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10/02/85

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: TELLURIDE

ALTERNATE NAMES:

TELLURIDE I  
TELLURIDE II  
TELLURIDE III  
TELLURIDE MINING, MILLING & DEV. CO.

MOHAVE COUNTY MILS NUMBER: 35B

LOCATION: TOWNSHIP 19 N RANGE 20 W SECTION 24 QTR. SW  
LATITUDE:N 35DEG 00MIN 49SEC LONGITUDE:W 114DEG 22MIN 02SEC  
TOPO MAP NAME: MOUNT NUTT - 7.5 MIN

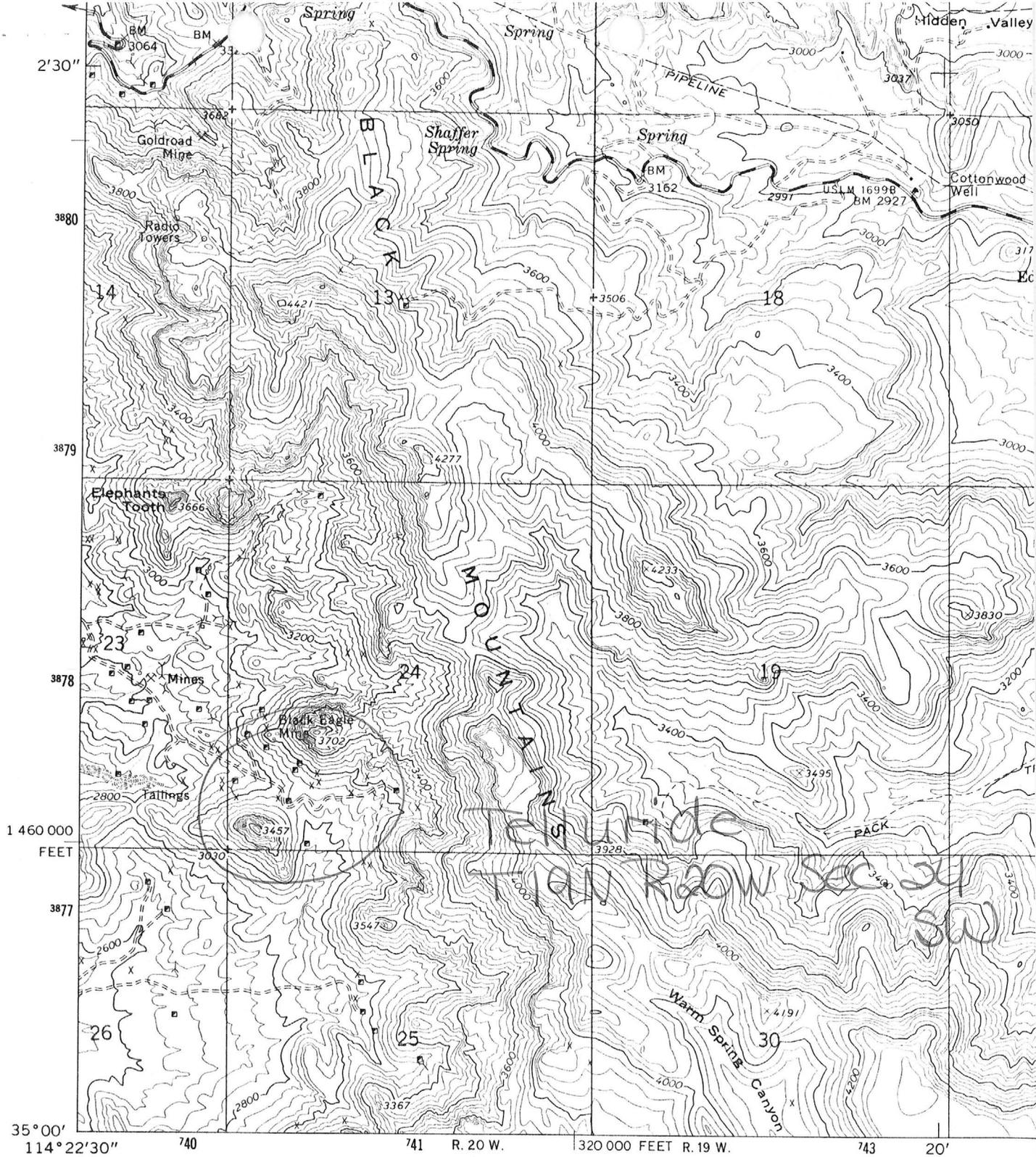
CURRENT STATUS: PAST PRODUCER

COMMODITY:

GOLD-(M) LODE-PRIMARY  
SILVER-COPRODUCT

BIBLIOGRAPHY:

ADMMR TELLURIDE MINE FILE  
ADMMR HOUSEHOLDER MAP  
RANSOME, F.L. "OATMAN GOLD DIST,AZ" USGS BULL  
743, MAP; 1923  
LAUSEN, C. "ORE DEPSTS OF OATMAN & KATHERINE  
DIST,AZ " AZBM BULL 131, P. 108-109; 1931  
CUNNINGHAM, J.B. "AZ LODE GOLD MINES" AZBM BU  
LL 137, P. 94; 1967  
ELSING, M.J. "AZ METAL PRODUCTION" AZBM BULL  
140, P. 96; 1936  
RAND'S MINES HNDBK VOL. XVIII, 1931, P. 672-3  
AZ. MINING JOURNAL, 6-19, P. 81  
GARDENR, E.D. "GOLD MNG & MLLNG IN BLCK MTNS,  
AZ" USBM IC 6901 P. 8 (MAP), P 38-40; 1936  
AZ. STATE MINE INSP. 16TH ANL RPT. P. 10  
ADDITIONAL WORKINGS SEC. 23-SE  
AZ. GEOLOGICAL SOCIETY DIGEST VOL. 15 "GOLD &  
SILVER DEPOSITS OF THE BASIN & RANGE PROVINC  
E WESTERN USA " P. 141; 1984  
MALACH, R. "ONE MINE HISTORY" 1983

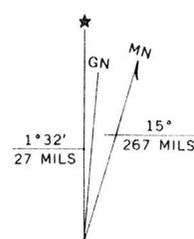


Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1965. Field checked 1967

Polyconic projection. 1927 North American datum  
 10,000-foot grid based on Arizona coordinate system, west zone  
 1000-meter Universal Transverse Mercator grid ticks,  
 zone 11, shown in blue



UTM GRID AND 1967 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

FOR SALE

Mt. Nott 7.5'

NAME: TELLURIDE I, II, III

COUNTY: MOHAVE

1/2 m. S of Oatman next to Center

Mt. Nutt 7 1/2

T 19 N

R 20 W

SEC. 23 + 24

E 1 3000

DISTRICT: SAN FRANCISCO

Oatman

Mineralization:

Au, Ag

Geology:

Type Operation: 700  
500' deep

Production: 200,000 by 1933 operated until 1940+?

