

# GM 56873

GEOLOGICAL REPORT, JOHAN BEETZ PROJECT

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Énergie et Ressources  
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Québec 

# **JOHAN BEETZ CLAIM BLOCK**

**Johan Beetz Project, Québec**

**NTS 12L/7**

MRN-GÉOINFORMATION 1999

GM 56873

## **GEOLOGICAL REPORT**

**June 6<sup>th</sup>, to AUGUST 24<sup>th</sup>, 1996**

**Submitted by:**

**Stephen MacConnell  
Toronto, Ontario  
January 1997**

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## **CONCLUSIONS AND RECOMMENDATIONS**

The Johan Beetz property was identified as an area of potential economic mineralisation due to several factors including:

1. The age of the rocks, middle Proterozoic aged rocks host some of the Worlds largest deposits.
2. Its tectonic setting in a rift system and close to a major deformation zone, the Caron Lake deformation zone.
3. Numerous known copper and copper-gold showings in the region and the Rustcliff copper showing which is on the claim block.

Examination of the property has shown that mineralisation seems to be confined to narrow quartz veins and was of a semi-massive nature. Further evaluation of the geochemical data has shown that the mineralisation is not spatially extensive.

Given these constraints it is recommended that no further work be carried out on the claim block at this time as the property does not seem to have the potential to host a deposit of any significant size.

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## **INTRODUCTION**

This report describes work performed under a joint venture agreement between Fancamp Resources Inc. (FANCAMP) and BHP Minerals Canada Ltd (BHP). This joint venture was initiated as part of a BHP program to evaluate the potential of the Wakeham Supergroup for base and precious metals exploration and covers 124 claims in the Canton of Johan Beetz. This report also covers work performed on 360 adjacent claims solely owned by BHP. Work on these claim blocks was started on June 6<sup>th</sup> and was completed on August 24<sup>th</sup> 1996.

## **ACKNOWLEDGMENTS**

This Author would like to acknowledge and thank the following people for their help and advise during the field season, Peter Smith, Phil Boudrias, Cathy and Ghislain Tanguay.

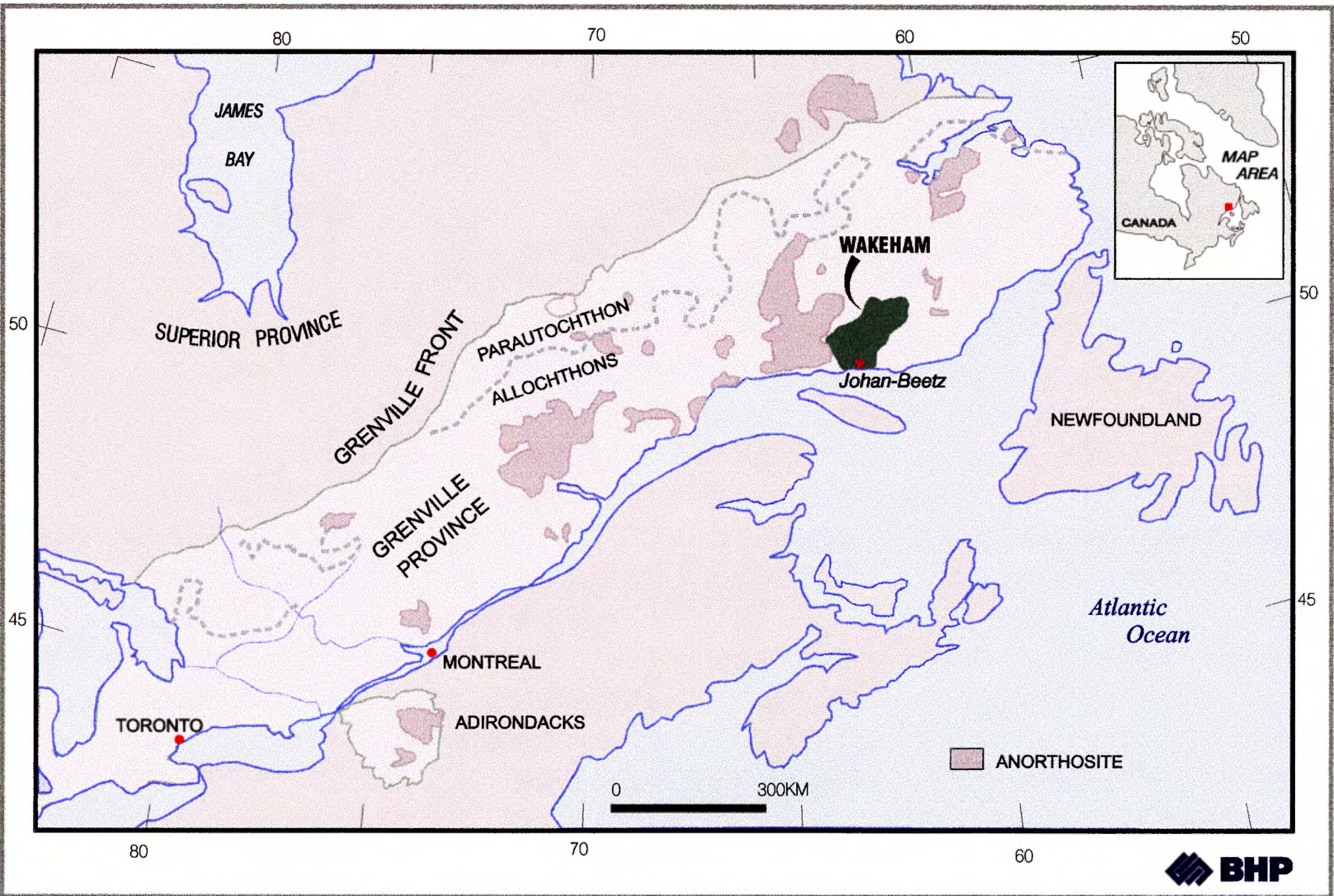
The Author would also like to express his thanks to the crew for all their hard work and enthusiasm: Tim Searcy; Matt Johanson; Al Renaud; and Germain Tardy.

