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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: NORTH STAR MINE

ALTERNATE NAMES:

YUMA COUNTY MILS NUMBER: 98

LOCATION: TOWNSHIP 1 S RANGE 17 W SECTION 36 QUARTER SW
LATITUDE: N 33DEG 17MIN 49SEC LONGITUDE: W 113DEG 58MIN 10SEC
TOPO MAP NAME: KOFA BUTTE - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
GOLD LODE
SILVER

BIBLIOGRAPHY:
ABM BULL. 192, P. 155
ABM BULL. 134, P. 113
ABM BULL. 137, P. 139
ABM BULL. 140, P. 104
ADMMR NORTH STAR MINE FILE
USGS BULL 620-H
USBM IC 8969, "GOLD & SILVER LEACHING", p. 16
DAHN, JERRY, ADMMR GEO FILE

JAMES V. THOMPSON
MINING AND METALLURGICAL ENGINEER
3357 MILDRED LANE
LAFAYETTE, CALIFORNIA 94549

July 12, 1990

Mr. John C. Power
Box 134
Nut Tree, California 95696

Dear John: Re: North Star Mine Tailing Project, Kofa Mountains
Southwest Arizona

I can not out of hand turn down this project. I am going to give you some comments and let you think about it for a while before we make another move. Read on, the news is not all bad.

Result of Assays

The assays averaged .101 oz/t based on 39 samples. There were a few "hot" ones and the highest was .350 oz/t. There were 30 samples out of 39 that were below the average and 9 that were above the average. This shows how a few high assays can skew the results. We can not mine selectively and we would have to take the average. Langguth reported assays of .12 to .14. This shows how amateurs do not know how to sample and always remember the high ones. The pile of pellets that the last operators made intending to put them on the leach pad assayed an average of .0846 oz/t based on 10 samples. The face of the pile last excavated by them assayed .093 oz/t an average of 10 samples. There seems to be no justification for Langguth's contention of .12 oz/t average.

Content of Pile and Condition

We hired a local engineer to determine the tons in the pile. He reported 35,000 tons plus 4000 tons that had been contaminated with coarse rock. This contamination occurred when a former operator pushed the tailings off a hillside and picked up a lot of coarse rock. What the engineer did not say was that the contaminated material is on top of the good material. There have been at least three recent past operators and they all screwed up the pile to some extent. One dug a hole in good material and filled it up with waste rock, another put down a rock pad on top of good tailings and built his plant on it. Another built a leach pile and mixed rock in it to get better flow through the leach pad (just plain stupid). The pile is so screwed up that I cut the reserves to just 35,000 tons minable.

John C. Power July 12, 1990

General Site Condition

Junk is everywhere. There have been at least three failed operations in the last five years. There is evidence that these tailings laid down in 1911 have been the site of failed operations since the 1970's. The last operation had no supervision, it was run by goof off hourly types that did not give a damn and there was no boss to jack them up. It would, however, have failed for technical reasons no matter how poor the supervision. Little of the junk on site would be of any use but there are a few tanks that might be salvaged. See photographs for general site conditions.

Economic Considerations (Hopefully the Good News)

I have made an "off the top of the head" by the "seat of the pants" Type Zero pre, pre, pre feasibility study. It is based on the 35,000 tons, grade of .101 and $350/oz gold. I would never suggest going ahead on the basis of this study. It is outlined on Tables 1 and 2 attached. When this type of study is "refined" the results generally get worse, not better. The results are summarized below.

Total expenditure, capital and operating cost	$ 896,000
Revenue, net back to the operation	1,116,000
Apparent profit before tax and royalty	220,000
Yield on funds expended in 265 days	24.55%
Total project duration	265 days
Days to break even (money back)	186 days

Risks

There are many. Water amounts to 29% of the total project cost. If the water contractor upped his price by one cent/gallon or failed to deliver the amount required on time it might wipe you out. Good labor and supervision might be hard to find-good people know that it is a temporary operation and good people are already employed. I am guessing at far too much to make decisions on a start up.

The Question

Read the tables, think about it. Do you want to refine the study remembering that the experience is often that things get worse (but not always). The next step would be the leaching test which might make for a more expensive or cheaper plant. After that a better feasibility study, to get to go-no go will take another $6500 to $7500. We, by the way, would not use the failed technology that past operations have used. If you want the details I will go over them with you.

With kind regards,

Yours truly,

James V. Thompson

Table 1

Economic Analysis at Various Production Rates

North Star Mine Tailings Project

	Case 1	Case 2	Case 3
Feed Rate	50 tpd	100 tpd	200 tpd
Make Ready Time, Days	90	90	90
Operating Time, Days	700	350	175
Total Time Elapsed, Days	790	440	265
Gross Value @ .101 oz/t @ $350/oz 35,000 tons all cases			$1,237,000
Less Mill Losses 5% of Gross			-62,000
Less Marketing Cost 5% of Recovered Value			-59,000
Net Back to the Operation			$1,116,000
Overall Management and Management Expense, $300/day	237,000	132,000	78,000
Engineering, Technical Advice Design & Procurement 50% of Management	118,000	66,000	39,000
Labor and Burden, 3 men @ $15/hr, 3 @ $10/hr burden and completion bonus @ 33% total $800/day	632,000	352,000	212,000
Power Cost, Rented Diesel Electric Set Works out at About $0.20 kwh	70,000	65,000	60,000
Parts, short time replacement	12,000	12,000	12,000
Chemicals, carbon, cyanide lime and laboratory	100,000	100,000	100,000
Water, 250 gal per ton ore $0.03/gal. delivered	263,000	263,000	263,000
Office & General Overhead 10%	16,000	12,000	8,000
Sub Total Direct Operating Cost	$1,448,000	$1,002,000	$772,000
Machinery	27,000	43,000	66,000
Installation Ex. Labor which is Included in Total Labor Above 50% of Machinery	14,000	22,000	33,000
Contingency 25% plant cost	10,000	16,000	25,000
Sub Total Plant Cost	$51,000	$81,000	$124,000
TOTAL PROJECT COST	$1,499,000	$1,083,000	$896,000
Apparent Before Tax Profit or (loss)	(383,000)	(33,000)	+ 220,000

Table 2

Cash Demand Requirements for Case 3

North Star Mine Tailings Project

First 90 Days

Management & Management Expense	$27,000
Engineering	20,000
Labor and Burden	72,000
Power Cost	5,000
Parts, Inventory Build Up	4,000
Chemicals, Inventory Build Up	10,000
Water, Minor Usage	3,000
Office & General Overhead	3,000
Plant, Complete	124,000
Sub Total end of 90 Days (no income yet)	$268,000

Production 175 Days

Management & Management Expense	51,000
Engineering	19,000
Labor and Burden	140,000
Power Cost	55,000
Parts	8,000
Chemicals	90,000
Water	260,000
Office & General Overhead	5,000
Sub Total 175 day operating period	$628,000

TOTAL PROJECT COST	$896,000

Direct Operating Cost During 175 day period	$17.90/t
Revenue during 175 day operating period	31.80/t
Operating Profit during 175 day period	13.90/t
Operating Profit per day 200 X 13.90 =	$2780.00

Days to pay off first 90 day cost
$268,000/$2,780 = 96 days

Brake even day from day one 90 + 96 = 186th day (6.2 months)
Days remaining to make $220,000 profit, 79 days (2.6 months)
Profit as a % of Total expended 220,000/896,000 = 20%
Note: Calculations assume no lag in payment for gold and are before tax.

JAMES V. THOMPSON
MINING AND METALLURGICAL ENGINEER
3357 MILDRED LANE
LAFAYETTE, CALIFORNIA 94549

April 17, 1990

Mr. Bob Langguth
300 Ambassador Dr.
Tempe, Arizona 85281

Dear Bob: Re: Proposal for Consulting Services

Attached is my proposal for helping you with your cyanide tailing leaching project in the Kofa Mountian area of south western Arizona. The suggestion at the top of page four might be the best alternate. You must realize that a study of this nature might give negative results, however the study that I have already give it would seem to point to a profitable operation but this needs to be proven and documented.

If want to retain me you might like to have further information about me. Enclosed is a detained resume. Your attention is called to items 1,6 and 7.

Thank you for contacting me.

Yours truly.

James V. Thompson

James V. Thompson

PROPOSAL FOR CONSULTING ASSISTANCE

TAILINGS RETREATMENT PROJECT

Introduction

In recent telephone conversations with you and some written information provided by you, it is my understanding that you control a deposit of old cyanide tailings in the Kofa mountian district of south western Arizona. It is my further understanding that these tailings amount to about 35,000 tons and that they contain about .15 oz/t of gold and some silver. Tests have shown that recoveries by cyanide leaching (bottle tests) can be in the mid 90s %. The tailings are unsual in that the values are in the fines where as in most cyanide tailings the values are in the coarse fraction due to not grinding enough in the original mill. The reason in this case is due to gold being released from pyrite after oxidizing for 80 years. The top size is about 28 mesh and there is 65 to 70% -200 mesh. Leaching time has been as short as one hour.

You have stated that an attempt has been made to agglomerate the tailings with portland cement (some lime and cyanide added?) and place them on heap leaching pads. This has been a failure due to lack of permeability. My comment to you was that it is difficult to heap leach with 100% agglomerated material and that most operators are agglomerating the natural fines from coarse (-5/8") crushed ore and adding the two products togather. There was one attempt to agglomerate 100% fines and it did not work.

Your material is a natural for slurry leaching. Heap leaching at best gives only about 70% recovery and is mostly restricted to ore containing .05 oz/t or less. Ores as high grade as your tailings, even if crushing and fine grinding were required, would be slurry leached.

Preliminary Conclusions

With insufficient study I would come to the preliminary conclusion that batch carbon-in-pulp leaching is the best approach. An alternate is decanting off a fairly clear solution and going to carbon-in-leach recovery useing the existing carbon columns presuming they are big enough. The loaded carbon can be sold to others for further treatement, but I would strongly advise study to see if on site burning, fluxing the ash and melting to dore (mixed gold and silver) bars might be prefered. This lets you keep part of the gold for sale at some future date. The plant for either alternate treatment method would be about the same but this is only a preliminary conclusion. The operation will be too small to afford carbon stripping, carbon reactivation and electolytic gold recovery. In addition this would require expensive skills that the operation could not afford. I have the strong feeling that you have the potential for a profitable project, but it will take some engineering study to prove it.

Scope of Work

I am proposing to investigate two plans for starting an operation. Plan I would involve some field investigation that would provide third party documentation as to tonnage, grade, cyanide recovery and field conditions. This would be valuable to you if you were to seek outside finance. Plan II would involve a site visit only and your information on tonnage, grade and cyanide recovery would be used. Other than the field work the two plans are alike, how, ever Plan I is obviously more expensive.

Plan I

Field Investigation

Map of the Deposit This may already exist but it need not be of a high order of accuracy. If one needs to be made it can be made in a day with a chain and brunton survey. It might be made by a photo "blowup" from existing topo maps.

Hand Auger Drilling I would suggest about 100 auger holes of 2.5" diameter. A hole could be completed in about 5 minutes, so about one day with a helper would be required. The 100 hole figure is not sacred and if only 75 holes were completed it would not matter-hold it to one day with helper. The equipment is simple and I can provide two drills.

Treatment of Cuttings In the field, make four splits of the cuttings from each hole. Split one is for fire assay for gold and silver. (Silver need not be done on all holes) Split two is for screen analysis. The test need be done on say every other hole and at 35 and 200 mesh only. It cannot be done in the field unless you have the equipment. (the equipment is cheap and you might want to aquire it) Some of the screen fractions should be assayed to determine where the gold is. Split three is for bottle tests with cyanide. There will be composits made and by no means will tests be required on all holes. Split four is for the permanent record-to be saved as long as you have an interest in the property and to be passed on if you sell out.

Assays and Test Work Third party documentation is the primary objective. The assays will be done by an assayer of your choosing. I use Sierra Mineral Analysis of Grass Valley, California or Hazen Research, Inc. of Golden, Colorado. I have no ownership or contractual agreement with either of these organizations, but I have used them for many years. The screen analysis and bottle leaching tests could be done by one or another of these organizations-I will obtain quotes from both if you so desire.

Calculation of Tonnage and Grade

Based on the map, drilling results,and assays,a manual calculation will be made. The deposit is too small for a "computer run" which in this case would be far more expensive than a manual calculation. The major objective here is third party documentation of tonnage and grade and "gross dollar recovery from the deposit". This will not be a time consuming effort.

Development of Treatment Method Flowsheet

As mentioned in the introduction, there are two choises i.e. batch leaching with carbon-in-pulp and batch leaching with solution decantation and carbon-in-leach. A flow sheet and equipment list will be developed for each method based on the bottle leaching tests. For so small an operation for such a limited life, continous methods do not seem to be justified. General arrangement sketches will be provided.

Operational Proceedures

A description of the operational proceedures for each method will be presented. Labor requirements,water and chemical requirements,power,supplies and parts will be developed. Size of operation and life of operation will be investigated for both methods. If early on, one method seems to be superior, it will be developed and the other method dropped.

Development of Capital And Operating Cost

For both methods, unless early on one method is clearly superior to the other, capital and operating costs will be developed. For a project as small as this and of such short duration (six to nine months-at most one year) it gets to be a matter of total "project costs" where there is no fine distinction between capital and operating cost except for perhaps tax matters. In any event these costs will be estimated on a life of project basis to be compared with gross revenue to be expected.

Plan II

In Plan II there is no third party documentation of tonnage, grade or recovery. All of this data is provide by you without outside confirmation. Plan II begins with "Development of Treatment Methods Flow Sheet" but would include a site visit.

Alternate Combination of Plan I and Plan II

Plan II could be carried out first. A study would be made based on your information input with out drilling and test work. If the results are good, indicating a good return, then the field work, assays and testing would be more than justified. Indeed you would want to do this work before you invested in additional plant and equipment. The cost would be some what more but if results pointed to a profitable operation it would be justified.

Cost of the Work

Table I and Table II attached give the estimated cost of the work. We will not exceed these estimates without your approval

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Frame of Time and Method of Payment

As a general rule on jobs like this I have found that the total elapsed time, is estimated task time plus 50%. This does not effect estimated total cost. On this basis Plan I would require about one month. However, because test work is involved over which I have no direct control the time might be six weeks or more. For Plan II the time would be about about one month. If everything falls into place just right these times can be shorter.

For my major client for the past 20 years I have worked on a cash advance basis rendering weekly expense accounts against the advance. I will not engage any outside laboratory with out a cash advance for the work and my minimum requirements are a cash advance against estimated out of pocket costs. I will render a weekly invoice (or statement of account) that includes fee.

On Going Services Beyond the Scope of this Proposal

If you elect to go ahead with the project I will help you locate the equiment, set it up in the field, train the operators and provide start up assistance, and ongoing help as required.

Operator training is essential, especially the "solution man". Any literate adult can be trained for the position of solution man. You must control the process. You need to keep records of tonnage treated, cyanide and lime strength and consumption, water loss, chemical loss(for the environmental people) ect.

References

Please feel free to contact the following references:

Mr. J.F Havard) Former Vice President, Kaiser
18552 Augustine Road) Engineers, Oakland California
Nevada City, CA 95959) and my last boss in Kaiser
(916) 265 5638)

Mr. Wayne Cornelius General Manager Granite Construction Co. Box 15287 Sacramento CA 95851 (916) 451 6531	For this firm I sampled the deposit supervised test work, designed the helped procure the machinery and started up the plant for recovery of byproduct gold from sand and gravel operations. I worked at 3 of their plants
Mr. John Boreta President Buttes Resources Company 3040 Post Oak Blvd Suite 300 Houston Texas 77056 (713) 627 9226	For this company I have been a consultant in mining and metallurgy for 23 years. I am on a permanent advanc basis. I have consulted for them in all kinds of mineral projects.

