UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

August 27, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report, DMA Docket 289, U. S. Manganese Corporation, Manganese Deposits, Pima, Pinal and Maricopa Counties, Ariz.

Attached hereto is the final report by the examining team on the subject docket, recommending denial of the application for a $50,000 development loan.

We concur with their recommendation of denial.

W. H. King

W. H. King
for Paul T. Allsman

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Arizona-New Mexico Branch
[redacted]
Box 4097
UNIVERSITY STATION

MINING DIVISION
REGION IV

TUCSON, ARIZONA

August 9, 1951

Memorandum

To : Paul T. Allsman, Denver, Colorado

From : Chief, Arizona-New Mexico Br., Mining Div., Region IV

Subject : Final Report, DMA Docket 289, U. S. Manganese Corp.'s Manganese Project, Pima, Pinal and Maricopa Counties, Ariz.

Enclosed are original and 7 copies of the section on Summary, Conclusions and Recommendations by Morris J. Elsing and Grant R. Rubly of the Bureau of Mines and Calvin S. Bromfield of the Geological Survey, for the above report; also the section on Engineering by Elsing and Rubly.

This report has my approval.

The brochure for this docket is enclosed,

Walter R. Storms

Walter R. Storms

CC P. T. Allsman (7)
C. A. Anderson
DMA 289
DF

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Defense Minerals Administration
200 New Customhouse
Denver 2, Colorado

August 21, 1951

Memorandum

To: DMA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 289, U. S. Manganese Corporation, Pima, Pinal, and Maricopa Counties, Arizona

Enclosed are the original and 7 copies of the geologic report by C. S. Bromfield of the U. S. Geological Survey covering the above docket.

A. H. Koschmann
A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (8)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P.O.Box 4126, University Station
Tucson, Arizona

August 15, 1951

Memorandum

To: Mr. A. H. Koschmann, Denver, Colorado

From: Mr. A. F. Shride, Tucson, Arizona

Subject: Geologic Report, DMA 289, U. S. Manganese Corporation, Pima, Pinal, and Maricopa Counties, Arizona

Enclosed are the original and 7 copies of the above report by C. S. Bromfield of the Geological Survey. This report and the conclusions and recommendations of this report and the combined report by Rubly, Elsing, and Bromfield have my approval.

It should be noted that the recommendations regarding an exploration project differ slightly in the Engineering Report and in the Geologic Report. In the Engineering Report it is stated that "It is believed that if, - - -, Brock is willing to apply for an exploration loan, consideration should be given his application." As I understand the authors' intent, this statement does not necessarily imply that an exploration application will be favorably received. The Geologic Report, in contrast, states that an exploration program would not likely succeed in outlining 12,500 tons of manganese ore of Government specification grade. Therefore, Bromfield would not be able to recommend an exploration program that has the objective of proving sufficient ore, from only the three subject properties, to fill the applicant's contract with the General Services Administration.

A. F. Shride

A. F. Shride
Acting District Supervisor
Arizona-New Mexico

Enclosures 8

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Minerals Development Branch
Denver

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMA-289, U. S. Manganese Corp.'s Manganese Project

Pima, Pinal and Maricopa Counties, Arizona

Morris J. Elsing, Consulting Mining Engineer
U. S. Bureau of Mines

Grant R. Rubly, Mining Engineer
U. S. Bureau of Mines

Calvin S. Bromfield, Geologist
U. S. Geological Survey

August 1951

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By Morris J. Elsing[1], Grant R. Rubly[2], and Calvin S. Bromfield[3]

The U. S. Manganese Corp., through its president, C. C. Brock, made application through the Defense Mineral Administration for a Government loan of $50,000 against a new General Services Administration contract for 10,000 tons of manganese concentrates. This requested loan was denied by Defense Minerals Administration on March 19, 1951. Some doubt developed as to the merits of a flat rejection of the proposal so the docket was reopened and referred to the Field Team, Region IV, for further investigation.

In the course of the investigation the applicant withdrew some of the properties listed in the docket and requested investigation of others in a different part of the state. All properties of the applicant have been investigated and reported upon on more than one occasion by Government engineers and geologists. In 1940-41 G. A. Apell made a comprehensive report on the Aguila Manganese District.[4] The work included making mine and topographic maps, sinking pits and cutting trenches. Samples were taken. Widths of veins and their assay values were recorded. Similar reports have been made on the Manganese King. Information contained in these reports is valid today.

1/ Consulting Mining Engineer, U. S. Bureau of Mines, Region IV
2/ Mining Engineer, U. S. Bureau of Mines, Region IV
3/ Geologist, U. S. Geological Survey
4/ Apell, G. A. Final Report on the Aguila, Arizona Manganese District, Strategic Minerals Project Number 314, Bur. of Mines, 1941.

The Aguila manganese deposits occur in veins and shear zones in andesite. Veins generally are not continuous and ore occurs in shoots of limited extent. All the ore requires concentration to make a product meeting commercial specifications.

The main Valley View vein has been sampled on the surface over a length of 1,080 feet. Approximately 500 feet of this vein averages 2.25 feet in width. The average grade is 20.7 percent manganese. It is possible that this section of the vein might produce some 4,000 tons of 20 percent ore. The direct operating costs of producing manganese from this mine will be more than $2.00 per unit of manganese which is the maximum payment allowed by General Services Administration as of July 25, 1951.

There are other less prominent veins on the Valley View property and there are 10 or more veins of similar character on the applicant's Sambo Aguila property. There is no question that these properties are potential producers of manganese but definitely not at the present price of $2.00 per unit of manganese.

At the Manganese King mine in Pima County the ore occurs as veins in cherty limestone dipping 35° to 45°. Rich pockets of ore occur, but in general concentration is required to make a saleable product. The grade of the ore is higher and the vein is wider than at the Valley View and Sambo Aguila. Even with these more favorable factors the property cannot be operated at a profit at the present price of manganese.

