(197)

Item 62

3800 0005

NEVADA RAND MINE

July 3, 1920

C. G. H. MacBride, President,
Nevada Rand Mines Company.

Dear Sir:

Having just made a personal visit to, and examination of the Nevada Rand Mine and District, I herewith note some observations which may be of value in conjunction with the more detailed report by S. E, Montgomery dated November 1, 1919.

The Rand District is located about 17 miles northeast of Nolan railroad station on Walker Lake, Mineral County, Nevada, and a correct description of its accessibility is given in the above mentioned report.

Rhyolites and andesites of the middle and late Tertiary period appear to make up the principal rock types. So far as opened up in the Rand Mine the deposit is a series of replacement veins in andesite. No great amount of work has as yet been done in the District, but in the property adjoining the Rand on the East, primary ore in the form of chalcopyrite and argentite has been disclosed, encased in quartz boulders in the oxidized zone, at a depth of 175 feet.

The secondary ores in the Rand are composed of quartz, silica, carbonates of lime, alumina, iron and manganese oxide, with cerargyrite, argentite, native gold, and occasional occurences of argentiferous cerusite, wulfenite; and in rare instances slight stains of silicate and carbonate of copper.

To the South and East of the Rand is a series of rhyolite hills. This rhyolite appears to slope gently under the andesite overflow in which the present workings are located. I look for the present shaft to cut this contact between the rhyolite and andesite at a depth of between 500 and 600 feet, as the rhyolitehills rise again about a mile to the North and Wast of the shaft. At the present shaft I should judge the water level will be found at a depth of at least 1000 feet, as Walker Lake is about 1500 feet lower than the mouth of the shaft.

The Nugent Wash, which drains a large area between the Camp and the Lake, crosses the district about a mile West of the shaft. I believe that an abundance of water an be had here at a reasonable deptth. Where this Wash enters the flat or dry lake bed on the North side of the Gabbs Valley Range, in which the mine is locatd, and at a distance of about nine miles fron the Camo, water is had in abundance at a depth of only 35 feet, in what is known as Dead Horse Wells. The Topographical Map of the U. S, Geological Surveyshows the surface of Walker Lake at an altitude of 4083 feet; Dead Horse Wells, 4182 feet; Nugent Wash, where it crosses the Rand Camp, 5100 feet; and the Rand shaft, 5650 feet. The Gold Pen Mine, which lies about a mile and a half southeast from the Rand, has developed water in abundance at a depth of 112 feet, within three and a half miles from their camp in the direction of the dry lake.

The ground covering the Rand Claims lies between two hills, capped by a fresh, hard, andesite flow, and between these hills of andesite and extending almost the entire length of the Claims, is a zone of vey highly altered and leached andesite. This zone is capped in spots by portions of the harder andesite overflow, especially in the vicinity

The ar4a of leached and altered material appears to be over 300 feet wide at the shaft, and on the Extension No. 1 Claim,where it is more exposed, it is fully 500 feet wide. This wide zone of alteration is probably an older formation than the fresher, green andesife capping the hill, which in places extends down over the leached and altered material.The leached area is well defined and easily traced by its being traversed by seams of mineral bearing quartz and quartz breccia. At one point on the Extension No. 1 Claim, near the Northeast center stake, I took samples of this quartz breccia which assayed as follows: .24 oz Au, 2.40 ozs Ag, or $7.20 per ton. This sample was taken from the surface. The zone can be traced from this point to the cabins on the L. H. Fraction Claim, or for a distance of at least 2000 feet. It is undoubtedly a belt of minetalization parallel to the one higher up the hillside in which the shaft is sumk, and the present workings opened.

My observations lead me to believe that the main source of ore will be found down the hill from the present workings, and underlying the vein syatem which traverses this leached area. With the exception of the surface cuts, this leached area has been almost entirely neglected in the past, but I believe that it will be found to be of more importance when explored than the ground that hes been opened up, in spite of the known value of the present workings. In fact, I believe that the present workings are but an indication of a much larger ore body lying beneath surfaces, which as yet have scarcely been prospected.