## **LOCATION AND ACCESS**

The property is located in Québec's Middle North Shore region, approximately 10km east of the village of Baie Johan-Beetz along highway 138. This community is located approximately 300 kilometers east of the city of Sept-Iles (Figure 1). The center of the grid is located approximately at latitude 50°19'30" N and longitude 62°45' W.

The village of Johan-Beetz can only be reached by either ferry from Havre-St-Pierre, or by flying to Natashquan and renting a vehicle and driving west along Highway 138. Access to the property is difficult with Highway 138, which bisects the southern portion of the grid, providing the only means of road access. The rest of the grid can only be reached by foot or by canoe along the Quetachou River (Figure 2).

**FIGURE 1**  
**Location of the Wakeham Terrane in the Grenville Province**



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## **CLAIM SITUATION**

Only a few claim blocks are active in the Wakeham Supergroup, with the majority of these being concentrated within a few kilometers of the Saint-Lawrence River.

The majority of the claim blocks in the area are centered around the Village of Johan-Beetz and where staked to cover some of the 40 known Cu, Cu-Au, and Cu-Au-Ag, showings. Various industrial mineral occurrences in the area including feldspar, silica, and mica have been staked. Claim blocks have also been staked in and around Natashquan for the heavy mineral sands found in this area.

A few isolated claim blocks have been staked inland by local prospectors, but no significant mineralisation has been reported from these claims.

The largest single claim block in the area consists of , 484 claims 124 of which are registered to Fancamp Resources and 360 adjacent claims stacked by BHP Minerals, and are the subject of this report.