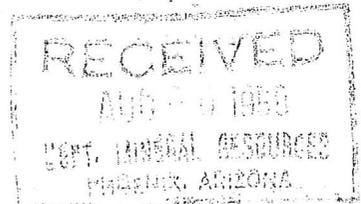
References: Schindler FC 1907 Miner p 226 (Mines Handbook 1920 p. 277)

ABM 131 p 108 (42) (43) (44) USGS # 743 Clipping file

Had Mill



DEPARTMENT OF MINERAL RESOURCES  
State of Arizona  
MINE OWNER'S REPORT



Date Aug. 19-58

- 1. Mine: Telluride
- 2. Location: Sec. Twp. Range. Nearest Town. Oatman. Distance. one mile  
Direction. Nearest R.R. bad washed Distance.  
Road Conditions. Parts bedrock out by rains in spots
- 3. Mining District and County: Sanfrancisco. Mohave.
- 4. Former Name of Mine: Telluride Mining Milling and Development Co.
- 5. Owner: Hattye H Hodges  
Address: Oatman Arizona P.O. Box 275
- 6. Operator:  
Address:
- 7. Principal Minerals: Gold
- 8. Number of Claims: Lode 3 & fraction Patented. Yes. Unpatented.  
Placer No Patented. Unpatented.
- 9. Type of Surrounding Terrain: Mountainous  
I am sorry I cannot give you more information but all my papers are at Oatman. I have a permanent address there but am here to take treatments I plan a trip up there later, and will try to have more
- 10. Geology and Mineralization: information.

I plan to remain here through winter, and continue the treatments but I make trips up there occasionally as have some machinery on property, and like to keep check on things.

11. D

\* Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective leasors or buyers. (over)

12. Ore "Blocked Out" or "In Sight":.....  
.....  
.....

Ore Probable:.....  
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.....

13. Mine Workings—Amount and Condition:.....

No.	Feet	Condition
Shafts.....		
Raises.....		
Tunnels.....		
Crosscuts.....		
Stopes.....		

14. Water Supply:.....  
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15. Brief History:.....  
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16. Remarks:.....  
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17. If Property for Sale, List Approximate Price and Terms:.....  
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18. Signature:.....  
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# REPORT

ON THE PROPERTY OF THE  
**Telluride Mining, Milling  
& Development Company**

LOCATED IN THE  
**OATMAN MINING DISTRICT**  
MOHAVE COUNTY, ARIZONA

By . . . . .  
**ETIENNE A. RITTER**  
*Mining Engineer.* . . . .



# REPORT

## ON THE PROPERTY OF THE

# TELLURIDE MINING, MILLING & DEVELOPMENT CO.

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Oatman, Arizona, February 2nd, 1917.

To the Directors of the  
Telluride Mining, Milling and Development Co.  
Oatman, Arizona.

Gentlemen:

According to the instructions of Mr. J. McIver, I have made a thorough examination of your property, during the latter part of January, 1917, and I submit the following report:

### CHAPTER I.

#### INTRODUCTION AND GEOGRAPHIC CONDITIONS.

The Telluride Group is located in the heart of the Oatman gold mining district, in Mohave County, Arizona, also known as the Gold Road-Tom Reed or as the San Francisco mining district. The property is located about a mile South-east from the town of Oatman. Oatman can be reached by automobile, either from Kingman or from Needles.

Mohave County is situated in the North-west corner of the State of Arizona, and next to the California line.

It is crossed by the main line of the Santa Fe railroad. The County Seat is the town of Kingman, a city of 2,000 inhabitants. Good automobile roads connect the town of Kingman and the neighboring districts. Oatman is 26 miles distant from Kingman.

Needles, in California, just across the Colorado River, and 24 miles away, is the other outfitting point for Oatman. It has one of the Harvey Hotels of the Santa Fe System and a population of 5,000 inhabitants.

Oatman and the mining district which surrounds it are in the heart of the Black Range Mountains. The Telluride Group is located on the

West side of the Range. A very prominent peak, made by a plug of rhyolite, representing the neck of one of the old and dismantled volcanoes, which have covered this country with the flows of their lavas, is a conspicuous feature of the topography, in the area owned by the Telluride M., M. and D. Co. It has a great geological importance, as well.

The Black Range trends nearly North and South. To the East is the Sacramento valley. To the West, the Mohave valley, through which the Colorado River flows South, towards the Gulf of California.

The topography of the Black Range is exceedingly rugged. The top of the Range reaches 5,500 feet. This decreases to 3,500 feet at the Gold Road Pass, where the road from Kingman to Oatman crosses the Range. Oatman has an elevation of 2,700 feet, while Kingman is higher and Needles, on the Colorado River, is only 425 feet high.

The climate of the region is arid, with hot summers and mild winters. It ranks among the most healthful of the United States. The annual precipitation is about 5 inches, much less than the evaporation.

The vegetation is of the desert type, and consists mainly of cacti, greasewood, yuccas and sagebrush. The bareness of the ground makes prospecting very easy and allows to follow the outcrops of the ledges without any difficulty, except where they are covered by surface wash.

The automobile has transformed the country, all the passenger traffic being done by automobile and most of the freight also, by heavy automobile trucks. The water supply is fairly large and several mining companies have built long pipe lines, to assure all the supply of water needed for the town of Oatman and for their milling operations. The Colorado River, with an inexhaustible supply, so far as the needs of the Oatman mining district are concerned, is only 12 miles distant, but at a much lower elevation.

The main shaft of the Telluride M., M. and D. Co. had encountered some water, near its lowest or 400 foot level. It is now drained dry by the Aztec shaft of the Tom Reed mining company, which has reached a lower level.

## CHAPTER II.

### THE HISTORY OF THE DISTRICT.

The district, in a sense, is a very old one. The oldest mine is the Moss mine, located 4 miles from the new mining camp of Oatman. It was discovered in 1863 or 1864 by John Moss, who took \$240,000 out of a hole about ten feet in diameter and ten feet deep. The report of this rich find brought a rush of prospectors to the region, in spite of the hostility of the Hualpai and of the Piute Indians.

