[illegible] MINING CO. at Manhattan, 42 mi. from Tonopah Nye County (Nevada)

Amalgamated Mill

Au

O. McCRANEY
MINING ENGINEER
TONOPAH, NEVADA

REPORT ON THE PROPERTY

OF THE

UNION AMALGAMATED MINING COMPANY

MANHATTAN, NEVADA.

O. McCraney

1916

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Tonopah, Nevada,

October 28, 1916.

BOARD OF DIRECTORS,

UNION AMALGAMATED MINING COMPANY,

TONOPAH, NEVADA.

Gentlemen:-

At the request of Mr. Wm. Forman I spent the week of October 11-18 in examining your property at Manhattan and submit the following report.

As a basis for my sampling and general study I found it necessary to make a survey of all of the accessible mine workings, as no maps had been previously prepared. I also surveyed the surface geology and present the results of this work on the two accompanying maps.

I have not prepared an assay plan as no material tonnage is represented and my sampling was done rather with the idea of determining the character of your ore deposit and arriving at a possible prediction of the results of the development work I have outlined.

Respectfully yours,

O. McCraney

LOCATION.

The property of the Union Amalgamated Mining Company is located at Manhattan, Nevada, forty-two miles from Tonopah, the nearest railroad point. The towns are connected by a good wagon road and freight is usually hauled by auto-trucks at the rate of $18.00 per ton. The altitude above sea level at the mine is about 7300 feet. The fall of snow, while heavy in some years, is not so great as to interfere with mining operations.

PROPERTY.

The property consists of seven lode claims, of which six are patented and the other is in the process of being patented. The title to the group is vested in the Union Amalgamated Mining Company. There is no dispute or counter claim to the present owner's possession. The Amalgamated Mill, which is also owned by this company, is briefly described later in this report.

MINE DEVELOPMENT.

The mine has been opened largely by leasers, the work on company account having been undertaken but recently. The result is that the work has been prosecuted in a desultory manner without a regular plan of development. Numerous shafts have been sunk and tunnels driven for short distances wherever there might have been ore or promise of it. The underground workings from the Bath, Earl and Kendall Shafts, as shown on the accompanying mine maps are the most extensive on the property.

GENERAL GEOLOGY AND NATURE OF ORE DEPOSITS.

The rocks within the area of the company's property consist entirely of highly metamorphosed limestone, shale and some quartzite. There are two roughly parallel belts of limestone

the shale forming both walls of each. The south belt has a thickness of from 35 to 48 feet and strikes about S. 40° E., dipping at from 30° to 45° to the southwest. The north belt of limestone is about thirty feet thick and in general dips at a somewhat higher angle. The relation between these belts of limestone and the numerous faults which cut through them is shown on the property map.

Development has proved that the principal ore bodies are to be found in these belts of limestone, the mineralization being controlled largely by numerous fractures which traverse the slate and limestone in all conceivable directions and attitudes.

These faults almost invariably exhibit a displacement of the bedding planes, the downthrow being in general on the east side. Most of these faults are normal in character, though reference to the map will show that quite a few are strongly reversed. The horizontal displacement ranges from a few inches to over a hundred feet, as along the Earl fault.

Most of this faulting occurred prior to the mineralization, though exceptions to this condition were observed. About midway between the Earl and Bath Shafts a barren east-west fault dipping to the south is found displacing a mineralized fissure. Also on the north end of the Great Mogul claim the north-south segments of a system of step faults are found to be barren, while the north-east striking segments are mineralized. With these two exceptions, every fissure examined was found to be mineralized, where it traversed the limestone, the values being estimated by panning in many cases, and assay values being obtained ranging from $3.00 per ton to high grade specimens showing free gold in the hand specimens. On passing into the shale the fissures in

general become barren, though occassional values from $1.20 to $ 4.00 were found.

Several stopes have been opened along the fissure where the displacement is such that there is lime on one side of the fissure and shale on the other, but the samples I secured from such points were not encouraging, the returns averaging about $ 6.00 with a $ 12.00 maximum.

PRODUCTION.

It is on these mineralized fissures in the limestone that practically all of the work was done by the leasers. I am informed that about $ 300,000.00 worth of ore was milled from the four fissures developed in the workings of the Bath, Earl and Kendall Shafts, $187,000.00 coming from a single fissure. This ore, as shown by the mill reports, averaged well above $ 20.00 per ton, while careful sorting brought some of it above $ 50.00 per ton.

The main fissures frequently separate into branches which diverge at small angles and re-unite in distances of from twenty to fifty feet. This is a favorable feature as the branches appear to have the same strength and tenor of value as the main trunks and there is usually a considerable body of lower grade ore enclosed between the branches which, with improved equipment, could be mined at a profit.

BEDDED VEINS.

