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RAWHIDE GOLD DEPOSITS

MINERAL COUNTY, NEVADA

PRELIMINARY FEASIBILITY STUDY

By

Bruce B. Goddard

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INTRODUCTION

The Rawhide mining district is located in the northern portion of mineral County, 40 miles southeast of Fallon and 27 miles east of Schurz, the nearest rail supply point. The Rawhide district encompasses an area about 5 miles long by 3 miles wide. Gold deposits occur within a belt of volcanic rocks which extend throughout the area. Virtually nothing remains of the old boom town of Rawhide, except an occasional foundation, as the town was completely destroyed.

The Rawhide district lies in an isolated part of Nevada, and is accessible only by dirt roads from Schurz, some 27 miles to the west, and from Sand Springs 19 miles to the north on U. S. Highway 50.

Climatic conditions are typical of much of central Nevada. Summers are hot and dry, winters windy and cold. Precipitation averages about eight inches per year. Temperatures range from sub-zero in the winter to 100 degrees (F) in summer. Snowfall is very minimal, and should a mining operation develop, productivity losses from weather conditions would not be anticipated.

The scant vegetation in the area consists of sparse scrub sagebrush and a minor amount of desert grasses which have established themselves in the desert soils.

There are no lakes or streams or other surface waters within several miles of Rawhide.

## PAST MINING HISTORY

After discoveries of gold in the latter part of 1906, a camp was formed in February of 1907. The mining district was formed and serious prospecting began. In its first three months the camp acquired 1,000 inhabitants. A newspaper was soon published, and it began to proclaim Rawhide as one of the great gold camps of the world. Promotional schemes were practiced here, such that an atmosphere of hysteria and excitement attracted between 4,000 to 8,000 inhabitants by June 1908.

The mines were opened up under a leasing system in which a block of ground 300 feet square constituted a lease. This system enhanced the chances of discoveries being made, and soon 330 leases were operating, which disclosed the presence of ore or low grade mineralization in a number of areas about the district. In most cases, the size of the lease block was too small for the ground to be developed to the best advantage.

In 1908, 50,000 feet of underground work was done at a cost of \$1,000,000. Eight companies were operating, and about 600 men were working in the mines.

At first Rawhide had been heralded as a high-grade free-gold district. It was soon recognized, however, that much of the ore would require milling and could not be directly shipped to reduction plants, although small deposits of very rich ore were encountered. Two small mills were built which treated ore from various operations.

By August 1910, 75,000 feet of underground work had been done. More than 20 mines had been opened to depths of 150 to 560 feet, the deepest being the Mint with 4 levels. It had produced about \$35,000 worth of ore, and the Coalition and the Queen had produced about \$400,000.

About this time 3 additional mills were added to those already in operation to serve the milling needs of the area. From 1911 to 1920 most of the mills were supplied with electric power. Mining continued during this period, but from 1917 to 1920 on a more moderate scale with ore harder to find. By 1923, the deepest workings were 750 feet. Production had declined considerably by this time and the better ore had been mined, and about only 50 men were in the camp. This number further decreased to a few leases, until the last recorded production in 1940.

The production of the Rawhide district, from its discovery in 1906 through 1940, the last year of recorded production, is said to be between 1.5 to 2 million dollars. (Gold at \$20 per ounce, silver at 60¢ per ounce.) Considering the amount of underground work done, and the expenses involved in obtaining this production, the operations were not particularly successful. It is for this reason that in the last 15 years it is considered economically unfeasible to prospect for these small high-grade pockets. Instead,

particular attention is being given to find large areas with sufficient mineralization to allow large scale open pit mining operations. These larger areas are, of course, of much lower grade.

Some relatively recent work has been done toward evaluating the placer occurrences of gold in the surrounding gullies of the Rawhide area. These efforts to develop large amounts of placer ground have not been successful, although some areas do contain placer gold.

### MINING CLAIMS

An examination of a property map (see Map of Dunning-Denton and Rawhide Claims, compiled by J. M. Forbes) reveals that the Denton Lease includes about 25 lode claims known as the "Grutt property". This ground under Mr. Denton's control encompasses most of Murry Hill and Grutt Hill, but does not include all of Hooligan Hill or all of Balloon Hill. The area excluded from the Denton Lease is considered to be the central part of the district and the site of most of the past work and production. This ground is held by Nevada Rawhide Mines Company and is commonly known as the "Scheeline claims". The Denton Lease holds only a 50 per cent interest in the Morning Star and Grey Eagle fraction claims.

The execution of a lease-option agreement on these claims by Mr. Denton would be very desirable. These claims contain zones where ore grade material might be found, and also in the event exploration work found ore on the Denton Lease, it would likely extend into these neighboring claims.

