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EPIGENETIC GOLD MINERALIZATION, BAIE VERTE PENINSULA, NEWFOUNDLAND

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ABSTRACT

The Baie Verte Peninsula is host to about 125 epigenetic, structurally controlled gold occurrences, most of which were discovered during the exploration boom of the late 1980s. These epigenetic gold occurrences cluster along major regionally extensive structural breaks such as the Baie Verte Line. Most occur in rocks of the Baie Verte Belt irrespective of age but are concentrated within the Cambro-Ordovician ophiolitic rocks and their cover sequences.

Two distinct styles of gold mineralization are present, vein-hosted and altered wall-rock hosted mineralization. The vein-hosted style comprises three subclasses, i) quartz veins with free gold, ii) quartz–pyrite veins, and iii) base-metal-rich quartz veins that locally contain visible gold. The altered wall-rock hosted style comprises, i) quartz–pyrite ± carbonate replacement, ii) talc–magnesite replacement, and iii) red albite–pyrite replacement.

A third group of gold occurrences are referred to as unassigned. These occurrences are typically altered wall-rock hosted in style, but they cannot be unequivocally classified as either epigenetic or syngenetic. Many of these occurrences are spatially associated with volcanogenic massive sulphide mineralization (e.g., the Rambler area).

The epigenetic gold mineralization is related to Siluro-Devonian deformation. Variations in deposit morphology appear to reflect the complex interaction of the Fleur de Lys and Baie Verte belts along the Baie Verte Line and subsidiary structures.

INTRODUCTION

In 1997, a project was initiated to document the numerous gold occurrences located on the Baie Verte Peninsula, central Newfoundland. Field work has concentrated on NTS map areas 12H/09, 12H/16 and the Mings Bight Peninsula portion of NTS 12I/01. A total of 111 epigenetic gold occurrences have been documented. Another 8 gold occurrences within the Rambler Mine area require further study and cannot yet be classified as either syngenetic or epigenetic. A B.Sc. (Honours) thesis study of auriferous quartz veins at the Romeo and Juliet Prospect was also initiated during the course of this project (*see* Meade *et al.*, *this volume*).

REGIONAL SETTING

The Baie Verte Peninsula is underlain by two distinct structural and lithic belts that are separated by a major arcuate, structural zone referred to as the Baie Verte Line (Hibbard, 1983). Rocks to the west of the Baie Verte Line belong to the Fleur de Lys Belt. This belt is part of the Humber Tectonostratigraphic Zone of Williams *et al.* (1988) and comprises a sequence of polydeformed Neoproterozic to Early Ordovician schists and gneisses considered to represent the eastern margin of Laurentia. The belt is subdivided into three main lithic sequences (Figure 1). These are, I) high-grade metamorphic basement rocks of the East Pond Metamorphic Suite, ii) a metaclastic cover sequence referred to as the Fleur de Lys Supergroup, and iii) post-kinematic granitic intrusive rocks of the Devonian Wild Cove Pond Igneous Suite.

The rocks lying to the east of the Baie Verte Line belong to the Baie Verte Belt, which is part of the Dunnage Tectonostratigraphic Zone. This belt comprises four main lithic elements; i) Cambro-Ordovician ophiolitic sequences of the Advocate, Point Rousse and Betts Cove complexes and the Pacquet Harbour Group, ii) Ordovician volcanic and

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volcaniclastic cover sequences of the Snooks Arm and Flatwater Pond groups, iii) Silurian terrestrial volcanic and sedimentary rocks of the Mic Mac Lake and Cape St. John groups, which unconformably overlie the Ordovician sequences, and iv) Siluro-Devonian intrusive rocks (e.g., the Burlington Granodiorite and Cape Brule Porphyry). The Cambro-Ordovician sequences represent vestiges of Iapetus and have been interpreted to have formed in supra-subduction zone ophiolitic and primitive island-arc environments (Jenner and Fryer, 1980; Swinden, 1991; Piercey *et al.*, 1997 and Bédard *et al.*, 1997).

REGIONAL DEFORMATION

Regionally, all pre-Carboniferous rocks and structures on the Baie Verte Peninsula, including the Baie Verte Line, are folded around a major structure referred to as the Baie Verte Flexure (Hibbard, 1983). Structural and lithological trends vary from north-northeast, south of Baie Verte, to east–west, east of Baie Verte. Hibbard (1983) interpreted this flexure to be a primordial feature that reflected the shape of the ancient Laurentian continental margin.

Three phases of deformation have been documented within rocks of the Fleur de Lys Belt and in the northern portion of the Baie Verte Belt (Hibbard, 1983). Regionally, these rocks have been metamorphosed in the upper greenschist to middle amphibolite facies. However, within the portion of the Fleur de Lys Belt on the eastern limb of the Baie Verte Flexure and the northern portion of the Baie Verte Belt, Acadian deformation has obliterated all evidence of earlier deformation. Based on radiometric cooling ages for metamorphic minerals, deformation within the remainder of the Fleur de Lys Belt is interpreted to be Taconic in age and related to westward obduction of the allochthonous sequences over the Fleur de Lys Belt (Hibbard, 1983).

The remainder of the Baie Verte Belt displays a single penetrative fabric and has been metamorphosed up to the lower greenschist facies. Deformation within the Baie Verte Belt is interpreted to be related to Siluro–Devonian tectonism.

The Baie Verte Line exhibits a protracted history of movement as a result of the juxtaposition and interaction of the Baie Verte – Fleur de Lys belts and the irregular Laurentian continental margin. Deformation along the Baie Verte Line varied from westward-directed thrusting in the Ordovician to later strike-slip faulting in the Carboniferous (Hibbard, 1983; Goodwin and Williams, 1990).

PREVIOUS WORK

The Baie Verte Peninsula has an extensive mining history centred primarily on the mining of volcanogenic massive sulphide deposits; past producers include the Rambler deposits, Bett's Cove, Tilt Cove, and the Terra Nova Mine. For a detailed account of exploration activity, mining history and geological studies prior to 1983 the reader is referred to Hibbard (1983). Despite more than 100 years of continuous mining activity, no systematic exploration for gold mineralization was conducted on the peninsula prior to 1984. The discovery of the Deer Cove prospect by Noranda Exploration Company Limited in 1986 initiated a period of intensive gold exploration that lasted until 1990 and resulted in approximately 120 new gold occurrences. In 1988, a number of significant new gold discoveries were announced, these included:

1) the Stog'er Tight Deposit, discovered by the Noranda–Impala Joint Venture (Huard, 1990);

2) the "Lightning Zone" discovered by Varna Gold Inc. and subsequently optioned to Corona Corporation in 1988. Follow up diamond drilling led to the discovery of the Thunder Zone and outlined what is the now referred to as the "Pine Cove" deposit with an estimated (undiluted, geologically inferred) reserve of 2.75 million tonnes at 3.0 g/t gold (Dimmell and Hartley, 1991); and

3) the "Nugget Pond" prospect discovered by Bitech Resources. The Nugget Pond prospect has since been developed by Richmont Mines Incorporated. Mining and milling infrastructures were completed in February 1997, and mining is presently ongoing at the site. Prior to the commencement of mining, reserves totalled 488 000 tonnes grading 0.357 oz/t gold (Richmont Mines Annual Report, 1996).