Since the ore reserves on the applicant's properties are small and since production cannot be made at a profit even under the prices to be paid by General Services Administration as announced July 25, 1951, it is recommended that the development loan for $50,000 be denied.

U. S. MANGANESE CORP.'S MANGANESE PROJECT
PIMA, PINAL, AND MARICOPA COUNTIES, ARIZONA
DMA 289

Geology and Ore Reserves

By Calvin S. Bromfield
Geologist, U. S. Geological Survey

U. S. MANGANESE CORP.'S MANGANESE PROJECT
PIMA, PINAL, AND MARICOPA COUNTIES, ARIZONA
DMA 289

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Fig. 1	Location of Manganese Mines	(See Engineering Report)
Fig. 2	Location Map of Manganese King Mine	" " "
Fig. 3	Location Map of Aguila Manganese Claims	" " "

INTRODUCTION

C. D. Brock, the applicant, is interested in three separate manganese properties in regard to his request for a Government loan. These three properties will be discussed separately as each is in a different geologic setting. These properties are the Manganese King Mine in the Cimarron Mountains, Pima County, Arizona, and the Valley View and Sambo Aguila properties in the Big Horn Mountains, Maricopa County, Arizona (Fig. 1).

Detailed reports are available on each of these properties and this report will necessarily be an abstract and review of these data together with certain modifications as seem indicated in the light of the new field examination. Where this writer's opinions differ from those expressed in previous reports, the reasons for the difference will be outlined.

Reports from which information was obtained are as follows:

Crittenden, M. W., Manganese King Mine, Memorandum Report, U. S. Geol. Survey, March 1, 1943.

Price, J. M., Manganese King Mine, War Minerals Report, U. S. Bureau of Mines, May 1943.

Chapman, T. L., Prieta Chinda (Valley View), War Minerals Report, U. S. Bureau of Mines, Feb. 1944.

Johnson, C. H., Preliminary Report on a Strategic Minerals Project in Aguila, Arizona Manganese District, U. S. Bureau of Mines, Sept. 1940.

Apell, G. A., Final Report on the Aguila, Arizona Manganese District, Strategic Minerals Project 314, U. S. Bureau of Mines, May 1941.

East, J. H., Jr., Preliminary Report on the Sambo-Aguila Manganese Prospect, Aguila, Arizona, Maricopa County, U. S. Bureau of Mines, Jan. 1942.

MANGANESE KING MINE

General Geology

The Manganese King Mine is located in the eastern foothills of the Cimarron Mountains (Fig. 2) on the north side of an easterly trending wash. The Cimarron Mountains are composed largely of granite and volcanics, but in the immediate area of the Manganese King Mine limestone of Paleozoic age predominates. On the southside of the wash limestone occurs overlying massive pink to red stained quartzite which resembles the Troy quartzite of south-central Arizona.

Ore Deposits

Manganese oxides occur in a fault zone striking N. 65° W. and dipping 35° to 45° NE. The vein is roughly parallel to the strike and dip of the thin bedded cherty gray limestone in which it occurs.

The vein has been mined for a length of 120 feet along the strike and 75 feet on the dip. Thickness varies up to 10 feet and averages 5 or 6 feet.

Ore minerals include coarsely crystalline manganite, probably primary, deposited in fractures in limestone. Secondary oxides, psilomelane and wad are also present.

There appears to be less secondary enrichment at 75 feet than at the surface, but previous investigators estimate that a depth of 100 feet may be reached in mining.

Ore Reserves

In 1943 Crittenden[1] estimated the reserves of the Manganese King as follows:

Indicated ore	500 tons
Inferred ore	2000 tons

These figures represent mine run ore averaging 30-35 percent manganese. The grade is based on trench samples by the owner.

This estimate of the potentialities of the Manganese King Mine seems reasonable.

AGUILA DISTRICT

The Valley View and Sambo Aguila properties lie at the northern end of the Big Horn Mountains and are included in the Aguila district (Fig. 3). The Big Horn Mountains are composed of granite, gneiss, and schist overlain in places by Tertiary lavas. The Sambo Aguila and Valley View properties are both situated in the lavas.

Within the Aguila district known manganese ore shoots are small. The largest tonnage from one ore shoot came from the Black Queen mine and its dimensions were 50 feet in length, 20 feet in height, and 8 feet in width. The main vein on the Valley View claims was the longest observed, being traceable for about 1000 feet but having an average width of only 1.5 feet. The average thickness of productive veins for the district is not over two feet. Mining has not been carried deeper than 50 feet anywhere in the district.

VALLEY VIEW CLAIMS

General Geology

The manganese veins on the Valley View claims are in a red biotite andesite composing a northerly trending ridge which rises

1/ Op. cit., p. 3.

several hundred feet above the valley floor. In general the veins strike northwesterly across the ridge and dip from 60° - 70° southwest.

Ore Deposits

The ore is composed of manganite, pyrolusite, and psilomelane. These occur as veins and veinlets occupying faults and shear zones. The vein filling is composed of manganese oxides filling interstices in andesite breccia. Calcite is quite common.

Workings are confined to shallow pits and open cuts along the veins. On the west side of the ridge one vein has been mined for a length of 100 feet, a depth of 10-20 feet, and a width of 2 to 3 feet. On the east side of the ridge a pit on the main Valley View vein is 35 feet long, 15 feet deep, and about 3 feet wide. The vein is traceable from this point for 500 feet to the crest of the ridge, and thence for another 500 feet. An exploration project of the U. S. Bureau of Mines showed the vein to have in this length an average width of 1.56 feet and to assay 17.9 percent manganese.

