Preliminary investigation of the Mount Costigan Zn–Pb–Ag ± Cu deposit, west-central New Brunswick

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Mount Costigan is the largest of several Zn–Pb–Ag ± Cu sulphide deposits hosted by Lower Devonian felsic to intermediate volcanic rocks of the Tobique Group (Tobique–Chaleurs Zone). The host sequence is dominated by high silica (>70 wt% SiO_2), sparsely feldspar–phyric to aphyric, rhyolite flows, intercalated lithic- and crystal-lithic lapilli tuff and subordinate intervals of fine-grained clastic sedimentary rocks. The mineralized zone has a north to south (strike-parallel) extent of approximately 200m, an east to west width of up to 300m, and has been intersected at depths up to 300m below surface. A historical resource estimate suggests a tonnage of mineralized rock of 6 to 8 Mt. Recent work has suggested that within this envelope is a sub-vertical to very steeply east-dipping zone containing a geological resource of ≈0.9 Mt of ≥4% Zn + Pb. Mineralization is cross-cutting to locally stratabound and consists of relatively coarse, light-coloured sphalerite and subordinate galena with minor pyrite and trace chalcopyrite occurring as veins and disseminations in the host rocks. Elevated silver (≤132 g/t) and gold (≤0.34 g/t) contents have been recognized in the mineralized envelope as have anomalous Sn, Bi & W. Alteration associated with the mineralization consists of three types; (1) Pervasive quartz flooding and veining well-developed at surface but decreasing with depth, (2) Potassic alteration is manifest as pervasive hydrothermal K-fedspar (adularia) and minor K-mica development, and (3) Chlorite alteration developed in the volcaniclastic rocks containing with disseminated mineralization and immediately adjacent to the larger sulphide veins. Given the style of mineralization, the low temperature ore mineral assemblage and the adularia–quartz–chlorite alteration it seems likely that this deposit formed from low-temperature magmatic fluid possibly emanating from the Redstone Granite (exposed at surface ≈4 km to the east), in a shallow environment.

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