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Arizona Department of Mines and Mineral Resources Mining Collection

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04/22/87

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: GLOBE MANGANESE

ALTERNATE NAMES:
GLOBE COMMERCIAL CU CO. GP.
CALIFORNIA GROUP
JOLYN MANGANESE
JONES MANGANESE

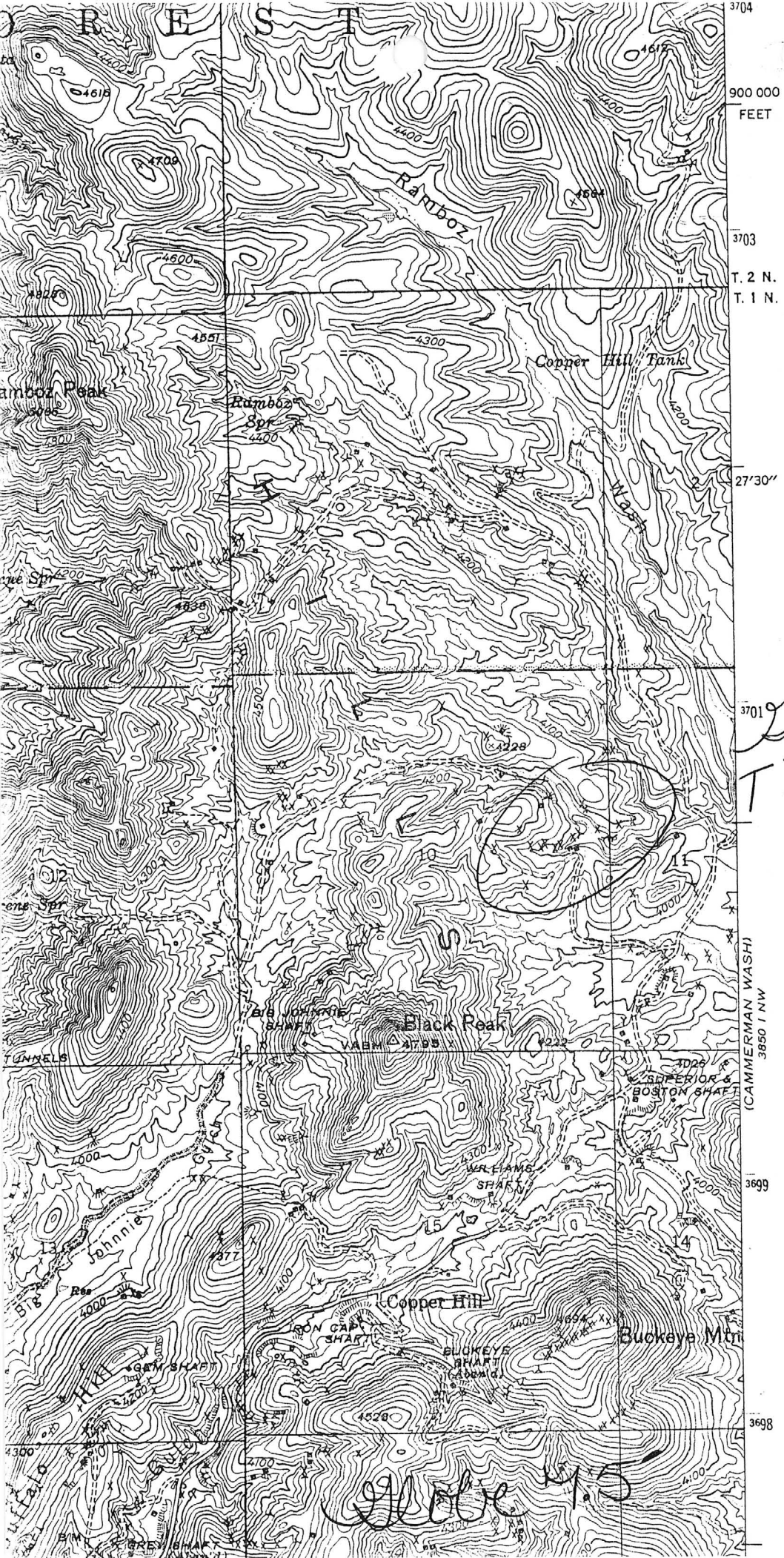
GILA COUNTY MILS NUMBER: 170E

LOCATION: TOWNSHIP 1 N RANGE 15.5E SECTION 10 QUARTER SE
LATITUDE: N 33DEG 26MIN 35SEC LONGITUDE: W 110DEG 45MIN 30SEC
TOPO MAP NAME: GLOBE - 7.5 MIN

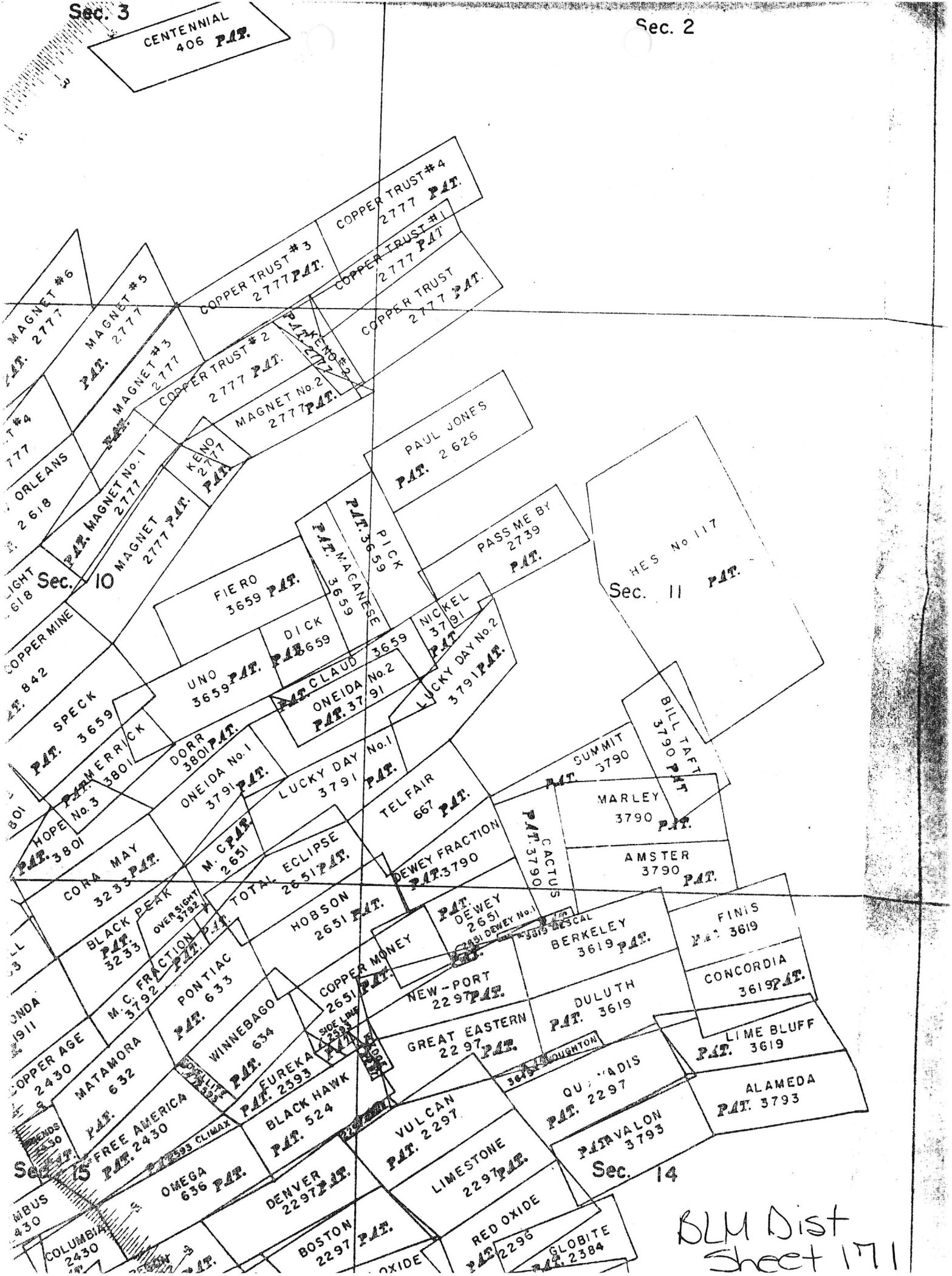
CURRENT STATUS: PAST PRODUCER

COMMODITY:
MANGANESE
SILVER

BIBLIOGRAPHY:
FARNHAM L L ETAL MANG DEPTS EASTERN AZ USBM
IC 7990 1961 P 61-64
BLM MINING DIST SHEET 171
RANSOME F L & E E BURCHARD CONT TO ECON GEOL
USGS BULL 710-D 1920 P 167
WILSON E D & B M BUTLER MANG ORE DETPS AZ
AZBM BULL 127 1930 P 59-71
ADMMR GLOBE MANGANESE FILE



Globe Manganese
T 2N R 15.5E Sec 10


Sec. 3
CENTENNIAL 406 PAT.
Sec. 2
COPPER TRUST #4 2777 PAT.
COPPER TRUST #1 2777 PAT.
COPPER TRUST #3 2777 PAT.
COPPER TRUST 2777 PAT.
MAGNET #6 2777 PAT.
MAGNET #5 2777 PAT.
MAGNET #3 2777 PAT.
COPPER TRUST #2 2777 PAT.
MAGNET No. 2 2777 PAT.
MAGNET No. 1 2777 PAT.
KENO 2777 PAT.
PAUL JONES 2626 PAT.
PASS ME BY 2739 PAT.
HES No 117 PAT.
Sec. 11
Sec. 10
PICK 3659 PAT.
MANGANESE 3659 PAT.
FIERO 3659 PAT.
DICK 3659 PAT.
NICKEL 3791 PAT.
UNO 3659 PAT.
CLAUD 3659 PAT.
ONEIDA No. 2 3791 PAT.
LUCKY DAY No. 2 3791 PAT.
SPECK 3659 PAT.
MERRICK 3801 PAT.
DORR 3801 PAT.
ONEIDA No. 1 3791 PAT.
LUCKY DAY No. 1 3791 PAT.
TELFAIR 667 PAT.
SUMMIT 3790 PAT.
BILL TAFT 3790 PAT.
MARLEY 3790 PAT.
HOPE No. 3 3801 PAT.
CORA MAY 3233 PAT.
M. C. 2651 PAT.
TOTAL ECLIPSE 2651 PAT.
DEWEY FRACTION 3790 PAT.
CACTUS 3790 PAT.
AMSTER 3790 PAT.
BLACK PEAK 3233 PAT.
OVERSIGHT 3792 PAT.
HOBSON 2651 PAT.
DEWEY 2651 PAT.
BERKELEY 3619 PAT.
FINIS 3619 PAT.
M. C. FRACTION 3792 PAT.
PONTIAC 633 PAT.
COPPER MONEY 2651 PAT.
NEW-PORT 2297 PAT.
DULUTH 3619 PAT.
CONCORDIA 3619 PAT.
WINNEBAGO 634 PAT.
GREAT EASTERN 2297 PAT.
LIME BLUFF 3619 PAT.
COPPER AGE 2430 PAT.
MATAMORA 632 PAT.
EUREKA 2393 PAT.
BLACK HAWK 524 PAT.
QUINCADIS 2297 PAT.
ALAMEDA 3793 PAT.
FREE AMERICA 2430 PAT.
VULCAN 2297 PAT.
VALON 3793 PAT.
Sec. 15
Sec. 14
OMEGA 636 PAT.
LIMESTONE 2297 PAT.
DENVER 2297 PAT.
RED OXIDE 2295 PAT.
GLOBITE 2384 PAT.
COLUMBIA 2430 PAT.
BOSTON 2297 PAT.
BLM Dist
Sheet 171

