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04/28/87

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: DOYLE-SMITH MANGANESE

ALTERNATE NAMES:
LAST RESORT

LA PAZ COUNTY MILS NUMBER: 5

LOCATION: TOWNSHIP 10 N RANGE 14 W SECTION 36 QUARTER NE
LATITUDE: N 34DEG 10MIN 03SEC LONGITUDE: W 113DEG 40MIN 21SEC
TOPO MAP NAME: IVES PEAK - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
MANGANESE

BIBLIOGRAPHY:
AZBM FILE DATA
ADMMR DOYLE-SMITH MANGANESE FILE
USBM IC 7843, P. 70
ADMMR "U" FINE - MANGANESE KING, LAST RESORT
AZBM BULL 180, P. 219, 222
AZBM BULL 192, P 14; 1978
ADMMR PARKER CUSTOM MILL STUDY - (GEOL. FILE)

See IC 7843 p70 Black Band

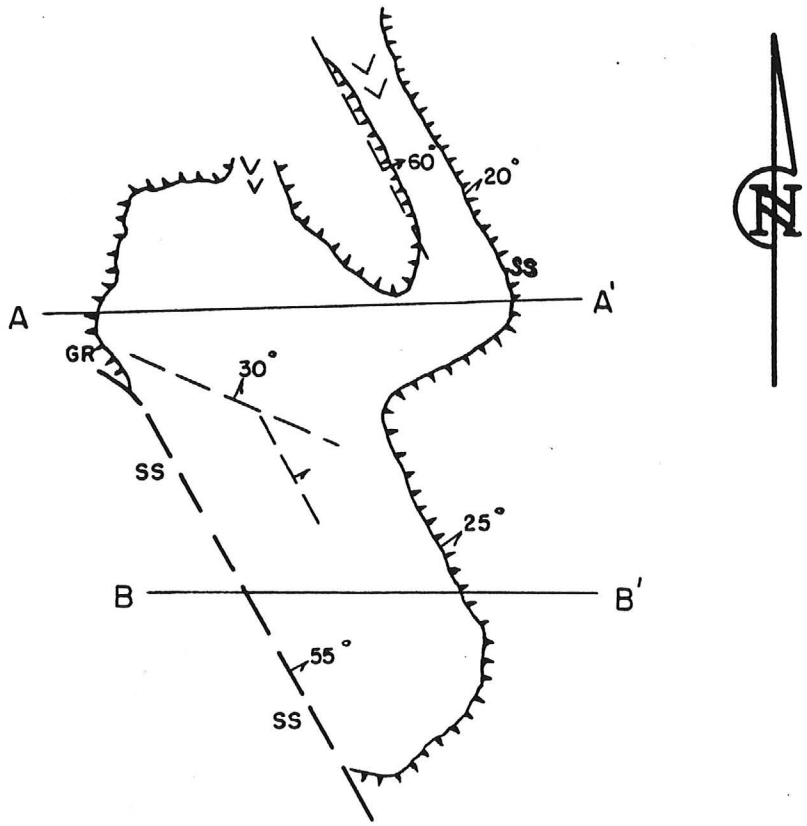
See Manganese King in "U" file.

See: Last Resort in "U" file.

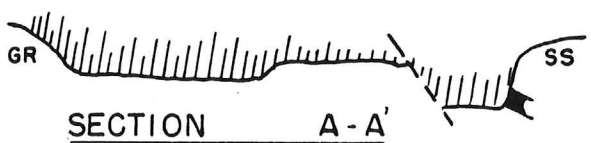
ABM Bull. 180, p. 219, 222

See Index of Mining Properties in Yuma Co.
Bulletin 192 - 1978, Pg. 114
Bureau of Geology and Mineral Technology

Parker Custom Mill Study - Manganese Ores (file)



PLAN



SECTION A-A'

SECTION B-B'

LEGEND

- FAULTS
- MINED ORE
- GR GRANITE
- SS SANDSTONES
- ORE IN PLACE

0 50 100
SCALE-FEET

FIG. 24 SKETCH MAP-PLAN & SECTION, DOYLE PIT

CONCENTRATION OF OXIDE MANGANESE ORE FROM DOYLE-SMITH CLAIMS, NORTHERN YUMA COUNTY, ARIZ.

BY A. O. IPSEN AND H. L. GIBBS

* * * * * * * * * * **Report of Investigations 4844**

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The Doyle-Smith claims are in northern Yuma County, within 15 miles of the Artillery Peak deposit. The lot of ore used in the test work was taken from the outcrop of a large, massive, irregular bed of oxide manganese ore found on the claims.

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SPECIFICATIONS FOR MANGANESE ORES

At the beginning of the investigation of manganese-ore beneficiation in December 1940, the only product marketable to Metals Reserve Company was ferrograde manganese-grade B, the requirements for which are tabulated below:

Assay, percent					
Mn min.	Fe max.	SiO_2 max.	P max.	Al_2O_3 max.	Zn max.
48.0	7.0	10.0	0.18	6.0	1.0

Later specifications were modified gradually. As of May 15, 1943, manganese products were acceptable if they contained over 35 percent manganese, less than 3 percent zinc, and less than 1 percent phosphorus. Specifications for marketable manganese further required that 75 percent of the product be coarser than 20-mesh. Therefore, fine material such as table and flotation concentrates must be nodulized or sintered.

After the close of World War II, the Metals Reserve Company ceased purchasing manganese ores and concentrates. Therefore, the specifications given, although correct at the time of the laboratory investigations, have been supplanted by specifications incorporated in the recently announced manganese ore-purchasing program administered by the General Services Administration. Briefly, the new specifications are based on oxide manganese ore or concentrates with the following maximum and minimum limits.

Grade	Assay, percent				
	Mn	Fe	$SiO_2+Al_2O_3$	P	Cu+Pb+Zn
Standard.....	48.0	6.0	11.0	0.12	-
Minimum.....	40.0	16.0	15.0	.30	1/1.0

1/ Not more than 0.25 percent Cu.

Prices are based on the standard-grade material, with premiums being paid for manganese above 48 percent and iron below 6 percent; and penalties being imposed for manganese below 48 percent and iron, silica plus alumina, and phosphorus above the given limits.

NATURE OF ORE

Physical

Manganese occurs as psilomelane, pyrolusite, and wad in a number of types of occurrences. Microscopic examination showed that the mixed manganese oxides occur (1) as cementing material in fractures in the gangue, (2) along crystallographic planes in feldspar, (3) as isolated grains replacing limestone, (4) in the micaceous material resulting from advanced decomposition of feldspar, and (5) intermixed with iron oxides associated with calcite. The psilomelane largely occurs as fillings or cementing material in fractures in the gangue. Grain size of the psilomelane was estimated to vary from 20- to 200-mesh with the greater portion occurring in the 48- to 200-mesh sizes. The pyrolusite is present as loosely consolidated and fine granular particles estimated to be chiefly minus-200-mesh in size, a form conducive to slime formation. The intermixed wad and iron oxide replacing calcite were extremely complex associations of exceedingly fine-grained minerals, the liberation of which would require grinding to slime sizes.