Ore Reserves

G. A. Apell in a report[2/] for the U. S. Bureau of Mines has estimated the reserves of the Valley View claims as follows:

Probable ore	12,350 tons
Possible ore	31,200 tons

These figures appear to be much too optimistic to the examining team. Apell's calculations are as follows (see fig. 4):

"Probable ore would be a right prism of rectangular base and triangular sides; the base dimensions being 1.56 x 500 feet.

2/ Op. cit., p. 12.

The altitude of the triangular sides is 180 feet after allowance has been made for ore removed. From these dimensions there are 12,350 tons of probable ore containing 17.91% manganese."

"Possible ore extends 200 feet in depth below probable ore. The dimension of this block would be 1.56 x 200 x 1000 (the mean length) having an assay value the same as probable ore. This gives 31,200 tons of possible ore."

There are several grounds for disagreement with these figures. Apell has considered the entire length of the traceable vein as being in the legitimate province of probable and possible ore. This does not seem valid because of two reasons: first, the vein has an average width of only 1.56 feet and an average grade of only 17.9 percent manganese. Therefore, while there are minable widths and grades in a part of the vein, much of it is too narrow and too low grade to be ore under present economic conditions; second, he has projected the probable ore to a maximum depth of 180 feet, and the possible ore an additional 200 feet. The reasons for this projection are not given in the report. Mining has nowhere in the district gone below 30 to 50 feet. This type of deposit usually becomes lean at quite shallow depths, and for this district 50 to 75 feet would be a reasonable figure.

Within 50 to 75 feet of the surface not more than 3500 to 4500 tons of ore can be inferred in the Valley View vein. Another 1000 tons might be reasonably inferred on minor parallel veins.

SAMBO AGUILA CLAIMS

General Geology

The rocks in the vicinity of the Sambo Aguila claims consist of bedded lavas and tuff. Veins occur in the lava and at the

contact of the tuff and lava. There are ten or more veins which strike northerly to northwesterly and dip at low angle to the southwest. In thickness they range from a few inches up to several feet; in one exposure a maximum thickness of 7 feet was observed.

Ore minerals are pyrolusite, manganite, and some psilomelane. An impure calcite is quite abundant in the gangue.

None of the veins has been developed extensively and a few shallow cuts are all that are present. These cuts seem to indicate little lateral extent for the ore sheets and one shallow incline cut was nearly barren 25 feet down-dip from the outcrop. The ore sheets are apparently lenticular in shape and the veins are relatively weak.

Ore Reserves

Little work has been done in outlining the extent laterally or vertically of any of the veins on the Sambo Aguila group. As a result it is difficult to make a satisfactory estimate of reserves. To aid in judging the project it is inferred that 500 tons may be available. Further exploration by stripping and trenching would have a good chance of developing a few thousand additional tons of ore. There is no reason to expect average widths or grades of any new veins to depart from the norm for the district.

SUMMARY OF THE U. S. MANGANESE CORPORATION RESERVES

	Indicated	Inferred
Manganese King	500 tons	2000 tons
Valley View	200 "	3500-4500 "
Sambo Aguila		500 "
Total reserves	700 "	6000-7000 "

Of the total reserves listed above only 700 tons are indicated. The amount of measured ore on these properties is insignificant. These reserves are insufficient to repay the loan the applicant desires.

CONCLUSIONS

An exploration loan having as its object the proving of sufficient reserves to fulfill the applicant's proposed contracts with the General Services Administration for 12,500 tons of manganese ore could not be recommended. Exploration is not likely to substantially increase the reserve figures as given.

Exploration on the Sambo Aguila claim would undoubtedly extend known ore shoots and discover new ones, but judging from the similarities in type with other properties in the district, probably only a few thousand tons could be added to the total reserves.

Exploration on the Valley View and Manganese King Mine probably would result merely in transferring inferred tonnage into the indicated or measured category.

The writer believes therefore that while an exploration program might increase the reserves by a few thousand tons, these three properties alone will not provide 12,500 tons of manganese ore at Government specifications.

U. S. MANGANESE CORP.'S MANGANESE PROJECT
PIMA, PINAL AND MARICOPA COUNTIES, ARIZONA
BMA-289

Engineering Report

By Morris J. Elsing, Consulting Mining Engineer
U. S. Bureau of Mines

Grant R. Rubly
Mining Engineer
U. S. Bureau of Mines

August 1951

U. S. MANGANESE CORP.'S MANGANESE PROJECT
PIMA, PINAL AND MARICOPA COUNTIES, ARIZONA
DMA-289

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INTRODUCTION

The U. S. Manganese Corp., through its president, C. D. Brock, some time ago apparently wrote Philip R. Bradley, Jr., Chief, Manganese Branch, Defense Minerals Administration, requesting a Government loan of $50,000. Brock offered 10,000 tons of ore to the General Services Administration to cover this loan. Although much of the needed information is not available to the field team, a letter dated May 21, 1951 and signed by P. R. Bradley, states that the application was denied on March 19, 1951. This rejection presumably was based on reports available through the U. S. Bureau of Mines and the Geological Survey. Although examinations were made 6 to 8 years ago, the information is still valid as the properties have been idle and no new work has been done.

The need for manganese is so great that it was decided to reconsider the loan application. Instructions were issued to the field team to examine the properties to check on the reported ore reserves. It was suggested that the field engineers discuss with the applicant other approaches to his problem, such as his willingness to undertake an exploration program.

