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PRINTED: 06/24/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: SAGINAW MINE

ALTERNATE NAMES:

PIMA COUNTY MILS NUMBER: 25

LOCATION: TOWNSHIP 15 S RANGE 12 E SECTION 13 QUARTER NE  
LATITUDE: N 32DEG 08MIN 43SEC LONGITUDE: W 111DEG 04MIN 53SEC  
TOPO MAP NAME: CAT MOUNTAIN - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

COPPER SULFIDE  
LEAD SULFIDE  
ZINC SULFIDE  
SILVER  
GOLD LODE

BIBLIOGRAPHY:

AZBM BULL. 189, P. 103, 1974  
ADM MR "U" FILE CU 74

08/14/87

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: PAPAGO QUEEN MINE

ALTERNATE NAMES:

AMOLE CLAIM NO. 11  
SAGINAW HILL  
GOLD HILL  
AMOLE GROUP  
PALO VERDE

PIMA COUNTY MILS NUMBER: 23

LOCATION: TOWNSHIP 15 S RANGE 12 E SECTION 12 QUARTER SW  
LATITUDE: N 32DEG 08MIN 25SEC LONGITUDE: W 111DEG 04MIN 36SEC  
TOPO MAP NAME: CAT MOUNTAIN - 7.5 MIN

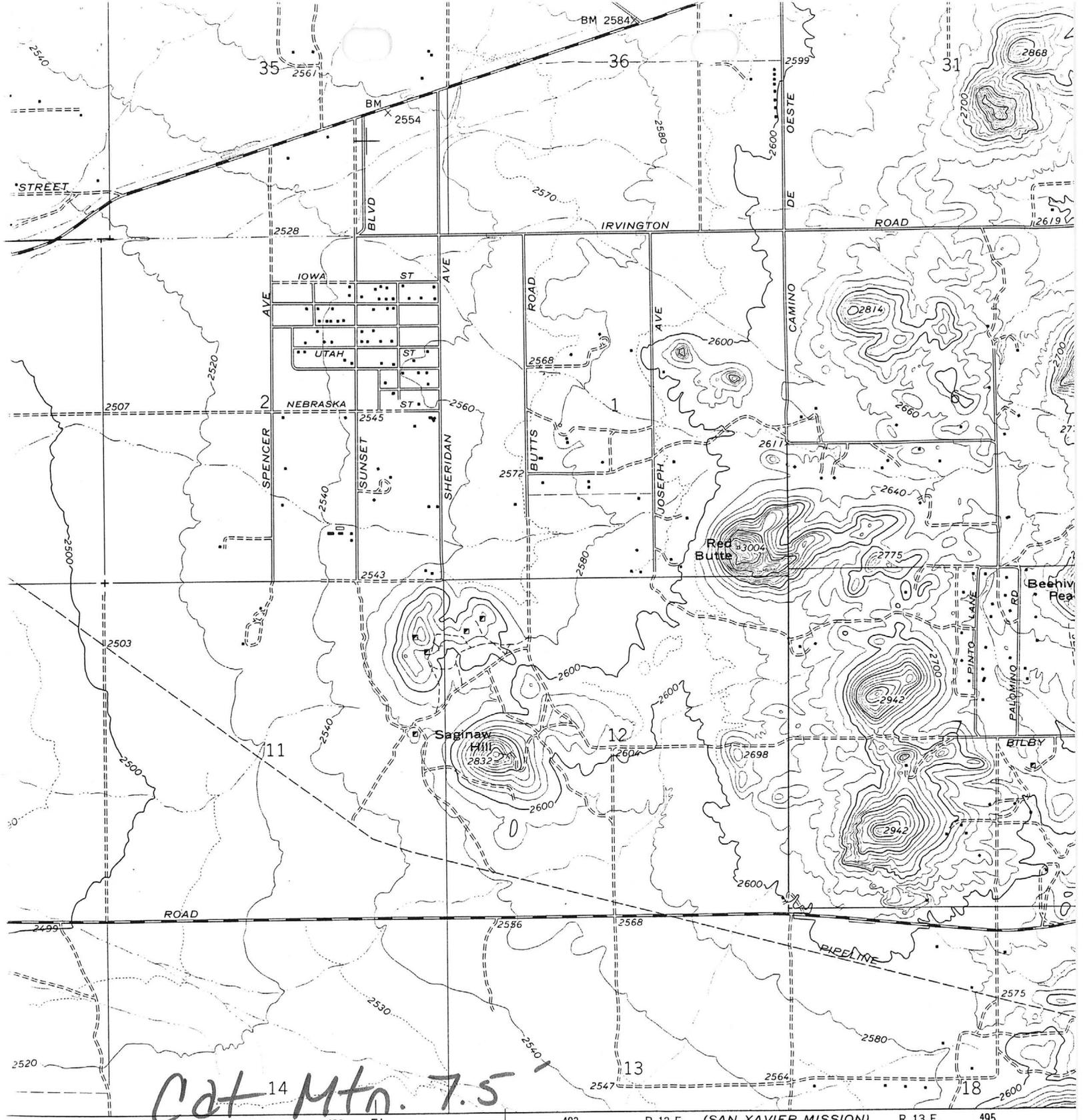
CURRENT STATUS: PAST PRODUCER

COMMODITY:

COPPER OXIDE  
SILVER  
GOLD LODE  
MOLYBDENUM

BIBLIOGRAPHY:

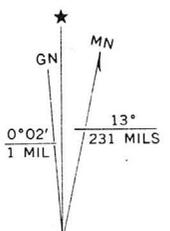
AZBM BULL. 106, P. 19 & 20  
AZBM BULL. 189, P. 102, 1974  
ADMMR SAGINAW HILL EXPLORTION PROJECT FILE  
ADMMR PALO VERDE FILE  
SEE MILS PALO VERDE MINE



