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what is ~~0000~~ mean - mineralized veins
what does [symbol] mean - spoon shaped - dlt fault
barite? - in veins
Sec.29 - [symbol], barite? -
Two unit Tcb's - not much chlorite breccia
local CuOx - pits along detachment - mostly N and W of Bullard Pk

GEOLOGIC MAP of the AGUILA RIDGE - BULLARD PEAK AREA, EASTERN HARCUVAR MOUNTAINS, WEST-CENTRAL ARIZONA

by Stephen J. Reynolds and Jon E. Spencer 1984

Arizona Bureau of Geology and Mineral Technology Open-File Report 84-4

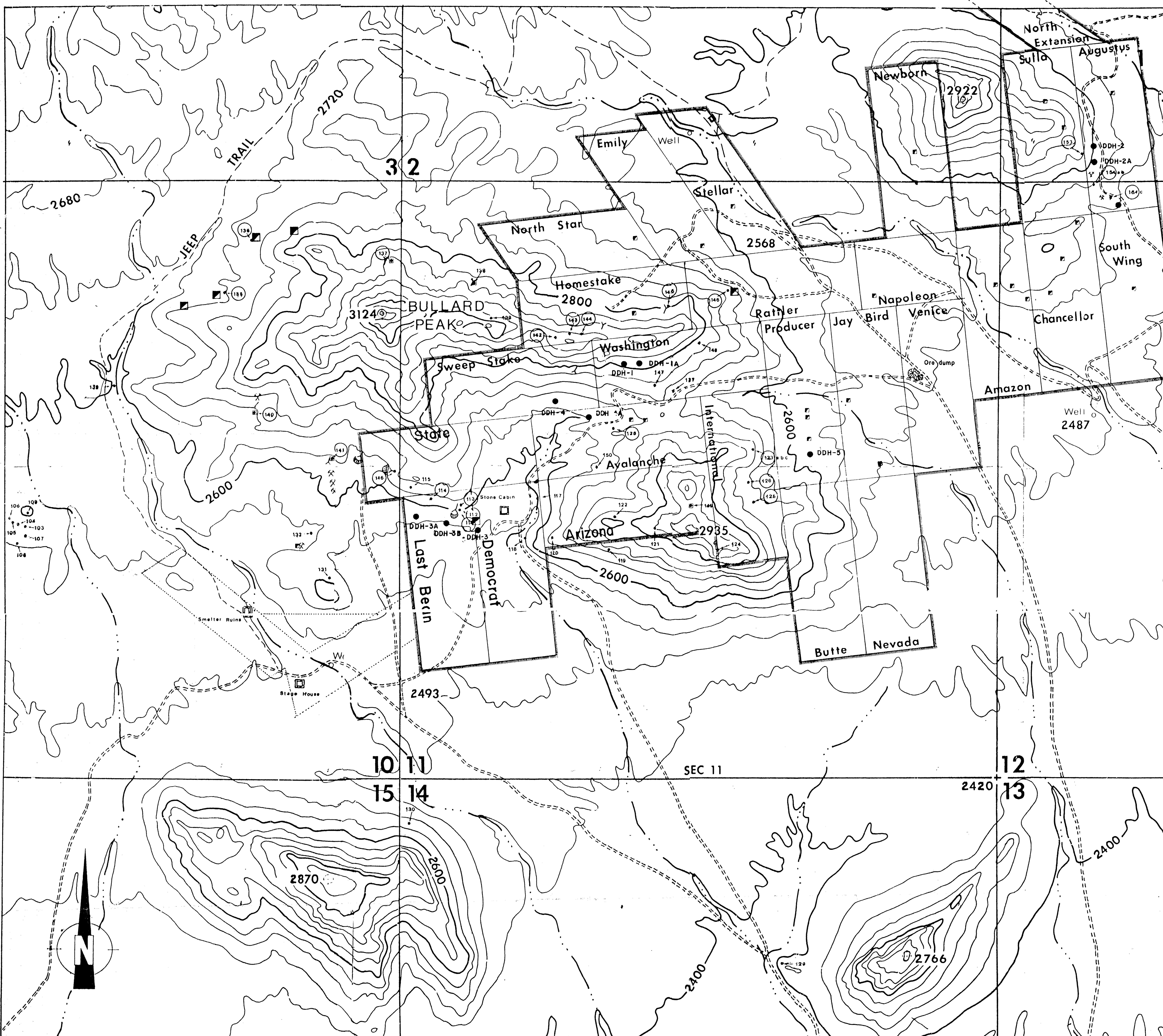


PLATE ONE

NRG RESOURCES LIMITED

BULLARD MINE

AGUILA, ARIZONA

scale 1" = 400 FT.

800 600 400 200 0 400 600 1000 FT.

LEGEND

Shaft or prospect

112 Sample (lith.)

45 Mineralized Zone

DDH-2 ● Diamond drill hole (proposed)

Claim Boundaries

Assays

	Au	Ag	Cu
Nº 111	0.21	0.60	2.50
Nº 112	0.26	0.60	5.50
Nº 113	0.03	0.15	0.24
Nº 114	Tr	0.10	1.60
Nº 116	0.06	0.20	2.80
Nº 123	Tr	0.05	1.30
Nº 123A	Tr	0.05	1.30
Nº 123B	0.01	0.40	0.87
Nº 123C	0.01	0.05	1.67
Nº 125	Tr	Tr	1.40
Nº 126	0.02	0.05	7.90
Nº 128	0.09	0.10	6.40
Nº 135	0.83	0.70	7.80
Nº 136	0.78	0.25	2.40
Nº 137	0.06	0.25	1.30
Nº 140	0.01	0.20	1.50
Nº 141	0.03	0.25	1.30
Nº 142	0.05	0.15	1.60
Nº 143	0.57	0.15	2.10
Nº 143A	0.16	0.10	0.16
Nº 144	0.12	0.10	4.10
Nº 145	0.08	0.10	1.20
Nº 146	0.06	0.10	0.88
Nº 146A	0.02	0.05	1.10
Nº 152	0.08	Tr	1.00
Nº 153	0.29	0.25	2.70
Nº 154	0.42	0.25	1.40
Nº 154A	0.05	0.10	1.30

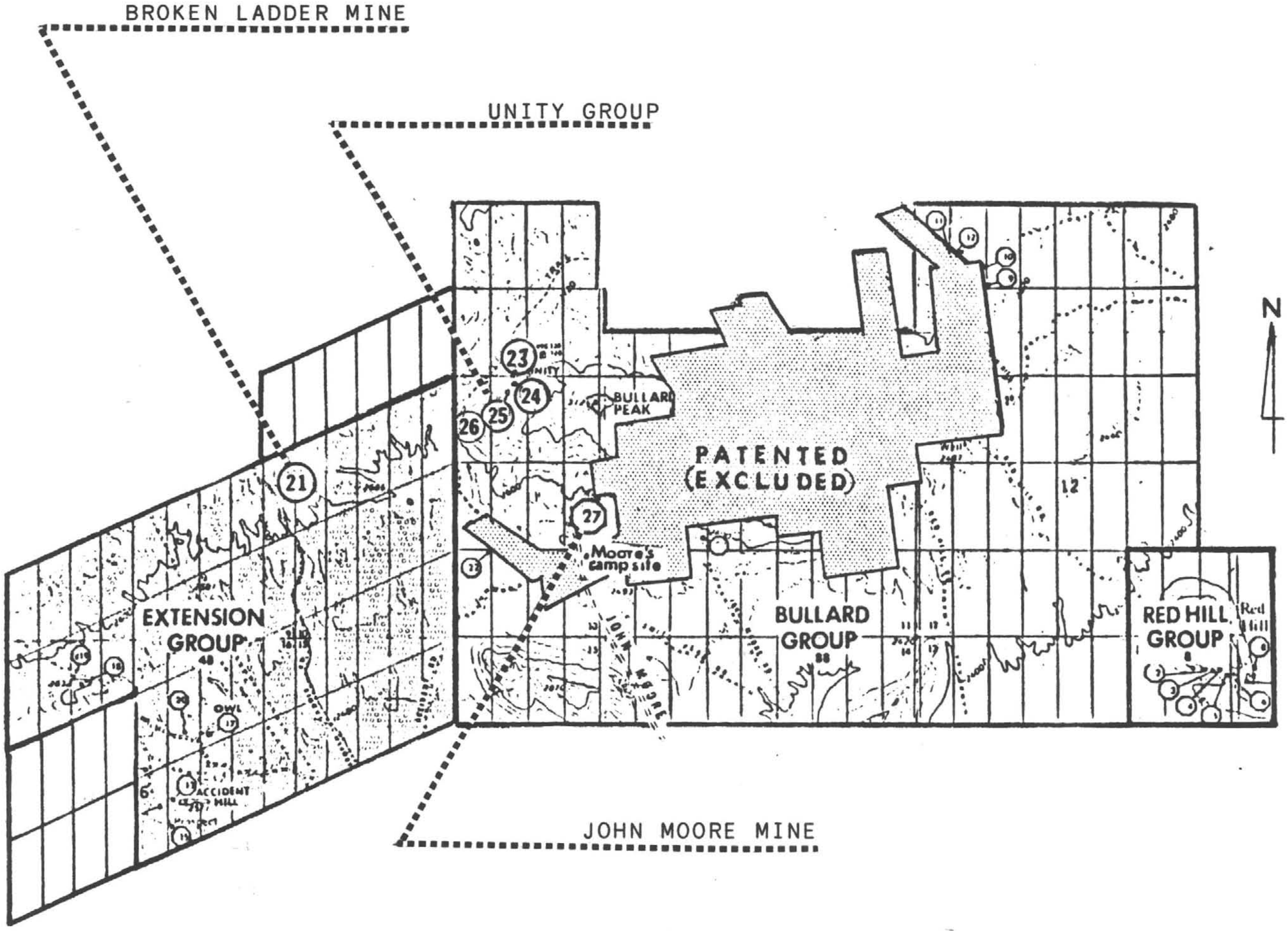
Plate One
Highest readings are on Sansone's claim Numbers 135 and 136

SAMPLE & CLAIM MAP

K. C. DELISE
9043 Harmony Grove Rd.
ESCONDIDO, CA 92025
(714) 743-8921 CA Lic. No. 2118 & 334335

ORIGINAL DECEMBER, 1980
REVISIONS: Jan 2, '81 Add State, Last Bern, Democrat, Arizona Claims K.C.D.

SANSONE'S
ACM 166 LODE MINING CLAIMS
AND
ACM MILLING



BULLARD PEAK

166 CLAIMS

(± 3,000 Acres)

AGUILA, ARIZONA

GENERAL INFORMATION

The Bullard Peak properties presented herein consist of 166 lode BLM claims comprising approximately 3,000 acres in area.

In 1978, Michael Sansone located and filed these Bullard Peak claims which included his combining more than 20 mine sites that had not been independently operated since prior to 1950.

It is the overall combination of these properties along with the milling and ore processing facilities that Sansone has developed that add a special attraction to the prospects of these claims.

This presentation particularly covers a target area that has been investigated by several geological sources. These geological studies are included herein in detail, with assay reports.

Sansone understands that further studies and testing are expected prior to any commitment from a mining company. Sansone is willing to allow a major concern to do a preliminary exploratory examination of these properties on a no-charge basis for a reasonable period of time.

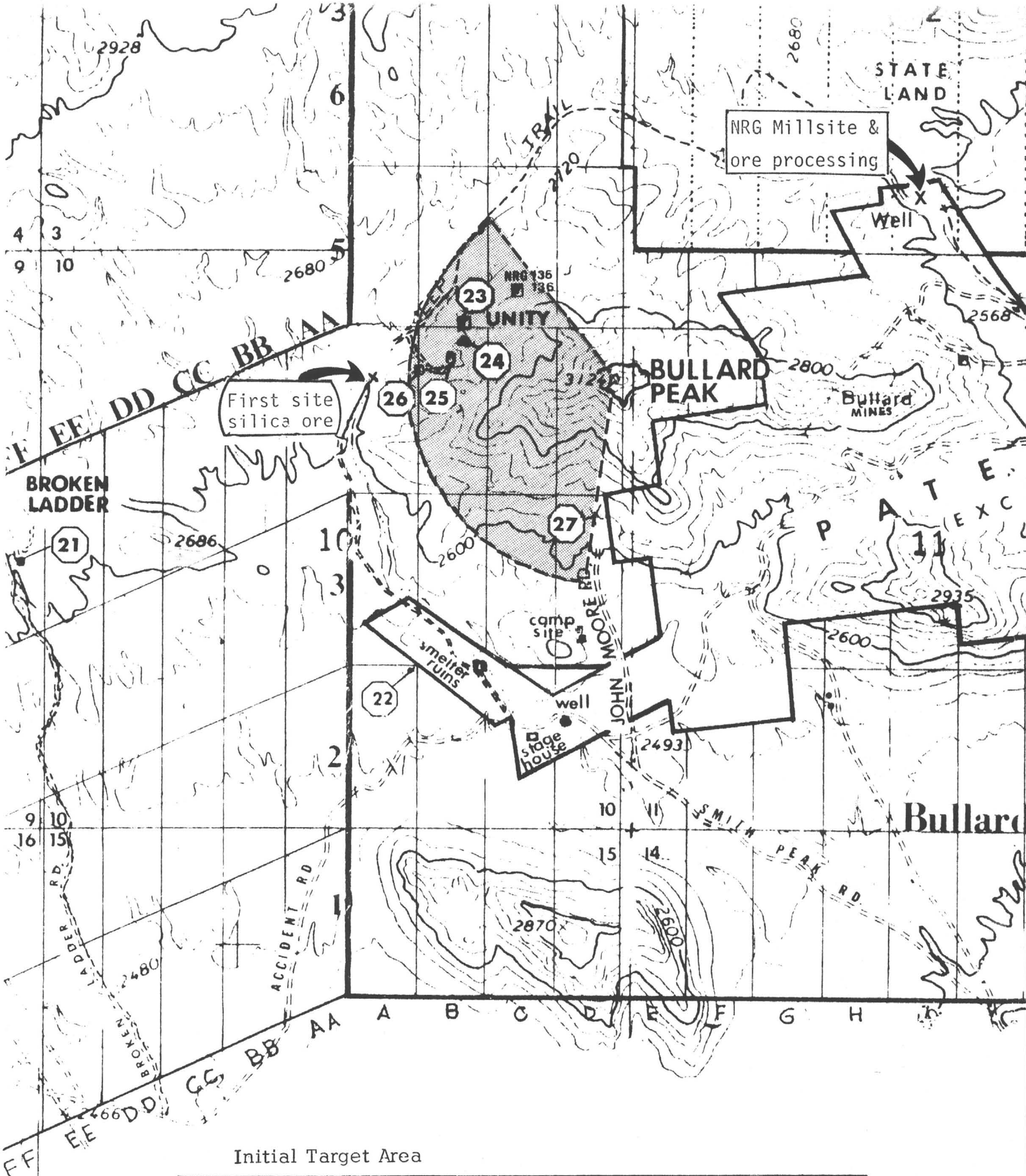
The target area has consistantly shown gold assays of over 1.00 oz/T in the select vein structure and an average of over 0.30 oz/T within a broader structure.

These 166 Sansone claims border 26 patented claims presently owned by NRG Resources, Ltd. A detailed engineered plat is contained in this presentation depicting the ownerships. NRG Resources, Ltd. has recently installed a mill and ore processing plant on their property and are expected to begin operations in the near future.

These Bullard Peak properties, owned by Sansone, will be entered and will appear in the "MineSearch Annual" published by Metals Economics Group, Boulder, Colorado. The publication will be coming out in August 1985.

INITIAL TARGET AREAS

ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
(602) 956-6070



Initial Target Area

Striking a 135 degree arc with a radius of 1800 feet from Bullard Peak to encompass the sampled locations results in an initial target area of approximately 80 acres.

SYNOPSIS OF SOME OF "FULL GEOLOGICAL DATA"

FULL GEOLOGICAL DATA AVAILABLE UPON REQUEST

AVAILABLE ON REQUEST

NOTE: Geological reports on the Bullard Peak properties are available upon request. These reports include:

a. E. THOMAS RIGGS of Unity Mining Company, made in 1984. This report primarily covers the target area which includes the Bullard Peak, itself.

b. JEFFERY W. GIESE, April, 1984, completed a geological investigation with mapping and sampling in the Bullard Peak properties.

c. KNOXIE C. DeLISE, Geologist, completed a geological investigation of the Bullard Mines in 1981. This report was prepared for NRG Resources,, Ltd. However, the area covered in this report has included claim areas owned by Sansone. This extended area of the report reveals that the area within Sansone's claims resulted in the highest gold samples of the report for NRG and their adjoining patented claims. This is a 35 page certified report.

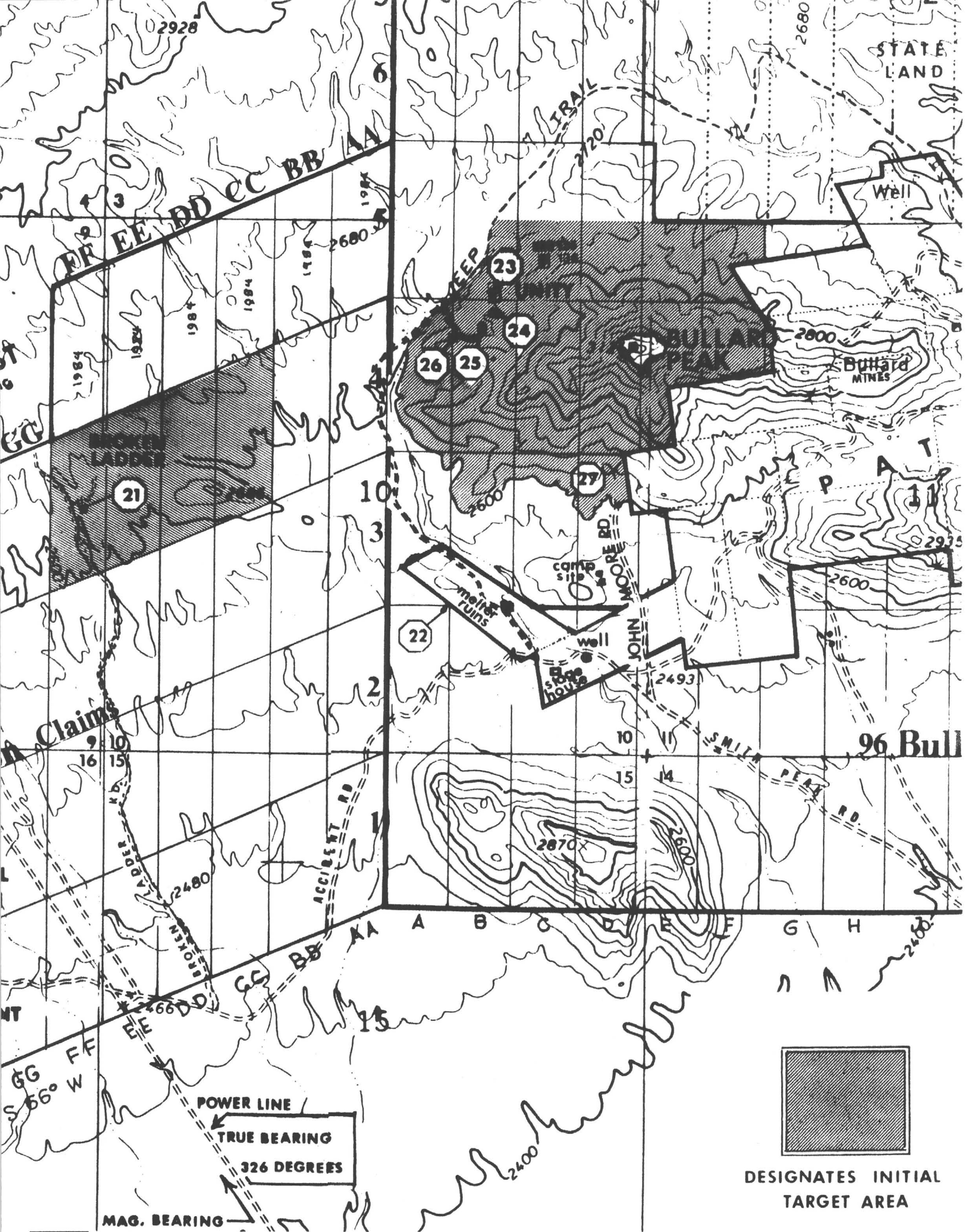
d. E. W. DURFEE, E.M. prepared a report on the patented claims sometime between 1907 and 1920, together with plats showing results of assays from numerous areas of the patented mine workings.

e. A.S.& R. CO. (now ASARCO) ordered and received a mineral survey of the patented claims about 1913.

f. WILLIAM B. MAITLAND conducted a mineral survey of the patented claims in 1944 in connection with a loan application to the Reconstruction Finance Corporation.

g. Other pertinent data and pictures are included with these geological reports.

h. Extensive information about the millsites is available, also on request.



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(602) 956-6070

E. THOMAS RIGGS REPORT

BULLARD PEAK PROPERTIES

The E. Thomas Riggs geological investigation covers an area near the Bullard Peak which has been determined to be the initial Target Area.

The Target Area is depicted on the plat shown

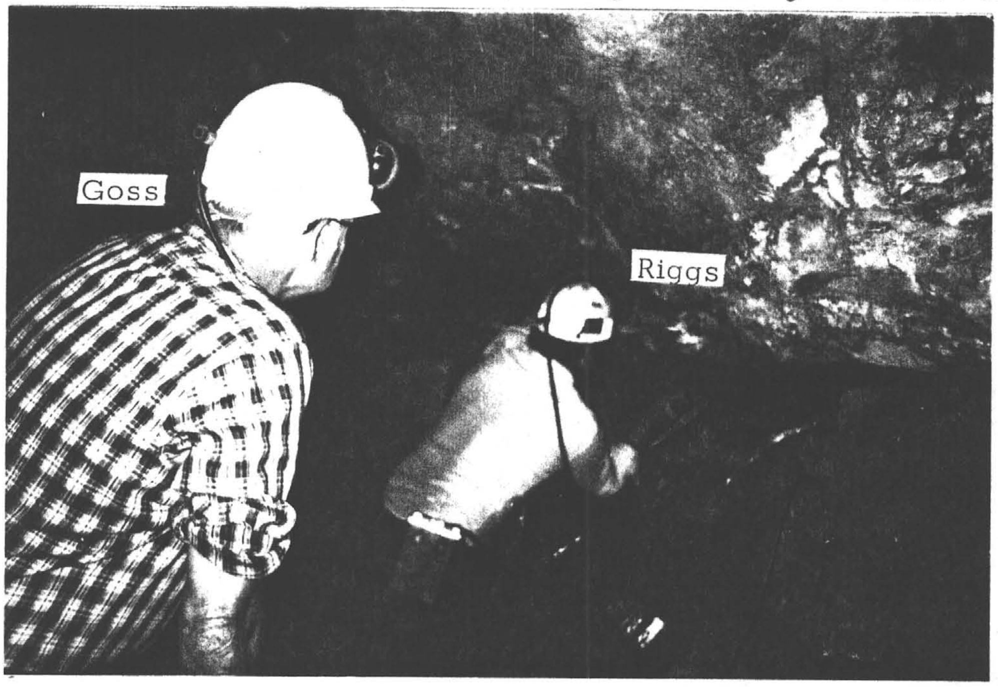
The specific mine sites are identified as: John Moore #27 & #27B; Unity #26, #25, #24, #23, and #22; and, the Broken Ladder mine #21.

With the report are results of samples that were sent to Unity's control laboratory with splits being verified by Skyline Labs, Inc. in Tucson, Arizona.

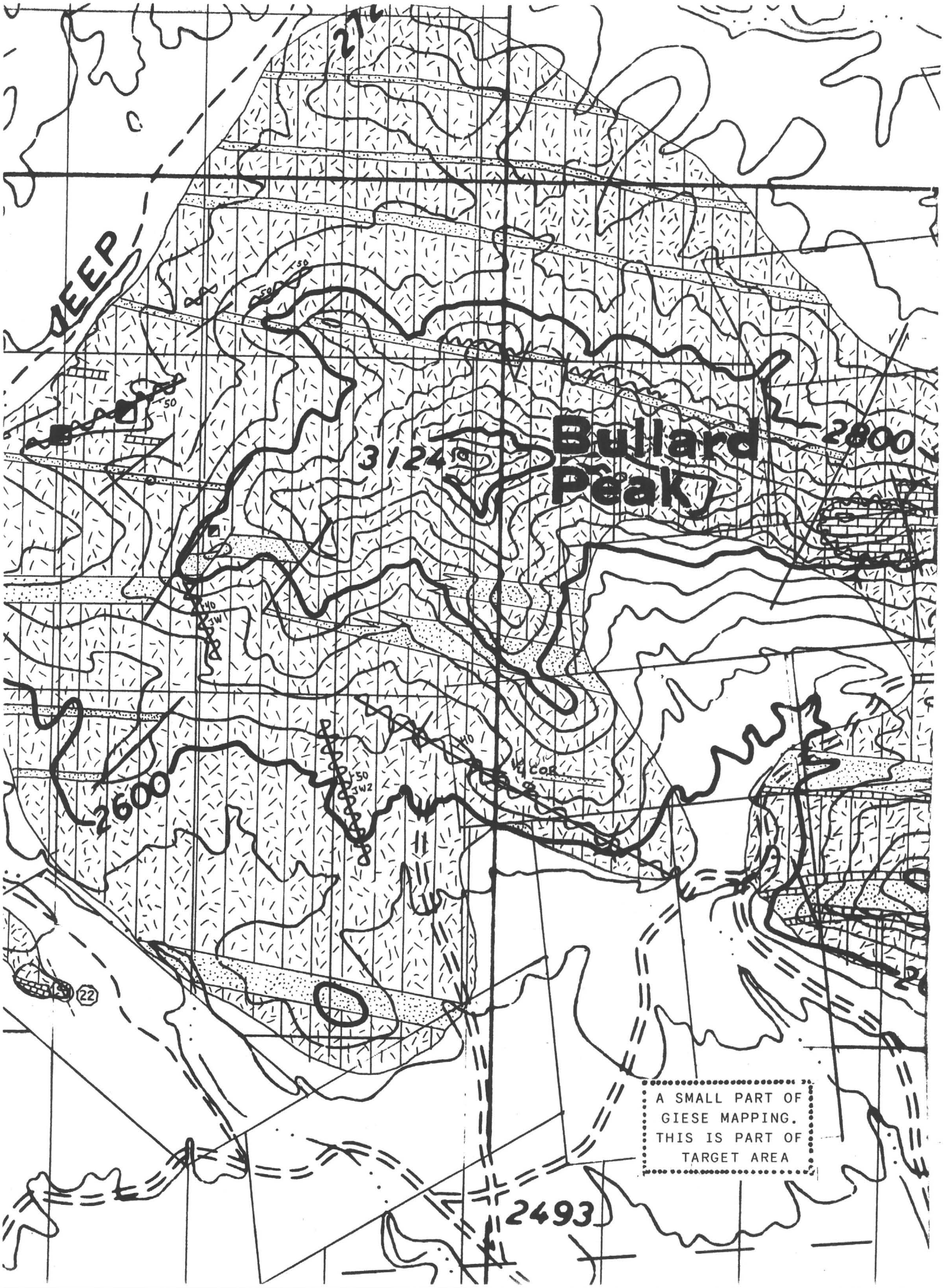
Average vein structure sampling was 0.25 to 1.73 oz Au/ton. (Au - Gold)

Earlier in 1981, Unity had leased this target area and did exploratory work for several months. This work has been an asset for determining the initial target area, as well as opening the area for inspection.

The full report is available upon requesting the Geological Data Package.



This photograph was taken by Sansone on March 13, 1984 while E. Thomas Riggs was collecting ore sampley under the supervision of Cadmus L.G. Goss, P.E.



A SMALL PART OF GIESE MAPPING. THIS IS PART OF TARGET AREA

JEFFERY W. GIESE

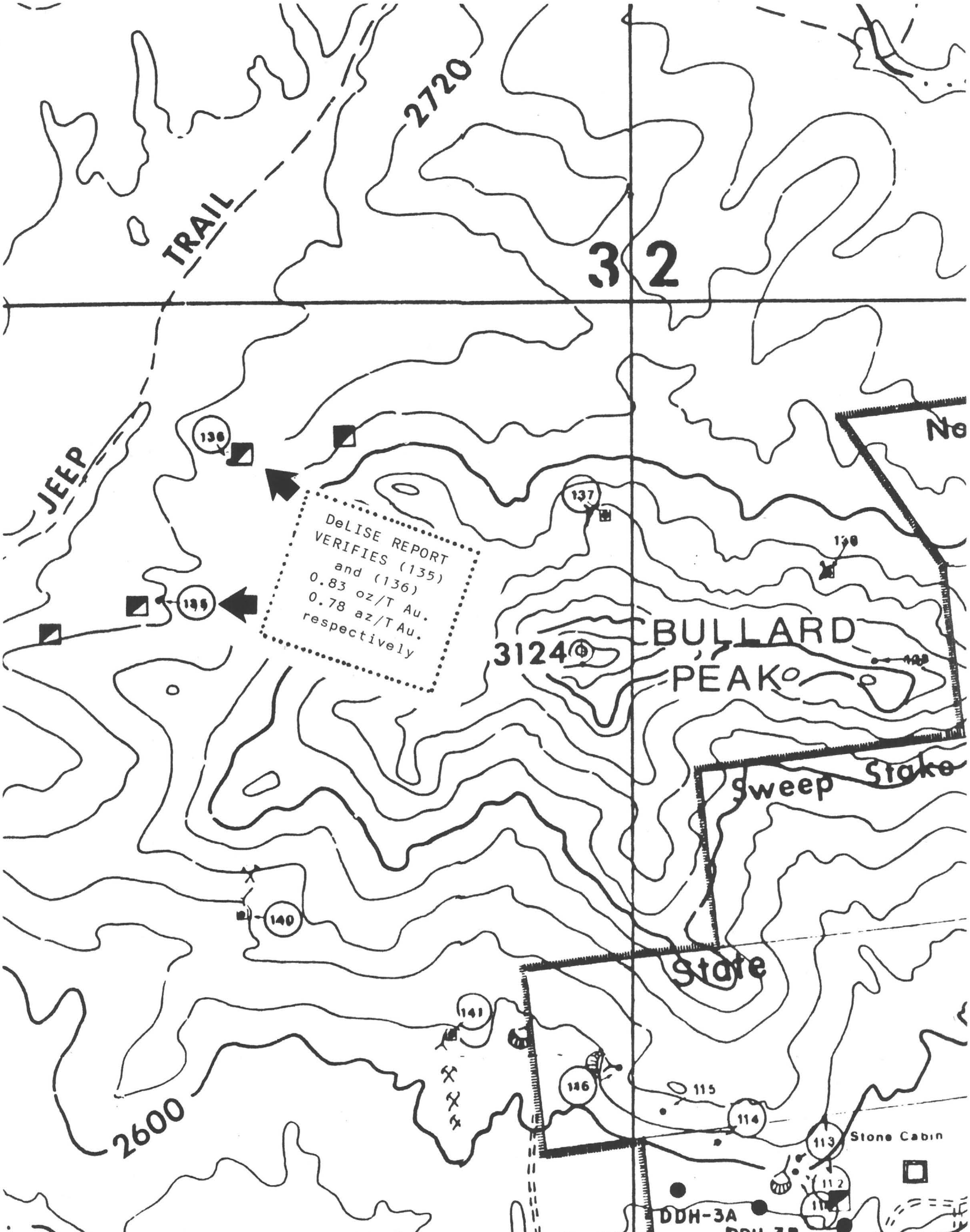
REPORT & MAPPING

This 17 page report covers the Bullard Peak properties owned by Sansone. It explains that in the 1940's records indicate 5,500 tons of ore removed averaging 0.32 oz/ton of gold, 0.24 oz/ton of silver and 2% copper. In the 1950's, ASARCO took 43 samples which averaged 0.25 oz Au/ton, 0.5 oz Ag/ton and 2.67% copper.

The report states the possibility of a bulk porphyry gold deposit may be considered as drilling proceeds to prove vein targets. It further states that geophysics should be the next step at the Bullard property.

Giese's reports and valuations are based upon his average samplings within several areas, testing 0.334 oz/ton Au, 0.411 oz/ton Au and 0.498 oz/ton Au. These averages, applied to estimated tonnages of ore, totaled $119,000,000 for the Target and Broken Ladder areas.

A COMPLETE DETAILED REPORT WITH MAP IS AVAILABLE UPON REQUEST FOR "FULL GEOLOGICAL DATA"



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KNOXIE C. DeLISE

1981 GEOLOGICAL REPORT

Knoxie C. DeLise's 1981 report was made for NRG Resources, Ltd. to cover their 26 patented claims.

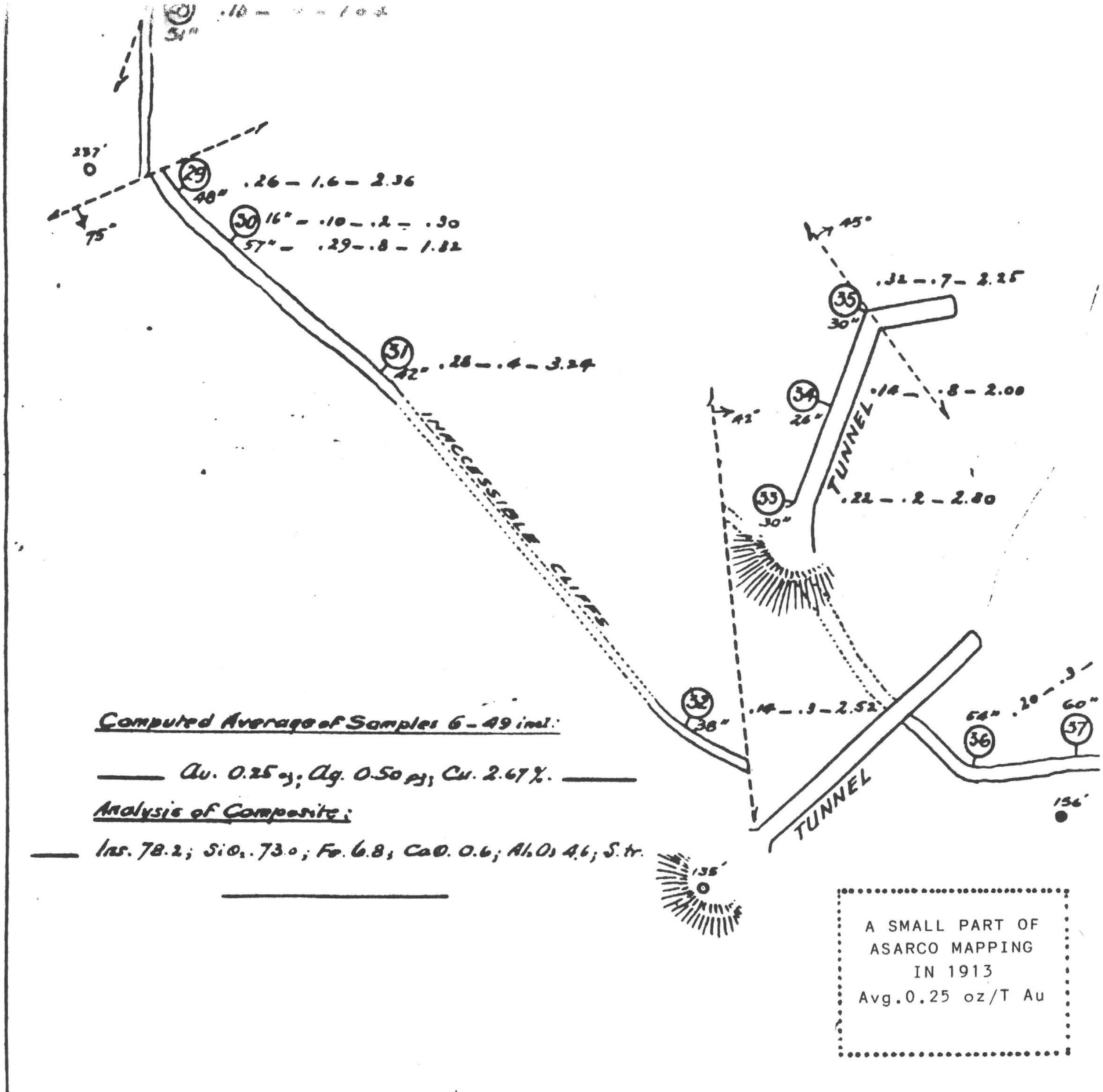
The report consists of 35 pages and 3 maps, the content of which extends into the Sansone Bullard Peak properties, and more particularly into the Sansone Target Area.

It should be noted that the sampling reported and mapping by Mr. DeLise shows that, from the 28 assays taken, the two highest valued assays were on the Sansone Bullard Peak properties. These were #135 at 0.83 oz Au, 0.70 oz Ag, and 2.40% copper; and #136 at 0.78 oz Au, 0.25 oz Ag, and 2.40% copper.

Ore treatment studies in the mineralized zones of the Bullard Peak area indicate the observed mineralization would respond to a gravity separation after crushng to a minus 40 mesh. This treatment should recover 95 - 97% of all sulphides. The follow-up treatment would be an acid copper leach process. Tests of this treatment were, in fact, carried out with positive results.

Knoxie C. DeLise is a certified geologist, registered in Arizona and California. His base of operations is San Diego, California.

A COMPLETE DETAILED REPORT WITH MAP IS AVAILABLE UPON REQUEST FOR "FULL GEOLOGICAL DATA"



HOME GROUP

PIERCE MINING DIST. YAVAPAI CO.
ARIZONA.

ASSAY PLAN AND SECTION

SHOWING LOCATION, WIDTH AND VALUE OF SAMPLES.

Scale: 1" = 40'

A. S. & R. Co. Map 1913

50

ASARCO MAPPING
1913

A map of the Bullard Peak area was prepared by A.S. & R. CO. (ASARCO) in 1913.

The computed average of samples 6 through 49, inclusive, gave:

0.25 oz/T Au.

0.50 oz/T Ag.

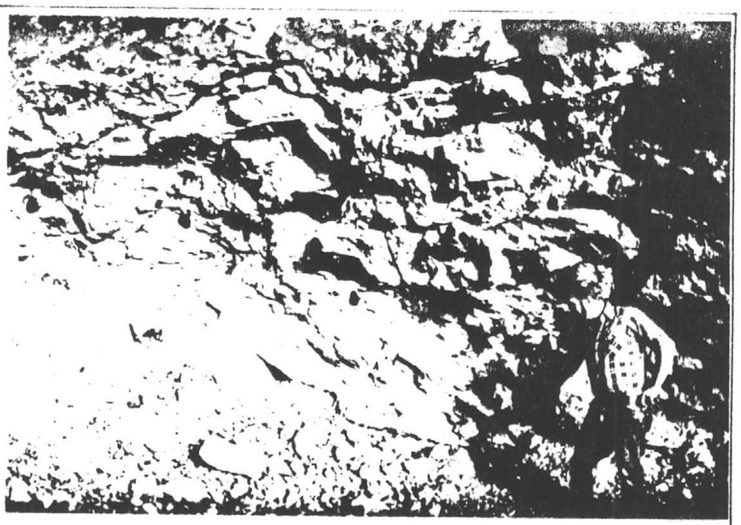
2.67% Cu.

The area covered by A.S. & R. Co. (now ASARCO) is just east of the target areas herein mentioned as the most likely prospects.

The complete mineral plat is included in the Geological Data Package.

The plat was copied from records of the Arizona Department of Mineral Resources, Arizona State Fairgrounds on McDowell Road at 19th Avenue, Phoenix, Arizona.

THE COMPLETE ASARCO GEOLOGICAL MAP IS AVAILABLE UPON REQUEST OF THE "FULL GEOLOGICAL DATA"



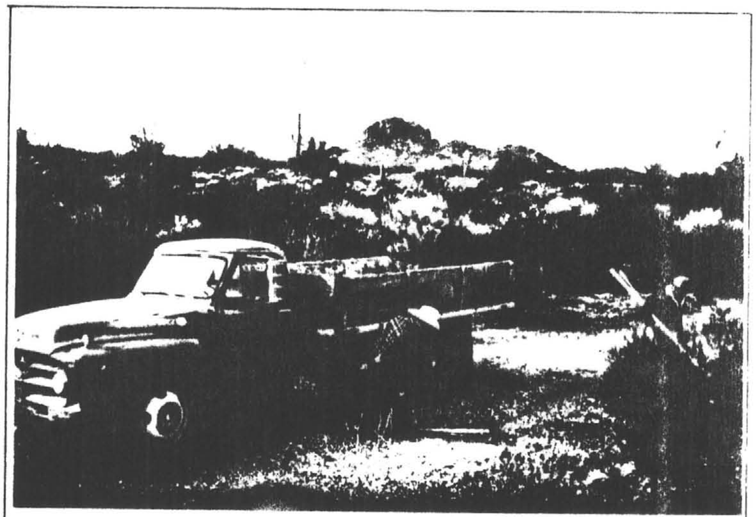
MAIN VEIN FROM UNITY MINING'S REMOVAL OF OVERBURDEN IN BULLARD PEAK TARGET AREA AT MINE SITE #23

HISTORIC RUINS OF STAGE COACH STOP ALONG SMITH PEAK ROAD ON THE WAY TO BULLARD PEAK TARGET AREA

LARGE AREA OF OVER-BURDEN REMOVED BY UNITY MINING IN 1982. THIS IS THE PRIME TARGET AREA AT MINE SITE #23.

SMITH PEAK ROAD IS A TYPICAL ROAD TO AND FROM BULLARD PEAK TARGET AREA

AT MINE SITE #25, from left to right - Thomas Riggs (Geological Consultant), Felix Rea, (Helper), David Rea (Helper), Cadmus Goss (Certifying Engineer). COLLECTING SAMPLES FOR RIGGS REPORT



SURVEY CREW RE-SETTING BULLARD PEAK CLAIM CORNERS FROM MAY TO SEPTEMBER 1985

HISTORY
BULLARD PEAK AREA

Around the turn of the century, and periodically thereafter, up to and during World War II, mining was a major industry in the vicinity of Aguila, Arizona. Gold, silver and copper were principal elementary metals

After WWII, with metals and minerals at low market prices, along with the closing of nearby mills, the many small mines began to shut down. At that time, these metals had values less than one-fifteenth of the present day market values.