Brock's original application included 4 mines near Winkelman and the Manganese King mine in Pima County, all in Arizona (see fig.1). The reported tonnage and grade of the ore in these mines as shown in the application are tabulated below:

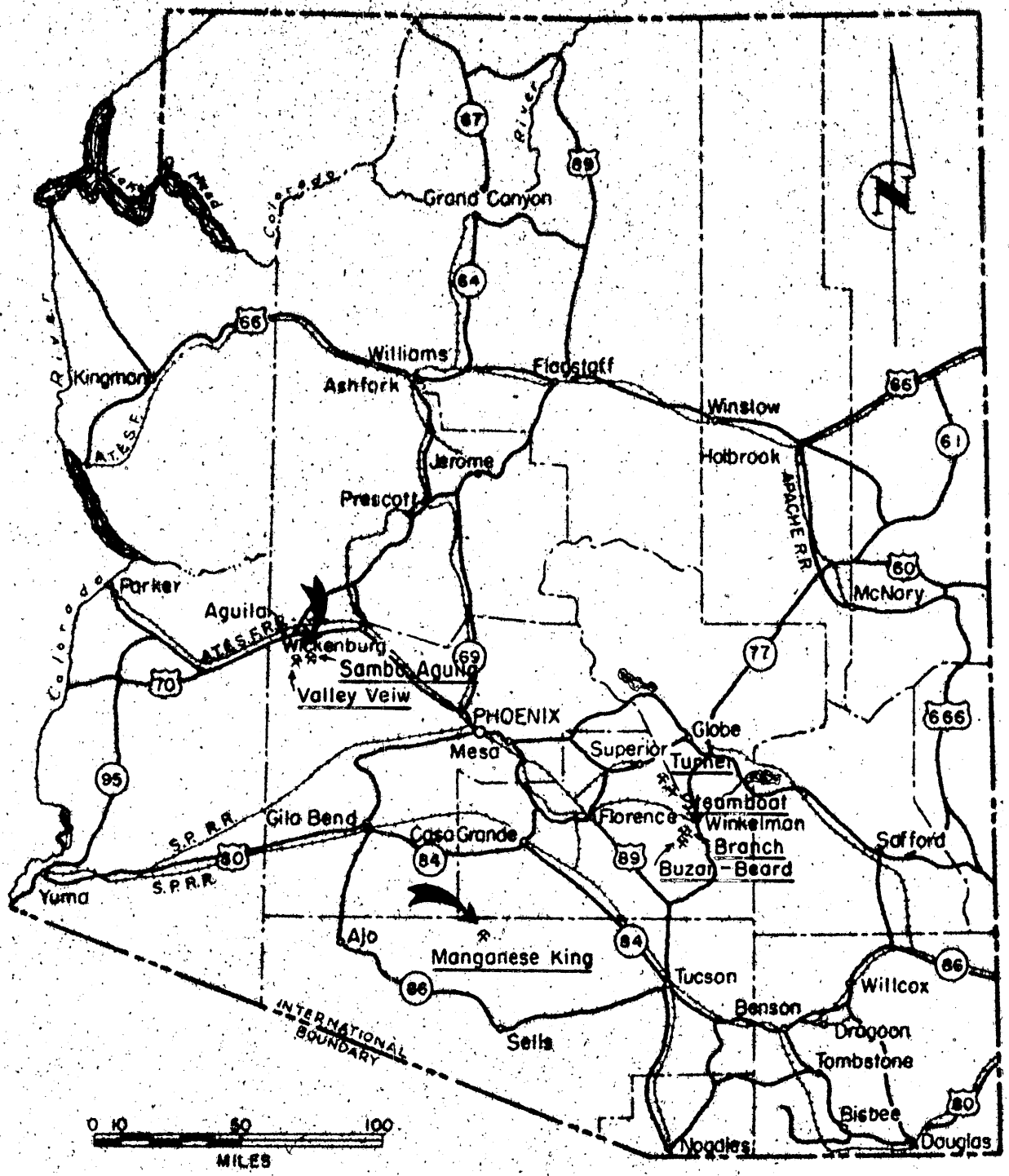

FIG. 1. LOCATION OF MANGANESE MINES
U.S. MANGANESE CORP.

	Measured Indicated Inferred Reserves, Long Tons	Percent Manganese
Branch (San Pedro)	5,000	25
Steamboat (Almino)	600	40
Turner (Geronimo)	None	---
Busan-Beard (North Star and Jack Rabbit)	5,000	20
Manganese King	2,000	45
Total	12,600	30

The applicant has two contracts with General Services Administion, the original for 2,500 tons at 79 cents per unit and a second for 10,000 tons at 96 cents per unit.

The original loan application was rejected because the properties listed in the docket were so widely scattered, because future reserves seemed to be insufficient to repay the amount of the loan, and because the present contract for 2,500 tons of manganese was below the actual cost.

The field examiners met with Brock on July 6, 1951 to plan the examination for the following week. Brock stated that he was acquiring some manganese properties south of Aguila in Maricopa County which he preferred to those near Winkelman. He further advised that he was not interested in the mines near Winkelman at this time but intended to concentrate his efforts on the Aguila district and the Manganese King mine on the Papago Indian Reservation in Pima County.

On July 9, 1951 the matter of the Winkelman properties was discussed with Brock. He stated that he was satisfied with the information presently available to the Defense Minerals Administration regarding ore reserves and their grade and that he did not wish a full examination of these properties. In order to make these statements a matter of record Brock agreed to write a memorandum to this effect to W. R. Storms

Chief of the Arizona-New Mexico Branch, Mining Division, Region IV. This letter was received on July 19. Therefore, no field examination was made of the mines around Winkelman.

The field engineers examined the Manganese King mine in Pima County, and the Valley View (Prieta Chinda) and Sambo Aguila deposits south of Aguila in Maricopa County (figs. 2 and 3). The Aguila deposits were the subject of an investigation by the Bureau of Mines in 1940 and 1941, and the Prieta Chinda in 1943. Complete reports on these properties were available to the examining engineers so the field examination was primarily for the purpose of identifying the properties and checking on the extent, if any, of new work.

