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July, 1943

WAR MINERALS MEMORANDUM 1/

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

Report of the Bureau of Mines to Hon. Harold L. Ickes, Secretary of the Interior

TUNGSTEN DIKE

TUNGSTEN

Summary

The Tungsten Dike property, Mineral County, Nevada, is in an area which formerly produced a large tonnage of tungsten ores from various mines, among which the Silver Dike was outstanding. This property adjoining the Silver Dike mine on the north, is favorably situated and may contain continuations of re-occurring mineralized sections of the Silver Dike vein system. Surface indication on the property comprise a well defined vein system 50 to 200 feet wide which outcrops boldly for a distance of 4,000 feet or more. This system bearing N. 70° W is related in a general way to a contact of diorite with an older volcanic series, and is represented by a number of parallel, steeply inclined or vertical fracture fillings composed largely of quartz. Mineralization occurs as disseminated scheelite in irregular shoots or lenses associated with anddistributed through coarse vein quartz. In the Silver Dike property the present lower levels are as highly mineralized as the upper portions. It also has been disclosed that portions of the vein system containing the largest concentrations of scheelite are apt

1/ These Memoranda present the facts reported by Bureau of Mines engineers regarding properties for which no further consideration is recommended. Therefore, they should be treated as confidential, for the sole use of Bureau employees. They should not be given out to the public or to the owners of the properties concerned.

to be obscure on the surface. Present development workings, largely surfical, are insufficient and have little exploratory value. Preliminary sampling of areas thought to be ore-bearing do not contain enough tungsten to be considered ore. This factor, however, should not condemn the property since it is believed that future possibilities are largely dependent upon deeper development, because of the impressive showings found on the Silver Dike property adjoining on the east.

Further consideration by the Bureau of Mines cannot be recommended at this time, but deeper development by the owner is justified.

Introduction

The Tungsten Dike mine, Mineral County, Nevada, was examined June 24, 1943, by an engineer 1/of the Bureau of Mines, accompanied by E. T. Hegglund, Mina, Nevada, owner of the property.

It is situated in Sec. 5, T. 5 N., R. 34 E., about 12 miles southwest of Mina, which is on Highway 95, between Fallon and Las Vegas. From Mina the old road to Hawthorne is followed eight miles in a westerly direction to a poor road going southeasterly to the vicinity of the mine. The last mile and one-half is by steep foot trail.

History

The Gold Ring mining district in which the deposit is situated, was formerly a large producer of tungsten from properties among which the Silver Dike was outstanding. As the outcrops of the Tungsten Dike mine are very prominent they have been known and prospected for years. Locations comprise 15 claims, six of which, known as the Tungsten Dike 1-6, were discovered and located by Mr. Hegglund in 1915. Recently the General Tungsten ground comprising 9 claims adjoining the Tungsten Dike on the north, was re-located in 1942, by Mr. Hegglund.

1/ Willmar T. Benson, Mining Engineer

Physical Features

The deposit is in an area of moderately rough topography at an altitude of about 7,500 feet. It roughly follows a large quartz outcrop, striking N. 70° W. that is exposed for several thousand feet.

The region is arid. Annual precipitation is relatively light, and occurs mostly as snow. Vegetation consists of pinion pine, of no value except for fuel. A small spring with a flow of about 10 G.P.M. is in a small north-south canyon a mile and a half west of the property. This water, suitable for domestic purposes, is not sufficient for mine and milling operations, but it is possible this flow could be increased with additional development. The nearest power is at Mina. Fuel oil for power generation would have to be trucked in from nearby supply centers. Mina, a supply point on the Southern Pacific Railway, is about 11 miles airline northeast of the property.

Labor and Living Conditions

A small frame house on the property, together with a cook house and two bunk houses on the General Tungsten ground, is sufficient to accommodate 20 men.

A limited supply of skilled and semi-skilled labor is available in nearby towns. Wages in the area range from $0.85 to $1.00 per hour.

Description of the Deposit

Rocks of the region consist of volcanic breccia, flows, tuff and thin sedimentary strata. The volcanic series forms the hanging wall of the vein system which is considerably metamorphosed by the processes of mineralization accompanying and following the intrusion of the diorite. The diorite in the area forms an irregular elliptical stock 1 1/2 miles long and a mile wide, and is much broken and fractured along the contact.

