4900 0025

(255)
Item 25

REPORT FOR ALEX L. HART
ON THE TERRELL TUNGSTEN DEPOSIT
NYE COUNTY, NEVADA

By

E. L. Stephenson
Consulting Geologist

Reno, Nevada
January 1970

Contents

Page

Introduction... 1

Geology.. 3

Mineralization... 5

Recommendations.. 8

Illustrations

Plate 1. Topographic and geologic map of the Terrell tungsten deposit, Nye County, Nevada. In pocket.

Plate 2. Terrell tungsten property, Nye County, Nevada. Underground workings. In pocket.

REPORT FOR ALEX L. HART ON THE TERRELL TUNGSTEN DEPOSIT NYE COUNTY, NEVADA

By

E. L. Stephenson
Consulting Geologist

INTRODUCTION

The Terrell tungsten deposit is located in the Mud Spring Basin area on the lower west slope of the Grant Range, Nye County, Nevada. Here scheelite mineralization occurs in zones of tactite, quartz, and altered limestone along or near limestone-granite contacts. The main known ore shoot is sharply localized on the west wall of a broad, shallow north-trending valley, but tungsten mineralization of varying intensity is widespread in the area.

The original discovery was made and claims were staked by members of the Terrell family, who did the initial development work and mined a certain amount of ore. Later another operator did additional underground development work and mined a substantial amount of reportedly very good ore. The only underground workings on the property are at this locality, which also accounts for essentially all production to date.

The workings include two shallow inclined shafts and an adit about 150 feet long, all of which connect to a series of small, irregular, stope-like underground openings at various levels, including a sublevel below the adit level. All of these workings are within a vertical interval of about 70 feet, at a point where the limestone-granite contact makes an abrupt change in strike. It has been estimated that the total production to date is on the order of 2,500 to 3,000 tons. No firm information is available as to the grade of the ore that was mined and shipped.

The Terrell property now is under lease to Mr. Alex L. Hart and associates, who are now installing a plant to process the ore visible in and around the earlier workings. The purpose of the present survey and report is to augment this development work by mapping of the topography and geology with plane table and alidade in order to determine favorable localities for drilling or other subsurface exploration for additional ore reserves. The new map also may prove helpful in planning the open pit mining that is contemplated. Also added to this report is a map (Plate 2) of the underground workings that I prepared for the Terrells in June, 1966. This map also shows the results of sampling done at that time by Union Carbide Corporation.

GEOLOGY

The newly mapped topography and geology are shown on the accompanying Plate 1 (in pocket), on a scale of 100 feet to the inch. Basically the general geology is simple. Limestone of presumably Paleozoic age has been intruded and broken by crystalline igneous rock of late Mesozoic or early Tertiary age. For convenience the igneous rock is called "granite" herein, but it may be nearer a quartz monzonite or granodiorite in composition. It is fine- to medium-grained in texture, gray to dark gray in color, and contains fairly large amounts of accessory ferromagnesian minerals. Also present in places is a dense, light colored, fine-grained, highly siliceous rock that probably is an aplitic phase of the granite. It has been mapped with the granite.

The limestone is somewhat variable but in general is a light to dark gray, dense to granular, thin- to medium-bedded rock that in places contains considerable amounts of dark chert. No attempt has been made to subdivide the limestone stratigraphically.

In the vicinity of the deposit the main body of granite occurs as a cupola, or upward bulge, some 500 to 600 feet wide along the bottom and lower sides of the valley (Plate 1). The granite appears to be faulted near the north end, where it narrows considerably, and a narrow westward extension, also possibly controlled by faults, crosses the saddle on the west ridge. Along the contact zones the limestone that caps the ridges on either side of of the valley is a shell of thin, broken remnants of the roof of the chamber formed by the intruding granite. The contacts mainly dip outward from the granite core at fairly steep angles, and the limestone no doubt thickens greatly away from the contact zones.

MINERALIZATION

In a deposit of this kind the process of mineralization, or at least the sequence of events leading to mineralization began with the intrusion of the granitic magma, which forced its way from below into the overlying limestone. The magma finally became emplaced at a point far below the then-existing surface, where it slowly cooled and crystallized. Hot solutions and emanations from the cooling intrusive rock altered the enclosing limestone, especially along the contacts or other zones of fracturing and weakness, and formed various secondary minerals, chiefly quartz and silicates such as garnet, epidote, and pyroxene. The resulting masses of these secondary minerals are called tactite or skarn.

Sulphide and oxide minerals, especially scheelite, may be introduced and deposited with the tactite, or more commonly they may enter late in the alteration process and be deposited especially in areas where the tactite and adjoining rocks have undergone faulting, fracturing, and related structural deformation. Where a sufficient concentration of scheelite occurs an ore body or ore shoot results, and later structural deformation, uplift, and erosion may bring the contact zone and the ore body to the present surface. Some scheelite ore may be found as true fissure veins in either the granite or the limestone, but more likely it will be found as irregular and more or less erratic masses in the tactite and altered rocks.

