

Geology of the 10-Vein Outcrop, Seabee Mine, Saskatchewan: Structural Controls on Gold Mineralization

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With over one million ounces of gold produced since 1991, the Seabee deposit, owned and operated by Claude Resources Inc., is Saskatchewan's largest gold mine. The Seabee deposit is situated in rocks of the Pine Lake greenstone belt of the Glennie Domain, 125 km northeast of La Ronge. It is a structurally controlled, mesothermal vein gold deposit developed in weakly deformed metagabbroic rocks of the ca. 1890 Ma Laonil Lake Intrusive Complex. The deposit area is transected by a network of kilometer-scale brittle-ductile shear zones, including the Laonil Lake shear zone, that have a strong spatial association with gold mineralization. Previous workers interpreted the gold-hosting veins as Riedel 'R' and 'P' veins, as fault-fill veins subparallel to the foliation, and as minor extensional veins oriented at a high angle to the shear zone boundary. The structural relationships observed in the X m² 10-vein outcrop area, located just north of the main gold-hosting vein network, support these inferences, with the pattern of shears showing a striking resemblance to the Riedel model. However, the foliation within these shear zones contains a steep lineation, indicating that the displacement along the shears cannot have been exclusively strike-slip. It is suggested that these brittle-ductile shear zones initiated as strike slip features, creating the Riedel pattern, and were subsequently reactivated to form the steeply southeast-plunging lineation.