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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: BLACK WARRIOR

ALTERNATE NAMES:
MCGREGOR
SITTON MILL
GRAHAM
BIG JIM

MOHAVE COUNTY MILS NUMBER: 403B

LOCATION: TOWNSHIP 12 N RANGE 13 W SECTION 33 QUARTER S2
LATITUDE: N 34DEG 20MIN 03SEC LONGITUDE: W 113DEG 36MIN 47SEC
TOPO MAP NAME: ARTILLERY PEAK - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
MANGANESE

BIBLIOGRAPHY:
ADMMR BLACK WARRIOR MINE FILE
ADMMR SITTON MINE FILE
ADMMR MAPS - UPSTAIRS FLAT DRAWER
ADMMR MOHAVE CUSTOM MILL PROJECT, CLAIM MAP 4
FARNHAM, L.L. "MANGANESE DPSTS OF W AZ" USBM IC 7843, P 28 (MAP), 34-36, 1958
LONG W.J. "OXIDE MANGANESE ORES YAV., YUMA, MAR, MOH CO. AZ" USBM RI 4291 P 17-24
USBM WAR MINERALS REPORT #308, P 1, 17-19
MINING WORLD 12/58, P 58
ADDITIONAL WORKINGS SEC. 3 & 4-T11N-R13W

MOHAVE CO. MILS

NUMBER: 403B
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MCGREGOR
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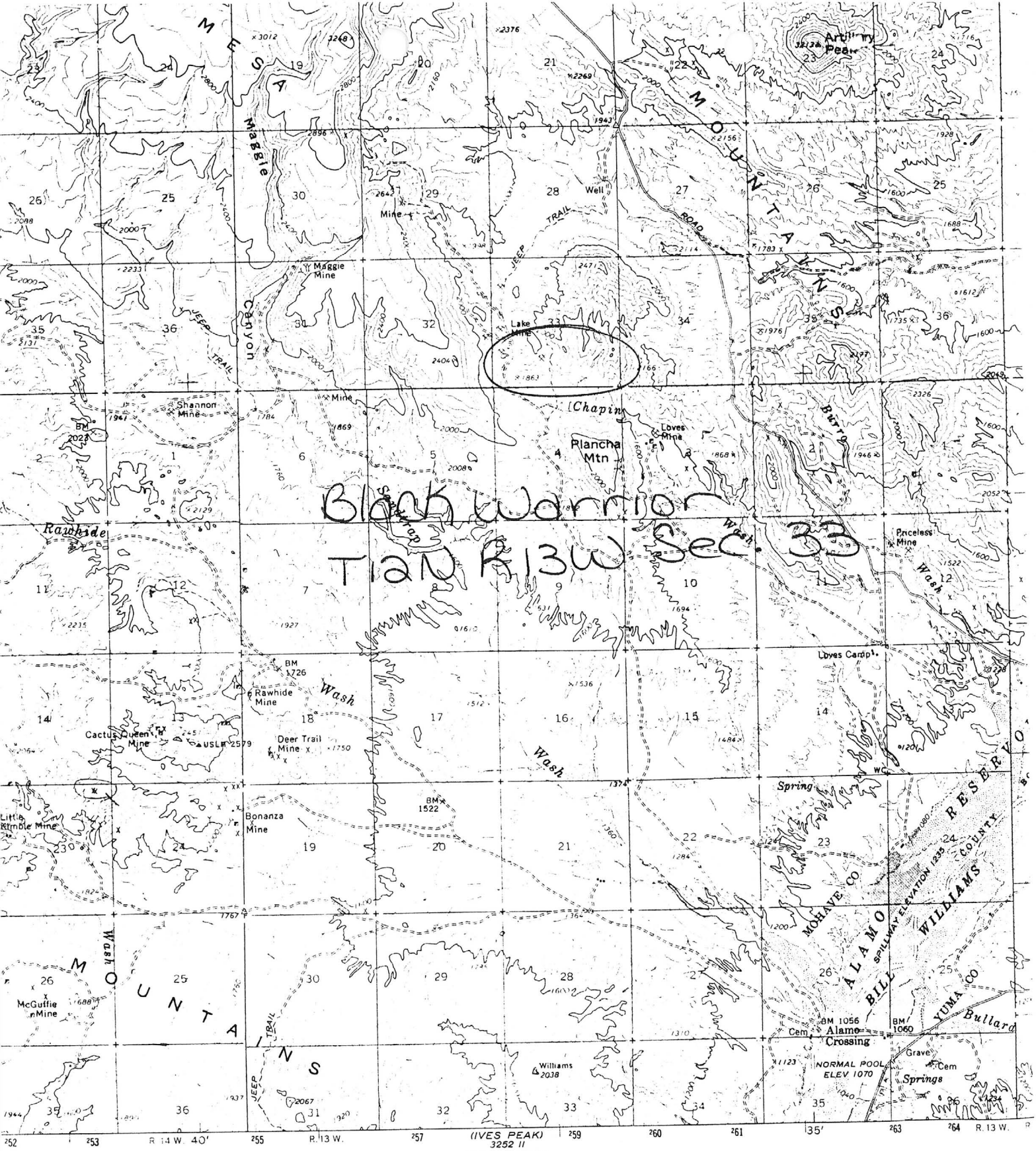
COMMODITY:
MANGANESE-PRIMARY
BIBLIOGRAPHY:
AZ. STATE LAND DEPT. MINERAL MAP
USGS PRESCOTT MAP
ADMR BLACK WARRIOR MINE FILE
ADMR SITTON MINE FILE
USBM RI 4291, PP. 17-24
USBM IC 7843, P. 28 (MAP), P. 34-36
USBM WAR MINERALS REPORT #308, P. 1, 17-19
ADDITIONAL WORKINGS SEC. 3 & 4 T11N-R13W
Mining World, 12/58, p. 58
Mohave Custom Mills Proj., Claim Map 4
Maps - upstairs flat storage area - Fifth Drawer ADMMR



Black Warrior
T12N R13W Sec. 33

SCALE 1:62500

4 MILES
21000 FEET
5 KILOMETERS

GN MN
1°29' 26 MILS
14½° 258 MILS

RID AND 1966 MAGNETIC NORTH
NATION AT CENTER OF SHEET.

CONTOUR INTERVAL 80 FEET
DOTTED LINES REPRESENT 40-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

ARIZONA
QUADRANGLE LOCATION

Artillery Peak, 15'

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

NAME OF MINE: BLACK WARRIOR

COUNTY: MOHAVE
DISTRICT: BIG JIM
METALS: MN

OPERATOR AND ADDRESS:		MINE STATUS	
DATE:		DATE:	
5/1/44	Norman W. McGregor, Wenden	5/1/44	Shipping
		10/45	Idle

Mining Journal
Sept. 1942

HANNA, M. A., COMPANY (OWNER)

Operated by Norman W. McGregor

MINE - BLACK WARRIOR MINE - Located in Mohave County adjacent to the Artillery Peak properties.

