CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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Arizona Department of Mines and Mineral Resources Mining Collection

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04/29/91

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: DUQUESNE

ALTERNATE NAMES:
SAN ANTONIO

SANTA CRUZ COUNTY MILS NUMBER: 66B

LOCATION: TOWNSHIP 24 S RANGE 16 E SECTION 2 QUARTER W2
LATITUDE: N 31DEG 22MIN 26SEC LONGITUDE: W 110DEG 41MIN 29SEC
TOPO MAP NAME: LOCHIEL - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
ZINC
LEAD
COPPER
SILVER
GOLD

BIBLIOGRAPHY:
INDEX OF MINING PROP. IN SANTA CRUZ CO.,
AZBM BULL. 191
USBM FIELD NOTES
LARGE AREA INVOLVING DUQUESNE AND WASH CAMP
OFTEN REFERED TO AS DUQUESNE MINES
SCHRADER, F.C., 1915, USGS BULL. 582,
P. 321-331
BLM MINING DISTRICT SHEET 727
ADMMR DUQUESNE MINE FILE
AZ. MINING JOURNAL JUNE 1918, P. 42-43,
DEC. 1, 1922, P. 17-18

DUQUESNE MINE

SANTA CRUZ COUNTY

T24S R16E Sec 3

AKA: San Antonio, New York Mine, Annie, Dudley Standard, Double Standard, Dudley Mine, Smuggler and Texas Mine

USGS Bull. 582 p. 342 - New York, 32-328 - Duquesne
USGS Bull. 582 p. 92, 230, 322, 236

AEC 172-489, p. 36. No abnormal radioactivity.
TAIME vol. 36, p. 626-646.

Projects file

Ariz. Mng. Journal June, 1918, p. 42, 43
" " " December 1, 1922, p. 17, 18

Arizona Mineral Commodity Update on Zinc, dated 11-3-77-, by D.D. Rabb, Bureau of Geology and Mineral Technology. (filed in Zinc commodity file)

BLM Mining District Sheet 727

ABM Bull. 191, p. 77

USBM "U" File

MILS Sheet sequence number 0040230170

MILS Santa Cruz Index #66B

USGS Lochiel Quadrangle Map

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA

SANTA CRUZ COUNTY

NEW YORK MINE

MILS #228

2-AKA's

Duquesne Mine(Ariz)

MM 536 Cuprodescloizite
537 "
538 "
539 "
540 "

BYRD INVESTMENT COMPANY
MAIN OFFICE
TUCSON, ARIZONA
P. O. BOX 5226
TELEPHONES 2032 AND 8529

August 31, 1946

Hon. Charles B. Henderson
Chairman of the Board
Reconstruction Finance Corporation
Washington, D. C.

Dear Sir:

My associates and I have been mining in the Southwest for many years. I think that such observations as I make here should be considered by the Administration and all federal agencies having the power to deal with the tragic shortage of strategic metal reserves in the United States.

I submit herewith a practical plan that will do much to solve what has come to be an acute, if not a desperate, situation.

The old prospectors found the outcrops of metal that were surface exposed. I believe any geologist will agree that there are vast quantities of ores, at minable depth, that have never been exposed. The mining industry should be encouraged to explore for and develop these ores. I believe it can be stated, as a truism, that the big companies, except in areas contiguous to ore bodies they are mining, will take little of the gambling hazard necessary to explore for blind veins and ore bodies. Almost every great mine in the country was discovered and/or initially developed by the prospector and small operator. The major companies, able to finance large-scale operations, mills, smelters and refineries, can produce ore at very much less cost than the small operator. The result is that, after mines are discovered and opened up by the small operators, they quickly fall into the hands of the large companies. I wish to illustrate, in our own experience here in Arizona, the statement that the major companies will seldom risk any substantial amount of capital to explore for hidden ore bodies or to undertake to develop new ore bodies in mines that have been worked out. In the caption "Application of Premiums at Duquesne" I have illustrated what I consider to be a weakness in the present application of the Premium Plan.

Duquesne Mines

The Duquesne properties in Southern Arizona, which had produced since the early 60's, were practically abandoned as being non-commercial before 1920, although it is estimated that the twenty or more mines of the Duquesne Group had produced more than $20,000,000 worth of lead, copper and zinc ores prior to that year. My brother and I bought the property in 1938, and opened up many of the old mines and found floors and faces of what we believed would develop into sizable tonnages of commercial ore. The American Smelting & Refining Company, Phelps-Dodge Corporation, and practically all the major companies operating in the West, when we presented the property to them, turned it down. We had no money for its development. We finally leased the property to Callahan Zinc-Lead Company which built a mill on the property just prior to the outbreak of the war. Since that time, and largely for the war effort, Duquesne has produced $2,700,000 in zinc, lead and copper concentrates, and it is still producing. We are now operating it ourselves, but without sufficient capital to provide milling facilities. We are mining the ore in a hand-to-mouth fashion. We are unable at present prices of metals, even with the premiums, to carry on extensive development work to open up new replacement ore bodies. Since all the mines, except one, are very shallow, few over 150 feet in depth, we are sure that an adequately financed program of development work would open up many sizable if not large mines on this property. The only mine on the property having any depth (635 feet) produced more than $3,500,000 when it was operated by George Westinghouse about thirty years ago. Zinc-lead ores that he could not then mine profitably are now processed by modern selective flotation. No big company operating in this section will take this property or help us to develop it because we do not have a large amount of blocked-out or proven ore. We have tried them all.

Application of Premiums at Duquesne. Our firm lost money during the war period, notwithstanding the fact that, with premiums, we produced essential metals from four mines other than Duquesne, all of which were abandoned prior to 1946. Then in 1946, when we were at last able to show a profit on Duquesne operation, the Committee threatened to reduce our premiums and in August 1946 did eliminate our C premium on zinc. No one is suggesting that the Government repay us for the losses that we incurred in the three preceding years, but now when we have an opportunity to get something like a compensating return for an extremely venturesome investment the Committee has advised us that we have been making too much money. Applying this theory, we would only be entitled to the premiums we have been receiving after we had demonstrated that the operations were unprofitable. It seems to me that this attitude of the Committee must be changed if the Premium Price Plan is to accomplish its purpose. When any operator takes the gamble that we took at Duquesne, when none of the big companies would touch it, he should not be subjected to the constant hazard of premium reduction or cancellation. The small operator must believe that he has a chance to make money when he engages risks such as we have undertaken.

Flux Mine

In 1939 we acquired a lease and option on the old **Flux**, after it had been examined and rejected by every major company operating in this section. We opened up new ore bodies on the Flux property and had in sight in a few months about 40,000 tons of zinc-lead ore. We were unable to finance a milling operation and had to practically give it away to a major company. The Flux has produced for the American Smelting & Refining Company, we believe, much more than $3,000,000 of lead-zinc concentrates since 1940.

Thus the Duquesne and Flux properties, rejected by the major companies, opened up by us, small miners who knew no better than to gamble, have produced some $6,000,000 of zinc, lead and copper concentrates since 1940 and largely for the war effort.

There may be some, but I do not know of any, of our really big producing mines, or any important virgin mining area in the United States, discovered by any one of the major companies.

Small Miners' Problems and Excessive Costs.

The small miner always explores and gambles if he feels he has a ghost of a chance. The Premium Price Plan, tied as a rider to OPA legislation, was never adequate because of the provision which gave the premium authorities the option to cancel premiums at any time. Furthermore, it was extended only from year to year, and development work, sometimes requiring months and years to complete, could never be prosecuted with any confidence. Therefore, the hazards of exploration and cancellation made it practically impossible for the small operator to ever secure any adequate financing.

Besides the hazards of exploration and cancellation that have confronted the small operator, he is also faced with heavy costs in marketing his ores, some of which are as follows:

(a) A large percentage of newly opened up mining properties are inaccessible, involving heavy cost for road building and trucking to the railroad for shipment;

(b) Even though he can afford new equipment and can get delivery of it, he must use, initially, small equipment, usually gasoline powered, resulting in an abnormal fuel cost as compared with the power costs of the big companies;

(c) Lack of comfortable housing in remote areas makes him unable to secure the class of labor that is attracted to the big plants offering community conveniences;

(d) In Arizona, the small operator pays 13% of his payroll for insurance. The big companies, carrying part or all of their industrial insurance themselves, pay less than half the insurance costs of the small operator;

(e) Overhead costs are in great disproportion to those of the large companies;

(f) **Smelter and Transportation Costs:** Three per cent copper ore was an average grade shipped by hundreds of small operators during the war. They received from the smelter, not including premiums, after all deductions, including railroad transportation, smelting charges, and penalties, 3½c to 4½c per pound for their ore in the bin at the mine, against which they had to charge all their mining expenses, and I can support this factual statement with numerous Settlement Sheets from three smelters to whom we have shipped such ores. Without the premiums our shipments would have averaged less than $3.00 per ton in the bin at the mine, and less than 5c per pound for our copper.

Remedies

The Bills now before Congress, to divorce the Premium Price Plan from the OPA, are inadequate in their provisions. The Congress should effect legislation that would authorize and include the following desiderata:

(a) A premium Price Plan extending over not less than a five-year period;

(b) Premiums should be uncancellable, except for fraud and misrepresentation;

(c) Premium payments should be applicable to all properties alike, whether or not applications were made prior to any specific dates;

(d) The Reconstruction Finance Corporation should be authorized and directed to pursue a constructive and liberal lending policy; only those experienced in mining should be financed, and they should be adequately financed to carry out the development programs they would undertake;

(e) Enlarged appropriations for the Bureau of Mines to continue and expand its exploration work.

Conclusion

With a wider use of inexpensive geophysical prospecting for underground ores, the large operators will undoubtedly enlarge and extend their ore reserves, but I wish to impress upon you the fact that, **whereas large operators are numbered by the dozens,** the prospectors and **small operators are numbered by the thousands.** (There are more than 4,300 members of the Arizona Small Mine Operators' Association alone), and the greatest assurance, if we have any regard for the history of the mining business, is the encouragement of these th ousands of small operators and prospectors to search for, explore, and develop vital new ore reserves. The small operators in the aggregate are developers, rarely substantial producers, because as soon as a worth-while development is accomplished, the big companies take over and, since the small operator produces such a very small part of the country's tonnage, the cost to the Government of extending premium assistance to him would involve a small amount of money in comparison with the total value of strategic metals produced in the country.

All authorities having to do with premium payment matters should be reminded that, for illustration, when lead supplies are short, nothing is gained by increasing the premiums on lead and correspondingly reducing them on other strategic metals, because lead in the West is found almost invariably associated with zinc and/ or copper: The effect of such readjustment, in most cases, would be to cripple the operator and reduce the volume of all the metals he produces. There are few purely lead mines in the western states.

It may be argued that a non-cancellable premium extending over a period of several years will make it possible for some operators to make huge profits on their investment. There won't be many instances of this kind, and such a contingency I think should be made entirely possible as an incentive and an inducement to the venture-capital that must be enlisted in the exploration work so badly needed.

The RFC made hundreds or perhaps thousands of small loans (access loans, etc.) to small operators during the war. These loans were practically all losses because, in the first place, they were made with little or no consideration of the mining ability or experience of the borrower ;and, secondly, the objective which had to be reached could not, perhaps one time in a thousand, be financed with so small a sum as $5,000; in the third place, nothing but obsolete and worn-out machinery was available to the small operator, which fact in itself was enough to defeat in most cases the success of any $5,000 investment program; and, in the fourth place, war-time mining costs were excessive, and the Army took practically all the best labor. These small loan projects were, therefore, practically all doomed to failure before they were begun; for that reason they cannot be fairly regarded as a criterion on which to base RFC credit.

Underground rock work is expensive and requires months and, in many cases, years to complete; therefore, unless the premiums are made uncancellable, there is small incentive to take the risk involved in undertaking a program of extensive exploration work.

I think that those to whom this letter is presented should realize the fact that an extremely small percentage of so-called marginal miners and small operators have made any money, notwithstanding the premiums they were granted, since the beginning of World War II. As a matter of fact, with a rather extensive acquaintance with the mines and operators in Arizona and New Mexico, I do not know as many as ten men who are on the credit side of the ledger as a result of their mining operations since the Premium Price Plan was established. The fact is that most of them are broke. Most of them have not only lost their own money but lost money for those who furnished them financial help.

As one of the Senators wrote recently, since the war is not ended cially, **the desiderata generally covered by what I recommend in this letter can be accomplished by presidential order or directive** until such time as appropriate legislation can be secured.

If the Premium Price Plan is revised, I believe it should not restrict its applicability to mines or properties as such, because an operator may suffer losses in a half dozen mining ventures before he succeeds in developing one that is profitable.

Mining is a precarious and hazardous business; the ratio of failures to successes involves overwhelming figures.

While Bureau of Mines authorities and other statisticians have given a limited number of years of life to the metal reserves now proven, these reserves were further sadly depleted during the recent war effort. The thoughtless citizen, in the face of these figures widely published, has answered that "We can import our strategic metals from foreign countries at much lower prices in many cases than the cost of producing these metals in our own country." This argument, it seems to me, was adequately negated during World War II. And there arises a further thought that—in another war, who is to know who our enemies may be or whether we shall have any allies that can supply our metal requirements. This seems to me to be the answer to the foolish argument that we can rely upon foreign sources for our defense metal requirements.

If it is desirable to produce more copper, zinc and lead, the incentives which I have proposed will put thousands of small miners to work, and I believe the results will astonish the statisticians who tell us that our reserves of strategic metals, further depleted by the war, will last only a few years.

Yours very truly,

J. H. BYRD
President

Furthermore, the extent of the decline in Arizona copper production trend cannot but be alarming, and these figures undoubtedly justify the fear of exhaustion of our copper reserves unless new reserves are discovered and developed.

Almost all zinc in Arizona contains copper, and the copper content usually increases at depth. Encouragement of z inc production, likewise, cannot but enlarge copper production in Arizona and in most parts of the West.

On the second page of my letter of August 31st, in connection with the production of the Flux Mine, information just received indicates that the Flux production was probably nearer $5,000,000 than $3,000,000, so that our small operations, combined with those of properties we developed since World War II started, have probably produced more than $8,000,000 worth of strategic metals.

Yours very truly,

J. H. Byrd
President

JHB/hc

THREE METAL SEPARATION AT DUQUESNE GROUP

Patagonia District, Santa Cruz County, Arizona

Callahan zinc, lead 150 ton flotation plant, Diesel plant. The promising ore is composed largely of sulphides zinc, lead, copper and iron, with a gangue of silicates and quartz.

Power De la Vergne diesel engine produce power at a cost 1 cent per kilowatt hour.

Flotation 3 Denver sub A machines -

Crushing to 3/4" by a 10 by 20" Pacific jaw crusher, 8 feet by 36" Hardinge ball mill with 6" wood blocks back of liners to make it a 7 ft. x 48" unit, operating in closed circuit with a 3 ft. Wemco spiral clasifier - The classified product overflowing at 35 percent solids is treated successfully in 3 Denver Sub A 18 inch special flotation machines. Screen analysis of classifier overflows as follows. Plus 80 mesh, 11.6 percent minus 80 plus 100 mesh 2-2 percent minus 100 plus 200 mesh, 24.6 percent and minus 200 mesh, 61.6 percent. The copper, lead concentrate made in cell 1 of floration machine No. 1 goes to the second cell (cell 5) of five of flotation machines No. 2 in which the copper, lead separation is made. Here the lead is floated off and the copper depressed. In other words the tailings from the copper, lead separation constitute the copper concentrate, and the material overflowing the first cell (cell 4) the lead concentrates. The first 3 cells of flotation machines No. 2 are used as zinc cleaners. Tailings from flotation machine No. 1 at 28 percent solids go to 6 by 6 ft. conditioner, from there to cell 1 of flotation machine No. 3. Finished lead, copper, zinc concentrates are dewatered in disk type filters from which the overflow goes to 16 by 10 thickner. The underflows from these units are returned to filters. Overflows go to mill tank. Water used at mill 80 gallons per minute 3 course ore bins, 100 tons each. 7.150 ton circular fine ore bins. Ball mill 22 r.p.m. and the classifier at 7½ r.p.m. The ball charge is 4 inches forged steel balls, consumption per ton 2 lbs. All 2 in. sand pumps are Wemco make. Power plant 1,225 pp and 2.130 pp De la Vegne engines. Water cooling tower waste heat is used for hot water for the change house. The mill was erected by Western-Knapp Engineering Company San Francisco, California.

MILL RESULTS

	Oz. Ag.	% Cu.	% Pb.	% Zn.
Heads	6.49	1.08	3.80	7.49
Tails	0.23	0.08	0.07	0.54
Cu. Conc.	12.44	27.84	5.68	7.67
Pb. conc.	114.66	3.73	69.53	3.36
Zn. conc.	2.24	0.94	1.09	56.38
Recovery	97.20	94.26	98.50	94.23

****

CERTIFICATE OF ASSAY

Certificate No.
601

Mr. Richard Malik

March 3, 1943

Sample marked	Gold oz. troy per ton	Gold value per ton	Silver oz. troy per ton	Silver value per ton	Pb. %	Cu. %	Zn. %
#1	.01	$ .35	4.2	$2.98	4.45	28.00	.50
#2	.01	.35	3.4	2.41	1.17	8.40	5.30
#3	.01	.35	7.8	5.54	8.82	12.10	5.00
#4	.01	.35	7.6	5.40	9.60	-	.70
#5	.01	.35	5.6	3.98	8.11	14.76	6.00

BYRD INVESTMENT COMPANY
MAIN OFFICE
TUCSON, ARIZONA
P. O. BOX 5226
TELEPHONES 2032 AND 8529

September 10, 1946

Hon. Charles B. Henderson
Chairman of the Board
Reconstruction Finance Corporation

Dear Sir:

After receiving a telegram from Mr. G. S. Burk, Secretary, assuring me that my letter would be given attention by the office of the Metals Reserve Company, I am enclosing you twelve copies of my letter dated August 31 which I have prepared in printed form in an effort to make it easier reading.

There are several points that I wish to make in this accompanying letter:

(1) If excessive profits result from uncancellable premiums, the State and Federal income taxes will take plenty of care of them;

(2) While I think stock-piling of foreign metals is important and desirable, it cannot in any manner solve the problem of enlarging our domestic reserves, and it would be unfortunate, as some suggest, to tie up stock-piling with any legislation calculated to encourage the enlargement of domestic reserves of strategic metals;

(3) I wish also to add the figures of Arizona metal production, '42 to '45 incl., supplied by the Arizona Department of Mineral Resources:

	Gold Oz.	Silver Oz.	Copper Lbs.	Lead Lbs.	Zinc Lbs.
1942	253,651	7,064,467	786,774,000	29,544,000	37,044,000
1943	171,810	5,713,889	806,362,000	27,454,000	39,354,000
1944	112,162	4,394,039	716,606,000	33,414,000	58,154,000
1945	75,000	3,357,000	571,000,000	41,500,000	76,500,000

I wish to call your attention, particularly, to the production relation between lead and zinc, as disclosed by these figures; to-wit, the increase in zinc production is in closely direct ratio to the increase in lead production. Obviously, Arizona cannot produce more lead without producing more zinc, and any discouragement of zinc production cannot but reduce the lead production. These figures, it seems to me, unequivocally prove my statements as to the necessity of supporting zinc prices if more lead is to be produced.

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Furthermore, the extent of the decline in the copper production trend cannot but be alarming, and these figures undoubtedly justify the fear of exhaustion of our copper reserves unless new reserves are discovered and developed.

Almost all zinc in Arizona contains copper, and the ratio of copper content usually increases at depth. Encouragement of zinc production, likewise, cannot but enlarge copper production in Arizona and in most parts of the West.

Yours very truly,

J. H. BYRD
President

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date 12-27-44

Name of Mine Duquesne & Silver Hill

Owner or Operator W C Byrd

Address 319 E Congress Tucson

Mine Location Near Silver Bell, abt 20 mi E Nogales

Filing Information

File System .....

File No. .....

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production ✓; Development ....; Financing ....; Sale of mine ....;

Experimental (sampling) ....; Owner's occasional trip ....;

Other (specify) .....

PRODUCTION: **Past and Future.** **Tons**

Approx. tons last 3 months .....

Approx. present rate per 3 months .....

Anticipated rate next 3 months .....

If in distant future check (X) here .....

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars	1940 Chrysler	3000	700
Light or Service Trucks			
Ore Hauling Trucks			
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper lead zinc

REMARKS:

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By Geo A Callaway

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

OPT

Office Defence Transp.
Security Bldg
Phoenix

Date 2/17/45

Name of Mine Duquesne

Owner or Operator Russell Villagran Stiles & Reid

Address 218 N 4th Ave Tucson

Mine Location Washington camp

Filing Information

File System .....

File No. .....

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production X; Development ....; Financing ....; Sale of mine ....;

Experimental (sampling) ....; Owner's occasional trip ....;

Other (specify) .....

PRODUCTION: Past and Future.

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks	3	Chev. pickup	400
Ore Hauling Trucks			
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper Lead + Zinc

REMARKS:

Mr Russell + associates are reopening this mine Application recommended for approval

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By Geo A Callaham

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date 12-20-44

Name of Mine Duquesne & Indiana

Owner or Operator J A R Byd Jr

Address Bergins Hotel Tucson

Mine Location Silver Bell Dist and Washington Camp

Filing Information

File System .....

File No. .....

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production ✓; Development .....; Financing .....; Sale of mine .....;

Experimental (sampling) .....; Owner's occasional trip .....;

Other (specify) .....

PRODUCTION: Past and Future. **Tons**

Approx. tons last 3 months .....

Approx. present rate per 3 months .....

Anticipated rate next 3 months .....

If in distant future check (X) here .....

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks			
Ore Hauling Trucks	1½ Ford - 1936		150 gal
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper, lead, zinc

REMARKS:

Mr Byrd is increasing his production of copper ore from Indiana mine and on account of increased activity has expended gasoline before next coupons are usable

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By George A Ballam

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date 12/19/42

Name of Mine D. Duquesne Mine

Owner or Operator J. H. Byrd

Address 319 E. Congress, Tucson

Mine Location Washington Camp, S.C. County

Filing Information

File System

File No.

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production ✓; Development ✓; Financing ; Sale of mine ;

Experimental (sampling) ; Owner's occasional trip ;

Other (specify)

PRODUCTION: Past and Future.

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars	1	2000	150
Light or Service Trucks			
Ore Hauling Trucks			
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

REMARKS: Gasoline files at Kilcock - to be transferred to Nogales.

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By George R Callaway

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date 11-24-44

Name of Mine Duquesne

Owner or Operator A R Byrd Jr

Address Congress Hotel, Tucson

Mine Location Washington Camp, Sta Cruz Co

Filing Information

File System .....

File No. .....

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production .....; Development ✓; Financing .....; Sale of mine .....;

Experimental (sampling) .....; Owner's occasional trip .....;

Other (specify) .....

PRODUCTION: Past and Future.

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks			
Ore Hauling Trucks			
Compressors	3 Gas per Shift		780
Hoist	40 hp Case - 3 gal Hr		620
Other Mine or Mill Eqpt.			
			1400

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper, Lead, Zinc

REMARKS:

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By George A Callaway

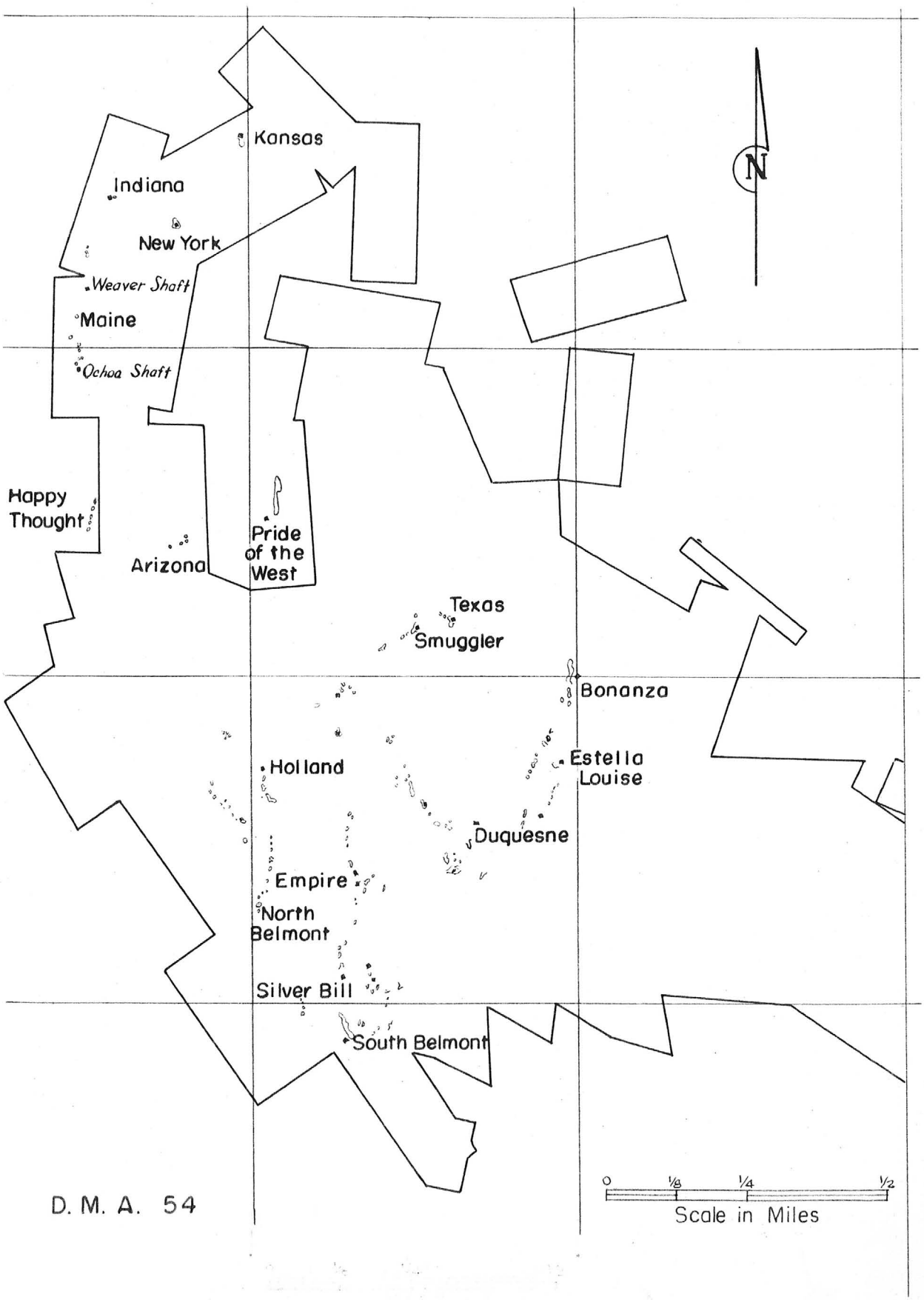


Fig. 2.- Property map, showing outline of property and position of mines, Duquesne Mining Company, Santa Cruz Co., Ariz.

