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Report of Mines of the Alamo District, Baja, California

By Oscar H. Hershey

San Francisco, California, Jan. 14, 1937

Mr. G. M. Miller

Holbrook Building

San Francisco, California

Dear Sir:

The property of the Compania Minera Moliners, S.A. in the Alamo District of Baja California impresses me as representing a very attractive opportunity to establish an important gold mining operation and in consequence I will discuss the possibility of what may be called the Princessa group in considerable detail.

Alamo is a village situated at an altitude of about 3800 feet in a broad valley surrounded by mountain peaks. The mineral deposits occupy a relatively narrow belt trending northwestward in low hills at the northern foot of one of these peaks. The Cerra Tomasa. Alamo is usually reached by automobile over an excellent highway from San Diego to the Mexican port of Ensenada and thence over a dirt road 75 miles to the village. Owing to unusual period of stormy weather that preceded my visit, I accompanied Mr. H. S. Boeker, one of the owners of the property, by airplane, requiring 35 min. from San Diego to

Ensenada and 25 min. thence to a landing field near the camp. During the two days that I remained at Alamo the ground was partly covered by snow but under the guidance of Senor Fernando Rodriquez and with the help of a large number of reports and maps that had been handed me I gained a very complete knowledge of the district.

One of the first questions an engineer asks is why, if the mines are promising, they have not been worked recently. In answer to this Mr. Boeker gave me the following brief history of the property. Rich placers were discovered in 1889. The placer activity lasted about a year. The Princessa vein was discovered in 1889. At first the lode properties were in the form of small claims with many different owners. Major Russel got control of the claims that now constitute this property. He operated under the name of Russel and Rhodes. They sold the property to an English Co. which made a failure and later Russel got control of the property again. He sold it to Douglas, Lacey & Co. a New York firm of Brokers and promoters. They put in a gas producing plant which was an experiment and proved an expensive failure and they lost \$240,000.00. During 1907 when the U.S. Government was going after blue sky companies the owners got into trouble on account of operations elsewhere. Major Russel was still manager. The property was operated under the name of several different companies. One, the Aurora Consolidated Mining Company. Mr. Ben R. Binns was sent in as manager. He persuaded Mr. Boeker to buy Aurora Consolidated stock in 1907, and when Douglas, Lacey & Co. got into trouble he got a five year lease on the Aurora and Princessa mines, bought up the debts and acquired the

entire ownership of the property. Active mining ceased about 1908 and nearly all the productive underground workings that are credited to have produced about 217,700 ounces/\$4,500,000.00 by that date. In 1910 Boeker and Johnstone retimbered and unwatered the Princessa shaft, for a San Francisco syndicate that included Mr. John McKenzie, well known to me. In 1921 Mr. Professor C. F. Tolman, Jr. and Mr. Errol McBoyle studied the Aurora-Princessa for a syndicate and recommended its purchase, but unsatisfactory promotion killed the deal. The Princessa shaft filled with water. In 1925 Price and Kingsbury took a lease and option on the property at a price of \$250,000.00. They changed the power from steam to Diesel, put in a 110 HP engine, built a 10 stamp mill and unwatered the Princessa and San David shafts. They did some cross-cutting and drifting and sank a winze from the 360 foot level 119 feet on the vein. In the San David shaft they had poor pumping equipment and had trouble keeping the lower level unwatered. They closed down to put in heavier machinery and an accident to Kingsbury delayed operations for eight months. On account of this and probable financial difficulties they finally quit and the mines filled with water. The Princessa and San David have never been unwatered since.

In 1932 Mr. J. H. A. Williams secured an option on the properties and placed Mr. S. J. Clausen in charge and he decided to re-open the Ulysses shaft. He moved machinery from the Princessa to a central power plant and electrified the property and spent all available funds practically all on the surface and did not have sufficient funds to properly explore underground.

