

2720 0002

HENDERSON AREA

Clark

(81)  
item 2Three Kids Mine  
Manganese, Inc.

Sidney J. McCarroll, General Supt.

Mine ore bed strikes roughly easterly dipping 45° south 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 inch hole. Powder consumption is 1/2 lb. per ton using 60% powder. The rotary drill is a Joy 235 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 1/2" although they designate it as above. Flotation feed is 85% minus 200 mesh. Large screw type classifiers are in line 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.	<del>Missal fuel</del> diesel fuel
63 lbs.	63% soap
8.4 lbs.	42% Oronite
8.5 lbs.	liquid SO <sub>2</sub>

The above are made into an emulsion by a emulsifier which gives 20% solids or oils. In addition to the above they also use 5-20 lbs. Na<sub>2</sub> CO<sub>3</sub> 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 thickeners and America filters before being calcined. The purpose of the calcining is to remove the oils and other flotation reagents, fume 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 contract 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 dissolution in H<sub>2</sub>SO<sub>4</sub>.

Personnel: Russ Waters, Asst. Supt. (?)  
John Anderson, Mill Supt.  
Ed Demos, Mine Supt.  
George Laughton, Isabel'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%  $\text{MnO}_2$  plus  $\text{CO}_3$ . The ore is a manganese Siderite. The calcine nodules will be about 35% manganese, and probably  $\text{MnO}$  plus  $\text{FeO}$ . 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 to 1000 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. Mailers, 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 ilmenite with as little as 40%  $TiO_2$ . It must be remembered, however, that the Quebec slag will contain about 75%  $TiO_2$  and the ilmenite ores of the U.S. must compete against this.

If the plant will use ilmenite some time in the future a production of 10 tons of Ti. per day would mean about 100 tons of ilmenite 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 Ti 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 electrolytic manganese oxide for use in dry batteries. They are interested in manganese ores which contain at least 20% manganese, however, prefer 30-35%. They would prefer carbonate ore, however, realize they are difficult to obtain. Their consumption is roughly 20 tons of ore per day. 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.