

A Preliminary Report on the Barrett Lead-Barite
Mining Property Near Magdalena, Socorro County,
New Mexico

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1. SUMMARY - The Barrett mining properties were examined in the period of March 28 to April 6, 1958, inclusive. They are situated in Socorro County, New Mexico, 1 mile north of Magdalena, a town of 1,000 population, on U. S. Hwy. 60, and a stub branch of the Atchison, Topeka & Santa Fe RR from Socorro 27 miles distant. The properties are old and have been subjected to much shallow surface workings and small ore shipments have been made from time to time. The subject area lies outside the previous main mining areas of the Magdalena District 2 to 4 miles to the south, and the Granite Mountain District lying 1 to 2 miles to the east. The Magdalena and Granite Mountain Districts were credited with about 48½ million dollars up to 1940, (U. S. G. S. Professional Paper 200) and subsequent production brings the estimated total to date of about 64 million dollars, of lead-zinc, silver, gold and copper. At the present time the Linchberg Mine, owned by the Empire Zinc and operated by Elayer & Company is producing about 75 tons per day of lead-zinc ore, running about 15% combined values, which is shipped to the Empire Co. mill at Hanover, New Mexico for milling and then to the A. S. & R. smelter at El Paso, Texas for smelting.

The subject area exposes a number of veins of lead-barite ore outcropping at the surface as shown in trenches, pits and shafts. The area is believed to be a part of the outer zone of mineralization characterized by cooler mesothermal solutions replacing the faulted zones around the boundaries of fault blocks in a complex zone of faults and fissures. If the ore veins continue laterally and to medium depth in size and mineral content in a similar manner to that shown in numerous exposures, and provided that a concentrating mill be available to produce marketable products of lead and barite, it would constitute a medium tonnage of ore that could be extracted by conventional underground mining methods at a fair profit.

2. INTRODUCTION - The identity of the property was learned during my previous visit to Socorro February 25 to March 2, 1958, at which time it was tied up by the Bunker Hill Company who was endeavoring to consolidate a group of 4 properties together with the operating Mex-Tex mill at Socorro, New Mexico. The consolidation failed of conclusion and this property became open for a deal upon my arrival here March 27. Preliminary discussions indicate that a favorable contract might be negotiated, and much work is being done to work up and prepare a suitable contract while the examination is being conducted and this report prepared.

2. LOCATION AND ACCESSIBILITY - The property is easily accessible from the small town of Magdalena, New Mexico by 1½ miles of fair graveled road of nearly level grade, passing over one low rolling hill elevated about 150' above the average valley floor. Magdalena, on U. S. Hwy. 60, and the stub line A. T. & Santa Fe RR, in the Rio Grande valley, on the west side of the Rio Grande River. Socorro, a town of 5,000 population of which about 55% are of Mexican descent, is 75 miles south of Albuquerque, New Mexico, and 202 miles north of El Paso, Texas. The nearest air line service is at Albuquerque, with good east-west service by T W A, and frequent north-south service by Continental and Frontier Airlines.

4. PHYSICAL FEATURES AND CLIMATE - Magdalena is situated in the narrow valley gap east-west, in the north-south trending Magdalena Range. In the gap at Magdalena the altitude is 6,570, while the sharp, high Range to the south reaches peaks of 10,000 and 11,000 altitude. To the north the Magdalena Range is broken into

segregated mountains of less relief and lower elevation. The gap at Magdalena makes an excellent east-west wind passage and this time of year is subjected to frequent 20 to 30 miles per hour winds. Water is available from wells from 75 to 150 feet depth and wind-mills dot the valley floors. The valleys are covered with a high wild grass, which in seasons of normal spring rains makes excellent cattle feed for the main industry of this region, cattle raising. Normally there is 2 to 3 inches of moisture during the months of February and March and 7 to 8 inches during July and August, occurring mostly as torrential rains (gully washers) from thunder storms. During the winter months of November, December, January, February and March the region may receive light snows and high winds approaching blizzard proportions, but they are usually of short duration and at temperatures above 10 degrees. The mining area is so located that it should be little affected by any weather extremes.

