

GM 49478

REPORT ON 1989 SUMMER FIELD SEASON, EASTMAIN RIVER GREENSTONE BELT

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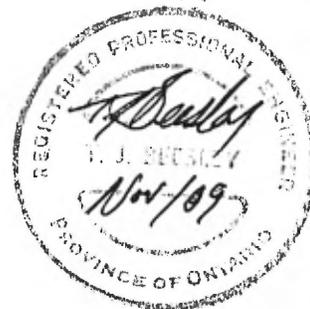
Québec 

Report on
Gold Exploration During the
1989 Summer Field Season
Eastmain River Greenstone Belt
Northern Quebec
for
The Eastmain Syndicate

Ministère de l'Énergie et des Ressources
Service de la Géoinformation

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T.J. Beesley, P.Eng.
Geological Services Inc.

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Summary

A program of exploration for gold was undertaken on the 444 mineral claim Eastmain River, Northern Quebec, properties of the Eastmain Syndicate over a 2.5-month period from early June to mid-August, 1989. The program followed up an exploration program in the summer of 1988 which involved reconnaissance and detailed geological mapping, geophysical surveying and rock sampling for analysis. The 1989 program consisted of:- regional-scale glacial drift sampling over the entire land holdings; prospecting as followup of the airborne geophysical survey conducted over the eastern two-thirds of the West Block in the winter of 1989, and of new claims staked in the East Block in 1989; pressure pump stripping, trench blasting and sampling and detailed geological mapping as followup of previous anomalous results from rock sampling; and reconnaissance and detailed geophysical VLF-EM surveying, as followup of the airborne survey and to detail conductors associated with mineralized zones. Results of rock sampling from both 1988 and 1989 were analysed statistically.

Anomalous results from the glacial till sampling program were not numerous or of great magnitude but do occur. A cluster of 12 As anomalies (>16 ppm) and 2 Au anomalies (>20 ppb) is strung out along the south side of the central part of the West Block. Two Au anomalies, including the highest result recorded, 82 ppb, lie in the southern part of the East Block, south of Lac Gael. Results of detailed rock work along the north contact of the greenstone belt in the West Block from Grid F to Grid H yielded no new Au anomalies and only sporadic anomalous values in Au indicator elements As and Cu. One Au anomaly from the glacial till sampling program, 24 ppb, lies 200 m down-ice from Grid F. Similarly no anomalous Au results were returned from Grid A or 40^o Creek north of Lac Lepante, although samples of chert at 40^o Creek had high levels of As (1675 ppm) and Cu (3026 ppm). Followup of low threshold anomalous Au and As values at the EXKO grid on the south side of the central part of the West Block greenstone belt resulted in the discovery of significant levels of gold (3550 ppb / 0.10 oz/T) with As, Ag and Cu in massive py-po tr cp with quartz in actinolite schist at an altered contact between basalt and ultramafic flow near the contact of both of these rock types with conglomerate. Subsequent work has indicated the presence of anomalous levels of Au over a strike length of 1.7 km (open) in the altered hanging wall quartz-veined basalt of this zone. The zone coincides with a conductor which follows the trace of the metavolcanic-metasedimentary contact, which also coincides with the cluster of 12 As and 2 Au glacial till anomalies discussed above.

During detailed stripping and trenching at the Pointer Bay Grid Valley Showing a highly tectonized younger intrusive granodiorite was recognized in the southern part of the grid, cut by the main conductor traversing the area. The granodiorite contains high background levels of As. An impressive cluster of anomalous and second population anomalous Au values occur around the granodiorite and in the adjacent new claims to the south.

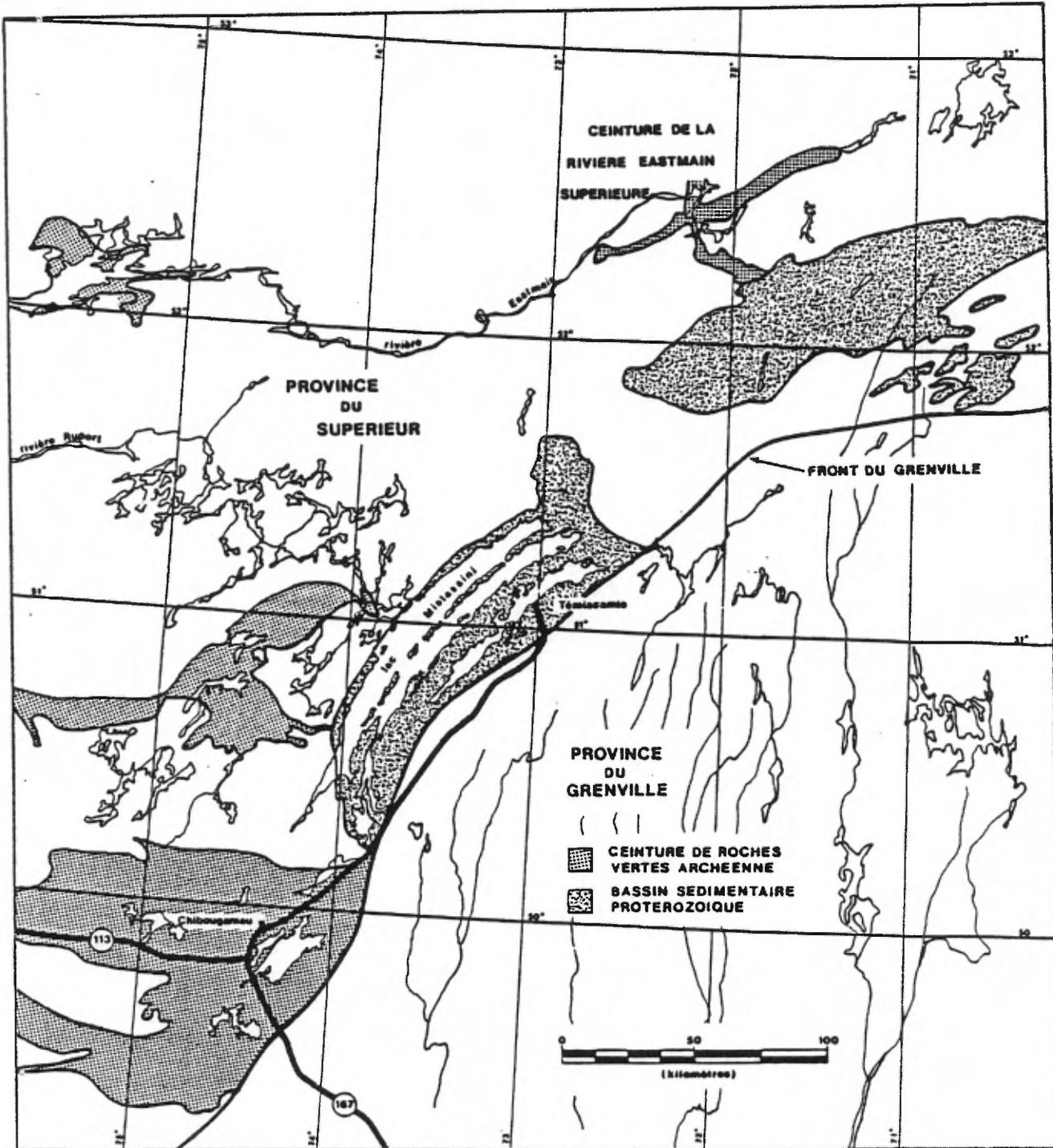


Figure 1: Location Map
(After Couture)