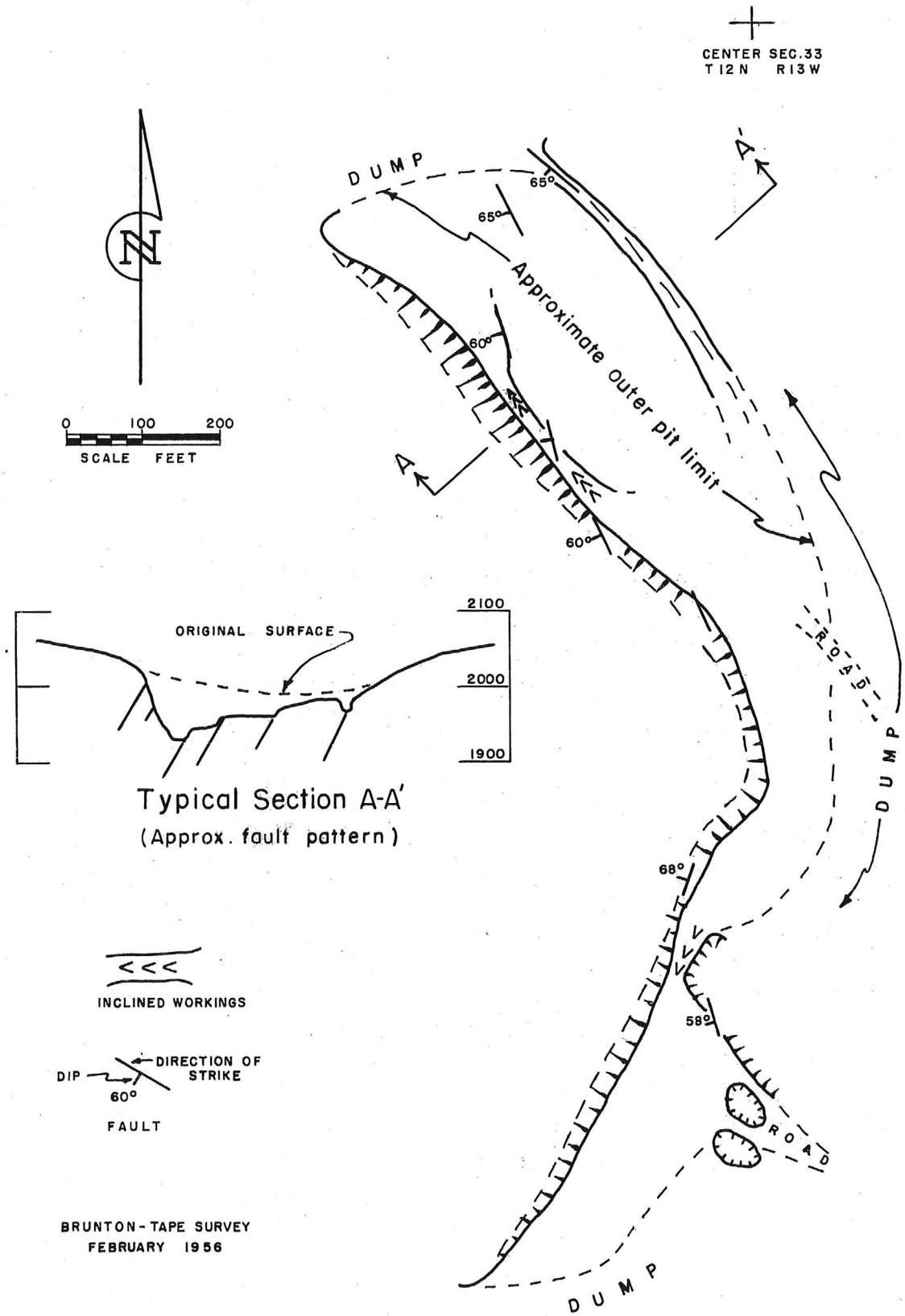


FIG. 14 PLAN & SECTION, Mc GREGOR PIT

BLACK WARRIOR MINE Secs 32+33 T12 N R 13 W
Secs 3+4 T11N R 13 W

MOHAVE COUNTY

This property reported to be active in July, 1956 and leased at that time to Dr. O. L. Jaggers, World Church, 1888 N. Crescent Heights, Los Angeles, California.

The Black Warrior now belongs to Sitton - produced considerable ore during Wenden program - reported property has large tonnage of lower grade but it does not up-grade satisfactorily - ore contains considerable lead. Mark Gemmill 5-27-57

Lee Hammons says Manzona Association has taken over this property. 7-22-58

Went to McGregor mine where there is little in the way of ore reserves. GW WR 4/21/76

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
OWNERS MINE REPORT

DEPT. MINERAL RESOURCES
RECEIVED
DEC 13 1940
PHOENIX, ARIZONA

Date 12, 10, 1940

1. Mine Black Warrior
2. Mining District & County Owens, Mahava
3. Former name
4. Location sec.33, T.17N, R.13W. T11-12N
5. Owner N.L.GOULDING
6. Address (Owner) ENID, OKLAHOMA
7. Operator N.W.McGREGOR
8. Address (Operator) WENDEN, ARIZ.
9. President
10. Gen. Mgr.
11. Mine Supt.
12. Mill Supt.
13. Principal Metals Manganese
14. Men Employed 2
15. Production Rate 50 L.T. daily
16. Mill: Type & Cap.
17. Power: Amt. & Type
18. Operations: Present Blocking out.Road building
19. Operations Planned Reserve dump of not less than 3000 tons
20. Number Claims, Title, etc. 12 claims U.S.Mining laws
21. Description: Topography & Geography Dissected bajada and lava-capped slopes north of the Williams River.altitude of 2246 ft.abouve sea level. These claims lay approx.2 miles in a southwesterly direction from Artillery Mtn.and about four miles west of the juction of the Big Sandy and the Santa Maria Rivers.Four and a half miles north of the Alamo Crossing,and highway #93.
22. Mine Workings: Amt. & Condition 350 ft. of test tunnels and 450 ft. of open cut work of which there has been 21 cars of ore shipped.

(over)

23. Geology & Mineralization Coarse-grained granitic rocks of probable pre-Cambrian age extend into the Artillery Mountains. Next younger is a thick series of probable Tertiary sandstones, shale, limestones, and conglomerates, all more or less lenticular. Lying in places upon the tilted beveled edges of these beds and in places upon the irregularly eroded surface of the granite, are relativly small areas of lava flows. Capping many of the mesas are basalt flows.

24. Ore: Positive & Probable, Ore Dumps, Tailings

Ore in sight estimated at 8000 tons of shipping grade
Milling ore estimated at 400000 tons.

24-A Vein Width, Length, Value, etc.

I8 in. 40 % plus(Mn) I500 Ft.
4ft. 44 % " " 250 Ft.
8Ft. 33 % " " 286 Ft. All slope to the southwest at an angle of I5 degrees.

25. Mine, Mill Equipment & Flow Sheet

250 ton ore bin, track and ore car, 30 Catapiller bulldozer, Ford V8 truck bunk shack, cook shack, water tank Owners quarters, machine shop, compressor hose, jack hammers Timken steel and bits water pumps Fairbanks-Morse engine steel beds and mattresses and cook shack equippment.

26. Road Conditions, Route

Good desert trucking roads on Route #93 from Wenden, Aguila, Congress Juntion and Yucca

27. Water Supply

Williams River approx. 4 miles

28. Brief History

This property has been opperated on and of sinse I9I7 under different people.

29. Special Problems, Reports Filed

A mill would be the most feasible methode of handling.

30. Remarks

31. If property for sale: Price, terms and address to negotiate.

32. Signed H. W. McGuigan

33. Use additional sheets if necessary.

R E P O R T

-- BLACK WARRIOR GROUP --

Artillery Mountains

OWENS MINING DISTRICT
Mohave Co., Ariz.

Prepared and submitted

by

Travis P. Lane
Consulting Mining Engineer
Phoenix, Ariz.

January 16, 1951

PROPERTY AND LOCATION

The property known as the Black Warrior mine and comprising 13 unpatented claims is located in the southern foothills of the Artillery Mountains in the extreme southern part of Mohava county. It is approximately 5 miles north from the deserted village of Alamo on the Bill Williams River. The claims lie in Sec. 33, T. 12 N, Range 15 W. and in secs. 3 and 4, T. 11 N, Range 15 W. The claims are not all contiguous and their locations are on the map which is attached to this report.

The nearest rail points are at Aguilla and Wenden each on Highway 60 and each some 45 miles distant southerly by good desert road from the property. Most shipments in the past were made via Wenden. Travel to these points must cross the Bill Williams River at Alamo and is sometimes interrupted for up to several weeks time because of seasonal flooding of the crossing at infrequent intervals. Another rail point is at Yucca approximately 75 miles distant by somewhat tortuous desert road northwest from the property. The nearest supply centers are at Wickenburg 73 miles by road southeast, and Kingman 95 miles northerly from the mine.