Exploration activity on the Baie Verte Peninsula waned during the early 1990s. In 1995, Ming Minerals Inc. successfully mined the Ming West volcanogenic massive sulphide deposit. The company also mined, with limited success, the Footwall Gold Zone to the Main Mine, and the Stog'er Tight deposit purchased from Noranda Exploration Limited (Bradley, 1997).

Recent gold exploration activity on the peninsula has centred mainly on the "Nugget Pond Horizon" (Sulliden Mines and Noveder Incorporated) and on the Kings Point Complex (Etruscan Resources). Other mineral exploration companies holding gold properties on the peninsula include Battle Mountain Canada, Triassic Properties Incorporated, British Canadian Mines Limited, Rex Resources, and Ming Minerals Incorporated.

The concentrated exploration activity on the Baie Verte Peninsula also resulted in a number of government and academic, deposit-level studies of gold prospects. These include: Deer Cove (Patey, 1990), Albatross (Field, 1990), Tilt Cove – Cape St. John area (Al, 1990), Rambler (Wieck, 1993), and Stog'er Tight (Ramezani, 1992). The Geological Survey of Canada completed structural and metallogenic

Table 1. Classification of epigenetic gold mineralization, Baie Verte Peninsula, Newfoundland

STYLES OF GOLD EPIGENETIC GOLD MINERALIZATION, BAIE VERTE PENINSULA			
VEIN-HOSTED GOLD			
Subclasses	Quartz veins ± carbonate	Quartz–pyrite veins	Base-metal-rich quartz veins
ALTERED WALL ROCK (± VEINS)			
Subclasses	Quartz–pyrite replacement	Talc–carbonate replacement	Red albite–pyrite replacement

studies of the Dorset prospect (Bélanger *et al.*, 1992), the Stog'er Tight prospect (Kirkwood and Dubé, 1992), and the Deer Cove prospect (Dubé *et al.*, 1993). The Geological Survey of Canada has also conducted detailed 1:20 000-scale mapping and deposit-level studies of gold mineralization in the Bett's Cove Complex (Bédard *et al.*, 1997).

GOLD MINERALIZATION

Most of the gold occurrences on the Baie Verte Peninsula are classified as structurally controlled, and therefore epigenetic, given their obvious spatial association with the Baie Verte Line (Figure 1). In viewing Figure 1, it is also evident that most of the gold occurrences lie within the Baie Verte Belt. The few known gold occurrences within the Fleur de Lys Belt can be linked to what can be termed as outliers of Baie Verte Belt rock.

Within the study area, two distinct styles of epigenetic gold mineralization are present: i) vein-hosted gold, and ii) altered wall-rock hosted gold (± veining) (Table 1). In the vein-hosted style, the gold is restricted to the vein whereas in the altered wall-rock hosted style the gold is generally associated with sulphide (pyrite) in the wall rock. The vein-hosted style has three subclasses; these are: i) quartz veins, ii) quartz–pyrite veins, and iii) base-metal-rich quartz veins. The vein subclasses generally exhibit high gold concentrations, and typically assay results have been reported in multi-ounces.

The altered wall-rock-hosted style of gold also can be subdivided into three subclasses, these are: i) quartz–pyrite ± carbonate replacement, ii) talc–magnesite replacement, and iii) red albite–pyrite replacement (Stog'er Tight style). Gold concentrations associated with the altered wall-rock-hosted styles are of significantly lower grade than the vein-hosted gold occurrences. However, the altered wall-rock subclasses have potential for large tonnage deposits as the gold is not restricted to veining. Auriferous veining can locally form a significant component in all of the altered wall-rock subclasses.

VEIN-HOSTED GOLD

QUARTZ VEIN SUBCLASS

The quartz vein subclass are primarily milky-white shear veins. The veins are weakly laminated, exhibit multiple generations of veining and contain only traces of sulphide. Wall-rock fragments are preserved locally. Fe-carbonate wall-rock alteration may be present and minor disseminated pyrite may be developed in the wall rock adjacent to the vein. Gold occurs in these veins as free gold and commonly as coarse flecks and clots. Delineating this type of deposit is extremely difficult due to the nuggetty nature of the gold. The Romeo and Juliet prospect (Figure 1 and Table 2) is an example of this subclass (*see* Meade *et al.* (*this volume*) for a detailed description of this prospect). The prospect consists of three subparallel large quartz veins (Juliet South–Juliet North, Connecting and Romeo zones) that have been exposed over a strike length of 250 m. The veins, which trend 30° and dip 60° to the southeast, are associated with an intense north-northeast-trending shear zone. The large veins are comprised of smaller, multiple generations of parallel, milky-white quartz veins as evidenced by crack-and-seal textures, comb textures, weakly preserved lamination and altered wall-rock fragments.

Wall rock, marginal to the veins, exhibits intense Fe-carbonate alteration resulting in a speckled appearance. Numerous quartz–carbonate tension-gash veins occur throughout the altered wall rock. Alteration locally extends up to 10 m from the veins and appears to be best developed in fine-grained gabbroic rocks.

Visible gold has been observed along most of the 250-m strike length of the Romeo and Juliet prospect. Gold occurs as very fine flecks and locally coarse patches sporadically developed along the multiple vein margins and along the external margins to the large veins. Assay results from channel sampling of the Romeo and Juliet prospect were consistently low (e.g., 1.15 g/t over 6 m from the Romeo Zone) despite the visible gold. However, one interval from the

