

Item 1

3890 0001

HARRY H. HUGHES
MINING GEOLOGIST
GOLDFIELD, NEVADA

STATE WATER RIGHT SURVEYOR
ESMERALDA COUNTY ENGINEER
REGISTERED PROFESSIONAL ENGINEER
NEVADA NO. 599; MISSOURI NO. E-5704

POST OFFICE BOX 666
TELEPHONE 3017

11 p Text
(firm map) not
included

160
Item 1

October 25
1955

To: The Board of Directors
Hercules Mines Company of Nevada
252 West First St.
Reno, Nevada

Gentlemen:

Herewith is my preliminary report on your
properties in the old silver mining camp of Austin,
Nevada.

Very truly yours,

Harry H. Hughes
HARRY H. HUGHES.

HHH:jh

**Preliminary Report on the Austin Mines of
HERCULES MINES COMPANY OF NEVADA
LANDER COUNTY, NEVADA**

SCOPE OF REPORT

The mining camp of Austin is the second oldest in Nevada. There has been published a wealth of information on the history, geology and mining of the district; so, for the sake of brevity, only the barest outlines on these features will be touched on in this report. And, most of the information under these headings will be lifted bodily from various papers and reports.

For anyone who might be interested in having more detailed information, he is referred to the following:

U. S. G. S. Bulletin No. 997, by Clyde P. Ross, (1953)
U. S. G. S. Bulletin No. 208, by J. E. Spurr, (1903)
U. S. G. S. Bulletin No. 594, by J. M. Hill, (1915)
U. S. Geological Exploration of the 40th Parallel, by S. F. Emmons, (1870)
Mineral Resources of the States and Territories West of the Rocky Mountains for 1868, by R. W. Raymond, (1869)
Files of the Reese River Reveille (from 1863 to date) may also be consulted for a vast store of information.

This writer has studied somewhat in detail the geology of a section of the southwest part of the camp—in the area of a recent uranium strike—and is generally familiar with the old silver-producing central part.

LOCATION AND ACCESSIBILITY

The Reese River mining district is on the western slope of the northern part of the Toiyabe Range. It is in Lander County, Nevada, of which Austin is the County seat. Austin is about 175 miles east of Reno on oiled U. S. Highway 50; and 91 miles south of Battle Mountain on State Highway (oiled) 8-A. Battle Mountain is the nearest rail point, and is on the main line of the Southern Pacific Railroad.

PROPERTY

The area under discussion in this report consists of 78 of the old patented mining claims located mostly in the central part of the camp of Austin, and they cover virtually all of the old productive area of the camp, on Lander and Union hills.

The Hercules Mines Company of Nevada owns all of these claims outright, and there are no further payments to be made on them, except a perpetual net royalty of 5%. Accompanying map shows distribution of these claims.

In order not to clutter up unnecessarily the body of the report, a detailed list of the claims is not given here, but is attached hereto.

HISTORY AND PRODUCTION

In order to give a clearer picture of the history and production of the first twenty years of the camp, we are giving below, verbatim, two reports by well known mining engineers of those days.

*Report of B. Silliman, M. A., M. D., E. M.,
of Yale College, Made in 1864*

"The mineral veins in the Austin granite are clearly fissure veins. Their course is about N. 25 degrees W. (magnetic), often N. E. and S. W., and again nearly N. and S., especially if we deduct the local variation of the needle, which is nearly 17 degrees 30 minutes E. The veins dip at various angles into the southerly face of the hill, to the N. and N. W.

"At the outcrop the veins are often quite flat, at a certain distance down they are in many (perhaps a majority of cases), broken and irregular, and usually inclined at a much higher angle. It would seem that from some cause there has been a break or slip of the face of the hill, occasioning a fault in all the veins at a certain depth. This fault or heave sometimes completely obscures the vein, leaving only a brown streak or stain in the granite, following which for a certain distance, usually at a small angle of inclination, the miner again discovers the lode within regular walls, or casings and pitching usually at a much higher angle of inclination. This fault seems to limit also the extent in depth of the superficial ores (chorides, etc.) as beneath the point where the vein becomes regular again (viz., at 30 or 40 feet from the surface, on the incline, in most cases) the sulphurets of silver, etc., take the place of the ores seen at the surface. The same causes, chemical and mechanical, which have produced the dislocation of the veins, and the chloride ores, seem also to have acted to remove from the veins the lines of division, which separate the vein from its walls in depth, glueing the contents hard to the sides of the country rock. In depth this peculiarity disappears, and the veins are in general well defined, and separated by clay partings from the country rock.

"The ores characterizing the veins in the Austin district of Reese River, are chiefly:

"Chloride of silver, or horn silver.

"Chloride-bromid of silver, or embolite.

"Native silver (distributed in minute particles, chiefly in a reddish earthy gangue of oxide of iron, and oozing out in globules when this material is "burned" or heated.

"Vitreous silver, containing about 87 per cent of metallic silver, is the richest ore.

"Copper silver glance, an ore with a variable proportion of silver, replacing a part of the copper in copper glance. This is a very common ore of the Reese River Mines.

"Dark-red silver ore, or ruby silver, an arsenical sulphuret of silver with 65½ per cent of silver.

"Brittle silver ore (stephanite), an antimonial sulphuret of silver with 68½ per cent of silver—this is a common ore in a Comstock lode.

"Tetrahedrite or Fahlerz. This is an ore, frequently called "gray copper," in which a part of the copper is replaced by silver, as much as 30 per cent of silver is sometimes found in it, associated with sulphur, antimony and arsenic. In some of the Reese River mines this is the prevailing ore.

"These are the principal silver ores found in the veins at Austin. A careful study of these ores, accompanied with minute chemical analyses, would be required to decide if there are not other species. But silver also occurs in some of the lodes in connection with lead, as argentiferous galena, while the metal is also associated with zinc blende and yellow copper (cuprite). This is especially true of the lodes on Lander Hill.

"From this recital of the mineralogical character of the Reese River lodes, it will be seen that they carry the richest and best ores of silver which are known."

"Look at the assays made by Mr. Moore. Keep in mind the fact that the ores of Austin, working average, are over \$220 per ton in silver, while those in the celebrated Comstock and Washoe generally average between \$40 and \$50 per ton, that the average yield of all ores working in Reese River is 130 per cent more than any other mining county or district, and that these veins are true fissures and inexhaustible, then you get some idea of their value."