The driftas in the present workings are poorly adapted to give any correct idea of the tonnage which may be expected from the ground opened. Most of the work was performed by early prospectore, with but limited mining knowledge, and entirely without surveys.

They followed their own knowledge as to where the ore should be and in consequence they did a large amount of dead work. In spite of this the 2500 feet of ground opened, which includes shaft and this dead work, has produced about $20. worth of ore for each foot of work, and in addition to the good ore developed and now showing in the present workings, and in my opinion the best of the ground is not yet opened.

Such work as has been done by the present management has been almost entirely in good ore; this work being principally the 150 stope, the 250 stope and the 200-foot level.

While shipments were made from the first two mentioned sections, not a great deal was shipped from the new 200-foot level, and the samplings on this level give a good idea as to how the new ground opens up. However, in places this 200 level is as yet but 2 feet wide, and when it is squared and opened to proper width , I look for a large, good grade, milling tonnage to be developed in this section. In the East face of this level, grending into virgin ground, I personally sampled the entire face. The face, including the gangue, gave an assay of .48 os Au., 48.40 ozs Ag., or $58. per ton. As the sample was carefully taken I consider it representativeof what the drift, which at this end is 3 feet and 4 inches wide, will break for milling.

The present assay map does not represent a thorough sampling of the mine for tonnage. It merely gives an idea of some of the ore in place. An estimate of the tonnage under these conditions is mare conjecture, based upon previous experience, but from my observations I should say that Montgomery is not far wrong, provided the laterals he recommends are run.

Unfortunately the 50-foot level and the section in the winze to the 150-foot level have not as yet beensampled. While the 50-foot level zone is mainly in leached material through which ore has probably passed, I believe a considerable tonnage will be developed above the 150-foot level, as the presence of high grade ore in the s stope above the 150-foot would well indicate.

The ore body is well oxidized as far down as it has been traced in the winze from and below the 250-foot level. This level appears to closely follow the course of the manganese-stained quartz or the apparent trend of the ore. From the position of this level and the conditions revealed there, I believe that the West wing of the 250-ft level was opened too far West to cut the ledge traced by the 50-foot above.

An interesting feature is the presence of a 2-foot streak of replacement quartz carrying values which are found at the shaft in the 50-foot level. This quartz is dipping across the shaft at about 75 degrees. No work has ever been done South of the shaft; and the 150-foot level should be extended in this direction to determine the significance of this formation.

In cutting what was first mistaken for a wall on the North 180-foot level, the present management encountered what appears to be a parallel, ore body in this section, and the entire drift on the 180-foot level should be ~~extended~~ lateraled to the North, and the good faces in both ends of the drift extended.

The 450-foot level drifts were run without a survey and it is almost unnecessary to comment on why the ore was not encountered here. The map shows the position of the rich ore belt above this level, especially on the new 200-foot level, to be at least 30 feet from the vertical Southeast of the main cut on the 450-foot level. This does not take into consideration any rake or dip of the ore body. The dip of the formation is generally towards the shaft, with a slight rake to the Southeast. The ground on this level is still well oxidized, although some sulphides appear along the cross-cut. At a point 27 feet from the shaft on the East side is a four-foot easm of oxidized material, which will probably make ore when driven far enough to get under the ore body above as shown by the survey.

I can see no reason why the rich ores should not persist well below the 450-foot level. The presence of an immense intrusion of fresh, hard green andesite blocking the ends of the East and West 450-foot drifts, and which is not present on the North 50-foot level, indicates to me that somewhere between the 350-foot depth and the 450-foot level the ore body has been forced in a Southerly direction from its original position; and while the survey shows that the rich ore on the new 200-foot level is further South than the drifts on the 450-foot level, the ore body on the 450-foot level, when disclosed, may really be foud still further South, owing to this intrusion.

