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(Subject to Correction and Revision)

PRELIMINARY WAR MINERALS REPORT

Report of the Bureau of Mines to Secretary of Interior Harold L. Ickes

- Initial Report -

VALLE MINES DUMPS
Jefferson and St. Francois Counties, Missouri

- Zinc -

References:

1. Swallow - Volumes 1 and 2, Old Series, Missouri Bureau of Geology and Mines.
Southeast Missouri Lead District - Missouri Bureau of Geology and Mines.
Winslow - Volumes 7 and 8, Missouri Bureau of Geology and Mines.
Geological Survey Report of Missouri - G. C. Broadhead for years 1855-1871.
2. Officials and private individuals consulted as follows:
Dave Haverstick and Clyde Lemons.

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PRELIMINARY WAR MINERALS REPORT 1/

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Jefferson and St. Francois Counties, Missouri

- Zinc -

SUMMARY

The Valle Mines dumps, 10 miles south of De Soto, Missouri, near the county line between Jefferson and St. Francois Counties, remain as the result of early mining. It is estimated that the dumps contain 202,840 tons of carbonate ore in which 23,231 tons of metallic zinc and 2,393 tons of metallic lead, equivalent to a combined unit metallic content of 12.63 percent, might be recovered by proper treatment.

A Waelz plant and the necessary loading and hauling equipment capable of producing 4,600 tons of zinc oxide, containing 59 percent zinc a year, over a five year period, is estimated to cost \$150,000.

The Bureau of Mines suggests that the installation of such a plant be given consideration and that financial assistance be furnished the operators through the proper Federal agency. There is no need for further exploratory or metallurgical work by the Bureau of Mines at this time.

1/ This preliminary war minerals report has been prepared for the engineers and consultants of the Bureau of Mines for their technical review and criticism, and to keep them informed of the progress of the Bureau of Mines war minerals program. It is not to be made available to others, as the data are subject to correction and revision. The final report, when issued, will be distributed on a limited basis to officials of the Federal war agencies, the owners or operators of the properties described therein, and to certain others with specific concern in the production of minerals vital to the prosecution of the war.

INTRODUCTION

The Valle Mines dumps represent remnants of a formerly extensive lead-zinc mining operation along the border between St. Francois and Jefferson Counties, Missouri. The dumps were inspected and sampled by an engineer^{2/} of the Bureau of Mines during the period November 27 to December 19, 1942. Dave Haverstick, who is locally in charge for the Valle Mines Company rendered valuable assistance in many ways during the examination.

Measurement and sampling of the dumps was undertaken to determine tonnages and values in zinc, lead, and barite. Preliminary screen, float-sink and table concentration tests were made by the Bureau of Mines to help in forecasting necessary milling procedures. Reduction-oxidation treatment possibilities also were checked to determine the applicability of a Waelz kiln to treat the zinc ores and mill products.

GENERAL INFORMATION

The Valle Mines dumps are located ten miles south of De Soto, Missouri. (See Fig. 1) The property covers several sections in T. 38 N., R. 5 E. and T. 38 N., R. 4 E. The town of Bonne Terre is about ten miles south of the area. The Potosi-Mineral Point lead and barite district lies to the west about ten miles. The Missouri-Illinois Railroad cuts across the main body of the tract and has a spur near a place called "Burner", shown on the accompanying map. This is called the "Tunnel Station" and is the place at which cars have been loaded and shipped in the past. There is also a loading spur at Valle Mines on the Missouri-Illinois Railroad.

United States Highway 61-67 passes within a mile of the district along its eastern and southern limits. Missouri State Highway V connects with United States Highway 61-67 and runs along a part of the northern extremity of the tract. A county road traverses the tract, running nearly north and south between State Highway V and United States Highway 61-67. This is a mail road and is, therefore, kept in good condition.

There are other roads leading to the tract which were formerly used in getting to and from the mines. These are in poor condition and would require considerable repair before they could be used. A road extends from State Highway V southward to "Burner". It is in fair condition but is not an all-weather road.

