

UNITED STATES DEPARTMENT OF THE INTERIOR  
Harold L. Ickes, Secretary

BUREAU OF MINES  
R. R. Sayers, Director

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War Minerals Report 48

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PROPERTY OF  
STATE DEPT OF GEOLOGY &  
MINERAL INDUSTRIES.

BLACK BUTTE MINE  
LANE COUNTY, OREG.

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STATE OFFICE BLDG., PORTLAND, OREG.

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Mercury

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WASHINGTON: 1943

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WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

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W.M.R. 48 - Mercury

January 1943

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BLACK BUTTE MINE

Lane County, Oreg.

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SUMMARY

Exploration by the Bureau of Mines shows that the Black Butte mine is capable of producing 3,000 flasks of mercury. Production to 1942 was about 14,000 flasks. Since January 1942 mine operation has consisted only of treating dump ore in a rotary kiln, but this operation also ceased recently. The property is owned and has been operated by the Quicksilver Syndicate, but this company does not have the financial resources or organization to carry out an extensive mining program.

As a result of sampling mine workings and of core drilling by the Bureau of Mines, it is estimated that there are about 76,550 tons of ore reserves containing 3 pounds of mercury a ton, classified as follows:

- 56,400 tons with 3 pounds of mercury a ton is exposed on one mine level and has been explored at depth by four diamond drill holes.
- 20,150 tons of ore with 2.7 to 3.6 pounds of mercury a ton is estimated from results of mine sampling.

Geological conditions are favorable for additional ore containing about 3 pounds mercury a ton.

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Rehabilitation of the mine, furnace plant, and surface buildings, road construction, and purchase of mine equipment estimated to cost \$46,500 are required to prepare the mine to produce 100 tons of ore a day. About 1,000 feet of drifting and about 300 feet of raising must be done before ore developed by core drilling will become available.

From results obtained by its exploration program, the Bureau of Mines concludes that:

1. With a preproduction expenditure of only \$63,000, it may be possible to produce over 3,000 flasks of mercury from this mine at a total investment and operating cost of about \$466,000.
2. Production of mercury can begin about 6 months after the additional equipment has been obtained, during which period the mine and surface plant can be rehabilitated.
3. At 100 tons of ore a day, more than 2 years would be required to mine the reserves now indicated.

#### INTRODUCTION

Early in 1942 the Bureau of Mines and the Geological Survey<sup>1</sup> made a preliminary examination of the Black Butte mine. Although production from the mine ceased in January 1942, some mercury was obtained by treating dump material. It was with the idea of developing ore reserves in the Black Butte mine that the Bureau of Mines and the Geological Survey jointly recommended exploration of this property. The program<sup>2</sup> was completed during the latter part of August. It consisted of diamond drilling seven holes and extensive channel sampling on the 400, 900, and 1,100 mine levels. More than 900 samples were taken in the course of the latter phase of the program.

#### HISTORY

The Black Butte mine was discovered in the early eighteen nineties, and it was worked sporadically until 1898, at which time it was acquired by

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<sup>1</sup> A. C. Waters, geologist, and Randall E. Brown, junior geologist.

<sup>2</sup> A. M. Evans, mining engineer, Bureau of Mines.



the late W. B. Dennis, a prominent Oregon engineer. Mr. Dennis developed the upper levels of the mine and designed a furnace plant that was said to be the most modern mercury plant in the country at that time. It utilized an upright tile condensing system and producer gas as fuel. Financial troubles due to the low price of mercury and the banking panic caused the plant to close in 1908. In 1916 the mine was again operating, this time utilizing a Scott furnace. The drop in price of mercury just after the close of the war caused the plant to discontinue operations. During this time only the upper five levels were worked, and total production from the mine was less than 4,000 flasks.

In 1927 the Quicksilver Syndicate, under the direction of the late R. S. Betts, reopened the mine. They abandoned the Scott furnace and installed a 4- by 60-foot Gould rotary furnace with a tile condensing system; in 1929 they added another similar unit. The mine and furnace plant have been in more or less continuous operation since that time, and about 300,000 tons of ore has been mined, from which about 10,000 flasks of mercury was obtained. Since the death of Betts in 1935, the mine has been worked rather sporadically, and in 1939 one Gould rotary furnace was sold, as the management could not supply enough ore to keep the two reduction units running at full capacity. The plant now has one Gould rotary furnace with a capacity of 100 tons of ore a day.