Chemical

The chemical analysis of the Doyle-Smith ore follows:

TABLE 1. - Chemical analysis

Assay, percent								
Mn	SiO_2	Al_2O_3	Insol.	Fe	P	CaO	Ba	MgO
16.1	40.4	9.1	57.2	2.3	0.006	3.6	1.5	0.21

Size Distribution of Manganese

A sample of Doyle-Smith ore was crushed through 1/2-inch and screened wet into sized fractions, which were then dried, weighed, and assayed. The distribution of manganese in size fractions of ore is presented in table 2.

TABLE 2. - Size distribution of manganese

Fraction	Weight, percent	Assay, percent		Distribution Mn, percent
		Mn	Insol.	
+10-mesh	40.2	12.2	65.0	30.7
-10+48 mesh	33.8	13.6	64.5	28.6
-48+100-mesh	8.5	22.8	46.0	12.1
-100+200-mesh	5.7	27.0	36.0	9.6
-200-mesh	11.8	25.8	35.6	19.0
Calculated heads	100.0	16.0	58.1	100.0

There is a decided increase in manganese grade in the minus-48-mesh sizes. This indicates that grinding to approximately 48-mesh will probably be necessary for a significant liberation of the manganese minerals.

METHODS OF CONCENTRATION

The presence of hard, clean grains of psilomelane indicated that a portion of the manganese could be concentrated by gravity methods. However, the occurrence of pyrolusite and wad as fine, soft material, often intimately associated with the gangue, indicated that flotation of finely ground ore might be necessary to recover the manganese from this portion of the ore.

The methods of concentrations studied were:

1. Combined jigging and tabling.
2. Flotation of manganese.
3. Combined tabling and flotation.

Combined Jigging and Tabling

A sample of ore was crushed through 6-mesh. The plus-20-mesh fraction was jigged. The remaining ore was screened on 48-mesh, and both fractions tabled. The slimes were collected as a separate product. Results are given in table 3.

No plus 40 percent manganese concentrates were obtained by jigging and tabling of the plus-48-mesh fractions, indicating that 48-mesh grinding is necessary for effective liberation. This confirms the results of the preliminary size distribution test shown in table 2.

TABLE 3. - Combined jigging and tabling

Product	Weight, percent	Assay, percent		Distribution Mn, percent
		Mn	Insol.	
Jig concentrate.....	18.9	17.6	57.2	21.0
-20+48-mesh table concentrate...	9.6	24.8	45.1	15.1
-48-mesh table concentrate.....	8.7	42.3	10.0	23.2
Combined middlings.....	39.2	9.4	70.5	23.4
Combined tailings.....	19.2	8.9	69.4	10.8
Slimes.....	4.4	23.2	40.2	6.5
Calculated heads.....	100.0	15.8	58.8	100.0

Flotation of Manganese

A series of flotation tests was made on the sand portion of a sample of ore crushed through 10-mesh, stage-ground to various sizes, and deslimed. The sand samples were pulped in a mechanically agitated flotation machine with Salt Lake City tap water maintained at a temperature above 18° C., and a calcite concentrate was floated and subsequently cleaned. Then successive manganese concentrates were floated using staged additions of a water emulsion of Liqro stabilized with Emulsol X-30. The pH was maintained at 10.2 during calcite flotation with sodium hydroxide in a pulp dispersed with sodium silicate. Sulfuric acid was used to maintain the pH between 6 and 6.4 when floating the manganese oxides.

Best results were obtained on deslimed minus-100-mesh ore and the metallurgical data are given in table 4.

TABLE 4. - Flotation of calcite and manganese from minus-100-mesh sand

Product	Weight, percent	Assay, percent				Distribution Mn, percent
		Mn	CaO	Insol.	SiO_2	
A. Calcite cleaner concentrate.....	6.3	14.4	29.5	15.6	9.2	6.3
B. Calcite cleaner tailing.....	5.8	31.0	2.0	31.0	20.6	12.4
C. Mn concentrate 1...	2.1	31.4	2.8	27.0	17.6	4.5
D. Mn concentrate 2...	14.8	36.6	.8	22.7	14.6	37.3
E. Mn concentrate 3...	4.0	22.6	.7	50.0	33.4	6.2
F. Slime.....	21.2	16.5	3.5	52.2	34.3	24.1
G. Rougher tailing....	45.8	2.9	.3	88.5	62.2	9.2
Calculated heads.....	100.0	14.5	3.1	60.3	41.4	100.0
Combined Mn products (B through E).....	26.7	32.9	1.2	28.9	19.0	60.4

The concentrates obtained by flotation were low grade and would sinter to only 35 percent manganese grade. The slime loss was high (24 percent), and treatment of the slime did not produce any marketable manganese. A similar test on undeslimed pulp gave lower-grade flotation concentrates and higher reagent consumption. No increase in recovery was made.

As a substantial part of the manganese occurs as cementing and filling material with the gangue, poor flotation selectivity may be attributed to the ready flotability of manganese oxide coated gangue particles, which dilute the concentrate.

Combined Tabling and Flotation

A large sample of ore was crushed to minus-10-mesh, and the crusher slimes were decanted. The minus-10-mesh sand was stage-ground to minus-48-mesh and sized into plus-100- and minus-100-mesh fractions. The minus-48-plus-100-mesh fraction was tabled to make a finished concentrate, and a tailing, which was reground through 100-mesh and added to the primary minus-100-mesh material. The combined minus-100-mesh material was sized into plus-200- and minus-200-mesh fractions. The minus-100-plus-200-mesh fraction was tabled to produce a concentrate, two middlings, and a tailing. The second middling was reground to minus-200-mesh, added to the primary minus-200-mesh material, and deslimed. The minus-200-mesh sand was tabled to make a finished concentrate and a tailing.

The minus-200-mesh sand-table tailing was pulped in a mechanically agitated flotation machine with Salt Lake City tap water and calcite, and manganese concentrates were floated using stage additions of a water emulsion of Liqro stabilized with Emulsol X-30. The calcite and manganese concentrates were cleaned separately, using small additional amounts of Liqro-X-30 emulsion. The calcite circuit was maintained at a pH of 10.2 with sodium hydroxide, using sodium silicate for dispersion. Sulfuric acid was used to maintain a pH between 6 and 6.4 during manganese roughing and cleaning operations.

