

Report on the Utopia Tunnels

of the Utopia Mining and Milling Company

Sampled May 25, 26, and 27, 1929.

MR 29-1

GEOLOGICAL SURVEY OF WYOMING

EXPLANATION. The holdings of the Utopia Mining and Milling Company at present are under ten year lease--beginning June 1, 1927, with ten years renewal option--to the Commercial Gold Mining Company. These two companies are under one management with headquarters in Centennial, Wyoming. The Commercial company owns the well known old Centennial mine from which, from three short, staggering stopes, limited by a flat fault to a maximum depth of sixty feet, a gross production of \$90,000 in free milling gold ore is authentically reported to have been made about sixty years ago. Extensive exploration by the latter company below the probable plain of flat faulting in the Centennial has as yet failed to locate ore corresponding to that mined near, and up to, the surface and now that company is endeavoring to develop in the Utopia a profitable production which eventually will provide money for further exploration of the Centennial ground.

Because of limited funds the time spent in this investigation and the number, sample interval and nature of the samples taken had to be limited to such as would enable merely a judgment of the prospective worth of further development without any estimation of developed tonnages and values. It is for the Commercial Gold Mining Company, Mr. Bernard Holtum, Centennial, Wyoming, secretary-manager, that this investigation was made.

DESCRIPTION. As indicated by Plate I, attached, the surface property of the Utopia company consists of two full, end-lining patented claims, 600 feet by 1500 feet each, giving 3000 feet in length and covering approximately 2300 feet of possible Utopia vein. There is as yet no direct indication that the outcrop in the Marquette claim may pass outside its south side line, but this possibility should be closely watched as development in Tunnel No. 4 progresses westward.

Going from the dump at the mouth of Tunnel No. 4 toward the N. E. endline of the Struggler claim the ground slopes more gently than from the same location back over the mountain along the line of the tunnels. Utilizing a part of the dump, which is old and well settled, to give gravity fall, this ground offers an excellent location for a mill and for impounding tailings which might be found to be detrimental to ranchers in the Centennial valley, immediately below.

The Laramie, North Park and Western R. R. and the town of Centennial, at which it has a station, are about one mile, over fairly even ground, from the possible mill site just mentioned. As to winter operating, it does not seem that the amount of snow-fall normally experienced in this locality is such as to interrupt hauling if the road is traveled every day, although there

might be short periods during which it would be necessary to use both sleds and wagons (or trucks) and to transfer loads.

Although the amount of profitable ore at present developed, lying in the 50 feet of backs between Tunnels 3 and 2 and about 70 feet in length, but beyond doubt extending farther westward, is not sufficient to warrant construction of a mill nevertheless further consideration of that phase seems justified.

Adquate water for milling operations, provided means were employed for settling and returning during the late winter season, doubtless could be secured by clearing out, perhaps blasting, a heavy flow of spring water which comes to the surface just below the north side of No. 4 dump.

Power would have to be generated on the ground as there is no power transmission line in the vicinity. For that purpose a good grade of steam coal could be purchased at railroad for about \$5.50 per ton, or if Diesel power were installed there is a refinery of the Standard Oil Company at Laramie, 30 miles away, with rail connection over the Laramie, North Park and Western R. R.

There is no standing timber suitable for construction or mine use anywhere on the Utopia claims although some small pine growth is found on the Commercial property. With the exception of some heavy ground encountered along the line of a fault traversed for about 80 feet by Tunnel 4, not timbered as yet, there is no ground which requires timbering in drifting.

SAMPLING. With the exception of breast samples, taken about waist high, all samples were taken from the roof. As previously explained, it was necessary to adopt the rather large sample interval of twenty feet and to take only one sample at each point. It is possible that by cutting, in Tunnel No. 4, separate samples of the streaks on the walls and of the intervening mineralized material some commercial values might have been found. On the other hand it is difficult to recognize this ore when not in place and mining for those streaks only, or hand sorting at the surface, would not appear to be feasible. Because of my connection with the mining department of the University of Wyoming it may be well to correct an erroneous, but fortunately not very common, belief that student help is used in the assaying done by me in the University Laboratory. As is always the case, the cutting down and assaying of the samples herein reported was done entirely by myself. In screening the final pulps, or samples for assay, close watch was kept for metallics (free gold) but none were observed.

