

REPORT ON THE PROPERTY OF THE
GREGORY-BATES MINING COMPANY

1936

by

Ernest N. Patty, E.M.

SUMMARY AND RECOMMENDATIONS:

The property is located in the Central City District and embraces the first gold lode location in the Rocky Mountain Region. For many years this area was one of the most important and productive gold mining regions in Colorado. This district reached its zenith about the close of the century and for the past twenty to thirty years has been practically dormant.

A careful study of all available records indicate that this was not due to exhaustion of the payshoots with depth but to the refractory nature of the ore and mounting costs which finally wiped out the margin of profit.

The Gregory-Bates Company now holds under lease and option the most productive and promising section of the district and are concerned with the reopening of the more favorable properties with the expectation of profit.

In their favor they have:

1. The advanced price of gold from \$20.67 to \$35.00 per oz.
2. The development of ore dressing technique which assures a recovery of 90% of the gold in the ore as compared with 50% to 60% under practices existing thirty years ago.
3. Lower power costs.
4. Lower mining costs through the mechanical developments through the past thirty years.

The financial set-up of the company is sound and equitable and affords maximum protection to the stock holders against manipulations.

What opportunity there was for examining unbroken ore underground will convince any engineer that the veins are strong and persistent, have continuous payshoots heavily mineralized with sulphides, and give every indication that the values will continue without diminution, at least several hundred feet beneath the present bottom of the mines.

All mining is now centered at the Hunter Shaft on the Bates Vein. A sixty-ton mill has been put into operation and at present is treating material derived from cleaning out the levels and cutting out for stoping. This material to date has averaged .18 ounces of gold per ton, which, since it has to be handled, could not be discarded but is of sufficient value to pay only a portion of the total expenses of the company. Stopes have now been started from three levels and according to sample records, the ore from these stopes should give a mill feed assaying about one-half ounce of gold per ton. Thus in the next thirty to ninety days this mine is going to meet the acid test. The total operating expense is averaging around \$8.00 per ton. Thus with a one-quarter ounce feed the operations will break even. Close control of stoping is recommended to hold the mill feed above .4 ounces

or preferably .5 ounces. Such a mill feed will take care write-offs and provide a handsome profit. When the stopes from the Hunter mine demonstrate their ability to hold the grade at this point, you can then safely assume that the operations of the Gregory-Bates Company are on firm ground.

The plan to sink a one-hundred-foot winze below the 800-level of the Hunter mine is recommended.

As soon as the Hunter Mine is on a profitable basis, the reopening of the O'Neil Mine is recommended. All available data, which appears to be very dependable, indicates that this is the highest grade ore body in the district and that there is an important tonnage available. Mr. Justin Haynes, mining engineer of Denver, made a careful study of the maps and official records of this company and estimates the developed ore at 70,000 tons, assaying \$28.78 per ton in gold. This would be exceptionally profitable under present conditions and if the estimates stand up to mining, the Hunter Mine and the O'Neil mine could be brought into shape to give a combined production of 150 to 200 tons per day. This would call for enlargement of the mill and would result in substantial reduction of operating costs.

With the Hunter and O'Neil mines in profitable production it is recommended that the Company seek to interest one of the larger mining organizations in the reopening of the Fifty Mines through the Cook Shaft. This has the ear-marks of a large, low-grade mine that should be operated on a 500 to 1,000 basis daily. Reliable engineering reports indicate 1,706,000 tons of developed ore assaying \$8.50 per ton. Profitable operation of the Hunter and O'Neil mines would set the stage to make the Fifty ore body very attractive to a mining organization which has the financial and technical resources to rehabilitate this large property.

It is recommended that additional tests be made toward cyanidation of the mill concentrates. If this can be successfully worked out, it will result in a substantial reduction of marketing costs.

The management of the company is in safe and competent hands. To date about \$200,000 has been expended; approximately \$40,000 of this has been for property payments. All funds are going into the development and advancement of the property. The business impresses me as a clean-cut mining venture.

Respectfully submitted,

Ernest N. Patty, E. M.

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Scope of Report:

This report is based upon two days' work on the property, during February 1936, and was supplemented by a study of all available reports by other engineers on this and adjoining properties; also a study of the general mining history, geology, and the general features of the ore deposits of the district as set forth in Profession Paper 94, of the U. S. Geological Survey.

