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ASSESMENT OF MINERAL RESOURCE POTENTIAL IN THE BATHURST INLET AREA, NTS 76J, K, N, O, INCLUDING THE PROPOSED BATHURST INLET NATIONAL PARK

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Preface

The new National Parks policy, introduced by the government of Canada in early 1979, recognizes the DINA requirement that "inventories" of mineral and fuel resource potential be made prior to setting aside lands for park purposes. Responsibility for implementing this policy rests with the Department of Indian and Northern Affairs.

A joint interdepartmental committee called the Working Committee for Northern Mineral and Energy Resource Assessment (MERA) was formed in early 1980 to conduct the required assessments. Committee membership includes representatives from the Department of Indian and Northern Affairs, the Department of Energy, Mines and Resources and Parks Canada Program of the Department of the Environment.

This report presents preliminary (Phase I) assessment results for the proposed Bathurst Inlet National Park, one of several northern areas currently being considered as potential parks.

The Phase I reports are based on office investigation using data and information available at hand. They do not include field investigations conducted specifically for the assessments. In many cases, however, field investigations will be required before more confident judgments can be made concerning the potential of these areas to contain undiscovered mineral and fuel resources. Such investigations will comprise Phase II of the assessment process and may result in significant changes in the potential ratings assigned during Phase I studies.

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SUMMARY AND CONCLUSIONS

The resource assessment procedure followed in this report involves comparisons of geological features and known mineral occurrences at Bathurst Inlet with those throughout the adjacent region. Possibilities that significant resources are present within and adjacent to the proposed Bathurst Inlet park are high compared to those in other parts of the region, with the exception of some areas already known to contain important base metal resources in volcanogenic deposits whose development probably will depend upon the establishment of transport connections to tidewater, including Bathurst Inlet.

A geological terrane like those that contain gold resources elsewhere in the region - e.g. Lupin, Cullaton Lake - extends into a large section of the eastern part of the proposed park and contains at least one significant gold prospect. The southwestern and core areas of the park are underlain by a unique combination of geological elements metallogenically favourable for uranium as attested by several uranium prospects. Islands and peninsulas in the northern part, underlain by cupriferous basalts and dolomite hosting copper concentrations, could contain small, rich copper deposits comparable to some of those found in similar rocks near Coppermine, N.W.T. and in other regions.

The most critical assumptions underlying the conclusion that the proposed park area has a particularly high resource potential are: (1) lenses of iron formation containing significant gold contents are more numerous than has yet been documented; (2) the unlocated source of uranium-gold float found near the southeastern boundary of the area is a significant concentration of the important unconformity-related uranium deposit type and its setting is one that occurs elsewhere within the area; (3) prospecting to date has not been sufficiently thorough to eliminate possibilities that small but rich copper deposits of the fault-breccia and karstic-breccia types are present in northern parts of the area.

These assumptions could be tested and the resource potential of the area better defined by a program of detailed geological mapping, studies of surficial materials and geochemical and geophysical surveys in selected limited areas. Such work would require extensive Phase II programs. It is recommended that this work should be done before any final decision is made concerning any areas that are to be incorporated in a park at Bathurst Inlet.

CONTENTS

PART I

INTRODUCTION AND METALLOGENY OF THE GENERAL BATHURST INLET REGION

This report outlines available data on mineral resource potential in the Bathurst Inlet area, District of Mackenzie, N.W.T., as required for purposes of evaluating the suitability of an area therein as a national park. The proposed park area, as outlined in a report by Parks Canada, Department of Indian and Northern Affairs, March 1976, is shown in Figure 1 and Figure 3 in this report. It includes parts of NTS blocks 76 J, 76 K, 76 N and 76 O, which are between latitudes 66 N and 68 N and longitudes 106 W and 110 W.

The assessment is based in part on known mineral prospects and geological features through an extensive region outside the proposed park as well as within and near proposed park boundaries. This is considered necessary as geologic mapping and prospecting have been less intensive in the area of special (park) interest than in many other parts of the District of Mackenzie, and these activities in the broader region provide some of the main clues to possibilities of future discoveries in and near the proposed park. The general information thus provided on mineral deposits up to several hundred kilometres from the area of interest may also be helpfull in connection with the park assessment inasmuch as their development could involve transport of supplies and products through Bathurst Inlet.

The report presents qualitative evaluations of possibilities that various geological features at Bathurst Inlet may contain various resources. These evaluations are based on comparisons of the interpreted geological history of the area with histories of other areas that contain known resources. Such prognosticated undiscovered resources need to be distinguished from observed quantifiable resources. The term resources may be considered to refer to mineral concentrations that may conceivably be transformed into ore reserves if requirements for transport, energy and labour supply, etc., can be met. Ore reserves are those portions of resources that not only can be measured with some stated degree of certainty but that are also known to be mineable at given commodity product prices and operating costs based on experience relevant to their location. Reserves are thus rarely precisely defineable except in mines or mining districts. Quantitative data are rarely available for resources that are not believed to be mineable at price-cost structures attainable in the foreseeable future. Thus, the development of geological data and concepts and their translation into prospect discoveries, into measured resources, and into ore reserves represents a chain of interrelated processes presently hampered in the Northwest Territories by a dearth of mining operations north of Yellowknife.

ACKNOWLEDGEMENTS AND SOURCES OF INFORMATION

A.B. Taylor assisted in collecting and compiling data on mineral deposits and geology, S.B. Green prepared additional figures and tables accompanying this report. D.C. Findlay acted as technical advisor with the responsibility for co-ordinating the work within the framework of a series of resource studies undertaken by the G.S.C. Information on Archean geology of the Bathurst Inlet area was drawn mainly from G.S.C. Paper 63-40 (Fraser, 1964) which outlines results of helicopter reconnaissance mapping of the northeastern part of the District of Mackenzie. Data on Proterozoic rocks was obtained from various publications by F.H.A. Campbell and M.P. Cecile, and personal communications with F.H.A. Campbell contributed much additional information on the area. Files maintained by the Resident Geologist's Office, DIAND, Yellowknife, were an essential source of locations and basic information on mineral occurrences. I have visited the area a number of times since 1973 and spent periods of several days there in 1977 with F.H.A. Campbell, in 1979 assisted by Craig Houle, in 1980 with R.I. Thorpe, and in 1981 and 1982. Many of the mineral occurrences reported by others in NTS Blocks 76 J, K, N, and O were examined during these trips. S.S. Gandhi contributed information on uranium occurrences near the inlet and advice on interpreting their significance. The mineral occurrence data was supplimented by the file of the National Mineral Inventory (Mineral Policy Sector, Department of Energy, Mines, and Resources) and their data file cards have been reproduced in Appendix II. W.W. Shilts provided advice on interpretations of surficial deposits. Geological Survey of Canada Open File Report 716 (Non-Hydrocarbon Mineral Resource Potential of Parts of Northern Canada) and discussions with contributors thereto were valuable sources of information. Suggestions by D.C. Findlay, who reviewed this report in manuscript, were very useful.

GEOGRAPHIC FEATURES

Bathurst Inlet extends nearly 200 km south from Coronation Gulf as a funnel-shaped arm of the sea penetrating a plateau 200 to 300 metres above sea level on the east side of the inlet, and up to 600 metres on the west side. The inlet, a flooded valley, is carved in a belt of relatively soft sedimentary rocks of Proterozoic age flanked by harder, more ancient crystalline Archean rocks. Its form is largely controlled by splays in the Bathurst Fault System which can be traced at least 80 km southeast from the end of the inlet along the Bathurst Trench (Wright, 1967). Extensive linear scarps are developed along the faults where easily eroded rocks are in juxtaposition with resistant rocks. Slopes rising several hundred metres along the west side of the main branch of the Bathurst Fault dominate the inlet. Various islands and promontories within the inlet rise abruptly out of the sea or tower over lowland areas. Amongst these are Bathurst Ridge, a hogsback extending north from Burnside Inlet through the Quadyuk Islands, and questas on Kuniak and Eloriak Islands.

Rivers and streams discharge drainage from about 52,000 km^2 into Bathurst Inlet. Burnside River and tributaries (notably Mara River) drain about half of this area, including Contwoyto Lake 200 km southwest of the inlet at an elevation of 445 metres. The river drops most abruptly in its lower reaches near the Bathurst Fault where it flows in a deep valley and locally, at Burnside Falls, through several kilometres of twisting canyon cut in colorful sedimentary rocks. Hood River and its tributary James River rise 200 km west of the inlet, drain nearly 17,000 km^2 of plateau-land, and flow swiftly in deep valleys near the inlet. At Wilberforce Falls, 40 km south of its outlet at Arctic Sound, the Hood River drops into a deep gorge. The falls are difficult to reach and view on the ground. Western River and Hiukitak River, respectively south and east of the inlet, each drain about 4,000 km^2. A number of lesser streams empty into Bathurst Inlet. Window Falls on one of these is a spectacular series of cascades near the west shore of the inlet south of Young Point.

Extensive lowland areas extend along the east side of the inlet from Arctic Sound to Burnside Inlet and along Western River in the Bathurst Trench. These areas, adjacent slopes and nearby open valleys support extraordinarily lush vegetation compared to that found elsewhere in northern Mackenzie barren lands.

More detailed information on physical geography and information on climate, ice conditions, vegetation, wildlife and Inuit population of the area may be obtained in Bird and Bird (1961), and in the Parks Canada 1978 pamphlet "Bathurst Inlet – A Natural Area of Canadian Significance".

HISTORICAL NOTES

Fragments of native copper collected from debris and beaches on basalt islands in the outer part of the inlet were (one of the sources of copper) long used by Inuit for utensils, tools and trade goods. Local Inuit still obtain soapstone for carving from some of these islands (eg. Algak Island) where it is found in dolomite intruded and metamorphosed by gabbro. Their name for the inlet is Kilohigok.

The principal geographic features of the area were named by John Franklin (1824) in 1821 during his first expedition when he charted the arctic seacoast, including Bathurst Inlet, from the mouth of Coppermine River to Melville Sound. The expedition, manned by twenty men (6 Britons, 11 'Canadians', 1 'Iroquois', 2 Inuit from Fort Prince of Wales), travelling in two canoes explored the inlet from July 26 to August 11 (Fig. 3). They did not encounter any Inuit although they found recent campsites. The noted naturalist John Richardson, a member of the party, discovered a vein of galena (lead ore) at the northwestern entry to the inlet (mineral occurrence N/13-1, Fig. 1 and Fig. 7).

David Hanbury (1904) visited the northern part of the inlet in 1902 in the course of an adventurous trip from Hudson Bay to Mackenzie River. An Inuit showed him occurrences of native copper on Iglorua Island and the party noted similar occurrences on Lewes Island (northwest point), "Kunuyuk" Island, and on several other islands. The Canadian Arctic Expedition visited the area in 1915 and 1916. J.J. O'Neill, an officer of the Geological Survey of Canada attached to the expedition, investigated the copper-bearing rocks in the outer part of the inlet and saw most of the occurrences known today (O'Neill, 1924).

Dominion Explorers Ltd. established a base camp on Burnside delta in 1929 and 1930 near a site subsequently occupied by a Hudson Bay Company post and a Roman Catholic Mission, but there are no records of any prospecting activity carried out by them near the inlet. In 1931, claims were staked for the Pedersen Whaling Company covering a reported discovery of galena at Detention Harbour a few kilometres west of the Galena Point lead occurrences. Gateway Gold Mines did some work here in 1949.

A field party of the Geographic Branch, Department of Mines and Technical Surveys, studied the geography of the area in 1954. They mentioned in their report (Bird and Bird, 1961) that a company had a field camp northwest of Bathurst Inlet where they were exploring a nickel deposit, but no records of this activity can be found. In 1958, Canadian Nickel Company discovered gold concentrated in iron-rich beds in Archean metasedimentary rocks east of the inlet (mineral occurrence 76 J/12-1 in Figure 1). A helicopter reconnaissance geological mapping project by the Geological Survey of Canada in 1962 included the inlet area (Fraser, 1964). Pits were blasted in several Galena Point veins in 1963 and 1964 and several test holes were drilled. A shipment of 111 tonnes of hand cobbed galena was barged out via Coronation Gulf and Mackenzie River in 1966.

Many of the mineral discoveries in Archean rocks resulted from activities of Roberts Mining Company between 1963 and 1967. These discoveries included gold and nickel occurrences west of the inlet (K/14-2,4; N/2-1,2,3; N/3-1) and prospects in the greenstone belt east of the inlet (O/16-1,2,3,4). North of the map-area (Fig. 1) in NTS 77A, gold-quartz veins were found on Ida Point and Roberts Lake, cobalt-arsenic occurrences (reportedly containing silver and gold) were discovered near the end of Hope Bay, a native silver-bearing vein was discovered east of Hope Bay and another was found several kilometres north on the coast. Prospecting by Noel Avadluk of Cambridge Bay and his wife is noteworthy as they continued their work independently and successfully during "off seasons" without aircraft and company support. Pitting was carried out on mineral occurrences west of the inlet and limited drilling was done on one gold prospect (N/2-1). In the early seventies Hope Bay Mines constructed a small mining and concentrating plant at the southern native silver deposit. They mined both of the known lenses, which proved to be small, and shipped the rich product by air. About 120,000 ounces were recovered from about 1500 tonnes of ore (Thorpe, 1980, p. 158).

In 1967, P.R. Parker prospected copper and gold-bearing veins at Daniel Moore Bay (N12-1). A group of companies, managed by B.I. Nesbit of Vancouver (Flagstone Mines, Arlington Silver Mines, Largo Mines) prospected native copper and other basalt-associated copper occurrences on the islands in the northern part of the inlet in 1967 and 1968. In 1968, bornite float and a copper-bearing vein were found at Arctic Sound. P.T. Conroy and Thomas prospected copper-bearing veins (N/6-1) west of Arctic Sound near the Bathurst Fault this same year.

Proterozoic map-units recognized by J.A. Fraser (1964) were defined as formations east and south of the inlet by L.P. Tremblay of the G.S.C. in 1967 and 1971. F.H.A. Campbell and M.P. Cecile of the G.S.C. studied their stratigraphic relationships and sedimentological histories in the Bathurst Inlet area in 1974 and 1975. Campbell continued this field work in 1977 and 1978, mainly in younger Proterozoic strata near and beyond the mouth of the inlet. These workers noted minor copper concentrations in several formations, some slightly radioactive strata, and some features comparable to those of rocks that host mineral concentrations in other areas. Their publications were particularly timely as multinational corporations had developed enormous interest in exploring for uranium in Proterozoic rocks in the late seventies and several companies turned their attention to the inlet. Exploration rights were obtained to large tracts of land and airborne surveys and geochemical surveys using helicopters were carried out rapidly, mainly in 1978. Only a few interesting results have been reported from these programs. Noranda Mines found minor occurrences of uranium in the Western River formation in the southern part of the area (J/11-2). Seru Nuclear found uraniferous zones in quartzite and dolomite breccia of the Brown Sound Formation. Cominco prospectors found some pitchblende and chalcocite-bearing veins in basalt layers in the Brown Sound Formation near the south end of Bathurst Lake (J/3-1). They also found enigmatic concentrations of uranium and gold in surficial materials south of Young Point (J/12-1). Work, including drilling, was continued on the pitchblende veins in 1979 and briefly in 1980. Cominco also reconnoitered areas around Buchan Bay, Elu Inlet and Kent Peninsula in 1979. Also in 1979, Giant Yellowknife Mines explored an outlier of Ellice River sandstone nonconformably overlying basement rocks along the Bathurst Trench south of the Figure 1 map-area.

In 1980, a small crew working for Goldfields, camped at Pistol Lake, spent two or three weeks sampling gold prospects (N/2-1) optioned from Roberts Mining Company (Fig. 4). The latter company carried out some geophysical and geochemical surveys in the vicinity of the Hope Bay silver mine-site (in 77A, north of the map-area).

The former Hudson's Bay Company establishment at Burnside delta has been the site in recent years of a tourist lodge. It is serviced during the summer tourist season by DC3 aircraft using an airstrip on the delta or by Twin Otter

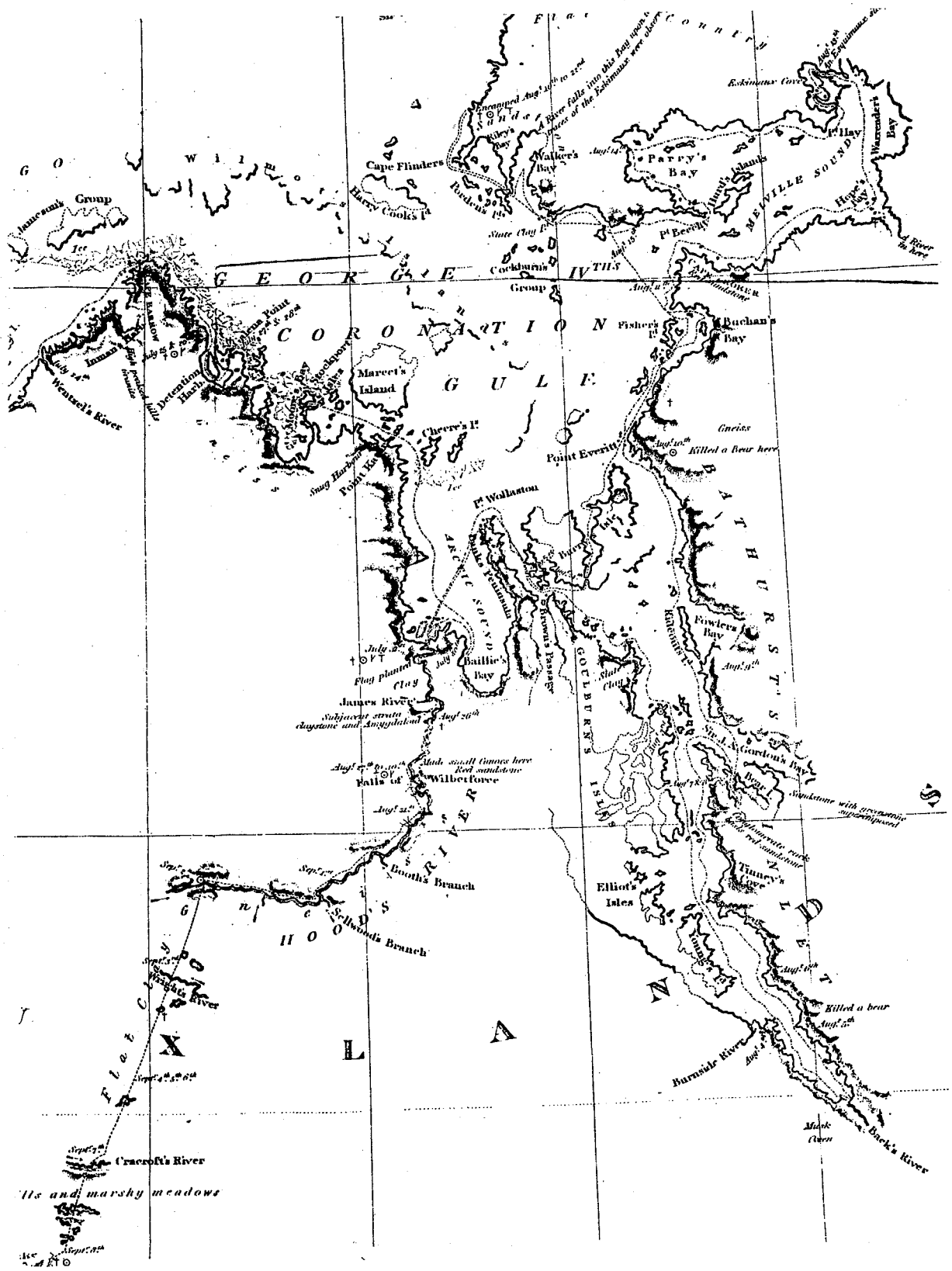


Figure 3. *Bathurst Inlet as charted in 1821 by John Franklin, part of a chart showing the route and discoveries of the 'Northern Land Expedition' in John Franklin (1824), Narrative of a Journey to the shores of the Polar Sea.*

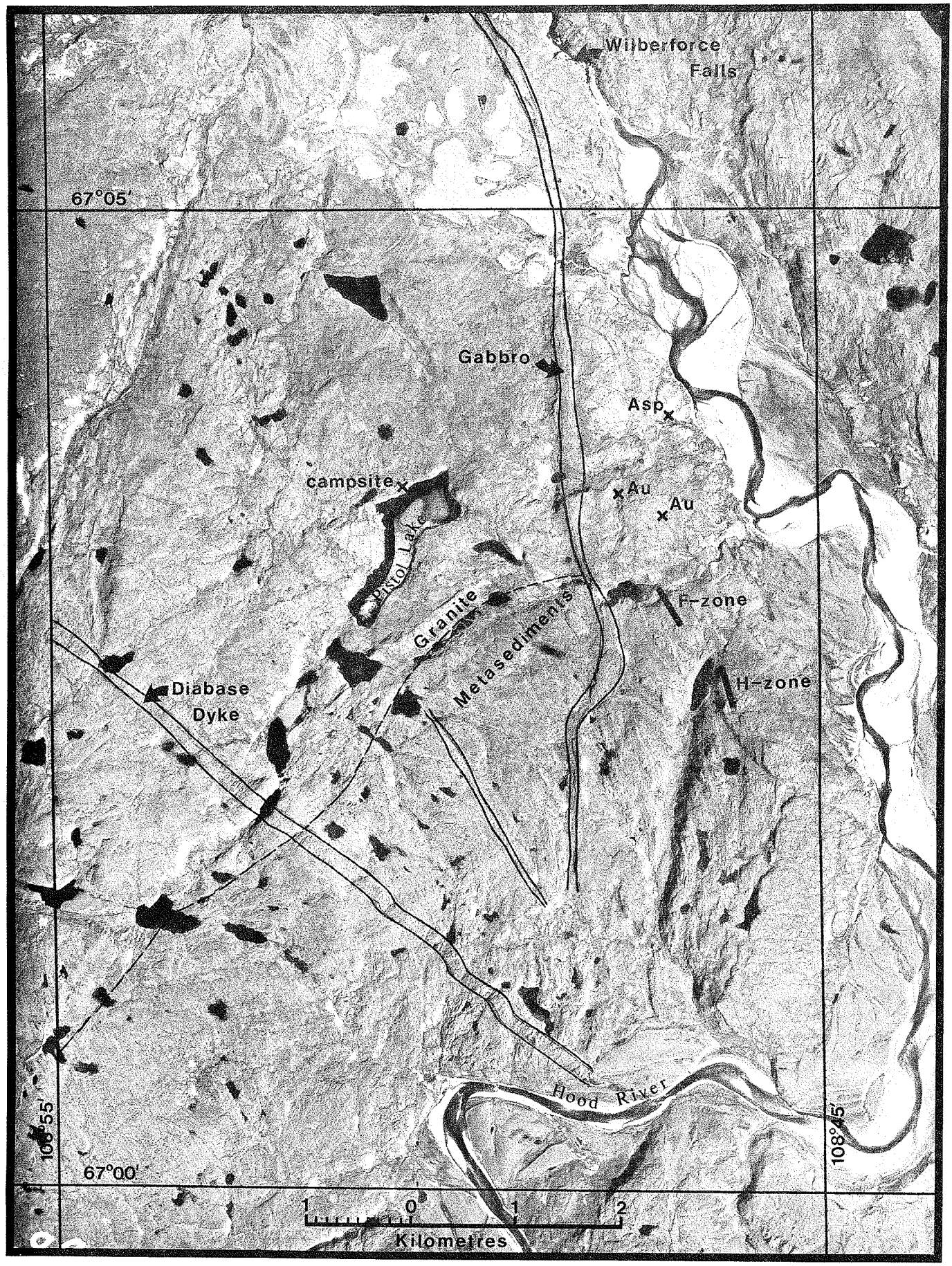


Figure 4. *Gold-bearing iron formations in Archean metasedimentary rocks near Wilberforce Falls (prospect N/2-1).*

aircraft on floats. A few Inuit families have permanent homes beside the lodge. The settlement of the area, recently established and entirely Inuit, is Umingmaktuk (formerly Bay Chimo). It is serviced, infrequently on request, from Cambridge Bay and by annual sea lift. The lodge, and to a lesser extent Umingmaktuk, have been useful to government survey parties and exploration companies as supply staging sites and storage sites for sea lifted fuel.

METALLOGENY

Regional metallogenic setting

Some of the rocks and mineral concentrations in the Bathurst Inlet area and elsewhere in the region were formed in Archean time more than 2.5 billion years ago (2.5 Ga). Others were formed in intervals of Proterozoic time referred to as Aphebian (2.5 to about 1.8 Ga), Helikian (1.8 to 1.0 Ga), and Hadrynian (1.0 to 0.6 Ga) following terminology developed by Stockwell, 1964. Figure 2 shows the general distribution of Archean, Aphebian and Helikian rocks and various types of associated mineral deposits in the District of Mackenzie (excepting Proterozoic strata in the Mackenzie Mountains along the west border of the Northwest Territories). The Archean Slave structural province forms a central core within the region, bordered to the east by more intensely deformed Archean rocks, to the south in the East Arm of Great Slave Lake by a belt of Proterozoic strata, and to the west by Aphebian sedimentary, metamorphic and igneous rocks.

The Slave province is characterized by rocks and mineral deposits like those in a large part of the southeastern Canadian Shield, termed the Superior province, which includes some of the most important base metal and gold mining districts in Canada. The abundance of known gold, base metal and other mineral deposits of a variety of types in the Slave province (Fig. 2) is unmatched elsewhere in those parts of Canada that lie north of latitude 54°N and east of the Cordillera, with the possible exception of several small areas like the Kaminak block near the west shore of Hudson Bay at latitude 62°N. A correspondingly large proportion of mines that have been operated with their own concentrating plants, and also of undeveloped measured resources, in the north are in the Slave province. Excepting gold ore at Yellowknife, the Colomac gold deposit and the Thor tantalum deposit, the most important known resources are closer to the arctic coast than to infrastructure at Great Slave Lake.

Aphebian strata in the East Arm of Great Slave Lake, the Epworth Group flanking the northwestern margin of the Slave province, and the Goulburn Group at Bathurst Inlet consist mainly of successions of quartzite, dolomite, and shale formations. Some volcanic formations are present in the East Arm and minor basaltic lava flows are interbedded with some of the sedimentary rocks at Bathurst Inlet. In each of these areas, the Aphebian rocks were intruded by sheet-like bodies of gabbro. In the East Arm they were intruded, in addition, by laccoliths of dioritic to monzonitic composition. Suites of mineral deposits in the three areas differ somewhat. Few deposits have been found in the Epworth Group. The East Arm contains a more highly varied suite of deposits than the Bathurst Inlet area, due partly to the additional presence there of deposits related to laccoliths.

Helikian sedimentary and volcanic rocks at Bathurst Inlet and in the Coppermine Homocline to the west are characterized metallogenically by copper and uranium deposits.

ARCHEAN ROCKS AND ASSOCIATED MINERAL DEPOSITS

General

The distribution of Archean volcanic and sedimentary rocks is shown in Figure 2. These rocks are believed to have been deposited during a short time interval 2.7 billion years ago (2.7 Ga) partly, if not entirely, upon 2.9 to 3.2 Ga granitic and tonalitic basement rocks (see Henderson, 1981). The strata were deformed so that volcanic rocks are now subvertical and sedimentary strata tightly and complexly folded in most areas. They were intruded by 2.7 to 2.5 Ga pre-orogenic, syn-orogenic and post-orogenic granitic rocks and were metamorphosed to greenschist, lower amphibolite and upper amphibolite facies. Unpatterned areas (A) in Figure 2 include highly metamorphosed and migmatitic metasedimentary rocks and basement rocks, as well as synorogenic and post-orogenic tonalitic to granitic intrusions. Many early intrusions in volcanic terranes, mafic and intermediate as well as felsic in composition, are synvolcanic sills, dykes, and stocks representing magmas that did not reach the surface.

Deposition of the Archean supracrustal rocks is envisaged to have begun with stretching and rupturing of a sialic crust resulting in down-dropping of a series of crustal blocks to form repositories first for lavas extruded on the sea floor and subsequently for turbiditic sediments that were spread over more extensive areas of fault-bounded sea floor basins. The lavas were extruded along the major fissure systems, in places perhaps along margins of blocks whose surfaces remainded near or above sea level (Frith and Roscoe, 1980). They probably accumulated as a number of separate prism-shaped piles rather than as a single coalescent assemblage of lenses. Some volcanoes were built up to form transitory volcanic islands. Uplifted volcanic rocks and basement blocks contributed detritus to the sedimentary basins but it is necessary to postulate late extra-basinal extrusions of felsic volcanics, not presently identifiable, as major sources for the turbiditic sediments (Henderson, 1981).

Volcanic rocks

The volcanic rocks are mainly basalts but lenses of felsic rocks, volcaniclastic sediments and minor chemical sediments (eg. chert) are present in all belts and some belts contain extensive sections with abundant volcanic rocks of intermediate to felsic composition. As in Archean volcanic belts elsewhere (e.g. the Abitibi belt in the Superior Province), these sections most commonly overlie basaltic sequences and are the most favourable hosts for base metal deposits. They are more abundant in belts in the northern part of the Slave Province than in those in the southern part. Komatiitic (ultramafic) lavas, found in many Archean volcanic belts elsewhere (eg. the Abitibi belt) and commonly hosting nickel and asbestos deposits, have not yet been recognized in the Slave Province.

During undersea eruptions, the hot lavas were altered to varying degrees by reactions with sea water that resulted in chemical changes in sea water as well as in lava composition. Iron, magnesium, calcium, and silica, for example, were thus leached from volcanic rocks to be redeposited subsequently as iron-formations, carbonate rocks, and chert. Volcanic rocks were carbonatized and albitized. Base metals were redistributed and locally concentrated as sulphides within the volcanic rocks and in sea floor sediments. The most intensive alterations occurred where lavas were highly fissured, where late explosive felsic

volcanism built up great piles of relatively permeable rocks near volcanic centres, where the latter were intruded by subvolcanic intrusions that heated and drove circulating sea water-derived solutions through the rocks, and where there were pauses in volcanic accumulation that permitted such hydrothermal cells to circulate during a prolonged period. 'Volcanogenic massive sulphide deposits' (VMS) were formed in such areas. These are mounds or basinal accumulations of iron sulphide, sphalerite (zinc sulphide), galena (lead sulphide) and chalcopyrite (copper iron sulphide) deposited on the sea floor, generally atop their feeder zones as marked by abundant veins of chalcopyrite in intensely altered rocks.