NAME OF MINE: GLOBE-GILA

COUNTY: GILA
DISTRICT:
METALS: Mn

E

OPERATOR AND ADDRESS:		MINE STATUS	
DATE:		DATE:	
5/1/44	Al Stovall & David Hartley, Globe	5/1/44	Mn Trucking
		12/44	Idle

See: IC 7990, p. 61

JONES MANGANESE

Mn

Gila 4 - 4 T 1 N, R 16 E

Jim Jones, Globe '42

NAME OF MINE: JONES'MN

COUNTY: GILA
DISTRICT:
METALS: MN

OPERATOR AND ADDRESS: DATE:		MINE STATUS DATE:	
5/1/44	F.A.Bennett, Box 93,Tucson	5/1/44	Idle

SEE: ABM Bull. 127, p. 59, 60, 61 (Globe Commercial Copper Co. (Calif. Group)).
SEE: IC 7990, p. 42
See: USGS Professional Paper #342 - Page 133 (California Group)

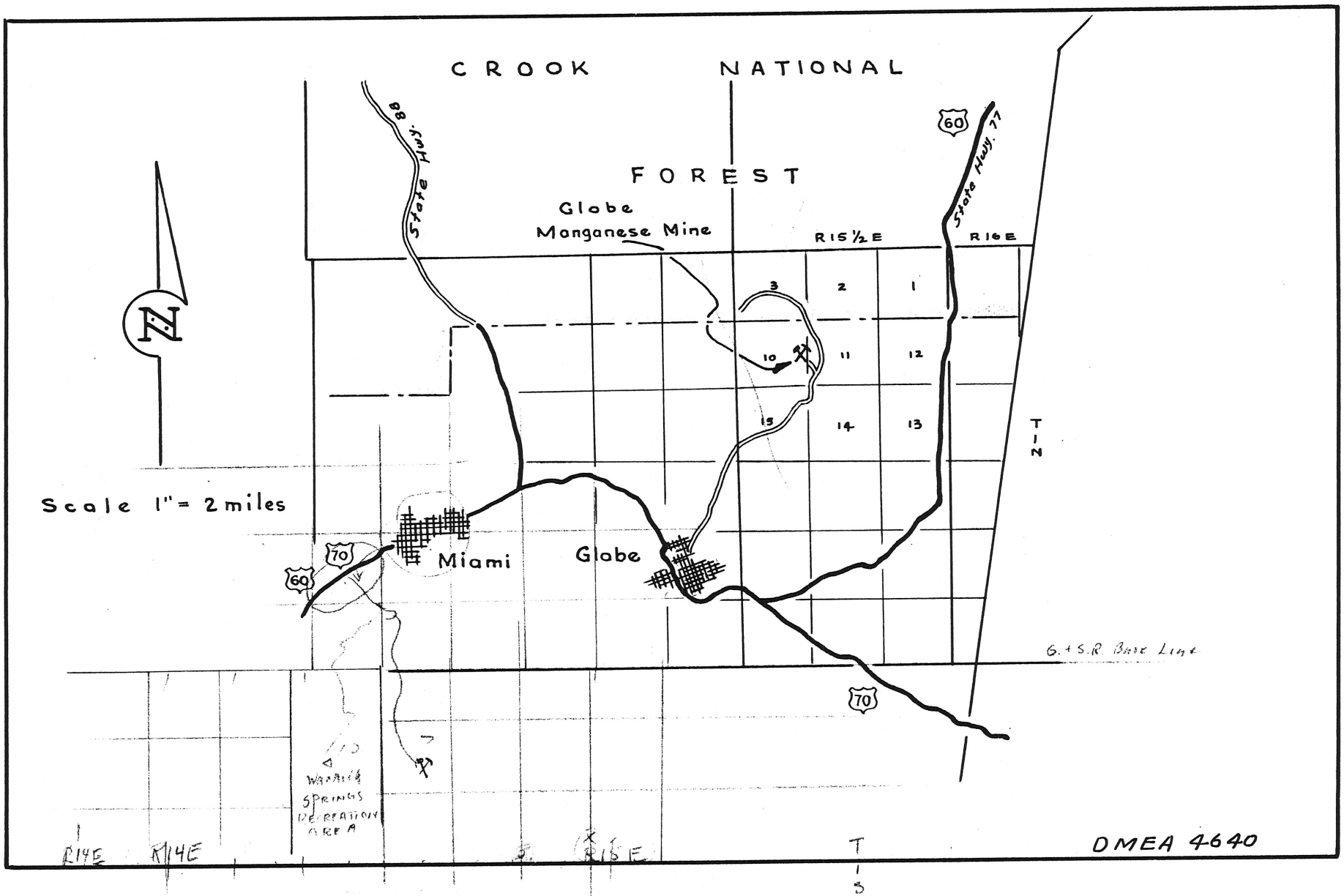


Fig. 1 Location map, Jolyn Associates
Gila County, Arizona

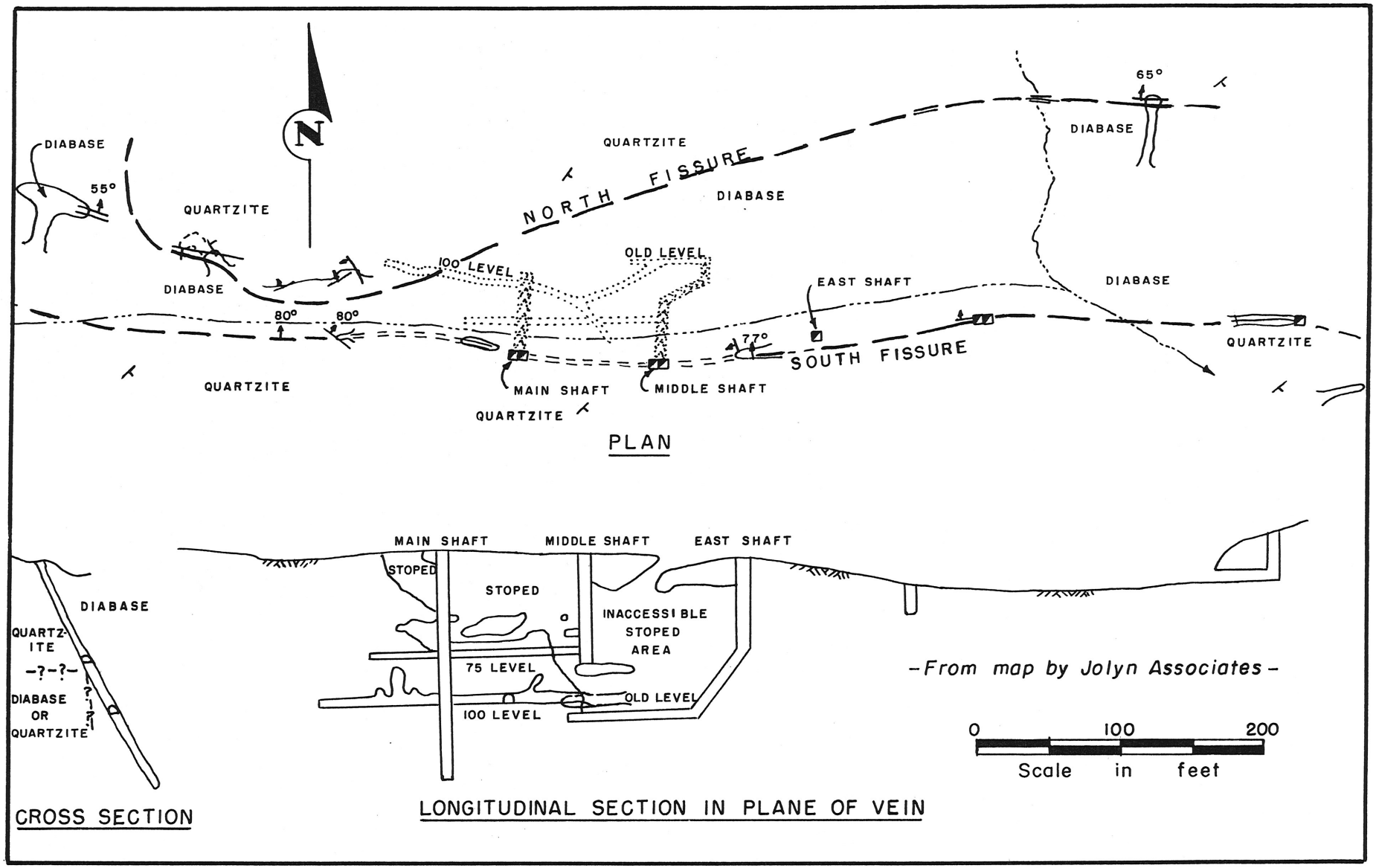


FIG. 11- GLOBE MANGANESE MINE, GILA COUNTY, ARIZ.

