White Oaks District

The White Oaks district is approximately on a straight line from the Nogal to the Jicarilla district and about half way between. It is about 8 miles east of U. S. Highway No. 71 and is served by a branch highway running southwest from the village of Jicarilla and joining highway No. 71 just southwest of the district. The village of White Oaks, with a population of about 100, is the nearest settlement.

The El Aviador Gold Mining Co., operating the Smuggler and Little Nell mines, is the principal producer. Some of the ore is shipped to the smelter at El Paso and some is treated in an amalgamation concentration mill of 15 tons daily capacity at the Little Mack mine. In 1935, 612 tons of ore containing 279 ounces of gold and 153 ounces of silver was shipped to El Paso, and 117 tons was treated at the amalgamation mill, yielding 93 ounces of bullion 835 fine.

ROSEDALE MINE SOCORRO COUNTY

Production

Gold production of Socorro County is principally from the San Mateo Mountains, the Silver Hills district, and the Rosedale district. From 1917 until 1934 the total annual gold production of the county was negligible; in 1934 it was 161 ounces and in 1935, 550 ounces.

Magdalena District

The Magdalena district produced small amounts of gold from lead, zinc, and copper ores. From 1913 to 1917 the production from this source was from 100 to 200 ounces a year, but since then it has never been more than 5 to 10 ounces a year, except in 1925, when it was about 55 ounces. In 1932 the Kelley Magdalena mine of the Empire Zinc Co. made shipments of lead-zinc ore containing gold and silver. Since then the production of the district has been negligible.

Silver Hills District

Production from the Silver Hills district is mostly from test runs made at a testing plant of 25-ton daily capacity. This plant was started in 1933 and used flotation. It continued operating in 1933 and 1934, but in 1935 flotation was replaced by a 20-mesh screen and a sand table and tailing launders lined with cotton blankets. Production in 1935 was 243 pounds of concentrates containing 2.30 ounces of gold.

San Mateo Mountains

In 1934 the Springtime Mining Co. and T. B. Everhart began making shipments from the San Mateo Mountains. Both of these operators shipped from newly developed claims. In 1935 the Springtime Mining Co. completed

NM Mine File No.5644

a flotation mill of 40 tons daily capacity and treated 1,295 tons of ore from the Panky mine. The concentrates produced contained 280 ounces gold and 4,800 ounces silver. Development in the mine consists of an adit 600 feet long and a shaft 100 feet deep with levels at 50 and 100 feet from the collar. Other operators produced a 35-ton shipment of gold-silver ore that was sent to El Paso.

Rosedale Gold Mines Limited

Situation

Rosedale gold mine is situated on the northeastern slope of the San Mateo Mountains in the County of Socorro, New Mexico. The nearest town is Magdalena, on the Santa Fe Railroad, from which point a first-class gravel road runs 29 miles southwest to the mine. The mine is at an elevation of 7,500 feet in the heart of a pine forest, and the camp enjoys an exceptionally temperate climate.

History[13]

Gold was discovered in the San Mateo area about 1882, and the Rosedale property was operated almost continuously from 1886 to 1911. Reports state that dividends were paid for about 15 years simply from ore taken from development. The property was reopened in 1913 and ran until 1916, when a fire destroyed the mill and surface plant. No data are available as to actual production, but it is evident that during early days the mine produced several hundred thousand dollars worth of gold.

In 1934 the present operators obtained the property, reconditioned the mine, and erected a complete cyanide plant of 65-ton daily capacity. After various test runs, the plant went into steady operation in November 1935 and was operated continuously until November 1936, when it was shut down for 3-1/2 months to permit enlargement of the power plant, increase in the mill capacity, and straightening one or two reverse bends in the main shaft. Early in March 1937 the plant resumed production, and at present the mill is treating 135 tons of mine ore daily.

Topography and geology

The San Mateo Mountains cover an area of some 800 square miles, extending for about 45 miles in a southwesterly direction. The rocks of these mountains are an accumulation of volcanics, chiefly rhyolite flows. No sediments occur, except in the southern part of the range at Nogal Creek, where a patch of Magdalena limestone (Pennsylvanian age) is reported.

The rhyolite in the Rosedale area is of Tertiary age and the district is remarkably free from dykes or other types of intrusives.