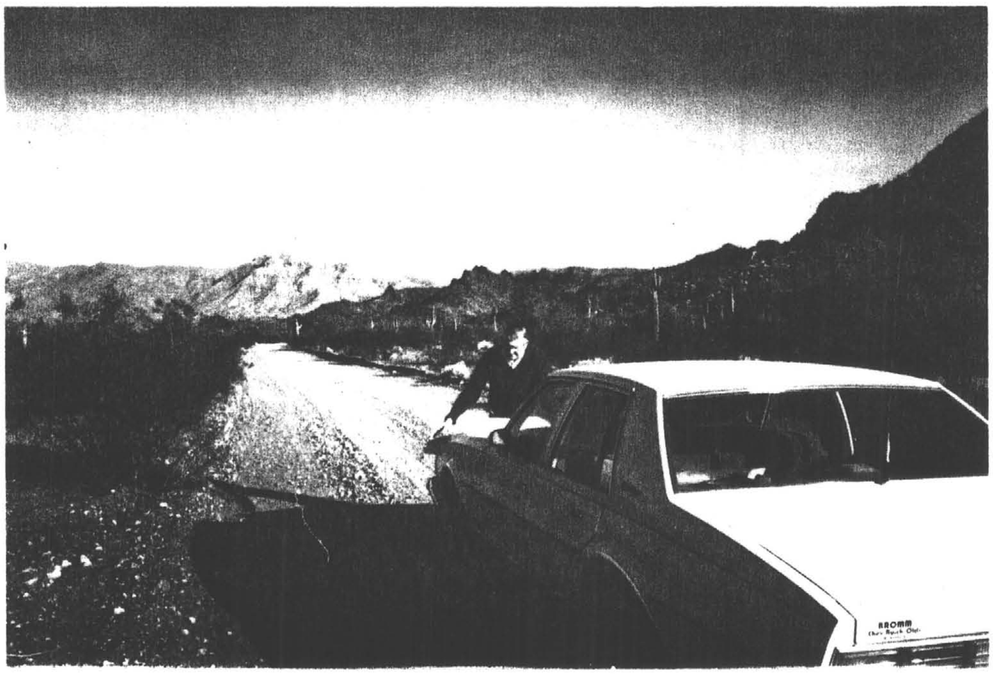
Recently, many mines have been inactive in the Aguila area because there are no facilities to custom mill and process the ores. The nearest custom ore milling and processing operations are now more than 100 miles from Aguila. Milling is done on a reservation basis.

Prior to the turn of the century, a former Confederate soldier named Bullard did extensive prospecting in the area north of Aguila. Bullard Peak is named for him. He was responsible for patenting many of the claims in the immediate vicinity of the peak. Bullard refused to make reasonable deals with people who wanted to develop the mines he had located. He would only make short-term leases with prospective miners. Bullard's terms made full scale development economically unfeasible, and thus, the claims were only worked intermittantly over the years.

The Bullard mine on the patented claims was described as a flat vein carrying copper, gold and silver. The mine outcropped in a low range of hills lying East of Bullard Peak. The grade of ore was judged to be continuous under and through the hill. Bullard died during the 1920's. Shortly before WWII, the mine was leased to good operators.

The files of the Arizona Department of Mineral Resources disclose a movement of nearly 5,500 tons of ore over a 29 month period from March 1939 to July 1941. During that period, 1,879 ounces of gold, 1,435 ounces

GOOD ACCESS ROADS TO ALL CLAIMS



TYPICAL ROAD

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of silver and nearly 119 tons of copper were milled from that quantity of ore. The milling and processing were done at the Hayden smelter, Hayden, Arizona, approximately 180 miles distant.

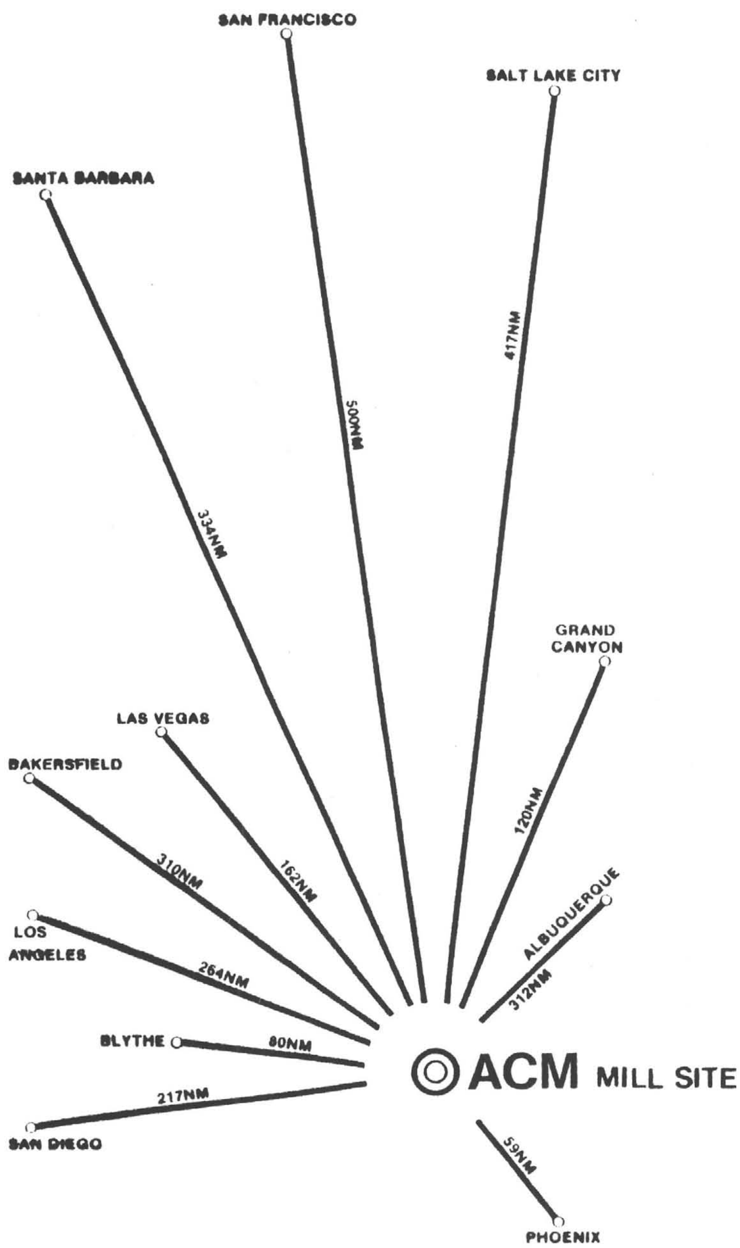
Sansone's Bullard Peak claims are situated in a low range of hills which are more or less isolated from the main mass of the Harcuvar Mountains which lie farther West. The hills rise abruptly from the general base level of the surrounding desert plains and are rather bold in outline, with sharp upstanding outcrops of rock. The general color is red to reddish black as against a rather white color predominating over the greater part of the desert wash.

The main mountain range, which culminates in Bullard Peak, is geologically of great age, and consists of the eroded remains of a complex of Archean Schists with later Cambrian intrusives. The gravel in the various gulches which deploy from the main mountain range include fragments of granite, schists, hornblendeschist, gneiss, porphyry and some metamorphic rocks difficult to identify. The 166 Sansone claims, lying at 2,700 feet above sea level, surround Bullard Peak.

In 1981, Unity Mining Company entered into an exploratory lease/option on the Sansone claims. Unity removed a large amount of overburden and uncovered 2,800 feet of two parallel veins, located on four of the claims. There is evidence that these veins continue for an additional 3,000 feet in a Southwesterly direction. Several shafts and drifts intersecting these veins indicate recoverable ore ranging in depths from 20 feet to 80 feet below the surface.

Unity, at that time, however, was already heavily involved in resolving environmental problems with other properties it was investigating. As a result of these difficulties, Unity allowed the lease/option to expire.

The target area that Unity was working has continued to be the recommended target area of all subsequent geological investigations of Sansone's 166 claims.



AGUILA, ARIZONA

HOW IT BEGAN

Between 1968 and 1978, Michael Sansone was developing and subdividing land in and around Aguila, Arizona.

At the same time, John Moore and Gene Pyers were prospecting and mining the nearby Bullard Peak area on a minimal basis.

During that period of time, Sansone and these miners became acquainted.

In 1978, Sansone joined with Moore and Pyers by investing sufficient funds to acquire heavy equipment, exploration services, a milling plant, a testing laboratory and other facilities to develop and fully operate a mining and processing plant.

Actual work began in mid 1978.

The partnership agreement between Sansone, Moore and Pyers provided that all of the claims would be filed in the name of Sansone.

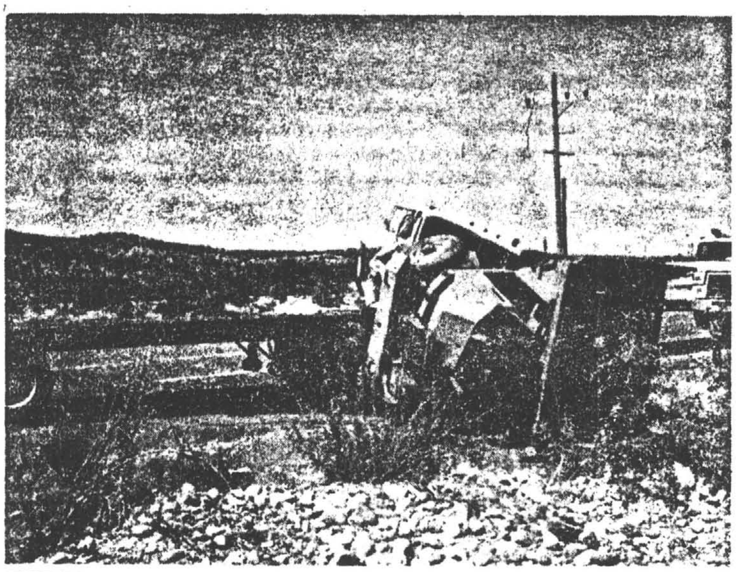
WHO WAS TO DO THE WORK

The mining operation was organized and work began with John Moore acting as the working partner with Gene Pyers as his assistant. John Moore had the expertise and know-how: to locate and develop mine sites; to operate and repair the heavy equipment acquired; to coordinate and direct the activities of the workers; and, most of all, he had a vast knowledge of the formations of Bullard Peak and the immediate surrounding area. He had spent many years prospecting and testing these properties. He and Pyers lived on the site for several years immediately prior to becoming partners with Sansone.

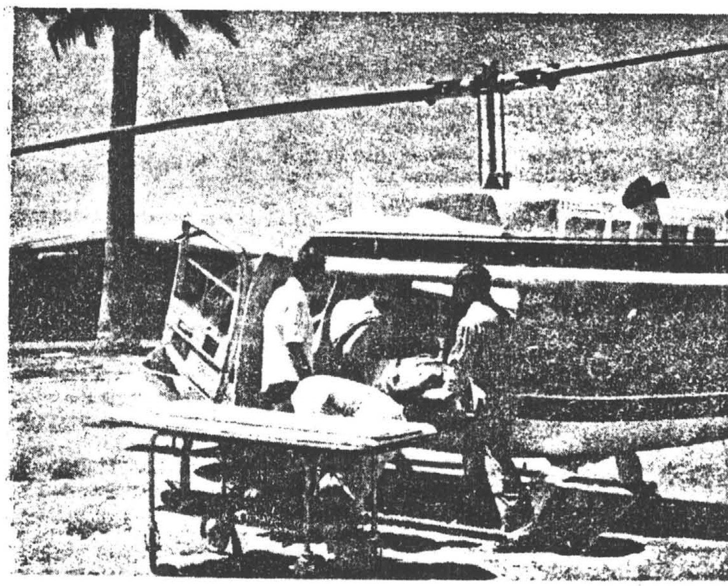
JOHN MOORE

15¢ **THE WICKENBURG SUN** 15¢

Vol. 45 No. 22 WICKENBURG, ARIZONA September 14, 1978



THIS FATAL CRASH of two heavy trucks occurred Monday morning this week on U. S. 60 about a mile east of Wickenburg. Highway Patrolmen reported a dump truck, stopped along the road because of running out of fuel, was struck by a flatbed semi-trailer truck. Both vehicles were headed toward Wickenburg when the crash occurred. The driver of the dump truck suffered severe chest and head injuries and was declared dead at Wickenburg Community Hospital. At press time, the Highway Patrol was trying to verify identity of the driver who was killed.



AN AIRLIFT TO PHOENIX of a second truck driver injured in a crash Monday morning on the Phoenix highway was made by Dept. of Public Safety helicopter. The driver, John Bruce, 24, of Diamond Bar, Calif., suffered leg, arm and eye injuries when the truck he was driving crashed into a dump truck stalled along the road. He was taken to the Wickenburg Community Hospital, then transferred to Good Samaritan Hospital in Phoenix by the helicopter.

Monday September 9, 1978

John Moore was killed

WHY IT WAS STOPPED

John Moore was killed, instantly, while delivering an ore truck to the Bullard Peak mine site.

Sansone decided not to continue actively in any mining operation. The decision was made, especially, because Sansone had no working knowledge for operating a mine or mill.

Moore was the key person for managing the operations and the business. Without Moore, and with no guidelines for hiring or taking on a new person, Sansone felt there was no alternative but to make a settlement and dissolve the partnership.

However, any recovery of Sansone's investment would have to come from the sale or lease of the claims and the 15 acre deeded processing plant in Aguila, Arizona.

Sansone has completed his real estate and airpark developments in the area. He has maintained the claims in good standing each year since 1978.

1978

PROPOSED OPEN-PIT MINING

SILICON ORE

IN EXCHANGE FOR CONTENT

OF PRECIOUS METALS

The following page explains
the original plan to develop the Bullard Peak properties.

PLAN IN 1978 - Ship Silicon Ore in Exchange for Precious Metals Content.

Shortly after the death of John Moore in September 1978, Sansone proposed to continue with the project started with Moore and Pyers.

This project was to mine ores containing high quantities of silicon and ship to ASARCO. There, ASARCO was to refine the ore, retain the silicon and return the valuable metals, i.e., gold and silver. The retention of the silicon was by way of payment for the refining.

However, without Moore to direct all of the mining operations, Sansone determined that it would not be practical to continue with this process and the project was subsequently dropped.

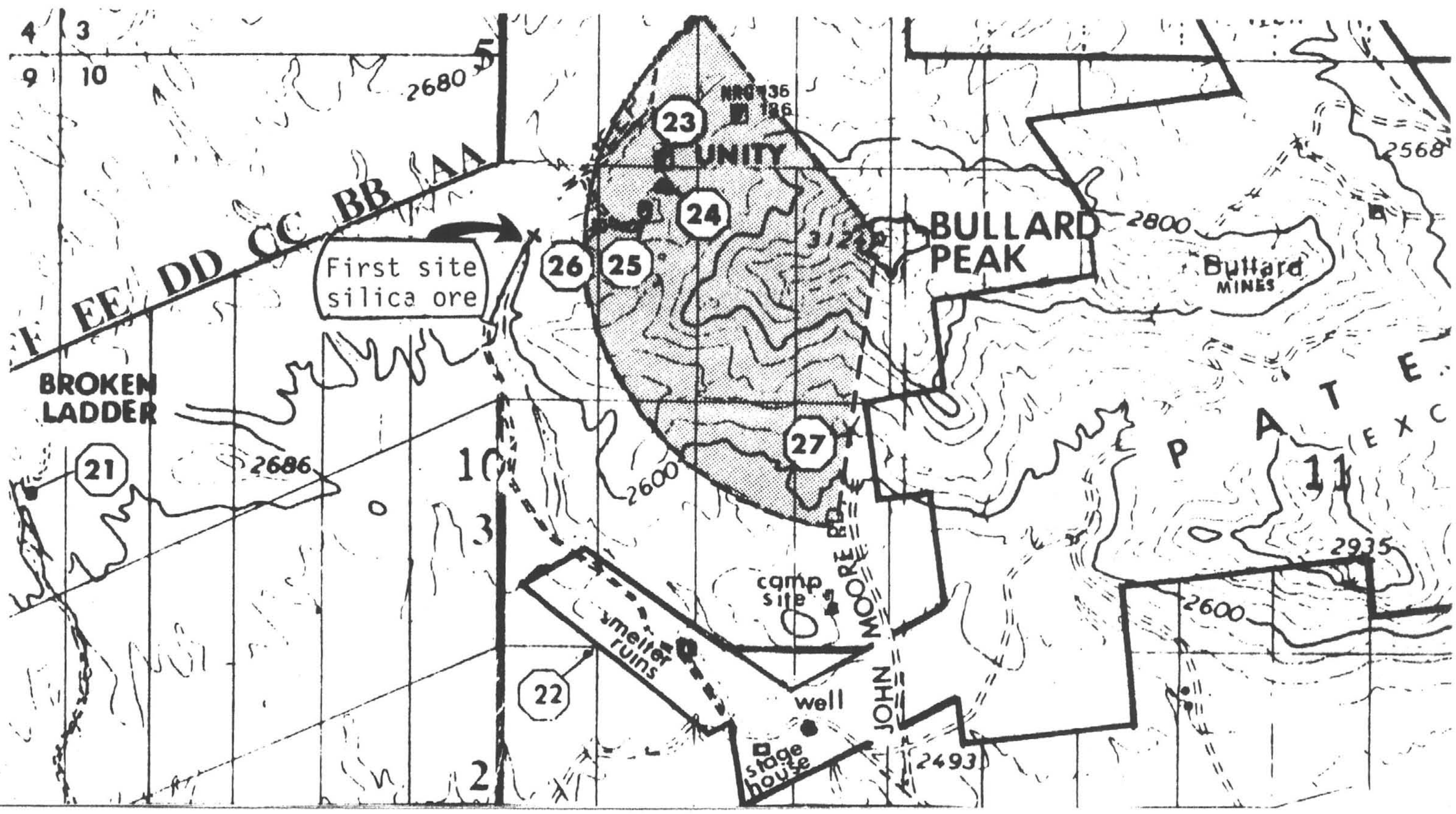
In connection with the project, Sansone had acquired much heavy mining equipment to be used in the extraction and shipping of the ore. He also had arranged to lease a 15 acre industrial site in Aguila, having access to both rail and highway for shipping of the prepared ores.

Upon determination that it was not practical to continue with the mining venture, Sansone proceeded to dispose of much of the heavy equipment. He retained the 15 acre industrial site, which is presently leased to an organization which has placed a small mill on the property and has been processing ores from other locations.

In 1979, Sansone settled with, and compensated Pyers for his interest in the claims and Pyers moved on.

1978 - THE BEGINNING OF DEVELOMENT FOR SILICON ORE.

TARGET AREAS FOR DEVELOPMENT



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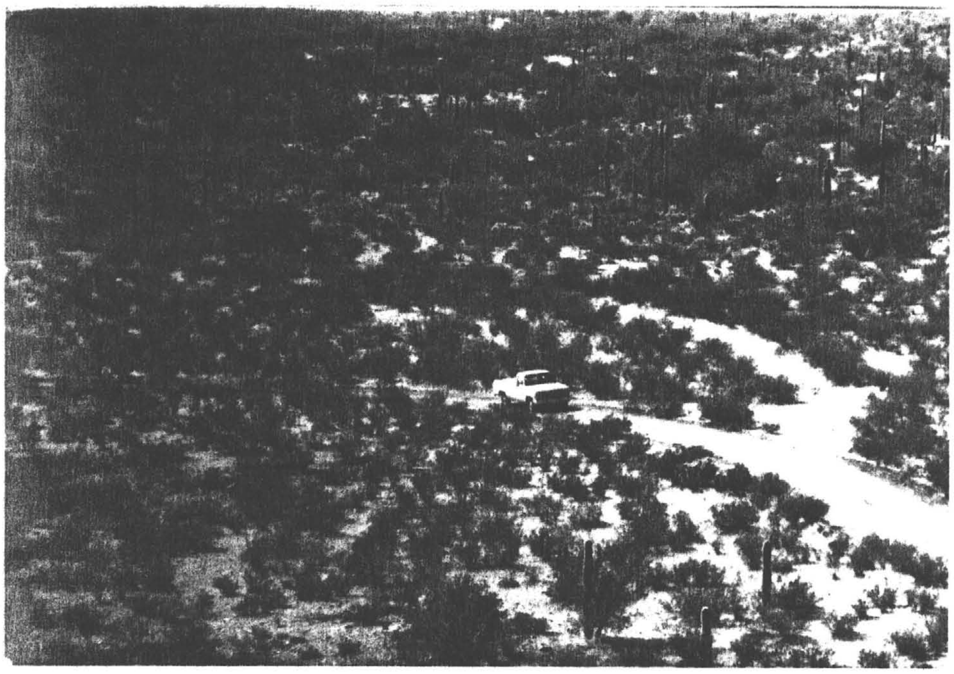
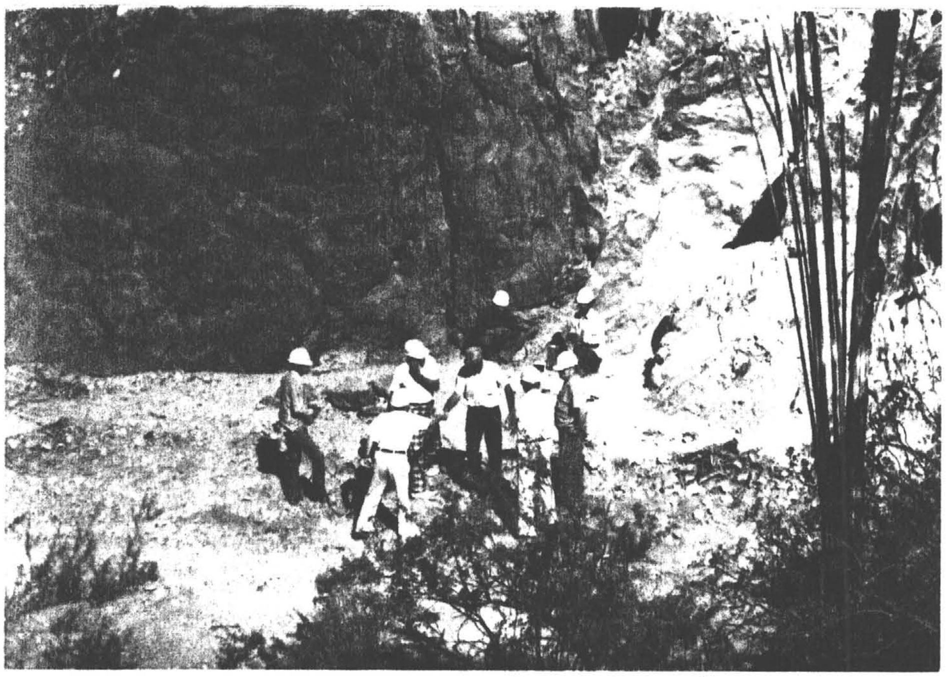
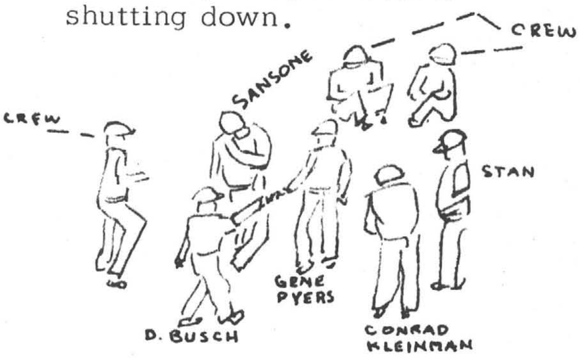
(602) 956-6070

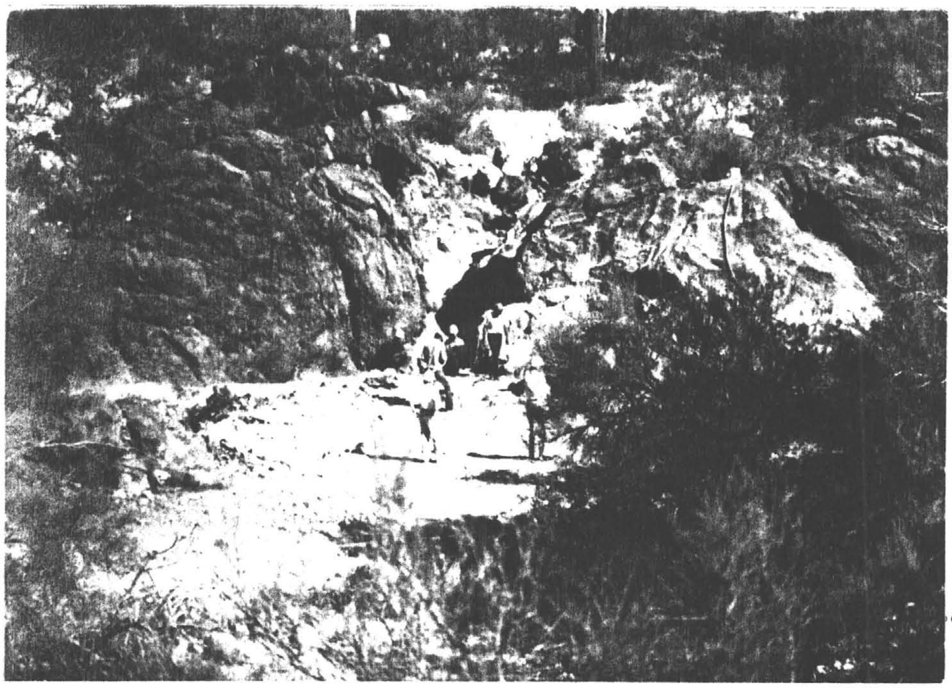


Mining Inspector arrival
This was in 1979, shortly after John Moore's accident.



Meeting the blasting crew. Just after John Moore's accident, and just before shutting down.





Setting the last dynamite charges before shutting down.

The following three pages are copies of reports by Arizona Testing Laboratories of ore analyses of several samples taken from the Silicon target area which are depicted on the plat on the second preceding page.

Note that the major constitutent of the samples was Silicon, while, at the same time the samples carried 0.20 oz and 0.40 oz/T respectively of Gold and 0.15 oz/T Silver each sample.

Arizona Testing Laboratories

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

For Mr. Mike Sansone
One West Madison
Phoenix, AZ. 85003

Date October 10, 1978

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
8109	ACM #5	0.20	0.15	0.28%			

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean, Jr.

Registered Assayer
CERTIFICATE NO.
6258
CLAUDE EUGENE
McLEAN, JR.
Date Signed 10/10/78
ARIZONA, U.S.A.

Arizona Testing Laboratories

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

For: Mr. Mike Sansone
One West Madison
Phoenix, Arizona 85003

Date: October 11, 1978

Lab. No.: 8109

Received: 10-6-78

Marked: ACM #6

Submitted by: same

REPORT OF QUALITATIVE SPECTROGRAPHIC EXAMINATION

ELEMENT	APPROXIMATE PERCENT
Boron	0.005
Silicon	Major Constituent
Aluminum	7.0
Manganese	0.07
Magnesium	2.0
Lead	0.4
Gallium	0.004
Copper	0.05
Iron	5.0
Calcium	2.0
Vanadium	0.006
Sodium	2.0
Titanium	0.1
Silver	0.0005
Nickel	0.02
Potassium	1.0
Strontium	0.02

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean, Jr.

Arizona Testing Laboratories

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

For Mr. Mike Sansone
One West Madison
Phoenix, AZ. 85003

Date October 10, 1978

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
8109	ACM #6	0.40	0.15	0.34%			

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean, Jr.

Registered Assayer Certificate No. 6253 Claude Eugene McLean, Jr. Date Signed 10/10/78 Arizona, U.S.A.

OFFICE PHONE 271-5971

~~HOME PHONE 94~~

State Mine Inspector

VERNE C. McCUTCHAN
PHOENIX, ARIZONA 85007

NOTICE TO STATE MINE INSPECTOR

In compliance with Arizona Revised Statute 27-303, we are hereby submitting this written notice to Mr. Verne C. McCutchan, State Mine Inspector, of our intent to start/stop a mining operation.

COMPANY NAME dba ACM Mining

MAILING ADDRESS One West Madison Ave. Phoenix, Arizona 85003 (602) 956-6070

CHIEF OFFICER AT ABOVE ADDRESS Michael C Sansone

PERSON SENDING THIS NOTICE Gene F Pyers

TYPE OF OPERATION Open Pit Mining

STARTING DATE 1 October, 1978 CLOSING DATE not applicable

DURATION OF OPERATION unknown at this time

NUMBER OF EMPLOYEES two to four

Give exact description of location of this operation (including directions for locating by vehicle). North then West of Aguila $8\frac{1}{2}$ mile as crow flie[s] West and adjoining the Bullard patents. Gene Pyers resides on said property to be mined. Property is situated in Yaapai County.

Michael C Sansone *Michael C Sansone* 9-17-78

Gene F Pyers *Gene F Pyers*

Any operation found operating without sending this notice will be charged with a misdemeanor.

Attn: Mr Roy Duniwin, Yavapai Mining Inspector
Mail to: State Mine Inspector
705 W. Wing, Capitol Bldg.
Phoenix, AZ 85007

9/2/77

PERMIT TO BEGIN SILICON DEVELOPMENT WORK

END OF NARRATIVE ON PROPOSED SILICON DEVELOPMENT

BEGIN IDENTIFICATION OF CLAIMS

ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
(602) 956-6070

The 166 Lode Claims listed below are of records of Bureau of Land Management Office, Phoenix, Arizona. These claims are located within Sections 1,3,9,10,11,12,13,14,15,16 in T8N, R10W and Sections 7 & 18 in T8N, R9W of G & SRB & M Yavapai County, Arizona, in the Pierce Mining District and recorded in the name of Michael C. Sansone of Phoenix, Arizona.

TYPE & NAME OF CLAIM		BLM SERIAL NUMBER	Yavapai County BOOK	PAGE
LODE	ACM 1A	AMC41150	1214	497
LODE	ACM 1B	AMC41151	1214	499
LODE	ACM 1C	AMC41152	1214	501
LODE	ACM 1D	AMC41153	1214	503
LODE	ACM 1E	AMC41154	1214	505
LODE	ACM 1F	AMC41155	1214	507
LODE	ACM 1G	AMC41156	1214	509
LODE	ACM 1H	AMC41157	1214	511
LODE	ACM 1J	AMC41158	1214	513
LODE	ACM 1K	AMC41159	1214	515
LODE	ACM 1L	AMC41160	1214	517
LODE	ACM 1M	AMC41161	1214	519
LODE	ACM 1N	AMC41162	1214	521
LODE	ACM 1P	AMC41163	1214	523
LODE	ACM 1Q	AMC41164	1214	525
LODE	ACM 1R	AMC41165	1214	527
LODE	ACM 1S	AMC41166	1214	529
LODE	ACM 1T	AMC41167	1214	531
LODE	ACM 1U	AMC41168	1214	533
LODE	ACM 1V	AMC41169	1214	535
LODE	ACM 1W	AMC41170	1214	537
LODE	ACM 1X	AMC41171	1214	539
LODE	ACM 1Y	AMC41172	1214	541
LODE	ACM 2A	AMC41173	1214	543
LODE	ACM 2B	AMC41174	1214	545
LODE	ACM 2C	AMC41175	1214	547
LODE	ACM 2D	AMC41176	1214	549
LODE	ACM 2E	AMC41177	1214	551
LODE	ACM 2F	AMC41178	1214	553
LODE	ACM 2G	AMC41179	1214	555
LODE	ACM 2H	AMC41180	1214	557
LODE	ACM 2J	AMC41181	1214	559
LODE	ACM 2K	AMC41182	1214	561
LODE	ACM 2L	AMC41183	1214	563
LODE	ACM 2M	AMC41184	1214	565
LODE	ACM 2N	AMC41185	1214	567
LODE	ACM 2P	AMC41186	1214	569
LODE	ACM 2Q	AMC41187	1214	571
LODE	ACM 2R	AMC41188	1214	573
LODE	ACM 2S	AMC41189	1214	575
LODE	ACM 2T	AMC41190	1214	577
LODE	ACM 2U	AMC41191	1214	579
LODE	ACM 2V	AMC41192	1214	581
LODE	ACM 2W	AMC41193	1214	583
LODE	ACM 2X	AMC41194	1214	585
LODE	ACM 2Y	AMC41195	1214	587
LODE	ACM 3A	AMC41196	1214	589
LODE	ACM 3B	AMC41197	1214	591
LODE	ACM 3C	AMC41198	1214	593
LODE	ACM 3D	AMC41199	1214	595
LODE	ACM 3E	AMC41200	1214	597
LODE	ACM 3GHJ	AMC41201	1214	599
LODE	ACM 3K	AMC41202	1214	601
LODE	ACM 3N	AMC41203	1214	603
LODE	ACM 3P	AMC41204	1214	605
LODE	ACM 3Q	AMC41205	1214	607
LODE	ACM 3R	AMC41206	1214	609
LODE	ACM 3S	AMC41207	1214	611
LODE	ACM 3T	AMC41208	1214	613
LODE	ACM 3U	AMC41209	1214	615
LODE	ACM 3V	AMC41210	1214	617
LODE	ACM 3W	AMC41211	1214	619
LODE	ACM 4A	AMC41212	1214	621
LODE	ACM 4B	AMC41213	1214	623
LODE	ACM 4C	AMC41214	1214	625
LODE	ACM 4D	AMC41215	1214	627
LODE	ACM 4E	AMC41216	1214	629
LODE	ACM 4F	AMC41217	1214	631
LODE	ACM 4PQ	AMC41218	1214	633
LODE	ACM 4R	AMC41219	1214	635
LODE	ACM 4S	AMC41220	1214	637
LODE	ACM 4T	AMC41221	1214	639
LODE	ACM 4U	AMC41222	1214	641
LODE	ACM 4V	AMC41223	1214	643
LODE	ACM 4W	AMC41224	1214	645
LODE	ACM 5A	AMC41225	1214	647

TYPE & NAME OF CLAIM		BLM SERIAL NUMBER	Yavapai County BOOK	PAGE
LODE	ACM 5B	AMC41226	1214	649
LODE	ACM 5C	AMC41227	1214	651
LODE	ACM 5D	AMC41228	1214	653
LODE	ACM 5R	AMC41229	1214	655
LODE	ACM 5S	AMC41230	1214	657
LODE	ACM 5T	AMC41231	1214	659
LODE	ACM 5U	AMC41232	1214	661
LODE	ACM 5V	AMC41233	1214	663
LODE	ACM 5W	AMC41234	1214	665
LODE	ACM 6A	AMC41235	1214	667
LODE	ACM 6B	AMC41236	1214	669
LODE	ACM 6C	AMC41237	1214	671
LODE	ACM 6D	AMC41238	1214	673
LODE	ACM 6P	AMC41239	1214	675
LODE	ACM 6Q	AMC41240	1214	677
LODE	ACM 6R	AMC41241	1214	679
LODE	ACM 6S	AMC41242	1214	681
LODE	ACM 6T	AMC41243	1214	683
LODE	ACM 6U	AMC41244	1214	685
LODE	ACM 6V	AMC41245	1214	687
LODE	ACM 6W	AMC41246	1214	689
LODE	ACM 1AA	AMC191585	1517	553
LODE	ACM 1BB	AMC191586	1517	555
LODE	ACM 1CC	AMC191587	1517	557
LODE	ACM 1DD	AMC191588	1517	559
LODE	ACM 1EE	AMC191589	1517	561
LODE	ACM 1FF	AMC191590	1517	563
LODE	ACM 1GG	AMC191591	1517	565
LODE	ACM 1HH	AMC191592	1517	567
LODE	ACM 1JJ	AMC191593	1517	569
LODE	ACM 1KK	AMC191594	1517	571
LODE	ACM 2AA	AMC191595	1517	573
LODE	ACM 2BB	AMC191596	1517	575
LODE	ACM 2CC	AMC191597	1517	577
LODE	ACM 2DD	AMC191598	1517	579
LODE	ACM 2EE	AMC191599	1517	581
LODE	ACM 2FF	AMC191600	1517	583
LODE	ACM 2GG	AMC191601	1517	585
LODE	ACM 2HH	AMC191602	1517	587
LODE	ACM 2JJ	AMC191603	1517	589
LODE	ACM 2KK	AMC191604	1517	591
LODE	ACM 3AA	AMC191605	1517	593
LODE	ACM 3BB	AMC191606	1517	595
LODE	ACM 3CC	AMC191607	1517	597
LODE	ACM 3DD	AMC191608	1517	599
LODE	ACM 3EE	AMC191609	1517	601
LODE	ACM 3FF	AMC191610	1517	603
LODE	ACM 3GG	AMC191611	1517	605
LODE	ACM 3HH	AMC191612	1517	607
LODE	ACM 3JJ	AMC191613	1517	609
LODE	ACM 3KK	AMC191614	1517	611
LODE	ACM 3LL	AMC191615	1517	613
LODE	ACM 3MM	AMC191616	1517	615
LODE	ACM 3NN	AMC191617	1517	617
LODE	ACM 3PP	AMC191618	1517	619
LODE	ACM 4AA	AMC191619	1517	621
LODE	ACM 4BB	AMC191620	1517	623
LODE	ACM 4CC	AMC191621	1517	625
LODE	ACM 4DD	AMC191622	1517	627
LODE	ACM 4EE	AMC191623	1517	629
LODE	ACM 4FF	AMC191624	1517	631
LODE	ACM 4GG	AMC191625	1517	633
LODE	ACM 4HH	AMC191626	1517	635
LODE	ACM 4JJ	AMC191627	1517	637
LODE	ACM 4KK	AMC191628	1517	639
LODE	ACM 4LL	AMC191629	1517	641
LODE	ACM 4MM	AMC191630	1517	643
LODE	ACM 4NN	AMC191631	1517	645
LODE	ACM 4PP	AMC191632	1517	647
LODE	ACM 5-6P	AMC197823	1535	596
LODE	ACM 4G	AMC197824	1535	594
LODE	ACM 5NP	AMC197825	1535	592
LODE	ACM 5KLM	AMC197826	1535	590
LODE	ACM 5F	AMC197827	1535	588
LODE	ACM 5GH	AMC197828	1535	586
LODE	ACM 5E	AMC197829	1535	584

Additional 14 Lode Claims filed 1984.

LODE	ACM-1LL	AMC227882	1664	356
LODE	ACM-1MM	AMC227883	1664	358
LODE	ACM-1NN	AMC227884	1664	360
LODE	ACM-1PP	AMC227885	1664	362
LODE	ACM-2LL	AMC227886	1664	364
LODE	ACM-2MM	AMC227887	1664	366
LODE	ACM-2NN	AMC227888	1664	368
LODE	ACM-2PP	AMC227889	1664	370
LODE	ACM-5AA	AMC227890	1664	372
LODE	ACM-5BB	AMC227891	1664	374
LODE	ACM-5CC	AMC227892	1664	376
LODE	ACM-5DD	AMC227893	1664	378
LODE	ACM-5EE	AMC227894	1664	380
LODE	ACM-5FF	AMC227895	1664	382

ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
(602) 956-6070

Title to all of the 166 Lode Mining Claims will be certified as being currently in good standing by a recognized mineral title search organization, with title to the claims to be transferred through escrow with a recognized title insurance company.

The original number of Bullard Lode Claims held by Sansone was:	97
In 1983, Sansone filed additional claims known as the Extension Group, numbering	48
Also, in 1983, Sansone filed additional claims to fill in the North boundary of the patented claims	7
In 1984, Sansone filed additional claims to the Extension Group, numbering	14
Grand Total of Bullard Peak Claims	166

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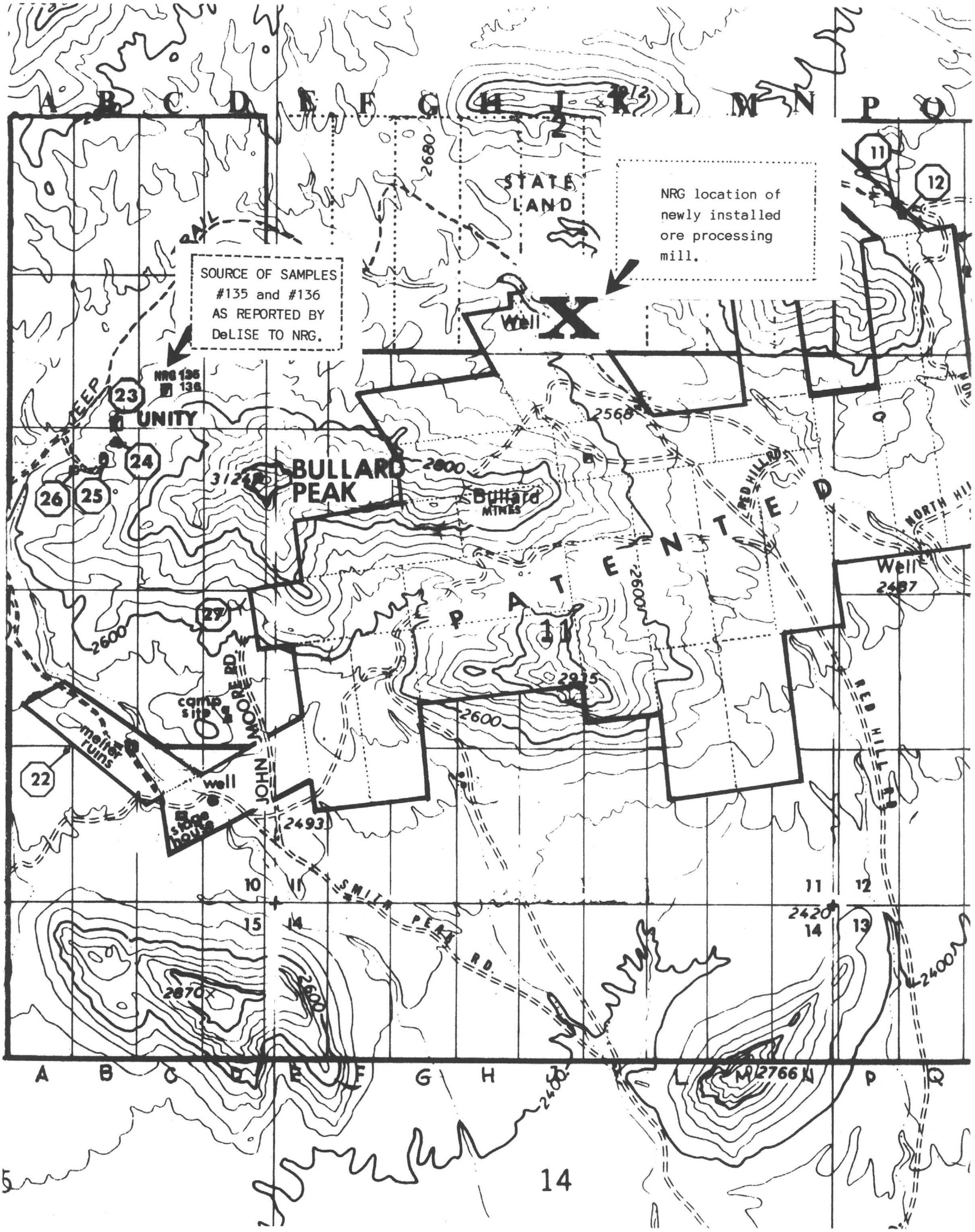
166 Claims as recorded in Yavapai County, Arizona, and filed in the office of the Bureau of Land Management, Phoenix, Arizona, in the name of Michael C. Sansone.