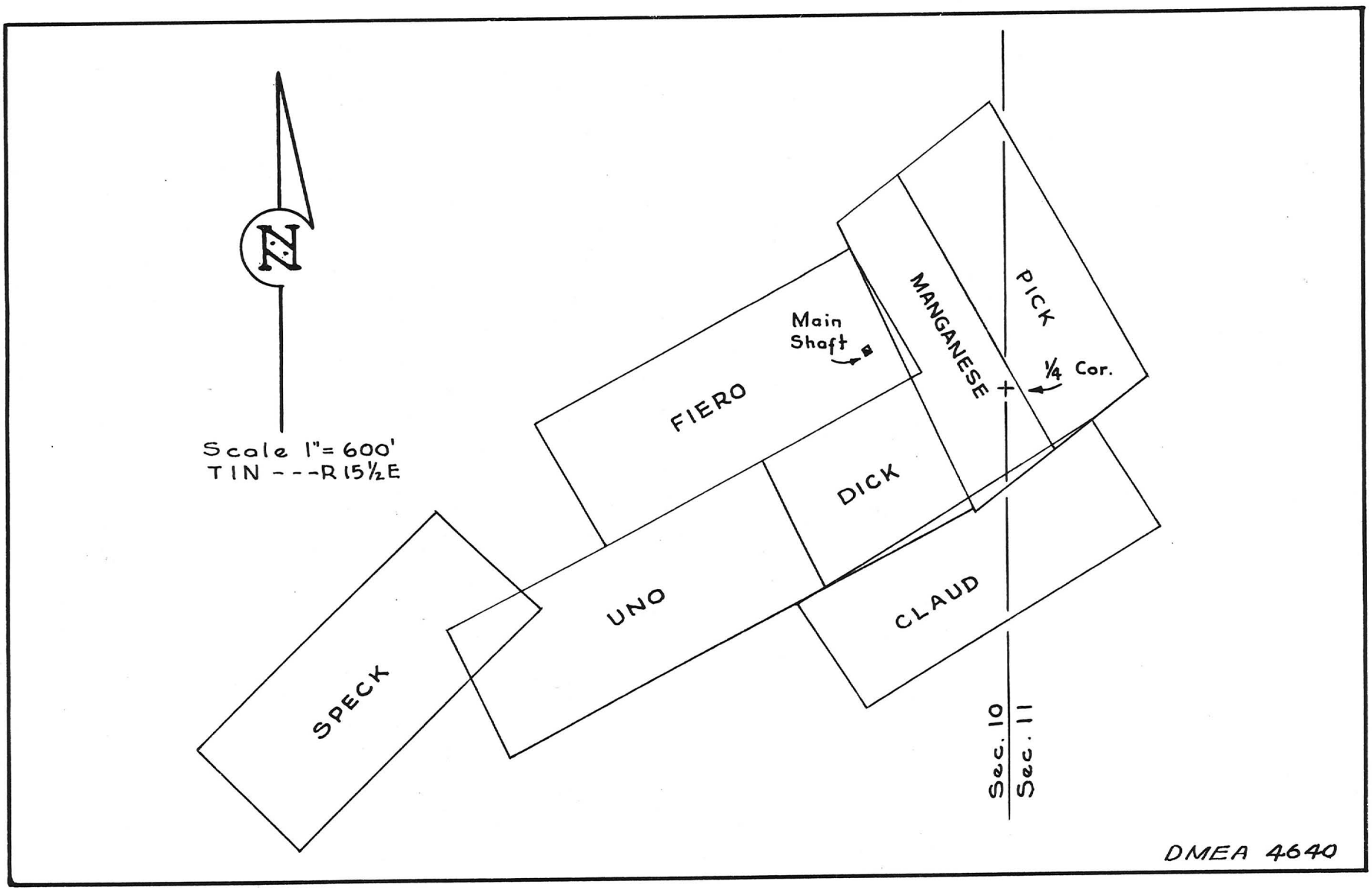


Fig. 2 Claim map, Jolyn Associates

Globe Manganese Mine, Gila County, Arizona

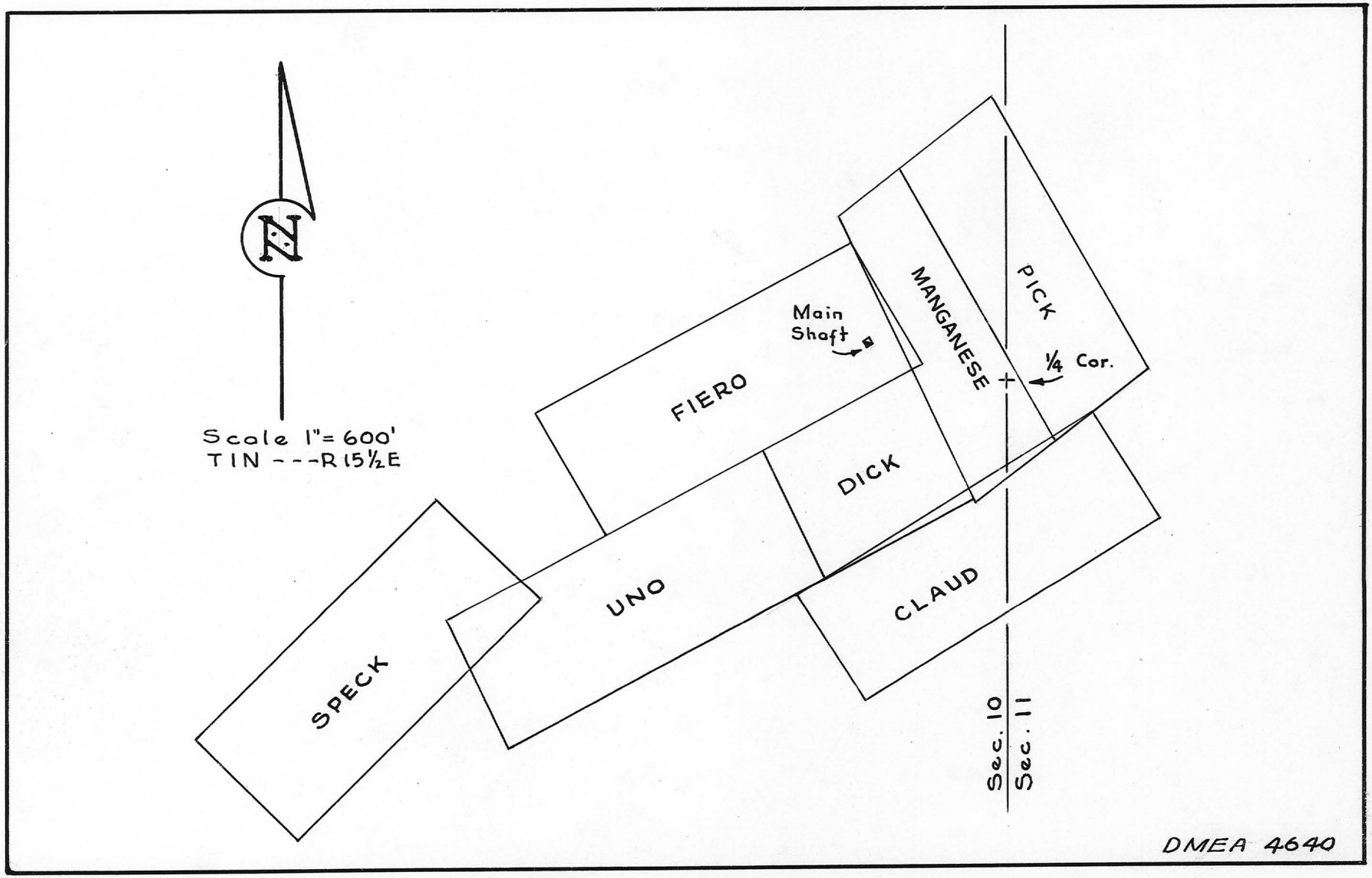


Fig. 2 Claim map, Jolyn Associates

Globe Manganese Mine, Gila County, Arizona

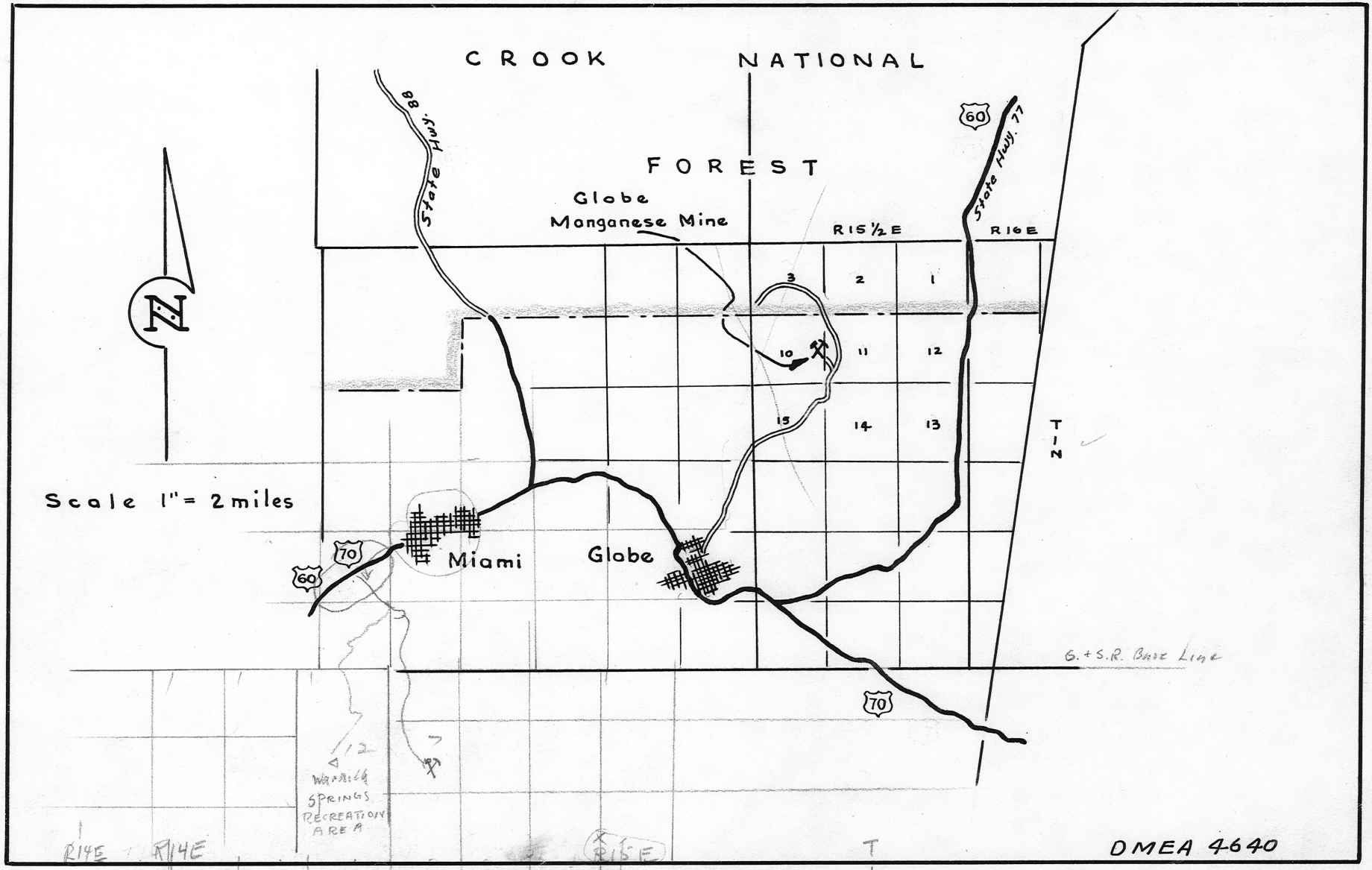


Fig. 1 Location map, Jolyn Associates
Gila County, Arizona

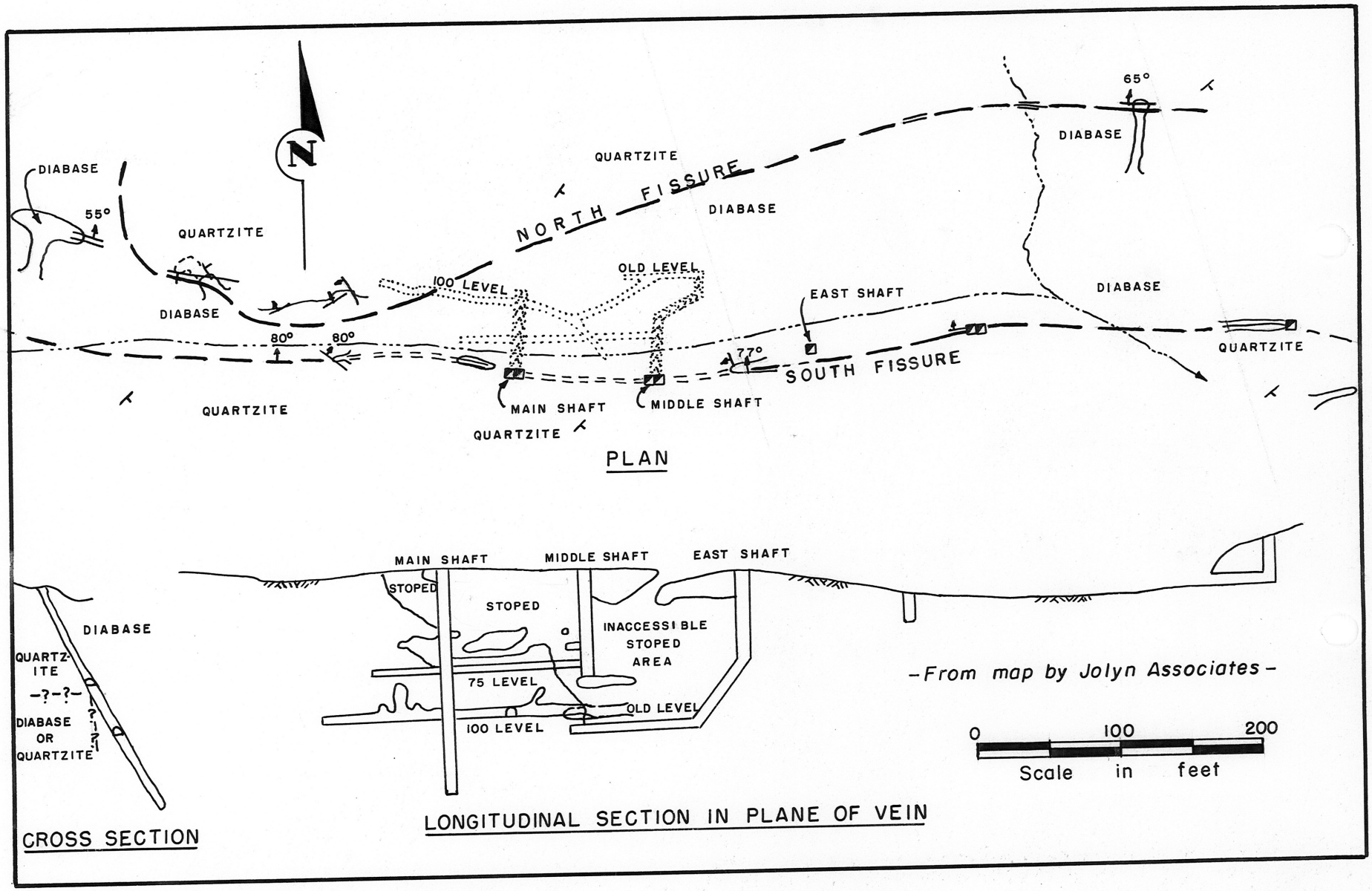


FIG. 11- GLOBE MANGANESE MINE, GILA COUNTY, ARIZ.

(Globe Manganese
IC 7990 pg 61

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine JOLYN MANGANESE MINE Date July 18, 1957

District GILA COUNTY Engineer Lewis A. Smith

Subject:

Owner: Jolyn Associates, Phoenix, Arizona.
President: Charles H. Jones, Sands Motel, Phoenix.

Supt. & Operator: Ralph Henderson & Sons, Globe, Arizona.

MINERAL: MANGANESE - 7 claims -- 25-30% Mn.

Location of Mine: At Copper Hill, East of Globe, 2 mi. North of Iron Cap and Superior and Boston. In Sec. 11, T1N R15½E.

Mine has 3 shafts - 1 adit.

Mine Equipment: 2 Cats
1-600 Gyolto Compressor
1-200 Worth "

Shipping Mn-Fe ore to Wickenburg.

Working 10 - 12 men.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Globe-Manganese Mine (Wolfe-Olsen Lease) Date May 23, 1958

District Globe (Sec. 11 T1N, R15½E) Engineer Lewis A. Smith

Subject: Mine Visitation

Owner: Tony Kimball of Silver City, New Mexico

Operators: Erwin Wolfe, Claypool, Arizona (in charge)
Oscar Olson, Globe, Arizona

Mine: The mine is opened by a 200' inclined shaft (overall) which goes 120' to a level and is offset by a drift 30' to a winze which goes down an additional 60'. The ore, now being mined is coming from 120 foot level. Thus far they have shipped 3 - 50 tons in 3 months of ore averaging between 24-31% Mn and 10% Fe per ton. They have on hand about 150 tons which they hope to ship to Winterhaven. The previous shipments having gone to Mohave at Wickenburg. The working portion of the vein trends NW-SE and is about 6-10' wide. The mine is equipped with a 15" single drive hoist powered by a gasoline engine. The air is furnished by a 210 Worthington compressor. 5 men are employed.

Geology: The geology is quite similar to that found in the Magnet-Yuma and Keno claims. The vein here dips 65° NE and strikes about N 45°W, but is curving. There appears to be some evidence that the manganese mineralization may be associated with the diabase intrusion. The vein is shattered and causes trouble in mining. It is also "chopped up" by transverse faults.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Globe Manganese Date 9-19-58

District Globe, Gila Co. Engineer Lewis A. Smith

Subject: Mine visit (supplementary)

Operators: Earl C. Wilson, Globe, Arizona (Lessee)

Employment: 3

Mining: Largely by stull stope, using jack hammers and hand mucking.

Beneficiation: Screening through 3/4 mesh. Screening shipped to Mohave Mining & Milling Co. at Wickenburg.