James V. Thompson 4/17/90

Table 1

Estimated Cost of Plan I

Time in Man Hours	Man Hours	Cost
Travel time	24	
Map of Deposit*	8	
Drilling, hand auger	8	
Calculation, tonnage & grade	8	
Flow Sheets & General arrangement sketches	8	
Equipment lists and pricing	8	
Capital & Operating Costs	16	
Evaluation and Report Preparation	24	
Contingency time	8	
Sub Total, Time	112 @ $30.00/man hr	$ 3360
Out of Pocket Expenses		
Transportation and Truck use**		510
Field supplies, sample sacks, tags, flags, ect		100
Repo, postage, communications, office supplies		100
Subsistance in the field 5 days		375
Field helper, 16 hrs @ $10/hr ***		160
Sub total out of pocket costs		$ 1245
Outside Laboratory Costs		
Assays, estimated 100 @ $15/ea		1500
Screen analysis		500
Cyanide tests		1500
Sub total, outside laboratory tests		$ 3500
General contingency		395
TOTAL, estimated for Plan I		$ 8500

Notes: * If a map exists this cost will not be involved

** I must have my truck on any field examination. It has all my field gear and tools and is a four wheel drive vehicle. I charge $0.30/mile for paved road travel and $30/day or fraction thereof for off highway use (Off highway you can drive 5 miles, blow a tire, break a spring or knock a hole in the crankcase and collect $1.50. I must collect the extra $30/day for the hazard involved)

*** If you are the field helper or can provide one, this cost will not be involved.

Table II

Estimated Cost of Plan II

Time in Man Hours	Man Hours	Cost
Travel Time and site visit	32	
Flow sheets and general arrangement sketches	8	
Equipment lists and pricing	8	
Capital and operating costs	16	
Evaluation and report preparation	24	
Contingency time	8	
Sub Total, Time	96 @ $30/man hr	$ 2880
Out of Pocket Expenses		
Transportation and truck use (see note on Table I)		510
Repo, postage, communication, office supplies		100
Subsistance in the field 3½ days		262
Sub Total, Out of pocket costs		$ 872
General Contingency		248
TOTAL estimated for Plan II		$ 4000

GROUNDWATER CONDITIONS AND POTENTIAL WATER WELL SITES FOR THE NORTH STAR MINE, YUMA COUNTY, ARIZONA

At the request of Mr. James M. Greenberg, President, Nevada Mining and Research, Inc., a study was made to determine the groundwater potential near the North Star Mine in April, 1982.

Scope of Work

The study consisted of literature research, collection and study of existing and historical water well data, and study of geologic and topographic maps and aerial photographs of the Kofa Mountains and the mine area, and a day in the field to identify existing and potential well sites.

The conclusions and recommendations are discussed, with supporting information on the geohydrologic conditions of the area. Selected sites and other pertinent information are are shown on the attached map.

Conclusions and Recommendations

There is no "true" groundwater reservoir in the alluvium in the shallow basins in the North Star and King of Arizona area. The unconsolidated deposits are of limited extent and depth. Existing wells record depths to bedrock of less than 50 feet, and water levels well below 50 feet. Consequently, the groundwater supply in this area is limited; subsurface water is infiltrating through fractures and other discontinuities in the metamorphosed sedimentary rocks underlying the alluvium. Transmission of water may be good near the rocks' surface, but with depth it decreases, as the openings become tighter and fewer.

In addition, the schists and metasediments are intruded by high-angle quartz-monzonite dikes, which help to retard groundwater flow on the upstream side. These probably control formation of local "reservoirs" for the infiltrating water, which could yield water to wells at rates of 5 to 20 gallons

per minute. The volume of available water in these deposits is controlled by the dikes, and may be limited severely. The quantities are not calculable, even with test pumping of the dug well.

The dikes discussed above appear to dip to the southwest, and strike parallel to the primary faulting in the area. Wells drilled upstream from these dikes could penetrate enough heavily-fractured rock to yield adequate flows for daily consumption. Two or more wells drilled at selected intervals along North Star Wash could tap enough water storage for the project. However, two conditions preclude utilization of this method: 1) existing land status and patents along North Star Wash impose severe restrictions on site locations; and 2) the accurate location of major dike occurences is hindered by their burial under alluvium.

Southwest of the mines, North Star Wash flows onto the surface of a pediment overlying Cretaceous volcanics. Drainage from a major canyon west of the property converges with North Star Wash below an alluvial fan that extends to within one mile of the old North Star wells 3 miles below the property. This well site appears to be located over the downthrown side of a major fault that originally influenced the formation of the basin known as King Valley. The valley fill in this area may be 500 to more than 1000 feet thick. Its potential for groundwater accumulation is much better than the area previously cited. There are few records of repute on the North Star wells, and none of them definitively describe their original depth or water levels. However it has been recorded that the wells were used for the mine, and depth was reprted to be more than 1000 feet.

The Kofa well sites, 2½ miles south of the North Star wells, are located near the axis of the valley. Because of the valley's relatively steep gradient, and its possible continuity with the Gila River 35 miles downstream, the water table may as deep as 1000 feet. Several documents cite the fact that the wells were drilled to 1000+ foot depths. One report stated the water level was at 1060 feet. However, the writer was citing unverified reports. It is inconclus-

ive as to wheth they refer to total depth depth to the water table . If hydrologic continuity with the Gila River is assumed, it seems more likely the water table would be located at a depth of 500 to 600 feet.

It is recommended tha a well be drilled at the old North Star Well sites. The well's depth should be planned for 1200 feet, to tap the major aquifer in King Valley. It is anticipated that the valley fill will be quite deep. However, if the well penetrates bedrock, and the driller confirms that it is impermeable; if the bedrock is at shallow depth and the overlying alluvium is dry, drilling should be terminated and the site should be moved to the old Kofa well sites, 2½ miles south.

If the driller confirms that there is water above bedrock at the North Star well site, a pump test should be conducted to accurately determine drawdown and yield of the well. In addition, periodic cuttings and a detailed well log should be ordered of the driller.

As of the date of this report, arrangements were being made to employ someone to investigate the condition of the Number Two shaft at the North Star Mine, and the presence of water in the mine below the 1830-foot elevation (which is, incidently, above the elevation of the dug well). If the shaft can be sounded to full depth, and if water is present, the potential for enough water to start and sustain the project for some time exists, provided additional wells can be located in North Star Wash to supplement the mine dewatering. It is this writer's opinion that there is not enough groundwater storage in the small basin near the mine to sustain the project, without use of the mine's storage, also. Tests on the dug well may show an adequate flow to provide 8000 to 9000 gallons per day, but storage limitations will affect it adversely after a period of time, probably 2 to 3 months.

Location and General Geohydrologic Condition

The North Star Mine is in the Kofa Mining District, at the foot of a steep escarpment on the southwest margin of the Kofa (or S.H.) Mountains in south central Yuma County. The property is situated in Section 36, T. 1 S., R. 17 W.,

Geologically, the Kofa Mountains in this area consist of deposits of Tertiary rhyolites, andesites, flows and tuffs, rising to heights of 2500 feet above King Valley, to the southwest. The deposits dip gently to the northeast. Extensive and complex faulting have exposed steep wall-like faces on the southwest slopes, with deeply incised canyons. A local outcrop of Mesozoic metasediments is exposed below the southwest escarpment. The North Star Mine is located on a faulted contact between the metamorhic rocks and the overlying volcanic deposits.

The North Star property is located near the head of North Star Wash, a desert wash that flows southwest approximately 8 miles to the middle of King Valley, a large basin that drains into the Gila River, 35 miles southeast. King Valley, with its tributaries, ishydrologically typical of the Basin and Range Physiographic Province. Generally, basins are long, broad valleys defined by narrow mountain ranges of high topographic relief. The basins have one well-defined wash, with tributaries flowing from the ranges.

The flow of groundwater from the ranges is generally normal to the axis of the valley, which is typically at the lowest elevation in cross-section. Groundwater then flows parallel to the axis of the basin, with a gradient that slopes downward to the next, usually larger basin, in this case the Gila River. The local direction of groundwater movement is controlled by available thickness of permeable material and the elevations of the underlying impermeable bedrock.

Recharge of the basin's groundwater is provided by precipitation falling directly over the area and by runoff and infiltration from the Castle Dome and Kofa Mountains. Because of the steep gradients of the washes exiting the mountains, and the shallow depth of bedrock, the largest portion of precipitated char

tion of precipita[illegible]n is directed to the bas[illegible]as runoff, with very little infiltration down to the water table.

Many of the canyons flowing out onto the valley exhibit well-defined alluvial fans extending from the mountain fronts. These deposits are usually highly permeable, and conduct the groundwater most effectively. Underlying and between these fans, a shallow bedrock floor extends southwestward from the mountain. This pediment is an erosional surface typical of arid region structures. It forms an impermeable surface for the collection and flow of groundwater.

Previous reports of the area describe the presence of a major fault running along the base of the Kofas. It is exposed nea r Stagecoach Pass, and is buried by alluvium further to the southeast. The downthrown block is on the southwest and the amount of displacement determines the eventual size and shape of King Valley. A generalized cross-section through the North Star Mine property to the valley center is shown on the attached map.

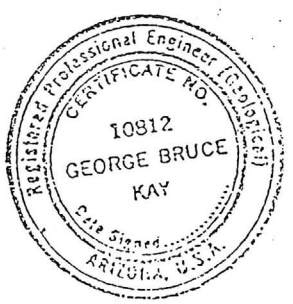
Resources

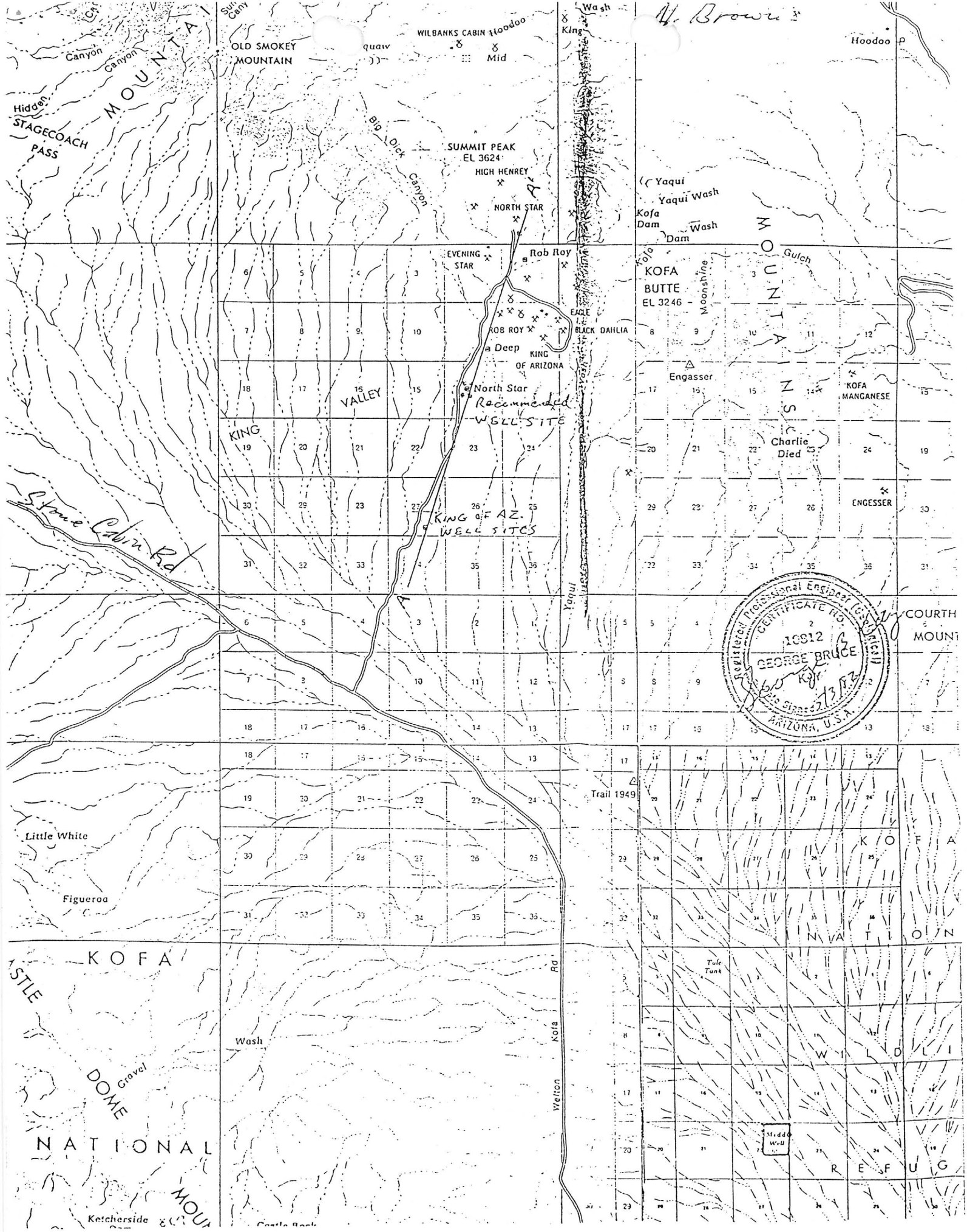
References used in the study of area and in the preparation of this report include:

1. Arizona State Dept. of Mineral Resources, Phoenix, AZ; various unpublished reports and correspondence relating to the King of Arizona and North Star Mines.
2. Jones, E.L., Jr., 1916, A reconnaissance in the Kofa Mountains, Arizona, U.S. Geological Survey Bull. 620.
3. Keith, Stanton B., Index of Mining Properties in Yuma Co., Arizona, Arizona Bureau of Geology and Mineral Technology, Bulletin 192, 1978.
4. Wilson, Eldred D., Gold Placers and Placering in Arizona, Arizona Bureau of Geology and Mineral Technology, Bulletin 168, Reprinted 1978.

Resources, (cont.)

5. Wilson, Eldred D, J.B. Cunningham, and G.M. Butler, Arizona Lode Gold Mines and Gold Mining, The Arizona Bureau of Mines, Bulletin 137, Revised 1967.
6. Wilson, Eldred D., P.T. Moore and J.R. Cooper, Geologic Map of Arizona, Arizona Bureau of Mines and U.S. Geological Survey, 1969.





N. Brown
OLD SMOKEY MOUNTAIN
WILBANKS CABIN
Hoodoo
Mid
King
Wash
Hoodoo
Canyon
Canyon
Hidden
STAGECOACH PASS
MOUNTAI
Big Dick Canyon
SUMMIT PEAK EL 3624
HIGH HENREY
NORTH STAR
Yaqui
Yaqui Wash
Kofa Dam
Wash
Dam
EVENING STAR
Rob Roy
KOFA BUTTE EL 3246
Moonshine
Gulch
EAGLE
BLACK DAHLIA
ROB ROY
Deep
KING OF ARIZONA
Engasser
KOFA MANGANESE
North Star
Recommended WELL SITE
KING
VALLEY
Charlie Died
ENGESSER
Stone Cabin Rd
KING OF AZ. WELL SITES
Yaqui
COURTH
MOUNT
Registered Professional Engineer (Geological)
CERTIFICATE NO. 10812
GEORGE BRUCE
ARIZONA, U.S.A.
Trail 1949
Little White
Figueroa
KOFA
NATION
KOFA
Tule Tank
Wash
Kofa Rd
Welton
Gravel
DOME
NATIONAL
Middle Well
REFUG
Ketcherside

Copied for [illegible] 7-19-88

NORTH STAR MINE (file)

YUMA COUNTY, ARIZONA

1986 - 1987 WORK PROGRAM

The work program conducted by Yuma Gold Mines Ltd. during 1986-1987 was in three parts. The first, an attempt to dewater, examine and sample the lower levels of the mine was not completed because of caving ground in the main shaft between the 5th and 6th levels. The rehabilitation work and supplying timber without a hoist or work deck was not feasible. In the second part a cross cut was driven on the 65 level and an underground drill station was cut to diamond drill the lower vein areas. In the third part six drill holes were planned, but only three were completed. The rock drilled very well, the core recovery was excellent, and the Boyles Bros. drill crew was first rate, but there were many drill equipment failures which more than doubled the original time and cost estimates. It is probable that a more reliable drill would have easily completed the program close to the estimated time and costs. The first two holes, on the east side of the ore zone, definitely intersected the fault - vein zone, but were not silicified or mineralized with gold. The third hole deeper and to the west intersected the same fault-vein zone and was silicified, but did not have significant gold mineralization. It is significant that this silicified core does not appear to be the fringe or boundary of a well mineralized ore shoot. It is quite "hungry" looking.

