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ABSTRACT

GEOLOGY OF THE CHIMNEY CREEK SEDIMENT-HOSTED GOLD DEPOSIT OSGOOD MOUNTAINS, NEVADA

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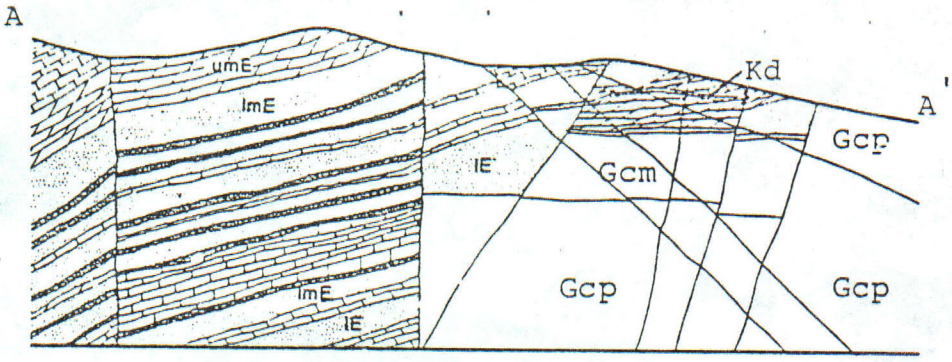
The Gold Fields Mining Corporation's Chimney Creek sediment-hosted gold deposit is located 10 kilometers northeast of the Getchell deposit in the Dry Hills, northern Osgood Mountains, 90 kilometers northeast of Winnemucca, Nevada. Ore reserves at the start of mining were 24.4 million tonnes at a grade of 2.73 grams/tonnes.

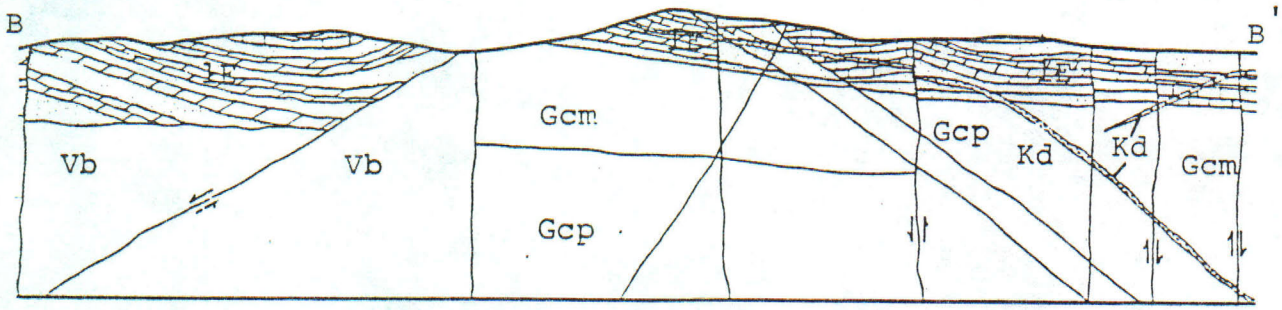
The mining reserves are largely hosted by the Etchart limestone, a mixed siliciclastic-carbonate shallow water sequence of Pennsylvanian-Permian age. The lower part of the deposit is in basalts of the Mississippian Gough's Canyon formation, products of back-arc spreading in a shallow marginal basin developed after the culmination of the Antler orogeny. The Etchart limestone lies above a low angle unconformity developed in the Gough's Canyon formation. These strata are bounded by the Roberts Mountain and the Golconda Thrust Faults and are intruded by the mid-Cretaceous Osgood Mountains granodiorite. Dacitic dikes related to the Osgood Mountains granodiorite cut the orebody.

The deposit is located along the northern extension of the Getchell Fault. Alteration and mineralization focussed upward by the fault spread outward along primary bedding in the lower member of the Etchart limestone, decarbonatizing calc-arenites and sandy dolomites. Feeder zones in the Gough's Canyon formation are jacketed by phyllic envelopes up to 50 meters wide, produced by hydrolysis reactions with acidic fluids. Quartz released by the reactions was deposited in decarbonatized Etchart limestone as bedded jasperoid after mixing with cooler meteroic waters. Episodic temperature fluctuation redissolved bedded jasperoid and reprecipitated it upward and outward along bedding planes and as cross-cutting jasperoid along post and syn-mineralization faults. The dacite dike noted above cuts altered rock and is itself phyllically altered.

