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THE BOB CREEK GOLD-SILVER PROSPECT (93L)

By B. N. Church

INTRODUCTION

The Bob Creek prospect (MI 93L-009) is centred 10.6 kilometres south of Houston at 800 metres elevation. The showing is approximately 1.4 kilometre by dirt road east of Buck Creek and the Buck Flats road (Fig. 17-1).

The property comprises the Buck and Lorne claim blocks which are relocated from previous claims including the old Porphyry Dyke, Horseshoe, and Gold Brick claim groups.

The property was visited briefly by the writer in June and August 1972, August 1980, and July 1984.

TABLE 17-1
TABLE OF CHEMICAL ANALYSES

	1	2	3	4
Oxides recalculated to 100:				
SiO_2	77.13	72.64	69.29	51.77
TiO_2	0.54	0.49	0.42	2.76
Al_2O_3	13.11	14.59	15.88	17.32
Fe_2O_3	3.38	2.17	2.03	2.08
FeO	0.31	1.13	3.54	7.14
MnO	0.33	0.24	0.67	0.13
MgO	0.40	0.72	1.08	5.52
CaO	0.13	1.36	2.23	6.96
Na_2O	0.63	0.09	0.03	4.28
K_2O	4.03	6.57	4.83	2.04
	100.00	100.00	100.00	100.00
Oxides as determined:				
$+H_2O$	2.09	2.63	2.18	3.01
$-H_2O$	0.34	0.10	0.14	0.17
CO_2	0.07	1.47	3.98	3.32
P_2O_5	0.01	0.17	0.22	0.69
S	0.03	1.42	1.09	0.04
Molecular Norm:				
Qz	55.4	41.3	41.1	—
Or	24.8	40.3	29.9	12.0
Ab	5.9	0.9	0.3	38.2
An	0.7	7.0	11.6	22.0
Wo	—	—	0.0	5.0
En	1.2	2.1	3.1	3.4
Fs	—	—	3.7	1.3
Fo	—	—	—	8.8
Fa	—	—	—	3.3
Il	0.8	0.7	0.6	3.8
Mt	—	1.7	2.2	2.2
He	2.8	0.5	—	—
Cr	8.4	5.5	7.5	—

Key to Analyses:

1. Hazelton maroon tuff breccia, near Bob Creek.
2. Mineralized rhyolite breccia, 'Ore zone.'
3. Altered quartz porphyry, west of Snoopy II adit, canyon area.
4. Bob Creek gabbro, on hillcrest east of Buck Flats road.

Much appreciation for company information is owing Dave Barr of DuPont of Canada Exploration Ltd. and Mark Rebagliati and Ian Trinder of Selco Divison, B.P. Resources Canada Ltd.

EXPLORATION AND DEVELOPMENT HISTORY

A small amount of placer gold was recovered from Bob Creek prior to 1905. In 1914 claims were staked covering the apparent source area, which proved to be a zone of altered rocks exposed upstream in the canyon of Bob Creek. Some exploratory tunnelling was completed by 1927. According to Lang (1929, p. 93A): 'A short adit has been driven into the right side of the canyon, exposing disseminations and small seams of pyrite, sphalerite, and a little galena, but no definite vein is exposed. About 100 yards (90 metres) upstream, a second short adit has been driven in the left side of the canyon where a 3-inch (7.6-centimetre) stringer is stated to have assayed: gold, 0.06 ounces (2.1 grams per tonne); silver, 41 ounces (1 400 grams per tonne); lead, 3 per cent; zinc, 11 per cent.'

A small mill was set up on the property in 1933 and three years later operations began under the direction of Houston Gold Mines Ltd. According to reports, 77 tonnes of ore was produced averaging gold, 3.5 grams per tonne; silver, 35 grams per tonne; and zinc, 1. per cent.