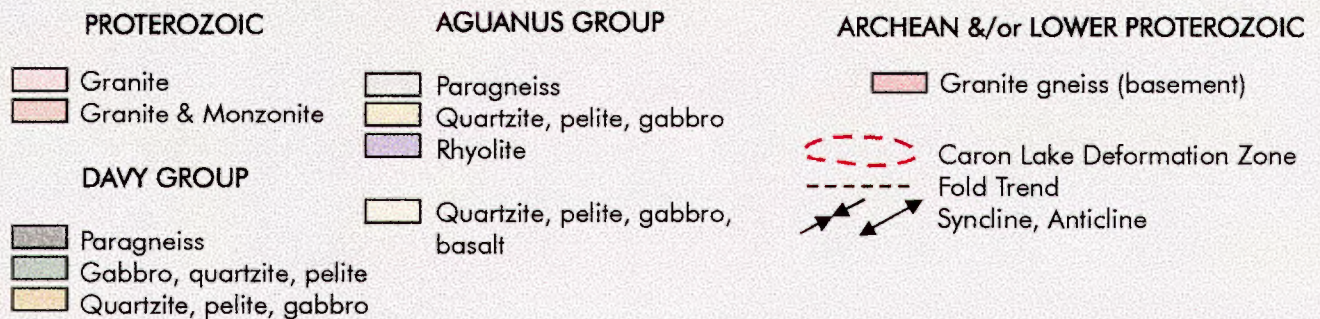
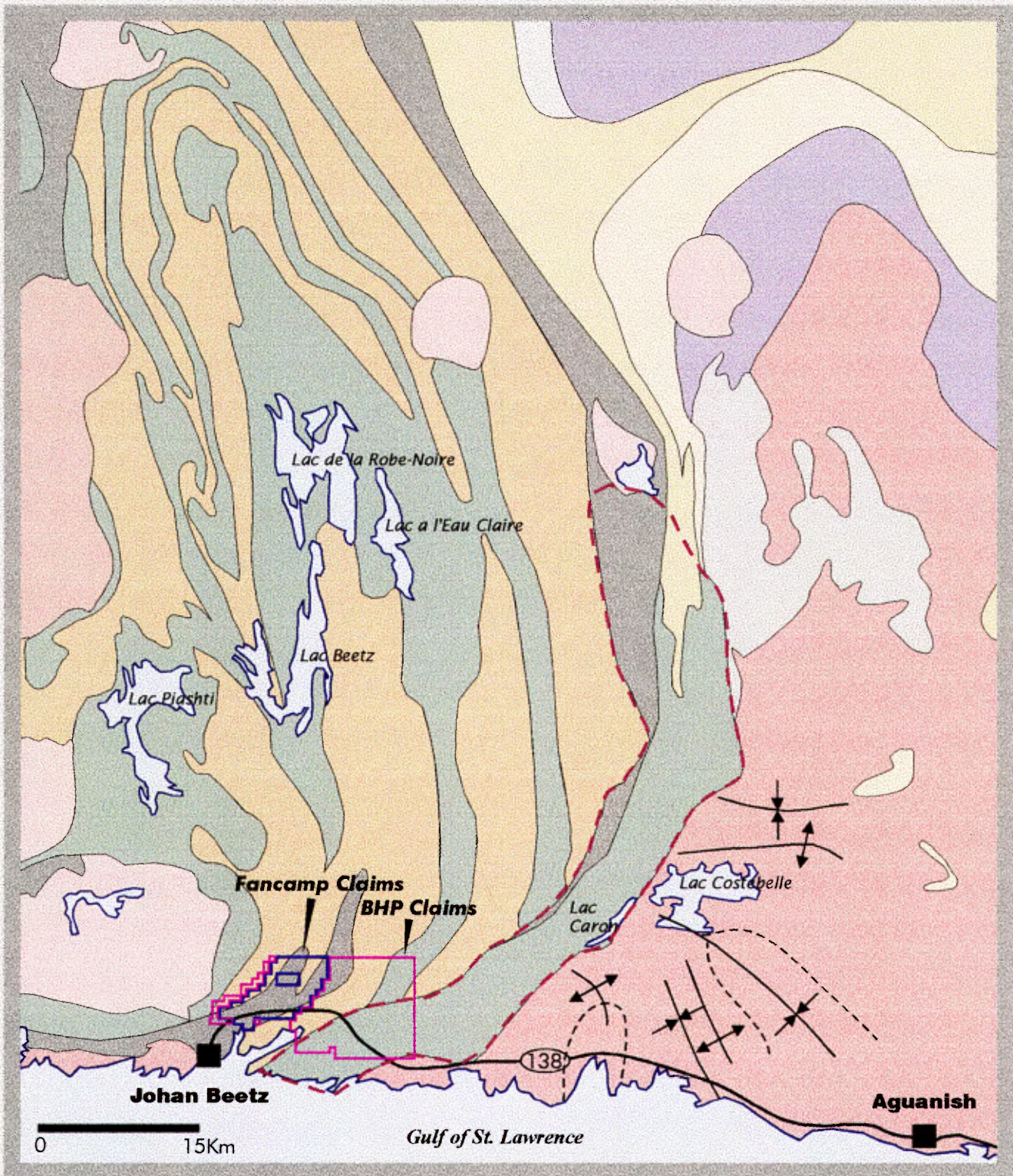
## **PHYSIOGRAPHY AND CLIMATE**

The area as a whole rises gently towards the north with a maximum elevation in the grid area of approximately 200 meters. In the Johan-Beetz area the topography can be roughly divide into three distinct terrain's, which tend to be controlled by the underlying bedrock:

### **Coastline**

The coastline in the Johan-Beetz area is very irregular with a large number of bays and peninsulas, with the long direction of the peninsulas marking the strike of the bedding of the underlying quartzites. Where the shoreline is more regular as in west of Johan-Beetz the underlying rock type is mainly granites. The coastline is very barren with only a few sheltered beaches observed.