Introduction

This report describes the results of a field exploration program on the Eastmain River properties of the Eastmain Syndicate comprised equally of Battle Mountain (Canada) Inc., Mingold Resources Ltd. and Quill Resources Ltd., carried out between June 6 and August 20, 1989. The program consisted of:- regional scale glacial till sampling over the East and West claim blocks; detailed geological mapping on traverses across the greenstone belt (geotraverses), two in the West Block and one in the East Block; high pressure pump stripping, blasting and sampling and detailed geological mapping as followup of showings discovered during the 1988 field exploration program in both claim blocks; prospecting followup of airborne conductors from the survey flown for the Eastmain Syndicate in January 1989 over the eastern two-thirds of the West Block; prospecting of the new claims staked in the East Block in the winter of 1989; reconnaissance and grid-scale ground VLF-EM surveying, to locate and detail airborne EM conductors.

Two reports accompany this report:- results of the glacial till sampling program are described in 'Report on Drift Prospecting 1989 Field Season Eastmain Greenstone Belt Northern Quebec for the Eastmain syndicate' by Northwood Geoscience; statistical analysis of analytical results for 25 elements on 472 rock samples collected on the project in 1989 together with results from 478 rock samples collected in 1988 are described in 'Report on the Statistical Analysis of Rock Samples Taken on the Eastmain Syndicate Eastmain River Project' by MDC Geological Consultants Ltd.

Property, Location and Access

The property consists of a total of 444 16 ha (40 acre) mineral claims in two claim blocks. The West Block consists of 300 claims and lies 20 km west of the MSV-Northgate deposit and 15 km west of the East Block, which consists of 144 claims. Of the West Block claims, 235 were staked in May 1988, and the remaining 65 in September of that year. The original 117 claims in the eastern part of the property were staked in two blocks in May 1988. The ground between these two blocks came open and 27 claims were staked in March 1989 to consolidate into one eastern block. Assessment work totalling \$198,195.29 from the 1988 summer field program and the 1989 airborne geophysical survey has been accepted and applied to the 300 West Block claims and the original 117 East Block claims. The original 352 claims staked in May 1988 have been renewed and the various claims are in good standing as follows:-

- 352 May 1988 claims - May 1992
- 65 September 1988 claims - September 1990
- 27 March 1989 claims - March 1991.

The property is located 200 miles NNE of Chibougamau and 100 miles north of the float airbase at Temiscamie. Temiscamie is located 100 miles north of Chibougamau and is accessible by all-weather road maintained year round. Access is via float or wheel-ski fixed wing aircraft from Temiscamie or Chibougamau.

General Geology

The Eastmain River greenstone belt is 100 km-long in an ENE direction and 40 km wide at its widest and consists of two arcuate metavolcanic-metasedimentary folds wrapped around granitic to granodioritic intrusives (Fig. 2), the whole sequence resting on an older metamorphic terrain. The volcanic-sedimentary rocks are tightly folded into overturned synclinal structures which in turn appear refolded into the broad arcuate features. The western end of the belt, overlain by the Eastmain Syndicate West Block, occurs in a tightly folded north-dipping overturned syncline with a structural deformation zone superimposed on the intrusive contact with granodiorite on the north side.

The volcanic rocks are predominantly mafic in composition, massive to pillowed, in contact with intermediate tuffs and fine to coarse clastic metasediments of uncertain age relation. Mafic to ultramafic intrusive rocks, gabbros and pyroxenites, intrude the mafic volcanics locally parallel to strike. At the western end of the belt ultramafic flows (komatiites) are interlayered with the mafic volcanics, exhibiting well-developed spinifex textures locally. A thin rhyolitic tuffaceous unit on a scale of tens of metres also occurs within the mafic volcanics in places, generally proximal to pyroxenite sills. Persistent sulphide horizons occur as well trending with the mafic volcanics. The thickest and most persistent sulphide units, 3-5m in width, are associated with ultramafic flows in the western end of the belt and mafic and ultramafic intrusive sills towards the centre of the belt in the vicinity of the deposit.

In the western end of the belt a tight synclinal fold has an axis dipping north parallel to the tightly folded stratigraphy at angles of 40-50 degrees. In the south-central part of the belt in the vicinity of the deposit the metavolcanic and metasedimentary rocks are folded into an overturned syncline dipping to the northeast at 40-50 degrees. The northeastern arm of the belt is devoid of ultramafic flows and intrusives, and consists chiefly of mafic metavolcanics, intermediate pyroclastics and oxide and sulphide iron formation. This arm is folded into a broad overturned syncline, at the northeast end dipping 60-70 degrees to the north.

Economic Geology

The PlacerDome-MSV deposit in mid-1988 was reported to contain indicated, inferred and estimated reserves of 1.1 million tons grading 0.46 oz/ton gold with 0.26% copper and approximately 1/2 oz/ton silver. The deposit is stratiform, from 3-10 m in thickness occurring in a massive sulphide lens associated with chert in a peculiar sequence of rhyolite tuff, mafic tuff and pyroxenite within a thick mafic metavolcanic sequence generally garnetiferous in the vicinity of the ore body. The origin of the deposit has been described as either volcanogenic or structural. Recent opinion (Couture, personal communication) suggests that