Mr. Douglas M. Todd, Jr., President of the Gregory-Bates Mining Company, was with me throughout the examination and placed all company records at my disposal. Without his intelligent and wholehearted cooperation the results could not have been accomplished in the time available for the examination. Mr. H. S. Shotwell, consulting geologist for the Company, spent one day with me and gave me the results of his observations in the district.

Location:

The several properties held under lease and option of the Gregory-Bates Mining Company are located in and near the towns of Black Hawk and Central City in the Central City Mining District, Gilpin County, Colorado. The mines are only thirty-six miles by automobile road from Denver. Although the town of Black Hawk is at an elevation of about 8,300 feet, the climate is very favorable for year-around operations, and at the time of my visit, in midwinter, there were only a few inches of snow on the surrounding hills.

Engineers' Reports Studied:

Report of Wm. A. Farish, dated December 1900.

Complete valuation report of the property by Justin H. Haynes, valuation engineer of Denver, dated November 1934.

Report of H. S. Shotwell, consulting engineer for the Company, dated March 1934.

History and Production:

The very colorful and interesting history of the Central City District has been fully covered in the reports cited and will not be repeated here. It is sufficient to note that on the property of Gregory-Bates is a monument marking the site of the first gold lode discovery in the Rocky Mountain Region. This discovery was made by John H. Gregory, May 6, 1859. For the next forty to fifty years the district was one of the more important gold mining areas in the Rocky Mountain region. The total production was around eighty-five million dollars in gold. The Gregory property now under option of the Gregory-Bates Company, is credited with a production in excess of twenty million dollars.

Why the Mines Closed Down:

After only a few hours in the district a stranger is impressed with the fact that he is standing on the site of one of the most compact and highly concentrated gold mining areas in Western America. All about him he sees the hillside dotted with old shaft houses and great dumps, the slopes scarred with long and continuous gashes where the veins were stoped

to the grass roots. In the Gulch bottoms are the remains of several large stamp mills. The old railroad grades and wagon roads to the mines are still visible. If all written records were lost, even the novice would appreciate that a great flow of mineral wealth come out of this small area.

The Gregory-Bates enterprise is concerned with the reopening of several of the more important of these old mines, with the expectation of profit. The obvious question then is: "Why did the mines close down one by one so that the district for many years has been practically dormant?"

In attempting to answer this the first question to be considered is: "Were the pay-shoots bottomed?" After a rather thorough study of the written records of the district, I feel safe in the conclusion that in general the ore in the present bottom of the mines will average about the same grade as it did in levels three or four hundred feet nearer the surface. This conclusion is founded upon what I believe to be trustworthy evidence and is further substantiated by the opportunity which I had to see the Bates vein on the eight hundred level at the bottom of the Hunter Shaft.

From the surface down to a depth of one to two hundred feet the ore bodies were highly oxidized and the gold pretty thoroughly liberated from the sulphides. This oxidized ore was richer than the primary ore and probably seventy to eighty per cent of the gold could be recovered by the early mills by straight amalgamation.

Below the water level the fresh primary sulphide ores were encountered. Much of the gold in this primary ore is mechanically locked up in the pyrite. Crushing the ore in stamp batteries liberated about forty-five per cent of the gold for recovery and the rest went down the creek. To combat this the miners had sorted out the larger chunks of more solid sulphide ore and shipped it direct to the smelters. The necessity of better recovery in the mills resulted in the development in this camp of what is known as the Gilpin bumping table, a crude form of gravity concentrator which was the fore-runner of the modern concentrating table. This crude bumping table added ten or fifteen per cent more to the existing recovery of gold.

Pumping and hoisting from the shafts was done with steam power which was expensive as compared to the electrical power now available in the district and the mining plants were cumbersome and expensive to operate. Drilling was done by hand, as compared to the modern air operated drills. Each new level at depth increased mining costs. The average grade of the mill ore appears to have been around one-half ounce of gold per ton of ore, this being sweetened somewhat by streaks of high-grade shipping ore. Each mine in turn, depending upon the grade of its individual ore body and upon its management, sooner or later reached its economic limit and became unprofitable. In most instances this was not because of diminution of values but because of increasing depths and mounting costs. Most of the ore bodies were followed down to a depth of six hundred feet and some, more favorably endowed, went down to from twelve to fourteen hundred feet.