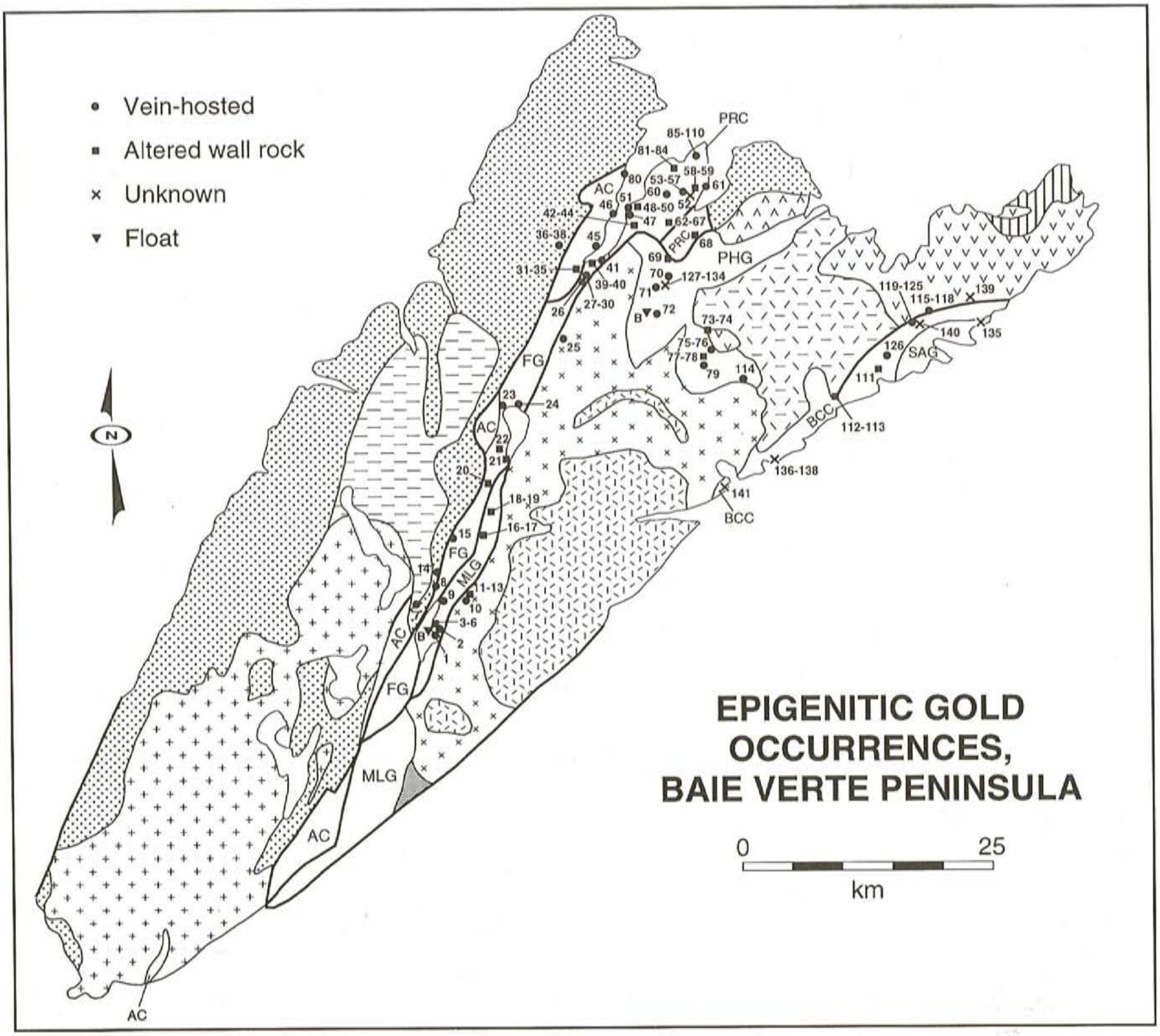

Figure 1. *Simplified geological map of the Baie Verte Peninsula* (after *Hibbard, 1983); also shown are the gold occurrences listed in Table 2.*

Juliet Zone assayed 23 g/t Au over 1 m (Dimmell and Hartley, 1991). A 10-tonne bulk sample taken from the Juliet South Zone produced in excess of 10 oz of gold (Kevin MacNeill, personal communication, 1997).

QUARTZ–PYRITE VEIN SUBCLASS

Shear, quartz breccia and tension-gash veins comprise the quartz–pyrite vein subclass. The veins are typically milky-white and contain weakly disseminated to coarse patches, clots and bands of pyrite. Wall-rock alteration varies from weak to locally intense with Fe-carbonatization of mafic rocks and sericitization and silicification of felsic rocks. Disseminated pyrite may be present in the altered wall rock. Elevated to economically significant gold values are only associated with the veining and can generally be positively correlated with pyrite concentrations. The Goldenville Mine and the Brass Buckle prospect are examples of this subclass. The reader is referred to Hibbard (1983) for a detailed description of the geology and mineralization of the Goldenville Horizon.

The Brass Buckle prospect is located within the southern lobe of the Pacquet Harbour Group. The vein has been traced on the surface for about 30 m; unfortunately, the width of the vein is difficult to ascertain from the surface exposure. In diamond-drill core, the vein has a maximum thickness of 30 cm. Assay results from the Brass Buckle (Dimmell, 1989) included 269 g/t Au over a 0.5 m channel and 242.5 g/t Au over 0.25 m from diamond-drill core (Table 2).

LEGEND		
AGE	FLEUR DE LYS BELT	BAIE VERTE BELT
Carboniferous		Conglomerate and Sandstone
Silurian to Devonian	Wild Cove Pond Igneous Suite	**Intrusive Rocks** La Scie Intrusive Suite, Cape Brule Porphyry (includes undivided extrusive (includes undivided extrusive phases), and × Burlington Granodiorite **Extrusive Rocks** Cape St. John Group MLG Mic Mac Lake Group
Ordovician		**Intrusive Rocks** Dunamagon Granite **Extrusive Rocks** FG Flat Water Pond Group, and SAG Snooks Arm Group
Neoproterozoic to Middle Ordovician	Fleur de Lys Supergroup	AC Advocate Complex PRC Point Rousse Complex PHG Pacquet Harbour Group BCC Betts Cove Complex
Neoproterozoic and Earlier	East Pond Metamorphic Suite	

Figure 1. *(Continued) Legend.*

BASE-METAL-RICH QUARTZ VEIN SUBCLASS

The base-metal-rich quartz veins are typically shear veins. The veins are generally smokey grey to milky white and banded. The base metals occur as clots and laminations of galena, chalcopyrite and ± sphalerite. Wall-rock alteration is generally weak but where developed comprises sericitization and silicification. There are presently four known examples of this subclass within the study area (Figure 1); these include, i) the El Stratos showing, ii) the Dorset prospect, iii) the Stuckey vein, and iv) the Hank showing. The gold in these base-metal-rich quartz veins is typically free and locally occurs as coarse flecks and clots. Assay results are generally very high and include 41.6 g/t Au over a 1.5 m channel from the Dorset prospect in the Flatwater Pond Group (MacDougall and MacInnis, 1990) and 150.4 g/t from a grab sample of the El Stratos vein in the Mic Mac Lake group (MacDougall, 1989). Channel samples obtained from the Stuckey vein located in the Pacquet Harbour Group assayed 0.13 oz/ton over 0.54 m and 0.18 oz/ton over 0.60 m (Tuach, 1978). Visible gold was observed by the authors at numerous locations within the Stuckey vein.

A significant zone of base-metal-rich quartz vein float known as the Voodoo prospect occurs on the western shore of MicMac Lake. The float, which comprises gold-bearing angular blocks up to 2.0 m in length, was discovered by Noranda Exploration Company Limited (MacDougall *et al.*, 1989). The blocks are similar in composition and grade to the El Stratos showing located approximately 0.8 km along strike to the south. The Voodoo quartz blocks contain abundant disseminated and banded pyrite, galena, sphalerite, minor chalcopyrite, and locally visible gold. Grab samples assayed up to 105.3 g/t Au, 17.1% Pb, 7.1% Zn, 0.8% Cu and 3.88 oz/t Ag. Despite extensive trenching and limited diamond drilling the float has not been sourced.

