UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

THE GUM-LAMOREAUX MINE, LEMHI COUNTY, IDAHO*

By

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ABSTRACT

The Garm-Lamoreaux property, Lemhi County, Idaho is known to have uraninite and zippeite on two of its dumps. The property has been explored by five adits, two of which are now caved, and one of which is partly caved. The country rock is schistose micaceous quartzite and argillaceous quartzite of Belt age. An east-west fault cuts the quartzite, and the Lamoreaux vein, a gold-sulfide-quartz vein, occurs in the fault. The uranium minerals are believed to have come from the vein, on the now inaccessible No. 3 level.

An alidade and plane-table map was made to tie in the positions of the five underground workings. The lowest adit, the first 200 feet of Tunnel 2 and the Bedrock tunnel were mapped. Maps of the other workings made by Gilbert in 1933 were combined with the writer's maps.

Samples were collected from the radioactive parts of the number two and number three dumps. Chemical analyses of the samples showed a range of from 0.001 to 0.54 percent uranium. It appears probable that at least some uranium could have been leached by sulfate-bearing waters in the dump material. The presence of as much as 0.54 percent uranium in one sample from the Tunnel 3 dump suggests that an exploration program would be advisable.

INTRODUCTION

The Cara-Lamoreaux mine is in sec. 31, T. 26 N., R. 21 E., Lemhi County, Idaho. It is about 11 miles northwest of North Fork, Idaho, on Allan Creek, a small south-flowing tributary of Hughes Creek. The property is a group of unpatented claims owned by the estate of Ira Lamoreaux, deceased, for which Ralph E. Yates, 631 South Fourth Street, Springfield, Ill., is the agent. G. I. Hurley of Salmon, Idaho, is the local manager of the property. Dr. J. E. Goggins and Mr. Keith Evarts, both of Salmon, Idaho, had a lease on the property in the summer of 1953.

D. C. Gilbert (written communication, 1933) examined the mine for gold in 1933 and made a map of the accessible underground workings. J. S. Vhay (1951) and A. F. Trites and E. W. Tooker (1953), all of the U. S. Geological Survey, examined the property for radioactivity in 1949 and 1951, respectively. In August and September 1953 the writers spent four days at the property, the last day in company with Messrs. John D. Bradley, Roger H. McConnel, and Charles Rathborn of the Bradley Mining Company.

DEVELOPMENT

The deposit has been developed by five adits totaling over 2,900 feet in length. The four upper tunnels were driven previous to the start of development on the present lease. The lowest adit is being driven by Goggins and Evarts to intersect the downward projection of

the Lamaream vein. At the time of the writers' examination, work on the lowest level had been discontinued temporarily. The approximate lengths of the adits and elevations (datum assumed) of their portals are as follows:

	Length (feet)	Elevation (feet)
Lowest tunnel	690	4,752
Tunnel 3	1,160+	5,000
Tunnel 2	445+	5,092
Tunnel 1	195 (?)	5,146
Hardrock Tunnel	445+	5,186

The writers made a surface sketch map by plane table and telescopic alidade tying the five adits together, and made Brunton and tape geologic maps of the lowest and Hardrock tunnels. The portal of Tunnel 2 was partially caved, but Armstrong and McConnel were able to map the first 200 feet. The rest of the workings were inaccessible due to cave-ins. In 1933 Gilbert was able to map practically all of Tunnels 2 and 3, but Tunnel 1 was caved. Gilbert's and the writers' work have been combined to produce figures 1 and 2. Since Gilbert made his examination, Tunnel 3 has been advanced about 270 feet. In 1949, Vhay entered the first 300 feet of Tunnel 3 at which point there was a cave. He did no mapping.

GEOLOGY

The area is underlain by micaceous, schistose quartzite and argillaceous quartzite of the Precambrian Belt series. Prominent schistosity in the quartzite strikes north to northeast and dips

steeply to the east. Numerous small faults and brecciated zones are parallel and subparallel to the schistosity. Where bedding was definitely recognized it strikes approximately east and dips 45° to 60° south. In only one place, on the lowest level, was it thought that the beds were overturned.

