
Contrasting PGE-Cu-Ni Mineralization in the Bird River Sill, SE Manitoba.

P. Theyer

Manitoba Industry, Trade and Mines; Geological Survey, Winnipeg, Manitoba, Canada
e-mail: ptheyer@gov.mb.ca

The Bird River sill is an Archean-aged (2745 +/- 5 Ma) intrusion located in southeastern Manitoba, Canada. The sill is approximately 20 km long and locally deformed by late granitoid intrusions and dissected by many north- to northwest-striking faults with displacements that in places exceed 1 km. Lithologically, it consists of a stratigraphically lower sequence of differentiated ultramafic rocks overlain by differentiated mafic rocks.

Discontinuous exposures focussed geological and mineral exploration onto two semi-contiguous localities that are areally equivalent to approximately 25 % of the sill's presently known extent. Although in a general sense there is a good stratigraphic continuity, detailed mapping allowed the differentiation of the sill into domains (the Chrome and the Page domain). These domains are distinguished on the basis of contrasting stratigraphies, lithologies and PGE concentration modes.

To date, PGE-Cu-Ni mineralization is known to occur at different stratigraphic levels

within the ultramafic rock sequence only. The mineralized layers differ not only in their stratigraphic position but also in the mineral assemblages associated with the PGE-Cu-Ni mineralization. Within the Chrome domain the stratigraphically lowermost mineralization is hosted by layered dunitic to peridotitic rocks and PGE-Cu-Ni mineralization correlates with the occurrence of magmatic and remobilized sulphides. In the stratigraphically higher chromitiferous zone, especially of the Page domain, there is good correlation between PGE-Cu-Ni mineralization and the occurrence of massive and disrupted chromitite layers. Portions of these chromitite layers are also associated with sulphides of magmatic appearance, however, there is only a weak correlation between these and PGE-Cu-Ni mineralization was noted.

The occurrence of two distinctive mineralization settings in the sill demonstrates that the identification of lithologic domains has important implications for the guidance of current and future PGE exploration in this structurally extremely disjointed sill.