^{2/} Perkins, Edwin T., Mining Engineer.

A high tension power line runs along United States Highway 61-67 and passes within a mile of the "Tunnel Station". The distance to "Furnace" is a little greater.

Telephone lines run to Valle Mines which is on State Highway V near the north boundary of the tract. Telephone connections were formerly available at the Valle Mines Company's office and could easily be reestablished if desired. Valle Mines is about two miles north of the "Tunnel Station" and, therefore, two miles of telephone line would have to be built to make service available at that point.

PHYSICAL FEATURES AND CLIMATE

The area is one of rugged hills and steep valleys with high ridges trending in a northwest-southeast direction.

The property of the Valle Mines Company is located on both the north and south slopes of one of these ridges. Shafts are located on the breaks in the ridges. Grass and scrub timber is plentiful in the area. At one time, considerable timber was available over the tract, but this has been largely cut over to make railroad ties. The small streams which drain the area are partly fed by springs. Near "Furnace", artesian water is obtainable from an old drill hole. Additional sources of water would have to be made available, however, for plant operation.

LABOR AND LIVING CONDITIONS

There are still some men in the vicinity who formerly worked in the mines and on the dumps. Some would be available if operations were resumed but additional men would be needed if extensive activities were undertaken. Very little labor is available either in De Soto or Bonne Terre at the present time due to extensive war plant and mining operations at and near those places.

There are several buildings on the property which were used by former employees and which could be made livable. De Soto could easily house any additional workers that might need to be imported. Living costs are moderate.

HISTORY AND PRODUCTION

Lead was produced in this area over a hundred years ago, first from shallow surface diggings and later from operations a hundred feet or more in depth. The size of the dumps indicates early mining operations of considerable extent.

A Missouri Geological Survey report ^{3/} shows a map of shafts in this area, the names of which are still being used at the present time. At one time, the operations were so extensive that a furnace was erected and operated to produce pig lead. The remains of this furnace are still standing at the place designated as "Furnace" on the accompanying map. (Fig. 1) A calcining plant was operated at "Burner" (Fig. 1) to increase the metal content of the ore.

The actual market value of the ores was difficult to obtain due to the peculiar conditions of the mining contracts. The zinc ore was purchased from the miners by Valle Mines Company at a price from which royalty had been deducted. During the early period of operation, the company leased the land to small operators who worked under an agreement called, "Rules and Regulations". This was a form of paternal system by which the company furnished certain equipment and supplies and paid the miners for the ore mined. This system was still in use during the active mining period of the first World War. The zinc mines were inactive from 1917 to 1940.

The operations of the present leasees have been confined entirely to hand picking, washing, and hand jiggling the old dumps.

Barite has been produced in the area over a long period of years. The main supply of barite appears to have been derived from the Garraty group of properties shown on Figure 1, in Section 12. Table 1 shows the production of zinc, lead and barite in short tons from 1898 until the present time. Earlier records are not available to the writer.

PROPERTY AND OWNERSHIP

The Valle Mines Company property consists of 5,500 acres of land located in parts of Sections 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 17, 18, 19, and 20 in T. 38 N., R. 5 E. and in parts of Sections 1, 11, 12, and 24 in T. 38 N., R. 4 E.

The dumps occur in three main groups: (1) those comprising the Miller and Rocky Digs located near the old "Furnace", (2) those located near "Burner" and (3), the Garraty group.

Henry Rozier of Ste. Genevieve, Missouri is the President of the Valle Mines Company which over two years ago leased the entire property to Lemons and Hatcher. Recently a sub-lease was given to the De Soto Lead and Zinc Company of which George W. Moore of Joplin, Missouri is general manager and Clyde Lemons of De Soto is assistant manager. The sub-lease runs concurrently with the principal lease and has some seven or eight years of life remaining.

