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REPORT ON VERDUN MINE

The Verdun Mine is located in the Aravaipa Mining District, Graham County, Arizona, at an altitude of about 4,000 feet, and approximately $3\frac{1}{2}$ miles east of the town of Klondyke. The road leading to the mine from this point passes by easy grade up a rather broad canyon wash which becomes gradually narrower as one approaches the mine. Klondyke is the distributing point for the district, and is reached by an excellent gravel highway from Cork, a station of the S. P. R. R. a distance of 35 miles, where paved highway passes from Globe to Safford, Safford is 15 miles to the South. Klondyke may also be reached from Willcox from the south on good graded road.

HISTORY

The property consists of a contiguous group of 8 unpatented claims, which were originally located by Ted Quinn, about 1898, and developed by him for some time. The shaft was sunk for the purpose of a water supply for milling, etc.; prior to reaching the water, however, his funds were exhausted. He then secured the assistance of associates, and Aravaipa Leasing Company, was formed. It was then decided to mill the ore, so far developed by a dry process instead of going down to the water. A revolving tube roaster was installed, together with pneumatic concentrating units, etc. This process was not a success, and had to be abandoned.

GEOLOGY

The mine lies slightly south-west from the foot of the Santa Teresa mountains, the latter standing out in bold relief from the surrounding country, and is probably a part of a granite batholith that extends for a considerable distance east and south beyond the mine area. The country rock incorporating the fractures or veins of the mine is a highly altered igneous rock, which the U. S. Geological Survey, according to their published report on the district have tentatively considered to have been probably a fine-grained granite. Some exposures resemble a Monzonite porphyry, with considerable feldspar phenocrysts; others suggest a possible Rhyolitic porphyry, the ground being very siliceous. The weathered and leached condition of the outcrops renders it extremely difficult to establish their true identities. To the south from the mine, and farther down to the west, the country forms low rounding ridges toward the lower flat country below. Near the mine there is evidence of Gila conglomerate of Pliocene age, which may form part of the above mentioned ridges, although they are almost entirely overlain or covered with unconsolidated or loose gravels, and detritus of Pleistocene and recent age.

The movements that created the veins at the mine probably took place during the Tertiary period, and that they were intense is evidenced in the Silver Coin, or main vein in the Verdun group. Here the vein exposure near the shaft shows exceptional brecciation and shearing, extending 50 or more feet into the wall rock. This brecciated condition in the vein has undoubtedly been an aid to the mineralizing solutions in migrating along the vein, and have permitted them to mineralize the wall rocks for several feet away from the main fracture in places.

DEVELOPMENT

The Silver Coin Vein is a very strong one, and is traced for a distance of a mile, and its strike in an easterly direction. In general, the vein shows silicification, with considerable secondary quartz, along with the other minerals. An adit tunnel was driven approximately 50 feet below the collar of shaft on the vein, and connected with the shaft at about 75 feet from portal. The tunnel continues beyond shaft to practically the 200 foot point. Along the drift several short cross-cuts were driven, to cross-cut the vein, and the ore shows varying widths from 5 to 15 feet. At a point 165 feet from portal, an 8 x 8 foot winze was sunk 50 feet deep. This shows ore for practically the full width, the entire distance including the bottom where drifts were run each way about 10 feet. Samples from these faces show: Silver 1.2 ozs. Lead 12.4% and a 6 foot width across bottom ran: Silver 1.2 ozs. Lead 16.0%. At the shaft on tunnel level a sample was taken across

vein 13 feet wide, that gave: Gold .094 oz. Silver 1.0 Lead 13.5%. Immediately east of the shaft a small stope had been started and a sample of the high grade portion about 10 inches in width yielded Gold .045 ozs. Silver 3.2 Ozs. Lead 37.5%. Twenty-five feet east from the shaft is a stope that extends up to the surface. It is reported that 500 tons were extracted from it.

The shaft is vertical, with 4 x 4½ foot hoisting compartment, and 2½ x 4½ manway, extending to the 300 foot level, with a 20 foot sump. On the 100 foot level only a station is cut. The vein here shows a value of Silver 1.6 Ozs. Lead 12.4%. On the 200 foot level a short cross-cut was driven to vein where two short drifts were run, with values reported of: Silver 1.0 oz. Lead 19.2%. On the 300 foot level an 8 x 10' cross-cut intercepts the vein where drifts were run 25 feet each way. Assays show: Silver .7 oz. Lead 12.4%, on the west side, with Silver 1.0 oz Lead 10.9% on the east side. From the surface down to the bottom level, the ore body for the most part is leached and oxidized. Small amounts of galena are in evidence throughout, together with cerussite (lead carbonate) and occasional wulfenite (lead molybdate) but no iron pyrites were noted, although the slightly iron stain gangue suggests pre-existing pyrites that have been subsequently oxidized and dissipated in the gangue. To the west from the shaft both on the surface and lower levels Vanadium and Molybdenum ore appears to increase. On the surface the outcrop shows Molybdenum for a considerable distance indicating a possible large tonnage. It is stated that determinations have been made for Molybdenum and Vanadium, and that .94% of each was reported. This proves a valuable asset inasmuch as these metals command a high price on the market.

The oxidized zone apparently extends approximately to the 300 foot level, at which point appears to be a line of demarcation immediately above the drift bottom that shows a greater amount of sulphides than above, and as the water was encountered just below this level, it may be inferred to be the permanent water level. The water table however, may have stood at different levels from time to time, which would create an overlapping of oxide and sulphide zones, sometimes evidenced by finding considerable oxides intermixed with sulphides below the water level.

No copper appears in any part of this section, but on the surface along the strike of vein, beyond tunnel zone, is an exposure of copper bearing ore, that assays show to contain 4.5% copper, 2.0 ozs. Silver, and 6.8% Lead. Two other assays were taken across the bottom of the above open cut stope at a depth of 35 feet, 4 foot width gave Copper 2.85%, Silver 3.9 ozs. Lead 30.8%. On the surface 300 feet east of shaft another sample indicated Silver 5.95 ozs. Lead 35.4%. The copper being principally in the form of carbonates (malachites.)

In passing to the east roughly along strike of vein, about ½ mile is apparently a cross vein exposed in the gulch striking North 50 degrees west, with a dip of 55 degrees to the North, showing a strong mineralization. Continuing the same course, about ¾ mile from the tunnel portal, is another cross-vein striking North 65 degrees West, and dipping 58 degrees to the North. A short tunnel has exposed vein material about 5 feet wide, with an 8 inch streak in the center, carrying Gold .04 oz. Silver 1.6 oz. Lead 40.8%. The remainder of vein has superficial enrichment, that would average well for milling. Another vein parallels the Silver Coin vein, some 300 or 400 feet to the North, and is called the LaClede. A short incline shaft has exposed the vein about 4 feet in width, showing manganese oxide (pyrolusite) with other oxides, and carbonates including copper. It is said this vein runs very well in silver, and that the Verdun holdings cover this portion of the vein. A mile or so to the west on this vein is located the LaClede mine workings. A series of assays were seen by the writer from these workings indicating an average mill ore of 15.0 ozs. silver, and specimen samples running into several hundred ounces silver, all carrying some copper, but apparently no lead.

The amount of ore that can be considered actually blocked out would be a trapezoid 200 feet on the funnel level, and 50 feet on the 300 foot level and assuming an average width of 6 feet allowing 15 cubic feet to the ton would yield 15,000 tons. But from the apparent uniform condition of the vein material in the various openings it would not be unreasonable to assume that the ore extended the same distance on the 300 level as on the tunnel level, which would make a block containing 24,000 tons, plus 1,200 tons in the block east of shaft, and 1,000 tons west of the shaft, from tunnel level to surface, making a total of 26,200 tons besides the copper ore exposed on the surface which is not taken into account.

The shaft is equipped with an 18 h. p. gasoline hoist, with 500 feet of 3/4 inch steel cable, all in excellent condition. A 50 ton ore bin, with an 8 x 18 steel sectional jaw crusher, mounted over it, and powered with a gasoline engine. Ore cars, hoisting buckets and water tanks together with a 50 ton capacity ball mill and an extra 10 or 15 h. p. gasoline engine completes the list of equipment that is in good condition and can be used on new operations.

