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REPORT
on the

RAMSEY MINE
Yuma County, Arizona

for
Azure Resources Ltd.,
433 - 355 Burrard St.,
Vancouver, B.C.

by
M.K. Lorimer, B.A.Sc., P.Eng.
25 Apr 75

SUMMARY

The Ramsey mine is an old property located in southwestern Arizona. Since its discovery in 1921, it is reported to have produced over 10,000 tons of a high-grade silver ore.

The mineralization occurs in a brecciated and fractured zone in rhyolite lavas. In addition to silver the vein contains a trace of gold and small amounts of lead, zinc, vanadinite and wulfenite.

The principal development was on the Ramsey vein where a shaft was sunk and several levels driven. Another development, known as the Creosote mine, opened up a narrower and leaner vein.

The Ramsey vein is known to contain at least a small tonnage of silver mineralization of economic grade, and percussion drilling is reported to have intersected material of open-pit grade extending into the footwall rocks. The geologic environment is favourable for the finding of more deposits along the strike of the Ramsey vein, particularly to the north.

It is recommended that a programme of percussion drilling be undertaken to check the reported results of previous underground drilling, and to explore the extensions of the Ramsey zone.

The estimated total cost of this preliminary programme is $29,700.

A MC 20945

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REPORT ON THE RAMSEY MINE

Yuma County, Arizona

INTRODUCTION:

This report is based on a personal visit to the Ramsey Mine in December, 1974, on a report entitled "Report on the Ramsey (R. and A.) Mine Property, Yuma County, Arizona" by R.C. Baker and G.A. Barber dated October, 1967, and on a set of assay plans of percussion drilling done in 1968.

LOCATION:

The Ramsey property is located in Yuma County, Arizona, about four miles southwest of Brenda, a small community on Highway 60 - 70 and near Interstate Highway 10. A gravel and dirt road leads to the property and, although much of it is unimproved, it can be travelled by passenger car. Limited facilities are available at small communities along the highways but there are no major centres of supply closer than Yuma or Phoenix, both about 120 miles away. Map 1.

TITLE:

The property is reported to consist of the following six patented claims recorded at the office of the County Recorder, Yuma, Arizona:

Name	Book	Page
R & A	23	369
R & A #2	23	493
R & A #3	23	494
R & A #4	23	495
R & A #5	509	785
R & A #6	509	786

The writer has not checked the title or standing of these claims but he has seen most of the legal survey posts and can verify that the workings described in this report lie within the surveyed area. Map 2.

TOPOGRAPHY:

The claims are located in rolling foothill country with mainly gentle slopes. A few steep places are found along the watercourses.

The climate being arid, the watercourses are dry most of the year and the vegetation consists of desert shrubs and cactus.

Most of the area is covered with overburden ranging from soil and sand to large boulders but there are frequent outcrops at higher elevations.

The average elevation is about 1800 feet.

HISTORY:

Metallic mineralization is reported to have been discovered in 1921. The locator, John Ramsey, developed and operated a small mine on the site of the original discovery during the 1920s. In subsequent years various operators did more development and shipped ore to smelters.

Records of production are said to be incomplete. It appears, from the existing maps of stopes and development in ore, that upwards of 10,000 tons were extracted. Smelter settlements quoted by Baker and Barber show two carloads assaying 37.53 and 39.12 ounces of silver per ton.

The present owners are reported to have acquired the property in the 1960s. They carried out a percussion drilling programme totalling nearly 5000 feet from two underground levels in 1968.

DEVELOPMENT:

(a) Ramsey: The principal development consists of the Ramsey shaft and over 1500 feet of drifts and cross-cuts. The shaft has a vertical depth of about 450 feet and an incline of about 60 degrees. It is a two-compartment shaft,

well timbered and with a good manway. The timber is still in good condition, at least at the upper levels. A second shaft from surface to the 72 level and about 80 feet to the south is now inaccessible although air passes through it.

There are 11 levels but the three lowest ones are little more than shaft stations. The topmost level is an adit connecting with the shaft 30 feet below the collar. Major development has been done on the 72, 161, 244 and 294 levels.

Several stopes and chutes were seen by the writer but none could be examined. A map dated August, 1967, shows a stope averaging 50 feet long extending from the 72 level to the 294 level and a small stope between the 30 and 72 levels, both on the north side of the shaft. On the south side there is a stope about 40 feet long between the 161 and 244 levels.

(b) Creosote: About 900 feet to the southeast another development, known as the Creosote, consists of a shaft 157 feet deep with about 300 feet of lateral development. An adit connects with the shaft below the collar. It is reported that a narrow stope up to 40 feet long and 70 feet high lies to the north of the shaft.

(c) Miscellaneous: Several other openings exist south of the Ramsey shaft along the apparent surface trace of the Ramsey vein. They are caved or sloughed and little is to be seen in them.

The only building is at the Ramsey shaft. It is structurally sound and could be repaired for exploration purposes at a moderate cost.

GEOLOGY:

The Ramsey and Creosote mines are in an area underlain by rhyolite lavas exhibiting flow structures that dip gently, sometimes north and sometimes south. In many of the surface exposures the rhyolite is fractured and laced with calcite veinlets but generally it is hard and siliceous.

Two north-trending dykes, one of andesite at the Ramsey portal and the other of rhyolite near the Creosote vein, cut the rhyolite lavas. Despite their proximities to the mineralized veins and their nearly parallel strikes and

dips, Baker and Barber could find no evidence that they are associated with the silver mineralization.

The general structural pattern has a northerly to northwesterly strike. Nearly all the mapped veins, dykes and fractures have strikes within these limits and steep dips to the east or northeast. This pattern is also manifested in the linearity of the topography. In this connection, a deep valley, part of a watercourse, extends northerly from the Ramsey mine and could well represent a continuation of the structure in which the Ramsey mineralization occurs.

The Ramsey vein has strikes varying from about N20°W to N45°W and dips from 50 to 70 degrees east. It has been exposed to the bottom level of the mine and has been intermittently traced on the surface for 680 feet south of the shaft. Underground it has been followed about 220 feet north. The widths range up to 14 feet with an average of 5 or 6 feet above the 294 level.

The vein consists of fractured and brecciated rhyolite with iron, manganese and lead oxides, barite and calcite. Thin coatings of vanadinite, and wulfenite are found in some fractures. Gold is virtually absent and zinc occurs sparingly. Although silver is present in significant amounts, its mode of occurrence has not been established. It is believed to occur in the iron and manganese oxides.

The mining pattern down to the 294 level suggests an ore shoot with an almost vertical rake. However, so little work has been done at depth and beyond the old workings that this impression cannot be substantiated.

The Creosote vein strikes from N18°W to N34°W and dips from 63 to 85 degrees east. It is a weak, lensy zone with a maximum width of 6.0 feet and an average of between 1.0 and 1.5 feet. The mineralization is similar to that of the Ramsey except for a greater proportion of manganese oxides and calcite. The vein has been followed to the bottom of the shaft (157 feet) but has not been traced on the surface for more than 40 feet due to overburden.

DRILLING:

In 1968, 41 percussion holes were drilled from the 161 and 244 levels. They were drilled into both

hanging- and footwalls at inclinations ranging from 0 to plus 44 degrees. Each 8-foot length was sampled for silver. The drilling was done under the supervision of the present owners and little is known of the method of collecting and handling the samples. The results, obtained from assay plans, and using a cut-off of one ounce of silver per ton, are tabulated in Appendix A.

The validity of these results depends on the care and methods employed in collecting and assaying the samples and on the degree to which contamination due to percussion drilling of the comparatively flat holes may have "salted" the samples. The results indicate extensive dissemination of silver values in the wall rocks, particularly on the footwall side. Five of the holes gave assays ranging from 22.40 to 54.00 ounces of silver per ton in the first eight feet of hole.

SAMPLING AND ASSAYING:

A longitudinal section of the mine dated August, 1967, a print of which is enclosed with this report, shows 39 samples on and above the 294 level assaying an average of 37.4 ounces of silver per ton over a width of 4.3 feet, and 9 samples below the 294 level averaging 1.8 ounces over 2.4 feet. Since these assays are not from a systematic sampling programme they do not necessarily represent the grade of ore left in the mine. However, the average value of 37.4 ounces per ton agrees closely with the reported smelter assays of 37.53 and 39.12 ounces per ton quoted earlier.

The writer took four samples on the 72 level. The details and results are tabulated below:

Sample No.	Dist. from shaft (ft.)	Width (ft.)	Silver (oz/ton)
988	10 north	6.0	26.9
989	48 "	7.0	24.7
990	60 south	2.7	3.2
991	55 "	7.0	8.3

These samples were cut in locations that appeared representative of the vein. While inconclusive, they support the belief that the mine contains high-grade ore and they indicate that the reported assays are not unreasonable.

Recorded assays show negligible values in gold and molybdenum, erratic, but generally low, values in lead, and values usually over one percent in zinc.

Assay values in the Creosote mine are apparently much lower although a 20-inch sample from the shaft bottom is reported to have assayed 32.92 ounces per ton. A sample taken by the writer from the widest part of the vein in the adit assayed 2.4 ounces silver per ton over 6.0 feet.

Two samples from outcrops with calcite veinlets between the Ramsey and Creosote both assayed 0.1 ounces of silver per ton. This is a further indication that the silver is not confined to the two main veins.

GEOPHYSICS AND GEOCHEMISTRY:

During the December, 1974, examination a magnetometer survey was attempted and two lines of soil samples were taken. The magnetometer results were unreliable, particularly on the second day because of magnetic storms. The soil samples were assayed for zinc and silver in an attempt to establish a relationship between these two metals. The test appeared successful since the higher zinc values were on, or adjacent to, projections of the Ramsey or Creosote veins and they were often accompanied by higher silver values. Geochemistry appears to be a useful exploration procedure for this property.

DISCUSSION:

The Ramsey mine undoubtedly contains a deposit of silver and other metals that has an economic potential. The grades are apparently satisfactory but the size of the deposit remains to be determined. As delineated at present it is too small to support a mining operation.

The results of the percussion drilling are interesting because they suggest the possibilities of an open pit operation. Since little is known of the methods of sampling and the extent of contamination, these results should be confirmed by check drilling.

The future of the property as a profitable mine will depend on finding new deposits or extensions of the known ones. The most promising areas for initial investigation are on possible extensions of the Ramsey vein, particularly to the north.

For the present, exploration can be carried out most economically by percussion drilling. This will serve to delineate target areas that can be checked later by diamond drilling.

CONCLUSIONS:

The high-grade shoot on which the mine was developed is probably limited in size but the area is geologically favourable for the occurrence of similar deposits along the same strike. The existence of comparatively large deposits of low-grade silver ore suitable for an open pit operation is also a possibility.

Because of its history and potential the property merits a moderate expenditure on a phased exploration programme.

RECOMMENDATIONS:

In accordance with the foregoing discussion and conclusions it is recommended that Phase 1 of an exploration programme be carried out. Further phases will depend on the results of the first phase and cannot be considered yet.

Specifically it is recommended:

1. That three percussion holes be drilled from the 161 level into the footwall to check the results of the previous drilling.

2. That a series of percussion holes be drilled at 100-foot intervals to intersect possible extensions of the Ramsey vein to the north and south of the shaft, these holes to be drilled in pairs, one at 45 degrees, the other at 80 degrees, and so collared that intersections will be made at about 50 and 100 feet below the surface. The first holes should be drilled at least 125 feet from the shaft to avoid underground workings. The holes should be drilled well into the footwall. Alterations to the drill pattern and fill-in drilling should be decided by the supervisor in the field.

3. That the drilling be done under the close supervision of an engineer or geologist with the help of a sampler.

4. That cuttings be collected in 5-foot lengths, dried, cut and assayed for silver.

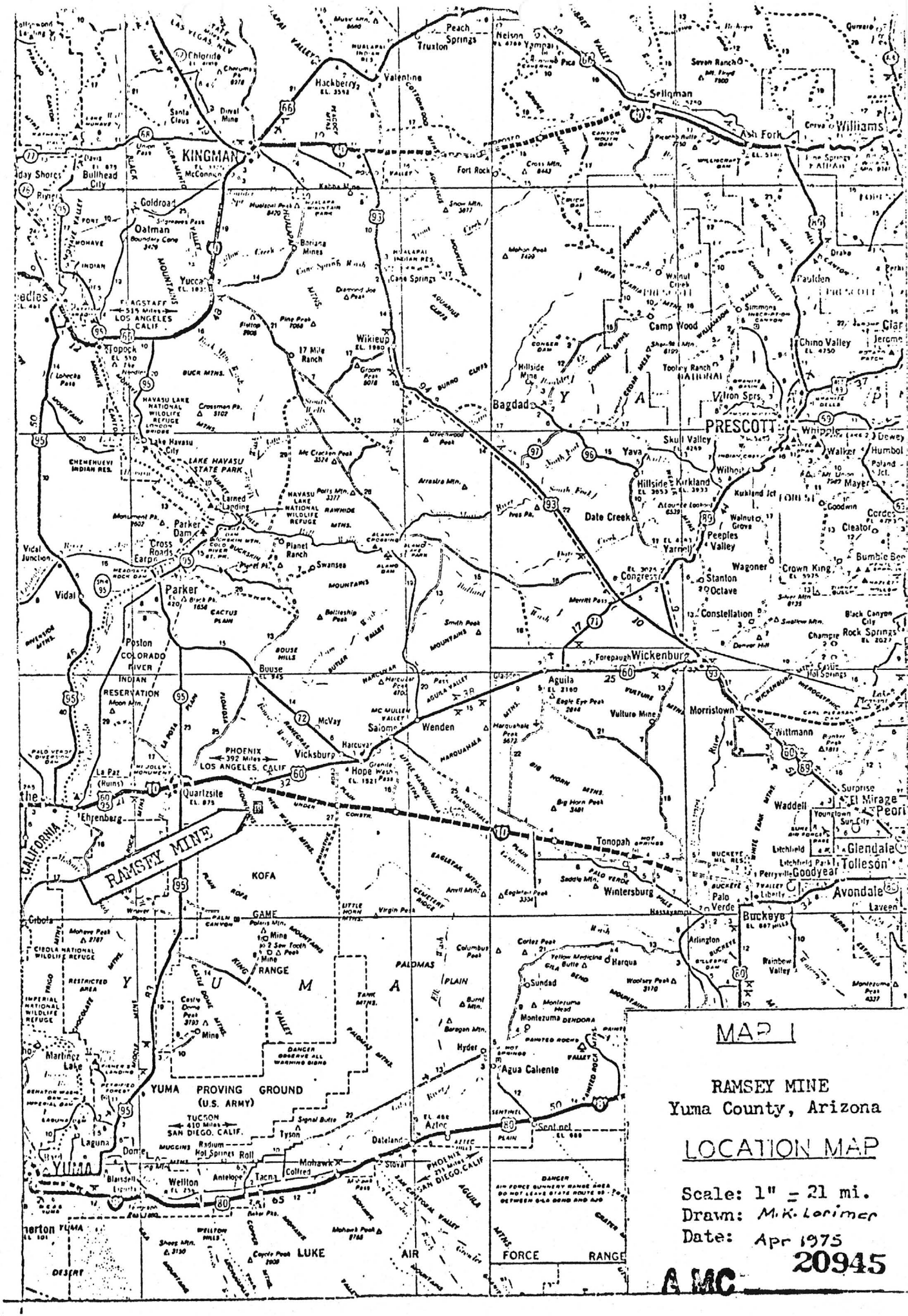
5. That samples be assayed as quickly as possible so that changes in the drilling pattern may be made by the man in the field with a minimum of delay.

COSTS:

The estimated costs are as follows:

Mobilization of equipment	$1000
300 ft. underground drilling @ $6.00	1800
2500 ft. surface drilling @ $5.00	12500
Sample shipping and assaying	2800
Geologist or engineer, 1½ months	3000
Sampler, 1½ months	1200
Room and board, 2 men @ $25/man-day	2250
Transportation	1500
Final report	1000
Miscellaneous & contingencies @ 10%	2650
TOTAL	$29,700

M.K. Lorimer, B.A. Sc., P.Eng.



MAP 1

RAMSEY MINE
Yuma County, Arizona

LOCATION MAP

Scale: 1" = 21 mi.
Drawn: M.K. Lorimer
Date: Apr 1975

20945

AMC

CERTIFICATE OF QUALIFICATIONS

A MC 20945

I, MALCOLM KEITH LORIMER, of the City of Vancouver, B.C., hereby certify:

1. THAT I am a practising Mining Engineer and reside at 3082 West 27th Avenue, Vancouver, B.C.

2. THAT I am a graduate in Mining Engineering of the University of British Columbia, Batchelor of Applied Science, 1950, and have been practising my profession for twenty-five years.

3. THAT I am a member of the Association of Professional Engineers of the Province of British Columbia.

4. THAT I am a member of the Canadian Institute of Mining and Metallurgy.

5. THAT the following is a true record of employment and experience:

1950-52	General engineering, Consolidated Mining and Smelting Company of Canada Limited, Kimberley, B.C.
1952-56	Chief Engineer, Pioneer Gold Mines of B.C. Ltd., Pioneer Mines, B.C.
1956-57	Chief Engineer, Buchans Mining Co. Ltd., Buchans, Nfld.
1957-59	Chief Engineer and Mine Superintendent, Cowichan copper Co. Ltd., Cowichan Lake, B.C.
1959-65	General exploration work for various companies, mostly in southern British Columbia.
1965-75	Associate, H.L. Hill and Associates Ltd., later L.J. Manning and Associates Ltd., Vancouver, B.C.

6. THAT I have no direct or indirect interest in the properties or securities of Azure Resources Ltd., nor do I expect to acquire any.

DATED at Vancouver, British Columbia, this 25th day of April, 1975.

M.K. Lorimer, B.A.Sc., P.Eng.

April 1975

RAMSEY SILVER MINE

YUMA COUNTY, ARIZONA

A MC 20945

The Ramsey Mine was last produced in the late 1960's and shut down in 1968 because of the drop in the price of silver. The ore from the Ramsey vein ran 30 to 50 ounces of silver per ton over widths from 5 to 7 feet. High grade ore is still available as confirmed by recent sampling. There is potential for developing new ore both at depth and along strike. Current depth is 294 feet with five levels developed.

There are additional holes R.L. SEPT. 75

In December 1968 thirty-five percussion holes were drilled from the 161 foot level and the 242 foot level. The grade calculated from those drill holes is 3.56 oz/Ag. per ton and the dimensions of the zone is 235 feet by 125 feet, or approximately 3,000 tons per vertical foot. The zone is still open. Since the structure is 300 feet deep to date and still open and about 500 feet long and still open, there is an immediate potential of ± 2 million tons. The ultimate potential could be in tens of millions of tons of material suited to open pit mining.

The ore is hosted by brecciated and silicified Cretaceous rhyolite into which calcite, barite and manganese has been introduced as vein and fracture fillings. The silver occurs in breccia zones with the calcite, barite and manganese.