End of Claims Identification


SOURCE OF SAMPLES #135 and #136 AS REPORTED BY DeLISE TO NRG.
NRG location of newly installed ore processing mill.
STATE LAND
PATENTED
BULLARD PEAK
Bullard MINES
UNITY
JOHN MOORE RD
SMITH PEAK RD.
RED HILL RD
NORTH HILL
camp site
melter ruins
stone house
well
Well
Well 2487
2680
2568
2600
2800
3124
2935
2493
2420
2670
2400
2766
NRG 135 136
X
23
24
25
26
27
22
11
12
A B C D E F G H J K L M N P Q
14

NRG RESOURCES, LTD.

NRG Resources, Ltd., a Canadian mining company, owns 60% of the patented claims which lie east of Bullard Peak. NRG has recently installed a processing mill at the location depicted on the accompaning map.

Pictures of the mill are shown on the following page.

The stock of NRG is traded on the Vancouver, B.C. Exchange.

The DeLise Report, mentioned earlier in this presentation, was prepared for NRG Resources, Ltd.

Two samples reported by DeLise are shown on this map as #135 and #136, located northwest of Bullard Peak, on Sansone's property.

These two samples indicated the highest gold and copper contents of all of the assays reported by the DeLise report. DeLise is a registered geologist in California and Arizona.

ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
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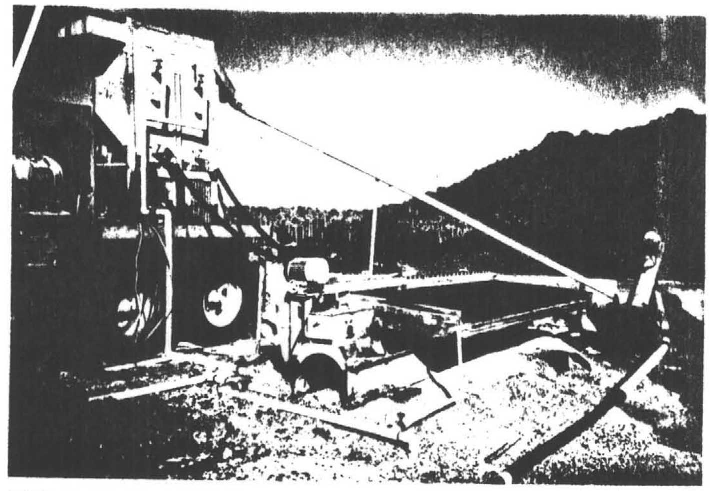
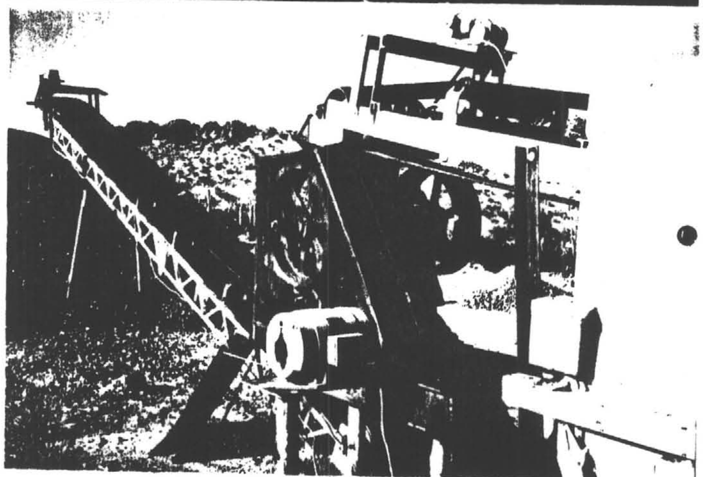
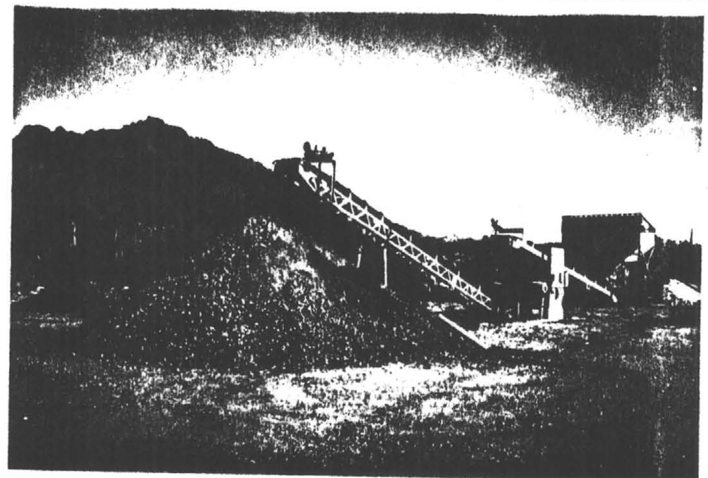
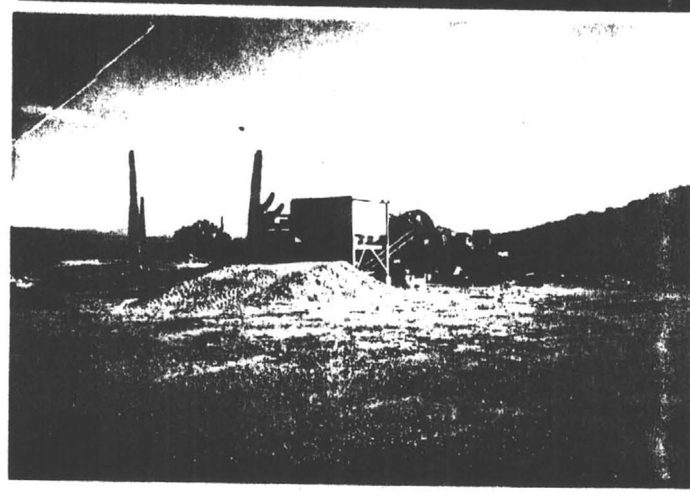
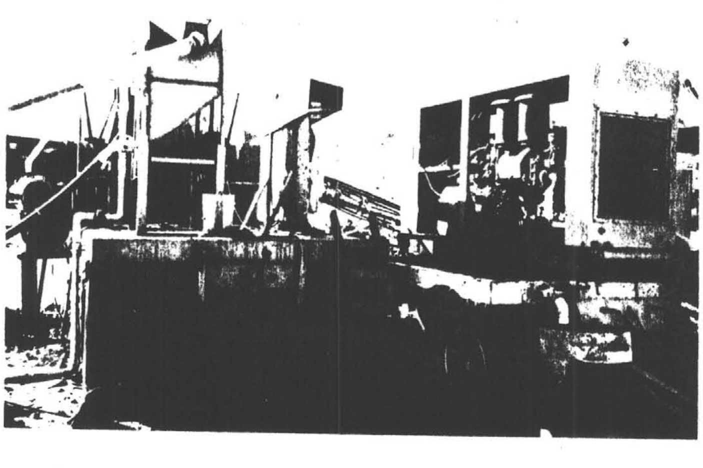
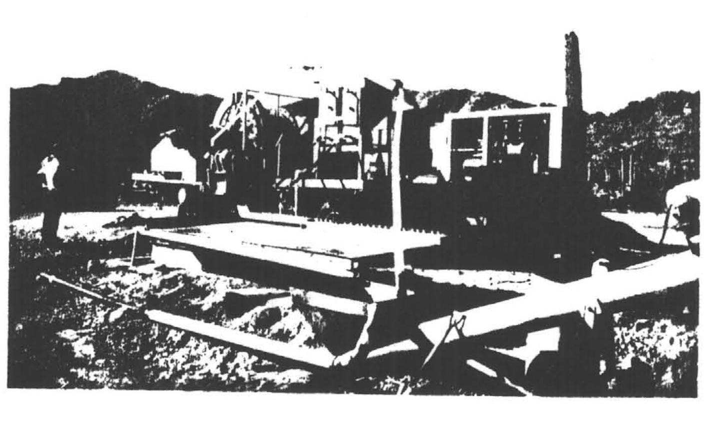












PICTURES OF NRG MILL TAKEN SPRING OF 1985

End of NRG Mill

ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
(602) 956-6070

AGUILA PROCESSING PLANT: Michael Sansone holds a long-term lease on 15 acres of land having the permitted use, by the Maricopa County Planning and Development Department, for the operation of an ore processing plant. These facilities contained within the plant are as follows:

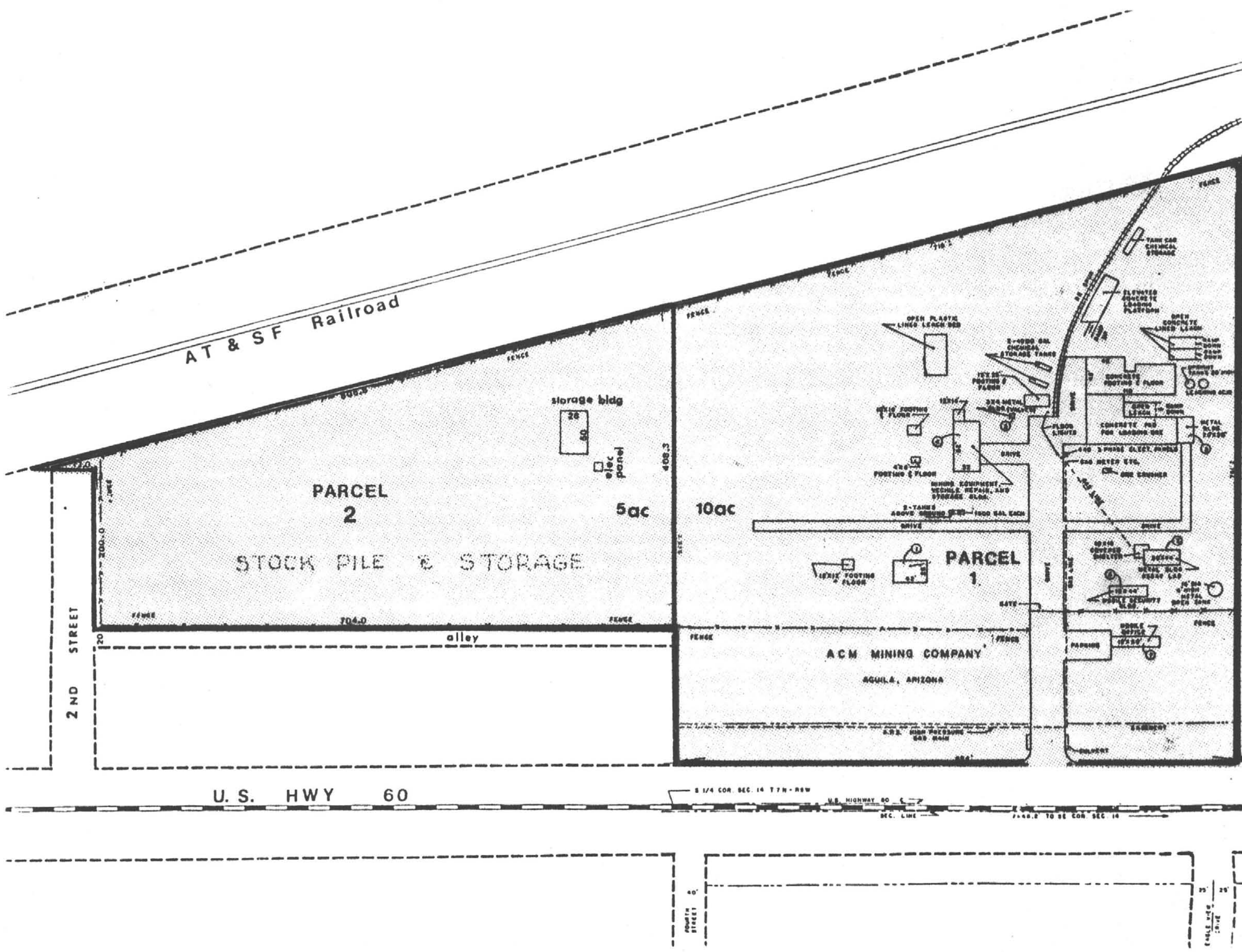
* Level 15 acres.
* Entirely fenced; dusk to dawn lighting; entrance office, security quarters; and Sheriff's Department patrol.
* Two bedroom, modern mobile home.
* Large equipment repair shop; storage buildings, leach beds; 8 car railroad siding with loading platform docks; truck loading platform; 690 feet of highway frontage; and large storage tanks (over 170,000 gallons).
* City water; 440 volt, three phase power; high-pressure natural gas; and phone installation.
* Assay laboratory.
* In-town, with post office; fuel and repairs; school, recreation park with lighted tennis courts; motels, grocery stores; and many other conveniences.
* Readily available labor force - non-union.
* The plant has a complete milling operation and testing laboratory in operation by KenPan Ltd., sublessee from Sansone.
* Low taxes.
* Waste landfill nearby.
* Fire Department and ambulance with six paramedics available. Hospital and doctors 22 miles, non-stop by State Highway,, in Wickenburg.

NOTE: None of the machinery and/or equipment depicted in the various pictures relating to the Aguila Processing Plant is included in this offering.

15 ACRES DEEDED

ORE PROCESSING PLANT

AGUILA, ARIZONA



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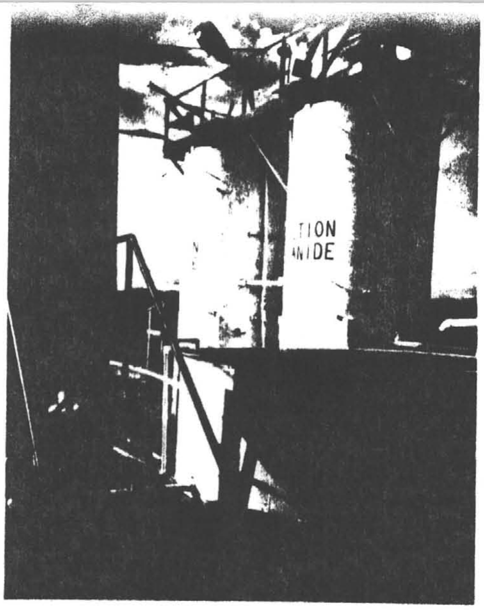
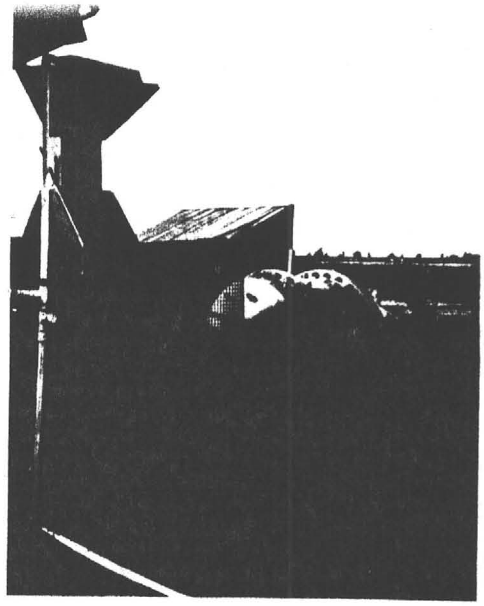
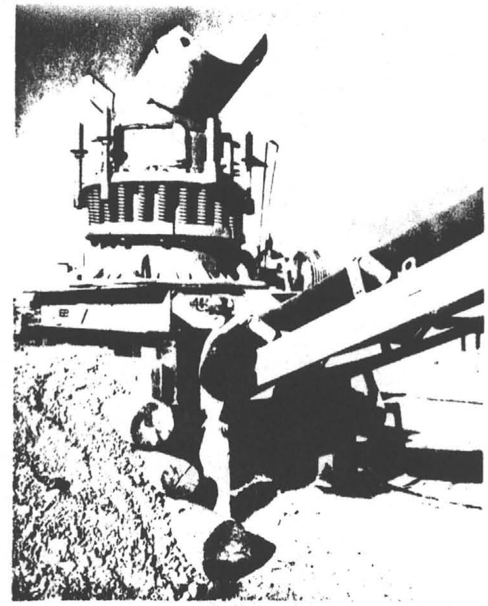
(602) 956-6070

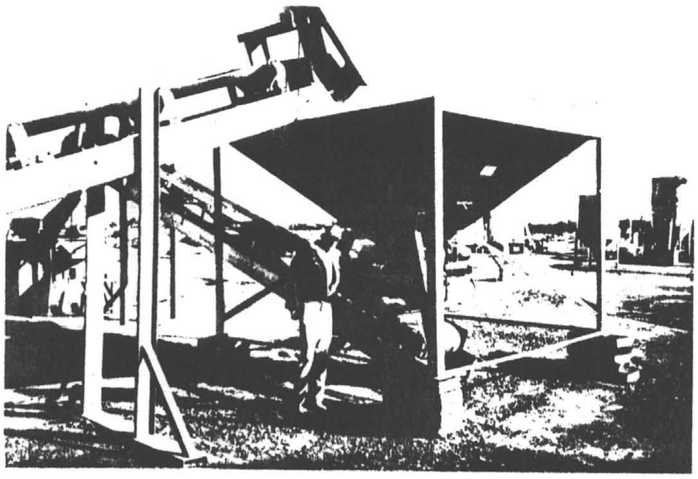
MILLING EQUIPMENT PRESENTLY LOCATED ON 15 ACRE AGUILA PROCESSING PLANT

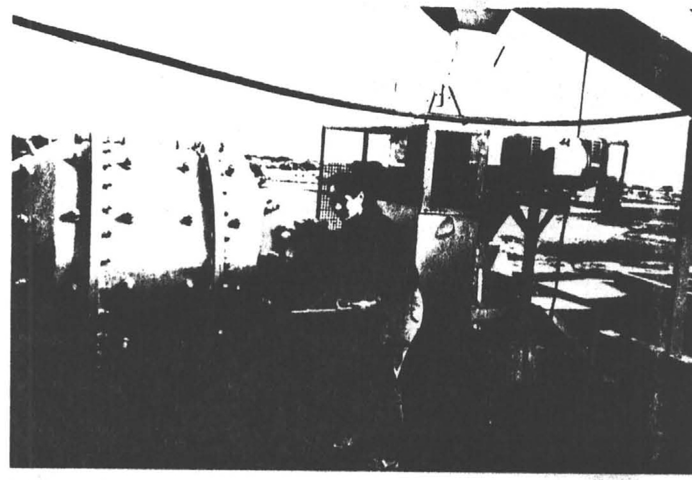
NOTE: This equipment is not owned by Sansone, and is NOT, therefore, included in this offering. The equipment is available for purchase upon inquiry of Sansone.

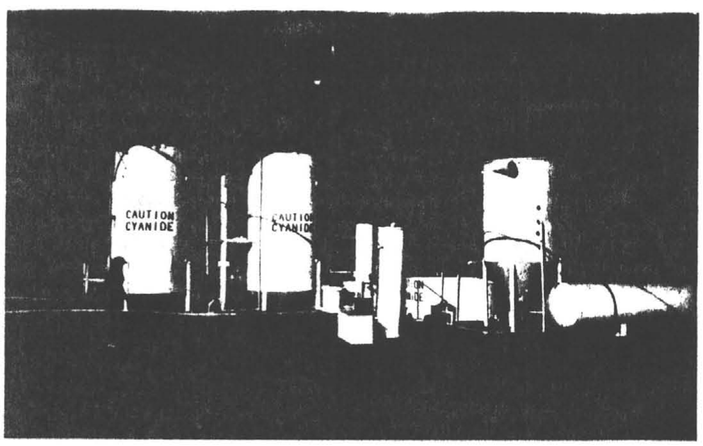


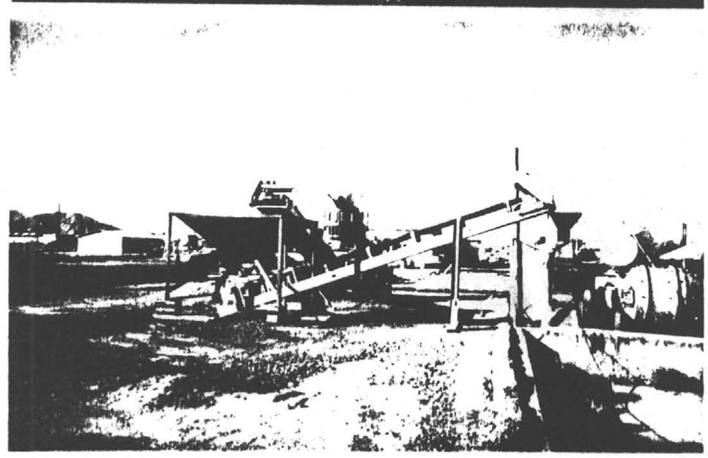


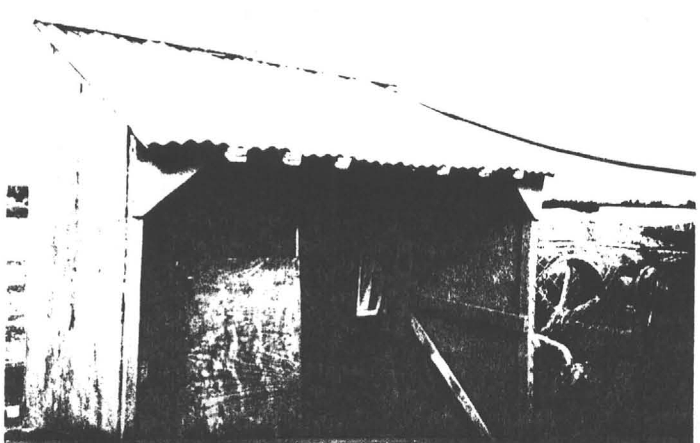


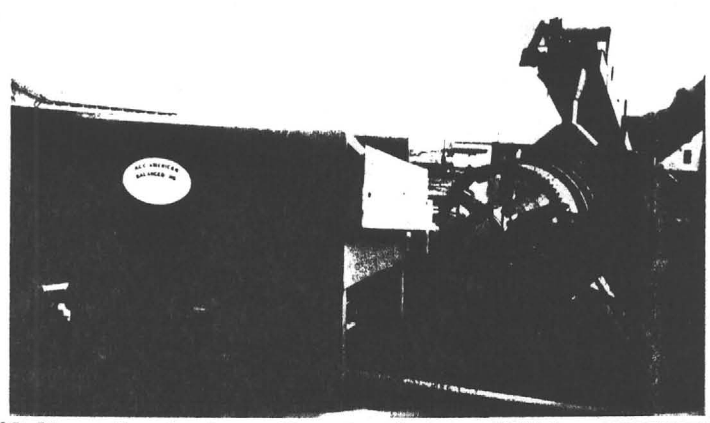












ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
(602) 956-6070

SUPPORTING FACILITIES

Office and living facilities are available with a sale, if considered advantageous to the buyer. The office is located immediately across the highway (U.S. Highway 60) from the 15 acre plant. It is at the East edge of the town of AGuila, and is situated on the corner, fronting 270 feet on the highway, and 247 feet depth along Eagle View Drive. The property is zoned commercial C-2 by Maricopa County (County seat in Phoenix, 80 miles to the Southeast). The office has a large storage building; and living quarters with city water, electric, natural gas and phone. It has a fenced area. The entire property has excellent sight-line from the highway.

Sansone also owns a winter home in Aguila, located at the foot of the Harcuvar Mountains, overlooking the city. All utilities are in, underground.

BACKUP MILLSITES

Sansone maintains 32 millsites of five acres each within 4 miles of the mining claims. These millsites have electric, high-pressure natural gas and phone service. A landing strip of 2,640 feet in length will soon be placed alongside of the millsite operation area.

Engineering surveys of these millsites are of record with the Yavapai County Recorder and the Bureau of Land Management. Access to these millsites is maintained by the highway departments of Maricopa County and Yavapai County.

Travel time to the town of Aguila is less than 10 minutes on all-weather roads.

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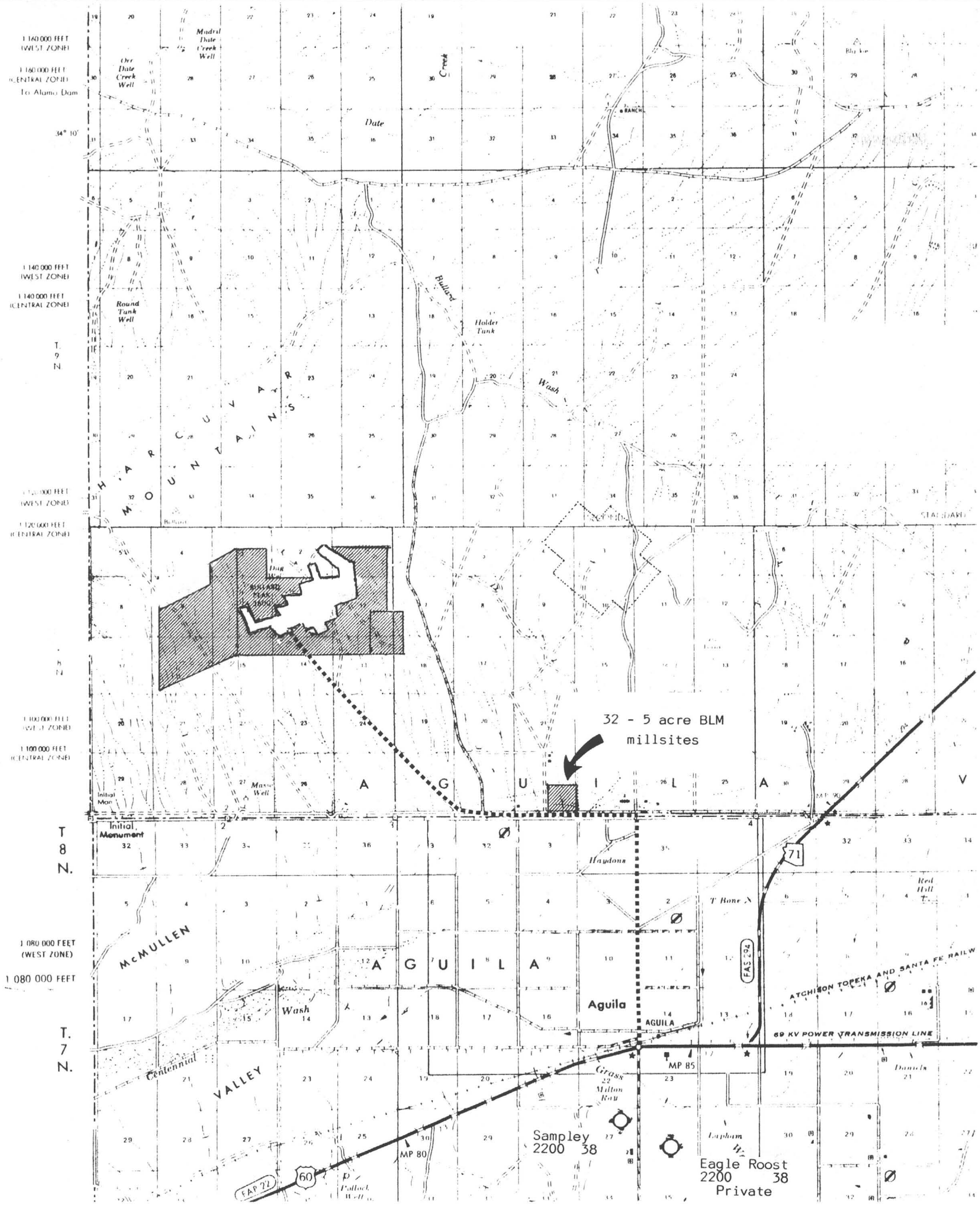
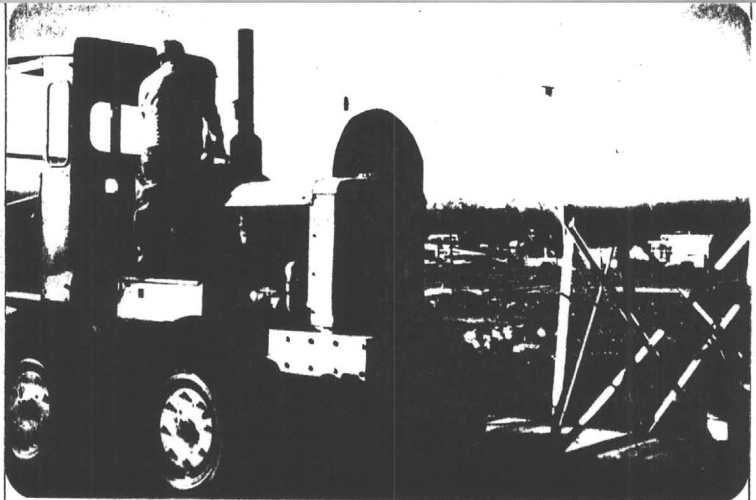


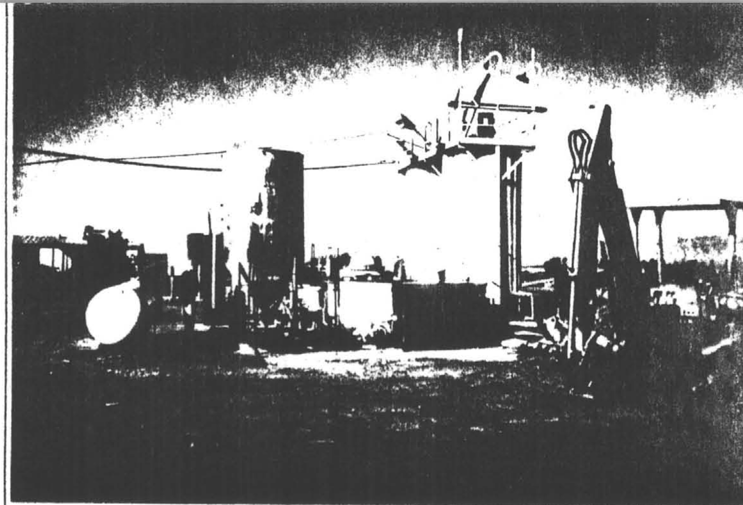
ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM

(602) 956-6070



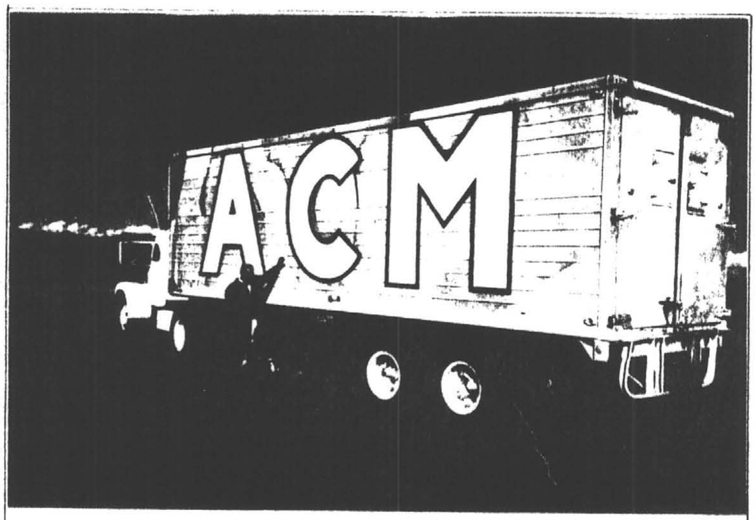
GRADER BLADE AND FUEL SERVICE TANKS

AGUILA ORE PROCESSING PLANT & EQUIPMENT



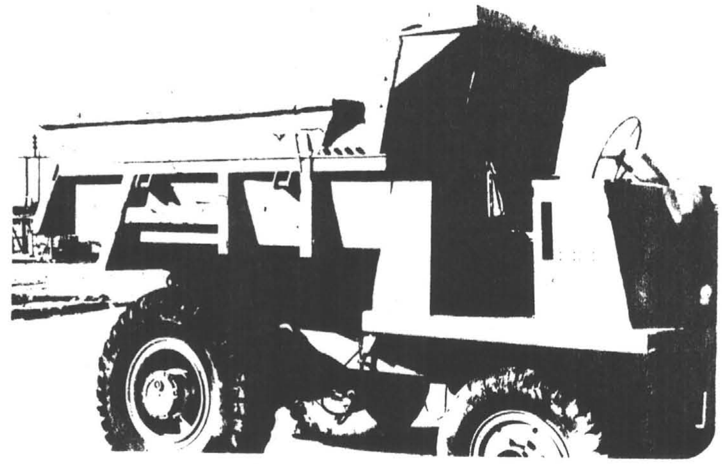
MIXING TANK AND BACK-HOE

AGUILA ORE PROCESSING PLANT & EQUIPMENT



ON-SITE EQUIPMENT STORAGE FOR MINING

AGUILA ORE PROCESSING PLANT & EQUIPMENT



ONE OF TWO LEYLAND ORE TRUCKS
PICTURE OF ORE TRUCK THAT JOHN MOORE WAS KILLED ON.

AGUILA ORE PROCESSING PLANT & EQUIPMENT

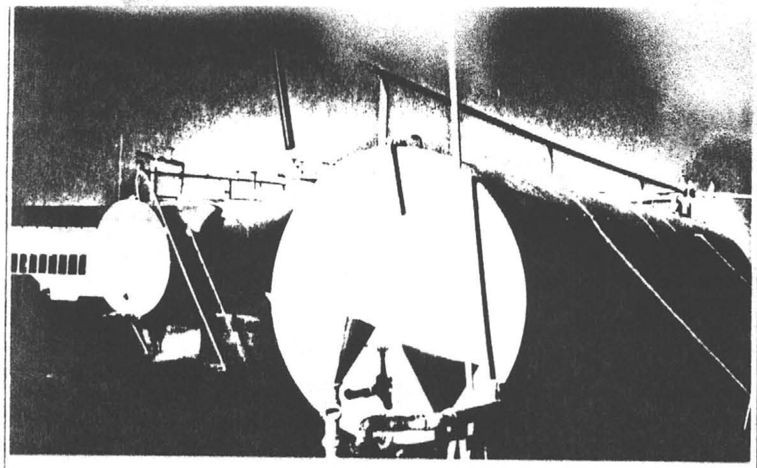
CRAWLER LOADER & EXCAVATOR

AGUILA ORE PROCESSING PLANT & EQUIPMENT

HEAVY DUTY CONCRETE CULVERTS FOR ACCESS ROAD
CONSTRUCTION TO MINES

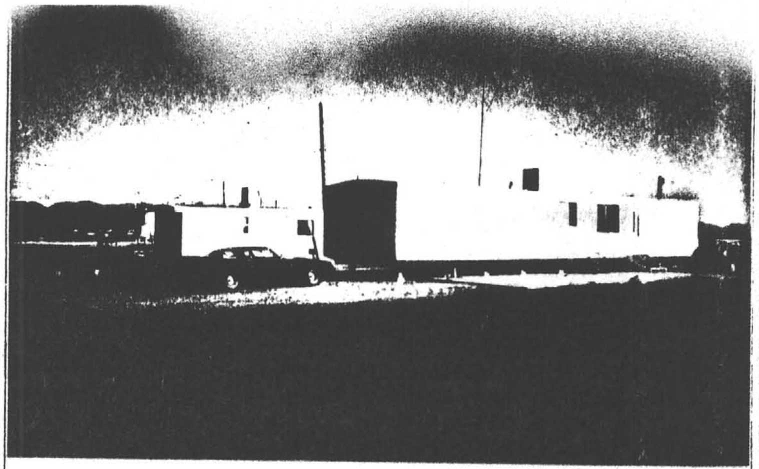
AGUILA ORE PROCESSING PLANT & EQUIPMENT

ACM Michael C. Sansone, 2942 North 24th Street, #107 Plaza Twenty-four, Phoenix, Arizona 85016 ACM
(602) 956-6070



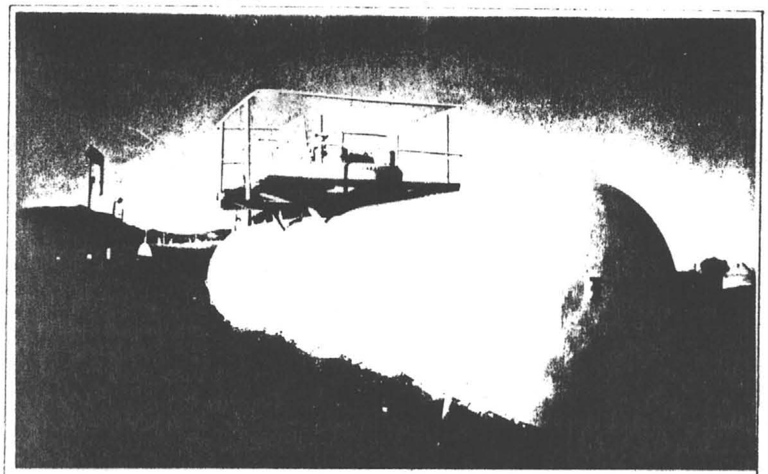
CHEMICAL STORAGE TANKS ALONGSIDE OF R.R. SIDING

AGUILA ORE PROCESSING PLANT & EQUIPMENT



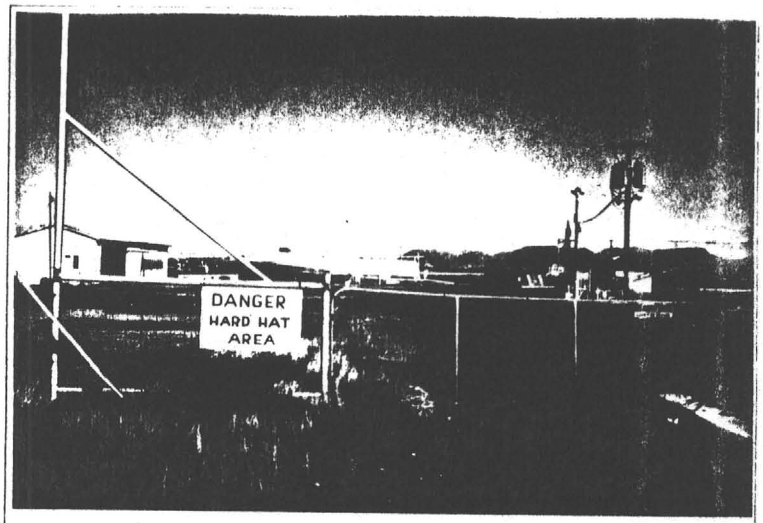
MOBILE HOME AND/OR OFFICE AT ENTRANCE TO PLANT

AGUILA ORE PROCESSING PLANT & EQUIPMENT



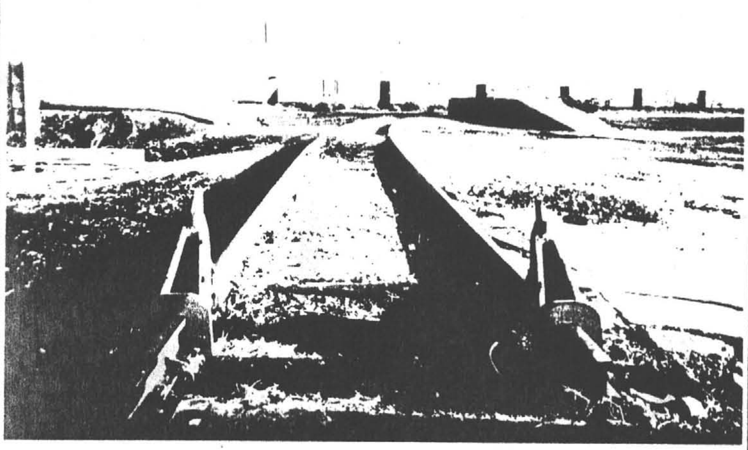
TANK CAR CHEMICAL OR WATER STORAGE

AGUILA ORE PROCESSING PLANT & EQUIPMENT



ENTRANCE GATE TO PLANT

AGUILA ORE PROCESSING PLANT & EQUIPMENT

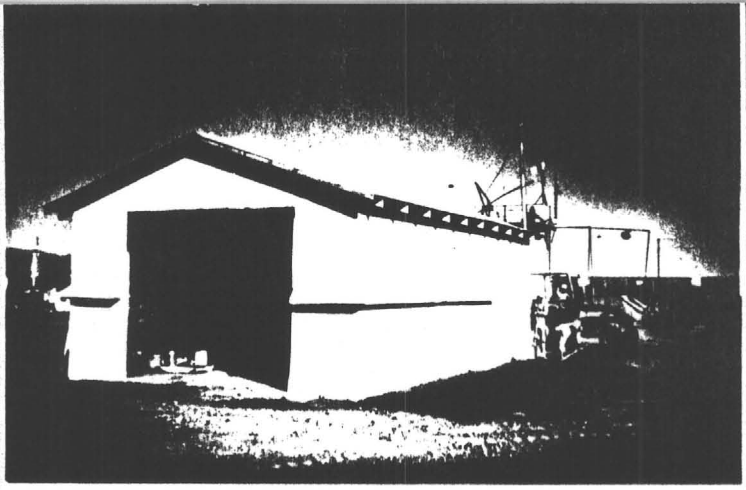


CAR R.R. SIDING, PART OF PLANT OWNERSHIP

AGUILA ORE PROCESSING PLANT & EQUIPMENT

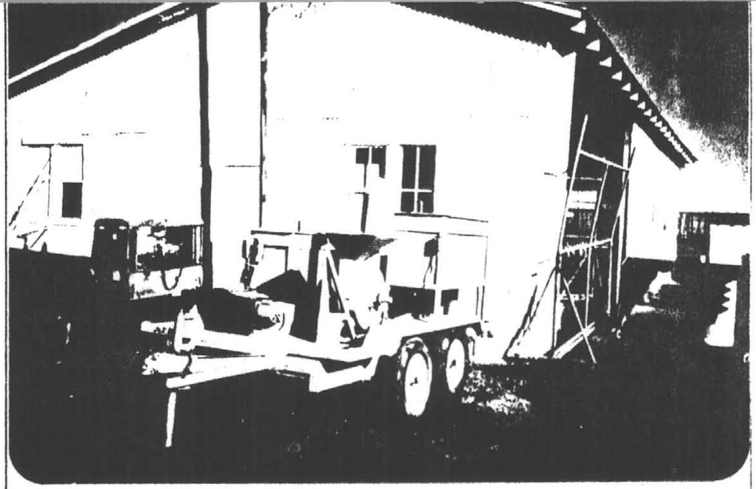
LOADING RAMP - PLATFORM FOR R.R. CARS AND/OR TRUCK DOCK