RECOMMENDATIONS

The shaft should be sunk 100 feet deeper, or at least deep enough to insure necessary water for immediate milling purposes, etc. Then the drifts on the lower levels should be extended in order that adequate stoping facilities may be secured while development work proceeds to increase future ore reserves. The latter to include further shaft sinking to investigate the ore below water level. The outlying veins could be taken care of in the future when the more pressing work had been completed.

Before the installation of a mill is undertaken an exhaustive and complete mill test should be made on generous average ore samples, that will leave no doubt as to the maximum recovery to be expected, and which can be accomplished. In connection with this the fact must not be overlooked that the character of the ore below water level will be different to some extent from that above, a feature that should be given due attention in making the test.

The ore bin and crusher together with the ball mill and perhaps the extra gas engine can be utilized in a 50 ton capacity mill design, all of which would aid considerably in the initial cost of plant.

A preliminary laboratory mill test has been made indicating a concentrating ratio of 6 to 1. Assuming this ratio and taking the average lead value conservatively at 12%, an example will illustrate what may be reasonably expected from the lead content, disregarding the other values. Eight tons of concentrates should be produced from a 50 ton per day operation, and at the present price of lead \$4.00 per 100 lbs. 1 ton of concentrates would equal \$57.60, and 8 tons \$460.80 gross per day. From this is deducted mining and milling at \$6.00 per ton of ore, or \$300.00, leaving \$160.80 per day for operations. Less 10 cents per ton mile or \$3.50 per ton concentrates truck haul, plus \$3.60 railroad to smelter, on this class of ore, plus \$2.50 per ton smelting charge, equals \$76.180 per day on concentrates, leaving a net profit of \$84.00 per day. The silver, gold and copper will, of course, add very materially to the total recovery value. As to Molybdenum and Vanadium, these metals must be separated before they can be marketed. The smelters do not as a rule pay for included rare metals in ore, or concentrates. A provision in the mill would be necessary to make this separation.

As soon as the mill successfully operates, attention should be given to the LaCledé vein, previously mentioned, because of its higher silver content. A portion of this ore added to the general mill run would help to raise the apparent low ratio of silver to lead in the silver Coin vein, and insure a higher grade concentrate.

In conclusion there is no reason why this property should not develop into a paying investment, and become eventually one of the larger mines of the State. The problem of mining the ore is very simple, and can be done very cheaply. The milling problem is more intricate, especially if the rare metals are separated. However, if these metals persist in economic amounts there is no doubt of its being satisfactorily solved to enjoy the added revenue these metals would bring. Also, if the anticipated improvement in silver and lead takes place it would raise the earning capacity considerably. The mine is located at an altitude that makes climatic conditions ideal for all year operations. It is to be deplored that this property has remained inactive so long, with the possibilities it holds.

The accompanying map shows substantially the present conditions of the mine workings, and the cross section of vein is more or less an ideal section. The limited time available at the property prevented more accurate measurements, as well as complete sampling in all instances. A few samples were taken however, to check previously taken samples and some of the latter used in addition to those taken. The photographic views will serve to give an idea of the general surface conditions.

Yours very truly
E. H. Lundquist, M. E. (Signed)
May 24, 1934

Immediately after submitting this report, my attention was called to a very enlightening letter that has been received from Mr. Karl S. Reinhardt, Chemical Engineer, of New York City. He has made analysis on this ore for the rare metals Molybdenum and Vanadium, placing great stress on the value of these metals, amounting to over \$2,000,000 in gross value for the Vanadium, not taking the Molybdenum into account. In view of this, I would advise that the work be concentrated on the extraction of this, as well as the other values.

Yours very truly,
E. H. Lundquist, M. E.

EAGLE-PICHER MINING & SMELTING COMPANY

OFFICE OF
WESTERN OPERATIONS

GENERAL OFFICE
214 WEST THIRD STREET
JOPLIN, MISSOURI

73 NORTH COURT STREET
P. O. BOX 1268

MONTANA MINE
RUBY, ARIZONA

TUCSON, ARIZONA

November 10, 1942

Mr. G.M. Colvocoresses,
1102 Luhrs Tower,
Phoenix, Arizona.

A 10/18 '42

Dear Mr. Colvocoresses:

I have your letter of the 4th, enclosing the report on the Verdun mine by Mr. Lundquist. We have no information in our files on the Verdun mine, nor do I remember of ever hearing it spoken of in connection with the Arivaipa district. I have been to the Grand Reef and to the Arivaipa Mines, so am rather surprised not to have heard of this if it represents as much of a mine as Mr. Lundquist reports. To the south of the Grand Reef I heard of a property or two that carried wulfenite along with the lead carbonates, and it may be that the Verdun was one of them, but I did not see any of them, nor have I read any reports on them. They were spoken of more as likely prospects that had failed to pay as small shippers.

I am certainly surprised at the pass you have come to in the Blue Bell and De Soto Mines. It makes a fellow wonder at some of the legal procedures that we can come up against these days.

We are still being able to carry on our experimental work at Harqua Hala, but as you may realize things are getting tighter all the time, so naturally we hardly know what to expect from week to week. Our results are continuing satisfactory, if operating conditions are not. I am carrying on about the same routine as when last we talked, and while I have nothing new in mind, would like the pleasure of having a talk with you the first time we can get together.

With best wishes,

Yours sincerely,

E.W. Morton

E.D. Morton-
OC

AMERICAN SMELTING AND REFINING COMPANY

SOUTHWESTERN ORE PURCHASING DEPARTMENT

810 VALLEY BANK BUILDING

P. O. BOX 2229

TUCSON, ARIZONA

November 17, 1942

BRENT N. RICKARD
MANAGER

A 10/18/42

Mr. George M. Colvocoresses
1102 Luhrs Tower
Phoenix, Arizona

VERDUN MINE, ARAVAIPA DISTRICT
GRAHAM COUNTY, ARIZONA

Dear Mr. Colvocoresses:

The subject property has been referred to our Mining Department on several occasions and rejected as not meeting our requirements.

The earlier records refer to this property as the Silver Coin Group, then owned by James T. Quinn of Phoenix. In a report on the various properties in the Aravaipa District made by one of our engineers in the latter part of 1923 I find the following in reference to Silver Coin Group:

"The Silver Coin Group of 6 unpatented claims, belonging to T. Quinn, is located about 3 miles east of Klondyke Post Office, 3 miles S. of the Grand Reef Mine, and about 66 miles from Willcox.

"The vein in andesite averages about 5 feet wide and has a strike of N 60° E and a very slight dip to the North. The ore is lead carbonate, wulfenite, and pockets and lenses of galena. Considerable ore has been stoped by leasers, between the 75-foot level and the surface, from this ore the high grade galena has been sorted out and shipped, and the low grade carbonates of which there is probably 2500 tons left on the dump which is said to run 6 to 10 oz. silver and 15 to 20% lead. The owner Mr. Quinn is now erecting a 25-ton oil burning, kiln type smelter to treat this ore.

"The development work consists of a 300 foot vertical shaft connecting with an adit drift at the 75 foot level. This adit is 230 feet long and near the end a winze 50 feet deep has been sunk. A stope from this adit level to the surface has produced 5 cars of shipping ore, at the bottom of the shaft a drift east and west on the vein for a distance of 20 feet each way, both faces show low grade carbonate ore. A crosscut N 25 feet to get under the bottom of the creek for water has also been driven from the bottom of the shaft. No crosscutting or drifting has been between the 75 foot level and the bottom.

done

Nov. 17, 1942

"The property is a good looking prospect but needs developing. There is no ore blocked and the average grade of the ore as mined is too low to ship under present conditions."