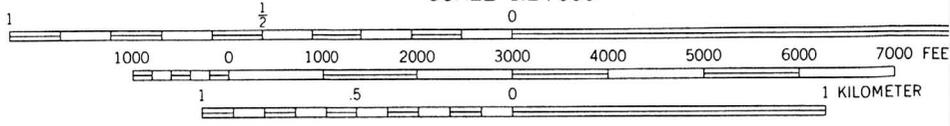
*Cont 14 Mtn. 7.5*

R. 12 E. (SAN XAVIER MISSION)  
3748 II SE R. 13 E.

SCALE 1:24 000



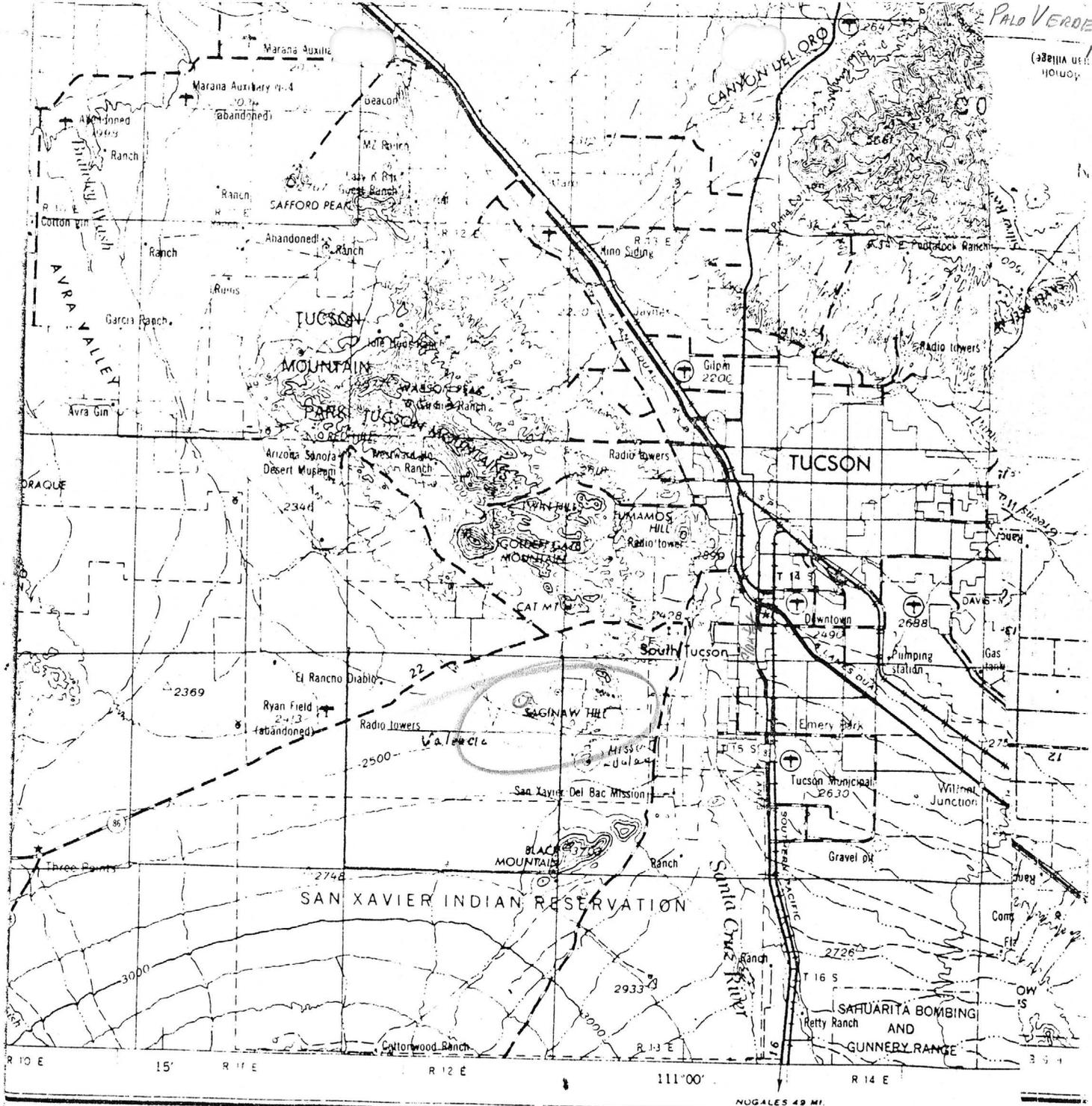
UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



CONTOUR INTERVAL 20 FEET  
DOTTED LINES REPRESENT 10-FOOT CONTOURS  
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS  
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON

PALO VERDE (fil)  
Pima  
(38) 111 110100



1:2

Arthur Jacobs

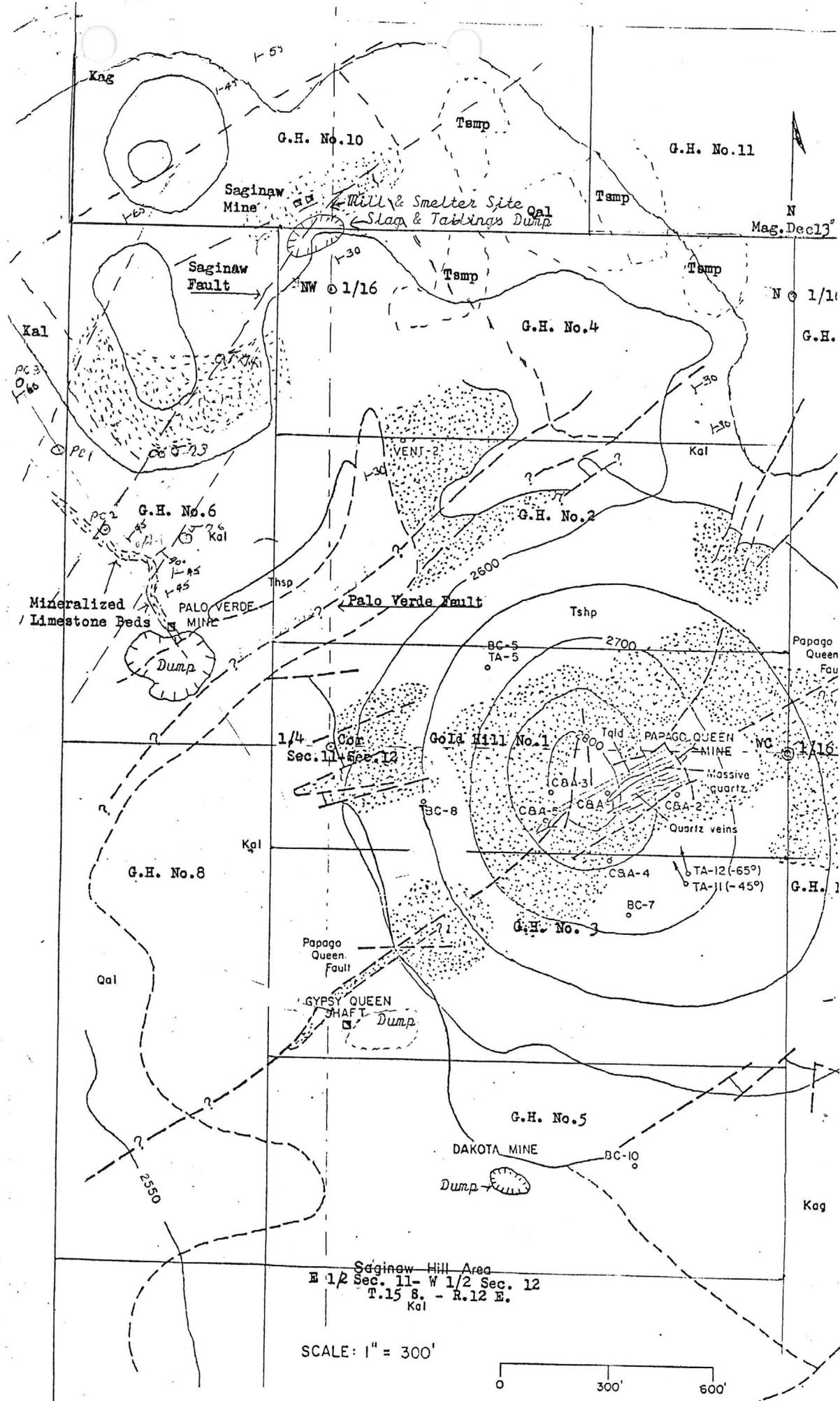
SAGINAW HILL EXPLORATION PROJECT  
GOLD HILL  
AMOLE GROUP  
PAPAGO QUENN MINE  
Mining World August 1963 p. 42

PIMA COUNTY  
AMOLE DIST.  
T15S, R12E, sec 12

ABM Bull. 106

MILS PAPAGO QUEEN MINE #0040190354

PALO VERDE (file).



Saginaw Hill Area  
 E 1/2 Sec. 11 - W 1/2 Sec. 12  
 T. 15 S. - R. 12 E.  
 Kal

SCALE: 1" = 300'

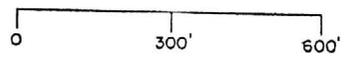


Figure 5a. Saginaw Hill Area Map

SAGINAW HILL EXPLORATION PROJECT

Little Hills mine continues shipping 200 tpd of silica ore to Hayden. GWI Quarterly Report  
12-31-70

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Mine visit - Little Hills mine. GWI WR 2-1-71

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Little Hill mines have been shipping about 150 TPD of prepared silica to ASARCO.  
(Prepared means crushed sized and screened) GWI QR 9/71

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A field interview was made at the offices of the Little Hill mine at Oracle for the purpose  
of updating the new Active Mine Directory. REL WR 9/25/73

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Gordon O. Veneklasen and Charles Hagerman, P.O. Box 1844, Consulting Professionals, Santa  
Fe, New Mexico, 87501, 505-983-9641 & 6801, now drilling the Saginaw mine. GWI WR 2/4/75

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Gordon Veneklasen reported that his company is still drilling at their Saginaw Hill prop-  
erty, Pima Co., just south of Ajo Road. GWI WR 6/4/75

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HM WR 2/6/88: Groundwater contamination, mineralization and mineral rights were  
discussed with Elizabeth Wheat, landscape architect, in relation to the Saginaw  
Hill Mines (file) Pima County. The Pima County Planning and Zoning Dept has  
designated the mine area as a future regional park and is contracting an archi-  
tectural study to a consulting firm. Wheat and Associates was planning to submit  
a bid. Ms. Wheat was surprised to learn that the area has a major sulfide system  
covered by active mining claims registered with the BLM. The resource has been  
regarded as sub-economic under recent economic conditions but with serious explor-  
ation efforts and improved metal prices, may be proven valuable. There has been  
some recent shipments of dump material to an Arivaca Mill for extraction of the  
gold content. Increasing urbanization surrounding Saginaw Hill will prove to be  
an obstacle to mine development. The Pima County Planning Dept was appraised of the  
situation.

---

E/H

379 South Craycroft  
Tucson, Arizona 85711

July 21, 1979

U. S. Department of the Interior  
Bureau of Land Management  
Phoenix District Office  
2929 West Clarendon Avenue  
Phoenix, Arizona 85017

Re: 3610

Mr. Michael J. Kirby  
Acting Area Manager  
Phoenix Resources Area

Gentlemen:

I have your letter of July 9, 1979 in reply to my letter of May 29, 1979, asking if we can dispose of coarse screened rejects as mineral materials.

The waste dumps on the Saginaw Hill property are in the same original condition they were at the time the ore was mined and shipped. There are no screened rejects materials on the mining property, nor has any ore or dumps material been removed by us from the property and crushed and screened off site.

Outsiders have hauled a large amount of dump material and have broken and removed a large amount of green copper stained rock from the hillside of the Papago Queen Mine, for personal use and disposal.

There are no buildings, trailers, mining or milling equipment, crushing and screening installations on the property site.

The original mining location on the property was made by Mr. Sam Hughes, and the property was known as the "Sam Hughes Gold Mine." It was also known by the Mexican people of that time as the "Mina del Aguila." A small amount of placer gold was recovered in the lower arroyos west and south of Saginaw Hill. A small Huntington Grinding and Amalgamating Mill and a True Vanner Concentrating Table were installed on the property. The gold from the mine is covered by a fine coating of iron oxide, "Rusty Gold," and was difficult to recover by amalgamation. The True Vanner Table concentrates were sent to the Thomas Hughes "Mexican Adobe Smelter," located near the present junction of Mission Road and Irvington Road. The high Zinc contents of the table concentrates <sup>made</sup> are smelting the ores difficult and the venture was not an economical success.