Early intrusions

Dykes, sills and plugs of igneous rocks, formed from magma that did not reach the surface, are abundant in the volcanic rocks. A few mafic intrusions are known to contain minor concentrations of copper and nickel sulphides (eg. in 86 I). One intrusion in 76 L contains abundant ilmenite ($FeTiO_3$, a titanium ore mineral); copper-bearing veins are associated with others. Concentrations of gold are spatially associated with some small felsic intrusions. Porphyry type copper or molybdenum deposits are also found in or near felsic intrusions emplaced at shallow depths with resultant intense rock alterations. Only one possible example of this type of deposit is known in the northern Slave Province, the Tuk molybdenum-copper prospect northwest of Contwoyto Lake (76 E).

Sedimentary rocks

Sedimentary strata are intercalated with volcanic rocks in many areas. They include coarse to fine grained volcanic detritus, carbonaceous pyritic slate, chert, and carbonate rock. Some of the sedimentary lenses mark stratigraphic zones that contain bodies of base metal-bearing sulphides. Auriferous quartz veins are associated with iron-rich sediments in some areas (eg. 76 G). Banded chert-magnetite iron formations are rare, thin and generally low grade in the Slave Province although they are important current and potential sources of iron ore in other Archean regions. Numerous lenses of auriferous, arsenical, iron sulphide and iron silicate-bearing iron formation have been found in turbiditic sediments in the northern part of the Slave Province. Mining operations began in 1982 at Lupin Mine, a gold deposit of the iron formation type at Contwoyto Lake (76 E) 190 km southwest of Bathurst Inlet.

Metamorphic rocks and syntectonic intrusions

Mineral deposits formed essentially contemporaneously with their host strata and with volcanic related shallow intrusions have been considered above. Other deposits - notably many occurrences of gold in quartz veins - were formed later when the strata were intensely deformed, thermally altered (metamorphosed) and intruded by granitic rocks. Their constituents were dissolved evidently from down-buckled, heated strata by metamorphically generated solvent fluids. Such fluids are formed from included sea water modified through reactions that produce hydrous minerals and, in deeper hotter regimes, from volatiles expelled from the hydrous metamorphic minerals. Ore and gangue minerals may be deposited where expulsions of large volumes of metamorphically-derived fluids are channelled through fissures in cooler, more brittle, or chemically reactive rocks. The major gold deposits in shear zones at Yellowknife were probably formed in this manner (Kerrich and Allison, 1978). A related origin is also probable for abundant small but rich gold concentrations in quartz veins in turbiditic sediments east of Yellowknife, and in younger turbidites in Nova Scotia and in the Bendigo gold district of Australia. Arsenic is commonly concentrated with gold and some veins contain tungsten with or without gold. It is possible that gold and arsenopyrite in auriferous iron formation, mentioned above, are of metamorphic rather than of sedimentary origin. Favourable zones for 'metamorphogenic' veins in the Bathurst Inlet area are most likely to be near transitions between amphibolite and greenschist facies Archean metamorphic rocks.

Muscovite-bearing granitic bodies, probably produced through melting of hydrous metamorphic rocks, intrude metasedimentary rocks in the Slave Province, notably east of Yellowknife. These include pegmatitic (very coarse grained granite) segregations formed from magma especially rich in volatile constituents. Pegmatites near Yellowknife contain notable concentrations, in some cases potential ores, of lithium, tantalum, beryllium, and tin. Molybdenum and uranium are concentrated in some pegmatites elsewhere, and some pegmatites are mined for feldspar or for gemstones. Muscovite granite and pegmatite are present in the northern Slave Province near Bathurst Inlet but no valuable constituents have been reported in them, probably because they have not been sufficiently well prospected.

DEVELOPMENT OF APHEBIAN ROCKS AND MINERAL DEPOSITS

Early Aphebian anorogenic intrusions

Metamorphic and intrusive events outlined in the previous section culminated in the development of the Slave Structural Province 2.6 billion years ago (2.6 Ga). This cratonic region was then uplifted and deeply eroded. Around 2.2 Ga, it was intruded by several distinctive alkaline and peralkaline bodies, probably along tensional fractures that tapped magma sources at great depth. The Spruce Lake nepheline syenite-carbonatite complex 145 km northwest of Yellowknife in NTS block 85/O contains concentrations of niobium. The northeasterly trending Easter Island alkaline mafic dyke intrudes Archean granitic rocks on Simpson Island in the East Arm of Great Slave Lake. The Blatchford alkaline granite-syenite complex on the north shore of the East Arm hosts a very large deposit of potential tantalum-niobium ore containing significant amounts of uranium, rare earth elements, beryllium, thorium and fluorite.

Alkaline intrusions elsewhere in the world are the main source of niobium and some contain important deposits of other commodities, including tin. Deposits in the Palabora complex in South Africa, for example, are mined on a very large scale for copper and also for phosphate; magnetite iron ore, vermiculite, zirconium, uranium, and a little nickel, gold and silver are also recovered from the ores. The possibility that early Aphebian alkaline intrusions may be present in the northern part of the Slave Province warrants consideration. The Easter Island dyke was intruded along a northeasterly-trending fissure. Along with the Blatchford complex, it was intruded by a swarm of northeasterly-trending diabase dykes. All of these early Aphebian intrusions, and also deposition of the Wilson Island Group (subsequently metamorphosed and intruded by granite), were probably related to northeasterly trending fissures that were precursors to later fissures that controlled deposition of the Union Island Group and the Great Slave Supergroup in the East Arm (see Hoffman, 1981). One possible site of analogous precursor fissuring in the northern part of the Slave Province might be marked by the northeasterly-trending syncline of Goulbourn strata between Contwoyto Lake and Bathurst Inlet. Some unusual aeromagnetic features along the margins of the syncline should be investigated as they might reflect early Aphebian intrusions rather than Archean rocks.

Development of the Wopmay Orogen and associated basins

Around 2.0 Ga, the Slave Province was subjected to tensional strain resulting in rifting with related warping and development of a northerly-trending seaway near its present western border. This site of volcanism, sedimentation, and various tectonic events has been termed the Wopmay Orogen. Its development was accompanied by that of the rift-controlled Athapascow Aulacogen in the East Arm of Great Slave Lake and the Kilohigok intracratonic basin centred on northwesterly-trending fissures at Bathurst Inlet. Parallel histories of development of these basins and sedimentation therein have been outlined in great detail in various publications by Campbell and Cecile, Hoffman, and Hoffman and associates which are listed in references in this report. The following account of prospecting possibilities in the Kilohigok Basin is based largely on the history of sedimentation therein as presented in the most recent report of Campbell and Cecile (1981).

Sedimentation in the Kilohigok Basin

Coarse fluvial sands and gravels of the Western River Formation (see Table 1) derived from, and deposited atop weathered Archean rocks afforded permeable channelways for oxidizing waters, capable of carrying dissolved metals, flowing in the subsurface under hydraulic head. In many similar settings, copper, uranium, or lead ores have been deposited as interstitial fillings, or less importantly as fracture fillings, where such oxidizing waters encountered reducing conditions, other chemically favourable conditions, or perhaps rose through cooler rocks. Several mineral occurrences provide evidence that these processes occurred at least on a small scale in the Western River Formation. These are: uranium and copper-bearing veins (prospect J/11-2, Fig. 1); disseminated chalcocite (copper sulphide in dolomite along the Booth River in 76 K/14 (Campbell and Cecile, 1976a, p. 376); and traces of copper sulphide adjacent to stromatolite mounds on an island in the Inlet in J/13 (67°48'N, 107°12'W). It is interesting also that the Hornby Channel Formation in the East Arm, which is comparable with the Western River Formation, contains minor uranium impregnations. The most favourable situations in the Western River Formation would be where fluvial sands are overlapped by, or interfinger with, shallow marine mudstones that include grey unoxidized beds.

Gold paleoplacers might have formed where heavy minerals (black sands -principally iron oxides) were hydraulically concentrated in layers within coarse, well sorted Western River sands and gravels (Thorpe, 1980). This possibility must be regarded as remote as no significant heavy mineral concentrations have been reported and, moreover, economically important deposits of this type are rare. Paleoplacers of the pyritic type, like those in Huronian and Witwatersrand strata, are major sources of gold and uranium but they cannot be expected to occur in younger oxidized strata in the Goulburn Group (Roscoe, 1981).

Paleomagnetic studies by Evans and Hoye (1981) suggest that there was a protracted time break between deposition of the Western River Formation and that of subsequent Aphebian sediments which were deposited at a tropical latitude. Evidence of hot, dry climatic conditions in the latter sediments include salt casts in mudstones, breccias evidently formed by collapses of strata caused by solution of underlying salt beds, abundant dessication cracks in mudstones, a predominance of red clastic sediments, and cementation features consistent with capillary transpiration-evaporation loss of pore water. This is of economic interest as brines are potent solvents of metals that may be redeposited in concentrated form in favourable locales, again most notably near transitions from oxidizing to reducing conditions. Most important sedimentary copper deposits in the world were formed in low latitudes, many in environments interpreted as sabkhas (occasionally flooded coastal salt flats). Important calcrete and silcrete uranium deposits have been formed in playas in arid areas. Evaporite deposits are present in many areas containing important sedimentary uranium or copper deposits. Additional phenomena favourable for the formation of sediment-hosted metal deposits include periodic uplifts that resulted in the formation of soils, and perhaps solution of carbonate rocks to form open cavities and porous breccias that might later become filled with base metal sulphides, e.g. Mississippi Valley type lead-zinc deposits.

Sedimentary rocks of the Burnside River Formation, deposited as fluvial sands and gravels subsequent to post-Western River uplift and erosion, of the overlying finer grained Mara Formation and also of the Brown Sound Formation, can be considered favourable hosts for sandstone-type uranium, copper, or possibly lead deposits formed where oxygenated metal-bearing intrastratal waters came into contact with rocks containing reductants such as ferrous iron, carbonaceous material, or hydrogen sulphide. The uppermost part of the Mara Formation consists of beds of carbonate pisolites in a matrix of fine-grained hematitic quartzite and (mainly in eastern areas) thin beds of granular hematite ironstone according to Campbell and Cecile (1981), who considered these rocks paleosols developed during a prolonged period of uplift. Conceivably, sites favourable for unconformity-related uranium deposits might have been developed along this stratigraphic zone. The Amagok Formation, overlying the Brown Sound Formation and capping the Aphebian Goulburn succession, can also be considered favourable, not only as a solution conduit and deposit host in Aphebian time but also later, after it was covered by Helikian conglomerates and sandstones.

The possibility that significant amounts of uranium-bearing intrastratal water passed through these formations is suggested by a number of features. Pitchblende-chalcocite veins have been found in thin basalt lava flows in the Brown Sound Formation near the south end of Bathurst Lake (Pomie prospects - J/3-1 on Figure 1). Other occurrences of uranium minerals, by request not shown in Figure 1, have been found in the Brown Sound Formation and in dolomitic siltstone of the Quadyuk Formation in the southern part of the inlet (76 J) according to a confidential report. One group of occurrences in the Brown Sound Formation are apparently uranium-enriched ferruginous arkose beds. Others are described as mineralized fractures in a zone 1.5 km long in dolomite breccia (Omingmaktook member) in the lower part of the formation and adjacent to a diabase dyke. Concentrations of pitchblende were found by Cominco prospectors along with gold in surficial detritus at the JCW showing (J/12-1) overlying grey siltstone of the Mara Formation. Campbell and Cecile (1976a) found that mudstones and siltstones of the Mara Formation (then considered the uppermost member of the Burnside River Formation) are everywhere distinctly radioactive and the highest scintillometer readings they obtained were south of Kuuvik Lake (76 K/6) where the formation is 300 metres thick. A sample was found to contain 30 ppm uranium (V. Ruzicka, personal communication). Perhaps the uranium was introduced into the siltstone during prolonged weathering of overlying rock. More likely it was an intrinsic component of the siltstone, in which case considerable amounts may have been leached during weathering and conceivably concentrated elsewhere – perhaps in deposits akin to the unconformity-related type. In addition, it is worth noting that the Kluziai Formation in the East Arm near Reliance contains small, rich concentrations of uranium. As the Burnside River and Kluziai formations are comparable in their lithologies, their stratigraphic positions and their depositional histories within the Goulburn Group and the Great Slave Supergroup, respectively, the former may also deserve attention from this point of view.

Table 1. Aphebian strata of the Goulburn Group, Bathurst Inlet (after Campbell and Cecile 1981)

AMAGOK FORMATION	- white to mauve coarse grained, moderately indurated lithic and arkosic sandstones; minor conglomerate
	- red, well indurated lithic and arkosic sandstones interstratified with white and mauve coarse grained, moderately indurated sandstones
	- thin vesicular basalt flows interstratified with red sandstones
	- red, medium- to fine-grained, well indurated lithic and arkosic sandstones
BROWN SOUND FORMATION	- ferruginous, calcareous muddy siltstones
Omingmaktook Member	- allochthonous sheets of brecciated and chaotically folded carbonates surrounded by carbonate-mudstone breccia
	- buff-brown, medium- to coarse-grained immature sandstone
	- ferruginous, calcareous mudstone, salt casts locally abundant near the base of the succession
	- stromatolitic carbonate, clastic carbonate; abundant edge-wise conglomerate, oncoliths (western equivalent of K_1-K_3)
KUUVIK FORMATION	- stromatolitic carbonate, clastic carbonate; abundant intraformational conglomerate, minor mudstone
	- very thick units of alternating carbonate-rich and mudstone-rich beds
	- thin-bedded carbonate-mudstone rhythmites (more than 50% carbonate)
	- red and green mudstones and siltstones with minor carbonate (western equivalent of P_1-P_3)
	- thin-bedded mostly red mudstone-carbonate rhythmites with carbonate concretions (eastern equivalent of P_1-P_3)
	- thin-bedded mostly green carbonate-mudstone rhythmites; minor concretionary mudstone
PEACOCK HILLS FORMATION	- thin-bedded green, red, and red-brown mudstone rhythmites; massive, thick-bedded siltstones with rare concretions or lenses of carbonate
	- thin-bedded red and green mudstone rhythmites; minor concretionary mudstone and carbonate beds
QUADYUK FORMATION	- stromatolitic carbonate, clastic carbonate; minor clacareous quartzite, mudstone, and rare intraformational breccia
	- pisolitic ferruginous dolomite; granular hematite ironstone; minor ferruginous dolomitic quartzite
MARA FORMATION	- red fine grained sandstone and siltstone; minor red quartzite
	- pink, white, red quartzite and minor subarkose; quartz-pebble conglomerate; intraformational conglomerate; conglomerate; rare shaly or muddy partings
BURNSIDE RIVER FORMATION	- arenaceous dolomite; doloarenite
	- red mudstone, minor dolomite and stromatolitic dolomite
----------Disconformity (?)----------	
	Upper Argillite Member
	- grey, buff, and red argillite and mudstone; minor quartzite and subarkose
	Quartzite Member
	- white, pink and red quartzite and subarkose; red mudstone and argillite; minor grey-green quartzose turbidites. Stromatolitic and clastic carbonate, doloarenite and dolosiltite; minor pisolitic ferruginous dolomite (Beechey Platform).
	Red Siltstone Member
WESTERN RIVER FORMATION	- red siltstone, mudstone, and argillite; minor clastic and quartzose carbonate and quartzite; rare stromatolitic carbonate
	Lower Member
	- interbedded siltstone, quartzite, argillite, mudstone; minor thin-bedded quartzose turbidites. Stromatolitic and clastic carbonate, calcareous quartzite and minor quartzite (Kimerot Platform).
	Basal Conglomerate and Regolith Member
	- quartzite, quartz-pebble conglomerate, argillite, regolith; minor clastic carbonate
----------UNCONFORMITY----------	
ARCHEAN ROCKS	- undifferentiated granitoid, gneissic, metasedimentary and metavolcanic rocks

Intrusive sedimentary breccias

South of Burnside Bay of Bathurst Inlet (Figure 1), upper formations of the Goulburn Group, consisting of 2000 m. of strata, were injected by three large bodies and many small dykes of breccia composed of clasts (some of huge dimensions) and comminuted matrix material derived from the sedimentary strata, together with secondary dolomite, quartz and tourmaline (Cecile and Campbell, 1977). Formation of these breccias involved dilation and movements of large volumes of fluid through materials of different bulk composition, and through varied pressure-temperature regimes. They remained permeable for some time subsequent to the movement of rock fragments. Hence, like many intrusive breccias of various origins elsewhere, they were potential sites for deposition of metallic minerals. Exotic breccias in the Great Slave Supergroup (Reinhardt, 1972), for example, contain minor concentrations of copper sulphides and uranium. Outcrops of breccia at Bathurst Inlet have no doubt been prospected rather thoroughly with radiometric instruments, presumably with negative results. Nevertheless, possibilities for discoveries of breccia-related concentrations of uranium, as well as copper or other metals cannot be considered exhausted.

HELIKIAN STRATA AND MINERAL DEPOSITS

General

Fluvial sands, marine sediments dominated by stromatolitic dolomite, basalt flows and finally silts were deposited over extensive areas of the Canadian Shield following development of the Wopmay Orogen, comparable terminal Aphebian tectonic events elsewhere, and considerable post-orogenic uplift and erosion. Deposition of these strata was preceded in very early Helikian or latest Aphebian time in the Great Bear Lake - Dismal Lakes area by fault controlled deposition of the Hornby Bay Group comprising fluvial sands and gravels, minor volcanic rocks, dolomite and muds (Kerans et al., 1981a). A similar phenomenon is marked in the Bathurst Inlet area by the Tinney Cove Formation (map unit 13, Figure 1) composed of fanglomerates and coarse arkose deposited in northerly-trending troughs synchronously with active uplifts along their bounding faults (Campbell, 1978).

Correlations of Helikian strata in the Bathurst Inlet and Coppermine-Great Bear Lake areas proposed by Kerans et al. are shown in Table 2. Some of these correlations can be extended to strata preserved in the large Thelon Basin southeast of Bathurst Inlet (Figure 2) where small areas of dolomite, and basalt, resembling rocks of the Parry Bay and Ekalulia Formations, overlie Thelon sandstone. A remnant of dolomite overlying sandstone is also found in the Athabaska basin in northern Saskatchewan.

There are marked similarities not only between the lithologies of Helikian formations in different parts of the Canadian Shield, but also in their associated mineral deposits. Native copper – copper sulphide mineralization, for example, is present in Helikian basalt in the Coppermine area, the Bathurst Inlet area, and the Seal Lake area in Labrador, as well as in the Lake Superior area where major quantities of copper have been produced from concordant deposits in amygdaloidal lavas, interflow conglomerates, and overlying shale. Some 5 million tons of resources containing about 3% copper have been found in discordant brecciated zones in Coppermine lavas (Kirkham, 1980, p. 35). Sub-economic stratiform copper deposits have been found in shale above copper-bearing lavas in the Seal Lake belt in Labrador (Gandhi and Brown, 1975). Important uranium deposits occur at the base of the Helikian Athabaska and Thelon sandstones and within Dismal Lake sandstone.

Table 2. Proposed correlations for Helikian Strata of Bathurst Inlet and Coppermine Homocline

BATHURST INLET Campbell (1978)	COPPERMINE HOMOCLINE Kerans et al. (1981)
ALGAK FM.	HUSKY CREEK FM.
EKALULIA FM.	COPPER CREEK FM.
KANUYAK FM.	DISMAL LAKES GROUP
PARRY BAY FM. ELLICE FM.	DISMAL LAKES GROUP
TINNEY COVE FM.	HORNY BAY GROUP

Pitchblende-bearing veins are found in or near all of the Helikian basins, most commonly in pre-Helikian rocks. Some veins, including perhaps some uraniferous veins in the Kilohigok basin, may be related solely to pre-Helikian events. Others, however, post-date deposition of some or all of the Helikian strata. These include simple pitchblende bearing veins that may extend far below unconformities, and veins containing abundant arsenides of nickel and cobalt along with concentrations of bismuth, selenium, precious metals, lead and copper. Some of the latter contain rich concentrations of silver, notably as native metal, but lack uranium. Some lack both uranium and silver. Still others are quartz or carbonate veins containing lead and zinc or copper sulphides. Vein deposits of the foregoing types are found associated with nonconformities of various ages but the most important of unconformity-related deposits, exemplified by the rich uranium concentrations in the Athabaska basin, are along Helikian-Aphebian unconformities. Some pitchblende veins are considerable distances from known appropriate unconformities and have great vertical extents. Nonetheless, they can be grouped with unconformity-related deposits on the basis of temporal relationships and commonly shared geochemical characteristics (e.g. contents of arsenic, nickel, cobalt, selenium and precious metals). Possibilities for discoveries of unconformity-associated deposits in the Bathurst Inlet area will be discussed in a subsequent section of this report.

The following outline of exploration possibilities in Helikian Formations (Table 3) in the Bathurst Inlet area is developed on the basis of stratigraphic descriptions and interpretations by Campbell (1978, 1979).

Ellice Formation

The Ellice Formation (unit 14, Fig. 1) in the Bathurst Inlet area is composed of up to 100 m of orthoquartzite and feldspathic quartzite with oligomictic conglomerate beds in lower sections. The formation is of special interest because comparable Helikian quartzite formations in the Athabaska, Thelon, and Dismal Lake areas contain or overlie important uranium deposits. It occurs in several long narrow northwesterly-trending, downdropped fault blocks in Bathurst Inlet and in a similar block 100 km to the southeast along the Bathurst Fault. An upper member composed of red siltstone

Table 3. Helikian strata, Bathurst Inlet (after Campbell, 1981)

Algak Formation: Reddish to purple arkose and siltstone; minor mudstone and shale (35 m).
Ekalulia Formation: Massive olive-green basalt; minor pillowed basalt; rare doloarenite (300-500 m).
Kanuyak Formation: Dolomite block megabreccia; chert-pebble conglomerate; minor quartzite; coarse grained doloarenite; oolitic and pisolitic dolomite; stromatolitic dolomite; red arkose, siltstone, and mudstone; (0-60 m).
----------Unconformity----------
Parry Bay Formation: Thin- to thick-bedded doloarenite, dolosiltite, rare dololutite; minor grey-black shale and mudstone; stromatolitic dolomite; oolitic and pisolitic intraclast-bearing dolomite; rare chert-pebble conglomerate and concretionary dolomite; (220 m).
Ellice Formation: Red mudstone and siltstone with minor red arkose and rare fine grained quartz-pebble conglomerate; minor beds of fine grained doloarenite; (100 m).
Reddish, pink, and white quartzite with interbedded quartz-pebble conglomerate; quartz grit; minor siltstone and rare mudstone; (500 m).
Reddish, vesicular, massive basalt; (10-20 m).
Quartz-pebble and boulder conglomerate; minor white quartzite; (2-10 m).
----------Unconformity----------
Tinney Cove Formation: Reddish, pink and locally mottled, poorly-sorted arkose and arkosic grit; minor quartz-pebble-bearing arkose and siltstone; (200 m).
Red, very coarse grained fanglomerate; conglomerobreccia; coarse grained polymictic conglomerate.
----------Unconformity----------
APHEBIAN AND ARCHEAN ROCKS

and dolomite is exposed on Hurd and Imnaktuut Islands in the outer part of the inlet and marks a northerly and upward transition from fluvial to shallow marine depositional conditions.

No significant occurrences of metallic minerals have been reported in the formation. Slight concentrations of uranium beneath the formation in the Elu Inlet area and copper and uranium in overlying shaly Parry Bay beds might have been precipitated from water that had percolated through Ellice sandstone, but the formation itself does not appear to contain facies likely to effect deposition of metals from intrastratal fluids. An exception might be heavy mineral layers and it is also remotely possible that such layers could contain paleoplacer gold concentrations. Athabaska and Thelon sandstones contain appreciable concentrations of apatite in some layers. The possibility that important concentrations of phosphate are present in the Ellice Formation should be investigated as sufficiently rich concentrations at tide-water could be economically significant in the future. If the hypothesis that apatite in the Athabaska Formation is of marine origin is correct, the most phosphatic beds in the Ellice Formation are likely to be found in the uppermost, marginal marine beds north of the proposed park area.

Parry Bay Formation

The Parry Bay Formation, dominantly stromatolitic dolomite with black shale beds (red in upper sections) is of special interest as a likely source for biogenic reductants and hydrogen sulphide capable of precipitating base metal sulphides and uranium from intrastratal solutions. Underlying fluvial Ellice sandstone and overlying oxidized, cupriferous, subaerial basalts were likely conduits and sources for such metalliferous solutions. Evaporite beds in the basal part of the Parry Bay Formation, at least in northerly areas, were possible sources of solvent brines and were evidently responsible also for the formation of solution slump breccias (Campbell, 1978) that provided possible sites for ore deposition. The formation is up to 220 m thick. Its top was

eroded subaerially and this resulted in the formation of karstic breccia (rubbly infillings of sink holes and solution channelways) that are classic host structures for Mississippi Valley type lead-zinc deposits.

Sangster (1980) noted the possibility that breccias in the Parry Bay Formation might host lead-zinc deposits but he down-graded chances of this somewhat because Campbell (pers. comm.) did not observe any white sparry dolomite, characteristically found in the interstices of many, but not all, breccias that host Mississippi Valley type deposits. R.V. Kirkham (pers. comm.) has suggested that breccias, subjacent to cupriferous basalts, might be equally or more likely to host rich concentrations of chalcocite (copper sulphide) analogous to the extremely rich chalcocite orebodies mined by Kennecott Copper Corp. in Alaska, which are in a Triassic dolomitic formation overlying basalt (see Carrière, Sinclair, and Kirkham 1982, p. 6). The host formation (Chitistone Limestone), like the Parry Bay Formation, contains abundant and varied stromatolites, dark shale beds, evaporites, and breccias (Moffit, 1938). The Parry Bay Formation underlies rather than overlies cupriferous basalts but there is abundant evidence that it provided favourable sites for deposition of copper.

Veins and pods of chalcocite, bornite and chalcopyrite have been found in several areas in Parry Bay dolomite beneath cupriferous basalt of the Ekalulia Formation (e.g. prospects O/5-1, N/10-2, N/11-1). Copper stains are common along contacts of basalt and underlying dolomite of either the Parry Bay Formation or the thin discontinuous Kanuyak Formation. Such contacts are fairly well defined by outcrops of dolomite and basalt and by topographic features along an aggregate distance of about 170 km, including sections between Daniel Moore Bay and Arctic Sound, on Banks Peninsula, and on the Barry Islands. Actual contacts, however, are not extensively exposed and upper parts of the Parry Bay Formation are mostly covered by talus and other debris. Many concentrations of copper, like those found in outcrops, must be hidden beneath drift. Karstic breccias in the Parry Bay Formation are also largely covered by drift. These structures, not recognized during previous copper prospecting, remain a favourable target for geologically directed, geochemical and geophysical prospecting over extensive areas.

In addition to possibilities for discoveries of copper sulphides in breccias and fractures in the Parry Bay Formation, there are possibilities for stratiform copper and possibly copper-uranium deposits at the base of the formation. Campbell (1978) noted disseminated pyrite with a little chalcopyrite in slightly radioactive black mudstone and shale near the base of the formation on Kent Peninsula. He considered that this lower facies might pinch out towards the south, but this is by no means certain as these rocks weather recessively so the base of the Parry Bay Formation is not exposed in the map area (Fig. 1). It is mostly beneath the sea but it crosses drift covered land areas between Brown Sound and Portage Bay and west of Arctic Sound. These areas, respectively 28 and 10 km long, are the only places where the entire formation is accessible for prospecting.

Kanuyak Formation

Red mudstone, arkose, and stromatolitic dolomite of the Kanuyak Formation locally fill depressions on the eroded top of the Parry Bay Formation. The formation, however, is rarely more than 30 m thick and is absent over extensive areas. It records a brief period when the land surface was depressed to sea level following uplift and erosion of the Parry Bay Formation and preceding eruption of basalt lavas. It hosts some copper sulphide in fractures but has little potential for significant deposits, compared to the Parry Bay Formation. The greatest potential would be in basal conglomerate composed of Parry Bay clasts, in some cases derived from and contiguous with Parry Bay karstic breccia.

Ekalulia Formation

The Ekalulia Formation comprises flows of massive basalt 2 to 6 m thick, some sparsely pillowed flows, and some thin interflow layers of dolomite and siltstone. The lavas are most typically olive green colour on weathered surfaces but variably brownish to reddish and green colourations are common. Campbell (1978) noted that tops of flows are generally reddish brown. The formation is believed to be 300 to 500 m thick. Most flows contain small vesicles filled with calcite, quartz, green silicate, agate and rarely, copper. Fractures with various orientations contain films and veinlets of calcite and, in many localities, secondary green copper minerals, chalcopyrite, chalcocite, or native copper.

Detailed stratigraphic studies of the formation would provide data useful for economic assessments (e.g. variations in oxidation of flows and minor intercalated sediments, positions of the most amygdaloidal zones, dislocations of strata due to faulting), but no such information is available. The origin of important copper deposits in subaerial basalt is much disputed, but it seems reasonable to assume that the known mineralization in the Ekalulia Formation represents little more than minor transfers of endogenic copper from more oxidized to less oxidized parts of the formation. Campbell (op. cit.) noted a 0.75 m unit of doloarenite, probably of lagoonal origin, some 5 m above the base of the formation in one place. Conceivably, this unit or other waterlain sediments intercalated with the subaerial basalt flows might host thin copper deposits, but there is little reason to suppose that the lavas contain sizeable concordant deposits. Many post-Helikian faults are present in the area and Ekalulia basalts are faulted against other formations in many places. Displacements marking faults are difficult to recognize within the basalts but numerous unmapped fissures must cut these rocks. Possibilities for discoveries of breccia-controlled deposits like those in the Coppermine area, therefore cannot be discounted. On the contrary, they may tentatively be considered 'good'.

