NBMG OFR 83-11 4840 0046 (254)
See also 83-12 for geochemical results. TONOPAH DISTRICT Item 47

The Tonopah mining district is centered on the town of Tonopah, in T2,3N, R42,43E, Nye and Esmeralda Counties. The main productive part of the district is located in Nye County, just outside the Esmeralda Resource Area (in S35,36, T3N,R42E). The workings in the district consist of many thousands of meters of underground drifts and crosscuts, with vertical shafts to the surface, Bonham and Garside (1979, fig. 73) show the location of the principal shafts.

The district was discovered by Jim Butler in 1900, and was worked by lessees in the first few years. Tonopah had steady production until 1930, and sporadic production until the late 1940's. There has been no recorded production since 1961. Hughes Tool Co. (Summa Corp.) purchased mining claims that comprise a substantial part of the district in 1969. Houston International Minerals Co. purchased these in 1977, and has done considerable exploration drilling, underground sampling, and mapping in the district in the search for new ore bodies or extensions of ones previously mined. No commercial discoveries have been announced to date. Cordex Exploration Co. drilled low-grade disseminated gold-silver mineralization at the Three Hills property 2.5 km west of Tonopah in the late 1970's. The company has not announced a discovery, and the property was inactive in 1982.

The Tonopah district has produced 57,890 kg (1,861,200 troy oz) gold and 5,416,878 kg (174,152,628 troy oz) silver from epithermal bonanza precious-metal veins in volcanic host rocks. The geology and ore deposits of the district have been described by numerous workers; these studies are cited in Bonham and Garside (1979). The underground geology is described in detail by Nolan (1935). The most recent work in the district was done by Fahley (1981).

The ore in the Tonopah district occurs in veins which cut Tertiary volcanic rocks ranging in composition from dacite to rhyolite. The veins are composed largely of quartz but also contain varying amounts of K-mica, adularia, pyrite, and rhodochrosite.

High-grade, primary metallization in the veins consists of argentite, polybasite, pyrargyrite, electrum, sphalerite, galena, and chalcopyrite. The volcanic rocks adjacent to the veins are altered to quartz, K-mica, and adularia. This zone of potassium-silicate alteration grades outward into an intermediate argillic zone consisting of kaolinite, halloysite, K-mica, and montmorillonite which in turn grades outward into propylitized rocks.

The ore bodies in the Tonopah district occur in a zone approximately 200 m thick, which is elongated in an east-west direction. This zone reaches its highest altitude in the central part of the district, which is the only place that ore bodies are exposed at the surface. The zone is controlled by several sets of pre-ore faults, which are both high and low angle. The exposed ore bodies are oxidized to an average depth of about 30 m, although some deeper oxidation occurs locally along faults, which cut the ore. Supergene enrichment was not a significant factor in the Tonopah district. Silver-gold ratios in oxidized ore were essentially the same as those in unoxidized ore, which indicates that relatively little supergene migration of silver or gold occurred. Most of the silver in the oxidized ore occurred as silver haloids.

The age of the bonanza silver-gold mineralization described above is well defined by K-Ar age dating of pre- and post-ore rocks and hydrothermal vein minerals (Bonham and Garside, 1979, p. 111-112) as 18-19 m.y.

In addition to the silver-gold deposits described above, younger low-grade gold-silver mineralization and hydrothermal alteration occur in intrusive rhyolite (Oddie Rhyolite) and tuffaceous sediments (Siebert Formation). These mineralized units are younger than the main-stage Tonopah mineralization.

Very little ore has been produced to date in the district from rocks mineralized in this later period of hydrothermal activity. Generally, the mineralization is distinctly lower grade than in the earlier phase and has a higher gold/silver ratio. Mineralized veins of this later period occur on

Mount Oddie and Ararat Mountain. Disseminated, low-grade, gold-silver mineralization also occurs in silicified, tuffaceous sediments of the Siebert Formation and Oddie Rhyolite of the Three Hills property 1 km northwest of Siebert Mountain.

Because unaltered rocks of the Brougher Rhyolite unconformably overlie hydrothermally altered rocks of the Siebert Formation, the age of the Brougher Rhyolite places a lower limit on this later period of mineralization in the Tonopah district. The Brougher Rhyolite in the Tonopah district has K-Ar ages of 16.1 and 16.3 m.y. The available evidence indicates that this second period of mineralization in the Tonopah district is the same age as the mineralization in the nearby Divide district and is probably genetically related to it, as adularia and adularized whole rock from mineralized lodes in the Divide district were dated by the K-Ar method at 16.3 and 16.4 m.y.

Anomalous Au, Ag, As, Sb, Zn, Ba, Mn and other metals are reported from vein and wallrock samples in the Tonopah district. The details of the geochemical anomalies are reported in Bonham and Garside (1982).

Olson (1964, p. 188) reports a clay deposit in the Tertiary Siebert Formation a few kilometers northwest of Tonopah. Also, the Tonopah Summit Members of the Fraction Tuff is extensively altered to zeolite minerals (predominantly mordenite) over a considerable area south of Tonopah (Papke, 1973; Bonham and Garside, 1979, p. 50).

REFERENCES - Tonopah District

Bonham, H. F., Jr., and Garside, L. J. (1979) Geology of the Tonopah, Lone Mountain, Klondike, and Northern Mud Lake quadrangles, Nevada: NBMG Bulletin 92.

_____ (1982) Geochemical reconnaissance of the Tonopah, Lone Mountain, Klondike, and northern Mud Lake quadrangles, Nevada: NBMG Bulletin 96.

REFERENCES - Tonopah District (continued):

Fahley, M. P. (1981) Fluid inclusion study of the Tonopah district, Nevada: unpublished M.Sc. Thesis, Colorado School of Mines.

Nolan, T. B. (1935) Underground geology of the Tonopah mining district, Nevada: Nevada University Bulletin 29, no. 5 [23].

Olson, R. H. (1964) Clays in Mineral and Water resources of Nevada: NBMG Bulletin 65, p. 185-189.