

# GM 50391

Report on the Geology, structure and ore reserves of the Bevcon-Buffadison mine and evaluation of the northern part of the Bevcon property

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AUR RESOURCES INC.

REPORT ON THE GEOLOGY, STRUCTURE AND ORE RESERVES  
OF THE BEVCON-BUFFADISON MINE  
AND EVALUATION OF THE NORTHERN PART OF THE BEVCON PROPERTY  
Project 311  
Louvicourt Township, Quebec



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Y.A. Buro, ing.

ÉNERGIE ET RESSOURCES  
SECTEUR MINES

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Bureau régional val d'Or

## SUMMARY

The Bevcon property is located 27 km east of Val d'Or, in the northeast quarter of Louvicourt Township. It encompasses 51 claims and 3 mining concessions over a total of 977.3 ha. Aur Resources has an option to acquire a 70% interest in the property owned by Consolidated Abitibi Resources Ltd.

The Bevcon-Bufferadison orebody is hosted by the Bevcon quartz diorite pluton, near its north contact with the volcanic rocks of the Upper Malartic Group.

The Bevcon-Bufferadison vein system was discovered by diamond drilling that followed the finding of gold mineralization in the Wyeth-Jowsey trenches in 1931, some 2,000 feet to the southwest. The Bufferadison shaft was sunk to 983 feet in 1946 and the Bevcon shaft started in the same year to reach 1000 feet. It was later deepened to 2,286 feet. Commercial production started at Bevcon in 1952 and stopped in 1965, with a total of 3,568,043 tons at a mined grade of 0.134 oz Au/ton, of which 323,571 tons at 0.123 oz Au/ton originated from the Bufferadison and Lencourt properties. The ore reserves at Bevcon were calculated at 568,106 tons grading 0.111 oz Au/ton above the 2225 level and 163,573 tons at 0.126 oz Au/ton below, to -3,200 feet. Reserves at Bufferadison are estimated at 384,914 tons grading 0.137 oz Au/ton.

The producing zone at Bevcon and the equivalent Bufferadison north zone lie between the pluton-volcanics contact to the north and a quartz feldspar porphyry dyke to the south. This zone widens from 150 feet on the 500 level to 400 feet at the 1600 level and below and strikes 080° in the Bevcon area and 090° at Bufferadison. East-West, subvertical shears and mafic dykes are associated with the Bevcon-Bufferadison mineralization. The south zone is flanked by the porphyry dyke of the north zone and a shear 400 feet further south. The volcanic formations were found to host only a minor portion of the mined ore. The gold mineralization occurs in a system of E-W veins dipping 30-40° to the

north and south, with an associated subhorizontal set. The vein material consists predominantly of quartz, ankerite, tourmaline and coarse-grained pyrite. Vertical zoning can be observed in the Bevcon orebody with predominant stockwork ore (700 to 1000 level) overlying a zone of conjugate, inclined veins (1000 to 1600 level) and subhorizontal veins (1600 to 2225 level). A concentration of subhorizontal veins coincides with a swarm of mafic dykes on the lowest mine levels and with the trace of the inflexion point of the 080-090° favourable horizon. South-dipping veins are the dominant system at Buffadison, to the west.

The Bevcon orebody is structurally-controlled by the change of strike of the favourable horizon, to the west, and by its narrowing down to the east and above the 500 level.

Generally, the available structural data indicate that the Bevcon-Buffadison mine area has recorded a history of early East-West, ductile, dextral movements followed by multiphase North-South compression under brittle condition with a shift from vertical to lateral extension. Tension along a North-South axis occurred as a late event.

The Wyeth-Jowsey trenches area appears to host gold mineralized veins with an East-West strike and a 60° southerly dip with related subhorizontal veins, in a geological setting somewhat similar to the Sigma-type of mineralization. These veins are spatially associated with a major East-West, steeply north-dipping shear that hosts gold-quartz veins and sheared mafic dykes, in an environment reminiscent of the Ferderber mine.

A \$275,000 first phase drilling program is recommended, testing the extension of the Buffadison North Zone below 1000 feet, the Bevcon South Zone below 600 feet and the Wyeth-Jowsey showing area at depth. A second phase diamond drilling program of \$235,000, contingent on the results of the first phase, is also outlined.

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY.....	i
1.0 INTRODUCTION.....	1
2.0 LOCATION AND ACCESS.....	1
3.0 PROPERTY DESCRIPTION.....	3
4.0 HISTORY.....	3
4.1 Buffadison Property.....	3
4.2 Bevcon Property.....	4
4.3 Bevcon-Buffadison-Lencourt Property.....	4
5.0 PREVIOUS WORK.....	5
6.0 MATERIAL, SCOPE OF REPORT.....	5
7.0 LOCAL GEOLOGY.....	7
7.1 Volcanic Formations.....	7
7.2 Bevcon Pluton.....	7
7.3 Pluton-Volcanics Contact.....	10
7.4 Quartz Feldspar Porphyry Dykes.....	10
7.5 Mafic Dykes.....	12
7.5.1 E-W System.....	12
7.5.2 NW System.....	13
8.0 STRUCTURE.....	13
8.1 E-W System.....	13
8.2 NE, NW, N-S Systems.....	15
9.0 GENERAL SETTING OF THE MINERALIZATION.....	16
10.0 DESCRIPTION, CONTROL OF THE GOLD MINERALIZATIONS.....	18
10.1 North Zone.....	18
10.1.1 Occurrence.....	18
10.1.2 Control of Mineralization.....	18
10.1.3 Spatial Vein Distribution.....	19
10.1.4 Veins Geometry.....	20
10.2 South Zone.....	22
10.3 Mineralization in the Volcanics.....	24
11.0 VEINS MINERALOGY; ALTERATION.....	24
12.0 PRODUCTION.....	25
13.0 ORE RESERVES.....	27
13.1 Bevcon Mine.....	27
13.2 Buffadison Mine.....	29
13.3 Conclusions.....	30

14.0 WYETH-JOWSEY TRENCHES AREA.....	30
14.1 Work Completed.....	30
14.2 Results.....	31
14.3 Interpretation.....	34
15.0 GROUND GEOPHYSICAL SURVEY.....	35
16.0 STRUCTURAL INTERPRETATION OF THE BEVCON-BUFFADISON MINE.....	35
17.0 PROPOSED EXPLORATION PROGRAM.....	39
17.1 Buffadison North Zone.....	39
17.2 Bevcon-Buffadison South Zone.....	41
17.3 Gold Mineralization in the Volcanic Formations.....	41
17.4 Wyeth-Jowsey Trenches Area.....	42
18.0 CONCLUSIONS.....	42
REFERENCES.....	45

#### LIST OF APPENDICES

Appendix I - List of Claims

#### LIST OF FIGURES

Figure 1. Location map, claim map, Bevcon property.....	2
Figure 2. General Geology, Val d'Or area.....	8
Figure 3. Bevcon-Buffadison mine area; general geology.....	9
Figure 4. Bevcon mine, cross-sections.....	11
Figure 5. Bevcon Mine, geology Plan, 600 level.....	17
Figure 6. Structural model of vein formation on intersecting shears.....	21
Figure 7. West wall of two cross-cuts on the 700 Level showing complex veins distribution.....	23
Figure 8. Section N and S showing vein matter in test pit, Wyeth-Jowsey property.....	32

#### LIST OF TABLES

Table 1. Total mine production.....	25
Table 2. Details of Bevcon production.....	26
Table 3. Bevcon mine production, per level.....	26
Table 4. Attitude of the Bevcon-Buffadison veins and associated features.....	37
Table 5. Description of sequential fracturing and associated features.....	38

Table 6. Summary of proposed diamond drilling.....40  
 Table 7. Budget of proposed exploration program.....40

LIST OF PLANS

- Map 1. Geological Compilation Map, Bevcon Property  
NE and NW Sheets, 1"=200'
- Map 2. Bevcon-Buffadison Mine; Geology Plan  
-800 feet elevation. 1"=200'
- Map 3. Bevcon Mine, Section 9200E; Geology. 1"=100'
- Map 4. Bevcon Mine; E-W, Vertical, Longitudinal Projection;  
Spatial Distribution of Gold Mineralized Veins. 1"=200'
- Map 5. Wyeth-Jowsey Trenches Area; Section 5640E;  
Diamond drill holes BB-5-3, -4, -8, -9, 10. 1"=20'
- Map 6. Bevcon-Buffadison Mine Area; Compilation of Diamond Drill Data  
E-W, Vertical, Longitudinal Projection. 1"=200'

## 1.0 INTRODUCTION

This report is part of the complete reevaluation of the Bevcon property undertaken by Aur Resources Ltd. following an option agreement signed in 1989 with Consolidated Abitibi Resources Ltd.

This work concentrates on the Wyeth-Jowsey trenches area, the former Bevcon and Buffadison mines, their immediate proximity and the lateral extension of the productive horizon.

The results from the study of all the mine plans and records, reserves calculations and surface exploration data are presented in this report.

The purpose of this work is to determine the geological-structural context in which the Bevcon-Buffadison mineralization formed, in order to locate possible additional ore in the mine area, or elsewhere along the north Bevcon pluton contact with the volcanics. It is also an attempt to isolate a mineable, higher grade portion, or a high tonnage block from the total estimated reserves.

The exploration potential of the Wyeth-Jowsey showing was also assessed during this study.

## 2.0 LOCATION AND ACCESS

The Bevcon mine is located 27 km east of Val d'Or, in the northeast quarter of the Louvicourt Township, near the northwest corner of Lot 45, in Range VII (Figure 1).

The mine shaft is 800 feet south of highway 117 - which crosses the north part of the property - and is accessible by an old unmaintained gravel road.

The same road provides access to the Buffadison mine shaft 2,250 feet farther to the SW-W and the Wyeth-Jowsey trenches, 1,400 feet in the same direction.



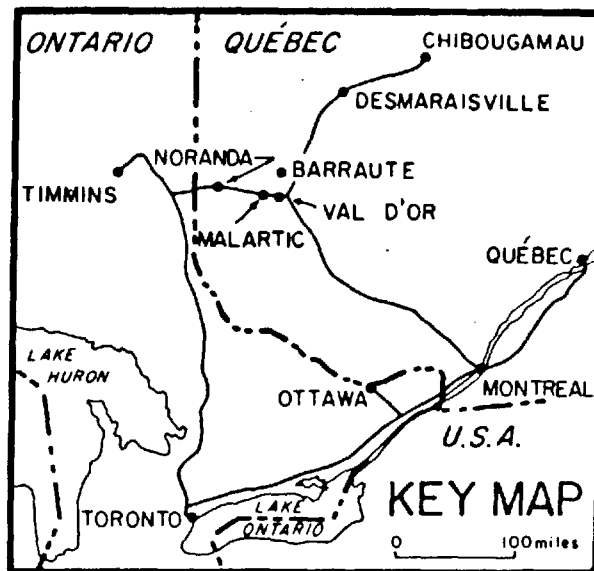
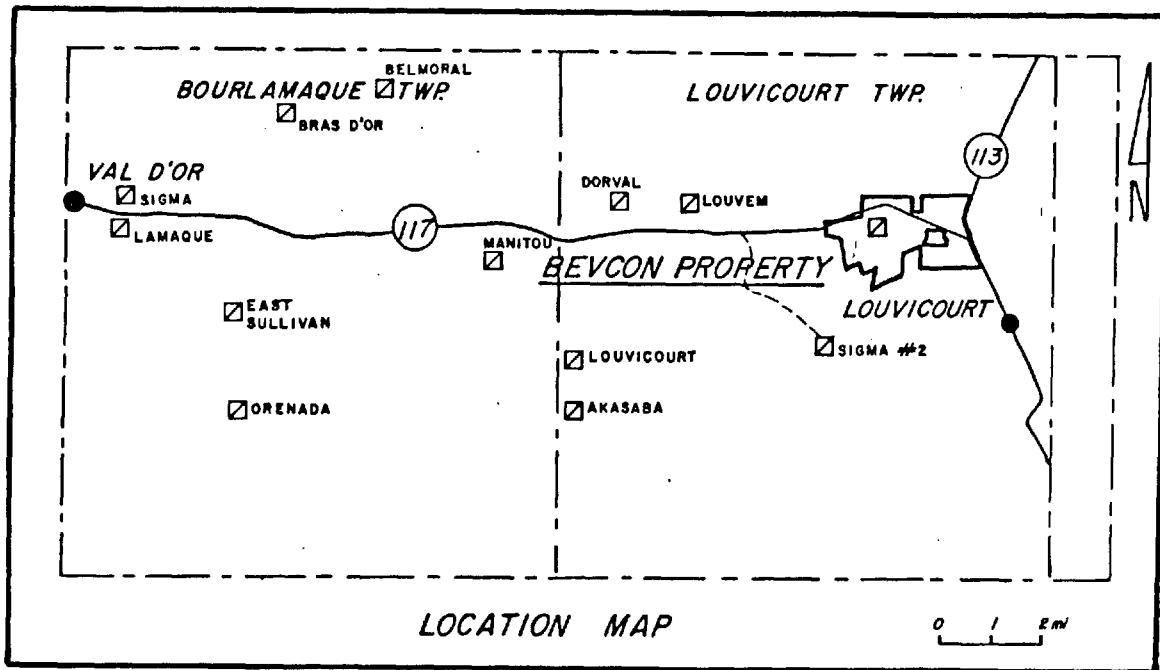
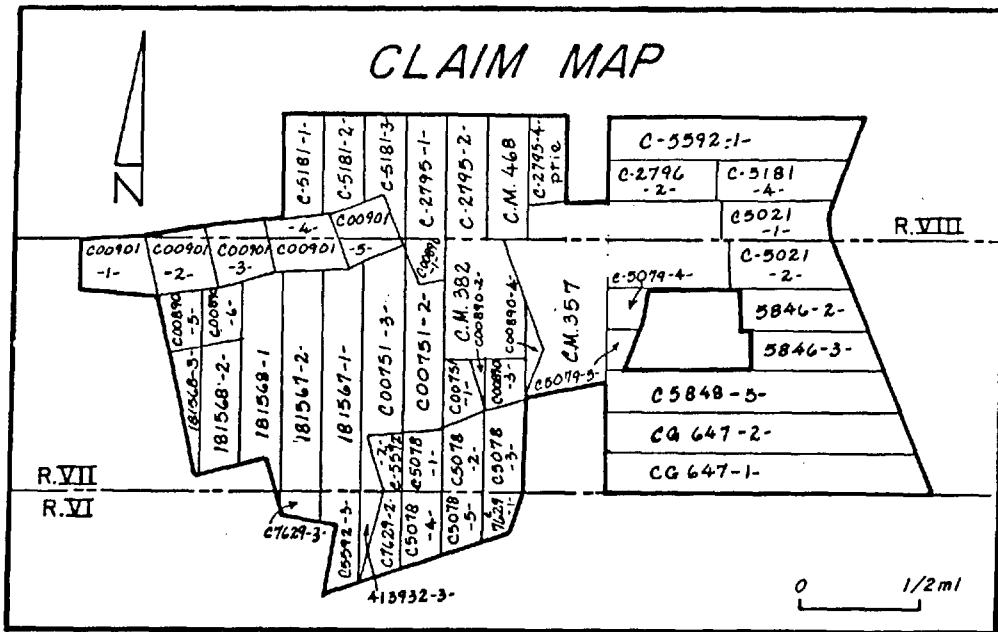