In indicating the assay values on Plate II the width sampled is entered first, following which appears the value per ton. Computations are made at \$20 per ounce for gold and 50c per ounce for silver. Assay values below the smelter payment minimum are included because only by some combination of concentration, amalgamation and cyanidation can these ores be made marketable; in which case those values would be raised above

"pay" and a large proportion be converted into bullion to be marketed at the mint value of \$20.67 for gold, with the balance sold as concentrates at the smelter figures of \$19.00 or \$19.50 per ounce.

GEOLOGY. The explorations on the Utopia vein as they occur in tunnels number two and three and the mineralized formation, so indicated on longitudinal projected section of Plate II, now being prospected in Tunnel No. 4, all show fissures in hornblende schist. On the surface, about 100 feet north of the Utopia vein, there are indications of a dike of diorite apparently paralleling this vein but there is no evidence that this dike is in any manner connected with the occurrence of ore nor can diorite be found in the walls in any of the tunnels. There has prevailed a belief that diorite should be located in Tunnel No. 4 and its contact with the schist be followed in order to come under the proven ore in tunnels two and three; no foundation for such theory could be established.

Reference has been made, and will be made further, to a fault (or faults) which appears as a two foot offset of the foot wall streak in Tunnel 3 and as a distinct zone of disturbance in Tunnel 4. This is shown on the composite plan map of Plate II at the place where the north of west direction of Tunnel 4 abruptly changes to west of south and after about forty feet again takes an approximately west direction. It is quite apparent that this faulting did not cause the south offset of the formation which was followed westward to it and resumed after following it for about forty feet. At several points along this approximately north and south part of No. 4 Tunnel the plane of faulting is exposed and the gouge, or resultant mud streak, shows that the movement was vertical. This conclusion is further confirmed by the change in direction of the drift in the plane of faulting.

The vertical distance between tunnel 2 and 3 is 50 feet and between 3 and 4 is 240 feet. The dip of the Utopia vein as observed in two and three and in the mineralized, sampled part of tunnel four, is one foot horizontal to seven feet vertical. Such dip shows conformity between tunnels two and three and also that part of tunnel four lying to the west of the fault.

It is unfortunate that faulting occurs exactly where it does for there is nothing in the formation west of the fault on four that can be tied to the well defined vein on three and two. That is, the Utopia vein, as exposed in those upper tunnels, is not in place in that part of Tunnel No. 4.

At the Rambler mines, about ten miles southwest of Centennial and also at the Keystone mine, near the Rambler, it is believed that the ore is cut off by flat faulting. Mention has been made of a flat fault which bottoms the ore in the Centennial mine, within a mile of the Utopia workings. After trying in every manner to avoid the apparent "alibi", there seems no solution to the Utopia problem but to assume a similar condi-

tion. And if that conclusion is accepted the assumption that that part of Tunnel No. 4 which sampled is the downward continuation from which the upper tunnels were laterally faulted conforms with the following conditions.

Throughout the ore in tunnels two and three there is a characteristic occurrence of coarse crystals of garnet. A similar association can be found in Tunnel No. 4 only in the sampled territory. In that part of the fourth tunnel lying west of the fault and apparently in conformity with the ore on the two levels above no garnets can be found and there is no mineralization; except that at the extreme end of the west drift just east of the north crosscut, there is a small lens of chalcopyrite in rhodochrosite which is entirely foreign to anything above.

The best values, and the greatest mineralization in the form of pyrite, in the vein in the two upper tunnels occur in quartz lying next to a gouge streak on both walls. In the lowest tunnel an exactly similar condition is found in the sampled ground, whereas it is difficult in that part vertically below the upper ore even to determine what indications governed the direction of drifting.

It is my belief therefore that the ground in which the upper tunnels are located has shifted approximately horizontally a distance of about eighty feet, in a direction slightly west of north, from its original position above a westward continuation of the vein sampled in Tunnel No. 4.

DESCRIPTION OF ORE AND ITS OCCURRENCE. The Utopia ore occurs in two forms. First, in quartz streaks which carry pyrite and free gold and lie along either or both walls and second, in the intervening, altered schist which contains the garnet crystals previously mentioned and doubtless also free gold. It is said that some of the garnets when broken show a small seed of gold at the center. It is to be regretted that time could not be taken to verify this. These garnets are not in sufficient quantity or of sufficient size to present a serious grinding problem.

