Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

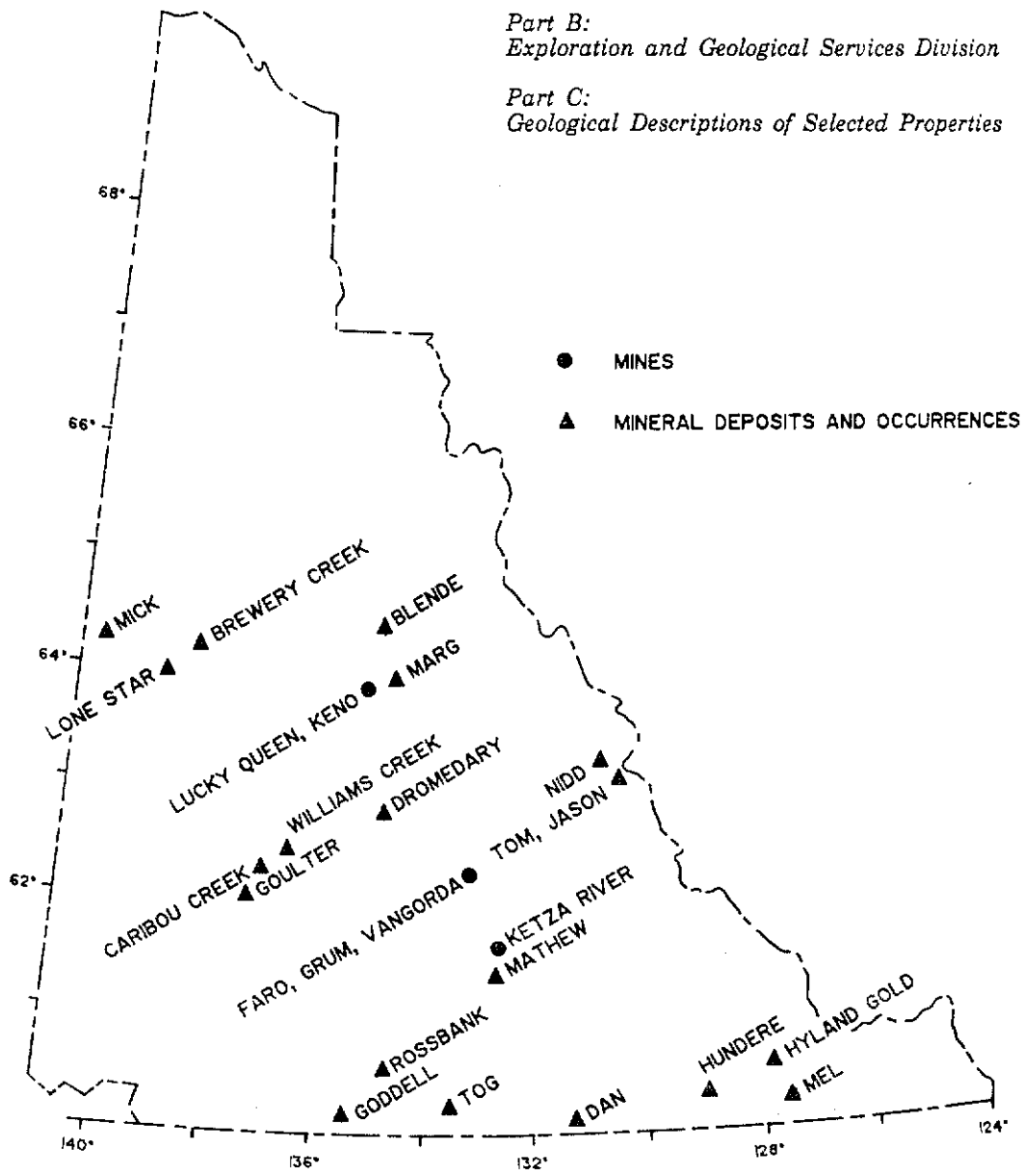
Exploration and Geological Services Division, Yukon Region

YUKON EXPLORATION 1990

Part A:
1990 Mining and Exploration Overview

Part B:
Exploration and Geological Services Division

Part C:
Geological Descriptions of Selected Properties



Canada

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Exploration and Geological Services Division
Mineral Resources Directorate
Northern Affairs Program
Yukon Region
Indian and Northern Affairs Canada
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Yukon, Indian and Northern Affairs Canada.

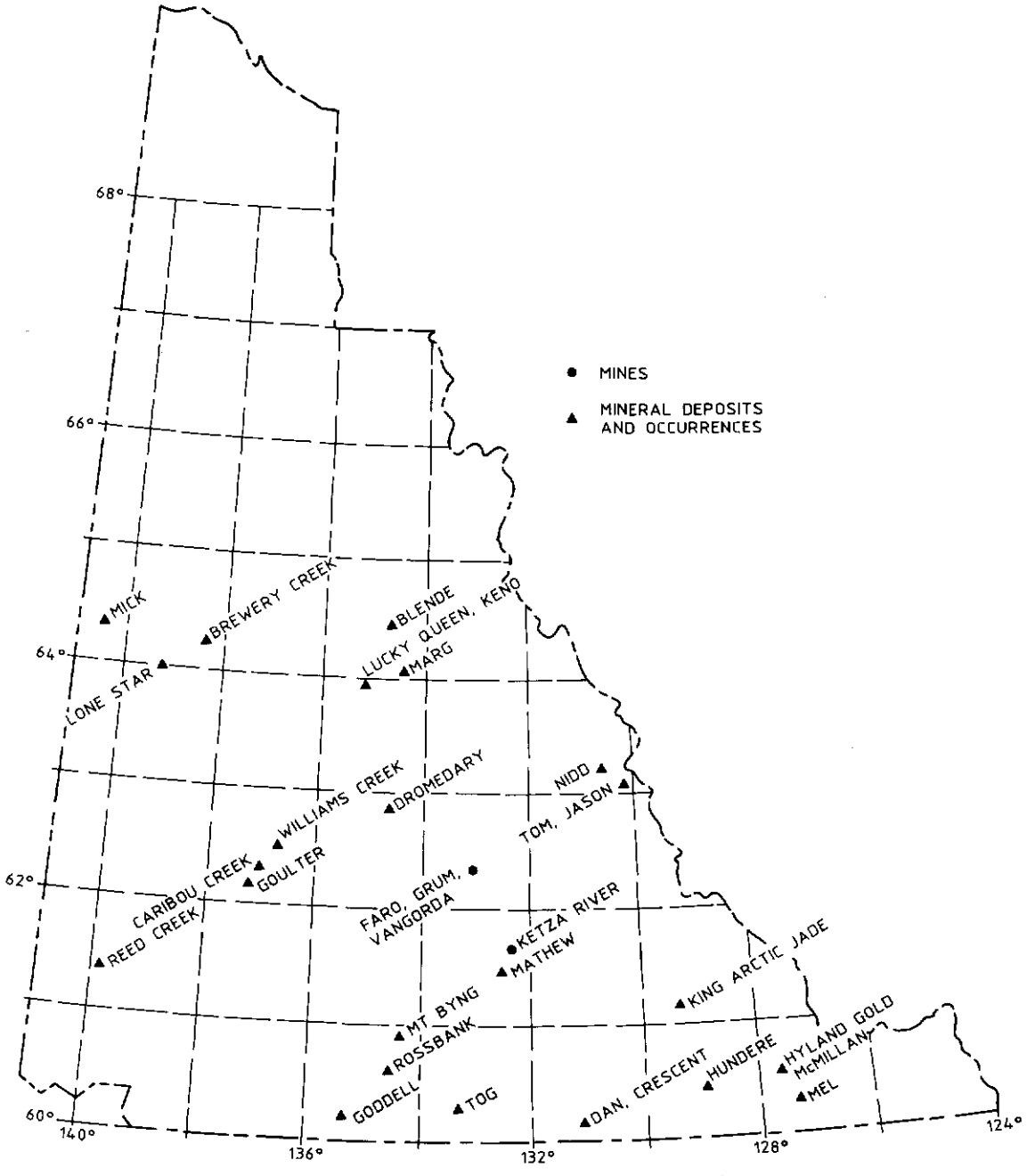
PREFACE

This publication is a significant revision of the Yukon Exploration series, which began in 1981 with the publication of Yukon Exploration and Geology 1979-80. The previous publication was a comprehensive summary of mining and exploration activity and included both an overview and detailed summaries and maps of exploration activity based on information from assessment reports and property visits by staff geologists. This year, Exploration and Geological Services Division, through the Canada-Yukon Economic Development Program, purchased the Northern Cordillera Mineral Inventory from Archer, Cathro and Associates (1981) Ltd. The inventory is now available through EGSD as YUKON MINFILE and can be purchased as a complete 1500 page, 38 map file or by individual 1:250 000 scale NTS map sheet. As a result, detailed information on exploration activity will now only be added directly to YUKON MINFILE and will be available annually in late spring as an update.

The revised Yukon Exploration includes three parts. Part A is a comprehensive overview of mining and exploration activity. Part B summarizes activities of Exploration and Geological Services Division. Part C documents significant new or previously unpublished information based on brief property visits by EGSD staff. The descriptions in Part C also include information from open assessment reports and other documents. Many of these summaries depend on industry geologists and mining companies who are willing to share information for the collective benefit of the mining industry, and this assistance is gratefully acknowledged.

S.R. Morison
Chief Geologist
Exploration and Geological Services Division
Northern Affairs Program
Yukon Region

1990 MINING AND EXPLORATION ACTIVITY



PART A

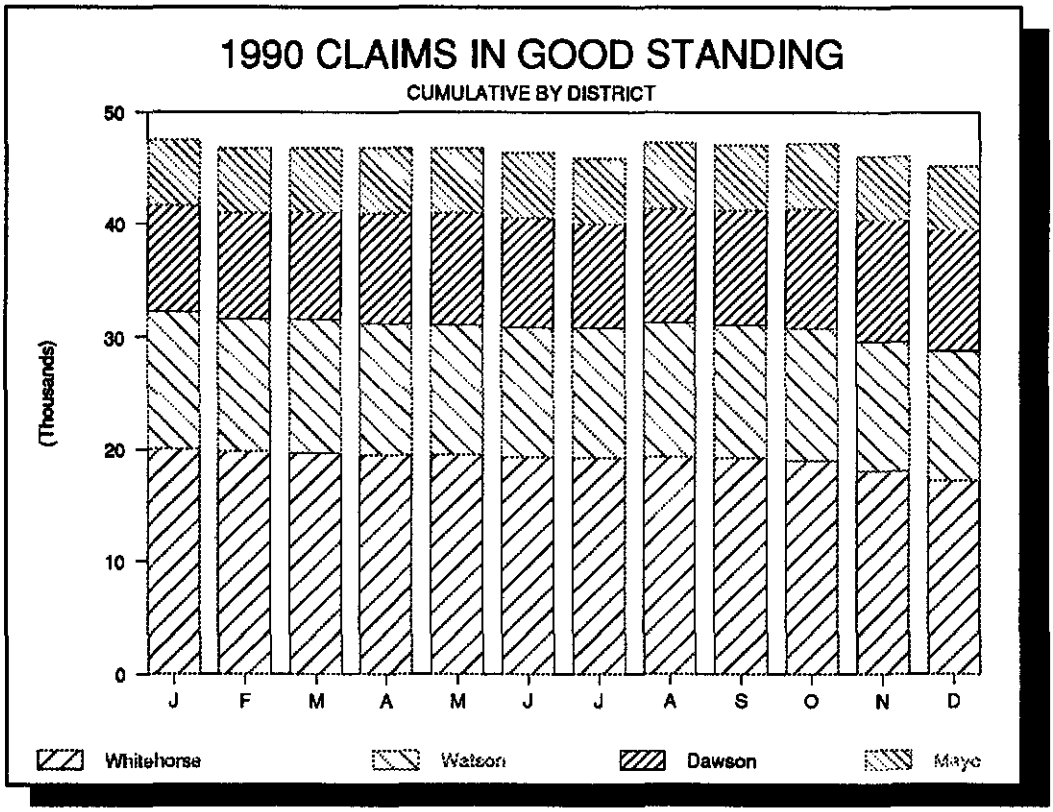
INTRODUCTION

In 1990, Yukon mineral exploration activity suffered a significant decline for the second consecutive year. Exploration expenditures continued to drop from $55 million in 1988 and $18 million in 1989, to less than $11 million in 1990. At least 40 exploration programs were still conducted in 1990. A few major mining companies explored several advanced mining properties, while junior mining companies explored grassroots properties on a limited basis. Base metal and precious metal exploration were evenly split with 47 percent of 1990 exploration focused on lead and zinc and 45 percent of activity centred on gold and silver. Exploration for other minerals such as copper, jade and building stone accounted for the remaining 8 percent of activity. The number of new quartz claims staked in 1990 exceeded 1989 figures but the total number of claims in good standing dropped. Most new quartz claim staking was by two companies in the Dawson Mining District where they expanded large land holdings.

Curragh Resources' Faro lead-zinc-silver mine operated in the Yukon throughout 1990, with production continuing on the Faro deposit underground and from the Vangorda open pit. Canamax Resources Ltd suspended operations in September due to depletion of oxide reserves, and the company has applied for an amendment to its' water licence to allow it to mine the sulphide portion of the deposit. United Keno Hill Mines Ltd, shut down since January 1989, was sold to Bharti Laamanen Mining of Sudbury, Ontario. The new owners began rehabilitation of the mine in preparation for production in early 1991.

The highlight of 1990 was the development of the Mt Hundere zinc deposit, owned by Curragh Resources Inc. and Hillsborough Resources Inc. Reserves of 5.6 million tonnes grading 12.7% zinc, 4.7% lead and 65 grams/tonne silver are contained in four ore bodies. Development work in 1990 saw the construction of a 3000 tpd (tonnes per day) mill and tailings dam, several thousand metres of ore reserve definition drilling, construction of a mine haulage road and completion of environmental studies. The committee administering the federal Environmental Assessment and Review Process (EARP) has conditionally approved the proposed mine. Curragh Resources Inc. and Hillsborough Resources Inc. hope to have the mine operational by the fall of 1991.

Placer gold production in 1990 dropped for the first time in several years to 132,154 crude ounces, or approximately 80% of 1989 production. This decline in production can be attributed to several factors including depleting placer reserves, regulatory uncertainty and low gold prices.



OPERATING MINES

FARO

Lead-Zinc-Silver Mine (Minfile #105K 61)

In September Curragh received approval of its water license to allow mining of the VANGORDA and GRUM open pits. Stripping of waste material from the GRUM deposit is progressing with the Company's new electric PNH 2800 shovel. This new shovel has a bucket capacity of 26 cubic metres, more than twice that of Curragh's four PNH 2100 shovels currently in use. The new shovel increases Curragh's ability to strip overburden from 2 million tonnes to nearly 3 million tonnes per month. Current production from the FARO underground and VANGORDA open pit operations is 13,000 tonnes per day. A total of 480,000 tonnes of lead and zinc concentrate worth more than $348 million dollars was produced in 1989. Production to the end of December 1990 was 4,275,629 tonnes of milled ore producing 116,571,896 kilograms of lead, 177,578,563 kilograms of zinc and 98,505,655 grams of silver. The remnants of the FARO orebody are currently being mined from both the open pit and underground from a portal at the bottom of the open pit.

KENO #9 & LUCKY QUEEN

Silver Veins (Minfile #105M 01)

Archer, Cathro and Associates (1981) Limited high-graded silver veins in the Keno Hill area in 1990. This operation consisted of drilling, blasting, bulldozer trenching and hand-picking argentiferous galena and tetrahedrite from the veins. Average grades encountered were 400 ounces per ton silver (13,713 grams/tonne) on the LUCKY QUEEN vein, and over 200 ounces per ton silver (6856 grams/tonne) on the KENO #9 vein. Over 100 tonnes were shipped to southern smelters in 1990.

KETZA RIVER

Gold Mine (Minfile #105F 19)

Although Canamax's KETZA RIVER gold mine suspended operations in September, gold production in 1990 was nearly equal to 1989 production. A total of 135,939 tonnes of oxide ore grading 9.8 grams/tonne gold was milled, producing 1,139,943 grams of gold. Remaining proven, probable and possible oxide reserves are 16,400 tonnes grading 9.7 grams/tonne gold. Probable and possible sulphide reserves total 175,000 tonnes grading 11.3 grams/tonne gold. Canamax is currently investigating the feasibility of mining the sulphide portion of the deposit.

KENO HILL

Silver District (Minfile #105M 01)

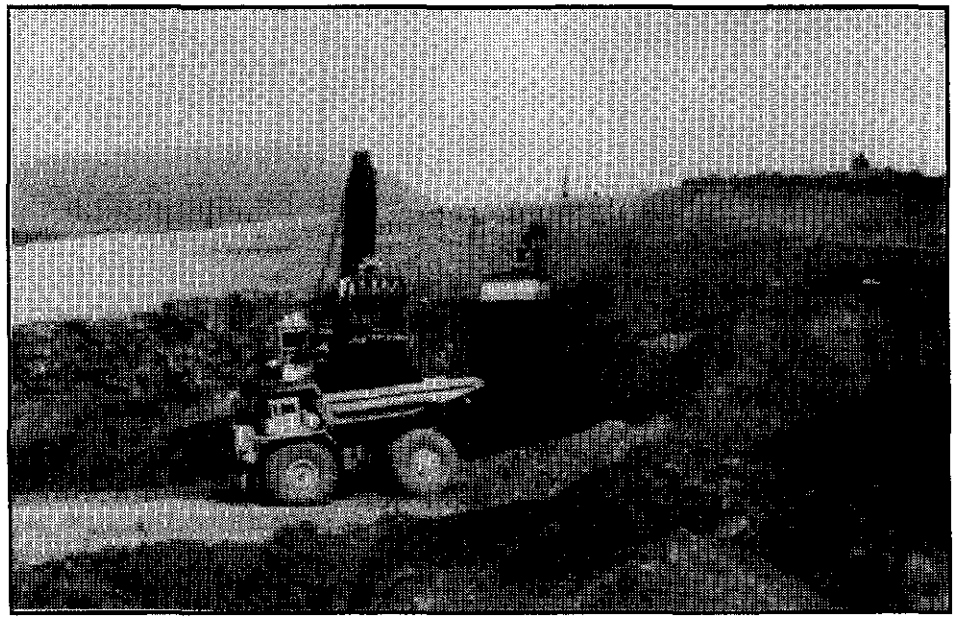
Falconbridge sold their majority holdings in United Keno Hill Mines Ltd. to Bharti Laamanen Mining Company Limited in 1990. Despite very low silver prices, rehabilitation work progressed through 1990 and the new owners hoped to resume mining operations in early 1991.

KING ARCTIC JADE

(Minfile #105H 16)

Max Rosequist continued to mine jade on his property near Frances Lake, producing 30 to 40 tonnes in 1990 for shipment to southern and overseas markets.

Curragh Resources Inc. stripped overburden from the 12.3 million tonne Vangorda lead-zinc deposit, in preparation for mining late in 1990.



ADVANCED DEVELOPMENT & EXPLORATION

ADVANCED DEVELOPMENT

Development of the MT HUNDERE (Minfile #105 A 13) zinc-silver skarn deposit near Watson Lake continued in 1990 with the completion of 1500 metres of infill diamond drilling and environmental studies. Curragh Resources Inc. purchased the property from Canamax Resources Ltd. in 1989 and is now in partnership with Hillsborough Resources Inc. Underground development included the collaring of an upper exploration/ventilation adit and a lower development/haulage adit on Jewelbox Hill. The foundations for the mill complex were poured before freeze-up allowing mill construction to continue through the winter months. Reserve estimates are 5.1 million tonnes of probable and possible ore grading 4.73% lead, 12.68% zinc and 1.9 ounces per ton (65 grams/tonne) silver in four ore bodies. When in operation, the mine will employ 140 people for eight to ten years. Open pit and underground operations will feed the 1000 to 3000 tpd (tonnes per day) mill producing 100,000 to 150,000 tonnes of concentrates grading 60% zinc and 70% lead per year. Concentrate will be trucked to tidewater at Skagway. A 28 km haulage road is being constructed from the Robert Campbell Highway to the mill site. The committee administering the federal Environmental Assessment and Review Process (EARP) has conditionally approved the proposed mine. Curragh Resources Inc. and Hillsborough Resources Inc. hope to have the mine operational by the fall of 1991.

EXPLORATION

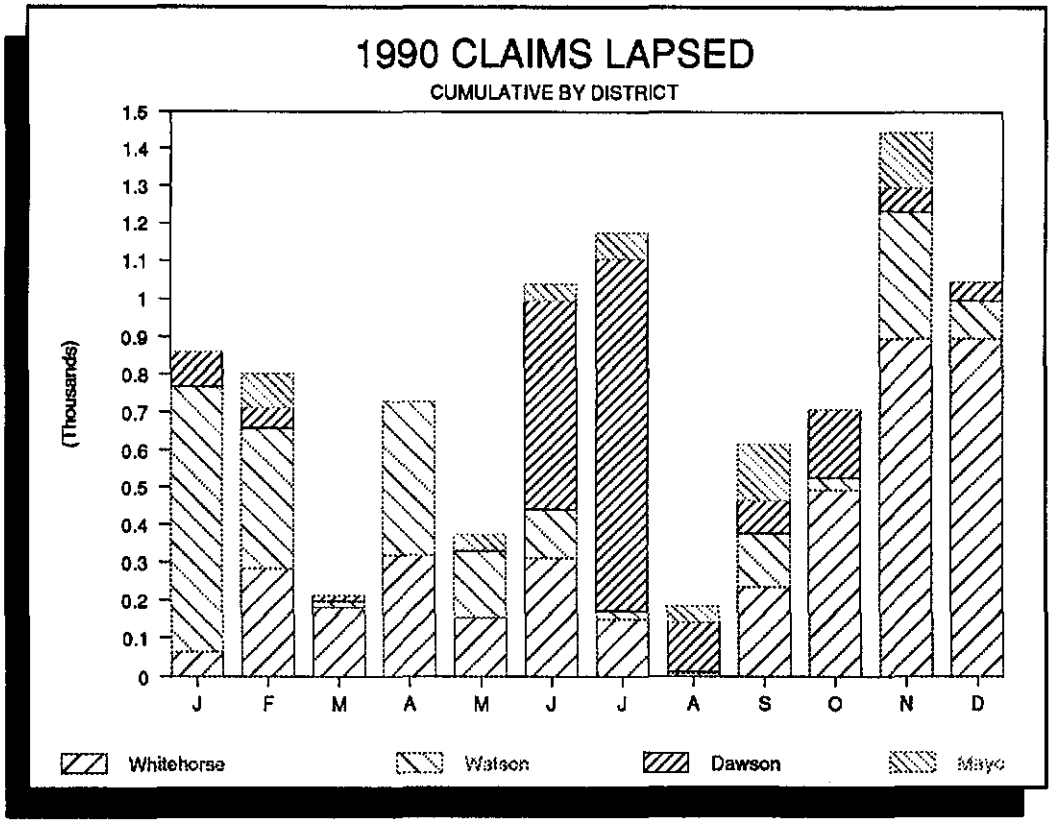
BASE METALS

High base metal prices prompted renewed interest in several base metal properties, mainly zinc and lead prospects. The following are some of the more significant programs.

Cominco Ltd. continued their option on the TOM (Minfile #105O 01) stratiform zinc-lead-silver property, located 226 kilometres from Ross River along the North Canol Road. The 3578.7 metre diamond drill program tested extensions of the WEST and SOUTHEAST zones. Total reserves in the EAST AND WEST zones were calculated by Hudson Bay Mining and Smelting to be 9,283,700 tonnes of 7.5 % lead, 6.2% zinc and 69.4 g/t silver using a 7% zinc plus lead cut-off. Cominco also diamond drilled 1352.3 metres on the NIDD sediment-hosted discordant zinc property located 20 kilometres west of the TOM. The NIDD is wholly owned by Cominco.

The JASON (Minfile #105O 19) stratiform zinc-lead-barite property saw renewed interest this year after Phelps Dodge Corporation of Canada Ltd acquired an option to earn 60% interest in the property. Western Canadian Mining Corporation and Abermin Corporation retain 8.98% and 24.88% respectively. The property includes the SOUTH, MAIN and END zones, which together contain geological reserves of 14.1 million tonnes grading 7.09% lead, 6.57% zinc and 79.9 g/tonne silver using a cut-off grade of 8% combined lead and zinc. In the 1990 season, 2667 metres of diamond drilling in 12 holes tested reconnaissance targets outside the known mineralized zones.

Barytex Resources explored the MEL (Minfile #95D 05) stratabound discordant zinc-lead-bar-

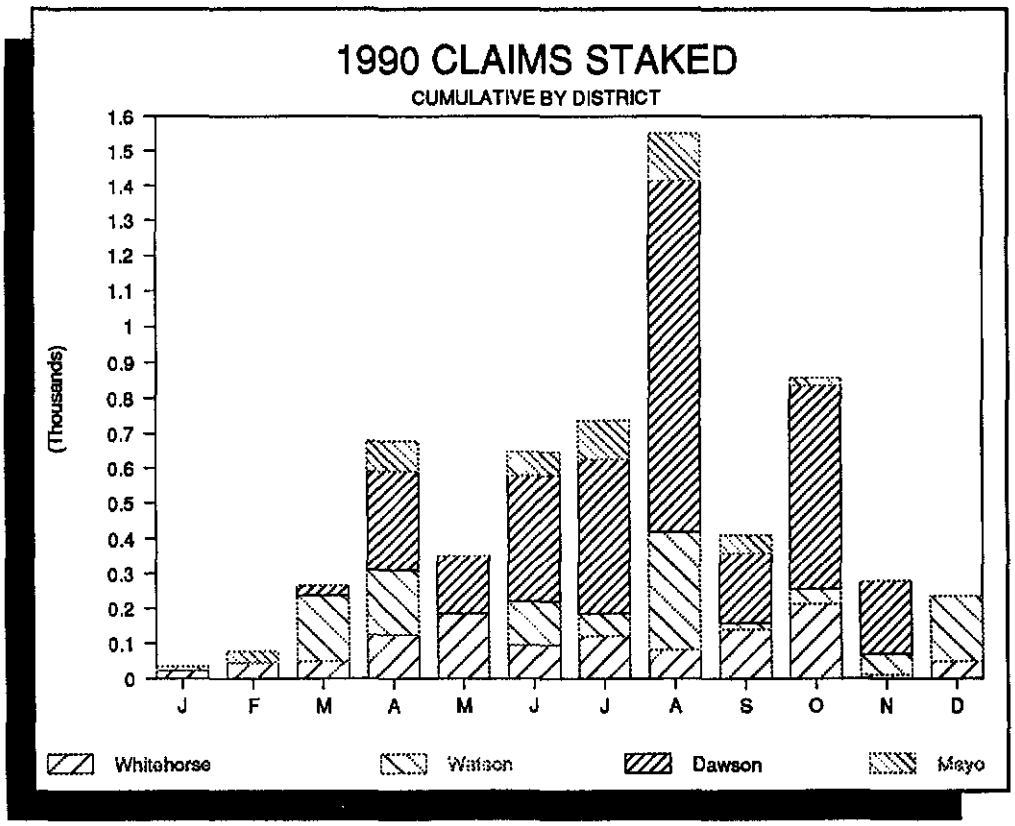


ite deposit in 1990 as part of an agreement with Breakwater Resources. Work done in 1990 consisted of mine planning, drilling and trenching on the main deposit and on the newly-discovered JERI showing located 4.5 kilometres to the east. Eleven BQ diamond drillholes completed in 1990 were designed to upgrade reserves from drill-indicated to mineable. The best intersection, in hole #34, returned 31 metres grading 9.87% combined zinc-lead and included an 8.8 metre section grading 18.9% zinc. True width of the zone is about 18 metres. Geological reserves are 5,260,000 tonnes grading 7.86% zinc, 2.09% lead and 48.98% barite. Grade and thickness appear to increase with depth.

On the MARG (Minfile #106D 09) property, owned two-thirds by NDU Resources Inc. and one-third by Cameco, ten diamond drill holes totalling 4119 metres were completed. Preliminary independent calculations of drill-indicated reserves are 2.86 million tonnes grading 1.62% copper, 2.25% lead, 4.17% zinc, 55.9 grams/tonne silver, and 0.89 grams/tonne gold, using a minimum mining width of three metres. Drilling extended the area of mineralization previously defined by 38 diamond drill holes (7856 metres) which were drilled in 1988 and 1989. The deposit consists of four tabular massive sulphide lenses, plus several smaller lenses in a Mississippian assemblage of quartz-graphite phyllite, quartz-sericite phyllite and quartzite. The zones are subparallel, strike approximately east-west and dip 50° south. Thickness of individual sulphide lenses average five metres with a maximum of 23 metres. The sulphides are oxidized to depths of up to 60 metres. The mineralized horizon has been traced for two kilometres along strike and more than 760 metres down-dip.

Billiton Metals Canada Incorporated continued its option on the BLENDE (Minfile #106D 64) lead-zinc-silver property, which is currently 100% owned by NDU Resources. Tabular stockwork and breccia zones cutting Proterozoic dolomite contain coarse grained sphalerite, galena and siderite with traces of quartz, pyrite, chalcopyrite and tetrahedrite. Fault zones and mineralization have been traced for more than seven kilometres by mapping and prospecting. Diamond drilling in 1990 outlined one mineralized zone 609.6 metres long and 152.4 metres deep. The zone remains open at both ends and at depth. Preliminary reserves have been calculated at 11.5 million tonnes grading 2.2% zinc, 3% lead, and 50 grams/tonne silver. The estimate was based on the results from 18 recent diamond drill holes along a 500 metre section of the mineralized fault complex, and used a minimum open pit width of 30 metres, a cutoff grade of 1% zinc and 1% lead, and a stripping ratio of 2.1 to 1. Billiton is planning additional metallurgical tests, environmental work, and at least 12,000 metres of diamond drilling for 1991.

First Yukon Silver Resources continued trenching on the DAN (formerly the BAR, Minfile #105B 27) showing near Swift River. Sheared, fractured calc-silicate rocks along the base of a thrust fault and tear faults oblique to the thrust contain massive black sphalerite with pyrite, pyrrhotite and magnetite in irregular layers up to 1.5 metres wide. Trenching exposed continuous but variably mineralized rock for 186 metres. Further exposures along strike indicate poten-



tial for a significant extension of the occurrence. The CRESCENT showing, a two metre skarn band traced for 800 metres along strike, is located three kilometres northwest of the DAN showing. It exhibits similar characteristics in both host rock and mineralization.

Archer Cathro & Associates (1981) Ltd, acting as operators for YGC Resources, began preliminary assessment of the MICKEY (Minfile #116C 116) showing. The property is situated in the Sixtymile region, accessable from the Clinton Creek Road. The property was originally explored in 1980 by Cominco. Galena and bedded barite occur in limy phyllite on the property. Old trenches were rehabilitated and the original soil grid was extended uphill. Limited exploration was also conducted by YGC Resources on the BOAR base metal prospect near Matson Creek.

Two diamond drill holes tested magnetometer anomalies on the DROMEDARY MOUNTAIN (Minfile #105L 51) property of Dromedary Exploration Company Ltd. One of the drill holes intersected 4.3 metres of massive pyrite and pyrrhotite with traces of galena and sphalerite.

Trenching and sampling continued on Yukon Mineral's KETZA (Minfile #105F 19) project on Groundhog Creek south of Ross River. The program successfully expanded known mineralized zones and also lead to the discovery of the new OTTER zone, which comprises stratiform mineralization exposed over a strike length of 200 metres. Assays include 18 g/t silver, 7.5% zinc and 2.7% lead over 2.0 metres.

The WILLIAMS CREEK (Minfile #115I 10) copper-gold deposit owned by Archer Cathro and Associates (1981) Ltd. has reserves of 16.3 million tonnes, half of which are oxidized, grading 1.15% copper with 0.68 grams/tonne gold. The deposit is located about 35 kilometres north of Carmacks. Western Copper Holdings, a Teck Corporation affiliate, acquired an option on the property in 1989. Three diamond drillholes in the fall of 1990 tested a zone of higher grade gold in the deposit. Recent tests have indicated that 85% of the copper can be extracted from the oxide reserves by using a sulphuric acid leach. Oxide ore could be mined by open pit methods. A solvent extraction-electrowinning plant capable of producing 30 tonnes of copper per day would be used if the mine goes into production.

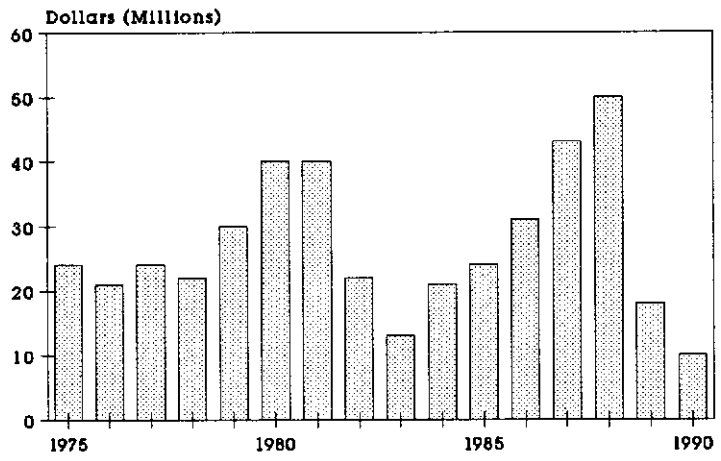
Aurora Gold drilled four reverse circulation rotary holes in the Whitehorse Copper Belt. Hole GR 90-2, collared to the south of the GRAFTER (Minfile #105D 53) deposit, intersected two zones of copper mineralization: 30 metres averaging 1.49% copper, 0.377 grams/tonne gold and 6.17 grams/tonne silver; and 17 metres averaging 1.93% copper, 0.54 grams/tonne gold and 14.1 grams/tonne silver.

Placer Dome conducted an airborne geophysical survey on their FYRE LAKE (Minfile #105 G34) copper-zinc-silver property north of Watson Lake.

PRECIOUS METALS

Approximately half of 1990 exploration activity was centred on gold and silver. Some of the more significant programs follow.