Algak Formation

Beds of arkose and reddish siltstone conformably overlying the Ekalulia Formation have been named Algak Formation. Sedimentary beds in this stratigraphic position deserve special scrutiny as grey mudstones overlying cupriferous basalts at Lake Superior contain a major stratiform sulphide deposit and analogous but sub-economic mineralization has been found near Seal Lake in Labrador (Gandhi and Brown, 1975). No grey mudstone layers were noted in the Algak Formation during reconnaissance geological mapping, mainly along shorelines. It is conceivable, however, that some may be present. Thus, possibilities for stratiform copper deposits in the Algak Formation may be considered low, but they cannot be entirely discounted.

UNCONFORMITY-RELATED DEPOSITS

Uranium

Exploration for uranium in recent years has been focused especially strongly on searches for so-called unconformity deposits beneath Helikian sandstone formations, including the Athabaska, Thelon, and Ellice formations as well as sandstone at the base of the Dismal Lakes Group. Only two minor occurrences of uranium

concentrations at the base of the Ellice Formation have been found to date. These are in Elu Inlet; one where the Ellice overlies Tinney Cove conglomerate and the other where it overlies weathered Archean rocks (Campbell, 1978 and 1979).

In order to provide perspective on exploration possibilities in the Ellice Formation in Bathurst Inlet, it is useful to outline features of unconformity deposits that have been found elsewhere. They are volumetrically small compared to most important mineral deposits and hence difficult to find, but they are characteristically high grade and in some cases phenomenally rich. Collectively, those discovered in the Athabaska basin and deposits found in very similar geological settings in Australia contain a very important portion of the world's low cost uranium resources. Nickel and cobalt arsenides, gold, silver and selenium are associated with uranium in many of the deposits (Dunn, 1976). The abbreviation URU is employed in tables and in some cases in text in this report to designate unconformity-related uranium deposits.

Most of the Athabaska deposits are in faulted, brecciated zones that transect nonconformities between folded Aphebian metasedimentary strata and nearly flat-lying Athabaska sandstone. The underlying host rocks were evidently deeply weathered in valleys formed along the faults prior to deposition of Athabaska sands and gravels. Post-Athabaska movement occurred along the faults, resulting in brecciation of basal conglomerate and sandstone beds. Intense alterations of the basement and overlying host rocks accompanied deposition of pitchblende and other metallic minerals largely in open spaces. Minor mineralized layers have been found in sandstone in a few places. Unconformably underlying strata at most deposits include highly carbonaceous beds. These, or associated iron sulphides, might have produced reducing conditions causing precipitation of ore minerals from hot waters.

The Lone Gull deposit in the Thelon basin near Baker Lake in Keewatin District has deep roots in highly altered Aphebian basement rocks. The Thelon Formation has been eroded in the immediate vicinity of the deposit. Aphebian strata (Amer Group) in this area include stratiform uranium deposits. The Mountain Lake deposit in the Coppermine area is a lower grade, peneconcordant uranium deposit in Dismal Lakes sandstone a few metres above an unconformity (Gandhi 1980). There is little evidence of fracture control of the mineralization, which includes copper sulphides. The deposit is localized where grey siltstones and arenites interfinger with clean sandstones and could be considered a 'sandstone-type' deposit rather than, or in addition to, a 'URU type' related to the same regional unconformity that underlies the Ellice Formation.

The Ellice Formation is known to overlie the Tinney Cove, Brown Sound and Amagok formations in the Bathurst Inlet map area (Fig. 1), as well as the Burnside River Formation and Archean basement rocks to the northeast in the Elu Inlet area. No doubt it was deposited on eroded surfaces of folded and faulted Aphebian Formations and Archean basement rocks in the Bathurst Inlet area. Thus, where the unconformity is buried in down-faulted blocks, the Ellice Formation may overlie various pre-Helikian rocks in addition to the Amagok and Brown Sound formations. More importantly, there are probably places along other fault blocks where recent erosion has just barely removed the Ellice Formation and paleosol at the sub-Ellice unconformity. Remnants of deeper zones of paleosol and deep but economically significant roots of unconformity-associated uranium deposits could be present therefore beneath drift-covered flats and shelves in the Bathurst Inlet area.

Occurrences of abundant widespread small clasts (generally less than 3 cm in diameter) containing rich concentrations of uranium, gold, and selenide minerals in drift at the JCW prospects (J/12-1) lends support to this concept. The drift overlies gently-dipping grey siltstone of the Mara Formation and contains abundant, closely-spaced clasts derived perhaps largely from this formation. Its relatively well-sorted character and hummocky topography distinguishes it from nearby, extensive, northerly-transported till (Blake, 1963). It may have been deposited by a glacio-fluvial stream system that flowed northeasterly to northerly. The uraniferous clasts, anomalous radioactivity, and radon anomalies occur over an area about 700 metres (north-south) by 500 metres (east-west). The uraniferous float fragments contain intimate mixtures of pitchblende (mainly as tiny botryoidal grains), clausthalite (lead selenide), cobaltian clausthalite, tiemannite (mercury selenide), carrollite (cobalt copper sulphide), native gold, and native selenium[1]. A lead-bismuth selenide and brannerite have also been reported (see Appendix A).

This mineralization appears to be remarkably similar to that of Amok's D Zone URU ore body at Cluff Lake, Saskatchewan as outlined by Harper (1978) and Ruzicka (1975). Nickel arsenide, abundant in many URU deposits, has not been found in the JCW erratics but this does not necessarily indicate that it is not present in the source mineralization as it is readily decomposed during weathering. It is possible that the source of the mineralized clasts was a URU related to the Mara weathering surface rather than one formed near a sub-Ellice unconformity.

If the source of the clasts was an exhumed unconformity-related deposit, the normally friable host rocks would likely have been eroded to form depressions subsequently filled by glacial and recent sediments. There is little chance that radiometric prospecting of nearby outcrops would lead to their discovery. Many such deposits have been discovered by seeking sources of radioactive boulders and other less enigmatic mineralized material than that at the JCW showing. Uraniferous boulder trains may not be well developed in some situations or they may themselves be hidden beneath sediments. The yet undiscovered source of the JCW uranium-gold float could be a significant deposit. It seems reasonable to conclude that additional drift-covered uranium concentrations could have escaped detection by the geochemical and other prospecting surveys carried out unevenly over parts of the Bathurst Inlet area. Such surveys certainly cannot have eliminated the possibility that URU deposits may be present beneath Helikian strata in down-dropped fault blocks. Other techniques including radon surveys and drilling would have to be applied in these blocks to further assess their uranium potential.

Silver or uranium and arsenide-bearing veins

Arsenide-bearing veins, in many but not all cases containing appreciable concentrations of uranium or silver, are found in a number of places in the northwestern Canadian Shield including the Bathurst Inlet area. These types of deposits, including the well known silver veins at Cobalt, Ontario, and pitchblende and silver veins at Great Bear Lake, are similar geochemically to some unconformity-related uranium deposits but not to any other types of mineral deposits. Most are near an unconformity, or may be presumed to have been formed at no great stratigraphic distance from one. They are also near or within intrusive rocks, most commonly gabbro sheets, that transect the unconformity or post-date strata overlying it. Veins at Port Radium, Great Bear Lake, were formed in part prior to

[1] The minerals were identified by microprobe methods by A.L. Littlejohn, Mineralogy Laboratories, Geological Survey of Canada.

intrusion of a diabase (gabbro) sheet but were extended into the diabase prior to deposition of most of the ore minerals according to Campbell (1955). The diabase sill at Cobalt evidently was still hot, producing local thermal gradients, when various arsenide minerals were deposited in different zones within the vein systems (Petruk, 1971). Arsenide veins in both these areas, and in many others, are near base-metal-bearing sulphide concentrations in the older rocks.

The many different hypotheses of origin that have been argued for arsenide-bearing veins in various areas cannot be reviewed here but they fall into two schools. Some hold that the deposits were hydromagmatic, formed from hydrothermal fluids produced during crystallization of an intrusive rock (e.g. Petruk, 1971). Others consider that the vein constituents were concentrated selectively by metasomatic processes or by diffusion from wall rocks and sulphide concentrations therein (Robinson and Ohmoto, 1973; Boyle and Dass, 1972). Neither school has assigned a direct role to unconformities in the formation of these deposits. It is suggested herewith that weathering of metalliferous rocks at surfaces now marked by unconformities played a definitive role, resulting in the solution and removal of the most abundant elements, Fe, Zn, Cu, S, from protores and the formation of residual concentrations of less abundant elements, As, Ni, Co, Bi, Ag or U, in deep fracture systems. Ground water sealed beneath an unconformity and depressed beneath a pile of accumulating sediments could have become modified into a saline hydrothermal solution rich in metals derived, not from the primary sulphide concentrations, but from more easily dissolved, oxidized, compositionally different, residues of these concentrations. The role that associated intrusive rocks almost certainly played in the process of vein formation may be illustrated by reference to Cobalt. There, intrusion of a diabase sill transecting an Archean-Aphebian unconformity at a low angle evidently triggered circulation of the hydrothermal solutions and subsequent rapid precipitation of carbonate and metallic minerals. Ore veins were formed in cooling cracks in the diabase as well as in adjacent Archean and Aphebian rocks.

Native silver ore has been mined in veins at two localities at Hope Bay about 20 km north of the map area (Fig. 1) near 107°W longitude. The ores contained only small amounts of arsenide minerals, but more abundant arsenides are present in nearby veins. Minor amounts of pitchblende are also present in some veins. The veins are near a gently dipping unconformity between Archean rocks and the Burnside River Formation. They were formed not far beneath the projected position of a near-horizontal gabbro sill. The ore-bearing veins cut highly sulphidic sediments in Archean volcanic rocks, a situation very like that of the silver veins at Cobalt.

At prospect N/2-3, 1 km south of the James River, small veins containing nickel arsenide are found in Archean rocks near a gabbro sheet (Fig. 5). Similar veins are found 260 km southeast at Itchen Lake near the Rockinghorse Lake outlier of Goulburn strata that marks an extension of the Bathurst Inlet – Contwoyto Lake structural trough. A gabbro sheet follows the unconformity at Rockinghorse Lake. The veins at Itchen Lake were probably formed not far beneath the Archean-Aphebian unconformity. They are in sulphidic Archean metastrata intruded by a small body of gabbro, then by a Mackenzie diabase dyke.

In the East Arm of Great Slave Lake, a group of numerous arsenide-bearing veins are found along a northeasterly-trending zone within Archean metasedimentary rocks and the Blachford syenite complex on the north shore of the Arm, and also within the Easter Island dyke which intrudes Archean Granite near the western part of Simpson Islands. A cluster of northeasterly-trending diabase dykes in the same area intrude all rocks older than the Great Slave Supergroup. The arsenide veins as a group appear to be more closely and more consistently associated with these dykes than with any other igneous rock. The veins on Easter Island are near a gently-dipping unconformity between Archean granite and basal strata of the Great Slave Supergroup.

Another group of arsenide veins are also present in the East Arm. They occur only in several monzonite-diorite laccoliths that intrude the Stark megabreccia within the Great Slave Supergroup. This formation is a probable salt solution breccia (Hoffman et al., 1977) and is comparable to the Omingmaktook olistostrome in the Brown Sound Formation of the Goulburn Group in Bathurst Inlet. This suggests that igneous rocks intruding into the lower part of the Brown Sound Formation might be worth prospecting for arsenide veins. It is interesting that some radioactivity has been found associated with a diabase dyke that cuts Omingmaktook breccia.

The Easter Island veins and two prospects in laccoliths contain a little silver and most veins contain some pitchblende.

Favourable situations for silver or uranium deposits of this type are near unconformities, near a gabbro sheet, and in some cases near sulphide-rich rocks, and near intrusive rocks, most commonly gabbroic sheets. The latter are widespread in the region near Bathurst Inlet but only a few of these are within the proposed park area. One is east of Buchan Bay. The southern end of Quadyuk Island, although not near an unconformity, is also of interest. Gabbro intrudes Omingmaktook breccia here and an analogy can be drawn with Blanchet Island in the East Arm, where arsenide viens containing a little pitchblende are found along the contact of a dioritic laccolith with the Stark Formation.

Copper

A breccia composed of dolomitic rock clasts cemented by abundant copper sulphides is present at the west shore of a lake 75 km west of Arctic Sound outside the map-area (Fig. 1). It unconformably overlies altered Archean rocks and apparently forms the base of an erosional remnant of Aphebian, Helikian, or, conceivably, Paleozoic strata that underlies the lake basin. It seems most probable that these strata are correlative with the Parry Bay Formation as a small outlier of this formation has been mapped west of the Bathurst Fault 18 km west of Arctic Sound. This outlier should be prospected.

Copper sulphide is concentrated in fractures in red altered granite 7 km southeast of Umingmatuk (Prospect O/12-1) (Fig. 6). The concentrations do not appear to represent a common sort of vein mineralization, much less a porphyry-type of copper veining. Nearby Archean granitic rocks are variably altered and veined with quartz. It may be speculated that this alteration, the veining and copper deposition occurred just below an exhumed unconformity.

Lead and zinc

Galena veins at Galena Point N/13-L (Fig. 7), and sphalerite-galena concentrations in an extensive breccia vein system on Hiukitak Island (O/3-1) were deposited in open spaces in fissured Archean granite and gneiss. They were formed after the Archean rocks were eroded and covered by Proterozoic strata. It is interesting to note that similar veins are found near Thunder Bay, Ontario (Franklin and Mitchell, 1977) transecting the unconformity between Archean rocks and the Helikian Sibley Group, which is comparable to the Parry Bay Formation in its lithology and its position within an Helikian succession. Other deposits of this type are probably present in the Bathurst Inlet area, but

Figure 5. *Gold prospect N/2-2 and nickel arsenide prospect N/2-3 in Archean rocks at Turner Lake*

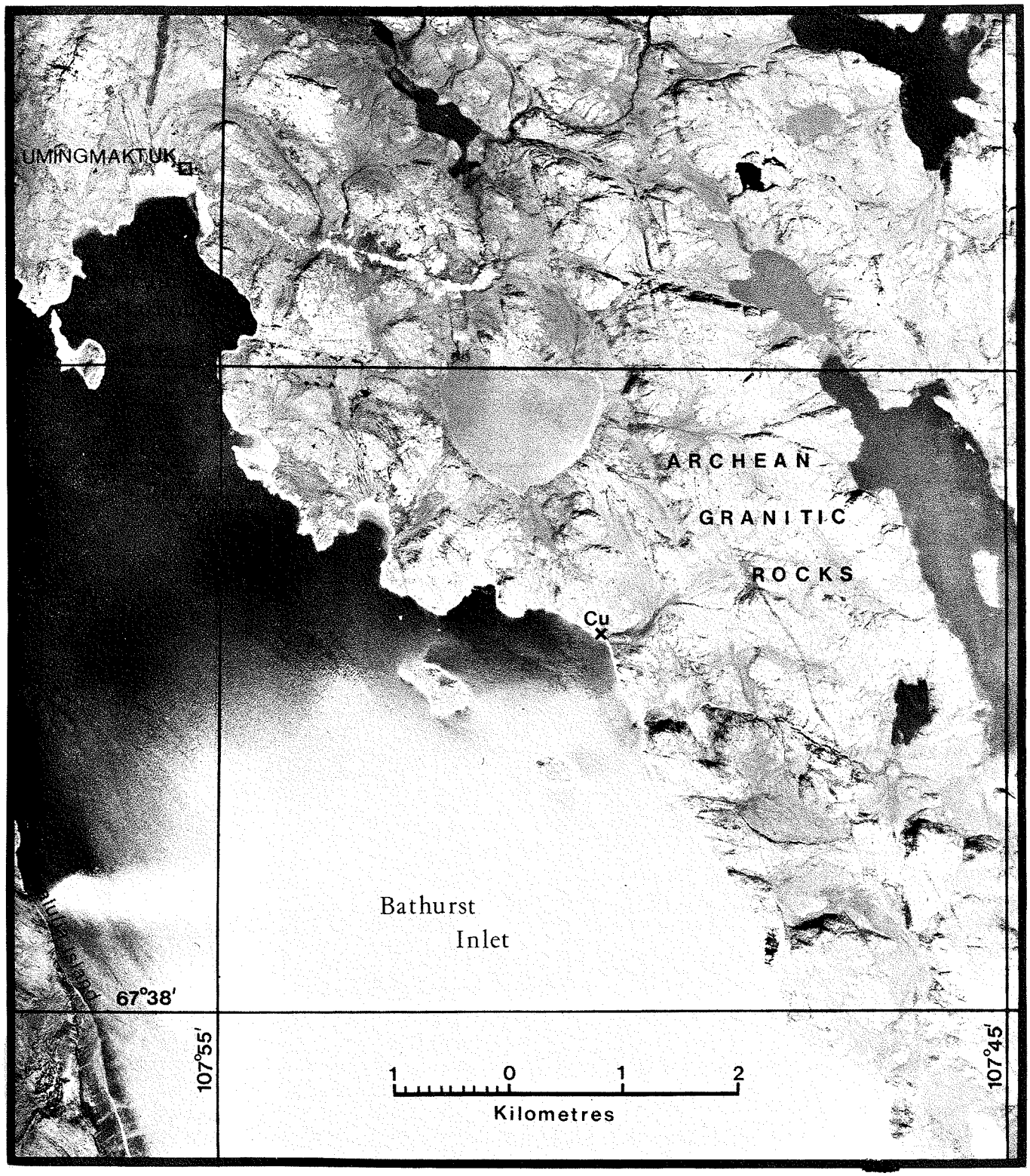


Figure 6. *Copper prospect O/12-1, Joe Group, near Umingmaktuk*

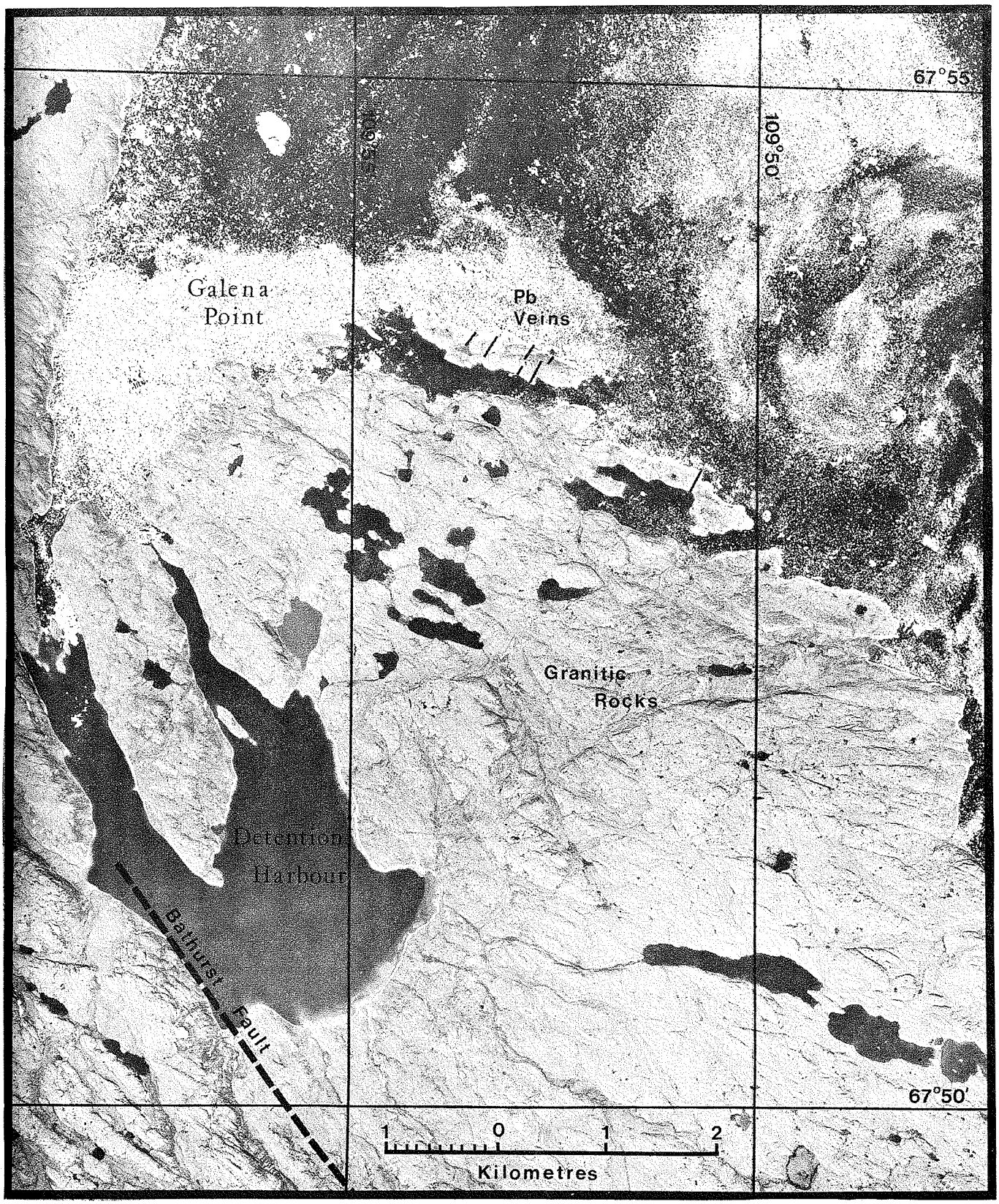


Figure 7. *Galena veins at Galena Point, prospect N/13-1*

they are not attractive exploration targets as they contain little silver and even larger and richer veins than those presently known could only contain small tonnages of ore with low bulk value.

GABBRO-RELATED DEPOSITS

Aphebian strata in the syncline west of Bathurst Inlet are intruded by sheet-like bodies of gabbro considered to be of Aphebian age (Evans and Hoye, 1981). For the most part these gabbro bodies were emplaced along the unconformity between Archean rocks and the Western River Formation but many of them transect this contact and intrude basement rocks, as well as the Western River and Burnside River formations. The intrusions produce strong aeromagnetic anomalies but they are not uniformly intensely magnetic. One of the more magnetic zones (K 14-1) within an intrusion at the north side of the Booth River is composed of a coarse ilmenite-rich peridotite rock which also contains small amounts of nickeliferous pyrrhotite and chalcopyrite. This extensive zone, and others likely to be present in the sills, require careful study as they could include sections with potentially economic concentrations of titanium or iron ore, nickel, copper and platinum metals (see Eckstrand, 1980).

Several sets of younger gabbro intrusions are also present in the area. Older sills are cut by steeply-dipping, northwesterly-trending diabase (gabbro) dykes of the Mackenzie swarm that may have been feeders for the lavas that erupted to form Ekalulia basalts. Some of the diabase sills and sheets in Helikian strata may also be intrusive equivalents of the lavas, but many such sheets seem to be contiguous with bodies that cut across the Bathurst Fault and branch faults that displace Helikian strata. These are considered correlative with Franklinian gabbro sills that intrude the Rae Group northwest of the map area.

In a number of localities on the Barry Islands, metamorphic alteration of Parry Bay dolomite near gabbro intrusions has resulted in the formation of soapstone used as carving stone.

Minor chalcopyrite veins of no economic interest have been developed near the contact of many gabbro intrusions.

The association of many arsenide-bearing veins with gabbro sills has been outlined previously. The veins might be described as 'gabbro associated' rather than 'unconformity-associated'. The latter categorization was adopted here in part to emphasize that there is little reason to believe that the veins were formed from hydromagmatic fluids derived from gabbro, as well as to emphasize their common parameters with unconformity-related uranium deposits.

PART II

MINERAL RESOURCES AND RESOURCE POTENTIAL

IN THE PROPOSED BATHURST INLET NATIONAL PARK

(1) Mainland east of Bathurst Inlet

Gold

Archean rocks east of Bathurst Inlet may contain important resources of gold, particularly in lenses of iron formation (IFG) in turbiditic sediments (map unit 2). One IFG (prospect J/11-1) has been discovered 8 kilometres east of the Inlet near Tinney Cove (Fig. 8). This zone is apparently sub-economic, but further investigations could reveal it to be of economic interest given significantly higher gold prices, particularly if other such deposits were found in the area. It is unlikely that the J/11-1 prospect is the only IFG in the area as such deposits are not found elsewhere as single isolated occurrences. The host metasediments, prior to their northerly displacement along the Bathurst Fault, were part of an extensive belt extending westward to Contwoyto Lake where the Lupin IFG is presently being mined.

The sedimentary rocks likely to contain IFG and their more highly metamorphosed equivalents in map-unit 3 are the most abundant rock types east of the Inlet, and possibilities of discovering IFG within areas presently mapped as granite (unit 4) cannot be entirely discounted. Their boundaries as shown in Figure 1 have been outlined only approximately by widely spaced helicopter traverses and air photo interpretations; moreover, they may contain unmapped inclusions of metasedimentary rocks. The known IFG has no aeromagnetic expression. It can be spotted from the air (when one knows where to look) by a dark, "burned" appearance and a little rust on some of the rocks, and this is how it was discovered. But occurrences of IFG could easily be missed from the air even by deliberate and experienced observers. IFG lenses are probably restricted to certain stratigraphic horizons characterized by fine-grained argillaceous beds within the complexly folded sedimentary rocks, but these could only be outlined and favourable areas thus delineated and reduced by detailed geological mapping throughout the entire Archean terrane area.

Significant deposits of gold in quartz veins may also be present in the turbiditic sediments (TVG). None have been reported but they are characteristically small, inconspicuous and unlikely to be found excepting by deliberate and tedious prospecting. A total absence of TVG in the entire area would be difficult to explain within the framework of current ideas about their metamorphic origin, coupled with the presence of auriferous quartz veins in nearby areas. Most TVG are "teasers", tiny isolated occurrences, but many have been found to be sufficiently large and rich to be mineable in geographic situations no more favourable than Bathurst Inlet. Detailed geological mapping, providing information on metamorphic gradients, various intrusive rocks, and abundances of small quartz veins could perhaps help reduce areas deemed favourable for TVG, but at present these must be considered to include all of the Archean rocks east of the Inlet and those on islands near the east shore.

Conceivably resources of placergenic gold in the Western River Formation along the east shore could be a very slight possibility.

Lithium, beryllium, tantalum, tin and molybdenum in pegmatites

The area contains muscovite granite pegmatites worth prospecting for valuable minerals. Such minerals have not been reported in pegmatites of the area and the pegmatites do not appear to occur in swarms of sizeable bodies conspicuous from the air like the resource-bearing pegmatites east of Yellowknife. The associated valuable minerals, however, are not likely to attract the attention of anyone but a specialist prospector or mineralogist. Detailed mapping of pegmatitic and granitic bodies, and of metamorphic facies in their host metasedimentary rocks would confirm or eliminate possibilities that economically interesting pegmatitic bodies are present. Until such surveys are carried out, it must be assumed that there are moderate chances for discoveries of resources in pegmatites.

Lead and zinc in veins in basement rocks

The lead-zinc breccia vein (0/3-1) on Hiukitak Island (Fig. 9) has an impressive length and a vertical extent of 150 metres that would permit adit mining if it contained ore shoots. Similar veins at Galena Point outside the proposed park area (Fig. 7) form a remarkable cluster and have yielded a shipment of 111 tonnes of hand-cobbed galena. The veins were probably formed near unconformities beneath overlying Proterozoic sediments. Unfortunately they contain little silver. They are not highly conspicuous so more will probably be found. No drilling has been done on prospect 0/3-1 and such deposits are not likely to attract the attention of large mining companies as they offer only possibilities of yielding small amounts of metals from small scattered pods within the vein structures. Nevertheless, they offer possibilities for small "cottage" industries in the area and could be considered minor potential resources.

Silver associated with an unconformity and gabbro intrusion

A special situation worth noting exists at the proposed northeastern park boundary east of Buchan Bay. A substantial body of gabbro intrudes an nonconformity between Archean rocks and the Burnside River Formation. These relationships are similar to those at Hope Bay 50 km to the northeast where two small vein deposits of extremely rich native silver ore have been mined. A feature of probable importance at Hope Bay is apparently missing at Buchan Bay. This is the presence of sulphidic and graphitic beds and greenstone in the basement rocks. The area was probably examined by Cominco in 1979. Nevertheless, the possibility that silver and/or uranium-bearing cobalt nickel arsenide veins may be present here should be checked carefully.

