REPORT

ON THE OCCURENCE OF TIN

IN THE ORES OF

GOLDFIELD, NEVADA

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Introduction

This report is a supplement to the report by the writer on the Goldfield Operators Lease of the Jumbo Extension Mine.

It is expressly agreed by Mr. H. P. Kervin and Goldfield Operators Ltd., that this report will be used only in its entirety and that no excerpts or quotations are to be made from this report without the written approval of the writer.

Sampling

In December, 1939, Mr. H. P. Kervin showed the writer a qualitative spectographic analysis made by the Applied Research Laboratories, Los Angeles, on a selected sample of ore from the 790 level of the Jumbo Extension Mine. This analysis reported approximately 1% tin in the sample. Another piece of the same sample, which consisted largely of the copper antimony sulphide, famatinite, was spectrographically analyzed by the writer and the presence of tin confirmed.

Subsequently, a laboratory flotation concentrate was made by Mr. Welsh of the Tonopah Mining School, Tonopah, Nevada, of ore taken from the drift and raise approximately at coordinates N 0000, E 2120, 790 level, Jumbo Extension Mine. This ore assayed $7.39 in gold and $1.44 in silver, a total of $8.83. The concentrate, assayed

by Atkin & McRae, Los Angeles, gave $188.67 in gold and silver and 14.1 per cent copper. This indicates a concentration ratio of about 21:1. A sample of this same concentrate gave 3.2 per cent tin according to an analysis by Dr. John Herman, Los Angeles. Assuming that the above concentration ratio is correct, this would give the tin content of the ore as 0.15 per cent.

Six samples of selected ore, collected by Mr. Kervin were next partially analyzed with the following results:

Sample	Gold (Oz.)	Silver (Oz.)	Tin (percent)
1	0.28	2.64	0.075
2	0.19	0.78	0.07
3	0.94	4.48	0.28
4	0.03	0.34	0.02
5	0.18	0.50	0.13
6	0.08	0.64	0.08

The location of these samples follow:

Sample: 1, Dump, Paloverde (Jumbo Ex.) shaft - sulphide bearing ore.
2, Dump, Paloverde shaft, ore in shale wallrock.
3, Ore dump, Velvet shaft; ore hoisted from the 790 level of the Jumbo Extension Mine.
4, Dump, Spearhead shaft.
5, Dump, Merger shaft, ore probably from around the 1400 level.
6, Ore screenings on dump, Grizzly Bear shaft; ore probably from about the 1200 level.

Gold and silver assays on these samples were made by Donner Bros., Goldfield, and the tin was determined by quantitative spectrographic analyses made by Applied Research Laboratories, Los Angeles.

A sample of ore rich in famatinite was collected by the writer from the raise and drift at N 0000, E 2120, 790 level, Jumbo Extension Mine. From this sample the writer hand-picked a selected sample of practically pure sulphides, mostly famatinite, which showed

2.85 per cent tin on analysis by the Smith-Emery Company, Los Angeles.

Other qualitative spectrographic analyses, made under the supervision of the writer, on ore from this district show tin ranging in amount from a trace in surface samples of vein quartz to approximately 0.5 per cent in selected samples of sulphide ore.

Mode of Occurrence of the Tin

No tin bearing mineral has as yet been positively separated from the ore and analyzed. However, polished sections of the ore show a mineral, which gives qualitative tests for tin, intergrown with famatinite. The composition of this mineral has as yet not been determined. It has been suggested by the U.S. Bureau of Mines that the tin mineral may be colusite, a sulphide of copper, iron, tin, molybdenum and zinc, carrying arsenic and a little antimony, but a spectrographic analysis of the Goldfield material does not confirm this suggestion. Colusite has been reported only from the Butte District, Montana, where it contains about 6.5 per cent tin.

The evidence to date, however, indicates a close association at Goldfield between tin and copper minerals, particularly famatinite. In no place has appreciable amounts of tin been found in ores lacking famatinite.

Significance of the Occurrence of Tin in these Ores

At the present time it is impossible to know whether the presence of tin in part of the Goldfield ore is merely a mineralogically interesting occurrence or whether it may have economic possibilities.

The above samples show that it is present in varying amounts in ore taken from points spread over a considerable part of the district. On the basis of the existing samples, none of the ore in the mines contains enough tin to justify mining it for the tin content alone. Apparently the tin is intimately associated with the copper sulphides in these ores which likewise are present in small amounts, since the copper content of the run-of-mine ore averages less than 3 per cent.

The occurrence in the epithermal type of ores, of which Goldfield is an example, of small amounts, i.e., a few tenths of a per cent or less, of one or more elements such as tungsten, nickel, molybdenum, mercury and tin is not unusual. No prediction can be made about the increase or decrease in amount of one or more of these elements at greater depth in any particular deposit. General experience indicates that where such changes take place, the rate of change with depth is too small to be of any practical use or importance.

Tin is generally found as the oxide mineral cassiterite im high temperature deposits closely associated with granitic rocks. The South American deposits are somewhat of an exception to this general rule both as to the type of deposit and the association with granitic rocks.

In the Goldfield district there is a possibility that as the granite and alaskite contact is approached, the character of the mineralization may change in the direction of an increase in the sulphide content of the ores. If such a change takes place, it might be accompanied

by an increase in the copper and tin content of the ores. Any increase in the tin content of these ores would logically be looked for at depth and in the vicinity of the granite shale contact.

Respectfully submitted,

(Signed) Horace J. Fraser

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