

UNITED STATES DEPARTMENT OF THE INTERIOR

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BUREAU OF MINES

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War Minerals Report 45

LOST RIVER MINES  
SEWARD PENINSULA, ALASKA

Tin



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## WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

W.M.R. 45 - Tin

February 1943

### LOST RIVER MINES

Seward Peninsula, Alaska

#### SUMMARY

The Bureau of Mines deems it advisable to explore the deposits both within the present workings and on extensions of the lodes in the district. If preliminary work warrants, exploring will be done by surface trenching and diamond drilling. The area has undergone several periods of development, but production has been unimportant.

The mine workings examined are in a state of disrepair, and no conclusive evidence as to the richness or extent of the ore could be obtained. Because of overburden, there are few outcroppings.

The War Production Board has allotted funds to the Bureau for preliminary work, and sampling has begun.

If men, equipment, and transportation were made available, the mine could be put into production by the end of 1944.

## INTRODUCTION

The Lost River tin mines were examined by a Bureau of Mines engineer<sup>1</sup> in July 1942 to determine whether exploration of the deposits was warranted.

These mines are in the valley of Cassiterite Creek, a branch of Lost River, on western Seward Peninsula. Lost River is approximately 27 miles northwest of Teller, on Port Clarence. The area is in the Second Judicial Division, and the mineral land records are at Nome.

The tin mines have been developed mainly on two mineralized structures - the Cassiterite and Ida Bell dikes. Cassiterite dike, the more extensively explored, seems to hold the greater promise of possible ore reserves. It has been prospected by five adits on the east side of Cassiterite Creek; the Randt Extension adit explores the lode on the west side of the creek. The general strike of Cassiterite lode is east-west. The Ida Bell lode, which has been prospected by a short adit, strikes about N. 70° E. and intersects Cassiterite lode some 700 feet west of Cassiterite Creek.

The Lost River mine has been sampled several times in the past, and results of the two most reliable samplings agree within reasonable limits. These indicate that preliminary diamond-drill exploration might show several hundred thousand tons of ore averaging not less than 0.5 percent tin. The cost of this preliminary work should not exceed \$35,000. If preliminary diamond drilling proves satisfactory and results appear to warrant further exploration, large tonnages can be outlined rapidly by further drilling.

The Cape Mountain tin area, near the extreme western tip of Seward Peninsula, also was examined at the time the Lost River mines were visited. The most important property in the

<sup>1</sup> Harold E. Heide, mining engineer.

area is the Bartels mine. Although it is said to have produced some ore in the past, there are no reports on assays of ores shipped from this mine. Some of the workings were accessible, but the rock surfaces were covered with ice, which made surface sampling and observations difficult. A trenching program is planned to determine the feasibility of intensive development work on this property.<sup>2</sup>

Two adjacent properties - Cance and Percy - were visited, but all workings were caved in or inaccessible. Much of the information contained in this report was obtained from "Lode Tin Deposits of the Lost River Area, Alaska," by G. B. Mertie, Jr., and Robert R. Coats (1942), an unpublished report of the Geological Survey, United States Department of the Interior.

#### HISTORY

Cassiterite was discovered in the Lost River area in 1903 by Leslie Crim, Charles Randt, and W. J. O'Brien, who staked claims along the Cassiterite dike on both sides of Cassiterite Creek, about 3/4 mile from its mouth. Later, these claims were bonded to a development company, which in 1904 sent a party into the area to sample and appraise this and adjoining lodes. Work was suspended after a month, and the property reverted to its original owners (Crim, Randt, and O'Brien), who continued the assessment work. They obtained patents to the ground and in July 1907 organized and incorporated the Lost River Tin Mining Co. at Nome, Alaska, under the laws of the Territory.

From 1904 to 1911 the only activity in this area was a little intermittent placer mining on Cassiterite Creek, which yielded about 20 tons of tin concentrates. In 1912 a syndicate headed by George Jamme, of Seattle, took a lease on this property from the Lost River Tin Mining Co. and started systematic

<sup>2</sup> War Minerals Report 164 (in preparation).

development. A small concentrating plant was erected in the spring of 1913, and this operated for two months of that year and for parts of the seasons of 1914 and 1915. Prospecting was continued until 1916, when the lease was allowed to lapse.

