Matson, E.J., 1944, Wartime studies by the U.S. Bureau of Mines.

The War Minerals Reports of the Bureau of Mines are issued by the United States Department of the Interior to give official expression to the conclusions reached on various investigations relating to domestic minerals. These reports are based upon the field work of the Bureau of Mines and upon data made available to the Department from other sources. The primary purpose of these reports is to provide essential information to the war agencies of the United States Government and to assist owners and operators of mining properties in the production of minerals vital to the prosecution of the war.

WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

W.M.R. 224 – Tungsten September 1944

TUNGSTONIA PROPERTY

Tungsten Minerals, Inc.

White Pine County, Nev.

SUMMARY

Exploration on the Tungstonia property in White Pine County, Nevada, was started by the Bureau of Mines on March 9, 1942, and was completed on November 3, 1942. Five parallel veins in an area roughly half a mile wide and three-quarters of a mile long were investigated. Because of the large surface area and the numerous small outcrops, it was planned to trench along the strike of the veins in the most favorable places at 10-, 25-, and 50-foot intervals, with the object of exploring the continuity of the outcrops and to determine vein structure for the advantageous placing of diamond-drill holes.

Twenty-two diamond-drill holes, totaling 3,420 feet, were drilled by the Bureau, and accessible mine workings also were sampled. The ore mineral is hübnerite, a manganese tungstate ($MnWO_4$), which, when pure, contains 76.6 percent tungstic trioxide (WO_3). Other associated minerals are pyrite, galena, fluorite, and occasionally small amounts of chalcopyrite and sphalerite.

Ore reserves measured, indicated, and inferred by Bureau exploration amount to 22,135 tons averaging 0.52 percent WO_3, or 11,556 units.

Surface equipment comprises a crushing plant, a 25-ton-a-day concentrator, compressor plant, repair and steel-sharpening shop, and a small camp consisting of a boarding house, cabins, and office.

The mill of the Tungsten Metals, Inc., is equipped for gravity concentration and magnetic separation. Check-sampling of a typical mill run over a period of 14 hours indicated that the mill can operate efficiently.

The ore is low-grade, and mining operations are scattered, indicating that this mine will be a high-cost and submarginal producer. The property has suspended operations, probably for the duration of the war; however, should the need for tungsten become acute, some production from this property can be expected.

INTRODUCTION

The tungsten deposit at Tungstonia, Nev., was examined by an engineer[1] of the Bureau of Mines on October 14 to 17, 1941, to determine its possibilities for exploration under the Strategic Minerals Program. Exploration was begun March 9, 1942, and was completed November 3, 1942.

The property is in the NE 1/4 of sec. 27, T. 21 N., R. 69 E., in the Regan Mining District, White Pine County, Nevada, about 45 miles northeast of Ely.

PROPERTY AND OWNERSHIP

The property comprises 37 mining claims and is held by Tungsten Minerals, Inc., a corporation organized under the laws of the State of Utah. J. M. Eccles, 826 Eccles Building, Ogden, Utah, is the president of the corporation and represents a majority of the stock.

Three claims, known as the Ophir Nos. 8, 9, and 12, on which the present mining operations are confined, are held under a lease-purchase agreement. The claims covering the other veins to the east are known as the Wolframite, Wolframite No. 1, Griswold, and Griswold No. 1. They are owned by the Ely Gold Mining Co., Ely, Nev., of which W. J. Walker is president. Tungsten Minerals, Inc., holds a lease on the entire property with option to purchase.

HISTORY

Tungsten veins in this area were discovered in 1910 by S. G. Simms and C. Olson. Previous to 1918, very little development except necessary assessment work was done on the property. Demand for tungsten during World War I created interest in the property, and a shaft (now called the "old shaft") was sunk on vein 1 about 800 feet south of the present workings and reached a depth of about 80 feet. Some stoping was done in this area, but the work was abandoned at the cessation of hostilities.

The property remained idle until about 1935, when the present company assumed control. From 1935 to 1938, the Wolframite workings on vein 2 and the crosscut adit toward vein 4 were developed. A 25-ton gravity concentration mill was constructed in 1938 to treat the ore. In the spring of 1940, the present work on vein 1 was begun and has been carried on intermittently. Work was suspended on October 30, 1942, pending a loan from the Reconstruction Finance Corporation, to be used for further development.

PHYSICAL FEATURES

The deposits are in a region of considerable relief in the southern foothills of the Kern Mountains at altitudes of 7,900 to 8,500 feet. The climate is warm and pleasant in summer and moderately cold in winter, with occasional snows.

1 E. J. Watson.

Vegetation consists of junipers, pinions, and mountain mahogany on the mountain slopes, with abundant desert sage and some varieties of cactus in the valleys. Very little of the native timber is suitable for use in mining.

Good spring water is available at the mine camp, about 1 mile south of the mine, and at the millsite, about 3 miles from the mine camp. The water supply from each spring is estimated at about 40 gallons per minute and is adequate for domestic and operational purposes.

The nearest supply center is Ely, Nev., about 92 miles southwest of Tungstonia by road. The nearest railroad point, at Cherry Creek, Nev., is 65 miles west of Tungstonia. Alternative routes are available to reach the property from Ely, Nev. One is north, along U. S. Highway 93, about 42 miles to the Schellbourne Pass turn-off, then right on Highway 2 to the mine; the other route is south from Ely about 27 miles on Highway 93 to its junction with U. S. Highway 6, then continuing north along the west side of Spring Valley. The distances are equal. The Schellbourne Pass route usually is impassable in winter because of snow. After leaving the paved U. S. Highways, both routes consist of good gravel and desert roads.

LABOR AND LIVING CONDITIONS

The property is in a remote and isolated area and therefore does not attract labor from other places. The local labor supply is small. At the beginning of 1942, the wage scale was $6 per 8-hour shift for muckers and $6.50 for miners. Wages have been increasing rapidly, and toward the end of 1942, muckers received $7.15 and miners $7.60.

The company has maintained a boarding house at the camp and has built several 1-room cabins as living quarters. Cost of board and room has been $1.50 a day.

Mail is delivered three times a week to a box stationed about 22 miles from camp on the R. F. D. route.

THE DEPOSITS

The vein system lies in an area of rough terrain about half a mile wide and three-quarters of a mile long. The country rock is a medium- to coarse-grained muscovite-biotite granite cut by a series of quartz veins and a system of closely spaced joints.

Five veins comprise the mineralized areas on the property; all roughly parallel each other and strike about N. 20° E. and dip 55° to 60° E.

The ore shoots occur in quartz-filled veins ranging in width from a few inches to several feet. Quartz outcrops can be traced along the surface for several miles. The individual mineralized quartz outcrops appear as lenses, which end abruptly and form an echelon pattern in the vein system. The lenses range in length from a few feet to several hundred feet. Paralelling the quartz veins, and in many places occupying the same fissure,

are dikes of a fine-grained basic rock called "diabase" by the miners. This rock is usually strongly silicified and mineralized with pyrite and fluorite where it abuts the quartz veins. In these places, the granite hanging wall is sericitized and mineralized with pyrite. There appears to be very little cross faulting, although some shearing is noted.

The ore mineral is hübnerite, a manganese tungstate ($MnWO_4$) which, when pure, contains 76.6 percent tungstic trioxide (WO_3). Other associated minerals are pyrite, galena, fluorite, and occasionally small amounts of chalcopyrite and sphalerite. Pyrite is the most abundant mineral. The presence of gold and silver in small amounts has been reported. The hübnerite occurs in the quartz as isolated crystals and sometimes in small bunches or clusters. Mineralization is spotty.

MINE WORKINGS AND DEVELOPMENT

The mine workings on vein 1 comprise two adits driven on the strike of the vein about 23 feet apart vertically. The upper adit extends for about 200 feet, whereas the lower one (elevation 7,870 feet) has been driven about 700 feet. The main stoped area begins about 180 feet from the portal of the lower adit and continues for about 180 feet on the vein strike, with an average stope height of about 50 feet above the floor. Two short raises about 50 feet apart have been started north of the main stope with the intention of opening more stoping ground. In addition, there is an inclined shaft (elevation at the collar about 7,785 feet) that was sunk years ago on the main vein (No. 1) to a depth of 80 feet. It is about 800 feet south of the present workings. A shallow opencut extends about 100 feet north and south of the shaft. The workings that show some stopings are now full of water and inaccessible.

An inclined shaft was sunk along the dip on vein 2 (misnamed the Wolframite vein) and reached a depth of about 60 feet. At 40 feet from the collar of the inclined shaft, a drift was driven about 120 feet to the south and about 60 feet north. An opencut was excavated south from the shaft for a distance of about 145 feet. The area between the floor of the opencut and the 40-foot level of the shaft has been stoped for a horizontal distance of about 90 feet. The shaft and stope are full of water, and the lower workings are partly caved. Minor work, consisting of a few small cuts, has been done on vein 3. Vein 4 has a shaft (Griswold shaft), which was sunk 43 feet on the vein, and some minor opencuts. No development work has been done on vein 5.

In addition, a crosscut tunnel (elevation 8,070 feet at the portal) was driven 285 feet with the intention of crosscutting veins 3, 4, and 5. Approximately 530 feet remain to be driven to reach vein 4. Numerous small trenches have been excavated for assessment work, but they do not contribute much to development.

SURFACE EQUIPMENT

The surface plant includes a blacksmith shop, compressor and house, crushing plant, and a gravity and magnetic concentration mill. The following are the more important items of equipment:

1. The blacksmith-shop equipment includes a drill-sharpening machine made by the Sullivan Machinery Co., a coal-burning forge, an anvil, and sundry tools pertaining to the shop.

2. The compressor house, 800 feet east of the mine, contains a vertical air compressor rated at 360 cubic feet per minute, made by the Gardner-Denver Co. The compressor is belt-driven by a 125-horsepower caterpillar Diesel engine.

3. The crushing plant consists of a wood ore bin, one Austin gyratory crusher crushing from 9 inches to about 1 inch, and a set of 27- by 14-inch rolls crushing to about 1/2 inch. The machinery is belt-driven by a caterpillar Diesel engine.

4. The gravity and magnetic concentration mill is about 3 miles from the crushing plant and contains the following equipment: One set of rolls for crushing (same type as in the crushing plant, except set for finer grinding), one set of Deister double screens for sizing, two Wilfley tables, a dryer for drying concentrates, and a Wetherill magnetic separator.

Power at the mill is supplied by a 4-cycle Cummins Diesel engine rated at 90 horsepower and equipped with a 220-volt generator for operating lights, pumps, feeder, and screens. All other equipment is powered by a line shaft driven by the Diesel engine. The magnetic separator has its own direct-current generator belt-driven from the main shaft.

WORK BY BUREAU OF MINES

Because of the large surface area involved and the numerous small outcrops, trenching was planned along the strike of the veins in the most favorable places at 10-, 25-, and 50-foot intervals. The object of the trenches was to explore the continuity of the outcrops and to determine vein structure for the advantageous placing of diamond-drill holes.

A minimum of 2,700 feet of diamond drilling was planned for the project, but actually 3,420 feet was drilled. Vein 1 was to be explored for north and south extensions of the ore shoot from the existing mine workings and to intercept the vein at depth. Seventeen holes were drilled on vein 1, totaling 2,680 feet.

Two holes, totaling 389 feet, were drilled on vein 2 to investigate a possible continuation of the ore shoot at the Wolframite mine workings.

Three holes, totaling 351 feet, were drilled on vein 4 to determine the extent and grade of the indicated ore shoot.

The operation of the mill also was studied, and samples of the product made in the mill were submitted to the Salt Lake City laboratory for further study. In addition, a large sample of the ore was tested in the laboratory to determine if simpler or more efficient mill operations could be achieved by rearrangement or alteration of the flow sheet.

Trenching

Trenching revealed that in most instances the outcrops would end abruptly with the disappearance of quartz. The mineralized outcrops, which consist chiefly of quartz or a highly silicified granite, resist weathering; and where no quartz was present, the vein would weather with the surrounding country rock.

A total of 94 trenches spaced at 10-, 25-, and 50-foot intervals was excavated and averaged 2 by 3 by 25.5 feet.

Vein 1 showed very little surface mineralization. The vein structure, consisting of silicified granite, also was somewhat weak, more or less weathered, and broken. A total of 51 trenches was dug on vein 1.

On vein 2, six trenches were excavated and some old workings were cleaned out. The vein, as disclosed in the trenches, was badly weathered and showed no quartz. The alluvium was too deep to warrant any extensive trenching. Some old workings about 950 feet south of the Wolframite claim, consisting of a pit about 10 feet deep and some minor cuts, were cleaned out but disclosed no worthwhile mineralization.

At vein 3, nineteen trenches were dug at about 10-foot intervals along the strike, which also showed weak mineralization.

At vein 4, eighteen trenches were dug, disclosing mineralization along a 450-foot ore shoot, which averaged 1.6 feet in width and assayed 0.46 percent WO_3. Trenching between outcrops disclosed only weathered granite or diabase.

Trenching contributed very little toward finding ore, but did prove that there was no indication of quartz in the vein zone at the surface.

Core Drilling

Forty-nine core and 53 sludge samples were taken in the vicinity of the ore zone. Close watch of the core drilling was kept at all times, and cuttings were panned and observed continuously. Sample intervals varied from 1 to 5 feet. Sludges were caught in batteries of tubs or 50-gallon drums. The clear water was syphoned, and the residue was placed in one tub for drying. A drying stove built at the drill site consisted of a pit dug in the ground, for a firebox, and covered with corrugated iron.

Channel Sampling

The underground samples in the mine workings on vein 1 were cut during the early period of the project, when the mine was not in operation.

Ninety-seven samples were taken in the mine. The average width of the vein was 3 feet, and 0.60 percent WO_3 appeared to be about the average grade of the ore. Surface trenches on vein 1 also were sampled. Only two carried any WO_3. Sample 113 had 1.7 feet of 0.74 percent WO_3, and sample 112 had 2 feet of 1.07 percent WO_3. The high assays in these two samples apparently were due to concentration of hübnerite crystals and indicate the spotty mineralization typical of the district. Thirty-five samples were cut, having an average of about 0.01 percent WO_3.

The exposed pillars of the Wolframite workings were sampled. Most of the workings were full of water and inaccessible. Men who worked in the mine when it was operated state that the lower level is caved. The workings would have been unwatered and cleaned if core holes 16 and 17 had penetrated ore; but they were barren, and no further work was warranted.

Twenty-eight channel cuts were made on vein 3. With the exception of nine channels, they averaged about 0.01 percent WO_3 and were considered negligible. The nine channel cuts averaged 2 feet in width and 0.45 percent WO_3.

Sixty-four channel cuts were made on vein 4, which was the most promising of the ore zones. Although 1,200 feet of the vein was examined, only spots or lenses showed mineralization. The largest shoot was 450 feet long; others ranged in length from 10 to 30 feet. The 450-foot shoot averaged 2 feet in width and carried 0.40 percent WO_3. Three core holes, 4-1, 4-2, and 4-3, were drilled in this area and showed the ore shoot extending in depth. The ore in the drill holes averaged 2 feet in width and assayed 0.50 percent WO_3.

No work was done on vein 5 because of the small outcrop and poor showing.

Roads and Trails Constructed

Nineteen hundred feet of trail was built to the drilling sites on veins 2 and 4. The trail was used for sampling the upper veins as well as for packing the drilling equipment.

One hundred feet of road for the drill rig had to be built between holes 16 and 17. The hillside had to be trenched for 100 feet and the lower slope built up to keep the drill rig from capsizing.

MILLING

The mill at Tungstonia was built in 1938 and has a capacity of 1-1/2 tons of ore per hour. Roll crushing and tabling followed by magnetic separation of the table concentrates constitute the flow sheet, which is detailed in figure 2. Although the mill has a daily capacity of 36 tons of ore, operation has been limited to 8 hours per day, with an occasional 14-hour run. The magnetic-separation section operates intermittently for a day at a time as table concentrates accumulate.