Figure 1

### 3.0 PROPERTY DESCRIPTION

The Bevcon property generally resembles an irregular rectangle, 5 km E-W and 2.5 km N-S. The property encompasses 2,415 acres (977.3 ha) in 51 claims and three contiguous mining concessions and includes the former Bevcon-Bufferadison producer and the Lencourt property (Figure 1, Table 1).

The topography in the Bevcon-Bufferadison mine area is generally flat with few areas of outcrop.

### 4.0 HISTORY

#### 4.1 Bufferadison Property

- |         |   |
|---------|---|
| 1931    | Gold discovery by J.B. Jowsey, prospecting for G.A. Wyeth, 1,400 feet SW-W of the Bufferadison shaft. Trenching.  |
| 1932    | Option taken by Dome Mines Ltd.; 3,000 ft of diamond drilling in 10 holes; 4,777 ft of trenching in the Wyeth-Jowsey area.                                  |
| 1934    | Property purchased by Louvre Gold Mines Ltd.  |
| 1936    | Option by Premier Gold Mining Ltd.  |
| 1939    | Option by Tech Hughes Exploration Company.  |
| 1940    | Property purchased by Madison Gold Mines Ltd.   |
| 1934-40 | 23,949 ft of diamond drilling completed outside of the Wyeth-Jowsey trenches area.  |
| 1945    | Property sold to Bufferadison Gold Mines Ltd. 25,286 ft of diamond drilling completed.  |
| 1946-47 | Bufferadison shaft sinking to 983 feet, with 8,573 ft of development on the 2 <sup>nd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> and 6 <sup>th</sup> levels. |
| 1948    | Operations suspended. 8,223 tons shipped to the Perron mill.  |
| 1959    | Bevcon Mines Ltd. takes over the property. Bufferadison shaft used as escape-ventilation and some Bufferadison ore being mined (1959-65) as a result.       |
| 1963    | 2,541 feet of diamond drilling (12 holes) in the Wyeth-Jowsey trenches area by Bevcon Mines Ltd.  |
| 1969    | Company reorganized as United Bufferadison Gold Mines Ltd.  |

#### 4.2 Bevcon Property

- 1944-46 Ground adjacent to the east of Buffadison acquired by Bevcourt Gold Mines Ltd. (Bevcon Mines Ltd. after 1955). Diamond drilling of 34 holes totalling 33,298 feet (7,385 ft of which on the east of the Proterozoic diabase dyke).
- 1946-48 Shaft sunk to 1,000 feet, with 5 levels cut from -500 feet.
- 1947-51 120,953 tons, with a recovered grade of 0.214 oz Au/ton, were shipped to the Perron mill.
- 1951 Perron mill purchased and moved to the Bevcon property.
- 1952 Start of commercial production on July 1 (500 tpd).
- 1953 Shaft deepening to 1,600 feet, with stations cut every 150 feet.
- 1955 Shaft deepened to 2,286 feet, with stations every 125 feet, the bottom one at -2,225 feet.

#### 4.3 Bevcon-Buffadison-Lencourt Property

- 1958 Acquisition of part of the Lencourt property (Fano Mining and Exploration Inc., 1955; Fanex Resources Ltd. in 1971) by Bevcon Mines Ltd.
- 1963 Acquisition of the whole Lencourt property
- 1965 Mining operations suspended in September, with a total production of 3,568,043 tons. Merging with Malartic Gold Fields (Quebec) Ltd.
- 1970 Bevcon-Buffadison-Lencourt claims sold to Dumont Nickel Corporation and vested into Trans-Canada Copper Mines Ltd. Transfer to Mid-Canada Gold and Copper Ltd.
- 1980 Option taken by Abitibi Resources Ltd. 51 miles of line-cutting, magnetometer and VLF-EM survey.
- 1983-84 33,390 feet of diamond drilling in 43 holes carried out by Abitibi Resources Ltd. 19,653 feet in 23 diamond drill holes in the Bevcon-Buffadison mine and Wyeth-Jowsey trenches areas.
- 1985 Abitibi Resources - Mid-Canada Gold and Copper joint venture; 29,008 feet of diamond drilling, 18,194 feet in Bevcon-Buffadison area; 58.9 miles of line-cutting, 25 miles of I.P. surveying; complete Buffadison ore reserves calculations.
- 1986-87 Abitibi Resources - Mid-Canada joint venture; 38 diamond drill holes totalling 24,585 feet, in the Buffadison mine area.

1989 Consolidated Abitibi Resources optioned the Bevcon, Dumont and Abitibi properties, to Aur Resources Ltd. who has the right to earn a 70% interest.

## 5.0 PREVIOUS WORK

1932 Trenching in the Wyeth-Jowsey discovery area.

1932-85 About 177,500 feet of surface diamond drilling in the Bevcon, Buffadison and discovery trenches area (Plan 1).

1964 Limited magnetometer and EM survey.

1946-65 Buffadison shaft sunk to 983 feet; underground development and diamond drilling on 4 levels. 220,301 tons extracted by Bevcon Mines Ltd.

1946-65 Bevcon shaft sunk to the 2225 level, with large amount of underground development and diamond drilling completed. 3,244,472 tons mined on 15 levels from -500 to -2,225 feet. Six holes drilled to -3,200 feet.

1968 J.I. Sharpe's geological mapping published by the Quebec Ministry of Natural Resources.

1968 Release of INPUT survey flown for the Ministry of Natural Resources.

1974 INPUT survey updated.

1980 Ground magnetometer and EM-VLF survey over 51 miles.

1985 I.P. survey along 25 miles of grid lines.

1985 Ministry of Natural Resources published P. Sauvé's study on the Bevcon Mine geology (MB 85-04).

## 6.0 MATERIAL, SCOPE OF REPORT

All the Bevcon and Buffadison mine plans and sections were examined, as well as some stope survey plans and chip sampling books. The mine production records and various company reports were also used.

A set of 1"=20' geology sections, 25 or 50 feet apart, was maintained at Bevcon during the life of the mine. They are fairly detailed, show the outlines of the stopes and the generally dense diamond drilling pattern.

No geological mapping was done in the stopes, the sublevels and in most raises. The geology plotted on 1"=20' level plans is well detailed to

the 1000 level and is sparse on the levels below.

Assay plans are available for all the levels and a few raises. No assay plans were kept for the stopes, although the chip samples records were saved. Only the vein material was systematically sampled and no description of the samples is available.

A set of 1"=50' Buffadison Mine sections, 100 feet apart, is available. The geology has been well reported for a few raises and on all level plans, at a scale of 30 feet to the inch.

Most underground diamond drill logs are available for both mines.

The diamond drill logs for a few early surface programs are missing. The results from the 1983-84 and 1985 campaigns are plotted on 1"=50' sections. Updated sections were not prepared during the 1986 surface drill program.

The Buffadison Mine dump was also examined during this study.

Valuable information was gathered from a discussion with N. McIsaac, Bevcon mine geologist between 1959 and 1965.

The scope of this study is to:

- determine possible trends in the bevcon-Buffadison orebody that could help locate additional ore near the mine workings;
- find possible large reserves blocks that could be extracted by bulk mining method;
- isolate a higher-grade portion from the total estimated reserves tonnage;
- construct a genetic model to help locate other areas near the Bevcon pluton margin where conditions favourable to the ore formation may have prevailed.

The mineralization in the Wyeth-Jowsey trenches area was also studied and compared to the Bevcon veins system.

## 7.0 LOCAL GEOLOGY

The Bevcon property lies in the southeastern part of the Abitibi greenstone belt of the Superior Province, and is underlain by rocks of Archean age, except for an Upper Cambrian diabase dyke (Figures 2, 3).

The report area lies along the north contact of the quartz diorite Bevcon pluton intruded into the volcanics of the Upper Malartic Group.

### 7.1 Volcanic Formations

The Volcanic sequences near the Bevcon mine have been described as predominantly fine-grained, massive lava of intermediate to mafic composition. These rocks commonly exhibit small feldspar crystals, a general grey color, moderate schistosity and chloritic alteration. They occasionally host interbedded tuffs or flow breccias.

