

INTRODUCTION

This report was written following an inspection of the McCarty gold lode mine and mill, made on the morning of November 4, 1941. Mr. James D. Crawford, manager of the operation, accompanied the writer.

OWNER AND LOCATION

The McCarty Mine is owned and operated by the U.S.S.R.&M. Co., with offices at Fairbanks and 1 State Street, Boston, Mass. It is situated at the head of Fairbanks Creek about 20 miles northeast of Fairbanks, on the Henry Ford group of lode claims. By auto road the distance from Fairbanks is about 26 miles.

PREVIOUS INVESTIGATIONS

A brief description of mining and prospecting on the Henry Ford group of claims appears in Geological Survey Bulletin 849-B, by James M. Hill. At the time of Hill's visit in 1931, however, the underground workings on the vein now being mined were not accessible. No reference to prospecting or mining on these claims was found in earlier Geological Survey publications..

UNDERGROUND WORKINGS

The main workings are on the Americal Eagle Vein, which strikes about N60°W and dips 55 - 60°SW. They are on three levels, namely the 28, 135 and 235 foot levels, and total about 3000 feet.

The levels are connected by airways and by an inclined shaft that dips 69°, or somewhat steeper than the vein. A second inclined shaft that dips about 60° - also steeper than the vein - has recently been sunk from the east end of the 235 foot level to a depth of 300 feet, from where a fourth level will be run to the east. Both shafts are in the country rock on the footwall side of the vein.

Most of the ore above the 135 foot level has been stoped and present mining is from the 235 foot level. This level is also being extended eastward. Heavy ground caused by extensive faulting has necessitated close timbering in most parts of the mine, particularly west of the shaft.

Power is supplied by a power line from the U.S.S.R.&M. Co. power house near Fairbanks, and all machinery is electrically operated. In the hoist house near the incline are a two-stage Ingersoll-Rand compressor and a single-drum hoist. This building also serves as a blacksmith shop and in addition contains a 10 HP upright boiler. Adjoining it is a change-room containing a shower bath.

A 24 inch American Blower driven by a 2 1/2 HP motor ventilates the 235 foot level where mining is now in progress. Air is forced from this level up the main incline, while fresh air is drawn in through the airways that connect with the upper levels on both sides of the incline.

A small amount of ground water is encountered underground. It drains to a sump under the incline on the 235 foot level and from there it is pumped to the surface. The flow was stated to be about 40 - 50 gallons per minute, but it varies with the time of year and reaches a minimum during the late winter months. The pump capacity is 65 gallons per minute against the present head of 246 feet.

Ore is brought from the chutes in 1/2 ton cars and is hoisted to the surface in a 1/2 ton skip, where it is dumped into a car and trammed by hand to the nearby mill.

THE MILL

At the mill the ore is reduced to 1 1/2 inch size by an 8 by 6 inch jaw crusher and is then crushed to pass through 40 mesh Tyler Toncap screens by a two-stamp Nisson mill. Each stamp in the mill weighs 1500 pounds and makes about 72 strokes per minute with an eight inch drop. After being crushed to size the ore is passed over two 3 1/2 by 10 foot copper plates. The tailings are impounded. A capacity of 10 tons per 24 hour day is attained.

Mill power is supplied by a 15 HP electric motor, which, through a two-way clutch can run both the jaw crusher and stamps. Because most of the ore breaks fine it is necessary to operate the crusher only a small part of the time.

OTHER BUILDINGS

In addition to the hoist house and change room, already mentioned, a mess house, a bunk-house and an assay office are on the property. All buildings appear to be well constructed and are insulated to withstand low temperatures.

EMPLOYMENT

Normally a crew of 13 men is employed underground and in the surface plant and mill. Seven men, including five miners, a trammer and a foreman work a single eight hour shift underground, six days a week. A hoistman and a trammer work the corresponding eight hour shift on the surface. Four men are employed in the mill, which runs three daily shifts, seven days a week, and one man is employed in the assay office.

At present three additional men are working on contract to sink the inclined shaft to the 300 foot level and their presence necessitates the employment of an extra hoistman and a trammer, who work on the night shift.

MINE SAFETY

Conditions in the mine and mill are good as regards safety and general mining conditions. The management appears to be making every effort to maintain safe working conditions.

STORAGE OF EXPLOSIVES

Powder is stored underground in an old mine dump across Fairbanks Creek and about a quarter mile upstream from the mine. About 100 cases are kept on hand in this main powder cache. About 10 cases are stored in a thawing pit built in the mine tailings 100 feet downstream from the hoist house. During cold weather steam is circulated through pipes in the pit in order to prevent the powder from freezing.