Copper-zinc-lead and silver in volcanogenic massive sulphide deposits (VMS)

The most important deposits found to date near the Inlet are VMS in Archean volcanic rocks. No volcanic rocks were recognized within the proposed park area in the course of reconnaissance helicopter mapping. Reconnaissance

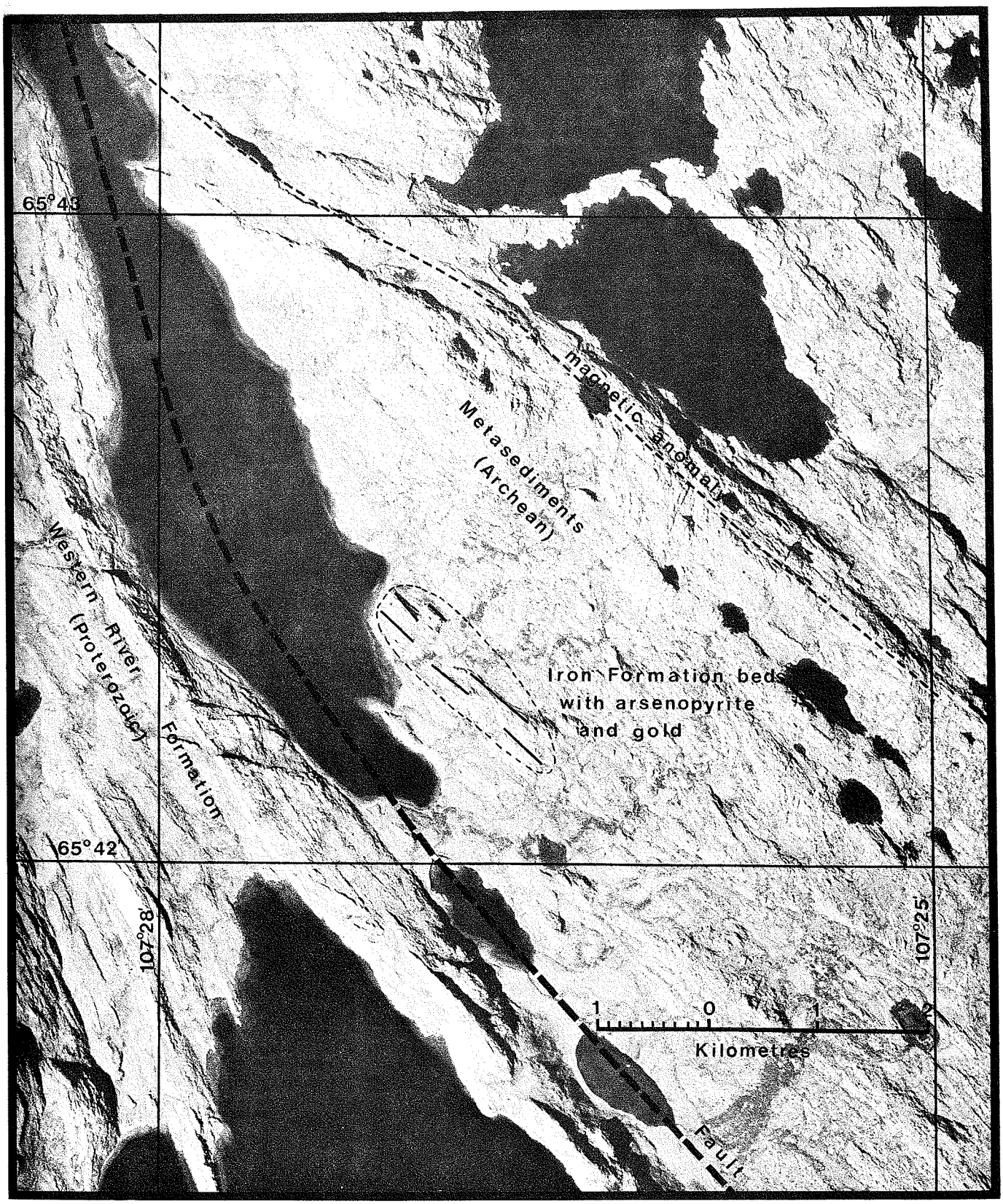


Figure 8. *Gold prospect J/11-1, COT Group, east side Bathurst Inlet near Tinney Cove*

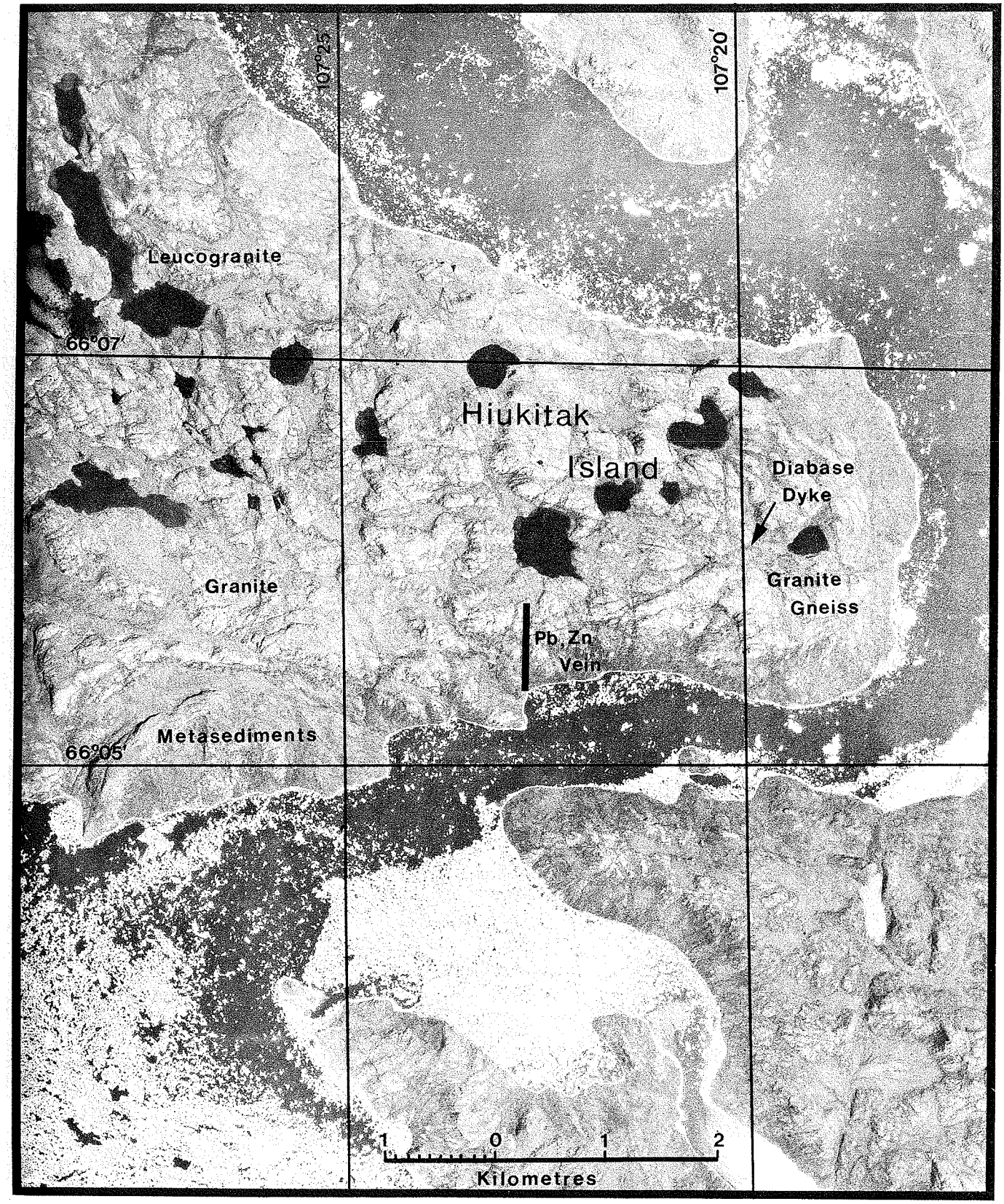


Figure 9. *Lead-zinc breccia vein, Wolf Group, prospect O/3-1, Hiukitak Island*

surveys, however, have failed to recognize at least one important belt of volcanic rocks in the District of Mackenzie (Hackett River) and many minor occurrences of volcanics within areas of metasedimentary rocks (eg. basalt, tuff, and volcanic clast conglomerate at mineral occurrences N/2-2 and N/2-3). Small slivers of volcanic rocks missed by reconnaissance surveys would, of course, have lower potential for VMS than larger bodies that would be less likely to have been missed. Detailed geological surveys in the future may show possibilities for VMS to be non-existant or at least limited to small areas, but for the present it must be assumed that there is a low to moderate potential for such resources throughout the Archean area.

Uranium in unconformity related deposits (URU)

The base of the Helikian Ellice sandstone, like that of the probably correlative Thelon, Dismal Lake, and Athabaska formations, is a prime target for URU - one of the most important types of uranium deposits. The Ellice Formation, now preserved only in Bathurst grabens, once extended over much of the area. The present surface must have been eroded far below the level of the sub-Helikian unconformity in most places. Nonetheless, some URUs have considerable vertical extent so it is conceivable that remnants of such deposits (if any were formed in this area) could be preserved in Archean rocks east of the Inlet as well as in Aphebian rocks. The reported uranium occurrence J/11-2 in the Western River Formation is consistent with this idea. Information is lacking on the amount of exploration and the types of surveys that may have been extended into Archean rocks east of the Inlet, but exploration was certainly focused on the Proterozoic rocks so it may be assumed that a low to moderate potential exists for discoveries of URU related to Ellice River sandstone now completely stripped from the area.

The nonconformity at the base of the Western River Formation presents another possibility for URU but chances for discoveries of such deposits, if they exist, are limited to narrow zones along basal contacts of the formation with Archean rocks. The formation is faulted against archean rocks in many places, but unfaulted basal contacts have been recognized and mapped near Kenyon Lake (N/6), at Gordon Bay in N/14 and at an outlier in N/10. These contacts have likely been well prospected for uranium so this possibility can be rated low. Possibilities for uranium (pitchblende) in veins associated with a gabbro intrusion as well as with an unconformity at Buchan Bay have been mentioned above.

Uranium and/or copper impregnations and fracture fillings in sandstones

Prospects J/11-2 and J/3-1, and also trace concentrations of copper at the margins of huge dolomite stromatolites (reefal structures) on islands in the bay east of Tinney Hills in N/13, show that uranium and copper were mobile at least locally in the sediments and that precipitants were also present. Accordingly, some potential for these types of uranium and copper resources should be accorded to the Western River and Burnside River formations along the east side of the Inlet. This potential is, however, considered low.

(2) Southwestern Mainland

Uranium related to base of Helikian strata (URU)

The most important uranium resources that might conceivably be present in the Bathurst Inlet area would be URU near the base of the Ellice Formation (map-unit 14). This formation and the Tinney Cove Formation, a more local subjacent graben filling, extend 160 km from the southern limit of the proposed park (J/2) northwesterly to Brown Sound (N/8), in down-dropped fault blocks (grabens) up to 12 km wide. The most favourable basal parts of these formations are buried, except in a few places, and are therefore not amenable to prospecting by normal methods. Recent uranium exploration in the area therefore should not be assumed to have significantly reduced chances for discoveries in the grabens. There are a number of favourable features, in addition to the regional correlation of the Ellice Formation with the Thelon and Athabaska sandstones, that are very likely to lead to interest in further investigations of the grabens, including stratigraphic drill tests, at some future time. Target depths are not excessive, the Helikian strata unconformably overlie a variety of Aphebian formations offering both possible sources of uranium and sources of precipitants. The Ellice Formation may also overlie Archean rocks locally along the Western River (J/2). Underlying rocks are probably weathered. Fault zones and paleo-depressions along the unconformity would have provided channelways for ore forming solutions. In the light of present knowledge of URU, the resource potential of the Helikian grabens should be considered at least moderate, although it is unlikely to be tested for many years. Possibilities for URU in rocks now completely stripped of their former cover of Ellice sandstone have been considered above for the area east of Bathurst Inlet. These possibilities are equally great along the fault slices near the west shore of the inlet. A remnant of Parry Bay dolomite west of the Bathurst Fault system in N/6 demonstrates that uplift and erosion outside the graben system has not been everywhere so great that there is no possibility that the roots of a sub-Helikian URU might be preserved. As outlined later, occurrences of distinctive mineral concentrations in erratics at prospect J/12 strongly suggests that at least one URU type of deposit is present southwest of the inlet.

Phosphate in the Ellice River Formation

The Athabaska Formation contains appreciable concentrations of apatite. So does the Thelon Formation although less is known about its distribution. The Ellice Formation with a similar history of deposition, including marine trangressions in its upper part, is also likely to contain phosphatic sections and, if present, these could be of economic significance in the future.

Uranium and copper in basalt flows in Aphebian redbeds

Veins at the "Pomie" prospect J/3-1 south of Bathurst Lake are the most extensively explored bedrock occurrence of uranium, copper, or any base metal sulphides, near the southwestern shore of the Inlet. Pitchblende-chalcocite veins occur here in basalt flows within red beds of the Brown Sound Formation. The metals were probably carried in oxidized solutions in permeable redbeds and deposited in a reducing environment in fractures in the basalt. Such deposits are unlikely to contain important resources of uranium but it is possible that some could be mined if sufficient numbers of veins were found or if other uranium ores were discovered in the area.

Possibilities for lead-zinc, copper, and uranium resources in breccias

Extensive intraformational megabreccias with large to huge clasts of stromatolitic dolomite have been mapped by Campbell and Cecile (1976) south of Young Point in J/12 and K/9, on South Quadyuk Island in J/13 and on Banks Peninsula (N/1 and N/8). Evidence that the brecciated rocks were deposited in evaporite basins and other features (see Cecile and Campbell, 1977) suggest that base metal and possibly uranium deposits should be sought near them and

within intrusive breccias associated with these syndepositional breccias. The intrusive, sedimentary clast breccias transect more than 2000 metres of Brown Sound and other oxidized sediments above, and in part below, the intraformational breccia, where it may have originated in part.

The intrusive breccia contains considerable interclast authigenic dolomite and quartz. These breccias would seem to be favourable hosts for lead-zinc, copper, or uranium deposits but it is uncertain whether the intruded rocks could have provided H_2S or other reductants. No uranium or sulphides have been reported in the breccias although their outcrops may have been thoroughly prospected for uranium. Extensive areas are drift covered and could contain undetected mineral concentrations, but these remarkable rocks cannot be assigned a high potential as possible hosts for mineral deposits.

Possible pitchblende veins associated with gabbro dykes and sheets intruding redbeds

Pitchblende veins may have been formed where gabbro dykes intruded permeable zones in red beds. The situation envisaged here is somewhat similar to that outlined for the Pomie deposits and the silver exploration possibility suggested at Buchan Bay. Proterozoic rocks probably lacked interstitial permeability when they were intruded by northwesterly trending diabase dykes and by gabbro sheets, but these intrusions could have encountered oxidized waters carrying uranium in highly fractured rocks along fault zones, heated the waters, and provided favourable reducing conditions for deposition of pitchblende in cooling cracks. Other metals, notably copper and perhaps silver, could have been similarly concentrated but such deposits are characteristically small so that pitchblende veins would stand the greatest chance of being economically viable.

Uranium concentrations have been found in fractures along the contact of a diabase dyke west of the south end of the Inlet according to a confidential report. (This occurrence is not shown on Figure 1 or described in Appendix A). The uranium-bearing fractures are in dolomite breccia at the base of the Brown Sound Formation. Anomalous radioactivity was found, reportedly, along a 1π km length of the diabase-dolomite contact.

There would seem to be moderate chances for discoveries of small, gabbro-associated veins of economic interest.

Surficial concentrations of uranium and gold

Abundant small rock clasts containing very rich concentrations of pitchblende, gold, and selenium minerals have been found in several places in thin drift overlying shallowly east-dipping grey siltstone (prospect J/12-1) on the JCW claim group staked by Cominco in J/12 and K/9 about 30 km south of Young Point. This is just outside of the proposed southwest border of the park. Several pits were dug through drift containing radioactive clasts but no credible bedrock source for the mineralized debris has been identified and it is possible that it was transported an appreciable distance, perhaps in a northerly-flowing glacio-fluvial stream.

The character of the mineralization in the clasts suggests that their source might have been a deposit with affinities to the very important, and characteristically rich, unconformity-related type of uranium deposit (URU). One site that might be envisaged for such a deposit would be along a fault zone transecting grey siltstone of the Mara Formation which is capped by highly oxidized paleosol. The source might also be remnants of URU deposit(s) formed beneath Ellice sandstone that is now stripped off the area. In this case, the Mara Formation would also be a likely host but fractured grey siltstone of the Peacock Hills Formation and perhaps grey, unoxidized beds near the top of the Burnside River Formation are other possibilities.

The concentrations of uranium and gold-bearing detritus on the JCW property must be considered a very important factor in the evaluation of mineral resource potential in nearby parts of the proposed park.

The bedrock source of the float is most likely outside the proposed west boundary of the park. The abundant mineralized clasts dispersed in the drift are not likely to have been derived from a concentration of insignificant size. Their character suggests that they were derived from a deposit of the important unconformity-related type. Most such deposits are in districts containing a number of significant deposits and relatively few minor occurrences. The fact that only one mineralized float locality is known does not indicate that no more than one deposit is likely to be present in the Bathurst Inlet area. The bedrock source of the known float is likely to be hosted in rocks that occur both inside and outside the proposed park. For these reasons, coupled with the fact that other types of uranium occurrences are found in outcrops, the uranium potential in this part of the proposed park (southwest of Bathurst Inlet) is rated high.

Gold in Archean rocks

Archean rocks along the west boundary of the proposed park in the northeast part of N/2 could contain important resources of gold and possibly of other metals. The eastern limit of the Archean rocks lies about 1 km west of the Hood River between Wilberforce Falls and the lower falls, and follows the Bathurst Fault from the James River near the lower falls along a bearing of north 30° east. This limit should be considered as a factor in future decisions about the precise position of a park boundary.

Uranium and other metals associated with the Western River Formation

The Western River Formation along the Hood River in N2 should be prospected for uranium impregnations and veins, for lead, copper and paleoplacer gold. Subjacent Archean rocks should also be prospected for URU. These possibilities are theoretical only and can be considered slight. Moreover, they have probably been considerably reduced by recent prospecting for uranium in the area.

(3) Northern parts of Bathurst Inlet

Native copper in basalt

The abundant occurrences of native copper in Ekalulia basalts on islands in the outer part of the inlet and on Banks Peninsula are small and not of economic interest. It may be noted, however, that the major stratiform copper deposits of Michigan occur in a similar geological setting.

Vein and breccia copper deposits in basalt

Chalcocite fracture filling and replacement deposits of economic significance have been found in the Coppermine River area. Such deposits could well be present along faults in Ekalulia basalts. If present, their location on tidewater would facilitate their development as mines. This resource possibility can be rated moderately high.

Copper sulphide (chalcocite, bornite) veins, replacements and solution breccia fillings in Parry Bay dolomite beneath Ekalulia basalts

Concentrations of copper sulphides at contacts between Parry Bay dolomite and overlying basalt as at O/5-1 and N/11-1 do not appear to have been prospected exhaustively. They may have limited small potential. The possibility that additional, moderate size, and rich copper deposits might be present as fillings and replacements in breccias in the dolomite along this contact can be envisaged.

Lead-zinc in solution collapse breccias in Parry Bay dolomite

Sangster (1980, p. 173) has noted that solution collapse breccias in the Parry Bay Formation are potential sites for "carbonate-type" lead-zinc deposits. He expressed reservations about this, however, because no secondary white sparry dolomite, characteristic of ore-bearing carbonate breccias, has been noted cementing clasts in the Parry Bay breccias.

PART III

SUMMARY OF RESOURCE POSSIBILITIES, BATHURST INLET PARK AREA

The principal types of significant mineral deposits that might have been formed in the various geological environments represented near Bathurst Inlet have been outlined in the previous sections. These are categorized in Table 4. The areas (NTS blocks) that contain rocks believed to be likely hosts for the deposit types are also listed in the table and the relative possibilities for discoveries therein are rated as high (H), moderate (M), or low (L). The ratings reflect a combination of factors: (1) evidence (e.g. mineral occurrences - not necessarily within the specified block) that significant deposits of the given type might have been formed in the area; (2) evidence that the block contains geological elements peculiar to the environments of such deposits; and (3) a judgement that detectable, but thus far undetected, significant deposits could be present. Table 5 summarizes perceived possibilities for discoveries of various types of deposits in each of the 64 NTS blocks included in the geological compilation of the Bathurst Inlet area (Figure 1). Blocks wholly or partly within the proposed park are identified in both Tables 4 and 5.

The different types of deposits have markedly different potential for economic development. Their unit commodity value ($/tonne), and their most probable sizes are characteristically different. Some types are relatively common, even ubiquitous, within a given geological environment, but are rarely rich enough or large enough to be of economic interest (e.g. PM and MI of Table 4). Others, although uncommon, are intrinsically so rich that a high proportion of all known occurrences are potential orebodies (e.g. URU). These factors must be taken into account before the estimated exploration possibilities given in Table 5 can be used to compare total potential resource values of the different blocks. Amongst other factors not considered quantitatively in Table 5 are differences in explorable extents of favourable geological features in different blocks. These many variables and uncertainties cannot be collated by any systematic procedure that can be rationalized herein. The following assessments of possibilities that various resources may be present in different parts of Bathurst Inlet area, including the proposed park, thus are based on intuitive evaluations of many parameters.

The Bathurst area is subdivisible into five metallogenically distinct domains, each characterized by relatively high possibilities for discoveries of resources of different dominant commodities (Figure 10).

Archean domains (A, A1) east, west, and south of the inlet contain likely hosts for deposits of base metals (VMS) and gold (VGV). Areas mapped as metavolcanic rocks (A1) as in K/1 near the Bathurst Norsemines deposits (c on Fig. 10) have high potential for VMS and VGV. Block O/15 contains rocks and geophysical indications similar to those at a prospect immediately to the north. Block N/6 is noteworthy because anomalous contents of base metals have been found in lake bottom sediments therein (DIAND, assessment files). Areas mapped as metasedimentary rocks are of interest mainly for gold (IFG and TGV) and those known to contain auriferous iron formations in J/11 and N/2 (locality a in Fig. 10) are rated highest. Valuable pegmatitic minerals (Li, Ta, Be, Sn) have not been reported in the area although possible host pegmatitic bodies are not uncommon and are considered likely to be most abundant near borders of granitic bodies outlined in reconnaissance geological mapping. Ratings for areas in domain A on the flanks of the Burnside syncline (K/5-6-11-10-15) are accredited a little additional potential based on highly speculative possibilities that they might contain AI deposits (Ta, Nb, P, Fe, U, Cu).

Domain B, Goulburn strata southwest of the Inlet, is of interest principally for uranium in possible SIU type deposits and less likely, except perhaps in J/12, K/9, J/5, and K/8 near the uranium and gold float at locality (c), in URU type deposits. Uranium and silver in URAU and URAS deposits are a possibility in areas where mafic sheets intrude strata or basement rocks near the unconformity. The same intrusions may contain MI concentrations of titanium, iron, nickel, copper and other commodities of possible economic interest. Strata-bound concentrations of base metals (SIC, SIL), as well as uranium, might be present but would be less likely to be exploitable.

Domain C, covering Proterozoic strata near the central and southern shores of the Inlet, is also of interest principally for uranium but it differs from B in many important respects. It contains extensive areas of Helikian Ellice and Tinney Cove formations and upper formations of the Goulburn Group not present in B. Lower formations of the Goulburn Group contain more varied beds in this axial zone of the Kilohigok Basin than in the platformal area represented by Domain B. They include finer grained clastic sediments, unoxidized sediments and carbonate reefs. The formations are exposed and juxtaposed in many individual fault block slices within the Bathurst graben system. These additional formations and complexities provide Domain C with more environments favourable for strata-bound deposits than can be envisaged in Domain B. Domain C also holds unique possibilities for discoveries of especially rich URU deposits near the sub-Helikian unconformity and speculative possibilities for phosphate in the Ellice Formation.

The most significant bedrock uranium propects near Bathurst Inlet are in Domain C. Three of these are in the Brown Sound Formation which is restricted to Domain C. Another (J/11-2) consists of extensive copper-uranium concentrations along fractures in the Western River Formation. The Brown Sound prospects include pitchblende-chalcocite veins in basalt (J/3-1), fracture-controlled pitchblende mineralization in dolomite breccia adjacent to diabase, and uranium impregnations in arenite (SIU).

Domain D is characterized by widespread copper mineralization in Helikian formations, Ekalulia basalt and underlying dolomite of the Parry Bay and Kanuyak formations. It covers the northward extension of Domain C. Possibilities exist for COC, BXC and less certainly for COZ and SIP type deposits. Deposits of copper-rich minerals in brecciated lava along fault zones (BXC) are the most credible exploration target and one that has been sought in the past, albeit with little effort to identify crucial geological controls. Richer, karstic breccia-hosted deposits represent an economically more exciting target that has not been sought specifically. Cupriferous veins and replacements are not uncommon in unbrecciated dolomite at the top of the Parry Bay Formation, so it may be expected that copper minerals were also deposited in breccia zones that extend to the top of the formation. The few breccia zones that have been recognized are in seacliffs. Almost certainly, more such breccias are partially or entirely covered by drift.

Table 4. Categorization of mineral deposit types known and suspected in Bathurst Inlet area

deposit type	code	commodities	NTS blocks with favourable area	
volcanogenic massive sulphide	VMS	Zn,Cu,Pb,Ag	O15,16,9,10 K1,2; N6: 08 N2,3	(H) (M) (L)
iron formation - hosted gold	IFG	Au	J1,2*,6*,7*,8,10,11*,14*,15* K14,15; N2,3,6 J9,16; K3,4,12,13; N4,5,12 O3*,4*,5*,6*,11*,13*	(H) (H) (M) (M)
Mafic, ultramafic intrusion - associated deposit	MI	Cu,Ni,PGM Ti,Fe,Cr,V asbestos soapstone	(Ni,Cu) O9; N2 (Ti,Ni) K1,3,4,6,7,12,14,15 (soapstone) N7*,9*,11*,15*,16*	(L) (M) (H)
volcanic associated gold - quartz vein	VGV	Au,W	O15,16,9,10; N2 K1,2; N6	(H) (M)
turbiditic sediment - hosted gold - quartz vein	TGV	Au,W	J2*,6*,7*,11*14*; N2,3,6	(L)
pegmatite - hosted minerals	PM	Li,Ta,Be,Sn Mo,U,REE, Gemstones	K1,2,3,4,6,7,12,13,14,15, N2,3,4,5,6,12,13, J1,2*,6*,8,9,10*,11*,14* J15*,16; O1,2,3*,6*,7,8,9,10 O11*,12*,13*,14,15,16	(M-L) (M-L) (L) (L) (L)
alkalic intrusion - hosted	AI	Ta,Nb,Fe,Cu phosphate,U	K3,4,6,7,12,13,14,15	(L)
unconformity - related deposits uranium, copper, lead-zinc veins;	URU	U	J2*,3*,6*,12*; K16*; N1* J5*,11*,13*; K9*,13*; N8*; O4* J7*,10*,14*; K15*; N2*,6*,	(H) (M) (L)
low sulphur arsenide veins with native silver or pitch-blende (associated additionally with intrusive rocks)	URC URL URAS URAU	Cu Pb,(Zn) Ag,(Co,Ni) U,(Co,Ni)	N5,6,12; O12* N13; O3* O13*,14; J13*; K15,16*; N2 K1,3,4,5,6,7,11,12,13,14	(L) (L) (LM) (L)
'sandstone' (clastic sediments) interstitial fillings and related veins and replacements of uranium oxide, copper or lead (plus zinc) sulphides, apatite	SIU (SIC) SIL (SIP)	U (Cu) (Pb,Zn) phosphate	J2*,3*,5*,6*,12*; K9*,15 J11*,13*,16*; N1*,8*; O4* J4,10*,14*; K1,3,4,5,6,7,8 K10,11,12,14; N2*,6*,7*; O5*,13*,14 J12*,13*; K16*; N2*	(M) (M-L) (L) (L) (L) (L)
shale - hosted disseminations of low sulphur copper sulphides (eg. chalcocite), uranium	SHC SHU	Cu U	N2*,6,8*,11 N2*,6,8*,11	(L) (L)
carbonate - hosted open space (breccia) fillings and related veins and replacements of zinc-lead sulphides, or low sulphur copper sulphides (eg. chalcocite)	COZ COC	Zn Cu	J14*; N2*,6,7*,8*,9*,10* N11*,12*,13,14,15*,16*; O5* J14*; N2*,6,7*,8*,9*,10* N11*,12*,13,14,15*,16*; O5*	(L) (L) (M) (L)
basalt - hosted breccia veins of low sulphur copper sulphides	BXC	Cu	N2*,7*,8*,9*,10*,11*,12,13 N14,15*,16*; O5*,12*	(M) (M)

*indicates favourable area within proposed park boundaries
(H),(M),(L) indicate relatively high, moderate, or low favourabilities, respectively.

