Current Research (1998) Newfoundland Department of Mines and Energy
Geological Survey, Report 98-1, pages 77-83

ROMEO AND JULIET PROSPECT, BAIE VERTE PENINSULA, NEWFOUNDLAND

J. Meade, D.T.W. Evans[1] and D.H.C. Wilton
Department of Earth Sciences, Memorial University of Newfoundland,
St. John's, Newfoundland, Canada, A1E 2H7

ABSTRACT

The Romeo and Juliet prospect is an example of a mesothermal auriferous shear-vein style of mineralization. The prospect comprises three zones, the Juliet North and South zone, the Connecting zone and the Romeo zone. Each zone consists of a massive milky-white quartz vein developed subparallel to a major north-northeast-trending shear zone. Internally, the veins exhibits crack-seal textures indicating multiple generations of veining; each generation developed parallel to the overall trend of the zone. The prospect has been exposed by trenching over a strike length of 250 m. Visible gold is developed along vein margins, and has been observed at numerous locations along the strike length of the prospect. Locally, visible gold has also been observed within the massive quartz.

INTRODUCTION

The Romeo and Juliet prospect is a structurally controlled mesothermal lode gold occurrence hosted by ophiolitic rocks of the Point Rousse Complex (Figure 1). The prospect is located on the Mings Bight Peninsula approximately 500 m north of Pine Cove. The prospect forms the basis of a B.Sc. (Honours) thesis by the senior author. This study documents the nature of the gold mineralization and its geological setting. The prospect is compared with similar vein systems elsewhere on the Baie Verte Peninsula and elsewhere on the Island.

Access to the study area is via paved highway from the Trans-Canada Highway to the town of Baie Verte (Route 410). The Pine Cove area can be accessed via Route 418, which joins the town of Ming's Bight with the La Scie Highway (Route 414). A rough gravel road extends from the Ming's Bight Highway to Pine Cove on the eastern shore of Baie Verte. A skidder trail leads directly to the prospect from the Pine Cove deposit.

PREVIOUS WORK

The Romeo and Juliet prospect was discovered by Varna geologist Wilson Jacobs during regional prospecting of the Pine Cove property in 1987 (C. Dearin, personal communication, 1997). A series of grab samples collected from the vein assayed up to 2.15 g/t Au. In 1988, Corona Corporation optioned the Pine Cove property and initiated a regional exploration program. In 1989, the prospect was trenched and tested by four diamond-drill holes (Dimmell and Hartley, 1991a). The Romeo and Juliet prospect is currently the property of Nova Gold Incorporated and New Island Minerals. Approximately 10 ounces of gold have been recovered from a 10-tonne bulk sample collected from the Juliet South zone (K. MacNeill, personal communication, 1997). As part of a regional structural study for Corona Corporation, Calon and Weike (1990) interpreted the veins to have formed as large *en échelon*, dilational (antitaxial) quartz veins that formed at an oblique angle to a shear zone.

GENERAL GEOLOGY

The Romeo and Juliet prospect is located on the western side of the Mings Bight Peninsula within rocks of the Cambro-Ordovician Point Rousse Complex. The complex comprises a dismembered ophiolite sequence conformably overlain by a mafic volcanic–volcaniclastic cover sequence (Hibbard, 1983). The ophiolite components are bound by high-angle faults and thrusts, with the thrust faults dipping moderately to the northwest (Hibbard, 1983). The Point Rousse Complex has been thrust southward over the Pacquet Harbour Group along the Scrape Thrust. The Scrape Thrust follows an arcuate pattern that defines the apex of the Baie Verte Flexure in the Pine Cove area (Dimmell and Hartley,