To: U. S. Department of the Interior  
Bureau of Land Management

July 21, 1979  
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In 1895, Captain Burgess, with the financial help of some Saginaw, Michigan investors (Saginaw Mining Company) installed a milling plant and a small blastfurnace. Due to the refractory character of the ore, the venture also failed. Water for the milling operation was supplied by a five mile long pipe-line from a well located near the Santa Cruz River.

In 1914, the C. <sup>17</sup>R. Mining Company <sup>cf</sup> at Bisbee, under the direction of Mr. Ira Joralemon, geologist, drilled Saginaw Hill, and developed, according to his report, about 10,000,000 tons of 0.42% (8.4 lbs/ton) of copper ore. This ore-body has been found to contain, in addition to the copper, small amounts of uranium and molybdenum. The hill was later drilled by other companies and confirmed the existence of the copper ore-body. The ore-body was too small for an open-pit mine and too low-grade for a direct shipping ore, except when the smelter needed high silica flux ore.

<sup>1917</sup>  
In 1917, Albert Steinfeld and Associates shipped high silica copper flux ore to the Douglas, ~~Hayden and Ajo~~ smelters. A study made of the Saginaw Hill copper deposit shows that it is amenable to leaching in place.

During the period of 1920 and 1925, the Arizona-Tucson Copper Company sunk a 45 degree incline shaft 600 feet deep and did some exploration work on the Palo Verde Mine. Several <sup>leases</sup> of high-grade lead-zinc-copper ore, with erratic values in gold and silver, were found in the sedimentary beds--the high gold value being associated with arsenic and antimony mineralization.

In 1945 the d'Autrement Brothers associated with Mr. Ira Joralemon, geologist, ~~and~~ shipped several thousand tons of zinc-lead ore to the Sahuarito mill (Eagle-Pitcher) for processing. This ore came from the Palo Verde Mine.

I mention this long relation of events to show that during these intermittent operations a large amount of rock material was produced that was not of economic value and went into the dumps. These dumps contained sulphide minerals and through weathering and oxidation produced rock coloration in red, yellow and brown that when crushed and screened produced a material of distinct character in that it is very attractive as a decorative rock for use on lawns and gardens, and at present has a good demand and is of economic value.

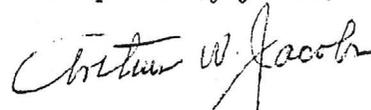
To: U. S. Department of the Interior  
Bureau of Land Management

July 21 1979  
Page 3

We plan to haul the rock material (dumps) to the Papago Materials, Inc. plant at 1500 West Ajo Way, Tucson, about a 10 mile distant haul, crush and screen the rock, ship the up-graded fine material (mineral values) to the smelter and dispose of the coarse product as a decorative rock or rock for use in the industry. We plan to blast the southwestern flank side of the Saginaw Hill to widen the road so that the large trucks and loader can reach the upper dumps of the Papago Queen Mine.

Trusting that this may be of some help to you in this matter, I remain,

Respectfully yours,



Arthur W. Jacobs

AWJ:nb

GEOLOGY OF THE SAGINAW HILL AREA  
PIMA COUNTY, ARIZONA

Unsubmitted thesis by Seton S. Williams  
Abstract

LOCATION:

Saginaw Hill is located on the southwest flank of the Tucson Mountains in Pima County, Arizona, about twelve miles southwest of down-town Tucson. It is about two miles south of the Ajo road, and roughly five miles northwest of the Mission of San Xavier del Bac. It is contained within sections 1, 2, 11, and 12 of Township 15 South, Range 12 East. The Saginaw Hill area includes Saginaw Hill and the ground surrounding it for a distance of not more than a mile in any direction from the summit of the hill.

GEOLOGY:

The Saginaw Hill area consists of a rhyolite porphyry stock, intruded into steeply dipping Cretaceous rocks which include shales, limestones and arkosic quartzite. Brown has designated the entire sedimentary series within the mapped area as the Amole arkose. The sediments are considered to have been laid down in Cretaceous time. Within the area mapped the sediments attain a thickness of about nine hundred feet. Folding within the mapped area is considered of negligible importance.

The writer considers that Saginaw Hill is best described as a complex rhyolite porphyry stock. In his description of the Southern Section of the Amole Mining District, Allen referred to rhyolite on the dumps of the Saginaw Mine, and noted that the Palo Verde shaft was sunk on the rhyolite-limestone contact. Brown describes the Saginaw stock as a latite porphyry, and various mining company geologists who have studied the copper prospects of the stock periodically since 1913, use the more general term, quartz porphyry.

Alteration of the stock and associated intrusives is intense. Two distinct igneous intrusives can easily be recognized on Saginaw Hill, a rhyolite porphyry with phenocrysts ranging up to  $2\frac{1}{2}$  mm. in size, and a porphyritic rhyolite containing relict orthoclase crystals ranging upwards of 2 cm. in size. The rhyolite porphyry occupies the lower slopes of Saginaw Hill and forms the south wall of the Palo Verde ore bodies where it is exposed in the Palo Verde fault. The mine dumps give evidence that it was cut in the Saginaw Mine, about two thousand feet northwest of the summit of the Hill, and in the Gypsy Queen Mine, about twelve hundred feet southwest of the hill top.

The porphyritic rhyolite occupies the summit of the Saginaw Hill, and in that area appears to rise above a talus slope as the single igneous body from which erosion carved the hill. Although rubble makes the contact of the two intrusives obscure, outcrops of the porphyritic rhyolite may be found on the lower northerly slopes of Saginaw Hill in a band about six hundred feet in width from the top of the hill to the contact.

The earlier rhyolite porphyry intrusive show marked sheeting with a northwesterly strike, approximately parallel to the average strike of the sediments. The later porphyritic rhyolite intrusive exhibits strong east-west sheeting. Both intrusives are cut by a cupriferous rhyolite porphyry dike, and the last stage of igneous activity brought up the massive cupriferous quartz fissure veins exposed in the summit area of Saginaw Hill.

