HILL	G.S.C. Summary Report, 1923, Part A, pp. 22-28 and This Report G.S.C., Mem. 364, pp. 133-134
27	GREY COPPER Hill	This Report
28	CARPENTER	G.S.C. Summary Report, 1924, Pt. A
29	ELLIOTT RIDGE	G.S.C. Summary Report, 1924, Pt. A
30	SILVER HILL	G.S.C. Summary Report, 1924, Pt. A G.S.C., Mem. 364, p. 133
31	SETTLEMEIR	
32	ROYAL	
33	ZULPS	Copper Vein
34	McCLUSKY	Copper Occurrence
35	GRAY	G.S.C., Pap. 68-68, p. 16
36	NEW JERSEY	G.S.C., Pap. 68-68, p. 16
37	PAGISTEEL	G.S.C., Pap. 68-68, pp. 28-30 G.S.C., Mem. 364, pp. 142-143 and This Report
38	AHEARNE	G.S.C., Mem. 364, p. 139
39	FRAN	G.S.C., Mem. 364, p. 143
40	FORD	Copper-Lead Vein
41	SLATS	Copper Vein
42	JEE	
43	DRESEN	Copper Vein
44	FOUND	Copper Vein
45	BUT	Copper Vein
46	NAT	Lead-Silver-Zinc-Copper Vein
47	BRAINE	G.S.C., Mem. 364, p. 139
48	BOND	G.S.C., Mem. 364, p. 139
49	LINGHAM	Lead-Zinc Vein
50	NEWT	Lead-Zinc Vein
51	SIHOTA	Copper-Zinc Vein
52	CLOUTIER	Lead-Zinc-Silver-Copper-Gold Vein
53	SLAB	G.S.C., Pap. 69-55, pp. 17-18
54	LOUIE	Copper Vein
55	EATON	This Report
56	CORD	This Report
57	ZAP	This Report
58	JT	This Report
59	ARCTOS	This Report
60	RAD	This Report
61	URSUS	This Report
62	SPRING	This Report
63	DEAL	This Report
64	FACE	This Report
65	ADUB	This Report
66	HAIL	This Report
67	PIK	This Report
68	SNOW STAR	This Report
69	ROD	This Report
70	BLUE LITE	This Report

NOW
Prism Resources Limited

Lead, Zinc, Silver, Gold
106 D 2 (2)
(64°13'N,134°37'W)

Claims: DEE 1-62, 69-84, 91-104, 111-124, 129-174

Source: Summary by R. Debicki from assessment report 090581 by B. Dewonck.

Current Work and Results:

Soil geochemical anomalies and mineralized float identified during 1978 work on the claims indicated targets for further work during 1979.

The area is underlain by a sequence of sedimentary rocks. Massive black argillite to cherty argillite with finely disseminated pyrite is topographically, and apparently, stratigraphically lowest. It is overlain by massive light to dark grey dolomite with quartz and calcite veinlets from a few mm to 3 m in width. The dolomite is altered and oxidized, with the intensity of alteration increasing with the intensity of fracturing and veining. Pyrite is abundant throughout the unit, but also is associated with the veining. Dark grey to black carbonaceous and occasionally limy shale with thin quartz and calcite veinlets overlies the dolomite.

Limited soil geochemical surveys were carried out in 1979 over two previously identified anomalies. Prospecting near one anomaly failed to reveal mineralization. A limited electromagnetic survey over the other anomaly showed several weak conductors related to pyrite in the underlying strata. Six diamond drill holes totalling 610 m tested this zone. The best intersection is of a quartz-boulangerite-sphalerite vein which assayed 4.64% lead, 0.04% zinc, 60.21 gm/tonne silver and 3.49 gm/tonne gold across 1.07 m.

GWAIHIR
Amax of Canada Limited

Tungsten Veins
106 D 4 (13)
(64°03'N,135°32'W)

References: Craig and Laporte (1972); Green and Roddick (1961).

Claims: HIT 1-96

Source: Summary by R. Debicki from assessment report 090560 by R. G. Kidlark.

Description:

The claims were staked in 1979 to cover an area of known scheelite mineralization. The area was first staked in 1962. It was restaked in 1964, 1969 and 1971. Previous work on the property by various companies includes prospecting, geochemical surveys, geological mapping and bulldozer trenching.

The area is underlain by quartzite, quartz-mica schist and calcsilicate rocks of the Keno Hill Quartzite, and by Cretaceous granodiorite. Scheelite is associated with a stockwork in the granodiorite, and occurs in quartz veins, in quartz-amphibole veins, on hairline dry fractures and disseminated within the granodiorite.

Current Work and Results:

In 1979, the property was mapped and rock, soil and stream sediment geochemical surveys were carried out. Old trenches were mapped and sampled.

Assays of the samples from the old trenches average 0.03% WO_3. The soil geochemical survey outlined two anomalous areas and several other sporadic, low order anomalies. One of the anomalies coincides with the area of known mineralization.

DUBLIN GULCH
Canada Tungsten Mining Corporation Limited; Queenstake Resources Limited

Gold Veins
106 D 4 (19)
(64°02'N,135°40'W)

References: Boyle (1965, p. 82-84); MacLean (1914, p. 127-157)

Claims: MAR 1-30; DG 1-56; RD 1-16; JEFF 1-112; DAVE 1-24; SMOKEY 1-82; BOB 1-73; ALEC 1-60

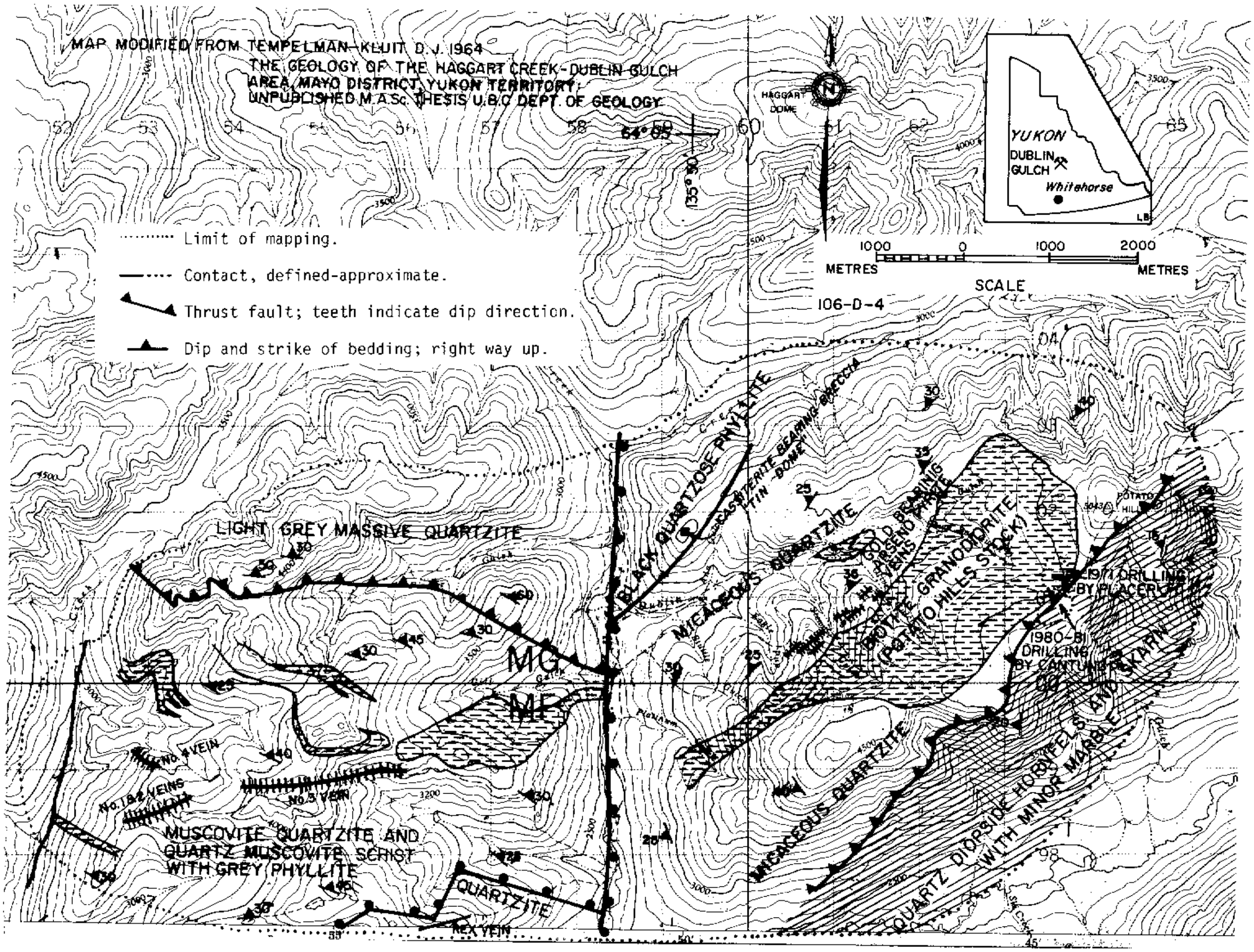
Source: Summary by D. Tempelman-Kluit based on property visit and from assessment report 090614 by W. B. Lennan and report 090790 by G. Nordin and K. E. Northcote.

View south across Dublin Gulch from Tin Dome. The flat ridge top is underlain by granodiorite of the Potato Hills stock. The trenching on the slope was done in 1980 to expose auriferous arsenopyrite quartz veins that cut the country rocks close to the granitic contact.

Current Work and Results:

Gold mineralization occurs in quartz veins that cut cataclastic rocks on the northeast side of the Potato Hills Stock. Samples collected from old trenches and adits contain from 0.17 gm/tonne to 129.80 gm/tonne gold.

The soil geochemical survey outlined several tungsten, tin and gold anomalies. Samples were analyzed for tungsten, tin, gold and silver. Antimony and arsenic were analyzed in some samples to assess their potential as indicators of gold-bearing vein systems. A magnetometer survey was used to locate the granodiorite-metasediment contact in an area of overburden.



Geological map showing Dublin Gulch area.

A narrow vertical veinlet of arsenopyrite cuts the flaser fabric of the schist that hosts it. This vein was exposed in a trench on the south side of Dublin Gulch. The coin is a quarter (23 mm across).

During 1980, extensive trenching was done in 3 areas on the gold quartz vein system and a backhoe was used effectively to follow some of the veins along strike. A number of new veins were exposed and the continuity or lack of it of a number of the veins was determined.

RAY GULCH
Canada Tungsten Mining Corporation Limited; Queenstake Resources Limited

Tungsten Skarn
106 D 4 (21)
(64°02'N,135°43'W)

References: Craig and Milner (1975, p. 24-25)

Claims: MAR 1-30; DG 1-56; RD 1-16; JEFF 1-112; DAVE 1-24; SMOKEY 1-82; BOB 1-73; ALEC 1-60

Source: Summary by D. Tempelman-Kluit based on property visit and from assessment report 090614 by W. B. Lennan and report 090790 by G. Nordin and K. E. Northcote.

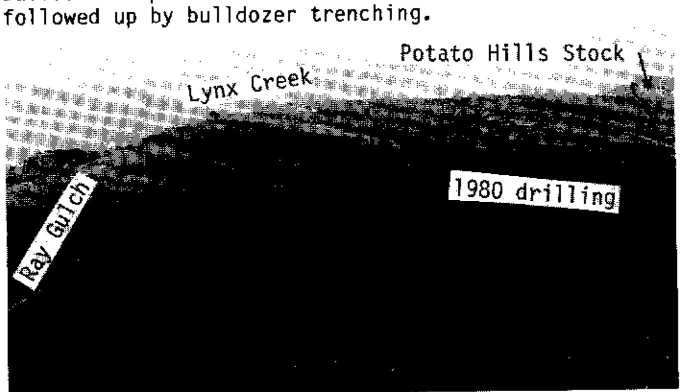
Current Work and Results:

The claims are underlain by a quartz monzonite, the Potato Hills stock, which intrudes limy cataclastic rocks. Skarns are developed near the contact. The stock contains disseminated scheelite and wolframite. A geological map of the general area is given in the accompanying figure.

An extensive work program was carried out on the claims in 1979. Ten old trenches were cleaned out, sampled, and mapped, and other trenches and two old adits were sampled and mapped. Soil geochemical surveys were carried out in several areas. Detailed geological mapping and rock analyses, and a magnetometer survey were also done. A total of 914.4 m of drilling was scheduled, but with encouraging results this was increased to 2421.9 m in 21 holes.

Scheelite is present in skarns with the best values commonly associated with quartz-rich skarns. A scheelite-bearing quartz-vein stockwork occurs within the Potato Hills stock, and a small nearby quartz monzonite plug. Work in 1979 outlined two skarn horizons named the "Upper Zone" and the "Lower Zone" containing significant tungsten. The total possible reserves projected for the two zones following 1979 drilling and analytical work is 4,871,808 tonnes grading 0.48% WO_3.

During 1980, 11,315 m of NQ and BQ diamond drill core was obtained from 61 holes. Drilling was on 50 m centers in an area 800 m x 400 m that trends northeast along the southern side of the Dublin Gulch stock. To permit more accurate geological mapping on the felsenmeer covered plateau of Potato Hills long lines of bulldozer rips were cut to bedrock. Some of these were followed up by bulldozer trenching.



View southwest from Potato Hills showing the area where drilling concentrated in 1980. The edge of the Potato Hills Stock is shown approximately.

GREY COPPER HILL
Prism Resources Limited

Silver, Lead Vein
106 D 6 (27)
(64°26'N,135°16'W)

References: Cockfield (1924).

Claims: SILVER HAWK 1-16

Source: Summary by R. Debicki from assessment report 090568 by G. Sivertz.

History:

The SILVER HAWK claims were staked in 1978 to cover an old prospect on Grey Copper Hill. The area was first staked in 1923 following the discovery of rich silver-bearing tetrahedrite float. In 1924, W.E. Cockfield reported examining a vein 60 to 75 cm wide which contains 1780 gm/tonne silver across 40 cm. Silver-rich float found at the head of a gulch on the claims contains 37,635 gm/tonne silver. No source for the float was found. Evaluation of the area since the 1920's has been done mainly through trenches and adits. Prism carried out prospecting, and a non-systematic geochemical survey of the SILVER HAWK claims in 1978.

Current Work and Results:

Geological and soil geochemical surveys were done on the claims in 1979. They are underlain by Late Proterozoic and Ordovician to Silurian grey to orange weathering grey dolomite, cherty dolomite and siltstone with sills and dikes of pyroxene diorite. Chalcopyrite was found in place near the mouth of an old adit. An apparently unmineralized yellow weathering dolomite sandstone near the adit contains 0.6% lead and 51.3 gm/tonne silver. The source of the rich silver-bearing tetrahedrite float was not located.

The 58 soil samples were analyzed for lead, zinc and silver. Several were also analyzed for copper and gold. Several poor silver-lead anomlies were identified. Additional geochemical work was done on the claims in 1980.

EATON
Wernecke Joint Venture; Chevron Canada Limited; Aquitaine Company of Canada Limited; Archer, Cathro and Associates Limited

Uranium Breccia
106 E 1
106 D 16 (55)
(65°00'N,134°26'W)

Claims: PIKE 1-32

Source: Summary by G. Abbott from assessment report 090766 by D. Eaton and A. Archer.

History:

The PIKE 1-14 claims were staked in 1975 to cover brannerite occurrences in hydrothermally altered metasediments adjacent to a breccia body. Geochemical surveys conducted in 1975 outlined weak to moderate uranium, copper and molybdenum soil anomalies but failed to locate significant mineralization. The PIKE 1-8 claims lapsed in 1978.

Current Work and Results:

The claims overlie the margin of an irregular heterolithic breccia about 2 km across that cuts black shale, argillite and quartzite of the Helickian or older Quartet Group. The metasediments are locally altered to hematite, carbonate, silica, albite and sericite near the main breccia. Elsewhere, rocks are bleached and cut by numerous vuggy and brecciated quartz veins and tan to red barite veins.

Brannerite has been found in a few small float boulders of barite and quartz.

The property was explored in 1980 with prospecting and hand trenching. Two small hand trenches, each about 1 m deep, were dug in areas of anomalous radioactivity but no mineralization was encountered. The PIKE 1-8 and 15-32 claims were staked after the program was completed.

CORD Rio Tinto Canadian Exploration Limited	Stratiform Zinc-Lead 106 D 16 (56) 106 C 13 (64°52'N,134°00'W)

Reference: Morin et al (1979, p. 39-40)

Claims: CORD 1-72

Source: Summary by J. Morin from assessment report 090759 by C. Campbell and J. McClintock.

Current Work and Results:

The claims are underlain by sedimentary rocks of Helikian age that host showings of stratiform massive sulphides and chert described in Morin et al (1979).

Geophysical survey, detailed geological mapping, trenching and showing chip sampling were conducted during summer 1980. Seventeen km each of Horizontal Loop, VLF electromagnetic and magnetometer surveys were conducted. Coincident electromagnetic and magnetic anomalies outline the sulphide-rich horizon and five trenches along it disclose that grade and thickness increase down dip.

ZAP Prism Resources Limited	Silver, Lead, Zinc Vein 106 D 1 8 (57) 106 C 4 5 (64°17'N,134°02'W)

References: Blusson (1974 b); Morin et al (1980, p. 15-16)

Claims: ZAP 1-16; ELITE 1-16; THRILL 1-8; TRUMPETER 1-8; GRANDMA 1-16; PIKA 1-76; CAROL 1-156.

Source: Summary by R. Debicki from assessment report 090582 by G. Cavey.

History:

The ZAP claims were staked in September, 1977 and the ELITE, THRILL, TRUMPETER and GRANDMA claims were staked in October of that year. The PIKA claims were staked in early summer, 1978 to cover mineralization discovered north of the existing claims. The CAROL claims were staked later in 1978 to cover area with anomalous stream sediment geochemistry, and additional lead-zinc mineralization. A description of the property geology is given by Morin et al.

Current Work and Results:

During 1979, additional geological mapping, soil geochemical surveys, trenching and diamond drilling were done. Mineralization was recognized in four different environments. Tetrahedrite and galena occur in a black baritic, cherty, often brecciated unit. The mineralization is fault-related. Sphalerite and galena with some silver occur in brecciated dolomite. Sphalerite and minor galena occur in veins. The relationship of mineralization to major and minor faults is complex on a detailed scale.

The soil geochemical surveys outline several anomalies of unknown source, and also reflect known mineralization. Some previously unknown mineralization was exposed in trenches.

Eight NQ holes totalling 953.4 m were drilled. Mineralization intersected was not sufficiently high in value or width to be of economic interest.

J.T. W. G. Timmins Exploration and Development Limited; J. Strebchuk	Silver, Lead Vein 106 D 3 (58) (64°03'N,135°19'W)

Reference: Green (1971)

Claims: J.T. 1-56

Source: Summary by R. Debicki from assessment report 090626 by W. G. Timmins and J. Strebchuk.

Current Work and Results:

The J.T. claims lie 16 km northeast of Elsa, and immediately northeast of Hanson Lake. A gravel road from Elsa provides access. No previous work is known on the property although considerable work has been done on adjoining properties. The claims are underlain by graphitic phyllite and quartzite of the Lower Schist of the Yukon Group. It hosts numerous dikes and sills of gabbro and diorite. Northeast-trending faults and shear zones on adjacent properties host silver-lead-zinc mineralization. On the LUCKY BEAR property north of the J.T. claims, a grab sample of vein material contains 4389 gm/tonne silver, 6.45% copper, 2.14% lead and 0.57% zinc.

During September, 1979, airborne magnetic, VLF electromagnetic and radiometric surveys were done. An east trending magnetic low over the south half of the property was interpreted as reflecting a synclinal axis and a thickened wedge of metasedimentary rocks. Small elliptical magnetic high scattered across the property may reflect dikes and sills of gabbro.

Three conductive zones were identified by the electromagnetic survey. One zone trends southeast, parallel to strike, and may reflect a graphitic horizon, or it may be along strike from mineralization at LUCKY BEAR.

ARCTOS
Pamicon Developments Limited;
Pan Ocean Oil Limited;
Mountaineer Mines Limited

Uranium, Copper Cobalt, Barium, Silver Breccia
106 D 16 (59)
(64°56'N,134°21'W)

Reference: Bell and Delaney (1977); Morin et al (1977, p. 101-107; 1979, p. 44; 1980, p. 16)

Claims: ARCTOS 1-16

Source: Summary by R. Debicki from assessment report 090587 by D. A. Yeager and C. K. Ikona.

Current Work and Results:

The claims were staked in 1976 following discovery of copper-uranium-cobalt mineralization during a prospecting survey being carried out for Mountaineer Mines Limited.

The trenches over the main showing were enlarged in 1979. The mineralization is associated with silicification and feldspathization around a vertical shear. Although the shear is 10 cm wide, the mineralization occurs across widths up to 1.5 m. Chip samples contain up to 0.33% copper and 0.038% U_3O_8 over 1.5 m and 0.45% copper and 0.090% U_3O_8 across 0.6 m. The shear is exposed by the trenches along a strike for 8 m.

Geological, geophysical and geochemical surveys were carried out during 1980. Additional trenching was also done.

RAD
Pamicon Developments Limited;
Pan Ocean Oil Limited;
Mountaineer Mines Limited

Uranium, Copper, Gold Breccia
106 D 16 (60)
106 E 1
(65°00'N,134°20'W)

References: Bell and Delaney (1977); Morin et al (1979), p. 48; 1980, p. 17)

Claims: RAD 1-24; BREAK 1-32

Source: Summary by R. Debicki from assessment report 090588 by D. A. Yeager and C. K. Ikona.

Current Work and Results:

Additional water geochemical surveying was done in 1979. The 77 samples were analyzed for uranium. Fifty-nine contained anomalous amounts. The highest value obtained was 55 ppb.

Geological mapping and trenching were done during 1980.

URSUS
Pamicon Developments Limited;
Pan Ocean Oil Limited;
Mountaineer Mines Limited

Uranium, Copper Silver Breccia
106 D 16 (61)
(64°55'N,134°15'W)

References: Bell and Delaney (1977); Morin et al (1977, p. 101-107, 1979, p. 44; 1980, p. 16)

Claims: URSUS 1-24

Source: Summary by R. Debicki from assessment report 090590 by D. A. Yeager and C. K. Ikona.

Current Work and Results:

Preliminary geological mapping, rock analyses and water geochemical surveying were done in 1979. Four mineralized zones were sampled, and others too limited in size and grade to warrant sampling were noted. The two best selected grab samples contain 1.07% copper and 0.212% U_3O_8 respectively. Uranium in the 20 water samples ranges from 0.2 to 4.4 ppb. A sharp decrease in uranium-in-water values at the western edge of the property is evident when the results of the 1978 and 1979 water geochemical surveys are examined together.

Geological, geophysical and geochemical surveys were carried out in 1980 and some trenching was done.

ROD
Canadian Superior Exploration Limited

Silver, Lead Vein
106 C 4
106 D 1 (69)
(64°12'N,134°00'W)

Claims: ROD 1-100

Source: Summary by D. Tempelman-Kluit from assessment report 090611 by B.Y. Kim, and report 090687 by S.C. James.

Current Work and Results:

The claims were staked in 1976 by McIntyre Mines following regional silt sampling. In 1977 the claims were prospected and mapped.

The claims lie astride the "Dawson Thrust", a fault that separates early Paleozoic platform carbonate rocks on the north from broadly time equivalent shales on the south. (See Craig property: this report). Fractures filled with galena and sphalerite occur on the property close to the Dawson Thrust in silicified carbonate rocks.

The property was mapped and several showings were trenched and sampled in 1979. An assay of a 5 m channel sample along a trench on the best showing gave 217 gm/tonne silver 13.25% lead and 1.15% zinc. The showings are similar to those on the Craig claims. A soil geochemical program was carried out and some anomalous values reflect known mineralization. The soil values are erratic. This is interpreted to result from the poor geochemical environment.

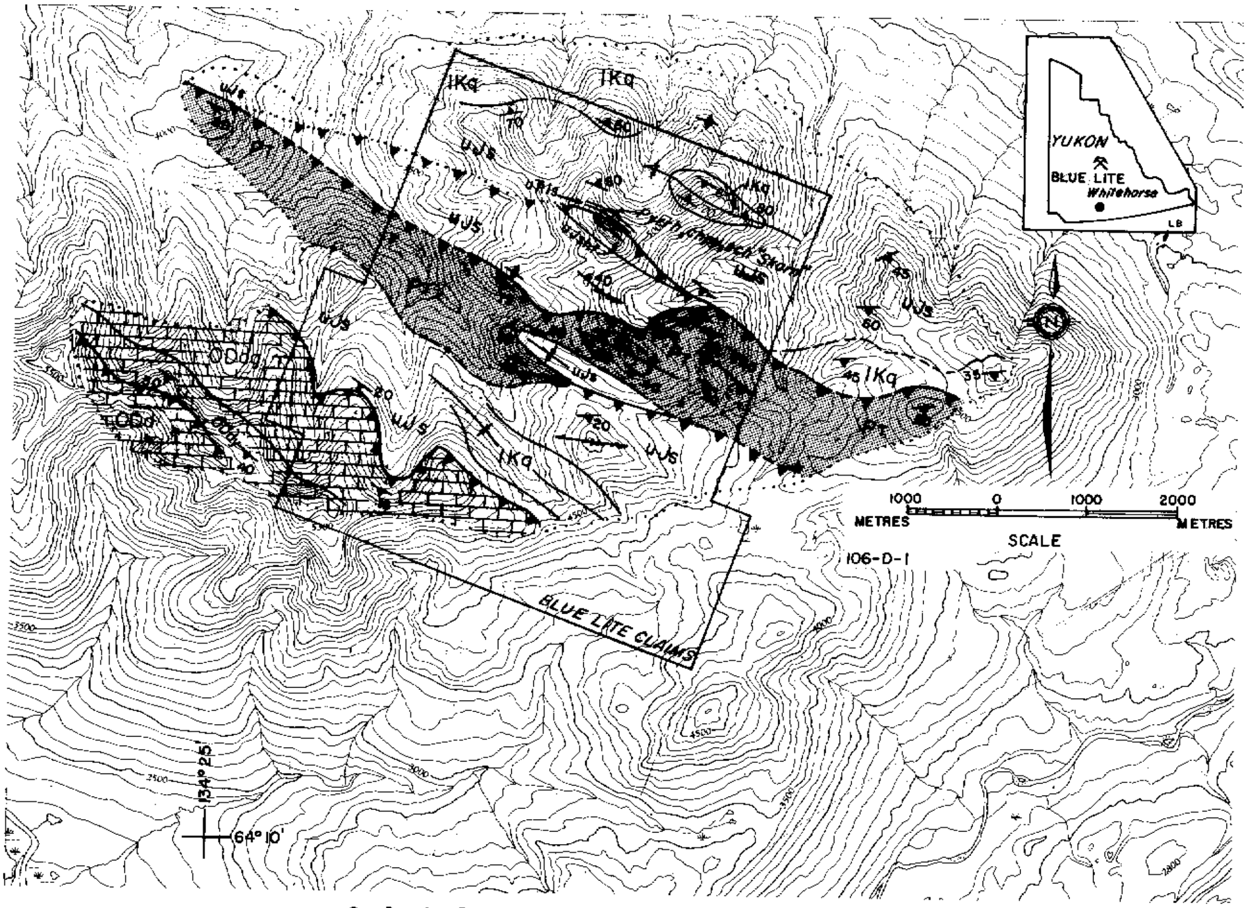
Four BQ holes totalling 325 m were drilled on the claims during 1980. Three of these holes tested a galena sphalerite showing and the fourth sought the source of argentiferous galena boulders. Minor mineralization was intersected in the holes and this generally grades below 0.5% lead, 1% zinc and 10 gm/tonne silver. No further drilling is planned.

BLUE LITE
Prism Resources Limited

Tungsten Skarn
106 D 1 (70)
(64°13'N,134°22'W)

Claims: BLUE LITE 1-128

Source: By D. Tempelman-Kluit based on property visit.



Geological map showing BLUE LITE claims.

LEGEND

LOWER CRETACEOUS

KENO HILL QUARTZITE

lKq Dark grey, thin-to medium-bedded, fine-grained resistant orthoquartzite with interbedded dark slate.

UPPER JURASSIC

"LOWER SCHIST"

uJs Black, moderately recessive weathering graphitic, noncalcareous, sooty slate, thin-bedded to laminated with well developed slaty cleavage. Minor interbedded orthoquartzite. uJshf - hornfelsed equivalents.

UPPER TRIASSIC

uTRls Sooty black graphitic thin-bedded limestone with minor slate.

PERMIAN

TAKHANDIT FORMATION

PT White weathering, resistant, thick-bedded sparry limestone, commonly with pale coloured chert granules and grains. Minor dark shaly limestone.

ORDOVICIAN TO DEVONIAN

ODdg Light grey to white weathering, resistant, well bedded medium-bedded dolostone.

ODdy Yellowish weathering, medium-and thin-bedded dolostone.

ODd Thick-bedded, resistant weathering dolostone.

Description:

The writer visited the property one day in August and the map of the geology and description are based on this visit. The writer was guided on the claims by Sheila Churchill and George Sivertz.

The claims, 3 km southwest of Kathleen Lake, were staked following discovery of scheelite in regional exploration during 1979.

A thrust repeated sequence of sedimentary rocks is exposed on the claims. The lowest thrust plate includes black graphitic slate of the "Lower Schist". This is an Upper Jurassic unit overlain conformably and with gradational relations by dark grey thin-bedded orthoquartzite, a part of the Lower Cretaceous "Keno Hill Quartzite". The rocks of this lower plate were previously considered to be correlatives of the Devono-Mississippian Black Clastic by S. L. Blusson (1978). E.T. Tozer discovered diagnostic fossils in the slate in Rackla River on trend and 2 km east of the claims and these fossils indicate the slate is Late Jurassic (E.T. Tozer written communication). The second thrust plate brings the Permian Takhandit Formation, a thick-bedded limestone, above the Mesozoic rocks on a south-dipping thrust. The Takhandit in this plate is overlain by a second panel of the "Lower Schist" and Keno Hill Quartzite. The third thrust plate has brought Early Paleozoic thick-bedded pale coloured dolomite above the Mesozoic strata and the stratigraphic throw of the thrust is considerably more than that of the others.

The showing occurs in the footwall of the lowest or northernmost thrust on the steep wall of a north facing cirque where the beds dip steeply north and the thrust dips steeply south. Scheelite is disseminated through a zone about 5 m thick and is associated with abundant pyrrhotite and minor chalcopyrite. The showing is a poorly developed skarn in black limestone that is probably Upper Triassic.

There is no exposed igneous rock on the claims that can explain the skarn in the main showing or the hornfels immediately above it. Intrusive rocks probably occur at depth below the showing and are not unroofed.

Current Work and Results:

The following is summarized from assessment report 090648 by S. Churchill. During 1979, the claims were soil sampled on a grid and geological mapping was done. Hand trenching was done on one showing and a single NQ hole 140 m deep was drilled at 45 to the south, obliquely across the bedding of the host rocks. Drill core grades between 0.02 and 0.08% WO_3 over a 10 m interval. During 1980, creeks on the property were pan fried at about 1/2 km intervals.

