

km west of Kamloops, B.C., within the Upper Triassic Nicola volcanic group and the associated dioritic to syenitic Iron Mask Batholith. The deposit contains economic amounts of Pd. However, one of the key problems is that, until now, it was believed that the PGE were associated with Cu and Au in the deposit. Consequently, some important mineralogical hosts for discrete PGE phases (pyrite and silicates) were being discarded. The present study is the first attempt to identify the most important mineral carriers for Pd and Pt, the timing of their formation, and their bearing on the overall distribution of Pd and Pt at the deposit scale. This information will lead to a conclusion about the difficulty or ease of extracting the Pd from the bulk ore. Bulk rock analyses show that Cu and Au show no correlation with PGE abundance. The best positive correlations that the PGE show in bulk rock analyses are with Ni and Hg. Inverse correlations between the PGE and Ba, Ti, U, Th, Tl, and Li were also observed. Thus far, quantitative analysis by SEM-EDS has been conducted on a sample of mounted heavy mineral separates from a high grade (>1 ppm Pd) core sample in the deposit, as well as 3 thin sections from 3 different core samples containing very high concentrations of Pd (up to 5 ppm Pd). So far, the SEM-EDS work has identified four platinum-group minerals hosted in both sulphide phases (pyrite and chalcopyrite) as well as alteration silicates: naldretteite (6 grains; Pd₂Sb), isomerteite and mercurian isomerteite (2 grains; Pd₁₁Sb₂As₂ or Pd₁₁[Sb, As, Hg]₄), mertieite-II (1 grain; Pd₈[Sb,As]₃), and kotulskite (1 grain; PdTe). These minerals are associated with the accessory phases electrum (avg. of 62 grains: Au₆₂Ag₃₈) gersdorffite (NiAsS), bromargyrite (AgBr), muthmanite (AuAgTe), and REE-rich monazite (avg. La = 6.6 wt%, Ce = 13.1 wt%; Nd = 4.7 wt%). Future work will attempt to constrain the processes that led to Pd introduction into the ore-forming system using the mineralogical and bulk chemical data combined with careful petrographic analysis of the alteration and sulphide assemblages that host the Pd carriers.

Mineralogical controls on the distribution of platinum-group elements and gold in the Afton porphyry deposits, Kamloops, British Columbia

KAY MACKENZIE AND JACOB HANLEY
*Department of Geology, Saint Mary's University,
 Halifax, Nova Scotia B3H 3C3*

The Afton Cu-Au porphyry system is an unusual alkalic-type porphyry deposit that is highly enriched in the platinum-group elements (PGE) Pd and Pt. The deposit is located 10