

HISTORY: The claims in the Courtland area were discovered and located in the early nineties. The major activity in the district continued up to 1919, at which time Courtland was a thriving camp with one rail connection north to Cochise and another south to Douglas. From 1919 to date the district has been more or less inactive, with minor ore shipments, some development work, and intermittent work by leasers.

Work was started in 1942 to rehabilitate the Leadville, and in 1946 work was done on the Highland Shaft of the Great Western.

GENERAL GEOLOGY: The general geology and comments by F.L. Ransome, from U.S.G.S. Bulletin 530-C on "The Turquoise Copper Mining District", published in 1913, is quoted below.

“ The general country rock of the Mame, Humbot, and Leadville mines is a series of shales and thin-bedded dolomite limestones cut irregularly by many dikes and sheets of quartz monzonite porphyry. The beds have prevalingly steep dips to the east. The entire belt of these rocks from Courtland northward shows decided metamorphism. The calcareous beds have been transformed to hard fine-grained aggregates consisting largely of garnet, with perhaps other silicates, quartz, calcite and pyrite. The porphyry has been altered to fine-granular aggregates of quartz, sericite, and pyrite. The pyrite, though widely disseminated through the rocks, is more abundant at some places than others. The superficial weathering of this formation is accompanied by further changes. The oxidation of the pyrite, with the production of sulphuric acid and sulphates, bleaches portions of the rocks and leads to the accumulation of iron oxides in other places. In connection with this weathering there has been some concentration of oxidized ore near the surface especially at the Humbot mine, but such concentration is local and superficial.

At the Mame Mine the oxidized ore is wholly inconsiderable and the work in progress during 1911 was directed to the exploration of the metamorphosed beds and the altered porphyry for bodies of pyritic ore. These are generally of lenticular form and lie with their greater dimensions approximately in the planes of bedding. They are said to be most abundant and largest close to the porphyry intrusions, which in their altered condition are difficult to distinguish underground from some of the metamorphosed sedimentary beds. These ore bodies have no sharp boundaries but are merely those portions of the formation where the pyrite is more thickly disseminated than elsewhere or where it has formed in solid masses by metasomatic replacement of the calcareous strata and probably, to some extent, of the porphyry also. Not all of the pyritic material contains enough copper to be classed as ore and numerous assays are necessary to determine the limits of each ore body. The deposition of the ore has no obvious relation to fissuring. The pyrite, together with the small proportion of chalcopyrite that gives the whole its value as a low-grade copper ore, was apparently formed during the general metamorphism of the formation by hot mobile solutions under such pressure that they were capable of moving along bedding planes and of

penetrating the mass of the rock through minute openings and by molecular replacement.

At a few places in the Mame mine there has been a little chalcocitic enrichment but the greater part of the ore has undergone no modification since it was first deposited.

In 1911 there had been shipped from the Mame mine about 1,500 tons of ore from development work but stoping had not been begun.

The dump of the Leadville No. 1 shaft, about half a mile northwest of the Mame, shows considerable low-grade pyritic ore. The geologic conditions at the two mines are similar, and if the Mame develops into a profitable mine, this will probably lead to a resumption of work at the Leadville.

The Humbot shaft is situated about 800 feet south of the Mame and belongs to the same company. Although the rocks are identical with those of the Mame, and although oxidized ore to the value of \$100,000 is said to have been mined from open cuts near the shaft, considerable exploratory work on two levels has failed to show any sulphide ore bodies of workable size.”

Since the Ransome report, the various shafts were sunk to their present depths and Sulphide ores were encountered. Additional development opened up a large tonnage of commercial sulphide ore. All work on the Highland Shaft was done subsequent to the report quoted.

REPORTS ON THE PROPERTIES: Numerous reports by competent engineers, with full access to the mine workings, and records have been made. Reference is made to only two of these reports, namely, one by Hoval A. Smith, and another by William A. Nickerson.

Hoval A. Smith, E.M., formerly Chief Mining Engineer of the Calumet and Arizona Mining Company, in his report dated July 1, 1936, relating to the Great Western Group mines, quoted in part as follows:

“ From the large past production of copper, gold and silver values mined within these properties, their future commercial possibilities are emphasized; Mr. W.J. Young, Jr., connected for eleven years with Great Western Mines, states that some 1,750,000 tons of copper ore plus gold and silver values, had been developed through the then existent drill and underground explorations.

