From the Mineral Inventory Files

Black Greisens at Kempt Snare Lake

In 1977, during the early years of tin exploration in southwest Nova Scotia, I became intrigued by a base metal occurrence at Kempt Snare Lake, Yarmouth County (Fig. 1). Boulders of "black granite" mineralized with galena and sphalerite were first discovered at Kempt Snare Lake in 1927. Within a year a 23 m deep shaft was dug on a 2 m thick quartz vein. That vein, and several others of similar orientation adjacent to it, are hosted within a small cupola of dark grey to black, coarse-grained granite porphyry that intrudes Cambro-Ordovician Goldenville Formation metasedimentary rocks along a northeast-trending shear zone. The shear zone is part of a series of northeast-trending fault structures that traverse this region (Fig. 1). The host granite at the prospect typically has a dark grey to jet black colour, resulting in the conclusion by early workers that the pluton was composed of quartz diorite.

The early exploration work reported that the vein ran 2% combined Pb-Zn, 0.5% Cu, 153 ppm Ag and up to 61 ppm Au. Since that time, similar levels of base metals and silver have been reported by subsequent workers but no one has ever been able to reproduce a comparable gold level. After 1950, the site lay abandoned until the late-1970s boom in tin exploration that enveloped southern mainland Nova Scotia. It was then realized that the host intrusion is not a mafic rock but, instead, a very highly evolved, potassic-rich leucogranite containing the elevated levels of K_2O, Rb, Al_2O_3, F, CO_2, Sn, Li, W and U typical of so-called "tin granites". At this time it was also realized that the veins contained interesting levels of tungsten (scheelite). Falconbridge Ltd. explored the site in 1985 and found anomalous levels of Sn, W, Zn and Ag in till geochemical surveys and followed these up with a three hole diamond-drill program in 1986. The results did not detect the presence of Au, and the levels of base metals and tungsten were deemed too low. However, the company noted widespread quartz veins within the pluton and several zones of high Ag levels. In addition, the potential for mineralized veins in the immediately enclosing metasedimentary country rocks was not tested. Given the fact that there are abundant deposits of tin and related elements in the Kemptville area (Fig. 1) the jury should still be out on just what may be found at Kempt Snare Lake.

The peculiar jet black colour of the host greisenized granite remained a mystery for some time, as rocks of highly evolved composition are almost always light coloured. Thin section examination showed that the colour was due to a fine-grained, pervasive and fracture-controlled dusting in the various minerals that constitute the rocks. Most observers thought the dusting was fine-grained mica coated with Fe-oxide.

In 1988, while I was having a few samples of the host analyzed, the true secret was revealed. The chemist at the lab happened to mention the presence of a residue floating on the acid digestion solution and how it was similar to residue he typically observed in samples of Halifax Formation slate. The lights went on: slates usually contain graphite and an analysis for elemental carbon revealed that the greisens contain upwards of 0.7 wt.% graphite. Furthermore, the analyses showed a marked positive correlation between increasing graphite and elemental indicators of progressive alteration, such as increasing K_2O, H_2O^+ and Rb, and a decrease of the K/Rb ratio. The graphite is certainly hydrothermal in origin but it is likely not derived solely from the parent granitic magma. More likely it is the result of interplay between a magmatically derived hydrothermal fluid and a metamorphic fluid rich in carbon derived from the abundance of graphite-rich slate units in the Meguma Group.

G. A. O'Reilly

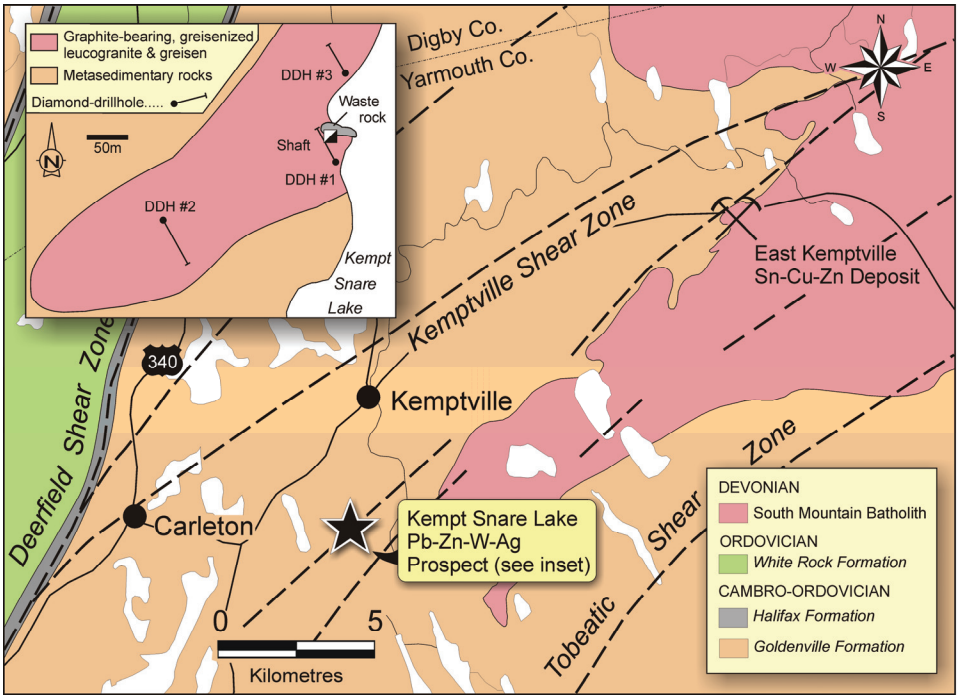

***Figure 1**. Geological map of the Kemptville area, Yarmouth County, with locations of mineral occurrences. Inset illustrates the Kempt Snare Lake prospect.*