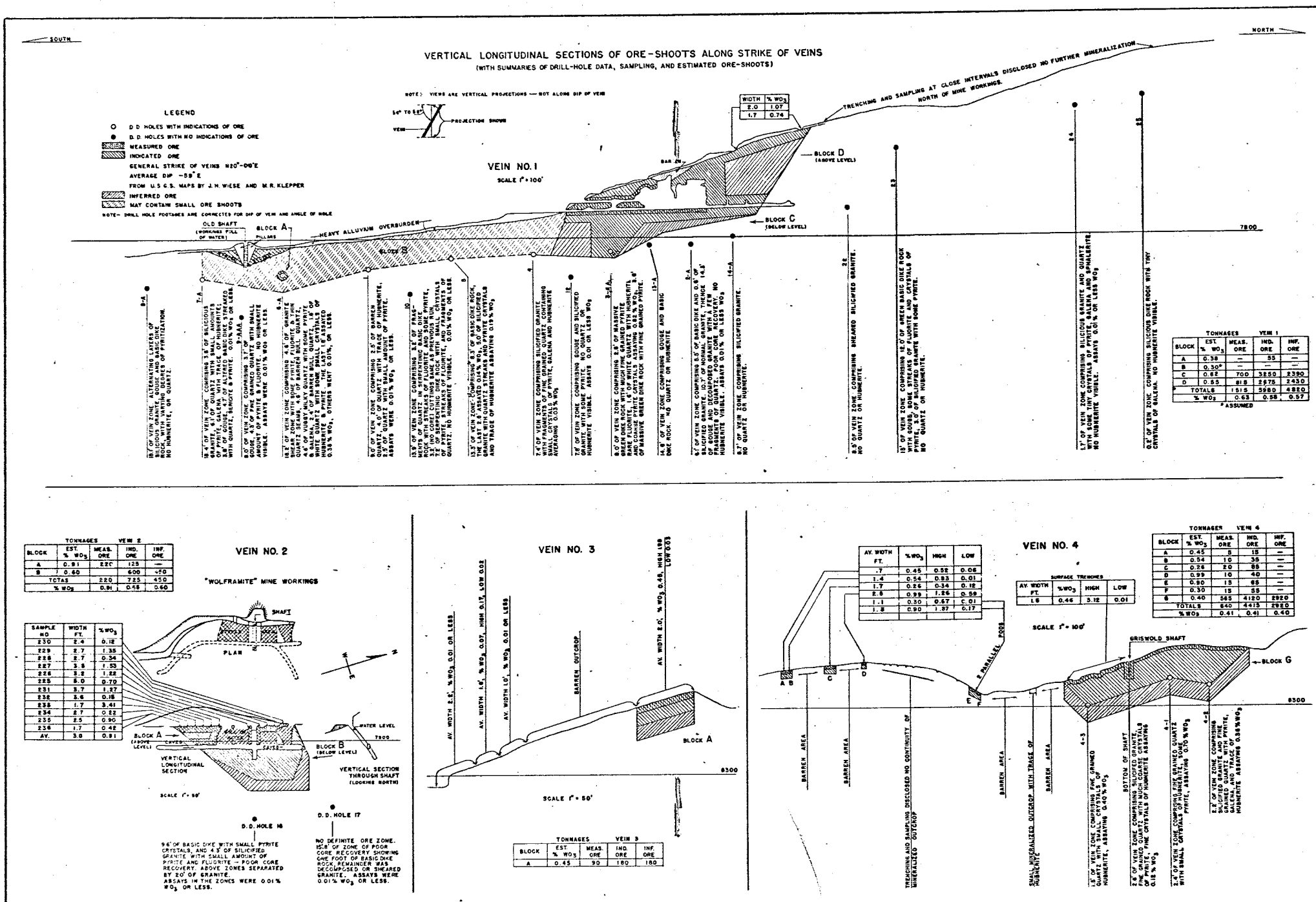

FIGURE 1.

The scales given are for the original, which was about 3× this plate.

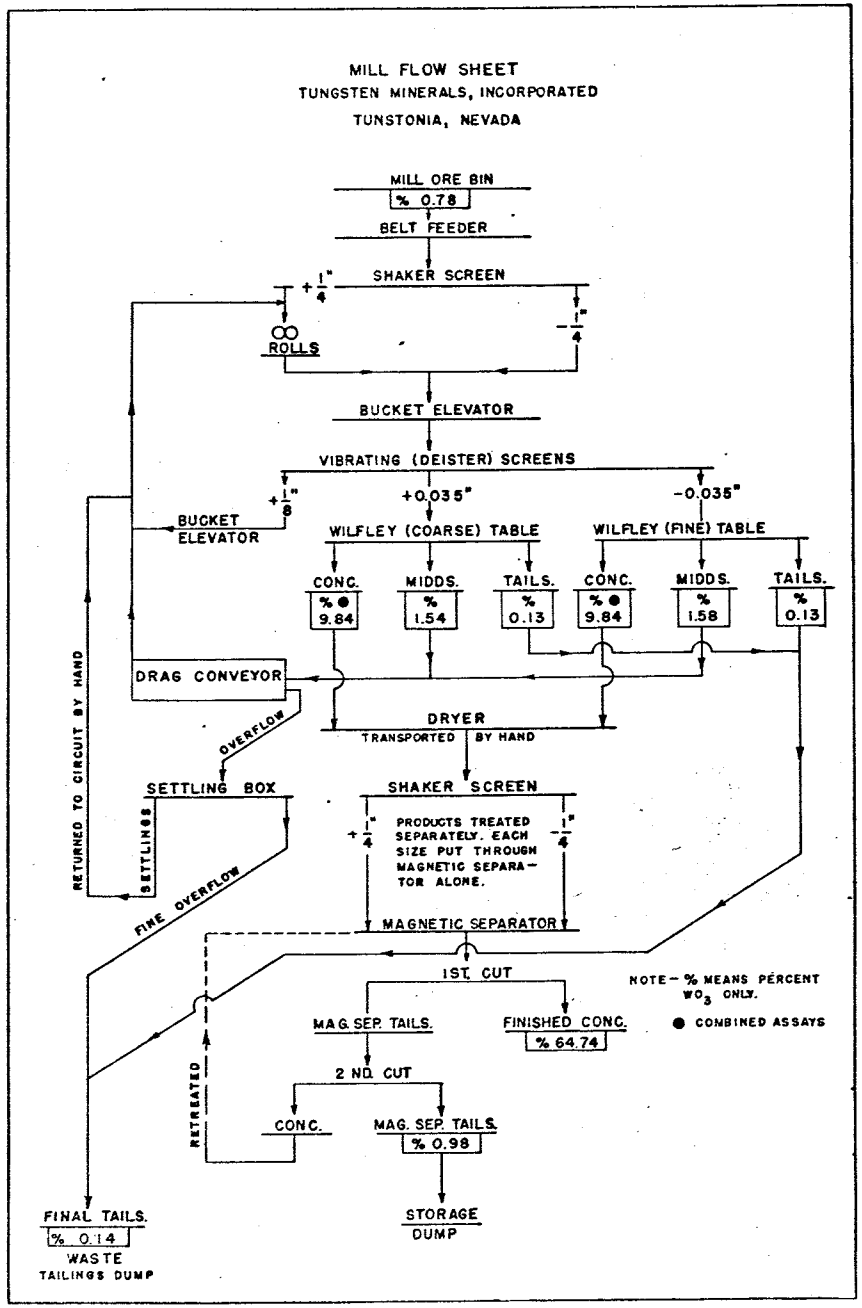

FIGURE 2.

Production data from 1938 to 1942, inclusive, were furnished by C. B. Reynolds, an associate of Tungsten Minerals, Inc., and are shown below. Attention is called to the intermittent operation of the mill, which these figures indicate.

Year	Tons treated	Average grade, percent WO_3	60-percent WO_3 concentrate, tons	Days' operation, calculated*
1938	343.75	0.60	3.44	28.6
1940	307.04	.65	3.35	25.6
1941	1,687.60	.71	19.83	140.6
1942	1,186.80	.60	11.89	98.9
	3,525.19	.66	38.51	293.7

* Assuming average run of 12 tons per 8-hour day.

Samples of mill heads and products were taken at half-hour intervals during a 14-hour run in October 1942 by an engineer of the Bureau of Mines. These were analyzed, and the rejects were forwarded to the Salt Lake City station for study. Assays and indicated recovery are tabulated below:

Mill results of 14-hour run, October 1942*

Product	Calculation, percent weight	Assay, percent WO_3	Indicated recovery, percent	Ratio concentrate
Heads	100.0	0.78	100.0	---
Table concentrates	6.6	9.84	83.3	15.2
Coarse table middlings . .	---	1.54	---	---
Fine table middlings	---	1.58	---	---
Coarse table tails	---	.13	---	---
Fine table tails	---	.13	---	---
Magnetic (final shipping) concentrate	0.9	64.74	76.1	109.4
Magnetic tails	5.7	.98	7.2	---
Final mill tails	93.4	.14	16.5	---

* See figure 2.

Analysis of the results obtained on this particular run shows that the marginal nature of the operation is not due to adverse metallurgical results but to the low grade and small tonnage of ore treated. However, losses common to intermittent operation of the mill are not fully reflected by the results shown, and the grade of ore treated was higher than the 4-year average of 0.66 percent WO_3. A slight drop in the head assay or recovery would seriously affect the margin of profit.

The samples of the magnetic tailing and table tailings from the 14-hour run of the mill were submitted to the Salt Lake laboratory for further study. After these products were tested by various methods to recover additional WO_3 from those now discarded, the following re-treatment suggestions were made:

1. If the final magnetic separator tails, which contain about 7.2 percent of the WO_3 in the ore, are re-treated in the magnetic separator, an additional over-all recovery of 4 percent of the tungsten can be obtained from a product assaying 58 percent WO_3. This would increase the over-all recovery in the mill to 80 percent in a final concentrate assaying about 64 percent WO_3.

2. If the "coarse table tailing" is re-treated in a "high-speed" jig, an additional 7 percent of the tungsten in the tailing can be recovered in a concentrate of about the same grade as the ore itself. By regrinding this concentrate to 48-mesh, tabling, and magnetically separating the table concentrates, the over-all mill recovery can be increased by about 5 percent.

3. If both these suggestions are incorporated in the flow sheet, the over-all recovery from milling will be increased to about 85 percent and the final concentrate will assay plus-63 percent WO_3.

An ore-dressing study of an 800-pound sample of typical "mine-run" ore also was made in the Salt Lake laboratory. This work comprised a large number of tests employing gravity, flotation, and magnetic methods of concentration, and combination of these methods.

The ore contains tungsten as hübnerite, with quartz and pyrite as the principal gangue minerals. A microscopic study of the ore indicates that the hübnerite occurs in 20- to 100-mesh crystals, most of the tungsten being in the coarser sizes. Chemical analysis of the sample follows:

	Assay, percent		Assay, percent
WO_3	0.78	SiO_2	66.2
Fe	5.75	Al_2O_3	9.6
S	5.9	CaO	1.8
Zn	.45	MgO	.7
Pb	Nil		Oz./ton
Cu	Nil	Au	Nil
Insoluble	81.4	Ag	0.4

The results of the laboratory testing on "mine-run" ore indicated that one change in the present flow sheet will give better metallurgical results. High-speed jigging should be utilized instead of tabling on the coarse fraction (minus 6- plus 35-mesh).

Efforts to treat the ore at coarser than 6-mesh sizes by jigging and sink-and-float methods were not successful, owing to the large middling product made and the loss of considerable tungsten locked in gangue particles.

A number of tests also were made in which flotation was substituted for magnetic separation as the final step in the flow sheet. The results of these tests indicated that by selective flotation of the sulfides, followed by

flotation of the tungsten minerals from the gangue, a concentrate of about the same grade and with the same recovery as the magnetic-separator product could be made. However, this treatment is more complicated than the simple magnetic method.

As a result of the laboratory study of the milling problem, the following recommendations are made:

1. High-speed jigging should be substituted for tabling of the coarser fraction of the ore.

2. Crushing and grinding of the ore must be controlled to avoid overcrushing and overgrinding with consequent loss of tungsten in slimes.

3. More careful sizing of the feed before gravity separation probably would improve the metallurgical results.

4. The mill should be operated continuously rather than intermittently.

ORE ESTIMATES

Vein 1

Six drill holes on vein 1 (7-A, 6-A, 1, 5, 4, and 3-AA) had indications of tungsten mineralization. (See fig. 1.) Hole 6-A had 1.8 feet of vein material that assayed 0.38 percent WO_3, and hole 3-AA had 1.6 feet of white quartz that assayed 0.82 percent WO_3. The others, 7-A, 1, 5, and 4, had at least some small visible crystals of hübnerite, but the assays showed only 0.01 to 0.19 percent WO_3.

Calculated measured ore amounts to 1,515 tons averaging 0.63 percent WO_3. Indicated ore is 5,980 tons averaging 0.58 percent WO_3, and inferred ore amounts to 4,820 tons with 0.57 percent WO_3.

In addition to the above, there exists on vein 1 a possible zone 950 feet long, 100 feet deep, and about 3 feet wide, which may contain lenses of ore. Eight drill holes did not verify the existence of ore of minable grade. It cannot be assumed definitely that the ore in the last block would be of uniform grade or continuous, nor can it be said to contain any definite content or tonnage of WO_3. The belief that the block contains ore is purely optimistic and is based upon the spotty occurrence of the ore and the experience gained from tungsten (hübnerite) mining in the district.

Vein 2

Holes 16 and 17 showed no quartz, and core recovery was very low. Sludge analyses showed 0.01 percent WO_3 or less.

Average analyses on the pillars of the mine workings were 0.91 percent WO_3, with an average width of vein of 3 feet. The indications are

that a small ore shoot exists here but apparently is delimited by holes 16 and 17. Measured ore is estimated at 220 tons of 0.91-percent WO_3.

The indicated ore should amount to about 725 tons of 0.65-percent WO_3, based upon the fact that the bottom of the shaft is in ore, as noted by the rock on the dump and from information gained from men who worked in the mine. The inferred ore amounts to 450 tons of 0.60 percent WO_3.

Vein 3

Vein 3 showed no indications of a large ore shoot, with the exception of a body about 75 feet long and 2 feet wide averaging 0.45 percent WO_3. Trenches south of the body and a close examination to the north did not disclose anything of value. Measured ore is computed at 90 tons of 0.45 percent WO_3; indicated ore is 180 tons of 0.45 percent WO_3; and the inferred ore amounts to 180 tons of 0.45 percent WO_3.

Vein 4

Assays of samples from trenches, outcrops, and three core holes (4-1, 4-2, and 4-3) disclosed a body 450 feet long with 565 tons of calculated measured ore containing 0.40 percent WO_3 and 4,120 tons of indicated ore of the same grade. The inferred ore amounts to 2,920 tons of 0.40 percent WO_3 grade.

Scattered smaller lenses can be traced southward, which together show 75 tons of measured ore containing 0.54 percent WO_3 and 295 tons of indicated ore containing 0.55 percent WO_3. The lenses are not continuous and would have to be considered individually.

Summary

The total measured, indicated, and inferred ore reserves in veins 1, 2, 3, and 4 are as follows:

Ore	WO_3, percent	Tons	WO_3, units
Measured	0.56	2,465	1,390
Indicated	.52	11,300	5,872
Inferred	.52	8,370	4,337
	.52	22,135	11,599

CONCLUSIONS

1. No large high-grade ore body can be expected in this area. The ore as mined should contain 0.3 to 0.7 percent WO_3, with occasionally tonnages of higher grade. A mill head of about 0.8 percent WO_3 could be maintained by hand sorting.