DIAMOND DRILL HOLES

DDH 1: Bearing 165 degrees, Dip -85 degrees, Depth 653 feet, Vertical Distance 491 feet, Fault - Vein intersection 493.0 feet

Sample No.	Feet	oz/t Au	oz/t Ag
48784	493' - 498'	<0.002	<0.02
48785	498' - 503'	<0.002	<0.02
48786	503' - 508'	<0.002	<0.02
48787	508' - 513'	<0.002	<0.02
48788	513' - 518'	<0.002	<0.02
48789	518' - 523'	0.006	0.02
48790	523' - 528'	0.009	0.06
48791	528' - 533'	0.013	0.05

DDH 2: Bearing 180 degrees, Dip -88 degrees, Depth 634 feet, Vertical Distance 525 feet, Fault - Vein intersection 525 feet

Sample No.	Feet	oz/t Au	oz/t Ag
48769	525' - 530'	<0.002	<0.02
48770	530' - 535'	<0.002	<0.02
48771	535' - 540'	<0.002	<0.02
48772	540' - 545'	<0.002	<0.02
48773	545' - 550'	<0.002	<0.02
48774	550' - 555'	<0.002	<0.02
48775	555' - 560'	<0.002	<0.02
48776	560' - 563'	<0.002	<0.02
48777	563' - 568'	<0.002	<0.02
48778	568' - 573'	0.016	<0.02
48779	573' - 579' (6.0')	0.047	0.04
48780	579' - 584'	0.002	0.02
48781	584' - 589'	0.006	<0.02
48782	589' - 594'	0.002	<0.02
48783	594' - 599'	0.006	<0.02

DDH 3: Bearing 275 degrees, Dip -84 degrees, Depth 685 feet, Vertical Distance 591 feet, Fault - Vein intersection 638 feet

Sample No.	Feet	oz/t Au	oz/t Ag
48792	638' - 643'	0.008	0.07
48793	643' - 648'	0.007	0.08
48794	648' - 653'	0.013	0.11
48795	653' - 658'	0.007	0.06
48796	658' - 663'	0.002	0.03
48797	663' - 668'	0.005	0.03

All drill holes were surveyed with a down the hole Eastman survey. The drill hole sites were not surveyed to tie them to the old workings or the No.2 shaft. This should be done as an angle error could change the position of the intercept enough to account for the lack of correlation in the core. The fault-vein intercept is not in question. The intercept with the "bottom" of the ore shoot is very questionable.

Exploration Work Still To Be Done:

Some basic work which was planned was not completed due to the time delays caused by expediting for the repeated drill break downs. Both the number of planned drill holes and the geology and survey work were reduced by the budget and time limitations caused by the drill down time.

1. Survey between the diamond drill holes and the No. 2 shaft on the 60 level. (a very short survey)

2. Survey between the high grade gold assays on the east end of the 2nd level (R. Mulchey, 1936; Phelps Dodge, 1986; G. B. Phelps, 1986) and the surface reverse circulation drill holes. Where the holes properly located to intercept the fault - vein and gold assay area, or does the NE fault displace the zone?

3. Map and sample the strike of the fault on and beyond the 6,000 foot strike of the claims. This was not done previously, since the work was concentrated on the established ore shoots.

4. Complete the underground work maps (make a master mylar) of R. Mulchey and G. B. Phelps.

5. The camp is in good condition. The pump and electric boxes are installed. The drill station is excellent and nearly ready to go (sump needs cleaning), so complete the other recommended drill holes after surveying to the No. 2 shaft to be certain of placement.

Gary B Phelps June 29, 1988

State License No.
10 106832-M

6/30/88

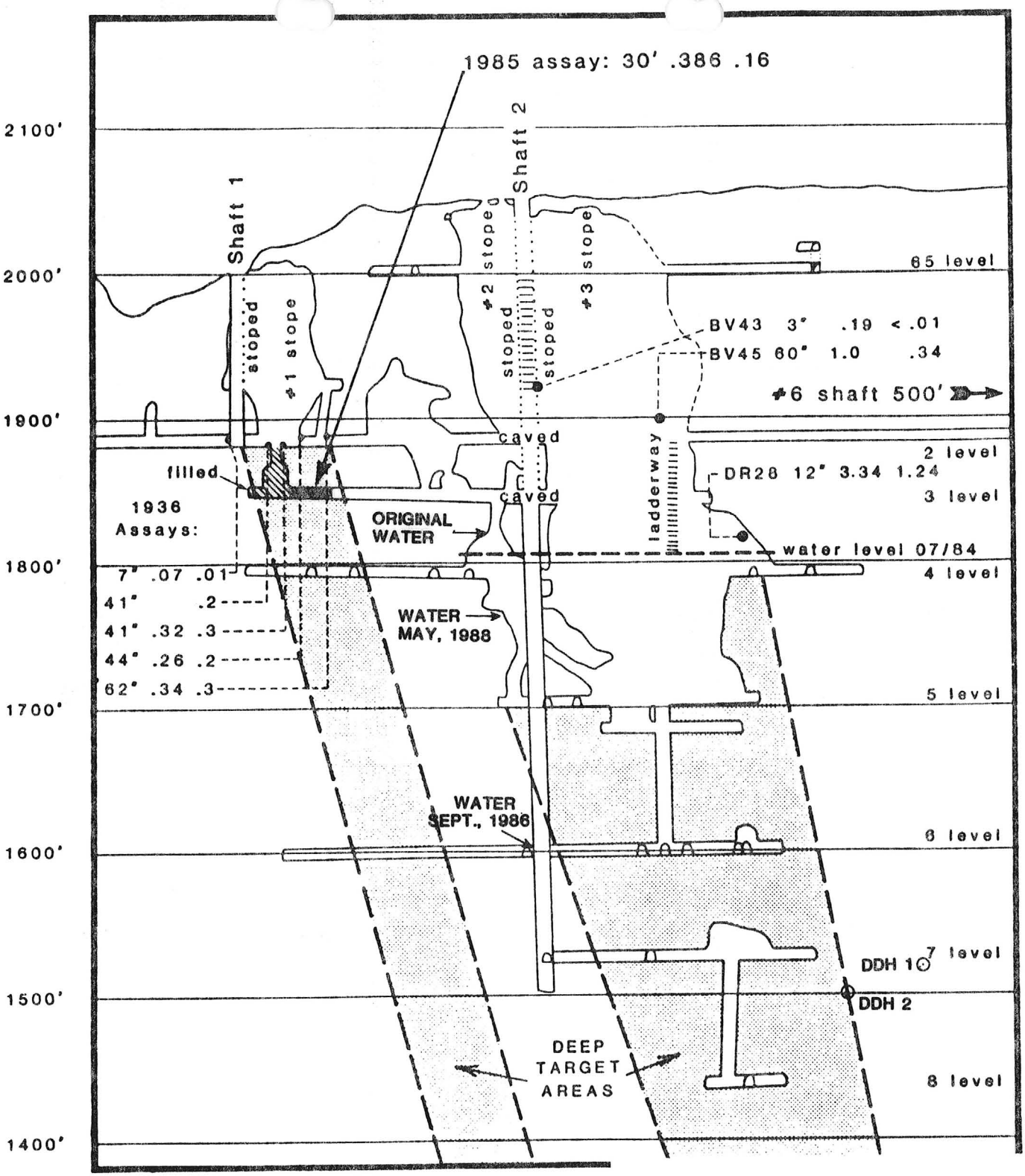
Telephone
(602) 881-7683

PMD Company

GEORGE B. PHELPS
Minerals Manager

Mailing Address
P.O. Box 13658
Tucson, Arizona 85732

Office Address
3111 East 4th St., #135
Tucson, Arizona 85716



NOTE: Main oreshoots projected to vertical plane. Plane of section E-W, looking North. Map based on 1936 tracing of 1910 data, updated 07/84.

KEY

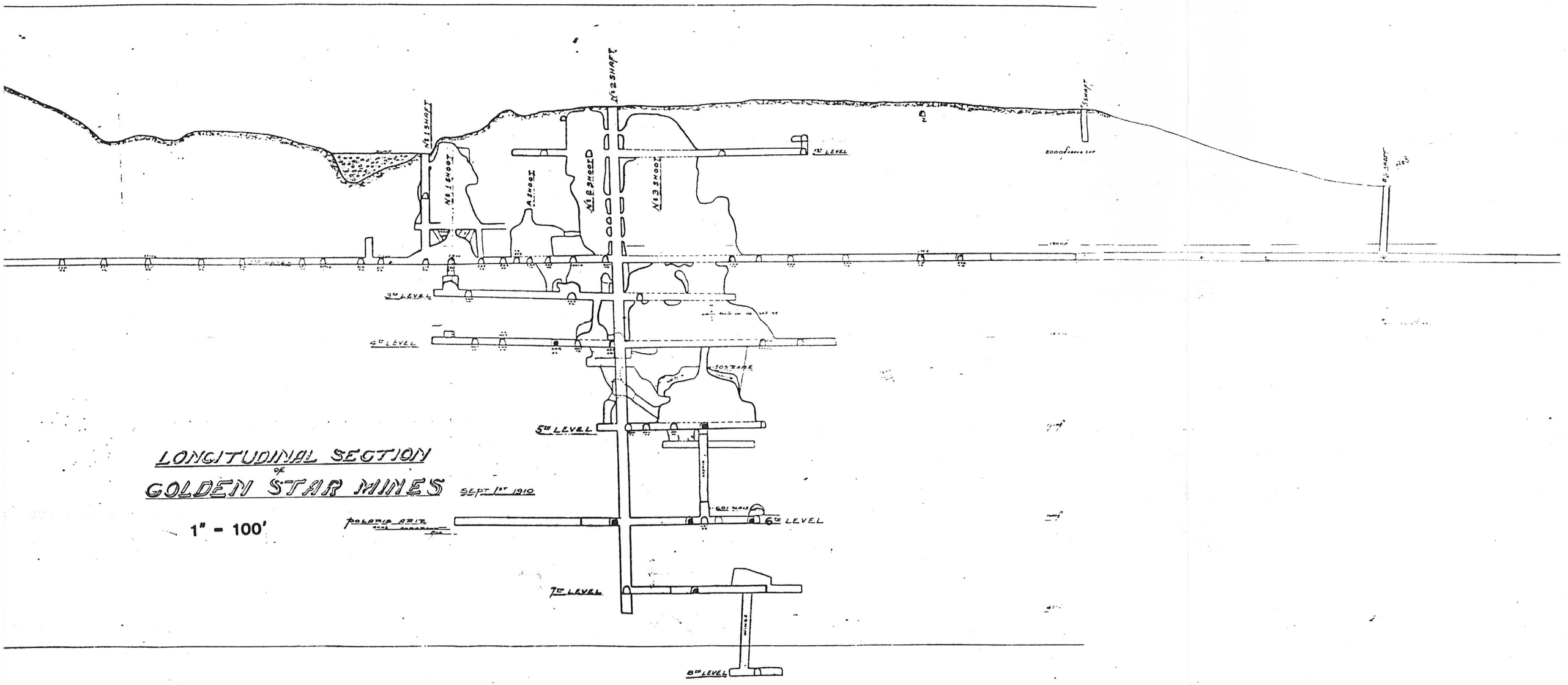
Sample # width oz Au/ton oz Ag/ton

100 ft.

Long Section

North Star Mine
Yuma Co., Arizona

11/85



LONGITUDINAL SECTION
OF
GOLDEN STAR MINES

SEPT 1st 1910

1" = 100'

Dec. 9, 1980

Robert Langguth
Phoenix, Arizona

Dear Bob:

As you are well aware, I have been involved in considerable testing on the North Star tailings for the past months. Benification studies have been made by us and others, which, for the most part, show that the tailings are not ameniable to either flotation or gravity methods of concentration.

However, considerable success has been noted with a variety of cyanide leaching techniques. Recoveries in excess of 90% seem achievable.

There are a few processing options that should be investigated prior to installing equipment. The options are primarily logistical due to the location of the tailings.

It is my opinion that the North Star is a viable mining opportunity, and prudentially approached, should be a highly profitable operation.

Respectfully submitted,

Hans W. Rasmussen

Hans W. Rasmussen

The high cost of conventinal cyanide mills (200 ton per day, 1.5 to 2 million dollars) has made it impossible for small mining companys to consider the possibility of extracting and refining their own metals. Most ore bodies or tailings are not sufficiently developed to justify the costs of such an installation.

This has prompted much research in cheaper methods of extraction. Considerable work has been done by the Bureau of Mines and others on heap leaching techniques, with recovery on carbon, and certain carbon in pulp extraction processes. These processes have proved to be very successful for certain types of ore bodies, or tailings, and the techniques are in wide use at the present time.

However, heap leaching does have some major drawbacks, primary of which is slimes. If the ore or tailings has slimes associated with it, they will have to be washed out prior to leaching the ore, or the whole of the ore will have to be treated by conventional methods. This would necessitate large tanks to achieve sufficient retention time to dissolve the values from the sand fraction, which is usually the major part of the tailings, and would negate the savings that could be made by the cheaper methods, thus, invalidating the project.

The Bureau of Mines has proposed a viable solution to the problem of slimes, which is, the cementation of tailings with cement and slime. The cyanide solution is added at the time of agglomeration. When the ore has set up sufficiently to stack, it is placed on the heap leach pad and leaching is commenced. Great care must be taken to insure that all of the slimes are agglomerated, or the pad could be ruined due to unagglomerated slimes, blocking off percolation.

This report presents an alternative method of processing that allows the processing of tailings and ore bodies with high slimes content. Further, the low capital equipment requirements allow serious consideration of tailings with as little as 2 to 3 thousand tons of material present.

It was while doing evaluations of the cenentation technique, that the idea developed; that if the slimes present the problem, why not get rid of the problem by a sand slime seperation. Further, it was assumed that any of the values carried off on the slime fraction would be very fine, and thus, would be dissolved rapidly by the cyanide solution. This definitely proved to be a valid assumption. Subsequent work has confirmed that extractions in the 85 to 90% range are achieved with as little as two hours retention time (as compared with the usual 72 hour leach).

You can appreciate the substantional reduction in tank capacity if retention time is reduced from 72 hours to 2 hours, without sacrificing metallurgical recovery.

Further, since most of the cost of a cyanide mill is in the thickening and clarification capacity, by using carbon in pulp on the slime fraction, the gold and silver laden carbon can be screened from the solution, elimination the need for thickeners and filters.

The sand fraction, after removal of the slimes, can be readily heap leached, and with the slimes removed, the solution does not have to be clarified prior to precipitation with zinc. Recoveries from the -16 mesh sand fraction have usually been in the 85 to 90% range within two weeks, some in as little as 1 week.

Thus, by making a sand slime seperation, with heap leaching of the sand fraction, and vat leaching of the slime fraction (carbon in pulp), a substantional tonnage plant can be constructed for a relative modest investment. Another most important point is that the cash flow from the project begins the first week of operation.

NORTH STAR ASSAY DATA

		GOLD	SILVER
McCarthy Samples:		0.10	
		0.15	
		0.15	
		0.14	
		0.06	
	Average	(0.120)	(0.5)
Langguth Samples:		0.120	0.80
		0.110	/
	(bulk sample)	0.150	0.85

Calculated head from screen sizeing tests:

0.158	/

Williams, Rasmussen samples. (Samples are channel cuts.)

#1.	0.115	0.34
#2.	0.220	0.38
#3.	0.130	0.08
#4.	0.070	Nil
Average	(0.134)	(0.20)

Wet screening Test:

93.21% of the Gold can be recovered in 68.31% of the weight, in the -200 mesh fraction.

24 hour cyanide leach: 93.18 % recovery of the Gold.

Pelletized heap leach: 85.18% recovery in 2 weeks.

North Star mine dump sample	0.025	Tr

(mine dumps should be sampled.)

Hand panned pyrite con	0.200	0.30

Recovery in con: 0.013 Gold, 0.020 Silver.