Not enough development has been done to begin to outline a defined shoot of ore. It is only in the upper tunnels that one might expect to find such limits. Toward the west the breast of each of these is in a good grade of ore and it is probable also that in each the vein continues eastward beyond the points where cut by the angling, crosscut, tunnel approaches. Recently a sample was brought in by Mr. Holtum, manager of the Commercial company, taken back of the drift timbers (loose ground, near surface) from ore extending east of the angle made by the crosscut and drift, which assays \$11.20 and confirms this assumption as regards Tunnel No. 2. In Tunnel No. 3 a point is indicated as marking the beginning of ore, extending westward; this probably is but the beginning of a new quartz

streak and it is possible that to the east there might be found another streak, perhaps on the other wall, coming from that direction.

In character this ore is such as to present a simple milling or reduction problem and is very similar to that occurring, notably in the Homestake mine, in the Black Hills district. Beyond a trace of copper and a small percentage of iron, as pyrite, there are no base metals present.

TREATMENT. Although it is too early to take up the matter of treatment there is suggested, should the matter arise, the following general method which avoids, so far as possible, the high freight charges arising from the great distance to Colorado, Utah or Montana smelters.

Coarse crushing, followed by stamps and amalgamation. Bulk floatation of all material, after amalgamation, eliminating classification and recovering the fine pyrite. Tabling of floatation tailings, recovering coarse pyrite. Cyanidation of final tailings if unrecovered values warrant. Cyanidation of iron concentrates if same shows a gain over freight and treatment.

By this method it is estimated that from seventy percent to all of the recoverable gold would be obtained in the form of bullion.

ORE DEVELOPED. Between tunnels two and three there is a small block of ore, fifty feet by fifty feet and with an average width of one and one-half feet, which averages \$14.25 per ton and contains about two hundred tons of what may be called "probable" ore. This would not become readily available however until it could be mined through a chute put up from the lowest tunnel.

In case the assumption of a flat fault between tunnels three and four is correct there has resulted a division of any possible ore between these levels into a section lying above four and below the fault, which could be stopped very easily, and another section lying below three and above the fault, and not above four, which would be harder to recover. However, again for possible future reference, it may be estimated that should ore be found in Tunnel No. 4 conforming with that in the levels above, each block one hundred feet in length would contain about eight thousand tons.

CONCLUSION. From the indications observed in the various workings comprising the Utopia Tunnels it appears reasonable to arrive at the following conclusions:

1. The east and west drift to the west of the vertical fault in tunnel number four is not on the Utopia vein.
2. The lack of conformity between tunnels two and three and tunnel number four is not caused by the vertical fault appearing in the west end of the workings.
3. The assumption of a lateral movement along a flat fault plane somewhere between tunnel three and tunnel four offers the

only explanation of lack of conformity of the vein as exposed on these levels.

4. The vein where sampled in Tunnel number four is the same as that opened by tunnels three and two.

5. If ore is found to the west of, and in the same formation as, that sampled in tunnel number four it probably will have the same average width as that already exposed; which is to say, between eight and nine feet.

6. The grade of ore in tunnel number four may be expected to continue to increase as work progresses toward and into the shoot opened in tunnels two and three.

7. There is no vertical line of demarkation of limits of values (ore shoot boundary) which can be carried downward from tunnels two and three to be applied to tunnel number four.

RECOMMENDATIONS. Referring to the composite plan map of Plate II it will be seen that there are two possible points from which to drive in order, allowing for dip and faulting, to come under the ore in tunnels two and three, one being the south end of that part of the tunnel which followed the fault and the other the breast in that part which was sampled. From the former the distance would be about eighty feet and from the latter about two hundred feet. In discussing these possibilities with Mr. Holtum several days ago I agreed with him that it would be better policy, from the standpoint of expense, to drive southeast from the end of the fault drift but since that time the analysis of assay values in tunnel number four, as appearing on the page of assays, has been made and from it I am led to believe that the improvement already appearing may be expected to continue and that a satisfactory grade of ore may be expected to be encountered in no greater distance than required by the former plan. Further considerations affecting this decision are:-

1. Other things being equal, it always is good policy to follow the ore.
2. Some heavy, bad ground would be encountered in breaking away from the fault.
3. Before starting from the fault, repairs would have to be made to track and transmission line over the distance from the sampled drift to the point of starting.
4. If ore were found, the shorter, direct drift would eventually have to be driven.
5. Wires are strung to the breast of the sampled drift and the electric drill and equipment, which are old style and very cumbersome, are already set up there. Note:- A truck gasoline motor belted to a small generator has been mounted on a foundation at the Centennial tunnel and furnishes just enough power to operate the electric drill. This explanation offered because of earlier statement that there are no transmission lines in this district.