### 7.2 Bevcon Pluton

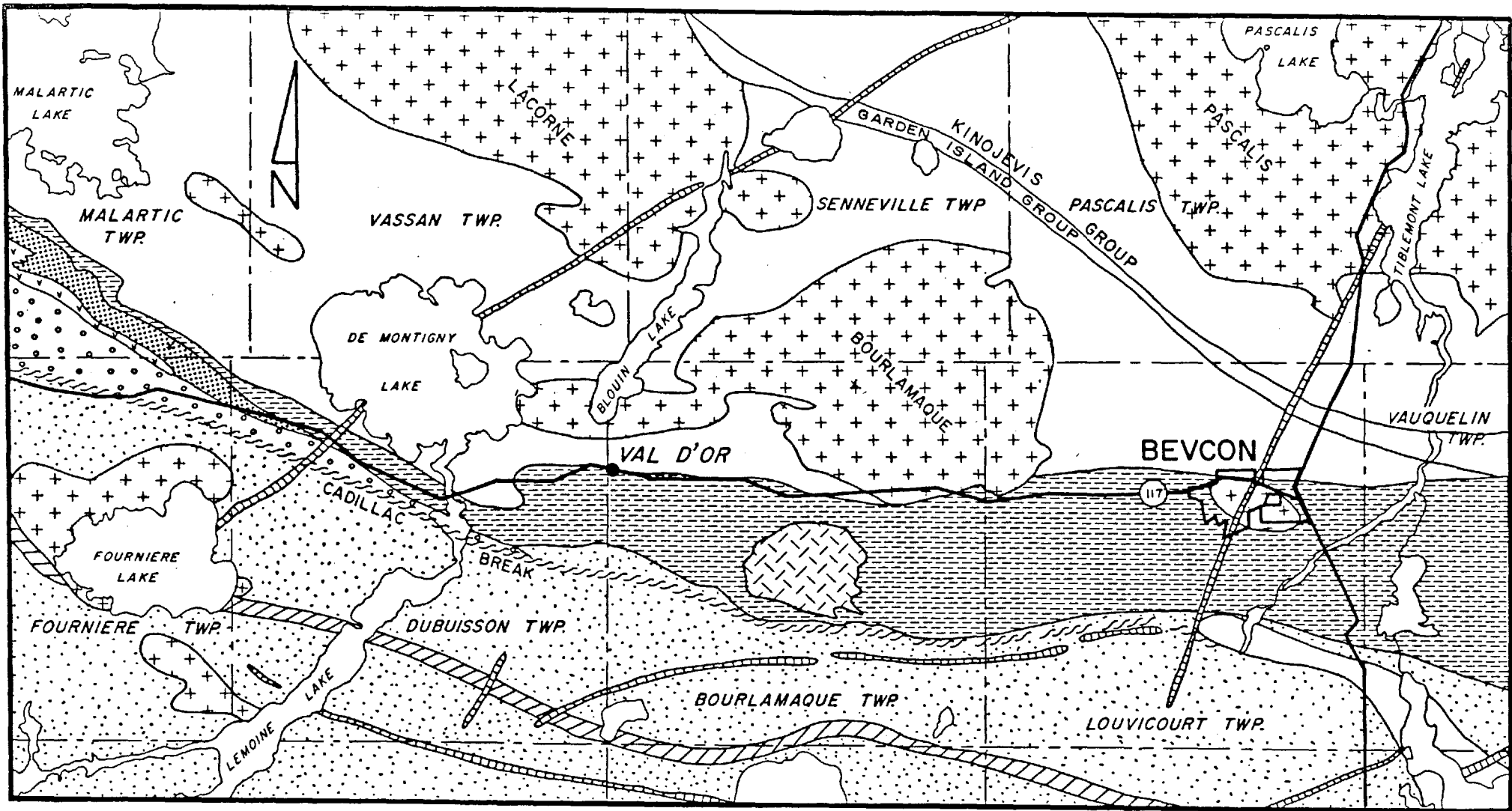
The Bevcon pluton is a tapered intrusion, 5 km E-W by 2.5 km N-S, that is somewhat similar in shape to the Bourlamaque batholith.

It lies in a subconformable attitude with the volcanics it intruded, except on the east, where it is clearly discordant, and is affected by widespread chloritic alteration and local shearing.




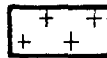



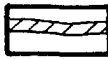


It is widely regarded as a syn-volcanic intrusion, possibly a satellite or apophysis of the Bourlamaque batholith.

The pluton consists of a grey, medium- to coarse-grained, altered quartz diorite to granodiorite containing 25% of blue quartz. The quartz diorite is generally massive but is cut by numerous discrete E-W shears, where sericite-chlorite schist may have developed.

The Bevcon quartz diorite hosts virtually all the gold mineralized veins stoped or defined in the Bevcon-Buffadison mine and in the Wyeth-Jowsey trenches area.



**LEGEND**

- |  |                                |   |                                 |   |                      |
|--|--------------------------------|---|---------------------------------|---|----------------------|
|  | DIABASE DYKE (PROTEROZOIC)     |  | CADILLAC GROUP                  |  | KEWAGAMA GROUP       |
|  | GRANITE BATHOLITH              |  | PONTIAC GROUP (SEDIMENTS)       |  | UPPER MALARTIC GROUP |
|  | DIORITE, CENTRE POST INTRUSION |  | PONTIAC GROUP (ULTRAMAFIC LAVA) |  | LOWER MALARTIC GROUP |
|  |                                |  | BLAKE RIVER GROUP               |   |                      |

0 5 10 15km  
SCALE = 1:250,000

Figure 2. GENERAL GEOLOGY, VAL D'OR AREA

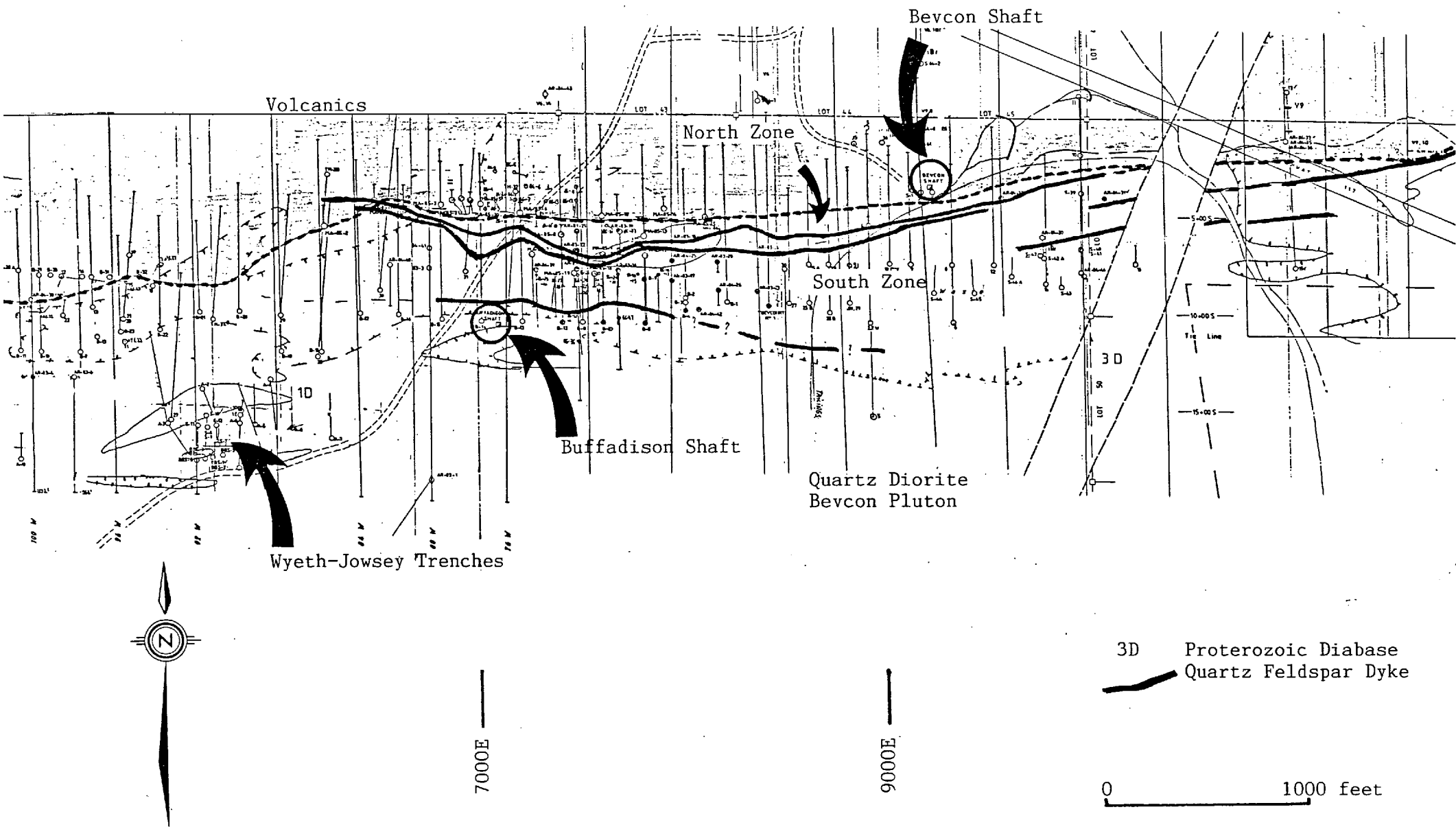


Figure 3. Bevcon-Buffadison Mine Area; General Geology



### 7.3 Pluton-Volcanics Contact

The north contact of the Bevcon pluton with the volcanic formations generally strikes 080° (075°-090°) in the Bevcon mine area and dips 65°N to the 1600 level, where it steepens to a vertical attitude. The contact forms an arcuate line in the Buffadison area, with a 060° strike on the west, where the quartz feldspar dykes enter the volcanics, that swings to 110° toward the east. The dip is well defined as 60 to 85°N to the -1,000-foot elevation.

Recent diamond drill data show that the two marked protuberances of the diorite into the volcanics shown on the regional maps, on the north and west of the Buffadison shaft, were an artifact of projecting single hole intersections to surface.

In detail, the contact forms a jagged line caused by offsets from NE and NW faults and by the E-W shears.

The presence of dykes of mafic composition, or of mafic dioritic phases, as well as mafic segregations, roof pendants, commonly found in marginal facies of granitoid intrusions, is indicated by the mine plans and core descriptions.

### 7.4 Quartz Feldspar Porphyry Dykes

A quartz feldspar porphyry dyke, about 5 feet wide, marks the south limit of the Bevcon-Buffadison north zone, and the north boundary of the south zone (Figure 4). This dyke has been traced over the whole Bevcon-Buffadison area and is cut by the Bevcon shaft at -600 feet. It is accompanied by a 35-foot dyke located approximately 5 to 50 feet to the south. They strike generally 080°, east of 8700E, and 090° to the west, with variations within 075° to 110° (Plan 1). Dips range from 65° north to vertical.

A narrow, subparallel mafic dyke truncates both felsic dykes.

A fairly wide halo of E-W shears as well as one strong shear is usually present at the north contact of the north dyke. This suggests that the

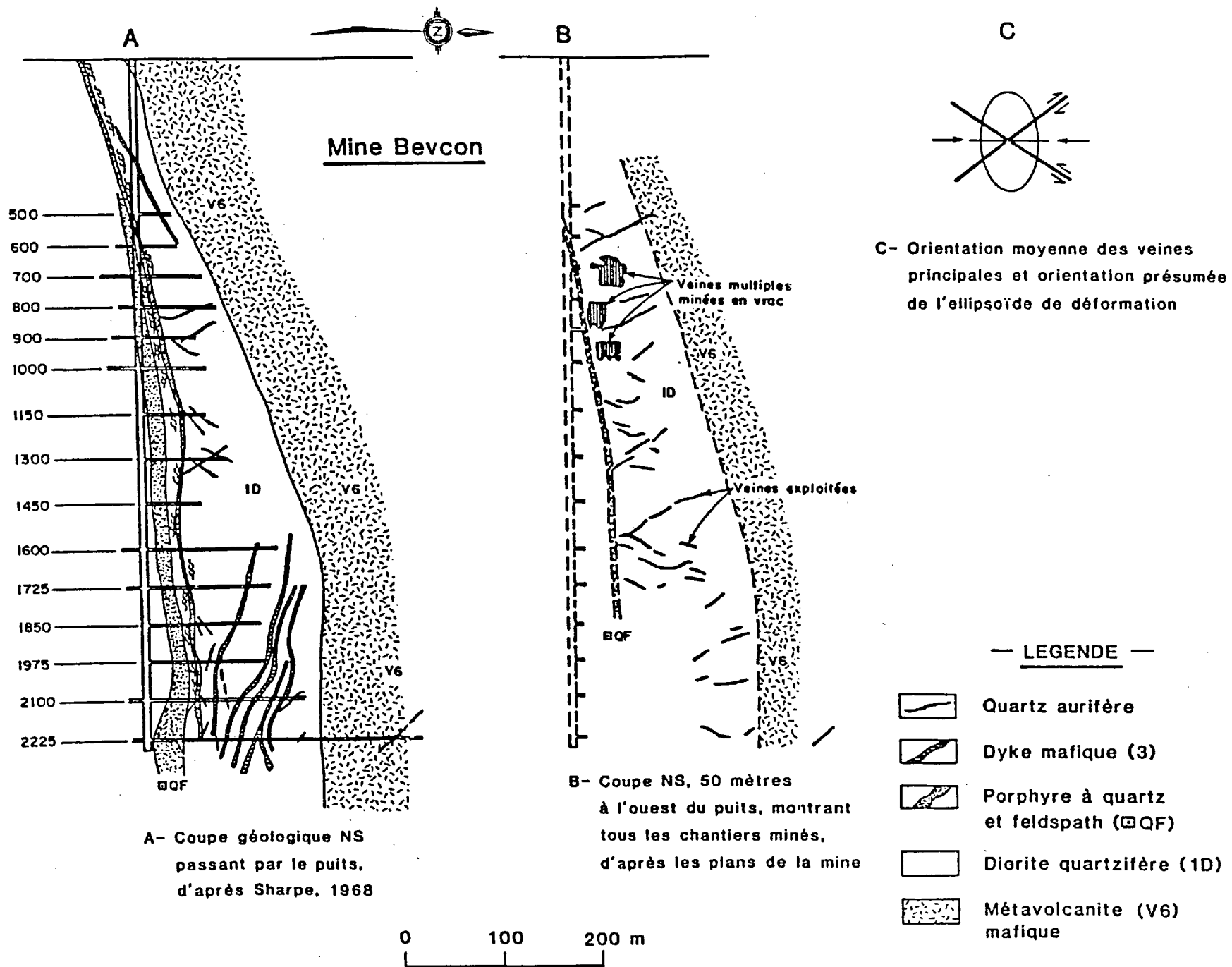


Figure 4. Bevcon Mine Cross-Sections (Sauvé, 1985)

dyke was intruded into one plane of a major E-W shear.

