3680 0275 Potosi

ABSTRACT

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

Mark Osterberg
Department of Geosciences
University of Arizona

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 O 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.

UNITED STATES GEOLOGICAL SURVEY ACTIVITIES

This monthly column is a new feature of the GSN Newsletter. The intent is to inform the readers about the activities of the United States Geological Survey in the Great Basin. The Water Resources, National Mapping, and Geologic Divisions are all active in the Great Basin. Contact points for each Division are as follows: Water Resources Division, Bill Carswell, District Chief, Carson City, 702 N. Plaza, Carson City, NV 89710, telephone (702) 882-1388; National Mapping Division, Bill Johnson, Chief Requirements Section, 345 Middlefield Road MS 531, Menlo Park, CA 94025, telephone (415) 329-4326; and Geologic Division, Gary Raines, Geologist-in-Charge Reno Field Office, c/o Mackay School of Mines, University of Nevada-Reno, Reno, NV 89557-0047, telephone (702) 784-6960; or Gary Dixon, Geologist-in-Charge Las Vegas Field Office, 1500 East Tropicana, Suite 201, Las Vegas, NV 89119.

The Geologic Division has opened a new Field Office at the Mackay School of Mines. The major program of this office will focus on mineral resource studies in the Great Basin. The group will develop regional mineral-resource, digital data bases and will study mineral districts. The staff will consist of a multidisciplinary group of ten. For parking at the Mackay School of Mines go to the kiosk at the Center Street entrance and ask for a parking pass.

The Nevada District Office of the Water Resources Division has a long established office in Carson City with a staff of 110; 85 in Carson City, 22 in Las Vegas and 3 in Elko. About a quarter of the program focuses on collection and dissemination of data on water resources. The remainder of the program involves hydrologic research. Major projects under way include leadership of the Carbonate Aquifer Program to investigate carbonate-rock aquifers in the eastern third of Nevada, an investigation into the impacts of mining near Carlin on local and regional ground-water aquifers, and a pilot project to compile a computer data base on water-quality data for the Winnemucca District of the U.S. Bureau of Land Management.

The National Mapping Division is presently in the final stages of completing two base map sets for Nevada. Early next year, the last 1:100,000 scale topographic maps for Nevada are scheduled for release. Over 70 percent of the 1:24,000 scale maps are completed with the rest to be published by 1992. The National Aerial Photography Program (NAPP) is considering acquiring 1:40,000 scale color-infrared photographic coverage of northern Nevada dependant on sufficient federal and state funds.

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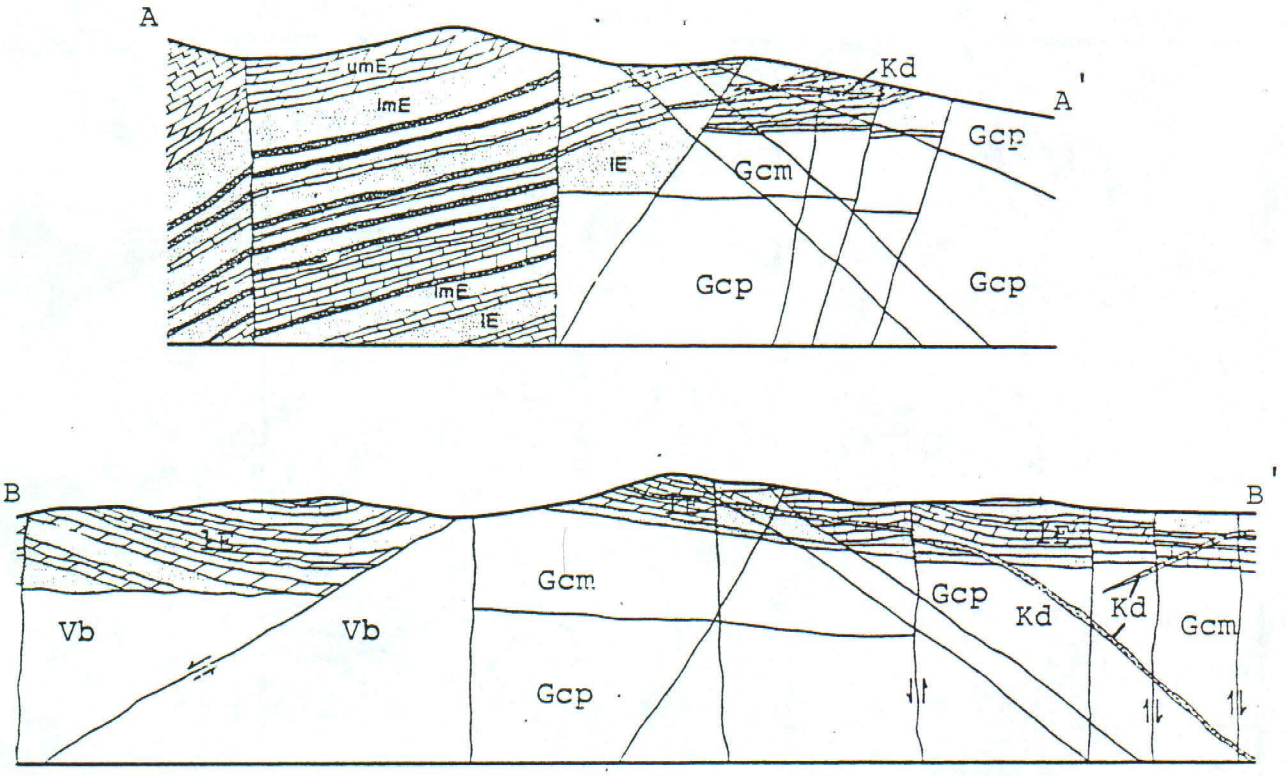


Explanation

Sediments

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)

Volcanics

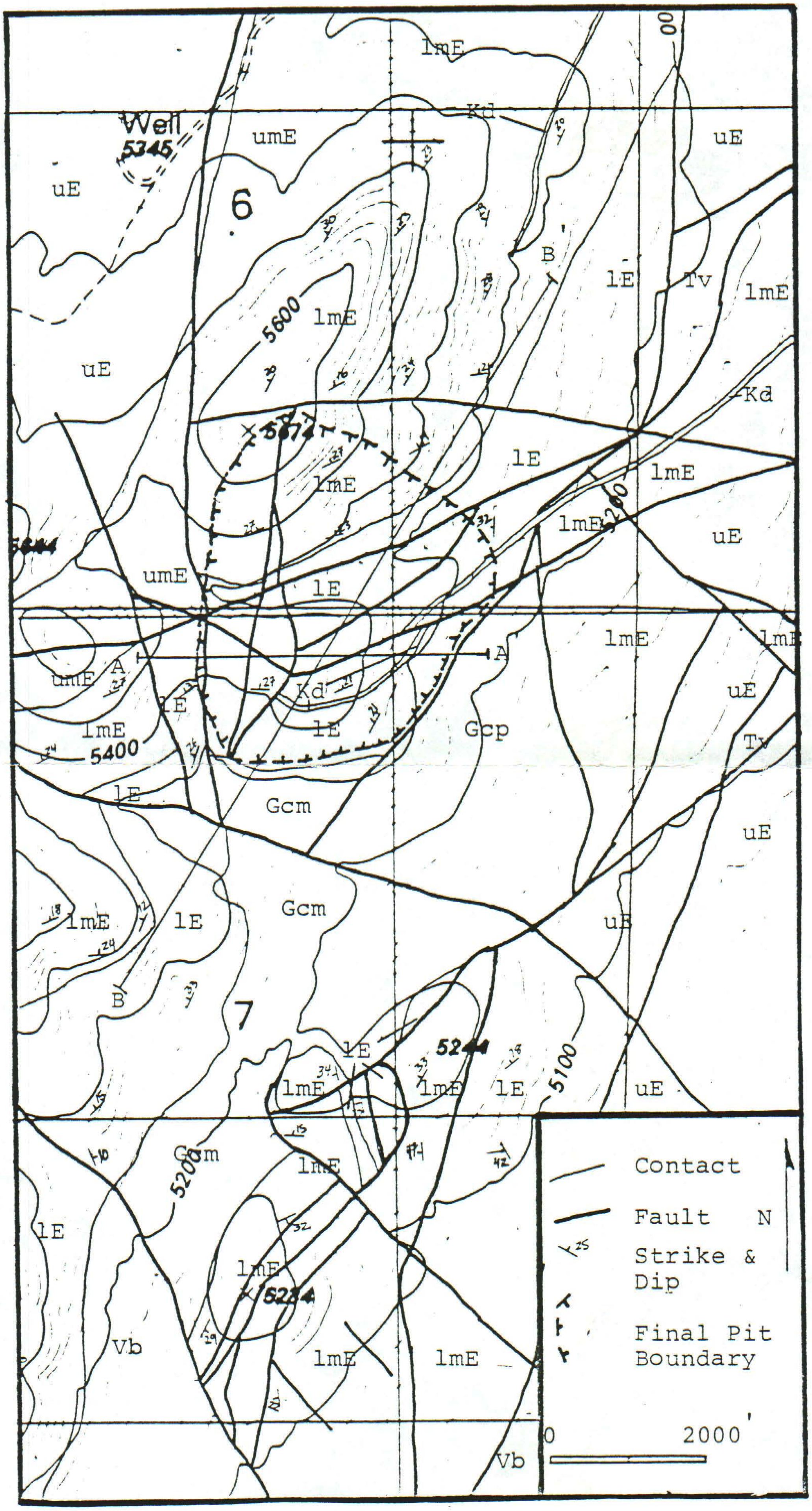
Tv Tertiary Subareal Volcanics

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

Vb Valmy formation basalts
(C-O)

Intrusives

Kd Dacite dikes
(Cretaceous)



Well
5345
6
7
umE
uE
lmE
Kd
lE
Tv
B
A
5600
5574
5400
5244
5224
5200
5100
Gcm
Gcp
Vb
Contact
Fault
N
Strike & Dip
Final Pit Boundary
0
2000'