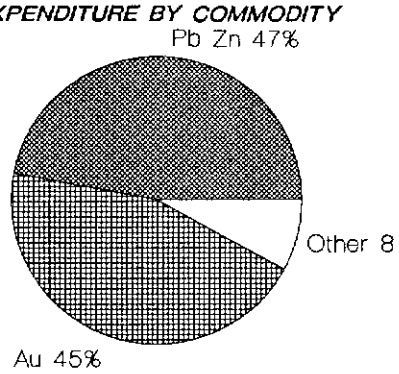
Exploration Expenditures
In The Yukon: 1975-1990



On the BREWERY CREEK (Minfile #116B 160) bulk tonnage gold property located east of Dawson City, Loki Gold Corporation and Noranda Exploration Company Limited continued trenching, drilling and sampling to test the strike and down-dip extensions of known mineralized zones and explore previously untested targets outlined by geochemistry. Reverse circulation drilling and some diamond drilling were done to determine preliminary reserve estimates, which have been targeted at ten million tonnes of heap-leachable ore grading 1.5 g/t gold. A prefeasibility study is currently underway. Preliminary tests of the oxidized material using cyanide leaching techniques have been encouraging.

Arbor Resources Inc. explored

EXPENDITURE BY COMMODITY



the LONESTAR (Minfile #115O 72) and six other related gold targets in the Dawson area. In search of the elusive lode source of the rich Klondike placers, 3000 metres of percussion drilling in 50 holes tested the seven gold targets located within the 1165 square km, 3000 claim property. The targets included IP (induced polarization) and magnetometer anomalies, soil geochemical anomalies, trenches and placer mining operations. Arbor Resources personnel propose that most of the placer gold in the area is related to a massive diabase dyke. The dyke is traceable as a magnetometer and resistivity low from Eldorado Creek to the Klondike River, a distance of some 17 kilometres. Exploration has shown lode gold to be concentrated within quartz veins and stockworks along the margins of and in fractures and faults cutting the diabase dyke and a subparallel quartz feldspar porphyry dyke located some 500 metres away. The intervening material consists of altered sericite-chlorite schist. The most anomalous areas within a five kilometre portion of the diabase dyke were percussion drilled. Grab samples from veins and quartz float in the area have yielded some spectacular results. The gold is associated with pyrite and occassionally base metal sulphides.

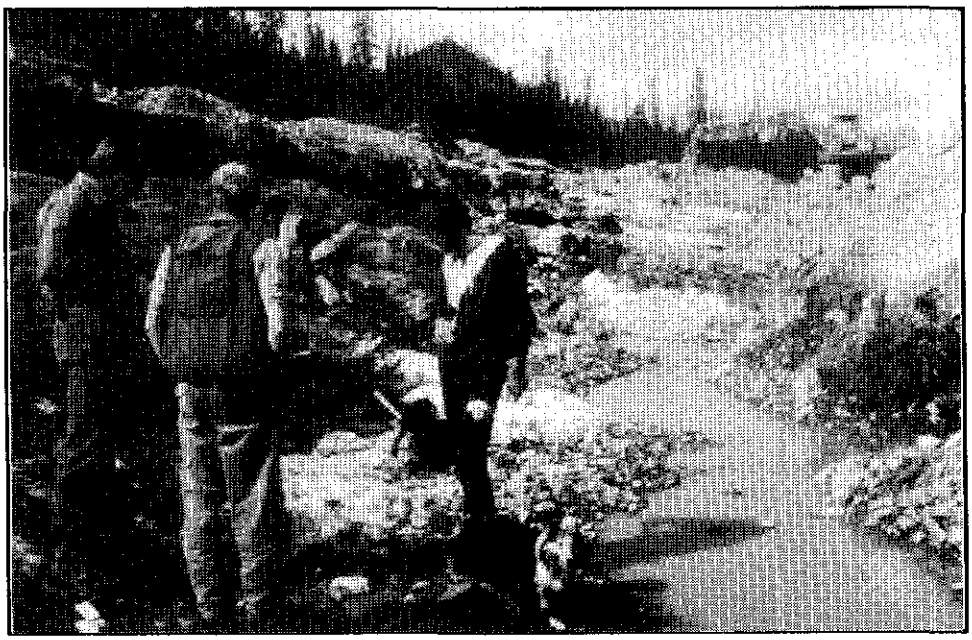
In the Wheaton area, Skukum Gold and Berglynn Resources explored the GOLDEN TUSK zone of the GODDELL (Minfile #105 D 25) property. The GOLDEN TUSK zone is a hydrothermally-altered shear zone intruded by felsic and intermediate dykes cutting Cretaceous quartz monzonite. It was first encountered at a depth of 365 metres by diamond drilling and later traced to surface. Six diamond drillholes were collared in 1990 to test the strike extension of the zone.

Doron Exploration constructed a mill to process a bulk sample of an exposed vein stripped over a length of 1300 metres on the CARIBOU CREEK (Minfile #115I 49) property. The property is located 50 km northwest of Carmacks on Mt. Freegold.

Aurchem Exploration continued exploration on the GOULTER (Minfile #115I 93) option situated adjacent to BYG Natural Resources Inc's Mt. Nansen property 50 km west of Carmacks. The property includes the WILLOW CREEK zone and the ELIZA CREEK zone. Exploration in 1990 concentrated on the ELIZA CREEK zone. A geophysical survey traced the steeply-dipping shear zone over a strike length of one kilometre. The zone exceedes 150 metres in width and consists of an anastomosing network of veins and hydrothermally-altered porphyry dykes. The north-trending structures are hosted by diorite and are considerably wider than similar veins of the WILLOW CREEK zone.

Dunvegan Exploration Ltd. carried out diamond drilling, backhoe trenching and metallurgical studies on the TOG (Minfile #105C 28) property located south of the Alaska Highway 100 kilometres southeast of Whitehorse. Gold-bearing quartz veins and quartz-carbonate alteration occur in faults associated with tectonically-emplaced ultramafic bodies. Coarse, vis-

First Yukon Silver's DAN showing looking east along the main trench.



ible gold is associated with malachite, azurite, pyrite, galena and sphalerite. The highest grades are in graphitic shears segmenting massive quartz vein material on the footwall of a ten metre wide alteration/shear zone. At least eight of these narrow, highly mineralized shear fractures occur over a five metre width. Strike potential exceeds 120 metres.

Feather Gold Resources Ltd. conducted an extensive bulldozer trenching program late in the season on seven veins which comprise the PEERLESS (Minfile #105D 156) property on Montana Mountain south of Carcross.

Noranda conducted grassroots exploration for precious metals on the ITSI and PUTZ-BENNETT (Minfile #1050 04) properties near MacMillan Pass. Gold-bearing quartz veins form ladder structures in dykes up to five metres wide along the margins of Cretaceous intrusions.

NDU Resources, Silverquest Resources and Adrian Resources explored the HYLAND GOLD (Minfile #95D 11) property northwest of Watson Lake with bulldozer trenching and rotary drilling. More than 3800 metres of drilling were completed during spring and summer programs. Gold occurs in a thick layer of iron oxide and siderite in the Proterozoic Hyland group at the contact between quartzite and phyllite, and overlying limestone. The drill program expanded the target considerably. Gold is also associated with quartz-carbonate veins, graphitic shears and quartz-limonite breccias within steep north-trending fault zones. The faults are about three metres wide and have associated antimony and bismuth soil anomalies. Rare unoxidized material contains arsenopyrite and pyrite with scorodite, calcite and siderite, and minor jamesonite and chalcopyrite.

Near Dawson, Tombstone Explorations Ltd conducted bulldozer trenching, chip sampling and soil sampling on the CONNAUGHT (Minfile #115N 40) copper-gold skarn deposit in the Sixtymile area. Geochemical surveys, geological mapping and assaying were conducted on the LORRIE (Minfile #116A 31) property in the Tombstone mountains.

DRILLING STATISTICS: 1990

		DIAMOND DRILLING		PERCUSSION DRILLING	
PROJECT	COMPANY	METRES	# HOLES	METRES	# HOLES
TOM	Cominco	3578	7	------	-------
NIDD	Cominco	1352	6	------	-------
JASON	Phelps Dodge	2667	12	------	-------
MEL	Barytex	1552	11	------	-------
MARG	NDU/Cameco	4267	10	------	-------
BLENDE	NDU/Billiton	3657	15	------	-------
HYLAND GOLD	NDU/et al	------	-------	3800	41
LONESTAR	Arbor/et al	------	-------	3048	50
BREWERY CREEK	Noranda/Loki	1290	21	14838	309
MT HUNDERE	Curragh	1500	25	------	-------
DROMEDARY	Dromedary Exploration	434	2	------	-------
JUBE	Dunvegan	263	8	-------	-------
GODDELL	Skukum/Berglynn	1250	6	------	-------
ROSSBANK	Inco	583	3	------	-------
KETZA RIVER	Canamax	2619	35	------	-------
GRAFTER	Aurora Gold	------	------	500	4
WILLIAMS CREEK	WCH/Thermal	3	------	-------	

EXPLORATION & GEOLOGICAL SERVICES DIVISION

The Government of Canada manages mineral resources in the Yukon Territory through the Northern Affairs Program of Indian and Northern Affairs Canada. The Mineral Resources Directorate of the Northern Affairs Program consists of Mineral Rights, Mineral Development, and the Exploration and Geological Services Division.

EXPLORATION AND GEOLOGICAL SERVICES DIVISION (EGSD)

Exploration and Geological Services Division staff presently includes S.R. Morison (Regional Manager/Chief Geologist), J.G. Abbott (Minerals Geologist), T.J. Bremner (Mineral Deposits Geologist), W.P. LeBarge (Staff Geologist), D.J. Ouellette (Staff Geologist), A. Wagner (Office Manager), and E. Phillips (Map Sales Manager).

STAFF ACTIVITIES

Steve Morison (Chief Geologist) is currently involved in discussions regarding a proposed new Mineral Resources Subagreement of the Canada/Yukon Economic Development Agreement, and he continues to use his placer sedimentology expertise to advise client groups and support related geological studies. Grant Abbott (Minerals Geologist) is chiefly responsible for 1:50 000 scale mapping projects and this year worked in the MacMillan Pass area and in the Patterson Ranges near the MARG and BLENDE mineral deposits. Trevor Bremner (Mineral Deposits Geologist) assumed the newly created position of Mineral Deposits Geologist in 1990. His responsibilities include coordinating the activities of the staff geologists and initiating special mineral deposit studies. He also has final responsibility for the accuracy of mineral deposit data in YUKON MINFILE. William LeBarge (Staff Geologist) is responsible for approving placer and quartz assessment reports and visiting active mining properties in the Dawson and Mayo Mining Districts. Dennis Ouellette (Staff Geologist) began a two-year term position with the Division in May, after several years of working for industry. He is responsible for visiting mining properties and approving quartz assessment reports in the Whitehorse and Watson Lake Mining Districts.

YUKON MINFILE, formerly the Northern Cordillera Mineral Inventory of Archer, Cathro and Associates (1981) Ltd., was purchased in 1990 through the Canada/Yukon Economic Development Program. This text and map-based file is currently available from EGSD by individual 1:250 000 NTS map sheet or as an entire 1500 page, 38 map file. In 1991 the YUKON MINFILE will be entered into a computer database, similar to Minfile PC of the British Columbia Geological Survey. Exploration and Geological Services Division now maintains the YUKON MINFILE and geological staff contribute to ongoing updates of this mineral occurrence database as new information becomes available.

The Division publishes several geotechnical reports including the annual Yukon Exploration report and the Yukon Geology Series. Yukon Geology Volumes 1 and 2 (Volume 3 is in press) are compilations of recent geological papers from studies which were supported or assisted by the Exploration and Geological Services Division. Yukon Exploration, previously a compilation of assessment report summaries, has taken on a new look with current statistics and descriptions of actively explored mineral properties, as well as detailed geological descriptions of properties visited by EGSD staff.

The Division also maintains the Yukon outlet of the Canada Map Office and sells topographic, geological (surficial and bedrock), aeromagnetic, aeronautical and land use maps. Geological Survey of Canada publications related to Yukon and northern British Columbia are also available. A geological library of texts and

This portal at the bottom of the Faro open pit allows access to remaining Faro ore, which will be depleted in 1991.

journals and selected air photos covering the Yukon from latitude 60° to 65°N are available for viewing.

AFFILIATED ACTIVITIES

The Division assisted or sponsored fieldwork for the following projects:
Ken Ridgway - University of Rochester, New York - PhD Study of the Relationship of Denali Strike-Slip Movement to the Stratigraphy of the Amphitheatre Formation

Tim Liverton - University of London - PhD Study of igneous intrusions in the Englishmans' Range

Brent Alloway (PhD) - University of Toronto - Study of Tephra Age and Stratigraphy in Klondike Area Alluvial Sediments.

Mike Spicuzza - Southern Methodist University, Dallas, Texas - PhD Study of Metamorphism of the Quiet Lake Batholith.

RECENT PUBLICATIONS

EGSD OPEN FILES 1990-1 TO 1990-3 were joint projects between EGSD and the Geological Survey of Canada.

OPEN FILE 1990-1, GEOLOGY OF MT. WESTMAN MAP AREA (106 D 1) by J.G. Abbott, (Exploration and Geological Services Division, INAC)

OPEN FILE 1990-2, GEOLOGICAL MAP OF THE TINY ISLAND LAKES MAP AREA (105 M 16) by S. Gordey (Geological Survey of Canada)

OPEN FILE 1990-3, GEOLOGY OF 106 D 8 AND 106 D 7 (east half) Map Areas by C. Roots (Geological Survey of Canada)

EGSD BULLETIN 2, Geology and Genesis of the Mount Skukum Epithermal Gold-Silver Deposits, Southwestern Yukon Territory, (NTS 105 D 3,6), by B.W.D. McDonald

INAC, (1990). YUKON EXPLORATION 1989; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

CANADA/YUKON ECONOMIC DEVELOPMENT PROGRAM

GEOLOGICAL MAPPING
Open File 1990-4, Geology of Whitehorse, Alligator Lake, Fenwick Creek and Part of Robinson Map Areas (105 D/2,3,6,7, & 11) by C.J.R. Hart and J.K. Radloff - replaces Open Files 1988-2, 1989-1, and 1989-2.

REGIONAL STREAM SEDIMENT AND WATER GEOCHEMICAL SURVEYS

Administered by Geological Survey of Canada

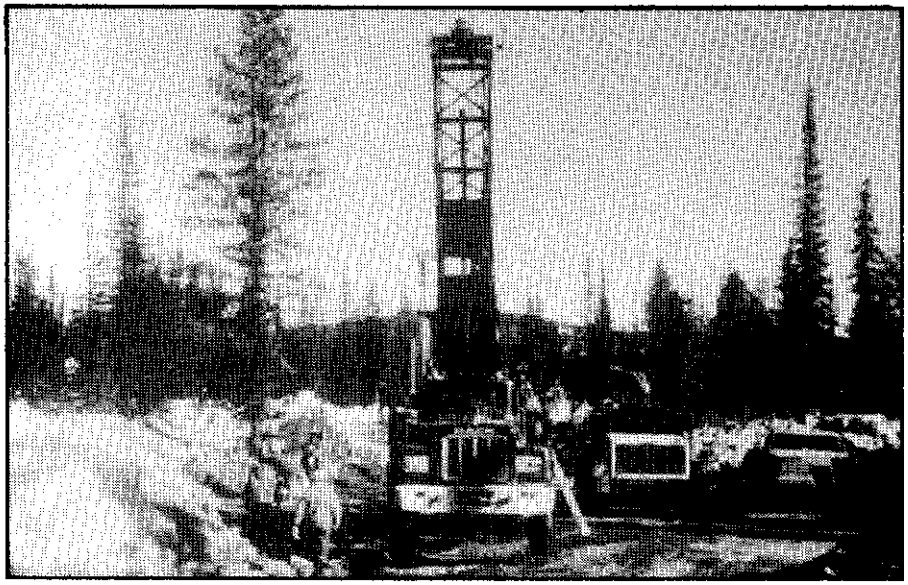
MAPS RELEASED IN 1990

GSC OPEN FILE 2173 105 J
GSC OPEN FILE 2174 105 K
GSC OPEN FILE 2175 106 D, parts of 106 C, 106 E, 106 F
GSC OPEN FILE 2176 116 A, 116 H (southern half)

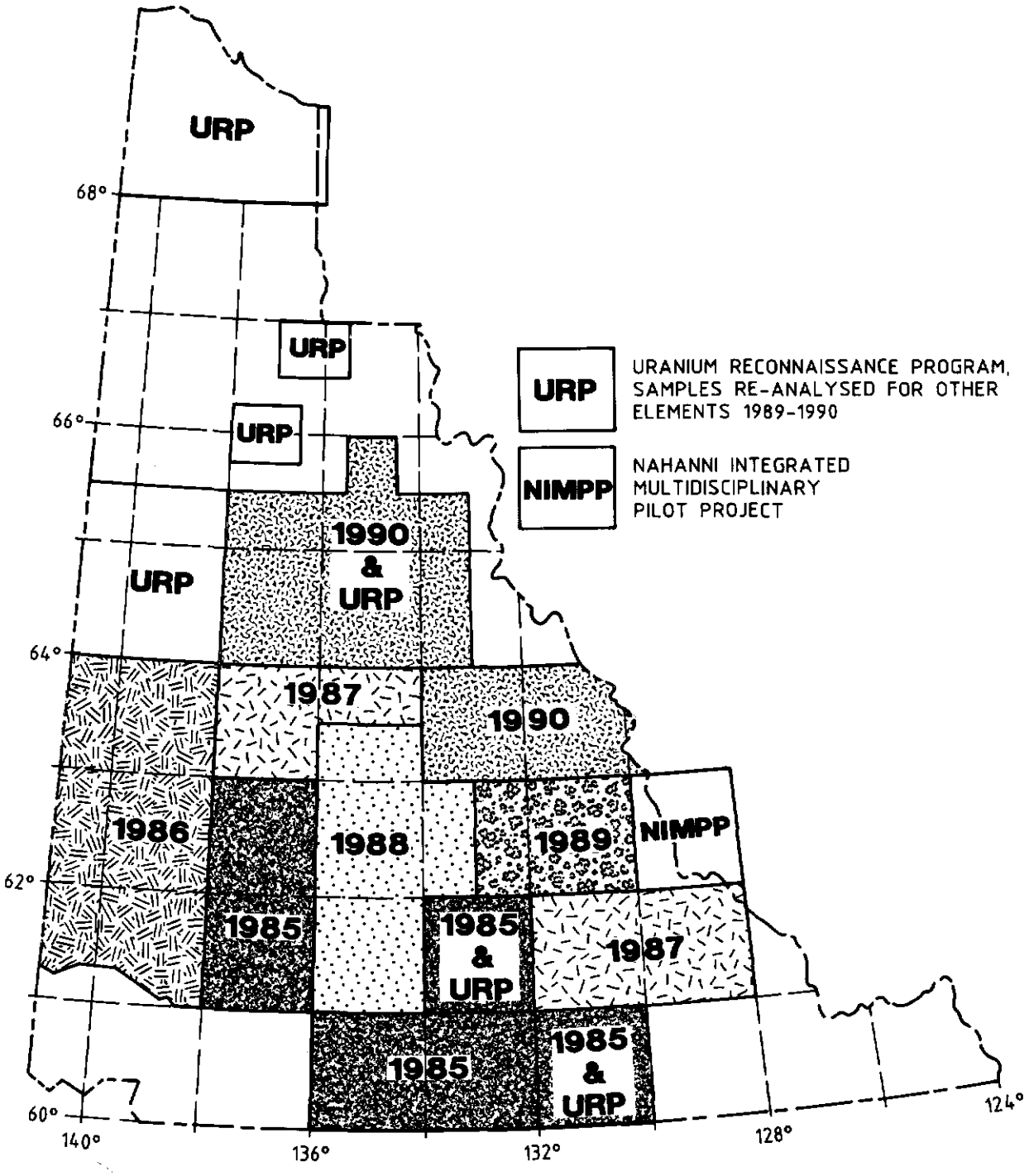
FIELDWORK IN 1990

LANSING RANGE 105 N
NIDDERY LAKE 105 O

NDU Resources Ltd. percussion drilled on the Hyland Gold showing northwest of Watson Lake in March of 1990.



CANADA – YUKON ECONOMIC DEVELOPMENT AGREEMENT AND OTHERS



DRILL CORE INDEX

H.S. BOSTOCK CORE LIBRARY

The H.S. Bostock Core Library houses approximately 112 000 metres of diamond drill core from 172 Yukon properties. The facility is located across the street from the Northern Affairs building at 200 Range Road. The core is stored in its original boxes, with no sample reduction. Confidentiality is maintained on the same basis as mineral claim assessment reports; a letter of release from the company owning the property must accompany a request to view confidential core. Status of specific core can be checked and arrangements to view or submit new core can be made by contacting the core librarian at 667-3204. Diamond saws, a core splitter and microscopes are available for use in heated examination rooms. The following is a list of the properties now represented in the library:

N.T.S.	PROPERTY/CLAIM NAME	COMPANY
94K,L	DRIFTPILE CREEK	Archer Cathro (Gataga Joint Venture)
95D 5,12	MCMILLAN (QUARTZ LAKE)	Noranda Exploration Company Limited
95D 12	MCMILLAN (QUARTZ LAKE)	Asarco Exploration of Canada
95D 6	MEL	Sovereign Metals Limited
95D 6	MEL	Novamin Resources Limited
95D 5,12	PORKER	Archer Cathro (Hyland Joint Venture)
104G 1	MULE CREEK	Noranda Exploration Company Limited
104M 1	HOBOE	Noranda Exploration Company Limited
105A 2,3,6	LIARD COAL	Placer Dome Inc.
105A 7,10	MT HUNDERE	Canadian Mine Services, CIMA Resources
105B 1	LUCK	Serem Inc., Goldex Resources Inc.
105B 1	FIDDLER	Amax Gold Inc.
105B 1	LORD	Butler Mountain Minerals Corp.
105B 4	BARB	A.M.P. Exploration and Mining Co. Ltd.
105B 4	CAN	Cominco Mining Limited
105B 4	MC, DU	DuPont of Canada Exploration Ltd.
105B 4,5	SWIFT RIVER	DuPont of Canada Exploration Ltd.
105B 7	NITE	Archer Cathro (Wolf Lake Joint Venture)
105B 11	IRVINE	Hudson Bay Exploration and Development
105B 14	SHOOTAMOOK	Total Erickson Resources Ltd.
105C 5	TOG	Dunvegan Exploration Ltd.
105C 8, 9	BAR	Comox Resources Ltd.(J.C.Stephen Exploration Ltd.)
105C 9	MINDY	Newmont Exploration of Canada Ltd.
105C 13	RED MOUNTAIN	Boswell River Mines Ltd.
105C 14	LINDSAY	Joe Lindsay
105D 1	JUBILEE	Golden Slipper Resources, Logan Mines Limited
105D 2	VENUS	Venus Mines Limited
105D 2	PEERLESS, BIG THING	International Mine Services Ltd.
105D 2	BIG THING (ARCTIC)	Arctic Gold and Silver Mines Ltd.
105D 2	JEAN	Univex Mining Corporation
105D 2,3	MIDNIGHT GULCH	Island Mining & Exploration Co. Ltd.
105D 3	MT ANDERSON	Noranda Exploration Company Limited
105D 3	DICKSON HILL	Shakwak Exploration Company Limited
105D 3,4	CHARLESTON	Island Mining & Exploration Co. Ltd.
105D 3, 6	TALLY-HO MOUNTAIN	Tally-Ho Exploration Company Limited
105D 3, 6	TALLY-HO GULCH	Tally-Ho Exploration Company Limited

N.T.S.	PROPERTY/CLAIM NAME	COMPANY
105D 4	RAM	Inco Metals Company
105D 6	VESUVIUS MTN	Shakwak Exploration Company Limited
105D 8	BUG	Dunvegan Exploration Ltd.
105D 10	WHITEHORSE COPPER	Hudson Bay Exploration and Development
105D 10, 11	WHITEHORSE COPPER	Whitehorse Copper Mines Ltd.
105D 11	POLAR	Mike Nichiporick
105D 11	ARCTIC CHIEF	Whitehorse Copper Mines Ltd.
105D 11	BEST CHANCE NORTH	Whitehorse Copper Mines Ltd.
105D 11	GRAFTER, KODIAK CUB	Whitehorse Copper Mines Ltd.
105D 11	LAST CHANCE, WAR EAGLE	Hudson Bay Exploration and Development
105D 11	GROUSE (JACKSON CREEK)	Whitehorse Copper Mines Ltd.
105D 11	WAR EAGLE	Whitehorse Copper Mines Ltd.
105D 11	TURBINE #4 NCPC	Whitehorse Power Corporation
105D 11	NORTH STAR	Whitehorse Copper Mines Ltd.
105D 11,14	RABBITS FOOT	Whitehorse Copper Mines Ltd.
105D 14	BEE	Silver Sabre Resources Inc.
105D 14	SUITS	United Keno Hill Mines Ltd.
105E 11	MIDAS	Midas Exploration Ltd.
105F 3	QUIET LAKE	Joe Lindsay
105F 6	HIDDEN, AYDUCK	Archer Cathro (CUB Joint Venture)
105F 7,10	STORMY MOUNTAIN	Rio Alto Exploration Ltd.
105F 7,10	GULL	Dupont of Canada Exploration
105F 9,10	PELMAC	Curragh Resources Ltd. (Cyprus Anvil)
105F 9,10	BNOB	Curragh Resources Ltd. (Cyprus Anvil)
105F 14	RISBY TUNGSTEN	Hudson Bay Exploration and Development
105G 2	FYRE	Cassiar Asbestos Mining Corporation Ltd.
105G 2	FYRE (DUB)	Atlas Exploration Ltd.
105G 3	TINTINA	Tintina Silver (Rio Tinto)
105G 6	SANDERS	Archer Cathro (Chevron Canada Ltd.)
105G 6	BOOT	Archer Cathro (Chevron Canada Ltd.)
105G 6	CYR	Newmont Exploration Limited
105G 7	PACK	Conwest Exploration Limited
105G 8	FETISH	Archer Cathro (Finlayson Joint Venture)
105G 11	EAGLE (BEV)	Hudson Bay Exploration and Development
105G 11	BEV	Hudson Bay Exploration and Development
105G 14	DWONK (ANMAK PROJECT)	Curragh Resources Ltd. (Cyprus Anvil)
105G 14	PELLY BANKS	Hudson Bay Exploration and Development
105G 14	ELECTRIC	Pelly Banks Syndicate
105G 14	LEACH, FAULT, CZAR	Dupont of Canada Exploration
105H 5	JULIA	Esso Minerals Canada Limited
105H 8	SUSAN	Union Carbide
105H 10	TOY (REA)	Union Carbide
105I 6	HOWARD'S PASS	Placer Dome Inc.
105I 12	ABBEY	Archer Cathro (Itsi Joint Venture)
105I 15	OMO	Hudson Bay Exploration and Development
105K 1	TENAS	Dupont of Canada Exploration
105K 2	GREW CREEK	Hudson Bay Exploration and Development
105K 3	LYN	J. Graham
105K 3	LYN	Cyprus Exploration Ltd.
105K 3	SUNSET (LYN)	Welcome North Mines Limited
105K 6	ROSE CREEK	Cyprus Anvil Mining Company Ltd.
105K 11	HAL	Northern Homestake Mines Ltd.
105L 8	FELIX	Union Carbide
105L 14	TUM	Cominco Mining Limited
105L 15	ONE HUMP	Anaconda Canada Exploration Ltd.

N.T.S.	PROPERTY/CLAIM NAME	COMPANY
105M 13	WAYNE	Island Mining & Exploration Co. Ltd.
105M 14	EAGLE	Archer Cathro, Brameda Res. Ltd. & Teck Corp.
105O 1	TOM	Hudson Bay Exploration and Development
105O 1	FETCH	Inco Metals Company
105O 1	ESS	Archer Cathro (Itsi Joint Venture)
105O 2	TEA	Eisenman Enterprises Limited
106B 4	BIRKLAND	McIntyre Mines Limited
106B 15, 16	GAYNA RIVER	Rio Tinto Mines Ltd.
106C 7	HARRISON	Great Plains Development Inc.
106C 7	GOZ CREEK	(Bonnet Plume River) Barrier Reef Resources Ltd.
106C 13	FAIRCHILD	Magni Mana Cement Company Limited
106C 14	MAMMOTH	Bonnet Plume River Mines
106C 14	PTERD	Archer Cathro (Ogilvie Joint Venture)
106C 15	CAB	Welcome North Mines Limited
106D 1, 2	MARG	Archer Cathro & Associates (1981) Ltd.
106D 7	BLENDE	Archer Cathro & Associates (1981) Ltd.
106D 10	BOND	Eldorado Nuclear Ltd.
106D 10	BOND	Archer Cathro (Wernecke Joint Venture)
106D 11	NICK	Archer Cathro & Assoc., NDU Resources
106D 16	PAGISTEEL	Pacific Giant Steel Ltd.
106E 1	IGOR	Archer Cathro and Associates (1981) Ltd.
106E 1	OTIS, IGOR	Archer Cathro (Ogilvie Joint Venture)
106E 2	FLUNK	Archer Cathro (Ogilvie Joint Venture)
106E 3	FORSTER	Archer Cathro (Ogilvie Joint Venture)
106E 6	BONNET PLUME COAL	Pan Ocean Oil Ltd.
114P 8	MT. HENRY CLAY	Stryker Resources Ltd.\
114P 15	CANDY MOUNTAIN	Noranda Exploration Company Limited
114P 15	PANTHER	Canex Placer Ltd.
114P 15	PARTON RIVER	Noranda Exploration Company Limited
115A 3	JACKPOT	Jackpot Copper Ltd.
115A 8	DEVILS' HOLE	Phelps Dodge Ltd.
115F 15	CANALASK	Versluce Mines Ltd.
115F 15,16	CANALASK	Canalask Nickel Syndicate
115G 5	WELLGREEN	Archer Cathro and Associates (1981) Ltd.
115G 5	WELLGREEN	Hudson Bay Exploration and Development
115G 5	QUILL CREEK	Hudson Bay Exploration and Development
115G 6	CORK	Imperial Oil Ltd.
115H 2	AISHIHIK	Hudson Bay Exploration and Development
115H 5, 12	SEKULMUN	Mike Nichiporick
115H 8	TESLIN	Teslin Exploration Limited
115H 8	LION	Archer Cathro and Associates (1981) Ltd.
115H 8, 105 E	DIVISION MTN	Arjay Kirker Resources Ltd.- Archer Cathro
115H 9	MACK'S COPPER	Arsenault/Versluce Mines Ltd.
115H 15	BUFFALO	Noranda Exploration Company Limited
115I 3	MT NANSEN	Kangaroo Exploration
115I 3	CYPRUS, MT NANSEN	Cyprus Exploration, Area Explorations Ltd.
115I 5	CASH	Archer Cathro (Klotassin J.V., Carmacks synd)
115I 5	FROG	Archer Cathro (CUB Joint Venture)
115I 6	DART	Noranda Exploration Company Limited
115I 6	LAFORMA	Rayrock Mines Limited
115I 6	LAFORMA	Tally-Ho Exploration Ltd.
115I 6	REVENUE CREEK	Shakwak Exploration Co. Ltd.
115I 6	REVENUE, NUCLEUS	Archer Cathro (Nat Joint Venture)
115I 6	CARIBOU CREEK	Doron Exploration Ltd.
115I 6,7	TINTA HILL	Mill City Gold Ltd.

N.T.S.	PROPERTY/CLAIM NAME	COMPANY
115I 7	WILLIAMS CREEK	Dawson Range Joint Venture
115I 7	WILLIAMS CREEK	Archer Cathro (Dawson Range Joint Venture)
115I 7	GRANITE MOUNTAIN	Dawson Range Joint Venture (Canex Aerial Expl. Ltd)
115I 11	MINTO	United Keno Hill Mines Ltd.
115I 13	KERR	Kerr Addison Mines Ltd.
115I 14	PELLY	Occidental Petroleum Inc.
115J 9	KOE	Kerr Addison Mines Ltd.
115O 1	TANTALUS BUTTE	Tantalus Butte Mines (Cyprus Anvil Mining Co. Ltd.)
115O 11	MCKINNON	McKinnon Rand Resources
115O 11	MCKINNON	Volcano Resources Ltd.
115O 14	LONE STAR	Arbor Resources Inc.
115O 14	DAWSON	Dawson Syndicate Exploration Ltd.
115O 14, 15	TEMPERANCE HILL	United Keno Hill Mines Ltd.
115P 13	URA	Beach Gold Mines Ltd.
115P 14	ZETA	Noranda Exploration Company Limited
116B 2,3	UNEXPECTED	Archer Cathro (Ukon Joint Venture)
116B 7	MAIDEN	Archer Cathro (Ukon Joint Venture)
116B 7	MARN	Noranda Exploration Company Limited
116B 8	THOR	Anaconda Canada Exploration Ltd.
116B 9, 10	TAK	Noranda Exploration Company Limited
116B 11	COMBINATION	Chevron Standard Limited
116B 13	OD, DASH	Union Miniere Exploration
116B 13	OD, LALA	Union Miniere Exploration
116C 7	CLINTON CREEK	Cassiar Asbestos Mining Corporation Ltd.
116C 8	CASSIAR CREEK	Noranda Exploration Company Limited
116G 1	MILCH	Milchem Canada Inc.
116K 8, 9	RUSTY SPRINGS	Kenton Natural Resources Limited

BLENDE

Trevor Bremner, Bill LeBarge, Grant Abbott
NTS: 106 D 7
Coordinates: 64°25'N, 134°40'W
Area: Wernecke Mountains
Access: Helicopter, winter road from Wind River trail
MINFILE #: 64
Company: Billiton Metals Canada Inc., NDU Resources Ltd
Commodities: Zinc, lead, silver

INTRODUCTION

The Blende is a large epigenetic zinc-lead-silver deposit hosted by brecciated middle Proterozoic dolomite. The deposit is tabular in shape and dips steeply, cutting bedding approximately at right angles. Mineralization occurs intermittently along a zone about 6 km long and up to 200 m wide. Based on 1990 drilling, reserves are estimated at 11.4 million tonnes grading 2.2% Zn, 3.0% Pb and 50.1 g/t Ag.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The property was first staked in 1975 by Cyprus Anvil Mining Corporation, and initial work was confined to geological mapping and a geochemical survey. Archer, Cathro & Associates (1981) Ltd restaked the property in 1981, and carried out trenching and rock sampling between 1981 and 1984. NDU Resources purchased the property in 1987, drilled three holes totalling 718 m in 1988, and optioned the property to Billiton in 1989.

