

Petrography, geochemistry, and alteration of Paleoproterozoic host rocks hosting auriferous quartz veins, Fisher property, Seabee Gold Operation, Saskatchewan, Canada

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The Fisher property is being actively explored as part of the Seabee Gold Operation in northern Saskatchewan, which includes the active Santoy mine and the recently decommissioned Seabee mine. These Paleoproterozoic orogenic gold deposits are hosted by shear zones in the Pine Lake greenstone belt of the Glennie Domain, which has a complex geologic history related to accretionary episodes during the development of the Reindeer Zone of the larger Trans-Hudson Orogen. The structures and lithological units, which host the Santoy and Seabee deposits, are interpreted to extend to the Fisher property, located to the southeast of the Santoy mine. Exploration consisting of mapping, soil sampling, and drilling has identified a number of high-grade gold occurrences within the Fisher property. However, the characteristics of the rocks that host the auriferous quartz veins are not well known. Representative samples of these rocks were collected from 8 drillholes along an 8 km trend of the extension of the Santoy shear zone through the Fisher property, and have been examined for their petrographic and geochemical characteristics. The host rocks are dominated by transitional to calc-alkaline basalts to dacites, with associated intrusives dominated by granodiorites and gabbros, that formed in a maturing continental arc. The mineral assemblages in the host rocks indicate that amphibolite grade conditions were reached across the property. Sampling of variably altered rocks, and auriferous quartz (+/- pyrite, chalcopyrite, pyrrhotite, native gold) veins from outcrop and drillcore show thin (~50 cm) alteration haloes. The alteration assemblage consists of variable proportions of chlorite, biotite, epidote, calcite, sericite, (\pm K-feldspar, actinolite, tremolite, titanite, rutile, ilmenite, magnetite and apatite). Pearce Element Ratio plots of the altered rocks suggests no significant material transfer processes occurred proximal to these quartz veins. Continued petrographic and litho-geochemical analyses will be used to determine whether the Fisher property rocks are directly comparable with those that host the Santoy mine, develop a paragenetic sequence for auriferous veins and alteration, and identify alteration and vein minerals that could constrain the age of mineralization using U-Pb and Re-Os geochronology.