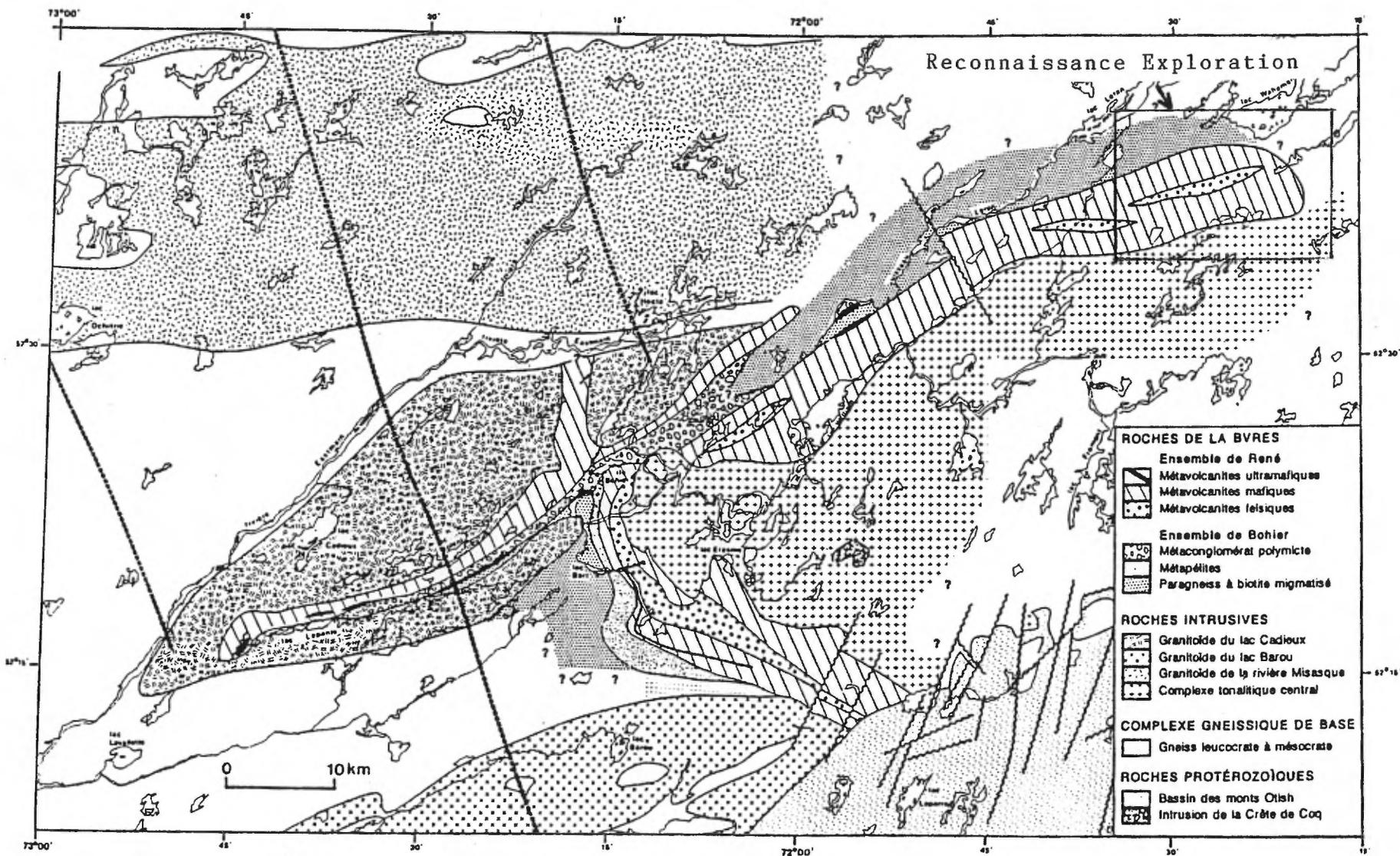


Figure 2: Geological Map Eastmain River Greenstone Belt (after Couture)

TABLE OF FORMATIONS

Intrusive Rocks

Proterozoic

Diabase

Intrusive Contact

Archean

Granodiorite

?Intrusive Contact?

Pegmatite

Granite

Intrusive Contact

Gabbro

Pyroxenite

Intrusive Contact

Metavolcanics

Rhyolite Tuff

Intermediate Tuff

Basalt

Ultramafic Flow-Komatiite

Metasediments

Fine-grained metasediment

Conglomerate

Metamorphics

Paragneiss

the deposit is of hydrothermal origin, with fluids from the younger, unfoliated Central Granodiorite (Tonalite) permeating a shear zone which was aligned with the regional schistosity during previous deformation. The presence of gold mineralization in later NE-trending faults and shears at two locations northwest of the ore deposit supports this interpretation.

The ore body has been divided into three zones, A, B, and C, which occur as distinct EM conductors over an interval of two kilometres along a magnetic trend following the country rock. The ore lenses occur in an overturned volcanic sequence dipping 35-55 degrees to the northeast. The ore is contained in a siliceous chert unit, laminated to brecciated, which contains 10-30 percent sulphides with pyrrhotite > pyrite > chalcopyrite, with minor amounts of sphalerite. Gold occurs with and within chalcopyrite, with lesser amounts of arsenopyrite and tetrahedrite. Alteration features consist of intense silica "grid" alteration, biotitization, sericitization and locally epidote and K-feldspar alteration. Potassium and magnesium flooding are represented by sericite, Mg rich biotite and Cr mica. CO₂ introduction is evidenced by carbonate, epidote, clinozoisite and clinopyroxene, and locally andradite garnets. A late retrograde Mg chlorite is developed at the expense of biotite and calcic amphibole.

The particular rock sequence comprising the deposit 'Mine Series', namely rhyolite tuff, mafic tuff, pyroxenite and sulphides within garnetiferous basalt was noted at two locations during the 1988 exploration; at Grid G on Lac Jim south of Lac Dolent in the eastern part of the West Block, and on the Pointer Bay Grid in the Lac Rene Block, and is likely present along strike in overburden-covered areas. In addition the rhyolite tuff unit was mapped in association with pyroxenites and gossans over several kilometres in the eastern half of the West Block and in the Lac Clement Block. Silicified chert and alteration minerals carbonate, clinopyroxene, sericite and chlorite are present locally with komatiites and gossans on Grid A at Lac Lepante in the western half of the West Block. Development of Cr mica is particularly extensive with rhyolite tuff and gossan on Grids G and H on Lac Jim, south of Lac Dolent in the eastern half of the West Block. A shallow subcrop of silicified felsic metavolcanic exhibiting strong "grid" alteration was uncovered in the floor of a valley adjacent to a VLF-EM conductor on the Pointer Bay Grid.

Exploration History

The earliest prospecting and exploration evident in the belt appears to have taken place on what is now Grid H on the east shore of Lac Jim, south of Lac Dolent in the West Block. Four old claim posts together each with single 5-digit claim tags (presumably 1940's or 1930's vintage) were noted several hundred metres east of extensive trenches in gossanous, siliceous Cr mica-rich felsic metavolcanics on the east shore of the lake. These claims predate later 5-digit tags and two generations of 6-digit tags on posts covering gossans in ultramafic rocks adjacent to rhyolite tuffs on the south shore of Lac Dolent 1.5 km to the west of Lac Jim.

The Lac Leran copper showing lies 25 km northeast of the MSV-PlacerDome deposit, in basic metavolcanics in the northeast arm of the belt, and was tested by trenching and drilling by a number of mining companies in the 1950's and 1960's.

In the mid-1960's a company named Fort George drilled several X-ray diamond drill holes in gossanous ultramafic metavolcanics (komatiite) at the extreme western end of the Syndicate West Block, intersecting sulphides (pyrrhotite, pyrite, and minor chalcopyrite).