The structure of the area is rather simple, consisting essentially of northeasterly tilted sediments of the Amole arkose formation intruded by a rhyolite porphyry stock and eroded to form a pediment. Intrusion of the Saginaw stock was accompanied and followed by faulting. Two types of fault are recognized in the area, i.e., peripheral faults, and post-intrusion strike-slip faults. Both types are essentially vertical. Peripheral faults are best exposed in the west central portion of the mapped area bordering the south and west base of the low sedimentary hill north of the Palo Verde shaft. Mine development has exposed two important, northeasterly trending strike-slip faults. Just north of the Saginaw stock another northeast trending strike-slip fault traverses the Palo Verde shaft. This Palo Verde fault was first recognized in the workings of the Palo Verde mine, where it traverses the shaft, brings the sediments on the north wall of the fault in contact with the Saginaw intrusive on the south wall and thus constitutes the south limit of the limestone-replacement ore body. Drag of the limestone beds exposed on the surface indicates that the north wall moved to the eastward. Prospect pits on the slope of the hill about two hundred feet northwest of the Saginaw shaft expose a vertical east-west fault which carries weak copper mineralization. The fault can be traced eastward for several hundred feet to its intersection with the Saginaw fault. The intersection is marked by a deep shaft, copper "oxide" mineralization in the walls and with similar mineralization in the adjacent waste dump. Displacement along this fault appears comparatively small, but its copper mineralization and its strike paralleling the copper mineralized east-west sheeting in the porphyritic rhyolite in the summit of Saginaw Hill raises the question of the relationship of this structure to its copper mineralization.

#### ALTERATION:

The abundance of sericite as an alteration mineral was noted. Second order pseudomorphs, consisting of microcrystalline quartz aggregates after sericite which had replaced original feldspar phenocrysts were also observed. Microcrystalline quartz replaces the groundmass of the mineralized rhyolite dike almost completely, replaces about half the sericite in the groundmass. Five thin sections cut from diamond drill core at depth intervals of roughly fifty feet show microcrystalline quartz replacing sericitic alteration in the groundmass of the older intrusive at a point about twelve hundred feet southeast of the summit of Saginaw Hill. While the microcrystalline quartz alteration is too widespread to be a useful guide to ore, it does indicate that late hydrothermal alteration is not limited to the core of the intrusive but is abundant throughout the stock. Argillic alteration is more intimately associated with observed copper mineralization. Throughout most of its length the cupriferous rhyolite dike contains feldspar phenocrysts which have been altered to one of the clay minerals, and display light green copper staining. Similar alteration is observed in the feldspars of the younger intrusive within the east-west copper mineralized sheeting zone.

Microscopic study of the argillic alteration was not undertaken, but surface reconnaissance suggests that it provides too narrow a target for use in ore search, since much of the copper mineralization is localized along fracture surfaces well outside the apparent zone of argillic alteration. Surface alteration of the sulfide minerals on Saginaw Hill exhibits a zonal effect with the quartz fissure veins as a center. Malachite, traces of azurite, and light green copper stain in the altered feldspar phenocrysts are well exposed close to the quartz fissure veins. Occurrence of much of the malachite as "paint" and in fine botryoidal aggregates suggests that it is exotic and has been deposited by supergene solutions from a segment of the stock which has been removed by erosion. The entire hill above the talus slope exhibits a chocolate brown color, but copper staining in the joint surfaces diminishes gradually away from the area of the quartz fissure veins with only slight traces of malachite showing as the talus slope is approached. Pyrite in various stages of oxidation was observed on Saginaw Hill, but no "relief limonite", or limonite boxworks to indicate the former presence of chalcocite were found. Pyrite casts occasionally showing a dark brown rim of indigenous limonite were observed in the hilltop area. Pyrite casts containing light brown indigenous limonite were found in specimens of the arkose quartzite and in the mineralized Palo Verde limestone, suggesting an association of the light brown pyritic oxidation with the lead-zinc mineralization.

#### MINERALIZATION:

Pyrite is the most widespread sulphide observed, and evidence of the various mine dumps indicates its presence in the Saginaw mine, the Palo Verde mine, the Gypsy Queen and Dakota mines. Diamond drill records show that it was found in the old Calumet and Arizona test holes, it was observed by the writer in the core of the 200 foot hole drilled in 1948. In the most recent diamond drill hole, pyrite occurs in small cubes disseminated through the older intrusive. Numerous pyrite casts are present in the various units of Amole arkose in the vicinity of Saginaw Hill.

Chalcopyrite is of negligible economic importance, except as one possible sulphide source of the copper carbonate mineralization in the area. About five very small masses of the mineral were observed in the core of the recent diamond drill hole.

Sphalerite is the most important ore mineral extracted in recent mining operations. It is the ferriferous variety known to the miners as "black Jack", or marmatite, and occurs in granular aggregates intimately associated with galena and pyrite.

Malachite, the most prominent copper mineral so far developed in the area, is well displayed near the crest of Saginaw Hill. It may well have attracted the earliest prospectors to the area, and was undoubtedly the cause of the study made by the Calumet and Arizona Copper Company which led to their diamond drill campaign. Near the crest of Saginaw Hill it is localized in the quartz veins and veinlets occupying the joint systems and gives the striking green color which may be seen from the new El Paso Natural Gas Company access road skirting the southwest side of the hill. Malachite, in very minor amounts, is present in the summit area as small earthy masses disseminated in the intrusive, but close examination will reveal the presence of a tiny quartz veinlet associated with the fracture structure. One exposure of this type has the appearance of a septarian concretion,

in which cupriferos quartz filled cooling cracks in the younger intrusive. A few small masses of malachite, apparently localized in minor breaks in the intrusive, were observed in the core of the recent diamond drill hole, and malachite was also observed in the dumps of prospect pits sunk in the sediments in the north and northeastern part of the mapped area, especially where surface alteration of the limestone suggests proximity of an intrusive rock to the surface.

Host rocks of economic mineralization in the area include the rhyolite porphyry dike, the fractured younger intrusive, quartz fissure veins, and the limestone beds from which the Palo Verde ores have been mined. The quartz fissure veins are typical fissure fillings, and attain a maximum thickness of roughly fifteen feet close to the summit of Saginaw Hill. The limestone beds in which the Palo Verde shaft has been sunk constitute an ideal host rock for sulphide replacement.

Copper mineralization is most prominent on Saginaw Hill, where copper carbonate minerals occur in quartz veins and veinlets and on fracture surfaces of the younger intrusive. Dissemination of copper in the intrusive is very slight. Ore mineralization is tentatively assigned to Laramide time.