**FIGURE 2**  
**JOHAN BEETZ CLAIM BLOCK**



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## **Ridge and Valley Topography**

This is the most dominant of the topographic units observed in the area, and consists of alternating long, narrow ridges and valleys. The ridges are predominately steep sided with flat to slightly rounded tops, with moderate to sparse tree cover. Where these ridges meet lakes they form steep cliffs in excess of 30 meters in height. These ridges consist predominately of resistive quartzites and gabbros. The valleys are generally flat in there short direction and dip gently to the south, south-west in there long direction. These valleys are well treed and usually contain small streams or rivers. Under-brush along these watercourses is extremely thick and marshy. Many of these valleys are thought to be underlain by less resistive metasedimentary rocks.

## **Plateau**

To the northwest of Johan-Beetz the topography becomes a lot flatter and more gentle to undulating. This terrain is underlain by granites that have been smoothed due to Glaciation.

## **DRAINAGE**

There is no well-developed drainage system in the area. In most cases, the lakes of one system are joined to that of another by a series of cascades and small waterfalls, which make navigation of these waterways problematic. Most of the rivers in the area are relatively deep and meandering. The drainage of the grid area is directed towards the Gulf of St. Lawrence along two major drainage basins:

# **Microfilm**

**PAGE DE DIMENSION HORS STANDARD**

**MICROFILMÉE SUR 35 MM ET**

**POSITIONNÉE À LA SUITE DES**

**PRÉSENTES PAGES STANDARDS**

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**SUITE DES PRÉSENTES PAGES STANDARDS**

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1. Petite Piashti river; draining Piashti, Petite Piashti and Salé lakes.
2. Quétachou river; draining Napoléon, and Bellanger lakes, as well as Cabane-Brûlée lake and numerous small lakes.

Numerous small rivers and streams also drain the area by either flowing directly into the Gulf or into one of the larger rivers. Several small lakes, less than 1/2km long, and ponds can be observed through-out the area. Little wild-life was observed in the area with only a couple of moose and bear sightings reported. Small game does not seem to be abundant, with only a few rabbits and wood grouse seen. Trout and salmon fishing in the larger lakes and rivers is reported to be quite good. Local vegetation consist mainly of black spruce, balsam, and poplar, with white birch present in small amounts. Ground cover consists mainly of grasses in the better drained areas and lichen and alders in the more swampy terrain's.

### **LOGISTICS**

Much of the supplies required for the field season were purchased in southern Ontario and shipped to the work area by truck, as the purchase of equipment locally is restrictive given the remote nature and poor transportation links available in the area. Due to the fact that the grid could be accessed by Highway 138 it was decided to lodge the crew in a boarding house in Johan-Beetz, rather than set-up a field camp. This helped to drastically reduce the logistical burden of the project, as meals were also included along with the lodgings. Shipment of samples was accomplished by placing them on the ferry to Sept-Ile, and then by ground transportation

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## **PREVIOUS WORK**

### **Government Surveys**

The southern portion of the Wakeham Supergroup (south of the 51<sup>st</sup> parallel) has been mapped by several authors of the M.E.R.Q. Although coverage is not complete and sometimes discontinuous the geology of this portion of the Wakeham is fairly well understood.

The northern portion of the Wakeham Supergroup is less well understood with only fragmental coverage by the M.E.R.Q. and the G.S.C. Areas covered by these surveys include the Lac Arthur and Ruffin areas by Martignole and Indarès (1986), and some regional reconnaissance by the G.S.C. in the Lac de Morhiban and Natashquan River map areas by Bourne et. all (1977).

Regional airborne geophysical data, including gravity and magnetic's, is also available for the region.

The Johan-Beetz area was first systematically mapped in 1951 and 1952 by Cooper, Cooper (1957) for the M.E.R.Q. Other programs conducted by the M.E.R.Q. in the Johan-Beetz area include a regional Lake sediment geochemistry program performed by Pellrtier (1986), and a study of the Freewest showing and the Caron Lake deformation zone Gobeil and Clark (1992).

### **Private Sector Exploration**

Private sector exploration in the Wakeham Supergroup has been mainly focused along the coastline of the Saint-Lawrence River, essentially for uranium and heavy mineral sands.

Prospecting by Mr. Philius Boudrias in the area identified the "Rustcliff" showing on the property in 1995. This was subsequently option by Fancamp Resources who increased the property size to its present 128 claims. Work by Fancamp Resources in 1996 included prospecting and the cutting of 30km of grid lines at 100m spacing and a nominal length of

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900m, over the Rustcliff showing. Some trenching and blasting as well as a gradiometric mag. and EM Max Min II surveys where conducted on this grid.

