

B. Gold in Saskatchewan: Deposits and Deposit Settings

Felsic-intrusion-related Gold Deposits: Diversity and its Significance

Francois Robert and K. Howard Poulsen

Geological Survey of Canada, 601 Booth Street, Ottawa, ON K1A 0E8

ABSTRACT

Gold deposits are associated with felsic intrusions in a variety of geological settings, ranging from relatively well-preserved Cenozoic volcano-plutonic arcs to their more deeply eroded Precambrian greenstone belt equivalents. Felsic-intrusion-related gold deposits fall into two end-member categories: those in which the intrusion plays an active role in mineralization, and those in which the intrusion forms a passive, competent structural host. Deposits of the first group are represented mainly by porphyry-, manto-, and epithermal-types of deposits, with mostly disseminated to stockwork ores; they form at upper crustal levels during development of volcano-plutonic edifices. Those of the second group are represented mostly by syn-tectonic, shear-zone-related vein deposits and form at greater depths during deformation of these edifices. The evolution of greenstone belts involves successive episodes of burial, deformation, and uplift, as indicated by the presence of folded angular unconformities and of pre- and post-unconformity volcanic rocks. As a result, deposits of both groups are expected to be present in greenstone belts, and even to locally overprint each other, but their recognition is commonly hampered by structural and metamorphic complications. In the La Ronge and adjacent domains, representatives of both groups of deposits are present: the disseminated Greywacke Lake deposit in a fluvial sedimentary environment belongs to the first group, whereas the shear-zone-hosted veins at Star Lake, Jolu, and Jasper represent the second group. Other deposits, such as Contact Lake, show successive hydrothermal stages and may combine characteristics of both groups. Different factors control the localization of ore in different types of felsic-intrusion related gold deposits and distinct sets of criteria are required for their exploration.