Item 11

ROSE CREEK MINE

Location and Access. The Rose Creek mine is on the northern end of the East Humboldt Range in Sec. 6, T. 34 N., R. 37 E., in Pershing County just south of the Humboldt-Pershing County line (see ~~Army Map Service, Winnemucca~~ U.S. Geological Survey, Rose Creek 15-minute quadrangle ~~topographic quadrangle map~~). The mine is easily accessible from Rose Creek Station on the Southern Pacific Railroad and U. S. Highway 40, 5½ road-miles to the northwest.

History and Production. The Rose Creek mine was first located for copper and gold, however no exploratory work was done until 1936 when tungsten was discovered. The mine was sold to the United States Vanadium Corp. in 1937. Considerable development work has been done since then. No tungsten ore has been produced except ?

Development. Shallow trenches explore the outcrop of the tungsten-bearing tactite layer for over 500 feet along its strike. The underground workings include a 400-foot adit-drift, an inclined winze which follows the ore downdip, 3 raises, and a crosscut.

Previous Work. Roberts (1943) has described the geology and mine.

The Rocks. Triassic (?) dolomite, limestone, argillite, and quartzite are intruded by bodies of granite, granodiorite, and diorite, and dikes of diorite porphyry, lamprophyre, and diabase (see Roberts, 1943, plate 1, for a geologic map of the mine area).

The intrusive bodies east and southeast of the mine are medium-grained granite with a border of medium- to fine-grained granodiorite a few feet wide. The intrusive body southwest of the mine is chiefly medium- to fine-grained granodiorite and diorite. Granite and granodiorite dikes cut the rocks adjacent to the intrusive bodies. Small pegmatite and aplite dikes fill fractures in the intrusive bodies.

Lamprophyre and diabase dikes cut and displace the tungsten-bearing tactite.

The lamprophyre dikes contain some scheelite, suggesting that they were emplaced while tungsten was still being deposited. In contrast, the diabase dikes apparently were intruded after the tungsten metallization stopped.

Structures. The rocks in the vicinity of the mine are complexly folded and faulted. A thrust fault cuts the rocks; its upper plate is dolomite, and appears to have been thrust to the west or southwest. There are numerous normal faults, a number of which offset the thrust fault. The normal faults can be divided into two groups: (1) an older system generally striking north to northeast; and (2) a younger system generally striking northwest. The blocks on the southwest side of the northwest-striking faults most commonly are downthrown. Normal faults cut the tungsten-bearing tactite and granite; diabase and lamprophyre dikes follow several of these faults.

A well-developed system of joints, striking N. 10°-20° W. and dipping steeply southwest, occur in the granite bodies east and southeast of the mine.

Contact Metamorphism. The granite and granodiorite bodies have metamorphosed the sedimentary rocks around their margins. The intruded rocks commonly are feldspathized for a few feet outward from the bodies; recrystallization has taken place up to a mile from the outcrops of the bodies.

The limestone and quartzite have not been affected greatly. Both have become coarser-grained, but there has been little change in their mineral composition. Locally, tremolite needles were formed in the limestone, and its color was changed from gray to white.

The argillite was altered to gray, green, and brown hornfels over an extensive area. The hornfels is composed chiefly of quartz, mica, epidote, and actinolite.

The calcareous argillite beds for hundreds of feet away from the contact were changed completely to tactite consisting of abundant diopside, actinolite, feldspar, and quartz, and minor apatite, sphene, and scheelite. The relative

amounts and distribution of the minerals varies irregularly.

Ore Bodies. The tungsten-bearing tactite "bed" at the Rose Creek mine is up to 4 feet thick (averaging about 2 feet), strikes generally east, and dips 30°-45° N. In detail, the tactite thins and thickens, and has many minor flexures, the tactite paralleling the bedding of the enclosing argillite. Several lamprophyre and diabase dikes and faults cut and offset the tactite layer short distances (see Roberts, 1943, plate 3 for geologic map of the mine workings).

Mineralogy. The tactite contains up to 5 percent WO_3, but in the workings averages 1.5 percent WO_3. The scheelite occurs as subhedral to euhedral grains up to 1/2 inch long, most commonly disseminated through the tactite, but locally distributed along cracks or in small quartz veinlets. There are two varieties of scheelite: one variety fluoresces bluish-white and contains about 0.05 percent molybdenum; the other variety fluoresces light yellow and contains about 1.8 percent molybdenum. Some crystals of scheelite consist of one or the other variety, but most commonly both varieties are irregularly intergrown in the same crystal. Some grains have a core of one variety enclosed in a shell of the other variety; the yellow-fluorescing variety more commonly forms the core than the other variety.

Pyrite, chalcopyrite, sphalerite, arsenopyrite, and molybdenite occur in small quartz veins and disseminations throughout the tactite and adjacent wall rock. Pyrite is the most abundant and widespread sulfide, chalcopyrite also being common; the other sulfide minerals are present only locally and in smaller amounts. The tungsten ore reportedly contains as much as 1.5 percent copper and 0.14 ounces of gold per ton.

Molybdenum Minerals. Molybdenite is the only molybdenum mineral noted in the mine area. The scheelite carries varying amounts of molybdenum (see discussion above).

Oxidation. At the surface the sulfide minerals have been altered to "limonite" and the silicate minerals to clay. The altered rock is porous, and stained by copper silicates and carbonates. The oxidized zone is only 3 to 10 feet deep, being deepest where the rock is most fractured.