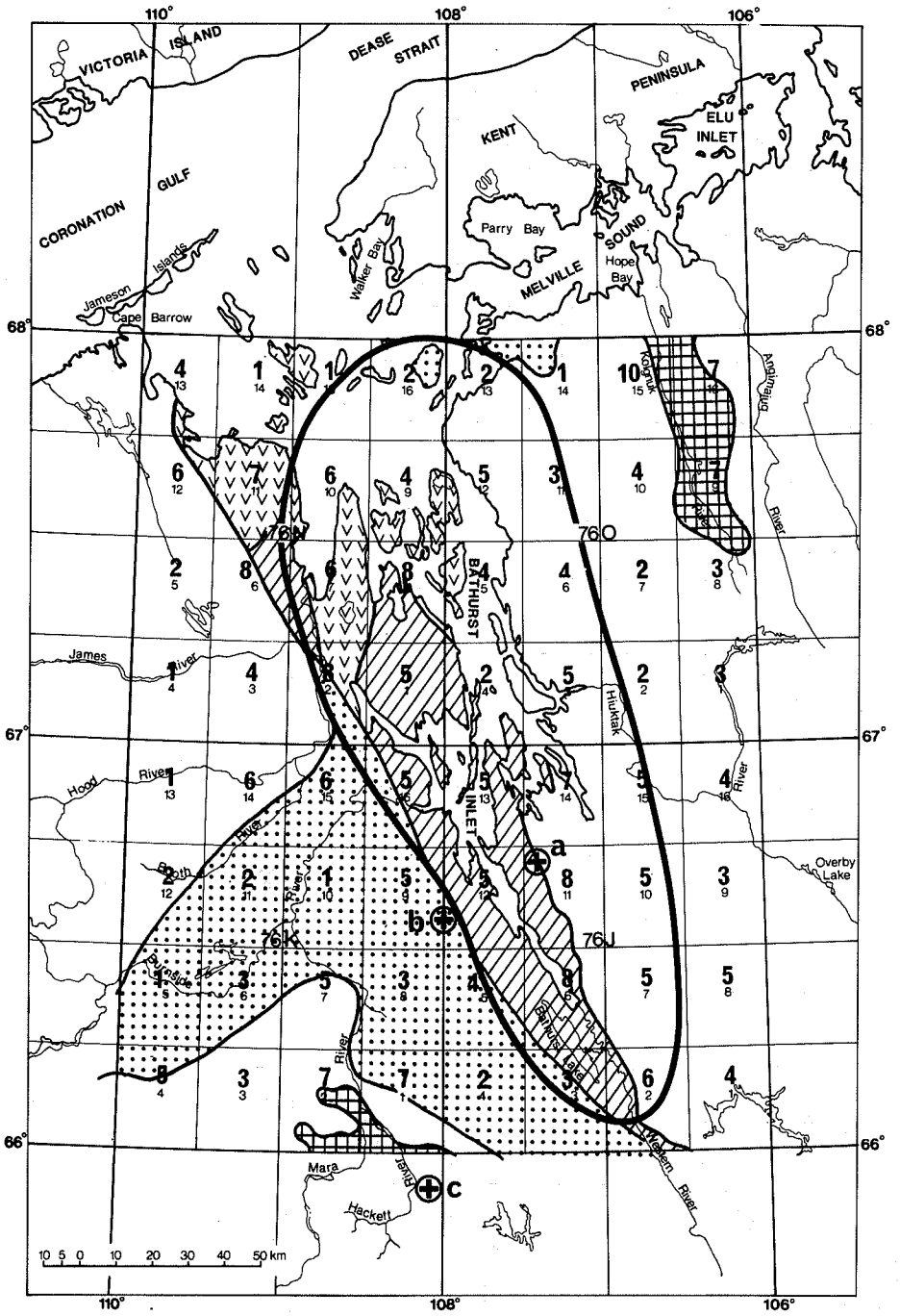
Table 5 Types of deposits most likely to be present in individual NTS blocks in Bathurst Inlet area

NTS block	VMS	IFG	MI	VGV	TGV	PM	AI	URU	URC	URL	URAS URAU	SIU	SIP	SHC SHU	COC COZ	BXC
76J 1		H				L										
(2)		H			L	L		H				M				
(3)								H				M				
4												L				
5								M				M				
(6)		H			L	L		H				M				
(7)		H			L	M-L										
8		H				L										
9		M				M										
10		H				M		L				L				
(11)		H			L	L		M				M-L				
12								H				M	L			
13								M			L-M	M-L	L			
(14)		H			L	L		L				L			L	L
(15)		H				M										
16		M				L										
76K 1	M	L	M	M		M-L					L	L				
2	M	M	L	M	L	M-L					L					
3		L	M		L	M-L	L				L	L				
4		M	M			M-L	L				L	L				
5											L	L				
6			H			M-L	L				M	L				
7	M		M		M	M-L	L				L	L				
8			M					L				L				
9			L					M				M				
10												L				
11			M								L	L				
12		M	M			M-L	L				L	L				
13		L				M-L	L									
14		H	H			M-L	L				L	L				
15		H	M			M-L	L	L			L-M	M				
16			M					H			L-M					

Table 5 (cont.)

NTS block	VMS	IFG	MI	VGV	TGV	PM	AI	URU	URC	URL	URAS URAU	SIU	SIP	SHC SHU	COC COZ	BXC
76N 1								H				M				
2	L	H	L	H		M-L	L	L			M	L		L	M	M
3	L	H				M-L										
4		L				L										
5		M				M-L										
6	M	H	L		L	M-L		L	L	L	L	L				
7		L	L									L			M	M
8								M				M-L		L	M	M
9															M	M
10															M	M
11									L	L				L	M	M
12						L									M	M
13						M-L				M					M	M
14																M
15			L												L	M
16															L	L
76O 1		L				M										
2		L				L										
(3)		L				L				M						
(4)		L						M		L						
(5)		M				L		L				L			M	M
(6)		M				L										
7		L				L										
8	M			L		L										
9	H		L	H		L										
10	H			H		L										
(11)		M				L										
(12)		M	M						L						L	M
(13)		M				L					L-M	L				
14											L-M	L				
15	H			H												
16	H			H												

Double-struck entry signifies block or deposit possibility partially or entirely within proposed park area.



Legend for Figure 10

Commodities of principal interest (secondary or speculative interest) in major metallogenic subdivisions.

D — Copper (Zn,Pb,U)

C — Uranium (Cu,Pb,Zn,phosphate)

B — Uranium (Ag,Au,Ti,Ni,Cu)

A — Gold (base metals and silver in small unmapped areas of metavolcanics; Li,Ta,Be,Sn, in pegmatites: U near coast side of inlet)

A1 — Base metals and silver, gold

⊕ — Mineral localities of special interest, (a) gold in iron formation: (b) uranium and gold in float: (c) Bathurst Norsemines base metal deposits.

5 / 8 — Discovery possibilities in NTS blocks are rated on a scale of 1 to 10.

Figure 10. *Metallogenic domains and variations in mineral potential*

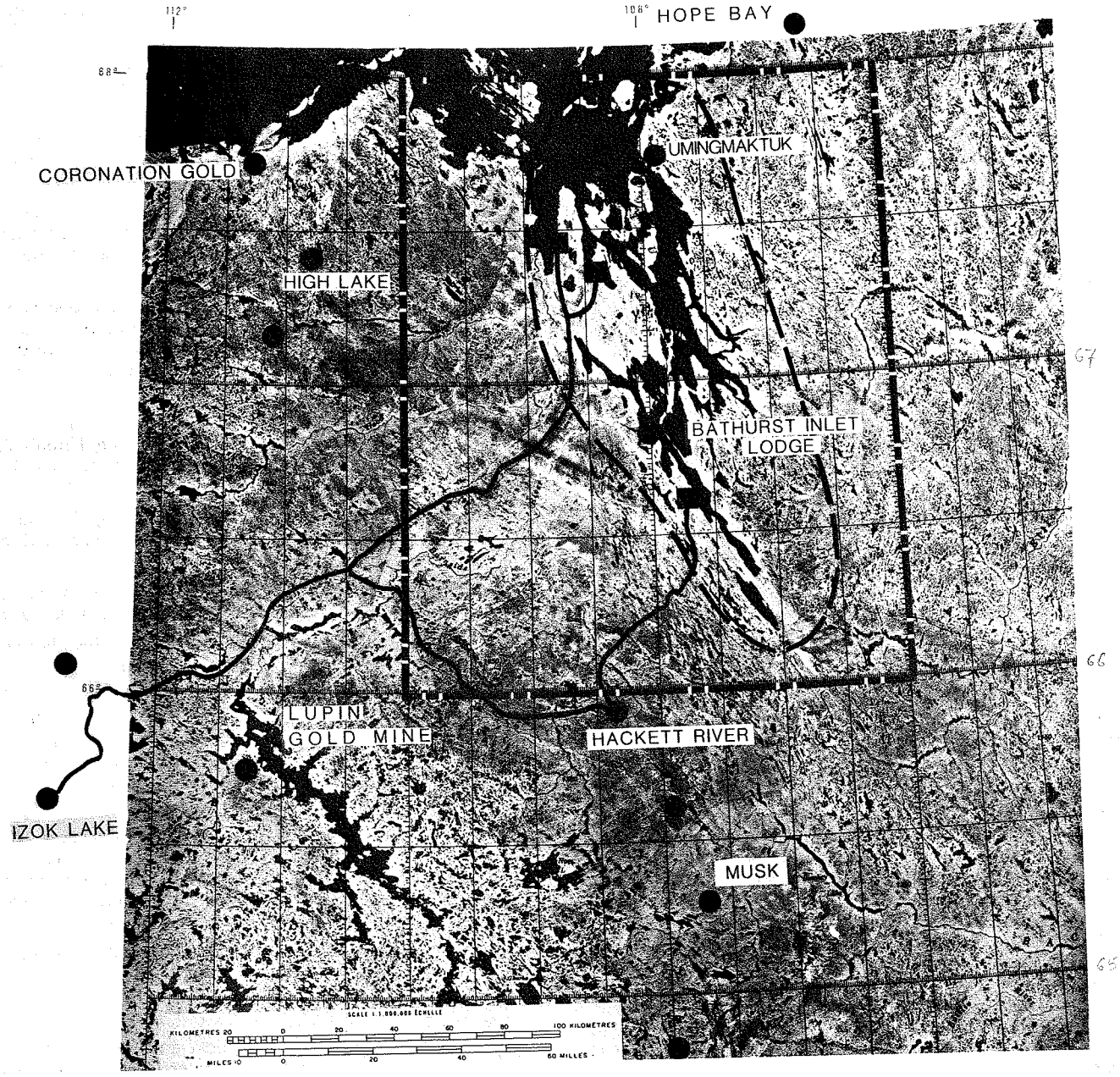


Figure 11. *Possible alternative resource service road routes Bathurst Inlet area, from a preliminary survey of possible routes by DIAND*

Metallogenic Domains A, C, and D cover about 45, 40 and 15 percent respectively, of the land area of the proposed park. The odds that mineable deposits of gold, uranium, copper, or other commodities are present in specific limited sections of these domains are not sufficiently great that mineral exploration organizations are likely to consider them high priority targets at present. Collectively, however, the possibilities for undiscovered deposits are significantly greater inside the boundaries of the proposed park than outside. The most important exception to this is the possibility for base metals in VMS deposits.

The present limited knowledge suggests that the proposed park is more likely to be endowed with certain types of valuable resources than most areas of similar size elsewhere in northern Canada. The southern half of Domain A within the proposed park, for example, may well be amongst those limited areas that are most likely to contain important IFG gold deposits like the Lupin Mine. The virtually unique Domain C, which forms the core of the proposed park, must tentatively be considered more likely to contain important rich uranium deposits (URU) than any other little-explored area of comparable size in District of Mackenzie. Domain D, although limited in explorable extent within the proposed park area, offers prospecting possibilities for rich copper deposits that cannot be postulated to exist elsewhere in the region.

These assessments of possible resources at Bathurst Inlet are opinions based on generalized geological information and on inferences concerning the effectiveness of prospecting activities to date. More detailed geological studies might show some of the presumptions made herein to be invalid. Detailed prospecting guided by such studies might indicate that further exploration for some types of mineral deposits is unwarranted. For the present, however, the mineral resource potential of the proposed park area and some of its fringing areas should be considered high. Since Domain C in the core of the proposed park in itself has at least moderate potential, it would be difficult to adjust boundaries in any way that would greatly reduce the apparent overall potential. Such shifts in any case might later be proven to be unnecessary. For example, detailed geological mapping could show that Domain A has a much lower potential for IFG than has been presumed (necessarily, because of prospects J/11 and N/2-1) in this study.

Accessibility for marine transport of supplies and mineral products should be weighed heavily as a favourable factor in assessment of possible resources in the proposed park area. With a few exceptions, the only mineral resources that have been developed in arctic Canada (north of the tree line) are on sea coasts. Exceptions are Asbestos Hill only 40 km from the Ungava coast and several gold mines (which do not require transport of bulk products). Without doubt, economic and environmental factors generally favour coast-based rather than inland-based transportation systems throughout most of the barren lands. The 200 km penetration of the sea inland in Bathurst Inlet provides not only a natural egress route for resources that may be present in and near the extensive area proposed as a park, but as well a possible important northern terminal site for the least expensive roads, air transportation systems and perhaps power lines that would be necessary for development of resources throughout a large part of Mackenzie District. The Department of Indian Affairs and Northern Development has made a preliminary study of some possible resource road systems (Fig. 11) between points on the inlet and areas at Hackett River and Izok Lake where substantial resources of potential base metal and silver ores (VMS) have been outlined (Dubois, 1979). Such a scenario would involve construction of sections of roads, port facilities, airfields and settlements in some limited parts of the area proposed as a park.

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APPENDIX (A)

Table of mineral occurrences reported in Bathurst Inlet area, 76 J, K, N, O

NTS and Index Number	Deposit Name	LAT.	LONG.	Commodity	Character
76J/3-1	POMIE	66 10'	107 02'	U	Fractures in basalt
76J/11-1	COT	66 42'10"	107 26'40"	Au	In amphibolite lenses
76J/11-2	YON	66 35'	107 28'	U	Veins in fault breccia (W. River)
76J/12-1	JCW	66 35	108 00"	Au	Quartz vein in Burnside R. Fm.
76K/1-1	HAC	66 03'	108 25'	Cu	Mafic gneiss (metaseds)
76K/2-1	MOX	66 06'	108 31'	Cu	Metasediments
76K/2-2	GRIF	66 08'	108 37'?	Cu	Metadacite/Meta rhyolite contact
76K/14-1	BOOTH R.	66 50'03"	109 05'02"	Fe	Gossan in gabbro
76K/14-2	HOOD R. N.	66 58'07"	109 21'08"	Cu	Metasediments
76K/14-3	SELLWOOD R.	66 47'04"	109 15'03"	Cu	Gossan in gabbro
76K/14-4	ROBERTS M.C-1	67 00'	109 14'	Au	Amphibolite lenses in metaseds
76N/2-1	PISTOL L.	67 03'	108 47'	Au	Archean banded amphibolites
76N/2-2	TURNER L. AU.	67 13'	108 57'45"	Au	Amphibolite band
76N/2-3	TURNER L.	67 14'	108 57'30"	Ni	Shear zone in qtz diorite
76N/3-1	ROBERTS M.C-2	67 00'05"	109 10'04"	Au	Amphibolite lens in metasediments
76N/6-1	PIT	67 23'05"	109 06'09"	Cu	Qtz veins in basalt near Bathurst fault
766N/8-1	BATHURST INLET	67 30'	108	Cu	Basic flows
76N/9-1	TINA	67 33'30"	108 01'30"	Cu	Basalt flows
76N/9-2	DOUG	67 34'	108 29'	Cu	Basalt joints
76N/9-3	PETE	67 37'	108 24'	Cu	Basalt flow
76N/9-4	CHAR	67 33'	108 03'	Cu	Basalt flow
76N/9-5	EKALULIA I.	67 40'	108 03'	STN	Dolomite/igneous contact
76N/10-1	POLAR	67 37'	108 35'36'30"	Cu	Basalt flows
76N/10-2	DUNC	67 30'	108 31'	Cu	Basalt fractures
76N/11-1	AXE, KIL, TL, F	67 30'	109 05'	Cu	Basalt & Dolomite
76N/12-1	SIK-SIK	67 42'06"	109 42'09"	Au, Cu	Quartz veins, fault zone
76N/14-1	STOCKPORT	67 47'	109 05'	Cu	Basalt flows
76N/14-2	CHAPMAN	67 52'45"	109 10'30"	Cu	Basalt flows
76N/13-1	DON	67 53'10"	109 53'15"	Pb	Quartz veins in granitic rocks
76O/3-1	WOLF	67 53'50"	109 52'50"	Pb	Contact Gneisses/granites
76O/5-1	BOB	67 25'	107 53'30/	Cu	Basalt/Dolomite contact
76O/12-1	JOE	67 39'15"	107 48'45"	Cu	Granitic fractures
76O/9-1	HOPE BAY SYN.	67 32'55"	106 19'	Au	Quartz veins in greenstone
76O/9-2	HOPE BAY SYN.	67 32'15"	106 17'25"	Au	Quartz veins in greenstone
76O/16-1	BRICK	67 50'50"	106 24'	Au	Granitic mylonite with qtz. lenses
76O/16-2	LAHTI N.	68 00'00"	106 28'00"	Au	Quartz vein in greenstone
76O/16-3	LAHTI S.	67 59'45"	106 27'45"	Au	Quartz vein in greenstone
76O/16-4	GUNN	67 58'35"	106 28'20"	Au	Quartz vein in greenstone

APPENDIX B

Description of mineral occurrences in
Bathurst Inlet area, 76 J, K, N, O

POMIE Gp.

66°10'N, 107°02'W
76-J-3
Cominco Ltd. (061589)

Uranium mineralization occurs along fractures in the lower basalt flow (Brown Sound Fm.) and along the lower, faulted contact with the underlying arkose. A sample of arkose from Trench #9 assaying 87 lbs U_3O_8/ton was examined in polished section and an autoradiograph was made. Radioactive material is extremely fine-grained and disseminated in a matrix of quartz grains, clay minerals and minor sulphides (pyrite and chalcopyrite). A sample of basalt from Trench #9 assaying 130 lbs U_3O_8/ton (check assay 89 lbs U_3O_8/ton) gave essentially the same result, mineralization being finely disseminated in the matrix and coating grains of sulphide. A linear concentration of fracture-filling was noted. A scanning electron microscope examination of this radioactive material indicates mainly U with minor Si, Fe and Ca suggesting that uraninite is the uranium mineral with minor impurities of quartz, iron oxides and calcite.

The radiometric surveys suggest that anomalies are confined to the basalt and faulted basalt-arkose contact (ignoring those over muskeg due to problems with definition).

The best grade is 41.96 lbs U_3O_8/ton over 13.0 feet located in Trench #9 at the southern end of the trend of mineralization, adjacent to a large area of drift and muskeg.

YON Gp.

66°35'N, 107°28'W
76-J-11
Noranda Expl. Co. Ltd.
(080737)

The claim group is underlain by sediments of the Western River Formation which dip steeply (58°) with tops to the west. These sediments were divided into five units by Noranda. North-south and east-west faulting is prevalent. The mineralized area is bounded by two north trending faults (Grizzly and McLaughlin) and the east trending Coliver fault. Brecciation occurs in a zone between the Grizzly and McLaughlin faults, above the Coliver fault. It is related to the faults and occurs in small zones and patches. Quartz injection is associated with the brecciation.

Vein type uranium mineralization occurs within the brecciated sediment in the vicinity of the Coliver fault. Mineralization is fault-controlled and occurs within discontinuous, narrow fractures that cross-cut the rock strike.

Uranium minerals present are possibly uraninite, sooty pitchblende, yellow and green uranium secondaries, and associated chalcopyrite, bornite, malachite and hematite.

The fractions analyzed are generally high-grade channel samples (5 feet) across the fractures giving assays as high as 0.39% U_3O_8, 0.006% Th, trace Ag and 0.4% Cu. Three samples (out of 11) assayed over 1 lb U_3O_8/ton.

Three major zones were outlined. The main one occurs on the east face of the ridge and is approximately 250' x 600'. Two smaller, less radioactive zones occur on the west face of the ridge.

The possible origin of the U-Cu mineralization is from hydrothermal fluids which ascended, possibly from a basement source along the fault zones and deposited the mineralization within features in the brecciated rocks.

If the three zones are joined the mineralized zone has a north-south strike length of over 1500 feet and a possible east-west extension of more than 1700 feet.

PRODUCT	GOLD	PROVINCE OR TERRITORY	Northwest Territories	N.T.S. AREA	76 J/11	REF. Au 1

NAME OF PROPERTY: COT GROUP

OBJECT LOCATED: Main mineralized area (G.S.C. Paper 70-70, p. 110).

UNCERTAINTY IN METERS

Lat. 66°42'10" Long. 107°26'40"

Mining Division: Mackenzie District: Mackenzie

County: Township or Parish:

Lot: Concession or Range:

Sec: Tp.: R.:

OWNER OR OPERATOR AND ADDRESS

1969 - Trans-Canada Resources Ltd.

DESCRIPTION OF DEPOSIT

The property is underlain by metasediments of the Yellowknife Group which strike about N30°W and dip 45°E. The mineralized showings are reportedly located in a large flexure which is apparently superimposed on the west limb of a syncline. Interbedded with the sediments are discontinuous lenses of garnet-cummingtonite-quartz-sulphide gneiss, locally gold-bearing and seldom more than a foot thick or 50 feet in length. The sulphides, disseminated to massive, consist chiefly of pyrite and pyrrhotite with arsenopyrite abundant in places and chalcopyrite generally present as a minor constituent.

The showings consist of sulphides and sulpharsenides disseminated in amphibolite bands. What appear to be individual crystals of arsenopyrite, up to $\frac{3}{4}$ cm across, scattered throughout the amphibolite, are a great number of individual arsenopyrite grains cemented by chalcopyrite. The main mineralized zone (500' x 1,500') strikes NW, dips 45°NE and reportedly contains closely spaced mineralized seams and layers.

Associated minerals or products of value - Copper.

HISTORY OF EXPLORATION AND DEVELOPMENT

Contwoyto Lake-type gold occurrences were discovered and staked as the OX group in 1964 by Canadian Nickel Company near the Tinney Hills 18 miles southeast of the settlement of Bathurst Inlet. Exploration work on the property included a few trenches and one packsack drill hole.

The showings were acquired in 1968 in the 24-claim COT group, jointly by Moresby Mines Limited and Trans Canada Oils Ltd. (renamed Trans-Canada Resources Ltd. in 1969). Work during the same year consisted of blasting out 13 trenches and sampling. The assay results from 63 samples taken ranged from a trace to maximum values of 0.35 oz./ton Au across 9 feet in Pit 5 and 0.86 oz./ton Au across 2 feet in Pit 4. The assay results from Pit 4 averaged 0.307 oz./ton Au across 11 feet.

In the main mineralized area the mineralization is distributed across a 500 foot wide zone extending southeast across claim COT 15. A parallel zone about a mile to the north on claim COT 4 (lat. 66°42'40"; long. 107°26') contains more copper.

HISTORY OF PRODUCTION

REFERENCES

Department of Indian Affairs and Northern Development; Assessment Files: Trans Canada Oils Ltd., 1968, 76-J-11.

Mineral Resources Branch; Corporation Files: "Trans-Canada Resources Ltd.".

Sohiller, E.A.; Mineral Industry of the Northwest Territories, 1964; G.S.C. Paper 65-11, p. 8, 1965.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories, G.S.C. Paper 63-40, 1964.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, pp. 109-110, Geol. Surv. Canada, 1972.

MAP REFERENCES

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - Accomp. G.S.C. Paper 63-40.

Map 76 J, Tinney Hills, (Topo.), Sc. 1:250,000.

Map 3636 G, , (Aeromag.), Sc. 1":1 mile.

Map 7893 G, Tinney Hills, (Aeromag.), Sc. 1":4 miles.

map 76 J/11, Bear Creek Hills, (topo), Sc 1: 50,000

REMARKS

Comp./Rev. By	ASJ						
Date	11-73						

JCW Gp.

66°35'N, 108°00'W
76-J-12, 76-K-9
Cominco Ltd. (061590)
(1976 work)

Two trenches, 16 metres apart, were sunk through overburden to expose a 15 cm (6") wide, sub-vertical quartz vein transgressing Burnside River Formation silstones, with a subparallel strike.

The mineralized material consists of grey translucent quartz with inclusions of siltstone. Fractures and vugs in the quarts are filled with chalcopyrite and pitchblende. Float samples from 16S, 95W, contain visible gold (assay value 10.5 oz Au/t) as fracture fillings in botryoidal pitchblende. Brannerite is also a minor constituent. An unusual silver-grey material was found veining the quartz. Electron microprobe traces indicate that this material is almost entirely of lead, bismuth and selenium with the lead/bismuth ratio quite variable, but the selenium content fairly constant at about 50%. This may be a rare mineral called quanajuatite.

A number of buried radiometric sources are present on the property but have not been evaluated. These may be quartz float material or additional quartz veins or perhaps stratabound mineralization.

A channel sample (17 feet) consisting of 16 feet of siltstone and 1 foot of quartz vein in Trench #1 assayed an average of 0.065% U_3O_8/t. The quartz vein assayed 0.22% U_3O_8/t.

Similarly a channel sample (8.5 feet) consisting of siltstone and 0.5 feet of quartz vein in Trench #2 averaged 0.005% U_3O_8/t. The quartz vein assayed 0.035% U_3O_8/t.

The average assay of all of the siltstone samples was 0.04 kg U_3O_8/t or 0.9 lb U_3O_8/t. Grab samples from quartz vein material assayed 4.5 – 14.5 oz Au/t, 7.7 – 11.0 oz. Ag/t, and 13 – 55 kg U_3O_8/t (26 – 111 lbs U_3O_8/t).

The gold values are quite erratic but significant in some cases.

A second mineralized area is located at the northern extremity of a small lake in the northwest corner of the property. A one metre wide massive quartz vein with an attitude of 010°/vertical and cutting flat-lying massive red siltstone of the Burnside River Formation returned an assay of 0.005 oz Au/ton.

Locations of these two mineralized zones are not readily identifiable from the report.

PRODUCT	PROVINCE OR TERRITORY	N.T.S. AREA	REF. CU 1
COPPER	Northwest Territories	76 K/1	

NAME OF PROPERTY: HAC

OBJECT LOCATED – HAC claims.

UNCERTAINTY IN METRES 3,000. Lat. 66°03' Long. 108°25'

Mining Division Mackenzie District Mackenzie

County Township or Parish

Lot Concession or Range

Sec Tp. R.

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

In the Hackett River area Archean metasediments, mainly quartz-mica schists and quartzites, locally contain gossan zones mineralized with pyrite, pyrrhotite, arsenopyrite, and small amounts of chalcopyrite.

The major portion of the HAC claims is underlain by two greenstone belts which trend northwest across the property and curve to the west. These belts are separated by metasedimentary rocks.

Sulphide mineralization is largely pyrrhotite in granitic and mafic gneiss: pyrrhotite has been reported in foliation planes and as much as 80% in some breccia zones. Traces of chalcopyrite and sphalerite were encountered in the drilling.

Associated minerals or products of value – Zinc.

HISTORY OF EXPLORATION AND DEVELOPMENT

The claims are located ½ mile south of the junction of the Mara and Hackett Rivers about 300 miles northeast of Yellowknife.

The HAC group of 105 claims were staked in August 1969 by D. Mercredi and E. Sonnenbergy, and the claims were recorded by D.E. Arden, of Vancouver. Ice Station Resources Ltd. purchased the property in December 1970.

Exploration work in 1971 included magnetic and EM surveys. Two series of parallel discontinuous conductive zones with coincident strong magnetic trends were outlined.

In 1972 geological mapping and diamond drilling were carried out. Twelve holes, totalling 2,925 feet, were drilled to check two conductive zones. Assay results were not significant with the highest running 0.63% Zn over 5 feet.

HISTORY OF PRODUCTION

MAP REFERENCES

Map 76 K, Mara River, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles – accomp. Paper 63-40, Geol. Surv. of Canada.

Map 3623 G, , (Aeromag.), Sc. 1":1 mile. (1968).

REFERENCES

Mineral Development Sector; Corporation Files: "Ice Station Resources Ltd.".

Padgham, W.A., et al.; Mineral Industry Report 1971 and 1972, Northwest Territories, West of 104° West Longitude; EGS 1975-8, pp. 79-80, Dept. Indian and Northern Affairs, 1975. +

REMARKS

Latitude and Longitude from EGS 1975-8, p. 79.

Comp./Rev. By		AJ					
Date	8-71	3-76					

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 K/2	CU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: MOX

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*: approx. Lat. (*Lat.*) 66°06' Long. (*Long.*) 108°31'

Mining Division *Division minière*: Mackenzie — District *District*: Mackenzie

County *Comté*: — Township or Parish *Canton ou paroisse*:

Lot *Lot*: — Concession or Range *Concession ou rang*:

Sec *Sect.*: — Tp. *Ct.*: — R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

Archean metasediments, mainly quartz-mica schists and quartzites, locally contain small gossan zones mineralized with pyrite, pyrrhotite, arsenopyrite, and small amounts of chalcopyrite.

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The claims are on the west side of the Mara River about 500 kilometers northeast of Yellowknife.

The MOX group (72 claims) was recorded in August 1969 by D.E. Arden, of Vancouver. Ice Station Resources Ltd. purchased the property in December 1970.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
503399 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Mineral Policy Sector; Corporation Files: "Ice Station Resources Ltd.".

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. Paper 63-40, Geol. Surv. Can.

Map 3623 G, , (Aeromag.), Sc. 1":1 mile.

Map 76 K, Mara River, (Topo.), Sc. 1:250,000.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*		CFL					
Date *Date*	8-71	3-80					

GRIF Gp.

66°08'N, 108°37'W
76-K-2
Noranda Expl. Co. Ltd.
(080671) (1977)

The claim group is located within the Hackett River Greenstone Belt, a metavolcanic complex over a hundred miles in length on a north-south axis. The rocks range in composition from basalt to rhyolite.

A number of pyrite or pyrite-pyrrhotite gossans occur at the contact of metadacite with metarhyolite.

Soil geochemistry over the area gave low metal values with the highest values reported being: 76 ppm Cu, 40 ppm Pb, 90 ppm Zn, and 1.6 ppm Ag.

These reconnaissance surveys indicate the claims are underlain by rocks favourable as hosts for volcanogenic massive sulphide deposits. The geochemical results, while not encouraging are difficult to assess and the results are often inconclusive.

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
GOLD	Northwest Territories	76 K/14, N/3	AU 1

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: ROBERTS MINING, SAMPLE C-1

OBJECT LOCATED / *OBJET LOCALISÉ*

UNCERTAINTY / *FACTEUR D'INCERTITUDE*

Lat. / *Lat.* 67°00' Long. / *Long.* 109°14'

Mining Division / *Division minière*: Mackenzie

District / *District*: Mackenzie

County / *Comté*:

Township or Parish / *Canton ou paroisse*:

Lot / *Lot*:

Concession or Range / *Concession ou rang*:

Sec / *Sect.*: Tp. / *Ct.*: R. / *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

Grab samples containing arsenopyrite and pyrite, picked up in a length of 75 feet by A. Sjolander for the Roberts Mining Company in 1964, returned assays averaging 0.05 oz Au/ton. The showing is apparently a Contwoyto Lake-type sulphide-bearing amphibolite occurring as a lens in the enclosing metasediments of the Yellowknife Group.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

Associated minerals or products
Minéraux ou produits associés

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 K, Mara River, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 3640 G, (Aeromag.), Sc. 1":1 mile.

REMARKS/*REMARQUES*

Comp./Rev. By / *Comp./rév. par*							
Date / *Date*	01-70						

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502679 *

REFERENCES/*BIBLIOGRAPHIE*

Department of Indian Affairs and Northern Development; Assessment Files: Roberts Mining Co., 1964; 76 K-14.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; GSC Paper 63-40, 1964.