My first recommendation then is that the fourth tunnel be driven farther west from the point where sampling ceased; that at approximately twenty foot intervals a flat hole be drilled to the south (hanging) wall and the drillings be saved and assayed, and that at the same point the roof be sampled and assayed. This work is important and may open up a valuable shoot of ore. It is to be noted in this connection that the finding of ore in the fourth Utopia tunnel may help in the discovery of the continuation of the very rich ore in the Centennial mine owned by the Commercial company.

In tunnel No. 3 a search for ore should be made in that part lying between the indicated "beginning of ore" and the turn into the entering crosscut tunnel. This is important as affecting the (theoretical distance to be driven in Tunnel No. 4 before reaching the shoot exposed in the upper levels.

The recommendation that the apparent trend of the vein toward the south side line of the Marquette claim be closely watched, is repeated.

ACKNOWLEDGMENT. The blue print which has been marked Plate II was prepared for the Utopia company by Bellamy and Sons, engineers, of Laramie, Wyoming and by that company given to me for incorporation in this report. Plate I was prepared, with certain additions and minor corrections and to reduced scale, from a survey Map by Bellamy and Sons.

Report submitted by A. C. DART

6-15-29

Mining Engineer, Laramie, Wyoming.

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ASSAY OF SAMPLES TAKEN FROM UTOPIA TUNNELS, MAY 25-27, 1929

| DESCRIPTION | | | | Width Sampled | Oz. per Silver | Ton Gold | Value Per T |
|----------------|--------------------------|--|---|------------------|-------------------|-------------|----------------|
| Tunnel No. 2. | 60' from Breast. | First showing of ore. | Foot (N) wall | 10" | None | 0.88 | \$17.60 |
| " " | 2. 40' " | " " | " " | 10" | " | 0.66 | 13.20 |
| " " | 2. 30' " | " " | 3 foot shot in hanging (S) Wall | 4" | " | 0.54 | 10.80 |
| Streak Exposed | | | | | | | |
| " " | 2. 20' " | " " | Foot wall. | 6" | 1.64 | 3.46 | 70.05 |
| " " | 2. | Breast. | Foot and Hanging wall streaks combined. Ft. | 9" | None | 0.74 | 14.80 |
| | | | | Hanging | 4" | | |
| " " | 2. | Dump Screenings | | | 0.28 | 0.92 | 18.40 |
| Tunnel No. 3. | Beginning of ore + | 5 feet. | Foot wall streak. | 10" | None | 0.52 | 10.40 |
| " " | 3. | + 25 " | | 38" | 0.64 | 1.36 | 27.20 |
| " " | 3. | + 45 " | | 26" | None | 0.58 | 11.60 |
| " " | 3. | + 65 " | | 10" | 0.28 | 0.62 | 12.40 |
| " " | 3. | + 82 " | Breast | 54" | 0.38 | 0.52 | 10.40 |
| " " | 3. | Dump | | | 1.20 | 0.80 | 16.50 |
| Tunnel No. 4 | Sample No. 4-1. | Vein cut here by tunnel. | | 54" | None | 0.04 | 0.80 |
| 4-2 | | (20 foot intervals) | | 42" | " | 0.08 | 1.60 |
| 4-3 | | | | 48" | " | 0.02 | 0.40 |
| 4-4 | | | | 32" | " | 0.02 | 0.40 |
| 4-5 | | | | 52" | " | trace | |
| 4-6 | | | | 52" | " | 0.05 | 1.00 |
| 4-7 | | | | 41" | " | 0.06 | 1.20 |
| 4-8 | | | | 56" | " | 0.05 | 1.00 |
| 4-9 | | | | 46" | " | 0.03 | 0.60 |
| 4-10 | | | | 53" | " | 0.04 | 0.80 |
| 4-11 | | | | 55" | 0.08 | 0.02 | 0.45 |
| 4-12 | | Caved to hanging (S) wall | | 104" | None | 0.14 | 2.80 |
| 4-13 | | Not all of vein. Perhaps 48" more in hanging' (S) wall | | 60" | " | 0.12 | 2.40 |
| 4-14 | | North half of vein. Mpre in South wall | | 58" | 0.06 | 0.14 | 2.80 |
| 4-15 | | Shot into south wall; full width exposed. | | 108" | 0.16 | 0.14 | 2.85 |
| 4-15 | | + 21 feet. Breast. Probably about half of vein. | | 54" | None | 0.12 | 2.40 |
| Tunnel No. 4. | Picked from dump by B. H | | | | 0.24 | 0.16 | 3.30 |