^{3/} G. C. Broadhead, Geological Survey Report of Missouri for years 1855-1871.

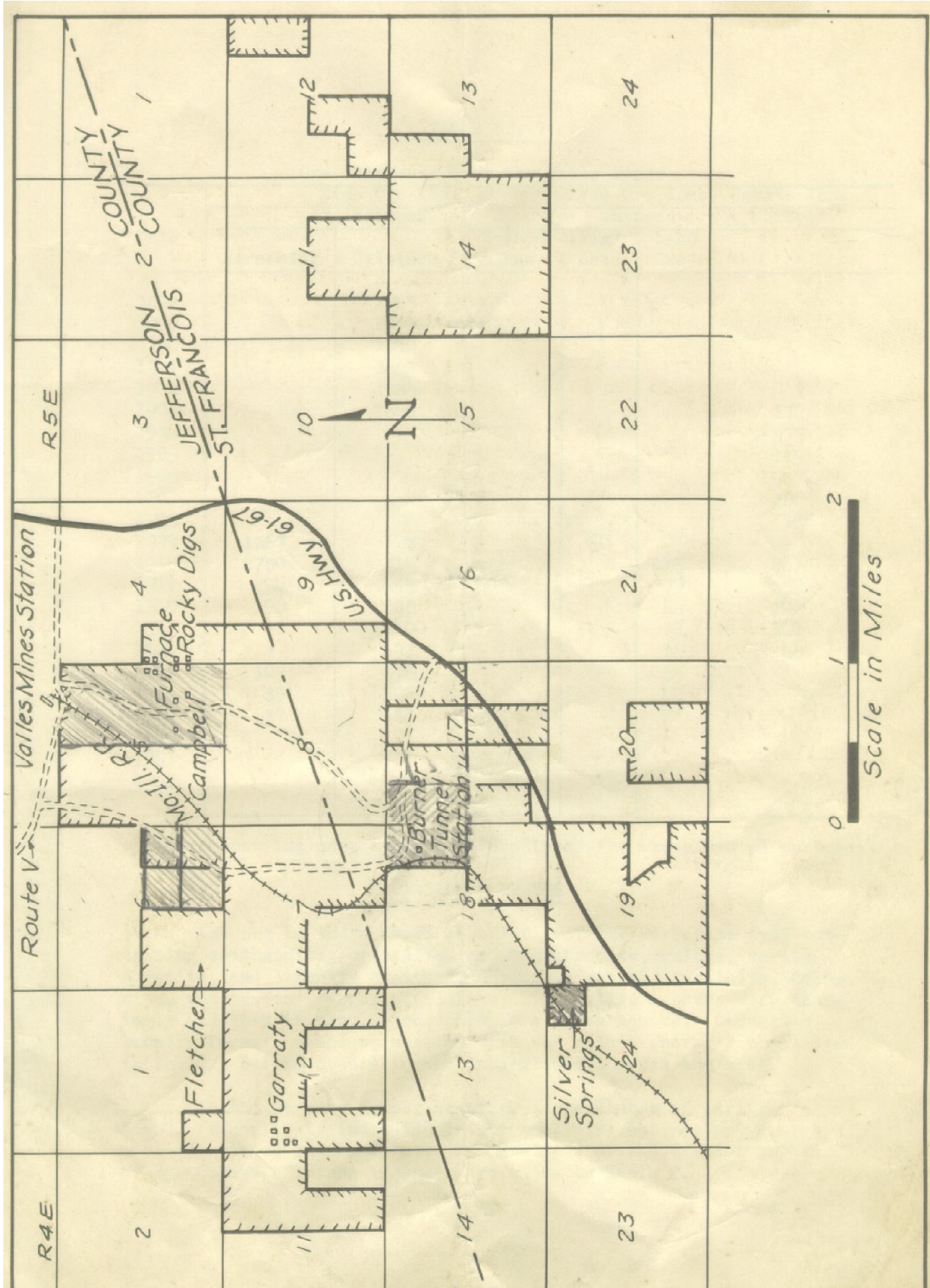


FIG. 1- VALLE MINES COMPANYS LAND

TABLE NO. 1

Ore Shipments from the Valle Mines

Date	Zinc Ore Tons			Lead Ore Tons		Barite Tons
	Shipped			Shipped		Shipped
	Screening	Calcined	Washed & Raw	Pig Lead	Lead Ore	
1898		225				
1899		1000				
1900		1050				
1901		1049				
1902		1388				7
1903		1326				172
1904						575
1905						119
1906						537
1907						388
1908						12
1909	1367	153		50		
1910	2730	718			135	241
1911	254	555			79	652
1912	198	803			44	303
1913	32	640			35	141
1914		497			38	46
1915	107	675			65	
1916	88	492			42	
1917	37	188				
1940			2639			
*1941			4049			
1942			971			
			7659			

* This amount includes some raw ore shipped for experimental purposes.

CHARACTER OF ORE

The ore in these dumps is chiefly of the carbonate type containing smithsonite, cerussite, and hemimorphite, galena, barite hematite, and limonite scattered through a gangue of calcite, dolomite, quartz, and ferruginous clay. Zinc sulfide occurs very sparingly and then is usually enclosed in zinc carbonate. Cerussite usually forms a complete coating over the galena wherever the latter is found. Barite occurs in small particles through the mass.

At the Garraty dumps, however, large pieces of barite are found. Fluorite is indicated in the analysis, but has not as yet been identified in the dumps. The analyses of the samples obtained by the Bureau of Mines engineer are shown in Table 2.

Holo 2.67
Mag
S/O. 2.5

TABLE NO. 2