The vein system, bearing N. 70° W., is related to the contact of diorite with the older volcanic series, and is represented by a series of parallel, steeply

Ore Reserves

Due to insufficient development, it was impossible to make a satisfactory estimate of ore reserves. Assay results of samples taken from favorable areas claimed by the owner to be ore-bearing are too low in grade to be considered ore. These factors should not, however, condemn the property since it is believed future possibilities are largely dependent upon deeper development. It has been noted that in the ore zones on the adjoining Silver Dike property, the scheelite values were not clearly exposed on the surface. As this property has surface indications identical to the Silver Dike, it appears possible that well directed development may disclose concentrated areas that might be commercial.

Conclusions

While this property has impressive surface indications and possibilities at depth, as judged from showings found in the property adjoining to the east, present development is insufficient to justify consideration by the Bureau of Mines at this time. Deeper development by the owner is justified.

inclined or vertical, fracture fillings composed largely of quartz. The maximum width of the vein system proper is about 200 feet, but in places the width is not more than 25 feet. On the surface the veins are evidenced by bold outcrops of quartz.

Mineralization is scheelite in quartz replacement veins in altered diorite associated with albite and occurs in zones varying in width from a few inches to 15 feet or more. It is reported that in the Silver Dike workings adjoining on the east, the present lower levels are as highly mineralized as the upper portions. It also has been disclosed that portions of the vein system containing the largest concentrations of scheelite are apt to be obscure on the surface.

Mine Workings

Development consists of four adits, two shallow shafts and numerous cuts and trenches irregularly spaced over a horizontal distance of about 4,000 feet along the line of outcrop.

The east adit 179 feet in length, follows a 2 inch quartz vein bearing S. 55°. Near the large quartz outcrop, 200 feet north of the east adit, a 15 foot shaft exposed tungsten showings to a depth of 15 feet. About 3,000 feet to the north, 300 tons of tungsten ore was mined from a 50-foot shaft and from an open cut 6 feet wide, 75 feet long, excavated to a depth of 10 to 20 feet. Other excavations on the property are too shallow to have any exploratory value.

The Ore

The ore occurs as finely disseminated scheelite, in irregular shoots or lenses, associated with and distributed through typical coarse vein quartz.

Three character samples were taken on the property and are described as follows:

Sample	$\%WO_3$	Remarks
No. 298	* 0.01	5 Ft. cut across face east adit
No. 299	* 0.01	Grab sample dump at 15 ft. shaft south side large outcrop
No. 300	* 0.01	Chip sample across ledge west Tungsten area

*Less than

6-285

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Mines
Technical Service, Reno, Nevada

Date: August 26, 1943

Sample supplied by: W. T. Benson
U. S. Bureau of Mines
224 West First Street
Address: Reno, Nevada

PROJECT: Benson
Hegglund Mines, Tungsten Dike Mine

Nature of Ore:

Sample No.	Oz.Au/Ton	Oz.Ag/Ton
306	Trace	None
307	Trace	0.25

cc District Engr. - G L Allen
Prin. Engr. - P T Allsman
Off. Reg. Engr. Western Div. - S R Zimmerley
Files

A. C. Rice /s/
A. C. Rice
Acting Supervising Engineer

SILVER DYKE AND TUNGSTEN DYKE MINES

Mineral County, Nevada

Paul C. Bateman
August 6, 1943

During June I briefly examined the Silver Dyke and the Tungsten Dyke mines, both located on the Silver Dyke vein in the Excelsior Mountains near Mina, Nevada. I visited the Silver Dyke Mine on June 10, accompanied by Krauskopf, and the Tungsten Dyke mine which adjoins the Silver Dyke property on the northwest on June 12 with E. T. Hegglund, the owner. Recently, I went through two mills in Sodaville. One is now operating on tailings from the Silver Dyke mine. The other is an old gold mill that the company now controlling the Silver Duke mine intends using to mill newly mined ore.

The "Silver Dyke" is a thick and continuous quartz vein that extends for several miles through the northeastern part of the Excelsior Mountains. The vein strikes northwesterly and dips to the northeast at a high angle. Along most of its length on the Silver Dyke pr perty it lies between diorita on the south and Triassic volcanic rocks of the Excelsior formation on the north. For a short distance near the northwestern end of the Silver Dyke property diorite forms both walls; on the Heggland property both walls are volcanics.