New discoveries were made from time to time, and in 1900 the present activities began with the opening of the Gold Road and of the Tom Reed mines. These two mines became large and steady producers, but only a small amount of prospecting and of mining work was done in the adjacent territory. It was only two years ago that the sinking, crosscutting and drifting done in the United Eastern disclosed a truly remarkable body of ore. The development of the District has been carried on with great activity, since that time.

## CHAPTER III.

### THE GEOLOGY OF THE DISTRICT.

I give first in this chapter an outline of the geology of the District, as a whole, in a general way, reserving for a future chapter the study of the geological conditions which affect specially the property of the Telluride M., M. and D. Co.

Mohave County is at the boundary of two important and large geo-

logical provinces. One is the Colorado Plateau to the East. The other is the Basin Range to the West. The province of the Basin Ranges comprises all the mining districts of Nevada. The Black Range and the Oatman District belong to its Southern extension into Arizona.

The chief feature of the Basin Range Province consists of ranges of mountains, trending nearly North and South, and separated by broad and level valleys, filled with great thicknesses of wash.

To the West lies the great trough of the Colorado River, which has cut through these Desert Ranges, without modifying much the general physiography of the country. The entire area drains into the Colorado River.

The Black Range is an important North and South range, with a width of about ten miles, in its Southern part. The range is composed of the pre-Cambrian granitoid complex, flanked, overlain and, in the Southern part, deeply buried under large areas of Tertiary lava flows.

### THE PRINCIPAL ROCK GROUPS.

The principal rocks of the region, beginning with the oldest, are the pre-Cambrian crystalline complex, the Paleozoic sediments, the post-Paleozoic intrusive rocks, the Tertiary lavas and the Quaternary sediments.

The great geological event that has affected most of the Black Range has been the eruption and the effusion of a mass of Tertiary volcanic lavas, which have more or less completely flooded the region. These eruptive rocks rest upon the eroded surface of the pre-Cambrian complex. They played an important part in the genesis of the mineral deposits of the range.

The rocks consist of andesites, trachytes, rhyolites and basalts, lying in broad superposed sheets, or flows, with intercalated beds of ash, tuffs and breccia, and even locally by thin beds of limestone and of shale.

Among the most important are:

1. A basal andesite, light gray, purple or pale green in color. It has a thickness of several hundred feet and consists of flows, tuffs and breccias. In several places it is separated from the next flow by some beds of shale or of limestone, indicating a period of quiescence of the volcanic activity, between the deposition of the lower andesite below and that of the Green chloritic andesite above.

2. A green chloritic andesite. It is disposed in heavy beds or flows, inclining in various directions, according to the conditions of block faulting, which have affected the District at the end of the period of ore deposition.

The rock consists mainly of a dark greenish to olive or light green groundmass, quite fine grained and containing numerous whitish feldspar phenocrysts.

The most important ore bodies mined or developed to date, in the Oatman mining district, have been in this geological horizon.

Another period of subsidence of the volcanic activity has followed the deposition of the Green chloritic andesite, and it is in several places, on the eroded surfaces of this rock that the next flow of lavas, have been poured out.

3. Overlying the Green chloritic andesite are a series of beds of lavas of different composition, some hard and forming benches on the slopes, some soft and easily decomposed, forming gentle slopes between the more abrupt benches. The trachytes are greenish, gray, purple or red and very porphyritic. The rhyolites range from dense, reddish, ironstained and silicified rocks, with banded structure, due to flow, to pale greenish or yellowish tuffs.

In cutting through them valleys, canyons and gulches, the erosion has shown that these lava flows have been traversed by numerous dykes

of andesite and of rhyolite. A number of plugs of rhyolite, representing the necks of the dismantled volcanoes, which have poured their flows of lavas over the country, have resisted the erosion much better than the andesite they have broken through, and they form now some sharp, high peaks, towering over the surrounding country. Boundary Cone and Telluride Peak are two conspicuous examples.

### THE VEINS OF THE DISTRICT.

The veins of the district belong to two well defined systems. In one the veins strike about N. 50 degrees W. and to this belong the Gold Road, the Tom Reed, the United Eastern and the Big Jim mines.

The other system strikes more nearly East and West, and to this system belong the Black Range, the Lexington-Boundary Cone-Golconda-Leland, the Lucky Boy-Carter-Oatman Queen, the Times and the Hardy veins.

The most important vein, or rather lode, of the District can be traced through the properties of the United Eastern, the Tom Reed, the Big Jim, the Telluride and of the Sunnyside mines.

I will describe this vein, or lode, in detail, where it crosses the ground of the Telluride M., M. and D. Co. in a later chapter.

Some of the ore-shoots mined to date are remarkably large, reaching in places up to 30 and 40 feet in width, of solid ore. The ore-shoots form large lenses and the two walls get farther and farther apart, as the ore-body widens. Between the ore-bodies, the average width of the vein is not so large. The lengths of some of the ore-shoots varies from a few hundred feet up to 1,200 feet in the case of the main ore-body mined by the Gold Road mine.

### THE ORE DEPOSITION.

Another special feature of the District is that many important ore-bodies do not come to the surface and also that the outcrops of the veins are not always prominent above the ore-bodies. Yet, with careful study, a number of remarkable characteristics can be singled out as discovered so far in a most exclusive way and in a most pronounced way to accompany the outcrops of the main ore-bodies as yet found, like the one of the United Eastern and the one of the Big Jim. These characteristics put in strong relief the actions of the metasomatic hot ascending waters. These have not only transformed the feldspar phenocrysts from a unaltered shiny appearance, to spots milky white, which are so suggestive of the common name of "bird's eye" porphyry, but they have gone fully one step farther and they have obliterated completely the appearance of the phenocrysts, as individuals. The result is that the completely altered Green chloritic andesite appears as a greenish, brownish or yellowish ground-mass, all uniform.

The veins appear to be made often by large sheeted zones, with both parallel and cross fissuring. The mineralizing waters which have deposited the ore-bodies have altered only slightly the walls of the veins. In many instances, they have left almost unaltered the pieces of breccia found in the veins. The outcrop of a vein is often marked by a gulch, due to the lesser resistance to erosion of the fractured zone, which constitutes the vein, or the lode.

The feature of lack of metasomatic replacement is quite characteristic of the Gold Road vein, at the 700 and at the 900 foot levels, for instance. I attribute it to the chemical composition of the mineralizing waters, probably too rich in lime to have much dissolving power. They were unable to transform the pieces of breccia in the fractured zone of the lode and the wall rocks. Such waters cannot accomplish the same amount

of metasomatic replacement, as those which have been so characteristic of most of the highly silicious gold ore deposits.