Operation by the Quicksilver Syndicate consisted in developing the lower levels, namely, the 600, 900, 1,100, and the 1,650 or Dennis Creek level, and the greater part of their ore production was mined from these levels. At present the mine is not in operation, but until recently the plant was burning dump material left from operating the old Scott furnace. The grade of ore mined by the Quicksilver Syndicate was said to average between

3 and 4 pounds of mercury a ton, and the dump rock that this company was treating assayed about 0.75 pound a ton. It was the purpose of the Bureau of Mines' exploration project to indicate, and if possible block out, ore that the Quicksilver Syndicate could mine and treat in the present plant.

#### PHYSICAL FEATURES AND COMMUNICATIONS

The Black Butte mine is in southeastern Lane County, at Black Butte, Oreg. It is connected with Cottage Grove, Oreg., the nearest railroad shipping point, by 17 miles of good, improved county highway. Telephone service and electric power are supplied at Black Butte from Cottage Grove. The mine, office, and furnace plant are on the northwest slope of Black Butte mountain approximately 1,200 feet above sea level, in the western foothills of the Cascade Mountain Range. The climate is fairly mild, but wet, and the country is heavily timbered.

#### LABOR AND LIVING CONDITIONS

The Black Butte mine is in a logging and farming community, and at the present time labor is very scarce in the general area owing to intensification of forest work and to the large amount of defense work being done in the Portland area. Indeed, it might be said that the labor shortage in this part of Oregon is acute. The mine and furnace plant formerly paid 50 to 60 cents an hour, but other industries are paying 80 to 95 cents an hour for common labor, and the present management feels that it cannot pay such high wages and operate its property without financial loss.

There are six residences on the property as well as a small boarding house, but should the mine and furnace plant be operated at capacity, an additional bunk house would have to be built unless living quarters for the laborers could be obtained in the immediate vicinity.

## THE DEPOSITS

Black Butte Mountain is composed of rocks of the middle and upper Calapoya formation consisting of volcanic flows and pyroclastic beds that dip gently to the northeast. The Calapoya formation in this general area is said to rest unconformably upon the Umpqua formation, which consists mainly of sandstones and shales, but is not present in the vicinity of Black Butte. Both are thought to be of the Eocene period.

Black Butte itself is a steep hill, which rises to a height of approximately 2,800 feet above sea level, its base being about 1,200 feet above sea level. It is heavily timbered, covered with considerable underbrush and topsoil, and shows few outcrops. The Black Butte main vein or fault system outcrops along the ridge at the top of the butte and is the result of faulting and subsequent silicification by hydrothermal action, which causes it to be more resistant to weathering than the surrounding rocks.

The rocks seen in the Black Butte mine are andesite flows and intrusives, volcanic tuffs and breccias, and a dense, hard rock locally called basalt but believed to be andesite. The tuffs and breccias, as seen in the mine workings, occur toward the hanging wall of the main fault zone and below the 900 level contain mercury ore at and near some of their bedding planes. The main fault zone passes through andesite and from the 900 level upward contains the mercury oreshoots. General descriptions of the rocks in the Black Butte mine are as follows:

1. Andesite flows. At places near the main fault it is altered and charged with carbonates.
2. White to pink tuff. At places near the Smoky Stope oreshoot it is highly altered and shows considerable calcite and siderite. At other places it shows much silicification. This formation could be the andesite mentioned above, greatly altered.
3. Dark red tuff. This formation overlies the ore in the western part of the 900 level, Smoky Stope drift, and the ore occasionally extends into it.



4. White tuff with carbonized plant remains.
5. Coarse red-brown tuff and breccia.
6. White to yellow tuff with some carbonized plant remains.
7. Andesite flows, often coarse-grained to porphyritic.
8. Andesite intrusives. This is the dark, dense, hard dike called basalt by the local miners.

// The Black Butte mine was developed from outcrops, downward along the strong fault zone, which strikes approximately N. 70° W. and dips 45° to 65° to the northeast. While its strike is approximately N. 70° W., it does not run exactly straight, but curves gently northward from west to east, and it is at and in the vicinity of the apex of the curve of the 'warp' that the fault shows its greatest horizontal displacement. The fault is fairly tight in the upper levels, but it widens considerably at depth. On the 1,100 level the fault has horizontal displacements up to almost 1 foot, whereas on the 1,650 or Dennis Creek level it has similar displacements up to as much as 5 or 6 feet.