2. About 6,000 tons of ore averaging 0.55 percent WO_3 can be mined at reasonable cost from the present workings on vein 1. The indicated and inferred ore from block G, totaling about 5,600 tons of a similar grade, would best be taken out from the vertical shaft sunk in the footwall of the vein. Such a shaft located about 200 feet south of the portal of the present workings would also serve for further exploration work on block B.

3. The ore shoot on vein 2 is small, and no large tonnage is to be expected. The measured ore amounts to some 220 tons of about 0.91 percent WO_3. The indicated ore amounts to 725 tons of 0.65 percent WO_3. This can be mined from the floor of the opencut and by unwatering the shaft.

4. The total ore in veins 3 and 4, with the exception of the small tonnage in scattered pods, amounts to 8,000 tons of about 0.40 percent WO_3. Ore from both veins could be mined from a proposed crosscut tunnel approximately 350 feet long. An aerial tram would be required to transport the ore down the hillside. The cost of mining the small pods would be prohibitive.

5. The capacity of the present mill is about 1-1/2 tons per hour when grinding to 20-mesh.

6. Re-treatment of about 4,000 tons of old tailings from previous milling operations should be considered.

7. Enough water is available at the millsite for treatment of a greater daily tonnage. Water to operate a mill has also been developed at the mine camp, only 1 mile from the mine.

8. Transportation is costly. The nearest railroad shipping point is 65 miles away, at Cherry Creek, Nev. Direct haul of concentrates to Salt Lake City by truck is about 240 miles over 50 miles of improved dirt road and 190 miles of State highway.

RECOMMENDATIONS

Should war requirements for tungsten become so acute that less favorably situated marginal producers must be operated, the Bureau of Mines recommends that:

1. The mill be rebuilt near the mine and the crushing plant be placed at the millsite to eliminate excessive handling of the ore.

2. High-speed jigs be installed to replace the coarse tables now employed in concentrating the minus 6- plus 35-mesh fraction.

3. Close control of crushing and sizing the ore be maintained to avoid loss of tungsten as slime.

4. The productive capacity of the mill be increased by instituting continuous 3-shift operation.

5. In new stope development, careful consideration should be given to the system of mining employed, especially the cut-and-fill method. (In the past, all ore has been mined by a combination of shrinkage and open-stope methods.)

6. Production from the mine be increased to the limit of mill capacity.

7. Ore in block D on vein 1 be mined first.

8. A 200-foot vertical shaft be sunk in the footwall about 200 feet south of the portal of the lower adit on vein 1, with a crosscut from the shaft to the vein for immediate ore for the mill from block C.

9. A drift be driven south on the vein from the above crosscut for exploratory work on block B.

10. The old shaft, 800 feet south of the present workings, be unwatered and repaired for exploratory work on the southern end of block B.

11. The ore shoot on veins 3 and 4 be mined from a proposed crosscut tunnel approximately 350 feet long driven at an altitude of 8,300 feet.

12. Consideration be given to the construction of an aerial tram to transport ore down the hillside from the portal of the proposed crosscut tunnel.

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Tungstonia

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY)
Hill, J. M. Notes on some mining districts in Eastern Nevada, USGS Bulletin 648 PP 202-207, 1916.

Location and Accessibility

The Kern district (No. 27, fig. 1) includes a large indefinite area in the northeastern part of White Pine County, comprising all of the Kern Mountains and the eastern part of the Antelope Hills. (See Pl. I.) The Kern Mountains are a part of the general uplift of the Snake Range in southeastern White Pine County and of the Toano Range in Elko County. The few prospects in these mountains are widely scattered. Those at the head of Deep Creek are most easily accessible from Wendover, Utah, a town on the Western Pacific Railway, about 115 miles to the north. Others on the west and south sides of the mountains are tributary to Cherry Creek on the Nevada Northern Railway but are also accessible by a practically level road that extends north along Antelope Valley to Dolly Varden siding, about 20 miles north of Currie. Biweekly mail service from Cherry Creek to Tippett station, in Antelope Valley, is maintained by way of Schellbourne and Aurum, a total of 66 miles

Geology

During the reconnaissance on which this report is based the southwestern part of the Kern Mountains and the eastern part of the Antelope Hills were visited. The main mass of the Kern Mountains is apparently composed of a fine-grained light-colored muscovite granite that intrudes dark limestones and shales in the southwestern part of the mountains.

Sedimentary Rocks

On the western and southwestern flanks of Kern Mountains the foothills and lower spurs of the main mountains are formed of dark, thin-bedded crystalline limestones, with some interstratified shales which dip steeply southwest or west. No fossils were found during the reconnaissance, so the

age of the rocks is not known, but they are thought to be very old.

Howell[1] noted 200 to 400 feet of quartzites overlying the granite at the head of Deep Creek and underlying shale and 3,000 to 5,000 feet of bluish-gray limestone at Pleasant Valley, both localities being on the east side of the range. He also found Carboniferous fossils at Uiyabi Pass.

Spurr[2] considers this series of quartzite, shale, and limestone to be of Cambrian age, similar to the rocks near Wheeler Peak, in which Cambrian fossils have been found.

Igneous Rocks

The granite which seems to form all the central part of the Kern Mountains is a light-colored fine-grained rock which weathers in rounded forms and is clearly distinguishable from the dark sedimentary rocks on the west and southwest flanks.

Concerning the Kern Mountains, Spurr[3] says:

"Upon the north side of the Kern Mountains granite is found in contact with the schistose Cambrian quartzites and also with the overlying metamorphic limestones. The central portion of the Kern Mountains is made up of this granite, with the Cambrian rocks on the flanks. A specimen examined microscopically proved to be a biotite-muscovite granite, approaching alaskite. On the borders of the granitic mass are found siliceous granitic dikes which cut the Cambrian quartzite schists. At one locality, which is on the southwest side of Pleasant Valley and near the State line, is found a broad belt of confused alaskite dikes showing a tendency to change into muscovite-biotite granite on the one hand and into larger quartz veins on the other."

Spurr believed that the granite is Archean, notwithstanding the fact that numerous dikes of it appear in the overlying Cambrian sediments.

At the south end of the mountains the granite has an even grain, and few of the minerals which compose it have crystal outlines, though in some places

mica plates are fairly well developed. Orthoclase and microcline are about equally abundant and the same is true of quartz and feldspar. Muscovite in small plates is more abundant than biotite. In Water Canyon the granite for about 75 feet north of the contact has a marked schistosity parallel to the contact. The granite breaks into thin slabs along planes in which the muscovite flakes are oriented, and the quartz and feldspar crystals are crushed. Schistosity along the edge of the granite seems to be developed at all places. In Water Canyon on the southwest side of the mountains the normally fine-grained rock grades into either a porphyritic muscovite granite in which orthoclase phenocrysts 2 inches in maximum length are set in a fine-grained groundmass of microcline, orthoclase, quartz, and muscovite, or into a coarse pegmatite of large crystals of all the constituent minerals.

This granite is clearly intrusive into the sedimentary rocks with form the low fringing hills at the southwest side of the mountains. The contact is regular on the whole, but numerous dikes run parallel to the bedding of the sediments near the true contact. Most of these dikes are fine grained, though some are pegmatitic rocks and one shows what appears to be a graduation from granite pegmatite into a quartz vein.

The contact between the igneous rock and the sedimentary rocks on the south and west sides of Kern Mountains is everywhere clearly distinguishable from a distance, for the intusive rock is light colored and weathers into rounded forms, and the limestones are dark and tend to weather into crags and sharp pinnacles. The contact is marked by saddles on the spurs and by gullies on both sides of the major canyons that cut across the contact. Along the west face of Kern Mountains, near Glenco Spring, the contact seems to strike a few degrees east of north and to dip very steeply west. In Water Canyon, at the southwest corner of the mountains, the contact strikes N. 70° W.

and dips 80° S. In the first canyon east of Water Canyon it strikes N. 45° W. and is vertical. The granite is schistose for 100 feet northeast of the contact, and the limestones are crystalline and have a platy fracture for 200 feet south of it. About half a mile south of the contact the thin-bedded dark-gray limestones dip about 45° SW. and are cut by fractures that strike parallel to the contact.

Ore Deposits

History.

According to the district records, kept at Tippett post office, the Kern district was organized May 7, 1869, by Messrs. H. T. Fitzhugh, John Eyre, J. Alnathan Smith, E. S. Smith, G. W. Chase, T. A. Stoutenberg, and B. B. Bird. The district as first organized included 10 square miles about Sentinal Peak, which stands near the head of Sentinel Canyon, about 12 miles from Antelope station, on the Overland Stage Route. On May 2, 1870, the boundaries of the district were changed to include all of the Kern Mountains south of old Fort Filmore. At a miners' meeting held July 4, 1872, the district was enlarged to include the eastern part of the Antelope Hills, where the Red Hills mine is located, and the name was changed to Eagle. Most of the claims in the Deep Creek and Pleasant Valley country were located in the early days, and the Well Annie, or Glenco, property was worked in the early eighties. There are no records of production from any of the properties.

Character of ore Bodies

In the granite core of the Kern Mountains there are quartz veins, some of which, in the southeastern part of the mountains, carry hubnerite, and others, as at Glenco Springs, carry gold and silver associated with enargite, galena, and spalerite. In a few places small deposits of oxidized lead and copper ores have been found in the sedimentary rocks that surround the intrusive core.

None of the deposits have been extensively worked in recent years.

The Properties

Glenco property. The Glenco group, formerly the Well Annie, consists of 14 claims near Glenco Springs, on the west side of the Kern Mountains about 7 miles east-southeast of Tippett post office. (See Pl. I.) The property has not been worked for many years and was not visited, as it was said that the 100-foot tunnel and 70-foot winze on the main vein were under water. The contact of granite and limestone runs a little east of north in this part of the Kern Mountains. The vertical vein is said to trend northeast, lying entirely in granite some distance east of the contact and to be 6 to 8 feet in width. Some ore, said to be from the vein at Tippett, is a white quartz carrying galena, sphalerite, and enargite that is said to carry $8 in gold and varying amounts of silver. Some iron-stained cerusite ore, seen at Tippett, is said to come from undeveloped prospects on the group that lies in the limestone west of the granite.

Red Hills mine. The Red Hills mine, at the east end of the Antelope Hills, about 15 miles south-southeast of Tippett post office, was worked in 1912 but was idle at the time of visit in 1913. In this vicinity outcropping light-colored reddish-weathering crystalline limestones strike north and dip 30° W. On the west side of the hill a rather thick bed of white calcareous sandstone, which outcrops near the top of the hill, just west of the Red Hills mine, is overlain by light and dark colored, somewhat cherty limestones in beds 1 to 2 feet thick. No fossils were found in the limestones and their age is not known.

The Red Hills mine is developed by an open cut 40 feet long and 20 feet deep at its face; by an inclined winze, apparently about 70 feet deep, 50 feet north of the open cut; and by a 50-foot crosscut tunnel, from whose face a

winze is sunk to a reported depth of 200 feet. The winzes could not be entered, for the ladder had been removed when work was stopped. The workings are all in a 20-foot zone of brecciated limestone that strikes N. 10° E. and dips 55°--70° W. and that has been somewhat mineralized near the west wall. At the surface small bodies of iron-stained sandy lead carbonate have been partly removed, but the ore on the dump of the tunnel, presumably taken from the deep winze, is a hard gray lead carbonate.

At the base of the hill about one-fourth mile to the east a 200-foot tunnel is driven S. 80° W. on a fracture that dips 75° S. Near the mouth of the tunnel a small body of brownish sandy material contains some lead carbonate.

Regan tungsten prospects. The Regan tungsten prospects are on the southeast side of the Kern Mountains south of the head of Pleasant Valley, 3½ miles north-northeast of Mike Spring and about 6 miles from the Utah line. The mines were visited in October, 1914. The veins were discovered in 1910 by C. G. Simms and Casten Olsen and were optioned to O. A. Turner, who was at that time working the tungsten properties near Osceola.(4) At present they are held by Messrs. Simms and Olsen.

The veins, which include nine 2 to 15 feet wide and numerous smaller ones, outcrop over an area approximately a mile wide and 2 miles long on the strike of the veins, which averages N. 20° E. The country rock is a coarse-grained muscovite-biotite granite approaching pegmatite, which is intruded by a series of east-west biotite porphyry (kersantite) dikes and by a few porphyritic biotitic granite dikes. The dikes were formed before the veins, for both types are squarely cut by the quartz. The granite is cut by a closely spaced system of joints that strikes approximately N. 20° E. and dips 50° E. The hubnerite-quartz veins are parallel to this jointing, which appears to have determined

the position of the veins. The largest vein is developed to a maximum depth of 60 feet by a 200-foot tunnel and by several shafts. In some places it is frozen to the walls, but in most places postmineral movement has crushed the vein filling and produced some gouge on both foot and hanging walls. The granite for a short distance on both sides of the vein is softened by sericitization of the feldspars, and small cubes of pyrite are distributed throughout the altered rock.

The vein filling is largely white quartz in which the metallic minerals are irregularly distributed, usually in small bunches or pockets. The light-brownish hübnerite is the most abundant metallic mineral, but galena, sphalerite, and a small amount of bismuthinite are present here and there in the veins. In vugs in the main vein needle crystals of hubnerite, cubes of purplish fluorite up to one-half inch on a side, and crystals of triplite have been found. Triplite is rare, but the fluorite and needles of hubnerite are more abundant.

Except for the presence of the rarer minerals the vein material resembles some phases of the pegmatitic dikes that grade into quarte veins near Water Canyon, and it is believed that the veins, though of the true fissure type, are the end products of the pegmatitic intrusions.

It is said that the disintegrated granite wash which covers the floor of the valley in which the prospects are situated, contains sufficient hubnerite to wash if enough water were available.

Other prospects. On the east side of the Kern Mountains in the head of Pleasant Valley some lead-silver and copper-silver deposits are said to occur in the blue limestone near the granite contact. These properties were discovered in the early days of the camp but have received little attention, apparently on account of the distance from railways.

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY) Cont.

In Water Canyon, at the southwest side of the mountains, about 12 miles southeast of Tippett post office, lenses of quartz parallel to the bedding of thin dark-blue limestones near the granite contact have been somewhat developed. A large part of the quartz on the three dumps is barren or contains a little hematite. Some specimens have thin yellow coatings of lead carbonate and one piece of quartz carried a speck of galena.

Notes:

1. Howell, E. E., U. S. Geog. and Geol. Surveys W. 100th Mer. Rept., vol. 3, pp. 241-242, 1875.

2. Spurr, J. E., Descriptive geology of Nevada south of the fortieth parallel and adjacent portions of California: U. S. Geol. Survey Bull. 208, pp. 28-29, 1903.

3. Idem, pp. 26-29

4. U. S. Geol. Survey Mineral Resources, 1910, pt. 1, p. 739, 1911.

MR 1910 "Near Regan, hubnerite deposits were discovered during the year by C. G. Simms and Casten Olsen. The deposits are about the middle of the Kern Range, 6 miles from the Utah line and 50 miles north of Osceola. The nearest shipping point is McGill on the Nevada Northern RR. 45 miles distant. Veins are said to have been found through a length of 2 miles and a width of 1 mile. O. A. Turner took an option on 12 claims and was prospecting them at the close of the year."

MR 1911 "The hubnerite properties near Regan were prospected under option during the year. Bismuthinite occurs with the ore and should add to its value."

MR 1915 "A mill was erected by A. L. Shepard and associates on the hubnerite deposits in the Regan district, 35 or 40 miles north of Osceola..."

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY) Cont.

MR 1916 "At Tungstonia, A. R. Shepard, Jr., and associates operated a small mill on ore taken from a large quartz vein carrying hubnerite accompanied by small quantities of sphalerite, galena and triplite. Several smaller veins were also worked. Other veins were discovered in the neighborhood by prospectors and a mill was put up a short distance SW of Tungstonia by the Salt Lake-Tungstonia Miles Co., and across the hills Northeast, possibly 2 miles away, another mill was begun by the Utah-Nevada M & M Co., but was not finished."