Underground: Access is by means of a 60° inclined shaft, 35 ft. deep. A drift along the vein for 35 feet is being driven and stoping is above part of this drift. Hoisting is done by means of a gasoline driven single drum hoist, a 1/2 inch cable and a bucket. The bucket is dumped into a one-ton car and trammed to a trestle where it is dumped into a truck. The truck delivers it to a stock pile where it is later picked up by Wells-Cargo. Air is furnished by a Worthington 100 compressor.

Geology: The vein trends NE-SW and cuts quartzite. The dip is to the SW at about 60°. The ore is comprised largely of pyrolusite and psilomelane, breccia fragments and iron oxides. The average grade is 25-30% Mn and 10% iron. The ore in this area is lenticular in occurrence and may be isolated in lenses by cross fractures or minor flexures in the quartzite.

Production: 6 tons of screened ore per day at present, but will be stepped up later.

DEPARTMENT OF MINERAL RESOURCES
State of Arizona
MINE OWNER'S REPORT

Date June 13, 1958

1. Mine: Globe Manganese
2. Location: Sec..... Twp..... Range..... Nearest Town Globe Distance 6 miles
   Direction..... Nearest R.R. Southern Pacific Distance 6 miles
   Road Conditions Fair
3. Mining District and County: Globe mining dist Gila County
4. Former Name of Mine: Globe manganese
5. Owner: T. W. Kimble
   Address: 1700 Georgia Street Silver City N.M.
6. Operator: Irwin Wolfe
   Address: Gen Del Claypool Ariz
7. Principal Minerals: Manganese
8. Number of Claims: Lode..... Patented 7 Unpatented.....
   Placer..... Patented..... Unpatented.....
9. Type of Surrounding Terrain: Quartzite
10. Geology and Mineralization: The ore is formed on a quartzsite-diabase contact. From the surface to the hundred foot level there is a quartzsite foot wall & a diabase hanging but at greater depth both walls are diabase. The vein runs east & west on about a 70° pitch to the north. There is considerable cross faulting, mostly pre mineralization, with the ore shoots running between the faul
11. Dimension and Value of Ore Body: Surface outcrop can be traced for ½ mile. Ave width is 4 to 6' sometimes as wide as 15' Ave grade 30% mg.

Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective leasors or buyers.

(over)

INCREASE PRODUCTION SURVEY

By: FRED H. PERKINS

Al Stovall, Lessor

Address: Gen'l Del'y, Globe, Arizona

JONES' CALIFORNIA MANGANESE GROUP

September 17, 1942

JONES' MANGANESE MINE

Al Stovall, Lessor

The California Group of manganese claims called RED HORSE, WHITE HORSE and CALIFORNIA, lode mining claims owned by Jim Jones, Globe, Arizona, and located four miles north of Globe on Copper Hill road, is now under Lease and Option to Al Stovall, of Globe, Arizona.

The development consists of one vertical shaft 45' deep; a combined drift and stope of 100', one inclined shaft 75' deep. Each shaft has a head frame and gasoline engine hoist. The vertical shaft is outfitted with a 15 ton ore bin.