ALTERED WALL-ROCK HOSTED GOLD

QUARTZ–PYRITE ± CARBONATE REPLACEMENT

This subclass is marked by extensive and distinctive zones of wall-rock alteration. Within gabbro and mafic volcanic rocks this alteration varies from weak to intense Fe-carbonatization accompanied by sulphidation. These zones typically occur as structurally controlled clusters of lensoidal alteration. The alteration can be up to 40 m thick and in excess of 100 m long. Field (1990) described the alteration zonation from the Albatross prospect, one of a cluster of gold occurrences occurring in gabbro of the Advocate Complex

Table 2. Listing of gold occurrences, Baie Verte Peninsula, Newfoundland (keyed to Figure 1). Abbreviations: gs-grab sample, cs-channel sample, ddh-diamond-drill hole, bs-bulk sample, sil-silicification, ser-sericitization, carb-carbonitization, chl-chloritization, epi-epidotization, serp-serpentinization, stilp-stilpnomelane, alb-albite, feld-feldspar, qtz-quartz, py-pyrite, gn-galena, cp-chalcopyrite, sp-sphalerite, asp-arsenopyrite, bp-bornite, po-pyrrhotite, mag-magnetite, spec-specularite, and hem-hematite. () denotes commodity presence determined by assay

OCCURRENCE	STYLE	Au GRADES	MINERALOGY	HOST ROCK	ALTERATION
Kings Point (NTS 12H/09)					
1. El Stratos	Quartz Vein	150.4 g/t (gs)	(Au),(Ag),gn,sp,cp,py	Felsic Volcanics	
2. Mega Vein	Quartz Vein	1.0 g/t (gs)	(Au),py,cp	Gabbro	Sil, Ser
3. Pandora	Altered Wall Rock	6.9 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Ser
4. Tornado	Altered Wall Rock	5.2 g/t (gs)	(Au),py,gn	Gabbro	Fe-Carb, Chl
A. Voodoo Float	Quartz Vein	105.3 g/t (gs)	(Au),(Ag),gn,sp,cp,py	Gabbro	Fe-Carb
5. Tamsworth	Altered Wall Rock	11.1 g/t (gs)	(Au),py,gn	Mafics	Fe-Carb
6. MicMac Lake East	Altered Wall Rock	4.62 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Fe-Carb
7. MicMac Lake West	Quartz Vein	1.03 g/t (gs)	(Au),asp,py	Pelite	Carb
8. MicMac Lake (NW)	Quartz Vein	33.4 g/t (gs)	(Au),py	Pelite	Sil, Ser
9. Clydesdale	Quartz Vein	59.6 g/t (gs)	(Au),(Ag),py	Granodiorite	Carb, Epi, Chl
10. Kreuger	Quartz Vein	32.9 g/t (gs)	(Au),(Ag),Cu,py,Mo	Mafic dykes in Granodiorite	Sil
11. Mackenzie	Altered Wall Rock	8.71 g/t (gs)	(Au),py	Mafic dykes in Granodiorite	Sil
12. Bedford	Altered Wall Rock	0.75 g/t (gs)	(Au),py	Gabbro	Sil, Epi, Ser
13. Sidewinder	Altered Wall Rock	8.3 g/t (gs)	(Au), py	Mafic dykes in Granodiorite	Sil
14. Wild Cove Pond E	Quartz Vein	1.9 g/t (gs)	(Au),asp,cp,bo,py	Pelitic Schist	Sil?
15. Kidney Pond South	Quartz Vein	1.5 g/t (gs)	(Au),py	Granite	???
16. Crow Hill South	Altered Wall Rock	1.01 g/t-10.6 m (DDH)	(Au),py, spec	Felsic Volcanics	Sil, Ser
17. Raven	Altered Wall Rock	8.0 g/t - 0.40 m (cs)	(Au),py	Felsic/Mafic Volcanics Contact	Sil, Ser, Fe-Carb
18. Crow Hill North	Altered Wall Rock	2.27 g/t -8.0 m (DDH)	(Au),py	Felsic Volcanics	Sil, Ser
19. Crow Hill NE	Altered Wall Rock	1.3 g/t (gs)	(Au), py	Felsic Volcanics	Sil, Ser
20. Bear Pond	Altered Wall Rock	5.9 g/t (gs)	(Au),py,po	Graphitic Sediments	Nil
Baie Verte (NTS 12H/16)					
21. Flatwater PondPark	Altered Wall Rock	1.9 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Carb
22. Gossan Zone	Altered Wall Rock	3.14 g/t (gs)	(Au),py,po	Mafic Volcanics & Graphitic Sediments	Sil, Carb, Chl
23. Flatwater Pond NW	Quartz Vein	0.99 g/t (gs)	(Au),py	Virginite	Talc-Carb, Serp, Fuch
24. Burlington Roadcut	Quartz Vein	1.95 g/t (gs)	(Au),py,gn	Sericite Schist	Sil, Ser
25. Black Duck	Quartz Vein	5.8 g/t (gs)	(Au),py	Mafic Volcanics (?)	???
26. Central Carbonate	Altered Wall Rock	5.5 g/t (gs)	(Au),py	Gabbro	Fe-Carb (Pervasive)
27. Le Braz	Quartz Vein	314.0 g/t (gs)	Au,py	Mafic (Gabbro?)	Sil, Fe-Carb (weak)
28. Gunshot	Quartz Vein	162.0 g/t (gs)	Au,py	Gabbro	Sil, Fe-Carb
29. Dorset # 1	Quartz Vein	407.0 g/t (gs)	Au,gn,sp,cp,py,bo,asp	Mafic Volcanics	Nil
Dorset # 2	Quartz Vein	41.6 g/t - 1.5 m (cs)	Au,gn,sp,cp,py,bo,asp	Gabbro / Mafic Volcanics	Nil
Dorset # 3	Quartz Vein	6.0 g/t (gs)	(Au),cp,py,	Mafic Volcanics	Nil
30. Dorset Extension	Quartz Vein	56.0 g/t - 2.5 m (cs)	Au,gn,sp,cp,py,bo,asp	Gabbro	Nil
31. Phoenix	Altered Wall Rock	1.07 g/t - 5.45 m (cs)	(Au),py	Gabbro	Sil, Fe-Carb
32. Albatross	Altered Wall Rock	2.8 g/t - 5.0 m (cs)	(Au),py	Gabbro	Sil, Fe-Carb
33. Casa Loma	Altered Wall Rock	2.3 g/t - 2.0 m (cs)	(Au),py	Mafic Volcanics	Sil, Carb, Chl
34. Powerline	Altered Wall Rock	1.6 g/t - 1.6 m (cs)	(Au), py	Gabbro	Sil, Fe-Carb
35. TN-89-01	Altered Wall Rock	2.35 g/t - 0.5 m (DDH)	(Au), py	Gabbro	Sil, Fe-Carb
36. Castor's Brook	Quartz Vein	8.25 g/t - 0.40 m (cs)	(Au), py	Psammite	Sil, Ser
37. Breezeway	Quartz Vein	25.5 g/t (gs)	(Au),bo,cp	Amphibolite Schist	Sil, Carb
38. Osbournes Pond	Quartz Vein	6.75 g/t (gs)	(Au),cp,gn	Qtz - Biotite Schist	Sil, Carb
39. Barritz	Altered Wall Rock	3.9 g/t - 4.0 m (cs)	(Au),py	Gabbro	
40. Tidewater	Altered Wall Rock	8.2 g/t (gs)	(Au),py	Chert Breccia	Sil, Fe-Carb
41. Powder House	Quartz Vein	2.71 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Fe-Carb
42. Anoroc	Altered Wall Rock	18.9 g/t - 1.0 m (DDH)	(Au),py	Mafic Volcanics & Sediments	Sil, Fe-Carb, Chl
43. Anoroc Extension	Altered Wall Rock		(Au),py	Mafic Volcanics & Sediments	Sil, Fe-Carb, Chl
44. Pine Cove	Altered Wall Rock	2.75 mt @ 3.0 g	Au,py	Mafic Volcanics, Gabbro, & Sediments	Sil, Chl
(1) Lightning Zone		-11.1g/t-8.1 m (DDH)			
(2) Thunder Zone		-10.0g/t- 36.0 m (cs)			
45. Sandy Point	Quartz Vein	1.12 g/t (gs)	(Au),py	Gabbro	
46. Baie Vista	Quartz Vein	5.7 g/t (gs)	(Au),py	Gabbro	Fe-Carb
47. Romeo & Julliet	Quartz Vein	10 t @ 1 oz/t (bs)	Au,py	Gabbro	Sil, Epi
48. Corkscrew	Altered Wall Rock	32.0 g/t - 1.0 m (DDH)	(Au),py	Silicified Gabbro (?)	Sil
49. Pumbly Point East	Altered Wall Rock	Unknown	(Au), py	Gabbro	Fe-Carb
50. Pumbly Point	Altered Wall Rock	1.91 g/t (gs)	(Au),py	Mafic Volcanics	Fe-Carb
51. Penny Cove	Altered Wall Rock	5.97 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Fe-Carb
Goldenville Horizon					
52. East Shaft	Unknown	Unknown	Unknown	Unknown	Sil
53. Main Shaft	Quartz Vein	12.89 g/t - 1.8m (DDH)	(Au),py,mag	Iron Formation	
		3.29 g/t - 0.7m (DDH)			Sil, Carb
54. North Shaft	Quartz Vein	Unknown	(Au),py	Intermediate Volcanics	Unknown
Maritec Trenches					
55. # 3	Quartz Vein	14.3 g/t (gs)	(Au),py,mag	Iron Formation	Fe-Carb
56. # 4	Quartz Vein	9.8 g/t (gs)	(Au),py,mag	Iron Formation	Sil, Fe-Carb
57. # 5	Quartz Vein	4.68 g/t (gs)	(Au),py	Mafic Volcanics	Sil
58. # 1	Altered Wall Rock	1.38 g/t (gs)	(Au),py	Gabbro	Sil
59. # 2	Altered Wall Rock	22.2 g/t (gs)	(au),py	Gabbro	Sil, Carb