MR 1910 (additional) "Hurnerite has been found in veins cutting granite country rock at Regan in the Red Hills near the Utah line, about 50 miles north and a little east of Osceola and 50 miles southeast of Currie on the Nevada Northern RR."

Lincoln, F. C., Mining Districts and Mineral Resources of Nevada, Reno, 1923, p. 245.

"The Eagle district is situated in the Kern Mountains south of Regan and Pleasant Valley in east White Pine County on the Utah border. The tungsten mines are in the neighborhood of Tungstonia in the southeast section of the district. Cherry Creek on the Nevada Northern RR. is 65 miles distant.

"The Eagle district was discovered in 1859 by Employees of the Overland Railway Company. It was organized as the Pleasant Valley district in 1868; the name changed to Kern district in 1869 and the district enlarged and re-christened the Eagle district in 1872. The Glencoe Mine was worked in the early eighties. The Red Hills mine was worked from 1911 to 1918, and other properties in the district were operated during this period. Tungsten was discovered by C. G. Simms and C. Olsen in 1910. In 1915, A. R. Shepherd, Jr. and associates erected a Tungston mill which they operated in 1916. The Salt Lake Tungstonia Mines Co. erected a 25 ton mill in 1916, and the Utah Nevada Mining & M. Co. began the construction of a mill that same year but did not complete it.

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY) CONT.

"The Kern Mountains are composed of granite intrusion into quartzite, shale and limestone according to Hill. The sedimentary rocks are believed by Spurr to be of Cambrian age. At the Glencoe Mine, a quartz vein in granite near a limestone contact contains galena, sphalerite and enargite and carries values in gold and silver. At Tungstonia, the granite is cut by a series of biotite-porphyry dikes and a few dikes of porphyritic biotite granite. Quartz veins carrying hubnerite cut these rocks, which are sericitized and pegmatized for short distances on both sides of the veins. Galena, sphalerite and a small amount of bismuthinite are present here and there in the veins and in bugs in the main vein, fluorite and a smaller amount of triplite occur with hubnerite. At the Red Hills Mine, lead carbonate ($PbCO_3$) ore occurs in a 20 foot zone of brecciated limestone. This ore contains a little silver, gold and copper."

EAGLE E & MJ. 141, No. 6, p. 74, June, 1940

"The Tungsten Minerals, Inc. a Utah Corporation recently organized by Salt Lake and Ogden men, reports that it will start milling operations at its Regan mining district property in White Pine County, Nevada; ore assaying 3.54% tungsten was recently uncovered in the main tunnel."

1620 0040

(342)

Kern Mountains

Tungstonia — EAGLE DIST.

The Tungstonia district (also known as Regan, Kern, or Eagle) is 48 miles northeast of Ely in the middle of the Kern Mountains about 6 miles from the Utah line. The principal mineralization is on the south slope of the range, reached by 22 miles of dirt road east from Aurum. Huebnerite was discovered here in 1910, and 2 small mills were operated in 1915-16, with a production of about 2,900 units of WO_3. Tungsten Minerals Corporation purchased and leased the areas of known mineralization in 1935, and in the period 1936-43 produced about 4,600 units of WO_3 from 7,500 tons of ore treated. In 1942, the U. S. Bureau of Mines, in co-operation with the Geological Survey, prospected the veins by surface trenching, and by 22 diamond drill holes, totalling 3,420 feet[1].

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[1] Anonymous, Tungstonia property, Tungsten Minerals, Inc., White Pine County, Nev.: U. S. Bureau of Mines War Minerals Report 224, 16 p., 1944.

Huebnerite, the only tungsten mineral present, occurs in parts of 5 parallel quarts veins (fig. ~~189~~ 180-A). The country rock is coarse,

Fig. ~~189~~ 180-A. Geologic map of part of the Tungstonia district, White Pine County, Nevada.

porphyritic muscovite-biotite granite with prominent joints that strike N. 20° E. and dip 60° SE. Several basic dikes were intruded parallel to this system of joints, and were followed by quarts veins, one of which occupies the same fracture with a dike. The veins crop out at intervals for a length of 2 miles, and are distributed over a width of/a half mile. The veins exposed are 2 to 20 feet wide, and are discontinuous along the strike.

The walls of the veins are sheared, silicified, pyritized, and sericitized granite or altered basic dike rocks up to 14 feet thick. The veins are largely quarts, in part barren, in part with huebnerite and pyrite, fluorite, triplite, argentiferous galena, sphalerite, and chalcopyrite (fig. 180-B).

Fig. 180-B. Photograph of ore from Tungstonia, Nevada, West vein.

The main ore body is in the West vein, which is opened by an adit-drift 600 feet long, a short adit 23 feet higher, and raises and stopes above the level (fig. ~~190~~ 180-BC). The average width of ore is 3 feet,

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Fig. ~~190~~ 180-BC Vertical ~~Geologic maps and~~ projections of workings ~~in the~~ Tungstonia district, White Pine County, Nevada.

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and the content of WO_3, 0.6 to 0.8 percent. A shaft and open stope were dug during World War I at a point 700 feet southwest of the main adit. The intervening part of the vein is not exposed and is poorly mineralized where tested by drill holes. The workings appear to be in 2 separate ore shoots, 450 and 230 feet long. No ore was found in 7 drill holes drilled beneath the ore shoots at depths of 150 to 230 feet below the surface. The small quantity and low grade of the ore mined discouraged development of the vein at greater depth, even though other comparable ore shoots might be found.

The Wolframite, or No. 2, vein is 700 feet east of the West vein, and is exposed for a length of 180 feet. From an inclined

shaft 50 feet deep, a level with 175 feet of workings is opened at a depth of 35 feet. An ore shoot 100 feet long was stoped from this level to the surface. Two drill holes tested the vein at depths of 100 and 130 feet, and found it barren.

Surface trenching on the No. 3 vein exposed a shoot of ore assaying 0.45 percent of WO_3 for a length of 70 feet and a width of 2 feet.

In vein No. 4, tungsten mineralization is exposed for 300 feet along the strike, and to depths of 75 to 100 feet in 3 drill holes. The width of ore averages 1.5 feet, and the grade, 0.4 percent of WO_3.

Vein No. 5 contains a trace of huebnerite, but no ore.

Yellow Jacket

The Yellow Jacket claims are on the north side of the Kern Mountains about 2 miles northeast from the Tungstonia mine, and are reached by 3 miles of narrow road that joins the route from Tippetts to Uvada about 5 miles west of Uvada. The deposits were discovered by C.F. Timm of Callao, Utah, and sold to H. F. Crutchely. In

1943-44, 20 tons of ore assaying 1.12 percent of WO_3 were shipped to Metals Reserve Co. Scheelite mineralization occurs in limestone, several hundred feet east of a contact with granite. The tungsten ore consists of granular quartz, calcite, light- and dark-colored amphibole, pyrite, and scheelite. The mineralization is along bedding in limestone near pegmatite sills, and is found in 2 zones 600 feet apart. Neither deposit was well-exposed in 1944. The west zone was opened by a 20-foot shaft that showed 2.5 to 3 feet of ore.

1620 0040

TUNGSTONIA

YEAR	UNITS	OPERATOR
1917	134	S. L. TUNG. MAG. CO.
1918	780	SHEPHERD, ET. AL
1936	89	TUNG. MINES, INC.
1937	171	
1938	184	
1940	150 97	TUNG. MINERALS
1941	1,191	
1942	707	
1943	765	
1944	118 485	
1945	147	
1947	91	
1948	214	
1951	—	
1952	17	
1954	22 ~~365~~	
1955	489	HELMAR MNG. & MLG. CO.
1956	2	
	5,918	

1620 0040 file Tungstonia

no card

Memorandum Report

Yellow Jacket Group of Claims, Regan Mining District

White Pine County, Nevada

S. W. Hobbs
July 1944

Location, Ownership & Development

The Yellow Jacket group of claims is located in eastern White Pine County, about 6 miles airline west of the town of Uvada, on the Utah-Nevada state line -- approximately in the center of section 23, T. 21 N., R. 70 E. The area is reached from the east via Callao, Utah, or from the west via Schellbourne Pass and the settlement of Tippetts, Nevada. A narrow road, three miles long, connects the Tippetts-Uvada road with the property to the south, and it turns off the main road about 5 miles west of the Uvada post office. The property is less than two miles northeast over the hill from the Tungstonia mine.

The claims were located by Mr. C. F. Timm of Callao, Utah and have recently been purchased by Mr. H. F. Crutchley, who was formerly a lessee at the Stardust Tungsten mine, Gold Hill, Utah. Mr. Crutchley is building a small mill on the property which is expected to handle about 3/4 ton of ore per hour. He has sufficient equipment of all kinds for a small scale mining & milling operation, and he and his son expect to operate at first by themselves.

The tungsten claims are located about 3/4 mile up the canyon above the camp and mill site, and a new road will have to be built to connect the mine and the mill. A very small amount of development work has been done at the property. Two open cuts have been made in one ore body and some small cuts and a 20-foot shaft have been dug in another. A 20 ton shipment of ore from the shaft, sent to Metals Reserve Co. in Salt Lake City, contained 1.12 % WO_3. Another ore body was sampled along 3 12-foot channels, and gave an average grade of 0.68% WO_3.

Geology and Ore Deposits

The deposits are a modified type of contact metamorphic deposit with the mineral scheelite occurring in certain zones of a limestone series in the vicinity of a limestone-granite contact. The sediments include limestone, shaley limestone and some quartzite, and strike nearly north-south with a dip to the east at angles which vary between 30 and 80 degrees. There is much local contortion. Granite intrudes the sediments several hundred feet to the west of the ore zones, and a number of pegmatite dikes and sills occur within the limestone and apparently are associated with the ore deposition.

Two main zones of scheelite mineralization occur in the area, one near the foot of the east bank of a small stream, and the other on the crest of the sharp ridge to the west of the same stream. The two areas are about 600 feet apart. The two main ore zones occur in the bedding and appear to be localized, both by the character of the rock and by some bedding shears and slips. In both cases pegmatitic sills are closely associated with the ore zones, and in the west ore body, the sill forms

the footwall of the deposit. No scheelite, however, has been found directly in the pegmatite.

The ore is ~~composed of much~~ contains considerable amounts of rather granular quartz, carbonates, some silicates of the amphibole variety -- both light and dark, and considerable iron sulfide. In most of the exposures, near the surface, the ore is leached and oxidized to a porous, light rock containing casts of limonite after pyrite, and is stained light brown with iron oxide. No primary sulfides ~~have been discovered~~ were found. Scheelite occurs both as fairly coarse crystals and as fine disseminations in this material. ~~Some~~ Small quartz veins ~~are present~~, but do not seem to carry any tungsten minerals as they do in the Tungstonia mine.

Reserves and Outlook

The deposits are very slightly explored. Mr. Crutchley reports that the ore zone to the east extends for about 300 feet along the strike, but that its average width is not known. The west ore zone has been traced for about 1,100 feet and where it is opened up in the shaft measures about $2\frac{1}{2}$ to 3 feet wide.

There is no assurance of continuous ore along these strike lengths and no measured or indicated ore of any consequence can be ~~outlined~~ estimated. As much as 2,500 tons of ore can probably safely be inferred for the district -- with an average content of 0.75% WO_3.

The property is a promising prospect, but until further exploration and development work is done, its future is unpredictable.

U. S. Geological Survey
July, 1944

S. W. Hobbs

1620 0040

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Room 307, 320 South Main
Salt Lake City 1, Utah
6 August 1951

Memorandum

To: Ralph J. Roberts

From: Roscoe M. Smith

Subject: Rees Silver Mine, White Pine County, Nevada.

The Rees Silver Mine was examined briefly on August 4, 1951 by R. M. Smith and G. C. Simmons of the Geological Survey, at the request of Mr. W. J. Rees, Box 502, Smithville, Utah, to determine its qualifications for a DMA loan. An application has been filled out but not submitted.

The mine is in T. 22 N., R. 68 E., low on the west flank and near the north end of the Snake Range (Red Hills ?), White Pine County, Nevada. It is about 8 miles SE of Tippetts Ranch.

The country rock is 45° east dipping massive limestone that has been cut in the mine area by a vertical east striking shear zone. The shear zone may be persistent for several hundred feet. Fractures of the shear zone contain 0-2 inch quartz stringers for a strike length of about 200 feet in a zone 10 feet wide. A two foot width of quartz for a strike length of about 15 feet is exposed on the surface along a part of the zone where the strike changes to NE. (Indicated movement of walls is N. side moved W.)

The quartz stringers contain argentite disseminated and in seams within the quartz, and malachite and azurite along fractures in the quartz. Specks of silver bromide also occur in fractures. Selected samples assay as high as 9 percent copper and 300 oz. silver per ton.

The limestone shows no sign of hydrothermal alteration.

A shaft inclined about 70° east is currently beint sunk along the quarts stringer and is now about 30 feet deep.

As this dip is steeper than the bedding the shaft is cutting older beds in depth. These older beds crop out along the hillside below the shaft and beds that project to be about 50 feet below the present bottom of the shaft are all massive limestone to the point where they are covered with valley aluvium.

Mr. Rees was advised that the possibility of discovering any significant amount of copper is believed to be very remote, and because the government is not lending money to explore for silver the mine is not eligible for DMA assistance.

Wilson, S. R., 1962 Applic. rept.
OME-6173 (silver-copper)
Rees Mining Co.
Antelope claims
White Pine County, Nev.
Contract 2144 Withdrawn (could not find a driller)

File: Eagle (342)

See OME-3654

1620 0040

INTRODUCTION

An application for OME assistance submitted by Rees Mining Co., a partnership, requests a loan to conduct exploration on the Antelope silver-copper property, Eagle mining district, White Pine County, Nevada. The application includes an estimated total cost of $56,900 to perform exploration consisting of 250 feet of shaft sinking, 1,000 feet of drifting, 800 feet of core drilling, and 200 hours of bulldozer time in surface stripping.

The property was examined by S. R. Wilson November 14 and 15, 1961. Wilford Rees and Sadie Rees, two of the three applicant partners, accompanied the examining engineer to the property and were present during the 2-day examination period.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The Rees property is located in northeastern White Pine County, Nevada, approximately 12 miles by road southeast of Tippett, the nearest settlement (fig. 1). The immediate area of the property is unsurveyed. A projection from the adjoining surveyed townships places the Rees property in secs. 22, 23, and 27, T. ~~12~~ 22 N. S., R. 68 E., Mt. Diablo meridian.

Ely, Nevada, the nearest source of mining supplies, is approximately 70 miles southwest of the Rees claims. The property may be reached from Ely by traveling 38 miles north on U. S. Highway 93, thence easterly over Shellbourne Pass for a distance of approximately 39 miles on an unimproved dirt and gravel road. Wendover, Utah, located on the Western Pacific Railroad, and at the junction of U. S. Highways 93 and 50, is

85 miles by road north of the Rees property. Forty-one miles of this distance is by way of Highway 93, south from Wendover. The remaining 44 miles is covered by dirt and gravel road, with improvement in some sections.

Winter operations in the area of the Rees property are sometimes impeded, and access may be difficult because of high winds and drifting snow.

The Rees claims lie on the southwest side of the Kern Mountains, a short distance above the floor of Antelope Valley. The altitude at the portal of the main adit on the Antelope No. 1 claim is approximately 6,100 feet. The altitude in the valley is approximately 5,700 feet. The Kern Mountains constitute a southwesterly trending spur of the Deep Creek Range, which extends northerly for many miles to the area of Gold Hill, Tooele County, Utah. The Deep Creek Range lies principally in Utah.

Sagebrush and scrub timber are conspicuous over much of the mountainous terrain on the property. None of the timber is suitable for mine supports.

No water is present on the Rees property, but if the need were sufficiently great, it appears that water could be developed by drilling wells in the valley. Any water currently used is hauled from Tippett. Water is also available from wells and springs on the west side of Antelope Valley, 8 to 10 miles from the Rees property.