Fluid inclusion and stable isotope determinations suggest that the deposit formed at least 1.5 kilometers below the paleosurface from CO_2-H_2O fluids, probably derived from magmatic or metamorphic sources at depth. Deposition was largely controlled by the mixing of a dilute 300°C CO_2-H_2O fluid with cooler fluid and not from reduction or oxidation involving carbonaceous matter. Gold mineralization is associated with primary sulfides, largely replaced by oxidation products. Higher than normal trace element abundances were caused by higher than normal mineralization temperatures or from lack of subsequent supergene modification by descending oxidized fluids.

from a talk presented at the Geological Society of Nevada, Reno meeting on November 18, 1988





Explanation

Sediments

Volcanics

Tv Tertiary Subareal Volcanics

Intrusives

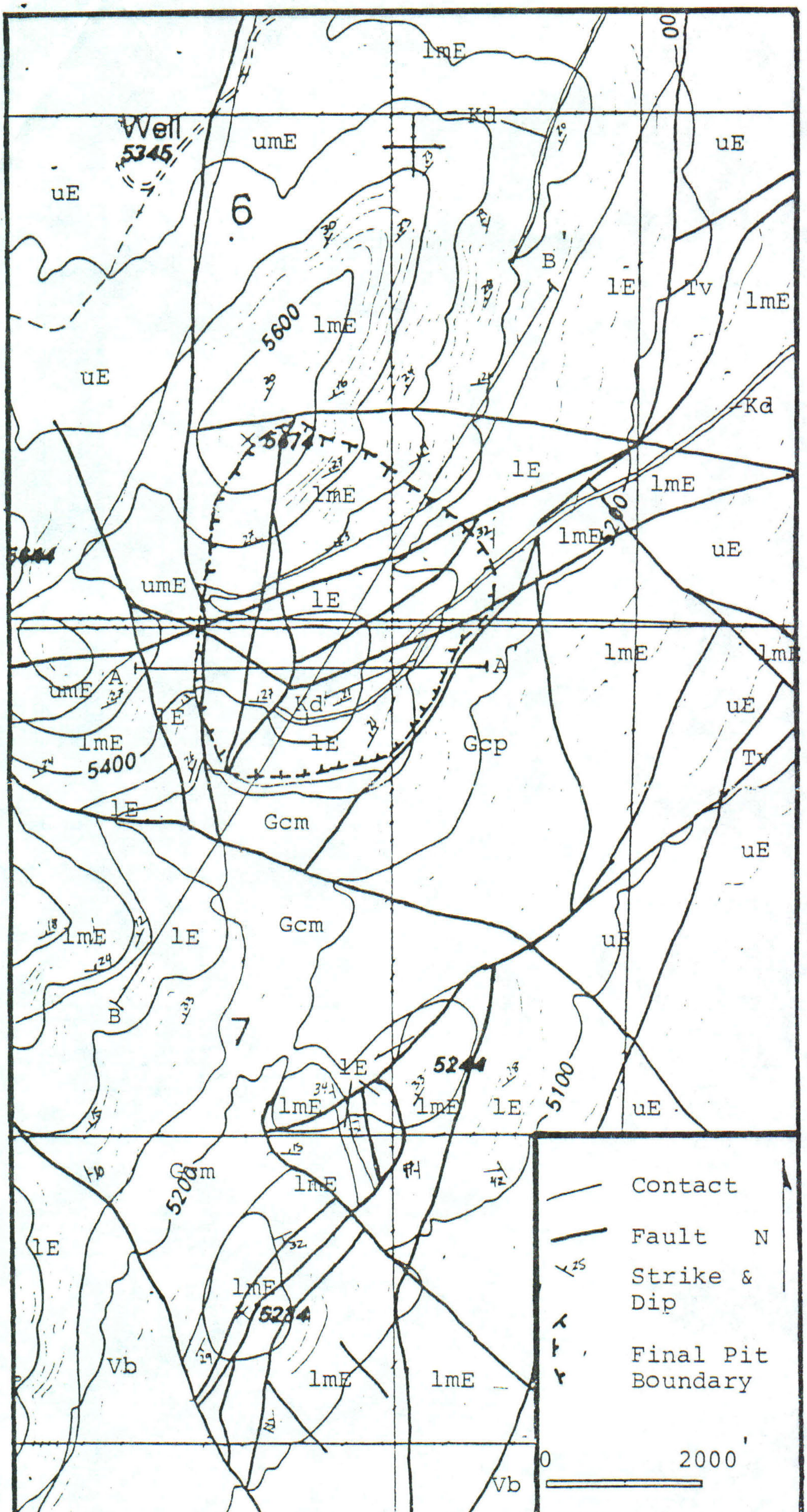
Kd Dacite dikes (Cretaceous)

uE Upper Etchart limestone
umE Upper middle Etchart limestone
lmE Lower middle Etchart limestone (Penn-Perm)
lE Lower Etchart limestone

Fc Farrel Canyon formation (Miss)

Gcm Goughs Canyon formation basalt
Gcp Goughs Canyon formation pillow (Miss)

Vb Valmy formation basalts (C-O)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uE
6
lmE
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B
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Gcp
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5100
5200
Vb
5284
Contact
Fault
N
Strike & Dip
Final Pit Boundary
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2000