The vein in the above is almost vertical and is about 12' wide. An air compressor and drills are installed convenient to the workings.

The average of the ore exposed runs 35% or better in manganese, with the wall rock of diabase and quartzite. Zinc up to 3% shows in the workings on the southerly extremity, with a total absence of zinc on the north portion of the property.

The ore is in the form of Pyrolusite and the present workings produce quantities of fines. The lessor has spent a lot of time in trying out different methods to bind the fines this ore produces. Of all the schemes he has tried, water and heat are the best binders and if any quantity of ore is handled, a cost of about $5.00 per ton was experienced.

The mine, in its present state of development and equipment, can produce a car of ore a day with six men.

A good, inexpensive road goes to this property.

INCREASE PRODUCTION SURVEY

By: FRED H. PERKINS

September 17, 1942

JONES' MANGANESE MINE

Al Stovall, Lessor.

PROBLEMS:

The mining of this ore body produces too large a percentage of fines. The presence of zinc up to 3% makes this ore undesirable to Government Ore Stock Piles and other purchasers. The stock pile at Deming will allow the lessor to ship only a car a week. He can't hold his working force by working only a day or two a week, whereas he could make some money if he could go ahead and work steadily, and be able to market all the ore he could ship.

This producer must have a ready sale for his product to keep up production.

The ore is in the form of Pyrolucite and cannot be successfully concentrated.

A lack of water is a draw back to this operation.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine JONES' MANGANESE MINE (Al Stovall - Lessor - F. A. Bennett - Sub-Lessor, Address: General Delivery, Globe, Ariz.)

Date September 19, 1942

District

Engineer FRED H. PERKINS

Subject:

The Red Horse, White Horse, and California lode mining claims comprise the Jim Jones' California Manganese Group. These claims are located four miles northerly from Globe, Arizona, on the Copper Hill Road. Mr. Al Stovall has a lease and option on the three claims and Mr. F. A. Bennett has a sub-lease on the California Lode Claim from Mr. Al Stovall.

The development on the California claim consists of a shaft 25' deep and 50' of a tunnel; also several open cuts of varying depths.

Mr. Bennett is driving a tunnel to cut the shaft at a depth of about 75'. This tunnel is driven on the vein and has produced over a car of ore in going a very few feet. The vein is around 8' wide and the ore is running over 35% manganese and shows no zinc.

The above vein is the north extention of the same vein Al Stovall is mining on. The rib of hard ore is wider in the Bennett lease than it is in the Stovall lease, thus making less fines in mining.

The Bennett lease is equipped with a compressor and drills.

In three months this property will be opened up sufficiently so that it can easily produce a car of ore a day.

A continuation of the Stovall lease road is completed to the Bennett lease workings.

PROBLEMS: - Water must be hauled to this operation. The tunnel that is being driven toward the shaft is not gaining depth very fast and some depth must be gained in the shaft before more than one working face is opened up.

To date Demming Stock Pile will only accept one car of ore per week.

Zinc content and percentage of fines do not bother this product, but it is a Pyrolucite ore and so far no good method of concentration is known.

Date 12-15-44

TO MINING DIVISION
LOS ANGELES COUNTY CHAMBER OF COMMERCE
LOS ANGELES - 15 CALIFORNIA

1. Name of Mine Globe Manganese
2. Owner's Name and Address
3. Operator's Name and Address Al Stovall Globe, Arizona.
4. Location of Mine about 7 miles N. of Globe
(Number of Miles N.E.S. or W. of Nearest Town)
5. District Copper Hill P.O. Address Globe Ariz.
6. Ore Produced manganese
7. How Developed shaft + drifts + stopes
8. Power used Gasoline
9. Equipment Hoisting equipment complete, Compressor and air drills + hand tools
10. Number of Men Employed 4
11. Plans for Future Operations will shut down Dec. 31st due to Governments termination of purchase of Mn. ores less than 42% Mn.
12. Remarks Not visible Mn ores of +42% Mn acceptable to Metals Reserve.

Signed A. Macfarlane
(Please state title)

[redacted]

Land + Mining Jnl Mar. 1944 p. 249

wad and needle-like crystals of manganite; the manganite occurs as narrow seams and lines small cavities in the ore. The ore is black, dark brown, and reddish, and in most of it that lies on the dumps the presence of manganese minerals is little suspected because they are enveloped by the soft limonite, which breaks to a powder. When the ore is freshly broken the manganese oxides are apparent as seams or as finely crystalline aggregates that line cavities. The best ore was obtained from the surface.

"Water level has nowhere been reached in the extraction of manganese ores; the deepest work is about 45 feet below the surface. There are some deeper shafts in the vicinity, but no information was to be had with regard to the depth of the water level.

"As explored, the ore shoots of the deposits are lenticular masses with a maximum length of 200 feet and a maximum depth of 45 feet. The ore at the point where this depth was attained, however, was of poor grade, and it is probable that the ore will not persist much below this depth in any of these veins.

"The replaced rock of the manganese deposits is greatly altered, so that its original character is difficult to recognize, but it appears probable that the diabase was replaced to a greater extent than the quartzite, as the texture of most of the replaced rock more nearly resembles that of the diabase than of the quartzite."

MINES AND CLAIMS

"*Globe Commercial Copper Co. (California group)*: The California group of the Globe Commercial Copper Company lies in the southeastern part of the manganese-bearing area north of Globe. The property is said to have produced some silver ore many years ago..... In 1916 the claims were leased to Buckingham & Wright, who shipped 24 cars of manganese ore from September, 1916, to February, 1917. Later the claims were worked by Jamison & Bailey, who shipped nine cars of ore to June, 1917, but since then work has been suspended. In all about 1,500 tons of ore was shipped to the Miami Metals Co., of Chicago, and to the Seaboard Steel & Manganese Corporation, of Temple, Pa., for use probably in alloys. Assays of the best and poorest carload shipments from this property are as follows: Manganese, 35.52 and 16.70 percent; iron, 11.31 and 8.77 percent; silica, 8.47 and 38.55 percent; phosphorus, 0.031 and 0.204 percent; and moisture, 6.04 percent in one sample only. The best ore was obtained near the surface, and the poorest is said to have come from the bottom of a shaft 45 feet deep, the greatest depth to

which the ore was mined. The ore is said to contain about two ounces of silver to the ton. Most of the ore of better grade has been mined from the veins in this property, but on the assumption that ore extends to a depth of fifty feet, there is in reserve probably 1,000 tons of ore with a content of twenty to thirty percent of manganese.

"Several manganiferous veins are inclosed by the California group. They strike about east and dip 30°-60° N. The vein that has yielded most of the manganese ore strikes N. 75° E. and dips 60° N. 15° W. In general, it lies at the contact of quartzite and diabase, but at the east end of the workings it is inclosed by diabase. The average width of the vein is eighteen inches, and it has been exploited to shallow depths for 200 feet along its strike. The greatest depth attained was in a shaft 45 feet deep, but there the ore was of low grade, being high in silica. The ore is soft black to dark-brown material. The manganese oxides are mostly in the form of wad, pyrolusite, and manganite. The cavities which occur sparsely in the ore are lined with short crystals that are probably manganite.

"*Superior & Globe*: The Superior & Globe group adjoins the California group on the northwest. One shipment of 47 tons of ore was reported to have been made from this group in June, 1917, and it gave the following assay: Manganese, 25.7 percent; iron, 10.62 percent; silica, 11.44 percent; phosphorus, 0.67 percent; moisture, 1.45 percent. From the meager developments, there is estimated to be in reserve from 1,000 to 5,000 tons of ore with a content of twenty percent of manganese. Several veins are exposed on both banks of an arroyo that drains westward. They have been explored by several short tunnels, open cuts, and shallow shafts. Two men were at work on the property in August, 1917. North of the arroyo an old shaft of the Superior & Globe Copper Co. was sunk in diabase to a depth of 900 feet in search of copper ore. The manganese-bearing veins strike northeast and dip 20°-60° NW. They are contained in diabase and quartzite or occur at the contact of these rocks. They can not be traced on the surface beyond the banks of the arroyo, but where exposed by the workings the manganese-bearing shear zones are from two to ten feet wide. The greatest depth attained on these veins was twenty feet, and at that depth the ores are very siliceous and the manganese content much lower than at the surface. The ore is dark brown to reddish brown but on fresh fractures shows the seams of black manganese oxides traversing it, with here and there a vug lined with small crystals of manganite.

The red and brown colors are due to limonite or hematite. The ore for the most part replaces the diabase, and the silica content varies according to the degree of replacement. Secondary calcite is a common mineral of the ore.

"*Mineral Farm Group*: The Mineral Farm group of 21 claims lies east of the Superior & Globe Commercial Copper Co.'s properties, in a small basin at the head of a gulch draining southward to Pinal Creek. No manganese ore has been produced from this property except for a small quantity said to have been used as a flux in the Old Dominion smelter at Globe. The manganese deposits are unexplored, so there is little on which to base an estimate of the ore reserves. The outcrops, however, indicate several thousand tons of manganiferous iron ore containing probably twenty percent of manganese. Numerous veins occur in this group, and they strike from north to northeast. They cut diabase and quartzite, and their courses are marked by outcrops of gossan and by abundant float of iron and manganese oxides, which can be traced for several hundred feet. The veins range in width from two to ten feet. The iron is in the form of limonite and specular hematite containing bunches and stringers of pyrolusite. Quartz is abundant in the croppings."

GREENLEE COUNTY

Jones [45] describes a manganese deposit in southwestern Greenlee County as follows:

"*Thurston & Hardy Mine*: A group of six manganese claims owned by R. V. Thurston and Joseph Hardy is in the Ash Peak district, Greenlee County, a short distance north of Ash Peak, The claims were visited May 16, 1918. The nearest shipping point is Sheldon, on the Arizona Eastern Railroad, eight miles east of the deposit, and it is accessible by a good wagon road. Production from these deposits was begun in 1917, and to August 31, 1918, over 500 tons of ore containing more than forty percent of manganese had been shipped to smelters east of Mississippi River.

"The deposits are in a moderately dissected area near the summit of the Peloncillo Mountains, at an altitude of 4,500 feet above sea level. The hill at the base of which lie the manganese deposits rises about 200 feet above them, and the higher peaks in the vicinity, one of which is Ash Peak, may reach 5,000 feet. Eastward the hills slope to Gila River, and westward the mountainous area gives way to a gently sloping detritus-filled valley.