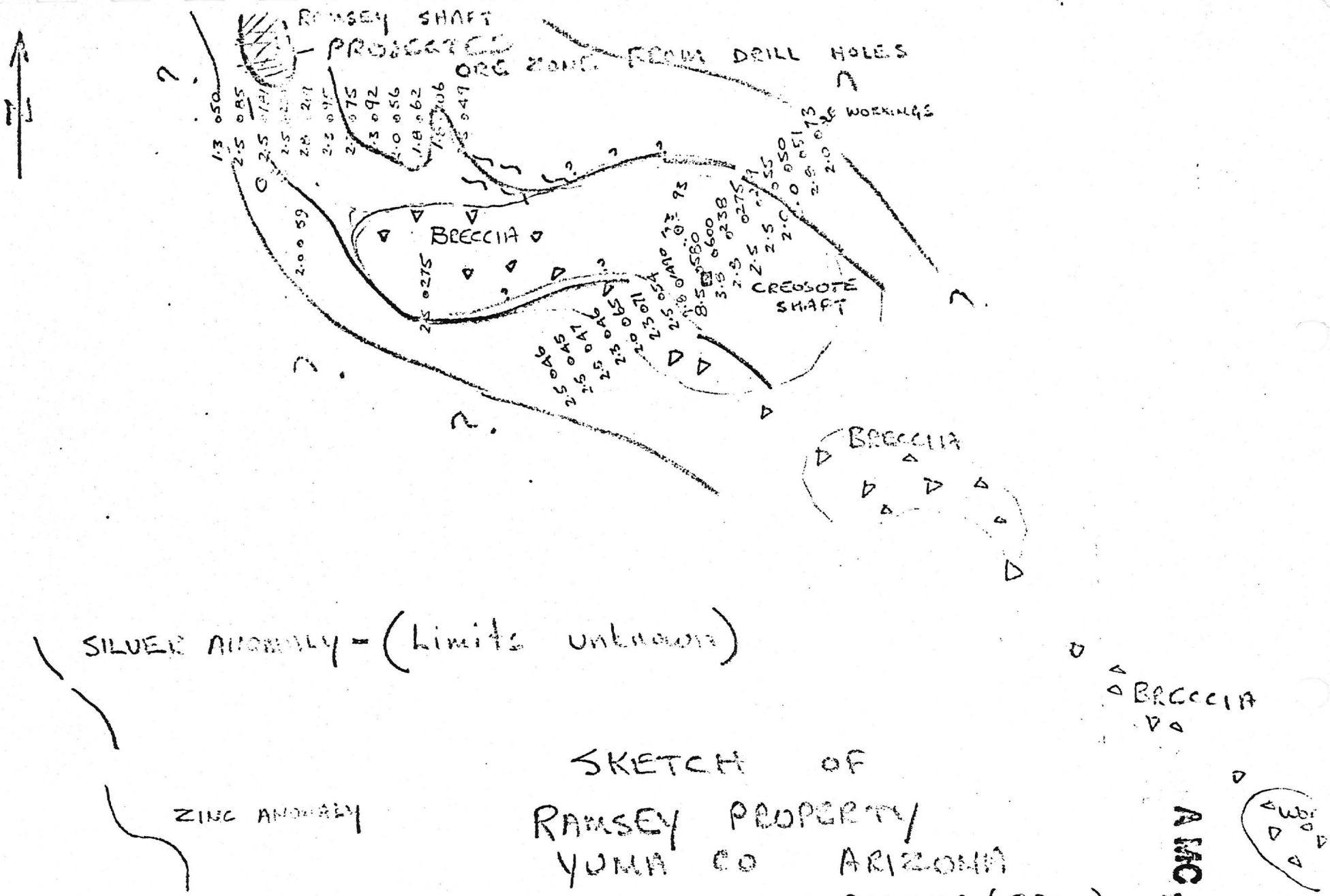
The largest surface area of brecciation found to date is pipe like in dimensions, roughly 800' x 400'. The creosote vein is within this brecciated zone. A geochemical anomaly 300 feet in width corresponding to this structure suggests the possibility of large tonnage in this zone.

Other large areas of silicified rhyolite breccia along strike for 3000' host calcite and manganese vein structures on which surface workings have been made.

Because of certain features i. e. the acidic volcanic flows, the proximity of volcanic necks (centre of volcanic activity) the brecciation and the mineral assemblage of the gangue, I feel that some effort should be directed towards seeking evidence of a volcanogenic massive sulphide deposit.

James R. Glass, P. Eng.

April, 1975.



SKETCH OF
RAMSEY PROPERTY
YUMA CO ARIZONA
GEOCHEMICAL RESULTS (P.P.M.)
Ag Zn
2.5 o 161

Scale

Date 197

J. G.

AMC 20945

Appendix A

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

August 29, 1967

Mr. A. R. Byrd
4670 E. San Francisco Blvd.,
Tucson, Arizona

A MC ~~20945~~

Ore test 1935 and 1937

Dear Mr. Byrd:

The samples from the Ramsey mine in Yuma County assayed as follows:

	ozs. silver per ton	
Red	24.5	Low manganese
Black	15.4	High manganese

Each sample was treated by flotation

Test 2 1935 Red ore

A sample was ground and the pulp treated by flotation. The reagents used are given in table 1 and the results in table 2. There was a small amount of lead in the ore and the pulp was treated to float the lead oxide after the silver was floated.

The concentrate No.1 amounted to 29 tons per 100 tons of feed, assayed 557.2 ozs. silver per ton and contained 64.9 per cent of the total silver.

The second concentrate amounted to 1.3 tons per 100 tons of feed, assayed 68.3 ozs. silver per ton. It contained only 3.6 per cent of the total silver.

The tailing assayed 8.2 ozs. silver per ton.

Tabling would not do as good.

Test 2 1937 Manganese Ore

A sample was ground in a ball mill and the pulp treated by flotation. The ore is much harder than the red ore. It did not have lead that would float. The reagents used are given in table 3 and the results in table 4.

The concentrate amounted to 1.5 tons per 100 tons of feed, assayed 382.9 ozs. silver per ton and contained only 38.9 per cent of the total silver.

The tailing assayed 8.8 ozs. silver per ton.

Yours very truly,

George H. Roseveare
Metallurgist

GHR/h
Enclosure: Invoice

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

Ore No. 1935 Red Test No. 2

A MC 20945

Conditions and Reagents

Table 1

Operation	Conditions			Reagents Pounds Per Ton									
	Time Mins.	% Solids	pH	A-25	Z-6	Na_2S	D-250						
Ball Mill	10	60		0.10	0.05								
Conditioner	2	25	7.8										
Rougher No.1	4				0.05								
Conditioner	3				0.05	0.25							
Rougher No.2	4				0.05		0.02						

Remarks: A-25 - Aerofloat 25
Z-6 - Amyl Xanthate
Na_2S - Sodium Sulphide
D-250 - Dowfroth 250

Metallurgical Products

Table 2

Product	Tons in 100 Tons Feed	Assays ozs./ton						% of Total					
		Silver						Silver					
Heads	100.0	24.9*						100.0					
Concentrate #1	2.9	557.2						64.9					
#2	1.3	68.3						3.6					
Tailing	95.8	8.2						31.5					
Assay Head		24.5											

Remarks: * Calculated.

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

Ore No. 1937 Black Test No. 2

A MC 20945

Conditions and Reagents

Table 3

Point of Addition	Conditions			Reagents Pounds Per Ton									
	Time Mins.	% Solids	pH	A-25	Z-6	D250							
Ball Mill	15	60		0.10	0.10								
Conditioner	2	25	8.0										
Rougher	6				0.10	0.02							

Remarks: A-25 - Aerofloat
Z-6 - Amyl Xanthate
D-250 - Dowfroth 250

Metallurgical Products

Table 4

Product	Tons in 100 Tons Feed	Assays oz per ton						% of Total				
		Silver						Silver				
Heads	100.0	14.4*						100.0				
Concentrate	1.5	382.9						39.8				
Tailing	98.5	8.8						60.2				
Assay Head		15.4										

Remarks: * Calculated

Material hard.

STILL & STILL
CONSULTING MINING ENGINEERS & GEOLOGISTS
ROOM 24 - UNION BLOCK
PRESCOTT, ARIZONA

J. W. STILL
ARTHUR R. STILL

TELEPHONE HI 8-0610
P. O. BOX 1812

April 12,1962

Mr. D. M. Kentro, Ass't. Vice Pres.
Shattuck Denn Mining Corporation
Prescott, Arizona

Re: Ramsey Mine (also known as the R. & A.)
Plomosa Mng. Dist., Yuma County, Ariz.

Dear Mr. Kentro:

The above named property was visited on March 6th and 7th by Messrs. E. R. Tomkinson and R. G. Raabe and was the subject of an intra-company report, by Raabe, under a date of March 15th. Mr. Raabe and Robert Burwell returned to the property, on March 20th and 21st, to conduct further sampling - particularly on the 299 ft. level. At your request, Mr. Raabe and I visited the property on April 2nd and 3rd. The following letter report briefly summarizes my conclusions and recommendations relative to the Ramsey Mine. To my knowledge, Mr. Raabe concurs with the conclusions reached.

Summary:

The past operators of the Ramsey Mine exploited a relatively small, but good grade, silver oreshoot. While not really in the "bonanza" class, some shipments from the property were in excess of 150 oz. per ton silver and the entire oreshoot very probably averaged about 50 to 60 oz per ton.

It appears obvious, however, that several geologic factors combined to terminate the ore zone at shallow depth - and the present mine workings, with one possible exception, have served to

adequately explore the vein zone beyond the economic limits of the single known oreshoot. The geological conditions contributing to the termination of ore with depth, all of which occur between the 253 and 352 levels, are: 1) a change in the footwall lithology, 2) a steepening of the vein zone and 3) a change in the mineralogy. Any one of these factors has accounted for a drastic change in the grade at other deposits - here the combined effect was devastating.

One possibility remains for extending the known oreshoot underground (see Plate 2). This would involve driving the 352 level southeast from the shaft to test the area under the 75 feet length of ore indicated by Raabe's channel sampling of the corresponding drift on the 299 level. However, the presently known extent of rapid closure of the bottom of the oreshoot would indicate that this ore is not likely to extend down to the 352 and, as such, I do not believe that this work - by the Corporation - is warranted.

The outcropping rhyolite-sedimentary contact southeast of the mine was mapped and examined for some 2,000 feet (Plate 1). Several zones of manganese-carbonate mineralization, over short strike lengths, occur but none appear to be of economic significance.

The area immediately northwest of the Ramsey Mine, for about 1,500 ft., is covered by alluvium and coarse stream wash. Within this strike length other orebodies of the Ramsey type could conceivably occur. However, the highly oxidized and friable vein material typical in the Ramsey would not lend itself to exploration by drilling and the small size of the single known economic oreshoot (10,000± tons) would not justify exploration by sinking and drifting.

In light of the above, I am cannot see any reasonable potential at this property of sufficient size to merit the further interest of Shattuck Denn. Because of this conclusion, I have no alternative but to recommend that you abandon your interest in the property without incurring any additional expense therein.

Past Production and History:

The Ramsey Mine was discovered by John L. Ramsey in 1921. He personally exploited the deposit until the late 1920's, at which time he let it out to lessees. The property has operated intermittently through the years with the last known leasing operation being conducted in 1957.

As is often the case with small mines, no complete production records are available. However, from the size and outline of the stoping areas I have estimated that the mine probably produced in the order of 10,000 tons. Presumeably this was all direct shipping ore since no evidence exists on the ground of any past treatment plant.

The best available sampling of the probable tenor of the ore is based upon the record of shipments to smelters at Hayden, El Paso & Inspiration, for the period of 1940 through 1947 (attached as Appendix A). It is probable that earlier shipping records exist but are held in storage by the smelters. Apparently no shipments have been received, by these smelters, since 1947. This data is tabulated and weighted below:

Smelter	Date	Tons		oz. Ag/ton
AS&R-Hayden	1941	81)	937	46.22
" El Paso	1942-47	856)		
International	1940-41	323.7		51.64
"	1942-44	882.7		43.86
		2,143.4		46.07

It is logical to assume that this tonnage, for the most part, represents roughly the lower one-fourth of the oreshoot. Because of the structural and mineralogical changes with depth the average grade of the over-all orebody may have been somewhat higher than this figure.

General Geology and Nature of the Vein Zone:

The Ramsey vein occurs along the contact between Mesozoic sediments and a Cretaceous to Tertiary rhyolite. On the eastern end of the surface area examined (Plate 1) the rhyolite appears to be conformable with the sediments but within the area of the Ramsey Mine the bedding in the sediments intersects the contact at an angle of about 40 degrees. The Mesozoic sediments consist of dirty limestones (on the eastern end), quartzites, sandstones and shales. The rhyolite in part is tuffaceous although underground in the mine it it usually a blocky, light colored rock with small quartz phenocrysts that is devoid of either bedding or flow banding structures. The bulk of the rhyolite probably represents flows and, if this is the case, it was deposited on an old erosional surface of some modest relief. In the immediate area of the Ramsey Mine the two rock types are in fault contact - the Ramsey vein occuring within the fault plane.

The vein is completely oxidized to the present bottom of the mine and the mineralogy of the deposit is moderately complex. The typical vein matter consists of a spongy mass of black to reddish quarts-carbonate material with lesser amounts of manganese oxides, iron oxides, barite and celestite. A wide variety of secondary minerals of both lead and silver occur. However, lead (as both residual galena, lead carbonates and other minerals) occurs sporadically and it does not

appear to have contributed greatly to the income from past operations. Aside from lead and silver, no other minerals or metals occur in sufficient amounts to be recoverable. Based upon a specimen shown to Raabe and Tomkinson - allegedly from this deposit - Raabe believes the primary silver to have been in the form of argentite.

Below the 253 level the vein filling has the aspect of being more open and somewhat lighter in color - more barite and celestite appear and pyromorphite-mimetite becomes noticeable. On the 352 level, near the shaft, pyromorphite-mimetite occur in a spectacular abundance, filling all fractures in the hangingwall rhyolite for as much as 20 feet outward from the vein, although they are probably not present in sufficient abundance to constitute an ore of lead. To the northwest on the 352 level the manganiferous vein material rapidly narrows and finally the "vein" becomes merely a zone, some 4 ft. wide, of partially rounded boulders (both rhyolite and sediments) that are essentially "dry" of any introduced vein filling material what-so-ever.

With depth below the 352, in the main shaft, the vein continues with persistence and looks almost the same as the material between the 253 and 352 levels, however, it is essentially barren of silver (see assays, Plate 2). It is a spongy, blackish siliceous material laced with bands of coarse celestite. When viewed under the binocular microscope the spongy material is seen to contain an abundance of very tiny yellowish-green pyromorphite (?) crystals.

Based upon the Iron King sampling, the remaining portions of the vein vary in width from 3 to a maximum of about 8 feet. The stopes in the upper part of the mine attain widths of as much as 8 to 10 feet although some of this width can be attributed

to spalling of the hangingwall either during or after mining. It is likely that the width of the economically mineralized material averaged about 6 feet.

Ore Controls and Changes with Depth:

The primary ore control of the deposit is undoubtedly the rhyolite-quartzite fault contact. An indicated second control (see Plate 2) is a steeply dipping fault (or faults) that comes out of the rhyolite hangingwall and intersects the contact at a small angle. The main portion of the oreshoot occurs to the northwest of this intersection although locally both the hangingwall fault(s) and the contact zone have been stoped for a short distance to the south of the intersection. Quite probably the contact zone was initially mineralized only with quartz, manganese minerals and siderite; the hangingwall fault occuring later and the lead silver mineralization being introduced along the intersection of the two structures. The trace of this line of intersection is indicated on Plate 2 by a green arrow. Curiously, it projects downward directly into the area of "dry boulder" vein filling on the 352 level.

Between the 253 and 352 levels the lithology of the footwall changes from a fine grained, greenish quartzite to a loosely consolidated sandstone with admixed shale. This lithologic change caused a deflection in the dip of the vein of about 7 degrees (see Plate 3), carrying the vein - at least in part - into a position where both walls are in sediments. The bottom of the economic oreshoot is sharply delimited by this change in wall rock and dip.

Additional Ore Prospects:

The only potentially worthwhile underground development remaining, as discussed in the summary, would be the advancement of the 352 level to the southeast to test the 75 ft. block of ore exposed in the floor of the 299 level. The configuration of known ore limits would indicate that this ore probably will not project down to the 352. This reasoning is further substantiated by the sample taken in the short south stub off the shaft at the 352 level (3.2 ft. of 4.84 oz. per ton) as well as by the fact that the ore block on the 299 (75 ft. at 29.88 oz.) is already appreciably below the grade for the lower one-fourth(?) of the deposit (2143 tons at 46.07 oz.). While this may constitute a valid "wildcat" target for a small individual lessee it does not constitute, in my opinion, a sufficiently large target to arouse Shattuck Denn's interest.

The present shaft has already tested something over 200 feet of dip length directly below the known shoot. While it is entirely possible that additional depth could bring about a repetition of the rhyolite-quartzite relationship - and thus an environment potentially favorable for ore - there is, in my opinion, little justification for deeper work at this time. My thinking in this matter is largely influenced by the limited size of the only district orebody known to date, i.e. the quarry hardly seems worth the pursuit at that depth. It is possible that a detailed geologic study of the area (both surface and underground) could develop a larger potential than that known to date by the projection of geologic contacts (and theory) such that more worthwhile targets, particularly at depth, might be indicated. However, such programs are long term, expensive

and quite highly speculative and I believe that Shattuck Denn has sufficiently better prospects - within the limits of their own properties - to wisely preclude the tying up of their limited number of technical personnel on such a "long shot".

With regard to repetitions along strike, the area to the southeast was examined, and mapped in a cursory manner, as shown on Plate 1. Several zones of siliceous manganese-carbonate mineralization do occur, over short strike lengths, within this area. Two such zones were sampled by us (at traverse stations 2 and 5) and were found to be essentially barren of silver. These same areas had been tested in the past, by parties unknown, by short drill holes. Both of these zones are entirely within the sediments and the adjacent contact is barren of mineralization. Other small zones exist between Sta. # 5 and the Ramsey Mine. These are entirely within the rhyolite and, from the limited work done on them, they too must be of low grade.

One large shaft is located well within the rhyolite at our station 11. Neither Byrd nor Burney, who visited the property with Raabe and Tomkinson, had any contributing knowledge of this workings. A 4 to 5 ft. zone of manganiferous vein material has been trenched both to the north and the south of the shaft. The shaft timbers appear to be good and are probably not over 10 to 15 years old. The shaft is in excess of 100 ft. deep although no evidence remaining on the ground would indicate that an ore bin ever existed at the site. Due to the limited time available for the examination, and a total lack of knowledge as to the condition of the shaft below the collar, this workings was not entered.

The area to the northwest of the Ramsey Mine is a rather broad foothills outwash and is alluvial covered for about 1500 feet along the projected strike of the Ramsey vein. There is a possibility of additional oreshoots in this direction, although the only major factor that gives this area potential is the fact that it is covered and has, therefore, not been previously prospected. Because of the nature of the normal vein material at the Ramsey (oxidized and friable) diamond drilling would not be a satisfactory exploration tool. The limited size, and potential worth, of a second 10,000 tons silver orebody precludes exploration by underground methods within an area of such limited known potential.

Conclusion:

While the Ramsey Mine area does constitute a very interesting geological occurrence - from many aspects - it does not, in my opinion, hold a sufficient potential for additional orebodies to warrant the expenditures necessary for their exploration and/or development.

Arthur R. Still
Mining Geologist

ARS/

Copies: Kentro-2
Mine office file-1
Raabe-1
Still & Still file-1

FORM 130

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SMELTING DEPARTMENT
File No. 700
April 2, 1962

Mr. Arthur R. Still
P. O. Box 1512
Prescott, Arizona

Dear Art:

Our old records, back in the 20's, leave a lot to be desired; however, I have found these in the 1940's.

Listed below are shipments made under the name of John L. Ramsey. We did not assay for lead.