The region is typically arid desert with annual rainfall averaging less than 5 inches and vegetation extremely sparse except along the broad wash of the Bill Williams river.

Topography in the immediate vicinity of the mine shows low ridges and shallow steep gullies. Elevation at Alamo on the rim is approximately 1000 above sea level and elevation at the claims is some 400 to 600 feet higher.

The Santa Maria and Big Sandy rivers converge some 2 miles above Alamo to form the Bill Williams river. Each of the first two rivers exists as a broad dry wash except during flood seasons, and the Bill Williams also carries little or no surface water. A very large flow of water is present however at all times in the gravels of the Bill Williams. An abundant supply of water is available therefore for mining and milling operations at a distance of 3½ to 4 miles from mill sites on the property.

HISTORY AND PRODUCTION

The maganese deposits of the Artillery Mountains have long been recognized as constituting one of the largest reserves of

manganese in the U.S., and because of the strategic importance of the metal for National Defense the Government, through the Agency of the U.S. Bureau of Mines, has been for many years conducting exploratory development in the area. This work to date has resulted in the proving up of a reserve of between 5 and 6,000,000 tons in a main ore body, with manganese content of 12%. Additional reserves are indicated in adjoining areas. The low grade of this reserve and the remoteness of the district require that the ore be beneficated at or near the mine before shipment to markets, and to this end the Bureau has done much metallurgical test work on the ore. It is planned to make shipments of ore to a small government owned treatment plant at Boulder City, Nevada, for working out finally optimum treatment proceedure. The whole program envisages ultimate justification for the installation at the mine of a plant of several thousand tons daily capacity.

The Black Warrior property lies approximately 1½ miles easterly from the property (commonly referred to as the Hanna property) which is being developed by the Bureau of Mines and its manganese deposits are similar to those existing on the Hanna property.

The first serious work on the Black Warrior property was done in 1917 on the Metallic Manganese claims Nos 2 and 3, and the Black Warrior No 6 claim. The development consisted principally in the sinking of a vertical shaft to a depth of somewhat over 300 feet in low grade manganese material on the Metallic Manganese No 2 claim. Some ore was mined but not shipped and the claims were abandoned. The ground was relocated in 1926 by Goulding, Eton and Johnson. The owners leased to Webb and Bell who worked intermittently for 2 years shipping a number of cars of 30 to 40% manganese ore to steel plants in Alabama and Colorado. In 1929 the Chapin Exploration Company leased the property and performed a little development and located a large number of adjoining claims. This company relinquished the Black Warrior group of claims within a year. The property then lay idle except for annual assessment work until 1939. Meanwhile H.B. Hurley joined Goulding in the ownership, the two former partners of Goulding having dropped out.

In 1939 a 10 year lease was granted to Norman M. McGregor who operated intermittently until the time of his death in 1947. McGregor made a substantial production of manganese ore shipping to eastern points and to the government stock pile at Phoenix, Arizona. Settlement sheets for these shipments are not available. Fragmentory records together with statements by interested parties indicate a production total approaching 10,000 tons of ore averaging somewhat over 30% manganese. This material was selectively mined and closely hand sorted and was derived principally from the Black Warrior No 6 claim.

Upon expiration of the term of the McGregor lease (in 1949) the property reverted to the owners. R.B. Hurley then acquired title from Goulding, his aunt, and from the party who had taken over the interest of R.B. Hurley (brother of R.B. Hurley). R.B. Hurley has entered into a participating agreement with a party who proposes to put the property into production, and for whom this report is made.

GEOLOGY

The geology of the Artillery Mountains is covered in Bulletin 936-R of the U.S.G.S. Briefly, the manganese deposits are part of a sequence of alluvial fan and playa material laid down in a fault basin. Three types of ore are recognized, namely: sandstone, clay and "hard" ore. Beds of sandstone and clay ore and barren beds of sandstone and clay exist in interlayered series. Hard ore is sandstone ore which has been impregnated with opal and calcite and in which the original amorphous manganese oxides have been converted to psilomelane.

The principal ore minerals are psilomelane, pyrolusite and manganite. The chief gangue minerals are quartz, feldspar and calcite distributed rather uniformly as grains and fragments throughout the manganese oxide groundmass.

ORE DEPOSITS AND
ESTIMATED ORE RESERVES

Mining and development in the past has disclosed four areas which contain bodies of ore of sufficient size and grade to be considered as having economic importance in the present market for manganese if concentrated in a mill on the property. The largest of these ore bodies occurs on the Black Warrior No 6 claim, and the others in the order of their importance occur on the Black Warrior No 11 claim, the Black Warrior No 13 claim and the Metallic Manganese No 3 claim.

In all of these deposits the continuity and uniformity of the ore beds is notably evident in surface workings. Diamond drilling by the U.S. Bureau of mines on a neighboring property has shown continuity of ore for slope distances of 500 feet or more. With these considerations in mind it has been assumed that the ore bodies will assuredly continue for 100 feet in depth and very probably for an additional slope distance of 200 to 300 feet, to the side lines of the claims; and the estimates of assured or "positive" ore and "probable" ore are based upon these assumptions. Possible ore would depend upon lateral extensions of the ore bodies and such extensions are not always clearly indicated. The ore situation, sampling etc. in each deposit is described in the following paragraphs. Some of the ore is rather porous with low

specific gravity and some, notably the hard ore, has a high specific gravity. A factor of 13 cu ft per ton of ore in place has been used in the tonnage estimates.

Black Warrior No 6 The ore deposit here has a surface exposure of approximately 500 feet along the beds and a horizontal width of approximately 150 feet. A pedestal remnant of the ore body on a nearby ridge points clearly to the continuity of the ore and to its dip - which indicates an ore thickness of 60 ft. Except in the southeast 100 feet of the ore length there are no interlayers of barren or very low grade material in the series of beds making up the above ore thickness. The ore can be seen to be extending in a southeasterly direction from the confines of the present surface workings and abundant manganese float material beyond here suggests the possible existence of ore for about 500 feet from the present workings. The mantle of overburden is deep here and in the absence of exploratory openings it is impossible to make any reasonable estimates regarding "possible" ore. It seems certain however that some ore will be derived from this area. If the amount is estimated at 10% of the total of assured and probable ore the figure would seem conservative enough.

Work in the past was done principally in the central and northwest portion of the ore body, probably because of the presence of a large proportion of hard ore there. The aim of the work was to produce "hard" ore because of its higher grade and because of market requirements as to minimum allowables of fines. Work was done with a tractor with a dozer blade and a ripper. After ripping the surface of a cleared area the hard ore chunks were picked out, and shipped and the remaining fine low grade material was moved aside and the operation repeated.

Samples #1, 3, 4 and 5 were cut in the walls of a dozer trench and in pits on the northwest portion of the ore body. Sample No 7 was taken in a dozer cut in the center of the ore body and sample No 8 was taken in a dozer cut in the southwest portion of the ore body. (each sample being made up of a number of vertical channel cuts). Samples Nos 2 and 6 were shovelled from discard dumps and represent several thousand tons of material. Following is a tabulation of the sample results -

Sample No	Width	% Mn
1	6'	18.74
3	6.5	20.81
4	5	14.46
5	15	13.57
7	5	10.47
8	7	16.97
	Av (weighted)	16.22

Sample No 2	Dump	12.39 % Mn
" 6	"	12.69 "
	Average	12.54

Based upon the areas shown on section B-B, and a length of ore of 500 feet, and with allowance of 1/3 for thinning of the ore on the southeast end and for ore removed from the northwest end the assured, or positive ore in the block calculates out at approximately 260,000 tons, and probable ore at approximately 230,000 tons or a total of 490,000 tons positive and probable ore. Estimated possible ore (at about 10%) would be approximately 50,000 tons. Practically all of the estimated positive ore could be mined by open cut method and about 1/3 would not require stripping. Stripping ratio for the balance would be under 1:1. The probable ore would need to be mined by underground method.