45 Work cited, pp. 130-132.

None of the gulches or arroyos that head in the Peloncillo Mountains contain flowing water except after heavy rains, and only a few springs are known in the range. The climate is arid, and the vegetation is very sparse, though the higher mountains support grasses sufficient for the subsistence of cattle.

"The country rocks in the vicinity of the manganese deposits consist of Tertiary lava flows—a gray to brownish-red vesicular basalt overlain by white to pink rhyolite which forms the capping of the small hill above the manganese deposits. The basalt is much decomposed and contains a white mineral of secondary origin which fills the cavities and vesicles, and in the shear zones it is altered to a crumbly and clayey material from which the manganese oxides can be readily separated by washing.

"The manganese deposits are contained in two shear zones about 1,200 feet apart, which cut the basalt and perhaps the rhyolite also, but no ore has been found in the rhyolite. The north shear zone trends N. 70° W. and dips steeply to the south. It has been traced for about 1,500 feet, and shallow, open cuts 1,200 feet apart show the character of its mineralization. Between these workings, manganese float occurs sparsely, but the length of the ore shoots has not been determined. At the east end of this zone an open cut shows the sheared rock to cover a width of thirty feet, in which six principal stringers of manganese oxides as much as three inches wide are distributed. The open cut near the west end of the zone shows ten feet of sheared basalt, with a few seams of manganese oxides, the largest of which is six inches wide.

"The south shear zone, which has been the source of the manganese ore so far recovered, is explored by shafts and open cuts through a distance of 900 feet, but the ore shoots are not continuous for this distance. At the east end the zone strikes N. 55° W. and dips 70° NE; at the west end it strikes N. 80° W. and dips 70° N. Two shafts thirty feet and 84 feet deep have been sunk on the east end of the shear zone, and in addition open cuts and drifts have explored the zone and proved it to be ore bearing for 200 feet. Here the shear zone is about ten feet wide, and the ore is found in discontinuous or lenslike veinlets, which in places are two feet wide. At the west end of this shear zone there is a shaft sixty feet deep, and open cuts and drifts aggregating 200 feet. Here the ore is contained in a fairly distinct vein about fourteen inches wide.

"The manganese minerals consist of the oxides psilomelane and pyrolusite. Psilomelane predominates, and it occurs in the

are principally covered by claims of the Globe Commercial Copper Co. (California), Superior & Globe, and Mineral Farm groups. The date of location of these claims was not ascertained, but as the region is famous for its production of copper and as veins having a heavy gossan crop out on the claims they were doubtless located many years ago. Some silver ore is said to have been produced from an old shaft on the Globe Commercial Copper Co.'s property. The deposits are readily accessible to Amster, the nearest shipping point on the Arizona Eastern Railroad.

GEOGRAPHY.

The Globe Hills in the immediate vicinity of the manganese deposits have low relief, though south of Globe the Pinal Mountains are high and are deeply dissected. The manganese deposits are at altitudes of 4,100 feet above sea level, at the base of hills which rise a few hundred feet above them. Pinal Peak, 10 miles south of Globe, has an altitude of 7,850 feet. Pinal Creek, an intermittent stream a few miles west of the manganese deposits, drains northward. Gulches on the east side of the deposits drain to the east and south, but they contain water only after periods of storms.

The climate is arid, and the average rainfall is probably not more than 10 inches a year. The hills support a sparse growth of shrubs typical of the desert areas.

GEOLOGY.

The rocks in the vicinity of the manganese deposits consist of quartzite belonging to the Apache group,[1] which is probably of ambrian age, intruded by masses of diabase. Exposures are poor, nd the formations are cut by numerous faults, which in places bring quartzite and diabase into juxtaposition. Along several of these faults, which strike east-northeast, the ore bodies are formed chiefly by the replacement of diabase, and to a minor extent they fill fissures and replace the quartzite.

ORE DEPOSITS.

The manganese oxides are associated with limonite, calcite, and unreplaced minerals of the diabase, principally quartz and feldspar, and fragments of quartzite. The manganese oxides are wad and needle-like crystals of manganite; the manganite occurs as narrow seams and lines small cavities in the ore. The ore is black, dark brown, and reddish, and in most of it that lies on the dumps the

[1] Ransome, F. L., Geology of the Globe copper district, Ariz.: U. S. Geol. Survey Prof. Paper 12, 1903.

presence of manganese minerals is little suspected because they are enveloped by the soft limonite, which breaks to a powder. When the ore is freshly broken the manganese oxides are apparent as seams or as finely crystalline aggregates that line cavities. The best ore was obtained from the surface.

Water level has nowhere been reached in the extraction of manganese ores; the deepest work is about 45 feet below the surface. There are some deeper shafts in the vicinity, but no information was to be had with regard to the depth of the water level.

As explored, the ore shoots of the deposits are lenticular masses with a maximum length of 200 feet and a maximum depth of 45 feet. The ore at the point where this depth was attained, however, was of poor grade, and it is probable that the ore will not persist much below this depth in any of these veins.

The replaced rock of the manganese deposits is greatly altered, so that its original character is difficult to recognize, but it appears probable that the diabase was replaced to a greater extent than the quartzite, as the texture of most of the replaced rock more nearly resembles that of the diabase than of the quartzite.

MINES AND CLAIMS.

37. *Globe Commercial Copper Co. (California group).*—The California group of the Globe Commercial Copper Co. lies in the southeastern part of the manganese-bearing area north of Globe. The property is said to have produced some silver ore many years ago, but it is only recently that attention has been turned to manganese ore. In 1916 the claims were leased to Buckingham & Wright, who shipped 24 cars of manganese ore from September, 1916, to February, 1917. Later the claims were worked by Jamison & Bailey, who shipped nine cars of ore to June, 1917, but since then work has been suspended. In all about 1,500 tons of ore was shipped to the Miami Metals Co., of Chicago, and to the Seaboard Steel & Manganese Corporation, of Temple, Pa., for use probably in alloys. Assays of the best and poorest carload shipments from this property are as follows: Manganese, 35.52 and 16.70 per cent; iron, 11.31 and 8.77 per cent; silica, 8.47 and 38.55 per cent; phosphorus, 0.031 and 0.204 per cent; and moisture, 6.04 per cent in one sample only. The best ore was obtained near the surface, and the poorest is said to have come from the bottom of a shaft 45 feet deep, the greatest depth to which the ore was mined. The ore is said to contain about 2 ounces of silver to the ton. Most of the ore of better grade has been mined from the veins in this property, but on the assumption that ore extends to a depth of 50 feet, there is in reserve probably 1,000 tons of ore with a content of 20 to 30 per cent of manganese.

Several manganiferous veins are inclosed by the California group. They strike about east and dip 30°–60° N. The vein that has yielded most of the manganese ore strikes N. 75° E. and dips 60°N. 15° W. In general it lies at the contact of quartzite and diabase, but at the east end of the workings it is inclosed by diabase. The average width of the vein is 18 inches, and it has been exploited to shallow depths for 200 feet along its strike. The greatest depth attained was in a shaft 45 feet deep, but there the ore was of low grade, being high in silica. The ore is soft black to dark-brown material. The manganese oxides are mostly in the form of wad, pyrolusite, and manganite. The cavities which occur sparsely in the ore are lined with short crystals that are probably manganite.

38. *Superior & Globe.*—The Superior & Globe group adjoins the California group on the northwest. One shipment of 47 tons of ore was reported to have been made from this group in June, 1917, and it gave the following assay: Manganese, 25.7 per cent; iron, 10.62 per cent; silica, 11.44 per cent; phosphorus, 0.67 per cent; moisture, 1.45 per cent. From the meager developments there is estimated to be in reserve from 1,000 to 5,000 tons of ore with a content of 20 per cent of manganese. Several veins are exposed on both banks of an arroyo that drains westward. They have been explored by several short tunnels, open cuts, and shallow shafts. Two men were at work on the property in August, 1917. North of the arroyo an old shaft of the Superior & Globe Copper Co. was sunk in diabase to a depth of 900 feet in search of copper ore. The manganese-bearing veins strike northeast and dip 20°–60° NW. They are contained in diabase and quartzite or occur at the contact of these rocks. They can not be traced on the surface beyond the banks of the arroyo, but where exposed by the workings the manganese-bearing shear zones are from 2 to 10 feet wide. The greatest depth attained on these veins was 20 feet, and at that depth the ores are very siliceous and the manganese content much lower than at the surface. The ore is dark brown to reddish brown but on fresh fractures shows the seams of black manganese oxides traversing it, with here and there a vug lined with small crystals of manganite. The red and brown colors are due to limonite or hematite. The ore for the most part replaces the diabase, and the silica content varies according to the degree of replacement. Secondary calcite is a common mineral of the ore.

39. *Mineral Farm group.*—The Mineral Farm group of 21 claims lies east of the Superior & Globe Commercial Copper Co.'s properties, in a small basin at the head of a gulch draining southward to Pinal Creek. No manganese ore has been produced from this property except for a small quantity said to have been used as a flux in

the Old Dominion smelter at Globe. The manganese deposits are unexplored, so there is little on which to base an estimate of the ore reserves. The outcrops, however, indicate several thousand tons of manganiferous iron ore containing probably 20 per cent of manganese. Numerous veins occur in this group, and they strike from north to northeast. They cut diabase and quartzite, and their courses are marked by outcrops of gossan and by abundant float of iron and manganese oxides, which can be traced for several hundred feet. The veins range in width from 2 to 10 feet. The iron is in the form of limonite and specular hematite containing bunches and stringers of pyrolusite. Quartz is abundant in the croppings.

VICINITY OF SAN PEDRO RIVER

40. *Clayshulte deposit.*—The manganese deposit owned by John Clayshulte is about 10 miles northeast of Mammoth, on the southeastern slope of Table Mountain. A poor road traverses an arroyo from the main road along San Pedro River to a point within 2 miles of the deposit, but the building of a new road for the remaining distance and repair of the old one would entail considerable expense. Winkelman, the nearest railroad point, is about 22 miles north of Mammoth.

Little development work has been done on the deposit, and no ore has been shipped.

The manganese deposit is contained in massive limestone and is apparently a replacement deposit along a fissure that strikes northeast. The ore body can be traced for 150 feet, and at the point where a shaft was sunk it is 16 feet wide. The shaft is 30 feet deep and is the only development work on the deposit. The ore is a mixture of iron and manganese oxides and would probably be classified as wad. It is soft, brownish black, and generally homogeneous, though in places it shows nests and veinlets of small manganite crystals. Assays are said to yield uniformly about 22 per cent of manganese. The iron content of the ore may equal or exceed the manganese content, but it has not been determined. The depth to which the ore extends below the 30-foot shaft is not known. Under present conditions this deposit has no value.