Mineral Policy Sector; Corporation Files: "Roberts Mining Company".

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 K/14	CU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: HOOD RIVER NORTH

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 66°58.7' Long. *Long.* 109°21.8'

Mining Division *Division minière*: Mackenzie

District *District*: Mackenzie

County *Comté*

Township or Parish *Canton ou paroisse*

Lot *Lot*

Concession or Range *Concession ou rang*

Sec *Sect.* Tp. *Ct.* R. *R.*

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

A minor showing of chalcopyrite in metasediments of the Yellowknife Group was noted in 1964 at this location 5 kilometers north of Hood river by Roberts Mining Company, while prospecting its Permit Area 76 K/14.

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. G.S.C. Paper 63-40.

Map 3640 G, (Aeromag.), Sc. 1":1 mile.

Map 76 K, Mara River, (Topo.), Sc. 1:250,000.

REMARKS/*REMARQUES*

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
503400 *

REFERENCES/*BIBLIOGRAPHIE*

Department of Indian Affairs and Northern Development; Assessment Files: Roberts Mining Co., 1964; 76 K-14.

Fraser, J.A. (1964); Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Geol. Surv. Can., Paper 63-40.

Mineral Policy Sector; Corporation Files: "Roberts Mining Company".

Comp./Rev. By *Comp./rév. par*		CFL					
Date *Date*	1966	3-80					

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 K/14	CU 2

NAME OF PROPERTY. *NOM DE LA PROPRIÉTÉ*: SELLWOOD RIVER

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.*: 66°47.4' Long. *Long.*: 109°15.3'

Mining Division *Division minière*: Mackenzie District *District*: Mackenzie

County *Comté*:

Township or Parish *Canton ou paroisse*:

Lot *Lot*:

Concession or Range *Concession ou rang*:

Sec *Sect.*: Tp. *Ct.*: R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

A gossan of reportedly large lateral extent occurs in a northeast-trending gabbro body at the headwaters of Sellwood river. Minor disseminated chalcopyrite with some malachite staining was noted in the gossan by Roberts Mining Company, while prospecting its Permit Area 76 K/14 during 1964.

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. G.S.C. Paper 63-40.

Map 3640 G, , (Aeromag.), Sc. 1":1 mile.

Map 76 K, Mara River, (Topo.), Sc. 1:250,000.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./Rév. par*		CFL					
Date *Date*	1966	3-80					

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
5034O1 *

REFERENCES/*BIBLIOGRAPHIE*

Department of Indian Affairs and Northern Development; Assessment Files: Roberts Mining Co., 1964; 76 K-14.

Fraser, J.A. (1964); Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Geol. Surv. Can., Paper 63-40.

Mineral Policy Sector; Corporation Files: "Roberts Mining Company".

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
IRON	Northwest Territories	76 K/14	FE 1

NAME OF PROPERTY
NOM DE LA PROPRIÉTÉ: BOOTH RIVER

OBJECT LOCATED
OBJET LOCALISÉ

UNCERTAINTY
FACTEUR D'INCERTITUDE

Lat. *Lat.* 66°50.3' Long. *Long.* 109°05.2'

Mining Division *Division minière*: Mackenzie
District *District*: Mackenzie
County *Comté*:
Township or Parish *Canton ou paroisse*:
Lot *Lot*:
Concession or Range *Concession ou rang*:
Sec *Sect.*: Tp. *Ct.*: R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

"A huge gossan, four miles long and one mile wide, contained abundant magnetite and pyrrhotite," according to Roberts Mining Company, which prospected its Permit Area 76 K/14 in 1964. Dimethylglyoxime tests were negative, but the company reports finding evidence that the occurrence was drilled 3 to 5 years previously. The gossan showings are found one mile northwest of Booth river in a body of gabbro that trends northeast, parallel to the river.

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 K, Mara River, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 3640 G, , (Aeromag.), Sc. 1":1 mile.

REMARKS/*REMARQUES*

REFERENCES/*BIBLIOGRAPHIE*

Department of Indian Affairs and Northern Development; Assessment Files: Roberts Mining Co., 1964; 76 K-14.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; GSC Paper 63-40, 1964.

Minerals Sector; Corporation Files: "Roberts Mining Company".

Comp./Rev. By *Comp./rév. par*							
Date *Date*	10-67						

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
508111 *

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
GOLD	Northwest Territories	76 N/2	AU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: PISTOL LAKE (NOEL CLAIMS)

OBJECT LOCATED *OBJET LOCALISÉ* - from GSC Paper 70-70, p. 100.

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 67°03' Long. *Long.* 108°47'

Mining Division *Division minière*: Mackenzie
District *District*: Mackenzie
County *Comté*:
Township or Parish *Canton ou paroisse*:
Lot *Lot*:
Concession or Range *Concession ou rang*:
Sec *Sect.*:
Tp. *Ct.*:
R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Roberts Mining Company,
400 Torrey Bldg.,
Duluth, Minn., U.S.A.

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

Seven separate mineralized zones, A, B, C, D, E, F, and Farney Lake, occur in an area about 4,000 feet long and 2,000 feet wide. Rocks underlying the property consist of granite; greenstone; gabbro; and metasedimentary rocks including greywacke, quartz, biotite schist, micaceous quartzite and interbanded amphibolite, and thin banded iron formation. On the 7 known zones, the most important are the F and Farney Lake zones. The F zone, located on a north-facing hillside along the south shore of Knutson Lake, has been traced for about 500 feet.

The Farney Lake zone, separated from the F zone by a gap of 500 to 600 feet, has been followed for about 600 feet. Width varies from 0.5' to a maximum of 3'. The zone may be an extension of the F zone. Mineralization in the zones consists of heavily disseminated pyrrhotite, pyrite, and arsenopyrite with short sections or pods of massive mineralization. Visible gold is rare but in a finely divided state is associated with the sulphides, especially with the arsenopyrite. The most favourable host rock appears to be the interbanded amphibolite and quartzite. Fraser (1964) reports that the gold showing is

p.t.o. ....

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The Pistol Lake property consists of the 36 Noel claims staked by Noel Avadluk in 1964, and optioned to Roberts Mining Company. The centre of the property is about 4,000 feet southwest of Hood River and 1.5 miles southeast of Pistol Lake. The showings are on claims Noel 33 and 34.

In 1967, the Noel group was optioned by Roberts Mining Company, along with 309 additional claims, to the Hope Bay Syndicate. Following surface work and limited diamond drilling in 1967, the option was dropped.

All of the mineralized zones have been investigated by trenching. Results indicate that only the "F" and Farney Lake zones have any potential, although in both cases the overall grade is too low, and widths too narrow to be exploited at this time. Additionally, continuity of the gold-bearing structures has not been established.

On the Farney Lake zone 16 shallow trenches were excavated. Values ranged from 0.01 oz/ton gold across 1 foot to 4.74 oz/ton across 3 feet. The "F" zone, explored by 22 trenches and 8 diamond drill holes totalling 2,257 feet, gave values ranging from 0.01 oz/ton gold over 1 foot to 1.00 oz/ton over 5 feet. Some drilling was done previously in 1965 on the F zone and hole PL-1 returned three intersections which assayed 0.20 oz/ton Au from 70-75 feet, 1.77 oz/ton Au from 75-80 feet and 1.05 oz from 115 to 120 feet.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502693 *

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT (continued)

in quartz-biotite gneiss and other highly metamorphosed sedimentary rocks of the Yellowknife Group. Some of the rocks contain garnet and abundant amphiboles. Pyrite, pyrrhotite and arsenopyrite form up to an estimated 30 per cent of some of the amphibolite interbeds which range up to 5 feet in thickness.

REFERENCES/*BIBLIOGRAPHIE*

Schiller, E.A.; Mineral Industry of the Northwest Territories, 1964; Paper 65-11, p. 10, Geol. Surv. of Canada, 1965.

Thorpe. R.I.; Mineral Industry of the Northwest Territories, 1965; Paper 66-52, p. 43, Geol. Surv. of Canada, 1966.

Mineral Policy Sector; Corporation File: "Lynx-Canada Explorations Limited".

Nethery, A.W., and Gunn, C.B.; Report to the Hope Bay Syndicate on the 1967 Field Season, N.W.T.; Unpublished report, Duncan R. Derry Limited, November, 1967.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories, Paper 63-40, Geol. Surv. of Canada, 1964.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, pp. 100-101, Geol. Surv. of Canada, 1972.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 3647 G, , (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*							
Date *Date*	07-68	01-74					

PRODUCT / *PRODUIT*	PROVINCE OR TERRITORY / *PROVINCE OU TERRITOIRE*	N.T.S. AREA / *RÉGION DU S.N.R.C.*	REF.AU 2 / *RÉF.*
GOLD	Northwest Territories	76 N/2	

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: TURNER LAKE GOLD SHOWING

OBJECT LOCATED / *OBJET LOCALISÉ*

UNCERTAINTY / *FACTEUR D'INCERTITUDE*

Lat. / *Lat.*: 67°13' — Long. / *Long.*: 108°57'45"

Mining Division / *Division minière*: Mackenzie — District / *District*: Mackenzie

County / *Comté* — Township or Parish / *Canton ou paroisse*

Lot / *Lot* — Concession or Range / *Concession ou rang*

Sec / *Sect.* — Tp. / *Ct.* — R. / *R.*

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Roberts Mining Company,
400 Torrey Bldg.,
Duluth, Minn., U.S.A.

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

"The gold showing occurs mainly on CCI claims 34 and 35. The eastern exposure of the showing is on a cliff face about 200 feet above the valley. It consists of disseminated arsenopyrite, in part gold-bearing, and sporadically distributed free gold within a band of arenaceous and amphibolitic rocks of the Yellowknife Group. The band is several tens of feet wide and has a fold-like configuration with a westerly striking axial plane and steeply plunging axis. The fold has an apparent amplitude of over 1,000 feet and a width that ranges from a few hundred feet to about 1,000 feet. In the central parts of the fold, some of the bedded rocks are tuffaceous. .... Medium grade gold assays were obtained from localized areas in the band, but the average grade across the band in several sections was low." (Schiller, 1965, p. 9). Pyrrhotite and chalcopyrite also occur in the group, and assays of up to 1% copper have been recorded.

Associated minerals or products / *Minéraux ou produits associés* – Copper.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The CCI group of claims was staked by Noel Avadluk and George Turner under contract to Roberts Mining Company during the winter of 1963-64.

Some work was done in 1964 and "During 1965, a considerable program of trenching and sampling was carried out. Some moderate gold assays were obtained and visible gold was noted in several samples, but the distribution of gold seems generally to be erratic. Two diamond drill holes totalling 540 feet failed to intersect anything of interest." (Thorpe, 1966, p. 44). In 1967 the Hope Bay Syndicate optioned 18 of the CCI claims along with 327 others in the Northwest Territories from Roberts Mining Company and carried out additional trenching and sampling. In all 46 trenches have been excavated along the north limb of the fold. With the exception of those along the nose, where a few assays of up to 1.50 oz/ton gold were obtained, gold values obtained were generally less than 0.25 oz/ton.

As the gold content is too low to be of economic interest at present, no further work was recommended, and the option was relinquished.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502694 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

REMARKS/*REMARQUES*

Comp./Rev. By / *Comp./rév. par*							
Date / *Date*	08-68						

REFERENCES/*BIBLIOGRAPHIE*

Schiller, E.A.; Mineral Industry of the Northwest Territories; Paper 65-11, pp. 8, 9, Geol. Surv. of Canada, 1965.

Thorpe, R.I.; Mineral Industry of the Northwest Territories, 1965; Paper 66-52, p. 44, Geol. Surv. of Canada, 1966.

Mineral Policy Sector; File MR 601.11.01 (1967).

Nethery, A.W., and Gunn, C.B.; Report to the Hope Bay Syndicate on the 1967 Field Season, N.W.T.; Unpublished report, Duncan R. Derry Limited, November, 1967.

Mineral Policy Sector; Corporation File: "Lynx-Canada Explorations Limited".

Roberts Mining Company (excerpts from report in Dept. of Indian Affairs and Northern Development).

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
NICKEL	Northwest Territories	76 N/2	NI 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: TURNER LAKE

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. 67°14' Long. 108°57'30"

Mining Division *Division minière*: Mackenzie
District *District*: Mackenzie
County *Comté*:
Township or Parish *Canton ou paroisse*:
Lot *Lot*:
Concession or Range *Concession ou rang*:
Sec *Sect.*:
Tp. *Ct.*:
R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Roberts Mining Company,
400 Torrey Bldg.,
Duluth, Minn., U.S.A.

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The showing consists of a shear zone striking N10°E in metamorphosed quartz diorite containing small pockets of massive and disseminated copper and nickel sulphides. The zone averages 25 feet in width with mineralization confined to less than five feet, and has been traced for 3,000 feet. The zone is located near the contact between micaceous quartzite and meta quartz diorite, and has been broken into many discontinuous sections by pegmatitic dykes. Mineralization occurs where cross shearing or a series of parallel shears are present. Metallic minerals present include pyrrhotite, chalcopyrite, arsenopyrite, niccolite, pyrite, safflorite, gersdorffite, galena, gold and silver.

Associated minerals or products – *Minéraux ou produits associés*: Copper, silver, cobalt, gold.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The C.O.M. group of 18 claims was staked for Roberts Mining Company during the winter of 1963-64 by Noel Avadluk and George Turner. The nickel showing lies on C.O.M. claims 12, 19, and 22, one mile northwest of the north end of Turner Lake.

In 1967 the Hope Bay Snydicate optioned the C.O.M. group along with 327 other claims in the Hope Bay and Turner Lake areas, from Roberts Mining Company. Work carried out by the Syndicate consisted of magnetometer and EM surveys, and 3 trenches across the zone. Assays obtained from the trenches were low:-

Trench	Au (oz/ton)	Ag (oz/ton)	Cu (%)	Ni (%)
1°	0.03/2.5'	0.13/2.5'	0.13/12.0'	0.13/12'
1+	0.02/4.3'	0.2/4.7'	0.13/4.3'	0.14/4.3'
1*	0.05/5.5'	0.08/2.5'	0.07/3.0'	0.01/3.5'

° - One sample assayed 0.93% copper across 2.5 feet and another 0.53% nickel across 2.5 feet.

+ - Grab samples from near the trench gave two copper assays 1.10% across one foot and 2.10% across 2 feet. Nickel assays of 0.90% across 1 foot, 10.5% across 2 feet and 2.10% across 2 feet were also obtained.

* - One nickel sample assayed 1.63% nickel across 5.5 feet.

Further work on the showing was not recommended, and the option was relinquished.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
506486 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

REMARKS/*REMARQUES*

REFERENCES/*BIBLIOGRAPHIE*

Schiller, R.A.; Mineral Industry of the Northwest Territories; Paper 65-11, pp. 8, 9, Geol. Surv. of Canada, 1965.

Mineral Policy Sector: File MR 601.11.01 (1967).

Nethery, A.W., and Gunn, C.B.; Report to the Hope Bay Syndicate on the 1967 Field Season, N.W.T.; Unpublished report, Duncan R. Derry Limited, November, 1967.

Mineral Policy Sector; Corporation File: "Lynx-Canada Explorations Limited".

Roberts Mining Company (excerpts from report in Dept. of Indian Affairs and Northern Development).

Comp./Rév. By *Comp./rév. par*							
Date *Date*	07-68						

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
GOLD	Northwest Territories	76 N/3	AU 1

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: ROBERTS MINING, SAMPLE C-2

OBJECT LOCATED / *OBJET LOCALISÉ*

UNCERTAINTY / *FACTEUR D'INCERTITUDE*

Lat. / *Lat.*: 67°00.5' — Long. / *Long.*: 109°10.4'

Mining Division / *Division minière*: Mackenzie — District / *District*: Mackenzie

County / *Comté* — Township or Parish / *Canton ou paroisse*

Lot / *Lot* — Concession or Range / *Concession ou rang*

Sec / *Sect.* — Tp. / *Ct.* — R. / *R.*

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

A 5-foot chip sample, taken in 1964 by A. Sjolander for Roberts Mining Company across arsenopyrite-pyrite mineralization, assayed 0.06 oz Au/ton. The showing is probably a Contwoyto Lake-type sulphide-bearing amphibolite occurring as a lens in the enclosing metasediments of the Yellowknife Group.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

Associated minerals or products
Minéraux ou produits associés

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502695 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Department of Indian Affairs and Northern Development; Assessment Files: Roberts Mining Co., 1964; 76 K-14.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; GSC Paper 63-40, 1964.

Mineral Policy Sector; Corporation Files: "Roberts Mining Company".

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 3646 G, (Aeromag.), Sc. 1":1 mile.

REMARKS/*REMARQUES*

Comp./Rev. By / *Comp./rév. par*							
Date / *Date*	03-70						

PRODUCT / PRODUIT	PROVINCE OR TERRITORY / PROVINCE OU TERRITOIRE	N.T.S. AREA / RÉGION DU S.N.R.C.	REF. / RÉF.
COPPER	Northwest Territories	76 N/6	CU 2

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: PIT GROUP

OBJECT LOCATED / *OBJET LOCALISÉ*

UNCERTAINTY / *FACTEUR D'INCERTITUDE*

Lat. / *Lat.* 67°23.5' Long. / *Long.* 109°06.9'

Mining Division / *Division minière*: Mackenzie

District / *District*: Mackenzie

County / *Comté*:

Township or Parish / *Canton ou paroisse*:

Lot / *Lot*:

Concession or Range / *Concession ou rang*:

Sec / *Sect.*: Tp. / *Ct.*: R. / *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

P.T. Conroy

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

A NNW-trending drift-covered valley, probably underlain by the Bathurst Fault, divides Yellowknife Group metasediments (west) from Proterozoic sediments of the Goulburn Group. In one section of the claims, where as indicated on Conroy's map the east side of the valley is underlain by diabase, six veins, striking east to northeasterly and said to be one to four feet wide and up to 200 feet long, cut the diabase. The veins, which dip SE, consist of sugary quartz mineralized with some pyrite and chalcopyrite.

Associated minerals or products / *Minéraux ou produits associés* – Zinc, silver, gold.

HISTORY OF EXPLORATION AND DEVELOPMENT / *HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR*

The 12-claim PIT group was staked in April 1968 by Messrs. P.T. Conroy and Thomas and was mapped and sampled in the following year. Grab samples of mineralized material from veins on the east side of a valley, possibly underlain by the Bathurst Fault, yielded maximum values of 1.36% Cu, 0.31% Zn, 0.14 oz Ag/ton and 0.02 oz Au.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
170257

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Department of Indian Affairs and Northern Development; Assessment File: Conroy & Thomas, 1969; Area 76-N-6.

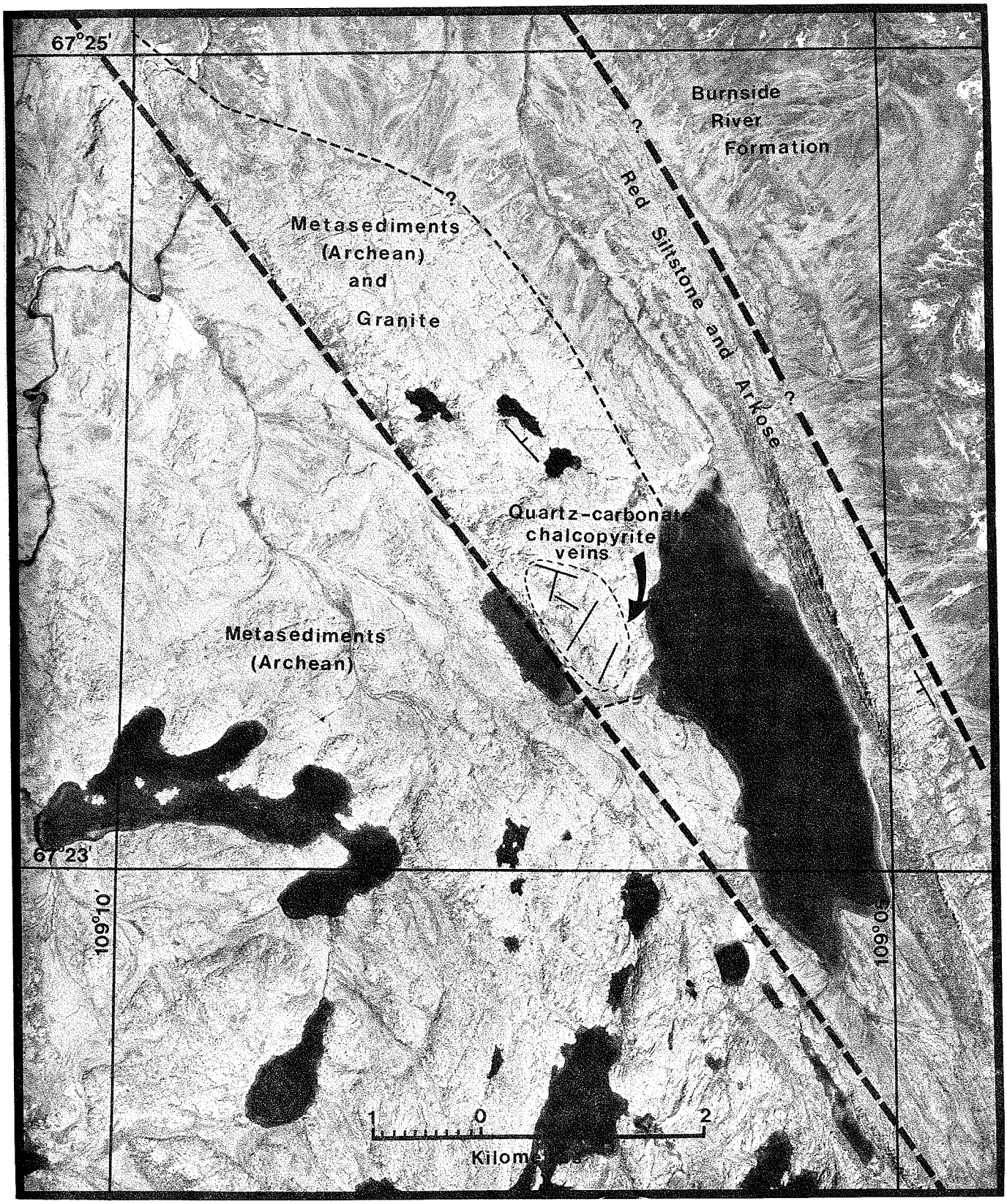
MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 3652 G, (Aeromag.), Sc. 1":1 mile.

REMARKS/*REMARQUES*

Comp./Rev. By / *Comp./rév. par*							
Date / *Date*	05-71						


67°25'
Burnside
River
Formation
Red Siltstone and Arkose
Metasediments
(Archean)
and
Granite
Quartz-carbonate
chalcopyrite
veins
Metasediments
(Archean)
67°23'
109°10'
109°05'
1
0
2
Kilome

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 N/8	CU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: BATHURST INLET AREA

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 67°30' Long. *Long.* 108°

Mining Division *Division minière*: Mackenzie

District *District*: Mackenzie

County *Comté*:

Township or Parish *Canton ou paroisse*:

Lot *Lot*:

Concession or Range *Concession ou rang*:

Sec *Sect.*: Tp. *Ct.*: R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The copper-bearing formation is a series of basic lava flows with thin beds of tuffaceous conglomerate and ash. Native copper occurs as minute flakes scattered in the basalt groundmass, as grains and masses in amygdules near the surface of flows, and in fissures and shatter plances. Chalcocite and covellite have been found replacing dolomite which underlies the copper-bearing rocks. Chalcopyrite and chalcocite occur disseminated through sills and dykes of diabase that traverse the region.

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

This area includes 150 islands of various sizes in Bathurst Inlet, Banks Peninsula, the western mainland and a strip extending along the coast from Arctic Sound to Moore Bay. Native copper was seen on almost every island in the area as well as on the mainland. Many of these showings have subsequently been staked.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
503421 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Lord, C.S. (1951); Mineral Industry of District of Mackenzie, Northwest Territories; Geol. Surv. Can. Mem. 261, pp. 109, 110.

Northern Miner, September 14, 1950, p. 14.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1": 10 miles - accomp. Canadian Arctic Exped. Report XI, 1924.
Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. Report by Fraser, 1964.
Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.
Maps 4552 G & 4553 G, (Aeromag.), Sc. 1":1 mile.
Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*		CFL					
Date *Date*	3-70	3-80					

PRODUCT	COPPER	PROVINCE OR TERRITORY	Northwest Territories	N.T.S. AREA	76 N/9, 0/12	REF.	CU 1

NAME OF PROPERTY: TINA GROUP (EKALULIA ISLAND)

OBJECT LOCATED-Tina group, from G.S.C. Paper 70-70, p. 106.

UNCERTAINTY IN METERS-2,000. Lat. 67°33'30" Long. 108°01'30"

Mining Division: Mackenzie District: Franklin

County: Township or Parish:

Lot: Concession or Range:

Sec: Tp.: R.:

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

O'Neill noted the presence of disseminated native copper in two separate flows, and widespread malachite staining elsewhere on the island.

Basalt flows of the Coppermine River group appear to underlie much of the property; however exposure is poor. A thin band of agglomerate overlies the flows near the northwest boundary of the group and a thick diabase sill overlies the agglomerate. Diabase dykes which cut the basalts are exposed in the southeast and northeast parts of the property. A broad fault zone is inferred to strike northwest through the southern part of the group.

At one locality chalcocite veinlets occur for a length of 200 feet associated with a diabase dyke in a fracture zone. Another showing consists of chalcopyrite, epidote and specularite in a silicified breccia in basalt. A slab of native copper weighing 10 pounds and up to ½ inch thick was found in overburden near the northern boundary. And basalt rubble at another locality contains native copper, zeolites and calcite in amygdules. Minor native silver was noted closely associated with the native copper.

Associated minerals or products of value

HISTORY OF PRODUCTION

MAP REFERENCES

Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1":10 miles - accomp. Canadian Arctic Expedition, Rept. XI, 1924.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - Accomp. report by Fraser, 1964.

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Maps 4552 G and 4553 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS

Comp./Rev. By	AJ	CFL					
Date	1-74	3-80					

HISTORY OF EXPLORATION AND DEVELOPMENT

Widespread occurrences of native copper on Ekalulia (Barry) Island were reported as early as 1821 by the members of the Franklin expedition. The Tina 1-72 claims were staked in 1967 on the central part of Ekalulia Island adjoining north of the Char group (see 76 N/9, Cu 4). The principal showings are grouped at the isthmus dividing the wide northern part of the island from the southern part.

Largo Mines Ltd. held the property in 1968. An exploration program during the year, for the company, consisted of geological mapping and electromagnetic and geochemical surveys. A total of 30 soil samples were taken but the results are only considered important where they support geophysical anomalies. An anomalous soil sample coincides with the north end of EM anomaly P. This anomaly which is moderately strong is near a diabase dike. Anomaly P is considered significant because its peak coincides with an inferred fault.

Mineral Resources Branch, Department of Energy, Mines and Resources, Ottawa.

511869*

REFERENCES

O'Neill, J.J.; The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 53A, 69A; 1924.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Paper 63-40, Geol. Surv. Canada, 1964.

Department of Indian Affairs and Northern Development; Assessment File: Turner Wager Prospecting Syndicate, 1967, 76 O-12.

Mineral Policy Sector; Corporation File: "Largo Mines Ltd.".

Kelly, J.A.; Summary of Mining Activities, Northwest Territories; April, 1969.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, pp. 106-107, Geol. Surv. Canada, 1972.

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 N/9	CU 2

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: DOUG GROUP (ALGAK ISLAND)

OBJECT LOCATED *OBJET LOCALISÉ*: – Beach, northwestern Algak Island.

UNCERTAINTY *FACTEUR D'INCERTITUDE*: 7,000 m | Lat. *Lat.*: 67°34' | Long. *Long.*: 108°29'

Mining Division *Division minière*: Mackenzie | District *District*: Franklin

County *Comté*: | Township or Parish *Canton ou paroisse*:

Lot *Lot*: | Concession or Range *Concession ou rang*:

Sec *Sect.*: | Tp. *Ct.*: | R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

Gently west-dipping basalts of the Coppermine River Group underlie all but the eastern portion of Algak Island. Calcite, zeolites, quartz, chalcedony, epidote, hematite and chlorite occur along joints and in amygdules. Native copper was found, at two places, along joints and in amygdules, with the native copper occurring as thin sheets, nuggets and thick slabs. The copper mineralization was found in an area of shattered rock that mantles a broad fault zone. Two northwest-striking faults cross the property.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The presence of copper mineralization here was reported by the members of the Franklin Expedition of 1821.

The Doug 1-36 claims were staked in 1966 by Arlington Silver Mines Limited to cover a beach area on the northwest tip of Algak Island which is reported as the source of native copper used by the Inuits many years ago. The claims also cover basalt flows reported by the Canadian Arctic Expedition (O'Neill, 1924) to contain native copper both in amygdules and in fractures.

The property was prospected in 1967, and work carried out in 1968 included geological mapping, geochemical and geophysical surveys. Some high heavy metal values from soil sampling were obtained from the south-central part of the property. Several anomalies from a radio-frequency electromagnetic survey occur along a major fault. One anomaly coincides with a zone of fairly high total heavy metals, and slabs of native copper were found in the rock rubble that covers the northward extension of this fault at the boundary between claims T 8899 and T 8900. The largest slab of native copper that was found was estimated to weigh about 77 kilograms.

Associated minerals or products
Minéraux ou produits associés

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
5031,22 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

O'Neill, J.J. (1924); The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, Vol. XI: Geology and Geography, pp. 53 A, 69 A.

Fraser, J.A. (1964); Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Geol. Surv. Can., Paper 63-40.

Department of Indian Affairs and Northern Development; Mineral Occurrence File: 76 N-9.

Mineral Policy Sector; Corporation Files: "Arlington Silver Mines Limited".

Thorpe, R.I. (1972); Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, pp. 103-104, Geol. Surv. Can.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles – accomp. report by Fraser, 1964.

Maps 76 N, Arctic Sound, and 76 O, Rideout Island, (Topo.), Sc. 1:250,000.