[1] Mineral Deposits Section

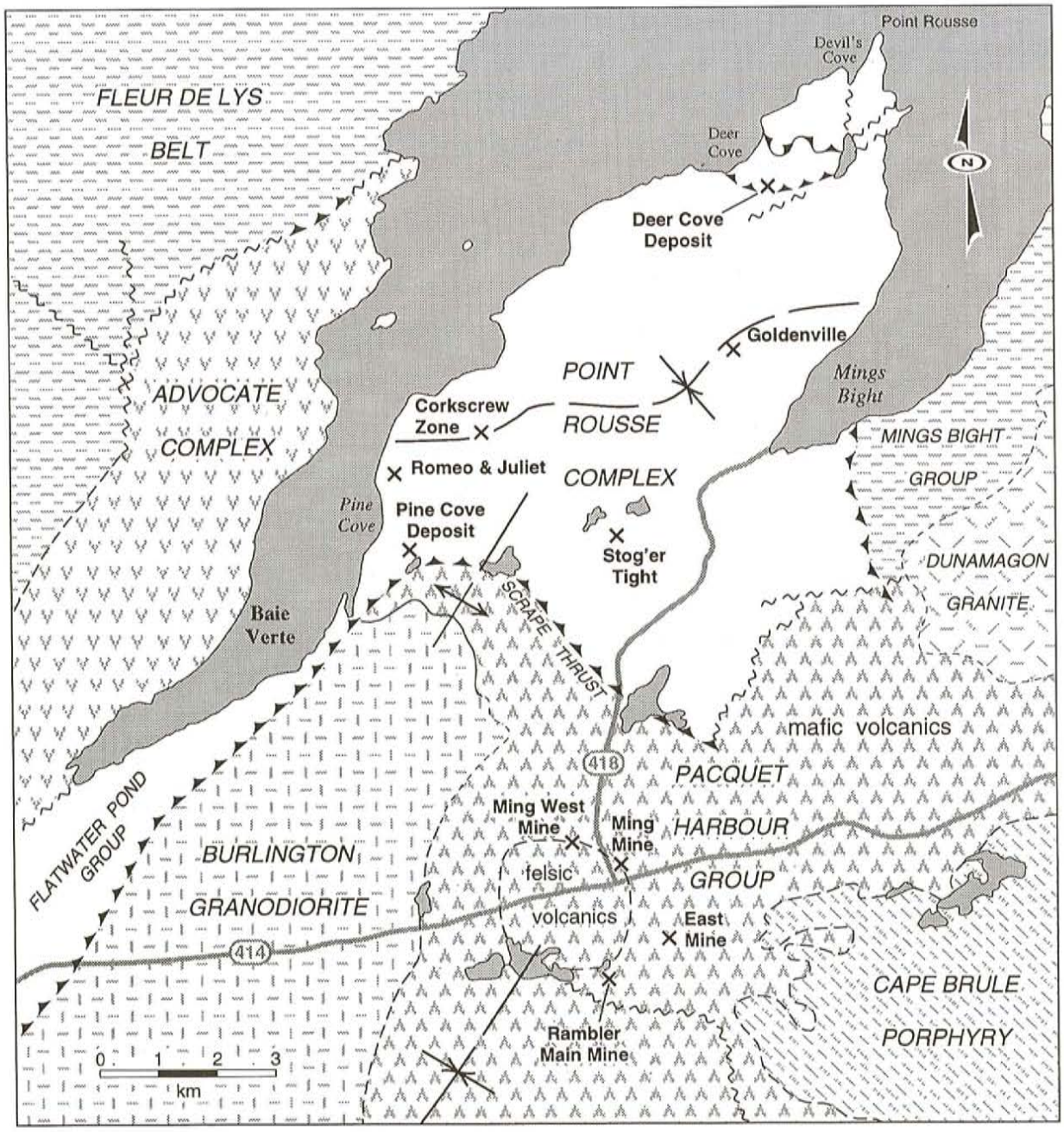


Figure 1. *Simplified geology map of the Mings Bight Peninsula, showing the locations of the major gold occurrences and past-producing base-metal mines (modified from Dimmell and Hartley, 1991b).*

1991b). It trends north-northeast to the west of the Pine Cove deposit and southeast to the east of the deposit.