EQUIPMENT COSTS

SCREEN:	$4,500.00
Ore Bin:	$2,500.00
Attrition Scrubber	$11,000.00
Screw Classifier	$8,000.00
Conveyor	$3,000.00
Leach Tanks 3ea @ $3,000.00	$9,000.00
Carbon screen	$1,500.00
Carbon Adsorption unit	$9,000.00
Total	$48,500.00

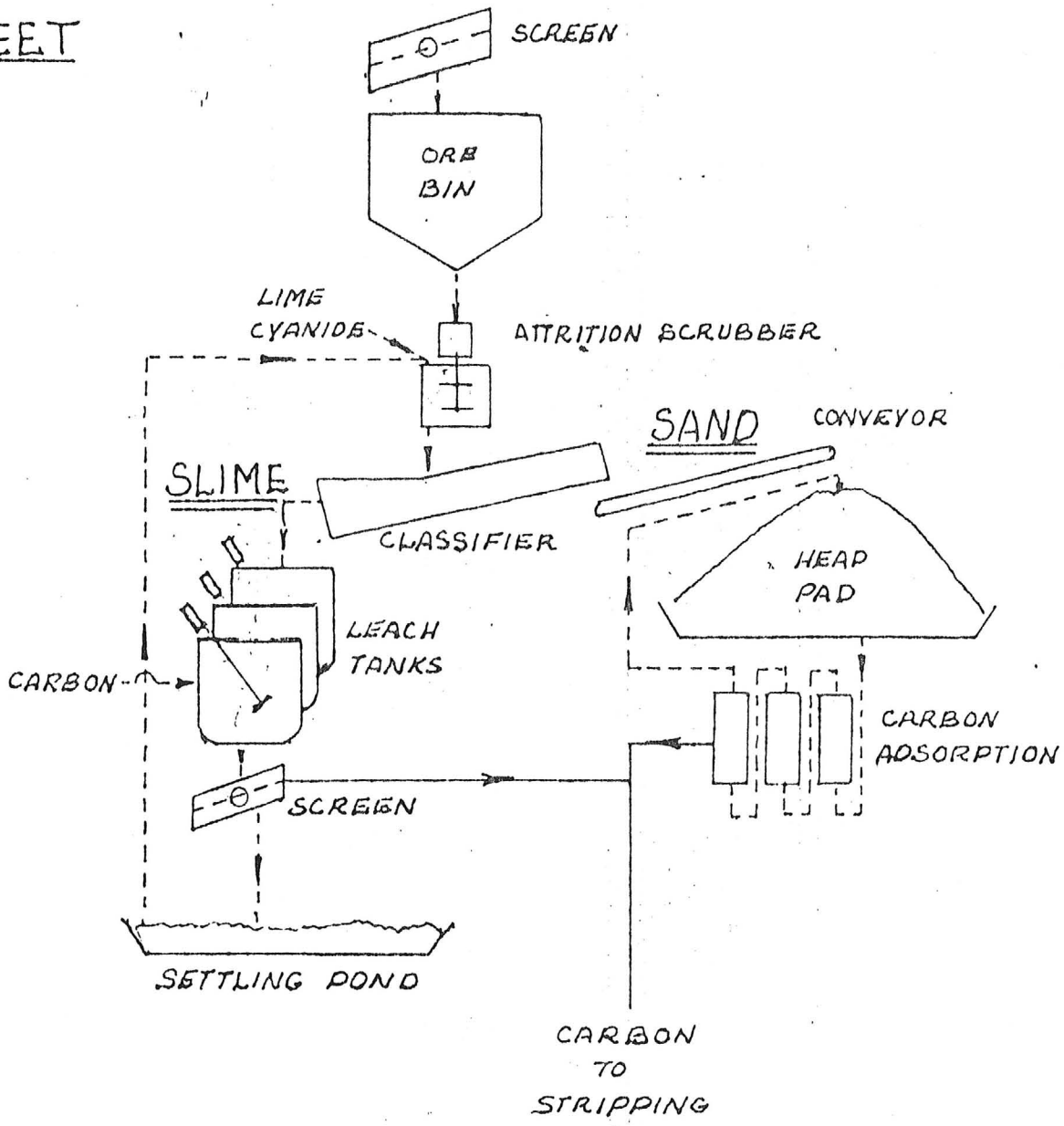
Pad Costs: $1.00 per ton for the first 5,000 tons
$0.50 per ton there after.

Pad: 20,000. ton $12,500.00

Cyanide: $0.68 per pound.

Carbon: $1.31 to $1.60 per pound.

FLOW SHEET


SCREEN
ORE BIN
LIME
CYANIDE
ATTRITION SCRUBBER
SAND
CONVEYOR
SLIME
CLASSIFIER
HEAP PAD
LEACH TANKS
CARBON
CARBON ADSORPTION
SCREEN
SETTLING POND
CARBON TO STRIPPING

A PLAN TO RECLAIM THE NORTH STAR MILL TAILINGS, YUMA COUNTY, ARIZONA

BY

DONALD P. McCARTHY, REG. GEOLOGIST
REG. PROFESSIONAL ENGINEER

JULY, 1964

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AGITATIORS	3
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OPERATING AND PLANT COSTS	4
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SUMMARY OF RETURNS AND COSTS	5
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ILLUSTRATIONS

Fig. 1. VIEW OF NORTH STAR TAILINGS . . 2

PLATE 1. MAP OF NORTH STAR MILL TAILINGS ...Inside back cover.

APPENDIX

ASSAY CERTIFICATE - GRAB SAMPLE COMPOSITE . i

ASSAY CERTIFICATE - CHANNEL SAMPLES . . ii

SUMMARY OF CYANIDE TESTS, UNIV. OF ARIZ., ARIZ. BUREAU OF MINES . . . iii

A PLAN TO RECLAIM THE NORTH STAR MILL TAILINGS

YUMA COUNTY, ARIZONA

BY

DONALD P. McCARTHY
REG. GEOLOGIST #4372, ARIZ.
REG. P.E. #2185, NEW MEX.

The North Star Mine and Mill located about 2 miles north of the King Of Arizona Mine in the Kofa District has a recorded total production of over $1 million. Mill recovery was not high and the tailings have long been known to contain good values. Re-treatment has not been done in the past due to a combination of several factors among them being a general misunderstanding of ownership of the property mistakenly considered by many to be patented. Secondly, water supply must be developed by drilling a well in the basin a few miles from the mine. And finally, re-grinding is necessary to obtain good extraction and hence a slime circuit must be provided.

This report is based upon field work coupled with information of the costs and capabilities of present-day mill equipment.

The North Star Mill Tailings located in Sec. 36 T 1 S - R 17 W, Yuma County, Arizona, consist of approximately 60,000 tons of fine, white, mill-sands. See Figure 1 and Plate 2. Samples of the dump show an average assay value of approximately $5.00 per ton in gold and silver, or a gross value of about $300,000. The dump covers an area about 750-feet long

by 250-feet wide to a depth ranging from about 2-feet to over 9½-feet as shown on Plate 1. It lies almost wholly on unpatented ground immediately south of the North Star Mine Patent. A placer mineral survey (Number 2634) was made in 1909 which included the dump however the patenting was not completed. The North Star Placer Claims were held for many years by New Star Mining Company. In May 1961 they were located by Mr. Houser, et al. of Yuma and in July 1962 were filed by Mr. Howell also of Yuma as Dottie Ann #1 and #2. In February 1964 the writer filed location notices as North Star #4 through #7 Placer in conformity with the Mineral Survey of 1909. Ownership status of the claims probably depends upon validity of former annual assessment work and is being investigated.

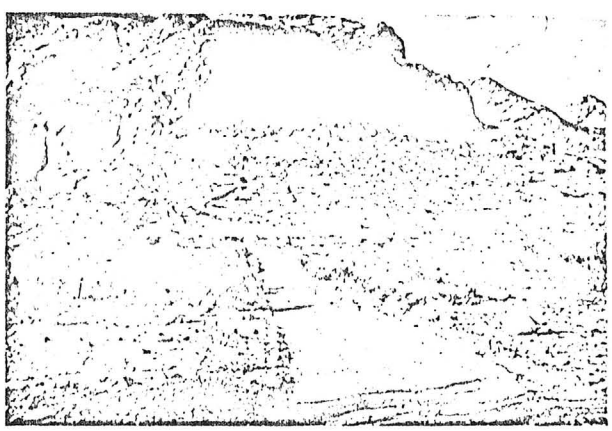

FIG. 1. View northward from a distance of about one mile from the North Star Tailings. A mine tunnel and mine dumps are visible above the white mill tailings.

Preliminary cyanide tests conducted by The Arizona Bureau of Mines, University of Arizona, Tucson on a sample of the tailings demonstrated that re-grinding and agitation are necessary for good recovery of the gold values in the tailings. See Appendix 1. The following flow-sheet which is based upon the Bureau of Mines tests should reclaim over 80% of the gold:

Tailings can be mined by loader at the rate of 100 tons per day and dumped directly into a hopper from which a conveyor leads to a ball mill. A small grizzly at the hopper is necessary to scalp out coarse rocks that might be picked up by the loader.

Grinding in a ball-mill with sufficient cyanide solution to make up a pulp of 60% solids. Discharge from the ball-mill pumped into a cyclone the underflow of which returns to the mill. The cyclone overflow is pumped to the head of a series of agitator tanks. Additional cyanide solution is added to reduce the pulp density in the agitator circuit to 30% solids. Overflow from the last agitator, to which a filter aid such as Dow Separan is added, goes to a drum or leaf-type vacuum filter. It may be necessary to re-pulp the filter cake with make-up water and put it through a second filter in order to reduce the loss of pregnant leach solution in the filter cake. The final filter cake will be conveyed to tailings dump. Dissolved gold in the solution from the first filter will be precipated with zinc. The wash solution from the final filter can be brought up to strength and added

to the circuit in the ball mill and agitators.

The planned rate of treatment of the tailings at 100 tons per day will give an operational life of between 18 months and two years. Over 6,800 ozs of gold bullion having a value of approximately $240,000.00 will be produced.

Operating and Plant Costs

The following summary of estimated operating costs is taken largely from Taggart's Handbook Of Mineral Dressing which gives cost data from many mills of comparable size:

	$/Ton
Loading and conveying to mill	.50
Grinding and Pumping	.50
Agitator Leach	.05
Filtration	.10
Tailings Disposal	.10
Zinc Precipitation	.05
Refining	.05
Total	$1.35

$1.35 per ton X 60,000 T = $81,000.00

Note: The above figures include supplies, power, labor, and maintenance.

Plant Cost Including Installation

An all-new mill including mill buildings, and full equipment to handle mine-run rather than pre-ground tailings would probably have a total present-day cost of between $70,000 and $100,000, or conceivably even more, exclusive of salvage value at the termination of operations.

However, giving consideration to the following: that this is a simple slime circuit which eliminates crushers and

thickeners; that the mild climate reduces building requirements to mere provisions for shade; and that serviceable used equipment can be obtained at a great price reduction, it is estimated that the plant cost will not exceed $50,000.00.

Cost Of Water Supply

The water required to pulp 100 tons of mill feed totals nearly 48,000 gallons. (approximately 35 Gal. per minute). Under ideal conditions, the total water loss will be only that which is in the filter cake to tails which will amount to about 2700 gallons per day or 2 gallons per minute.

The North Star area is very arid but there are two possible water sources to be considered: First, is the old Kofa Well on the Plain to the southwest a few miles. To clean out this well or to drill a new one and provide pumps and surface-laid pipe to the mill is extimated to cost $25,000.00. The second potential source of water is to purchase it from owners of a well on the Rob Roye Patented Claim about one-mile to the east of the North Star. The latter possibility would probably be more economical, however the estimate of $25,000.00 cost for water is used in this summary report.

Summary Of Returns And Costs

Total Recovery: Over 6800 ozs of bullion		=	$240,000.00
Salvage of Mill Equipment		=	12,000.00
	Total		$252,000.00
Costs: Total operating Costs	$81,000.00		
Total Plant Cost	$50,000.00		
Water	$25,000.00		
Total	$156,000.00		156,000.00
Net Return			$96,000.00

CERTIFICATE

The foregoing plan to recover the values in the North Star Mill Tailings, Yuma County, Arizona is respectfully submitted for your consideration.

Donald P. McCarthy,
B.Sc.; B.Sc.Met. Engr.

Appendix III

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

June 9, 1964
Ore Test No. 1808

Mr. Donald P. McCarthy
551 West 2nd Place
Mesa, Arizona

Dear Mr. McCarthy:

The sample of North Star tailing from Yuma County was cyanided with three different grinds and 24 and 48 hour cyanidation time.

The screen tests of different lengths of time grinds was as follows.

Mesh	Grind Time, Minutes 4 Percent weight	8 Percent weight	12 Percent weight
on 100	2.2	0.6	1.5 1.5
through 100 on 150	6.3	3.0	4.1 4.1
through 150 on 200	9.7	6.5	13.5 13.5
through 200 on 325	17.1	15.4	80.9 80.9
through 325	64.7	74.5	

The results of the cyanide tests are given in the attached tables. The tailing assays are lower on the finer grind than the coarser, and the tailings are also lower for 48 hours than for 24 hours agitation. The recoveries of gold in the tests are given in the following table:

	Test Number 1	2	3	4	5	6
Recovery of gold, %	63.6	80.2	79.2	74.5	83.5	87.1
Tailing assay oz per ton	0.04	0.02	0.02	0.03	0.02	0.015
Hours of agitation	24	24	24	48	48	48
Cyanide Consumption, Pounds per ton ore	1.8	2.1	2.2	-	-	-

The 8-minute grind 24 hour agitation cyanidation test gave a recovery of 80.2 percent of the total gold. The longer agitation did not give the additional recovery to warrent the extra time. The tailing dropped from 0.04 to 0.02 oz per ton which indicates grinding is necessary to improve recovery.

The silver value was only 0.10 oz in the tailing on test 5.

Yours very truly,

George H. Roseveare
Metallurgist

GHR/y

METALLURGICAL RESULTS OBTAINED ABOVE SHOULD BE CONSIDERED AS ONLY APPLICABLE TO MATERIAL CONFORMING TO THE CHARACTER OF THE SAMPLE UPON WHICH THE TESTS WERE MADE.

NORTH STAR(P) 98108046

152050N

Joe

Office of State Mine Inspector

705 West Wing, Capitol Building
Phoenix, Arizona 85007
602-255-5971

FEB 27 1989

NOTICE TO ARIZONA STATE MINE INSPECTOR

In compliance with Arizona Revised Statute Section 27-303*, we are submitting this written notice to the Arizona State Mine Inspector (705 West Wing, Capitol Building, Phoenix, Arizona 85007) of our intent to start/stop (please circle one) a mining operation.

COMPANY NAME NEVADA REFINING CORP

CHIEF OFFICER Ron Giles President

COMPANY ADDRESS 6080 Burnham St. Las Vegas Ne 89119

COMPANY TELEPHONE NUMBER 702-798-4842

MINE OR PLANT NAME North Star Tailings

MINE OR PLANT LOCATION (including county and nearest town, as well as directions for locating by vehicle)

Sec 36, Twp 1 South, 17 West, Yuma Co - Kofa District, North of King of Az 2 miles.

TYPE OF OPERATION Heap Leach PRINCIPAL PRODUCT Gold

STARTING DATE 3-1-89 CLOSING DATE

DURATION OF OPERATION 6 months

PERSON SENDING THIS NOTICE Robert Langguth

TITLE OF PERSON SENDING THIS NOTICE Owner

DATE NOTICE SENT TO STATE MINE INSPECTOR 2-22-89

*A.R.S. Section 27-303 NOTIFICATION TO INSPECTOR OF BEGINNING OR SUSPENDING OPERATIONS: When mining operations are commenced in any mine or when operations therein are permanently suspended, the operator shall give written notice to the inspector at his office prior to commencement or suspension of operations.

Revised 7/84

NORTH STAR MINE FILE

27.

ANACONDA MINERALS COMPANY
PROPERTY SUMMARY
AZ 537

TITLE: North Star Gold Prospect, Yuma County, Arizona.

TARGET: The North Star vein has potential for small high grade gold deposits at depth and possibly laterally from the historic workings. One or more deposits ranging from 10,000 to 50,000 tons of high grade gold ore possible. Additional small tonnages of 0.5 opt gold may exist adjacent to the old workings.