### GEOLOGICAL SETTING

#### Regional Setting

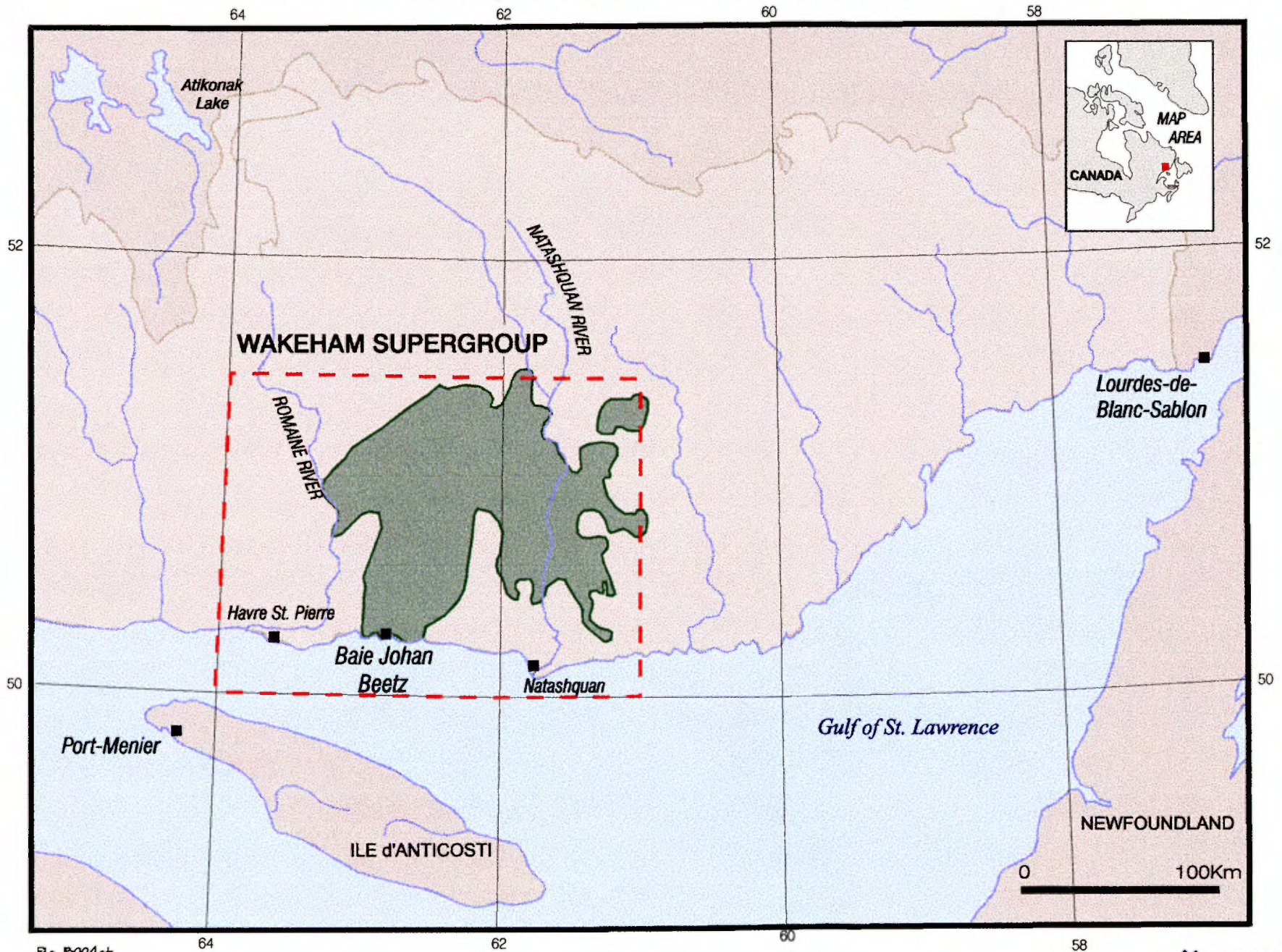
The geology of the Wakeham Supergroup was first described by Blais (1955) and Cooper (1957), and represents a area of approximately 10000 km<sup>2</sup> within the Grenville Structural Province (Figure 4).

Studies by Martignole and Indarès, (1987,1992) for the M.E.R.Q. define the Wakeham as an allochthonous monocyclic belt of Middle Proterozoic supracrustal rocks overlying a Lower to Middle Proterozoic gneissic basement. They further subdivide the Wakeham into two main stratigraphic units: the sedimentary and volcanic rocks of the basal Aguanus Group, and the unconformably overlying, mainly sedimentary rocks of the Davy Group (Figure 2).