The results of this test are given in table 5, and the analyses of sinters made of composites of beneficiated products are given in table 6.

Straight tabling of minus-48-mesh ore recovered 47.4 percent of the total manganese in a concentrate that, when sintered, met Metals Reserve Co. base-price specifications. Flotation of gravity tailing increased recovery to 64.3, 74.5, and 81.4 percent in products that sintered to 44.2, 39.7, and 35.2 percent manganese, respectively.

TABLE 5. - Combined tabling and flotation

Product	Weight, percent	Assay, percent				Distribution Mn, percent
		Mn	CaO	Insol.	SiO_2	
A. Table concentrate (to sinter 1).....	17.8	43.2	1.4	11.3	6.8	47.4
B. Tabling middling.....	3.7	35.0	2.6	27.0	18.4	8.0
C. Mn flotation concentrate.	4.7	30.8	.9	32.3	21.3	8.9
D. Crusher slime.....	6.0	22.8	3.0	40.8	26.8	8.4
E. Calcite flotation cleaner tailing.....	1.4	20.6	1.6	47.4	31.4	1.8
F. Secondary slime.....	15.2	14.6	3.6	57.6	36.7	13.7
G. Mn flotation cleaner tailing.....	2.6	8.5	.9	75.8	51.7	1.4
H. Calcite flotation concentrate.....	2.2	5.2	38.4	16.0	10.8	.7
I. Combined table and flotation rougher tailing...	46.4	3.4	2.5	84.7	57.2	9.7
Calculated head.....	100.0	16.2	3.5	58.0	38.6	100.0
Combined A, B, C, (to sinter 2).....	26.2	39.8	2.9	17.3	11.0	64.3
Combined A, B, C, D, E (to sinter 3).....	33.6	36.0	2.9	22.7	14.7	74.5
Combined A, B, C, D, E, and 1/2 of F (to sinter 4).....	41.2	32.0	3.0	29.2	18.8	81.4

TABLE 6. - Results of sintering

	Assay, percent						
	Mn	SiO_2	Al_2O_3	Fe	Zn	P	$SiO_2+Al_2O_3$
Sinter 1.....	48.4	7.7	3.3	4.5	0.2	0.010	11.0
Sinter 2 (calculated).....	44.2	12.2	-	-	-	-	-
Sinter 3.....	39.7	15.8	5.6	4.7	.15	.044	21.4
Sinter 4 (calculated).....	35.2	20.7	-	-	-	-	-

CONCLUSIONS

1. Owing to the large quantities of slime produced by the fine grinding necessary for manganese mineral liberation, high recoveries of plus 48 percent manganese products were not obtained by concentration of Doyle-Smith ore.

2. Tabling of minus-48-mesh ore recovered only 47.4 percent of the manganese in a concentrate that sintered to 48.4 percent manganese grade.

3. Fatty acid flotation recovered 60 percent of the manganese in a low-grade concentrate that, when sintered, assayed approximately 35 percent manganese.

4. Combined tabling and fatty acid flotation recovered 64 and 81 percent of the manganese in products that sintered to 44 and 35 percent manganese, respectively.

Int. - Bu. of Mines, Pgh., Pa.

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E. Mn concentrate 3...	4.0	22.6	.7	50.0	33.4	6.2
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Combined Mn products (B through E).....	26.7	32.9	1.2	28.9	19.0	60.4

The concentrates obtained by flotation were low grade and would sinter to only 35 percent manganese grade. The slime loss was high (24 percent), and treatment of the slime did not produce any marketable manganese. A similar test on undeslimed pulp gave lower-grade flotation concentrates and higher reagent consumption. No increase in recovery was made.

As a substantial part of the manganese occurs as cementing and filling material with the gangue, poor flotation selectivity may be attributed to the ready flotability of manganese oxide coated gangue particles, which dilute the concentrate.

Combined Tabling and Flotation

A large sample of ore was crushed to minus-10-mesh, and the crusher slimes were decanted. The minus-10-mesh sand was stage-ground to minus-48-mesh and sized into plus-100- and minus-100-mesh fractions. The minus-48-plus-100-mesh fraction was tabled to make a finished concentrate, and a tailing, which was reground through 100-mesh and added to the primary minus-100-mesh material. The combined minus-100-mesh material was sized into plus-200- and minus-200-mesh fractions. The minus-100-plus-200-mesh fraction was tabled to produce a concentrate, two middlings, and a tailing. The second middling was reground to minus-200-mesh, added to the primary minus-200-mesh material, and deslimed. The minus-200-mesh sand was tabled to make a finished concentrate and a tailing.

The minus-200-mesh sand-table tailing was pulped in a mechanically agitated flotation machine with Salt Lake City tap water and calcite, and manganese concentrates were floated using stage additions of a water emulsion of Liqro stabilized with Emulsol X-30. The calcite and manganese concentrates were cleaned separately, using small additional amounts of Liqro-X-30 emulsion. The calcite circuit was maintained at a pH of 10.2 with sodium hydroxide, using sodium silicate for dispersion. Sulfuric acid was used to maintain a pH between 6 and 6.4 during manganese roughing and cleaning operations.

The results of this test are given in table 5, and the analyses of sinters made of composites of beneficiated products are given in table 6.

Straight tabling of minus-48-mesh ore recovered 47.4 percent of the total manganese in a concentrate that, when sintered, met Metals Reserve Co. base-price specifications. Flotation of gravity tailing increased recovery to 64.3, 74.5, and 81.4 percent in products that sintered to 44.2, 39.7, and 35.2 percent manganese, respectively.

TABLE 5. - Combined tabling and flotation

Product	Weight, percent	Assay, percent				Distribution Mn, percent
		Mn	CaO	Insol.	SiO_2	
A. Table concentrate (to sinter 1).....	17.8	43.2	1.4	11.3	6.8	47.4
B. Tabling middling.....	3.7	35.0	2.6	27.0	18.4	8.0
C. Mn flotation concentrate.	4.7	30.8	.9	32.3	21.3	8.9
D. Crusher slime.....	6.0	22.8	3.0	40.8	26.8	8.4
E. Calcite flotation cleaner tailing.....	1.4	20.6	1.6	47.4	31.4	1.8
F. Secondary slime.....	15.2	14.6	3.6	57.6	36.7	13.7
G. Mn flotation cleaner tailing.....	2.6	8.5	.9	75.8	51.7	1.4
H. Calcite flotation concentrate.....	2.2	5.2	38.4	16.0	10.8	.7
I. Combined table and flotation rougher tailing...	46.4	3.4	2.5	84.7	57.2	9.7
Calculated head.....	100.0	16.2	3.5	58.0	38.6	100.0
Combined A, B, C, (to sinter 2).....	26.2	39.8	2.9	17.3	11.0	64.3
Combined A, B, C, D, E (to sinter 3).....	33.6	36.0	2.9	22.7	14.7	74.5
Combined A, B, C, D, E, and 1/2 of F (to sinter 4).....	41.2	32.0	3.0	29.2	18.8	81.4

TABLE 6. - Results of sintering

	Assay, percent						
	Mn	SiO_2	Al_2O_3	Fe	Zn	P	$SiO_2+Al_2O_3$
Sinter 1.....	48.4	7.7	3.3	4.5	0.2	0.010	11.0
Sinter 2 (calculated).....	44.2	12.2	-	-	-	-	-
Sinter 3.....	39.7	15.8	5.6	4.7	.15	.044	21.4
Sinter 4 (calculated).....	35.2	20.7	-	-	-	-	-

CONCLUSIONS

1. Owing to the large quantities of slime produced by the fine grinding necessary for manganese mineral liberation, high recoveries of plus 48 percent manganese products were not obtained by concentration of Doyle-Smith ore.