At and near the surface the mineralization is confined almost entirely to the brecciated zone of the transverse fissures. There are no well defined walls to these deposits, the values diminishing gradually from a maximum along the more open portion of the fissure. With depth however there was a tendency on the part of the mineralizing solutions to seek out the more

favorable bedding planes and strata of the limestone and form ore along them. The stope west of the shaft between the third and fifth levels of the Bath workings is entirely on such a deposit.

These bedded veins vary in thickness from four to twenty feet as developed in the Bath workings. They are readily distinguished from the barren limestone strata by the presence of iron and manganese oxides and the partial or complete replacement of the limestone by silica. The gold is free, though so finely disseminated as to seldom be seen in the hand specimen. In the bottom of the shaft however a two-inch stringer of dense gray quartz was found to be abundantly spotted with coarse free gold. Also above the face of the west drift on the fifth level a sample from six-inch seam of clay-like gouge which lies along the bedding in the lime returned $ 284.00 in gold per ton. I am informed that in a winze, which was inaccessible at the time of my visit, this gouge seam attains a width of eighteen inches and, as judged by panning tests, is of much the same value as at the point where I observed it.

Nearer the surface, with a single exception observed on the second level, the values in the bedded veins drop off materially, assays on this same stratum running as low as $1.40 and averaging around $ 3.00. As the workings are shallow this bedded type of deposit was not brought to the attention of the leasers and much of the property's future depends upon the careful prospecting and development of this feature.

No single stratum of the lime is particularly favored as the values are found to pass from one stratum to another at points where there is no significant feature to indicate the reason for such a change. This may be observed in the stope

referred to and at the point where the shaft steepens up below the second level.

Nor are the values necessarily confined to a single stratum, as was observed on the second level where two strata - separated by eighteen feet of barren limestone - were found to carry values of $12.00 and $30;00. Also just above the third level, where three cut samples from the stratum the shaft follows show values of $ 6.00, $ 7.20 and $ 9.00, and the stope on another stratum sixteen feet above returned an average of $ 9.70 from the last seventeen box samples.

These conditions suggest the wisdom of more frequent cross-cutting than has been the practice. In this connection it should be made clear that the capacity of the compressor is such that it has been impossible for the management to carry on such prospecting while stoping.

The ground stands well after being opened, as is evidenced by some of the lease stopes whichare in good condition though they are supported by only such timbers as are absolutely necessary for convenience in mining. Small stulls can be obtained locally from a growth of nut-pine and cedar on the property, but larger stulls and timbers are shipped from California and Oregon.

Shaft sinking was being undertaken at the time of my visit but no progress was being made on account of the inadequate provision for handling water. The shaft is making about twenty gallons per minute, with the probability of this being greatly increased as sinking progresses.

The shaft will go down on the Bath fissure in ore. As long as mining will be carried on through the Bath shaft there will be a considerable amount of ore along the fissure that cannot be

extracted without endangering the use of the shaft. Ultimately another working shaft must be sunk in order to recover this ore and that which has been left in the vicinity of the shaft from the fifth level to the surface. A like condition prevails in the vicinity of the Earl shaft and the Kendall shaft has caved as a result of carrying the work too close to it. In the Earl workings there is a considerable tonnage of low grade ore that can be broken at possibly $ 5.00, should conditions ever warrant working ore of this grade. The present condition of the mine warrants the sinking of the Bath shaft but stoping in the vicinity of the shaft should be discontinued until developments have made it possible to sink another working shaft. When the sinking of such a shaft is contemplated it should be located on the south side of the gulch south of the Earl shaft well in the hanging of the Earl fault. This is not only a convenient point from which to work the fissures developed, but will also prospect a block of ground in which I am particularly interested, as it is entirely undeveloped and is not without possibilities. The surface here is traversed by a number of thinly bedded strata of limestone which are cut and displaced by the same fissures mapped in connection with the two main belts of limestone. At one point I secured a specimen which panned well in free gold, though a sample from the same belt yeilded but $ 1.60.

The present cost of mining and milling on a basis of treating 1000 tons per month is about $5.30 per ton. Milling costs $2.00 per ton when treating thirty tons per day. The ore is being hauled to the mill at an expense of about eighty cents ton. Mining is costing $2.50 per ton, but this is lower than can be expected under my plan of development as no development work

was being done during the period that this cost was figured.

PROPOSED DEVELOPMENT.

The fissure veins developed and stoped above the 350 level of the Earl and the fifth level of the Bath show a strength and value at the lowest points developed rather better than that exhibited above. There is also an undoubted improvement in the character of the bedded deposits as found on the lower levels. The strength of the fissures is apparent from the amount of displacement as exhibited on the map, and the improvement in the grade of ore with the small depth attained is most encouraging as to the results of the prospecting I recommend.

