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12/08/93

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: GOLD BUG MINE

ALTERNATE NAMES:

MOHAVE COUNTY MILS NUMBER: 157B

LOCATION: TOWNSHIP 26 N RANGE 21 W SECTION 4 QUARTER NE
LATITUDE: N 35DEG 40MIN 33SEC LONGITUDE: W 114DEG 31MIN 52SEC
TOPO MAP NAME: MT PERKINS - 15 MIN

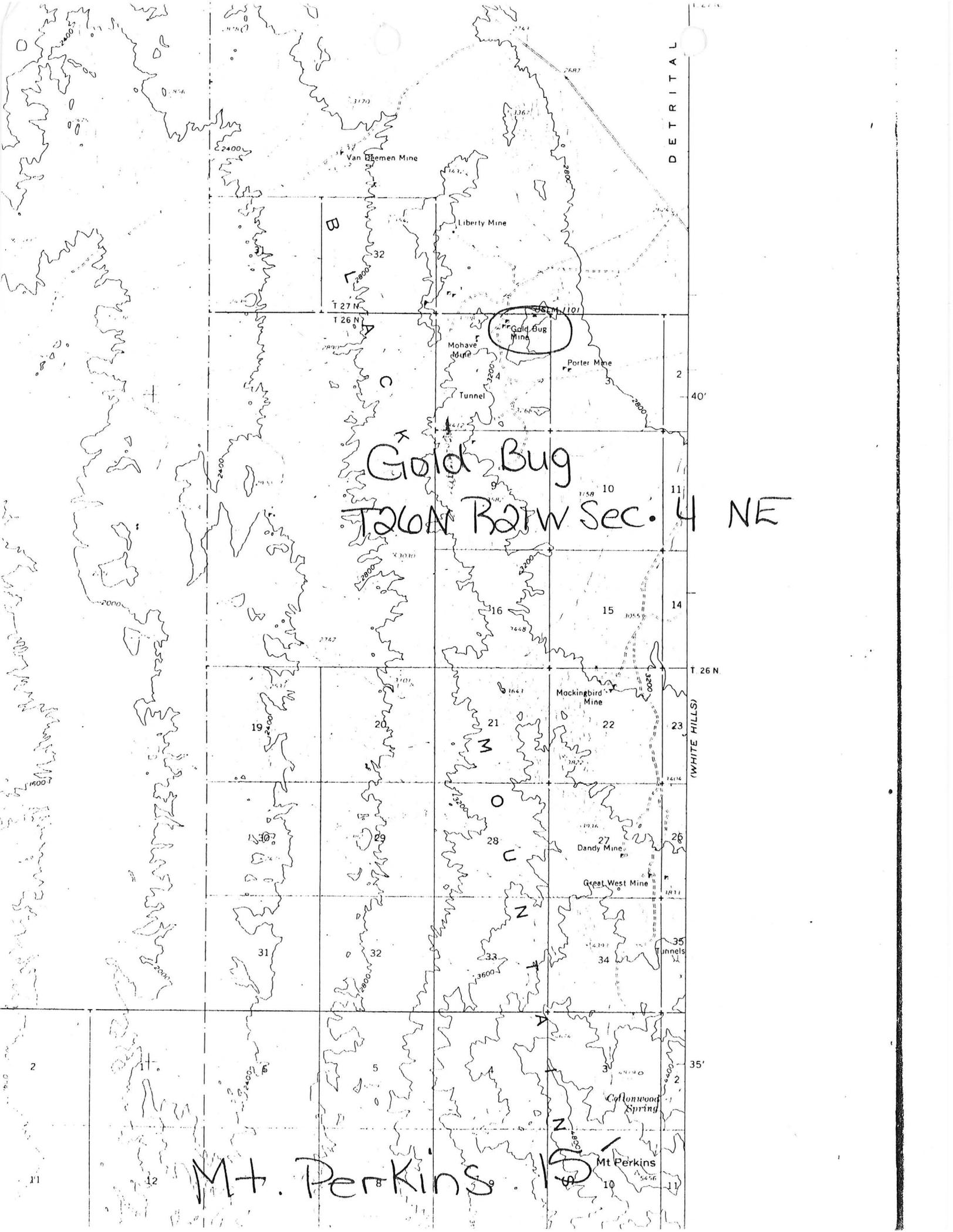
CURRENT STATUS: PAST PRODUCER

COMMODITY:

GOLD LODE
SILVER
VANADIUM MINOR ACCES

BIBLIOGRAPHY:

ADMMR GOLD BUG MINE FILE
MALACH, R. "MOHAVE CTY PLACE NAMES", P. 15
MALACH, R. "ADVENTURER-JOHN MOSS", P. 7
SCHRADER, F.C. "MIN. DSPTS OF CRBT RNGE, BLCK
MTNS, GRND WSH CLFS,AZ" USGS BULL 397, P 217
GARDNER, E.D. "GOLD MNG & MLLNG IN BLCK MTNS"
USBM IC 6901, P. 56; 1936
AZBM BULLETIN 137 P. 78
GREAT BASIN GEM JT VENTURE, VOL. 2 (ADMMR GEO
LOGY FILE)



DET RITAL

Gold Bug
T26N R21W Sec. 4 NE

WHITE HILLS

Mt. Perkins

Mt Perkins

B

T 27 N

T 26 N

C

40'

T 26 N

35'

Gold Bug

T26N R21W Sec. 4 NE

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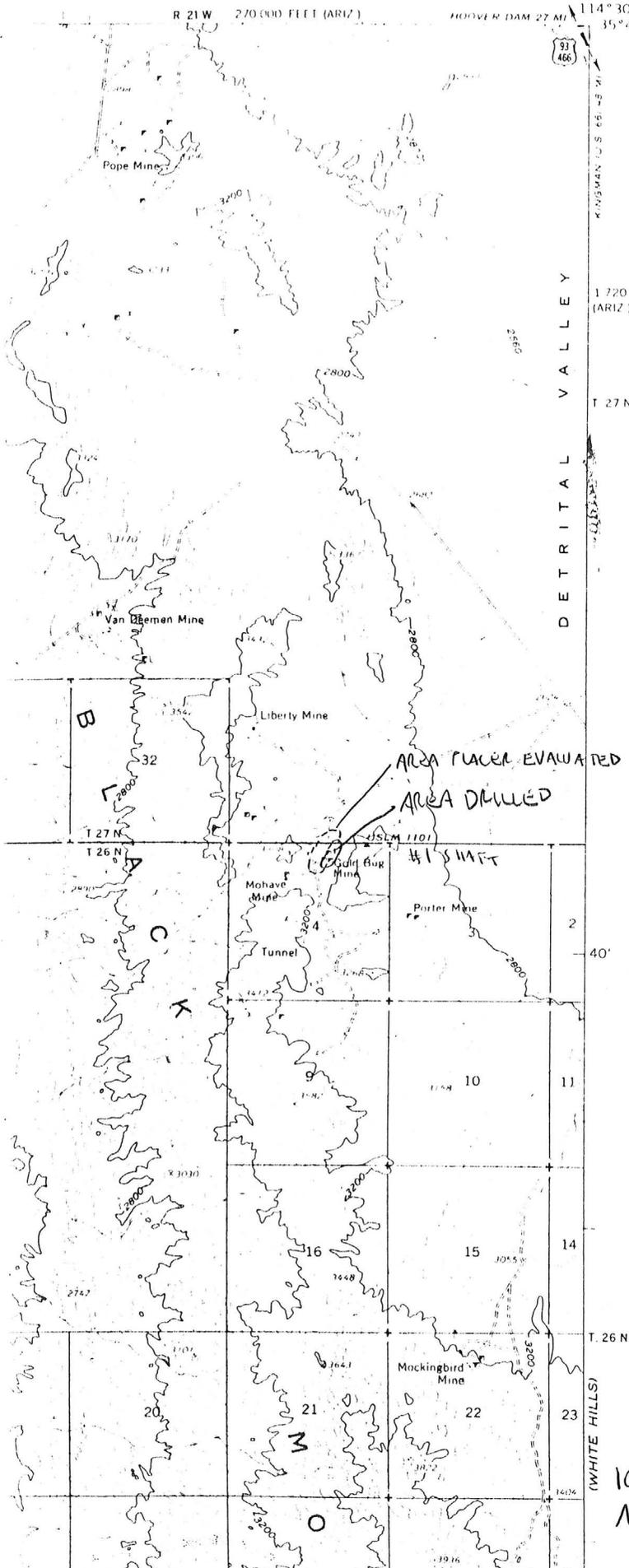
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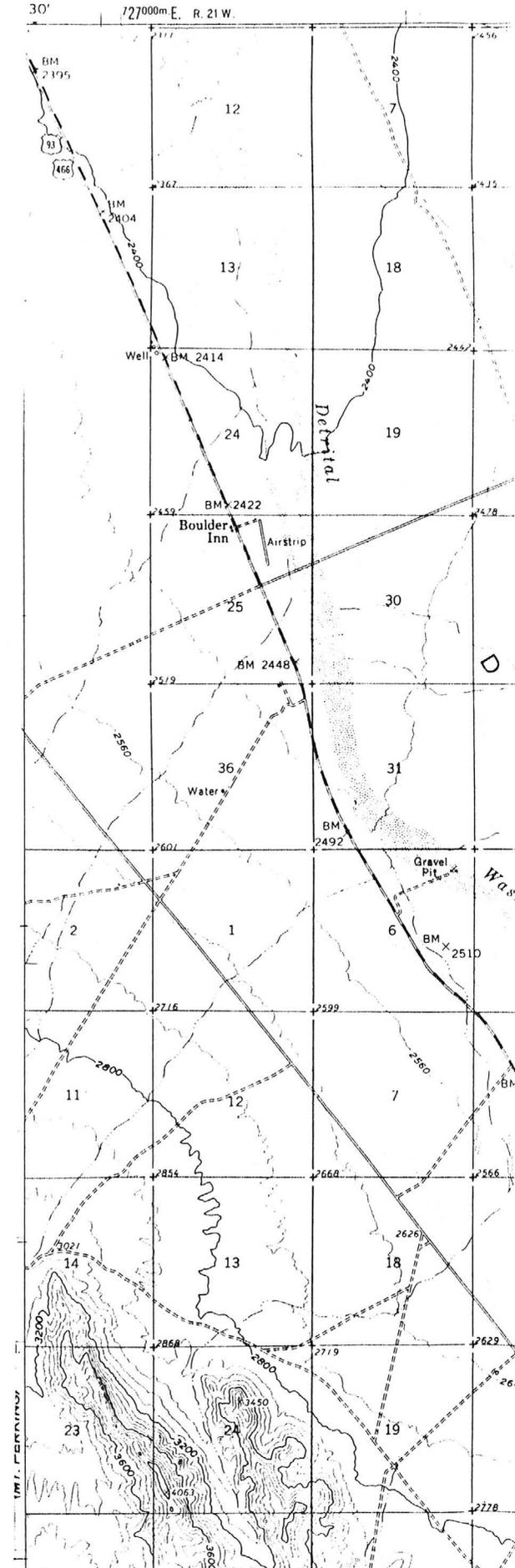
11

MT. PERKINS QUADRANGLE
ARIZONA-NEVADA
15 MINUTE SERIES (TOPOGRAPHIC)

(SENATOR MOUNTAIN)

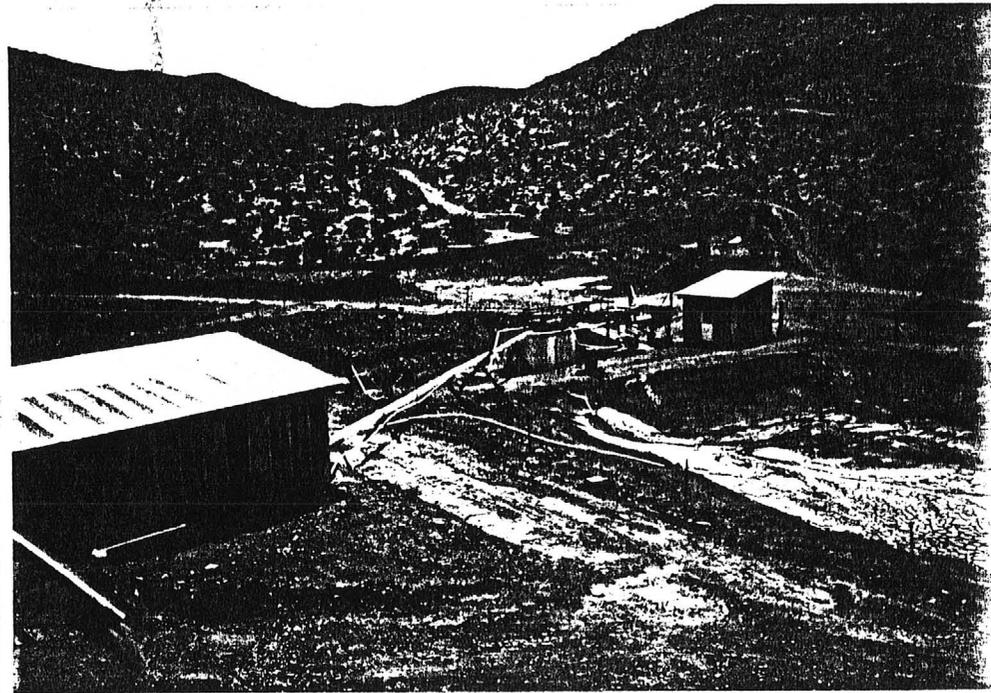
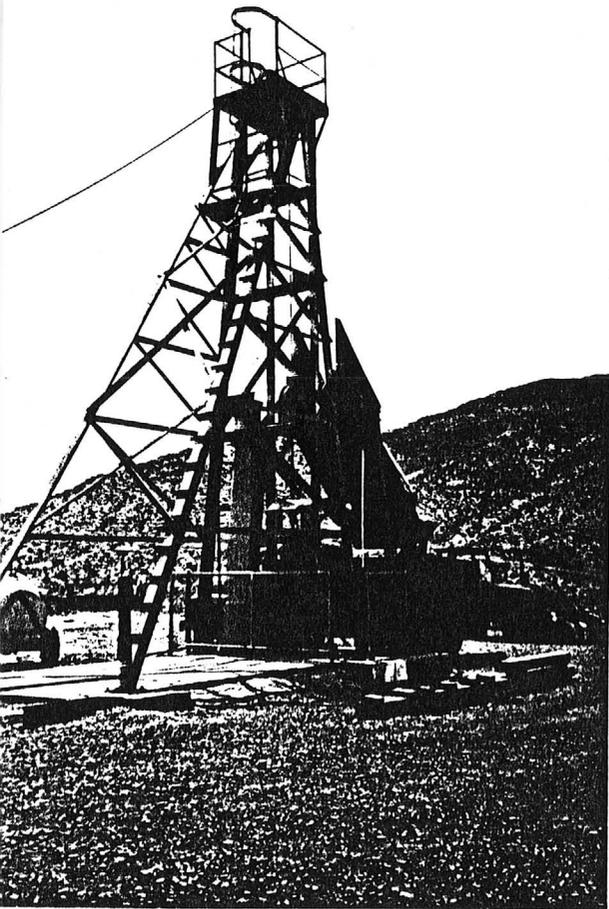
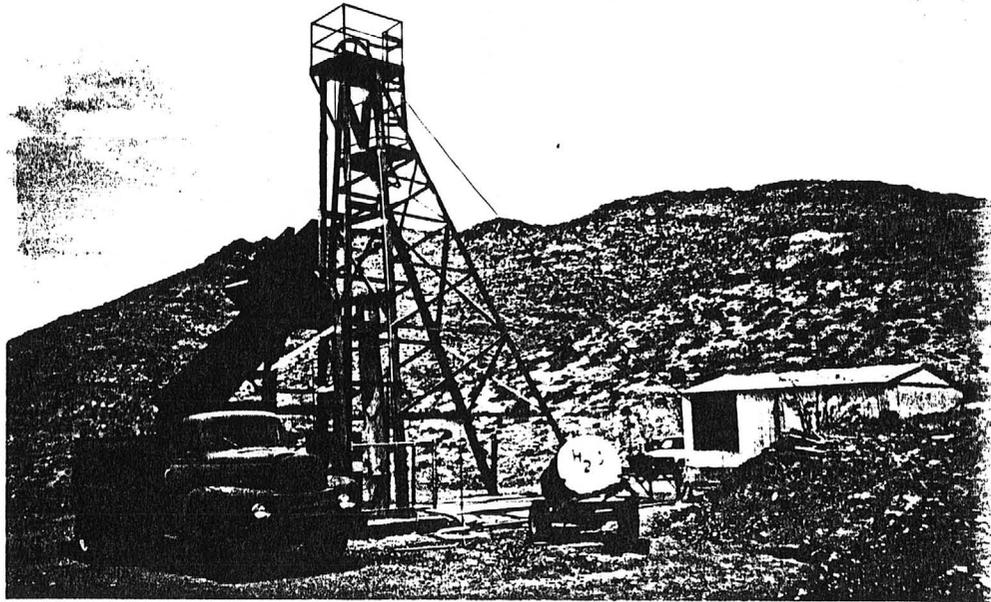


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



(WHITE HILLS)
10/86
NJSN

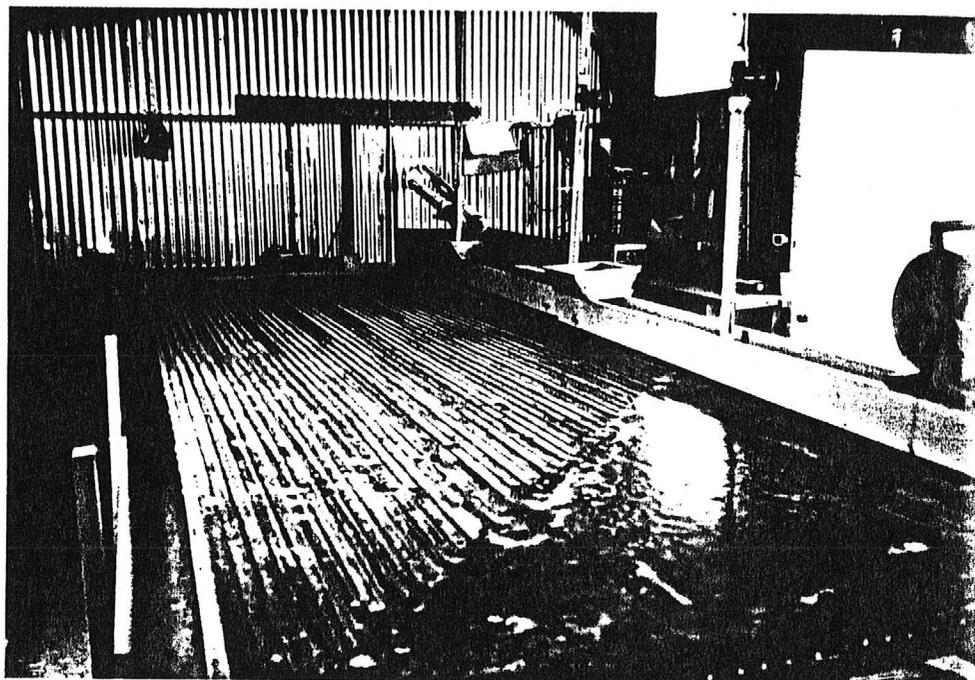
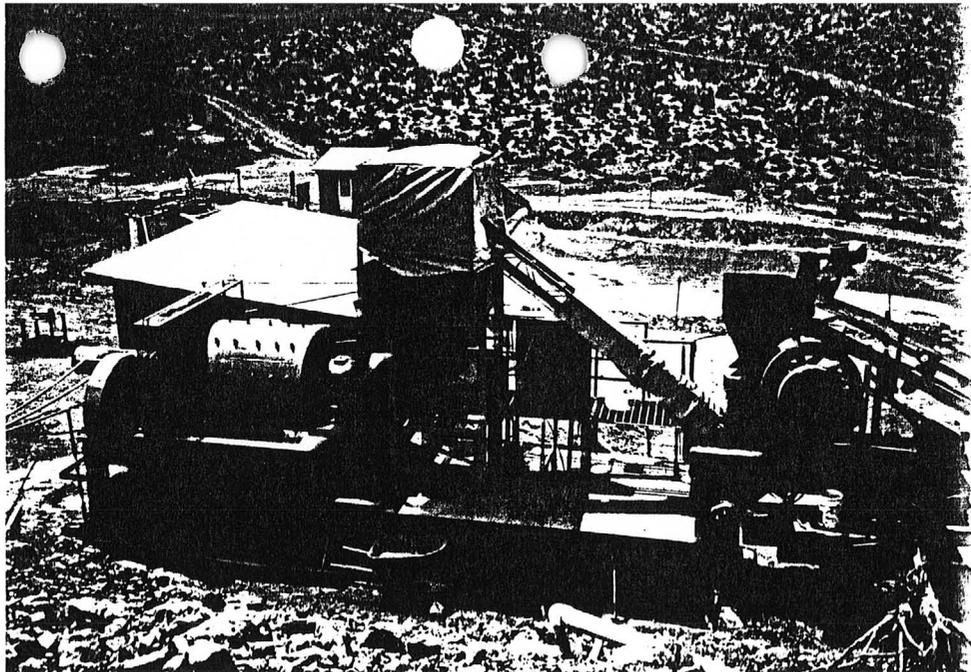
GOLD BUG
6188



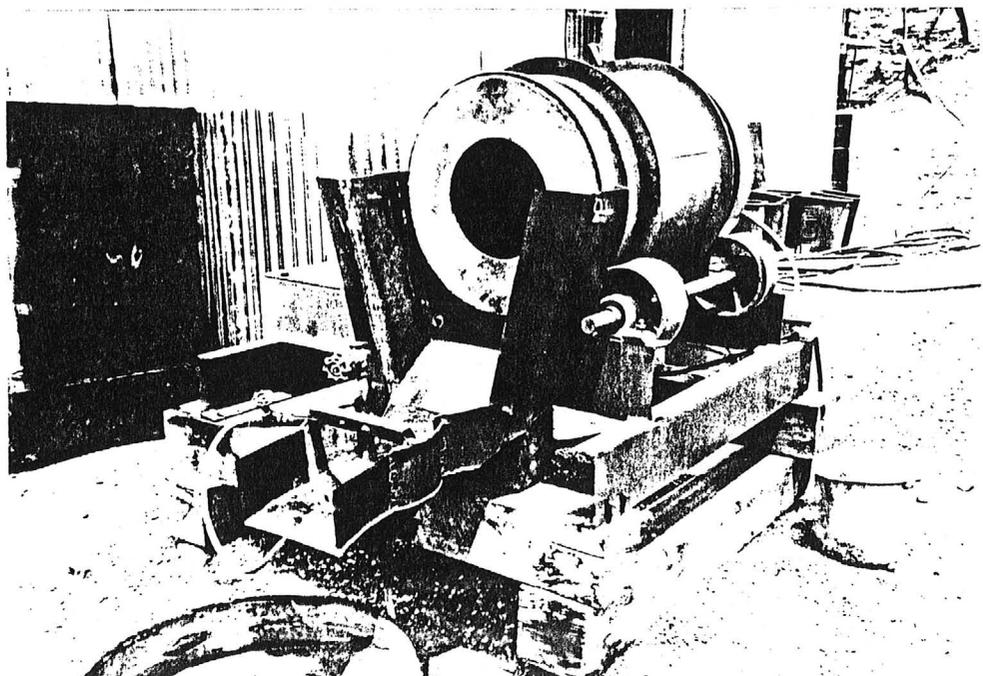
GRAVITY
MILL

AGITATION
CYANIDE
PLANT

GOLD BUG
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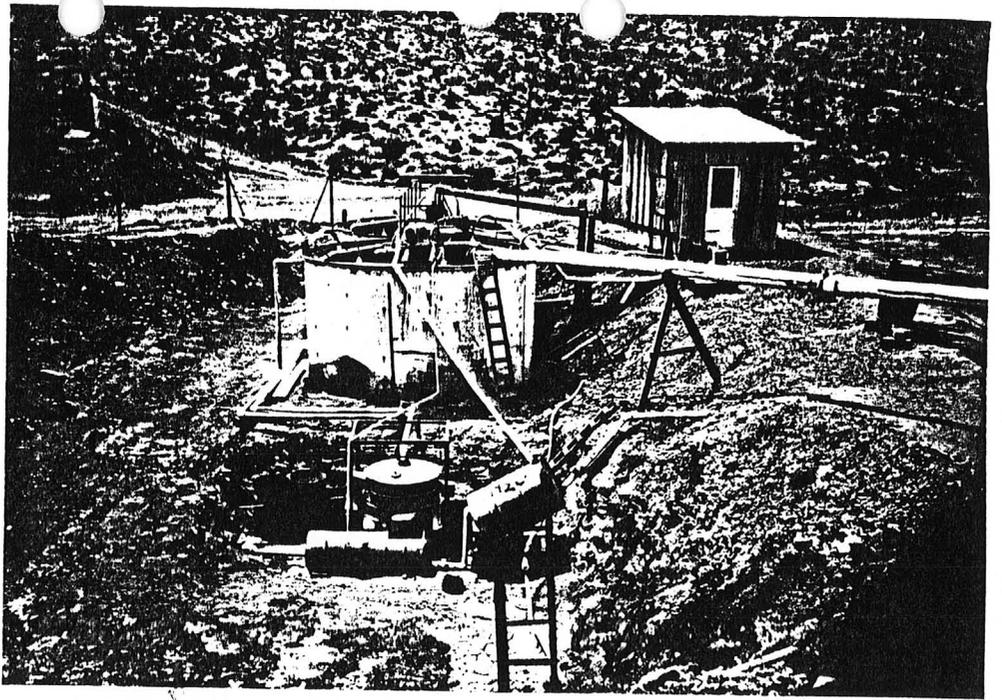
AMALGAMATOR



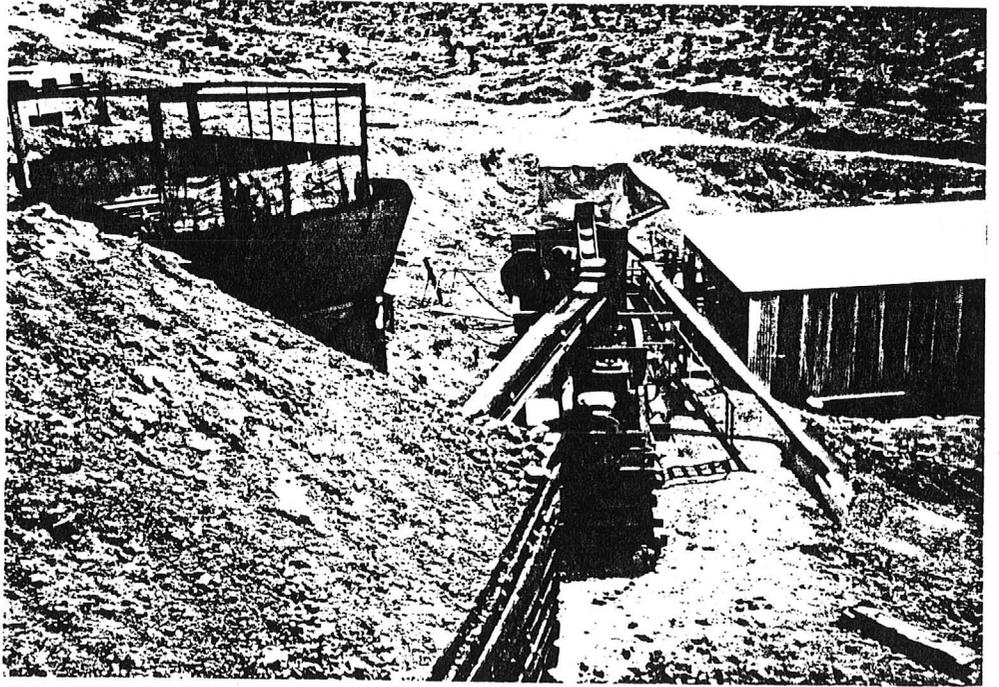
GOLD BUG

6188

CYANIDE
MILL



CRUSHING
PLANT



Surface Mining Equipment
Underground Mining Equipment
Crushing Equipment
Asphalt Plants
Concrete Plants
Cranes
Cables

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TELETYPE: 262898

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Pilot SX Plants: (2) ten GPM aqueous each.

Pilot EW Plant: 4500 amp. complete w/anodes and cathodes.

A.C. LaBarr (602) 577-2414 t/bf

Complete, 1,000 TPD concentrator crushing (2) 7 by 7 ball mill, etc.

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Bank of 5 Wemco #36 cells, 75 TPD capacity, Excellent condition.

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28-31bp

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Contact: Chuck Einarsen (303) 861-4695 or (303) 771-0077 week-ends and nights. t/bfw

Will Joint Venture

100.Ton per Day Flotation Mill with nearby profitable Gold & Silver Mine

Missoula Mt. area on I-90 and R.R.

Contact: George Silvola or Chuck Einarsen at (303) 861-4695 t/bfw

FOR LEASE

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- 11 - WAGNER ST-5A
- 1 - WAGNER ST-2B
- 1 - EIMCO 912
- 3 - EIMCO 911

DRILLS JUMBOS

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50-80% Free

Microfine placer gold can now be recovered. For info & Tech report, call E. Ott, (303) 287-2642.

27-30bo

FOR SALE

Silver mine and associated claims for sale; non-operating; historically good producer; near Crested Butte, Colorado. (602) 962-0712. 31-34be

Franklin Consolidated Mining Co., Inc. to offer custom milling at Idaho Springs location. Assay service, transportation & geological consulting available on request. Phone millsite at (303) 567-4080 or 642-7453. Write P.O. Box 508, Idaho Springs, CO 80452. 30-31bf

Mining Engineer for contract jobs. 24 yrs. underground & surface narrow vein & process plants. (303) 279-2148. 30-33bj

CaCO₃ 98% pure, any reasonable offer seriously considered. Call or write Frank N. Eaton, 3064 D½ Rd., Grand Junction, CO 81504, (303) 434-3384. 28-31be

Operating gold mine — Patented underground gold mine in Arizona for sale with lease option on mine equipment and 25 ton-per-day CIL mill. Fully permitted. Contact: Gold Bug Partners Limited, (602) 763-1030. 31-34bg

Gold Bug, The Mining Record, Aug. 3, 1988



RECORD

ing News

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veries and changes in the Western
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happens, covering all segments of the industry,
ining news — open-pit, strip mining, hardrock, placer,
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aware of.
ational resource stock quotations from seven exchanges.
n makers in the industry — keeping you current on the
ailable.

Wage And Benefit Survey

SPOKANE, WA — Despite widespread wage freezes and reductions at a few mines last year, most U.S. mining companies reported annual wage increases ranging from one percent to five percent in a recently published study by Mining Cost Service of Spokane.
A total of 100 mines submitted information covering hourly-wage schedules, benefit plans, and incentive bonus systems. Across the U.S., 50 coal, 28 metal, and 22 industrial mineral mines were included in this study, the fifth annual for Mining Cost Service.

were accompanied by decreases in benefits, with vacation and sick leave taking the brunt of the cuts.
According to the survey, incentive bonus plans appear to be on the increase, with metal mines again showing leadership in this area. Forty-six percent of the metal mines, twenty percent of the coal mines, and only ten percent of the industrial mineral mines reported an incentive bonus plan in effect.
Safety and coal production were the most commonly mentioned factors determining the size of bonuses in the

Arizona Department of Mines and Mineral Resources

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA, MOHAVE CO.
Virginia Dist.
Gold Bug mine
Black Mts.

MM N 101 Gold, native

MILS # 157B
O-AKA's
Gold Bug (gold)

March 22, 1981
Las Vegas Sun
Magazine.

(17)

The Wanderers of Gold Bug Camp

OLD PHOTO ALBUM YIELDS CLUES TO EARLY MINERS

By WILL DEETHARDT

THE mineral-rich region stretches in an unbroken line from the pine covered mountains along the Truckee down through the flat lands of Nevada and into the arid deserts of Mohave County, Ariz.

Names like the American Flag Mine, the Comstock and the Holy Moses still haunt the minds of those who dream of riches. There are the gold and silver mines beneath the earth, home now to an occasional horned owl or a lizard seeking the cool of the mines' many caverns.

Countless gaping holes cover thousands of square miles. The mines are mostly nameless now; traps for a wandering coyote, they speckle the landscape among the rusted tin and weathered wood of that romantic era in our history.

Have you ever heard of the Hackberry or the Tom Reed? The Julia or the Grosh? Or, the Gold Bug? That's the ruins of an old mine to visit — the Gold Bug, Mohave County, Ariz.

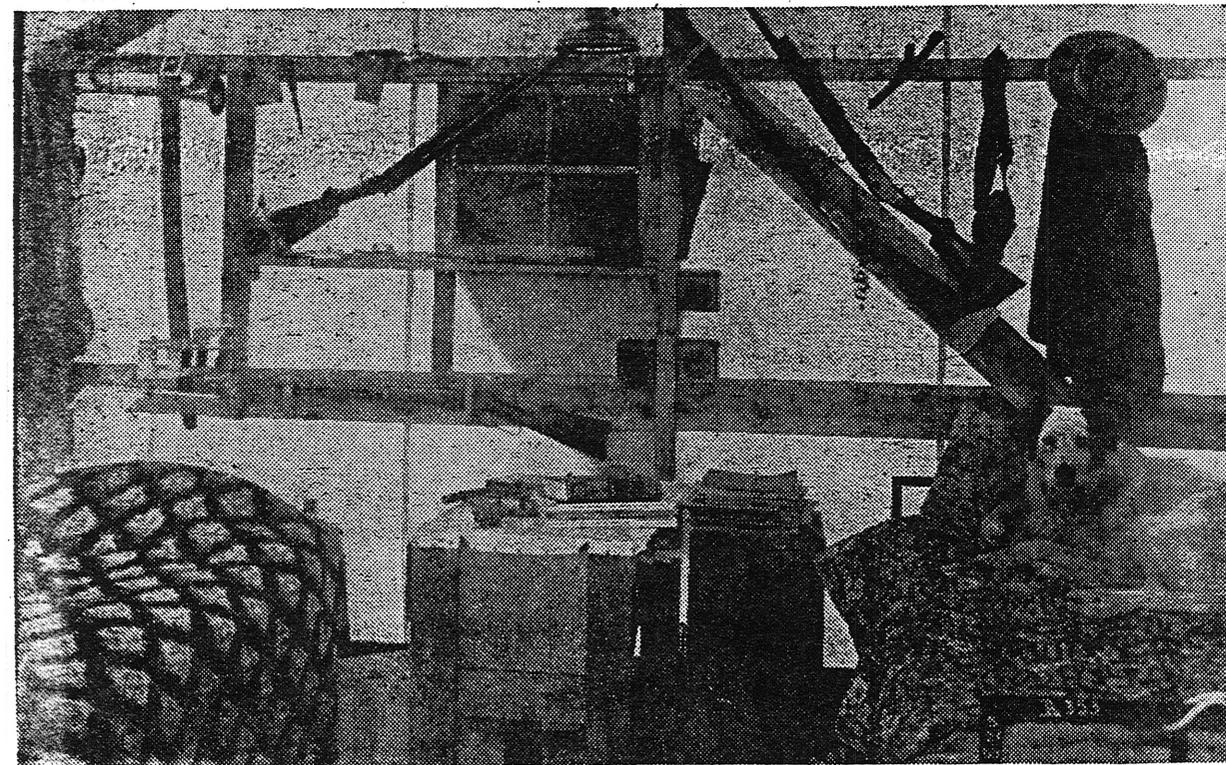
The Bug was discovered in 1892 by two Mormon miners wandering through the Black Mountains, 30 miles below where someday would stand a mighty fortress to hold back the Colorado River, Hoover Dam.

How much gold those miners took from their find is not known. But the following year the developers sold the property for a vast profit; then they disappeared. The new owners called themselves The Gold Bug Mining Company. In the next five years they removed a mere 50 tons of selected ore valued at \$45,000. These new owners erected a 20-ton Huntington mill on the banks of the Colorado River, 10 miles to the west, and continued operations until they went broke. In that short time, the ore they dug brought \$15 a ton.

The Gold Bug was abandoned and sat alone in the shadow of Mt. Perkins.

In March, 1908, our nomads entered the scene. There were 12 of them, and at least half came from somewhere in Northern Nevada, from around Jackpot, Ely and other areas. They came to re-mine the Gold Bug.

There were two leaders in the little band of wanderers. One was C. Hall who wore high-laced boots, a slouch hat and sported a thick mustache. He brought with him his wife Lucinda and their two



Teddy, the ring-tailed dog, is in many of the pictures. Among belongings in this neat tent bedroom were 2 Winchester rifles, 2 shotguns, 4 pistols and a bugle. Reading matter included a book called "The Crisis," and periodicals Argosy, The Popular Magazine, and The Scrapbook. The tents were home for 19 months

sons. His partner was known only as A.B., and he too brought his wife. Her name is not known. The two women were friends and would spend their days exploring the cool, wet washes near the camp in their bare feet, or would take shooting lessons with their husbands' Winchesters.

A LONG with these six people came an Austrian named Lyon, a photographer, two miners, a couple of Chinese cooks and a ring-tailed dog named Teddy.

As they moved into the area, their wagon was weighted down with provisions and bent under the strain. The wagon was later converted to a tanker for hauling water from the nearby Colorado by removing the bed and dropping a huge tank on the axles. When the wagon was not in use, one of the four horses could be hitched up to a buggy, and the women would travel to nearby Chloride City.

The camp took on a relaxed atmosphere, and it seemed that no one worked hard at removing ore from the mine (there was very little ore left from the earlier diggings).

They built structures of two-by-fours and covered them with canvas. This made for cozy, weather-tight living quarters. They build a stable the same way, which showed that they had great concern for their animals. Within those first months they also built a boarding house where they all shared meals, two bunk houses, two small storage sheds, a tool shed near the mine and an assay office. A crevice was carved into a nearby hill, and the assay office was partially built into the rock. This helped to keep chemicals and assay equipment cool. A stone structure was built in front of this office, then filled with earth and leveled to make room for C. Hall and his partners' two tents, which served as living quarters and offices.

The photographer spent much of his time shooting scenes around the camp or of the mine or of lizards and other desert creatures. He kept close track of his

pictures and numbered each one. On one print of the buildings, he had identified each structure with numbers, then listed them on the reverse of the photograph.

It was the two sons, miners and Chinese who did all the work in the mine, but the bosses and their wives took time to make side trips to Cerbat, Kingman and the Grand Canyon during their stay at Gold Bug.

Lyon was, no doubt, left in charge. He was a foreigner — perhaps Serbo-Croatian or Tyrolean. He wore a huge sombrero and sported a thick mustache. He shaved his head and had massive shoulders and huge hands, and he weighed close to 300 pounds. He was shy of the photographer's camera, but when he was shown he delivers an air of arrogance and pride.

The Chinese cooked and took turns working the mine. They often are seen acting as servants to the others. One of them, Quong Fong, spent much of his off time making kites from old newspapers. Very little is known of the second Chinese, except that he doubled as a servant or houseboy.

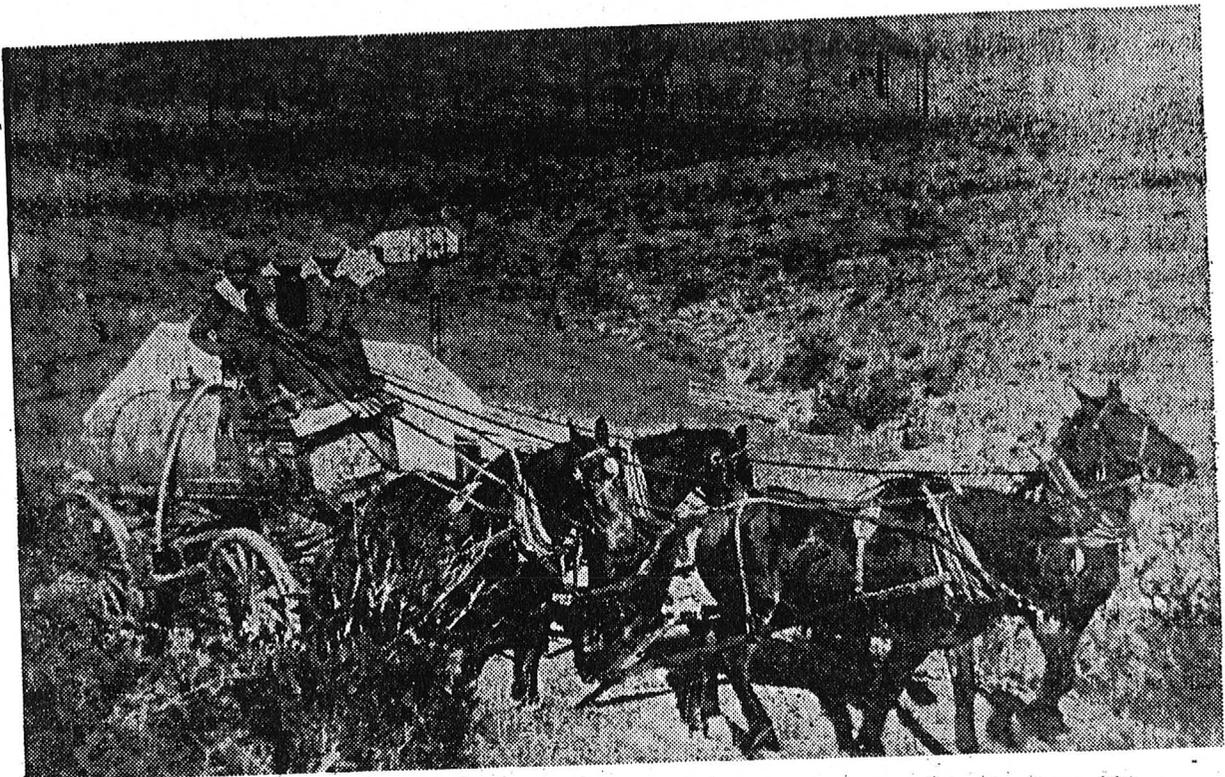
THERE are no clues as to how much ore this band of nomads took out of the mine. U.S. Geological Survey Reports show the total production for the Gold Bug Mine to be \$60,000 at the end of 1909. With the 1893 figure showing a production of \$45,000, it is safe to assume they retrieved a mere \$15,000 during the 19 months they stayed.

The ore would have to be carried to a mill. The old El Dorado mill was not in operation, so they had to haul it south, either to the Mockingbird District or the San Francisco Mining District, which was 30 miles to the north-east. Here the Tom Reed Mine has a 10-stamp mill and the Victor Mine has a 20-stamp mill and cyanide plant. No photographs of ore being shipped have been found. There was a railhead to the south in Kingman and another at Parker, Ariz., which



New Year's Eve, 1908 — 10 of the group posed for a picture.
C. Hall is believed to be the bearded man in the center

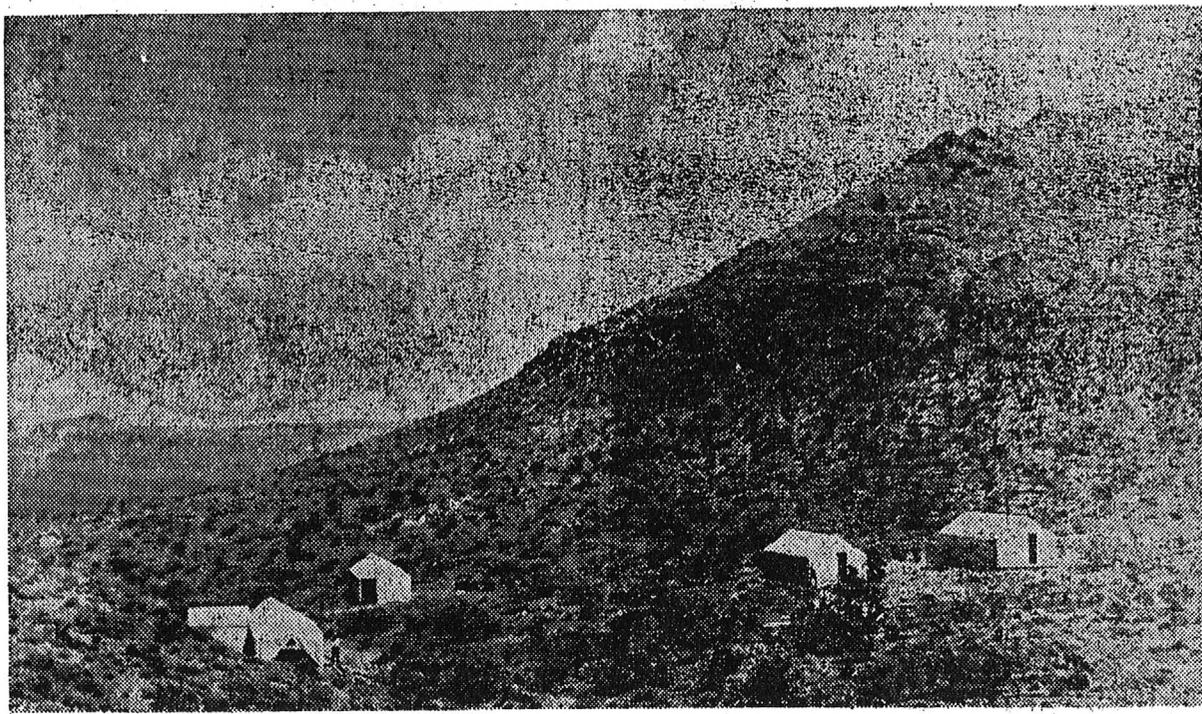
(4.)



Their wagon became a water tanker; the two women ride up the steep incline with one of the men. How hard they all worked — men, women and their patient horses



The amenities were somehow preserved; the women saw to that

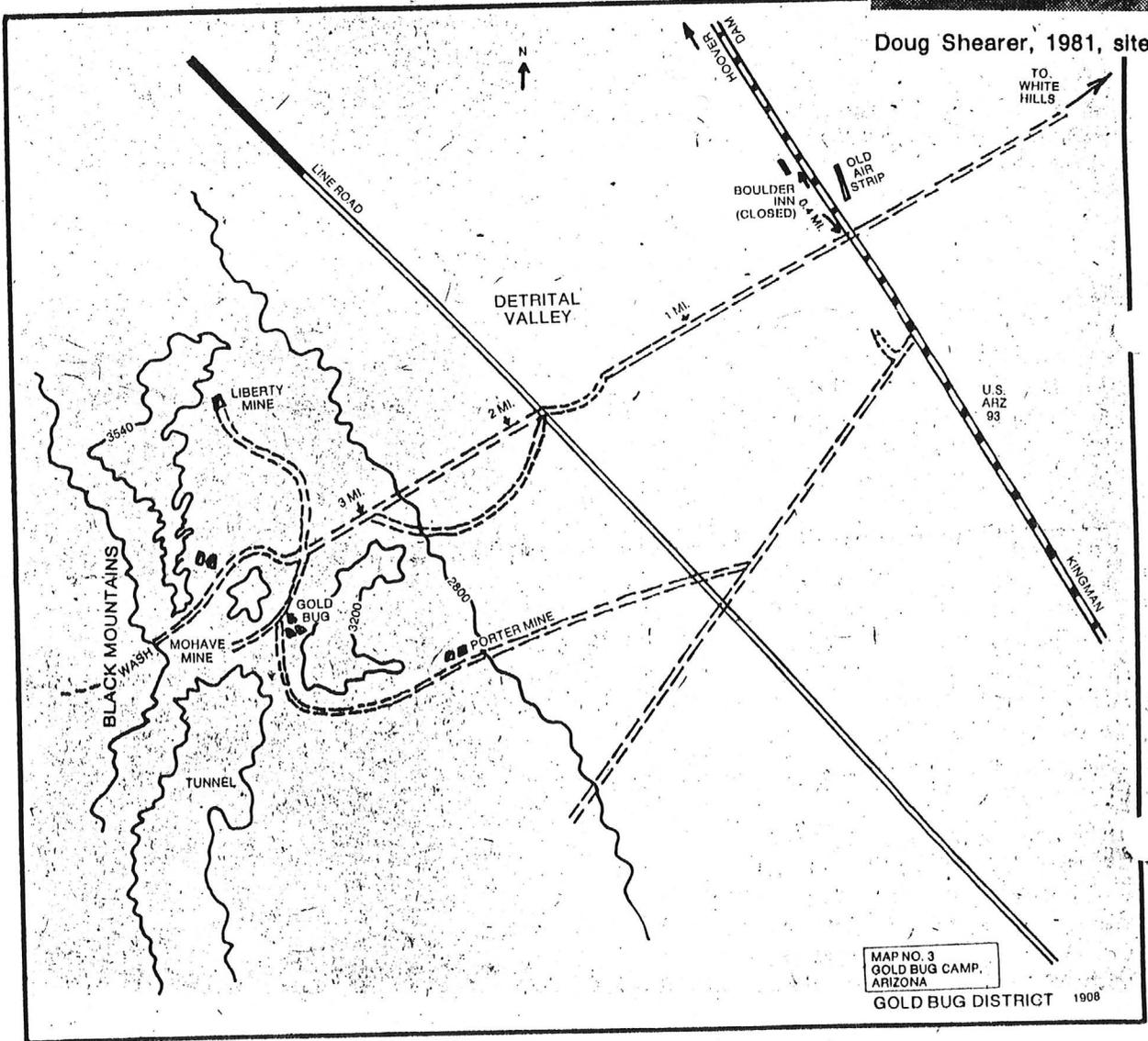


The camp under a blazing sun, at a moment in 1909

(2.)



Doug Shearer, 1981, site of the old assay office



Revisiting historic old Gold Bug Camp

was closer, but it is doubtful that the ore was shipped by rail.

Another theory, which comes from some historians, is that the ore could have been shipped by paddlewheeler down the Colorado and processed in Mexico. What happened to the ore these 12 mines is unknown.

All in all, the Gold Bug seemed a small operation compared to the larger mines of the White Hills District to the east or the Grand Gulch to the north. But here were 12 wanderers, working 2,300 feet of tunnel, deep beneath the surface of the Gold Bug.

During October of 1909, they very suddenly packed up and left. Did they work for a larger company who ordered them out? Was this just a small family venture that had failed? No one knows. No trace of them exists after they left. The only clues come from the photographs taken by the man who signed the pictures with the initials A.D.

It is known that C. Hall returned to the area in 1912, but this time he was accompanied by another man. They took pictures of themselves on horseback, in the middle of Sawmill Pass. Another photo is marked "Greenwood Pass." Did he return only to view and reminisce about those short months he had spent on a dream?

I decided to search for clues. An old cowboy had given me the album of photos taken by A.D., and

I was curious about the Bug and the people who tried to make it go. I enlisted the aid of a Death Valley historian who knew much about desert survival. Doug Shearer had spent many years exploring the mines and ghost towns of Nevada, Arizona and Death Valley, Calif. He offered his expertise and his 4-wheel drive Jeep, and on a rain-threatening day we headed for Gold Bug. Finding the mine was easy, and the access road seemed well traveled. The sky cleared, and I noticed many newly-painted claim stakes as we neared the site. I could not help thinking about the modern day prospectors and Sunday afternoon geologists who, like the 12 nomads, had visions of getting rich.

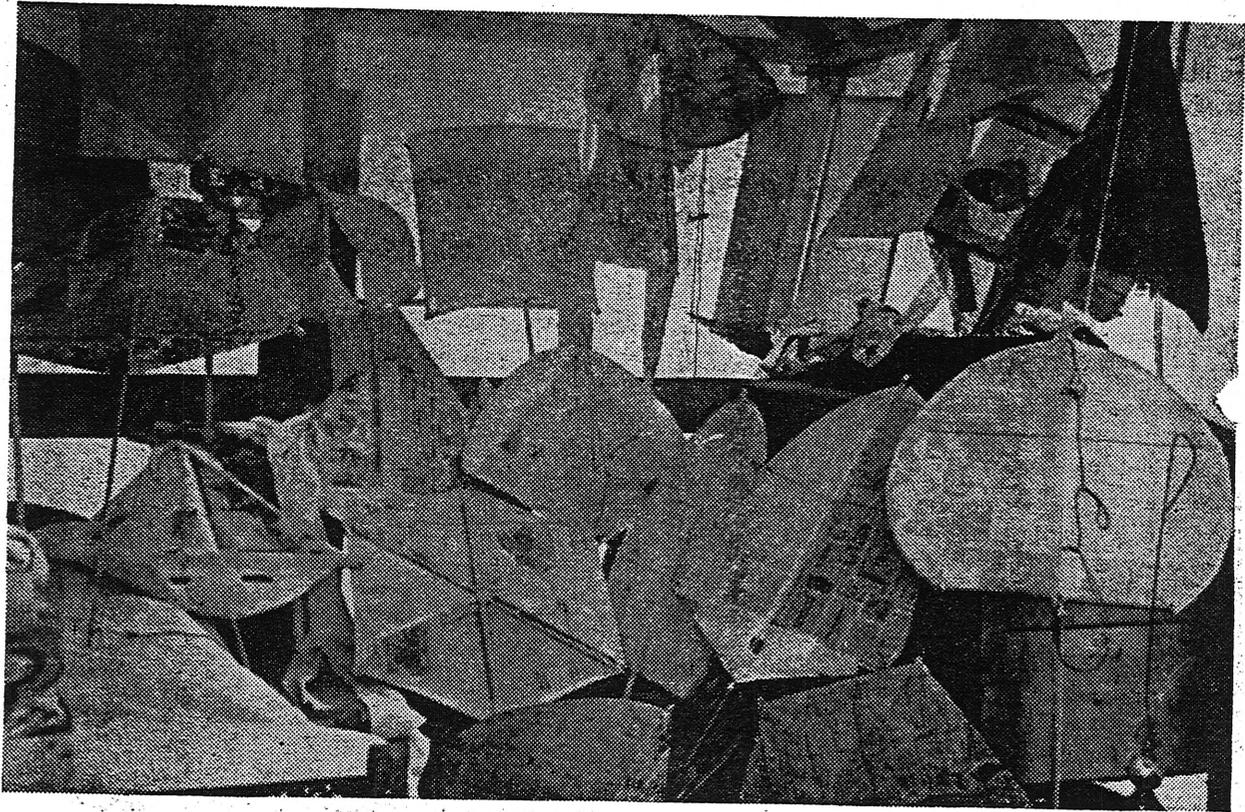
I had hand-drawn maps and the old album, and I walked around the site, showing Doug where the various structures had stood. Their scars were still on

the ground. Of course, there were no buildings now, but the landscape was scattered with rusted cans and wood from the mine's headstand. I showed him exactly where the photographer stood when he took the pictures of the stable, bunkhouse and assay office. The stone embankment where C. Hall's tent sat was still there. A new road cut through the site, but the ruts of 1909 are still there. So are the memories.

After a photography session, we dug out our metal

detectors and went to work searching the desert floor where the buildings had once stood. We found an old fork and spoon, proof that we had found the boarding house. At the bunk house we found many empty shell casings, tobacco tins, buttons from the mine clothing and a few blued bottles.

Like that dozen people, we were wanderers just passing through, leaving the memories of the past in the stillness of the Black Mountains. □



Quong Fong's kites; the Chinese cook-miner spent his leisure hours creating them out of old newspapers

GOLD BUG

MOHAVE COUNTY

NJN WR 7/8/88: Bill Vanderwall (card) of Ivy Minerals reported that Jerry Haynes (card), owner of the Gold Bug (file) Mohave County will resume development of the mine beginning July 19. It is estimated full production will be obtained in about a month.

GOLD BUG

MOHAVE COUNTY

NJN WR 8/16/85: Larry Kersey (c) of Alanco Ltd. (c) visited and reported that G.R. (Jerry) Haynes (c) was offering the Gold Bug Mine (f) Mohave Co and they were sampling at the property.

NJN WR 6/6/86: Bill Vanderwall (c) with Ivy Minerals (c), called and reported he has been drilling on the Gold Bug Mine (f) Mohave County. They have identified a small tonnage of high grade material, possibly 3,000 tons of 1 oz/ton Au that they may decide to mine and ship as silica flux to a smelter. This is apparently one of the high grade pods that the old timers missed.

NJN WR 1/30/87: Bill Vanderwall (c) reported that Harrison Mining (c) of Battle Mountain, Nevada is the contractor at the Gold Bug Mine (file) Mohave County. A Verbal Information Report has been written on their activities there.

NJN WR 10/16/87: Received from Bill Van Der Wall (card) with Ivy Minerals (card) a native gold in quartz vein specimen from the Gold bug (file) Mohave County. The specimen will be added to the Museum collection.

NJN WR 10/16/87: Jim Weatherby (card) reported that Ivy Minerals (card) is building a semi portable mill to process the ore at the Gold Bug Mine (file) Mohave County.

NJN WR 9/18/87: Bill Vanderwall (card) Ivy Minerals called to report that they are underground at the Gold Bug (file) Mohave County. He has a specimen for the Museum which he will be sending soon.

NJN WR 1/22/88: Bill VanDerWall (card), Ivy Minerals, reported that they have completed the mill at the Gold Bug Mine (file) Mohave County. The mill is a combination of gravity and cyanide. They plan to grind the ore to 200 mesh, table the free gold, then process the rest by agitation cyanide leach, recovery by carbon in leach. The mill officially started January 1, but they have been getting the bugs out as they have been having problems with the clays and silica fowling the carbon. Ivy decided to construct the mill as the smelters were seeking 85% silica and the foot of gouge that accompanies the vein cannot be avoided during mining. They have developed the underground by drifting underneath the ore body and raising up through it.

COMPLETE AND MAIL TO:
STATE MINE INSPECTOR
1624 WEST ADAMS, ROOM 208
PHOENIX, ARIZONA 85007-2606

Gold Bug (A) Mohave Co.

FOR OFFICE USE ONLY
SIGNATURE NUMBER 74311044
STATE NUMBER _____
MSHA NUMBER _____

Hemmer

NOTICE TO ARIZONA STATE MINE INSPECTOR

In compliance with the Arizona Revised Statute Section 27-303, we are submitting this written notice to the Arizona State Mine Inspector of our intent to start XXXX 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: XXXX If you want the Education and Training Division to assist with your mine safety training, please check here: XXXX
If this operation will use Cyanide for leaching, please check here: _____

COMPANY NAME: Ivy Minerals Inc. (Operator): Harrison Mining Co. (Contract Miner)

DIVISION: Mines

MINE OR PLANT NAME: Gold Bug TELEPHONE: 602-763-1030

CHIEF OFFICER: William Vanderwall (Operations Mgr.)

COMPANY ADDRESS: Local: P.O.B. 9125 KS, Bullhead City, AZ 86430
HQ: P.O.B. 2532, Boise, ID. 83701

CITY: _____ STATE: _____ ZIP CODE: _____

MINE OR PLANT LOCATION: (Include county and nearest town, as well as directions for locating property by vehicle: Four miles west of Hwy 93 on White Hills Rd. approx, mile post 30, Boulder Inn is nearest landmark.

NE $\frac{1}{4}$ Sec. 4; T26N; R21W; G&SRM, Mohave County, Arizona

TYPE OF OPERATION: u/g mining PRINCIPAL PRODUCT: exploration drift

STARTING DATE: 1/1/87 CLOSING DATE: _____ DURATION: _____

PERSON COMPLETING NOTICE: Wm. Vanderwall TITLE: Oper. Mgr.

DATE NOTICE MAILED TO STATE MINE INSPECTOR: 1/12/87

FIELD VISIT

Mine: Gold Bug

Engineer: Nyal Niemuth

County: Mohave

Date: 6/16/88

Information from: Bill Vanderwall

Ivy Minerals has erected a hoist and headframe and finished underground development at the Gold Bug (file) Mohave County. In addition to retimbering the shaft, 200' of new drift has been completed on the 200' level and a 30' finger raise developed. They have constructed a semi-mobile crushing circuit, gravity mill, including table and amalgamator, and an agitation cyanide circuit. At -200 mesh the mill has a capacity of 25 tons per per 24-hour day, while at -60 mesh they can process approximately 50 tons per day. Ivy has mined and milled 80 tons from which they have shipped 38 oz gold. Additional loaded carbon remains in one of the agitation tanks. Ivy would like to sell the property so it can concentrate its efforts on other properties. They are asking \$75,000 down with other terms negotiable. The property is fully operational, including diesel generated electric power and air, although water is trucked in for current operations. The property would be ideal for someone who would like to own and operate a small, high-grade gold mine. Photos showing facilities described above have been added to the mine file.

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Information from: Bill Vanderwall

Company: Ivy Minerals (c)

Address: P.O. Box 9125 KS

Bullhead City, AZ 86430

2. Phone: 754-4481

3. Mine: GOLD BUG

4. ADMMR Mine File: Same

5. County: Mohave

6. Summary of information received, comments, etc.:

Reports Jerry Haynes (c) owner of the Gold Bug has suffered a mild stroke, so his plans to mine the deposit himself have been put off and the property remains for sale.

Date: September 19, 1988

Nyal J. Niemuth, Mining Engineer

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

Information From: Bill Vanderwall

Mine: Gold Bug Mine

County: Mohave County

Date: January 27, 1987

Engineer: Nyal J. Niemuth

Bill Vanderwall (c) reported that Harrison Mining (c) of Battle Mountain, Nevada is the contractor at the Gold Bug Mine (file) Mohave County. Seth Johnson and Kelly McGrew mucked out the #2 shaft to 250' level. To everyone's surprise, instead of encountering a 30' drift, there was a 250' drift. The contractor is now busy timbering the shaft and extending the drift. They expect to produce 3-400 tons of +2 oz Au. The rich shoots are more common where the vein cuts pegmatites. This is perhaps due to the pegmatite rock being more competent, thus the mineralized plumbing system does not plug up (?)

Drilling of the ore shoot had a high intercept of over 7 oz and a low intercept of 1.3 oz. A previously mined shoot on the vein produced a basketball-sized piece of ore that contained over 20 oz.

The ore produced may either be milled at Kemble Camp, or shipped to a smelter. Asarco will not issue a contract for so small an amount of high grade, but will buy it.



GOLD BUG (A) N. VE

K or MB

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

EVAN MECHAM, GOVERNOR
GERALD H. TELETZKE, PH.D., DIRECTOR

NOTICE OF INTENT TO (ISSUE) (A) GROUNDWATER QUALITY PROTECTION PERMIT(S)

Pursuant to Arizona Compilation of Rules and Regulations, Title 9, Chapter 20, Article 2 the Director of the Arizona Department of Environmental Quality intends to (issue) (a) Groundwater Quality Protection Permit(s) to the following applicant(s), subject to certain special and general conditions.

Public Notice No. 111-87AZGW November 2, 1987
Medical Environmental Inc.
18019 North 25th Avenue
Phoenix, Arizona 85023
Groundwater Quality Protection Permit No. G-0039-08

The permittee is restricted to the disposal of domestic sewage from a 68-bed community hospital. Total wastewater from the entire facility shall not exceed 21,080 gallons per day over an effective area of 10 acres. The sewage shall be treated by 4 septic tanks and 16 associated leach lines. The effluent will be monitored on a monthly basis for TTHM's (Trihalomethanes), Radiochemicals, coliform and primary drinking water pollutants (metals only). The facility is located at 2735 Silver Creek Road, Bullhead City, Arizona. The approximate depth to groundwater is 200 feet.

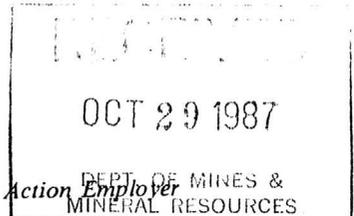
AND

Public Notice No. 114-87AZGW
Ivy Minerals' Gold Bug Mine
P.O. Box 9125 KS
Bullhead City, Arizona 86430
Groundwater Quality Protection Permit No. G-0040-08

The Ivy Minerals' Gold Bug Mine is located 4 miles due west of Boulder Inn, which is 29 miles south of Boulder Dam on Hwy. 93, on White Hills Road west off Hwy. 93. The permittee is authorized to operate a closed circuit non-disposal hydrometallurgical precious metal recovery facility, utilizing the vat leaching method. The facility shall be constructed and maintained in such a manner as to prevent disposal of pollutants to the land surface of subsurface which may affect groundwater quality.

The permit (application)(Notice of Disposal) is available for public review Monday through Friday, 8:00 a.m to 5:00 p.m. at Arizona Department of Environmental Quality, Water Permits Unit, 2005 North Central Avenue, Phoenix, Arizona 85004.

Persons may submit comments or request a public hearing on the proposed action, in writing, to ADEQ at the above address within thirty (30) days from the date of this notice. Public hearing request must include the reason for such request.



The Department of Environmental Quality is An Equal Opportunity Affirmative Action Employer



GOLD BUG (H) Minerals Co.

JK

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Governor Jane Dee Hull

Jacqueline E. Schafer, Director

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

November 22, 1999

REF#: EU99-0670

Ivy Minerals
Attention: Conway Ivy
PO Box 2532
Boise, ID 83701

RE: Ivy Minerals - Gold Bug Mine
Inventory #100282
Lat. 354005/Long. 1143000

NOTICE OF VIOLATION

The Arizona Department of Environmental Quality (ADEQ), Water Quality Division, Water Quality Enforcement Unit, has determined that Ivy Minerals, of Boise, ID, is in violation of the Arizona Revised Statutes (A.R.S.), Title 49-101 et seq. and applicable rules.

I. FINDINGS OF FACT AND DESCRIPTION OF VIOLATION(S)

1. Ivy Minerals, is the owner and/or operator of the Ivy Minerals - Gold Bug Mine, a discharging facility, operating pursuant to Groundwater Quality Protection Permit, G-0040-08.
2. The owner/operator of the Ivy Minerals - Gold Bug Mine has failed to submit monitoring data for the second (2nd) quarter of 1999, as required by the Groundwater Quality Protection Permit issued for the facility. The monitoring data for the second (2nd) quarter of 1999, was due to ADEQ by July 28, 1999. Failing to monitor or report as required by a Groundwater Quality Protection Permit is a violation of the permit and A.R.S. §49-261.A.

II. CITATIONS OF AUTHORITY

1. The Arizona Department of Environmental Quality (ADEQ) shall prevent and abate all water pollution. [A.R.S. §49-104.A.11.]

3. The above documentation shall be deemed "submitted" when received by ADEQ.
4. Any facility updates including owner/contact/operator name, address and phone number changes should be submitted as soon as the information is available.

V. STATEMENT OF CONSEQUENCES

Failing to adequately respond to this notice in a timely manner will result in an ADEQ referral to the Arizona Attorney General's Office for an escalated enforcement action. At ADEQ's request, the Arizona Attorney General shall file a civil complaint in superior court to recover substantial civil penalties up to twenty-five thousand dollars (\$25,000) per day per violation. [A.R.S. §49-262.C.]

Achieving compliance and/or providing an explanation for noncompliance does not preclude ADEQ from seeking civil penalties through the Attorney General for the above-cited violations.

VI. OFFER TO MEET

ADEQ personnel are willing to schedule a meeting to discuss the violations and corrective actions. Prior to the meeting, please submit the following: 1) an agenda that specifies the issues that you wish to discuss and 2) the names and affiliations of the participants that will be accompanying you.

If you would like to meet, or feel that this notice has been sent in error, please contact Lynn Ott at (602) 207-4816, or 1-800-234-5677 x 4816, within five days of receipt of this notice.

M. Reza Azizi

M. Reza Azizi, Manager,
Water Quality Enforcement Unit

cc:

Mohave County Health & Social Services
ADEQ Northern Regional Office Regional Office

CHARLES R. WARD CORPORATION

Mining Development & Mineral Recovery

706 EAST ALTA VISTA

PHOENIX, ARIZONA 85040

3/17/76

PARCEL # 76 GOLDBUG

LOCATION: Black Mountains, Mohave County, 30 Miles North West from Chloride, Arizona.

NUMBER OF CLAIMS: Six patented, approximately 94 acres.

DEVELOPMENT: 15 shafts and open cuts. Three shafts have been sunk to the 100 foot, 512 foot and 140 foot levels (#1, #2, and #3 respectively).

WATER, ROADS AND POWER: At present time there is no water in the mine and no commercial power readily available. Roads can easily be improved into excellent condition.

TYPE OF MINE: Underground.

TERMS: \$175,000 sale price, 29% down after exploration of four months, balance in four years.

ASSAY AVERAGES: Gold: high of 11.98 ounces, low of 0.02 ounces.
Average Gold: (from total sampling) 1.65 ounces.

Silver: high of 4.3 ounces, low 1.09 ounces.
Average Silver: (from total sampling) 1.09 ounces.

COMMENTS: There is only one shaft accessible, number two, to which these comments are directed. Well defined vein matter is showing on the 140 foot, 240 foot and 290 foot levels. The 20 foot level is closed off and can not be inspected at this time. The 70 foot level shows now no substantial vein matter, but there are indications that a considerable amount of ore has been taken out from this level in the past. On the 140 foot level, the vein is evident but not persistent. Ore apparently has also been taken out of this level. The vein has a strike practically North, and a dip of about 75 to 80 degrees. On the 240 foot level apparently some ore has been taken out. Unfortunately no records of ore shipments are available for examination. Vein matter on this level is evident but not of real interest. The vein has a strike of about North and a steep dip of 75 to 80 degrees.

On the 290 foot level the showing is good. The vein has about the same strike and dip as above. No vein matter appears in the North drift. The 400 foot level has no vein matter in evidence. The floor of the drift is rather wet, but no standing water. Below this level the shaft is caved.

There are no surface improvements of any kind, all have been removed. The ladders are in fairly good condition, and in addition to the ladder-way, there is a hoist-way about three feet six inches in the clear.

PRESENT CONDITION: The mine as it stands today is clearly a development proposition and as such is attractive. It is difficult to understand why certain work has not been done underground and why other work has been done. It would have seemed wise and natural to have crosscut the 290 foot vein on the 400 foot and the 500 foot levels in order to determine the size and value of that particular vein at the lower levels. Little timbering is used underground, and the drifts and shafts are in good condition with the exception of that portion below the 400 foot level.

DEVELOPMENT PLAN: As it stands, this mine possesses good development features. Just what work should be done would be the subject of further study, but it is clear that exploration of the 290 foot vein from the lower levels should be about the first step to be taken.

SUMMARY: In view of all the circumstances, it is felt this property is well worthy of development, and it is quite probable that, as the mine is intelligently developed, very high-grade ore bodies may be found, which, under the present conditions, will show a good profit.

REPORT ON THE GOLD BUG MINE
OF MOHAVE COUNTY ARIZONA

by
JOHN T. MORROW, E. M.
25 Church Street, N. Y.
January 1923.

References:
USGS Bull. 397,
p. 217
USGS P.P. 374-E
p. 43
ABM Bull. 137,
p. 78

Situation of Property

The Gold Bug mining property is situated in the liver range of mountains (known in the U.S.G.S. reports as the Black Mountains) about 30 miles North-west from Chloride, Mohave County, Arizona. The nearest railroad point is the town of Chloride, but as a train only runs to this point from Kingman once a week the mine is reached by automobile from Kingman which is on the main line of the Santa Fe railroad. The distance from Kingman to Chloride is about 30 miles making a distance of about 50 miles in all from Kingman to the mine.

IC 6901 p.56

The road from Kingman to Chloride is in good condition and is in fairly good shape between Chloride and the mine.

Claims. Description of Acreage

The property consists of the following claims, six in number, presumably owned by Mr. H. J. Marston, via Mariposa, Gold Bug No. 2, Little Daisy, Rattlesnake, N.S.V.P., and the Buena Vista. These claims are said to be patented and to comprise in all about 94 acres.

Ownership

This group of claims was acquired by Messrs. Euell S. Rogers and Harry A. Garwood, both of Chicago, on May 20th, 1920, from one Hildreth Frost, the receiver of the Gold Bug Mining Co. In the appendix will be found a certified copy of the deed making this conveyance. These gentlemen appear on the records as paying the annual taxes on the claims. A brief study of the records at the Court House in Kingman-the County Seat-failed to show any attachments, liens, mortgages, or "actions" of any kind, against the property. Mr. Marston states that Messrs. Rogers and Garwood are his associates, and that he holds full power of attorney from them to deal as he thinks proper with reference to the mine.

In the event that it is decided to do this development, I would advise that a lawyer at Kingman be engaged to examine the title and ownership situation thoroughly before actual work is begun. This can be done very quickly by some such man as Mr. L. L. Wallace, of Kingman, who bears an excellent reputation there.

Geology

A very complete study of the geology of Mohave County appears in Bulletin 307 of the U.S. Geological Survey, 1906, particular mention being made of the Gold Bug Mine on pages 217 and 218. A reproduction of this article has been made and will be found in the appendix.

Another quotation from this same report, beginning page 46, paragraph 2, is also interesting, remembering that the Gold Bug Mine is in the Black Mountains of Mohave County, as follows:

"The veins of the Black Mountains are filled fissure veins, with a general northerly, or northwesterly strike, and steep dip. The fissure filling is quartz, adularia, and calcite, and in many cases there is evidence that the first two minerals have replaced the calcite, probably through the medium of hot solutions. The values are almost exclusively in gold which, as a rule, is finely divided and can best be recovered by the cyanide process. The quartz filling contains many inclusions of the country rock. The veins cut through the great mass of Tertiary volcanic rocks which characterize the range but undoubtedly continue in depth into the underlying pre-Cambrian granitic rocks. The oxidation extends to a depth of 600 or 700 feet, and as a rule, no sulphides are found. The water level is at least 700 feet below the surface. These deposits have suffered comparatively little erosion since their deposition. They bear evidence of having been formed rather close to the surface by hot waters which ascended through the lavas at the close of igneous activities."

Broadly speaking the values are contained in quartz fissure veins in granitic rock.

Development and improvements

It is said that work on this property has been done to the extent of some 15 shafts and open cuts, and that there are three shafts (Nos. 1, 2, and 3) which have been sunk to depths of 100 feet, 512 feet, and 140 feet, respectively. There is, however, only one shaft now accessible, No. 3, to which my studies were, of necessity, very largely confined. I found well defined vein matter on levels 140', 240', and 290'.

The 20 foot level is closed off and could not be inspected.

The 70 foot level shows now no substantial vein matter, but there are indications that a considerable amount of ore has been taken out from this level in past times.

On the 140 foot level the vein is evident but not persistent. Ore apparently has also been taken out of this level. Samples which I took on this level are as follows--the vein having a strike practically North, and a dip of about 75 to 80 degrees.

140 foot level

Number 11. 120 feet south from shaft in hanging well. About 10" wide.		Silver		Gold	
Oss. per ton of 2000 lbs.	Value at 64¢ per oz.	Oss. per ton of 2000 lbs.	Value \$20.87 per oz.	Total Value	
1.40	\$0.90	0.12	\$4.55	\$5.45	
Number 12. 105 feet south of shaft, in roof. Sample about 24" wide.		Silver		Gold	
.60	\$0.89	0.06	\$1.03	\$1.61	
Number 13. North drift 30 feet in from shaft. Sample about 4' wide.		Silver		Gold	
.40	\$0.28	0.02	\$0.41	\$0.69	

On the 240 foot level apparently some ore has been taken out. Unfortunately no records of ore shipments are available for examination. Vein matter on this level is evident but not of real interest. A sample which I took on this level is as follows--the vein having a strike of about North and steep dip of 75 to 80 degrees.

240 foot level

Number 10. 15 feet south from shaft, in roof over chute. about 26" wide.		Silver		Gold	
Oss. per ton of 2000 lbs.	Value at 64¢ per oz.	Oss. per ton of 2000 lbs.	Value \$20.87 per oz.	Total Value	
.50	\$0.32	0.06	\$1.24	\$1.56	

On the 290 level the showing is good. The vein has about the same strike and dip as above. My sampling of this level is as follows, being all in the south drift. No vein matter appears in the north drift. 290 foot level

290 foot level

Number 1. 65 feet in from shaft--in roof. About 48 inches wide.		Silver		Gold	
Oss. per ton of 2000 lbs.	Value at 64¢ per oz.	Oss. per ton of 2000 lbs.	Value \$20.87 per oz.	Total Value	
2.	70 feet "	"	39		
3.	75 "	"	36		
4.	80 "	"	44		
5.	90 "	"	24		
6.	95 "	"	16		
7.	100 "	"	60		
8.	127 "	"	24		

Sample		Silver		Gold		Total
No.	Oss. per ton of 2000 lbs.	Value at 64¢ per oz.	Oss. per ton of 2000 lbs.	Value at \$20.76 per oz.	onc. Value	
1.	0.30	\$0.39	0.19	\$3.72	\$4.10	
2.	0.40	0.26	0.02	0.41	.67	
3.	1.89	1.15	3.60	72.35	73.50	
4.	1.10	.70	0.68	14.06	14.76	
5.	4.30	2.75	11.96	247.63	250.38	
6.	1.40	0.90	2.88	59.91	60.81	
7.	0.40	0.26	0.07	1.46	1.71	
8.	0.40	0.26	0.08	1.66	1.91	

400 foot level

There is no vein matter in evidence here. The floor of the drift is rather wet, but no standing water. I could not get below this level as the shaft is caved.

PDF PP 27 / tif 28

There are no surface improvements of any kind, no hoist, no buildings. The ladders are in fairly good condition, and, in addition to the ladderway, there is a hoist-way about three feet six inches in the clear.

A general sample of the ore pile at dump of No. 2 shaft is as follows:

Sample No. 14.

Silver 0.60 oz., Gold 0.20 oz., Total value \$6.37

Present Condition

The mine as it stands to-day is clearly a development proposition and as such is attractive. It is difficult to understand why certain work has not been done under ground and why other work has been done. It would seem wise and natural to have crosscut the 290 foot vein on the 400 foot and the 600 foot levels in order to determine the size and value of that particular vein at the lower level.

Little timbering is used underground, and the drifts are in good condition also the shaft with the exception of that portion below the 400 foot level.

Water, Roads, Power, Fuel

At the present time there is no water in the mine and none available for any purpose short of the Colorado River about ten miles away. In the event of a mill being built on the property water would have to be pumped that distance, or, the mill put near the river and there shipped that distance in some way.

There is no road, now, to the river. The road to Chloride--30 miles and no pole line constructed--so power would have to be developed by distillate, gasoline, or other fuel.

Development Plan

As it stands, this mine possesses good development features, and a plan for carrying on development of any sort would require an equipment of gasoline hoist, miscellaneous mining tools, head frame, and camp buildings. From an estimate which I have made, I feel this could be all accomplished inside ten thousand dollars. This would put the mine in condition to carry on the development on an efficient, and economical basis. The actual work of mining can be arranged on a contract basis for about fourteen dollars per running foot, this to include all expense. It would be necessary to employ someone to superintend the work and this could be arranged, I believe locally, on a very moderate, though efficient, basis. It would cost, also, about a thousand dollars to repair the shaft below the 400 foot level so work could be done from the 600 foot level.

Just what work should be done would be the subject of further study by the man engaged to superintend the development, but it is clear that exploration of the 290 foot vein from the lower levels should be about the first step to be taken.

Summary

In view of all circumstances, I feel that this property is well worthy of development, and if an arrangement can be made with the owner which would seem fair in view of the condition of the mine I would advise that a fund be provided and the development undertaken. It would seem quite probable that development would bring to view substantial bodies of ore of attractive values.

Mr. Amaden--deceased--the former superintendent, made a very extensive and thorough sampling of this 290 foot level in 1909 and his average of 21 samples gives \$20.13 per ton of ore, with length of ore sheet about 80 feet, and average width of pay streak 34 inches.

Mr. Richard W. Alk, a mining engineer living at Chloride, Arizona, states that he sampled this same vein in 1922 and his estimate of the value of ore body is about \$17.00 per ton.

115 #29

Such ore as this with the present lack of facilities for transportation would hardly pay to ship, nor would it probably be very profitable to mine and mill the ore with the lack of water, high priced fuel, and other conditions, but it is only a question of time when the railroad should come closer to the mine, and when comparatively cheap power will be available, and these changes will make 16 to 18 dollars ore yield a good profit.

And, it is quite probable that, as the mine is intelligently developed, very high grade ore bodies may be found, which, under the present conditions, will show a good profit.

My feeling is that if \$30,000 to \$40,000 is raised and put into the hands of a man well experienced in mining the results will well justify the investment.

Respectfully submitted
(Signed) John L. Morrow

25 Church Street.
New York
January 24, 1924.

MINE PROSPECT FIELD VISIT DATA SUMMARY

Sheet 1 of 2

COMMODITIES AuMILS ID No. 157B Date 10-3-86ENGINEER Nyal J. NiemuthINFORMATION FROM: Seth Johnson and Kelly MulgrewPROPERTY SUMMARY

- I. MINE NAME Goldbug Mine (f) OTHER POSSIBLE NAMES
INCLUDING ANY CLAIM NAMES NOTED _____
- II. LOCATION: T 26N R 21W SEC(S) 4 NE MINE DISTRICT _____
ELEV. _____ COUNTY Mohave TOPO QUAD. _____
DIRECTIONS As on topo
- MAP ATTACHED yes
- III. OWNERSHIP: NAME Jerry Haynes PHONE 753-3821
ADDRESS: 1025 Lydia Dr., Kingman, AZ 86401
COMPANY NAME IF ANY: Ivy Minerals, P.O. Box 2532, Boise, ID 83701
PERTINENT PEOPLE Bill Vanderwal
- IV. PROPERTY AND HOLDINGS: Patented mining claims
- V. PAST PRODUCTION - NOTED, KNOWN, PROBABLE, UNKNOWN, NONE Noted
- IV. CURRENT STATUS: Active (drilling completed, underground rehabilitating)
- IIV. WORKINGS: 3 shafts caved and/or timber of collar dangerous #120' deep
currently being cleaned out with crane mounted clam shell. New drift will be
driven to north on that level.
- IIV. GEOLOGY AND MINERALOGY: DEPOSIT TYPE: gold - quartz veins
LENGTH: +500' WIDTH: 1-3' VEIN STRIKE N25E sinuous DIP near verticle
HOST ROCK: Pre cambrian chloritic shist and gneiss, cretaceous volcanic cover
ECONOMIC MINERALS: coarse gold in oxidized quartz veins
- COMMENTS: main veins are sinuous both laterally and with depth. Numerous cross
veins cut 2 main veins which are about 50' apart.
- IX. EQUIPMENT ON SIGHT: crane with clam shell. Timber stockpile for underground
workings

X. SAMPLING: NOTE TYPE IF Any, DRILLING? Drainage to north has been pitted and
trenched to evaluate placer. Sampling averaged .0015 oz Au/yard. Recent
drilling by Ivy Minerals in lode has totaled 4000' of airtrack drilling
(80' deep holes) and 14 reverse circulation rotary, the deepest of which was 400'.

XI. REFERENCES AND REMARKS Tentative plans are to drive drift under discovery and
selectively mine it. Ore produced may be milled at Kemble Camp's mill.

X. (CONT) Drilling has identified a small (<5000 tons?) of high grade (1 oz or better?)
pod north of the #1 shaft on the west vein.

COPY

C. B. Amsden,
Mining Engineer,
Examinations & Reports

Pioche, Nevada.
May 23, 1921.

Mr. H. J. Marmain,
1028 First National Bank Bldg.,
Chicago, Illinois.

Dear Mr. Marmain:

I wrote you in my last letter that I thought I should get up a regular report on the Gold Bug, but when I made the attempt I found that I could not, from memory, supply the necessary exact facts and figures that I once had in my head, and besides I did not dare to dwell on early history or give estimates of early production and shipments, for fear of seeming to contradict the original "story" which you had from Mr. Crosby, and which you no doubt passed along to your friends and associates. I shall therefore discuss the matter informally with you in the hope that you may derive some help from this letter.

All the claims comprising the Gold Bug group have one or more well defined veins upon which more or less work has been done. Many of these veins look good, and ought to assay, but so far as I have been able to test them, but ~~4~~ make encouraging showing of values, although very probably there are places where commercial values exist, that have not been discovered. The veins are softer than the enclosing rocks, consequently there is no outcrop, and the course of the veins on the surface can only be determined by digging.

There is a tunnel, probably in the Little Daisy claim, in the hill back of the old office building, toward the west, which in places, shows some pretty good ore, but is so "spotted" and uncertain that I gave it up in despair. I believe this tunnel is nearly 200 feet ~~xxx~~ long, with a 20 foot winze sunk in the floor about half way from the portal. I have sampled these workings several times very thoroughly, sometimes getting quite flattering assay results, but when I come to verify them, by resampling, I generally met with disappointment, and was finally forced to the reluctant conclusion that no regular ore-shoot existed, but the mineralization was too erratic to justify further development until the property was on a paying basis, since there are more encouraging places to develop.

The Boana Vista vein is strong and shows ore in at least 2 places a considerable distance apart, indicating a possible long ore-shoot. I have never attempted any development for the same reason that applies to the Little Daisy vein, that is there have always been more encouraging places to spend the money, and there is the additional reason that I have always expected to drive toward the East, and from some level in the main shaft, which would prospect the veins at depth without the expense of sinking another shaft for prospecting purposes. I believe, however, that this vein deserves development, and if the long crosscut is to be long deferred it will be wise to do some work to prove it up.

The original discovery was made in Shaft No.1, which is now about 125 feet deep. The rich ore began at the surface and extended downward between 40 and 50 feet while along the vein the shoot was probably 100 feet in length. The vein filling was all ore, and I have no doubt that the whole body of quartz was rich enough to stand the expense of shipment to Denver, which was at that time, included a 50 mile wagon haul to Kingman, a terrific freight charge on the railroad besides a high treatment charge. As to the value per ton of the ore shipped to the smelters, probably none of it ran less than \$250.00 per ton, and I recall one carload, that I saw sampled, which was purchased at \$800.00 or 40 ounces gold, per ton. I picked around a good deal in the car and every piece showed gold.

This ore was rather narrow at the surface, possibly 18 inches wide gradually widening to a maximum thickness of 44 inches. Toward the North it thinned out to a feather edge, holding its value to the last: but going South, its character changed from a highly colored iron stained, friable quartz, filled with free gold, to a hard white quartz, showing little visible gold,

and narrowing down to about 12 inches in width. I saw its remarkable ore-body at its best, when I visited the property, with Mr. Crosby, in August, 1892. When I personally took charge of operations in December, or it may have been in September, 1892, it was supposed that all of the ore of any value had been mined out, but I discovered that the hard, apparently barren, quartz left, was really good milling ore, and I sent one lot to the mill on the Colorado River, operated by Monaghan and Murphy, that yielded \$105.00 per ton, by simple amalgamation. After the shipping ore had been cleaned up there was left on the dump, a pile of big white coarse quartz, that was sent down to the Colorado River and crushed in a Bryan Mill operated by I. E. Blake, and a yield of \$40.00 a ton obtained.

Shaft No. 3 is situated about 220 feet Southwest from shaft No. 1 and is supposedly the same vein. The ore in this shaft was very much like that at No. 1, except that it was not so wide and not so rich, being worth about \$100.00 per ton just as it was mined. While the ore was not so extensive and the general average not too high in grade, some of it was richer than any I ever saw from No. 1 shaft. The large specimen which, no doubt, you saw at Colorado Springs, was from here. My assays of this specimen indicated a value of \$500.00 gold per ton, but I have always believed that it was worth more, and that my sample was not representative. This ore pinched out at just about the same depth as that in No. 1. While there is scarcely room for doubt that the two shafts are in the same vein, the fact has never been proven, since the two drifts which I started toward each other, never were connected.

I have always felt that more work should be done in this vein, since the greater part of the money received from ore sales must be credited to this vein. I drove out from the 240 foot level in No. 2 shaft about 150 feet in a cross cut toward the West in an effort to find this vein at depth, but was obliged to stop work before decisive results were obtained. I was never sure that I had gone far enough to catch the vein, which dips away. I knew the general impression among the miners who worked in the cross cut was that the vein was still ahead of us.

Shaft No. 3, below the ore never showed any encouragement, but in shaft No. 1, the vein was exposed near the bottom where it was but 2 or 3 inches wide, and not of much value, but the fact that it "came" back" was encouraging. I have regretted that I did not continue the work here during Mr. Crosby's administration, while we had money "to burn", so to speak.

The strike of No. 2 vein points to No. 1 shaft, but the actual intersection of the two veins has never been disclosed either on the surface or underground. I believe that vein No. 2 passes a few feet East of shaft No. 1, which would go through the intersection somewhere North of that shaft. I have always realized the possibilities centering around this intersection, but something has always prevented my reaching it with my underground workings. The vein will intersect at a very acute angle, which has been found especially favorable to deposition of ore.

The original discoverers of the Gold Bug first found "float" in the wash below the site of the boarding house, and traced it up the hill to the vein. There were still rich specimens of float to be found after I came on the scene, as one of my children found a very fine piece of it. I have an idea that if water for sluicing were available, surprising results might be obtained from the gravel right in the old camp.

There was a tradition that rich float has been found in the next little wash or gulch, lying North of shaft No. 1, and if this is true it would be strong evidence of the existence of another rich bunch of ore North of shaft No. 1. There is no denying that conditions are favorable for an ore shoot there, and I hope to see a level driven in that direction far enough to thoroughly explore the North end of the claim.

With Vein No. 2 is opened by shaft No. 2, sunk to a depth of 500 feet vertically and located about 225 feet Southwesterly from No. 1 shaft. Vein No. 2 is much softer than vein No. 1 and there is no outcrop or surface exposure, except in some shallow cuts lying to the Southwest of the shaft.

The ore which comes to the surface around the collar of No. 2 shaft, like those of No. 1 and No. 3, cut out from 70 feet from the surface, which allowing for the difference in elevation at the collars is on the same level at which the ore disappeared in the last mentioned shafts. This break in the ore at about the same level in all the shafts may be merely a coincidence, or it may be of considerable significance, and may offer substantial encouragement for the prospecting of No. 1 vein at depth. In all three instances the ore disappeared near the surface and was not found below, it would be reasonable to suppose the occurrences were due to surface infiltrations and only superficial deposits could be expected, but the finding of the important body of ore on the 290 foot level in No. 2 vein, demonstrates beyond controversy, that in the No. 2 vein there is only a temporary interruption of the mineralization, due to faulting and movement after the veins were formed and the ore deposited, and there is every reason for believing the same thing occurred in vein No. 1. If better values are found below a barren zone in one vein, why not expect like conditions to exist in the other one.

With reference to leaching in the zone of oxidation with redeposition and secondary enrichment in the sulphide zone at water level or just below it, it can be said that all the elements and conditions barring only one, promulgated by W. H. Emmons, who is considered the highest authority on the mineralization and enrichment of ore deposits, are present in vein No. 2. The one unfavorable condition is the presence of calcite in the vein which is supposed to retard the migration of gold. Notwithstanding the presence of calcite, there is abundant evidence that leaching has taken place, in the vein as far down as the 240 level, where can be seen a mass of spongy, cellular quartz, showing numerous casts from which the sulphide has been removed and frequently, in these casts thin films of metallic gold are to be seen. It is significant that immediately below, in the 290 foot level there was found the richest specimens of free gold ever taken from the property.*

The ore in No. 2 vein carries a far greater proportion of silver than does vein No. 1. In the upper levels this silver is frequently in the form of horn silver and sometimes it is very rich. Vanadium is associated with the best ore and the presence of galena is always an indication of rich gold ore.

The 800 tons of ore milled in the Company's mill at the River came from the stopes above the 70 foot level in No. 2 shaft. While the 70 foot level was in a large body of excellent ore, a winze sunk in the floor passed into broken barren ground within a few feet.

The 140 foot level in No. 2 shaft corresponds to the 120 foot level in the No. 1 shaft and the two shafts are connected on this level. The No. 2 vein is a blank on the 140 foot level, although the greatest amount of work was done here, the vein appears to be wiped out by faults which has crushed the vein out of existence between the 70 foot level and the 140 foot level, where it begins to assume a normal position, and the ore commences to show values again.

On the 290 foot level, usually called the 300, the vein makes the best showing, there is exposed a body of ore which commences about 50 feet Southeast of the shaft, and extends about 90 feet. The vein here is about 6 feet wide, with a pay streak on the west wall averaging 34 inches in width, which has been repeatedly sampled at five foot intervals both top and bottom of drift, showing average value of about \$30.00 per ton, at the present price of silver, which constitutes half of the total value of the ore. This ore body broke off toward the southwest when a disturbed region was encountered.

The vein northeast from the shaft is well defined, there is about a foot of quartz which does not show sufficient value to be classed as ore. This drift should be, by all means extended, for two reasons, on general principles any ore vein which is known to contain an ore shoot, should be thoroughly prospected as long as it can be followed, and secondly it will be heading toward the intersection of the veins.

Below the level just described, the shaft followed the vein vertically to the 400 foot level, there being some good ore and occasionally all the way down. I was not disappointed that no better showing was made by the shaft, because the ore in the level at 290 feet, was not found nearer than about 50 feet southwest of the shaft, and is supposed to incline downward away from it. On the 400 level all the work was done on the southwest from the shaft. The zone of fissuring here is much wider than at any point above, and I made the mistake of drifting on what I supposed was the vein, before I discovered that I was running parallel to the ore and a few feet east of it. The drift disclosed a good looking body of quartz from which some good assays were obtained, and an occasional specimen of free gold found, but the showing so far made is not anywhere as good as that on the 290 foot level. There is much work to be done on this level before we can tell much about it. A drift should be driven to the northeast, after the vein is cross-cut, and more work should be done southwest of the shaft. While we have as yet, failed to find the ore as large and rich as that 100 feet above, we are not yet through with it, and the fact that we find the vein so large and well defined is distinctly encouraging.

The shaft followed the vein for about 50 feet below the 400 foot level, but suddenly changed its dip and went into the west wall. I was continually on the job until the shaft was 450 feet deep, when I was called away by your kind suggestion that I take a couple of weeks vacation. I placed Mose Lyon in charge with instructions to watch the shaft, but when I returned I found he had not been down in it while I was absent. The sinking The sinking had gone on satisfactorily, but the vein was lost and the shaft timbered up so I could not inspect it without considerable expense. I naturally expected to pick it up on the 500 foot level but the rock is hard for hand work and I was never able to find it in the drifts and cross cuts which I made. Considering the steady improvement in the size of the vein from the surface to the 400 foot level I have no fear of its quitting between the 450 and 500 foot level in fact I have never known of a vein bottoming.

Now as to "what can be accomplished with \$50,000.00", after expending \$5,000.00 in settling up old debts and allowing \$15,000.00 for surface plant and equipment, we shall have \$30,000.00 for development. I have already indicated to you the kind of plant I should advise, which provides for a compressor plant of three jackhammer drill capacity, and a hoist of ample power to sink the shaft to 1000 feet in depth.

I believe this "statement" will convince you that the sinking of the shaft is not the first thing to be done when operations are resumed. The further sinking of the shaft is going to be rather expensive and will hamper the other work to a certain extent. Before the shaft is deepened, the vein should be located on the 500 foot level, for if it is toward the southwest, as it appears likely to do, for immediate results I would strongly advise a winze down in the ore from the 500 level, for prospecting purposes.

If the proposed prospecting work brings any good results toward the north the property may be put on a paying basis before it will be necessary to deepen the shaft. It may be you can raise money to sink deeper, easier than for any other purpose, but put that off as long as possible, because of the great expense of sinking, and because other development I have named is more likely to bring early results.

The possibility of locating other surface deposits of rich ore, has always appealed to me as it did to Mr. E. E. Olcott, the engineer sent out for the Vanderbilt interests to report on the property in 1894. If another such a bunch of ore could be opened in vein No. 1, it would boom Gold Bug stock to the skies; the Katherine would not be in it.

In estimating the early production of rich ore, there is one feature that deserves consideration, and that is the large amount of very rich specimens that were encountered all over the country. I have an idea that \$1000.00 would not cover the value of the ore taken by and sent to Mr. Crosby. Specimens were plentiful in every saloon in Kingman and all the towns along the railroad property -- everybody had a specimen or two, wherever you went. All the old desert prospectors made pilgrimage to the

~~scene~~ scene of the sensational strike, and carried away all they wanted of the ore. It was the most talked of strike I have ever known made in the desert. In estimating the output of ore you are justified in giving large consideration to the ore carried away as specimens, which are always the best and very richest ore.

I cannot make even an intelligent attempt to say, in money or tonnage of ore, what may be accomplished by the expenditure of \$50,000.00 but I can say that it will be legitimately and wisely used in prospecting one of the richest gold veins that remains undeveloped anywhere in the River Range, which, extending from White Hills southward beyond Oatman is known to be the richest in gold of any part of Arizona.

It is true that a large sum has ~~been~~ already been expended in developing the Gold Bug, but inspections of the workings discloses the fact that a large part of it was for work entirely off the vein, and in preliminary work always necessary in the beginning of large operations. The new investors will have the benefit of the expenditure and experience of their predecessors.

With reference to the geology of the Gold Bug, the prevailing rock composing Gold Bug Mountain is schist, with occasional dykes of eruptive rock, chiefly Andesite, locally called "porphyry". There is a heavy intrusion of Andesite exposed in a tunnel situated about half way up the summit of the mountain, above the main shaft, and probably on the Boana Vista claim. Not enough work has been done to determine the boundaries of this intrusion, or its relation to the vein and ore bodies, but as Andesite is considered an essential accompaniment or ore in the mines along the River Range; I have no doubt it will be encountered in the workings eventually.

The rock immediately enclosing the veins is exceptionally hard and close grained, resembling eruptive, but as good an authority as T. A. Rickard has pronounced it an altered schist, which I have no doubt, is the proper classification.

With reference to the first work I should like to do when operations are resumed, of course the vein must be located on the bottom level, which will take one drill. I should do some cross cutting on the 400 level, which will take a second drill, and I believe I should employ the third drill in extending the drift to the North on the 300 level. This programme can be changed any time developments alter conditions, as they no doubt will. There is one thing to remember in planning development work, and that is, very frequently work in one locality renders development planned for another place, unnecessary. It does not always pay to rush development in too many places at the same time.

When circumstances permit there should be a long cross cut driven from some level, (probably the 500 will be best) into the hill, toward the East to explore the Andesite and Boana Vista, as before suggested.

With reference to the deepening of the shaft, the only immediate advantage would be in the water supply we should undoubtedly secure. If the permanent water is going to be anything like the small flow we have at the 500 level, it will not be good for anything but to cool our engines and a compressor. We shall have to keep a truck anyway, and the cooking water we shall need will not add much to our expenses.

I regret that I have not data at hand to enable me to make this statement more complete in details, but I believe you have the essential facts. You may recall that I made a report, quite complete to you, in the fall of 1908, of which I kept a copy, but unfortunately I have lost it or have stored it away somewhere. Sometimes I would like to have a copy made from your original, as it contained information covering the entire workings, that it will be almost impossible for me to obtain.

Very sincerely your,

(Signed) O. B. Amsden.

412 37

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A SUMMARY REVIEW REPORT
ON THE
GOLD BUG MINE (f)
MOHAVE COUNTY, ARIZONA

by
William Vanderwall
Registered Geologist - State of Arizona
May, 1988

Introduction:

The Gold Bug is a fully operational underground gold mine. Over the past two years Ivy Minerals, as general partner of Gold Bug Partners Limited, has completed considerable work on the property. Beginning in 1986, exploration work, consisting of surface mapping and sampling followed by shallow and deep drilling, discovered and delineated a small but high-grade ore shoot. Subsequently, an existing shaft was rehabilitated and new drift driven to the shoot. The shoot was raised on, exposing obvious gold ore. During this time metallurgical tests were conducted on rejects from samples of drillhole cuttings. Based on the results a semi-portable one ton per hour gravity mill and agitated cyanide leach facility was designed, constructed and installed on the property. It is permitted and operational. Presently the mill and the mine are idle. The Partners are offering the mine for sale and the equipment for lease.

The reasons for offering the property for sale at this point in its development are as follows: Subsequent to the Gold Bug development decision, Ivy Minerals Inc. has developed several potential intermediate size low grade gold deposits, the most prominent presently containing 450,000 tons of reserves grading .025 ounces of gold per ton (opt.) with the ore body being open to further extensions on two sides. Another mineralized zone contains 3.2 million tons of geologically inferred reserves grading .015 opt. Both deposits, along with other attractive structures the Company has located, require substantial additional drilling.

Rather than continuing the time and financial investment in the Gold Bug Property that is required for stope development,

production and the deliniation of additional reserves, Ivy Minerals would rather devote its limited financial and management resources to its other potentially larger projects. In addition, the sale of the Gold Bug Mine and lease of the equipment would also allow Ivy Minerals to further enhance its larger properties by reinvesting the capital it has employed in the Gold Bug Mine.

Property:

The Gold Bug Property consists of five patented mining claims. The property is held by the Gold Bug Partners under a purchase agreement with the owners. The holding cost is \$750.00 per month. The agreement provides for 6% NSR royalty to the owners until the purchase price of \$625,000.00 is paid.

A title search undertaken by Transamerica Title Company shows a clean chain of title, vested in the owners.

Location, Access and Physiography:

The property is located in the Black Mountains of northwestern Arizona approximately 50 miles north of Kingman. More specifically, it is located in Section 4; Township 26 North; Range 21 West, GSRM, Mohave County, Arizona. See figures 1&2.

It is readily accessible by high clearance two-wheel drive vehicle. From Kingman or Las Vegas take highway 93 to mile market 29 1/2 where White Hills Road intersects the highway. Take White Hills Road west four miles to the mine.

The physiography is characterized by low hills trending northwesterly paralleling the Black Mountains. Topographically elevations are moderate ranging from 2800 feet to 3300 feet above sea level. These foothills are covered by a desert environment

with vegetation limited to sparse grasses, low bushes and cacti. The climate is mild with hot summers and cool winters and little rainfall.

Maps:

USGS Mt. Perkins Quadrangle, Arizona-Nevada, 15 Minute Series.

USGS Boulder City: Nevada-Arizona, 1:100,000 scale.

Published Reports:

USGS Bulletin 397, by F.C. Schrader, 1909, pp 217-218.

History:

The Gold Bug Mine lies in an area rich and colorful in Arizona mining history. Gold discoveries in the Black Mountains at the turn of the century helped settle northwestern Arizona. According to Schrader the Gold Bug, like many other neighboring mines, was responsible for producing extremely rich ore. For example, in 1895 the Gold Bug produced 50 tons of ore averaging 43 ounces of gold per ton.

Chronologically, the history of the property starts with the discovery by two prospectors in 1892. They reportedly mined some extremely rich ore and sold the property the following year. In 1895, 50 tons of select ore was shipped. Between 1895 and 1903 the owners built a mill on the Colorado River and shipped an unknown quantity of ore reported to average 1.5 ounces of gold per ton (opt). In 1908 or 1909 the main shaft was deepened to 500 feet and an orebody on the 290 foot level was developed but not mined. In 1931 just over a thousand tons of 2.0 opt material was mined from the 140 level and shipped to the mill at Kemple Camp. During 1936 to 1938 the ore developed on the 290 level was mined and shipped to the Producers Mill, this ore reportedly

averaged 2.25 opt. In 1982, G.R. Haynes of Kingman, mined about 30 tons of average 2.0 opt ore from an open cut. Mr. Haynes retains a briefcase full of specimens from this activity.

Gold Bug Partners Ltd. acquired the property in 1986. In 1988 the Gold Bug Partners sorted about 10 tons of ore from the finger raise in the orebody they discovered and it ran over 2.0 opt. A five gallon bucket full of specimens from this raise was retained for examination.

Historically, the mine has produced high-grade ore from isolated shoots when a mill was locally available. Schrader reports that at the time of his visit some 15 shafts and open cuts existed on the Gold Bug. From the records, it generally appears shafts or surface cuts were dug or underground works were developed where promising looking material was encountered and work progressed as long as encouraging material was found. Also, from the record, it is clear that ore pinches off laterally and passes into low-grade sulfides at depth.

Geology and Mineralization:

The property lies in the eastern foothills of the Black Mountains which are composed of precambrian metamorphic rocks overlain by a thick sequence of tertiary volcanics. The Black Mountains are located within the Basin and Range tectonic province and is one of many northwest trending fault block mountain ranges of the Southwest.

Country rock at the Gold Bug is precambrian meta-sediments which have been turned nearly vertical and intruded by volcanic (andesite) and granodiorite dikes. Mineralized quartz veins are associated with the dikes.

The area is quite structurally complex being extensively fractured and faulted. Major faults trend northeast paralleling schistosity while subordinate faults trend northwest to east-west, the latter appear to be younger and sometimes contain pegmatite dikes. The oldest dikes appear to be the granodiorites from cross-cutting relationships, the andesites and pegmatites probably represent renewed activity during tertiary time. Quartz veins are known to cut dykes of both ages.

The veins occur in nearly vertical fault fissures. They are always associated with the dikes and appear to favor the hanging wall of the andesite. The fault fissures are largely occupied by breccia with abundant shearing and some gouge. Ore shoots occur in clusters and tend to have a greater vertical rather than horizontal extent. Concentrations of extremely rich ore favor fault flexures and junctions.

Primary mineralization as evidenced by relict boxwork structure, surviving sulfide species and secondary minerals, appears to be pyrite chalcopyrite and galena. The oxidized portion of the veins ranges to 300 feet deep and contains copper and lead carbonates, iron and manganese oxides, vanadinite, cerargyrite and native gold.

Gold occurs as microscopic and larger flakes and pieces occurring loose in fractures, crystalline growths and encrustations in vugs and boxworks and small veinlets in hard quartz. It is believed the majority of the gold is secondary enrichment being deposited by the downward migration of slightly acid rainwater carrying the metal in solution during the normal weathering process.

Exploration:

The Gold Bug Partners focused exploration on the area shown on the attached maps; i.e. the vicinity of shafts 1,2&3. Map 1 shows the veins and sample results from vein material, which should be used in conjunction with map 3 which shows geology and structure. Additional samples were taken from country rock and wall rock to the veins but the results were consistently barren and were not plotted. More detailed work was performed north of the shafts based on the reasoning that previous work had concentrated south of the shafts and ore in this area has probably been mined out. Two veins showed a high probability of containing virgin ore shoots, vein 1 emanating northeast of shaft 1 and vein 2 northeast of shaft 2.

A shallow drilling program was undertaken to systematically test the veins along strike. Holes were drilled at close intervals using an IR250 air track drill. Samples were collected at five foot intervals. Hole locations and assay results (greater than 0.02opt) are shown on map 2. Assaying was primarily intended to confirm the existence of an ore vein since dilution and cross-contamination in an air track hole must be expected.

Shallow drilling showed the richest ore seam to be vein 1. It contained consistently high intercepts when the vein was encountered plus showed two distinctly anomalous zones; one at the intersection of veins 1 and AH51, in hole AH51-1, and under the 1982 cut, in holes AH 8,9&16. Considering the possibility that this intersection and structural flexure could provide the locus for widening of the vein, a deep drilling program was initiated in this location. Holes were drilled using the reverse circulation method to minimize contamination. Hole locations (RC series) are plotted on map 3. Supplemental maps 3A and 3B show cross-sections, critical lithology and anomalous assays.

Deep drilling indicated the AH51 vein is not continuous to depth, nor is the flexure at the junction of the veins significant. More encouraging results were obtained from intersections with vein 1. All holes intersected the vein (except RC 102) indicating a greater than 90% continuity to a depth as great as 240 feet. Hole RC 1 appears to have intersected the vein beyond what was thought to be the fault termination of vein 1. Also, holed RC 4, 6, 101, 103 and 104 delineated a cigar shaped ore shoot existing under the 1982 cut.

Also, six reverse circulation drillholes along vein 2 are shown on map 3. Where encountered the vein was low grade therefore, no additional reserves were generated by the RC 200 series program.

This leaves the property with three potential ore sources which are, as yet, substantially unexplored. The area south of the shaft which was the focus of previous mining and may contain additional ore. The pegmatite dike where the PD series of air track holes indicated an anomaly. And other vein potential on the property, namely, the Mariposa and Buena Vista veins.

Engineering and Development:

Given the discovery of a virgin ore shoot, the continuity of the vein in the vicinity of the shoot and the production history of the property, an engineering study was undertaken. It's purpose was to determine the mining method for the stope and the feasibility of utilizing the existing shaft and underground workings to minimize the costs of drifting under the ore shoot. The report is attached as appendix A.

The number 2 shaft was mucked out and retimbered to the 240 level and the existing drift was rehabilitated in early 1987.

New drift was driven to the ore shoot and in January 1988 the first of two raises was driven in ore. A cribbed raise with ore chute was installed for 25 feet where the ore pinched and was lost. Two cars of high-grade ore were mined from this raise and from which eight ounces of gold were recovered. This small sub-parallel or faulted piece of the shoot was abandoned in favor of developing the target ore shoot. It is available for extraction.

The targeted ore shoot was opened in March 1988 and a finger raise was driven to the drillhole intersection (RC 4) at the 150 level. This raise is not timbered but is open and shows obvious gold ore. The ground is holding and it appears the resuing method can be successfully used to extract the ore. The exposed ore averages a foot in width. See map 4 for the plan and cross-section of the workings on the 240 level.

Metallurgy:

Concurrent with mine development, metallurgical testing was performed on drill cuttings and surface samples. Two identical tests were performed by commercial ore testing services. Results were in agreement and indicated that in excess of 90% recovery could be expected by using a gravity circuit followed by an agitated cyanide leach. Mill requirements and test results are attached in appendix B.

A one (plus) ton per hour, semi-portable mill was constructed and installed on the property. Appendix C shows the mill circuitry. The mill is fully permitted and operational.

Approximately 60 tons of development ore has been processed by the mill with a calculated recovery of 90%.

Ore Reserves:

Drillhole intercepts and surface and underground exposures indicate the ore shoot contains approximately 275 tons of ore calculated by the following exercise:

240' deep X 20' long X 1' wide, divided by 14 cu ft/t = 342 tons, assume 20% void space leaves 275 tons.

Historically, the ore has averaged over 2 opt with higher grade pockets. In addition, the likelihood of recovering specimen grade material should not be overlooked.

Furthermore, profitable mill grade ore may be developed along stope margins and by the discovery of additional shoots on existing known vein structures. Opportunity also exists for the development of reserves on the three substantially unexplored areas mentioned above.

Summary:

The Gold Bug Property represents a unique opportunity for acquiring an operational gold property with a substantial portion of the risk eliminated. It has a partially drilled out reserve that is developed and ready for immediate production.