41. *Mogul group.*—The Mogul group of five claims, owned by J. W. Norton, is in the Black Hills 3 miles west of San Pedro River, at a point 15 miles south of Winkelman. In order to ship ore it would be necessary to build a road from the deposit to San Pedro Valley, but this could be accomplished at little expense by following an arroyo for most of the way.

The claims were located early in 1918, but to the time of visit only a small amount of development work had been done, and no ore had

These veins were formed by replacement of gouge, breccia, and diabase wallrock. The vein matter is completely oxidized to the depth reached by the mine workings and probably for a considerable distance below. It consists of a soft, earthy mixture of maganese oxides, limonite, clay, calcite, unreplaced diabase, and riblike masses of vuggy quartz. The best ore was formed by residual concentration and downward enrichment of manganese oxides and did not extend below a depth of about 20 feet from the surface. According to Wilson and Butler (1930, p. 61), who examined the property in 1917, when only the richest near-surface ore had been mined, the veins became more siliceous within 20 feet of the surface, and the manganese content was much smaller than at the surface.

CALIFORNIA GROUP

The California claims of the old Globe Commercial Copper Co. adjoin the Superior and Globe claims on the southeast. The principal workings are 1,500 feet southeast of the Superior and Globe mine. Wilson and Bulter (1930, p. 60) reported that 33 cars of ore containing from 16.7 to 35.5 percent manganese were shipped from the property in 1916 and 1917. Recently, mining has been resumed, and several cars of low-grade manganese ore have shipped to the stock pile in Deming, N. Mex.

The California vein follows a contact between Pioneer formation and diabase for about 1,200 feet, it strikes N. 75° E. and dips about 60° NW. The outcrop has been explored along most of its length by open pits, shafts, and short adits which revealed but one mineable ore shoot near the western end of the vein.

The ore shoot was developed by two shafts about 50 feet deep from which it has been stoped to the surface for a strike length of about 200 feet. The stopes are 2 to 3 feet wide, but apparently the ore shoot was even narrower, for much waste rock remains on the mine dumps.

The vein matter that can be observed in the workings is similar to that of the Superior and Globe veins. The best ore was obtained near the surface; manganese content decreased and the silica increased progressively toward the bottom of the shafts. According to Wilson and Butler (1930, p. 61), the ore shipped in 1916 and 1917 was reported to contain about 2 ounces of silver to the ton, and a little ore from this vein was mined for its silver content during the early days of the district.

GOLD-SILVER VEINS

In the same general area that contains the manganese-bearing veins, there are many workings from which ores containing native gold and silver are reputed to have been mined during the early days of the district. Examples are the Centenial, Mexican, Tom Boy, Bull Hill, Bonanza, Badger, Tiger, and many others whose names have long been forgotten.

Undoubtedly some, if not all, of these small deposits should be included in the groups that have been discussed, but practically no information about them is available, and very little can be learned from examination of the surface. Apparently all the ore came from the oxidized zone in which the precious metals of all the various types of deposits are normally concentrated. The adits and shafts, probably none of which reached depths of more than 50 feet, are caved and inaccessible. Even shallow opencuts are so badly caved that detritus from the barren wallrocks conceals all exposures of the mineralized rock, or else the ore occurred in small pockets that have been completely mined out.

The veins, if the term "veins" can be applied to these deposits, must have been short, discontinuous segments not more than a few inches wide. The workings are commonly alined as if along intermittently mineralized fissures; if so, the traces of the fissures are so inconspicuous that they can rarely be followed from one working to another. The alinement is clearly northeast, like that of all other mineralized faults and fractures in the district.

The mineral asemblages probably were most like those of the weakest zinc-lead-vanadium veins, but in their reputedly high content of gold the deposits resembled some of the simple zinc-lead veins. The ore bodies must have been small pockets for even in narrow opencuts from which ore must have been shipped, the wallrocks show no evidence of local hydrothermal alteration or the effects of oxidation or leaching of sulfide minerals. Most of the meager vein matter must have been quartz. The wallrocks are diabase, Pinal schist, or early Precambrian dioritic rocks.

The total production form these deposits could not have been more than a few thousand tons, and it is questionable that the operations were profitable. The small pockets probably served mainly as an incentive for further prospecting.

MOLYBDENITE VEINS

BRONX PROPERTY

The Bronx property is in the northwestern part of the Pinal Ranch quadrangle, 1¾ miles northeast of Pinal Ranch. It contains several mineralized fractures that crop out in the Schultze granite near the western edge of the stock. The mineral assemblage of these veins is unlike that of any of the other deposits of the district, but it has characteristics that suggest a

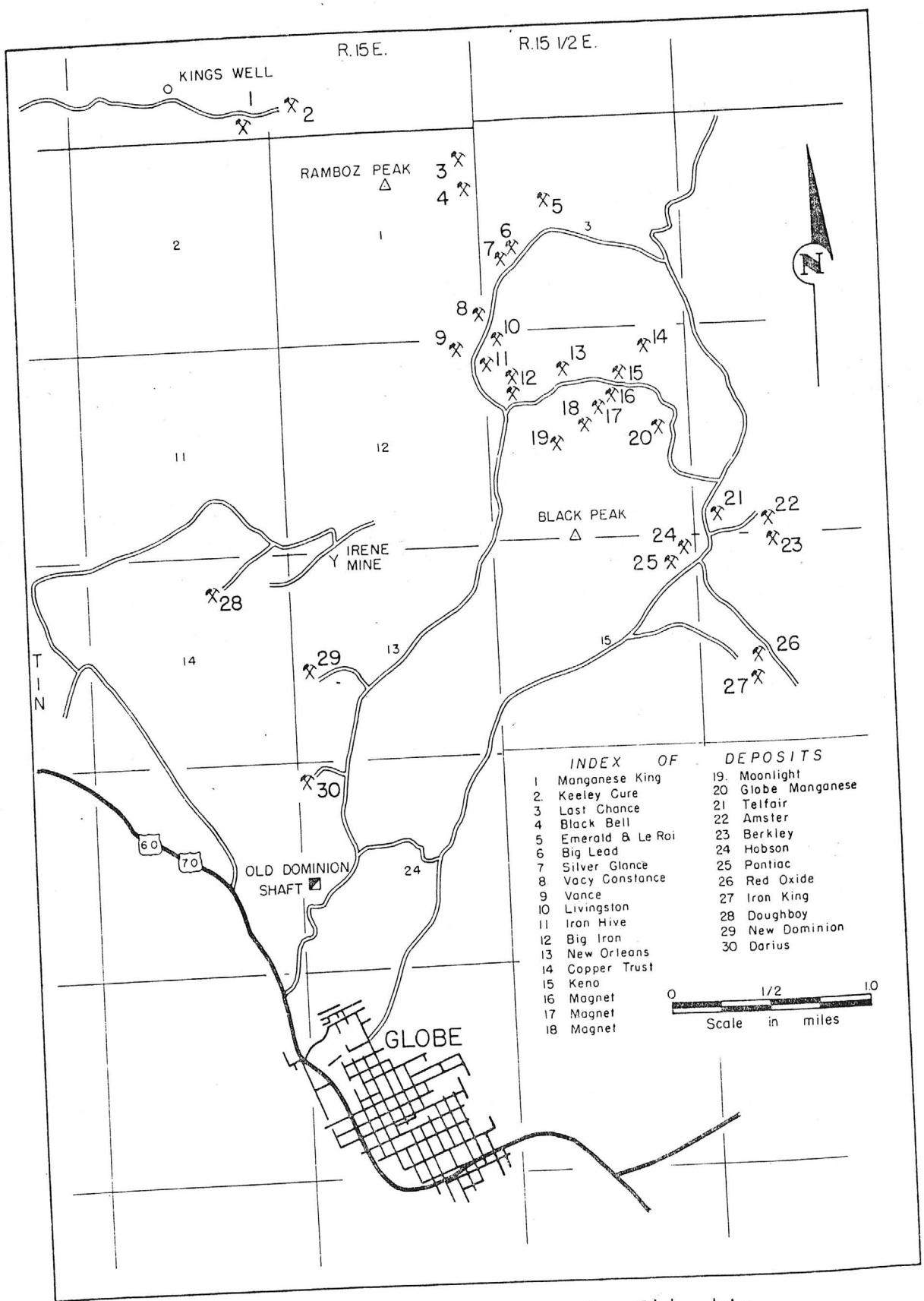


FIGURE 9. - Manganese Deposits Near Globe, Ariz.

veins containing small amounts of manganese minerals. The records in the Deming purchasing depot show that 26 long tons of sorted ore, containing 21.8 percent manganese, was shipped by Sitton from the No. 4 claim. This ore was mined from a shallow opencut about 40 feet long.

No work was in progress when the property was visited in January 1957.

New Orleans

The New Orleans claim is one of the large group of old patented claims held for many years by the late F. A. Bennett and presently owned by F. A. Sitton, of Phoenix, Ariz. The property is about 4 miles by road north of Globe in NE1/4NW1/4 sec. 10. T. 1 N., R. 15-1/2 E. and adjoins the northeast end of the Mineral Farm No. 1 claim. (See fig. 9, p. 44.) The eastern branch of the Big Johnnie Gulch crosses the north part of the New Orleans claim.

The first manganese ore was produced from the claim in 1953 by Thomas C. Vetter, who shipped 223 long tons of sorted ore, averaging 19.7 percent manganese, to the Government purchasing depot in Deming, N. Mex.

The productive deposit occurs along a fault zone at the contact between diabase and quartzite. The zone strikes N. 65° E. and dips about 60° NW. It can be traced for several hundred feet along the strike and in places contains stringers and sporadic bunches of manganese oxides across widths as much as 10 feet. The ore was mined in an opencut that is about 50 feet long, 8 to 10 feet wide, and as much as 6 feet deep. The higher grade ore was localized along the footwall next to the quartzite in short irregular strands ranging from 1 to 3 feet in width. Parallel and interlacing seams and stringers of manganese mineral separated by altered diabase occupied the footwall. Some manganese was present in the quartzite, but the bulk of the mineralization appeared to be in the diabase.

The ore minerals were wad, pyrolusite, and some psilomelane accompanied by iron oxides and calcite.

Other exploratory openings, consisting largely of bulldozer trenching and stripping, were present in several scattered areas on the claim. Although some manganese minerals were exposed in places by this work, it did not appear that an appreciable amount of ore had been mined from the openings.

No work was in progress when the property was visited in April 1957.