Later movements on the E-W shears and NE faults have affected the porphyry dykes.

The porphyry dykes consist of 15-35% of feldspar phenocrysts, about 1 cm long, and 10-15% of quartz phenocrysts set in an aphanitic, dark grey matrix. The porphyry is massive or developed as a sericitic schist in shear zones.

### 7.5 Mafic Dykes

The mafic dykes at the Bevcon-Buffadison Mine have been described as a fine-grained, massive to schistose, altered rock, that was originally of mafic, feldspathic composition. They are referred to as diabase dykes in the mine terminology.

Some workers have suggested that these dykes are more concentrated in the Bevcon than in the Buffadison area. It does not appear to be the case if one compares strictly the same (upper) portion of both mines.

Two systems can be distinguished on the basis of their attitude: an E-W and a NW system.

#### 7.5.1 E-W System

Most mafic dykes present at the mine belong in this system and are generally traceable over considerable distances.

This system can be subdivided into a north- and a south-dipping set suggesting a conjugate system of E-W shears.

##### a) North Set

A few dykes along 080-100/55°N-90° occur on the upper Bevcon Mine levels. A very continuous, narrow dyke that runs alongside the porphyry dykes can be placed in this category.

Most dykes of this north-dipping subgroup and their enclosed quartz veins have undergone variable degrees of boudinage.

## b) South Set

A swarm of mafic dykes, with individual units oriented along a 080-115/55°SW-90° range, form a corridor with a general 100/75°SW attitude that starts on the 1300 level and reaches a width of 200 feet on the 2100 level. This corridor roughly coincides with the area where the pluton-volcanics contact changes from a steep north dip to vertical (Figure 4). The dykes and vein material within them have undergone significant boudinage and local folding.

Isolated, generally narrow, units along 070-110/55-80°SW have been observed in the Bevcon and Buffadison areas. One of them cuts the "A" vein at Buffadison and, in turn, is offset by a later mineralizing event in the same vein.

### 7.5.2 NW System

This system includes a series of narrow, discontinuous, sheared dykes distributed throughout the mine. A subgroup oriented 135-160/40-85°NE and another one at 130-140/70°SW-90° form this NW system.

These dykes locally host minor gold mineralizations, yet, do not seem to affect the veins. They were emplaced in a few faults offsetting the pluton-volcanic contact.

A major 30-40 feet wide unit along 155-160/50-65°NE, located in the south zone at Buffadison, is offset by major vertical-apparent sinistral movements on both felsic dykes-shears bounding the zone. This is described in the E-W fault section of this report.

## 8.0 STRUCTURE

The main fault-shear systems at the Bevcon Mine form a predominant E-W set and a minor NE and NW set.

### 8.1 E-W System

A series of strong, wide shears striking 070° to 110°, arranged in an anastomosed pattern, with a general steep dip to the north, can be

observed throughout the mine (Plan 2). They are parallel to the regional schistosity and probably formed during an early regional diastrophism.

The full spectrum of vertical to horizontal dips has been measured on E-W shears in the mine. Yet, most shallow dipping shears are part of the conjugate system that hosts the auriferous quartz veins.

The subvertical E-W faults have caused apparent dextral movements of the pluton-volcanics contact, as evidenced by three 085-095/085°N-90° faults between 15110N and 15550N at the Bevcon Mine. Part of the dextral offset could be accounted for by late vertical offsets.

A distinct concentration of vertical shears in a wide band on the north of the porphyry dyke suggests that a major fault is the actual south boundary of the Bevcon gold-quartz veins. The dykes were probably emplaced into one or several interconnected discontinuity planes of this shear.

The quartz feldspar porphyry dykes have been affected by dextral movements on the E-W shear. This is visible in a 085/85°N fault near 15000N on the 500 Bevcon Mine level.

The steep E-W shears occasionally host minor gold mineralizations but they exercise a definite control on the mineralized veins. Indeed, many stopes are clearly located in the space between two shears (Plan 3). A major E-W shear constitutes the south boundary of the Bevcon main mineralized zone.

Late vertical movements on the E-W shears, with downthrown north blocks, have affected some mineralized veins.

Although these shears are major features traceable over considerable distances laterally, their vertical continuity is somewhat blurred (Plan 3). Paradoxically, it appears that later movements on the vein shears have partially obliterated their controlling steep, E-W shears.

Various mafic dykes were intruded into, and sometimes affected by the

steep E-W shears. A major N-NW/NE dipping dyke is offset by both shears-felsic dykes bounding the Buffadison south zone. The north zone block appears to have moved down by as much as 500 feet relative to the south block. The south block itself may have dropped 300 feet. This type of movement was observed at Bevcon by Kempthorne (1957). Local sinistral drag of the dyke indicate an oblique component to the vertical movement.

Both strike-slip and dip-slip movements along the E-W faults have been documented in this region (Sigma 2) and have been recorded on fault planes in an outcrop on the side of highway 117.

## 8.2 NE, NW, N-S Systems

NE and NW trending faults have variously affected the pluton-volcanics contact, the porphyry dykes or some mineralized veins.

### a) NE System

An inclined and a steep set can be recognized in this system.

Two faults of the former set, oriented 020-040/30-40°NW have offset the pluton-volcanics contact, but not the porphyry dykes, in a 20 to 80 feet sinistral movement (8950E, 9350E, Bevcon 700 level).

A steep fault trending 020-040/70-80°SE passes near 8500E on the Bevcon 800 level. It has caused a sinistral offset of 30 to 80 feet in the porphyry dyke but does not extend into the volcanics. It has created a marked sinistral drag on one mineralized vein but left another one unaffected. A short vein (010° strike) correlates with this fault on the 800 level.

It is interesting to note that the east contact of the Bevcon pluton seems to be governed by a NE feature. A NE fault seems to offset the east third of the intrusion (dextral) and yet another one on the west suggests vertical displacement.

A very long N-NE Proterozoic diabase dyke passes through the pluton center but its orientation may be unrelated to local features.

b) NW System

The northwest system is represented by faults along 150-170/75°NE-90°, with a 100-foot dextral displacement of the pluton-volcanics contact (7800E, on Bevcon 800 and 1725 levels).

c) N-S System

A system of weak shears along 173-190/75°E-80°W causing slight movements on older structures may represent reactivated dilation fractures related to the steep NE-NW fault system.

## 9.0 GENERAL SETTING OF THE MINERALIZATION

The Bevcon-Buffadison gold mineralizations are situated near the north contact of the Bevcon quartz diorite pluton with the volcanics of the Upper Malartic Group (Figure 3).

The great majority of the veins mined at Bevcon are hosted in a strip of the quartz diorite flanked by the pluton contact and a quartz feldspar porphyry dyke-shear on the south (Figures 4, 5). This was referred to as the north zone at Buffadison where a south zone limited by the same dyke and another shear-felsic dyke further south hosts a series of quartz veins similar to those of the north zone (Figure 3, Plan 2).

Although the volcanic rocks do not appear to constitute a favorable host to gold mineralization in the Bevcon Mine proximity, a very rich vein was mined well within the volcanics on the lowest two levels. Some mineralized veins cross the pluton contact and extend some distance into the volcanics (Figure 4).

The discovery of the Bevcon-Buffadison orebody resulted from the finding of shear-related gold mineralizations by Wyeth-Jowsey on the SW-W of the Buffadison Mine shaft location (Plan 1).

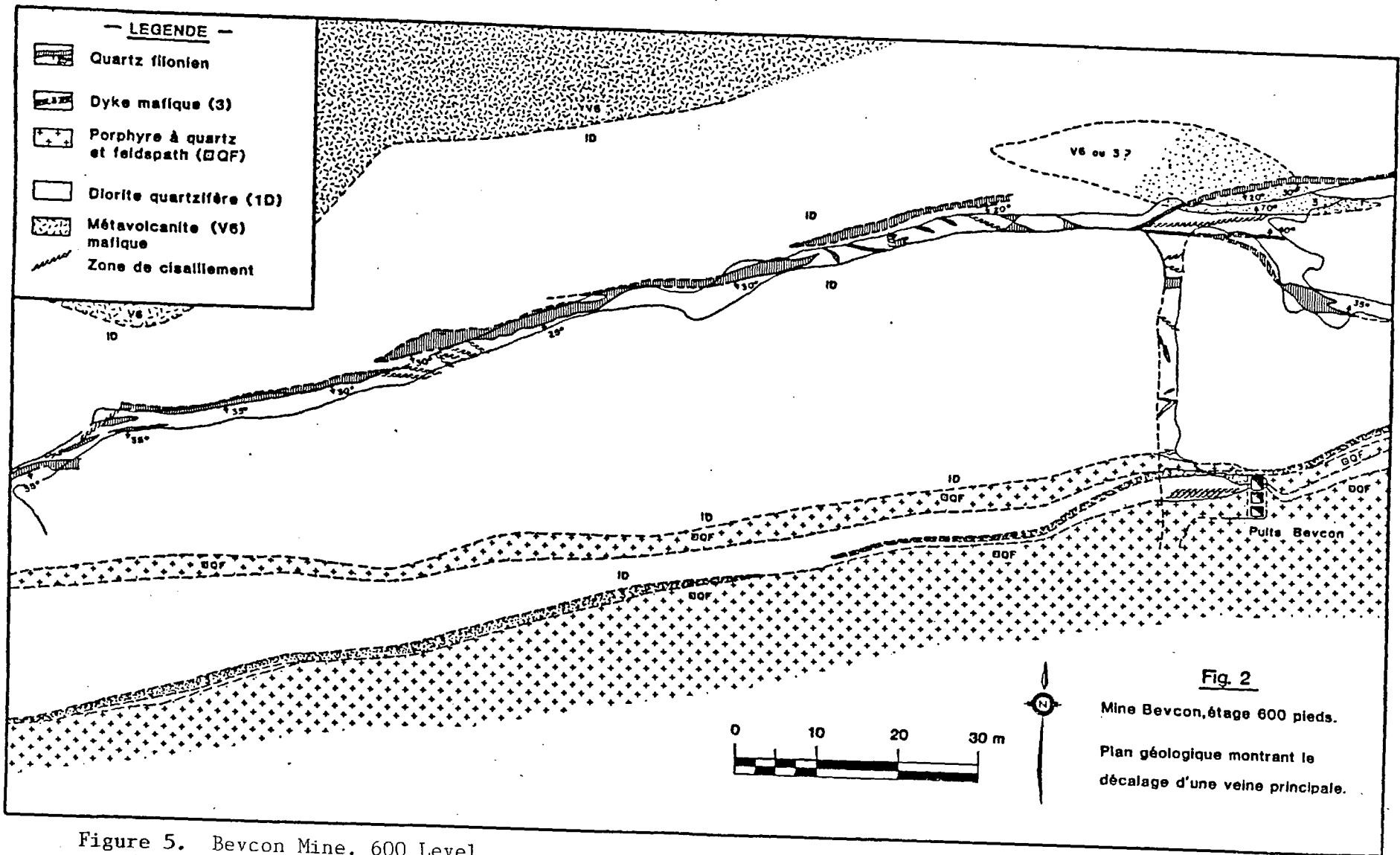


Figure 5. Bevcon Mine, 600 Level  
 Geology plan showing en echelon arrangement of a main mineralized vein (Sauvé, 1985)



## 10.0 DESCRIPTION, CONTROL OF THE GOLD MINERALIZATIONS

### 10.1 North Zone

#### 10.1.1 Occurrence

The north zone mineralization is hosted in a strip oriented 080° in the Bevcon Mine area and 090° in the Buffadison area, with the inflexion point projected to around 8750E on surface. A very large proportion of ore mined from this zone comes from the Bevcon area.

The auriferous mineralization consists of a conjugate set of E-W trending veins, with dips of 30-40° to the north and south, and associated subhorizontal veins. The envelope of the Bevcon veins appears, on some mine levels, to rest at a low angle to the 080° favourable band formed by its more easterly direction and its steep dip to the north.

The mineralization essentially stops at the north Bevcon pluton contact. A 5 feet wide quartz feldspar porphyry dyke intruded into a major E-W, steeply north-dipping shear constitutes the south boundary of the north zone. The veins generally pinch out as they approach the dyke or are sometimes smeared along it when they are truncated.