In 1933 Mr. Robert S. Moehlman studied the geology of the western portion of the district and published a paper on Dikes and Veins of the Alamo Gold District, Lower California. In November, 1933, number of Economic Geology. The Alamo Gold Syndicate quit and since then the property has been worked in a small way by leasers above water level.

The remnant of the early day population of the town of Alamo have supported themselves from these shallow workings and have opened an astonishing number of cuts and shallow shafts along the vein. I can see nothing the above history to discredit the property as it did well up to 1908 and the outfits that have tried to resuscitate the property since have been insufficiently financed with extravagant management.

GEOLOGY: There have been available a preliminary report on the southeastern portion of the property with geological maps and sections by Prof. Tolman and Errol McBoyle and the paper by Moehlman on the northwestern portion of the property including a map of dykes and veins and so far as I can see they cover the subject thoroughly and I did not feel it necessary to re-map the surface geology. These men are practically in agreement that the veins occur in quartz diorite which occupies an extensive area in this portion of Baja California. They constitute a system of roughly parallel veins in that north-westward trend and usually dip steeply southwestward. These veins are interrupted by a number of intrusive dykes which Prof. Tolman divides into three classes. Moehlman specializes more in the petrography of the district and recognized an older group of coarses gabro and hornblende porphyry and younger diabase dikes. There are

also a few aplite dikes. Moehlman says the late parallel dikes of diabase parallel in strike and dip. The hornblende dikes tend to have more northward courses but dip eastward also. All of these dikes intersect the veins at oblique angles and cut them into segments that rake southward south eastward at relatively low angles. This causes the ore shoots to appear to rake in the same direction.

Moehlman brings out that the primary mineralization in the veins consists of Pyrrhetite, magnetite and specularite. At a later date the pyrrhetite was largely altered to marcosite and pyrite which in turn was oxidized to limonite and he contributes this alteration to the action of supergene acid solutions. If by that he means solutions descending from the surface I doubt it. Gold occurs in areas heavy in metallic minerals but the exact age of the gold was not determinable. It has been seen in contact with galena, magnetite and pyrite but also occurs alone in quartz free from sulphides. The quartz is of a peculiar type like granulated sugar which is characteristic of deep seated quartz veins. I agree with Tolman that the ores are of deep seated type and will be found at greater depth. He also compared them to Grass Valley ores in character. The unusual features about the district are the richness of the ore and the coarseness of the gold. The values are almost invariably recorded in ounces and low grade ore is anything below an ounce in gold.

MINES: The Princessa shaft is caved at the collar and the mine would be inaccessible even if it were not full of water but fortunately the Tolman-McBoyle maps and records and report give a very full picture of it down to the 250 foot level. This shows the rich Aurora stope mapped as 200 feet long. The text that

the report that 29,028 ounces/\$600,000.00 from the Aurora shoot between the 150 foot level and the surface is said by Mr. McBoyle to be obtained from the Mexican Customs records and is probably authentic. The ore is reported to have assayed twenty ounces in gold per ton. The report of the value of the ore milled by Mr. Johnstone is taken from his records and is also authentic, in brief it may be concluded that the ore mined has been of usually high grade and promises successful results for future development.

This (Aurora) shoot rakes south-eastward about 25 degrees. Going northwestward along the vein another shoot was stoped at various places, in part inaccessible to Tolman but including a stope 200 feet below collar of the Princessa shaft. This may be what Tolman described as the east Princessa shaft which is reported to have assayed five ounces and was stoped from the 220 foot level. The section shows it in strips and separated by two dykes and raking southeastward. Tolman described a third shoot as the west Princessa shoot and reported to have produced as high as 15 ounces which was mined to the 250/360 foot level, and underhand stoped below that level.