Table 2. *Continued*

OCCURRENCE	STYLE	Au GRADES	MINERALOGY	HOST ROCK	ALTERATION
60. Green Cove Brook	Quartz Vein	6.44 g/t (gs)	(Au), spec	Iron Formation (Goldenville Horizon)	Nil
61. Barry & Cunningham	Quartz Vein	331.0 g/t (gs)	Au,py,cp	Quartz Sericite Schist	Sil, Ser
62. Stog'er Tight Mine	Altered Wall Rock	0.65 mt @ 6.5 g/t	Au,py	Gabbro	Sil, Carb, Py, Alb
63. Gabbro Zone	Altered Wall Rock	4.6 g/t - 14.0 m (DDH)	Au,py	Gabbro	Sil, Carb, Py, Alb
64. Main Zone	Altered Wall Rock	Unknown	Au,py	Mafic Volcanics / Tuffs	Sil, Carb, Py, Alb
65. Magnetic Zone	Altered Wall Rock	7.68 g/t - 6.4 m (DDH)	(Au),py	Gabbro	Sil, Carb, Py, Alb
66. Cliff Zone	Altered Wall Rock	7.11 g/t - 3.5 m (cs)	(Au),py	Gabbro	Sil, Carb, Py, Alb
67. Massive Sulphide	Massive Pyrite	2.3 g/t - 1.0 m (cs)	(Au),py	Mafic Volcanics/Fe-Formation	Sil, Carb, Py, Alb
68. Shear #1	Altered Wall Rock	1.63 g/t (gs)	(Au),py	Ultramafics	Unknown
69. Carrol Option	Altered Wall Rock	2.3 g/t (gs)	(Au),py	Gabbro	Sil, Fe-Carb
70. Stuckey Vein	Quartz Vein	6.2 g/t - 0.6 m (cs)	Au,(Ag),gn,cp,py	Gabbro	Fe-Carb (weak)
71. Uncle Hank	Quartz Vein	Unknown	(Au),gn,sp,cp,py	Unknown	Unknown
B. Krissy Boulder (float)	Quartz Vein	Visible Au	Au, py	Unknown	Unknown
72. Krissy Trend	Quartz Vein	3.4 g/t - 1.0 m (DDH)	(Au),py,gn	Qtz-Lithic Tuff	Sil, Ser
73. WJ-660	Altered Wall Rock	1.0 g/t - 4.0 m (cs)	(Au),py	Crystal Lithic Tuff	Sil, Ser
74. FDR (Fred Derf)-263	Altered Wall Rock	76.0 g/t (gs)	(Au),py	Feldspar Porphyry	Sil, Ser
75. Brass Buckle	Quartz Vein	242.5 g/t -0.25m(DDH)	Au,py	Gabbro, Mafic and Felsic Volcanics	Sil
76. Brass Buckle Ext.	Quartz Vein	Visible Au	Au,py	Unknown	Unknown
77. BBT	Altered Wall Rock	4.3 g/t (gs)	(Au),py	Felsic Pyroclastics	Sil, Ser
78. Skidder Pond	Altered Wall Rock	5.1 g/t (gs)	(Au),(Ag),py,cp	Feldspar Porphyry	Sil, Ser
79. Tie Line (Twin Pond)	Quartz Vein	2.8 g/t (gs)	(Au), mag	Mafic Volcanics	Sil
Fleur De Lys (NTS 12I/01)					
80. Marble Cove	Quartz Vein	9.9 g/t (gs)	(Au),py	Ultramafics (?)	Sil, Ser
81. Fox Pond (#1)	Altered Wall Rock	61.8 g/t - 1.0 m(cs)	Au,mag,py,cp,bo	Ultramafics	Talc, Carb, Serp
82. Fox Pond (#2)	Altered Wall Rock	18.5 g/t - 0.20 m(DDH)	Au,mag,py,cp,bo	Ultramafics	Talc, Carb Serp
83. Fox Pond North	Altered Wall Rock	2.7 g/t (gs)	(Au),py	Gabbro	Sil, Carb, Chl, Ser
84. Gabbro Showing	Altered Wall Rock	1.90 g/t (gs)	(Au),py	Gabbro	Sil, Carb, Chl, Ser
85. Main Zone Deer Cove	Quartz Vein	226.0 g/t - 1.5 m	Au,py,cp,asp	Mafic Volcanics, Diabase and Gabbro	Sil, Carb, Chl, Epi, Ser
86. AK-2	Quartz Vein	7.65 g/t (gs)	(Au),py	Microgabbro	Sil, Carb, Chl, Epi, Ser
87-108. Deer Cove Block	Quartz Vein		(Au),py	Mafic Volcanics	Sil, Carb, Chl, Epi, Ser
109. Devils Cove	Quartz Vein	1.25 g/t (gs)	(Au),py	Ultramafics	Talc-Carb
110. Eastern Point	Quartz Vein	2.5 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Carb, Chl, Epi, Ser
Nippers Harbour (NTS 2E/13) (Not examined during this study)					
111. Nugget Pond Mine	Altered Wall Rock	0.488 mt @ 0.357 oz/t	Au, Ag, py	Nugget Pond Horizon	Py,Stilp,Qtz-Feld-Carb Stockwork
112. Pine Pond West	Altered Wall Rock	1.83 g/t (gs)	(Au)	Ultramafics/quartz-feldspar porphyry	Sil
113. Pine Pond East	Altered Wall Rock	26.12 g/t (gs)	(Au), py	Gabbro/Diabase	Py
114. South Yak Lake (OMJ Showing)	Quartz Vein	4.22 g/t (gs)	(Au),(Ag),gn,bo,cp,co, mag,hem	Fe-Formation ?	Sil
115. Boneyard Showing	Quartz Vein	3.01 g/t (gs), 6.87 g/t - 2.01 m (DDH)	(Au),py	Felsis Volcanics	Sil, Py
116. Long Pond/Inco	Quartz Vein	2.8 g/t (gs), 21.5 g/t - 1.19 m (DDH)	(Au),py,spec,cp	Ultramafic Rocks	Carb,Hem,Sil,Serp,Talc
117. Long Pond West	Quartz Vein	5.814 g/t	(Au),spec	Conglomerate	Sil, Carb
118. Long Pond Shear	Quartz Vein	4.1 g/t A (gs)	(Au),py	Gabbro	
119. Low Water (Newmont) Showing	Quartz Vein	13.5 g/t (gs), 2.13 g/t - 0.64 m (ddh)	(Au),spec,py	Basalt	Qtz-Carb Veining
120. Betts Big Pond	Quartz Vein	60.6 g/t (gs)	(Au),py	Quartz Porphyry	Nil
121. George Showing	Quartz Vein	12.43 g/t - 7 cm (cs)	(Au),spec	Felsic Tuff	Sil, Carb
122. Tom Showing	Quartz Vein	3.7 g/t - 30 cm (cs)	(Au),spec	Felsic Tuff - Conglomerate Contact	Sil
123. Red Cliff Pond "A and B"	Quartz Vein	2.0 g/t (gs) Fe-Formation, 4.0 g/t (gs) Chlorite Schist	(Au)	Fe-Formation, Chlorite Schist	
124. Red Cliff Pond West	Carbonate Vein	1.49 g/t - 2.02m (ddh)	(Au),py	Ultramafic	Talc, Carb
125. Arrowhead Pond	Quartz Vein	1.2 g/t (gs)	(Au),cp	Ultramafic	Talc, Carb
126. Inco No Name	Carbonate Vein	1.35 g/t -1.5m (ddh)	(Au),spec	Ultramafic	Unknown
Genesis Unknown (Syngenetic or Epigenetic) (NTS 12H/16)					
127. Uncle Enos	Altered Wall Rock	22.4 g/t - 1.1 m (cs)	(Au),py	Qtz-Sericite Schist	Sil, Ser
128. Footwall Au Zone	Altered Wall Rock	32 Kt @ 6.12 g/t	(Au),py	Qtz-Sericite Schist	Sil, Ser
129. Hill Bog	Altered Wall Rock	13.6 g/t - 1.5 m (cs)	(Au),py	Qtz-Sericite Schist	Sil, Ser
130. Uncle Bill	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
131. Uncle Theo	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
132. Uncle Angus	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
133. Uncle Will	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
134. Uncle Mike	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
Genesis Unknown (Syngenetic or Epigenetic) (NTS 2E/13)					
135. Long Pond East	Unknown	15.4 g/t (gs)	(Au),py	Argillite	Unknown
136. Nippers Harbour N.	Unknown	4.3 g/t (gs)	(Au)	Mafic Dykes	Unknown
137. Nippers Harbour Cu	Unknown	6.3 g/t (gs)	(Au),cp?	Mafic Dykes	Unknown
138. Pittmans Bight	Unknown	1.2 g/t (gs)	(Au),cp?	Mafic Dykes	Unknown
139. Dump Pond	Unknown	3.57 g/t (gs)	(Au)	Ultramafic?	Sil, Carb
140. East Pond Newmount	Unknown	2.09 g/t (gs)	(Au),py	Pillow Lava	Sil
141. Jilks Point	Unknown	2.75 g/t (gs) (>10,000 ppm Cu)	(Au),cp ?,py	Diabase Dyke	Sil

