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(208)

Tungsten

Min. Co.

ITEM 32

SILVER DYKE MINES.

Outline of this report.

1= History, titles, property owned and general situation.
2= Geology, ore occurrences, mining methods, transportation, water supply.
3= Workings (a) Goodale; (b) Atkins; (c) Noble shafts; (d) surface pros=pects.
4= Production to date.
5= Operating costs; (a) Atkins, Kroll & Co; (b) Noonan, Bean & Beck; (c) estimate under present conditions after equipping.
6= Recommendations for installation of equipment.
7= Summary of present value based on recovery of 80%, assuming a market at $20 per unit of tungstic acid during one year.

This report compiled by H A Morrison, Mining Engineer, who was in charge of the Silver Dyke mines during their operation by Atkins, Kroll & Company.

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I

The Silver Dyke mines were located in May 1915 by Chas E. Noble. Three claims, Silver Dyke No 1, Silver Dyke No 2 and the Isabel, comprise the group. The group was sold to Atkins, Kroll & Co of San Francisco in October 1915 and by them sold to Noonan, Bean & Beck of Sodaville in December 1917, and the ownership now rests with the latter partnership. The group is now held under United States patent and is free from all encumberance and the title is clear and absolute. The Silver Dyke lies at an elevation of seven thousand feet above sea level and is distant eleven miles from Sodaville, Nevada. At the latter place abundant water is available and it was at Sodaville that Atkins, Kroll & Co erected a mill with 100 tons daily capacity. This plant was dismantled and sold in 1917, but the townsite and water rights at Sodaville are still owned by Atkins, Kroll & Co.

II

The ore is a clean white and iron stained quartz containing variable amounts of scheelite, the sole valuable constituent. The main quartz vein or so called dyke represents a line of brecciation, along what is usually the contact between grano=diorite on the south or footwall side and a much altered schistose lime shale on the north or hanging wall side. The big outcrop of quartz traverses the claims for 3,000 feet along its strike and averages more than 50 feet in thickness. It strikes east and west and dips 75 degrees to the north. On the hang=ing wall side there is a continuous selvege of silicious breccia four to six feet thick which seems to be entirely free from tungsten or other metals. This breccia shows numerous and often deep striations and leads to the inference that much movement occurred along the contact and indicates that the vein represents the mineralization of a contact fault zone. Very recently garnets have been recognized as a common constituent of the ores and this is taken to strengthen the idea that the vein lies along a contact of sedimentary and igneous rocks. In some cases grano=diorite is found on both walls and the evidence that the hanging wall rock as usually found, is a sedimentary, [illegible] is rather obscure. However along the vein some distance west of the mine the hanging wall rock is clearly and unmistakably limestone.

The ore usually is found along the footwall of the vein, varies in width from two to six feet and in grade from one to five per cent tungstic acid. In certain instances the ore travels diagonally from the foot toward the hanging wall along cross slips or shear planes. The Noble vein, in which the first scheelite was found, is a footwall

stringer or feeder which diverges from the main vein on the footwall side and both walls are of the common granite rock. In certain cases the Noble vein consists of a stock work of scheelite veinlete in gar= netiferous granites.

Numerous faults of small throw are in the main post mineral. There were several periods of silicification, accompanied by faulting, and it seems that in possibly but one period were the scheelite and quartz in solution at the same time. One case where faulting was certainly pre mineral will be cited later in this report.

The big quartz vein shows a noticeable tendency to diminish in width as moderate depth is gained. It seems at least possible that scheelite content of the vein may remain more or less constant and that by decrease of barren quartz as greater depth is gained, a uniformly higher grade of ore will be encountered.

In most cases the ore is fairly hard and it can be handled cheaply by shrinkage stoping methods. In some instances it is neces= sary to stull and fill the stopes as work proceeds.

A small amount of water, sufficient for domestic use occurs near the claims in small springs which belong to the mine. Water for milling purposes can be had at Rhodes seven miles distant, or at Soda= ville, eleven miles from the mine over a fair road with grade in favor of the ore.

III.