A 50-ton ore bin has been erected near the Highland Shaft for the early shipment of ore.

Except for drilling machines and steel, the mine is fully equipped for active mining and development. Piping, timber, and the sinking pump from the Leadville #2 Shaft are installed and available to complete the unwatering of the shaft.

PROPOSED OPERATING PLAN: Both properties are practically fully equipped, with ample housing facilities, roads, water supply, and ready for active mining. No early development work is required. The preparation of stopes for efficient and steady extraction of ore, however, is necessary.

The following program is proposed, and in the order listed below.

1. Complete the reconditioning of the Highland Shaft. De-water the old workings and prepare slopes for efficient mining.
Until a mill is provided, the ore mined will be shipped to the smelter.
2. Re-open the Leadville #2 Shaft, that is unwater and prepare stopes for mining and shipping.
3. Retimber and re-open the 3-compartment 350-foot Mame Shaft, which is located about midway between the Leadville #3 Shaft and the Highland Shaft.
4. Make connections between the old workings of each of the 3 shafts mentioned with the workings from the adjoining shaft so as to provide emergency exits as required by the mining statutes.
5. Install a 200 to 250 ton daily capacity flotation mill, as soon as sufficient ore is prepared for mining. As additional ore is prepared for mining, the capacity of the mill can be increased from time to time by the addition of like capacity milling units.

Once this work is done and the operation on an earning basis, additional development is contemplated. An underground haulage should be made, connecting the Leadville, Mame, and Highland Shafts. The mill will be located near the Mame Shaft, where ore can be hoisted direct to the mill bins from ore passes from the various ore bodies to the main haulage level.

The Highland Shaft work should be completed within 60 days time of resuming work. The Leadville #2 Shaft will take two to three weeks to unwater. The Mame Shaft will require about four months to retimber and unwater.

Pending the erection of the mill, all ore mined will be shipped to the smelter. Early in 1947, 7 cars totaling 332 tons of ore, averaging 4% on copper, were shipped from the Great Western property to the Phelps Dodge Smelter at Douglas. At the present price of copper, 21 1/2¢ per pound, the copper in this ore has a value of \$17.20 per ton.

REASONS FOR INSTALLATION OF A MILL: The last shipment of ore from the old workings on the lower level of the Highland Shaft on the Great Western showed –

4.34% copper; 0.10 ounces gold; 0.98 ounces silver.

A typical settlement sheet by the smelter on such an ore at present prices for metals would be as follows:

| | | | |
|--|----------|--|-------------|
| Gold | 0.10 oz. | @ \$32.50 per oz. | \$ 3.22 |
| Silver | 0.98 oz. | no pay under 1 oz. | - -- |
| Copper | 4.34% | minus 1.5% = 2.84% or 56.8 lbs. 90% @ (21.5% - 2.75% or 18.75 per lb. | <u>9.59</u> |
| Gross pay value per ton | | | \$12.81 |
| Less smelter charge | | | <u>3.50</u> |
| Net smelter returns per ton of crude ore | | | \$ 9.31 |

If this same ore were milled and a recovery made of 90% of the values, with a ratio of concentration of 6 to 1, we would have 1 ton of concentrates for each 6 tons of ore mined and milled.

The concentrates would assay approximately as follows:

23.4% copper; 0.54 ounces gold; 5.28 ounces silver.

A typical settlement sheet by the smelter on such a concentrate at present day prices for metals would be as follows;

| | | | |
|---|----------|---|--------------|
| Gold | 0.54 oz. | @ \$32.20 | \$17.39 |
| Silver | 5.28 oz. | Minus 1.0 oz. @ 88.5¢ | 3.78 |
| Copper | 23.4% | Minus 1.5% - 21.9% or 438 lbs. 90% @ (21.5¢ - 2.75¢) or 18.75¢ per lb. | <u>73.91</u> |
| Gross pay value per ton | | | \$95.08 |
| Less smelter charge | | | <u>5.00</u> |
| Net smelter returns per ton of concentrates | | | \$90.08 |

These concentrates represent 6 tons of crude ore,
making net smelter returns per ton of crude ore \$15.01

Net smelter returns per ton of crude ore by direct shipping 9.31

MARKETING SAVING BY CONCENTRATION per ton of crude ore \$5.70

Assuming reasonable approximate figures for mining and hauling crude ore
to the smelter – mining @ \$2.00 per ton; hauling @ \$2.00 per ton – we have
a cost per ton of crude ore of \$4.00