5000 4000 3000 2000 1000 0 1000 2000 3000 4000

6000
5000
4000
3000
2000
1000
00
1000
2000
3000

POSEY LODE
KANSAS
KANSAS MINE
NEW YORK
KANSAS FAULT ZONE
NEW YORK MINE
New York Fault zone
INDIANA
OHIO N°2
MAINE
STORM
GEORGIA
N.H. CHAPIN
GOLDEN GATE
IRON CON
0200
POCAHONTAS
MORNING STAR
EVENING STAR
DIVIDE
SLIM JIM
ARIZONA
DAVE ALLEN
CONTACT OF THE WEST
NEW YORK
SMUGGLER
TEXAS Stope
IMPERIAL
RUTH
BONANZA
BONANZA FAULT
MBO
ALASKA
KLONDIKE
COMET
INDIANAPOLIS
HOLLAND MINE
AMSTERDAM
STANDARD
DOUBLE
ANNIE
GRASSHOPPER
DUQUESNE
DUQUESNE STREET
ILLINOIS
KEYSTONE
BIG CROP
BIG CROP EXT
MONTEZUMA
CONTACT
JOE WHEELER
BELMONT
LITTLE EMMA
MARY JANE
EMPIRE
CALIFORNIA
SAN ANTONIO
GREAT REPUBLIC
ESTELLE AND LUCILLE
BRONCO
BISBEE
CAVE
MEYER
TUANPINE
ATLANTO
PITTSBURG
SUCCESS
COPPER BELT
LAST CHANCE
CHRIS EVERS
WEDGE
CENTER
SILVER BELL
LEAD KING
SILVER JACK

north.

LEGEND

Granite porphyry
Monzonite
Garnet Zones
Limestone
Ore zone

CLAIM MAP OF
DUQUESNE MG & RED. CO.
DUQUESNE. ARIZONA.

Scale 1" = 1200'

SNE MINE [redacted] SANTA CRUZ COUNTY

tive Mine List May 1970 - 35 men - James Scardina, Supt.
tive Mine List Oct. 1970 - 15 men - Norman Lehman, J.R. Simplot

Mine Visit - Duquesne mine. Rosario managing in joint venture with Simplot. GWI WR 11-7-70

Thr Rosario Exploration Company has joined Simplot in the Duquesne Washington camp project and have taken over the management of same. Present underground work is confined to the Indiana Shaft area. GWI QR 10-1-70

The Rosario Exploration Company is continuing work at Duquesne and Washington Camp. GWI QR 12-31-70

Rosario Exploration Co. is working in Washington Camp. GWI QR 4-1-71

MG WR 9/17/80: Visited the Duquesne Mine in Santa Cruz County. There was no sign of activity at the mine site.

DUQUESNE MINE SANTA CRUZ

Do Not Reproduce

I drove to Duquesne camp in the Patagonia Mountains. VBD WR 5/14/75

I drove to Duquesne Camp; no one around. VBD WR 8/7/75

Ray Roripaugh to report that Superior Minerals was making a deal with Rosario on the Washington Camp property. GWI WR 9/23/76

MG/WR 3/7/79 - Visited the mine, no activity. 4/18/79 a.p.

MG WR 3/14/80: Visted New York Mine, in Santa Cruz County. There is no obvious activity at this property.

DUQUESNE MINE SANTA CRUZ

Do Not Reproduce.

Rosario Exploration continues exploration at Duquesne and Washington Camp. GWI 4 ¼ '72

T. C. Mr. Don Bork, project manager for Rosario, who has replaced Mr. Mike Seaward. Mr. Seaward has been transferred to Canada. GWI WR 10/19/72

Rosario operations at Duquesne, Indiana Mine still doing exploration work. Report that UV industries is drilling near Harshaw. GWI WR 3/19/73

Texas Mine

The Texas mine is one of many patented mines in the Washington Camp-Duquesne area presently under the control of the Rosario Exploration Company, Box 17030, Tucson, 85710. The mine is not presently active, but is part of Rosario's holdings in the area, all of which are the target of a continuing exploration and development project for copper, lead, zinc and silver. The Texas mine is reported by many rockhounds to have produced numerous quality mineral specimens of pyrite, chalcopyrite, and siderite. While escorting a gem and mineral collecting club over the property, May 26, 1973, a few high quality mineral specimens of pyrite and chalcopyrite were found, the largest being a half inch pyrite cube on matrix. Many massive specimens of siderite and brown calcite (possibly all calcite) were also collected. Some sphalerite and galena could also be found on the dumps.

The Texas mine and dump, as well as all other mines controlled by Rosario in the area, are closed to rockhounds and the general public. Individuals wishing to obtain rock samples and mineral specimens should contact the caretaker, Dale Hammersley, at Duquesne. Rockhound and gem and mineral clubs wishing to plan collecting trips at this mine or any other of Rosario's properties should contact the Director of the Arizona Department of Mineral Resources. KAP Report dated 6/18/73

Joe Wise, Rosario geologist for Arizona, reports that they have another company that will joint venture their Washington Camp deal - no name yet. GWI WR 10/31/74

Mine visit with Rosario at Washington Camp. No activity at present; the company is looking for an exploration partner. GWI WR 12/19/74

Tony Hauch, at PD, Douglas, called regarding Rosario looking for a partner at Washington Camp. GWI WR 12/23/74

[redacted]

Western Prospector
& Miner, Jan. '75

The holdings of Mr. Nash at Washington Camp were purchased by Mr. Carl Sandberg, 7425 N. Obregon Dr., Tucson, and Fred Williams, Jr., 2060 Yandes Street, Indianapolis Indiana (2).

See complete report in the Nash Mines file.

MEMO ALJ NOV. 12, 1964

Duquesne Mine Visit - talked with Mr. Alvarez. Head Frame gone, shaft caved at collar, change room burned. Not much information from Alvarez, except that things were quiet, and that he and two other families were living in the camp.

GWI WR 7/3/65

No Activity

GWI WR 7/30/65

Mine visit to the Simplot operations at Duquesne, still drilling - Ted Hanks no longer with company.

GWI WR 9/3/67

Simplot are doing more work near Duquesne and expect to sink another shaft in this area. (GWI Quarterly Report June 1968).

Patagonia Dist
Santa Cruz Co.

CONTINENTAL MATERIALS CORPORATION

Interoffice Correspondence

To: C. H. Reunolds **Date:** Dec. 15, 1964

From: G. L. Brooke **Copies:**

Subject: Duquesne-Washington Camp, Patagonia Mountains, Santa Cruz Co., Arizona

The mines of the above area were visited briefly on December 14th. I was accompanied by Mr. Neil Vogel of Tucson.

Location: The Duquesne-Washington Camp is located 18 miles south of Patagonia, or an equal distance east of Nogales. The area is situated on the lower eastern slope of the Patagonia Mountains at an elevation of about 5,500 feet.

Property: The property consists of 91 patented claims and some 20 unpatented claims. Included are the following which have had some recorded production.

1. Bonanza
2. Estelle Louise
3. Duquesne
4. Empire
5. Belmont
6. Holland
7. Maine
8. Indiana
9. New York
10. Kansas
11. Texas
12. Pride-of-the-West
13. Others

Production: Production for the area recorded and estimated by the Arizona Bureau of Mines are as follows:

Period	Dry Tons
1872-1899	25,000
1899-1925	170,000
1925-1929	1,500
Early Production	196,500

Period	Dry Tons	oz. Ag	% Pb	% Cu	% Zn	Rec. Plant
1940-44	116,050	3.77	2.39	1.44	7.75	Callahan Zinc
1945-50	28,369	4.10	3.44	1.85	10.59	Trench Mill
1946	9,017	4.50	3.59	1.71	9.36	Sahuarita
Sub-Total	153,436					

Period	Dry Tons	oz. Ag	% Pb	% Cu	% Zn	Rec. Plant
1951	7,735	1.5-7.6	0.9-6.6	0.6-4.5	4.2-28.9	Trench Mill
1952	12,620	1.4-10.1	0.3-7.0	0.3-4.3	2.7-22.9	Trench Mill
	48	1.8	0.4	2.97	4.5	El Paso
1953	1,322	2.0-6.8	0.8-4.6	0.9-4.7	4.9-22.3	Trench Mill
	4,274	3.9	--	5.0-12.0	3.0	El Paso
1954	789	1.6-12.2	0.7-7.3	0.6-5.6	4.5-21.6	Trench Mill
	1,029	1.0-3.0	--	3.0-9.0	3.0	El Paso
1955	2,358	1.0-12.0	0.7-7.4	0.2-3.7	3.0-33.3	Trench Mill
	171	1.9-6.1	0.4-2.5	3.3-4.0	9.3-15.4	Deming
	587	4.0	--	4.0-12.0	3.5	El Paso
1956	4,430	3.7-17.1	2.3-11.8	0.5-5.3	6.1-16.0	Trench Mill
	501	1.7-3.6	0.2-1.3	4.7-5.6	13.2-20.0	Deming
	896	5.0	1.0	5.0-9.0	4.5	El Paso
1957	3,433	2.0-13.7	1.0-9.5	0.4-5.7	5.1-17.7	Trench Mill
	148	1.2-4.7	0.4-2.0	4.8-7.0	5.5-18.7	Deming
	1,340	1.0	--	4.0-8.0	2.5	El Paso
Sub-Total	41,681					
1940-57	195,117	TOTAL				

The total estimated and recorded production amounts to 391,617 tons.

Very few company operations have been undertaken on these properties, for obvious reasons, however the Callahan Lead & Zinc Co. operated several during the war. Their biggest operation was the Bonanza, which produced about 25,000 tons over a $2\frac{1}{2}$ year period.

The only mining being done in the area at the moment is at the Indiana, where a leassor is shipping about 150 tons a month. This ore is shipped to the A.S.& R. mill at Deming, New Mexico and reportedly has a net smelter value of $40-$50/ton. He is working from a 50 foot winze on the 130 foot level.

The deepest opening in the camp is the Bonanza shaft, which is 635 feet deep and has about 7,000 feet of underground workings.

The Holland, probably the third largest producer in the camp next to the Bonanza and Pride-of-the-West, produced 30,000 tons during the early days from 3 inclines.

Geology: The orebodies in the area are pyrometasomatic, or contact metamorphic in origin. They occur along limestone-granite (quartz monzonite?) contacts. Several of these contacts can be traced over an area roughly $1\frac{1}{2}$ miles long (N-S) by 1 mile wide (E-W). They appear to be dawndropped fault blocks.

The small, erratic "pocket-type" ore shoots are restricted to these contacts, fractures leading from these contacts, or faults occurring wholly in the limestone. The ores are relatively high grade, containing zinc, lead, copper, silver and minor gold in a garnet-quartz gangue.

These limestone blocks probably bottom at relatively shallow depths, however the Bonanza shaft, 635 feet deep, is reportedly still in limestone.

Conclusions: These small, high-grade deposits have been exploited, for the most part by leassors and any mining undertaken in the future will be of this type because of the limited size of the oreshoots.

Deal: The asking price is a minimum royalty of $15,000 per year at the rate of 5 per cent of net smelter, with an end price of $750,000.

Recommendations: Of no interest to a company except perhaps to grub-stake a leasor to obtain his ore as mill feed.

A brief summary of the T.F.Gardner report dated Sept, 1938 on the various mines making up the Duquene group of some 90 Patented claims.

Discovery and operations date back to 1860.

Properties originally held by small owners, the Duquene Mining & Reduction Company organized in 1892 by George Westinghouse and these properties brought into one group comprising 64 Patented Claims. Later to 91 Patented claims.

Original operation of new company was to sink Bonanza shaft to 535 feet, good ore encountered. Writer joined company as Superintendent in 1916, production from Bonanza 500 tons per month average (this shaft now down to 635 feet and the deepest hole on the property)
1938 comments " Lots of good ore in this mine "

Bonanza. Recorded production since 1940 38,290 ton.

Estella Louise mine. 150 feet East of Bonanza, good ore @ 60 feet from 4 to 6 feet wide having an assay value of 4.8 Oz silver, 5% copper, and 25% zinc.

Recorded shipments since 1940. 20,427 tons

California mine, leased by writer, 700 tons averaged 11% copper, 13. Oz. Au. At 15 feet ~~carbonates cut and~~ sulphides came in with heavy zinc, no method of handling sulphides and smelters penalized for zinc so lease was dropped; 150 feet West on this same claim, 2 car loads were shipped assaying 24.Oz Au 20% lead, 4% copper and 15% zinc.

No recorded shipments since 1940.

San Antonio Mine, southerly and westerly from California. Reference is made to two very large openings from which enormous bodies of ore must have been taken.

Recorded shipments since 1940. 71 ton.

Empire mine. goes to sulphides at 20 to 30 feet, about 6 to 700 feet in a southerly direction from shaft; an open cut indicates from 5 to 6 feet of good copper.

Recorded shipments since 1940. 7178 ton.

Silver Bill mine. Has produced an enormous tonnage of high grade silver, lead and copper, hit good ore, chances are very good.

Recorded shipments since 1940. 1953 only 174 ton.

Belmont mine. Produced large tonnage, considerable low grade ore in mine assay 7.0 oz. silver, 7% lead and 1.5% copper

Recorded shipment 1955 only, 33 ton 3.72 Oz silver, 1,86% lead, 1.39% copper and 12.1% Zinc.

Holland mine. One of the first mines in district for lead, work suspended in 1897. Writer shipped two car loads to Florence, Colo. 16.Oz Silver, 10% lead, 4 % copper and 38% zinc. Water was at 60 feet, believes ore is wide.

Recorded shipments since 1940. 37,592 tons.

(OVER)

Arizona mine. Locat d about 1500 feet north of the Holland, writer shipped two car leads assaying 18.0z silver,20% lead, 5% copper and 20% zinc. Indicates a continuous ore body from the Holland.

No further records.

Maine mine. On northwest end of Arizona group and along the west contact but information limited.

Shipments since 1940 of record. 1446 ton.

Indiana mine. Ore shoot to 20 feet wide, shaft 50 feet deep with a 120 foot drift running south. One pillar sampled 6.5 Oz silver, 7 %copper, 25% zinc. another sample from 3 foot face 5.0 Oz silver, 3.9 % copper, 26% zinc.

Shipment recorded since 1940. 1531 ton.

New York mine. A 210 foot shaft on the Kansas vein, water stands at 20 foot below collar, has been a good producer, a Mr Cox acquired this with the Kansas, at 110 feet stoped in drift ~~were~~ was 30 feet wide, shipments by Cox carried 6.0 Oz silver and 12% copper.

Recorded shipments since 1940. 3196 ton (5 month shipments in 1944, 2256T (2256 ton)

Kansas mine. One of the best mines in the district, Mr Cox made good shipments prior to losing lease; a Mr. Everett picked up lease and shipped 10 to 18 Oz. silver, 15 to 20% lead, Mr. Everett fell in shaft and was killed. Curtis Bracey, Nogales banker, picked up the property. In 1932 a Mr Shell estimated 50,000 tons of ore in sight assaying .04 gold, 8.0 Oz silver, 7.% lead, 2.7 % copper and 11 % Zinc. Writer believes this estimate high but considers 25 to 30,000 tons reasonable.

Shipments ~~###~~ 1940 to 1957. 19,293 ton

EARLY PRODUCTION ESTIMATE

1872 - 1899	25,000	Dry Tons					
1899 - 1907	70,000	" " " "	Pride of the West Mine			$1,400,000	
1899 - 1925	170,000	" " " "	Duquene Mines			4,000,000	
1925 - 1929	1,500	" " " " "	Published data.				
	196,500	Dry tons					
Recorded shipments.							
1940 - 1944	116,050	Dry tons	3.77 Oz Ag.	2.39 % Pb.	1.44 % Cu.	7.75 % Zn	
1945 - 1950	28,369	" "	4.10	3.44	1.85	10.59	
1946	9,017	" "	4.50	3.59	1.71	9.36	
	153,436	" "					
1951 - 1957	41,681	" "					
1940 - 1957	195,117	Dry Tons Shipments of record					
	196,500	Dry Tons Prior estimated shipments from old records.					
	391.617	Dry tons.					

Mineral Production DUQUENE U.S. Bureau of Mines Reports 1940 -1956

211,234 Tons 811,902 Oz Ag. 5,922,731# Cu. 10,661,997# Pb. 26,227,900# Zn.
VALUE RECEIVED $ 6,391,585.00

*GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT-USBM FILE DATA

REFERENCE 2 F2 < USBM FILES, DUQUESNE MINE

REFERENCE 3 F3 < BLM DISTRICT MINING SHEET 727

REFERENCE 4 F4 < KEITH, S.B., 1975, ABM BULL. 191, p. 77

L110< COMPRISES 2 PATENTED CLAIMS = (DUQUESNE, SAN ANTONIO), PATENTED BY LUTTRELL AND PARTNERS IN 1880 >

K5 < BETWEEN EPITAPH DOLOMITE AND COLINA LIMESTONE; ORE DEPOSITS OCCUR ALONG A NOSE OF STRONG GARNETIZATION >

N5< SEDIMENT BELT (2.5 MILES LONG AND 1.25 MILES WIDE) SURROUNDED BY IGNEOUS ROCKS WHICH ALSO FORM DETACHED MASSES AND DIKES WITHIN BELT >

F5< ABGMT FILES, STANTON B. KEITH >
F6< SIMONS, F.S., 1974, USGS MAP I-762 (1:48000) >
F7< LEHMAN, NORMAN E., 1978, THE GEOLOGY AND PYROMETASOMATIC ORE DEPOSITS OF THE WASHINGTON CAMP-DUQUESNE DISTRICT, SANTA CRUZ COUNTY, ARIZONA; PH.D. DISSERTATION, UNIVERSITY OF ARIZONA, p. 126-143, MAPS >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 <> *RECORD TYPE B20 <X, 1 M> DEPOSIT NUMBER B40 <>

*REPORT DATE G1 <8, 2, 0, 5> (YR. MO.) *INFORMATION SOURCE B30 <1, 2> *FILE LINK IDENT. B50 <USBM-0040230170>

*REPORTER (SUPERVISOR) G2 < CALDER, SUSAN R. > (last, first, middle initial) ( ) (last, first, middle initial)

*REPORTER AFFILIATION G5 < ABGMT > *SITE NAME A10 < DUQUESNE MINE >

SYNONYMS A11 < SAN ANTONIO MINE >

LOCATION

MINING DISTRICT/AREA A30 < WASHINGTON CAMP DISTRICT >

COUNTY A60 < SANTA CRUZ > *STATE A50 <AZ> *COUNTRY A40 <U.S.>

PHYSIOGRAPHIC PROV A63 <1, 2, >

DRAINAGE AREA A62 <1, 5, 0, 5, 0, 3, 0, 1, >, LOWER COLORADO

*LAND STATUS A64 <0, 1, >, >, (, 1, 9, 7, 9,)

QUADRANGLE NAME A90 < LOCHIEL (, 1, 9, 5, 8,) > *QUADRANGLE SCALE A100 <6, 2, 5, 0, 0, >

SECOND QUAD NAME A92 < DUQUESNE (, 1, 9, 4, 8,) > SECOND QUAD SCALE A91 <2, 4, 0, 0, 0, >

ELEVATION A107 <, 5, 5, 0, 0, >, FT. >

UTM

NORTHING A120 <3, 4, 7, 0, 4, 7, 6, >

EASTING A130 <5, 2, 9, 4, 5, 0 >

ZONE NUMBER A110 <+, 1, 2, >

*ACCURACY

ACCURATE (ACC) (circle)

ESTIMATED: EST <>

GEODETIC

*LATITUDE A70 <3, 1, -, 2, 2, -, 1, 2, N, >

*LONGITUDE A80 <1, 1, 0, -, 4, 1, -, 2, 5, W, >

CADASTRAL

TOWNSHIP(S) A77 <0, 2, 4, S, :, >, >, :, >, >, :, >, >, :, >, >

*RANGE(S) A78 <0, 1, 6, E, :, >, >, :, >, >, :, >, >, :, >, >

SECTION(S) A79 < 03 :, >, >, :, >, >

SECTION FRACTION(S) A76 < E2 OF SE >

MERIDIAN(S) A81 < GILA AND SALT RIVER >

POSITION FROM NEAREST PROMINENT LOCALITY A82 < 3/4 MILE SOUTH OF WASHINGTON CAMP; JUST WEST OF DUQUESNE >

LOCATION COMMENTS A83 < 1/4 MILE NE OF EMPIRE MINE >

ESSENTIAL INFORMATION
ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

COMMODITY INFORMATION

COMMODITIES PRESENT C10: Zn, Cu, Au, Pb, Ag
ORE MINERALS C30: SPHALERITE, GALENA, CHALCOPYRITE, PYRITE
COMMODITY SUBTYPES C41:
GEN. ANALYTICAL DATA C43: ORE VALUES AVERAGED ABOUT 8% Zn, 3% Pb, 1.5% Cu, 5 oz./TON Ag, MINOR Au
COM. INFO. COMMENTS C50:

SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR: Zn	MAIN COMMODITIES PRESENT C11:
MINOR PRODUCTS	MINOR: Cu, Ag, Pb, Au	MINOR COMMODITIES PRESENT C12:
POTENTIAL PRODUCTS	POTEN:	
OCCURRENCES	OCCUR:	OCCURRENCES OCCUR:

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SML) MED LGE (circle one)	PRODUCTION UND NO (circle one)

EXPLORATION OR DEVELOPMENT

STATUS

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20: 4	STATUS AND ACTIVITY A20:

DISCOVERER L20:
YEAR OF DISCOVERY L10: NATURE OF DISCOVERY L30: YEAR OF FIRST PRODUCTION L40: 1940 YEAR OF LAST PRODUCTION L45: 1953
PRESENT/LAST OWNER A12:
PRESENT/LAST OPERATOR A13:
EXPL./DEV. COMMENTS L110: OWNERS AND OPERATORS INCLUDED DUQUESNE MINING AND REDUCTION CO. (?–1930), CALLAHAN ZINC LEAD CO. (1940–43), NASH MINES (1952), E.W. McFARLAND (1953); PROPERTY

DESCRIPTION OF DEPOSIT

DEPOSIT TYPE(S) C40: REPLACEMENT
DEPOSIT FORM/SHAPE M10: LENSES; BUNCHES; DISSEMINATIONS
DEPTH TO TOP M20: UNITS M21: MAXIMUM LENGTH M40: UNITS M41:
DEPTH TO BOTTOM M30: UNITS M31: MAXIMUM WIDTH M50: UNITS M51:
DEPOSIT SIZE M15 (SMALL) M15 MEDIUM M15 LARGE (circle one) MAXIMUM THICKNESS M60: UNITS M61:
STRIKE M70: DIP M80:
DIRECTION OF PLUNGE M100: PLUNGE M90:
DESC. COMMENTS M110:

DESCRIPTION OF WORKINGS

Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one)
DEPTH BELOW SURFACE M160: UNITS M161: OVERALL LENGTH M190: UNITS M191:
LENGTH OF WORKINGS M170: UNITS M171: OVERALL WIDTH M200: UNITS M201:
DESC. OF WORK. COM. M220: SHAFT OPERATIONS; EXTENT OF DEVELOPMENT UNKNOWN
OVERALL AREA M210: UNITS M211:

GEOLOGY

AGE OF HOST ROCK(S) K1: E.P.E.R.M.
HOST ROCK TYPE(S) K1A: GRAY DOLOMITIC LIMESTONE
AGE OF IGNEOUS ROCK(S) K2: E.P.E.R.M.
IGNEOUS ROCK TYPE(S) K2A: FINE-GRAINED COLINA LIMESTONE
AGE OF MINERALIZATION K3: L.CR.E.T.-T.E.R.T.
PERT. MINERALS (NOT ORE) K4: IRON OXIDES; GARNET
ORE CONTROL/LOCUS K5: MINERALIZATION ALONG BEDDING PLANES OF LIMESTONE AND FAULT CONTACT ZONES
MAJ. REG. TRENDS/STRUCT. N5: MINERAL DEPOSITS OF WASHINGTON-DUQUESNE AREA OCCUPY A LIMESTONE-
TECTONIC SETTING N15: WASHINGTON CAMP FAULT BLOCK; N-S TRENDING BONANZA FAULT ZONE
SIGNIFICANT LOCAL STRUCT. N70: LOCAL INTRUSIONS OF TERTIARY BIOTITE-HORNBLENDE GRANODIORITE
SIGNIFICANT ALTERATION N75: PYROMETASOMATIZED LIMESTONE
PROCESS OF CONC./ENRICH. N80: METASOMATIC REPLACEMENT AND SECONDARY ENRICHMENT
FORMATION AGE N30: E.P.E.R.M.
FORMATION NAME N30A: EPITAPH DOLOMITE
SECOND FM AGE N35: E.P.E.R.M.
SECOND FM NAME N35A: COLINA LIMESTONE
IGNEOUS UNIT AGE N50:
IGNEOUS UNIT NAME N50A:
SECOND IG. UNIT AGE N55:
SECOND IG. UNIT NAME N55A:
GEOLOGY COMMENTS N85:

GENERAL COMMENTS

GENERAL COMMENTS GEN: MINES IN REGION OF WASHINGTON CAMP AND DUQUESNE ARE SOMETIMES REFERRED TO AS THE DUQUESNE MINES

COMMODITY INFORMATION

COMMODITIES PRESENT C10 <Pb | Ag | Zn | Cu | Au | Mn | B | Mo | V | Sb |>
ORE MINERALS C30 <ARGENTIFEROUS GALENA, CERUSSITE, ANGLESITE, BINDHEIMITE, WULFENITE, VANADINITE>
COMMODITY SUBTYPES C41 <>
GEN. ANALYTICAL DATA C43 <ORE VALUES AVERAGED 4% Pb, 3 OZ./TON Ag, 25% Mn, 12% Fe.>
COM. INFO. COMMENTS C50 <>

* SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR <Pb, Ag>	MAIN COMMODITIES PRESENT C11 <>
MINOR PRODUCTS	MINOR <Cu, Au, Zn, Mn>	MINOR COMMODITIES PRESENT C12 <>
POTENTIAL PRODUCTS	POTEN <>	
OCCURRENCES	OCCUR <Be, Mo, V, Sb>	OCCURRENCES OCCUR <>

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SML) MED LGE (circle one)	PRODUCTION UND NO (circle one)

EXPLORATION OR DEVELOPMENT

*STATUS

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 <4>	STATUS AND ACTIVITY A20 <>