AGUILA ORE PROCESSING PLANT & EQUIPMENT



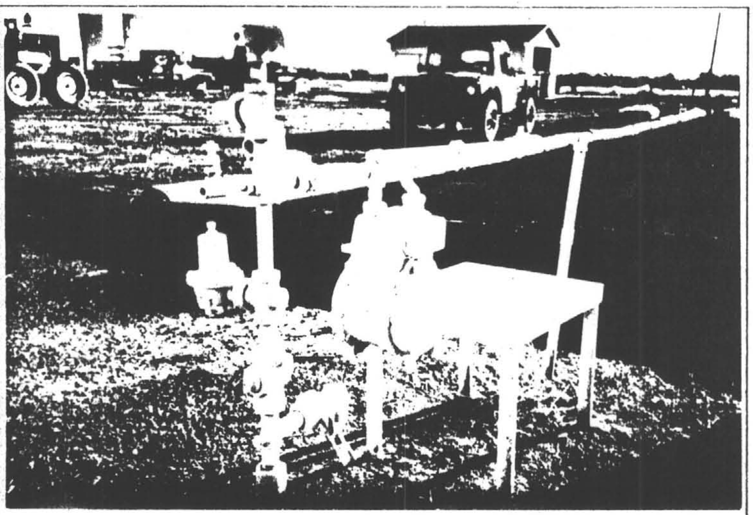
EQUIPMENT REPAIR SHOP OR WASH RACK

AGUILA ORE PROCESSING PLANT & EQUIPMENT



EQUIPMENT REPAIR SHOP AND PARTS STORAGE

AGUILA ORE PROCESSING PLANT & EQUIPMENT

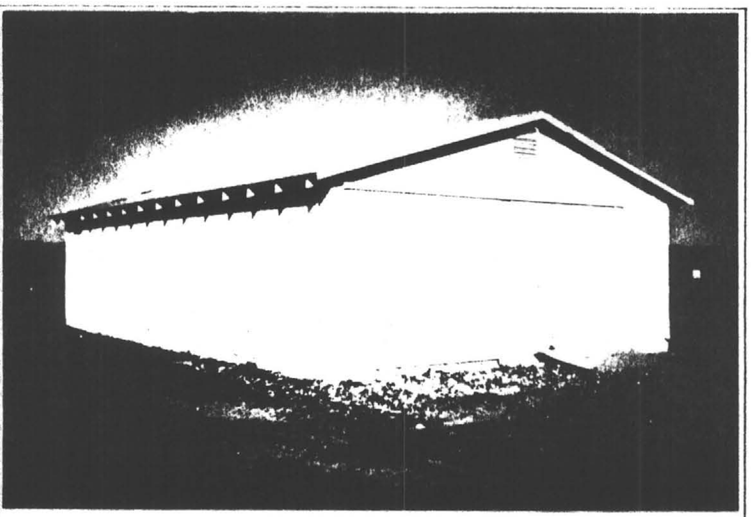


HIGH PRESSURE GAS REGULATOR

AGUILA ORE PROCESSING PLANT & EQUIPMENT

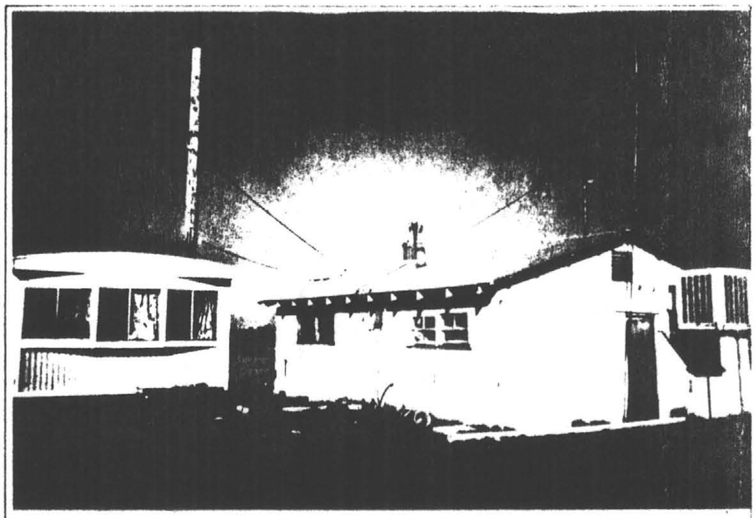
ELECTRIC POWER SUPPLY - 440 VOLT & 3 PHASE
DUSK TO DAWN LIGHTING

AGUILA ORE PROCESSING PLANT & EQUIPMENT



STORAGE BUILDING WITH HEAVY DUTY FLOORING

AGUILA ORE PROCESSING PLANT & EQUIPMENT



ASSAY LABORATORY AND SMALL APARTMENT.
USED AS WATCHMAN"S OFFICE

AGUILA ORE PROCESSING PLANT & EQUIPMENT

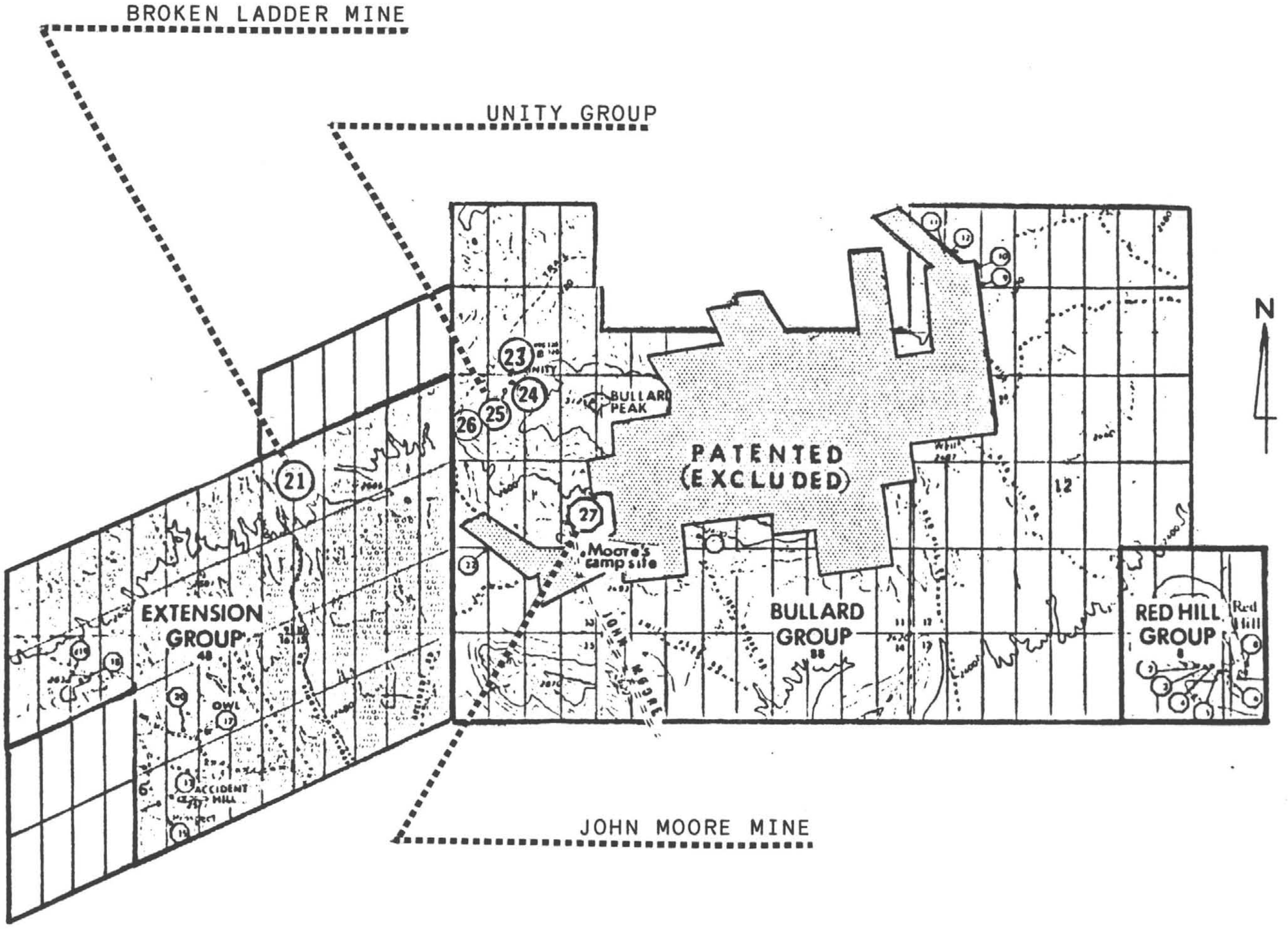
REASON FOR SELLING OR LEASING

Michael C. Sansone has been successfully instrumental in the real estate development of several sections of land in the immediate area of Aguila, Arizona.

At 64 years of age, and very active as a pilot, he has a compelling desire to travel and spend time with his family and grandchildren.

Gold and silver mining, with complete processing requires a full-time, full-scale exploration, mining and processing operation. This would take a concentrated effort for several years. Sansone does not wish to spend such an amount of time for these purposes.

Sansone has no previous knowledge of mining and processing of ores.



BULLARD PEAK

166 CLAIMS

(± 3,000 Acres)

AGUILA, ARIZONA

The following report was prepared by E. THOMAS RIGGS on March 13, 1984.

This information was dictated into a tape recorder while on-site at each of the locations.

The dictated information was later transcribed in the herein form.

The "target area" of this report covers parts of 8 claims which include approximately 70 acres. A map is attached which designates this subject "target area".

Results of 44 samples taken on the 152 claims are incl-uded, immediately following this report.

REPORT BY THOMAS RIGGS OF FIELD SAMPLING TRIP, MARCH 13, 1984.

This is Tom Riggs. With me on this trip are Michael Sansone, Cadmus L. G. Goss (Professional Engineer), Angel Rea and David Rea.

We are starting at the Moore campsite, Site 27. We have just done a 10 assay sample program on the property. We are going to take the samples that have been generally mostly copper and copper sulfates in the area. There was a little bit of copper calcophyrite showing. But it was very little. It seemed like the miners got deep enough to get into the area where the oxidation hadn't eroded the phyrites away. The samples were tarped, takein on 7 foot intervals throughout the vein, well marked, well defined in the area. There is no doubt as to where the vein structure and country rock end. The host rock seems to be volcanic, very broken. There is quite a bit of brecciation in the ore in certain areas. These 15 to 20 pound samples will be taken to be ground into quarter-inch minus through a chipmunk grinder and then split out. Two samples of these splits will be sent to a control lab and the remaining 8 samples will be run though our lab. The number 10 sample was taken from this area as a waste rock sample just to check the mine run of the glory hole roof. There seems to be about 6 to 12 inches of material left in the roof that may not have been of economic value to mine at that time, considering the costs and methods then available.

The vein goes in a north-northwesterly direction and dips back to the northeast at about 30 degrees. The glory hole area includes an area that is about 60 feet by 60 feet. There are two winzes that go down off of the glory hole. One winze is in a crosscut just to the northwest of the glory hole. The other winze' is straight in the northeast corner of the glory hole. The winze in the northeast corner only goes down about 15 feet. It is filled with mud and water. The northwesterly winze goes down about 15 feet then it was drifted on a crosscut back into the northeast direction again. It seem like they were going to intersect the northeasterly winze and then block out the ore that way.

The veins in that area tend to be wider in structure, 38 to 40 inches, measured with a tape measure. The crosscut leaves the glory hole in country volcanic rock. It goes about 60 feet and intersects another vein. At that point there was a glory hole and another decline that was sunk in that vein. In that area there was a major fault that breaks the vein samples 4 and 5. One vein tends to lay back to the southwest and the other one goes back to the north-northwest. On the Northwesterly break there is a secondary winze that goes down and comes to the surface for a haulage road, and it goes down a distance of about 70 feet.

Also in this area we ran onto another decline that we labeled as 27B. It seems to be an extension of the northeasterly vein where the winze comes to the surface there. The decline comes to the surface. It lays in the same area, about 150 feet from Site 27. The vein direction tends to lay the same as in Site 27. The texture of the vein tends to be the same with the same brecciation of broken ore. There is a plug at the bottom so you can only go in about 40 feet . It is full of dirt.

Site 26.
We are now on the back side of the Bullard property in what is known as the Unity Group. We have taken 4 samples across a 200 foot face. All samples have been staked. The vein varies in width from 2 feet to 3 feet. There is one extensive dump on this site that is complised of about 250 tons of waste material, mostly volcanic dump. The dump material does assay and run on a leach for copper. There are also some high-grade samples of gold in the dump. In the decline at site 26 the depth of the decline is unknown. Judging from from the amount of muck taken out versus the amount of vein material left, I wouldsay that the decline is approximately 90 feet in length. The vein structure in site 26 is about 1400 to 1600 feet in length. There are various sites along it, mostly declines. We are going to sample all of these declines today.

The dip on the vein is approximately 35 degrees. The material has a large amount of silica in it. There are no pyrites found within the copper zone. One sample, earlier, did show a small amount of free gold. Previous samples across this vein have asayed as high as 3 ounces of gold, and as low as .02 ounces. Average of that last graded sample went 0.4 ounces across the face. The vein lays about 45 drgrees to the west and dips almost to the south.

Site 25
At site number 25, there is a considerable decline, with a dump of approximately 400 or more tons. I have picked some high grade samples from this dump in the past that have assayed 2 ounces of gold, however, these were high-grade samples.

Vein width tends to be approximately 3 to 4 feet. Tunnel width is about 8 feet and the height of the tunnel or the decline is about 5 feet.

Sample number 1 was taken from the mouth of the decline, at the dump area. It was taken across the vein, with the vein measuring about 36 to 40 inches. There are two distinct veins, one overlying the other. There is a large amount of chrysocolla, azurite, malachite, picot-copper in these samples.

We went down approximately 50 feet into the decline, which goes on down to a depth of maybe 95 to 100 feet where it caves. At 50 feet we encountered large amounts of pyrites. Number 2 sample was taken from this area.

Number 3 and number 3a samples were taken from the vein material on the surface approximately 50 feet east of the decline. The width of the vein at point was about 40 inches.

All samples were tarped and the fines were caught, except on one sample where the decline was too steep to be able to tarp.

The vein lays at about 45 degrees to the west and dips to the south at about 75 degrees. It tends to do down and then levels off then goes deeper again, a little steeper.

Site 24.
Site number 24 lies in the Unity Group, on the north side of Bullard Peak. This site appears to be a small prospect hole. We took a sample of it even though the vein width was only 3 to 4 inches wide. The prospect was maybe 5 feet deep.

The area is fully broken up. There is copper extruded out into the volcanic area. There has been tremendous pressurized area in this location. Anywhere there was a fissure, there has been a small amount of copper intrude into the area.

Site 23
The vein at this location tends to strike into the side of the mountain at about 75 to 80 degrees, and approximately 3 to 4 feet in width. There are actually 2 veins here. One is about 2 feet wide and lies about 8 feet from the other one , with volcanic material in between. Samples 1 through 3 (of 4 samples taken from this area) were taken from the first vein referred to here. Sample 4 was taken from the 2 foot wide vein.

We samples across the face, it being about 75 feet across, and we are at the far eastern end of the 1400 foot vein. The vein runs between site 23 and site 26 and is consistent throughout. Consistency is shown by bulldozer cuts at various locations along the vein.

The material is high in silica with a lot of quartzy looking material in it. We also have malachite, azurite and a little pecot-copper showing. There is quite a bit of pyrite showing. We have been about 30 feet into a dozer cut into the side of the mountain in a large excavation. Apparently this is why the pyrites are still showing; they haven't oxidized out.

Site 21
The vein at this location lays to the east and west, standing in a vertical position.

There has been a shaft here sunk to an approximate depth of 75 feet. The vein width appears to be about 12 feet, overall. It is a mixture of rhyolite, a little bit of manganese and a lot of copper. It is hard to tell where the values lie since there is no definite vein structure itself. It is intruded all throughout, like a brecciated type ore. There are pockets of iron and manganese in the rhyolite.

You can see coloration in the substructure for about 250 feet, lying in an east-west direction. It protrudes up the far hill.

There is an overlying cap in this whole area, so it is hard to tell where the veins lie.

We took a sample of a rhyolite base ore that lies just to the northwest of the main shoot. This sample may carry a low-grade gold deposit, and it is initially free of copper. There is a large amount of tonnage of this ore.

We are taking a sample across the deposit. The deposit is about 250 feet wide and probably 400 feet in length. It is kind of a rhyolite blow-out. If it carries a lowgrade deposit, then we can come back and estimate the tonages.

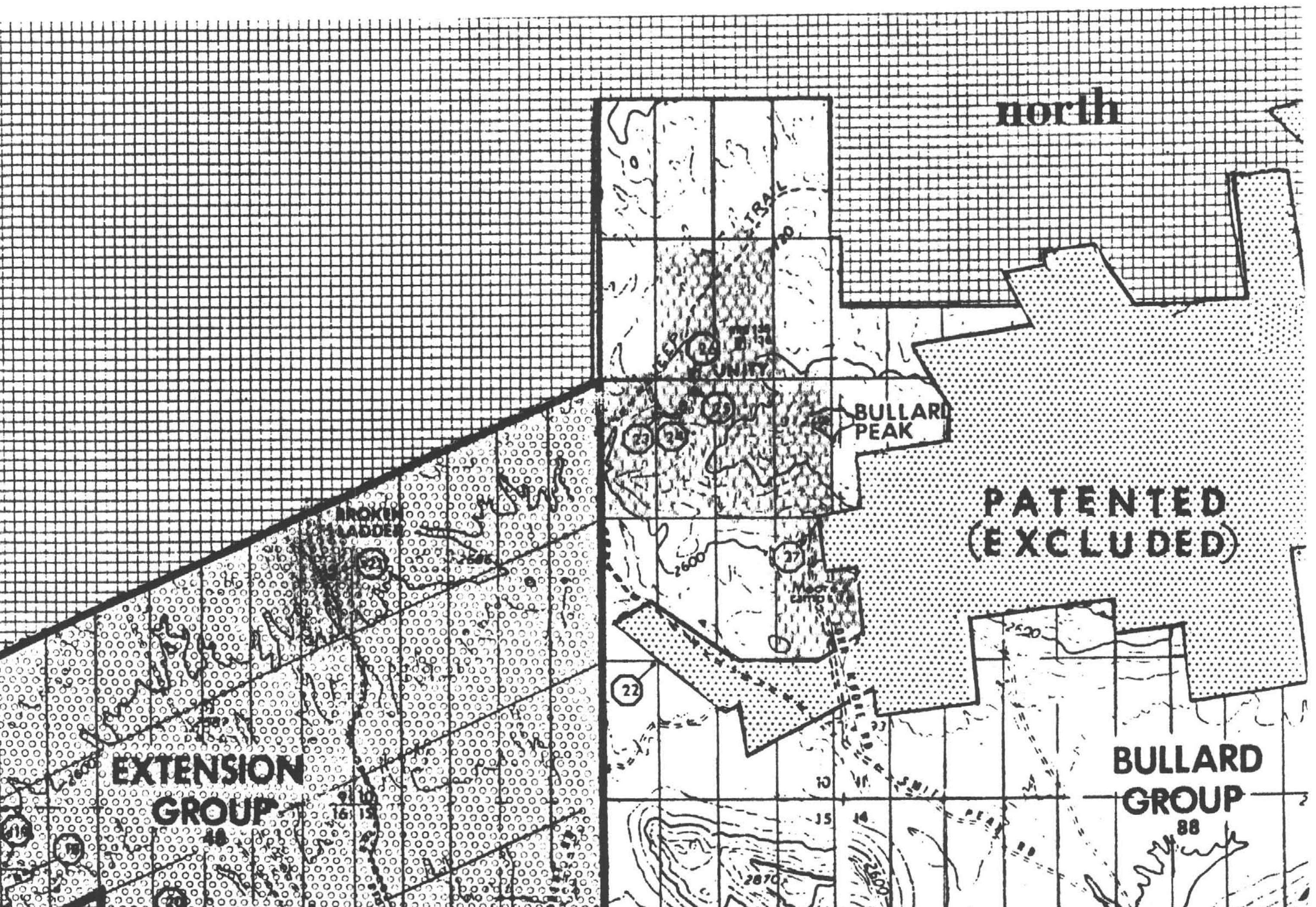
Site 22
Site 22 is a decline that goes in about 125 feet where there is a rock fall. We have taken three samples, both of the vein material and the dump area. The two samples in the decline were taken at 1/3rd and 2/3rds of the way down.

The material has an iron cap overlay and an iron cap underlay. The copper lies in between. We sampled the iron separate from the copper to check and see where the best gold values were laying.

One sample was taken entirely across the vein. Another was taken from the dump.

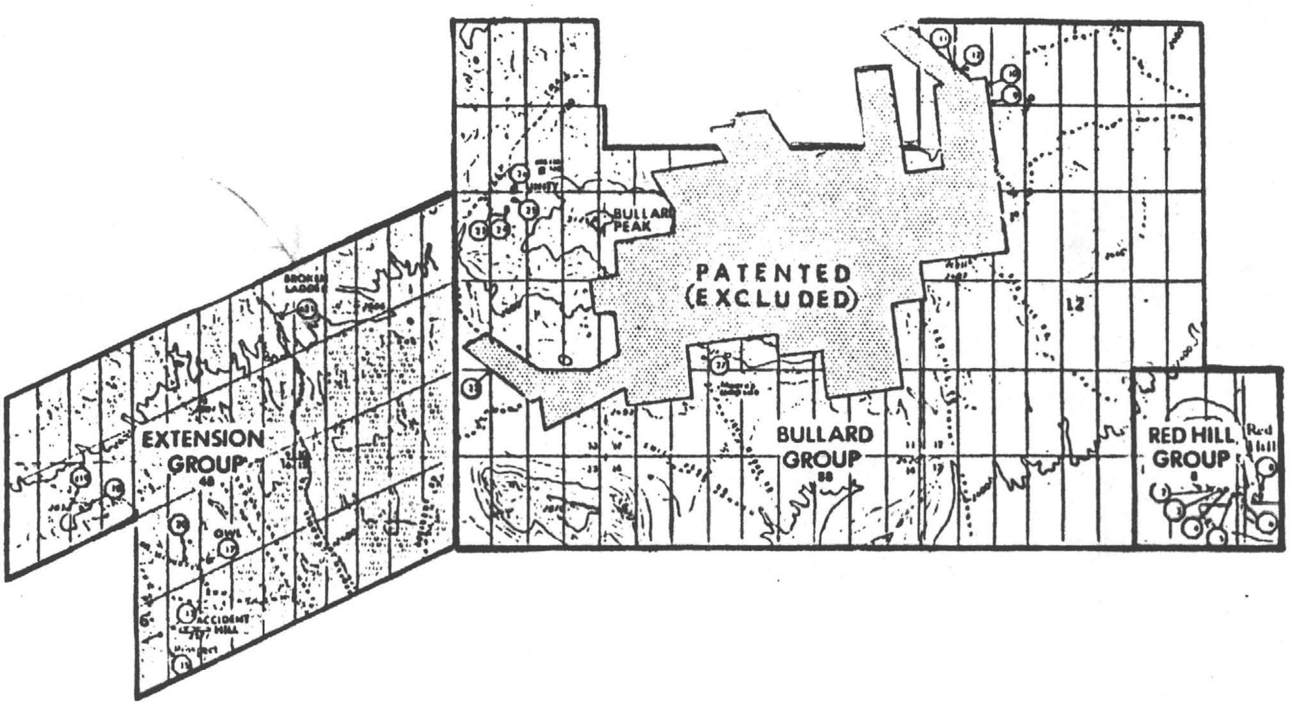
The vein dips to the east, slightly southeast, and runs just about southwest. The vein dips down at about a 60 degree decline, pretty steep. The host rock is volcanic in this area.

There are 2 or 3 interesting shear zones in the area. There is a shear in the left-hand wall of the decline, and also a shear zone in the foot-wall.


north
BROKEN LADDER
UNITY
BULLARD PEAK
PATENTED (EXCLUDED)
EXTENSION GROUP
OWL
ACCIDENT HILL
Prospect
BULLARD GROUP
88

2

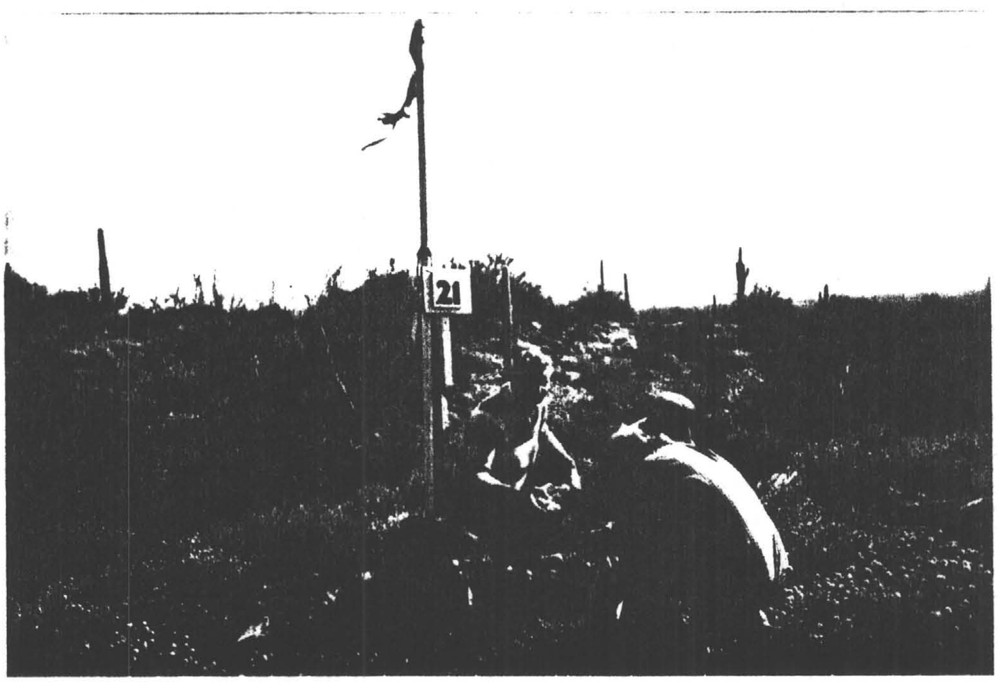
(21) Broken Ladder. 3rd largest in ACM group of 152 claims



(21) Broken Ladder in Claim ACM 4 FF

ACM

21 Broken Ladder. Tom Riggs taking samples from dump, 1/1/84



21 Broken Ladder. Mike Sansone taking samples from dump, 1/1/84

Michael C. Sansone
For REALTY INVESTMENT COMPANY
2942 North 24th Street #107
Phoenix, Az. 85016

Date April 6, 1984

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
21-1		.098					
21-2		1.0					

ORE SAMPLE INFORMATION

Date collected: March 13, 1984   Sample collected by: E. Thomas Riggs & Cadmus Goss

Location of collection: Broken Ladder site number 21 on Bullard Extension claims

Description of structure from which sample removed: 75 foot shaft sunk on vein. Rhyolite, copper manganese vein structure.

Identification mark placed on structure showing location of removal: wooden stakes

Sample container identification 10# cloth sample bags marked with site number and sample number

Additional split of sample: 4 sample splits available

Identification of sample containers: plastic bags with identification numbers marked

Where available: Unity Mining Company laboratory, Forpaugh, Az.

Samples submitted for assay to: Unity Mining Company laboratory

Name: Thomas M. DeHoff   Date: March 13, 1984

Address: P. O. Box 2659, Wickenburg, Az. 85358   Phone: 602-685-2477

Method of assay: Fire   Lab number:

REMARKS

Vein structure can be traced for 300 feet and can possibly be covered by volcanic ash flows.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
5095
CADMUS L. G. GOSS
Date Signed 4/6/84
ARIZONA, U.S.A.

(seal)

CERTIFIED BY Cadmus L. G. Goss, P.E. # 5095

Signature: Cadmus L G Goss   Status

Michael C. Sansone
For REALTY INVESTMENT COMPANY
2942 North 24th Street #107
Phoenix, Az. 85016

Date April 6, 1984

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
22-1		.230					
22-2		.036					
22-3		.070					
22-4		.093					

ORE SAMPLE INFORMATION

Date collected: March 13, 1984 Sample collected by: E. Thomas Riggs & Cadmus Goss

Location of collection: Site 22 on Bullard Claims. Samples taken from dump, irons, coppers and cross vein

Description of structure from which sample removed: Large vein structure. iron, manganese, copper vein. Possible large vein covered by ash flows.

Identification mark placed on structure showing location of removal: Paint spray numbers on walls at site of samples

Sample container identification 10# cloth sample bags marked with site number and sample number

Additional split of sample: 4 sample splits available

Identification of sample containers: plastic bags with identification numbers marked

Where available: Unity Mining Company laboratory, Forpaugh, Az.

Samples submitted for assay to: Unity Mining Company laboratory

Name: Thomas M. DeHoff Date: March 13, 1984

Address: P. O. Box 2659, Wickenburg, Az. 85358 Phone: 602-685-2477

Method of assay: Fire Lab number:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
5095
CADMUS L. G.
GOSS
Date Signed 4/6/85
ARIZONA, U.S.A.

(seal)

REMARKS

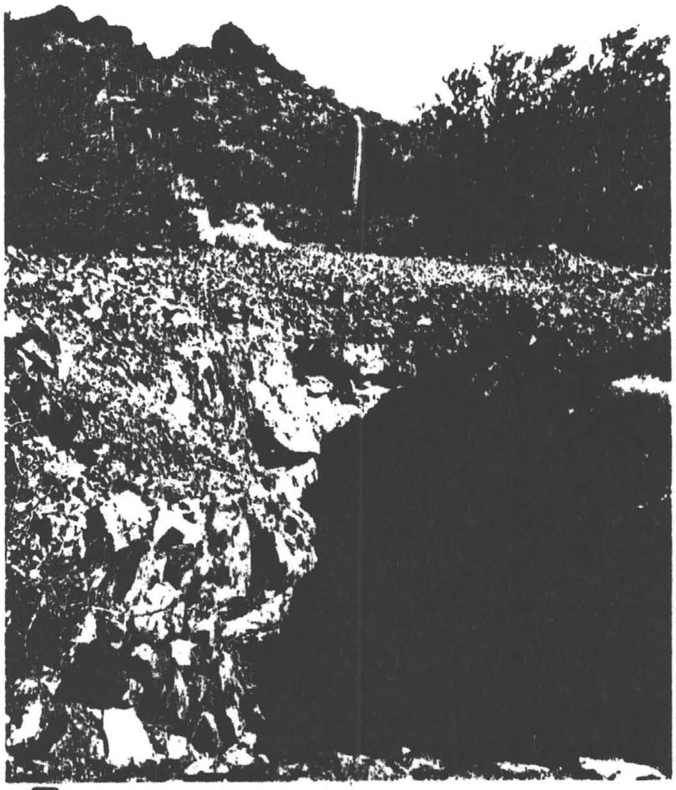
This vein could be vein that was encountered when 900 foot well was drilled on stage coach wash, below old smelter.

CERTIFIED BY C us L. G. Goss, P.E. # 5095

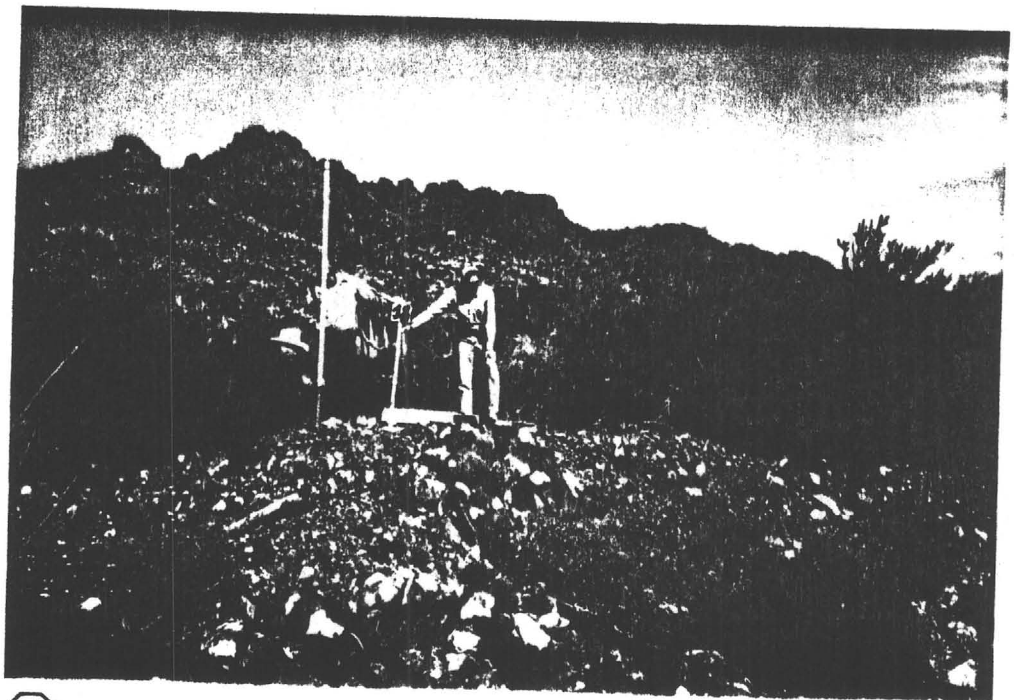
Signature:

Status

(22) Old Lady Hole. Very old abandoned mine, large workings.



(22) Old Lady Hole. Easily accessible



23 Unity Group. In ACM 4 B. These four mines are largest in group of ACM 152 claims.

23 Unity Group. Best Bullard promise in recent report for NRG.

Michael C. Sansone
For REALTY INVESTMENT COMPANY
2942 North 24th Street #107
Phoenix, Az. 85016

Date April 6, 1984

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
23-1		.103					
23-2		1.73					
23-3		1.67					
23-4 *		.015					

ORE SAMPLE INFORMATION

Date collected: March 13, 1984 Sample collected by: E. Thomas Riggs & Cadmus Goss

Location of collection: West end of Unity Mining Exploration site.

Description of structure from which sample removed: Samples taken from two definite veins. Veins run between sites 23 and 26

Identification mark placed on structure showing location of removal: wooden stakes

Sample container identification 10# cloth sample bags marked with site number and sample number

Additional split of sample: 4 sample splits available

Identification of sample containers: plastic bags with identification numbers marked

Where available: Unity Mining Company laboratory, Forpaugh, Az.

Samples submitted for assay to: Unity Mining Company laboratory

Name: Thomas M. DeHoff Date: March 13, 1984

Address: P. O. Box 2659, Wickenburg, Az. 85358 Phone: 602-685-2477

Method of assay: Fire Lab number:

REMARKS

two vein structures at sample sites. Samples were taken from both veins.

* Sample 23-4 was lower than the other three samples.

Registered Professional Engineer (Civil) CERTIFICATE NO. 5095 CADMUS L. G. GOSS Date Signed 4/6/84 ARIZONA, U.S.A.

(seal)

CERTIFIED BY Cadmus L. G. Goss, P.E. # 5095

Signature: Cadmus L. G. Goss Status

Michael C. Sansone
For REALTY INVESTMENT COMPANY
2942 North 24th Street #107
Phoenix, Az. 85016

Date April 6, 1984

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
25-1		.47					
25-2 *		.031					
25-3c *		.077					
25-3v		.47					

ORE SAMPLE INFORMATION

Date collected: March 13, 1984 Sample collected by: E. Thomas Riggs & Cadmus Gos

Location of collection: Unity Group Exploration site number 25

Description of structure from which sample removed: copper vein located at this site

Identification mark placed on structure showing location of removal: wood stakes and paint on vein wall in decline.

Sample container identification 10# cloth sample bags marked with site number and sample number

Additional split of sample: 4 sample splits available

Identification of sample containers: plastic bags with identification numbers marked

Where available: Unity Mining Company laboratory, Forpaugh, Az.

Samples submitted for assay to: Unity Mining Company laboratory

Name: Thomas M. DeHoff Date: March 13, 1984

Address: P. O. Box 2659, Wickenburg, Az. 85358 Phone: 602-685-2477

Method of assay: Fire Lab number:

REMARKS

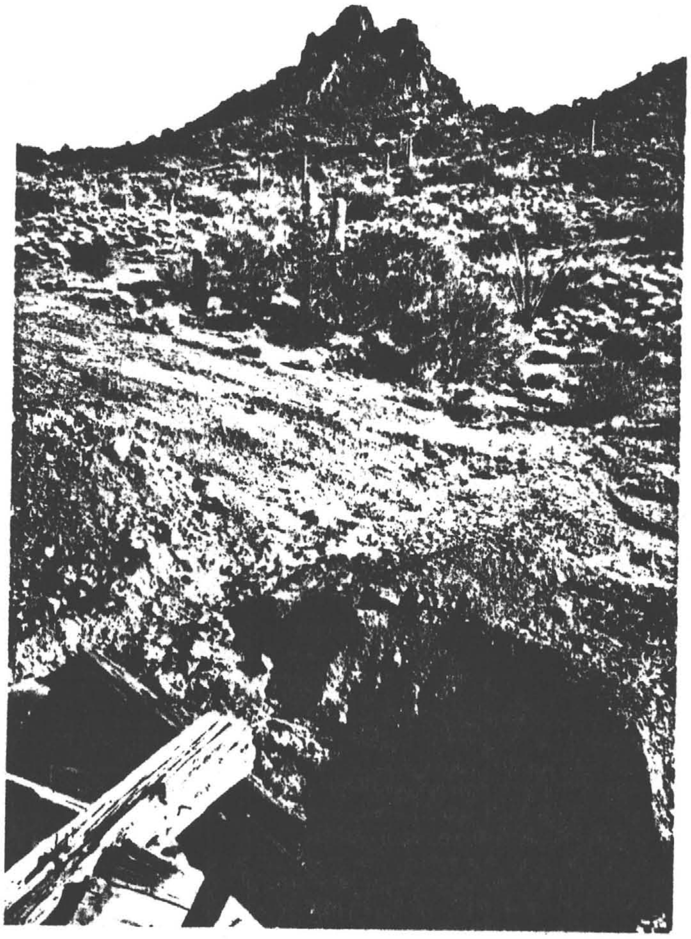
Sample 25-1 was taken at the mouth of the tunnel.
*Sample 25-2 was taken from the wall specimen of vein. This probably is why the samples run low in gold.
Sample 25-3c is a sample of the cap over the vein. 25-3v is a sample of the vein.

Registered Professional Engineer (Civil) Certificate No. 5095 CADMUS L. G. GOSS Date Signed 4/6/84 ARIZONA, U.S.A.

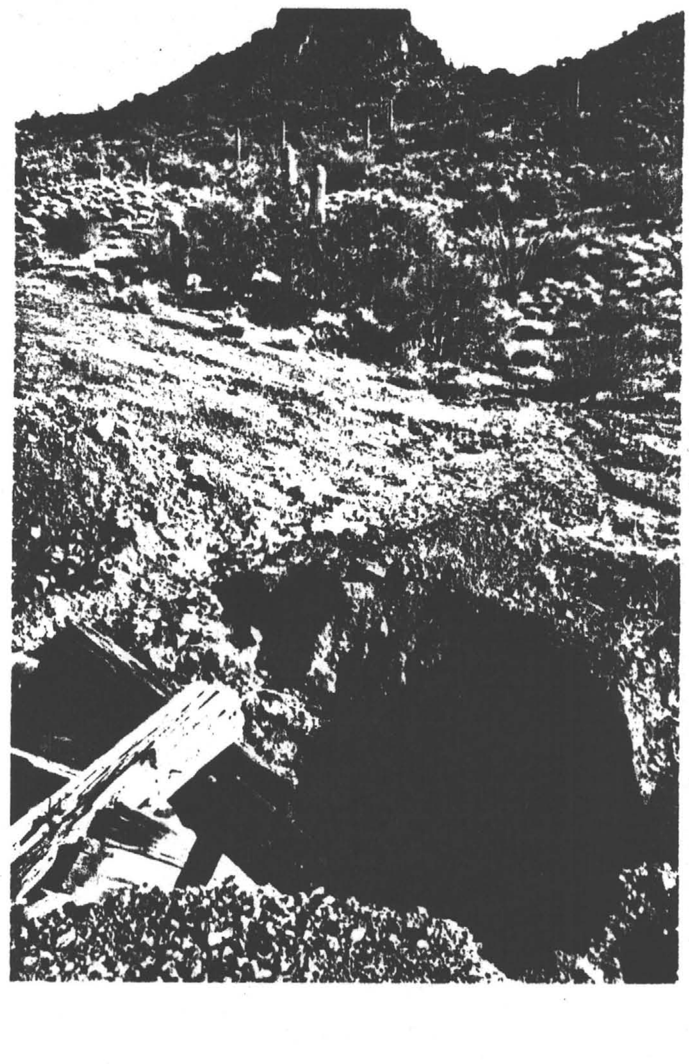
(seal)

CERTIFIED BY: Cadmus L. G. Goss, P.E. # 5095

Signature: Cadmus L. G. Goss Status

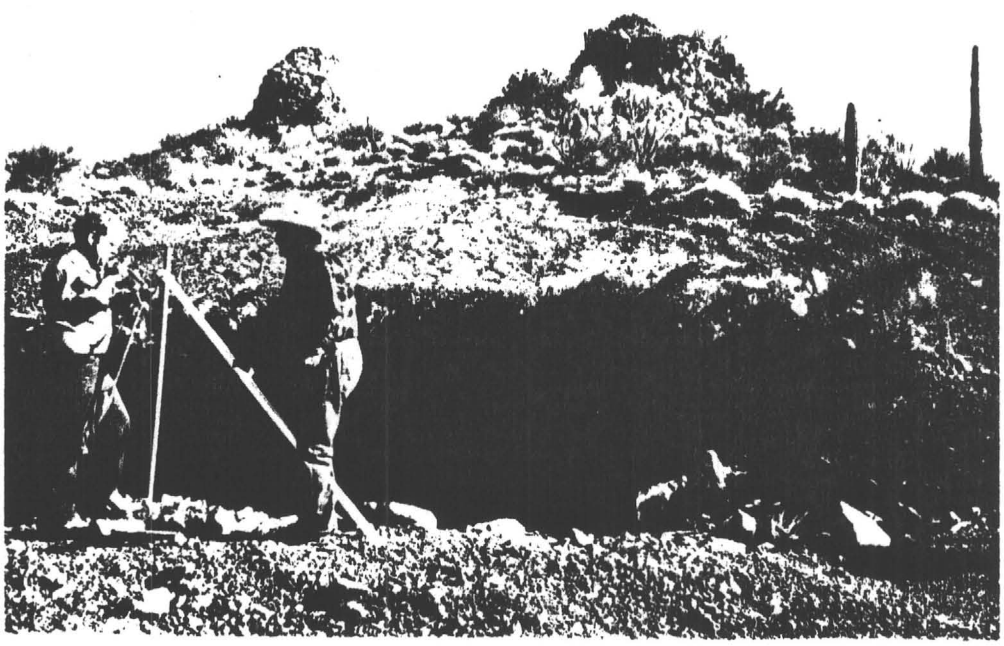


(25) Unity Group in Bullard Peak. Highest gold report for NRG.