On the basis of the above factors, tungsten ore is most likely to be found where the contact zones are faulted, where they show strong alteration of the limestone or granite, or particularly where there are large bodies of quartz or tactite, not all of which may be mineralized. Such conditions are most likely to occur where there are irregularities of the contact zone, particularly sudden changes of strike and dip. The present Terrell ore shoot is a good example of a body occurring where the contact abruptly changes direction and where large amounts of quartz and tactite occur in and near the contact zone.

The Terrell ore shoot, as so far developed and outlined, is indicated on Plate 1 and is shown in detail on Plate 2 (in pocket), on a scale of 20 feet to the inch. The scheelite mineralization occurs in tactite, altered limestone, and quartz. The shoot rakes or pitches northward at about 30°, extending from the surface at or near the main inclined shaft to the deep sublevel. The strike or trend roughly parallels the north-south segment of the contact zone. Thus the ore shoot appears to be a north- or northeast-trending, irregular, inclined chimney, although the present workings do not disclose the exact limits of mineralization.

The only available information as to grade of the ore remaining in and around the present workings consists of nine samples taken by Mr. James E. Morgan, Exploration Geologist, Union Carbide Corporation, in June, 1966, at the time that I did the underground mapping. The location, length, and grade of these samples are shown on Plate 2. The arithmetical average grade of the nine samples is 0.55% WO_3 and the weighted average grade is 0.51% WO_3. If the 6-foot sample (0.07%) at the west face of the adit level is eliminated, as it may be outside of the ore shoot, the arithmetical average is 0.61% WO_3 and the weighted average is 0.58% WO_3. The averages also might be somewhat higher if a sample had been taken from the underground opening in the vicinity of the small shaft, where good ore is showing. In any event, these figures seem reasonable on the basis of observation and lamping in the present workings.

The showings in the deep sublevel indicate that the ore shoot has not been bottomed, but drilling or other development work will be required to determine the extent and quality of the mineralization at greater depths. The geology is such that a sizable deeper ore body could be present along either segment of the contact, particularly the east-northeast segment north of the adit.

RECOMMENDATIONS

As an integral part of the present development program on the Terrell property, it is recommended that a reasonable amount of drilling be done (1) to gain more information as to the extent and grade of mineralization of the Terrell ore shoot for use in planning the open pit mining, and (2) to explore for additional bodies of ore at other localities on the property.

It is understood that a small diamond drill is available, which would be adequate for the shallow drilling contemplated here. The chief question is whether a small diameter drill will recover adequate core in the altered and broken rocks of the contact zones. If good core recovery is not achieved the drilling of course is useless. If contract drilling becomes necessary it can be by either diamond or dry rotary drill. The diamond drill can be used for inclined holes and the dry rotary cannot, but as the targets are relatively broad irregular zones rather than narrow tabular veins, most or all of the drilling can be vertical. For all other reasons, including much lower cost, speed of operation, and adequate sampling, the dry rotary drill is preferred for all depths down to water level.

The first and probably most favorable exploration target is the area of the Terrell ore shoot and the irregular contact zones to the east and south. The known mineralization, the presence of large amounts of tactite and quartz, and the irregularities and changes in strike of the contact all are favorable. The broad zone of nearly pure quartz lying north of the adit and extending eastward from the workings to the valley bottom shows scheelite in the bank of the wash, suggesting possibilities of mineralization anywhere in this zone.

Exposures both east and south of the workings indicate that the contact and associated tactite dip outward from the granite at angles of 45° to 60°. On this basis the first holes should be collared at short distances out in the limestone and can be either vertical or inclined toward the contact. Some of these holes should be close to the present workings, but others should be located to test the entire contact zone. Findings in the first holes will determine the depths to be drilled and the locations of subsequent holes.

A second area that shows large amounts of quartz and tactite and many contact irregularities lies on the east ridge between plane table station 1 (Plate 1) and the stripped area and post 5404. The small north prospect hole at the south end of the stripped area shows good tactite on an east-dipping contact. It is recommended that the first holes be drilled above this location, in the irregular tongue of limestone and in the main body of limestone on the ridge top in the general vicinity of claim post 5412. At least a few holes also could be drilled farther north in the quartz areas.

Another body of quartz and a probable fault in the contact occur on the west ridge in the southwest part of the mapped area. A few holes here would be justified, perhaps late in the drilling program, to be followed by additional holes if any favorable indications are found.

A more detailed examination and lamping of the entire contact zone on the Terrell property may reveal other areas that should be drilled. It is suggested that such work be done before the drilling program is completed.

A possible alternative or supplement to drilling in the high-quartz zone east of the Terrell workings would be to drive a crosscut from the present adit to open the contact zone. A crosscut 60 feet long driven from a point 70 feet inside the present portal would enter the contact zone about 75 feet east of the deep sublevel at a point where an offset and possible fault occurs in the contact. Advantages would be foot by foot exploration of the high-quartz zone and opening of the contact zone to direct observation. Disadvantages would be relatively high cost, possibly too high an elevation in relation to mineralization, and development of only about 30 feet of back between the adit level and the surface.

E. L. Stephenson

Reno, Nevada
January, 1970

E. L. Stephenson
Consulting Geologist
Registered Professional Engineer
Nevada No. 501