

1906
MR. ~~WMS~~ - 6-8

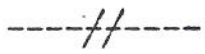
GEOLOGICAL SURVEY OF WYOMING

A R E P O R T

O N

T H E S T R O N G M I N E .

L E S L I E , A L B A N Y C O U N T Y , W Y O M I N G .



L O C A T I O N A N D E X T E N T .

The property known as the Swigart-Baker Group or the "Strong Mine" is situated in Section 4 Township 16 North, Range 71 West and Section 58 Township 17 North, Range 71 West, at Leslie Post Office near the head of Horse Creek, in the eastern part of Albany County, Wyoming.

It consists of sixteen claims, as follows:-

Leslie,	Strong No. 3,	Granite,
Laura,	Marsh,	Farman,
Albany,	Boston,	Copper,
Natalie,	Strong,	Swigart,
Strong No. 2,	Jean,	Wedge,
	Granite Extension.	

These claims comprise about 270 acres, lying in one compact block of ground, as shown on the maps of the Company.

T I T L E A N D O W N E R S H I P .

These claims are held by location and discovery under the laws of the United States and the State of Wyoming and it is recommended that United States Patent on this ground be applied for at once.

The "Swigart-Baker" Group, as the property was formerly known, was located in October 1898 and has been in practically continuous development ever since.

It is now owned by the Strong Copper Mining Company of Laramie, Wyoming, organized under the laws of the State of Wyoming and capitalized at \$1,000,000.00, divided into 1,000,000 shares, par value \$1.00 each.

Of this stock 500,000 shares were paid for the purchase of the property and the balance placed in the treasury of the Company for development purposes and there still remains 234,000 shares yet unsold on this date, according to statement received from the Treasurer of the Company.

The officers for the year 1936 are as follows:-

N. E. Corthell,	President,	Laramie, Wyo.
E. P. Baker,	Vice President,	Leslie, Wyo.
I. R. Swigart,	Secretary, Treasurer and General Manager.	Laramie, Wyo.

GENERAL GEOLOGY.

The Strong is situated on the east side of the range of Mountains that extends north and south along the Laramie-Albany County line and which is known as the Laramie Hills.

The general formation of this range consists of a core of granites flanked on either side by the succeeding sedimentary formations, limestones, shales, sandstones etc. The granite is usually of a reddish feldspathic variety, but grey granite is noted and these are both found to contain numerous dykes, ledges and bands of gneiss, schist, diorite, gabbro and other dyke rocks, and it is here noted that the mineral showings in this range are all found to occur in intimate connection with these dykes or ledges.

These showings vary in different parts of the Hills, but uniformly show copper ores with well defined surface indications, and the trend or direction of the veins or ledges, as well as that of the dykes etc. vary locally in the different camps of this range.

G E O L O G Y A T T H E S T R O N G .

The Horse Creek Valley, where the Strong is situated, shows the overlying limestone at the head of the valley, but this is missing in the valley below and nothing but the granite and the dyke rocks are to be found in the Strong Vicinity.

The granite is the usual red granite of this range, rather coarse grained and showing small veins and stringers of quartz throughout its mass, but the principal mineral showings are associated with the dykes. Here these dykes are principally gabbro and diorite, often much altered and weathered and showing extensive evidence of fracturing in the formations, both in the adjacent granites and in the dykes proper.

The fractured and fissured condition is the result of a number of movements in the formations, which have left the original dykes and granites and the later quartz veins much crushed and broken and provided a place for the copper and other minerals to be deposited.

The surface of the group is usually covered with a granitic wash or gravel, in common with a great deal of the upper Horse Creek country, but the dykes and ledges which form the principal surface showing on the Strong group may readily be followed by outcrops along their course.

The surface showing usually consists of quartz and oxidized iron, showing both as masses of brown limonite and hematite (red and brown) and staining the adjacent quartz and dyke rocks, the usual rusty brown color of iron oxides.

With this iron stain is also copper, both as stains of blue and green copper carbonates (azurite and malachite) and some scales of native copper as well as partly oxidized copper sulphides, similar to those found in the deeper workings of the mine.

The principal showing at ~~RMK~~ present worked is noted on the Strong claim at the site of the main shaft and work confined to the showings of these workings.

O R E S .

The ores noted at the Strong are copper sulphide ores suitable for concentration and smelting.

In the upper level the usual oxidized forms of copper are noted, malachite and azurite, the green and blue carbonates being most common, and associated with them are chrysacolla, silicate of copper, cuprite, red oxide of copper, some native or metallic copper and small amounts of the rarer copper minerals, but these are unimportant.

