

# GM 51540

REPORT ON VLF-EM AND MAGNETOMETER SURVEYS, GEOLOGICAL MAPPING, PROSPECTING AND LITHOGEOCHEMICAL SAMPLING ON THE BENOIT AND DUPLESSIS PROPERTIES

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REPORT  
ON

VLF-EM AND MAGNETOMETER SURVEYS,  
GEOLOGICAL MAPPING, PROSPECTING,  
AND  
LITHOGEOCHEMICAL SAMPLING  
ON THE  
BENOIT AND DUPLESSIS PROPERTIES

BENOIST AND DU PLESSIS TOWNSHIPS,  
ABITIBI EAST MINING DISTRICT,  
NORTHWESTERN QUEBEC  
FOR  
TRUMP RESERVE MINERALS LTD.

NTS 32F/8

MER - S.I.S.E.M.

1992/12/08

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December, 1991

T.S. Jolliffe, B.Sc.(Eng.)

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## 1.0 SUMMARY

An exploration program consisting of line-cutting, magnetometer and VLF-EM surveys, geological mapping, prospecting, and lithogeochemical sampling was carried out in the summer of 1991 on the Benoit and Duplessis properties of Trump Reserve Minerals Ltd., under the supervision of T.S.J. Consultants Ltd.. The Benoit and Duplessis properties consist of 44 and 30 claims, respectively, located approximately 18 km apart at Pusticamica Lake, near Miquelon, Quebec.

The properties were staked in the spring of 1991 as favourable exploration prospects close to the recently announced gold discovery by Freewest Resources Inc. on Pusticamica Lake. A number of other gold and base metal deposits have previously been discovered in the region.

Limited outcrop exposures on the Benoit Property consist of dominant intermediate to felsic pyroclastics, with minor diabase dykes, intermediate flows, diorite and mafic metavolcanics. Some of the rocks in the south-central sector are strongly sheared but assays from grab samples were generally negative. The geophysical survey results suggest that most of the overburden covered areas are also underlain by dominant intermediate to felsic volcanics but two higher magnetic intensity zones may be caused by mafic intrusives and/or mafic volcanics.

Outcrops are even less common on the Duplessis Property. Available exposures indicate that the claims are underlain mainly by granitoid to dioritic intrusives, with very minor mafic and felsic flows. Outcrops on the shore of Pusticamica Lake near the southeast corner of the property are characterized by shearing, pyritic sulphide concentrations and strong hematite alteration. Sampling results from this area include four anomalous assays (high value: 90 ppb gold). The anomalous gold, as well as the alteration, sulphide mineralization and shearing may be associated with the Pusticamica Lake Fault or a subsidiary structure further to the east of the property.

Numerous weak to strong conductors were outlined on each claim group. Some of the conductors, particularly on the Benoit claims, may be related to shear zones and/or sulphide mineralization, with favourable potential for gold mineralization in this geological environment, but none of the anomalies provides an unambiguous target for diamond drilling.

IP surveys are recommended for the Benoit and Duplessis properties at an estimated cost of \$40,000 and \$20,000, respectively.

## 2.0 INTRODUCTION

The Benoit and Duplessis properties of Trump Reserve Minerals Ltd. comprise 44 and 30 mining claims, respectively, located at Pusticamica Lake, approximately 175 km northeast of Val d'Or and 160 km west-southwest of Chibougamau, Quebec (Fig. No. 1).

An exploration program consisting of ground magnetometer and VLF-EM surveys, geological mapping, prospecting, and lithogeochemical sampling was carried out on the properties between June and September, 1991, by TSJ Consultants Ltd. for Trump Reserve Minerals Ltd. This report is a description of the results from the exploration program.

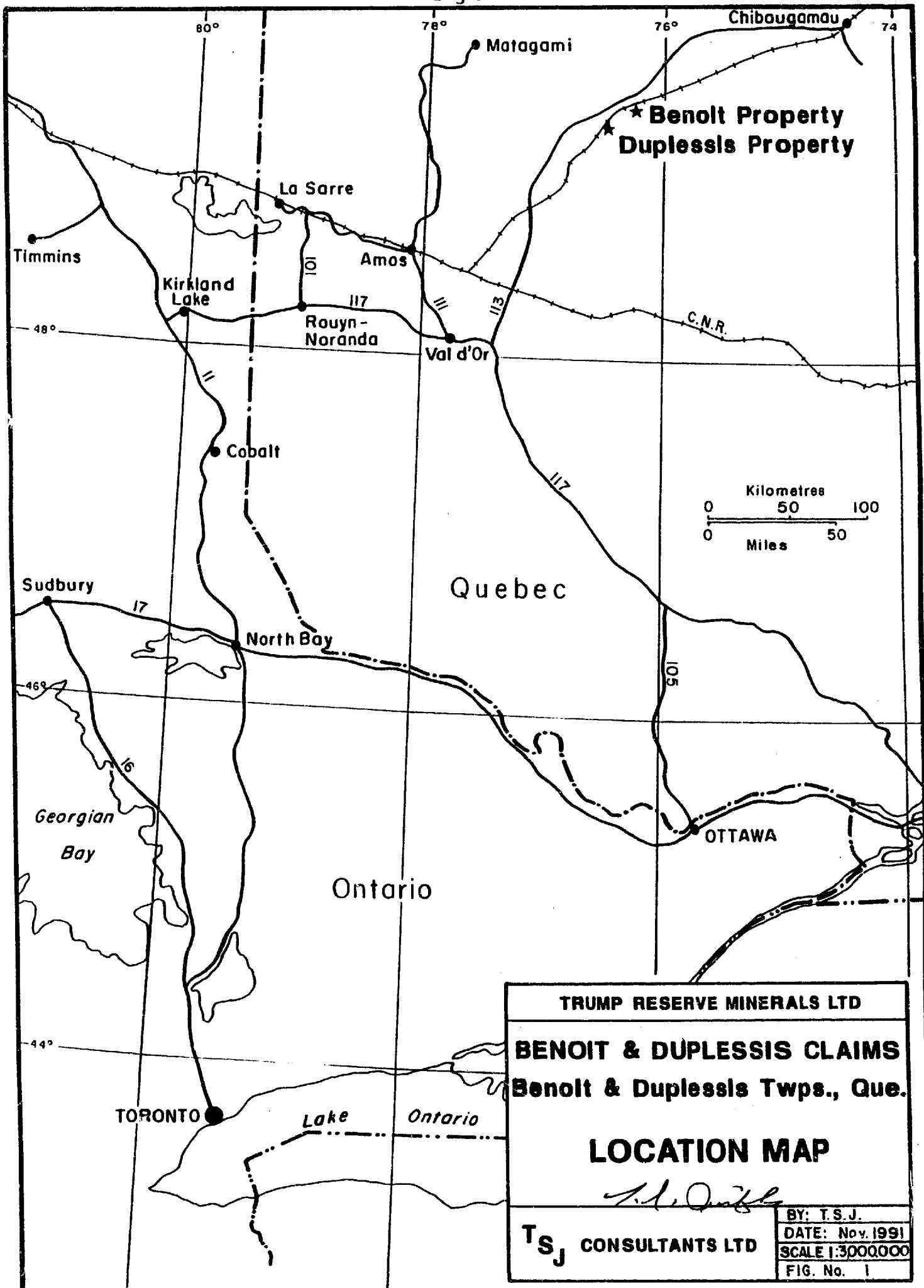
The work dates and personnel were as follows:

<u>Work</u>	<u>Property</u>	<u>Dates</u>
Line-cutting	Benoit	June 21 - July 7
	Duplessis	July 8 - July 15
VLF-EM Survey	Benoit	June 21 - July 7
		Aug. 31 - Sept. 2
	Duplessis	July 8 - July 15
		Sept. 3 - Sept. 4
Magnetometer Survey	Benoit	July 4 - July 7
		Aug. 19 - Aug. 30
	Duplessis	Aug. 11 - Aug. 18
Geological Mapping, Prospecting	Benoit	Aug. 19 - Sept. 2
	Duplessis	Aug. 11 - Aug. 18

<u>Personnel</u>		
Tom Jolliffe	Project Geologist	Toronto, Ont.
Bryan Elliott	Geologist	Oshawa, Ont.
Frank Recoskie	Geophysical Operator	Val d'Or, Que.
Steve Gilbert	Field Assistant	Toronto, Ont.

## 3.0 PROPERTY DESCRIPTIONS

The Benoit property consists of 44 contiguous, unpatented mining claims (Fig. No. 2) located in the northeastern portion of Benoist Township, Province of Quebec, and shown on the Ministère de



<b>TRUMP RESERVE MINERALS LTD</b>	
<b>BENOIT &amp; DUPLESSIS CLAIMS</b>	
<b>Benolt &amp; Duplessis Twps., Que.</b>	
<b>LOCATION MAP</b>	
<i>T.S.J.</i>	
<b>T<sub>S</sub>J</b>	<b>CONSULTANTS LTD</b>
BY: T.S.J.	DATE: Nov. 1991
SCALE 1:3000000	
FIG. No. 1	



76° 15'

NELLIGAN

5073	5073	5073	5073	5073	5073	
186	195	194	193	172	171	
5073	5073	5073	5073	5073	5073	
189	190	191	192	173	170	
5073	5073	5073	5073	5073	5073	
188	187	186	185	174	169	
5073	5073	5073	5073	5073	5073	
180	181	182	183	184	175	168
5073	5073	5073	5073	5073	5073	5073
179	162	152	153	154	176	167
5073	5073	5073	5073	5073	5073	5073
177	163	151	150	149	178	166
5073	5073	5073	5073	5073	5073	5073
146	147	148	164	165		

49° 25'

Lac Pusticamica

BENOIT TWP.

LE TAC

TRUMP RESERVE MINERALS LTD

BENOIT PROPERTY  
Benoit Township, Quebec

CLAIM SKETCH

T<sub>S</sub>J CONSULTANTS LTD

BY: T.S.J.
DATE: Nov. 1991
SCALE 1: 50,000
FIG. No. 2

l'Énergie et des Ressources, Québec (Mines) claim sheet for Benoit Township.

The Duplessis property consists of 30 contiguous, unpatented mining claims (Fig. No. 3) located in the southeastern portion of Du Plessis Township and shown on the claim sheet for Du Plessis Township

The claim numbers and registration dates are as follows:

<u>Claim Numbers</u>	<u>Total</u>	<u>Registration Dates</u>
<u>BENOIT PROPERTY</u>		
5073146 - 5073154	9	April 4th, 1991
5073162 - 5073196	35	April 4th, 1991
	---	
	44	
<u>DUPLESSIS PROPERTY</u>		
5073465 - 5073494	30	March 28th, 1991
	---	
	30	

The properties are owned by Trump Reserve Minerals Ltd. of Toronto, Ontario.

#### 4.0 LOCATION, ACCESS AND SERVICES

The Benoit Property (Lat. 49°26'N, Long. 76°15'W) and the Duplessis Property (Lat. 49°20'N, Long. 76°28'W) are located, respectively, 15 km east and 8 km south of Miquelon, at Pusticamica Lake in Northwestern Quebec, approximately 175 km northeast of Val d'Or (Fig. No. 1).

The village of Miquelon is roughly mid-way on the Senneterre-Chibougamau highway (Route 113). From Miquelon, access to the Benoit Property is by boat or snow machine south along the O'Sullivan River, then east-northeast on Pusticamica Lake, for a total distance of about 21 km. The Duplessis Property is also accessible by boat on Pusticamica Lake, or by gravel road to the west of Miquelon, off Highway 113, going south via Highway 101 and timber access roads for a distance of about 10.5 km to the northwest corner of the Duplessis Property.

Considerable infrastructure is available in the area, including a Quebec Hydro transmission line, the

C.N.R.

DUPLESSIS TWP.

BENOIT TWP.

Lac Rochester

5073	5073	5073	5073	5073
465	476	477	487	488
5073	5073	5073	5073	5073
466	475	478	486	489
5073	5073	5073	5073	5073
467	474	479	485	490
5073	5073	5073	5073	5073
468	473	494	484	491
5073	5073	5073	5073	5073
469	472	480	483	492
5073	5073	5073	5073	5073
470	471	481	482	493

Pusticomica

49° 20'



MOUNTAIN TWP.

76° 30'



TRUMP RESERVE MINERALS LTD

DUPLESSIS PROPERTY  
Duplessis Twp., Quebec

CLAIM SKETCH

T.S.J. CONSULTANTS LTD

BY: T.S.J.
DATE: Nov. 1991
SCALE 1:50,000
FIG. No. 3

Canadian National Railway line to Chibougamau and the paved highway which all pass within 4 to 10 km of each property. Supplies and equipment can be readily hauled in from Miquelon and a skilled manpower pool is available from the mining communities in the region.