In 1969 Canex Placer flew an airborne magnetic-electromagnetic survey over mafic metavolcanics wrapped around the west side of the younger granodiorite intrusion in the central part of the belt. A single line overburden-covered magnetic-electromagnetic airborne anomaly was located on the ground and drilled in 1970, resulting in an intersection of 1.5 m of sulphide grading 13.71 gt Au, 20.22 gt Ag and 0.33% Cu in what is now part of the A Zone, which was not considered significant under conditions prevailing at the time (3). In 1974 the ground tested by Placer in 1969-70 was either optioned or restaked by Nordore. Airborne and ground geophysical surveys were carried out along with a limited amount of drilling. One of the Nordore holes intersected 6 m of low grade gold on the shoulder of what is now the B Zone. As this was the best intersection the project was terminated and the ground was allowed to lapse. Placer returned to the area in 1981 under the improved conditions for gold and restaked the A Zone. Ground geophysics in that year outlined the A, B, and C Zones. In 1982 the B Zone was discovered at a depth of 100 metres, targetting the geophysically indicated northwest plunge of the EM conductor. This hole, 82-1, intersected a 3 m-wide sulphide zone grading 8.34 gt Au, 10.16 gt Ag and 0.21 percent copper. By the end of 1982 reserves of 750,000 tons had been indicated in the A and B Zones and the present land holding of about 1,000 claims around the west end of the granodiorite had been established. Exploration and diamond drilling has continued steadily from 1981 through 1988. In 1983 Eldor entered a joint venture with Placer on the property and in that year conducted comprehensive airborne geophysical and ground followup geological mapping, prospecting and sampling surveys

over a 30 km-long strip comprising the central part of the northeast arm of the belt, from the northeast extent of the Placer ground. Gold results from rock sampling were low (maximum 160 ppb) and it was noted that no ultramafic rocks were encountered during the program. In 1987 Placer announced initial results from an underground sampling program from a decline sunk on the B Zone. Channel samples from each blast face in a drift assayed an average 0.57 oz/ton Au across a 7-ft. wide zone and along 344.5 ft. of strike, with 0.65 oz/ton Ag, confirming earlier drill results. Seven grids were established to guide ground geophysical followup of airborne anomalies in the Placer claim block on the north contact of the granodiorite, 13 km north of the deposit. Single followup diamond drill holes were sunk on four of these grids in 1987. In each case the drill holes intersected uniform basaltic metavolcanics containing barren pyrrhotite and pyrite.

In 1974 Inco Ltd. flew their airborne magnetic-electromagnetic system over the entire Eastmain River Greenstone Belt, in a joint venture with Uranerz, who reconnaissance explored the Otish Mountain Proterozoic rocks for uranium, and James Bay Development Corp. Selected combined magnetic-electromagnetic anomalies were followed up on the ground by trenching and X-ray diamond drilling. Although no public record of this work exists, activity appears to have been heavy around Grid A at Lac Lepante and Grid E on the south shore of Lac Dolent in the West Block, and to the south and southeast of Lac Clement in the Lac Clement Block.

In 1982 Placer established seven grids several kilometres to the south of the deposit to guide exploration over an overburden-covered formational EM conductor trending EW. The westernmost of these grids (Placer Grid A) covered the eastern and central parts of the Lac Clement Block. Magnetic and electromagnetic (MaxMin) surveys were conducted on Grid A and the grid was geologically mapped and rock sampled (no anomalous gold results).

Airborne magnetic and electromagnetic surveys were flown by Aerodat for Placer in 1983 over what are now the Lac Rene and the Lac Clement (northwest half) Blocks, and followed up by ground reconnaissance geological mapping and prospecting and sampling. Anomalous gold (310 ppb) and copper (720 ppm) results were obtained from separate locations on what is now the Pointer Bay Grid at Lac Rene, and the acquisition of this ground by staking was recommended by the Placer geologist.

In 1984 ground magnetic and electromagnetic (VLF and MaxMin) surveys were run over grids established on what is now the Lac Rene Block (South Atlantic Ventures) and the ground between what is now the Lac Rene and Lac Clement Blocks (Eurocan Ventures). No followup is reported.

Previous Work Eastmain Syndicate

The initial landholdings on the Eastmain project were obtained in May 1988, when 352 mineral claims were staked to form the nucleus of the current West and East Blocks.

Preliminary reconnaissance and detailed followup gold exploration were conducted over the original 352 mineral claims by a 5-man party between June 28 and September 14, 1988. The three mineral claim blocks were geologically mapped, prospected and sampled and reconnaissance geophysically surveyed at a mineral claim scale. Areas of geological and geophysical interest defined were hip chain and compass gridded to guide detailed followup geological mapping, prospecting and sampling and VLF-EM surveying. Twelve followup grids were established, nine in the West Block and three in the East Block. A total of 478 samples of rock was taken, assayed for gold and analysed by 24-element ICP. A helicopter reconnaissance exploration of a 300 square km area covering the northeast end of the Eastmain River greenstone belt was conducted over a 5-day period in early September. Results of 1988 field exploration are discussed in (3).

An additional 65 mineral claims were staked in September, 1988 to tie onto the northeast part of the West Block to protect the strike extension of conductive mineralized targets.

A combined horizontal loop EM-proton magnetometer-VLF-EM airborne survey was flown by Aerodat Ltd. over a 20-km length from the northeast end of the West Block in January, 1989. Line spacing was 100 m and a total of 600 line-km was flown.

A total of 27 mineral claims was staked in March, 1989 to join the two parts of the East Block together, and cover a 2 km strike length of prospective rock.

Activities of Other Companies 1989

MSV Resources carried out a 10,000-m diamond drilling program on their deposit in January and February. MSV announced a decision to proceed with development of the property, based on favourable conclusions to a feasibility study completed in early 1989. Northgate Exploration Limited announced the effective acquisition of a 51 percent interest in the MSV Eastmain gold deposit.

Three other companies staked claims in the Eastmain River area in the winter of 1989. Loydex staked 124 mineral claims along the west part of the north side of the main MSV-Northgate claim block. Kingswood Explorations 1985 Ltd. staked an E-W 150-claim block between the east end of the syndicate West Block and the northwest corner of the Syndicate East block and the adjacent MSV-Northgate main block. Metall Mining staked 289 mineral claims around the northwest contact of the younger granodiorite, north from the northwest corner of the MSV-Northgate block.

Corona Corporation conducted an exploration program on their large (approx. 500 claims) landholdings southeast of the MSV-Northgate deposit and 25 km ESE of the Syndicate East Block, with an 8-man crew between mid-June and mid-August. Work consisted of reconnaissance scale geological mapping and prospecting and sampling, linecutting grid establishment, and detailed grid-controlled geological mapping and geophysical magnetometer and MaxMin II EM surveying, and prospecting and sampling.

A 2-man crew from Metall Mining conducted reconnaissance-scale geological mapping, prospecting and sampling, and soil geochemical sampling on their 289-claim property over a 3-week period in late July and early August.