(25) Unity Group in ACM 2 B

26 Unity Group



26 Unity Group

Michael C. Sansone
For REALTY INVESTMENT COMPANY
2942 North 24th Street #107
Phoenix, Az. 85016

Date April 6, 1984

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
26-1		.083					
26-2		.082					
26-3		.116					
26-4		.048					

ORE SAMPLE INFORMATION

Date collected: March 13, 1984 Sample collected by: E. Thomas Riggs & Cadmus Gos:

Location of collection: Unity Group exploration site

Description of structure from which sample removed: surface structure on southwest side of Unity Group exploration

Identification mark placed on structure showing location of removal: wooden stakes

Sample container identification 10# cloth sample bags marked with site number and sample number

Additional split of sample: 4 sample splits available

Identification of sample containers: plastic bags with identification numbers marked

Where available: Unity Mining Company laboratory, Forpaugh, Az.

Samples submitted for assay to: Unity Mining Company laboratory

Name: Thomas M. DeHoff Date: March 13, 1984

Address: P. O. Box 2659, Wickenburg, Az. 85358 Phone: 602-685-2477

Method of assay: Fire Lab number:

REMARKS

These values will increase at depth. The reasoning behind this statement is that there has been a decline sunk on this site. From the amount of material in the dump, depth is estimated to be 90 to 150 feet

Registered Professional Engineer (Civil)
CERTIFICATE NO.
5095
CADMUS L. G.
GOSS
Date Signed 4/6/84
ARIZONA, U.S.A.

(seal)

CERTIFIED BY. Cadmus L. G. Goss, P.E. # 5095

Signature: Cadmus L. G. Goss Status

Michael C. Sansone
For REALTY INVESTMENT COMPANY
2942 North 24th Street #107
Phoenix, Az. 85016

Date April 6, 1984

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
27-1	Moore Campsite	.213					
27-2	" "	1.0					
27-3	" "	.095					
27-4	" "	.025					
27-5	" "	.119					
27-6	" "	.80	.5				
27-7	" "	.279					
27-8	" "	.100					
27-9	" "	1.1					
27-10 *	" "	.184					
27-B *	" "	.334	.7				

ORE SAMPLE INFORMATION

Date collected: March 13, 1984 Sample collected by: E. Thomas Riggs & Cadmus Gos

Location of collection: Old John Moore's Campsite Southwest of Bullard Peak

Description of structure from which sample removed: Samples taken from stopes, glory hole and inclines.

Identification mark placed on structure showing location of removal: Sample number spray painted on wall with perimeter marks at each end of sample area.

Sample container identification 10# cloth sample bags marked with site number and sample number

Additional split of sample: 4 sample splits available

Identification of sample containers: plastic bags with identification numbers marked

Where available: Unity Mining Company laboratory, Forpaugh, Az.

Samples submitted for assay to: Unity Mining Company laboratory

Name: Thomas M. DeHoff Date: March 13, 1984

Address: P. O. Box 2659, Wickenburg, Az. 85358 Phone: 602-685-2477

Method of assay: Fire Lab number:

REMARKS

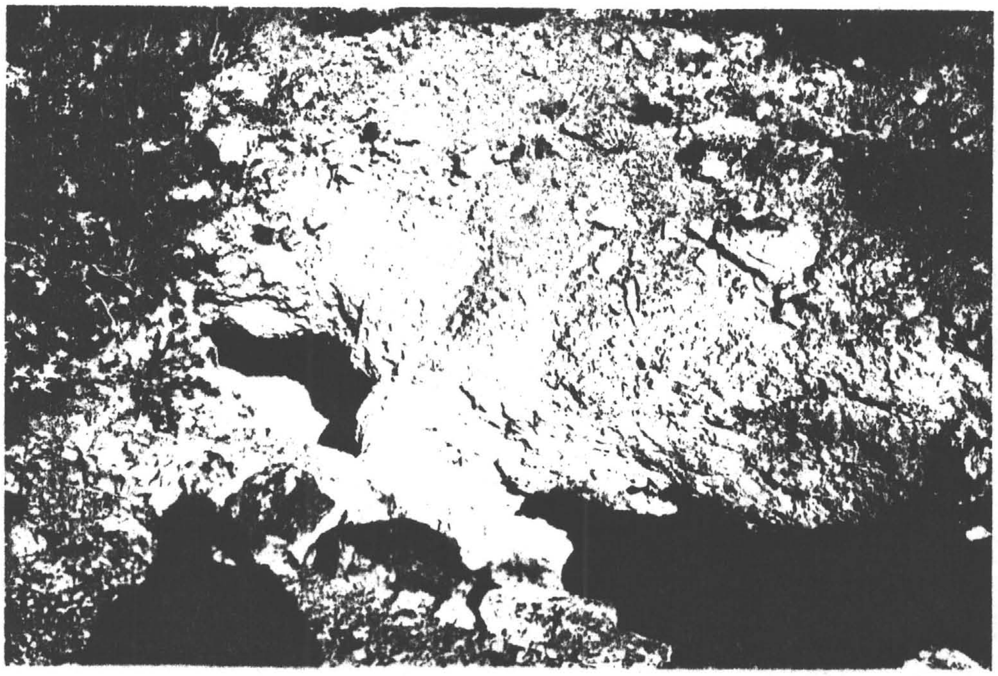
Samples were taken from across vein with each sample area being tarped. * Sample 27-10 was taken as a control to see if the roof contained any values. * Sample 27B was taken from a decline adjacent to site 27, adjacent to site 27 mineralized zone, and is of the same origin.

Registered Professional Engineer (Civil) CERTIFICATE NO. 5095 CADMUS L. G. GOSS Date Signed 4/6/84 ARIZONA, U.S.A.

(seal)

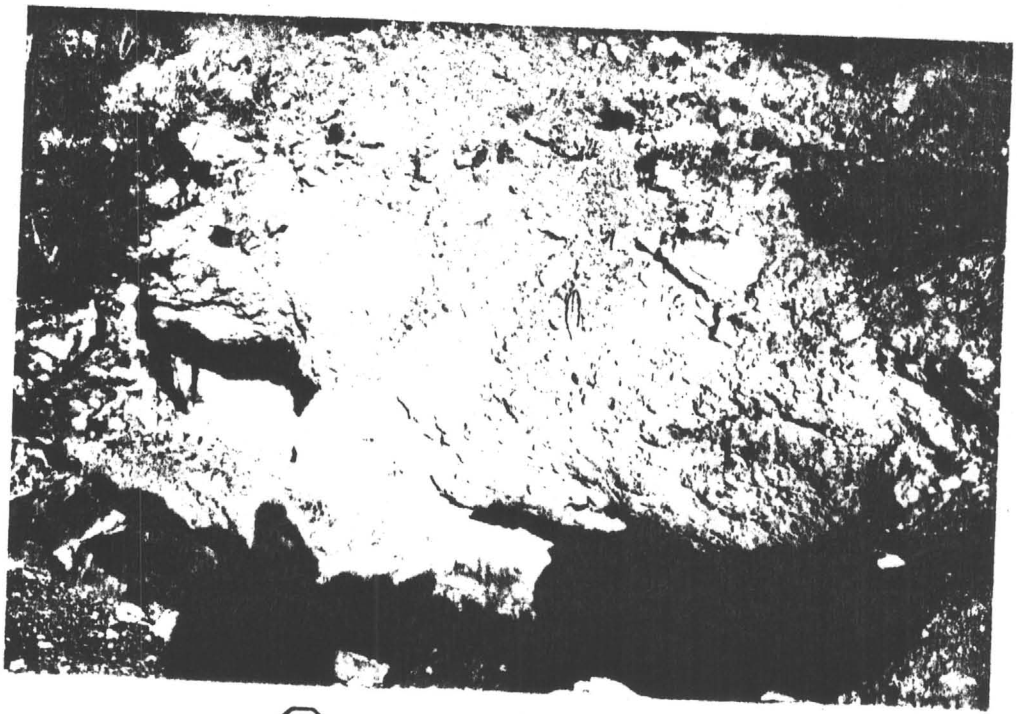
CERTIFIED BY. Cadmus L. G. Goss, P.E. # 5095

Signature: Cadmus L. G. Goss Status

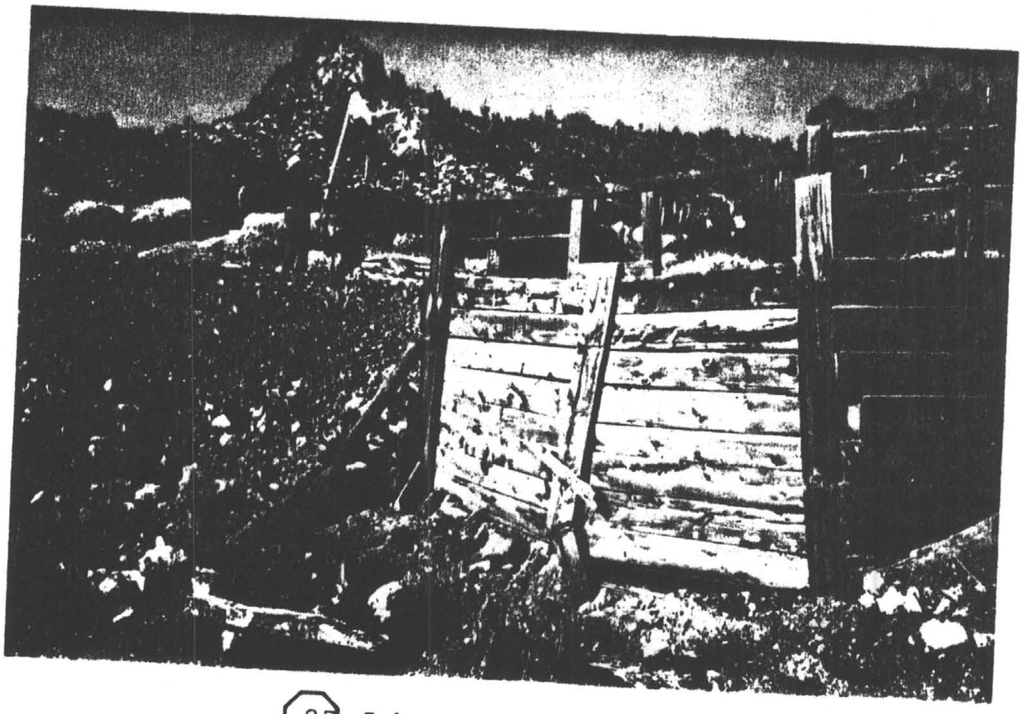


27 John Moore Campsite

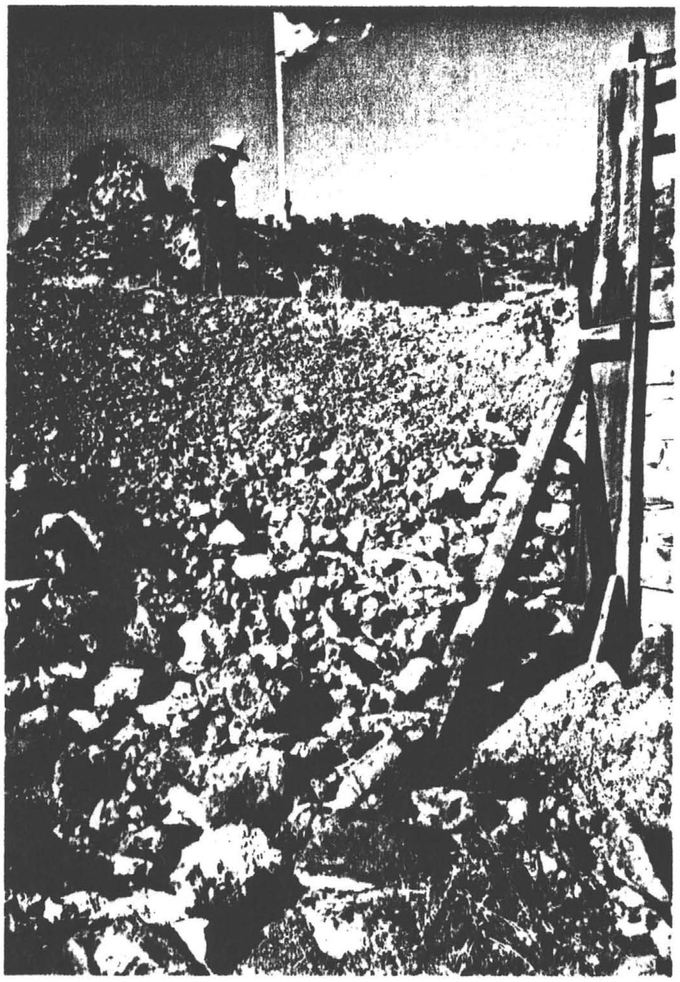
John Moore Campsite



27 John Moore Campsite

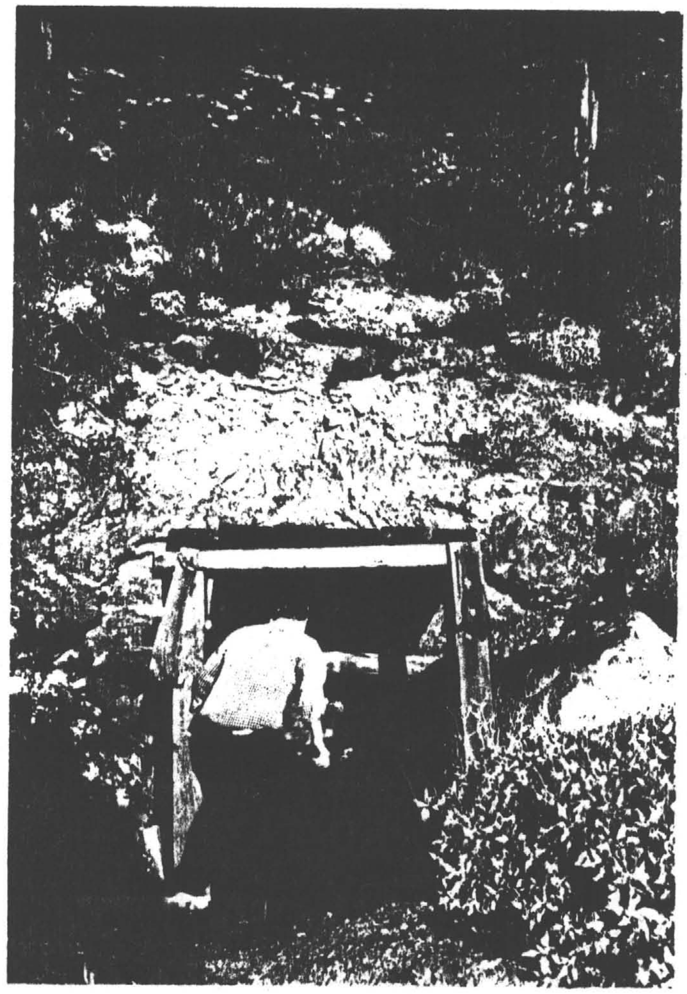


27 John Moore Campsite

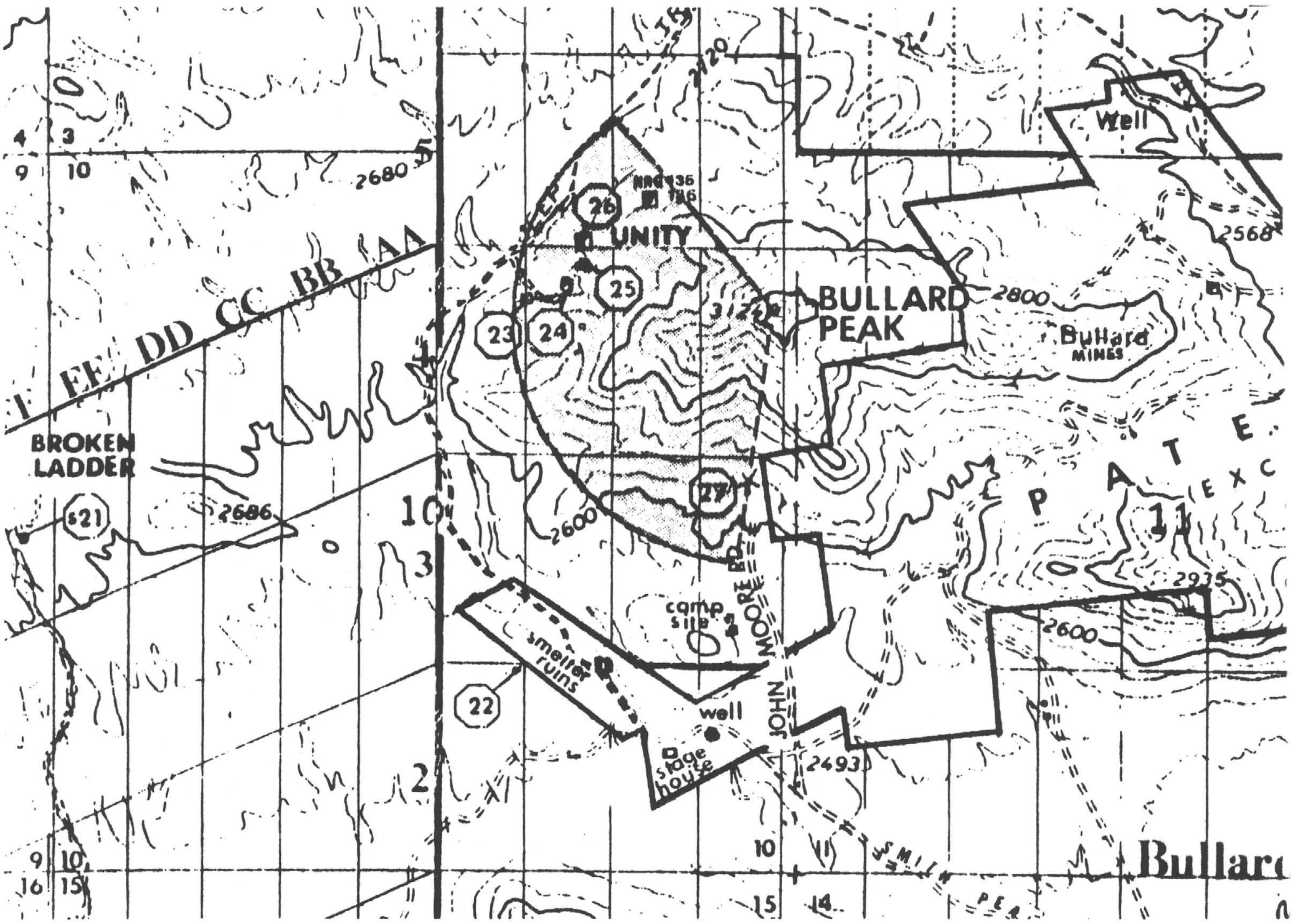


(27) John Moore Campsite

(27) John Moore Campsite



From the samples assayed and reported on the preceding pages, 8 of the splits were submitted to Skyline Labs, Inc., Tucson, Arizona for comparative analysis. Following is the Report of Analysis by Skyline Labs, Inc.



SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. URU 001
May 22, 1984
B-21-2 TO B-27-9

REALTY INVESTMENT COMPANY
Attn: Mr. Michael C. Sansone
P.O. Box 10402
Phoenix, Arizona 85064

Analysis of 8 Ore Samples

		FIRE ASSAY	
ITEM	SAMPLE NUMBER	Au (oz/t)	Ag (oz/t)
1	B-21-2	.940	.30
2	B-22-4	.100	.38
3	B-23-2	.720	1.08
4	B-23-3	1.150	.49
5	B-25-3v	.165	.12
6	B-26-3	.090	.21
7	B-27-6	.445	.64
8	B-27-9	.600	.46

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

"A GEOLOGICAL INVESTIGATION OF THE BULLARD MINE, AGUILA, ARIZONA"

Jeffery W. Giese

April, 1984

INTRODUCTION:

The town of Aguila, Arizona, is located twenty five miles west of Wickenburg, Arizona, on US 60. The field area for this investigation is the Bullard Claims located eleven miles to the north-west of Aguila. The area is accessible by seven miles of county maintained road and four miles of road which is passable by two-wheel drive vehicle. Present road conditions are good. Vegetation is typical of the upper Sonoran Desert. Water does exist in the mine workings and local wells.

The area has been mined intermittently since the late 1800's. Early records are sparse to non-existent. In the 1940's, records indicate 5,500 tons of ore removed averaging 0.32 oz/ton of gold, 0.24 oz/ton of silver and 2% copper. In the 1950's, ASARCO took 43 samples which averaged 0.25 oz Au/ton, 0.5 oz Ag/ton and 2.67% copper. The area has been mined as recently as 1980. There are 166 claims in the Bullard group of claims held by Michael C. Sansome. These claims surround a block of patented claims of record.

ABSTRACT

The Paleozoic stratigraphy of the Bullard area claims has been obscured by the shallow intrusion of a Laramide Andesite porphyry. In the Mid-Tertiary, the area was effected by the metamorphic core development in the Harcuvar Mountains with subsequent listric normal faults. The area also has mid to late Tertiary sediments and volcanics. The ore forming event(s) are post Andesite intrusion.

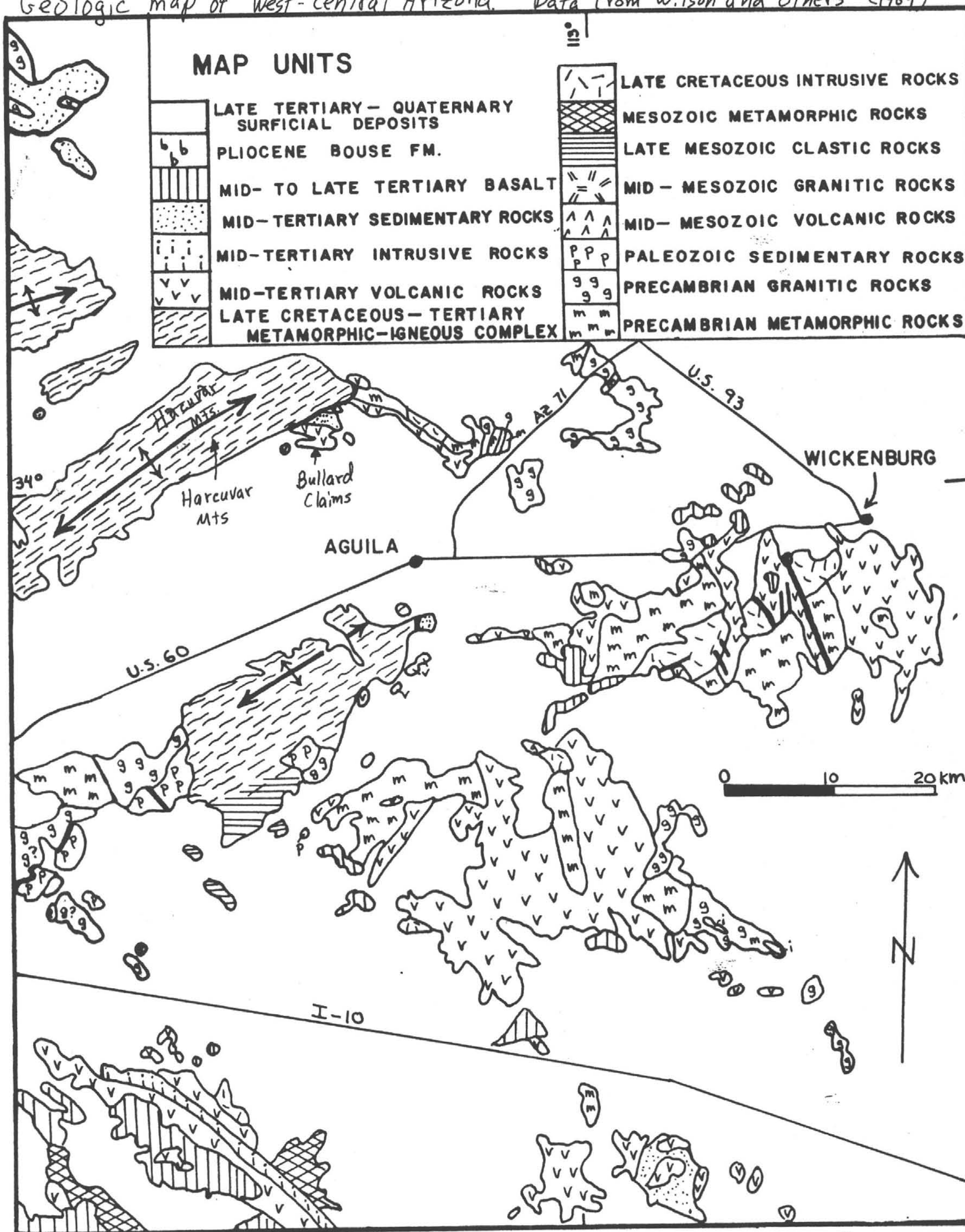
Mapping and sampling in the Bullard claims indicate six veins with an estimated total of 673,000 tons and value of 90, million dollars. The possibility of a bulk, low-grade porphyry gold deposit may be considered as drilling proceeds to prove vein targets. Geophysics should be the next step at the Bullard property.

REGIONAL GEOLOGY:

The Bullard claims occupy hills of low to moderate relief situated on the south-east flank of the Harcuvar Mountains. These mountains were formed twenty to thirty million years ago by a metamorphic/tectonic event. There are several of these "metamorphic core complexes" in the Basin and Range province of both Arizona and California; the Harcuvars seem to be typical of them. These complexes appear as broad up-arches of Pre-Cambrian basement. As the up-arching proceeds, the Pre-Cambrian develops sub-horizontal joints and foliations while the Phanerozoic rocks above the basement are typically faulted by low-angle, listric, normal faults. These faults result in highly deformed, near vertical dipping Phanerozoic strata on the flanks of the metamorphic core complex.

The Laramide orogeny has effected many areas of the Basin and Range. The area of the Bullard claims are now largely occupied by an intrusion of this age. These rocks intrude the Phanerozoic strata from 100 plus to 30 million years ago and subsequently rotated through 90 degrees by the listric faults. Mineralization in the area is post-intrusive. Mineralization is cut by late Tertiary faults.

Geologic map of West-central Arizona. Data from Wilson and others (1969)



modified using maps of Ciancanelli (1965), Jemmett (1966), Miller (1966, 1970), Shackelford (1975), Rehrig and Reynolds (in press), Rehrig and others (this volume), Marshak (1979), Arizona Public Service (1975), and regional and detailed mapping by S. Reynolds.

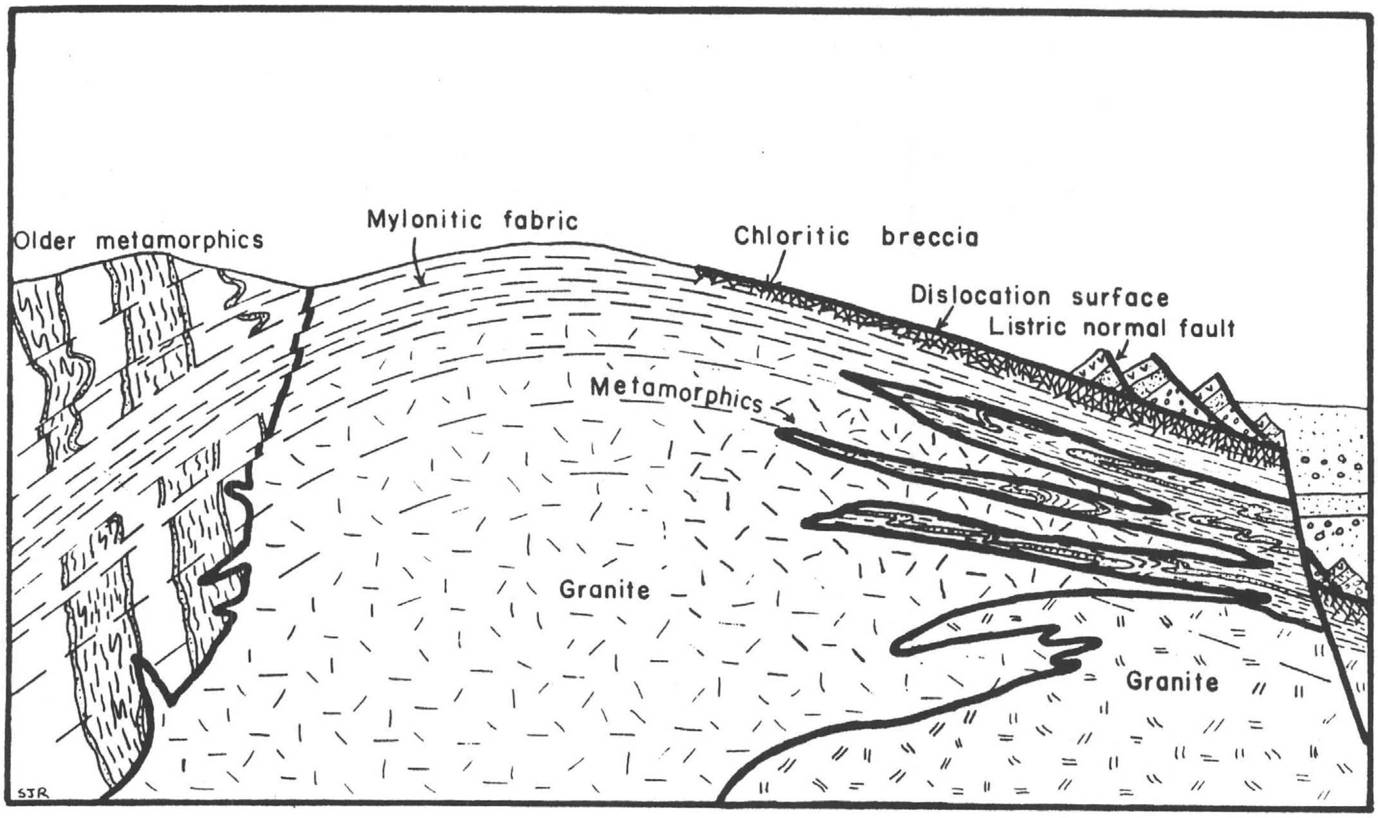


Fig. 4. Schematic cross section across a "typical metamorphic core complex"

GEOLOGY OF THE BULLARD CLAIMS:

The story of the Bullard claims is basically one of Phanerozoic sedimentation and volcanism which are intruded by a Laramide porphyry. All of these rocks are faulted and locally overturned by listric faults as the metamorphic core complex develops to the north-west. Mineralization is post-porphyry but before some late-Tertiary faulting.

The Pre-Cambrian in the claim's area is now represented by the granites and gneisses in the metamorphic core complex of the Harcuvar Mountains. These rocks are separated from the rocks of the Bullard claims by a major east-north-east fault that is covered but probably listric and normal.

The sediments of the area are conglomerates, sandstones, shales and limestones of probable Paleozoic age. These rocks have been intruded by a Laramide Andesite Porphyry. Later deformation has resulted in the sediments generally striking east-west and dipping near vertical. Some sediments and volcanics are not involved in the intrusion and possessing different bedding attitudes are mapped as Tertiary in age.

ANDESITE PORPHYRY

From Cretaceous to mid-Tertiary, this Laramide pluton intruded into a shallow level of the crust. Its intrusion, as dikes and sills, disrupted and assimilated all previously existing strata. In a few outcrops the porphyry weathers to mimic an extrusive texture. Although some portions of the unit may have been extrusive volcanics, the larger majority of field relations indicate an intrusive origin for this rock.

The Andesite porphyry of this report is equivalent to the "Diabase" of the DeLise (April, 1980) report. Although locally the rock may be diabasically textured, more generally the rock has a porphyritic texture. The Andesite porphyry is the host for at least one wall, and usually both walls, of all mineralized veins in the area, with the notable exception of the "Broken Ladder" mine.

A subject beyond the scope of both this paper and existing samples, but a subject that does deserve further investigation, is that the Andesite porphyry could be the host of a bulk, low-grade, disseminated gold porphyry-type deposit. The Andesite porphyry makes up the vast majority of the outcrops of the area and is under a thin alluvial cover in the Aguila Extension claim block. This rock may extend another 2 miles to the west and several miles to the north and east of the Bullard Claim area.

ROCK DESCRIPTIONS:

Andesite Porphyry to Porphyritic Diorite

Rock weathers black, green and red; grey on fresh surface, usually high fractured; slope former.

Plagioclase: 20-50% white to grey, euhedral, rarely corroded, flow oriented (?), porphyritic, argillic altered.

Augite: less than 10% euhedral, black, chlorite altered.

Aphanitic: 20-70% fine granular, grey.

Accessory: Hornblende, magnetite and olivine.

Secondary: Quartz and calcite.

Sedimentary

Clastics are usually red and cliff formers. Sandstone is rarely well rounded and sorted. Most commonly the rock is conglomerate. Pebbles to cobbles are usually granitic, rarely basaltic and occasionally lithic. Rare cut and fill. Shales are fissile to blocky, aphanitic. All rocks have suffered at least low grade metamorphosis.

The freshest rock in the area are the limestones. Breciated in the hanging wall of the Bullard Mine, they appear very well preserved in the flats of the Extension Group of 48 claims. They are composed of 80% micrite with 20% chert nodules. Echinoderm spines have been replaced by silica and well preserved. Other fossils may be fusulinid and rugose coral could assign an upper Paleozoic age.

ECONOMIC GEOLOGY:

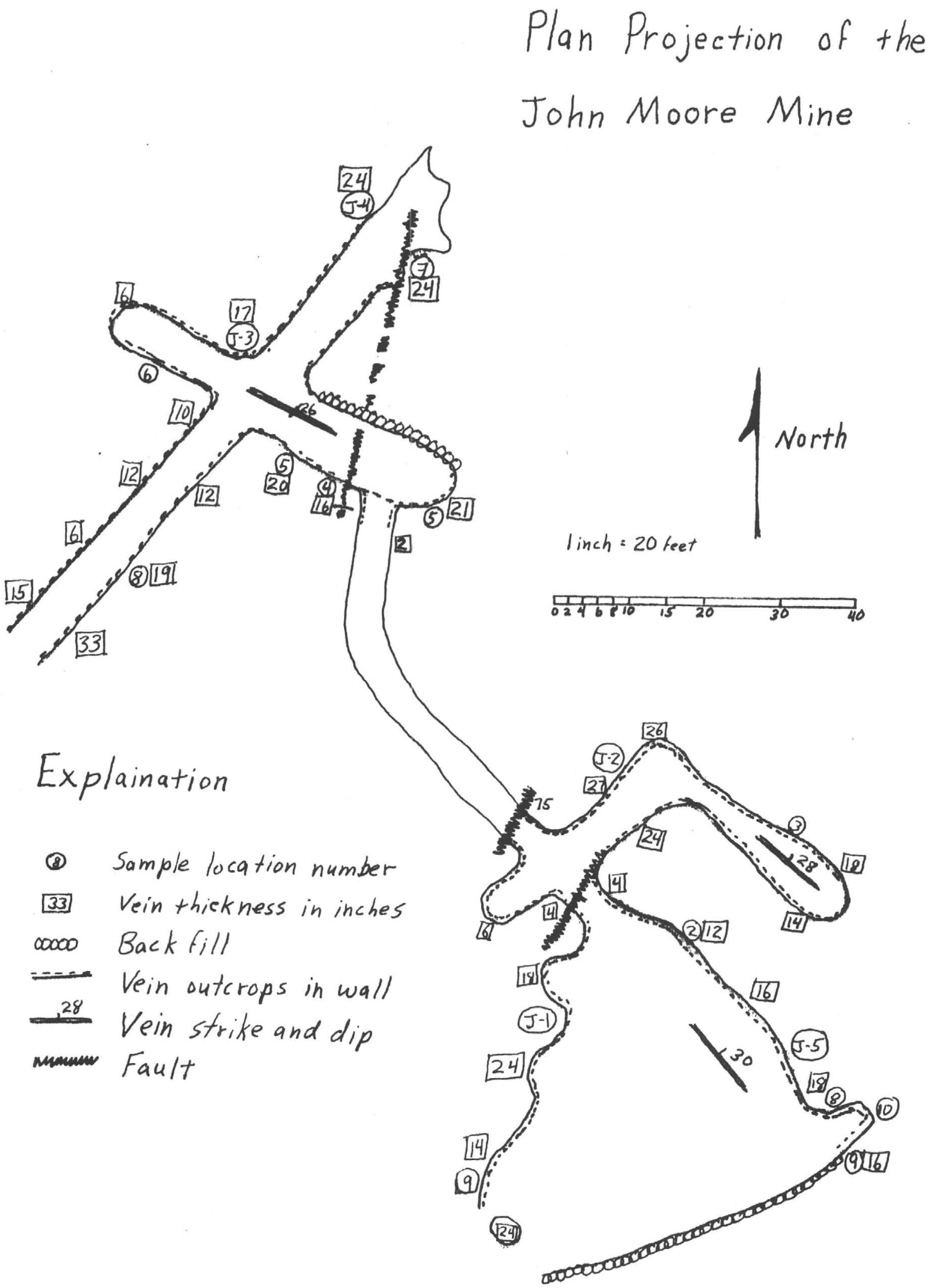
The mineralization in the Bullard claims occurs as veins in fault and shear zones. The possibility of a bulk, low-grade, disseminated gold porphyry warrants further investigation. The veins must be the present target, however, since a porphyry could not be considered porperly until a large amount of subsurface data has been obtained. This data may be generated as a by-product of drilling for vein targets.

The age of mineralization is younger than the andesite porphyry and older than late-Tertiary faulting. The occurrence of good mineralization at the "Broken Ladder" hosted in the Pre-Cambrian gneiss may indicate that veins will extend into basement and could be younger than metamorphic core complex development. All other veins are hosted in the andesite porphyry. Indirect evidence suggests that mineralization may extend to greater than 900 feet; this distance is unusually large for this type of deposit, but believable. Another geologist working in the area suggests that, "samples indicate that lower in the section higher average values may exist." This, again, would be unusual for this type of deposit, but could make development attractive. In some cases, notably Red Hill and possibly John Moore and Unity Group, veins are still only a few feet wide, but several, parallel veins occur in a shear zone 10's of feet thick.

Veins exposed to date generally strike north-west and dip north-east but a few strike north-east and dip south-east. Cutting faults generally strike north. Mineralized veins occur as silicates, carbonates, oxides, and sulfides. The most prominent minerals are chrysocolla, malachite, azurite, cuprite, chalcopyrite, hematite and pyrite. The majority of the vein material is quartz and calcite gangue. Gold and silver occur as electrum and as native elements. The wall rock adjacent to veins have been bleached (sericite or argilic alteration) and occasionally chloritized.

Economic veins form in dilational portions of faults. Veins of considerable thickness can pinch to non-existent in a matter to tens of feet; veins can be displaced by later faulting. Subsurface drilling can pass through uneconomical portions of an otherwise rich vein; you really don't know what's there until it's dug up. However, by linear measurements and estimates, and through sampling establish average grades, we can generate estimates of tons and value.

Target Area of Bullard Peak Properties.



JOHN MOORE VEIN

A portion of this vein is on the patented property.

1500 x 600 x 2	=	1,800,000 cu.ft.
1,800,000/ 13	=	140,000 tons.

12 samples within this structure, processed in 3 laboratories, yielded an overall average of .411 oz/ton Au.

JOHN WEST VEINS

To the west of John Moore I found two different veins with attractive widths.

JW1	500 x 500 x 3	=	750,000 cu.ft.
	750,000/ 13	=	57,000 tons
JW2	700 x 500 x 4	=	1,400,000 cu. ft.
	1,400,000/ 13	=	107,000 tons

One sampling from this area yielded .334 oz/ton Au.

UNITY

This could prove to be the richest vein on the property.

2000 x 600 x 2	=	2,400,000 cu. ft.
2,400,000/ 13	=	185,000 tons

An average of 19 samples, processed in 3 laboratories yielded .498 oz/ton Au; .48 oz/ton Ag.; and 2.3% Cu.

These three groups lie within an arc of 135 degrees, having a radius of 1800 feet from Bullard Peak, and comprising approximately 80 acres. Collectively, this area should be designated as a "target area".

Average values of $390/oz Au., $10/oz Ag. and 66¢/lb. Cu. are used herein.

This "target area", totalling 498,000 tons, would yield <u>$96,491,940.00</u>.

BROKEN LADDER

In the Aguila Extension claims is the Broken Ladder. This is a good looking vein with inclined shaft whose extension is under the Tertiary gravels. For this, we must estimate not only depth, but also length.