The lithology of the Aguanus Group is composed in the lower part of arkose, quartz sandstone, calcareous sandstone, sub-felspathic lithic sandstone, and rare intercalations of pelite and basalt (Martignole et al. 1992; Sharma, 1973). This sequence of sandstones are overlain by a thick unit of subaerial, porphyritic rhyolites and rhyodacites, these are in turn intruded by granitic, monzonitic and monzodioritic, and porphyritic plutons. The age of these volcanics has been set at 1271 Ma (Loveridge, 1986), although one quartz monzonite pluton was found to be 1322 Ma (Martignole et al., 1987).

The rocks of the Davy Group are separated from those of the Aguanus Group by an erosional unconformity. Depending on location the lithology of the basal portion of the Davy Group can vary from sericite schist, quartz sandstone, black schist, conglomerate, and felsic volcanic rocks. The upper portion of the Davy Group consists of uniform massive quartzites, quartz sandstone's, and sandstone's.

**FIGURE 4**  
**Location Map Showing Wakeham Supergroup Limits**



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According to Martignole and Indarès, the distinction between the Aguanus and Davy Groups is based on:

1. The presence of a dominantly rhyolitic, anorogenic, bimodal volcanic suite IN the Aguanus Group.
2. The Aguanus Group has a north-east trending deformation as well as the later north-south phase which effects the entire Wakeham Supergroup.

Both the Aguanus and Davy Groups contain numerous generally concordant gabbro sills, with these being more abundant in the Davy. Several discordant, late-to post-tectonic, subcircular plutons are scattered through out the region and are easily identified on regional magnetic maps. The composition of these plutons range from biotitic granite to quartz monzonite, with one pluton 993 Ma (La Galissonnière pluton, Loveridge, 1986).

### Structure

The structural history of the area is quite complex and on a regional scale it appears that the Wakeham Group comprises several major structural domains, which are separated from each other by important tectonic zones. The most important of these in regards to the Fancamp claim block is the Caron Lake deformation zone, a major ductile deformation zone with an average width of 3 to 4 km and a length in excess of 100km, which separates the Davey Lake syncline and the Lac Gaudreau anticline.

The rocks of the Aguanus group are generally thought to have been deposited about 1300Ma in an intracontinental rift environment, orientated northeast-southwest, but a subsequent closing of the rift imposed a northeast compressional deformation phase on this sequence. A reopening of the rift and a subsequent erosional period led to the deposition of the Davy group with-in a north-south orientated basin. A second compressional event lead to the generation of northwest-southeast trending structures in the Davy group and the creation of polyphase deformation features in the Aguanus group (Indarès and Martignole, 1987).

This polyphase rifting sequence has resulted in the rocks in the map area being moderately to well deformed into tight upright regional folds with shallow north-northeast plunges (Gobeil and Clark 1992).

Emplacement of the discordant late-post tectonic subcircular granitic plutons, that show up very well on the regional magnetic maps, are attributed to a later extensional event.

### **CURRENT PROGRAMME**

#### **Rationale and Objectives**

This area was chosen by BHP as being highly prospective due to several factors including :

1. The age and setting of the rocks in the Wakeham Group. Many of the worlds largest deposits are to be found in Middle Proterozoic age rocks such as these.
2. An examination of regional geochemical and aeromagnetic, data made available by the Québec Geological survey.
3. Over 40 known Cu, Cu-Au, Cu-Au-Ag mineral occurrences in the region. Several Uranium showings are also known in the area.
4. Wide spread and intensive tourmalnites have also recently been recognized in the area.

It is felt by BHP Minerals that the Wakeham Supergroup offers the opportunity for several different types of mineral deposits. These include :

1. Cu, Au, Fe, Mo, Ba, REE, U  
Olympic Dam type deposits.
2. Cu, Pb, Zn, Co, Ba, B, (U)  
Redbed copper / Sullivan type deposits.

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Work planned for the 1996/97 financial year includes :

1. Geological mapping and prospecting over the entire claim group.
2. Reconnaissance geophysics using a "beep mat" over the entire claim block.
3. The establishment of a cut line grid over the Fancamp portion of the claim block at a line spacing of 400m and picketed at every 25m.
4. A multi-media geochemical sampling program to cover the Fancamp grid at a spacing of one sample per 25m.

### LOCAL GEOLOGY

Where possible the nomenclature used by previous Government mappers has been used to provide a sense of continuity between Regional scale mapping and the more detailed grid mapping performed on this claim block.

Where necessary additional subdivisions of units have been added to help in the correlation of units from one line to another.