The Point Rousse Complex has been recognized as hosting several gold deposits and showings, including the Stog'er Tight, Pine Cove and Deer Cove deposits (Figure 1). The Stog'er Tight deposit consists of four auriferous zones: Gabbro zone, Stog'er Tight zone, Main zone and Magnetic zone (Huard, 1990). The Pine Cove deposit comprises two zones: Lightning zone and Thunder zone (Dimmell and Hartley, 1991b). These two deposits, as well as the deposit at Deer Cove (Patey, 1990; Patey and Wilton, 1993) are all of the mesothermal lode gold variety.

In the area of the Romeo and Juliet prospect, the Point Rousse Complex comprises relatively undeformed, massive fine-grained, non-variolitic and locally vesicular pillow basalts. Fine-grained, gabbroic intrusive rocks are common in the area of the prospect and, locally, form the immediate host rock to the mineralization.

MINERALIZATION AND ALTERATION

The Romeo and Juliet prospect consists of a series of three subparallel quartz vein zones: i) Juliet South–Juliet North zone, ii) Connecting zone, and iii) the Romeo zone (Figures 2 and 3). These vein systems have been exposed over a strike length of 250 m trending 030° and dipping approximately 60° to the southeast. The veins are associated with an intense north-northeast-trending shear zone. The large veins consist of smaller, multiple generations of parallel milky-white quartz, as evident by crack-seal textures, comb textures, weakly preserved lamination and altered wall-rock fragments.

JULIET SOUTH ZONE

The Juliet South zone has a strike length of about 60 m and consists of a massive vein, comprised of multiple generations of smaller veins. The massive vein and its component veins are offset by oblique strike-slip faults. The host rock comprises fine-grained, strongly epidotized green pillow lava and variably Fe-carbonitized fine-grained gabbro (Figure 4). The wall rock adjacent to the veins is strongly fractured having well-developed cleavage trending subparallel to the quartz veins. The iron carbonate altered wall rock weathers a rusty brown and displays a slight mineral lineation in the plane of the cleavage and parallel to the dip surface. The degree of host-rock fracturing and orientation of the quartz veins suggest that the veins developed in a shear zone parallel to the cleavage. The veins consist of fractured, milky-white quartz having local vugs containing well-developed quartz crystals.

The multiple vein margins look like fracture surfaces, but quartz crystal terminations give the surface its ragged, pitted or fractured appearance. It is along these surfaces that visible gold occurs as fine grains or blebs. Small flecks of gold were also observed along a cut surface of a quartz sample from the zone indicating that gold also occurs within the massive veins as well. Channel sample results from this zone are typically low. However, a 1.0 m interval from the Juliet South zone assayed 23 g/t Au (Dimmell and Hartley, 1991a). Diamond drilling on the zone also returned generally low values with the exception of a 0.5 m interval which assayed 11.1 g/t Au (Figure 4). Rare oxidized pyrite cubes with pyritohedrons up to 4 mm in diameter, but averaging 2 mm, also occur along these surfaces. The irregular vein margins are typically greyish having a greasy sheen, and are coated with minor green sericite and a soft clay-like mineral. Vein margins are locally a rusty red due to prominent hematite staining. Extensive milky-white veining is developed parallel to the shearing throughout the footwall rocks to the massive vein.

JULIET NORTH ZONE

The hanging wall rocks of the Juliet North zone consist of mafic volcanic breccias and broken pillow basalts. Footwall rocks are strongly altered and well cleaved as in the Juliet South area. The contact between the pillow basalts in the hanging wall and the quartz vein is not exposed but is inferred to be within 6 to 8 m from the visible pillow basalt outcrop. As in Juliet South, the quartz is typically milky white. The veins trend 020/65° southeast and display weak banding. This portion of the Juliet North zone contains no visible pyrite. The vein itself is cut by crosscutting fractures trending 125/85° east. The northeast portion of the vein displays a 0.5-m sinistral offset, whereas the vein is cut off by a fault trending 025/85° southeast. The fault trace disappears into the bank. The wall rock adjacent to the veins is highly cleaved from about 1.5 m into the hanging wall and about 5.0 m into the footwall.