Map 4552 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*		CFL					
Date *Date*	1-74	3-80					

PRODUCT / *PRODUIT*	PROVINCE OR TERRITORY / *PROVINCE OU TERRITOIRE*	N.T.S. AREA / *RÉGION DU S.N.R.C.*	REF. / *RÉF.*
COPPER	Northwest Territories	76 N/9	CU 3

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: PETE GROUP (IGLORUA ISLAND)

OBJECT LOCATED / *OBJET LOCALISÉ*: – Centre of Iglorua Island.

UNCERTAINTY / *FACTEUR D'INCERTITUDE*: 4,000 m

Lat. / *Lat.*: 67°37'

Long. / *Long.*: 108°24'

Mining Division / *Division minière*: Mackenzie

District / *District*: Franklin

County / *Comté*:

Township or Parish / *Canton ou paroisse*:

Lot / *Lot*:

Concession or Range / *Concession ou rang*:

Sec / *Sect.*:

Tp. / *Ct.*:

R. / *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

Except for an intrusive sill of diabase, much of the island is underlain by amygdaloidal basaltic flows of the Coppermine River Group. Most of the flows, which are 7 to 22 meters thick and dip about 5°W, contain sparse flakes and grains of native copper.

Within a massive flow of fine-grained brownish grey basalt, a section 5 meters thick is stained with copper. Some showings consist of sheets of native copper in fractured and brecciated zones associated with strong faulting in the basalts. Trenching was carried out to better expose these showings.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

Abundant occurrences of native copper were observed here in 1821 by the members of the Franklin expedition.

In 1967, much of the island was staked as Pete Group and investigated by Flagstone Mines Limited. Some showings were blasted out.

Exploration work on the property in 1968 for Flagstone Mines included a photogeologic study, geological mapping and electromagnetic surveying. The latter survey indicated a northeast-striking fault terminated by another fault. Because these faults are conductive they are considered to be favorable locations in which to explore for copper. Nine anomalies, in addition to those found along the above faults, were located.

Associated minerals or products
Minéraux ou produits associés

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
503433 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. report by Fraser, 1964.

Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1": 10 miles - accomp. Canadian Arctic Expedition Report XI, 1924.

*Maps 76 N, Arctic Sound, and 76 O, Rideout Island, (Topo.), Sc. 1:250,000.

Map 4552 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

REFERENCES/*BIBLIOGRAPHIE*

O'Neill, J.J. (1924); The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 53 A, 67 A.

Fraser, J.A. (1964); Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Geol. Surv. Can., Paper 63-40.

Department of Indian Affairs and Northern Development; Assessment File: 76 N-9.

Mineral Policy Sector; Corporation File: "Flagstone Mines Limited".

Thorpe, R.I. (1972); Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Geol. Surv. Can. Paper 70-70, p. 104.

Comp./Rev. By / *Comp./rév. par*		CFL					
Date / *Date*	1-74	3-80					

PRODUCT	COPPER	PROVINCE OR TERRITORY	Northwest Territories	N.T.S. AREA	76 N/9	REF. CU 4

NAME OF PROPERTY: CHAR GROUP (EKALULIA ISLAND)

OBJECT LOCATED -Char group from G.S.C. Paper 70-70, p. 106.

UNCERTAINTY IN METERS-2,000. Lat. 67°33' Long. 108°03'

Mining Division: Mackenzie District: Franklin

County: Township or Parish:

Lot: Concession or Range:

Sec: Tp.: R.:

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

O'Neill noted the presence of disseminated native copper in two separate flows and widespread malachite staining elsewhere on the island.

On the Char claims vein material is plentiful in the raised beaches; it is composed of a gangue of quartz, carbonate and zeolites containing native copper. This vein material is thought to have been derived from an underlying fault zone. Three fault zones were inferred to be present on the property.

Basalt flows of the Coppermine River Group underlie much of the property. One copper occurrence was found which contained native copper in amygdules and as particles disseminated in massive basalt.

Associated minerals or products of value

HISTORY OF EXPLORATION AND DEVELOPMENT

Widespread occurrences of native copper on Ekalulia (Barry) Island in Bathurst Inlet were reported as early as 1821 by the members of the Franklin expedition.

The Char 1-30 claims were staked in 1967 to cover raised beaches where vein material, rich in native copper, was found. The principal showings are grouped at the isthmus dividing the wide northern part of the island from its southern part.

Largo Mines Ltd. acquired the property and work carried out for the company in 1968 included a photogeological study of the property, geological mapping and an electromagnetic survey. The electromagnetic survey detected two anomalies of appreciable strength. Anomaly H, on claim Char 26, is near an assumed zone of faulting.

MRB-124

HISTORY OF PRODUCTION

MAP REFERENCES

*Map 76 N, Arctic Sound, (Topo,), Sc. 1:250,000.

Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1": 10 miles - accomp. Canadian Arctic Expedition, Rept. vol. XI, 1924.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. report by Fraser, 1964.

Map 4552 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS

REFERENCES

O'Neill, J.J.; The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 53A, 69A; 1924.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Paper 63-40, Geol. Surv. Canada, 1964.

Department of Indian Affairs and Northern Development; Assessment File: Turner Wager Prospecting Syndicate, 1967, 76 O-12.

Mineral Policy Sector; Corporation File: "Largo Mines Ltd.".

Kelly, J.A.; Summary of Mining Activities, Northwest Territories; April, 1969.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, p. 106, Geol. Surv. Canada, 1972.

Comp./Rev. By	AJ	CFL					
Date	1-74	3-80					

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. STN *RÉF.*
SOAPSTONE	Northwest Territories	76 N/9	1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: EKALULIA ISLAND

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 67°40' Long. *Long.* 108°03'

Mining Division *Division minière*

District *District*: Mackenzie

County *Comté*

Township or Parish *Canton ou paroisse*

Lot *Lot*

Concession or Range *Concession ou rang*

Sec *Sect.* Tp. *Ct.* R. *R.*

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

At the north end of Ekalulia Island, 3 miles southwest of Bay Chimo, a light-green soapstone occurs in beds up to 6 inches thick within sediments of the Parry Bay Formation. The soapstone was formed as a result of the alteration of an impure dolomite near its contact with basic igneous rocks.

Associated minerals or products
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

Soapstone from this locality is used by the Eskimos for carvings.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
509451 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

"North"; Vol. 12, No. 5, pp. 19, 20, Department of Northern Affairs and National Resources, Ottawa, Sept.-Oct., 1965.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Paper 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*							
Date *Date*	11-65						

PRODUCT	COPPER	PROVINCE OR TERRITORY	Northwest Territories	N.T.S. AREA	76 N/10	REF.	CU 1

NAME OF PROPERTY: POLAR GROUP (WOLLASTON POINT)

OBJECT LOCATED

UNCERTAINTY IN METERS

Lat. 67°37' Long. 108°35'

Mining Division: Mackenzie District: Mackenzie

County: Township or Parish:

Lot: Concession or Range:

Sec: Tp.: R.:

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

The northern part of Banks peninsula is underlain by basaltic flows of the Coppermine River Group which dip a few degrees west. O'Neill described the flows as amygdaloids 30 to 60 feet thick. Finely disseminated native copper is found in most flows, while malachite staining is noticeable in cliffs on both the east and west shores of the peninsula. A specimen of basalt containing disseminated native copper, taken by O'Neill from a small island just west of Wollaston Point, assayed 0.235% Cu.

The Polar group is underlain by basalt. Greenish grey massive basalt is overlain by a thin red flow. A grey flow 40-50 feet thick with a highly amygdaloidal top overlies the red flow. Vesicules in this flow top are up to several feet in diameter and they have been filled or partly filled with quartz, some calcite, and occasional small blebs of chalcocite.

Associated minerals or products of value

HISTORY OF PRODUCTION

MAP REFERENCES

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1": 10 miles - Accomp. Canadian Arctic Expedition Rept. vol. XI, 1924.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - Accomp. report by Fraser, 1964.

Map 4552 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS

HISTORY OF EXPLORATION AND DEVELOPMENT

Polar 1-100 claims were staked circa 1967 and held by B.I. Nesbitt, president of Flagstone Mines Limited. The claims cover the northernmost part of Banks peninsula, on the east side of Wollaston Point. The area was staked to cover basalt flows which show copper staining in cliff faces along the point.

Exploration for Flagstone Mines in 1968 consisted of geological mapping and electromagnetic and geochemical surveys. The latter consisted of 86 soil samples. The electromagnetic survey detected 28 conductors; anomalies 15 and 17 are considered to be the most promising.

Mineral Resources Branch, Department of Energy, Mines and Resources, Ottawa.

511871 *

REFERENCES

Department of Indian Affairs and Northern Development; Mineral Occurrence File: 76 N-10.

O'Neill, J.J.; The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 69A, 70A; 1924.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Paper 63-40, p. 19, Geol. Surv. Canada, 1964.

Kelly, J.A.; Summary of Mining Activities, Northwest Territories, April 1969.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, pp. 107-108, Geol. Surv. Canada, 1972.

Comp./Rev. By	AJ	CFL					
Date	1-74	3-80					

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 N/10, 7	CU 2

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: DUNC CLAIMS

OBJECT LOCATED / *OBJET LOCALISÉ*

UNCERTAINTY / *FACTEUR D'INCERTITUDE*: approx. Lat. 67°30' Long. 108°31'

Mining Division / *Division minière*: Mackenzie — District / *District*: Mackenzie

County / *Comté* — Township or Parish / *Canton ou paroisse*

Lot / *Lot* — Concession or Range / *Concession ou rang*

Sec / *Sect.* — Tp. / *Ct.* — R. / *R.*

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Arlington Silver Mines Limited,
1110, 505 Burrard St.,
Vancouver, B.C.

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The mineralization is underlain by basalt. The basalt has a total thickness of about 800 meters in a series of flows that dip gently west exposing vertical scarps from 10 to 17 meters facing east. It is dark grey or purplish, weathers dark olive-green, and is commonly stained dark red along fractures.

Native copper is said to occur in amygdules and fractures of flat dipping basalt of the Coppermine River Group. O'Neill (1924) correlated the flows with those of the Coppermine River Group exposed southwest of Coronation Gulf, which they resemble closely in lithology and structure.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The eighteen Dunc claims, apparently located on the east side of Banks Peninsula, were investigated in 1969 by Arlington Silver Mines Limited, having earlier been reported as the property of B.I. Nesbitt.

Associated minerals or products
Minéraux ou produits associés

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
5034 34 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Kelly, J.A.; Resumé of Northwest Territories Mining Activities, December 1969, p. 2.

Kelly, J.A.; Summary of Mining Activities, Northwest Territories, April 1969, p. 15.

Fraser, J.A. (1964); Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Geol. Surv. Can. Paper 63-40.

O'Neill, J.J. (1924); The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 69 A, 70 A.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. report by Fraser, 1964.

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Maps 4552 G and 3653 G, (Aeromag.), Sc. 1":1 mile.

REMARKS/*REMARQUES*

Comp./Rev. By / *Comp./rév. par*		CFL					
Date / *Date*		3-80					

PRODUCT COPPER

PROVINCE OR TERRITORY Northwest Territories

N.T.S. AREA 76 N/11, 6, 10 REF. Cu 1

NAME OF PROPERTY AXE, KIL, TL, F

OBJECT LOCATED—claim groups.

UNCERTAINTY IN METERS Lat. 67°30' Long. 109°05'

Mining Division Mackenzie District Mackenzie

County Township or Parish

Lot Concession or Range

Sec Tp. R.

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

The rocks in the vicinity of the fault are sediments of Perry Bay.

Numerous widespread mineral occurrences, including native copper, chalcopyrite, bornite and chalcocite are found in place on the claims. Mineralized float is also abundant.

Three distinct types of mineralization occur:

(1) Syngenetic native copper occurring locally as fine disseminations, amygdales and fracture fillings in basalt flows.

(2) Epigenetic fracture fillings of native copper, chalcopyrite, chalcocite and bornite occurring in basalt flows and diabase dykes and sills.

(3) Epigenetic fracture fillings and disseminations of chalcopyrite, chalcocite and bornite occurring locally in Perry Bay dolomite.

Associated minerals or products of value

HISTORY OF EXPLORATION AND DEVELOPMENT

The property is located west of Arctic Sound on Bathurst Inlet. Bornite float was found circa 1968 in overburden along a major fault, subsidiary to Bathurst Fault. Subsequently O. Soprocolle and associates staked about 700 claims in TL, KIL and AXE groups, covering about 20 miles of the fault which trends northwesterly from Arctic Sound.

In 1970 a combined geological and geophysical survey was carried out on the property by Western Electronics & Engineering Ltd.

Mineral occurrences are listed below in order of significance by claim group.

AXE:	(S.E. Imnegukat Lake).		
	67°33'	109°05'	Type 3
	67°37'	109°24'	Type 2
KIL	67°32.8'	109°14'	Type 3
	67°32'	109°07.5'	Type 3
	67°30.5'	109°02'	Type 2
TL	67°29.5'	109°02.5'	Type 3
F	67°32'	108°58'	Type 3
	67°38'	108°58'	Type 1

Mineral Resources Branch, Department of Energy, Mines and Resources, Ottawa.

503420

HISTORY OF PRODUCTION

REFERENCES

Department of Indian and Northern Affairs; Assessment Reports, 75 N/11, 6, 10, 1968.

Kelly, J.A.; Summary of Mining Activities, Northwest Territories, April 1969, pp. 15-16, Department of Indian and Northern Affairs.

MAP REFERENCES

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, N.E. District of Mackenzie, (Geol.), Sc. 1": 8 miles - accomp. G.S.C. Paper 63-40.

Maps 3652 G, 4551 G, 4552 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS

Comp./Rev. By	IANA							
Date	8-74							

PRODUCT GOLD

PROVINCE OR TERRITORY Northwest Territories

N.T.S. AREA 76 N/12

REF. Au 1

NAME OF PROPERTY SIK-SIK

OBJECT LOCATED

UNCERTAINTY IN METERS

Gold Lat. 67°42.6' Long. 109°42.9'

Copper Lat. 67°43.3' Long. 109°42.6'

Mining Division Mackenzie

District Mackenzie

County

Township or Parish

Lot

Concession or Range

Sec

Tp.

R.

OWNER OR OPERATOR AND ADDRESS

HISTORY OF EXPLORATION AND DEVELOPMENT

The Sik-Sik group of 12 claims, staked by P.R. Parker in 1967, at the southwest end of Daniel Moore Bay, Bathurst Inlet, was prospected during the year. Reconnaissance mapping was also carried out.

DESCRIPTION OF DEPOSIT

Several westerly striking quartz-calcite veins cut Yellowknife Group metasediments. These veins are reported to be associated with sheared and brecciated zones along the Bathurst Fault. The largest of these can be traced for about 100 feet, but nowhere does it exceed 1 foot in width. The veins locally contain chalcopyrite. Towards the southwest part of the claim group a shear zone 25-40 feet wide extends for over 2,000 feet along a SSW strike. Random chip sampling across the shear zone revealed scattered gold values up to 0.12 oz./ton over 5 feet. The mineralization is contained within myriad veinlets of quartz intruded along strike of the zone.

Associated minerals or products of value – Copper.

HISTORY OF PRODUCTION

REFERENCES

Department of Indian and Northern Affairs; Assessment Files: International Mines Services Ltd., 1967; 76 N-12.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; G.S.C. Paper 63-40, 1964.

MAP REFERENCES

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1"=8 miles - accomp. G.S.C. Paper 63-40.

Map 4551 G, (Aeromag.), Sc. 1"=1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1"=4 miles.

REMARKS

Comp./Rev. By	AJ						
Date	8-74						

PRODUCT / PRODUIT	PROVINCE OR TERRITORY / PROVINCE OU TERRITOIRE	N.T.S. AREA / RÉGION DU S.N.R.C.	REF. / RÉF.
LEAD	Northwest Territories	76 N/13	PB 1

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: GALENA POINT (DON GROUP)

OBJECT LOCATED / *OBJET LOCALISÉ* – Centre of drilled area on Don 1.

UNCERTAINTY / *FACTEUR D'INCERTITUDE*: 150 m

Lat. / *Lat.*: 67°54'15" Long. / *Long.*: 109°46'32"

Mining Division / *Division minière*: Mackenzie

District / *District*: Mackenzie

County / *Comté*:

Township or Parish / *Canton ou paroisse*:

Lot / *Lot*:

Concession or Range / *Concession ou rang*:

Sec / *Sect.*: Tp. / *Ct.*: R. / *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

"The claims are underlain by granitic rocks and contain quartz veins, in part pegmatitic, some of which are tourmaline-bearing. The veins range from inches to about 4 feet wide and contain disseminated and massive galena. In one vein massive galena up to 4 feet wide crops out for several feet along strike before entering the ocean .... Numerous veins inches wide occur on the property. Parts of the granitic host rocks contain disseminated galena", (Schiller, 1965, p. 8).

"The galena-bearing quartz veins on the property generally strike northeast and dip steeply to the west. The veins are commonly up to 6 inches wide, but are occasionally 2 or 3 feet wide, and one vein is 7 feet wide. Minor chalcopyrite and sphalerite are present in the veins but galena is the predominant sulphide and is essentially massive in the wider portions of veins. The veins cut massive granite.

"The largest vein that has been discovered is on the north shore of the island just off of Galena Point. The vein is about 6 feet wide at the shore and narrows to a width of 2 feet at a distance of 75 feet from the shore." (Thorpe, 1972,p.108)

p.t.o. ....

Associated minerals or products / *Minéraux ou produits associés* – Copper, zinc, silver.

HISTORY OF EXPLORATION AND DEVELOPMENT / *HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR*

Lead deposits in the vicinity of Galena Point were first described by O'Neill (1924, p. 47). In 1931 a galena deposit was found at Detention Harbour, a few miles west of Galena Point, and claims were staked in the area for the Pederson Whaling Company. In 1949 Gateway Gold Mines Limited re-staked this or another deposit.

In 1961, D. Normand and A. Cameron staked the DON claims 1-10, to cover the central part of the large island off of Galena Point and part of the mainland. The Don claims 11-22 were added to the property during the 1964 season. Trenching was carried out in 1963 and 1964 on Don 1 and 2 claims. Galena Holdings Ltd. held the property in 1966, and planned to ship 400 tons of galena by barge to Hay River during the summer. A shipment of 111 tons, to Cominco Ltd., graded 75% Pb, 0.8% Zn and 1.3 oz/ton Ag.

During the summer of 1968, Galena Holdings Ltd. drilled 7 holes totalling 757 feet. Four holes intersected the downward extension of veins. Holes 1 and 2 cut the main vein at depths of 71 and 96.5 feet, respectively; only minor sulphides were intersected in the second hole. The results of hole 1 follow:

Depth (ft)	Cu (%)	Ag (oz/ton)	Zn (%)	Pb (%)
71.2-72.2	0.39	1.2	3.85	62.4
72.2-73.0	0.42	tr	0.10	tr

The results of this drilling indicate that the veins are variable in width and lack continuity.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
506183 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

In 1966, 400 tons of high-grade galena ore was shipped from the property.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.
Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1": 10 miles - accomp. Canadian Arctic Exped. Rept. vol. XI, 1924.
Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.
Map 4557 G, , (Aeromag.), Sc. 1":1 mile.
Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

The latitude and longitude of the drilled area on claim DON 1 was obtained from Claim Sheet 76 N/13.

Comp./Rev. By / *Comp./rév. par*							
Date / *Date*	09-65	04-74					

REFERENCES/*BIBLIOGRAPHIE*

Stockwell, C.H., and Kidd, D.F.; Metalliferous Mineral Possibilities of the Mainland Part of the Northwest Territories; Sum. Rept. 1931, Pt. C, pp. 70-85, Geol. Surv. of Canada.

O'Neill, J.J.; The Geology of the Arctic Coast of Canada West of the Kent Peninsula; Report of the Canadian Arctic Expedition 1913-18, Vol. 11, Pt. A, p. 47, 1924.

Lord, C.S.; Mineral Industry of District of Mackenzie, Northwest Territories; Mem. 261, p. 154, Geol. Surv. of Canada, 1951.

Mineral Policy Sector; Corporation Files: "Gateway Gold Ltd."; "Galena Holdings Ltd.".

Schiller, E.A.; Mineral Industry of the Northwest Territories, 1964; Paper 65-11, p. 8, Geol. Surv. of Canada, 1965.

Western Miner, January 1967.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Paper 63-40, p. 19, Geol. Surv. Canada, 1964.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River Area); Paper 70-70, pp. 108-109, Geol. Surv. Canada, 1972.

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT (continued)

A symbol at the east end of the island on GSC Map 45-1963 locates a galena occurrence (lat. 67°53'50"; long. 109°54'). Another symbol near Galena Point is at lat. 67°53'10"; long. 109°53'.

PRODUCT COPPER | PROVINCE OR TERRITORY Northwest Territories | N.T.S. AREA 76 N/14, 15 77 B/2 | REF. Cu 1

NAME OF PROPERTY CHAPMAN ISLANDS

OBJECT LOCATED–Island 20 on Fig. 6 (see Remarks).

UNCERTAINTY IN METERS –1,200. Lat. 67°52'45" Long. 109°10'30"

Mining Division Mackenzie District Franklin

County Township or Parish

Lot Concession or Range

Sec Tp. R.

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

Native copper occurs in flat-lying basalts of the Coppermine River Group on the Chapman Islands. The flows are amygdaloidal and may contain minute grains or flakes of native copper in the groundmass, the amygdules, or in veins, often with quartz and calcite.

Associated minerals or products of value

HISTORY OF PRODUCTION

MAP REFERENCES

*Maps 76 N, Arctic Sound, and 77 B, Richardson Islands, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - Accomp. report by Fraser, 1964.

Maps 3657 G, and 4558 G, (Aeromag.), Sc. 1":1 mile.

Map 7916 G, Arctic Sound, (Aeromag.), Sc. 1":4 miles.

REMARKS

Islands containing copper mineralization are designated in the text of O'Neill's report by number, and these numbers identify islands on a map (Fig. 6) with his report.

Comp./Rev. By	AJ						
Date	8-74						

HISTORY OF EXPLORATION AND DEVELOPMENT

The following showings of copper mineralization on Chapman islands are singled out by O'Neill (1924):

On the island centering at 67°52'45"N, 109°10'30"W, a vein up to 1½ inches wide and traced for 6 feet was reported to be one-third filled with copper. This is designated as island No. 20 in O'Neill's report.

Southeast of the southernmost large island of the archipelago, on several small islands (67°49'30"N, 109°01'30"W), thin flakes of copper occur in seams and veins, the largest of which measured ½ to ¾ of an inch in width and extended for at least several hundred feet.

O'Neill had over 20 specimens of copper-bearing rocks from various islands analyzed. The assays ranged from 0.006 to 0.15% copper.

More than 750 claims were staked on Chapman Islands around 1968 by Hearne Coppermine Explorations Limited.

REFERENCES

O'Neill, J.J.; The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 65A-67A; 1924.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; G.S.C. Paper 63-40, p. 19, 1964.

Kelly, J.A.; Summary of Mining Activities, Northwest Territories, April 1969, p. 17.

PRODUCT COPPER | PROVINCE OR TERRITORY Northwest Territories | N.T.S. AREA 76 N/14, 15, 10, 11 | REF. Cu 2

NAME OF PROPERTY STOCKPORT ISLANDS

OBJECT LOCATED–Marcet Island.

UNCERTAINTY IN METERS -3,000. Lat. 67°47' Long. 109°05'

Mining Division Mackenzie District Franklin

County Township or Parish

Lot Concession or Range

Sec Tp. R.

OWNER OR OPERATOR AND ADDRESS

HISTORY OF EXPLORATION AND DEVELOPMENT

O'Neill (1924) has singled out the following showings on Stockport Islands:

Near the northeast end of the large island (67°47.0'N; 108°59.0'W - uncertainty 800 metres) east of Marcet island, one thin copper-bearing vein was traced for 60 feet and smaller veins, up to ½ inch thick, that carry flakes of native copper occur in the vicinity. Numerous copper-bearing veins and seams occur on a small island to the northwest.

Similar veins were noted on Marcet Island.

Of five specimens of copper-bearing rocks from Stockport Islands, taken by O'Neill, the best assay, 0.195% Cu, came from a small island south of Marcet Island.

About 1968, Hearne Coppermine Explorations Limited staked some 150 claims of the AN group on these islands.

DESCRIPTION OF DEPOSIT

Flat-lying basaltic flows of the Coppermine River Group underlie Stockport Islands. The flows are amygdaloidal and most of them carry minute disseminated grains or flakes of native copper in the groundmass, the amygdules, and in veins with quartz and calcite.

Associated minerals or products of value

HISTORY OF PRODUCTION

REFERENCES

O'Neill, J.J.; The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, pp. 65A-67A; 1924.

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; G.S.C. Paper 63-40, p. 19, 1964.

Kelly, J.A.; Summary of Mining Activities, Northwest Territories, April 1969, p. 17.

MAP REFERENCES

*Map 76 N, Arctic Sound, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. G.S.C. Paper 63-40.

Maps 4551 G, 4552 G, 4557 G, and 4558 G, (Aeromag.), Sc. 1": 1 mile.

Map 7916 G, Arctic Sound, Sc. 1":4 miles.

REMARKS

Comp./Rev. By	AJ						
Date	8-74						

Wolf Claims Pb, Zn-bearing quartz-carbonate vein system
760/03
67°05'30"N; 107°22'40"W
1981 claim holder unknown

A galena and sphalerite-bearig breccia vein system has been traced 700 m up a 150 m rise on the south side of "Hiukitak" Island in Archean granitic rocks and gneiss. As exposed in numerous blasted pits and on natural outcrops, it ranges from less than one metre to more than 10 m in breath. The wider parts include sections of breccia containing a high proportion of quartz carbonate and sulphides in thin bands surrounding angular granitic rock clasts. Vuggy open spaces line with terminated quartz crystals indicate either incomplete filling of open spaces or dissolution of calcite.

No information is available on the amount of silver that is associated with sulphides in the zone but this in itself as well as the general character of the zone suggests that the silver content is low. None of the exposed sections of the zone appear likely to contain more than a few percent lead and zinc through appreciable thicknesses and lengths. No drilling has been done. According to unconfirmed reports an extension of the zone was found on the mainland and an occurrence of chalcopyrite has been found in metarhyolite in the central part of Hiukitak Island.

The Wolf zone is in many respects similar to veins at Galena point and near Thunder Bay, Ontario. It seems possible that, like the latter, they were formed near an unconformity between Archean rocks and a thin cover of overlying Proterozoic sediments. If so, the immediate overlying sediments could have been quartzite or argillite or dolomite of the Western River, Burnside River, or Parry Bay Formation.

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	Northwest Territories	76 O/5	CU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: BOB GROUP (KANUYAK ISLAND)

OBJECT LOCATED *OBJET LOCALISÉ*: - see remarks.

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 67°25' Long. *Long.* 107°53'30"

Mining Division *Division minière*: Mackenzie
District *District*: Franklin
County *Comté*:
Township or Parish *Canton ou paroisse*:
Lot *Lot*:
Concession or Range *Concession ou rang*:
Sec *Sect.*:
Tp. *Ct.*:
R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

1969 - Arlington Silver Mines Limited,
1110, 505 Burrard St.,
Vancouver, B.C.

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

"The sediments outcropping along the eastern side of the island consist of dolomites overlain by sandstone and shale (Parry Bay Group). A short distance inland the sediments are overlain by the amygdaloids (Coppermine River Group), where these rest directly on the dolomite, that rock at most places is replaced by a mixture of chalcocite and covellite. At one such locality near the northern end of the island, the upper layers of the dolomite are highly impregnated with the sulphides, especially within 1-1/3 meters of the contact. An analysis of a specimen of one of these layers which showed a complete replacement of a bed 15 centimeters thick, indicated the presence of 49.87 per cent copper and 1.12 ozs of silver per ton." (O'Neill, 1924).

"Dolomite and limestone, with minor interbeds of sandstone and shale, of the Parry Bay Formation are overlain by sediments and basalt flows of the Coppermine River Group. .... In places the Parry Bay Formation is directly overlain by basalt. Approximately 80 per cent of the property is underlain by basalts. Two faults were recognized on the property and these have northwest strikes.

p.t.o. ....

Associated minerals or products *Minéraux ou produits associés*: - Silver.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

Bob Group was staked here in 1967 or 1968 and acquired by Arlington Silver Mines Limited. It was reported that high grade specimens of copper mineralization had been obtained previously along the dolomite-basalt contact near the east shore of the island. Surface investigations were conducted in 1968 and 1969 on the Bob claim which lie along the contact between dolomite and overlying basalts. This work included geological mapping, an electromagnetic survey, and a geochemical survey. Little significance was attached to the geochemical or electromagnetic survey results.

Because the zone is exposed on a nearly vertical cliff, further exploration might be carried out by driving short adits or by cutting benches along the edge of the mineralized zone and its extensions.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
5034.35 *

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT (continued)

"The main chalcocite-bearing zone is on claim T 14954 and consists of concentrated mineralization in a band approximately 6 inches thick. A chip sample was taken representing a combined length of 80 feet in two sections, with covered areas between, within a distance of 413 meters. This sample assayed 13.4% Cu. This mineralization is apparently in dolomite along or very near the contact with overlying basalt. The contact strikes about north-south and dips 3° to 18° west; the copper mineralization may thus be of great lateral extent. ....

"In addition to the main zone of mineralization, some chalcocite and native copper are present in amygdules and fractures in the basalts." (Thorpe, 1972, pp. 103-104).

REFERENCES/*BIBLIOGRAPHIE*

O'Neill, J.J. (1924); The Geology of the Arctic Coast of Canada, West of Kent Peninsula; Report of the Canadian Arctic Expedition, 1913-18, vol. XI: Geology and Geography, p. 69 A.

Fraser, J.A. (1964); Geological Notes on Northeastern District of Mackenzie, Northwest Territories; Geol. Surv. Can., Paper 63-40.

Kelly, J.A.; Resumé of Northwest Territories Mining Activities, December 1969, p. 2.