LOCATION: The prospect is in the Kofa Mountains of southwestern Arizona about 120 miles west of Phoenix.

LAND STATUS: Anaconda acquired the four patented claims that constitute the property through a lease agreement in 1983, and then subleased the property in 1984. Caprock Energy subleases the property and has an option to joint-venture and they are actively evaluating the prospect.

The four patented claims each consist of approximately 20 acres and connect end to end to include the outcropping vein. They are surrounded by the Kofa Game Refuge, which is closed to mineral entry.

GEOLOGIC SETTING: The North Star vein is a major structure separating Tertiary volcanics in the hanging wall from Mesozoic metamorphics in the footwall. The structure has been intruded by brecciated and silicified rhyolite.

Gold mineralization occurred in two distinct episodes, one predating brecciation and one postdating it. The latter mineralization was the focus of historic mining, whereas the earlier mineralization may have been stoped from a deposit that could be partially intact beneath the 500-foot deep mine workings. Small fragments of this earlier mineralization range from several ounces per ton to several percent gold and indicate that if part of the deposit still exists, it has an exceptionally high grade.

EVALUATION: Anaconda's work includes aerial photography, surface mapping and sampling; dewatering and rehabilitation of underground workings. The subleasee has rehabilitated additional workings, sampled most of the accessible workings and has planned a drilling program to commence in late May 1985.

WORK REQUIRED: None

ok to — Caprock Resources Inc.
Vancouver B.C.

No mill type

FOR OFFICE USE ONLY
START-UP NUMBER 88115055
STATE NUMBER 1016700
MSHA NUMBER _____

Joe

NOTICE TO ARIZONA STATE MINE INSPECTOR

In compliance with Arizona Revised Statute Section 27-303, we are submitting this written notice to the Arizona State Mine Inspector of our intent to start X stop ___ move ___ (please check one) a mining operation.

If this is a move, please show last location: _____
If you have not operated a mine previously in Arizona, please check here: ___ If you want the Education & Training Division to assist with your mine safety training, please check here: Yes If this operation will use Cyanide for leaching, please check here: X

COMPANY NAME: Hilbrands Bros

DIVISION: _____

MINE OR PLANT NAME: North Star ~~Mine~~ TAILINGS TELEPHONE: _____

CHIEF OFFICER: Ted or Arie Hilbrands

COMPANY ADDRESS: 21450 N. 23rd Ave Phx Az 85027

CITY: _____ STATE: _____ ZIP CODE: _____

MINE OR PLANT LOCATION: (Include county and nearest town, as well as directions for locating property by vehicle). _____

North Star Mine

TYPE OF OPERATION: Leach PRINCIPAL PRODUCT: Au

STARTING DATE: feb 23, 1988 CLOSING DATE: _____ DURATION : _____

PERSON COMPLETING NOTICE: Arie J. Hilbrands TITLE: mining Contracting

DATE NOTICE MAILED TO STATE MINE INSPECTOR: Feb 23, 1988

FORM 101-106 REV. 10/85

North Star K
Yuma Co.

Arizona Testing Laboratories

817 West Madison Street □ Phoenix, Arizona 85007 □ 602/254-6181

For: Mr. Bob Langguth
300 Ambassador Drive
Tempe, Arizona 85281

Date: 4-5-88

Lab. No.: 820701-09

Sample: Solutions

Marked: See Below

Received: 4-4-88

Submitted by: Same

REPORT OF LABORATORY TESTS

XA = OZ PER ASSAY TON RL

	GOLD
Col 1 Test	0.025 troy oz/ton N.S. TAILS COLD
Test A	0.068 N.S. TAIL W/ H REC.
Test B	0.037 "
Test C	0.041 " ONLY CY - HOT
Test D —	0.027 " ALLUVIUM W/ H REC
Test E ISOFA	0.019 BLANK
1A	0.038 BLANK
1B	0.003 "
EA-1 ED HARDING	2.83 ED Harding

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Robert J. Drake

ARIZONA DEPT. OF MINES & MINERAL RESOURCES
STATE OFFICE BUILDING
416 W. CONGRESS, ROOM 161
TUCSON, ARIZONA 85701

HANOVER FINANCIAL SERVICES, INC.

Northstar & Yuma Co.

July 8, 1987

Tuscon Citizen
Judy Lefton
4850 S Park Ave Box 26767
Tuscon, AZ 85726

Dear Ms. Lefton,

Enclosed, you will find a copy of the Investors Underground News published in Dana Point, California. On page 12 of this July issue, you will find an article on Gold and Minerals Company Inc., written by Dewey Linze, editor and publisher of the Investors Underground News.

The subject of waste disposal makes for a very topical story at this time. This recent review of Gold and Minerals "Sewer Sugar" operation is written in the colorful language Mr. Linze often uses to get and keep his reader's attention. I found this to be both informative as well as entertaining and think your readers may do the same. We would appreciate your review and use of the story in your publication in some form, complete or paraphrased.

My company, Hanover Financial Services, represents Gold and Minerals company in the area of investor relations and public relations. If I can be of any further service, please feel free to call me at (303) 499-1708 [09]. Thank you.

Sincerely,

Ronald J Blekicki
President

RJB/cjl
enclosures: a/s

ARIZONA DEPT. OF MINES & MINERAL RESOURCES
STATE OFFICE BUILDING
416 W. CONGRESS, ROOM 161
TUCSON, ARIZONA 85701

5330 Manhattan Circle, Suite D • Boulder, CO 80303 • 303/499-1708

Arizona Depa. ment of Mines and Mineral Resources

VERBAL INFORMATION SUMMARY

May be Reproduced

1. Information from: P. A. "Doc" Birdick
   Address: (card)
2. Mine: North Star
3. ADMMR Mine File Same
4. County: Yuma
5. District Kofa
6. Township _____ Range _____ Sec(s) _____
7. Location: _____
8. No. of Claims - Patented _____ Unpatented _____
9. Owner (if different from above) _____
10. Address: _____
11. Operating Company: Yuma Gold Limited (Vancouver)
12. Pertinent People and/or Firm: Terry Heard, Al Rathzluff
13. Commodities: _____
14. Operational Status: _____
15. Summary of information received, comments, etc.: _____

George Phelps is a local contact at the property. Mr. Birdick said 2 - 3 people always seem to be busy at the property.

A p ipeline has been constructed to carry water pumped from the North Star workings to a holding basin at the King of Arozna Mine for use at the King's tailings retreatment project.

Date: 11/6/86 Ken A. Phillips
(Signature)
ADMMR

Nor'e Star

DATE: January 18, 1985

TO: Mr. F. J. Menzer, Chief Geologist

FROM: J. A. Waegli, Geologist

SUBJECT: Arizona Department of Mineral Resources
List of Flux Properties

In early October, 1984, Mr. John Robertson, Ore Buyer for Phelps Dodge Corporation, requested that the Arizona Department of Mineral Resources (ADMR) compile a list of properties in the state that could produce material grading +80% SiO_2 and +1/3 O/T Au. In response, Mr. Nyal Niemuth, Mineral Resources Specialist with the ADMR, compiled a list of 16 properties (attached) that he feels are capable of producing +70% SiO_2 with $100.00 metal credits. (He stated that he did not know of any mines capable of meeting Mr. Robertson's criteria.)

November 19-21 were spent in Phoenix examining ADMR files to obtain information on each of the mines. Mr. J. E. DuHamel of Western Exploration screened their files and compiled the resulting information in a memo dated November 27 (attached). Based on his memo, pertinent reports were copied from the Western Exploration files on December 3 and 4.

The following is a listing of these 16 properties arranged in order by quad number. A brief description of each property is given, with information on current activity and a summary of past work conducted by Phelps Dodge Corporation. Recommendations based on information compiled to date are also given. Table 1 summarizes information compiled in this report.

13. NORTH STAR (Figure 5): Yuma County, T.1S., R.17W., Sec. 36, AZ 307

The North Star is a gold property, with a brecciated quartz-adularia vein that strikes east-west and dips 60°N. The vein averages 10 feet in width. According to BaSaw Khin of Western Exploration, the hanging wall is an intrusive granodiorite, and the footwall consists of shaly sediment and dacitic tuff. The gold to silver ratio is approximately 2:1. Gold reportedly occurs free and is associated with fine-grained sulfides in chalcedonic quartz (Wilson, et al, 1934).

The North Star vein was discovered in 1906 and was mined through 1911 when the ore reached an unprofitable grade. During this period, the mine produced 20,392 ounces of silver and 46,999 ounces of gold (Wilson, et al, 1934). The amount of ore mined to produce the metals is not recorded, but the cutoff grade was said to be $14/ton (0.7 O/T Au).

The mine was developed by two inclined shafts, 90 and 500 feet deep. Levels were spaced at 100-foot intervals. An adit from the footwall side of the vein connects with the first level from the No. 2 staff. Total development work is about 3,500 feet (Wilson, et al, 1934).

Recent activity at the North Star has included shipping dump rock as flux to Asarco at Hayden and attempts to cyanide leach mill tailings. According to the ADMR, a total of 65 troy ounces of gold were produced from tailings in 1984.

Anaconda acquired a lease (with purchase option ?) in late 1983 or early 1984. Anaconda, in turn, gave a lease with purchase option to Caprock Mines. Caprock can acquire the property for $900,000 in exploration expenditures and cash payments.

The property has been examined by A. G. Ruedi of Western Nuclear in 1980, J. A. Waegli in 1981, and M. R. Pawlowski in 1984. These examinations are summarized in a memo by M. R. Pawlowski dated December 3, 1984. Samples by M. R. Pawlowski around a possible 20,000-ton ore shoot ranged from no detectable gold to 0.708 O/T Au.

Caprock is currently testing this ore shoot by diamond drilling. Drilling will be monitored and core examined if possible. If the results of drilling are favorable, negotiations with Caprock will be recommended. Drilling is expected to be completed by March or April, 1985.

Northstar mine (?)
Yuma Co.

Gold and Minerals Company, Inc.
88 Steele Street, Suite 200
Denver, CO 80206
(303) 393-1111

For Immediate Press Release

December 2, 1985

Gold and Minerals Company, Inc., announced today the completion of its joint venture agreement with Fadedo, S.P.A. an Italian company, in which Fadedo, is providing a loan of three million dollars to the joint venture for the funding of three precious metals mining projects. Fadedo will retain a 50% interest in the profits of the three projects and Gold and Minerals will use the properties and equipment as security for the loan until the loan is paid off.

The first project is the Northstar tailings and the Kofu District placer project in Arizona. The equipment is in place and with an additional capital expenditure of $150,000, management expects to be producing 1,500 ounces of gold per month within 60 days and 2,000 ounces per month within the next six months.

The second project is the sludge project which will recover gold and silver plus base metals from human and industrial sludge. The budget is $600,000 for this project, which will produce approximately 1,000 ounces of gold per month. There are three western cities which are now being considered for this project.

The third project is a placer project located near Wickenburg, Arizona and has a capital budget of $950,000. It is expected to begin producing 500 ounces within the next 60 days, with an additional 1,800 ounces being produced in another 60 days. The total ounces per year for 1986 should be in excess of 60,000 ounces per year based on the exploration and testing of these three projects.

All three of these projects have had exploration and development work done on them over the past nine months. Gold and Minerals has been developing information and documentation in order to bring a financial partner into a joint venture so that Gold and Minerals can be a producing company with cash flow. Management is confident that this financing by Fadedo should accomplish this.

ARIZONA DEPT. OF MINES & MINERAL RESOURCES
STATE OFFICE BUILDING
416 W. CONGRESS, ROOM 161
TUCSON, ARIZONA 85701

The Board of Directors of Gold and Minerals and Golden Sierra Mining and Exploration has agreed to merge the two companies, but have been waiting on Gold and Minerals financing to be completed. The final details of the merger have yet to be worked out, but are expected to be completed within the next 30 days. Golden Sierra is an asset rich company with no debt and with interests in gold, silver, titanium, and other mineral properties. The merger with Gold and Minerals and its expected cash flow should be of benefit to Golden Sierra shareholders.

In addition to the three precious metals mining projects, Gold and Minerals has been negotiating to acquire a company that would require a one million dollar investment. If these negotiations are successfully completed, the balance of the Fadedo financing of the three million dollar loan would be available for this acquisition.

TECHNICAL-PAPERS AVAILABLE on refining and purifying precious metals. Easy to read instructions on how to use Aqua Regia, Nitric Acid, etc. Send self addressed stamped envelope to: McLESLIE PUBLICATIONS, P.O. Box 2185, West Covina, CA 91793.

MAY PURCHASE TAILINGS

Gold and Minerals Co. has entered into a letter of intent to purchase an interest in the Northstar tailing project in Arizona.

There are approximately 60,000 tons of tailings material left from the Old Northstar Mine, which have tested consistently at 0.15 ounces of gold per ton of dump material.

The company plans to produce more than $1 million worth of bullion within the next six months.

Gold and Minerals has assigned a 50 percent interest in the project to Golden Sierra Mining and Exploration Corp.

IF YOUR PRECIOUS METALS PROPERTY is proven with certified engineering, we can finance. Send information to: POLARIS MINERALS, 3415 Winged Foot Court, Dallas, TX 75229; (214) 357-3202.

FOR SALE: Several placer claims. Unpatented, $500 each. Early Chinese gold mining area. Associated minerals: silver, platinum, molybdenum, uranium, thorium and others. No vacation freeloaders, please. L.H., Box 257, Cascade, ID 83611. (208) 382-4142.

NEW FLUORSPAR DISCOVERY

Good traces of other values. Pegmatite formation, abundance of ore. Investors needed for exploration. Details and assays on request. Located, San Juan Co., Colo., C.T. CLARK, Box 206, Flora Vista, NM 87415. Phone: (505) 334-3461.

PROCESSING GOLD ORES Using Heap Leach-Carbon Adsorption Methods, by H. J. Heinen, D. G. Peterson, and R. E. Lindstrom, $12; "A Process for the Recovery of Gold from Activated Carbon by Leaching and Electrolysis" by J. B. Zadra, $17.50; "Process for Recovering Gold and Silver from Activated Carbon by Leaching and Electrolysis" by J. B. Zadra, A. L. Engle and H. J. Heinen, $18, all postpaid. All three $40. The above three titles were originally published by the U.S. Bureau of Mines. For complete catalog of mining equipment, metal detectors, mineralights, supplies and mining publications, send $2 (refundable) to RAYMOND J. WALLACE 5785-1 Hermosillo, Atascadero, CA 93422.

FOR SALE OR TRADE for conventional Peterbuilt 3 axle 1965 or newer: rock crusher and/or separate screening plant. (209) 966-2705.

Prospector's Advertising Service March-April 15 15 1985

Joe

NORTH STAR MICE

STATE MINE INSPECTOR

AUG 23 1984

Office of State Mine Inspector

705 West Wing, Capitol Building
Phoenix, Arizona 85007
602-255-5971

NOTICE TO ARIZONA STATE MINE INSPECTOR

In compliance with Arizona Revised Statute Section 27-303*, we are submitting this written notice to the Arizona State Mine Inspector (705 West Wing, Capitol Building, Phoenix, Arizona 85007) of our intent to start/stop (please circle one) a mining operation.

COMPANY NAME Robert L. LANGGUTH *

CHIEF OFFICER SAME

COMPANY ADDRESS 300 Ambassador Dr

COMPANY TELEPHONE NUMBER 941-0751

MINE OR PLANT NAME North STAR - Yuma Az

MINE OR PLANT LOCATION (including county and nearest town, as well as directions for locating by vehicle)

Kofa MTNS - 25 MILES EASTERLY of STONE CABIN Hwy

TYPE OF OPERATION HEAP LEACH PRINCIPAL PRODUCT GOLD
CURRENT FUNCTION IS PILOT OPERATION

STARTING DATE Sept 1, 1984 CLOSING DATE ANTICIPATED FALL 85

DURATION OF OPERATION 1 year

PERSON SENDING THIS NOTICE Robert LANGGUTH

TITLE OF PERSON SENDING THIS NOTICE OWNER - OPERATOR

DATE NOTICE SENT TO STATE MINE INSPECTOR 8-10-84

*A.R.S. Section 27-303 NOTIFICATION TO INSPECTOR OF BEGINNING OR SUSPENDING OPERATIONS: When mining operations are commenced in any mine or when operations therein are permanently suspended, the operator shall give written notice to the inspector at his office prior to commencement or suspension of operations.

