ABSTRACT

TITLE:	Insight Into Controls on Precious-Metals Mineralization in the May Day Mine, La Plata Mining District, Southwestern Colorado
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ABSTRACT: The May Day-Idaho mine is one of the oldest and most productive in the La Plata Mountains. Early mining on this property produced over 100,000 ounces of gold and 1,000,000 ounces of silver. Even though this mine has had a productive history the controls on precious-metal mineralization are poorly understood. In this investigation, field and analytical studies were used to develop an exploration model for precious-metal mineralization. Field studies in the May Day Mine confirm that mineralization is concentrated in altered intrusive igneous rocks and adjacent sedimentary country rocks. Dominant deposit types are stockwork breccias zones in fractured intrusive rocks and sandstones, quartz- and ankerite-rich veins, and replacement-type deposits in altered intrusive rock and limestone. Existing mineralized zones in the mine are generally discontinuous and have a limited extent. Microanalytical studies on rock samples using reflected-light microscopy and QEMSCAN establish that mineralization had two main phases. An early phase dominated by base-metal minerals was followed by a latter phase of gold-silver mineralization, mostly as telluride minerals, native gold and electrum. Mineralized zones are characterized by a small number of gangue minerals that include calcite, quartz, ankerite, siderite barite, and fluorite. Rocks within and adjacent to mineralization contain quartz-pyrite-sericite alteration indicating that ore-bearing fluids were slightly acidic and were 300 to 600 C. Geochemical analyses on selected samples from mineralized zones indicate gold and silver are closely allied with tellurium and arsenic-lead bearing sulfide minerals. This is explained by precious-metal mineralization in the mine being controlled by gold- and silver-bearing telluride minerals nucleating around earlier formed lead-arsenic-copper sulfide minerals. For the first time in the history of the May Day mine, we have provided a comprehensive exploration model for precious-metals mineralization. This model will serve as a tool to assess the location and economic potential of precious-metals deposits in the La Plata Mountains.