I have failed to find any evidence of a well defined wall anywhere in the mine. This would indicate that the full width of the mineralized zone has not been explored.

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Marle Woodson, B. Sc.

191
Item 6

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Respectfully submitted,

Marle Woodson, B. Sc.

Rand Assays.

	Ag	Au.
1	0.67	Tr
2	6.40	0.10
3	10.06	0.11
4	1.48	0.03
5	13.00	0.44
6	5.12	0.10
7	0.99	Tr
8	1.33	Tr
9	1.03	Tr.
10	0.63	0.01
11	8.18	0.06
12	0.29	Tr.
13	8.67	0.20
14	0.38	Tr.
15	17.27	0.36
16	2.42	0.15
17	0.78	Tr.
18	Tr	Tr.
19	17.32	0.55
20	0.47	Tr.
21	7.54	0.34
22	0.64	0.016
23	0.48	Tr.

191
Item 6

REPORT ON THE NEVADA RAND MINE
by
J. C. Jones, Geologist, Professor of Geology, Mackay School of Mines, Reno, Nevada.

Nevada Rand Mining Company,
11 Fordonia Building, Box 152,
Reno, Nevada.

Dear Sirs:-

At the request of your Management I have made a brief examination of your property, located in the Rand District, Mineral County, Nevada, to determine the major geological factors that have influenced the deposition of the ore bodies. The main facts observed are sufficient to warrant a general statement as to the origin and occurence of the ore. In addition I have had the opportunity to examine miscropically the many rock slodes of the ores and country-rocks.

In the area covered by the 7 claims comprising your property only one rock type is exposed at the surface-- hornblende-trachy-andesite. The andesite varies from a rather fresh, greenish, massive roch , through different stages of alteration by the hot waters accompanying the deposition of the ores, to a white and creamy soft , fractured and porous rock; naturally the greater amount of alteration is in the vicinity of the ore bodies.

The geological history of the deposit is as follows:- On an old eroded surface of the Triassic limestone, intruded by a Cretacious granodiorite, a flow of rhyolite lava, about 500 feet thick, was followed by an equal thickness of trachy-andesite, making a cover approximately 1000 feet thick above the old surface. Fracturing then occured, developing channels through the lavas, with a general trend to the Northwest. Through one of these channels, represented by the lode in which the mine workings are situated, heated waters percolated, altering the rocks and depositing quartz, adular, sericite, and gold and silver minerals. The character of this primary ore is difficult to determine in the mine, but remnants of the quartz are round on the 200' level, containing ~~sulphides~~ silver sulphides. During the time that has elapsed since the primary ore was deposited. the erosion of the surface has removed a portion of the lode, and as the minerals were attacked by the surface waters, the gold and silver was taken into solution and carried down through the lode aand redeposited in the form of native gold and cerargyrite or horn silver. As is frequently the case, the clay seams and softer areas of the altered andesite tended to concentrate this secondary ore, making the bodies of high grade that have been found. Due to the presence of manganese minerals in the lode, the zone of secondary enrichment has been carried to greater depths than is common and extends below the 250' level.

The most important problem at present is to pick up below the present workings the shoot of primary ore now exposed on the upper levels. It apparently is pitching South where found on the 200' level, and was consequently missed by the crosscut run from the bottom of the shaft by the former management. As the type of the ore deposit is similar to those found in Tonopah, there is an excellent chance that with depth, the primary ore will be of commercial grade.

I would advise drifting South along the mineralized fissure, shown about 25 feet from the shaft on the 450' level, for a distance of 100 feet, and then croscutting to the walls of the lode at the 50 and 100 foot marks, from this drift. This should pick up the shoot known above. With the information gained it will then be possible to decide as to the wisdom of deepenig the shaft and determining the value of the lode as it passes through the underlying rhyolite.