## 5.0 PHYSIOGRAPHY AND VEGETATION

On the Benoit Property outcrop exposures are present over less than 2% of the area, and are confined to the south-central sector. Minor outcrop ridges and the gently rolling sand (and boulder) hills which cover most of the claim group trend roughly southwest, parallel to the local glacial trends. The intervening valleys are muskeg-covered or swampy, and dissected by minor creeks which flow into Pusticamica Lake, a part of the James Bay drainage system. The hills are covered by poplar and spruce, with alders, birch and balsam. Spruce and alders, with tamarack and balsam, are dominant in the valleys. Relief is generally less than 30 meters, except for the outcrop hill in the southwest sector which rises to about 45 meters above Pusticamica Lake (elevation 288 meters).

The Duplessis Property also has poor outcrop exposure, except along the shore of Lake Pusticamica. The terrain is more hummocky, with east-west as well as southeast trends. A major feature is the large hill in the east-central sector which rises to more than 45 meters above Pusticamica Lake. Much of the overburden has a finer silt/clay component than on the Benoit Property. Most of the Duplessis claims have been cut over and are covered by immature second growth consisting of scrub alder, birch, poplar, jackpine, spruce, maple and balsam.

## 6.0 PREVIOUS WORK

Serious prospecting in the region began in 1934 with the discovery of gold at Lac Madeleine (Lac Rose Mine), 20 km to the west of Pusticamica Lake. In 1936, prospectors found visible gold in angular boulders of quartz and greenschist on the south shore of Pusticamica Lake at the entrance of the more easterly of the two long, southwest trending arms. Other discoveries included numerous gold showings in quartz veins associated with a broad zone of intense shearing and carbonatization stretching from Lac Quévillon to Lac Bachelor. One of the discoveries, in 1946, to the southwest of Lac Bachelor, stimulated additional interest in the region and eventually led to the development of the Bachelor Lake Mine. More recently, in 1980, the Lac Shortt gold deposit was discovered approximately 25 km northeast of Desmaraisville.

Pusticamica Lake was withdrawn from staking during the 1970's because of the James Bay hydro development project. After the area was again opened for staking in 1986, Freewest Resources Inc. carried out exploration programs to investigate the origin of the gold-bearing float discovered in 1936. In early 1991, the company announced that it had intersected significant gold mineralization in boreholes drilled on Pusticamica Lake.

The region has also been explored for base metals. The Coniagas Mine (zinc-lead-silver-gold), located close to the Bachelor Lake Mine, was developed into production in the 1960's. In 1990, VSM Exploration and Sagem-Québec announced the discovery of a volcanogenic massive sulphide deposit (zinc-copper-silver) in Grevel Township, approximately 15 km west-southwest of Pusticamica Lake.

The Benoit and Duplessis properties were acquired by Mint Gold Resources Ltd. during the staking rush precipitated by the Freewest discovery. Ownership was later transferred to Trump Reserve Minerals Ltd.

Limited work has previously been carried out on the areas which now make up the Benoit and Duplessis properties. In 1947, line cutting and geological mapping (scale: 1"=300') were done on a 15-claim group (the Donaldson Group) in the south-central part of the present Benoit property. Areas of shearing, quartz veining, carbonate alteration and diabase dykes with minor associated pyrite were reported (Hellens, 1947). A ground magnetometer survey for Bluegrass Uranium Mines Ltd. in 1956 covered the eastern portion of the present Benoit claims. Ground magnetometer and horizontal loop electromagnetic surveys by Soquem in 1975 also covered a small area along the eastern boundary of the present Benoit claims. In 1985, a regional airborne combined electromagnetic, magnetic and VLF survey by Kerr Addison Mines Ltd. included the area of the present Benoit property. The only reported work on the area of the present Duplessis property is a ground magnetometer survey by Sullico in 1962, covering the central portion.

No diamond drilling has been reported on either property. Two drilling programs have been carried out east and southwest of the Benoit claim group. Three holes drilled by Wright-Hargraves Mines, Ltd. in 1950, less than 1 km east of the southeast corner of the present Benoit property, intersected dominant greywacke with sheared intervals, minor quartz veining and minor sulphides. A six-hole fence was drilled by Aurogin Resources Ltd., in 1988, across a zone of airborne electromagnetic anomalies which trends east-northeast onto the southeast quadrant of the present Benoit property, approximately 1.4 km to the east-northeast. The holes intersected felsic to mafic volcanic flows and volcanoclastics with intermittent metasediments. The northernmost fence hole (#315-6) intersected a

2.2 m pyrite-quartz interval which may belong to a major fault system. The remainder of the fence holes had little mineralization and only minor, localized alteration and/or quartz stringers; occasional graphitic sediment horizons were considered the source of the conductors.

A number of geological and geophysical surveys by the Quebec Government have covered the area of the Benoit and Duplessis properties. The Pusticamica Lake district was first mapped on a regional scale by MacKenzie in 1934. In 1985, the region was mapped by Gauthier on scale of 1:20 000. Regional airborne electromagnetic (INPUT) and magnetic surveys for the Quebec Government, covering the Benoit and Duplessis claims were published in 1981 and 1985, respectively.

