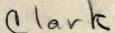
## HENDERSON AREA





Three Kids Mine Manganese, Inc. Sidney J. McCarroll, General Supt.

Mine ore bed strikes roughly easterly dipping 45° sough with a normal fault causing repetition of the ore. Thickness of the bed is about 100 feet. The ore is largely wad and is being mined by Isbel Company. The mill is designed for 1200 long tons per day. Plans are that mining can be handled on a basis of 1600 short tons per day. Drilling for blasting is largely with a rotary drill at 9 feet centers with a 4 fach hole. Powder consumption is 1/2 lb. per ton using 60% powder. The rotary drill is a Joy 255 and gives about 2 feet per minute. The drill is operated with a heavy air blast and no water. Wagon drills are used to some extent. However, they plug readily in this soft ore. Explosive loading is done with spacers so that every other foot is loaded. This gives better fragmentation. The ore varies from 15-30% manganese.

# Mill

Flotation with calcining of concentrates. Crushing is largely done with Cedar Rapids Impact crushers (hammer-mill type). This produce to ball mill and a rod mill which are in parallel. The mill feed is 95% minus 1/2" and they try to hold it at 22 1/2 - 24% manganese. It was noticed that the mill feed is largely minus each although they designate it as above. Flotation feed is 85% minus 200 mesh. Large screw type classifiers are in with the mills. However, the presence of ventenite in the ore makes them of no use except to remove scrap iron. Classifying is actually done by 5 cyclone cones. 3 cones of 12" sizes using about 30 H.P. handle about 700 tons of solids per day. The balance is handled by 2 15" cones of their own design. The company is very well satisfied with the performance of the cyclone cone classifiers.

It was pointed out that conditioning is one of the secrets of their flotation operation.

## Flotation Reagents per ton of ore

120 lbs. Missel fueldiesel fuel 63 lbs. 63% soap 8.4 lbs. 42% Oronite 8.5 lbs. liquid SO2

The above are made into an emulsion by a emulsifier which gives 20% solids or oils. In addition to the agove they also use 5-20 lbs. Nap Cox and 0.4 lbs. Quebracho. The above reagents represent a large volume per ton of ore and are an impressing sight as they are added. Reagents are usually added with pumps rather than ordinary reagent feeders. The mill is giving a recovery of 80-90%. A very modern laboratory is maintained with the mill and laboratory tests are made on all the ore at the same time it is going through the mill. They find the mill circuit can not check laboratory results, of which the later are usually better (at present, however, the laboratory results are low). The flotation concentrates are dewatered in large thickners and America filters before being calcined. The purpose of the calcining is to remove the oils and other flotation reagents, fune off about 2% lead, and nodulize. Due to the pressure of the large amount of oil the concentrates are self-calcining. The calcine product contains about 45% manganese and less than 15% Si plus Al. Their specifications call for less than 5% minus 20 mesh. The product is usually about 1/2% minus 20 mesh. Payment for this product under government c ntract is \$1.50 per unit plus 3 c per unit bonus above 45%. At present some of the product is being sold to Pioche Manganese and to WECCO. The latter uses the flotation product direct as the oils are beneficial to give a reducing condition which they desire as they wish MnO for ready disolution in HoSOA.

Personnel: Russ Waters, Asst. Supt. (?)
John Anderson, Mill Supt.
Ed Demos, Mine Supt.
George Laughton, Isbel's Supt.

#### Henderson Area

Combined Metals Manganese Visited March 9, 1953 Dick Lotridge in charge Mr. Peterman, Metallurgist

At present this plant which plans to produce ferro-manganese is obtaining no product from Caselton. In the future the calcine product from Pioche which is made from their flotation product will be shipped to Henderson in the nodulized form. At the mill they plan to up-grade from 12% manganese to about 30% MnO<sub>2</sub> plus CO<sub>3</sub>. The ore is a man gano Siderite. The calcine nodules will be about 35% manganese, and probably MnO plus FcO. Henderson will be looking for high grade manganese ore of at least 7 or 8 to 1 manganese to iron ration. However, it must be kept in mind that for proper regulation of their metallurgical steps they must have of relatively large lots of ore, say 500 ton1000 tons of high grade.

Mr. Lotridge mentioned that the Caselton plant will buy sulfide lead zinc ores but not oxides and that they prefer a carbonate to a silicate gangue.

Titanium Metals Corporation of America

Visited Monday March 19, 1953

H. G. Maiers, Plant Engineer Kirby Stoddard, Metallurgist (?)

This plant is now and will in the future be making titanium metal from titanium ores. At present their ore is Rutile concentrate of which 90% comes from Australia and 10% from Florida. In the future their source of raw material may be illemenite with as little as 40% TiO<sub>2</sub>. It must be remembered, however, that the Quebec slag will contain about 75% TiO<sub>2</sub> and the illemenite ores of the U.S. must compete against this.

of Ti. per day would mean about 100 tons of ill menite consumed per day. As the plant must logically be geared to the ore it received one must assume that it would require 6 months supply of 100 tons per day as a logical source of ore. It is unlikely that much less than this would justify the changes required in their plant as this company is having considerable difficulty producing Til now from the high grade Rutile, it can well be realized that they will be reluctant to buy small lots of ore which require continual plant changes.

Like any company they are interested in dollar values and if ores from this area can compete favorably with other ores they may be interested.

#### Henderson Area

Western Electro Chemical Co. WECCO Visited Tues., Mar. 10, 1953 Jack Gibson, Plant Superintendent Fred Gibson, Manager was out of town

This company is buying manganese ores from which they are making electrolitic manganese oxide for use in dry batteries. They are interested in manganese ores which contain at least 20% manganese, mowever, prefer 30-35%. They would prefer carbonate ore, hwoever, realize they are difficult to obtain. Their consumption is roughly 20 tons of ore; ay. As each ore requires a little different handling and actually some ores are difficult for them to treat, they prefer 40 or 50 lbs. samples of relatively large lots of ore, say a few hundred tons at least. The important part is that they wish a large sample of ore first. Jack Gibson was not sure what they paid for the ore but believed it was in the neighborhood of \$1.00 a unit per ton.