On the Extension and Extension No. 1 there is a large area of altered andesite that is likely to contain orebodies of

Nevada Rand Mines.
11 Fordonia Bldg., Reno. Nevada.

(Statement probably prepared by W. V. R.)

In 1924 a lens of high grade ore was disclosed on the 250' level 150' east of the shaft. This shoot produced 12 shipments of ore that returned $27,686.48, smelter receipts. The lowest grade shipment averaged $41.49 per ton, and the highest $213.52 per ton. Picked samples taken from the core of the vein showed the following proportions in gold and silver:

No. 1.	$1000.43 gold,	$291.20 silver,	$1291.63 total.
No 2,	$7325.55 "	$1779.60 "	$9105.15 "
3,	$2745.00 "	$ 1492.41 "	$4237.40 "
4,	$1347.80 "	$1251.48 "	$2599.28 "

The shipping ore was broken in bulk over widths of 5 to 7 feet. The selected samples are noted to show the richness of the ore in the core of the vein.

The 350' level requires an extension of about 100 feet, and the 450' level should be extended about the same distance to intersect the 250 shoot described. The character of the xxx vein and the quality of the ore lend great encouragement to this undertaking.

PROPERTY.

Seven lode claims, approximately 110 acres, held under U. S. Mineral laws, and situated in the Rand Mining District, Mineral County, Nevada. The shipping point is Nolan, on Walker Lake, a station on the Tonopah-Goldfield branch of the Southern Pacific Railroad. The vein outcrops are traced for 2000 feet on the Company's claims.

GEOLOGY

The veins are of the replacement type and occur in rocks that are essentially andesitic in composition. Gold and silver are the commercial products.

Development.

The well timberd main shaft has a depth of 450 feet. There is no water in the mine workings, and little timber is required in miining. About 4500 feet of drifts, crosscuts and raises. Levels at 50, 150, 250, 350, and 450 feet, with intermediate levels at 180 and 300 feet. An air raise prevides good mine ventilation.

PRODUCTION

From workings of limited extent, high grade ore has been extracted to the value of approximately xxxxxxxxx $100,000. Former owners of the property shipped about $40,000 gross. Their ore averaged $31.00 per ton. Shipments made by the company to Aug. 17, 1925, total 812 tons, with net smelter receipts of $52, 553.08, an average of $64.67 per ton. The hauling charge from the mine to Nolan is $3.00 per ton.

AVAILABLE ORE

A substantial tonnage of milling grade ore remains available on the mill dump and developed in the mine. One engineer estimates possible mine ore at 30,000 tons, averaging $15. per ton, with 2000 tons on the dump that sampled from $13.60 to $25. per ton.

REPORTS

The following xxxxxx conclusions were reached by three well known engineers reporting on the property: S. E. Montgomery, U. S. Mineral Surveyor and Mining Engineer, Reno, Nevada:

"The production shown from the comparatively small area opened by the present workings, added to the existing exposed ore, denotes a high type of mineralizationfor the ground under exploration. This should lend encouragement to explore the larger areas of virgin ground and to complete the development work for the downward extension of this ore body. The primary ores encountered were of good grade and were formed by deep seated solutions. Every effort should be made to explore the property on a more extensive scale."

Dr. J. Claude Jones, Geologist, Reno, Nevada; Department of Geology, Mackay School of Mines, University of Nevada:

" The mine is in my opinion a very promising property; and if a mill and sufficient funds can be provided to carry on development work outlined, it has an excellent chance of proving a large producer in years to come."

F. Lynwood Garrison, E.M., Philadelphia, Pa.:

"The geologic environment of your property is good. In some respects it resembles Tonopah. It is situated on the same mineralized zone, as is the Gold Pen and Mims properties. Development in depth is desirable, also laterallt along the 450' level to the east.

"The practice of taking out only the rich ore is inadvisable. All the ore should be mined and shipped. To do this, the mine must be properly equipped, and once done, with careful and conservative management, it ought to be a paying property."