CONNECTING ZONE

The Connecting zone runs for a strike length of approximately 40 m north-northwest. Within this zone, there is a 37-m-long quartz vein having a maximum exposed width of 1.2 m; the vein is overlain by pillow basalts. Vein margins are strongly deformed in a similar fashion to that of Juliet North. Evidence of brittle deformation postdating vein formation is indicated by fracturing of the quartz vein and surrounding wall rock. Also, slivers of quartz were broken off from the main section of the vein and incorporated into the footwall rock, during deformation. Brittle deformation is more pronounced in the hanging wall than in footwall rocks.

Spectacular visible gold mineralization is localized along the multiple vein margins. These surfaces also contain rare oxidized pyrite cubes up to 4 mm across, as well as minor sericite along fresh fracture surfaces.

ROMEO ZONE

The Romeo zone covers an area measuring approximately 20 by 40 m. The quartz veining is localized within a northeast-trending shear zone oriented at 040°. An intense Fe-carbonate alteration halo surrounds the veining (Dimmell and Hartley, 1991b).

The southern end of the Romeo vein system consists of a buff-coloured quartz vein with red hematite staining along fracture surfaces. Angular fragments of wall rock are trapped within quartz along vein margins. Sericite and euhedral pyrite cubes and pyritohedrons up to 5 mm, but averaging 2 to 3 mm across occur along growth surfaces. The general trend of this portion of the vein is 062/72° southeast. A zone of strong iron carbonate alteration trending 038/60° south, with associated tension-gash quartz veins at multiple orientations and similar textures described above, trends subparallel to larger veins.

Toward the north end of the Romeo zone, the quartz vein becomes undulatory. Tension-gash veins trend roughly subparallel to the direction of shear at 036/44° northwest. Veins