just south of the town of Baie Verte, as comprising four alteration assemblages related to progressive alteration. These assemblages include: i) chlorite–calcite, ii) chlorite–calcite–ankerite, iii) sericite–ankerite–siderite, and iv) chlorite–ankerite–fuchsite. Gold occurs only within the sericite–ankerite–siderite zone.

In felsic volcanic rocks, the alteration comprises sericitization and silicification. The Crow Hill North and South prospects, which are located within the Mic Mac Lake group (Figure 1), are examples of the felsic-hosted quartz–pyrite subclass. The Crow Hill North prospect occurs within weakly silicified, bleached quartz–feldspar porphyritic lithic tuff containing up to 3 percent disseminated pyrite and rare specularite (Deering and MacDougall, 1989). Chlorite accompanied by 1 to 5 percent fine disseminated pyrite occurs as fracture coatings throughout the mineralized zone. Channel samples from the Crow Hill North assayed up to 1.87 g/t over 11.0 m.

At Crow Hill South, the felsic volcanic rocks are strongly sheared, silicified and sericitized, and cut by abundant milky-white quartz tension-gash veins (Deering and MacDougall, 1989). Minor specularite and 1 to 5 percent medium-grained disseminated pyrite occur throughout the altered felsic rocks. Zones of up to 5 percent disseminated and stringer pyrite occur marginal to the sericitic alteration. Assay results from the prospect include 1.03 g/t Au over a 12.0 m channel and 1.01 g/t Au over 10.6 m in diamond-drill core.

Quartz veining is a significant component of both the mafic- and felsic-hosted examples of this subclass. Shear, quartz breccia and tension-gash vein styles can be present. The veins typically consist of milky-white quartz ± carbonate. Pyrite occurs within the veins as weak disseminations, coarse patches, clots and bands. Disseminated pyrite may be present in the altered wall rock. Elevated to economically significant gold values are associated with pyrite, both in the veining and in the altered wall rock. Gold concentrations can be correlated with pyrite abundances. The gold appears to occur within fractures and as inclusions within the pyrite grains. Selected grab samples from the Albatross prospect (McDougall, 1989) containing between 2 and 10 percent pyrite assayed up to 31 g/t Au (Table 2). Channel samples from the same occurrences typically assayed much lower, generally <3 g/t Au over 5.0 m.