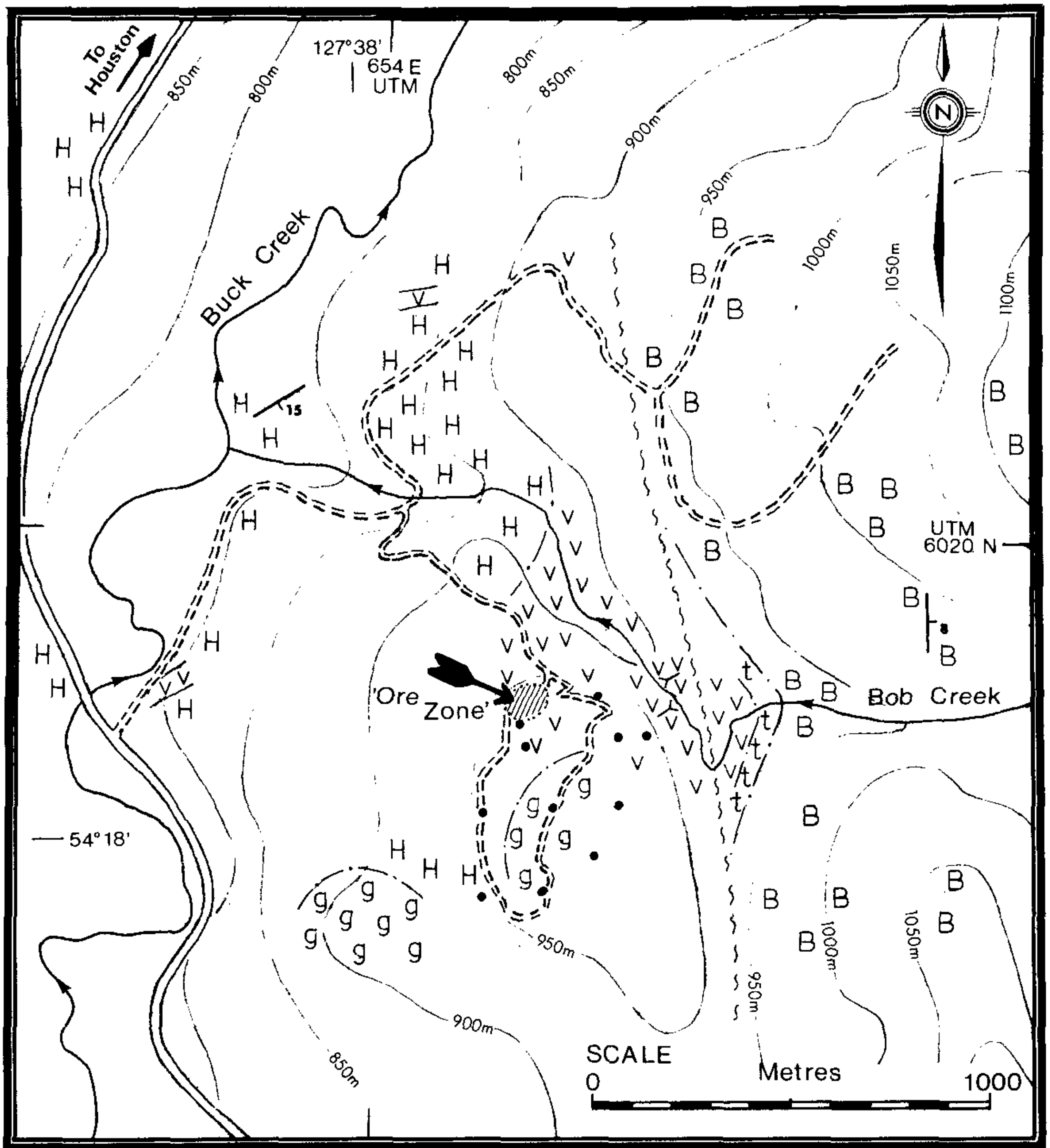
The property was the focus of intermittent exploration in subsequent years. Some of the more important drilling programs were conducted by the Premier Gold Mining Company in 1945 (three diamond-drill holes totalling 240 metres), Denison Mines Ltd. in 1961 (eight drill holes totalling 155 metres), Asarco Exploration Company of Canada Ltd. in 1968 (seven holes totalling 640 metres), and DuPont of Canada Exploration Ltd. in 1978 (six holes totalling 751 metres). Most recently, Selco Division of B.P. Resources Canada Ltd. completed a major program in 1984 consisting primarily of eight diamond-drill holes totalling 1 247 metres.