The chief ores of the mine are chalcopyrite and bornite, copper-iron sulphides and with these is found copper glance or chalcocite, a black hard sulphide of copper which furnishes the "specimen ore" of the mine, running as high as 70% copper in selected samples.

With the copper values are found gold and silver values in varying quantity, and the presence of molybdenum and lead is noted, but is not important.

These ores and including materials or gangue are discussed in detail in paragraphs relating to the showings on the different levels.

W O R K I N G S .

The development consists of the following:

Main shaft,		303 feet.		(Jan. 12, 1906)
Drifts,	100' Level.	43 "	"	" " "
	150 "	207 "	"	" " "
	250 "	124 "	"	" " "
Crosscuts		169 "	"	" " "
Winze		<u>5 "</u>	"	" " "
Total development,		851 "	"	" " "

At present these are being daily increased by sinking the shaft and drifting south and west on the ore on the 250 level.

M A I N S H A F T .

This was sunk on the Strong Claim as a double compartment shaft following the dip of the ore and shows ore for nearly its whole depth, and the various drifts and levels run at the different intervals above noted under the head of "Workings".

The ore at the surface showed six feet wide and at a depth of fifteen feet showed eleven feet in width and at fifty feet showed fourteen feet wide in a crosscut on the east side of the shaft. The quartz vein

carrying copper continued down the shaft, showing a varying width, to a point below the 150 level, where the vein changed from a slight easterly dip to a stronger westerly dip and the shaft continued in a mineralized gabbro to the present depth.

The mineral showing in this gabbro is copper and iron sulphides, occurring in spots and streaks scattered throughout the mass and quartz vein in the gabbro.

No tests have been made as to the grade of this material, but it is evident that a great portion would be available for concentration with other ores of the mine. At present this ore is only considered as indicating the extent of the mineralization in connection with the more developed ore bodies of the mine, but will later become important when further developed and shown up.

THE 100 LEVEL.

On this level, which is 43 feet long, the quartz ore impregnated with copper sulphides extends the whole length and shows in the floor, roof and sides of the drift and also in the present face.

At a point 27 feet from the shaft, a winze was sunk five feet deep and shows the same ore as in the drift. The width of the ore shown at the floor of the drift where the winze was sunk is 7 feet 9 inches.

A five foot cross cut was run into the gabbro on the east side of the drift, at 13 feet from the shaft, showing the gabbro in the face and quartz ore on the sides of the crosscut.

Some high grade ore has been taken out of this level and the winze near the south end, but the mass of the body shown is considered

concentrating ore and is evidently part of a large body of ore that has not been fully opened up by the present drift.

On this level considerable oxidized ore is noted in connection with the usual sulphides above mentioned, but the greater percent is sulphide ore suitable for concentration.

THE 150 LEVEL.

This level is the longest of the present levels and like the others has been run on the ore. Its length over all is 207 feet along the vein north and south. On the south side of the shaft, the drift is 181 feet long and in ore of a concentrating grade for a length of 110 feet, the remainder being a crushed and broken quartz and gabbro, showing a mineralized condition similar to the present shaft material and is evidently the usual ground between ore shoots.

A cross cut has been run on the east side of the drift for a showing a good grade of copper ore seven feet in width length of eleven feet at a point 63 feet from the shaft and at 50 feet further south cross cuts on either side followed a fault or fissure line running diagonally across the trend of the ore shown in the main drift.

The material in these cross cuts shows a crushed and fractured condition, showing smooth "slickensides" indicating considerable movement in the formation adjacent to the ores of the drift. These cross cuts were driven for exploration purposes and not on the ore.

The ores here show the copper sulphides in quartz and gabbro and a width (as far as developed) of from one to nine feet, the narrow streaks showing some very rich ore and the wide bodies, rich streaks through the mass of low grade copper sulphide ore. A similar condition shows for a length of 20 feet on the north side of the shaft.

THE 250 LEVEL.

This level is the most important showing at present made in the mine, showing as it does that the ore values are not confined to the surface shoots, that there are shoots of ore not shown in the surface outcrops and that the size of vein and grade of ore has not diminished but rather increased with depth, all of which have an important bearing on all consideration for the future of the mine.

Drifts have been run north and south of the shaft and ore shown in each instance, but the main showing is made in the easterly drift on the south side of the shaft.

This drift extends south from a cross cut at a point 25 feet south of the shaft where a showing of ore indicated that a vein had crossed the general course or trend of the ore in upper levels and the drift run as above noted. This drift cut into rich glance and bornite ore and has continued in the same ever since.