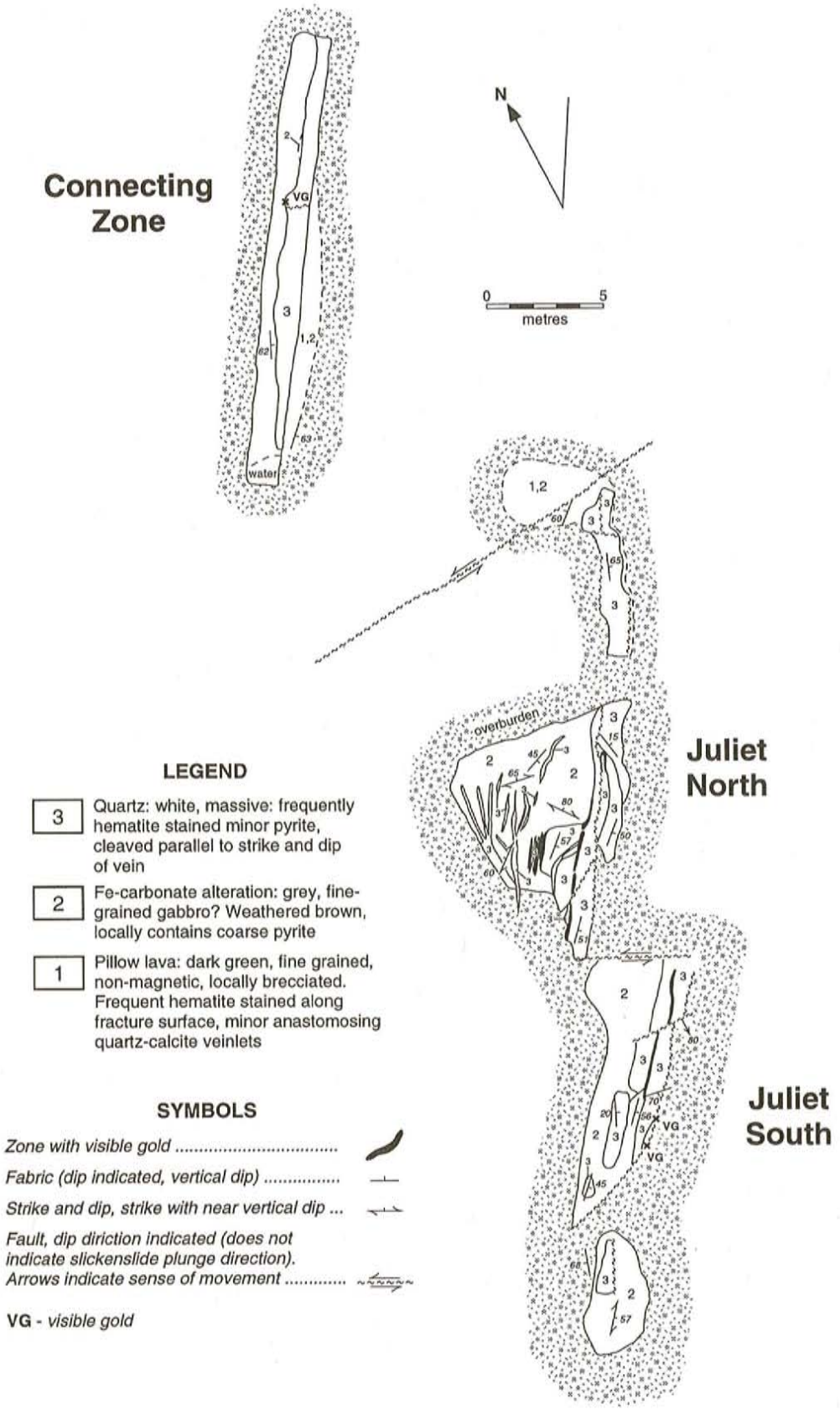
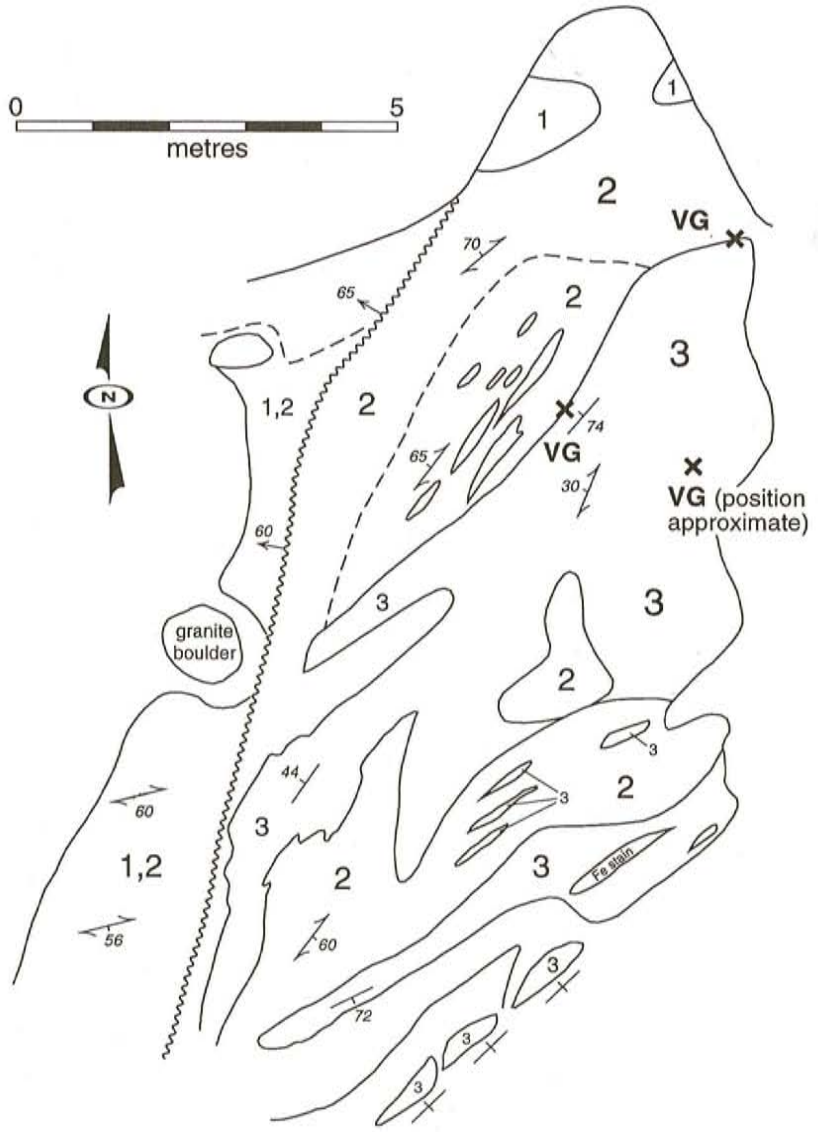


