

Detailed geological mapping and core logging of volcanic and sedimentary rocks in the footprint of the Kerr–Addison mine, Virginiatown, Ontario

N. St-Jean¹, J. Blackwell², R.L. Sherlock¹, B. Lafrance¹

¹Harquail School of Earth Sciences, Laurentian University, Sudbury, Ontario; ²Long Point Geologic Ltd., Kamloops, British Columbia;

The Larder Lake Cadillac deformation zone (LLCDZ), in the Kerr Addison area, is the deformed contact between the Timiskaming sedimentary rocks to the north and the Larder Lake group (equivalent to the Piché Group in Quebec) to the south. The Larder Lake group occurs as a sliver of moderately to strongly deformed ultramafic and mafic volcanic rocks, and minor sedimentary rocks, and is the main host of gold deposits along the LLCDZ in the Larder Lake area, including the world-class Kerr–Addison–Chesterville deposit (~11 million ounces at 9 g/t Au production). The mine property is located in northeastern Ontario, approximately 35 km east of Kirkland Lake, along Highway 66, and geologically lies within the southern Abitibi Subprovince of the Superior Province. The Larder Lake group is thicker at the Kerr–Addison Mine than in other segments along the LLCDZ and is thus an ideal location to study the stratigraphic and structural setting of these rocks. This study focused on detailed mapping of key structural and lithological features on the mine property and correlating these findings at depth with diamond drill core logs in order to reconstruct the stratigraphy and structural history of the Larder Lake group. In addition, this study involved detailed mapping of newly exposed outcrops of the LLCDZ and the hanging wall Timiskaming sedimentary rocks, which have been tightly folded and show an increase in strain and alteration proximal to the LLCDZ. The varying degrees of strain have overprinted all primary textures and the challenge lies in determining whether this contact is a result of structural interleaving of two units or whether this was a depositional contact that was later overprinted by ductile deformation. Studying the internal structural history of the Larder Lake group and comparing it to the deformation events observed in the Timiskaming sediments will be important for understanding the LLCDZ as a whole and how these two assemblages relate to one another. The main objectives of this study are to: 1) characterize the lithostratigraphy of the Larder Lake group volcanic and associated sedimentary rocks; 2) identify and characterize key structural relationships between units within the Larder Lake group and place the gold mineralizing event within this context, and; 3) determine the nature of the contact between the Larder Lake and Timiskaming sedimentary rocks and place it in a regional context.