

DESCRIPTIVE MODEL OF QUARTZ PEBBLE CONGLOMERATE Au-U

By Dennis P. Cox

DESCRIPTION Placer Au, U, and PGE in ancient conglomerate.

GENERAL REFERENCES Pretorius (1981), Minter (1982).

GEOLOGICAL ENVIRONMENT

Rock Types Oligomictic mature conglomerate beds in thick sequence of less mature conglomerate and sandstone deposited on Archean granite-greenstone. Basal volcanic rocks locally. Thick sedimentary sequences underlying Superior type iron-formation.

Textures Well-rounded, well-packed pebbles of vein quartz, chert and pyrite. Bimodal clast-size distribution with well-sorted pebbles and well-sorted matrix. Matrix is quartz, mica, chlorite, pyrite, and fuchsite. Granite clasts are absent.

Age Range Major deposits are Archean to Early Proterozoic (3,100-2,200 m.y.), Tarkwa is 1,900 m.y.

Depositional Environment Very thick onlapping sedimentary deposits in elongate epicontinental basins or half-grabens. Middle and basal reaches of alluvial fans deposited on steeper side of basins. Reducing atmosphere believed to be necessary to preserve detrital pyrite and uraninite.

Tectonic Setting(s) Slow subsidence of Archean craton. Later moderate uplift and erosion to remove Phanerozoic strata and retain Early Proterozoic rocks.

Associated Deposit Types Recent gold placer deposits. Low-sulfide gold quartz veins and Homestake Au in basement rocks. Superior Fe in overlying sequences.

DEPOSIT DESCRIPTION

Mineralogy Quartz, gold, pyrite, uraninite, brannerite, zircon, chromite, monazite, leucoxene, osmium-iridium alloys, isoferro platinum and sperrylite. By-product Ag. Middle Proterozoic (Tarkwa) and Phanerozoic occurrences have only traces of pyrite and no uraninite.

Texture/Structure Pyrite may occur as rounded grains, and concentrically layered concretions. Gold is in small angular grains, 0.005 to 0.1 mm in diameter.

Ore Controls Braided stream channels in broad unconformity surfaces in alluvial fans. Trough-cross bedding, current- or wave-winnowed bedding surfaces. Gold concentrated at base of mature conglomerate beds deposited on an erosion surface. Carbonaceous layers resembling algal mats deposited at low-energy base of fan contain U and fine Au.

Weathering Residual gold in weathering zone.

Geochemical Signature Au, U, PGE; anomalous radioactivity.

EXAMPLES

Witwatersrand, SAFR	(Pretorius, 1981; Feather, 1976)
Elliot Lake, CNON	(Roscoe, 1969)
Jacobina, BRZL	(Gross, W., 1968; Cox, 1967)
Tarkwa, GHNA	(Sestini, 1973)