HISTORY AND PRODUCTION

Several of the mining claims now comprising the Rees Mining Co. property were obtained by purchase a short time prior to 1940, and additional claims were located soon after discovery of tungsten mineralization on ground adjoining that proposed for exploration in the present application. Claims have been relocated and some of the locations amended during more recent years.

Ore production from the silver-copper deposits on the Rees property has been minor. Smelter settlement sheets attached to the application include two shipments totaling 56.692 tons. The average assay value of the two lots is 0.95 percent copper and 27.8 ounces of silver per ton. =1575 oz.

Complete records of tungsten ore produced from the Rees property are not available. It appears probable that the gross value of the tungsten ore mined from the property and sold is approximately $90,000.

PROPERTY OWNERSHIP AND EXTENT

Rees Mining Co. holds a large number of unpatented claims in the Eagle mining district. Those listed in the application, with recording information in the White Pine County offices, Ely, Nevada, are as follows:

Claim	Book	Page
Antelope No. 1	172	138
" No. 2	172	139
" No. 3	172	140
" No. 4	172	142
" No. 6	172	144
" No. 9	172	147 and 205
" No. 11	172	149
" No. 29	172	267

The claims have not been surveyed by the applicant partnership. A prior application for Government assistance in exploring the tungsten occurrences, submitted by Rees Mining Co. under docket No. DMEA 3654, included some of the claims listed in the present application. Several of the claims have been amended and their current positions on the ground do not coincide with the positions as depicted on figure 4 attached to the examination report covering docket No. DMEA 3654.

A study of claim information on the ground and review of the location notices in the company office in Salt Lake City lead to the conclusion that the actual position of the claims is approximately as shown on figure 2.

A contract, if drawn, should encumber Antelope Nos. 5, 36, 37, and 38 claims, in addition to those listed in the application. Antelope No. 6 need not be included. The recording data for these claims are shown below:

Claim	Book	Page
Antelope No. 5	172	143
" No. 36	199	157
" No. 37	199	158
" No. 38	199	159

SURFACE AND UNDERGROUND FACILITIES

Existing buildings at the property are sufficient to accommodate four to six men. No water or electric power are available on the claims.

The principal underground workings on the silver-copper mineralized zones are on the Antelope No. 1 claim. Here a drift 153 feet in length has been driven on the main northeast-striking silver-copper-bearing vein.

Surface cuts and pits and short adits have been excavated in searching for silver-copper ores on the Antelope Nos. 2, 3, and 4 claims, and to a lesser extent on several additional claims.

A small air compressor and miscellaneous tools and drilling equipment are available on the property.

GEOLOGY AND ORE DEPOSITS

Rocks outcropping in the area of the Antelope claims consist principally of limestone probably Cambrian in age,[1/] and muscovite granite that has intruded the limestone. Granite appears at the surface on the southeast side of the Antelope claim group. Some shale interbedded in the limestone is present on Antelope Nos. 6 and 29 claims at the north end of the property.

The limestone is commonly thin bedded and dark gray to black in color. The beds strike northeast and dip steeply to the northwest. Principal mineralized structures exposed at the surface are northeast-trending faults and fractures. Fissures striking northwest intersect the main northeasterly zones.

The silver-copper vein on Antelope No. 1 claim has been explored to a greater extent than any of the other veins containing similar mineralization. The vein on this claim strikes N. 47°-85° E. and dips to the northwest at angles ranging from 64° to 77°. A drift has been

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1/ Hill, James M., Notes on Some Mining Districts in Eastern Nevada: Geol. Survey Bull. 648, 1916, pp. 202-207.

driven on the vein for a distance of 153 feet, and from a point near the face a raise has been carried to the surface. The vein is mineralized over widths varying from a few inches to as much as 2-1/2 feet.

Primary vein filling consists largely of quartz, with erratic concentrations of silver-bearing tetrahedrite. The partially oxidized ore also contains varying amounts of azurite, malachite, jarosite, and stibiconite, with silver probably present as cerargyrite.

Intersections of northwesterly-trending fractures with the northeast fissures appear to have influenced localization of small ore shoots within the veins.

The vein on Antelope No. 1 claim may be traced on the surface for a short distance northeast of the present face of the drift on the vein. Further to the northeast, on Antelope No. 29 claim, considerable quartz is present at the surface, and this exposure may represent the same vein as that present on the Antelope No. 1 claim.

Veins exposed by shallow workings on Antelope Nos. 2, 3, and 4 claims are similar to the Antelope No. 1 vein. Outcrops of these veins are 200 to 300 feet topographically higher than the outcrop of the Antelope No. 1 vein. The vein exposed in a cut near the north side line of the Antelope No. 2 claim strikes N. 45° E. and dips 82° to the northwest. This vein appears to die out to the northeast. To the southwest it is difficult to follow the vein at the surface because of overburden. Mineralization explored by cuts on Antelope Nos. 3 and 4 claims may be a southwesterly

continuation of the vein on the Antelope No. 2 claim. On the Antelope No. 4 claim a cut 50 feet long and a 10-foot vertical shaft have been excavated on the vein.

Information on the character of the silver-copper veins below present shallow workings is lacking. It is probable that the limestone section is several hundred feet thick and may be underlain by the Cambrian Prospect Mountain quartzite. Ore shoots in the silver-copper veins appear to have short strike lengths, and the highest grade zones are 12 inches or less in width.

Samples taken from the veins on Antelope Nos. 1 and 4 claims with assay results are shown below:

Sample No.	Description	Assay		
		Percent	Ounces	
		Cu	Au	Ag
1	5-inch cut across vein near face of main adit, Antelope No. 1 claim	1.68	Tr.	54.9
2	Character sample from vein near portal of main adit, Antelope No. 1 claim	1.50	Tr.	53.2
3	Character sample from vein exposed in open cut, Antelope No. 4 claim	0.62	Tr.	31.6

ORE RESERVES

No measured reserves of silver-copper ores are present on the mining claims proposed for exploration by the Rees Mining Co. A small tonnage of ore is indicated by exposures in the drift on Antelope No. 1 claim.

EAGLE DISTRICT 1620 0040

White, 1871, p 81 for 1869-70

PLEASANT VALLEY DISTRICT.

Mines were discovered in this vicinity in 1859, by the employees of the Overland Mail Company. The district was organized April 17th, 1869. It is situated on the south side of Pleasant Valley—a wide pass through the Snake Mountains, about forty-five miles south of Big Creek. There is a fine supply of wood, bunch grass, and water, with considerable meadow land. Yellow pine and fir occur about the heads of the cañons.

MAMMOTH MINE.

Before the organization of the district this mine was opened to the depth of fifteen feet. The vein matter stood from one to twenty feet above the surface, and contained sulphurets of iron, traces of gold, some copper and silver. A mass of magnetic iron ore was found in the opening, at the depth of six feet; below, it diminished, but continued on the foot wall—the other part of the vein carrying copper, lead, and nickel. Assays show from three dollars to over a hundred dollars in silver and gold. The foot wall is well-defined, and lined with clay. The country rock is granite. The claim was located in June, 1868. Several claims have been located as extensions of the Mammoth.

The district was intended to cover a hill or section of the mountain about fifteen miles long northwest and five or six miles wide. No other part of this hill was prospected, except immediately about the Mammoth ledge, until the 3d of May, 1869, when a company of men from Kern County, California, entered a wide cañon, five or six miles west of the Mammoth, in search of water. They discovered several mines on the sides of the hills, and on the 9th of May organized Kern District, including the same section of the mountain embraced in Pleasant Valley District. A friendly adjustment of the conflicting claims has been made, and Kern, the name adopted at the last organization, is retained. The mineral belt seems to include the whole southwestern slope of the hill, and three or four miles of the northeastern slope. The body of the hill is granite and quartzite. It is capped with limestone, which is generally the country rock about the mines. A village called Glencoe was surveyed in the cañon when the discoveries were made in May; the country rock in that vicinity is granite.

FITZHUGH LEDGE.

About five feet wide. Course, 10° east of north. Stands vertically. The claim has one thousand six hundred feet, and was located on the 6th of May, 1869. A cut across the ledge, six feet in depth, shows walls with clay linings. The ore is very dark, and carries oxide of iron, galena, and stains of copper. It assays high in silver.

PINYON MINE.

Located May 6th, 1869. Dip, 45° south. An incline follows the ledge fifteen feet. Width, eighteen inches. The ore is similar to the ore from the Fitzhugh.

The Butter Cup, Sentinel, and several other mines, have about the same general character as the mines described. The Spartan shows a very fine quality of chloride ore on the surface. The Arctic, Goshute and East End mines are supposed to be on the same vein with the Spartan. The ore is of the same character. There are promising indications of good mines in this district when they are developed.

About twenty miles southeast of these mines there are three salt beds, connected by a slough, and capable of affording an almost unlimited

supply of salt. A creek from the west flows into the salt marsh about these salt beds, known as Warm Creek. The water has a temperature of 80°. The stream is eight feet wide and two feet deep, and flows from a boiling spring two or three miles west in the foot-hills. There are several sections of meadow land in this neighborhood. Along the valley southward for sixty or seventy miles, there are fertile places well supplied with water.

Warm Springs? Antelope Range?

EAGLE DISTRICT 1620040

(Kern,

Raymond, 1870, p 178

KERN DISTRICT.

Kern district is situate about twenty-five miles east of Egan cañon, on the eastern slope of Shell Creek range, and ninety miles distant from Hamilton. It is only ten miles south of the Antelope station on the Overland road, and within twenty miles of the Utah line. The country rock is granite. Some twenty-five ledges have been discovered in it, all of which run northeast and southwest, are very regular in their course, and vary in thickness from eighteen inches to eight feet. They dip from fifty to seventy degrees to the east, and carry mostly sulphurets of silver in a quartzose gangue, with some decomposed ores at the surface. Assays of specimens brought to Hamilton yielded from $200 to $900 per ton, and 22 pounds of rock worked in a pan yielded $560 to the ton. The district promises to be quite an important one.

file Eagle

EAGLE (FORMERLY KERN) DISTRICT, NEVADA. (Wheeler, 1872, P. 27)

[From notes furnished by Mr. E. E. Howell.]

Discovered in April and organized in May, 1869, and has been worked since that time, with the exception of the winter of 1871–'72. The general trend of the mountain-range is north and south. The central portion of the district is granite, which forms the highest peaks and ridges, and is flanked on all sides by calcareous schists and silicious limestone. The mining-ledges are mostly confined to the granite, and the schists and limestone for 500 to 1,000 feet adjoining the granite. The strike of veins in the granite is northeast by southwest. In the limestone they run parallel to the line of separation between the granite and limestone. The ore in the granite is nearly a free-milling ore, and in the limestone it has more base, (galena and copper,) with the exception of one lode lately discovered, which is perfectly free. Twenty tons of ore have been milled, yielding from $100 to $700 per ton; average, $300 per ton; but this was very closely sorted. Assays show a trace of gold in the silver-bearing ores. The principal mines are the Lyons and Flemming, and the Sentinel. The former, a carbonate mine in the limestone, has been taken hold of by a company from San Francisco, who are making preparations to commence work immediately. The Sentinel is in the same condition in regard to work. It is in granite chloride ore, with some galena. A 40-feet shaft has been sunk; average width of vein, 3½ feet; strike, northeast by southwest; dip, southeast, 50°, which is unusually low. The average cost of mining labor is $4 per day. Hay costs $20 per ton; grain, $3.50 to $4 per hundred; beef, 12½ cents per pound. There is sufficient timber for mining-purposes in the district, and thirty miles north, toward Deep Creek, there is plenty of excellent timber. Population, 15 to 20. No stage or freight lines. The country-roads are very good. There are about 100 men, women, and children of the Goshute tribe of Indians in the vicinity.

EAGLE

MR 1910 pt.1 p.739

Near Regan hübnerite deposits were discovered during the year by C. G. Sims and Casten Olsen. The deposits are about the middle of the Kern Range, 6 miles from the Utah line and 50 miles north of Osceola. The nearest shipping point is McGill on the Nevada Northern Railroad, 45 miles distant. Veins are said to have been found through a length of 2 miles and a width of 1 mile. O. A. Turner took an option on 12 claims and was prospecting them at the close of the year.

MR 1911

The hübnerite properties near Regan were prospected under option during the year. Bismuthinite occurs with the ore and should add to its value.

MR 1912

Eagle district.—An important tonnage of lead ore, containing gold and silver, was produced from the Red Hills property.

MR 1913

Eagle district.—Lead carbonate was produced from the Red Hills property. This ore contained silver, a little gold, and a trace of copper.

1913 See Hill, 1916, p. 202-207

MR 1914

Kern district.—No production was recorded for this district in 1914. The region includes the Kern Mountains and the eastern part of the Antelope Hills, and is situated in the northeastern part of White Pine County. According to Hill,[1] the central part of this mountain mass is a muscovite-biotite granite that is intrusive into quartzites, slates, and limestones of supposed Cambrian age. Quartz veins in the granite carry enargite, galena, and sphalerite that is said to contain both silver and gold; other quartz veins, that may be related to the pegmatitic phase of the granite, contain a little hübnerite. In the sedimentary rocks surrounding the granite, there are a few prospects on bodies of oxidized lead-silver or copper-silver ores. This region is at least 65 miles from railroad transportation, and little work has been done here.

MR 1915

Eagle district.—Lead ore containing a little silver, mined from the Dandy property, was shipped to the smelter.

MR 1915 p. 825

A mill was erected by A.R. Shepard and associates on the hübnerite deposits in the Regan district

At Tungstonia A. R. Shepherd, jr., and associates operated a small mill on ore taken from a large quartz vein carrying huebnerite accompanied by small quantities of sphalerite, galena, and triplite. Several smaller veins were also worked. Other veins were discovered in the neighborhood by prospectors and a mill was put up a short distance southwest of Tungstonia by the Salt Lake-Tungstonia Mines Co., and across the hills northeast, possibly 2 miles away, another mill was begun by the Utah-Nevada Mining & Milling Co., but was not finished.

MR 1916 pt.1 p. 793

MR 1916

Eagle district.—The April Fool claim was worked and yielded a small output of lead ore containing silver.

Hill, 1916
p. 202-207

LOCATION AND ACCESSIBILITY.

The Kern district (No. 27, fig. 1) includes a large indefinite area in the northeastern part of White Pine County, comprising all of the Kern Mountains and the eastern part of the Antelope Hills. (See Pl. I.) The Kern Mountains are a part of the general uplift of the Snake Range in southeastern White Pine County and of the Toano Range in Elko County. The few prospects in these mountains are widely scattered. Those at the head of Deep Creek are most easily accessible from Wendover, Utah, a town on the Western Pacific Railway, about 115 miles to the north. Others on the west and south sides of the mountains are tributary to Cherry Creek on the Nevada Northern Railway but are also accessible by a practically level road that extends north along Antelope Valley to Dolly Varden siding, about 20 miles north of Currie. Biweekly mail service from Cherry Creek to Tippett station, in Antelope Valley, is maintained by way of Schellbourne and Aurum, a total distance of 66 miles.

GEOLOGY.

During the reconnaissance on which this report is based the southwestern part of the Kern Mountains and the eastern part of the Antelope Hills were visited. The main mass of the Kern Mountains is apparently composed of a fine-grained light-colored muscovite granite that intrudes dark limestones and shales in the southwestern part of the mountains.

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[1] Howell, E. E., U.
1875.
[2] Spurr, J. E., Des
portions of Californi
[3] Idem, pp. 26–29.

of the contact has a marked schistosity parallel to the contact. The granite breaks into thin slabs along planes in which the muscovite flakes are oriented, and the quartz and feldspar crystals are crushed. Schistosity along the edge of the granite seems to be developed at all places. In Water Canyon on the southwest side of the mountains the normally fine-grained rock grades into either a porphyritic muscovite granite in which orthoclase phenocrysts 2 inches in maximum length are set in a fine-grained groundmass of microcline, orthoclase, quartz, and muscovite, or into a coarse pegmatite of large crystals of all the constituent minerals.

