

Paper No. 63-3 Presentation Time: 8:50 AM-9:05 AM ***THE LINK BETWEEN
BEDDED BARITE AND CARLIN-TYPE GOLD
DEPOSITS IN NEVADA***

[AREHART, Greg B.](#), Geological Sciences, Univ of Nevada, Reno, Geological Sciences, MS-172, University of Nevada, Reno, Reno, NV 89557, arehart@unr.edu and **MUNTEAN, John**, Placer Dome Exploration, 240 S. Rock Blvd., Suite 117, Reno, NV 89509

Carlin-type gold deposits are found in several localities around the world, however, the deposits of substantial size are all concentrated in western North America, and within a very restricted area in northeastern Nevada. This occurrence suggests a convergence of events is required to generate large deposits of this type. Spatially overlapping with Carlin-type deposits, which are dominantly of Eocene age, are bedded barite deposits of Paleozoic age. In addition, some Paleozoic rock units in this region contain abundant organic matter. We propose that the bedded barite and organic matter are important in the development of bisulfide-bearing fluids capable of transporting unusually high concentrations of gold. As hydrothermal circulation cells developed in conjunction with Eocene extensional tectonism and/or magmatism, sedimentary barite was reduced thermochemically to bisulfide by the associated organic matter. The abundance of sulfate resulted in a very bisulfide-enriched fluid, capable of transporting gold large distances through the crust to within a few kilometers of the surface before depositing gold. The characteristic high Au:Ag observed in Carlin-type deposits resulted from the extreme enrichments (relative to most hydrothermal fluids) in bisulfide, perhaps as high as 1 molar H₂S. The bisulfide-enriched meteoric fluid either dissolved gold from the crustal column upon descent or accepted gold from deep crustal sources (magmatic or metamorphic) upon ascent along crustal-scale faults. Ore-stage sulfides generally have a wide range of $\delta^{34}\text{S}$ values ranging from near 0‰ (Getchell), which is consistent with a magmatic (mantle) contribution, to near 20‰ (Goldstrike), consistent with no magmatic (mantle) contribution.

Carlin-type deposits may not have been generated in similar tectonic/magmatic regimes in other areas of western North America because of the lack of available sedimentary sulfate in conjunction with an appropriate reducing agent. Other areas of the world where smaller Carlin-type deposits are present generally lack a significant component of sedimentary sulfate, thus the deposits in those areas may be of smaller size because of the lower overall bisulfide concentration in the hydrothermal fluids.

[2002 Denver Annual Meeting \(October 27-30, 2002\)](#)

Session No. 63

[Diverse Origins of Sedimentary Rock-Hosted Disseminated Gold Deposits: A Global Perspective](#)

Colorado Convention Center: A101/103

8:00 AM-12:00 PM, Monday, October 28, 2002