REGIONAL SETTING

The area was mapped at a 1:50 000 scale by C. Roots (Geological Survey of Canada) in 1989. Sedimentary rocks of middle Proterozoic age include (from oldest to youngest) black phyllite and slate of the Quartet Group, dolomitic siltstone and stromatolitic dolomite of the Gillespie Lake Group, and unconformably overlying black siltstone and red-weathering stromatolitic dolostone of the Pinguicula Group. The section is thickened by folding and cut by south-dipping thrust faults. Diorite sills and dykes of Proterozoic or younger age cut the sedimentary rocks.

GEOLOGY AND MINERALIZATION

Sphalerite, galena, pyrite and minor chalcopyrite and tetrahedrite occur in brecciated stromatolitic dolomite which forms the upper part of the Gillespie Lake Group (G1 unit of Roots (1998). Lead isotope studies indicate that the mineralization has an age of 1.4 billion years (Godwin, 1988). The sulphides occur in five or more parallel tabular zones, each up to 20 m wide, which occur in a 200 m wide, 6 km long shear zone which strikes 110° and dips 70° southwest. At the footwall of the shear zone the mineralization terminates abruptly in sheared rock along a structure which is designated the "footwall thrust".

Four main areas of interest identified so far are named the west, central, east and far east zones. Work to date has concentrated on the west zone.

Fine grained yellow sphalerite, the dominant sulphide, is difficult to distinguish by colour from the host dolomite. The sulphides occur along fractures, and form part of the matrix between clasts in dolomite breccia. The brecciation appears to be related to the formation of a strong cleavage which strikes 110° and dips steeply to both the north and south.

Mineralized zones on the Blende property are well defined by zinc geochemical anomalies with 5 000 ppm Zn. Large copper anomalies and chalcopyrite stringers were found associated with a halo of bleached rock around a nearby diorite sill

CURRENT WORK

Exploration in 1990 consisted of 15 diamond drill holes on the west zone, totalling 3659.7 m. The holes were drilled along six northeast-trending section lines 100 m apart. The best intersection in 1990 graded 7.14% Pb, 8.20% Zn and 118.6 g/t Ag across 11.92 m in DDH 90-9. The drilling outlined 11.4 million tonnes of reserves grading 2.2% Zn, 3.0% Pb and 50.1 g/t Ag.

Promising results were also obtained from reconnaissance prospecting in the east zone, which appears to have a substantial width, and a high grade. A specimen from this zone contained 36.1% Pb, 11.6% Zn and 438.8 g/t Ag.

ACKNOWLEDGEMENTS

B. Lebarge and T. Bremner visited the property in 1990. Dan Bulat and Mike Phillips (Archer, Cathro & Associates (1981) Ltd) explained the geology of the property, and the overnight hospitality of Archer, Cathro & Associates (1981) Ltd at their camp near Keno City is also gratefully acknowledged.

REFERENCES

GODWIN, C.I., GABITES, J.E., and ANDREW, A., 1988. Leadtable: a galena-lead isotope data base for the Canadian Cordillera: B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1988-4

ROOTS, C.F., 1990. Geology of 106D/8 and 106D/7 (East half) map areas: Exploration and Geological Services Division, Indian and Northern Affairs Canada, Open File 1990-3

ROOTS, C.F., 1990. New Geological maps for the southern Wernecke Mountains, 106D/7 (East half) and 106 D/8; in Current Research, Part E, Geological Survey of Canada, Paper 90-1E

PART C

BREWERY CREEK

Trevor Bremner
NTS: 116 B 1
Coordinates: 64°03'N, 138°14'W
Area: Klondike River
Access: Klondike Ditch 4x4 road
MINFILE #: 160
Company: Noranda Exploration Co. Ltd, Loki Gold Corp.
Commodities: Major Au, minor Sb

INTRODUCTION

The Brewery Creek property is a low grade oxide gold deposit hosted by syenitic intrusive rocks in the south Klondike area. The deposit appears to be structurally controlled by a low angle fault which may be part of the Tintina fault system. Drilling to date has proved up several million tonnes of mineralization grading approximately 2.5 g/t Au.

HISTORY

In 1987, Noranda staked a regional aeromagnetic anomaly coincident with a Geological Survey of Canada regional silt sample which was anomalous in mercury. Gold concentrations are negligible in both silt and pan concentrates, but initial soil samples taken over the deposit returned strongly anomalous values up to 2000 ppb Au, and hand pits exposed rusty intrusive rock containing 2-5 g/t Au. There is no natural outcrop in the area, so soil geochemistry has continued to be the key exploration tool.

Geophysical surveys were carried out in 1988. Further exploration in 1989 included mapping, geochemical and geophysical surveys, road construction, trenching, 9 diamond drillholes totalling 1097 m and 14 percussion drillholes totalling 1646 m. More than 200 rotary holes were drilled on the property in 1990.

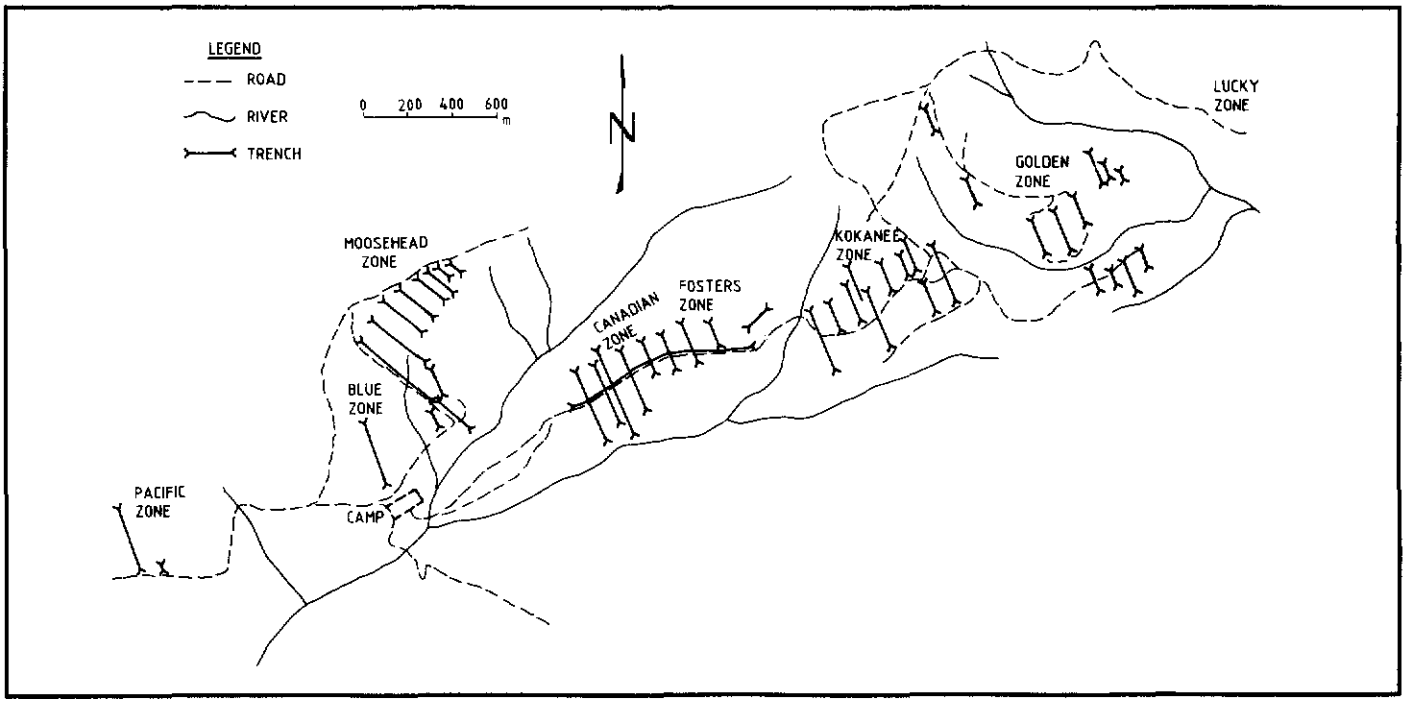
REGIONAL SETTING

The property lies immediately northeast of the Tintina Trench, in an area of low relief south of the Ogilvie Mountains. Sedimentary rocks in the area consist of silty argillite, chert, sandstone and bedded barite which were mapped by Green as the Road River Formation. Barite beds discovered in these rocks on the property suggest that they belong, at least in part, to the Devono-Mississippian Earn Group (Grant Abbott, personal communication). Exploration revealed a south-dipping syenite slab of probable mid-Cretaceous age. The intrusion is believed to be part of the Tombstone Plutonic Suite (Anderson, 1988).

GEOLOGY AND MINERALIZATION

A large low-grade oxide gold deposit occurs along a low angle shear zone which separates a sill-like body of syenite and latite porphyry from underlying graphitic argillite. The mineralized fault strikes 100-110° and dips approximately 20° south. A tabular zone of intermittent mineralization about 6.7 km long, 100 m wide and 20 m thick has been outlined to date by trenching, and diamond and rotary drilling. The locations of 8 main mineralized areas are shown in Figure 1. The deposit is exposed on south-facing dip slopes, is oxidized to

Figure 1. Map of the Brewery Creek property.



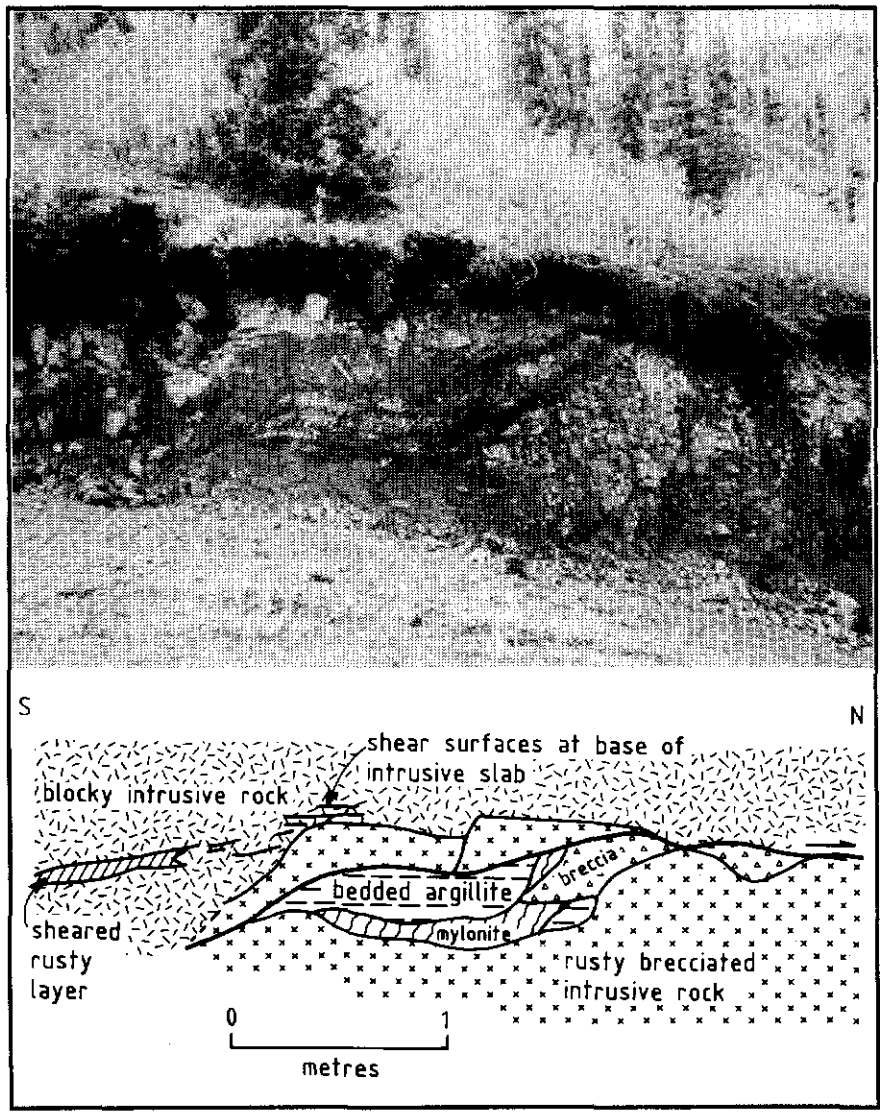
depths ranging from 10 to 110 m, and appears amenable to open-pit mining. Metallurgical tests on oxide material indicate a recovery of better than 90% of the gold from a 30 day column leach.

Gold occurs in fine chalcedony stockworks within the intrusion, and in narrow stibnite veins which occur along parallel shears in the footwall mudstone at the west end of the property. Mineralized intrusive rock is recognized by its sheared, rusty appearance and pyrite-sericite alteration. The gold is most commonly confined to the lower 10-20 m of the intrusive slab but may also occur in brecciated rock in the middle or at the top. There seems to be little evidence of an intrusive contact: clay alteration and shearing are common along the margin but chilled margins and hornfelsing are absent. Along strike, the deposit is separated into eight zones each characterized by a distinct soil geochemical response.

In detail the shear zone appears to be complex and the intrusive layer probably includes several imbricated slabs. For instance, a road cut in the Golden zone shows sigmoidal shear surfaces which enclose duplexes of sheared argillite with a south-dipping foliation (Figure 2). These duplexes are sandwiched between south-dipping layers of rusty intrusive rock which returned good drillhole assays (e.g. 3.4 g/t Au over 12 m in hole 90-181). Another road cut at the east end of the Golden zone exposes silicified argillite overlying folded, sheared graphitic argillite in the footwall.

Sheared argillite in a trench at the west end of the Pacific zone shows a strong c-s shear fabric consistent with low angle thrust faulting from the south. The main shear foliation strikes 80-100° and dips 28° S. Scorodite-stained stibnite and quartz-stibnite veins from 0.07 to 0.6 m thick occur in both the argillite and overlying feldspar porphyry breccia. Figure 3 shows a stibnite vein following the upper margin of a lens of rusty, brecciated intrusive rock in sheared argillite. Gold values up to 21.4 g/t Au have been obtained from these veins, and 3 m of the sheared argillite described above assayed 2.47 g/t Au and 42.5 g/t Ag.

Figures 2a,b. Argillite duplex in Golden zone roadcut. Note sheared, brecciated footwall.



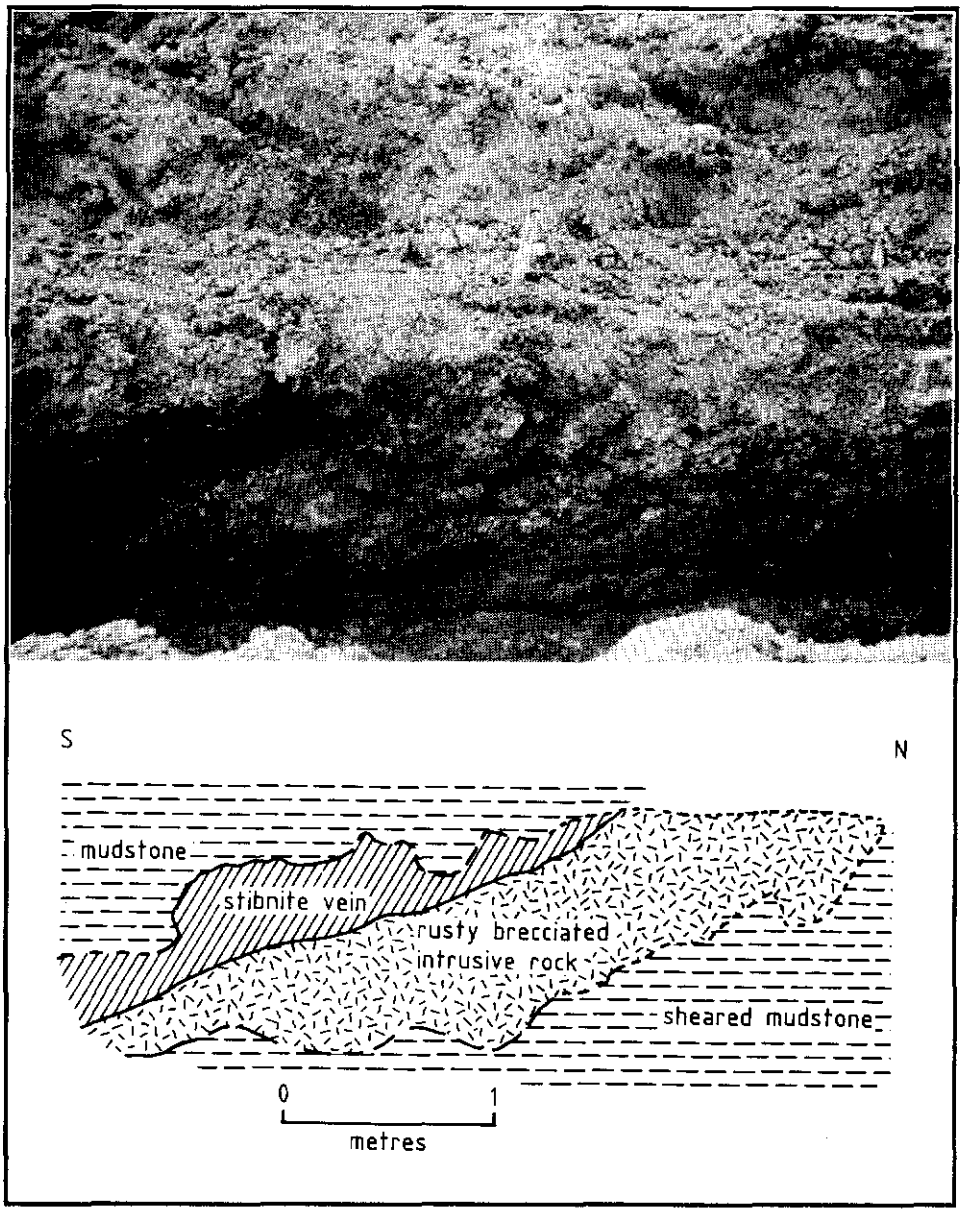
The best gold values on the property so far have come from the Kokanee zone, where a chip sample averaged 28.5 g/t Au over 6 metres and a drillhole intersected 10 metres grading 16.1 g/t Au. The material sampled consisted of rusty clay-altered intrusive rock overlying black graphitic gouge.

On this property, arsenic in soil is the most useful indicator of gold mineralization, and a consistent As: Au ratio of 1 000:1 has been noted. Stibnite veins occur throughout the property except for the Moosehead zone. Bedded barite up to 18 m thick occurs in the footwall argillite in the Kokanee zone but is most likely a layer in the Earn Group, unrelated to the gold.

CURRENT WORK

9 diamond drillholes and 15 rotary drillholes were completed in 1989, and approximately 200 rotary holes were drilled in 1990. Exploration was expanded to cover the Pacific zone at the west end of the property and the Lucky zone at the east end of the property.

Figures 3a,b. Stibnite vein in Pacific zone trench.



RESULTS SUMMARY

Based on 1989 and 1990 drilling, reserves for two of the mineralized zones were calculated as follows:

Zone	Tonnes	g/t Au
Canadian	1 500 000	2.0
Kokanee	250 000	5.0

Total reserves based on the 1989 and 1990 drilling are expected to be in the 4-5 million tonne range. Development will require approximately 10 million tonnes open-pittable oxide material grading 1.5 g/t Au.

ACKNOWLEDGEMENTS

T. Bremner visited the property briefly in 1990 and is grateful to Gordon McKay (Noranda Exploration Co. Ltd) for an excellent tour of the property, and for subsequent discussions and a review of the manuscript. Dr Charlie Roots (Geological Survey of Canada) also visited the property in 1990 and generously shared his field notes. Grant Abbott edited the text twice and contributed several valuable insights.

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ANDERSON, R.G., 1987. Plutonic rocks in the Dawson map area, Yukon Territory: in Current Research, Part A, Geological Survey of Canada Paper 87-1A, p. 689-697

ANDERSON, R.G., 1988. An overview of some Mesozoic and Tertiary plutonic suites and their associated mineralization in the northern Canadian Cordillera; in Recent advances in the geology of granite related mineral deposits, R.P. Taylor and S.F. Strong (eds.), Canadian Institute of Mining and Metallurgy, Special volume 39, p. 96-113

GREEN, L.H., and RODDICK, J.A., 1961. Dawson, Yukon Territory: Geological Survey of Canada Map 1284A

PART C

CANYON

Trevor Bremner
NTS: 105 H 1
Coordinates: 61°14'N, 128°24'W
Area: Mt Billings
Access: Conglomerate Creek road, 78 km north of Miner's Junction on Nahanni Range Road
MINFILE #: 24
Company: Inactive
Commodities: Lead, silver

INTRODUCTION

No exploration has been done on this property since 1981. Surface geology suggests that the mineralization is a replacement of brecciated limestone in the footwall of a low-angle fault. Results from previous exploration have proved disappointing but the host structure is probably regional in extent and larger deposits may exist along strike.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. Since the first claims were staked in 1964, the property has been restaked several times. The most recent owners were Kimberley Gold Resources Ltd and Vancliffe Resources Corp. Exploration to 1981 included geochemical, magnetometer and EM surveys, trenching, and 14 drillholes (1470 m).

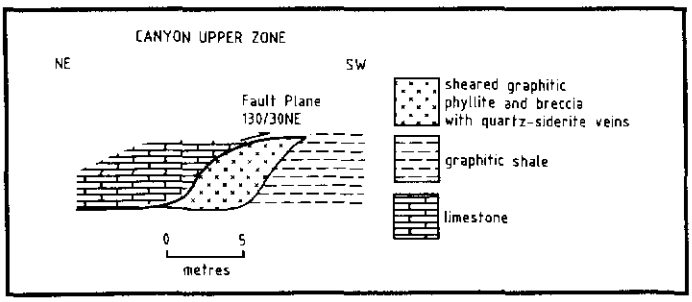
REGIONAL SETTING

The property is underlain by graphitic and calcareous shale near the contact of the Cretaceous Mt Billings batholith.

GEOLOGY AND MINERALIZATION

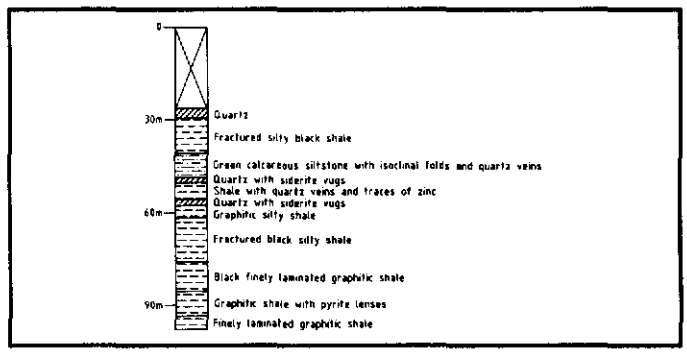
The upper of two showings was briefly examined in 1990. Galena and pyrrhotite occur in manganese-stained quartz-carbonate breccia beneath rusty limestone, which appears to have been thrust over sheared graphitic phyllite veined with quartz and siderite. The fault plane strikes 130° and dips 30° northeast (Figure 1). A specimen of sulphide-bearing graphitic shale with quartz-siderite veins taken by T. Bremner from the intersection of trenches K-2-81 and K-4-81 assayed 10.98% Pb and 73.0 g/t Ag. J.W. McLeod in 1978 described disseminated sulphides in the upper zone over a strike length of about 9.1 m, with a core of massive sulphide about 0.6-0.9 m thick which returned values up to 25.6% Pb, 117.9 g/t Ag and 0.34 g/t Au. Two of 6 holes which tested the upper zone in 1981 intersected thin zones which returned high silver values. The best of these was 987.4 g/t Ag over 0.3 m in DDH K-2-81.

Figure 1. Field sketch of fault on south side of Conglomerate Creek. The structure appears to extend into the area of the upper zone trenches.



The lower zone, which lies 1000 m east of the upper zone, is described as geologically similar, with a strike length of about 46 m and a massive sulphide core about 0.9 m thick which returned values up to 17.25% Pb and 92.6 g/t Ag and 0.3 g/t Au (Archer, Cathro & Associates (1981) Ltd in Yukon Minfile). Diamond drill hole K-5-81 from the lower zone was examined briefly in the field and a rough description is given in Figure 2. The hole intersected several thin sulphide bands, and traces of zinc were observed in a thin interval of fractured dark grey shale with numerous quartz veins. However, no significant assays were obtained. The most notable feature seen in the core was a pervasive shearing parallel to the axial planes of small isoclinal folds in the calcareous siltstone.

Figure 2. Drillhole K-5-81, Canyon Lower zone.



CURRENT WORK

The property is presently inactive.

ACKNOWLEDGEMENTS

Thanks are due to Grant Abbott for editing the manuscript.

REFERENCES

BLUSSON, S.L., 1965. Geology, Frances Lake Map-Area, Yukon and District of Mackenzie, 105H: Geological Survey of Canada, Map 6-1966

MCLEOD, J.W., 1978. Unpublished assessment report 061810 on the SKULL mineral claims for Skat Resources Ltd

TULLY, D.W., 1972. Unpublished assessment reports 091060 and 091072 on the SKULL 1-180 claims for Kimberley Gold Resources Inc.

PART C

CRESCENT

Trevor Bremner, Tim Liverton
NTS: 105 B 3
Coordinates: 60°11'N, 131°13'W
Area: Swift River
Access: 4WD road from Pine Lake airstrip
MINFILE #: 26
Company: First Yukon Silver Resources Inc.
Commodities: Zinc

INTRODUCTION

Originally staked as the ATOM claims by Hudson Bay Mining and Smelting in 1947, the Crescent occurrence consists of black sphalerite, pyrrhotite, pyrite and magnetite in garnet-diopside-epidote-actinolite skarn hosted by sheared, brecciated schist and hornfels near a fault-bounded slab of Jurassic diorite south of Crescent Lake. The mineralization is believed to have replaced brecciated calc-silicate rock in the footwall of a south-dipping thrust fault which passes through the Crescent Lake area and extends through the Dan prospect 5.8 km to the east.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. Since the original discovery by Hudson's Bay Mining and Smelting in 1947, documented exploration consists mostly of bulldozer trenching by a variety of companies, plus geological mapping and geochemical and geophysical surveys by Boswell River Mines Ltd in 1971. The most recent work consisted of bulldozer and excavator trenching by Yukon Silver Resources Inc. in 1989 and 1990.

REGIONAL SETTING

The property is underlain by Late Paleozoic metasedimentary and metavolcanic rocks of the Yukon Cataclastic Complex, cut by southward-dipping imbricated thrust faults. A small stock of Cretaceous quartz monzonite intrudes the metamorphic sequence 3 km east of the upper showing.

GEOLOGY AND MINERALIZATION

Two massive sulphide showings occur 800 m apart. The upper showing (Figure 1) consists of a 2 m wide layer of massive sphalerite with a strike length of about 50 metres, hosted by finely banded calc-silicate hornfels similar to the footwall rocks at the Dan showing. A sample of mineralized float taken by John Baril (Placer Dome Exploration Ltd) 125 m west of the lower showing contained 8.95% Zn, 67.2 ppm Ag, 1250 ppm Cu, 1870 ppm Pb, 201 ppm As, 49 ppm Sb, 500 ppm Ba and 28 ppb Au.

The lower showing consists of massive garnet-pyrrhotite-chlorite skarn with two generations of garnet, and garnet-magnetite-sphalerite skarn. Banded hornfels host rocks at the lower location consist of alternating layers of garnet-epidote and quartz-chlorite. Sample results contributed by John Baril include the following: a weakly magnetic massive sulphide specimen from the lower showing assayed 7.00% Zn, 0.1 ppm Ag, 33 ppm Cu, 9 ppm Pb, 80 ppm As, 16 pp, Sb, 70 ppm Ba and 55 ppb Au. A chloritic metavolcanic rock with minor garnet, epidote and variable amounts of sphalerite from the same location contained 9100 ppm Zn, 0.2 ppm Ag, 19 ppm Cu, 12 ppm Pb, 78 ppm As, 17 ppm Sb, 140 ppm Ba and 13 ppb Au. Shale with sulphides in fractures and cross-cutting quartz veinlets contained 2010 ppm Zn, 0.6 ppm Ag, 157 ppm Cu, 16 ppm Pb, 160 ppm As, 28 ppm Sb, 1220 ppm Ba and 58 ppb Au.

Both of the Crescent Lake showings are associated with strong magnetic anomalies and anomalous soil containing more than 600 ppm Zn. The present distribution of the anomalies may be explained as the result of an 800 m displacement along a vertical north-striking tear fault.

The Crescent Lake showings are on strike with the Dan showing, which shows a similar mineralogy. A large geochemical anomaly, and a conspicuous pyrrhotite gossan designated the "Gossan Zone" on Boswell River maps, mid-way between the Dan and Crescent Lake showings.

DISCUSSION

A south-dipping thrust fault is inferred to pass through the Crescent Lake, Gossan zone and Dan showings. Base metals appear to have been emplaced with actinolite, magnetite and chlorite along zones of permeable fault breccia as a result of retrograde thermal metamorphism which may have accompanied the intrusion of a small quartz monzonite stock 3 km east of the Crescent Lake showing. The strike length of the host structure suggests that the potential for a large deposit exists in the area, particularly in view of the other prospects similar to the Crescent Lake showings which occur along it.

CURRENT WORK

Doug Schellenberg and Hardy Hibbing of First Yukon Silver Resources carried out bulldozer and excavator trenching on the property in 1990.

ACKNOWLEDGEMENTS

T. Bremner visited the property briefly on two occasions in 1990. Tim Liverton mapped the area around the showings in detail and examined thin sections of the host rocks. This summary draws heavily on the work of Helmut Wober (Boswell River Mines Ltd) in 1971, and Grant Abbott, who mapped the area as part of a larger project in 1980. Doug Schellenberg and Hardy Hibbing provided much-appreciated hospitality in the field. John Baril of Placer Dome Exploration Ltd generously supplied sample descriptions and assays taken during a 1990 visit to the property. Grant Abbott edited the manuscript and contributed helpful suggestions.

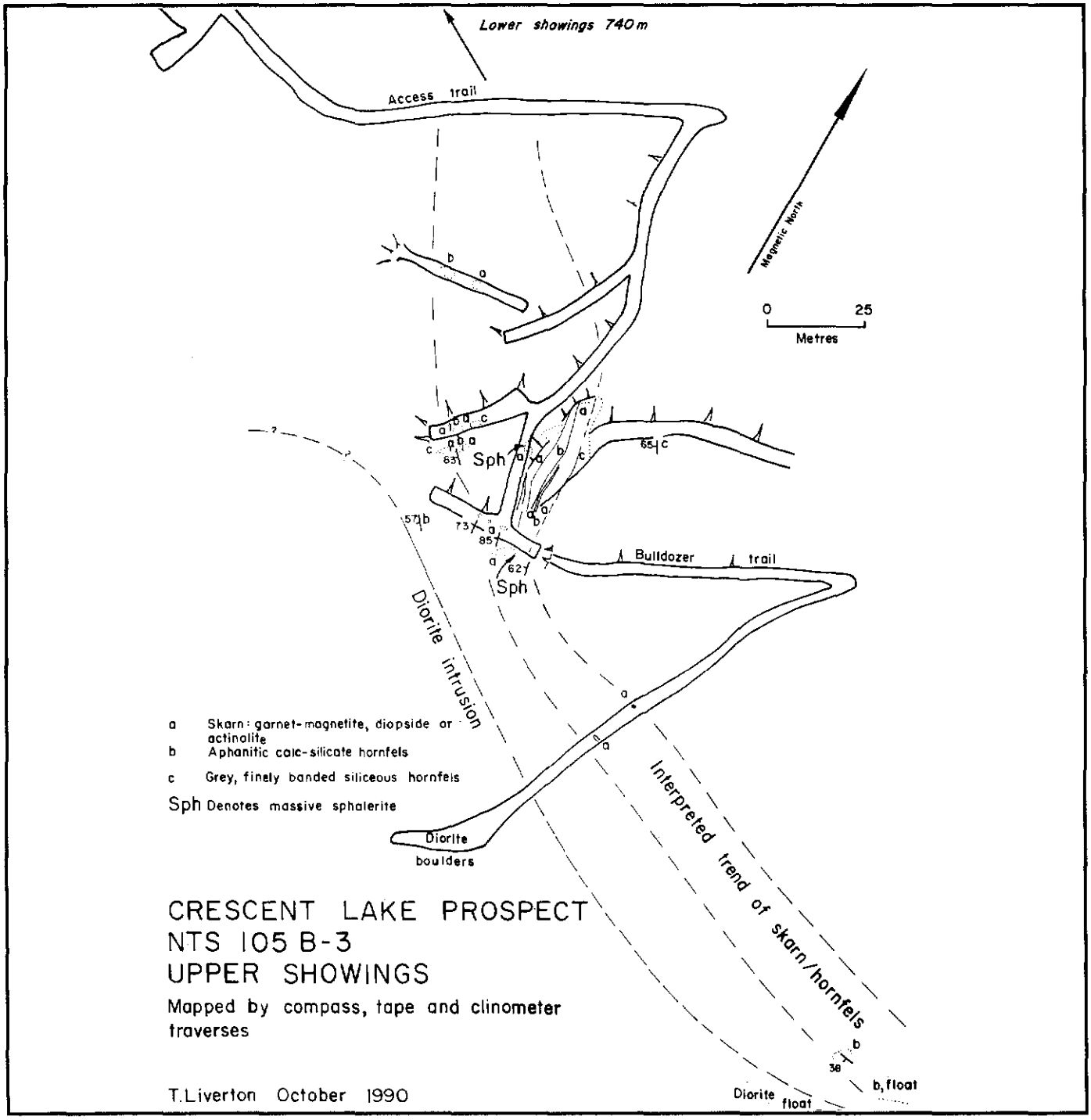
REFERENCES

ABBOTT, G.J., 1981. Geology of Seagull tin district: Yukon Geology and Exploration, 1979-80, p. 32-44

POOLE, W.H., RODDICK, J.A., and GREEN, L.H. 1960: Wolf Lake, Yukon Territory. Geological Survey of Canada, Map 14-1982.