TALC–MAGNESITE–MAGNETITE REPLACEMENT

This subclass is not extensive, the known occurrences are restricted to the Point Rousse Complex and include the Fox Pond #1 and Fox Pond #2 prospects. The mineralization and alteration are localized within narrow approximately north–south-trending high-strain zones that cut weakly serpentinized ultramafic rocks. Within these shear zones the ultramafic rocks are strongly altered to an assemblage of talc and magnesite. The zones are cut by, i) talc–magnesite–dolomite tension-gash veins that are up to 15 cm thick, ii) anastomosing stockwork-like veinlets, and iii) fracture-controlled porcelain-white dolomite veins. Gower (1988) reported that the dolomite veins also contain minor amounts of pyrite, chalcopyrite, malachite, bornite and locally exhibit greenish crystalline talc margins. All the vein sets contain clots of magnetite. Fine stringers and disseminations of magnetite are also present within the talc–magnesite altered ultramafic rocks adjacent to the veins and as blocks within the stockwork-like veining.

Visible gold was observed in the altered wall rock at the Fox Pond #1 prospect (Gower, 1988). Gower (1988) also reported that gold values were obtained from, the talc–magnesite–dolomite veins, dolomite veins that contained no sulphide minerals, vein selvages, and wall rock within the shear zones including the magnetite-rich blocks. Channel sample assay results from the Fox Pond #1 prospect range up to 61.8 g/t au over 1.0 m. Diamond drilling at the Fox Pond #2 prospect intersected a 0.2 m zone of talc–magnesite that assayed 18.5 g/t Au.

RED ALBITE–PYRITE REPLACEMENT

The Stog'er Tight deposit (Figure 1, Table 2) is one of a cluster of five significant gold deposits and prospects located within the Point Rousse Complex just west of the community of Mings Bight. These occurrences were discovered by Noranda Exploration Company Limited beginning in 1987 (Huard, 1990). The alteration and gold mineralization appears to be unique to these deposits and has not yet been recognized outside of the Stog'er Tight area. The structural setting of the occurrences has been documented by Kirkwood and Dubé (1992). They interpreted the alteration and mineralization to have formed during brittle–ductile deformation attributed to a late D_1 event.

The mineralization and alteration were examined by Ramezani (1992). He defined four alteration zones based on distinct mineral assemblages, these include, i) a chlorite–calcite zone, ii) an ankerite–sericite zone, iii) a chlorite–magnetite zone, and iv) a red albite–pyrite (+gold) zone. The red albite–pyrite zone is termed a replacement vein. Abundant quartz veins occur within the mineralized zones both as barren tension-gash veins that are interpreted to postdate the mineralization, and as shear-parallel, quartz–albite–ankerite veins. The gabbroic wall rock adjacent to the shear veins is characterized by intense red-albite alteration and by coarse auriferous pyrite. The intensity of the alteration diminishes within 5 to 15 cm from the shear-parallel veins. The hydrothermal alteration at Stog'er Tight has been dated by U–Pb zircon at 420 ± 5 Ma (Ramezani, 1992).

Ramezani (1992) reported that the gold within the Stog'er Tight zone occurs as fine-grained (<0.05 mm) micro veinlets and disseminated blebs within the pyrite. Channel sampling across the Stog'er Tight zone returned values of up to 23.0 g/t Au over 7.0 m and grab samples up to 115.3 g/t Au (Huard, 1990). Diamond drilling by Noranda Exploration Company Limited traced the zone approximately 150 m down-dip and indicated a plunge to the east, which increased its strike length to 650 m. Based on this work a deposit with a probable geological reserve of 650 000 tonnes grading 6.7 g/t Au was outlined. Open-pit mining of the deposit between October 1996 and January 1997 by Ming Minerals Incorporated revealed that the ore zone was not a continuous sheet-like body but rather a series of discrete lenses or pods developed within a shear zone (Bradley, 1997).

UNASSIGNED GOLD OCCURRENCES

These occurrences are all located within the Pacquet Harbour Group and are spatially associated with the volcanogenic massive sulphide deposits of the Rambler mining camp. The occurrences can be classified as belonging to the altered wall-rock style of gold mineralization. However, due to their spatial association with volcanogenic massive sulphide deposits a volcanogenic origin cannot be ruled out. Further work is required to resolve their origin.

The Footwall Zone, Main Mine is one of the more significant of the auriferous zones spatially associated with massive sulphide mineralization in the Rambler area. During mining operations (1964 to 1967) about 399 093 tonnes of massive sulphide ore grading 1.3% Cu, 2.16% Zn, 5.6 g/t Au and 29.14 g/t Ag were produced from the Main Mine. The massive sulphide deposit had a maximum strike length of about 90 m and was mined down to a vertical depth of approximately 550 m (Hibbard, 1983; Coates, 1990).

The footwall to the Main Mine consists of a unit of quartz–sericite schist and chlorite schist that are cut by bands, veinlets and disseminations of pyrite, chalcopyrite and sphalerite. A section of the footwall immediately beneath the massive sulphide mineralization contains significant concentrations of gold. Bradley (1997) indicated that higher gold grades within the footwall zone appear to correspond directly to an increase in the concentrations of sphalerite and chalcopyrite, and an increase in silicification with a corresponding decrease in the amount of sericite and chlorite. Sections of the footwall containing abundant fuchsite do not contain significant concentrations of gold. Gold grades within the footwall are reported to decrease significantly beyond the strike extent of the massive sulphide body. The auriferous Footwall Zone has been traced from surface down to a depth of 520 m (Coates, 1990). From August to October 1996, Ming Minerals Incorporated, mined a portion of the crown pillar and the footwall Zone in an attempt to recover the gold.

GEOLOGICAL SETTING OF THE EPIGENETIC GOLD MINERALIZATION

The rocks of the Baie Verte Peninsula, and in particular those of the Baie Verte Belt, are prolific hosts for gold mineralization. Major regionally extensive structures such as the Mic Mac–Flatwater Fault exhibit a tight spatial association with many of the gold occurrences. Such structures form key exploration targets. Most of the epigenetic occurrences associated with these structures were discovered during the exploration boom between 1985 and 1990. Since then many of the high potential areas have received little exploration effort, but the potential for further discoveries is still excellent.

The complex deformational history of the Baie Verte Line resulted in, i) the juxtaposition of a variety of rock types that could serve as gold sources, ii) the generation of large volumes of metamorphic fluid capable of removing and transporting gold, iii) a series of deep-seated regionally extensive faults to serve as fluid conduits, and iv) the structural preparation of favourable host rocks. The numerous regionally extensive structural breaks, such as the Mic Mac–Flatwater Fault and the Scrape Thrust, can be considered to be subsidiary structures associated with the Baie Verte Line and brittle movement associated with these structures provide sites for gold deposition; these sites do not appear to be lithogically controlled. However, mafic rocks, particularly gabbro, are the most prevalent gold host due to their Fe-rich nature and their competency contrasts with surrounding rocks, which enables them to deform more brittlely.

Based on the styles of epigenetic gold mineralization there would appear to have been at least two, and possibly three, different gold-bearing fluids, or sources of fluids, responsible for the gold occurrences on the Baie Verte Peninsula (Table 1). One fluid was CO_2-rich and produced pyritiferous gold occurrences, particularly in the ophiolitic sequences. The second mineralizing fluid produced the base-metal-rich vein systems that occur mainly in the Ordovician and younger cover sequences. These fluids were probably not significantly different in age but their source areas contrasted significantly. The fluids responsible for the pyritiferous gold occurrences were probably derived from the ophiolitic sequences, but the base-metal-bearing fluids would have had to been derived from either Grenvillian basement or felsic volcanic and sedimentary rocks of island-arc derivation. Preliminary isotopic data for many of these occurrences appears to support this multiple source theory (Derek Wilton, personal communication, 1997) and further study is ongoing. A third possible source for the base-metal-rich fluids could have been the Silurian Burlington Granodiorite.