This granite is clearly intrusive into the sedimentary rocks which form the low fringing hills at the southwest side of the mountains. The contact is regular on the whole, but numerous dikes run parallel to the bedding of the sediments near the true contact. Most of these dikes are fine grained, though some are pegmatitic rocks and one shows what appears to be a gradation from granite pegmatite into a quartz vein.

The contact between the igneous rock and the sedimentary rocks on the south and west sides of Kern Mountains is everywhere clearly distinguishable from a distance, for the intrusive rock is light colored and weathers into rounded forms, and the limestones are dark and tend to weather into crags and sharp pinnacles. The contact is marked by saddles on the spurs and by gullies on both sides of the major canyons that cut across the contact. Along the west face of Kern Mountains, near Glenco Spring, the contact seems to strike a few degrees east of north and to dip very steeply west. In Water Canyon, at the southwest corner of the mountains, the contact strikes N. 70° W. and dips 80° S. In the first canyon east of Water Canyon it strikes N. 45° W. and is vertical. The granite is schistose for 100 feet northeast of the contact, and the limestones are crystalline and have a platy fracture for 200 feet south of it. About half a mile south of the contact the thin-bedded dark-gray limestones dip about 45° SW. and are cut by fractures that strike parallel to the contact.

ORE DEPOSITS.

HISTORY.

According to the district records, kept at Tippett post office, the Kern district was organized May 7, 1869, by Messrs. H. T. Fitzhugh, John Eyre, J. Alnathan Smith, E. S. Smith, G. W. Chase, T. A. Stoutenberg, and B. B. Bird. The district as first organized included 10 square miles about Sentinal Peak, which stands near the head of Sentinel Canyon, about 12 miles from Antelope station, on the Overland Stage Route. On May 2, 1870, the boundaries of the district were changed to include all of the Kern Mountains south of

old Fort Filmore. At a miners' meeting held July 4, 1872, the district was enlarged to include the eastern part of the Antelope Hills, where the Red Hills mine is located, and the name was changed to Eagle. Most of the claims in the Deep Creek and Pleasant Valley country were located in the early days, and the Well Annie, or Glenco, property was worked in the early eighties. There are no records of production from any of the properties.

CHARACTER OF ORE BODIES.

In the granite core of the Kern Mountains there are quartz veins, some of which, in the southeastern part of the mountains, carry hübnerite, and others, as at Glenco Springs, carry gold and silver associated with enargite, galena, and sphalerite. In a few places small deposits of oxidized lead and copper ores have been found in the sedimentary rocks that surround the intrusive core. None of the deposits have been extensively worked in recent years.

THE PROPERTIES.

Glenco property.—The Glenco group, formerly the Well Annie, consists of 14 claims near Glenco Springs, on the west side of the Kern Mountains, about 7 miles east-southeast of Tippett post office. (See Pl. I.) The property has not been worked for many years and was not visited, as it was said that the 100-foot tunnel and 70-foot winze on the main vein were under water. The contact of granite and limestone runs a little east of north in this part of the Kern Mountains. The vertical vein is said to trend northeast, lying entirely in granite some distance east of the contact, and to be 6 to 8 feet in width. Some ore, said to be from the vein at Tippett, is a white quartz carrying galena, sphalerite, and enargite that is said to carry $8 in gold and varying amounts of silver. Some iron-stained cerusite ore, seen at Tippett, is said to come from undeveloped prospects on the group that lies in the limestone west of the granite.

Red Hills mine.—The Red Hills mine, at the east end of the Antelope Hills, about 15 miles south-southeast of Tippett post office, was worked in 1912 but was idle at the time of visit in 1913. In this vicinity outcropping light-colored reddish-weathering crystalline limestones strike north and dip 30° W. On the west side of the hill a rather thick bed of white calcareous sandstone, which outcrops near the top of the hill, just west of the Red Hills mine, is overlain by light and dark colored, somewhat cherty limestones in beds 1 to 2 feet thick. No fossils were found in the limestones and their age is not known.

The Red Hills mine is developed by an open cut 40 feet long and 20 feet deep at its face; by an inclined winze, apparently about 70

feet deep, 50 feet north of the open cut; and by a 50-foot crosscut tunnel, from whose face a winze is sunk to a reported depth of 200 feet. The winzes could not be entered, for the ladder had been removed when work was stopped. The workings are all in a 20-foot zone of brecciated limestone that strikes N. 10° E. and dips 55°–70° W. and that has been somewhat mineralized near the west wall. At the surface small bodies of iron-stained sandy lead carbonate have been partly removed, but the ore on the dump of the tunnel, presumably taken from the deep winze, is a hard gray lead carbonate.

At the base of the hill about one-fourth mile to the east a 200-foot tunnel is driven S. 80° W. on a fracture that dips 75° S. Near the mouth of the tunnel a small body of brownish sandy material contains some lead carbonate.

Regan tungsten prospects.—The Regan tungsten prospects are on the southeast side of the Kern Mountains south of the head of Pleasant Valley, 3½ miles north-northeast of Mike Spring and about 6 miles from the Utah line. The mines were visited in October, 1914. The veins were discovered in 1910 by C. G. Simms and Casten Olsen and were optioned to O. A. Turner, who was at that time working the tungsten properties near Osceola.[1] At present they are held by Messrs. Simms and Olsen.

The veins, which include nine 2 to 15 feet wide and numerous smaller ones, outcrop over an area approximately a mile wide and 2 miles long on the strike of the veins, which averages N. 20° E. The country rock is a coarse-grained muscovite-biotite granite approaching pegmatite, which is intruded by a series of east-west biotite porphyry (kersantite) dikes and by a few porphyritic biotite granite dikes. The dikes were formed before the veins, for both types are squarely cut by the quartz. The granite is cut by a closely spaced system of joints that strikes approximately N. 20° E. and dips 50° E. The hübnerite-quartz veins are parallel to this jointing, which appears to have determined the position of the veins. The largest vein is developed to a maximum depth of 60 feet by a 200-foot tunnel and by several shafts. In some places it is frozen to the walls, but in most places postmineral movement has crushed the vein filling and produced some gouge on both foot and hanging walls. The granite for a short distance on both sides of the vein is softened by sericitization of the feldspars, and small cubes of pyrite are distributed throughout the altered rock.

The vein filling is largely white quartz in which the metallic minerals are irregularly distributed, usually in small bunches or pockets. The light-brownish hübnerite is the most abundant metallic mineral, but galena, sphalerite, and a small amount of bismuthinite

[1] U. S. Geol. Survey Mineral Resources, 1910, pt. 1, p. 739, 1911.

are present here and there in the veins. In vugs in the main vein needle crystals of hübnerite, cubes of purplish fluorite up to one-half inch on a side, and crystals of triplite have been found. Triplite is rare, but the fluorite and needles of hübnerite are more abundant.

Except for the presence of the rarer minerals the vein material resembles some phases of the pegmatitic dikes that grade into quartz veins near Water Canyon, and it is believed that the veins, though of the true fissure type, are the end products of the pegmatitic intrusions.

It is said that the disintegrated granite wash which covers the floor of the valley in which the prospects are situated, contains sufficient hübnerite to wash if enough water were available.

Other prospects.—On the east side of the Kern Mountains in the head of Pleasant Valley some lead-silver and copper-silver deposits are said to occur in blue limestone near the granite contact. These properties were discovered in the early days of the camp but have received little attention, apparently on account of the distance from railways.

In Water Canyon, at the southwest side of the mountains, about 12 miles southeast of Tippett post office, lenses of quartz parallel to the bedding of thin dark-blue limestones near the granite contact have been somewhat developed. A large part of the quartz on the three dumps is barren or contains a little hematite. Some specimens have thin yellow coatings of lead carbonate and one piece of quartz carried a speck of galena.

EAGLE (Regan, Tungstonia, Kern, Pleasant Valley)
Lead, Silver, Gold, Copper, Tungsten

Location. The Eagle District is situated in the Kern Mts. S. of Regan and Pleasant Valley in E. White Pine Co. on the Utah border. The tungsten mines are in the neighborhood of Tungstonia in the S.E. section of the district. Cherry Creek on the N. N. R. R. is 65 m. distant.

History. The Eagle District was discovered in 1859 by employees of the Overland Mail Co. It was organized as the Pleasant Valley District in 1868; the name changed to Kern District in 1869; and the district enlarged and rechristened the Eagle District in 1872. The Glencoe Mine was worked in the early eighties. The Red Hills Mine was worked from 1911 to 1918, and other properties in the district were operated during this period. Tungsten was discovered by C. G. Sims and C. Olsen in 1910. In 1915, A. R. Shepherd, Jr., and associates erected a tungsten mill which they operated in 1916. The Salt Lake Tungstonia Ms. Co. erected a 25-ton mill in 1916, and the Utah-Nevada M. & M. Co. began the construction of a mill that same year but did not complete it.

Geology. The Kern Mountains are composed of granite intrusive into quartzite, shale, and limestone, according to Hill. The sedimentary rocks are believed by Spurr to be of Cambrian age. At the Glencoe Mine, a quartz vein in granite near a limestone contact contains galena, sphalerite, and enargite and carries values in gold and silver. At Tungstonia, the granite is cut by a series of biotite-porphyry dikes and a few dikes of porphyritic biotite granite. Quartz veins carrying huebnerite cut these rocks, which are sericitized and pyritized for short distances on both sides of the veins. Galena, sphalerite, and a small amount of bismuthinite are present here and there in the veins, and in vugs in the main vein, fluorite and a smaller amount of triplite occur with huebnerite. At the Red Hills Mine, lead carbonate ore occurs in a 20-ft. zone of brecciated limestone. This ore contains a little silver, gold, and copper.

Bibliography.

R1869 174
R1875 193-4
SMN1869-70 81-3.
MR1911 I 700
MR1912 I 816
MR1913 I 841
MR1914 I 712
MR1915 I 652
MR1916 I 498
MR1917 I 296
MR1918 I 260
MR1910 I 739 Tungsten
MR1911 I 943 "
MR1915 I 825 "
MR1916 I 793 "
Hill507 228. Hill648 202-7.
Spurr208 28-9 Kern Mts. Thompson & West 654.
WeedMH 1324 Salt Lake Tungstonia Ms. Co.

EGAN CANYON see CHERRY CREEK

EAGLE

MR 1917

Eagle district.—The Red Hills property was operated during the year and produced lead ore containing silver and gold.

MR1918

Eagle district.—Lead ore was shipped from the April fool No. 1 and Red Hills group in 1918

MR 1923

Eagle district (Regan).—Lessees operated the Dandy mine of the Red Hill group, 16 miles southeast of Tippett. Several lots of ore were hauled to Gold Hill, Utah, a distance of 56 miles, and shipped on the Western Pacific Railroad to the smelter. The ore averaged about 30 per cent of lead and 36 ounces of silver and $2.20 in gold to the ton.

MR 1924

Eagle district (Regan).—Lessees of the Dandy mine near Tippett produced several lots of lead-silver ore, which were hauled to Gold Hill, Utah, on the Western Pacific Railroad, and shipped to smelters.

MR1925

Eagle or Regan district.—From the Dandy group of claims 34 tons of sulphide lead ore containing silver and a little gold were shipped to Salt Lake City, Utah, for smelting.

ng MR1926

Eagle or Regan district.—A little lead ore from the Dandy mine of the Red Hills group was shipped to Midvale, Utah.

MY

1937 - Production was reported [sec. on Au, Ag, Cu, Pb, Zn]

MY 1945
P. 667
see
Tungsten
(commod)

1945 - The remaining production of primary concentrates in Nevada in 1945 came from a number of smaller operations. The bulk was, however, produced by the Tungstonia Mining Co, operating the Tungstonia mine --- [and two other companies]

Eagle district
Red Hills Mining Co
MJ Feb. 15, 1943.

Nevada
White Pine Co

Holdings consist of the Contact, Dandy, and Whiskey Bottle mines. Values are in lead, gold, silver, and copper. Paul Co Lyon, Ness Building, Salt Lake is Pres.

1944

NEVADA
White Pine County
Eagle dist.

Tungstonia property, Tungsten Minerals, Inc., White Pine County, Nev.:
U. S. Bure Mines War Minerals Rept. 224, 16 p.,2 figs., 1944.

SUMMARY

Exploration on the Tungstonia property in White Pine County, Nevada, was started by the Bureau of Mines on March 9, 1942, and was completed on November 3, 1942. Five paralle veins in an area roughly half a mile wide and three-quarters of a mile long were investigated. Because of the large surface area and the numerous small outcrops, it was planned t trench along the strike of the veins in the most favorable places at 10-, 25-, and 50-foot intervals, with the object of exploring the continuity of the outcrops and to detemine vein structure for the advantageous placing of diamond-drill holes.

Twenty-two diamond-drill holes, totaling 3,420 feet, were drilled by the Bureau, and accessible mine workings also were sampled. The ore mineral is hübnerite, a manganese tungstate ($MnWO_4$), which, when pure, contains 76.6 percent tungstic trioxide (WO_3). Other associated minerals are pyrite, galena, fluorite, and occasionally small amounts of chalcopyrite and sphalerite.

Ore reserves measured, indicated, and inferred by Bureau exploration amount to 22,135 tons averaging 0.52 percent WO_3, or 11,556 units.

Surface equipment comprises a crushing plant, a 25-ton-a-day concentrator, compressor plant, repair and steel-sharpening shop, and a small camp consisting of a boarding house, cabins, and office.

The mill of the Tungsten ~~Metals~~ Minerals, Inc., is equipped for gravity concentration and magnetic separation. Check-sampling of typical mill run over a period of 14 hours indicated

(over)

that the mill can operate efficiently.

The ore is low-grade, and mining operations are scattered, indicating that this mine will be a high-cost and submarginal producer. The property has suspended operations, probably for the duration of the war; however, should the need for tungsten become acute, some production from this property can be expected.

p. 2:

INTRODUCTION

.....

The property is in the NE¼ of sec. 27, T. 21 N., R. 69 E., in the Regan Mining District, White Pine County, Nevada, about 45 miles northeast of Ely.

PROPERTY AND OWNERSHIP

The property comprises 37 mining claims and is held by Tungsten Minerals, Inc., a corporation organized under the laws of the State of Utah. J. M. Eccles, 826 Eccles Building, Ogden, Utah, is the president of the corporation and represents a majority of the stock.

Three claims, known as the Ophir Nos. 8, 9, and 12, on which the present mining operations are confined, are held under a lease-purchase agreement. The claims covering the other veins to the east are known as the Wolframite, Wolframite No. 1, Griswold, and Griswold No. 1. They are owned by the Ely Gold Mining Co., Ely, Nev., of which W. J. Walker is president. Tungsten Minerals, Inc., holds a lease on the entire property with option to purchase.

FIG. 1. Vergical Longitudinal sections of ore-shoots along the strike of veins, with summaries of drill hole data, sampling, and estimated ore shoots.

Fig. 2. Flow sheet, mill of Tungsten Minerals, Incorporated.

File ~~Dist. Mngt~~
Eagle dist.

MY 1947 p. 1191

Tungsten

Nevada

--- Smaller producers --- were
--- Tungstonia Minerals Inc.,
operating the Tungstonia mine
in White Pine County.

MY 1948

The chief smaller producers --- were ---
~~the~~ Tungsten Minerals, Inc., operating the
Tungstonia mine [and 4 others]

MY 1952

Tungstonia District.—Tungstonia Co. (D. M. Peck) shipped concentrate recovered from the Tungstonia mine tungsten ore.