About 8 tons of concentrates were produced and shipped.

In 1918 another concern, organized by James F. Halpin, took a lease on the Lost River property. This group did a great deal of underground exploring, but in 1920 all work was suspended. No tin concentrates are known to have been shipped.

In 1928 the National Tin Mining Co. leased this property and shipped machinery and supplies with the intention of reopening and exploring the old workings. It continued prospecting and development work for two years. In 1930 operations ceased, and the property reverted to the original owners.

#### PHYSICAL FEATURES

The approach to the Lost River mine from Bering Sea is one of generally low topographic relief. The river-bottom area is wide and flat, and the surrounding hills are low and rolling. The immediate vicinity of the deposits is more mountainous, slopes rising 1,000 feet at about 30° angles. No timber is observable along the entire coastal strip from Nome to Lost River, and there is no timber in the immediate area.

A coastwise steamer makes two or three trips each season (the three summer months) to Lost River from Seattle or intermediate ports. The last return trip from Lost River is made about October 6. Heavy equipment and supplies from Seattle should be shipped by this route. There is no harbor at Lost River, and all freight must be lightered ashore. The freight rate from Seattle is approximately \$30 a ton, with additional lighterage costs of \$7.50 or more a ton for ordinary cargoes. Lighterage from Teller may range from \$10 to \$25 a ton.

Supplementary coastwise service is provided by a small mail boat of the motor-schooner type, which makes bi-monthly trips between St. Michael, Nome, and Kotzebue. This schooner will tow a barge from Nome to Lost River when cargoes justify. Freight by this route from Nome to Lost River is about \$30 a ton, with additional charges for lighterage.

At present transportation from Lost River to the mine, a distance of 8 miles, is by tractor and trailer. A road suitable for truck haulage was maintained by the last mine operators in 1928 and could be put into serviceable condition at a cost of a few thousand dollars.

There is no harbor at Lost River. A harbor exists at Port Clarence, 25 miles to the southeast, and possibilities of using this port will be investigated. An old road, which runs from Teller to Lost River is reported to be still in serviceable condition for tractor-trailer haulage. If large-scale mining operations at Lost River are indicated by exploration, a survey of harbor facilities, roads, and necessary improvement thereof will be made.

An alternative method of transportation is by air. There is a natural landing field  $1\frac{1}{2}$  miles south of the mine, and pilots assert that heavy loads can be landed on it in its present condition. Air-express tariff from Nome to Lost River is now 15 cents a pound. However, this rate could be lowered appreciably by contracting for regular air-freight haulage.

Lode-mining equipment and supplies are not stocked by local merchants and agents because little such mining is done in the region. In general, these supplies will have to be brought in from the outside. However, there are some valuable mining equipment, compressors, drills, hoists, cars, and tools at the Lost River mine, and these will serve for fairly extensive preliminary development work.

## LABOR AND LIVING CONDITIONS

Experienced labor, both underground and otherwise skilled, is now virtually nonexistent in this part of Alaska, but there is an adequate supply of unskilled Eskimo labor. The Eskimos on Seward Peninsula are fairly intelligent and industrious and have proved valuable in army and civilian construction work. In July 1942 unskilled labor was paid \$7 a day.

The skilled-labor problem could be solved by importing a skeleton crew of miners and mechanics with foremen and instructors to train the natives.

## ORE DEPOSITS

The ore occurs chiefly in acidic dikes intrusive in limestone. The preponderance of development work has been on the best showings or known ore shoots in these dikes. Similar, unworked dikes occur nearby, and these are possible sources of additional ore.

Fissures in the limestones surrounding the lodes may have contributed to the general metamorphism and to localization of tin deposition. On first inspection the fractures show two directional trends - one conforming to the stronger north-south faults and the other conforming to the east-west bearing of the dikes.

Owing to tight lagging of the roof and walls, the workings of the Cassiterite lode afford few exposures of the vein. Because of the bad condition of the timber, it was unsafe at the time of examination to open the lagging for inspection or sampling. The lode is in a hard quartz-porphry dike, which when altered, contains many secondary minerals.