2. Tabling of minus-48-mesh ore recovered only 47.4 percent of the manganese in a concentrate that sintered to 48.4 percent manganese grade.

3. Fatty acid flotation recovered 60 percent of the manganese in a low-grade concentrate that, when sintered, assayed approximately 35 percent manganese.

4. Combined tabling and fatty acid flotation recovered 64 and 81 percent of the manganese in products that sintered to 44 and 35 percent manganese, respectively.

Int. - Bu. of Mines, Pgh., Pa.

DOYLE-SMITH MANGANESE YUMA

Went to the Doyle manganese mine in Sec. 36 T1ON R14W where there is little or no ore left except perhaps down dip where presently there is several feet of water in a 50 ft. long stope 30 ft. down dip. The ore is 6-8 feet thick in this stope and is dipping about 20° east.
GW WR 4/20/76

T10N R14W Sec. 36 NE

R14

MEMO

October 11, 1961

DASCO MILL (manganese)

Visit - Travis P. Lane

Visited the site of the former Dasco manganese mill at Wenden. Ampco Engineering Corporation, 226 S. Hinton Ave., Scottsdale, is conducting some research testing here, looking toward the direct reduction of iron from iron ore. They are using some of the equipment remaining including the sintering plant. Bob Doyle and Proctor Gamble are doing the work. The iron ore under test is shipped to them from Jim Hicks of Bouse, who owns some iron deposits in that region. Bill Kittrell is Pres. of Ampco Corporation. Associated with him are Archie Poarch and H. K. Thomas.

Testing procedure consists of mixing the fine ore (-1/4") with coke and sodium silicate and water, and pelletizing the mix. The pellets are sintered at about 1800° F.

June 15, 1962 - Visited the Dasco mill at Wenden and talked with Bob Doyle and Proctor Millikan, employees of Ampco, 226 So. Hinton Ave., Phoenix. Process research in manganese metallurgy (also iron) is continuing at the Company's Hinton Ave. test laboratory.

TRAVIS P. LANE - Weekly Report - 6-16-62

See: AMPCO CORP. (file)

DOYLE SMITH MANGANESE

DASCO PLANT

YUMA COUNTY
WENDEN, ARIZONA

Visited Dasco plant and the office of the new operators in Wenden. The new company is Arizona Ventures, Inc., Wenden, Arizona, which purchased from Dasco about 3 months ago. Kenneth Moore of La Jolla, Calif. is the principal. The project is being operated by the Arizona Metallurgical Co. composed of Ted Biddle and Chandler Drummond. The company address is Wendon, Arizona. Ted Biddle is in Charge. The plant is being rehabilitated and expects to treat ores from various plants and shippers needing to clean up stock piles before termination of the Mn progrm, particularly material requiring flotation and/or sinter treatment. They expect to be doing business sometime before the end of June. Mr. Drummond is the partner with E. L. Whipple, Jr. in Tungsten Refining Co. with plant on Henshaw road in Phoenix. Tomo Ito formerly with Sunshine Mining at Bouse is the plant metallurgist.

TRAVIS P. LANE - WR - 6/13/59

Visited the Arizona Ventures office in Wenden. The company is operating the Dasco sintering plant 2 shifts per day treating about 70 TPD and shipping out approximately 50 TPD of manganese concentrates to the Wenden stockpile (according to Bob Doyle).

TRAVIS P. LANE - WR - 7-25-59

Interviewed Bob Doyle in Wenden. He reported no progress re the Poarch manganese project although he and Proctor Millikan are still being retained by Poarch. The Dasco mill is still intact.

TRAVIS P. LANE - WR - 6-18-60

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine DOYLE MINE Date October 16, 1957

District SANTA MARIA , YUMA COUNTY Engineer Frank P. Knight

Subject:

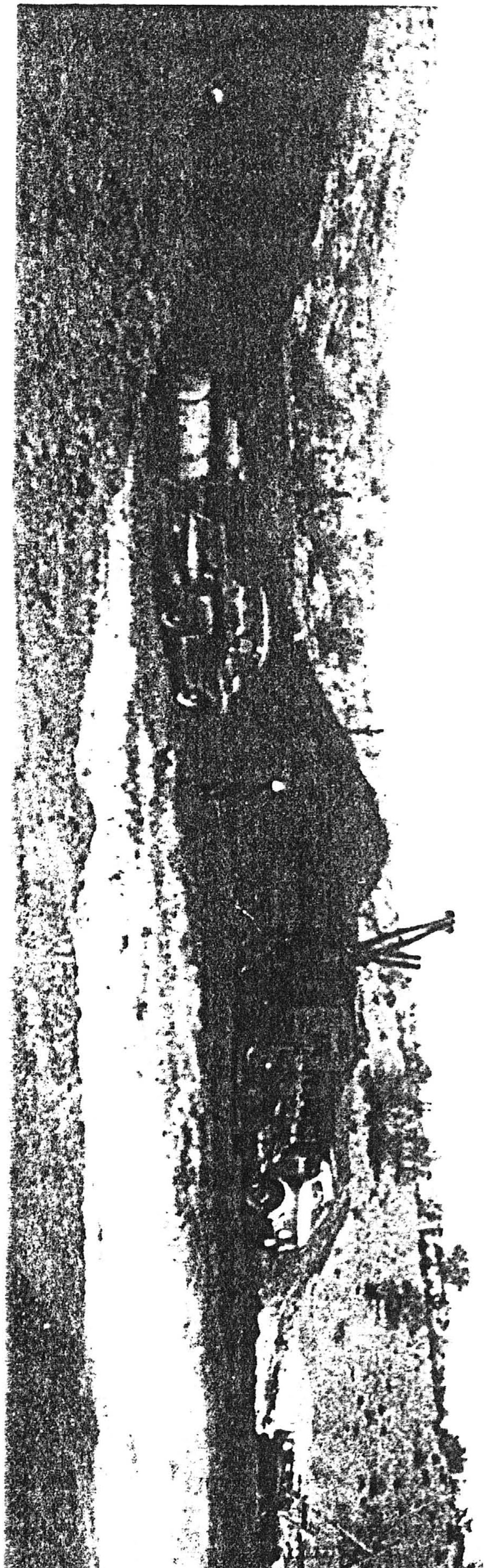
Mineral: Manganese

The Doyle Mine, Santa Maria District, Yuma County, twenty-eight miles north of Wenden.