GEOLOGY

American Eagle Vein-

The American Eagle Vein is from one to three feet thick, and as previously noted, strikes about N60°W and dips 55 - 60°SW. It consists in general of coarsely crystalline quartz with free gold and small proportions of jamesonite, stibnite, arsenopyrite and sphalerite. In addition, occasional large kidneys or lenses of high-grade stibnite¹

¹A grab sample taken from a large stibnite kidney near the east end of the 235 foot level contained the following:

Antimony 60.66%

Arsenic TR

Lead Tr

The analysis was made by A. E. Glover, Territorial Assayer

are found associated with the vein. These lenses contain little gold and probably represent a later period of mineralization than the gold-quartz. It is likely that it would pay to sort

out the high-grade portions of stibnite for possible shipping.

The high-grade gold ore occurs in a shoot of irregular outline that pitches east at a low angle. Although modified considerably by faulting, the position of this shoot may coincide approximately with the occurrence of wall rock competent to transmit faulting stresses along a simple fissure. In general, the quartzite schist wall rock appears to be more favorable for ore deposition than the softer mica schists.

West of the shaft on the 235 foot level the ore has been cut out in many places by a major fault that follows the vein. High-grade ore was found from a point near the shaft to the east end of the 235 foot level, but it is expected that the east pitch of the ore shoot will soon carry it below this level. The new 300 foot level will be run in order to cut the eastward extension of this shoot.

Henry Ford Vein

Crossing the American Eagle Vein is the Henry Ford Vein, which strikes N65°E and dips about 75°E. This vein apparently represents a mineralization distinct from that of the American Eagle. It is displaced along the latter vein by the strike fault mentioned in the preceding paragraph, so that its southwest extension is about 200 feet northwest of the northeast part. The Henry Ford Vein is 4 - 5 feet thick and is reported to carry \$1 to \$15 in gold which is intimately associated with arsenopyrite and consequently is not free-milling.

COUNTRY ROCK

Quartz-mica schist constitutes the chief country rock, but quartzite schist and calcareous schist are also encountered. Sericitization is said to characterize the wall rock near the vein and the gouge formed by strike-faulting also appeared to contain sericite.

Bedding and schistosity are nearly coincident. In general the dip is flat - less than 20° - but the direction of dip varies considerably.

FAULTS

Faulting occurred during several distinct periods. Considerable faulting apparently preceded and also accompanied vein filling, but in this brief examination most attention was paid to post-mineral faults.

The largest post-mineral fault is parallel to the American Eagle Vein, as witnessed by the 200 foot offset of the Henry Ford Vein. This fault coincides with the vein west of the shaft, where the ore has been cut out by drag, and it continues past the west end of the 235 foot level. Movement apparently took place in several directions; the main displacement, however, was horizontal and some of the faulting was of a reverse nature according to the directions of striations and the large amount of gouge.

East of the shaft the large fault that offsets the Henry Ford Vein passes into the hanging wall. Numerous other faults that coincide with the vein are found east of the shaft, but their displacements are small and are apparently in no single direction.

In addition to the faults already described, numerous post-mineral cross-faults were encountered in the various levels. These faults strike from northwest to northeast and dip from about 60° to 80° east. The strike of many of them is approximately that of the Henry Ford Vein, although the dip is reversed. They are all normal and therefore the displacement of the American Eagle Vein is always to the north when facing east. The maximum horizontal displacement caused by any single cross-fault is 80 feet. Considerably less gouge is associated with these faults than with the strike-faults.

VALUES

For several years the mill ore ran over \$60 per ton in gold but at present values are about \$35. These lower values are the result of mining from the upper extremities of the east-plunging ore shoot rather than a decrease in tenor at increased depth. It is expected that higher grade ore will again be encountered on the eastward extension of the 300 foot level.

Since only the free gold is recovered in the amalgamation, some gold associated with the sulfides is contained in the tailings, as well as some finely divided free gold that is enclosed in vein quartz. About 10,000 tons of tailings, said to assay somewhat over \$6 per ton, have been impounded. It is expected that eventually these tailings will be retreated.

CONCLUSIONS

Because of the short time spent on the property the writer offers the following brief remarks with considerable hesitancy.

It is apparent that the American Eagle Vein lies in a major fissure, or zone of faulting, and thus the vein may be expected to continue a considerable distance past the present workings. As is the case with many fissure veins in the Fairbanks District, the character and tenor of the ore are apparently influenced mainly by the hardness and competence of the wall rock. For this reason, at the McCarty mine changes due to increased depth are not expected to occur for several hundred feet. The ore apparently occurs in shoots whose size, shape and distribution can be determined only by additional development.

Prospecting should be continued past the west end, where the vein is cut out by the large parallel fault. Diamond drilling possibly could be used to advantage here.

The Henry Ford Vein, which has been little prospected, has good possibilities as a larger, but lower grade producer.

Development and mining have been carried out systematically and safety conditions both underground and in the mill are satisfactory.

ACKNOWLEDGEMENT

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