Most of the lode, with the possible exception of the gouge, can be diamond drilled without difficulty. In No. 3 adit, the best tin-bearing portion of the lode shows the most sericitization and kaolinization of the porphyry.

Systematic sampling of the mine was not undertaken during the preliminary examination. It had been planned to take enough samples to check the available assay maps, but the physical condition of the mine made this impracticable. The present plan of preliminary sampling is to trench the floor of adit No. 3 and to trench across the lode at intervals.

#### MINE WORKINGS

At the time of this examination (July 1942) the principal underground workings consisted of three entrance adits with raises and winzes on the Cassiterite lode, on the east side of Cassiterite Creek, the Randt Extension adit, and one short adit on the west side of the creek. No. 3 (lowest) adit was open for approximately 550 feet, the Randt Extension adit for 75 feet, and the others were caved near the portals. Timber in the accessible adits is badly rotted; the workings are partly caved and unsafe. Caving is not believed to be caused by heavy ground, but by rotting timbers.

A winze was sunk from No. 3 adit at a point about 500 feet from the portal; it is reported to be 420 feet deep and to have an inclination of  $70^{\circ}$ . In July 1942 the winze was accessible to a depth of 305 feet, the point of permanent water level. A drift, said to be 245 feet long, was visible from the winze at the 305-foot level. The water level was 3 feet above the level of the drift floor.

Neither the drift nor the winze was in the lode near the 305-foot station. The winze is lagged, so that nothing can be seen of the rock walls except at the stations. All timber here

is in good condition with the possible exception of the collar set, and the winze will be usable for some time with only minor repairs. The winze is one and one-half compartments with a half-ton skip and air hoist installed.

#### ORE RESERVES

An assay map made in 1918 by a previous operator shows the ore above No. 3 adit to average 1.46 percent tin and 0.44 percent tungstic acid. The ore estimates were:

<u>Class</u>	<u>Ore, tons</u>	<u>Tin, tons</u>	<u>WO<sub>3</sub>, tons</u>
Assured ore.....	54,000	788	237
Indicated ore.....	95,000	1,387	418
Probable ore.....	592,000	8,643	2,604

In 1934, a recalculation of the reserves was as follows:

Assured ore.....	149,000	2,175	655
Indicated ore.....	592,000	8,643	2,604

Examination of this area in 1941 led to the following conclusions:

Ore in Cassiterite dike above Cassiterite Creek - 170,000 tons with 0.6 to 0.8 percent tin and less than 0.03 percent tungsten (WO<sub>3</sub>).

Ore in Ida Bell dike above level of Cassiterite Creek - 55,000 tons (with lower values than Cassiterite dike ore).

Cassiterite dike will yield approximately 100,000 tons for each 100 feet of depth.

Ida Bell dike will yield approximately 79,000 tons for each 100 feet of depth.

Ore-reserve estimates based on the limited unverified information now available are mere conjectures. The preliminary exploration described in this report, with the supplementary exploration that may be warranted thereafter, may develop several hundred thousand tons of tin ore with an average tin content of at least 0.5 percent.

PROPOSED EXPLORATION BY BUREAU OF MINES

The Bureau plans to explore the Cassiterite and Ida Bell lodes by means of diamond drilling and surface trenching. The following are the estimated costs for this work:

Surface trenching (bulldozing), 1,060 lin. ft.....	\$3,600
Surface trenching (hand) 200 lin. ft.....	325
Mine sampling: Drifts, \$700; winzes, \$600..	1,300
Trails and roads (1 mile of grading).....	200
Diamond drilling (2,130 ft. at \$10 per ft. over all).....	21,300
Transportation: Personnel, \$1,000; supplies and equipment, \$2,000.....	3,000
Supervision and engineering.....	<u>1,000</u>
	30,725

CONCLUSIONS

The proposed exploration work should determine whether further work is warranted. Sampling to check investigations made by others is going forward, and the results will be used as a guide in conducting a large-scale exploration program.

The Bureau plans to do this preliminary exploration work at an estimated cost of \$30,725.