The Bath Shaft should be sunk for at least another 200 feet. At a point 100 feet below the fifth level drifts should be run east and west along the bedding of the limestone to develop the four fissures which are known to make ore from the present lowest levels to the surface. As these fissures are encountered they should be drifted and raised on. In drifting along the fissure veins the strata of the adjacent lime should be carefully sampled and the more promising bedded veins carefully prospected. As the ore sometimes occupies more than one stratum of the lime and as the values in the bedded veins are often better at some distance from the fissures than immediately adjacent, cross-cuts should occasionally be driven from wall to wall of the lime at points where they do not follow the fissure. As the values pass at times from one stratum to another, cross-cutting for a reasonable distance may be undertaken at points where the ore being followed on a bedded vein becomes lean. Such a cross-cut might be run near the shaft on the fifth level.

Many of the workings shown on the map as shafts were unfortunately inaccessible, so my examination was confined largely

to the Bath and Earl workings and points on the surface. One promising surface showing is in a cut on the extreme westerly fissure mapped on the Great Mogul claim. No sample from here was assayed but a small portion panned showed gold values of possibly between $10.00 and $20.00. Also the panning of a sample from the most westerly tunnel mapped showed values which warrant more careful investigation.

MILL.

The company owns the Amalgamated Mill which is situated about two miles down the canyon and is well equipped for handling this ore. Ore is hauled from the mill by teams which handle from six to seven tons per trip. The bin capacity ia about 200 tons, or six days run at the present rate of treatment.

From a 40-ton storage bin the ore passes to a Blake crusher where sufficient ore is broken on the day shift to run through the twenty four hours. An elevator delivers the crushed product through an automatic sampler to a 50-ton bin from which it passes by automatic feeders to a battery of ten 1050-pound stamps where it is crushed to pass a 16-mesh screen. Crushing is done in water, cyanide being added at the agitators.

From the battery it passes over amalgamating plates to a simplex Dorr classifierwhere the oversize goes to the tube mill and the slimes join the tube mill product and are passed over a second set of amalgamating plates.

The tailing from these plates is returned to the classifier, making a closed circuit through the classifier and tube mill, the only outlet from which is a discharge set high in the slime end of the classifier which delivers the slimed product to

two Dorr thickeners. The clear water overflow returns to the battery and the thickened pulp is transferred to five Pachuca agitators. At this point about three pounds of lime and two pounds of cyanide per ton of ore is added to the charge.

The agitator charges are transferred in rotation to two stock tanks where agitation is continued until treatment is complete. From here it passes to a 35-leaf Butters filter where the cake is washed and dropped in barren solution and discharged as tailing, about a ton of moisture passing out with each ton of ore treated. The gold solution goes through two gold tanks to three sets of precipitating boxes. Zinc shavings are used for precipitation. The barren solution is returned to the filter for washing the cake and the precipitate is shipped for refining.

Electric power is used throughout at the mill and mine.

The mill practice is most satisfactory, about 60% of the values being recovered by amalgamation and about an 80% extraction being made on the plate tailing in the cyanide department. The average net extraction is a little above 90%. At present the mill is treating thirty tons per day. This can be increased to fifty tons without changing the equipment.

Should the mine development warrant moving the mill to a point nearer the mine a considerable saving in costs can be effected. Ample water for handling up to 200 tons per day can be secured from the mine workings at this season of the year.

CONCLUSIONS.

Mining in your property has been carried on in advance of proper prospecting with the result that the ores that may be mined and treated at a profit with your present equipment are

all but exhausted. The exception to this condition is in a limited tonnage which is developed so near your working shafts that it cannot be mined without endangering your shafts. The time is at hand when a vigorous campaign of development must be undertaken and carried out along the lines suggested.

Considering all of the conditions I have set forth, there is good reason to believe that the results of this prospecting will be remunerative. The presence of an ore chute immediately below the fifth level is a certainty, the top of this being already developed in the shaft and along the west drift. The marked improvement in the bedded vein at this point is most encouraging and I am led to believe that this condition may prove to be more general with added depth.

The fissure veins also exhibit improved conditions of strength and value within the depth developed and the persistense of the Bath fissure to the fifth level leads to a logical assuption that the four fissures of identical character to the east will also maintain their strength and value to at least this depth. So similar are thes deposits in character that, within certain limits, the results shown by the Bath sinking may reasonably be accepted as an index of the condition to be developed on the same level in the other fissures.

It is a reasonable certainty that the work proposed will repay your efforts in the opening up of another level on the fissure veins already developed.. Inaddition there is a reasonable possibility that the improved condition found in the bedded veins may bring you a large tonnage which will be the making of your mine.

I wish to add a word of commendation of the management of your property by Mr. L. L. Mushett, who has accomplished much along the right lines, though hampered by a somewhat inadequate equipment.

Respectfully submitted,

O. McClaney