Analysis of Samples taken by the Bureau of Mines						
Sample No.	4.3-4.5	7.4-7.6	3.6-4.0	2.67	4.50	3.00 3.3
	Zn	Pb	Fe	CaCO ₃	BaSO ₄	CaF ₂
1	13.53	1.33	12.92	15.47	9.58	0.26
2	13.09	2.80	6.96	14.19	13.46	0.70
3	14.62	0.86	12.69	14.75	6.30	0.58
4	7.05	0.05	21.38	12.50	7.78	0.12
5	10.85	3.69	17.14	14.49	7.59	0.01
6	17.07	0.05	7.47	15.57		0.56
7	13.96	0.05	7.88	16.02	15.56	0.74
8	12.68	1.44	8.34	19.96		0.07
9	11.26	1.19	9.15	14.86		0.01
10	12.11	2.29	12.38	17.55	9.20	0.42
11	12.93	0.80	8.69	21.21		0.21
12	5.54	2.35	9.17	21.38	16.14	0.62
13	13.89	0.98	8.79	16.11		0.28
14	12.27	2.15	10.67	16.38		0.21

PRELIMINARY TESTS

The results of a screen test of a sample containing 14.0 percent zinc, 2.1 percent lead and 4.2 percent iron are shown in Table No. 3. The values were rather evenly distributed throughout.

TABLE NO. 3

*Screen Test on Typical Sample							
Size Mesh	Weight Percent	Analysis, Percent			Percent of Total		
		Zn	Pb	Fe	Zn	Pb	Fe
-10 + 28	31.4	18.0	2.4	4.6	39.3	39.0	33.5
-28 + 65	19.4	12.3	2.6	3.9	16.7	26.1	17.6
-65 + 200	17.0	12.3	1.7	3.1	14.6	14.9	12.2
-200	32.2	13.1	1.2	4.9	29.4	20.0	36.7
Composite	100.0	14.4	1.9	4.3	100.0	100.0	100.0
Heads		14.0	2.1	4.2			

* The above sample was furnished by the operators.

Float-sink tests were made on the screen sizes coarser than 200-mesh, using a separating medium of 2.95 specific gravity. Although a sharp separation was obtained, the float products contained considerable zinc, indicating that part of it was intimately associated with gangue. The sink products were rather low in zinc, being diluted by lead and iron minerals.