## 7.0 REGIONAL GEOLOGY AND ECONOMIC MINERALIZATION

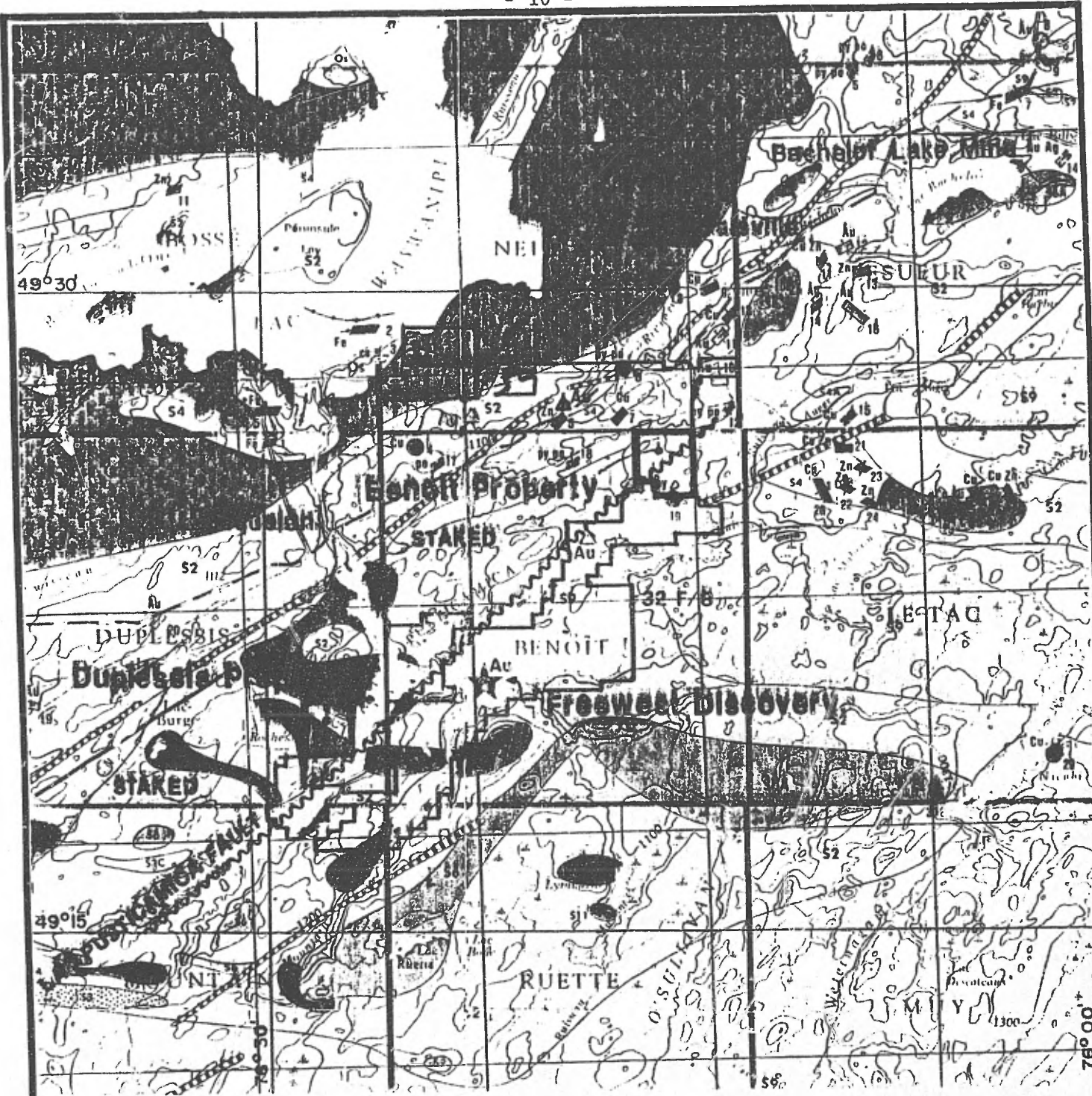
### 7.1 Regional Geology

The Pusticamica Lake region (Fig. No. 4) is in the eastern Abitibi Subprovince, which forms part of the Superior Province within the Canadian Shield. The region has been classified as the Miquelon segment within the northern part of the Abitibi Belt (Daigneault and Archambault, 1990). It is underlain by dominant Archean mafic to felsic metavolcanic rocks and associated syn-volcanic mafic to ultramafic sills, as well as metasedimentary rocks, including greywacke, conglomerate and banded iron formation. These rocks have been intruded by a number of pre- to post-kinematic diorite to granodiorite stocks and plutons and are cut by unmetamorphosed, east-northeast trending Proterozoic diabase-gabbro dykes (Gauthier, 1986).





The Archean supracrustal assemblage appears to have undergone at least two deformation events and the rocks have been metamorphosed to lower amphibolite facies. The rocks generally show steep dips and arcuate foliation trends controlled by multiple intrusions in the area. At least four fault systems, trending northeast-southwest, northwest-southeast, north-south and east-west, have been recognized. The northeast-southwest trending Pusticamica Lake Fault, a major regional structure on the northwest side of Pusticamica Lake, is characterized by a zone of shearing, hematization, carbonatization and/or silicification (Gauthier, 1986).



### 7.2 Regional Economic Mineralization

A number of gold and base metal deposits and occurrences are located in the region. Gold deposits include the 1991 Freewest discovery and three former gold producers: the Bachelor Lake Mine, the Lac Shortt Mine and the Lac Rose Mine. Base metal deposits include the former producing Conia-








**GEOLOGICAL LEGEND**

-  Volcanic rocks
-  Sedimentary rocks
-  Granitic intrusive rocks
-  Gabbro

-  Diabase
-  Fault zone

**MINERALIZATION**

-  Au Gold
-  Cu Copper
-  Zn Zinc
-  py Pyrite,
-  po pyrrhotite

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BENOIT AND DUPLESSIS PROPERTIES  
Abitibi, Quebec**

Scale 1 : 250,000

*A. L. Giffels*

FIG. 4.

gas Mine and the VSM Explorations - Serem prospect discovered in 1990 in Grevet Township. In addition, iron production was briefly obtained (1970-71) from the Chesbar Mine.

Initial drilling on the Freewest discovery under Lake Pusticamica resulted in multiple auriferous intersections, including 16.2 m (53.3 ft) grading 6.2 g/t (0.18 oz./ton) gold. Mineralization was reported to be in silicified tuffs / pyritic schist in a structurally complex area, possibly at the intersection of the Lake Pusticamica Fault and an east-west trending cross-structure (Northern Miner, Feb. 11th and Mar. 11th, 1991).

The Bachelor Lake Mine operated between 1982 and 1989 and mined 884 047 tonnes grading 5.02 g/t. Much of the ore is hosted by an east-southeast trending silicified, hematite altered shear zone/stockworks, averaging 2 m in width, which transects a sequence of mafic to felsic volcanics and a granitoid intrusive. Gold is typically associated with pyrite. Gold is also associated with carbonate alteration along faults (Buro, 1984).

The Lac Shortt Mine, located 25 km northeast of Desmaraisville, began production in 1984 and has mined over 2 million tonnes at a grade of 4.55 g/t. It has been called a volcanic-hosted stratiform gold deposit (Cormier, et al., 1984) but more recently the deposit was described as gold-bearing, disseminated pyritic zones within a shear zone up to 5 m wide in mafic and syenitic rocks (Simard, et al., 1990).

Minor production (6 000 tonnes grading 18 g/t) was obtained from a gold-bearing quartz vein at the Lac Rose Mine in 1938 and 1939 (Barrette, 1989).

The Coniagas Mine (zinc-lead-silver), located about 2 km west of the Bachelor Lake Mine, was in production from 1961 to 1967. It is a small deposit (700 000 tonnes grading 10.7% zinc and 182 g/t silver) which consists of several folded massive sulphide lenses in coarse- and fine-grained volcaniclastite and andesite, with associated sericitization, chloritization and silicification (Chartrand and Cattalani, 1990).