Results of the 1989 Summer Exploration Program

Geotraverse Detailed Geological Mapping (Dwgs. 5-9)

Three sections across the metavolcanic stratigraphy and adjacent acid intrusive or metasedimentary rocks, two in the West Block and one in the East Block, were geologically mapped in detail in a geotraverse of all outcrops encountered in the particular section. Outcrops making up the geotraverses are located at scales ranging from 1:4000 to 1:1000 and details of the lithologies and structure encountered are illustrated at a scale of 1:100, and in some cases 1:1000.

Geotraverse 1 (Dwgs. 5 and 6) originates in the Lac Cadieux granite on the north shore of Lac Dolent, between Grid E and Grid F, and covers an interval of 2 km across the strike of the greenstone belt.

	GEOTRAVERSE 1
NORTH	Lac Cadieux Granite
	Intrusive Contact
	Pyroxenite (70m)
	Intrusive Contact
	Basalt (180m)
	Pillowed Basalt (100m)
	Basalt (850m)
	Oxide Iron Formation (1m)
SOUTH	Conglomerate (300m open to S)

The primary schistosity (S1) is represented in all rock types, including the granite, strikes 070° to 090° , and dips from 55° to 60° N. The S2 deformation is evidenced by stretching of pillows in the basalts and pebbles and cobbles in the conglomerate in the plane of S1. The S3 deformation is manifested in crenulation of the S1 schistosity, notably in several of the metasedimentary outcrops, in pyroxenite in OC1 and in pillow basalts in OC7. Axial planes of S3 crenulations trend $280-315^{\circ}$ in conglomerates and $345-355^{\circ}$ in the pyroxenite and pillow basalts. An S4 deformation, recumbent folds with axial planes parallel to S1, was noted in two locations, pyroxenite in OC2 and pillow basalt in OC6 accompanied by ultrastretching of the pillows. Both of these instances are thought to indicate the most extreme deformation:- the north contact of the greenstone

belt (pyroxenite); and the axial plane of the overturned fold (pillow basalt). The S3 is manifested in both 'S' and 'Z' types at most occurrences. Brittle deformation is best illustrated by a 340-355°-trending fracture set present in all rock types across the traverse, dipping steeply to vertically. A secondary fracture set trending within 30 degrees of S1 locally across the traverse.

Size of undeformed cobbles in conglomerates varied up to 25 cm. Reliable top determinations were not possible in pillows due to the general extent of the deformation.

Geotraverse 2 (Dwg. 7) crosses the greenstone belt at the east end of Lac Lepante, just east of Grid A, and covers an interval of 1.8 km across strike.

GEO TRAVERSE 2

NORTH Lac Cadieux Granite
Intrusive Contact
Ultramafic volcanic (90m)
Pillowed basalt (400m)
Intrusive Contact
Pyroxenite (250m - E of section)
Intrusive Contact
Pillowed basalt (150m)
Ultramafic volcanic (220m)
Intermediate lapilli tuff (250m)
Intrusive Contact

SOUTH Pegmatite/Granite(100m open to S)

The Lac Cadieux granite is only weakly foliated, and the contact with the greenstone belt does not appear to be deformed at this location. The S1 primary schistosity strikes 080-090° and dips 43-52°N. The S3 crenulation was noted in only one outcrop, OC1, with an axial plane trending 310°. An extreme S2 deformation was noted on OC's 3 and 4, in the central part of the belt. The presumably original pillow basalt has been stretched into a thinly banded rock, with the most extreme deformation resembling a pseudo-cleavage parallel to S1. This phenomena probably represents the locus of the axial plane of the overturned fold. A strong fracture set trending 350° was noted throughout the traverse. This set and another at right angles trending 080° are well developed in the pyroxenite which intrudes the pillow basalts near the centre of the belt. The lapilli fragments in the intermediate tuff in OC7 are stretched and broadly crenulated. Both fracture directions are represented in this rock type. Relatively well preserved pillows are exposed on the south-dipping slope of OC1. Tops appear to face towards the north in this outcrop.

Geotraverse 3 (Dwgs. 8 and 9) traversed the part of the greenstone belt covered by the East Block along the south shore of Lac Rene. An interval of 1.6 km was traversed.

GEOTRAVERSE 3

EAST Paragneiss (100m open to E)
 Coarse clastic metasediment (150m)
 Paragneiss (450m)
 Gabbro (180m)
 Mafic metavolcanic (90m)
 Basalt (175m)
 Rhyolite tuff (110m)
 Intermediate tuff (165m)
 Intrusive Contact
 Pyroxenite cum sulphide-oxide Fe fm
 (55m)
 Intrusive Contact

WEST Biotite-quartz metasediment (150m open
 to west)

The S1 on this traverse is represented by schistosity in volcanics, foliation in metasediment and gneissosity in paragneiss, all trending uniformly 330° +/- and dipping $44-60^{\circ}$ E. The only structural features are fracture sets, striking NE to ENE, subparallel to a presumed fault structure underlying Lac Rene, and dipping steeply south. The gabbro possesses a schistosity and may represent a coarse-grained mafic metavolcanic. The presence of pyrrhotite and magnetite-rich zones within a band of pyroxenite probably helps to explain the peculiar magnetic-electromagnetic response over the East Block.

Prospecting

Prospecting was conducted in the West Block along with the VLF-EM as a followup of EM conductors from the 1989 Aerodat airborne survey, chiefly in overburden-covered areas from the east of Lac Jim (Grid H) to the eastern end of the block. The loci of the conductive responses were traced, but no outcrop or conductive glacial boulders were encountered in the entire area prospected. A quartz porphyry dyke intruding gabbro was discovered during the course of this work and sampled (Dwg. 24). Prospecting west from this occurrence led to the discovery of a thin (several m) quartz porphyry trending parallel to S1 in mafic metavolcanics, but with definite intrusive relationships to the older country rock. The quartz porphyry is light grey and aphanitic with quartz eyes to 1 mm. The porphyry contains finely disseminated euhedral pyrite and free quartz as narrow veins, particularly near the margins. The porphyry can be traced for 300-400m and is non-foliated. It has been ascertained that 1988 samples 29595 and 596, containing 984 and 590 ppb Au respectively came from quartz veins at the margin of this unit southwest of Lac Jim. The samples had previously been described as originating from alternately a granite dyke or rhyolite tuff. The quartz porphyry is thought to represent the thin band of 'V1' on the government geological map at this point.

Prospecting on a reconnaissance scale was carried out in the 27 mineral claims staked in 1989 to join the two eastern claim blocks. Outcropping in the new claims is limited as the terrain is generally low and swampy. A low ridge running

through the new claims in a NW-SE direction coincides with an airborne EM conductor with magnetic correlation from a previous survey. Rock outcrops locally along this ridge, which joins up with the north end of the 1988 Long Grid. Sulphides are associated with a pyroxenite unit in contact with either a rhyolite tuff or a silicified, chertified intermediate tuff. Results from sampling this unit in the northern part of the new claims were successful. Of ten samples taken from two locations 500m apart in this composite unit, four returned threshold anomalous gold results (>103 ppb) and of these two, one from each location, were in the second anomalous population for gold (>640 ppb), namely 1113 and 999 ppb from gossanous pyroxenite.

