ABSTRACT

TITLE:	Insight Into the Origin of Gold at the Bessie G Mine, La Plata Mountains, Southwest Colorado
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ABSTRACT: The La Plata Mountains are one of several laccolithic complexes in northwestern New Mexico and southwestern Colorado that formed ~70 Ma during the Laramide orogeny. Base metal and tellurium-rich Au-Ag-Hg-PGE deposits formed in hydrothermal systems during or after the emplacement and crystallization of potassic intrusive rocks. The La Plata mining district contains a complex history of mineralization defined by late-stage precious metal deposits. The district is well known for vein and replacement epithermal Au-Ag deposits in which native gold forms in association with telluride minerals. In previous studies, native gold was mostly considered hypogene and genetically related to the nearby intrusions. Although competing hypotheses note that younger post-Laramide igneous and tectonic events may have contributed to precious metals mineralization. The Bessie G mine is one of several mines in the La Plata district that produced significant gold and silver. In this study, petrographic and microprobe analyses on ore samples were used to test competing ideas on the genesis of late-stage native gold which provided insight into the progression of telluride and gold mineralization in the district. Our research determined, in order of abundance, coloradotite (HgTe), petzite (Au3AgTe2), and hessite (Ag2Te) to be the most common tellurides. Mineral paragenesis occurred as an early assemblage of sulfides, petzite, and hessite followed by a late stage of coloradoite and native gold. Other observation document native gold in isolated blebs, coating earlier minerals, infilling microfractures, and commonly occurring with coloradoite. This association suggests gold formed by late-stage replacement of Au-Ag tellurides or supergene enrichment rather than syngenetic crystallization with the sulfides and Au-Ag tellurides. Precious metals mineralization may be related to younger regional incipient rifting and mantle magmatism in the Oligocene to Miocene.