DISCOVERER L20 <LOCATED IN EARLY 1850'S BY MEXICANS; RELOCATED IN 1858 AND PURCHASED IN 1860 BY>
YEAR OF DISCOVERY L10 <1850's> *NATURE OF DISCOVERY L30 <B> *YEAR OF FIRST PRODUCTION L40 <1864> *YEAR OF LAST PRODUCTION L45 <1952>
PRESENT/LAST OWNER A12 <U.S. MINING AND SMELTING CO. (1967-1970)>
PRESENT/LAST OPERATOR A13 <U.S. MINING AND SMELTING CO. (1967-1970)>
EXPL./DEV. COMMENTS L110 <OWNERS AND OPERATORS INCLUDED J.W. DOUGLASS, R.S. EWELL, J.N. MOORE, RANDALL, LORD, DOSS, H.T. TITUS, SILVERBERG AND STEINFELD (1890-1901), GENERAL CARLETON (1862-1864),>

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 <VEIN; CONTACT METASOMATIC; REPLACEMENT>
DEPOSIT FORM/SHAPE M10 <TABULAR; PIPE; MANTOS; PODS AND POCKETS OF MN>
*DEPTH TO TOP M20 <> *UNITS M21 <> *MAXIMUM LENGTH M40 <1/2> *UNITS M41 <MILE>
*DEPTH TO BOTTOM M30 <500> *UNITS M31 <FT> *MAXIMUM WIDTH M50 <6-8> *UNITS M51 <FT>
*DEPOSIT SIZE M15 (SMALL) M15 <MEDIUM> M15 <LARGE> (circle one) *MAXIMUM THICKNESS M60 <> *UNITS M61 <>
*STRIKE M70 <N75E> *DIP M80 <80 N>
*DIRECTION OF PLUNGE M100 <> *PLUNGE M90 <>
*DEP. DESC. COMMENTS M110 <21 PATENTED CLAIMS TOTALLING 420 ACRES; CROPPINGS EXTEND INTERRUPTEDLY ALONG CONTACT FISSURE FOR MORE THAN ½ MILE; DEPOSIT FORMS ALMOST CONTINUOUS TABULAR SHEET ALONG>

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one)
*DEPTH BELOW SURFACE M160 <500> *UNITS M161 <FT> *OVERALL LENGTH M190 <625> *UNITS M191 <FT.>
*LENGTH OF WORKINGS M170 <15,000> *UNITS M171 <FT> *OVERALL WIDTH M200 <300> *UNITS M201 <FT.>
*OVERALL AREA M210 <187,500> *UNITS M211 <SQ. FT.>
DESC. OF WORK. COM. M220 <DEVELOPMENTS INCLUDED DIAMOND DRILLING (1954-1955) BY VENTURES LTD. OF CANADA; 15,000 FT OF DRIFTS, RAISES, AND WINZES CONNECTING TO SURFACE BY AT LEAST 6 SHAFTS>

GEOLOGY

*AGE OF HOST ROCK(S) K1 <M.I.S.S.-PERM.>
*HOST ROCK TYPE(S) K1A <CHERTY LIMESTONE>
*AGE OF IGNEOUS ROCK(S) K2 <L.CRET.-TERT.>
*IGNEOUS ROCK TYPE(S) K2A <QUARTZ MONZONITE, UNDERLAIN BY GABBRO INTRUSIVE AT 235 FT. LEVEL>
*AGE OF MINERALIZATION K3 <E.TERT.>
*PERT. MINERALS (NOT ORE) K4 <FERRUGINOUS AND MANGANIFEROUS GANGUE INCLUDING SIDERITE, JAROSITE, HEMATITE>
*ORE CONTROL/LOCUS K5 <NORTH, OR HANGING WALL SIDE, OF E-W MOWRY FAULT, AS REPLACEMENT BODIES IN LIMESTONE>
*MAJ. REG. TRENDS/STRUCT. N5 <ORE DEPOSITS LOCALIZED BETWEEN WEST END AND MILL FAULTS, A DISTANCE OF>
*TECTONIC SETTING N15 <MOWRY MINE FAULT BLOCK; DOWNTHROW TO NORTH>
*SIGNIFICANT LOCAL STRUCT. N70 <4 PRINCIPAL ORE BODIES ARE LOCALIZED WITHIN 100 FT. NORTH OF MOWRY FAULT, DECREASING>
*SIGNIFICANT ALTERATION N75 <LIMESTONE IS HIGHLY SERICITIZED, BRECCIATED AND STAINED WITH MN AND FE;>
*PROCESS OF CONC./ENRICH. N80 <DEEP OXIDATION TO 300 FT LEVEL AND SUPERGENE ENRICHMENT>
*FORMATION AGE N30 <M.I.S.S.>
*FORMATION NAME N30A <ESCABROSA LIMESTONE>
SECOND FM AGE N35 <PENN.-PERM.>
SECOND FM NAME N35A <NACO LIMESTONE>
*IGNEOUS UNIT AGE N50 <>
*IGNEOUS UNIT NAME N50A <>
SECOND IG. UNIT AGE N55 <>
SECOND IG. UNIT NAME N55A <>
GEOLOGY COMMENTS N85 <MOWRY FAULT OFFSET BY WEST END AND EAST END FAULTS; WEST END FAULT BLOCK IS LATERALLY DISPLACED 50 FT TO SOUTH; COPPER AND IRON SULFIDES FIRST ENCOUNTERED>

GENERAL COMMENTS

GENERAL COMMENTS GEN <>

* GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT- USBM FILE DATA >

REFERENCE 2 F2 < USBM FILES, MOWRY PROPERTY >

REFERENCE 3 F3 < ADMR FILE DATA, MOWRY MINE >

REFERENCE 4 F4 < UNPUBLISHED DATA, 1979, JAN C. WILT, U.S. GEOLOGICAL SURVEY >

C30 < PSILOMELANE, PYROLUSITE, WAD, MANGANITE, PYRITE, CHALCOPYRITE, MARCASITE >
L20 < LT. SYLVESTER MOWRY >
L110 < MOWRY MINES CO. (1904-1907), A.J. HAZELTINE, FISH, STEINFELD AND SWAIN, SANTA CRUZ MINES AND SMELTING CO., MITCHELL, STONE, B. LOGAN, K. PETERSON, G.M. GRANT, T.L. WOODRUFF F. METTER, J. CURTIS, WHITE AND LOVELACE, M. ENCINIAS, H. MILLER, E.J. GALLAGHER, SQUIRES, W.J. MITCHELL, STANDARD METALS CO., MOWRY EXPLORATION CO., SOUTHWEST METALLURGICAL INDUSTRIES (1955) >
M110 < 600-FT. STRETCH OCCUPIED BY MINE OPENINGS; ORE SHOOTS OCCUR AT INTERVALS ALONG NE-TRENDING VEIN AND PITCH 40-60 SW; SEVERAL DEPOSITS OCCUR AS MANTOS, FOLLOWING LIMESTONE FOR SEVERAL 100 FT BEYOND SHEAR ZONE >

K4 < PSILOMELANE, PYROLUSITE, KAOLIN, AND CALCITE AT DEPTHS >
K5 < AND AS CONTACT FISSURE DEPOSITS BETWEEN LIMESTONE AND MONZONITE >
N5 < ABOUT 1000 FT >

N70 < IN SIZE AND GRADE TO 500 FT LEVEL WHERE THEY RAPIDLY PINCH OUT >
N75 < FELDSPARS ARE GREATLY KAOLINIZED AND ALTERED TO EPIDOTE >
N85 < ON 400-FT LEVEL; COARSELY CRYSTALLINE GALENA OCCURS IN LENSES AND MASSES EMBEDDED IN MANGANIFEROUS GANGUE; A LARGE ORE BODY AND SEVERAL SHEETS OR VEINS OF MN ARE FOUND AT 150-FT. LEVEL >

most 44C

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 < >
*RECORD TYPE B20 < X, 1, M >
DEPOSIT NUMBER B40 < >
*REPORT DATE G1 < 8, 2, ¥, 0, 3, > (YR. MO.)
*INFORMATION SOURCE B30 < 1, 2, >
*FILE LINK IDENT. B50 < USBM-0040230013 >
*REPORTER(SUPERVISOR) G2 < CALDER, SUSAN R. > (last, first, middle initial)
((last, first, middle initial)
*REPORTER AFFILIATION G5 < ABGMT >
*SITE NAME A10 < MOWRY MINE >
*SYNONYMS A11 < PATAGONIA MINE; ENTERPRISE MINE, Bronco, Eastern Ent. Enterprises >

LOCATION

*MINING DISTRICT/AREA A30 < HARSHAW DISTRICT >
*COUNTY A60 < SANTA CRUZ >
*STATE A50 < A, Z >
*COUNTRY A40 < U, S >
*PHYSIOGRAPHIC PROV A63 < 1, 2, ¥ >
*DRAINAGE AREA A62 < 1, 5, 0, 5, 0, 3, 0, 1, ¥, LOWER COLORADO >
*LAND STATUS A64 < 0, 1, ¥, ¥, (1, 9, 7, 9,) >
*QUADRANGLE NAME A90 < LOCHIEL , (1, 9, 5, 8, 1,) >
*QUADRANGLE SCALE A100 < 6, 2, 5, 0, 0, >
SECOND QUAD NAME A92 < HARSHAW , (1, 9, 4, 8, 1,) >
SECOND QUAD SCALE A91 < 2, 4, 0, 0, 0, >
*ELEVATION A107 < , 5, 5, 0, 0, ¥, F, T, >

UTM
*NORTHING A120 < 3, 4, 7, 6, 9, 2, 0, >
*EASTING A130 < 5, 2, 8, 2, 0, 0 >
*ZONE NUMBER A110 < +, 1, 2, >

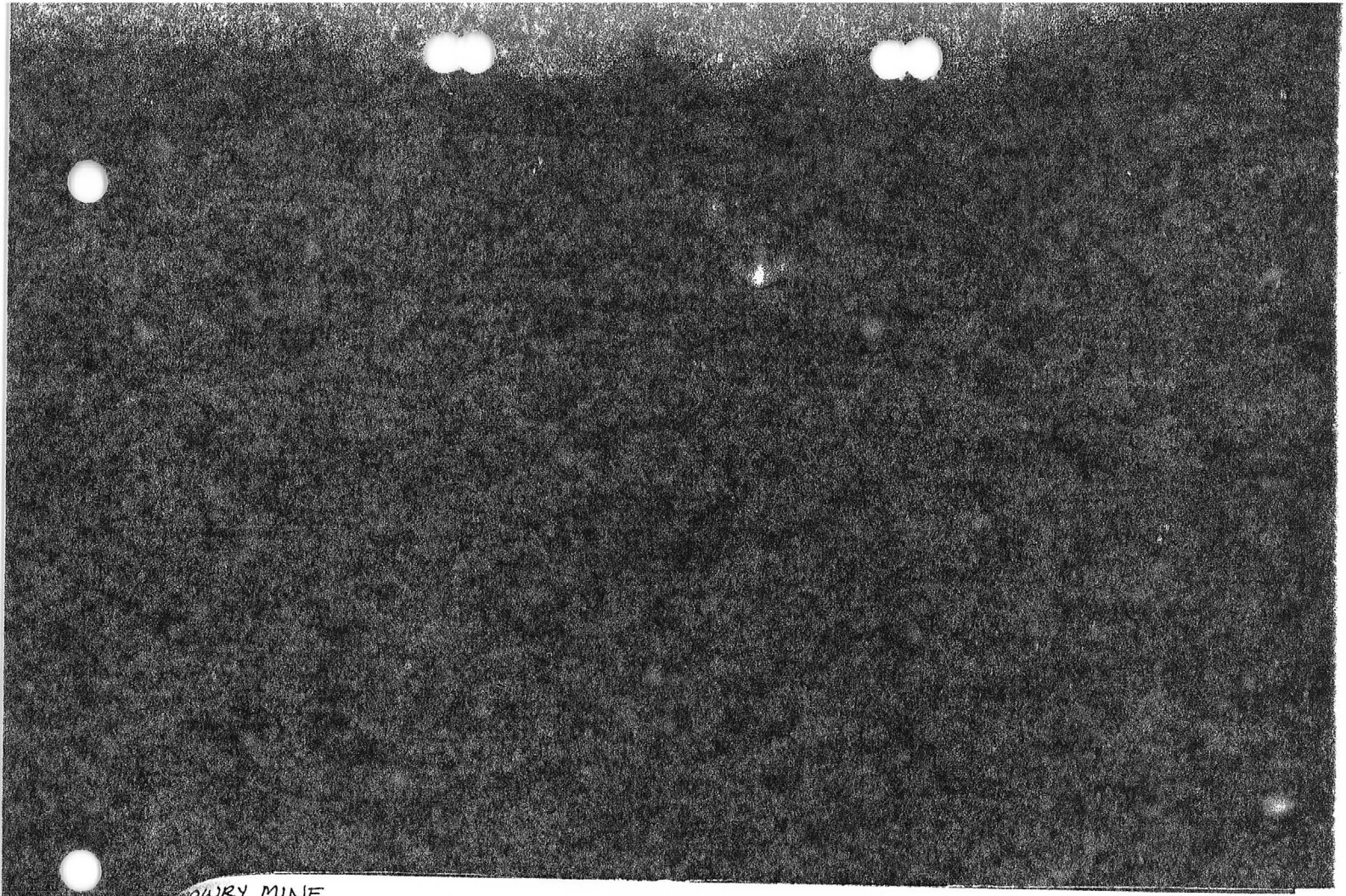
*ACCURACY
ACCURATE (ACC) (circle)
ESTIMATED EST < >

GEODETIC
*LATITUDE A70 < 3, 1, -, 2, 5, -, 4, 2, N, >
*LONGITUDE A80 < 1, 1, 0, -, 4, 2, -, 1, 2, W, >

CADASTRAL
*TOWNSHIP(S) A77 < 0, 2, 3, S, ¥, ¥, ¥, ¥, >
*RANGE(S) A78 < 0, 1, 6, E, ¥, ¥, ¥, ¥, >
*SECTION(S) A79 < 15 ¥, ¥, ¥, >
*SECTION FRACTION(S) A76 < S2 OF SW >
*MERIDIAN(S) A81 < GILA AND SALT RIVER >

*POSITION FROM NEAREST PROMINENT LOCALITY A82 < 9 MILES SOUTH OF PATAGONIA >
*LOCATION COMMENTS A83 < 1.5 MILES SE OF AMERICAN PEAK, IN SOUTH BASE OF MOWRY HILL >

* ESSENTIAL INFORMATION
· ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED



MOWRY MINE

* GENERAL REFERENCES CONT'D.

REFERENCE 1 F1 <

EFERENCE 2 F2 <

EFERENCE 3 F3 <

EFERENCE 4 F4 <

F5< SMITH, GEORGE E., 1956, THE GEOLOGY AND ORE DEPOSITS OF THE MOWRY MINE AREA, SANTA CRUZ COUNTY, ARIZONA; M.S. THESIS, UNIVERSITY OF ARIZONA, 44 pp. >

E6< SCHRADER, FRANK C., 1915, MINERAL DEPOSITS OF THE SANTA RITA AND PATAGONIA MOUNTAINS, ARIZONA; USGS BULLETIN 582, p. 296-306 >

F7< TENNEY, JAMES B., 1927-1929, HISTORY OF MINING IN ARIZONA; ARIZONA BUREAU OF MINES, p. 299-293 >

F8< SIMONS, FRANK S., 1974, GEOLOGIC MAP AND SECTIONS OF THE NOGALES AND LOCHIEL QUADRANGLES, SANTA CRUZ COUNTY, ARIZONA; USGS MAP I-762 (1:48000) >

F9< KEITH, STANTON B., 1975, INDEX OF MINING PROPERTIES IN SANTA CRUZ COUNTY, ARIZONA; ARIZONA BUREAU OF MINES BULLETIN 191, p. 81 >

F10< ABGMT FILES, STANTON B. KEITH >

F11< FARNHAM, L.L., STEWART, L.A. AND C.W. DELONG, 1961, MANGANESE DEPOSITS IN EASTERN ARIZONA; U.S. BUREAU OF MINES INFORMATION CIRCULAR 7990, p. 159-162 >

F12< PROUT, J.W., 1907, THE SILVER-LEAD DEPOSITS OF THE MOWRY MINE, MOWRY, SANTA CRUZ COUNTY, ARIZONA; M.S. THESIS, UNIVERSITY OF ARIZONA, 18 pp. >

F13< BRINSMADE, R.B., 1907, LEAD-SILVER DEPOSITS OF MOWRY, ARIZONA; MINES AND MINERALS, VOL. 27, NO. 12, p. 529-531 >

F14< ABGMT CLIPPINGS FILE, MOWRY MINE >

F15< BLM DISTRICT MINING SHEET 723 >

* GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT- USBM LE DATA >

REFERENCE 2 F2 < USBM FILES, ANNIE MINE >

REFERENCE 3 F3 < BLM DISTRICT MINING SHEET 727 >

REFERENCE 4 F4 < KEITH, S.B., 1975, ABM BULL. 191, p. 76 >

L110 < PATENTED CLAIM; MINED FOR OXIDE ORE IN LATE 1800's AND FOR SULFIDE IN EARLY 1900's >

K5 < FOLDED LIMESTONE >

N5 < SEDIMENT BELT (2.5 MILES LONG AND 1.25 MILES WIDE) SURROUNDED BY IGNEOUS ROCKS WHICH ALSO FORM DETACHED MASSES AND DIKES WITHIN BELT >

F5 < ABGMT FILES, STANTON B. KEITH >
F6 < SIMONS, F.S., 1974, USGS MAP I-762 (1:48000) >
F7 < LEHMAN, NORMAN E. 1978 THE GEOLOGY AND PYROMETASOMATIC ORE DEPOSITS OF THE WASHINGTON CAMP - DUQUESNE DISTRICT, SANTA CRUZ COUNTY, ARIZONA; PhD. DISSERTATION, UNIVERSITY OF ARIZONA, p. 126-143, MAPS >
F8 < CROSBY W.O. 1906, THE LIMESTONE - GRANITE CONTACT DEPOSITS OF WASHINGTON CAMP, ARIZONA; AIME TRANSACTIONS, VOL. 36, p. 626-646 >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 < >
*RECORD TYPE B20 < X, M >
DEPOSIT NUMBER B40 < >
*REPORT DATE G1 < 82 (YR.) 05 (MO.) >
*INFORMATION SOURCE B30 < 1, 2 >
*FILE LINK IDENT. B50 < USBM-0040230099 >

*REPORTER(SUPERVISOR) G2 < CALDER, SUSAN R. (last, first, middle initial) ((last, first, middle initial))
*REPORTER AFFILIATION G5 < ABGMT >
*SITE NAME A10 < ANNIE MINE >
*SYNONYMS A11 < >

LOCATION

*MINING DISTRICT/AREA A30 < WASHINGTON CAMP DISTRICT >
*COUNTY A60 < SANTA CRUZ >
*STATE A50 < AZ >
*COUNTRY A40 < U.S. >
*PHYSIOGRAPHIC PROV A63 < 1, 2, >
*DRAINAGE AREA A62 < 15050301, LOWER COLORADO >
*LAND STATUS A64 < 0, , , (1979) >
*QUADRANGLE NAME A90 < LOCHIEL (1958) >
*QUADRANGLE SCALE A100 < 62500 >
SECOND QUAD NAME A92 < DUQUESNE (1948) >
SECOND QUAD SCALE A91 < 24000 >
*ELEVATION A107 < 5100 FT >

UTM
*NORTHING A120 < 3470400 >
*EASTING A130 < 529200 >
*ZONE NUMBER A110 < 12 >

*ACCURACY
ACCURATE ACC (circle)
ESTIMATED (EST) < USED USBM FILES; BLM DISTRICT MINING SHEET 727 >

GEODETIC
*LATITUDE A70 < 31 - 22 - 10 N >
*LONGITUDE A80 < 110 - 41 - 35 W >

CADASTRAL
*TOWNSHIP(S) A77 < 024S >
*RANGE(S) A78 < 016E >
*SECTION(S) A79 < 03 >
*SECTION FRACTION(S) A76 < SE OF SE >
*MERIDIAN(S) A81 < GILA AND SALT RIVER >

*POSITION FROM NEAREST PROMINENT LOCALITY A82 < 3/4 MILE SOUTH OF WASHINGTON CAMP >
*LOCATION COMMENTS A83 < ADJACENT ON NORTH TO EMPIRE MINE; ADJACENT ON SE TO DUDLEY STANDARD MINE >

* ESSENTIAL INFORMATION
+ ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

COMMODITY INFORMATION

*COMMODITIES PRESENT C10 <Zn, Pb, Cu, Ag, Au,>
*ORE MINERALS C30 < SPHALERITE, GALENA, CHALCOPYRITE
COMMODITY SUBTYPES C41 <
*GEN. ANALYTICAL DATA C43 < ORE VALUES AVERAGED ABOUT 5% Zn, 3% Pb, 0.5% Cu, 5 OZ./TON Ag, TRACE Au
COM. INFO. COMMENTS C50 <

* SIGNIFICANCE

	PRODUCER		NON-PRODUCER	
MAJOR PRODUCTS	MAJOR	<Zn, Pb,>	MAIN COMMODITIES PRESENT	C11 <
MINOR PRODUCTS	MINOR	<Cu, Ag, Au,>	MINOR COMMODITIES PRESENT	C12 <
POTENTIAL PRODUCTS	POTEN	<		
OCCURRENCES	OCCUR	<	OCCURRENCES	OCCUR <

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SML) MED LGE (circle one)	PRODUCTION UND NO (circle one)

*STATUS EXPLORATION OR DEVELOPMENT

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 <4>	STATUS AND ACTIVITY A20 < >

*DISCOVERER L20 <
*YEAR OF DISCOVERY L10 < > *NATURE OF DISCOVERY L30 < > *YEAR OF FIRST PRODUCTION L40 < > *YEAR OF LAST PRODUCTION L45 <
*PRESENT/LAST OWNER A12 <
*PRESENT/LAST OPERATOR A13 <
EXPL./DEV.COMMENTS L110 < OWNERS AND OPERATORS INCLUDED DUQUESNE MINING AND REDUCTION CO. M. PERKINS AND F.R. MEDINA (1951), FRANCISCO AND MEDINA (1952); PROPERTY COMPRISES 1

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 < REPLACEMENT; SHEAR ZONE
DEPOSIT FORM/SHAPE M10 < IRREGULAR LENSE
*DEPTH TO TOP M20 < > *UNITS M21 < > *MAXIMUM LENGTH M40 < > *UNITS M41 <
*DEPTH TO BOTTOM M30 < > *UNITS M31 < > *MAXIMUM WIDTH M50 < > *UNITS M51 <
*DEPOSIT SIZE M15 (SMALL) M15 (MEDIUM) M15 (LARGE) (circle one) *MAXIMUM THICKNESS M60 < > *UNITS M61 <
*STRIKE M70 < > *DIP M80 <
*DIRECTION OF PLUNGE M100 < > *PLUNGE M90 <
*DEP. DESC. COMMENTS M110 <

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one)
*DEPTH BELOW SURFACE M160 < > *UNITS M161 < > *OVERALL LENGTH M190 < > *UNITS M191 <
*LENGTH OF WORKINGS M170 < > *UNITS M171 < > *OVERALL WIDTH M200 < > *UNITS M201 <
DESC. OF WORK. COM. M220 < SHAFT OPERATIONS *OVERALL AREA M210 < > *UNITS M211 <

GEOLOGY

*AGE OF HOST ROCK(S) K1 <E.PERM,>
*HOST ROCK TYPE(S) K1A < CRYSTALLINE LIMESTONE
*AGE OF IGNEOUS ROCK(S) K2 <J.E.R.T., 58 ± 5 m.y. DATE ON HORNBLENDE (SIMONS, F.S., 1974)
*IGNEOUS ROCK TYPE(S) K2A < BIOTITE-HORNBLENDE GRANODIORITE DIKES AND SILLS
*AGE OF MINERALIZATION K3 <L.C.RET.-T.E.R.T.>
*PERT. MINERALS (NOT ORE) K4 < GARNET QUARTZ GANGUE
*ORE CONTROL/LOCUS K5 < SMALL IRREGULAR LENSE IN A PYROMETASOMATIC DEPOSIT IN FAULTED AND
*MAJ. REG. TRENDS/STRUCT. N5 < MINERAL DEPOSITS OF WASHINGTON-DUQUESNE AREA OCCUPY A LIMESTONE-
*TECTONIC SETTING N15 < DUQUESNE FAULT BLOCK
*SIGNIFICANT LOCAL STRUCT. N70 < NW-TRENDING FAULT; GRANODIORITE INTRUSION NEARBY
*SIGNIFICANT ALTERATION N75 < STRONG GARNETIZATION
*PROCESS OF CONC./ENRICH. N80 < PARTLY OXIDIZED AND ENRICHED IN SILVER AND LEAD NEAR SURFACE
FORMATION AGE N30 <E.PERM.>
FORMATION NAME N30A < COLINA LIMESTONE
SECOND FM AGE N35 <>
SECOND FM NAME N35A <
IGNEOUS UNIT AGE N50 <>
IGNEOUS UNIT NAME N50A <
SECOND IG. UNIT AGE N55 <>
SECOND IG. UNIT NAME N55A <
GEOLOGY COMMENTS N85 <

GENERAL COMMENTS

GENERAL COMMENTS GEN <

* GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT-USB[illegible]ILE DATA

REFERENCE 2 F2 < USBM FILES, DUDLEY STANDARD MINE

REFERENCE 3 F3 < BLM DISTRICT MINING SHEET 727

REFERENCE 4 F4 < KEITH, S.B., 1975, ABM BULL. 191, p. 77 >

L110< EARLY 1900'S THROUGH 1951; PRODUCTION DATA AVAILABLE FOR 1951 ONLY >

K5 < PARALLEL GARNET SKARN ZONES ALONG STRONG FAULT ZONES CUTTING LIMESTONE >
N5 < SEDIMENT BELT (2.5 MILES LONG AND 1.25 MILES WIDE) SURROUNDED BY IGNEOUS ROCKS WHICH ALSO FORM DETACHED MASSES AND DIKES WITHIN BELT >

N70< LIMESTONE; TRANSECTED BY MINERALIZED FAULT AND SKARN ZONES THAT PARALLEL NE-TRENDING TEXAS FAULT (JUST TO NORTH OF MINE WORKINGS) >
N80 < HYPOGENE ENRICHMENT EVIDENCED BY NEAR-SURFACE CONCENTRATION OF NATIVE ARSENIC >
N85< CLAIM; MAJOR FAULTING IN AREA POSTDATES METAMORPHISM OF LIMESTONE AND EMPLACEMENT OF ORE BODIES >