The applicant was negotiating for the mill and mining equipment of the Associated Mining Co. in Aguila. This mill was erected to test oxidized copper ores and now is idle. It was equipped with crushers, ball mills, classifiers, flotation cells, tables, and other incidental items. There were new ore trucks, dozers and mining machines available at the mill site. The applicant apparently intended to convert the mill in order to handle manganese ores. He also said that he intended to treat some scheelite and copper ores. The impression was gained that the acquisition of this mill was somewhat contingent on a favorable report by the DMA examiners on the manganese properties.

The field engineers discussed with Brock the possibility of considering an exploration program in place of his development program. Apparently such a program would be agreeable to the applicant but

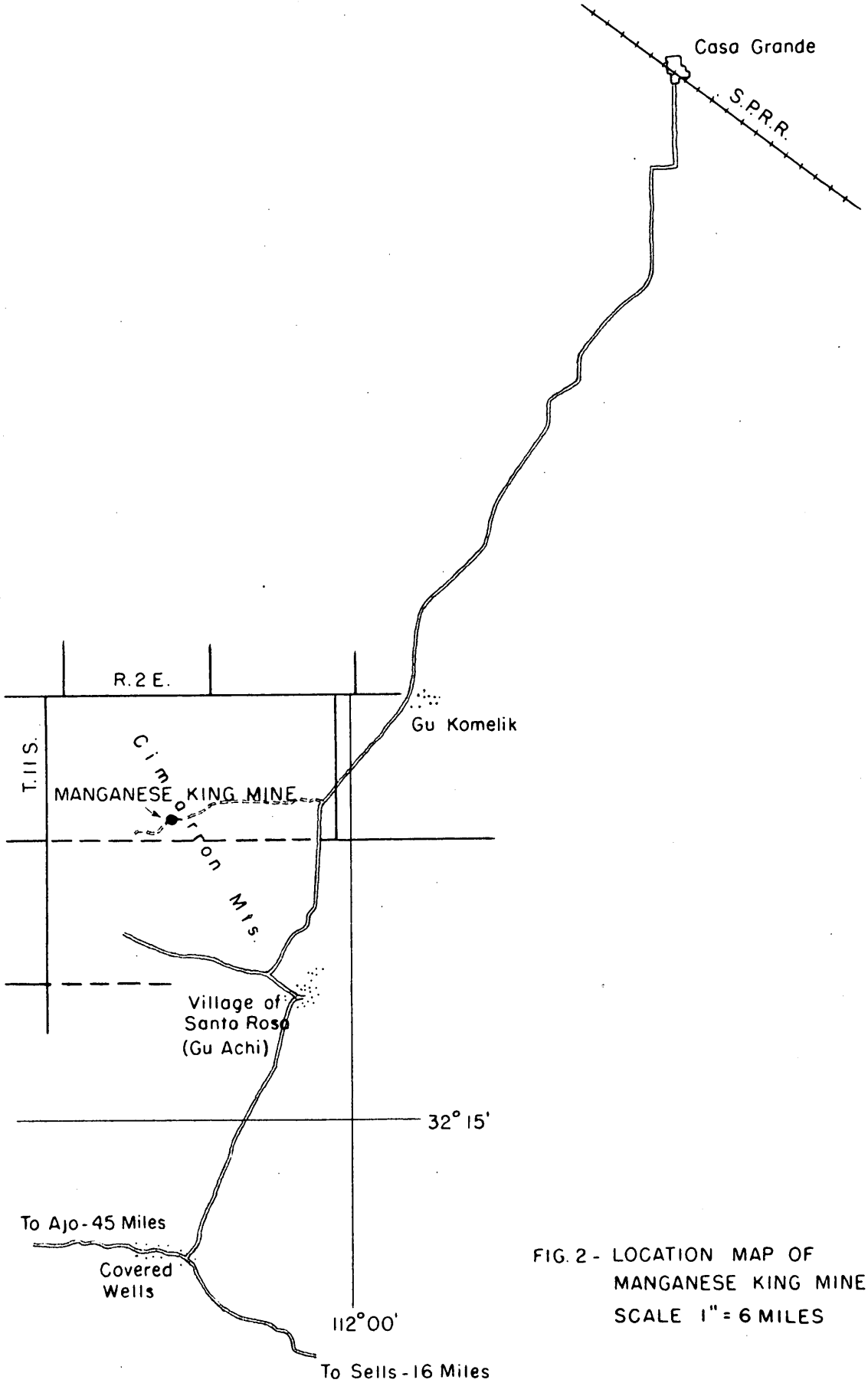

FIG. 2 - LOCATION MAP OF MANGANESE KING MINE
SCALE 1" = 6 MILES

DMA 289 JULY 1951

the applicant indicated that his need was for milling equipment rather than for exploration. Then, too, it must be pointed out that in deposits such as these, any exploration is actually an extractive process, the ore being mined as it is explored. A liberal interpretation must be placed on the definition of an exploratory project under these conditions.

ACKNOWLEDGMENTS

The field engineers are indebted to C. D. Breck for his time and assistance in making the examination of the various properties.

Complete reports on each of the properties are available to Federal Agencies and the data contained in this report have been largely abstracted from them. Credit is hereby freely given to the Bureau of Mines and the Geological Survey even if not individually acknowledged. Since little or no work has been done on these properties since the reports were written, data contained in them are still valid.

PROPERTIES

Inasmuch as there are several widely scattered properties involved, each will be discussed briefly and separately as to location, topography, physical features, history and production, ownership and extent, description of the deposits, mineable ore reserves, etc.

