

UNITED STATES DEPARTMENT OF THE INTERIOR

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BUREAU OF MINES

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War Minerals Report 67

BRETZ MERCURY MINE DUMPS

MALHEUR COUNTY, OREG.

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The War Minerals Reports of the Bureau of Mines are issued by the United States Department of the Interior to give official expression to the conclusions reached on various investigations relating to domestic minerals. These reports are based upon the field work of the Bureau of Mines and upon data made available to the Department from other sources. The primary purpose of these reports is to provide essential information to the war agencies of the United States Government and to assist owners and operators of mining properties in the production of minerals vital to the prosecution of the war.

WAR MINERALS REPORT
UNITED STATES DEPARTMENT OF THE INTERIOR — BUREAU OF MINES

W.M.R. 67 — Mercury

September 1943

BRETZ MERCURY MINE DUMPS

Malheur County, Oreg.

(Supplement to W.M.R. 46)

SUMMARY

Recent studies by the Bureau of Mines indicate the possibility of producing appreciable amounts of mercury by treating low-grade ore from the dumps and abandoned pits of the Bretz mercury mine. The property has been operated by the Bradley Mining Co., Crocker Building, San Francisco, Calif., since 1931. Total production to date is about 11,500 flasks.

Ore bodies occur near the surface along two parallel fault structures. They range in length from 100 to nearly 400 feet and are 10 to 40 feet wide. Stripping, mining, and prospecting are done almost entirely with power shovels, bulldozers, and other surface excavating equipment.

All known ore bodies are depleted, except for some low-grade ore along the sides of some of the old pits. Recent surface prospecting by the Bradley Mining Co. has largely eliminated the probability of finding other important ore bodies along the lower or south structures. About the only remaining possibility of finding new ore bodies is along the east extension of the upper or north structure.

Extensive sampling by the Bureau of Mines¹ in the winter and spring of 1942 indicated 164,000 tons of 1½-pound mercury ore in

¹ O. H. Metzger, senior mining engineer.

the dumps and along the sides of some of the pits. The cost of mining and treating this material at the rate of 200 tons per day should be relatively low. Assuming a recovery of 1.25 pounds per ton, production of mercury would be at the rate of approximately 100 flasks per month. It is probable that the equipment and organization of the Bradley Co. could be made available for conducting the operation. This would largely eliminate any man-power or materials problem that might arise. Any additional equipment that might be necessary could probably be made available from the numerous idle mercury-reduction plants in Nevada and Oregon.

ORE RESERVES

Known reserves of commercial ore have been virtually depleted. Reserves of marginal and subcommercial ore, as indicated by sampling by the Bureau of Mines, consist of 91,500 tons along the sides of the old pits and 72,500 tons in the dumps. All of this ore averages about $1\frac{1}{2}$ pounds of mercury per ton.²

MINING METHODS AND PRACTICES OF THE BRADLEY MINING CO.

The ore is mined with power shovels from open-cut pits and hauled by trucks to a stock pile several hundred feet away. From the stock pile it is handled several times through a raise and an adit and is then dumped into storage bins. From these it is drawn into trucks and then hauled about 10 miles to a reduction plant at the Opalite mine. Here it is handled and rehandled several times before it finds its way into the crusher bins. All of this handling and rehandling, plus a 10-mile truck haul on a contract basis of \$1.20 per ton, adds considerable to the cost of production. A plant at the mine, equipped to eliminate as much handling as possible, probably would reduce costs to such an extent that very low-grade ore could be economically mined and treated.

PROPOSED PLANS FOR PRODUCTION

Proposed production plans are based upon 164,000 tons of indicated ore that assays $1\frac{1}{2}$ pounds of mercury per ton. A plant to handle ore of this grade successfully would require the following:

1. A capacity of at least 200 tons a day.
2. A location near the source of ore supply, so that the longest haul would not exceed three-quarters of a mile.

² Assay data are on file at Bureau of Mines offices and may be consulted by authorized persons.

3. A bin capacity of 150 tons, so that all loading and hauling could be done in one shift and the plant be kept operating three shifts a day.

4. All labor-saving devices possible.

5. A large and well-regulated condenser system.

The opalite plant of the Bradley Mining Co. has a capacity of 100 tons per day. It is now operating only 2 to 3 days a week on ore that is being hauled from Gold Banks, south of Winnemucca, and on development ore from the Opalite mine. It could probably be made available and moved to the Bretz property at any time. Additional capacity of approximately 100 tons per day would be necessary. This could be provided by adding one 100-ton-per-day furnacing unit or two 50-ton-per-day furnacing units obtained from idle plants in Nevada and southern Oregon.

The Bradley Mining Co. has enough power shovels, bulldozers, trucks, and other mining and haulage equipment to supply a 200-ton-per-day plant at the Bretz mine. If this equipment could be made available, it would not be necessary to get priorities for new equipment.

A permanent supply of water might possibly be developed by drilling wells near the property. If these proved impractical, water would have to be piped and pumped from Cottonwood Creek, 4 miles distant.

Production could be started in 4 to 6 months after equipment is made available.

COST ESTIMATES

The purchase price and cost of installing new furnaces and condensing equipment would be approximately \$1,000 per ton of daily capacity. The purchase price of used equipment would depend on its condition, but the cost of installing it would be about the same as for new equipment. Since the cost in either case is only a small part of the total, it would not seem unreasonable to assume total costs of about \$600 per ton per day capacity if old equipment were used or a cost of about \$125,000 for a 200-ton-per-day plant.

Two truck drivers, two miners, and one shovel operator should be all the labor required to supply 200 tons per day to a centrally located plant. As much of the ore is in the dumps, the miners

would be needed only a part of the time. The cost of mining, loading, and delivering ore to the plant should not exceed \$0.25 per ton.

The cost of treating the ore at a rate of 200 tons per day is estimated at \$1.60 per ton, including fuel, labor, and overhead.

Estimated capital expenditures and operating costs are as follows:

Capital expenditures:

Erection of 200-ton-per-day plant from used equipment.	\$125,000
Used mining and haulage equipment.	35,000
Water supply	3,000
	<u>163,000</u>

Operating costs:

Mining and hauling 164,000 tons @ \$0.25.	41,000
Treatment, 164,000 tons @ \$1.60.	262,400
	<u>303,400</u>
	466,400

Assuming a recovery of 1.25 pounds of mercury per ton of ore treated, the total production would be 205,000 pounds, or 2,697 flasks of mercury.

The cost of production, exclusive of interest and royalties, would be \$2.27 per pound, or \$172.52 per flask of mercury.

CONCLUSIONS

1. The ore in place and in mine dumps could be mined and treated at a relatively low cost in a 200-ton-per-day plant near the mine. Production would be about 100 flasks of mercury per month.

2. A plant could be built entirely of used equipment from idle plants in Nevada and southern Oregon.

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