The vein varies considerably in thickness, due partly to shearing in the plane of the vein. Near the northwest end of the Silver Dyke property the vein is at least 50 feet thick. In many places two parallel veins, separated by brecciated country rock ribboned with quartz veinlets, lie 10 to 25 feet apart. Cross faults offset the vein short distances. Comb structure is prominent throughout the vein and brecciation is common.

Scheelite occurs in tabular shoots on the walls of the vein. The larger shoots lie on the south or footwall side, but smaller pods occur on the hanging wall. Away from the shoots the quartz contains little or no scheelite.

Silver Dyke Mine

Since the Nevada-Massachusetts Company stopped operations the Silver Dyke mine has reverted to Mrs. Beane, widow of Beane of the former operating company of Beane, Becke and Noonan. It is now leased to the Nevada-Silver Dyke Company of which Magnus G. Thomle is president. Persons interested in this company include George E. Berry, East Lynn, Mass.; Stanley R. Jordan, Huntington, L.I.; James J. Lynch, Brooklyn, N. Y.; Ben S. Allen, Palo Alto, Calif.; A. N. Torkelson, Los Angeles; W. P. Stymus, New York; and Jafet Lindeberg, San Francisco. Lindeberg is in charge of their operations which at present are the rehabilitation of certain portions of the mine. Three men are employed.

The company has acquired an old mill at Sodaville which it proposes converting to a tungsten mill. This mill has not been used for several years and it is doubtful if much of the equipment, except the building and the bins, can be used.

Another mill, also at Sodaville, is actively operating on tailings from the Silver Dyke mine. The mill is operated by H. S. Crowell who has a sub-lease from the Nevada-Silver Dyke Tungsten Company on the old tailings and dumps. The mill includes a small jaw-crusher, a roller mill, and two tables. Crowell has no help. He hauls about 10 tons of tailings daily to the mill and from that recovers an estimated 3 to 4 units of WO_3. He intends shipping his concentrates to Salt Lake after cleaning them up with a magnetic separator. No concentrate has yet been shipped so the grade of the concentrates and consequently the exact number of units produced is not known. Crowell thinks he has at least 100 units of WO_3 now on hand that were milled since the first of July.

The portion of the vein on the Silver Dyke property was originally prospected and developed through several shafts and adits dug on the vein. When the Nevada-Massachusetts Company acquired the property they drove a long crosscut from near the bottom of Silver Dyke Canyon that intersects the vein several hundred feet below its outcrop. Drifts extend both northwest and southeast from the crosscut and connect by means of raises with the upper workings. Maps of most of these workings are included in Paul Kerr's publication on the mine. (Kerr, P.F., The Tungsten Mineralization at Silver Dyke, Nevada. Bull. Nev. St. Bur. of Mines, No. 5, June, 1936) Since this paper was published the drift was extended further to the northwest and two winzes were sunk below the main level. This extended part of the main drift is saved and not accessible.

There appear to be two main shoots in the mine, one developed in the workings east of the crosscut and one by the workings west of the crosscut. Kerr separated the east shoot into the Wagner and Beane shoots, but commented that they joined. He also divided the west ore shoot into the 600 West and the Goodale shoots, separated by the Goodale fault. Both shoots are on the footwall side of the vein and appear to rake vertically. It is my impression that no ore remains above the main level.

The two winzes prospect the downward extensions of the shoots. The winze on the east ore shoot has been sunk 100 feet below the main level where about 500 feet of drift explores the vein. Several underhanded stopes have been extended downward from the main level and there are a few small stopes and raises above the 100-foot level, but I believe only about half of the expected ore block between the levels has been removed. Under ultra-violet light very little ore can be seen on either level. The stoping at the main level has been very clean and little ore remains on the stope walls. On the 100-foot level I saw only small patches of scheelite which are not commercial. Apparently the east shoot does not continue much below the main level.

I did not get into the winze that explores the west shoot. It is rumored to extend about 400 feet below the main level.