Mineral production from the Saginaw Hill area, the extreme south end of the Amole Mining District, has been of little more than academic interest.

Intermittently over a long period of years, Saginaw Hill has excited interest in mining circles as a potential low grade copper deposit. In 1914 the Calumet and Arizona Copper Company took an option on the property and put down five vertical diamond drill holes in the summit area of Saginaw Hill. On the basis of the drilling the option was dropped. "All the holes showed appreciable values in copper, but not enough to make commercial ore". In 1917, with copper prices at their historic peak of  $27\frac{1}{4}$  cents per pound, the Papago Queen Mining Company shipped three railroad cars of highly siliceous copper ore from the hill top workings. Saginaw Hill was examined for copper in 1946 by the American Smelting & Refining Company. Results of their study apparently agreed with the earlier findings of the Calumet and Arizona Copper Company, that the estimated grade and tonnage under foreseeable metal prices were not adequate to justify further exploration. However, a unique parallelism of diamond drill results exists between Saginaw Hill and the New Cornelia mine at Ajo, Arizona. In each case five holes were drilled, and one almost blank hole led to dropping the option in each case. Subsequent work at Ajo revealed that if the barren hole had been collared ten feet from the original site in any direction it would have cut profitable ore. With that experience in mind the present owners of the property decided to drill an additional hole in the spring of 1948. The hole was sunk to test the persistence of copper mineralization at a distance from the fracture zones at the top of the hill, and was therefore collared in an area roughly 1150 feet southeast of the summit and about 250 feet below the summit elevation. The hole was drilled vertically downward for 199 feet. Sparse disseminated pyrite and small amounts of malachite and azurite were encountered, but no mineable ore was cut.

Easily visible relationships which include the limitation of significant copper mineralization to a narrow zone of the summit area, limitation of this mineralization to quartz veinlets and fracture surfaces of the igneous rock, and negligible dissemination of copper even within this best mineralized zone, make it difficult to postulate a hypothetical ore body in Saginaw Hill of sufficient tonnage and grade to make a profitable mine under present cost conditions and copper prices. The Calumet & Arizona Mining Company drilled to a maximum depth of 375 feet without finding an enriched zone, cutting fresh copper sulfide minerals 125 feet below the collar of their deepest hole. A profitable enriched ore body may exist at greater depth, but in view of the Calumet & Arizona drill results it will take a courageous geologist to recommend the search for it.

Exploration to discover additional lead-zinc ore close to the Palo Verde shaft warrants consideration on the basis of the following three factors: 1. Several years ago a diamond drill hole was collared about five hundred feet northeast of the Palo Verde shaft, and sunk at an inclination of 45 degrees on bearing S 30° W. This hole is reported to have struck ore at three points, 396 feet, 425 feet, and 455 feet vertically below the surface.

Geologic mapping indicates that these three showings are all on the south side of the Palo Verde fault. Unfortunately no written drill log of this hole is available and the type and grade of the reported ore are unknown. 2. Recent geophysical work in the area by Humphreys of Tombstone showed magnetic anomalies about 400 feet southwest of the Palo Verde shaft. Bedrock in this area is covered by several feet of alluvium.

3. Both the Dakota shaft (reported depth 150 feet) and the Gypsy Queen shaft (reported depth 80 feet) are sunk in limestone similar to the limestone host of the Palo Verde ores. Projecting the strike of this favorable bed northwestward under the alluvial cover suggests that the geophysical anomalies and the diamond drill indications are associated with the same favorable limestone. Considered together the three factors suggest the existence of an undiscovered ore body, similar to the Palo Verde ore body, the top of which may now be hidden by the shallow alluvial cover.

The large question marks which surround the diamond drill and geophysical information make prospecting for this ore a gamble, and local experience indicates that the probable size of the discovery will be too small to interest a major mining company. However, a series of three relatively short diamond drill holes, collared about 350 feet southwest of the Palo Verde shaft, on the south side of the Palo Verde fault, as shown on sketch will quickly confirm this ore, or determine its non-existence.

Mr. W. H. Loerpabel

-2-

April 6, 1946

RESULTS OF CALUMET AND ARIZONA DRILLING

This area was under option to the C and A in 1914 and was diamond drilled subsequent to a report recommending drilling from Ira Joralemon. One of the chief reasons for this interest was the proximity of the prospect to a proposed Tucson to Ajo railroad. Five diamond drill holes were put down as tabulated below. They were closely spaced in the most favorable zone as can be seen from the map, except for number 4.

<u>Drill Hole</u>	<u>Depth</u>	<u>Au</u>	<u>Ag</u>	<u>Cu</u>	
1.	376 feet	.007	0.16	0.44	Assays are average of entire hole
2.	293 "	.007	0.09	0.57	
3.	270 "	.007	0.09	0.48	
4.	290 "	-	-	0.25	
5.	271 "	-	-	0.54	
				0.41	Geometric average all holes

The holes were sampled in five foot portions, all of the hole being sampled. Values varied from .10% to 1.5% Cu, core and sludge was averaged together, the core recovery being rather poor. No significant change was observed with depth, the higher values being associated with random fractures.

JORALEMON'S REPORT

In his original report, examined by me at Bisbee, Joralemon has this to say in his conclusion, "It seems likely that there is ore under the central hill, no ore under low ground. 10,000,000 tons the limit." In this conclusion, that the ore would be limited to the central silicified zone, I concur, and this is apparently also the opinion of those who have examined this property for the company in the past. Drill hole No. 4, drilled outside the core of the hill shows only 0.25% Cu, and also confirms the above opinion.

ORE RESERVES

If it is assumed that the "ore" will be limited to the core of the hill, the area outlined in green on the map, then roughly 1,000,000 tons per 100' of depth are indicated. The grade is .41% Cu. No stripping would be necessary but the shape of the area precludes a pit of any great depth, and although the deposit might continue, open pit extraction would be very limited.

From the shape of the possible ore zone and the distribution of the copper in obvious structural relationship to the fracture zone of weakness intruded by the andesite dike it is apparent that this is not a disseminated porphyry copper, in the general sense of the word, but that mineralization has been confined to closely spaced shear zones. The pyrite casts found beyond the limits of the copper staining do not indicate the oxidized capping of an ore body, as leaching is very minor -- in many places the feldspars are not altered in these pyrite cast zones, and it is probable that this pyrite is largely derived from the associated weak lead zinc mineralization in the sediments.

