



CONTACT INFORMATION

Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
<http://www.azgs.az.gov>
inquiries@azgs.az.gov

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SUMMARY OF DATA ON PINE HILL MINE,near Grass Valley, Calif.

1. Report by Bert C. Austin, Mining Engineer, Balfour Bldg., San Francisco.

Location, Property. 14 miles NW of Auburn, 14 miles SW of Grass Valley. Auburn-Grass Valley highway passes within 4 miles of property, and good country road leads from highway to mine. Mine is 140 miles from San Francisco.

Four mining claims: Golden Gate, Golden Gate Extension, Thresher and Tres Robles, total about 160 acres. Does not say whether claims are patented.

History. Worked with 10 stamp mill after discovery in 1862. Austin says less than 20% recovery by amalgamation; since the ores worked were oxidized, this may be questioned. At any rate, tests summarized below show that 85-90% of the gold can be recovered by cyaniding these oxidized ores, which extend to a depth of 100 feet. Below this depth the ores will probably turn to sulphides that may require flotation.

Geology. Development seems to have been done in a gossan, with width 50-100', and a traceable length on the surface of 2000'. Apparently the best part of the mine is confined to an area 200' long, 25' wide. The gossan within this area has been thoroughly sampled and the sampling indicates an average value in gold at \$35/oz. of \$9.00. 40,000 tons of \$9.00 ore are indicated within the oxidized zone and above the cross cut tunnel level. There are indications that ~~xxx~~ sulphides have been leached from the quartz gossan.

Development. 2000' of crosscuts, drifts, and a little shaft sinking below the adit levels. The property is in fair condition to start mining above the crosscut level on oxidized ore.

The assured length of \$9.00 ore is 125', (Austin said 200' previously, see above), with a 25' width. Some surface sampling was done to determine the value of the entire mass, but it is doubtful if the values are high enough to warrant wholesale mining. But this feature should be investigated.

Working Conditions etc. Climate mild; Nevada County Irrigation water ditches cross the property. Labor and supplies obtainable locally. No boarding house needed.

No equipment nor timber on the property.

Conclusions. Austin recommends a 100-150 ton cyanide mill, located at portal of main crosscut. This location gives sufficient headroom, also space for tailings disposal. The water ditch is within a few hundred yards of this location.

While the Pacific Gas & Electric Co. high tension power line passes close to the property, it is doubtful if this line can be tapped for local consumption. Austin suggests small Diesel plant.

There follows his estimate of mining and milling costs, on basis

of 150 tons daily production. He thinks second hand mining and milling equipment could be put in for \$20,000.

	<u>Cost per ton</u>
Mining & Development	
Labor.....	\$1.00
Power.....	.40
Supplies....	.50
\$1.90
Milling.	
Labor.....	\$.45
Power.....	.25
Supplies....	.50
1.20
Taxes, Insurance.....	.35
Bullion, concentrates, smelter, freight..	.25
Overhead, superintendent and gen'l exp.	.15
	<u>\$3.85</u>

Not including depreciation, amortization of capital investment, nor tailing loss, but including development.

The following costs should cover development, including its portion of the overhead:

	<u>Per foot.</u>
Drifting.....	\$10.00
Crosscutting.....	8.00
Sinking.....	20.00
Raising.....	8.00

With operating costs at \$3.85, and allowing \$1.00 tailing loss, a \$4.15 profit per ton may be expected, or a net profit of \$166,000 on 40,000 tons of probable ore above the adit level, in the oxidized zone. Fair possibilities exist that sinking will develop further ore.

Royalties and obligations involved in the contract must be subtracted from the expected profit. What these are not stated.

Austin states there is no doubt that property warrants will at present, but recommends appropriation of \$750 for further examination.

2. Summary of Metallurgical Tests by Pan-American Engineering Co., 820 Parker St., Berkeley, Calif.

Composite sample of four sacks of ore (weight not given) ran Au \$8.50/ton, Ag. 4.60 oz. Flotation was found to yield only 1.9% recovery of the gold, 5.7% of the silver. (Why they tried flotation I cannot fathom). Cyanidation however gave, combined with jig concentration, 88.1% gold recovery, 78.3% silver recovery. However, assaying results of sizing test indicated that the -65 mesh grinding used in the cyanide test should have been finer, and the consumption of reagents, 2.54 lb. sodium cyanide and 10.30 lb. lime per ton of ore is quite high. Pan-American recommends, naturally, further experimentation, just as Austin recommends further examination.