13/ Lasky, Samuel G., The Ore Deposits of Socorro County, New Mexico: New Mexico Bureau of Mines Bull. 8, 1932, pp. 94-95.

The Rosedale vein occurs in a prominent shear zone in a hard rhyolite prophyry. This shear is a main structural feature in the area and can be traced for at least a mile to the southeast of the shaft and for a similar distance to the northwest, as the hard porphyry forming the wall rock of the vein withstands weathering action to form rugged ridges on the slopes and along the backs of the hills. The shear containing the vein has an average strike of N. 15 W. and a dip of 75° to 85° to the southwest.

The shearing extends for a considerable distance into the wall rocks, and for this reason the vein walls are loose in many places and not well defined. The vein filling is mostly a white quartz, crushed and broken portions of rhyolite recemented by quartz to form a type of rhyolite breccia, some limonite, a little hematite, and in places much manganese, which occurs as a black film on the fractures. The gold is free and is found as minute films on the quartz and rhyolite fragments. Usually, where the vein is rich, a considerable quantity of greenish quartz is present, which has a waxlike luster, and this type of quartz is one of the markers for high-grade ore. Oxidation has been intense and extends to the 700 level at least. No sulphides have ever been detected, and although water is present immediately below the 700-level station, it seems likely that the oxidation zone will extend to a much greater depth.

The gold values are spotty. Ordinarily, the values will lie in a high-grade streak; at times a rhyolite breccia band may carry the values, and again a streak of banded quartz may carry high gold values. Such streaks cannot be relied upon to carry for any great distance, as the high-grade portion may suddenly jump from one wall to the opposite side. It is possible and very probable that as the mine is deepened, and especially as the bottom of the oxidation zone is reached, the vein values will be more consistent.

Some premineral faulting is evident, but it is due to the great amount of post-mineral faulting that the ore zones have been cut into blocks and moved considerable distances. Considerable geologic study is being given to the vein structure, throw of faults, etc., but a great additional amount of such work must be done before a complete story can be written as to the movements of the Rosedale vein. Briefly, one or more major post-mineral faults has shifted the vein to the south and at the same time depressed or forced the ore blocks downward. In places, large ore blocks may be found in the heart of such fault movement, but it appears that the larger ore zones are outside the areas of greatest fault disturbance. The faulting has caused a thickening and thinning of the vein, and where thickening occurs the better grade ore is found. Ore blocks will average 100 to 150 feet in length and 100 to 200 feet in height, and in such areas the vein will average 5 to 15 feet in width.

In many places the vein walls are not well defined and the ore is mined to an assay wall.

Development

The mine was opened by a 2-compartment shaft sunk on the footwall of the vein to a depth of 726 feet. When the mine was first worked, levels were driven north and south from the shaft in the vein at 50-foot intervals. For present operations, the level interval has been increased to 100 feet.

Prospecting

The ore zones are prospected by driving drifts and crosscuts, then blocked out between the levels by means of 2-compartment raises driven 100 to 150 feet apart. Such raises afterwards serve as entrance to the stopes and provide proper ventilation to the stoping areas.

Mining methods

The 2-compartment raises have an untimbered chute compartment and a manway compartment closely cribbed with 3- by 12-inch cribbing 4 feet long. The manways have a timber slide for lowering drill steel and supplies to the stopes, a ladderway, and air and pipe lines.

Two men - a miner and a helper - are used in driving raises.

Drifts are driven 5 by 7 feet in the clear, no timber being required. On drift work, one man operates a rock drill, a second man being required only to aid in blasting.

Each level block between the completed raises is prepared for stoping by installing chutes at 15-foot intervals with rock pillars between. The first round for each chute pocket is blasted on the track. The 6- by 8-inch chute timbers are then put in place and a chute of 3-inch lagging is built. Light rounds are then drilled and blasted into the chute. The chute pockets above the chutes are enlarged until they are connected, leaving a pillar from 8 to 10 feet thick between the chutes and a level back 20 feet above the rail from which to start stoping.

This practice has proved to be fast and safe and it does not tie up a level with large piles of muck on the track.

Practically all stoping is by the shrinkage method. Excessive dilution from loose wall rock is prevented by keeping the stopes as full as possible while breaking is in progress. Each cut or slice is carried the full length of the stope before the next one is started, thus preventing the exposure of more than 10 feet of wall rock between the top of the broken ore and the back of the stope. The ore does not tend to break in large pieces. Close attention is given to the placing and loading of drill holes; hence, very little chute blasting is necessary and very few boulders are sledged on the level grizzlies. Breakage in the stopes averages 49.3 tons per machine shift.