In July 1929 Mr. J.A. Nevin of Phoenix brought to our attention the Silver Coin Mine owned by Verdun Company, Inc. In April 1940, while visiting other mines in the Aravaipa District, Mr. F.M. Stephens reported this property under lease and bond to a closed corporation of which Edna Montgomerie, President, L.W. Wixon, Secretary-Treasurer; that Dan Lewis was interested to the extent that his sister owned a large part of the mine. The Denver Equipment Company had recently made tests on the ore and Mr. Lewis, with whom Mr. Stephens talked, stated they expected shortly to erect a 75 to 100-ton mill. Vein is reported as 7 to 20 feet wide, average assays of samples:

<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Mo</u>
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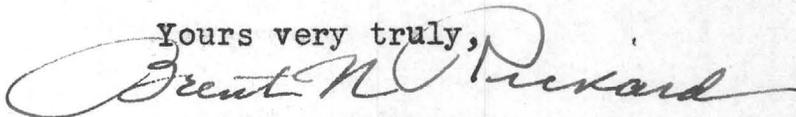
Tr.	3.0	8-10%	1.8% (wulfenite)
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Mr. Stephens reported that the operators had retimbered the 300-foot shaft and were ready to start mining as soon as the mill was erected. He did not examine the mine.

In June 1941 Mr. Paul Jones, Jr., 703 West North Street, Brazil, Indiana, referred the property to our New York Office, as well as to Federal Mining and Smelting Company, Wallace, Idaho. At that time we were supplied with report on the property by E.H. Lundquist, dated May 24, 1934. Mr. Stephens then examined the surface and adit tunnel on the 75-foot level; the shaft was filled with water below that point. He also had another talk with Dan Lewis. As a result of his investigations Mr. Stephens came to the conclusion that the oxidized ore is generally too low grade to be commercial and the possibility of developing sulphide ore of better grade at depth is remote.

Apparently this mine has possibilities in a small way if suitable metallurgy of the oxidized lead ore can be worked out. I understand that the metallurgical problem is much like that at the Grand Reef Mine in the same district.

Yours very truly,



BRENT N. RICKARD

November 19, 1942

Mr. E. D. Morton
Eagle-Fischer Mining Company
P. O. Box 1268
Tucson, Arizona

Re: Verdun Mine

Dear Morton:

Thank you very much for your letter of the 10th on the above subject and information contained therein. From another source I have been able to secure more details and apparently the Verdun is similar in character to the Grand Reef and contains a limited quantity of lead carbonates and some molybdenite. I rather doubt if my friends will care to do anything further with this property but there is a chance that some Government assistance might be obtained while war conditions prevail and if so I may have an opportunity to discuss the matter with you further and also to have a visit with you in connection with other things of mutual interest.

I am glad to note that you are continuing your work at the Harqua Hala which has certainly been to the advantage of the owners of that property and I am glad that your metallurgical results have been favorable. Perhaps this work may prove to be well worth while at some future date and when gold mining is once again in favor.

If I could have an opportunity to tell you the whole story of the Blue Bell and De Soto I am sure that you would be even more astounded at the workings of legal procedures. The long and short of the matter is that the mines are absolutely idle and seem likely to remain so for an indefinite period of time unless the War Production Board will take the bull by the horns and accept the responsibility for putting them to work. The party who won the right to redeem them and thereby deprived us of the title has taken no action whatever toward such redemption but has merely been trying to shake us down and seems surprised that we have not accepted his kind offer to pay him \$25,000 advance cash royalty for a lease on a property which he does not and may never actually acquire. Meanwhile the Federal Government is standing by with claims for some ten thousand dollars of back taxes to slap on the company as soon as it is revived and other alleged stockholders are trying to intervent in the proceedings and making matters worse and worse all the time. Perhaps some solution will eventually be found but meanwhile it is a headache with a capital H.

Best personal regards.

November 19, 1942

Mr. Brent N. Rickard, Manager
American Smelting and Refining Company
P. O. Box 2229
Tucson, Arizona

Re: Verdun Mine *file*

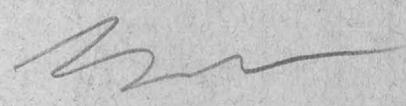
Dear Rickard:

Thank you very much for your long and interesting letter of the 17th on the above subject. The information which you have given is exactly what I hoped to receive and I note particularly your conclusion that the mine has possibilities of being operated in a small way if the metallurgy of the oxidized material can be worked out. I have it in mind that the Grand Reef Mine, which you mention as having contained a similar character of ore has not been profitably operated to date but in that I may be mistaken.

If my friends should decide to follow the matter up any further I will probably have an opportunity to talk to you again about this property and just possibly it may become a small producer during this war period when lead and molybdenum are both in such great demand.

Hoping that I may see you before long, and with best personal regards, I remain

Yours sincerely,



GMC:cg

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of gas by of Home

209
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200 - 200 'hunting up
 210 - 18 - 8.69
 220 - 15 - 4.90
 230 - 10 - 2.45
 240 - 14 - 0.47
 250 - 12 - 0.77
 260 - 20 - 4.31
 270

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 1072

7 10 6 2
 to W.G.M.
 to J.S.
 to J.G.
 to Home
 to half of K.G.T.
 to Carl

100' vent

18' level - hunk steps

Main payment Jan

	A.	B.	C.
Stacy	80.00		
Cop. Paid	66.30		
Per 19th	80.00	20.00	40.00
C. Club	15.		
Rel. 2nd	15		
Jones Co.	25		
T. Bollen	50		
John Ch.		10.00	
Walt Sam		3.00	
to do.			177.00
my job.	27.50		
Can. Investor	20		30.00
C&C		50.	
	312.50	149.30	247.00
Pr	147.00		
	165.50		

165.50
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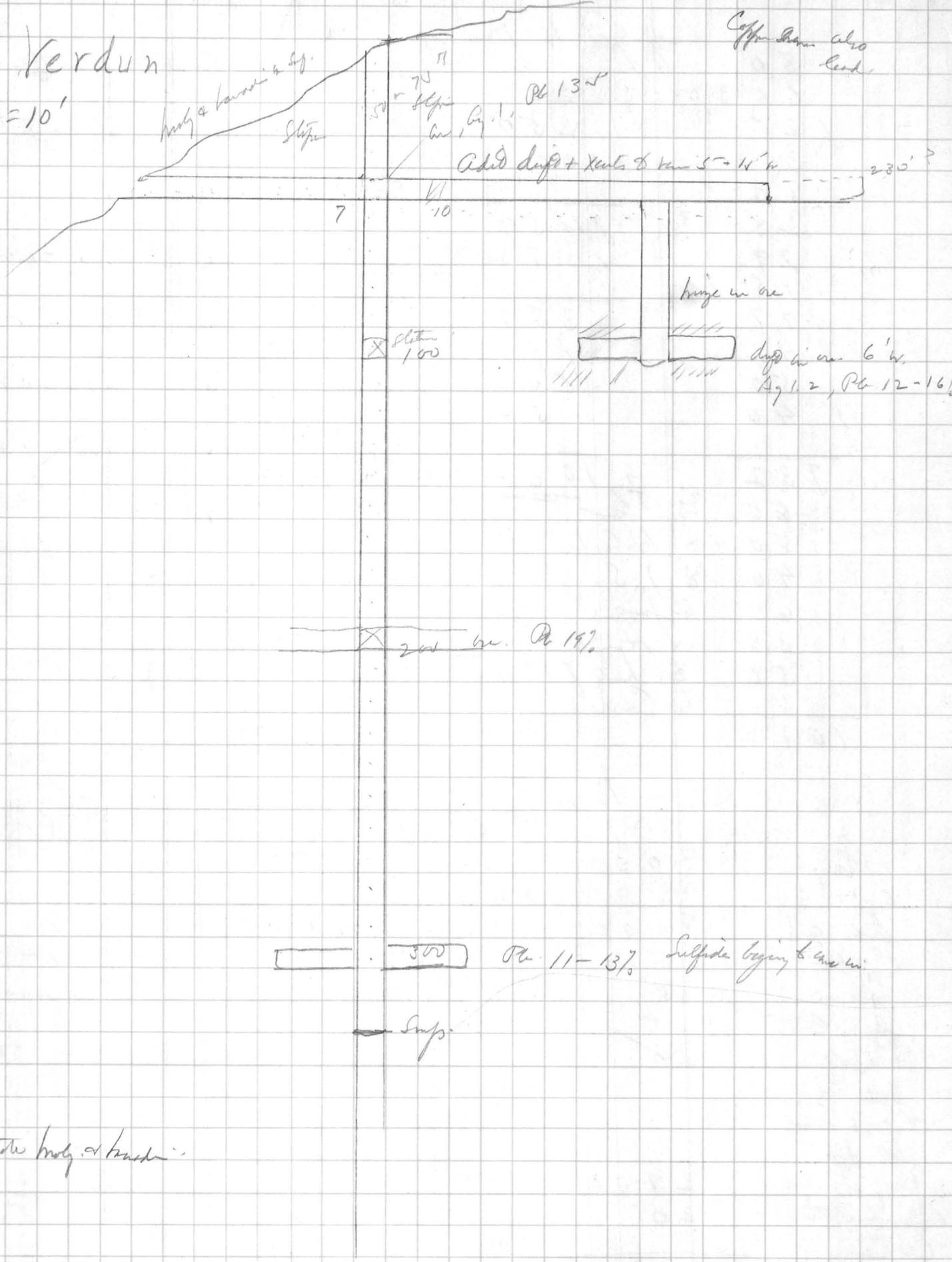
 550
 315