Date	Tons	Ag	Au	Cu	SiO_2	Al_2O_3	Fe	CaO
Oct. 1940	63.8	43.06	Tr	Tr	60.6	2.2	5.9	5.0
June 1940	29.0	33.73	Tr	Tr	60.2	2.7	4.6	5.8
	9.6	271.04	Tr	Tr	42.1	0.2	2.6	10.7
May 1940	40.2	38.66	.003	Nil	60.1	0.5	4.9	7.5
	32.7	50.44	Tr	Tr	55.2	1.9	5.2	7.1
Jan. 1940	23.7	73.86			62.4	1.9	4.6	5.2
Feb. 1940	30.9	61.96			63.6	2.6	4.3	4.7
Jan. 1941	51.3	29.84	.003	0.29	49.3	1.5	5.6	13.4
	7.2	185.84	.005	Tr	38.9	0.1	1.7	12.8
	21.6	16.52	Tr	Tr	49.7	2.3	3.4	14.7
Mar. 1941	13.7	21.54	Tr	Tr	45.7	1.6	3.9	17.5

In 1942 - 1944 under the name of R & A Mines about 1500 tons were shipped of which I list some examples:

R & A MINES:

Date	Tons	Ag	SiO_2	Al_2O_3	Fe	CaO
July 1942	44.4	29.44	48.2	1.4	3.4	15.0
	47.3	33.10	50.0	1.1	3.6	16.0
Aug. 1942	50.3	18.43	46.2	1.4	3.5	15.6
	55.0	18.97	43.2	1.0	3.2	17.1
	40.0	26.70	46.4	1.8	3.4	15.4
	50.0	43.07	47.8	1.4	3.5	15.2
Sept. 1942	47.8	60.20	47.3	0.8	4.3	14.4
	50.9	38.98	44.5	0.8	4.3	15.6
	43.6	25.45	45.9	0.7	3.2	16.8
Oct. 1942	49.6	54.67	55.0	1.3	3.5	13.1
	39.4	29.41	58.7	1.3	4.3	11.6
Feb. 1943	43.8	64.72	42.7	1.3	4.7	21.7
	43.5	47.68	45.2	1.3	4.6	19.0
	41.1	65.23	48.4	1.3	4.3	16.0
March 1943	47.2	61.21	41.8	1.2	4.0	19.8
April 1943	43.9	35.76	38.3	1.0	3.0	22.2
	44.1	39.42	41.0	1.4	3.7	18.5
May 1943	49.5	88.30	44.9	1.6	3.8	16.4
April 1944	51.3	51.64	46.1	0.9	3.7	19.8
	885.7	(43.858)				

I trust this is of some assistance to you. We could use some ore of this type.

Sincerely yours,

Henry Allen
Smelter Superintendent

:fm

AMERICAN SMELTING AND REFINING COMPANY
SOUTHWESTERN ORE PURCHASING DEPARTMENT
803 VALLEY NATIONAL BUILDING
TUCSON, ARIZONA

REED F. WELCH
MANAGER

April 2, 1962

Mr. Arthur R. Still
P.O.Box 1512
Prescott, Arizona

RAMSEY(R&A) MINE, YUMA COUNTY

Dear Arthur:

I have your letter of March 30 requesting production record from the Ramsey Mine. In November 1957 I compiled this information for Mr. J.H. Byrd and enclose a copy of my letter to Mr. Byrd listing receipts from this property at El Paso and Hayden plants showing tonnage, assay and analysis.

If shipments were made to other plants from the Ramsey Mine my file does not indicate tonnage or destination.

Please let me know if I can be of further assistance.

Yours very truly,

Reed

REED F. WELCH

Enclosure

Tucson, Arizona

November 6, 1957

Mr. J. H. Byrd
Byrd Mining Company
721 South 6th Ave.
Tucson, Arizona

Ramsey (R+A)

RAMSEY (R&A) MINE, PLOMOSA DISTRICT
YUMA COUNTY, ARIZONA

Dear Mr. Byrd:

In response to your telephone request the other day I have looked up our record for the Ramsey Mine near Quartzsite and show below shipments received at El Paso and Hayden plants for the period 1941 through 1947.

Year	Shipper	Dry Tons	Approx. Average Assays Silver Oz./Ton	Lead %	Copper %	SiO_2 %	Fe %	CaO %	Al_2O_3 %
Receipts Hayden Plant									
1941	R&A Mining Co.	82	28.6	-	-	44.0	6.2	20	2.6
Receipts El Paso Plant									
1942	R&A Mining Co.	159	56.2	5.5	.05	43.0	5.5	16	1.0
		22	199.9	37.0	.07	31.0	1.4	11	-
1944	R&A Silver Mine	53	113.4	14.2	.05	47.0	3.0	10	-
	Perry, Cornett & Starwick	209	31.5	4.3	.04	54.0	3.5	10	.5
1946	Arizona-Williamsto Co	103	54.6	4.8	.05	50.0	6.5	12	.4
	Black Mesa Mines	115	27.9	2.9	.03	39.0	4.0	15	1.8
		159	30.6	1.9	.03	50.0	4.3	12	2.0
1947	Ditto	48	32.7	2.0	.08	[illegible]	4.0	13	2.0
		937	(46.25)						

Yours very truly,

REED W. WELCH

D:RWD:bl:rb

Oct- 1967

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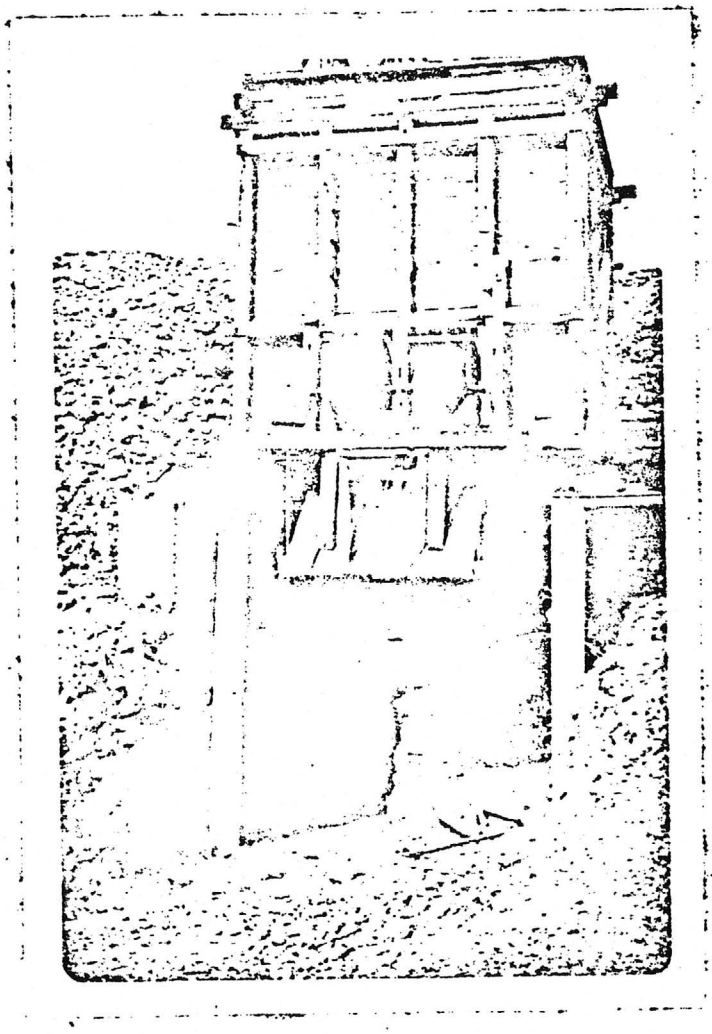

PORTAL OF THE ADIT(30 FOOT) LEVEL OF RAMSEY SHAFT WITH

ORE BIN ABOVE

Report on the

RAMSEY (R. AND A.) MINE PROPERTY

Yuma County, Arizona

R. C. Baker
G. A. Barber

October 1967

Contents

LIST OF ILLUSTRATIONS

AMC 20945

INTRODUCTION

This report summarizes the results of a geologic examination of the Ramsey mine and adjacent areas made by the writers during the period of May through September, 1967. This investigation was made at the request of Mr. A. R. Byrd, Jr. of Tucson, Arizona. A total of ten man-days were spent mapping and sampling surface and underground exposures at the property. Sixty-one rock samples were taken in the course of this work, and these assay results together with numerous additional samples taken at the property by various companies and individuals during the past ten years have been incorporated in this report. A series of seventeen plans and sections (Plates I - XVII) showing claim locations, surface and underground development, sample locations and assays, and geologic features of the property accompanies this report.

LOCATION

The Ramsey mine, otherwise known as the Ramsey and Arizona or R. and A. mine, is located in Township 3 North, Range 15 West (unsurveyed) in Yuma County, Arizona, four miles southwest of Brenda, a small settlement located sixteen miles east of Quartzsite on U. S. Highway 60-70 (see attached Location Map, Figure 1, page 2). The property is accessible by way of an unimproved road leading south from the main highway approximately one mile west of Brenda. Interstate Highway 10, currently under construction, passes approximately two miles north of the mine property.

The Ramsey mine is situated in the Plomosa Mining District in the low, northeast foothills of the Plomosa Mountains (see Topographic Map, Figure 2, page 3). Elevations in the vicinity of the mine range from 1650

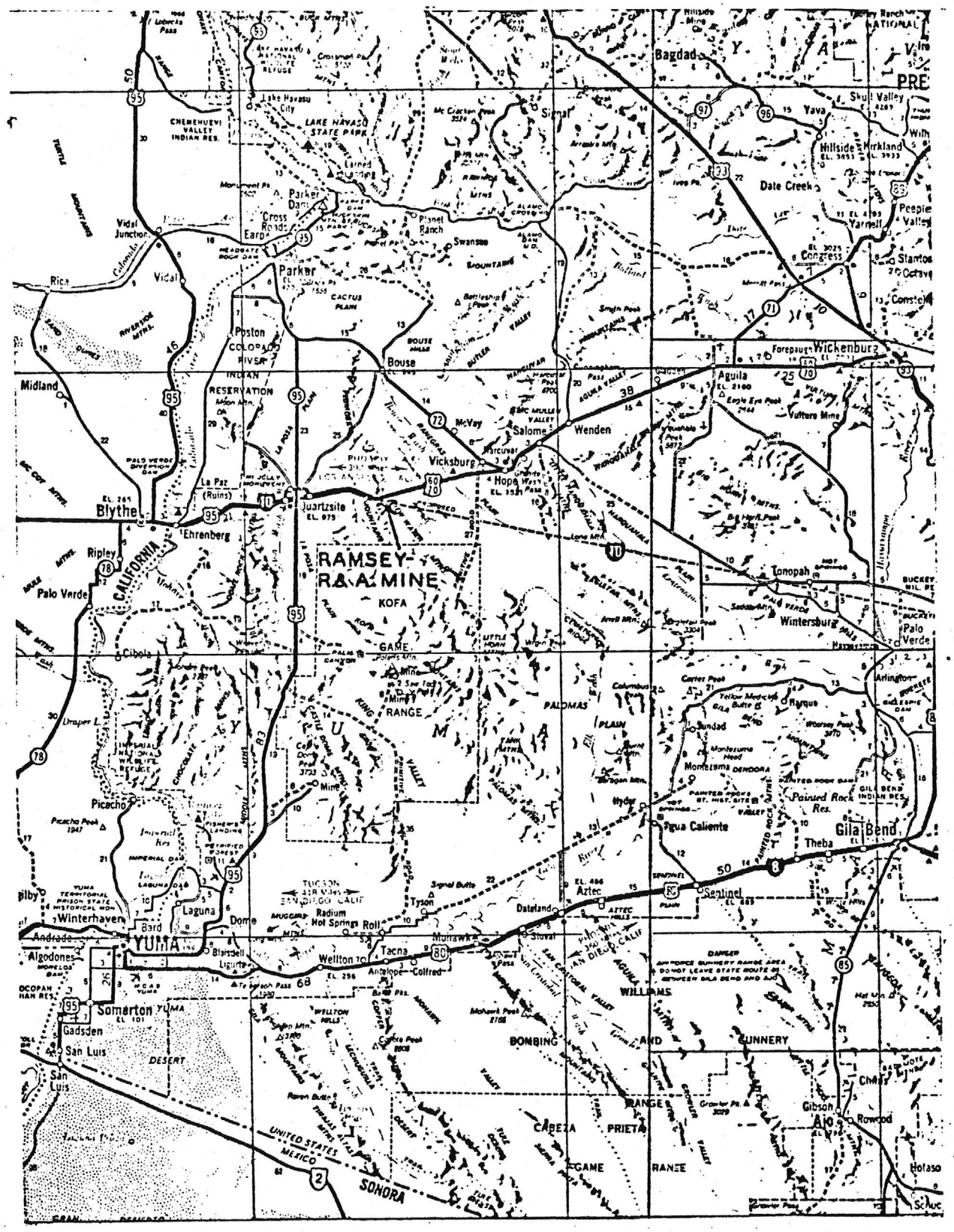

Figure 1. - Location Map, scale: 1 inch = approximately 21 miles.

AMC 20945

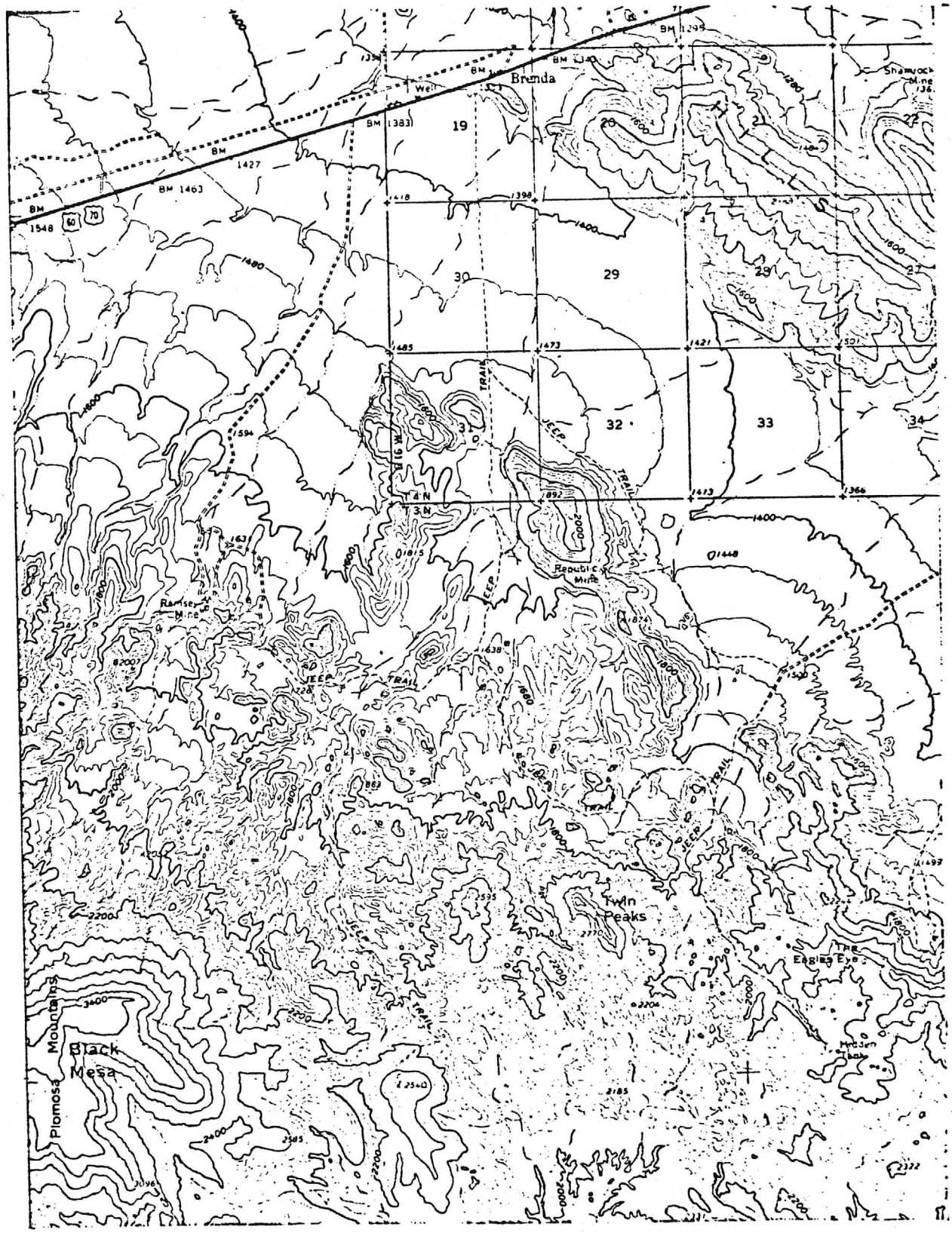

Figure 2. - Topographic map of the Ramsey mine area, scale: 1:62,500.

to 1900 feet above sea level. The climate is arid and there is no near-surface water supply on or near the property, the deepest mine workings (448 feet) being completely dry. Water used in the construction of the nearby interstate highway was carried by pipeline from a well approximately twelve miles to the east. The nearest electric power is at Brenda, four miles to the northeast. The Atchison, Topeka, and Santa Fe Railroad passes just east of Hope, approximately sixteen miles east of Brenda.

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PROPERTY AND OWNERSHIP

The Ramsey mine property consists of four contiguous unpatented lode mining claims, designated the R. and A., R. and A. 2, R. and A. 3, and R. and A. 4 claims, situated as shown on the accompanying Sketch Map, Plate I. These claims were originally located by John Ramsey about 1921, and were held by him until his death in 1960. The property is now owned by the Ramsey Estate, represented by the legal firm of Westover, Keddie, and Choules of Yuma, Arizona.

HISTORY AND PRODUCTION

According to Roscoe G. Wilson, in a feature article in the Arizona Republic of June 12, 1960, John Ramsey came to Arizona from Nevada in 1907, shortly after discovering and selling the rich Skidoo gold mine near Death Valley. Ramsey spent several years prospecting in the Kofa and Plomosa Mountains, eventually moving northward, where, in 1921 he made the original discovery at the present site of the Ramsey shaft. The mine was developed and operated by Ramsey until the late 1920's, after which it was sporadically leased to various individuals who obtained some additional production.

There are no complete production records for the Ramsey mine. Based on a cursory examination of the extent and width of stoping, it is estimated that between 12,000 and 14,000 tons of ore have been extracted through the Ramsey shaft. The bulk of this production came from the north side of the shaft, where a continuous stope five to seven feet in width and up to seventy feet or more in length extends from the 30-foot level to just above the 294-foot level. There is no record of the average silver content of ore mined from this large stope. Smelter settlement sheets on two car-load shipments of Ramsey mine ore shipped to the Magma smelter in 1957, and believed to be from a smaller stope south of the shaft above the 244 level, report 37.53 ounces and 39.12 ounces silver per ton. There are no other official records of tonnage and grade produced from the property.

AMC 20945

DEVELOPMENT

The two principal underground developments on the Ramsey property are the Ramsey shaft and the so-called Creosote shaft, 900 feet to the southeast (see Sketch Map, Plate I and Surface Geologic Map, Plate II). The 4 x 8-foot Ramsey shaft is inclined 53° to 65° toward the southeast and reaches a vertical depth of 448 feet below the surface. Approximately 1530 feet of drifts and cross-cuts have been driven from the Ramsey shaft, most of this footage being represented by the 30-, 72-, 125-, 161-, 244, and 294-foot levels (see Composite Plan of Ramsey Mine, Plate X). Lateral development along the vein is restricted to within less than 30 feet of the shaft below the 294-foot level. As previously noted, a large stope north of the shaft is five to seven feet wide, up to 70 feet long and

extends almost continuously from the 30-foot (adit) level to below the 244-foot level, a distance of about 280 feet down the dip of the vein (see Ramsey Shaft Composite Longitudinal Section, Plate XIII). Other smaller stopes are found south of the shaft above the 72-, 161-, and 244-foot levels. An inaccessible shaft at the surface approximately ninety feet south of the main Ramsey shaft may connect with the 161- or the 244-foot level at depth. Neither this shaft nor any of the stopes in the Ramsey mine has been mapped in detail.

All of the drifts in the mine and the Ramsey shaft itself are in excellent condition. The shaft is timbered to the bottom and the ground stands well with little or no lagging in the shaft and very little ground support required in the drifts. The stopes are open and show no evidence of sloughing or collapse over the years. The headframe of the Ramsey shaft appears to be in serviceable condition. There is good air circulation throughout and no water anywhere within the mine.

The 4 x 8-foot Creosote shaft is inclined 79° to 89° southeast and reaches a vertical depth of 157 feet, with 292 feet of drifts on seven levels (see Creosote Shaft Composite Plan, Plate XVI). There is no headframe and some timber and other debris have fallen into the shaft. The shaft is timbered and lagged and is accessible to the bottom. A stope on the north side of the Creosote shaft is about three to four feet wide, up to 40 feet long, and extends about 70 feet vertically from above the 113-foot level to the bottom. Like the main Ramsey shaft, the ground in the Creosote shaft appears to stand well and requies little support.