F5< SIMONS, F.S., 1974, USGS MAP I-762 (1:48000) >
F6 < LEHMAN, NORMAN E., 1978, THE GEOLOGY AND PYROMETASOMATIC ORE DEPOSITS OF THE WASHINGTON CAMP-DUQUESNE DISTRICT, SANTA CRUZ COUNTY, ARIZONA; PhD. DISSERTATION, UNIVERSITY OF ARIZONA, p. 126-143, MAPS >
F7 < CROSBY W.O. 1906, THE LIMESTONE-GRANITE CONTACT DEPOSITS OF WASHINGTON CAMP, ARIZONA, AIME TRANSACTIONS, VOL. 36, p. 626-646 >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 <[illegible]>
*RECORD TYPE B20 <X,1,M>
DEPOSIT NUMBER B40 <[illegible]>
*REPORT DATE G1 <82,05> (YR. MO.)
*INFORMATION SOURCE B30 <1,2,[illegible]>
*FILE LINK IDENT. B50 < USBM-0040230168 >

*REPORTER(SUPERVISOR) G2 < CALDER, SUSAN R. (last, first, middle initial) ((last, first, middle initial) NC)>
*REPORTER AFFILIATION G5 < ABGMT >
*SITE NAME A10 < DUDLEY STANDARD MINE >
SYNONYMS A11 < DOUBLE STANDARD MINE; DUBLY STANDARD; DUDLEY MINE >
NC

LOCATION

MINING DISTRICT/AREA A30 < WASHINGTON CAMP DISTRICT >
COUNTY A60 < SANTA CRUZ > *STATE A50 <AZ> *COUNTRY A40 <U.S.>
PHYSIOGRAPHIC PROV A63 <12,[illegible]>
DRAINAGE AREA A62 <15050301,[illegible], LOWER COLORADO>
*LAND STATUS A64 <01,[illegible],[illegible],1979>
QUADRANGLE NAME A90 < LOCHIEL ,1958,> *QUADRANGLE SCALE A100 <62500,>
SECOND QUAD NAME A92 < HARSHAW ,1948,> SECOND QUAD SCALE A91 <24000,>
ELEVATION A107 <5550,[illegible],FT.>

UTM
NORTHING A120 <3470700>
EASTING A130 <529100>
ZONE NUMBER A110 <+,12>

*ACCURACY
ACCURATE (ACC) (circle)
ESTIMATED EST <[illegible]>

GEODETIC
*LATITUDE A70 <31-22-20 N,>
*LONGITUDE A80 <110-41-38 W,>

CADASTRAL
TOWNSHIP(S) A77 <024S,[illegible],[illegible],[illegible],[illegible]> *RANGE(S) A78 <016E,[illegible],[illegible],[illegible],[illegible]>
SECTION(S) A79 < 03 [illegible]>
SECTION FRACTION(S) A76 < NW OF SE >
MERIDIAN(S) A81 < GILA AND SALT RIVER >

POSITION FROM NEAREST PROMINENT LOCALITY A82 < ½ MILE SSW OF WASHINGTON CAMP >
LOCATION COMMENTS A83 < ADJACENT ON NE TO HOLLAND MINE AND ON SW TO TEXAS MINE >

ESSENTIAL INFORMATION
ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

COMMODITY INFORMATION

*COMMODITIES PRESENT C10 <Zn, Pb, Cu, Ag,
*ORE MINERALS C30 < SPHALERITE, CHALCOPYRITE, GALENA
COMMODITY SUBTYPES C41 <
GEN. ANALYTICAL DATA C43 <ORE VALUES AVERAGED 6% Zn, 3% Cu, 2% Pb, 3 OZ./TON Ag, MINOR Au
COM. INFO. COMMENTS C50 <

SIGNIFICANCE

		PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR	<Zn,	MAIN COMMODITIES PRESENT C11 <
MINOR PRODUCTS	MINOR	<Cu, Ag, Pb,	MINOR COMMODITIES PRESENT C12 <
POTENTIAL PRODUCTS	POTEN	<	
OCCURRENCES	OCCUR	<Au,	OCCURRENCES OCCUR <

*PRODUCTION

PRODUCER	NON-PRODUCER
*PRODUCTION YES (circle) *PRODUCTION SIZE (SML) MED LGE (circle one)	*PRODUCTION UND NO (circle one)

*STATUS EXPLORATION OR DEVELOPMENT

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 <H>	STATUS AND ACTIVITY A20 < >

*DISCOVERER L20 <
*YEAR OF DISCOVERY L10 < > *NATURE OF DISCOVERY L30 <B> *YEAR OF FIRST PRODUCTION L40 < > *YEAR OF LAST PRODUCTION L45 <
*PRESENT/LAST OWNER A12 <ROSARIO EXPLORATION CO (1973)
*PRESENT/LAST OPERATOR A13 <
EXPL./DEV.COMMENTS L110 <OWNERS AND OPERATORS INCLUDED DUQUESNE MINING AND REDUCTION CO., A.B. BYRD, NASH MINES; PROPERTY COMPRISES 1 PATENTED CLAIM; MINED INTERMITTENTLY FROM

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 <REPLACEMENT; SHEAR ZONE
DEPOSIT FORM/SHAPE M10 <BUNCHES; IRREGULAR; DISSEMINATED
*DEPTH TO TOP M20 < > *UNITS M21 < > *MAXIMUM LENGTH M40 < > *UNITS M41 <
*DEPTH TO BOTTOM M30 < > *UNITS M31 < > *MAXIMUM WIDTH M50 < > *UNITS M51 <
*DEPOSIT SIZE M15 (SMALL) M15 <MEDIUM> M15 <LARGE> (circle one) *MAXIMUM THICKNESS M60 <20> *UNITS M61 <FT
*STRIKE M70 <NNE-SSW> *DIP M80 <
*DIRECTION OF PLUNGE M100 < > *PLUNGE M90 <
DESC. COMMENTS M110 <2 ORE ZONES ARE 10-20 FT THICK AND ARE SEPARATED BY ABOUT 50 FT. OF BARREN LIMESTONE

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND M130 BOTH (M140) (circle one)
DEPTH BELOW SURFACE M160 < > *UNITS M161 < > *OVERALL LENGTH M190 < > *UNITS M191 <
*LENGTH OF WORKINGS M170 < > *UNITS M171 < > *OVERALL WIDTH M200 < > *UNITS M201 <
DESC. OF WORK. COM. M220 <SHAFT, TUNNEL, AND OPEN CUT OPERATIONS *OVERALL AREA M210 < > *UNITS M211 <

GEOLOGY

*AGE OF HOST ROCK(S) K1 <E.P.E.R.M.
*HOST ROCK TYPE(S) K1A <GRAY DOLOMITIC LIMESTONE
AGE OF IGNEOUS ROCK(S) K2 <E.P.E.R.M.
IGNEOUS ROCK TYPE(S) K2A <FINE-GRAINED LIMESTONE
AGE OF MINERALIZATION K3 <L.CRET.-TERT.
PERT. MINERALS (NOT ORE) K4 <GARNET-QUARTZ GANGUE; ARSENIC
ORE CONTROL/LOCUS K5 <IRREGULAR REPLACEMENT BODIES AND DISSEMINATIONS IN 2 NE-TRENDING
MAJ. REG. TRENDS/STRUCT. N5 <MINERAL DEPOSITS OF WASHINGTON-DUQUESNE AREA OCCUPY A LIMESTONE-
TECTONIC SETTING N15 <WASHINGTON CAMP FAULT BLOCK
SIGNIFICANT LOCAL STRUCT. N70 <ON OR NEAR N-S TRENDING CONTACT BETWEEN EPITAPH DOLOMITE AND COLINA
SIGNIFICANT ALTERATION N75 <CRYSTALLIZED AND PYROMETASOMATIZED LIMESTONE
PROCESS OF CONC./ENRICH. N80 <PARTIAL OXIDATION OF ORES; REPLACEMENT AND SECONDARY ENRICHMENT;
FORMATION AGE N30 <E.P.E.R.M.
FORMATION NAME N30A <EPITAPH DOLOMITE
SECOND FM AGE N35 <E.P.E.R.M.
SECOND FM NAME N35A <COLINA LIMESTONE
IGNEOUS UNIT AGE N50 <
IGNEOUS UNIT NAME N50A <
SECOND IG. UNIT AGE N55 <
SECOND IG. UNIT NAME N55A <
GEOLOGY COMMENTS N85 <PARALLEL ORE BODIES ORIGINATE ON PRIDE OF THE WEST CLAIM, ARE THROWN EASTWARD ONTO SMUGGLER CLAIM, AND THEN FLEX BACKWARD TO WEST ONTO DOUBLE STANDARD

GENERAL COMMENTS

GENERAL COMMENTS GEN <

*GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT- USBM FILE DATA >

REFERENCE 2 F2 < USBM FILES, NEW YORK MINE >

REFERENCE 3 F3 < SCHRADER, F.C., 1915, USGS BULL. 582, p. 342 >

REFERENCE 4 F4 < KEITH, S.B., 1975, ABM BULL. 191, p. 79 >

L110 < BYRD (1945-46), BRACEY CURTIS ESTATE, TOM GARDNER >

K5 < CRYSTALLINE LIMESTONE >

N5 < SEDIMENT BELT (2.5 MILES LONG AND 1.25 MILES WIDE) SURROUNDED BY IGNEOUS ROCKS WHICH ALSO FORM DETACHED MASSES AND DIKES WITHIN BELT >

N70 < GRANODIORITE >

F5 < ADMR FILE DATA, KANSAS MINE >
F6 < ABGMT FILES, STANTON B. KEITH >
F7 < SIMONS, F.S., 1974, USGS MAP I-762 (1:48000) >
F8 < LEHMAN, NORMAN E., 1978, THE GEOLOGY AND PYROMETASOMATIC ORE DEPOSITS OF THE WASHINGTON CAMP-DUQUESNE DISTRICT, SANTA CRUZ COUNTY, ARIZONA; PhD. DISSERTATION, UNIVERSITY OF ARIZONA, p. 126-143 >
F9 < ABGMT CLIPPINGS FILE, NEW YORK MINE >
F10 < TENNEY, JAMES B., 1927-29, HISTORY OF MINING IN ARIZONA; ARIZONA BUREAU OF MINES, p. 293-360 >
F11 < BLM DISTRICT MINING SHEET 727 >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 < >
*RECORD TYPE B20 < X, 1, M >
DEPOSIT NUMBER B40 < >
REPORT DATE G1 < 82, 05 > (YR. MO.)
*INFORMATION SOURCE B30 < 1, 2 >
*FILE LINK IDENT. B50 < USBM-0040230300 >

REPORTER (SUPERVISOR) G2 < CALDER, SUSAN R. > ( )
(last, first, middle initial) (last, first, middle initial)

REPORTER AFFILIATION G5 < ABGMT >
*SITE NAME A10 < NEW YORK MINE >
SYNONYMS A11 < POOLE GROUP; OHIO MINE >

LOCATION

MINING DISTRICT/AREA A30 < WASHINGTON CAMP DISTRICT >
COUNTY A60 < SANTA CRUZ >
*STATE A50 < AZ >
*COUNTRY A40 < U.S. >
PHYSIOGRAPHIC PROV. A63 < 1, 2, >
DRAINAGE AREA A62 < 15050301, LOWER COLORADO >
*LAND STATUS A64 < 01, , , (1979) >
QUADRANGLE NAME A90 < LOCHIEL (1958) >
*QUADRANGLE SCALE A100 < 62500 >
SECOND QUAD NAME A92 < HARSHAW (1948) >
SECOND QUAD SCALE A91 < 24000 >
ELEVATION A107 < 5450 FT >

UTM
NORTHING A120 < 3471750 >
EASTING A130 < 529100 >
*ZONE NUMBER A110 < +12 >

*ACCURACY
ACCURATE (ACC) (circle)
ESTIMATED EST < >

GEODETIC
*LATITUDE A70 < 31-22-54 N >
*LONGITUDE A80 < 110-41-38 W >

CADASTRAL
TOWNSHIP(S) A77 < 023S >
*RANGE(S) A78 < 016E >
SECTION(S) A79 < 34 >
SECTION FRACTION(S) A76 < SE OF NE >
MERIDIAN(S) A81 < GILA AND SALT RIVER >

*POSITION FROM NEAREST PROMINENT LOCALITY A82 < LESS THAN ½ MILE NW OF WASHINGTON CAMP >
*LOCATION COMMENTS A83 < NORTH SIDE OF WASHINGTON GULCH >

* ESSENTIAL INFORMATION
· ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

COMMODITY INFORMATION

COMMODITIES PRESENT C10: Pb, Cu, Au, Zn, Ag
ORE MINERALS C30: CHALCOPYRITE, SPHALERITE, GALENA, PYRITE
COMMODITY SUBTYPES C41:
GEN. ANALYTICAL DATA C43: ORE VALUES AVERAGED ABOUT 9% Pb, 4% Zn, 2% Cu, 7 OZ./TON Ag
COM. INFO. COMMENTS C50:

SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR: Pb, Zn	MAIN COMMODITIES PRESENT C11:
MINOR PRODUCTS	MINOR: Ag, Cu, Au	MINOR COMMODITIES PRESENT C12:
POTENTIAL PRODUCTS	POTEN:	
OCCURRENCES	OCCUR:	OCCURRENCES OCCUR:

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SML) MED LGE (circle one)	PRODUCTION UND NO (circle one)

EXPLORATION OR DEVELOPMENT

STATUS

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20: (4)	STATUS AND ACTIVITY A20:

DISCOVERER L20: ALLEN BROTHERS AND PARTNERS
YEAR OF DISCOVERY L10: 1878 +NATURE OF DISCOVERY L30: B +YEAR OF FIRST PRODUCTION L40: 1921 +YEAR OF LAST PRODUCTION L45: 1954
PRESENT/LAST OWNER A12:
PRESENT/LAST OPERATOR A13: ALEX DE LA OSSA (1954)
EXPL./DEV.COMMENTS L110: OWNERS AND OPERATORS INCLUDED PRIDE OF THE WEST CO. (1905), DUQUESNE MINING AND REDUCTION CO. (1906-1919), EVERETT (1922-23), CALLAHAN ZINC LEAD CO. (1941-44),

DESCRIPTION OF DEPOSIT

+DEPOSIT TYPE(S) C40: REPLACEMENT
DEPOSIT FORM/SHAPE M10: IRREGULAR; LENSING
+DEPTH TO TOP M20: +UNITS M21: +MAXIMUM LENGTH M40: +UNITS M41:
+DEPTH TO BOTTOM M30: +UNITS M31: +MAXIMUM WIDTH M50: +UNITS M51:
+DEPOSIT SIZE M15 (SMALL) M15 (MEDIUM) M15 (LARGE) (circle one) +MAXIMUM THICKNESS M60: +UNITS M61:
+STRIKE M70: NE +DIP M80:
+DIRECTION OF PLUNGE M100: +PLUNGE M90:
+DEP.DESC.COMMENTS M110:

DESCRIPTION OF WORKINGS

+Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one)
+DEPTH BELOW SURFACE M160: +UNITS M161: +OVERALL LENGTH M190: +UNITS M191:
+LENGTH OF WORKINGS M170: +UNITS M171: +OVERALL WIDTH M200: +UNITS M201:
+OVERALL AREA M210: +UNITS M211:
DESC. OF WORK. COM. M220: OLD WORKINGS, NOW CAVED, EXTENDED TO DEPTH OF MORE THAN 200 FT.; SHAFT AND TUNNEL OPERATIONS

GEOLOGY

+AGE OF HOST ROCK(S) K1: E.PERM.
+HOST ROCK TYPE(S) K1A: FINE-GRAINED LIMESTONE
+AGE OF IGNEOUS ROCK(S) K2: E.PE.RM.
+IGNEOUS ROCK TYPE(S) K2A: MASSIVE SANDY LIMESTONE
+AGE OF MINERALIZATION K3: LC.RET.-TERT.
+PERT. MINERALS (NOT ORE) K4: GARNETIFEROUS QUARTZ GANGUE
+ORE CONTROL/LOCUS K5: NE-TRENDING ZONE OF IRREGULAR MINERALIZATION IN GARNETIFEROUS
+MAJ. REG. TRENDS/STRUCT. N5: MINERAL DEPOSITS OF WASHINGTON-DUQUESNE AREA OCCUPY A LIMESTONE-
+TECTONIC SETTING N15: WASHINGTON CAMP FAULT BLOCK
+SIGNIFICANT LOCAL STRUCT. N70: DEPOSITS NEAR A DIKE-LIKE INTRUSION OF TERTIARY BIOTITE-HORNBLENDE
+SIGNIFICANT ALTERATION N75: SILICIFIED AND PYROMETASOMATIZED LIMESTONE
+PROCESS OF CONC./ENRICH. N80: OXIDATION WITH SILVER ENRICHMENT NEAR SURFACE; SECONDARY ENRICHMENT
+FORMATION AGE N30: E.PERM.
+FORMATION NAME N30A: CONCHA LIMESTONE
SECOND FM AGE N35: E.PERM.
SECOND FM NAME N35A: SCHERRER FORMATION
+IGNEOUS UNIT AGE N50:
+IGNEOUS UNIT NAME N50A:
SECOND IG. UNIT AGE N55:
SECOND IG. UNIT NAME N55A:
GEOLOGY COMMENTS N85: GARNET ZONE NOT DEVELOPED HERE AS AT MOST OF OTHER MINES IN AREA

GENERAL COMMENTS

GENERAL COMMENTS GEN:

*GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT-USB FILE DATA >

REFERENCE 2 F2 < USBM FILES, SMUGGLER AND TEXAS MINE >

REFERENCE 3 F3 < BLM DISTRICT MINING SHEET 727 >

REFERENCE 4 F4 < KEITH, S.B., 1975, ABM BULL. 191, p. 79 >

L110 < MAIN PRODUCTION IN 1950's; PROPERTY COMPRISES 2 CONTIGUOUS PATENTED CLAIMS: (TEXAS, SMUGGLER) >

K5 < ASSOCIATED ORE MINERALS IN TILTED FAULT BLOCKS OF PYROMETAMORPHOSED LIMESTONE >

N5 < SEDIMENT BELT (2.5 MILES LONG AND 1.25 MILES WIDE) SURROUNDED BY IGNEOUS ROCKS WHICH ALSO FORM DETACHED MASSES AND DIKES WITHIN BELT >

N70 < TRENDING CALIFORNIA FAULT WHICH IS RIGHT LATERALLY DISPLACED BY TEXAS FAULT >

N40 < EPERM ϕ >

N40A < EPITAPH DOLOMITE >

F5 < SIMONS, F.S., 1974, USGS MAP I-762 (1:48000) >

F6 < LEHMAN, NORMAN E. 1978 THE GEOLOGY AND PYROMETASOMATIC ORE DEPOSITS OF THE WASHINGTON CAMP-BUQUESNE DISTRICT SANTA CRUZ COUNTY, ARIZONA; PhD. DISSERTATION, UNIVERSITY OF ARIZONA, p. 126-143, MAPS >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 < > *RECORD TYPE B20 < X, 1 M > DEPOSIT NUMBER B40 < >

*REPORT DATE G1 < 8,2 ✕ 0,5 > (YR. MO.) *INFORMATION SOURCE B30 < 1, 2, > *FILE LINK IDENT. B50 < USBM-0040230363 >

*REPORTER(SUPERVISOR) G2 < CALDER, SUSAN R. (last, first, middle initial) ((last, first, middle initial))

*REPORTER AFFILIATION G5 < ABGMT > *SITE NAME A10 < SMUGGLER AND TEXAS MINE >

SYNONYMS A11 < TEXAS MINE >

LOCATION

MINING DISTRICT/AREA A30 < WASHINGTON CAMP DISTRICT >

*COUNTY A60 < SANTA CRUZ > *STATE A50 < AZ > *COUNTRY A40 < U.S. >

PHYSIOGRAPHIC PROV A63 < 1,2 ✕ >

DRAINAGE AREA A62 < 15050301 ✕ LOWER COLORADO > *LAND STATUS A64 < 0,1 ✕ 4,1 ✕ (1,9,7,9,) >

QUADRANGLE NAME A90 < LOCHIEL (1,9,5,8,) > *QUADRANGLE SCALE A100 < 62500. >

SECOND QUAD NAME A92 < HARSHAW (1,9,4,8,) > SECOND QUAD SCALE A91 < 24000. >

ELEVATION A107 < 5,5,5,0 ✕ FT >

UTM

*NORTHING A120 < 3,4,7,1,0,2,5, >

*EASTING A130 < 5,2,9,3,0,0 >

*ZONE NUMBER A110 < + 1,2 >

*ACCURACY

ACCURATE (ACC) (circle)

ESTIMATED EST < >

GEODETIC

*LATITUDE A70 < 3,1 - 2,2' - 3,0 N >

*LONGITUDE A80 < 1,1,0 - 4,1 - 3,1 W >

CADASTRAL

TOWNSHIP(S) A77 < 024S ; ✕ > *RANGE(S) A78 < 016E ; ✕ >

SECTION(S) A79 < 03 ; ✕ >

SECTION FRACTION(S) A76 < S2 OF NE >

MERIDIAN(S) A81 < GILA AND SALT RIVER >

POSITION FROM NEAREST PROMINENT LOCALITY A82 < 1/2 MILE SOUTH OF WASHINGTON CAMP >

LOCATION COMMENTS A83 < ABOUT 1/4 MILE NW OF BONANZA MINE; 1/2 MILE NE OF HOLLAND MINE; SMUGGLER TUNNEL AND SHAFT TO WEST OF TEXAS SHAFTS >

* ESSENTIAL INFORMATION
· ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

COMMODITY INFORMATION

*COMMODITIES PRESENT C10 <Cu, Pb, Zn, Ag, Au,
*ORE MINERALS C30 < CHALCOPYRITE, PYRITE, GALENA, SPHALERITE
COMMODITY SUBTYPES C41 <
*GEN. ANALYTICAL DATA C43 < ORE VALUES AVERAGED ABOUT 14% Zn, 3% Cu, 1% Pb, 9 OZ./TON Ag
COM. INFO. COMMENTS C50 <

* SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR <Zn,	MAIN COMMODITIES PRESENT C11 <
MINOR PRODUCTS	MINOR <Cu, Ag, Pb,	MINOR COMMODITIES PRESENT C12 <
POTENTIAL PRODUCTS	POTEN <	
OCCURRENCES	OCCUR <Au,	OCCURRENCES OCCUR <

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SML) MED LGE (circle one)	*PRODUCTION UND NO (circle one)

*STATUS EXPLORATION OR DEVELOPMENT

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 <4>	STATUS AND ACTIVITY A20 < >

*DISCOVERER L20 <
*YEAR OF DISCOVERY L10 < > *NATURE OF DISCOVERY L30 <B> *YEAR OF FIRST PRODUCTION L40 < 1951 > *YEAR OF LAST PRODUCTION L45 < 1957
*PRESENT/LAST OWNER A12 <
*PRESENT/LAST OPERATOR A13 <
EXPL./DEV.COMMENTS L110 < OWNERS AND OPERATORS INCLUDED DUQUESNE MINING AND REDUCTION CO., NASH MINES, MAJALCA BROTHERS, AMADO AND MAJALCA; SOME EARLY WORK DONE BY CHLORIDERS;

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 < REPLACEMENT; SHEAR ZONE
DEPOSIT FORM/SHAPE M10 < LENSES; IRREGULAR
*DEPTH TO TOP M20 < > *UNITS M21 < > *MAXIMUM LENGTH M40 < > *UNITS M41 <
*DEPTH TO BOTTOM M30 < > *UNITS M31 < > *MAXIMUM WIDTH M50 < > *UNITS M51 <
*DEPOSIT SIZE M15 (SMALL) M15 <MEDIUM> M15 <LARGE> (circle one) *MAXIMUM THICKNESS M60 < > *UNITS M61 <
*STRIKE M70 < > *DIP M80 <
*DIRECTION OF PLUNGE M100 < > *PLUNGE M90 <
*DEP. DESC. COMMENTS M110 <

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one)
*DEPTH BELOW SURFACE M160 < > *UNITS M161 < > *OVERALL LENGTH M190 < > *UNITS M191 <
*LENGTH OF WORKINGS M170 < > *UNITS M171 < > *OVERALL WIDTH M200 < > *UNITS M201 <
DESC. OF WORK. COM. M220 < NUMEROUS SHALLOW SHAFTS AND ADITS; EXTENT OF DEVELOPMENT UNKNOWN
*OVERALL AREA M210 < > *UNITS M211 <

GEOLOGY

*AGE OF HOST ROCK(S) K1 <PENN.-PERM. (LPENN-EPERM)
*HOST ROCK TYPE(S) K1A < THIN-BEDDED LIMESTONE AND DOLOMITIC LIMESTONE
*AGE OF IGNEOUS ROCK(S) K2 < E.PERM
*IGNEOUS ROCK TYPE(S) K2A < FINE-GRAINED LIMESTONE OF COLINA FORMATION
*AGE OF MINERALIZATION K3 < L.CRET.-T.ERT.
*PERT. MINERALS (NOT ORE) K4 < CALCIUM SILICATES
*ORE CONTROL/LOCUS K5 < REPLACEMENT LENSES AND IRREGULAR BODIES OF CALCIUM SILICATES AND
*MAJ. REG. TRENDS/STRUCT. N5 < MINERAL DEPOSITS OF WASHINGTON-DUQUESNE AREA OCCUPY A LIMESTONE-
*TECTONIC SETTING N15 < WASHINGTON CAMP FAULT BLOCK; NW-TRENDING WASHINGTON CAMP ANTICLINE
*SIGNIFICANT LOCAL STRUCT. N70 < TEXAS SHAFTS AT INTERSECTION OF NE-TRENDING TEXAS FAULT AND N-S
*SIGNIFICANT ALTERATION N75 < DOLOMITIZED AND HIGHLY METAMORPHOSED LIMESTONE
*PROCESS OF CONC./ENRICH. N80 < OXIDATION AND SUPERGENE ENRICHMENT OF SILVER NEAR SURFACE
*FORMATION AGE N30 < PENN.-PERM. (LPENN-EPERM)
*FORMATION NAME N30A < EARP FORMATION
*SECOND FM AGE N35 < E.PERM.
*SECOND FM NAME N35A < COLINA LIMESTONE
*IGNEOUS UNIT AGE N50 <
*IGNEOUS UNIT NAME N50A <
*SECOND IG. UNIT AGE N55 <
*SECOND IG. UNIT NAME N55A <
*GEOLOGY COMMENTS N85 <

GENERAL COMMENTS

*GENERAL COMMENTS GEN <

LAW OFFICES OF
BENEDICT J. MILITANA
601 E. TREMONT AVENUE
NEW YORK 57, N. Y.

TREMONT 8-2022
LUDLOW 3-3160

February 26, 1947

Arizona Bureau of Mines
University Station
Tucson, Arizona

Gentlemen:

Please be informed that I represent Miss Margaret Pichel who is the President and Treasurer and stockholder (51%) of Paydirt Mining Company, an Arizona corporation, which is a gold-mining company and which has claims situated at Castle Creek Mining District, Yavapai County, Arizona, (Township 8 N. Range 2W).