The main distinguishing feature of the Oatman District is the presence of a very important leached zone, found practically in all the mines and which may vary from 100 to 500 feet in depth.

This feature is so peculiar to this district and it has such an influence on the methods of developing the mines, that I think it useful to devote a special chapter to its description.

## CHAPTER IV.

### THE LEACHED ZONE. INTRODUCTION.

There is no doubt, in my mind, that it is the existence of a deep leached zone, which has kept the district undeveloped for so many years. For a generation, the prospectors have come and gone. They were attracted by the enormous ledges, which crop so boldly and for such long distances.

As they were following the outcrops, along the strikes of the lodes, panning from place to place, in order to locate where an ore-shoot would reach the surface, they found values in gold only too small to pay to mine the lode at a profit there, and they passed on.

In only a few places, at the Moss mine, at the Hardy and at the Leland mines, some pockets of high grade ore were found. The gold from these places is quite different from the gold mined below the leached zone. While the gold mined below the leached zone is in microscopic particles, so that it is almost impossible to see it with the naked eye, even in very rich specimen, the gold found near the surface, in the Moss, Leland or Vivian mines is very coarse nugget and wire gold, and instead of being distributed all over the vein, always comes in pockets. It simply represents a special phase of the zone of leaching, in places, where it was left behind on account of special conditions.

The outcrops of the veins are very different, according to the nature of the country rock. When the outcrop is in the rhyolite, or in the green chloritic andesite, at a point not too far below, the level where the rhyolite, now eroded away was at a time, the outcrop of the vein is marked by some prominent cliffs of quartz stained with dark iron and manganese, by silicified chert, with few seams of calcite, running through it. When the outcrop is in the Green chloritic andesite, some distance below the rhyolite, then the outcrop is marked by the sheeted appearance of the rock into a large number of parallel fissures, often a fraction of an inch apart, and the bleached decomposed appearance of the rock. I have already described the characteristics of these outcrops above the known ore-shoots of the United Eastern and of the Big Jim, in a previous paragraph.

The exceptionally open character of the ledges, as well as their great width, is noticeable. It is admitted by all the engineers who have visited the District that the ore-bodies came at one time to the surface and were leached down to a lower level by the rain waters, trickling down the lode and carrying with them the gold values, which they have redeposited at the level below the zone of leaching, greatly increasing the value of the primary ore. By primary ore, I designate the ore which was deposited by the hot ascending mineralizing waters, at the time of the original, or primary deposition, of the gold in the veins, and which has been left undisturbed since that time.

The leached zone is the result of three factors, whose cumulative effect will oblige to sink to a depth of several hundreds of feet, before starting an exploration of the vein, with real chances of success. Local geological conditions will militate in favor of sinking deeper at one place than at another, before starting the lateral development work. I will show

that the conditions which prevail near the main shaft of the Telluride M., M. and D. Co. will require your company to reach a deeper level than at some other places, such as the Big Jim, for instance, before you can expect to have reached the proper level below the zone of leaching.

The leached zone is the result of the following factors:

1. The exceptional openness of the veins.
2. The character of the mineralized hot-ascending waters, which have brought up the values of the primary deposition of the ore.
3. The exceptionally old and low base water level, which controls the underground water circulation of the District.

### THE OPENESS OF THE VEINS.

The veins of the Oatman Mining District are really lodes of great width, with often several branches, separated from each other by "horses" of country rock.

The lodes are made by sheeted zones, where the crushing action has been strong enough to create a regular breccia, containing pieces from one-half to pieces four and five inches in diameter. I believe that this condition is the result of two different directions of fracturing, one being nearly North 50 degrees West, and the other almost East and West. I believe that, as far as the veins are concerned, the stress has been relieved without much vertical or horizontal displacement, and I attribute to this reason the remarkable friction-breccias, so characteristic in the lodes of the Oatman District.

These brecciated zones in the vein have been formed both before and after the deposition of the ore. They have been channels of circulation for the surface waters migrating downward, freer, more ramified and of greater size than I have seen anywhere else.

This openness of the fissures forming the lodes has allowed these surface waters migrating downward to create a zone of leaching of great vertical depth, or in other words, of great vertical height. It has also allowed the leaching process to be exceptionally thorough.

### THE CHARACTERISTICS OF THE MINERALIZED HOT ASCENDING WATERS

The gangue of the veins of the Oatman District is calcite and quartz. But the presence of calcite, in larger amounts than in any other known gold mining district is the characteristic feature of the gangue of the veins. The veins are brecciated zones, recimented by quartz and calcite, carrying gold, in an exceedingly finely divided state. They are quite remarkable in the absence of any other metalliferous mineral, accompanying the native gold.

There is quite a large amount of quartz mixed with the calcite in the ore, below the leached zone and in many places the gangue of the ore is even more silicious than calcitic.

While the veins, where the gangue is exclusively calcitic carry some values, the pay-ore, and to a larger extent, the high grade ore is always found in parts of the veins rich in quartz.

This quartz represents a second stage in the ore deposition by the hot ascending, mineralizing waters, and it has greatly increased the amount of gold in the ore-shoots.

Whether the remarkable pseudomorphs of quartz on calcite, shown as a general feature of the character of the ore in the Oatman District is due exclusively to quartz deposited by silicious magmatic waters, or whether, part of it at least, is a mineral of secondary deposition, from the surface waters migrating downwards, which has been left in place of some crystals of calcite dissolved there by these same waters and carried deeper down, is a question which remains doubtful in my mind.

The fact that these pseudomorphs are found everywhere, in the upper workings of the Hardy mine, as well as at the greatest depth yet reached by the United Eastern mine seems to militate for the deposition by downward migrating waters, as well as hot ascending ones, in a number of cases.

The gangue of the veins, at all the levels, shows many pieces of breccia made of country rock, in a remarkably broken condition, and with very little silicification, even along the numerous seams in the rock. Yet this part of the vein is often quite rich in gold. This rich deposition of gold, without being accompanied by hardly any metasomatic replacement of the wall rock of the fissure is one of the chief features of the Oatman District.

Returning to the question of a deep zone of leaching in the Oatman District, the fact that the bulk of the gangue was made of calcite has had a great influence.

It is a well known fact that the solubility of the calcite is infinitely greater than the solubility of the quartz. The surface waters, in migrating downwards had no difficulty whatever in leaching down most of the calcitic gangue and most of the gold it contained, and in creating in that way a leached zone of great height, without hardly any values left behind. This leaching was naturally more thorough than it would have been, in the case of a gangue exclusively silicious.