5. HISTORY AND PRODUCTION - The history of the Magdalena District is long and colorful dating back to the first ore discovery in 1866, with shipments beginning in 1880. Seven large mines, the Waldo, Graphic, Kelly, Juanita, East Juanita, Nit, Hardscrabble and Linchberg, accounted for the major part of the production, reported to be about \$64,000,000, with about a dozen smaller mines having fair production records. The Granite Mountain District, which lies immediately east of the subject area is reported to have produced \$1,500,00 up to 1940. There is no record of previous shipments from the subject claims excepting the one car shipped by the owners. From the shallow workings it might be a fair estimate that 10 or 12 car lot shipments of sorted ore might have been made. These shipments were mostly of lead ore crudely cobbled from barite gangue, since the carbonates are so friable that they are impossible to sort from the gangue. The one car lot shipped by Clarence Barrett, 7-1-57, wet weight 96,280 lb., 0.5% moisture, .01 oz. gold, 1.0 oz. silver, 22.0% lead, 0.10% copper, 46.0% insol, 41.4%, 4.0% iron, 1.8% zinc, 16.0% sulphur, 1.0% alumina, 0.23% arsenic, and .25 antimony. The car lot netted \$1,721.99 with lead at 14.0¢ per lb.

6. PROPERTY AND OWNERSHIP - The entire group of 42 unpatented contiguous claims owned by Barrett and associates is situated in Sections 9, 10, 11 and 15, in Township 2 South, Range 4 West, in Socorro County, New Mexico. The claims situated in Section 15 are

located on land that is surface patented to Badger Cattle Co., Mr. Hudgens, manager, with the mineral rights held by the U. S. Government. No contractual arrangement has yet been made with the surface owner providing for any damages to the surface, who presently occasionally uses the surface for cattle grazing. As per my suggestion Mr. Barrett is to contact Mr. Hudgens immediately for written permission to use so much of the surface as may be necessary or incidental to the mining purposes. Of the group of 11 claims which are presently intended to be placed under contract the Bell Nos. 1, 2, 3, 6, 8, 11, 13 and 15 are in the name of Clarence Barrett of 320 North Sixth St., Socorro, New Mexico; the Bell Nos. 4 and 7 are in the name of Vic Christensen, 739 Highway 60, Socorro, New Mexico; and the Bell No. 5 is in the name of Herman Johnston, 320 North Sixth St., Socorro, New Mexico. I have not found any conflicts of claims on the ground or any defects on the recording of the claims in the office of the County Recorder in the Courthouse at Socorro, New Mexico. A copy of the claim map constructed from the crude sketch by the owners, together with section sheets of the pits, trenches and the Discovery Shaft accompanies this report. Distances to the various workings have been tied in from the discovery posts.

7. WATER SUPPLY AND POWER - No water is available on the property except that which might be available from shaft sinking. The water level in the Discovery Shaft presently stands at 65 feet below the collar. At a millsite tentatively selected near the railroad siding at Magdalena, water would be available from the wells drilled from 100 to 150 foot depth and approximately 100 gallons per minute would be available from the town water supply system. It is believed that sufficient water would be available for a 250 ton per day capacity mill by reclaiming water from a tailing pond and using city water. Three phase electric power is available from a line about 3/4 mile distant from the contemplated mining operations and would be available at the millsite.

8. MINE WORKINGS AND EQUIPMENT - There is no usable equipment on the property. The workings are mostly shallow shafts steeply inclined along the vein, with only a small footage of drifts. The Discovery Shaft, the most extensive on the property, is 70 feet deep on an incline of 72 degrees, with short drifts on levels

at and feet, respectively. At the Barrett Shaft, a short drift has been driven along the vein at the 50 foot level.