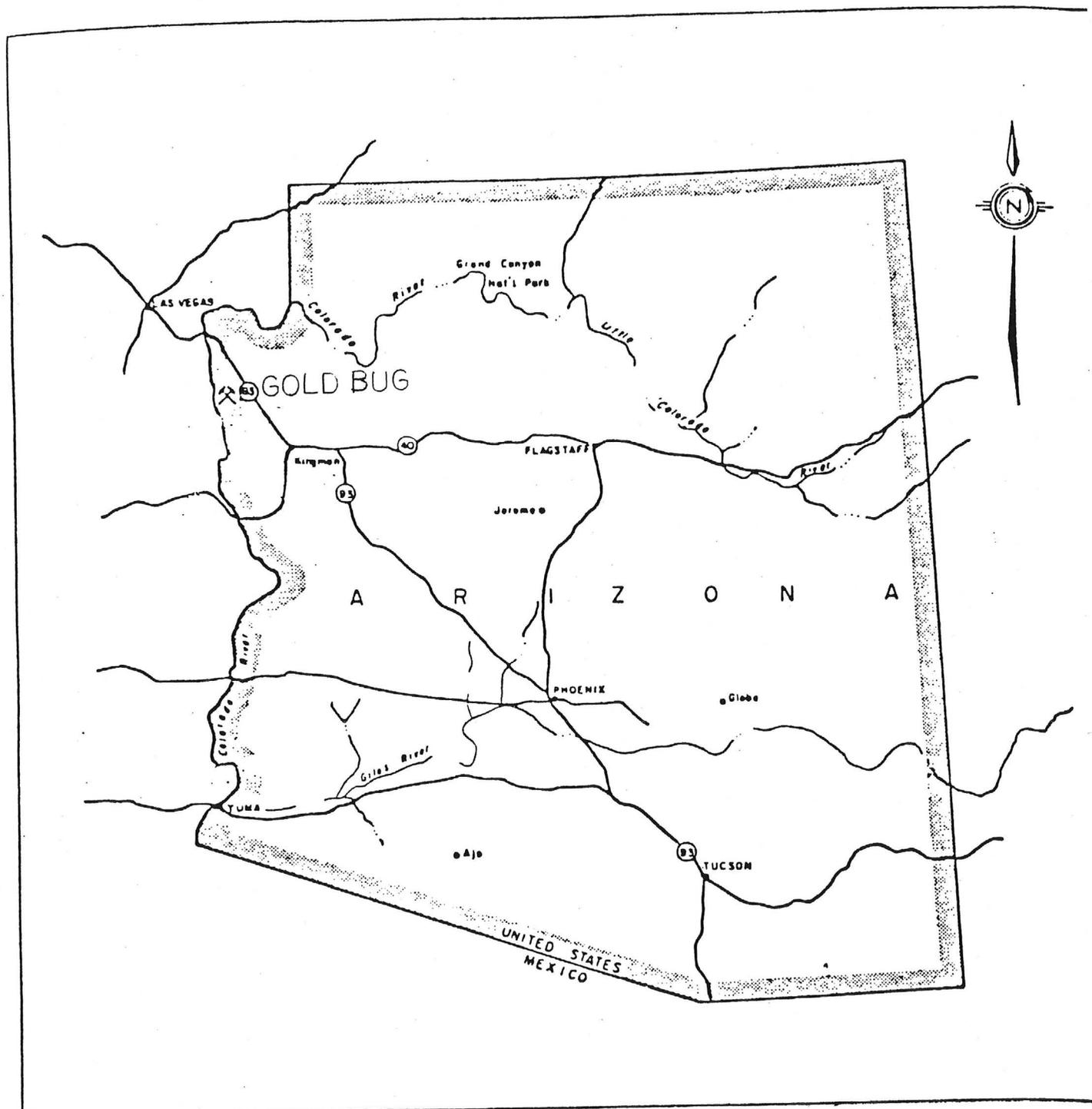
Respectfully Submitted,

Wm. Vanderwall
Registered Geologist - State of Arizona
A48

ATTACHMENTS AND ENCLOSURES

Figure 1	General Location, Gold Bug Mine Mohave County, Arizona
Figure 2	Site Location, Gold Bug Mine Mohave County, Arizona
Appendix A	Proposed Mining Method and Cost Schedule for the Gold Bug 240 Stope by Kevin Hanna
Appendix B	Recommendation for a Mill to Treat Ore from the Gold Bug Mine by Ken B. Hall
Appendix C	Gold Bug Mine - Mill Process Flow Sheet
Map 1	Gold Bug : Vein Sampling
Map 2	Gold Bug : Drilling Data (Shallow)
Map 3	Gold Bug : Geology - Showing Deep Drillhole Locations
Map 3A&B	Gold Bug : Supplement to Map 3 Showing Deep Drillhole Cross Sections
Map 4	Gold Bug : Underground Workings 240 Level

FIGURE 1 General Location
Gold Bug Mine
Mohave County
Arizona



MT. PERKINS QU
ARIZONA-NE
15 MINUTE SERIES (

713 3055 1 (BLACK CANYON) 716 717 718 35' 719 720 721 R 21 W 270 000. FEET (ARIZ.) 724

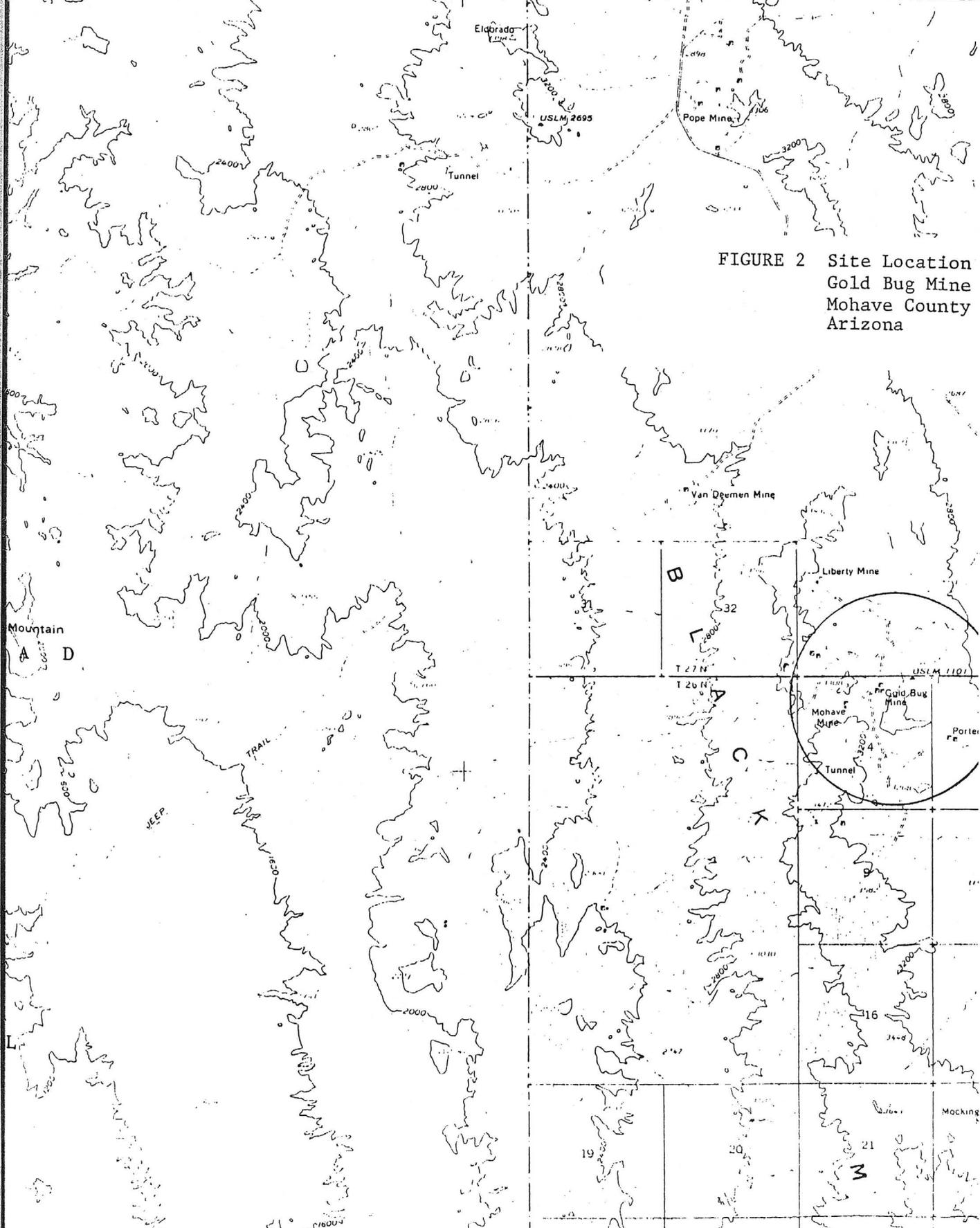


FIGURE 2 Site Location
Gold Bug Mine
Mohave County
Arizona

APPENDIX A

PROPOSED MINING METHOD AND COST SCHEDULE
FOR THE GOLD BUG 240 STOPE

Done for: Ivy Minerals
P.O. Box 2532
Boise, ID 83701

By: Kevin Hanna
May 11, 1987

Kevin Hanna
5/11/87

MINING METHOD:

The narrow high grade nature of the ore shoot at the Gold Bug Mine, as delineated by previous drilling, dictates that conventional overhand stoping with resuing be utilized as a means for mining that ore. It is expected that the value of the ore will more than offset the high cost of breaking waste for resuing.

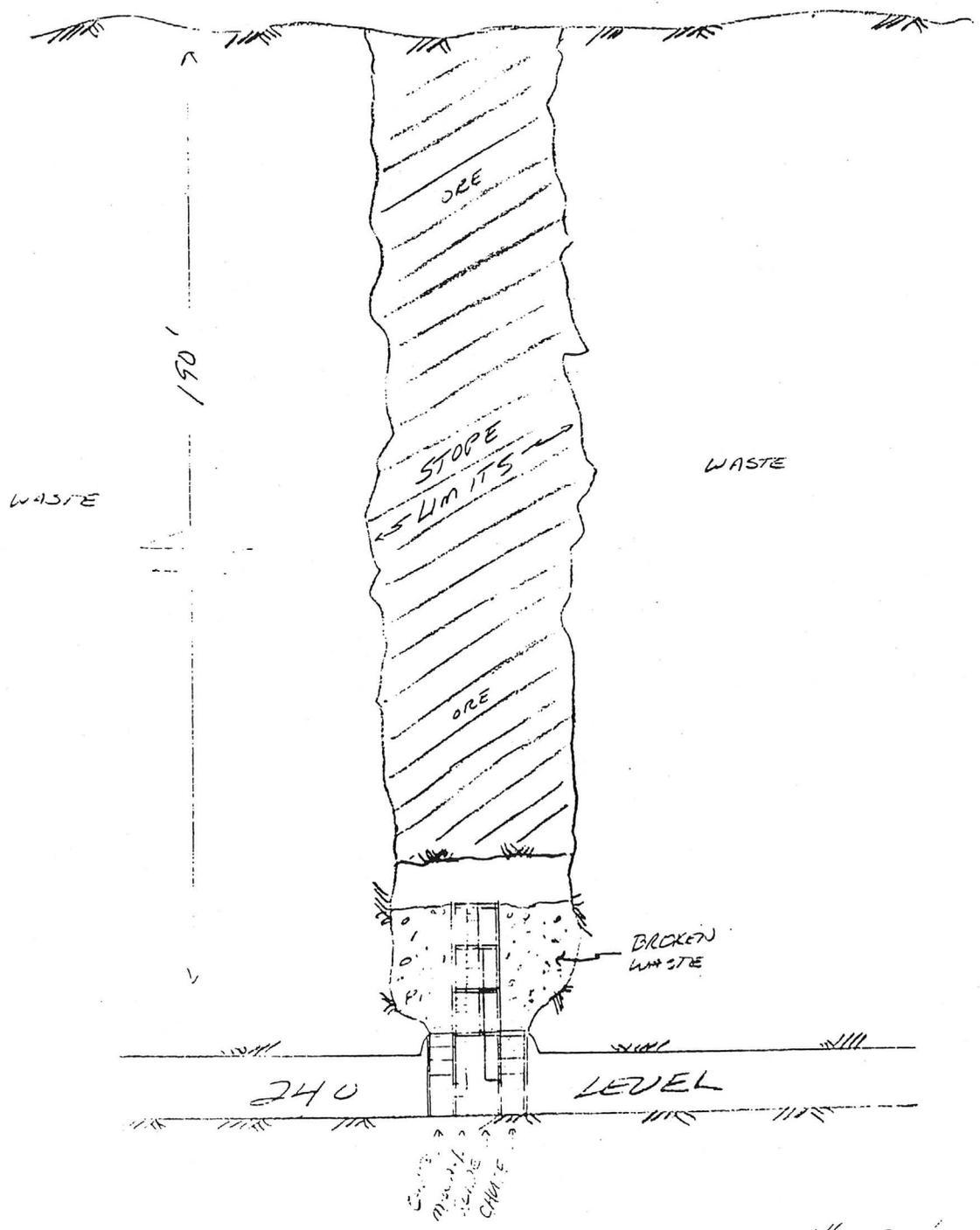
A case for shrinkage stoping might be made in this instance, but it is believed that the savings in mining costs will be offset by losses due to :

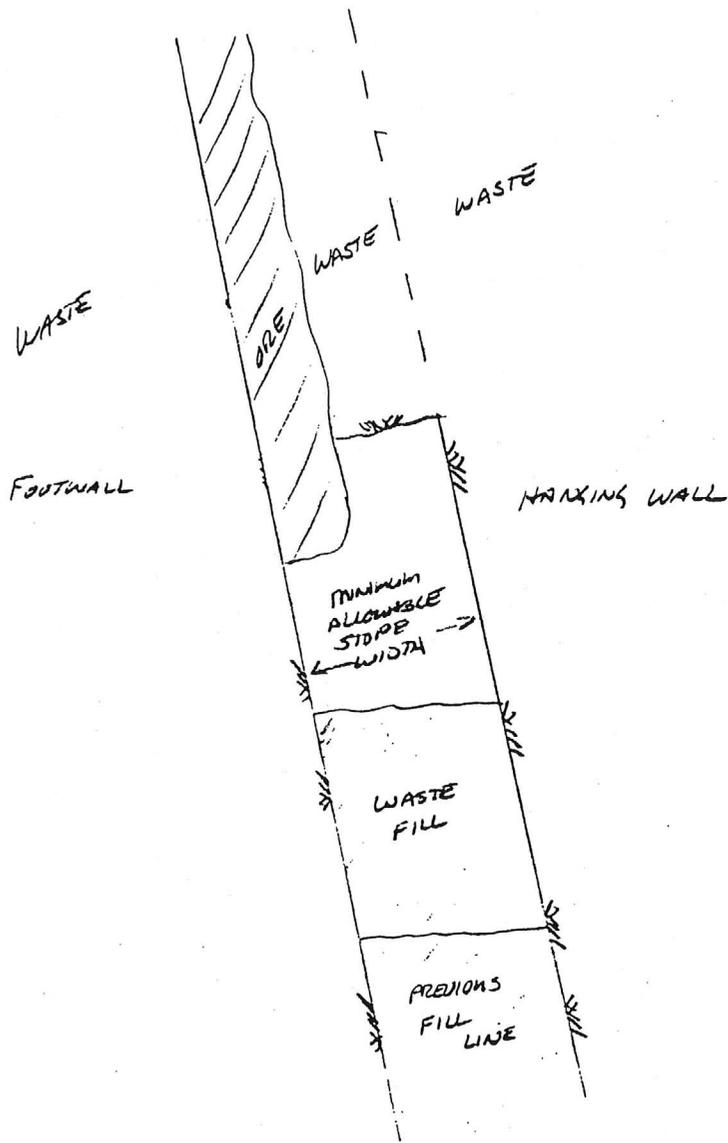
1. Dilution from mixing ore and waste.
2. Additional dilution of ore from caving stope walls during stope drawdown. The degree of jointing in the Gold Bug wall rock will most certainly result in stope wall caving, chute hangups, the need for additional blasting in hung up chutes, and continuous timber repair.
3. Higher milling costs.
4. Greater gold losses in mill tailings.

Because of this situation, the resuing method should be utilized in the Gold Bug Mine. The accompanying diagrams illustrate this method.

MINING COSTS:

Again, the narrow width, high grade "pockety" nature of the Gold Bug's ore poses a problem in estimating mining costs in that it is not likely that stoping will progress on a routine cyclical chronology. Irregular stope limits and high grade zones that will require slow and careful mining will probably not yield a production level in excess of 2 tons per man-shift. The cost estimates for the stoping phase of this project have been formulated using that figure. Initial capital investment, shaft rehabilitation, crosscutting costs and milling costs are not incorporated into the mining costs arrived at in this report.





CROSS SECTION IN SLOPE

Resulting Method of Striping

GOLD BUG MINE STOPING COSTS

1. Labor and Materials

Labor: 2 miners @ \$12.00/hr	-	\$192.00/shift
1 hoistman @ \$9.00/hr	-	72.00/shift
1 nipper @ \$6.00/hr	-	<u>48.00/shift</u>
		\$312.00/shift

\$312.00/shift X 1.5 (payroll burden) gives \$468.00/shift

say \$475.00/shift

Fuel: 30 gals/shift @ \$1.10/shift gives \$33.00/shift

say \$35.00/shift

Powder/Primers: (assume - electric primers, detaprime boosters,
ANFO Prills)

20 primers/boosters/shift @ \$1.50 gives \$30.00/shift

75 lbs. ANFO/shift @ \$14.00/cwt gives \$10.50/shift

total \$40.50/shift

say \$45.00/shift

Miscellaneous materials: (nails, wire, ladder stock, etc.)

say \$35.00/shift

Maintenance:

say \$15.00/shift

GRAND TOTAL: \$605.00/shift

say \$650.00/shift

2. Stope Preparation - Includes initial raise rounds, slab rounds, mucking,
installation of sill timber sets, slide, ladders,
chutes and chute gates, tugger, air and water lines.

5 shifts @ \$650.00 gives \$3250.00

say \$3250.00/shift

GOLD BUG MINE STOPING COSTS (cont'd)

3. Timber costs

Material - roughsawn Oregon fir @ \$320.00/unit
1 unit equals 1000 board ft. say \$.32/bd ft

Assume - 4 X 6 stall and post raise, 5 foot sets.

Requirements;

3	-	6" X 8" X 4' stulls	-	48 bd ft
6	-	4" X 6" X 4' posts	-	48
2	-	4" X 6" X 4' girts	-	16
2	-	4" X 6" X 2' girts	-	8
8	-	1" X 12" X 5' side lagging	-	40
4	-	1" X 12" X 5' slide	-	<u>20</u>

180 bd ft/set

190 ft of back/5 ft per set gives 38 sets required
38 sets X 180 bd ft per set gives 6840 bd ft of timber required
6840 bd ft of timber X \$.32 gives \$2188.80 for timber

say \$2500.00

4. Miner productivity

2 tons per man-shift (using 2 miners) yield 4 tons/shift
Expected tonnage from raise/stope - 190' X 4' X 20' gives 563 yds
563 yds X 2 tons per yd gives 1125 tons
1125 tons/1 shift per 4 tons gives 281 shifts.

say 280 shifts to mine out ore body

5. GRAND TOTAL

280 shifts X \$650.00/shift gives	\$182,000
stope preparation	3,250
timber costs	<u>2,500</u>

\$187,750

\$187,750/1125 tons (half ore, half waste) gives \$167.00/ton

or \$334.00/ton ore

GOLD BUG MINEJune 10, 1987Recommendations for a mill to treat ore from the Gold Bug Mine

An ore body has been located at the Gold Bug Mine near Dolan Springs, Arizona. A comprehensive drilling and sampling program has confirmed approximately 500 tons of ore at 3 ounces per short ton of ore and possibly 3,000 tons at 1/4 ounce per ton.

Development at the mine is underway. An old shaft has been renovated and a headframe and hoist have been installed. Drifts are being extended underground to intercept the high grade ore. Production of ore from the mine is expected as soon as the ore body is reached.

It is recommended that a small portable mill be designed, constructed and put into operation to treat 24 tons of ore per day. It would be of simple design, and the cost of building and operating it would be relatively low. Also being of portable design it could be easily moved for use at other mine sites. Consideration has been given to selling the ore or having it custom treated at some plant, but cost of transporting the ore long distances would be prohibitive.

Preliminary laboratory ore tests indicate that the ore is amenable to conventional methods of gravity concentration and cyanide leaching. A representative sample of Gold Bug ore weighing about 100 pounds was sent to Iron King Assay Inc. near Prescott, Arizona for laboratory tests. Later a 3 pound split of the sample was sent to Wayne Wanhanen, Test Engineer at Homestake Mining Co. to check some of the data from Iron King.

Test results from the Iron King laboratory in some cases were questionable because of their inexperience in the testing of gold ores. We had decided to use Iron King because of their very low fees, and we felt that with specific instructions and close supervision we would get the required information. As it turned out we did get useful information at a low cost. It is recommended however, that further laboratory tests be conducted to determine the effect of very fine grinding on recovery of gold. Also laboratory tests should be conducted to determine cyanide leach times, cyanide concentrations, and consumption of cyanide and lime.

From the test data which we have, the following has been established:

1. Ore grade of 300 tons to be about 3 ounces per ton.
2. Ore grindability appears to be reasonable. No grindability index has been established but laboratory grinds were no problem.
3. Recovery of gold in the mill should be above 90%.

Recovery by gravity separation is expected to be 45-50%.

Recovery by cyanide leach is expected to be 45-50%.

4. The ore should be ground to at least 200 mesh. Laboratory grind tests would tell how fine to grind.
5. Single stage crushing would be preferred.
6. Free gold could be recovered ahead of the ballmill.
7. The ore could be ground to the desired size in a ballmill.
8. Free gold following grinding could be recovered by gravity concentrate table.
9. Gold can be recovered from the slimes by cyanide leaching.

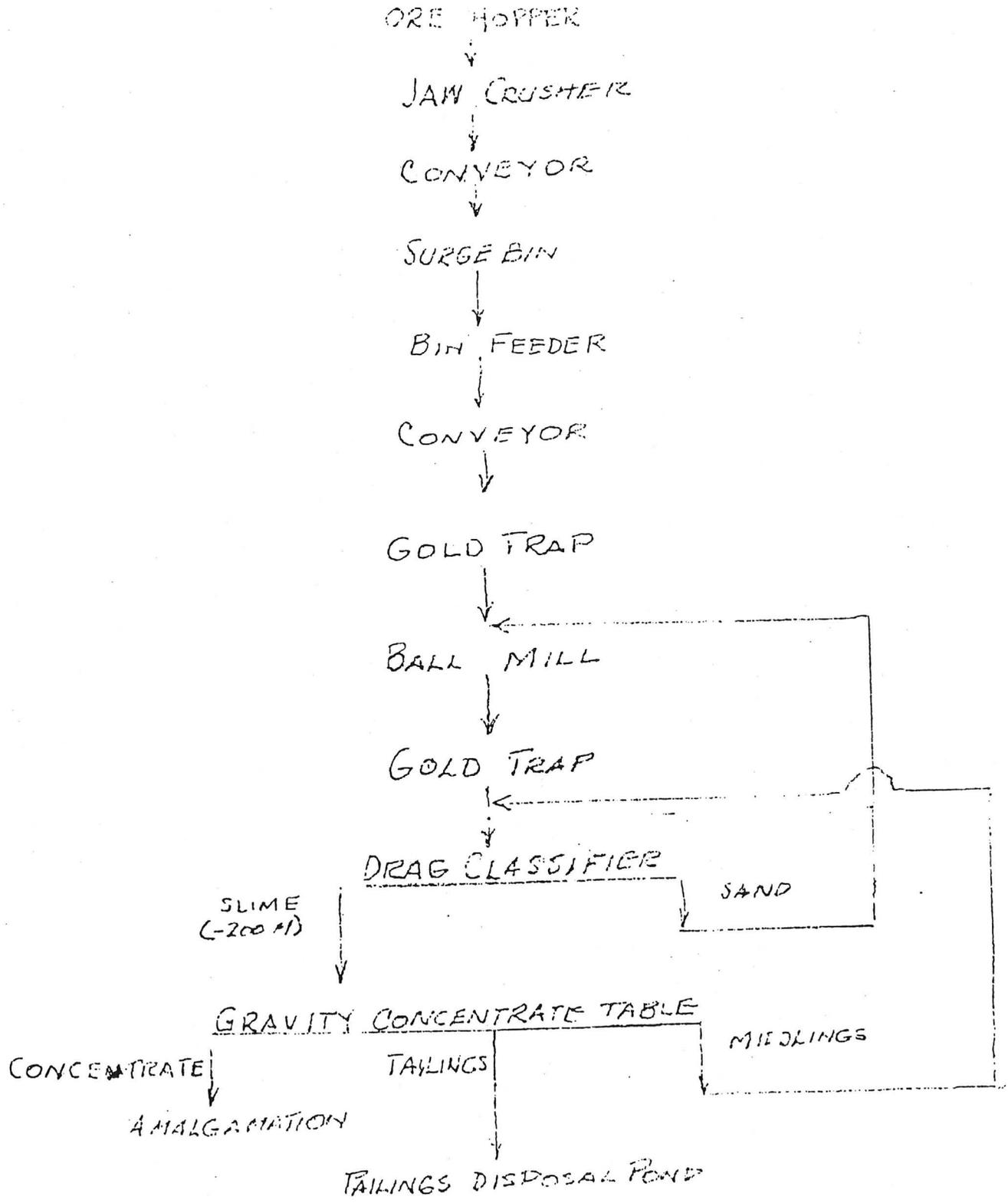
Ore would be hoisted from the mine and dumped into a truck which would haul a short distance to be dumped into a crusher feed hopper. From the hopper it would be fed into a jaw crusher. An 8X10 jaw crusher is available at the Roadside Mine near Bullhead City at a reasonable price. Crusher discharge at minus 5/8 inch would be conveyed to a 10 ton surge bin. From the surge bin the ore would be fed by a mechanical feeder to a sluice box type of gold trap where it would be slurried with water ahead of the ballmill. The bottom of the trap would be lined with some type of blanket or astro turf for recovery of coarse gold ahead of grinding. In the ballmill classifier circuit the ore would be ground to the desired final grind, which will probably be minus 200 mesh. A 4X5 ballmill has been acquired by Mr. Ivy and a drag classifier owned by Mr. Haynes would be used. There would be a gold or amalgam trap between the ballmill and the classifier to recover free gold liberated in the ballmill. Classifier slimes would flow by gravity to a Wilfley standard size gravity concentrating table. One has been purchased by Mr. Vanderwall in Salt Lake City. Concentrates from the table along with that from the gold traps which should be about 50% gold would be upgraded by amalgamation or leach before being sold. Table middlings would be recirculated to the ballmill classifier circuit. Table tailings would go to a tailings disposal pond for storage ahead of a Carbon-in-Leach Plant to be built and put into operation at a later date. A permit to operate a leach plant must be obtained from the State of Arizona before it can be operated.

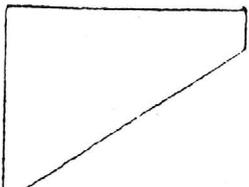
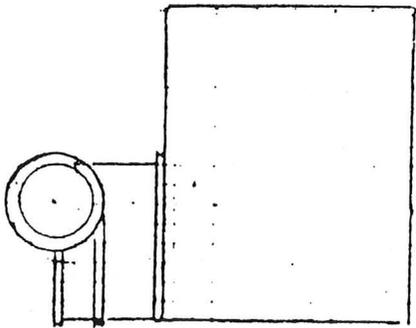
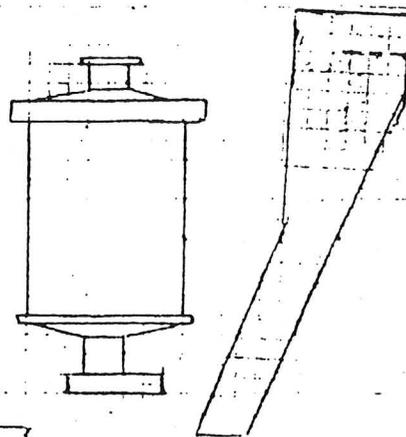
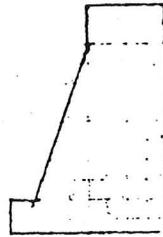
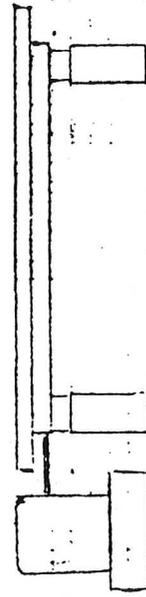
Gene B. Hall

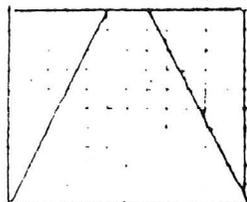
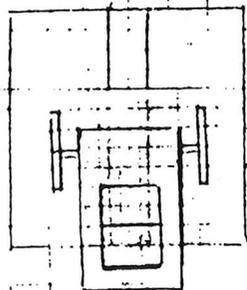
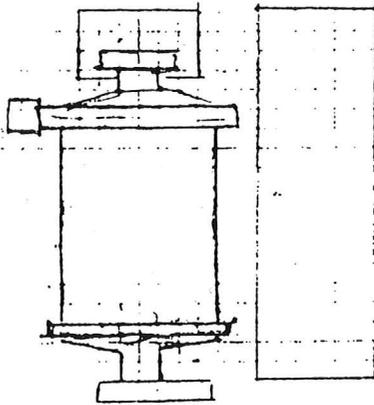
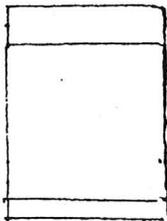
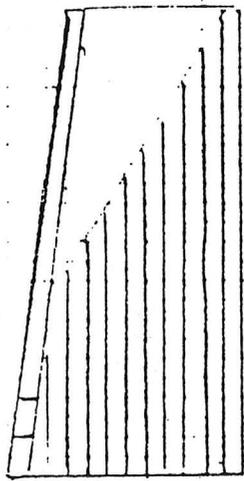
6/10/87

Comparison of test data from Iron King and Wanhanen.