1980 MINERAL CLAIMS STAKED

RAMBLER — 106 D 3 (10)
Ariadna Chrnavska et al — (64°05'N,135°00'W)
Turner Energy

Claims 1980: MICHELLE (13); OX (6); KLASSEN (2)
Fringe staking

PESO — 106 D 4 (15)
Canada Tungsten — (64°01'N,135°56'W)

Claims 1980: MOLE (15)

LYNX — 106 D 4 (23)
Canada Tungsten — (64°04'N,135°38'W)

Claims 1980: CJ (240)

MCKAY HILL — 106 D 6 (26)
Grant Oil Inc. — (64°21'N,135°22'W)

Claims 1980: BEAVER (8)

PAGISTEEL — 106 D 16 (37)
Zelon Enterprises — (64°50'N,134°17'W)

Claims 1980: IRON (28)

URSUS — 106 D 16 (61)
Pan Ocean Oil — (64°55'N,134°15'W)

Claims 1980: URSUS (29)

SPRING — 106 D 3 (62)
Rambler Explorations — (64°03'30N,135°01'W)
D. Symonds

Claims 1980: SPRING (24)

DEAL — 106 D 3 (63)
J. Strebchuk — (64°04'30"N,135°04"W)

Claims 1980: LEAD (8)

FACE — 106 D 16 (64)
Zelon Enterprises — (64°52'N,134°19'W)
Archer, Cathro and Associates

Claims 1980: FACE (8)

ADUB — 106 D 16 (65)
Zelon Enterprises — (64°52'30"N,134°12'W)

Claims 1980: ADUB (18)

HAIL — 106 D 16 (66)
Zelon Enterprises — (64°54'N,134°10'W)

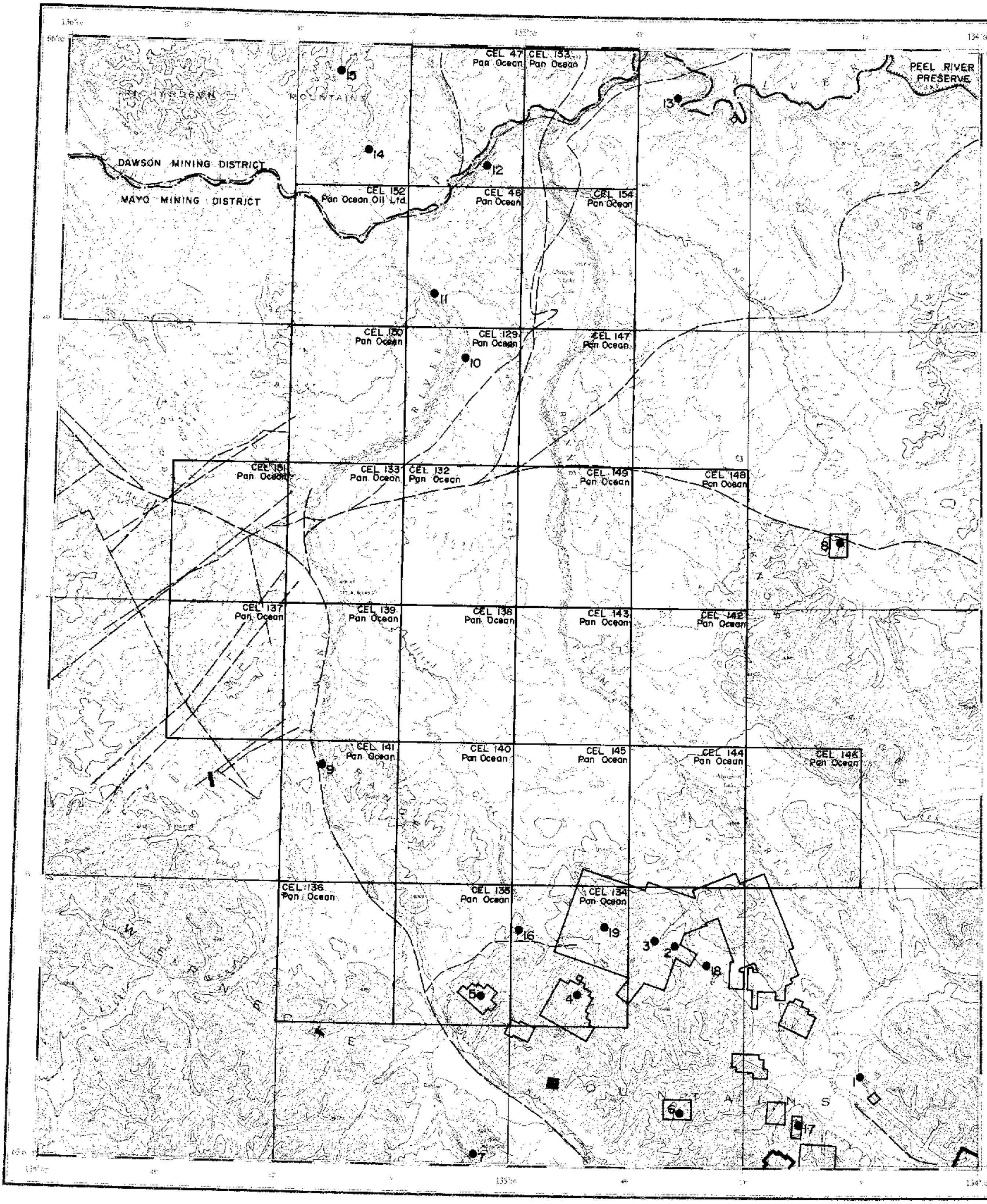
Claims 1980: HAIL (12)

PIK — 106 D 16 (67)
Archer, Cathro and Associates — 106 E 1
(65°00'N,134°26'W)

Claims 1980: PIKE (32)

SNOW STAR — 106 D 16 (68)
Zelon Enterprises — (64°54'N,134°00'W)

Claims 1980: SNOW STAR



WIND RIVER

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

O72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

◇ .... Oil or Gas Well

.... Airstrip

WIND RIVER MAP-AREA (NTS 106 E)

NO.	PROPERTY NAME	REFERENCE
1	IRENE	G.S.C., Pap. 76-1A, p. 132
2	GREMLIN	Copper-Silver-Occurrence
3	CHLOE	Lead-Zinc-Occurrence
4	FLUNK	MIR, 1975, pp. 65-67
5	FORSTER	MIR, 1974, pp. 67-68
6	IGOR	This Report
7	MAGIC	MIR, 1974, p. 69
8	HENDRY	MIR, 1974, pp. 63-64
9	PRONGS	G.S.C., Annual Report 1904, Vol. 16, Part CC, p. 30
10	CHAPPIE	G.S.C., Annual Report 1904, Vol. 16, Part CC, pp. 27-30
11	BASIN	G.S.C., Annual Report 1904, Vol. 16, Part CC, pp. 27-30
12	SAINVILLE	G.S.C., Annual Report 1904, Vol. 16, Part CC, pp. 41-46
13	LOPSTICK	G.S.C., Annual Report 1904, Vol. 16, Part CC, pp. 41-46
14	ONCE	MIR, 1974, pp. 86-87
15	TUKU	MIR, 1974, p. 87
16	SLATER	Coal
17	OTIS	This Report
18	SCYLLA	This Report
19	DEER	Uranium Breccia

IGOR
Wernecke Joint Venture;
Chevron Canada Limited;
Aquitaine Company of
Canada Limited;
Archer, Cathro and
Associates Limited

Copper, Uranium
Breccia
106 E 2 (6)
(65°03'N,134°38'W)

References: Sinclair et al (1975, p. 68), Bell and Delaney (1977, p. 53)

Claims: IGOR 1-26

Source: Summary by D. Tempelman-Kluit from assessment report 090756 by W.D. Eaton and A. R. Archer.

Current Work and Results:

Mineralization is restricted to a heterolithic breccia which underlies central parts of the claims. The minerals include hematite, magnetite, barite, pyrite, chalcopyrite and pitchblende and occur with dolomite, ankerite and siderite as disseminations within the breccia matrix.

In 1979, five drill holes totalling 486 m were completed. In 1980, 1969 m of drilling were done in 17 holes. This drilling shows that surface faults which are unmineralized are traceable into the subsurface, but that small fractures that are mineralized cannot be similarly followed downward. Highly variable uranium, copper and cobalt concentrations occur in breccia along an irregular fault that strikes east-northeast and that dips steeply west.

OTIS
Archer,Cathro and
Associates Limited;
Chevron Canada Limited;
Aquitaine Company of
Canada Limited

Uranium Breccia
106 E 1 (17)
(65°02'N,134°24'W)

References: Norris (1975); Sinclair et al (1976); Morin et al (1977, p. 103-126); Delaney (1978); Morin et al (1980), p. 18)

Claims: OTIS 11-20

Source: Summary by R. Debicki from assessment report 090580 by A. R. Archer.

Current Work and Results:

The claims were staked in June, 1975 by Wernecke Joint Venture which is managed by Archer, Cathro and Associates Limited. During 1975 geological, soil geochemical and radiometric surveys were carried out. The property was optioned to Eldorado Nuclear Limited in 1976. Prospecting, minor trenching and detailed radiometric surveys were carried out that year. In 1978, an airborne radiometric survey was conducted.

The claims are underlain by Helikian strata. Green phyllite of the Fairchild Lake Group is in fault contact with grey to black pyritic argillite to phyllite of the younger Quartet Group. Both units have been intruded by a polymictic diatreme breccia containing fragments of chert, argillite and carbonate rocks in a carbonate-rich matrix. Some of the country rock is altered to a grey-green to reddish calcsilicate. Two faults with zones of brecciated country rock cemented by quartz and chert with minor hematite and chlorite trend north and northwest across the property.

Mineralization consists of locally disseminated brannerite within the fault breccia and in fractures associated with the faults. Brick-red hematite alteration halos 2 to 10 cm wide commonly surround the brannerite.

One BQ hole was drilled to 137 m in 1979 to test possible fault related brannerite mineralization at depth. Some weak diatreme-type alteration was present at the drill site, although the closest known breccia lies 700 m north. The fault was intersected, but no mineralization was encountered. A radiometric borehole log also failed to indicate the presence of mineralization.

SCYLLA
Scylla Corporation

Uranium Breccia
106 E 2 (18)
(65°10'N,134°35'W)

References: Morin et al (1977, p. 101-107); Archer and Schmidt (1978)

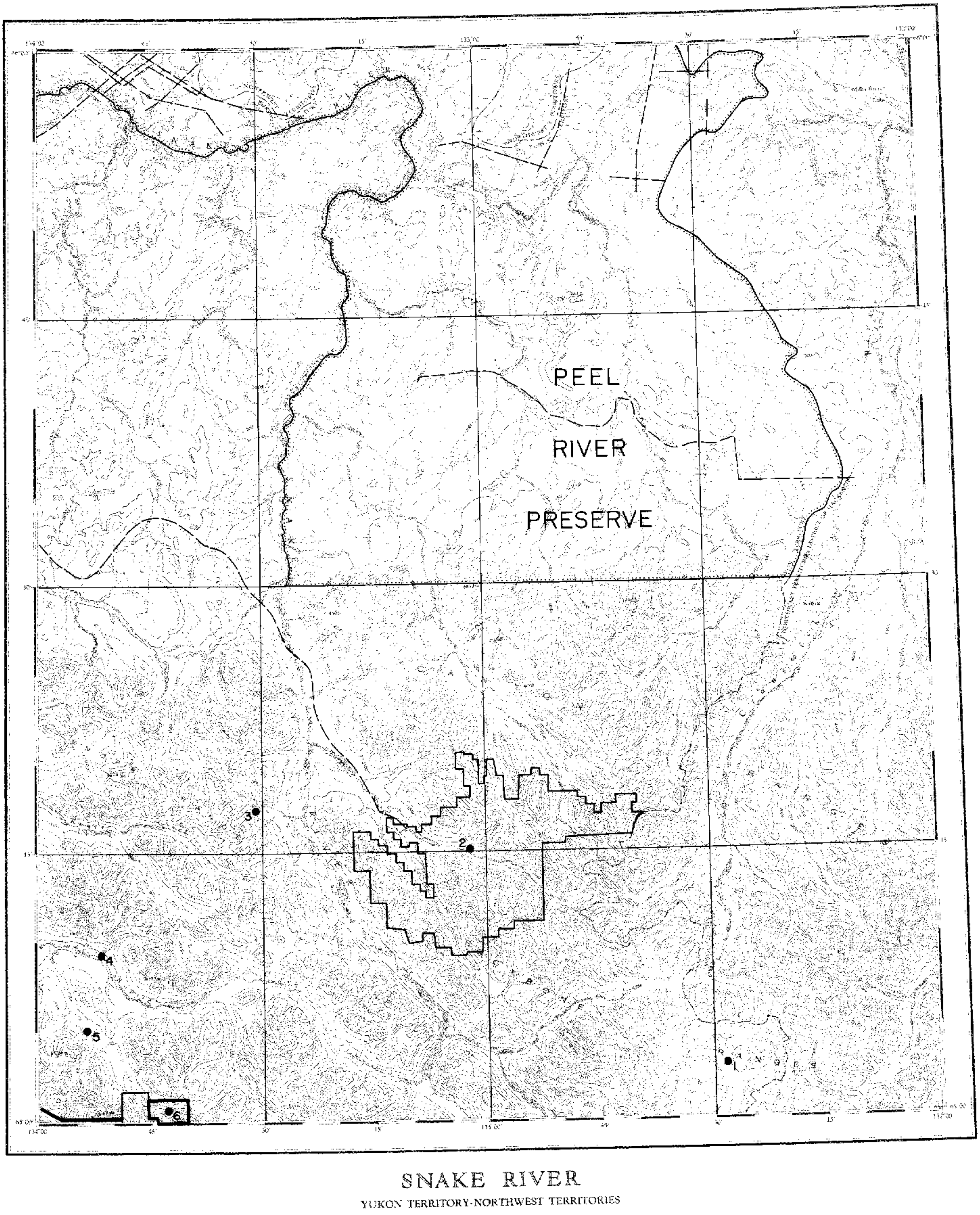
Claims: A 1-56; B 1-38

Source: Summary by R. Debicki from assessment report 090493 by P. S. White.

Current Work and Results:

Uranium showings were first located in the region in 1975. The A and B claim groups were staked in February, 1978, and cover uranium anomalies identified by the Geological Survey of Canada stream sediment geochemical survey of the area (Open File Report 518). Uranium-copper mineralization occurs in fractures in and near breccia pipes which cut only Helikian strata.

During 1978 and 1979, ground and airborne scintillometer surveys, prospecting, a reconnaissance geological survey and trenching were done. Follow-up ground scintillometer and prospecting work failed to confirm the anomalies discovered in the airborne survey. The claims are underlain by Helikian to Aphebian sedimentary rocks.



SNAKE RIVER

YUKON TERRITORY-NORTHWEST TERRITORIES

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

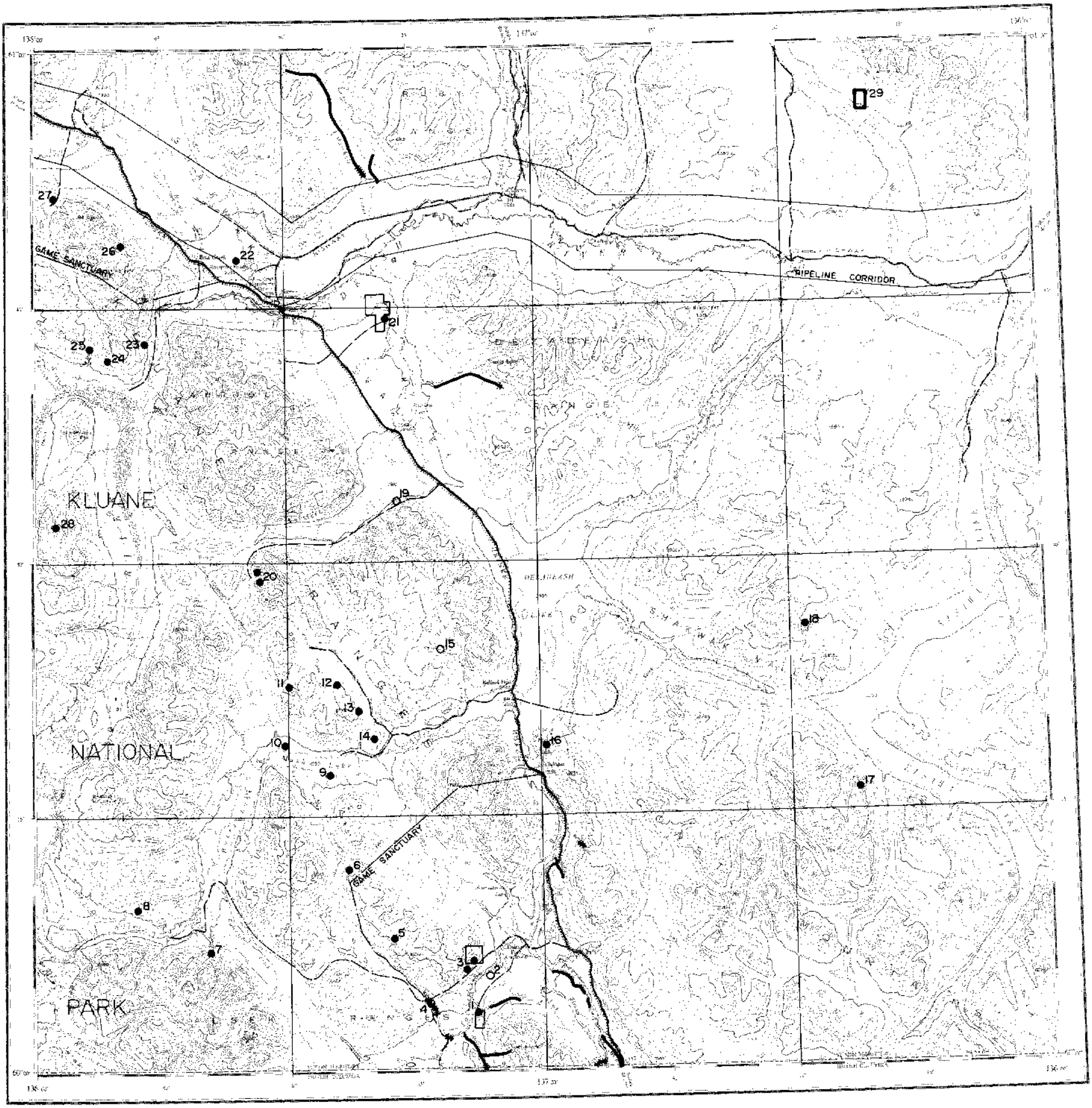
SNAKE RIVER MAP-AREA (NTS 106 F)

NO.	PROPERTY NAME	REFERENCE
1	VYE	Zinc Stratabound
2	CREST	Northern Miner, 1964, Sept. p. 83 G.S.C., Pap. 63-38, pp. 15-18
3	HOME	Zinc Occurrence
4	PLAINS	Zinc Stratabound
5	YUK	Lead-Zinc Occurrence
6	VOLE	This Report

1980 MINERAL CLAIMS STAKED

VOLE
Pan Ocean Oil
106 F 4 (6)
(65°00'30"N,133°43'W)

Claims 1980: VOLE (38)



DEZADEASH
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

DEZADEASH MAP-AREA (NTS 115 A)

NO.	PROPERTY NAME	REFERENCE
1	JACKPOT	G.S.C., Pap. 69-55, pp. 43-44 MIR, 1973, p. 72 G.S.C., Pap. 71-1A, p. 85
2	DALTON	
3	KANE	This Report
4	CHICKALOON	
5	PHOTO	G.S.C., Pap. 68-68, p. 74
6	MUSH	G.S.C., Pap. 61-23, pp. 37-38
7	BATES	G.S.C., Mem. 268, p. 56
8	FENTON	Copper Vein
9	CAVE	Copper-Silver Vein
10	SHAFT	Copper Occurrence
11	BELOUD	G.S.C., Mem. 268, pp. 49-50, 55
12	HUSKY	Copper
13	WREN	Copper
14	KEL	Copper
15	SHORTY	G.S.C., Mem. 268, pp. 49, 55
16	KLUKSHU	Copper Occurrence
17	DEVILHOLE	Copper-Molybdenum-Lead Porphyry
18	KUSAWA	Skarn Copper
19	MILLHOUSE	
20	JOHOBO	G.S.C., Pap. 67-40, p. 55 G.S.C., Pap. 71-1A, p. 85 G.S.C., Pap. 63-1
21	REX	G.S.C., Pap. 67-40, p. 55 MIR, 1973, p. 73
22	ELGIN	Skarn Copper
23	STRIDE	G.S.C., Mem. 268, p. 56
24	SUGDEN	G.S.C., Mem. 268, p. 58
25	FERGUSON	G.S.C., Mem. 209, p. 11 G.S.C., Mem. 193, p. 12
26	DECOELI	Copper-Asbestos Vein
27	KLOO	G.S.C., Pap. 67-40, p. 54
28	SOUTHER	G.S.C., Pap. 75-1A, pp. 66-70
29	SIFTON	This Report

KANE
Northern Horizon
Resource Corporation

Silver, Lead Vein
115 A 3 (3)
(60°07'N,137°07'W)

Reference: Sinclair et al (1975, p. 140-141)

Claims: TUF 1-48

Source: Summary by R. Debicki from assessment report 090519 by J. H. Kruzick.

Description:

The TUF claims were staked to cover a silver-lead bearing vein. A tote trail leads 18 km west to the property from km 173 of the Haines Highway.

Current Work and Results:

Geological mapping, trenching, rock sampling and soil geochemical surveys were carried out on the claims in 1979. The claims are underlain by fine- to coarse-grained granite to gabbro, with fine- to medium-grained hornblende diorite most common. Several faults and three sets of dikes transect the diorite. The most persistent set of dikes are orange to grey weathering quartz-feldspar-hornblende porphyry. The dikes strike northwest and dip 60° to 80° southwest. They have been traced along strike for up to 800 m, and are between 12 and 15 m thick.

Lead-silver mineralization occurs in quartz veins, fracture fillings, and as disseminations in one altered porphyry dike. Galena, sphalerite, pyrite and tetrahedrite-tennantite are present in a sulphide-bearing zone more than 180 m long and 60 to 90 cm wide. The best chip sample from trenches across the mineralized zone contain 4276 gm/tonne silver and 5.35% lead across 60 cm. The average grade of 7 trenches dug at intervals along the 180 m of exposed mineralized vein is 2076 gm/tonne silver and 3.15% lead across 45 cm. No sulphide mineralization was seen in other dikes.

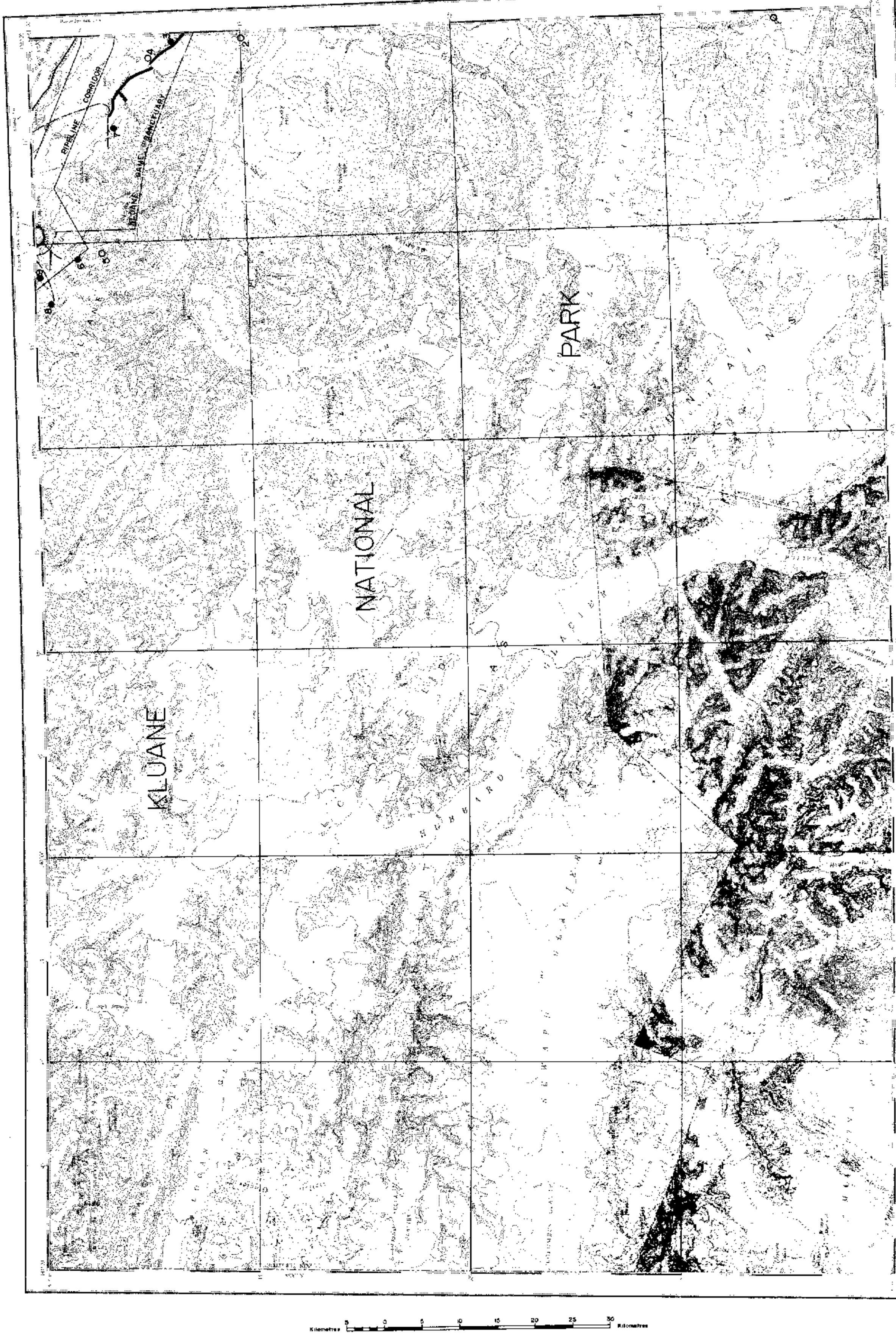
Approximately 450 soil samples collected on a 30 x 30 m grid over the mineralized zone were analyzed for lead, zinc and silver. Known mineralization was outlined.

1980 MINERAL CLAIMS STAKED

SIFTON
Union Carbide

115 A 16 (29)
(60°56'30"N,136°20'W)

Claims 1980: TIM (8)



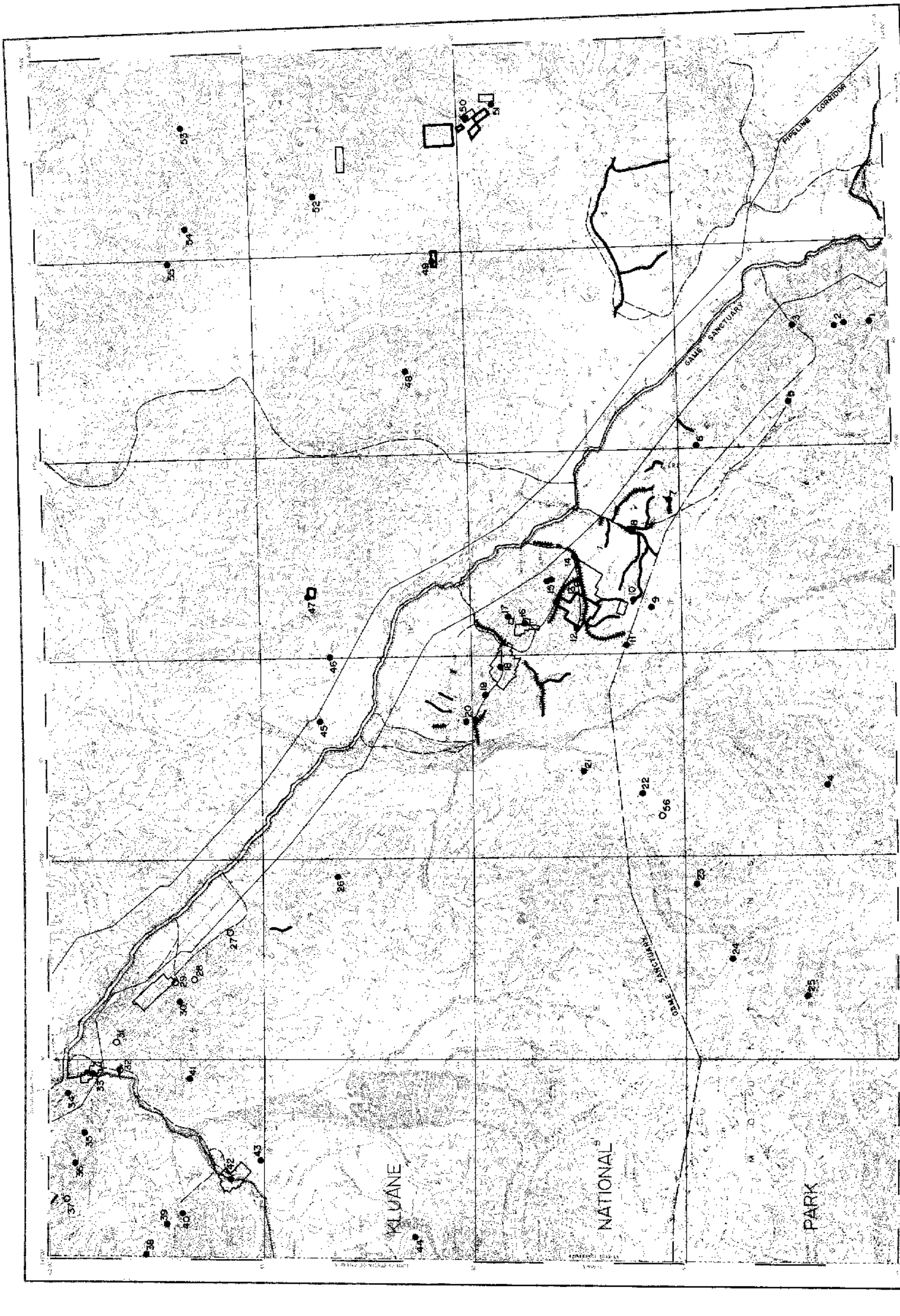
MOUNT ST ELIAS
CANADA-UNITED STATES OF AMERICA

Kilometres 5 0 5 10 15 20 25 30 Kilometres

- ●81 .... Mineral Deposit or Occurrence see Key on facing page
- ○72 .... Unmineralized Target
- .... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980
- .... Mineral Claims staked in 1980
- .... Placer Leases in good standing (Jan. 1981)
- .... Placer Claims in good standing (Jan. 1981)
- CEL .... Coal Exploration Lease
- CML .... Coal Mining Lease
- .... Tote Trail
- .... Driveable Road
- ◇ .... Oil or Gas Well
- .... Airstrip

MOUNT ST. ELIAS MAP-AREA (NTS 115 B-C)

NO.	PROPERTY NAME	REFERENCE
1	PLUG	Copper-Silver Occurrence
2	KASKAWULSH	Copper-Silver Occurrence
3	KIMBERLEY	G.S.C., Mem. 268, p. 58
4	JARVIS	G.S.C., Summary Report 1904, 16 A
5	DULUTH	Nickel-Copper Magmatic
6	GIBBONS	Nickel-Copper Magmatic
7	TELLURIDE	Copper-Zinc-Silver-Gold-Nickel Massive Sulphide
8	BULLION	Gypsum-Copper-Lead Stratabound
9	SHEEP	G.S.C., Summary Report 1904, p. 17A



KLUANE LAKE
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
○72 .... Unmineralized Target	.... Placer Claims in good standing (Jan 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	.... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

KLUANE LAKE MAP-AREA (NTS 115 G-F)

NO.	PROPERTY NAME	REFERENCE
1	METALLINE	G.S.C., Summary Report 1904, 16 A, p. 18
2	STOVE	G.S.C., Mem. 340, pp. 113-114
3	CONGDON	MIR, 1973, pp. 66-67
4	MULLER	G.S.C., Mem. 340, p. 112
5	DICKSON	Nickel-Copper-Cobalt Magmatic
6	DESTRUCTION	Nickel-Copper Magmatic
7	WINDGAP	MIR, 1969-1970, pp. 153-154
8	DUKE	Asbestos
9	HOGE	G.S.C., Mem. 340, pp. 113-115
10	AMPHITHEATRE	G.S.C., Mem. 340, pp. 113-115
11	WADE	Copper-Silver
12	CORK	This Report
13	GLEN	This Report
14	BURWASH	G.S.C., Summary Report 1914, p. 31
15	JACQUOT	MIR, 1969 & 1970, p. 103 G.S.C., Pap. 71-1A, p. 85
16	QUILL	G.S.C., Pap. 68-68, pp. 70-72 G.S.C., Pap. 71-1A, p. 85
17	VERSLUCE	G.S.C., Pap. 68-68, pp. 70-72
18	WELLGREEN	MIR, 1973, pp. 64-65 G.S.C., Pap. 72-1A, pp. 81-82
19	AIRWAYS	Copper-Nickel Magmatic
20	MUSKETEER	Copper-Nickel Magmatic
21	CEMENT	G.S.C., Summary Report 1905 G.S.C., Summary Report 1904, Part A, p. 18
22	ST. ELIAS	G.S.C., Pap. 61-23, p. 36
23	SHARPE	G.S.C., Mem. 340, p. 112
24	GALLOPING	G.S.C., Pap. 61-23, p. 36
25	ICEFIELD	G.S.C., Pap. 61-23, p. 36
26	GARLIC	Copper-Molybdenum Occurrence
27	LIBERTY	Copper-Nickel Occurrence
28	DUENSING	
29	CATS AND DOGS	Copper-Nickel Occurrence
30	MEXICO	Skarn Copper
31	PICKHANDLE	G.S.C., Pap. 71-1A, p. 85
32	SEVENSMA	
33	CANALASK	G.S.C., Pap. 69-55, p. 39 MIR, 1973, pp. 60-61 G.S.C., Pap. 72-1A, pp. 81-82
34	EPIC	Copper-Molybdenum Vein
35	TAYLOR	Skarn Copper-Molybdenum
36	SANPETE	MIR, 1971-1972, pp. 37-38
37	HUMP	G.S.C., Mem. 74, p. 193
38	MEMOIR	G.S.C., Mem. 50, p. 141
39	MCLELLAN	G.S.C., Mem. 50, p. 141
40	RABBIT	G.S.C., Mem. 50, pp. 123-124 G.S.C., Pap. 71-1A
41	LEP	MIR, 1971-1972, pp. 38-39
42	WHITERIVER	MIR, 1974, pp. 138-139
43	SHARE	
44	KLETSAN	G.S.C., Pap. 69-55, p. 42 National Geographic Magazine, Vol. 4, pp. 117-162 U.S. Geological Survey, Bull. 417, pp. 51-57 (1910)
45	ELEVENTHIRTY	G.S.C., Mem. 267, p. 40
46	KENNEDY	G.S.C., Mem. 267, P. 40
47	TINCUP	This Report
48	BROOKS	G.S.C., Mem. 340, p. 112
49	TALBOT	This Report
50	RAFT	This Report
51	ROCKSLIDE	G.S.C., Mem. 340, pp. 112-113
52	DWARF	MIR, 1973, pp. 70-71
53	BIRCH	MIR, 1971 & 1972, p. 83
54	BRUMMER	MIR, 1971 & 1972, pp. 85-86
55	RHYOLITE	MIR, 1971 & 1972, pp. 83, 87
56	NICK	Nickel Magmatic

GLEN
Halferdahl and Associates Limited

Unmineralized Target
115 G 6 (13)
(61° 22'N,139° 19'W)

References: Read and Monger (1976); Morin et al (1980, p. 46)

Claims: EL 1-8; JO 1-8; SUE 1-8; KAT 1-8; JAN 1-8; NAN 1-8; DEN 1-8; WEN 1-8; AND 1-8; JY 1-8.