Other development on the Ramsey property is confined to shallow openings along the surface trace of the Ramsey and Creosote vein zones (see Surface Geologic Map, Plate II).

GENERAL GEOLOGY

The Ramsey mine is within a thick series of rhyolitic volcanic rocks which are exposed on the surface of the property and extend to the bottom of the Ramsey shaft. The rhyolite, which apparently represents an accumulation of lava flows, is a hard, siliceous rock, which in many places is structureless and gives little evidence of its attitude. Flow structure in the rhyolite just north of the Creosote shaft strikes east-west and dips 30° to 35° north. The dip of the rhyolite in both the Creosote and main Ramsey workings ranges from 16° to 35°, toward both the north and south. Near the east edge of the property the rhyolite is overlain by and in part interbedded with shales and minor thin impure limestone beds which strike north and dip about 35° toward the west. At the portal of the Ramsey adit, the rhyolite is overlain by fine-grained arkose dipping 27° west. The general impression is that the rhyolite flows are gently dipping, with local dips of up to 75° due to the typical contorted flow banding of the lavas.

Many of the rhyolite exposures are fractured, shattered, and/or brecciated, but this fracturing for the most part is believed to be an original feature of the lava flows and probably does not represent later structural features that might be significant in ore localization.

A steeply dipping, north-trending rhyolite dike, approximately 45 to 80 feet wide, cuts the rhyolite lavas just west of the Creosote shaft and is in turn cut by thin stringers of the Creosote vein zone (see Plate II). An andesite dike is exposed at the portal of the Ramsey adit and in the wash fifty feet to the north and appears to approximately parallel the strike of the Ramsey vein. There is no evidence, however,

that the rhyolite or andesite dikes are in any way related to or responsible for silver mineralization on the property, although they both are approximately parallel to the main Ramsey vein.

MINERALIZATION

Silver mineralization on the Ramsey property occurs in two separate vein-like structures herein referred to as the Ramsey and Creosote veins. These two veins are approximately parallel in strike and about 500 feet apart at the surface as indicated at the south end of the R. and A. claim (see Plate II). Since they differ in mineralogy, metal content, and apparent economic potential, these two veins will be described separately.

Ramsey Vein

The Ramsey vein is exposed to a depth of 446 feet in the Ramsey shaft and can be traced intermittently on the surface for a distance of 680 feet south of the shaft where it apparently is covered by soil and surface debris (see Plate II). The strike of the vein in the Ramsey mine workings averages N. 20° W. above the 204-foot level and varies between N. 25° and 45° W. in the deeper workings (see Plates III through IX). The dip of the vein ranges from 50° to 70° east throughout the mine. On the surface the strike of the vein swings gradually to about N. 50° W. as it is traced south from the shaft, with a fairly consistent dip (see Plate II). The Ramsey vein is not exposed on the surface north of the Ramsey shaft where it is covered by a broad, gravel-filled wash which extends for at least 300 to 400 feet in that direction.

The Ramsey vein consists of a rubbly fractured, shattered, and brecciated zone in the rhyolite containing variable amounts of red-

brown iron oxide, minor manganese oxide, white barite, gray to dark gray or black calcite, drusy fracture coatings of small vanadinite and wulfenite crystals, and locally prominent black lead oxides. No silver minerals have been identified in the Ramsey ore. Presumably the silver values are tied up in the iron and manganese oxides. In many places calcite, barite, and iron oxides occur in banded zones within the crushed and fractured zone separated by lenses and bands of barren rhyolite. The proportion of rhyolite to vein material within the zone is quite variable.

The position of the Ramsey vein on the various levels of the mine is shown on the accompanying level plans and cross-sections (Plates III-IX, XI, XII). Vein widths in the Ramsey mine range up to 14 feet where branching of the vein occurs, but average about five to six feet through most of the workings above the 294-foot level. On the 294-foot level the vein weakens and becomes lensy north of the shaft although the structure containing it persists and three feet of vein material with low silver content occurs in the north face of 294 drift (see Plate VIII). The vein narrows somewhat in the shaft below the 294-foot level but at the bottom of the shaft it is represented by a strong mineralized structure from 1.5 to 3.0 feet wide (see Plate IX).

Branching of the vein occurs on a small scale at many places throughout the mine workings, but one potentially very important split occurs just north of the shaft on the 204 and 244-foot levels. On the 244-foot level, a 3.5 foot vein in the footwall of the main vein strikes N. 24° W. compared with a strike of N. 45° W. for what has been considered the main vein at the shaft (see Plate VI). On the 244-foot level (Plate VII), the same footwall branch of the vein strikes N. 29° W. compared

with the N. 42° W. strike of the main vein in the 244 drift. The more westerly strike of the developed vein south of the shaft below the 204-foot level has already been noted. It seems more than likely that the lower workings of the Ramsey mine are on a hanging wall strand of the mineralized zone, and that a second, as yet virtually unprospected, strand lies in the footwall west of the existing mine workings south of the shaft (see Composite Plan of the Ramsey mine, Plate X , Sections A-A' and B-B', and Plates XI and XII).

Silver values in the Ramsey vein are erratic in detail but in general the higher values in the present workings show a well-defined ore shoot extending 15 to 40 feet south of the shaft and 40 feet or more north of the shaft from the 30-foot (adit) level to the 244-foot level (see Ramsey shaft Composite Longitudinal Section, Plate XII). The north edge of the large stope north of the shaft was not accessible during our examination and was not sampled, so the north limit of higher silver values is not known at this time. An average of 21 samples taken within this ore shoot in the main vein shows an average grade of 35.89 troy ounces per ton silver for an average width of 3.85 feet. Much of this higher grade section of the vein has been mined out and a significant tonnage consists of pillars immediately adjacent to and protecting the Ramsey shaft. It appears that this sample assay average, which is slightly lower than the grades of the two ore shipments previously mentioned could represent a grade to be expected in portions of the Ramsey vein system.

The erratic distribution of silver is illustrated by duplicate samples taken at several locations. Following is a tabulation of comparative samples taken at approximately the same locations within the vein:

Location	Width (ft.)	Initial Sample oz./ton	Check Sample oz./ton
72-foot level north	4.0	6.32 (B-B)	19.6 (M-H)
244- " " "	1.5	8.84 (B-B)	3.44 (B-B)
" - " " "	0.5	15.06 (B-B)	7.32 (B-B)
" - " " "	5.0	408.20 (B-B)	37.66 (B-B)

This variance is not due to assay laboratory errors, as check assays practically duplicate values for individual samples. It is therefore assumed to be due to erratic distribution of silver within the vein and indicates that a large number of samples will be necessary for mining control.

With the possible exception of zinc, no metals other than silver are present in the Ramsey vein in economically significant amounts. This is clearly shown by the following tabulation of samples assayed for a variety of metals:

Location	Gold oz./ton	Silver oz./ton	Lead %	Zinc %	Mo %
Ore pile from Creosote shaft	trace	16.84	0.3	1.4	- -
Screenings from Ramsey shaft	trace	23.92	0.3	2.5	- -
Bottom of main shaft, S. side	trace	3.70	2.0	- -	- -
391-ft. level of main shaft ±20 ft. north of shaft	trace	1.90	4.9	6.0	- -
244-ft. level of main shaft 68 ft. S. of shaft, across sill	trace	14.84	0.2	1.5	- -
244-ft. level of Ramsey shaft; 20 ft. S. of shaft, across back	trace	34.64	0.2	1.2	- -
204-ft. level of Ramsey shaft footwall vein at face to north	trace	11.20	0.1	1.2	- -
161-ft. level of main shaft	trace	12.94	1.6	1.4	- -
448-ft. levelof Ramsey shaft	nil	1.50	0.94	0.34	0.002
391-ft. level of Ramsey shaft	nil	2.26	4.86	1.59	0.001
367-ft. level of Ramsey shaft	nil	3.12	0.26	0.19	- -
125-ft. level of Ramsey shaft	nil	11.44	2.10	2.42	0.001

The zinc content of the samples analyzed, with few exceptions, is greater than one percent, lead is erratic but generally low, and gold values are insignificant.

The silica content of typical Ramsey ore is believed to be about 50% based on the two 1957 ore shipments to the Magma smelter. Manganese content of three vein samples within the ore shoot are as follows:

Location	oz/ton Silver	% Manganese
Adit level	38.38	1.29
161 level	38.22	2.41
244 level	35.28	0.77

Creosote Vein

The Creosote vein strikes N. 18° to 34° W. and dips 63° to 85° east. The enclosing rocks are the rhyolite volcanics except where the vein intersects the rhyolite dike at the surface and on the adit level (see Plate XIII). Where exposed at the surface and in underground openings down to the 55-foot level, the vein is narrow and weak, consisting of lensy calcite, manganese oxide, and iron oxide up to 1.5 feet wide but generally averaging less than one foot in width. Discontinuous thin seams and small pods of manganese oxide occur adjacent to the main structure (see Plates XIII and XIV). The Creosote vein consists of up to 3.0 feet of manganese-iron oxides and calcite and the zone is very lensy where it is stoped north of the shaft below the 55-foot level.

Mineralogically the Creosote vein differs from the Ramsey vein in that it contains a much greater proportion of manganese oxides and probably more calcite. The highest silver values were obtained at the bottom of the shaft where one 20-inch sample in a pillar assayed 32.92 ounces silver per ton. As in the Ramsey vein, no specific silver mineral has been identified.

The north and south projections of the Creosote vein on the surface are covered by a thin mantle of soil and rhyolite debris, and the persistence of this structure along strike is unknown. From what can be seen in the underground workings, the Creosote vein appears to be much weaker and the mineralization narrower and more lensy than that in the Ramsey vein.

ORE RESERVE

A probable ore reserve from the Ramsey shaft consisting mainly of small blocks of ore marginal to the existing stopes has been calculated. This reserve is classified as probable, rather than proven, due to the fact that sampling has been confined to the drifts, the stope boundaries have neither been sampled nor accurately measured, and the width of the pillar that must be left to protect the Ramsey shaft may vary with different ground conditions. However, a conservative estimate has been made in arriving at these figures, and in view of the fact that many of the stope fringes have not yet been sampled and are not included in the estimate, this reserve figure is believed to be an approximation of the minimum amount of ore in sight in the Ramsey mine workings.

The ore blocks included in this estimate are tabulated below and their locations are shown on the accompanying Composite Longitudinal Section of the Ramsey shaft (Plate XIII).

Ore Reserve - Ramsey Shaft

Block	Location	Width of vein zone (ft.)	Tons	Average grade-Oz./ton Silver
A	72-ft. level	2.0	92	38
B	72- " "	3.0	45	45
C	72- " "	4.0	204	71
D	161- " "	3.0	124	20
E	244- " "	5.0	524	47
F	244- " "	5.0	238	36
G	294- " "	4.0	253	36
H	294- " "	5.0	307	49
			1787	- 45

METALLURGICAL TESTS

Two bulk samples were taken from the property for metallurgical study. The results of two ore tests made by George H. Roseveare, metallurgist at the Arizona Bureau of Mines in Tucson, accompany this report as Appendix A. Sample No. 1935-Red Ore is from a small pile of ore screenings near the Ramsey shaft collar and is believed to be representative of typical material from the Ramsey vein. Sample No. 1937-Manganese Ore is from an ore pile near the collar of the Creosote shaft. The results of this limited testing are not conclusive, and they suggest only that lower grade Ramsey ore might be satisfactorily concentrated by flotation. The advisability of further metallurgical testing is dependent on more information as to possible tonnages and grades of available ore.

CONCLUSIONS AND RECOMMENDATIONS

Based on the calculated probable ore in the Ramsey mine together with the potential additional ore represented by the footwall branch of the Ramsey vein as well as the several hundred feet of unexplored vein south of the Ramsey shaft, it is concluded that development of the Ramsey

mine property is justified. This conclusion is enhanced by the current and foreseeable strong demand for silver. Exploration of the several ore possibilities could be carried out in conjunction with and probably financed by development and mining of probable ore from the Ramsey shaft.

The following procedures are recommended to properly explore the economic potential of the Ramsey mine property: AMC 20945

1. Locate twelve additional claims surrounding and contiguous with the existing R. and A. claims as shown on Plate I.

2. Conduct additional sampling of probable ore blocks A through H at various locations, especially at the stope margins to verify the present grade estimates.

3. Extend 294 drift at least 50 feet south from shaft on vein beneath Block H, sample both back and sill at 5-foot intervals.

4. Re-open and sample the back-filled drift south of the shaft on the 204-ft. level. Long-hole at least 25 feet into footwall ten feet south of shaft, beginning on the 204-foot level and continuing on the 161, 244, and 294-foot levels, to prospect for the footwall strand of the vein. Cross-cut to the footwall vein on the 294 level south of shaft if sufficient values are encountered in the drilling program.

5. Additional sampling in the Ramsey mine as follows:

   a) north faces of the large stope north of the shaft from above the 294-foot to the 91-foot level;

   b) 125- and 161-foot level drifts south of shaft, at five-foot intervals alternating between the back and the sill.

6. On the surface, make bulldozer cuts at 50-foot intervals across the trace of the Ramsey vein beginning 120 feet south of the Ramsey shaft, removing soil and overburden and as much of the leached capping of vein material as possible. Sample any exposed vein material. Alternating cuts should be at least 50 to 75 feet long to expose any possible branches of the vein.

7. Make several bulldozer cuts across surface projection of Creosote vein both north and south of the Creosote shaft, sampling any vein material exposed.

R. C. Baker

R. C. Baker

G. A. Barber

G. A. Barber

Tucson, Arizona

October, 1967

August, 1967

A MC 20945

DEL TIERRA ENGINEERING & MINING CORP.

U. S. Mineral Surveys Mining Exploration

Plats of Creosote Shaft Levels 18, 28, 42, 55, 113 + 157.

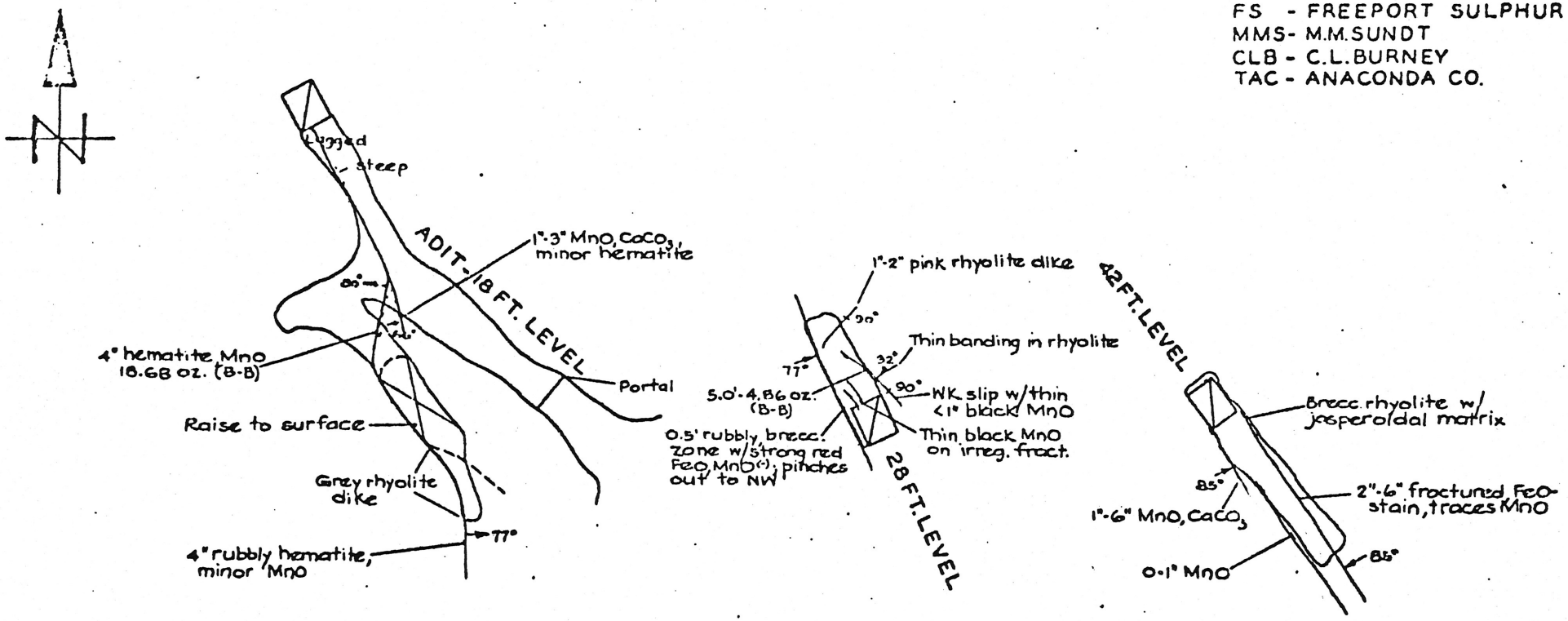
Also composite of all levels.

No plat available for 68 level.

6016 N. Kachina Lane Scottsdale, Arizona 85253
Tel. 602 948-5517

SAMPLE ASSAY SOURCE

B-B - BAKER-BARBER
FS - FREEPORT SULPHUR
MMS- M.M.SUNDT
CLB - C.L.BURNEY
TAC - ANACONDA CO.