### MINERALIZATION

A recent examination trip was made by the writer to inspect the surface and evaluate the property. This trip, coupled with a study of old reports and miscellaneous data, suggests:

1. The better grade ore has already been extracted by selective mining methods conducted between the years 1906 to 1940.
2. Widespread, low-grade gold-silver mineralization does exist in the district. This mineralization appears to occur along structural zones that may offer potential targets for further exploration.
  - a. One of these zones extends northeastward from the Truett shaft on the Happy Hooligan claim toward, and possibly into, Balloon Hill. This zone does not lie within ground under control of Mr. Denton.

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- b. A zone extends northward across Grutt Hill within the Denton Lease.
- c. There are two other zones; one near the Murray Hill shaft, the other near the Bald Hornet shaft. The Denton Lease takes in most of this ground, but not all of it.

No inference is to be made that the zones contain economic mineralization. The zones are poorly delineated and no implication is herein made that any mineralization approaching economic grade will necessarily be found. Rather, they are mentioned as zones to be systematically explored and tested for the existence of ore grade material.

### EXPLORATION PROGRAM

Since no positive ore on which to base an operation has been delineated, and insufficient drilling and sampling have been done to determine the potential ore of the area, it appears a systematic evaluation of the zones described above is warranted.

Efforts should be made to secure parcels of ground not now under control of the Denton Lease. Especially important is that a lease be obtained on the Scheeline group of claims. Then a preliminary exploration program under the direction of a competent geologist can be initiated as follows:

1. Control survey. It will be necessary to establish claim boundaries, control points, show mine workings and dumps, and prominent physical features of the district on a base map. This can best be accomplished by hiring a surveying firm to do the work.
2. Detailed geologic mapping of the area, sampling of surface exposures, bulldozing trenches and sampling them, assaying, and a study of all existing data.
3. Preliminary drilling. After the geological work is completed in step 2, it should be possible to lay out a drilling program of 10 to 15 holes aggregating about 3,000 feet to test the mineralization. Holes will range in depth from 200 to 300 feet.

This preliminary exploration program should indicate whether the property has potential to contain an ore deposit. If the program is unsuccessful, no further work is recommended at this time on the property. The cost of the preliminary program is estimated at \$50,000.

If the preliminary program is deemed a success, then further work is justified. A logical second stage program would be as follows:

1. More drilling to delineate the orebody and expand it, if possible. Calculation of a positive ore reserve should be possible, if enough drilling is done.
2. Preliminary metallurgical testing on samples that are representative of the orebody. Work to be done at laboratory of metallurgical firm or consultant.
3. Mine a bulk sample for large scale metallurgical testing.

Cost of these steps should approach \$100,000 or more.

If the evaluation of steps 1, 2 and 3 shows that a substantial ore reserve exists that is amenable to metallurgical treatment, then the next step is advised:

4. Feasibility study by an engineering-construction firm.

The feasibility study provides a basis for evaluating potential costs and technology which would be associated with operations at Rawhide. This analysis involves a detailed calculation and checking of ore reserves, a study of the preliminary metallurgy results, design of an open pit, financial assessments pertinent to optimization of the facility, and recommendations regarding future work.

Considerations are made involving production rates, types of mining equipment to be used, blasting patterns, source of power and transmission lines, transformers and electrical gear, water sources and pipelines, plant site layout, ancilliary buildings, etc.

Usually, after selecting the type of beneficiation (mill) plant best suited to treat the ore, preliminary design work is done on the plant, such that cost estimating can be done.

The financial assessments involve all combinations of milling methods and mining production rates to either confirm the profit potential, or the lack of any profit, or the losses that might be suffered on the venture.

These projections are usually calculated on the current market price for gold (now \$115 per troy ounce), a price below the current market price, and a price above the current quotation.

The costs of a feasibility study vary widely with the amount of work that has to be done, but a \$100,000 to \$150,000 cost is not uncommon.

If the feasibility study appears to be favorable, and the necessary financing can be obtained, then steps 5 and 6, as set out below, would be logical to follow.

Regarding financing, it should be noted that if the programs outlined above develop an orebody of some magnetude, a major mining company might seek to buy the property, or arrange a partnership deal.

5. Design the plant and pit.  
Procure the management and technical staff.  
Seek bids for construction.  
Letting of contract.  
Ordering of mining and milling equipment.
6. Construction of mill.  
Delivery of equipment.  
Build up of necessary man power.  
Pre-production mine work.  
Construction of trailer park for personnel.  
Construction of power line.  
Drilling of water wells.  
Construction of water pipeline.
7. Production. Gradual buildup of ore production to rated capacity of the metallurgical plant.