* OPERATING UNDER INDEPENDANT CONTRACTOR Duane Gray d/b/a As Sundance Equipment Rental. Contractor 15 2/80 By Agreement

Responsible for compliance to ALL Federal State Regulations-

R Longwell 8-10-84

Note

I AM on your List for notice of Cyanide ANTIDOTE TRAINING - IF you CAN TRAIN AT THE MINE I ANTICIPATE THAT I CAN HAVE ~~THE~~ MINIMUM NUMBER of TRAINEES IN ATTENDANCE_

RL

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine North Star Mine

Date July 13, 1983

District Kofa - Yuma County

Engineer Nyal J. Niemuth

Subject: Telephone interview

Bob Languth reported that production has occurred at the North Star Mine. Nevada Mining and Research's operation there consists of a carbon-in-pulp plant which can process up to 180 tons/day. Feed material consists of the North Star tailings. Assay of present feed material is about .1 oz Au/ton. No grinding is being done as 60% of the material is already less than 200 mesh. Assay of tails from the plant are reported to be in the area of .001 oz Au/ton. Bob Crook, registered assayer, is in charge of the assaying and metallurgical accounting. A lab with an AA unit is on the site. Water for the operation is obtained from the Welton/Mohawk Irrigation District for 2 cents per gallon. It is trucked (6,300 gallons per trip) 68 miles to the mine site at a cost of $2.60 per ton of water. Between four and six trips are made each day. Water is stored at the mine in a 155,000 gallon pond. The site has two generators supplying electricity. Workers are being housed in two 12'x55' mobile homes.

431 C

Lop No. .....

File No. 1420 McC

Date 24 FEB 1964

CHAS. . . DIEHL
(Registered No. 682)

Arizona Assay Office

Phone ALpine 3-4001

MR. DONALD P. MC CARTHY

815 North First Street
Phoenix, Arizona
P. O. Box 1148

VALUES
Latest Quotation

1 oz. Gold.....
1 oz. Silver.....
1 lb. Copper.....
1 lb. Lead.....
1 lb. Zinc.....

THIS CERTIFIES
Samples submitted for assay contain as follows:

Short Ton ..... 2000 Lbs.
Short Ton Unit ..... 20 Lbs
Long Ton ..... 2240 Lbs.
Long Ton Unit ..... 22.4 Lbs.

MARKS	SILVER PER TON Ozs.	SILVER PER TON Tenths	VALUE PER TON	GOLD PER TON Ozs.	GOLD PER TON 100ths	VALUE PER TON	TOTAL VALUE PER TON of Gold & Silver	PERCENTAGE	REMARKS
NORTH STAR		.4	$.50		.16	$5.60	$6.10	GRAB SPL. COMPOSITE	

Charges $ 4.00

Assayer Jack Stone

ANDY CHUKA, PRINT

Appendix - 2

Shop No. 450 M
File No. 1425 McC

Date 19 March 1964

CHAS. . DIEHL
(Registered No. 682)

Arizona Assay Office

Phone ALpine 3-4001

815 North First Stree.
Phoenix, Arizona
P. O. Box 1148

MR DONALD P. McCARTHY

VALUES
Latest Quotation

1 oz. Gold.....
1 oz. Silver...$1.25.....
1 lb. Copper.....
1 lb. Lead.....
1 lb. Zinc.....

THIS CERTIFIES
Samples submitted for assay contain as follows:

Short Ton ..... 2000 Lb.
Short Ton Unit ..... 20 Lbs.
Long Ton ..... 2240 Lbs.
Long Ton Unit ..... 22.4 Lbs.

MARKS	SILVER PER TON Ozs.	SILVER PER TON Tenths	VALUE PER TON	GOLD PER TON Ozs.	GOLD PER TON 100ths	VALUE PER TON	TOTAL VALUE PER TON of Gold & Silver	PERCENTAGE	REMARKS
K A - 1 0' -	2	.1	$ 2.62	.38		$13.30	——		KING OF ARR. GRAB SPL. COMPOSITE
NS-25.5-		.5	$.62	.10		$3.50	$ 4 12		NORTH STAR TLS - CHANNEL SPL
NS 2 -5.5'-9.5'		.5	$.62	.15		$5.25	5 87		" "
NS - #3 0'-8'		.5	$.62	.15		$5.25	5 87		" "
NS - 4 0'-7½'		.5	$.62	.14		$4.90	5 52		" "
NS - 5 0'-4½'		.5	$.62	.06		$2.10	2 72		" "

REGISTERED ASSAYER
CERTIFICATE EXPIRES
JACK E. A. STONE
ARIZONA, U.S.A.

Charges $ 24.00 PAID

Assayer

ANDY CHUKA, PRINT

Appendix II

1435 SOUTH 10TH AVENUE
TUCSON, ARIZONA 85713

Jacobs Assay Office
Registered Assayers

PHONE 622-0813

Tucson, Arizona, 26 1000., 19~~79~~

Sample Submitted by Mr. L. J. Lichty Robert Langgath

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
1st Test								
"CONC"	0.32	~~	1.75					
"Tails"	0.11	~~	0.40					

*Gold Figured ~~$100.00 per~~ oz. Troy

Charges $ 42.00
Floation Test & Assaying

Very respectfully,

1435 SOUTH 10TH AVENUE
TUCSON, ARIZONA 85713

Jacobs Assay Office
Registered Assayers

PHONE 622-0813

Tucson, Arizona, 20 NOV. , 19 79

Sample Submitted by Mr. Robert Tunggoth "Screenings" wet

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore*	SILVER Ozs. per ton ore	COPPER Per Cent Wet Assay	LEAD Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
+50M	0.880	~	0.05	.769%				
-50+100	0.004	~	0.10	10.16%				
-100+200	0.002	~	0.05	26.77%				
-200M	0.220	~	5.35	68.31%				

*Gold Figured $~~100.00~~ per oz. Troy

Charges $ 51.00
Wet Screened, Dryed, Weighted, Assayed

Very respectfully,
M. A. Jacobs

1435 SOUTH 10TH AVENUE
TUCSON, ARIZONA 85713

Jacobs Assay Office
Registered Assayers

PHONE 622-0813

Sample Submitted by Mr. Robert Langgath

Tucson, Arizona, 8 Nov., 1971

"Tailings"

Sample Marked	GOLD Ozs. per ton ore	GOLD Value ~~per ton ore~~	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
"Bulk Sample"	0.150	—	0.85					
(Head Sample)								

*Gold Figured ~~$100.00 per~~ oz. Troy

Charges $ 12.00 Duplicate Assays

Very respectfully,

Mike D. Jacobs

Arizona Testing Laboratories

817 West Madison · Phoenix, Arizona 85007 · Telephone 254-6181

For Mr. Robert Langguth
300 Ambassador Drive
Tempe, Arizona 85281

Date October 19, 1979

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER	SILICA		
1721	N S Heads	0.11			67.7 %		

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean, Jr.

Registered Assayer
CERTIFICATE NO. 6258
CLAUDE EUGENE McLEAN, JR.
Date Signed 10/19/79
ARIZONA, U.S.A.

STATE OF ARIZONA
DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA 85007

March 6, 1968

TO: FRANK P. KNIGHT, Director
FROM: C.L.Hoyt , Field Engineer
Re: North Star and Rob Roy Mines - Kofa district.

Dr. P.A. Burdick (Birdick?) Drawer 1430, Yuma, Ariz., phone 783-5012, owner of the Rob Roy mine in the Kofa Mountains phoned from Yuma to say that Mr. Harold Fenix and Mr. Homer Brown are moving equipment on to the North Star mine adjoining his Rob Roy mine for the purpose of reworking the North Star tailings. The claims now held by Fenix are the North Star Nos. 4,5,6, & 7.

Equipment reported as being moved in are a 100 KW generator set, a D8 Caterpillar Tractor, 2 loaders and a 5 or 10 ton truck with rotating drum. This equipment was reported as having been moved from a property near the Vulture Mine. Fenix and Brown claim the tailings contain values of $5.00 per ton Au.

Dr. Burdick said Fenix and Brown want to get water from his well. He was advised that if he let them have water under a contract stating definite amounts and a definite termination date he would probably not endanger his rights but that he should obtain legal advice.

Data in the Mineral Resources Department files show:

Mr. Harold Fenix of Wickenburg held an option on the Bullard mine in Secs. 10 & 11, T8N R10W about 12-1/2 miles north west of Aguila, in the Pierce Mining District from 1965 to 1967. He did some drilling on the property.

An assay report by the Arizona Assay Office - July 24, 1948 labeled "North Star Tailings" shows 0.11 Oz of Ag and 0.15 Oz Au with a value of $5.25. This is in the file on the North Star Mine.

Intra-Company Correspondence

SHATTUCK DENN MINING CORPORATION

and

SUBSIDIARIES

Humboldt Office

Date March 3, 1966

TO: C.R. Sundeen

SUBJECT: NORTH STAR MINE

FROM: J. Olaf Sund

TYPE: Gold

LOCATION

This past gold producing mine is located in the Kofa District and mountain range of Yuma County. Specifically, it is at the south east corner of T-1-S and R-17-W.

HISTORY:

The North Star vein was first discovered in 1906 and mined from 1908 to 1911. It was developed by two incline shafts, 90 and 500 feet deep, and by 3500 feet of lateral development work distributed at 100 foot intervals.

REFERENCES:

"Geology and Mineral Deposits of Southern Yuma County"; Arizona Bureau of Mines, Vol. IV, No. 2, Geological Series No. 7, Bulletin No. 134, February 1933, pp 113.

"Arizona Lode Gold Mines & Gold Mining", Arizona Bureau of Mines, Vol V, No. 6, Mineral Tech Series No. 37, Bulletin No. 137, August 1934, pp 139.

GEOLOGY:

The mineralization was apparently a finely divided free gold with minor amounts of silver that is associated with very fine sulphides in quartz and silicified rock.

Thus the ore body is a silicified breccia zone in andesitic lavas and quartz veins. This zone averages some 10 feet wide but may in places bulge to nearly 20 feet. The general orientation is north 80 degrees west with a 65 degree north dip. The breccia zone supposedly represents a fault which has andesite on the hanging wall to the north and a footwall of dark calcareous shale to the south. This latter feature was not very clear during the property examination.

The silicic ore body is easily traced in surface as it crops several feet above the enclosing rocks and is discolored by a dark gossan. There are a number of apparent cross faults along the length of the ore zone at approximate strikes of north 20 degrees east and dips of 85 degrees west. The offsets are in the order of 5 to 10 feet and generally with the west side south. Slickensides and fault grooves at the east end show a 40 degree south plunge with the same relative movement.

The ore zone appears to have gradually diminished in both the east and west directions. It is not clear and could not be deduced whether the zone is actually displaced and lost by cross faulting or if it merely dissipates.

ECONOMIC CONDITIONS:

The past mining was very complete. Very little of the ore zone was left as pillars or sills. The mine extends to the 500 foot level at which point the grade apparently dropped quite drastically. Also, as noted above, the east and west extensions of the ore zones are subtly cut off. Considerable exploration with prospect pits, shafts and tunnels were dug in an apparent attempt to locate an extension of the ore zone.

The following samples were collected from the sill of the ore zone and assayed, with the following results:

Sample No.	Description	Au	Ag
12191	Breccia-20' wide-west end	Tr	Nil
12192	Same 100' east of above	Nil	Nil
12193	Westernmost stope-ore dump	Tr	Nil
12194	Breccia & qtz.-west stope	0.07	Nil
12195	Same-75' east of above	Tr	Nil
12196	Same-100' east of "94"	0.02	Nil
12197	Same-100' east of above	0.02	Nil
12198	Same-near eastern end	Tr	Nil
12199	Same-near eastern end	0.03	Nil
12200	Same-at eastern end	0.16	Nil

ECONOMIC POSSIBILITIES:

It would appear that the mine is completely exhausted. Diligent prospecting and geological work might locate an extension of the ore zone either to the east or the west. Similarly, an extensive diamond drill program to depth might locate another gold ore zone similar to the one which has been mined out. However, one must consider the problems of gold mining at the present time, together with the fact that the odds are against extending the ore zone to any degree or tonnage. Thus, this would not appear to be a suitable exploration target.

CONCLUSIONS:

It seems best not to pursue this particular property for exploration purposes despite the fact that Gibbs may himself locate an ore shoot that was missed. If so, it would probably be best exploited by himself on a small basis.

JOS/db

North Star Mine

McCORVEY, TURNER, JOHNSTONE, ADAMS & MAY
ATTORNEYS AT LAW
NINTH FLOOR MERCHANTS NATIONAL BANK BUILDING
HEMLOCK 3-5561 P. O. BOX 1070
MOBILE 6, ALABAMA

GESSNER T. McCORVEY
BEN D. TURNER
C. M. A. ROGERS (1891-1957)
C. A. L. JOHNSTONE, JR.
R. F. ADAMS
JAMES L. MAY, JR.
ALEX T. HOWARD, JR.
CHAUNCEY MOORE
J. JEPTHA HILL
CHARLES B. BAILEY, JR.

RECEIVED
MAY 12 1958
DEPT. MINERAL RESOURCES
PHOENIX, ARIZONA

May 5, 1958

Mr. Lewis A. Smith, Field Engineer
Department of Mineral Resources
State of Arizona
Mineral Building, Fairgrounds
Phoenix, Arizona

Re: North Star Mine
Kofa District, Arizona

Dear Mr. Smith:

The Merchants National Bank has asked us to reply to your letter of April 25.

The five original owners are all dead, and we give you the following information:

1. The Merchants National Bank of Mobile is Trustee for the combined Hubbard-Stevens interests, and any letter to them about it should refer to the Hubbard or Drake estate - Black Giant Mines.

2. Mrs. Helen R. Meaher is handling the Meaher estate 24% interest, but it is my opinion she would want her attorney, Mr. Sam W. Pipes, III, whose office is in the First National Bank Building, Mobile, Alabama, to handle any correspondence concerning it.

3. The J. M. Hemphill estate has been closed and one of the sons, Mr. J. Walton Hemphill of Anniston, Alabama, an attorney, is probably the one to write to concerning it.

4. Mr. J. H. Luce died very recently, and our suggestion would be that any correspondence concerning his 4% interest be addressed to his son, Mr. Dwain G. Luce, President, Central Bank, Mobile, Alabama.

Very truly yours,

RFA/an

NORTH STAR MINE

YUMA COUNTY
KOFA DISTRICT

Addendum by G. J. Duff May 22, 1951

This property has never been presented to Eagle-Picher but I do have a report by two reliable geologists that it has possibilities. Heretofore, the owners or partners have been reluctant to dispose of the property, but recent information is to the effect that it might be available through part owner, brother of Bernard Baruch.

If there is any merit to the "hedging" which some of the large base metal mining companies are doing in regard to possible increase in the price of gold, it would be well for Eagle-Picher to keep posted on this property. It lies a mile or two to the north of the King of Arizona which is potentially owned by Eagle-Picher, and the consolidation of the two properties might support a medium sized mill.

1. North Star Min
2. Yuma County, Arizona

Copy of report in Miami office

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THE EAGLE-PICHER MINING & SMELTING COMPANY
MIAMI, OKLAHOMA

INTRA-COMPANY CORRESPONDENCE

TO Grover Duff - Tucson Office DATE April 6, 1951

FROM John W. Chandler - Miami Office

SUBJECT: Exploration Work

Dear Grover:

We are presently compiling a record of all the mines and prospects which we have examined for the Company during the past 10 years.

Starting with 1940, and listing the work done by years, such as 1940, 1941, 1942, etc., we would like to have the following information tabulated:

1. Name of property
2. Location - (State and County)
3. Who it was submitted by
4. Who made the examination
5. Time spent on the examination
6. Metals involved
7. General conclusions drawn from examination
8. Remarks - Under this heading could be shown whether we have done drilling or any other work in addition to the examination. Give brief outline. If the property subsequently became a mine unit and was operated so state.