The ore here shows in bottom, top, sides and face of the drift and the grade is the same for the whole length of 35 feet. (1-11-06); the vein being a crushed quartz showing copper glance, bornite and chalcopyrite and is evidently of a high concentrating grade, though no tests of large amounts have been made on this material; specimens show very high values.

A drift has been started on this same vein on the west side of the drift south from the shaft, following the ore, which shows about the same conditions as noted for the east side. Neither of these showings have been crosscut but the drifts show them over six feet wide. As stated in the shaft description, the ore followed down, dipped away from

the shaft line to the west and the shaft was sunk from that point down without regard to walls or vein. It is evident from conditions noted on this level that some movement or intrusion took place at this point and that the ore followed in the upper shaft and levels varied from its regular dip and course, and also, that the present work above noted has again opened up this ore and the work on this will determine the course to be followed on this and lower levels.

The first drift run on this level was too far west and went ^{be} along _A side the ore on the west side. Some ore was encountered here on the east side of this latter drift and this indicates the extent of the mineralization, but which will be developed later.

On the north side of the shaft, drifts were run on a showing of ore for a length of 45 feet. At a point 13 feet north, a crosscut was run east 23 feet to cut the gabbro contact. At a point 20 feet a crosscut was run 45 feet west to cut the ore shown in shaft above, but to date has not penetrated it. Small stringers of quartz and ore were cut here, but the shaft ore is considered to be ahead of this work.

P R O B A B L E O R E .

The different levels have not yet been connected by raises on the ore to establish its full extent and admit of mill samples to determine its exact commercial values, but enough has been done already to thoroughly demonstrate beyond a reasonable doubt that the Strong contains a great amount of ore and that the ore is of commercial concentrating grade.

A careful inspection of the showings made indicates that the average width of the ore is at least five feet and taking this on a basis of calculation, with the length of ore opened up on the different levels and shown by the depth of the shaft, it is evident that this shows an amount of ore that will fully justify the further active development of these ores and the erection of a suitable plant to concentrate these ores to a profitable shipping basis.

The ores indicate that such works would concentrate from four to eight tons of ore into one ton of concentrates and this, with the gold and silver values shown in the tests made on these ores, shows a good grade of concentrates, that may be shipped at a profit.

All records of tests are in the hands of the secretary and copies may be had on application to him.

EQUIPMENT.

The present equipment consists of

- 1-40 H.P. Tubular Boiler,
- 1-25 H.P. H. & E. Hoist,
- 1 Exhaust Fan,
- 1 Blacksmith outfit.

This is used in connection with the usual mine tool equipment. Cable, cars, buckets etc. for the necessary operation of the mine.

The buildings consist of the following:

- | | |
|------------------|-----------|
| 1 Shaft house | 26' X 50' |
| 1 Boarding house | 28' X 48' |
| 1 Bunk house | 16' X 24' |
| 1 Barn | 16' X 24' |

These latter are at the Creek, below the shaft, on a tract of patented land.

N E W M I N E E Q U I P M E N T .

The present equipment is sufficient for prospecting work, but hand work in mining is of necessity slow and it is recommended that machine drills be put in place of hand drilling in the heavy work of the mine as soon as practicable.

This will require the installation of an air compressor of proven utility, properly equipped with automatic cut off, receivers etc., at least two machine drills of approved design and the necessary air pipe and other equipment of a drilling outfit.

Steam for this work may be furnished from the present boiler for the present, but this should be properly built in and enclosed to as to avoid any waste of fuel or steam that may be used to advantage in the mining work.

The present mine water does not require a pump, being handled by bucket, but it is likely that such a pump may be required at any time and this should be provided at the same time as the other equipment.

The present shaft is in good order for prospecting work and will answer all purposes until a steady production is called for, but at that time it is recommended that it be put in thorough first class shape for rapid hoisting by having all changes of dip lessened and timbered from top to bottom, to prevent any possible accidents from falling rock, and proper guard rails etc placed at all stations or working places.

C O N C E N T R A T O R .

A concentrator is recommended for the ores of this mine. As has been already stated, these ores are suited to a concentrating-smelting process and at the present time, a small concentrator only is warranted by the showings as above described, the resulting concentrates to be shipped to the nearest smelter at convenient intervals.

The plant required consists of storage bins at shaft and mill, connected by over head rope tramway equipped with necessary buckets, landing devices etc. at either end to receive and deliver the ore automatically, and driven by power from the mill engine.

The mill proper consists of a rough crusher, rolls, screens to size the product to uniform sizes; concentrating tables of approved and practical design, settling tanks for unwatering and settling fine material or slimes and slime tables, the whole set up and equipped with necessary tanks, piping, concentrator, elevators (if required) and other appliances for the practical and economical operation of the mill.