 245

Verdun

1 sq = 10'

Copper also lead



hinge & lower + sq.
slope

70
50
Ag 1
Pl 13

Added depth + Xents to base 5-11''
230''

7

10

hinge in ore

X slit 100

dip in ore 6''
Ag 1, 2, Pl 12-16

X 200 ore. Pl 19

300 Pl. 11-13 Sulfida begin to come in

Imp.

note body of track

REPORT ON THE VERDUN MINE

The Verdun Mine is located in the Aravaipa Mining District, Graham County, Arizona, at an altitude of about 4,000', and approximately $3\frac{1}{2}$ miles east from the town of Klondike. The road leading to the mine from this point passes by easy grade up a rather broad canyon wash which becomes gradually narrower as one approaches by an excellent gravel highway from Cork, a station on the S. P. R. R., a distance of 35 miles where paved highway passes from Globe to Safford. Safford is 15 miles to the south. Klondike may also be reached from Willcox from the south on good graded road.

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GEOLOGY The mine lies slightly southwest from the foot of the Santa Teresa Mountains, the latter standing out in bold relief from the surrounding country. It is probably a part of a granite batholith that extends for a considerable distance east and south beyond the mine area. The country rock incorporating the fractures or veins of the mine is a highly altered igneous rock, which the U. S. Geological Survey, according to their published report on this district, have tentatively considered to have been possibly a fine grained granite. Some exposures resemble a Monzonite porphyry with considerable feldspar phenocrysts; others suggest a possible Rhyolitic porphyry, the ground being very siliceous. The weathered and leached condition of the outcrop renders it extremely difficult to establish their true identities. To the south from the mine and farther down to the west, the country forms low rounding ridges toward the lower flat country below. Near the mine there is evidence of Gila conglomerate of Pliocene age, which may form part of the above mentioned ridges, although they are almost entirely overlain or covered with unconsolidated or loose gravels and detritus of Pleistocene and recent age.

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From the surface down to the bottom level the ore body is for the most part leached and oxidized, small amounts of galena are in evidence throughout, together with cerrusite (lead carbonate) and occasional wulfenite (lead molybdate), but no iron pyrites were noted, although the slightly iron stained gangue suggests pre-existing pyrites that have been subsequently oxidized. To the west from the shaft both on the surface and lower levels the vanadium and Molybdenum appears to increase. On the surface the outcrop shows Molybdenum for a considerable distance indicating a possible large tonnage, and 0.9% of each was reported.

The oxidized zone apparently extends approximately to the 300' level at which point appears to be a line of demarcation that shows a greater amount of sulphides than above, and as the water was encountered just below this level, it may be inferred to be the permanent water level.

No copper appears in any part of this section, but on the surface east along strike of vein beyond tunnel zone is an exposure of copper bearing ore that assays 4.5% copper, 2.0 oz. silver, 6.8% lead. There are still on the dump at tunnel level, several tons apparently mined from here; two other assays were taken across the bottom of the above open-cut stope at a depth of 35', 4' width gave copper 2.85%, silver

0.9 oz, lead 16.0%; 3' width gave copper 2.0%, silver 3.9 oz, lead 30.8%. On the surface 300' east of shaft another sample indicated silver 5.95 oz., lead 35.4%. The copper is principally in the form of carbonates (malachite), no chalcopryrite or other copper sulphides were noted.

In passing to the east roughly along strike of vein about one-half mile there is apparently a X-cut vein exposed in the gulch, striking north 50 west, with a dip of 55 to the north, showing strong mineralization. Continuing the same course about 3/4 of a mile from the tunnel portal is another cross vein, striking north 65 west, and dipping 58 to north; a short tunnel has exposed vein material about 5' wide, with an 8" streak in the center carrying gold 0.04 oz., silver 1.6 oz. lead 40.8%. The remainder of vein has superficial enrichment that would average well for milling.

At another vein which parallels the Silver Coin vein some 300' or 400' to the north, called the Laclede, a short incline shaft has exposed the vein about 2' in width, showing manganese oxide with other oxides and carbonates, including copper. It is said this vein runs very well in silver and that the Verdun holdings cover this portion of the vein. A mile or so to the west on this vein is located the Laclede mine workings; a series of assays were seen by the writer from these workings indicating an average mill ore of 15.0 oz., silver and specimen samples running into several hundred ozs silver all carrying some copper, but apparently no lead.

The amount of ore that can be considered actually blocked out would be a trapezoid 200' on the tunnel level, and 50' on the 300' level, and assuming an average width of 6', allowing 15 cu. ft. to the ton, would yield 15,000 tons. But from the apparent uniform condition of the vein material in the various openings it would not be unreasonable to assume that the ore extended the same distance on the 300' level as on tunnel level, which would make a block containing 24,000 plus 1,200 in the block east of the shaft, and 1,000 tons west of shaft from tunnel level to surface, making a total of 26,200 tons, besides the copper ore exposed on the surface which is not taken into account.

The shaft is equipped with an 18 H. P. gasoline hoist with 500' of $\frac{1}{4}$ " steel cable, a 50 ton ore bin with an 8" x 18" steel section jaw crusher mounted over it, powered with a gasoline engine, ore cars, hoisting bucket, and water tanks.

A laboratory mill test has been made indicating a concentrating ratio of 6 into 1; assuming this ratio and taking the average lead value conservatively at 12%, would give a high grade concentrate. Attention should be given to the Laclede vein previously mentioned, because of its higher silver content, a portion of this ore added to the general mill run would help to raise the apparent low ratio of silver to lead in the Silver Coin vein and would insure a higher grade concentrate.

In conclusion, there is no reason why this property should not develop into a paying investment, and eventually become one of the

larger mines of the state. The problem of mining the ore is very simple and can be very cheaply done. The milling problem is more intricate, especially if the rare metals are separated. However, if these metals persist in economic amounts, there is no doubt that it can be satisfactorily solved. Also, if the anticipated improvement in silver and lead prices take place, it would raise the earning capacity considerably. The mine is located at an altitude that makes climatic conditions here ideal for all year operations.

The accompanying map shows substantially the present condition of the mine workings, and the cross section to vein is more or less an ideal section. The limited time available at the property prevented more accurate measurements as well as complete sampling in all instances. A few were taken however, to check previously taken samples, and some of the latter were used in addition to those taken. The photographic views will serve to give an idea of the general surface conditions.

E. H. Lundquist M. E.

May 24, 1934

November 4, 1942

Mr. E. D. Morton
Eagle-Fischer Mining Company
P. O. Box 1268
Tucson, Arizona

Re: Verdun Mine

file

Dear Morton:

I am enclosing a copy of a report which was given to me yesterday on the Verdun Mine in the Aravaipa Mining District.

Since I know something of the engineer who made this report I do not consider that the statements carry much weight but it does appear possible that this property could produce some lead under present conditions and might therefore be of value to the present war effort.

In all probability you already have some information on this property from your own engineers and I hardly assume that because of its limited possibilities it would be of any particular interest to your company but if such is the case the enclosed report may be of interest and anyway you will perhaps want to put it in your files.