Factors Favorable Toward Rejuvenation of the District:

1. Gold now commands a price of \$35.00 per ounce as compared to the old price of \$20.67--or 1.7 times the original price.
2. Discovery of the flotation process and the cyanidation process will assure a recovery of 90 to 95 per cent of the gold in the ore under standard milling practices.
3. Lower power costs through purchases of electric power from lines crossing through the districts.

To date about \$200,000 has been expended. All of this money has gone into the development of the property with no diversion of funds for promotion purposes. The balance sheet and profit and loss are included with statements filed with the Securities Commission and will not be repeated here.

The financial organization is such that no officer of the company shall profit except through operating profits which the company shall make. This statement obviously excludes very nominal salaries paid to those officers who are actively engaged in the operations of the company.

Geology:

The prevailing country rock of the district is a complex of Pre-Cambrian gneiss and schist. This is intruded by dikes and small stocks of monzonite and it is assumed that the veins were end products derived from deep-seated mineralized solutions ejected from the parent mass of monzonite during its period of cooling and consolidation.

The vein system can best be described as a reticulated (fish-net) pattern. The major fissures trend through the district in a north-easterly direction and are jointed by other mineralized fissures which meet them at an acute angle. Many individual veins show a habit of branching into two or more strands which may again unite farther along the strike. The veins observed have steep dips, averaging 65 to 80 degrees southeast.

The gneiss, where observed, is flat-lying and the veins cut across its cleavage planes. The veins ascended along pronounced fault fissures, and in the mines this is marked by a well defined foot-wall with the mineralization working out irregularly into the hanging-wall. The vein filling is quartz highly impregnated with pyrite and minor amounts of chalcopyrite, galena and sphalerite. The remainder of the filling is highly altered and sericitized wall rock laced with threads and bands of pyrite. Streaks of almost solid pyrite varying from an inch up to three feet in width are common in all of the stopes visited. These sulphides streaks pinch and swell irregularly both along the strike and dip of the veins. In mining, the larger chunks of rather pure sulphides are hand-sorted out and shipped direct to the smelter.

Free gold is sometimes observed in the ore but most of the gold is finely divided and enmeshed in the pyrite. Grinding through forty-mesh is reported to liberate about 30 to 40 per cent of the gold. The ore carries about two ounces of silver for each ounce of gold. Copper averages from .2 to .3 of one per cent and there are lesser amounts of lead and zinc. Gold is the only metal of importance in the ore with silver as a subordinate by-product. The high iron content of the pyrite secures a special premium of \$3.00 per ton at the smelter.

The mineable ore is localized in payshoots and sections of the vein intermediate between these shoots are too low in gold content to be commercial. Judging from historical records and the evidence of old stopes along the surface some of the larger payshoots must have been at least 2,000 feet in length, others are shorter but most of the important ore shoots are 200 to 500 feet or more in length. The mineralization observed in the Hunter ore-shoots is strong and healthy and should extend to a depth of several hundred feet below the northeast along the stroke of the vein.

Bates Vein:

The Gregory-Bates Company has under option a strip of land covering about 2,000 feet along the most productive segment of the Bates Vein. The chief center of past operations on this vein have been from two shafts spaced about 500 feet apart. The Becker shaft is

located on the north slope of Gregory Gulch and the Hunter shaft is on the opposite side of the Gulch.

Hunter Shaft:

The workings from the Hunter shaft are often spoken of as the Hunter-Bates Mine. All mining work at the present time is centered at the Hunter shaft. This shaft, sunk as an incline, follows the vein down to a depth of 765 feet below its outcrop to what is known as the 800-level.

The shaft is equipped with a modern single drum electric hoist, a wood and steel head-frame, and with sorting table and ore bins. An air compressor furnishing compressed air to the drills and a blower for ventilation, both electrically driven, are located near the shaft collar. An Ingersoll-Rand electric sinking pump, located at the bottom of the shaft, easily handles a flow of about 100 gallons of water per minute. The shaft is well timbered and in good condition and the equipment at hand is capable of hoisting 100 tons of ore per day, without difficulty.

It is reported that the Hunter shaft was closed in 1893. It was recently pumped out and rehabilitated after being under water for more than forty years. This work disclosed that there had been only a limited amount of stoping below the 500-level, and that there is a block of ore containing at least 15,000 tons developed on the west side of the shaft from the bottom level upward to above the 500-level. After the 500- and 700-levels are more fully caught up and it is possible to explore the raises and check up more thoroughly on the amount of old stoping that has been done, it is quite probable that the tonnage immediately available will be found to be much in excess of the estimate given above.