Now I am inclined to interpret the facts in a different light. Instead of a series of shoots raking southeastward there may originally have been one shoot standing vertically or nearly so. Including the dykes it largely occupies a length of 450 feet along the vein at the surface, in the vicinity of the 150 and 220 foot levels it is spread along a distance of 630 feet. The northwestern limit is indicated by the notations "vein weak at this end". Below the 150 foot level the shoot has not been fully developed as the 250 and 360 foot levels were short at the time of

the Tolman study, however, there is in existence another map that indicates that the 350 foot subsequently was extended farther northwestward and developed a new ore shoot about 100 feet long. The Price and Kingsbury winze sunk in this ore shoot to a vertical depth of 430 feet below the surface. Mr. Piccini, an Italian, says he sank the winze and that it is all in ore. Mr. C. M. Gossert, who is now operating the Fortune, formerly called the Avelina mine, says he was in this winze and saw ore, quartz, thicker than the winze. A report by Mr. Geo W. Bryant says of this winze "a winze sunk in the northwest edge of the ore body for the purpose of paralleling strike and dip of dyke continued in ore for 130 feet when, due to operators accident work was stopped. About 8000 tons of ore from development work in winze, upraise and drift was run in a series of mill tests and yielded about one and one-half ounces of gold per ton, width being about four feet and dip nearly vertical." As there is no reason to expect other dykes for a very considerable distance this can be considered the apex of important ore body of which 100 feet in depth and length can be called proved.

Tolman says further about the Princessa vein "in addition a rich small vein east of the Princessa vein has been mined from the 100 to the 200 foot levels. Cota who mined this ore reports it is assaying 18 ounces of gold per ton and his report is verified by Mr. Johnstone who milled the ore. This is doubtless the Rico vein".

About 40 feet southwest of the Aurora shaft there is a vein that for a distance of 70 feet has holes made to the water level and which yielded good ore. At about 30 feet farther southwest there is another vein that has been similarly

pitted for a distance of 120 feet. Wherever these old shafts occur Fernando said they were dug to water level and all yielded good ore. They are rarely continuous cuts at the surface because the leasers did not go through the dyke where unnecessary. Anyone who knows Mexican miners accepts the statement that they rarely dig long on a vein unless it yields good pay ore. I regard these groups of old cuts and shafts as evidence of ore shoots, most of which have been untouched below the water level.

Sulphide ore comes in near water level and is as rich as the oxidized ore especially where it contains pockets of galena and other sulphides.

A report by Mr. Wm. S. Knowles dated Feb. 8, 1913, gives a table of 27 lots of leasers ore milled aggregating 555 tons that averaged 3.53 ounces/\$73.00 per ton at the old price of gold, also 14 lots milled averaged 2.42 ounces gold per ton. Also 28 tons of Princessa vein ore milled showed an average recovery of 1.81 ounces/\$37.50 per ton and 0.32 ounces/\$6.60 went into the tailings.

About 120 feet southwest from the vein described is the Golindrina vein. A Spaniard recently put a shaft 70 to 75 feet to water level and has stoped on both sides as per Fernando.

Beginning about 50 feet farther northwest there is a practically continuous cut for 200 feet on this vein, it yielded good ore as per Fernando who mined some of it himself. It is doubtful that this vein has been touched below water level. A long cross-cut driven southwestward on the Princessa 200 foot level may have passed it in a dyke interval. From the Spaniard shaft the Golindrina vein is

traceable southwestward several hundred feet by surface workings until it seems to meet a larger vein that comes in from the Cruda shaft.

The next vein towards the southwest is the Borracha vein. It was early developed in the Borracha shaft which is about 675 feet southeast of the Princessa shaft. Fernando says this yielded good ore and Bryant says a stope from the 50 foot level to surface produced five ounce gold ore but was cut off at that level by the dyke shown on longitudinal section. The shaft was sunk to the 150 foot level and a cross-cut driven to vein No. 5, which was producing 10 ounce ore for a leaser when driven out by filibusters in 1911. During the Price and Kingsbury period an effort was made to reach the Borracha shaft by a cross-cut on the Princessa 360 foot level but not quite finished but it cut No. 5 vein in four stringers. Bryant says that recent sampling of outcrops southeast of the Borracha shaft gave across 36 inches 3.28 ounces gold 1.1 oz. silver per ton.