United Reese R. Mining Co.

San Francisco, December 5th, 1864.

Gentlemen: I have assayed the samples of ore deposited by you, with the following result:

<i>Value Per Ton</i>		<i>Value Per Ton</i>	
1. North Star	\$2,655.19	15. Union	700.66
2. North Star. No. 2.....	5,037.36	16. Yankee Blade	3,220.47
3. The Oregon	149.25	17. Peerless	1,002.34
4. Honest Miner	1,838.38	18. Pride of the East.....	817.03
5. Southern Light	1,608.95	19. Yosemite	758.73
6. Nevada	253.79	20. Monitor	116.14
7. Camargo	1,301.01	21. Diana	1,106.04
8. Madison and Jefferson.....	917.50	22. Gov. Seymour	2,008.08
9. The Hornet	358.25	23. Blue Ledge	1,272.72
10. Erie	666.19	24. Independent Co., Congr. Lode	1,236.50
11. Apollo	549.81	25. Beard & Seaver & Harker.....	509.00
12. Silver Cloud	725.92	26. Black	2,293.93
13. San Miguel	144.43	27. Joe Lane	493.25
14. Whitlach	2,690.08	28. Chicago	663.70

(signed) GIDEON E. MOORE

Prof. Silliman says of Mr. Moore, "He is an excellent chemist, who received his education in science at the Sheffield Laboratory in Yale College, for whose accuracy I am willing to vouch."

REPORTS OF DR. ROSSETER W. RAYMOND
U. S. Government Commissioner of Mining Statistics

The following paragraphs are quoted from the annual reports of Dr. Raymond, covering the period from 1868 to 1876. The first report was submitted to Congress by the Secretary of the Treasury, Hon. Hugh McCulloch, accompanied by a letter to Hon. Schuyler Colfax, Speaker of the House.

The three succeeding annual reports were submitted to Congress by Hon. George S. Boutwell, Secretary of the Treasury, a letter accompanying same, being addressed to Hon. Jas. G. Blaine, Speaker of the House.

The other reports were submitted in similar manner and were from time to time published in accordance with an Act of Congress and printed in the government printing establishment. These reports in full may be found in the government publications of the period referred to.

"We are comparatively ignorant of the peculiarities of our mining districts, and our mineral veins have shown themselves in many (I might almost say in most) cases to vary in depth to an extraordinary degree. The veins of Lander Hill (on which are located the properties of the Austin Manhattan Consolidated Mining Company) may be cited as an example, some of them dipping 60 degrees below the horizon, and at a depth of 300 feet are found to run for a considerable distance almost horizontally. Tracts of 40 acres at least should cover such mining ground, and I consider it impracticable to grant mineral lands containing gold and silver, in such parcels, though, no doubt, capitalists would prefer large areas. * * *

"The rich veins of Lander Hill have always been known to be narrow, at the same time, they are unmistakably fissure veins—perhaps the most distinct specimens of that class of all the West. They show very clearly the manner in which the fissures were filled by successive deposits of quartz, magnesia, spar, silver ore, etc., along their walls. The seams in the granite of Lander Hill are very numerous and very close together and on the surface one looks as promising as another. Almost all the thousands of outcrops which have been discovered here carry rich chloride ore in pockets and streaks. It was unavoidable therefore that in the beginning both miners and experts sent to examine the veins should consider them as generally of equal values. There is scarcely a producing mine on Lander Hill which is not worked and often claimed by someone else and the question of title is generally settled by the financial position of the parties. * * * The root of the trouble is the nearness to one another of the Lander Hill locations. The United States law can scarcely be applied, and if it could, would not help the matter.

There is no help for it, except an actual agreement by a few strong companies as to the ownership of the hill. These companies should unite and construct a tunnel, cutting their veins at a depth of 1,000 or more feet.* * *

"There is a great deal of low grade ore not sent to the mill. The product of the veins is still further reduced by wasteful sorting. The rich ore only is sent to the mill and has therefore to bear the cost of the whole extraction. Of course, the second class ore is made all the poorer by such handling, the average of the lode being reduced, and is less likely than ever to be profitably reduced.

"A great deal of low grade ore is not sent to the mill. The product of the veins is still further reduced by wasteful sorting.

"A great many persons seem to think the cost of ordinary concentration is what prevents its use in the Reese River district, and not to be aware that it is the actual loss of silver ore in the operation which renders the use of concentration by water possible. This loss sometimes amounts to 80 per cent.* * *

"Mining is never on a sound and prosperous footing until the low grade ores are successfully reduced. In a certain sense, the high yield per ton reported from these districts (Reese River) is a measure of the wastefulness of mining, it represents, not the average quality of the vein matter, but the quality of that portion of it which is rich enough to pay for milling.* * *

"I have already spoken of concentration as a possible cure for this evil and it remains to be added that any reduction in the mining and milling cost will sensibly increase the amount of ore reduced in the Reese River and similar districts. A gradual fall in wages and living expenses will add something and the many inventions for saving expense, also the new chlorizing furnace of Stetefeldt promises to be highly beneficial. It saves a great deal of the cost of roasting, and what is even more, part of the saving is in fuel.* * *

"The resources of the Reese River District have been just skimmed; not a single mine is deep enough to be upon the undisturbed and settled portion of this vein; at the same time, it is evident that a consolidation of the properties and a new and more economical system of mining will be required for the adequate future development of the district." (Raymond's Report of 1869.)

"It will be observed that the consolidation of the properties in the Reese River District recommended by Dr. Raymond has been successfully accomplished (1) by the purchase of the principal mines by the Manhattan Company, and by the continued consolidation of other properties with those originally controlled by that company, until the present owners control practically every property in the district.

"The methods of mining now used, together with the lower cost of labor and supplies, have reduced the cost per ton, for handling the ores to perhaps less than one-third what it was in the early days, while the methods of milling have shown a marvelous and relatively greater saving. In the early days, much of the values were lost in the tailings, and the medium grade ores were not handled at all. The gold values in the low grade ores in Lander Hill will pay the expenses of mining, milling, concentrating and cyaniding, leaving the silver as net profit. On account of the much larger recovery and the lower cost of mining and milling, the profits per ton of ore at the present time in this district will largely exceed the profits in the past.