If by chance you should have additional information on the Verdun which indicated that it might become a small producer of merit, I have some clients who are looking for something of this nature and who would very likely be disposed to take over the mine on a lease and then endeavor to secure a Government loan for its further development and operation and any information that you may be able to give me will be appreciated.

about

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Mr. E. D. Morton - 2

The Government is making it very difficult to operate any kind of mine with advantage and the situation appears to grow worse from month to month although I was certainly pleased with the general results of yesterday's election but hardly imagine that this will have any beneficial effect for sometime to come.

With personal regards and hoping that you will drop in on me when you next pass through Phoenix or that I may have an opportunity to see you in Tucson, I remain

Yours very truly,

GMC:CG

Enc: Report on Verdun Mine

VERDUN MINE

November 3, 1942

Note report by Lundquist who is not reliable.

Owned by John De Camp
c/o Frank Williams
23 West Monroe Street
Phoenix, Arizona

and Roscoe Hurst claims to have some financial interest in the property. Title is supposed to be good and has been cleared by Neil Clark.

De Camp has offered to lease and sell for \$60,000 with first payment of \$3,000 due in nine months from date of lease and balance to be paid in full within five years from that date.

Some shipments were made but apparently owner has no record of these nor any assay maps or reports other than that of Lundquist.

Hurst thinks that the average grade of the developed ore is about \$1.00 in gold, \$1.00 in silver and 12% lead which would make gross value of ore \$23.20 per ton with lead at the bonus price of 9.25¢, but ore would have to be concentrated and if only 15,000 tons is now blocked out a much larger tonnage would have to be developed before a mill is justified.

Suggest writing to Morton and Rickard and if they should send any favorable data might take it up with H. H. Brown and others.

November 4, 1942

Mr. Brent N. Rickard
American Smelting & Refining Company
Valley Bank Building
Tucson, Arizona

Re: Verdun Mine

File

Dear Rickard:

A friend of mine who claimed to have some financial interest in the Verdun Mine near Aravapais has called on me and asked me to investigate this property with a view to trying to make arrangements to have it put in operation.

The report on the mine which he left with me is not at all convincing and I do not want to go any further if the mine is worthless or unpromising.

I presume that your company has doubtless examined this mine or at least that you know something about it and evidently it has not been of interest to you or other large companies, but if production should start it appears to me that the ore or concentrates would be shipped to your smelter in El Paso where I presume you would be glad to receive an additional tonnage of lead bearing material.

Any information that you can give me concerning this mine would be appreciated and incidently please don't forget to look in on me the next time that you are in Phoenix. I will do the same by you when I come to Tucson.

Best personal regards.

Sincerely,

[Handwritten signature]

CNC:CG

looking & I particularly mention this point
 because I have been informed that when another
 engineer attempted to examine the mine some
 time ago he found that the ~~shaft~~ had full
 presence of water in the shaft made it
 impossible for him to go down much below the
 adit level, ^{and} altho you have told me that slide
 is not now the case it is ^{obvious} that
 water, and ground, & dangerous ladders
 might give me to confine my inspection to other
 portions of the mine

G. V. T.

Furbush file

September 29th, 1939

Mr. Robert L. Frost
Box 185
Altadena, California

Dear Frost:

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Probably it will be best for you to come by train to Phoenix as suggested and then go by bus to Prescott. I would gladly drive you up to that city but so far as I can tell there is nothing which will call me there until around the 15th of October.

While you are in Phoenix we can have a talk with Clark and explain the situation relative to the Diamond Joe and in all probability he will be glad to hold the matter open for your consideration unless he has some other prospect in view or unless Mr. Wanvig delays too long in reaching a decision.

Personal regards.

Sincerely,

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A 9/26.
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mine file ✓

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Told him was not interested in any promotion but would be glad to talk to the lady.

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re Grand Reef.

Frederick Place File

July 10th, 1939

Mr. R. O. Egeland, Manager
Mine & Smelter Equipment Company
110 South Third Avenue P.O. Box 788
Phoenix, Arizona

Dear Mr. Egeland:

I returned to Phoenix this morning and find your letter of July 6th with which you sent check for \$20.00 in full payment for the Denver pan. Many thanks.

There have evidently been several misunderstandings in connection with this transaction for I should not have allowed it to be taken from Prescott in the first instance excepting that I definitely understood that you had a prompt cash sale for the pan which could be closed without further delay. I told you at the time that the crank handle was broken but otherwise I believe that it was in good condition and it was operating very satisfactorily up until we closed down the sampling of the placer.

This entire transaction, with the exception of a very small amount to cover expenses, was not a personal matter with me for the price which you have paid for the pan went to the party for whom I sampled the placer and he has been pressing me continuously to hurry up this payment in order to clean up some small accounts that were left outstanding when the work was completed.

I fully appreciate that all of us are frequently short of cash during these times and I was sorry to keep after you for payment of the small amount due but I had given the party whom I was representing pretty definite advice that payment for this pan would be made and it was very embarrassing to keep him waiting so long. I well realize that I would have been taking a chance by leaving the pan in Prescott but I did not understand that I was taking any chance when you had it brought down to Phoenix and therefore was naturally disappointed at the delay in completing the transaction.

Yours very truly,

Frederick

Roscoe Hurd

Phoenix -

Re Verdeens Mine.

I have agreed to examine & report ^{for you & your associates} on the
Verdeens mine in the Aravaipa Mining District,
Graham County, Arizona & according to present
plans will leave for the mine on the 31st
with the understanding that Dean Jones
is to meet me at Willcox shortly after noon on
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My fee for this work including services &
expenses is \$250.00 of which \$125.00 is
to be paid in advance & the balance in the

Forbach Placer file

July 21st, 1939

Mr. Robert L. Frost
1731 East Mendocino Street
Altadena, California

Dear Frost:

About a week ago Forbach called me on the long distance telephone from Superior and said that he was anxious to secure a copy of the claim map of his property. I told him that any of the data which I had prepared regarding the Forbach Placer could only be given to him with your permission but that I believed that I had in my office a blueprint of the old claim map which had been taken from his camp and that he was welcome to this if it would be of any use to him. He promised to call and get the map on the following day but did not show up so it is still waiting for him here.

Forbach told me that he had actually leased his claims to F. J. Schimmer, as mentioned in the news item which accompanied my letter to you of June 26th and that Schimmer had already put a considerable amount of equipment on the property and was preparing to start his testing work. When I expressed some surprise at this statement Forbach went on to say that he considered that you had forfeited your prior lease and that he had served you (if I understood him correctly) with legal notice of forfeiture and cancellation of the said agreement.

I was very sorry to hear this news and while of course I did not argue the matter with Forbach since it is none of my business, I did tell him that I thought that you were under the impression that your lease was still in full force and effect and that I sincerely hoped there would be no complications or difficulties in that regard.

I presume that you have been corresponding directly with Forbach on this matter and doubtless will be guided by the actual situation in any further negotiations that you may carry on with Wanvig or others and if the lease is actually cancelled, I suppose it is unlikely that I shall hear from Wanvig or be able to be of any further assistance to you in financing operations on this property.

I had earnestly hoped that you might be able to work out some plan that would be to your advantage and perhaps Forbach may be altogether mistaken in respect to your legal rights and present status of the lease agreement.

With personal regards.

Yours very truly,

J. M. ...

(2)

form of a 60 day promissory note for a like amount signed by Robert Armstrong & to be given him after I have completed & presented my report in duplicate. If I can honestly recommend this mine as suitable for an R. F. C. loan I will also prepare the necessary technical data & accompany the app. to be embodied in the application for such a loan without additional expense to you.

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8/3/39

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Sincerely,


Robert L. Frost.

Schedule of trips:

Wed. 3/27

Phox & Miller 6 - 12

Miller & ... 1.00 - 5.00

at stay at ~~Miller~~ Kladys & Camp...

Th: 1st To ...

Wed 5?

Mon - 2nd. Red Ph.

W. S. G. S. Bulletin

763

See of ... & Stanley ...

Trip to Ardum mine via Milcox

Plum & Safford	184	$\frac{35}{2}$ 245
Safford & Milcox	<u>55</u>	
	239	by <u>7 hrs.</u>

4 to Plum 5, A hrs.

to by Truss	125	
	53	218
to Brown		105
Brown to Hays	17	203
Hays to Carter	11	<u>526 hrs.</u>
Carter to mine	12	
	<u>218</u>	by <u>6 hrs.</u>

4 to Plum 6, A hrs.