Source: Summary by R. Debicki from assessment report 090499 by L.B. Halferdahl and R. Bissonnette, and assessment report 090655 by L.B. Halferdahl.

Description:

The BUR property is accessible by an 11 km road which leads south from km 1766 of the Alaska Highway, north of the town of Burwash. The claims were staked in August, 1978 over rusty weathering rocks considered to have potential for nickel, base metal and precious metal mineralization. Previous work was done on the property by other operators, most notably in 1966-1967 by Alice Lake Mines Limited, and 1972-1973 by the same company. Parts of the claim group were mapped and 411 soil samples were collected in 1978.

Current Work and Results:

Geological and soil and humus geochemical surveys were carried out in 1979 and 1980. Magnetic surveys were also done. The claims are underlain by volcaniclastic rocks of the Permian Station Creek Formation of the Skolai Group intruded by one or more Permo-Triassic gabbroic sill-like bodies and Paleocene latite porphyry masses. Rusty weathering volcaniclastic rocks near Tatamagouche Creek contain abundant pyrrhotite and other sulphides, with low concentrations of gold and other metals.

Overburden drilling was carried out at 169 sites in 1979, and 174 sites in 1980. The overburden samples obtained were mostly from depth of less than 1 m. From 10 to 20 cm of white volcanic ash is present just below surface on the claims. Soil samples obtained by drilling were analyzed for copper, nickel, lead, zinc, gold and arsenic. Several coincident copper-nickel anomalies were outlined.

The magnetic survey outlines the gabbroic sill. Some or all of the conductors identified by a previous electromagnetic survey indicates the margins of the sill. The geochemical anomalies appear to coincide with basal contacts of the sill.

1980 MINERAL CLAIMS STAKED

CORK
115 G 6 (12)
(61°22'N,139°25'W)

Claims 1980: JY (56)

TINCUP
115 G 11 (47)
(61°41'N,139°20'W)

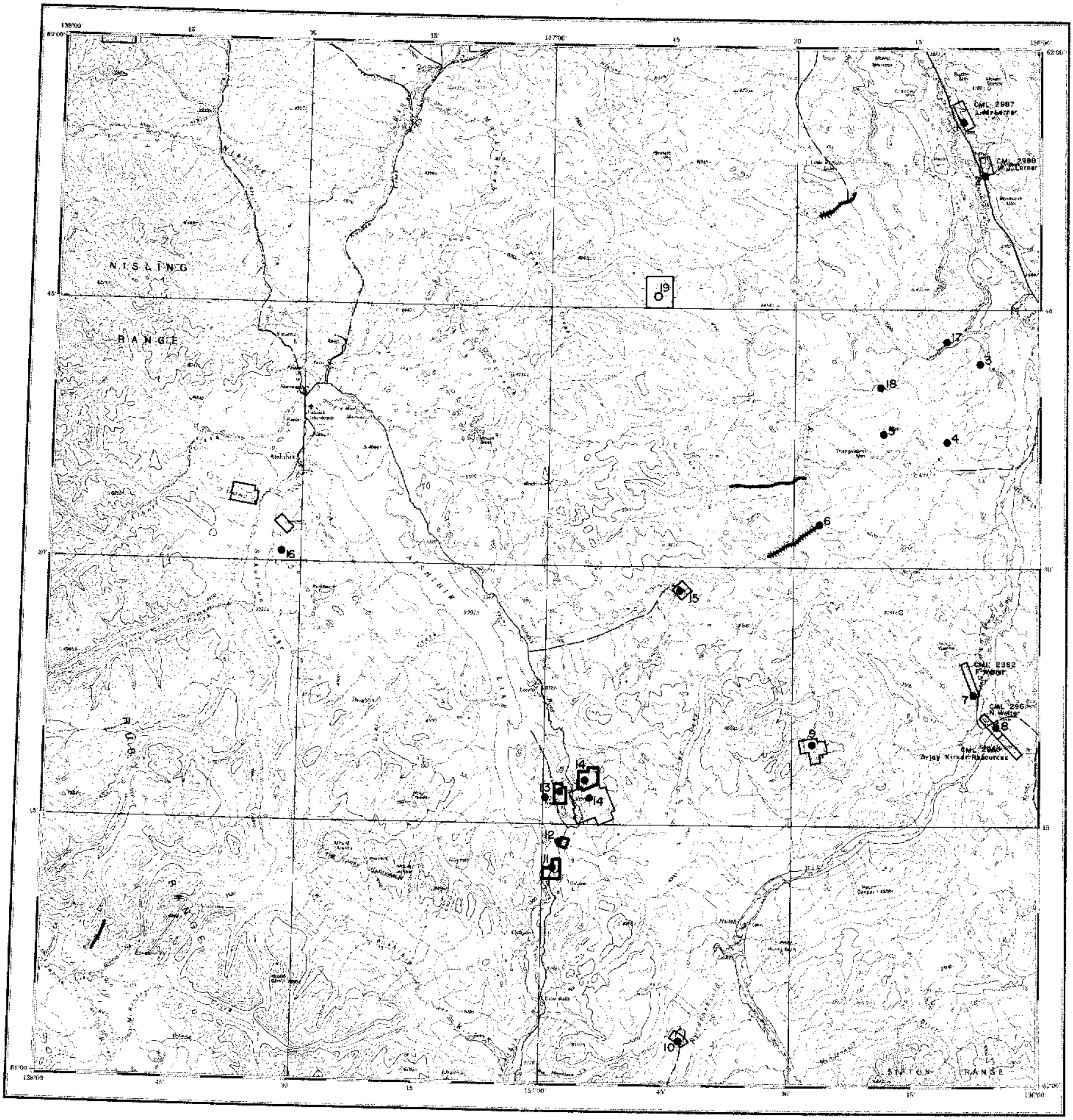
Claims 1980: RENIE (22)

TALBOT
115 G 10 (49)
(61°32'N,138°31'W)

Claims 1980: THUNDER (8)

RAFT
H. Larsen
115 G 8,9 (50)
(61°29'30"N,138°10'W)

Claims 1980: BEAR (23); HANK (48)



AISHIHIK LAKE
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

...... Mineral Claims in good standing (Jan. 1981) and staked before Jan 1980

...... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

...... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

AISHIHIK LAKE MAP-AREA (NTS 115 H)

NO.	PROPERTY NAME	REFERENCE
1	LOSCH	G.S.C., Mem. 5, p. 49
2	ANDESITE	Coal
3	AH	Copper Vein
4	MACK'S	MIR, 1971 & 1972, pp. 80-81
5	SNIPE	Copper Occurrence
6	KIRK	Copper Occurrence
7	VOWEL	G.S.C., Summary Report 1907
8	DIVISION	Coal
9	LION	Molybdenum-Lead Occurrence
10	MORAINE	This Report
11	GILTANA	This Report
12	AISHIHIK	MIR, 1973, pp. 69-70, and This Report
13	JANISIW	G.S.C., Mem. 5, pp. 57-58 and This Report
14	HOPKINS	This Report
15	SATO	MIR, 1971 & 1972, pp. 88-89
16	SEKULMUN	This Report
17	ORLOFF	Gold Occurrence
18	SHAD	Copper
19	BUFFALO	This Report

MORAINE
Hudson Bay Exploration and Development Company Limited

Copper, Tungsten Skarn
115 H 2 (10)
(61°02'N,136°44'W)

Claims: COOT 1-8 (lapsed)

Source: Summary by R. Debicki from assessment report 090488 by D. A. Downing.

Current Work and Results:

The claims are underlain by metamorphosed sedimentary rocks that are probably Proterozoic, in which skarns are developed. Old trenches attest to previous work on the property.

In 1979, a magnetometer survey was carried out over the claims, with readings taken 25 m apart along lines at 100 m spacings. The lines are perpendicular to the strike of the strata. One moderately high anomaly correlating to a magnetite-epidote skarn, and a weaker anomaly correlating to a thin pyrrhotite-garnet skarn were identified.

BUFFALO
Noranda Exploration Company Limited

Unmineralized Target
115 H 15 (19)
(61°46'N,136°46'W)

Claims: TAH 1-42

Source: Summary by G. Abbott from diamond drilling assessment report 090814 by G. MacDonald.

Current Work and Results:

The TAH claims were staked by Noranda in the summer of 1977 and explored with three diamond drill holes totalling 265 m in 1980. The claims are underlain by Jurassic porphyritic quartz monzonite and Tertiary acid volcanics. The drill holes intersected altered gneissic granodiorite and porphyritic quartz monzonite. Core was assayed for copper, gold and silver, and returned low values.

1980 MINERAL CLAIMS STAKED

GILTANA — 115 H 2 (11)
(61°12'N,136°59'W)

Claims 1980: GFM (16)

AISHIHIK — 115 H 2 (12)
(61°14'N,136°57'W)

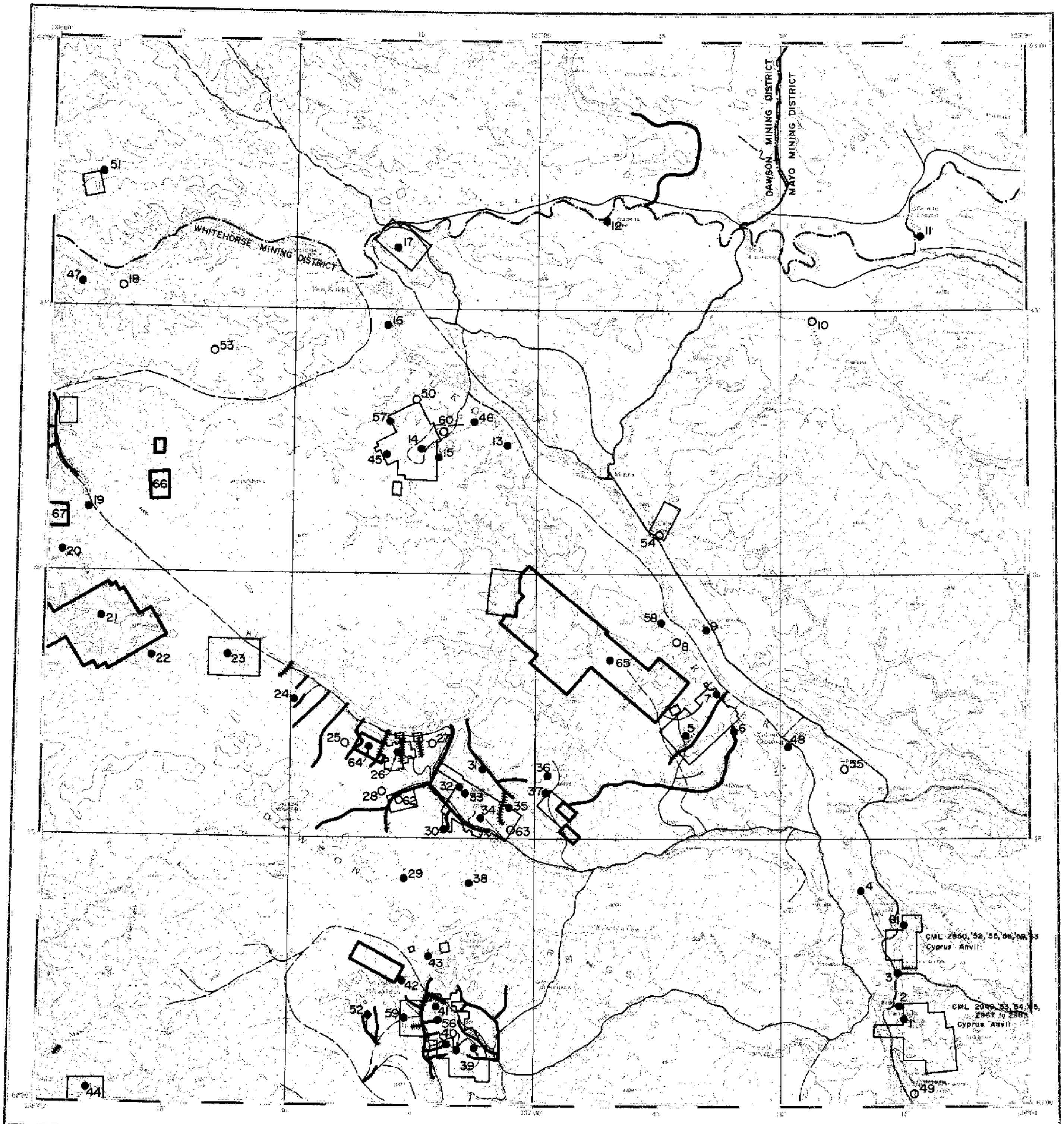
Claims 1980: VERA (4)

JANISIW — 115 H 7 (13)
(61°17'N,136°57'W)

Claims 1980: COP (14)

HOPKINS — 115 H 7 (14)
(61°17'30"N,136°55'W)

Claims 1980: BAR (8); RO (8)



CARMACKS
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip

CARMACKS MAP-AREA (NTS 115 I)

NO.	PROPERTY NAME	REFERENCE
1	SOUTH TANTALUS	G.S.C., Pap. 67-40, p. 89
2	TANTALUS MINE	G.S.C., Mem. 5, pp. 59-63 G.S.C., Mem. 189, pp. 58-59
3	TANTALUS BUTTE	G.S.C., Mem. 5, pp. 52-53 G.S.C., Pap. 68-68, p. 114 MIR, 1974, p. 168
4	FIVE FINGERS MINE	G.S.C. Mem. 189, pp. 62-63
5	WILLIAMS CREEK	Copper-Silver-Gold-Molybdenum Occurrence
6	MERRICE	G.S.C., Summary Report, 1909
7	BONANZA KING	G.S.C., Pap. 66-31, pp. 42-44
8	MAUD	
9	HOOCHEKOO	G.S.C. Annual Report, 1887, Vol. III, p. 145 B
10	TOWHATA	G.S.C., Mem. 189, p. 63
11	NEEDLEROCK	G.S.C. Summary Report, 1902, Vol. XV, Part A, pp. 31, 38
12	BRADENS CANYON	Copper-Gold-Silver-Molybdenum Occurrence
13	COIN	MIR, 1973, pp. 48-49
14	MINTO	MIR, 1974, pp. 96-100
15	PAL	MIR, 1974, pp. 100-101
16	GRENIER	G.S.C., Mem. 189, p. 63
17	PELLY	MIR, 1971-1972, p. 60
18	MINNESOTA	
19	TAD	MIR, 1971-1972, pp. 77-79
20	PHELPS	MIR, 1969-1970, pp. 71-72
21	FROG	This Report
22	STARBIRD	MIR, 1971-1972, pp. 70-71
23	CASH	MIR, 1974, pp. 111-112
24	KLAZAN	MIR, 1969-1970, pp. 87-88
25	COM	
26	REVENUE	MIR, 1969-1970, pp. 79-82 MIR, 1974, pp. 114-115
27	COMBO	MIR, 1969-1970, pp. 83-84
28	BOW	MIR, 1969-1970, pp. 82-83
29	LIL	G.S.C., Mem. 220, p. 16
30	CARIBOU CREEK	G.S.C., Mem. 220, pp. 15-16 MIR, 1974, pp. 118-119
31	KOOK	MIR, 1974, pp. 117-11832
32	RED FOX	This Report
33	GUDER	This Report
34	LAFORMA	This Report
35	EMMON	G.S.C., Mem. 214, pp. 19-20 MIR, 1969-1970, pp. 78-79
36	GRANITE MOUNTAIN	G.S.C., Pap. 68-68, pp. 34-35
37	TINTA HILL	MIR, 1974, pp. 120-121 G.S.C., Pap. 61-23, pp. 35-36
38	FOSTER	G.S.C., Mem. 209, pp. 10-11
39	BROWN McDADE	G.S.C., Pap. 69-55, p. 23
40	MT. NANSEN	G.S.C., Pap. 68-68, pp. 35-38 MIR, 1969-1970, pp. 88-89
41	CYPRUS	This Report
42	ESANSEE	This Report
43	DIVIDE	MIR, 1974, p. 126
44	MALONEY	MIR, 1969-1970, pp. 76-78
45	COMANCHE	MIR, 1974, pp. 101-102
46	NORTHAIR	MIR, 1974, p. 107
47	TUF	MIR, 1974, p. 95
48	CROSSING	Copper Vein
49	EWING	
50	ORI	MIR, 1974, pp. 108-109
51	KERR	Molybdenum-Copper Occurrence
52	LONELY	Copper Occurrence
53	SAM	
54	MCCABE	
55	RINK	G.S.C., Summary Report, 1900
56	GOULTER	Gold-Silver Vein
57	GIANT	MIR, 1974, pp. 102-103
58	BLUFF	MIR, 1974, pp. 122-123
59	RUSK	MIR, 1973, pp. 38-39
60	BOYLEN	MIR, 1974, p. 103
61	HLAVAY	MIR, 1973, pp. 120-121
62	LETA	This Report
63	DART	This Report
64	NUCLEUS	This Report
65	STU	This Report
66	MUT	This Report
67	NIT	This Report

FROG
NAT Joint Venture;
Chevron Canada Limited;
Armco Mineral Exploration Limited;
Archer, Cathro and Associates Limited

Silver, Lead Veins
115 I 5 (21)
(62°27'N,137°55'W)

Reference: Craig and Milner (1975, p. 58)

Claims: LILYPAD 1-32; NEWT 1-6

Source: Summary by D. Tempelman-Kluit from assessment report 090741 by E.P. Onasick and A.R. Archer.

Description:

The 423 contiguous claims were staked in 1980 to cover an area of Jurassic coarse-grained hornblende syenite that is intruded by mauve medium-grained monzonite or quartz monzonite (Late Cretaceous). This younger rock is the subvolcanic phase of the Late Cretaceous Mount Nansen intermediate volcanics that underlie Prospector Mountain. The plutonic rocks and the volcanic rocks intrude and overlie mica schist of Yukon Cataclastic Complex. The Carmacks volcanics are basalt that is coeval with the Mount Nansen andesite which overlies the Mt. Nansen Group comformably. Pyrite is disseminated in the volcanic rocks and is widespread.

Current Work and Results:

Soil samples were collected from 910 localities and analyzed.

RED FOX, GUDER, LAFORMA
Archer, Cathro and Associates Limited
(Freegold Project)

Gold Porphyry
115 I 6 (32,33,34)
(62°16'N,137°07'W)

References: Johnston (1937, p. 17-18); Green (1966, p. 29-31); Findlay (1969, p. 23); Sinclair et al (1975, p. 115-116)

Claims: GNAT (1-94, 96-102)

Source: Summary by D. Tempelman-Kluit from assessment report 090711 by A. R. Archer.

Current Work and Results:

The GNAT claims on Freegold Mountain northwest of Carmacks were staked in 1979 by Esperanza Exploration Limited. They were optioned by Arctic Red Resources Limited along with claims held by Discovery Mines and an adjoining group of claims held by F. Guder. The entire set of claims was explored by Archer, Cathro and Associates as the Freegold Project in 1980. Work included grid soil sampling on a part of the claims thought to be favourable for a bulk gold deposit and centered on a Tertiary intrusive breccia complex of the Mount Nansen suite.

Geology of the breccia complex was mapped in detail and an excellent map was produced. The 810 samples were analyzed for gold, arsenic, silver, lead, zinc and copper and have given definitive results. Background values for gold in the Dawson Range are below 1 ppb, while threshold and anomalous levels are 5 ppb and 20 ppb respectively. Nearly all samples in the grid are above this threshold and most samples over the breccia complex exceed 160 ppb. Arsenic background and anomaly levels are 5 ppb and 40 ppm respectively. Like gold, arsenic is uncommonly high in the Freegold grid and it is consistently above 250 ppm over the breccia. Similar but less marked response is seen for silver, lead and zinc. Over the breccia silver is commonly above 2 ppm, the regional anomalous level; lead is at about the anomalous level of 100 ppm and zinc is generally above 100 ppm, the threshold level for that metal. The copper values are below 100 ppm over the entire grid, which is considered roughly the threshold level.

CYPRUS
Cominco Limited

Copper,
Molybdenum Porphyry
115 I 3 (41)
(62°05'N,137°11'W)

Reference: Sawyer and Dickinson (1976).

Claims: SEN 1-8

Source: Summary by D. Tempelman-Kluit from assessment report 090616 by L. J. Nagy.

Current Work and Results:

The SEN claims, staked in 1979, cover a small quartz-tourmaline breccia pipe near Mount Nansen. Low grade copper and molybdenum mineralization are disseminated in the rocks and this was investigated as the CYPRUS showing previously. The work was directed toward testing the breccia pipe as a possible host for Bolivian style cassiterite.

The breccia pipe, 30 to 50 m in diameter, has fragments of volcanic rocks and porphyry cemented by tourmaline, but it lacks cassiterite.

A soil geochemical survey was carried out over the claims with 480 samples analyzed for tin, tungsten and molybdenum. Results defined two small molybdenum anomalies with values between 5 and 22 ppm and two tungsten anomalies in the center of the claims. No anomalous tin values were noted.

ESANSEE
BRX Mining and Petroleum Corporation

Silver, Gold, Lead,
Zinc Vein
115 I 3 (42)
(62°07'N,137°15'W)

References: Craig and Laporte (1970, p. 90-91); Findlay (1969b, p. 25)

Claims: TAWA 1-72

Source: Summary by G. Abbott from assessment report 090692 by C. R. Saunders.

Current Work and Results:

BRX explored the property in 1980 with three short bulldozer trenches, a soil geochemical survey and seven diamond drill holes totalling 447.3 m. Two 1968 trenches were reopened and yielded similar assays to those obtained previously. Trench No. 3 is new and exposes a decomposed vein with 5.58 gm/tonne gold and 31.8 gm/tonne silver over 0.61 m. A second chip sample across the vein assayed 1.36 gm/tonne gold and 15.6 gm/tonne silver. Holes 80-1 to 5 were drilled near trench 3, hole 80-6, beneath trench 1 and hole 80-7 near trench 2. All holes intersected faults, alteration zones and vein fault zones in granitic rock. Holes 2 to 5 intersected mineralization in widths ranging from 0.1 to 1.5 m and grades from 0.03 to 16.5 gm/tonne gold and 2.1 to 43.8 gm/tonne silver. Hole 80-6 intersected a 6 m zone assaying 7.56 gm/tonne gold and 22.47 gm/tonne silver including a 1.5 m zone assaying 21.45 gm/tonne gold and 43.8 gm/tonne silver. Hole 80-7 intersected six zones each less than a meter wide with assays up to 3.69 gm/tonne gold and 52.56 gm/tonne silver. Soil samples were collected at 15 m intervals on lines spaced 100 m apart and were analyzed for silver and lead. Results were not released. The survey only covers part of the TAWA 3 and 4 claims.

LETA	Unmineralized Target
Noranda Exploration Company Limited	115 I 6 (62)
	(62°16'N,137°15'W)

Claims: LETA 1-24

Source: Summary by R. Debicki from assessment report 090536 by G. MacDonald.

Current Work and Results:

The claims lie approximately 58 km west of Carmacks. The area is underlain by schist and gneiss of Proterozoic and/or Paleozoic age, and by porphyritic granodiorite.

In 1979, a soil geochemical survey was done over the claims. The 207 samples were analyzed for copper, lead, zinc, molybdenum and tungsten. Anomalous values were those above 30 ppm copper, 50 ppm lead, 100 ppm zinc, 6 ppm molybdenum and 5 ppm tungsten. Two significant and one small copper-tungsten anomalies were identified. Weakly mineralized porphyry is exposed at the site of the smaller anomaly.

DART	Unmineralized Target
Noranda Exploration Company Limited	115 I 6 (63)
	(62°17'N,137°02'W)

Claims: DART 1-6

Source: Summary by R. Debicki from assessment report 090533 by G. MacDonald.

Current Work and Results:

The claims are underlain by schist and gneiss of Proterozoic and/or Paleozoic age. Gold-bearing veins are known on Emmons Hill.

During 1979, horizontal shootback electromagnetic, induced polarization, resistivity and geochemical surveys were conducted over part of the claim group. A narrow, weak northwest trending anomaly identified by the elctromagnetic survey with poor but coincident induced polarization and resistivity anomalies more than 350 m long was identified.

Two BQ drill holes totalling 94.2 m were drilled in 1980.

NUCLEUS	Copper Molybdenum Porphyry
NAT Joint Venture; Chevron Canada Limited; Armco Mineral Exploration Limited; Archer, Cathro and Associates Limited	115 I 6 (64)
	(62°20'N,137°30'W)

Reference: Sinclair et al (1975, p. 114-115)

Claims: NUCLEUS 1-34

Source: Summary by D. Tempelman-Kluit from assessment report 090739 by E. P. Onasick and A. R. Archer.

Current Work and Results:

The claims were staked on open ground between Yukon Revenue and the Cash property during 1980 near a low grade porphyry copper-molybdenum occurrence. Rusty weathering schist and gneiss of Yukon Crystalline Terrane underlie the claims and are intruded extensively by felsic plutonic and subvolcanic rocks related to the Late Cretaceous Mount Nansen Group.

About 200 soil samples were collected on a 400 x 225 m grid.

STU	Copper Porphyry
United Keno Hill Mines Exploration Limited	115 I 7 (65)
	(62°25'N,130°49'W)

References: Sinclair (1977); Morin et al (1979, p. 71-72); Pearson and Clark (1979); Pearson (1979)

Claims: STU 1-192; MOON 1-106; NOON 1-108

Source: By D. Tempelman-Kluit based on property visit, assessment report 090771 by E. Leblanc and R. Joy, and assessment report 090775 by D. Newman and R. Joy.

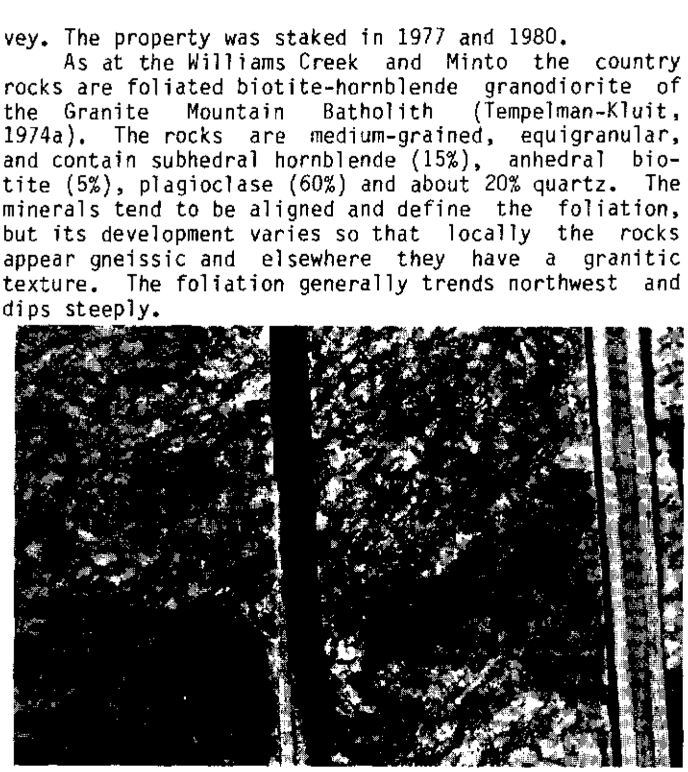
Description:

This showing is about 40 km northwest of Carmacks on a small tributary of Hoochekoo Creek. The showing resembles those at Williams Creek and Minto (Sinclair, 1977; Pearson and Clark, 1979) and lies between them about 10 km northwest of the Williams Creek and 30 km southeast of the Minto showings.

Dick Joy and Ken Watson, geologists on the property, guided the writer through the bulldozer trenches and showed him some of the drill core on a one-day visit in June, 1980.

There is very little natural outcrop and the area is densely vegetated. The area was thoroughly prospected in the early seventies and it is a surprise that this showing was not discovered earlier. Discovery in 1979 was through follow-up of a soil geochemical survey. The property was staked in 1977 and 1980.

As at the Williams Creek and Minto the country rocks are foliated biotite-hornblende granodiorite of the Granite Mountain Batholith (Tempelman-Kluit, 1974a). The rocks are medium-grained, equigranular, and contain subhedral hornblende (15%), anhedral biotite (5%), plagioclase (60%) and about 20% quartz. The minerals tend to be aligned and define the foliation, but its development varies so that locally the rocks appear gneissic and elsewhere they have a granitic texture. The foliation generally trends northwest and dips steeply.



Two pieces of split drill core from the STU showing the foliation in the host granodiorite (Klotassin suite). Chalcopyrite and bornite are disseminated through this rock along the foliation.

The rocks are variably altered throughout the batholith. Wholesale replacement by pink potassium feldspar has occurred so that the rock locally approaches quartz monzonite. Pink feldspar-aplite veins are common. Elsewhere, the rocks are silicified or sericitized, and chlorite or biotite partly replaces hornblende. The rocks are strongly fractured and limonite lines some breaks. The altered zones vary in shape and range from a few millimeters to hundreds of meters wide.

The alteration began with feldspathization and formation of hydrothermal biotite. Silicification, sericitization and chloritization followed and limonite was last. The early alteration, namely feldspathization and biotite growth, probably coincides with the late stages of plastic flow that led to the gneissic fabric, but the limonite and chlorite and some sericite post-date the gneissic fabric everywhere.

As at Minto and Williams Creek the mineralization consists of chalcopyrite and bornite with minor pyrite and locally abundant magnetite. The sulphide minerals are most plentiful in some of the silicified and strongly altered rocks, but chalcopyrite is also disseminated in the comparatively unaltered foliated granodiorite. As elsewhere in the district no direct correlation between mineralization and a specific alteration type is seen so that the deposits are difficult to assess and explore for.

At the STU the rocks are as yet undated, but elsewhere the thermal history of these rocks is well documented. At Minto zircon in the granodiorite has given a concordent uranium-lead age of 192 Ma (Tempelman-Kluit and Wanless, 1980) and the granodiorite is therefore thought to have crystallized about the Late Triassic-Early Jurassic. Biotite in these rocks gave K-Ar ages between 165 and 180 Ma (Tempelman-Kluit and Wanless, 1975; Pearson, 1979) and that interval is considered the time of cooling following the deformation that foliated the rocks and following most of the hydrothermal alteration.

Pearson (1979) has summarized possible origins for the deposit type. The mineralization was probably emplaced in the Mid-Jurassic during the later stages of hydrothermal alteration of the rocks and may be derived directly from the granodiorite, rather than from a pre-existing sulphide deposit. As such it may represent a peculiar type of porphyry deposit rather than a metamorphosed and mobilized pre-existing redbed or other stratabound deposit.

Current Work and Results:

During 1980 the property was drilled with about 5000 m in 28 holes. Isolated good grade sections were cut in 3 holes as follows.