"In the meantime, a great improvement could be made in the consumption of fuel for mining purposes by a consolidated working of the mines, and using a few shafts where many are now kept open, or by running deep tunnels and thus escaping the heavy expense of hoisting and pumping machinery altogether. A great deal of money is annually thrown away to no purpose by the useless complication of shafts, when one large, well constructed shaft, with suitable machinery, could do the work much better and at much less cost. If the mines are owned by different companies, and they cannot otherwise agree, it would be much wiser to sink a union shaft and pay the expense to an agreed width and advantageous terminus.* * * Many of the mining districts of this part of Nevada are admirably suited for tunnel purposes. One deep tunnel which penetrates the hill and can drain the veins of the whole hill is obviously better and cheaper than the present system of draining each vein by its own shaft or incline.

"The general characteristics of mines in this district (Lander County) have been described in preceding reports and it is now only necessary to briefly recapitulate the

main points. They are true fissure veins, narrow but rich, numerous and close together and frequently carry rich deposits of chloride ores near the surface. There are two classes of veins, one striking northwest and southeast and the other north and south, of which the former are believed to be the older and known to be the most valuable.

"The country rock is granite, except in the north portion of the district (formerly known as Amador district). There slate occurs. Both chlorate and sulphuret or antimony are found, the former above and the latter below the water line.* * *

"The deep workings of the past year have given much valuable information as to the character of the Lander Hill veins and have shown that generally they are wider and more uniform in depth than at or near the surface. It is now certain that many of the small claims which were located and worked as distinct veins are only spurs or offshoots of the main fissure and unite with it at short distances from the surface." (Raymond's Report of 1870)

"A pleasing peculiarity of the Lander Hill veins is that the ores in them do not get poorer with depth, but they have rather improved so far. This will of course, have its limits, but this much is certain, that the future of these mines is as sure and certain as it can be in the very best of mines.* * *

"I have remarked that the Manhattan Company generally works very rich ores. As an example, I give below a table which is compiled from the books of the Manhattan Company, presenting an extraordinary lot of ores from the Austin district, all of which were worked during a fortnight. I doubt if a record of any works anywhere for the reduction of silver ore can surpass or equal the list. (The table referred to shows ore from nine mines or shafts averaging over \$1,000 in value per ton.) * * *

"But we should bear in mind that small lots of very rich ore may build up, but will not sustain settlement. The low grade of ore of a district, which is the great bulk of its product, must be relied upon to maintain large and prosperous communities. (The low grade ore, so-called, in the Austin district has hardly been touched.) The rich ore benefits the individual, but the poorer, or ordinary grade promotes the interest of the whole.

"It has been long foreseen that only a consolidation of owners would permit the efficient and economical exploitation of the undoubtedly rich ore bodies of a large area and it can conduct its operations henceforward with increased security, economy and success." (Raymond's Report of 1871.)

"The net profits of the North Star mine above the 300 foot level from October, 1866, to December 31, 1871, were \$326,761.91. The vein continues below the 500 fissure lode, and there can be no doubt of its continuity and value. The vein is proved on the east by the Timoke and on the west by the Buel North Star, both of which have been very productive mines, so far as they have been worked. The Timoke is worked down on an incline of the vein 350 feet, and the Buel North Star has been worked by the Pacific Company down on the line of the 500 foot level through the Manhattan shaft.

"The Oregon lode (1,000 feet) is nearly parallel in course and depth with the North Star and is situated about 225 feet above it (or northeast), measured at right angles to the depth of the lode.

"The surface portion of the lode has been worked by an incline and levels from it to a depth of 360 feet on the incline of the lode. The Oregon, a vertical shaft, cuts the vein at a depth of 240 feet below the surface, and at a depth of 290 feet a cross cut was run northeasterly, cutting the vein again. From all these points levels have been run. The smaller portions of the lode have been stoped out from the lower levels, the remaining portions are virgin ground and contain large quantities of rich ore. The average length of ore proven by these levels is about 620 feet, and from the surface outcroppings the incline of the lode to the 300 foot level is about 700 feet. The amount of ore taken out of the Oregon lode from the three levels run from the shaft and the small stopes is 1,517 tons. The bullion yield was \$473,560.11, giving an average value per ton of \$312.00.* * * The Southern Light, Savage and Seymour mines are all on a large, strong vein and lie a short distance south of the North Star. This is generally called the Savage vein and it belongs to the second system of veins, or those having a more eastern and distinct course and steeper dip. Its course is N. 54 degrees W., and its dip is 56 degrees N.E. This is a strong and true fissure vein, having an average width and thickness of 18 inches. The principal work has been done in the Savage Mine.* * *

"The unexplored claims belonging to the Manhattan Company are too numerous to

describe. The majority of them are situated in the rich center of silver bearing localities through the district, and most of them are known to contain good ore and are identical in character with those lodes that have been extensively worked. There is not a single lode known to be barren of ore, and it is reasonable to expect that many of them will prove as valuable as those now being worked." (Raymond's Report of 1873.)

In this report, Dr. Raymond emphatically indorsed a proposal to run a level or main tunnel southeast on Lander Hill, commencing below the town and driving in a line N. 83 degrees E. to the Oregon shaft, and a horizontal distance of 5,560 feet to the North Star lode, making a total of 6,000 feet. The advantages enumerated were: (1) the draining of the rich veins, (2) furnishing a cheap means of transportation from the veins of the ores extracted along the ridge of the Adit, (3) giving better ventilation to the mines than can be procured from the surface, (4) the chances of making valuable discoveries of ores that are not at that early date.

It will be observed that these recommendations of Dr. Raymond have been carried out and the beneficial results of the tunnel are all and more than predicted at that early date.)

"The principal mining operations of this county (Lander) are in the Reese River district, where the Manhattan Company controls nearly all the producing mines and all the contiguous mining claims. This company has greatly strengthened its position and avoided conflicts of title, which would have been disastrous to the district. I know of no place in the United States where such conflicts could more easily arise or would be more difficult to decide than at Lander Hill. More than once in the earlier days a rich vein was settled by the course of the fissure. Beyond this, the continuation could not be found. To trace the lode and rediscover the vein was difficult enough, but to prove it as identical and establish ownership against the claim of a contending company was well nigh impossible. The natural result was that a miner who had lost his vein pushed boldly into the country around to find it and recognized as the missing property the first vein he found which was rich enough to convince him of its continuity. Lapse in and purchase of one title after another has now made the Manhattan Company the owner of so much ground that construction can be carried on freely. It is not only a good thing for the company itself, but it is the only condition which permits the exploitation of the district." (Raymond's Report of 1876)

GEOLOGY

Austin is underlain by a quartz-monzonite pluton which is intruded into impure carbonaceous quartzite. The intrusive is intricately jointed. Dikes of lamprophyre, aplite and pegmatite cut the quartz monzonite, mostly along joint-plane openings.