An 8-foot pillar is left between the back of the stope and the level above. After a stope is finished, the air and water lines are removed from the raises.

When drawing a stope, the top of the ore pile is kept level by close drawing control. This prevents further dilution while the broken ore is being extracted. Loose rock from the walls falls on top of the broken ore and does not appear in the chute until after a large percentage of the ore has been extracted.

Very few pillars are mined after the stopes are once finished. Waste from development is used as filling in old stopes; however, stope refilling is unnecessary, as not enough ground has been opened up to cause rock movement.

The ore is hand-trammed in 16-cubic-foot standard box-type mine cars and dumped into shaft pockets over 8-inch grizzlies. The skip tender loads from hand-operated chutes to a 1-ton skip cartridge, which discharges direct into a 1-ton skip. The skip dumps automatically into the headframe ore bin.

Worthington 86 drifters mounted on 3-inch columns are used in all drifts, crosscuts, and stopes. Stoping machines are used in the raises. One-inch, round, hollow-lugged steel is used in the drifters and 1-inch, hollow, quarter-octagon steel in the stopers.

One- and one-eighth-inch 40-percent gelatin is used in all cut holes in the drifts and raises. All other holes are blasted with 1-1/8-inch Gelex powder.

Channel samples are taken from every face after each blast in order to maintain close control on vein values. The engineer supervises all sampling and development work and has charge of all mine records.

All timber is cut to standard size in the mine timber yard. Native-pine timber is used throughout the mine.

The mine is cool and there is no dust. There is no water above the 700 level. Good ventilation is maintained in all working places. All working-shaft stations and ore-loading stations are electrically lighted. Mine refuse is removed from the mine daily.

The mine operates two 8-hour shifts for 6 days a week. On Sunday, usually one haulage and hoisting shift is required to maintain sufficient ore for the mill. The mine employs only white labor of the highest-skilled type. Lately, due to the country-wide shortage of skilled labor, it has been necessary to train a number of local men. Many of these men are turning into first-class machinemen and miners, although they had never worked underground before.