CREOSOTE SHAFT
ADIT-18, 28, 42 FT. LEVELS

RAMSEY (R. AND A.) MINE

SOUTH OF BRENDA, YUMA CO., ARIZONA

SCALE: 1 INCH = 20 FEET AUGUST, 1967

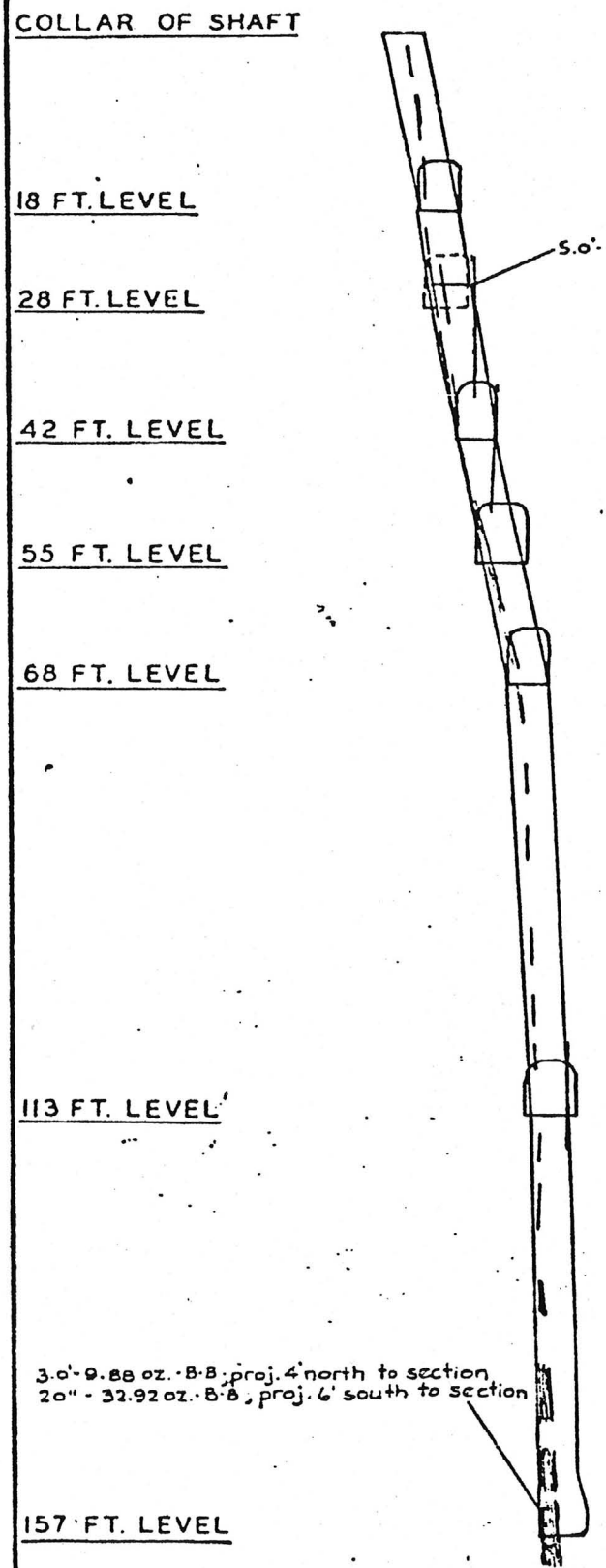
AMC 20945

PLATE XIV

SAMPLE ASSAY SOURCE

B-B - BAKER-BARBER
FS - FREEPORT SULFUR
MMS - M.M. SUNDT
CLB - C.L. BURNEY
TAC - ANACONDA CO.
M-H - MC FARLAND-HULLINGER

A MC 20945



CREOSOTE SHAFT
CROSS-SECTION C-C'
LOOKING NORTH

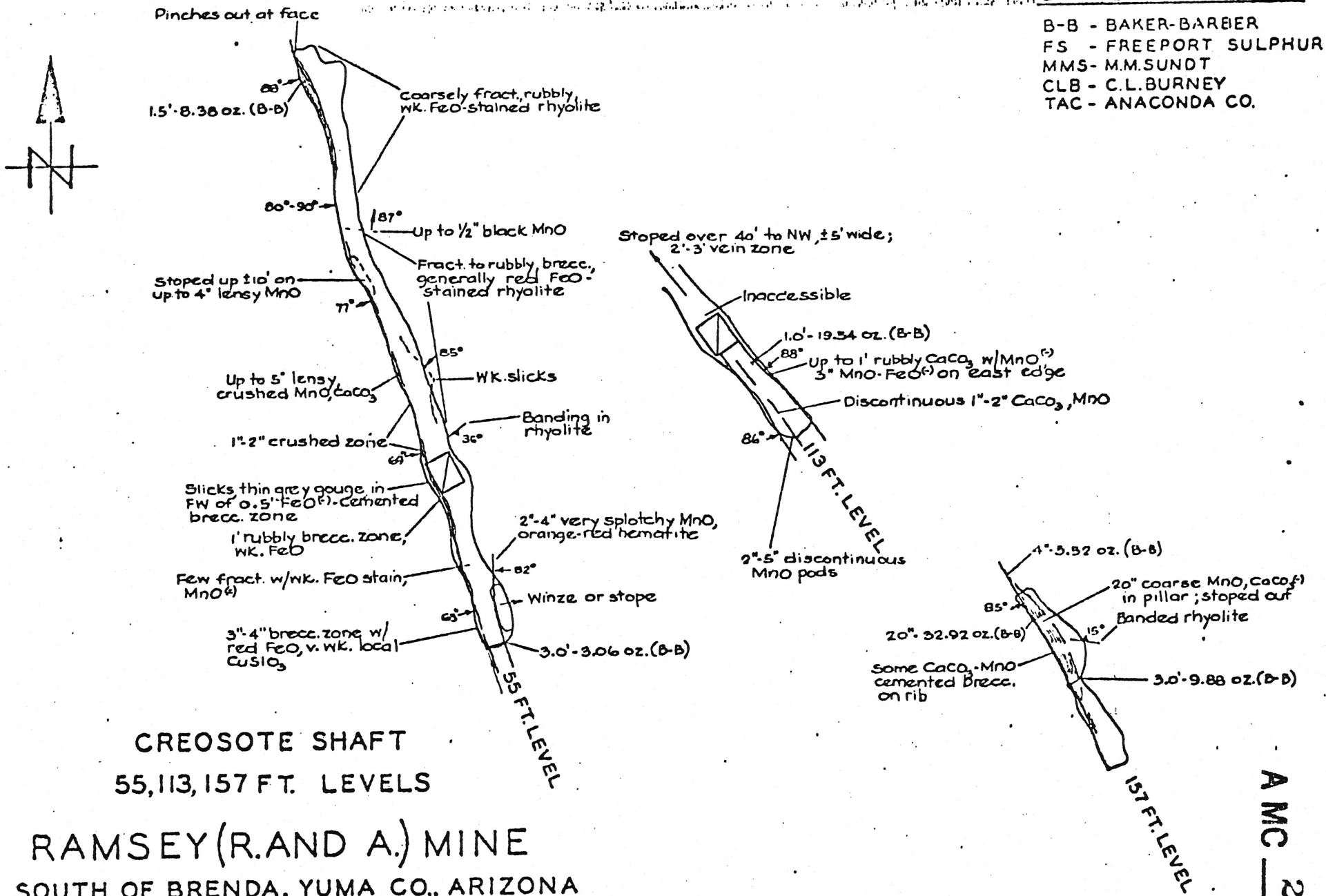
RAMSEY (R. AND A.) MINE

SOUTH OF BRENDA, YUMA CO., ARIZONA

SCALE: 1 INCH = 20 FEET

AUGUST, 1967

PLATE XVII



CREOSOTE SHAFT

55, 113, 157 FT. LEVELS

RAMSEY (R. AND A.) MINE

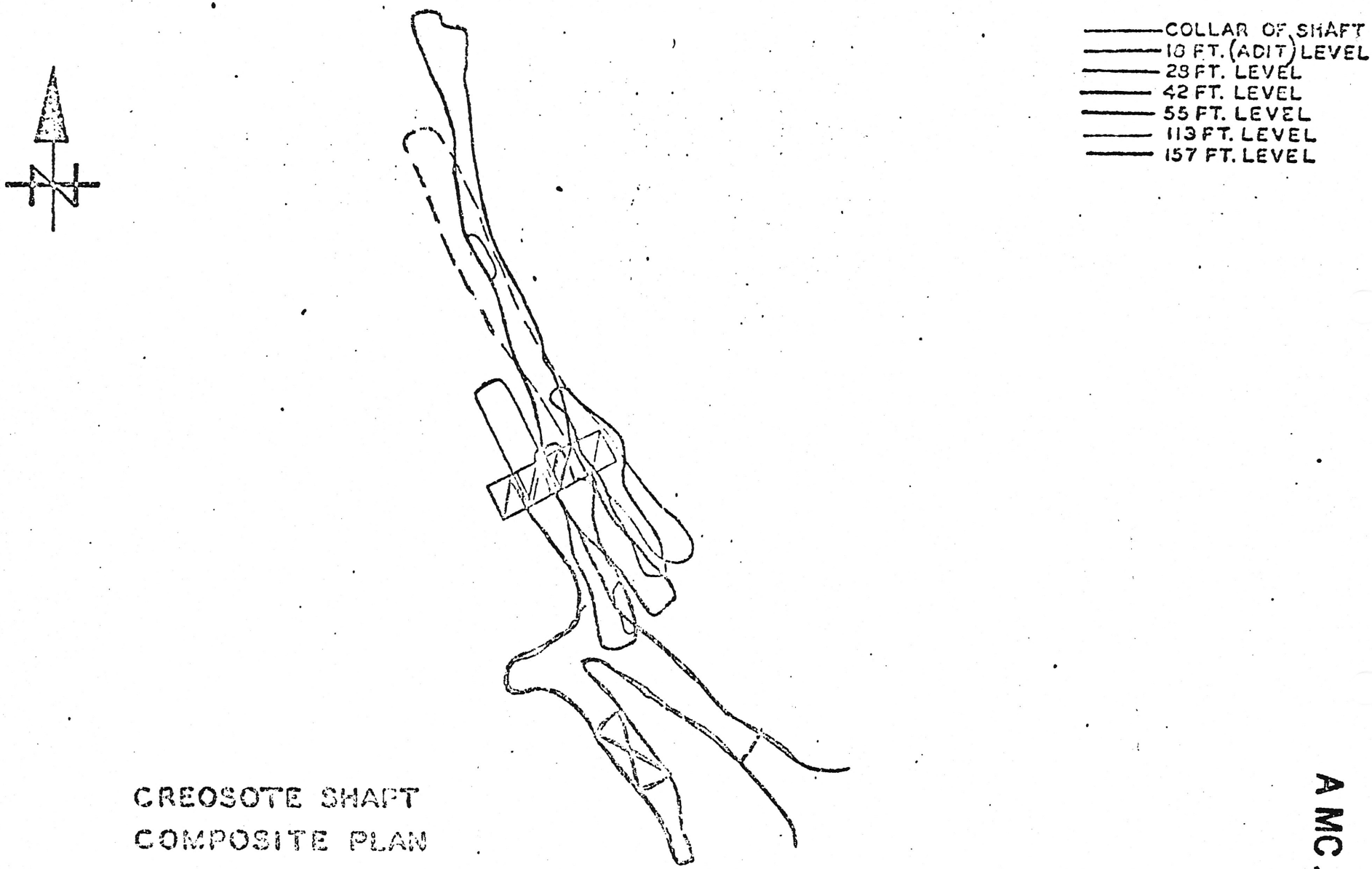
SOUTH OF BRENDA, YUMA CO., ARIZONA

SCALE: 1 INCH = 20 FEET

AUGUST, 1967

PLATE XV

AMC 20945



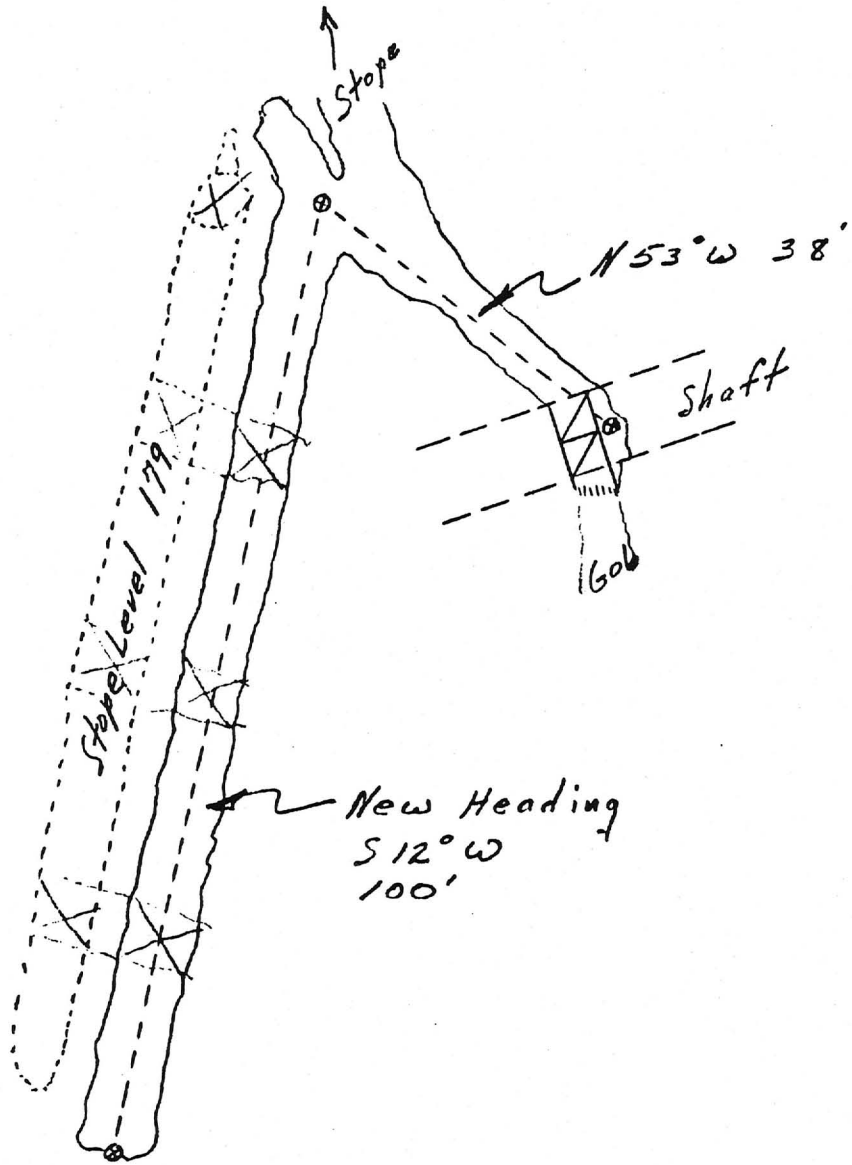
CREOSOTE SHAFT
COMPOSITE PLAN

RAMSEY (R. AND A.) MINE
SOUTH OF BRENDA, YUMA CO., ARIZONA

SCALE: 1 INCH = 20 FEET AUGUST, 1967

A MC 20945

PLATE XIII



RAMSEY MINE
204 LEVEL
SCALE 1" = 20'

AMC 20945

RAMSEY MINE

Proposed

SILVER LEACHING OPERATION

SUMMARY

The Ramsey Mine Property is situated in the Plomosa Mining District of Yuma County, Arizona. It lies four miles to the southwest of Brenda and sixteen miles east of Quartzite--two small Arizona townsites on U.S. Highway No. 60-70.

The minesite is accessible via a natural dirt road from Brenda. The access road passes over U.S. Interstate Highway No. 10 at a point two miles southwest of Highway No. 60-70. There is no local access to I-10 at the overpass.

Depending on quantity of Power, Lines may be brought in, or MG set up (416-220-440V)

Closest electrical power source is at Brenda and the closest railway is at Hope, Arizona, 15 miles east of Brenda.

Because the climate is arid, vegetation is sparse and there is no water supply at or near the property. For small scale operations, water will have to be truck hauled to the minesite. Water plentiful in valley to East & South of from Brenda

The mine is in a foothills area at the base of a mountain. Local elevations range from 1650 to 1900 feet above sea level.

The property consists of four contiguous unpatented lode mining claims, originally located by John Ramsey, in 1921. These claims passed on to Ramsey's estate when he died in 1960.

The property is currently controlled by a Tucson partnership.

The mine was first worked in the 1920's by Ramsey and lease operated by others intermittently thereafter. Most recent production

was carried out in 1968, by M. M. Sundt Construction Co. of Tucson.

Main mineralization at the Ramsey mine is a N20W trending 3 - 15 foot wide vein, situated at a faulted rhyolite-sediment contact. The vein is in a complex fracture zone containing iron oxides, manganese oxides, barite and celestite. Vanadanite, wolframite, argentite and galena are reported as minor minerals. Silver is believed to be principally in the form of argentite (Ag_2S).

The Ramsey Vein is underground developed to a depth of 528 feet. Working on ten levels aggregate approximately 1500 feet. Ore shipments varied from 16 to 51 oz. of silver per ton from 1941 to 1968.

A second paralled vein, known as the Creosote Vein, is situated approximately 500 feet to the southeast of the Ramsey shaft. The Creosote shaft, mined to a depth of 157 feet below the surface, is no longer accessible. Reportedly, a surface sample across a 20-inch face at the Creosote Vein contained 32.9 oz/ton silver. The Creosote stockpile is reported to have assayed 16.8 oz/ton silver. Manganese oxides are more abundant at the Creosote and lead-silver runs about 2% combined. Mine dumps at the Creosote have not been assayed or tested.

Combined stockpiles and mine dumps at the Ramsey shaft are estimated to contain 4200 tons of material averaging 3.5 oz/ton silver.

Preliminary simulated heap leaching tests of the Ramsey stockpiles and mine dumps have indicated that this material lends itself readily

to silver extractions by sodium cyanide solution methods. Approximately 2.25 oz/ton silver were taken into solutions in 24 hours of test leaching.

Based on the Ramsey reserve of stockpile and dump material it is considered that a successful leaching operation could be carried out at a rate of 65 tons per day, over a one-month period.

It is estimated that a pilot operaton of this type, if successful, could return a gross silver-value equivalent of approximately $53,000 on an investment of $45,500, in one month, based on an average price for silver of $7.00 per ounce. more 27% return

The larger objective is for the development of an open cut mining reserve of 320,000 tons of potential "leaching ore", to a depth of 140 feet, averaging approximately 2 oz/ton silver. This material could sustain a one-year operation at an estimated total investment cost of $1.7 million and a net return of approximately $1.0 million, 1.3 more before taxes - based on $7 per ounce silver.

Exploration and a successful pilot run on the stockpile and dump material would be required to more accurately establish the potential profitability of the larger operation and substantially reduce the risk.

INTRODUCTION

Recent very significant rises in the price of silver have made it worthwhile to consider the possibility of re-opening the old Ramsey silver mine. Unfortunately, however, mining costs have also risen very substantially and the likelihood that the Ramsey mine could be re-worked profitably as a conventional underground mine remains doubtful. On the other hand, serious consideration can be given to alternative development methods. This paper therefore examines the Ramsey mine development potential based on a cyanide heap leaching operation that would utilize the residual ore stockpiles, mine dumps and, possibly, shallow open cut or open pit operations.

The report covers the status of the property, an historical sketch and a review of the geology, mineralization, development and past production. Provisional plans, layouts and estimates for a cyanide leaching operation are included along with conclusions and recommendations.

Liberal use is made of existing geological maps, underground plans and cross-sections. A set of current colored photographs have been added to enhance the reader's understanding of the terrain and present minesite conditions.

PROPERTY

Location, Access and Physiography

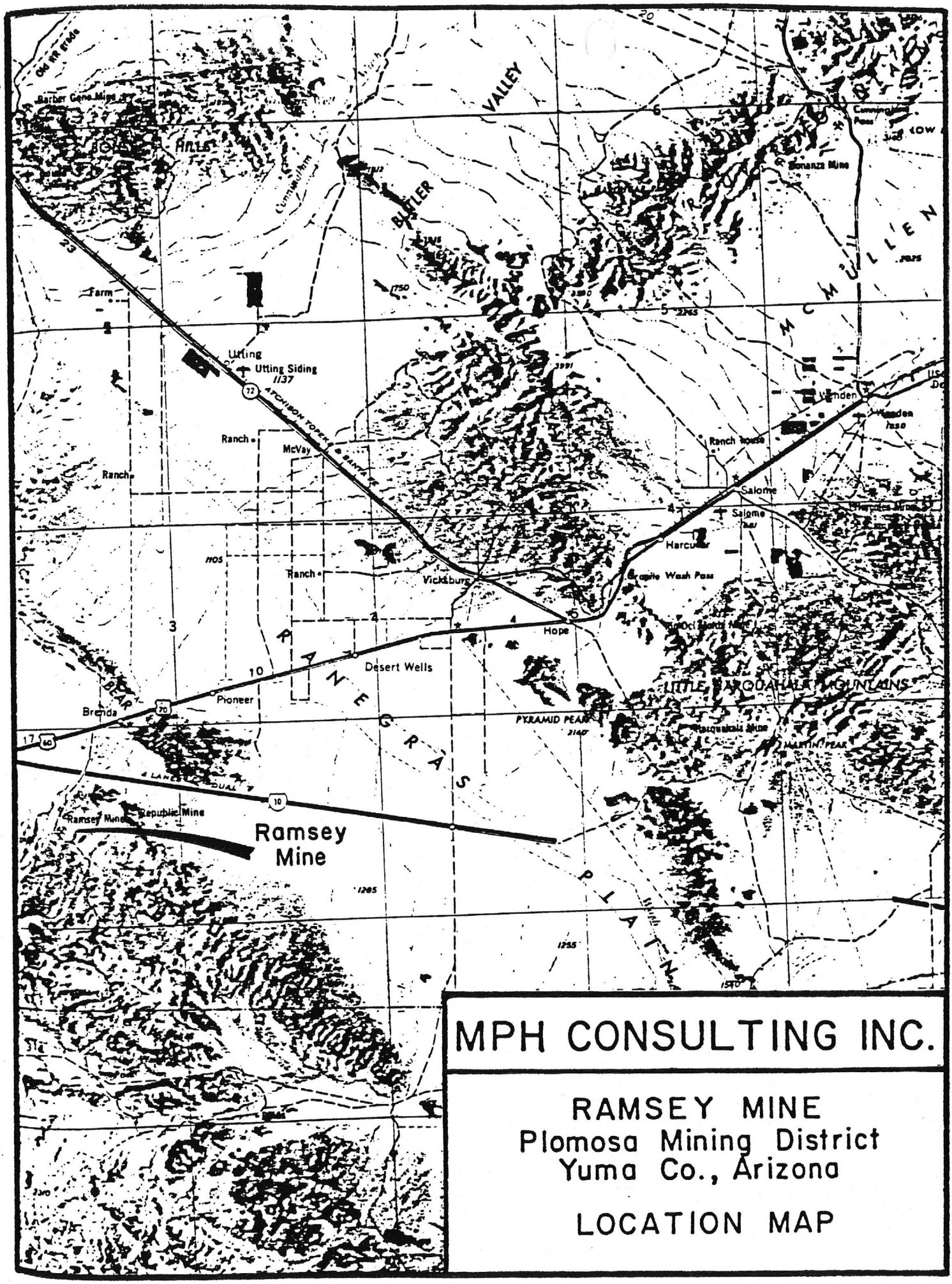
The Ramsey mine is located in Township No. 3, North, Range 15 West (unsurveyed) of Yuma County, Arizona.