	<u>Iron King</u>	<u>Wanhanen</u>
Head Oz/ton	4.530 (Avg of 4)	3.793 (avg of 4)
Amalgamation to determine free gold		
Time of contact	2.0 hours	8.0 hours
Lime or caustic	17-20 lbs/ton	None
Amalgamation tails oz/T		2.025
Gold recovery	42.7 %	46.61%
Grind	80% minus 200 mesh	100% minus 00 mesh
Cyanide Leach		
Head Oz/ton		2.265
Residue Oz/ton		
48 hour contact	0.154	0.60
72 hour contact		0.51
NaCN		
Start		0.1%
Finish		0.05%
CaO		
Start		0.4%
Finish		0.091%
PH		
Finish		12.57
Gold recovery		
Grind 80% minus 100 mesh		66.36%
100% minus 100 mesh		74.81 %
80% minus 200 mesh		73.26%

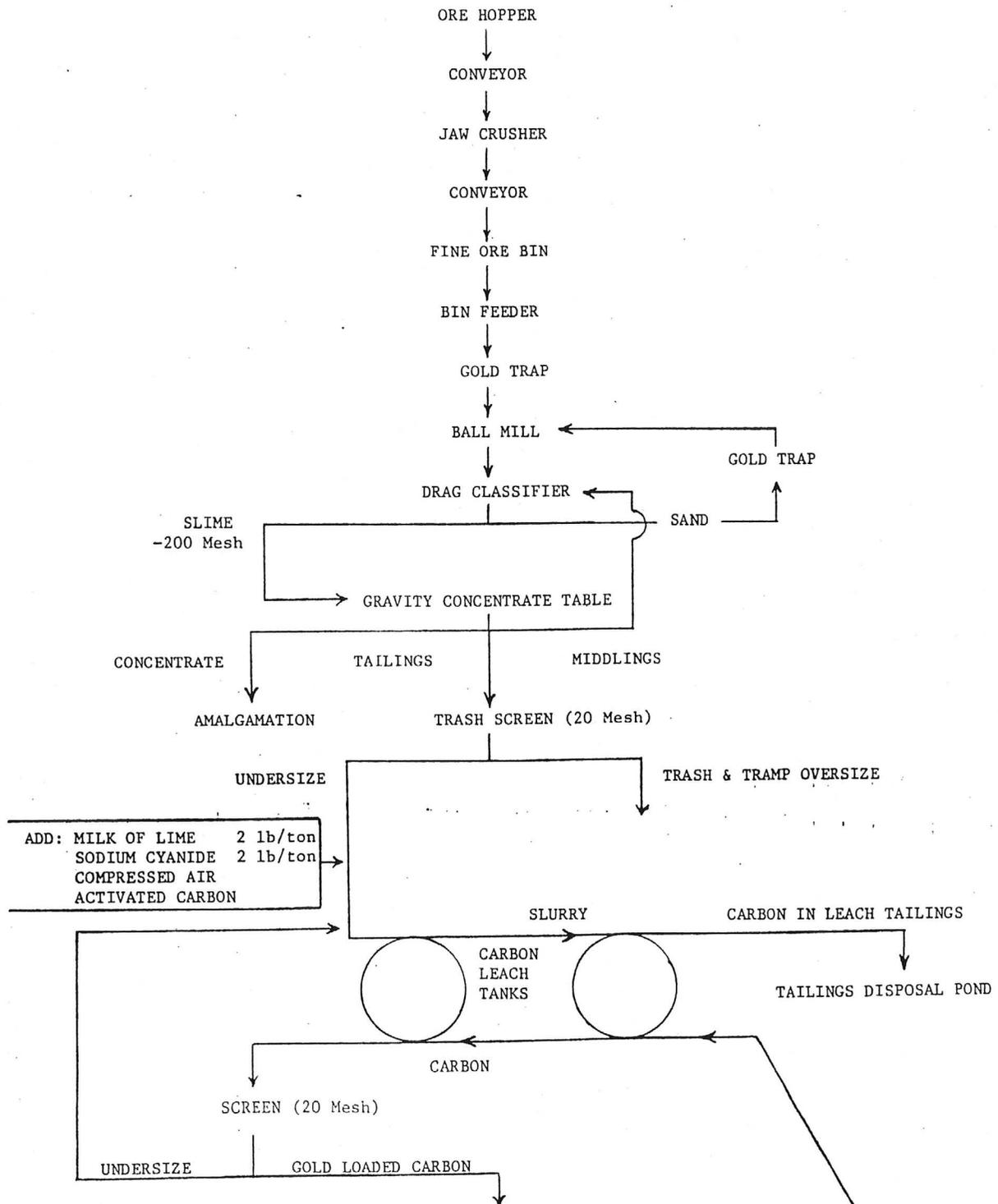






APPENDIX C

GOLD BUG MINE
PROCESS FLOW SHEET



Ivy Minerals Inc. • P.O. Box 2532 • Boise, Idaho 83701

Ivy Minerals Inc.
P.O. Box 2532
Boise, Idaho 83701

William Vanderwall
Operations Manager

P.O. Box 9125, KS
Bullhead City, Arizona 86430

Telephone
602-754-4481

A SUMMARY REVIEW REPORT
ON THE
GOLD BUG MINE (f)
MOHAVE COUNTY, ARIZONA

by
William Vanderwall
Registered Geologist - State of Arizona
May, 1988

copied for TWS

Introduction:

The Gold Bug is a fully operational underground gold mine. Over the past two years Ivy Minerals, as general partner of Gold Bug Partners Limited, has completed considerable work on the property. Beginning in 1986, exploration work, consisting of surface mapping and sampling followed by shallow and deep drilling, discovered and delineated a small but high-grade ore shoot. Subsequently, an existing shaft was rehabilitated and new drift driven to the shoot. The shoot was raised on, exposing obvious gold ore. During this time metallurgical tests were conducted on rejects from samples of drillhole cuttings. Based on the results a semi-portable one ton per hour gravity mill and agitated cyanide leach facility was designed, constructed and installed on the property. It is permitted and operational. Presently the mill and the mine are idle. The Partners are offering the mine for sale and the equipment for lease.

The reasons for offering the property for sale at this point in its development are as follows: Subsequent to the Gold Bug development decision, Ivy Minerals Inc. has developed several potential intermediate size low grade gold deposits, the most prominent presently containing 450,000 tons of reserves grading .025 ounces of gold per ton (opt.) with the ore body being open to further extensions on two sides. Another mineralized zone contains 3.2 million tons of geologically inferred reserves grading .015 opt. Both deposits, along with other attractive structures the Company has located, require substantial additional drilling.

Rather than continuing the time and financial investment in the Gold Bug Property that is required for stope development,

production and the deliniation of additional reserves, Ivy Minerals would rather devote its limited financial and management resources to its other potentially larger projects. In addition, the sale of the Gold Bug Mine and lease of the equipment would also allow Ivy Minerals to further enhance its larger properties by reinvesting the capital it has employed in the Gold Bug Mine.

Property:

The Gold Bug Property consists of five patented mining claims. The property is held by the Gold Bug Partners under a purchase agreement with the owners. The holding cost is \$750.00 per month. The agreement provides for 6% NSR royalty to the owners until the purchase price of \$625,000.00 is paid.

A title search undertaken by Transamerica Title Company shows a clean chain of title, vested in the owners.

Location, Access and Physiography:

The property is located in the Black Mountains of northwestern Arizona approximately 50 miles north of Kingman. More specifically, it is located in Section 4; Township 26 North; Range 21 West, GSRM, Mohave County, Arizona. See figures 1&2.

It is readily accessible by high clearance two-wheel drive vehicle. From Kingman or Las Vegas take highway 93 to mile market 29 1/2 where White Hills Road intersects the highway. Take White Hills Road west four miles to the mine.

The physiography is characterized by low hills trending northwesterly paralleling the Black Mountains. Topographically elevations are moderate ranging from 2800 feet to 3300 feet above sea level. These foothills are covered by a desert environment

with vegetation limited to sparse grasses, low bushes and cacti. The climate is mild with hot summers and cool winters and little rainfall.

Maps:

USGS Mt. Perkins Quadrangle, Arizona-Nevada, 15 Minute Series.

USGS Boulder City: Nevada-Arizona, 1:100,000 scale.

Published Reports:

USGS Bulletin 397, by F.C. Schrader, 1909, pp 217-218.

History:

The Gold Bug Mine lies in an area rich and colorful in Arizona mining history. Gold discoveries in the Black Mountains at the turn of the century helped settle northwestern Arizona. According to Schrader the Gold Bug, like many other neighboring mines, was responsible for producing extremely rich ore. For example, in 1895 the Gold Bug produced 50 tons of ore averaging 43 ounces of gold per ton.

Chronologically, the history of the property starts with the discovery by two prospectors in 1892. They reportedly mined some extremely rich ore and sold the property the following year. In 1895, 50 tons of select ore was shipped. Between 1895 and 1903 the owners built a mill on the Colorado River and shipped an unknown quantity of ore reported to average 1.5 ounces of gold per ton (opt). In 1908 or 1909 the main shaft was deepened to 500 feet and an orebody on the 290 foot level was developed but not mined. In 1931 just over a thousand tons of 2.0 opt material was mined from the 140 level and shipped to the mill at Kemple Camp. During 1936 to 1938 the ore developed on the 290 level was mined and shipped to the Producers Mill, this ore reportedly

averaged 2.25 opt. In 1982, G.R. Haynes of Kingman, mined about 30 tons of average 2.0 opt ore from an open cut. Mr. Haynes retains a briefcase full of specimens from this activity.

Gold Bug Partners Ltd. acquired the property in 1986. In 1988 the Gold Bug Partners sorted about 10 tons of ore from the finger raise in the orebody they discovered and it ran over 2.0 opt. A five gallon bucket full of specimens from this raise was retained for examination.

Historically, the mine has produced high-grade ore from isolated shoots when a mill was locally available. Schrader reports that at the time of his visit some 15 shafts and open cuts existed on the Gold Bug. From the records, it generally appears shafts or surface cuts were dug or underground works were developed where promising looking material was encountered and work progressed as long as encouraging material was found. Also, from the record, it is clear that ore pinches off laterally and passes into low-grade sulfides at depth.

Geology and Mineralization:

The property lies in the eastern foothills of the Black Mountains which are composed of precambrian metamorphic rocks overlain by a thick sequence of tertiary volcanics. The Black Mountains are located within the Basin and Range tectonic province and is one of many northwest trending fault block mountain ranges of the Southwest.

Country rock at the Gold Bug is precambrian meta-sediments which have been turned nearly vertical and intruded by volcanic (andesite) and granodiorite dikes. Mineralized quartz veins are associated with the dikes.

Exploration:

The Gold Bug Partners focused exploration on the area shown on the attached maps; i.e. the vicinity of shafts 1,2&3. Map 1 shows the veins and sample results from vein material, which should be used in conjunction with map 3 which shows geology and structure. Additional samples were taken from country rock and wall rock to the veins but the results were consistently barren and were not plotted. More detailed work was performed north of the shafts based on the reasoning that previous work had concentrated south of the shafts and ore in this area has probably been mined out. Two veins showed a high probability of containing virgin ore shoots, vein 1 emanating northeast of shaft 1 and vein 2 northeast of shaft 2.

A shallow drilling program was undertaken to systematically test the veins along strike. Holes were drilled at close intervals using an IR250 air track drill. Samples were collected at five foot intervals. Hole locations and assay results (greater than 0.02opt) are shown on map 2. Assaying was primarily intended to confirm the existence of an ore vein since dilution and cross-contamination in an air track hole must be expected.

Shallow drilling showed the richest ore seam to be vein 1. It contained consistently high intercepts when the vein was encountered plus showed two distinctly anomolous zones; one at the intersection of veins 1 and AH51, in hole AH51-1, and under the 1982 cut, in holes AH 8,9&16. Considering the possibility that this intersection and structural flexure could provide the locus for widening of the vein, a deep drilling program was initiated in this location. Holes were drilled using the reverse circulation method to minimize contamination. Hole locations (RC series) are plotted on map 3. Supplemental maps 3A and 3B show cross-sections, critical lithology and anomolous assays.

Deep drilling indicated the AH51 vein is not continuous to depth, nor is the flexure at the junction of the veins significant. More encouraging results were obtained from intersections with vein 1. All holes intersected the vein (except RC 102) indicating a greater than 90% continuity to a depth as great as 240 feet. Hole RC 1 appears to have intersected the vein beyond what was thought to be the fault termination of vein 1. Also, holed RC 4, 6, 101, 103 and 104 delineated a cigar shaped ore shoot existing under the 1982 cut.

Also, six reverse circulation drillholes along vein 2 are shown on map 3. Where encountered the vein was low grade therefore, no additional reserves were generated by the RC 200 series program.

This leaves the property with three potential ore sources which are, as yet, substantially unexplored. The area south of the shaft which was the focus of previous mining and may contain additional ore. The pegmatite dike where the PD series of air track holes indicated and anomaly. And other vein potential on the property, namely, the Mariposa and Buena Vista veins.

Engineering and Development:

Given the discovery of a virgin ore shoot, the continuity of the vein in the vicinity of the shoot and the production history of the property, an engineering study was undertaken. It's purpose was to determine the mining method for the stope and the feasibility of utilizing the existing shaft and underground workings to minimize the costs of drifting under the ore shoot. The report is attached as appendix A.

The number 2 shaft was mucked out and retimbered to the 240 level and the existing drift was rehabilitated in early 1987.

New drift was driven to the ore shoot and in January 1988 the first of two raises was driven in ore. A cribbed raise with ore chute was installed for 25 feet where the ore pinched and was lost. Two cars of high-grade ore were mined from this raise and from which eight ounces of gold were recovered. This small sub-parallel or faulted piece of the shoot was abandoned in favor of developing the target ore shoot. It is available for extraction.

The targeted ore shoot was opened in March 1988 and a finger raise was driven to the drillhole intersection (RC 4) at the 150 level. This raise is not timbered but is open and shows obvious gold ore. The ground is holding and it appears the resuing method can be successfully used to extract the ore. The exposed ore averages a foot in width. See map 4 for the plan and cross-section of the workings on the 240 level.

Metallurgy:

Concurrent with mine development, metallurgical testing was performed on drill cuttings and surface samples. Two identical tests were performed by commercial ore testing services. Results were in agreement and indicated that in excess of 90% recovery could be expected by using a gravity circuit followed by an agitated cyanide leach. Mill requirements and test results are attached in appendix B.

A one (plus) ton per hour, semi-portable mill was constructed and installed on the property. Appendix C shows the mill circuitry. The mill is fully permitted and operational.

Approximately 60 tons of development ore has been processed by the mill with a calculated recovery of 90%.

Ore Reserves:

Drillhole intercepts and surface and underground exposures indicate the ore shoot contains approximately 275 tons of ore calculated by the following exercise:

240' deep X 20' long X 1' wide, divided by 14 cu ft/t = 342 tons, assume 20% void space leaves 275 tons.

Historically, the ore has averaged over 2 opt with higher grade pockets. In addition, the likelihood of recovering specimen grade material should not be overlooked.

Furthermore, profitable mill grade ore may be developed along stope margins and by the discovery of additional shoots on existing known vein structures. Opportunity also exists for the development of reserves on the three substantially unexplored areas mentioned above.

Summary:

The Gold Bug Property represents a unique opportunity for acquiring an operational gold property with a substantial portion of the risk eliminated. It has a partially drilled out reserve that is developed and ready for immediate production.

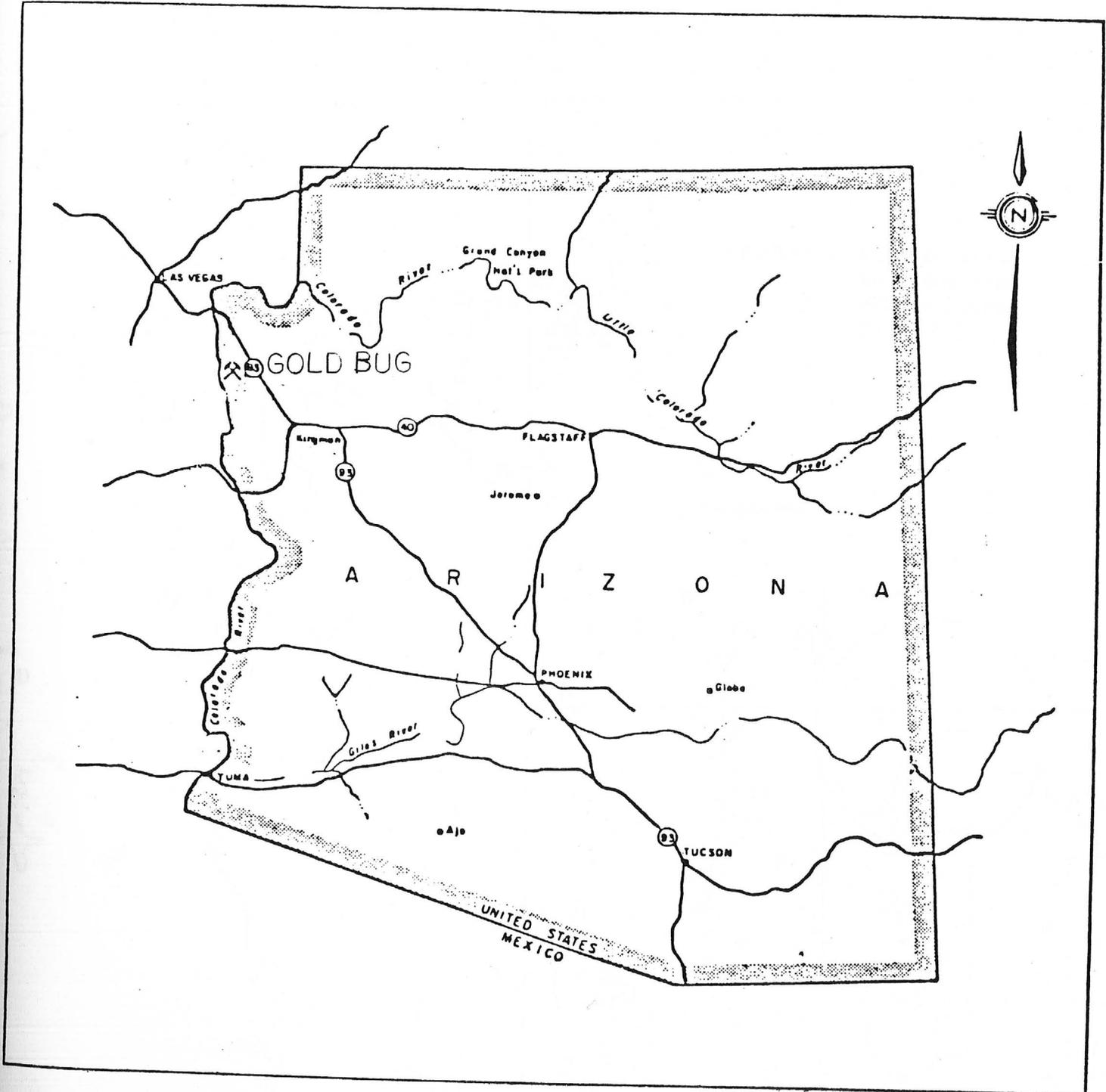
Respectfully Submitted,

Wm. Vanderwall
Registered Geologist - State of Arizona
A48

ATTACHMENTS AND ENCLOSURES

Figure 1	General Location, Gold Bug Mine Mohave County, Arizona
Figure 2	Site Location, Gold Bug Mine Mohave County, Arizona
Appendix A	Proposed Mining Method and Cost Schedule for the Gold Bug 240 Stope by Kevin Hanna
Appendix B	Recommendation for a Mill to Treat Ore from the Gold Bug Mine by Ken B. Hall
Appendix C	Gold Bug Mine - Mill Process Flow Sheet
Map 1	Gold Bug : Vein Sampling
Map 2	Gold Bug : Drilling Data (Shallow)
Map 3	Gold Bug : Geology - Showing Deep Drillhole Locations
Map 3A&B	Gold Bug : Supplement to Map 3 Showing Deep Drillhole Cross Sections
Map 4	Gold Bug : Underground Workings 240 Level

FIGURE 1 General Location
Gold Bug Mine
Mohave County
Arizona



MT. PERKINS QUADRANGLE
ARIZONA-NEVADA
15 MINUTE SERIES (TOPOGRAPHIC)

713 3055' (BLACK CANYON) 716 717 718 35' 719 720 721 R 21 W 270 000 FEET (ARIZ.) 724 HOOVER DAM 27 N

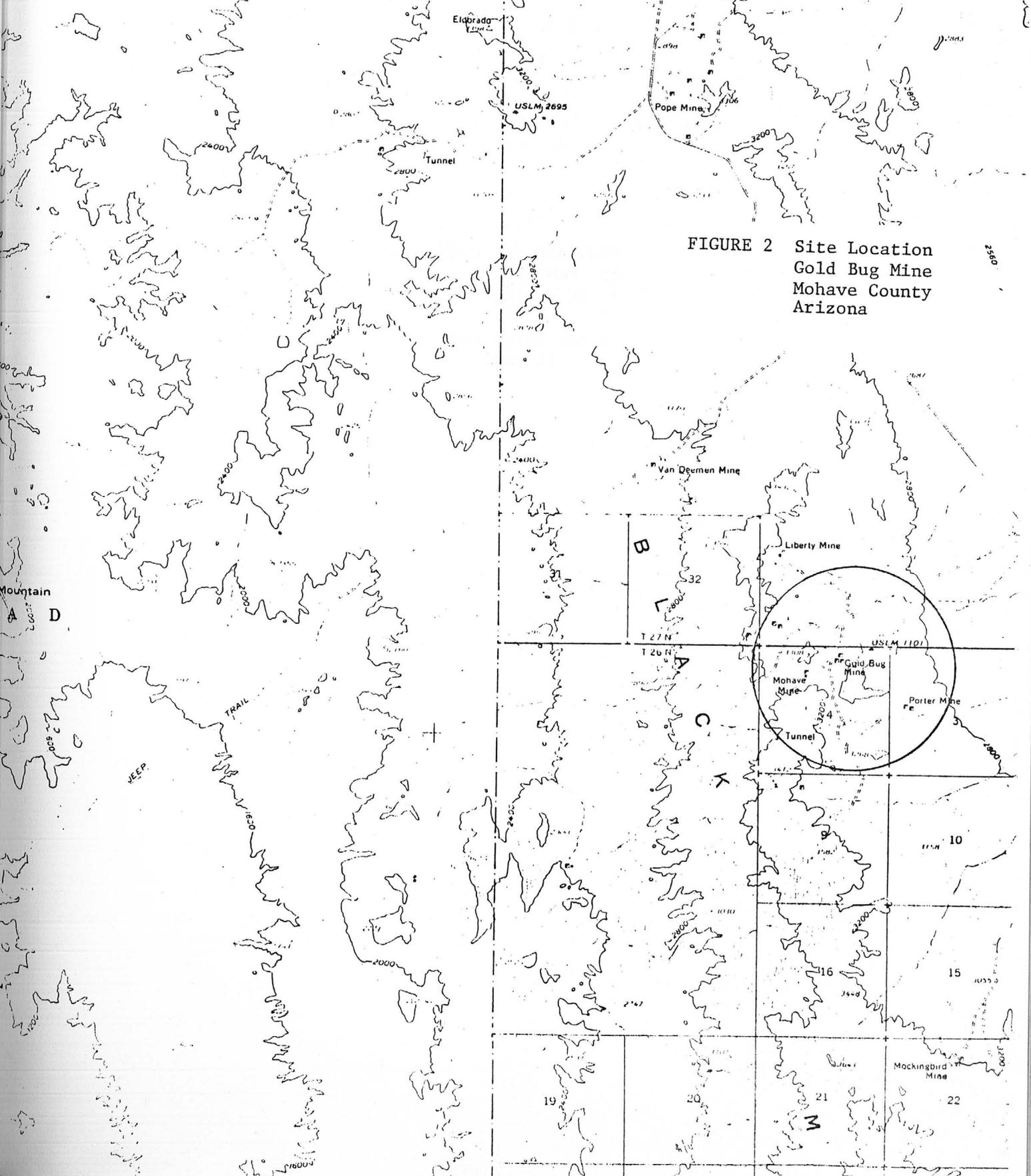


FIGURE 2 Site Location
Gold Bug Mine
Mohave County
Arizona

APPENDIX A

PROPOSED MINING METHOD AND COST SCHEDULE
FOR THE GOLD BUG 240 STOPE

Done for: Ivy Minerals
P.O. Box 2532
Boise, ID 83701

By: Kevin Hanna
May 11, 1987

[Handwritten signature]
5-11-87

MINING METHOD:

The narrow high grade nature of the ore shoot at the Gold Bug Mine, as delineated by previous drilling, dictates that conventional overhand stoping with resuing be utilized as a means for mining that ore.

It is expected that the value of the ore will more than offset the high cost of breaking waste for resuing.

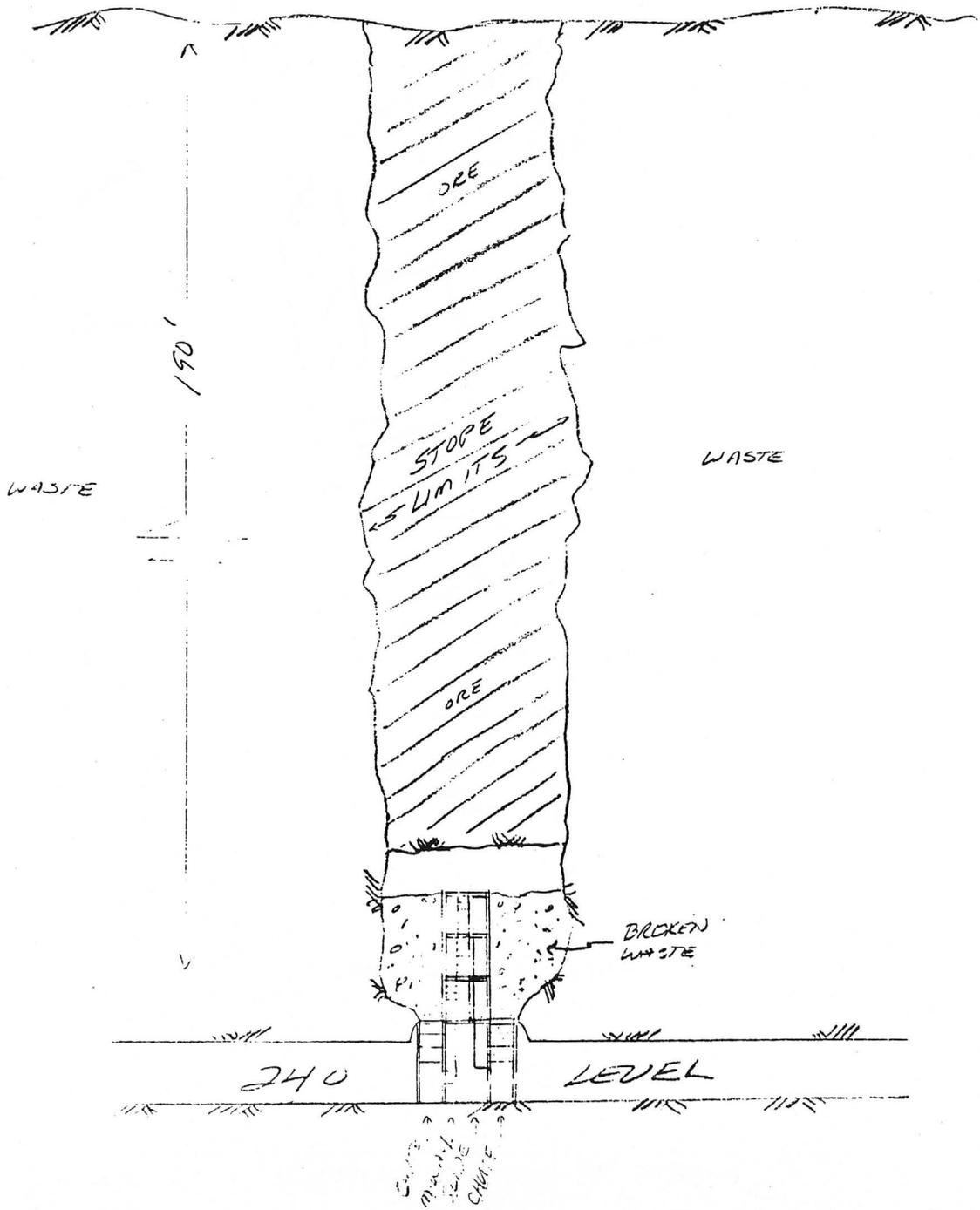
A case for shrinkage stoping might be made in this instance, but it is believed that the savings in mining costs will be offset by losses due to :

1. Dilution from mixing ore and waste.
2. Additional dilution of ore from caving stope walls during stope drawdown. The degree of jointing in the Gold Bug wall rock will most certainly result in stope wall caving, chute hangups, the need for additional blasting in hung up chutes, and continuous timber repair.
3. Higher milling costs.
4. Greater gold losses in mill tailings.