WOBER, H., 1971. Report on work performed on the property of Boswell River Mines Ltd (NPL) in the Swift River area of the Yukon Territory: unpublished assessment report 060879

Figure 1. Map of upper showing, Crescent Lake.



PART C

DAN

Trevor Bremner, Tim Liverton
NTS: 105 B 3
Coordinates: 60°10'N, 131°08'W
Area: Swift River
Access: 4WD road from Pine Lake airstrip
MINFILE #: 27
Company: First Yukon Silver Resources Inc.
Commodities: Zinc

INTRODUCTION

This area was originally staked as the BAR claims by Hudson Bay Mining and Smelting in 1952. Massive black sphalerite occurs with pyrrhotite and magnetite in up to 3 irregular but roughly concordant layers at the contact between massive white marble and hard green and white-banded meta-tuff. Trenching in 1989 and 1990 exposed the mineralization over a strike length of 315 m, and there appears to be good potential for a sizeable strike extension based on isolated showings east and west of the discovery area. The mineralization is believed to have replaced brecciated marble in the footwall of a south-dipping thrust fault which passes through the DAN prospect and extends through the Crescent Lake area 5.8 km to the east.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. Zinc prospects in the Swift River area were discovered by the Hudson Bay Mining and Smelting Co. in the late 1940's, during their program of prospecting the Alaska Highway and existing military roads. They carried out bulldozer trenching and limited diamond drilling on several prospects, but with little interest in zinc at the time, the claims were lapsed. During the 1960's, Boswell River Mines carried out extensive airborne EM and ground magnetic, EM, Turam and IP surveys over geochemical targets. Some, but not all of these targets were investigated by diamond drilling. Again, lack of interest in zinc probably led to the claims being abandoned. Doug Schellenberg of First Yukon Silver Inc. prospected and restaked the area between 1988 and 1990, and, guided by the Boswell River geophysical and geochemical anomalies, began excavating near the old showings.

REGIONAL SETTING

The property is underlain by Late Paleozoic metamorphosed and imbricated sedimentary and volcanic rocks of the Yukon Cataclastic Complex (Figure 1). A small stock of Cretaceous quartz monzonite intrudes the metamorphic sequence 2.4 km west of the DAN showing. A major fault separating the cataclastic rocks from the Cassiar Platform runs along the Swift River valley less than 1 km north of the showing.

GEOLOGY AND MINERALIZATION

The Dan prospect consists of irregular layers of massive sphalerite which follow the sheared contact between white and green banded hornfels (a metamorphosed tuff), and marble with bands of diopside-garnet skarn. Much of the garnet skarn has been replaced by actinolite and chlorite and most of the sphalerite and pyrrhotite is associated with these retrograde silicate phases. The massive sulphides have been exposed in a large trench over a strike length of 315 m, and up to 3 individual sulphide layers averaging about 1.5 m thick occur over a width of 50 m. Disseminated sulphides occur in calc-silicate rocks between the massive sulphide layers. Similar showings along the same trend and coincident magnetic anomalies suggest that there may be potential for a sizeable deposit.

Although roughly concordant, the sulphide layers appear to follow a branching system of reverse faults and steeply dipping cross faults of minor displacement (Figure 2). Three major faults dip southward at 0-10°, 45° and 75° respectively, forming an imbricate stack. Deformation in the meta-tuff is limited to fracturing, but marble shows small scale isoclinal folds. Fold vergence is consistent with reverse movement on the faults. At the east end of the excavated area, steeply dipping faults separate many 1-2 m sized skarn blocks. Brecciated skarn and fault gouge along the two lower structures, and sharp lithological differences between small fault blocks, show that movement on the faults was contemporaneous with and probably postdated the mineralization.

Bands of disseminated sphalerite in the lower marble layer assay low grades of zinc over significant widths. A sample taken by Noranda Exploration Co. Ltd in 1990 averaged 2.5% Zn over 6 m. Massive sulphide layers return considerably higher values. A chip sample taken by T. Bremner from the lowest massive sulphide layer aver-

Figure 3. Section through east end of main excavation.

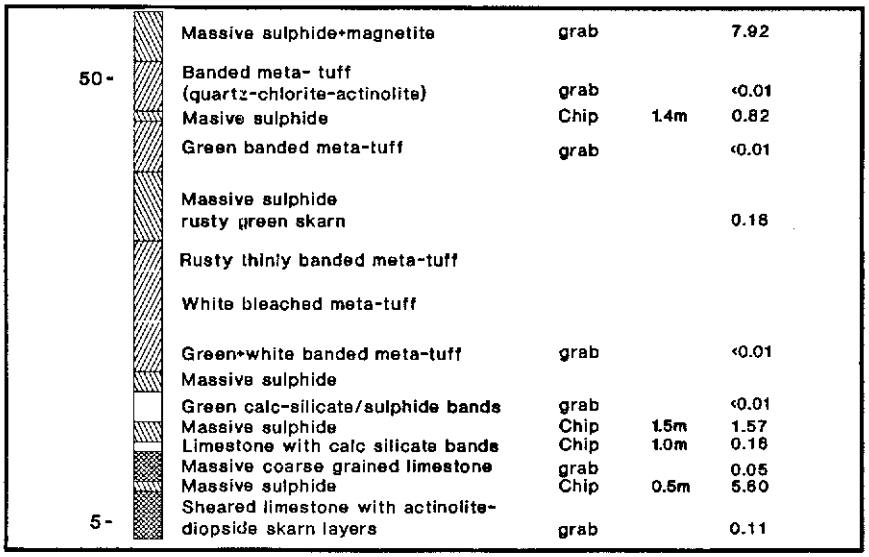
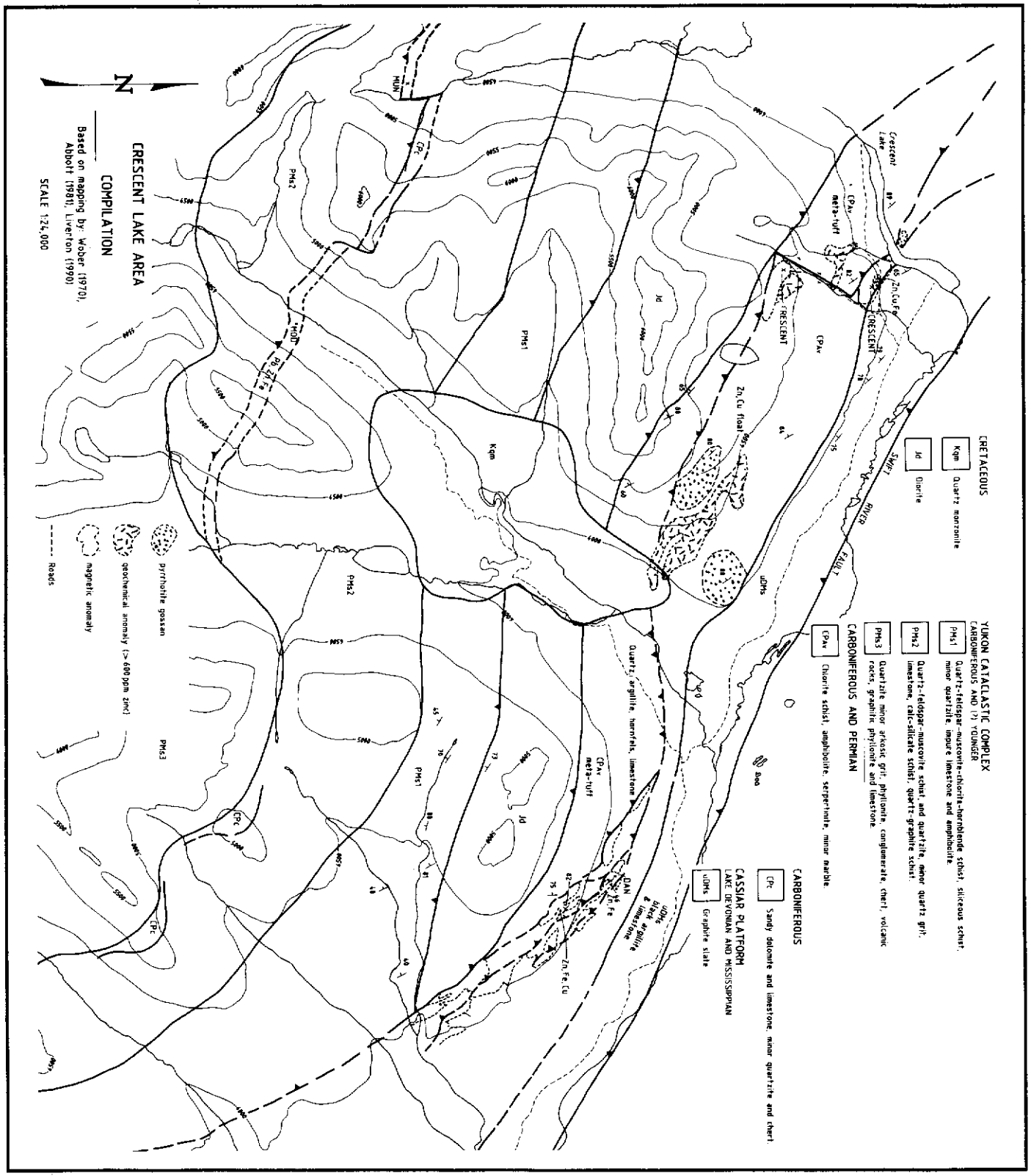
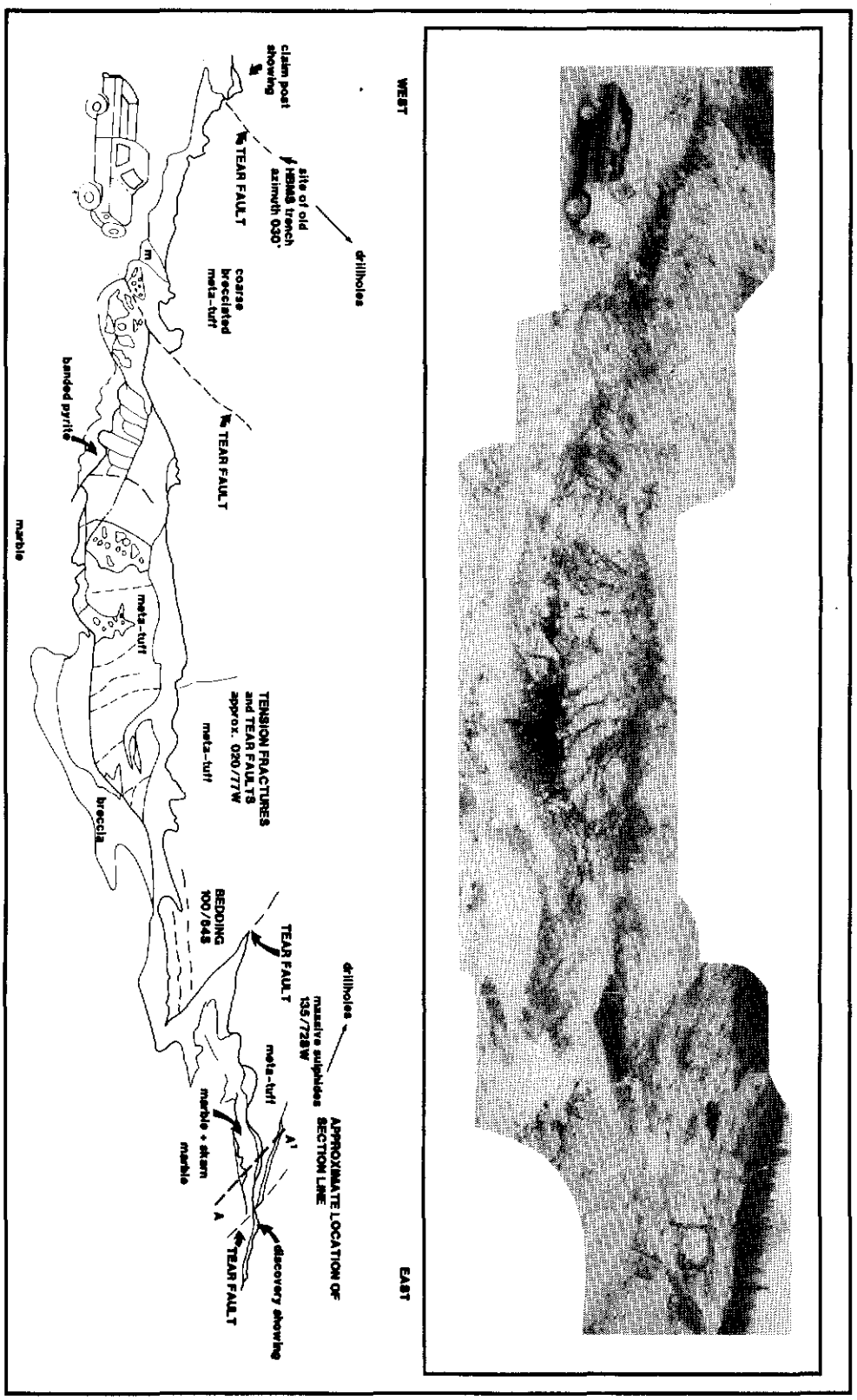


Figure 1. Compilation map covering the area of the Dan, Crescent Lake and Munson showings.





Figures 2a,b. Photomontage and geological sketch of main excavated area, Dan property.

aged 5.6% Zn over 1.0 m, and a specimen taken from the uppermost of the three layers contained 7.92% Zn (Figure 3). Five grab samples of massive sulphides taken by John Baril of Placer Dome Exploration Ltd from 3 separate locations on the Dan property contained between 2.43 and 39.35% Zn. Gold, antimony, silver, lead and copper were also anomalous in some of the Placer Dome samples. A specimen of banded pyrite and sphalerite from the central part of the exposed area contained 205 ppb Au, 83.0 g/t Ag, 1050 ppm Pb, and 8.74% Zn.

Polished sections of the massive sulphide material show sphalerite and pyrrhotite embaying and surrounding silicate minerals, indicating replacement (Figure 4). Disseminated sphalerite in the calc-silicate marble is concentrated along and adjacent to a chloritic shear foliation which crosscuts bedding (Figure 5).

No significant geochemical anomaly is associated with the Dan zinc showings, due to thick overburden cover. However, strong zinc soil anomalies along strike to the west are associated with large pyrrhotite gossans, and to the east, narrow, anastomosing magnetic anomalies appear to follow the deposit.

DISCUSSION

Early workers interpreted this property as a volcanogenic massive sulphide target, based on the concordant nature of the mineralization and the banded, tuffaceous-looking rocks in the hanging wall. The high iron content of the showings has been interpreted by others as an indication of syngenetic deposition as a base-metal rich iron formation. However, based on the brecciated or mylonitized nature of the host rock, the skarn mineral assemblage, the locally discordant contacts of mineralized skarn and replacement textures

evident in thin and polished sections, the base metals were likely introduced with actinolite, magnetite and chlorite along zones of permeable fault breccia during retrograde thermal metamorphism which may be associated with the emplacement of the nearby Cretaceous stock.

CURRENT WORK

Doug Schellenberg and Hardy Hibbing of First Yukon Silver Resources carried out bulldozer and excavator trenching on the property in 1989 and 1990. Tim Liverton spent six days mapping the Dan and Crescent Lake showings in detail in 1990.

ACKNOWLEDGEMENTS

T. Bremner visited the property briefly on several occasions in 1990 and examined several thin and polished sections of the sulphides and host rocks. Tim Liverton mapped the area around the showings in detail and examined thin sections of the host rocks. This summary draws heavily on the work of Helmut Wober (Boswell River Mines Ltd) in 1971, and Grant Abbott, who mapped the area as part of a larger project in 1980. Doug Schellenberg and Hardy Hibbing provided much-appreciated hospitality in the field. John Baril of Placer Dome Exploration Ltd generously supplied sample descriptions and assays taken during a 1990 visit to the property. Grant Abbott edited the manuscript and provided many helpful suggestions.

Figure 5. Chlorite (dark) outlining shear fabric in calc-silicate marble. Disseminated sphalerite is concentrated in and adjacent to the shear fabric. Transmitted light, partially crossed polars, field of view 4 mm.

REFERENCES

ABBOTT, G.J., 1981. Geology of Seagull tin district: Yukon Geology and Exploration, 1979-80, p. 32-44

POOLE, W.H., RODDICK, J.A., and GREEN, L.H. 1960: Wolf Lake, Yukon Territory. Geological Survey of Canada, Map 14-1982

WOBER, H., 1971. Report on work performed on the property of Boswell River Mines Ltd (NPL) in the Swift River area of the Yukon Territory: unpublished assessment report 060879

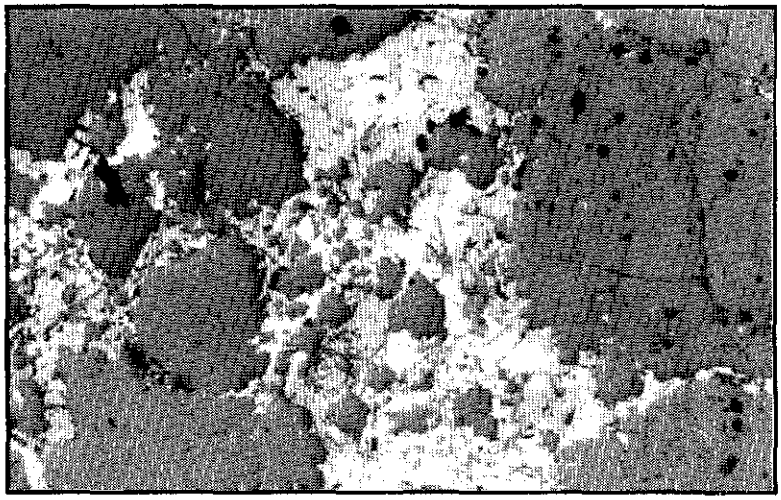


Figure 4. Massive sulphide from west end of main excavation showing replacement of silicates (dark) by pyrrhotite (grey) and sphalerite (light grey). Reflected plane polarized light, field of view 4 mm.

PART C

FLIP

Trevor Bremner
NTS: 105 H 2
Coordinates: 61°09'N, 128°40'W
Area: Mt Billings
Access: Winter trail along Dolly Varden Creek from Nahanni Range Road
MINFILE #: 5
Company: Alex Black
Commodities: Zinc, lead, silver, copper, tungsten

INTRODUCTION

No exploration has been done on this property since 1979. The property was originally staked to cover float boulders containing 12.8% Zn, 8.1% Pb, 1.1% Cu 202.3 g/t Ag and 1-2% WO3. The mineralized rock is an actinolite skarn at the southwest margin of the Billings Batholith. Cursory examination of trench outcrops suggests that mineralization may have been emplaced in a zone of permeable breccia related to a fault.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The first claims were staked in 1964. Since then the property has been restaked several times. Early work included airborne geophysical surveys, reconnaissance geochemistry and ground magnetic surveys. The most recent work consisted of magnetometer and IP surveys by Cominco in 1977, and 9 bulldozer trenches in 1979. The present owner is Alex Black of Watson Lake.

REGIONAL SETTING

The property is underlain by hornfels and argillite of the Devono-Mississippian Earn Group, near the southwest contact of the Cretaceous Billings batholith (Figure 1).

GEOLOGY AND MINERALIZATION

Cominco's 1977 trenches exposed a layer of diopside-garnet-epidote-actinolite skarn more than 213 m long and up to 13.3 m wide (Figure 2). The skarn layer follows a limestone-argillite contact and contains galena, sphalerite and chalcopyrite, both disseminated and in lenses and thin concordant bands. Bedding strikes northeast and dips 32° southeast. A Cominco chip sample across the massive sulphide band in Trench #2 assayed 397.7 g/t Ag, 0.8% Cu, 3.1% Pb, 5.4% Zn and 0.28% WO3 across 2.0 m. The best sample in Trench #1 assayed 476.6 g/t Ag, 3.04% Cu, 2.05% Pb, 19.6% Zn and 0.73% WO3 across 1.3 m.

It is not clear from Cominco's mapping whether the skarn consists of two separate lenses or a single layer offset by faulting. A wide zone of quartz-chlorite skarn with minor sulphides occurs in Trench #2 where the apparent offset occurs (Figure 3). The rock exposed in the trench floor is brecciated and silicified and a shear fabric has developed which locally strikes 140° and dips 73° northeast. Thirty metres of dextral strike-slip offset in a north-south direction could account for the present distribution of the skarn, in which case the faulting probably acted as a conduit for mineralizing fluids.

CURRENT WORK

The property is presently inactive.

ACKNOWLEDGEMENTS

Grant Abbott kindly reviewed the manuscript.

REFERENCES

BLUSSON, S.L., 1965. Geology, Frances Lake Map-Area, Yukon and District of Mackenzie, 105H: Geological Survey of Canada, Map 6-1966.

MAWER, A.B., 1979. Bulldozer trenching on MTB mining claims 1,3,4, Mount Billings Area, Yukon: unpublished assessment report 090934 for Cominco Ltd.

SCOTT, A.R., 1977. Induced polarization and magnetic survey, MTB claims 1-8, Hyland River Area, Yukon: unpublished assessment report 090209 for Cominco Ltd.

Figure 1. View of Cominco's 1977 trenches, looking east to Billings Batholith. Rusty hornfels outcrops on ridge in right foreground.

Figure 2. Property geology, based on map by A.B. Mawer (1979) for Cominco Ltd.

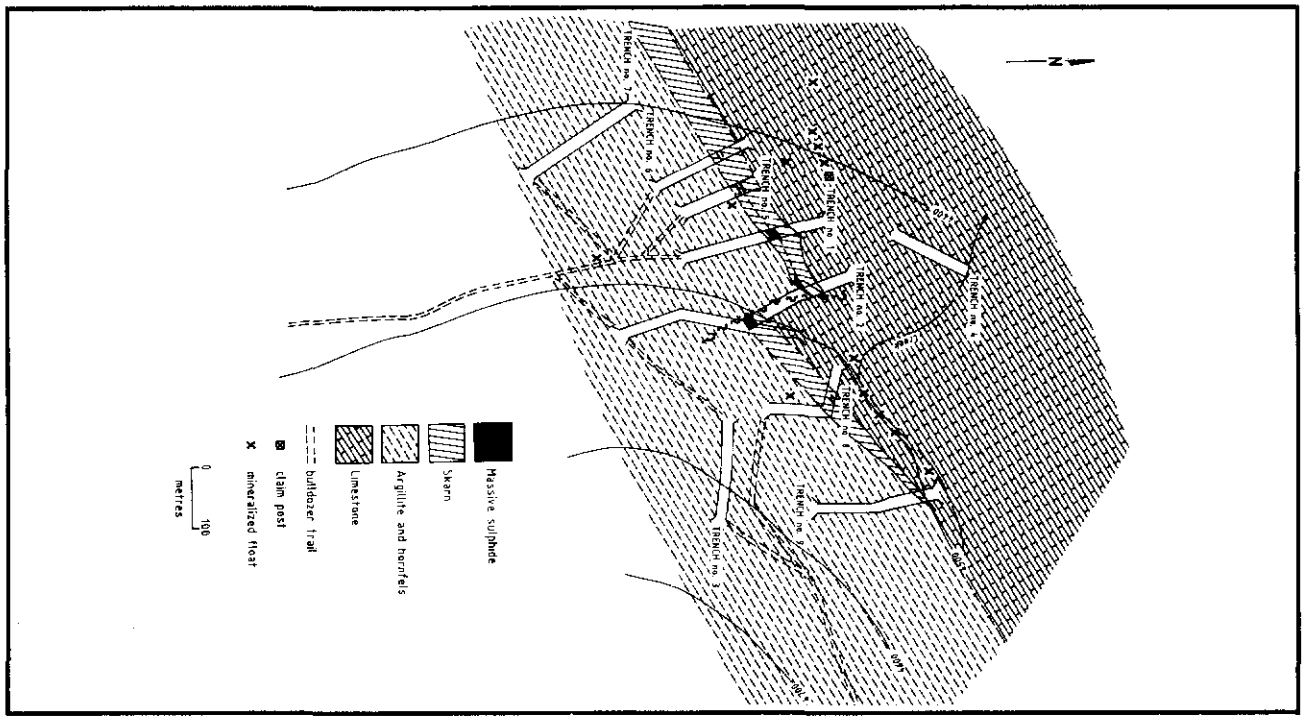
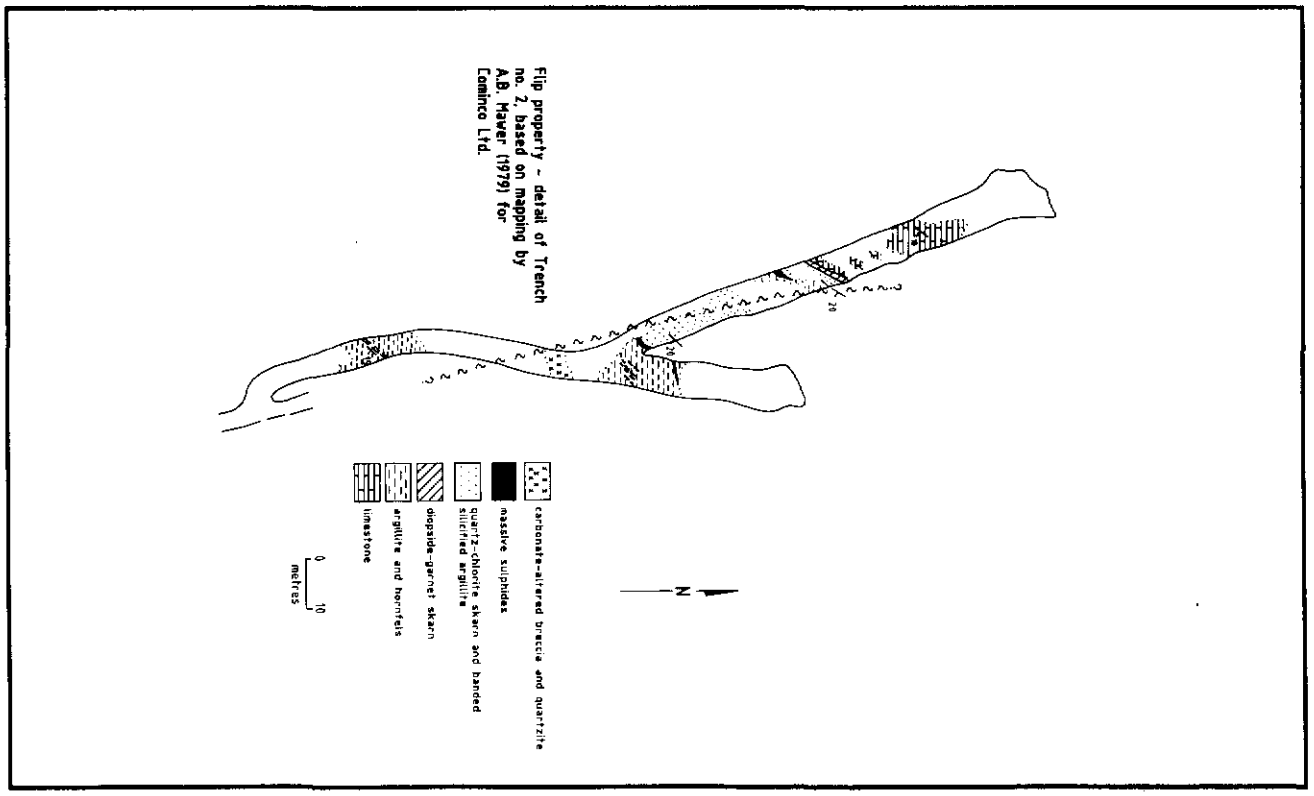


Figure 3. Detail of trench #2, based on mapping by A.B. Mawer (1979) for Cominco Ltd.



PART C

GOULTER

Trevor Bremner
NTS map sheet: 115 I 3
Coordinates: 62°05'N, 137°12'W
Area: Mt Nansen
Access: Mt Nansen road from Carmacks
MINFILE #: 93
Company: Aurchem Exploration Limited
Commodities: Major gold, silver, minor lead

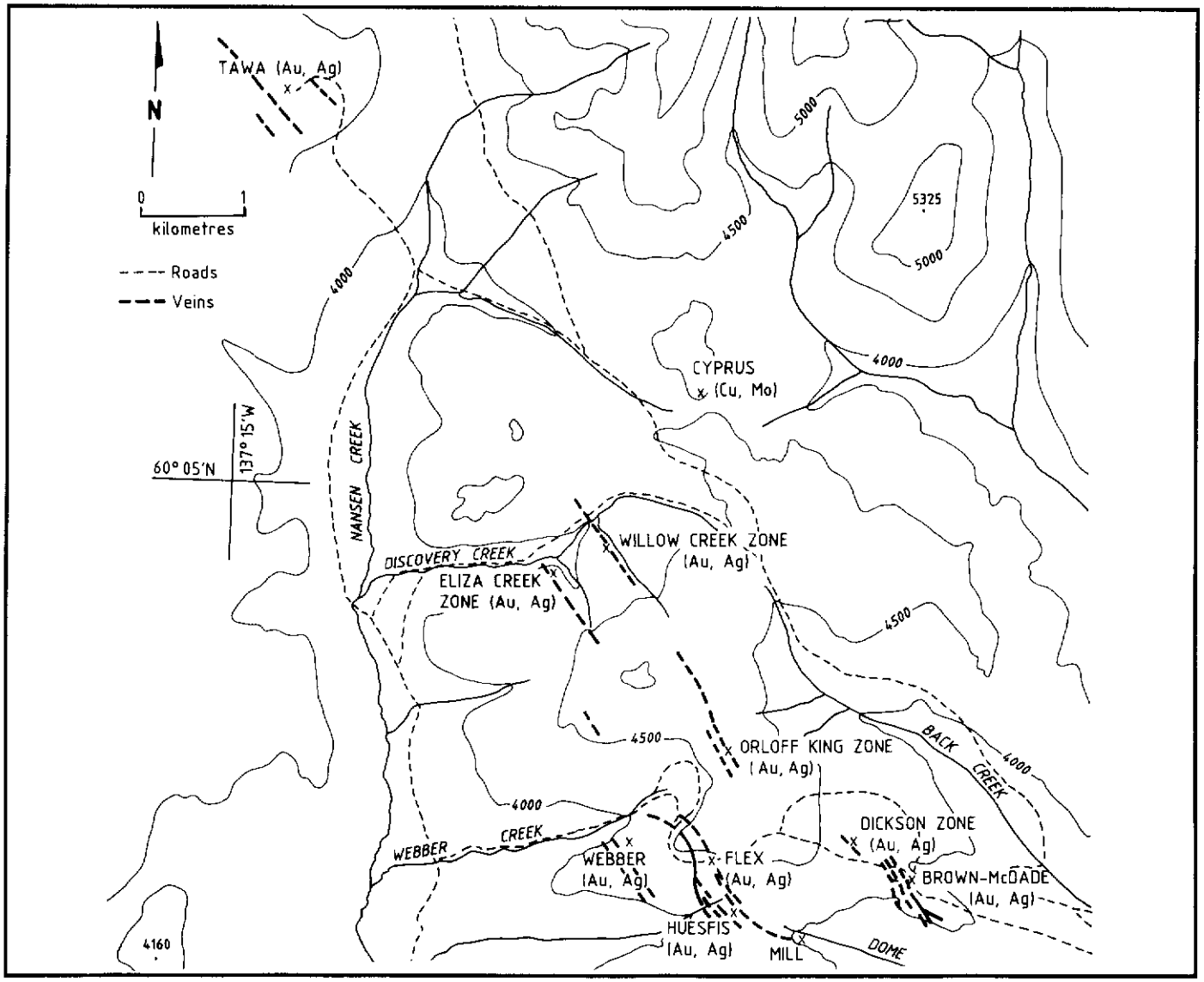
INTRODUCTION

This property, which adjoins the Mt Nansen property on the north side, is bisected by Discovery Creek, a significant placer gold producer. Two parallel zones of anastomosing quartz veins and por-phyry dykes cut Cretaceous intrusive rocks and contain variable amounts of gold and silver over substantial widths. The two mineralized zones lie approximately on trend with the Brown-McDade and Webber-Huestis zones on the Mt Nansen property to the south, and with gold and silver-bearing veins on the Tawa property to the north (Figure 1). The mineralized zones are deeply oxidized, and the property appears to have good potential as a bulk tonnage low-grade oxide gold deposit.

EXPLORATION HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The first claims on the property were staked in 1917 and exploration in the form of several un-

Figure 1. Map showing location of the Eliza Creek and Willow Creek vein systems relative to the Mt Nansen and Tawa property veins.



derground drifts was done between 1918 and 1941. Silver Standard Mines Ltd conducted electromagnetic and geochemical surveys and geological mapping in 1958 and 1959. Gordon Dickson staked the present WEDGE claims in 1984 and optioned them to the present owner in 1985. Aurchem subsequently explored the property with close-spaced soil geochemistry, and magnetometer and VLF-EM surveys, diamond drilling and bulldozer and excavator trenching. The 1988 diamond drilling consisted of 12 NQ/HQ holes totalling 1219.2 m. Work in 1989 was directed toward exposing and sampling veins in the eastern, or Willow Creek zone. In 1990, the exploration was concentrated on the western, or Eliza Creek zone.

REGIONAL GEOLOGY

The claims lie at the south end of the Dawson Range, and are underlain by Paleozoic? schist intruded by Cretaceous diorite and granodiorite. Latite porphyry dykes which cut the diorite and granodiorite intrusions are believed to belong to the Early Cretaceous Mount Nansen Volcanics, which also occur as small plugs and flows capping ridge crests in the area.

GEOLOGY AND MINERALIZATION

Two wide north-trending fault zones marked by wide areas of sheared, altered porphyry, quartz veining and clay gouge, extend more than 1 km across the Goulter property. The zones roughly parallel two north-flowing tributaries of Discovery Creek and are named the Willow Creek zone (east) and the Eliza Creek zone (west). Figure 2 is a field sketch of one of these faults exposed in a Willow Creek zone trench. The major north-south structures are cut by younger normal faults which strike approximately 100°. Most of the information reported below pertains to the Willow Creek zone, as little information on the Eliza Creek zone is available at present.