3. Notes by E.W.

The thing looks small as it stands, but it has some points in its favor. If it can be obtained on the usual 10% lease and bond, then the profit in sight, 10% less than \$166,000, taking Austin's estimates of grade and cost, would be \$150,000. This would amply repay the cost of even new mining and milling equipment; but the profit left after that wouldn't amount to much. Further, while Austin does not state the oxidized ore gives out at 100' depth, the metallurgical test report mentions finding traces of sulphides in the ore, so that the sulphide horizon can't be so very far below the horizon from which the test samples were taken, possibly the surface. This limits the reasonable assurance of \$9.00 ore that is amenable to cyanide treatment to very shallow depth below the surface. While the sulphide zone may carry good ore too, it is unlikely to be as rich as the surface ore, so that it might not be minable at all, since even though cyanidation might possibly handle it, still extensive changes in the mill would be needed, and these might not pay for themselves because of the low grade of the sulphide ore. It is safest, therefore, to assume 100' depth of minable ore.

This means that to find more ore than Austin's 40,000 tons we must look along the strike. The gossan shows traces of former sulphides; this suggests it is part of a strong vein, and the idea is confirmed by its great width and great proven length of 2000'. The 200' length of \$9.00 ore is only 1/10th of the strike length of 2000', although Austin does not say this 2000' lies ^{all} inside the property. I gather from his report that no really thorough sampling was done outside of the proven area, and while Austin does not tell us about this either, I gather also that the workings are rather largely confined to the vicinity of his ore body. This means if true that the rest of the outcrop, judging from that country which I am acquainted with, would have to be sampled by trenching or, better, by the use of bulldozer and tractor, and I am sure this has not been done. Oxidized outcrops are soft, so that outcrops that stood up above the soil would probably be no good, and possible good outcrops would be buried, but not very deep as I recall this general country.

It is true the old-timers almost always found the best ore if ore came anywhere near the surface. But if we consider the widths of the gossan, up to 100' in places, it seems that steam shovel operations might be possible in such places; if so, minable ore might run as low as \$3.00 per ton and still yield some profit. (Mining and milling at \$2.00 or less: Mountain Copper Co. at Kennett mining \$2.00 gold gossan).

Austin does not give the dip of the vein, the proposed method of mining at cost of \$1.90, nor any information on the way the rock stands so that we might figure on a possible mining method. Glory-holing might serve, but I don't like it for small operations. If the vein dips vertically or steeply, some open-cast ~~might~~ method might be worked out, and this would be extremely desirable if it is possible. If the vein dips as flatly as some of the Grass Valley veins, and the slope of the ground is with the dip, steam shovel with stripping might possibly work. You see how many uncertainties Austin leaves us.

Since the mill etc. would be paid for from the proven ore body, finding a few more of comparable gold content would soon start running into real profit, and what I like best about the place is this: no great capital expense ~~then~~ up in deep shaft work, etc. If the ore is anywhere it is practically on the surface, where you can get at it, sample and measure it.

The Mountain Copper Co. has successfully mined lowgrade gossan ore for years, while Anglo-American is putting the Greenhorn mine in Shasts Co. into production; this is also a gossan. I tried to get the Greenhorn lifted up for Lucky Tiger early this year, but Anglo-American exercised their option. At these mines the gossan lies flat at or near the surface, so that steam shovel methods are employed; they would hardly be feasible at Pine Hill. But the Pine Hill ore so far developed is about three times as rich as the other ores. Another point: Austin neglects silver values, but the composite sample assayed by Pan-American and supposedly representative of the ore body (since it was sent down for mill test) assayed 4.6 oz. silver per ton. At \$0.71 per oz., this is \$3.25 per ton contained, or at 78% recovery, \$2.50 per ton recovered value. Therefore the expected net profit per ton would not be \$4.15 per ton but \$6.65, and the total net profit in the ore body not \$166,000 but \$236,000, quite a difference. Three more such ore bodies, with this ratio of silver holding, and you approach a \$1,000,000 net operating profit, and ore bodies, on account of the great width, needn't be at all long, so that they might easily have been overlooked in the supposedly casual sampling conducted.

I suggest you consider this property, on the following basis: if preliminary examination shows the facts to be about as Austin stated, and no unfavorable factor appears, then to be prepared to go in with bulldozer and thoroughly prospect the outcrop by trenching and sampling. If further ore bodies are indicated, they may be further prospected by small shafts or tunnels, depending on the topography; just possibly by diamond drilling, if the gossan looks firm enough to core. With the expected great widths, it is plain that very shallow shafts with cross-cuts run from their bottoms should quickly prove up a lot of ore, enough perhaps to justify going ahead; the same thing applies to tunnels with shallow backs. The cost should be quite moderate.

If no further ore bodies are indicated by the work outlined, all work should be abandoned, unless some striking feature discovered gives real hope for exploration in the sulphide zone.