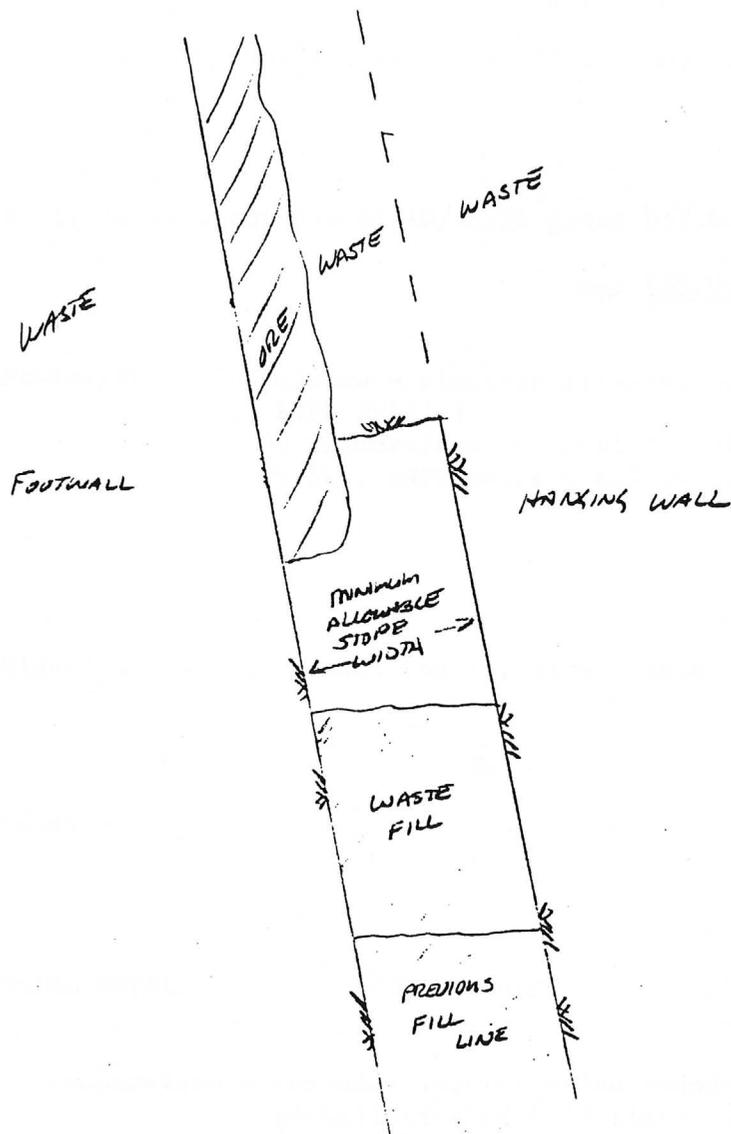
Because of this situation, the resuing method should be utilized in the Gold Bug Mine. The accompanying diagrams illustrate this method.

MINING COSTS:

Again, the narrow width, high grade "pockety" nature of the Gold Bug's ore poses a problem in estimating mining costs in that it is not likely that stoping will progress on a routine cyclical chronology. Irregular stope limits and high grade zones that will require slow and careful mining will probably not yield a production level in excess of 2 tons per man-shift. The cost estimates for the stoping phase of this project have been formulated using that figure. Initial capital investment, shaft rehabilitation, crosscutting costs and milling costs are not incorporated into the mining costs arrived at in this report.



1" = 20'



CROSS SECTION IN SLOPE

RESUMING METHOD OF STOPPING

GOLD BUG MINE STOPING COSTS

1. Labor and Materials

Labor: 2 miners @ \$12.00/hr	-	\$192.00/shift
1 hoistman @ \$9.00/hr	-	72.00/shift
1 nipper @ \$6.00/hr	-	<u>48.00/shift</u>
		\$312.00/shift

\$312.00/shift X 1.5 (payroll burden) gives \$468.00/shift

say \$475.00/shift

Fuel: 30 gals/shift @ \$1.10/shift gives \$33.00/shift

say \$35.00/shift

Powder/Primers: (assume - electric primers, detaprime boosters,
ANFO Prills)

20 primers/boosters/shift @ \$1.50 gives \$30.00/shift

75 lbs. ANFO/shift @ \$14.00/cwt gives \$10.50/shift

total \$40.50/shift

say \$45.00/shift

Miscellaneous materials: (nails, wire, ladder stock, etc.)

say \$35.00/shift

Maintenance:

say \$15.00/shift

GRAND TOTAL: \$605.00/shift

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2. Stope Preparation - Includes initial raise rounds, slab rounds, mucking,
installation of sill timber sets, slide, ladders,
chutes and chute gates, tugger, air and water lines.

5 shifts @ \$650.00 gives \$3250.00

say \$3250.00/shift

GOLD BUG MINE STOPPING COSTS (cont'd)

3. Timber costs

Material - roughsawn Oregon fir @ \$320.00/unit
1 unit equals 1000 board ft. say \$.32/bd ft

Assume - 4 X 6 stall and post raise, 5 foot sets.

Requirements;

3	-	6" X 8" X 4' stulls	-	48 bd ft
6	-	4" X 6" X 4' posts	-	48
2	-	4" X 6" X 4' girts	-	16
2	-	4" X 6" X 2' girts	-	8
8	-	1" X 12" X 5' side lagging	-	40
4	-	1" X 12" X 5' slide	-	<u>20</u>
				180 bd ft/set

190 ft of back/5 ft per set gives 38 sets required
38 sets X 180 bd ft per set gives 6840 bd ft of timber required
6840 bd ft of timber X \$.32 gives \$2188.80 for timber

say \$2500.00

4. Miner productivity

2 tons per man-shift (using 2 miners) yield 4 tons/shift
Expected tonnage from raise/stope - 190' X 4' X 20' gives 563 yds
563 yds X 2 tons per yd gives 1125 tons
1125 tons/1 shift per 4 tons gives 281 shifts.

say 280 shifts to mine out ore body

5. GRAND TOTAL

280 shifts X \$650.00/shift gives	\$182,000
stope preparation	3,250
timber costs	<u>2,500</u>
	\$187,750

\$187,750/1125 tons (half ore, half waste) gives \$167.00/ton

or \$334.00/ton ore

APPENDIX B

GOLD BUG MINE

June 10, 1987

Recommendations for a mill to treat ore from the Gold Bug Mine

An ore body has been located at the Gold Bug Mine near Dolan Springs, Arizona. A comprehensive drilling and sampling program has confirmed approximately 500 tons of ore at 3 ounces per short ton of ore and possibly 3,000 tons at 1/4 ounce per ton.

Development at the mine is underway. An old shaft has been renovated and a headframe and hoist have been installed. Drifts are being extended underground to intercept the high grade ore. Production of ore from the mine is expected as soon as the ore body is reached.

It is recommended that a small portable mill be designed, constructed and put into operation to treat 24 tons of ore per day. It would be of simple design, and the cost of building and operating it would be relatively low. Also being of portable design it could be easily moved for use at other mine sites. Consideration has been given to selling the ore or having it custom treated at some plant, but cost of transporting the ore long distances would be prohibitive.

Preliminary laboratory ore tests indicate that the ore is amenable to conventional methods of gravity concentration and cyanide leaching. A representative sample of Gold Bug ore weighing about 100 pounds was sent to Iron King Assay Inc. near Prescott, Arizona for laboratory tests. Later a 3 pound split of the sample was sent to Wayne Wanhanen, Test Engineer at Homestake Mining Co. to check some of the data from Iron King.

Test results from the Iron King laboratory in some cases were questionable because of their inexperience in the testing of gold ores. We had decided to use Iron King because of their very low fees, and we felt that with specific instructions and close supervision we would get the required information. As it turned out we did get useful information at a low cost. It is recommended however, that further laboratory tests be conducted to determine the effect of very fine grinding on recovery of gold. Also laboratory tests should be conducted to determine cyanide leach times, cyanide concentrations, and consumption of cyanide and lime.

From the test data which we have, the following has been established:

1. Ore grade of 300 tons to be about 3 ounces per ton.
2. Ore grindability appears to be reasonable. No grindability index has been established but laboratory grinds were no problem.
3. Recovery of gold in the mill should be above 90%.

Recovery by gravity separation is expected to be 45-50%.

Recovery by cyanide leach is expected to be 45-50%.

4. The ore should be ground to at least 200 mesh. Laboratory grind tests would tell how fine to grind.
5. Single stage crushing would be preferred.
6. Free gold could be recovered ahead of the ballmill.
7. The ore could be ground to the desired size in a ballmill.
8. Free gold following grinding could be recovered by gravity concentrate table.
9. Gold can be recovered from the slimes by cyanide leaching.

Ore would be hoisted from the mine and dumped into a truck which would haul a short distance to be dumped into a crusher feed hopper. From the hopper it would be fed into a jaw crusher. An 8X10 jaw crusher is available at the Roadside Mine near Bullhead City at a reasonable price. Crusher discharge at minus 5/8 inch would be conveyed to a 10 ton surge bin. From the surge bin the ore would be fed by a mechanical feeder to a sluice box type of gold trap where it would be slurried with water ahead of the ballmill. The bottom of the trap would be lined with some type of blanket or astro turf for recovery of coarse gold ahead of grinding. In the ballmill classifier circuit the ore would be ground to the desired final grind, which will probably be minus 200 mesh. A 4X5 ballmill has been acquired by Mr. Ivy and a drag classifier owned by Mr. Haynes would be used. There would be a gold or amalgam trap between the ballmill and the classifier to recover free gold liberated in the ballmill. Classifier slimes would flow by gravity to a Wilfley standard size gravity concentrating table. One has been purchased by Mr. Vanderwall in Salt Lake City. Concentrates from the table along with that from the gold traps which should be about 50% gold would be upgraded by amalgamation or leach before being sold. Table middlings would be recirculated to the ballmill classifier circuit. Table tailings would go to a tailings disposal pond for storage ahead of a Carbon-in-Leach Plant to be built and put into operation at a later date. A permit to operate a leach plant must be obtained from the State of Arizona before it can be operated.

B. B. Hall

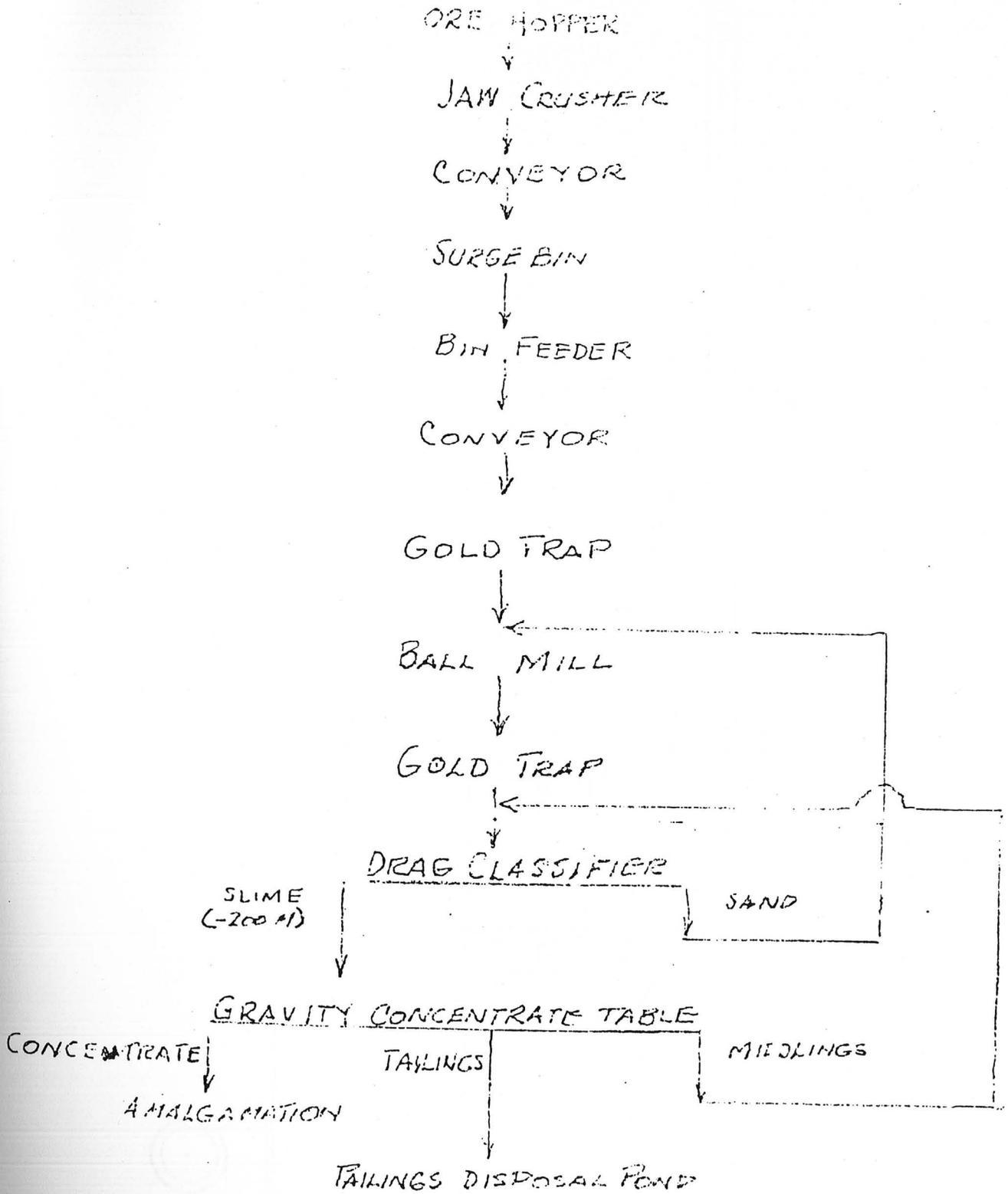
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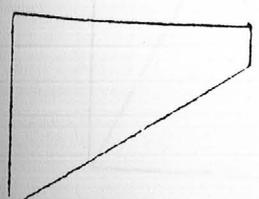
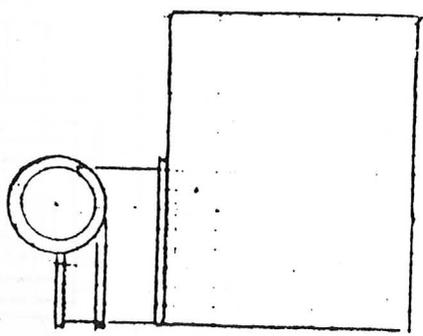
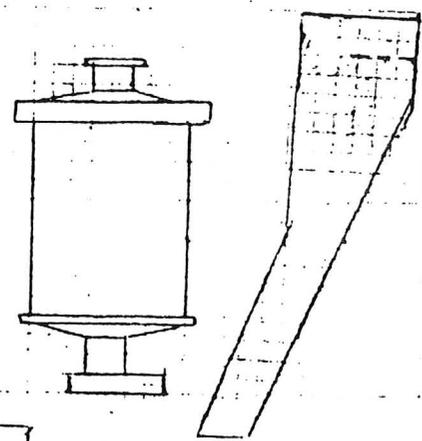
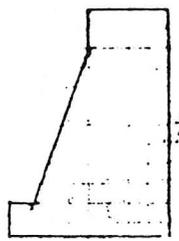
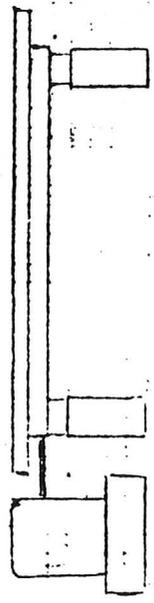
Gold Bug Ore

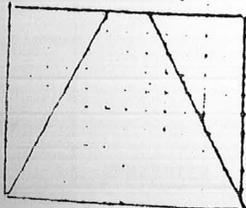
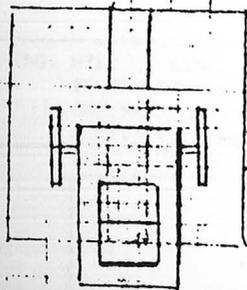
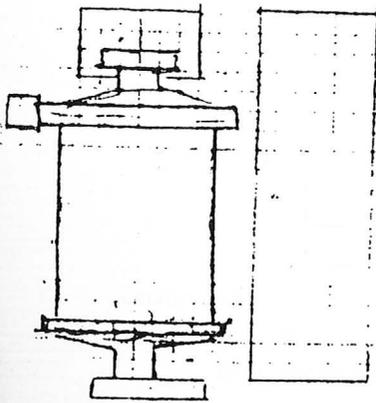
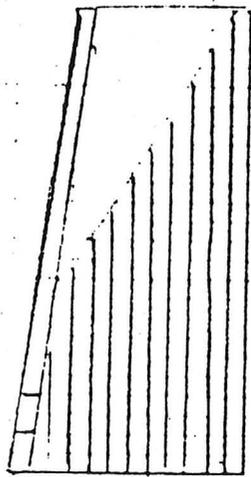
May 11, 1987

Comparison of test data from Iron King and Wanhanen.

	<u>Iron King</u>	<u>Wanhanen</u>
Head Oz/ton	4.530 (Avg of 4)	3.793 (avg of 4)
Amalgamation to determine free gold		
Time of contact	2.0 hours	8.0 hours
Lime or caustic	17-20 lbs/ton	None
Amalgamation tails oz/T		2.025
Gold recovery	42.7 %	46.61%
Grind	80% minus 200 mesh	100% minus 00 mesh
Cyanide Leach		
Head Oz/ton		2.265
Residue Oz/ton		
48 hour contact	0.154	0.60
72 hour contact		0.51
NaCN		
Start		0.1%
Finish		0.05%
CaO		
Start		0.4%
Finish		0.091%
PH		
Finish		12.57
Gold recovery		
Grind 80% minus 100 mesh		66.36%
100% minus 100 mesh		74.81 %
80% minus 200 mesh		73.26%

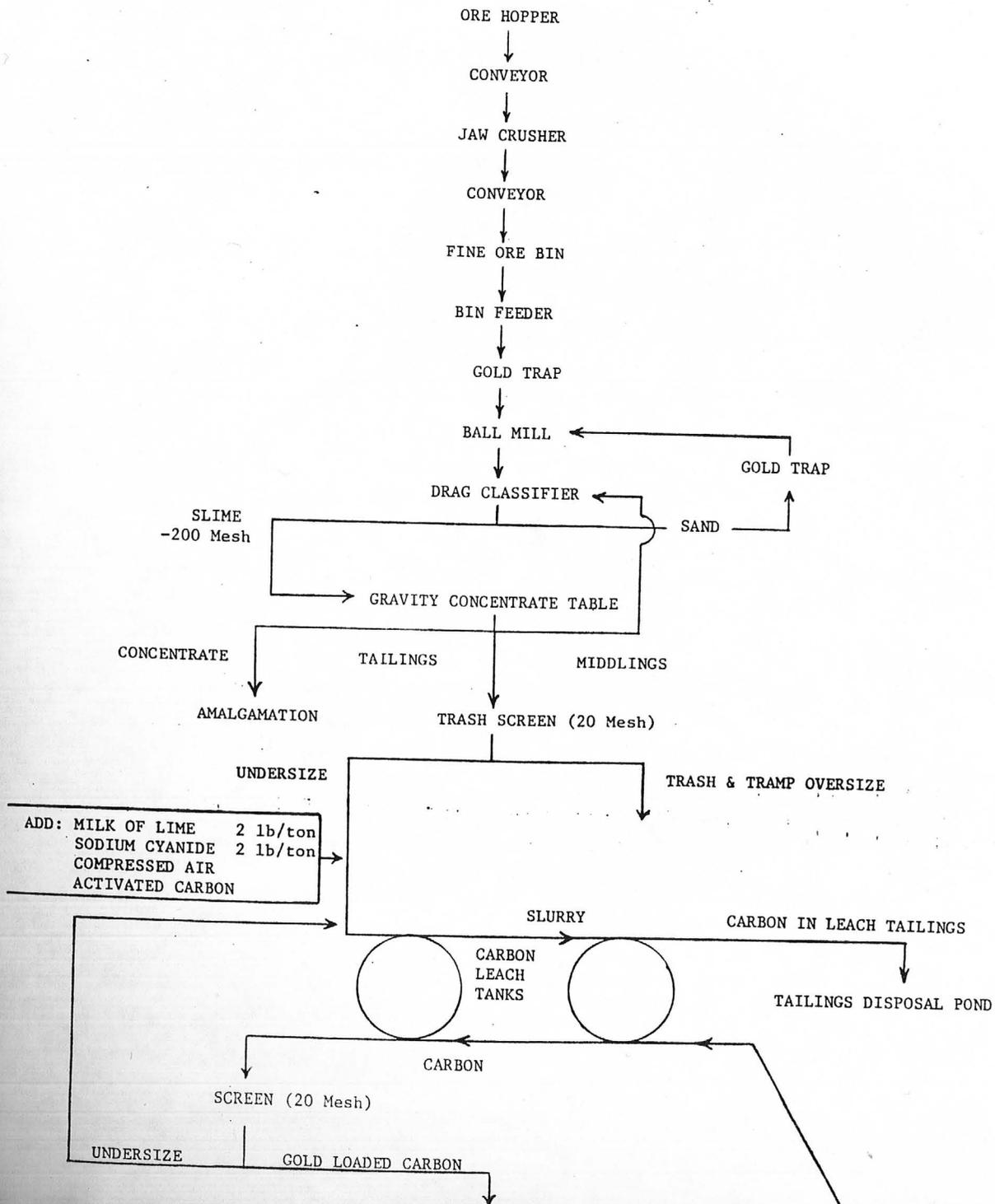


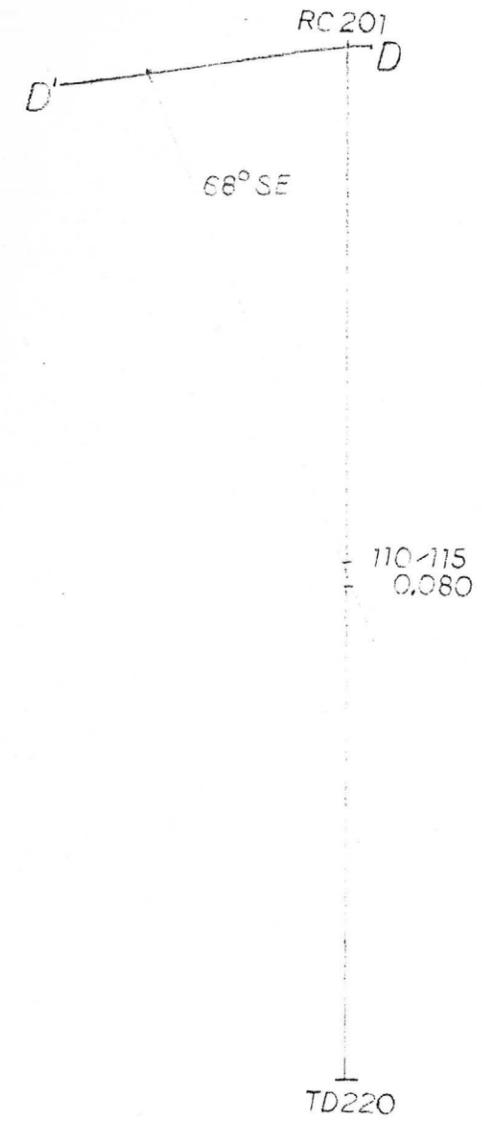
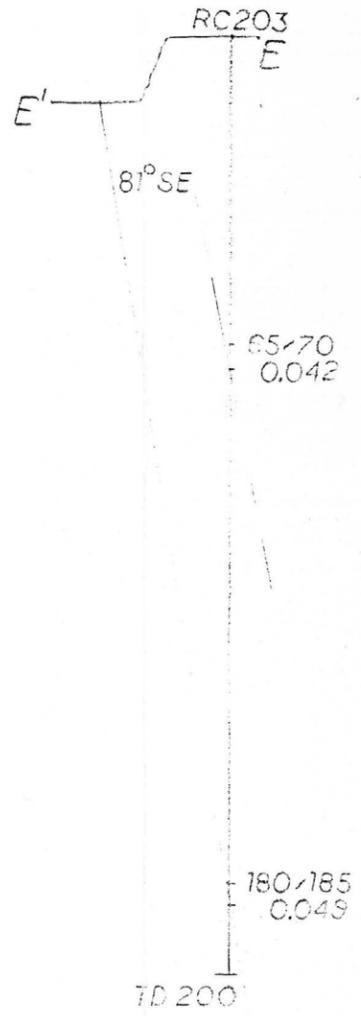
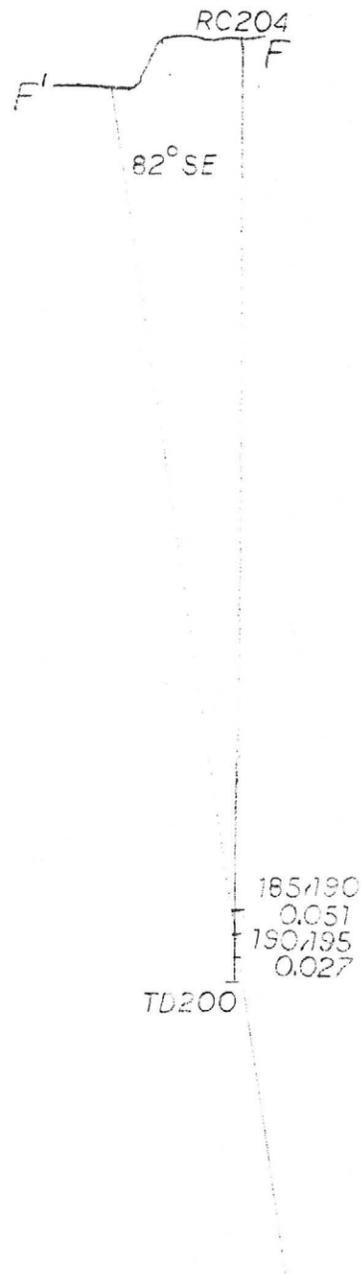