Found three men at work stripping to get to a bed below the ore mined by Stovall. One man operating a D8 dozer and collecting some broken manganese ore for shipment to the mill besides doing some clearing for the two men drilling. Had small I-R compressor, jackhammer, pick-up truck and small idle dozer.

The exposed floor of the pit where being drilled was sandstone. Farther south, bentonite underlying the sandstone was exposed sufficiently to indicate a dip of the beds to the NE. The ore evidently is associated with favorable beds and with two parallel NE-SW fractures dipping about 65° SE and roughly 200 feet apart.

On the way back to Wenden, met truck with dozer probably going to the Doyle mine.



DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Dasco Mill

Date June 25, 1958

District Wenden, Arizona, Yuma Co.

Engineer Travis P. Lane

Subject: Plant visit

All operations were terminated for company account on June 24th. Mr. Engle stated that a deal had been consummated on that date with a Mr. Mel Rogers whereby Rogers et al purchased the mill and the Doyle mine. Mr. Rogers was in New York and therefore was not available for discussion regarding his plans. Apparently the mill will be operated primarily as a custom plant treating crude ore and concentrates requiring upgrading to a marketable product by flotation and or sintering. Also, the new owners are said to have leased one or more manganese deposits in the Artillery Peak region which will be mined for company account.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine DOYLE Mine and DASCO Mill Date JUNE 11, 1958

District - Yuma Co. Engineer T. P. LANE

Subject: Mine & Mill visit

Owner: Dasco Mining Corporation - 67 W. 2nd Street-Yuma, Arizona

The mine is located about 27 miles northwesterly from Wenden, Arizona, and the mill is located at Wenden.

Mr. Hugh Angle is manager; Leonard Beebee is Mill Supt and Robert J. Harris is metallurgis

The Doyle mine has been abandoned recently because of exhuastion of its ore body. The mill crew went on strike 2 months ago and since that time the staff has operated the sintering plant on the night shift treating accumulated flotation concentrates. It is anticipated that the project will be shut down before the 1st of July. The company does not have any other mining property and is negotiating with a mine owner group to sell or lease the mill to them.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Dasco Mill and Doyle Mine Date January 10, 1958

District Wendon, Ariz. Yuma Co. Engineer Lewis A. Smith

Subject: Mill Visit

Location: 23 miles north of Wenden along the Alamo Road.

Owner: Dasco Mines Corp. 67 W. 2nd Street, Yuma, Ariz.

The Company Officers (Recent Meeting of Directors) are:

(1) Murphy Wallis, President
(2) Charles Mull Jr. Treasurer
(3) Harrison Doyle, Secretary
(4) Hugh Engle, Supt. at Wenden
(5) Dwight Meas, Mine Foreman

Development: The mine is an open pit capable of producing 500 tons daily. Trackscavator loaders employed.

The Mill is composed of three Divisions;

(1) Crushing (Primary and Secondary)
This reduces ore to $\frac{1}{4}$ mesh.
(2) Grinding (Ball Mills)
This reduces ore to 80% thru 65 mesh.
(3) Flotation (16 cells)

The ore now averages (from the mine) 10-12% Mn. and is upgraded by flotation to 35% Mn. The daily rate, at present, varies from 200-250 tons of ore.

The Sinter plant upgrades the flotation concentrate to 43%. This sinter is sent to Dallas. Some fines, from Powers Bros. (Cibola) and Speake-Appleton (Dome Rock Area) were treated, recently. These ran 43% Mn and 52% Mn, respectively. 50 tons from Powers and 150 tons from Speake-Appleton were treated. The sintering plant treats 40-50 tons daily.

30 men are employed as follows;

Doyle Mine	5
Mill	16
Sinter Plant	9

This does not include the top supervision.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine DASCO MILL (at Wenden) (manganese)

District YUMA CO.

Date October 8, 1957

Engineer FRANK P. KNIGHT

Subject: visit to Mill

Visited 10-8-57 at quitting time. Harvey Morgan, Gen. Mgr. not there, nor was Mr. Moore, Sup't

Had made first day's run with the usual starting difficulties and produced a couple tons of concentrates for which the sintering plant was not quite ready.

Flowsheet roughly - 50 ton bin to about 14"x24" crusher to set of rolls closed with about 5/16" screen. Crushing unit powered by two natural gas engines. Minus 5/16 to about 300 ton bin. Conveyor to 4½'x5' (approx) ball mill closed with 6'x18' Dorr classifier. Discharge (about 100 mesh by the feel), to flotation unit of 18 Fagergren cells. Concentrates to Eimco 6', 3 section filter to concrete platform then by skiploader to about a 20 ton bin. Then to spiral mixer, elevator to 1 ton cart over 6 section Mace sintering unit. Sinter cake discharges to concrete pit. Sintering unit not quite completed.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine **DOYLE MINE** Date **October 16, 1957**

District **SANTA MARIA , YUMA COUNTY** Engineer **Frank P. Knight**

Subject:

Mineral: Manganese

The Doyle Mine, Santa Maria District, Yuma County, twenty-eight miles north of Wenden.

Found three men at work stripping to get to a bed below the ore mined by Stovall. One man operating a D8 dozer and collecting some broken manganese ore for shipment to the mill besides doing some clearing for the two men drilling. Had small I-R compressor, jackhammer, pick-up truck and small idle dozer.

The exposed floor of the pit where being drilled was sandstone. Farther south, bentonite underlying the sandstone was exposed sufficiently to indicate a dip of the beds to the NE. The ore evidently is associated with favorable beds and with two parallel NE-SW fractures dipping about 65° SE and roughly 200 feet apart.

On the way back to Wenden, met truck with dozer probably going to the Doyle mine.