Gold, silver and lead occur in highly altered veins which consist of a mixture of illite, quartz and sericite, and contain variable amounts of cerussite or galena, argentite and electrum. Pyrite, arsenopyrite, sphalerite and chalcopyrite are also common. The veins are associated with and appear to grade into porphyry dykes.

Figure 2. Field sketch of shear zone exposed in Trench K-9, Willow Creek zone (profile).

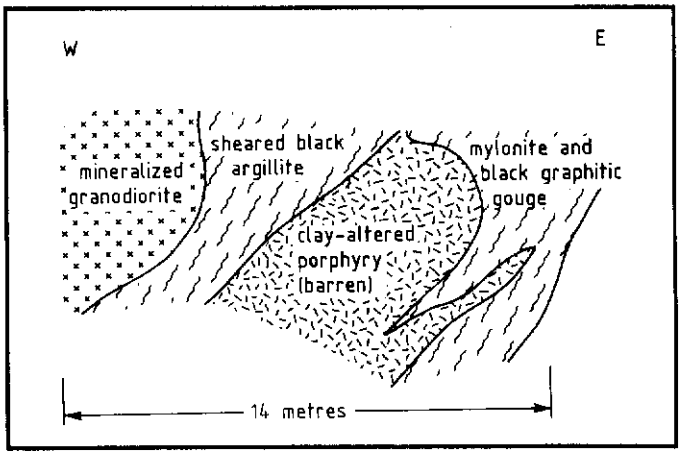
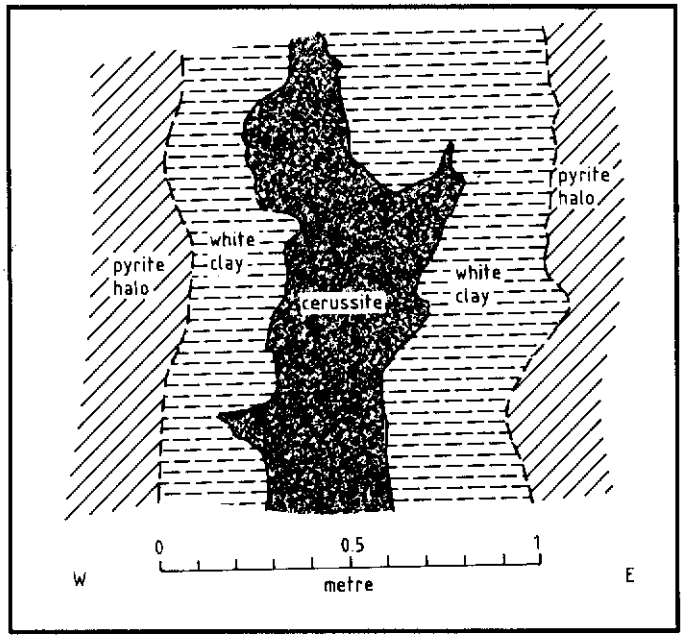


Figure 3. Sketch of narrow vein in 1989 Willow Creek zone trench (profile).



Two sets of veins are recognised. First phase veins strike approximately 340° and consist of brecciated quartz, with calcite, pyrite and arsenopyrite. These veins are surrounded by wide alteration zones and the hanging wall is frequently faulted. They are typically hard, have a sheared, rusty appearance and are coated with scorodite. Gold values and silver values are generally low, but sporadic values up to 27.4 g/t Au and 102.8 g/t Ag have been recorded, and chip sampling across one of these veins returned an average value of about 1 g/t Au over a width of 12-18 m. Zinc is generally more abundant than lead.

Second phase veins striking 000 and 310° have more economic significance. These veins consist of a cerussite or galena-rich core grading up to 62% Pb and 3428 g/t Ag, surrounded by white vuggy quartz and a narrow kaolinite alteration halo (Figure 3). Brecciation and carbonate minerals are absent, and the veins typically weather to a white mud. Acanthite occurs as rims on galena and tetrahedrite grains. In the Willow Creek zone, second phase veins range from 0.5 to 12 m wide (average about 1.5-3.0 m). Metal values are highest in the core and decline toward the vein margins. A 0.45 m chip sample across the core of one of these veins assayed 29.8 g/t Au, 582.8 g/t Ag and 17% Pb. Gold values, however, are erratic, and are generally overshadowed by the silver and lead values. Copper, antimony, zinc and arse-

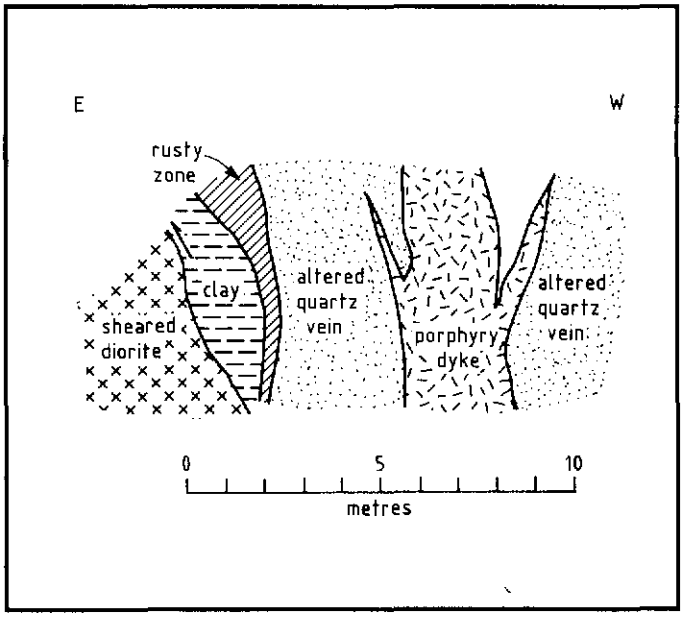
nic contents of these second phase veins also show a wide variation. Trenching on the Eliza Creek zone in 1989 exposed two veins with widths of more than 11 and 22 m. These veins consist of quartz, clay, and iron and manganese oxides and resemble the second phase veins of the Willow Creek zone. They differ from the Willow Creek veins mainly in their greater width and different host rock, which consists of sheared, fine grained diorite. The Eliza Creek veins are associated with wide areas of clay-altered porphyry. Trench E-16 (1990) exposed more than 14 m of clay alteration, iron oxide, quartz vein and altered porphyry dyke material with a strong shear fabric oriented 120/73° southwest (Figure 4).

Excavations between the Willow Creek and Eliza Creek zones also show brecciated north and northeast-trending veins with abundant sulphides which cut a narrow rib of Paleozoic? schist and are offset in a left-lateral sense along cross faults trending 100°.

CURRENT WORK

Detailed geophysical and geochemical surveys in 1988 and 1989 proved extremely useful in accurately locating both first and second phase veins. Both sets of veins appear as magnetic lows. First phase veins were successfully distinguished by a strong VLF-EM surveys and a zinc-arsenic geochemical signature. Second phase veins showed no VLF response and were distinguishable by a Pb-Au geochemical signature. Both the Willow Creek and the Eliza Creek zones have been traced over a strike length of more than 1 km. Initial work on the Eliza Creek zone suggests that it is more than 152 m wide, and individual veins are considerably wider than the Willow Creek veins. Drilling to date has been limited due to poor core recovery in the soft oxide material, but the width and strike length indicates the potential for a large low-grade deposit. Preliminary metallurgical tests in 1988 yielded 100% recovery of gold from clay-altered veins and 85% recovery from sulphide veins.

Figure 4. Field sketch of part of trench # E-16, Eliza Creek zone (profile).



DISCUSSION

The major fault zones cutting the Goulter property are steeply dipping and are associated with a deep-seated regional fault with a strike length of at least 9.7 km based on Aurchem mapping and air photo interpretation. The veins pinch, swell and branch and the hanging wall or footwall of each vein is generally faulted. Silicified cappings on some of the veins contain tungsten and molybdenite, suggesting they are deep seated in origin. Drilling on the central part of the property outlined a central vertical vein flanked by veins to the east and west which dip toward the central vein and appear to converge at a depth of about 182-244 m. One possible interpretation of this kind of geometry is a flower structure associated with a compressional oblique-slip fault.

ACKNOWLEDGEMENTS

This report is based on several property visits by Northern Affairs geologists in 1989 and 1990, plus information generously supplied by Mark Langdon, Geological Manager, Aurchem Exploration Ltd in 1988 and 1989. Aurchem's assistance and hospitality is gratefully acknowledged.

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TEMPELMAN-KLUIT, D.J., 1984. Carmacks map-area: Geological Survey of Canada, Open File 1101

PART C

HYLAND GOLD

Trevor Bremner, Dennis Ouellette
NTS: 95 D 12
Coordinates: 60°30'N, 127°49'W
Area: Quartz Lake
Access: Floatplane/winter trail from Alaska Highway at Coal River
MINFILE #: 11
Company: Hyland Joint Venture (Silverquest Resources Ltd, NDU Resources Ltd, Adrian Resources Ltd)
Commodities: Gold

INTRODUCTION

The Hyland Gold prospect is a low-grade oxide gold deposit hosted by Proterozoic sedimentary rocks. The deposit is associated with an almost flat-lying siderite manto cut by anastomosing vertical faults. Possible open-pit reserves of 6 750 000 tonnes grading 2.0 g/t Au are inferred from trench assays. These will be updated based on rotary drilling carried out in 1990.

HISTORY

Liard River Mining Company staked the first claims and carried out preliminary exploration in 1954, including the drilling of 4 holes 2 km to the west of the present trenches. Hyland Joint Venture restaked the property in 1973, and subsequent work has included a gravity survey, detailed geochemistry, extensive bulldozer trenching, and 8 more diamond drillholes (679 m). In 1990, a winter road was constructed to the property from the Alaska Highway at Coal River, and more than 3 800 m of rotary drilling was done.

REGIONAL SETTING

Quartzite, limestone and phyllite of the Proterozoic or Lower Cambrian Hyland Group underlie the area.

GEOLOGY AND MINERALIZATION

Gold occurs in a thick layer of iron oxides and siderite at the contact between quartzite and phyllite of the Proterozoic Hyland Group and overlying limestone. The hanging wall limestone is confined to the south part of the property and dips to the south at a low angle. A generalized stratigraphic column based on drill sections is shown in figure 1.

Siderite occurs (a) as massive replacement bodies up to 20 m thick in limestone; (b) in a layer 1-2 m thick at the limestone-quartzite contact; (c) in quartz-siderite veins in phyllite and quartzite beneath the limestone. Sulphides occur (a) in siderite lattices in the limestone; (b) in a massive sulphide band at the limestone-quartzite contact; (c) disseminated in the footwall phyllite and quartzite, and in quartz-carbonate veins in the footwall rocks. The massive sulphide consists mainly of pyrite with little lead or zinc.

Within the siderite and oxide layer, the gold appears to be concentrated along a series of anastomosing north-striking faults about 3 m wide. The major zone of north-trending faults is outlined at surface by a strong gold anomaly which trends 010°. Anomalous levels of antimony and bismuth occur with the gold. Surface oxides extend to a depth of 15-60 m (average 30 m), and show supergene enrichment. The major north-south structure extends through the Cuz property (Minfile #33) which lies 2 km to the south.

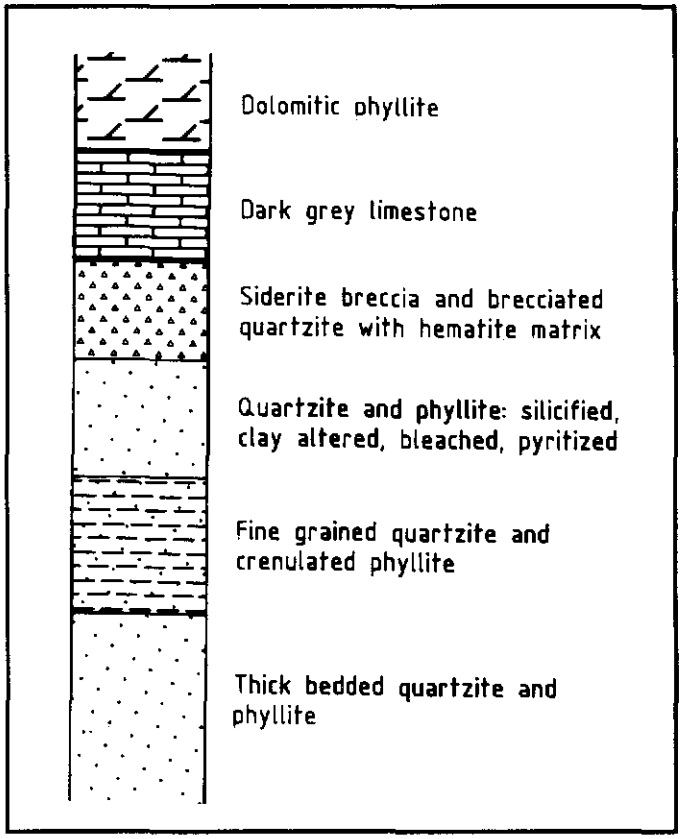

Figure 1. Generalized section based on rotary drilling.

The property was visited briefly by T. Bremner and D. Emond in March, 1990 and again by T. Bremner and D. Ouellette in July, 1990. Low angle structures in trench oxides (Figure 2) suggest that the mineralized horizon may have formed by replacement along the brecciated sole of a south-dipping thrust fault which is evident in outcrop along Pyrite and Quartz Creeks on the adjoining McMillan property 5.6 km to the west (Minfile #6). The predominance of pyrite over lead and zinc on the Hyland Gold property may reflect a lateral zonation between the McMillan and Hyland Gold showings. A curved low angle fault plane exposed in Trench #36 appears to have formed a ramp over an open south-plunging anticline with an axis which plunges 11° to 202°. North-trending structures may be tear faults at right angles to the low-angle structure.

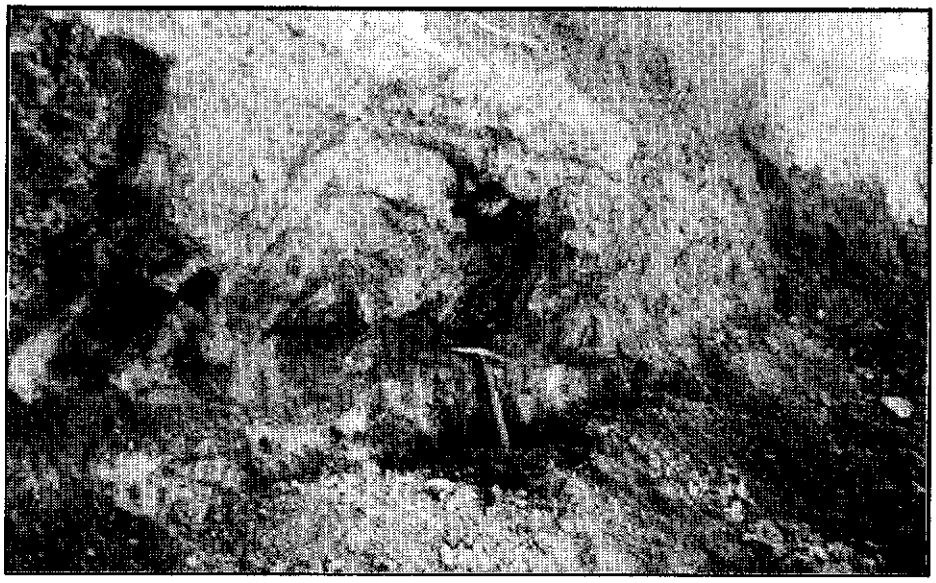

Figure 2. Horizontal structures cutting gold-bearing oxide material, trench #36.

CURRENT WORK AND RESULTS

Rotary drilling in 1990 expanded the target area considerably. Drillholes consistently encountered a pyritic zone 15 to 21 m thick which dips at a low angle to the south beneath the hanging wall limestone. The pyritic zone is anomalous in arsenic.

ACKNOWLEDGEMENTS

Jack Dennett and Kel Sax (Archer, Cathro & Associates (1981) Ltd) provided information and tours of the property. Their hospitality is gratefully acknowledged.

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PART C

KING ARCTIC

Trevor Bremner, Dennis Ouellette
NTS map sheet: 105 H 3
Coordinates: 61°17'N, 129°47'W
Area: Campbell highway
Access: 4WD road from Campbell Highway
MINFILE #: 14
Company: Max Rosequist
Commodities: Jade

INTRODUCTION

Nephrite occurs with sheared ultramafic rocks along the Campbell Highway. For the past several years, small-scale mining on the King Arctic property has been carried out by Max Rosequist during the summer months. D. Ouellette and T. Bremner visited the property briefly in 1990.

EXPLORATION HISTORY

Details of previous work on the property were compiled by Archer, Cathro & Associates (1981) Ltd and are documented in the Yukon Minfile. The property was first staked in 1964 by P. Risby and B. Lindstrom and has since changed hands several times. Past exploration includes road construction and bulldozer trenching in 1975 and 102 shallow drillholes (51.5 m) in 1976. The present owner began sawing jade boulders in 1988 and sent a 70 tonne shipment to China in 1989.

REGIONAL GEOLOGY

The claims cover highly sheared limestone, argillite and serpentinite of the Anvil-Campbell allochthon, 3.2 km west of the Campbell highway near the south end of Frances Lake.

GEOLOGY AND MINERALIZATION

Nephrite (twisted-fibre tremolite) occurs in 5m x 2m lenses distributed intermittently over a total strike length of possibly 500 metres along the base of at least two south-dipping thrust faults which juxtapose masses of sheared, pale green serpentinite of probable Permo-Triassic age, and Permo-Pennsylvanian limestone and argillite (Figure 1). The thrust faulting is believed to be Late Triassic in age, and was accompanied by folding about axes which plunge toward the south-southeast at a low angle. Segments of the thrust faults are separated by subvertical tear faults with strike slip offset, which strike east-northeast. These tear faults are marked by strong topographic lineaments and quartz-carbonate lenses at right angles to the main structural trend. At least seven jade lenses have been mined (Max Rosequist, personal communication). The jade lenses are encased in envelopes of quartz-carbonate and green mica alteration (rodingite) which show a gradational contact with adjacent serpentinite.

The lowermost jade lens is about 15 m long and 5 m thick (Figure 2), and is oriented 026/30°W, subparallel to bedding in the hanging wall argillite. Slickensides in the footwall serpentinite plunge approximately 13° to 240° and are consistent with northeast-directed thrust faulting.

Two other jade lenses were examined. One of these, measuring about 10 m long and 1.5 m thick and striking 170° and dipping 50° west, was surrounded by an envelope of rodingite. The uppermost lens, approximately 1 m thick, outcrops immediately below the ridge, lies in the axis of an overturned fold and is separated from overlying serpentinite by a thin rodingite envelope. The rodingite shows a gradational contact against the serpentinite (Figure 3).

Figure 1. Sketch map of the King Arctic jade property.

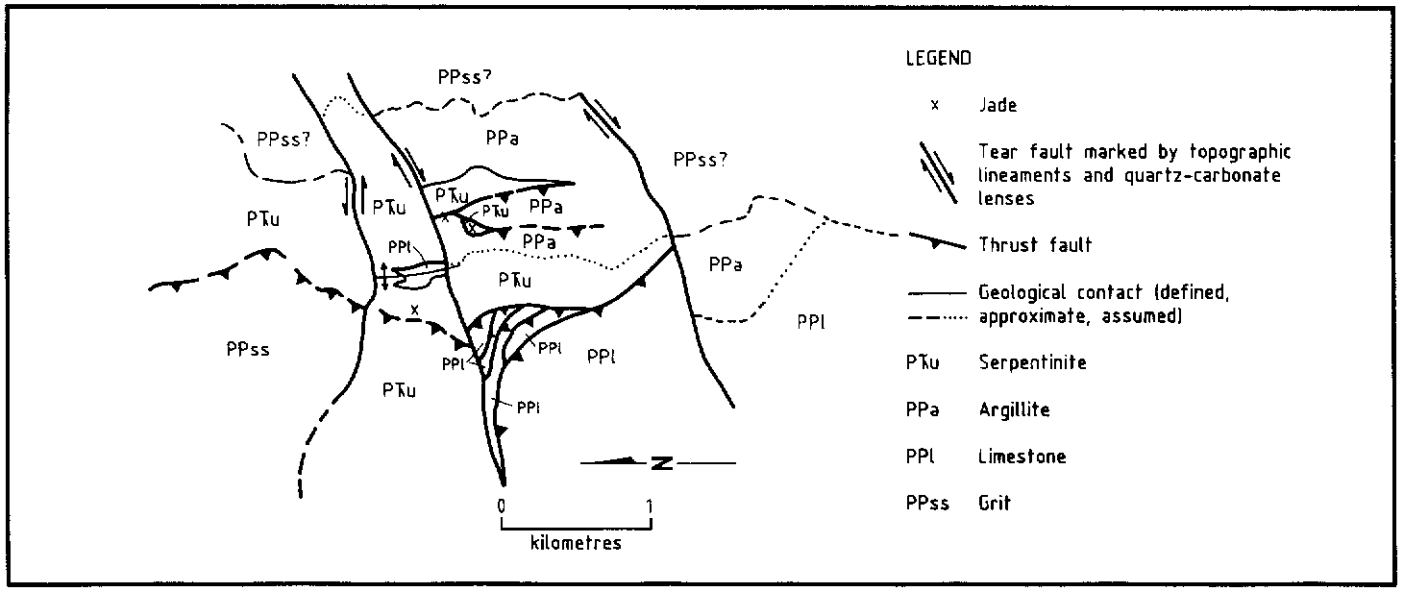

Figure 2. Lowermost jade lens, up to 5 m wide, exposed over a strike length of 15 m. Massive argillite forms hanging wall, slickensided serpentinite forms footwall.

CURRENT WORK

Seventy tonnes of jade were produced in 1989 and 40 tonnes in 1990. The price of jade currently varies between about $2.00 and $7.00 per kg depending on quality.

ACKNOWLEDGEMENTS

This report includes information derived from the Geological Survey of Canada publication "Jade in Canada", and other information supplied by Max Rosequist, owner of the property. Diane Emond contributed information from a property visit in 1989. Grant Abbott edited the text.

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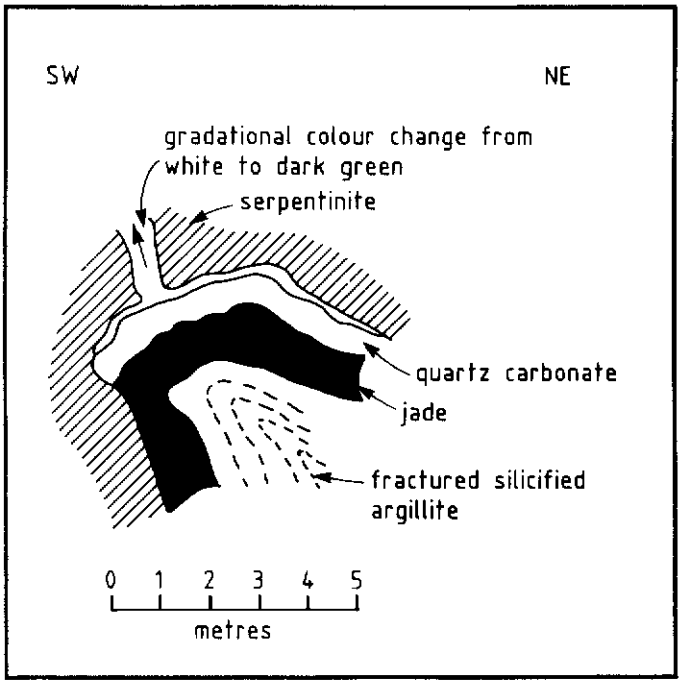
LEAMING, S.F., 1978. Jade in Canada: Geological Survey of Canada, Paper 78-19

Figure 3. Field sketch (profile) of uppermost jade showing.



LOGAN

Trevor Bremner
NTS: 105 B 9
Coordinates: 60°30'N, 130°28'W
Area: Rancheria district
Access: Airstrip on property, winter road from Alaska Highway at kilometre 1106.
MINFILE #: 99
Company: Total Energold Corp.
Commodities: Zinc, silver

INTRODUCTION

Sphalerite and tetrahedrite occur with arsenopyrite and minor chalcopyrite and galena in a tabular, fault-bounded body which cuts granitic rocks of the Cassiar batholith. Diamond drilling between 1986 and 1988 outlined a deposit 1 100 m long and 50-100 m wide containing geological reserves of 12.3 million tonnes grading 6.17% Zn and 26 g/t Ag. These reserves are amenable to open pit mining and the deposit is open to depth.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. Regional Resources Ltd staked the first claims in 1979. Getty Canadian Minerals Ltd became a joint venture partner in 1984. The Regional Resources interest was transferred to Fairfield Minerals Ltd and Total Energold Corp. acquired Getty's interest in 1989. Work on the property to the end of 1988 includes geological mapping, geochemical sampling, magnetic, EM and IP surveys, trenching, construction of an airstrip and a total of 103 diamond drillholes (16 439 m).

REGIONAL SETTING

The property covers granitic rocks of the Cretaceous Marker Lake Batholith and a pendant of Lower Cambrian metasedimentary rocks which include muscovite and biotite schist and gneiss, and interbedded quartzite.

GEOLOGY AND MINERALIZATION

Zinc and silver occur in three zones along a northeast-trending fault which has been traced for more than 8 km. The Main Zone deposit is contained in a tabular, fault-bounded body 1100m long and 50 to 100m wide which strikes 060° and dips at 64-70° to the north-northwest. Quartz veins, stockworks, breccia bodies and silicified zones in highly altered granodiorite and felsic dykes contain coarse-grained sphalerite and smaller amounts of pyrite, arsenopyrite, cassiterite, pyrrhotite and galena.

Trenches, roadcuts and some drill core were briefly examined during a 1-day visit to the property in 1990. Trenches expose a wide zone of silicified, clay and sericite-altered breccia with fragments of pegmatite and graphic granite in a clay-sericite-muscovite-biotite matrix which also contains large amounts of coarse black sphalerite and is heavily manganese stained. The hanging wall consists of a graphic-textured pegmatite. The footwall consists of a massive clay-altered or silicified felsic

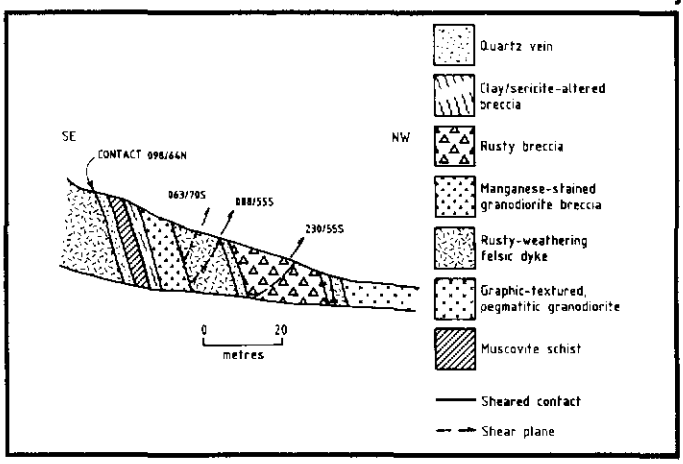
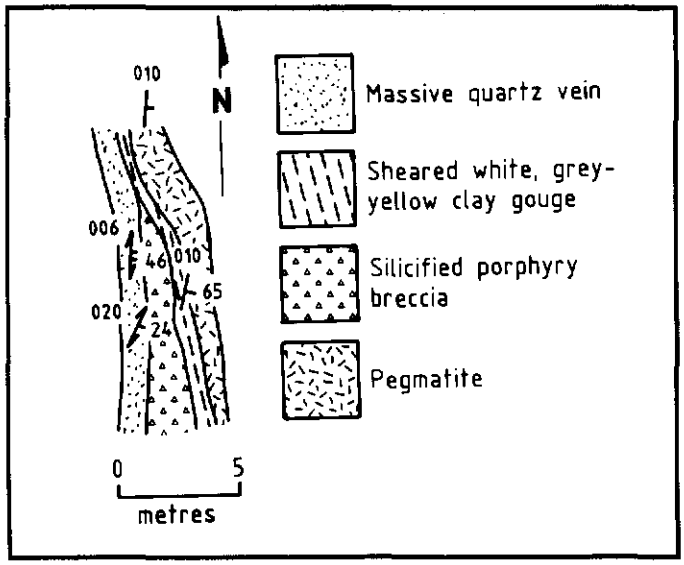


Figure 1. Profile (field sketch) along trench # 88-L-15.

ke. In Trench #88-L-15 (Figure 1), the footwall contact is complex, with quartz veins, muscovite schist, pegmatite breccia and felsic dykes juxtaposed over a width of at least 22 m. In Trench #88-L-812, the footwall contact appears simpler, but consists of a wide zone of sheared, clay-altered rhyolite, overlain by a wide zone of clay-altered breccia with extremely coarse mica.

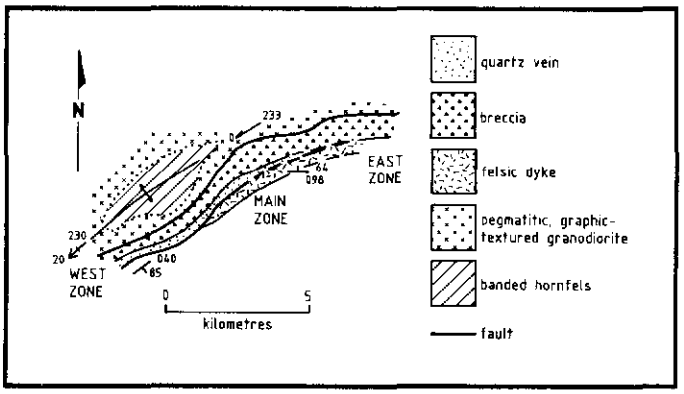
Faults and quartz veining are also exposed by a roadcut near drillsite 88-L-87 on the west zone (Figure 2). On the footwall side of the road, a massive quartz vein is overlain by felsite breccia, which is silicified adjacent to the vein, and clay-altered adjacent to a shear zone filled with clay gouge which separates it from pegmatitic graphic-textured granodiorite on the hanging wall side. The silicified breccia contains angular rhyolite clasts up to 5 cm across in a fine-grained chalcedonic matrix.

Figure 2. Field sketch showing detail of shear zone near drillsite 88-L-87 (plan view).



At the extreme west end of the Logan property, the pegmatite contains vugs filled with 5 cm euhedral quartz crystals. A strong shear foliation in the pegmatite strikes 040° and dips 85° south. Mesoscopic folds in a roof pendant of banded quartzofeldspathic hornfels plunge southeast at a low angle, parallel to the trend of the Logan zone, and, perhaps coincidentally, have axial planes which are subparallel to the shear foliation in the intrusion (Figure 3).

Figure 3. Simplified field sketch of Logan property geology.



DISCUSSION

Abbott (1985) noted that faults exert a strong control on the form and location of mineral deposits in the Rancheria area, which are generally associated with faults, dykes and breccias. He proposed that faults may have controlled both the sulphide deposition and late-stage intrusive activity. He proposed that the east-west faulting may be a secondary effect related to right lateral movement on major northwest-trending strike-slip faults during the Late Cretaceous or Early Tertiary. The Logan is one of the clearest examples of structurally controlled deposits in the area, based on the association of the mineralization with fractured and brecciated rock and late-stage quartz veins in the fault zone.

Germann (1989) used arsenopyrite geotherm-ometry to establish formation temperatures in the range 335-385°C, and presented fluid inclusion evidence that the mineralizing fluids are not wholly magmatic in origin. On the basis of the complex mineralogy of the Logan deposit and the presence of cassiterite and fluorite, plus the pervasive quartz-sericite alteration, Basnett (1990) suggested the mineralization formed from mixed meteoric and magmatic fluids transported upward along a wide fault zone above a buried molybdenum-tungsten porphyry system.

Examination of drill core from DDH 87-L-31 showed a quartz vein with sphalerite and chalcopyrite crosscutting red and green breccia, implying that if the breccia is a diatreme, the explosive activity predated the mineralization. Most of the breccia clasts appear to consist of pegmatitic granodiorite which is probably a late phase of the Marker Lake batholith, and the shearing and introduction of the quartz veins in the fault zone may be considerably younger, possibly correlative with the felsic dykes on the property which may be related to 52 million year-old intrusions reported in the area (Abbott, 1985). Sphalerite mineralization appears to be coeval with the emplacement of the quartz, as sulphide stringers crosscut and are cut by quartz veinlets in the drill core. Radiometric dating of the sulphides, the alteration and the different intrusive phases would be helpful in further understanding the origin of this deposit.

CURRENT WORK

No work was done on the property in 1990.

ACKNOWLEDGEMENTS

T. Bremner spent one day on the property in 1990 and is grateful to Richard Basnett and Total Energold Corporation for permission to visit. Grant Abbott edited the manuscript and provided useful discussion.

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POOLE, W.H., RODDICK, J.A., and GREEN, L.H. 1960: Wolf Lake, Yukon Territory. Geological Survey of Canada, Map 14-1982

PART C

LONE STAR

Bill LeBarge, Trevor Bremner
NTS: 116 B 3
Coordinates: 63°54'N, 139°14'W
Area: Klondike district
Access: Bonanza Creek road
MINFILE #: 72
Company: Arbor Resources Ltd
Commodities: Gold

INTRODUCTION

The Lone Star property covers a large number of gold and silver-bearing mesothermal quartz veins which are believed to be the main source of gold placers in the Klondike area (J. Mortensen, personal communication). However, recent rotary drilling in the Boulder Lode area has intersected a concordant, rusty zone 200 m long and up to 31 m thick which has the potential for a bulk tonnage oxide gold deposit. Some of the better drill intersections include 2.7 g/t Au over 7.6 m and 5.4 g/t Au over 6.0 m in drillhole 90-R-8, 4.5 g/t Au over 12.1 m in drillhole 90-R-9 and 3.3 g/t Au over 12.2 m in drillhole 90-R-11.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The Boulder Lode was first discovered in 1897, and 7650 tonnes were mined underground between 1912 and 1914. Sporadic activity over the next 65 years included a 230 m drift below the old workings in 1929-1931, a 27.2 tonne bulk sample in 1941, and a small amount of core and rotary drilling. Dawson Eldorado Gold Exploration Ltd acquired and expanded the property in 1979 and carried out a program of geochemical sampling, geological mapping, a resistivity survey, trenching and rotary drilling (6 holes-168 m) between 1980 and 1985. Arbor Resources optioned the property in 1986. Arbor's work to the end of 1988 included geological mapping, geochemical, ground magnetometer, VLF, EM and IP surveys, airborne magnetic and EM surveys, bulldozer trenching and more than 69 diamond drillholes totalling 7459 m and 110 rotary drillholes totalling 9917.7 m, including 1094 m of diamond drilling and 1324.4 m of rotary drilling in the immediate Boulder Lode area.