The Bates vein as exposed west of the Hunter shaft on the 800-, 700-, and 500-levels is a very impressive mineral showing. The vein is strong and healthy and intensity of the sulphide mineralization gives cause to expect that the present values should extend for a depth of at least several hundred feet below the present bottom of the mine. The mineralization zone is in places twelve feet, but the best values appear to be generally localized in a zone about three to four feet wide, which follows the foot-wall, and every effort should be made to confine ore extraction to the higher grade sections of the vein with the idea in mind of keeping the mill feed up around .5 ounces of gold.

The various levels will be described separately, and if this description is read in conjunction with the sketch map enclosed, it will be much easier to understand the features discussed.

800-LEVEL:

After the Hunter shaft was unwatered and the bottom of the mine exposed, one of the first pieces of development work done was to extend the east drift on the 800-level for a distance of 305 feet in an effort to get under some high-grade ore known to exist below the Gregory-mine (which is on the same vein, the two shafts being about 500 feet apart). This drift exposed some spots of rich ore but no continuous payshoots that could be stoped. The face of the east drift is now directly below the rich ore, at a depth of 270 feet. Its failure to encounter the payshoot is probably due to the fact that the ore-shoot is plunging eastward, or away from the face of the tunnel. Extension of this drift an additional one hundred to two hundred feet should result in tapping the Becker payshoot and thus quickly and cheaply result in the development of a commercial block of ore beneath the Becker shaft.

It will, however, be more conservative development at first, to explore this Becker payshoot by extending the east drift on the 500-level from the Hunter shaft a distance of 270 feet. This would also permit draining the Becker mine through the 500-level of the Hunter and thus give lower pumping costs.

The Hunter payshoot rakes eastward and is encountered a short distance west of the shaft on the 800-level. The west drift on the 800-level has been reopened along the vein for a distance of about 450 feet and stopes have now been started upward to the 700-level. Observations here indicate that the Hunter payshoot is at least 400 feet long, measured along the level, and may exceed 500 feet in length. The stoping section of the vein will average three to four feet in width.

At a distance of about 160 feet west of the shaft a cross vein intersects the Bates vein. For convenience I have designated that as the Todd vein. This strikes west-east and dips 60 degrees toward the south. The vein has been explored for a distance of forty feet toward the north and discloses eighteen to twenty-four inches of good looking ore.

The present face of the west drift is now at the point of intersection of the Hartford vein with the Bates vein. This point is known as the "Hartford Crossing" and the drift face shows a wide brecciated mass of ore and mineralized wall rock. The "Hartford Crossing" is reported to have been very productive on the upper levels of the mine.

Making allowances for previous stoping done between the 800- and 700-levels there should be 7,000 to 8,000 tons of commercial ore recovered from the Bates vein between these levels. Ore from the Todd and Hartford veins will likely increase this tonnage.

NOTE: At the intersection of the Bates and Todd veins the management plan to sink a 100-foot winze to what will be the ninth level. From the bottom of the winze they will drift east and raise up under the bottom of the Hunter shaft. This should add 15,000 to 20,000 tons to the reserves and is recommended.

700-LEVEL:

The west drift on the seventh level has been reopened for a distance of 250 feet from the shaft. A stope 150 feet long has been started and is now up ten feet above the sill. This stope will ultimately be lengthened to 250 feet. West of this point old stopes are encountered and it is assumed that this west section of the vein is mined out. As closely as can be estimated there is about 5,000 tons of ore to be stoped from this block between the 700- and 500-levels.

500-LEVEL:

A stope 100 feet long, intermediate between the shaft and the old stopes, has been started above the 500-level. This stope is now up about twenty feet and the mineable section of the vein averages about three feet wide of heavily mineralized material. This stope is now, like other sections of the mine, shows lenses of practically solid pyrite trending along the vein. The coarser chunks of this heavy pyrite are hand-sorted out on the surface and sent direct to the smelter. Coarse chunks of wall rock are rejected and the fines and remainder of the vein filling constitute mill ore.