Doyle-Smith Manganese (formerly Manganese King Group)
sec. 36, T. 10N., R. 14W.
Yuma County

reference: Arizona Dept. of Mineral Resources
Doyle-Smith Manganese Yuma County (file)

present owner: ~~R.N. Doyle P.O. Box 74, Pasadena, Ca.~~
Ampco Engineering Corp, Scottsdale (?)
very little ore left in 1976

ore body: 6-8 feet thick; dipping 20° E
Reportedly there is little or no ore left

history of the mine:
area first explored for manganese in 1940. R.N. Doyle was trying to sell the property in 1940. Mr. A.H. Vaughn and L.S. Hackney showed interest but did not buy. In 1958 the mine was abandoned because the ore body was exhausted. At this time Mr. Mel Rogers et al. purchased the mill and the Doyle mine. Until 1958 the mine was operated by Dasco Mines Corporation of which H. Doyle and R.N. Doyle were president and vice-president, respectively.
The latest work was in 1962 when the Ampco Engineering Corp, 1226 S. Hinton Ave. (Scottsdale or Phoenix) was conducting research in manganese metallergy at the mill.

1940 assay

Mn min.	Fe max.	SiO_2 max.	P max.	Al_2O_3 max.	Zn max.
48.0%	7.0%	10.0%	0.18%	6.0%	1.0%

~~Doyle Property~~ - Mangan~~ese~~ King Engineer-Mark Gemmill - Jan. 30, 1952
Al Stovall, operator. Located 26 m. north of Wenden

This was my second trip to the property. I was very pleased to find that a cut made through the deposit shows a depth of 20 ft or more with the ore continuing all across the bottom of the cut. Further stripping indicates distinct walls dipping at 50 or 60 degrees. A the point where the cut is made the ore appears to have a width of about 40 ft. normal to the dip. There is about 2000 tons of broken ore piled up from the cut excavation. I was told that various sample taken from the excavated ore average 18%. This conforms with drill hole samples taken previously. Stripping and other development work is being continued.

owner - R. N. Doyle
Box 74
Pasadena, Calif

Right Eagle Supt
Wenden, Ariz.
Nasco Mill

Cal M.J. - 10/56 - Vol 157 P 136

WESTERN MACHINERY COMAPNY

820 North 17th Ave.
P. O. Box 6472
Phoenix, Arizona

Phone ALpine 8-8531

Feb. 24, 1960

Machinery and equipment located in the Dasco Mines Mill
in the Town of Wenden, Arizona

1 - Heavy wood timber Ore Bin with Rail Grizzly - 50 lb. rail with 20 X 18 ft. spread, 8½" Spacing, 8 X 8 Timbers, lined with 3" wood.

1 - Link Belt Heavy Reciprocating Plate Feeder, 30" wide 5 ft. long pan with 1" steel in bottom, 3/4" sides, with Gearmotor and drive.

1 - 24" X 42 ft. Belt Conveyor on channel frame, late type cable troughing idlers, torque arm reducer, and 5 HP 220-440 motor on head drive.

1 - 18" X 80 ft. Belt Conveyor on channel frame, late type cable troughing idlers, torque arm reducer, 7½ HP Motor, walkway.

1 - Cedar Rapids Portable Crushing Plant on 12:00 X 20 Rubber; with 18 X 24 Crusher, Plate Feeder with Hopper, Under Conveyor, and Gasoline Power Unit.

1 - Cedar Rapids Portable Screen Plant with 24 X 16" Rolls, 3 X 8 Vibrating Screen, sand wheel, side conveyor, top conveyor, and Gasoline Power Unit on 12:00 X 20 Rubber.

1 - 22 ft. by 18 ft. hi Bolted Steel Circular Ore Bin, on heavy Timbers 6 ft. off ground, with opening in bottom and tunnel for conveyor.

1 - 15" X 44 ft. Channel Frame Belt Conveyor, head and tail drive, with Speed Reducer and small Motor.

1 - 5 ft. Dia. by 6 ft. Long Colorado Iron Works Ball Mill, with heavy self-aligning trunnion bearings, spur gear and pinion drive, scoop feeder, steel scoop box, V sheave on countershaft, and 75 HP 440 volt, Slip Ring Motor, 720 RPM; with Grids, Controller and Circuit Breaker.

1 - Lot approximately 6 tons of new 3" Grinding Balls.
1 - Lot approximately 6 tons of used 3" Grinding Balls.

1 - 8 ft. wide by 21 ft. long Dorr Duplex Rake type Classifier with hand wheel lifting device, with 15 HP 440 volt ball bearing Motor and Drive.

1 - 8" X 10 ft. Spiral Screw Conveyor with Small Gearmotor and Drive for Classifier Conveyor to Ball Mill Scoop Box.

1 - 6 Cell Fagergren Flotation Machine size 56" cells, 3 two cell units joined together, complete with 220-440 volt, 1750 RPM motors and V belts.

1 - 6 ft. 3 leaf American Disc Filter, with all vacuum equipment, with motor for filter drive, 2" Acme Roots Blower and Motor, 1½" Filtrate Pump and Motor, Moisture Trap, Vacuum Tank, 12 X 6 I.R. Vacuum Pump, with 15 HP 220-440 volt Motor and V Belt Drive.

1 - 1" Denver Vertical Sand Pump with 1½ HP Motor and Drive.

1 - 2" Denver Vertical Sand Pump with 2 HP Motor and Drive.

1 - 2" Denver Vertical Sand Pump with 3 HP Motor and Drive.

1 - 2" Denver Vertical Sand Pump with 5 HP Motor and Drive.

1 - 2" Wilfley Model K Sand Pump with overhead motor mount and 5 HP 220-440 volt Motor and V belt drive.

1 - Dorr Thickener and Steel Tank, 28 ft. dia. by 10 ft. high, with Dorr Low beam steel superstructure, with overload alarm, checkered plate walkway, with 3 HP 220-440 volt Gearmotor and Roller Chain Drive. With 4" Diaphragm Pump, with gear reducer and motor.

1 - Horizontal Cylindrical Steel Tank, 9 ft. dia. by 24'-7" long, about 3/16" metal, used for fuel tank or storage tank.

1 - 36" dia. by 10 ft. long Horizontal Light Weight Fuel Tank.

1 - 36" dia. by 12 ft. long Horizontal Light Weight Fuel Tank.

1 - Clarkson Model E Gearmotor driven Reagent Feeder.

1 - Small Steel Hopper 8 ft. wide by 4 ft. by 6 ft. high tapered down to one side with opening for gate on side at bottom.

1 - Wood Mill Building approximately 36 ft. wide by 110 ft. long, about 18 ft. to eaves, wood trusses, covered with galvanized corrugated iron.

1 - 1¼" Rotary Pump direct connected to 1 HP 220-440 volt, 1750 RPM Motor.

Write or phone our Phoenix Office for Prices and Information.

WESTERN MACHINERY COMPANY
820 North 17th Ave.
PHOENIX, ARIZONA

Phone ALpine 8-8531

P. O. Box 6472

April 19, 1943

Mr. Robert N. Doyle
P. O. Box 94
Pasadena, California

Dear Mr. Doyle:

Thank you for your letter of April 15.