The different dips of the generally steep dyke and the pluton-volcanics contact cause a widening of the productive zone from 150 feet, on the 500 level, to 400 feet at the 1600 elevation and below, where the pluton contact steepens to vertical from 70°N (Figure 4).

#### 10.1.2 Control of Mineralization

No economic mineralization has been found at Bevcon or Buffadison above the -500-foot elevation, where the favourable horizon is generally narrower than 120 feet.

The east limit of the Bevcon mineralization is along a near vertical line around section 9600E. This corresponds to a narrowing of the productive zone caused by the convergence of the pluton contact and the prophyry dyke. Furthermore, an E-W/60-70°N mafic dyke cuts across the

whole productive zone on the 500 to 800 levels and creates wedges devoid of economic mineralization in their narrow portion.

A straight line running from 9000E on the 500L to 8000E on the 1300 level (Plan 4), delineates the west end of most Bevcon mineralizations. This coincides with the trace of the inflexion point of the 080° (Bevcon) to 090° (Buffadison) trend of the productive horizon. West of this line, the Buffadison south dipping veins clearly predominate.

The Buffadison north zone stops on the west along a line plunging 55° west, from 6500E on surface. This represents the contact of the quartz porphyry dyke with the volcanic formations.

Six vertical diamond drill holes collared on Bevcon lowest levels confirm the continuity of a similar mineralized system to a depth of 3,200 feet.

### 10.1.3 Spatial Vein Distribution

The Bevcon orebody is probably a vertical shoot, although its attitude is obscured by the presence of domains of various vein sets governed by the geometry of the favorable horizon. As we have just mentioned, the structures controlling the limits of the orebody are subvertical and subhorizontal.

The following zonation can be observed from the top to the bottom of the orebody:

- no economic mineralization was found in the narrow portion of the productive horizon, above the 500 level.
- stringer ore zones (stockwork) lie on the upper mine levels (700-1000), at the centre of the Bevcon orebody.
- north and south dipping veins occur between 8500E and 9400E, on the 1000 to 1600 level.
- a zone with predominant subhorizontal veins is observed on the lower mine levels.

The core of north and south dipping veins and stockwork mineralization spatially correlate with the area of the mine where the productive zone widens with depth (Figure 4, Plan 4). Concentrations of either north, or south, or horizontal veins occur at the periphery of the core of stringer and north with associated south veins.

Subhorizontal veins seem to be the dominant type represented in an area below the 1300 level where the swarm of E-W mafic dykes were emplaced (Figure 4; Plan 4). Another increase in the proportion of subhorizontal veins occurs along the trace of the inflexion point of the 080-090° favourable north zone horizon (Plan 4).

On the west, at Buffadison, south dipping veins predominate.

#### 10.1.4 Veins Geometry

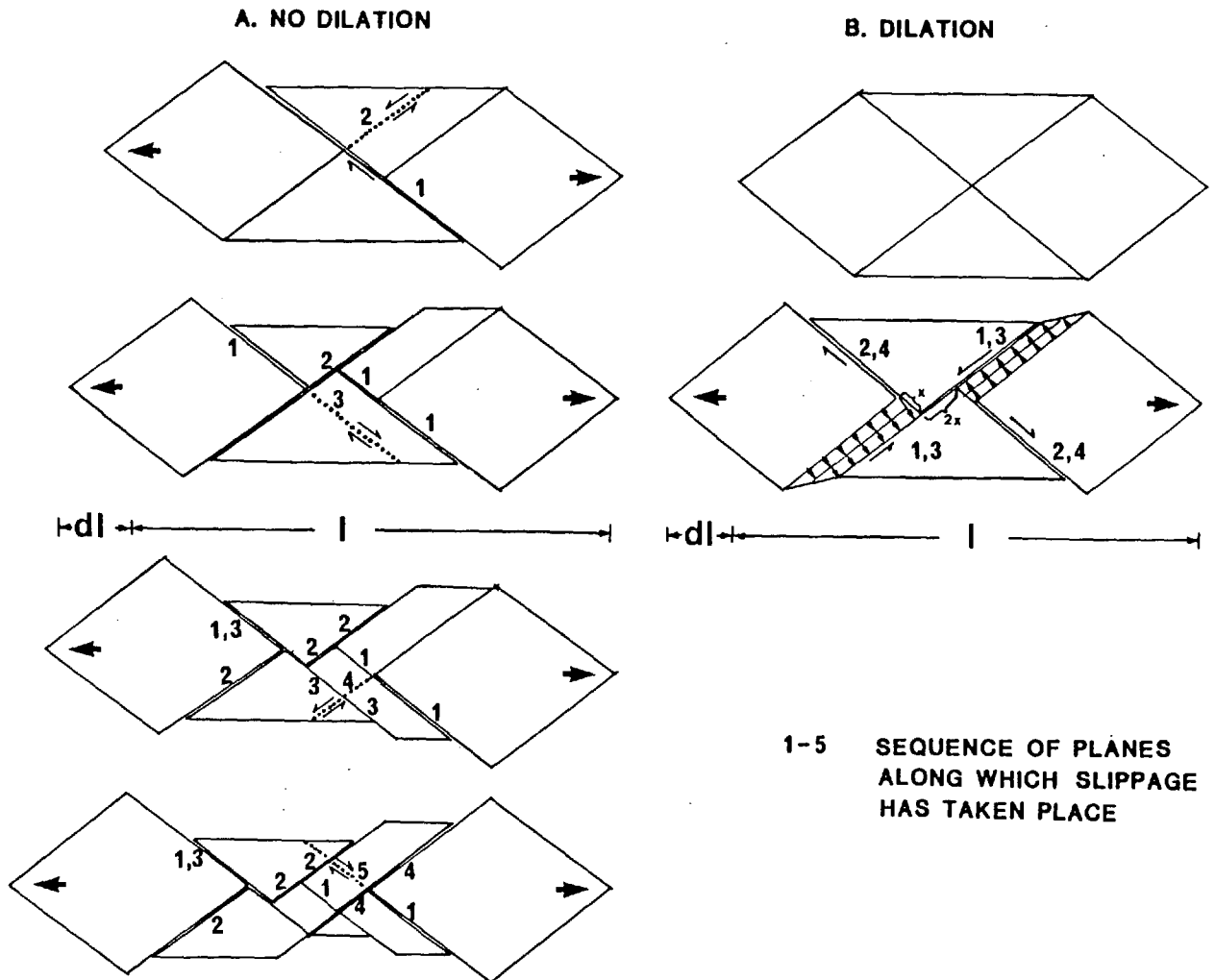
The Bevcon mineralized veins can be subdivided into a subhorizontal set and a conjugate system of 065-100/30-35°N and 070-095/30-40°S veins occurring at irregular vertical intervals. The bisector of the conjugate system appears to be tilted by 10° to the south, with a possible horizontal attitude above the 1150 level.

A separate category is made up of a complex network of closely spaced veins of all systems accompanied by various secondary veins. This stockwork was referred to as "stringer zone ore" or "zone ore" in the mine terminology.

The veins occur between the parallel but steeply north dipping shears and generally peter out as they approach them. Minor gold mineralization is commonly found in the steep shears.

The vein of a given dip frequently pinch as they reach an imaginary line extended from the nearest vein of conjugate dip. Conflicting cross-cutting relationships between the sets of inclined veins exist. This pattern can be explained by recurrent movements on sets of intersecting shears as illustrated in Figure 6.

The veins have also been offset by minor, late, normal movements along



Two ways in which bulk, inhomogeneous shortening can be achieved by successive, alternating increments of movement on sets of intersecting shears. Note that method B can lead to the development of a crack-seal ribbon vein in which each ribbon is slickensided before being incorporated into the vein, as is commonly the case in such veins (McKinstry and Ohle, 1949). With method B, all of the movement occurs on the same two shears, with movement on one of the shears consisting only of simple shear, and on the other shear, of alternating increments of simple shear parallel to, and dilation sub-normal to, the shear fracture. Method A requires that after each increment of movement on one of the shears, a new shear fracture must be propagated through one of the blocks before movement can occur on the other shear. As a result, the body being strained by this process becomes progressively disaggregated into increasingly smaller, diamond-shaped, unstrained domains separated by increasingly closer-spaced high strain domains, as the deformation proceeds.

Figure 6. In: Mineralization and Shear Zones, GAC  
Short Course Notes, Vol. 6, 1989; p.85

subvertical shears (downthrown north blocks).

The north dipping veins are generally short along strike and are commonly stacked in vertically extensive zones, sometimes as ladder steps between south dipping veins.

A variety of secondary veins have been reported as a common association with this set.

The south dipping veins are commonly very persistent strikewise and are generally arranged as an en echelon pattern (Figure 5). These veins, referred to as "ladder veins" at the Bevcon Mine, were by far the richer and the ones with the more evenly distributed and consistent gold grades; they had characteristic tourmaline at right angle to the vein contact (N. McIsaac, pers. comm.). They are the dominant type at Buffadison although with lower gold grades.

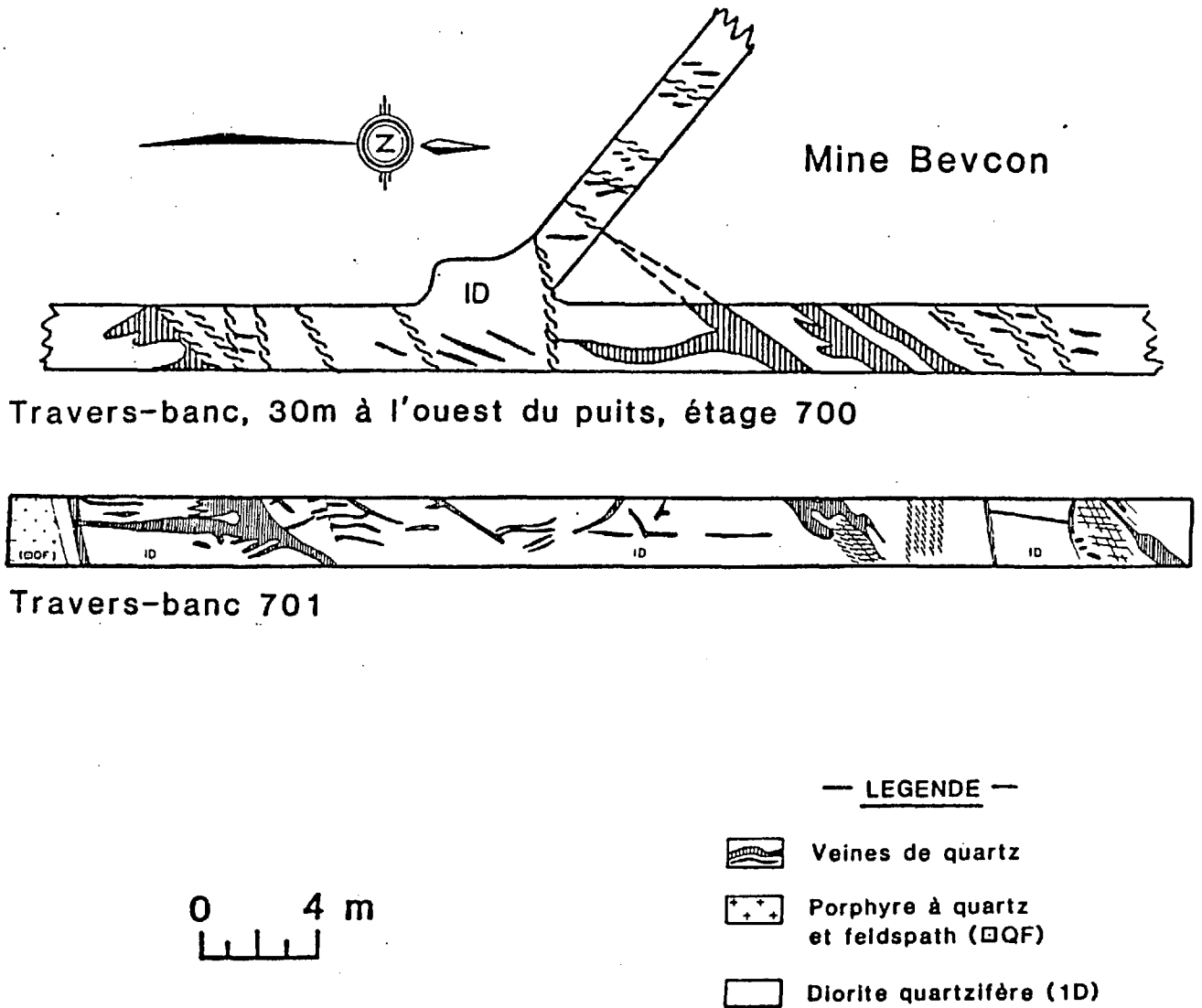
At a small scale, the veins are rather irregular and display a wide array of abrupt dip changes, incipient asymmetric folds, en echelon arrangement (south set), boudinage and a variety of secondary veins (Figure 7).