Five major rock units have been identified in the claim block and in order of abundance these are : Gabbro, pegmatite's, quartzites, schist's and gneisses.

QUATERNARY			Fluvial deposits		Clay, sand, and gravel
			Glacial deposits		Moraine, boulders and sand
UNCONFORMITY					
PROTEROZOIC	HELIKIEN		Intrusive Rocks		Massive granites and pegmatites
	APHEBIAN	Davy Group	Intrusive Rocks	1	Metagabbro Sills
			Paragneisses and sediments	2	Quartzites, meta-arkose, iron formation
				3	Sandstones
				4	Schists
				5	Mafic Gneisses and Amphiboles
UNCONFORMITY					
ARCHEAN?			Basement Gneiss Complex	10	Granitic Gneiss
				10a	Biotite and /or hornblends Gneiss

Table 1.0: Table of Formations

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### Gabbro

The gabbros mapped on the Fancamp property are most prevalent in the north-eastern portion of the claim block. This unit is easily identified in the field as it forms steep sided ridges which can have vertical faces in excess of 30 meters. Outcrops are generally lichen covered and weathered surfaces are medium green in colour with fresh surface being dark black green. Texturally these rocks are medium to coarse grained massive to moderately foliated, hornblende + plagioclase +/- biotite +/- chlorite +/- magnetite. This rock type has been subdivided into:

- 1 - massive gabbro
- 1a - foliated gabbro
- 1c - coarse grained hornblende gabbro :- individual hornblende crystals can be seen with the naked eye.
- 1d- tourmaline gabbro :- presence of tourmaline crystals.
- 1e - magnetic gabbro :- magnetite is rarely seen in these units but they register on the beep mat (see geophysics section).
- 1f - amygdroidal gabbro :- this name is given to those units that contain numerous quartz-feldspar inclusions.

### Pegmatite

Pegmatites are very common in the claim area and are present as both cross cutting dikes and concordant sills. These are easily the most identifiable rocks in the region as they form low to moderate lichen free rounded ridges and when incorporated in outcrops of other material have sharp contacts. Texturally they are coarse to extremely coarse grained, individual feldspar crystals of 20cm and more have been observed on the property, and are massive to weakly foliated, white to light pink in colour on weathered surfaces and white on fresh surface,

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compositionally they are; quartz + feldspar + muscovite +/- tourmaline +/- garnet, rare beryl crystals up to 2cm where also observed.

### Quartzites

The quartzites on the Fancamp claim block are to be found mainly in the western portion of the grid where they form large lichen free hills and ridges and are easily identifiable in the field. Texturally this unit is very consistent and occurs as two main types. The more dominant type being a fine grained, massive, white coloured on weathered surfaces and white to transparent on fresh surfaces, 95-100% quartz. This unit is occasionally hematitic (2a), or contains some carbonate (2c). The other main type of quartzite found in the area shows distinct millimeter scale banding. These bands may be formed by either, micas (2d), graphite (2e), or magnetite (2f). Again the "beep mat" proved useful in helping to differentiate between these units.

### Schist

Several schistic units were observed on the Fancamp claim block mainly through the central portion of the grid and they roughly outline the divide between the gabbros to the east and the quartzites and pegmatite's to the west. Due to the extremely foliated nature of this unit it was not possible to determine the protolith for these rock types in hand specimen. Therefore it was decided to subdivide this unit by composition to aid in the correlation of units. Three main types of schist were observed on the Fancamp grid these being:

- 4b - graphitic schist :- this unit is comprised almost entirely of graphite (70-80%) and is fine grained, well foliated, dark silver grey in colour.
- 4c - Biotite-garnet schist :- this unit is medium to coarse grained, well foliated, dark black, biotite>>garnet +/- quartz, +/- sillimanite, +/- graphite, +/- magnetite.

4d - Quartz-biotite schist :- this unit is fine to medium grained, moderate to well foliated, dark grey on weathered surfaces, light grey on fresh, quartz-biotite +/- graphite, +/- garnet.

These units are difficult to observe in the field as they form low weathered ridges that are covered in thick moss. Sericite schist was observed in several locations as small localized units generally associated with pegmatite's.