// From the 500 level upward the oreshoots lie along this fault zone for distances of several hundred feet on each side of the warp of the fault, but the region near the apex of the warp was too low-grade for mining. Lower down, on the 900 level, the ore bodies lie on the hanging wall of the fault zone along some 1,600 feet, and the apex of the warp was mined there. Below the 1,100 level only the west side of the fault warp has been developed, and that not extensively. It was in the eastern area below the Smoky Stope, which has been mined above but not below the 900 level, that our core drilling has indicated a large block of ore. The ore below the 900 level does not seem to be controlled entirely by the faulting but is determined both by subordinate faulting near and in the hanging wall of the main fault and by the bedding contact between the light-colored tuff and a darker, reddish tuff and breccia.

Judging from the mine workings, the oreshoots were large, ranging from 100 feet to over 500 feet in length, and extend from the top east portion of the mine down to below the 1,100 level. According to the management, the mercury content in these ore shoots is rather spotty. Assays ranged from a fraction of a pound to over 30 pounds of mercury per ton and averaged between 3 and 4 pounds of mercury per ton for the ore mined. The Smoky stope is a good example of this type of oreshoot. The Bureau of Mines sampled the Smoky Stope drift and obtained assays from a few tenths of a pound to over 30 pounds of mercury a ton over a distance of 490 feet along the drift. The average assay value for this distance was 2.91 pounds of mercury per ton. The four holes drilled in this area intersected the vein at distances of 140 to 350 feet below the drift and showed vein widths of 6 to 28 feet. The ore averaged 4.2 pounds of mercury a ton.

Mercury occurs near the fault zones and at the bedded tuff contacts as cinnabar with subordinate amounts of metacinnabar and native quicksilver. Accessory minerals in the ore zones include calcite, siderite, pyrite, and silica. The cinnabar occurs as thin streaks and small specks throughout the altered andesite and tuff. The walls of the oreshoots are not definite and are determined by assays, the mercury values gradually diminishing as they get farther from the fault zone or the contact of the tuff beds. It would seem that the main fault zone with its subordinate hanging-wall faults were the channels of access for the mercury-bearing solutions. The mercury was deposited in the upper tight area of the main fault zone and just below the red tuff and breccia in the lower portion of the mine between the subordinate hanging-wall faults.

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Acknowledgment is made to A. C. Waters of the Geological Survey for his classification of the various rocks, for his suggestions, and for his recommendations in drill-hole spotting.

## PROPERTY OF THE QUICKSILVER SYNDICATE

The Black Butte mine and the South Lead and Sutherland prospects constitute the principal mineral properties in an area of about 1,000 acres owned by the Quicksilver Syndicate. Robert Taylor, president, and Fred Mills, secretary-treasurer and manager, live at Black Butte, Oreg., and are active in the direction of the company.

At present the mine is not in active operation, and all of the production for this year, which was 2 to 6 flasks of mercury a week until operation ceased recently, came from surface dumps. The company is not financially able to rehabilitate the mine, renovate the furnace plant, and start mining operations.

MINE WORKINGS AND EQUIPMENT<sup>3</sup>

The Black Butte mine has been extensively developed and mined on the 100, 200, 300, 400, 500, 900, 1,100, and 1,650 (or Dennis Creek) levels from adit tunnels. Besides these, two other small subordinate levels, the 600 and the 1,135, have been developed for short distances from raises and winzes from other levels. About 300,000 to 400,000 tons of ore has been mined, and about 14,000 flasks of mercury has been produced from these workings.

There are no shafts in the mine, and the various levels are connected by raises and open stopes, which in the mined-out regions are inaccessible. There are only two ore passes; one of these connects the 600 level with the

<sup>3</sup> The following maps are on file in the Bureau of Mines's offices at Washington, D. C., and Salt Lake City, Utah, and may be consulted by authorized persons:

1. Plan of Black Butte mine.
2. Longitudinal section of Black Butte mine.
3. Assay plan, 400 level.
4. Assay plan, 900 level, Smoky stope area.
5. Assay plan, 1100 level, west end.
6. Plan and longitudinal section, 900 level, Smoky stope ore block.
7. Vertical section, hole 1.
8. Vertical section, hole 2.
9. Vertical section, hole 3.
10. Vertical section, hole 4.



900 level and the other connects the Dennis Creek or 1,650 level with the 1,100 level. Hence, any ore that would be mined must be transferred down ore passes and open stopes and retrammed on each of the 600, 900, 1,100, and 1,650 levels. Passing ore through so many ore passes and raises causes the fines, which are higher-grade than the average ore, to settle out and become lost in the larger stopes. For that reason, and also because of the difficulty experienced in keeping the flat ore passes open, it is suggested that any plan for starting mining operations take into consideration the building of truck roads to the mine-level portals and trucking the ore to the crusher and furnace plant, a distance of less than half a mile.