Leasers workings occur southeast from the Borracha shaft for 90 feet and the vein is then interrupted by a large basis dyke which offsets it a little towards the east. Beyond the dyke there is a cut 50 feet in length which Fernando says produced much ore. Going northwestward from the Borracha shaft the vein is buried for about 150 feet representing an ore shoot on the Borracha vein. If this goes down as I suppose, it has not been mined below the water level. There are a few old shafts in the next few hundred feet but the vein may be weak. It was picked up on the Princessa 200 foot level and driven on eastward but not far enough to get this ore shoot if it has a steep rake.

About 130 feet eastward from the Borracha shaft is the Crudo shaft which Fernando says produced 14 ounces ore. From the shaft there is a group of holes, 30 or 40 scattered along the vein go the top of the ridge at the southeast end of the Boeker property, a distance apparently of 2000 feet. Fernando says these all yielded good ore but ended at the water level.

Going northwestward from the Crudo shaft the vein can be traced by old holes to the end of the Golindrina vein.

The only place I could get underground on the Princesa group was about 225 northwestward from the Princesa shaft where Fernando and partners did their last work. At the foot of the shaft about 50 feet deep they were on the quartz vein which is largely two to three feet thick. It has good walls but not strong gauge. At the southeast it bends more eastward and there is a winze about 8 feet deep now full of water and which goes down on a rich shoot which Fernando says produced 15 to 20 ounce gold ore. It was yielded fine specimens showing much galena, sulphides and gold. The recent stormy period has caused the water level to rise and stop work. This chimney seems to go down deep, much of the quartz in the drift is white and low grade, Fernando says about one half ounce in gold, not less than this, he says, but where small pockets of limonite occur it is richer. At the northwest face the vein seems pinched upward by a small sheer zone and gauge seam that dips eastward 70 degrees, in fact a large part of the quartz diorite area shows similar dipping, sheeting and shearing and may have controlled the positions of the diabase dykes. About 18 feet up the raise the sold quartz vein is cut off abruptly by a basic dyke. There is a small seam that dips eastward 55

degrees at the contact, suggesting a little post mineral movement. Above this dyke is another segment of quartz two feet thick, then a dyke, then another quartz segment and finally a large dyke near the surface. There is no evidence of vein matter or even the vein fissure in the dykes. Nobody can convince me that the abort segments of quartz were formed in the sheared diorite between the dykes. It is a clear case of an intrusion of dykes through a vein. This vein must have been cut by a cross-cut on the Princessa 200 foot level unless the cross-cut passed it in dyke interval. The vein is traceable at the surface by leasers shafts for a distance of about 120 feet.

About 60 feet northeast of the vein that has the shaft I descended is the Iron Vein. This is a large vein three to four feet in thickness that has much white quartz but also rich pockets to sweeten it. It has been cut by a cross-cut on the Princessa 200 foot level and apparently some effort was made to follow it and much work has been done on it by leasers but its apex is so near the level of Alamo creek that the water level is soon reached. For the same reason it is largely buried under much debris but by the shaft and cuts here and there it seems to me it becomes the Grano de Oro vein in the northwest portion of the property, giving it a known length of about 2250 feet. Fernando thinks that the Iron vein becomes the Rabol del Oro/Arbol do Oro vein near the Ulysses shaft. Tolman thinks that vein represents the Princessa vein. There may be sort of an intersection of veins near the Alamo creek, but it seems to me the Iron vein and Grano de Oro vein resemble each other strongly and the many holes on both of them are in line. So far as I can see this vein is untouched below the water level except for a short

exposure in the Princesa workings. I was told that Clauson was driving for it from the Ulysses shaft but never reached it.

Between the Grano de Oro and the Ulysses is the Arbol de Oro described as a small vein. It has been extensively worked at the surface for a distance of a hundred feet opposite the Ulysses shaft. It must have been rich, as the dirt down a gentle slope has been worked for placer gold.