1000 x 600 x 2	=	1.200,000 cu.ft.
1,200,000/ 13	=	92,000 tons

Four samples, processed in three laboratories, yielded .557 oz/ton Au. This yield, coupled with the district average of .23 oz/ton Ag and 2.3% Cu. and 92,000 tons would result in $22,894,720.00.

The combined total of yields is:

"Target Area"....	$ 96,491,940.00
Broken Ladder ..	$ 22,894,720.00
Total Value	$119,386,660.00

The above sites on which these estimates have been made comprise only a small portion of the total number of known sites within the boundaries of the 152 lode claims owned by Sansone.

claims could be hampered if the patented properties are not secured.

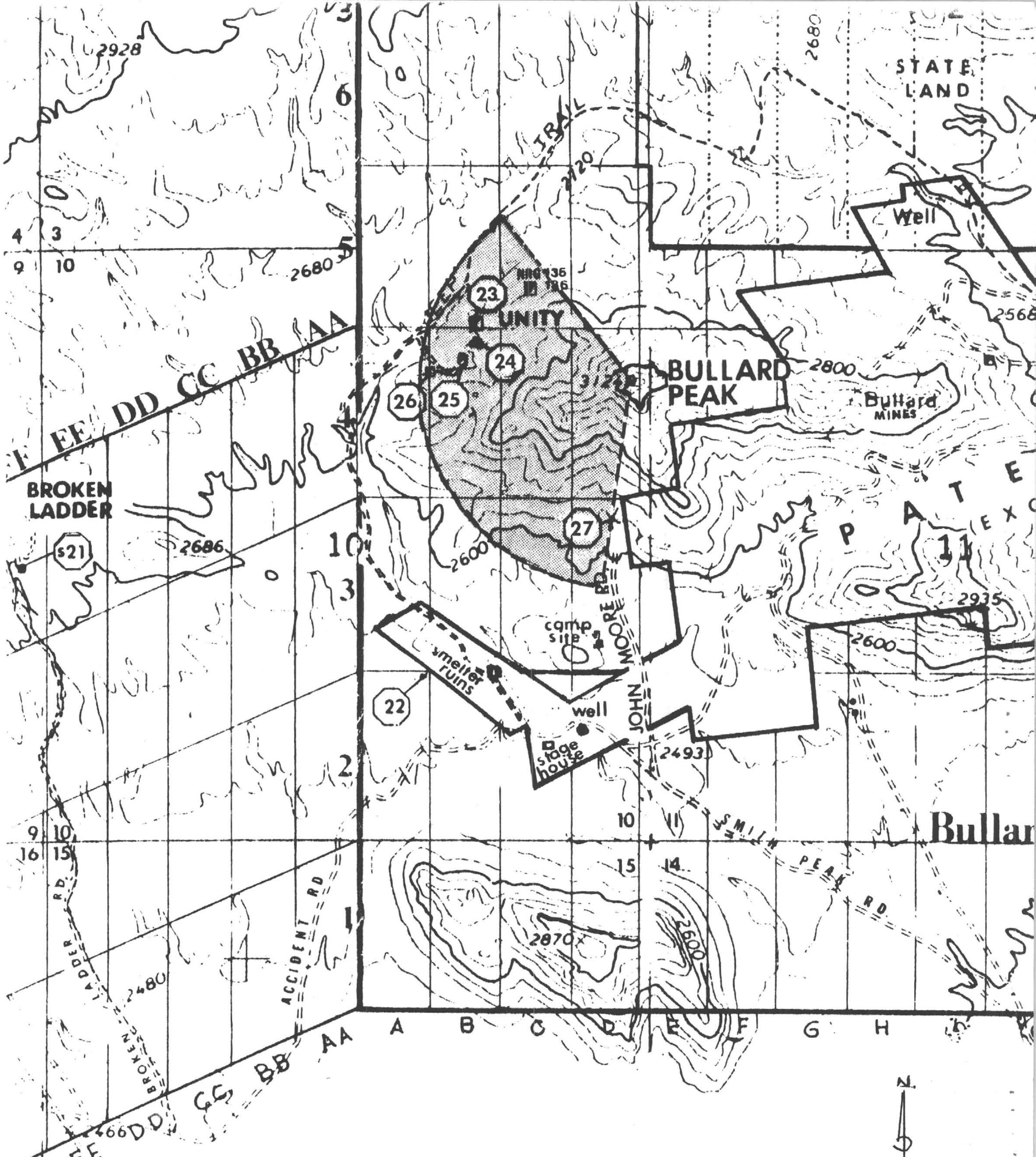
The next step is a more thorough sampling of outcrops. The The two veins west of John Moore have not been sampled; each has an audit which needs mapping and sampling. More samples could be taken between existing sample locations to get a better idea of the mineralization which is in outcrop and in the shallow, existing mine workings.

The most emphatic recommendation is a geophysic program. The method to use would probably be induced polarization. The first uses would be on the "Owl" and "22" to determine their strike length and depth. By these small scale surveys we may determine how effective this method is in the detection of ore at the property. It should prove successful and the next place for a survey would be on a larger scale in the areas south of the Unity Group and west of John Moore. If this is still giving good results, then a still larger scale survey should be undertaken in the Aguila Extension.

The better anomalies of the geophysical survey should be drilled into. Drilling may produce favorable results on the dip side of veins. The first intercepts of the veins should be approximately 200 feet below surface. Deeper holes will probably not be used unless favorable intercepts occur. It bears repeating that drilling can pass between the rich portions to show poor results on a good vein. The most enlightening program could well be a geophysical survey.

Wickenburg, Arizona
April 30, 1984

Jeffery W. Giese



Initial Target Area

Striking a 135 degree arc with a radius of 1800 feet from Bullard Peak to encompass the sampled locations results in an initial target area of approximately 80 acres.

RESUME

FOR: Jeffery Wayne Giese
20 Gold Finch Circle
Sierra Vista, Arizona 85635
(602) 378-6038

EMPLOYMENT OBJECTIVE: Staff Geologist with career opportunities for advancement.

EDUCATION: University of Arizona Bachelor of Science in Geology awarded May 1981. Geology grade point average in excess of three. Geology courses taken included Intro to Geology, Mineralogy, Intro to Paleontology, Micropaleontology, Paleo-ecology, Sedimentology, Principles of Stratigraphy, Structural Geology, Geologic Implications of Plate Tectonics, Optical Mineralogy and Petrology, Economical Mineral Deposits and a five-week geology field camp. Other areas of study were in Geophysics, ash flow tuffs and Hydrogeology.
Other classes from my University curriculum provided a thorough understanding of Trigonometry, Calculus, Statistics, Computer Programming, Chemistry, Physics and additional areas of study.

WORK HISTORY: From September to December, 1982 (Uranerz, U.S.A., Inc.), Andre Guitier and I reconnaissance mapped a large area northeast of Wickenburg, Arizona, of Pre-Cambrian schist, gneiss, migmatite and granite at a scale of 1:100,000. In the company's claims, two other geologists and I mapped and sampled a 725 foot adit and logged and sampled 6,000 feet of core.
From June to November of 1981, I did a field study in Sonora, Mexico, mapping and sampling fifteen square miles for ore bodies evaluations.
For two weeks after graduation, I toured Onterio, Canada, economic deposits with a group of graduate students from the University of Arizona.
During college, aside from several part-time jobs, I worked one full-time summer on several locations near Coalville, Utah, including Shell's off-shore platform in the Salt Lake.

REFERENCES: Andre Guitier, Uranerz, USA, Inc., Wickenburg, AZ
(602) 684-7357
John M. Guilbert, University of Arizona, Tucson, AZ
(602) 626-2509

INTERESTS: Photography, rock collection and sports.

PERSONAL DATA: Single; 6'3" tall; 190 pounds; excellent health

PLATE TWO
NRG RESOURCES LTD.
BULLARD MINE
AGUILA, ARIZONA
SCALE 1" = 400 ft.
400 200 0 400 800 1000 ft.
50
Plate Two
A large portion of this report includes mineralization zone of Sansone's claims at Bullard Peak and West.
LEGEND
QUATERNARY
Qal alluvium
Qdt detritus; outcrop rubble; ss, sh and ls
CRETACEOUS
Kd diabase; gray to greenish, plagioclase laths 10mm
Ku diabase; undifferentiated with ss, sh and ls
PALEOZOIC
Palss sandstone; buff to reddish, altered meta-sediments fine-med gr, pebble cgl. locally
Palsh shale; well-indurated meta-sediments, argillaceous silty, well-bedded locally
Palls limestone; dark gray, hard, altered, siliceous, clastic argil., aren., low-med rank metamorphism
Palcgl conglomerate; gray to dark gray, altered, calcareous arenaceous, cobbles to 6in., ang. frags. (breccia?)
B' B'' Vertical section
Shaft
Prospect or glory hole
Drill hole (old)
DDH-2 PROPOSED
Fault
MINERALIZED ZONE OR MINERALIZED SHEAR ZONE
RECONNAISSANCE
GEOLOGIC MAP
K. C. DELISE
ORIGINAL DECEMBER 1980
REVISIONS
BULLARD PEAK
3124
2720
2922
2800
2568
2680
2600
2487
2935
2493
2420
2870
2766
2400
Thickness of these sandstones exaggerated
JEEP TRAIL
well
Stone Cabin
Ore dump
SMELTER RUINS
STAGE HOUSE RUINS
MM-1
DDH-1
DDH-1A
DDH-2A
DDH-2B
DDH-3A
DDH-3B
DDH-4
DDH-5
3 2
10 11
15 14
11 12
13
ARENACEOUS ARGILLACEOUS METASEDIMENTS
SILICEOUS LIMESTONE
(UNMAPPED)
AREN. ARGIL. META-SEDIMENTS
(UNMAPPED)


GEOLOGIC MAP OF THE BULLARD PEAK AREA
LEGEND
PREPARED BY J. GIESE, APRIL, 1984
Quaternary to Tertiary
Cover; aluvial conglomerates
Tertiary
Conglomerates, volcanics and agglomerates
Tertiary to Cretaceous
Laramide andesite porphyry
Jurassic to Paleozoic
Limestone with chert
Conglomerates, sandstones and shales
Pre-Cambrian
Gneiss and granites
foliation
bedding
fault
vein
one mile
Bullard Peak
3124
Bullard Mine
JEEP TRAIL
JEEP TRAIL
Well
Well
2487
Mine
Prospect
2571
2912
2922
2935
2870
2766
2622
2686
2632
2567
2988
3062
2928
2505
2568
2493
2581
2466
2440
2420
2320
2306 S89°57'W
2295
2360
1
2
3
4
9
10
11
12
14
15
16
PREPARED FOR MICHAEL C. SANSONE 2942 N. 24TH ST PHOENIX, ARIZONA 85016

Mine Production Record

Date	Tonnage	Ozs Gold	% Copper
1936 1937	996.45	0.5702	2.84
1939 1941	6592.00	0.3509	2.40
Nov-Dec 1943	864.32	0.118	.97
Jan-Mar 1944			

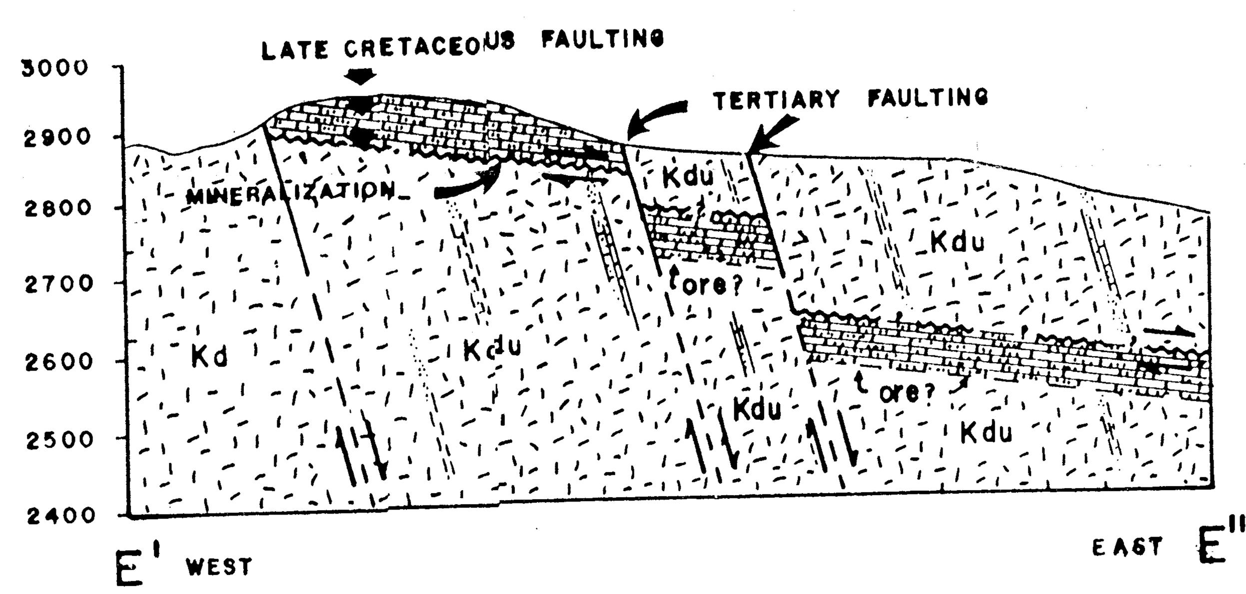
Bullard Mine

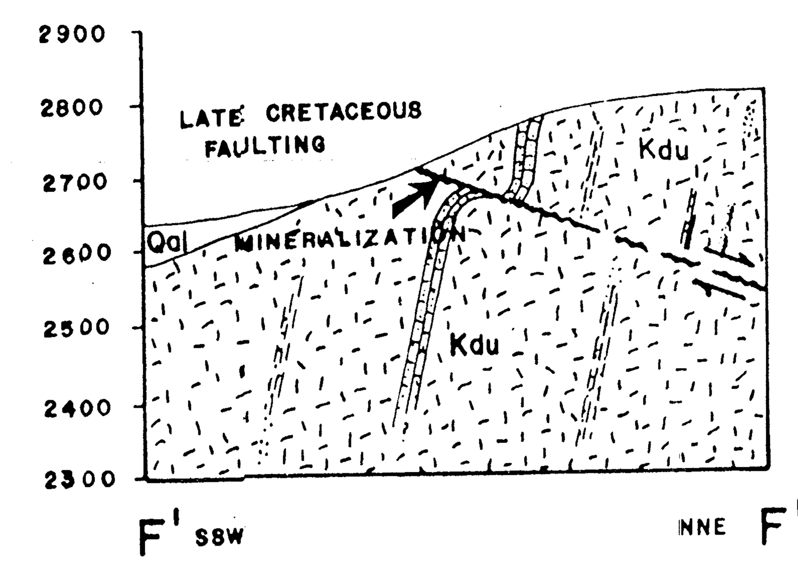
Bullard Gold Mines; Inc Docket No. ND 5391
Aguila Yavapai Co., Arizona
Scale 1" = 40' Feb 4, 1944
Wm. B Maitland

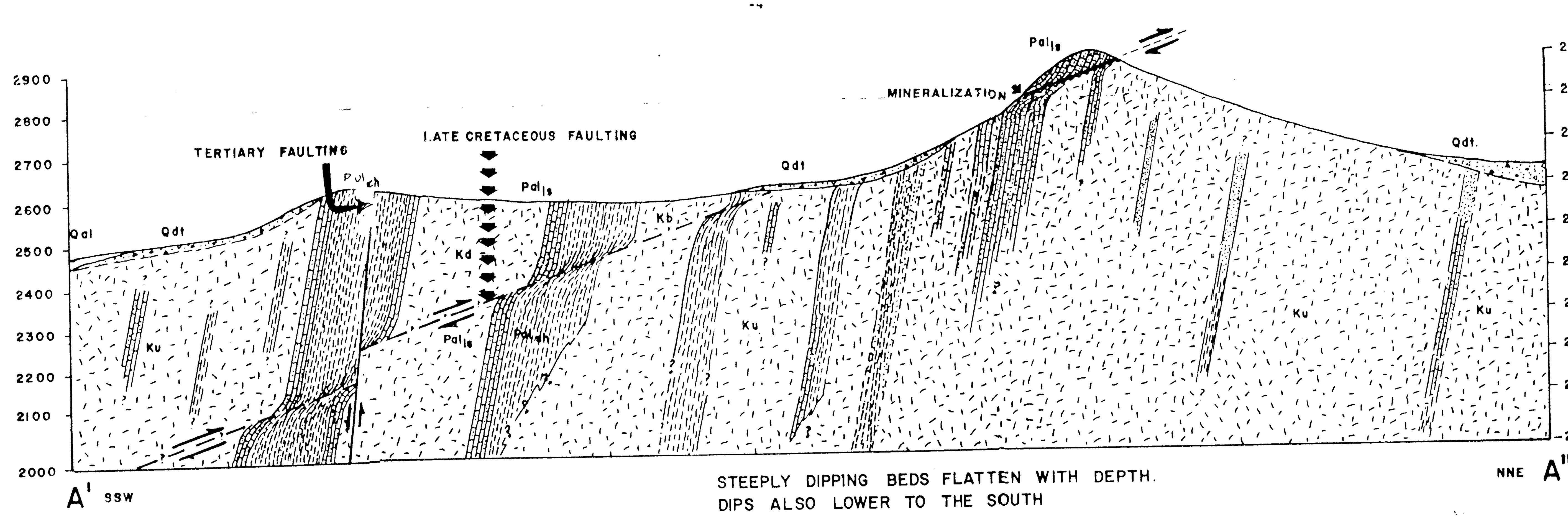
Sample Legend:
Assay No, Width in inches, Ounces gold, Per cent Copper
A Samples by A S & R Co
M " Wm B Maitland
K " Jos F Klein

Inclined shaft
Vein outcrop obscured
Limit of stope
Vein outcrop definite
Drifts
Fault

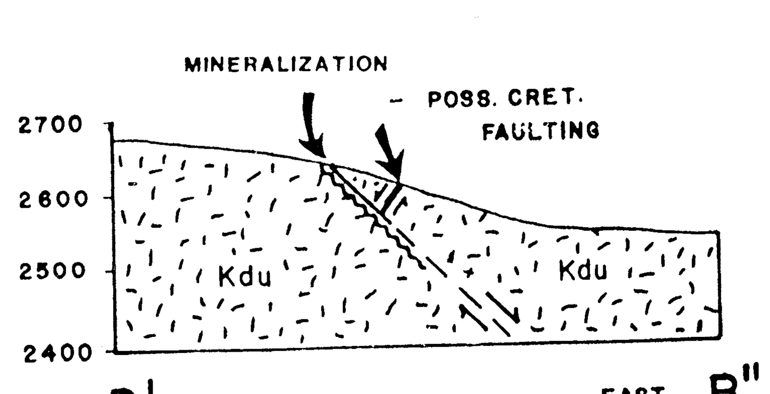
Colors Copied from Maitland Print

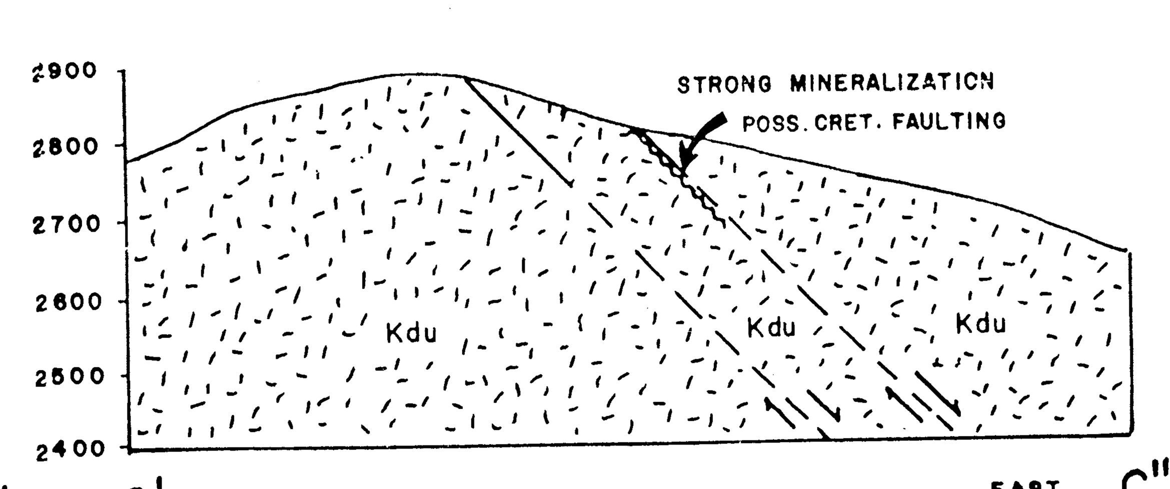






STEEPLY DIPPING BEDS FLATTEN WITH DEPTH.
DIPS ALSO LOWER TO THE SOUTH





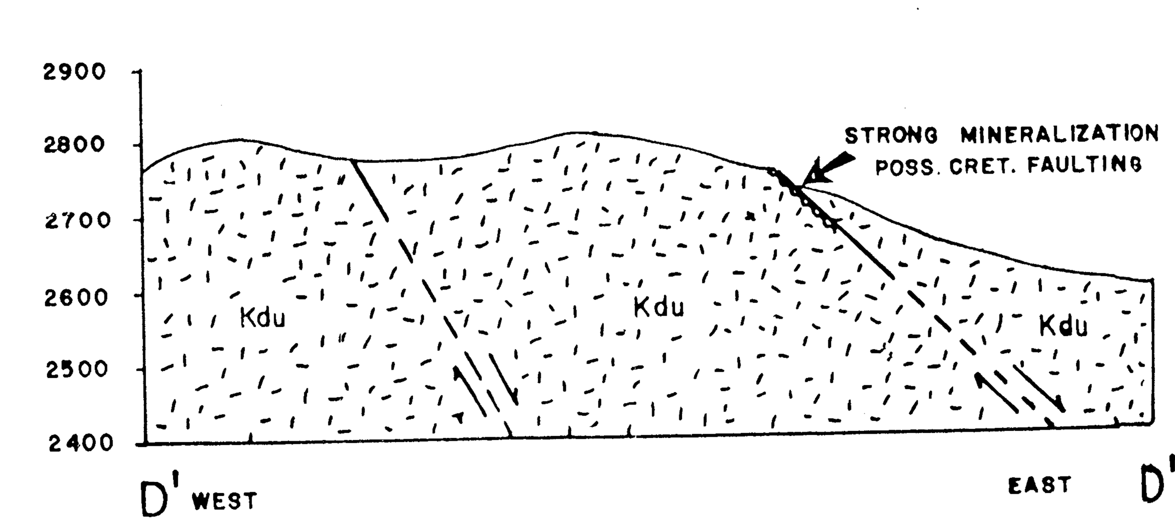


PLATE THREE

NRG RESOURCES LTD.

BULLARD MINE

Plate Three
This NRG report
extends into Sansone
claims West of
Bullard Peak.

AGUILA , ARIZONA

SCALE 1" = 200 ft.
(HORIZ. & VERTICAL)

200 100 0 200 400 600 800 900

QUATERNARY	Qal	alluvium
	Qdt	detritus
CRETACEOUS	Kd	diabase
	Ku	diabase with ss, sh and ls
PALEOZOIC	Pal ss	sandstone
	Pal sh	shale
	Pal ls	limestone

B'........B'' VERTICAL SECTION

FAULT

MINERALIZED ZONE OR
MINERALIZED SHEAR ZONE

GEOLOGIC VERTICAL SECTIONS

K. C. DELISE
9043 Harmony Grove Rd
ESCONDIDO, CA 92025
(714) 743-8921 CA Lic. No. 2118 & 334335

ORIGINAL JAN. 1981
REVISIONS:


HOME GROUP
PIERCE MINING DIST. YAVAPAI CO.
ARIZONA.
ASSAY PLAN AND SECTION
SHOWING LOCATION, WIDTH AND VALUE OF SAMPLES.
SCALE: 1" = 40'
A. S. & R. Co. Map 1913.
50
Computed Average of Samples 6–49 incl.:
Au. 0.25 oz; Ag. 0.50 oz; Cu. 2.67%.
Analysis of Composite:
Ins. 78.2; SiO2. 73.0; Fe. 6.8; CaO. 0.6; Al2O3 4.6; S. tr.
Area Probable Ore: 170,000 sq. ft.
Average thickness of ore: 2.5 ft.
Tons of Probable ore: 32,692. at 13 cbft. per ton.
Note: Width of outcrop has been revolved to horizontal position.
OUTCROP COVERED BY DETRITUS
APPROXIMATE STRIKE OF VEIN: N. 55° E.
ASSUMED LIMIT OF PROBABLE ORE
TUNNEL
INCLINE
OPEN CUT
SHAFT
CROSSCUT
DRIFT
BLACKSMITH SHOP
ELEVATION 0' DATUM PLANE & COLLAR OF INCLINE
WASHINGTON CLAIM
RATTLER CLAIM
DATUM PLANE: 100 FT. ABOVE COLLAR INCLINE BLACKSMITH SHOP
SECTION THROUGH LINE A-B, S 35° E.
570 FT. ALONG DIP OF VEIN.
N
A
B

ulrv

EVIDENCE FOR LARGE-SCALE TRANSPORT ON THE BULLARD DETACHMENT FAULT, WEST-CENTRAL ARIZONA

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ABSTRACT

The Bullard detachment fault is a gently to moderately dipping normal fault that flanks the Harcuvar and Harquahala Mountains of the Basin and Range Province in west-central Arizona. The stratigraphy of upper-plate Miocene conglomerates and the regional distribution of upper- and lower-plate pre-Tertiary units indicate that upper-plate rocks were displaced approximately 50 km to the northeast with respect to the lower plate during middle to late Tertiary time. Normal slip of this magnitude on the regionally northeast-dipping Bullard fault requires that deep-seated Tertiary-Cretaceous(?) mylonitic gneisses and Mesozoic thrust faults of the lower plate were drawn out from beneath Precambrian rocks in the Transition zone of central Arizona by Tertiary crustal extension. The Transition Zone was, therefore, affected by deep-seated tectonism in both Mesozoic and Tertiary time.

INTRODUCTION

Current models for the origin of detachment faults[1] associated with metamorphic core complexes can be divided into two groups: those that envision the faults as surfaces of major transport (Wernicke, 1981; Davis, 1983; Davis and others, 1983; Reynolds, 1984), and those that consider the fault surface to be an exhumed brittle-ductile transition that has only minor displacement (Rehrig and Reynolds, 1980; Miller and others, 1983). In this paper, we present evidence that the Bullard detachment fault of west-central Arizona accommodated approximately 50 km of normal slip during middle to late Tertiary crustal extension. The fault roots to the northeast beneath the Transition Zone, which separates the Colorado Plateau and the Basin and Range Provinces of Arizona. Reconstruction of 50 km of transport indicates that south- and southwest-vergent Mesozoic thrusts in the lower plate of the Bullard fault projected to mid-crustal levels beneath the Transition Zone prior to Tertiary detachment faulting. This suggests that the Transition Zone underwent more Mesozoic tectonism, at least at deeper crustal levels, than has been generally assumed.

1 - The term "detachment fault" is used by us and, in our view, by many other geologists to describe a low-angle normal fault that represents a major structural discontinuity with at least one of the following four characteristics: (1) it is a zone of major displacement as revealed by a pronounced lithologic mismatch between upper and lower plates; (2) it separates rocks with contrasting structural styles; faulted, rotated, and brittiely distended upper-plate rocks are juxtaposed against less faulted lower-plate rocks; (3) the upper plate contains normal faults that are cut by or merge with the detachment fault; and (4) it is underlain by a zone of hydrothermally altered breccia and microbreccia derived from lower-plate rocks. We suggest usage of the term

"low-angle normal fault" for any gently dipping fault that lacks all of these features, unless the fault can be traced laterally into a fault that fits the above definition.

GEOLOGIC RELATIONSHIPS

The Bullard detachment fault is a gently to moderately dipping fault that flanks the northeast ends of the Harcuvar and Harquahala Mountains of west-central Arizona (Figure 1; Rehrig and Reynolds, 1980; Reynolds, 1982). The fault separates upper and lower plates that have undergone dramatically different metamorphic, structural, and thermal histories. Rocks below the fault generally consist of high-grade metamorphic and plutonic rocks that have been complexly overprinted by Mesozoic and Cenozoic metamorphism and ductile deformation. In contrast, upper-plate rocks include highly tilted and faulted middle Tertiary volcanic and sedimentary rocks and Proterozoic metamorphic and granitic rocks that have generally escaped significant Mesozoic-Cenozoic metamorphism and ductile deformation. Lower-plate mylonitic rocks have yielded K-Ar biotite ages of 25 and 17 m.y. (Shafiqullah and others, 1980; Rehrig, 1982), whereas upper-plate, Cretaceous(?) granite yielded a Late Cretaceous K-Ar biotite age (J. Kirkwood, 1977, personal communication). This discrepancy in cooling ages indicates that the upper and lower plates of the Bullard fault had contrasting thermal histories prior to mid-Miocene time.

Geology of Lower-Plate Rocks

Rocks below the Bullard detachment fault in the Harcuvar Mountains are composed of Precambrian metamorphic and granitic rocks, Upper Cretaceous granitic sills and plutons, and Upper Cretaceous or Lower Tertiary muscovite granite and pegmatite (Rehrig and Reynolds, 1980; Reynolds, 1982; Rehrig, 1982;

Reynolds and Spencer, unpublished mapping). These rocks have been widely overprinted by Cretaceous regional metamorphic fabric and, in the eastern part of the range, by Tertiary(?) mylonitic fabric. Foliation in the mylonitic rocks dips moderately to gently off the flanks of the range and defines a broad, east-northeast-trending antiform. Lineation in the mylonitic rocks consistently trends east-northeast.

Geologic relationships are more complex in the Harquahala Mountains (Figure 1; Rehrig and Reynolds, 1980; Reynolds and others, 1980; Reynolds, 1982; Keith and others, 1981; Hardy, 1984; Richard, DeWitt, Reynolds, and Spencer, unpublished mapping). The structural geology of the range is dominated by the Harquahala thrust, which places Precambrian crystalline rocks over an upturned to overturned section of Precambrian, Paleozoic, and Mesozoic rocks. Regional metamorphic fabrics of probable Mesozoic age are widespread, and more localized, mylonitic fabrics with north-trending lineation occur along the thrust. Minor structures, including S-C surfaces (Berthe and others, 1979; Simpson and Schmid, 1983), in mylonitic rocks along the thrust indicate that the upper plate moved to the south. Penetrative, low-angle mylonitic fabrics with an east-northeast-trending lineation are present on the northeastern end of the range, and define an east-northeast-plunging antiform similar to that in the Harcuvar Mountains.

The Little Harquahala and Granite Wash Mountains contain Mesozoic clastic and volcanic rocks that have been overridden along the Hercules and Centennial thrusts by Precambrian crystalline rocks, upended Paleozoic and Mesozoic supracrustal rocks, and Mesozoic or Precambrian granitoids (Figure 1; Reynolds and others, 1980; Keith and others, 1981; Richard, 1982; Reynolds and others, 1983, 1984; Spencer and others, in preparation). Lower-plate Mesozoic rocks are only slightly cleaved and metamorphosed away from the Hercules thrust, but have been converted into schists immediately below the thrust, especially in the Granite Wash Mountains. S-C fabrics in mylonitic rocks along the thrust and overturned folds in lower-plate rocks indicate southwest transport of the upper-plate rocks. The thrust sheets and thrust-related metamorphic fabrics have been intruded by large plutons of Upper Cretaceous granodiorite and granite.

The Bullard Detachment Fault

The Bullard fault is best exposed along the flank of the eastern Harcuvar Mountains where lower-plate mylonitic gneisses are juxtaposed against upper-plate Tertiary volcanic and sedimentary rocks (Figure 2). The fault is underlain by a zone of chloritic breccia and limonitic microbreccia derived from lower-plate mylonitic gneiss. The fault, breccia zone, and mylonitic foliation in lower-plate rocks below the breccia zone all dip approximately 50-70 degrees to the southeast (Figure 3). The fault probably decreases in dip as it curves to the north around the northeastern end of the range, but is poorly exposed. A detachment fault, which we correlate with the Bullard fault, dips gently eastward off the northeastern end of the Harquahala Mountains and separates southwest-dipping, upper-plate Tertiary volcanic and sedimentary rocks from lower-plate chloritic breccia and mylonitic gneiss (Figure 1).

Geology of Upper-Plate Rocks

Upper-plate rocks in the Harcuvar Mountains include a crystalline basement composed predominantly of Precambrian gneiss, schist, and porphyritic granite (Figure 2), all of which have a steep crystalloblastic foliation that is characteristic of Precambrian rocks throughout Arizona. This fabric locally has been weakly overprinted by a southwest- to southeast-dipping, mylonitic foliation of unknown age and significance(Reynolds and Spencer, 1984). The

Precambrian rocks have been intruded by Cretaceous(?) granite and lower Tertiary(?) garnet-muscovite granite.

The crystalline basement is depositionally overlain by a faulted, southwest- to south-dipping sequence of middle Tertiary volcanic and sedimentary rocks (Figures 2 and 3). The basal Tertiary unit, an arkosic conglomerate, is overlain by trachytic ash-flow tuffs that yielded a 24 m.y. K-Ar biotite age (Brooks, 1984) and a 17 m.y. K-Ar whole-rock age (Scarborough and Wilt, 1979). The tuffs are overlain by approximately 600 m of coarse conglomerate and sedimentary breccia that changes significantly in clast type up section. The basal part of the coarse conglomerate contains well-rounded clasts of reddish quartzite exotic to the region. Up section, the conglomerate is composed of angular clasts of porphyritic granite and Mesozoic clastic rocks, and contains lenses of sedimentary breccia and sheets of granitic megabreccia. These rocks are in turn overlain by coarse, angular conglomerate composed almost entirely of clasts of Mesozoic sandstone, conglomerate, and mudstone, most of which are unmetamorphosed and undeformed; a few clasts contain a weakly developed cleavage. Mesozoic volcanic clasts become relatively abundant toward the top of the conglomerate directly beneath a series of overlying andesite flows, one of which yielded a 16 m.y. K-Ar whole rock age (Scarborough and Wilt, 1979).

DIRECTION AND MAGNITUDE OF TRANSPORT ON THE BULLARD FAULT

Significant normal slip on the Bullard Fault is suggested by the mismatch of lithologies and structural styles across the fault. The fault juxtaposes different middle Tertiary crustal levels represented by upper-plate, high-level middle Tertiary volcanic and sedimentary rocks and lower-plate, deeper-level gneisses which have yielded middle Tertiary cooling ages. Major normal slip is also suggested by the presence of Mesozoic granitic sills and ductile fabrics in the lower plate and their general absence in the upper plate. Also, a distinctive porphyritic granite containing only Precambrian fabric is present in the upper plate, but not in the lower-plate.

For several well-documented detachment faults, tilted upper-plate units strike perpendicular to the line of transport and dip in a direction opposite, or antithetic, to the line of transport (Davis and others, 1980). If this generalization is true for the Bullard fault, then the southwest dip of upper-plate units reflects antithetic rotation during northeast transport of the upper plate relative to the lower plate. The systematic change in orientation of upper-plate units along Aguila Ridge (Figure 2), if interpreted as a large-scale drag structure, also indicates northeast transport of the upper plate (Reynolds, 1982). In addition, relative northeast displacement of the upper plate is supported by correlation of the Bullard fault with the Whipple-Buckskin-Rawhide detachment fault, which, based on various types of evidence, also displaced upper-plate rocks to the northeast relative to the lower plate (Shackelford, 1980; Davis and others, 1980).

Further evidence for large-scale northeast transport of the upper plate relative to the lower plate is contained in the upper-plate sequence of conglomerate and sedimentary breccia. Granitic megabreccia in the conglomerate is composed of porphyritic granite that is lithologically most similar to granites that occur above the Hercules thrust in the Little Harquahala and western Harquahala Mountains (Figure 1), but is completely dissimilar to any granites we have mapped in the eastern Harquahala or Harcuvar Mountains. Conglomerate that overlies the megabreccia contains large, angular clasts of unmetamorphosed Mesozoic clastic rocks that are not present in either the Harcuvar or Harquahala Mountains. Regional mapping has revealed that unmetamorphosed Mesozoic clastic rocks are present only in the Little Harquahala Mountains, western Granite Wash Mountains, and ranges farther to the west. Correlative Mesozoic sedimentary rocks occur in windows beneath regional thrust sheets in the western and southern Harquahala Mountains, but have been strongly metamorphosed. Likewise, clasts of unmetamorphosed Mesozoic volcanic rocks, which are abundant near the top of the Miocene conglomerate, have no source in the Harcuvar or eastern Harquahala Mountains, but could have been derived from Mesozoic volcanic rocks that underlie Mesozoic sedimentary rocks in the Little Harquahala Mountains. The angular nature and large size of the clasts argues against significant sedimentary transport of the clasts prior to deposition. Therefore, Mesozoic rocks in the Granite Wash and Little Harquahala Mountains, although they contain less chert grains and mudstone than the clasts in the Miocene conglomerate, represent the nearest exposed source of relatively unmetamorphosed Mesozoic rocks.

The strongest evidence for large-scale transport is the fact that the clast stratigraphy of the conglomerate appears to be the inverse of the structural and stratigraphic stacking of the Little Harquahala and Granite Wash Mountains. The stratigraphic succession in the Miocene conglomerate from granitic megabreccia to overlying Mesozoic-clast conglomerate suggests that granite originally overlay Mesozoic sedimentary rocks in the source area. The presence of granite over Mesozoic sedimentary rocks would be unusual in most geologic settings, but is precisely what is observed in the Little Harquahala and Granite Wash Mountains where Mesozoic sedimentary and volcanic rocks have been overridden by granitic rocks along the Mesozoic Hercules thrust. The upward increase in abundance of clasts of Mesozoic volcanic rocks in the Miocene conglomerate is interpreted as the result of progressive unroofing of volcanic rocks that underlie Mesozoic sedimentary rocks of the Little

Harquahala and Granite Wash Mountains.

We interpret the present-day 50-km distance between the conglomerate and the possible source rocks to be the approximate amount of transport on the Bullard detachment fault. The closest lithologic match to the clasts of Mesozoic rocks actually occurs in Mesozoic sections in the southern Plomosa Mountains, the next range west of the Granite Wash Mountains, but we do not, at present, infer that the fault has 100 km of transport. It is unlikely that Mesozoic sedimentary rocks were originally part of the highest thrust sheet in the Harquahala Mountains, because the thrust sheet and its inferred offset equivalents above the Bullard Fault are composed entirely of Precambrian and Mesozoic crystalline rocks; Mesozoic and Paleozoic sedimentary rocks are nowhere observed in the upper plate of the Bullard fault.

IMPLICATIONS

Our data indicate that detachment faults on the flanks of core complexes do have significant amounts of transport and were not formed as a result of in-situ crustal stretching of the lower plate. The restriction of penetrative mylonitic fabrics to the eastern Harcuvar and Harquahala Mountains (Figure 1) indicates that in-situ ductile distension of the lower plate, if it occurred, could not have caused more than about 15 km displacement of the upper plate relative to lower plate. We therefore conclude that most, if not all, of the northeast displacement of upper-plate rocks relative to lower-plate rocks occurred by translation above the Bullard detachment fault.

Geologic mapping and regional geologic relationships indicate that the Bullard fault does not surface to the northeast, but instead projects at depth beneath the edge of the Transition Zone and toward the Colorado Plateau (Rehrig and Reynolds, 1980; Lucchitta and Suneson, 1981; Otton, 1982; proprietary seismic reflection data). If the fault has 50 km of transport, and a corresponding original minimum down-dip extent of 50 km, then deeper segments of the fault were almost certainly within the ductile regime, even if the fault had a very gentle original dip. Lower-plate mylonitic rocks presently exposed in the easternmost Harcuvar and Harquahala Mountains would probably have been within the ductile regime at the inception of faulting and, therefore, probably represent the initial ductile phases of movement on the Bullard fault. This interpretation is supported by the top-to-the-northeast sense of shear indicated by the relationship between S and C surfaces in mylonitic rocks in the eastern Harcuvar and Harquahala Mountains. An original northeast dip of the fault zone is further supported by the restriction of middle Tertiary cooling ages to the easternmost, and therefore structurally deepest, lower-plate rocks. Our data thus reinforce those models that interpret mylonitic fabrics in core complexes as a ductile, deeper seated manifestation of low-angle normal faulting (Davis, 1983; Davis and others, 1983; Reynolds, 1984).

Restoring 50 km of movement on the Bullard fault and correlative Buckskin-Rawhide fault places the most northeasterly exposed lower-plate rocks beneath the cities of Bagdad, Congress, and Wickenburg, near the edge of the Transition Zone (Figure 4). This implies that the Harcuvar core complex, with its Mesozoic plutons, metamorphic fabrics, and thrust faults was drawn out from under the Transition zone, a region dominated in outcrop by Precambrian rocks considered by most geologists to have escaped significant Mesozoic tectonism. Restoring Mesozoic thrust sheets of the Harquahala Mountains to a position under the edge of the Transition Zone opens the possibility that a variety of rock types now exposed in the Basin and Range Province were underthrust beneath the present-day Transition Zone in the Mesozoic, only to be exhumed by detachment faulting during middle to late Tertiary crustal extension. Thrust-induced crustal thickening in the Mesozoic could have accentuated the Mogollon Highlands of Harshbarger and others (1957), a Late Triassic to Eocene uplift that is inferred to have occupied parts of the present-day Transition Zone.