* Globe Manganese *

The property of Globe Manganese, once known as the American group, consists of seven contiguous patented claims situated about 5 miles north of Globe in the east-central part of sec. 10, T. 1 N., R. 15-1/2 E. *(See fig. 9, p. 44.) The group can be reached by 0.7 mile of access road that branches left from the Copper Hill Road about 4.3 miles north of the Globe post office.

The claims, known as the Claud, Fierro, Manganese, Spec, Pick, Una, and Dick, were once the property of Globe Commercial Copper Co., which is said to have produced some silver ore in the late 1880's. No attention was paid to the manganese deposits until World War I. In 1916 and 1917,34/ lessees are reported to have shipped about 1,500 tons of manganese ore to eastern smelters. The ore contained 16.7 to 35.5 percent manganese and 8.8 to 11.3 percent iron. Manganese mining was resumed during World War II, when the property was held by T. J. Long and Al Stovall. From July 1942 to April 1943, records indicate that approximately 1,150 long tons of ore, averaging about 34 percent manganese, was shipped to the Metals Reserve Company stockpiles in Deming, N. Mex., and Phoenix, Ariz. Additional ore is said to have been produced after April 1943, but no records are available of these shipments.

Subsequently, the property was acquired by the present owner, T. W. Kimble, of Silver City, N. Mex. In 1943 Ralph Henderson, of Miami, Ariz., obtained a lease and option on the property and in the next 2 years shipped 1,381 long tons of ore, averaging 30.1 percent manganese, to the Government purchasing depot in Deming, N. Mex. During the same period, T. W. Kimble shipped 58.7 long tons containing 33.8 percent manganese to the Deming depot. The mine was closed late in 1955 and remained idle until late in 1956, when Henderson assigned his lease and option to Jolyn Associates, of Wickenburg, Ariz.

Operations were resumed in December 1956. When the property was visited in February 1957, six men were employed under the supervision of Ralph Henderson and about 15 tons of ore was being mined daily. Much of the ore as mined was passed over a 1/2-inch vibrating screen. The undersize, amounting to about two-thirds of the total material handled, was said to average 20 to 30 percent manganese. The screen undersize was shipped to the plant of Mohave Mining & Milling Co. near Wickenburg, Ariz., where it was upgraded by flotation and sintering to a product acceptable under the Government "carlot" program. According to Charles H. Jonas, manager of Jolyn Associates, about 1,342 tons of this screened ore had been shipped between December 1956 and April 1957. Thus, the total known production from the property to April 1957 was 5,431 tons containing nearly 30 percent manganese.

The ore occurs in disconnected lenticular ore shoots along two sinuous fault fissures that crop out along the contact between diabase and Precambrian quartzite. The fissures diverge and are 25 to 150 feet apart. Both trend east to northeast and dip 65° to 80° N. They can be traced more or less continuously on the surface for some 700 feet. The outcrop of the south fissure has a quartzite foot wall and a diabase hanging wall. That condition persists in the main inclined shaft to a depth of about 65 feet, below which both walls of the fissure are diabase. Along the outcrop of the north fissure, quartzite occupies the hanging wall and diabase the foot wall.

34/ Jones, E. L., Jr., and Ransome, F. L., Deposits of Manganese Ore in Arizona: Geol. Survey Bull. 710, pt. 1, 1920, p. 167.

Virtually the entire output of ore was mined from the central part of the south fissure, where it was exploited in places for some 400 feet along its strike and to a maximum depth of about 100 feet. The ore shoots were of various sizes, ranging from 20 to more than 100 feet in strike length and from 1 to 8 feet in width. The higher grade ore, probably 1.5 to 2 feet wide, is said to have been more abundant in the upper 75 feet of the workings where quartzite formed the foot wall of the fissure.

The ore minerals are the softer oxides, wad, and pyrolusite. Iron oxides, with some calcite, and quartz are the dominant gangue minerals.

The workings comprise four inclined shafts and a few opencuts along the south fissure and four shallow openings scattered along the outcrop of the north fissure (fig. 11).

The main working shaft, situated near the west end of the exploited area, was 162 feet deep. Its upper 70 feet was inclined about 70°. Below that depth it flattened to about 60°. At the time the property was visited the lower 60 feet of the shaft was inaccessible. Although some manganese was present in this deeper work, the ore bodies were said to be small, erratic, and lower in grade than those in the upper workings. Two drifts, known as the 75 and 100 levels, extended east and west from the main shaft. The 75 level

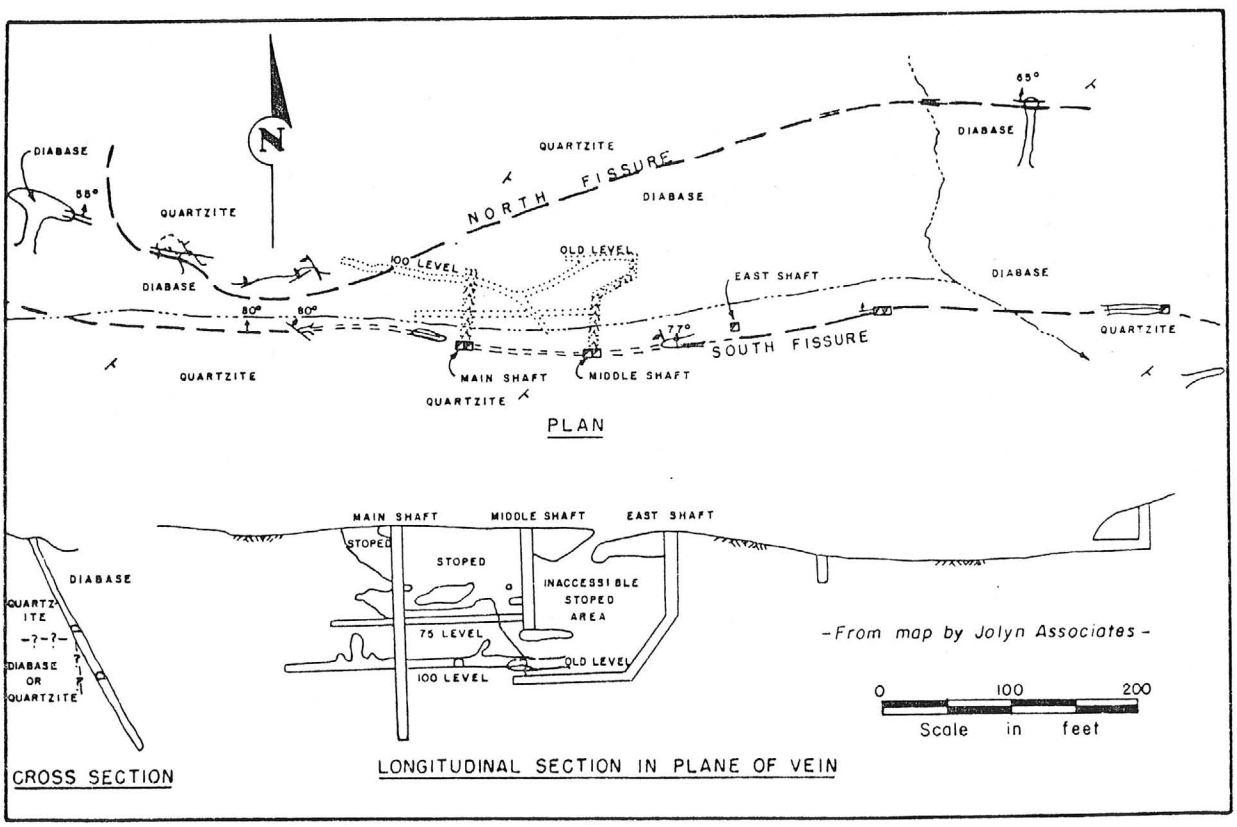


FIGURE 11. - Globe Manganese Mine, Gila County, Ariz.
(From Map by Jolyn Associates.)

had been driven westward about 50 feet and eastward 98 feet, where it connected with an old inaccessible shaft said to be 116 feet deep. The ore above the 75 level and between the two shafts had been mined in open stopes extending in places to the surface. About 110 feet east of the last-mentioned, or middle, shaft is another shaft, reportedly sunk during World War II to a depth of some 100 feet but now inaccessible. The area between the middle and east shaft was inaccessible but doubtless contained many stopes, one of which had broken through to the surface.

The 100 level from the main shaft extended westward 95 feet and eastward about 105 feet, where it broke into an old, partly caved drift driven from the middle shaft. A little stoping had been done above the back of the 100 level west of the main shaft, and a single small stope extended a short distance above the east drift. The operators were planning to do more exploration to the west on the ore showing in the old level driven from the middle shaft.

The carload of ore shipped to the Deming depot by T. W. Kimble was mined from shallow adit workings on the south fissure 500 feet or more east of the main shaft.

A small amount of sorted ore may have been produced from some of the shallow openings along the outcrop of the north fissure. However, the manganese minerals exposed along this fissure occurred largely as narrow stringers and small podlike bunches.

Magnet

The Magnet claim is one of the old patented group formerly owned by Superior & Globe Mining Co. It is situated near the center of sec. 10, T. 1 N., R. 15-1/2 E. and is accessible from Globe either by way of the Copper Hill Road or the road in Big Johnnie Gulch. By the former route, the workings are reached from an access road 0.6 mile long that branches west-northwest from the Copper Hill Road 4.5 miles north of the intersection of Yuma Street with U.S. Highway 60-70 in Globe. (See fig. 9, p. 44.)

The claim was located first in the 1880's and prospected for silver-copper ore. The first manganese ore was produced in World War I under a lease from Superior & Globe Mining Co. Incomplete records indicate that about 100 tons of ore containing 25 percent manganese was shipped at that time. Some years later the property was acquired by F. A. Bennett. In World War II the production of manganese ore was resumed. During that period about 780 tons containing 27 percent manganese is said to have been shipped to the Metals Reserve Company stockpiles, either in Phoenix, Ariz., or Deming, N. Mex. In 1953 the property was purchased by the present owner, F. A. Sitton, of Phoenix, Ariz. The following 2 years 2,427 long tons of ore, averaging about 26 percent manganese, was shipped from the claim to the Government purchasing depot in Deming, N. Mex. Over 2,200 tons of that ore was shipped by lessee Louis Winn of Globe, and the balance was shipped by F. A. Sitton. In 1956, D. N. Spencer, of Spokane, Wash., obtained an option on the property and explored the Magnet and other veins in the area by rotary-drill holes. The results of this work were not available. The property was idle when the district was visited in January 1957.