Date	Milcox to Klondyke	20
		24
Ret. via Feb Ten		19
		28
		32
	<u>165</u>	10
	203	<u>105</u>

Inluch file

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November 3, 1942

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and Roscoe Hurst claims to have some financial interest in the property. Title is supposed to be good and has been cleared by Neil Clark.

De Camp has offered to lease and sell for \$60,000 with first payment of \$3,000 due in nine months from date of lease and balance to be paid in full within five years from that date.

Some shipments were made but apparently owner has no record of these nor any assay maps or reports other than that of Lundquist.

Hurst thinks that the average grade of the developed ore is about \$1.00 in gold, \$1.00 in silver and 12% lead which would make gross value of ore \$23.20 per ton with lead at the bonus price of 9.25¢, but ore would have to be concentrated and if only 15,000 tons is now blocked out a much larger tonnage would have to be developed before a mill is justified.

Suggest writing to Morton and Rickard and if they should send any favorable data might take it up with H. H. Brown and others.

November 4, 1942

Mr. Brent N. Rickard
American Smelting & Refining Company
Valley Bank Building
Tucson, Arizona

Re: Verdun Mine

File

Dear Rickard:

A friend of mine who claims to have some financial interest in the Verdun Mine near Aravapais has called on me and asked me to investigate this property with a view to trying to make arrangements to have it put in operation.

The report on the mine which he left with me is not at all convincing and I do not want to go any further if the mine is worthless or unpromising.

I presume that your company has doubtless examined this mine or at least that you know something about it and evidently it has not been of interest to you or other large companies, but if production should start it appears to me that the ore or concentrates would be shipped to your smelter in El Paso where I presume you would be glad to receive an additional tonnage of lead bearing material.

Any information that you can give me concerning this mine would be appreciated and incidently please don't forget to look in on me the next time that you are in Phoenix. I will do the same by you when I come to Tucson.

Best personal regards.

Sincerely,

[Handwritten signature]

CMC:CG

EAGLE-PICHER MINING & SMELTING COMPANY

OFFICE OF
WESTERN OPERATIONS

GENERAL OFFICE
214 WEST THIRD STREET
JOPLIN, MISSOURI

73 NORTH COURT STREET
P. O. BOX 1268

MONTANA MINE
RUBY, ARIZONA

TUCSON, ARIZONA

November 10, 1942

Mr. G.M. Colvocoresses,
1102 Luhrs Tower,
Phoenix, Arizona.

C 10/18, '42

Dear Mr. Colvocoresses:

I have your letter of the 4th, enclosing the report on the Verdun mine by Mr. Lundquist. We have no information in our files on the Verdun mine, nor do I remember of ever hearing it spoken of in connection with the Arivaipa district. I have been to the Grand Reef and to the Arivaipa Mines, so am rather surprised not to have heard of this if it represents as much of a mine as Mr. Lundquist reports. To the south of the Grand Reef I heard of a property or two that carried wulfenite along with the lead carbonates, and it may be that the Verdun was one of them, but I did not see any of them, nor have I read any reports on them. They were spoken of more as likely prospects that had failed to pay as small shippers.

I am certainly surprised at the pass you have come to in the Blue Bell and De Soto Mines. It makes a fellow wonder at some of the legal procedures that we can come up against these days.

We are still being able to carry on our experimental work at Harqua Hala, but as you may realize things are getting tighter all the time, so naturally we hardly know what to expect from week to week. Our results are continuing satisfactory, if operating conditions are not. I am carrying on about the same routine as when last we talked, and while I have nothing new in mind, would like the pleasure of having a talk with you the first time we can get together.

With best wishes,

Yours sincerely,

E. W. Morton

E.D. Morton-
OC

AMERICAN SMELTING AND REFINING COMPANY

SOUTHWESTERN ORE PURCHASING DEPARTMENT

810 VALLEY BANK BUILDING

P. O. BOX 2229

TUCSON, ARIZONA

November 17, 1942

BRENT N. RICKARD
MANAGER

A 10/18/42 ✓

Mr. George M. Colvocoresses
1102 Luhrs Tower
Phoenix, Arizona

VERDUN MINE, ARAVAIPA DISTRICT
GRAHAM COUNTY, ARIZONA

Dear Mr. Colvocoresses:

The subject property has been referred to our Mining Department on several occasions and rejected as not meeting our requirements.

The earlier records refer to this property as the Silver Coin Group, then owned by James T. Quinn of Phoenix. In a report on the various properties in the Aravaipa District made by one of our engineers in the latter part of 1923 I find the following in reference to Silver Coin Group:

"The Silver Coin Group of 6 unpatented claims, belonging to T. Quinn, is located about 3 miles east of Klondyke Post Office, 3 miles S. of the Grand Reef Mine, and about 66 miles from Willcox.

"The vein in andesite averages about 5 feet wide and has a strike of N 60° E and a very slight dip to the North. The ore is lead carbonate, wulfenite, and pockets and lenses of galena. Considerable ore has been stoped by leasers, between the 75-foot level and the surface, from this ore the high grade galena has been sorted out and shipped, and the low grade carbonates of which there is probably 2500 tons left on the dump which is said to run 6 to 10 oz. silver and 15 to 20% lead. The owner Mr. Quinn is now erecting a 25-ton oil burning, kiln type smelter to treat this ore.

"The development work consists of a 300 foot vertical shaft connecting with an adit drift at the 75 foot level. This adit is 230 feet long and near the end a winze 50 feet deep has been sunk. A stope from this adit level to the surface has produced 5 cars of shipping ore, at the bottom of the shaft a drift east and west on the vein for a distance of 20 feet each way, both faces show low grade carbonate ore. A crosscut N 25 feet to get under the bottom of the creek for water has also been driven from the bottom of the shaft. No crosscutting or drifting has been between the 75 foot level and the bottom.

done

Nov. 17, 1942

"The property is a good looking prospect but needs developing. There is no ore blocked and the average grade of the ore as mined is too low to ship under present conditions."

In July 1929 Mr. J.A. Nevin of Phoenix brought to our attention the Silver Coin Mine owned by Verdun Company, Inc. In April 1940, while visiting other mines in the Aravaipa District, Mr. F.M. Stephens reported this property under lease and bond to a closed corporation of which Edna Montgomerie, President, L.W. Wixon, Secretary-Treasurer; that Dan Lewis was interested to the extent that his sister owned a large part of the mine. The Denver Equipment Company had recently made tests on the ore and Mr. Lewis, with whom Mr. Stephens talked, stated they expected shortly to erect a 75 to 100-ton mill. Vein is reported as 7 to 20 feet wide, average assays of samples:

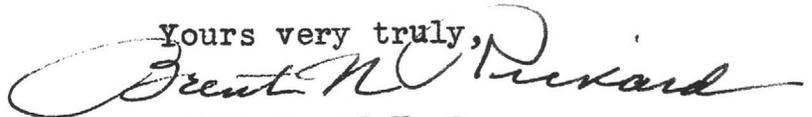
	<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Mo</u>
Tr.	3.0	8-10%		1.8% (wulfenite)

Mr. Stephens reported that the operators had retimbered the 300-foot shaft and were ready to start mining as soon as the mill was erected. He did not examine the mine.

In June 1941 Mr. Paul Jones, Jr., 703 West North Street, Brazil, Indiana, referred the property to our New York Office, as well as to Federal Mining and Smelting Company, Wallace, Idaho. At that time we were supplied with report on the property by E.H. Lundquist, dated May 24, 1934. Mr. Stephens then examined the surface and adit tunnel on the 75-foot level; the shaft was filled with water below that point. He also had another talk with Dan Lewis. As a result of his investigations Mr. Stephens came to the conclusion that the oxidized ore is generally too low grade to be commercial and the possibility of developing sulphide ore of better grade at depth is remote.

Apparently this mine has possibilities in a small way if suitable metallurgy of the oxidized lead ore can be worked out. I understand that the metallurgical problem is much like that at the Grand Reef Mine in the same district.