#### **THE OLD AND LOW BASE WATER LEVEL, WHICH CONTROLS THE UNDERGROUND WATER CIRCULATION**

The base water level, which should not be confounded with the main permanent water level, is the lowest level in which the underground waters can flow. In other words, the permanent water level represents the top and the base water level, the bottom of the vertical height, in which the underground waters circulate through the fissures in the rocks. Of course, the base water level controls to a great extent the depth to which the permanent water level is found.

The zone of leaching corresponds roughly with the permanent water level, and continues for some distance below it, if the fissures are fairly open, and the downward migration of the water, from the permanent towards the base water level is easy. It has also varied with the amount of precipitation, during the geological times covering the period from the deposition of the ore to the present day.

In the case of the Oatman District, the base water level depends from the Colorado River, situated about 12 miles West of the District. It was draining the country on which the volcanic eruptions have built the Range of the Black Mountains. It has acted since the ore was deposited in the veins of the Oatman District.

The presence of this exceptionally important and prominent water level has been emphasized by the fact that a number of the East and West lodes can be traced from the District to points more than half way between the District and the Colorado River.

While Oatman is at an altitude of 2,700 feet, the Colorado River flows at an altitude of about 450 feet. We know that water flows in large ditches on a gradient of five feet per mile. In increasing ten times this amount, in order to account for a much greater coefficient of friction in underground waters, it places the base water level in the Oatman District at between 1,600 and 1,700 feet, below the surface. This is an unusually great depth. But it checks well with the fact that the ores taken from the bottoms of the Gold Road and Tom Reed mines are yet very amenable to the cyanide process.

It is easy to understand that with such a great height of downward

underground migration of the surface waters, they have created a zone of leaching proportionately great.

The fact that a certain amount of pyrites of iron did exist is proven not only by the iron stain of the silicious outcrops, but also by the presence of Gypsum, which occurs specially above the outcrops of some ore-bodies, like those exploited in the Big Jim and the Aztec claims, for instance. I am convinced that this gypsum is due to the decomposition of the pyrites of iron into iron oxide, which stains the outcrops, and sulphuric acid. This last by reaction on the calcite of the gangue has transformed it into gypsum, found now, in its stead, in some of the outcrops of several important veins.

All these facts bring an extraordinary amount of cumulative evidence, proving the existence of a leached zone of a much greater vertical height, as well as much more active and strong agency, than I have seen in any other mining district I am acquainted with.

## CHAPTER V.

### THE MINING CLAIMS. THE LOCATION OF THE PROPERTY.

The property of the Telluride M., M. and D. Co. consists of thirteen lode mining claims, and fractions, covering an area of about 200 acres, in the heart of the Oatman Mining District.

The property has a length of about 9,000 feet and varies in width from 300 to 2,000 feet.

The names of the mining claims are from the North-west to the South-east: The Connecting Link No. 2, the Connecting Link No. 1, the Tellurium Fraction, the North-west Extension Blue Ridge, the Blue Ridge Fraction, the Blue Ridge, the Telluride, the Telluride No. 1, the Lodestone, the Telluride No. 2, the Telluride No. 4 and the Telluride No. 3.

The full claims are 1,500 feet long and 600 feet wide and the fractions are smaller. The claims are held by right of discovery and annual assessment work. They are not yet patented.

The location of the Telluride Group on the main proven belt of the Oatman District needs to be emphasized. While I believe in the future of the District at large, the fact remains that, with the exception of the Gold Road mine, the most important mines of the District, the United Eastern, the Tom Reed and the Big Jim mines are all located on a narrow and well defined belt.

The Telluride Group is on that belt. The mines mentioned are immediately North-west from it. To the South-east of the Telluride property, and on that same belt is the Sunnyside Group. The main vein of the Telluride property, which has given a number of mines at the other end, is developed at the South-east end of your ground by the Sunnyside G. M. Co. The development work done on this group now is showing the most flattering results.

## CHAPTER VI.

### THE EQUIPMENT OF THE PROPERTY. THE UNDERGROUND WORKINGS.

The Telluride property has been explored by two shafts. One, the old shaft, is not in very good condition and I have not examined it. This shaft is 500 feet deep, and there are some workings at the 200, at the 400 and at the 500 foot levels, as the map added to this report shows. The machinery and the buildings have been removed from it. It was sunk at the limit of the Blue Ridge and the Telluride claims and it explored a fractured zone in the rhyolite. Numerous assays taken carefully by the management, while the work was in progress, failed to disclose any pay

ore and I believe that the shaft is located in a portion of your property not at all as promising as two other places, at least, are.

On account of the very mediocre showing, work was discontinued at that point and the management decided to sink a new shaft on the Blue Ridge Fraction claim.

The new shaft is in excellent condition and well timbered. It has reached a depth of 475 feet, with two levels, at 400 and at 475 feet. It is perfectly dry, being drained by the Aztec shaft of the Tom Reed G. M. Co.

The development at the 400 feet level consists of 100 feet of cross-cutting and at the 475 foot level of about 600 feet of crosscutting and drifting.

The drifting forms about one-half of the development work, while the crosscutting represents the other half. Of the drifting, one half has been done on the Lucky Boy and one half on the Telluride vein. These two veins are described in the following chapter.

The new shaft is a two compartments, four by nine feet shaft, in the clear, with a gallows-frame forty feet high. The equipment consists of a White and Middleton forty H. P. gas engine, a friction hoist, good for seven hundred feet, attached to the engine, a 10 by 10 Fairbanks-Morse air compressor, good for two drills, a Chicago Pneumatic crude oil air compressor, good for five drills.

There are two oil tanks and three circulating tanks, one water tank. There are a powder and a fuse house. There are a carpenter's shed, a very good blacksmith's shop, with a complete set of tools, the necessary drills, cars, tracks, quite an amount of lumber on hand, and so forth. There are five miners' cabins and a cook-house, making the camp quite complete for the prosecution of further development work.

## CHAPTER VII.

### THE LOCAL GEOLOGY OF THE TELLURIDE PROPERTY.

The main geological feature of the Telluride property is the existence of an important plug of rhyolite, cutting through the green chloritic andesite, and which forms a sharp peak on the Blue Ridge claim just back of the main shaft of your company.

This peak has acted as an immovable pillar at the period of the fissuring of the adjoining area, when the veins were formed and at a later period, when they were faulted. Its influence has been felt beyond the limits of your property, in the area to the North-west of it.

The rest of the area covered by your claims is in the green chloritic andesite, the country rock in which most of the important ore bodies of the camp have been found so far, so that the country rock in which ore-bodies can be expected in your ground is the same as the country rock encountered in the proven mines of the District.