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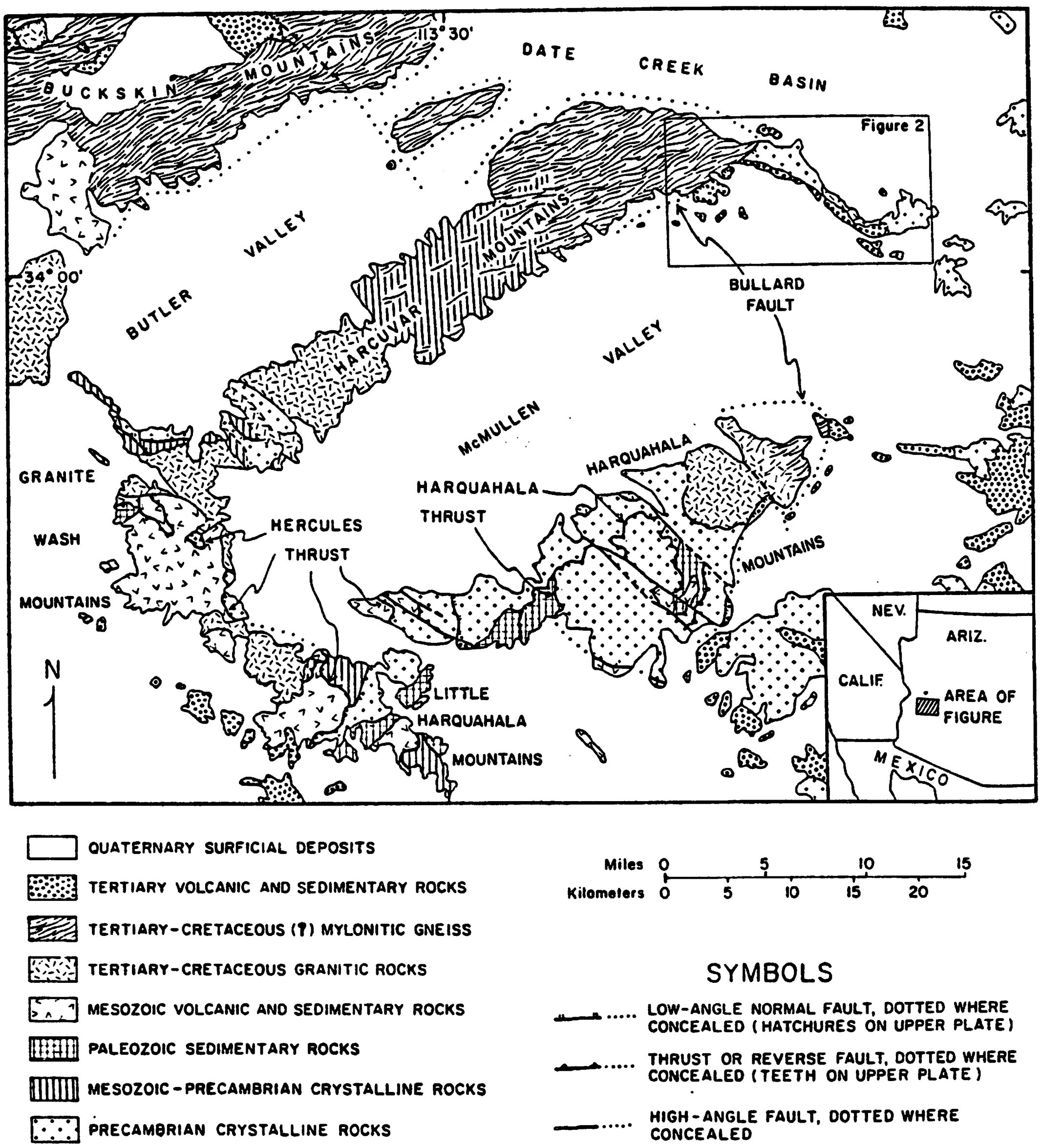
FIGURE CAPTIONS

Figure 1. Simplified geologic map of McMullen Valley area.

Figure 2. Simplified geologic map of Aguila Ridge, Bullard Peak area, and easternmost Harcuvar Mountains. Areas without pattern are Quaternary surficial deposits. See Figure 1 for location of map area.

Figure 3. Simplified geologic map of Bullard Peak area. See Figure 2 for location of map area. Fault symbols same as Figure 1.

Figure 4. Map showing distribution of pre-Quaternary bedrock exposures (stippled) and major physiographic provinces in part of western and central Arizona and adjacent California. Major faults are shown with same symbols as in Figure 1. Arrows indicate 50-km translation of lower-plate rocks necessary to restore to pre-mid-Tertiary position. Capitol letters indicate the position of the Whipple (W), Buckskin-Rawhide (BR), Harcuvar (HV), Granite Wash (GW), Little Harquahala (LH), and Harquahala (HH) Mountains.



BUCKSKIN MOUNTAINS
113° 30'
DATE CREEK BASIN
Figure 2
BUTLER VALLEY
HARCUVAR MOUNTAINS
34° 00'
BULLARD FAULT
McMULLEN VALLEY
HARQUAHALA MOUNTAINS
HARQUAHALA THRUST
GRANITE WASH MOUNTAINS
HERCULES THRUST
LITTLE HARQUAHALA MOUNTAINS
N
NEV.
ARIZ.
CALIF.
AREA OF FIGURE
MEXICO
QUATERNARY SURFICIAL DEPOSITS
TERTIARY VOLCANIC AND SEDIMENTARY ROCKS
TERTIARY-CRETACEOUS (?) MYLONITIC GNEISS
TERTIARY-CRETACEOUS GRANITIC ROCKS
MESOZOIC VOLCANIC AND SEDIMENTARY ROCKS
PALEOZOIC SEDIMENTARY ROCKS
MESOZOIC-PRECAMBRIAN CRYSTALLINE ROCKS
PRECAMBRIAN CRYSTALLINE ROCKS
Miles 0 5 10 15
Kilometers 0 5 10 15 20
SYMBOLS
LOW-ANGLE NORMAL FAULT, DOTTED WHERE CONCEALED (HATCHURES ON UPPER PLATE)
THRUST OR REVERSE FAULT, DOTTED WHERE CONCEALED (TEETH ON UPPER PLATE)
HIGH-ANGLE FAULT, DOTTED WHERE CONCEALED

Fig 1

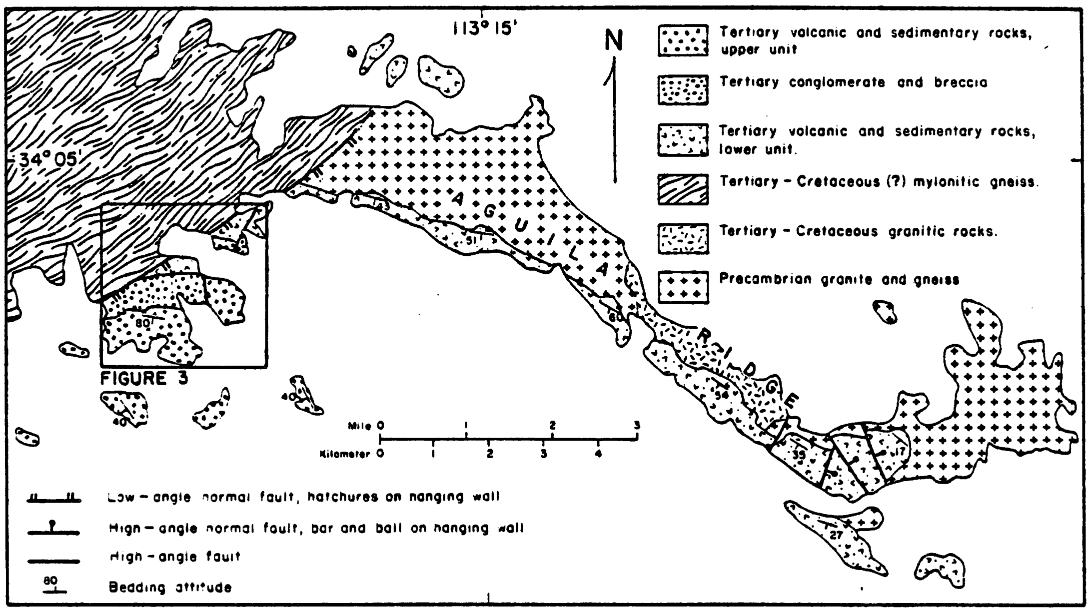

113° 15'
N
34° 05'
Tertiary volcanic and sedimentary rocks, upper unit
Tertiary conglomerate and breccia
Tertiary volcanic and sedimentary rocks, lower unit.
Tertiary - Cretaceous (?) mylonitic gneiss.
Tertiary - Cretaceous granitic rocks.
Precambrian granite and gneiss
A G U I L A
R I D G E
FIGURE 3
Mile 0 1 2 3
Kilometer 0 1 2 3 4
Low-angle normal fault, hatchures on hanging wall
High-angle normal fault, bar and ball on hanging wall
High-angle fault
Bedding attitude

Fig 2

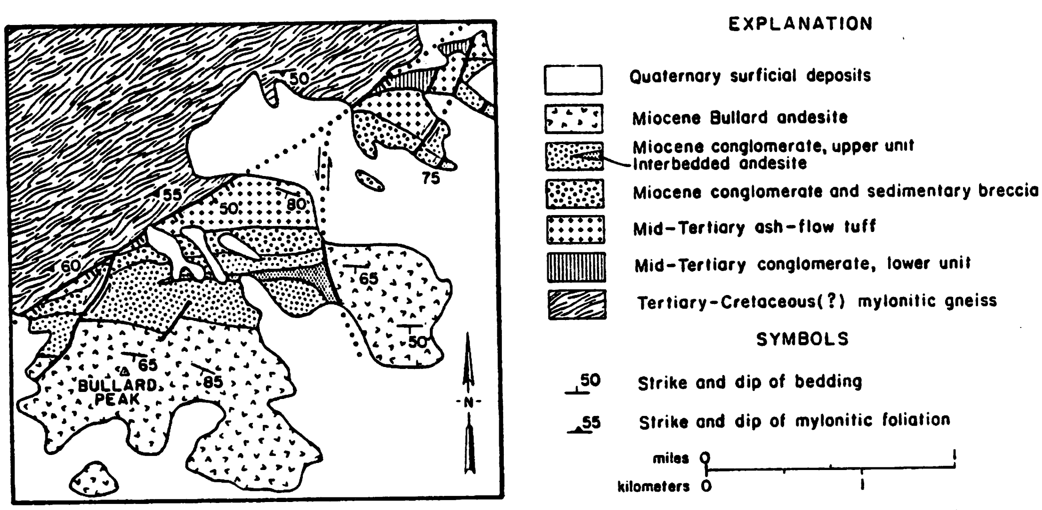

BULLARD PEAK
-N-
EXPLANATION
Quaternary surficial deposits
Miocene Bullard andesite
Miocene conglomerate, upper unit
Interbedded andesite
Miocene conglomerate and sedimentary breccia
Mid-Tertiary ash-flow tuff
Mid-Tertiary conglomerate, lower unit
Tertiary-Cretaceous(?) mylonitic gneiss
SYMBOLS
50 Strike and dip of bedding
55 Strike and dip of mylonitic foliation
miles 0 1
kilometers 0 1

Fig. 3

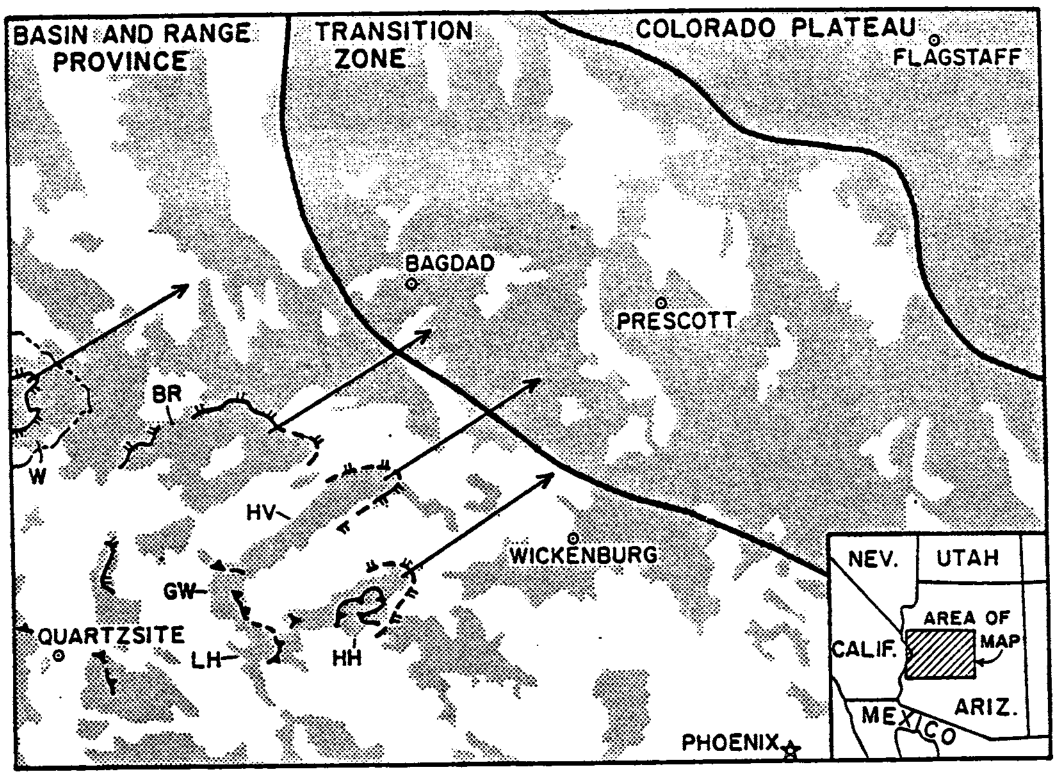

BASIN AND RANGE PROVINCE
TRANSITION ZONE
COLORADO PLATEAU
FLAGSTAFF
BAGDAD
PRESCOTT
BR
W
HV
GW
QUARTZSITE
LH
HH
WICKENBURG
PHOENIX
NEV.
UTAH
CALIF.
AREA OF MAP
ARIZ.
MEXICO

Fig 4

The University of Arizona

Department of Geosciences
Tucson, Arizona 85721
(602) 621-6024

1885

1985

A Proud Beginning

October 4, 1985

Mr. William H. Wilkinson
Nicor
Suite 12
2341 South Friebus
Tucson, Arizona 85713

Dear Mr. Wilkinson:

Much precious-metal exploration these days is directed toward gold mineralization in detachment fault terrains. I am starting research on detachment fault related mineralization as part of a M.S. thesis at the University of Arizona under the direction of Drs. Ruiz and Reynolds (Bureau of Geology and Mineral Technology). The project is a study of the regional extent of potassium metasomatism, trace element mobility and bulk chemical changes accompanying fluid flow along the Bullard detachment fault. The study area includes the Bullard district which produced 610,000 lbs. of copper, 6,000 oz. of silver and 3,600 oz. of gold.

This study will attempt to constrain the regional extent of hydrothermal circulation in a detachment terrain by studying the regional extent of potassium metasomatism as well as constrain the source of the chemical components and characterize chemical changes occurring as a result of mineralization. An understanding of these processes will greatly aid in exploration for mineral deposits in detachment terrains and, in addition, make a significant scientific contribution.

My research will require a modest amount of funds for chemical analyses, thin sections, and travel (see attached budget). If your company is able to partially or fully support this research, I would be greatly appreciative. For the sake of brevity, I have included only a short summary of the proposed research for your information. I would gladly add information to the proposal if you would like me to. Thank you for your consideration of this matter.

Sincerely,

Michael Roddy

Michael Roddy

jo
Enclosure

INTRODUCTION

Western Arizona is characterized by low-angle, normal-slip faults known as detachment faults which are associated with mylonitization, chloritic brecciation, and mineralization. Recently strong potassium metasomatism has been recognized at Picacho Peak by Brooks (1985) who noted K_2O values as high as 11 wt. %. In addition to Picacho Peak, Chapin and Glazner (1983) mention several areas of potassium metasomatism such as the Cady, Rincon, and Whipple Mountains. Both Lindley and others (1983) and Chapin and Glazner (1983) report metasomatized rocks with K_2O as high as 13 wt. % with the virtual elimination of Na_2O. A geochemical traverse in the upper-plate volcanic rocks above the metamorphic-core-complex-related detachment fault revealed that K_2O content decreases with distance from the core-complex related detachment fault (Brooks, 1985). The potassium distribution together with trace element evidence such as As and Zr decreasing with Li increasing with distance from the fault led Brooks (1985) to theorize that the rocks were altered by hydrothermal fluids circulating along the detachment fault. This is not the only possibility for potassium alteration. Chapin and Lindley (1985) argue for a diagenetic origin for the potassium metasomatism in various igneous units in the Socorro, New Mexico area because of the great areal extent of the potassium metasomatism, its subtle nature, simple mineral assemblage, enrichment in ^{18}O and location in a rift basin. While the potassium alteration is chemically distinctive and might be important in exploration, it is subtle and easily overlooked in the field and in thin section (Chapin and Glazner, 1983).

PROPOSED RESEARCH

The Harcuvar Mountains are in west-central Arizona located in a terrain characterized by detachment faulting. In the eastern Harcuvar Mountains, the Bullard detachment fault separates lower-plate mylonitic gneiss from upper-plate middle Tertiary volcanic and sedimentary rocks. Upper-plate tuff units of trachytic geochemical character and a reddish-brown conglomeritic sandstone both of regional extent with the units exposed adjacent to the fault and up to 11 km away from the fault are ideal for a study of the extent of potassium metasomatism associated with the Bullard detachment fault.

The relationship of mineralization and potassium metasomatism to the processes of mylonitization, chloritc alteration, and brecciation will be examined to constrain the origin of the mineralizing and chemically altering fluids.

In addition to constraining the regional extent of hydrothermal circulation related to detachment faulting, it is hoped that diagnostic trace element concentrations or patterns will define mineralization such as at the Bullard mine.

METHOD OF TREATMENT

Potassium metasomatism will be tested by taking 16 or more samples from the two tuff units and from a conglomeritic sandstone unit along an 8-10 km traverse away from the detachment fault. A trachytic welded ash-flow tuff (Ttm) with a reddish-brown color is one of the tuff units with the other being a tan or buff colored, lithic ash-flow tuff (Ttu) (Reynolds and Spencer, 1984). The other unit to be sampled is a reddish-brown arkosic conglomerate and comglomeritic sandstone (Tcl) (Reynolds and Spencer, 1984).

Sampling the tuff units and the conglomeritic sandstone along an 8-10 km traverse away from the fault will characterize the regional extent of the potassium metasomatism. Chapin and Glazner (1983) noted that potassium metasomatism tends to homogenize volcanic sections of diverse composition. Therefore, sampling the Bullard andesite will document the effect of the potassium metasomatism on another rock type. Six or more samples of the Bullard andesite will be taken from near the detachment fault to 4-6 km away from the detachment fault. The included sandstone members will also be sampled.

A lower-plate traverse collecting 4-6 samples will be done in the South Mountains where the sequence from unaltered granodiorite through mylonitic foliation to chloritic breccia is well exposed. This lower-plate traverse will test the theory that chloritic alteration, mylonitization and brecciation released the potassium and base and precious metals found in ore deposits such as are in the Bullard district. The basis for this theory is that many trace elements, gold in particular, have a high migration capacity because in the case of gold the metal is usually not in isomorphic replacement sites, but rather the metal occurs in microfracture and other discontinuities in minerals from which it is readily mobilized (Boyle, 1979).

Whole rock analysis will be done on the samples collected and the samples will be analyzed for the trace elements As, Sb, Cu, Au, Ag, Zr, Rb, Ba, Pb, Zn, Sr, Mn, Li and Bi. Samples for thin section study will be collected at locations where samples for whole rock and trace element analyses are gathered. These thin section samples will be examined to see the mineralogical manifestations of the potassium metasomatism and effects of the hydrothermal fluid.

BUDGET

Funds for whole rock analyses which will be done by X-Ray Assay Labs of Don Mills, Canada at a cost of $14 each are requested. Trace element analyses will be done with AA or INAA facilities existing at the University of Arizona at no cost to your company. Funds for thin sections at a cost of $9 each are also requested. In addition to the above items, funds for three round trips traveling from the University of Arizona to the field area are desired. Expenditures are as follows:

Item	Cost
32 thin sections — $9/section	$ 288
32 whole rock XRF analyses major elements — $14/analysis	448
Transportation to field area at $0.20/mi	300
	$1036

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GEOLOGIC MAP OF THE AGUILA RIDGE - BULLARD PEAK AREA, EASTERN HARCUVAR MOUNTAINS, WEST-CENTRAL ARIZONA

Stephen J. Reynolds and Jon E. Spencer
Arizona Bureau of Geology and Mineral Technology

Arizona Bureau of Geology and Mineral Technology
Open-File Report 84-4

1984

This report is preliminary and has not been edited or reviewed for conformity with Arizona Bureau of Geology and Mineral Technology standards.

POST-DETACHMENT DEPOSITS

Qs - Quaternary surficial deposits

ROCK UNITS ABOVE THE BULLARD DETACHMENT FAULT

Ts - sedimentary rocks (lower Miocene); includes sandstone, siltstone, and conglomerate

Tba - Bullard Andesite (lower Miocene); ss - sandstone interbeds

Ta - andesite (lower Miocene to upper Oligocene); interbedded with or intruded into unit Tc

Tc - upper conglomerate (lower Miocene to upper Oligocene); mostly composed of large, angular clasts of Mesozoic clastic rocks

Tcb - conglomerate and sedimentary breccia (lower Miocene to upper Oligocene); composed of the following units from bottom to top: (1) lower conglomerate of well rounded clasts of quartzite, possibly derived from Precambrian Mazatzal Quartzite of central Arizona; (2) sedimentary breccia and megabreccia landslide blocks of shattered porphyritic granite; and (3) conglomerate composed of clasts of Mesozoic clastic rocks and granitic rocks

Tvc - volcaniclastic and volcanic breccia (upper Oligocene)

Tt - welded ash-flow tuff (upper Oligocene); subdivided on Aguila Ridge into the following units:

Ttu - upper, lithic ash-flow tuff; commonly gray, tan, or buff colored

Ttm - middle, trachytic, welded ash-flow tuff; reddish-brown color; unit includes several distinct welded ash-flow tuffs with local vitrophyres and nonwelded intervals

Ttl - lower, rhyolitic(?) tuff; greenish gray with numerous lithophysae

Tvs - volcaniclastic sandstone (upper Oligocene); locally present between Ttm and Ttu

Tcl - arkosic conglomerate and conglomeratic sandstone (Oligocene?); reddish brown color; composed of granitic and metamorphic pebbles to boulders in an arkosic matrix

d - rhyolite to quartz latite dikes (Upper Cretaceous or Tertiary?)

Tkg - muscovite granite (Upper Cretaceous or Lower Tertiary); medium-grained, equigranular with 2-3 percent muscovite and minor biotite and pale red garnet

Kg - granite and granodiorite (Upper Cretaceous); medium- to coarse-grained, equigranular, with 2-3 percent biotite and minor hornblende; biotite from this unit yielded a late Cretaceous K-Ar age (J. Kirkwood, 1977, oral communication, CONOCO Minerals)

P€g - porphyritic granite (Precambrian); medium- to coarse-grained with 15 to 20 percent K-feldspar phenocrysts 0.5 to 3 cm long in a matrix of plagioclase, quartz, and biotite; commonly foliated

P€m - metamorphic rocks (Precambrian); composed of compositionally banded quartzofeldspathic gneiss and biotite schist; local quartz-rich schist, muscovite-biotite schist, and medium- to fine-grained granofels; crystalloblastic foliation parallel to compositional layering.

ROCKS BELOW THE BULLARD DETACHMENT FAULT

Tcb - chloritic breccia (middle Tertiary); derived from TKm

TKm - metamorphic and mylonitic rocks (Upper Cretaceous to middle Tertiary); derived from Precambrian metamorphic and plutonic rocks and Upper Cretaceous to Tertiary granitic rocks

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"A GEOLOGIC INVESTIGATION OF THE BULLARD MINE, AGUILA, ARIZONA"

Knoxie C. DeLise

October, 1981

The following Geological report was prepared for NRG Resources by KNOXIE DE LISE on patented claims which adjoin the 166 claims owned by MICHAEL SANSONE.

This report and test samples extend into the claims controlled by Sansone.

Plate One, at the end of the report, shows that the highest reported gold content was assayed from samples #135 and #136. These two samples came from Sansone claims.

PROFESSIONAL STATEMENT

I, Knoxie C. DeLise, do hereby certify in the County of San Diego, California, that:

1. This report was prepared for NRG Resources, Ltd., and that I have no interest in NRG Resources, Contract Mining Corporation or Brunyan Resources, Ltd. I also certify that I will not in the future receive any interest in these companies.
2. This report is based on my personal examination of the Bullard Mine patented mineral claims.
3. I hereby certify that I hold neither direct nor contingent interest in NRG Resources Ltd., Contract Mining Corp. or Brunyan Resources Ltd.
4. I am a consulting geologist with a business address at 9043 Harmony Grove Road, Escondido, California 92025.
5. I am a graduate of the University of California, Berkeley, with advanced degrees in the geological sciences in 1955 and 1957.
6. I am a duly registered and licensed professional geologist and a member in good standing of the Society of Mining Engineers, the American Association of Petroleum Geologists, The Society of Economic Paleontologists and Mineralogists and other professional associations.

PROFESSIONAL STATEMENT (continued)

7. I have practiced my profession for more than 20 years.

8. Consent is hereby granted to NRG Resources Ltd., to reproduce all of this report with or without plates, figures or appendices.

Dated in the City of Escondido, County of San Diego, California

this *24th* day of *October*, 1981

Knoxie C. DeLise

Reg. Geol. No. 2118

REGISTERED GEOLOGIST K. C. DE LISE No. 2118 STATE OF CALIFORNIA

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ABSTRACT

The Bullard Mine consists of 26 lode claims in southwest Yavapai County, Arizona. The outcrop exposures are visible in the foothills adjacent to, and southeast of the Harcuvar Mountain Range.

Economic conditions have controlled mining at the Bullard since the late 1800's. Subsequently, such mining has been intermittent with probably 10,000 to 20,000 tons having been extracted up to 1970.

The area consists of Paleozoic clastic strata and limestones, possibly of Devonian or Mississippian age, intruded by thick diabase sills, all of which have been rotated to vertical. The diabase appears to be Late Cretaceous or Early Tertiary and is related to the Laramide orogeny. Mineralization is expressed as silicates, carbonates, oxides and phosphates of copper with small quantities of associated gold and silver, as well as sulphides. This mineralization appears in faults, shear zones, fissures and some bedding planes and pre-dates the major, Late Cretaceous orogenic movements. Bullard mineralization occurrence is seen as intrinsically related to the diabase intrusive. Tertiary faulting has subsequently superimposed a complex structrual pattern upon these beds.

Mineralized zone reserves are calculated as: 40,000 tons (measured), 72,693 tons (indicated) and 612,643 tons (inferred). Average assays show .22 oz/ton gold, 0.23 oz/ton silver and

about $144.00 per ton gross (using $450.00 per ounce gold, $10.00 per ounce silver and $.70 per pound copper.

The implied gross value of the mineralized zones is calculated on a total of 725,336 tons with the resulting figure being $104,450,000.00.

Treatment procedures of Bullard potential ore are still being studied but early test results indicate crushing to minus 40 mesh with gravity separation to reach 95 to 97% recovery of all sulphides. This would be followed by acid copper leach processes.

2. INTRODUCTION

A. Location

The Bullard mining claims are situated in the Pierce Mining District of southwest Yavapai County, Arizona, 11 miles north of Aguila. The town of Aguila, with a population of around 1000, is on the Santa Fe Railroad, 25 miles west of Wickenburg and 80 miles west-northwest of Phoenix (see figure A).

All-year highways (U.S. 60 and Ariz. 71) reach Aguila with most services available there or in Wickenburg. Roads from Aguila to the claim area are good but can be impassible for a few days after seasonal rains. Adequate water is available for mining purposes from several wells on and near the property and in abandoned shafts.

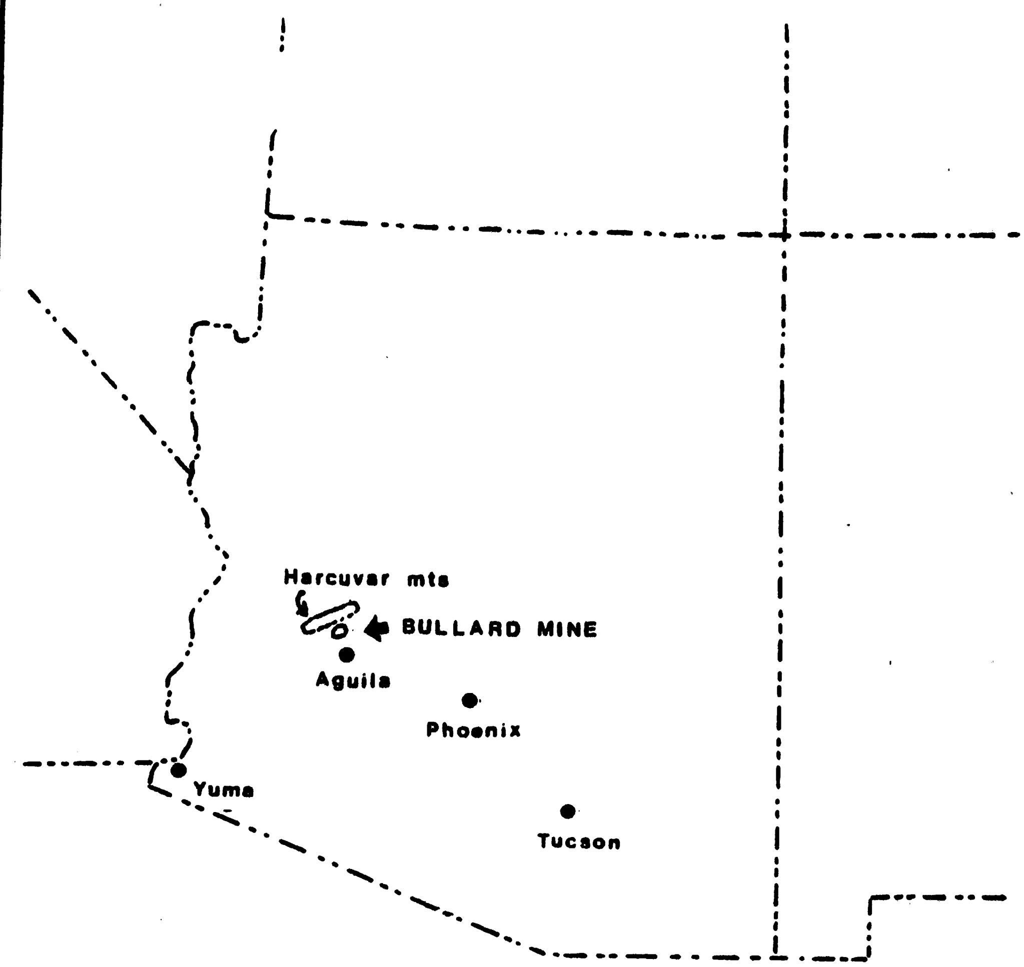
B. Area of Interest

The Bullard Mine is at an altitude of about 3000 feet. There are 26 lode claims which occupy a total area of 537 acres (0.84 square miles or 2.17 square kilometers).

A reconnaissance geologic map was completed in January of 1981 overlaying the claim area in particular and although time limited the detail of mapping, contiguous surrounding features were also investigated and mapped. The total resultant map area covers 3.3 square miles or 8.5 square kilometers (see Plate 1,2).

C. The Claims

The claim boundaries are outlined on Plates 1 and 2 and are identified as follows:



LOCATION MAP ARIZONA

FIG. A

CLAIMS

1. North Extention
2. Augustus
3. South Wing
4. Sulla
5. Chancellor
6. Amazon
7. Newborn
8. Napoleon
9. Venice
10. Jay Bird
11. Nevada
12. Producer
13. Butte
14. Rattler
15. Emily
16. Steller
17. North Star
18. Homestake
19. Washington
20. International
21. Sweep Stake
22. Avalanche
23. Last Bean
24. Democrat
25. Arizona
26. State

3. PAST WORK

The Bullard property has been optioned to various groups and individuals through the years and a complete chronology is beyond the scope of this report. However, the reader is referred to the appendix where some of the documents have been reproduced. At least one company, Powdered Metals Corporation (PMC), churn-drilled several holes on the claims from 1969 to 1970. Some of the holes are shown on plate 1. Unfortunately, the information and data from the PMC drilling is, so far, not available. Powdered Metals Corporation went into bankruptcy in 1973 or 1974.

The Bullard Mine has a long history of intermittent operation since the late 1800's. It is known that a smelter was built around 1887 and according to Durfee (report undated; p. 1) worked for a short period. The ruins of the smelter are visible today and are noted on the map (see plate 1,2). Durfee also mentions that the coke needed for this smelter was hauled by horse and wagon from the nearest railhead at Maricopa, 100 miles distant. The Bullard family patented the property in 1907.

Later operators and promoters of the Bullard property have reported copper concentrations at around two to three percent with small amounts of gold and silver. In 1950, ASARCO mapped and evaluated the main mineralized horizon, assaying 43 samples for an average concentration of 0.25 oz/ ton Au, 0.50 oz/ton Ag and 2.67% copper.

Shipping records are sparse but workings suggest that probably no more than 10 to 20 thousand tons were shipped before Contract Mining Corporation took over in November of 1979. CMC began mining the property in 1980 and has shipped some 4,000 tons to date. Development is now continuing with NRG Resources Ltd. of Canada and Contract Mining Corporation of Yuma, Arizona.

4. GENERAL GEOLOGY

A. Introduction

The Bullard area is adjacent to the Harcuvar Mountains, the latter of which is a Late Cretaceous or Early Tertiary metamorphic-igneous complex (Reynolds, 1980). The Harcuvar Range is about 35 miles long, trending northeast-southwest. The area of investigation in this report is an east-west trending series of vertical or near vertical sedimentary strata intercalated with thick sills of olivine diabase and possibly some extrusive volcanic beds.

The sedimentary strata are siliceous limestones, metashales and sandstones, probably Devonian or Mississippian in age. The limestones and sandstones are very well indurated, altered by low rank metamorphism and forming high ridges due to their resistance to erosion. Not all the high resistant ridges here are siliceous limestones or sandstones; some of these features are diabase.

Diabase commonly and frequently weathers to low profiles rather readily as seen in other areas such as the Globe-Miami district of central Arizona. Such weathering to subdued topography is seen in the Bullard area. Bullard Peak itself, the highest resistant diabase is probably the consequence of juxtapositioning by faulting or by variable mineralogy or both.

B. Lithology

a. The Diabase

Mapping in the area has revealed the pervasive relationship of a Late Cretaceous or Early Tertiary mafic olvine diabase intrusion as sills into a series of Paleozoic clastic sedimentary strata.

The diabase is gray to dark gray, often with a greenish hue. It ranges from very coarse grained to aphanitic. As is common in diabase texture, the plagioclase laths are as much as 20 milimeters in length. Poikilitic augite (and hornblende?) in spheroidal to very irregular masses up to several inches long occur as rounded inclusions and curious, unusual shapes (not unlike a coarse porphyritic texture). These often weather out intact and appear as spheroidal "kernels" and rounded, marble-like shapes. Similar diabase texture occurs near the Globe-Miami and Superior areas (Peterson, 1962).

Dark brown augite is abundant in the groundmass and is frequently poikilitically arranged with secondary quartz rim. Euhedral calcite is also noted as "poikiliths". It is not clear whether these calcite crystals are deuteric or metasomatic in origin. Their presence within the mineralized zones suggests that they are probably metasomatic in orgin. Poikilitic and trace olivine is also common as light, bottle green, divergent, acicular crystals, comprising up to 5% of the rock or more. Differentiation of olivine crystals is more concentrated in the lower portions or floors of the thicker sills in the Bullard area. This is a classic example of elutriation or magmatic differentiation of olivine in a theoleiitic diabase sill such as manifest in the Palisades of New York.

b. The Siliceous Sandstones

The sandstones are buff to reddish, thin-bedded to massive from 10 to 100 feet in thickness. These strata are fine to medium grained, argillaceous, very siliceous, often calcareous, locally with stringers of pebble conglomerate and poorly sorted grits. They are very hard, dense and have been subjected to low to moderate metamorphosis and much secondary crystallization. Quartz and feldspar grains are often subrounded, angular to subangular in coarser grained beds.

c. The Meta-shales

The denser, aphanitic texture of the meta-shales are noted in what appears to be an easterly facies change of the coarser sediments found to the west. These meta-shales are often calcareous, very siliceous and have undergone considerable metasomatic change along with low-rank metamorphism. The shales are gray to dark gray, hard and are fissile to blocky. The rock becomes more abundant and more pronounced from west to east as well as higher in the sections, possibly indicating a deepening (facies) of the offshore basin and also a deepening of the basin with time.

These so-called meta-shales are so fine grained and aphanitic that it is impossible to know the mineralogy in the hand specimen. There certainly exists the possibility that some of the rock types referred to as meta-shales may be in fact, extrusive igneous or welded tuffs. Thin-section examination should identify these in a more positive way.

d. The Conglomerate

Conglomerates were noted in the eastern portion of the mapped area. In general they are gray to dark gray, calcareous, argillaceous to arenaceous, often siliceous with angular to subangular pebbles and cobbles to 6 inches. Some pebbly conglomeratic seams are noted in the more arenaceous members (sandstones). The beds are highly altered, fractured and faulted with calcareous seams throughout. The rock is so changed in many places that much of its original structure is lost. The angular to subangular inclusions are suggestive of a breccia. However, the beds are often wide and regular so that brecciation cannot be confirmed.

C. Structure and Stratigraphy

During the Paleozoic a very shallow basin of deposition existed in the Bullard Peak area. Sedimentation was intermittent and beds were probably deposited upon truncated Pre-Cambrian metamorphic strata which is common in adjacent areas and those of southwest and central Arizona. Sedimentation was interrupted from time to time in this shallow basin causing disconformities at several horizons. This phenomenon has not been investigated in the course of preparation of this report.

During Cambrian to Pennsylvanian time to the northwest of the State of Arizona, northward from southern Nevada, there existed the southeastern limits of the Cordilleran Geosyncline and in southeastern Arizona and southwestern New Mexico we note the northwestern limits of the Sonoran Geosyncline. The area between these two basins of deposition is referred to as Mazatzal Land which was a shelf inundated periodically by marine waters from Cambrian to Mississippian time (see figures 1, 2).

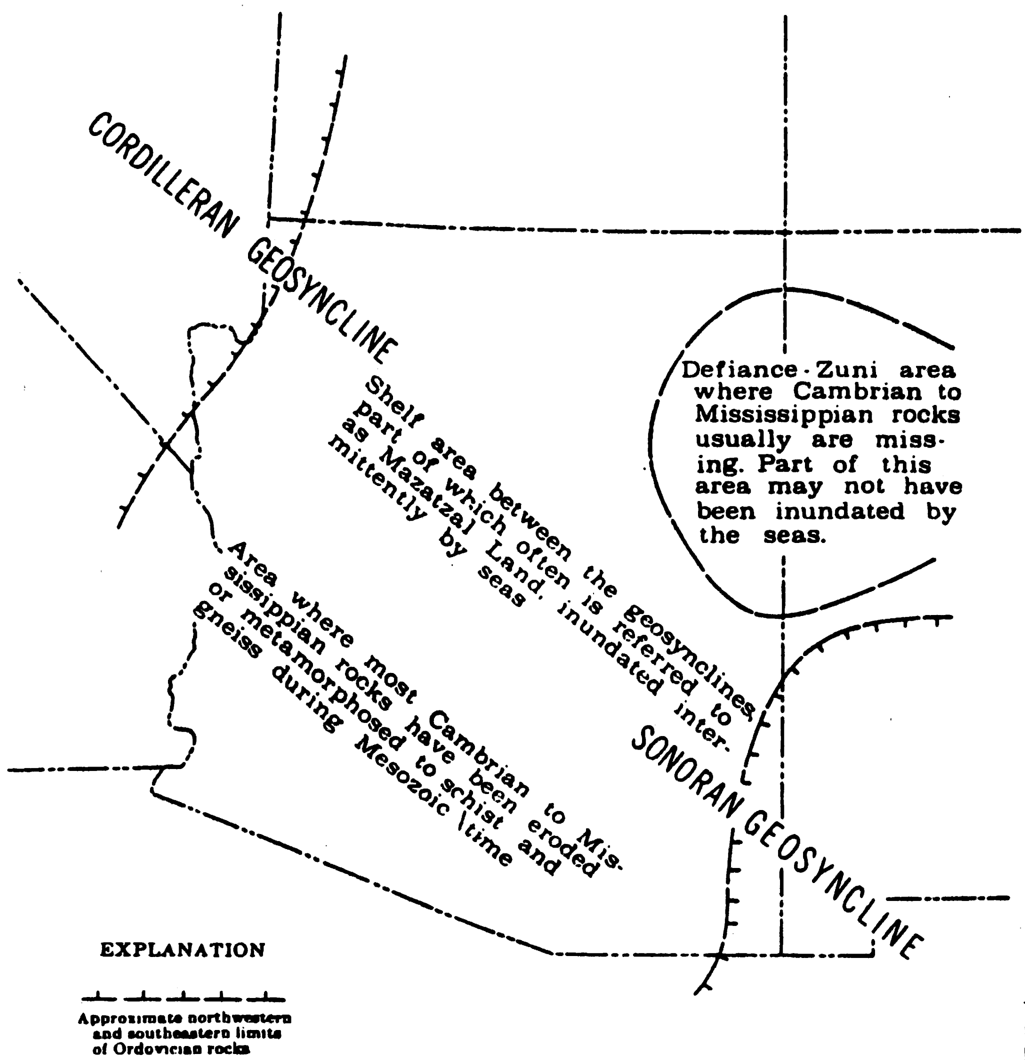


Figure 1. Cambrian to Mississippian time

Early development of the Paleozoic Cordilleran and Sonoran geosynclines.