Extensive improvements were made to both camp and mine equipment including the erection of ore bins. Several levels in the mine were cleaned of low grade ore which was placed on the dump. The 350' level was crosscut for a distance of 85 feet and a drift was adv nced 44 feet toward the vertical position of the 250' level shoot. The 350' level requires an extension of about 100 feet and the 450' level should be extended about the same dis* tance to intersect the 250 shoot described. The character of the v vein and the quality of the ore lends great encouragment to this undertaking.

REPORT OF TESTS ON HAND ORE.

The ore was a medium hard brown oxidized highly silicious material containing some pyrite.

It was broken in a jaw crusher to 1/4" size, ground to pass a 40-mesh sieve in Braun Laboratory Disc Pulverizer, then sampled by rolling and quartering.

The average assay value of a number of samples was .78 oz. gold and 36.7 ozs silver, which is equivalent to $59.65 per ton, gold at $20. per oz and silver at $1.30 per oz.

The following tests were made to discover a suitable method of treatment to extract its value.

1. Flotation followed by cyanidation of the tailings.
2. Concentration " " " " "
3. Amalgamation, concentration, followed by cyanidation of tailing.
4. Amalgamation followed by cyanidation.
5 Cyanidation alone.
   1. Varying strength of cyanide.
   2 " degrees of crushing fineness.

The first four tests may be briefly discussed as follows:

1. Flotation is not suitable to an oxidized ore of this type. Even when crushed fine, about 20% of the value only is recoverable in flotation concentrate. However cyanide treatment reduces the flotation tailing to a value of $1.49, indicating a possible total recovery including flotation concentrate, of 97.5%.

2. Concentration on the coarsely ground ore- all product through 40-mesh sieve- removed 74% of the value, leaving a $16. tailing, which by cyanide treatment was reduced to $1.49 giving a total extraction of 97.7%. The value of the concentrate was about $3800. per ton. The cyanide and lime consumption on the tailings were respectively, 1.01b sodium cyaninde and .5 lb pure lime. This seems

an excellent method of treatment but it must be remembered that the handling, transportation and marketing of concentrate is a troublesome and costly procedure, and smelting charges are high.

3. Amalgamation, Concentration, Cyanidation: This was on the coarsely ground ore, similar to No. 2 test. 46% of the gold was amalgamated, and by amalgamation and concentration combined 70% of the value was removed from the ore. The tailing was reduced by cyanide treatment to $1.58, with a consumption per ton of 0.9 sodium cyanide and 3 lbs of pure lime. This gives a total extraction of 97.5% of the ore value. The value of the concentrate was $640. per ton. This treatment presents no advantage over No. 2.

4. Amalgamation and cyanidation: The ore used in this test was re-ground to pass a 60 mesh sieve, about 50-60% passing a 200 mesh sieve. Amalgamation recoved 60% of the gold value and 56% of the silver value, leaving a tailing assaying $25.50. This was reground so that 71% was finer than 200 mesh and but .5% remained on 100 mesh. This is equivalent to fair tube mill practice when running in colosed circuit with classifier. This re-ground tailing was reduced by cyanide treatment to $1.19, with a consumption of cyanide of 1.65 pounds and and 5 pounds pure lime. The extraction in this test was 97.2% of the value of the ore of which amount 56.8% was by amalgamation. Evidently amalgamation alone is not sufficient for this ore, but when followed by cyanide treatment the extraction is excellent.

From the foregoing tests it appears that an economic extraction of the values of this ore cannot be easily effected by flotation, concentration, or amalgamation, either alone or together. However, the readiness with which the tailing from any of these processes yielded its value to cyanide treatment suggests the use of cyanide on the ore itself.