Valley View Mine

The Valley View group of claims at one time or another was known as the Prieta Chinda, the Manganese Development Co.'s claims, and the Wheeler claims. The group is located approximately 14 miles southeast

of Aguila in sections 17 and 21 T. 5 N., R. 8 W. The road from Aguila is a good desert road to within about 1 mile of the mine. A poor road extends from the highway at the lower portion of the mine workings.

Production during World War I amounted to about 265 tons of 40 to 46 percent manganese, most of this coming from the property of the Manganese Development Co. Total production to date amounts to about 500 tons.

The claims are held by location by Dempsey B. Powell and associates of Aguila, Ariz. and are under lease to the applicant. There are at least 11 unpatented lode mining claims on the eastern slope of the hills, and an undetermined number on the western slope, where they are known as the Yarnell group. A portion of the Valley View group is known as the Prieta Chinda and was investigated in 1944 by the Bureau of Mines.

Manganese minerals are found in fractures and veins in andesite. Only one vein can be traced on the surface for any great length. The ore occurs in small lenticular shoots, often mixed with brecciated fragments of andesite. From Nov. 27, 1940 through Feb. 13, 1941, G. A. Apell, Bureau of Mines, made an examination[1/] of various manganese properties in the Aguila district including the Valley View and the Sambo Aguila both of which are under lease to the applicant.

1/ Apell, G. A., Final Report on the Aguila, Arizona Manganese District, Strategic Minerals Project Number 314, Bur. of Mines, 1941.

Apell made a very careful examination of the Valley View. He made a map of the main vein and took some 38 samples at 29 different points more or less uniformly spaced along the vein. As measured on the surface the vein is 1,080 feet long. The width of the vein, based on an average of the widths at 29 different points, is 2.0 feet. The average grade is 16.7 percent manganese. Widths of the vein vary from 5 to 69 inches and the grade varies from a low of 3.0 percent manganese to a high of 30.8 percent.

The results of sampling are as follows:

Valley View Mine Samples

Sample No.	Partial Widths, Inches	Manganese, Percent	Total Widths, Inches	Average Manganese, Percent
120	24	24.1	—	—
121	12	23.4	—	—
120-21	—	—	36	23.9
122	—	—	25	25.4
123	—	—	22	27.4
124	24	14.7	—	—
125	5	22.2	—	—
124-25	—	—	29	16.0
126	24	6.0	—	—
127	21	33.1	—	—
128	24	26.5	—	—
126-28	—	—	69	21.4
129	24	13.1	—	—
130	16	16.0	—	—
129-30	—	—	40	14.3
131	—	—	18	7.4
132	—	—	25	19.4
133	—	—	26	16.9
134	—	—	12	28.3
135	—	—	11	13.8
136	—	—	10	25.8
137	—	—	26	30.8
138	24	10.9	—	—
139	22	17.2	—	—
140	22	12.6	—	—
138-40	—	—	68	12.6

Valley View Mine Samples, Cont'd.

Sample No.	Partial Widths, Inches	Manganese, Percent	Total Widths, Inches	Average Manganese, Percent
141	—	—	10	9.6
142	—	—	18	13.3
143	—	—	16	3.0
144	—	—	8	10.2
145	—	—	23	12.6
146	—	—	22	17.1
147	—	—	11	5.5
148	—	—	23	17.1
149	—	—	23	6.2
150	—	—	20	6.4
151	—	—	22	14.9
152	24	20.2	—	—
153	10	6.2	—	—
152-53	—	—	34	16.1
154	24	—	—	—
155	12	—	—	—
154-55	—	—	36	13.8
156	—	—	5	12.1
157	—	—	25	19.8
Average 29 points			2.0 ft.	16.7

If it is assumed that the entire length of the vein is mined with an average width of 2.0 feet to a depth of 50 feet from the surface, the total tonnage will be 9,000 tons, (1,080 feet long by 50 feet deep by 2.0 feet wide with 12 cubic feet per long ton). The average grade of this tonnage is 16.7 percent manganese.

The ore is secondary. Enrichment will extend to shallow depths from the surface. A 50-foot depth has been assumed. In places enrichment may extend to a depth of 75 feet but it is not likely to be much deeper than this. This conclusion is based on results of operations at other mines in the district as well as the past history of other manganese mines of similar character.

Approximately 500 feet of the vein averages 2.25 feet in width with a grade of 20.0 percent manganese. This section of the vein contains approximately 4,000 tons of ore.

Production costs at the Valley View mine will be high. Mining will have to be done from the surface as systematic development by tunnels and raises is not warranted because the tonnage available is not sufficiently large. Assuming that the 500-foot section of the vein is mined, a cost of approximately $25 per long ton of ore is not out of line. The output from a vein 2.25 feet wide will not be more than one ton per manshift. With labor at $15 per shift, including taxes and insurance, the labor cost will be $15 per long ton. If labor is 60 percent of the total cost, the mining cost will be $25 per ton. Transportation to the mill will be not less than $1.00 per ton and the milling cost will be at least $2.00 per ton. Mill recovery is estimated at 65 percent. To produce one ton of concentrates averaging 40 percent manganese will require 3.1 tons of ore. The mining, transportation and milling costs are estimated as $28.00 per ton. On the basis of concentrates the cost will be $86.80 per ton.

Costs are herewith summarized:

Cost of Producing Manganese Concentrates f.o.b. Deming, N. Mex., from 2-foot Vein

	Per Long Ton of Ore	Per Long Ton of Conc.
Mining		
Labor	$15.00	$46.50
Supplies, etc.	10.00	31.00
Total mining	$25.00	$77.50
Transporting to mill	1.00	3.10
Milling	2.00	6.20
	$28.00	$86.80
Trucking to R. R. and loading		1.00
R. R. freight to Deming		14.20
Royalty, 10% (76-14.20)		6.18
State sales tax, 1% (76-14.20)		0.62
		$108.80
Value of 40% Conc. at Deming		76.00
Loss per ton concentrates		$32.80

The above summary shows a loss of $32.80 per ton of concentrates before depreciation and amortization of a loan. Since there is no profit there are no Federal and State income taxes.