Arizona Geol. Soc.
1967

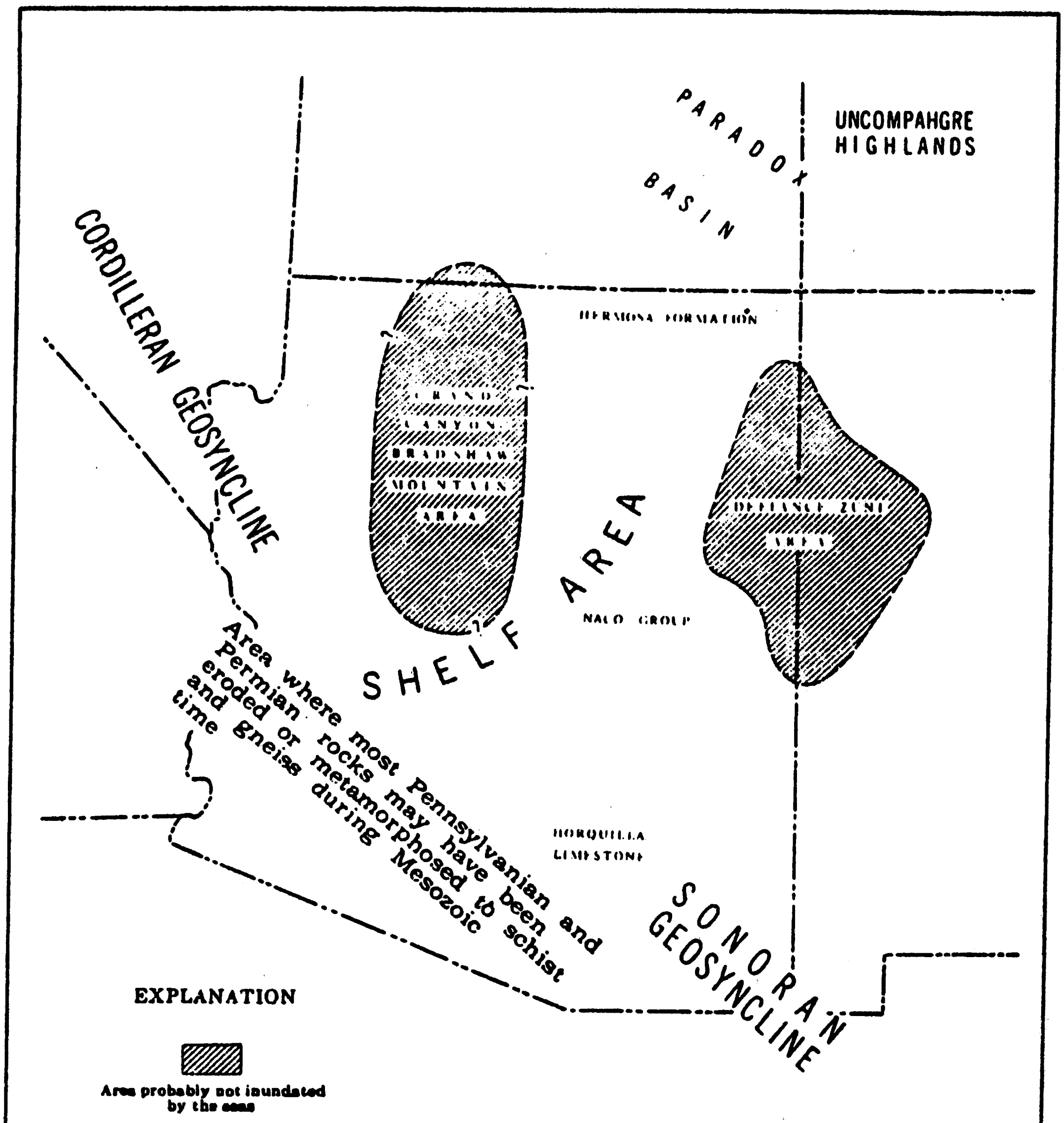


Figure 2. Pennsylvanian time

Late development of the Paleozoic Cordilleran and Sonoran geosynclines accompanied by rise of the Uncompahgre Highlands and subsidence of the Paradox basin.

Arizona Geol. Soc.
1967

It is believed little tectonic activity occurred during the early Paleozoic in this area except for limited hiatus and subsequent disconformities due to broad upwarping. Regional uplift continued to affect the shallow seas during the Pennsylvanian period and ultimately caused complete regression. Instability continued into the Late Triassic with volcanism and igneous intrusions establishing the primordial Mogollon Highlands in southwest Arizona (see figures 3, 4). During this time, Pennsylvanian and Permian rocks, if they ever were deposited, may have been eroded or metamorphosed or both. The Larimide orogeny began to severely disturb existing Bullard Paleozoic strata in Late Cretaceous and/or Early Tertiary time (see figures 5, 6). So large a phenomenon, this major orogeny affected the entire western North American scene. Intense orogenic activity began with the relatively shallow emplacement of large quantities of mafic, diabase intrusives between strata. This interjection of igneous rock must have induced considerably normal faulting and shear zones across the still relatively flat-lying sedimentary beds of the Bullard section. It is very probable that mineralization at the Bullard Mine was coupled with this intrusion, as it is with porphyritic intrusive rocks noted at large Arizona Copper deposits elsewhere. Deuteric solutions must have played a role, as they and their potent vapors breeched the integrity of the sedimentary beds in shear zones, faults and other zones of weakness. It

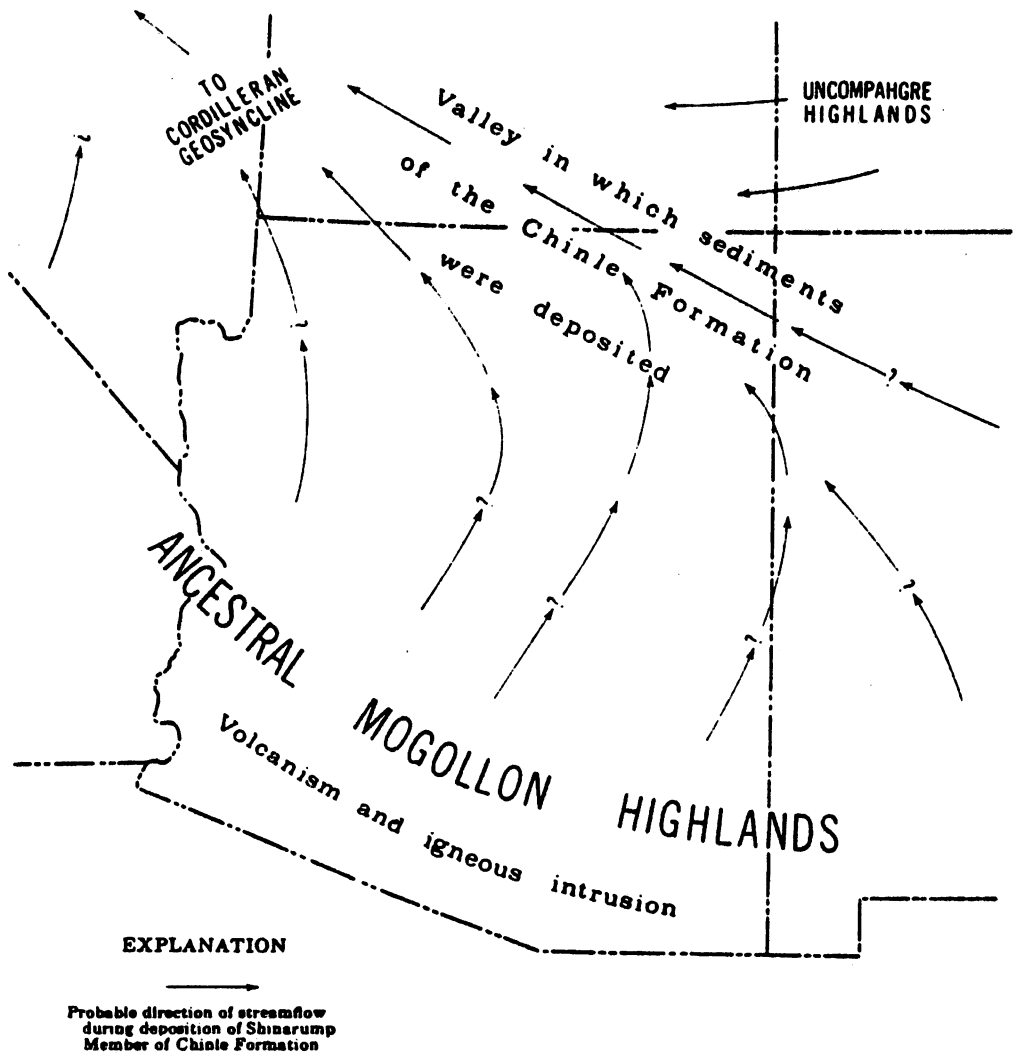


Figure 3. Late Triassic time

Waning stage of the Cordilleran geosyncline and uplift of the Uncompahgre and ancestral Mogollon Highlands.

Arizona Geol. Soc. 1967

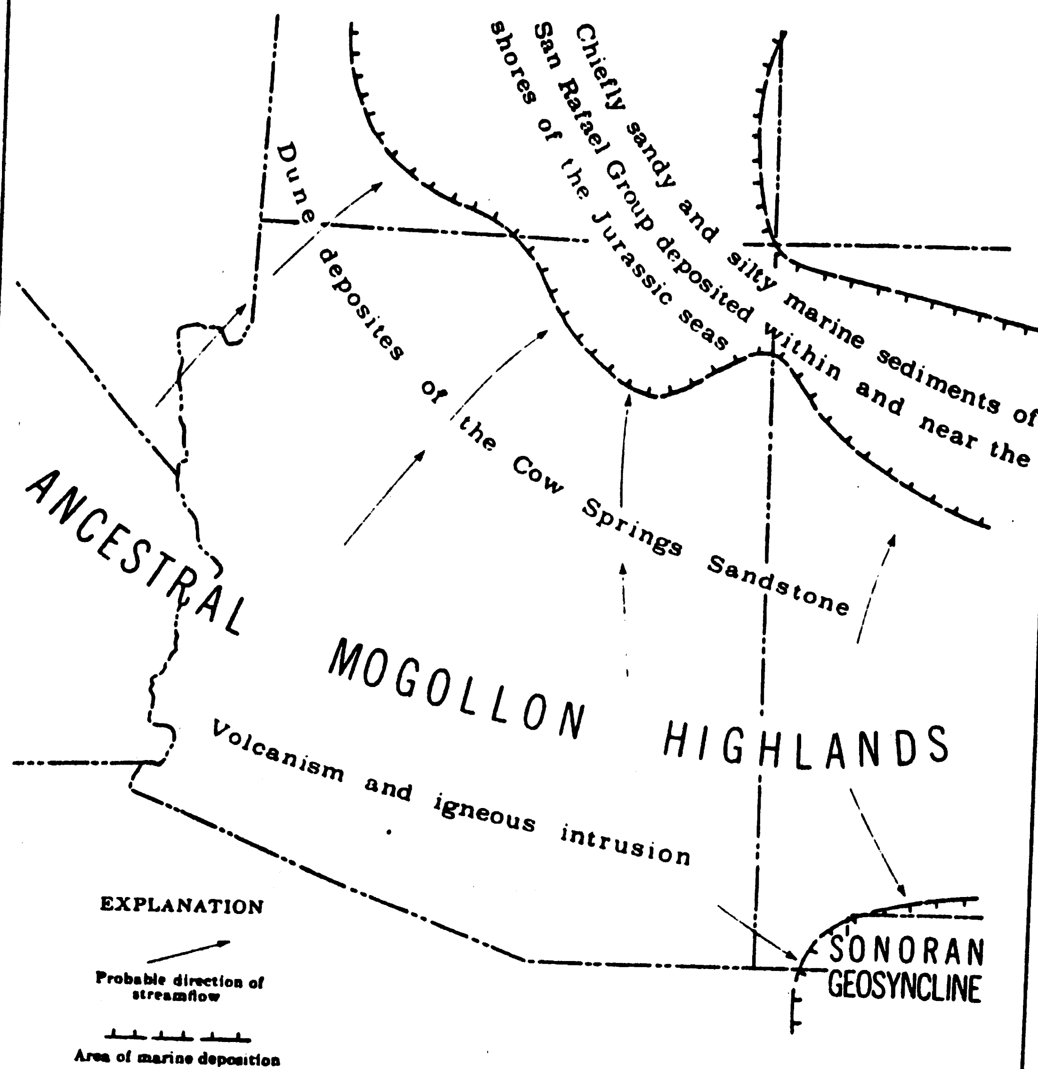


Figure 4. Late Jurassic time
Maximum extension of the Jurassic seas.
Arizona Geol. Soc.
1967

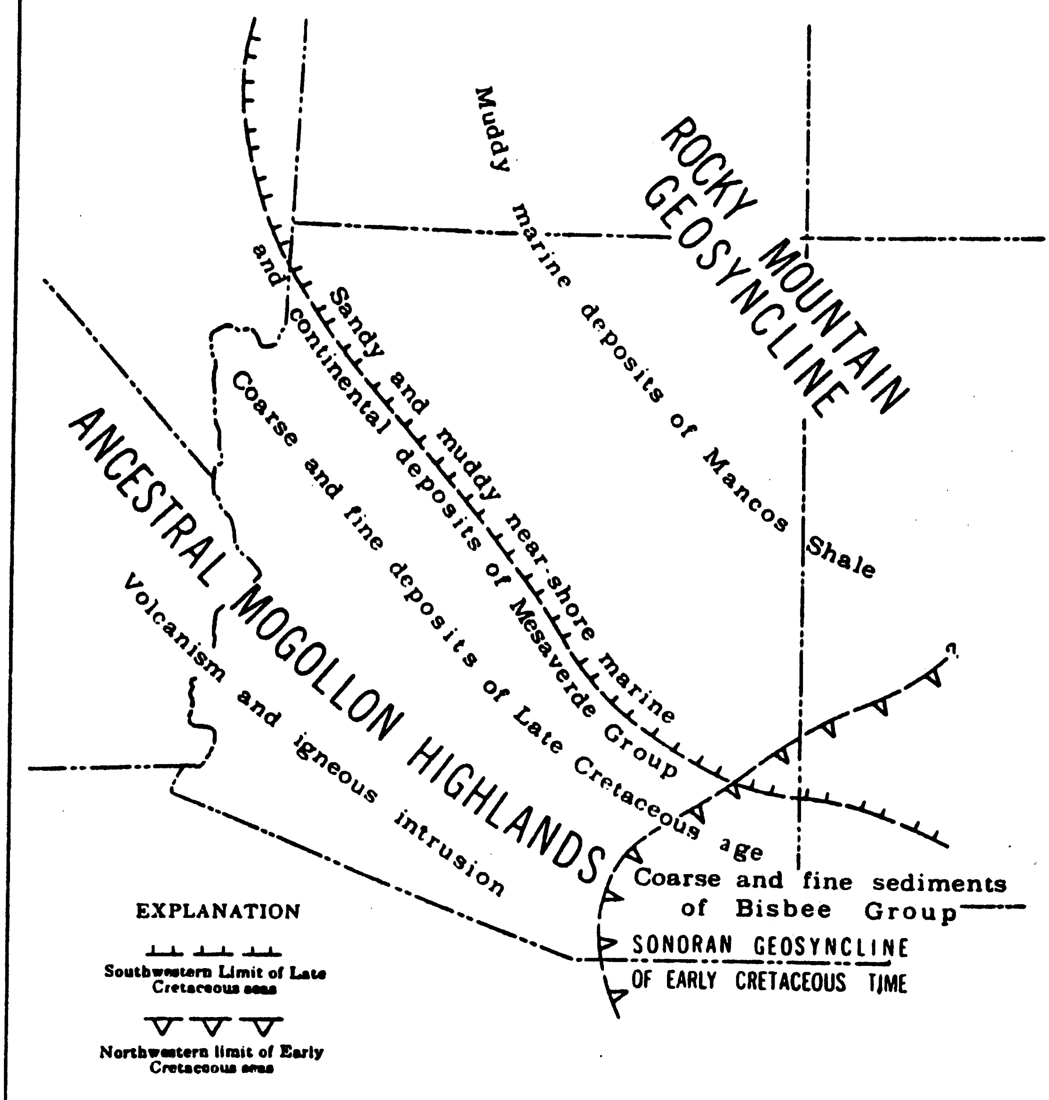


Figure 5. Cretaceous time

Extension of Sonoran geosyncline and maximum development of the Rocky Mountain geosyncline.

Arizona Geol. Soc.
1967

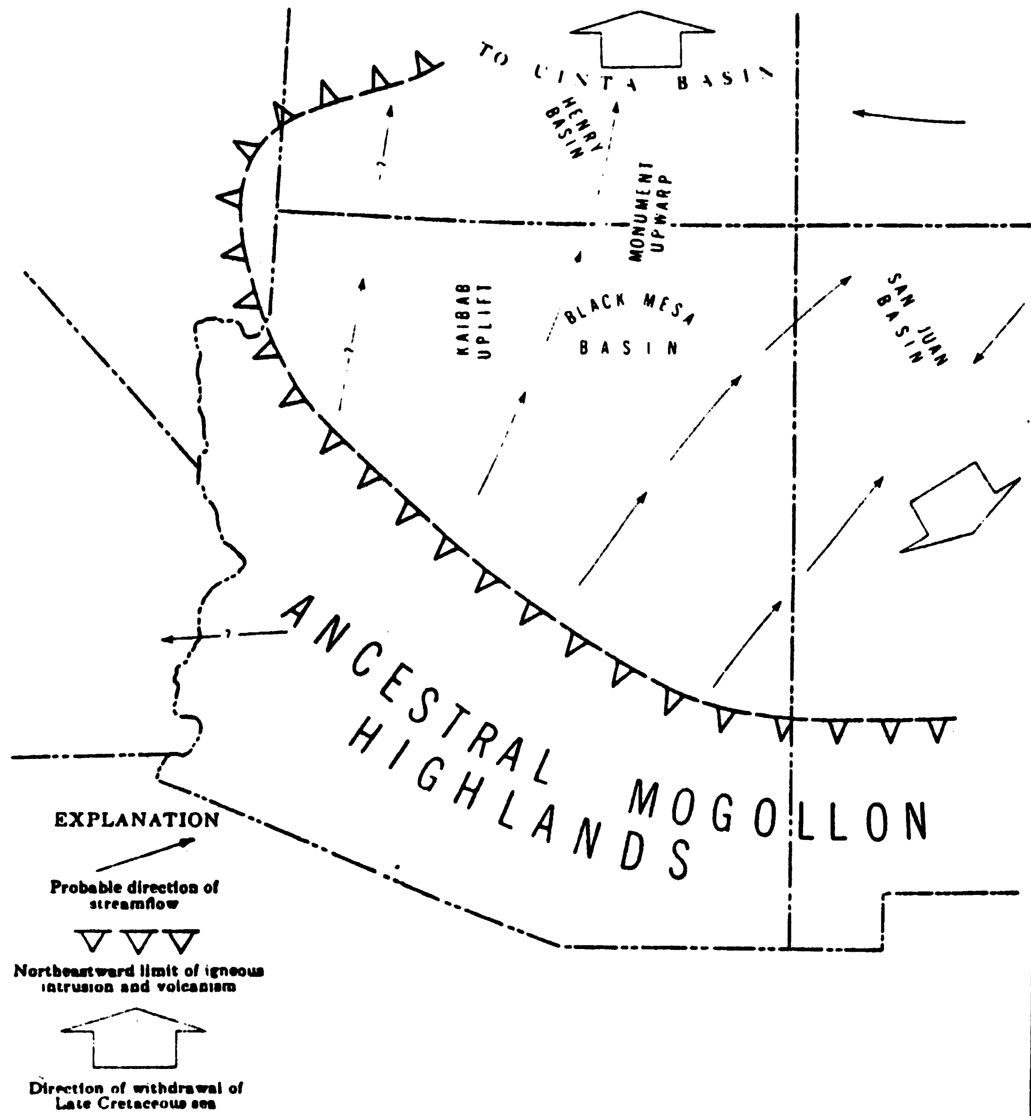


Figure 6. Late Cretaceous and early Tertiary time

Regional warping that accompanied Laramide orogeny caused withdrawal of seas.

Arizona Geol. Soc.
1967

is suspected that it is within this environment that deposition of hypogene copper, gold, silver sulphides and other mineral species and compounds occurred. The lowering of temperature and pressure in such an environment could have triggered the deposition and mineralization of such zones.

As the Laramide orogeny developed, the Bullard Peak Paleozoic strata, solidified diabase sills and mineralized zones and veins began their listric rotation to vertical from relatively low-dipping attitudes (see figure 6).

Volcanism and igneous intrusions continued throughout the Late Cretaceous and Early Tertiary but by middle Tertiary time the major uplift had already been completed and formation of the Basin and Range province had begun. (see figures 7, 8).

Teriary faulting then further dissected the steeply dipping sedimentary series with its contained diabase sills. Major offsets of mineralized fissure zones also occurred during the Tertiary. However, primary mineralization is neither found along nor within these Tertiary structural features.

5. ECONOMIC GEOLOGY

A. The Mineralized Zones

Mineralization in the Bullard area is confined mainly to faults, fissures and shear zones. There appears to be no primary mineralization of any consequence in structural features younger than Late

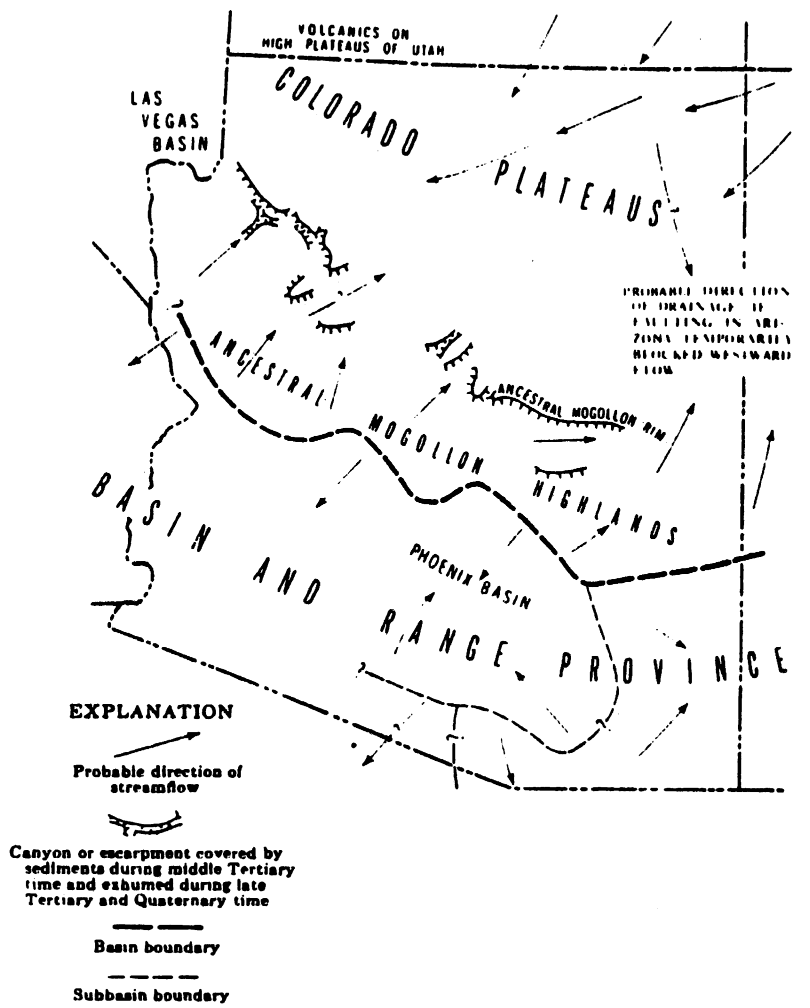


Figure 7. Middle Tertiary time

Beginning development of the Basin and Range and Colorado Plateaus physiographic provinces and the Colorado River system on the Colorado Plateaus.

Arizona Geol. Society
1967

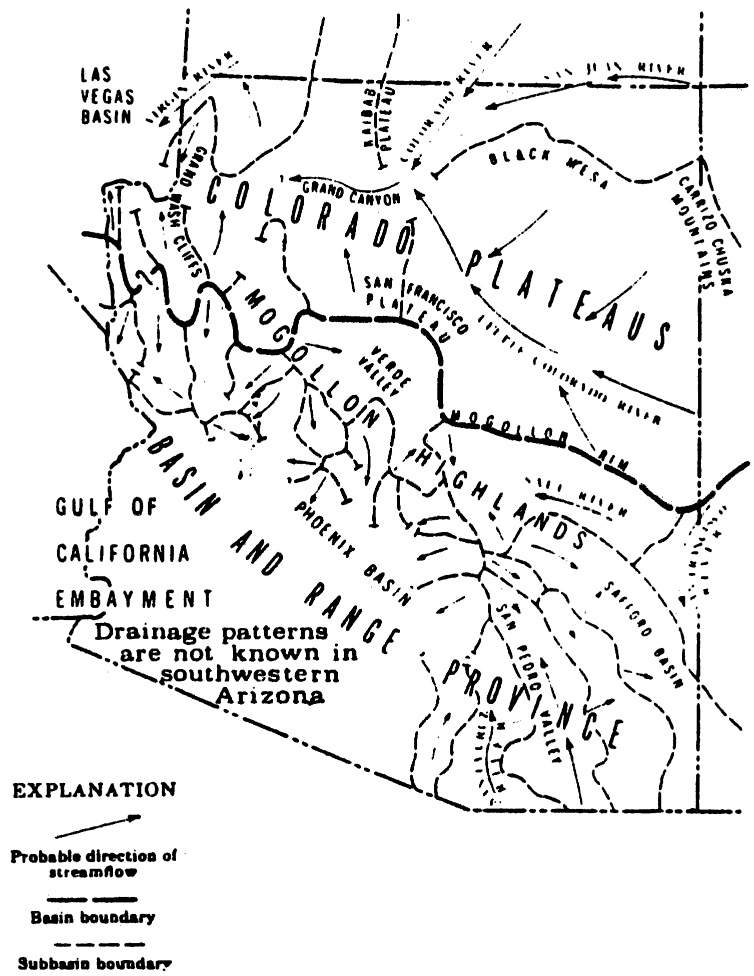


Figure 8. Late Tertiary time

Cutting of Grand Canyon by the Colorado River and maximum development of internally drained basins in Basin and Range provence.

Arizona Geol. Society

1967

Cretaceous or Early Tertiary. Later Tertiary faulting has been observed to have cut off mineral veins in several places. However, there may be secondary deposits or supergene enrichment as yet not located.

The mineralized zones are mainly silicates, carbonates, oxides and phosphates of copper with some sulphides and other metals. Small amounts of gold and silver are associated with the copper. Gold and silver are, in some samples, bonded as electrum or near electrum. Some free gold and silver are no doubt contained within these mineralized veins as well.

Chrysocolla, a silicate of copper, $CuSiO_2$, $2H_2O$, is the predominent copper ore mineral with malachite, a carbonate of copper, $Cu_2(OH)_2CO_3$, and cuprite, an oxide of copper, Cu_2O, as secondary minerals. Also associated in gangue is crystalline and amorphous quartz (silica comprising about 73% of the ore), euhedral calcite, dioptase (H_2CuSiO_4), and hydrated copper sulphate. The zones of mineralization are also the locus of secondary oxidation minerals such as limonite, jarosite, possibly alunite, magnetite, siderite and barite.

Sulphides are present but not obvious in hand specimens and except for the surficial occurrence of the metallic oxide psilomelane (MnO), no other sulphides were noted. Petrographic examination of samples is continuing. A comprehensive paragenetic study of the Bullard area mineralization has not yet been completed, so many petrographic and mineralogic questions will be answered as work continues.

B. Assays and Values

A detailed sample map was made by ASARCO, presumably in 1950. This map covered the main Bullard vein and indicated the location of 43 samples. The computed average of these samples was given as 0.25 oz/ton Au, 0.50 oz/ton Ag and 2.67% copper. This relates to an estimated value for this ore body to be around $150.00 per ton using values of $450.00 per oz. for gold, $10.00 per oz. for silver, and $.70 oz. per pound for copper. This metalliferous zone has been mined at a profit in years past and recently by Contract Mining Corporation.

West of Bullard Peak on Sansone claims

Five samples were analyzed from a mineralized vein workings west of Bullard Peak. This area is off the Bullard claims and thought to be stratigraphically lower in the section. Subsequently, these samples are important as they indicate that lower in the section higher average values may exist. These five samples assayed at; 0.56 oz/ton Au, 0.40 oz/ton Ag and 3.83% Cu.

International Claim: A mineralized zone occurs within the International Claim which assayed at 0.02 oz/ton Au, 0.10 oz/ton Ag and 2.58% Cu. This vein appears to have good potential because the mineralized area lies within a large shear zone. There is a deep shaft at this point but little is known at the present time as to its depth or the minerals removed from it. Some superficial shallow precussion drilling has been done on the International Claim but little else is known about it.

Last Bean and Democrat Claims: Just west of the stone cabin, five samples were taken from the prospect holes, mineralized zones and tops of the incline shafts. The results of these assays were: 0.11 oz/ton Au, 0.33 oz/ton Ag and 1.74% Cu.

Sulla Claim: A very substantial vein of mineralization exists on the Sulla claim in the northeast area of the map (see plate 2). Sampling there indicated an average of; 0.15 oz/ton Au, 0.10 oz/ton Ag and 1.59% Cu. It should be noted here that of the three samples taken from this vein, two of them gave an average of; 0.36 oz/ton Au, 0.25 oz/ton Ag and 2.0% Cu for an estimated $192.00 per ton value. This zone appears to be stratigraphically lower in the section than the Bullard vein. This further indicates that values may be higher at points lower in the section.

The average computed values of all samples in the Bullard area taken in the course of mapping was as follows: 0.22 oz/ton Au, 0.23 oz/ton Ag and 2.3% Cu for a gross value per ton of around $133.00.

C. Potential and Observed Ore Areas

There are five potentially favorable areas for investigation and possible production. These are both observed and inferred. One through four have been observed, while number five is inferred.

1. The Bullard Vein proper (homestake, Sweepstake, and Washington claims.

2. Area west of Stone Cabin (State, Last Bean, and Democrat claims.)

3. The fault areas of the Sulla claim.

4. The fault zones of International and Producer claims.

5. Bullard Extension (all areas south of Bullard Ridge).

This list, with the exception of number 5, contains only those reserves with production history, surface expression, and/or favorable sampling. Based on geologic interpretation and observation to date, it is certain that there are still to be located other favorable zones in the subsurface.

6. DEFINITION OF MINERALIZED RESERVES

The U. S. Bureau of Land Management and the U. S. Geological Survey in a recent estimate of mineral reserves have agreed upon and defined the following terms to signify relative dependability of information.

A. Measured Mineralized Reserves

Measured reserve tonnage is computed from dimensions revealed in outcrop trenches, workings and drill holes for which the grade is computed from the results of detailed sampling. The sites for inspection, sampling and measurement are so closely spaced and the geologic character is so well defined that the size, shape and mineral content are well established.

The computed tonnage and grade are judged to be accurate within limits which are stated and no such limits are judged to differ from the computed tonnage or grade by more than 20%.

B. Indicated Mineralized Reserves

These are reserves for which the tonnage and grade are computed from projections for a reasonable distance on geologic evidence. The sites available for inspection, measurement and sampling are too widely or otherwise inappropriately spaced to outline the mineralized zone completely or establish its grade throughout.

C. Inferred Mineralized Reserves

Inferred reserves are quantitative estimates which are based largely on broad knowledge of the geologic character of the deposits and for which there are few if any samples or measurements. The estimates are based on an assured continuity or repetition for which there is geologic evidence. The evidence may include comparison with deposits of similar types. Bodies that are completely concealed may be included if there is specific geologic evidence of their presence. Estimates of inferred reserves should include a statement of the special limits within which the inferred reserves may lie.

7. RESERVES

A. The Bullard Vein (Measured 40,000 tons)

The Bullard vein covers an area of approximately 271,000 square feet. The vein averages 2.5 feet in thickness and is in a fault zone dipping about 20 degrees to the south. The easterly edge of the bed is bound by what is believed to be a down-thrown normal fault. The south exposure of the vein is probably eroded for a short distance and possibly continues into the subsurface further south (see vertical section A'A" Plate 3).

There are about 678,000 cubic feet of mineralized reserves within the Bullard Vein, using a conservative average thickness of 2.5 feet. Computing this block at 13 cubic feet per ton, gives 52,000 tons of proven reserves, of which about 12,000 tons have already been mined. It is estimated, then, that 40,000 tons of proven mineralized reserves are still left in the Bullard Vein proper.

B. Area west of Stone Cabin in the State, Last Bean, Washington and Democrat Claims. (Indicated 55,384 tons).

This area was sampled from prospect holes and old workings and measures about 1200 feet long by an estimated 400 feet in width with an average thickness of 1.5 feet. The calculations are:

1200 ft. X 400 ft. X 1.5 ft. = 720,000 cu. ft.

$$\frac{720{,}000 \text{ cu ft.}}{13.0 \text{ cu ft.}} = 55{,}384 \text{ tons}$$

C. Fault Areas of the Sulla Claim (Indicated 28,846 tons)

This area has at least two major faults which are mineralized. These faults trend north-south with the westerly one dipping east at about 45 degrees and the easterly one dipping west at about 45 degrees (see plate 3, section B'B"). These mineralized fissures may be as deep as 400 feet with an intersection point of about 100 feet. This intersection point would be an ideal objective for the exploration of a concentrated ore body. The thickness of this mineralized zone is at least 2.5 feet and may be much more in the subsurface. With these parameters the calculations are:

600 ft. X 1200 ft. X 2.5 ft. = 300,000 cu. ft.

$\frac{300{,}000 \text{ cu. ft.}}{13.0 \text{ cu. ft.}}$ = 23,077 tons (east fault)

600 ft. X 50 ft. X 2.5 ft. = 75,000 cu. ft.

$\frac{75{,}000 \text{ cu. ft.}}{13.0 \text{ cu. ft.}}$ = 5,769 tons

5,769 + 23,077 = 28,846 tons total

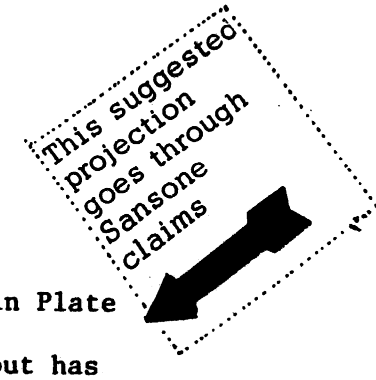
D. The Fault Zone of the International Claim (Inferred 18,461 tons)

Potential reserves in this area can only be inferred because along the faulted zone only intermittent mineralized outcrops are visible. An old shaft was noted at sample localities 123, 123a, 123b and 123c but access was impossible and its dimensions are not known. Samples from this mineralized area were assayed at 0.02 oz/ton Au, 0.10 oz/ton Ag and 2.58% copper, these concentrations seem uneconomical. However, it is felt the high copper content in sample Number 126 (7.9%) for example, is indicative of potentially better values in the immediate area or with depth, the estimated

Dimensions are 600 ft. long by 200 feet in depth by 2 feet in thickness. Therefore:

600 ft. X 200 ft. X 2.0 ft. = 240,000 cu. ft.

$$\frac{240{,}00 \text{ cu. ft.}}{13.0 \text{ cu. ft.}} = 18{,}461 \text{ tons}$$



E. The Bullard Extension (Inferred 553,800 tons)

The Bullard Extension is that fault zone as depicted in Plate 3 (section A'A"). The fault itself is suspected to exist but has not been confirmed in any way. Locals indicate that a well drilled near the stone cabin penetrated a thick zone of mineralization at 900 feet. There is absolutely no confirmation that such a hole was ever drilled or that even a shaft ever got to that depth. However, it is interesting that the Bullard mineralized zone, which is a fault, when projected to that area near stone cabin, intersects with the subsurface at about 800 to 900 feet. The inference is that if this fault is mineralized as suspected then considerable ore reserves may well be uncovered. Combination rotary and diamond drilling is being recommended for this area.

The demensions of this theorhetical ore body is as follows:

1800 ft. X 1600 ft. X 2.5 ft. = 7,200,000 cu. ft.

$$\frac{7{,}200{,}000 \text{ cu. ft.}}{13.0 \text{ cu. ft.}} = 553{,}800 \text{ tons}$$

F. Other reserves

If the concept of Late Cretaceous - Early Tertiary faulting is correct then there may be several zones of flat-lying faults which may have been rotated from their original high-angle, normal position. These could be very mineralized and add greatly to the reserves.

8. RESERVE SUMMATION

		Tons	
a.	Bullard Vein	40,000	Measured Mineralized Reserve
b.	West of stone cabin	55,384	Indicated Mineralized Reserve
c.	Sulla Claim	28,846	Inferred Mineralized Reserve
d.	International Claim	18,461	Inferred Mineralized Reserve
e.	Bullard Extension	553,800	Inferred Mineralized Reserve
	Total	696,491	tons

Bullard Extension goes through Sansone claims

696,491 tons at $144.00 per ton = $102,450,000.00

9. PROGRAM OF EXPLORATION

A. Geophysics

The exploration program will consist of a ground electromagnetic survey. The most intense mineralization is expected to be relatively flat-lying with dips of around 20 degrees with associated smaller veins at higher angles, perhaps 45 degrees or more. The flat-lying veins can be expected to be bound on all sides by possible tertiary faulting which could create a note-worthy anomaly. A magnetic survey should be considered and may be very useful for detecting sub-surface structrual manifestations. Induced polarization methods may also be of use. Resistivity surveys should be avoided in the

Bullard area due to poor results experienced in this desert enviorment.

The exploration program will consist of a ground geophysical survey. A grid system over the Bullard Vein will be established with a base-line in a N45W direction.

Twenty-two grid lines, 4000 feet long will then be established perpendicular to the base-line on 200 foot spacings. A 200 foot station interval will be established and data collected on the 100 foot intervals to reduce geologic noise and detect near-surface conductors.

This geophysical survey would consist of 17 line miles at current costs of $800.00 per line mile. This includes technicians, equipment and interpretation of the results. The purpose of this ground survey is to delineate the Bullard Vein in the southerly direction where past reports have indicated its locations. The geophysical results will be correlated with known geologic data to establish the continuity of the Bullard Vein within the grid system.

Total cost for this program is estimated at $15,000.00.

B. Drilling

It is recommended that all anomalies outlined by the previously described geophysical surveys be physically investigated by drilling. The initial phase of this program could be completed by rotary drilling to reduce the cost per foot. If the results are encouraging, a diamond drilling program could be undertaken to determine grades and any change in the tenor of the mineralza-tion. At the present time, numerous rotary drills are available in the area. Present quotes range from $3.85 to $8.55 per foot, depending on the total footage of the contract. At this time no estimate of footage is possible until geophysical data is created and interpreted to determine location and depth of the anomalies.

Specific areas are recommended for diamond drilling (see plates 1 and 2). These are described as follows:

Diamond core drilling is recommended as follows:

1. DDH-1: Vertical drill to prove Bullard vein on the down-thrown block east of present exposures and on the south flank of Bullard Ridge. Drill DDH-1A, B, C, etc. as necessary if ore mineralized zones are encountered. The expected depth is 50 to 100 feet maximum.

2. DDH-2: Angle drill at 60 to 45 degrees west to penetrate the mineralized fault zones at depth (see B'B", plate 3). Prob-able depth is about 200 feet. Add DDH-2A, B, C, etc., as deter-mined if ore is intersected. These cores will be on the Sulla Claim.

3. DDH-3: Angle drill 60 to 45 degrees toward the north near stone cabin in the Democrat, Last Bean or even State Claims. This is to intersect the possible fault plane depicted in section A'A" of plate 3. Estimated depth is 900 feet plus. Add DDH-3A, B, C, etc., as necessary if ore is intersected.

4. DDH-4: This coring should be done as a vertical hole in the Avalanche and Sweepstake Claims. Depth to the fault objective is estimated at 200 to 300 feet. Add DDH-4A, B, C, etc. as needed.

10. PROGRAM OF MINE DEVELOPMENT

Mining could commence immediately by initiating work on the 40,000 ton Bullard Vein proper. This mineralized vein has been mined in 1979 by CMC at a profit and it could be stockpiled until milling and beneficiation equipment is installed. Mining could also begin on the 28,000 tons which lie in the Sulla Claim. Only a small amount of road work may be necessary to begin work here.

In any event, the following mine development plan is recommended for the Bullard Mine:

1. The plan includes current costs of equipment and labor. Initiation of the plan could commence as soon as funding is available. Equipment and personnel are readily available in the area and no environmental problems are anticipated.

2. The Bullard Vein on the Washington Mineral Claim was mined at a 200 ton-per-day rate during 1980 by Contract Mining Corporation of Yuma, Arizona. All development work including portals, haulways and truck loading areas has been completed. A room and pillar system was utilized by Contract Mining Corporation during their operation and it is recommended that this system of mining be continued. Costs are estimated at:

Drilling	$ .90
Blasting	.64
Loading	.68
Hauling	.52
Roof bolting	.64
Air & Water Supply	.14
Ventilation	.36
Power	.22
Development	.42
Supervision	.65
Engineering	.39
Repair & Maintenance	.86
Assay & Laboratory	.60
Taxes & Depreciation	.75
Amortization	1.25
TOTAL MINING COST PER TON	9.02

3. Engineering, Supervision and labor is based on current salary and wages paid in Arizona. Namely, Professional Engineers at $350.00 per day, Mine Supervisor at $3500 per month, Miners at $13.00 per hour and Laborers at $9.50 per hour.

Equipment requirements are:

Air Compressor	$20,000.00
Gen. Set	10,000.00
Air & Water Line	5,000.00

Air Drills with Legs ----------------	$ 6,000.00
30 hp Slusher & Bucket --------------	12,000.00
10 hp Slusher & Bucket --------------	10,000.00
Mining Supplies ---------------------	25,000.00
TOTAL	88,000.00

A portable concentrating mill is available at this time for processing Bullard Vein material. Contract milling costs are quoted as $20.00 per ton. This includes all labor, milling supplies and fuel. This does not include the transportation of the concentrate to the smelter in Hayden, Arizona, approximately 200 miles from the Bullard Mine in Aguila, Arizona.

I firmly recommend a minimum of $300,000.00 be allocated for the initial phase of the Bullard Mine development.

11. ORE TREATMENT

Initial studies of the mineralized zones of the Bullard Mine indicate the observed mineralization would respond to a gravity separation after crushing to minus 40 mesh. This treatment should recover 95-97% of all sulphides. The follow-up treatment would be an acid copper leach process. Contract Mining Corporation has, in fact, carried out tests of this type with positive results. I would suggest however, that beneficiation studies be continued as mining an development proceeds to enhance concentration in the light of subsequent new data or should there be a large variation (unlikely) in the mineralized zones mined.

12. MISCELLANEOUS

A land survey should be done to firmly establish claim boundaries and markers for geophysical and other subsequent surveys.

San Diego, California

October 20, 1981

Knoxie C. DeLise
Registered Geologist