Omitting dump samples and casting out the \$70 value in Tunnel No. 2 as being a high spot, the average widths and values are:—

| | | | |
|---------------|-------------|-------|---------|
| Tunnel No. 2. | width 9" | value | \$14.10 |
| Tunnel No. 3. | width 27½" | value | 14.40 |
| Tunnel No. 4 | width 58½ " | value | 1.40 |

Further analyzing the values in Tunnel No. 4 by separately averaging the first five, the intermediate six and the last five samples shows increasing values of \$0.64; \$1.00, and \$2.65 respectively. Widths are not considered, as in reality the full width appears in only two samples, where the vein has been opened to the hanging wall. It is worthy of note that in each of these full exposures the value is above the average.

By A. C. DART, Assayer

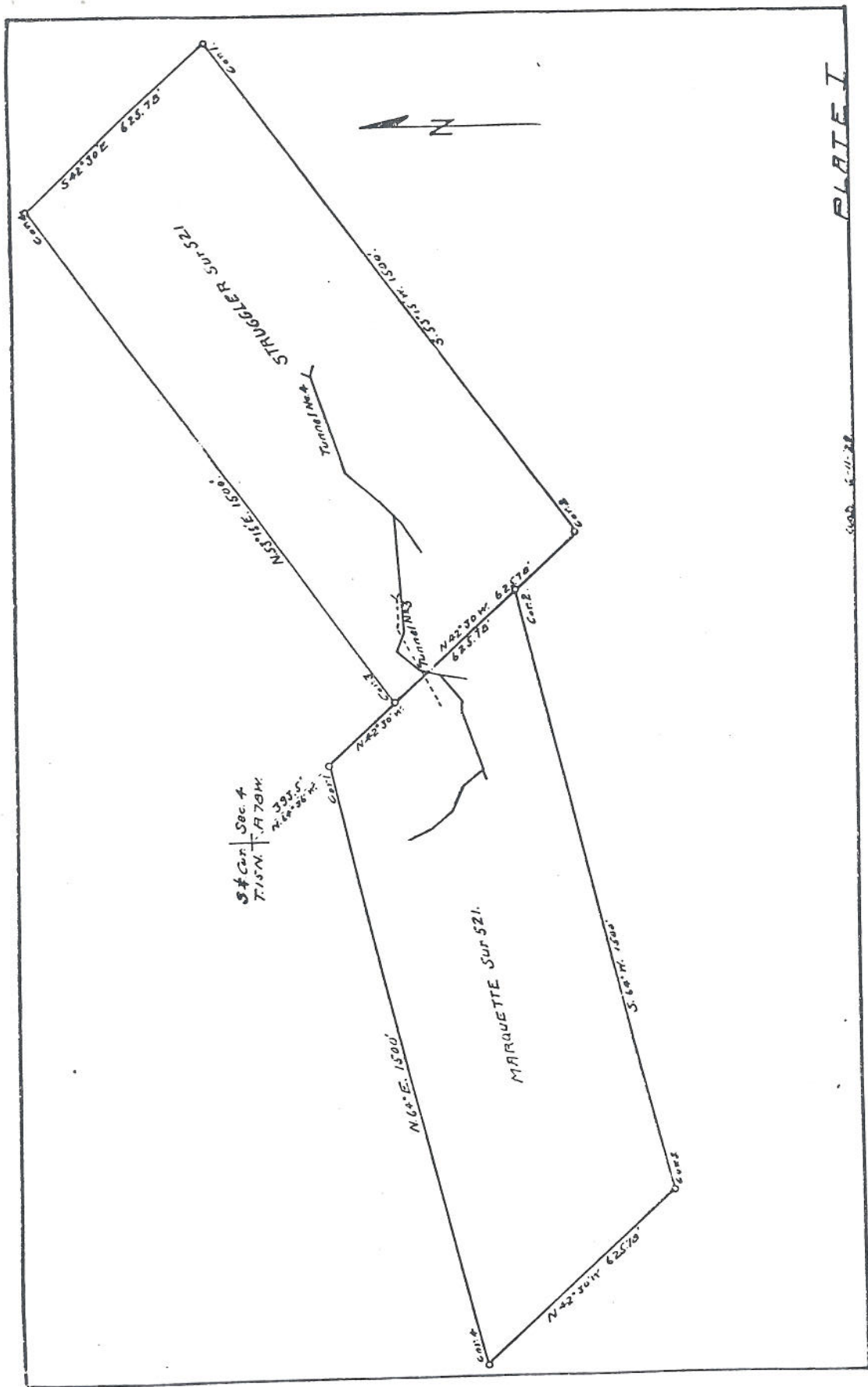
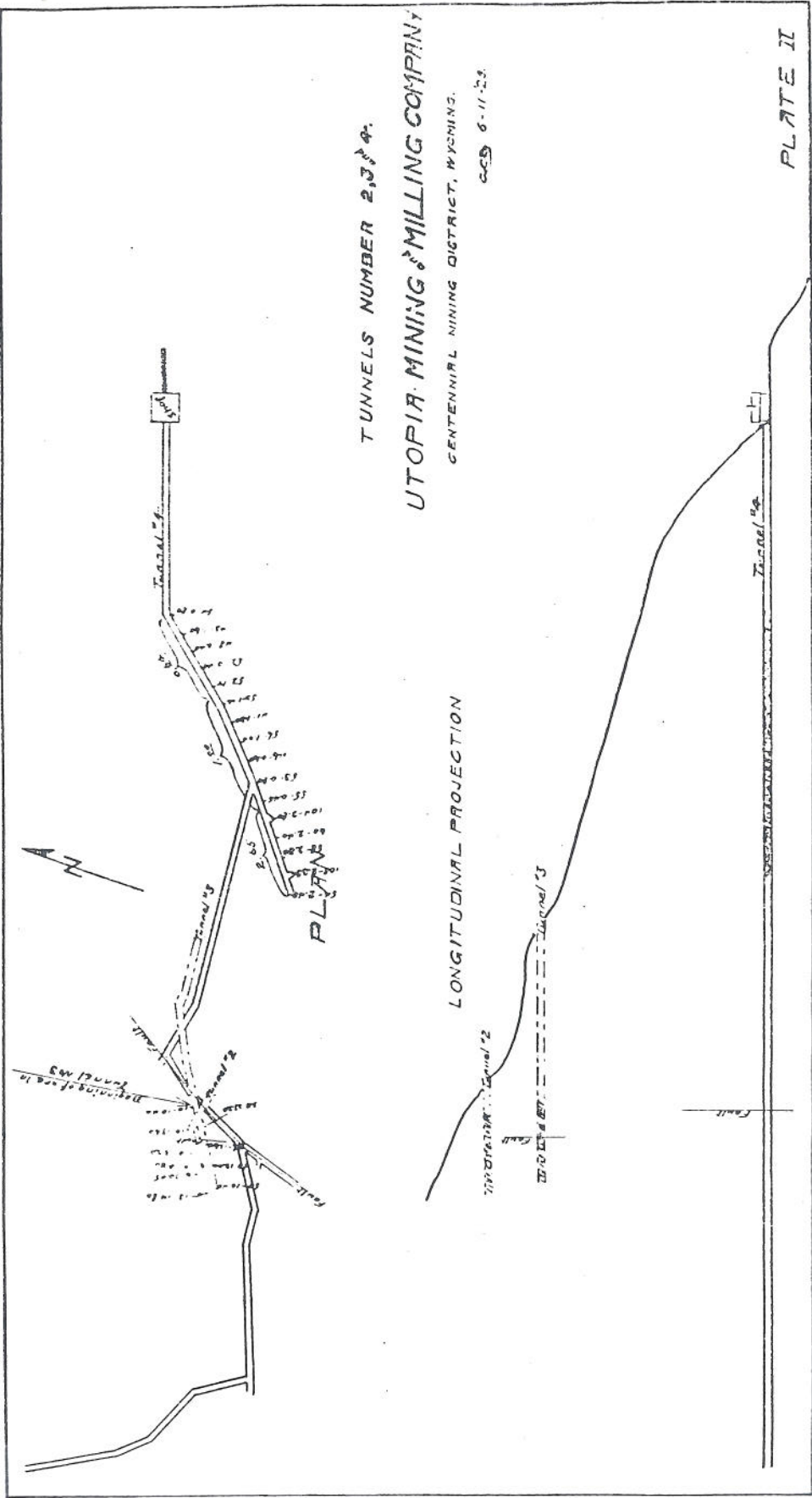


PLATE I

Scale 1" = 100'



TUNNELS NUMBER 2,3,4

UTOPIA MINING & MILLING COMPANY

CENTENNIAL MINING DISTRICT, WYOMING

6-11-23

LONGITUDINAL PROJECTION

PLATE II