A table concentration test was also made on a portion of 10-mesh ore. This was first hydraulically classified and the products tabled to make a concentrate, middling, and tailing. These results are shown in Table No. 4.

TABLE NO. 4

Results of Table Concentration Test							
Product	Weight Percent	Analysis, Percent			Percent of Total		
		Zn.	Pb.	Fe.	Zn.	Pb.	Fe.
Concentrate	18.2	29.3	8.7	9.5	37.6	83.8	43.5
Middling	3.0	15.9	0.2	5.1	3.4	0.3	3.8
Tailing	48.2	8.6	0.1	1.3	29.3	2.8	15.2
Slimes	30.6	13.8	0.8	4.9	29.7	13.1	37.5
Composite	100.0	14.2	1.9	4.0	100.0	100.0	100.0
Heads		14.0	2.1	4.2			

A recovery of 37.6 percent of the zinc and 83.8 percent of the lead was made in a combined concentrate which assayed 29.3 percent zinc, 8.7 percent lead and 9.5 percent iron. About 30 percent of the zinc was present in the slimes and an equal amount was lost in the tailing.

REDUCTION — OXIDATION TESTS

Tests indicate that both a log washer concentrate and the crude carbonate ore are amenable to treatment by a reduction-oxidation process such as that afforded by a Waelz kiln in treating zinc ores. A sample of crude ore, containing 11.1 percent zinc, after reduction and fuming left a residue containing less than 0.05 percent zinc, indicating a recovery of 90 to 95 percent of the zinc. The log washed concentrate, containing 14.5 percent zinc gave almost identical recoveries. In none of the tests was the charge sintered or fused, indicating that either the crude ore or the log washed product could be processed in a Waelz kiln, under proper time and temperature conditions, to yield excellent zinc extraction.

ORE RESERVES

Table No. 5 shows the available ore reserves in the Valle Mines Dumps, in short tons of ore.

TABLE NO. 5

Available Reserves in Valle Mine Dumps

Sample No.	Location	Ore	Zinc Content		Lead Content		Location See
		Short Tons	Percent	Tons	Percent	Tons	
1	Fletcher Washer	1,500	13.53	202.95	1.33	19.95	Figure 1
2	Silver Springs	1,000	13.09	130.90	2.80	28.00	do 1
3	Rocky Dig Group						
	Miller						
	Campbell	20,740	14.62	3,032.19	0.86	178.36	do 1
4	Deep Dig-Isabell						
	Leon						
	2 Bills	27,770	7.05	1,957.78	0.05	13.88	do 2
5	Wilkinson						
	Nash						
	Hale & 2 others	6,840	12.85	742.14	3.69	252.40	do 2
6	Cedar	9,160	17.07	1,563.61	0.05	4.58	do 2
7	Finney						
	Haverstick						
	Cottonwood						
	Johnson						
	Pearl						
	Roberts						
	Madden	15,480	13.96	2,161.01	0.05	7.47	do 2
8	Crobar	15,640	12.68	1,983.15	1.44	225.22	do 2
9	Green						
	McLain						
	African & 4 - 5	39,550	11.26	4,453.33	1.19	470.65	do 2
10	Brown						
	Casey & 2 - 3	15,460	12.11	1,872.21	2.29	354.03	do 2
11	Ashburn						
	Spludge						
	Appleberry	10,200	12.93	1,318.86	0.80	81.60	do 2
12	Garraty	18,000	5.54	997.20	2.35	423.00	do 2
13	McGregory						
	Fletcher						
	Taylor	11,000	13.89	1,527.90	0.98	107.80	do 2
14	McGuire						
	Murray & 2 others	10,500	12.27	1,288.35	2.15	225.75	do 2
Total		202,840		23,231.58		2,392.96	