In addition to the drilling, a number of geochemical and geophysical programs were completed. In 1965 Triform Mining Ltd. joined with Coast Exploration Ltd. to geochemically test 4 100 metres of bulldozer trenching and stripping. Later Minwealth Explorations Ltd. performed airborne magnetic and EM surveys and a geochemical program. In 1978 DuPont completed 13 kilometres of pulse EM survey and geological mapping. Cominco Ltd. did a thorough review of the property in 1981 and followed this with an IP survey, and soil, silt, and lithogeochemical studies.

GEOLOGICAL SETTING

The rocks in vicinity of the Bob Creek prospect consist predominantly of gently dipping volcanic formations of Jurassic, Cretaceous, and Tertiary ages, a small gabbro stock, and a number of dykes.

The oldest rocks are mostly maroon volcanics of the Hazelton Group similar to the Lower (?) Jurassic assemblage on Morice Mountain located to the west. These are exposed along the lower course of Bob Creek and on the valley slopes near the confluence of Bob Creek and Buck Creek in the west part of the map-area (Fig 17-1). The most common unit is massive tuff breccia with a few thin intercalations of accretionary lapilli and siltstone. The volcanic



LEGEND

BEDDED AND EFFUSIVE ROCKS

TERTIARY

[B] *BUCK CREEK VOLCANICS*

UPPER CRETACEOUS

[t] TIP TOP HILL VOLCANICS

[V] RHYOLITE BRECCIA AND QUARTZ FELDSPAR PORPHYRY

JURASSIC

[H] HAZELTON VOLCANICS

INTRUSIVE ROCKS

[g] BOB CREEK GABBRO

SYMBOLS

DIAMOND-DRILL HOLE .... ●

Figure 17-1. Geological sketch map of the Bob Creek prospect.

TABLE 17-2
RADIOMETRIC DATES BY POTASSIUM/ARGON ANALYSES

No.	Lat.	Long.	Rock	Mineral	K%	Ar^{40*} $\times 10^{-6}$cc/gm	Ma
1	54°18.5′	126°37′	Feldspar porphyry	Biotite	6.79	21.739	80.6±2.8
2	54°18.1′	126°37.2′	Quartz porphyry	Sericite	8.42	26.099	78.1±2.8

clasts are mostly dacitic with some rhyolite admixture (Table 17-1, No. 1). A thin shale facies from this section has been intersected in the exploration drilling. Although the base of the formation is not seen, the total thickness certainly exceeds several hundred metres.

The host rock for mineralization is a belt of altered felsic volcanic rocks, about 600 metres wide, exposed in the canyon of Bob Creek. These are quartz-feldspar porphyry feeder dykes and breccias equivalent in age to the Upper Cretaceous Okusyelda Hill and Duck Lake volcanic rocks and intrusions (Church, 1972, p. 359).

The slightly younger Tip Top Hill Formation overlies the felsic volcanics east of the canyon. These rocks are brown, somewhat altered, andesitic tuffs and breccias; they form an erosional remnant immediately underlying the Tertiary sequence.

The youngest beds are assigned to the Buck Creek Formation. These rocks comprise about 500 metres of Early Tertiary fine-grained dacitic lavas and breccias exposed along the upper course of Bob Creek and on the hills and ridges in the east part of the map-area. The layering of this sequence, displayed on the valley walls, dips about 8 degrees easterly.

The 'Bob Creek gabbro' crops out on the crests of two low hills south of the canyon. This is a somewhat altered, medium to fine-grained stock intruding the Jurassic and Cretaceous volcanic rocks. Normative mineral calculations indicate a quartz deficiency similar to many gabbros (Table 17-1, No. 4).