MY 1954

Tungstonia (*Eagle*) (*Regan*) *District.*—Wilford J. Rees developed and shipped tungsten ore from the Antelope underground mine near Tippett to custom mills. The ore averaged about 3.7 percent WO_3. A. E. Gull & Associates operated the Tungstonia tungsten mine for a portion of 1954 and shipped hübnerite ore to a custom mill.

MY 1955

Helmar Mining & Milling Co. operated the Tungstonia mine and mill, *Tungstonia* district, and sold tungsten concentrate to a Utah mill.

EAGLE

MY 1956 Exploration for tungsten ore, under the DMEA program, was undertaken at the Teresa mine in the *Tungstonia* district by Helmar Mining & Milling Co., Inc., and at the Valley View mine in the *Granite* district by Robert N. Salvi.

MY 1956 In the *Tungstonia* district, Ely Uranium, Inc., operated the Antelope mine and shipped its ore to a Utah mill.

MY 1957 The McGill smelter also received fluxing ores from --- Antelope mine.

MY 1958 --- operations in the --- Tungstonia --- districts produced ore containing recoverable gold and silver.

file Mineralogy
Eagle District.

ART. VII—*Triplite from Eastern Nevada;* by FRANK L. HESS and W. F. HUNT.* / 913 p 51-54

THE triplite described in this paper was found in specimens of tungsten ore sent to one of the writers (F. L. H.) by Mr. G. G. Sims, of Aurum, Nevada. As described by Mr. Sims, the locality is in the Reagan mining district, about the middle of the Kern Range, White Pine County, Nevada. The prospect from which the mineral was obtained is six miles from the Utah line, 25 miles east of Aurum and 50 miles north of Osceola.

The country rock is said to be granitic, but among the specimens received are graphitic schist and other highly metamorphosed rocks. Many dikes cut the older rocks and in general both dikes and veins run north and south, paralleling the range.

The association of minerals is unusual. The veins, as judged from Mr. Sims' description and specimens, are quartz carrying wolframite (which is possibly hübnerite), scheelite (very little), pyrite, chalcopyrite (very little), an argentiferous sulphide of bismuth and lead which is probably cosalite, native bismuth, a little sericite, and the triplite which forms the subject of this article. Part of the quartz is of crystalline clarity and has been mistaken for topaz. The triplite is in irregular masses, the largest of which are less than an inch in diameter.

The ensemble strongly suggests a vein of pegmatitic origin and also suggests a relationship to veins in the Deep Creek Mountains of Utah, lying about 15 miles east of and parallel to the Kern Range. Certain gold veins in the Deep Creek Mountains are thought by B. S. Butler† to be of pegmatitic origin, and in the Clifton district farther north in the same mountains and about 40 miles northeast of the Reagan district are scheelite-bearing pegmatites carrying numerous other minerals. Triplite itself can probably be accepted as an essentially pegmatitic mineral and its presence in a vein would seem to indicate that the vein was either a phase of a pegmatite or deposited from magmatic waters. All the analyses quoted in this paper are of specimens either from pegmatites or from veins closely related to pegmatites, among which are tin-bearing veins.

Not only is the Reagan district a new locality for this somewhat rare mineral, but the variety here represented is rather different from previously described types and a short description is deemed desirable.

* Published by permission of the Director of the United States Geological Survey.

Chemical properties.—As considerable material was at hand, by exercising some care in freeing the mineral from its associates four or five grams of the pure substance was easily obtained for a chemical examination. Qualitative tests having established the composition as essentially a manganese-fluo-phosphate, a quantitative analysis was undertaken to determine the particular species.

The fluorine was determined according to the Fresenius method, by which the silicon fluoride liberated by the action of concentrated sulphuric acid and silica is absorbed in a train of U-tubes containing, respectively, moistened pumice, soda lime, and calcium chloride. The phosphoric acid was weighed as magnesium pyrophosphate after previous precipitation as ammonium phosphomolybdate. The manganese was precipitated as NH_4MnPO_4 after dissolving the first precipitate of the oxide. The minor constituents, ferrous iron, calcium, and magnesium, were estimated in the usual manner. In the analysis, separate samples were taken for the individual determinations with the exception of calcium and magnesium. Ferric iron, water, and the alkalies were absent.

The results of the above methods gave:

				mol. ratio	
MnO ..	57·63	MnO	43·13	·608	
FeO ..	1·68	FeO	1·68	·023	·712 = 3·17
CaO ...	2·86	CaO	2·86	·051	
MgO ..	1·21	or MgO ...	1·21	·030	
P_2O_5 ..	31·84	P_2O_5	31·84	·224	·224 = 1·
F	7·77	MnF_2 ...	19·00	·204	·204 = ·91
	102·99		99·72		
−O=F ...	3·27				
	99·72				

Approximately in whole numbers 3 : 1 : 1 or $3MnO.P_2O_5.MnF_2$. The deviation from the theoretical composition is probably due to the somewhat unsatisfactory fluorine determination, for with a slight increase in the fluorine there would result in the recalculated percentage a decrease in the MnO. The similarity of the derived formula to the one generally accepted for triplite is easily recognized. Reference to the literature, however, reveals a considerable variation in the composition of this mineral, as shown by the following table:*

* As some of the earlier analysts overlooked the fluorine, their analyses have not been included.

	P_2O_5	FeO	MnO	CaO	MgO	F	Fe_2O_3	SiO_2	H_2O	Na_2O	K_2O	Al_2O_3	Total
1.	30·33	41·42	23·25	....	....	6·00	....	....	....	....	....	....	101·00
2.	31·29	31·03	31·05	1·42	tr.	8·17	....	....	....	·52	·72	....	104·20
3.	33·85	26·98	30·00	2·20	3·05	8·10	....	....	....	....	tr.	....	104·18
4.	32·33	20·48	32·60	·80	1·33	6·96	3·40	·11	1·25	·98	·33	2·16	102·73
5.	32·05	18·43	35·23	2·10	4·46	8·72	2·38	·18	·10	·31	....	·37	104·33
6.	35·65	18·30	37·84	4·46	tr.	4·94	....	·13	....	....	....	....	101·32
7.	31·50	16·07	38·20	5·99	....	7·87	2·25	....	....	....	....	....	101·88
8.	32·17	7·69	54·14	1·80	....	7·53	....	....	·36	....	....	....	103·69
9.	31·84	1·68	57·63	2·86	1·21	7·77	....	....	....	....	....	....	102·99

1. Bodenmais (Zwieselite), Rammelsberg, Min. Ch., p. 351, 1860.
2. Vienna, John C. v., Verh. k. k. Geolog. R.–Anst., l, p. 336, 1900 : Zeit. Kryst., xxxvi, pp. 642–643.
3. Schläckenwald, v. Kobell, J. pr. Ch., xcii, p. 390, 1864.
4. Skrumpetorp, Hamberg, Axel, Geol. Fören. i. Stockholm, Förhandl., xxvi, p. 77, 1904 ; Neues Jahrb. ii, p. 189, 1905.
5. Lilla Elgsjöbrottet. Nordenskjöld, Ivar, Geol. Fören. i. Stockholm, Förhandl, xxiv, p. 412, 1902.
6 and 7. Sierra de Córdoba. Stelzner and Siewert, Min. Mitth. Tschermak, pp. 227–230, 1873.
8. Branchville, Penfield, Dana Syst. of Min., 6th ed., p. 778.
9. Reagan District, Nevada, W. F. Hunt, analyst.

If, in the above analyses, those constituents representing either adhering matrix or altered material intimately mixed with the triplite are disregarded, the greatest variation is to be found in the proportion of FeO to MnO. Inasmuch as the percentage of FeO varies from 41·42 to 1·68 with a corresponding increase in the MnO from 23·25 to 57·63, we have unquestionably isomorphous replacements of these elements in all proportions and the term triplite must be considered to include not only those phosphates of manganese high in iron, but likewise those in which the iron content is practically negligible. The material from Nevada would seem to represent the manganese end member of this iron-manganese series.

Blowpipe and physical properties.—Triplite is soluble in acids. Before the blowpipe it fuses readily to a black globule and becomes slightly magnetic, and gives a manganese reaction with the borax bead. The color of triplite given in texts as various shades of brown and black, seems to correspond to those varieties rich in FeO or those possessing considerable included and oxidized material; the mineral here described was apparently unaltered, possessed a vitreous luster and light salmon-pink color. Streak white. $H = 4 - 4\frac{1}{2}$. Cleavage in two directions, one very prominent. Sp. gr. 3·79.

Optical properties.—The material was entirely massive and the indices were determined by immersion in oils by E. S. Larsen as follows: $\alpha = 1{\cdot}650$ $\beta = 1{\cdot}660$ $\gamma = 1{\cdot}672$, all $\pm{\cdot}005$. The birefringence is about ·020. The optic axis emerges perpendicular to one of the cleavages. A very large optical angle is shown by the extremely slight curvature of the bar observed on this interference figure. Optically +, dispersion $\rho > \upsilon$. Under high magnification some of the fragments reveal dark colored rounded or fibrous aggregates of included material. Similar inclusions were reported by Lazarevic* in a brown variety and Stelzner† is of the opinion that the dark color of triplite is to be explained by the unusually large quantities of these inclusions. Whether or not this supposition is correct, in the Nevada material, which is apparently unaltered and contains a comparatively small number of inclusions, we have a variety which is not brown but salmon-pink in color.

* Centr. Min., 385, 1910. † Min. Mitth., 222, 1873.

Tungstonia

Red Hills area

Mines, prospects, mills

Surf. U.G. pros. expl. Prod. rept.

Dandy claims (See Autumn 1917) X

USBM Production Records - Tungstonia Eagle, etc

Dist.	Mine							
Eagle	April Fool	1909+1916+1918	65 Tons	Au ore and lead ore				
	(65' shaft 300' tunnels in 1937)							
Eagle	Broechel	1934, 36, 37, 39, 1940	289 Tons	15 Au	5457 Ag	1068 Cu	6805 Pb	
Eagle	Dandies	1940, 41, 42	82 Tons	4 Au	1522 Ag	966 Cu	33174 Pb	
	T21N R67+68E	Dev. By 2 Tunnels 302+580'						
Red Hills	Dandy	1934, 35, 36, 37, 38	476 Tons	17 Au	7093 Ag	3753 Cu	187144 Pb	
Eagle	Dandy	1915+1924+1925	213 Tons	12 Au	5937 Ag	704 Cu	137042 Pb	
(Tungstonia)	Loc Pleasant Valley							
Tungstonia	Del Rey	1949	100 est. Tons	43 Au	29 Ag			
Eagle?	Free Coinage	1924	1 Ton	5 Au	665 Ag	2 Cu	2 Pb	
	Lucky Strike	1949	11 Tons		43 Ag	63 Cu	1892 Pb	2000 Zn
Regan	Malinda	1957	1 Ton	0.5 Au	89 Ag	156 Cu	740 Pb	
Eagle	Nevada Queen	1934	2 T.		61 Ag.		open cut	
Regan	Old Ferry	1951	2 0, T lgs		15 Ag			
Eagle	Red Hill (Dandy)	1908	37 Tons	8 Au	3364 Ag		2381 Pb	
		1911-12-13	643 T.	53 Au	23794 Ag	444 Cu	646442 Pb.	
		1917-18	80 T.	3 Au	1951 Ag		72,161 Pb	
	" "	1923, 26, 27	93 T	7	2234	245	52415	
		1939, 40,	90 T.	2	1621	1983	20221	
		1946, 47	130 T.	12 Au	853	1144	36348 Pb	
Eagle	Whiskey Bottle	1949	31 Tons	1 Au	356	228	7692	
"	White Cliff	1949	2	39	21	55	108	
		1950	1	2	4	18	110	

USBM

Tungstonia (Eagle)

Antelope

1937	2 Tons		27 oz Ag	
1939	1		9	
1940	5		~~[illegible]~~75	31 Cu
1941	6		104	
1948	15		140	
1957	57	1 Au	1583 Ag.	1079 Cu

Silver Chip

1958	12 T.	219 Ag	60 Cu 38 Pb
1959-63 - ~~None~~			

Total 2465 Tons - figures above (by mines)

Total 2728 Tons - from table of production by years

Teresa mine = Tungstonia ?

Mines, Eagle district

Pleasant Valley, Kern, Eagle, Regan, Tungstonia

Couch & Carpenter

Glenco — Pleasant Valley (Kern)

* Red Hills

✓ Tungstonia (Teresa)

* Tungstonia Mng. & Mlg. Co

Regan Tungsten prospects

Other prospects

Pb-Ag — E. side of Kern mts,

Cu-Ag — " " "

Pb — Water canyon

Reports available

Tungstonia (Tungsten Minerals Inc.

vein 1, 2 (Wolframite) 3, 4, 5

Yellow Jacket

See 250,000 Scale

Patented Claims - Eagle district

Aloha
Annabelle
Blue Horse
Independence Millsite
Punki
UNION

Regan district Bk. page

Annabelle 3399 (65353)
Aloha 3356 (67615)
Blue Horse 3758 (235742) E.F. Low 61-288
Independence Millsite 99759-4606 Deutke
Punki 3399 (65353)
UNION 11335-37 D.F. Low

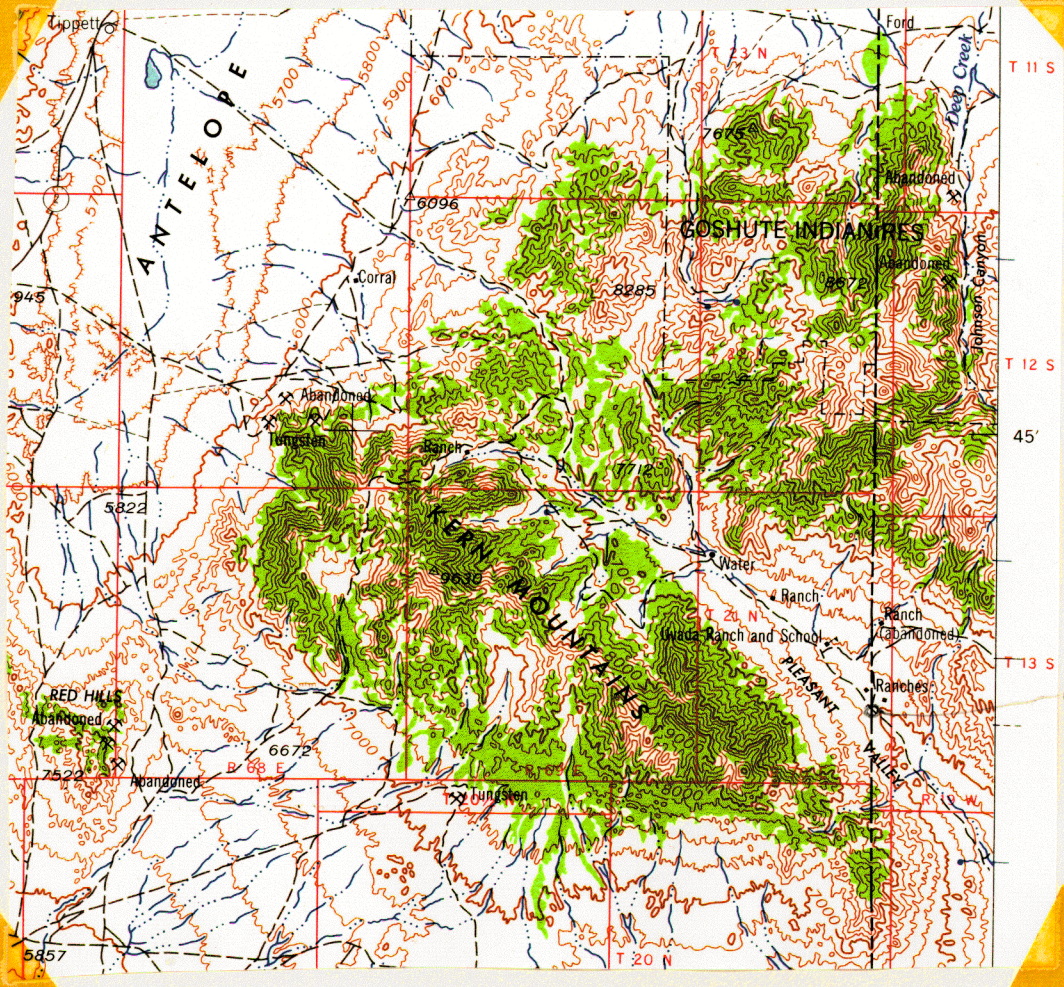
Tungstonia

342

Mines Reg. | Mines, prospects, mills, Operator | surf. ug Pros. Expl Prod Rep't

1918-20 | Salt Lake Tungstonia

R 70 E



21 N

Tungstonia district

Scale 1:250,000

AMS, 1956

1620 0040

WHITE PINE COUNTY
~~REGAN~~ MINING DISTRICT
EAGLE

TUNGSTEN

ENGINEERING & MINING JOURNAL

ENGINEERING & MINING JOURNAL, vol. 138, no. 11, p. 68, November 1937.