We do not have a complete file in this office on all properties examined by the Company and we will combine your report with the one being made up from our files to make the final report complete. I would appreciate it if you could put someone on this work until it is completed, sending me three copies of your tabulation.

Best regards,

Jack.

John W. Chandler.

JWC/jm

4-25-51 - Mr. Chandler will send us a list of the properties on which they have reports in their files, and we will then send him the information on the others.

GJD

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

August 30, 1948

Mr. Charles Dunning, Director
Department of Mineral Resources
Fairgrounds
Phoenix, Arizona

Dear Mr. Dunning:

The sample of North Star tailing which Mr. Manning left with the Arizona Bureau of Mines is too fine for sand cyanidation by percolation.

A screen test on the tailing gave the following results:

Mesh	Cumulative Weight, per cent	oz. gold per ton
on 65	5.6	
thru 65 on 100	14.2	
" 100 on 150	22.5	
" 150 on 200	30.0	0.08
" 200	70.00	0.135
Composite	100.0	0.118*

* Calculated

Only 30 per cent of the weight is on 200 mesh which is not great enough weight for separation of sand and slime and the cyanidation of the sand by leaching.

We would like to know the name of the party who submitted the sample for our records.

The results of the cyanidation will be out in the next few days.

Very truly yours,

G. H. Roseveare
Metallurgist

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

Cyanidation by Agitation

A sample was ground in a ball mill for 5 minutes and the pulp cyanided in a revolving bottle for 24 hours and the first solution removed and the pulp washed, then a second cyanide solution added and agitated for a second 24 hours. The results are given in the following table:

	Tons per 100 tons of heads	Oz. gold per ton	Distribution gold per cent
Heads	100.0	0.119*	100.0
First solution	160.0	0.052	69.6
Second solution	156.0	0.006	7.8
Tailing	100.0	0.027	22.6

*Calculated

The total gold recovered in 24 hours was 69.6 per cent and 48 hours was 76.4 per cent. The tailing assayed 0.027 oz. gold per ton. It was noted that pyrite was present in the original tailing. The cyanide and lime consumption were 2.8 and 3.0 pounds per ton, respectively.

Yours very truly,

G. H. Roseveare
Metallurgist

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

North Star
Yuma Co

September 10, 1948

Mr. Charles H. Dunning, Director
Department of Mineral Resources
Mineral Bldg., Fairgrounds
Phoenix, Arizona

Dear Mr. Dunning:

The sample of North Star tailing which was left by Mr. Manning with the Arizona Bureau of Mines was checked for the possibility of sand percolation and cyanidation by agitation after a light grind.

A screen test on the original tailing gave the following results:

Mesh	Cumulative weight, per cent	Oz. gold per ton
on 65	5.6	
" 100	14.2	
" 150	22.5	
" 200	30.0	0.08
thru 200	70.00	0.135
Composite	100.00	0.118*

* Calculated

The material is too fine for good cyanidation of the sands by percolation.

GHR.

No. 385 De

T1S R14W
T2S R16W Sec. 35-36
M.S. #2630

Phoenix, Arizona,
July 24, 1948.

VALUES
1 oz. Gold.....
1 oz. Silver.....
1 lb. Copper.....
1 lb. Lead.....
1 lb. Zinc.....

CHAS. A. DIEHL

Arizona Assay Office

N 5th

Phone 3-4001 — 815 North First Street — P. O. Box 1148

THIS CERTIFIES *That samples submitted for assay by* DEPARTMENT OF MINERAL RESOURCES *contain as follows per ton of 2000 lbs. Avoir.*
Mineral Building-Fairgrounds

MARKS	SILVER Ozs.	SILVER Tenths	VALUE	GOLD Ozs.	GOLD 100ths	VALUE	TOTAL VALUE of Gold & Silver	PERCENTAGE	REMARKS
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Charges $ 1.50

Assayer ARIZONA ASSAY OFFICE

COPY

REPORT ON
PRELIMINARY EXAMINATION
OF
NORTH STAR MINE
YUMA COUNTY, ARIZONA

for

WEST COAST SYNDICATE

by

ROLAND B. MULCHAY

APRIL 1936

0 0 8 4

REPORT ON PRELIMINARY EXAMINATION

NORTH STAR MINE

YUMA COUNTY, ARIZONA

INTRODUCTION

Reports of high grade gold ores at the old North Star Mine were made to Dr. L. D. Ricketts by the owners of the property, and at his request a preliminary examination was completed from April 1 to 10, 1936, inclusive. This preliminary examination had for its purpose the determination of the advisability of obtaining a formal option upon the property by the West Coast Syndicate.

Sampling and geologic mapping done during the examination was planned to check high grade samples reported by the owners from specific areas, and to endeavor to determine the geologic conditions under which the old known high grade ore shoot occurred. Mr. V. D. Perry, Chief Geologist of the Cananea Consolidated Copper Company, visited the property April 4 to 7, and summarized his views of the general geology in a letter addressed to Dr. Ricketts.

Mr. A. B. Rogers, manager of the property in 1908 was present on various days during the examination.

LOCATION AND PHYSICAL FEATURES

The North Star Mine is located in the Kofa Mining District, Yuma County, Arizona, in the southern part of the Kofa Mountains. The property is about 25 miles by fair road from the Yuma-Quartzite state highway which is graveled and well maintained. Yuma to the south is 80 miles distant from the mine, and Quartzite is 53 miles to the north. The nearest accessible rail connection is at Blaisdell, a station on the main line of the Southern Pacific Railroad, about 63 miles from the mine.

There is no timber available in the vicinity. Water for the old operation was obtained from a well drilled to a depth of 1000 feet, and located about three miles southwest of the mine and 500 feet lower in elevation. No information about the present condition of this well could be obtained; a two inch pipe-line from the well to the mine is still in place, and appears to be in fair condition.

HISTORY AND PRODUCTION

The North Star vein was discovered in 1906 by Mr. Felix Mayhew of Yuma, Arizona, and was sold in 1907 to the Golden Star Mines Company for a reported price of $350,000. A mill was constructed in 1908 in which the ore was treated by the cyanide process. After three years operation the mine and mill were shut down in August, 1911. Since that time the owners have kept a watchman at the property and no equipment has been removed. Considerable drifting and shaft sinking has been done on the property from year to year as assessment work on unpatented claims.

During the operation from 25,000 to 35,000 tons were milled. The recovered value of gold and silver is estimated as more than $1,100,000 by the Arizona Bureau of Mines, and as approximately $2,000,000 by the owners. Either figure indicates that the ore milled was very high grade.

Mr. A. B. Rogers estimated that costs during his period at the property were about $11.00 per ton, and that no ore under 0.60 ounces gold per ton was mined.

The Kofa District includes one other notable producer of gold ores known as the King of Arizona mine. This property is located two miles south of the North Star, and is reported to have produced $3,500,000 between 1897 and 1910. Approximately one million tons is said to have been mined from the surface to the eighth level.

GENERAL GEOLOGY

Ore deposits at the North Star Mine have been found along a steep dipping contact of volcanic rocks with a metamorphosed sedimentary series of probable pre-Cambrian age. This contact zone strikes approximately east and west, and dips 60 - 70° to the north. It is characterized by intense brecciation of the metamorphosed sediments which form the footwall rocks and the volcanics found in the hanging wall.

The metamorphic rocks locally exhibit schistose structure, and underground often contain considerable disseminated pyrite. The volcanic rocks are composed of andesites, fine agglomerates and rhyolites which are tilted steeply and are about parallel to the contact at the surface. A buff colored dense rhyolite found along the contact zone on the surface and the 2 level may be in-

trusive rather than a part of the volcanic series.

Quartz mineralization of several ages has formed short thick mineralized shoots within the breccia zones. These shoots die out rapidly on strike, and are characteristically weaker where they are completely within the footwall rocks. The mineralization within the shoots is composed of quartz cementing silicified brecciated volcanics and footwall series rocks, calcite, little fluorite, manganese oxide and iron oxide and little pyrite. The precious metal content is largely gold with little silver, and the high grade ore generally occurs erratically through the quartz mineralization without evident structural control. In a footwall stringer east of 2 Shaft, however, gold is definitely associated with a one inch seam of iron oxide.

Strong clay gouges parallel the mineralization and indicate post mineral movement along the contact zone. These clays form the hanging wall side of the mineralized shoots in the western part of the mine, but are well in the footwall of the mineralization in the 6 Shaft area to the east.

Three main areas of mineralization have been developed. Mineralization in the Main ore shoots around 1 and 2 Shafts, and in the Jail Tunnel shoot to the west, contains more quartz and iron oxide than the mineralized area around 6 Shaft where calcite and manganese oxide are associated with the quartz.

Dumps around 2 Shaft indicate that the last development work done from that shaft, presumably on the lower levels, was done in footwall series rocks. Water at present stands at about 15 feet below the 3 level, and there is no information available as to the geologic conditions encountered in the lower level development.

DEVELOPMENT AND SAMPLING

Development work at the North Star above the present water level is shown on the maps and sections which accompany this report. Description of work done below the water level is taken from maps supplied by the owners.

As shown on the long section of the main oreshoots stoping operations around 1 and 2 Shafts were carried on in four stopes. #1 Stope immediately east of 1 Shaft has not been worked below the 2 level. Sampling on this level indicates that for a length of 70 feet, and a width of 5.0 feet, the vein will

average 0.34 ounces gold per ton. The projection of this shoot below the 2 level has been poorly prospected on the 3, 4 and 6 levels. No information relative to this development is available, but from samples taken on the 2 level and the statements as to operating costs made by Mr. Rogers, this material would not have been ore under former conditions. If it is assumed that this ore will continue from the 2 to the 5 level, approximately 6000 tons could be expected. From the back of #1 Stope to the surface a small block of good grade ore is indicated by surface sampling; about 300 tons could be mined from this block. A small pillar at the east end of #1 Stope should produce about 200 tons of 0.34 oz. gold ore between the 2 level and the 90 foot level.

#2 and #3 Stopes are immediately west and east of 2 Shaft respectively. Ore has been mined from these stopes to the 5 level, and a small stope 50 feet long and 20 feet high was opened on the projection of this ore on the 7 level. A winze to the 8 level was driven on the further downward projection of this ore, and about 60 feet of drifting was done on the 8 level from the bottom of the winze. Scattered unlocated assays of samples from the 8 level shown by the owners indicate that some 0.50 oz. gold ore was found on that level. A verbal communication to Mr. Perry by Mr. C. B. Phillips who worked on the 8 level stated that such ore was found but that it was too low grade at the time it was developed. Projection of this oreshoot from the 5 level to the 8 level would indicate some 10,000 tons in the present development assuming a width of 5.0 feet.

Sampling along the back of #2 and #3 Stopes showed that about 300 tons of plus 0.40 oz. gold ore could be mined above these stopes to the surface. Sampling on the 65 tunnel level at the west end of #2 Stope indicated that about 300 tons could be mined in that location. Irregular hanging wall parts of the vein unstoped from the surface to above the 2 level in #2 and #3 Stopes should produce several hundred tons of fair grade ore.

A large block of unstoped ground has been left between #1 and #2 Stopes. A small stope, known as "A" Stope, was started in this block from the 2 level on footwall mineralization. This stope was carried irregularly to 50 feet above the level, and approximately 1000 tons were extracted. While no definite tonnage can be calculated in this block of ground above "A" Stope, a

considerable tonnage might be developed. Below the "A" Stope some high grade ore is exposed in an incline raise from the 3 level. About 20 feet below the 2 level in this raise bunchy quartz mineralization showed 2.09 ozs. gold per ton across a width of 1.5 feet.

The results of the preliminary sampling done during the examination indicate from the above calculations that from 2500 to 3000 tons of 0.30 - 0.40 oz. gold ore could be mined from small blocks now developed in the main ore-shoots above the water level.

The Jail tunnel mineralized zone outcrops for a length of 190 feet at the surface, and reaches a width of 25 feet. This zone is partly prospected on the Jail tunnel level, and upon the 2 level at 90 feet below the tunnel level. Mineralization on the 2 level is from 6 to 10 feet in width; samples did not show higher values than 0.04 ozs. gold per ton on this level in this area.

On the surface at the west end of the outcrop a cut across the full width of the vein showed high grade ore near the center of the mineralized width. 1.6 feet assayed 4.27 ozs. gold, and 5.4 feet next to this high grade assayed 0.24 ozs. gold per ton. Fifty feet east of this cut a small trench showed high grade values as posted upon the surface map. Assuming that this high grade ore will be continuous between these cuts and extend for ten feet on either end beyond the cuts about 11 tons per vertical foot would be produced from this shoot. The width of this ore would be 2.0 feet and the grade should average about 3.00 ozs. gold.

Samples from the Jail tunnel did not show high grade values; the best sample located directly below the most westerly high grade exposure showed 0.73 oz. gold per ton. The Jail tunnel is about 30 feet below the surface at this point, and the surface high grade may be projected downward to this area to form a triangular oreblock with the base at the surface and the apex at the tunnel level. About 175 tons of high grade ore would be produced from such a block.

A footwall stringer vein east of 2 Shaft showed scattered visible free gold associated with iron oxide. This stringer can be traced on the surface for 65 feet east of 2 Shaft and though the assay returns did not show high grade

values it can be assumed from visual inspection that some high grade ore could be gouged from this stringer vein. On the 65 level a short crosscut into the footwall at 35 feet east of 2 Shaft exposed a narrow stringer which assayed 1.27 ozs. gold per ton over a width of 0.9 feet. It is probable that this stringer is the downward projection of the narrow vein exposed at the surface 55 feet above.

Mineralization in the 6 Shaft area is very strong on the surface and at the 2 level. 75 feet below the 2 level at the 3 level the mineralization is nearly entirely within the footwall rocks, and is much weaker than on the level above. The owners reported that considerable tonnages would contain from 0.25 - 0.50 ozs. gold per ton at the 2 level, and that the gold occurred as coarse particles associated with quartz. Though all of the samples taken on the 2 level in this area contained some gold, only two of them contained appreciable amounts, namely 1.14 and 0.79 ozs. gold per ton. Of the seventeen other samples taken the highest assay was 0.11 ozs. These apparently erratic results appear to substantiate the contention the gold in this area is coarse and erratically distributed. To determine whether or not there is enough contained value in this material to form low grade gold ore it might be necessary to sample the mineralization in lots of several tons to accurately determine its gold content.

TAILINGS AND DUMPS

The tailing pile from the old milling operation was locally reported to contain 35,000 tons, and to average about 0.12 ozs. gold per ton. About half of this contained gold was said to be in soluble form because there was not thorough washing of the tailings in the filter presses.

The surface of the tailing pile is extremely irregular, and no accurate estimate of the tonnage could be made without sampling by means of bore holes. Sixteen scattered samples were taken from the tailings at points where appreciable thicknesses were exposed by erosion. A list of these samples is attached to this report. The samples indicate a gold content of plus 0.12 ounces gold per ton. There is probably not less than 25,000 tons of this material available, and there is possibly more than 30,000 tons.

Dumps from 1 and 2 Shafts are to a large extent covered with waste rock, but samples from quartz mineralization near these shafts showed 0.22 and 0.81 ozs. gold per ton respectively. The tonnage of this material which might be present in these dumps is unknown, but it is likely that there are at least several hundred tons.

From the 6 Shaft and Jail tunnel dumps about 3000 tons could be obtained. Surface sampling of these dumps indicates a grade of about 0.12 ounces gold.

SUMMARY AND CONCLUSION

Preliminary investigation of the North Star Mine has shown small tonnages of fair grade gold ore to exist around the old stopes above the water level. Sampling below the #1 Stope indicated that this oreshoot may extend below the 2 level to an unknown depth. There is some reported ore below the water level on the projection of the #3 Stope from the 5 to the 8 level.

A small high grade ore lense of gold ore is present at the surface above the Jail Tunnel, but development on the Jail tunnel level and on the 2 level appears to definitely limit this ore with depth. A small tonnage of high grade ore may be gouged from a narrow footwall vein east of 2 Shaft.

The sampling done on the surface and around the old oreshoots, and the geologic features observed in the mineralized areas demonstrate that the high grade gold oreshoots are localized within the mineralized zones without particular structural control.