Several feldspar porphyry dykes intrude the Hazelton rocks. The largest of these is observed in a road cut where the Bob Creek and the main Buck Flats roads join, and on a logging road north of Bob Creek. These dykes contain subhedral clusters of plagioclase, 0.5 centimetre across, in a matrix of fine-grained feldspar, biotite, and quartz. Potassium/argon age determination of a biotite separate from these rocks gives an Upper Cretaceous age of 80.6±2.8 Ma (Table 17-2, No. 1) similar to the Duck Lake intrusion.

MINERALIZATION

The felsic effusive rocks exposed on the canyon of Bob Creek are a composite of hydrothermally altered breccias, including some round clast vent breccias, and quartz-feldspar porphyry feeder dykes. Normative calculations from whole rock chemical analyses suggest high quartz and alkali feldspar content typical of many unaltered rhyolites (Table 17-1, Nos. 2 and 3).

The alteration of these rocks is intense, consisting mostly of kaolinization with local sericitization and silicification. Limonite is developed on many outcrops as a result of oxidation and leaching of sulphides.

The main sulphide minerals are pyrite and sphalerite with lesser amounts of galena and chalcopyrite. These occur as disseminations, stringers, and in quartz veinlets of apparent random orientation.

The main target of exploration is a zone of high lithogeochemical values midway between the canyon and the north contact of the Bob Creek gabbro. This 'Ore zone' is an ellipical 80 by 50-metre area with gold and silver assays ranging to more than 4 ppm and 35 ppm respectively.

The age of mineralization has been determined to be 78.1±2.8 Ma from potassium/argon analyses of sericitized biotite from a hydrothermally altered porphyry from the canyon area (Table 17-2, No. 2). It is noted that this is only slightly younger than unaltered biotite feldspar porphyry dykes of the region which have been correlated with the Duck Lake intrusion and Okusyelda volcanic event.

According to Caelles (1982): '. . . the Au-Ag (Zn-Pb-Cu) mineralization in the Buck Creek property is epigenetic, deposited by circulation of hydrothermal fluids that are very likely genetically related to the predominantly felsic volcanism. If this hypothesis is correct, lithological control of mineralization could be important, mainly through control of mineralizing fluid circulation by rock porosity and permeability.'

Malingering hydrothermal activity may be responsible too for the altered condition of the Tip Top Hill andesites and the Bob Creek stock. In accordance with this, the 'Ore zone,' which is proximal to the stock, coincides with the end phase of a rhyolite to andesite and gabbro, Upper Cretaceous eruptive cycle.