EXCERPTS FROM ENGINEER'S REPORTS

The following quotation is taken verbatim from W.H. Godfrey's report, dated March 25, 1930, covering the Leadville Mines property:

“After careful examination of the surrounding country, together with assays from the mine itself, I have no hesitancy in recommending this property as a high class commercial mining manufacturing proposition, with a long and successful operation ahead, only needing a competent manager to make it one of the biggest dividend producers in the world. The gold values, according to my investigations, have been much underestimated and it is my opinion and firm conviction that the gold values alone will make a very much larger dividend payer. I found the gold assay values exceeding in values the famous Home Stake mine in South Dakota, as per average of 1916, which is the last values I have on general mine run values. The situation as to this property is ideal, transportation, fuel, water, climatic conditions, labor situation, ore bodies, large well-defined veins of commercial ore and proper elevation to dump from skip to treatment plant, with no handling (gravity doing the work), equipment sufficient to do all necessary work to make everything automatic from mine to treatment plant; the plant built so nothing is shipped from the mine but the finished products such as pure metals and minerals.”

Hoval A. Smith in his report, dated July 1, 1936, relating to the Great Western Group mines quoted, in part, as follows:

“From the large past production of copper, gold and silver values mined within these properties, their future commercial possibilities are emphasized; Mr. W.J. Young, Jr., connected for eleven years with Great Western Mines, states that some 1,750,000 tons of about two per cent Copper ore plus Gold and Silver values, had been developed through the then existent drill and underground explorations.

Gross value of ore shipped equals about \$3,427,270,00 or \$19.42 per ore ton. (Old Price Basis).

The Great Western group embraces 23 Patented claims containing 416.617 acres as shown on the larger map. There are about 25,000 feet of underground workings from five shafts – 310', 350', 350', 200' and 185' deep respectively. The principal workings are the Mary, Mame, Highland, Humbot and Brown mines.

The Geologic map shows that the major portion of the known mineralized ore formation of the Courtland District lies within the Great Western and Leadville group.”

In special reports, prepared by A.J. Harshberger the following are excerpts, relating to the Leadville property in the Turquoise Mining District:

“By a careful examination of the surrounding country and the surface workings of the mine, the amount of ore shipped and its value, I do not hesitate in recommending this property for further development, believing that there are great bodies of sulphide ores at greater depth,

and by continuing the exploration work for at least a thousand feet deeper and crosscut to the granite wall, there will be sufficient ore bodies to warrant putting up at least a million dollar plant for the treatment of these ores which will be of sufficient volume for continuous work for many years to come. I do not hesitate in saying that this is one of the most promising properties that I have been privileged to examine for some time and believe it will develop into one of the best paying mines in the State of Arizona.

Also the evidence of the leaching which has been going on for centuries prove beyond any shadow of doubt the presence of a very high grade secondary enrichment of sulphide ores on the lower levels. Basing my opinion upon these facts and the evidence of the workings as far as developed, the geological conditions that prevail and the mineralization as far as it has been explored, I believe I am warranted in saying that the tonnage of milling ore now blocked on the dumps and in sight would far exceed any estimate that has been made on them, and in my judgment the tonnage could not be estimated to any degree of accuracy. Still, in my opinion, based on the above facts, you can safely figure on more than \$50,000,000.00 worth of merchantable ore in sight and ready for production.” (This relates to the Leadville property only).

F.S. Richards, quotes, in part, as follows, from his report on the Leadville Property, dated April 16, 1932:

“After spending nineteen months on the property and taking 387 samples of ore from the various workings, I freely state that there are 8,000,000 tons of ore above the 400 foot level in this mine, worth \$10.00 per ton when brought to the surface.” (The price quoted is predicated on the price of metals prior to 1930). *\$80,000,000.00*

DEVELOPMENT

Many miles of drifts, raises and crosscuts, together with the extensive tunnel system, have exposed the geology and characteristics of the vein system. This facilitates the future operation and development of these mines. It is estimated the aforementioned development work would have a present-day replacement value in excess of \$2,250,000.

The Leadville Group has about 9,000 feet of underground workings radiating from seven shafts, and the Great Western has about 25,000 feet extending from five shafts, designated as follows: