

K-AR AGE OF ORE DEPOSITION, TUSCARORA MINING DISTRICT, ELKO COUNTY, NEVADA

Edwin H. McKee
Robert R. Coats
U. S. Geological Survey
Menlo Park, CA 94025

This report is one of a series of K-Ar geochronological studies of epithermal gold and silver deposits in Nevada being carried out jointly by staffs of the Nevada Bureau of Mines and Geology and the U. S. Geological Survey. Analytical equipment and procedures are the same as those described in McKee and others (1971). Analytical uncertainties of the ages were calculated at one standard deviation. Constants used in the calculation of the K-Ar ages are: $\lambda_e = 0.585 \times 10^{-10} \text{ yr}^{-1}$; $\lambda_\beta = 4.72 \times 10^{-10} \text{ yr}^{-1}$; $K^{40}/K \text{ total} = 1.22 \times 10^{-4} \text{ gm/gm}$. Abbreviations used are: $^*Ar^{40}$ = radiogenic argon-40; ΣAr^{40} = total argon-40.

GEOLOGY

The Tuscarora mining district is located in the western part of Elko County, Nevada, about 40 mi (65 km) northwest of Elko. The district was discovered in 1867 and produced only placer gold until 1871 when lode and vein deposits were discovered. Placer mining accounted for about \$700,000 (Nolan, 1936) and lode mines about \$4 million. Recorded production through 1941 was 128,165 ounces of gold and 7,138,684 ounces of silver (Granger and others, 1957) with most production before the turn of the century.

The mineralized area is underlain by a series of bedded rhyolite tuffs, andesite flows, and irregularly shaped andesite intrusive bodies. These rocks are cut by many faults, mostly with northerly trends and with variable dips and displacements. Mineralization consists of narrow veins in andesite that are rich in silver (weight ratio of silver to gold of about 150 to 1) and wide, poorly defined, gold-bearing fracture zones in the bedded tuffaceous rocks (weight ratio of silver to gold of 4 or 5 to 1).

The principal ore minerals according to amount are argentite, stephanite, proustite, pyrrargyrite, pyrite, enargite, arsenopyrite, bornite, chalcopyrite, sphalerite, and galena (Nolan, 1936), and the gangue minerals are quartz, adularia, and calcite.

No radiometric age determinations have been made on the host rocks at Tuscarora, but volcanic and plutonic rocks in the region have yielded K-Ar ages that suggest late Eocene and early Oligocene ages. For example, biotite from pumice from a rhyodacite about 6 miles (9.6 km) south of Tuscarora is dated at about 41 m.y. (unpub. date, R. R. Coats). The granodiorite pluton at Mount Neva, 7 miles (11.2 km) west of Tuscarora yielded an age of 38.4 ± 1.5 m.y. (Coats and McKee, 1972), which is late Eocene or early Oligocene. The age of mineralization at Tuscarora determined by a K-Ar date on adularia from the De Frees vein, which is of the high-silver type, is 38.4 ± 1.5 m.y. This age suggests that alteration and mineralization at Tuscarora may be related to emplacement of the Mount Neva pluton or at least to higher level hydrothermal activity that may be part of the regional igneous activity.

The 38-m.y. age of mineralization at Tuscarora dates it as the oldest Tertiary epithermal vein mineral deposit in northern or central Nevada. All other vein deposits for which age determinations have been made in this region are of Miocene or older age (Silberman and McKee, 1974).

SAMPLE DESCRIPTION

<u>USGS (M) 01063</u>	K-Ar	(adularia) 38.4 ± 1.5
<u>Coats no. 67NC13</u>		
Adularia ($41^\circ 19' 20'' \text{N}$, $115^\circ 51' 40'' \text{W}$); from the De Frees vein, Grand Prize claim, at Tuscarora; Elko Co., NV).		
Analytical data: $K_2O = 14.77, 14.87\%$, $^*Ar^{40} = 8.50 \times 10^{-10} \text{ mole/gm}$, $^*Ar^{40}/\Sigma Ar^{40} = 75\%$, collected by R. R. Coats, U. S. Geological Survey. <u>Dated by:</u> E. H. McKee, U. S. Geological Survey. <u>Comment:</u> Most of the available adularia at Tuscarora is in the form of crystals, generally less than 5 mm in greatest dimension, that, with prisms of quartz, line open fractures. A study of the adularia by X-ray diffractometry showed, using the 3 reflection method of Wright (1968, p. 88-93), the adularia to be intermediate in structure between orthoclase		

and high sanidine. The (131) peak was not accompanied by a recognizable ($\bar{1}\bar{3}\bar{1}$) peak indicating that no triclinic component of feldspar is present. The value of $20.96^\circ 2\theta$ ($\text{CuK}\alpha$) for ($\bar{2}\bar{0}\bar{1}$) corresponds to a composition of 96 wt percent Or, according to Wright's diagram (his Fig. 4), whereas the K_2O content indicates 87.5 wt percent Or, most probably due to intergrowth of fine-grained quartz, which is very common in hydrothermal K-feldspars. A feldspar of this composition should be highly retentive of argon (Evernden and James, 1964, p. 918).

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