Value of the Ore:

The hand sorted sulphides shipped direct to the smelter average one to two ounces of gold per ton and generally carry about two ounces of silver for each ounce of gold. The

mill ore from the Hunter shaft has been averaging about .18 ounces of gold. This has been from two to three parts waste to one ton of ore, due to the fact that the material has been secured from picking up old caves and when cutting out for starting stopes. Extreme care in controlling the stoping is a vital necessity for making a profit. Until the ore is well known daily sampling of the exposures is recommended to define correct stoping widths in various sections of the mine. This assay control will be of great value until such time as a better knowledge of gold distribution within the deposit is known. Waste filling in the stopes should at all times be kept to within six to seven feet of the back; otherwise there will be slabbing in of waste from the hanging-wall to dilute the broken ore. The stopes should be kept narrow, generally not over three to four feet wide, and grade, not tonnage, should be the dominating policy of the mine.

The sampling that has been done by the company indicates that it should be possible to keep the gold assay of the mill feed around .4 to .5 ounces. Such a feed would yield a very comfortable profit. The dead-line, which would pay operating costs but not take care of write-offs, would be a feed assaying .25 ounces per ton.

According to unofficial advices, forty-seven samples, taken on the lower three levels of the Hunter-Bates Mine, gave an average of \$25.00 per ton.

I did no sampling in the mine, chiefly because all of the sampling faces are now being mined and the mill results within the next thirty days will give a much truer average of the vein than could be obtained by sampling. Mining during the next thirty to sixty days will automatically apply the acid test to the Hunter ore body. If the stopes will yield a feed averaging .4 ounces or higher, the property will be on firm ground with a good future ahead.

Gregory Shaft:

As previously mentioned, the Gregory shaft is just across Gregory Gulch from the Hunter shaft and opens a second payshoot on the Bates vein. The two shafts are about 500 feet apart measured along the strike of the vein. At the time of my visit, the Gregory shaft was under water and only brief mention will be made of it in this report.

Since the Gregory shaft is only 430 feet deep, it was the first one to be reopened by the Gregory-Bates Company. Some stoping was done and a winze sunk fifteen feet below the bottom level is reported to be in high-grade ore. To avoid the necessity of two hoisting and pumping plants, the Becker shaft was properly closed down and work concentrated through the Hunter shaft. Details of mineralization in the Gregory shaft are contained in the report of Mr. H. S. Shotwell, who had the opportunity to follow the development from day to day. Ore beneath the Becker workings can be more cheaply mined by drifts from the Hunter shaft.

The Mill:

At Black Hawk is a large stamp mill owned by the Fifty Gold Mines Company. This mill has been idle for years, but the bins, coarse crushers, etc., are in good condition. A section of this mill was rehabilitated and brought up to date by the addition of a tube mill, classifier, and flotation equipment.

The ore hauled is from the Hunter shaft by trucks at a contract of thirty-five cents per ton. The trucks are weighed and dumped into a large storage bin at the head of the mill. Ore is drawn from these bins over grizzlies, the fines dropping into an intermediate storage bin and the coarse ore being reduced in Blake type Jaw crushers set for a two-inch opening. A ten stamp battery is used for intermediate crushing, the stamps discharging through an eight-mesh screen.

Following the stamps are blanket tables for collecting the free gold. From the blanket tables the ore is fed to Wilfley concentrating tables, which makes a shipping concentrate. The table tails and millings are reground in a tube mill working in closed circuit with an Aikens classifier. The classifier overflow passes over additional blankets for removal of free gold and is then floated. The flotation machines made a direct shipping concentrate and the tails after passing over a pilot table are pumped to a storage pond near the mill.

To get the idea of the mill performance the mill records were examined and the following typical data were secured.

1. 161 tons mill ore yielded 20.0 tons of concentrates--ratio 8 to 1
2. 191 tons mill ore yielded 19.5 tons of concentrates--ratio 10 to 1
3. 936 tons mill ore yielded 88.3 tons of concentrates--ratio 9.2 to 1

Assumed average for ratio of concentration 9 to 1.

Typical Assay of Concentrates:

Gold	1.056 ounces
Silver	2.060 ounces
Insoluble	3.0 per cent
Iron	45.6 per cent
Moisture	8.0 per cent

Other shipments show concentrates assaying over 2 ounces of gold. The mill tailings are averaging around .05 ounces of gold and the mill recovery is about 70 per cent.

Mill recovery can be improved by the addition of a new flotation machine. The Aikens machine shows a tendency to fluctuate and the mill foreman advises that it requires almost constant attendance. To avoid that he has eliminated the Aikens from the circuit and all flotation is being done by a Denver Sub A unit cell. This single cell is obviously over-loaded. If the Aikens cannot be put into good operating condition, it should be discarded and a Denver Sub A three-cell machine installed. The Sub A machine is a dependable unit and will effectively handle a relatively coarse feed.