### **Mixed Paragneiss and Amphibolite**

Volumetrically this represents the smallest of the map units encountered on the Fancamp claim block and like the schist's is used here to describe rock types whose protolith is not readily apparent. These units tend to form low narrow ridges that are difficult to observe in the field as they tend to be covered with vegetation and moss. They are fine to medium grained, poorly to well banded, dark greyish-green on weathered surfaces and medium to dark grey on fresh surface. Again it was decided to subdivide this unit by lithology to help in the correlation of units across the map sheet. Five sub-units were established:

- 5a - Banded gneiss :- this designation is used for those units that show good gneissic banding but are too fine grained to determine their composition in hand specimen.
- 5b - Amphibolite :- this unit designation was restricted to those rocks whose composition was >75% amphiboles (hornblende), they are medium to coarse grained, massive to weakly foliated, dark black, and consist mainly of large hornblende crystals.
- 5c - Biotite garnet gneiss :- this unit is fine to medium grained moderately to well banded with alternating quartz and biotite>>garnet layers, garnets are well formed 0.5-2m
- 5d - Quartz biotite gneiss :- this unit is identical to (5c) except the garnets are absent.
- 5e - Magnetic gneiss :- this unit is similar to (5c) except there are large (up to 3mm) well formed magnetite crystals present (up to 1% of the total rock mass).

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## **Structural Geology**

Structurally the Fancamp claim block has undergone moderate to intense deformation. All the units mapped show some signs of deformation. These include augen and boudin structures in both the gabbros and quartzites as well as highly deformed schists. The main structural feature affecting this area is the Caron Lake deformation zone, which runs through the eastern and southern portions of the property. This trend can be seen in the strike of the foliation. All foliation and gneissosity measurements indicate that these units are steeply dipping to the southeast in the southern portion of the property and to the east in the central and northern portions of the grid. A large number of concordant and cross cutting quartz veins were also observed on the property, these vary from a few millimeters to 10's of centimeters in width and tend to be moderately to well deformed with both boudin and augen structures common.

## **Geochemistry**

See accompanying Geochemical report.

## **Geophysics**

A ground surveying program using a GDD Instrumentation Inc. Beep Mat model BM-IV was conducted over the grid on the Fancamp claim block. This instrument is a prospecting tool which enables the geologist to detect both magnetic and conductive media up to a depth of 2 meters (for a detailed description and specifications see Appendix 1). This instrument proved very valuable as a mapping tool in helping to differentiate between magnetic and non magnetic and conductive and non conductive members of different units. This proved especially helpful in the gabbros where distinction between such members is not readily discernible in hand specimens.

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## **Economic Geology**

The most significant mineral showing on the claim block thus far is the Rustcliff showing (Figure 3). This is a small showing of semi-massive chalcopyrite associated with a quartz vein in a shear zone. Several other mineralised quartz veins have been found on the property and assay values from these are pending. Beryl crystals up to several centimeters were observed in pegmatite's.

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### Discussion and Conclusions

The mapping completed on the claim block fits well with the regional work performed by members of the M.E.R.Q. and the G.S.C. and consists of a thick sequence of sedimentary rocks extensively intruded by large concordant gabbro sills and both concordant and cross cutting pegmatite's.

Although no massive sulphides were observed in the field the presence of semi-massive sulphides in numerous quartz veins indicates the presence of metal moving fluids in the system. Unfortunately there does not appear to be an area on the property where these fluids have concentrated in appreciable amounts. That is geochemical anomalies appear as point anomalies only when plotted and have no continuity.

### PERSONNEL

The following personnel were employed by BHP Minerals :

NAME	ADDRESS	DATES EMPLOYED
Matthew Johnson *Assistant	113 Ridgeview Dr. Carp, Ontario	01/06/96 to 02/09/96
Stephen MacConnell *Geologist	33 Yonge St Toronto, Ontario	01/06/96 to 04/09/96
Alain Renaud *Assistant	7 St. Patrick Street Kapusking, Ont	01/06/96 to 04/09/96
Tim Searcy *Geologist	269 Rossini Road Windsor, Ont.	01/06/96 to 04/09/96
Germaine Tardy *Assistant	5438-5e Avenue Montreal, PQ	23/07/96 to 30/08/96

Table (2.0)

BHP personnel 1996 field season.

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## **STATEMENT OF QUALIFICATIONS**

I, Stephen MacConnell, of 57 Main Street West, Huntsville, Ontario, do certify :

1. I am a Geologist employed by BHP Minerals Canada Ltd., 33 Yonge Street, Suit 610, Toronto, Ontario.
2. I am a graduate of Acadia University with a B.Sc. Degree in geology, 1993; and have been practicing my profession continuously since graduation.
3. The accompanying report is based upon my own field work and upon that of others under my supervision during the period July 23<sup>rd</sup>, 1996 to August 24<sup>th</sup>, 1996.
4. I have no direct or indirect interest in the property, nor do I expect to receive any such interest.

Stephen MacConnell  
Geologist  
Dated 6<sup>th</sup> September, 1996

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