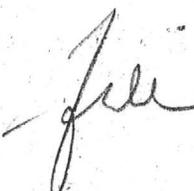
Yours very truly,



BRENT N. RICKARD

November 19, 1942

Mr. E. D. Morton
Eagle-Fischer Mining Company
P. O. Box 1268
Tucson, Arizona

Re: Verdun Mine 

Dear Morton:

Thank you very much for your letter of the 10th on the above subject and information contained therein. From another source I have been able to secure more details and apparently the Verdun is similar in character to the Grand Reef and contains a limited quantity of lead carbonates and some molybdenite. I rather doubt if my friends will care to do anything further with this property but there is a chance that some Government assistance might be obtained while war conditions prevail and if so I may have an opportunity to discuss the matter with you further and also to have a visit with you in connection with other things of mutual interest.

I am glad to note that you are continuing your work at the Harqua Hala which has certainly been to the advantage of the owners of that property and I am glad that your metallurgical results have been favorable. Perhaps this work may prove to be well worth while at some future date and when gold mining is once again in favor.

If I could have an opportunity to tell you the whole story of the Blue Bell and De Soto I am sure that you would be even more astounded at the workings of legal procedures. The long and short of the matter is that the mines are absolutely idle and seem likely to remain so for an indefinite period of time unless the War Production Board will take the bull by the horns and accept the responsibility for putting them to work. The party who won the right to redeem them and thereby deprived us of the title has taken no action whatever toward such redemption but has merely been trying to shake us down and seems surprised that we have not accepted his kind offer to pay him \$25,000 advance cash royalty for a lease on a property which he does not and may never actually acquire. Meanwhile the Federal Government is standing by with claims for some ten thousand dollars of back taxes to slap on the company as soon as it is revived and other alleged stockholders are trying to intervent in the proceedings and making matters worse and worse all the time. Perhaps some solution will eventually be found but meanwhile it is a headache with a capital H.

Best personal regards. 

November 19, 1942

Mr. Brent N. Rickard, Manager
American Smelting and Refining Company
P. O. Box 2229
Tucson, Arizona

Re: Verdun Mine *file*

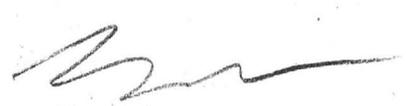
Dear Rickard:

Thank you very much for your long and interesting letter of the 17th on the above subject. The information which you have given is exactly what I hoped to receive and I note particularly your conclusion that the mine has possibilities of being operated in a small way if the metallurgy of the oxidized material can be worked out. I have it in mind that the Grand Reef Mine, which you mention as having contained a similar character of ore has not been profitably operated to date but in that I may be mistaken.

If my friends should decide to follow the matter up any further I will probably have an opportunity to talk to you again about this property and just possibly it may become a small producer during this war period when lead and molybdenum are both in such great demand.

Hoping that I may see you before long, and with best personal regards, I remain

Yours sincerely,



GMC:cg

Verdun

1 sq = 10'

Upper Basin also lead

body of karst
Slip

70
50
60
70
80
90
100

Pt 13

Added depth + Xents to base 5-11'

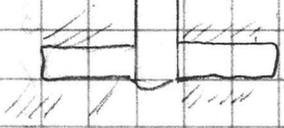
2 3/4'

7

VI
10

hinge in ore

X slits
100



depth in ore 6' w
Pg 12, Pt 12-16

X 200' w. Pt 14



Pt 11-13 Sulfide layer to base w

— Sump

Water body of karst

of 29 hrs of Home

80		200	200 (initial) exp
66.30	209		
125	250	210	18-8.69
37	1000		
80		220	15-4.90
23	1459		
29	1072	230	10-2.49
18			
177	387	240	74-0.47
47	135		
50	500	250	12-0.77
40	50		

732	7	1062	hrs. from in	260	20	4.39
60	to		A Cape alm.			
50	to			270		
40	to					
60	to					
30	to					
50	to					
50	to					
<u>1072</u>						

18 hrs. home days

100' bank

Main Payment for

	A.	B.	C.	
Sting	80.00			
Cop Paid		66.30		
Per 9 hr.	80.00	2000	40.00	165.50
C. Clat.	15.			149.30
hls 36	15			
Jays G.	25			<u>314.80</u>
7 Bells	50			my. to m. A u
John Ch		10.00		
hls 30		3.00		
to do.			177.00	
my p.	27.50			
Can lobster	20		3000	
C. C. C.		50.		
	<u>312.50</u>	<u>149.30</u>	<u>24700</u>	
Per	147.00			
	<u>165.50</u>			

18 hrs. home days

100' bank

18 hrs. home days

100' bank

REPORT ON VERDUN MINE

The Verdun Mine is located in the Aravaipa Mining District, Graham County, Arizona, at an altitude of about 4,000 feet, and approximately $3\frac{1}{2}$ miles east of the town of Klondyke. The road leading to the mine from this point passes by easy grade up a rather broad canyon wash which becomes gradually narrower as one approaches the mine. Klondyke is the distributing point for the district, and is reached by an excellent gravel highway from Cork, a station of the S. P. R. R. a distance of 35 miles, where paved highway passes from Globe to Safford, Safford is 15 miles to the South. Klondyke may also be reached from Willcox from the south on good graded road.

HISTORY

The property consists of a contiguous group of 8 unpatented claims, which were originally located by Ted Quinn, about 1898, and developed by him for some time. The shaft was sunk for the purpose of a water supply for milling, etc.; prior to reaching the water, however, his funds were exhausted. He then secured the assistance of associates, and Aravaipa Leasing Company, was formed. It was then decided to mill the ore, so far developed by a dry process instead of going down to the water. A revolving tube roaster was installed, together with pneumatic concentrating units, etc. This process was not a success, and had to be abandoned.

GEOLOGY

The mine lies slightly south-west from the foot of the Santa Teresa mountains, the latter standing out in bold relief from the surrounding country, and is probably a part of a granite batholith that extends for a considerable distance east and south beyond the mine area. The country rock incorporating the fractures or veins of the mine is a highly altered igneous rock, which the U. S. Geological Survey, according to their published report on the district have tentatively considered to have been probably a fine-grained granite. Some exposures resemble a Monzonite porphyry, with considerable feldspar phenocrysts; others suggest a possible Rhyolitic porphyry, the ground being very siliceous. The weathered and leached condition of the outcrops renders it extremely difficult to establish their true identities. To the south from the mine, and farther down to the west, the country forms low rounding ridges toward the lower flat country below. Near the mine there is evidence of Gila conglomerate of Pliocene age, which may form part of the above mentioned ridges, although they are almost entirely overlain or covered with unconsolidated or loose gravels, and detritus of Pleistocene and recent age.

The movements that created the veins at the mine probably took place during the Tertiary period, and that they were intense is evidenced in the Silver Coin, or main vein in the Verdun group. Here the vein exposure near the shaft shows exceptional brecciation and shearing, extending 50 or more feet into the wall rock. This brecciated condition in the vein has undoubtedly been an aid to the mineralizing solutions in migrating along the vein, and have permitted them to mineralize the wall rocks for several feet away from the main fracture in places.

DEVELOPMENT

The Silver Coin Vein is a very strong one, and is traced for a distance of a mile, and its strike in an easterly direction. In general, the vein shows silicification, with considerable secondary quartz, along with the other minerals. An adit tunnel was driven approximately 50 feet below the collar of shaft on the vein, and connected with the shaft at about 75 feet from portal. The tunnel continues beyond shaft to practically the 200 foot point. Along the drift several short cross-cuts were driven, to cross-cut the vein, and the ore shows varying widths from 5 to 15 feet. At a point 165 feet from portal, an 8 x 8 foot winze was sunk 50 feet deep. This shows ore for practically the full width, the entire distance including the bottom where drifts were run each way about 10 feet. Samples from these faces show: Silver 1.2 ozs. Lead 12.4% and a 6 foot width across bottom ran: Silver 1.2 ozs. Lead 16.0%. At the shaft on tunnel level a sample was taken across

vein 13 feet wide, that gave: Gold .094 oz. Silver 1.0 Lead 13.5%. Immediately east of the shaft a small stope had been started and a sample of the high grade portion about 10 inches in width yielded Gold .045 ozs. Silver 3.2 Ozs. Lead 37.5%. Twenty-five feet east from the shaft is a stope that extends up to the surface. It is reported that 500 tons were extracted from it.