Hole #9 -	3.44 %	copper	13.5 m
	1.87 gm/t	gold	
	13.37 gm/t	silver	
Hole #14 -	3.51 %	copper	13.5 m
	2.49 gm/t	gold	
	18.35 gm/t	silver	
Hole #18 -	2.80 %	copper	12.5 m
	4.04 gm/t	gold	
	17.42 gm/t	silver	

The remainder of the mineralized rock intersected grades between trace copper to 0.49% over 17 m.

One hundred, six MOON claims were staked to adjoin the STU in 1980 by United Keno Hill Mines and were geologically mapped and soil sampled. Of 5289 soil samples, four percent had values above 30 ppm copper and this value was taken as threshold. Good correlation is seen between anomalous copper and strongly foliated zones in the granodiorite.

The NOON claims, 108 in all, were also staked, mapped and soil sampled by United Keno Hill Mines in 1980 as part of the general STU project. Two areas of particular interest were discovered in the southwest part of the claim group. The figuration distribution of the 5173 soil samples closely parallels that of the MOON geochemical survey.

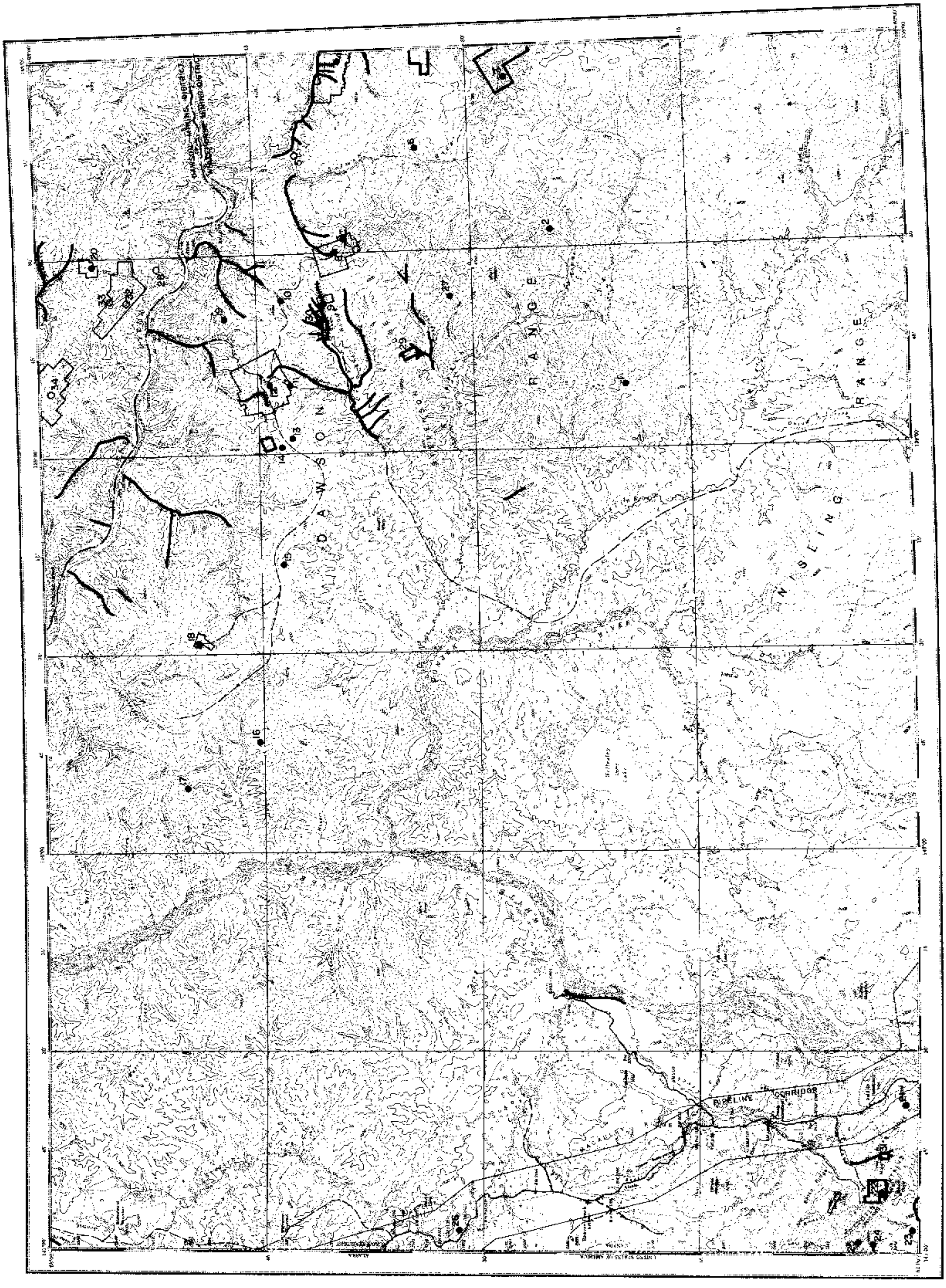
1980 MINERAL CLAIMS STAKED

MUT — 115 J 9, 115 I 12 (66) (62°35'N,137°46'W)

Claims 1980: NUT (30)

NIT — 115 I 12 (67) (62°33'N,137°59'W)

Claims 1980: NIT (36)



SNAG
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
○72 .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL........ Coal Exploration Lease	◇ .... Oil or Gas Well
.... Mineral Claims staked in 1980	CML........ Coal Mining Lease	.... Airstrip

SNAG MAP-AREA (NTS 115 J-K)

NO.	PROPERTY NAME	REFERENCE
1	KLOT	MIR, 1971-1972, p. 75
2	SOMME	MIR, 1969-1970, p. 72
3	PRIDE	Copper Vein
4	HAYES	This Report
5	SELWYN	G.S.C., Map 44-34 (marginal notes)
6	CROCK	MIR, 1969-1970, p. 68
7	COCKFIELD	This Report
8	CO	This Report
9	RUDE CREEK	MIR, 1969-1970, p. 63 G.S.C., Summary Report, 1927
10	NORDEX	Silver-Lead Vein
11	BOMBER	G.S.C., Pap. 67-40, pp. 32-34
12	CASINO	MIR, 1969-1970, pp. 55-57
13	AZTEC	MIR, 1969-1970, pp. 54-55
14	ZAPPA	This Report
15	BOREAL	MIR, 1969-1970, pp. 42-43
16	BID	MIR, 1969-1970, pp. 38-39
17	VINA	MIR, 1969-1970, pp. 35-37
18	TONI TIGER	MIR, 1969-1970, pp. 40-41
19	MARGUERITE	MIR, 1969-1970, pp. 51-42
20	SCROGGIE	This Report
21	ONION	Nickel-Copper-Molybdenum Magmatic
22	NUTZOTIN	Skarn Copper, This Report
23	CALIFORNIA	G.S.C., Mem. 50, p. 123
24	TRUDI	Copper-Molybdenum Porphyry
25	RIP	G.S.C., Mem. 50, pp. 121-122
26	BATRICK	G.S.C., Mem. 267, pp. 44-45
27	PATTISON	MIR, 1974, p. 94
28	BRI	This Report
29	STEVENSON	This Report
30	LESLIE	This Report
31	CHAIR	This Report
32	NEF	This Report
33	MK	This Report
34	HASL	This Report

HAYES
Hudson Bay Exploration and Development Company, Limited

Gold, Silver, Vein(?)
115 J 9 (4)
(62°39'N,138°05'W)

Reference: Sinclair *et al* (1975, p. 95-96)

Claims: SWEDE 1-6; SAM 1-86

Source: Summary by G. Abbott from assessment report 090777 by G. Douglas.

History:

Anglo American Corporation of Canada, Limited staked the SAM claims in 1976 and optioned the SWEDE claims from S. Martenson and A. McDiarmid in late 1977. The property was explored with geochemical sampling; VLF electromagnetic surveys and trenching in 1977 and 1978 and 11 drill holes totalling 481.8 m in 1978. Hudson Bay acquired the property in 1978 and conducted a small geochemical program.

Current Work and Results:

In 1980, the property was explored with geochemical, magnetometer and VLF EM-16 surveys. Anomalies were tested with four drill holes totalling 397.4 m located on the SWEDE 4 and SAM 23 claims. The holes intersected Tertiary rhyolite porphyry that includes quartz-biotite gneiss and sheared and foliated basic volcanics. Alteration zones related to the rhyolite consist of carbonate, kaolinite, limonite and silica.

COCKFIELD
Archer, Cathro and Associates Limited
(Denison Mines Option)

Copper, Molybdenum Target
115 J 9,10 (7)
(62°38'N,138°28'W)

Reference: Craig and Laporte (1972, p. 66-68)

Claims: KOKUP 1-24

Source: Summary by D. Tempelman-Kluit from assessment report 090767 by R. J. Cathro.

Current Work and Results:

The property was remapped and re-interpreted and a detailed map was produced. Many of the volcaniclastic rocks of the Casino Volcanics are interpreted as tuff and ignimbrite related to two explosive events that followed extrusion of the Mount Nansen Group. The Casino Volcanics are genetically related to, and generally of the same age as, the Mount Nansen Group. The original Cockfield property was staked over a copper-molybdenum geochemical anomaly over minor mineralization in a Cretaceous intrusion on Mt. Cockfield. Work in 1980 concentrated on the volcanic rocks of the Casino Volcanics where pyrite is common and where fractures are closely spaced.

A geochemical soil survey was done over the property and threshold values are approximately 150 ppm lead, 2 ppm silver, 100 ppm arsenic and 10 ppb gold. A number of the samples are anomalous in all metals, but most of these are not over the Casino Volcanics.

CO
Cominco Limited

Copper, Molybdenum
Porphyry
115 J 9,10 (8)
(62°40'N,138°30'W)

Reference: Craig and Laporte (1972, p. 64-67)

Claims: BATTLE 1-64

Source: Summary by D. Tempelman-Kluit from assessment report 090792 by A. S. Denton.

Current Work and Results:

The claims were staked in 1980 to cover the source of anomalous heavy mineral concentrates collected from the headwaters of Battle Creek. They cover a showing investigated in 1970. Granodiorite of the Klotassin Batholith (Triassic) is intruded by subvolcanic breccia of the Casino volcanics (Late Cretaceous) and is overlain by extrusive equivalents of these volcanics. Molybdenite and chalcopyrite are disseminated through the volcanics in quartz-filled fractures.

Soil samples were collected along contours at 50 m intervals around the three drainages on the claims and were analyzed for copper, lead, zinc, molybdenum and tungsten. Two copper anomalies with values above 500 ppm were located at the head of Battle Creek. They have coincident anomalous molybdenum with values that exceed 100 ppm. Tungsten values and the values of lead and zinc are erratic, scattered and considered insignificant.

ZAPPA
Archer, Cathro and Associates Limited
(Denison Mines Option)

Copper, Molybdenum
Porphyry
115 J 10 (14)
(62°44'N,138°59'W)

References: Craig and Laporte (1972, p. 46-47); Tempelman-Kluit (1974b)

Claims: KOFFEE 1-7, 9, 11

Source: Summary by J. Morin from assessment report 090772 by R. J. Cathro.

Description:

The claims were staked in September, 1976 overground previously held as the MOTHER and ZAPPA claims. Underlying the property are schists and gneisses of the Yukon Metamorphic Complex that have been intruded by three suites: the Klotassin Suite of Triassic age, the Cretaceous Coffee Creek Suite and the Tertiary Mount Nansen hypabyssal and extrusive volcanics. Minor disseminated sulphide mineralization is present: pyrite in feldspar porphyry of the Mount Nansen suite, trace chalcopyrite in quartzite adjacent to a Coffee Creek Suite granodiorite intrusion and minor molybdenite and associated pyrite in a quartz vein stockwork. Generally, hypogene alteration does not exceed strong propyitic to weak argillic facies.

Current Work and Results:

During summer 1980, Archer, Cathro and Associates Limited managed geological mapping (1:10,000) and lithogeochemical sampling programs. Much of the geological data is based on rock chips gathered from 96 hand dug pits. Twenty-six samples showing alteration, sulphide mineralization or fracturing were analyzed for copper, molybdenum, silver, gold and lead. Combination of 1969 and 1970 soil geochemical data and 1980 lithogeochemical data disclosed two main anomalous areas - molybdenum, copper, lead anomalies coincident with the porphyry plug and copper, molybdenum, silver, gold anomalies associated with the Coffee Creek granodiorite stock.

SCROGGIE
Amax of Canada Limited

Disseminated Copper, Molybdenum
115 J 15,16 (20)
(62°50'N,138°31'W)

References: Craig and Milner (1975, p. 11)

Claims: BRIDGET 1-16

Source: Summary by D. Tempelman-Kluit from assessment report 090668 by G. W. Booth, A. C. Hitchins and J. L. LeBel.

Description:

The present claims were staked in 1978 and 1979 when the original claims of Silver Standard Mines lapsed. Highly sheared Paleozoic metamorphic rocks, mainly quartz-mica schist and brown granodiorite gneiss of Nisutlin and Simpson Allochthonous Assemblages respectively are intruded by cretaceous quartz monzonite dikes of the Coffee Creek suite. Chalcopyrite, molybdenite, pyrite and magnetite occur in quartz veins in biotite schist near a large copper molybdenum soil anomaly, with best assay results of 210 ppm copper and 241 ppm molybdenum.

Current Work and Results:

During 1980 a detailed re-examination was undertaken. This involved geological mapping, soil sampling, digging two test pits, panning local streams and IP and magnetometer surveys. One hundred, sixty soil samples were taken at 60 m intervals along lines 400 m apart to test the soil anomaly defined in previous work. Gold values show backgrounds of 10 ppb with a few in the 30-40 ppb range. Copper and molybdenum values are anomalous over the centre of the grid with highs of 410 and 235 ppm respectively. Tungsten values are generally low. The IP survey detected a broad weak frequency effect anomaly and showed that resistivity is fairly uniform. A 300 m to 600 m wide northwest trending magnetic high was defined in the magnetic survey. The IP and magnetic surveys show little correlation with each other or with the geochemical results.

BRI
N.W. Burmeister

Unmineralized
Target
115 J 15 (28)
(62°52'N,138°30'W)

Claims: SUE 1-8; BRI 1-8; SB 1-8

Source: Summary by R. Debicki from assessment report 090514 by N. W. Burmeister.

Current Work and Results:

The property staked in 1978 is underlain by schist and gneiss of probable Paleozoic age and by the Pelly Gneiss. They are intruded by a Cretaceous quartz monzonite pluton of the Coffee Creek granite.

Work in 1979 consisted of a three-channel radiometric survey over a compass and chain grid. Lines were spaced 185 m apart, and readings were taken over 10 second intervals at stations 61 m apart. Total radiation count over the quartz monzonite ranges from 1500 cps in areas of deep overburden to 3500 cps where outcrop occurs.

The survey results are inconclusive, but show a northwest grain that corresponds to the grain of the country rocks.

NEF
Eldorado Nuclear

Unmineralized
Target
115 J 15 (32)
(62°58'N,138°38'W)

Reference: Tempelman-Kluit (1974b)

Claims: NEF 1-93

Source: Summary by D. Tempelman-Kluit from assessment report 090656 by W. J. Olsson.

Current Work and Results:

Claims NEF 1-34 were staked in 1978 following a reconnaissance which located an area of anomalous uranium in water and silt samples. The remaining claims were staked in 1979. Geological mapping and scintillometer surveys were done in 1978.

The property is underlain by foliated granodiorite geniss, part of the Selwyn Gneiss, that is part of a large near-horizontal thrust sheet. It is intruded by a small subcircular pluton of coarse-grained biotite-quartz monzonite of Cretaceous age, part of the Coffee Creek suite.

Four radiometric anomalies occur on the claims. A detailed soil geochemical survey was also undertaken. Radiometric and soil anomalies are locally coincident.

MK
N. W. Burmeister

Unmineralized
Target
115 J 15 (33)
(62°54'N,138°30'W)

Claims: MK 1-38

Source: Summary by D. Tempelman-Kluit from assessment report 090602 by N. W. Burmeister.

Current Work and Results:

The claims are underlain by granodiorite gneiss of the Selwyn Gneiss which is intruded by a small biotite-quartz monzonite plug near the claims. The claims were staked in 1978 on the prospect that the geology is favourable for intragranitic uranium. Because outcrop is sparse, a radiometric survey was conducted over the claims. Three anomalies were outlined and these are considered to be related to primary or secondary uranium enrichment.

HASL
Eldorado Nuclear Limited

Unmineralized
Target
115 O 2
115 J 15 (34)
(62°58'N,138°50'W)

Reference: Morin et al (1980, p. 26)

Claims: HASL 1-40

Source: Summary by D. Tempelman-Kluit from assessment report 090612 and 090679 by W. Olsson.

Current Work and Results:

In 1979 bulk water, bulk silt and heavy mineral sampling were carried out with a radiometric and soil geochemical grid survey. These surveys show that uranium is being transported mechanically and chemically in Pedlar Creek. Work for 1980 consisted of reanalysis of soil samples collected in previous years for thorium.

1980 MINERAL CLAIMS STAKED

ZAPPA

115 J 10 (14)
(62°44'30"N,138°59'W)

Claims 1980: KOFFEE (9)

NUTZOTIN

115 K 2 (22)
(62°03'N,140°52'W)

Claims 1980: GOLD (32)

STEVENSON

115 J 10 (29)
(62°34'N,138°45'W)

Claims 1980: RAY (8)

LESLIE

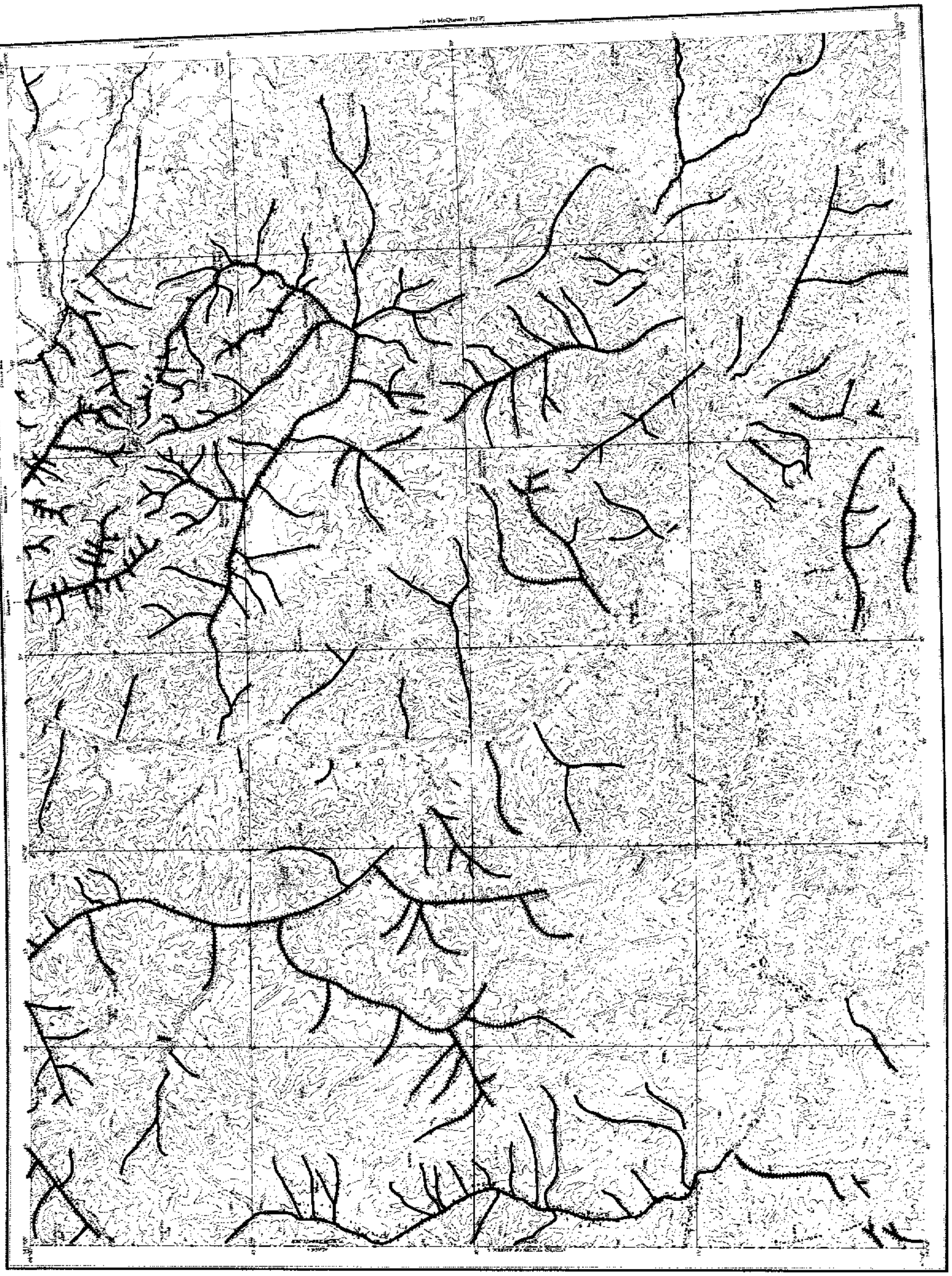
115 J 10 (30)
(62°40'30"N,138°40'W)

Claims 1980: ART (6)

CHAIR

115 K 2 (31)
(62°02'N,140°46'W)

Claims 1980: BILL



STEWART RIVER
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan 1981) and staked before Jan 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan 1981)

.... Placer Claims in good standing (Jan.1981)

CEL........ Coal Exploration Lease

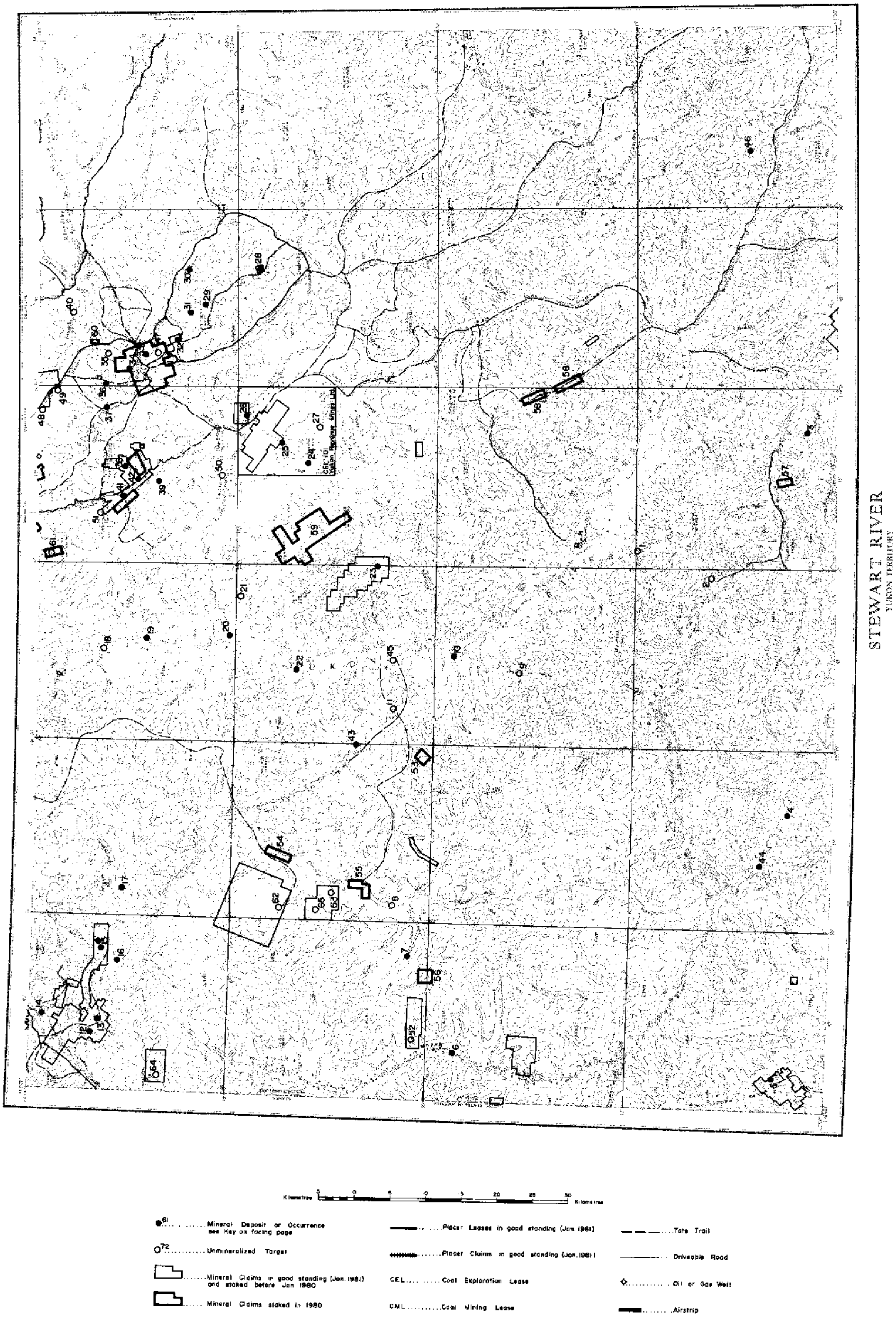
CML........ Coal Mining Lease

.... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip


STEWART RIVER
YUKON TERRITORY
Kilometres 5 0 5 10 15 20 25 30 Kilometres
61 ...... Mineral Deposit or Occurrence see Key on facing page
72 ...... Unmineralized Target
...... Mineral Claims in good standing (Jan. 1981) and staked before Jan 1980
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...... Placer Claims in good standing (Jan. 1981)
CEL ...... Coal Exploration Lease
CML ...... Coal Mining Lease
...... Tote Trail
...... Driveable Road
...... Oil or Gas Well
...... Airstrip

STEWART RIVER MAP-AREA (NTS 115 O-N)

NO.	PROPERTY NAME	REFERENCE
1	TREVA	
2	NORTHERN LIGHTS	
3	BLACK FOX	G.S.C., Mem. 97, pp. 33-34
4	ARIES	Copper-Molybdenum Occurrence
5	MOOSEHORN	MIR 1976, pp. 33-54
6	LADUE	Copper-Molybdenum Occurrence
7	SANTA	Silver-Lead-Tin Vein
8	SVENN	G.S.C., Mem. 123, p. 52
9	EXCELSIOR	Mines Branch Pub. 222 (1914), p. 121
10	COMET	
11	TENMILE	G.S.C., Summary Report, 1901
12	LUBRA	Silver-Lead-Gold Vein
13	CONNAUGHT	MIR, 1969-1970, pp. 32-34
14	PER	G.S.C., Mem. 123, p. 52 G.S.C., Pap. 66-31, pp. 26-28
15	BUTLER	G.S.C., Summary Report 1917, Part B, p. 8 MIR, 1969-1970, pp. 32-34
16	FIFTY	Skarn Copper
17	ENCHANTMENT	G.S.C., Pap. 73-1A, pp. 48-49
18	MONTE CHRISTO	
19	PICKERING	Mines Branch Pub. 222 (1914), p. 120
20	INDIAN	Asbestos
21	BISHOP	
22	WOOD	Skarn Copper
23	BURMEISTER	This Report
24	HAYSTACK	Mines Branch Pub. 222 (1914), p. 205
25	MCKINNON	Gold Stratabound
26	RAVEN	Mines Branch Pub. 222 (1914), pp. 74-75
27	FOTHERGILL	Mines Branch Pub. 222 (1914), pp. 71-74
28	AIME	Gold Vein
29	GOLD RUN	Mines Branch Pub. 222 (1914), pp. 83-85
30	PORTLAND	Mines Branch Pub. 222 (1914), pp. 101-104
31	DOMINION	Mines Branch Pub. 222 (1914), pp. 86-87
32	LLOYD	Mines Branch Pub. 222 (1914), pp. 76-82
33	HUNKER DOME	G.S.C. Summary Report, 1909, pp. 17-18 Mines Branch Pub. 222 (1914), pp. 106, 112-114, 125
34	MITCHELL	Mines Branch Pub. 222 (1914), pp. 107-111 G.S.C., Bull. 173, pp. 16-17
35	FAWCETT	Mines Branch Pub. 222 (1914), pp. 107-111
36	BUM	G.S.C., Bull. 173, pp. 14-15 MIR, 1971-1972, p. 13
37	BOX CAR	Mines Branch Pub. 222 (1914), pp. 87-91 G.S.C., Bull. 173, p. 14
38	LONE STAR	Mines Branch Pub. 222 (1914), pp. 20-40 G.S.C., Bull. 173, pp. 15-16 and This Report
39	VIOLET	Mines Branch Pub. 222 (1914), pp. 50-61 G.S.C., Bull. 173, p. 17
40	LEOTTA	
41	HILCHEY	This Report
42	BUCKLAND	G.S.C., Pap. 63-38, p. 19 G.S.C., Bull. 173, p. 16
43	SUSTAK	Iron Vein
44	PROSPECT	Copper Occurrence
45	CRUIKSHANK	Coal
46	MCMICHAEL	Copper Occurrence
47	GOLDEN ROD	
48	HEFFRING	
49	TRILBY	
50	TORRANCE	
51	BALD EAGLE	
52	STEVO	This Report
53	FLUME	This Report
54	TYRRELL	This Report
55	SNIP	This Report
56	DOLE	This Report
57	THIS	This Report
58	MAISY	This Report
59	RUBY	This Report
60	HUNK	This Report
61	BRONSON	This Report
62	JOVE	This Report
63	SON	This Report
64	CRAG	This Report
65	DOORMAT	This Report

BURMEISTER (LUCKY JOE)
Rio Tinto Canadian
Exploration Limited

Copper
Stratabound
115 O 11,12 (23)
(63° 35'N,139° 30'W)

Reference: Morin et al (1980, p. 28)

Claims: B 1-8; SUNEP 1-34; BJB 1-17; ASH 1-44; PAX 1-10

Source: Summary by D. Tempelman-Kluit from assessment report 090683 by E. T. Pezzot and G. E. White.

Current Work and Results:

The property is underlain by highly sheared metamorphic rocks which form a pseudo-sedimentary sequence that is part of Nisutlin Allochthonous Assemblage. Chalcopyrite and pyrite are disseminated within quartz muscovite schist,a member of this structural sequence.

During 1980 a vector pulse electromagnetic survey was conducted over part of the claims where mineralization is known. The schist member that is mineralized shows an EM response, and the unit was traced 500 m west of previous drilling. The response along strike is weaker, suggesting that the sulphide content decreases. No other responsive members were discovered.

MITCHELL
Cominco Limited

Gold Target
115 O 14,15 (34)
(63° 52'N,139° 00'W)

Claims: KSD 1-133

Source: Summary by D. Tempelman-Kluit from assessment report 090769 by G.A. Medford and I. Jackish.

Current Work and Results:

The claims were staked to cover several arsenic and gold geochemical anomalies and a copper-lead-zinc anomaly found in the King Solomon Dome area during 1979. The claims adjoin the King Solomon and Dominion Groups which cover the Mitchell and Fawcett gold showings. These showings have disseminated gold in quartz lenses within the Klondike Schist (Nisutlin Allochthonous Assemblage) and the same rocks with quartz lenses underlie the present claims.

During 1980, geochemical sampling was done with 50 m sample spacing on five grids centered over the anomalous areas discovered in 1979. A soil sample and a residual rock chip sample was collected at each locality with all samples analyzed for gold and arsenic. Gold values in soil and rock chips are generlly low with scattered high values and do not correlated with arsenic. Arsenic values in soils trace out a continuous zone which also shows up in the rock chip results suggesting the zone follows a high arsenic horizon within the schist.

During 1980, a 12 km IP survey was also done over the claims on two grids with line spacing of 300 m and station interval of 50 m. The resistivity results show a north trending sequence of banded highs and lows and the chargeability results show weak highs that correlate with topographic highs. There is no correlation between the chargeability and resistivity results.

HILCHEY
G.J. McGinn
Klon Exploration
Company Limited

Gold Placer
115 O 14 (41)
(63°54'N,139°18'W)

References: Morin et al (1980, p. 28); Green and Godwin (1963, p. 19)

Claims: RON 1-40

Source: Summary by R. Debicki from assessment report 090479 by G. J. McGinn.

Current Work and Results:

During 1978, VLF electromagnetic and magnetometer surveys were carried out and 3 rotary and percussion holes totalling 118.6 m were drilled. The work was designed to evaluate the placer potential of the claims at depths greater than 12.2 m (a lease on exploration and mining of those placer deposits was obtained from the holders of the placer claims) as well as the lode potential of the area.

