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# WALLROCK ALTERATION ASSOCIATED WITH THE CHUKAR FOOTWALL CARLIN-TYPE DEPOSIT, EUREKA COUNTY, NEVADA

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Carlin-type deposits (CTDs) are the dominant source of gold production and reserves in the United States today. Many of these deposits occur along the Carlin trend in north-central Nevada. Despite being studied for more than 40 years, many aspects of CTDs remain enigmatic. One important aspect that is not clearly understood concerns the compositions, zonations, and extents of wallrock alteration halos around the deposits.

This study presents the results from examination of the wallrock alteration halo associated with the Chukar Footwall gold deposit, a CTD located in the central part of the Carlin trend. With a gold endowment of approximately 530,000 oz, Chukar is a relatively small satellite deposit to the much larger Gold Quarry deposit, which contains a total of 24 million oz in past production and current reserves and resources.

For Chukar, descriptions of lithologies, geological structures, and hydrothermal alteration assemblages from standard core logs are compared with assay results for gold, carbonate stain results, ICP-MS data, XRD data, and carbonate stable isotope data ($\delta^{13}C$ and $\delta^{18}O$) to determine wallrock alteration characteristics relative to the distribution of ore-grade gold.

Of the various analytical tools compared during this study, the ones that have the best potential for use as exploratory tools for carbonate-hosted CTDs are standard alteration logging, trace element geochemistry, carbonate staining, and isotopic ($\delta^{18}O$) analyses. Alteration logging and trace element geochemical analyses are already standard practices for most (if not all) mining and exploration companies. Carbonate stain results can be logged and modeled like any other alteration characteristic, and provide a less subjective method than estimation of alteration intensity. The low costs, both in dollars and time, make staining amenable to industrial RC and core logging protocols.

An important result of this study is the recognition of $\delta^{18}O$ analyses as a powerful tool for recognizing hypogene changes in carbonate host rocks associated with CTDs. $\delta^{18}O$ results indicated the presence of alteration in rocks that appeared mineralogically and texturally fresh, and that did not have elevated trace element concentrations. Identifying such subtle expressions of a hydrothermal system may provide new vectors to blind orebodies.