It is believed that a price of more than $3.00 per unit will be necessary to permit operation of the Valley View mine.

There are other veins on the property which can produce manganese but no vein has surface showings as strong as the vein that has been sampled by the Bureau of Mines. An excellent job of sampling was done and it is believed the results can be accepted without hesitation.

The cost data given for mining are necessarily estimates but they are based on similar operations in the Southwest.

Sambo Aguila

The Sambo Aguila property is located 13 miles southeast of Aguila, in sections 35 and 36, T. 6 N., R. 8 W., and sections 1 and 2, T. 5 N., R. 8 W., near the Aguila-Hassayampa road.

This is a comparatively recent manganese discovery and was mapped by the U. S. Geological Survey several years ago. Not enough work has been done to give any idea of continuity of the 10 or more narrow veins exposed, nor of tonnage available. The claims are held by location by Dempsey B. Powell and associates and are under lease to the applicant.

The manganiferous veins occur in andesite. There are 10 or more flat lying veins which pitch with the slope of the hillside. This ore is harder and more siliceous than most of the ores in the Aguila district. Since the veins lie approximately with the slope of the hill it would be possible to develop tonnage readily should the veins have any thickness or continuity. However, in view of the behavior of other manganese deposits in the area, it is doubtful if the ore shoots have any great lateral extent. There are no measured reserves.

Vein widths vary from a few inches up to 7 feet. There is no evidence to warrant the belief that the grade of the ore or average widths of the veins are different from the Valley View vein. The length of ore shoots may be less. The main difference is that the Sambo Aguila veins have a flatter dip. The ore is more silicious and harder. There is no reason to expect a lower cost of production at the Sambo Aguila than that calculated for the Valley View.

Manganese King

The Manganese King or Drew Springs manganese mine is situated on the Pagago Indian Reservation in Pima County, Ariz., approximately in the NW¼ of sec. 36, T. 11 S., R. 2 E., in the foothills of the Cimarron Mountains. It is reached from Sells, the headquarters of the Indian Agency, by traveling 44.7 miles northerly on the Sells-Casa Grande Highway, thence westerly on a side road 6 miles to the mine. The Sells-Casa Grande road is a graveled highway in good condition. The side road is unimproved and generally in poor condition.

The mine was located and worked during World War I. Shipments were made during World War II to a Metals Reserve stockpile. In all, somewhat over 1,300 tons of ore averaging about 45 percent manganese have been shipped to date. Mine-run ore contains 30 to 35 percent manganese.

The mine is owned by Messrs. Struckmeyer, Yancy, Price, and Dorsey, and is being leased by the applicant. There are six unpatented claims in the group.

The ore deposit occurs as veins striking about N. 65° W. and dipping 35° to 45° NE. Wall rocks are cherty limestones which have been highly faulted and veined with manganese minerals. The veins have been opened about 120 feet along the strike and about 75 feet down the dip. They have a thickness of over 6 feet. There are rich pockets of ore, but in general the ore requires concentration in order to bring it up to commercial specifications.

There are about 100 tons of ore blocked out in the present workings. There is a possibility that in the course of mining, the remainder of the deposit could produce as much as 2,000 tons of mine-run ore.

At the present time the mine is idle. It could be placed in production very quickly. At a camp at Drew Springs, near the mine, a mill of sorts is available. Trommels, conveyors (minus belts), a table, water tank, and sundry other items are set up. A few thousand dollars would put this equipment into operating condition.

Since the vein at the Manganese King is wider and the grade of ore is higher than at the Valley View costs of production will be less. From calculations made it is not believed that the U. S. Manganese Corp. can mine the ore at a profit on the basis of a payment of $2.00 per unit. The Manganese King is a small lease operation. With little or no overhead, two or three partners might make wages by carefully mining and shipping high-grade ore to Deming on the basis of receiving $2.00 per unit for their ore.

PROJECT PROPOSALS

Manganese King Mine

The applicant proposes to recondition the mine, which is just an open cut with some semi-underground workings, and begin production of ore. The mill at Drew Springs will require some overhaul and installation of power units in order to be placed in operating condition.

Aguila Properties

The applicant plans to mine from the best looking outcrops and ship to a mill in Aguila. This mill was erected by the Associated Mining Co. to treat oxidized copper ores by flotation. The applicant is presumably negotiating to acquire this mill for handling manganese, and some scheelite and copper ores. Considerable work will be required to adapt the mill to handle manganese ores. Bins and jigs for the coarser sizes must be installed. The acquisition of the mill seems to be contingent on a favorable action on this application. The applicant intimates that he is acquiring other manganese properties in the aguila area.

CONCLUSIONS

The Valley View, Sambo Aguila and the Manganese King have no measured ore reserves. The Valley View can probably produce 4,000 tons of 20 percent manganese ore from its main vein. The Manganese King has 500 tons of ore classed as indicated and 2,000 tons of inferred ore with an average grade of 30 percent manganese. The total is 6,500 tons with an average grade of 23.8 percent. This ore is estimated on the basis of ore exposures which have been measured and sampled on the surface and underground. The Valley View can produce approximately 1,300 tons of 40 percent concentrates and the Manganese King approximately 1,200 tons.

Harold B. Ewoldt[2] states that manganese prospects near Aguila occur in an area 2.5 miles wide and 20 miles long. He also says "it is believed the district as a whole could produce well over 50,000 tons". C. H. Johnson[3] states that from 1917-24, recorded shipments of manganese ore ranging from 35 to 48 percent amounted to about 4,000 tons. He lists 10 producers and on a map accompanying his report he shows 15 mines. Apell[4] states that the Aguila district is capable of producing 108,000 short tons of ore in 3 years.