Black Warrior No 11 The ore on this claim is exposed for a length of 150 feet in the west bank of a sand wash and a remnant of the same ore bedding can be seen on the top of a bluff on the east bank of the wash. Section C-C, depicts the situation here. A few hundred tons appears to have been mined here principally on the east bank of the wash. Sampling of the west bank, with several vertical cuts combined in each sample, showed the following :

Sample No	Width	% Mn
13	9'	26.56
14	8	18.45
Av. weighted	8.5	22.73

Sloughed material at the foot of the bank prevented sampling the full thickness of ore. It could be seen at places to be several feet greater than the sampled thickness and width of ore therefore is about 12 feet. With an extension in depth of 100 feet the tonnage of assumed ore here would be approximately 13,000 tons, and with a further extension to the side line of the claim the probable ore would be approximately 23,000 tons. Lateral extension of ore beyond the present opening is not indicated and no estimate can be made therefore regarding possible ore. A large part of the estimated positive ore could be mined by open cut method with strip ratio somewhat above 1:1. The balance would be mined by underground method.

Black Warrior No 13 A thin bed of manganese ore on the Black Warrior No 13 claim extends throughout the full length of the claim. It is underlain by several low grade sandstone beds alternating with barren sandstone beds. The area is cut

by numerous sharp ravines. A road was built into here and an area some 300 feet by 60 feet was stripped but no ore has been mined. The stripped area is on the east wall of a canyon and the ore dips into a bluff on the opposite side of the canyon. It can be seen in the face of the bluff continuing to the end of the claim but was not accessible for sampling except in the stripped area where a combined sample from both sides of the canyon for a length of 600 feet assayed as follows :

Sample No.	Width	% Mn
16	42"	19.77

Approximately 5,000 tons of ore is measurable in the stripped area, and an extension in depth of 100 feet in the west wall of the canyon would give another 16,000 tons or a total of 21,000 tons of positive ore. A further extension in depth to the side line of the claim would give some 33,000 tons of probable ore. Possible ore in the 900 feet of distance to the end of the claim (with extension on dip to the side line of the claim) is estimated at over 70,000 tons. All of the ore in this area except that which is now stripped would have to be mined by underground method.

Metallic Manganese No 3 A thin bed of manganese has been stripped and considerable ore mined in a flat area on the bank of a wash. The partially mined ore is some 200 feet long on the dip and 60 feet wide. Several hundred tons of ore appear to have been mined here and considerable moderate grade discard material has been left on the pit floor. Sampling here with a number of cuts combined in each sample showed the following :

Sample No.	Width	% Mn
10	48"	24.35
11	48"	18.45
Av.	48"	21.40

An extension of 100 feet on the dip and 60 feet laterally would appear to be a reasonable basis for calculating positive ore; and this works out at approximately 5,500 tons which, together with approximately 3000 tons of unmined ore in the stripped area, gives a total of 8,500 tons of positive ore. The location of the work with respect to the side line was not exactly determined and probable ore in the extension on dip to this side line cannot therefore be estimated. The distance is short however and no significant tonnage could be counted upon here. There are no ore showings laterally from the pit upon which an estimate of possible ore might be based. The ore here could all be mined by open cut method with strip ratio not greatly exceeding 1:1.

The estimated ore reserves are summarized as follows :

	Positive Ore	Probable Ore	Total	% Mn	Possible Ore
Black Warrior No 6	260,000	230,000	490,000	16.22	50,000
" " 11	15,000	23,000	38,000	22.73	-
" " 13	21,000	33,000	54,000	19.77	70,000
Metallic Mang. 3	8,500	-	8,500	21.40	-
	304,500	286,000	590,500	17.04	120,000

There are many ore showings at places on the property other than those developed to date, and with mining operations in progress in the proven ore bodies prospect exploration of some of these showings would be a logical proceedure.

It will be noted that the ore estimates assume extensions in depth to the side lines of the claims which in most cases is a short distance. The ore very probably continues on its dip for a considerable distance into adjoining claims held under other ownership. It is said by some that inclined bedded deposits of uniform thickness and mineralization and established downward continuity from their croppings can be properly classed with vein deposits; and they would therefore possess the extra lateral right to follow down and mine beneath groumd which is adversely owned. Adverse claimants however would probably contest such a proceedure. In any event it seems likely that the owners of adjoining ground would be willing to deal on a favorable royalty basis with an established producing operator; and thus a large addition might be made to the estimated reserve of "possible" ore.

MINING METHOD AND ESTIMATED COST

The nature of the deposits favors low mining costs. Most of the positive ore of the estimated reserves can be mined by open cut method with relatively little stripping required. Ore beds and the barren overlying sandstone beds although quite firmly compacted do not need to be drilled and blasted but can be broken down and loaded by a power shovel or a dozer-loader. The indicated underground method of mining is the room-and-pillar method. Mining experiments by the Bureau of Mines have shown that the overlying strata are generally sufficiently firm to allow carrying openings of between 25 and 30 ft in width with safety. It is believed that practically all of pillar material can be recovered by a retreating system of extraction after the ore limits have been reached in any particular direction. Drilling presents some difficulty in places because of irregularity in hardness of the ore. Few holes would be needed and the duty

per machine shift would be high and the explosives cost low. The angle of dip of the Black Warrior deposits is sufficiently low (20 - 22 deg) to permit slushing of broken material up slope to the surface with slusher hoists installed in the open. Mining cost by open cut method is estimated at $1.50 per ton, including stripping and haulage to the concentrator. Underground mining cost is estimated at $2.50 per ton for the deposits on the Black Warrior No 6 and No 11 claim, and at $ 4.00 per ton for the relatively thin ore bed of the Black Warrior No 13 deposit.

The principal items of mining equipment required for the proposed production rate of 200 tons per day would be : a power shovel of ½ to ¾ cu yd capacity, a bull dozer, two 15 ton Diesel trucks, compressor, rock drills and accessories. Estimated cost of this equipment is $60,000.

TREATMENT METHOD AND
ESTIMATED COST

Concentration tests by the Bureau of Mines have shown that the manganese oxides occur intimately mixed with quartz and feldspar grains and that fine grinding is required to liberate the manganese for satisfactory recovery in milling processes. Gravity concentration gave poor results; concentration by flotation was moderately successful, and concentration by leach processes gave the best results. The latter processes however encountered many difficulties when attempted on bulk lots in a pilot plant.

While indicated recoveries by simple flotation are not high they are sufficiently good to promise attractive economic results in the prevailing good market for manganese. A plant of this type is far less costly than one employing the complicated flow sheet of a leach process; and operating cost is less. Also, as noted above, the metallurgy of the leach processes is far from solved. Admittedly flotation of manganese on a plant scale will be somewhat of an innovation and therefore the project would be pioneering in a sense. However the tests that have been made appear to be rather conclusive and a conventional flow sheet is flexible enough so that the inevitable bugs which might appear at the outset can very probably be ironed out in time.

The test work on Black Warrior ore is described in the U.S. Bureau of Mines publication R.I. 4291. A tabulation of results from 6 tests shows an average manganese recovery of 79% in a concentrate averaging 39.0 % manganese. The concentrate sintered to 46.5% mn with 18.6% combined silica and alumina - as compared with standard ferro grade specifications of 48% and 11% respectively. Because of the importance of maintaining a clean high grade sintered product even at some sacrifice in recovery and because of unforseen metallurgical difficulties which might

arise it has been considered prudent to assume a recovery of 70% in the estimated recovered values noted hereinafter.

A plant of 200 tons daily capacity is proposed for the property. Operating cost in a plant of this size is estimated at $2.00 per ton for flotation and $1.50 per ton for sintering, or a total of $3.50 per ton.