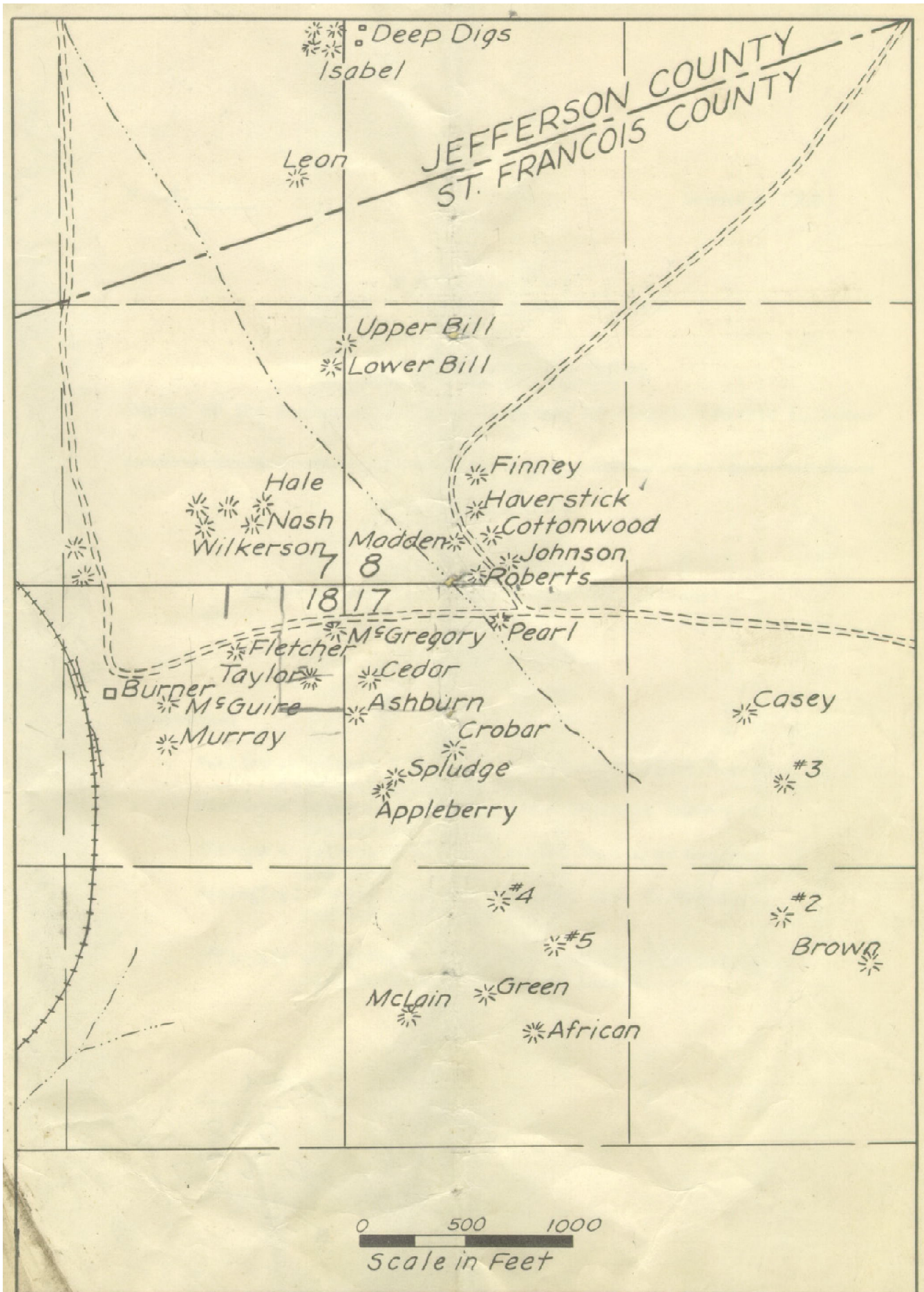


FIG 2-VALLE MINES, SHOWING ORE DUMPS