Ramezani (1992) determined that the alteration at the Stog'er Tight deposit had a U–Pb hydrothermal zircon age of

420 ± 5 Ma. Xenotime from mineralized veining from the Nugget Pond deposit was dated at 374 Ma (Bédard *et al.*, 1997). The Silurian sequences all contain gold occurrences, which indicates that the gold mineralization postdates the deposition or intrusion of the Silurian rocks. Auriferous quartz veins within the Pacquet Harbour Group all contain sugary-textured recrystallized quartz. This area was affected by regional Acadian deformation that resulted in upper greenschist to lower amphibolite-grade metamorphism; this suggests that the gold-bearing quartz veins are pre-Acadian in age. Therefore, the age of the gold mineralization on the Baie Verte Peninsula can be broadly constrained to the Late Silurian–Early Devonian.

OPHIOLITIC ROCKS

The ophiolitic sequences (Advocate and Point Rousse complexes and Pacquet Harbour Group) of the Baie Verte Belt are the most prolific hosts to gold mineralization and all the epigenetic gold subclasses are represented. However, base-metal-rich quartz veins are restricted to the Pacquet Harbour Group, which is probably in part, stratigraphically equivalent to the Flatwater Pond Group. The mafic volcanic and gabbroic rocks of the Point Rousse and Advocate complexes contain most of the gold occurrences. However, economically significant deposits appear to be restricted to the Point Rousse Complex. Within the Pacquet Harbour Group gold mineralization is associated with both mafic and felsic sequences.

The quartz–pyrite subclass of the altered wall-rock style of gold mineralization, accompanied by extensive Fe-carbonate alteration, is the most widespread style of gold mineralization within the ophiolitic sequences. But, despite their abundance these occurrences consistently exhibit low gold concentrations and typically contain less than 5 percent pyrite. Even though the CO_2-rich fluids responsible for the alteration and mineralization liberated abundant iron from the breakdown of mafic minerals, the low sulphur concentrations resulted in the low pyrite abundances. These fluids carried gold as is evidenced by the gold concentrations in pyrite-rich zones. If pyrite formation is restricted then a nucleation site for gold was lacking and therefore much of the gold remained in solution. One possible source of sulphur was the abundant Fe-formations that locally contain bedded pyrite. Interaction of the CO_2-rich fluids with this biogenic pyrite would liberate sulphur.

Within the Point Rousse Complex iron formations are common. The most extensive unit, which consists of inter-banded ferruginous chert and iron formation, is referred to as the Goldenville horizon. The horizon is host to five gold occurrences (Figure 1), the most significant of which is the Goldenville Mine. Within this horizon gold is associated with pyritiferous quartz veins and as disseminated gold hosted by bedded magnetite and ferruginous cherts. Background gold values for the Goldenville horizon are typically 15 to 20 times the background of 3 to 4 ppb for the surrounding mafic rocks (Frew, 1971; Fitzpatrick, 1981). This led previous workers to state that the gold mineralization is strata-bound and syngenetic. However, where the chert is fractured and veined it was reported to locally contain up to 4 times more gold than more massive non-fractured chert (Frew, 1971; Fitzpatrick, 1981). Hibbard (1983) also reported that at the main shaft the gold-bearing quartz veins crosscut the regional foliation indicating that the gold was remobilized. It is not known if the iron formation was the source of the gold, but based on the abundance of gold occurrences in the immediate area, many of which are hosted by gabbro, an external source is likely. The Fe-rich gabbros and iron formation would act as chemical traps for the gold-bearing fluids.

COVER SEQUENCES

The Flatwater Pond Group is host to auriferous quartz–pyrite veins, base-metal-rich quartz veins and quartz–pyrite replacement accompanied by extensive Fe-carbonate alteration in mafic volcanic and intrusive rocks and sericitization and silicification in felsic volcanic rocks. In the Mic Mac Lake group gold is associated with, i) pyritiferous quartz–sericite schists, and ii) base-metal-rich quartz veins that are accompanied by minimal wall-rock alteration. Within the Cape St. John Group gold mineralization is associated with narrow pyritiferous sericite schist zones developed within felsic volcanic rocks.

Extensive Fe-carbonate alteration is restricted to the Ordovician mafic rocks. A number of gold occurrences exhibiting Fe-carbonate alteration (Voodoo, Tamworth, Mega Vein and Tornado; Figure 1 and Table 2) are located on the eastern shore of MicMac Lake and are hosted by rocks included in the Mic Mac Lake group. Kidd (1974) who mapped and defined the Mic Mac Lake group indicated that some of the rocks to the east of MicMac Lake could indeed be Ordovician. This was based on mapping by Neale and Nash (1963) who reported that pillow lava outcropped on islands near the eastern shore of MicMac Lake. Trenching near the Voodoo prospect exposed abundant fine-grained gabbro and mafic volcanic flows, both exhibiting extensive zones of Fe-carbonate alteration. Diamond drilling in the same area intersected a sequence of mafic volcanic rocks, locally pillowed, intruded by a series of fine-grained gabbros. As the Mic Mac Lake group is comprised of subaerial volcanic rocks, the pillow lava probably belongs to the Flatwater Pond Group. If this is correct then there are no examples of Fe-carbonate alteration within the Silurian or younger cover sequences.

SILURIAN INTRUSIVE ROCKS

Gold occurs in both the Burlington Granodiorite and the

Cape Brule Porphyry. It occurs in association with shear-hosted base-metal-rich quartz veins within the Burlington Granodiorite and quartz–pyrite veins within the Cape Brule Porphyry.

FLEUR DE LYS BELT

The Castors Pond prospect and the Osbournes Pond and Breezeway showings are the only reported significant gold occurrences within the Fleur de Lys Belt. At Castors Pond, the gold is associated with pyritiferous quartz veins hosted by graphitic zones within muscovite schist. Both the Osbournes Pond and Breezeway showings comprise small base-metal-rich veinlets developed within muscovite schist and marble. These three occurrences are related to a major arcuate structure, a possible splay from the Baie Verte Line, which extends northward toward the community of Fleur de Lys. Isolated pods or lenses of ultramafic rocks occur along this structural zone. It is believed that the gold is related to these fragments of Baie Verte Belt rocks.

SUMMARY

The Baie Verte Peninsula is host to the largest concentration of gold occurrences in Newfoundland. Three of these deposits have been mined and one, the Nugget Pond Deposit, is currently in production. In the past, mineral exploration has mainly concentrated on the Baie Verte Belt and in particular on the Cambro-Ordovician ophiolitic and cover sequences. The lack of significant gold mineralization within the Fleur de Lys Belt may only reflect the limited amount of gold exploration carried out within this area. A number of large sigmoidal topographic linears extend from the Baie Verte Line northwestward across the Fleur de Lys Belt. The gold potential of these features should be examined. Exploration work should concentrate along structures that are demonstrably Late Silurian or younger in age.

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