Several used idle flotation plants of the above capacity are available in the state at prices well below new equipment prices. The plants are not complete however and it is believed that many of the needed items can also be purchased at used prices. In this manner it is believed that a plant of this capacity can be built on the property at a cost of approximately $200,000. This figure does not include power or a water supply system. The cost of sintering equipment is estimated at $25,000, and total plant cost therefore is estimated at $225,000.

A number of suitable mill sites are available on the property with easy short hauls from the ore deposits.

ORESVALUES AND
INDICATED PROFITS

Manganese ore purchasing contracts differ considerably in prices paid and in specifications regarding the chemical analysis and physical characteristics of the product offered. No firm value therefore can be assumed for a given plant product until a concentrate has been made and sintered and offered to the trade. However it is believed that Engineering and Mining Journal quotations and the National Stockpile Specification P-30 dated June 29, 1950 will furnish reasonably satisfactory data for purposes of estimation. Recent quotations for manganese are around 90¢ per long ton unit of standard ferro grade material (48% Mm). The National Stockpile Specification P-30 imposes a penalty of 1¢ for each 1% Mn below 48% and a penalty of 1¢ for each 1% of combined silica and alumina above 11%. The expected sinter product would therefore incur penalties amounting to approximately 9¢ per unit and would have a value of 46.5 x 81¢ or $37.85 per long ton.

Cost for trucking concentrates to Wenden in 15 ton trucks is estimated at $4.00 per ton. In many contracts the purchaser pays all or part of the rail freight from the mine and with the present demand situation for manganese it seems probable that a purchaser would absorb all of the rail freight. The concentrate therefore would have a net value f.o.b. Wenden of $33.85 per ton.

Indicated values, costs and profits per ton are tabulated as follows : (at 70% recovery in a 46.5% Mn. product).

Tons Pos.& Prob.	Deposit	% Mn	Conct Ratio	Val. p.t.	Oper. Cost	Oper. Prof.	Conting & O'head	Net Prof.
490,000	B.W. 6	16.22	3.67	9.22	5.67	3.55	1.00	2.55
38,000	B.W. 11	22.73	2.49	13.60	6.00	7.60	1.00	6.60
54,000	B.W. 13	19.77	2.96	11.43	6.50	4.93	1.00	3.93
8,500	Met.Mn 3	21.40	2.67	12.67	5.00	7.67	1.00	6.67

POWER

The U.S. Reclamation power line which serves the Bagdad Mining Corporation passes within 8 miles of the Black Warrior property. The cost for building a line to connect into this line is estimated at $4500 per mile or $36,000.

Power requirements of the project are estimated at between 400 and 500 H.P. Since practically all of the power load would be used continuously in the mill the power factor would be high and the rate favorable. Existing schedules indicate a rate of around 0.8¢ per kwh.

WATER

An abundant supply of water is available in the gravels of the Bill Williams River some 3.5 miles distant from a central mill site on the property. Pumping lift would be approximately 250 feet. Water requirements, assuming some tailings pond reclamation at the mill, is estimated at approximately 100 gals per minute. Cost of pipe line , pumping plant and storage is estimated at $30,000.

CAMP

There are no buildings on the property at present and an entire camp must be provided. The type of mining here will not require a large force of men. During early open cut stage of mining probably not more than 30 men will be needed for mining, milling and supervision; and a few more will be needed when underground mining is in progress.

Camp buildings required : office, warehouse, boarding-house, bunk house and several cottages. Cost is estimated at $35,000.

ESTIMATED COST
OF PROJECT

Milling Plant	$ 225,000
Mining Equipment	60,000
Water Supply	30,000
Power Line	36,000
Camp	35,000
Contingencies and working capital	64,000
Total	$ 450,000

CONCLUSIONS

Assured and probable ore in the presently proven deposits of the Black Warrior Group of claims is estimated to total 590,500 tons having an average grade of 17.04% Mn. The estimates are arrived at by assuming extensions in depth which are considered to be entirely reasonable in view of the size and continuity and uniformity of the ore exposed in present workings. The possibilities for developing additional ore in other showings on the property and in extension of workings into adjoining claims seem quite promising.

Numerous mill tests on the ore by the U.S. Bureau of Mines indicate that simple conventional flotation treatment followed by sintering of the concentrates is feasible.

The profit estimates given in this report are based upon an extremely modest recovery of manganese and upon the prevailing market for manganese which promises to continue favorable during the years of intense National Defense effort.

Travis P. Lane

January 16, 1951
Phoenix, Ariz.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine: Sitton Mill, Black Warrior — Date: Sept. 30, 1958

District: Artillery Mtn., Mohave Co. — Engineer: Travis P. Lane

Subject: Status of Operations

The mill and Black Warrior property (formerly McGregor) are owned by F. A. Sitton, 830 N. Central Ave., Phoenix, Arizona.

These and other properties in the district are operated under lease agreement by:

Manzona Minerals, Inc. -- The company has recently incorporated and changed its name (formerly Manzona Mining Associates).

The company personnel is as follows:

Pres. - G. Calvin Williamson of Yuma

Gen. Mgr. - Proctor G. Millikan, 132 N. Frontier St., Wickenburg (Company Office)

Mill Supt. - Carl Allbran

Mine Supt. - Edgar Butts

The company has deferred construction of a flotation section in the Sitton plant. The mill resumed operations on Sept. 1st, treating 150 TPD on a one-shift a day basis. The H. M. and jig concentrates are being sent to Stovall at Casa Grande for blending into a specification product.

Most of the present mill feed is coming from the Shannon mine of Arizona Manganese Corp. Other current contributors are the American, Lewis and Peterson properties. All these sources are in the immediate vicinity of the plant. 14 men are employed, distributed as follows:

Mine (and trucking)	8
Mill	3
Office	3

Phone 3-4001

ARIZONA ASSAY OFFICE

CHAS. A. DIEHL
815 North First Street

Phoenix, Arizona,
Jan. 3, 1951

P. O. Box 1148

This Certifies That samples submitted for assay by Mr. Fred Falcon contain as follows per ton of 2000 lbs. Avoir.

MARKS	No.	SILVER Ounces	SILVER Tenths	VALUE (Oz.)	GOLD Ounces	GOLD Hundths	VALUE (Oz.)	TOTAL VALUE Of Gold and Silver	% MANGANESE	PERCENTAGE	%	REMARKS
72"	1								18.74			
NE Dump	2								12.39	Dump		
60"	3								20.81			
60"	4								14.76			
15 ft.	5								13.57		B W 4 6	
Middle Dump	6								12.69	Dump		
60"	7								10.47			
84"	8								16.97			
24"	9								8.11	low grade 3.9		
48"	10								24.35			
48"	11								18.45	Metallic		
9 ft	13								26.56			
8 ft	14								18.45	B.W. 11		
42"	16								19.77	B. W 13		

Charges $35.00

Assayer ARIZONA ASSAY OFFICE

Wenden, Arizona,
August 21, 1942

BLACK WARRIOR MINE-

To: J. S. Coupal

NEWS ITEM

From: Elgin B. Holt

The Black Warrior manganese mine, located in Mohave County, adjacent the the Artillery Peak properties, controlled by the M. A. Hanna Company, is being operated by Norman W. McGregor. Ore is hauled by truck to Wenden where it is loaded in cars and shipped to the Phoenix stockpile. One car was shipped around August 10, and another car will be delivered to Wenden ready for shipment within the next week.

Elgin B. Holt

DEPT. MINERAL RESOURCES
RECEIVED
AUG 24 1942
PHOENIX, ARIZONA

B Cock Warrior

CHD

September 23, 1944

Mr. N. W. McGregor
Box 95
Aguila, Arizona

Dear Mr. McGregor:

We have received the following from Bill Broadgate in answer to the letter I wrote when you were here last week:

> "Not a chance for anything under 42%. All contracts will run out in December. No chance for the Parker low grade stockpile to continue either. The manganese below 42% is not needed. We have 100,000 tons plus which will not be used in this war of low grade."