### THE VEINS OF THE TELLURIDE GROUP.

Two main veins cross your property. They are what I believe to be the continuation of the Big Jim-Aztec vein, towards the Sunnyside, across the Telluride ground, and the extension to the North-east of the Carter-Lucky Boy vein.

There are some other veins of minor importance, and among these I want to mention a vein which is the main one of the Connecting Link No. 2 claim. This vein is about twelve feet wide and is well exposed a short distance of your property, on the Rose claim of the Lucky Boy M. Co., in a shaft 40 feet deep. It strikes N. 55 deg. W.

No work of any consequence has been done on this vein or on any other, except the two main ones, I have already indicated, and on which I advise you to concentrate your efforts.

### THE LUCKY BOY-C. J. D. VEIN.

The Lucky Boy and C. J. D. vein is one of the main mineralized fissures of the District. It can be traced from the North-west end of the Oatman Queen Group, by the Carter and the Lucky Boy Groups, into the property of the Telluride M., M. and D. Co., to the South-east and beyond, through the C. D. J. claim.

At the East end of the Lucky Boy claim, the vein shows well in a cut and a shaft. It is exposed on the Telluride ground by several shallow workings on the Blue Ridge N. W. Extension claim, and specially, in the Blue Ridge claim, on the slope of the prominent peak made by the rhyolite plug, a short distance up hill from the main Telluride shaft.

At the point where it enters the Telluride property, to the North-west, the vein shows a width of about six feet, with some stringers of quartz and of calcite, penetrating both walls. The vein proper is made chiefly of calcite, with some quartz. As the outcrop is followed towards the slope of the rhyolite plug, it passes into a mass of thoroughly altered and leached rock, quite decomposed, where the seams of hard calcite have disappeared. Farther East, the calcite in heavy seams reappears, and at the shafts on the C. J. D. claim, the outcrop of the vein presents an appearance intermediate between the two types previously described.

From the two shafts, approximately 15 and 30 feet deep, on the C. J. D. claim, close to the wagon road from Oatman to the Argo property, to the North-west end of the Oatman Queen Group, the vein can be traced for a distance of a mile and a half, showing that it is an important vein. The vein strikes North 75 deg. West and it dips from 70 deg. to 75 deg. to the North-east.

Its width varies from six to ten feet. It cuts through all the formations. For nearly its full length, it is a fracture through the green chloritic andesite. But it cuts also, and very sharply, through one of the youngest dykes of rhyolite, showing it to be a fracture later than the latest eruption of volcanic rocks.

This vein has been exposed in the 475 foot level of the main shaft of the Telluride Group, at a point where it crosses the Telluride vein, and a drift has been driven on it for a distance of 160 feet.

The point of junction of the Telluride and of the Lucky Boy veins shows less disturbance than would be expected and it has not made an ore-body either, at least at that level.

A short distance West from the point of junction of the two veins, however, the Lucky Boy vein shows many smooth surfaces of faulting and strong evidence of some important vertical and horizontal movements. This is quite important, as I believe that the vein has acted there as a more or less parallel fault-plane of an important fault, I will describe later and which has had a great influence on the present location of the Telluride vein.

At the 475 foot level the vein shows mostly calcite and only very little quartz indeed. The Lucky Boy vein was assayed regularly, while the drifting on it was in progress, but the values obtained varied from a fraction of a dollar to two or three dollars, only. The work done on it has not yet opened an ore-shoot of pay ore.

As I will show, I believe that the efforts of your company should be concentrated on the development of the Telluride vein. But I also think that after some important ore-bodies have been found in it, it will be a wise policy to start, again the exploration of the Lucky Boy vein, specially with the use of the information obtained in opening up ore in the Telluride vein.

### THE TELLURIDE VEIN.

The Telluride vein can be traced, I think, from a shaft 80 feet deep, on the Bald Eagle claim of the Tom Reed G. M. Co., by a shaft 15 feet

deep and about 500 feet farther, located just below the wagon road, to some cuts immediately above the blacksmith's shop of the Telluride M., M. and D. Co.

Farther East, the vein can be traced only with great difficulty to a point not far from the South-east endline of the Lodestone claim, belonging to your company.

This difficulty in tracing the outcrop of the vein is simply due to the fact that the Lodestone claim is covered by a thick bed of surface wash.

A short distance from the endline of the Lodestone claim, the Sunnyside G. M. Co. has exposed a very promising outcrop of this vein, in a long open cut, where it shows a width of nearly 30 feet of decomposed vein material. This outcrop is very similar to those of the United Eastern and of the Big Jim above their ore bodies. From that point, the Sunnyside G. M. Co. has traced the vein by a number of cuts, two main shafts and other shallower workings, farther East, for a distance of more than 1,000 feet, on its ground.

In the Telluride ground, the vein outcrops on the slope of the mountain, facing the flat area to the South-east, where the shaft of the Pictured Rock G. M. Co. is located.

The outcrop of the vein should be exposed on the Telluride ground by two long open cuts, similar to the ones made by the Sunnyside G. M. Co. not far from your line, and these two cuts should be located, one very close to your South-east endline of the Lodestone claim, and the other a few hundred feet farther West.

The problem of the exploration of the vein at depth at that point can be taken in two different ways: either by shaft sinking, with crosscuts to the vein and drifts on it, or by diamond drilling. I will discuss this in the next chapter.

### THE TELLURIDE VEIN.

The Telluride vein, on the Blue Ridge Fraction claim has been exposed at the 400 and at the 475 foot levels of your main shaft.

I think that this vein is the same as the one which has shown so much ore in the workings of the Big Jim and of the Aztec mines.

I give the following paragraphs, as the best results of the information now available. I recognize that new facts exposed by the further development work of your and of the neighboring properties may perhaps oblige to modify part of the conclusions given here, at a later time. Yet I feel that I have accumulated a sufficient amount of proofs to fully justify this exposition, as the most useful information on which to base the future development work on your property, at the present time.

From a careful examination of the surface of the ground, I believe that the Telluride vein is the same as the one which has given the very large body of ore exposed in the workings of the Big Jim and the Aztec mines.

I think that this vein was pushed by a North-west and South-east earth movement towards the rhyolite plug, which forms the high peak on your ground, and which acted as an immovable pillar. The result was that a large block of ground, and within the block of ground, the vein it contained, was faulted, along a fault line, almost vertical and striking about N. 85 deg. W. That fault shows an horizontal displacement of about 500 feet, the North block having been pushed to the East and the South block having been pushed to the West.