(a) The Goodale ore shoot outcrops along the west endline of the Silver Dyke #1 claim and a shaft of the same name was sunk to a depth of 172 feet in the shoot and three levels were opened at intervals of about 60 feet. This ore shoot is three to six feet wide and 75 in length along the strike. It is continuous from surface to the third level and continues into the floor of the latter level. The average of all ore mined from this shoot was better than 2% tungstic acid. Very little work has been done to the west of the Goodale shaft, but a promising ore shoot which produced a fair tonnage of 3% ore is opened on the first level west.

In a surface cut which runs diagonally from the Goodale shoot toward the hanging wall, about 300 tons of 2% ore were mined. This is as much as eight feet wide and continues in the floor of the cut.

Extensive stoping has been done from the second level to sur= face in the Goodale shoot. Much average grade ore remains between the second and third levels and the shoot goes into the floor of the latter with size and granite unimpaired. There are several undeveloped and promising prospects which have not been tested on the second and third levels east and a drift west on the second level should enter ore within 20 feet. The third level east drift should be driven and fre= quent crosscuts to the hanging wall are advisable.

(b) The Atkins ore shoot outcrops 200 feet west of the east end line of the Silver Dyke #1 claim. On surface this ore was three to seven feet in width and averaged 6% tungstic acid for a distance of 75 feet along the strike. The Atkins shoot is characterized by numer= ous step faults of small displacement. Most of the faults are normal but two are reverse and all seem to be post material. The ore lies clos to the footwall and in general is much softer and more talcose than the Goodale. This is of course a natural result of the faulting men= tioned above. At this time fully 500 tons of 4% ore, at least three feet in average width are definitely in sight in the Atkins ore shoot. The bottom of the mine is only about 100 feet from the surface and the bottom of the workings show ore of equal grade and width as the average mentioned for the whole shoot. On the adjoining ground to the east, owned by Mr Wagner, the shaft is over 200 feet deep, and the lower 75

feet of the shaft shows ore of 4% grade with an average width of two feet. The Wagner shaft is very close to the east end line of the Silver Dyke #1 claim, and the ore exposed is taken to represent the easterly extension of the Atkins shoot. It seems that the latter goes down vertically as the ore thins out in size and in value in the country to the east of the Wagner shaft. It is however possible that the ore will extend farther to the east as depth is gained.

The Atkins shaft, 188 feet deep, is about 250 feet west of the Atkins shoot and it is recommended that this shaft be connected with the main ore showing by drifting east from the 200 foot level. The general outlook for a larger tonnage of better than 3% ore from the further development of the Atkins shoot is considered very good.

(c) The Noble vein is a stringer or feeder running south= easterly from the principal and much larger quartz vein in which the Goodale and Atkins shoots have been found. The Noble vein diverges from the big vein at or near the Goodale shaft and it has been developed by extensive tunneling, and the Noble shaft which is 168 feet deep and has three extensive levels as depths corresponding to the levels of the Goodale with which it is connected on the first and third levels. This vein has produced about 2000 tons of 4.5% ore from one continuous ore shoot. The ore averaged 30 inches in width. Both walls of the Noble are grano=diorite which is strongly garnetized in some instances. This vein becomes weak and indefinite below the third level where a 50=foot winze has been sunk and further deep development of the vein is not justified on the present showing. However, it would be advisable to drive a crosscut to it in case the big vein is opened two hundred feet below the present bottom of the Goodale shaft. In the workings above the "A" tunnel on the Noble vein a considerable tonnage of better that 1% ore can be cheaply mined.

The socalled fault vein is apparently a connecting link between the Goodale and Noble ore shoots. This lies between the Noble and Goodale shaft and forms the base of a triangle, the sides of which are the two other vein structures. The fault plane is nearly vertical and well defined, and the filling is quartz about three feet thick. The ore in this vein seldom averaged more than one foot in width and does not seem to persist below the 100 foot point. Production amounts to 200 tons of 5% ore.

(d) At several points along the outcrop of the principal vein both east and west of the Goodale shaft moderate widths of 1 to 3% ore have been found. Additional work on the best of these pros= pects is well justified. It is pointed out that at least two thirds of the vein within the Silver Dyke claims is but slightly prospected and no underground work done. As very good exposures of ore have been found both on the Wagner ground to the east and on the Heggland groupe to the west, it is quite certain that the Silver Dyke ore occurrence cannot be considered small local concentrations of scheelite and it is believed that they do indicate a deep seated and well defined ore channel which, when properly developed, will be the scene of a long lived, profitable mining campaign.