## 10.2 South Zone

The South Zone, as described in the Buffadison Mine area, lies in a 200 to 400 feet band situated between the shear-porphyry dyke that is the south limit of the north zone and a major sericitic shear along 085-110/80°N-90° intruded by a felsic dyke.

The existing data indicate that all the veins in this zone dip to the north, like the Lower 22 vein exposed over 330 feet along the dip (7300E). The veins of this zone dip 30 to 52° north and strike generally E-W, although individual units are within the 055° to 135° range.

The South Zone area has not been investigated in the Bevcon Mine but its presence in a wider, ill-defined strip is suggested by several 1945 and 1984 surface diamond drill holes (Plan 1).



Murs ouest de deux travers-bancs montrant la complexité des veines et la présence des veines horizontales.

Figure 7. West wall of two cross-cuts on the Bevcon 700 Level showing complex veins distribution. Note horizontal veins (Sauvé, 1985)

### 10.3 Mineralization in the volcanics

Several veins extend from their quartz diorite host into the volcanic formations, particularly on the 600 and 700 levels.

A few south-dipping, en echelon veins were delineated on the 2100 and 2225 Bevcon Mine levels over 145 feet along the dip and 250 feet along strike, 250 to 400 feet north of the pluton contact and south of a major E-W shear, probably the "Northern Shear". These narrow veins were the richest ever mined at Bevcon with 10,793 tons at a grade of 0.272 oz Au/ton.

Existing, unevenly spaced diamond drill holes have never intersected another economic vein in the volcanic formations near the Bevcon-Buffadison Mine area.

### 11.0 VEINS MINERALOGY; ALTERATION

All the vein material has been described as an assemblage of milky and vitreous quartz, ankerite, tourmaline and fine- to coarse-grained pyrite cubes, occasionally occurring as blebs up to 1.5 feet across. Frequent specks of visible gold have been reported with minor chlorite, sericite, chalcopyrite, telluride, scheelite and sphalerite.

Our examination of the Buffadison mine dump showed vein material characteristic of shear or tension openings filling: ribbon quartz with parallel tourmaline needles or vuggy, comb quartz and tourmaline.

It appears that the veins at Buffadison are made up of a more milky variety of quartz, with generally less tourmaline and lower gold values (N. McIsaac, pers. comm.).

Quartz mineralization has caused a selvage of bleaching and tourmaline, sericite, ankerite and pyrite enrichment of the quartz diorite host. Low gold values, with a maximum average of 0.03 oz Au/ton accompany the alteration (N. McIsaac, pers. comm.). Sheared, altered horizons of the Bevcon diorite commonly host some gold mineralization, whereas the unaltered quartz diorite has only traces values of gold.

## 12.0 PRODUCTION

The Bevcon Mine produced ore from a very large number of working places, some of which were active for years. Low productivity was obtained from shallowly dipping stopes, commonly as little as 3.5 to 4.0 feet high.

Mining activities took place between the -500 and -2225 feet below surface and essentially between 7800E and 9700E, with some ore extracted to 10 000E and 7100E. The mine workings extend from 6000E to 10 000E, with the Buffadison shaft at 7100E, the Bevcon shaft at 9240E and the former common property boundary near 8200E.

The Bevcon Mine levels were cut every 100 feet from -500 to -1000 feet, every 150 feet to -1600 feet and every 125 feet to the -2225 elevation. The Buffadison levels are at 357 (2<sup>nd</sup>), 658 (4<sup>th</sup>), 805 (5<sup>th</sup>) and 950 (6<sup>th</sup>) feet below surface. The two mines are connected on the 800 level (1.5 feet step in the drift).

The mine records indicate total production figures, from 1947 to 1965, as follows:

Bevcon Mine	3,244,472 tons	at 0.135 o.p.t. Au
Buffadison Mine	220,301 tons	at 0.124 o.p.t. Au
<u>Lencourt Area</u>	<u>103,270 tons</u>	<u>at 0.122 o.p.t. Au</u>
<b>TOTAL:</b>	<b>3,568,043 tons</b>	<b>at 0.134 o.p.t. Au</b>

The grades mentioned in this table are the mined grades. The total recovered gold amounted to an average of 0.117 oz Au/ton.



The mine production can be broken down into the following figures (Table 2):

Table 2: Details of Bevcon Production	
Bevcon vein in volcanics:	10,793 tons at 0.272 oz Au/ton
Bevcon development ore:	9% of total, at 0.115 oz Au/ton
Bevcon "Zone Ore":	8.8% of total mined
<u>Level</u>	<u>Production</u>
800	94,557 t/0.102 oz Au/ton
900	69,305 t/0.130 oz Au/ton
1000	88,116 t/0.124 oz Au/ton
1150	62,937 t/0.100 oz Au/ton
TOTAL:	314,915 t/0.114 oz Au/ton

The total, per level production tabulated in Table 4, is expressed in tons per vertical foot to allow for the different spacings between the levels. It excludes 51,973 tons at 0.116 oz Au/ton mined from unspecified locations at Buffadison and Lencourt in 1965:

Table 3. Bevcon Mine Production, per level		
Level	Total Tons/Vert.ft	Average Mine Grade
500	107	0.106
600	907	0.210
700	1,409	0.127
800	2,104	0.118
900	3,669	0.142
1000	2,785	0.142
1150	2,952	0.141
1300	2,818	0.128
1450	2,042	0.129
1600	1,767	0.130
1725	2,646	0.125
1850	1,837	0.114
1975	1,218	0.134
2100	1,421	0.131
2225	712	0.157
Mine Average	1,955	0.134

This table shows that 43% of the total tonnage produced comes from the 800 to 1300 feet elevations, that is, a relatively modest volume, outside of the wider portion of the productive horizon. No obvious vertical variation of the grade is present. The variations of the grade with time stayed within 0.112 and 0.141 oz Au/ton and showed no definite trend during the years of commercial production. It is interesting to note that 120,952 tons sent to the Perron mill, between 1947 and 1952, had a recovered grade of 0.214 oz Au/ton, but dropped immediately after the mine went on commercial production, in July, 1952.

### 13.0 ORE RESERVES

#### 13.1 Bevcon Mine

The in situ reserves were calculated shortly before the mine shut down, in 1965, at 99,800 tons grading 0.13 oz Au/ton. This was the tonnage accessible with little development and consisted mostly of pillars recovery, backslashing and completion of partially developed stopes, in 50 different working places. N. McIsaac recalculated the "possible, drill-indicated" reserves in 1968 as 568,106 tons grading 0.111 oz Au/ton above the 2225 level, and 166,573 tons at 0.126 oz Au/ton below that level. These are undiluted tons arrived at by cutting the high assays to 0.15 opt above the 2225 level and by using uncut values below. Most of the tonnage above the 2225 level was considered as narrow vein ore that could be developed with 20,700 feet of underground diamond drilling and 15,000 feet of drifting and raising.

N. McIsaac's figures show that 80% of the estimated tonnage lies between the 1000 and 2225 levels or 50% between the -1000 and -1600 elevations. The total reserves would be contained in probably more than a hundred stopes.

We agree that the reserves blocks are reasonably sized and documented and reflect the long experience of the geologist in this mine. However, a significant portion of the remaining ore lies between, extends from, or intersects, existing stopes. Practically, this would eliminate some tonnage from the mineable ore category. As regards the reserves grade,

the practice of cutting the high assays to a maximum of 0.15 opt is totally biased toward reconciling the reserves grade with the historical mill feed. Any new reserves calculations should use a factor calculated by statistical methods that would certainly overcome the pronounced, but not extreme, gold nugget effect in the Bevcon mineralizations. To some extent, this erratic gold distribution may be an artifact of blending different populations of assays from the richer south dipping veins and the other sets. Examination of the chip samples records in various stopes lends support to this view.

Isolating a higher grade portion of the total calculated tonnage can be achieved by selecting richer mineralization or by improving the mining practices. The former may be accomplished by mining only the south dipping veins, that made up about 30% of the total tonnage delivered to the mill (N. McIsaac, pers. comm.). Discriminating the south veins, using the relatively scant existing diamond drill data may be rather difficult. Insufficient information on possible correlations of high-grade zones with the association of specific geological features prevents us to point to loci of higher grade ore. The survey plans clearly indicate that most stopes were very narrow by any standard. The proportion of more diluted development ore produced during stope preparation, the internal dilution caused by the complex vein geometry are all areas where little can be done to alleviate the dilution problem.

Strict grade control based on intense underground drilling appears to be the main possible improvement. It is our view that only a small portion of the total reserves may be economically extracted, conceivably 120,000 tons at 0.2 oz Au/ton. About 100,000 tons in the Bevcon reserves calculations fall in the category of better than 0.13 oz Au/ton.

The alternative of mining large blocks of lower tonnage is limited outside of the stringer zones by the high distance between the veins and the barren intervening quartz diorite. Mine workings driven near a few remaining unmined blocks or pillars of stockwork ore do not suggest that their grade is much higher than the historical 0.114 opt average for the "Zone Ore".

The reserves calculated below the 2225 level are based on six diamond drill holes that indicate no significant change in the characteristics of the mineralized veins.

### 13.2 Buffadison Mine

The mineable ore reserves of all categories were calculated by Groupe-Conseil Geologica in 1985 for the Buffadison Mine. They stand at 584,853 tons grading 0.12 oz Au/ton, using 0.01 opt material to dilute the veins to a minimum mining width of 5 feet, and cutting the high assays to 1.0 opt. These were revised to 384,914 tons at 0.137 oz Au/ton by A.S. Bayne and Co. in 1987 (high assays cut to 1.0 oz). The same tonnage at a revised grade of 0.31 oz Au/ton was obtained by Mid-Canada Gold and Copper Ltd. in 1988. The high values were not cut, on the rationale that they represented only 14% of all the ore grade assays. We question that view as these uncut values account for 55.8% of all the gold in the reserves. We suggest the sound approach is to statistically calculate the cutting factor rather than indiscriminately cutting the high values to 1 ounce per ton, or arbitrarily not cutting them.

The results from the 1986 surface drilling program have never been used to update the reserves calculations.

The calculated reserves should be further qualified by the following considerations:

- all the veins in the north zone are shown as south dipping veins, while close examination of the drill core logs and some sections clearly indicates the presence of other sets with the predominant south system. This may significantly affect the mineable, if not the reserves, tonnage.
- The mine records show that 114,076 tons grading 0.132 oz Au/ton were mined in the Buffadison stopes. This compares with the Bevcon average stope grade of 0.137 oz Au/ton (2,955,453 tons) but certainly not with its south vein average. Also, this does not agree with the reserves grade of 0.31 oz Au/ton.

- Some bias may have been introduced by cutting the high assays values, after unduly extending the zone of influence of very narrow, high grade veins to a predetermined minimum sample length.

### 13.3 Conclusions

It is our perception that remaining economic stockwork mineralization or high-grade vein ore are limited in the Bevcon-Buffadison mine area. It seems clear that wider veins or additional stringer ore has to be delineated before considering underground exploration or production.

### 14.0 WYETH-JOWSEY TRENCHES AREA

The discovery of gold mineralization in outcrops located 1,400 feet SW-W of the Buffadison Mine shaft led to the discovery of the Buffadison and the Bevcon orebodies (Plan 1).

#### 14.1 Work Completed

- 1931           Discovery; 5 trenches and one pit.
- 1932           Dome Mines Ltd. drilled 3,000 feet in 10 holes, over a maximum strike length of 1,400 feet (7 drilled northward, 3 southward, at -30° to -49°) and excavated 4,776 feet of trenches as well as a 6 x 6 feet pit, 16 feet deep.
- 1936           Surface hole 1E was drilled northward to 153 feet and #10 to 903 feet. No results are available.
- 1963           12 holes drilled by Bevcon Mines Ltd. (7 to the north, rest to the south, at -40° to -80°) for a total of 2,541 feet, between sections 5582E and 5720E.
- 1983           Abitibi Resources Ltd. drilled two -50°, south holes, for a total of 2,065 feet at about 700 and 900 feet west of the main pit, to test a VLF anomaly unrelated to the Wyeth-Jowsey showing.

## 14.2 Results

We have been unable to plot with certainty the unsurveyed 1932 diamond drill holes and trenches relative to the surveyed 1963 drill holes collars. It appears that they have all been drilled around the same E-W shear zone but some older maps suggest otherwise or show wide discrepancies.

The 1932 existing data indicate a major shear, up to 50 feet in width, trending 100° and dipping steeply to the north, located 50 feet south of the exposed mineralizations.

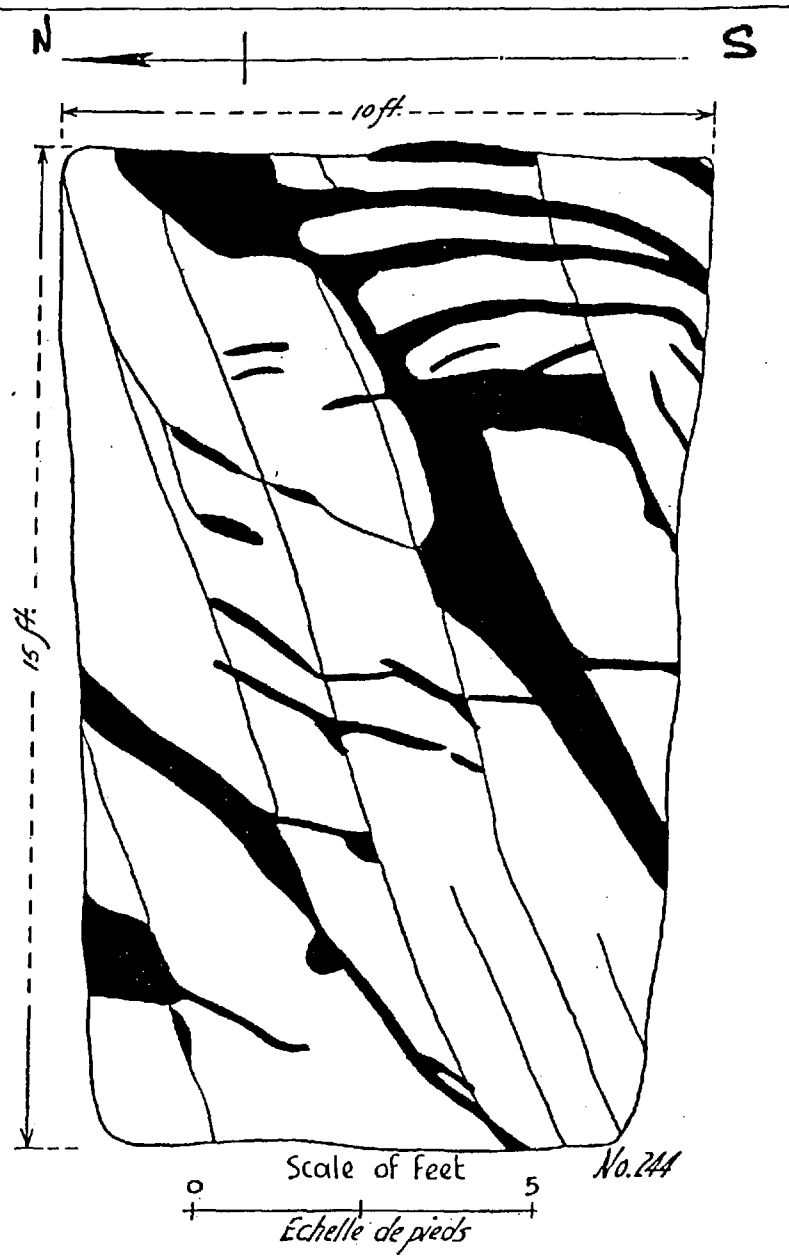
The veins have been described in a pit (Figure 8) as a main system of E-W quartz-filled fractures dipping 60° to the south and showing evidence of movement and brecciated wallrock fragments. It is associated with subhorizontal, north and south inclined veins. This is in contrast with the Bevcon setting where the steep fractures set is marginally mineralized. It was found that the veins hardly extended underneath the pit and probably petered out as they approach the shear. The best values obtained in the discovery trenches were reported at an average of 0.87 oz Au/ton across 28.5 feet, in the zone north of the shear. The mineralized veins intersected by the ten 1932 drill holes yielded no significant gold values.

The results from the 1963 diamond drill holes can be separately summarized as follows:

### a) Shear Zone

A major shear zone, about 20 feet wide, striking 100° and dipping steeply to the north, was intersected in drill holes BB-S-1 to BB-S-6. This zone contains narrow mineralized quartz veins with significant values in BB-S-2: 0.12 oz Au/ton over 2.0 feet and in BB-S-3: 0.14 oz Au/ton over 1.0 foot. A two by two feet quartz lens grading 1.2 oz Au/ton was reported in a trench.

It is unclear whether this shear zone is the same that was observed on the south of the surface trenches, or a parallel one.



Section N. and S. showing vein matter in test pit, Wyeth-Jowsey property.

LEGEND:—Heavy black, quartz; Lines, fractures;  
Country rock is granodiorite.

Figure 8. In: McCrea, 1932

## b) Zone north of the shear

An illustration of our interpretation is given in section 5640E, plan 5. It appears that a group of low-grade veins in hole BB-S-3 and two parallel veins with significant gold values in BB-S-8 and 9 line up along a 60° southerly dip. This corresponds to the main vein system described in the surface pit, is consistent with the angles at which the veins were intersected and represents the easiest way to correlate these veins. However, it is also possible to visualize a subhorizontal vein system in the same set of data.

The best veins intersected by the 1963 diamond drill holes are as follows:

Section	Hole Number	o.p.t. Au/Core Length
5595E	BB-S-11	0.57 / 2.0'
		0.18 / 0.6'
		0.14 / 1.0'
5634E	BB-S-10	5.32 / 1.0'
5640E	BB-S-8	0.23 / 6.0'
		0.38 / 5.6'
5668E	BB-S-2	0.31 / 1.0'
		0.63 / 0.3'
5689E	BB-S-12	0.13 / 2.2'
		0.32 / 0.3'
5720E	BB-S-5	0.17 / 2.5'

Despite encouraging results from the shallow diamond drill holes completed in 1963, "drilling was suspended in part due to the proximity of the R. Joseph's claim boundary" (Honsberger, 1972).

Diamond drill hole A10, collared 950 feet west of the main pit, intersected only slightly mineralized granodiorite and quartz stringers with tourmaline, chlorite, carbonate and marginal gold values in the 217.0 to 256.0 interval. However, this zone was described as "the nearest approach to being anything like to original showing" in the original report (McCrea, 1932). Although the collar location is



uncertain, it appears that most of this hole was in the extension of the same zone.

Diamond drill hole 83-4, located 900 feet west of the original pit, intersected three closely spaced groups of veins that may be interpreted as the same zone, with the best values at 0.16 oz Au/ton over 2.0 feet and 0.14 oz Au/ton over 1.0 foot, the latter associated with chalcopyrite. Three groups of low-grade quartz veins were also intersected in hole 83-6, 700 feet west of the original pit.

### 14.3 Interpretation

It is our perception that the association of scattered but high gold values with some features described in the various available records may indicate the presence of significant mineralizations in the Wyeth-Jowsey trenches area.

14.3.1 A situation reminiscent of the Belmoral geological-structural setting can be seen here in:

- the presence of a major E-W shear hosting gold-quartz veins and lenses, as well as altered, mafic dykes and fragments;
- the higher distance from the pluton margin (850 feet) than is the case for Bevcon-Buffadison.

14.3.2 The following features strike us as an association more comparable to the Sigma than the Bevcon type of mineralization:

- steeply-dipping quartz-filled, sheared fractures with associated subhorizontal and inclined veins. Minor chalcopyrite observed.
- spatial association of shear and veins of subparallel strike.
- presence of general schistosity, common mauve-pink alteration of the host quartz diorite.
- presence of mafic dykes, schist in the host rocks.

However pertinent, the work carried out in this area was essentially

restricted to a narrow block, over 850 feet of strike length and to a maximum depth of 270 vertical feet. The difficulty encountered by the former workers in correlating the various quartz veins and perceiving a continuity of the gold values may be accounted for by the fact that the diamond drill program seems to have been guided by the assumption that the gold mineralizations were hosted in shallowly dipping veins similar to the Bevcon system.

In our opinion, this area certainly calls for additional exploration work.

#### 15.0 GROUND GEOPHYSICAL SURVEY

A ground survey conducted in 1980 shows relatively concordant trends in the magnetic and EM-VLF responses.

A few VLF anomalies oriented  $110^\circ$  pas on the south of the Wyeth-Jowsey trenches and one is south of the Bevcon mine shaft. Between them are several discontinuous  $080^\circ$  trending anomalies. The magnetic response is generally subdued, with a distinct  $110^\circ$  grain, on the south of the Wyeth-Jowsey trenches, truncated along the  $080^\circ$  pluton contact on the northwest. The Bevcon-Buffadison mine area is located in a relatively weak magnetic depression with no distinct signature directly associated with the productive zones. The Wyeth-Jowsey trenches are located near the narrow end of converging magnetic and VLF trends (Plan 1) that may represent major lineaments.

#### 16.0 STRUCTURAL INTERPRETATION OF THE BEVCON-BUFFADISON MINE

Although we do not have the benefit of direct observation of movements and characteristics of the various features, it is reasonable to assume that the three sets of auriferous veins mined at Bevcon form a true conjugate system. Yet, some of the veins must have formed independently as relief or tension openings, in response to thrust or differential movements between the pluton contacts and the quartz diorite dyke.

Despite this uncertainty, it seems that the Bevcon-Buffadison mine area has undergone sequential fracturing very similar to that described in

the Sigma-2 area (C. Giguère; CIM Bulletin, Sept. 1990). The main differences are that the subhorizontal extension veins host the Sigma-2 gold mineralization and all the comparable features are oriented along about 10° clockwise, relative to the Bevcon area.

The attitude of all the main features described in the Bevcon mine are summarized in Table 4.

Early, E-W, ductile shearing, with dextral movements is indicated at Bevcon (Table 5), probably in response to regional NW-SE compression. This was followed by a long phase of N-S, horizontal compression and release that first formed the E-W inclined conjugate set in a brittle-ductile regime. Mafic dykes were later injected into this fault system. Continuing compression in a brittle medium (acute dihedral angle), with evidence of vertical extension, formed the three subhorizontal mineralized veins. Alternating compression and release are suggested by the ribbon texture of the veins, ambiguous cross-cutting relationships among the different sets of veins, between the veins and mafic dykes, variable degree of boudinage of the veins in the mafic dykes, different ages of dykes emplacement.

The NE and NW, inclined, conjugate faults that host mafic dykes and weak mineralization, may result from a transition from vertical extension (vein system) to lateral extension (NE, NW, N-S subvertical faults) in a brittle medium, in a N-S compressive field. Apparently, this fault system was not observed at Sigma 2, although the exchange of the intermediate and minor stress axes was documented. The same N-S compression would have formed the NE, NW subvertical conjugate faults as a brittle response, with lateral extension. The N-S faults may be original extension fractures formed at the same time. A late event of extension along the N-S axis has caused the normal, downthrown north blocks movements on the E-W shears that have affected the veins and a NW mafic dyke.

The reason for the better mineralizations found in the Bevcon mine, as compared to Buffadison, remains undetermined. However, we see a direct relationship between the two types of mineralization and the trend of

Table 4. Attitude of the Bevcon-Buffadison Veins and Associated Features

VEINS			BEVCON PLUTON - VOLCANICS CONTACT	DYKES Mafic	Quartz-feldspar porphyry
North dipping	South dipping	Subhorizontal			
<u>Bevcon N Zone</u> 065-100/30-35°	<u>Bevcon N Zone</u> 070-095/30-40°	045-120/10°S- 15°N	<u>Bevcon Area</u> average: 080° Range: 075-090/65°N-90°	<u>E-W System</u> -N Set: 080-100/55-90°	<u>Bevcon Area</u> Average: 080° Range: 075-095/70°N-90°
<u>Buffadison S Zone</u> Lower 22 vein: 085-100/35° Others: 055-135/30-52°	<u>Buffadison N Zone</u> 075-085/20-40° (60°)		<u>Buffadison Area</u> Average: 090° Range: 060-110/60-85°N	-S Set: 070-115/55-90°	<u>Buffadison Area</u> Average: 090° Range: 075-110/65-80°N
	<u>Bevcon Volcanics</u> 065-095/35-60°			<u>NW System</u> -NE Set: (120) 135-160/41-90°	South Boundary of <u>Buffadison South Zone</u> 085-110/80°N-90°
				-SW Set: 130-140/70-90°	

FAULTS

E-W Shears	NE System	NW System	N-S System
Average: 090/70°N Range: 065-120/60°N-70°S	<u>Subvertical Set</u> 020-045/70-80°SE (sinistral)	<u>Subvertical</u> 150-170/75NE-90° (dextral)	173-010/75°E-80°W
	<u>Inclined Set</u> (002) 020-040/25-40°NW (sinistral)		

Table 5. Description of Sequential Fracturing and Associated Features in the Bevcon-Buffadison Mine.

PHASE	FRACTURES	ATTITUDE	MOVEMENT	ASSOCIATED FEATURES	REGIME
I	E-W Subvertical	090/70°N	Dextral	-major shears -mafic dykes -porphyry dykes -weak mineralization	NW-SE Compression; ductile
II	E-W, steep conjugate	090/75°N 090/75°S	? ?	-mafic dyke -mafic dyke	N-S compression brittle-ductile transition
	E-W Subhorizontal Conjugate	085/30°N 085/35°S 085/10°S-15°N	Dip slip? dip slip? extension	Au-quartz veins Au-quartz veins (richer) Au-quartz veins	brittle; vertical extension
	NE-NW inclined, conjugate	150/40°NE 030/35°NW	? ?	mafic dykes -faults -veins	brittle; transition to lateral extension
	NE, NW, Subvertical	160/80°NE 030/75°SE	dextral sinistral	-fault -mafic dykes -fault -minor gold veins	brittle lateral extension
	NS, vertical	178/85°NE	minor	-fractures, shears	
III	E-W, subvertical		normal, vertical- oblique	offset Au-quartz veins and mafic dykes	N-S extension

the productive horizon. The following mechanisms may be postulated for the formation of the different orebodies:

- early, dextral movement resulting from NW-SE compressive stress may have applied more strain on the 080° (Bevcon) segment of the productive horizon and pre-fractured the quartz diorite, and possibly formed a very large E-W tension gash that would correspond to the envelope of the Bevcon veins.
- later N-S compression during vein formation may have introduced a sinistral component of movement in the 080° leg of the productive horizon. This would induce a vector of opening at Bevcon and favor fluids circulation over the higher compression zone in the 090° trending Buffadison area.

## 17.0 PROPOSED EXPLORATION PROGRAM

The following two-phase exploration program is proposed and is summarized in Tables 6, 7.

### 17.1 Buffadison North Zone

This zone near the pluton-volcanics contact has been mined to 2,225 feet at Bevcon and drilled to about 2,000 feet from the Lencourt drift, as far as 7900E (Plan 6). Except for short holes from the 1300 level further west, little drill information exists below -1,000 feet in the Buffadison area.

Our study indicate that slight changes in the geometry of the productive horizon might suffice to create a domain of higher vertical extension, consequently of wider veins. Moreover, 43% of the total Bevcon mine production came from the -800 to -1,300 feet elevation, which represents about a quarter of a total mine section area.

We are proposing a distance of 500 feet between the drill sections, which corresponds to an approximate target size of 100,000 tons per vein (assuming other dimensions of 6 and 350 feet).

One diamond drill hole is proposed on sections 6800E and 7250E.

Table 6. SUMMARY OF PROPOSED DIAMOND DRILLING

AREA	PHASE I		PHASE II	
	D.D. Hole	Section	D.D. Hole	Section
North Zone	2,200 ft 2,200 ft	6800E 7250E	2,200 ft	6300E
South Zone	2,000 ft 2,000 ft 2,000 ft 2,000 ft	6900E 7500E 8500E 9500E	2,100 ft 2,100 ft 2,100 ft	6500E 9000E 11000E
Volcanics			1,500 ft	11350E
Wyeth-Jowsey trenches	1,100 ft	5630E	1,000 ft	5430E
<b>TOTAL:</b>	<b>13,500 ft</b>		<b>11,000 ft</b>	

\* \* \* \* \*

Table 7. BUDGET OF PROPOSED EXPLORATION PROGRAM

PHASE I

Diamond drilling; geology, assays 13,500 feet at \$20/ft.....	\$270,000
Chain grid lines, locate old drill holes & spot new holes.....	3,000
Survey Wyeth-Jowsey trenches.....	<u>2,000</u>
<b>TOTAL PHASE I:</b>	<b><u>\$275,000</u></b>

PHASE II

Diamond drilling; geology, assays 11,000 feet at \$20.....	\$220,000
Outcrop stripping, geology, assays.....	<u>15,000</u>
<b>TOTAL PHASE II:</b>	<b><u>\$235,000</u></b>

Drilling these holes to 2,200 feet, at  $-60^\circ$  to the north, from a collar location in the south zone is recommended. Pending encouraging results, another hole is proposed on section 6300E (Phase 2).

No diamond drilling is recommended into the north zone, on the east of the Proterozoic diabase dyke, as several existing holes on sections 11000E and 11600E indicate a very narrow width of the productive horizon to -1,000 feet. Section 11000E is near the middle of 1,000 to 1,400 feet of favourable strike length where the quartz feldspar porphyry dyke is within the Bevcon pluton.

### 17.2 Bevcon-Bufferadison South Zone

The south zone has been fairly intensely diamond drilled and investigated by underground workings to a depth of 1,000 feet near the Bufferadison mine (Plan 6). Its presence in the Bevcon area is confirmed by old diamond drill holes to a depth of 500 feet, that is, in the area devoid of economic mineralizations at Bevcon and Bufferadison. Deep surface holes have been drilled only on sections 8100E and 10 000E.

The same E-W spacing of 500 feet is recommended and holes are proposed on sections 6900E, 7500E, 8500E and 9500E. These holes would be drilled at  $-80^\circ$  to the north, with a total depth of 2,000 feet. Drilling on sections 6500E and 9000E is proposed if the first phase brings encouraging results.

In a second phase, we would advise drilling one hole on section 11 000E, in order to test the virtually unknown south zone on the east of the Proterozoic diabase dyke.

### 17.3 Gold Mineralization in the Volcanic Formations

A narrow but very rich vein mined on Bevcon lower levels in the volcanics, south of a major shear, produced about 10,793 tons at a grade of 0.272 oz Au/ton.

Although unevenly spaced, several holes drilled from surface and underground failed to intersect new gold mineralization of any



significance in the volcanic formations. However, one second-priority diamond drill hole is proposed on the east of the Proterozoic diabase dyke, in order to test this new ground. One hole drilled to 1,500 feet, at 60° north, collared on section 11350E at about 200 feet north of the pluton contact, is proposed.

#### 17.4 Wyeth-Jowsey Trenches Area

It is recommended to survey the surface trenches around the main occurrence in the pit as well as the 1932 diamond drill holes, if possible, in order to tie the information they contain in with that of the surveyed 1963 holes. If this leads to the same interpretation of a 60° southerly dipping vein system, we would advise to strip the surface trenches area, in order to study the vein-shear structural relationship. One diamond drill hole would be necessary to confirm the model and possibly verify the presence of mineralized veins on the south of the shear and within it.

If the 1932 and 1963 results plotted on the same sections suggest the existence of a subhorizontal and inclined veins systems, we would advise completing two vertical diamond drill holes.

Provisions for 1,000 feet of diamond drilling both in the first and second phase have been made in the budget of the proposed exploration program.

#### 18.0 CONCLUSIONS

This study of the Bevcon-Buffadison mine area has indicated that:

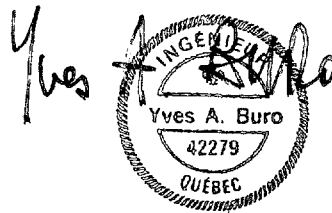
- the Bevcon mineralizations are located in a 080° trending strip in the quartz diorite pluton, near its north contact with the volcanics, whereas the Buffadison mine lies in an 090° E-W segment.
- Three sets of moderately dipping, EW fractures host the Bevcon gold-quartz veins, with higher gold values and greater extension being the attributes of the south-dipping set.
- The spatial distribution of the different vein sets is correlated with

the geometry of the host quartz diorite horizon

- The absence of economic mineralization above the 500 level and to the east of the Bevcon mine can be explained by the reduction to less than 120 feet of the width of the productive horizon.
- The west limit of the Bevcon mineralization coincides with the inflexion point of the 080-090° oriented productive horizon.
- South dipping veins predominate in the Buffadison north zone with gold values much lower than their Bevcon equivalent.
- The Bevcon-Buffadison mine has recorded a history of early E-W, ductile, dextral movement followed by long, multiphase N-S compression under brittle condition, with a shift from vertical to lateral extension. Extension along the N-S axis occurred as a late event.
- The calculated reserves at Bevcon are hosted in over 100 stopes. Probably a small proportion is mineable, high-grade material. No large reserve block of lower grade ore was observed.
- Buffadison calculated reserves are mainly, but not exclusively, located in south-dipping veins. The reserves grade is expected to correlate with the mined grade.
- 43% of the total ore extracted from the north zone originated from the -800 to -1300 feet interval.
- The north zone in the Buffadison area and the south zone in the Bevcon area have been drill-tested to only -1,000 and -600 feet, respectively.
- The Wyeth-Jowsey trenches area represents a geological-structural environment more comparable to the Belmoral or Sigma mine setting than to Bevcon-Buffadison.
- Diamond drilling is proposed in the untested zones just described.

- Geological setting similar to Bevcon-Buffadison probably exists on the east of the Proterozoic diabase dyke but diamond drill data suggest a narrow favourable horizon.

Yves A. Buro, ing.



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- Appendix "C". Diamond Drill Logs MA-85-1 to MA-85-30.
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## MINE PLANS AND RECORDS - 1946-1965

- Buffadison Mine
  - Level plans, geology; 1"=30'
  - Cross-sections; 1"=50'
  - Various raise plans, geology and assays, 1"=10'
  
- Bevcon Mine
  - Level plans, geology; 1"=20'
  - Level plans, assays; 1"=20'
  - Cross-sections; 1"=20'
  - Production reports (Bevcon, Buffadison, Lencourt)
  - Chip samples records
  - Underground drill logs
  - Various raise plans
  
- Bevcon-Buffadison Area
  - Surface diamond drill logs or sections of early programs

**APPENDIX I**  
**List of Claims**



## BEVCON PROPERTY (311)

## Claims List

<u>Claim No.</u>	<u>Location</u>	<u>Renewal Date</u>	<u>Area (ha)</u>
C008901	R.VII, L.41	November 16	5.60
C008902	R.VII, L.42	November 16	1.20
C008903	R.VII, L.43	November 16	6.17
C008904	R.VII, L.44	November 16	7.20
C008905	R.VII, L.35	November 16	8.00
C008906	R.VII, L.36	November 16	10.80
50211	R.VIII, L.46	December 12	16.20
50212	V.VII, L.51	December 12	19.40
51811	R.VIII, L.38	December 12	16.80
51812	R.VIII, L.39	December 12	16.00
51813	R.VIII, L.40	December 12	14.00
51814	R.VIII, L.47	December 12	18.80
C009011	R.VII	December 19	16.45
C009012	R.VII	December 19	16.14
C009013	R.VII	December 19	13.12
C009014	R.VII	December 19	16.26
C009015	R.VII	December 19	13.76
4139323	R.VI, L.40	January 4	7.00
50781	R.VII, L.41	January 6	11.20
50782	R.VII, L.42	January 6	12.80
50783	R.VII, L.43	January 6	15.20
50784	R.VI, L.41	January 6	10.60
50785	R.VI, L.42	January 6	8.80
50794	R.VII, L.50	January 11	6.80
50795	R.VII, L.49	January 11	8.80
76291	R.VI, L.43	February 15	5.20
76292	R.VI, L.40	February 15	6.40
76293	R.VI, L.38	February 15	3.60
1815671	R.VII, L.39	March 2	34.00
1815672	R.VII, L.38	March 2	34.00
1815681	R.VII, L.37	March 3	28.00
1815682	R.VII, L.36	March 3	18.00
1815683	R.VII, L.35	March 3	14.00
58462	R.VII, L.50	April 27	17.60
58463	R.VII, L.49	April 27	18.00
58485	R.VII, L.48	April 27	45.60
G006471	R.VII, L.46	July 23	47.20
G006472	R.VII, L.47	July 23	48.80
27951	R.VIII, L.41	August 12	20.00
27952	R.VIII, L.42	August 12	20.00
27954	R.VIII, L.44	August 12	14.70
27962	R.VIII, L.47	August 12	19.60
201383	R.VII	August 12	1.40
201385	R.VII	August 12	0.20
201387	R.VII	August 12	0.40

<u>Claim No.</u>	<u>Location</u>	<u>Renewal Date</u>	<u>Area (ha)</u>
C007511	R.VII, L.42	September 22	6.07
C007512	R.VII, L.41	September 22	25.20
C007513	R.VII, L.40	September 23	34.40
55921	R.VIII, L.48	September 23	40.00
55922	R.VII, L.40	September 23	4.80
55923	R.VI, L.39	September 23	10.00

Mining Concessions

CM0357	R.VII & VIII, L.43-46,51	February 1	101.80
CM0382	R.VII, L.42,43	February 1	41.64
CM0468	R.VII, L.42,43	February 1	20.18

Total No. of claims: 54

Total area: 977.89 hectares