When working on a .4 ounce feed this mill should make a 90 per cent recovery per day. Milling costs at present are \$1.25 per ton, which will be reduced to about \$1.00 per ton when operations are on a routine basis. Adjoining the mill is a good office and assay laboratory.

Smelting and Marketing Charges:

- (a) Concentrates assaying one ounce of gold per ton:

	Per Ton Concentrates	Per Ton Mill Ore Basis, 9:1 Ratio
Freight	\$ 3.50	
Base Charge	6.00	
Deduction from gold	2.69	
	<u>\$12.19</u>	
Credit when Fe over 40% and insoluble under 10%	3.00	
	<u>\$ 9.19</u>	\$ 1.00

(b) Concentrate assaying two ounces gold per ton:

	Per Ton Concentrates	Per Ton Mill Ore Basis, 9:1 Ratio
Freight	\$ 3.50	
Base charge less credit	3.00	
Deduction from gold	5.38	
	<u>\$11.88</u>	\$ 1.30

Possibility of Cyanidation of Concentrates:

The smelter pays for 90 per cent of the gold in the concentrates or \$32.31 per oz. This represents a deduction of \$2.69 per ounce from the mint price for each ounce of gold in the concentrates, which must be added to freight and treatment charges in making up the total marketing costs.

When the assay of the concentrates is two ounces of gold or higher per ton, this becomes a very expensive charge. The possibilities of cyaniding the concentrations, which would permit selling gold bullion direct to the mint, offers the possibility of materially reducing the market charges.

While I was at the mine, Mr. Burnett, the mill foreman, was conducting some preliminary cyanide tests on the concentrates. He reported the surprisingly low reagent consumption of 2 lbs. of cyanide and 2 lbs. of lime per ton of concentrates treated. These tests had not been carried to completion but they are very encouraging. A small cyanide installation to regrind and treat six to eight tons of concentrate daily would cost from \$5,000 to \$15,000, depending upon how elaborate an installation is made. These tests should be encouraged and if successful, the problem should be turned over to a metallurgical firm, experienced in this line of work, for detailed study. If it is possible to secure a 90 to 95 per cent of extraction of gold from the concentrates, the marketing costs would be substantially reduced. The saving would be somewhat as follows:

1. 90 per cent of Recovery:

	Per Ton of Concentrates
Reagents	\$ 0.50
Regrinding, treatment, write-offs, etc.....	1.00
10% loss, basis 2 oz. concentrates	7.00
Total	<u>\$ 8.50</u> as compared to \$11.88

2. 95 per cent of Recovery:

Reagents	0.50
Regrinding, treatment, etc.....	1.00
5 % loss, basis 2 oz. concentrates	3.50
	<u>\$ 5.00</u> as compared to \$11.88

Gregory Vein:

A monument in Gregory Gulch just at the edge of the town of Black Hawk marks the site of the first lode gold discovery in the Rocky Mountain Region. As one stands at this monument and looks northward across Gregory Gulch, the eye traces the Gregory vein by a continuous line of stopes still standing open to the surface. Facing southward the stopes continue up the hill toward the O'Neil shaft. Certainly this marks a long and continuous payshoot, and I assume that it was from these stopes that much of the \$20,000,000 credited to the Gregory vein, came.

Very little authentic data are to be had concerning the value of the vein below these stopes and no plans exist for investigating this section of the ground in the immediate future. Rather, the company plans to reopen the O'Neil segment of the Gregory vein where extraction has not been so heavily prosecuted. The O'Neil will be discussed below.

The Gregory vein is 700 feet southwest of the Bates vein (previously described) and is parallel to it. The vein strikes N 45 E and dips 80 degrees SE. It is two to eight feet wide.

O'Neil Mine:

The O'Neil mine embraces the southwest extension of the Gregory vein and from all information available appears to offer one of the best opportunities in the district for profitable operations.

Since the mine is under water, all information is secured from Mr. H. C. Eastman of Denver, who is now the sole owner of the property. Fortunately, Mr. Eastman has collected and now holds authentic documents, such as smelter and mill returns, assay maps, etc., with which to substantiate his statements. I did not have an opportunity to examine these data but they have been checked by Mr. Justin Haynes, mining engineer of Denver, and the figures quoted below are abstracted from a report which he made for the Gregory-Bates Co. I discussed these figures with Mr. Haynes and he assures me that he has complete confidence in the picture which they form of the O'Neil property.