9. GEOLOGY AND ORE DEPOSITS - The surface of the subject area is covered mainly with limestones of Carboniferous Pennsylvanian age, with some patches of remnants of Tertiary andesite flows. The tilted and faulted Carbonaceous sediments rest on a basement of Pre Cambrian formations of argillites and schists. These have been invaded successively by Pre Cambrian masses of gabbro and felsite, a granite batholith and many diabase dikes. From the end of the Pre Cambrian a long period of erosion exposed the granite batholith. On this erosion surface the Kelley limestone of Mississippian age was laid, 130 feet in thickness. Then the Sandia limestone of Pennsylvanian age, 550 feet thick, was laid conformably, though not in successive time periods. The Madera limestone formation of undisclosed thickness conformably overlies the Sandia. Tertiary rocks represented by flows, tuffs, breccias of latite, andesite and rhyolite, stocks of granite and monzonite, dikes of lamprophyre and white rhyolite. The main granitic stock is at the northwest end of the Magdalena Range and minor stocks were introduced in and beyond the northwest part of the district in a northwest trend in line with the principal zone of faults along which the ore solutions rose. The dikes also lie for the most part along the structural zone of northwest trend. A series of transverse faults with northeast to northwest strike and easterly dip have executed control. Limestone, particularly the Kelley, has been replaced by high temperature contact minerals in the main Magdalena ore zone, and later sulphide minerals replaced the contact minerals. Flexing took place in Laramide time along vertical faults with settling along intervening wedge shaped blocks. In the inner area the largest deposits were formed by wide replacement of limestone along a network of minor faults, fissures and bedding planes subject to movement. In the outlying subject area gradation into cooler mesothermal mineralizing solutions resulted in formation of lead-barite veins replacing the fault gouge and breccia. The faults vary considerably in width between walls, the amount of gouge and breccia, the degree of completeness of replacement and the amount of barite gangue in relation to the lead minerals. Where the barite predominates the lead minerals are protected from oxidation and are found as metallic sulphides. Where the

barite is present in scattered lesser amounts, the vein minerals may be completely oxidized and the vein may be a soft to hard oxidized mass of lead carbonates, barite crystals, calcite crystals stained brown to black (probably a mixture of siderite, calcite and manganosiderite), and quartz, with soft yellow limonite and hematite. This type of vein breaks up into fine particles when mined and it is impossible to sort lead for shipping. The veins are easily traceable by the barite float along the surface and many cuts and trenches have been made along the outcrops. The veins vary in strike from northwesterly to east-west, but dip mostly from vertical to 70 degrees to the east and north and vary from 2½ to 8 feet in width.

Faulting has been mostly pre-mineral but some post mineral movement is noted. Some faulting has been later than the andesite flows for the veins cut through andesite, and in some places andesite has been dropped on the hanging wall of normal faults. It is noted that the degree of replacement is lower and less complete when the walls are of andesite. There are no ore bodies in this property that ^{can} be said to be blocked out. From the workings of the Discovery shaft, to 70 feet depth, the vein varies from 2½' at the top to 12 ft. with the average probably about 5 feet wide. An estimate of grade might be conservatively stated as 5% lead and 25% barite. This vein is exposed at the surface by cuts and in shallow shafts for a strike length of 700 feet and it may extend to the bulge shaft, an additional 500 feet to the southeast. Samples have been cut on exposed faces, but the assays are not yet available. It is contemplated to sink the shaft to the 200 ft. level and drift both ways on the vein at that depth. Figuring 700' long, 200' deep, 5' wide, tonnage factor of 10 cu. ft. per ton, there would be 75,000 tons, or if 1200' long then an additional 50,000 tons, less about 500 tons already mined, or about 600 tons per vertical foot.

At the Barrett shaft the vein is a continuous 6' in width for 40' in depth. The lead content appears to be less, while that of the barite is greater. The east-west vein in the Barrett appears to be continuous to the west side line, approximately 300', and to the Dugger Shaft, in Section 16, 300' further west, where it has been explored to an incline depth of 128'. No

waste is seen on the dump. Eastward from the Barrett shaft the Barrett vein should intersect the Discovery vein, a likely place to expect a larger ore deposition. If 600' of strike length of vein is assumed, 6' wide and 200' deep, then this assumed block would contain 72,000 tons, or 360 tons per vertical foot. In addition there are other vein systems noted within approximity of 300' that could materially increase this tonnage.

10. METALLURGICAL TESTS - We have had no opportunity to make any tests on this ore. Mr. Barrett has stated that the Bunker Hill Co. had an extensive series of tests made on these ores, as well as those from other properties, at the School of Mines and/or the State Bureau of Mines here in Socorro and that they were very favorable. He stated that he believed that he could secure copies of the testing results so that we could observe and use them. The conventional flotation process is already proven to be well suited to making good recoveries on lead and barite ores.