The electromagnetic survey identifies anomalies interpreted as bedrock faults. The magnetometer survey, done to identify buried channels, was unsuccessful. The 15 cm diameter drill holes were drilled using rotary boring in upper sections and percussion boring in lower sections. The deepest hole is 48.2 m deep. Bedrock was not reached. The alluvium includes fluviatile sediments dominated by quartz and sericite schist pebbles.

STEVO
Resource Associates
of Alaska, Incorporated

115 N 10 (52)
(63°32'N,140°50'W)

Claims: LAD 597-600, 697-700, 797-800, 897-900; MAT 511-512, 611-612, 711-712, 811-812, 911-912.

Source: Summary by R. Debicki from assessment report 090531 by J. Johnson, and from information provided by Resource Associates of Alaska, Incorporated.

Current Work and Results:

The LAD and MAT groups were staked in 1978. They are underlain by metarhyolite in the Klondike Schist with gossanous patches apparently related to disseminated pyrite in the metarhyolite. Outcrop is poor.

Soil, stream sediment, heavy mineral concentrate and rock samples were collected at 75 m intervals along the claim lines in 1979 for geochemical analysis. Soil and stream sediment samples were analyzed for lead, zinc, silver, copper and uranium. Anomalous lead and zinc values obtained from soil samples were apparently associated with disseminated pyrite in the metarhyolite. Heavy mineral concentrates were analyzed for lead, zinc, gold, copper, silver and thorium. No anomalous values were obtained from the heavy mineral concentrates or rock samples. No work was done on the property in 1980.

MT. BRONSON
Cominco Limited

Unmineralized
Target
115 O 14 (61)
(63°58'N,139°29'W)

Reference: Green (1972).

Claims: BRONSON 1-10

Source: Summary by J. Morin from assessment report 090773 by E. G. Olfert.

Current Work and Results:

The claims were staked in June, 1980. They are underlain by a northwest trending belt of quartz-feldspar-muscovite gneiss and schist collectively termed Klondike Schist and interpreted to be rhyolitic metavolcanics. A few boulders of galena-mineralized quartz-carbonate vein float were discovered near the north end of the claim group.

During summer 1980, a soil geochemical sampling program for copper, lead, zinc and silver was conducted. A total of 240 samples were collected at 50 m intervals along lines spaced 200 m apart. Several large anomalies were determined concordant with the foliation, one of them coincident in the four metals. In addition, 75 samples were analyzed for manganese, anomalies of which tend to correlate with the anomalous zinc values.

JOVE
Eldorado Nuclear Limited

Uranium Spring
115 N 9,10
115 N 15,16 (62)
(63°45'N,140°31'W)

Claims: JOVE 1-370

Source: By D. Tempelman-Kluit based on property visit.

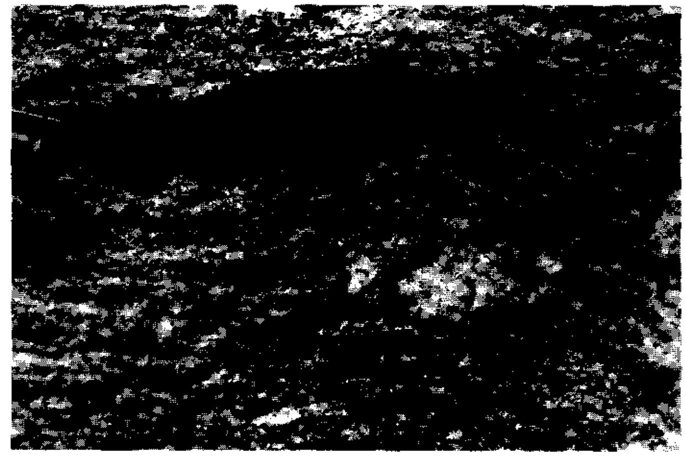
Description:

The writer visited the property for two days in July, 1980 with R. Bell of the Geological Survey of Canada and was guided on the ground by W. Olsson, geologist for Eldorado Nuclear Limited.

The JOVE property includes 370 claims at the headwaters of Glazy Creek, a tributary of Matson Creek, 65 km southwest of Dawson. Sixteen claims were staked in 1977 to cover a geochemically anomalous spring (with 57 ppb in water) discovered in an airborne radiometric survey.

The property is in the unglaciated part of Yukon and the country has deeply disected rolling uplands with nearly 1000 m of relief. Felsenmeer and talus covers much of the upland and exposures are few.

The property is underlain by granite gneiss which is part of a large batholith (known as the Fiftymile Batholith) of the Pelly Gneiss (Tempelman-Kluit, 1973). The unit is distinctly heterogeneous on the claims and includes two intimately mixed phases that are mapped together. The rocks weather to a blocky talus and the two phases have the same characteristics. Generally dominant is the older, strongly foliated, medium grey biotite-muscovite granodiorite augen gneiss locally with well developed K-feldspar augen up to a centimeter across. The second phase, injected along and across the fabric of the augen gneiss, is equigranular medium-



Pelly Gneiss from the JOVE is a well foliated biotite granodiorite gneiss that has given U/Pb discordia ages about 375 Ma and K/Ar ages on biotite of 98 Ma.

to coarse-grained leucocratic muscovite granite or quartz monzonite which is weakly foliated to unstructured. This younger leucocratic phase commonly grades to coarse-grained simple pegmatite with beautiful cuneiform quartz-feldspar intergrowths and books of muscovite several centimeters across. Locally the pegmatite cuts across both the augen gneiss and the leucocratic granitic phase appearing as a distinct third stage. The shape of the leucocratic bodies is irregular; they vary from sills and dikes to irregularly shaped masses and their size ranges from several centimeters thick to some kilometers across.

Zircon from the augen gneiss has given a U/Pb discordia age of 374 Ma (Tempelman-Kluit and Wanless, 1980) and biotite from a sample of the same gneiss gave a K/Ar age of 97.6 Ma. This is interpreted to mean that a granodiorite batholith was emplaced in this region 375 m.y. ago about the middle Devonian. It was deformed and metamorphosed to augen gneiss 97 m.y. ago in the Early Cretaceous. As part of this metamorphic event the rock was partially melted and the leucocratic phase generated. This second phase was locally mobilized to give rise to the crosscutting relationships; where it was not mobilized it displays conformable relations to its host.

The Pelly Gneiss on the property looks like that elsewhere in the Fiftymile Batholith. It is equally fresh and commonly has the two phases found on the JOVE property. No distinctive phase of the Pelly Gneiss nor any distinctive alteration is associated with the uranium mineralization on the property.

Current Work and Results:

The results of work done are summarized from assessment reports 090657 and 090762 for 1979 and 1980 by W. J. Olsson. In exploring the property the company did extensive geochemical and radiometric surveys in 1979 along with resistivity and EM-16 surveys. During 1980 the property was trenched by bulldozer and 7 holes for a total 945 m were drilled to test the mineralization. This work outlined two narrow north trending zones, each about 500 m long, with anomalously high uranium in soils and anomalous scintillometer response. These zones, the JOVE central and JOVE east, are on the north side of Glazy Creek. Several other areas of less

Northward view across Glaizy Creek of bulldozer trenches on the JOVE claims, a uranium prospect south of Dawson. The prominent trenches on the left cover the Jove Central geochemical zone, those on the right the Jove East. A spring with Uranium in water, the reason why the claims were staked and the focus for some of the early drilling, is shown.

interest were also found. The geochemical surveys define 3.5 ppb uranium in water as threshold level and 10 ppb or more as anomalous. For stream silts 15 ppm and 40 ppm uranium are considered threshold and anomalous levels. The property was extensively trenched over the JOVE central and east zones.

At the JOVE central anomalous zone secondary lemon yellow meta-autunite occurs in widely spaced hairline fractures and joints and in porous weathered bedrock within 70 m of the surface, but no other mineralization is known. The JOVE central anomalous zone coincides with the uranium-rich spring that led to staking this property. The zone of secondary meta-autunite was initially thought to overlie primary uranium mineralization and this hypothesis guided the trenching and drilling of the property. Because no primary mineralization was intersected at depth it is now considered (W. Olsson, company geologist) that the meta-autunite of the JOVE central zone is a downslope seep anomaly. Whether this seep anomaly represents uranium derived from a primary concentrated source up hill or whether it is uranium precipitated at the surface from widely disseminated mineralization up hill remains to be tested. The JOVE east anomalous zone likely has the same explanation as the JOVE central zone.

SON
Cominco Limited

Unmineralized Target
115 N 9 (63)
(63°37'N,140°26'W)

Claims: SON 1-40

Source: Summary by D. Tempelman-Kluit from assessment report 090700 by O. P. Lavin.

Current Work and Results:

Three-hundred, thirty samples of spruce twigs with needles were collected at 50 m intervals along a grid. The samples were fried, mashed and analyzed for uranium. Fifty soil samples were also collected and analyzed for uranium. The correspondence between uranium in twigs and soils is weak and there is even less correlation between uranium in twigs and needles from the same sample. Repeatability of the biogeochemical results was tested by sampling four sites with three separate samples each. Variation between the replicate samples is considerable, but not extreme considering the generally low concentration levels. Three areas within the claims have higher uranium levels in the twigs and are thought to represent bedrock sources of uranium.

CRAG
Eldorado Nuclear Limited

Uranium spring
115 N 9,10,15(64)
(63°50'N,140°55'W)

Claims: CRAG 1-60

Source: Summary by D. Tempelman-Kluit from assessment report 090761 by W. J. Olsson.

Current Work and Results:

The CRAG claims were staked in 1979 to protect a sharp drainage anomaly south of Crag Mountain discovered in regional reconnaissance. Medium grey weathering blocky, strongly foliated medium-grained biotite-muscovite-quartz monzonite underlies much of the claim group. Minor interfoliated augen gneiss also occurs. The rocks are part of the Pelly Gneiss plutonic complex but those on Crag Mountain are distinctly more felsic than the Pelly Gneiss is generally. The thermal history of the rocks may be the same as that on the JOVE.

Detailed surface radiometric mapping and geochemical sampling was done on the claims. Radiometric readings were taken on lines 25 m apart with readings every 10 m and soil samples were taken on a 50 m x 50 m grid.

Three radiometric and six soil anomalies were identified.

DOORMAT
Eldorado Nuclear Limited

Unmineralized Target
115 N 9,10,15(65)
(63°28'N,140°21'W)

Claims: MAT 1-56

Source: Summary by D. Tempelman-Kluit from assessment report 090760.

Current Work and Results:

This group of claims was staked in 1979 to cover a drainage anomaly found during a regional reconnaissance. Granodiorite gneiss, part of the Pelly gneiss, underlies the claims. A description of the rocks is included for the JOVE.

A detailed radiometric survey and a soil geochemical survey with parameters like those for the CRAG were done on the claims in 1980. Two radiometric anomalies were located. Three soil geochemical anomalies were defined and two of the radiometric anomalies coincide with the main geochemical anomaly.

1980 MINERAL CLAIMS STAKED

MITCHELL — 115 O 15 (34)
Cominco — (63°52'N,138°56'W)

Claims 1980: KSD (140)

LONE STAR — 115 O 14 (38)
Gordon Hilchey — (63°23'N,139°13'W)
Klondike Ken Ventures

Claims 1980: ND (22)

HILCHEY — 115 O 14 (41)
Klon Exploration — (63°23'30"N,139°50'W)

Claims 1980: RON (24)
Added to existing (32)

FLUME — 115 N 9 (53)
Roger Voisine et al — (63°01'N,140°02'W)

Claims 1980: FLUME (12)

TYRRELL — 115 N 9 (54)
William Gullikson et al — (63°42'N,140°49'W)

Claims 1980: WO 2 (16)

SNIP — 115 N 9 (55)
William Gullikson et al — (63°35'N,140°35'W)

Claims 1980: WO 2 (16)

DOLE — 115 N 10 (56)
Albert Savage et al — (63°30'N,140°39'W)

Claims 1980: LODE (16)

THIS — 115 O 3 (57)
Les Hakonson — (63°04'N,139°15'W)

Claims 1980: LES (8)

MAISY — 115 O 6/7 (58)
Maisy May Mines — (63°23'N,139°01'W)

Claims 1980: PILOT (19); APEX (19)

RUBY — 115 O 11 (59)
Snafu Holdings — (63°09'N,139°25'W)

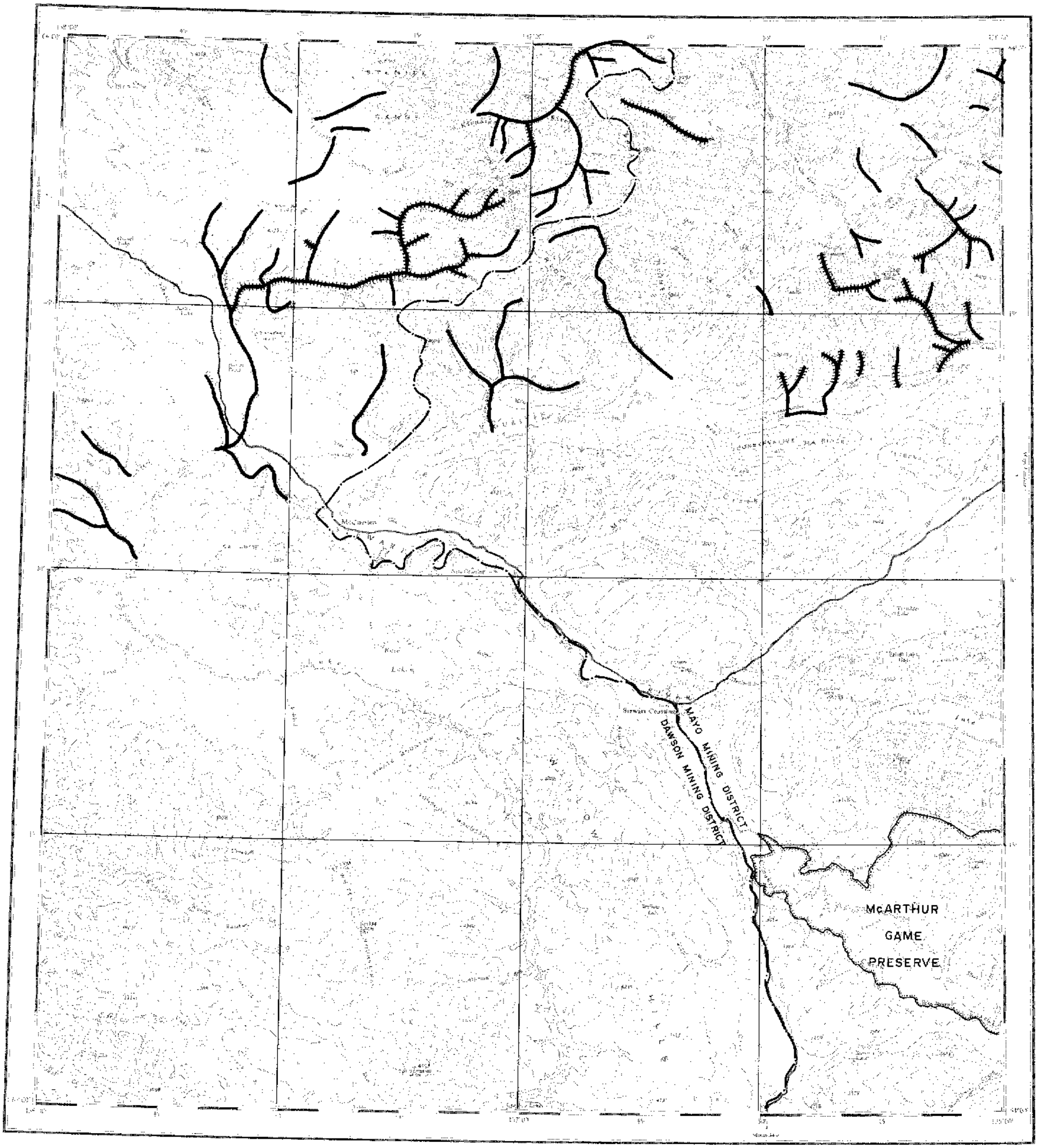
Claims 1980: RUBY (152)

HUNK — 115 O 15 (60)
George Bownes — (63°56'N,138°53'W)

Claims 1980: LARRY (1); GERALD (1)

BRONSON — 115 O 14 (61)
Cominco — (63°59'N,139°28'W)

Claims 1980: BRONSON (10)



McQUESTEN
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

○72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

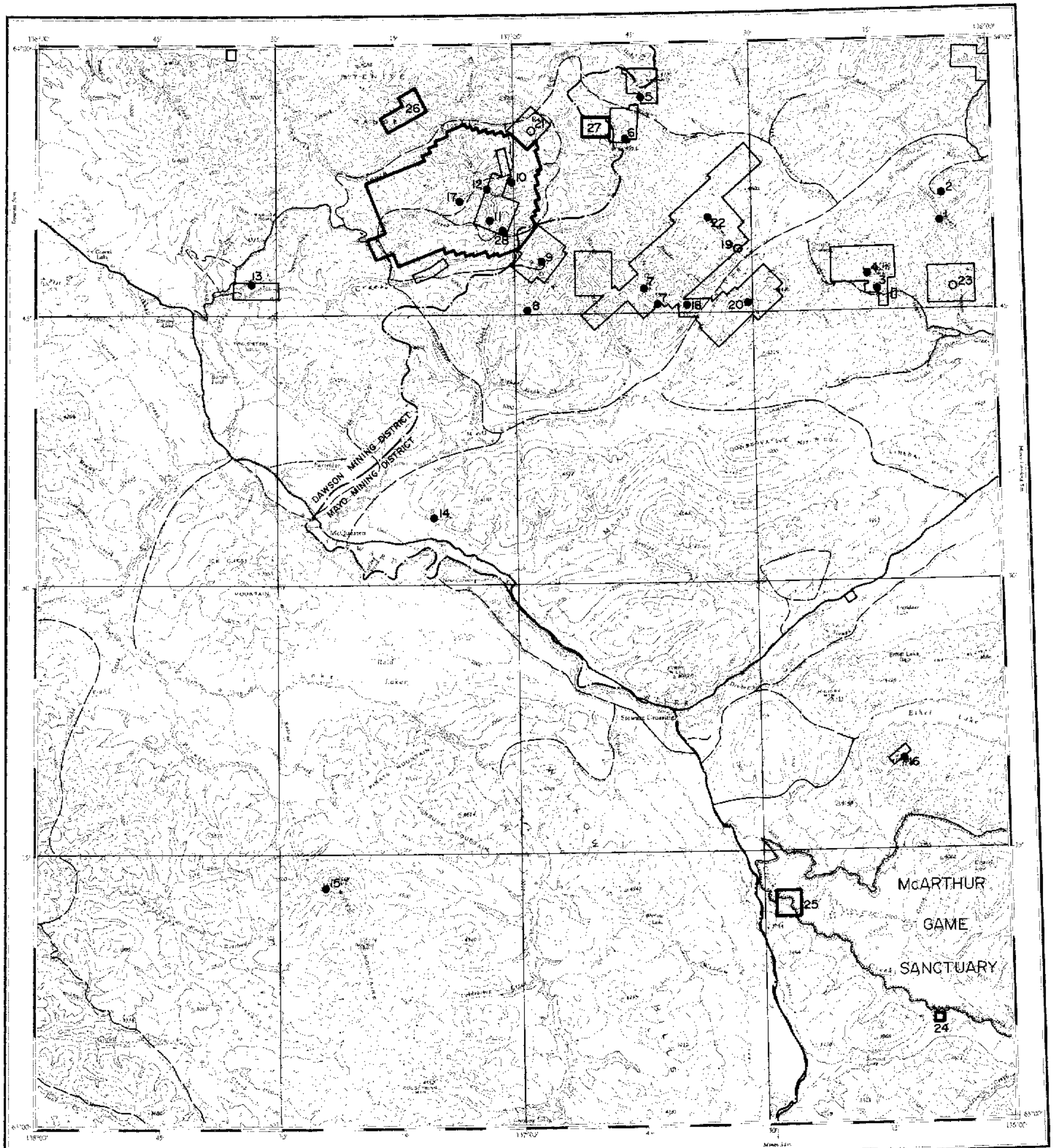
CML ... . Coal Mining Lease

..... Tote Trail

.... Driveable Road

.... Oil or Gas Well

.... Airstrip



McQUESTEN

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page	.... Placer Leases in good standing (Jan. 1981)	.... Tote Trail
O72 .... Unmineralized Target	.... Placer Claims in good standing (Jan. 1981)	.... Driveable Road
.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980	CEL .... Coal Exploration Lease	.... Oil or Gas Well
.... Mineral Claims staked in 1980	CML .... Coal Mining Lease	.... Airstrip

MCQUESTEN MAP-AREA (NTS 115 P)

NO.	PROPERTY NAME	REFERENCE
1	JAYBEE	Silver-Lead Vein
2	SEATTLE	G.S.C., Pap. 64-36, p. 16
3	HAWTHORNE	G.S.C., Pap. 66-31, pp. 20-21 G.S.C., Mem. 234, pp. 33-34
4	SCHEELITE DOME	This Report
5	HOBO	This Report
6	SPRAGUE	G.S.C., Pap. 48-25, p. 11
7	EAST RIDGE	This Report
8	LUGDUSH	MIR, 1971-1972, p. 10
9	RIDGE	This Report
10	JOSEPHINE	G.S.C., Pap. 48-25, p. 11
11	RHOSGOBEL	This Report
12	PUKELMAN	Tungsten-Molybdenum Porphyry
13	CLEAR CREEK	G.S.C., Pap. 51-10, p. 14
14	MOOSE RIDGE	Silver-Lead-Iron Occurrence
15	ROSEBUD	G.S.C., Pap. 48-25, p. 12
16	SETHER	
17	LEWIS	Gold Vein, This Report
18	BOULDER	G.S.C., Pap. 48-25, p. 11
19	TOTH	
20	EPD	This Report
21	MOZI	This Report
22	SP	This Report
23	BEN	This Report
24	WOODBURN	This Report
25	CROOKED	This Report
26	FIONA	This Report
27	MAHTIN	This Report
28	JUBJUB	This Report

SCHEELITE DOME
Cominco Limited

Tungsten Skarn
115 P 16 (4)
(63°47'N,136°15'W)

References: Little (1959, p. 20-21, 30-33); Bostock (1964); Green (1971); Craig and Milner (1975, p. 23); Morin et al (1980), p. 23)

Claims: SUN 1-112; GLOW 1-224

Source: Summary by R. Debicki from assessment report 090459 by L. J. Nagy, and assessment report 090483 by S. B. Butrenchuk.

History:

The property has been known and explored since 1904, when scheelite and cassiterite were recognized in the placer deposits of creeks draining it. The SUN claims were staked in May, 1978 by Gordon Dickson and optioned to Cominco in July, 1978. Cominco staked the adjacent GLOW claims in August, 1978.

Current Work and Results:

Additional geological mapping and soil geochemical surveys were done in 1979. One NQ hole 120.7 m deep was drilled. The 284 soil samples from a grid just northeast of Scheelite Dome were analyzed for lead, zinc and tungsten. A few local highs were identified, but no definitive anomalies were outlined.

The hole was drilled to test the down-dip extension of a tungsten-bearing zone identified in 1978. A 3.34 m thick zone grading 0.23% WO_3, with low tin, gold, copper and silver values in amphibolitic skarn was intersected.

HOBO
Amax of Canada Limited

Gold Vein
115 P 15 (5)
(63°57'N,136°45'W)

Reference: Bostock (1948b, p. 11, 1964)

Claims: HI 1-3, 5-97

Source: Summary by R. Debicki from assessment report 090559 by R. G. Kidlark.

History:

The HI claims are between Sprague and Hobo Creeks on the west side of Red Mountain, 58 km northwest of Mayo. The area was staked as the HOBNAIL claims in October, 1923. In the late 1920's, Treadwell Yukon Consolidated dug a few hand trenches and a short adit. The property was staked in September, 1933 as the HOBO groups, and again in 1947 as the RED MOUNTAIN group. Asarco Exploration Company of Canada Limited staked the property as the RED claims in 1974, and did some geological mapping. Amax of Canada Limited staked the property in April, 1979 to cover molybdenum occurrences reported in the Northern Cordillera Mineral Inventory produced by Archer, Cathro and Associates Limited.

Current Work and Results:

Geological and reconnaissance soil, stream sediment and rock geochemical surveys were carried out during 1979. The claims are underlain by schist, quartzite, phyllite and slate of the Yukon Group, and by younger green slates and basic volcanic rocks. The Yukon Group metasedimentary rocks strike northwest and dip gently northeast. They are faulted against the younger rocks, which are folded into a series of northwest-trending synforms and antiforms. Both sequences are intruded by diorite to gabbro dikes, and a large eucocratic biotite granite sill. Minor biotite hornfels is present at the granite contact. A prominent gossan is associated with the granitequartzite contact along the eastern margin of the sill.

No molybdenum mineralization was found. Auriferous arsenopyrite is present in small quartz veins in metasedimentary rocks close to the granite contact. The highest values obtained by the geochemical survey were from a 5 cm wide vein intersected by the old adit. The sample contained 14.2 gm/tonne gold and 8.8 gm/tonne silver.

EAST RIDGE — Tin Skarn
Campbell Resources, Inc. — 115 P 15 (7)
(63°48'N,136°39'W)

References: Bostock (1948, p. 11); Craig and Milner (1975, p. 20-21); Morin et al (1980, p. 22)

Claims: SNARK 1-252; TEE 1-8

Source: Summary by R. Debicki from assessment report 090535 by D. R. Kennedy.

Current Work and Results:

The SNARK claims were staked by CCH Resources after up to 10% tin and 1.93% WO_3 were found in pan concentrates of stream sediments from the area. Several copper-lead-zinc-silver occurrences had been located and trenched, and tin mineralization was reported in stream sediments and in the area before 1977.

Geological and soil geochemical surveys were done on the southwest part of the property during 1979. The area is underlain by gently to moderately dipping quartzite and calcareous quartzite of the Yukon Group intruded by a biotite granodiorite stock, and by dacite and felsite dikes. Hornfels and skarn occur at and near the granodiorite. Numerous granodiorite dikes intrude the country rock and have an intrusive breccia at their contacts. North trending shears one or two meters wide are the loci for lead-zinc-silver mineralization. Sphalerite is disseminated in skarn. Scheelite occurs locally along the granodiorite-meta-sedimentary rock contact.

Soil samples were collected along a 50 x 50 m grid. The 2102 samples were analyzed for zinc, copper, silver, tin and tungsten. Lead analyses were done on 654 of the samples. Two tin anomalies with roughly coincident, but more widespread zinc, copper, silver and tungsten highs, were identified. A separate strong silver anomaly is also present. The lead values have sporadic highs coincident with known occurrences.

Geological mapping at 1:10,000 prospecting and geochemical work was done during 1980. Hand trenching work was also done.

RIDGE — Tin Target
Cominco Limited — 115 P 15 (9)
(63°49'N,136°58'W)

Claims: NEL 1-23

Source: Summary by D. Tempelman-Kluit from assessment report 090572 by L. Nagy and 000720 by I. Jackish.

Current Work and Results:

The NEL claims were staked in September, 1978 to cover the probable source for anomalous tin and silver in heavy mineral concentrates collected from the headwaters of Forty Mile Creek, 60 km northwest of Mayo. The area is underlain by thin-bedded to massive light brown quartzite, quartz-muscovite schist, and graphitic quartz-biotite-chlorite schist possibly of the "Grit Unit" (Proterozoic). These strata are intruded by porphyritic quartz-biotite-hornblende porphyry (Cretaceous).

Prospecting and soil geochemical surveys were carried out on the claims in 1979. Gossanous quartzite and tourmaline enriched quartzite boulders containing 3-25% pyrite, 5-20% tourmaline and traces of chalcopyrite and cassiterite were identified. The distribution of the mineralized outcrops and boulders suggests that the mineralization is related to one or more of the porphyry intrusions.

Soil samples were collected at 25 m or 50 m intervals along lines 150 m apart. All 613 samples were analyzed for lead, zinc, tungsten and molybdenum. Several scattered, non-coincident, tin and silver anomalies were identified. Background values for the area are lead, 15 ppm; zinc, 50 ppm; silver, 0.4 ppm; copper, 10 ppm; tin, 2 ppm; tungsten, 2 ppm; molybdenum, 2 ppm.

In 1980 an 18.9 km induced polarization survey was carried out on a grid over part of the claims. Three anomalies with high chargeability and low resistivity were defined.

RHOSGOBEL — Tin Target
CCH Resources Limited — 115 P 14,15 (11)
(63°50'N,137°01'W)

Claims: JUB JUB 1-32

Source: Summary by D. Tempelman-Kluit from assessment report 090802 by A. Woodsend and report 090550 by D. R. Kennedy.

Current Work and Results:

The claims were staked in 1979 to cover the probable area of provenance of high silver values obtained in a 1978 stream sediment geochemical survey. The area is underlain by rocks of the Yukon Group. Small granitic plutons lie west and north of the property.

Reconnaissance soil geochemical surveys were done in 1979 and 1980. Samples were analyzed for tin, zinc and silver. A few anomalous silver values were obtained (highest 3.8 ppm).

EPD — Tin, Tungsten Target
Campbell Resources Limited — 115 P 9,10
115 P 15,16 (20)
(63°45'N,136°30'W)

Reference: Morin et al (1980, p. 22)

Claims: EPD 1-84

Source: Summary by R. Debicki from assessment report 090476 by A. Woodsend and assessment reports 090758 and 090542 by D. Kennedy.

Description:

The property was staked in 1978, following the identification of anomalous contents up to 7.35% tin and 1.90% WO_3 in pan concentrates from stream sediments of Oliver Creek. A preliminary soil geochemical survey done on the claims in 1978 outlined areas with anomalous tin. Malachite stained float collected during the survey contains 0.18% tin, 0.84% copper, 0.15% zinc and 45 gm/tonne silver.

Current Work and Results:

Geological mapping and additional soil geochemical sampling were done in 1979. The claims are underlain by micaceous quartzite, phyllite and argillaceous quartzite of the Yukon Group along the south-dipping southern limb of the McQuesten anticline. White, medium-grained hypabyssal muscovite granite intrudes the metasediments. East dipping shear zones with related breccia, and north-south trending faults disrupt the succession.

The 1300 samples collected for the soil geochemical survey were anlayzed for tin, lead, zinc, silver, copper and tungsten. Anomalous and highly anomalous metal contents used in interpreting survey results are tin: 10 and 100 ppm; zinc: 300 and 1000 ppm; silver: 1.0 and 2.0 ppm; copper: 50 and 100 ppm; tungsten: 3 and 10 ppm. Lead values are not reported. Several strong east trending tin anomalies were identified. Zinc, silver and copper results are broadly coincident with tin results. A narrow tungsten anomaly was identified.

Trial magnetic and VLF electromagnetic surveys were done in 1979. Three trenches were dug, and 4 AQ drill holes totalling 322 m were completed. Tin mineralization was encountered in each hole, with the best intersection grading more than 1% tin over more than 4 m.

During 1980, additional geochemical work was done. Eight NQ drill holes totalling 914 m were completed. One hole 99.1 m long was drilled in the Fewmet zone. Cassiterite occurs in quartz veins in brecciated quartz -chlorite schist. The best intersection assayed 1.03% tin and 12 gm/tonne silver across 6.0 m.

MOZI	Unmineralized
Campbell Resources	Target
Limited	115 P 14,15 (21)
	(63°54'N,136°58'W)

Reference: Bostock (1964).

Claims: MOZI 1-48

Source: Summary by R. Debicki from assessment report 090549 by D. R. Kennedy.

Current Work and Results:

The MOZI claims were staked in 1979 following discovery of high molybdenum, tungsten, zinc and silver by a 1978 reconnaissance geochemical survey. There is no record of previous staking of the property.

Geological and reconnaissance soil geochemical surveys were done in 1979. The claims are underlain by shale, arkose and conglomerate which dip gently north, and are intruded by minor quartz-feldspar porphyry dikes. Breccia consisting of angular shale fragments in cross-cutting vuggy quartz veins appears to be extensive. Open spaces in the quartz veins are coated with rusty material, which does not contain recognizable sulphides.

The 846 soil samples collected were analyzed for zinc, copper, silver, tungsten and uranium. Anomalous molybdenum values are broadly coincident with anomalous zinc and silver and weakly anomalous copper and tungsten. High geochemical values in the soil correlates with the breccia. Rock samples were analyzed, and enrichment of lead, zinc, copper and molybdenum was found in the breccia.

SP	Tin Target
Cominco Limited	115 P 15 (22)
	(63°50'N,136°35'W)

Claims: A 1-128; SP 1-92

Source: Summary by R. Debicki from assessment report 090586 and 090713 by S. B. Butrenchuk.