Over Lander and Union Hills, in the center of the mineralized area, are many fissure veins. The veins are filled with several stages of quartz carrying the rich silver minerals proustite, tetrahedrite, argentite stephanite, enargite, and others. In the oxidized zone there was considerable pyrargyrite (silver chloride), but the oxidized zone is very shallow. In some veins there are also considerable amounts of the sulphides of copper, lead and zinc.

Most of the veins strike between N 20 deg. W and N 40 deg. W, and dip 25 deg. to 45 deg. NE. In the southwestern part of the district, though, there are veins which strike N 20 deg. - 60 deg. E and dip steeply northwest.

The veins are genetically related to the monzonite. Vein filling began when rock temperature was high and continued until it had dropped markedly. Vein forming solutions migrated through pre-existing openings that were modified and enlarged by movements during mineralization.

Alteration is locally intensive in the wall rocks, and products of this alteration include sericite, calcite, dolomite, quartz, chlorite, pyrite and other sulphides.

Some of the veins of the Austin area are relatively narrow, although there are a number of fairly wide ones. Among the latter may be mentioned the Whitlatch, which is 8 or 9 feet in width; the Union, 6 to 8 feet; the Panamint 5 feet; the Savage and Independence, both of which are 6 to 7 feet wide.

However, even in the narrow veins, if the high grade ore persists they can be profitable. This writer is familiar with the old El Tigre mine in Sonora, Mexico, the vein in which averaged only 6 inches wide. It produced millions of dollars in profits and operated for many years, using the resuing method of mining.

ORE DEPOSITS

As noted by Dr. Raymond and other prominent engineers, the ore bodies in Austin occur in fissure veins. The ore shoots vary in length from 50 to several hundred feet. The numerous veins vary in strike and dip to a considerable extent. This writer believes that at some point in depth below the deepest workings of the old mines there will be junctioning of some of the veins, which should make for much wider, though less numerous ones in depth. In other words, it is believed that as the fissures made upward there was a branching or fingering from fewer but wider veins. This is one of the features upon which is predicated the proposed prospecting program of the Hercules Mines Company of Nevada.

In virtually all of the mining operations in Austin silver was the only metal recovered. In some of the old reports it is even mentioned that when base metals were encountered mining of such ores was avoided as much as possible.

The Hercules Mines Company of Nevada has assayed a sample of fines which have broken off from a sack of specimens of high grade ore. The sample carried 2600.2 ounces silver and .06 oz. gold per ton with 6.70% copper.

Ross, in U. S. G. S. Bul. 997 reported the presence of Indium, Cadmium, Nickel, and platinum, in some of the ores. Discovery of the presence of these metals is very significant to this writer. If they can be found even in moderate amounts their combined values would at least equal, and perhaps exceed, the average values of the silver ores mined in the boom days of Austin. Though there will always be a certain amount of silver present in the ores as well as in the deeper sulphide bodies—copper, lead and zinc.

The prices of these rare and base metals today are as follows:

Platinum.....	\$76 to \$80 per ounce
Indium	2.25 per ounce
Cadmium.....	1.70 per pound
Nickel.....	.64½ per pound
Copper.....	.44 per pound
Lead.....	.15½ per pound
Zinc12 per pound

These prices are for October, 1955.

To explore for vein junctions as well as for the rare and base metals it is this writer's opinion that diamond drill holes should be put down to depths of 2,000 to 3,000 feet.

The deepest old workings in the camp extend to a vertical depth of only 1,100 feet,

with no lessening of strength of mineralization. In some of the old reports it was noted that where two veins joined horizontally, there was an increase in the silver values at and near the junction.

As noted above, the deepest workings in the camp are 1100 feet vertically. This might give the idea that many of the mines and veins were worked to this depth, which is not true. The Frost shaft was the only one which penetrated to this depth. It is at the southeast end of the hanging wall vein system and is 3000 feet away from the proposed diamond drill holes, to be mentioned later.

Even the inclined shafts sunk in the veins did not reach much more than 1000 feet on the slope, which, with an average dip of 30 deg., would give vertical depths of around 500 feet.

In the northwestern part of the camp several veins have been opened which carry considerable copper and zinc and some lead. This is somewhat in line with the old zonal theory of deposition, which holds that in ore deposits gold and silver are deposited at the top and center of a mineralized zone, with lead, zinc and copper being deposited downward and outward in that order.

There are a number of geological features in the Austin area which are similar to Butte, Montana, which is called "the richest hill on earth."

Last, but possibly by no means least, in speaking of the various metals, uranium should be mentioned. The writer made a casual inspection of a few of the old dumps with a scintillator and in places got readings which, while not spectacular, were very interesting.

Dr. W. C. Peters, who made an examination of one of the uranium strikes in the south part of the camp of Austin, concludes his report with the following: "The Toiyabe Range near Austin has some possibility as a uranium-bearing province. While the handful of prospects in the area do not seem promising to date, the local granitic rocks would provide a source for secondary concentration of uranium ore and perhaps for uranium-bearing primary metallic veins. The silver mines at Austin contain minerals which would reasonably be expected in association with pitchblende. The general area has not been thoroughly prospected for uranium and should be kept in mind for appropriate action on any further developments."

Should any uranium mineral be found in deep diamond drill holes it would certainly be pitchblende. Also, quite similar geological conditions at Austin to the Bolder area in Montana and Marysvale, Utah, give hope that it will be found at Austin.

RECOMMENDATIONS

Practically all of the old workings in the camp of Austin are inaccessible, and even if they were open it would be doubtful if an economic operation could be made in the upper levels. Therefore, the writer recommends that they be disregarded entirely, at least for the present.

The hanging wall of the Austin vein system has been determined as closely as is possible on the surface and three sites from which diamond drilling will be done have

been selected. Sections have been made through several of the holes which are recommended and are shown on the accompanying maps. The aerial photograph with the report also shows, by the white line, the surface trace of the hanging wall of the vein system, and the small circles on the photograph indicate the diamond drill positions.