Trenching, Sampling and Detailed Geological Mapping

Areas indicated to contain threshold anomalous gold values or gold indicator element threshold values from rock sampling in the 1988 exploration program on the Syndicate ground were the subject of detailed followup during the 1989 program. In 1988 samples were taken from outcrop surface, often highly weathered where altered or gossanous. To overcome this problem a Wajax Mark IV high pressure fire pump and hoses and an Atlas Copco gasoline powered plugger were employed to strip prospective areas and blast trenches to fresh bedrock. It was found that sulphide-rich zones adjacent to gossans weathered to two or more metres were fresh under as little as 30 cm of glacial till.

Nine zones in both claim blocks were tested in this manner. The details of this work are summarized in accompanying Table 2, 'Summary of Stripping, Trenching and Sampling'. Detailed geological maps at a scale of 1:30 or 1:100 were prepared at each of these sites, with sample location and results of Au (ppb), and Cu and As (ppm) shown.

The northern contact of the greenstone belt with the Lac Cadieux granite between Grid F and Grid H south of Lac Toms and Lac Dolent, over a strike length of 4 km, in the West Block has been subjected to repeated, intense deformation. This contact is coincident with a pyroxenite unit in contact with rhyolite tuff which is also the locus for two regional EM conductors, the combination prospective for gold in this belt. Four surface rock samples from the Grid G and Grid H area contained threshold anomalous amounts of gold in 1988. In addition three rock samples each from the sampling at Grid E and Grid F contained threshold anomalous amounts of gold.

The results from stripping, trenching, sampling and detailed geological mapping at Grids E, F, G and H are shown in Dwg. 17 through 23 inclusive. The four zones tested are adjacent to or within 200m of the northern contact of the greenstone belt with the Lac Cadieux granite and the degree of structural deformation noted is relative to the distance from this contact. At Zone F a pyroxenite unit is in contact with mafic volcanics on the south and intermediate volcanics on the north. Silicification and chertification are prominent, with sulphides pyrite, and minor galena and sphalerite. Broad

Table 2: Summary of Stripping, Trenching and Sampling

<u>Grid</u>	<u>Area Stripped m²</u>	<u>No.</u>	<u>Trenching Linear m</u>	<u>m³</u>	<u>No. samples</u>
G	83	2	17.0	6.5	31
H	160	2	12.4	5.3	34
E	360	5	22.9	8.9	79
F	76	3	17.7	5.2	37
A	26	7	14.8	5.1	44
40° Creek	30	2	7.9	5.6	17
EXKO	20	1	2.5	0.8	40
Pointer Bay	188	6	48.2	33.1	92
Swamp	<u>16</u> 959	<u>1</u> 29	<u>8.6</u> 152.0	<u>3.0</u> 73.5	<u>14</u> 388

S3 folds with NE-trending axes occur. No values were reported in Au-Cu-As. Maximum Pb and Zn values from grabs are 4565 and 4096 ppm respectively in basalt with quartz and sulphides. Sample 8133 contained 1086 ppm Pb and 2201 ppm Zn/0.7m in basalt with graphite and 5% sulphides.

Outcrops 1A and 1B on Grid E are adjacent to the granite contact, and display intense structural deformation. The granite is in contact with a rhyolite tuff which is in turn in contact to the south with a pyroxenite. The rhyolite exhibits two sets of S3 folds, with axes to the NE and NW. The contact with the pyroxenite is complex within broad and small-scale S4 recumbent folds with axes along the NNE-trending S1 schistosity. The rhyolite tuff-pyroxenite contact is the locus for quartz veining and sulphides. Work at OC2 uncovered a massive quartz vein with sulphides replacing pyroxenite and rhyolite tuff. Ladder quartz veins cut rhyolite tuff along strong fractures trending 330° and 080°. No anomalous values in Au-Cu-As were encountered in these three outcrops, which lie along the trace of the strongest regional conductor. Grid E OC3 lies on the secondary conductor 100m south, and consists of a highly altered rhyolite tuff with chert and banded sugary quartz and sulphides (py-po) in contact with altered ultramafic. No values in Au were encountered, but a threshold anomalous value of 547 ppm As was returned from an altered ultramafic with 2% sulphides and 1236 Cu from a gossanous chert with quartz veins.

At Grid G a structurally complex contact between rhyolite tuff and pyroxenite is the locus for quartz veining and sulphides. S3 folds and kink bands have well-defined and uniform axes trending 043°. In sampling on this zone in 1988 a combined value of 735 ppb Au and 711 ppm Cu was returned from a quartz vein. No anomalous gold values were reported from the 1989 sampling, but two threshold anomalous arsenic values (551 and 320 ppm) and one threshold anomalous Cu value (805 ppm) occur in fuchsite-bearing altered pyroxenite.

At Grid H OC's 1 and 2 broad S3 crenulation folds in interbanded rhyolite tuff and basalt host well-defined NNE and NNW-trending fracture sets, with narrow ladder quartz veins. Two threshold anomalous As values (231 and 285 ppm) occur in rhyolite tuff and one threshold anomalous Cu value (574 ppm) in gossanous basalt, near a 1988 sample which returned 388 ppb Au. At OC's 3 and 4 to the northeast silicified and altered intermediate and mafic volcanics are in contact, with quartz veining and sulphides. Structural deformation is extreme (proximal to the granite contact) with S3 and well-developed recumbent S4 folds. No anomalous results were reported from the sampling.

Multiple conductors coincide with komatiitic ultramafic volcanics on the south side of the greenstone belt north of Lac Lepante. Sampling in 1988 revealed several low level threshold anomalous Au and Cu values in this suite. Stripping and trenching was undertaken in seven locations in this sequence in 1989 (Dwg. No. 16).

The conductors are associated with a series of three apparent flow top concentrations of graphitic, cherty, sulphide-rich material in the order of several metres thick. The work in 1989 tested the lowest (southernmost) flow top concentration over a strike length of 200m. No Au or As anomalies were turned up. Several threshold anomalous values in Cu, between 400 and 900 ppm, were obtained, as well as 10 threshold anomalous Zn values, between 1592 and 4009 ppm.

40⁰ Creek lies at the west end of Grid A, but closer to the lapilli tuff contact and covering a conductor which lies south of those tested above (Dwg. No. 15). Threshold anomalous Au, Cu and Zn values were reported in 1988. The rocks trend NE at this point in an apparent flexure. Silicified sulphide bearing schist (py-cp-sp-gn) is in contact to the SE with sulphide bearing chert horizons, in contact with sulphide-bearing ultramafic rock, all dipping steeply to vertically. No threshold anomalous Au values were reported from the 1989 sampling, but the highest Cu values reported on either block (10 threshold values from 372 to 3026 ppm) and six anomalous Zn values, from 1651 to 3358 ppm. One highly anomalous arsenic value, 1675 ppm/0.36m, was obtained from a chert containing 2% disseminated sulphide.