The property is opened through a shaft 866 feet deep with levels at 100-foot intervals. Just east of the shaft is what is known as the Fisk water course. This water course permitted unusually deep and thorough oxidization, thus giving relatively free-milling ore. For this reason practically all of the stoping was done from the east side of the shaft and very little stoping west of the shaft. The report infers that the unstoped ore west of the shaft is of equal grade but base was pushed ahead of ore extraction in an effort to block out sufficient tonnage to warrant erection of a modern concentrator. Operations were financed through sale of ore to custom mills and direct shipment of high-grade hand-sorted ore to the smelter. No stoping has been done below a depth of 666 feet, although the records indicate that there was no diminution of values in the bottom of the mine. Official production records give a total of \$187,847.26. The milling ore returned \$17.00 per ton (\$28.78 new price of gold) after deductions were made for milling losses. This would be a total of 11,052 tons and would represent a block of ore three feet wide, sixty-five feet long, and six hundred feet deep. If this is the total stoping from this mine, the ore body, judging by other payshoots in the district, is practically untouched.

High-grade ore shipped direct to the smelter averaged 6.83 ounces gold per ton, according to the report. This is much higher than the average smelting ore shipped from the district and tends to confirm the idea that the O'Neil payshoot was of high tenor.

After a study of the mine records, Mr. Justin Haynes, in his report, credits the O'Neil mine with a developed ore reserve of 70,000 tons of ore assaying \$28.78 per ton, or a gross value of \$2,014,600. He places operating costs at \$9.24 per ton, which leaves a gross profit of \$1,367,800.

When the Hunter-Bates Mine is on a profitable basis, it is the plan of the Gregory-Bates Company to next reopen the O'Neil. This plan is heartily approved. The relatively high-grade ore indicated is exceptionally attractive. Even if we cut Mr. Haynes' estimate in half there would still be a good profit available.

The Gregory-Bates Company now holds under lease and option a fifty-one per cent interest in the Fifty Mines, which option includes a full interest in the surface improvements. This option of \$75,000, payable in installments of \$5,000 each six months. It is understood that the minority interest in the Fifty Mines can be acquired under reasonable terms when the Company is ready to assume this extra financial burden.

Fifty Mines drew its name through a consolidation which included fifty small mining units. It covers the chief productive ground on the Mammoth, Fisk, Bob Tail, and Cook, as well as several subordinate veins, which are credited with a production of \$17,000,000.

The Gregory-Bates Company does not plan to reopen this property until after the Hunter-Bates and the O'Neil are on a profitable basis.

The strategic point for reopening this property is through the Cook shaft which has been sunk to a depth of 1,400 feet. W. A. Farish, mining engineer of Denver, made an examination of the property for the Fifty Mines in 1900. He visualized the property as one which would yield a large profit if operated as a large low-grade mine on a 500 to 1,000 daily basis. After a thorough study and detailed sampling of the deposit he estimated the developed ore at 1,706,000 tons assaying .25 ounces gold. I would regard that as a marginal property under the price of gold prevailing at that time, but today this would be \$8.50 per ton.

There is no reason that I know of why the mining conditions in this property should not be favorable as those I saw in the Hunter mine. The report indicates this condition except that the vein is wider. If the tonnage estimates of Farish are approximately correct and if the opportunities for deeper ore are as he saw them, then this property would be of interest to one of the larger mining organizations.

When the Hunter-Bates and O'Neil mines are profitably producing the attention of the mining organizations will return to this old district and the Gregory-Bates Company, would, as I see it, be in a strategic position to capitalize on their option on the Fifty Mines. It would require a million dollars or more to rehabilitate this property and build a modern large-scale concentrator. When it is demonstrated that it is possible to make a profit, today, from the mines in the district, the business of reopening the Fifty as a large, low-grade deposit would be attractive to some of the larger organizations who have the capital and staff to handle such an enterprise. Similar set-ups have been handled by granting the operating company a sixty to seventy per cent interest in the option. Such an arrangement would give Gregory-Bates a substantial profit from the Fifty Mines and avoid diverting profits from their other properties to finance such large scale developments.

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