Both Gilbert and Hurley (oral communication) have described the Lamoreaux vein as a fractured quartz vein containing a little pyrite, galena, and free gold. In Tunnel 1, Gilbert reports the vein to be 3½ feet thick. The vein occurs in a fault that appears to strike east in Tunnels 1 and 2 and northwest in Tunnel 3. The dip of the fault appears to be nearly vertical between Tunnels 1 and 2 and about 45° NE between Tunnels 2 and 3; below Tunnel 3 the dip is reported to be 87° NE. G. I. Hurley reports the fault zone to be as much as 9 feet thick in Tunnel 3. The strike of the fault suggests that the Lamoreaux vein is similar to the veins at 310 feet and the end of the Hardrock Tunnel and is not related to the faults that approximate the attitude of the schistosity. Vein material on the dumps, reported to be from the Lamoreaux vein, consists of fractured, slightly iron-stained quartz containing a little chlorite and sparse pyrite and galena.

In the northwest corner of Tunnel 3 dump, brilliant yellow efflorescence was found on several dark siliceous vein fragments and all of these fragments showed abnormal radioactivity. Mineralogists of the U. S. Geological Survey identified uraninite in the dark siliceous vein material and identified the yellow

efflorescence as zippeite. Both identifications were by X-ray diffraction patterns. A dark gray to black, powdery material occurs in minute veinlets in and coating the same and other vein fragments, but the fragments do not show sufficient abnormal radioactivity for all of the powdery material to be scoty pitchblende.

RADIOACTIVITY

The radiation background in the vicinity of the mine is 0.016 millircentgens per hour. A traverse of Tunnel 3 dump for abnormal radioactivity showed a 225 square foot area to be more than ten times background; a 1,000 square foot area, more than five times background; and the northern half of the dump, more than twice background (fig. 1). The lack of vegetation and marks of old ties and track suggest that the north half of the dump is some of the last, though not the very last, rock mined from the adit. A similar traverse of Tunnel 2 dump showed a small area on the south part of the dump to be about twice background (fig. 1). The lowest and Hardrock adits showed no abnormal radioactivity.

SAMPLES

The writers took two samples from Tunnel 3 dump and two from Tunnel 2 dump. Samples Nos. FCA-10A and FCA-11A were taken from the part of dump No. 3 that showed ten times background. Judging from the radioactivity shown by many other pieces, other samples with a uranium content similar to No. FCA-10A (0.54 percent) could

have been taken. The samples from Tunnel 2 dump are believed to be representative of the abnormally radioactive south part of the dump.

In 1949 Vhay (1950) took four samples from the property, and in 1950 Trites and Tooker (1952) took six samples. The results of the analyses of the 14 samples are shown below in table 1.

On September 10, 1953, Messrs. L. D. Jarrard and R. Nicolls of the Butte, Mont., sub-office of the Atomic Energy Commission visited the property. A sample they collected from an ore pile at the residence of G. I. Hurley in Salmon, Idaho, reported to be from the mine, assayed 0.47 percent equivalent U_3O_8 and 0.36 percent U_3O_8.

CONCLUSIONS

Phair and Levine (1953) have shown that "once - [pitchblende] has been partly oxidized by contact with oxygen, either in the air or dissolved in mine waters, - [it] is readily susceptible to solution by H_2SO_4 invariably present in and around sulfide mines." They leached two 2 g splits of a specimen of Katanga pitchblende in 31 ml of 1.84 N and 0.17 N sulfuric acid for 144 hours, and leached 41.00 and 30.46 percent, respectively, of the uranium originally present in the splits. The presence of sparse sulfides in the Germ-Lamoreaux dumps and of pulverulent zippeite [$(UO_2)(SO_4)(OH)_2 \cdot {}_nH_2O$] on uraninite-bearing fragments of vein material, suggests that the dumps are in the process of being leached by sulfuric acid solutions. The quantity of uranium removed from the dump is not known but in the light of Phair and Levine's findings it could be appreciable. The