The shaft is vertical, with 4 x 4½ foot hoisting compartment, and 2½ x 4½ manway, extending to the 300 foot level, with a 20 foot sump. On the 100 foot level only a station is cut. The vein here shows a value of Silver 1.6 Ozs. Lead 12.4%. On the 200 foot level a short cross-cut was driven to vein where two short drifts were run, with values reported of: Silver 1.0 oz. Lead 19.2%. On the 300 foot level an 8 x 10' cross-cut intercepts the vein where drifts were run 25 feet each way. Assays show: Silver .7 oz. Lead 12.4%, on the west side, with Silver 1.0 oz. Lead 10.9% on the east side. From the surface down to the bottom level, the ore body for the most part is leached and oxidized. Small amounts of galena are in evidence throughout, together with cerrusite (lead carbonate) and occasional wulfenite (lead molybdate) but no iron pyrites were noted, although the slightly iron stain gangue suggests pre-existing pyrites that have been subsequently oxidized and dissipated in the gangue. To the west from the shaft both on the surface and lower levels Vanadium and Molybdenum ore appears to increase. On the surface the outcrop shows Molybdenum for a considerable distance indicating a possible large tonnage. It is stated that determinations have been made for Molybdenum and Vanadium, and that .94% of each was reported. This proves a valuable asset inasmuch as these metals command a high price on the market.

The oxidized zone apparently extends approximately to the 300 foot level, at which point appears to be a line of demarcation immediately above the drift bottom that shows a greater amount of sulphides than above, and as the water was encountered just below this level, it may be inferred to be the permanent water level. The water table however, may have stood at different levels from time to time, which would create an overlapping of oxide and sulphide zones, sometimes evidenced by finding considerable oxides intermixed with sulphides below the water level.

No copper appears in any part of this section, but on the surface along the strike of vein, beyond tunnel zone, is an exposure of copper bearing ore, that assays show to contain 4.5% copper, 2.0 ozs. Silver, and 6.8% Lead. Two other assays were taken across the bottom of the above open cut stope at a depth of 35 feet, 4 foot width gave Copper 2.85%, Silver 3.9 ozs. Lead 30.8%. On the surface 300 feet east of shaft another sample indicated Silver 5.95 ozs. Lead 35.4%. The copper being principally in the form of carbonates (malachites.)

In passing to the east roughly along strike of vein, about ½ mile is apparently a cross vein exposed in the gulch striking North 50 degrees west, with a dip of 55 degrees to the North, showing a strong mineralization. Continuing the same course, about ¾ mile from the tunnel portal, is another cross-vein striking North 65 degrees West, and dipping 58 degrees to the North. A short tunnel has exposed vein material about 5 feet wide, with an 8 inch streak in the center, carrying Gold .04 oz. Silver 1.6 oz. Lead 40.8%. The remainder of vein has superficial enrichment, that would average well for milling. Another vein parallels the Silver Coin vein, some 300 or 400 feet to the North, and is called the LaClede. A short incline shaft has exposed the vein about 4 feet in width, showing manganese oxide (pyrolusite) with other oxides, and carbonates including copper. It is said this vein runs very well in silver, and that the Verdun holdings cover this portion of the vein. A mile or so to the west on this vein is located the LaClede mine workings. A series of assays were seen by the writer from these workings indicating an average mill ore of 15.0 ozs. silver, and specimen samples running into several hundred ounces silver, all carrying some copper, but apparently no lead.

The amount of ore that can be considered actually blocked out would be a trapezoid 200 feet on the tunnel level, and 50 feet on the 300 foot level and assuming an average width of 6 feet allowing 15 cubic feet to the ton would yield 15,000 tons. But from the apparent uniform condition of the vein material in the various openings it would not be unreasonable to assume that the ore extended the same distance on the 300 level as on the tunnel level, which would make a block containing 24,000 tons, plus 1,200 tons in the block east of shaft, and 1,000 tons west of the shaft, from tunnel level to surface, making a total of 26,200 tons besides the copper ore exposed on the surface which is not taken into account.

The shaft is equipped with an 18 h. p. gasoline hoist, with 500 feet of 3/4 inch steel cable, all in excellent condition. A 50 ton ore bin, with an 8 x 18 steel sectional jaw crusher, mounted over it, and powered with a gasoline engine. Ore cars, hoisting buckets and water tanks together with a 50 ton capacity ball mill and an extra 10 or 15 h. p. gasoline engine completes the list of equipment that is in good condition and can be used on new operations.

RECOMMENDATIONS

The shaft should be sunk 100 feet deeper, or at least deep enough to insure necessary water for immediate milling purposes, etc. Then the drifts on the lower levels should be extended in order that adequate stoping facilities may be secured while development work proceeds to increase future ore reserves. The latter to include further shaft sinking to investigate the ore below water level. The outlying veins could be taken care of in the future when the more pressing work had been completed.

Before the installation of a mill is undertaken an exhaustive and complete mill test should be made on generous average ore samples, that will leave no doubt as to the maximum recovery to be expected, and which can be accomplished. In connection with this the fact must not be overlooked that the character of the ore below water level will be different to some extent from that above, a feature that should be given due attention in making the test.

The ore bin and crusher together with the ball mill and perhaps the extra gas engine can be utilized in a 50 ton capacity mill design, all of which would aid considerably in the initial cost of plant.

A preliminary laboratory mill test has been made indicating a concentrating ratio of 6 to 1. Assuming this ratio and taking the average lead value conservatively at 12%, an example will illustrate what may be reasonably expected from the lead content, disregarding the other values. Eight tons of concentrates should be produced from a 50 ton per day operation, and at the present price of lead \$4.00 per 100 lbs. 1 ton of concentrates would equal \$57.60, and 8 tons \$460.80 gross per day. From this is deducted mining and milling at \$6.00 per ton of ore, or \$300.00, leaving \$160.80 per day for operations. Less 10 cents per ton mile or \$3.50 per ton concentrates truck haul, plus \$3.60 railroad to smelter, on this class of ore, plus \$2.50 per ton smelting charge, equals \$76.80 per day on concentrates, leaving a net profit of \$84.00 per day. The silver, gold and copper will, of course, add very materially to the total recovery value. As to Molybdenum and Vanadium, these metals must be separated before they can be marketed. The smelters do not as a rule pay for included rare metals in ore, or concentrates. A provision in the mill would be necessary to make this separation.

As soon as the mill successfully operates, attention should be given to the LaCledé vein, previously mentioned, because of its higher silver content. A portion of this ore added to the general mill run would help to raise the apparent low ratio of silver to lead in the silver Coin vein, and insure a higher grade concentrate.

In conclusion there is no reason why this property should not develop into a paying investment, and become eventually one of the larger mines of the State. The problem of mining the ore is very simple, and can be done very cheaply. The milling problem is more intricate, especially if the rare metals are separated. However, if these metals persist in economic amounts there is no doubt of its being satisfactorily solved to enjoy the added revenue these metals would bring. Also, if the anticipated improvement in silver and lead takes place it would raise the earning capacity considerably. The mine is located at an altitude that makes climatic conditions ideal for all year operations. It is to be deplored that this property has remained inactive so long, with the possibilities it holds.

The accompanying map shows substantially the present conditions of the mine workings, and the cross section of vein is more or less an ideal section. The limited time available at the property prevented more accurate measurements, as well as complete sampling in all instances. A few samples were taken however, to check previously taken samples and some of the latter used in addition to those taken. The photographic views will serve to give an idea of the general surface conditions.

Yours very truly
E. H. Lundquist, M. E. (Signed)
May 24, 1934

Immediately after submitting this report, my attention was called to a very enlightening letter that has been received from Mr. Karl S. Reinhardt, Chemical Engineer, of New York City. He has made analysis on this ore for the rare metals Molybdenum and Vanadium, placing great stress on the value of these metals, amounting to over \$2,000,000 in gross value for the Vanadium, not taking the Molybdenum into account. In view of this, I would advise that the work be concentrated on the extraction of this, as well as the other values.

Yours very truly,
E. H. Lundquist, M. E.