Current Work and Results:

The claims were staked in March, 1979 to cover an area underlain by metasedimentary rocks thought to correlate with the Proterozoic Grit Unit, intruded by small felsic and gabbroic dikes.

Geological and reconnaissance soil geochemical surveys were carried out during 1979. Quartzite with minor associated rhyolite tuff and mica schist, intruded by a quartz-feldspar porphyry and a gabbro dike underlies and the claims. The quartzite and associated tuff and schist are regionally metamorphosed to lower greenschist facies, and are moderately to intensely deformed.

The soil samples were analyzed for copper, lead, zinc and tin. The results for all four elements were considered to be background, with a few isolated high values, but no significant anomalies.

Four NQ drill holes totalling 542.8 m were drilled in 1979. Minor tourmaline and pyrite occur where fractured quartzite is close to intrusive rocks. Low grade (0.02%) tin mineralization was encountered.

BEN	Unmineralized
Cominco Limited	Target
	115 P 16 (23)
	(63°47'N,136°05'W)

Claims: BEN 1-80

Source: Summary by R. Debicki from assessment report 090555 by L. J. Nagy.

Current Work and Results:

The property was staked in March, 1979 to cover the suspected source of a heavy mineral concentrated from a stream sediment sample with 1105 ppm tin, 875 ppm tungsten and 44 ppm gold collected in 1978.

Geological mapping, prospecting and geochemical surveys were done in 1979. The claims are underlain by rusty, weakly pyritic quartzite and quartz-biotite schist of the Yukon Group which dip moderately southeast and form the southern limb of the McQuesten Anticline. Several narrow Cretaceous (?) quartz-feldspar porphyry dikes cut the metasedimentary rocks. Disseminated pyrite and a 2 cm wide vein of pyrrhotite were the only mineralization seen.

Lead, zinc, copper, silver, tungsten, molybdenum, tin and gold were determined for 26 stream sediment samples, 27 heavy mineral concentrate samples and 144 soil samples. Twelve rock samples were analyzed for lead, copper, silver, tungsten, molybdenum, tin and gold. One heavy mineral concentrate contains anomalous amounts of tin. Several scattered soil samples contain weakly anomalous amounts of tin and gold. The 1979 work did not explain the anomalous sample collected in 1978.

1980 MINERAL CLAIMS STAKED

LEWIS — 115 P 14 (17)
Canada Tungsten Mining Corp. — (63°51'N,137°07'W)

Claims 1980: CC (716)

WOODBURN — 115 P 1 (24)
James Carson — (63°05'30"N,136°03'W)

Claims 1980: PHOENIX (4)

CROOKED — 115 P 1 (25)
James Carson et al — (63°12'N,136°27'W)

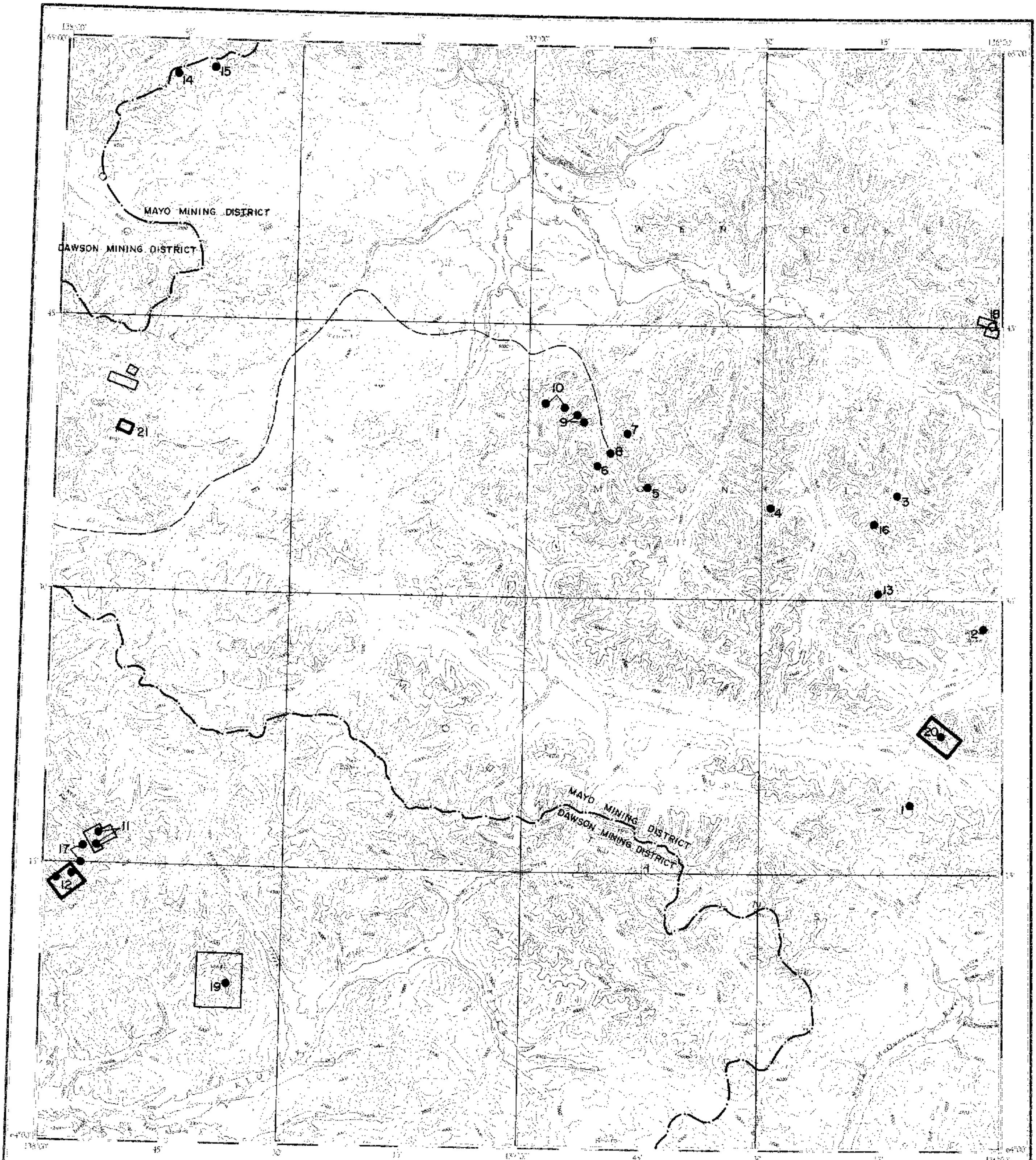
Claims 1980: FIREBIRD (28)

FIONA — 115 P 14 (26)
Tim Donnelly et al — (63°56'N,137°14'W)

Claims 1980: FIONA (48)

MAHTIN — 115 P 15 (27)
Campbell Resources Incorporated — (63°55'N,136°50'W)

Claims 1980: MAHTIN (24)



LARSEN CREEK

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 .... Mineral Deposit or Occurrence see Key on facing page

O72 .... Unmineralized Target

...... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

...... Mineral Claims staked in 1980

...... Placer Leases in good standing (Jan. 1981)

...... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

...... Tote Trail

...... Driveable Road

.... Oil or Gas Well

.... Airstrip

LARSEN CREEK MAP-AREA (NTS 116 A)

NO.	PROPERTY NAME	REFERENCE
1	TIMBERWOLF	Copper Vein
2	WORM	Copper Vein
3	RAMA	Copper-Silver-Lead Vein
4	MATTSON	Copper Vein
5	SOUP	Copper Vein
6	REINDEER	Copper-Lead
7	GRACE	MIR, 1969-1970, pp. 26-27
8	HART RIVER	MIR, 1977, pp. 22-24
9	BELCARRA	Copper-Lead-Zinc Vein
10	ZEBRA	G.S.C., Mem. 364, p. 140 MIR, 1969-1970, pp. 23-25
11	HAMILTON	Gold-Copper-Silver-Bismuth Vein
12	RIMROCK	This Report
13	AUSTON	G.S.C., Mem. 364, p. 140
14	HOT	MIR, 1974, pp. 76-77
15	MICHELLE	MIR, 1974, p. 71
16	BRUK	Lead-Zinc Vein
17	PHILP	Skarn Copper-Gold-Silver
18	DALE	This Report
19	IDA	This Report
20	STROKER	This Report
21	NO BEAVER	This Report

DALE — Minor Copper Vein
Mattagami Lake Exploration Limited — 116 A 9,16 (18)
(64°45'N,130°02'W)

Claims: DALE 1-14

Source: Summary by D. Tempelman-Kluit from assessment report 090530 by J. Biczok and assessment report 090770 by Paul Metcalfe.

Desscription:

The claims were staked in July, 1978 to cover minor galena and chalcopyrite in narrow quartz-calcite veinlets in phyllite found during follow-up of a G.S.C. stream sediment anomaly. An east trending, northward younging, steep dipping succession of Proterozoic rocks underlies the claims. It includes grey, green and black phyllite, dolomite and black shale intruded by gabbro and porphyritic dacite dikes.

Current Work and Results:

During 1979 and 1980 the geology of the claims was mapped and 38 stream sediment samples were collected. Some of the stream sediments contain interesting values in copper, lead and zinc. The stream sediment samples show little consistency in response over the carbonate rocks. In contrast the phyllitic strata appear to have fairly uniform values of 50 to 130 ppm copper, 60 to 160 ppm zinc and 2 ppm molybdenum.

IDA — Disseminated Gold
Rio Tinto Canadian Exploration — 116 A 4 (19)
(64°09'N,137°37'W)

Claims: IDA 1-120

Source: Summary by D. Tempelman-Kluit from assessment report 090781 by A. Winkler and J. McClintock.

Current Work and Results:

The claims were staked in August, 1979 to cover a mercury, arsenic, antimony geochemical anomaly discovered during regional silt sampling along the Dawson Fault. The area is underlain by Ordovician to Lower Devonian strata of the Kechika and Road River Groups including calcareous grey shale and siltstone, grey chert and siliceous shale and black graphitic shale. Graptolites in the shale indicates an Early Silurian age. Massive greenstone and greenstone breccia interbedded with the fine-grained clastic rocks are interpreted as coeval volcanics. The rocks are intruded by a number of small stocks, dikes and plugs of hornblende monzonite (Cretaceous) part of the tombstone intrusions, which have metamorphosed the country rocks thermally.

The claims were soil sampled on a 150 x 50 m grid and the geology of the group was mapped in detail. About 3200 soil and 500 rock samples were analyzed. Threshold and anomalous levels were determined as 600 and 1000 ppm arsenic, 20 and 50 ppm antimony, 500 and 1000 ppb mercury. A 5 x 1 km area in the center of the claim group is anomalous in the three elements. Mapping outlined a 2 x 1.8 km area where the rocks are hydrothermally bleached and silicified. Rock chip sampling over the claim block showed that gold backgrounds are 5 ppb outside the altered zone while the altered rocks have backgrounds of 50 ppb gold. Within the larger altered zone a 400 x 600 m area averages 0.3 gm/tonne gold with 3.0 gm/tonne over some 10 m sections. Best gold grades are related to most intense silicification and gold grade correlates most closely with the mercury values. Arsenic is more widespred than the gold and antimony shows the best interrelation with gold.

1980 MINERAL CLAIMS STAKED

RIMROCK — 116 A 4 (12)
Anaconda — (64°14'N,137°57'W)
Richard Hall et al

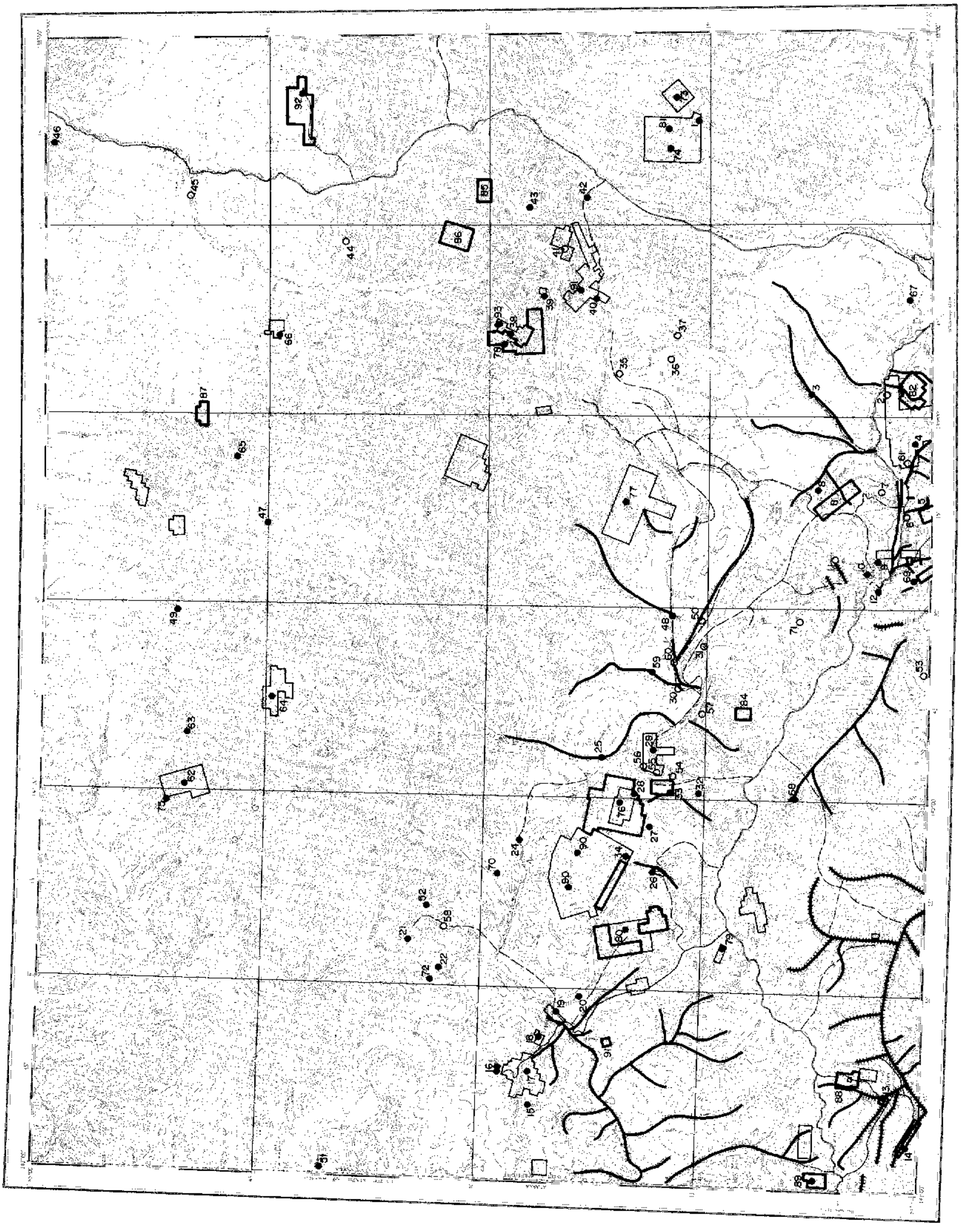
Claims 1980: LALE (30)

STROKER — 116 A 8 (20)
Rio Tinto — (64°23'N,136°08'W)

Claims 1980: STROKER (40)

NO BEAVER — 116 A 12 (21)
Eric Scholtes et al — (64°39'N,137°52'W)

Claims 1980: AB (6)



DAWSON
YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

- ● 61 .... Mineral Deposit or Occurrence see Key on facing page
- ○ 72 .... Unmineralized Target
- .... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980
- .... Mineral Claims staked in 1980
- .... Placer Leases in good standing (Jan. 1981)
- .... Placer Claims in good standing (Jan 1981)
- CEL .... Coal Exploration Lease
- CML .... Coal Mining Lease
- .... Tote Trail
- .... Driveable Road
- .... Oil or Gas Well
- .... Airstrip

DAWSON MAP-AREA (NTS 116 B-C)

NO.	PROPERTY NAME	REFERENCE
1	INDEX	G.S.C., Mem. 364, p. 142
2	GERMAINE	G.S.C., Pap. 65-19, pp. 64-65
3	COLLIERY	G.S.C., Mem. 218, pp. 13-14 G.S.C., Mem. 234, p. 27 G.S.C., Mem. 59
4	UNEXPECTED	Mines Branch Pub. 222, pp. 124-125 (1914)
5	VIRGIN	Mines Branch Pub. 222, pp. 41-49 (1914), and This Report
6	MacLEAN	Mines Branch Pub. 222, pp. 125-
7	BOYLE	
8	LEPINE	Mines Branch Pub. 222, pp. 114-119 (1914) G.S.C. Annual Report, 1901, Pt. B, p. 65, and This Report
9	FIBRE	Asbestos
10	MIDNIGHT DOME	Asbestos
11	BROAD- LEDGE	G.S.C. Summary Report, 1909, p. 5
12	WEST DAWSON	Copper-Lead-Silver Skarn, Vein
13	HUNGRY	G.S.C., Mem. 123, p. 52
14	MILLER	G.S.C., Mem. 123, pp. 51-52, This Report
15	SPHERE	MIR, 1973, p. 31
16	FOXY	G.S.C., Pap. 65-19, p. 27
17	CLINTON CREEK	G.S.C. Annual Report, 1888-89, Pt. D G.S.C., Pap. 65-19, pp. 25-27 MIR, 1974, pp. 72-73
18	ACHERON	Asbestos
19	CONE HILL	Silver-Lead-Gold Vein
20	MICKEY	Asbestos
21	SHELL CREEK	G.S.C., Pap. 69-1A
22	CLIFF	G.S.C. Annual Report, 1903, Pt. A, pp. 39-41
23		G.S.C., Mem. 59
24	SOURDOUGH MINE	G.S.C. Annual Report, 1903 G.S.C., Mem. 364, p. 146
25	FIF	G.S.C., 1900, Pt. A, pp. 39-41
26	CALEY	G.S.C., Pap. 65-19, pp. 27-28
27	SUBMARINE	G.S.C., 1927, Pt. A, p. 9
28	ROAL	G.S.C., 1927, Pt. A, p. 9
29	SILVER CITY	G.S.C., Pap. 66-31, pp. 23-24 MIR, 1971-1972, pp. 15-16
30	OGILVIE	
31	KEYSTONE	
32	ASS	Asbestos
33	WOODCHOPPER	Asbestos, This Report
34	ETHELDA	Copper Skarn
35	HAY MEADOW	
36	JECKELL	
37	SNYDER	
38	FIREWEED	G.S.C., Pap. 65-1A, p. 36
39	GRAVE	This Report
40	SPOTTED FAWN	G.S.C. Summary Report, 1918, Pt. B, pp. 15-17 G.S.C., Mem. 364, pp. 137-138 MIR, 1974, pp. 73-74
41	SUBTRACT	This Report
42	ROBERT SERVICE	G.S.C., Pap. 65-1A, p. 36
43	MULTIPLY	G.S.C., Pap. 65-1A, p. 36
44	CRAWFORD	Copper Vein
45	BLACKSTONE	Coal
46	CHAPMAN	MIR, 1974, p. 76 G.S.C., Mem. 364, p. 138
47	FIFTEEN MILE	Copper-Silver Vein
48	CHANDINDU	G.S.C. Annual Report, 1900, Pt. A, pp. 39-41
49	SHAND	Copper
50	JEROME	Coal
51	PAULA	G.S.C., Pap. 68-1B, p. 8
52	KRAUSE	Iron Stratabound
53	MASTODON	
54	RISCO	
55	WINAGE	
56	HEALY	
57	LAWRENCE	
58	LEDUC	Coal
59	BARETTE	Coal
60	THANE	Coal
61	HATTIE	Mines Branch Pub. 222, (1914), pp. 124-125
62	MONSTER	Lead-Zinc Vein, Stratabound
63	TART	Zinc-Lead
64	OZ	MIR, 1974, pp. 74-75
65	SEELA	Lead-Zinc Vein
66	KIWI	MIR, 1974, p. 75
67	MORRISON	G.S.C., Map 711 A (marginal notes)
68	LOWNEY	
69	HALIFAX	This Report
70	CHAIN	Coal
71	HALE	
72	JEPHSON	Coal
73	O'BRIEN	Gold Vein
74	SANDOW	G.S.C., Mem. 364, p. 142
75	UGLY	Zinc-Lead Vein
76	TJOP	This Report
77	STYX	This Report
78	MARN	This Report
79	CLIP	This Report
80	PLUTO	This Report
81	THOR	This Report
82	ETC	This Report
83	FROGGY	This Report
84	FRESNO	This Report
85	RIKI	This Report
86	TAK	This Report
87	KITL	This Report
88	GUCH	This Report
89	BALDY	This Report
90	RAIL	This Report
91	MAIDEN	This Report
92	REIN	This Report
93	NEBULOUS	This Report

GRAVE
Noranda Mines Limited;
Mattagami Lake
Exploration Limited

Copper Vein
116 B 7 (39)
(64°27'N,138°40'W)

Reference: Crawford (1959)

Claims: TRIX 1-4

Source: Summary by R. Debicki from assessment report 090523 by J. Biczok.

Current Work and Results:

The TRIX claims were staked in 1978 to cover a xenolith of Permian Tahkandit limestone within the Cretaceous Tombstone Batholith. The limestone is white to grey-blue, medium to coarsely crystalline and thin-bedded. Garnet-tremolite-actinolite-calcite skarn is developed in the limestone. A large xenolith of Lower Cretaceous Keno Hill thin-bedded pyritiferous, argillaceous to clean quartzite, shale and argillite with hornfelsed margins is also enclosed in Tombstone Batholith. The intrusive rocks are equigranular to porphyritic hornblende syenite with minor dikes of diorite and granite.

Geological mapping and rock sampling were done in 1979. Uranium mineralization in fluorite veinlets, and sulphide veinlets with pyrite, chalcopyrite, arsenopyrite, stibnite, galena and molybdenite were identified. The veins are limited in size and distribution.

SUBTRACT
Urangesellschaft Canada
Limited

Unmineralized
Target
116 B 7 (41)
(64°25'N,138°33'W)

References: Findlay (1968, p. 16); Morin et al (1979, p. 53-54)

Claims: BETA 1-38

Source: Summary by R. Debicki from assessment report 090510 by J. B. Williams.

Current Work and Results:

The claims were staked in April, 1977 following the identification of anomalous uranium contents in water in Geological Survey of Canada Open File Report 388, part 2. Ground radiometric and geological surveys were done on the claims in 1977. Claims BETA 27-38 were staked in 1978. No other work was done that year.

Geological, geochemical and radiometric surveys were done in 1979. The data collected will form the basis for an M.Sc. Thesis concerning the Tombstone Batholith and its genesis to be done by H. J. Weyer at R.W.T.H., Aachen, Germany.

An 8.3 line grid was established on the claims as a control for the geological and radiometric surveys. No mineralization was found, and no radiometric anomalies were identified.

The 38 sediments and heavy mineral concentrate samples and 9 of the rock samples collected were analyzed for uranium and molybdenum. Several anomalous results were obtained, but no trends were established.

TJOP
Teslin Joint Venture
(Cassiar Resources Limited;
Cominco Limited; Exploration
Minerals Limited)

Asbestos
116 B 5
116 C 8 (76)
(62°22'N,140°00'W)

Reference: Htoon (1975, 1979)

Claims: TJOP 1-196

Source: Summary by G. Abboft from assessment report 090788 by Scott Murray and R. J. Cathro.

Description:

The claims cover a cluster of small poorly exposed, asbestos bearing serpentinite bodies of the Anvil Allochthonous Assemblage. These were first staked for their asbestos potential in 1964. The ultramafic rocks are enclosed by brown sericite schist, green chlorite schist, black graphitic schist and cream coloured marble belonging to the Nasina Series and/or Klondike Schist. Metadiorite and gabbro are associated with the serpentinite but may be younger and intrude it.

Current Work and Results:

The TJOP 1-44 claims were staked in the summer of 1979 and the TJOP 45-196 in the summer of 1980. The property was explored in 1980 with prospecting, mapping, a magnetometer survey and grid soil sampling. A new technique was used to separate asbestos fibre from soil. Three large soil anomalies defined by fiber length and quantity were obtained. Follow-up resulted in the discovery of nine new showings in outcrops and float in hand pits. The length and percentage of fiber in several specimens approaches commercial ranges but the showings have not been sampled due to poor exposure.

STYX
Anaconda Canada
Exploration Limited

Lead, Copper, Zinc
Geochemical Anomaly
116 B 6 (77)
(64°20'N,139°15'W)

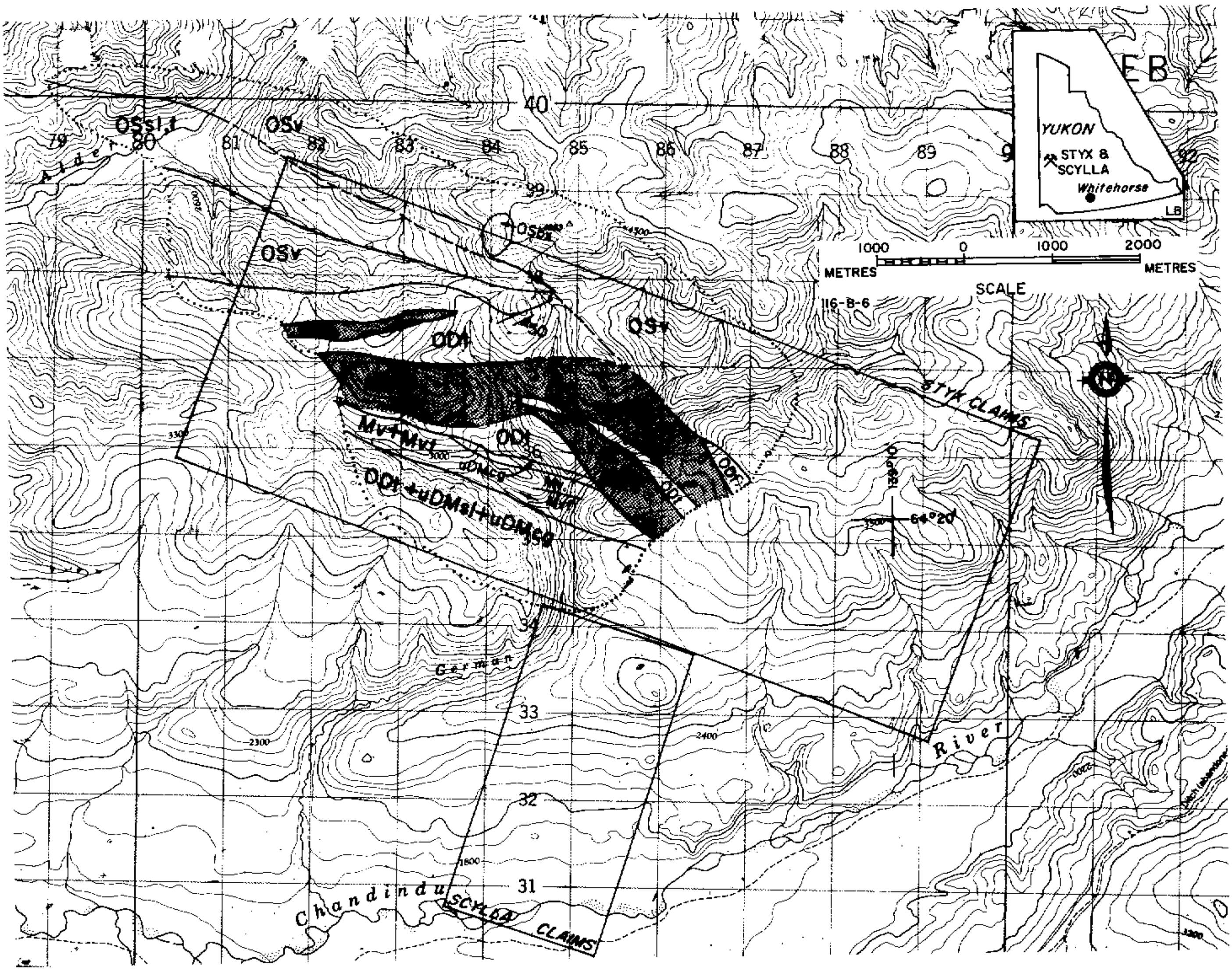
Reference: Green (1962)

Claims: STYX 1-160

Source: By D. Tempelman-Kluit based on property visit and from assessment report 090551 by C. Roots, K. Baldry and G. Carlson.

Description:

The STYX claims lie 35 km north of Dawson City, astride German Creek. The reconnaissance stream sediment geochemical survey carried out in the area by the Geological Survey of Canada identified two samples with moderately anomalous copper, zinc, nickel, molybdenum and barium contents. Reconnaissance work by Anaconda in 1978 confirmed the presence of geochemical anomalies, and located mafic and felsic volcanic rocks considered favourable hosts for exhalative massive sulphide deposits. The claims were staked in April, 1979.



LEGEND

CRETACEOUS

Kqfp Light weathering resistant feldspar porphyry and quartz feldspar porphyry.

MISSISSIPPIAN

Mvt Greenish siliceous slate.

Mv Greenish siliceous tuff.

uDMcg Chert pebble conglomerate and slate.

ORDOVICIAN TO DEVONIAN

ODt Resistant dark grey massive chert.

ORDOVICIAN AND SILURIAN

OSv Resistant dark green amygdaloidal basalt and flow breccia.

OSbx Brown weathering volcanic breccia.

OSslt Recessive black slate, minor chert.

The writer visited the property in July, 1980 with R. I. Thompson of G.S.C. and was guided on the ground by G. Carlson of Anaconda. The claims are underlain by a south dipping Paleozoic succession that youngs generally southward the the rocks are intruded by Cretaceous quartz-feldspar porphyry dikes. The country rocks at the north edge of the property include amygdaloidal basalt flows and breccias with minor intercalated slate; these are correlated with unit 4 of Green (1972). Next up section are grey chert and slate considered correlative with the Road River group and Ordovician to Devonian in age. Chert pebble conglomerate with intercalated siliceous black slate and overlain by pale green tuff and vesicular flow rocks and siliceous tuffs are thought Upper Devonian and Mississippian respectively. The Paleozoic country rocks are intruded by light weathering resistant feldspar porphyry dikes and sills of irregular shape. The rock is massive, has a pale grey fine-crystalline to aphanitic groundmass with thick tabular white feldspar phenocrysts to a cm across and is generally fresh. The porphyry contains small clear quartz grains and euhedral dark green hornblende prisms. Contacts with the country rocks are sharp and dip steeply.

Current Work and Results:

An 85.1 line-km grid was established in 1979, and geological, soil geochemical, magnetic and electromagnetic surveys were carried out.

More than 2000 soil samples were collected at 25 m intervals along lines spaced 200 m apart, and were analyzed for lead, zinc, copper and silver. Log-probability plots of the data were used to determine the distribution of the analytical results.

Percentile	99	98	95	90
Copper ppm	150	115	76	48
Lead ppm	150	105	60	43
Zinc ppm	650	440	235	150
Silver ppm	3.0	2.0	1.3	0.85

Two geochemical anomalies identified by the survey coincide with the black slate units.

MAX-MIN electromagnetic and magnetic surveys were done along 26.5 km of line. Several conductors were identified. The strongest electromagnetic and soil geochemical anomalies coincide with the central black slate unit. Magnetic contours over the area are flat.

Late in the 1979 season, an additional 30.5 km of line was cut in preparation for work in 1980. Additional geological, geochemical and geophysical work was done in 1980.

MARN	Copper Skarn
Mattagami Lake	116 B 7 (78)
Exploration Limited	(64°27'N,138°48'W)

Claims: MARN 1-62

Source: By D. Tempelman-Kluit based on property visit.

Description:

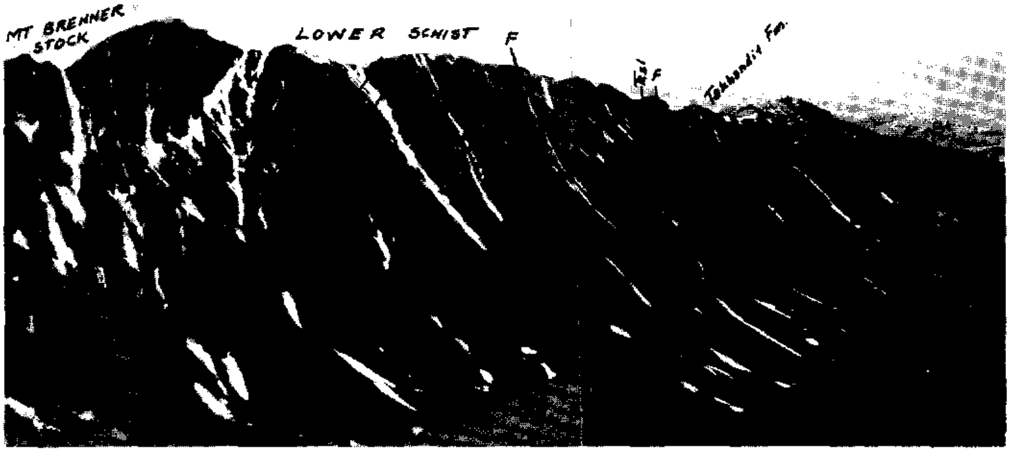
The claims are 55 km north-northwest of Dawson at the headwaters of Fireweed Creek. They were staked in 1978 to cover the contact between the Permian Tahkandit Formation and the Cretaceous Mount Brenner Stock.