In the past, mining of the ore by the shrinkage system and relative softness of the rock were contributing factors in obtaining low mining costs. The ground is well suited to this system of mining as the walls in the open stopes have stood well after many years of exposure. The shrinkage system could therefore be used in future mining operations unless the grade of ore proved too irregular. In such event, selective mining might be necessary and a cut and fill system would be used.

Although some mining equipment is on hand, it is not adequate for a production of 100 tons of ore a day. Two compressors are on the property—one at the portal of the Dennis Creek level of 500 c.f.m. capacity, which is in working condition, and one at the 1,100 level portal of 400 c.f.m. capacity, which is not at present in working condition but could easily be repaired. Motors, switches, power lines, transformers, etc., are complete at these stations. There is enough mine track on the property, stored and in working places, to serve any future operation, but some of it is in very bad condition. There are 15 mine cars on the property, but only six are in even fair condition. Some of the others could, no doubt, be repaired. Rock-drilling equipment

consists of three old, dry, jackhammers with hose and drill steel. There is some pipe on the property but not enough for carrying on both mining and development operations at the same time.

#### TREATMENT PLANT

The treatment-plant equipment consists of the following units:

One 200 tons a day-capacity crushing unit, complete, and ore bins at the portal of the 1,650 or Dennis Creek level.

One approximately 100 tons a day-capacity crushing unit, complete, at the portal of the 900 level.

One 4- by 60-foot Gould rotary furnace, complete with motors, feeders, blowers, bins, and condensing system.

Blacksmith shop, forge, and a miscellaneous assortment of small tools.

With the exception of the condensing system, the equipment, with minor repairs, is adequate for treating 100 tons of ore a day. The condensing system is in such bad condition that it must be replaced entirely for efficient operation.

All of the buildings are in disrepair, including the furnace building, general office building, boarding house, and six houses suitable for use as living quarters.

#### EXPLORATION BY BUREAU OF MINES

As originally planned, the Black Butte project contemplated diamond drilling three holes down the dip and along the probable westerly rake of the Smoky stoep oreshoot and at the same time to sample other local prospects and workings, which might lead to finding additional ore.

Diamond drill hole No. 1 was located at the 3132 S. and 3315 E. coordinates and at 1,116 feet above a Black Butte datum point. It was directed S. 20° W. at a dip of 58°. At a depth of 330 to 357 feet, this hole penetrated the lower extension of the Smoky Stoep oreshoot, and the core from 27 feet

of hole with 94 percent core recovery averaged 8.9 pounds of mercury per ton. With allowances for dip and strike of the vein, the indicated vein width would be approximately 20 feet at a distance of about 150 feet below the Smoky Stope drift. This hole also penetrated two minor mineralized zones at 395 to 410 feet and 446 to 457 feet.

Diamond drill hole No. 2 was drilled below hole No. 1 and to the west to test the downward extension and expected westerly rake of the vein, was started at the 3046 S. and 3127 E. coordinates at an elevation of 997 feet, and was directed S. 20° E. at a dip of 67°. At a depth of 322 to 332 feet the mineralized tuff-beds contact, which was the Smoky Stope vein, was penetrated and assayed 0.8 pound mercury per ton over the 10 feet. This showing was found about 350 feet on the dip of the vein below the 900-level Smoky Stope drift.

Since the vein showing in hole No. 2 did not disclose good ore, it was decided not to drill for any further downward extension but to drill laterally along the strike of the Smoky Stope oreshoot. Hole No. 3 was therefore spotted at 3170 S., 3476 E. coordinates at an elevation 1,146 feet and was directed S. 35° W. at a dip of 46°. At a depth of 451 to 463 feet, the mineralized contact of the two tuff beds which constitute the Smoky Stope oreshoot was encountered, and assays of the cores averaged 0.95 pound mercury per ton over that distance, with the core between 455 and 457 1/2 feet assaying 3.1 pounds mercury per ton. On the basis of this showing, a vein width of 10 feet was assumed at a distance of 140 to 150 feet below the Smoky Stope drift.

Diamond drill hole No. 4 was drilled at the 3106 S., 3250 E. coordinates at an elevation of 1,117 feet and was directed S. 20° W. at a 59° dip. At the contact of the two tuff beds the Smoky Stope vein was encountered at a depth



of 387 to 417 feet, and the adjusted core and sludge assays over 27 feet of width averaged 6.2 pounds mercury per ton. A particularly high-grade streak at a depth of 397 to 399 gave a core assay of 121.2 pounds and a sludge assay of 25.2 pounds mercury per ton.

