From the Mineral Inventory Files

Castle Frederick: A New Style of Pb-Zn-Ag Mineralization in the South Mountain

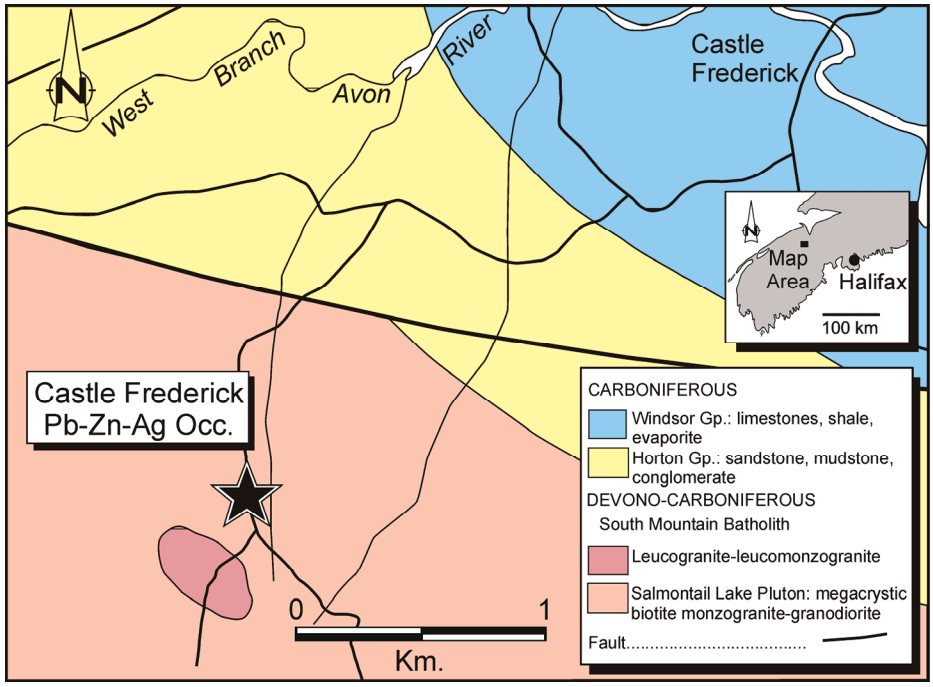

Figure 1. *Geology map of the Castle Frederick area showing location of the granite-hosted Pb-Zn-Ag in quartz-carbonate veins exposed in a rock aggregate quarry.*

An interesting Pb-Zn-Ag occurrence has recently been discovered at Castle Frederick, Hants County (Fig. 1). While visiting an aggregate quarry recently excavated in the South Mountain Batholith (SMB), DNR Regional Geologist Donald Weir noted galena-rich quartz-carbonate veins intruding the granitic wall rock. The occurrence is described in more detail by P. K. Smith, G. Prime, and D. Weir in Report ME 2006-1 (see Special Note, p. 8).

At least four veins occur in a quarry about 50 m long by 15-20 m wide. The veins have sharp boundaries, an E-W trend and steep southerly dips. They average 1-2 cm thick but swell to 8 cm. The veins are zoned, with an outer rim of galena and sphalerite(?) and an inner core of carbonate, vein quartz, chalcedony and jasper (Fig. 2), with local pyrite and/or marcasite. A second set of veins occurs along N-S faults and fractures with a vertical dip. These veins have disseminated pyrite and marcasite. The relationship of the two vein sets is not clear, but at least portions of the N-S veins also contain minor galena, suggesting a syngenetic relationship with the more mineralized E-W set. In places, the E-W veins have an impressive content of galena, with sections consisting almost entirely of massive sulphide. A sample from one vein, assayed by P. K. Smith (DNR), returned 52% Pb, 25% Zn, 38 ppm Ag, 132 ppm Sb and 140 ppm Cd.

What is the origin of these mineralized veins? Similar occurrences are not known in the SMB, but Ag-bearing, Pb-Cu-Zn veins occur at the Dunbrack deposit in the Musquodoboit Batholith (see *N. S. Minerals Update*, v. 21, no. 3). At Dunbrack, the mineralized veins are found along the brecciated contact of a highly evolved leucogranite with less evolved biotite-muscovite monzogranite. At Castle Frederick, the veins are hosted by megacrystic monzogranite of the Salmontail Lake Pluton (SLP), which is one of the more primitive and least chemically evolved phases of the batholith. The SLP is not really a good candidate to produce mineralized veins, but there are intrusions of much more evolved leucogranite in the area of the pit (Fig. 1). Perhaps these intrusions played a role in vein formation.

There is another model that warrants consideration. The predominant Pb-Zn association in the veins suggests a relationship to the nearby Carboniferous Horton and Windsor groups (Fig. 1), in which numerous, carbonate-hosted, base metal deposits are found (see article on Gays River, p. 4). Immediately north of the Castle Frederick occurrence these Carboniferous units are in both fault and nonconformable contact with the SMB. As well, a large raft of Horton Group sediments overlies the SLP a few kilometres to the northwest. This suggests that in Carboniferous times, the SMB near Castle Frederick had been uplifted and unroofed, and was undergoing continental erosion and sedimentation. Conceivably, veins in the granite may be satellite occurrences to larger base metal deposits that were formed in the Carboniferous basin. Given the spectacular appearance of samples collected from these veins, it is probable that someone will take up the challenge to determine their origin.

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Figure 2*. Zoned, quartz-carbonate vein bearing galena and sphalerite intruding biotite monzogranite at Castle Frederick.*