The drill holes have been laid out so that the veins will be cut at maximum depths possible with the least footage of drilling. Depths of the holes where they will cut the hanging wall will vary from about 500 feet to 1200 feet. However, it must be remembered that the vein system is at least 300 feet deeper after they go through the hanging wall.

If, as this writer confidently expects, these first holes find ore additional and deeper holes should be drilled to outline the orebodies before development work is started.

Depending on where ore is found it may be advisable later to rehabilitate the Clifton tunnel for a main haulage way. This tunnel is 6000 feet long and penetrates Lander Hill to a vertical depth of 700 feet. However, reopening of it can be held in abeyance for further developments.

CONCLUSIONS

Several engineers who are familiar with Butte, Montana, have remarked on similarities between it and Austin. Like Austin, the "richest hill on earth" started as a silver camp. Near the surface Butte veins carried around \$400 per ton in silver and were worked for this metal alone. The copper was not only not paid for but was detrimental in recovering the silver. Many other copper camps throughout the world also started as silver mines. The presence of copper in the Austin veins has already been noted and this writer firmly believes that the copper content of the veins will greatly increase in depth. Also, being fissure veins they will no doubt continue in depth for several thousand feet.

In addition to silver and copper in the ores, as previously stated, Ross has reported the presence of Indium, Cadmium, Nickel and platinum in the Austin ores. And we have quoted Dr. Peters remarks on the possibilities of finding uranium. This, if found, will undoubtedly be one of the primary ores such as pitchblende or urananite. Similar geological conditions at Austin to those at the Boulder area in Montana and Marysvale, Utah, make this writer feel reasonably certain that uranium will be found in the Austin veins in depth.

And as a final word, this writer is convinced that with sufficient drilling of deep holes, new orebodies containing not only silver but copper and all of the other metals mentioned above will be found at Austin.

The proposed drill holes will cut the veins at such depths as to give at least 1500 feet of backs on the slope of the veins.

Furthermore, it must be borne in mind that should the vein system be opened up along the dip for an additional 1500 feet below the area already mined, the potential ore available would be greater than the 50 million dollars already produced. And should copper and these other metals be present in the ores, this might well be the second richest hill in earth.

PATENTED MINING CLAIMS

Owned by

HERCULES MINES COMPANY OF NEVADA

Appollo	Lot No. 54	Savanna	Lot No. 65
Bell Wilder (Audubon)	Lot No. 83	Southern Light	Lot No. 47
Blue	Lot No. 57	South American	Lot No. 37
Black	Lot No. 55	Spokane	Survey No. 3715
G. J. Love	Lot No. 96	New York (18/1000)	Survey No. 3313
Eclipse 1st West Ext.	Survey No. 3689	Brannan	Survey No. 3715
First West Ext. Gov. Seymour	Lot No. 79	Foster	Lot No. 41
Greer	Lot No. 71	Highwater	Survey No. 3718A
Joe Lane	Lot No. 56	Humes Fraction	Survey No. 3715
Lander	Lot No. 109	1905	Survey No. 3721
Manhattan	Lot No. 81	Bonanza	Survey No. 3721
Rourke	Lot No. 105	Emergency No. 2	Survey No. 3721
Rubicon	Lot No. 69	Emigrant	Lot No. 128
Samanthe	Lot No. 70	First East Ext. White No. 2	Lot No. 107
Siratoga	Lot No. 68	Gleason	Lot No. 102
Troy	Lot No. 90	Grand Prize	Lot No. 118
Wark	Lot No. 103	Great Republic	Lot No. 80
Wall and Isabella	Lot No. 82	Ophir	Lot No. 132
Washington Second West Ext.	Lot No. 53	Penobscot	Lot No. 86
Sunset (364/1000 part)	Survey No. 3313	Snow Flake	Lot No. 124
Allsop	Lot No. 99	Taft and Ashley	Lot No. 91
Buel North Star	Lot No. 38	Union	Survey No. 3721
Blue	Lot No. 72	Union Fraction	Survey No. 3715
Diana	Lot No. 39	Warren	Lot No. 106
Dollarhide and Defiance	Lot No. 95	White	Lot No. 108
Great Eastern	Lot No. 62	Carmargo	Lot No. 59
George Hogan	Survey No. 4635	Camillus	Lot No. 78
Home	Survey No. 4633	Congress Independent	Lot No. 60
Leon Consolidated	Lot No. 40	Eclipse	Lot No. 58
Littrell Fraction	Survey No. 3715	Hardy	Survey No. 3700
Miles	Survey No. 3715	Mizpah	Survey No. 4638
Morris	Lot No. 97	San Jose	Lot No. 51
Morgan and Muncey	Lot No. 87	S. C. Baker	Lot No. 100
North Star	Lot No. 42	S. C. Baker, 1st West Ext.	Lot No. 121
Oregon	Lot No. 67	Sillman	Lot No. 77
Savage	Lot No. 98	Silver Chamber	Lot No. 50

YANKEE BLADE:

Kearney	Lot No. 127	Whitlach Yankee Blade.....	Lot No. 61
11/20 Undivided Int. in Aurora.....		Lot No. 122	

MIDAS FLAT:

Yellow Dog	Survey No. 3698	Yellow Dog No. 2	Survey No. 3698
Bank	Survey No. 3715		

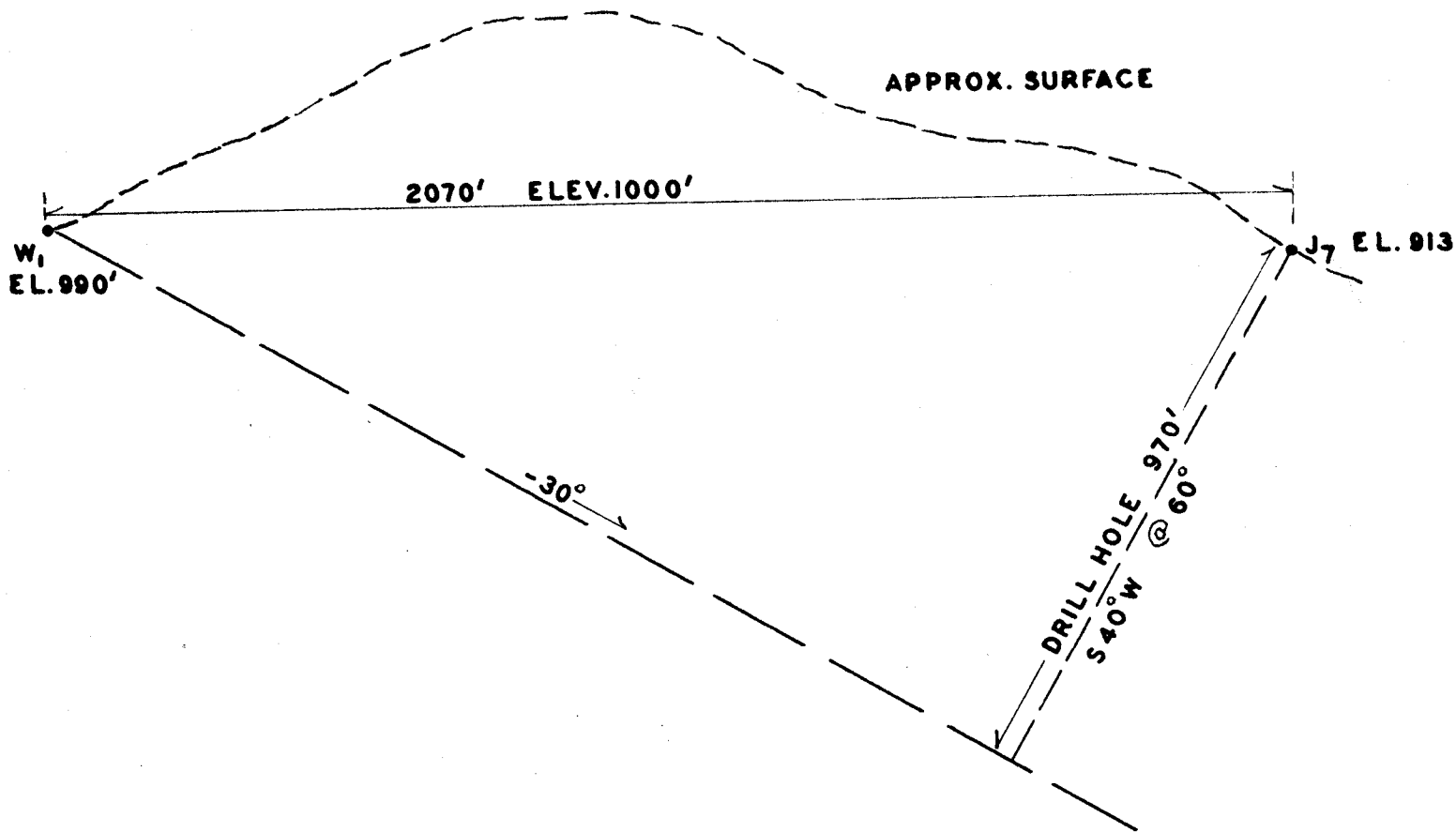
Respectfully submitted,

HARRY H. HUGHES

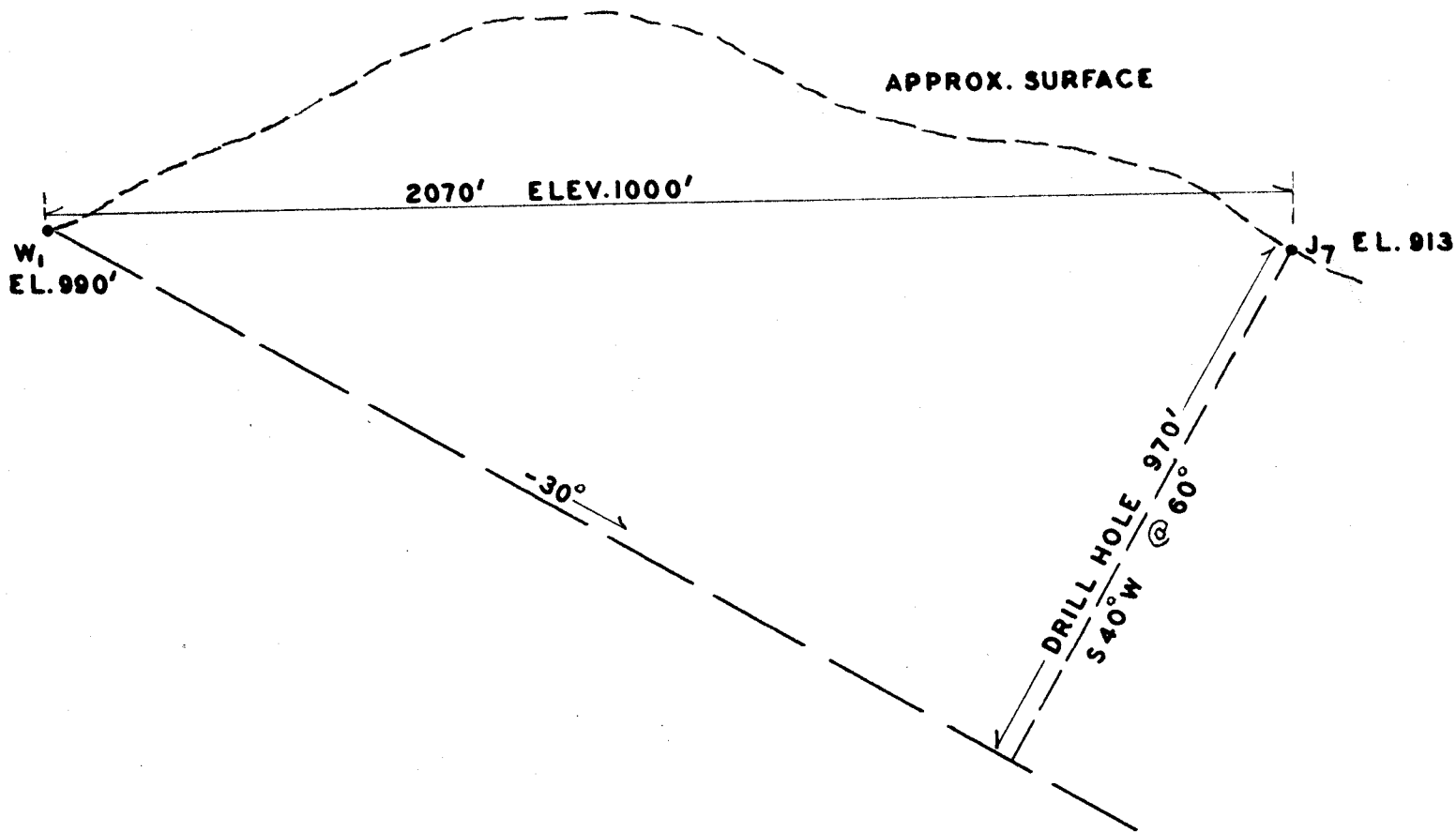
Goldfield, Nevada

