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Sulfide Chemistry at the Fenelon Gold Deposit, Québec

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The Abitibi Greenstone Belt in Canada hosts several world-class gold deposits and is an important gold producer globally. Most of the known deposits are in the southern Abitibi along large east-west trending structures including the Cadillac-Larder Lake and Porcupine-Destor fault zones. The northern Abitibi hosts a similar structure called the Sunday Lake Deformation Zone that is known to host significant gold mineralization along the Detour-Fenelon Gold Trend. The Fenelon Gold Deposit is the focus of this research project. Until recently, there has been minimal research and exploration conducted in the northern Abitibi due to thick overburden and lack of infrastructure. Since 2018, the Wallbridge Mining Company Ltd. has made significant advances in the exploration of this region, with focus on the Fenelon Gold property. This presentation discusses the sulfide chemistry related to gold mineralization based on results from a combination of spot, line, and map analyses by laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS).

This presentation focuses on the two main styles of gold mineralization observed at the Fenelon Gold property, known as Area 51 and Tabasco. Area 51-style mineralization is hosted in smoky quartz veins and is often associated with pyrite, chalcopyrite, and lesser amounts of pyrrhotite and arsenopyrite. These veins crosscut the Jeremie Diorite (2697 Ma), the main intrusive body at the property. Tabasco-style mineralization is shear zone hosted along the contact between the Jeremie Diorite and the surrounding sediments. Tabasco mineralization is dominantly associated with pyrrhotite and chalcopyrite with trace amounts of pyrite. In both the Area 51 and Tabasco zones, trace element analyses of the pyrrhotite were insignificant, however analyses of the pyrite show correlations between gold, arsenic, and bismuth. The sulfide chemistry shows the relationship between sulfide and gold precipitation at Fenelon and highlights the importance of geochemical analyses for developing a more complete understanding of mineralization on a deposit-scale.