Host Rock Alteration associated with the gold mineralization at the Lapa Mine, Quebec, Canada.

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The Lapa mine, entirely owned and operated by Agnico Eagle Mines Ltd., is located 50 km west of the city of Val d'Or along the well-known Cadillac-Larder Lake Break in the Archean Abitibi greenstone belt. Mineralization in the mine is divided into twelve zones based on the morphology of ore bodies, gold grade and gold occurrence. We examined samples representing different lithologies collected at depths from 920 to 1400 m in zones 1, 7 and 8 at the mine working. Zones 7 and 8 are newly discovered, high-grade ore bodies. This study focuses on alteration of the host rock in selected zones 7 and 8. The comparison of the three zones is used to evaluate the gold grade difference in two similar ore bodies (Zone 7 and 8). Our thin section analyses and previous studies show that the mineralization in Zone 1 (also known as Contact Zone) is hosted by quartz-carbonate veins in basalts that have been biotitized and chloritized. Gold occurs as native gold and some are spatially associated with pyrrhotite. Minor gold is reported to occur as aurostibite. Native gold grains are also present as dissemination with pyrrhotite and arsenopyrite in the altered basalt. In Zones 7 and 8, the gold mineralization is hosted by felsic dykes that intruded into already deformed and altered mafic schists and andesite. This goldbearing dyke intrusion is accompanied by alteration, producing calcite and chlorite. Gold is present as free native gold in the felsic dyke, but it also occurs as dissemination with pyrrhotite and arsenopyrite in the host rock. Bulk rock analysis shows that Zone 7 samples contain higher sulphur than those in zone 8. High sulphur contents, reflecting the abundance of pyrrhotite and arsenopyrite, are positively correlated with gold grade in Zone 7. The felsic dyke samples have low arsenic and sulphur. This could be explained by the presence of gold mineralization mostly as native Au and rarely associated with arsenopyrite/pyrhottite.