The Mex-Tex Corporation uses jigs and tables to recover and separate lead concentrates and barite concentrate, (part of the lead being oxidized), but are said to make only about a 55% recovery, from an ore head running 2.5 to 4.0% lead and 35% barite. Present operations are about 125 tons of mine run ore per day. Barrett said he thought that the operation was netting about \$100.00 per year.

11. ECONOMIC CONSIDERATIONS - Ground barite, sacked F.O.B., Socorro, New Mexico is being sold by Mex-Tex Corp. for \$30.00 per ton. The presence of barite in the veins in the subject area with the lead is necessary to make sufficient recoverable products to constitute a commercial ore, and a good flotation plant is necessary to separate the lead and barite into salable products. While results from samples taken are not yet available, a hypothetical are assumed to run 5% lead and 25% barite would produce as follows in a mill capacity of 100 tons per day, with 90% recovery, lead @ 13¢ per lb., barite @ \$30.00 per ton sacked, F.O.B. Car @ Magdalena or Socorro, New Mexico.

Lead - $\frac{72 \text{ cones}}{5 \times .90} = 16$ ratio of concentration of lead to 72% concentrates

72% = 1440 lb. - $30 \times .90 = 1269 \times .13 - .02.2 = \137.05 per ton
 Smelting charges 6.50 - 10¢ per unit + 30% = 6.05
 Freight to El Paso + tax 4.15
 - 10.20
 \$126.85 per ton

@ 16 to 1 ratio, Recoverable value per ton of crude ore = \$7.93 per ton for lead

Cost of mining \$4.00
 Cost of milling 3.00
 Royalty .79
 \$7.79 - 7.79
 Gross on lead ore per ton \$0.14

Barite - $\frac{95\%}{25 \times .90} = 4.2$ tons of original mill feed to be treated to produce 1 ton of 95% barite cone.

Cost of re-floating barite \$1.00 per ton = \$4.20 per ton of barite cone, worth \$30.00 per ton, and produce 22.5 tons of barite per day.

Cost of milling \$4.20
 Dry, regrind, bag 1.50
 Cost of bags 8.00
 Royalty 3.00 \$30.00
 \$16.70 \$ Gross - 16.70
 \$13.30 or \$2.17 per ton of crude ore.

Gross \$2.17
 Less - Amort on mill \$1.00
 Return of cap, mine 1.00
 Gross on barite \$0.17 per ton
 Total gross on products \$0.31 per ton

Profit estimates:

From these figures it is seen that a mill capacity of 100 tons per day under present prices and above grade of products would be the lowest base at which the operation could break even.

A mill of 200 tons per day capacity might lower the costs \$1.25 per ton making a total gross profit per ton, before taxes, of $\$0.31 + 1.25 = \1.56

For each 1% increase in lead add \$1.57 profit	Per Ton
for 100 ton mill $\$0.31 + \$1.57 =$	\$ 1.88
for 200 ton mill $1.56 + 1.57 =$	3.13

+0.31

Profit per ton with lead @ 14¢ per lb. = 1¢ = \$0.85

for 5% ore, 100 ton mill $0.31 + 0.85 =$	\$1.16
for 5% ore, 200 ton mill $1.56 + 0.85 =$	2.41
for 6% ore, 100 ton mill $0.31 + 1.57 + .85 =$	2.73
for 6% ore, 200 ton mill $1.56 + 1.57 + .85 =$	3.98
for 7% ore, 100 ton mill $0.31 + 3.14 + .85 =$	4.30
for 7% ore, 200 ton mill $1.56 + 3.14 + .85 =$	5.55

Profit per ton with lead @ 15¢ per lb. = 2¢ = 1.70

for 5% ore, 100 ton mill $0.31 + 1.70 =$	2.01
for 5% ore, 200 ton mill $1.56 + 1.70 =$	3.26
for 6% ore, 100 ton mill $0.31 + 1.57 + 1.70 =$	3.58
for 6% ore, 200 ton mill $1.56 + 1.57 + 1.70 =$	4.83
for 7% ore, 100 ton mill $0.31 + 3.14 + 1.70 =$	5.15
for 7% ore, 200 ton mill $1.56 + 3.14 + 1.70 =$	6.40
for 8% ore, 100 ton mill $0.31 + 4.71 + 1.70 =$	7.97

For a 5% lead ore @ 13¢ per lb.