The Grevet Township deposit (zinc-copper-silver), located 40 km northeast of Lebel-sur-Quevillon, consists of at least four zones within a package of mafic to felsic volcanics characterized by several relatively short volcanic cycles. Approximately half of the mineralization occurs as stratiform sulphide beds grading over 20% zinc; the remainder is disseminated to massive sulphides in stockworks and breccias. Associated alteration consists of chloritization, sericitization, silicification and carbonatization. Geological reserves have been estimated at 18 400 000 tonnes grading 7.2% zinc, 0.41% cop-

per, 0.15% lead and 31.3 g/t silver (Northern Miner, March 11th, 1991).

## 8.0 PROPERTY GEOLOGY

### 8.1 Benoit Property

The very limited bedrock exposures on the Benoit Property consist of a steeply north-dipping, east-northeast trending supracrustal assemblage dominated by intermediate to felsic pyroclastics, with minor diabase dykes, intermediate flows, diorite and mafic metavolcanics (Dwg. Nos. 3A and 3B). The magnetometer survey results (p.14) and regional government mapping (Gauthier, 1986) suggest that most of the overburden covered area is also underlain by intermediate volcanics. Two probable exceptions are the unexposed high magnetic intensity zones which trend across the southern part of the property. The northern of the two zones trends east-northeast and is interpreted to be a late diabase dyke or a mafic metavolcanic unit. The southern, east trending zone may consist of two mafic volcanic units or mafic sills.

The intermediate to felsic pyroclastics weather pale greenish buff to whitish buff and are bluish to greenish grey/buff on fresh surface. Tuffs (including minor crystal tuff) are dominant but lapilli tuff and tuff-breccia are also common. The coarser fragmentals consist of sub-angular to sub-rounded, elongated, rhyolitic to rhyodacitic lapilli and/or blocks in a less felsic ash matrix. In the outcrop areas south of 9+00S, between L0 and L5E, minor intermediate flows and mafic tuffs and/or flows are intercalated with the intermediate to felsic pyroclastics and the assemblage is cut by east trending and north-northwest trending late diabase dykes. A minor exposure of pillowed intermediate flows is present at L11E/4+00N. Minor diorite (medium-grained flow center?) is exposed to the south of the property.

The outcrop exposures between L0 and L5E show moderate to strong shearing parallel to the east-northeast lithological trend. Lineations and the direction of fragment stretching show steep plunges to the east and west. A north-northeast trending shear is exposed to the south of the property. There was no evidence in outcrop of structures matching the common east-southeast conductor trend

The rocks on the property have been metamorphosed to lower amphibolite facies. Carbonate and hematite alteration are locally associated with shearing in the outcrop areas between L0 and L5E.

On the regional government geology map (Gauthier, 1986), the northeast trending Pusticamica Lake Fault is projected onto the Benoit Property at approximately L6W/12S. The projected trace of the fault passes through overburden covered ground to the east of the large outcrop hill between L5W and L3W. Outcrops on the hill do not show shearing or alteration and the geophysical survey results do not provide evidence of a significant structure along the projected trend.

## 8.2 Duplessis Property

Outcrop exposure on the Duplessis Property is poor (Dwg. No. 6). Most of outcrops examined are located immediately east of the property along the shore of Pusticamica Lake. The scattered small outcrops in the northern two-thirds of the property (north of about 6S) consist of intrusive rocks with a granodiorite to granite composition. They are commonly flesh pink to light grey, medium-grained and homogeneous with up to 10% quartz and variable hornblende ( $\pm$ biotite). Some of the outcrops have coarse-grained feldspar and/or amphibole phenocrysts. Accessory magnetite and minor rounded to lenticular, amphibolitic xenoliths are locally present. These may be responsible for the zone of higher magnetic intensities outlined by the magnetometer survey (p.16).

The remaining outcrops, south of 6S along the shore of Pusticamica Lake, are in an area characterized by strong to weak hematite alteration and shearing (east, north-northeast and north-northwest trends) with associated pyrite mineralization. The dominant intrusives in the area have a generally more mafic (granodiorite to diorite) composition, although the strong hematite alteration commonly gives the rocks the appearance of a syenite. Mafic flows and very minor felsic flows (silicified mafic flows?) are also present.

The entire area west of about L11W contains no outcrops except for granitoid intrusive rocks north of the property. Magnetometer survey results suggest that the western sector is probably underlain by granitoid intrusives with minor untopped remnants of mafic volcanics.

## 9.0 LINE-CUTTING AND GEOPHYSICAL SURVEYS

### 9.1 Description of Program

Line-cutting was carried out on both the Benoit property and the Duplessis property. On each, a base line oriented at 090° was established near the center of the claim group, with north-south crosslines spaced 100m apart, picketed at 25 intervals and tied in by east-west tie lines close to the



regional scale (Gauthier, 1986). The only outcrop exposures, on the flanks of the anomaly at L5E and L7W, consist of mafic to intermediate pyroclastics but a subsidiary parallel magnetic anomaly at L5E/8+62S coincides with a narrow mafic sill. However, the orientation of the anomaly parallel to lithological trends also suggests that the zone could be an unexposed mafic volcanic unit.

The southern zone of magnetic anomalies is less continuous and trends east-west across the property close to the southern boundary, in an area with no outcrop. Minor exposures of mafic to intermediate volcanics and/or intrusives have been mapped to the southwest outside the property and greywacke has been mapped by the Quebec government (Sharma and Lauzière, 1983) to the east of the property. The zone is bimodal, with magnetic intensity peaks approximately 100m to 115m apart; anomaly peaks range from about 58,300 gammas up to a maximum of 60,243 gammas (L0). Discontinuities and disruptions in trend along the southern bimodal anomaly zone suggest that it may represent two mafic volcanic units affected by cross-faulting or discontinuous mafic sills.

The VLF-EM survey of the Benoit property outlined numerous conductors (Dwg. Nos. 2A and 2B). To the north of about 5+00S, in the overburden covered area characterized by flat, low magnetic intensities, the conductors are predominantly weak and most do not show a close correlation with the projected east-northeast lithological trend. The dominant east-southeast to east conductor trends suggest possible cross-faulting but there is no correlative evidence from the magnetic survey results.

The southern portion of the Benoit property also contains a number of conductors. The conductors range from weak to strong and have east-northeast to east-southeast trends. As is the case to the north, the majority are discontinuous and/or sinuous and lack correlation with magnetic intensity patterns or lithological trends. Most are probably related to overburden conductivity or topographic effects. However, some of the anomalies may be bedrock conductors and are discussed below.

A weak to strong, sinuous and somewhat discontinuous conductor, coincident with weakly elevated magnetic intensities, trends approximately east-west from L5W/5+50S to L13E/4+35S. A strong segment of the conductor, from L4W to L2W corresponds to a cliff edge and runs oblique to foliation trends in the area. The conductor may be an unexposed cross fault, although there is no visible evidence of shearing and alteration in nearby outcrops. A similar but weaker, sinuous, east to east-northeast trending conductor trends across the property from L8W/12+00S to L18E/10+25S. Outcrop exposures along the conductor, between L4E and L5E consist of sheared volcanics.

Between the two conductors mentioned above are a number of weak to strong, east-northeast to east-southeast trending conductors in the vicinity of the distinctive northern high magnetic zone.

These may be related to shearing as well, although they do not coincide with major disruptions in the magnetic patterns.

Additional possible shear-related anomalies include four parallel, east-southeast trending conductors, spaced about 50m to 75m apart, to the south of 12+00S. The northernmost and strongest conductor, from L2W/11+90S to L5E/13+50S is located south of outcrops which show minor carbonate alteration but no shearing. The most southern of the conductors, from L2W/13+85S to L1E/14+90S, coincides with disruptions in the magnetic intensity patterns within the southern high magnetic zone.

Finally, a number of short, weak to moderate conductors, most notably from L0/16+15S to L3E/15+90S, coincide with peaks within the southern high magnetic intensity zone and may be related to sulphide mineralization.

In summary, the geophysical survey results suggest the presence of several structures which could be favourable for gold mineralization in this geological environment but no definitive targets were outlined.

#### 9.2.2 DUPLESSIS PROPERTY

Over much of the Duplessis property, the magnetometer survey results (Dwg. No. 4) show relatively flat, low magnetic intensities, ranging from 57,800 gammas to 58,200 gammas, which are consistent with the very limited outcrop exposures of granitoid intrusions. The main exception is a large irregular-shaped zone of higher relief (57,102 gammas to 61,131 gammas) in the east-central sector. The zone has maximum dimensions of approximately 1,100m (east-west) and 900m (north-south). Internally, the zone shows some discontinuous, linear anomalies trending 090° to 105°. The few outcrops present lie outside the areas of peak magnetic intensities, and consist of granitoid intrusives, some of which contain magnetite or xenoliths of mafic flow (intrusive?) fragments. The zone probably reflects the presence of partially 'stoped' remnants of mafic volcanics (intrusives?) or a more mafic phase of the intrusive.

The VLF-EM survey of the Duplessis property outlined several short, discontinuous or sinuous, weak to moderate conductors (Dwg. No. 5). These and a more persistent, moderate to strong conductor, along a valley from L0/6+25N to L8W/7+35N, do not correlate well with magnetic features and probably have a surficial source; overburden on the property has a significant clay component. One possible exception is a weak to moderate conductor, trending east to east-southeast from L12W/0+15N to L2W/1+75S, which shows a very approximate correlation to the location of magnetic peaks in the

southern part of the higher magnetic intensity zone. This may reflect the presence of shearing and sulphides along a geological contact.

## 10.0 LITHOGEOCHEMICAL SAMPLING

### 10.1 Description of Program

Geological mapping (scale = 1: 2 500) was carried out along with prospecting and lithogeochemical sampling on both the Benoit and Duplessis properties. Grab samples were collected from outcrops and boulders to test features of potential economic interest, including quartz veins, shear zones, sulphides and alteration.

In total, 44 grab samples from the Benoit Property and 14 samples from the Duplessis Property were shipped to Bourlamaque Assay Laboratories Ltd., Val d'Or, Québec, for analysis. The samples were crushed and pulverized to - 150 mesh and a 20g sample of the homogenized pulp was analyzed for gold, using fire assay, finished by atomic absorption spectroscopy (lower detection limit 5 ppb Au). Aqua regia was used as the reagent. Two of the samples from the Benoit Property were also analyzed by atomic absorption for zinc.

Detailed grab sample descriptions are given in Appendix B and all analytical certificates are compiled in Appendix C. Sample locations are shown on the geology maps, Dwg. Nos. 3A, 3B and 6 (back pocket).

### 10.2 Discussion of Results

#### 10.2.1 BENOIT PROPERTY

All samples assayed less than or equal to 10 ppb gold except for sample #3838 (100 ppb Au) which consisted of sheared, carbonated altered intermediate tuff close to the contact with a cross-cutting diabase dyke. Other samples from the immediate area (#3839, #3843, #3844) were not anomalous.

Due to the poor distribution of outcrops on the property, the generally negative sampling results may not be significant.

#### 10.2.2 DUPLESSIS PROPERTY

Four anomalous results, ranging from 50 to 90 ppb gold, were obtained from grab samples (#3804,

#3805, #3813 and #3815). The anomalous samples come from the area immediately east of the property, along the shore of Pusticamica Lake, and are characterized by hematite alteration, pyrite mineralization and/or shearing. The anomalous gold, as well as the alteration, sulphide mineralization and shearing may be associated with the Pusticamica Lake Fault or a subsidiary structure further to the east of the property.

As was the case on the Benoit Property, poor outcrop exposure limited the effectiveness of surface sampling as an exploration guide.

## 11.0 COST OF PROGRAMS

### 11.1 Benoit Property

Line-cutting, geophysical and geological surveys	\$ 41,520.68
Analytical costs	\$ 500.00
Project management	\$ 4,797.60
Report preparation	\$ <u>2,341.46</u>
TOTAL:	\$ <u>49,159.74</u>

### 11.2 Duplessis Property

Line-cutting, geophysical and geological surveys	\$ 24,724.28
Analytical costs	\$ 168.93
Project management	\$ 2,249.05
Report preparation	\$ <u>1,597.16</u>
TOTAL:	\$ <u>28,739.42</u>

## 12.0 CONCLUSIONS

The present exploration programs on the Benoit and Duplessis properties were hindered by the extensive overburden cover. The generally negative sampling results are probably not significant, due to the poor distribution of sampling sites. Some of the VLF-EM conductors and magnetic intensity patterns, particularly on the Benoit claims, could be related to unexposed structures with potential for gold mineralization, but the evidence is not yet sufficient to justify a diamond drilling program.

The properties are located in a favourable geological environment for gold exploration. One of the characteristics of several gold deposits in the region, including the Freewest discovery, is the presence of disseminated pyrite mineralization. IP surveys over each property may provide an effective means of locating such mineralization and delineating specific targets for follow-up drilling.

### 13.0 RECOMMENDATIONS

IP surveys should be carried out on both the Benoit and Duplessis properties. Recommended parameters include a 200m line spacing (ie. every second line) with fill-in lines over anomalies and a 50m dipole spacing with "n" spacings of 1, 2, 3 and 4.

### 14.0 ESTIMATED COST OF RECOMMENDED PROGRAM

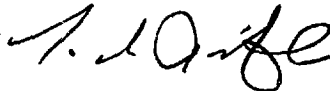
#### 14.1 Benoit Property

IP Survey: 40km @ \$1000/km                      \$40,000

#### 14.2 Duplessis Property

IP Survey: 25km @ \$1000/km                      \$25,000

Respectfully submitted,



T. S. Jolliffe, B.Sc.(Eng.)

Geologist

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APPENDIX A

CERTIFICATE OF QUALIFICATION

## CERTIFICATE OF QUALIFICATION

I, THOMAS S. JOLLIFFE, OF 1217-44 ST. JOSEPH ST., TORONTO, ONTARIO, CERTIFY THAT:

1. I am a graduate of Queen's University with the degree of Bachelor of Science (Geological Engineering) in 1971.
2. I have worked as an exploration and mine geologist since 1971.
3. I supervised exploration activities on the Duplessis and Benoit properties from August 1<sup>st</sup>, 1991, to September 4<sup>th</sup>, 1991.
4. The statements contained in this report, and the conclusions reached, are based upon the field work and a comprehensive study of all relevant assessment work records, geological reports and maps of the Ministry of Energy and Resources, Quebec.
5. In this report, I have disclosed all relevant descriptive and interpretive material which is, to the best of my knowledge, necessary to gain a complete understanding of the viability of the project and the recommendations.

DATED THIS 10<sup>th</sup> DAY OF February, 1992



T. S. Jolliffe, B.Sc.(Eng.)  
Geologist

APPENDIX B

GRAB SAMPLE DESCRIPTIONS

DUPLESSIS PROPERTY  
GRAB SAMPLE DESCRIPTIONS

SAMPLE NUMBER	LOCATION		DESCRIPTION	ASSAYS	
	Grid Co-ordinates			Au ppb	Zn ppm
3804	1+05E	0+40N	Quartz-Feldspar Veinlet -trace pyrite, slightly limonitic; 2-10cm wide; 123°/55°N; in granodiorite	70	
3805	0+40W	1+30S	Mafic Volcanic (Boulders) -2-7% disseminated pyrite cubes, carbonate alteration; close to source?	50	
3806	0+75W	1+82S	Pelitic Metasediment (Boulder) -biotite-rich; possible mafic volcanic -with limonitic quartz veinlet containing 1-2% pyrite, pyrrhotite	<5	
3807	0+25E	6+27S	Altered Mafic Flow -strong hematite alteration; xenolith ? - at contact with felsic intrusive -1-3% disseminated pyrite	5	
3808	0+50E	6+33S	Shear Zone -in hematite altered felsic intrusive; exposed width 0.6m , 027°/V	<5	
3809	0+75E	6+65S	Sheared Mafic Volcanic -strong hematite alteration; shear foliation 085° - 105° -small folds with axis trend/plunge at 113/53°W	<5	
3810	0+74E	7+07S	Shear Zone -hematite alteration; 5-15cm wide, 093°/V	<5	
3811	0+55E	7+17S	Sheared Gossan Zone -very strong limonite, hematite alteration; sheared at 015°/V (?), with slickensides plunging 045°S; possible silicified mafic volcanic; -trace - 5% fine-grained disseminated pyrite	5	
3812	0+40E	7+17S	Sheared Gossan Zone -similar to #3811; trend, width uncertain; in mafic volcanic	10	
3813	0+25E	7+18S	Sheared Gossan Zone -similar to #3811; uncertain trend (possibly 145°/25°S); trace - 15% fine-grained disseminated pyrite	60	
3814	0+07E	7+18S	Quartz Vein/Pod -milky, chloritic; in strongly hematite altered mafic volcanic	<5	
3815	1+05W	10+15S	Altered Granodiorite or Syenite -strong hematite alteration	90	
3816	1+10W	10+00S	Altered Felsic Volcanic -strong hematite alteration	<5	
3817	7+80W	3+10N	Diorite -xenolith in felsic intrusive;-with feldspar and epidote alteration and stringers trending 090°	<5	

BENOIT PROPERTY  
GRAB SAMPLE DESCRIPTIONS

SAMPLE NUMBER	LOCATION		DESCRIPTION	ASSAYS	
	Grid Co-ordinates			Au ppb	Zn ppm
3818	0+00	18+55S	Sheared Mafic Volcanic -trace pyrite; trend 063°/70° N, with slickensides 80°W; very minor quartz±carbonate veinlets	<5	
3819	0+01E	11+82S	Quartz-Chlorite Vein/Lens -up to 3cm wide; at contact between mafic flow and intermediate tuff	<5	
3820	0+02E	11+85S	Shear Zone -trend 080°/85° N; in mafic to intermediate tuff	<5	
3821	16+95E	2+93S	Quartz Vein -minor chlorite; irregular, up to 1m wide, trending 092°; in felsic pyroclastic	<5	
3822	2+99E	10+27S	Quartz Lenses -trace pyrrhotite; 20% quartz lenses over 0.5m in sheared intermediate volcanic	<5	
3823	3+10E	10+25S	Quartz Lenses -continuation of #3823 to the east; 40% quartz veinlets and lenses	<5	
3824	3+05E	10+30S	Sheared Mafic to Intermediate Tuff -shear trend 065°/80° S; general grab sample	<5	
3825	4+57E	9+26S	Felsic to Intermediate Tuff -very minor pyrite; moderately strong carbonate, hematite alteration; sheared, sericitic	<5	
3826	4+62E	9+24S	Felsic to Intermediate Tuff -similar to #3825 except more sericitic, fissile, less carbonate, hematite	<5	
3827	4+54E	9+29S	Intermediate Tuff and Tuff-Breccia -sheared; minor quartz-carbonate veinlets	<5	
3828	4+45E	9+32S	Intermediate to Felsic Tuff -weak carbonate, hematite alteration; sheared	<5	
3829	4+45E	9+32S	Mafic to Intermediate Tuff -trace-3% fine-grained disseminated pyrite; sheared, limonitic	<5	
3830	12+00E	3+65N	Quartz Veins and Lenses -milky, minor chlorite; up to 10cm wide, 065°/68° S; in crystal tuff	<5	
3831	4+99E	8+56S	Mafic to Intermediate Tuff -trace pyrite; slightly limonitic; sheared; with minor quartz lenses	<5	
3832	4+97E	8+59S	Mafic Dyke -magnetic; 0.5% pyrrhotite; 0.6m exposed width	<5	
3833	4+97E	8+59S	Intermediate Tuff -sheared, phyllitic, fissile, friable; at contacts of mafic dyke (#3832)	<5	