#### GOLD HEAP LEACHING

If the efforts put forth on exploration develop an orebody, which would probably be of a low-grade character, I would envision the ore being treated as a heap leach operation, with the gold and silver being recovered through adsorption on activated charcoal. The preliminary metallurgical test work should show whether this method of treatment can be used on this ore. This process has been perfected in recent years by the U. S. Bureau of Mines, and is currently in use to recover values from low-grade ores at several properties located throughout the western United States.

Briefly described, the process of heap leaching involves putting mined ore, which has been crushed, onto an impervious pad or base to form a heap or a stack. A dilute cyanide-lime solution is then distributed over the surface of the heap, subsequently collected and circulated through vessels containing activated charcoal. The gold which has been dissolved out of the heap by the cyanide solution is then recovered on the activated charcoal. To effectively leach or remove the gold from the ore may require the recycling of the dilute cyanide solution for weeks or even months.

This method of treatment is a simple process and requires relatively low capital investment.

## ESTIMATED EARNINGS PROJECTIONS

For the purpose of developing a cash flow picture, let us assume that exploration efforts are successful in developing a low-grade ore reserve of 5,000,000 tons of open pit ore grading .06 oz. /ton gold based on a cut-off grade of .03 oz. /ton. To this reserve, let us say an additional 3,000,000 tons of rock must be stripped or removed as internal waste to mine the ore and maintain a proper pit configuration.

Current direct leaching plant costs are estimated at \$2.00 per ton for a 1,000,000-ton per year mining operation. Current direct costs for efficient mining, crushing, and placing of ore on heap leach pads is running \$1.00 per ton. The estimated capital cost of a 1,000,000-ton per year plant is \$8,000,000. (Mining at 4,000 tons per day, 250 days per year equals 1,000,000 tons per year.) Capital costs of mining equipment to mine the ore and remove the waste is \$1,000,000. Total capital costs are \$9,000,000. Since I do not know at this time the exploration costs or the ultimate property purchase costs, I assume for purposes of my financial projections that there will be \$9,000,000 invested in the property which must be returned from gold sales.

To make a general over-all cash flow projection with these data, I assume that a 70% recovery of the gold in the ore can be made, about the average for a leaching operation. I also assume that the average price at which gold will be sold is \$115 per ounce, today's price. I give no credit to silver contained in the ore, assuming it will help defray refining and shipping costs.

Sales:	5,000,000 tons @ .06 @ 70% @ \$115.00		\$24,150,000
Costs:	Mine: 5,000,000 tons @ \$1. =	\$ 5,000,000	
	Leach: 5,000,000 tons @ \$2. =	10,000,000	
	Waste: 3,000,000 tons @ .75 =	<u>2,250,000</u>	<u>17,250,000</u>
	Operating Profit		\$ 6,900,000
	Less: Total Investment =	\$ 9,000,000	
	Depletion @ 15% =	<u>3,622,500</u>	<u>12,622,500</u>
	Taxable Income	(Loss)	(\$ 5,722,500)

Life of mine = 5 years. 1,000,000 x 5 = 5,000,000-ton reserve.



For purposes of comparison, let us consider a much smaller operation. Assume 400,000 tons of ore were found and proved, at a higher grade of 0.10 oz. gold per ton, the price of gold and the recovery factor remained the same. Production rate was to be 100,000 tons per year, or 400 tons per day. The cost of the treatment plant is estimated at \$800,000, and some 100,000 tons of waste were to be moved, then the cash flow would be:

Sales:	400,000 tons @ .10 @ .70 @ \$115.	=	\$3,220,000
Costs:	Mine: 400,000 tons @ \$2.50	=	\$1,000,000
	Waste: 100,000 tons @ 1.00	=	100,000
	Leach: 400,000 tons @ 3.40	=	<u>1,360,000</u>
			<u>2,460,000</u>
	Operating Profit		\$ 760,000
	Less: Total Investment	\$800,000	
	Depletion @ 15%	483,000	<u>1,283,000</u>
	Taxable Income	(Loss)	(-\$523,000)

Life of mine = 4 years @ 100,000 tons per year.

The above income forecasts based on two different theoretical ore reserves clearly show that a large operation, as well as a small modest one would be unprofitable at the current price of gold. Actually, the cost of the smaller plant may be understated, inasmuch as it will cost as much to develop a power supply and water source for the smaller plant as it would be for the larger plant. The water source lies 7 miles southeast of the property, as does the nearest electric power line.

These income forecasts are significant in that income is negative, in spite of procedures which will understate actual expenses. Interest on money, county taxes, property taxes, insurance, and net proceeds taxes were not included against the operating profit margin.

#### CONCLUSION:

Much work is needed to develop a positive ore reserve on which an operation can be based. At current gold prices, it is questionable that any type of operation could be a success at Rawhide.

A cautious commitment of exploration funds used under the direction of a competent geologist might develop an orebody which could be exploited, especially under a more favorable price of gold.