I respectfully request that you forward any information regarding the said mine that the department may have in its possession.

Please notify me of any expenses incurred in obtaining and forwarding said information to this office, for which I shall immediately reimburse you.

Enclosed please find an affidavit of Miss Margaret Pichel which is self-explanatory.

Very truly yours,

Benedict J. Militana

BENEDICT J. MILITANA

BJM:MW
Enc.

M. M.

rBB

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Mine Visit

   Address:

2. Mine: Duquesne 3. No. of Claims - Patented

   Unpatented

4. Location: Duquesne

5. Sec Tp Range 6. Mining District

7. Owner:

8. Address:

9. Operating Co.: Rosario Exploration for Themselves & Simplot,

10. Address:

11. President: 12. Gen. Mgr.:

13. Principal Metals: 14. No. Employed: 5

15. Mill, Type & Capacity:

16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☒
    (d) Production ☐ (e) Rate tpd.

17. New Work Planned: Drilling Surface + U. G By Metker Bro.
    & one other Contractor.

18. Miscl. Notes:

Date: 5/21/17

(Signature)

(Field Engineer)

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Jim Scardina

   Address: J. R. Simplot Co. Patagonia Arizona. 85624

2. Mine: Duquesne

3. No. of Claims - Patented

   Unpatented

4. Location: Duquesne Arizona

5. Sec Several Unsurveyed. Tp ~~##~~ 24S Range 16E

6. Mining District Duquesne or Washington

7. Owner:

8. Address:

9. Operating Co.: J. R. Simplot

10. Address: Patagonia Az 85624

11. President:

12. Gen. Mgr.:

13. Principal Metals:

14. No. Employed: 35 at visit
    42 very soon

15. Mill, Type & Capacity: non

16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☒
    (d) Production ☐ (e) Rate tpd.

17. New Work Planned: Continued development at the Holland x-cutting on lower level. New hoist and continued development at the Indiana. (Holland x-cutting N & S. Indiana 200' level will drift opposite side also.

18. Miscl. Notes: Jim Scardina, Supt. Norman Lehman, Geologist. Jack Jones, Office manager.

Jim Scardina requested that they be put on current dept. mailing list for Active Mine list and statistical publications.

Date: 3-3-70

G W Imm

(Signature) (Field Engineer)

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Jim Scardina

   Address: J. R. Simplot Co. Patagonia Arizona. 85624

2. Mine: Duquesne

3. No. of Claims - Patented

   Unpatented

4. Location: Duquesne Arizona

5. Sec Several Unsurveyed. Tp ~~##~~ 24S Range 16E

6. Mining District Duquesne or Washington

7. Owner:

8. Address:

9. Operating Co.: J. R. Simplot

10. Address: Patagonia Az 85624

11. President:

12. Gen. Mgr.:

13. Principal Metals:

14. No. Employed: 35 at visit
    42 very soon

15. Mill, Type & Capacity: non

16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☒
    (d) Production ☐ (e) Rate tpd.

17. New Work Planned: Continued development at the Holland x-cutting on lower level. New hoist and continued development at the Indiana. (Holland x-cutting N & S. Indiana 200' level will drift opposite side also.

18. Miscl. Notes: Jim Scardina, Supt. Norman Lehman, Geologist. Jack Jones, Office manager.

Jim Scardina requested that they be put on current dept. mailing list for Active Mine list and statistical publications.

Date: 3-3-70

GW Imm
(Signature)

(Field Engineer)

STATE OF ARIZONA
DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA

Tucson, Arizona,
Sept. 25, 1962

Mrs. Hack Townsend,
Arivaca, Ariz.

Dear Mrs. Townsend:

Last Thursday, I stopped in at the Bureau of Land Management's office in Phoenix and obtained the following information on old patented mining claims in Ariz. These are filed in books probably in the order that the applications for patent are recd. Following is the information taken from the first two books:

Axel L. Johnson (Dept. Engineer)

San Antonio Mining Claim---Santa Cruz Mts.-- So. part of Pima Co.
Surveyed Sept.23, 1873 T24S,R16E,Secs.2&11
Size of claim----13.77 acres (Now in Santa Cruz Co.)
Patent issued Sept. 23, 1876

Mill Site of San Antonio---same location as above
Size of claim----5 acres
Patent issued----Sept. 23, 1876

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Duquesne Mine Date Oct. 9, 1952.

District Duquesne District, Santa Cruz County Engineer Axel L. Johnson

Subject: Mine Report ---- Present Status. Information from E. W. McFarland, Nogales, Ariz.

Location Near Washington Camp.

Number of Claims 4 patented claims

Owners Nash ~~xxxxxxxx~~ Mines --D. C. Gilbert, Manager, Patagonia, Ariz.
Austin, Texas

Lessee E. W. McFarland, 23 Anza Drive, Nogales, Ariz.

Principal Minerals Zinc and Lead

Number of Men Working 5 men

Production Rate NoProduction. Doing repair work getting ready for production.

Present Mine Workings One vertical shaft 160 ft. deep
One level (the 100 ft. level), with 1200 ft. of workings.

Present Operations Repairing shaft
Repairing the 100 ft. level
Retracking the 100 ft. level.
Has broken 200 tons of shipping grade ore

Proposed Plans Intend to start ore production, and just about ready to produce ore. Operators are very much afraid of the present prices for Zinc and Lead.

Mine Nash Mines Date 4--8--53

District Engineer

Subject:

(e) Nash leases call for a minimum work of 48 shifts per month.

(f) The Holland and Kansas mines report losing money on their operations. In order to attempt to break even on their operations, they have materially reduced the wages to their miners and other workers. In some cases this cut amounts to $3 per day.

Information on individual mines

(d) Duquesne Mine is under lease by E. W. McFarland, 23 Anza Drive, Nogales. This mine is a good lead-zinc property, capable of producing 150 to 200 tons per month. Last fall, the 160 foot shaft and the drifts on the 100 ft. level were repaired to put the mine in shape for future operations. However, on account of further price reductions in zinc and lead, the operator was forced to close down the mine completely. Mr. McFarland, however, still retains the lease on the property, and keeps his equipment at the mine ready for operation whenever the price of lead and zinc comes back to normal again.

June 4, 1953 report by Axel L. Johnson

The Duquesne mine leased by E. W. McFarland of Nogales, Arizona, on which repair work, exploration work, and development work was continued last fall and this spring, has now been closed down completely.

NAME OF MINE: DUQUESNE
OWNER:

COUNTY: Santa Cruz
DISTRICT:
METALS: Pb, Zn

OPERATOR AND ADDRESS		MINE STATUS	
Date:		Date:	
11/44	A.R. Byrd, Congress Hotel Tucson (Box 5226)	11/44	Developing
4/45	Chas. Russell, 218 N. 4th Ave., Tucson	4/45	
		10/46	Shipping

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Nash Mines Date April 8, 1953

District Duquesne Mining Dist., Santa Cruz Co. Engineer Axel L. Johnson

Subject: News Report ----- Operations of Nash Mines

GENERAL PICTURE

(a) The few remaining mines still in production are only mining the higher grade lead-zinc ores, (High Grading), as it does not pay to mine the lower grade zinc and lead ores. This leaves the low grade ores remaining, of such low grade that they can possibly never be mined economically at any future date when the price is fair for these metals. This is a poor way to conserve our natural resources. Also, these low grade ore bodies, that are left behind, often become isolated, inaccessible, and lost for any future mining operations. Again a poor way to conserve our natural resources.

(b) All of the Nash Mines are in badly need of exploration and development work. Very little of this work is done at present on account of the low price of the metals. No more exploration and development than absolutely necessary will be done under the present prices for zinc and lead.

(c) Operators of the Nash Mines have been forced to postpone indefinitely all needed repair work to the mine plant, machinery and underground workings, and also postpone the purchase of new machinery and equipment on account of the present prices for zinc and lead, as they are now already operating at a loss.

(d) Production from the Nash Mines before the price break of last summer and fall was from 1200 to 1650 tons per month. The production from the Nash Mines the past month (March) was only 565 tons, and since then there has been further curtailment. Mr. D. C. Gilbert, Superintendent of the Nash Mines states that he expects that the present operations will be curtailed still further unless there is an increase soon in the price of zinc and lead. "It is purely a question of metal prices," states Mr. Gilbert.

REPORT ON THE PROPERTY OF THE

DUQUESNE MINING AND REDUCTION COMPANY

DUQUESNE, ARIZONA

by

Franklin Wheaton Smith
April 15, 1916

SUMMARY AND CONCLUSIONS OF A REPORT ON THE PROPERTY OF THE DUQUESNE MINING AND REDUCTION COMPANY

The ore deposits are of the contact metamorphic type, associated with garnet zones, except in the Kansas and occurring between crystalline limestone and intrusive granite porphyry, especially where contacts of N.N.E. to E.N.E. trend have been intersected by strong faults of N.N.W. strike. The only important exception is the Pride of the West shoot, which has a limestone footwall and an aplite and monzonite hanging.

The ores are complex sulphides in garnet and quartz gangue, carrying copper, lead, zinc and varying amounts of silver, and are ckassified as zinc and copper ores. The surface zone of enriched oxidized ores is only 10 to 80 feet deep and ores of this character are now almost exhausted. There is no zone of enriched secondary sulphide ores underlying the oxidized zone. The Bonanza and Kansas ores quoted below are primary complex sulphides and should maintain their grade to depths greater than are likely to be reached by development in the immediate future.

Last year's prodeuction of the Bonanza, which supplied two-thirds of the camp's output, was:-

Ore Class	Dry Tons Shipped	Oz. Silver	Average Assay per Ton %Copper	%Lead	%Zinc
Copper	19,533	3.0	5.0	2.0	9.0
Zinc	2,050	1.0	3.6	2.0	21.4

Existing ore bodies are nearly exhausted, with perhaps 4000 tons left in theshoots that gave the 1917 production, but prospects are good north of the main shaft, below the 500 level; also at the south end of the 70 level and deeper, in the Estelle and Louise shoot. Other sections may repay prospecting.

In the immediate future the Pride of the West and Kansas mines promise to become important producers. in 1917 the Kansas produced 1316 tons of copper ore, averaging 5.2 oz silver; 6.3% copper; 4.0% lead; 9.0% zinc; The outlook for 10,000 tons or more averaging 5 oz silver and 5% copper is good. If the shoots persist in depth, as it should, and maintains the size indicated on the lower tunnel level, 100 ft. of sinking with shafts and cross-cuts will put 10,000 tons actually in sight.

The Pride is estimated by former superintendent A.J.Jones, based on his survey and sampling, to have reserves of copper are amounting to 9,500 tons averaging 5.0 oz silver; 5.0% copper; 16% zinc and 5.0 lead.

Although there is little ore in any of the mines actually developed and measurable, as a whole the camp in the immediate future may be expected to produce fifty thousand tons of shipping ore averaging about 3 to 5 oz. silver; 4to 5% copper; 9 to 12% zinc; 2 to 4% lead.

Successful development in the Bonanza and Kansas-New York sections will largely increase the probable tonnage.

The property requires the continuation of the careful and conservative policy that has characterized the management during the past year. Its present condition and probably future do not warrant the investment of a large amount of new capital.

Development outlined in this report can be paid for out of current earnings.No long drifts or crosscuts deep drill holes or shafts are advisable now.The underground development recommended is mostly in short drifts and crosscuts. The half dozen drill holes that it may be worth while to sink will probably range in depth from 250 to 400 ft. and are not liekly to exceed 1000 to 1500 feet in total footage.

If developments are favorable, a year from now it will be well to take stock of the reserves of milling ore,tailings and dumps and get a competent opinion as to whether recent advance in the very rapidly developing art of concentration by flotation makes profitable treatment possible. No new capital should be put into a mill until after a very careful study of the resources of the property and of milling methods. These preliminary steps will cost little and can be paid for from earnings.

No plan looking towards the erection of a smelter by this company should have a moment's consideration, Such isolated plants, in spite of the large economies they may show on paper in preliminary calculations, are almost invariably very costly failures.These deposits are of a type arratic and capricious in their distribution and incapable of systematic development to block out a large tonnage ahead of extraction without going to much expense.It is not probable that at any time it will be possible to say that the property has an assured lifeof five or ten years ahead of it.It ma last that long but the finanfial policy should be conservative and the property made to pay its way.

SMITH AND ZIESEMER
BY Franklin Wheaton Smith

Dated at
Bisbee, Arizona
April 15, 1918

REPORT ON THE PROPERTY OF THE
DUQUESNE MINING AND REDUCTION COMPANY
DUQUESNE, ARIZONA

This report is confined to the subjects covered by the following instructions:

(1)Geology of tract with especial attention to the main productive areas.
(2)Recommendations for the future development of the productive areas.
(3) Amount of ore developed at present.
(4) Opinion of undeveloped resources of property.

My preliminary report of April 5, 1918, sets forth my main conclusions which are not modified herewith.

Production has been keeping pace with development. No closely figured estimate of reserves is possible. The property's great need is the discovery and development of new ore shoots. This may be done either by the systematic development of all contacts and garnet zones, in the hope of finding profitable shoots; or the conditions governing the localization of the more important known ore bodies may be studied and the work directed first toward the places most likely to contain similar bodies. On account of the great length and number of the garnet zones the first method would be ruinously expensive. Most of theperiod of the examination was devoted to formulating a campaign by the second method.

Geology: The small scale may herewith gives the broad outlines of the formations. There is no accurate typographic may of the property, hence no close mapping was attempted outside the important sections.

The limestone (blue) is a remnant of a formation of greater extent penetrated and perhaps engulfed by the intrusive granite porphyry (green).Later, quartz monzonite (red), a granitic rock, intruded both and probably underlies the whole area at greater or lessdepth. At the south end, in the Silver Bill-Belmont section, it is near the surface. In the Bonanza and the Kansas areas it is doubtless considerably deeper. Some of the rocks mapped as granite porphyry, especially onthe West contact and in dikes too small to show on this map, are considerably younger. They look like quartzite, are fine grained, very silicious and seem to be the product of the expiring phase of the monzonite intrusion, prior ot the advent of the mineralizing solutions, which were probably derived from the same magma.

The limestone strata stand nearly vertical, striking as a rule N.-S. and dipping 60 to 75 degrees W. There are marked deviations in strike, due to folding. Stresses due to both intrusives fractured and faulted the limestone in all directions. Most of the movement planes have no

significance, but two sets, striking N. 15° to 35° W. and N. 10 to 20 E. appear to have been influential in governing the position of the ore shoots.

In addition to faults another class of features is often important, in contact deposits, in affecting the position of ore shoots. Limestone is the most soluble of rocks. Where it projects as a salient into the intrusive conditions are most favorable for attack and replacement by mineralizing agents ascending along the contact.

THE BONANZA ZONE includes the east contact from 600 ft. north of the Bonanza shaft to 1500 ft. south of it. This contact has been explored underground a maximum distance of 250 ft. north and 850 ft. south of the shaft. The most important series of shoots has been confined to a long shallow salient near the main shaft, extending about 50ft. north and 100 to 200 south of it. An important fault of the N.N.W. system, dipping 59° easterly, intersects the contact at the south end of the productive zone. Its horizontal displacement is about 30 ft. south on the east side. The main ore bodies down to the 300 ft. level lie in the acute angle between thefalut and the contact, which is marked by nearly vertical faulting in the N.N.E. system. This salient bottoms on the 300 ft. level and north of the shaft the contact, striking N. 10° W., is the path of the fault. The ore channel has left the salient and follows the footwall of the fault. When the contact turns N?N.E. as it may at any time, the ore may cross to the hanging side. Recent work of the 400 ft. level north seems to promise that the ore channel will be opened in the corresponding structural position on that level. If so, the prospect for continuation in depth, always stepping northerly with the pitch of the intersection is good.

On the 100 ft. level, 135 ft. below the collar, minor NNE fractures, parallel to the contact faulting are cut and displaced on the hanging wall of the fault. Between it and the main shoot there is another that may have had a similar effect. A few feet of drift will decide.

South of the main channel a few small shoots have been found mostly in acute angles between the main contact and instrusive spurs that extend into the limestone. The upper levels here promise little, but if the Great Republic Fault has had a favorable effect, similar to that of Bonanza, there may be shoots at greater depth, say at the 400 ft. level and below, under the Illinois country, where the contact swings from a northwesterly to a northeasterly strike.

In the Estelle and Louise, 800 ft. south of the Bonanza shaft conditions are somewhat different. A rather sharp salient has been accentuated by N.65° to 75° W. faulting at 60° northerly dip, and easterly displacement of 40 to 50 ft. on the north side. Movement is chiefly of premineral age. In the point of this salient the surface shows

a small amount of mineralized garnet, close to coarse aplite, intrusive in the porphyry. It expends to a shoot 100 ft. long and 4 to 8 ft. wide at a depth of 35 ft.

The Bonanza 70 ft. level has reached the north end of this shoot and finds it wide and strong. The features in conjunction here are the sharp salient, occupied by the shoot; the W.N.W. faulting, forming with one of the planes near the footwall of the zone, the north boundary of the ore; and the intrusive aplite, a rock likely to have had genetic connection with it. somewhat similar structural conditions exist on the West contact, south of Duquesne gulch, on the extension of the strike of the Estelle fault zone.

On the Great Republic structural conditions resemble those of the Bonanza, except that the fault's horizontal displacement seems to be in the opposite direction. Surface indications are obscure, as is usually the case with faults in limestone.The mantle of debris over the limestone-porphyry contact prevents accurate mapping.The dip of this falut is unknown, probably steeply to the east. If ore bodies exist under the wide, nearly barren garnet outcrop they should be fo nd by carefully placed drill holes from the surface. Aside from the Bonanza fault,most of those of that system dip 70 to 75° easterly. If the fault is one of the factors governing the location of another ore zone its dip will govern the pitch of that zone northerly with depth,the other factor being the dip of the contact, which is also unknown, but probably to the east more steeply than the fault.

THE DUQUESNE*-SAN ANTONIO-EMPIRE SECTION is the southwesterly continuation of the Bonanza zone. Close to the contact there is a heavy, scantily mineralized garnet zone, with arms ramifying northerly, where solutions acted on the limestone walls of the faults of the two main systems. The monzonite reached the surface within the garnet zone, as shown on the large scale map. The indications are that the mineralization is shallow and is underlain by intrusives. The only ore bodies that have been found have been small erratic shoots of enriched oxidized ores, bottoming in a few feet of lean or barren unoxidized garnet rock.The San Antonio shoot may prove an exception. It was the largest of the surface shoots and the oxidized ore has passed into garnet sulphide ore of excellent grade.

The surface indications taken in connection with the poor showing on the 110 ft. level of the Duquesne, are the grounds for advising against a systematic development campaign in this section.

On the Empire, about 200 ft. east of the 70 ft. shaft two broad arms of garnet diverge, as mapped, On the western side of the western one were developed small productive shoots of this mine. The sharppsalient of

coarse crystalline limestone, opend by pits in the angle, shows solution-roughened surfaces but no ore. in deposits of this type the sulphides are mostly deposited near the lime side of the garnet. If an ore body with no outcrop was formed hereabouts, this is the most probable locus and may be tried out with a single drill hole.

IN the SILVER-BILL-BELMONT Section the altered ore-bearing limestones is surrounded on threee sides by the intrusive monzonite, the contacts well up on the flanks of the hill. The western part of this hill, in which no ore of consequence has ever been found, is probably a small block of metamorphosed limestone resting on monzonite and isolated from the rest of the sediments by a dike and sill of the later fine-grained, highly silicious rock.

The eastern part, containing the Belmont and Silver Bill workings, has given little encouragement with depth. All profitable ores have been confined to shallow, oxidized, enriched bodies of small size, derived from lean garnet-sulphide ores. The Belmont tunnel and the Silver Bill tunnels and shaft show altered limestone and garnet rock,with much confused, strong, but non-persistent, structure and only scanty mineralization.The upper Silver Bill tunnel cuts many flat shears, suggesting the monzonite at the portal and for some distance in,the contact dipping under the hill. About 2000 ft. of underground work has been done with small results.There is no indication of the presence of bodies of primary ore of shipping grade. They may exist, but all conditions lead one to expect that they will be small and very erratic.If a method of milling low grade garnet ores be developed, sampling will be in order, to estimate possible tonnage, on which point no data are now available.

THE WEST CONTACT,SOUTHERN SECTION,has little development. The North Belmont tunnel penetrates a garnet zone, mostly barren. A winze has been sunk on a N.60 W. fracture showing irregular mineralization with silver, copper and lead. The bottom was inaccessible but appears to pass into hard garnet rock at 40 ft.

This garnet zone can be followed northerly over the mineral monument hill to a series of unpromising shallow pits and tunnels, in barren oxidized garnet-quartz rock, close to the main monzonite contact, on the Indianapolis, and about 500ft. West of the strong curved garnet zone at the Holland, along which much surface ore was produced years ago. The stope bottoms cannot be examined. Presumably they are barren or in low grade primary garnet-sulphide ore.

WEST CONTACT,NORTHERN SECTION. The garnet zone on the west conatct is intercepted by an arm of monzonite as mapped. The southern end of the northern section, south

of Moctezuma gulch, is probably a mere cap resting on monzonite. Thence,north over the hill to Duquesne gulch, the zone is 50 ft. or more in width, strongly developed, but with scant signs of ore. On the southern slope there is no work save open cuts.At one point the contact is intersected by a strong ledge of chalcedonic breccia, striking westerly. Here the garnet zone shows much iron oxide, derived from sulphide minerals, which may,however, have been merely barren pyrite on the garnet-lime boundary, with a little ore on the dump.Thence north to the gulch the country is traversed by a N.60° to 70° W. fault zone, dipping northerly, that may be the extension of the Estelle and Louise fault zone. There are several open cuts and twotunnels aggregating about 500 ft. of work, between the crest and Duquesne gulch.They are in sheared oxidized garnet-quartz rock, showing signs of faulting and pressure but none of mineralizations.Indications of bodies of pay ore are absent but a little drilling may be justified for the following reasons:

The ore minerals and garnet are probably derived from the same source. From the very hot solutions garnet and associated silicates were first deposited in enormous quantity.From the same solutions,toward the end of a continuous process the metallic sulphides were doubtless deposited.Garnet zones often contain entirely within their mass erratic shoots, capriciously distributed.It is just possible that within this belt of barren garnet such shoots may have been formed.

North of Duquesne gulch the lower slope shows a straight contact belt between porphyry and massive limestone with no mineralization. The high ground over Lime Peak saddle, owned by others, contains a few small sulphide shoot,not large enough to repay the cost of exploration. Thence to the Indiana the contact is covered by the Main claim on which a think bed of massive marble, without important cross-structure, is in contact with the porphyry. The garnet zone is irregular and discontinuous. The surface stope shows a foot or two of solid copper-zinc-iron sulphides,in a short vertical lens. The tunnel on the contact, 250 ft. long, opened nothing commercial.This claim at best is suitable only for leasers.

IN THE KANSAS-NEW YORK-INDIANA SECTION conditions are much more favorable. At the Kansas, the most promising of the three, the garnet is absent. Mixed sulphides occur replacing the lime near the intersections of faults of the N.N.W. system with a porphyry dike and the main contact. The Indiana and Kansas are close to the main contact. The New York deposits are associated with silicious dikes that trace in the direction of the last exposure, 300 ft. southerly of the long tongue of monzonite and aplite that crosses the East side of Lime Peak just below the summit. The Kansas dike also strikes toward the New York.After the Bonanza zone this is the most important.section.

THE PRIDE OF THE WEST was not studied. The ore body occurs in the limestone on the underside of a thick monzonite dike that dips 40° westerly. It is the only important ore body in the camp that occupies a monzonite-limestone contact.

WASHINGTON BASIN is floored with monzonite. The contact around the western, southern, and eastern edges was examined at many points without finding evidence of commercial mineralization except at POCAHONTAS, where there were shallow deposits, now exhausted. It is not a section worth prospecting.

THE TEXAS MINE is at the eastern end of the garnet zone, 1300 ft. long, striking N. 60° E. and formed along a fault between crystalline limestone on the south and dense chert on the north. From the Dubley Standard tunnel at the bend of the road to the Texas shaft there are numerous workings showing 3 to 10 ft. of garnet and occasionally a little ore. the good shoot in the Texas is limited indepth on the west end by movement planes. The fracture along which it formed extends east of the shaft but there are only a few small lenses of ore, measurable in inches.

The formation here changes from N. 60° to nearly north in strike and the shoot probably owes its position to the favorable opportunity for attack by mineralizing solutions offered by the fractured rock in the apex of the bend. The structure is blind. Prospecting can only follow the more important side planes on the chance that they will lead to more ore. If ore comes in again below it will probably step westerly with the dip of the strong slip that bounds the ore on the west in the open cut and on the 50 ft. level. The best gamble would be to follow this slip down with a winz and crosscut the formation to see whether any one bed of limestone may have been selected for more replacement deposits. The known shoot may have ended where it did because the lime bed of the most favorable chemical composition was dislocated by the slip that bottoms the ore.

EAST MOUNTAIN lies wholly in the granite porphyry area, where it has been intruded by one or two other rocks. Some alteration has taken place along contacts and faults but it is of barren hydrothermal type. The whole porphyry belt from the Pocahontas to the Meyer offers no inducements to prospecting. Nowhere do the intrusive rocks hold out the faintest hope that they may contain deposits of disseminated ores of the porphyry-copper type.

RECOMMNEDATIONS FOR FUTURE DEVELOPMENT:

Bonanza Zone: A short drift on the 100 ft. level, referred to on page 4, will try out a possible location for a small shoot at little expense.

No deepening of the main shaft is yet called for. The 300 ft. level will naturally be pushed north to the limit of the productive zone now being exploited. No work north of the shaft above the 300 is desirable at present. This section has better chances to make good in depth than near the surface.

The 400 north drift sho ld be pushed and the ore zone explored by a winz. If results are satisfactory it will probably be best to unwater the 500 ft. level and drift north, extracting the ore up to the 400 through it, instead of drifting on the 500. The present hoist cannot handle spoil from many development faces in addition to ore. If an ore zone is proven by the winz development cost per ton will be reduced by driving one level only and from the standpoint of stoping operations the method should be wholly practicable.

A long drift wouth on the 300 or 400 to tap the Estelle and Louise country and explore the Illinois section on the way may be called for later. It seems wiser now to develop that ore by sinking on it before undertaking a drift that will cost about 6000 dollars.