Tungsten Dyke Property

The Tungsten Dyke group of 15 unpatented claims is held by E. T. Heggland of Mina. Certain of the claims were formerly held by the General Tungsten Company which made a small production. The property is accessible from Mina by about 12 miles of dirt road and 2 miles of trail. The road does not pass thru or near the Silver Dyke claims.

Workings consist of open cuts, a 200-foot adit, several small adits and shafts, and a long drift that was dug for silver many years ago. Heggland reports that the General Tungsten Company produced 350 tons of ore that contained 3.5% WO_3. Heggland produced 22 tons of 1.5% ore that were milled by the Nevada-Massachusetts Company.

I examined the open cut from which the 350 tons are reported to have been dug, but saw only a few remaining crystals of scheelite. The cut is partially caved and not well exposed. The 22 tons were produced from the 200-foot adit which Heggland dug on a subsidiary vein south of the main structure. A good grade of ore in a band 3 to 6 inches wide is exposed in the roof of the adit for about 100 feet from the portal, where the vein is cut off by a cross fault. I saw no scheelite elsewhere in the adit. The other prospect diggings contain only scattered grains of scheelite.

Heggland's principal claim for ore rests in his claim to have affidavits by miners who worked in the caved portion of the main northwest drift in the Silver Dyke mine. I did not see the affidavits but they are said to state that the drift extended beyond the limit of the Silver Dyke property and into Heggland's property. High-grade ore is said to have been encountered there. Heggland contends the drift has not caved but was blasted when Nevada-Massachusetts abandoned the mine.

Heggland has applied for a road to replace the 2 miles of trail to his property. Such a road does not appear to me to be warranted by the showings.

Conclusions

We have some hope of getting the Nevada-Massachusetts Company's maps and records of the Silver Dyke mine. Several piles of drill cores indicate they did considerable diamond drilling before abandoning the property. After this information is made available it may be desirable to do additional geologic work.

COPY

Winnemucca, Nevada
October 5, 1943.

Mr. T. B. Nolan
U. S. Geological Survey
c/o Ima Mines Corp.
Patterson, Idaho.

U. S. Geol. Survey
C O N F I D E N T I A L
For use of
U. S. Government
Only

Dear Mr. Nolan:

Subject: Silver Dyke and Tungsten Dyke Properties and Operation of Nevada-Silver Dyke Tungsten Company.

In following up the chore outlined in your wire of September 30 I found that Nevada Silver Dyke Tungsten Co. and not E. T. Heggland, owner of the adjacent Tungsten Duke property, is attempting to obtain electric power from Mina. Consequently I devoted most of my time to Silver Dyke. The current Silver Dyke situation is summarized in the first few paragraphs; some details that might be of interest are expanded upon in the following.

The Nevada-Silver Dyke Tungsten Co. now owns the Silver Dyke mine and two mills and a camp at Sodaville, nine miles by road from the mine. A lessee is treating tailings in the smaller of the mills; the larger is being remodeled and refurnished. The company is equipping this mill to operate with electricity, hoping that a three mile power line will be built from Mina.

Although the company has built large ore bins and remodeled a mill, it has apparently made no attempt to find ore. In fact there is a surprising lack of familiary with the mine by those in charge. Work underground was started recently, and two men are now laying track and pipe.

I estimate that about 2000 tons of 0.5-0.6% WO_3 ore are partly developed and can be mined from the accessible underground workings. This ore is marginal to the two main shoots from which most of the past production has come. The only reserve of ore that can keep the rebuilt mill in operation for more than a few months is in tailings and waste dumps. Approximately 4000 tons of tailings are estimated, on the basis of a few assays and examination in ultra-violet light, to average near 0.5% WO_3. A larger volume of tailings probably of lower grade, is scattered farther down the canyon. Of the waste dumps, possibly 20,000 tons may be amenable to sorting. From this, possibly 3 or 4 thousand tons of mill feed averaging between 0.5 and 0.75% WO_3 can be sorted.

To me it seems unlikely that a profitable 100-ton operation on tailings, waste dumps and mine ore will be attained under the present management. Under very efficient management, it might be possible to mill the tailings and sort and mill some of the dump rock profitably. At the same time judicious underground exploration might reveal a few thousand tons of ore. Treatment of the tailings on a small scale, as the lessee now does, is almost certain to be profitable.