The writer visited the property for one day in June and was guided on the showings by John Biczok and Bill Mercer.

The showing is exposed on a steep hillside and consists of massive pyrrhotite with chalcopyrite and arsenopyrite that weathers very rusty. It is developed in a green diopside and amphibole skarn enclosed by limestone of the Permian Tahkandit Formation. The skarn lens is roughly 100 m across, irregular in plan, and has sharp boundaries with the barren coarsely crystalline marble host. The mineralization is estimated to contain up to 2% or 3% copper locally and assays by the company show the material has silver and gold values. Massive sulphide is developed in a small part of the skarn over an irregular area some 10 m across. Most of the remaining skarn contains considerable disseminated pyrite. The sulphides are cut by fine narrow, regular calcite filled veins and an aplite dike cuts the skarn. The skarn is developed close to the contact of a small northward protrusion of the Mount Brenner stock (Tempelman-Kluit, 1970). The protrusion of the stock intrudes a moderately southeast dipping succession of strata that strike northeast and which dip to the southeast. The stratigraphic succession includes 150 m of slate and chert of the Road River Formation with volcanic lenses at the base, overlain by about 20 m of the Tahkandit Formation and in turn covered by a thick black slate, the "Lower Schist". The slaty rocks are pervasively hornfelsed and pyrrhotite is widely developed in them giving rise to rusty weathering hillsides.

The MARN claims cover a chalcopyrite bearing pyrrhotite skarn developed in the Permian Takhandit limestone next to the contact with the Cretaceous Mount Brenner stock. This view of the north side of Upper Fireweed Creek, 55 km northeast of Dawson shows the relationships.

The Mount Brenner stock is zoned, and grades from peralkaline, silica deficient rocks at its margins to calcic, silica saturated rocks at its core (Lambert, 1966). On the claims it consists of aegerine-augite monzonite to garnetiferous biotite diorite cut locally by rare dikes of radioactive porphyritic syenite, pyroxenite and biotite lamprophyre. The contact of the stock dips steeply and is sharp. Drilling in 1980 was intended to test whether the protrusion of the Mount Brenner stock was sill-like and whether the mineralized skarn extended beneath it.



View south across the head of Fireweed Creek. The succession exposed on the south wall of the creek dips steeply east (to the left) and youngs in the same direction. Chert (OSc) with intercalated basalt (OSv) (Road River Group: Ordovician and Silurian) forms the base of the succession overlain by chert grain sandstone and slate (DMsc) (Devono-Mississippian) and by limestone of the Permian Takhandit Formation. Above it is a thin recessive unit of limy shale that may be Triassic (Tsl) and this is overlain by rusty weathering hornfelsed black slate of the Upper Jurassic Lower Schist Formation. Syenite of the Mount Brenner stock intrudes the succession.

Current Work and Results:

The following is summarized from assessment reports 090522 and 090638 by J. Biczok of Mattagami Mines. Geological, soil and stream sediment geochemical and geophysical surveys were done on the claims in 1979.

Preliminary soil and stream sediment geochemical surveys identified anomalous copper and tungsten in both sample media. In a more detailed soil geochemical survey, 101 samples were analyzed for lead, zinc, copper, silver, molybdenum and tungsten. Uranium was also determined for 50 samples, and tin for the remaining 51.

Anomalous copper and tungsten values were identified. Coincident anomalous lead, zinc and molybdenum values are apparently related to the black shale. Heavy mineral concentrates panned from steam sediment samples were analyzed for lead, zinc, copper, silver, tungsten, molybdenum and tin.

Magnetic and radiometric surveys were also carried out. Strong magnetic anomalies probably reflect magnetic and pyrrhotite developed in skarns. The radiometric survey identified no anomalies. Additional geological and geochemical surveys were done during 1980. Eight BQ drill holes totalling 1003.7 m were drilled on claims MARN 4, 6, 8 and 21.

CLIP	Zinc, Lead
Cominco Limited	Stratabound
	116 C 1 (79)
	(64°14'N,140°25'W)

Claims: CLIP 1-10

Source: Summary by R. Debicki from assessment report 090491 by E.G. Olfert.

Current Work and Results:

The CLIP claims were staked in 1978 to cover an area containing stratiform sphalerite in talus float. The area is underlain by graphitic quartzite and phyllite.

In 1979, linecutting, soil and stream sediment geochemical surveys, prospecting, geological mapping and rock analyses were done to define the size of the mineralized zone. Samples were analyzed for lead and zinc and an anomalous zone 600 m long and 150 m wide was identified. The zone is underlain by highly deformed carbonaceous quartzite, phyllite, schist and banded marble of the Nasina Series. Two mineralized areas were found in talus. One contains banded sphalerite, barite and pyrite in micaceous quartzite and bands and stringers of galena in quartzite are seen at the other.

PLUTO	Molybdenum
Cominco Limited	Porphyry
	116 C 8 (80)
	(64°20'N,140°21'W)

Source: By D. Tempelman-Kluit based on property visit.

Description:

The PLUTO showing 54 km northwest of Dawson is 7 km north of the road to Clinton Creek and about 2 km south of Yukon River. The showing lies within the Klondike Plateau, an upland at about 4000 feet elevation that is dissected to a depth of about 2000 feet. The showing is covered by 166 mineral claims referred to as the Pluto Group. The PLUTO showing was discovered in 1978 through stream sediment geochemical sampling of tributaries to Yukon River. The author visited the property in June, 1980 for two days and was guided on the ground by Ian Paterson with whom many of the features were discussed. The author was shown all the company's geological, geochemical and geophysical data and this report was drawn on that data freely.

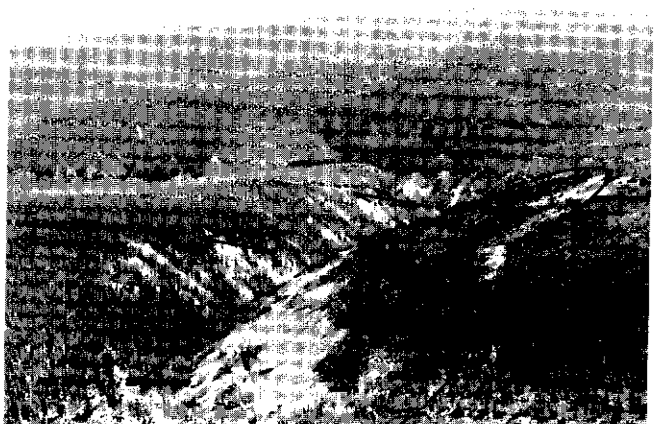
Outcrop is scarce and mapping is based on float which is fairly abundant locally. The claim group is underlain by quartz mica schist (Green, 1972) that represents highly deformed and metamorphosed Paleozoic ? sedimentary rocks, mainly slate and impure sandstone. The rocks have a well developed and closely spaced flaser fabric with a uniform moderate northeast dip. The intense ductile deformation has destroyed the stratigraphic succession so that it is difficult to subdivide the strata sensibly or map continuity of any but the largest units. Most of the country rocks are quartz biotite chlorite muscovite schist or their hornfelsed equivalents.

The regionally metmorphosed rocks are intruded by a northeast trending quartz porphyry stock, about 1.5 km long and 0.5 km wide, exposed along a small north flowing tributary of Yukon River. The quartz porphyry contains about 25% prominent dark grey glassy quartz phenocrysts, 5 mm across, and fewer thick tabular white plagioclase crystals to 1 cm across in a fine crystalline to aphanitic white quartzofeldspathic groundmass.

The quartz porphyry body was dated as 59.4 Ma by the company and is Late Cretaceous/Early Tertiary. It correlates with map-unit 25 of Green, 1972, but was missed in his reconnaissance mapping.

Mineralization was discovered in the southwest part of the quartz porphyry plug and in the adjacent host rocks. It consists of planar, variously oriented veinlets of quartz and sericite with molybdenite wolframite and pyrite. The veinlets are less than 1 cm thick. The porphyry and schist next to the veinlets are strongly altered and replaced by finely crystalline greenish sericite. The mineralization occurs only in large blocks of float and without drilling it is difficult to assess the grade of mineralization.

A geochemical survey of the claims by Cominco shows close correspondence between molybdenum in soils and the known mineralized rocks, but copper, lead and zinc values in soils tend to be peripheral to molybdenum and tungsten mineralization and form an incomplete halo around the showing.



View due north down the creek on the Pluto claims. The vegetation free talus in the centre is quartz feldspar porphyry that locally has molybdenite and wolframite in veinlets. Yukon River is in the valley running across the photo.

Geological sketch map of Pluto claims.

Current Work and Results:

The following is summarized from assessment report 090686 and from assessment report 090750 both by I. Paterson of Cominco Limited.

During 1979 a grid geochemical survey was carried out over the claims and 843 samples were anlalyzed for lead, zinc, copper, tungsten and molybdenum. Molybdenum values in soils range between 5 and 300 ppm with tungsten between 10 and 220 ppm. During 1980 part of the property was trenched by bulldozer. The trenches were cut about 1 km north of the main quartz-feldspar porphyry stock and exposed two smaller mineralized plugs or stocks.

THOR	Gold Veins
Anaconda Canada	116 B 8 (81)
Exploration Limited	(64°19'N,138°15'W)

Claims: THOR 1-192

Source: By D. Tempelman-Kluit based on property visit, and assessment report 090552 by C. Roots, K. Baldry and G. Carlson.

Description:

The THOR claims immediately northwest of Antimony Mountain were staked in April, 1979 following reconnaissance work in the area to examine the cause of anomalous stream sediment results identified by the Geological Survey of Canada. Massive pyrrhotite chalcopyrite-arsenopyrite float was found in a cirque.

The writer visited the property in July,1980 with Bob Thompson of the G.S.C. and was guided on the property by Richard Hall of Anaconda.

LEGEND

CRETACEOUS

Kqm Resistant, grey weathering, massive, medium- to coarse-grained biotite quartz monzonite granite and granodiorite.

CAMBRIAN, ORDOVICIAN AND ? SILURIAN

KECHIKA GROUP

ЄOK Buff weathering, platy to thin-bedded, calcareous slate and slatey limestone: interbedded dark grey non-calcareous slate: interbedded lenses of greenstone.

LATE PROTEROZOIC AND EOCAMBRIAN

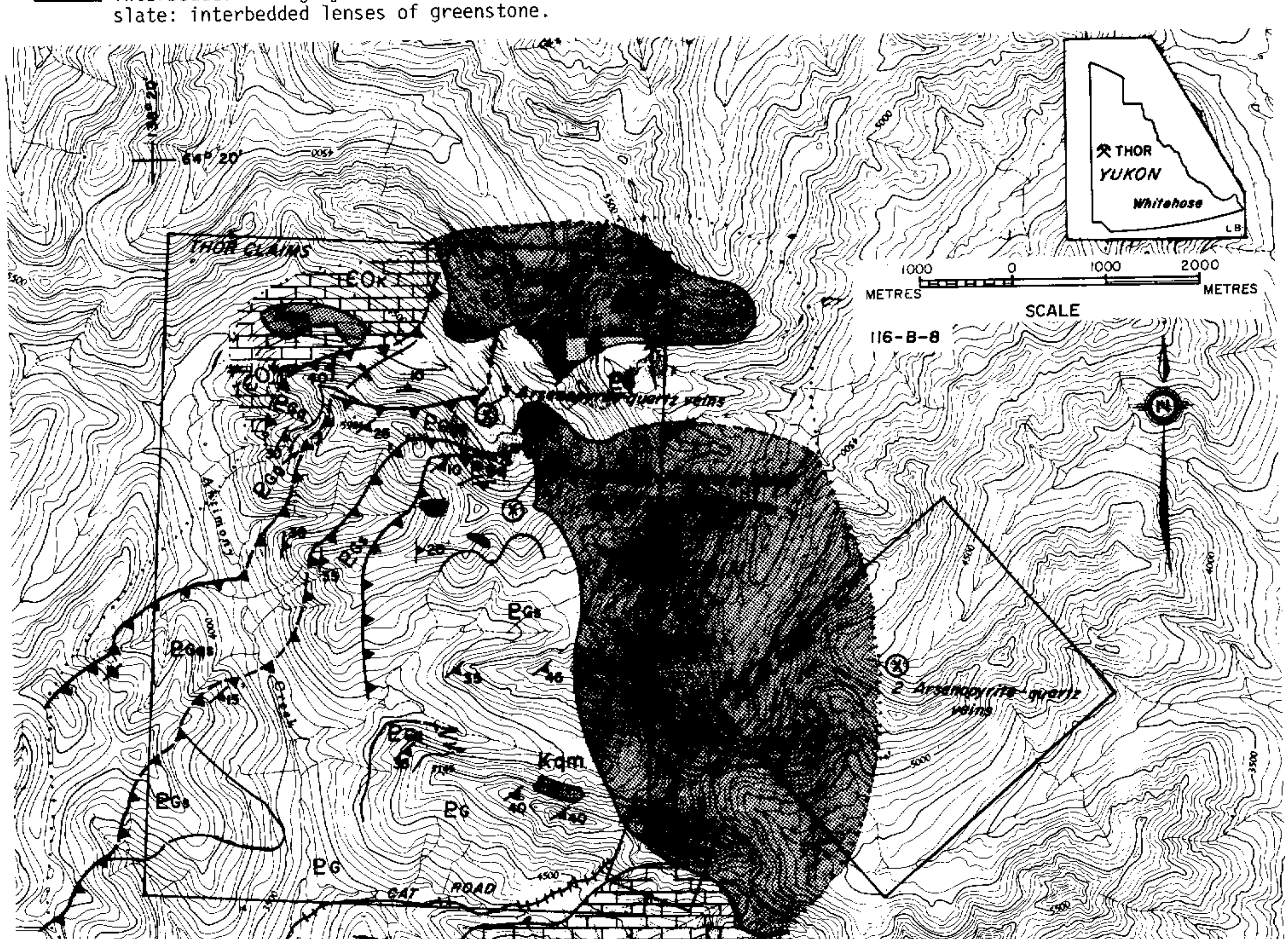
GRIT UNIT

ᕈGq Resistant, thick-bedded gritty quartzite with minor interbedded slate.

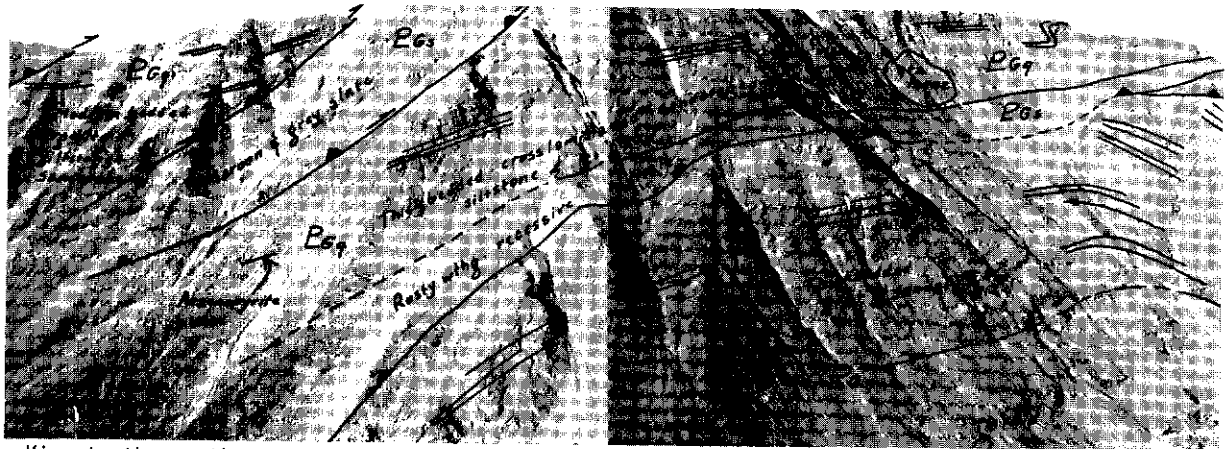
ᕈGqs Rusty weathering, resistant medium-bedded light grey and green siltstone and fine-grained quartzite.

ᕈGs Dark weathering moderately resistant maroon shale.

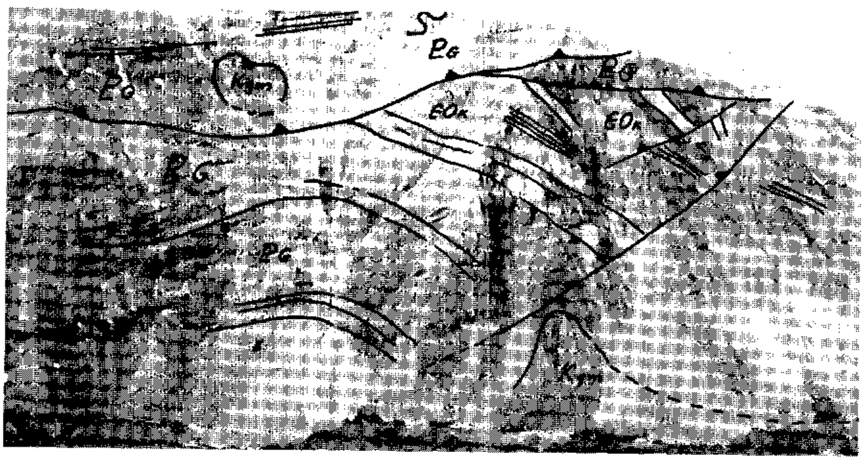
ᕈGq Resistant, thick-bedded granule grit.



Geological sketch map of the Thor claims.



View to the southwest of the ridge running northwest from the Antimony Mountain. The photograph illustrates the deformation of the Proterozoic "Grit Unit" by imbricate northwest directed thrust faults. A small quartz monzonite plug can be seen in this view and one of the arsenopyrite quartz veins that have gold values is marked on the photo. Units are labelled as on the map. Short parallel lines indicate bedding dips and are not contacts.



View of the same ridge as in figure above. The thrust near the top of the photo, also seen above, cuts a broad anticline in the lower thrust plate. Units are labelled as on the sketch map.

A moderately southeast dipping succession of clastic rocks of the late Proterozoic "Grit Unit" that is repeated by thrust faults underlies the claims. On the east of the claim block is the Antimony Mountain stock of mid-Cretaceous age. At the margin of the stock the clastic rocks are hornfelsed and pyrrhotite is developed giving them rusty weathering colours. The Antimony Mountain stock ranges from biotite-quartz monzonite and granodiorite to hornblende biotite syenite. It is a member of the Tombstone intrusions.

Eight veins which contain arsenopyrite and pyrite, lesser chalcopyrite and pyrrhotite and minor sphalerite and galena cut the rocks. The veins are less than 1 m wide and generally less than 100 m long. They are planar, near-vertical and trend east or northeast and they pinch and swell. Assay values from material in the veins range from highs of 10% copper, 3% lead, 2.5% zinc, 300 gm/tonne silver, 30 gm/tonne gold to average values of 2% copper, 1% lead, .2% zinc, 30 gm/tonne silver, 3 gm/tonne gold over the width of the veins as determined from samples by the company. The vein minerals are zoned from the walls inward with dark ferroactinolite on both walls, quartz in terminated crystals next to it and coarsely crystalline sulphides in the partly open space in the centre. The sulphide filled central part of the veins is generally about a third the width of the entire vein.

Current Work and Results :

During 1979 soil samples were collected on a grid and 1080 were analyzed for lead, zinc, copper and silver. A copper anomaly was identified about the centre of the claims. In addition, a MAX-MIN electromagnetic survey was carried out, but the results were not interpreted because of instrument problems.

During 1980 the property was mapped and some hand trenching was carried out. Four NQ holes totalling 1,000 m were drilled on the ridge and valley floor near the five veins (see map). The philosophy in drilling was that the veins may represent a stockwork above a copper replacement in the "Grit Unit", but this has not been borne out.

The veins in the THOR property are similar in setting, host rocks, mineralogy and grade to those on the AJ claims on the east side of the Antimony Mountain stock.

BALDY
Cominco Limited

Stratabound Lead, Zinc
116 C 2 (89)
(64°07'N,140°59'W)

Claims: BALDY 1-22

Source: Summary by D. Tempelman-Kluit from assessment report 090774 by E. G. Olfert.

Description:

The claims were staked in May, 1980 to cover an area with anomalous soil and silt geochemistry. Quartz-chlorite schist that dips moderately to the north and which is part of Yukon Cataclastic Complex underlies the claims. Mineralization occurs on strike with, and in the same rocks as, that at the Boundary prospect just across the Yukon-Alaska border.

Current Work and Results:

Grid soil sampling at 25 m intervals on lines 150 m apart was done on the claims. Coincident anomalous levels of copper, lead and zinc were found over an area 500 x 100 m. Background values for lead are 10-25 ppm, for zinc 50-75 ppm and for copper 10-15 ppm. The claims were prospectedd and sphalerite, chalcopyrite, galena and pyrite were found disseminated along the foliation of the schist in float boulders near the geochemical anomaly.

RAIL
Noranda Exploration
Company Limited

Tungsten Skarn
116 C 8 (90)
(64°23'N,140°10'W)

Claims: RAIL 1-4; ROAD 1-62

Source: Summary by D. Tempelman-Kluit from assessment reports 090637, 090660 and 090709 by G. MacDonald.

Description:

The claims, 35 km northwest of Dawson, were staked in 1979 following reconnaissance prospecting. A roughly equant shaped plug, 8 km in diameter, of medium -grained biotite-quartz monzonite intrudes gently dipping, highly sheared metamorphic rocks of the Nisutlin Allochthonous Assemblage. The latter includes a structural succession from the top down of a) quartz-mica schist, b) crystalline marble, c) chloritic quartzite, and d) greenstone and amphibolite.

Garnet-diopside-epidote-tremolite-pyrrhotite skarn developed locally near the contact of the stock in the sheared country rocks contains scheelite. The host rock and geologic setting is similar to that of the Ray Gulch tungsten showing on Potato Hills, near Mayo.

Current Work and Results:

Soil geochemical and magnetometer surveys were carried out over the claims in 1979. Anomalous levels were determined as follows: copper above 40 ppm, zinc above 100 ppm, lead above 35 ppm, tungsten above 5 ppm.

During 1980, the geology of the claims was mapped and a further geochemical reconnaissance carried out. The anomaly threshold levels determined earlier were found applicable. Erratically distributed, weakly anomalous values of copper, lead, zinc and molybdenum were defined, and three areas of moderately anomalous tungsten values were found. Because soil geochemistry is considered an effective tool in the region, the three anomalies are considered significant and they will be grid sampled in future.

During 1980, four BQ holes totalling 466 m were also drilled on the claims. These intersected minor amounts of scheelite.

MAIDEN
Ukon Joint Venture
Chevron Canada Limited;
Archer, Cathro and
Associates Limited

Uranium Tinguaite
116 B 7 (91)
(64°23'N,138°38'W)

Reference: Morin et al (1980, p. 29)

Claims: TING 1-50, 85-86, 91-94; NOTING 51-76; PROSPECTING 77-84

Source: Summary by D. Tempelman-Kluit from assessment report 090561 by A. R. Archer.

Current Work and Results:

Sixteen holes for a total of 1774 m were drilled in 1979 to test the uranium content of the tinguaite beneath the best surface mineralization. The drilling intersected 195 m grading better than 105.7 gm/tonne U_3O_8 in zones between 2 and 76 m thick. Minor pyrrhotite and pyrite and traces of molybdenite occur throughout the tinguaite.

REIN
Union Miniere Exploration
and Mining Corporation
Limited

Barite Stratabound
116 B 9 (92)
(64°43'N,138°10'W)

Reference: Morin et al (1980, p. 24)

Claims: REIN 7-96

Source: Summary by D. Tempelman-Kluit from assessment report 090617 by B. Templeton.

Current Work and Results:

During 1980 the property was drilled and trenched. The work concentrated on two zones, the Ridge and Cliff areas. Twenty-one reverse circulation rotary percussion holes for a total 906.4 m were completed. Extensive surface trenching was also conducted and two 1300 kg bulk samples were obtained for mill testing. During 1980 an additional 60 claims were staked.

NEBULOUS
Ukon Joint Venture
Chevron Canada Limited;
Archer, Cathro and
Associates Limited

Uranium in dike
116 B 7 (93)
(64°28'N,138°46'W)

Reference: Morin et al (1979, p. 54)

Claims: NEBULOUS 1-33

Source: Summary by D. Tempelman-Kluit from assessment report 090708 by D. Eaton.

Current Work and Results:

A 10 m long hand trench was dug in bedrock across a moderately radioactive dike of monzonite porphyry. The dike contains 57 ppm uranium compared with 11 ppm in average plutonic rocks in the area.

1980 MINERAL CLAMS BAKED

VIRGIN
John Young et al
116 B 3 (5)
(64°00'N,139°15'W)

Claims 1980: 1980 LODE (16)

LEPINE
Clarke Ashley et al
116 B 3 (8)
(64°07'N,139°12'W)

Claims 1980: SPEC (52)

MILLER
Walter Yaremco et al
116 C 2 (14)
(64°01'N,140°53'W)

Claims 1980: MARY (24)

WOODCHOPPER
Archer, Cathro and Associates
116 B 5 (33)
(64°18'N,139°58'W)

Claims 1980: TOC (24)

HALIFAX
Clarke Ashley
116 B 3 (69)
(64°00'N,139°24'W)

Claims 1980: SPEC (8)

MARN
Noranda
Mattagami Lake Mines
116 B 7 (78)
(64°29'N,138°48'W)

Claims 1980: MARN (104)

PLUTO
Cominco Limited
116 C 8 (80)
(64°20'30"N,140°22'W)

Claims 1980: PLUTO (112)

ETC
116 B 2 (82)
(64°01'N,138°56'W)

Claims 1980: COOKIE (1);RANDY (1); BUCLY (1); JIM (1); ETC (38)

FROGGY
Zephirin Lavoi
116 B 3 (83)
(64°01'30"N,139°23'W)

Claims 1980: FROG REACH (2)

FRESNO
Robert McIntyre et al
116 B 4 (84)
(64°12'30"N,139°46'W)

Claims 1980: CHANCE (12)

RIKI
Mattagami Lake Mines
116 B 9 (85)
(64°30'N,138°25'W)

Claims 1980: RIKI (24)

TAK
Mattagami Lake Mines
116 B 10 (86)
(64°32'N,138°32'W)

Claims 1980: TAK (48)

KITL
UMEX
116 B 14,15 (87)
(64°49'30"N,139°00'W)

Claims 1980: TS (16)

GUCH
Dan Dominick et al
116 C 2 (88)
(64°04'N,140°43'W)

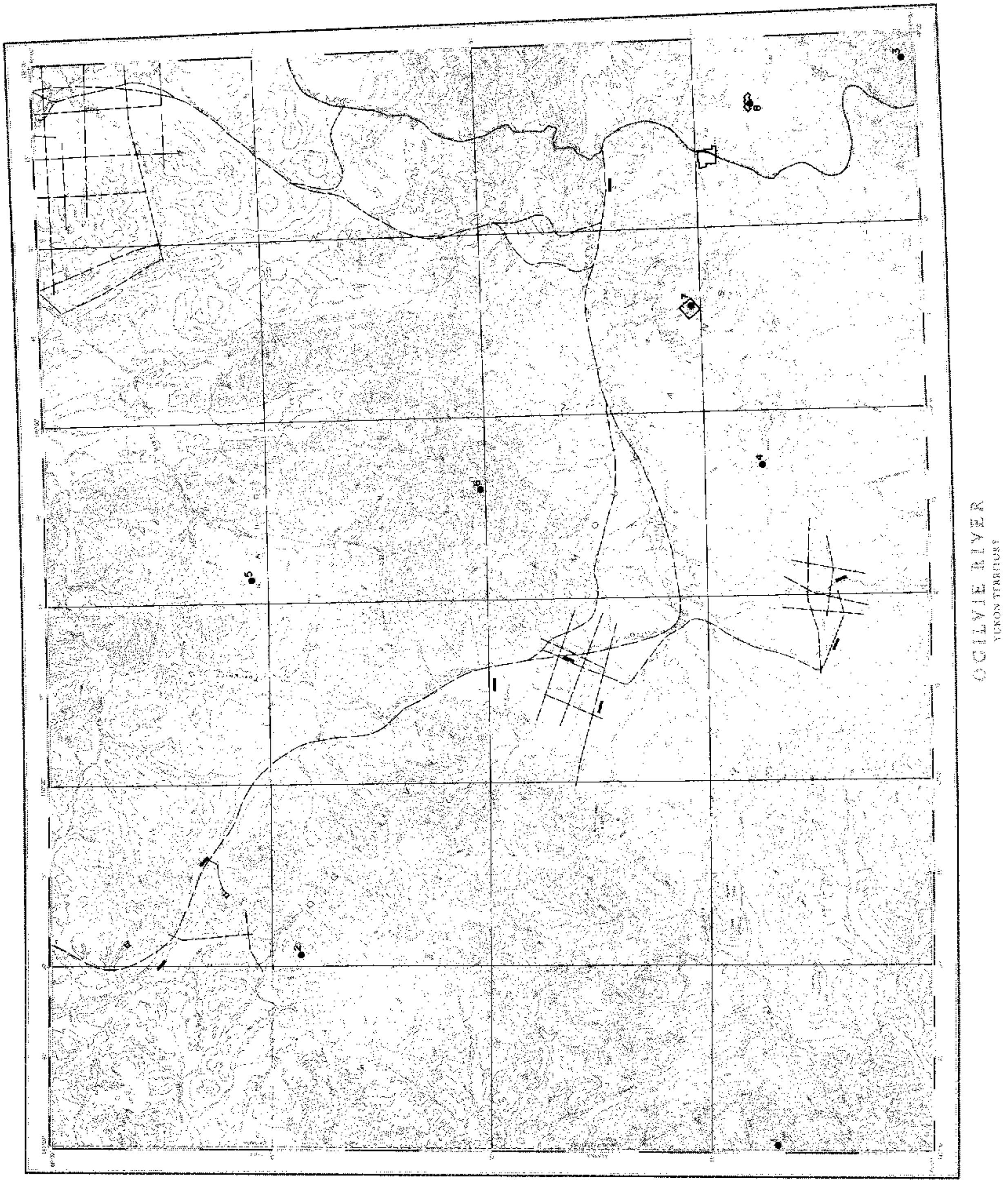
Claims 1980: BE (31); JEM (8)

RAIL
Noranda Mines Ltd.
116 C 8 (90)
(64°24'N,140°11'W)

Claims 1980: TRACK (28)

MAIDEN
T. Paul Wylie
116 C 7 (91)
(64°21'N,140°38'W)

Claims 1980: TEQUILLA (4)



Kilometres 5 0 5 10 15 20 25 30 Kilometres

● 61 .... Mineral Deposit or Occurrence see Key on facing page

○ 72 .... Unmineralized Target

.... Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

.... Mineral Claims staked in 1980

.... Placer Leases in good standing (Jan. 1981)

.... Placer Claims in good standing (Jan. 1981)

CEL .... Coal Exploration Lease

CML .... Coal Mining Lease

.... Tote Trail

.... Driveable Road

◇ .... Oil or Gas Well

.... Airstrip

OGILVIE RIVER MAP-AREA (NTS 116 G-F)

NO.	PROPERTY NAME	REFERENCE
1	BURGOYNE	G.S.C., Mem. 67, pp. 53, 112
2	SIT DOWN	G.S.C., Pap. 76-1A, p. 459
3	DYKE	G.S.C., Pap. 74-1A, p. 344
4	NUCLEAR	MIR, 1974, pp. 77-78
5	GIG	Lead Vein
6	COOT	Lead Vein
7	BILBO	This Report
8	MILCH	

BILBO
Preussag Canada Limited

Lead, Barite Vein
116 G 7 (7)
(65°16'N,138°43'W)

Reference: Sinclair *et al* (1975, p. 78)

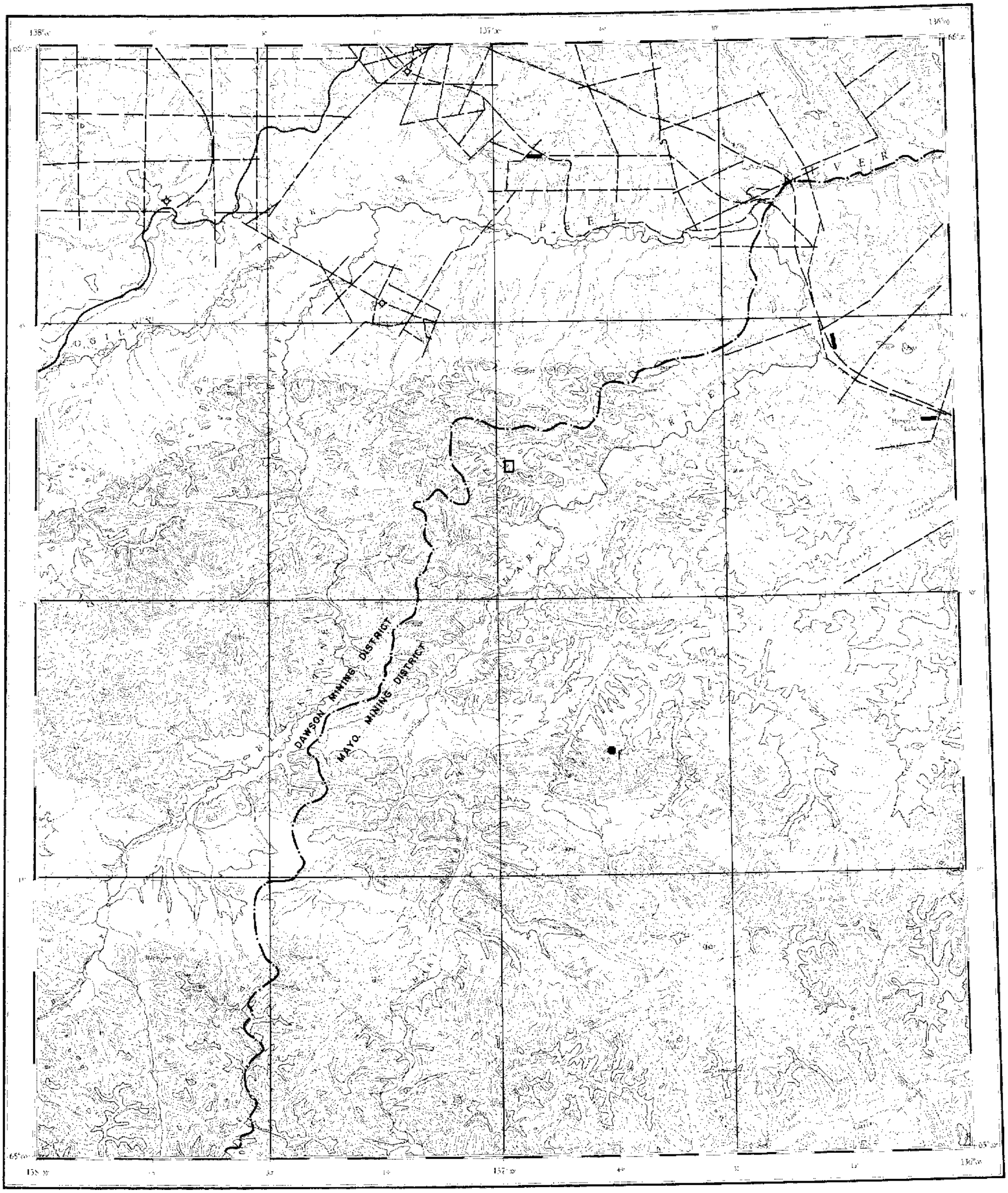
Claims: ENT 1-16

Source: Summary by D. Tempelman-Kluit from assessment report 090751 by J. L. Wright.