The Ulysses vein near the shaft appears to be from four to six feet wide for a distance of 100 feet but a big cut extends 50 feet further southeast. Bryant's memorandum regarding the Ulysses mine made in 1905 by an unknown party apparently familiar with the workings fixed a level at 60 feet with the vein eight feet wide carrying one half ounce of gold per ton down to the 140 foot level where vein was five feet wide and at 200 feet, six feet wide milled product showed two ozs. of gold per ton, pockets of rich ore not being included. The values stated are mill products obtained. Sulfides came in and contained satisfactory values. Bryant stated that Clauson did not investigate old workings on the main and foot-wall veins but cross-cut 500 feet southwest for veins 3 and 4 and intermediate vein. All three were found at calculated locations and had widths of from 18" to 2' as surface openings which proved disappointing to the operator who expected to find wider veins similar to the Ulysses. Assays showed about one ounce in gold in these veins and a west drift on the intermediate vein for 100 feet 1.355 ounces/\$28.00 in gold. No effort was made to follow ore workings and stopes of wide vein from which good tonnage had been produced.

Tolman says that in the northern portion of the claims the Arbol de Oro and Grano de Oro are pronounced veins of the narrow rich type, the former having been stoped to the water level. The Ulysses vein is large, five feet of ore showing at the surface and this end of the property is almost as attractive as the Aurora-Princessa section.

Much float quartz suggests an offset to the northeast in the Ulysses vein, going southeast. Thence the vein is badly involved with a large basic dike, but cuts show it at intervals to the El Paso shaft, there is a shoot of ore seems to have been stoped to the surface. After an interval the vein occurs again at the San Juan shaft where Fernando says it goes down 100 feet and is 4 to 5 feet wide. He says he took his pump out and left good ore there. A short distance farther southeast the vein seems to split into two smaller veins that diverge. Recently leasers have been taking good ore from shallow holes on both veins as well as picking specimens from the dumps, this being crushed in a small arrastre except some being mortared by women of the village and the coarse gold picked out.

Nearly is the San David shaft with timbers in good condition to the surface. Tolman states, in the bottom level of the San David workings, Dr. Cota, foreman at the Alamo mines since the mines have been worked, informed me that there was six feet of ore averaging a little over an ounce of gold per ton. This central portion of the property is very attractive and should be developed and simultaneously with the richer and smaller shoots of the Aurora-Princessa section in order to assure a steady supply of ore. Price and Kingsbury were able to hold the water at the 280 foot level only a few hours but long enough to sample a vein

six feet wide in a drift about 50 feet long assaying one half ounce gold but improving towards the northwest. In the San Juan shaft there is three feet of attractive quartz with much hematite assaying 2.74 ounces gold per ton. Bryant says this ore shoot can be reached from the San David shaft in a short distance.

I accepted Mr. C. S. Gossert's invitation to visit the Fortuna, formerly the Avelin, to see a vein cut by dikes. It is situated part way up the slope of the Cerro Leon, the vein strikes northward and dips westward about 50 degrees. It is developed by an incline shaft about 365 feet deep. From the surface to the 150 foot level there has been mined a shoot of ore Mr. Gossert describes as 150 feet long, 3 to 9 feet wide, that milled 3.87 ounces/\$80.00 per ton at the old price of gold. The shoot seems to rake steeply northward. At the 150 foot level it is cut off squarely by a basic dike that is 90 feet thick where cut in the shaft. No vein matter or even fissure extends into the dike. Above it is a small dike that intrudes the quartz and there can be no question that the dikes are post mineral in age. Below the big dike, a small shoot of very rich ore has been found and the drift is being driven northward in search of the main shoot on its northward rake, it has reached a small vein whose course is east-west and is probably a stringer to the main vein. This small vein is of particular interest because it contains pyrrhotite without evidence of alteration to marcasite and pyrite and a little chalcopyrite and is very rich in gold showing that gold was deposited in connection with the primary sulfide mineralization.