October 25, 1955

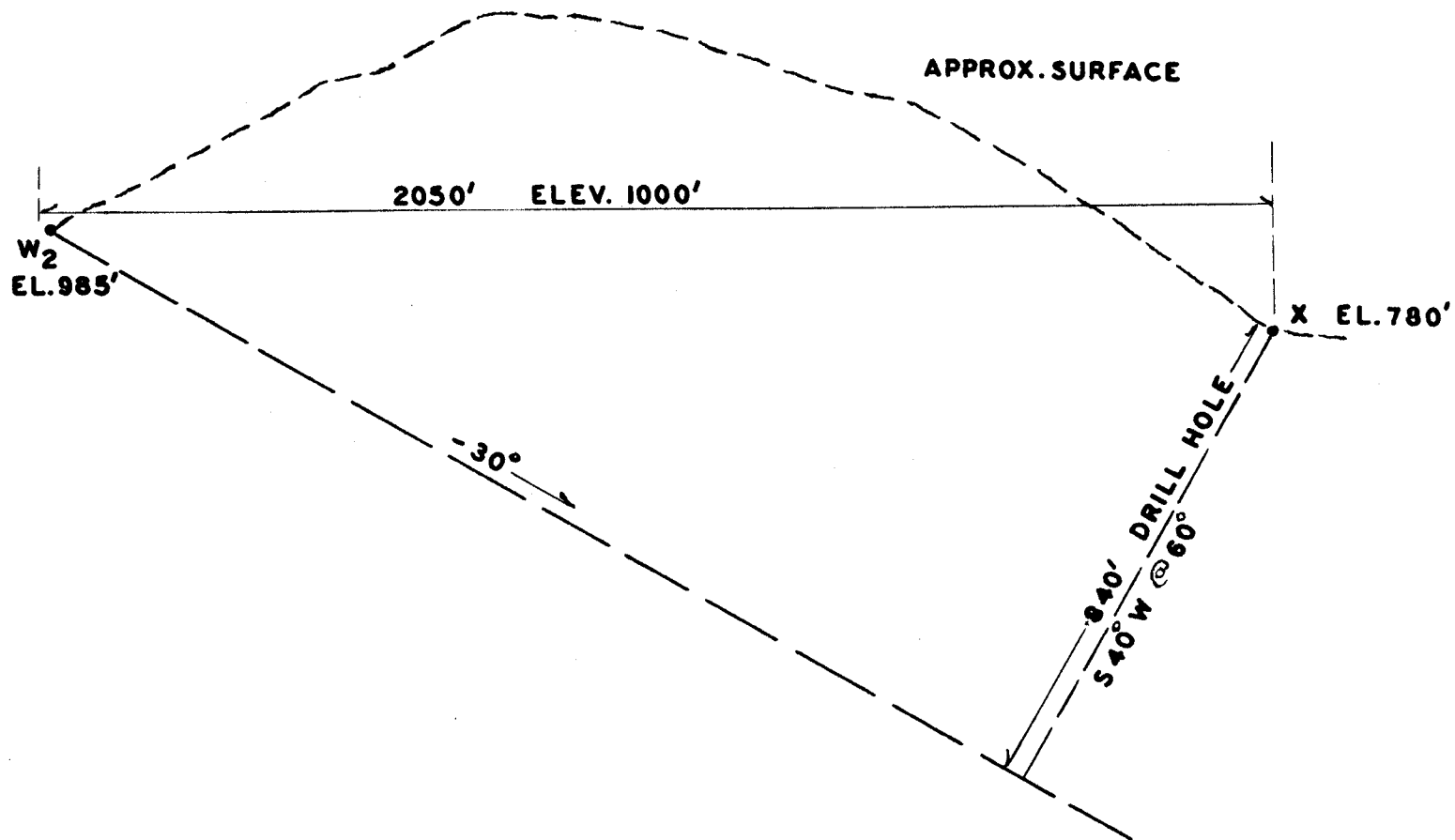




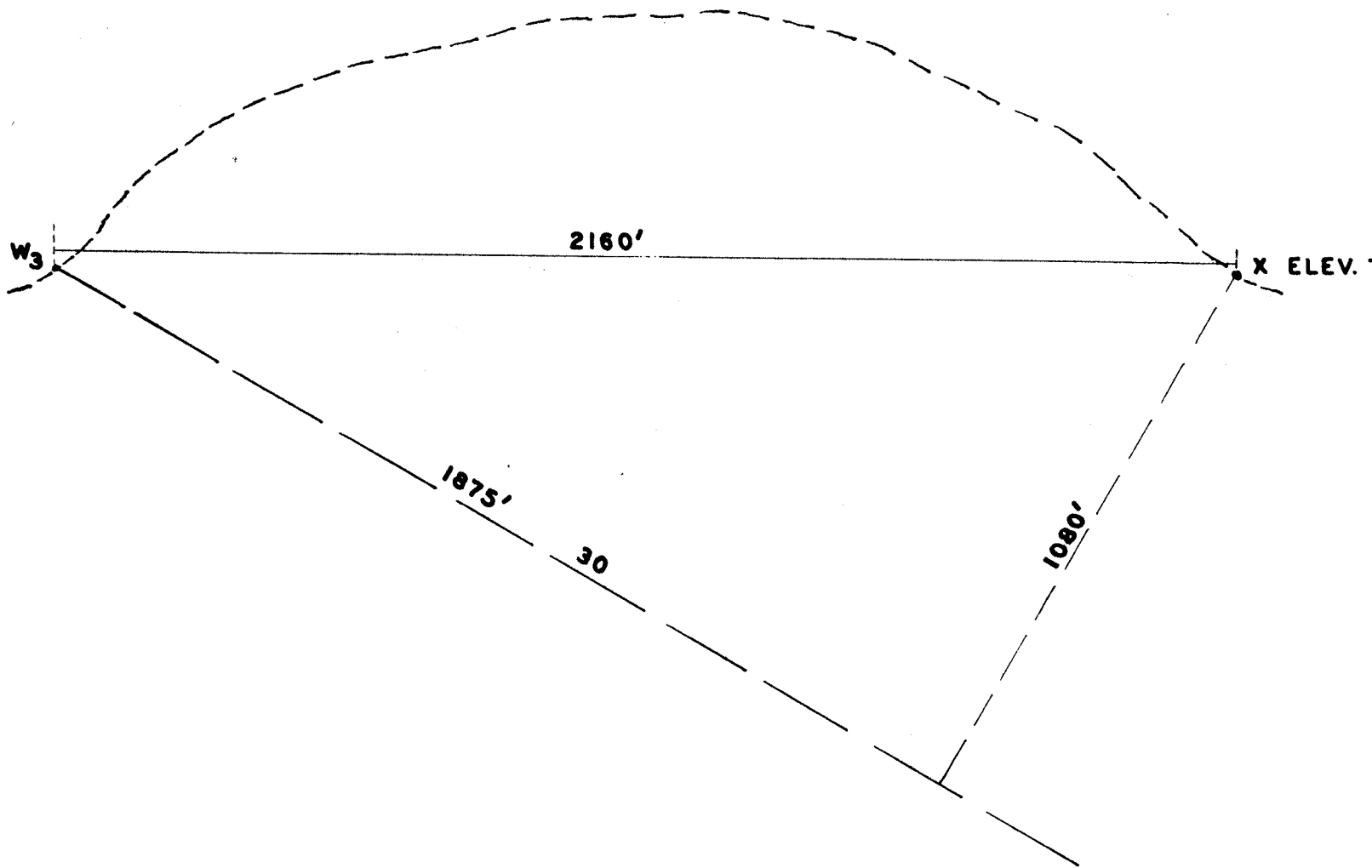
SECTION A-A'



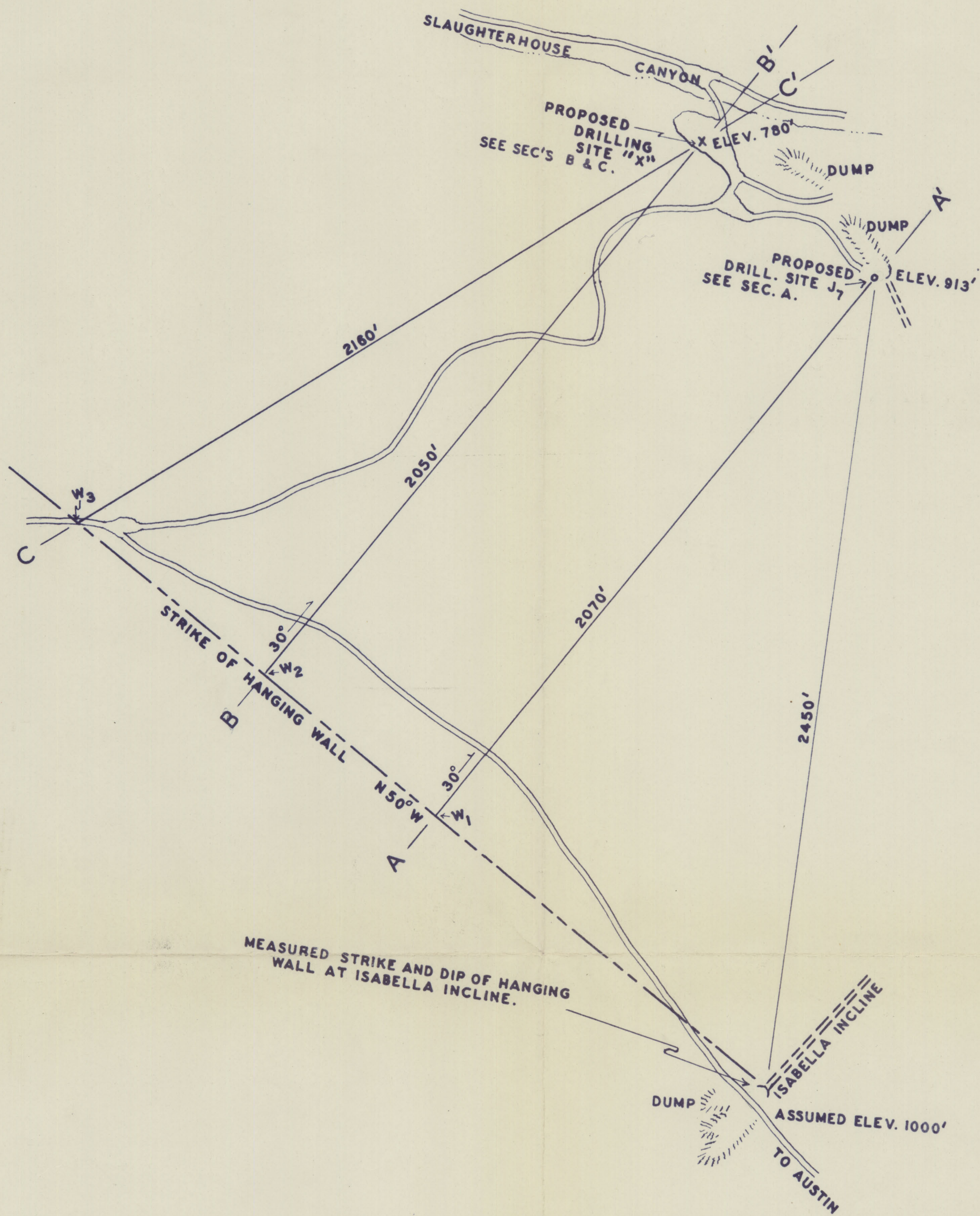
SECTION A-A'



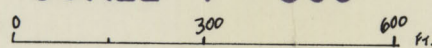
SECTION B - B'



SECTION C — C'



PROPERTIES OF
HERCULES MINES CO. OF NEVADA
 LANDER HILL, — AUSTIN, NEVADA
 SCALE 1" = 300' OCTOBER 1955



SHOWING STRIKE AND DIP OF THE HANGING WALL AND
 EXPECTED DEPTHS OF DRILL HOLES.

3890 0001