I note that you have rewritten the agreements on the Doyle-Smith Manganese (formerly the Manganese King Group) and have forwarded copies to Mr. Harry M. Osborne.

I am expecting work shortly as to the progress being made on the plans and know that you will be kept advised.

With best wishes and kindest personal regards, I am

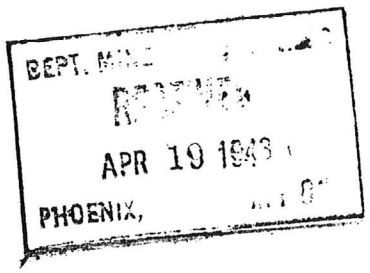
Very truly yours,

J. S. Coupal, Director

JSC:kk

Robert N. Doyle
AND ASSOCIATES
ORES AND MINERALS
P.O. BOX 74
PASADENA, CALIFORNIA

April 17,1943



Mr J.S.Coupal
413 Home Builders Bldg.
Phoenix,Arizona.

Dear Mr Coupal:

Yours of April 14th received with the two copies of the option to Harry M.Osborne of Parker.

I have taken the liberty of rewriting them and have forwarded them to Mr Osborne at Parker.

As there is another property in Arizona called the Manganese King Group we have called our claims the Doyle-Smith Manganese property. I have also changed the royalty percent to 10%. You had it from 7½ to 10%.

I trust the above is satisfactory, and that everything is working out to your satisfaction.

With my best regards to you,I remain,

Yours Sincerely,
Robert N. Doyle

Robert N. Doyle

September 15, 1941

Mr. R. N. Doyle
Box 74
Pasadena, California

Dear Mr. Doyle:

L. S. Hackney, 132 North Kenmore Avenue, Los Angeles, California, has expressed an interest in your Manganese King Mine and we have sent him your name and address. You will no doubt hear from him.

If you do make a contact with him that results in business done, we would appreciate your advice for the records of the department.

Hoping that you will hear from him further, I am

Yours very truly,

Chairman, Board of Governors
Arizona Department of Mineral Resources

CFW:LP

14 August 1940

Mr. Robert N. Doyle,
P. O. Box 74,
Pasadena, California.

Dear Mr. Doyle:

I thank you for your letter of August 12 in which you advise of the option to purchase of your manganese claims in Yuma County by Mr. A. H.Vaughn of Phoenix, Arizona.

I am making a notation on your Report of this option, and should you wish to list it with us again at a later date, I shall be glad to have you write me.

I am glad you were able to make a deal on the Manganese King, and appreciate your kind expressions regarding the department.

With best wishes, I am

Yours very truly,

J. S. Coupal
Director

JSC-jrf

3 July 1940

Mr. R. N. Doyle,
P. O. Box 74,
Pasadena, California.

Dear Mr.Doyle:

Replying to your letter of June 21, I am enclosing herewith a blank Mine Owners Report, which I should suggest that you fill out in detail and return so that information may be available concerning your manganese property.

Upon receipt of this report, I shall submit it to inquirers for manganese properties.

Yours very truly,

J. S. Coupal
Director

JSC-jrf
encls.

P. O. Box 74,
Pasadena, California,
June 21, 1940.

Mr. J. S. Coupal,
Director, Dept. Mineral Resources,
Capitol Building,
Phoenix, Arizona.

Dear Mr. Coupal:

We would like to list, for sale or lease, our manganese property situated in Sec. 36, Township 10 N., Range 14 W.

We have two main deposits of manganese dioxide averaging around 30% manganese metal content. Both ledges average 25 feet in thickness and are exposed at surface better than 700 feet. They are of disseminated type, easily subject to flotation and sintering, and have been tested favorably for this type of reduction by the Bureau of Mines under the Strategic Minerals Survey. They are close to water ample for any size mill; are easily accessible over average desert roads, thirty miles from highway and railroad. Mining costs should be nominal inasmuch as both ledges are power shovel propositions. We estimate, due to difference of relief in the exposed outcrops, that there are in sight 200,000 tons of good grade milling ore that should concentrate about two to one to make a high grade steel concentrate.

We would consider any proposition that will help finance or place this property in production, either by ourselves or on a royalty per ton basis. The properties are about three miles south of the Bill Williams River from near the Townsend Mill, thirty miles northeast of Bouse.

Please address all communications to me at P. O. Box 74, Pasadena, California, and to those interested I will send a complete report covering the property.

Very truly yours,
R. N. Doyle.
(R. N. Doyle)

RND:RH

June 17, 1940

Mr. R. N. Doyle,
P. O. Box 74,
Pasadena, California.

Dear Mr. Doyle:

I have your letter of June 10 and wish to advise that it is the Department of Mineral Resources and not the Arizona Small Mine Operators Association which lists property for sale or lease. It is likewise the State Department that receives inquiries for properties.

The work of putting buyers and sellers of mining property in contact with each other is being done by the Arizona Department of Mineral Resources, W. S. Coupal, Director, Capitol Building, Phoenix, Arizona, and I am referring your letter to the department. They will communicate with you to see of what assistance they can be, and it might interest you to know that the department has been very successful in its work of bringing buyers and sellers together.

Yours very truly,

CHARLES F. WILLIS, State Secretary
Arizona Small Mine Operators Association

CFW:MH

P. O. Box 74,
Pasadena, California,
June 10, 1940.

Mr. Charles F. Willis,
State Secy., Arizona Small Mine Operators Assn.,
Title & Trust Building,
Phoenix, Arizona.

Dear Sir:

Will you kindly list, for sale or lease, our manganese property situated in Sec. 36, Township 10 N., Range 14 W.

We have two main deposits of manganese dioxide averaging around 30% manganese metal content. Both ledges average 25 feet in thickness and are exposed at surface better than 700 feet. They are of disseminated type, easily subject to flotation and sintering, and have been tested favorably for this type of reduction by the Bureau of Mines under the Strategic Minerals Survey. They are close to water ample for any size mill; are easily accessible over average desert roads, thirty miles from highway and railroad. Mining costs should be nominal inasmuch as both ledges are power shovel propositions. We estimate, due to difference of relief in the exposed outcrops, that there are in sight 200,000 tons of good grade milling ore that should concentrate about two to one to make a high grade steel concentrate.

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Please address all communications to me at P. O. Box 74, Pasadena, California, and to those interested I will send a complete report covering the property.

Very truly yours,

R. N. Doyle.

(R. N. Doyle)

Pasadena,California
August 12,1940
P.O.Box 74.

Arizona Dept. of Mineral Resources.
Mr J.S.Coupal, Director.
Phoenix,Arizona.

Dear Sir:

This is to advise your office that myself and associates have given Mr A.H.Vaughn of Phoenix an option to purchase our Manganese claims in Yuma,County.