The minesite is accessible by way of a natural dirt road leading southwest from Brenda, Arizona, a small settlement on U.S. Highway No. 60-70, at a point sixteen miles east of Quartzite, Arizona. The access road passes over U.S. Interstate No. 10, approximately two miles to the southwest of Brenda. There is no access to the mine roadway from the Interstate, at the overpass. (See Plate I).

The Ramsey mine lies in the foothills of the New Water Mountains and is situated in the Plomosa Mining District of Arizona.

Elevations in the vicinity of the mine property range from 1650 to 1900 feet above sea level.

The climate is arid and vegetation is sparse. There are no streams and no water producing wells near the property.



MPH CONSULTING INC.

RAMSEY MINE
Plomosa Mining District
Yuma Co., Arizona

LOCATION MAP

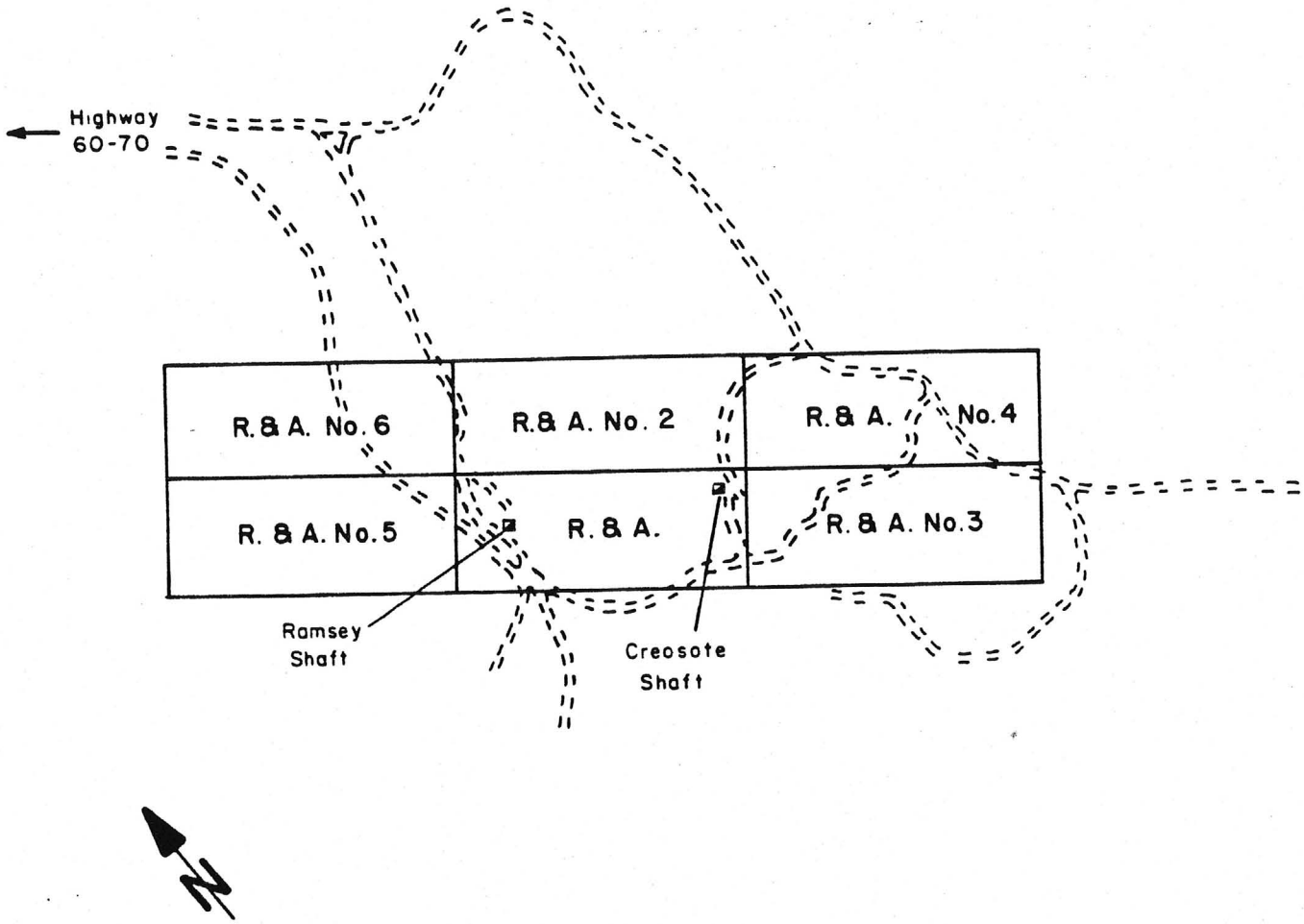
PLATE I

Claims and Property Ownership

Currently the Ramsey mine property consists of six contiguous (20-acre) unpatented lode mining claims, designated the R & A claim, R & A No. 2 claim, R & A No. 3 claim, R & A No. 4 claim, R & A No. 5 claim and R & A No. 6 claim (See Plate II).

The R & A claims were originally located by John Ramsey in 1921 and were retained and worked intermittently by Mr. Ramsey until his death in 1960. The property is currently owned by the Ramsey Estate and is controlled by a Limited Partnership involving the Ramsey Estate and Messrs. Noman, Dussel, Hustad and Burney of Tucson, Arizona. The Ramsey Estate is represented by a Mrs. Byrd of Yuma, Arizona.

The R & A claims are currently in a state of patent application.



LEGEND

Existing Unpatented Lode Claims

Roadways

MPH CONSULTING INC.

RAMSEY MINE
CLAIM MAP

Scale 1"=1000'

April 1979

PLATE II

HISTORY

John Ramsey, prospector, came to Arizona from Nevada in 1907, shortly after discovering and selling the Skidoo gold mine near Death Valley.

Mr. Ramsey continued his prospecting efforts in the Kofa and Plomosa Mountain ranges and in 1921 made the original discovery which was to become the Ramsey Mine.

The mine was developed and operated by John Ramsey until the late 1920's, after which time it was sporadically leased by various groups and individuals who worked or explored the property.

Most recent development at the mine took place in 1968, when the M.M. Sundt Construction Company, of Tucson, leased the property and extracted some ore from the old underground workings at the Ramsey shaft.

Within the past several years a lease to a Vancouver promotional group resulted in surface geological and geophysical exploration and some surface blast hole drilling for sampling purposes.

Production records for the Ramsey mine are very sketchy; however, there is evidence that approximately 9000 to 10,000 tons of ore have been extracted from the Ramsey shaft.

Some ore shipments have also been made from the Creosote Shaft which is situated approximately 500 feet to the southeast of the Ramsey

headframe.

In 1968 the M. M. Sundt Construction Company shipped 36 carload lots to the Inspiration Mining & Smelting Company smelter at Miami, Arizona. This was the most recent production and latest ore shipment from the mine.

GEOLOGY

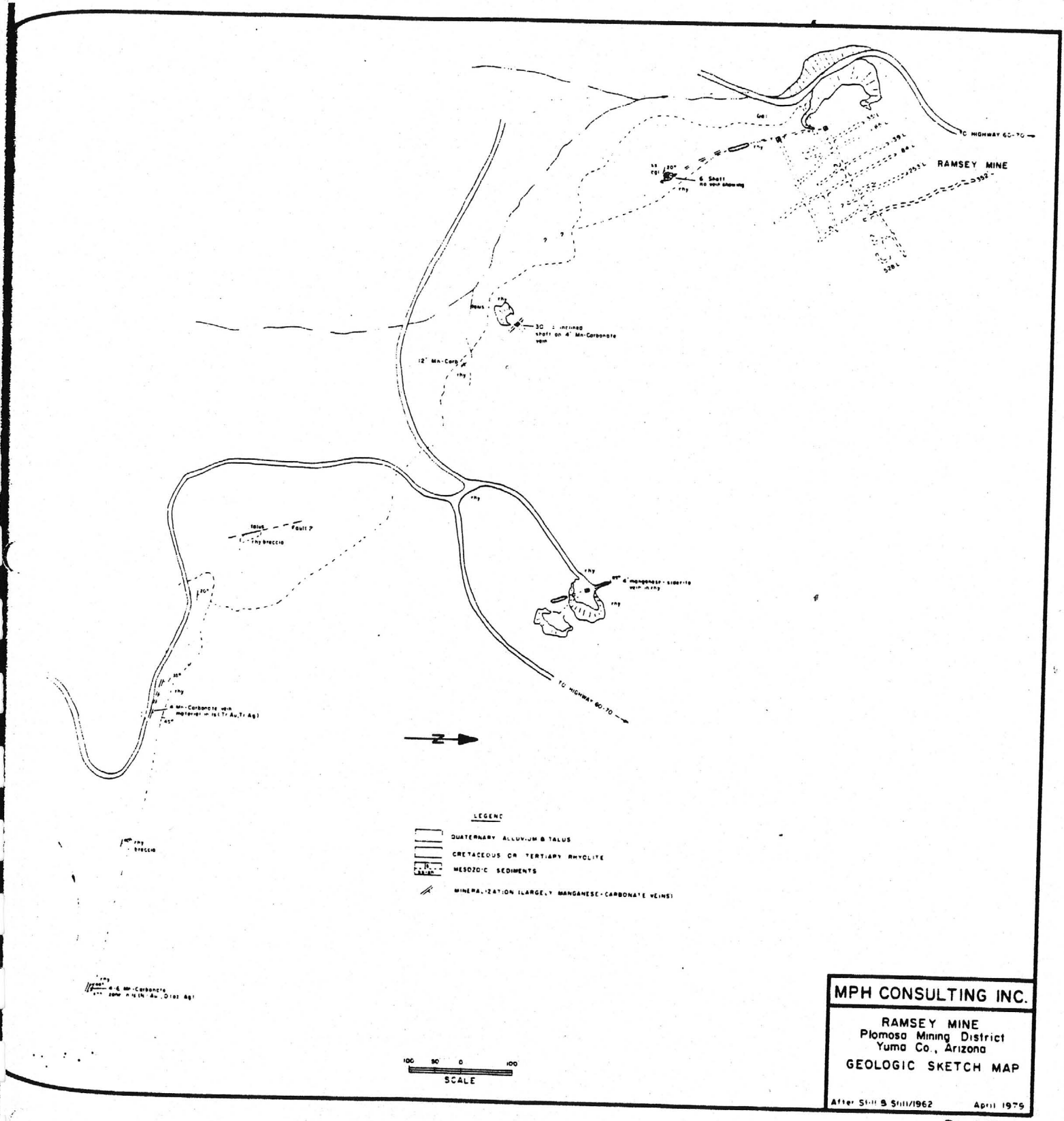
The regional bedrock geology can best be described as an area underlain by Mesozoic sediments, intruded and/or truncated by Cretaceous to Tertiary intrusives and extrusives. A Laramide granite intrusive occurs nearby and is probably the source of the volcanics.

Within the Property, Mesozoic limestone, quartzite, sandstones and shales are in fault contact with Cretaceous to Tertiary rhyolite. The flat-dipping (10° -20° NE) northwesterly trending sediments are truncated by the steeper dipping (40°-60° NE) rhyolite. (See Plate III).

The sediments are medium-hard, thin-bedded and fine grained. Near the contact, i.e., in the vicinity of the Ramsey vein, the sediments are highly fractured and impregnated with silica, calcite, manganese and iron oxides.

Quartz veins of significant thickness have been observed in the sediments. These may or may not be related to the mineralization of the Ramsey vein.

The rhyolite tends to be very hard, siliceous and structure-less. On surface the rhyolite is highly fractured and generally brown stained. Underground it tends to be massive, blocky, light coloured and slightly porphyritic. Some andesitic phases appear to exist. The bulk of the rhyolite was probably flow emplaced, on a modestly



MPH CONSULTING INC.

RAMSEY MINE
Plomosa Mining District
Yuma Co., Arizona

GEOLOGIC SKETCH MAP

After Still & Still/1962 April 1979

PLATE III

undulating erosional surface.

The Ramsey vein occurs along the faulted rhyolite-sediment contact. The Creosote vein, on the other hand, lies well within the rhyolite mass.

The mineralization of the Ramsey vein is complex.

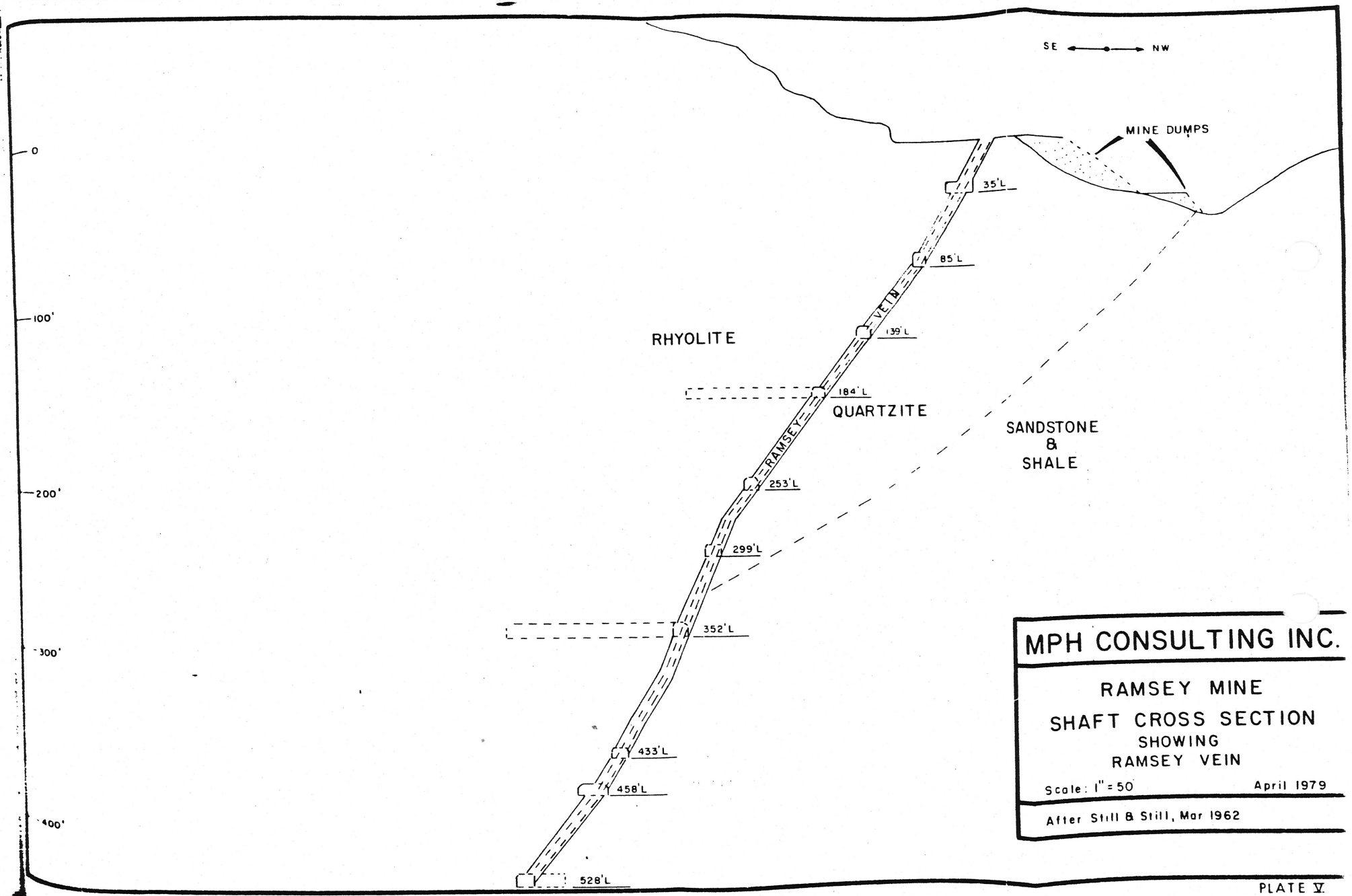
Typically, the Ramsey vein matter consists of a spongy to sooty, black to reddish mass of quartz-carbonate material, with varying amounts of manganese oxide. Fracture coatings of vanadinite and wolframite are also associated with black calcite and galena.

The silver is believed to be present in the form of argentite (Ag_2S). Secondary minerals of both lead and silver are thought to be present in the complex, as well.

Vein widths in the Ramsey mine range up to 14 feet, but average around 6 feet. On the 299-foot level the vein weakens somewhat and becomes more lensy to the north of the shaft; although the structure persists northward and at least 3 feet of vein material is observable in the face of the north drift.

The richest ore appears to have been extracted from a shoot that lay between the surface, north of the shaft, and a position south of the shaft on the deepest levels of the mine.

Grade of the extracted ore from the early operations is unknown; however, records from the AS&R Smelter are reported to show 937 tons of Ramsey ore, received in 1941-47, averaging 46.22 oz/ton silver, and, International Smelter reportedly recorded 323.7 tons received in 1940-41, averaging 51.64 oz/ton silver and in 1942-44, 882.7 tons averaging 43.86 oz/ton silver.



MPH CONSULTING INC.

RAMSEY MINE

SHAFT CROSS SECTION
SHOWING
RAMSEY VEIN

Scale: 1" = 50' April 1979

After Still & Still, Mar 1962

PLATE V.

MINERALIZATION

Thus far, silver mineralization on the Ramsey property has been found in two separate vein-like structures, the Ramsey and Creosote veins. The two veins are approximately paralleled in their strike but lie almost 500 feet apart. They differ in mineralogy, silver content and apparent economic potential.