The new mill of the Tungsten Mine, Inc., the Regan mining district, 90 miles east of Ely, is operating 2 shifts a day and producing a good grade of concentrate. The property, containing 29 claims, has been developed by test pits, shafts, and tunnels, proving three parallel veins carrying tungsten, gold, silver, lead, and zinc. The value of the ore ranges from $40-$50 a ton, with pockets running as high as $300 a ton.

1620 0040

WHITE PINE COUNTY
~~REGAN~~ MINING DISTRICT(
EAGLE

TUNGSTEN

ENGINEERING & MINING JOURNAL

Engineering & Mining Journal, vol. 141, no. 6, p. 74, June 1940.

Tungsten Minerals, Inc. reports that it will start milling operations at its Regan mining district property in White Pine County, Nevada. Ore assaying 3.54 per cent tungsten was recently uncovered in the main tunnel.

1620 p040

(342)

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY)
Hill, J. M. Notes on some mining districts in Eastern Nevada, USGS Bulletin 648 PP 202-207, 1916.

Tungstonia Eagle Dist

Location and Accessibility

The Kern district (No. 27, fig. 1) includes a large indefinite area in the northeastern part of White Pine County, comprising all of the Kern Mountains and the eastern part of the Antelope Hills. (See Pl. I.) The Kern Mountains are a part of the general uplift of the Snake Range in southeastern White Pine County and of the Toano Range in Elko County. The few prospects in these mountains are widely scattered. Those at the head of Deep Creek are most easily accessible from Wendover, Utah, a town on the Western Pacific Railway, about 115 miles to the north. Others on the west and south sides of the mountains are tributary to Cherry Creek on the Nevada Northern Railway but are also accessible by a practically level road that extends north along Antelope Valley to Dolly Varden siding, about 20 miles north of Currie. Biweekly mail service from Cherry Creek to Tippett station, in Antelope Valley, is maintained by way of Schellbourne and Aurum, a total of 66 miles

Geology

During the reconnaissance on which this report is based the southwestern part of the Kern Mountains and the eastern part of the Antelope Hills were visited. The main mass of the Kern Mountains is apparently composed of a fine-grained light-colored muscovite granite that intrudes dark limestones and shales in the southwestern part of the mountains.

Sedimentary Rocks

On the western and southwestern flanks of Kern Mountains the foothills and lower spurs of the main mountains are formed of dark, thin-bedded crystalline limestones, with some interstratified shales which dip steeply southwest or west. No fossils were found during the reconnaissance, so the

mica plates are fairly well developed. Orthoclase and microcline are about equally abundant and the same is true of quartz and feldspar. Muscovite in small plates is more abundant than biotite. In Water Canyon the granite for about 75 feet north of the contact has a marked schistosity parallel to the contact. The granite breaks into thin slabs along planes in which the muscovite flakes are oriented, and the quartz and feldspar crystals are crushed. Schistosity along the edge of the granite seems to be developed at all places. In Water Canyon on the southwest side of the mountains the normally fine-grained rock grades into either a porphyritic muscovite granite in which orthoclase phenocrysts 2 inches in maximum length are set in a fine-grained groundmass of microcline, orthoclase, quartz, and muscovite, or into a coarse pegmatite of large crystals of all the constituent minerals.

This granite is clearly intrusive into the sedimentary rocks with form the low fringing hills at the southwest side of the mountains. The contact is regular on the whole, but numerous dikes run parallel to the bedding of the sediments near the true contact. Most of these dikes are fine grained, though some are pegmatitic rocks and one shows what appears to be a graduation from granite pegmatite into a quartz vein.

The contact between the igneous rock and the sedimentary rocks on the south and west sides of Kern Mountains is everywhere clearly distinguishable from a distance, for the intusive rock is light colored and weathers into rounded forms, and the limestones are dark and tend to weather into crags and sharp pinnacles. The contact is marked by saddles on the spurs and by gullies on both sides of the major canyons that cut across the contact. Along the west face of Kern Mountains, near Glenco Spring, the contact seems to strike a few degrees east of north and to dip very steeply west. In Water Canyon, at the southwest corner of the mountains, the contact strikes N. 70° W.

and dips 80° S. In the first canyon east of Water Canyon it strikes N. 45° W. and is vertical. The granite is schistose for 100 feet northeast of the contact, and the limestones are crystalline and have a platy fracture for 200 feet south of it. About half a mile south of the contact the thin-bedded dark-gray limestones dip about 45° SW. and are cut by fractures that strike parallel to the contact.

Ore Deposits

History.

According to the district records, kept at Tippett post office, the Kern district was organized May 7, 1869, by Messrs. H. T. Fitzhugh, John Eyre, J. Alnathan Smith, E. S. Smith, G. W. Chase, T. A. Stoutenberg, and B. B. Bird. The district as first organized included 10 square miles about Sentinal Peak, which stands near the head of Sentinel Canyon, about 12 miles from Antelope station, on the Overland Stage Route. On May 2, 1870, the boundaries of the district were changed to include all of the Kern Mountains south of old Fort Filmore. At a miners' meeting held July 4, 1872, the district was enlarged to include the eastern part of the Antelope Hills, where the Red Hills mine is located, and the name was changed to Eagle. Most of the claims in the Deep Creek and Pleasant Valley country were located in the early days, and the Well Annie, or Glenco, property was worked in the early eighties. There are no records of production from any of the properties.

Character of ore Bodies

In the granite core of the Kern Mountains there are quartz veins, some of which, in the southeastern part of the mountains, carry hubnerite, and others, as at Glenco Springs, carry gold and silver associated with enargite, galena, and spalerite. In a few places small deposits of oxidized lead and copper ores have been found in the sedimentary rocks that surround the intrusive core.

None of the deposits have been extensively worked in recent years.

The Properties

Glenco property. The Glenco group, formerly the Well Annie, consists of 14 claims near Glenco Springs, on the west side of the Kern Mountains about 7 miles east-southeast of Tippett post office. (See Pl. I.) The property has not been worked for many years and was not visited, as it was said that the 100-foot tunnel and 70-foot winze on the main vein were under water. The contact of granite and limestone runs a little east of north in this part of the Kern Mountains. The vertical vein is said to trend northeast, lying entirely in granite some distance east of the contact and to be 6 to 8 feet in width. Some ore, said to be from the vein at Tippett, is a white quartz carrying galena, sphalerite, and enargite that is said to carry $8 in gold and varying amounts of silver. Some iron-stained cerusite ore, seen at Tippett, is said to come from undeveloped prospects on the group that lies in the limestone west of the granite.

Red Hills mine. The Red Hills mine, at the east end of the Antelope Hills, about 15 miles south-southeast of Tippett post office, was worked in 1912 but was idle at the time of visit in 1913. In this vicinity outcropping light-colored reddish-weathering crystalline limestones strike north and dip 30° W. On the west side of the hill a rather thick bed of white calcareous sandstone, which outcrops near the top of the hill, just west of the Red Hills mine, is overlain by light and dark colored, somewhat cherty limestones in beds 1 to 2 feet thick. No fossils were found in the limestones and their age is not known.

The Red Hills mine is developed by an open cut 40 feet long and 20 feet deep at its face; by an inclined winze, apparently about 70 feet deep, 50 feet north of the open cut; and by a 50-foot crosscut tunnel, from whose face a

winze is sunk to a reported depth of 200 feet. The winzes could not be entered, for the ladder had been removed when work was stopped. The workings are all in a 20-foot zone of brecciated limestone that strikes N. 10° E. and dips 55°--70° W. and that has been somewhat mineralized near the west wall. At the surface small bodies of iron-stained sandy lead carbonate have been partly removed, but the ore on the dump of the tunnel, presumably taken from the deep winze, is a hard gray lead carbonate.

At the base of the hill about one-fourth mile to the east a 200-foot tunnel is driven S. 80° W. on a fracture that dips 75° S. Near the mouth of the tunnel a small body of brownish sandy material contains some lead carbonate.

Regan tungsten prospects. The Regan tungsten prospects are on the southeast side of the Kern Mountains south of the head of Pleasant Valley, 3½ miles north-northeast of Mike Spring and about 6 miles from the Utah line. The mines were visited in October, 1914. The veins were discovered in 1910 by C. G. Simms and Casten Olsen and were optioned to O. A. Turner, who was at that time working the tungsten properties near Osceola. At present they are held by Messrs. Simms and Olsen.

The veins, which include nine 2 to 15 feet wide and numerous smaller ones, outcrop over an area approximately a mile wide and 2 miles long on the strike of the veins, which averages N. 20° E. The country rock is a coarse-grained muscovite-biotite granite approaching pegmatite, which is intruded by a series of east-west biotite porphyry (kersantite) dikes and by a few porphyritic biotitic granite dikes. The dikes were formed before the veins, for both types are squarely cut by the quartz. The granite is cut by a closely spaced system of joints that strikes approximately N. 20° E. and dips 50° E. The hubnerite-quartz veins are parallel to this jointing, which appears to have determined

the position of the veins. The largest vein is developed to a maximum depth of 60 feet by a 200-foot tunnel and by several shafts. In some places it is frozen to the walls, but in most places postmineral movement has crushed the vein filling and produced some gouge on both foot and hanging walls. The granite for a short distance on both sides of the vein is softened by sericitization of the feldspars, and small cubes of pyrite are distributed throughout the altered rock.

The vein filling is largely white quartz in which the metallic minerals are irregularly distributed, usually in small bunches or pockets. The light-brownish hubnerite is the most abundant metallic mineral, but galena, sphalerite, and a small amount of bismuthinite are present here and there in the veins. In vugs in the main vein needle crystals of hubnerite, cubes of purplish fluorite up to one-half inch on a side, and crystals of triplite have been found. Triplite is rare, but the fluorite and needles of hubnerite are more abundant.

Except for the presence of the rarer minerals the vein material resembles some phases of the pegmatitic dikes that grade into quartz veins near Water Canyon, and it is believed that the veins, though of the true fissure type, are the end products of the pegmatitic intrusions.

It is said that the disintegrated granite wash which covers the floor of the valley in which the prospects are situated, contains sufficient hubnerite to wash if enough water were available.

Other prospects. On the east side of the Kern Mountains in the head of Pleasant Valley some lead-silver and copper-silver deposits are said to occur in the blue limestone near the granite contact. These properties were discovered in the early days of the camp but have received little attention, apparently on account of the distance from railways.

In Water Canyon, at the southwest side of the mountains, about 12 miles southeast of Tippett post office, lenses of quartz parallel to the bedding of thin dark-blue limestones near the granite contact have been somewhat developed. A large part of the quartz on the three dumps is barren or contains a little hematite. Some specimens have thin yellow coatings of lead carbonate and one piece of quartz carried a speck of galena.

Notes:

1. Howell, E. E., U. S. Geog. and Geol. Surveys W. 100th Mer. Rept., vol. 3, pp. 241-242, 1875.

2. Spurr, J. E., Descriptive geology of Nevada south of the fortieth parallel and adjacent portions of California: U. S. Geol. Survey Bull. 208, pp. 28-29, 1903.

3. Idem, pp. 26-29

4. U. S. Geol. Survey Mineral Resources, 1910, pt. 1, p. 739, 1911.

MR 1910 "Near Regan, hubnerite deposits were discovered during the year by C. G. Simms and Casten Olsen. The deposits are about the middle of the Kern Range, 6 miles from the Utah line and 50 miles north of Osceola. The nearest shipping point is McGill on the Nevada Northern RR. 45 miles distant. Veins are said to have been found through a length of 2 miles and a width of 1 mile. O. A. Turner took an option on 12 claims and was prospecting them at the close of the year."

MR 1911 "The hubnerite properties near Regan were prospected under option during the year. Bismuthinite occurs with the ore and should add to its value."

MR 1915 "A mill was erected by A. L. Shepard and associates on the hubnerite deposits in the Regan district, 35 or 40 miles north of Osceola..."

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY) Cont.

MR 1916 "At Tungstonia, A. R. Shepard, Jr., and associates operated a small mill on ore taken from a large quartz vein carrying huhnerite accompanied by small quantities of sphalerite, galena and triplite. Several smaller veins were also worked. Other veins were discovered in the neighborhood by prospectors and a mill was put up a short distance SW of Tungstonia by the Salt Lake-Tungstonia Miles Co., and across the hills Northeast, possibly 2 miles away, another mill was begun by the Utah-Nevada M & M Co., but was not finished."

MR 1910 (additional) "Hurnerite has been found in veins cutting granite country rock at Regan in the Red Hills near the Utah line, about 50 miles north and a little east of Osceola and 50 miles southeast of Currie on the Nevada Northern RR."

Lincoln, F. C., Mining Districts and Mineral Resources of Nevada, Reno, 1923, p. 245.

"The Eagle district is situated in the Kern Mountains south of Regan and Pleasant Valley in east White Pine County on the Utah border. The tungsten mines are in the neighborhood of Tungstonia in the southeast section of the district. Cherry Creek on the Nevada Northern RR. is 65 miles distant.

"The Eagle district was discovered in 1859 by Employees of the Overland Railway Company. It was organized as the Pleasant Valley district in 1868; the name chaned to Kern district in 1869 and the district enlarged and re-christened the Eagle district in 1872. The Glencoe Mine was worked in the early eighties. The Red Hills mine was worked from 1911 to 1918, and other properties in the district were operated during this period. Tungsten was discovered by C. G. Simms and C. Olsen in 1910. In 1915, A. R. Shepherd, Jr. and associates erected a Tungston mill which they operated in 1916. The Salt Lake Tungstonia Mines Co. erected a 25 ton mill in 1916, and the Utah Nevada Mining & M. Co. began the construction of a mill that same year but did not complete it.

EAGLE (REGAN, TUNGSTONIA, KERN, PLEASANT VALLEY) CONT.

"The Kern Mountains are composed of granite intrusion into quartzite, shale and limestone according to Hill. The sedimentary rocks are believed by Spurr to be of Cambrian age. At the Glencoe Mine, a quartz vein in granite near a limestone contact contains galena, sphalerite and enargite and carries values in gold and silver. At Tungstonia, the granite is cut by a series of biotite-porphyry dikes and a few dikes of porphyritic biotite granite. Quartz veins carrying hubnerite cut these rocks, which are sericitized and pegmatized for short distances on both sides of the veins. Galena, sphalerite and a small amount of bismuthenite are present here and there in the veins and in bugs in the main vein, fluorite and a smaller amount of triplite occur with hubnerite. At the Red Hills Mine, lead carbonate ($PbCO_3$) ore occurs in a 20 foot zone of brecciated limestone. This ore contains a little silver, gold and copper."

EAGLE E & MJ. 141, No. 6, p. 74, June, 1940

"The Tungsten Minerals, Inc. a Utah Corporation recently organized by Salt Lake and Ogden men, reports that it will start milling operations at its Regan mining district property in White Pine County, Nevada; ore assaying 3.54% tungsten was recently uncovered in the main tunnel."