This does not look encouraging.

However, Mr. Willis is going to Washington on the 30th and may be able to bring about some changes.

We will hope for the best.

Yours very truly,

Chas. H. Dunning
Director

CHD:LP

October 21, 1943

Mr. Oscar Hogsett
c/o McKinney Blue Print Co.
939 South Olive Street
Los Angeles, California

Dear Oscar:

I believe I can locate a man who has equipment available and who is competent to go in and move the manganese ore from the Curtis-Black Warrior property provided a firm deal can be made and provided a proper royalty will be granted.

The parties concerned know that they can deliver manganese to the Kaiser Company on a basis of 20 percent manganese for $6.00 f.o.b. Bouse or Parker with an increase of two cents per unit for each percent under 20 percent ore.

On low grade material of this type I do not believe a 10 percent royalty is enough for the operator to move equipment and make investment necessary. On a low grade material of this type a 5 percent royalty with a minimum guarantee per month seems the most equitable deal to make.

Please advise me what you would consider on a deal of this type and I will take it up with the parties who have approached me regarding it. I might say that the contracting parties are two operators whom I have known for many years and in whose ability to move ore I have the utmost confidence.

With best wishes and kindest personal regards, I am

Yours very truly,

J. S. Coupal, Director

JSC:LP

CC: Mr. George McKinney

October 27, 1942 C

MEMORANDUM

BLACK WARRIOR MANGANESE MINE

TO: Elgin B. Holt

FROM: Earl F. Hastings

We have your report on the Wenden-Alamo road and note your information on the Black Warrior property.

For your own private information the Black Warrior Mine was formerly known as the Black Jim and title to it was recently returned to W. C. Graham, an associate, as per enclosed Court Order. It is our understanding that McGregor has been operating under a lease from H. B. Hurley and that Hurley now has lost possession of the premises. Consequently this project being sponsored by McGregor might backfire.

30 September 1941

Mr. H. W. McGregor,
Wenden,
Arizona.

My dear Mr. McGregor:

I have today mailed to Mr. L. S. Hackney, 132 No. Kenmore Avenue, Los Angeles, California, a copy of mine owners report covering the BLACK WARRIOR MINE with the suggestion that he communicate with you for further information.

I trust that you will hear from Mr. Hackney, and that desired results may be obtained.

With best wishes, I am

Yours very truly,

J. S. Coupal

JSC-jrf

September 16, 1944

DEPT. MINERAL RESOURCES
RECEIVED
SEP 21 1944
PHOENIX ARIZONA

MEMORANDUM

TO: W. C. Broadgate

FROM: Chas. H. Dunning

Norman W. McGregor has completed his manganese contracts numbers 977 and 2635. His shipments average about 38%.

What is the future outlook for such cases?

Chas H Dunning

CHD:LP

Sept 19

Check:

Not a chance for anything under 42%. All contracts will run out in December. No chance for the Parker lowgrade stockpile to continue either. The manganese below 42% is not needed. We have 100,000 tons + which will not be used in this war of lowgrade.

Bill

MD-58

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
OWNERS MINE REPORT

DEPT. MINERAL RESOURCES
RECEIVED
DEC 13 1940
PHOENIX, ARIZONA

Date I2, IO, I940

T11-12N

1. Mine Black Warrior
2. Mining District & County Owens, Mahava
3. Former name
4. Location sec.33, T.I7N, R.I3W.
5. Owner N.L.GOULDING
6. Address (Owner) ENID, OKLAHOMA
7. Operator N.W.McGREGOR
8. Address (Operator) WENDEN, ARIZ.
9. President
10. Gen. Mgr.
11. Mine Supt.
12. Mill Supt.
13. Principal Metals Manganese
14. Men Employed 2
15. Production Rate 50 L.T. daily
16. Mill: Type & Cap.
17. Power: Amt. & Type
18. Operations: Present Blocking out. Road building
19. Operations Planned Reserve dump of not less than 3000 tons
20. Number Claims, Title, etc. I2 claims U.S. Mining laws
21. Description: Topography & Geography Dissected bajada and lava-capped slopes north of the Williams River. altitude of 2246 ft. abouve sea level. These claims lay approx. 2 miles in a southwesterly direction from Artillery Mtn. and about four miles west of the juction of the Big Sandy and the Santa Maria Rivers. Four and a half miles north of the Alamo Crossing, and highway #93.
22. Mine Workings: Amt. & Condition 350 ft. of test tunnels and 450 ft. of open cut work of which there has been 2I cars of ore shipped.

(over)

23. Geology & Mineralization Coarse-grained granitic rocks of probable pre-Cambrian age extend into the Artillery Mountains. Next younger is a thick series of probable Tertiary sandstones, shale, limestones, and conglomerates, all more or less lenticular. Lying in places upon the tilted beveled edges of these beds and in places upon the irregularly eroded surface of the granite, are relativly small areas of lava flows. Capping many of the mesas are basalt flows.

24. Ore: Positive & Probable, Ore Dumps, Tailings

Ore in sight estimated at 8000 tons of shipping grade
Milling ore estimated at 400000 tons.

24-A Vein Width, Length, Value, etc.

I8 in. 40 % plus(Mn) I500 Ft.
4ft. 44 % " " 250 Ft.
8Ft. 33 % " " 286 Ft. All slope to the southwest at an angle of I5 degrees.

25. Mine, Mill Equipment & Flow Sheet

250 ton ore bin, track and ore car, 30 Catapiller bulldozer, Ford V8 truck bunk shack, cook shack, water tank, Owners quarters, machine shop, compressor hose, jack hammers, Timken steel, and bits, water pumps, Fairbanks-Morse engine steel beds and mattresses and cook shack equippment.

26. Road Conditions, Route

Good desert trucking roads on Route #93 from Wenden, Aguila, Congress Juntion and Yucca

27. Water Supply

Williams River approx. 4 miles

28. Brief History

This property has been opperated on and of sinse I9I7 under different people.

29. Special Problems, Reports Filed

A mill would be the most feasible methode of handling.

30. Remarks

31. If property for sale: Price, terms and address to negotiate.

32. Signed K. W. McGuigan

33. Use additional sheets if necessary.

MB-58

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
OWNERS MINE REPORT

Date 12/10/40

1. Mine Black Warrior

2. Mining District & County Owens Dist. Mohave County

3. Former name

4. Location Sec. 33, T. 17 N, R. 13 W

5. Owner N. L. Goulding

6. Address (Owner) Enid, Oklahoma

7. Operator N. W. McGregor

8. Address (Operator) Wenden, Arizona

9. President

10. Gen. Mgr.

11. Mine Supt.

12. Mill Supt.

13. Principal Metals Manganese

14. Men Employed 2

15. Production Rate 50 L. T. daily

16. Mill: Type & Cap.

17. Power: Amt. & Type

18. Operations: Present Blocking out. Road building

19. Operations Planned Reserve dump of not less than 3000 tons.

20. Number Claims, Title, etc. 12 claims. U. S. Mining Laws

21. Description: Topography & Geography Dissected bajada and lava-capped slopes north of the Williams river, altitude of 2246 ft. above sea level. These claims lay approx. 2 miles in a southwesterly direction from Artillery Mts. and about four miles west of the Junction of the Big Sandy and the Santa Maria rivers. Four and a half miles north of the Alamo Crossing, and highway #93.

22. Mine Workings: Amt. & Condition 350 ft. of test tunnels and 450 ft. of open cut work of which there has been 21 cars of ore shipped,

(over)

23. Geology & Mineralization Coarse-grained granitic rocks of probable pre-Cambrian age extend into the Artillery Mountains. Next younger is a thick series of probable Tertiary sandstones, shale, limestones, and conglomerates, all more or less lenticular. Lying in places upon the tilted beveled edges of these beds and in places upon the irregularly eroded surface of the granite, are relatively small

24. Ore: Positive & Probable, Ore Dumps, Tailings Ore in sight estimated at 8000 tons of shipping grade
Milling ore estimated at 400,000 tons.