Figure 2. *Trench geology map of the Juliet and Connecting zones.*



LEGEND

3	Quartz: white, massive: frequently hematite stained minor pyrite, cleaved parallel to strike and dip of vein
2	Fe-carbonate alteration: grey, fine-grained gabbro? Weathered brown, locally contains coarse pyrite
1	Pillow lava: dark green, fine grained, non-magnetic, locally brecciated. Frequent hematite stained along fracture surface, minor anastomosing quartz-calcite veinlets

SYMBOLS

Fabric (dip indicated, vertical dip) 60

Strike and dip, strike with near vertical dip ... 60

Fault, dip diriction indicated (does not indicate slickenslide plunge direction) 60

VG - *visible gold*

Figure 3. *Trench geology map of the Romeo zone. The Romeo zone is located approximately 100 m north of the Connecting zone.*

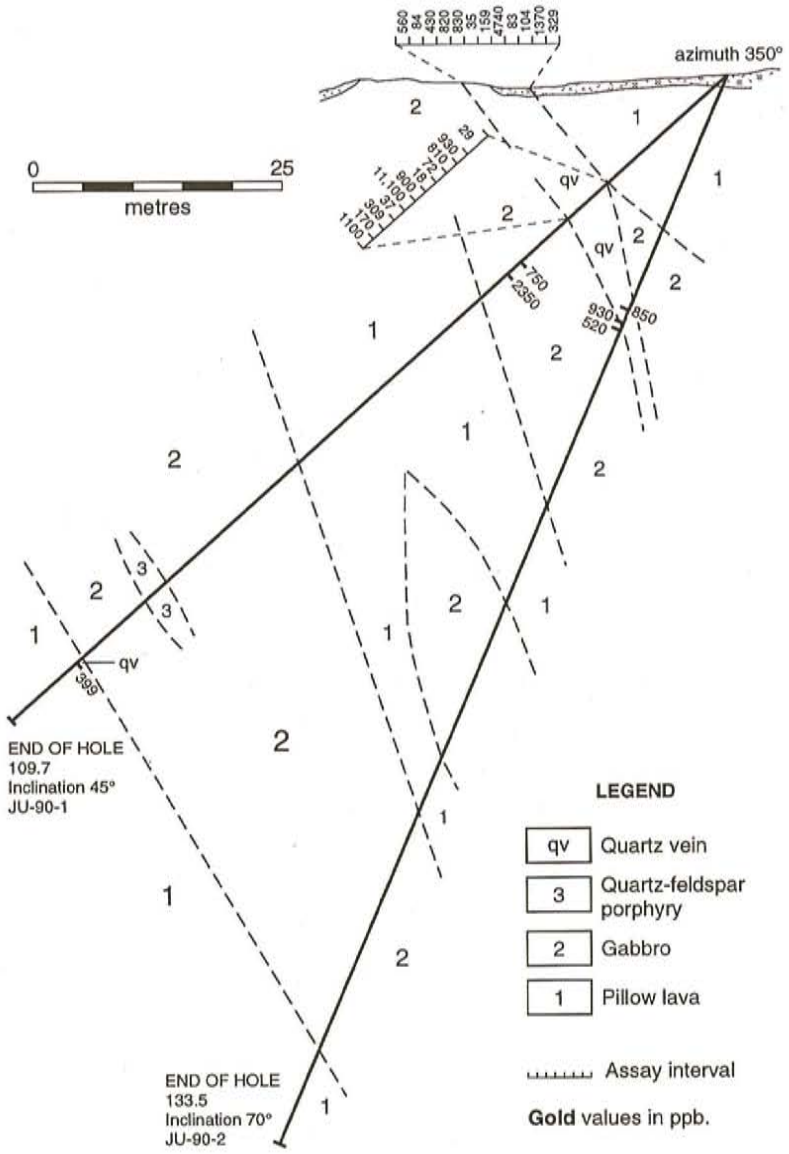


Figure 4. *Diamond-drill section, Juliet zone, view to the north (modified from Dimmell and Hartley, 1991a).*