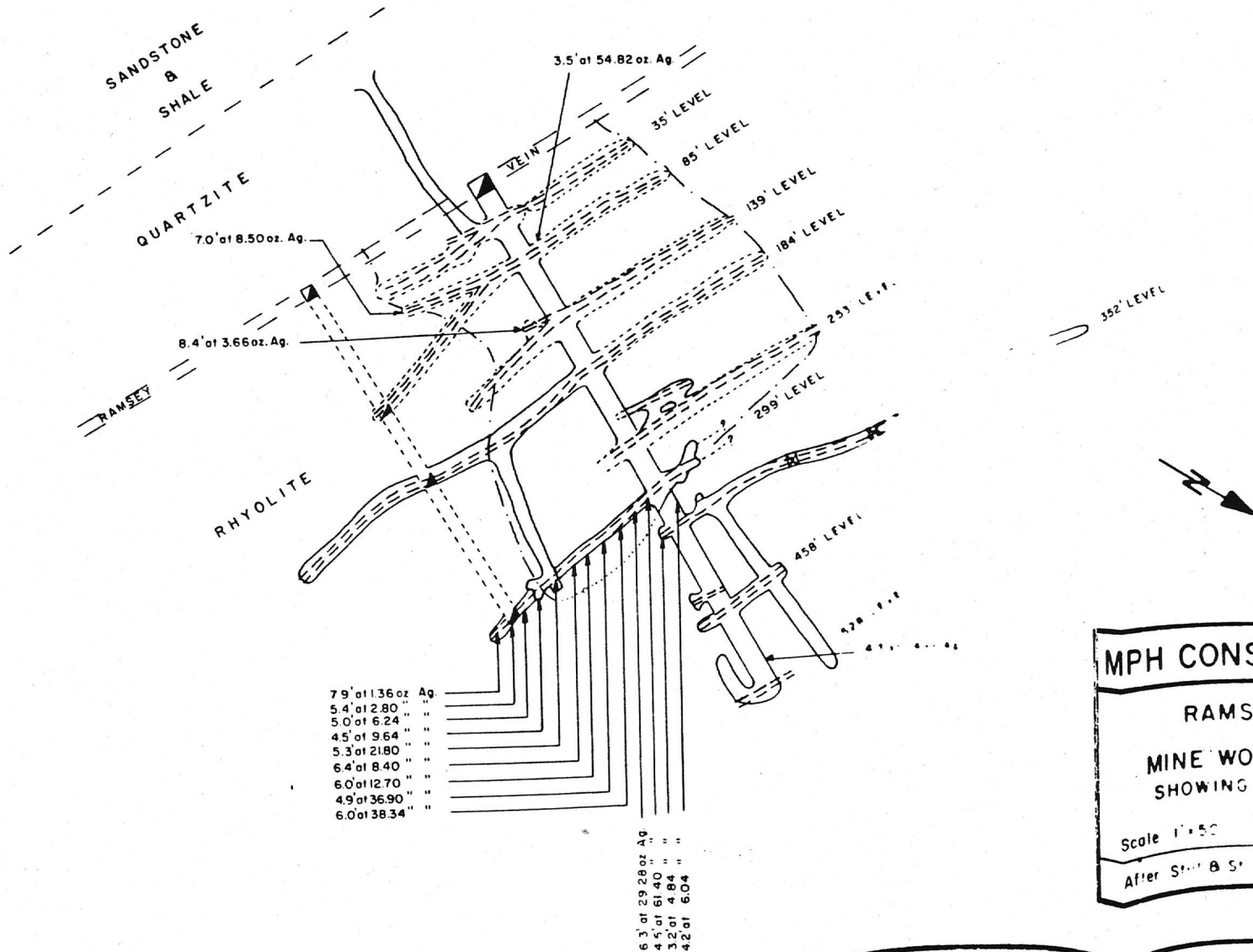
Ramsey Vein

The Ramsey vein has been exposed underground to a depth of 528 feet and traced intermittently on surface for 680 feet, southward from the Ramsey shaft. Surface strike extensions of the vein are covered by soil and rock debris. The ultimate depth and length of the vein is unknown. (See Plates IV and V).

The strike of the vein in the Ramsey mine averages N20^{o}W, above the 204 foot level, and varies between N 25°W and N 45°W in the deeper workings. The dip of the vein in the mine ranges from 50° to 70° southeast, throughout the workings.

At least one vein "split" is found in the footwall, south of the shaft. Additionally, possibly one or more narrow, branching or parallel, veins appear to exist in both hanging and footwall zones.

The main vein consists of a rubbly fractured, shattered and brecciated zone in the rhyolite and is oxidized to the approximate 500 foot depth of the mine.



MPH CONSULTING INC

RAMSEY MINE

MINE WORKINGS PLAN
SHOWING RAMSEY VEIN

Scale 1" = 50' April 1979

After Stu & St. Mar 196

PLATE IV

Floor sampling on the 299-foot level, in 1962, reported an average width of 3.85 feet containing 35.89 oz/ton silver for a drift length of approximately 50 feet.

Records of the assays of Ramsey ore samples showed wide variations in grade and considerable variance even in the check samples. This substantiates the erratic distribution of silver in the vein.

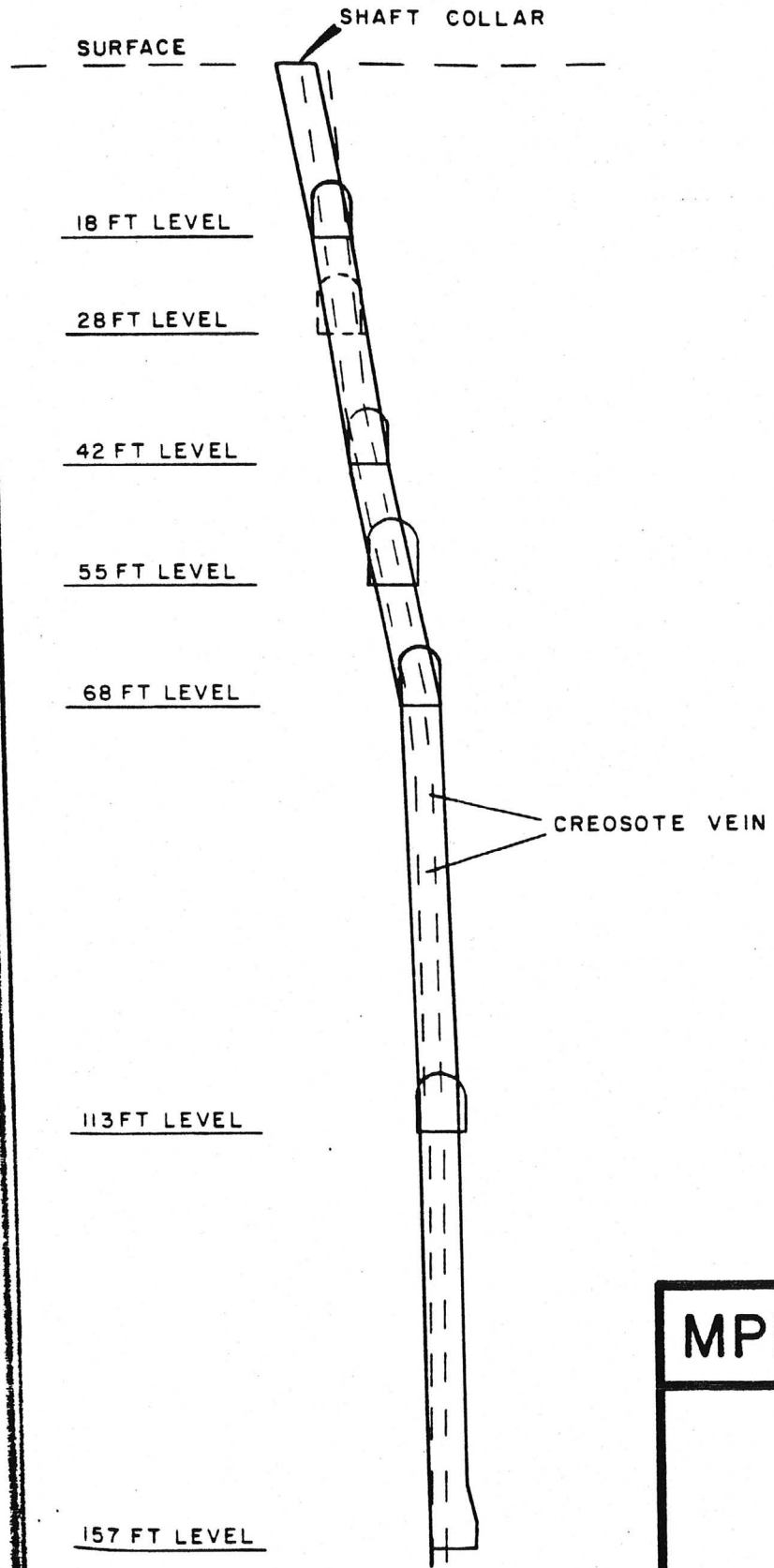
Combined lead-zinc values appear to range in the 1-2% level, although some samples ran as high as 10% combined lead-zinc. Gold occurs in insignificant amounts and metals such as vanadium, strontium and tungsten are only known by their reported minerals - no quantitative data is recorded for these metals.

Creosote Vein

Little is known about the extent and development of the Creosote vein. On surface this vein is approximately 3 feet wide and in the underground it is reported to have been followed down to a depth of 157 feet, where its width is reduced to approximately 1.5 feet. (see Plate VI).

The Creosote vein strikes N18^{o}W to N34^{o}W and dips 63° to 85° to the east.

Mineralogically, the vein is a mixture of manganese oxides, iron oxides and calcite. It tends to be more lensy and comprises more discontinuous thin seams and small pods of maganiferous oxides and calcite than is



MPH CONSULTING INC.

RAMSEY MINE
CREOSOTE SHAFT
(LOOKING NORTH)

Scale 1"=20' April 1979

After Baker & Barber, Oct. 1967

PLATE VIII

PAST DEVELOPMENT

Ramsey Shaft

Development at the Ramsey property has been predominantly concentrated on the Ramsey vein structure, primarily in and around the Ramsey shaft. (see Plate VII).

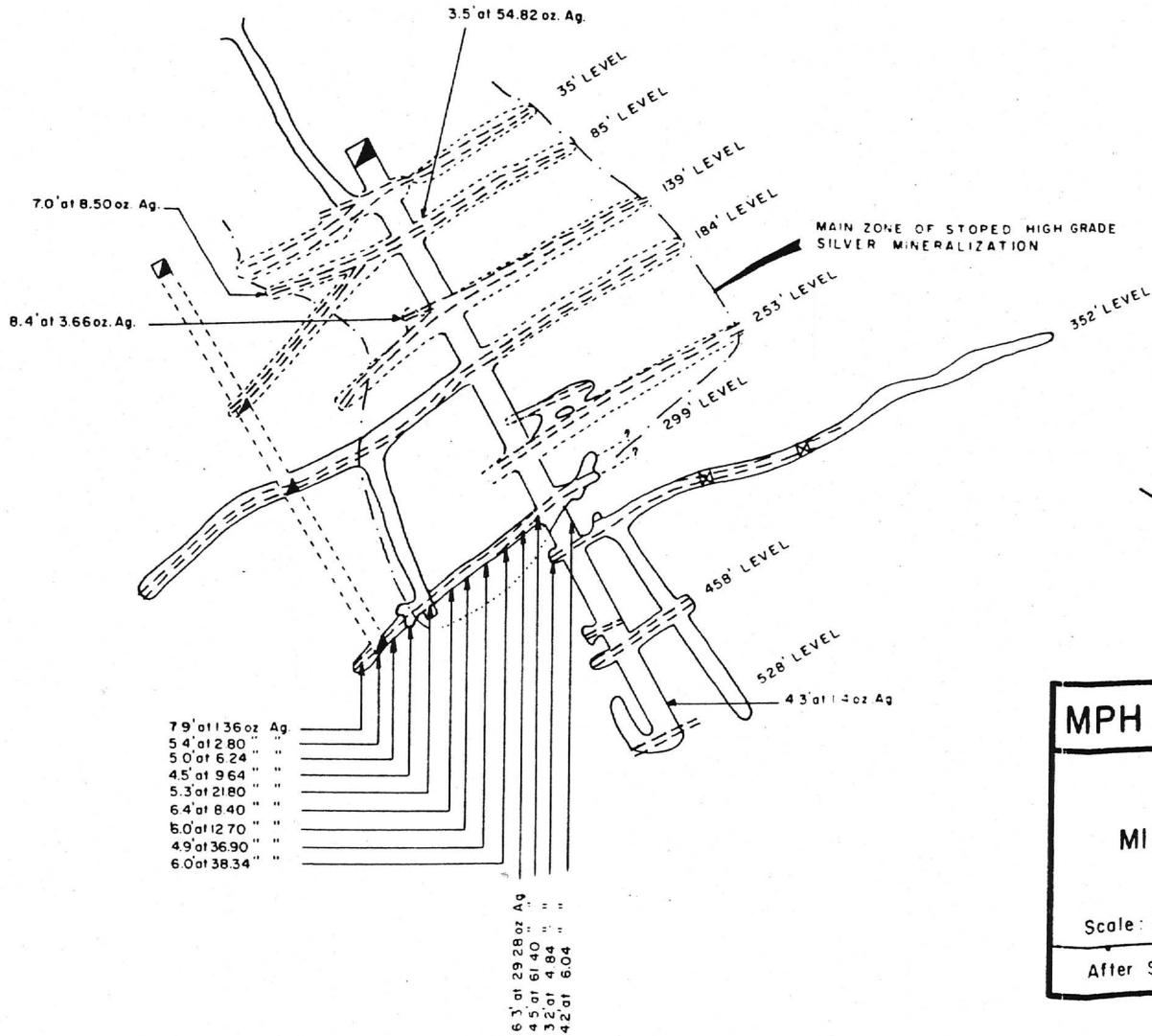
A 4 x 8-foot shaft follows the vein to an inclined depth of 528 feet - vertical depth from the collar elevation being 458 feet to the bottom of the shaft. From the shaft, lateral development has taken place on ten levels, some to the north, some south and at other levels in both of these directions. Two hangingwall and one footwall crosscut are reported as well.

The development record is as follows:

Table I

Ramsey Mine Underground Development Record

Level (ft.)	North Drift (ft.)	South Drift (ft.)	Crosscut (ft.)	Total (ft.)
35	68	66		134
84.5	80	135		215
139	92	55	30 (FW)	177
184	95	165	75 (HW)	325
253	101	+5		106
296	+20	102		222
352	215		100 (HW)	315
458	35	10		45
				1539 ft.



MPH CONSULTING INC.

RAMSEY MINE

MINE WORKINGS PLAN

Scale: 1" = 50' April 1979

After Still & Still, Mar 1962

PLATE VII

The extent of the stoping in the Ramsey vein is not fully recorded; however, it is reported that a 5 x 75-foot stope to the north of the shaft is continuously developed from the 299 ft. level up to the 84.5 ft. level - i.e., a stope height of 214.5 ft. Additionally, stoping in the south drifts appears to extend over the full length of the drifts between the 299 ft. and 184 ft. levels.

An air-ventilation shaft reaches the surface from the 299 ft. level, at a point 95 feet to the southwest of the main Ramsey shaft.

Thirty feet to the south of the Ramsey shaft a small 6-ft. surface excavation has been made in the extension of the vein and another 40 feet to the south a second shaft follows the vein down its 45° inclined dip, to a depth of approximately 30 feet below surface.

The current state of the Ramsey underground workings is very good. The ladders are all intact and in excellent condition to the 352 ft. level, thus the mine is readily accessible and the air is good at least to this depth.

Below the 352-level the ladders are not in place and conditions of the lower levels are unknown because they are not accessible.

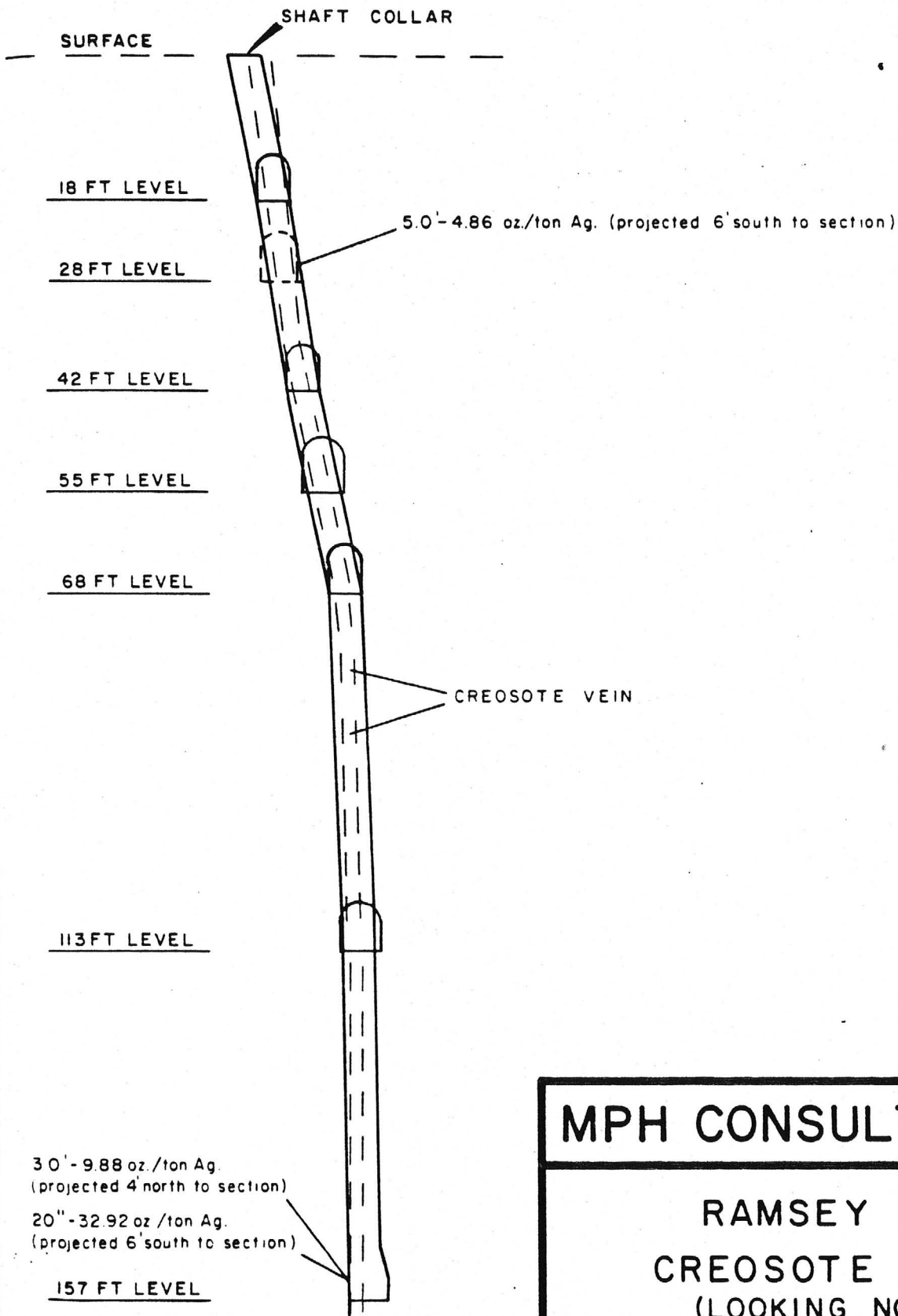
The ladders in the upper and lower parts of the air-ventilation shaft appear to be in good shape and this part of the mine is also thought to be fully accessible.

The northern drifts in the Ramsey shaft are all inaccessible between, and including, the 84.5 ft. and 299 ft. levels. Also, the 253 ft. level is closed off to the south, and the 299 ft. level is closed to the north.

Crosscuts are known to exist on the 139 ft., 184 ft. and 352 ft. levels. The 139 ft. level has a short 30 ft. footwall crosscut and the 184 ft. and 352 ft. levels have hangwall crosscuts of 75 feet and 100 feet long, respectively.

Creosote Shaft

Development on the Creosote vein is not fully documented; however, at least a 157-foot shaft depth has been recorded on one of the cross-sectional drawings. (see Plate VIII). Unfortunately, the Creosote shaft is no longer accessible because of a fire which burned out the ladders and timbers. In fact, as it now stands, the collar area is unsafe and should be cordoned-off until such time as the shaft is filled, sealed or rehabilitated.



MPH CONSULTING INC.

RAMSEY MINE
CREOSOTE SHAFT
(LOOKING NORTH)

Scale 1"=20' April 1979

After Baker & Barber, Oct. 1967

PLATE VI

PAST PRODUCTION

As previously noted, the ore production record for the Ramsey property is scanty; nevertheless, the extent of the underground workings at the Ramsey shaft tend to suggest that some 12,000 to 14,000 tons of material were extracted at this locale. Since approximately 3,000 -4,000 tons of underground material forms the present Ramsey mine dumps, it is estimated that 9,000 - 10,000 tons of ore has been extracted and shipped.

Following is a record of at least part of the shipments, as reported by various earlier writers, and supplemented by shipment data from M.M. Sundt Construction Co. during the recent 1968 production period.

TABLE II

RAMSEY MINE - ORE SHIPMENT RECORD

Smelter	Dates	Tons of Ore	Silver Content (oz/ton)
AS&R Hayden	1941	81	46-22
AS&R El Paso	1942-47	856	
International	1940-41	323.7	51.64
International	1942-44	882.7	43.86
Insperation-Miami	1968	1669.3	16.11

No production data is available for periods prior to 1940, and nothing is known about ore shipments from the Creosote shaft.