At the same time, the faulting was accompanied by a downthrow of the southern block. It is not possible to estimate the extent of the downthrow, with any real approximation, but, for a number of reasons, too complicated to give here, I think that the South block was sunk at least between 200 and 300 feet.

This same fault can be traced for about three-quarters of a mile farther, to a point where it has faulted to a similar extent a dyke of rhyolite, on the Gold Cross claim of the Carter G. M. Co.

It has affected the Telluride vein, in three different ways: First, it has thrown the vein in the ground of your company. Second, it has probably changed its normal dip in the upper few hundred feet. The vein, in the present workings, at the bottom of the shaft dips about 75 deg. to the South-west, while I believe that at a greater depth, it will become vertical and finally reverse its dip to between 70 deg. and 80 deg. to the North-east, which is the normal dip in the United Eastern, Big Jim and Aztec mines. Third, it has buried to a greater depth the top level, to which the ascending silicious mineralizing waters have produced a secondary enrichment of the vein. If this contention is correct, it means that, other things being equal, the Telluride M., M. and D. Co. will have to go several hundred feet deeper, to reach the same horizon, which is now exploited through the Aztec shaft.

These conclusions are confirmed by the character of the vein at the 400 and at the 475 foot levels, in the main Telluride shaft. There, no quartz can be seen, in the vein, where it has simply been cut by the cross-cut, at the 400 foot level. It has the appearance of a breccia recemented by seams of calcite. These same characteristics are shown also at the 475 foot level, but besides them, the vein shows few quartz seams, indicating an improvement in depth.

At the 475 foot level, the vein has been drifted on towards the South-east, a distance of about 80 feet. It has been faulted, a distance of about 10 feet by the Lucky Boy vein, at its junction with it. From that point, it has been drifted on for about 20 feet towards the North-west. The distance of 250 feet in that direction, on the vein, before it leaves your ground, is the most promising place where to prosecute the further development work.

## CHAPTER VIII.

### CONCLUSIONS.

The Telluride property is remarkably well located on the main proven belt of the Oatman District. It is crossed by two main veins, The Lucky Boy and the Telluride veins.

While the Lucky Boy is a valuable and promising vein, and one of the important veins of the District at large, I advise you to concentrate your efforts, at the present time, on the Telluride vein, reserving for a later date, the development of the Lucky Boy vein.

The Telluride is part of the most important vein of the District, which can be traced from the United Eastern, by the Tom Reed, the Big Jim and the Aztec, into the Telluride ground, and from there, through the Sunny-side property.

The Telluride group covers the apex of that vein for a distance of 3,500 feet. Of the two places, where it deserves to be explored most actively from the present showing, one is in the main shaft of the Telluride M., M. and D. Co., on the Blue Ridge Fraction claim, and in drifting on the vein, towards the North-west. The vein, as it is exposed in the present 475 foot level, shows a considerable widening from the breast of the South-east drift, to the breast of the North-west drift, on the other side of the crosscut, indicating plainly the advantage of drifting towards the North-west. However, I would advise you to sink another hundred feet, before starting any new drifting on that vein, in the direction indicated above, on account of the improvement shown by the appearance of quartz in the vein, between the 400 and the 475 foot levels.

The second place where I consider the exploration work to be most promising is towards the South-east end of the Lodestone claim. I be-

lieve that the vein should be well exposed first in two open cuts. For the exploration in depth, I believe that diamond drilling would be the most satisfactory method, provided a core large enough is obtained to assure that the sample obtained will really represent an average of the value of the ore at that neighborhood.

The cheapness and the rapidity of this method of testing the ground at a sufficient depth seems to me to recommend it there, against shaft sinking and drifting. In that way, the vein could be tested for a considerable distance along its strike, and at a sufficient depth, in the Lodestone claim, and for a much lesser amount than would be the case by shaft sinking and drifting.

The results of that work will determine the future policy of your company, after the exact location of a good body of ore has been disclosed by means of the diamond drill.

I am of the opinion that the Telluride M., M. and D. Co. is fully justified in prosecuting the work indicated above, with the reasonable expectation of uncovering some important bodies of commercial ore.

Respectfully submitted,

ETIENNE A. RITTER.

Telluride mine  
Mohave Co.

# Telluride Mining, Milling and Development Company

Oatman, Arizona

## DAILY MILL ASSAY REPORT

For Mill Day Ending 7 a.m. Aug. 28 1924

SAMPLE No.	DESCRIPTION	AU		REMARKS
		OZS. PER TON	VALUE PER TON	
1	Press Tails 7-3	<del>TR</del>	<del>TR</del>	
2	" " 3-11 } Shifts	<del>TR</del>	<del>TR</del>	
3	" " 11-7 } Average	<del>TR</del>	<del>TR</del>	
4	" " Average			
5	" " Special			
6	Head Sol. 7-3	0.180	3.72	
7	" " 3-11 } Shifts	0.172	3.55	
8	" " 11-7 } Average	0.162	3.35	
9	" " Average		<u>10.62</u>	
10	Thick Overflow, No. 1		3 <u>3.54</u>	
11	" " No. 5			
12	" " No. 6	0.002	0.04	
13	Thick Underflow, No. 1			
14	" " No. 5			
15	" " No. 6	0.002	0.04	
16	Agitator Sol. No. 3			
17	" Washed No. 3	0.03	0.62	
18	Thick. Washed No. 1			
19	" " No. 5			
20	" " No. 6	0.025	0.52	52
21	+ 200 Mesh			04
22	- 200 "			<u>106</u>
23	Tailings Scrapings			
24	Ppt., Lot No.			
	Marcy Discharge	1.48	30.69	
	Mine Sample	0.64	13.23	

ARIZONA DEPT. OF MINES & MINERAL RESOURCES  
 STATE OFFICE BUILDING  
 416 W. CONGRESS, ROOM 161  
 TUCSON, ARIZONA 85701

*this is the "original"  
was stolen in past!*

# Telluride Mining, Milling and Development Company

MILL OPERATING REPORT FOR 
 WEEK  
 24 HOURS ENDING 7 A.M. *Aug. 24, 1924*  
 MONTH

Oatman, Arizona

## OPERATING DATA

ARIZONA DEPT. OF MINES & MINERAL RESOURCES  
 STATE OFFICE BUILDING  
 416 W. CONGRESS, ROOM 161  
 TUCSON, ARIZONA 85701