24-A Vein Width, Length, Value, etc. 18 in. 40 % plus (Mn(1500 ft.
4 ft. 44 % " " 250 ft.
8 ft. 33 % " " 286 ft. All slope to the southwest at an angle of 15 degrees.

25. Mine, Mill Equipment & Flow Sheet 250 ton ore bin, track and ore car, 30 catapiller bulldozer, Ford V-8 truck, bunk shack, cook shack water tank, Owners quarters, machine shop, compressor hose, jackhammers, Timken steel, and bits, water pumps, Fairbanks-Morse engine, steel beds and mattresses and cook shack equipment.

26. Road Conditions, Route
Good desert trucking roads on route #93 from Wenden, Aguila, Congress Junction and Yucca

27. Water Supply Williams river approximately 4 miles.

28. Brief History This property has been operated on and off since 1917 under different people.

29. Special Problems, Reports Filed A mill would be the most feasible method of handling

30. Remarks

31. If property for sale: Price, terms and address to negotiate.

32. Signed N. W. McGregor

33. Use additional sheets if necessary.

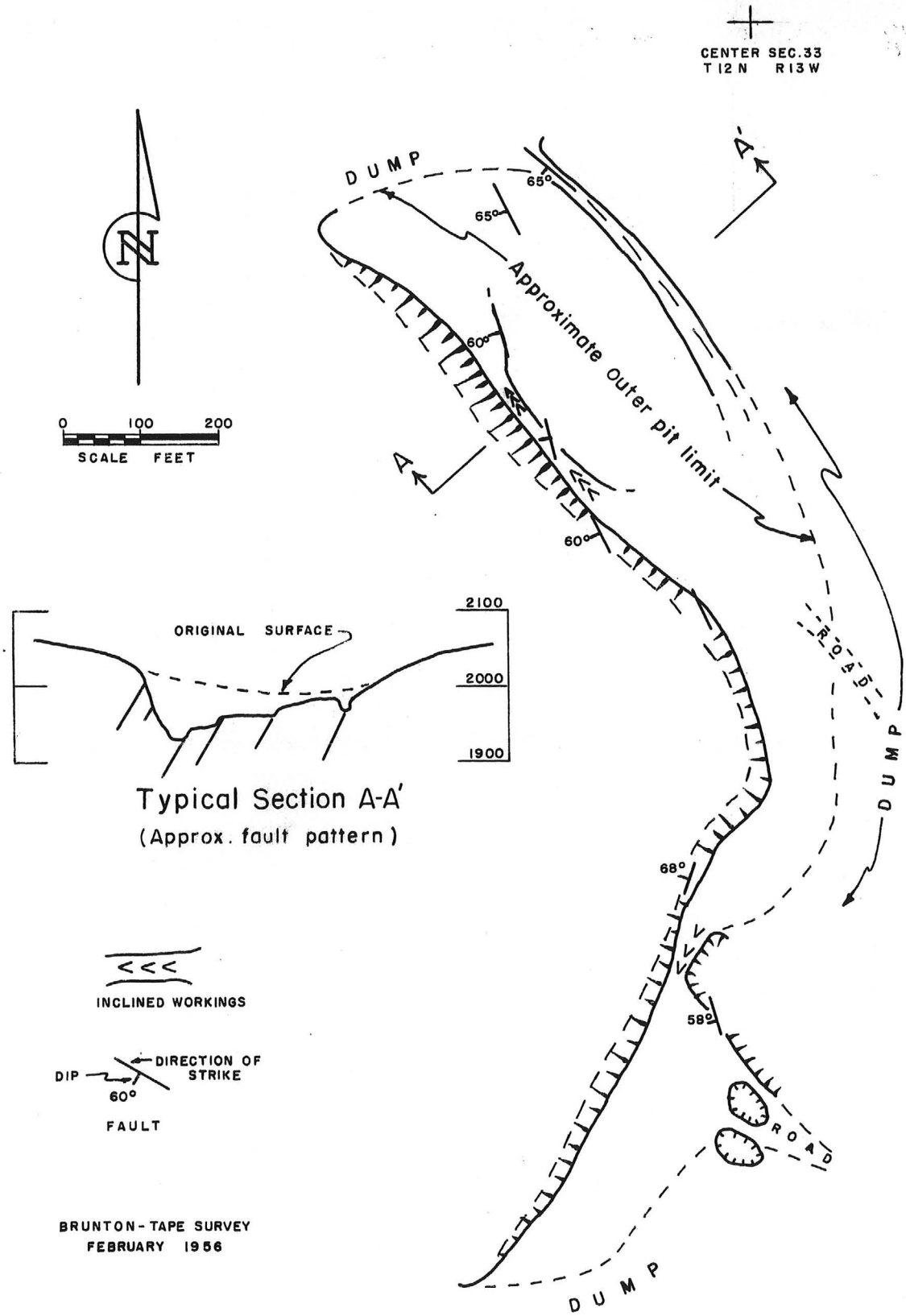
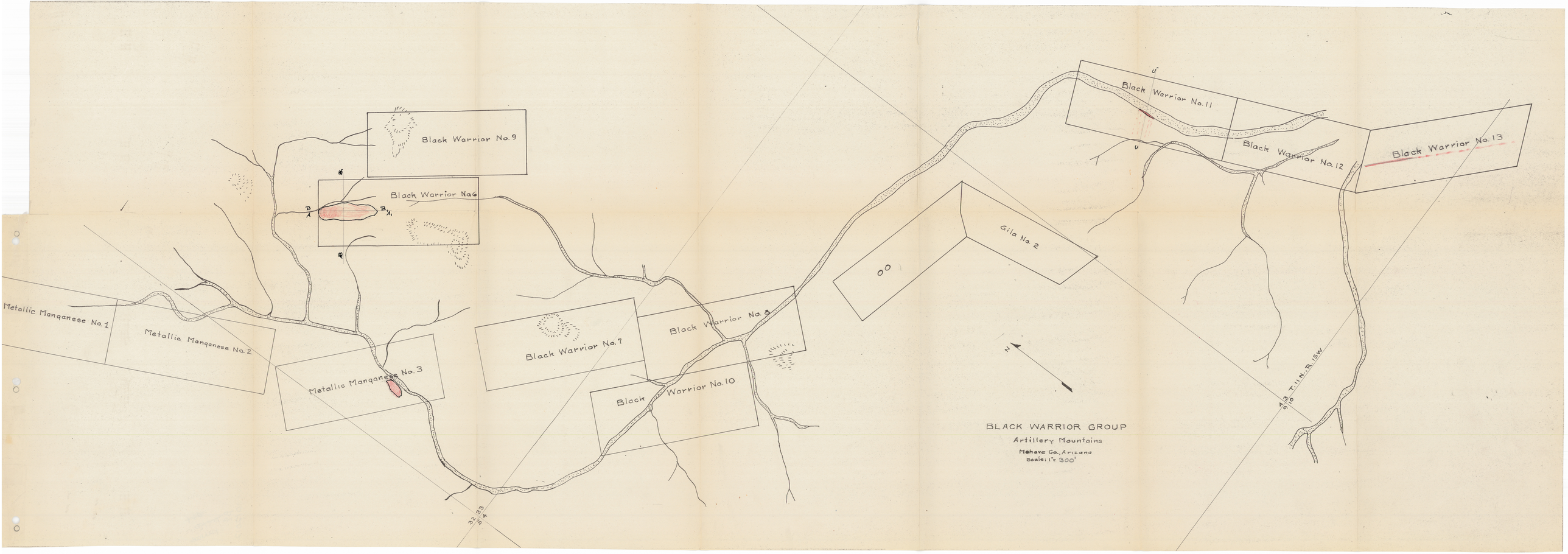