5. The coarse ore as in tests No. 2 and 3, (all through 40 mesh. about 50% on 60 mesh and about 40% passing a 200 mesh sieve) yielded over 96% of its value to simple agitation in cyanide solution of moderate strength- 1.5 to 2. lbs sodium cyanide per ton of solution or 4 to 6 lbs sodium cyanide per ton of ore. The consumption per ton of ore of this grade, as shown by the tests, would probably be 5. to 8. pounds sodium cyanide and and of pure lime 6. lbs, or 7.5 lbs of the usual commercial grade furnished cyanide mills. No lead compound appeared to be necessary for this type of oxidized ore.

Strong solution of cyanide showed no appreciable increase of extraction over a 2. lb solution of sodium cyanide. Finer grinding than given above resulted in slightly higher extraction; that is, grinding equivalent to good tube milling, namely, 1.0% on 100 mesh and 76.% minus 200 mesh, gave 97.% extraction. The cyanide consumption was higher and the increased extraction probably would not justify the expense of finer grinding.

Twenty-four hours agitation appeared to be enough since 96.% of the value was extracted in this time and longer agitation resulted in but slightly better results. The extraction of gold in all cases was nearly perfect, probably better than 98.%.

In Conclusion it can be stated that simple cyanidation would be t the best method of treating the ore.

A simple flow sheet might be arranged as follows:

1. Rock crusher breaking to 2-3 inch sizes.
2. Marcy or other type of ball mill, with Dorr or other type of classifier in closed circuit, wet grinding through 50 or 60 mesh.
3. Dorr Thickeners.
4. Agitators, Dorr preferred. Trent. Perhaps even a mechanical type since the ore is so easily cyanided.
5. Filter Press; American, Portland, Oliver, Butters.

considerable size. Near the east side center stake of the Extension No. 1 claim there is an unusual amount of quartz. A fifty foot shaft should be sunk at this point on the promise that another lode will be developed.

While no sampling was done by myself, there seems to be no serious reason for questioning the estimates of ore in sight made by Mr. Montgomery.

The only economical method of working the mine is to erect a mill on the property. There seems to be no doubt but that sufficient water can be developed either by a well in the Nugent wash which crosses the district about a mile from the mine, or elsewhere in the district.

The mine is in my opinion one of the most promising properties I have examined and if a mill and sufficient funds can be provided to carry on the development work outlined it has an excellent chance of proving a large producer in years to come.

Respectfully submitted,

J. C. Jones. (Signed)

(Copy)

Note: This is a rich ore, and high grade solutions result from its treatment, therefore any decantation system would require quite a large installation of tanks to reduce the solutions in value to an extent where they might be discharged without considerable economic loss of soluble value.

Therefore it seems that a filter press would be advisable in a small mill, and perhaps on account of the flexibility of time in the washing cycles, a Butters press unit would be desirable. Two units of presses of the American type in series would be ideal, one taking the solution washed cake from the other and rewashing it with water.

6. Zinc boxes using zinc thread or a Merrill Press using zinc dust for precipitating the gold and silver.
7. A refinery with steam pan for drying, and Steele Harvey #275 or Monarch Rockwell small size furnace for melting the precipitate to bullion.

An alternative method of treatment would be concentration of the product after ball milling, over Overstrom tables, Wilfley, or Dorr tables, followed by cyaniding as in No. 1 method. The concentrate could be marketed or perhaps some scheme of treatment might be devised to treat them at the plant, such as regrinding and agitation in moderately strong cyanide solutions with protective lime and lead compounds such as lead carbonate or lead oxide.

A second alternative treatment would be amalgamation followed by cyanidation of tailing. The product from the ball mill crushing in cyanide solution to 60 mesh could be passed over plates and 55 to60% of the value recovered as amalgam. The tailing could then be cyanided as in No. 1 method. Amalgamating in cyanide solution is practiced in several mills and presents little difficulty except that the alkaline cyanide solution tends to harden the quicksilver on the plates and they require frequent dressing and more attention than when a water circuit is used.