Channel sampling of several mine levels also was done. Sampling of the 900 level Smoky Stope drift at 5-foot intervals was conducted from the east face of the drift towards the west for a distance of 490 feet, and the drift samples averaged arithmetically 3.02 pounds of mercury per ton and gave an assay value of 2.91 pounds mercury per ton. The 400 level, which has a large unstoped length below the 300 level, was sampled similarly for the purpose of finding any block or blocks of ore that might remain. On the western part of this level a block 105 feet long was disclosed, which averaged 3.6 pounds mercury per ton over an average width of 5 feet. The 1100 level was sampled from the west end for a distance of 400 feet, and ore of about 3 pounds mercury per ton was noted for the eastern 200 feet of this section. The vein has not been mined below the level in the latter zone, but the ore has been stoped out above the drift over the entire distance sampled and below the drift through a distance of 150 feet from the west end of the level. The ore in the eastern portion of the sampled area occurs in flat-lying seams, and no ore estimates were made for this block extending below the level. With additional exploration, this section may develop into a productive ore zone.

The ore in the 1100 west zone lay in the flat-dipping tuff beds near the contact of light-colored tuff and darker-colored tuffaceous breccia, 100 or more feet from the footwall side of the main fault zone. To explore the intervening distance toward and into the footwall of the main fault, two very flat drill holes, Nos. 5 and 6, were drilled from underground set-ups 176 and 113 feet in depth, respectively. Both holes failed to disclose any ore near the fault.

On the 1650 or Dennis Creek level the crosscut across the main fault zone was sampled and proved to be barren, as was also a flat drill hole, No. 7, which was drilled into the footwall of the vein for 40 feet.

The Woodward, South Lead, Sutherland, and Williams prospects are all on ground adjacent to the Black Butte mine, and about 287 samples were cut in these workings. Although a few individual samples showed very slight amounts of mercury, none of them showed enough to warrant further work.

#### ORE RESERVES

Ore containing 2.91 pounds mercury per ton was found for 490 feet along the 900 level East Drift under the Smoky Stope, and three of the drill holes, Nos. 1, 3, and 4, hit ore of 0.95 to 8.9 pounds mercury per ton and averaged 4.2 pounds mercury per ton over vein widths of 10 to 27 feet for distances down the vein of 140 to 200 feet. On this basis a block of ore below the 900 level was estimated to be 490 feet in length, 150 feet in depth, and at least 10 feet in width. The average grade for this block was calculated at 3 pounds mercury per ton, and tonnage based upon specific-gravity determinations of the ore at 2.55 was calculated at 56,400 tons. It is possible that this block of ore may contain over 200,000 tons, since its eastern extremity was not determined and only a depth of 150 feet on the dip of the vein was considered. Drill hole No. 2 cut 10 feet of contact material at a depth of 350 feet on the dip of the vein, which assayed 0.8 pound mercury per ton. Even though this hole did not indicate commercial ore, it is emphasized that the mercury values in this mine are extremely spotty, and down to the horizon of hole No. 2 ore cannot be evaluated on one hole alone. The fact that some mercury was found is enough to warrant further drilling through this horizon, and decision as to further development would depend on results obtained from this drilling.

Another block of ore reserves was indicated east of the Smoky Stope and above the 900 level, but this block was available for sampling only on the 900 level. The ore in this drift averaged 2.71 pounds mercury per ton through a distance of 140 feet. Using a height of 150 feet, inasmuch as the Smoky Stope was mined to this height above the level, and a width of 10 feet, 16,100 tons of ore is estimated in this block.

Sampling on the 400 level disclosed ore through a length of 105 feet near the west part of the level, which is still accessible. The sample widths were 5 feet, and the ore was assumed to extend 50 feet above and 50 feet below the level. On this basis, a block of ore was calculated to contain 4,050 tons of ore at 3.6 pounds mercury a ton.