FIG. 14 PLAN & SECTION, Mc GREGOR PIT



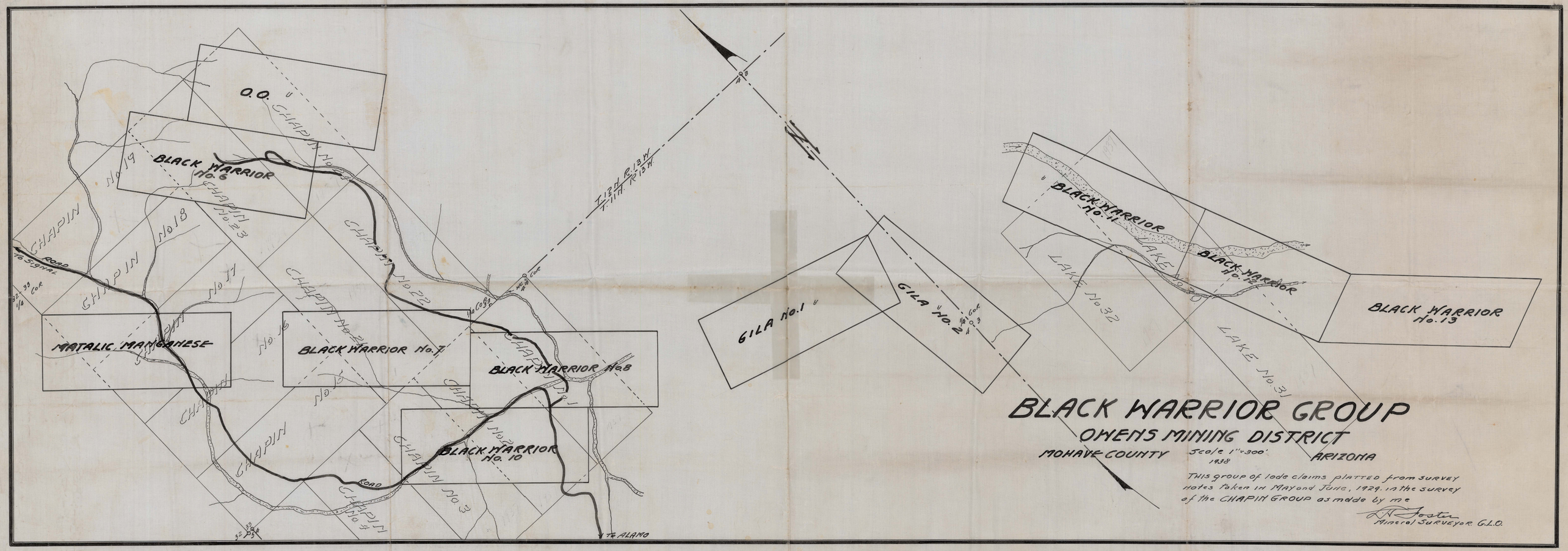
BLACK WARRIOR GROUP

Artillery Mountains

Mohave Co., Arizona

Scale: 1" = 300'

Mineral Survey No 1309



Map Of

Black Warrior Manganese Group Of Lode Mining Claims In Township 11 North, Range 13 West Gila & Salt River Base Meridian Owens Mining District In The County Of Mohave, Arizona

This Map Compiled & Delineated By
E. Ross Householder
E. Ross Householder, E.M.
Registered Mining Engineer #257
Kingman, Arizona

"From Various Sources Of Information Herein Noted.
"Original Claim Survey By: L.H. Foster, U.S. Mineral Surveyor (1929)
"Geology By: B.H. Webber, Geologist (1930)."

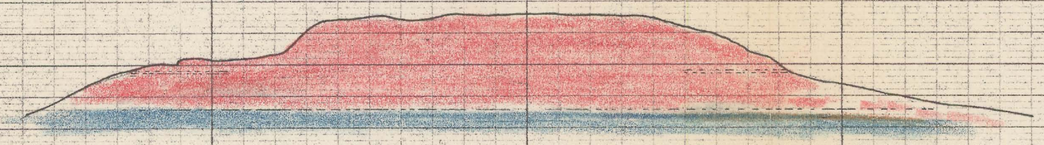
Traced By W. M. Walker 1948. Checked & Titled By: ERH Dec. 11, 1948

Scale 1" = 300'

This Map Especially Prepared For: R.B. Hurley, 155 Maple St., Kingman, Arizona

BLACK WARRIOR NO. 6

SEC. A-A.

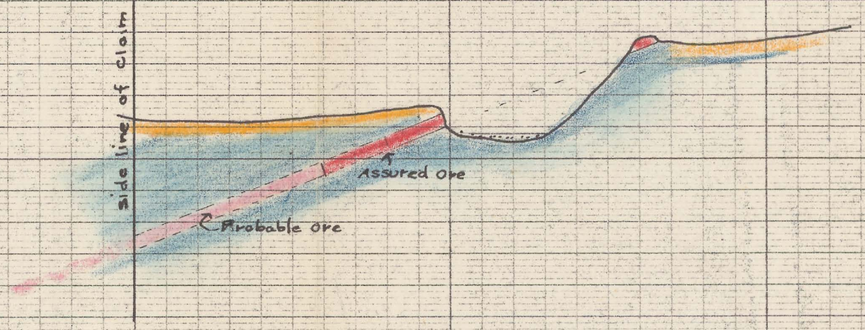
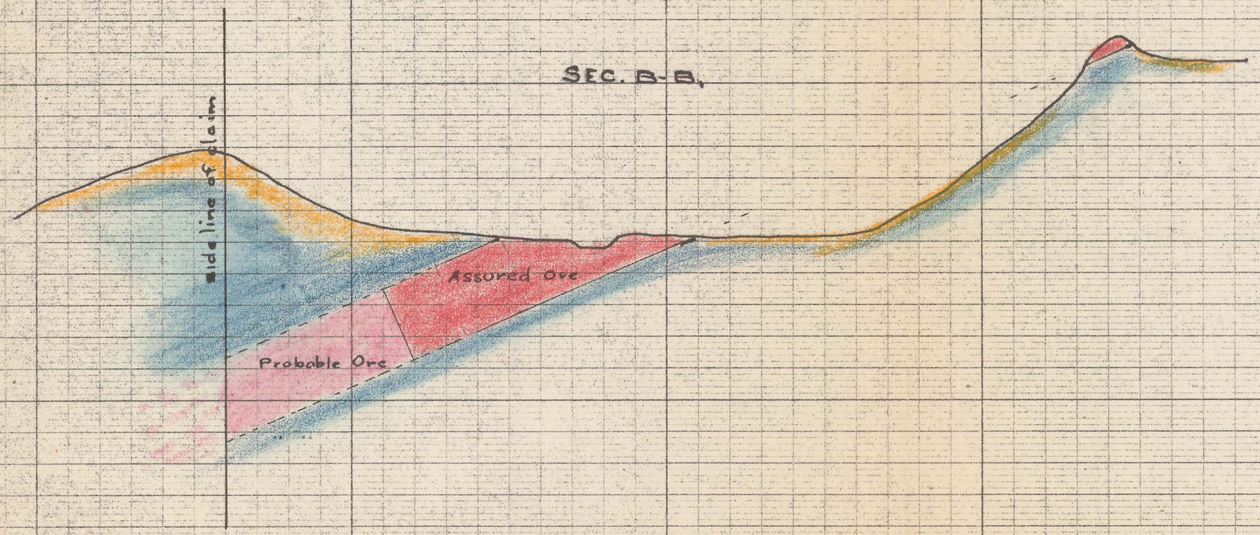


Ore
Talus, gravel, sd.
Sandstone, shale

SCALE: 1" = 100'

BLACK WARRIOR NO. 11

SEC. C-C.



SEC. B-B.