Ball Mill Hours Worked	1600						
Ball Mill Hours Lost:							
Acct. power shortage		Thickener Hours Worked	144.0 Lost				
Acct. supply shortage		Agitator Hours Worked	22.0 Lost				
Acct. water shortage		Precipitation Hours Worked	23.41 Lost 0.59				
Acct. ball mill repairs		Extraction { <table style="margin-left: 20px; border-collapse: collapse;"> <tr><td style="border-right: 1px solid black; padding-right: 5px;">Ore.</td><td style="padding-left: 5px;">96.60%</td></tr> <tr><td style="border-right: 1px solid black; padding-right: 5px;">Head Sol.</td><td style="padding-left: 5px;">100%</td></tr> </table>	Ore.	96.60%	Head Sol.	100%	
Ore.	96.60%						
Head Sol.	100%						
Acct. classifier repairs							
Acct. feeder repairs							
Acct. Ore Shortage	800						
Acct.		Per cent minus 200 mesh	91.61				
Total Ball Mill Hours Lost	800						

## SUPPLY DATA

Consumptions:

Aero Cyanide	100 <sup>can</sup> lbs.	Zinc Dust	14 lbs.	Used Balls	4" 108	3 1/2" 2"	lbs.
Lime	360 lbs.	Lead Acetate	1 lbs.	Water			gals.

## TONNAGE and ASSAY RECOVERY

	Tons	Assay Average	Contents Ozs. Average		Value
	Ore in bin at 7 a.m. (estimated)	43			
Ore from mine to mill (weightometer)	28				
Ore Milled (estimated)	30	15.33	22259		46010
Tailings discharged (sp. gr. and volume)	30	0.45	0657		1350
Solution precipitated (solution meter)	140	3.19	21606		44660
Solution tailings	140	-			
Tailings scrapings treated	<i>Marcy Discharge</i>				
Tailings scrapings discharged	<i>As pptd. for mo. to date</i>		20.67		
Value in press	4846.57				
Tons milled for mo. to date.	798	Net			44660

Value in press 4846.57  
 Tons milled for mo. to date. 798  
 Daily average 35

*P. J. B.*

Mill Superintendent

Same as previous page!

TELLURIDE MINING, MILLING & DEVELOPMENT CO.

OATMAN, ARIZONA

Aug. 20/24

Mr. Robt. Lyons, Gen. Mgr.,  
Telluride M. M. & D. Co.,  
Oatman, Ariz.

ARIZONA DEPT. OF MINES & MINERAL RESOURCES  
STATE OFFICE BUILDING  
416 W. CONGRESS, ROOM 161  
TUCSON, ARIZONA 85701

Weekly Mill Letter,  
For week ending Aug. 24.

Dear Sir:

During the past week we have milled ore as follows:

Total Hrs	Hrs Per day	Tons Ore	Tons per hr.	Tons per day
Grinding 102.24	15.32	207	1.930	29.57

We have precipitated 1,075 tons of sol. pro-  
ducing approximately \$3924.47.

The average heads for the past week were \$19.69, tails \$0.045 giving an extraction of 97.57%

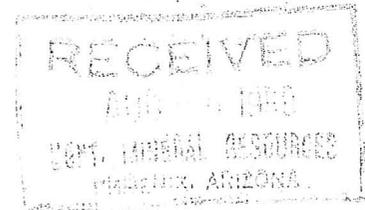
The total gold precipitated for month to date amounts to \$12221.97

During the week we continued grinding only two shifts.

Yours very truly,

Mill Superintendent.

DEPARTMENT OF MINERAL RESOURCES  
State of Arizona  
MINE OWNER'S REPORT



Date Aug. 19-58

- 1. Mine: Telluride
- 2. Location: Sec..... Twp..... Range..... Nearest Town...Oatman..... Distance...one mile  
Direction..... Nearest R.R..... Distance.....  
bad washed  
Road Conditions... Parts bedrock out by rains in spots
- 3. Mining District and County: Sanfrancisco Mohave
- 4. Former Name of Mine: Telluride Mining Milling and Development Co
- 5. Owner: Hattye H Hodges  
Address: Oatman Arizona P.O.Box 275
- 6. Operator:.....  
Address:.....
- 7. Principal Minerals: Gold
- 8. Number of Claims: Lode 3 & fraction Patented... Yes..... Unpatented.....  
Placer... No..... Patented..... Unpatented.....
- 9. Type of Surrounding Terrain: Mountainous  
I am sorry I cannot give you more information but all my papers  
are at Oatman. I have a permanent address there but am here to take  
treatments I plan a trip up there later, and will try to have more  
10. Geology and Mineralization: information.

I plan to remain here through winter, and continue the treatments  
but I make trips up there occasionally as have some machinery on  
property, and like to keep check on things.

11. Dimension and Value of Ore E

From Hattye H Hodges,  
381 North 6th Ave.,  
Phoenix, Arizona.

8-19-58

\* Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective leasors or buyers.

12. Ore "Blocked Out" or "In Sight":.....  
.....  
.....

Ore Probable:.....  
.....  
.....

13. Mine Workings—Amount and Condition:.....

No.	Feet	Condition
Shafts.....		
Raises.....		
Tunnels.....		
Crosscuts.....		
Stopes.....		

14. Water Supply:.....  
.....  
.....

15. Brief History:.....  
.....  
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.....  
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.....

16. Remarks:.....  
.....  
.....  
.....  
.....

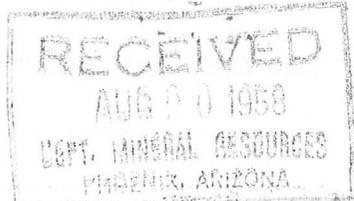
17. If Property for Sale, List Approximate Price and Terms:.....  
.....  
.....

18. Signature:.....  
.....

DEPARTMENT OF MINERAL RESOURCES

State of Arizona

MINE OWNER'S REPORT



Date Aug. 19-58

- 1. Mine: Telluride
- 2. Location: Sec..... Twp..... Range..... Nearest Town...Oatman..... Distance...one mile  
 Direction..... Nearest R.R..... Distance.....  
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- 3. Mining District and County: Sanfrancisco Mohave
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 Address:.....
- 7. Principal Minerals: Gold
- 8. Number of Claims: Lode 3 & fraction Patented...Yes..... Unpatented.....  
 Placer No Patented..... Unpatented.....
- 9. Type of Surrounding Terrain: Mountainous  
I am sorry I cannot give you more information but all my papers  
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- 10. Geology and Mineralization: information.

I plan to remain here through winter, and continue the treatments  
but I make trips up there occasionally as have some machinery on  
property, and like to keep check on things.

11. Dimension and Value of Ore Body

From Hattye H Hodges,  
 381 North 6th Ave.,  
 Phoenix, Arizona.  
 8-19-58

\* Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective lessors or buyers.