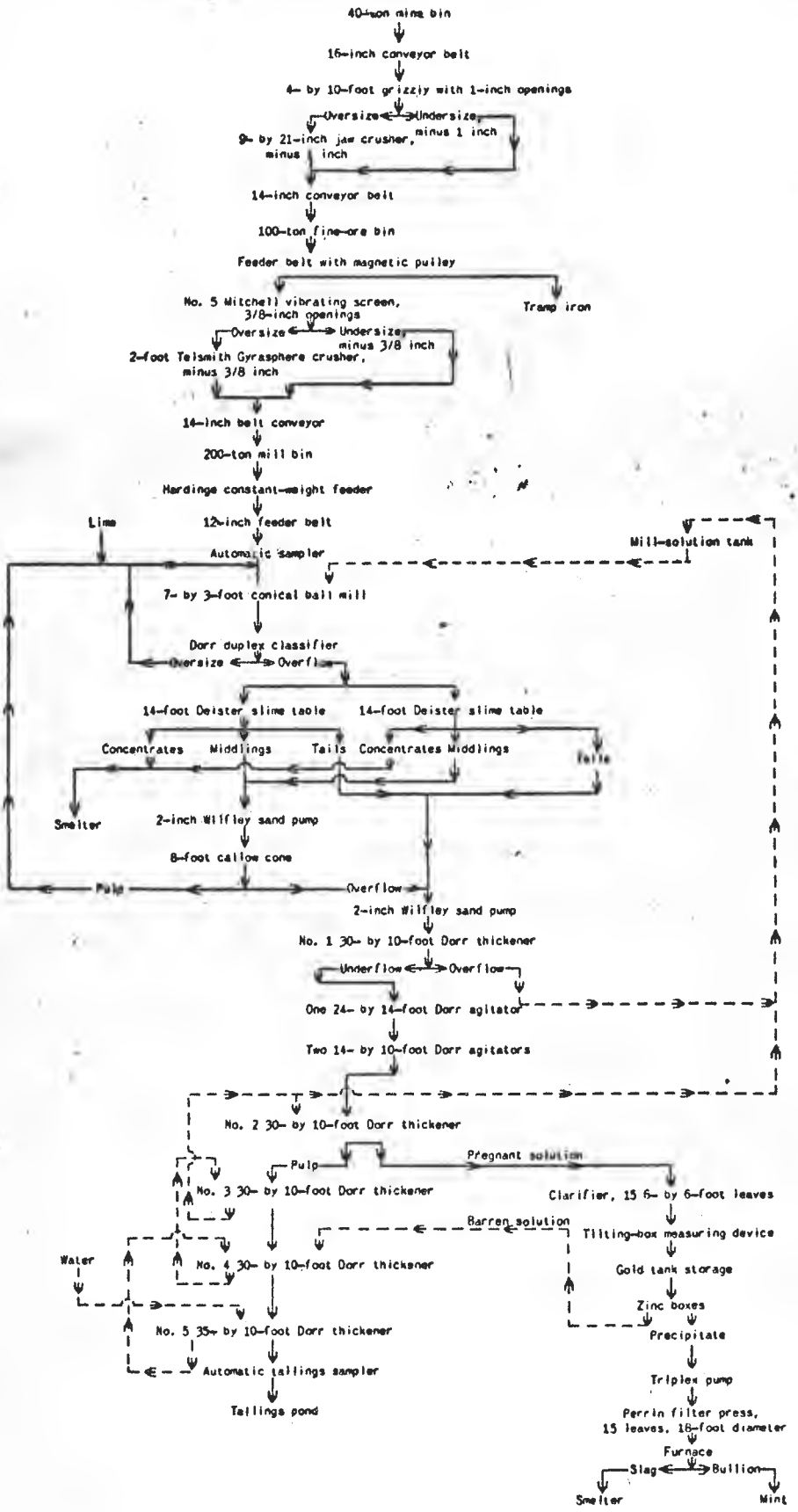

Figure 11.- Flow sheet of Rosedale Gold Mines, Ltd., mill.

During the last three months bonus and contract systems have been introduced. Drifts and raises are run on a contract basis at a published price per foot of advance. Powder, caps, and fuse are sold to the contractors at cost price.

Stopes are bonused on a certain price per cubic yard of extraction. Bonus rates may be changed as conditions demand, but new rates are posted at least a week before the end of each period. Stopes are measured at least twice a month by the mine engineer, and bonus and contract sheets are posted before the following pay day. All miners, trammers, and muckers on bonus or contract are guaranteed the regular rate of daily pay for the type of work performed. A total of 23 men is employed on the mine force, which includes foremen, miners, trammers, muckers, and hoistmen.

Underground men wear the usual type safety hats. Safety kits are maintained on all levels and safety rules are rigidly enforced at all times. Since July 1935, when the first underground work commenced, there have been no serious accidents in the mine and only a few accidents of a minor nature, such as cut fingers, etc.

Milling

Figure 11 is a flow sheet of the Rosedale mill.

Ore from the 40-ton head-frame bin is fed directly to a 16-inch conveyor belt, discharging over grizzlies with 1-inch openings to a 9- by 21-inch Telsmith jaw crusher set to 1-inch opening. The undersize from the grizzly and the discharge from the crusher feed onto a 14-inch conveyor belt, which feeds to a 100-ton fine-ore bin. Ore from the fine-ore bin discharges onto a feeder belt equipped with a Dings magnetic pulley to remove tramp iron, and thence onto a No. 5 Mitchell vibrating screen with 3/8-inch openings. The oversize from the vibrating screen feeds direct to a 2-foot Telsmith Gyrasphere crusher, which crushes to minus 3/8 inch. The screen undersize and gyrasphere discharge fall on to a 14-inch conveyor belt discharging into a 200-ton mill bin. Provision has been made to close-circuit the gyrasphere crusher and the vibrating screen, but, due to the nature of the rock, little oversize is produced and this installation probably will not be installed until a step-up in tonnage is made.

The ore from the mill bin is fed by a Hardinge constant-weight feeder to a conveyor belt, thence to a 7-foot by 36-inch Hardinge ball mill running in closed circuit with a Dorr duplex classifier. The mill head sample is cut at the point where the feed enters the ball mill by means of an automatic sample cutter, which cuts the entire stream for a portion of the time. This sample falls into a separate bin. Grinding is done in cyanide solution and approximately 55 percent of the gold is dissolved in the ball-mill circuit. Lime is also added in the ball mill from a separate lime tank situated outside the mill building.