EXHIBIT A

2. b) Ownership certificate, as mentioned on page 1 of application.

This certifies that H. M. d'Autremont and Ira B. Joralemon are the owners in fee to a one-third interest each in the following 14 unpatented lode mining claims, subject only to the paramount interest of the United States, located in the Amole Mining District, Pima County, Arizona, in sections 11 and 12, Township 15 South, Range 12 East, as follows:

Amole No. 1	located	March 31,	1945,	recorded	Book 76,	Page 74,	Record of Mines
" No. 2	"	"	"	"	"	" 75,	"
" No. 3	"	"	"	"	"	" 76,	"
" No. 4	"	"	"	"	"	" 77,	"
" No. 5	"	"	"	"	"	" 78,	"
" No. 6	"	"	"	"	"	" 79,	"
" No. 7	"	"	"	"	"	" 80,	"
" No. 8	"	"	"	"	"	" 81,	"
" No. 9	"	"	"	"	"	" 82,	"
" No. 10	"	"	"	"	"	" 83,	"
" No. 11	"	April 3,	1945,	"	"	" 84,	"
" No. 12	"	"	"	"	"	" 85,	"
" No. 13	"	"	"	"	"	" 86,	"
" No. 14	"	"	"	"	"	" 87,	"

Tucson, Arizona  
 Dated: July 23, 1945

C. M. d'Autremont  
 C. M. d'Autremont

State of Arizona )  
 ) s. s.  
 County of Pima )

Before me, Winifred Griffin, a Notary Public for the State of Arizona, appeared C. M. d'Autremont, known to me to be the person who affixed his hand and seal to the above instrument, the day and year above written.

My commission expires:  
Feb 3, 1946

Winifred Griffin  
 Notary Public



AMOLE PROPERTY  
Pima County  
Arizona

A S S A Y S

<u>Description</u>	<u>Wt#</u>	<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
Amole-Hauck Shaft leached Por	1	+2	0.24	0.33	+2	+2
Parson shaft - Pyrite ore on dump <i>(Now known as Palo Verde Mine)</i>	2	0.66	1.10	+2	1.8	2.8
Rooster claim Dump of 20' incline	3	0.22	0.43	+2	+2	+2
Pinto Incline	4	0.01	0.68	+2	+2	+2
Noone Claim Surf. cut, qtz & por on dump	5	0.02	0.26	0.75	+2	+2
Noone small pit stained por on dump	6	0.003	0.28	1.33	+2	+2
Noone 20' shaft top of hill - grab of dump	7	0.006	1.50	0.75	4.7	+2
Noone cut on S side of hill 4' face	8	0.006	0.24	0.32	+2	+2
Bronco tunnel 40 ft x cut, stained perph.	9	0.008	0.16	0.20	+2	+2
Bronco tunnel qtz on dump	10	0.003	0.28	1.54	+2	+2

<u>Composite</u>	<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>Fe</u>	<u>Si.02</u>	<u>Al.203</u>	<u>CaCO3</u>
1-4	0.17	0.63	0.08	10.9	61.2	7.7	0.2
5-10	.009	0.45	0.91	2.9	35.0	5.6	0.1
					<u>Pb</u>	<u>S</u>	<u>Zn</u>
					0.45	8.0	0.3
					0.80	0.3	+2

LIQUIDATIONS REPORTS

Copper-silica ores shipments to Phelps-Dodge Co. Douglas, Arizona  
Saginaw Hill Mine  
Tucson, Arizona

Date	Smelter Lot No.	Shipper Lot No.	Copper %	Silica %	Silver Oz/Tn	Tons Shipt.	Total Payment
Jun.1 -56	795	1	1.00	91.60	0.40	142.80	\$1,216.22
Jun.22-56	868	2	1.07	90.80	0.44	162.56	\$1,477.64
Jun.29-56	911	3	0.64	- -	0.33	149.16	\$ 804.83
Jul.7 -56	961	( 4	1.02	89.60	0.54	162.24	\$1,388.78
		(	1.06	89.60	0.50	162.24	\$1,423.44
Jul.26-56	1055	5	0.79	92.20	0.56	218.97	\$1,462.29
Jul.31-56	1064	6	0.93	90.20	0.50	226.34	\$1,672.68
Feb.16-57	177	7	1.11	87.40	0.52	516.67	\$3,356.29
Feb.22-57	193	8	1.08	88.0	0.50	530.23	\$3,547.29

Note:

These shipments were made by Strong & Harris and sub-leaseors to the Douglas smelter of Phelps-Dodge. Others shipments were made to the Smelter of the ASRCO in Hayden, Ariz. and To the Phelps- Dodge plant at Ajo, Arizona.

These flux ore shipment<sup>As</sup> were made from the Papago Queen Mine (Saginaw Hill). In this mining operation a large tonnage of waste or second grade-ore was produced. <sup>It went into the dumps.</sup> We plan to remove this material crush and screen it an up-grade it in the fines to make a shipping grade product- and to dispose of the coarse material as decorative rock.



P. O. Box 1844, Santa Fe, New Mexico 87501 505-983-9641

January 8, 1979

Mr. Arthur W. Jacobs  
379 So. Craycroft Rd.  
Tucson, Arizona 85711

Dear Mr. Jacobs:

Please forgive my slow response to your letter of November 15, 1978 concerning your Saginaw Hill property. At the time of my inquiry about its availability, we had a client whom we thought was sincerely interested in the property. However, the decline in copper prices about the time of our negotiation chilled the client's interest.

We believe that the Saginaw Hill property could be shattered by explosives and the copper leached in place, but environmentalist pressures and weak prices make this idea unworkable at present. Therefore, we have no active interest in the Saginaw Hill property at the present time.

Our active interest at this point is in gold, silver and uranium; and if you have any properties which you think may be of interest to us, we would be pleased to review any available data and examine them physically.

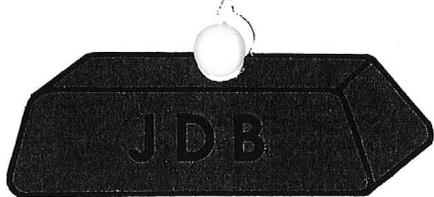
It was nice to receive your holiday greeting. Thank you, and best wishes for good health and a prosperous New Year.