IV.

Since its discovery in 1915 the Silver Dyke has produced approximately 10,000 tons of 2.8% ore, from which 17,000 units of tungstic acid were recovered. This represents a saving of 60% of the scheelite content. A very substantial profit has been made on all operations. The various reserves of ore now exposed are as follows:

Goodale, 3000 tons 1.5% ore above 150 foot level.
769 " 2. " assumed below 150 foot level.
Noble, 200 " 3. " from lower workings.
3969 tons on recovery of 1.2 units equals 4762.8

net units.

The Atkins shoot, Block A, 4x30x32' = 295 tons at 13 cu.ft. per ton.
" B, 4x25x60' = 462 "
" C, 3x50x100' 1170 "

1927 tons estimated at 4% WO3.

Estimated recovery 3 units from 1927 tons equals 5781 net units.
Total net units developed in Silver Dyke mines are 10,543.8 units.

The total operating costs at the time Atkins, Kroll & Co stopped work, were $14 per unit on 2% ore. At present the unit oper= ating costs of Noonan, Bean & Beck are $16.50 on a 4% grade.

It is estimated that after the installationof the machinery which is justified by the ore exposed, a cost of not more than $10 can be made on 1.5% ore.

The present market quotation is $24 per unit, giving a net profit of $14 per unit on the total of 10,543.8 units now developed in the mine. This indicates that the Silver Dyke mine now has a gross actual value of $147,600.

VI.

Since no water for milling is to be had in the vicinity of the mine, it is necessary to haul the ore either to Sodaville, distant eleven miles by good road or to a point near Rhodes, distant seven miles. In either case the product would be milled at or near the railroad. Hauling has been done in the past with teams, Holt tractors and Packard trucks. Costs per ton for team haul were $3.50, for tractors $1.75 and for trucks $1.60 for the haul to Sodaville. Under present conditions on a 50 ton daily basis the ore can be moved from the lower bin to Sodaville for $2.50 per ton.

It is recommended that a 50 ton mill, closely following the general plan of the one now operating at Toulon be built at one of the two places mentioned. Two small gasoline hoists would be needed at the mine together with two wire rope trams, each about 1500 feet between terminals should be installed to serve in collecting the ore in the lower loading bin. The latter should be moved to a suitable central point much nearer the mine and on the claims.

To date all drilling has been done with single hand hammers. This should be discontinued and suitable compressor capacity provided to handle the work on the basis suggested.

The following cost data from the operations of Noonan, Bean & Beck will serve to indicate the places wherein costs can be reduced by providing suitable equipment:

Produced 452 tons 4% ore prior to June 1, 1918.

Per ton cost for labor,	$18.00	Milling costs segregated.	
Supplies,	4.50	Unloading ore,	$1.00 perton
Hauling to Sodaville,	5.50	Milling,	7.50
Milling at Toulon,	11.05	Cleanup chgs,	.50
R R freight,	3.25	Sacks for concts.	.50
Loading on cars,	.40	Assaying,	.05
		Selling chgs.	1.50
Total per ton costs,	42.70	Total mill chg	11.05

On the 452 tons of 4% ore shipped, the recovery has averaged 83% and the concentrates have averaged 70% WO3.

Since 3.2 units per ton were recovered, the ore had a gross value of $76.32 at $24 per unit. Costs being $42.70, the net value per ton of the ore shipped by the present owners was $33.62.

VII.

One very strong point in favor of the reopening of the Silver

Dyke in a large way is that it is proven that good extraction, exceeding 80% can be made on all ores of commercial grade. The work of the Toulon mill demonstrates this point.

It may be assumed that scheelite will not be less than $20 per unit during the next year and a higher price is probable.

The writer is extremely familiar with the ore occurrence and general conditions of the Silver Dyke, having been in charge of the mine and the milling connected therewith during the time the mine was being very actively worked while owned by Atkins, Kroll & Co. He has always had a high regard for the mine and this belief is strongly confirmed by a recent careful investigation of all the workings.

It is my belief that the mine will produce ore of a profitable grade during a long period, if carefully managed and continuously de= veloped.

(Signed) H A Morrison,
Mining Engineer.

Goldfield, Nevada,
July 1, 1918.