Once each month the mill is shut down for 12 to 16 hours for repairs and inspection. Operating time averages 96 percent.

The mill heads average only a fraction of an ounce in silver and 0.12 ounce per ton in gold. Mill extractions are computed daily. The average recovery is from 90 to 92 percent.

The mill operates three 8-hour shifts 30 days a month. American labor is employed everywhere except in the crushing section. The mill crew consists of 1 mill foreman, 3 operators, 3 mill helpers and 2 crushermen.

Power plant

Generating equipment consists of two Diesel engines direct-connected to 480-volt generators and having a total output of 365 horsepower. The power plant also includes a 14-1/2- by 8- by 10-inch direct-driven Worthington compressor that supplies air for the mine, and a small, single-stage, Sullivan compressor that supplies low-pressure air for the mill agitators.

Shops

A fully equipped machine shop is maintained on the property. Electric welding equipment as well as oxygen acetylene equipment is maintained, and all repairs except heavy Diesel repairs are made on the property under the direction of a machinist and an electrician.

The steel-sharpening shop is equipped with the usual machines. A fully equipped assay office is run for the proper guidance of the mine and mill operation.

Housing

A bunk house and boarding house are operated for unmarried employees and small residences are provided rent-free for married employees. All residences are electrically lighted and most of the houses are provided with running water. The company employs 48 men, all of whom are housed at the property.

Costs

Detailed costs of all operations are kept at the office. Each day, at noon, the total detailed costs for the previous day and the month-to-date costs are posted. Total operating costs, mine, mill, office, etc., average $2.50 to $2.60 per ton of ore milled.

tax Commission files

1936 18263 tons milled; gross value 60,652 (dollars and cents) or average 3.32/ton day ore milled

1937 1665 oz au at 34.84 = 58,052.15
2200 oz ag at .77 = 1,769.84
59,821.81

USMY

1936 - 75 ton cyanidation mill operated 324 days at average daily rate of 50 tons - 16206 tons total

1937 operated 263 days at average daily rate of 116 tons - 30,508 tons total for the year 1937

6082

Plant closed Dec '37.

Forged steel grinding balls are used. Rosedale ore is extremely abrasive and the liner and ball wear is high. The mill is lined with manganese steel liners, yet a set of liners will grind only about 16,000 tons. A mixture of 25-percent 3-inch and 75-percent 2-inch balls is used. Ball consumption runs 4-1/4 to 4-1/2 pounds per ton of ore. The ball-mill discharge runs at 80-percent density and the classifier overflow 19- to 20-percent density.

The classifier overflow goes to two Deister slime tables. The tables make three products - a concentrate that contains about 10 percent of the total gold produced and sent to the smelter; a middling that is pumped to an 8-foot Callow type cone; and a tailing that constitutes the feed to the cyanide section. The cone overflow joins the table tails to the cyanide tanks, and the spigot discharge is returned direct to the ball mill. Before installing the cone, the table middlings were pumped direct to the classifier, but trouble was experienced, inasmuch as too much water was added to the classifier and a great amount of material ground fine enough for cyaniding polluted the ball-mill circuit. The feed to the cyanide section averages as follows:

	Percent
+ 100 mesh.....	9
- 100 + 200.....	26
- 200.....	65

The table tails are pumped to a 30- by 10-foot Dorr thickener, the overflow is sent to the mill solution tanks, and the underflow to the agitators. The pulp passes through a set of three agitators, thence through a unit of four tanks operated in counter current.

Pregnant gold solution overflows from the tank following the agitators to a vacuum clarifier, thence to a head gold tank, and then through the zinc boxes. Every third day the zinc boxes are cleaned, the sludge being flushed to a triplex pump and pumped direct to a small locked Perrin press. Zinc shavings are cut in the mill on a zinc lathe from zinc sheets purchased direct from rolling mills. The cake in the Perrin press is air-dried, discharged direct into pans, and carried to the smelter, where it is melted into bullion.

Reagent consumption per ton of dried ore is as follows:

	Pounds
Lime.....	2.87
Cyanide.....	.50
Zinc.....	.44