SAMPLE NUMBER	LOCATION		DESCRIPTION	ASSAYS	
	Grid Co-ordinates			Au ppb	Zn ppm
3834	4+97E	8+70S	Intermediate Tuff and Lapilli Tuff -minor hematite, limonite; sheared (084°/V), phyllitic, fissile, friable; minor narrow quartz veinlets	<5	
3835	4+87E	8+82S	Intermediate to Mafic Tuff -up to 1% fine-grained disseminated pyrite; limonite, hematite; sheared (065°/V) with small folds (axes plunge 52°W)	<5	
3836	4+75E	9+03S	Sheared Intermediate Tuff -slightly limonitic; strongly sheared; phyllitic, fissile, friable	<5	
3837	4+00E	9+39S	Sheared Intermediate Tuff -with limonitic patches (carbonate alteration); moderately to strongly sheared (070°/V)	<5	
3838	3+99E	9+53S	Intermediate to Felsic Tuff -weak to strong carbonate alteration; sheared at 070°/80°N	100	
3839	3+99E	9+53S	Quartz (±Chlorite) Veins -vitreous to milky; up to 20cm wide; in sheared intermediate to felsic tuff (#3838)	<5	
3840	4+02E	9+66S	Silicified Intermediate Tuff -weak to moderate carbonate alteration; at contact with diabase dyke (#3845) -trace-0.5% pyrite, chalcopyrite (+sphalerite?)	<5	80
3841	4+02E	9+68S	Silicified Intermediate Tuff -some epidote; brecciated, with approximately 40% quartz vein fillings -0.3m wide zone at contact with diabase dyke; trace-2% pyrite, chalcopyrite (±sphalerite)	<5	130
3842	3+95E	9+84S	Quartz (±Chlorite) Veins, Lenses -40% discontinuous veins over 0.3m width -in sheared (075°/85°N), slightly carbonate altered intermediate to felsic tuff with trace pyrite	<5	
3843	3+93E	9+54S	Silicified Intermediate Tuff -limonitic, carbonate altered; at west contact of diabase dyke; trace pyrite	<5	
3844	3+95E	9+54S	Diabase Dyke -some epidote; magnetic; trace pyrite (+chalcopyrite?)	<5	
3845	4+00E	9+68S	Diabase Dyke -similar to #3844	<5	
3846	3+51E	9+69S	Quartz-Chlorite-Carbonate Veinlets -concordant (066°); lensoid, 2-20cm wide	<5	
3847	4+07E	9+79S	Silicified Intermediate Tuff -epidote alteration; with minor quartz±epidote veinlets; close to contact with diabase dyke -trace-0.5% pyrite, chalcopyrite	<5	
3848	2+56E	10+26S	Intermediate Tuff-Breccia and Lapilli Tuff -some limonite, hematite (after carbonate?); moderately strong shearing at 065°/86°S	<5	

SAMPLE NUMBER	LOCATION		DESCRIPTION	ASSAYS	
	Grid Co-ordinates			Au ppb	Zn ppm
3849	3+50W	6+35S	Intermediate Tuff -slightly limonitic; trace-0.5% pyrrhotite	<5	
3850	3+50W	6+35S	Quartz Veins and Lenses -concordant (068°), discontinuous, up to 0.5m wide; in intermediate tuff (#3849)	<5	
3851	3+70W	6+37S	Quartz Veins/Lenses/Pods -concordant to cross-cutting; discontinuous, up to 0.6m wide	5	
3852	1+82E	12+29S	Intermediate Tuff or Flow -weakly to moderately limonitic (after carbonate?); chlorite seams (pillow selvages?)	<5	
3853	1+18E	12+15S	Quartz Veinlets -concordant (066°) to cross-cutting, discontinuous, up to 10cm wide; in intermediate volcanic	<5	
3854	1+13E	11+71S	Sheared Intermediate Tuff, Lapilli Tuff -minor limonite, moderate carbonate alteration; sheared at 084°/84°N; fissile, friable, phyllitic	<5	
3855	1+15E	11+70S	Quartz Vein/Lens -concordant, 2-10cm wide; in intermediate tuff	<5	
3856	1+52E	12+19S	Intermediate Crystal Tuff -slightly limonitic (after carbonate?)	<5	
3857	1+83E	11+95S	Intermediate Tuff or Flow -weak to moderate carbonate alteration; with minor quartz lenses, veinlets	<5	
3858	1+48E	11+51S	Quartz Vein -with chlorite seams (in shear?); 0.9m exposed width	<5	
3859	1+86E	11+47S	Quartz Vein -minor limonite, chlorite; possible tourmaline; 081°/V, 0.6 m wide; extension of #3858	<5	
3860	1+86E	11+48S	Sheared Intermediate Volcanic -strong hematite (±limonite) alteration; host of quartz vein (#3859)	<5	
3861	1+98E	11+18S	Sheared Intermediate Volcanic -limonite, hematite alteration; sheared at 073°; approximately 1.2m wide; very fissile, friable	10	

APPENDIX C

ANALYTICAL CERTIFICATES



# LABORATOIRE D'ANALYSE BOURLAMAQUE LTÉE

## BOURLAMAQUE ASSAY LABORATORIES LTD.

T.S.J. Consultants Ltd.

CERTIFICAT D'ANALYSES  
CERTIFICATE OF ANALYSIS

N° 58212

ECHANTILLONS  
SAMPLES

Peck

VAL D'OR (QUÉBEC)

August 21

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ANALYSES  
ASSAYS

14 Au

Echantillon	Au ppb	Au oz/ton
3804	70	0.002
3805	50	N.D.
3806	N.D.	N.D.
3807	5	N.D.
3808	N.D.	N.D.
3809	N.D.	N.D.
3810	N.D.	N.D.
3811	5	N.D.
3812	10	N.D.
3813	60	0.002
3814	N.D.	N.D.
3815	90	0.003
3816	N.D.	N.D.
3817	N.D.	N.D.

For Au ppb: N.D. means less than 5 ppb  
For Au oz/ton: N.D. means less than 0.002 oz/ton

*[Signature]*  
ANALYSTE / ASSAYER

APPENDIX D

GEOPHYSICAL AND GEOLOGICAL MAPS