Structural conditions may prove favorable for ore in the north end of the Great Republic claim, southwest of the Estelle and Louise; also in depth below the Illinois shaft. Some preliminary work might be done on the 70 Ft. level to prove structure by extending the southwesterly crosscut that penetrates the Estelle fault zone just before the main drift makes its sharp turn east. The level is plotted on the surface map herewith. Sugh a crosscut would prove whether the fault is a strong shear zone or a mere zone of minor adjustment with little persistent structnre. It would, however, cut it too far north to have much chance of finding ore. It would cost between $500 and $1000 and the money had better be spent in probing the surface with a drill near the more promising intersection of fault zone and contact. It will be best to drill one scout hole before laying out others. The dips of the fault and contact are unknown, but both are probably to the east, the contact being more nearly vertical than the fault. The scout hole is laid out on the assumption that the contact dips easterly 75° or 80° and the fault 60° to 70°. The hole may be started 75 ft. east of the small shaft with the windlass, the deepest working of the string of pits, and pointed S 70° W. with a dip of 80° from the horizontal. If the dips are as estimated the hole will be 250 to 300 ft. deep.

Duquesne-San Antonio- Empire Section: No systematic work is yet advisable. The San Antonio shoot is the most promising and naturally will be followed down as long as it pays. A drill hole on the Empire may be put down as outlined on page 7, although a small prospect shaft would be a better method, for the first 50 or 75 ft. at least, in order to determine the dip and pithh of the sharp lime now. The intrusive, both porphyry and monzonite, are now far away and may underlie this formation. This work is the best gamble indicated on that ground by structural conditions, where no ore outcrops. A crosscut from the 70 ft. shaft is now proving the ground under the old surface stope.

Silver Bill- Belmont Section : Conditions are not favorable for systematic prospecting. The outlook is that the tunnels and the Silver Bill shaft, either on its 110 ft. level

or deeper, will find only lean or barren garnet rock in quantity with occasional bunches or small shoots of better grade sulphides, to the position of which the confused structure gives no sure clue. If a milling method should ever be developed this ground my be of value for low grade ore.

West Contact, Southern Section ; No systematic work seems likely to be profitable at the North Belmont, Indianapolis or in the tunnel of the Holland, which is driven in dense baked sidements, not far from the big monzonite dike that extends through from the Pride of the West. On the slope above one cut shows and aplite dike, another a little sopper-stained garnet. The monzonite- limestone contact is well exposed in the gulch bed, where the sediments are baked, altered and very slightly mineralized. This section is not promising.

West Contact, Northern Section ; A little drilling may be done between Duquesne and Moctezuma gulches, at one or more of the following places:

(1) An inclined hole from the east to crosscut the garnet zone 100 ft. or more below the 50 ft. shaft on the crest. This is the only place where there is an ore showing of even the slenderest kind.
(2) A similar hole to probe under the strongly oxidized garnet rock, near the intersection of th chalcedony breccia lode.
(3) An angle hole directed southwesterly to cut the garnet map herewith is based on a hasty, rough and inaccurate topographic survey. If any drilling is to be done here there should be an accurate topographic map that will permit a close mapping of W.N.W. fault zone, before any holes are definitely placed.

This field is not very promising. The lack of oxidized copper minerals is all the tunnels is a bad sign. If the drilling be done at all, it should be left until the last. Numbers 1 and 3 are better gambles than 2.

The Main is too small and pocketly for company operation. It should be leased.

Kansas- New York-Indiana Section: Systematic work may be undertaken with excellent chance of developing a good tonnage of ore.

In the Indiana there is no work below the 45 ft. level, which follows a good sulphide shoot S. 35° W. near the main contact, under Washington gulch. North of the shaft the 30 ft. level, about 100 ft. long, opens country that is new-traversed by faults and much altered and oxidized. Surface conditons suggest that prospecting easterly toward the 25 ft. shaft shown on the map may be worth while.

The open cut on the main contact, north of the New York selected by Mr. Murray as a good place to prospect, is at the apex of a small lime-salient, shows some ledge matter

and favorable structure and is worthy of more work.

An assay map should be made of the second level of the New York, 55 ft. below the tunnel. A considerable width of mineralized contact metamorphic rock has been cut in the northwest cross cut from the shaft. The chamber at the end is said to be in pay ore. It has a N.N.W. fault as its east wall, The shaft station is in a porphyry diek, striking N. 20° W. and dipping westerly 75°. The fault passes along the N.E. side of the glory hole and has porphyry on its east wall that may be the faulted extension of the Kansas dike. The New York shoot, therfore, is associated with structural conditions similar to those in Bonanza and Kansas.

The shoot stoped in the glory hole pitched south along the dike and was followed 30 ft. below the tunnel, below which point the winz passed into the dike. A few feet of drifting on the second level southerly along the dike from the contact near the raise will show whether the shoot continues.If so it can be opened on the third level, 110 ft. below the tunnel, where a drift nearly 100 ft. long may be required. On this level the first work should be croscutting southwesterly near the face to get out of the porphyry and into the mineralized ground under the chamber on the second level. The results of this work, as shown by systematic sampling and mapping, will enable further development to be planned intelligently.

At the Kansas a shaft is needed to explore the shoot below the lower tunnel and lift the ore above the bin level. The ore shoot is of good size and should maintain its grade in depth. The old shaft and surface workings south of it are on a strong N.N.W. fault.The ore shoot occurs close to a dike as sketched. So far as known this fault zone has not been explored below the upper tunnel. The lower tunnel has opened an excellent shoot of mixed sulphides in a parrallel shear zone 100 ft. west of this fault and about 40 ft. south of the main contact, which strikes N.60° E. and dips southeasterly 65 to 75°. Unless it flattens it should not cut off the ore channels. The shoot should persist in depth.The development of this shoot is naturally the first work to be done. The collar of the old shaft is 86 ft. above the portal of the lower tunnel. If it can be utilized it will save that much new sinking, but at the cost of a rather long crosscut, though the ore may make toward it in depth on account of the steep dip of the fault zone in that direction. The size of the shoot is not yet known. On the tunnel level it has been crosscut for 35 ft. Samples at intervals of 5 ft. taken by the mine sampler, are plotted on the mine map and show an average of 1.9 oz. silver and 3.4% copper, increase from 2.4%at the margin to 4.8% at the face, where the proportionof barren cubic pyrite is smaller.Ore from the bottom of the stope, 15 ft. below the level runs, in carload lots 5.1 to 5.5 oz. silver, 5.2 to 6.8% copper and 8 to 12% zinc, which is within the smelter's free limit. This increase in grade suggests that the barren pyrite is largely marginal feature.

If a new shaft has to be sunk a good location, other things being equal, will be at the back of the big surface cut,about 50 ft. W.S.W. from the old shaft, as sketched.This w would require shorter crosscuts and yet should keep the shaft out of the ore shoot, which is likely to pitchsoutherly while dipping easterly.

A crosscut to connect the New York with the Kansas would cost about $10,000.oo and take a year to complete unleass driven from both ends. If driven from the third level of the New York it would cut the Kansas shoot about 325 feet below the collar of the old shaft or 225 ft. below the bottom of the lowest stope. This is not back enough to justify driving 900 ft. If kept in a straight line for economical haulage its value for prospecting would not be great. At only one point would it pass near a possible ore channel, which is not very promising on the surface.The Kansas shaft would have to be sunk anyhow as the element oftime is too important to admit of waiting to raise from such a drift.

The dike near which the Kansas and the small surface showing mentioned above are located, may extend through to the New York. If prospecting in the New York shows that favorable beds of lime have been replaced by pay ore near the dike it will be well to drift along it toward Kansas. The country is cut by many faults, some of which may have influenced ore disposition. Close mapping can only be done after an accurate topography.For the present it is not advisable to go to further expense for surface mapping.

A connecting drift from New York to Indiana is not needed, but as New York pumping drains Indiana, the company should get the benefit of the latter's production.

The Texas and other sections have been sufficiently discussed on pages 11 to 13.

AMOUNT OF ORE NOW DEVELOPED

OPINION OF UNDEVELOPED RESOURCES

These subjects may best be treated together. Extraction is stepping so closely on the heels of development that no precise estimation of reserves is possible. In the Bonanza, the chief producer, pay ore is exposed in the backs of idle reserve stopes, inaccessable for sampling without expensive staging, and in the breasts and backs of active stopes, changing from day to day with no advance development to indicate the size of the ore shoot. The mode of accurrence of the shoots and the character of the enclosing rock is such that the blocking out of tonnage ahead of extraction would be both difficult and expensive and would materially increase the cost of mining. This does not refer to the discovery of new shoots and indication of their size by drifts and crosscuts on the main levels. That is a result greatly to be desired and at the earliest possible time. Further exploration should find new shoots but of course such

possibilities cannot be translated into tonnage figures.

Since I undertook no sampling, I have relied upon and endorse as being a reasonable expectation, the following estimate by former superintendent A.J.Jones of the probable reserves as indicated today. It indicates a total probable tonnage of shipping ore of 25,000 averaging about 5 oz. silver 5% copper, 10% zinc, 4% lead.

Source	Tonnage estimated Oct. 1917	Extracted since	Tonnage Remaining
Bonanza	22,000	18000	4,000
Other properties	29,000	8500	20,500
Totals	51,000	26,500	24,500

In addition Mr. Jones estimates 41,000 tons of dumps and mill tailings averaging 3.5 oz. silver, 2% copper, 10.4 zinc and 1.9% lead as listed in detail in his reportof March 31,1918. I have no independent information on the subject. The profitable beneficiation of this material is a problem yet to be solved. The considerable expense that would be invloved by a check estimation and sampling is not yet advisable. The total gross assay value of the contained metals is:

145,000 oz. silver	at 75¢	$108,750
1,670,000 lb. copper	at 20¢	334,000
10,400,000 lb zinc	at 5¢	520,000
1,650,000lb. lead	at 4¢	65,200
Total in round numbers		$1,028,000

Owing to milling loss and smelter deductions the realizable value will be much less than this amount, but the sum is great enough to justify, later on, a moderate expenditure on flotation tests by a really first class consulting metallurgist, who would probably charge about $1000 for careful laboratory tests and report. It is by no means certain that this material can be milled at a profit. No investment of new capital should be made until satisfactory results are assured.

It is probable that the mine tonnage estimated for the outside properties will be more than realized. I have segregated them into two classes: A., figures with which I agree: B., figures I increase. Since ther ore is not actually blocked out, except in the Pride, no assays can be given, but those for last year's production in Mr. Jones' annual report and estimate of reserves should be approximated.

Class A	Tonnage Estimated Oct. 1917	Extracted Since	Tonnage Remaiining
South Belmont	3500	1200	2300
Silver Bill	4000	2400	1600
Texas	1700	700	1000
Smuggler	500	100	400
Maine	500	100	400
Holland	500	100	400
Mary Jane	300	150	150
Pocahontas	200	130	70
California	1000	100	900
Empire	1000	150	850
Dubley Standard	200	100	100
Duquesne	5500	50	450
North Belmont	500	100	400
Pride of the West	10000	500	9500
Totals	24400	5880	18520

I made no careful examination of the Pride of the West. The figures look conservative on the basis of themap and sampling by Mr. Jones. There is nothing in the Present condition of the other properties in the above list to warrant an increase in the tonnage estimated, and while some may fall below the figures given, others may exceed their allotment.

CLASS B	Tonnage Estimated oct. 1917	Extracted since	Tonnage Remaining
Estelle and Louise	700	300	400
Kansas	1900	1000	900
New York	500	50	450
Indiana	500	470	30
San Antonio	1000	800	200
T otals	4600	2620	1980

Estelle and Louise: New development on the 70 ft. level of the Bonanza is entering the shoot about 35 ft. below the bottom of the lessee's work. The ore, at first wholly zinc, is showing more copper. Structural conditions are favorable for extension in depth. A shoot 100 ft. long by 6 ft. wide is a reasonable expectation, which would give 60 ,about8 tons per foot of depth.

Probable ore	5000 tons
Possible ore	5000 tons
Total	10000 tons

Kansas; After Bonanza, this mine has the best outlook. Mr. Jones included in his estimate an additional 20,000 tons of milling ore assaying: 3 oz. silver,2.5% copper, 8% zinc and 3% lead. He says, "The bulk of the milling ore tonnage would come from the Kansas mine lower tunnel, where the

present crosscut has shown the ore lens to be over 50 feet in width and it may be assumed that it is 75 feet in length and it extends 30 ft. in height above the level and 30 ft. in depth below the level."

This ore contains no garnet but still would produce only a low grade concentrate on account of the large amount of barren pyrite, which may, however, prove to be present chiefly in the margins of the shoot. The crosscut is not 35 ft. long. The ore assays 2.4% copper at the edge of the shoot and 4.8% in the face, with about 2 oz. silver. Ore from the understope nearby, of the same general character, runs 5.5% copper and 5.5 oz. silver. The tunnel level promises low grade shipping ore. This shoot is as yet undeveloped but unless out off in depth by the inward dip of the contact should produce 10,000 tons or possibly much more. No close estimate can be made on the basis of present development.

NEW YORK: The tonnage listed is for tunnel level and above, where indications are slight. The second level, 55 ft. below the tunnel, requires systematic sampling. The mineralized ground is of considerable width and if of pay grade will make good tonnage. The shoot that produced in the glory hole and to a depth of 30 feet below the tunnel has not been explored deeper. The third level, 110 ft. below the tunnel, paid no attention to the geology and is all in the intrusive porphyry. On account of lack of assays no tonnage cay be estimated. The property has good development chances.

INDIANA: A small shoot has been opened by a lessee on the main contact. It may extend in depth, others may be found and the country to the north may be productive. It should be included with the New York in any plan of campaign.

SAN ANTONIO : The oxidized surface ores are nearly gone, but they have passed in depth into garnet- copper ore said to run 8%.The shoot may continue to some depth but the structure is confused and indefinite, gives little information and the showing does not yet justify extension of the 100 level of the Duquesne shaft to get underneath. The outlook is uncertain but it is the most promising of the surface stopes.

SUMMARY: It is reasonable to expect that the mines in Class B will increase the tonnage of shipping ore, as estimated on page 25, by 25,000 tons,- possibly by much more. These figures look considerably ahead of present development.

BONANZA: known ore bodies are approaching exhaustion. No new shoots of the first importance have been opened. Prospects north of the shaft below the 300 foot level are hopeful. If the ore recently opened on the 400 north proves to be first rate shoot the outlook for the country north of the shaft below the 300 level will be good.

Present conditions do not admit of tonnage estimates even in the terms of possible ore, but they warrant vigorous development of that section on the 400 foot level, with a winz to explore the ore zone below it.

RESUME': On the basis of ,r. Jones' figures and my comments, a further production in the immediate future of 50,000 tons from all of the mines owned or operated by the company is a reasonable expectation. Conditions do not point to much increase in the ultimate total, above the figures given, except in the Bonanza-Estelle and New York-Kansas sections, where favorable results from development will greatly increase possible tonngge.

SMITH & ZIESIMER,

By Franklin Wheaton Smith

Bisbee, Arizona
April 15, 1918

S C H E D U L E

The following schedule is prepared from data in the possession of the Duquesne Company. It is believed to be an accurate description of all the mining claims owned or controlled by this company, and so far as the parties of the first part know there are no serious defects in title to the claims as scheduled. But the accuracy or completeness of the schedule and the titles to the mining claims are not warranted by parties of first part.

Patagonia Mining District, Santa Cruz County, Arizona

Name of Claim	Acres	Patent Number	Name of Claim	Acres	Patent Number
Golden Gate	17,572	44027	Pluto	19,842)	
Evening Star	17,210	44926	Pluto No. 2	4,423)	
				)	44032
Alaska	10,497	02399	Duquesne	8,243)	
Meyer	17,701	45462	Virginia	.055)	
Turnpike	19.584	45465	Illinois	5.060	44676
Success	19.584		Pocahontas	20.660	40925
Pittsburgh	19.584		Noonday	20.661	06376
Rhino	19.584)		Grasshopper	9.777	44030
Big Cave	19.473)		Dubley Standard	20.244)	44028
Bisbee	19.808		Mary Jane	13.800)	
Bronco	19.612)		Klondyke	15,992)	44029
Copper Belt	18.650		Contact	11.636)	
Big Crop	20.161)		Montezuma	19.866)	
Big Crop No. 2	20.210)	44025	Annie	9.355	44021
Jumbo	20.063)		Lead King	20.661	44020
Keystone	5.030)		Smuggler	17.245	04691
Last Hope	10.683)		Iron Cow	11.445	07164
Chris Excers	10.511)		Laurette	10.299)	
Center	17.085)		Comet	8.310)	
Wedge	15.624)		Mohawk	5.116)	44026
Mansanita	1.905)		Indianapolis	13.990)	
Silver Jack	19.126		Little Emma	7.121)	
Doco	16.852	44959	Georgia	20.000	44956
New York	16.189	44954	Kansas	17.798	44954
Maine	17.465	44955	Texas	18.875	44952
California	12.230	44953	Great Republic	11.270	45464
Stewart	4.305	45466	Posey	20.660)	44950
Holland	20.065		Seven Oaks	)	
Amsterdam	2.439	45401	Estelle & Louise	15.790	40924
Little Joker	.738)		Bonanza	20.290	40923
Imperial	4.474	45460	Ohio No.2	20.662	44957
Divide	10.179		Arizona	16.250	44951
Slim Jim	15.992	44957	Empire	20.661	lot 40A x
Silver Bill	5.000	lot 41x	Belmont	41.322	lot 38A x
San Antonio	10.331	lot 39 Ax	Indiana	16.680	45463

x- no record

The following unpatented claims are reported:

New York No.2	7.957	Elgin	3.502
Yosemite	0.348		

REPORT ON THE PROPERTY OF THE

DUQUESNE MINING AND REDUCTION COMPANY

DUQUESNE, ARIZONA

by

Franklin Wheaton Smith
April 15, 1916

SUMMARY AND CONCLUSIONS OF A
REPORT ON THE PROPERTY OF THE
DUQUESNE MINING AND REDUCTION COMPANY

The ore deposits are of the contact metamorphic type, associated with garnet zones, except in the Kansas and occurring between crystalline limestone and intrusive granite porphyry, especially where contacts of N.N.E. to E.N.E. trend have been intersected by strong faults of N.N.W. strike. The only important exception is the Pride of the West shoot, which has a limestone footwall and an aplite and monzonite hanging.

The ores are complex sulphides in garnet and quartz gangue, carrying copper, lead, zinc and varying amounts of silver, and are classified as zinc and copper ores. The surface zone of enriched oxidized ores is only 10 to 80 feet deep and ores of this character are now almost exhausted. There is no zone of enriched secondary sulphide ores underlying the oxidized zone. The Bonanza and Kansas ores quoted below are primary complex sulphides and should maintain their grade to depths greater than are likely to be reached by development in the immediate future.

Last year's prodeuction of the Bonanza, which supplied two-thirds of the camp's output, was:-

Ore Class	Dry Tons Shipped	Oz. Silver	Average Assay per Ton %Copper	%Lead	%Zinc
Copper	19,533	3.0	5.0	2.0	9.0
Zinc	2,050	1.0	3.6	2.0	21.4

Existing ore bodies are nearly exhausted, with perhaps 4000 tons left in theshoots that gave the 1917 production, but prospects are good north of the main shaft, below the 500 level; also at the south end of the 70 level and deeper, in the Estelle and Louise shoot. Other sections may repay prospecting.

In the immediate future the Pride of the West and Kansas mines promise to become important producers. in 1917 the Kansas produced 1316 tons of copper ore, averaging 5.2 oz silver; 6.3% copper; 4.0% lead; 9.0% zinc; The outlook for 10,000 tons or more averaging 5 oz silver and 5%copper is good. If the shoots persist in depth, as it should, and maintains the size indicated on the lower tunnel level, 100 ft. of sinking with shafts and cross-cuts will put 10,000 tons actually in sight.

The Pride is estimated by former superintendent A.J.Jones, based on his survey and sampling, to have reserves of copper are amounting to 9,500 tons averaging 5.0 oz silver; 5.0% copper; 16% zinc and 5.0 lead.

Although there is little ore in any of the mines actually developed and measurable, as a whole the camp in the immediate future may be expected to produce fifty thousand tons of shipping ore averaging about 3 to 5 oz. silver; 4to 5% copper; 9 to 12% zinc; 2 to 4% lead.

Successful development in the Bonanza and Kansas-New York sections will largely increase the probable tonnage.

The property requires the continuation of the careful and conservative policy that has characterized the management during the past year. Its present condition and probably future do not warrant the investment of a large amount of new capital.

Development outlined in this report can be paid for out of current earnings.No long drifts or crosscuts deep drill holes or shafts are advisable now.The underground development recommended is mostly in short drifts and crosscuts. The half dozen drill holes that it may be worth while to sink will probably range in depth from 250 to 400 ft. and are not liekly to exceed 1000 to 1500 feet in total footage.

If developments are favorable, a year from now it will be well to take stock of the reserves of milling ore,tailings and dumps and get a competent opinion as to whether recent advance in the very rapidly developing art of concentration by flotation makes profitable treatment possible. No new capital should be put into a mill until after a very careful study of the resources of the property and of milling methods. These preliminary steps will cost little and can be paid for from earnings.

No plan looking towards the erection of a smelter by this company should have a moment's consideration, Such isolated plants, in spite of the large economies they may show on paper in preliminary calculations, are almost invariably very costly failures.These deposits are of a type arratic and capricious in their distribution and incapable of systematic development to block out a large tonnage ahead of extraction without going to much expense.It is not probable that at any time it will be possible to say that the property has an assured lifeof five or ten years ahead of it.It ma last that long but the finanfial policy should be conservative and the property made to pay its way.

SMITH AND ZIESEMER
BY Franklin Wheaton Smith

Dated at
Bisbee, Arizona
April 15, 1918

REPORT ON THE PROPERTY OF THE
DUQUESNE MINING AND REDUCTION COMPANY
DUQUESNE, ARIZONA

This report is confined to the subjects covered by the following instructions:

(1)Geology of tract with especial attention to the main productive areas.
(2)Recommendations for the future development of the productive areas.
(3) Amount of ore developed at present.
(4) Opinion of undeveloped resources of property.

My preliminary report of April 5, 1918, sets forth my main conclusions which are not modified herewith.

Production has been keeping pace with development. No closely figured estimate of reserves is possible. The property's great need is the discovery and development of new ore shoots. This may be done either by the systematic development of all contacts and garnet zones, in the hope of finding profitable shoots; or the conditions governing the localization of the more important known ore bodies may be studied and the work directed first toward the places most likely to contain similar bodies. On account of the great length and number of the garnet zones the first method would be ruinously expensive. Most of theperiod of the examination was devoted to formulating a campaign by the second method.

Geology: The small scale may herewith gives the broad outlines of the formations. There is no accurate typographic may of the property, hence no close mapping was attempted outside the important sections.

The limestone (blue) is a remnant of a formation of greater extent penetrated and perhaps engulfed by the intrusive granite porphyry (green).Later, quartz monzonite (red), a granitic rock, intruded both and probably underlies the whole area at greater or lessdepth. At the south end, in the Silver Bill-Belmont section, it is near the surface. In the Bonanza and the Kansas areas it is doubtless considerably deeper. Some of the rocks mapped as granite porphyry, especially onthe West contact and in dikes too small to show on this map, are considerably younger. They look like quartzite, are fine grained, very silicious and seem to be the product of the expiring phase of the monzonite intrusion, prior ot the advent of the mineralizing solutions, which were probably derived from the same magma.

The limestone strata stand nearly vertical, striking as a rule N.-S. and dipping 60 to 75 degrees W. There are marked deviations in strike, due to folding. Stresses due to both intrusives fractured and faulted the limestone in all directions. Most of the movement planes have no

significance, but two sets, striking N. 15° to 35° W. and N. 10 to 20 E. appear to have been influential in governing the position of the ore shoots.

In addition to faults another class of features is often important, in contact deposits, in affecting the position of ore shoots. Limestone is the most soluble of rocks. Where it projects as a salient into the intrusive conditions are most favorable for attack and replacement by mineralizing agents ascending along the contact.

THE BONANZA ZONE includes the east contact from 600 ft. north of the Bonanza shaft to 1500 ft. south of it. This contact has been explored underground a maximum distance of 250 ft. north and 850 ft. south of the shaft. The most important series of shoots has been confined to a long shallow salient near the main shaft, extending about 50ft. north and 100 to 200 south of it. An important fault of the N.N.W. system, dipping 59 easterly, intersects the contact at the south end of the productive zone. Its horizontal displacement is about 30 ft. south on the east side. The main ore bodies down to the 300 ft. level lie in the acute angle between thefalut and the contact, which is marked by nearly vertical faulting in the N.N.E. system. This salient bottoms on the 300 ft. level and north of the shaft the contact, striking N. 10° W., is the path of the fault. The ore channel has left the salient and follows the footwall of the fault. When the contact turns N. N.E. as it may at any time, the ore may cross to the hanging side. Recent work of the 400 ft. level north seems to promise that the ore channel will be opened in the corresponding structural position on that level. If so, the prospect for continuation in depth, always stepping northerly with the pitch of the intersection is good.

On the 100 ft. level, 135 ft. below the collar, minor NNE fractures, parallel to the contact faulting are cut and displaced on the hanging wall of the fault. Between it and the main shoot there is another that may have had a similar effect. A few feet of drift will decide.

South of the main channel a few small shoots have been found mostly in acute angles between the main contact and instrusive spurs that extend into the limestone. The upper levels here promise little, but if the Great Republic Fault has had a favorable effect, similar to that of Bonanza, there may be shoots at greater depth, say at the 400 ft. level and below, under the Illinois country, where the contact swings from a northwesterly to a northeasterly strike.

In the Estelle and Louise, 800 ft. south of the Bonanza shaft conditions are somewhat different. A rather sharp salient has been accentuated by N.65° to 75° W. faulting at 60° northerly dip, and easterly displacement of 40 to 50 ft. on the north side. Movement is chiefly of premineral age. In the point of this salient the surface shows

a small amount of mineralized garnet, close to coarse aplite, intrusive in the porphyry. It expends to a shoot 100 ft. long and 4 to 8 ft. wide at a depth of 35 ft.

The Bonanza 70 ft. level has reached the north end of this shoot and finds it wide and strong. The features in conjunction here are the sharp salient, occupied by the shoot; the W.N.W. faulting, forming with one of the planes near the footwall of the zone, the north boundary of the ore; and the intrusive aplite, a rock likely to have had genetic connection with it. Somewhat similar structural conditions exist on the West contact, south of Duquesne gulch, on the extension of the strike of the Estelle fault zone.

On the Great Republic structural conditions resemble those of the Bonanza, except that the fault's horizontal displacement seems to be in the opposite direction. Surface indications are obscure, as is usually the case with faults in limestone.The mantle of debris over the limestone-porphyry contact prevents accurate mapping.The dip of this falut is unknown, probably steeply to the east. If ore bodies exist under the wide, nearly barren garnet outcrop they should be fo nd by carefully placed drill holes from the surface. Aside from the Bonanza fault,most of those of that system dip 70 to 75° easterly. If the fault is one of the factors governing the location of another ore zone its dip will govern the pitch of that zone northerly with depth,the other factor being the dip of the contact, which is also unknown, but probably to the east more steeply than the fault.