are locally curved in response to shear movement. Evidence of movement is provided by slickensides on fracture surfaces within quartz. The bulge at the top of the prospect is represented as a quartz breccia pod and the vein margins locally have sericite occurring as small pods along the fracture surface, some of which have visible gold within. Isolated flecks of visible gold are present in small depressions similar to those at the Juliet prospect. A channel sample from the Romeo zone assayed 1.15 g/t Au over 6 m (Dimmell and Hartley, 1991a); diamond drilling failed to intersect the vein. Approximately 20 m east of the Romeo zone, the pillow lavas are intruded by a highly silicified mafic (?) dyke.

CONCLUSIONS

The Romeo and Juliet prospects are a structurally controlled, auriferous, mesothermal shear-vein system that formed in response to regional deformation along the Baie Verte Line. The abundant visible gold, which is consistently developed as fine clots along vein margins over a considerable portion of the exposed strike length of 250 m, makes this one of the most significant under-explored auriferous veins in the Newfoundland Dunnage Zone. The nuggety, fine-grained nature of the gold and its distribution along very narrow vein margins that parallel the trend of the main vein, makes it difficult to get channel-sample assay results that reflect the true gold content of the vein system. This is supported by the typically low assay values obtained from the channel sampling and diamond drilling. One method of overcoming this problem is to panel sample the vein margins.

ACKNOWLEDGMENTS

Pine Cove Resources is thanked for their permission to study the Romeo and Juliet prospects, in particular Kevin MacNeill and Roly Chamberlain are thanked for providing maps and other data. Peter Dimmell and Charlie Dearin are thanked for sharing their ideas on the geology and mineral occurrences of the area. This manuscript has benefitted from review by Dick Wardle, Anne Hogan and Chad Wells.

REFERENCES

Calon, T.J. and Weick, R.J.

1990: Structural study on the Pine Cove Deposit area. Structural evolution of the Pine Cove gold deposit, preliminary report of a detailed structural analysis on behalf of Corona Corporation. Unpublished report, Corona Corporation, 25 pages.

Dimmell, P. and Hartley, C.
1991a: Geology, geochemistry, geophysics and diamond drilling on Project 7432, Varna Option Property, Baie Verte area, Newfoundland. Unpublished report, Corona Corporation, 44 pages.

1991b: Gold mineralization and exploration of the Pine Cove property, Baie Verte Peninsula. *In* Ore Horizons, Volume 1. Newfoundland Department of Mines and Energy, Geological Survey Branch, pages 51-62.

Hibbard, J.
1983: Geology of the Baie Verte Peninsula, Newfoundland. Newfoundland Department of Mines and Energy, Mineral Development Division, Memoir 2, 279 pages.

Huard, A.A.
1990: The Noranda/Impala Stog'er Tight gold deposit. *In* Metallogenic Framework of Base and Precious Metal Deposits of Central and Western Newfoundland (Field Trip 1). *Edited by* H.S. Swinden, D.T.W. Evans and B.F. Kean. Geological Survey Canada, Open File 2156, pages 173-177.

Patey, K.S.
1990: Lode gold mineralization at Deer Cove, Baie Verte Peninsula, Newfoundland. Unpublished B.Sc. thesis, Memorial University of Newfoundland, St. John's, Newfoundland, 96 pages.

Patey, K.S. and Wilton, D.H.C.
1993: The Deer Cove deposit, Baie Verte Peninsula, Newfoundland, a Paleozoic mesothermal lode-gold occurrence in the northern Appalachians. Canadian Journal of Earth Sciences, Volume 30, pages 1532-1546.