Table 1.-- Samples from the Grouse Creek property, Lemhi County, Idaho

Sample number	Location	Description	Gold (oz/ton)	Uranium (percent)	Molybdenum (ppm)	Silver (oz/ton)
FCA-10A	Southwest part of Tunnel 2 dump	Selected vein material	0.45	0.54	0.15	0.10
FCA-11A	" " " "	Representative sample of most radioactive part of dump	.042	.055	.12	.14
FCA-12A	South part of Tunnel 2 dump	" " "	.011	.005	.24	.30
FCA-13A	" " " "	" " "	.011	.006	.40	.38
9-VS-8	Northwest part of Tunnel 3 dump	Random sample across dump face	.027	.018	N.D.	N.D.
9-VS-9	" " " "	Selected material	.024	.008	N.D.	N.D.
9-VS-10	Tunnel 2 dump	Yellow-stained quartz and gossan	.015	.005	N.D.	N.D.
9-VL-24	Tunnel 3 dump	Fragments of fractured quartz, chlorite, pyrite, and secondary minerals taken for study	.13	.11	N.D.	N.D.
AFT-S5-50	Northeast part of Tunnel 3 dump	Composite sample of vein material	.013	.009	N.D.	N.D.
AFT-S2-50	Near center of Tunnel 2 dump	Grab sample containing limonite-stained quartz	.007	.005	N.D.	N.D.
AFT-S3-50	" " " "	" " "	.014	.010	N.D.	N.D.
AFT-S4-50	" " " "	Grab sample of dump material	.003	.001	N.D.	N.D.
AFT-S6-50	North & South parts of Tunnel 2 dump	Composite sample of dump material	.003	.001	N.D.	N.D.
AFT-S7-50	Tunnel 1 dump	" " "	.004	001	N.D.	N.D.

N.D. = Not determined
All analyses by the U. S. Geological Survey.

possibility of substantial leaching of the dump material, together with the rather high uranium content of the samples collected from the dump appears to indicate a reasonably good possibility of the occurrence of at least some high grade uranium ore underground. The writers believe that this possibility is sufficiently good to justify further investigation of the property as a uranium prospect.

Tunnel 3 should be made accessible. The portal has caved since the autumn of 1949 and should not be too difficult to open. From Vhay's work it is known that about 300 feet from the portal there is another cave. This cave may extend to the surface for Vhay observed surface matter in the caved material. According to Everts, who has been in Tunnel 3, there were only three sets of timber supporting this loose ground which extended 15 or 20 feet along the drift. He believes the cave can be spiled through without much trouble. If it is found too expensive to spile through the cave, a drift can be run to the northeast around the caved area. Because of the lack of detailed information on the location of the workings and the resultant difficulty of re-entering the adit on grade, the length of the by-pass should be kept to a minimum.

Everts states that the "big fault" mapped by Gilbert about 90 feet east of the cave, is not likely to be caved, nor is the rest of the adit southwest of the split in the adit (fig. 1). Northeast of the split Everts thinks there may be cave-ins. If the adit is too badly caved to be cleaned out, crosscuts from both branches of the split in the adit should be driven to the vein (fig. 1).

Because it is not known exactly where the radioactivity occurs in Tunnel 3, it is important that as much as possible of the old workings be made accessible for examination. When the level is made accessible a traverse for abnormal radioactivity should be made and the favorable areas sampled. Phair and Levine (1953) have pointed out that uranium may be leached from the walls of old mine workings in the same manner as from old dumps. Therefore, even if the results of this traverse are negative, some drifting along the vein should be done.

If development in Tunnel 3 is successful, then Tunnel 2 should be reopened and the lowest adit extended to intersect the Lamoreaux vein. The shortest route from the face of the lowest adit to the Lamoreaux vein appears to be N. 40° E. 600 or 700 feet, but because of the incompleteness of the information at hand and the distance between Tunnel 3 and the lowest level, 248 feet, the distance to the vein may be greatly in error.

LITERATURE CITED

Phair, George, and Levine, Harry, 1953, Notes on the differential leaching of uranium, radium, and lead from pitchblende in H_2SO_4 solutions: Econ. Geology, v. 48, p. 338-369.

Trites, Albert F., and Tooker, Edwin W., 1953, Uranium and thorium deposits in east-central Idaho, southwestern Montana: U. S. Geol. Survey Bull. 988-H.

Vhay, J. S., 1951, Reconnaissance examinations of uranium at six mines, and properties in Idaho and Montana: U. S. Geol. Survey Open-file report.