REGIONAL SETTING

An excellent map of the area has recently been published by Mortensen (1990). The property is underlain by quartz-muscovite augen schist of Permian age, commonly referred to as the "Klondike Schist". The schist contains bodies of quartz monzonite orthogneiss and serpentinite bodies which outline major regional thrust faults, and is cut by late mafic dykes. A graphitic horizon in the schist outcrops along both sides of Bonanza Creek and forms a good marker in the area (Figure 1).

GEOLOGY AND MINERALIZATION

The Boulder Lode is a gold-bearing quartz vein which strikes 120° and dips 30-40° north. Wall rock alongside the vein is silicified, and visible gold is found in the margins of the vein or in narrow pyrite veins. Near the Lone Star vein, an oxidized gold deposit occurs along a low angle thrust fault which strikes 110° and is cut by a north-trending vertical fault. The thrust fault has placed Klondike augen schist of Permian age over quartzite and porphyry (J. Mortensen, personal communication). Gold flakes appear to form a halo around pyrite veins, which form about 1% of the deposit. Some of the better drill results are given above. The Lone Star deposit is overlain by a 2 km long zone of anomalous soil which returns values higher than 35 ppb Au. The most distinctive geological and geophysical marker in the area is a graphitic horizon which outcrops 1 km downhill from the top of the Lone Star soil anomaly. It is not yet evident whether the graphite layer is stratigraphic or marks a thrust fault which crosscuts the stratigraphy at a low angle.

In 1990, Arbor Resources acquired several other properties covering mesothermal quartz veins in the Bonanza and Hunker Creek areas. The Violet vein, exposed by 1990 trenching, is a 1.5 m quartz vein with minor galena and barite at the mylonitized contact between orthogneiss and a mafic dyke. The Mitchell vein contains visible gold along with rutile and coarse pyrite, which has replaced euhedral magnetite porphyro-blasts. The vein is surrounded by a pyrite halo in the chlorite schist wall rock. The Sheba vein is 1.5 m thick and contains abundant galena and chalcopyrite and up to 10 285 g/t Ag. It was mined by J. Erickson in 1988. The main vein strikes 170° and dips 41° east. Chlorite schist in the footwall is sheared up to 1 m away from the contact. Muscovite from the centre of the vein yielded a K-Ar age of 140 million years for the mineralization (J. Mortensen, personal communication). A 2967 kg bulk sample shipped to the Trail, B.C. smelter in early 1988 contained an average of 34.0% Pb, 2.0% Cu, 6728 g/t Ag, 1.0 g/t Au and 0.9% Sb.

CURRENT WORK

Rotary-percussion drilling was undertaken in 1990 to further delineate the Lone Star oxide deposit and test geophysical targets in the Bonanza Creek area. The best intersections for rotary drillholes 90-R8 to 90-R17 are tabulated below:

DRILLHOLE	AU (G/T)	THICKNESS (M)
90-R-8	2.7	7.6
90-R-8	5.4	6.0
90-R-9	4.5	12.1
90-R-11	3.3	12.2
90-R-14	2.8	7.6
90-R-15	24.7	1.5
90-R-16	2.1	6.1
90-R-17	8.8	1.5

ACKNOWLEDGEMENTS

B. Lebarge and T. Bremner visited the property with Jim Mortensen (Geological Survey of Canada) and Scott Tomlinson (Arbor Resources Ltd) in 1990. The generosity of Jim Mortensen and Scott Tomlinson in sharing their extensive knowledge of the area is greatly appreciated. Art Troup and Scott Tomlinson of Arbor Resources kindly edited the manuscript and supplied additional information. Grant Abbott also reviewed the manuscript.

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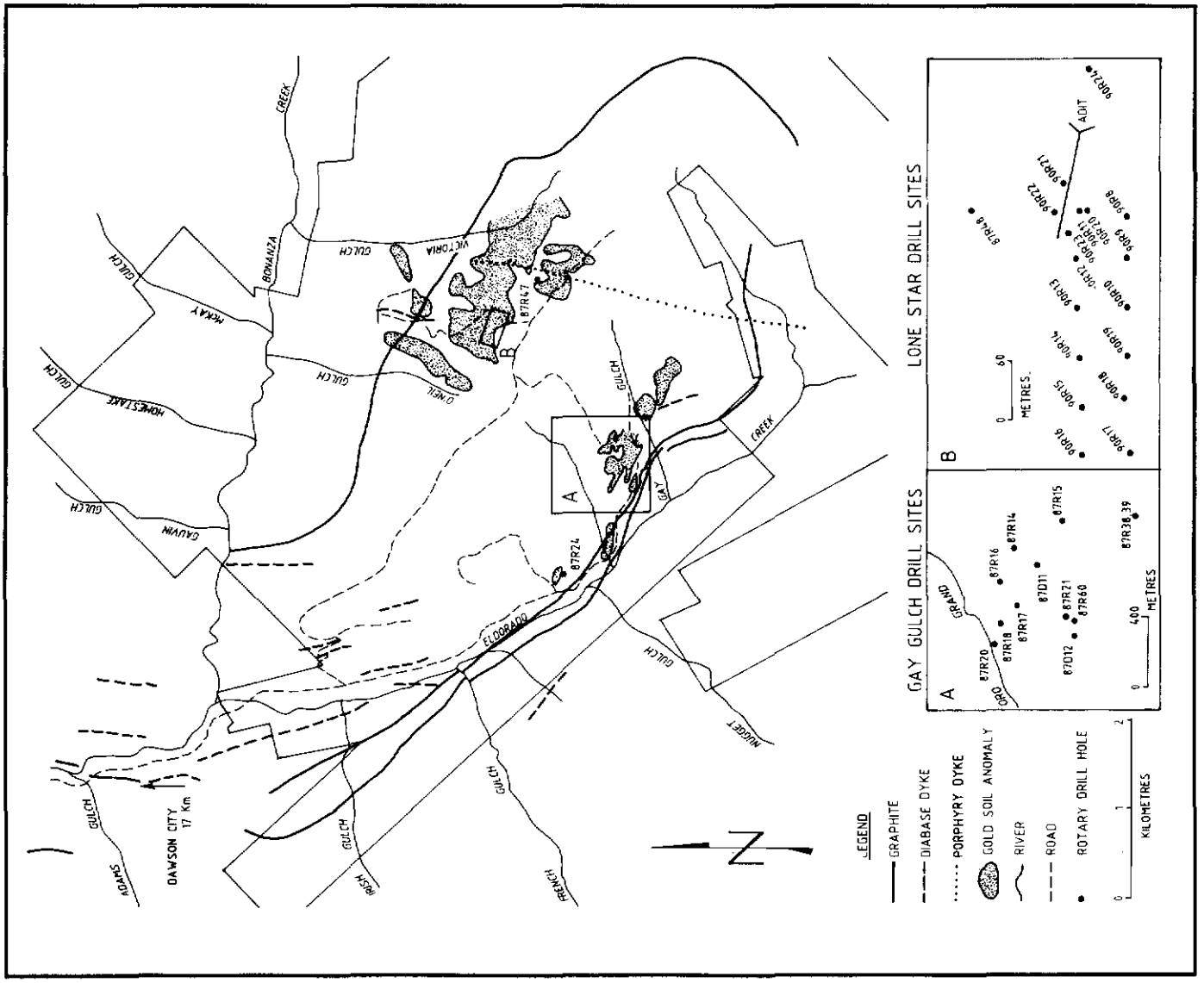
MORTENSEN, J.K., 1990. Geology and U-Pb geochronology of the Klondike district, west-central Yukon Territory. Canadian Journal of Earth Sciences, volume 27, p. 903-914

Figure 1. Compilation map of Lone Star area, courtesy of Scott Tomlinson, Arbor Resources.



PART C

MCMILLAN

Trevor Bremner
NTS: 95 D 12
Coordinates: 60°30'N, 127°57'W
Area: Quartz Lake
Access: Floatplane/winter trail from Alaska Highway at Coal River
MINFILE #: 6
Company: Noranda Exploration Co. Ltd
Commodities: Zinc, lead, silver

INTRODUCTION

The McMillan deposit contains 1.1 million tonnes grading 8.3% Zn, 4.1% Pb and 62 g/t Ag in a manto-like replacement deposit in the Proterozoic/Lower Cambrian Hyland Group at the sheared contact between carbonate rocks and underlying shale. A smaller deposit 300 m to the south contains a further 0.4 million tonnes grading 9.3% Pb, 1.7% Zn and 214 g/t Ag. These deposits appear to lie in the footwall of a southward-dipping thrust fault which extends eastward toward the Hyland Gold property.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The initial discovery is believed to date back to 1892. K. McMillan restaked the area in 1948 and sold the claims to Noranda, one of the present owners. Adjoining claims were staked in the area by Fort

Figure 1. Geological sketch of the Quartz Lake area, based on mapping by Noranda (1975), Abbott (1985), and field observations by Bremner, (1990).

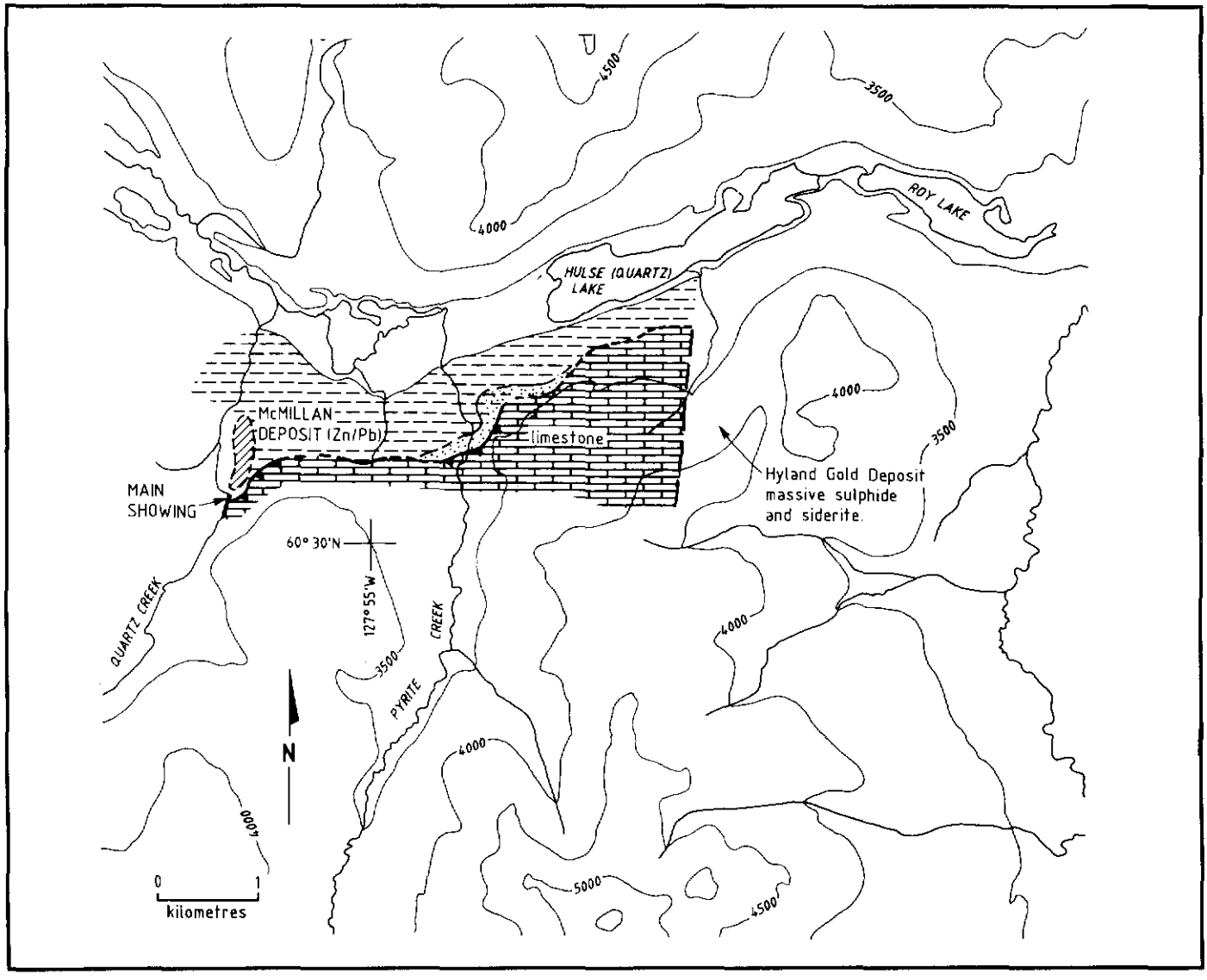
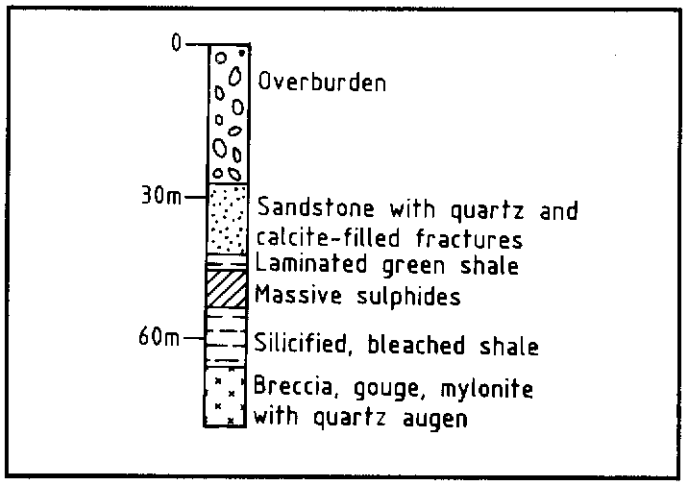


Figure 2. Field log of DDH #130, showing lithologic sequence on McMillan property.



Reliance Minerals Ltd and partners. Exploration of the two properties by both groups since 1948 has included geochemical, airborne and ground geophysical surveys and a total of 190 diamond drill holes (13 806 m).

REGIONAL SETTING

Proterozoic or lower Cambrian sedimentary rocks of the Hyland Group underlie the area. These include maroon and green argillite, quartzite and limestone, cut by steep north-striking faults and low-angle thrust faults.

GEOLOGY AND MINERALIZATION

Massive sphalerite, galena and pyrite occur along the sole of a thrust fault which separates massive grey limestone and quartzite from bleached, silicified and clay-altered phyllite (Figures 1,2). This fault was named the "Black Fault" by Noranda geologists, and forms the base of the mineralized horizon in most of the drillholes. The fault plane is irregular, but where exposed in Quartz Creek appears to strike about 125° and dips about 16° south. Thin massive sulphide layers form envelopes around duplexes of sheared, silicified phyllite and are cut by sulphide-filled tension fractures oriented at 010/85° E (Figure 3). A large pod of manganese-stained quartz-sulphide breccia can be seen at the north edge of the thrust fault (Figure 4), beneath an upper plate of limestone which has a strongly slickensided base pock-marked by irregular cavities. Orientation of shear foliations, drag folds and duplexes are consistent with north-directed thrust faulting (Figure 5a,b). However, away from the creek, drilling on the main zone has outlined a massive sulphide body 600 m long, 150 m wide and 2 to 30 m thick, which is elongated in a north-south direction and dips at a low angle to the east. This is consistent with a more westerly component of thrusting. Noranda geologists mapped a north-trending anticline in the area, and fractures axial planar to this fold may have partly controlled emplacement of the sulphides.

Figure 3. Quartz-filled tension fractures cutting massive sulphide at contact between rusty, brecciated limestone (above) and bleached phyllite (below). Note angular discordance between foliations above and below the sulphides.

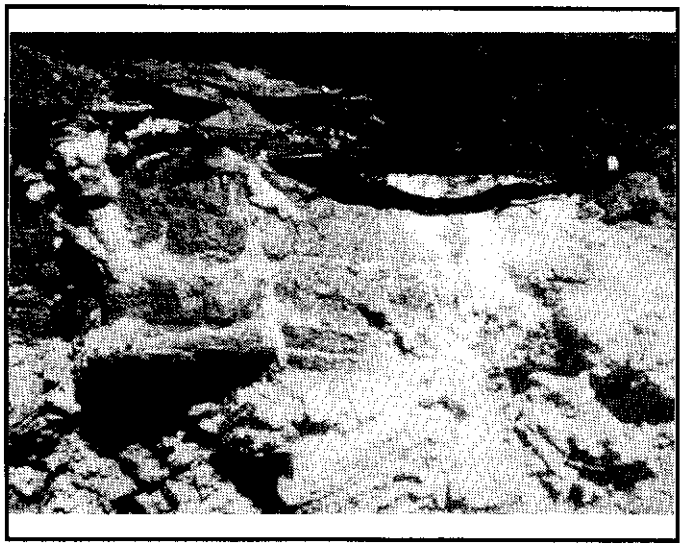
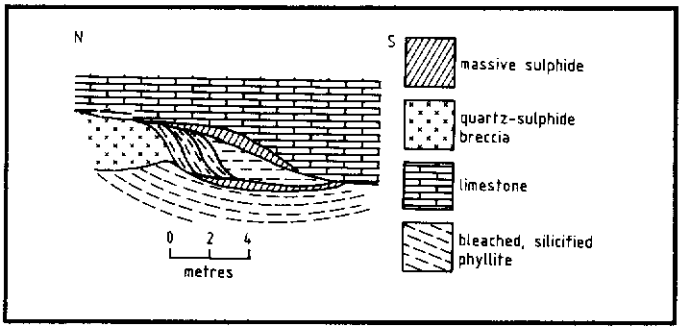


Figure 4. Field sketch of main showing, east bank of Quartz Creek.



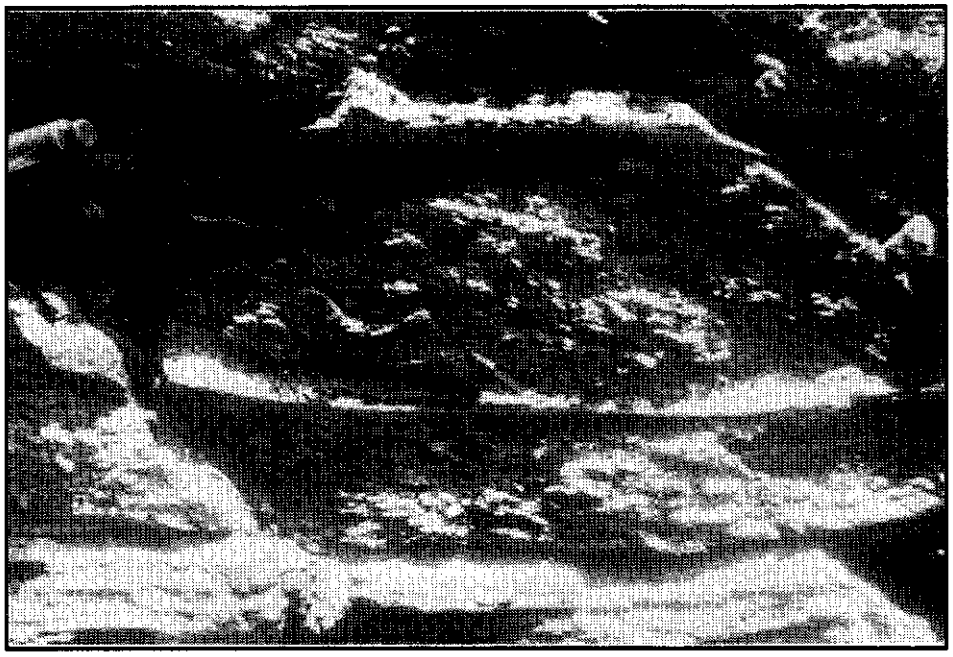
A low-angle structure which is possibly an extension of the "Black Fault" was mapped by Noranda geologists in Pyrite Creek on the east side of the property, where a conspicuous gossan occurs at the contact between massive quartzite and sheared argillite. Here the fault plane strikes northeast and dips to the southeast, consistent with northwest-directed thrusting. This fault is believed to extend eastward onto the adjacent Hyland Gold property of NDU Resources.

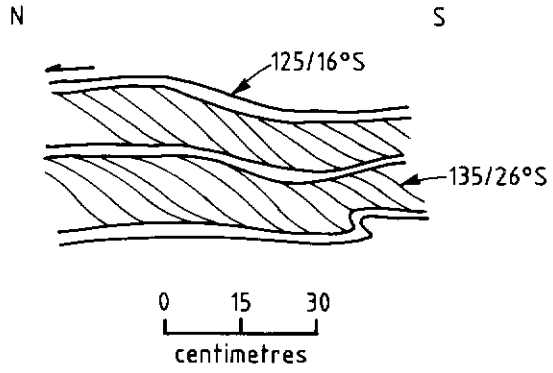
A lead isotope age of 100 million years was obtained for galena samples taken from the McMillan deposit by P. Vaillancourt in 1981. This is consistent with an epigenetic origin.

CURRENT WORK

Noranda Exploration Co. Ltd spent one week on the property in 1990.

Figures 5a,b. Photograph and field sketch of shear fabric in silicified, bleached phyllite in footwall of main showing.





ACKNOWLEDGEMENTS

T. Bremner briefly examined the discovery showing and core from two diamond drill holes in 1990, and gratefully acknowledges help supplied by Jesse Duke and Danielle Heon of Noranda Exploration Co. Ltd who provided information on the geology and access to company maps. Grant Abbott provided annotated air photos and field notes based on his mapping in the area in 1985 and kindly edited the text.

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MARG

Bill Lebarge, Grant Abbott, Trevor Bremner
NTS:106 D 1
Coordinates: 64°01'N, 134°28'W
Area: Mt Westman
Access: Airstrip on property
MINFILE #: 9
Company: NDU Resources Ltd, Cameco
Commodities: Copper, lead, zinc, silver

INTRODUCTION

The Marg deposit consists of four stacked massive sulphide lenses hosted by Devono-Mississippian felsic metavolcanic rocks. Based on 1988 and 1989 diamond drilling, reserves are estimated at 2.86 million tonnes grading 1.62% Cu, 2.25% Pb, 4.17% Zn, 55.9 g/t Ag and 0.89 g/t Au. The calculated reserves occur in a block 503 m long, 6.1 m thick and with a downdip extent of 305 m. Nine more widely spaced holes which were drilled in 1990 outside the main reserve block more than doubled the strike length and the downdip extent of the deposit.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. Canadian Superior Exploration Ltd staked the initial claims in 1965 based on a Geological Survey of Canada silt anomaly, and since then the property has been restaked twice, most recently as the TUDL claims by ZX Joint Venture in 1982. All-North Resources acquired a 2/3 interest in the property in 1986, and sold its interest to NDU Resources in 1987. Noranda Exploration Co. Ltd acquired a 1/3 interest from NDU in 1989 which it subsequently relinquished. The other 1/3 interest is held by Cameco, the descendant of one of the ZX Joint Venture partners who staked the property in 1982. Exploration prior to 1982 included soil sampling, mapping and trenching. Exploration between 1982 and 1990 included construction of an airstrip, mapping, soil geochemical, VLF, magnetometer, max-min and pulse-EM surveys and a total of 47 diamond drillholes (approximately 12123.7 m).

REGIONAL SETTING

The area was mapped at a 1:50 000 scale by G. Abbott (DIAND) in 1989. A series of south-dipping thrust faults has imbricated Mississippian Keno Hill Quartzite with graphitic phyllite, quartz-sericite schist and chlorite schist which are now recognized as part of the Devono-Mississippian Earn Group. This narrow belt is bounded to the north by Jurassic? to Devonian black shale and sandstone, and to the south by the Robert Service Thrust which places siliciclastic rocks of the Proterozoic and Lower Cambrian Hyland Group above the Devonian and Mississippian rocks.

GEOLOGY AND MINERALIZATION

The Marg deposit includes four polymetallic sulphide lenses in a thrust fault-bounded package of alternating graphitic shale and green quartz-sericite-chlorite phyllite layers. The green phyllite is carbonate-altered and contains quartz eyes which are interpreted as relict phenocrysts. The sulphide lenses are concordant and occur along black shale-phyllite contacts.

No sulphides are seen on surface due to oxidation which extends to a depth of 20 m. However, surface indications of the deposit include a 1200 x 300 m copper-lead-zinc soil anomaly, a banded limonite gossan with banding which is conformable with foliation, and a transported gossan in a creek draining the deposit.

From bottom to top, the sulphide lenses are designated A, B, C and D, with the upper, or "D" zone being the most continuous, and also the thickest (up to 23 m). The sulphide lenses strike east-northeast, dip 55-60° southeast, and are elongated in a downdip direction. Along strike, they grade into massive carbonate.

In drill core the sulphides consist of banded, very fine grained pyrite, sphalerite, galena and chalcopyrite with minor arsenopyrite and tetrahedrite. Turner and Abbott (1990) described a concentric zoning of metal ratios and alteration minerals and commented on the absence of a barite halo around the deposit.

CURRENT WORK

Exploration in 1990 consisted of 9 diamond drill holes totalling approximately 4267.2 m. These holes located outside the main reserve block increased the mineralized strike length by 701 m and the downdip extent by 488 m.

ACKNOWLEDGEMENTS

B. Lebarge and T. Bremner visited the property in 1990, and are grateful to Mary McLellan (Archer, Cathro & Associates (1981) Ltd) for explaining the property geology, and to personnel at the Archer, Cathro camp near Keno City for their hospitality.

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PART C

MATT BERRY

Trevor Bremner, Dennis Ouellette
NTS: 105 H 6
Coordinates: 61°29'N, 129°24'W
Area: Frances Lake
Access: Floatplane
MINFILE #: 21
Company: Barytex Resources Corp.
Commodities: Lead, zinc, silver

INTRODUCTION

The Matt Berry deposit consists of roughly concordant layers of massive galena, sphalerite, pyrrhotite and chalopyrite in Paleozoic phyllite. Drill-indicated reserves in 1979 were calculated at 533 434 tonnes grading 6.1% Pb, 4.8% Zn and 102.9 g/t Ag. The mineralization appears to have replaced the host phyllite along a narrow shear zone which strikes northnorthwest and dips at a moderate angle to the east. Geochemical and geophysical surveys in 1987 outlined a new exploration target 1 km along strike to the southeast.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The original showing is in a creek canyon near the lake shore and is believed to have been discovered before 1887. It was restaked by A.K. Money in the late 1930's and optioned to Cominco in 1943. Since then it has been restaked several times, and explored by a variety of companies with soil sampling, magnetic and gravity surveys, EM, soil geochemistry, trenching and 38 diamond drill holes totalling 3853.9 m. The present owner is Barytex Resources Corp.

REGIONAL SETTING

The property is underlain by phyllite of the Devono-Mississippian Earn Group, and lies within 2 km of the contact of the Cretaceous Mt Billings batholith.

GEOLOGY AND MINERALIZATION

The main Matt Berry showing consists of three thin layers of massive galena, red-brown sphalerite and chalcopyrite in a narrow shear zone which cuts deformed phyllite of the Devono-Mississippian Earn Group. The shear zone, which is well exposed in a bulldozer trench above the discovery outcrop, strikes approximately 165° and dips 40° east. Duplexes of phyllite are surrounded by thin mas-sive sulphide or quartz-sulphide envelopes and thin zones of fault gouge (Figures 1,2). At least three main sulphide bands between 7.6 and 45.7 cm thick are exposed across a 9.1 m width, and have been traced about 300 m along strike. Fold axes in the host phyllite plunge about 18° to 345° and subvertical tension fractures strike east-west. Immediately east of the main showing, a galena-bearing quartz vein 0.6 m thick has been exposed by ground sluicing. The vein occupies a tension fracture which strikes 080° and dips about 83° north.

The discovery showing is a quartz-sulphide vein more than 1.5 m wide, which outcrops in the creek canyon on trend with the massive sulphide bands. The vein contains chalcopyrite, galena, sphalerite, and pyrrhotite. It strikes 170° and dips 65° east and appears to have formed where the shear zone steepens. Rubble from this location includes rusty, sulphide-cemented fault breccia containing numerous parallel quartz veinlets. Massive sulphide boulders in the area contain patches of coarse and fine-grained galena which suggest at least two stages of mineralization.

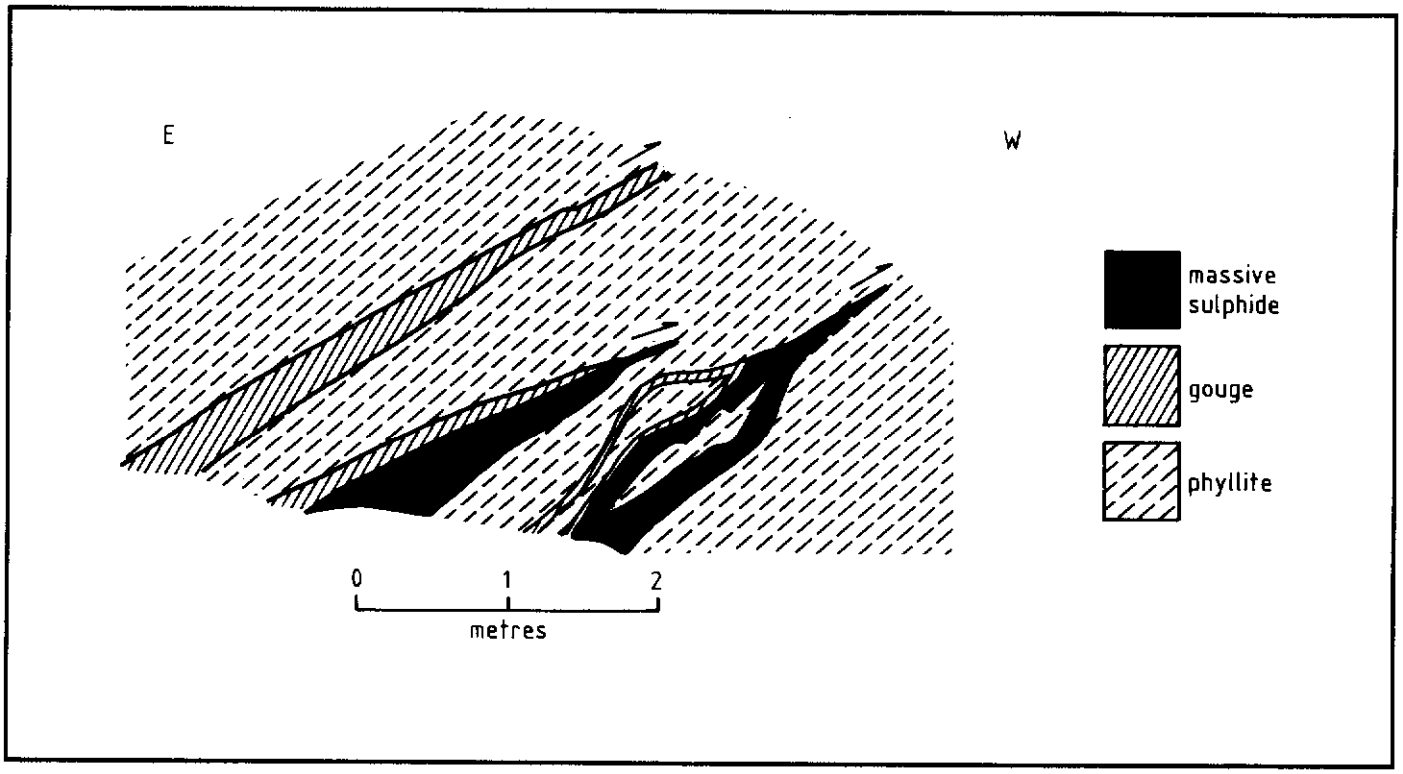
Structural evidence suggests that the Matt Berry deposit formed by replacement of brecciated phyllite along a zone of compressional faulting. The fault zone probably extends southeast through the 1987 anomaly.

CURRENT WORK

No work was done on the property in 1990.

Figure 1. Sulphide lens in sheared phyllite.

Figure 2. Field sketch of sulphide layers exposed in bulldozer trench above discovery showing (profile).



ACKNOWLEDGEMENTS
Thanks are due to Grant Abbott who edited the manuscript.

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MEL

Trevor Bremner, Dennis Ouellette
NTS: 95 D 6
Coordinates: 60°21'N, 127°24'W
Area: Otter Lake
Access: Airstrip on property, winter road from Alaska Highway at Contact Creek
MINFILE #: 5
Company: Breakwater Resources Ltd, Barytex Resources Corp.
Commodities: Zinc, lead, barite

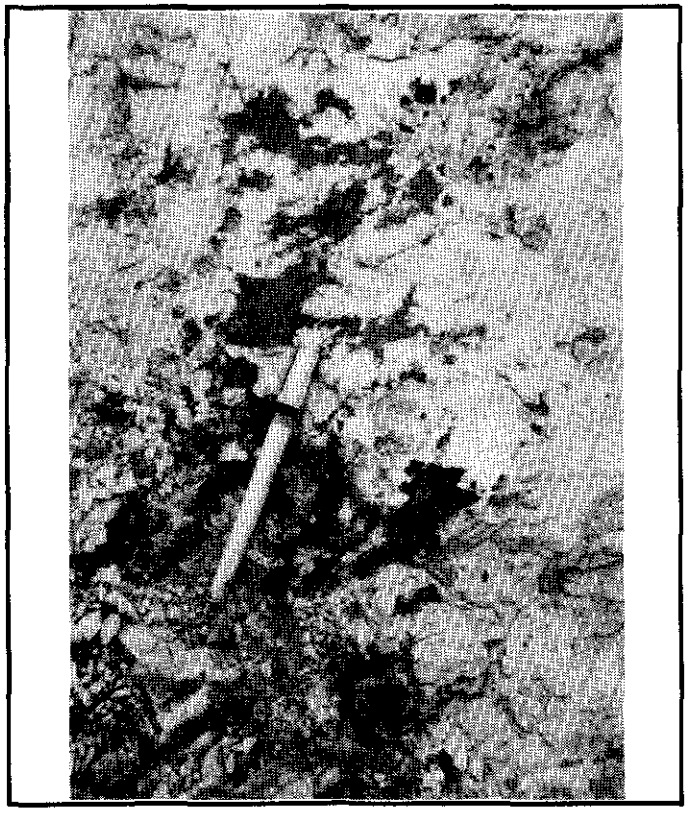
INTRODUCTION

The Mel deposit consists of a concordant, folded lens of barite and coarse recrystallized galena and sphalerite at the contact between Cambro-Ordovician limestone and shaly limestone. Based on diamond drilling since 1972, the deposit contains geological reserves of 6 200 000 tons grading 6.77% Zn, 1.92% Pb and 49.6% barite to a depth of 457 m. The mineralization is open to depth, and the higher grade part of the deposit lies below 305 m.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. J. Melnychuk and T. Flint first staked the property in 1967. Work by a number of different owners and joint venture partners between 1967 and 1989 included mapping, geochemical surveys, trenching, IP and gravity surveys and 48 diamond drillholes (8780 m).

