Twin Canyon, Gold Mineralization in a Hydrocarbon Reservoir

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Twin Canyon gold prospect, Montezuma County, Colorado, is located on the southwest flank of the La Plata Mountains in Jurassic eolian Junction Creek Sandstone. The prospect is located in the crest of an anticlinal structure in fine-grained bleached and altered sandstone sealed above by the Morrison Formation. Detrital feldspar in the sandstone was altered to kaolinite, and calcite cement has been dissolved leaving the host rock soft and friable. Gold is intimately associated with bituminous hydrocarbons. Bitumen occurs as disseminated spots, dense plumes of concentrations of spots, concretionary masses, and vein and fracture fillings. Bitumen is associated with native gold and has an uncertain paragenetic relationship with disseminated iron oxides, which occur in deformation bands, concretionary masses, and as selvedges around plumes of bitumen concentrations.

Two sets of veins and fractures occur in the Charlene Mine. Early swarms of discontinuous deformations bands accentuated with concentrations of gray to brown limonite and containing gray calcite centers are crosscut by veins and fractures filled with friable dark-colored bitumen with occasional central open spaces lined with fine calcite crystals. Bitumen veins are also characterized by dense halos of disseminated bitumen that extend into the wall rock sandstone.

Historical channel sampling in the underground prospect has returned assays up to 8 gm Au/ton over 3 m. Historical drilling indicates multiple stratiform mineralized horizons within the Junction Creek Sandstone. Sampling along the projected Junction Creek Sandstone has anomalous gold in soils (> 20 ppb Au, up to 500 ppb Au) for over 3 km across the axis of the anticline. Native gold occurs as fine flakes and grains disseminated in sandstone and in bitumen-filled veins and fractures. Laser ablation inductively coupled mass spectrometry and electron microprobe analyses indicate the bitumen contains as much as 50 ppm “no-see-um” gold.