Sampling on the 1100 level, west end, showed good ore in the drift, but as it had been partly stoped both above and below that level, and as these old stopes were inaccessible for sampling, no ore was estimated on that level. Attention is called to the 1100 level as a zone for future development and mining. The blocks of ore are summarized in the following table:

Location of block	Length, feet	Depth, feet	Width, feet	Ore, tons	Mercury per ton, pounds
Under 900 level, Smoky Stope . . .	.490	150	10	56,400	3.0
Above 900 level and east of Smoky Stope . . . . .	.140	150	10	16,100	2.7
Above 400 level . . . . .	.105	50	5	2,025	3.6
Below 400 level . . . . .	.105	50	5	2,025	3.6
Total				76,550	3.0

#### PRODUCTION COSTS AND EXPENDITURES

Production could be begun as soon as equipment is provided and plant and buildings are rehabilitated. The first mining would be done on the west end of the 1100 level and east of the Smoky Stope above the 900 level. Below the 900 Smoky Stope level the ore could be developed simultaneously with this mining.



The management furnished data showing mining, treatment, and overhead costs of \$2.37 a ton for a period of several years, but owing to the price of mercury the mine was forced to close. At that time labor was paid 40 to 60 cents an hour, depending on their various skills, but labor in this area now receives more than twice as much as formerly.

The company did not keep the mine and mill equipment in repair but allowed it to deteriorate. Taking these conditions into consideration, as well as the difficulty of obtaining highly skilled labor and competent management at this time, operating costs, on the basis of 100 tons of ore a day, are estimated by the Bureau of Mines as follows:

Supervision and general operating expense:

	<u>Per month</u>	<u>Per day</u>	
1 general superintendent . . .	\$ 400	\$ 13.00	
1 plant foreman . . . . .	300	10.00	
1 mine foreman . . . . .	300	10.00	
1 engineer . . . . .	250	8.00	
1 bookkeeper . . . . .	180	6.00	
General and miscellaneous . . . . .	<u>10.00</u>		\$ 57.00

Plant:

	<u>Per day</u>	
3 furnacemen . . . . .	8.80	26.40
3 helpers . . . . .	7.60	22.80
1 mechanic . . . . .	8.80	8.80
Fuel, 100 tons per day . . . . .	.60 (per ton)	60.00
Power . . . . .	15.00	15.00
Miscellaneous . . . . .	10.00	<u>10.00</u>
		143.00

Mine:

10 miners . . . . .	8.80	88.00	
10 helpers . . . . .	7.60	76.00	
5 trammers and truckers . . . . .	7.60	38.00	
Explosives for 100 tons per day . . . . .		50.00	
Supplies . . . . .		25.00	
Power for 100 tons per day . . . . .	<u>15.00</u>		<u>292.00</u>
			492.00

The cost of treating a ton of ore is therefore \$4.92.

As a result of the Bureau of Mines' exploration, the Black Butte mine should produce over 3,000 flasks of mercury. This amount can be obtained

by treating the 3-pound-per-ton mercury ore in the present plant (which has a capacity of 100 tons of ore a day) over a period of 2 or 3 years.

Preproduction expenditures are estimated as follows:

1. Constructing truck road from furnace plant to the 1100, 900, and 600 level portals . . . . .	\$ 10,000
2. Moving crusher and ore bins from the Dennis Creek level to the 1100 level portal . . . . .	5,000
3. Repairing mine track, pipe, and mine cars . . . . .	1,500
4. Purchasing one 10-ton truck, ten 1-ton mine cars, a mine locomotive, three drifters, six stopers, three jackhammers, pipe, drill steel, drill bits, air and water hose, and miscellaneous mining equipment . . . . .	17,000
5. Drifting from the east face of the 1100 level for 1,000 feet along the vein and raising to the 900 level Smoky Stope drift. . . . .	17,000
6. Repairing the air compressor at the 1100 level portal. . . . .	500
7. Constructing a bunkhouse to accommodate 20 men. . . . .	8,000
8. Contingencies. . . . .	<u>4,000</u>
	63,000

#### CONCLUSIONS

The Bureau of Mines concludes:

1. That 76,550 tons of ore containing 3 pounds of mercury per ton is indicated by core drilling and drift sampling.
2. That considerable additional ore may be developed.
3. That about 3,000 flasks of mercury could be produced with a preproduction expenditure of about \$63,000 and an operating expenditure of \$403,000, based on a mining and treating cost of \$5 a ton of ore. With a total estimated expenditure of \$466,000, about \$564,000 worth of mercury, at the present price of \$188 a flask, could be produced.
4. The ore could be mined at the rate of 100 tons a day, and the property could produce about 100 flasks a month for a period of over 2 1/2 years, and with additional development and plant capacity it could possibly double that amount.
5. That production could start within 6 months after obtaining mine personnel, laborers, and equipment.
6. That steps should be taken to put the property into production as the management states it is unable to finance operation of the mine at full capacity.