Figure 1. Irregular patches of coarse grained galena and red sphalerite in massive barite.



REGIONAL SETTING

The area is underlain by Cambrian to Devonian carbonate rocks near the west edge of the Mackenzie platform, cut by Mesozoic east-directed thrust faults.

GEOLOGY AND MINERALIZATION

An excellent description of the Mel deposit was published by Miller and Wright (1986). The main zone mineralization consists of irregular blobs of coarse galena and sphalerite (Figure 1) in a folded barite lens 22 m thick and 800 m long, at the contact between cryptocrystalline limestone containing Lower Ordovician fossils, and overlying calcareous grey shale and silty limestone of the Rabbitkettle Formation (Figure 2). The barite lens is concordant with the host rocks and has been interpreted as a sedimentary exhalative deposit, although the original depositional textures have been obliterated by extensive recrystallization of the barite and remobilization of the sulphides. Where exposed at surface by recent trenching and stripping, the barite lens strikes 160° and dips 35-52° west. Miller and Wright determined that the deposit and the enclosing limy sediments are folded into an overturned syncline with a west-dipping axial plane. They also noted that the deposit and the overlying slate show a strong shear fabric both in outcrop and in thin section.

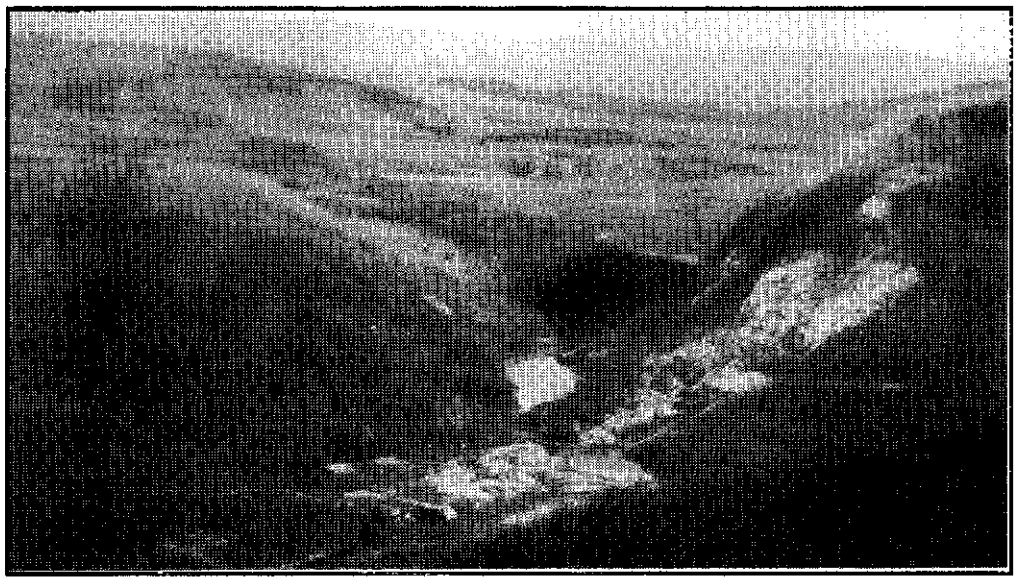
T. Bremner and D. Ouellette (DIAND) visited the property with Dave Miller in 1990, and were able to examine a large surface exposure which had been stripped and hydraulically cleaned at the site of a possible open pit (Figure 3). In detail, barite forms several lens-shaped bodies separated from the footwall limestone by a thin zone of anastomosing faults and strongly sheared, brecciated green shale containing barite and sulphides. The shear zone strikes approximately north-south, and a strong shear foliation oriented 172/79° W has overprinted bedding in the shale. East-west cross fractures dip steeply to the north.

CURRENT WORK

Fifteen shallow diamond drillholes (maximum depth 244.4 m) were drilled between October, 1989 and July 1990, including 5 in 1990, and the main deposit was exposed at surface in several new pits, for the purpose of confirming open-pittable reserves. The most significant hole was Hole #34, drilled at -60 east, which intersected 31.1 m grading 9.87% combined Zn-Pb in the upper part of the deposit, including 8.8 m averaging 18.9% Zn. True width of the zone at this depth is about 18.3 m. The infill drilling confirmed about 725 760 tonnes to a depth of 61 m.

Trenching and geochemical sampling were also carried out 7.5 km to the northeast on the JERI showing, a 4-5

Figure 2. View of Mel property looking west. Deposit extends from near bottom left corner of photograph through pond to stripped area (middle right). Cambro-Ordovician cryptograined limestone (overturned footwall) forms cliffs on right hand side of picture.



m thick smithsonite layer which lacks barite and sulphides, and occurs at the same stratigraphic horizon as the main MEL deposit. The smithsonite layer forms a cap over strongly brecciated and silicified limestone which has been interpreted as an exhalite vent (Tim Sadlier-Brown, personal communication).

DISCUSSION

Lead isotope ratios tabulated by Godwin et al. (1988) suggest a Devonian age for the mineralization (Grant Abbott, personal communication). Because lead isotope ratios do not change significantly on recrystallization, the Devonian age raises the interesting possibility that the MEL is an epigenetic replacement deposit, perhaps related to Devonian tectonism in the Selwyn Basin described by Abbott and Turner (1990).

ACKNOWLEDGEMENTS

T. Bremner and D. Ouellette visited the property in July, 1990 and are very grateful to the late Dave Miller, who generously shared his extensive knowledge of the property several days before he was killed in a tragic accident. Thanks are also due to Sam Aikins and Jake Melnychuk for arranging the trip and to Tim Sadlier-Brown (Nevin-Sadlier Brown Goodbrand) for current information on the Jeri prospect. Grant Abbott provided several helpful contributions and edited the manuscript.

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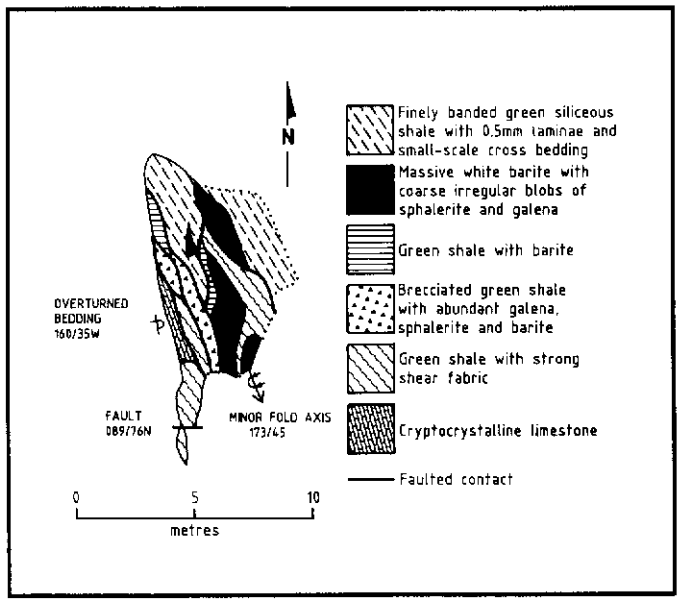
CARNE, R.C., 1976. Geology of the stratabound barite-lead-zinc deposit on the Mel and Jean claim group, Coal River, Yukon; Exploration and Geological Services Division, Whitehorse, Indian and Northern Affairs Canada, Open File Report 1979-16.

GABRIELSE, H., and BLUSSON, S.L., 1969. Geology of Coal River map-area, Yukon Territory and District of Mackenzie (95D); Geological Survey of Canada, Paper 68-38

GODWIN, C.I., GABITES, J.E., and ANDREW, A., 1988. Leadtable: a galena-lead isotope data base for the Canadian Cordillera: B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1988-4

MILLER, D.J., and WRIGHT., 1986. Mel barite-lead-zinc deposit, Yukon - an exploration case history: in Mineral Deposits of Northern Cordillera, J.A. Morin (ed.), Canadian Institute of Mining and Metallurgy Special Volume 37, p. 129-141

Figure 3. Field sketch of 1990 stripped area at site of proposed open pit.



PART C

MOUNT BYNG

Trevor Bremner
NTS: 105 D 16
Coordinates: 60°55'N, 134°25'W
Area: Whitehorse
Access: Helicopter, winter trail to Livingstone Creek
MINFILE #: 189
Company: Carlyle Geological Services, Aurora Gold Ltd
Commodities: Au

INTRODUCTION

An interesting grassroots exploration prospect is associated with a Lower Cretaceous intrusive complex on the ridge north of Mt Byng, 50 km northeast of Whitehorse. Brecciated quartz-carbonate veins which return sporadic high gold values are associated with north-trending rhyolite dykes and small stocks.

HISTORY

In 1987, Larry Carlyle and Drew MacDonald discovered malachite and azurite-stained vuggy quartz float associated with altered rhyolite while following up several weak gold anomalies identified by a 1986 Geological Survey of Canada regional silt sampling program. Preliminary work on the property included hand trenching and a small soil grid in 1987, and VLF-EM surveys and further soil sampling in 1988. Four days of reconnaissance geological mapping were done in 1989 and further work in 1990 included soil sampling, blast trenching and VLF-EM surveys.

REGIONAL SETTING

The property covers two distinct suites of igneous rocks which intrude Upper Triassic and Jurassic sedimentary rocks on the east side of the Whitehorse Trough.

GEOLOGY AND MINERALIZATION

Gold occurs in brecciated quartz-carbonate veins associated with rhyolite dykes and small stocks which cut a thick sequence of andesite flows, gabbroic intrusions and granodiorite on the north ridge of Mt Byng (Figure 1). Samples of the vein material have returned values up to 126.9 g/t Au and also contain anomalous levels of mercury, arsenic, antimony and tungsten.

Four main areas of interest were identified by the 1987 and 1988 work. From southeast to northwest, these are designated the R12, main, R7 and R17 zones (Figure 2). The main zone showing is a vuggy, brecciated quartz-carbonate vein (Figure 3), which strikes 160° following the margin of a 9 m wide rhyolite dyke. A specimen taken from this vein in 1987 assayed 68.6 g/t Au. Similar rusty quartz-carbonate vein material containing elevated gold values has been found associated with strong VLF anomalies in the R12 and R7 zones. The R17 zone is a north-trending fault gully at the northwest corner of the claim block, where a conspicuous gossan overlies a breccia of silicified fragments up to 15 cm across, cemented by vuggy, orange-weathering chalcedony (Figures 4a,b).

Figure 1. Main showing area north of Mt Byng. Lineaments mark the location of vertical, north-trending rhyolite dykes 9-15 m wide which appear to be associated with gold-bearing quartz veins.

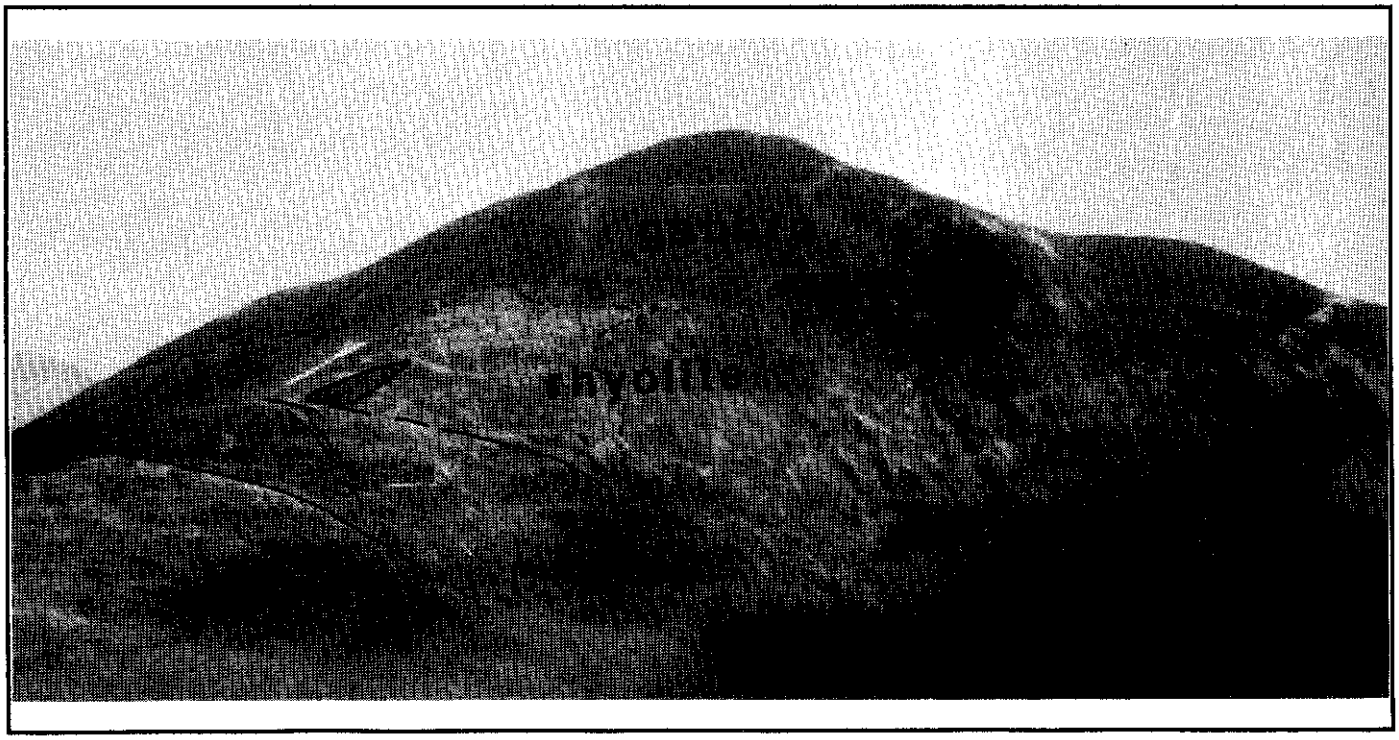


Figure 2. Geological map of the Mt Byng property. Numbers show location of samples taken for radiometric age dating.

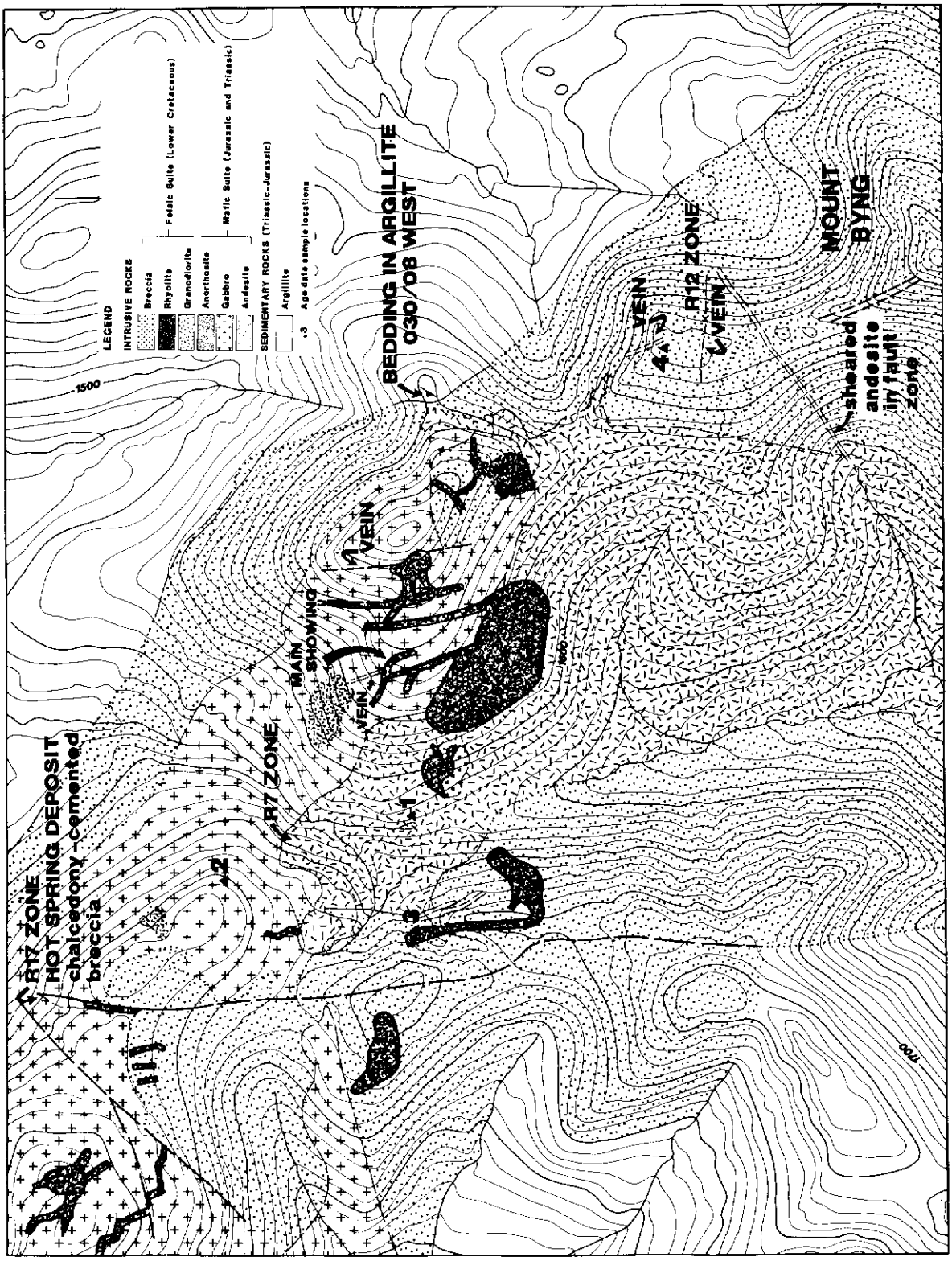
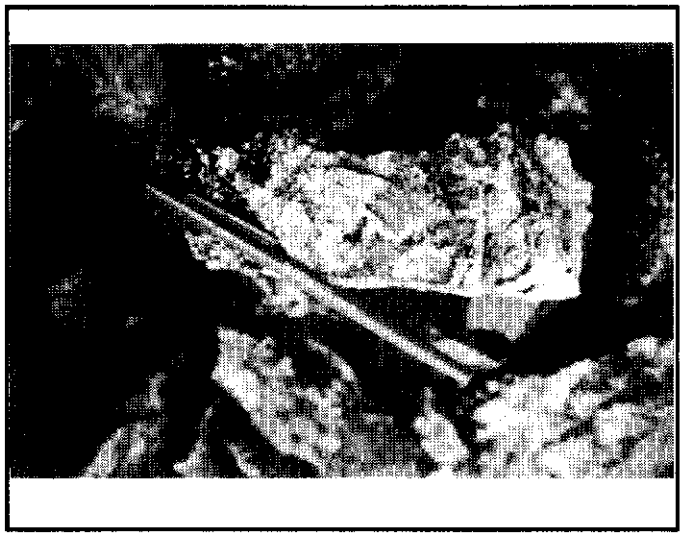


Figure 3. Rusty, quartz-calcite vein/breccia from a hand trench across the main zone. 1988 samples from this zone assayed 68.6 g/t Au.



Mapping and radiometric age dating show that igneous rocks in the Mt Byng area fall into distinct mafic and felsic suites. The oldest unit is an aphanitic andesite, which is commonly found as xenoliths in all the other units (Figures 5,6). The andesite appears greenish due to chloritic alteration, and fresh samples are difficult to obtain. A Rb/Sr whole rock age of 252 ± 10 Ma was obtained by Dr R. Armstrong and J. Gabites (University of British Columbia).

The andesite is intruded by coarse grained gabbro (Figure 6) which is cut by two subcircular anorthosite plugs. The age of the gabbro and the anorthosite is questionable, but a Armstrong and Gabites obtained a K/Ar whole rock date of 168 ± 6 Ma, with minor argon loss suspected.

A younger suite of felsic rocks consists of a large granodiorite to quartz-feldspar porphyry intrusion cut by rhyolite dykes and small stocks. Armstrong and Gabites obtained a K-Ar hornblende age of 121 ± 5 Ma for the granodiorite, and a whole rock age of 104 ± 4 Ma for the rhyolite. Gold-bearing quartz veins described above appear to be closely associated with the rhyolite. The youngest igneous phase is a small diatreme of heterolithic breccia which contains angular fragments of all of the major rock types in the area, welded by granodiorite porphyry (Figure 7).

DISCUSSION

The gabbro and anorthosite probably form part of the Lewes River Arc which was active during the Triassic and Jurassic. The Early Triassic age of the andesite suggests it is either a part of the Cache Creek assemblage and pre-dates the Lewes River Arc, or forms a part of the Lewes River Arc and provides evidence for activity in the Lewes River Arc as long ago as Early Triassic. The latter interpretation seems most probable based on the petrographic identification of the volcanic rock as andesitic rather than basaltic.

The granodiorite and rhyolite (Lower Cretaceous) are comparable in age to felsic and intrusive and volcanic rocks in the Mt Nansen area, 200 km to the northwest.

Gold-bearing quartz veins in the area have so far been found adjacent to rhyolite dykes and appear to be structurally controlled, by vertical north-trending lineaments.

CURRENT WORK

A modest amount of work was done on the property in 1990, under an option agreement between owners Carlyle and MacDonald, and Aurora Gold Ltd. The work was confined to the Main and R-17 zones, where 176 soil samples were taken and 9 blast trenches totalling 86 cubic metres were excavated. VLF-EM surveys were also carried out across the central part of the R-17 zone. Ten rock samples taken from the 1990 trenches were assayed. Two specimens from the main zone returned values of 18.5 g/t Au and 126.9 g/t Au.

Figures 4a,b. Chalcedony breccia on trend with a rhyolite dyke in a north-trending linear gully at the R-17 zone.

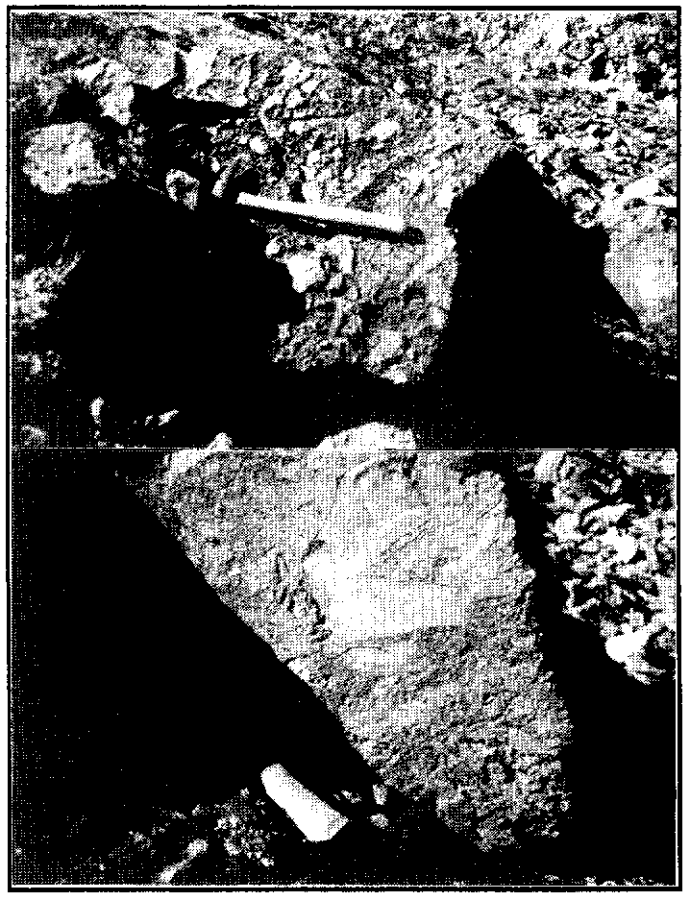


Figure 5. Fractured basalt invaded by granodiorite dykes on ridge north of Mt Byng. Basalt xenoliths occur in the granodiorite.

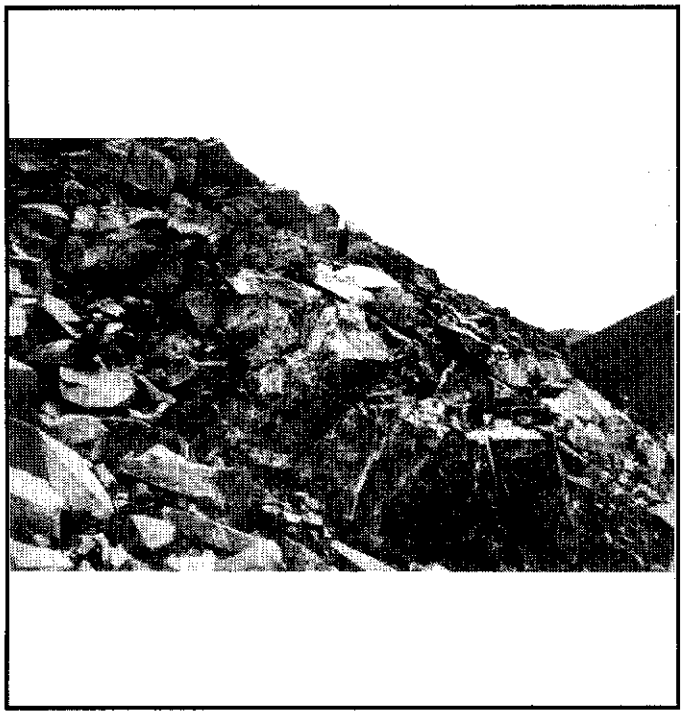


Figure 7. Heterolithic breccia from a small circular diatreme cutting granodiorite near the head of Byng Creek. Angular clasts include all of the major rock types in the area (basalt, gabbro, granodiorite and rhyolite) welded together by feldspar porphyry.

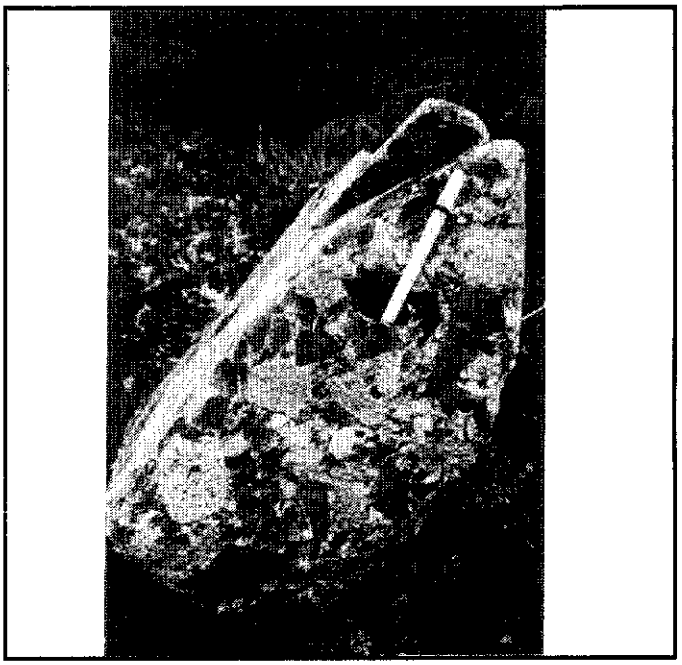


Figure 6. Deformed basalt xenoliths in gabbro, east flank of ridge north of Mt Byng..

ACKNOWLEDGEMENTS

T. Bremner visited the property for four days in 1989, and is grateful to Larry Carlyle for supplying hospitality and sharing his knowledge of the property. Dr Richard Armstrong and Janet Gabites (University of British Columbia) provided K/Ar and Rb/Sr dates for samples of the main igneous rock types. Grant Abbott contributed to the interpretation of the data and edited the manuscript.

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APPENDIX

Radiometric age data: Analyses by Dr R. Armstrong and J. Gabites (University of British Columbia)

Y89-18-1 Hornblende K/Ar
105D/16 **121 ± 5 Ma**

Wt % K = 0.514
Rad. Ar = 2.509 x 10^{-6} cm^3/gm
% Atmos. Ar = 91.0

From a saddle at the head of Byng Creek, Yukon, 60°56'01" N, 134°22"33"W. Sample TJB89-18-01, collected and interpreted by T.J. Bremner. Consists of granodiorite from intrusion northeast of Mt Byng.

Y89-18-2 Whole Rock K/Ar
105D/16 **168 ± 6 Ma**

Wt % K = 0.132
Rad. Ar = 0.906 x 10^{-6} cm^3/gm
% Atmos. Ar = 74.4

From the ridge north of Mt Byng, Yukon, 60°56'27"N, 134°22'54"W. Sample TJB89-18-02, collected and interpreted by T.J. Bremner. Consists of coarse grained pyroxene gabbro.

Y89-18-3 Whole Rock K/Ar
105D/16 **104 ± 4 Ma**

Wt % K = 2.76
Rad. Ar = 11.471 x 10^{-6} cm^3/gm
% Atmos. Ar = 95.2

Near saddle at the head of Byng Creek, Yukon, 60°56'01" N, 134°22"33"W. Sample TJB89-18-03, collected and interpreted by T.J. Bremner. Consists of quartz-eye rhyolite from a dyke cutting andesite.

Y89-18-4 Whole Rock Rb/Sr
105D/16 **252 ± 10 Ma**

ppm Sr = 90.6
ppm Rb = 1.6
Rb/Sr = 0.017
$^{87}Rb/^{86}Sr$ = 0.050
corrected $^{87}Sr/^{86}Sr$ = 0.70463

From the north ridge of Mt Byng, Yukon, 60°55'37"N, 134°20'44"W. Sample TJB89-18-04, collected and interpreted by T.J. Bremner. Consists of aphanitic andesite, with a greenish cast due to chlorite alteration of hornblende. Contact relationships show it is the oldest rock type in the area. A K/Ar age of 143 ± 5 Ma from the same sample is unreasonable as it is clearly older than sample Y89-18-2. Moderate argon loss was reported with the K/Ar analysis.

PART C

MT HUNDERE

Trevor Bremner, Dennis Ouellette
NTS: 105 A 10
Coordinates: 60°31'N, 128°53'W
Area: Watson Lake
Access: Road
MINFILE #: 12
Company: Curragh Resources Incorporated, Hillsborough Resources Limited
Commodities: Zinc, lead, silver

INTRODUCTION

In 1990, Curragh Resources announced its intention to spend $70 million to develop a high-grade zinc-lead-silver mine at Mt Hundere, 54 km north of Watson Lake. The deposit has formed by the replacement of limestone at the sheared contact between Lower Cambrian limestone and phyllite. Proved reserves are approximately 4 million tonnes in 4 zones, with an average grade of 8.45 Pb, 13.2% Zn and 50 g/t Ag. A further 1.2 million tonnes of possible sulphide reserves grading 5.2% Pb and 12.5% Zn have also been identified. The ore is coarse grained and free of impurities, and the waste will be non-acid generating due to the limestone host rock and the relatively low amount of waste sulphides. Production is estimated at 100 000 to 150 000 tonnnes of concentrate per year over a mine life of 8.5 years.

EXPLORATION HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The first claims on Jewelbox Hill were staked in 1962 by prospectors Jake Hundere and Pete Ritco, on behalf of the Frances River syndicate (Dr A. Aho). A road to the property was built in 1963, and the claims were explored with bulldozer trenches and six diamond drillholes. Over the next 20 years, a number of Aho's companies surveyed the claim boundaries and explored the property with geochemical and geophysical surveys and bulldozer trenching, and 72 holes were drilled between 1979 and 1982, resulting in the discovery of the north and south zones about 5 km apart. A feasibility study in 1982 recommended a small open pit operation and a 250 ton per day mill. In 1984, Canamax Resources Incorporated purchased and remapped the property and carried out more geochemical and airborne geophysical surveys, and drilled 37 more holes, identifying 3 separate deposits in the area of the south zone (Jewelbox Hill). By the end of 1988 Canamax had completed 186 drillholes and increased the reserves to approximately their present level. Mt Hundere Joint Venture (Curragh Resources 80%, Hillsborough Resources 20%) purchased the property from Canamax and the Kaska Nation acquired a 5% ownership in 1990.