Current Work and Results:

The present claims were staked in 1979 after earlier claims on this showing lapsed. Devono-Mississippian clastic rocks of the Canol and Imperial Formations underlie the region, but on the claims is an older sequence of sandy dolomite overlain by cherty dolomite and in turn covered by shale of the Road River Group. Near the top of the cherty dolomite fractures filled with coarsely crystalline barite host coarsely crystalline galena.

Magnetometer, gravity, horizontal loop EM and IP surveys were done on the claims on a grid with 50 m line spacing and 12.5 m station interval. Magnetic relief is low as expected with the carbonate host rocks. The gravity survey was partly corrected for topography, but residual topographic effects remain and are difficult to remove. The data show that no large tonnage of barite occurs on the claims. Three electromagnetic anomalies were detected, but they are poor conductors suggesting they may reflect shear zones or shaly rocks. The IP survey reflects the dolomite as a low chargeability region of high resistivity compared with the shale. Faint chargeability anomalies within the dolomite may indicate mineralization.



HART RIVER

YUKON TERRITORY

Kilometres 5 0 5 10 15 20 25 30 Kilometres

●61 ....Mineral Deposit or Occurrence see Key on facing page

○72 ....Unmineralized Target

............Mineral Claims in good standing (Jan. 1981) and staked before Jan. 1980

............Mineral Claims staked in 1980

.......Placer Leases in good standing (Jan. 1981)

.......Placer Claims in good standing (Jan. 1981)

CEL..........Coal Exploration Lease

CML..........Coal Mining Lease

.....Tote Trail

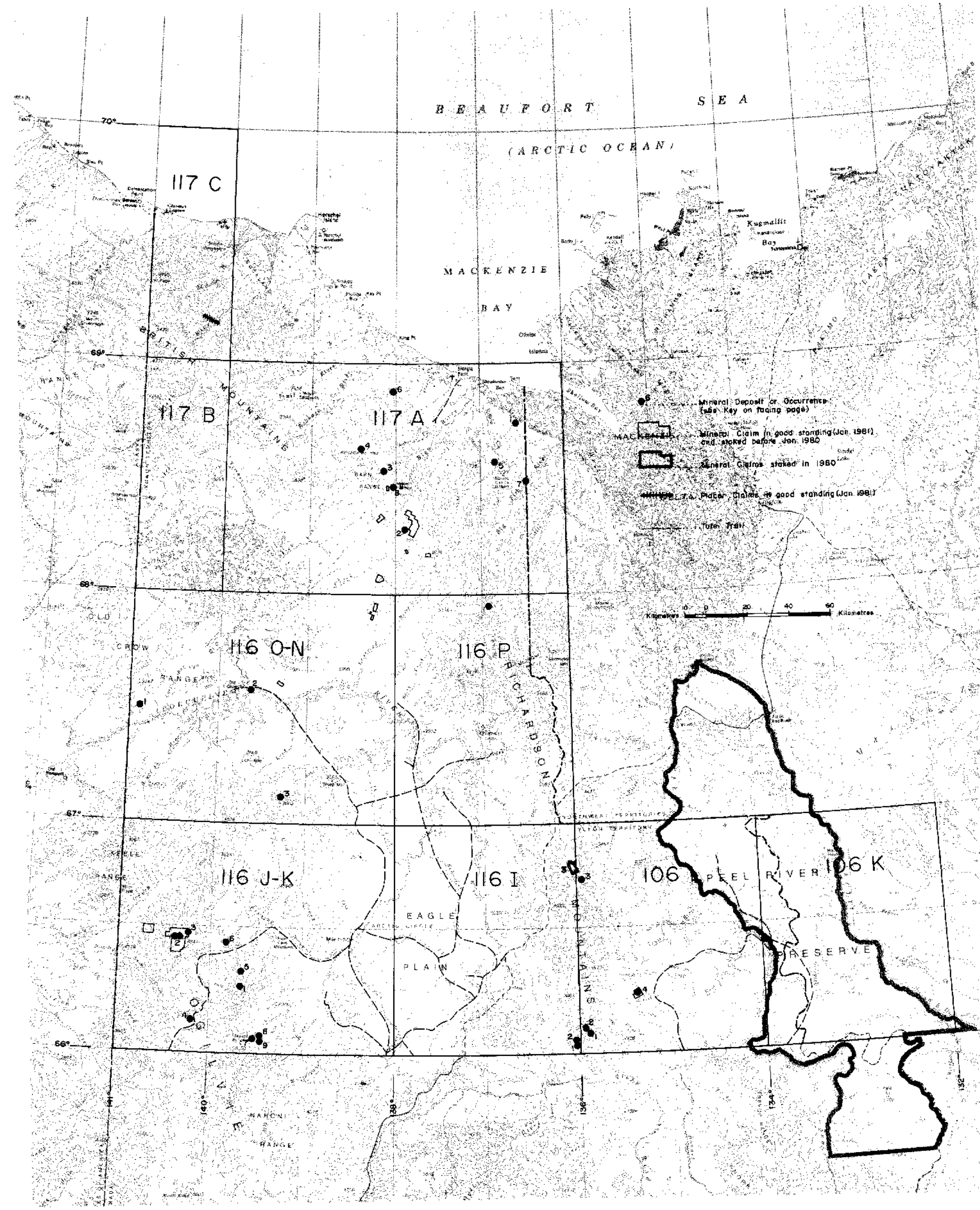
.....Driveable Road

............Oil or Gas Well

.........Airstrip

HART RIVER MAP-AREA (NTS 116 H)

NO.	PROPERTY NAME	REFERENCE
1	CUNG	MIR, 1974, pp. 69-70


BEAUFORT SEA
(ARCTIC OCEAN)
MACKENZIE BAY
117 C
117 B
117 A
116 O-N
116 P
116 J-K
116 I
106
106 K
BRITISH MOUNTAINS
RICHARDSON MOUNTAINS
EAGLE PLAIN
PEEL RIVER PRESERVE
OLD CROW RANGE
Mineral Deposit or Occurrence (see Key on facing page)
Mineral Claim in good standing (Jan. 1981) and staked before Jan. 1980
Mineral Claims staked in 1980
Placer Claims in good standing (Jan. 1981)
Tote Trail
Kilometres 0 20 40 60 Kilometres
70°
69°
68°
67°
66°
140°
138°
136°
134°
132°

MARTIN HOUSE MAP-AREA (NTS 106 K)

NO.	PROPERTY NAME	REFERENCE
1	CARIBOU BORN	Coal

TRAIL RIVER MAP-AREA (NTS 106 L)

NO.	PROPERTY NAME	REFERENCE
1	PILON	MIR, 1974, pp. 88-89
2	TWICE	MIR, 1974, pp. 90-91
3	TOUCHE	MIR, 1974, p. 91, This Report
4	NOR	This Report

EAGLE RIVER MAP-AREA (NTS 116 I)

NO.	PROPERTY NAME	REFERENCE
1	LLOD	MIR, 1974, pp. 87-88
2	HARIVAL	MIR, 1974, pp. 87-88
3	TOUCHE	This Report

PORCUPINE RIVER MAP-AREA (NTS 116 J-K)

NO.	PROPERTY NAME	REFERENCE
1	PEACH	MIR, 1974, pp. 81-82
2	TERMUENDE	This Report
3	ALTO	G.S.C., Pap. 76-1A, p. 461
4	BERN	MIR, 1974, pp. 79-81
5	FISHING BRANCH	MIR, 1974, pp. 81-82
6	MOKO	MIR, 1974, pp. 81-82
7	WART	MIR, 1974, p. 84
8	YUM	MIR, 1974, pp. 83-84
9	BULLIS	MIR, 1974, p. 85

OLD CROW MAP-AREA (NTS 116 O-N)

NO.	PROPERTY NAME	REFERENCE
1	SUNAGHUN	G.S.C., Pap. 64-36, p. 18
2	TACK	G.S.C., Annual Report 1888-89, Vol. IV, Part D, pp. 127-128
3	SALEKEN	MIR, 1974, pp. 85-86

BELL RIVER MAP-AREA (NTS 116 P)

NO.	PROPERTY NAME	REFERENCE
1	NORRIS	G.S.C., Pap. 74-1A, p. 348

BLOW RIVER MAP-AREA (NTS 117 A)

No.	PROPERTY NAME	REFERENCE
1	MOOSE CHANNEL	G.S.C., Pap. 50-14, p. 30
2	BONNET	G.S.C., Pap. 59-14
3	HOIDAHL	G.S.C., Economic Geology Report No. 20 Western Miner 42(4): 28-40
4	WELCOME	G.S.C., Pap. 50-14, p. 26
5	RAPID	G.S.C., Pap. 72-1A, p. 232
6	SHINGIE	G.S.C., Pap. 72-1B, p. 97
7	STRADDLE	G.S.C., Pap. 72-1A, p. 232
8	MAM	This Report

NOR
Getty Minerals
Company Limited

Uranium, Copper
Breccia
106 L 3 6 (4)
(66°16'N,135°23'W)

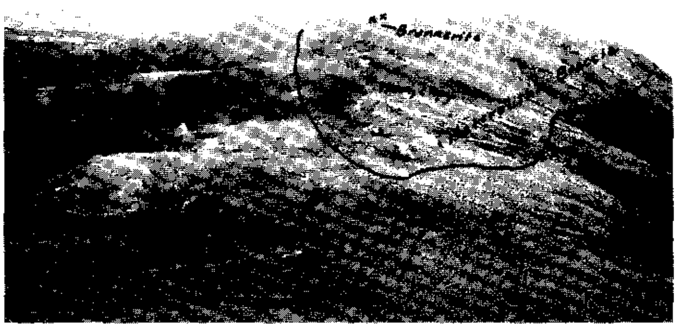
References: Norris (1975); Morin et al (1980, p. 26)

Claims: NOR 1-56

Source: By D. Tempelman-Kluit based on property visit and from assessment report 090515 by M.H. Sanguinetti.

Description:

The NOR claims, 312 km north of Mayo and 65 km east of Eagle River Lodge on the Dempster Highway, were staked in 1977 and 1978 to cover a heterolithic diatreme breccia intruded into a fault-bounded outlier of Proterozoic sedimentary rocks on the east flank of the southern Richardson Mountains. The writer visited the property for two days in June, 1980.



View of the NOR breccia pipe from the north. The pipe boundary is outlined and the brannerite mineralization and location of hematite-chalcopyrite showing are shown in relation to the breccia.

The claims are underlain by an 800 x 1800 m diatreme breccia which is oval in plan and elongate in a northward direction. The breccia invades limy siltstone and phyllite considered to be Proterozoic (Norris, 1975). The diatreme body appears to have irregular outer margins with the country rocks and its boundaries are gradational. The breccia contains angular fragments of the country rocks in a fine matrix. The clast to matrix ratio varies, but is generally high. Between fragments the matrix material is commonly finely laminated and this lamination is considered a fluxion or flow texture. Although a small proportion of the matrix may be introduced "volcanic" material, the bulk is finely comminuted country rock. Clasts range from sandstone to boulder size. In the central part of the diatreme is a large zone, irregular in plan and about 300 m across which is made up mainly of finely fluxion structured material. The fluxion textured material interfingers with the breccia.

The diatreme pipe hosts two types of mineralization that are spatially distinct and which formed at separate times. Earliest is massive magnetite-hematite-jasper-quartz with minor disseminated chalcopyrite that occurs partly as matrix in the northern part of the breccia pipe. It forms an irregular zone with gradational margins some 30 m across. The second type

Heterolithic breccia from the NOR shows the angular nature, variety in clast lithology and size range of fragments in this rock. The groundmass is finer grained than the clasts, but consists of the same material.

Fluxion banded rock form the NOR showing alternate layers of finer and coarser grained material. This finely comminuted material interfingers with the coarser breccia seen in the other photograph.

of mineralization includes coarsely crystalline brannerite distributed erratically as late cavity fillings with quartz and pink K-feldspar at the east edge of the fluxion textured core of the breccia pipe.

Current Work and Results:

During 1979, 84.75 line-km of grid were established, and geological, soil geochemical, spectrometer, and track-etch surveys carried out. Soil samples were collected at 430 sites along 17.25 km of line, and were analyzed for uranium. The analyses fall into categories considered to be background (0 to 1.0 ppm), above background (1.1 to 2.0 ppm), anomalous (2.1 to 3.0 ppm) and highly anomalous (more than 3.0 ppm). Five anomalous areas were identified. The geochemical survey shows that copper values in soils closely outline the known uranium occurrences, but the scintillometer survey shows no correlation with the uranium mineralization.

Track-etch cups were set out for 6 weeks, at 250 sites along 7 lines 400 m apart to measure radon gas concentrations in soil. Seven anomalous sites show little correlation with soil geochemistry or scintillometer data. The spectometer survey was carried out along 76.8 km of line. Several strong and weak anomalies were identified, but there was only local correlation with the geochemical survey.

During 1980, additional track-etch surveys were carried out and hand trenches were dug to expose brannerite in bedrock.

1980 MINERAL CLAIMS STAKED

TOUCHE	106 L 13 (3)
Mattagami Lake Mines	(65°50'N,136°01'W)

Claims 1980: TOUCHE (56)

TERMUENDE (RUSTY SPRINGS)	Lead, Zinc
Rio Alto Exploration	Silver Cavity
Limited	Fillings
	116 K 8,9 (2)
	(66°31'N,140°20'W)

References: Norris et al (1963); Norris (1977); Schoel (1978); Hansen (1979); Morin et al (1979, p. 57-58, 1980, p. 31)

Claims: RIO 1-104; NATE 3-14; CARB 1-16; JP 1-54; MOOSE 1-48; HG 1-146

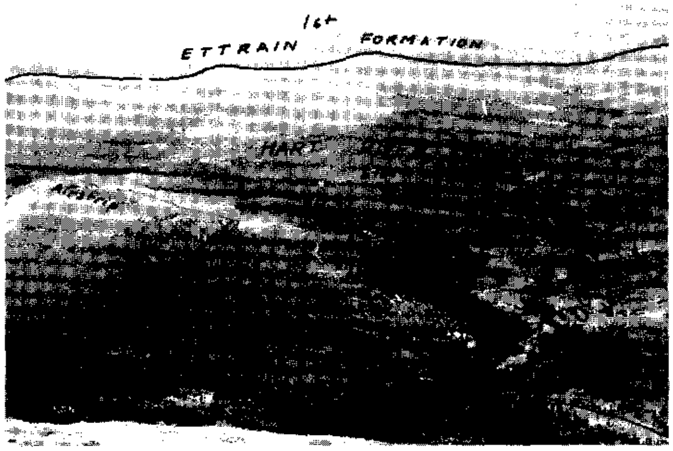
Source: By D. Tempelman-Kluit based on property visit.

The TERMUENDE or RUSTY SPRINGS property, a block of 380 claims, 270 km north of Dawson, is about 20 km east of the Alaska border on the headwaters of Black River, a tributary of the Porcupine River in the northern Ogilvie Mountains. The country is one of moderate relief and rounded mountains that attain heights near 1000-1500 m. The vegetation is relatively scrubby and tree line is at 800 m altitude. Upper slopes are covered with talus and minor outcrop is seen in the valleys. Access to the property is difficult, the closest point serviced by road is the Ogilvie River bridge at km 198 on the Dempster Highway. It is 160 km to the southeast.

The writer visited the property during four days in June, 1980 through the courtesy of the company and while there saw the more important showings, mapped the geology near the property, and discussed the geology and showings with Jill Kirker and Joe Bankowski, company geologists. The writer was given free access to all company information.

Mineralization was discovered in 1975 by Bob Termuende, a geologist working for Rio Alto, while prospecting gossans visible from the air. Several prominent rusty springs are seen on the creek that drains across the property. These acid springs carry iron derived from the pyritic slate of the Hart River Formation which is precipitated as limonite where the springs issue at the contact with dolomite of the underlying Ogilvie Formation. The property was staked in 1975 and explored in following summers. Altogether nearly 4100 m of diamond drilling has been completed and a geochemical soil survey, electromagnetic survey and gravity survey were carried out.

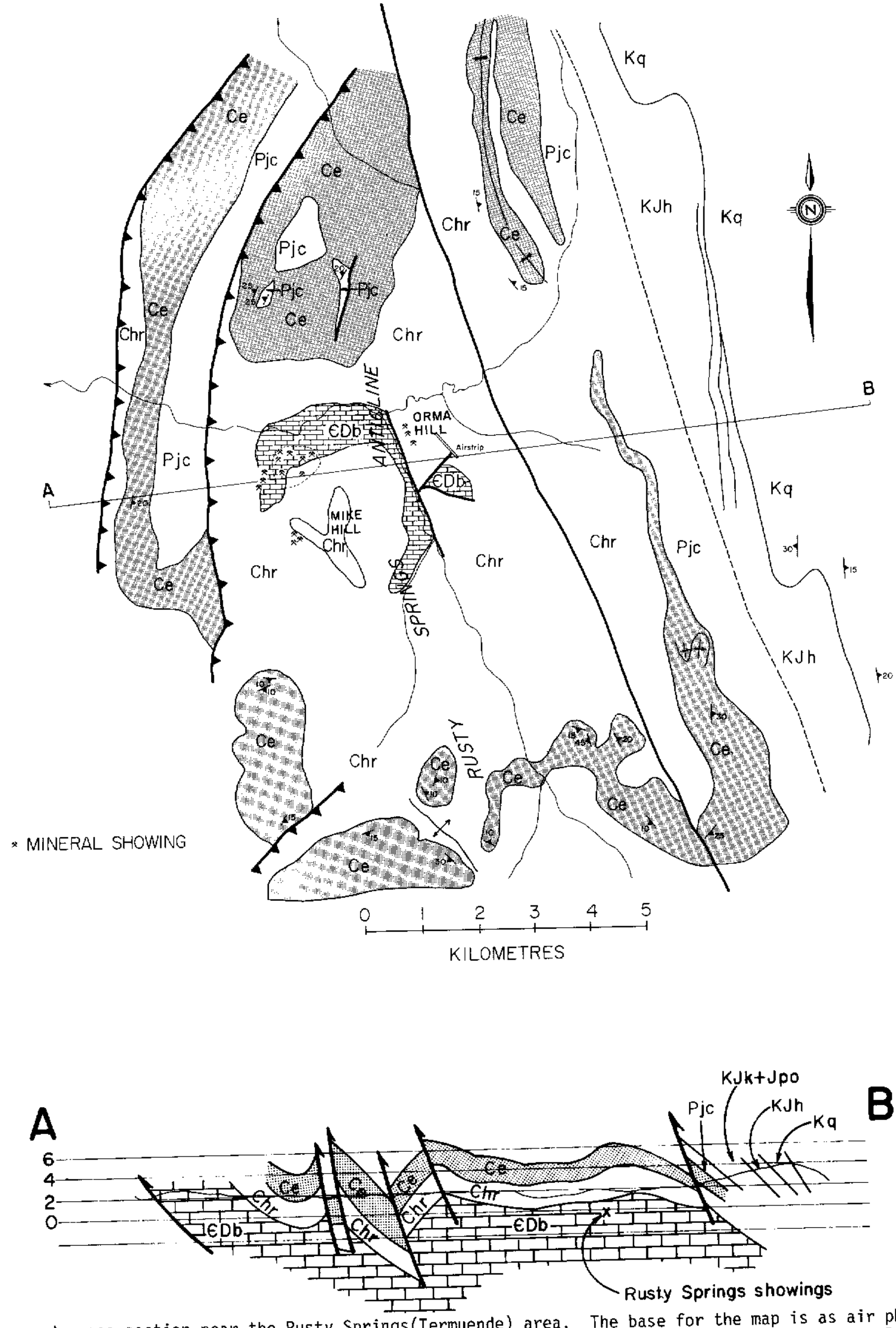
Prospecting, soil geochemical and geological surveys and geological mapping were done on the claims in 1975, 1976, 1977 and 1978. Pits and trenches were dug in 1976 and 1980. In 1977, 903 m of diamond drilling were completed, 1,767 m were completed in 1978 and 1,453 m were completed in 1980.



View to the south of the Termuende or Rusty Springs prospect in the northern Ogilvie Mountains. The low ground in much of the picture is underlain by Devono-Mississippian black slate of the Hart River Formation. Dolomite of the Devonian Ogilvie Formation exposed in the bottom of the valleys hosts cavity filling lead-zinc mineralization.

Geology

The geology of Porcupine River map-area (NTS 116 J and 116 K E 1/2) was mapped by Norris (1977). Figure 1 is a geological map of the immediate area of the claims based on Norris' (1977) work, but modified by the writer. Mineralized strata on the property are exposed in a small stream locally called Carroll Creek, a headwater tributary of Salmon Fork. They include the upper part of the Ogilvie Formation, a Devonian dolomite whose base is not seen and the unconformably overlying slate of the Hart River Formation (Mississippian). The Ogilvie Formation includes dark grey, massive to thick-bedded, fetid, finely crystalline dolomite with locally plentiful crinoid fragments. The Hart River Formation includes siliceous black slate, grey chert, chert granule sandstone and rusty weathering greenish shale. It is correlated with the Canol Formation, Imperial Formation, Ford Lake shale, Kekiktuk and Kayak Formation. Neither unit contains diagnostic fossils on the property. Younger strata above the mineralized rocks include the Ettrain and Jungle Creek Formations, limestone and shale units respectively of Pennsylvanian and Permian age that lies unconformably above the mineralized strata. Unconformably above all these are Jurassic and Cretaceous shale



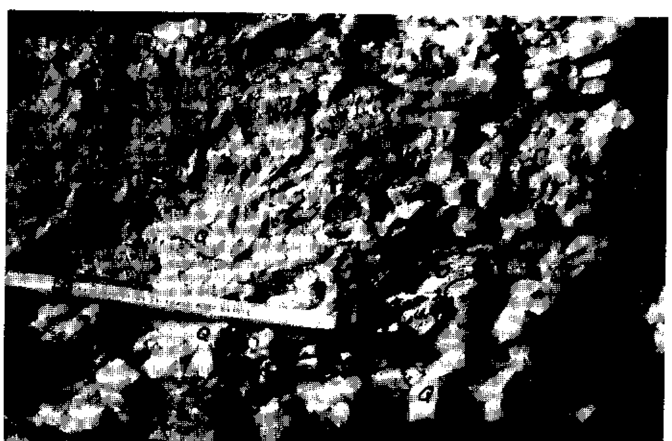
Sketch map and cross-section near the Rusty Springs(Termuende) area. The base for the map is as air photograph. Map-units are labelled following Norris (1977). ЄDb-dolomite including Ogilvie Formation; Chr-Hart River Formation, black slate; Ce-Ettrain Formation, shaly limestone; Pjc-Jungle Creek Formation, sandstone; KJk + Jpo - Kingak Formation, shale and sandstone; KJh-Husky Formation, shale and sandstone; Kg-"White and coaly quartzite", Orthoquartzite.

and sandstone of the Husky Formation and White and Coaly quartzite divisions. Strata beneath the Ogilvie Formation are inferred from Norris (1977) to be a thick unnamed dolomite of Cambrian to Devonian strata in turn above the Tindir Group, a late Proterozoic clastic unit.

A structural cross-section of the property shows that the rocks are exposed as part of a generally eastward dipping sequence repeated and modified by a series of relatively minor north trending folds and faults. Along trend to the south the generally east dipping succession is replaced by a pair of folds, a 15 km wide synclinorium on the west and Porcupine anticline, a 7 km wide simpler fold east of it (Norris, 1975).

Mineralization

The surface showings, 33 in number, are exposed over a wide area on the lower slopes of two hills locally named Mike and Orma Hills. They are irregular lenses of coarsely crystalline galena with resinous brown sphalerite and locally abundant tetrahedrite in a gangue of coarsely crystalline clear quartz and white calcite. The sulphide minerals are generally subhedral and interstitial to euhedral quartz and calcite. Pale yellow barite crystals are seen in some cavities. The silver content of some tetrahedrite in the sulphide lenses, as assayed by the company, is 5806.4 gm/tonne and the silver-lead ration (gm/tonne: %) averages near 15:1. The largest mineralized lenses are less than a meter across; most are only a few centimeters or decimeters in maximum dimension. The coarse sulphide lenses are cavity fillings in a pervasively altered zone of white coarsely crystalline, vuggy dolomite.



Mineralization from the Termuende or Rusty Springs showings commonly includes coarsely crystalline galena (G) and quartz crystals seen in this example. The material apparently filled an open cavity judging from the well terminated quartz crystals.

This broader dolomitized zone is irregularly shaped, of unknown extent, and may average 100 m thick. It is crudely localized near the shale-dolomite contact of the Ogilvie and Hart River Formations. The dolomite of the broad altered zone is sugary textured with a grain size approaching 0.5 mm and a near white or very pale grey colour. It has numerous small cavities about 5 mm across which are lined with black pyrobitumen and euhedral small pyrite crystals 0.2 mm across. The coarse sulphide lenses appear to be irregularly distributed throughout the broadly dolomitized zone. Although some of the sulphide lenses occur close together, control by faults or fractures cannot be demonstrated. A crude concentration of sulphide lenses near the base of the generally altered zone forms irregular veins, veinlets and pseudobreccias in the primary black dolomite and the transition generally occurs over several meters or tens of meters. No economic minerals are visible in the dolomitized zone. Near the surface the sulphide lenses are extensively altered and replaced by the secondary minerals smithsonite, malachite, azurite, plumbojarosite and cerussite. In places goethite and hematite mixtures are seen.

Most work on the property was done to test for extensions of the surface showings. Limited bulldozer trenching was done on the northwest side of the Orma Hill and most drilling was done to test depth. Holes were generally planned to drill through the altered zone into unaltered Ogilvie Formation in the hope of hitting sulphide lenses. The control on mineralization guiding drilling was that the sulphides are "Mississippi Valley" type cavity fillings with sulphides derived from nearby shales and transported into the rocks by low temperature hydrothermal systems. The geochemical and geophysical surveys show no correlations with the mineralization and little correlation with the geology.

The mineralizing event probably occurred in two stages following deposition and early diagenesis of the Ogilvie Formation. The first stage involved pervasive redolomitization to form the extensive irregular very pale dolomite zone localized roughly on the Ogilvie -Hart River contact. The second stage followed the first closely and was more localized than the first; it emplacedd quartz and sulphides with calcite in some of the cavities left after the first event. There is no evidence of the time of alteration and mineralization. These events may post-date deposition and diagenesis by a considerable time and might be late Paleozoic or Mesozoic. Several other mineral occurrences like the RUSTY SPRINGS showings are known in the region.

Current Work and Results

This section is summarized from assessment report 090532 by P.S. White and from assessment report 090685 by J. Bankowski, both of Rio Alto Exploration. Work done in 1979 was designed to "fill-in" gaps in data concerning the property, and to identify drill targets for subsequent work. Prospecting, geological, soil geochemical, induced polarization, resistivity and gravity surveys were carried out. Prospecting identified 17 new showings. A 143 kg sample from the Orma showing contained 2.44% copper, 27.7% lead, 0.07% zinc and 2162 gm/tonne silver.

Copper, lead, zinc and silver analyses were done on approximately 400 soil samples. Most of the anomalous values correlate with mineralized areas on Mike and Orma Hills. A limited number of stream sediment samples were also collected and analyzed. Several samples had anomalous zinc contents.

Induced polarization and resistivity surveys were done along 62.3 km of line on the Mike and Orma Zones. Several heavily oxidized mineralized areas lack induced polarization or resistivity anomalies. Gravity surveys were done along 52.9 km of line on the Mike and Orma Zones. Two of the three I P anomalies have coincident gravity anomalies.

In 1980, all work was done on Orma Hill. Twenty-seven holes totalling 1,453 m were drilled. The best intersection was 1.5 m of 2021 gm/tonne silver, 24.57% lead, 2/53% copper and 0.004% cadmium. Several holes were barren. Six trenches totalling 3825 cubic meters were excavated. The best selected sample from one trench contains 15,985 gm/tonne silver, 7.9% lead, 25.8% copper and 2.11% zinc.

MAM	Uranium, Tungsten,
Aquitaine Company	Molybdenum Skarn
of Canada Limited	117 A 6 (8)
	(68°28'N,138°03'W)

Claims: MAM 1-8

Source: Summary by R. Debicki from assessment report 090508 by D. Noakes.

Current Work and Results:

The MAM claims were staked in 1977 following the discovery of uranium and molybdenum mineralization during a ground traverse. A preliminary investigation was performed that year to outline the extent of mineralization.

Geological and induced polarization surveys were carried out on the claims in 1978, and several trenches were dug. The claims encompass the contact between the Devonian (?) Mount Fitton granitic stock and Ordovician-Silurian Road River Formation shale and quartzite. The uranium, molybdenum and minor tungsten mineralization exposed in the trenches is in hornfels next to a granitic dike which extends from the pluton. The IP survey does not indicate a zone of high chargeability or low resistivity over the mineralization, although several anomalous zones were identified.

Geochemical and geophysical surveys were done during 1979.

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