Thorpe, R.I. (1972); Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Geol. Surv. Can., Paper 70-70, pp. 101-102.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. report by Fraser, 1964.
Map 1963, Darnley Bay to Bathurst Inlet, (Geol.), Sc. 1": 10 miles - accomp. Canadian Arctic Expedition Report, vol. XI, 1924.
Map 76 O, Rideout Island, (Topo.), Sc. 1:250,000.
Map 4547 G, (Aeromag.), Sc. 1":1 mile.
Map 7915 G, Rideout Island, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

Latitude and longitude obtained from Geol. Surv. Can., Paper 70-70, p. 101.

Comp./Rev. By *Comp./rév. par*		CFL					
Date *Date*	1-74	3-80					

PRODUCT	GOLD	PROVINCE OR TERRITORY	Northwest Territories	N.T.S. AREA	76 O/9	REF.	Au 1

NAME OF PROPERTY: HOPE BAY SYNDICATE

OBJECT LOCATED

UNCERTAINTY IN METERS

No. 1 Showing Lat. 67°32'55" Long. 106°19'
No. 2 Showing Lat. 67°32'15" Long. 106°17'25"

Mining Division: Mackenzie District: Mackenzie

County: Township or Parish:

Lot: Concession or Range:

Sec: Tp.: R.:

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

The No. 1 and No. 2 showings consist of quartz veins containing visible gold. Both showings are in greenstone, near the southeast corner of the Hope Bay greenstone belt (Archaean Yellowknife Group). The 2-foot wide No. 1 vein was exposed for 200 feet. Grab samples assayed up to 16 oz./ton gold.

Associated minerals or products of value

HISTORY OF PRODUCTION

HISTORY OF EXPLORATION AND DEVELOPMENT

Noel Avadluk and his wife, Angie, while prospecting for the Hope Bay Syndicate in 1967, located two small gold showings 3 miles southeast of Pincher Lake. Trenching was reported to have been carried out on these veins in 1968.

REFERENCES

Department of Indian Affairs and Northern Development; Assessment Reports: Hope Bay Syndicate, 1967, 1968, File 76-0-9.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, p. 117, Geol. Surv. Canada, 1972.

MAP REFERENCES

*Map 76 O, Rideout Island, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - Accomp. G.S.C. Paper 63-40.

Map 4554 G, (Aeromag.), Sc. 1":1 mile.

Map 7915 G, Rideout Island, (Aeromag.), Sc. 1":4 miles.

REMARKS

The latitude and longitude of the veins were obtained from G.S.C. Paper 70-70, p.116.

Comp./Rev. By							
Date							

SEPT 1973

PRODUCT	COPPER	PROVINCE OR TERRITORY	Northwest Territories	N.T.S. AREA	76 O/12	REF. CU 1

NAME OF PROPERTY: JOE GROUP

OBJECT LOCATED-Symbol on G.S.C. Map 45-1963.

UNCERTAINTY IN METERS-1,000. Lat. 67°39'15" Long. 107°48'45"

Mining Division: Mackenzie District: Mackenzie

County: Township or Parish:

Lot: Concession or Range:

Sec: Tp.: R.:

OWNER OR OPERATOR AND ADDRESS

1968 - Flagstone Mines Limited.

HISTORY OF EXPLORATION AND DEVELOPMENT

This showing, noted during regional mapping in 1962 by Fraser, was staked and prospected in 1967 by J.S. Turner and was turned over in the 36 Joe claims to Flagstone Mines Limited. The main mineralized area occurs on claim T 8825 near the east shore of Bathurst Inlet, opposite Ekalulia Island. A selected sample from a trench on the property is reported to have assayed 5.54% Cu and 1.6 oz./ton Ag.

Exploration work on the property in 1968 included geological mapping and an electromagnetic survey. The latter survey located 14 anomalies. The strongest, anomalies 10-14, may represent one single north-striking conductor that has been offset by the east-striking mineralized fault zone. Or, anomaly 14 may represent a conductive zone along the fault. A recommendation to drill anomaly 14 was made. This anomaly is located on claim Joe 25, with the centre of this claim at lat. 67°39'15"; long. 107°45'12".

DESCRIPTION OF DEPOSIT

The best mineralized exposure is at the edge of the ocean where the rock is a very reddish mixture of syenite, granite, pegmatite and a few narrow quartz veins. All these rocks contain chalcopyrite and pyrite.

Granodiorite, which occupies most of the north part of the property has been cut by faults and diabase dykes.

In the central part of the property a body of grey granite is in contact with a small body of amphibolite on the east. The amphibolite is succeeded by pink granite. An east-west fault occurs along the south edge of the grey granite; this faulting and copper mineralization extends east into the pink granite. Chalcopyrite occurs with pyrite as fracture fillings and disseminations in the granitic rocks for a length of 1,500 feet.

Associated minerals or products of value - Silver.

HISTORY OF PRODUCTION

REFERENCES

Fraser, J.A.; Geological Notes on Northeastern District of Mackenzie, Northwest Territories; G.S.C. Paper 63-40, 1964.

Department of Indian Affairs and Northern Development; Assessment File: Turner Wager Prospecting Syndicate, 1967; 76 N-15.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, p. 105, Geol. Surv. Canada, 1972.

MAP REFERENCES

Map 76 O, Rideout Island, (Topo.), Sc. 1:250,000.

*Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - Accomp. report by Fraser, 1964.

Map 4553 G, (Aeromag.), Sc. 1":1 mile.

Map 7915 G, Rideout Island, (Aeromag.), Sc. 1":4 miles.

REMARKS

Comp./Rev. By	AJ	AJ	CFL				
Date	1-74	8-74	3-80				

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
GOLD	Northwest Territories	76 0/16	AU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: BRICK SHOWING

OBJECT LOCATED *OBJET LOCALISÉ*

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 67°50'50" Long. *Long.* 106°24'

Mining Division *Division minière*: Mackenzie

District *District*: Mackenzie

County *Comté*:

Township or Parish *Canton ou paroisse*:

Lot *Lot*:

Concession or Range *Concession ou rang*:

Sec *Sect.*: Tp. *Ct.*: R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Hope Bay Syndicate -
- Lynx-Canada Explorations Limited - 50%
- O'Brien Explorations Limited - 30%
- Cliffs of Canada Limited - 10%
- Robert W. Nicholls - 10%

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The Brick showing is a very low grade gold showing, located in the south-central sector of the Hope Bay greenstone belt, about 600 feet west of the eastern granite contact. The underlying rocks are a greenstone-granite-granodiorite complex, containing a network of late micro-pegmatite and felsite dykes. The showing consists of a northwesterly-trending band of buff coloured, pyritized mylonite which contains lenses of massive mineralized quartz. The zone is about 20 feet wide and mineralization has been traced for about 400 feet. Individual quartz lenses are up to 5 feet thick. Mineralization consists of sphalerite, chalcopyrite, limonite, galena, and low values in gold and silver.

Rocks of the Hope Bay greenstone belt have been assigned to the Yellowknife Group of Archaean age.

Associated minerals or products *Minéraux ou produits associés* - Copper, zinc, silver.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The showing is located on the common corner of Brick claims 1 to 4, staked by the Roberts Mining Company in 1965. The showing was mapped by the company in 1965 and sampling indicated low gold and silver values. The best sample obtained assayed 0.38 oz/ton gold across 3 feet, and 0.50 oz/ton across 4 feet.

In 1967, the Hope Bay Syndicate acquired a 3-year option on 345 claims from Roberts Mining Company, including the 4-claim Brick group. Work carried out by the Syndicate in 1967 included detailed mapping and a limited amount of trenching. Seven representative chip samples were taken, analyses of which gave the following results:-

No.	Width (ft.)	Gold (oz/ton)	Silver (oz/ton)	Copper (%)	Zinc (%)
174	5.5	Tr	0.32	0.15	0.95
175	4.5	Tr	0.30	0.15	1.40
176	5.0	Nil	Tr	0.20	1.20
177	7.6	Nil	0.30	0.10	1.20
178	3.0	0.04	0.10	0.10	1.10
179	9.0	0.02	0.26	0.10	1.05
180	3.0	0.54	0.80	0.05	0.75

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502697 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Mineral Policy Sector; Corporation File: "Lynx-Canada Explorations Limited".

Nethery, A.W., and Gunn, C.B.; Report to the Hope Bay Syndicate on the 1967 Field Season, N.W.T.; Unpublished report, Duncan R. Derry Limited, November, 1967.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, pp. 115-116, Geol. Surv. Canada, 1972.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 0, Rideout Island, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 4560 G, Aeromag.), Sc. 1":1 mile.

Map 7915 G, Rideout Lake, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*							
Date *Date*	09-68	09-73					

PRODUCT / *PRODUIT*	PROVINCE OR TERRITORY / *PROVINCE OU TERRITOIRE*	N.T.S. AREA / *RÉGION DU S.N.R.C.*	REF. / *RÉF.*
GOLD	Northwest Territories	76 0/16	AU 2

NAME OF PROPERTY / *NOM DE LA PROPRIÉTÉ*: LAHTI SHOWING

OBJECT LOCATED / *OBJET LOCALISÉ*: North vein 68°00'00" 106°28'00"

UNCERTAINTY / *FACTEUR D'INCERTITUDE*: South vein Lat. 67°59'45" Long. 106°27'45"

Mining Division / *Division minière*: Mackenzie

District / *District*: Mackenzie

County / *Comté*:

Township or Parish / *Canton ou paroisse*:

Lot / *Lot*:

Concession or Range / *Concession ou rang*:

Sec / *Sect.*: Tp. / *Ct.*: R. / *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Hope Bay Syndicate -
- Lynx Canada Explorations Limited - 50%
- O'Brien Explorations Limited - 30%
- Cliffs of Canada Limited - 10%
- Robert W. Nicholls - 10%

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The Lahti showing is located in the central sector of the Hope Bay greenstone belt. It is very low grade, composed of 2 northeast-striking, steeply-dipping quartz vein systems about 2,000 feet apart. The quartz lenses which outcrop intermittently over a length of about 300 feet average about 4 feet in width, and occupy southerly dipping thrust faults. Sulphide mineralization is present up to about 5% in the lenses and consists chiefly of pyrite and chalcopyrite. Low gold and silver values are associated with the sulphides in the quartz.

Rocks of the Hope Bay greenstone belt have been assigned to the Yellowknife Group of Archaean age.

Some galena has also been reported in the vein.

Associated minerals or products / *Minéraux ou produits associés* - Silver, copper.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The showing is on Wan claims 30 and 38, staked in 1967 by Duncan R. Derry Limited for the Hope Bay Syndicate. A small amount of stripping was carried out, and detailed mapping done (Sc. 1":40'). Representative samples taken at 2 places along the south vein gave the following results:-

Sample	Width	(Gold (oz/ton)	Silver (oz/ton)	Copper (%)
1	5	0.44	0.28	0.16
2	5	2.04	1.48	0.31

A sample across a width of 5 feet in the north vein assayed 0.05% Cu, 0.94 oz/ton Ag and 0.38 oz/ton Au.

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502698 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Mineral Policy Sector; Corporation Files: "Lynx-Canada Explorations Limited"; "Hope Bay Syndicate".

Nethery, A.W., and Gunn, C.B.; Report to the Hope Bay Syndicate on the 1967 Field Season, N.W.T.; Unpublished report, Duncan R. Derry Limited, November, 1967.

Thorpe, R.I.; Mineral Exploration and Mining Activities, Mainland Northwest Territories, 1966 to 1968 (excluding the Coppermine River area); Paper 70-70, p. 116, Geol. Surv. Canada, 1972.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 76 0, Rideout Island, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 4560 G, (Aeromag.), Sc. 1":1 mile.

Map 7915 G, Rideout Island, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

The latitude and longitude of the veins were obtained from GSC Paper 70-70, p. 116.

Comp./Rev. By / *Comp./rév. par*							
Date / *Date*	09-68	09-73					

PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
GOLD	Northwest Territories	76 0/16	AU 3

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ*: GUNN SHOWING

OBJECT LOCATED *OBJET LOCALISÉ* - Occurrence.

UNCERTAINTY *FACTEUR D'INCERTITUDE*: 400 m

Lat. 67°58'35" Long. 106°28'20"

Mining Division *Division minière*: Mackenzie

District: Mackenzie

County *Comté*:

Township or Parish *Canton ou paroisse*:

Lot *Lot*:

Concession or Range *Concession ou rang*:

Sec *Sect.*: Tp. *Ct.*: R. *R.*:

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Hope Bay Syndicate -
- Lynx-Canada Explorations Limited - 50%
- O'Brien Explorations Limited - 30%
- Cliffs of Canada Limited - 10%
- Robert W. Nicholls - 10%

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The Gunn showing is located in the central sector of the Hope Bay greenstone belt. It is a very low-grade gold occurrence consisting of quartz vein about 5 feet wide mineralized chiefly with pyrite, chalcopyrite and some galena. The vein, which is lensy in character, outcrops intermittently for about 400 feet in a narrow band of buff coloured pyritized greenstone-mylonite. The occurrence is about a mile north of the nose of a horseshoe-shaped diabase dyke, and about 1,000' west of the granite contact.

Rocks of the Hope Bay greenstone belt have been assigned to the Yellowknife Group of Archaean age.

Associated minerals or products *Minéraux ou produits associés* - Copper, silver, lead.

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The Gunn showing, discovered in August 1967, is located on Bec claims 32 and 33, staked in 1967 by Duncan R. Derry Limited for the Hope Bay Syndicate. Detailed mapping (Sc. 1":40'), was carried out in 1967, along with a limited amount of trenching and some chip sampling. Two representative samples gave the following results:-

Sample	Width	Gold (oz/ton)	Silver (oz/ton)	Copper (%)
1	4	0.01	0.02	0.26
2	4	0.02	0.12	0.21

Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa
Secteur de la politique minérale, ministère de l'Énergie, des Mines et des Ressources, Ottawa
502699 *

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

REFERENCES/*BIBLIOGRAPHIE*

Mineral Policy Sector; Corporation File: "Lynx-Canada Explorations Limited".

Nethery, A.W., and Gunn, C.B.; Report to the Hope Bay Syndicate on the 1967 Field Season, N.W.T.; Unpublished report, Duncan R. Derry Limited, November, 1967.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

*Map 76 0, Rideout Island, (Topo.), Sc. 1:250,000.

Map 45-1963, Northeastern District of Mackenzie, (Geol.), Sc. 1":8 miles - accomp. GSC Paper 63-40.

Map 4560 G, (Aeromag.), Sc. 1":1 mile.

Map 7915 G, Rideout Island, (Aeromag.), Sc. 1":4 miles.

REMARKS/*REMARQUES*

A symbol locating the Gunn showing is printed on the map accompanying Hope Bay Syndicate's 1969 Assessment Report.

Comp./Rev. By *Comp./rév. par*							
Date *Date*	09-68	09-73					

APPENDIX C

BATHURST INLET

A Natural Area of Canadian Significance

(Contributed by Parks Canada Department of Environment)

The following conclusions and recommendations are taken from the report, A Natural Resource Survey of the Bathurst Inlet Area, Northwest Territories (Zoltai, S.C., Karasiuk, D.V., and Scotter, G.W., 1980). The conclusions provide an excellent overview of the natural resources of the Bathurst Inlet Area, and indicate why the area is of interest to Parks Canada. The boundary recommended by Zoltai et al to Parks Canada is based primarily on natural resource considerations, and would have to be balanced against other factors such as the mineral assessment.

The complete natural resource survey report may be reviewed at Parks Canada offices in Yellowknife, Winnipeg or Ottawa.

CONCLUSIONS AND RECOMMENDATIONS (from A Natural Resource Survey of the Bathurst Inlet Area, Zoltai, S.L., Karasiuk, D.J., Scotter, G.W., 1980)

The Bathurst Inlet area offers features that are common to large portions of the arctic mainland. At the same time, the outstanding scenery, richness of flora, huge caribou herds, and rich Inuit heritage make this area truly unique (Hancock, 1979).

13.1 National Significance of the Bathurst Inlet Study Area

The Bathurst Inlet area offers beautiful scenery and waterfalls that are unsurpassed anywhere on the Canadian Shield. It has an exceptionally rich and varied flora. Muskoxen and caribou range within the area and huge caribou herds migrate through it annually. It has a rich archaeological base, as well as interesting links with the discovery of the north.

13.1.1 Representativeness of the Area

The Bathurst Inlet study area lies on the boundary between Natural Regions 15 and 16 (Parks Canada 1972). The uplands on either side of Bathurst Inlet are representative of these natural regions in their physiography, soils, vegetation and fauna.

The glacially sculptured uplands of the Canadian Shield, with their discontinuous, thin till cover are characteristic of both regions. The vegetation is also representative of these regions, being typical of the heath-lichen vegetation of the Low Arctic ecoregion. The other potential national park in this natural region, the Great Slave Lake (reserve) area, is on the southern fringe of the tundra and includes patches of subarctic forests.

The attraction of Bathurst Inlet proper for Parks Canada is its uniqueness, for Bathurst Inlet proper is unrepresentative of regions 15 and 16. The area is a climatic oasis during the summer months, and this probably accounts for the unusual diversity of vegetation, and for the unusual vegetation types that occur. Bathurst Inlet has several species of breeding birds that are isolated from other populations of their species, again because of the presence of unusual vegetation types. However, the terrestrial mammal and fish populations of the area are probably typical of the region. The inlet is notably poor in marine mammals, except for ringed seals.

The prehistoric record in Bathurst Inlet indicates that the area was "no-man's land," because of the centuries-long animosity between the Indians and Eskimos. The archaelogical sites that do exist are fascinating, although of recent origin.

From the point of view of recent history, Bathurst Inlet has few features of direct historical significance.

13.1.2 Outstanding and Unique Features

The Bathurst Inlet study area has a scenery that is unexcelled in the northern Canadian Shield. Steep rock cliffs, rising from the sea or surrounded by sedge meadows combine into most pleasing, rugged landscapes. New scenery is exposed to the boat traveller at each turn into one of the many sheltered bays or straits. The hiker can expect to traverse a great variety of terrain and be rewarded by magnificent views.

The number and size of waterfalls, especially on the west side of the inlet is truly remarkable. The best known of these is Wilberforce Falls, (Fig. 1c) where the water thunders down an upper and lower falls for a combined drop of 52 m. During high water stages in the spring the falls envelop a small island, but in the late summer only a series of pools remain in the western arm. The river continues its turbulent course in a deep canyon sculpted from quartzite.

A spectacular falls occurs on a small, unnamed stream south of Bathurst Inlet Lodge (Fig. 1c). Locally known as Window Falls for a rectangular opening in the rock near the lip of the falls, the water drops some 45 m. Water has carved out a narrow, deep canyon below the falls.

There are innumerable falls and rapids on all the rivers and creeks flowing into the inlet. The Burnside Falls on Burnside River are only about 10 m. high, but the great volume of water tumbling over the falls make the rocks tremble. Smaller falls that would create a great deal of interest in inhabited areas, are commonplace here. One such falls occurs on the James River near its confluence with Hood River. The falls will necessitate portages over often difficult terrain, but the canoeist will be amply rewarded with awesome sights.

Two unique caves were found on Stockport Island (Fig. 1c). These caves, informally called "Twin Caves" were formed by the erosion of softer bedrock under a thick (3 m) sheet of diabase. The diabase was injected along the gently undulating plane of bedding. As the softer underlying rock eroded, possibly by the pounding of the sea during high sea level stages, the diabase formed gently arching structures over the caves that look deceptively man-made. The larger of the two caves is 10 m high and 42.5 m wide at the entrance and 15 m deep. The smaller cave is 6 m high and 20.5 m wide at the entrance, and extends 9.5 m into the rock. Cursory examination of the interior of the caves showed signs of temporary occupancy by small predators. A more thorough examination may reveal evidences of early human occupancy, as the caves appear to be adequate and safe shelters.

A truly outstanding feature of the area is the variability of its flora. Literally dozens of plants, be it flowering plants, mosses, or lichens, were found during the brief exploratory survey that are not known to occur for many kilometers. The abundance of special hatitats, formed by rock faces that reflect heat, waterfalls that provide a steady water spray, and nutrient-rich soils may account for this unexpected floral variety.

Huge herds of caribou, numbering in the tens of thousands, converge around Bathurst Inlet during their annual movements. Although our survey missed the migration, the trails made by thousands of hooves were fresh and the smell of thousands of animals was unmistakable. The well-worn trails indicate a constant use of the route between Bathurst Inlet and Bathurst Lake, as well as the south end of Bathurst Inlet. The sight of a huge herd leaves an unforgettable impression on the viewer.

The most concentrated Inuit sites were connected with the caribou migration. At the northern end of Bathurst Lake the caribou are forced to cross a narrow land bridge between two lakes (Fig. 1c). A number of old blinds, built by hunters, of flat stones propped on edge attest to the long-established use of this crossing by the caribou. The hunters left dozens of tent rings marking their campsites, as well as caches for the temporary storage of surplus meat.

Bathurst Inlet has a small concentration of breeding territories of the endangered peregrine falcon. This species is now so rare that Bathurst Inlet should be considered a critical wildlife area.

The marine life of Bathurst Inlet is unusual because it contains relict populations of fishes that are isolated from their normal range. More research on the oceanography of

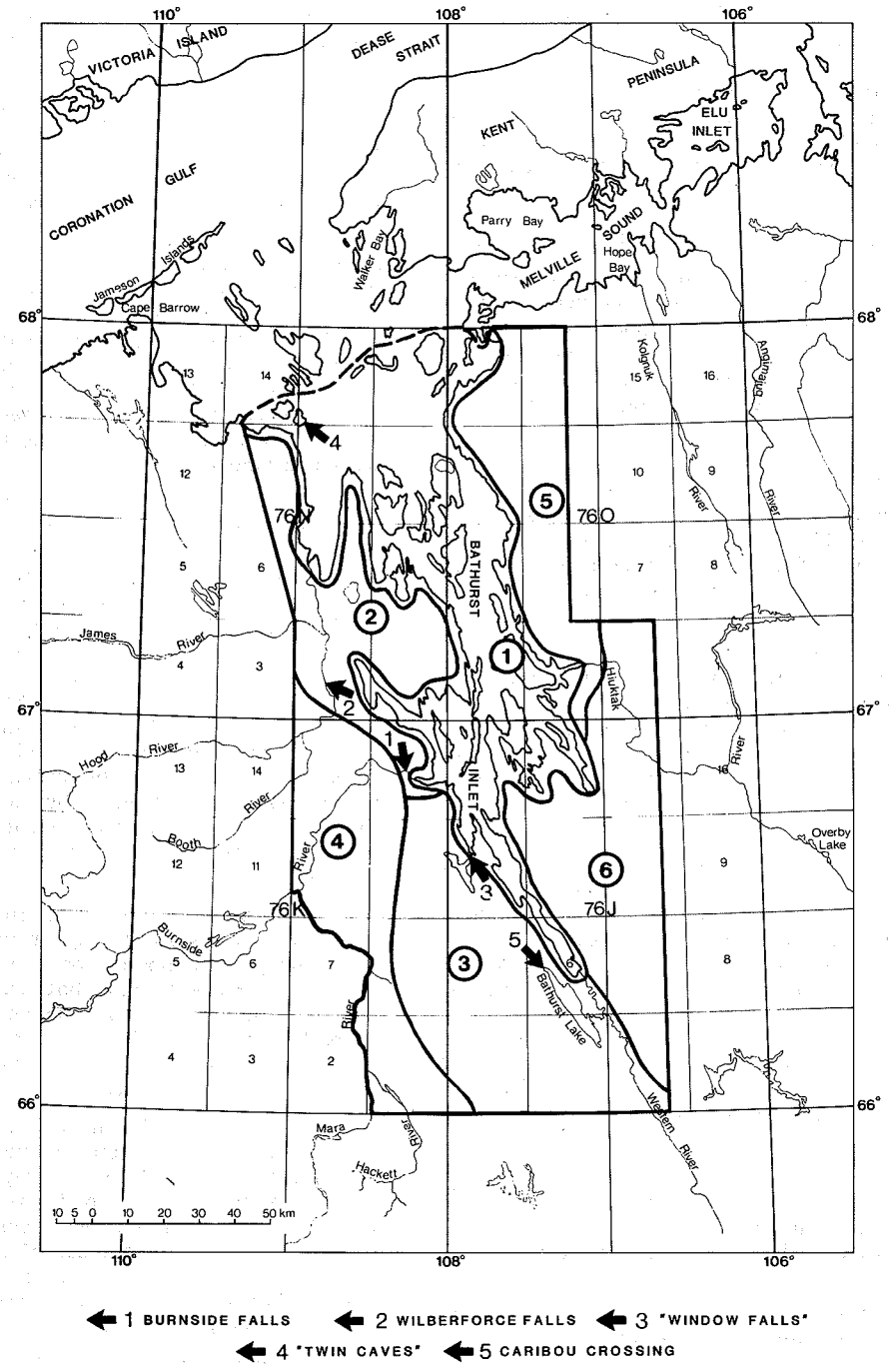


Fig. 1c Suggested boundary and component areas of the Bathurst Inlet national park, with points of special interest.

Note: Boundary shown here is not identical to that shown in Fig. 10 & 11, main body of this report.

the inlet is needed, but present information suggests that the inlet is less saline, and probably warmer, than the neighbouring Coronation Gulf.

Recent information suggests that Bathurst Inlet has been colonized only recently by the Inuit. Nonetheless, there are many recent Inuit archaeological sites in a good state of preservation that are of considerable interpretive interest. Among these are inukshuit ("stone men"), meat caches, hunting blinds, and camp sites. Although a few burial areas are known, these should niether be advertised nor interpreted, out of respect for the local people.

Bathurst Inlet is associated with colourful and tragic events in the history of European exploration of the central Arctic. Although little of importance happened to the first Franklin expedition while it traversed Bathurst Inlet, the time required to explore its maze of islands and channels cost the lives of many of Franklin's voyageurs. The death of Radford and Street, and the subsequent Bathurst Inlet patrol by the R.C.M.P., is a contrast of the scurrilous and the heroic in the advent of whites in the North.

13.2 Evaluation of Geographic Segments of the Study Area

The area presents a variety of scenery which, combined with its rich flora and concentration of wildlife, could be the focal point of the proposed park. Activities could range from viewing landscapes and waterfalls to observing wildlife and flora, and hiking or wildwater canoeing.

The study area was divided into relatively homogeneous segments to facilitate their evaluation as a potential park (Fig. 1c).

Block 1 contains Bathurst Inlet proper, whith its islands, peninsulas, and coastlines. This block is essential to the proposed park. The land portion of Block 1 contains much of the rugged topography that characterizes the Bathurst Hills. The waters of the Inlet both separate the islands and peninsulas from the mainland and provide a ready waterway. This block includes all the marine mammals, fish, and marine bird nesting habitats. Areas of historic significance, such as stops made by the Franklin expedition and fur trading posts are within this block.

Management concerns:

1. Periods of high winds may present hazards to small boats.
2. Navigational aids to help identify landmarks and passageways may be necessary.

Block 2 occupies the northern portion of the land west of Bathurst Inlet. This block is essential to the proposed park. This area contains broad clay plains and contrasting bedrock cuestas. Because the land descends from the highlands in the west to sea level, all major rivers display a series of falls and rapids. The lush vegetation of the sedge meadows of the clay plains serve as rangeland for muskoxen. The most spectacular waterfalls, Wilberforce Falls, is in this block.

Management concerns:

1. Frequent rapids and waterfalls make the major rivers unsuitable for boat travel.
2. Arctic char runs are restricted by waterfalls. Management of fishing on available streams is necessary.
3. Trail access to Wilberforce Falls needs to be developed.
4. Campsites must not be located on readily erodible marine silt or clay.

Block 3 occupies the southern portion of Bathurst Hills. It is considered to be essential for the proposed park. Although the scenery is less spectacular in this block than in Blocks 1 and 2, this area offers a variety of terrain and contains the scenic "Window Falls".

Along with Blocks 1 and 2, Block 3 supports a rich flora that contains many rare species. Major caribou migration routes cross the block, especially at the north end of Bathurst Lake. Recent archaeological sites, associated with the hunting of caribou, provide added interest. The Western River allows canoe access into a scenic, well-vegetated valley.

Management concerns:

1. Mining exploration is currently being carried out in the Bathurst Lake area, indicating conflicting land use.
2. Destruction of archaeological sites must be prevented.
3. Viewing of caribou migration depends on accurate timing.

Block 4 occupies the uplands west of Bathurst Inlet. While this area is desirable, it is not essential for the proposed park.

This area contains uplands that are typical of Natural Region 15. The Burnside River and its major tributary, Mara River, may be navigable by canoe above the falls a few kilometres upstream from Burnside Falls. These rivers may provide access to broad, scenic valleys. A major caribou calving area was identified in this area, extending into Block 3.

Major concerns:

1. Navigability of the Burnside-Mara river system should be determined.

Block 5 occupies the northern portion of the land east of Bathurst Inlet. This area is not considered to be essential for the proposed park, but its inclusion is desirable.

This area consists of wave-washed bedrock ridges and small clay pockets, with many lakes in the valleys. Although the topography is hilly, not much variation is offered to the visitor. This area, along with Block 6, is typical of Natural Area 16. Part of a caribou calving area is in this block. These calving grounds extend eastward to Ellice River. For effective management of the caribou, it would be highly desirable to include the entire calving grounds into the proposed park (Kingsley 1979b).

Block 6 occupies the southeastern part of the study area. Its inclusion into the proposed park is not essential, but desirable.

This area consists of rugged, bedrock-dominated uplands and innumerable lakes of various sizes, characteristic of Natural Area 16. Hiukitak River, rich in fish, forms an important canoe access route to the interior. Important caribou migration routes cross this area and a major caribou calving area is located within this block.

Figure 1c shows the suggested boundary of the national park. The boundaries of this map were drawn to include the essential and desirable portions of the studyarea. The boundary east of Block 5 may be extended to Ellice River to include an entire caribou calving grounds within the proposed park.