THE DUQUESNE*-SAN ANTONIO-EMPIRE SECTION is the southwesterly continuation of the Bonanza zone. Close to the contact there is a heavy, scantily mineralized garnet zone, with arms ramifying northerly, where solutions acted on the limestone walls of the faults of the two main systems. The monzonite reached the surface within the garnet zone, as shown on the large scale map. The indications are that the mineralization is shallow and is underlain by intrusives. The only ore bodies that have been found have been small erratic shoots of enriched oxidized ores, bottoming in a few feet of lean or barren unoxidized garnet rock.The San Antonio shoot may prove an exception. It was the largest of the surface shoots and the oxidized ore has passed into garnet sulphide ore of excellent grade.

The surface indications taken in connection with the poor showing on the 110 ft. level of the Duquesne, are the grounds for advising against a systematic development campaign in this section.

On the Empire, about 200 ft. east of the 70 ft. shaft two broad arms of garnet diverge, as mapped, On the western side of the western one were developed small productive shoots of this mine. The sharp salient of

coarse crystalline limestone, opend by pits in the angle, shows solution-roughened surfaces but no ore. in deposits of this type the sulphides are mostly deposited near the lime side of the garnet. If an ore body with no outcrop was formed hereabouts, this is the most probable locus and may be tried out with a single drill hole.

IN the SILVER-BILL-BELMONT Section the altered ore-bearing limestones is surrounded on threee sides by the intrusive monzonite, the contacts well up on the flanks of the hill. The western part of this hill, in which no ore of consequence has ever been found, is probably a small block of metamorphosed limestone resting on monzonite and isolated from the rest of the sediments by a dike and sill of the later fine-grained, highly silicious rock.

The eastern part, containing the Belmont and Silver Bill workings, has given little encouragement with depth. All profitable ores have been confined to shallow, oxidized, enriched bodies of small size, derived from lean garnet-sulphide ores. The Belmont tunnel and the Silver Bill tunnels and shaft show altered limestone and garnet rock, with much confused, strong, but non-persistent, structure and only scanty mineralization. The upper Silver Bill tunnel cuts many flat shears, suggesting the monzonite at the portal and for some distance in, the contact dipping under the hill. About 2000 ft. of underground work has been done with small results. There is no indication of the presence of bodies of primary ore of shipping grade. They may exist, but all conditions lead one to expect that they will be small and very erratic. If a method of milling low grade garnet ores be developed, sampling will be in order, to estimate possible tonnage, on which point no data are now available.

THE WEST CONTACT, SOUTHERN SECTION, has little development. The North Belmont tunnel penetrates a garnet zone, mostly barren. A winze has been sunk on a N.60 W. fracture showing irregular mineralization with silver, copper and lead. The bottom was inaccessible but appears to pass into hard garnet rock at 40 ft.

This garnet zone can be followed northerly over the mineral monument hill to a series of unpromising shallow pits and tunnels, in barren oxidized garnet-quartz rock, close to the main monzonite contact, on the Indianapolis, and about 500ft. West of the strong curved garnet zone at the Holland, along which much surface ore was produced years ago. The stope bottoms cannot be examined. Presumably they a e barren or in low grade primary garnet-sulphide ore.

WEST CONTACT, NORTHERN SECTION. The garnet zone on the west conatct is intercepted by an arm of monzonite as mapped. The southern end of the northern section, south

of Moctezuma gulch, is probably a mere cap resting on monzonite. Thence, north over the hill to Duquesne gulch, the zone is 50 ft. or more in width, strongly developed, but with scant signs of ore. On the southern slope there is no work save open cuts. At one point the contact is intersected by a strong ledge of chalcedonic breccia, striking westerly. Here the garnet zone shows much iron oxide, derived from sulphide minerals, which may, however, have been merely barren pyrite on the garnet-lime boundary, with a little ore on the dump. Thence north to the gulch the country is traversed by a N.60° to 70° W. fault zone, dipping northerly, that may be the extension of the Estelle and Louise fault zone. There are several open cuts and two tunnels aggregating about 500 ft. of work, between the crest and Duquesne gulch. They are in sheared oxidized garnet-quartz rock, showing signs of faulting and pressure but none of mineralizations. Indications of bodies of pay ore are absent but a little drilling may be justified for the following reasons:

The ore minerals and garnet are probably derived from the same source. From the very hot solutions garnet and associated silicates were first deposited in enormous quantity. From the same solutions, toward the end of a continuous process the metallic sulphides were doubtless deposited. Garnet zones often contain entirely within their mass erratic shoots, capriciously distributed. It is just possible that within this belt of barren garnet such shoots may have been formed.

North of Duquesne gulch the lower slope shows a straight contact belt between porphyry and massive limestone with no mineralization. The high ground over Lime Peak saddle, owned by others, contains a few small sulphide shoot, not large enough to repay the cost of exploration. Thence to the Indiana the contact is covered by the Main claim on which a thick bed of massive marble, without important cross-structure, is in contact with the porphyry. The garnet zone is irregular and discontinuous. The surface stope shows a foot or two of solid copper-zinc-iron sulphides, in a short vertical lens. The tunnel on the contact, 250 ft. long, opened nothing commercial. This claim at best is suitable only for leasers.

IN THE KANSAS-NEW YORK-INDIANA SECTION conditions are much more favorable. At the Kansas, the most promising of the three, the garnet is absent. Mixed sulphides occur replacing the lime near the intersections of faults of the N.N.W. system with a porphyry dike and the main contact. The Indiana and Kansas are close to the main contact. The New York deposits are associated with silicious dikes that trace in the direction of the last exposure, 300 ft. southerly of the long tongue of monzonite and aplite that crosses the East side of Lime Peak just below the summit. The Kansas dike also strikes toward the New York. After the Bonanza zone this is the most important section.

THE PRIDE OF THE WEST was not studied. The ore body occurs in the limestone on the underside of a thick monzonite dike that dips 40° westerly. It is the only important ore body in the camp that occupies a monzonite-limestone contact.

WASHINGTON BASIN is floored with monzonite. The contact around the western, southern, and eastern edges was examined at many points without finding evidence of commercial mineralization except at POCAHONTAS, where there were shallow deposits, now exhausted. It is not a section worth prospecting.

THE TEXAS MINE is at the eastern end of the garnet zone, 1300 ft. long, striking N. 60° E. and formed along a fault between crystalline limestone on the south and dense chert on the north. From the Dubley Standard tunnel at the bend of the road to the Texas shaft there are numerous workings showing 3 to 10 ft. of garnet and occasionally a little ore. the good shoot in the Texas is limited indepth on the west end by movement planes. The fracture along which it formed extends east of the shaft but there are only a few small lenses of ore, measurable in inches.

The formation here changes from N. 60° to nearly north in strike and the shoot probably owes its position to the favorable opportunity for attack by mineralizing solutions offered by the fractured rock in the apwx of the bend. The structure is blind. Prospecting can only follow the more important side planes on the chance that they will lead to more ore. If ore comes in again below it will probably step westerly with the dip of the strong slip that bounds the ore on the west in the open cut and on the 50 ft. level. The best gamble would be to follow this slip down with a winz and crosscut the formation to see whether any one bed of limestone may have been selected for more replacement deposits. The known shoot may have ended where it did because the lime bed of the most favorable chemical composition was dislocated by the slip that bottoms the ore.

EAST MOUNTAIN lies wholly in the granite porphyry area, where it has been intruded by one or two other rocks. Some alteration has taken place along contacts and faults but it is of barren hydrothermal type. The whole porphyry belt from the Pocahontas to the Mayer offers no inducements to prospecting. Nowhere do the intrusive rocks hold out the faintest hope that they may contain deposits of disseminated ores of the porphyry-copper type.

RECOMMNEDATIONS FOR FUTURE DEVELOPMENT:

Bonanza Zone: A short drift on the 100 ft. level, referred to on page 4, will try out a possible location for a small shoot at little expense.

No deepening of the main shaft is yet called for. The 300 ft. level will naturally be pushed north to the limit of the productive zone now being exploited. No work north of the shaft above the 300 is desirable at present. This section has better chances to make good in depth than near the surface.

The 400 north drift sho ld be pushed and the ore zone explored by a winz. If results are satisfactory it will probably be best to unwater the 500 ft. level and drift north, extracting the ore up to the 400 through it, instead of drifting on the 500. The present hoist cannot handle spoil from many development faces in addition to ore. If an ore zone is proven by the winz development cost per ton will be reduced by driving one level only and from the standpoint of stoping operations the method should be wholly practicable.

A long drift wouth on the 300 or 400 to tap the Estelle and Louise country and explore the Illinois section on the way may be called for later. It seems wiser now to develop that ore by sinking on it before undertaking a drift that will cost about 6000 dollars.

Structural conditions may prove favorable for ore in the north end of the Great Republic claim, southwest of the Estelle and Louise; also in depth below the Illinois shaft. Some preliminary work might be done on the 70 Ft. level to prove structure by extending the southwesterly crosscut that penetrates the Estelle fault zone just before the main drift makes its sharp turn east. The level is plotted on the surface map herewith. Such a crosscut would prove whether the fault is a strong shear zone or a mere zone of minor adjustment with little persistent structure. It would, however, cut it too far north to have much chance of finding ore. It would cost between $500 and $1000 and the money had better be spent in probing the surface with a drill near the more promising intersection of fault zone and contact. It will be best to drill one scout hole before laying out others. The dips of the fault and contact are unknown, but both are probably to the east, the contact being more nearly vertical than the fault. The scout hole is laid out on the assumption that the contact dips easterly 75° or 80° and the fault 60° to 70°. The hole may be started 75 ft. east of the small shaft with the windlass, the deepest working of the string of pits, and pointed S 70° W. with a dip of 80° from the horizontal. If the dips are as estimated the hole will be 250 to 300 ft. deep.

Duquesne-San Antonio- Empire Section: No systematic work is yet advisable. The San Antonio shoot is the most promising and naturally will be followed down as long as it pays. A drill hole on the Empire may be put down as outlined on page 7, although a small prospect shaft would be a better method, for the first 50 or 75 ft. at least, in order to determine the dip and pitch of the sharp lime now. The intrusive, both porphyry and monzonite, are now far away and may underlie this formation. This work is the best gamble indicated on that ground by structural conditions, where no ore outcrops. A crosscut from the 70 ft. shaft is now proving the ground under the old surface stope.

Silver Bill- Belmont Section : Conditions are not favorable for systematic prospecting. The outlook is that the tunnels and the Silver Bill shaft, either on its 110 ft. level

or deeper, will find only lean or barren garnet rock in quantity with occasional bunches or small shoots of better grade sulphides, to the position of which the confused structure gives no sure clue. If a milling method should ever be developed this ground my be of value for low grade ore.

West Contact, Southern Section ; No systematic work seems likely to be profitable at the North Belmont, Indianapolis or in the tunnel of the Holland, which is driven in dense baked sidements, not far from the big monzonite dike that extends through from the Pride of the West. On the slope above one cut shows and aplite dike, another a little copper-stained garnet. The monzonite- limestone contact is well exposed in the gulch bed, where the sediments are baked, altered and very slightly mineralized. This section is not promising.

West Contact, Northern Section ; A little drilling may be done between Duquesne and Moctezuma gulches, at one or more of the following places:

(1) An inclined hole from the east to crosscut the garnet zone 100 ft. or more below the 50 ft. shaft on the crest. This is the only place where there is an ore showing of even the slenderest kind.
(2) A similar hole to probe under the strongly oxidized garnet rock, near the intersection of th chalcedony breccia lode.
(3) An angle hole directed southwesterly to cut the garnet map herewith is based on a hasty, rough and inaccurate topographic survey. If any drilling is to be done here there should be an accurate topographic map that will permit a close mapping of W.N.W. fault zone, before any holes are definitely placed.

This field is not very promising. The lack of oxidized copper minerals is all the tunnels is a bad sign. If the drilling be done at all, it should be left until the last. Numbers 1 and 3 are better gambles than 2.

The Main is too small and pocketly for company operation. It should be leased.

Kansas- New York-Indiana Section: Systematic work may be undertaken with excellent chance of developing a good tonnage of ore.

In the Indiana there is no work below the 45 ft. level, which follows a good sulphide shoot S. 35° W. near the main contact, under Washington gulch. North of the shaft the 30 ft. level, about 100 ft. long, opens country that is new-traversed by faults and much altered and oxidized. Surface conditons suggest that prospecting easterly toward the 25 ft. shaft shown on the map may be worth while.

The open cut on the main contact, north of the New York selected by Mr. Murray as a good place to prospect, is at the apex of a small lime-salient, shows some ledge matter

and favorable structure and is worthy of more work.

An assay map should be made of the second level of the New York, 55 ft. below the tunnel. A considerable width of mineralized contact metamorphic rock has been cut in the northwest cross cut from the shaft. The chamber at the end is said to be in pay ore. It has a N.N.W. fault as its east wall. The shaft station is in a porphyry diek, striking N. 20° W. and dipping westerly 75°. The fault passes along the N.E. side of the glory hole and has porphyry on its east wall that may be the faulted extension of the Kansas dike. The New York shoot, therfore, is associated with structural conditions similar to those in Bonanza and Kansas.

The shoot stoped in the glory hole pitched south along the dike and was followed 30 ft. below the tunnel, below which point the winz passed into the dike. A few feet of drifting on the second level southerly along the dike from the contact near the raise will show whether the shoot continues. If so it can be opened on the third level, 110 ft. below the tunnel, where a drift nearly 100 ft. long may be required. On this level the first work should be croscutting southwesterly near the face to get out of the porphyry and into the mineralized ground under the chamber on the second level. The results of this work, as shown by systematic sampling and mapping, will enable further development to be planned intelligently.

At the Kansas a shaft is needed to explore the shoot below the lower tunnel and lift the ore above the bin level. The ore shoot is of good size and should maintain its grade in depth. The old shaft and surface workings south of it are on a strong N.N.W. fault. The ore shoot occurs close to a dike as sketched. So far as known this fault zone has not been explored below the upper tunnel. The lower tunnel has opened an excellent shoot of mixed sulphides in a parrallel shear zone 100 ft. west of this fault and about 40 ft. south of the main contact, which strikes N.60° E. and dips southeasterly 65 to 75°. Unless it flattens it should not cut off the ore channels. The shoot should persist in depth. The development of this shoot is naturally the first work to be done. The collar of the old shaft is 86 ft. above the portal of the lower tunnel. If it can be utilized it will save that much new sinking, but at the cost of a rather long crosscut, though the ore may make toward it in depth on account of the steep dip of the fault zone in that direction. The size of the shoot is not yet known. On the tunnel level it has been crosscut for 35 ft. Samples at intervals of 5 ft. taken by the mine sampler, are plotted on the mine map and show an average of 1.9 oz. silver and 3.4% copper, increase from 2.4% at the margin to 4.8% at the face, where the proportion of barren cubic pyrite is smaller. Ore from the bottom of the stope, 15 ft. below the level runs, in carload lots 5.1 to 5.5 oz. silver, 5.2 to 6.8% copper and 8 to 12% zinc, which is within the smelter's free limit. This increase in grade suggests that the barren pyrite is largely a marginal feature.

If a new shaft has to be sunk a good location, other things being equal, will be at the back of the big surface cut, about 50 ft. W.S.W. from the old shaft, as sketched. This w would require shorter crosscuts and yet should keep the shaft out of the ore shoot, which is likely to pitch southerly while dipping easterly.

A crosscut to connect the New York with the Kansas would cost about $10,000.00 and take a year to complete unleass driven from both ends. If driven from the third level of the New York it would cut the Kansas shoot about 325 feet below the collar of the old shaft or 225 ft. below the bottom of the lowest stope. This is not back enough to justify driving 900 ft. If kept in a straight line for economical haulage its value for prospecting wo ld not be great. At only one point would it pass near a possible ore channel, which is not very promising on the surface. The Kansas shaft would have to be sunk anyhow as the element oftime is too important to admit of waiting to raise from such a drift.

The dike near which the Kansas and the small surface showing mentioned above are located, may extend through to the New York. If prospecting in the New York shows that favorable beds of lime have been replaced by pay ore near the dike it will be well to drift along it toward Kansas. The country is cut by many faults, some of which may have influenced ore disposition. Close mapping can only be done after an accurate topography. For the present it is not advisable to go to further expense for surface mapping.

A connecting drift from New York to Indiana is not needed, but as New York pumping drains Indiana, the company should get the benefit of the latter's production.

T he Texas and other sections have been sufficiently discussed on pages 11 to 13.

AMOUNT OF ORE NOW DEVELOPED

OPINION OF UNDEVELOPED RESOURCES

These subjects may best be treated together. Extraction is stepping so closely on the heels of development that no precise estimation of reserves is possible. In the Bonanza, the chief producer, pay ore is exposed in the backs of idle reserve stopes, inaccessable for sampling without expensive staging, and in the breasts and backs of active stopes, changing from day to day with no advance development to indicate the size of the ore shoot. The mode of accurrence of the shoots and the character of the enclosing rock is such that the blocking out of tonnage ahead of extraction would be both difficult and expensive and would materially increase the cost of mining. This does not refer to the discovery of new shoots and indication of their size by drifts and crosscuts on the main levels. That is a result greatly to be desired and at the earliest possible time. Further exploration should find new shoots but of course such

possibilities cannot be translated into tonnage figures.

Since I undertook no sampling, I have relied upon and endorse as being a reasonable expectation, the following estimate by former superintendent A.J.Jones of the probable reserves as indicated today. It indicates a total probable tonnage of shipping ore of 25,000 averaging about 5 oz. silver 5% copper, 10% zinc, 4% lead.

Source	Tonnage estimated Oct. 1917	Extracted since	Tonnage Remaining
Bonanza	22,000	18000	4,000
Other properties	29,000	8500	20,500
Totals	51,000	26,500	24,500

In addition Mr. Jones estimates 41,000 tons of dumps and mill tailings averaging 3.5 oz. silver, 2% copper, 10.4 zinc and 1.9% lead as listed in detail in his reportof March 31,1918. I have no independent information on the subject. The profitable beneficiation of this material is a problem yet to be solved. The considerable expense that would be invloved by a check estimation and sampling is not yet advisable. The total gross assay value of the contained metals is:

145,000 oz. silver	at 75¢	$108,750
1,670,000 lb. copper	at 20¢	334,000
10,400,000 lb zinc	at 5¢	520,000
1,650,000lb. lead	at 4¢	65,200
Total in round numbers		$1,028,000

Owing to milling loss and smelter deductions the realizable value will be much less than this amount, but the sum is great enough to justify, later on, a moderate expenditure on flotation tests by a really first class consulting metallurgist, who would probably charge about $1000 for careful laboratory tests and report. It is by no means certain that this material can be milled at a profit. No investment of new capital should be made until satisfactory results are assured.

It is probable that the mine tonnage estimated for the outside properties will be more than realized. I have segregated them into two classes: A., figures with which I agree: B., figures I increase. Since ther ore is not actually blocked out, except in the Pride, no assays can be given, but those for last year's production in Mr. Jones' annual report and estimate of reserves should be approximated.

Class A	Tonnage Estimated Oct. 1917	Extracted Since	Tonnage Remaining
South Belmont	3500	1200	2300
Silver Bill	4000	2400	1600
Texas	1700	700	1000
Smuggler	500	100	400
Maine	500	100	400
Holland	500	100	400
Mary Jane	300	150	150
Pocahontas	200	130	70
California	1000	100	900
Empire	1000	150	850
Dubley Standard	200	100	100
Duquesne	5500	50	450
North Belmont	500	100	400
Pride of the West	10000	500	9500
Totals	24400	5880	18520

I made no careful examination of the Pride of the West. The figures look conservative on the basis of themap and sampling by Mr. Jones. There is nothing in the Present condition of the other properties in the above list to warrant an increase in the tonnage estimated, and while some may fall below the figures given, others may exceed their allotment.

CLASS B	Tonnage Estimated oct. 1917	Extracted since	Tonnage Remaining
Estelle and Louise	700	300	400
Kansas	1900	1000	900
New York	500	50	450
Indiana	500	470	30
San Antonio	1000	800	200
T otals	4600	2620	1980

Estelle and Louise: New development on the 70 ft. level of the Bonanza is entering the shoot about 35 ft. below the bottom of the lessee's work. The ore, at first wholly zinc, is showing more copper. Structural conditions are favorable for extension in depth. A shoot 100 ft. long by 6 ft. wide is a reasonable expectation, which would give 60 ,about8 tons per foot of depth.

Probable ore	5000 tons
Possible ore	5000 tons
Total	10000 tons

Kansas: After Bonanza, this mine has the best outlook. Mr. Jones included in his estimate an additional 20,000 tons of milling ore assaying: 3 oz. silver,2.5% copper, 8% zinc and 3% lead. He says, "The bulk of the milling ore tonnage would come from the Kansas mine lower tunnel, where the

present crosscut has shown the ore lens to be over 50 feet in width and it may be assumed that it is 75 feet in length and it extends 30 ft. in height above the level and 30 ft. in depth below the level."

This ore contains no garnet but still would produce only a low grade concentrate on account of the large amount of barren pyrite, which may, however, prove to be present chiefly in the margins of the shoot. The crosscut is not 35 ft. long. The ore assays 2.4% copper at the edge of the shoot and 4.8% in the face, with about 2 oz. silver. Ore from the understope nearby, of the same general character, runs 5.5% copper and 5.5 oz. silver. The tunnel level promises low grade shipping ore. This shoot is as yet undeveloped but unless out off in depth by the inward dip of the contact should produce 10,000 tons or possibly much more. No close estimate can be made on the basis of present development.

NEW YORK: The tonnage listed is for tunnel level and above, where indications are slight. The second level, 55 ft. below the tunnel, requires systematic sampling. The mineralized ground is of considerable width and if of pay grade will make good tonnage. The shoot that produced in the glory hole and to a depth of 30 feet below the tunnel has not been explored deeper. The third level, 110 ft. below the tunnel, paid no attention to the geology and is all in the intrusive porphyry. On account of lack of assays no tonnage cay be estimated. The property has good development chances.

INDIANA: A small shoot has been opened by a lessee on the main contact. It may extend in depth, others may be found and the country to the north may be productive. It should be included with the New York in any plan of campaign.

SAN ANTONIO : The oxidized surface ores are nearly gone, but they have passed in depth into garnet- copper ore said to run 8%.The shoot may continue to some depth but the structure is confused and indefinite, gives little information and the showing does not yet justify extension of the 100 level of the Duquesne shaft to get underneath. The outlook is uncertain but it is the most promising of the surface stopes.

SUMMARY: It is reasonable to expect that the mines in Class B will increase the tonnage of shipping ore, as estimated on page 25, by 25,000 tons,- possibly by much more. These figures look considerably ahead of present development.

BONANZA: known ore bodies are approaching exhaustion. No new shoots of the first importance have been opened. Prospects north of the shaft below the 300 foot level are hopeful. If the ore recently opened on the 400 north proves to be first rate shoot the outlook for the country north of the shaft below the 300 level will be good.

Present conditi ns do not admit of tonnage estimates even in the terms of possible ore, but they warrant vigorous development of that section on the 400 foot level, with a winz to explore the ore zone below it.

RESUME': On the basis of ,r. Jones' figures and my comments, a further production in the immediate future of 50,000 tons from all of the mines owned or operated by the company is a reasonable expectation. Conditions do not point to much increase in the ultimate total, above the figures given, except in the Bonanza-Estelle and New York-Kansas sections, where favorable results from development will greatly increase possible tonnage.

SMITH & ZIESIMER,

By Franklin Wheaton Smith

Bisbee, Arizona
April 15, 1918

S C H E D U L E

The following schedule is prepared from data in the possession of the Duquesne Company. It is believed to be an accurate description of all the mining claims owned or controlled by this company, and so far as the parties of the first part know there are no serious defects in title to the claims as scheduled. But the accuracy or completeness of the schedule and the titles to the mining claims are not warranted by parties of first part.

Patagonia Mining District, Santa Cruz County, Arizona

Name of Claim	Acres	Patent Number	Name of Claim	Acres	Patent Number
Golden Gate	17,572	440 27	Pluto	19,842)	
Evening Star	17,210	44926	Pluto No. 2	4,423)	
				)	44032
Alaska	10,497	02399	Duquesne	8,243)	
Meyer	17,701	45462	Virginia	.055)	
Turnpike	19.584	45465	Illinois	5.060	44676
Success	19.584		Pocahontas	20.660	40925
Pittsburgh	19.584		Noonday	20.661	06376
Rhino	19.584)		Grasshopper	9.777	44030
Big Cave	19.473)		Dubley Standard	20.244)	44028
Bisbee	19.808		Mary Jane	13.800)	
Bronco	19.612)		Klondyke	15,992)	44029
Copper Belt	18.650		Contact	11.636)	
Big Crop	20.161)		Montezuma	19.866)	
Big Crop No. 2	20.210)	44025	Annie	9.355	44021
Jumbo	20.063)		Lead King	20.661	44020
Keystone	5.030)		Smuggler	17.245	04691
Last Hope	10.683)		Iron Cow	11.445	07164
Chris Excers	10.511)		Laurette	10.299)	
Center	17.085)		Comet	8.310)	
Wedge	15.624)		Mohawk	5.116)	44026
Mansanita	1.905)		Indianapolis	13.990)	
Silver Jack	19.126		Little Emma	7.121)	
Doco	16.852	44959	Georgia	20.000	44956
New York	16.189	44954	Kansas	17.798	44954
Maine	17.465	44955	Texas	18.875	44952
California	12.230	44953	Great Republic	11.270	45464
Stewart	4.305	45466	Posey	20.660)	44950
Holland	20.065		Seven Oaks	)	
Amsterdam	2.439	45401	Estelle & Louise	15.790	40924
Little Joker	.738)		Bonanza	20.290	40923
Imperial	4.474	45460	Ohio No.2	20.662	44957
Divide	10.179		Arizona	16.250	44951
Slim Jim	15.992	44957	Empire	20.661	Lot 40A x
Silver Bill	5.000	lot 41x	Belmont	41.322	lot 38A x
San Antonio	10.331	lot 39 Ax	Indiana	16.680	45463

x- no record

The following unpatented claims are reported:

New York No.2	7.957	Elgin	3.502
Yosemite	0.348		

San Antonio mine
Santa Cruz Co.

PROSPECTUS

OF

SAN ANTONIO SILVER MINING COMPANY,

OF ARIZONA.

60,000 SHARES,—NOMINAL PAR, $50 EACH.

ISSUED FOR THE PURCHASE OF MINING CLAIMS AND PROPERTY IN ARIZONA.

Trustees.

SAM F. BUTTERWORTH, Esq., President of the Quicksilver Mining Company.

ANTHONY W. MORSE, Esq., of Morse & Co.

CHARLES LAMSON, Esq., of Charles H. Marshall & Co.