Heggland's claim for ore is based on affidavits by former Silver Dyke miners. These affidavits are said to state that the Nevada-Massachusetts Co. west drift penetrated Heggland's ground and there found high grade ore. This area is now caved. O. F. Heizer and W. G. Emminger, however, inform me that the west drift was not pushed to the limit of Nevada-Massachusetts (Silver Duke) ground and that no ore that would be of interest at the present price was found beyond about 500' northwest of the Goodale shaft.

Supplement

Ownership:- Nevada-Silver Dyke Tungsten Co. is a stock company of which Magnus G. Thomle is president. Most of the stock is held by a few men. Jafet Lindeberg and Herman S. Crowell are in charge of different phases of the work at the property. Nevada-Silver Dyke, according to Thomle, has acquired title to the Silver Dyke mine from the Beane estate, although payment in full has not yet been made. The company also owns a small camp and two mills along U. S. highway 95 at Sodaville. The smaller mill, along with all tailings and dumps on the Silver Dyke property, is leased to Crowell. E. T. Haggland and George Thorswedt of Mina own the Tungsten Dyke property which includes the ground originally held by General Tungsten Co. and claims located by Heggland. This ground adjoins the Silver Dyke property on the northwest.

Current Operations.- Nevada Silver Dyke employs six men. Two are engaged in laying track and pipe at the mine. The others are installing equipment in the larger mill. This mill, now about halfway completed, will contain a jaw crusher, conveyors, classifier, ball mill, and five tables. This equipment, except for the tables which are reported to be in transit, is installed or now being installed. Electric motors and a transformer are also being installed.

Crowell has remodeled the smaller mill and operates it with diesel power. He employs two men and has, since early July, produced about two tons of concentrate from tailings. Currently he recovers about 160 pounds of concentrate from 10 tons of tailings daily. He hopes in the near future to operate three shifts daily and to mill 15 or 20 tons. No concentrate has yet been shipped, but I believe that grade is at least 50% WO_3.

Thorswedt and Heggland work for Nevada-Silver Dyke filed application through the Mineral County Power Supply for three miles of line to be placed on poles now standing. The wire was taken from these poles last year and used at the Hawthorne Naval Base. This line would extend from the present terminus at Mina to the rebuilt mill. Mineral County Power Supply advises me that a triple line of no. 4 copper wire, about 3½ tons, would be needed for this project. I understand that a former and more ambitious request, a twelve mile line from Mina to mill to mine, was denied.

Crowell would also like to have electric power at the smaller mill, about 600' distant from the larger one.

Heggland and Thorswedt state that all they wish is an opportunity to clear the caved drift and get to work on the supposed bonanza. The surface showings are unimpressive and accessible only by a two mile trail. The level of the caved west drift is 600' to 800' below the outcrop near the west end of the Silver Dyke property. Approximately the same backs would be had beneath Heggland's ground.

Ore Reserve.- After examining all accessible workings in the Silver Dyke mine I am convinced that former operators did not leave much developed ore behind. I believe that about 2000 tons of 0.5 or 0.6% WO_3 ore can be mined from the margins of the two main ore shoots. Most of this ore is near the bottom of the east shoot and could be mined from the lateral workings off the Wagner winze. A small stope might also be mined above the east drift southeast of the winze. Another small shoot might be stoped above the west drift near the Noble crosscut. In the rest of the accessible workings the vein is either stoped, barren or very low grade. No ore is exposed in accessible workings in the Noble vein.

It does not seem like that the west ore shoot continues below the west drift. Unfortunately, the winze in this area is inaccessible. There is a possibility, however, that some additional ore might be found around the margins, particularly near the bottom, of the east ore shoot. Careful geologic mapping might yield clues that would be valuable in guiding an exploratory campaign.

The most tangible reserve is in the tailings and in waste dumps. Very probably 2000 units of WO_3 can profitably be taken from the tailings. Sorting of the waste dumps is not as likely to be successful, although it is possible that a few thousand units might be recovered from them.

Predicted Future.- A production of 100 to 125 units of WO_3 per month is anticipated as long as Crowell runs tailings through the small mill. Ultimately the tailings may yield 1500 units or more. If and when the larger mill is completed, it may be necessary to run tailings through it to keep it in operation. I expect that after the tailings are exhausted, production will be rather small and erratic.

Sincerely yours,

M. R. Klepper.