APPENDIX C

GOLD BUG MINE
PROCESS FLOW SHEET





Holes RC202, 205, 206 show no intercept

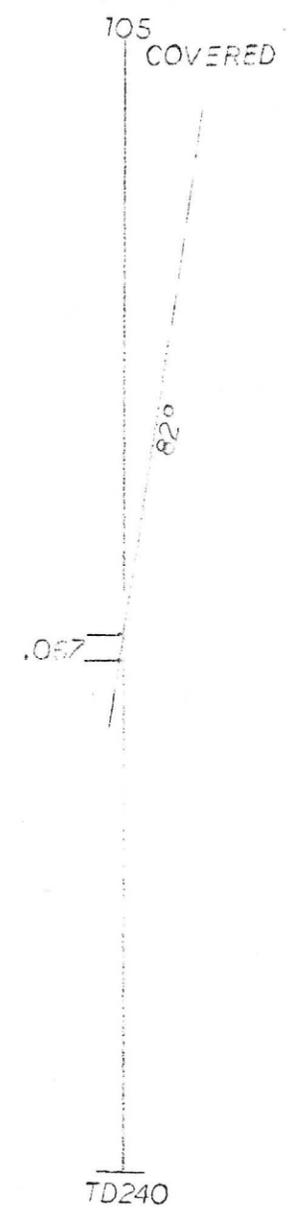
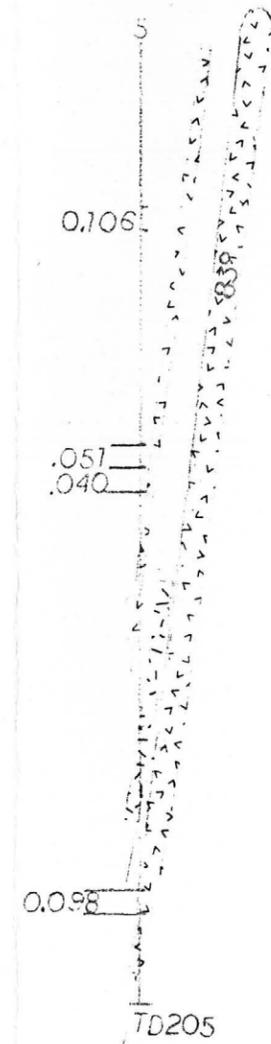
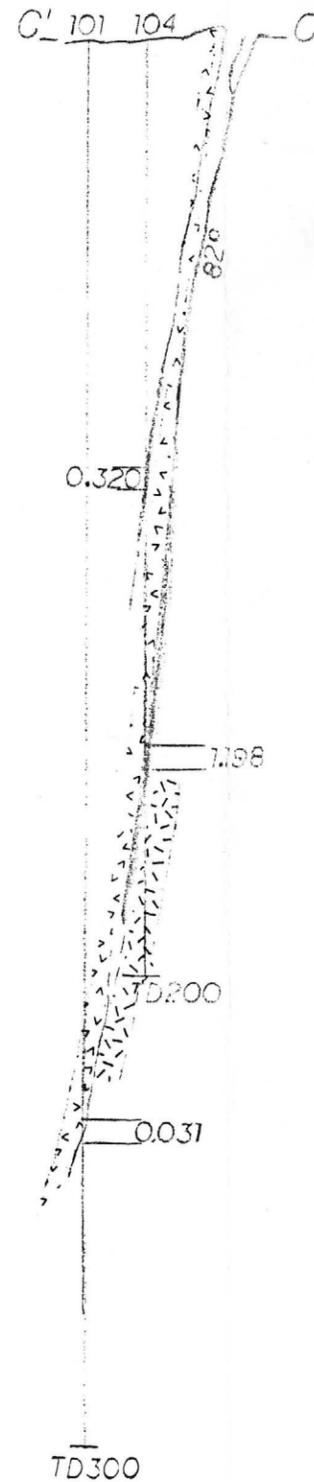
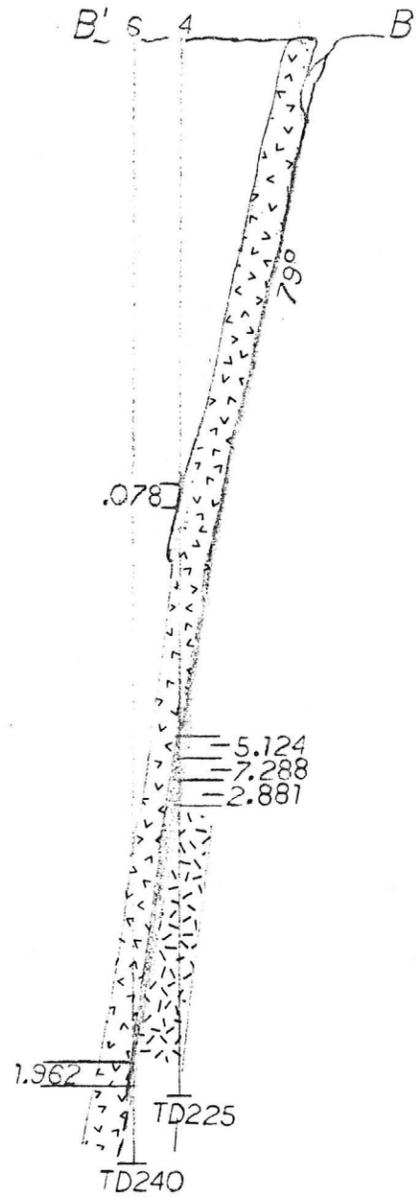
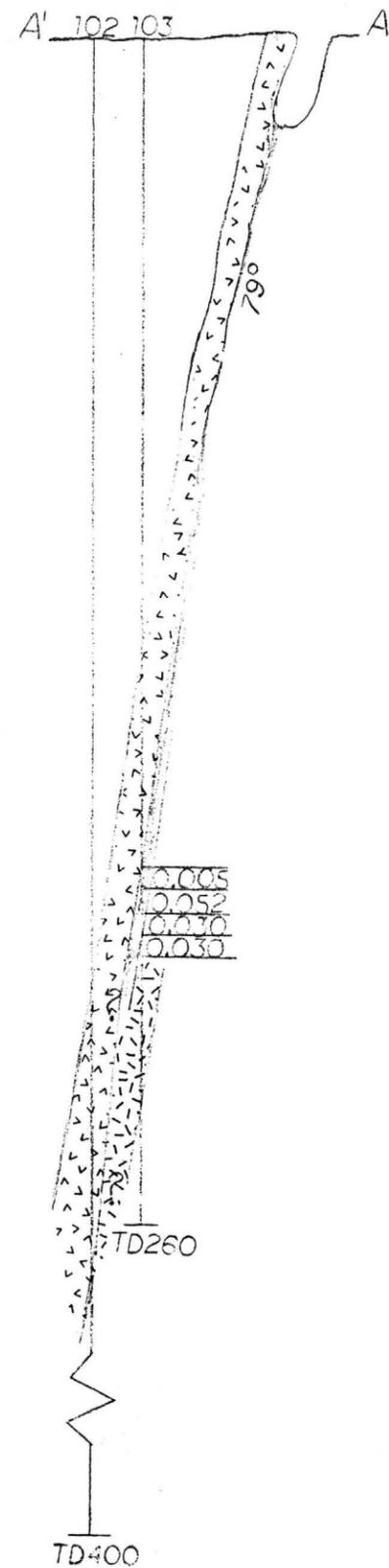
GOLD BUG CROSS SECTIONS

SCALE: 1"=40'	APPROVED BY:	DRAWN BY WV
DATE: 7/86		REVISED

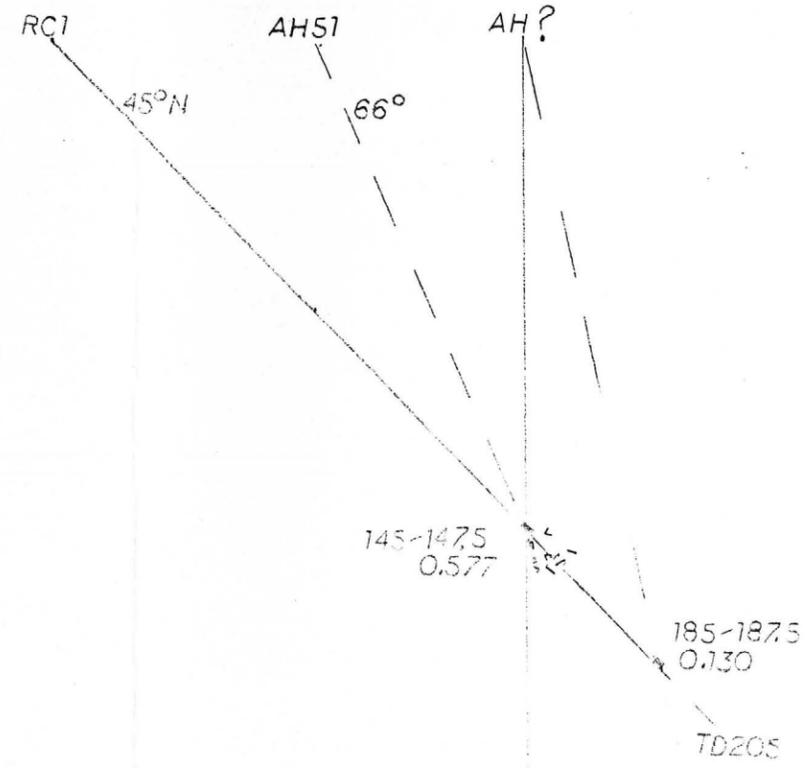
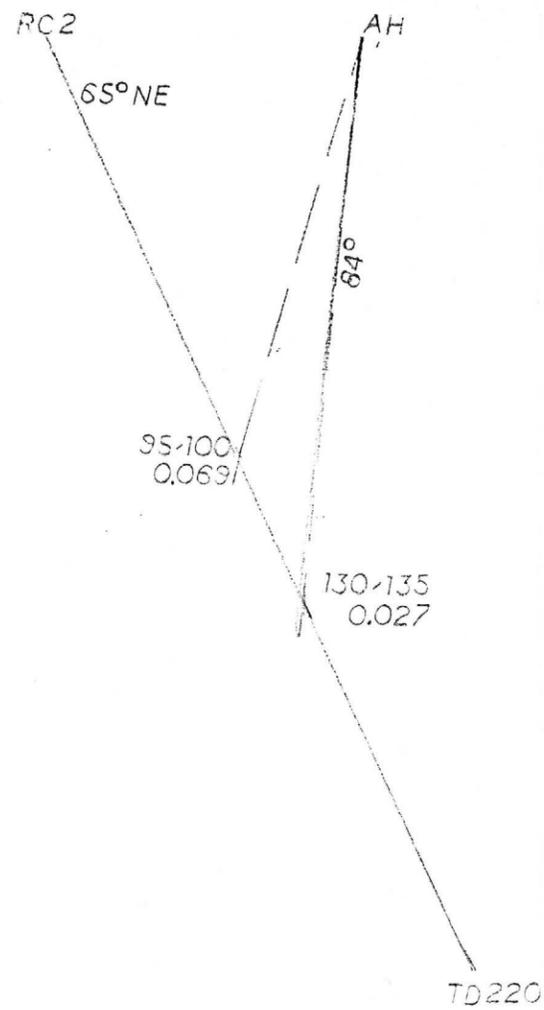
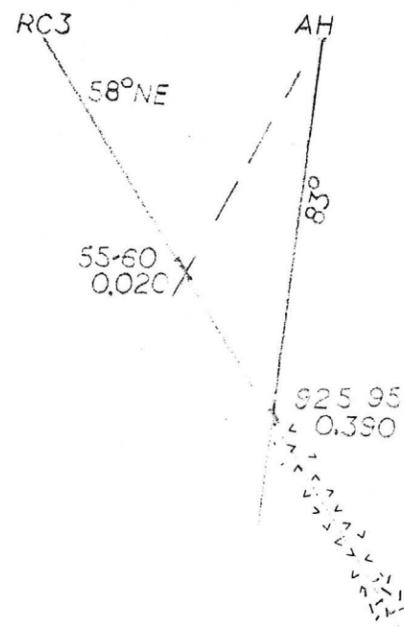
RC SERIES DRILLHOLES

SEE MAP 3 FOR EXPLANATIONS

DRAWING NUMBER
SUP. 3C



GOLD BUG CROSS-SECTIONS		
SCALE: 1"=40'	APPROVED BY:	DRAWN BY WV
DATE: 6/86		REVISED
RC SERIES DRILLHOLES		
SEE MAP 3 FOR EXPLANATIONS		DRAWING NUMBER SUP. 3A



TD345

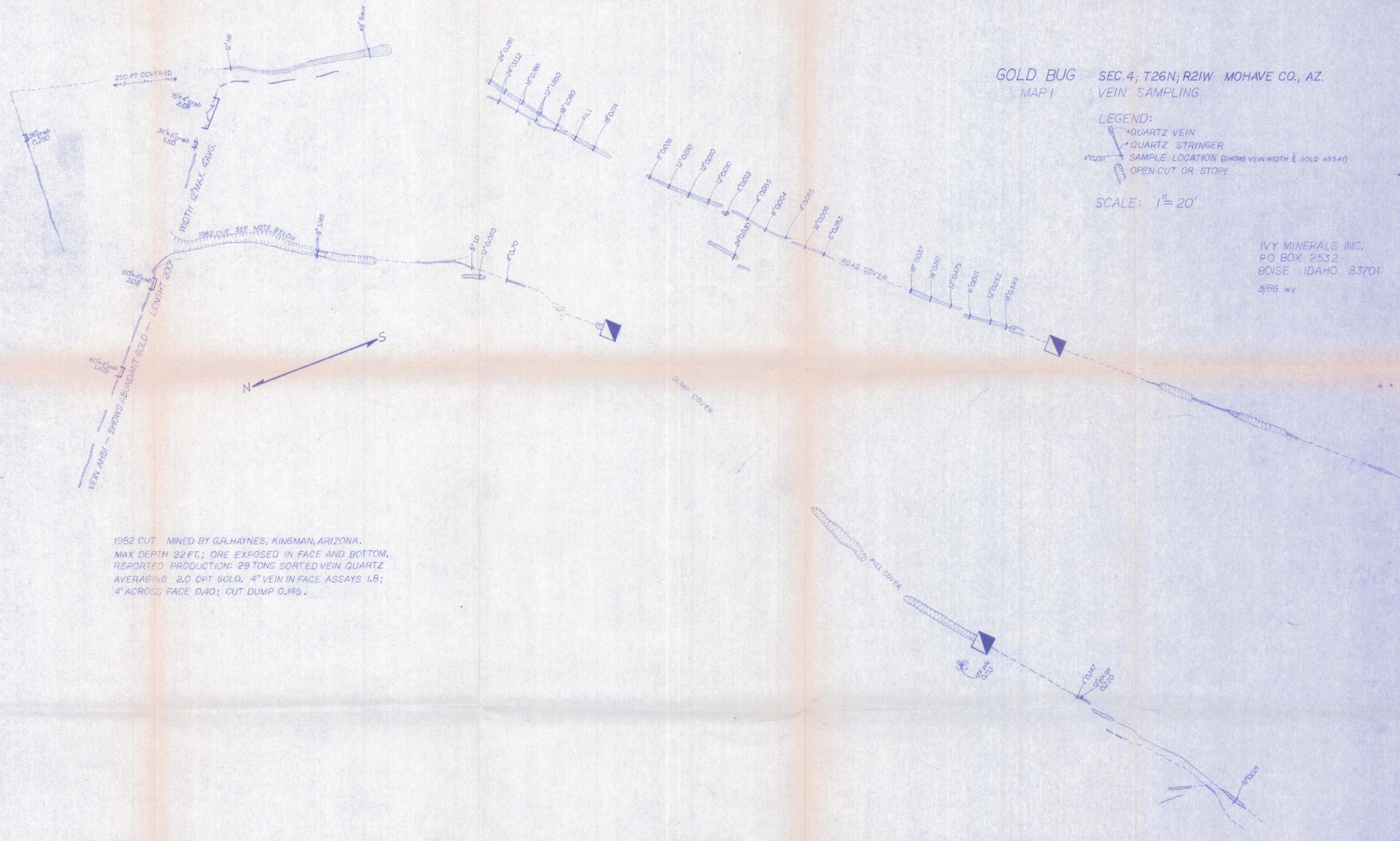
GOLD BUG CROSS SECTIONS		
SCALE: 1"=40'	APPROVED BY:	DRAWN BY WV
DATE: 6/86		REVISED
RC SERIES DRILLHOLES		
SEE MAP 3 FOR EXPLANATION		DRAWING NUMBER SUP. 3B

GOLD BUG SEC. 4; T26N; R21W MOHAVE CO., AZ.
 MAP I VEIN SAMPLING

- LEGEND:
 QUARTZ VEIN
 QUARTZ STRINGER
 SAMPLE LOCATION (SHOWS VEIN WIDTH & GOLD ASSAY)
 OPEN CUT OR STOPE

SCALE: 1" = 20'

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 PO BOX 2532
 BOISE IDAHO 83701
 3/86 wv



1982 CUT MINED BY G.R. HAYNES, KINGMAN, ARIZONA.
 MAX DEPTH 22 FT.; ORE EXPOSED IN FACE AND BOTTOM.
 REPORTED PRODUCTION: 29 TONS SORTED VEIN QUARTZ
 AVERAGING 2.0 OPT GOLD. 4" VEIN IN FACE ASSAYS 1.8;
 4" ACROSS FACE 0.40; CUT DUMP 0.145.

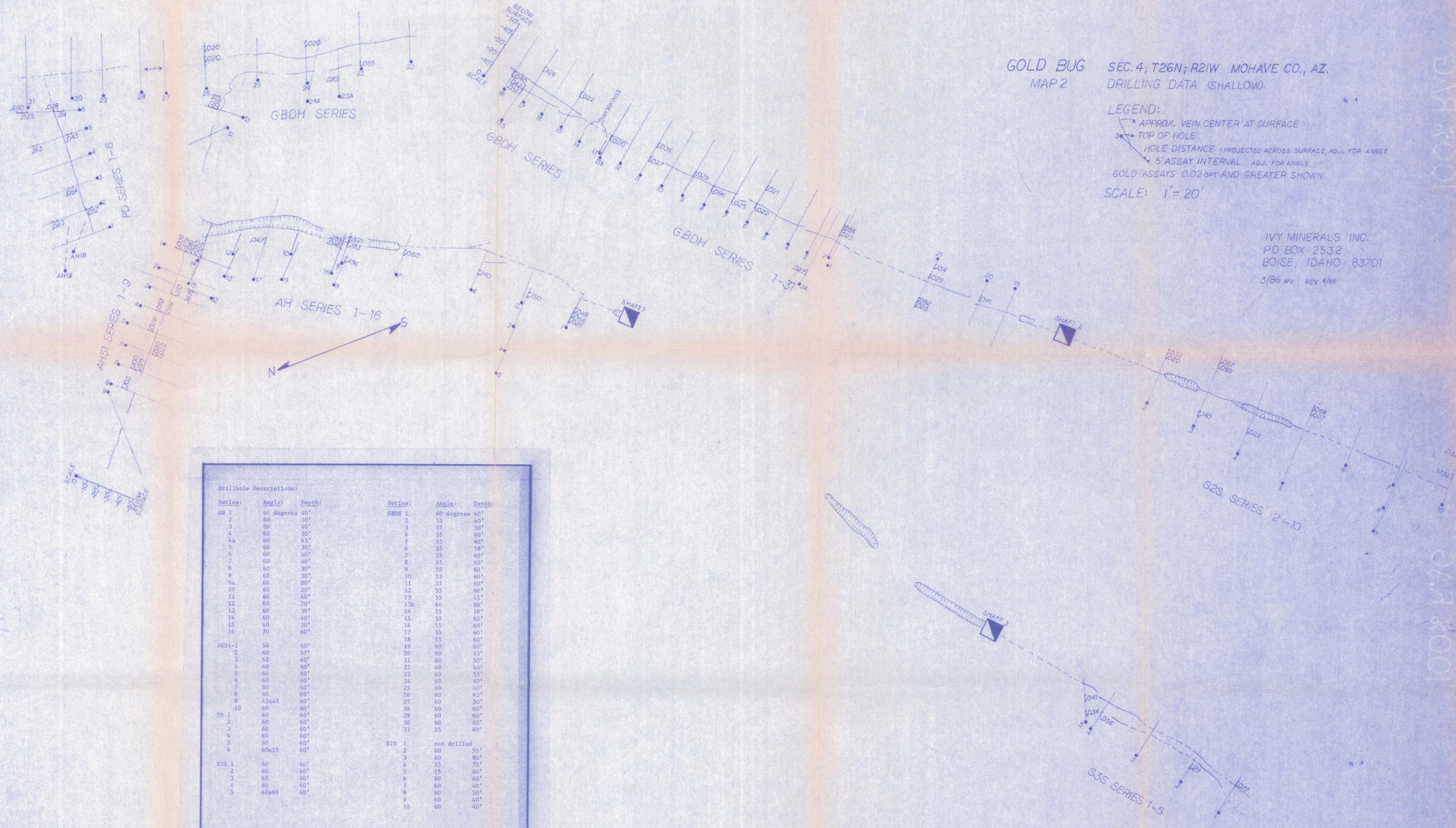
GOLD BUG
MAP 2

SEC. 4; T26N; R21W MOHAVE CO., AZ.
DRILLING DATA (SHALLOW)

LEGEND:

 APPROX. VEIN CENTER AT SURFACE
 TOP OF HOLE
 HOLE DISTANCE - PROJECTED ACROSS SURFACE, ADJ. FOR ANGLE
 5' ASSAY INTERVAL ADJ. FOR ANGLE
 GOLD ASSAYS 0.02 OPT AND GREATER SHOWN
 SCALE: 1" = 20'

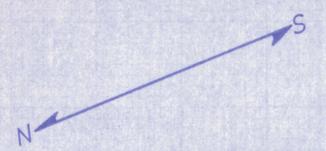
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 BOISE, IDAHO 83701
 3/86 WV REV 4/86



Drillhole Descriptions:

Series:	Angle:	Depth:	Series:	Angle:	Depth:
AH 1	60 degrees	40'	GBDH 1	60 degrees	60'
2	60	30'	2	55	40'
3	60	40'	3	55	50'
4	60	30'	4	55	60'
4a	60	65'	5	55	80'
5	60	30'	6	55	58'
6	60	40'	7	55	60'
7	60	40'	8	55	60'
8	60	30'	9	55	60'
9	60	30'	10	55	60'
9a	60	80'	11	55	60'
10	60	20'	12	55	60'
11	60	40'	13	55	45'
12	60	20'	13b	60	60'
13	60	30'	14	55	10'
14	60	40'	15	55	60'
15	60	30'	16	55	60'
16	70	60'	17	55	60'
AH51-1	56	60'	18	55	60'
2	60	57'	19	60	60'
3	62	60'	20	60	45'
4	60	60'	21	60	50'
5	60	60'	22	60	40'
6	60	60'	23	60	55'
7	60	60'	24	60	40'
8	60	60'	25	60	40'
9	45x45	60'	26	60	45'
10	60	80'	27	60	50'
PD 1	60	60'	28	60	60'
2	60	60'	29	60	60'
3	60	60'	30	60	60'
4	60	60'	31	55	60'
5	60	60'	S2S 1	not drilled	
6	60x15	60'	2	60	55'
S3S 1	60	40'	3	60	80'
2	60	40'	4	55	75'
3	60	40'	5	55	80'
4	60	40'	6	60	40'
5	60x60	40'	7	60	40'
			8	60	50'
			9	60	40'
			10	60	40'

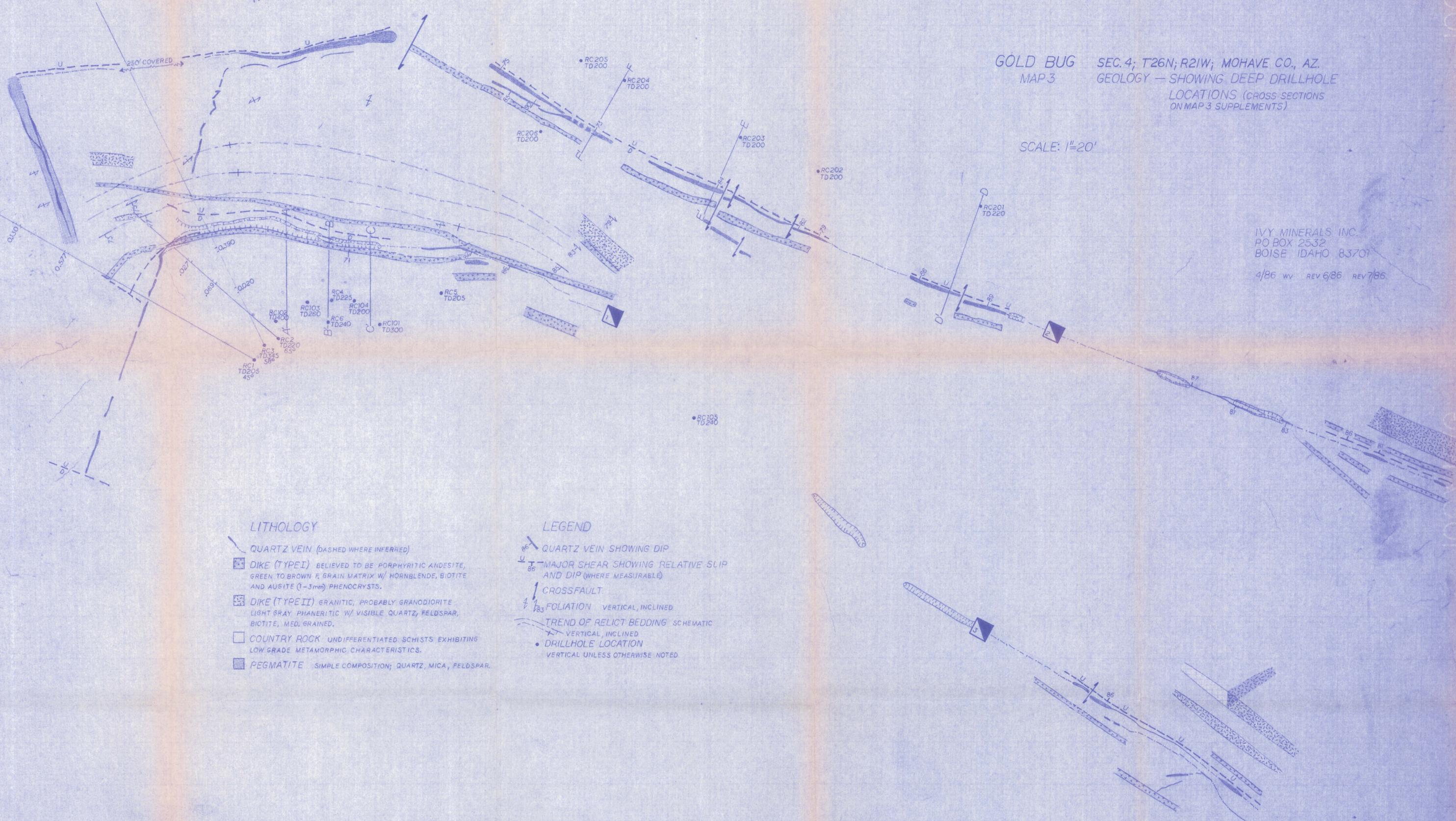
Holes drilled with IR250 Air Trac; samples collected @ 5' intervals in cyclone; samples split with mechanical splitter; 1/4 assayed by commercial laboratory*; 1/2 retained. *All assays performed by registered Arizona assayers.



GOLD BUG SEC. 4; T26N; R21W; MOHAVE CO., AZ.
 MAP 3 GEOLOGY — SHOWING DEEP DRILLHOLE
 LOCATIONS (CROSS SECTIONS
 ON MAP 3 SUPPLEMENTS)

SCALE: 1"=20'

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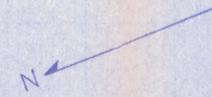
LITHOLOGY

- QUARTZ VEIN (DASHED WHERE INFERRED)
- DIKE (TYPE I) BELIEVED TO BE PORPHYRITIC ANDESITE, GREEN TO BROWN F. GRAIN MATRIX W/ HORNBLLENDE, BIOTITE AND AUGITE (1-3mm) PHENOCRYSTS.
- DIKE (TYPE II) GRANITIC, PROBABLY GRANODIORITE LIGHT GRAY PHANERITIC W/ VISIBLE QUARTZ, FELDSPAR, BIOTITE, MED. GRAINED.
- COUNTRY ROCK UNDIFFERENTIATED SCHISTS EXHIBITING LOW GRADE METAMORPHIC CHARACTERISTICS.
- PEGMATITE SIMPLE COMPOSITION; QUARTZ, MICA, FELDSPAR.

LEGEND

- QUARTZ VEIN SHOWING DIP
- MAJOR SHEAR SHOWING RELATIVE SLIP AND DIP (WHERE MEASURABLE)
- CROSSFAULT.
- FOLIATION VERTICAL, INCLINED
- TREND OF RELICT BEDDING SCHEMATIC
 - VERTICAL, INCLINED
 - DRILLHOLE LOCATION VERTICAL UNLESS OTHERWISE NOTED

GOLD BUG UNDERGROUND WORKINGS 240 LEVEL
MAP 4



SCALE 1" = 20'

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4/88 wv