From the above it is apparent that the Aguila district is quite extensive and there are numerous mine developments. The failure of the district to make a substantial production is not due to a lack of ore but to a lack of ore which can be profitably mined.

The conclusions drawn regarding the properties of the U. S. Manganese Corp. are as follows:

1. The three properties can produce some 2,500 tons of manganese concentrates averaging 40 percent from areas where vein widths have been measured and samples taken.

2. Numerous other veins occur on the Valley View and Sambo Aguila. These veins are practically undeveloped except for an occasional pit. Such a small amount of work has been donethat it is impossible to estimate inferred ore.

2/ Assistant Mining Engineer, Mining Division. U. S. Bureau of Mines, Report for Metallurgical Division on Manganese Property near Aguila, Ariz.

3/ Associate Mining Engineer, U. S. Bureau of Mines, Preliminary Report on a Strategic Minerals Project in the Aguila, Arizona Manganese District. 1940.

4/ Previously cited in Footnote No. 1.

3. The total cost of production from the properties under lease to the U. S. Manganese Corp. will be more than $2.00 per unit of manganese.

4. It is believed that additional exploration on the Valley View and Sambo Aguila properties will show ore in other veins but there is no evidence that the width of the veins and the grade of the ore will be greater than thus far shown on the Valley View.

5. It is believed that if, in spite of the above conclusions, Brock is willing to apply for an exploration loan, consideration should be given his application.

RECOMMENDATIONS

It is recommended that the application of the U. S. Manganese Corp. for a loan of $50,000 be denied because the company cannot be operated at a profit at the present price of $2.00 per unit of manganese.

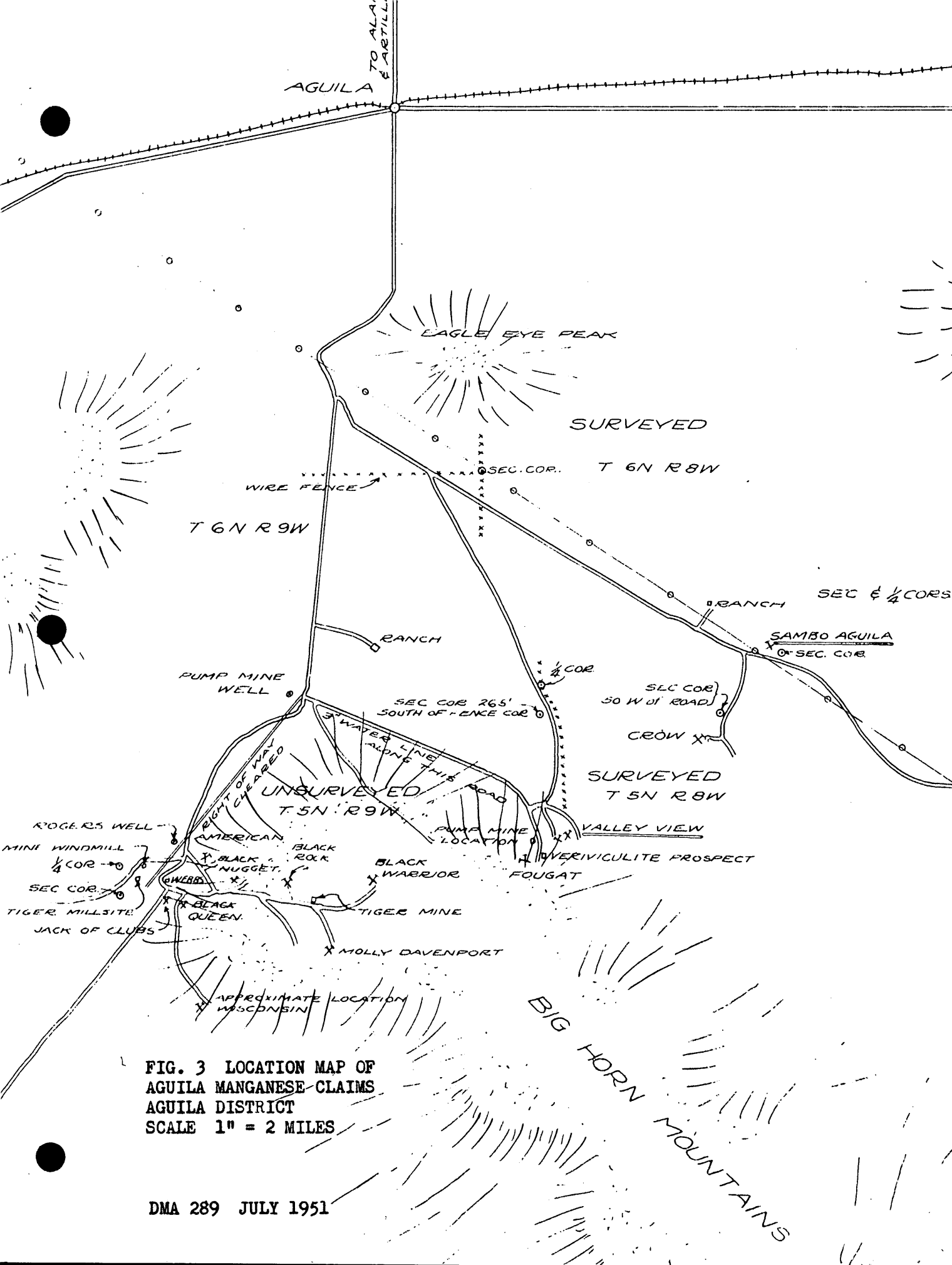

FIG. 3 LOCATION MAP OF AGUILA MANGANESE CLAIMS AGUILA DISTRICT SCALE 1" = 2 MILES

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