The EXKO Grid was the site of low level threshold anomalous Au and As values from sampling of a surface gossan in komatiitic ultramafic flow in 1988. A trench blasted here in 1989 gave values of 2200 and 1460 ppb Au with high arsenic and copper from an initial 11 samples. Subsequently a grid baseline was cut over 2.5km along a conductor associated with the showing, to guide geological mapping, prospecting and sampling (Dwgs. 10 and 11). The showing lies at the contact between an ultramafic volcanic and a basalt. The ultramafic volcanic is altered to an actinolite schist and replaced by quartz, sugary quartz and sulphides (py-po-cp). The basalt has been converted to a medium-grained amphibolite, impregnated with narrow quartz stringers and eyes and py-po, to a lesser extent than in the ultramafic.

The conductor is only exposed for 2m, at the showing trench, on the grid. The altered basalt on the north side of the conductor is exposed, however, for 1.7 km, and throughout this interval threshold anomalous Au values (>103 ppb) were obtained in this rock type. Within a 200 m interval centred on the showing the anomalous Au results were accompanied by highly anomalous As values (413 to 2184 ppm). Anomalous Cu values were not obtained from grid samples, but from the actual showing trench. Ag values were obtained both in the showing (17.0ppm) and in the surrounding country, where a quartz-veined basalt 50m north of the conductor contained 10.8 ppm Ag along with 225 ppm As.

Best results in the EXKO showing trench are summarized in the accompanying Table 3.

A test pit was sunk as close as possible to the conductor on Section 11+05E. Bedrock was encountered at a depth of 8 feet, consisting of talc with biotite, 1% sulphide and quartz veins.

Table 3: Summary Best Results EXKO Showing Trench

<u>Sample</u>	<u>Auppb</u>	<u>Agppm</u>	<u>Cuppm</u>	<u>Description</u>			<u>Length,m</u>
8229	1460	3.1	514	QV	CHERT	5%S	-
8234	2200	0.5	357	ACTIN	QV	10%S	0.48
8365	3550	3.5	107	QV	MS	ACTIN	-
8366	32	17.0	1251	BAS	QV	2%S	-
8368	1073	0.8	450	ACSCH	BIOT	5%S	-
8444	935	0.8	177	PBAS	GOSZN	S1%	0.76
8450	1551	3.2	994	ACSCH	QV	S1%	-

In the East Block the Pointer Bay Grid Valley Showing received the bulk of the stripping, trenching and blasting (Dwg. No. 25). From the 1988 sampling this area was threshold anomalous in a number of elements, particularly Cu and As, but not Au, as was the northern end of the Long Grid, 1.5 km to the south now in the new claims. An attempt was made to expose the two conductors that run down either side of the valley and sink trenches on them. Trenches were sunk on OC's 3 and 8 on the main conductor on the west side of the valley, and on OC's (subcrops) 4, 5 and 6 on the secondary conductor on the east side of the valley. The secondary conductor is caused by sulphides developed at the contact of basalt and a horizon of recrystallized, chertified rhyolite tuff, best illustrated in OC6. The main conductor appears to be caused by sulphides with quartz veins in a shear cutting basalts in OC3 to the north and a highly tectonized granodiorite in OC8 to the south. The presence of the granodiorite on the grid was unknown, previously represented by a small outcrop of sericite schist on the west wall of the valley. The granodiorite has been exposed over a width of 14m, open in both directions. The unit appears to have been repeatedly tectonized, with a sericite schist as the extreme. Fresher samples exhibit the original feldspar-quartz-biotite assemblage. The granodiorite has been finally intruded by several narrow (20 cm) fresh granodiorite dykes. An overall width for the rhyolite tuff unit of 25m can be inferred from the group of 9 and 10 outcrops on Line 200S, where the tuff is in contact with the granodiorite. A low outcrop of silicified, chertified rhyolite tuff pokes out of the valley floor at O+60W/1+45S, just north of the granodiorite. This outcrop exhibits grid alteration, a square pattern of raised silica veins typical of the halo of the MSV deposit, and other mineral deposits. Highlights of the sampling here include a high background of As in the tectonized granodiorite, including threshold amounts across the entire width sampled, and a maximum of 540 ppm at the valley end of the trench. Samples from OC6, 60m north across the valley from OC8, contained 4 threshold anomalous Au values in 9 samples taken, including a maximum of 675 ppb/0.7m in a quartz-veined basalt with 1% sulphides in contact with the rhyolite tuff. Two threshold anomalous Cu values (482 and 377ppm) in rhyolite tuff and chlorite schist. One threshold anomalous As value was reported from the trench in OC3, 150 m north of OC8, 239 ppm in quartz-veined gossan.

One trench was sunk in the Swamp Grid, where threshold anomalous gold values were returned in 1988 (Dwg. No. 27), in a garnitiferous, gossanous mafic metavolcanic. No anomalous Au-Cu-As values were obtained in chip sampling in the trench. One threshold anomalous Au value, 159 ppb, reported from a grab sample of quartz-veined basalt with 5% sulphides.

Two Au numbers were reported from the south shore of Lac Gael in the SE part of the East Block in 1988, from a narrow quartz vein and from a gossan. The area was thoroughly prospected in 1989 but no anomalous Au and As and only three anomalous Cu values (717, 694, and 562 ppm) in gossanous amphibolites were encountered (Dwg. No. 3).

Geophysical Surveying

Permanent grid baselines were cut on the following:- Grid E, west part; EXKO Grid; Pointer Bay Grid East baseline. In addition 50m-spaced crosslines were cut from baseline from L00 to L200S to 100W to cover the Pointer Bay Valley Showing.

These grids were used to guide VLF-EM surveying over the length of the EXKO grid (Dwgs. 12 and 13) and detailed VLF-EM surveying over the EXKO showing area (Dwg. No. 14) and the Pointer Bay Valley Showing (Dwg. No. 26).

The airborne EM conductor associated with the EXKO showing was traced on the ground over the 2.5 km length of the grid. The stronger parts of the conductor seem to correspond to areas of enhanced metal values from the sampling. The conductor also coincides with the contact sequence pillow basalt-ultramafic flow-conglomerate. The detailed survey on both Cutler and Annapolis over the showing area shows a different interpretation for each frequency. On the Cutler survey the conductor through the showing appears to be terminated (faulted off?) just to the west of the showing, whereas in the Annapolis survey the conductor through the showing appears to join with a parallel conductor to form one conductor to the west. This discrepancy could be resolved with a proper HLEM ground survey.

Surveys on frequencies Annapolis and Cutler were carried out on 50m-spaced crosslines from 0+50N to 2+00S on the Pointer Bay grid in an attempt to establish the relationship between the main and secondary EM conductors. Responses from both frequencies were similar. Although the two conductors approach each other at 0+50S they appear to remain separate.