Very truly yours,

*Gordon Veneklasen*

GORDON O. VENEKLASEN

GOV:cm



**JDB Company**  
3010 South 48th Street / Suite 9  
Phoenix, Arizona 85040  
(602) 966-8566

# ASSAY CERTIFICATE

NAME PHOENIX INTERNATIONAL PHONE \_\_\_\_\_  
2501 J. SCHREND  
ADDRESS PHOENIX, AZ 85027 DATE SUBMITTED 11-21-81

SAMPLE NO.	GOLD	SILVER			
WTP25 317	TRACE	NIL			
WTP27	TRACE	0.5 oz/t			
WTP24	NIL	TRACE			
WTP25 318	TRACE	0.4 oz/t			
WTP29 8'	TRACE	TRACE			
WTP29 23'	TRACE	TRACE			
RESULTS OF CUSTOMER SPECIFIED LEAD TESTS					
WTP25 317	TRACE				
WTP27	TRACE				
WTP24	TRACE				
WTP25 318	TRACE				
WTP29 8'	TRACE				
WTP29 23'	TRACE				

JDB CO. IS NOT LIABLE FOR ANY LOSS RESULTING FROM THE USE OF ITS SERVICES. NO GUARANTEES ARE EITHER EXPRESSED OR IMPLIED CONCERNING THE WORK OF JDB CO.

ASSAYER *John Best*

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine      Saginaw Hill Exploration Project      Date      Oct. 21, 1963  
            (formerly called Gold Hill)  
District    Amole District, Pima Co.                      Engineer    Axel L. Johnson  
Subject:    Present Status.      Information from G. A. Barber, geologist, Anaconda Co.

References      Report of May 28, 1963 & report of "Gold Hill" under date of Sept. 12, 1958.

Present Status      All exploration by the Anaconda Co. has been discontinued, and the Option to Lease or Purchase has been dropped.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Saginaw Hill Exploration Project  
(formerly called Gold Hill)

Date May 28, 1963

District Amole District, Pima Co.

Engineer Axel L. Johnson

Subject: Field Engineers Report - Information from G.A. Barber, Geologist in charge Anaconda Co., W.D. Nelson, McFarland & Hullinger

References: Report on Gold Hill under date of Sept. 12, 1958.

Location: About 11 miles southwest of Tucson. Take highway No. 86 (Ajo Road) west from Tucson for about 8 miles. Turn left (south) at a point 0.6 miles west of the Tucson Mt. Park Road. Drive about 3 miles south to the mine. Can also be reached from Valencia road.

Owners: (1) Arthur W. Jacobs, Tucson, Ariz.

\*Odin B. Dodd, Tucson, Ariz.

\*Carlos Robles, Tucson, Ariz. own 52 unpatented claims.

(2) McFarland & Hullinger, Box 811, Tucson, own a number of additional unpatented claims.

Lessees: McFarland & Hullinger, Box 811, Tucson, has lease on claims owned by Jacobs, Dodd & Robles.

Option to Lease or Purchase Anaconda Company -

Anaconda Co. Geology Dept., 151 S. Tucson Blvd., Tucson.

Principal Mining Activity: Diamond drilling by Boyles Bros. Drilling Co. on contract. 1 diamond drill operating 2 shifts.

Past History: Operated by Strong & Harris, Inc. in 1958, who mined and shipped high silica copper ore to the A.S. & R. smelter at Hayden, Arizona. (See report of Gold Hill under date of Sept. 12, 1958.)

✓  
GOLD HILL (

PIMA COUNTY  
AMOLE DIST.

Occasional shipments of high-silica copper ore are being made to the Hayden smelter from the Gold Hill group of claims in the Amole district, about 11 miles southwest of Tucson, Arizona.

Owners and operators of the property are Strong & Harris, Inc. of Tucson, Arizona, with R. H. Harris in charge.

†  
Taken from MINING WORLD, Feb. 1959

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Gold Hill

Date Sept. 12, 1958

District Amole District, Pima County

Engineer Axel L. Johnson

Subject: Field Engineers Report - Information from R. H. Harris & Personal Visit

Location: About 11 miles southwest of Tucson. Take highway No. 86 (Ajo Road) west from Tucson for about 8 miles. Turn left (south) at a point 0.6 miles west of the Tucson Mt. Park Road. Drive about 3 miles south to the mine.

Number of Claims: 54 unpatented claims

Owners: Strong & Harris, Inc., P. O. Box 2202, Tucson, Ariz.  
& Oprs. R. H. Harris, Mining Engineer

Principal Minerals: Siliceous Copper

Present Mining Activity: Mining siliceous copper ore from adit and open cut above same. 3 men working.

Geology & Mineralization: Fissure deposit in rhyolite porphyry. Fissure is from 6 to 14 ft. wide, strikes E & W, and dips about 70° to the north. Ore minerals are chiefly malachite and azurite, with smaller amounts of chalcopyrite and bornite.

Ore Values: According to Mr. Harris the ore averages about 1% in copper and contains from 88 to 90% silica. Favorable smelter and freight rates are obtained from the A. S. & R. on account of the high silica content.

Marketing Facilities: Ore shipped to the A. S. & R. Smelter at Hayden, Arizona.

Mine Workings:  
1 adit into the hillside - about 200 ft. long  
1 open cut on the surface above the adit  
1 raise connecting the open cut with the adit  
1 stope at end of adit



**JDB Company**  
 3010 South 48th Street / Suite 9  
 Phoenix, Arizona 85040  
 (602) 966-8566

# ASSAY CERTIFICATE

NAME PHOENIX INTERNATIONAL PHONE \_\_\_\_\_  
 2501 W. BEHREND  
 ADDRESS PHOENIX, AZ 85027 DATE SUBMITTED 11-21-81

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ASSAYER John Best

SAGINAW HILL EXPLORATION PROJECT  
GOLD HILL  
AMOLE GROUP  
PAPAGO QUENN MINE  
Mining World August 1963 p. 42

PIMA COUNTY  
AMOLE DIST.  
T15S, R12E, sec 12

ABM Bull. 106

MILS PAPAGO QUEEN MINE #0040190354

PALO VERDE (file).