Gross profit on lead per ton \$0.14

and with a barite content of 30%, gross profit on barite \$1.84 per ton of mine run ore.

Total Gross profit lead + barite \$1.98 per ton.

There would be an increase of gross profit of \$0.33 for each 1% increase in barite content above 25%.

If reserves sufficient in size and grade to warrant the installation of a mill should be disclosed, and economic conditions concerning markets and prices are favorable, it is believed that the mine would offer a fairly small but attractive profit possibility.

12. ESTIMATES OF INITIAL DEVELOPMENT COSTS - The initial cost of the first commitment for development, being the sinking of the discovery shaft from the 70' point to the 200' level, (at 72 degrees, the shaft would have to be 211' on the incline) plus 15' for a sump and dump pocket, requiring 156' of shaft sinking, cutting a station, and drifting each way on the vein for a total of 300', is estimated as follows:

Rental of hoist, truck, gravel crushing plant, and accessory equipment	\$ 2,000.00
One Pickup truck (From Blanding)	750.00
Cost of small head frame, ore bin, sheave	
Cost of small head frame, ore bin, sheave wheel, et., skip and dump	2,000.00
Erection of combination hoisthouse and shop, change room, warehouse and small office, of demountable Butler buildings	1,500.00
Compressor to be moved from Blanding	
Cost of 2 machines, (light jackhammers with air-legs), steel, parts, hoses, tools and general supplies (from Blanding largely)	2,000.00
Cost of 1 - mucking machine rental basis, 2 months @ \$200	400.00
Purchase of 2 - No. 35 sumpumps	900.00
3 - Mine cars - 14 cu. ft. capacity, rental @ \$25.00 per month, 2 months	150.00
Estimated cost of seeking, purchasing and hauling equipment to mine	<u>2,000.00</u>
	\$11,700.00

Cost of cutting 200 level station, installing pump and equipment \$ 600.00

(The equipment now stored at Elfrida, Arizona can all be used on this project, excepting the sludge box, and could be moved here with one medium sized truck load.)

Hauling from Elfrida 1½ compartments 75.00

Sinking - With a contract for labor on the sinking at \$27.50 per foot 1½ compartment, and with all supplies, power, equipment, etc., furnished by company, the estimated cost of sinking shaft @ \$75.00 per foot, for 156 ft. = 11,700.00

Drifting - With a labor contract of \$8.00 per ft. for running alternate drifts on either side of the shaft, estimated cost per ft. total @ \$20.00, for 300' = 6,000.00

Management, supervision, engineering, overhead, etc., plus expenses \$1,500 per mo., 5 months 7,500.00

Core Drilling - Core drilling may or may not be required, and if so, it should be done laterally from the 200 level

Payments - During the period in which this work is being done, payments of advance royalty must be made which will amount to 5,000.00

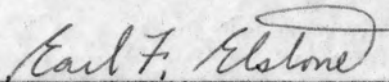
Total estimated cost of the initial project \$42,575.00

13. AVAILABILITY OF SUPPLIES AND SERVICES - It is believed that the Socorro Electric Cooperative will put in the connecting power line for the 3/4 mile necessary to service the property. Sawed timber and probably stull timber are available from the local sawmill in Magdalena. At present there is available ample labor, both unskilled and miners for \$1.25 to \$1.75 per hour. Living quarters are available in Magdalena.

14. CONCLUSIONS - Possible return from operation of this property is believed to be attractive enough to warrant an exploration

program. Furthermore, it is possible that other lead-barite properties being examined might warrant the establishment of a larger centrally located mill at Socorro, so that any ore produced from this property may be treated, whether there should be sufficient ore developed to warrant a mill of its own. It is believed that the proposed development of 156' of shaft work and 300' of drift might produce 1948 tons of material of which 75% or 1461 tons might be considered millable. In addition to this figure, the work done here should develop for mining above the 200 level 28,000 tons of which 75%, being 21,000 tons, could be considered of a minable ore grade with some profit potential.

Respectfully submitted,



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