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TABLE 1. COMPUTER PROGRAM IN TI BASIC TO DETERMINE MOLECULAR NORM MINERALOGY FROM MAJOR OXIDE WEIGHT PER CENT

```
100 REM "XXXXXXXXXXXXXXXXXX"
110 REM "X                X"
120 REM "X MOLECULAR NORM X"
130 REM "X                X"
140 REM "X   B.N. Church  X"
150 REM "X                X"
160 REM "XXXXXXXXXXXXXXXXXX"
170 PRINT
190 A=.01667
200 A1=.01251
210 A2=.01962
220 A3=.01252
230 A4=.01392
240 A5=.02481
250 A6=.01783
260 A7=.03226
270 A8=.02124
280 INPUT "SAMPLE NO. =":Z
290 INPUT "WT.% SIO2  =":B
300 INPUT "WT.% TIO2  =":B1
310 INPUT "WT.% AL2O3 =":B2
320 INPUT "WT.% FE2O3=":B3
330 INPUT "WT.% FEO   =":B4
340 INPUT "WT.% MGO   =":B5
350 INPUT "WT.% CAO   =":B6
360 INPUT "WT.% NA2O =":B7
370 INPUT "WT.% K2O   =":B8
380 C=A*B
390 C1=A1*B1
400 C2=A2*B2
410 C3=A3*B3
420 C4=A4*B4
430 C5=A5*B5
440 C6=A6*B6
450 C7=A7*B7
460 C8=A8*B8
470 D=C+C1+C2+C3+C4+C5+C6+C7+C8
480 E=C*100/D
490 E1=C1*100/D
500 E2=C2*100/D
510 E3=C3*100/D
520 E4=C4*100/D
530 E5=C5*100/D
540 E6=C6*100/D
550 E7=C7*100/D
560 E8=C8*100/D
570 REM E=SI E1=TI E2=AL
575 REM E3=FE+++ E4=FE++ E5=MG
580 REM E6=CA E7=NA E8=K CATION %
590 M1=5*E8
600 M2=5*E7
610 K=(E2-E7)-E8
620 G=E6*2
630 GOTO 680
640 M3=K*5/2
650 M4=(E6-M3/5)*2
660 M5=0
670 GOTO 720
680 IF G>K THEN 640
690 M3=E6*5
700 M5=K-M3*2/5
710 M4=0
720 M6=E5*2
730 M7=E1*2
740 GOTO 800
750 M8=(E4-E1)*3
760 O=E3-M8*2/3
770 M9=0
780 R3=M9/2
790 GOTO 850
800 IF (E3/2)>=(E4-E1)THEN 750
810 M8=E3*3/2
820 M9=(E4-E1-M8/3)*2
830 O=0
840 R3=M9/2
850 S1=E-((M1*3/5)+(M2*3/5)+(M3*2/5)+(M4/2)+(M6/2)+(M9/2))
860 PRINT "SAMPLE NO. =",Z
870 PRINT "NORMATIVE %"
880 PRINT
890 PRINT "QUARTZ      ",S1
900 PRINT "ORTHOCLASE  ",M1
910 PRINT "ALBITE      ",M2
920 PRINT "ANORTHITE   ",M3
930 PRINT "WOLLASTONITE",M4
940 PRINT "ENSTATITE   ",M6
950 PRINT "FERROSILITE ",M9
960 PRINT "ILMENITE    ",M7
970 PRINT "MAGNETITE   ",M8
980 PRINT "HEMATITE    ",O
990 PRINT "CORUNDUM    ",M5
1000 PRINT
1010 IF S1<0 THEN 1040
1020 PRINT
1030 END
1040 PRINT "UNDERSATURATED"
1050 PRINT "OPX GOES TO OV"
1060 PRINT
1070 F=(M6+M9)/2
1080 S2=E-(((M1/5)*3)+((M2/5)*3)+((M3/5)*2)+(M4/2))
1090 Y=(F-S2)*2
1100 X=F-Y
1110 I=2*X
1120 J=Y+(Y/2)
1130 L=(M6/(M6+M9))*I
1140 P=(M9/(M6+M9))*J
1150 T=(M6/(M6+M9))*J
1160 U=(M9/(M6+M9))*I
1170 PRINT "ENSTATITE  =",L
1180 PRINT "FERROSILITE=",U
1190 PRINT "FORSTERITE =",T
1200 PRINT "FAYALITE   =",P
1210 PRINT
1230 IF I<0 THEN 1260
1240 PRINT
1250 END
1255 PRINT
1260 PRINT "FELDSPATHOIDAL"
1270 PRINT "OLV+NEPH NORM"
1280 PRINT
1290 H=(E5/2)+E5
1300 N=(R3/2)+R3
1310 S3=S2-(R3/2)-(E5/2)+(E7*3)
1320 V=(S3-E7)/2
1330 W=E7-V
1340 Q=V*5
1350 Z=W*3
1360 PRINT "ORTHOCLASE  ",M1
1370 PRINT "NEPHELINE   ",Z
1380 PRINT "ALBITE      ",Q
1390 PRINT "ANORTHITE   ",M3
1400 PRINT "WOLLASTONITE",M4
1410 PRINT "FORSTERITE  ",H
1420 PRINT "FAYALITE    ",N
1430 PRINT "ILMENITE    ",M7
1440 PRINT "MAGNETITE   ",M8
1450 PRINT "HEMATITE    ",O
1460 PRINT "CORUNDUM    ",M5
1470 PRINT
1480 PRINT
1490 PRINT
1495 PRINT
1500 PRINT
1510 END
```