Power to be furnished by boiler and engine set conveniently at the mill and provided with shafting, belting etc. conveniently placed for present and future needs when the proposed plant is enlarged.

It is recommended that the details of this mill be worked out on the working plans as soon as possible and necessary experiments made to determine practically the machinery best adapted for these ores regardless of apparent suitability or "interested" advice.

It is recommended that this mill be built on a 25 ton per day basis and so designed and constructed that it may be added to as the ore in sight in the mine warrants.

The crushing and steam plant should of necessity have a greater capacity than the above, and by means of screens at crusher and rolls can be much increased, so that all that would be required for a mill of nearly double the above capacity will be additional tables and slivers, with necessary equipment and hoisting.

M I L L S I T E .

At a point on Horse Creek below the present boarding houses, there is a prominent outcrop of granite on the north side of the Creek that forms an ideal site for a small mill as above described, and this is recommended as the mill location, as it provides all necessary conditions for foundation, fall etc. at a minimum distance from the shaft (about 1500 feet), is accessible from all sides and the entire creek may be conducted into the mill tanks with a ditch of not to exceed a length (estimated) of 2500 feet and obtain all the fall necessary for milling purposes.

This site is not on the Strong group of claims, but on patented land adjoining, belonging to Messrs I. R. Swigart and E. P. Baker, the original locators of the Strong and who have personally assured the writer that they will deed a proper sized mill site to the Strong Copper Mining Company, upon erection of a mill.

Below this site the ground is covered by the Strong Group and provides sites for a proper series of settling ponds for the mill tailings which are necessary to prevent pollution of Horse Creek below the works and thus avoid all future trouble with those interested in the stream, either for fishing or irrigation purposes.

W A T E R, T I M B E R A N D F U E L .

Horse Creek flows through the property and water rights for milling purposes may be obtained on application to the State Engineer of Wyoming, under whose jurisdiction all waters are placed by the laws of the State of Wyoming.

This stream provides all water necessary for a mill as proposed and by storage reservoirs above and pumping back from settling tanks, a much larger plant may be taken care of, aside from the water from the mine, which will form an important item.

There is no timber on the Strong Group suitable for mining purposes, but in the vicinity there is the usual pine timber, which is used for fuel and rough mine timbers.

For extensive building or mining work, lumber may be had in car load lots at the usual trade prices in Cheyenne or Laramie. The nearest delivery station is Horse Creek, ten miles distant, on the Cheyenne-Orin Junction branch of the Colorado and Southern R. R.

This station is the natural outlet for the Strong as it is a down hill pull to the station over what can be made a first class mountain road with small expense, and with a mill once producing steadily the question of hauling will be readily settled as it will provide a load for the team both ways, concentrates down to the Railroad (the heaviest loads) and coal and other supplies, lumber etc. back to the mine.

Contracts for hauling to Horse Creek or to Laramie may readily be made as soon as a steady production and the most economical route determined.

GENERAL RECOMMENDATIONS .

A survey and patent of the entire group is recommended as well as an accurate survey and map of the shaft and underground workings, also a profile and map of the proposed mill site and tramway line between the shaft and mill, together with ditch lines and necessary levels to admit of complete estimates and working drawings being made of all these works.

This work should be done as soon as possible and all points thoroughly canvassed before actual construction is begun and then work pushed as fast as possible.

ESTIMATED COSTS .

The estimated costs of these works and improvements is as follows:

Mill, set up and running.....	\$ 7000.00
Tramway ditches etc.....	3000.00
Mine plant and works.....	5000.00
Mine expense before starting mill.....	5000.00
Patenting group and surveys.....	<u>5000.00</u>
Total.....	\$25000.00

It is possible that all this may not be needed but it is considered this is a fair working estimate of the expense of these works and that it can be done within these figures.

CONCLUSIONS .

The Strong Mine is considered a first class development proposition, which justifies the fullest development of its contained ores and the erection of a plant to treat these ores, on the lines indicated in the foregoing report.


16.

There is every reason to believe that the ores now out into are only a small part of the ores of this mine and that deeper workings, following the ~~ores~~, will develop a much greater amount of ore of equal grade.

To this end it is recommended that the present shaft be sunk as rapidly as possible, and at 100 feet below the present 250 level, that a level be run on the ore at that point and further sinking considered.

At the same time lateral development on the ore is necessary with raises and crosscuts to fully determine these ores, their extent, value and relation to each other and in the light of this work the future development of the mine may be planned.

Respectfully Submitted,


State Geologist.

Date of Examination,

January 11-12, 1906.