Glacial Drift Sampling Program

The results of the regional glacial drift sampling program are ably described in a report accompanying this report by Frank Thompson of Northwood Geoscience - "Report on Drift Prospecting 1989 Field Season Eastmain River Greenstone Belt for the Eastmain River Syndicate". Several observations may be made concerning the drift prospecting results in light of results from the trenching and sampling and prospecting programs carried out in 1989.

The only element appearing to statistically possess an unequivocal threshold anomalous population would appear to be As, and definitely As >16 ppm. Gold would appear to have a break > 20 ppb. The base metals, other than a concentration of Pb on the south shore of Lac Dolent, appear to lack an anomalous threshold. The definite and probable anomalous results would occur as the top 12 As results (>16 ppm) and the top 5 Au results (>20 ppb). All of the As anomalies and 3 of the 5 Au results occur in the West Block, with the remaining two Au results in the south part of the East Block.

All 12 of the As anomalies and 2 of the 3 Au anomalies in the West Block are spatially associated with the conductive basalt-ultramafic flow-conglomerate or basalt-conglomerate or basalt-ultramafic flow-lapilli tuff contact along the southern side of the West Block. The remaining Au anomaly in the West Block lies 200m down ice from the F Grid. The two remaining Au anomalies, in the East Block, including the highest one encountered in the survey (82 ppb) are both spatially associated with a contact basalt-ultramafic flow-metasediment in an area known from previous surveys to be conductive.

An 18 ppb Au value was obtained in a sample from Pointer Bay Grid Valley showing. Two adjacent samples containing 16 and 18 ppb Au line up with the two gold anomalies south of Lac Gael. A reading of 22 ppb Au south of Lac Clement in the East Block was recorded in a sample described as of glaciofluvial origin.

Statistical Analysis of Rock Samples

A complete statistical analysis of analytical data from 950 rock samples taken in both the 1988 and 1989 field seasons on the Eastmain Syndicate properties is presented in an accompanying report by Diana Wiese of MDC Geological Consultants Ltd. - "Report on the Statistical Analysis of Rock Samples Taken on the Eastmain Syndicate Eastmain River Project". Seven appendices to the report give a complete listing of all pertinent data on the samples.

Several highlights from the report include:- the presence of two anomalous populations for Au (>103 ppb and >640 ppb); the presence of anomalous values of Ag, Cu, As and Cd within this second Au population; the high mean Au value (241.33 ppb) with all occurrences of Actinolite, making it the best indicator of gold mineralization.

Correlation matrices were done for numerous datasets. A compilation of correlations with gold > 0.20 has been made and is summarized in Table 4: Au Correlations (>0.20). The best correlations from Au-related elements through a range of datasets are Ag, As, Cu and Cd. The best correlations of these elements within datasets belong to minor and accessory chert, followed by all actinolite and basalt. Strongest correlation in the dataset Au>103ppb is Zn (.71) followed by Ag (.55).

Table 4:

Au Correlations (> 0.20)

<u>Dataset</u>	<u>Ag</u>	<u>As</u>	<u>Ca</u>	<u>Cd</u>	<u>Cu</u>	<u>Fe</u>	<u>Mn</u>	<u>Ni</u>	<u>Sr</u>	<u>U</u>	<u>Zn</u>
>10%<20%S		.42		.27			.23			.28	
ALL ACTINOLITE	.21	.24		.37		.28	.37				
ALL CHERT	.44		.28		.20	.31	.54			.54	
MINOR AND ACCESS CHERT	.52	.48	.29	.26	.43	.32	.61			.67	
ROCK1=BAS		.41	.30		.21						
ROCK1=PYROX									.22		
ROCK1=FTUFF					.24						
Au>103ppb	.55				.20	.39	.33	.24		.34	.71
ROCK1=QV	.37						.36			.27	

Conclusions and Recommendations

1. Three significant results of the 1989 exploration program warrant followup:-

- The Au potential of the EXKO showing within the framework of the regional conductive-mineralized metavolcanic-metasedimentary contact with glacial till anomalies
- The analogous metavolcanic-metasedimentary contact in the southern East Block with potential indicated by Au anomalies
- The Au potential of the Pointer Bay Grid granodiorite and surrounding gold anomalous rock.

2. The three areas should be subjected to detailed prospecting and geochemical sampling, specifically:-

- the metavolcanic-metasedimentary contact in the West Block over an 18 km strike length from the diabase dyke in the east to the west end of Lac Lepante in the west; glacial till sampling to fill-in previously sampled 400m-spaced lines on 200m spacings, 50m sample interval, 0.5-1km lines, approx. 2000 sample sites
- the Pointer Bay granodiorite prospecting on a detailed outcrop scale to the west and south
- south of Lac Gael over a 4 km strike length of metavolcanic-metasedimentary contact; glacial till sampling in between previous 200m-spaced lines, 50m sample spacing over 1 km, approx. 600 sample sites.

3. A 3000-foot 6 or 7-hole diamond drilling program is warranted to test the EXKO showing and anomalous gold halo between 0+00 and 2+00W, and, depending on results, between 11+00 and 15+00E, but its implementation should be contingent on results of exploration on the broader target.

4. Baselines should be cut to guide prospecting and geochemical till sampling. Detailed HLEM surveying should be carried out on 50m lines to define conductors of interest, such as the EXKO grid.

5. The above program would require 2.5 months. A budget is estimated.

Budget Estimate Eastmain 1990 Program
2.5 months

	\$
2,500 till samples @ \$20.00	50,000
500 rock samples @ \$20.00	10,000
Rental equipment	7,500
Food 750 man days @ \$25	18,750
Freight	5,000
Travel and hotel	6,000
Materiel	5,000
Personnel	
Prospecting 3	
Geochemical 6	
Cook <u>1</u> 2.5 mos.	105,000
Helicopter support 50 hrs. @ \$700	35,000
Fixed wing support	25,000
Supervision and reporting	<u>15,000</u>
	\$282,250

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Certificate

1. I, Timothy John Beesley, reside at 24 Lothian Avenue, Toronto, Ontario, M8Z 4J8, and am a geologist and professional engineer.

2. I hold a B.A.Sc. in Applied Geology from the University of Toronto and a M.S. in Geology from the University of Colorado and have been continuously practising my profession for the past 22 years.

3. This report is based upon my personal field supervision of the exploration programs described herein.

4. I have not, directly or indirectly, received and do not expect to receive any interest, directly or indirectly, in the property of any member of the Eastmain Syndicate, namely Mingold Resources Ltd., Battle Mountain (Canada) Inc., or Quill Resources Ltd., or any affiliate, or beneficially own, directly or indirectly, any securities of members of the Eastmain Syndicate or any affiliate.

5. I hereby consent that the material contained in this report to the Eastmain Syndicate on the 1989 field exploration program may be used in a prospectus.