CURRENT WORK

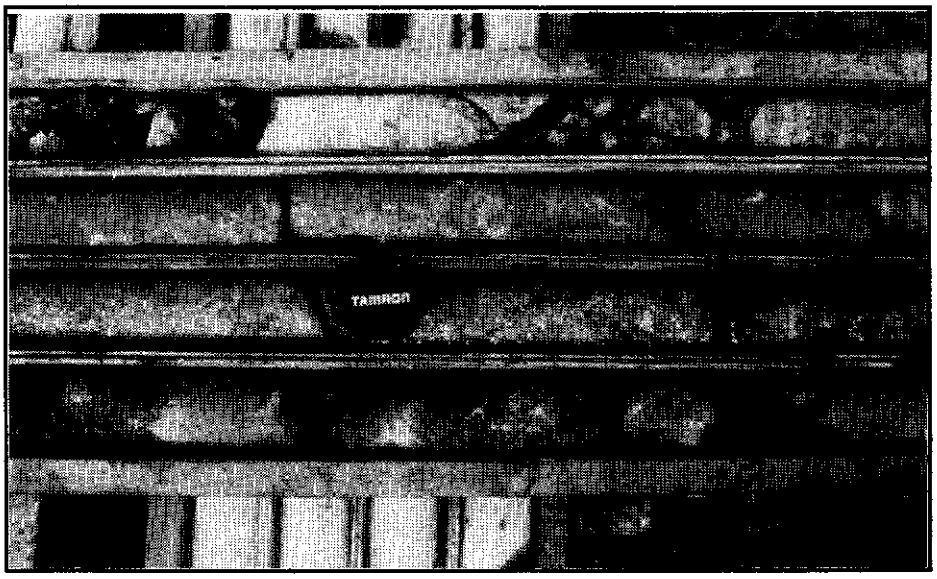
Commencing in September, 1990, infill drilling was completed on the main zone at Jewelbox Hill. The drilling consisted of 25 diamond drillholes totalling 450 m, and brings the total number of holes on the property to 356. Construction began on a 70 x 22 m concentrator and tailings disposal facilities, and a 28 km haul road was completed from the mine site to the Campbell Highway. Underground work began with the collaring of an upper exploration and ventilation adit at the 1400 m level on the east side of Jewelbox Hill, and a lower development and haulage adit at the 1250 m level which will be accessible to 50 ton trucks.

GEOLOGY AND MINERALIZATION

High grade sphalerite and galena occur in skarn zones at the sheared contact between Lower Cambrian phyllite and limestone. Highly sheared graphitic phyllite lying immediately above the main limestone body forms a major marker. Outside of the sheared zone, the phyllite is calc-silicate altered and lacks graphite, and the limestone has been altered to pale green andradite garnet-quartz-calcite skarn.

Proved reserves to date are confined to the main zone on Jewelbox Hill (Figure 1). A further 2 million tonnes of possible reserves occur in the Attila and Burnick zones on North Hill, and a high grade mineralized skarn lens beneath Gribbler Ridge (between Jewelbox Hill and North Hill) is known from 1987 drilling.
On Jewelbox Hill the main ore type consists of coarse actinolite skarn with massive sphalerite and galena. Copper-iron skarns and replacements with magnetite, pyrrho-

Figure 1. Coarse grained sphalerite and galena, diamond drill hole MH 90-368.



tite and pyrite also occur. The highest silver values on the property come from prograde diopside-rich skarn on the east side of Jewelbox Hill. The mineralized skarns form lensoid and tubular bodies from 1 to 15 m thick in two sheared, brecciated limestone layers with extensively developed cavernous porosity. Some of the ore occurs in horizontal tubular bodies and in a 50 m chimney of high grade material connecting the upper and lower limestone. Two vertical eastnortheast-trending faults filled with quartz-fluorite breccia occur near ore, and some fluorite extends into in the ore (Figure 2).

DISCUSSION AND CONCLUSIONS

The mineralization at Mt Hundere is epigenetic and appears to be structurally controlled. Examination of the area around the upper portal on Jewelbox Hill shows that the footwall of the mineralization consists of 10 m of mylonitic graphitic phyllite and clay gouge, cut by curving low-angle shear surfaces which strike about 005° and dip 27° W (Figure 3). Lenticular quartz boudins lie along these shear surfaces. Examination of the area around the Discovery showing on Jewelbox Hill shows low-angle fault duplexes in the limestone immediately overlying actinolite-sphalerite skarn. Both of these fabrics are consistent with eastward-directed thrust faulting. The upper and lower limestones may represent imbricated tectonic slices, with zones of fault breccia controlling the emplacement of the sulphides.

Abbott (1977) described several episodes of deformation in the area. His D2 deformation produced the strong shear fabric seen in the host limestone and adjacent argillite. This deformation consists of low-angle shearing and drag folds with subhorizontal axes. Abbott also referred to thermal metamorphism which was contemporaneous with and/or post-dated the D2 structures and produced the mineralized skarns. On the basis of a dome-shaped uplift in the Mt Hundere area and quartz-albite porphyry dykes on the property, Abbott proposed that the mineralization was related to a buried intrusion, probably of Cretaceous age. However, a whole rock K/Ar age of 50 Ma was reported by Sinclair from a quartz porphyry dyke on North Hill, suggesting that both the igneous activity and the late structures in the area may be Tertiary rather than Cretaceous (Grant Abbott, personal communication).

Figure 3. Field sketch of shear zone exposed in north rib near entrance to 1440 m portal.

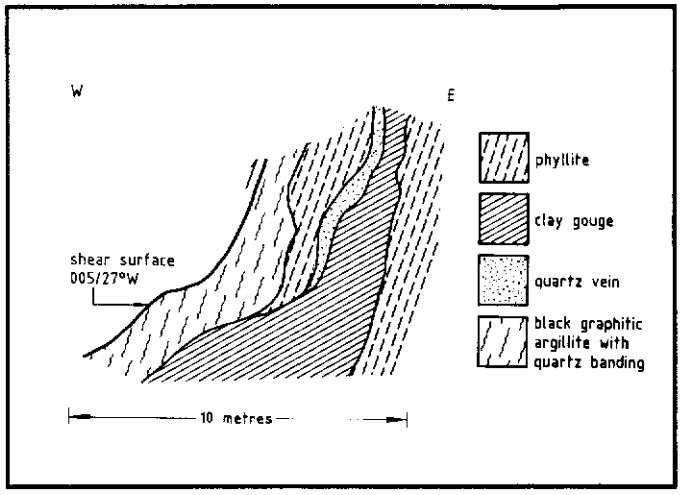


Figure 2. Jewelbox Hill looking west, showing upper portal, (top), haul road, and concentrator site (bottom). The gully on the north side of Jewelbox Hill is the topographic expression of the "Fluorite Fault", a normal fault which separates Jewelbox Hill (left) from Gribbler Ridge (right).

EXPLORATION POTENTIAL

All of the ore zones remain open. The Attila and Burnick zones on North Hill are not presently being developed as they are contain about half the reserves of the Jewelbox Hill deposit, are lower grade and are lead-poor. However, potential for further reserves exists between the North Hill deposits.

ACKNOWLEDGEMENTS

Bill Mann (Curragh Resources Inc.) provided information and a tour of the property. Grant Abbott contributed his knowledge of the regional geology and the structure of the property and edited the manuscript. The contributions of these two people are gratefully acknowledged.

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PART C

MUNSON

Trevor Bremner
NTS: 105 B 3
Coordinates: 60°09'N, 131°15'W
Area: Swift River
Access: 4WD road from Pine Lake airstrip
MINFILE #: 29
Company: Yukon Minerals Corp.
Commodities: Zinc, lead, silver

INTRODUCTION

Originally staked as the BOM claims by Hudson Bay Mining and Smelting in 1947, the Munson occurrence consists of massive black sphalerite, galena, chalcopyrite, pyrrhotite and magnetite exposed in bulldozer trenches on the floor of a cirque. The sulphides are associated with siliceous breccia and actinolite skarn along the contact between siliceous metavolcanic rocks and limestone which also passes through the Mod showing, 2.4 km to the west. The contact appears locally discordant and is interpreted as a steep reverse fault.

HISTORY

Previous work on the property was compiled by Archer, Cathro & Associates (1981) Ltd and is documented in the Yukon Minfile. The property was first staked as the BOM claims by Hudson's Bay Mining and Smelting in 1946. Since then the property has been restaked several times, and optioned to a variety of companies. Expiration on the property between 1946 and 1987 included geochemical and magnetic surveys, bulldozer trenching and 2264 m of diamond drilling. The most recent work consisted of bulldozer trenching by Apex Energy Corp. in 1987, to fulfil the terms of an option agreement with Yukon Minerals Corp., the present owner.

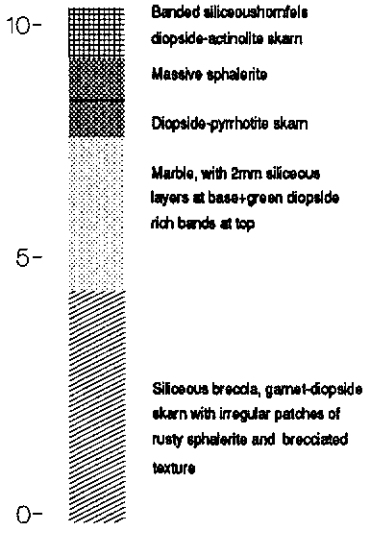

Figure 1. Measured section across sulphide skarn and marble exposed in main trench.

REGIONAL SETTING

The property is underlain by Carboniferous metamorphosed and imbricated sedimentary and volcanic rocks of the Yukon Cataclastic Complex. Small stocks of Cretaceous quartz monzonite and granite which intrude the metamorphic sequence are believed to be related to the Seagull Batholith, which lies 2.5 km to the south.

GEOLOGY AND MINERALIZATION

Massive pyrrhotite, pyrite, galena, sphalerite and chalcopyrite are exposed in a bulldozer trench at the contact between marble and overlying banded siliceous hornfels, probably a meta-tuff (Figure 1). The massive sulphide layer is 0.6 m thick and has been exposed over an estimated strike length of at least 30 m. Polished sections show coarse pyrite-rich bands alternating with galena and sphalerite-rich bands 0.5-1 mm thick, and replacement textures such as round islands of gangue material surrounded by coarsely crystalline sulphides. Sphalerite appears to have crystallized first, followed by galena. Late pyrite is interstitial to the other sulphides and occurs along cleavages in galena and along fractures in the gangue.

Beneath the galena and sphalerite is a layer of diopside-pyrrhotite skarn. The footwall rocks consist of siliceous breccia, marble and brecciated garnet-diopside skarn with irregular patches of sphalerite.

A steep reverse fault which strikes 90° and dips 70° to the south is inferred to pass through the showing, and also through the very similar MOD showing 2.4 km to the west. The mineralization is interpreted as a replacement of limestone in brecciated rocks along the footwall of this fault. Base metals were introduced with actinolite, magnetite and chlorite as a result of retrograde thermal metamorphism which may be associated with the emplacement of a small Cretaceous stock.

The Munson showing resembles other sulphide skarn/replacement occurrences in the area such as the Dan and Crescent showings, and may have a large potential strike length based on the size of the host structure.

CURRENT WORK

The property is presently inactive.

ACKNOWLEDGEMENTS

Hardy Hibbing provided an excellent tour of showings in this area and provided logistical support which is much appreciated. Grant Abbott and Tim Liverton generously contributed their expertise on the regional geology and mineral deposits of the area. Grant Abbott edited the manuscript.

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PART C

REED CREEK

Trevor Bremner
NTS map sheet: 115 G 12
Coordinates: 61°33'N, 139°37'W
Area: Donjek River
Access: 10 mile ATV trail from Alaska Highway
MINFILE #: 102
Company: Dublin Gulch Placers
Commodities: Gold

INTRODUCTION

Placer mining on the Reed Creek property in the 1980's produced coarse, angular nuggets with adhering gangue material which resembles quartz-carbonate alteration outcropping on the canyon wall. The gangue is predominantly a white mixture of quartz, calcite and clay, but at least one of the nuggets is associated with distinctive black calcareous and graphitic material containing quartz veinlets. Similar black alteration has been exposed on the wall of the lower canyon at the location of an old adit. Shear zones with demonstrable oblique slip movement cut a thick sequence of low grade metavolcanic rocks at several locations in the canyon and raise the possiblity that a significant shear-zone hosted gold deposit could exist in the area.

EXPLORATION HISTORY

Placer mining is known to have occurred on the creek between 1935 and 1939. Recent placer mining between 1983 and 1988 produced 1275 oz gold. Total production including the 1935-1939 production is estimated at 2000 oz (Darrell Duensing, pers. comm.) Quartz claims were staked on the basis of coarse, angular gold nuggets in the creek which are associated with white quartz-calcite-clay alteration and black quartz-carbonate-graphite alteration. Similar alteration is found along three shear zones which cut green metavolcanic rocks outcropping in the creek canyon.

REGIONAL GEOLOGY

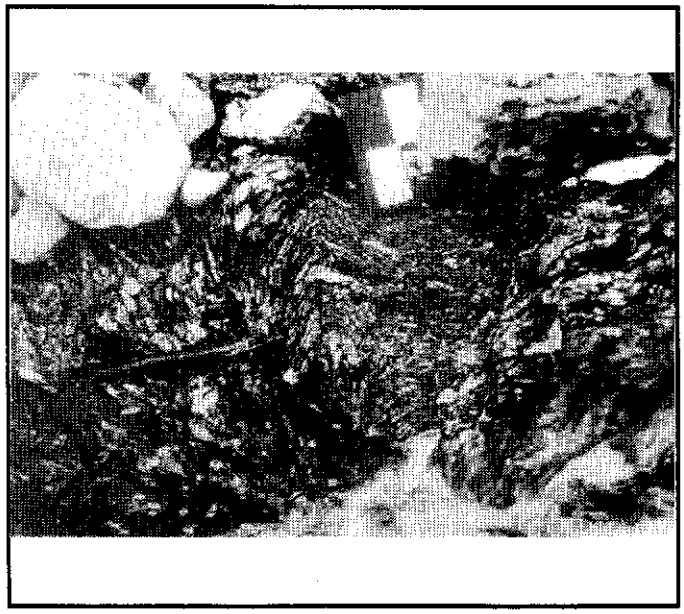
The claims lie adjacent to a presently inactive segment of the Denali Fault, a major northwest-trending strike-slip fault with 250 km of right lateral movement since the Cretaceous. The Denali fault forms the east boundary of the Wrangellia terrane.

The Kluane Range in the Reed Creek area consists of Permo-Pennsylvanian andesitic pyroclastic rocks of the Station Creek Formation, believed to have been deposited in an island arc setting, overlain by a thin cover of basinal shale and turbidite debris flow conglomerate and thin-bedded limestone of Permian age. The highest ridges are capped with amygdaloidal basalt and gabbro of Triassic age. These units are repeated by a series of anastomosing imbricate faults which show a predominant southward dip, but at several locations the faults dip north. The fault planes are frequently curved, and dip angles generally vary from moderate to steep. Slickensides, rotated clasts, c-s fabrics, drag folds, and offsets of planar structures are indicative of both strike-slip and reverse movement, and the fault system is interpreted as a positive flower structure related to oblique-slip movement on the Denali and subsidiary transcurrent faults (Bremner, 1990). Oligocene dykes in the area have been strongly sheared, indicating the faulting is Tertiary or younger.

PROPERTY GEOLOGY

Hydrothermal alteration is associated with faults which cut across Reed Creek canyon at three locations described as the Lower, Middle and Upper canyon respectively (Figure 1). Most of the rock exposed in the canyon consists of green andesitic tuff of the Pennsylvanian Station Creek Formation which has been intruded by quartz-feldspar and hornblende-feldspar porphyry dykes of Oligocene age. Emplacement of the dykes was controlled by east-southeast striking shear zones, and vertical tensional fractures associated with north-northeast striking tear faults. Ragged, irregular dykes exposed in the creek bed appear to follow one such tensional fracture and the massive dykes which form the cliffs at the bottom end of the canyon appear to be related to a north-dipping thrust. Some of the dykes are fresh and show chilled margins, but others have sheared, mylonitic margins and are cut by subparallel shear zones filled with black mylonite. A K/Ar age of 23.5 m.y. was obtained by Dr R. Armstrong and J. Gabites (University of British Columbia) from a fresh porphyry dyke with feldspar and acicular hornblende phenocrysts which outcrops in the middle canyon area. In three locations in the canyon, hydrothermal alteration has resulted in conversion of some of the the porphyry dyke material to a friable mixture of quartz granules and clay, and mylonite has been altered to a mixture of quartz-carbonate-graphite crosscut by fine quartz veinlets.

Figure 2. Contorted mylonite with quartz boudins, Denali fault zone, downstream from Reed Creek canyon.



A wide northwest-trending shear zone believed to be part of the Denali Fault extends more than 300 m downstream from Reed Creek canyon to a point where it disappears under overburden. The shear zone consists entirely of strongly foliated, contorted mylonite (Figure 2). Colour contrast in the mylonite identifies the parent rocks as Station Creek pyroclastics and Oligocene porphyry dykes similar to unsheared rocks which outcrop in the canyon. Shear fabric orientation, asymmetric drag folds, and rotated clasts provide evidence of reverse movements which have been directed toward both the southwest and the northeast (Figure 3). However, a highly sheared dyke shows several 0.3 m dextral offsets along the mylonitic foliation, showing that strike-slip movement has also occurred (Figure 4). The ambiguous structural indicators are taken as evidence of oblique slip movement in a compressional environment.

The intensity of shearing in the mylonite diminishes upstream toward the mouth of the canyon, where a phacolith of unsheared green metavolcanic rock outcrops in the creek adjacent to a massive porphyry dyke which has been thrust over green pyroclastic volcanic

Figure 1. Geological sketch map of Reed Creek canyon showing location of major shear zones.

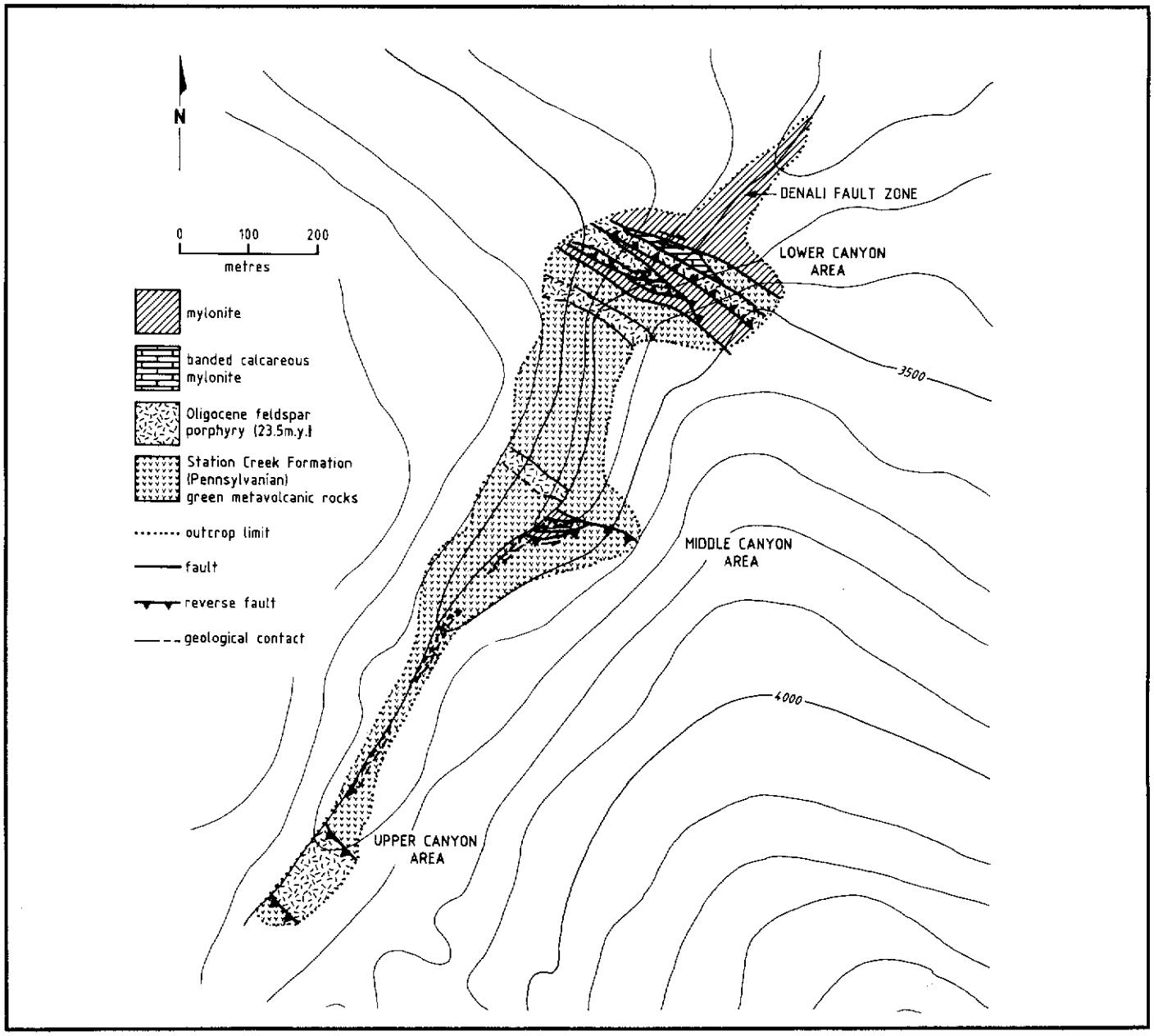


Figure 3. Shear fabric in mylonitized porphyry and volcanic rock, downstream from Reed Creek canyon.

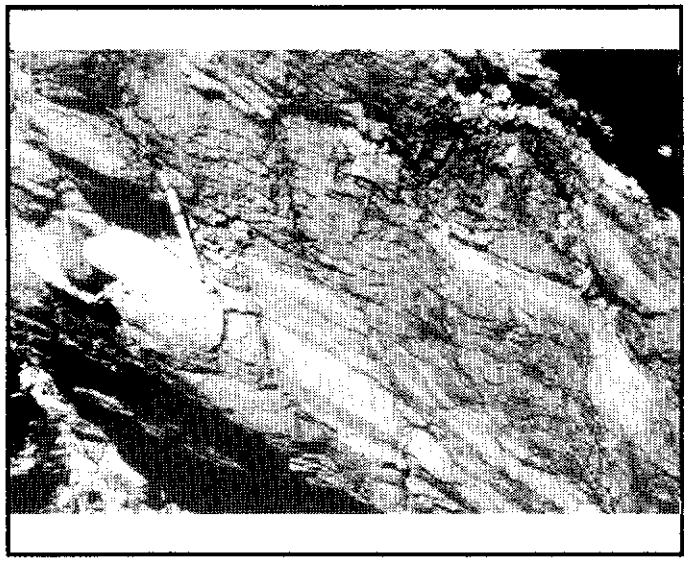
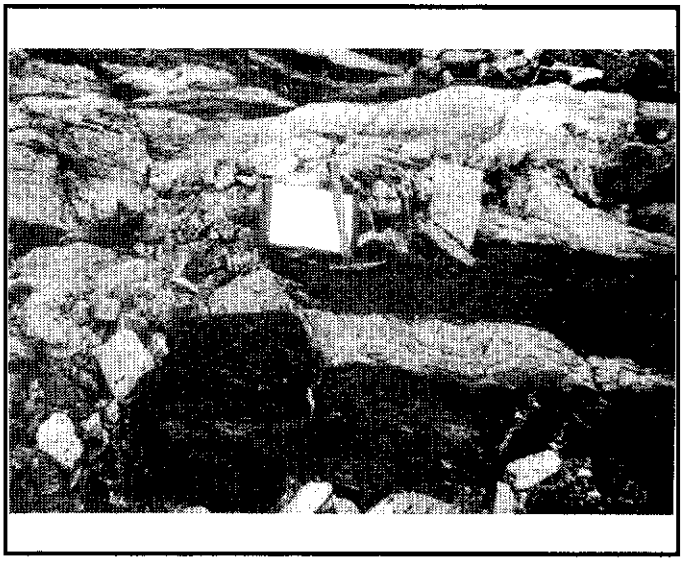


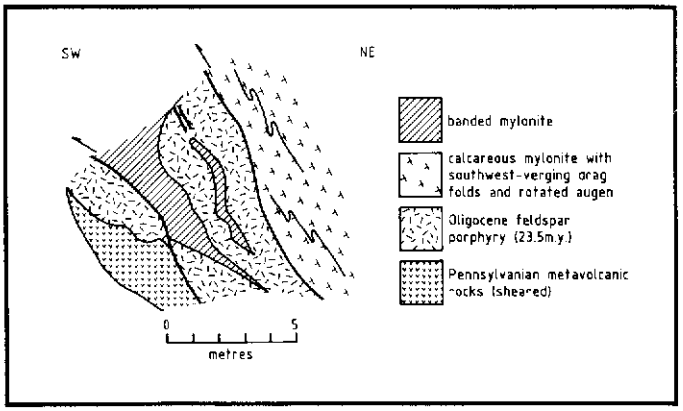
Figure 4. Mylonitized porphyry dyke showing dextral offset, downstream from Reed Creek canyon.



rocks along a steep fault oriented at 122° with a steep dip to the northeast. Rotated clasts and asymmetric drag folds with subhorizontal axes trending 100° occur in calcareous hanging-wall mylonite and are consistent with southwest-directed reverse movement on the fault (Figure 5). A 12.2 m wide shear zone in the footwall of this fault comprises black mylonite, black quartz-carbonate-graphite alteration permeated by fine quartz veinlets, lens-shaped phacoliths of brecciated, clay-altered, quartz-veined porphyry, anastomosing quartz veins and a wide zone of mylonite and breccia (Figures 6a,b,c). The alteration resembles gangue minerals adhering to the nuggets.

In the middle canyon, massive metavolcanic rock has been sheared to a green phyllonite along two narrow shear zones which merge toward the upper end of the outcrop area. The shear zones strike about 115° and a combination of right lateral strike slip and north-north-east directed reverse movement is inferred. One of the shear zones is steep, with curved shear surfaces in phyllonite bounding narrow lenticular zones of clay gouge, breccia and rotated phyllonite clasts (Figures 7a,b). Foliation in the phyllonite dips 67° south. The other shear zone dips at a low angle (29°) to the southwest and contains pale green clay gouge bounded by a narrow envelope of bleached silicified metavolcanic wall rock. A pyrite halo extends several metres beyond the zone of silicification. A 2.5 m wide feldspar porphyry dyke crossing the shallower shear zone at right angles shows two right-lateral strike-slip offsets of about a metre each (Figure 9).

Figure 5. Field sketch showing shear zone detail, lower Reed Creek canyon. Profile of exposure on northwest bank.



At the upper end of the canyon a south-dipping thrust fault overrides a north-trending porphyry dyke which outcrops in the creek bed. The fault strikes about 115°, dips about 43° south and projects east along strike into trench exposures which show multiple slabs of sheared, clay-altered quartz-feldspar porphyry intercalated with zones of rusty, bleached pyritic volcanic rocks over a width of about 20 metres.

CURRENT WORK

Work in 1988, 1989 and 1990 consisted of excavations along the south side of the creek in the lower, middle and upper canyon areas with a bulldozer, backhoe, explosives, and a monitor.

RESULTS

Composite grab samples of black alteration taken from the shear zone in the lower canyon by the owners of the property in 1989 assayed 174.1 and 450.8 g/t Au.

ACKNOWLEDGEMENTS

Darrell Duensing provided information on the placer min-

Figure 6a. Shear zone at lower end of Reed Creek canyon (southeast side) multiple steeply dipping slabs of porphyry separated by layers of black mylonite.

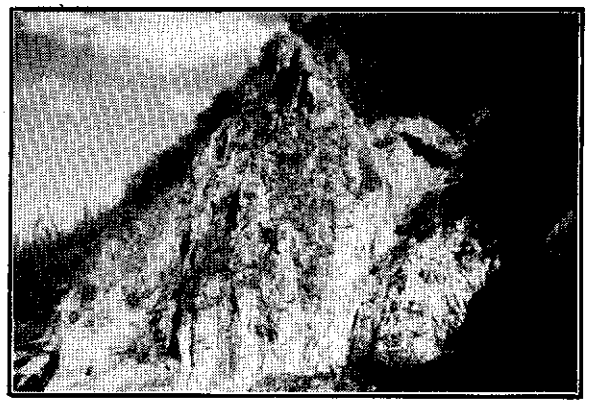


Figure 6c. Phacolith of sheared porphyry surrounded by graphite-quartz-carbonate alteration and quartz veining, lower end of Reed Creek canyon (southeast side).

Figure 6b. Field sketch of shear zone exposed by blasting, lower Reed Creek canyon (southeast side). Profile view.

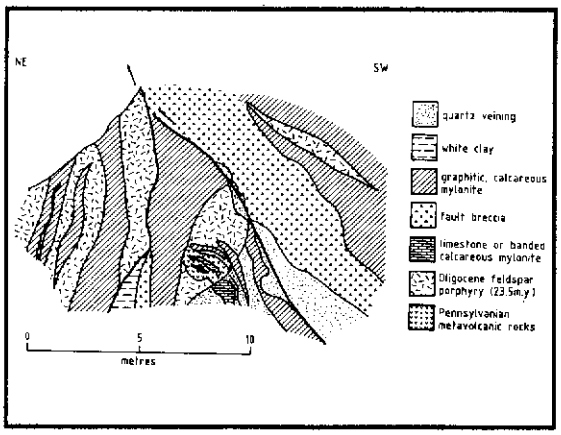


Figure 7b. Fault breccia and clay gouge in shear zone, middle canyon area. Photograph shows rotated clasts of green phyllonite in a clay matrix.

Figure 7a. Steep shear zone in middle canyon area (southeast side). Curved foliations in phyllonite have an average orientation of about 124/67° S.

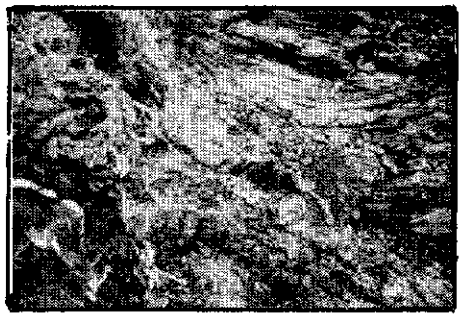
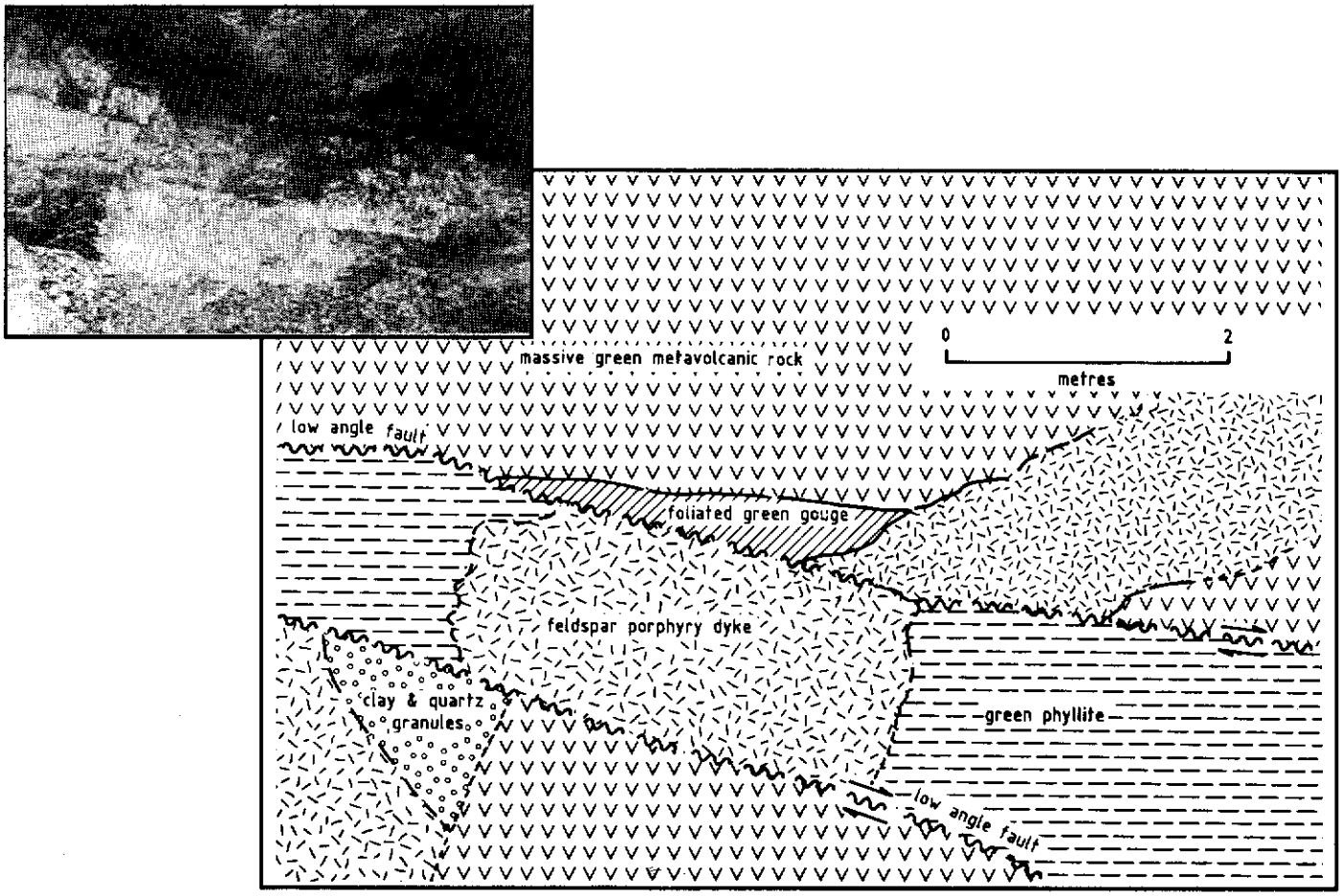


Figure 8 a,b. Porphyry dyke in middle canyon area, offset in a right lateral sense along low angle south-dipping faults.



ing history of the area. Hospitality and information on the property provided by Darrell Duensing, Larry Tremblay and Lorne Smith are gratefully acknowledged. Grant Abbott edited the manuscript.

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APPENDIX

Radiometric age data: Analyses by Dr R. Armstrong and J. Gabites (University of British Columbia)

Y89-32-5	Whole Rock K/Ar
105D/16	**23.5 ± 5 Ma**
	Wt % K = 0.692
	Rad. Ar = 0.637 x 10^{-6} cm^3/gm
	% Atmos. Ar = 39.2

From middle of canyon, north side, Reed Creek, Yukon, 61°32'44" N, 139°37"44"W. Sample TJB89-32-5, collected and interpreted by T.J. Bremner. Consists of feldspar porphyry dyke with acicular hornblende, cutting Permo-Pennsylvanian metavolcanic rock (Station Creek Formation). Closely resembles latite porphyry intrusions along Burwash Creek, dated at 26 ± 1 Ma by Dodds & Campbell (1988).