In the diorite there is a dike of apparent diorite porphyry. Vein quartz extends into it but it is ragged and low in grade. Moehlman may have taken such

pre-mineral dikes with the post mineral dikes and been led to draw a wrong conclusion regarding the relative ages of the ore and most of the dikes. One more fault I have to find with his paper, he says the quartz veins are narrow. That gives a wrong impression for they doubtless pinch and swell as in most regions but it is most evident that where ore occurs much of the quartz is several feet thick.

Gossert says that where the veins pinch to six inches the values may drop to 0.29 ounces/\$6.00 or 0.339 ounces/\$7.00 per ton but the swells are good ore which here means anything above one ounce. In fact, an old Mexican leaser told Tolman they could not make money on less than two ounce ore which means by arrastres. The reports from which I have drawn contain a great deal more information but I have given enough, along with my personal observations, upon which to base my conclusions. First, I will quote the last two paragraphs of Tolman's report as follows:

“There are good prospects not only for the development at greater depth of the three ore shoots mentioned above Princessa but also the Barracho vein can be reached from the 220 foot level in about 150 feet. This important iron vein which is so strongly developed in the San David claim and has produced rich ore in the Princessa claim in surface cuts should also be explored from the Princess mine workings.

Mr. Boeker says Mr. McKenzie expressed the intention of sinking the Princessa shaft to 500 feet and developing a new level from it. That is what ought to be done but much ore could be found on higher levels.”

CONCLUSION: It seems that no practical mining man could follow the veins and see the many places at which Mexican leasers have dug ore on at least ten veins in an area over a mile long, without realizing that the workings above the water level merely scratch the probably ore occurrences. If these workings have produced say 217,706 ounces/\$4,500,000.00 at the old gold prices of \$20.67 per ounce within several hundred feet of the surface, how many millions may be taken out by the time the property has been thoroughly worked, say to a depth of 2000 feet. I will not mention a figure but the possibilities are exciting.

The present high price of gold is a favoring feature, on the other hand, costs may increase in the years to come and the Government of Mexico may become more severe in its charges, but the ore is of such high grade that it is not likely that anything can happen in the next twenty years to wipe out a good profit from the Alamo mines.

I am assuming efficient management. Mr. Boeker insists that the Princessa shaft shall be reopened and I agree with him that this is desirable. Afterwards, the San David and Ulysses shafts can be unwatered and veins explored from them.

The finding of the ore will not be difficult but will require some technical superintendence. The Mitchell Baby Diamond Drill would be very useful in the Alamo mines to prove what a geologist will conjecture, in advance of cross-cutting and etc.

The purchaser will acquire the stock of a long established Mexican company, recognized by the Mexican Government, that is a great advantage.

There are no bandits in Lower California because the population is too sparse to protect them. All that will be necessary to avoid trouble will be to obey the laws of Mexico. I have been connected with mining in Mexico for 16 years and I do not anticipate any trouble in operating a mine in that country.

There is much old mining machinery on the property and a good mechanic may find enough of it can be used in the preliminary stages of development. The 10 stamp mill has scarcely been used and will do to beneficiate any 20 ounce ore that may be encountered. It will be supplied with water from the mine.

In short it appears that no heavy outlay will be required to begin operations. Catching up and re-timbering the upper portion of the Princessa shaft is the most expensive work in sight. The company owns enough buildings in Alamo to house its staff. The town people are waiting the opportunity to go to work as miners.

It is evident that a comparatively small investment will prepare the property for production and it is certain that there is in sight, without further development, more than enough ore to pay for the property and preparatory work. After that it will take care of itself.

I have thoroughly sold the property to myself. I feel that anyone who will read this report from the beginning to end and then refuse to be interested is not seriously wanting a mine investment, for the Alamo and district presents one of the big opportunities of the earth.

Respectfully submitted,

Signed: Oscar H. Hershey