If a suitable treatment process for the tailings and dumps can be worked out, a considerable profit should be made from treatment of this material. This profit could be applied toward the reopening of the lower levels of the mine and further prospecting of the strongly mineralized areas.

Speculative possibilities at the North Star rest upon the further discovery of high grade ore within the strongly mineralized zones; upon the downward projection of #3 Stope oreshoot below the 5 level; and upon the downward continuance of ore below the 2 level from #1 Stope oreshoot.

The presence of an available reserve of tailings and dumps which may show a considerable profit after treatment makes an operation to test these

speculative possibilities at the North Star attractive. Should scattered reports of ore below the 5 level in the #3 Stope area be confirmed when the mine is unwatered a successful operation would be assured.

It is therefore recommended that a formal option upon the North Star Mine be secured, and the mine unwatered for complete examination.

Respectfully submitted,

s/ Roland B. Mulchay

Inspiration, Arizona
April 25, 1936

TAILINGS

No.	Width	Oz./Ton Ag	Ozs./Ton Au
10085	1.5'	0.1	0.08
86	5.5'	0.1	0.14
87	7.5'	0.2	0.12
88	6.0'	0.3	0.26
89	7.0'	0.2	0.24
90	7.0'	0.2	0.15
91	5.5'	0.2	0.15
92	6.0'	0.2	0.17
93	3.0'	0.1	0.12
94		0.1	0.11
95	2.5'	0.1	0.10
96	1.5'	0.3	0.12
97	3.4'	0.2	0.01
98	3.8'	0.1	0.02
99	4.5'	0.1	Tr.
10100	3.0'	0.1	0.06

6/30/88

State License No.
10 106832-M

Telephone
(602) 881-7683

PMD Company

GEORGE B. PHELPS
Minerals Manager

Mailing Address
P.O. Box 13658
Tucson, Arizona 85732

Office Address
3111 East 4th St., #135
Tucson, Arizona 85716

No. 385 De

T1S R19W Sec. 35-36
T2S R16W
M.S. #2630

Phoenix, Arizona,
July 24, 1948.

VALUES
1 oz. Gold.....
1 oz. Silver.....
1 lb. Copper.....
1 lb. Lead.....
1 lb. Zinc.....

CHAS. A. DIEHL

Arizona Assay Office

N 5th

Phone 3-4001 — 815 North First Street — P. O. Box 1148

THIS CERTIFIES *That samples submitted for assay by* DEPARTMENT OF MINERAL RESOURCES *contain as follows per ton of 2000 lbs. Avoir.*
Mineral Building-Fairgrounds

MARKS	SILVER Ozs.	SILVER Tenths	VALUE	GOLD Ozs.	GOLD 100ths	VALUE	TOTAL VALUE of Gold & Silver	PERCENTAGE	REMARKS
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Charges $ 1.50

Assayer ARIZONA ASSAY OFFICE

COPY

REPORT ON
PRELIMINARY EXAMINATION
OF
NORTH STAR MINE
YUMA COUNTY, ARIZONA

for

WEST COAST SYNDICATE

by

ROLAND B. MULCHAY

APRIL 1936

0084

REPORT ON PRELIMINARY EXAMINATION

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YUMA COUNTY, ARIZONA

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Development work at the North Star above the present water level is shown on the maps and sections which accompany this report. Description of work done below the water level is taken from maps supplied by the owners.

As shown on the long section of the main oreshoots stoping operations around 1 and 2 Shafts were carried on in four stopes. #1 Stope immediately east of 1 Shaft has not been worked below the 2 level. Sampling on this level indicates that for a length of 70 feet, and a width of 5.0 feet, the vein will

average 0.34 ounces gold per ton. The projection of this shoot below the 2 level has been poorly prospected on the 3, 4 and 6 levels. No information relative to this development is available, but from samples taken on the 2 level and the statements as to operating costs made by Mr. Rogers, this material would not have been ore under former conditions. If it is assumed that this ore will continue from the 2 to the 5 level, approximately 6000 tons could be expected. From the back of #1 Stope to the surface a small block of good grade ore is indicated by surface sampling; about 300 tons could be mined from this block. A small pillar at the east end of #1 Stope should produce about 200 tons of 0.34 oz. gold ore between the 2 level and the 90 foot level.

#2 and #3 Stopes are immediately west and east of 2 Shaft respectively. Ore has been mined from these stopes to the 5 level, and a small stope 50 feet long and 20 feet high was opened on the projection of this ore on the 7 level. A winze to the 8 level was driven on the further downward projection of this ore, and about 60 feet of drifting was done on the 8 level from the bottom of the winze. Scattered unlocated assays of samples from the 8 level shown by the owners indicate that some 0.50 oz. gold ore was found on that level. A verbal communication to Mr. Perry by Mr. C. B. Phillips who worked on the 8 level stated that such ore was found but that it was too low grade at the time it was developed. Projection of this oreshoot from the 5 level to the 8 level would indicate some 10,000 tons in the present development assuming a width of 5.0 feet.

Sampling along the back of #2 and #3 Stopes showed that about 300 tons of plus 0.40 oz. gold ore could be mined above these stopes to the surface. Sampling on the 65 tunnel level at the west end of #2 Stope indicated that about 300 tons could be mined in that location. Irregular hanging wall parts of the vein unstoped from the surface to above the 2 level in #2 and #3 Stopes should produce several hundred tons of fair grade ore.

A large block of unstoped ground has been left between #1 and #2 Stopes. A small stope, known as "A" Stope, was started in this block from the 2 level on footwall mineralization. This stope was carried irregularly to 50 feet above the level, and approximately 1000 tons were extracted. While no definite tonnage can be calculated in this block of ground above "A" Stope, a

considerable tonnage might be developed. Below the "A" Stope some high grade ore is exposed in an incline raise from the 3 level. About 20 feet below the 2 level in this raise bunchy quartz mineralization showed 2.09 ozs. gold per ton across a width of 1.5 feet.

The results of the preliminary sampling done during the examination indicate from the above calculations that from 2500 to 3000 tons of 0.30 - 0.40 oz. gold ore could be mined from small blocks now developed in the main ore-shoots above the water level.

The Jail tunnel mineralized zone outcrops for a length of 190 feet at the surface, and reaches a width of 25 feet. This zone is partly prospected on the Jail tunnel level, and upon the 2 level at 90 feet below the tunnel level. Mineralization on the 2 level is from 6 to 10 feet in width; samples did not show higher values than 0.04 ozs. gold per ton on this level in this area.

On the surface at the west end of the outcrop a cut across the full width of the vein showed high grade ore near the center of the mineralized width. 1.8 feet assayed 4.27 ozs. gold, and 5.4 feet next to this high grade assayed 0.24 ozs. gold per ton. Fifty feet east of this cut a small trench showed high grade values as posted upon the surface map. Assuming that this high grade ore will be continuous between these cuts and extend for ten feet on either end beyond the cuts about 11 tons per vertical foot would be produced from this shoot. The width of this ore would be 2.0 feet and the grade should average about 3.00 ozs. gold.

Samples from the Jail tunnel did not show high grade values; the best sample located directly below the most westerly high grade exposure showed 0.73 oz. gold per ton. The Jail tunnel is about 30 feet below the surface at this point, and the surface high grade may be projected downward to this area to form a triangular oreblock with the base at the surface and the apex at the tunnel level. About 175 tons of high grade ore would be produced from such a block.

A footwall stringer vein east of 2 Shaft showed scattered visible free gold associated with iron oxide. This stringer can be traced on the surface for 65 feet east of 2 Shaft and though the assay returns did not show high grade

values it can be assumed from visual inspection that some high grade ore could be gouged from this stringer vein. On the 65 level a short crosscut into the footwall at 35 feet east of 2 Shaft exposed a narrow stringer which assayed 1.27 ozs. gold per ton over a width of 0.9 feet. It is probable that this stringer is the downward projection of the narrow vein exposed at the surface 55 feet above.

Mineralization in the 6 Shaft area is very strong on the surface and at the 2 level. 75 feet below the 2 level at the 3 level the mineralization is nearly entirely within the footwall rocks, and is much weaker than on the level above. The owners reported that considerable tonnages would contain from 0.25 - 0.50 ozs. gold per ton at the 2 level, and that the gold occurred as coarse particles associated with quartz. Though all of the samples taken on the 2 level in this area contained some gold, only two of them contained appreciable amounts, namely 1.14 and 0.79 ozs. gold per ton. Of the seventeen other samples taken the highest assay was 0.11 ozs. These apparently erratic results appear to substantiate the contention the gold in this area is coarse and erratically distributed. To determine whether or not there is enough contained value in this material to form low grade gold ore it might be necessary to sample the mineralization in lots of several tons to accurately determine its gold content.

TAILINGS AND DUMPS

The tailing pile from the old milling operation was locally reported to contain 35,000 tons, and to average about 0.12 ozs. gold per ton. About half of this contained gold was said to be in soluble form because there was not thorough washing of the tailings in the filter presses.

The surface of the tailing pile is extremely irregular, and no accurate estimate of the tonnage could be made without sampling by means of bore holes. Sixteen scattered samples were taken from the tailings at points where appreciable thicknesses were exposed by erosion. A list of these samples is attached to this report. The samples indicate a gold content of plus 0.12 ounces gold per ton. There is probably not less than 25,000 tons of this material available, and there is possibly more than 30,000 tons.

Dumps from 1 and 2 Shafts are to a large extent covered with waste rock, but samples from quartz mineralization near these shafts showed 0.22 and 0.81 ozs. gold per ton respectively. The tonnage of this material which might be present in these dumps is unknown, but it is likely that there are at least several hundred tons.

From the 6 Shaft and Jail tunnel dumps about 3000 tons could be obtained. Surface sampling of these dumps indicates a grade of about 0.12 ounces gold.

SUMMARY AND CONCLUSION

Preliminary investigation of the North Star Mine has shown small tonnages of fair grade gold ore to exist around the old stopes above the water level. Sampling below the #1 Stope indicated that this oreshoot may extend below the 2 level to an unknown depth. There is some reported ore below the water level on the projection of the #3 Stope from the 5 to the 8 level.

A small high grade ore lense of gold ore is present at the surface above the Jail Tunnel, but development on the Jail tunnel level and on the 2 level appears to definitely limit this ore with depth. A small tonnage of high grade ore may be gouged from a narrow footwall vein east of 2 Shaft.

The sampling done on the surface and around the old oreshoots, and the geologic features observed in the mineralized areas demonstrate that the high grade gold oreshoots are localized within the mineralized zones without particular structural control.

If a suitable treatment process for the tailings and dumps can be worked out, a considerable profit should be made from treatment of this material. This profit could be applied toward the reopening of the lower levels of the mine and further prospecting of the strongly mineralized areas.

Speculative possibilities at the North Star rest upon the further discovery of high grade ore within the strongly mineralized zones; upon the downward projection of #3 Stope oreshoot below the 5 level; and upon the downward continuance of ore below the 2 level from #1 Stope oreshoot.

The presence of an available reserve of tailings and dumps which may show a considerable profit after treatment makes an operation to test these

speculative possibilities at the North Star attractive. Should scattered reports of ore below the 5 level in the #3 Stope area be confirmed when the mine is unwatered a successful operation would be assured.

It is therefore recommended that a formal option upon the North Star Mine be secured, and the mine unwatered for complete examination.

Respectfully submitted,

s/ Roland B. Mulchay

Inspiration, Arizona
April 25, 1936

TAILINGS

No.	Width	Oz./Ton Ag	Ozs./Ton Au
10085	1.5'	0.1	0.08
86	5.5'	0.1	0.14
87	7.5'	0.2	0.12
88	6.0'	0.3	0.26
89	7.0'	0.2	0.24
90	7.0'	0.2	0.15
91	5.5'	0.2	0.15
92	6.0'	0.2	0.17
93	3.0'	0.1	0.12
94		0.1	0.11
95	2.5'	0.1	0.10
96	1.5'	0.3	0.12
97	3.4'	0.2	0.01
98	3.8'	0.1	0.02
99	4.5'	0.1	Tr.
10100	3.0'	0.1	0.06

STATE OF ARIZONA
DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA 85007

March 6, 1968

TO: FRANK P. KNIGHT, Director
FROM: C.L.Hoyt, Field Engineer
Re: North Star and Rob Roy Mines - Kofa district.

Dr. P.A. Burdick (Birdick?) Drawer 1430, Yuma, Ariz., phone 783-5012, owner of the Rob Roy mine in the Kofa Mountains phoned from Yuma to say that Mr. Harold Fenix and Mr. Homer Brown are moving equipment on to the North Star mine adjoining his Rob Roy mine for the purpose of reworking the North Star tailings. The claims now held by Fenix are the North Star Nos. 4,5,6, & 7.

Equipment reported as being moved in are a 100 KW generator set, a D8 Caterpillar Tractor, 2 loaders and a 5 or 10 ton truck with rotating drum. This equipment was reported as having been moved from a property near the Vulture Mine. Fenix and Brown claim the tailings contain values of $5.00 per ton Au.

Dr. Burdick said Fenix and Brown want to get water from his well. He was advised that if he let them have water under a contract stating definite amounts and a definite termination date he would probably not endanger his rights but that he should obtain legal advice.

Data in the Mineral Resources Department files show:

Mr. Harold Fenix of Wickenburg held an option on the Bullard mine in Secs. 10 & 11, T8N R10W about 12-1/2 miles north west of Aguila, in the Pierce Mining District from 1965 to 1967. He did some drilling on the property.

An assay report by the Arizona Assay Office - July 24, 1948 labeled "North Star Tailings" shows 0.11 Oz of Ag and 0.15 Oz Au with a value of $5.25. This is in the file on the North Star Mine.

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

August 30, 1948

Mr. Charles Dunning, Director
Department of Mineral Resources
Fairgrounds
Phoenix, Arizona

Dear Mr. Dunning:

The sample of North Star tailing which Mr. Manning left with the Arizona Bureau of Mines is too fine for sand cyanidation by percolation.

A screen test on the tailing gave the following results:

Mesh	Cumulative Weight, per cent	oz. gold per ton
on 65	5.6	
thru 65 on 100	14.2	
" 100 on 150	22.5	
" 150 on 200	30.0	0.08
" 200	70.00	0.135
Composite	100.0	0.118*

* Calculated

Only 30 per cent of the weight is on 200 mesh which is not great enough weight for separation of sand and slime and the cyanidation of the sand by leaching.

We would like to know the name of the party who submitted the sample for our records.

The results of the cyanidation will be out in the next few days.

Very truly yours,

G. H. Roseveare
Metallurgist

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

Cyanidation by Agitation

A sample was ground in a ball mill for 5 minutes and the pulp cyanided in a revolving bottle for 24 hours and the first solution removed and the pulp washed, then a second cyanide solution added and agitated for a second 24 hours. The results are given in the following table:

	Tons per 100 tons of heads	Oz. gold per ton	Distribution gold per cent
Heads	100.0	0.119*	100.0
First solution	160.0	0.052	69.6
Second solution	156.0	0.006	7.8
Tailing	100.0	0.027	22.6

*Calculated

The total gold recovered in 24 hours was 69.6 per cent and 48 hours was 76.4 per cent. The tailing assayed 0.027 oz. gold per ton. It was noted that pyrite was present in the original tailing. The cyanide and lime consumption were 2.8 and 3.0 pounds per ton, respectively.

Yours very truly,

G. H. Roseveare

G. H. Roseveare
Metallurgist

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

North Star
Yuma Co

September 10, 1948

Mr. Charles H. Dunning, Director
Department of Mineral Resources
Mineral Bldg., Fairgrounds
Phoenix, Arizona

Dear Mr. Dunning:

The sample of North Star tailing which was left by Mr. Manning with the Arizona Bureau of Mines was checked for the possibility of sand percolation and cyanidation by agitation after a light grind.

A screen test on the original tailing gave the following results:

Mesh	Cumulative weight, per cent	Oz. gold per ton
on 65	5.6	
" 100	14.2	
" 150	22.5	
" 200	30.0	0.08
thru 200	70.00	0.135
Composite	100.00	0.118*

* Calculated

The material is too fine for good cyanidation of the sands by percolation.

GHR.