This option was made through Mr James Townsend who has a mill and other mining property near ours.

As the Manganese property was listed in your office on a form sent out by the department to me, I thought you would like to be advised of its (temporary at least) withdrawal from the market.

The Department of Mineral Resources is doing a marvelous job for the small mine owner so more power to you and associates in the department. Keep up the good work.

sincerely yours
Robert M. Doyle
Robert M. Doyle

POBox 74, Pasadena, Calif.,
July 7th, 1940,

Mr. J. S. Coupal, Director,
Department of Mineral Resources,
State of Arizona,
Phoenix, Arizona,

Dear sir:

In accordance with your letter of July 3, I am enclosing the Mine Owner's Report covering our manganese properties in northern Yuma County.

Very truly yours,

R. N. Doyle

(R. N. Doyle).

July 14, 1958

DASCO PLANT, Wenden, Ariz.

M. E. Roger has taken over. Details of organization and plans not yet available. He intends to operate the ROAD'S END MINE (40 Min. N of Ehrenberg) for main supply of Mn ore.

T. P. LANE

DASCO MINES CORP.
67 West Sedond Street
Yuma, Arizona

1957
FPK

Harrison Doyle, President
Alfred Morgan, Mgr.

Mines: Doyle Vanadium (file)
Little Giamt (file)
Doyle-Butler, Cu,Au,Bouse
Doyle Mine,Mn (See-Doyle-Smith Mn.)(file)
Black Band, Wenden
Little Cindy Group,Uranium,Mohave Co.

Mill at Wenden-Enlarging Mill-Double (8-1957)
Flotation -200 to 250 tons addition.

See:"MILLS-NORTHERN DIST." (file)
(In Geology file)

R. I. 4844

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
MINE OWNER'S REPORT

Date July 7, 1940.

1. Mine Manganese King. X

2. Location Sec.36,Tsl0N,R14W Gila & Salt R. Meridian. 33 miles NE Bouse, 3 miles south Bill Williams River near Townsend's Mill.

3. Mining District & County
Santa Maria-- Yuma County.

4. Former name

5. Owner R.N.Doyle, Harrison Doyle & L.V.Smith.

6. Address (Owner) POBox 74,Pasadena, Calif.

7. Operator
Same.

8. Address (Operator) Same.

9. President, Owning Co.

9A. President, Operating Co.

10. Gen. Mgr.

14. Principal Minerals Manganese dioxide.

11. Mine Supt.

15. Production Rate

12. Mill Supt.

16. Mill: Type & Cap.

13. Men Employed

17. Power: Amt. & Type

18. Operations: Present

Assessment work-cuts--trenches for sampling--exploration.

19. Operations: Planned

20. Number Claims, Title, etc.

Three claims, two millsites.

21. Description: Topography & Geography The claims lie in medium rough country and cut by desert washes. Mang.King claim lies along side of desert wash exposing parts of the 70 degree ledge as much as 50 ft to top of outcrop. Resort claim lies fairly flat in out of detrital mesa cross-section cut by wash on three sides. Elevation about eight hundred feet. Power shovel job. Both claims a little over three miles from the Bill Williams River in Sec.36 Tsl0,R14W Gila & Salt River Meridian.

22. Mine Workings: Amt. & Condition

Location Work, assessment work, cuts,trenches, etc.

Difference in relief and erosion have exposed the outcrops deeply in several places and all estimates in this report have been based only on what is exposed. There is in all probability much more ore below ground.

(over)

23. Geology & Mineralization Type of mineralization is not known. Evidently sedimentary. Lies on younger series red sandstones like some of Artillery Peak deposits some tem miles distant. Shows brecciated quartz & chlorite fragments included and some sandstone, as tho there had been a later replacement of conglomerates with the manganese dioxide. Seams of higrade are larger with increased size of the included fragments. Overall average of Manganese metal runs over 25% thruout.

24. Ore: Positive & Probable, Ore Dumps, Tailings Manganese King shows ledge outcropping above wash bottom some seventy feet; is twenty ft thick, and 500 ft long. At 10 cu ft per ton this shows 70,000 tons of milling ore in sight. Resort claim has same thickness, is roughly triangular 300ft on N end 100ft on S end, 600 ft long, about 150,000 tons of milling ore in sight blocked out by nature. Power shovel proposition, easy to get out. Good camp site near by. Road making easy over desert drifts about a mile and a half.

24A. Dimensions and Value of Ore body

On the two claims there is probably 200,000 tons of milling ore that will mill two to one to a 52% concentrate. 48% ore has sold lately to the Procurement Div. of the Treasury for as high as 90cents a unit, or $43.20 per ton. During the 1st world war manganese ore sold as high as $65.00 per ton. If we rated the milling ore in sight at $10.00 a ton, there is $2,000,000.00 in sight.

25. Mine, Mill Equipment & Flow-Sheet

The Bureau of Mines has furnished us a Flow sheet from a test run of the ore at Rolla, Mo., for flotation treatment. They made a 52% concentrate and stated that we had a good grade of commercial ore.

26. Road Conditions, Route The claims are situated approximately 33 miles N.east of the town of Bouse, and three miles south of the Bill Williams River from near Townsend's Mill. They are on the old road to Wenden, the last half mile of which is washed out now, and which will take a couple of days work to repair before cars can get thru to the Manganese King claim. The Resort claim is approximately a half mile from the MK claim over about half of which a road must be scraped. Our Engineer estimates that it will take two men a week to build this section of road suitable for trucks to use.

27. Water Supply

There are two mill sites about a mile from the Bill Williams River in the Flats. Wells have never been known to go dry in these flats which are above a natural cofferdam in the river. There is a basin in the flats about two miles square upon which water can be found at any point, and at any month in the year

28. Brief History

29. Special Problems, Reports Filed

30. Remarks

The shipping point would be at the RR and highway at Bouse. The road in to the property from Bouse is in good shape, mostly over rolling desert drifts, and has no appreciable grades. The first 14 miles out of Bouse is over the Swansea road to near the new power line. From that point on, the road has been scraped by the County, and there are no high centers or dangerous spots.

31. If property for sale: Price, terms and address to negotiate. We offer the properties either singly or separately on a 5% gross, sales price can be paid out of this 5% gross. We require a down payment of $1,000 on each, or $2,000 on the two. Price of Manganese King Claim, $20,000. Price of Resort Claim $30,000. Millsites included. or,

We will consider a partnership with or percentage deal with parties financially able to erect a 100 ton flotation mill and sintering kiln, or who can operate successfully on a large scale.

32. Signature..... R. N. Doyle

(R.N.Doyle) POBox 74, Pasadena, Calif.

33. Use additional sheets if necessary.