FREDERIC C. GEBHARD, Esq., of Schuchardt & Gebhard.

MATT ELLIS Esq., of Boston.

JAY CADY, Esq., of Schenectady.

President.

SAM F. BUTTERWORTH, Esq.

Treasurer.

CHARLES LAMSON, Esq.

Bankers.

Messrs. SCHUCHARDT & GEBHARD.

Attorneys.

Messrs. FOSTER & THOMSON.

Books of Subscription for the purchase of Shares of this Company, at $25 a share, are open at our office. $5 payable at the time of subscription, and the balance on May 2nd, 1864.

Attention is called to the Letter of Sam F. Butterworth, Esq., who has lately visited the property of the Company.

MORSE & CO.,

24 WILLIAM ST., NEW-YORK.

April 5th, 1864.

New-York, 4th April, 1864.

I visited this Mine in the month of December, 1863, accompanied by Guido Kustel, the most distinguished Metallurgist and Mining Engineer on the Pacific Coast, for many years the Manager of the Ophir Works, and author of a valuable Treatise on the "Processes of Silver and Gold Extraction," recently published in California. My opinion of the value and quality of this Mine is based on information derived from this gentleman, and on my own observations at the Mine.

The Mine is situated in Arizona, about three miles north of the northern boundary line of Sonora, and five miles distant from the celebrated Mowry Silver Mines; it is accessible at all seasons of the year, either by the way of Los Angelos, Libertad, or Guaymas. But little work has been done in developing the Mine; enough however, to discover the width and extent of the lode and determine the quality and value of the ores.

Where the shaft is sunk the vein is from four to six feet wide between lime-rock and garnet, running east and west, and exhibits galena or sulphuret of lead, carbonate of lead, zinc-blend, and copper-pyrites; the richest is the sulphuret of lead, assaying one hundred and fifty-five dollars per ton; the vein has been prospected about half a mile. Mr. KUSTEL, in a letter addressed to the San Francisco owners, says: "The San Antonio lode appears, where the shaft is sunk, a good wide vein of ore, easy to reduce by fire, and will pay on an average, according to the proportions of the different metals, from seventy to ninety dollars per ton." I believe there is an abundant supply of this ore, and that by an expenditure of a comparatively small sum of money, the Mine can be put in a condition to produce 40 tons per day; if this ore averages only $80 per ton, the gross product of the Mine would exceed $3,000 per day: the entire cost of mining and reducing a ton of this ore will not exceed twenty dollars.

On the premises, about 200 yards from the San Antonio lode, in a N. E. direction, there is a very rich copper lode, six feet wide; the ores which we obtained from this lode (considered a fair average) assayed 80 per cent. of copper and $76 in silver. Miners can be obtained in any number in the immediate vicinity, at about ten dollars per month.

The reduction works of the Mine are three miles distant from the Mine, consisting of a small engine and two furnaces. There is an abundance of wood and water for all purposes on the property.

I consider the San Antonio a very valuable Silver Mine; if worked with skill and energy, it will produce most satisfactory results.

SAM F. BUTTERWORTH.

BYRD INVESTMENT COMPANY
MAIN OFFICE
TUCSON, ARIZONA
P. O. BOX 5226
TELEPHONES 2032 AND 8529

August 31, 1946

Hon. Charles B. Henderson
Chairman of the Board
Reconstruction Finance Corporation
Washington, D. C.

Dear Sir:

My associates and I have been mining in the Southwest for many years. I think that such observations as I make here should be considered by the Administration and all federal agencies having the power to deal with the tragic shortage of strategic metal reserves in the United States.

I submit herewith a practical plan that will do much to solve what has come to be an acute, if not a desperate, situation.

The old prospectors found the outcrops of metal that were surface exposed. I believe any geologist will agree that there are vast quantities of ores, at minable depth, that have never been exposed. The mining industry should be encouraged to explore for and develop these ores. I believe it can be stated, as a truism, that the big companies, except in areas contiguous to ore bodies they are mining, will take little of the gambling hazard necessary to explore for blind veins and ore bodies. Almost every great mine in the country was discovered and/or initially developed by the prospector and small operator. The major companies, able to finance large-scale operations, mills, smelters and refineries, can produce ore at very much less cost than the small operator. The result is that, after mines are discovered and opened up by the small operators, they quickly fall into the hands of the large companies. I wish to illustrate, in our own experience here in Arizona, the statement that the major companies will seldom risk any substantial amount of capital to explore for hidden ore bodies or to undertake to develop new ore bodies in mines that have been worked out. In the caption "Application of Premiums at Duquesne" I have illustrated what I consider to be a weakness in the present application of the Premium Plan.

Duquesne Mines

The Duquesne properties in Southern Arizona, which had produced since the early 60's, were practically abandoned as being non-commercial before 1920, although it is estimated that the twenty or more mines of the Duquesne Group had produced more than $20,000,000 worth of lead, copper and zinc ores prior to that year. My brother and I bought the property in 1938, and opened up many of the old mines and found floors and faces of what we believed would develop into sizable tonnages of commercial ore. The American Smelting & Refining Company, Phelps-Dodge Corporation, and practically all the major companies operating in the West, when we presented the property to them, turned it down. We had no money for its development. We finally leased the property to Callahan Zinc-Lead Company which built a mill on the property just prior to the outbreak of the war. Since that time, and largely for the war effort, Duquesne has produced $2,700,000 in zinc, lead and copper concentrates, and it is still producing. We are now operating it ourselves, but without sufficient capital to provide milling facilities. We are mining the ore in a hand-to-mouth fashion. We are unable at present prices of metals, even with the premiums, to carry on extensive development work to open up new replacement ore bodies. Since all the mines, except one, are very shallow, few over 150 feet in depth, we are sure that an adequately financed program of development work would open up many sizable if not large mines on this property. The only mine on the property having any depth (635 feet) produced more than $3,500,000 when it was operated by George Westinghouse about thirty years ago. Zinc-lead ores that he could not then mine profitably are now processed by modern selective flotation. No big company operating in this section will take this property or help us to develop it because we do not have a large amount of blocked-out or proven ore. We have tried them all.

Application of Premiums at Duquesne. Our firm lost money during the war period, notwithstanding the fact that, with premiums, we produced essential metals from four mines other than Duquesne, all of which were abandoned prior to 1946. Then in 1946, when we were at last able to show a profit on Duquesne operation, the Committee threatened to reduce our premiums and in August 1946 did eliminate our C premium on zinc. No one is suggesting that the Government repay us for the losses that we incurred in the three preceding years, but now when we have an opportunity to get something like a compensating return for an extremely venturesome investment the Committee has advised us that we have been making too much money. Applying this theory, we would only be entitled to the premiums we have been receiving after we had demonstrated that the operations were unprofitable. It seems to me that this attitude of the Committee must be changed if the Premium Price Plan is to accomplish its purpose. When any operator takes the gamble that we took at Duquesne, when none of the big companies would touch it, he should not be subjected to the constant hazard of premium reduction or cancellation. The small operator must believe that he has a chance to make money when he engages risks such as we have undertaken.

Flux Mine

In 1939 we acquired a lease and option on the old **Flux**, after it had been examined and rejected by every major company operating in this section. We opened up new ore bodies on the Flux property and had in sight in a few months about 40,000 tons of zinc-lead ore. We were unable to finance a milling operation and had to practically give it away to a major company. The Flux has produced for the American Smelting & Refining Company, we believe, much more than $3,000,000 of lead-zinc concentrates since 1940.

Thus the Duquesne and Flux properties, rejected by the major companies, opened up by us, small miners who knew no better than to gamble, have produced some $6,000,000 of zinc, lead and copper concentrates since 1940 and largely for the war effort.

There may be some, but I do not know of any, of our really big producing mines, or any important virgin mining area in the United States, discovered by any one of the major companies.

Small Miners' Problems and Exeeeesive Costs.

The small miner always explores and gambles if he feels he has a ghost of a chance. The Premium Price Plan, tied as a rider to OPA legislation, was never adequate because of the provision which gave the premium authorities the option to cancel premiums at any time. Furthermore, it was extended only from year to year, and development work, sometimes requiring months and years to complete, could never be prosecuted with any confidence. Therefore, the hazards of exploration and cancellation made it practically impossible for the small operator to ever secure any adequate financing.

Besides the hazards of exploration and cancellation that have confronted the small operator, he is also faced with heavy costs in marketing his ores, some of which are as follows:

(a) A large percentage of newly opened up mining properties are inaccessible, involving heavy cost for road building and trucking to the railroad for shipment;

(b) Even though he can afford new equipment and can get delivery of it, he must use, initially, small equipment, usually gasoline powered, resulting in an abnormal fuel cost as compared with the power costs of the big companies;

(c) Lack of comfortable housing in remote areas makes him unable to secure the class of labor that is attracted to the big plants offering community conveniences;

(d) In Arizona, the small operator pays 13% of his payroll for insurance. The big companies, carrying part or all of their industrial insurance themselves, pay less than half the insurance costs of the small operator;

(e) Overhead costs are in great disproportion to those of the large companies;

(f) **Smelter and Transportation Costs:** Three per cent copper ore was an average grade shipped by hundreds of small operators during the war. They received from the smelter, not including premiums, after all deductions, including railroad transportation, smelting charges, and penalties, 3½c to 4½c per pound for their ore in the bin at the mine, against which they had to charge all their mining expenses, and I can support this factual statement with numerous Settlement Sheets from three smelters to whom we have shipped such ores. Without the premiums our shipments would have averaged less than $3.00 per ton in the bin at the mine, and less than 5c per pound for our copper.

Remedies

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All authorities having to do with premium payment matters should be reminded that, for illustration, when lead supplies are short, nothing is gained by increasing the premiums on lead and correspondingly reducing them on other strategic metals, because lead in the West is found almost invariably associated with zinc and/ or copper: The effect of such readjustment, in most cases, would be to cripple the operator and reduce the volume of all the metals he produces. There are few purely lead mines in the western states.

It may be argued that a non-cancellable premium extending over a period of several years will make it possible for some operators to make huge profits on their investment. There won't be many instances of this kind, and such a contingency I think should be made entirely possible as an incentive and an inducement to the venture-capital that must be enlisted in the exploration work so badly needed.

The RFC made hundreds or perhaps thousands of small loans (access loans, etc.) to small operators during the war. These loans were practically all losses because, in the first place, they were made with little or no consideration of the mining ability or experience of the borrower ;and, secondly, the objective which had to be reached could not, perhaps one time in a thousand, be financed with so small a sum as $5,000; in the third place, nothing but obsolete and worn-out machinery was available to the small operator, which fact in itself was enough to defeat in most cases the success of any $5,000 investment program; and, in the fourth place, war-time mining costs were excessive, and the Army took practically all the best labor. These small loan projects were, therefore, practically all doomed to failure before they were begun; for that reason they cannot be fairly regarded as a criterion on which to base RFC credit.

Underground rock work is expensive and requires months and, in many cases, years to complete; therefore, unless the premiums are made uncancellable, there is small incentive to take the risk involved in undertaking a program of extensive exploration work.

I think that those to whom this letter is presented should realize the fact that an extremely small percentage of so-called marginal miners and small operators have made any money, notwithstanding the premiums they were granted, since the beginning of World War II. As a matter of fact, with a rather extensive acquaintance with the mines and operators in Arizona and New Mexico, I do not know as many as ten men who are on the credit side of the ledger as a result of their mining operations since the Premium Price Plan was established. The fact is that most of them are broke. Most of them have not only lost their own money but lost money for those who furnished them financial help.

As one of the Senators wrote me recently, since the war is not ended officially, **the desiderata generally covered by what I recommend in this letter can be accomplished by presidential order or directive** until such time as appropriate legislation can be secured.

If the Premium Price Plan is revised, I believe it should not restrict its applicability to mines or properties as such, because an operator may suffer losses in a half dozen mining ventures before he succeeds in developing one that is profitable.

Mining is a precarious and hazardous business; the ratio of failures to successes involves overwhelming figures.

While Bureau of Mines authorities and other statisticians have given a limited number of years of life to the metal reserves now proven, these reserves were further sadly depleted during the recent war effort. The thoughtless citizen, in the face of these figures widely published, has answered that "We can import our strategic metals from foreign countries at much lower prices in many cases than the cost of producing these metals in our own country." This argument, it seems to me, was adequately negated during World War II. And there arises a further thought that—in another war, who is to know who our enemies may be or whether we shall have any allies that can supply our metal requirements. This seems to me to be the answer to the foolish argument that we can rely upon foreign sources for our defense metal requirements.

If it is desirable to produce more copper, zinc and lead, the incentives which I have proposed will put thousands of small miners to work, and I believe the results will astonish the statisticians who tell us that our reserves of strategic metals, further depleted by the war, will last only a few years.

Yours very truly,

J. H. BYRD
President

BYRD INVESTMENT COMPANY
MAIN OFFICE
TUCSON, ARIZONA
P. O. BOX 5226
TELEPHONES 2032 AND 8529

August 31, 1946

Hon. Charles B. Henderson
Chairman of the Board
Reconstruction Finance Corporation
Washington, D. C.

Dear Sir:

My associates and I have been mining in the Southwest for many years. I think that such observations as I make here should be considered by the Administration and all federal agencies having the prower to deal with the tragic shortage of strategic metal reserves in the United States.

I submit herewith a practical plan that will do much to solve what has come to be an acute, if not a desperate, situation.

The old prospectors found the outcrops of metal that were surface exposed. I believe any geologist will agree that there are vast quantities of ores, at minable depth, that have never been exposed. The mining industry should be encouraged to explore for and develop these ores. I believe it can be stated, as a truism, that the big companies, except in areas contiguous to ore bodies they are mining, will take little of the gambling hazard necessary to explore for blind veins and ore bodies. Almost every great mine in the country was discovered and/or initially developed by the prospector and small operator. The major companies, able to finance large-scale operations, mills, smelters and refineries, can produce ore at very much less cost than the small operator. The result is that, after mines are discovered and opened up by the small operators, they quickly fall into the hands of the large companies. I wish to illustrate, in our own experience here in Arizona, the statement that the major companies will seldom risk any substantial amount of capital to explore for hidden ore bodies or to undertake to develop new ore bodies in mines that have been worked out. In the caption "Application of Premiums at Duquesne" I have illustrated what I consider to be a weakness in the present application of the Premium Plan.

Duquesne Mines

The Duquesne properties in Southern Arizona, which had produced since the early 60's, were practically abandoned as being non-commercial before 1920, although it is estimated that the twenty or more mines of the Duquesne Group had produced more than $20,000,000 worth of lead, copper and zinc ores prior to that year. My brother and I bought the property in 1938, and opened up many of the old mines and found floors and faces of what we believed would develop into sizable tonnages of commercial ore. The American Smelting & Refining Company, Phelps-Dodge Corporation, and practically all the major companies operating in the West, when we presented the property to them, turned it down. We had no money for its development. We finally leased the property to Callahan Zinc-Lead Company which built a mill on the property just prior to the outbreak of the war. Since that time, and largely for the war effort, Duquesne has produced $2,700,000 in zinc, lead and copper concentrates, and it is still producing. We are now operating it ourselves, but without sufficient capital to provide milling facilities. We are mining the ore in a hand-to-mouth fashion. We are unable at present prices of metals, even with the premiums, to carry on extensive development work to open up new replacement ore bodies. Since all the mines, except one, are very shallow, few over 150 feet in depth, we are sure that an adequately financed program of development work would open up many sizable if not large mines on this property. The only mine on the property having any depth (635 feet) produced more than $3,500,000 when it was operated by George Westinghouse about thirty years ago. Zinc-lead ores that he could not then mine profitably are now processed by modern selective flotation. No big company operating in this section will take this property or help us to develop it because we do not have a large amount of blocked-out or proven ore. We have tried them all.

Application of Premiums at Duquesne. Our firm lost money during the war period, notwithstanding the fact that, with premiums, we produced essential metals from four mines other than Duquesne, all of which were abandoned prior to 1946. Then in 1946, when we were at last able to show a profit on Duquesne operation, the Committee threatened to reduce our premiums and in August 1946 did eliminate our C premium on zinc. No one is suggesting that the Government repaiy us for the losses that we incurred in the three preceding years, but now when we have an opportunity to get something like a compensating return for an extremely venturesome investment the Committee has advised us that we have been making too much money. Applying this theory, we would only be entitled to the premiums we have been receiving after we had demonstrated that the operations were unprofitable. It seems to me that this attitute of the Committee must be changed if the Premium Price Plan is to accomplish its purpose. When any operator takes the gamble that we took at Duquesne, when none of the big companies would touch it, he should not be subjected to the constant hazard of premium reduction or cancellation. The small operator must believe that he has a chance to make money when he engages risks such as we have undertaken.

Flux Mine

In 1939 we acquired a lease and option on the old **Flux,** after it had been examined and rejected by every major company operating in this section. We opened up new ore bodies on the Flux property and had in sight in a few months about 40,000 tons of zinc-lead ore. We were unable to finance a milling operation and had to practically give it away to a major company. The Flux has produced for the American Smelting & Refining Company, we believe, much more than $3,000,000 of lead-zinc concentrates since 1940.

Thus the Duquesne and Flux properties, rejected by the major companies, opened up by us, small miners who knew no better than to gamble, have produced some $6,000,000 of zinc, lead and copper concentrates since 1940 and largely for the war effort.

There may be some, but I do not know of any, of our really big producing mines, or any important virgin mining area in the United States, discovered by any one of the major companies.

Small Miners' Problems and Execcesive Costs.

The small miner always explores and gambles if he feels he has a ghost of a chance. The Premium Price Plan, tied as a rider to OPA legislation, was never adequate because of the provision which gave the premium authorities the option to cancel premiums at any time. Furthermore, it was extended only from year to year, and development work, sometimes requiring months and years to complete, could never be prosecuted with any confidence. Therefore, the hazards of exploration and cancellation made it practically impossible for the small operator to ever secure any adequate financing.

Besides the hazards of exploration and cancellation that have confronted the small operator, he is also faced with heavy costs in marketing his ores, some of which are as follows:

(a) A large percentage of newly opened up mining properties are inaccessible, involving heavy cost for road building and trucking to the railroad for shipment;

(b) Even though he can afford new equipment and can get delivery of it, he must use, initially, small equipment, usually gasoline powered, resulting in an abnormal fuel cost as compared with the power costs of the big companies;

(c) Lack of comfortable housing in remote areas makes him unable to secure the class of labor that is attracted to the big plants offering community conveniences;

(d) In Arizona, the small operator pays 13% of his payroll for insurance. The big companies, carrying part or all of their industrial insurance themselves, pay less than half the insurance costs of the small operator;

(e) Overhead costs are in great disproportion to those of the large companies;

(f) **Smelter and Transportation Costs:** Three per cent copper ore was an average grade shipped by hundreds of small operators during the war. They received from the smelter, not including premiums, after all deductions, including railroad transportation, smelting charges, and penalties, 3½c to 4½c per pound for their ore in the bin at the mine, against which they had to charge all their mining expenses, and I can support this factual statement with numerous Settlement Sheets from three smelters to whom we have shipped such ores. Without the premiums our shipments would have averaged less than $3.00 per ton in the bin at the mine, and less than 5c per pound for our copper.

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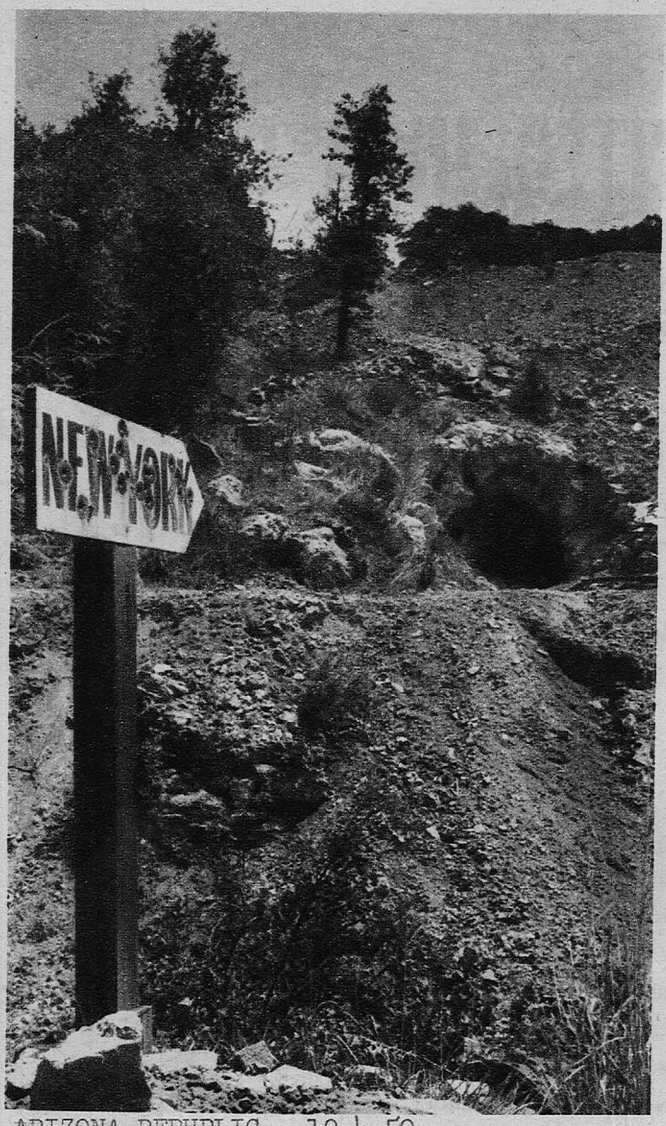
President



ARIZONA REPUBLIC - 10-4-59
ARIZONA DAYS & WAYS MAGAZINE SECTION
SANTA CRUZ COUNTY -

ARIZONA LANDMARK

New York Mine

IT'S A LONG WAY from New York, but that's what the sign says.

Actually the embattled sign marks the site of the old New York mine in the Patagonia Mountains. Roughly it is 2,600 miles from the bright lights of 42nd Street and Broadway.

Perhaps the mine's founder had a nostalgic moment when he gave it its name, and then again he just might have had illusions of grandeur.

Mining records place the workings in the Duquesne District about 15 miles East of Nogales and claim that a considerable tonnage of high-grade lead-silver ore was removed prior to 1915. Perched among the oak trees above beautiful San Rafael Valley, most of the workings have caved in.

MINING ACTIVITY continues to this day in the area, but from the looks of things the New York definitely has seen better days. Arizona is dotted with such decayed workings, yet who can say that their days are definitely over. With modern techniques and machinery, maybe the old New York will someday live up to the golden sound of its name.

NAME OF MINE: DUQUESNE
OWNER:

COUNTY: Santa Cruz
DISTRICT:
METALS: Pb, Zn

Date:	OPERATOR AND ADDRESS	Date:	MINE STATUS
11/44 4/45	A.R. Byrd, Congress Hotel Tucson (Box 5226) Chas. Russell, 218 N. 4th Ave., Tucson	11/44 4/45 10/46	Developing Shipping

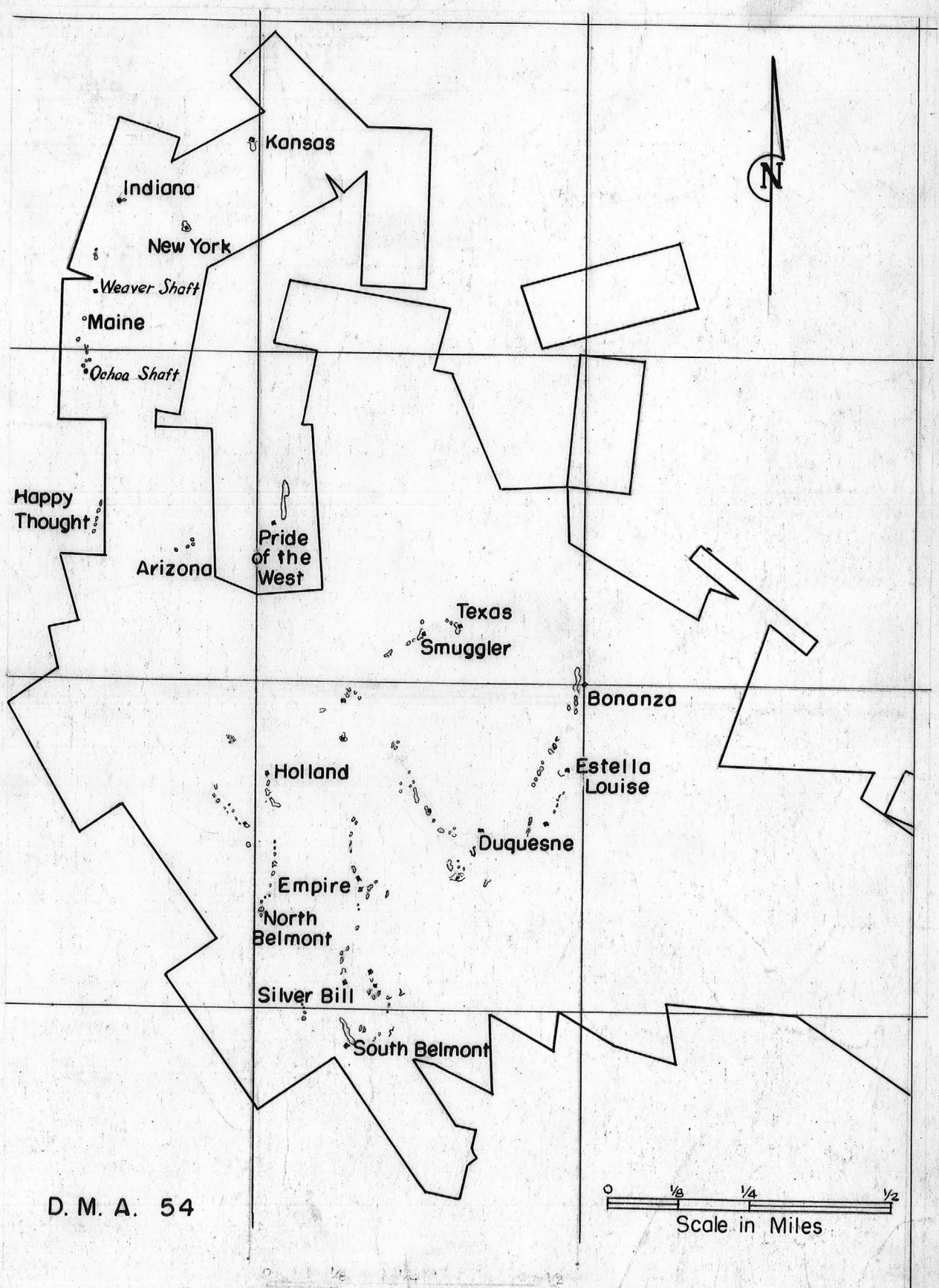


Fig. 2.- Property map, showing outline of property and position of mines, Duquesne Mining Company, Santa Cruz Co., Ariz.