Judging by the size of the dump and lack of an ore stockpile at the Creosote shaft, it seems likely that at least some of the early ore shipments came from this vein.

ANALYSES & LEACHING TESTS

Cyanide Leaching

A review of the state-of-the-art of cyanide leaching in Arizona supports the idea that the Ramsey mine ore could lend itself to silver extraction by heap leaching methods.

At Tombstone, Arizona, State of Maine Mining Company, fabricates small unitized cyanide leaching plants for silver recovery. The Escapule Brothers who build these plants, operate a successful heap leaching facility at their own mine in Tombstone. Capacities of the Escapule plants are 65, 100, 150 and 300-tons of liquid per day. Samples taken by the writer from the stock piles and dumps at the Ramsey Mine were assayed and preliminarily tested for their silver leachability at the Escapule - Tombstone leaching facilities. Results obtained were as follows:

TABLE III

RAMSEY MINE LEACH TEST RESULTS

SAMPLE	24-Hour Ag (oz/ton)	24-Hour Au (oz/ton)	48-Hour Ag (oz/ton)	48-Hour Au (oz/ton)	72-Hour Ag (oz/ton)	72-Hour Au (oz/ton)
Crude-Upper Dump (Liquid)	2.52	Tr	3.12	Tr		
Crude-Upper Dump (Extraction)	0.50		0.624			
Crude-Stock Pile (Liquid)	4.00	Tr	8.00	Tr		
Crude-Stock Pile (Extraction)	0.454		0.909			
-1/2" Crush-Upper Dump & S.P.	4.56		4.88		5.76	
Crude-Lower Dump (Liquid)	0.92	0.006	1.20	ND		
Crude-Lower Dump (Extraction)	0.248		0.324			
-1/2" Crush-Lower Dump (Liquid)	0.88		1.12		1.12	

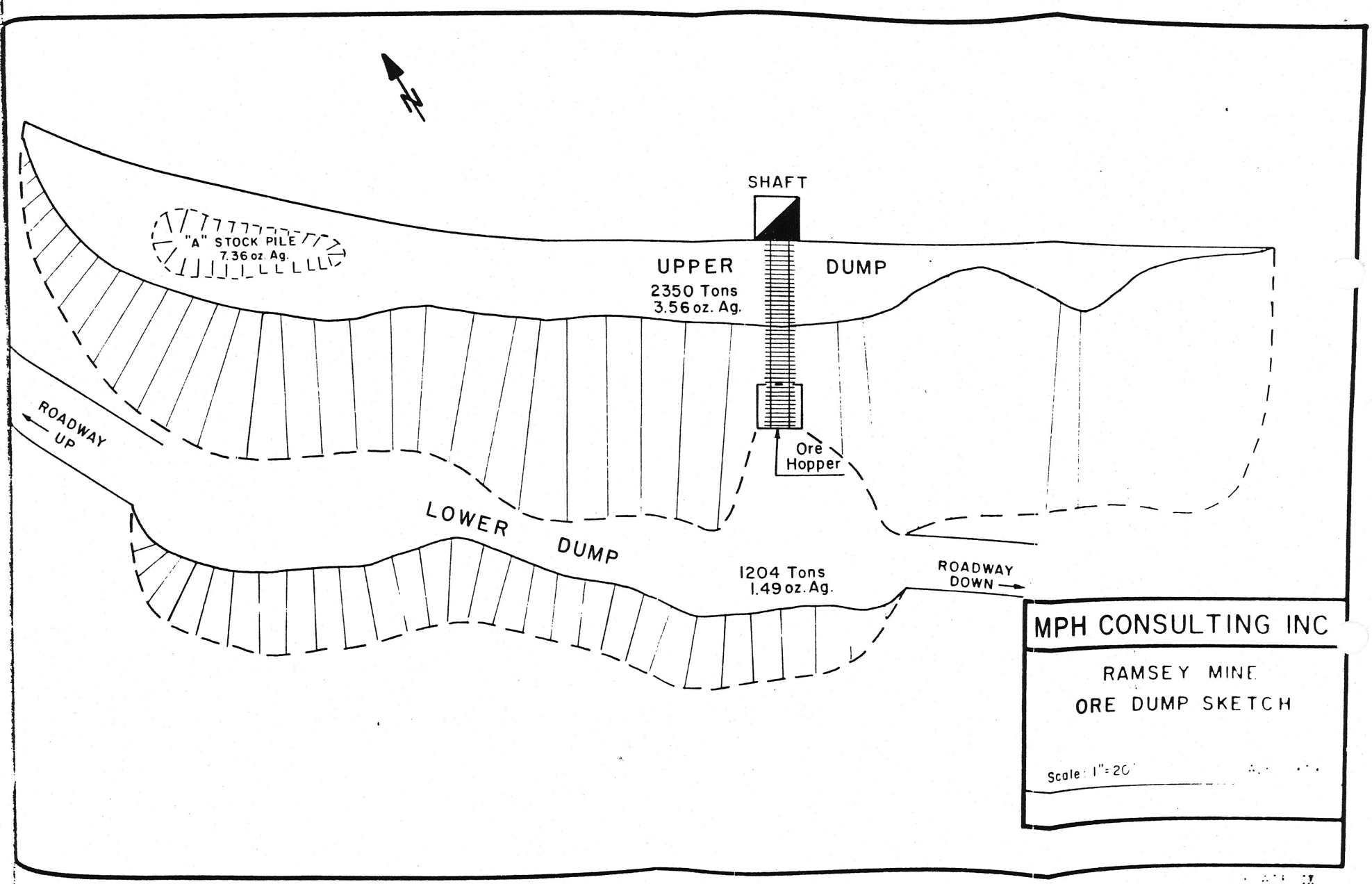
Tonnage estimates and assaying results indicate that the Ramsey stockpiles contain an aggregate of approximately 600 tons of ore averaging 7.30 oz/ton silver. In addition, the upper mine dump is estimated to contain 2500 tons of material averaging 3.5 oz/ton silver and the lower mine dump is estimated at 1200 tons of 1.5 oz/ton silver material. (See Plate IX).

Preliminary simulated heap leaching tests carried out a Tombstone on the Ramsey stockpile material produced a silver pregnant solution carrying approximately 4 oz of silver per ton of solution, in 24 hours. Moreover, 0.45 oz of silver was extracted from this material in 24 hours and 0.91 oz Ag. was taken into solution in 48 hours. This is considered an abnormally good extraction rate, compared with other ores that have been tested at the Tombstone facilities.

The upper mine dump leached well; producing, in 24 hours, a solution bearing 2.5 oz. of silver per ton of liquid and extracting 0.50 oz. of silver in 24 hours.

As expected, the lower dump material was less responsive, producing only 0.90 oz. of silver per fluid ton in 24 hours and extracting only 0.25 oz. of silver in 24 hours. Nevertheless, considering that the lower mine dump had a head grade of only 1.50 oz/ton Ag, the extraction rate appears to be generally good, in relative terms.

Test runs were made on crushed stockpile and mine dump samples, crushed through 1/2 inch mesh screen size. These samples indicated improved


N
SHAFT
"A" STOCK PILE
7.36 oz. Ag.
UPPER
DUMP
2350 Tons
3.56 oz. Ag.
ROADWAY
UP
Ore
Hopper
LOWER
DUMP
1204 Tons
1.49 oz. Ag.
ROADWAY
DOWN
MPH CONSULTING INC
RAMSEY MINE
ORE DUMP SKETCH
Scale: 1" = 20'

silver release rates for stockpile and upper mine dump material but a slight drop in the extraction rate for lower mine dump material. The latter was thought to be due to reduced percolation, brought on by the increase in fines generated during the crushing operation.

More tests need to be carried out at coarser crushing, such as 1 inch and 2 inch mesh, to better evaluate the advantages and disadvantages of this fragmentation process vis-a-vis leaching rates of the material.

CURRENT DEVELOPMENT CONSIDERATIONS

In view of the encouraging leaching test results obtained on Ramsey stockpile and mine dump material, it appears that a "pilot" operation could be worthwhile. This small-scale operation would make it possible to fully test the material's leachability under operating conditions and would provide a means of developing parameters for an enlarged operation, involving open-cut mining and heap leaching the resulting mine products.

Mine Dump Leaching Potential

It is estimated that 4200 tons of mine dump material exists at the Ramsey shaft site. Initially, it is conceivable that this material could be relocated to a prepared leach pad where it would be layed down in a layer and leached with a sodium cyanide solution. Extraction of silver from the resulting pregnant cyanide solution could be carried out, using a 65-ton per day Escapule-type zinc extraction plant. Life expectancy of this operation would be one to two months. A 50 x 100-foot heap, built in the form of a bench five feet deep, would suffice. This would be followed by a second, adjacent, heap of the same dimensions. A conventional plastic pipe and garden sprinkling system would be used to apply the sodium cyanide solution and collection of the silver-bearing solution would be by way of a plastic underpad and drainage ditch system, directed into a collection basin. (See Plate X)

The common practice is to sprinkle the first heap for 2-4 weeks; then, shut this heap down and begin to sprinkle the second heap for the same

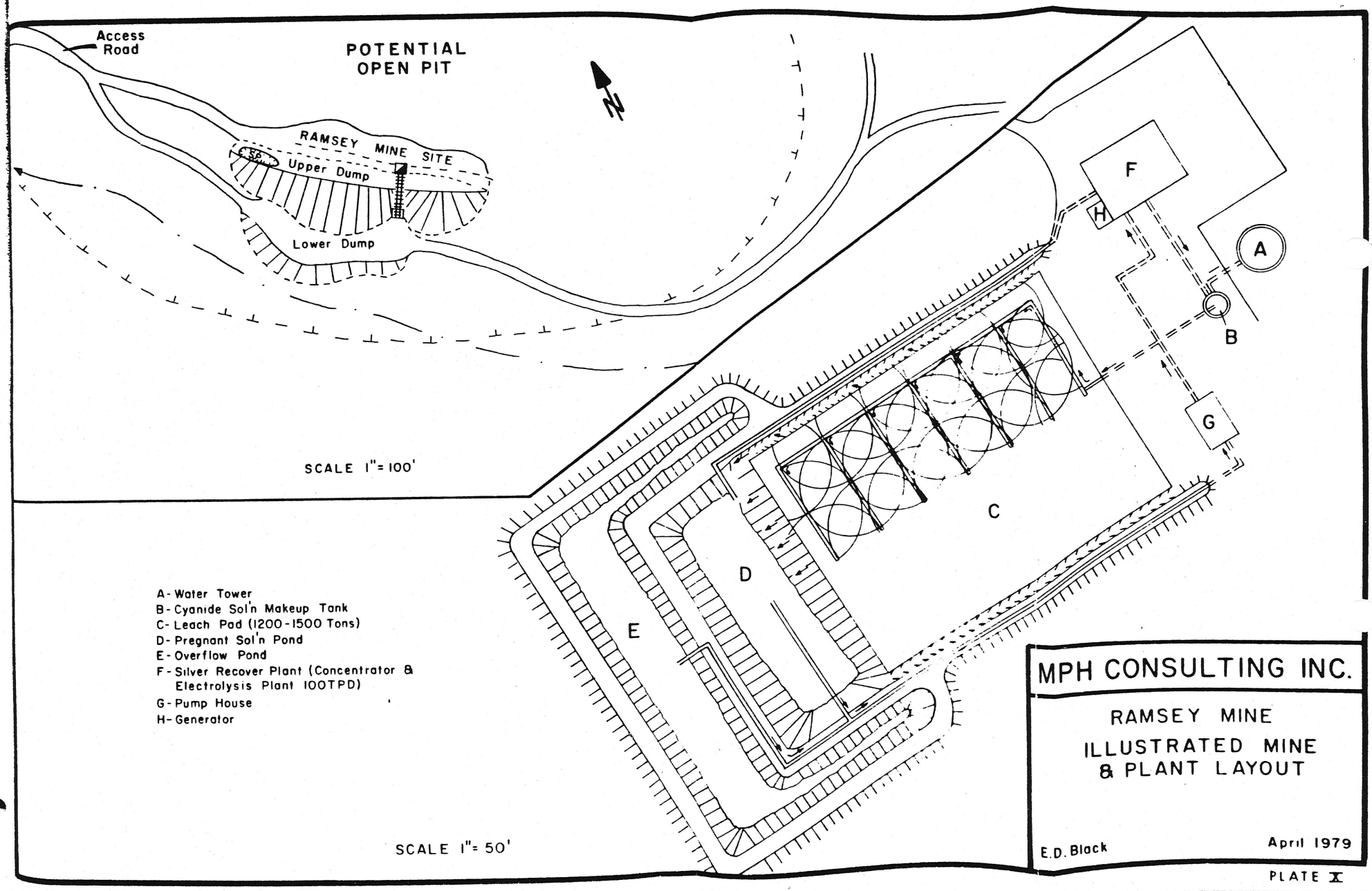

Access Road
POTENTIAL OPEN PIT
N
RAMSEY MINE SITE
Upper Dump
Lower Dump
SCALE 1" = 100'
A
B
C
D
E
F
G
H
A- Water Tower
B- Cyanide Sol'n Makeup Tank
C- Leach Pad (1200-1500 Tons)
D- Pregnant Sol'n Pond
E- Overflow Pond
F- Silver Recover Plant (Concentrator & Electrolysis Plant 100TPD)
G- Pump House
H- Generator
SCALE 1" = 50'
MPH CONSULTING INC.
RAMSEY MINE
ILLUSTRATED MINE & PLANT LAYOUT
E.D. Black
April 1979

PLATE X

amount of time. After the first pad has had a "rest" and has been oxygenated it can be re-leached until values of silver drop below economic limits. When the pad is re-leached and its values drop below recoverable levels other lifts can be added to the heaps or the operation can be terminated.

In the contemplated Ramsey mine (pilot) dump leaching operation, approximately 2000 tons of material could be heap leached at one time. Two weeks on the first heap followed by a two week leaching period on the second heap. Depending upon the results obtained the operation's life could be extended by re-leaching the two pads until their silver recoveries drops below economic limits.

Tests should be run on dump material from the Creosote shaft to check its possibilities as a supplement to the Ramsey dump material.

Extraction tests on the Ramsey stockpile and dump material have demonstrated a more rapid release of silver after crushing the material through 1/2 inch mesh screen size. However, some problems with percolation were experienced due to the "fines" generated. Because of this problem, it would be important to carry out additional crushing tests at different screen sizes (say 1 in & 2 in) to determine the actual merits of crushing and the optimum size to which the material should be fragmented for efficient heap leaching.

Should crushing tests significantly improve silver recovery, a crushing stage could be introduced into the operation. This would be best

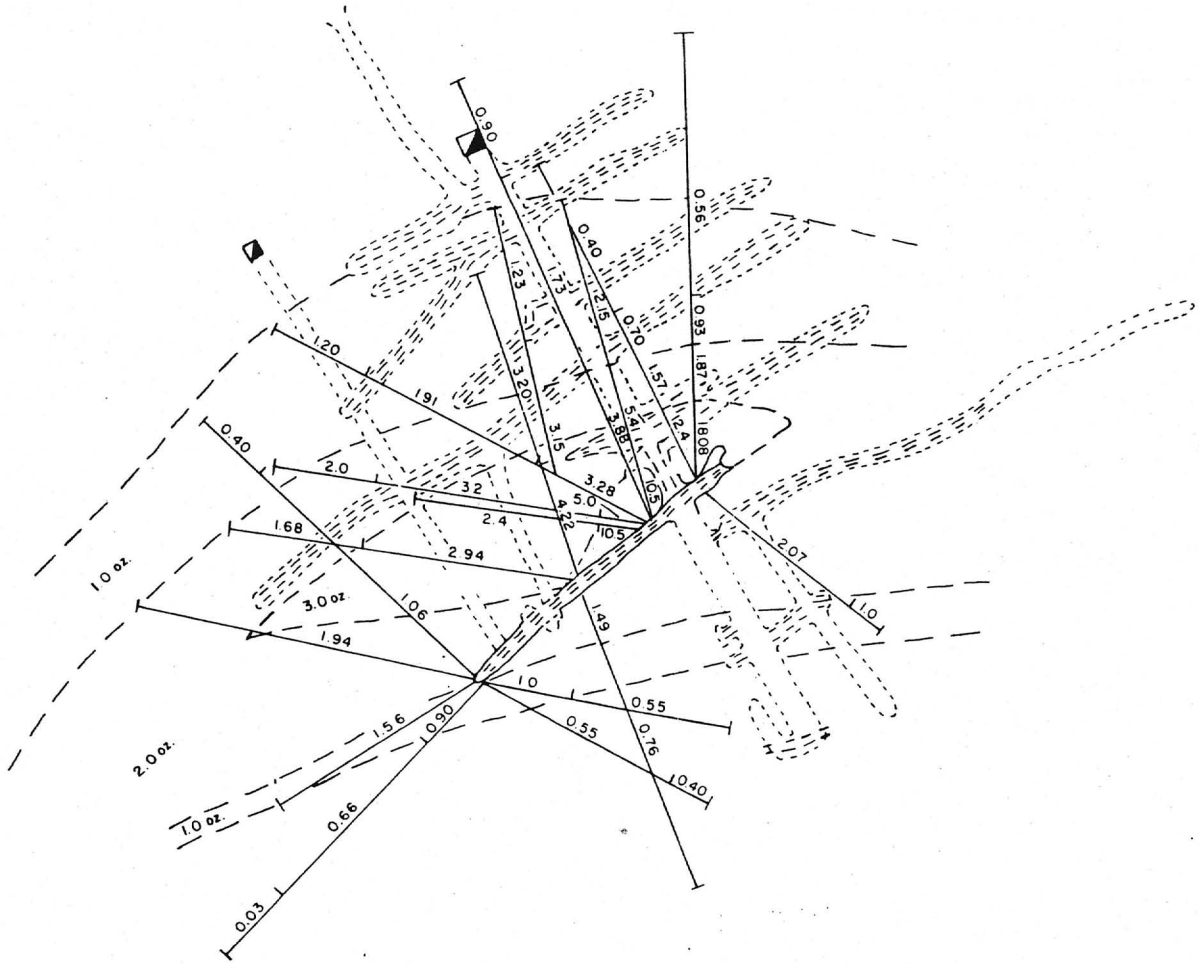
situated between the excavation and heap building stages of material handling. A small impact crusher or jaw crusher, in-line between the loader and trucks, should suffice.

Open Cut Ore Leaching Potential

To date, no leaching tests have been carried out on virgin underground ore or mineralized wallrock from the Ramsey mine; however, it seems reasonable to expect that material of this type will leach well and release its silver because surface oxidation has reached a depth of at least 300 feet in the vicinity of the mine.

Utilizing results from the 1968 underground long hole drilling, which took place on the 184-ft and 299-ft levels, and extrapolating this data upward to the surface, it appears geologically reasonable to expect a potential open-cut mineable reserve of 320,000 tons of material grading from +1 oz/ton to +7 oz/ton silver, to a depth of 140 feet below the surface. However, before an open cut operation can be undertaken, this reserve will have to be drill-explored and elevated to a "proven ore reserve" category. The writer's grab samples taken from three ore bins on the 299-foot level gave assays averaging 10.7 oz/ton silver. This encourages that high grade (+10 oz/tons) mine pillars and additional vein matter will be encountered in the hanging and footwall rocks during open cut development. Obviously, such high grade ore would enchance the profitability of this extraction operation.(See plates XI & XII)

Based on this estimated potential 320,000 ton reserve, an operation of this type would have a life expectancy of approximately one year, at



MPH CONSULTING INC.

RAMSEY MINE
299' LEVEL PLAN
SHOWING
POTENTIAL ORE ZONES

Scale: 1"=50' April 1979

After Still & Still, Mar. 1962

PLATE XI

a comfortable 300-ton per day (liquid) silver extraction plant capacity. A leach plant of this size could be expected to extract approximately 1200-1300 ounces of silver per day -- or approximately 375,000 ounces of silver per year (250 days).

Open Pit Leaching Potential

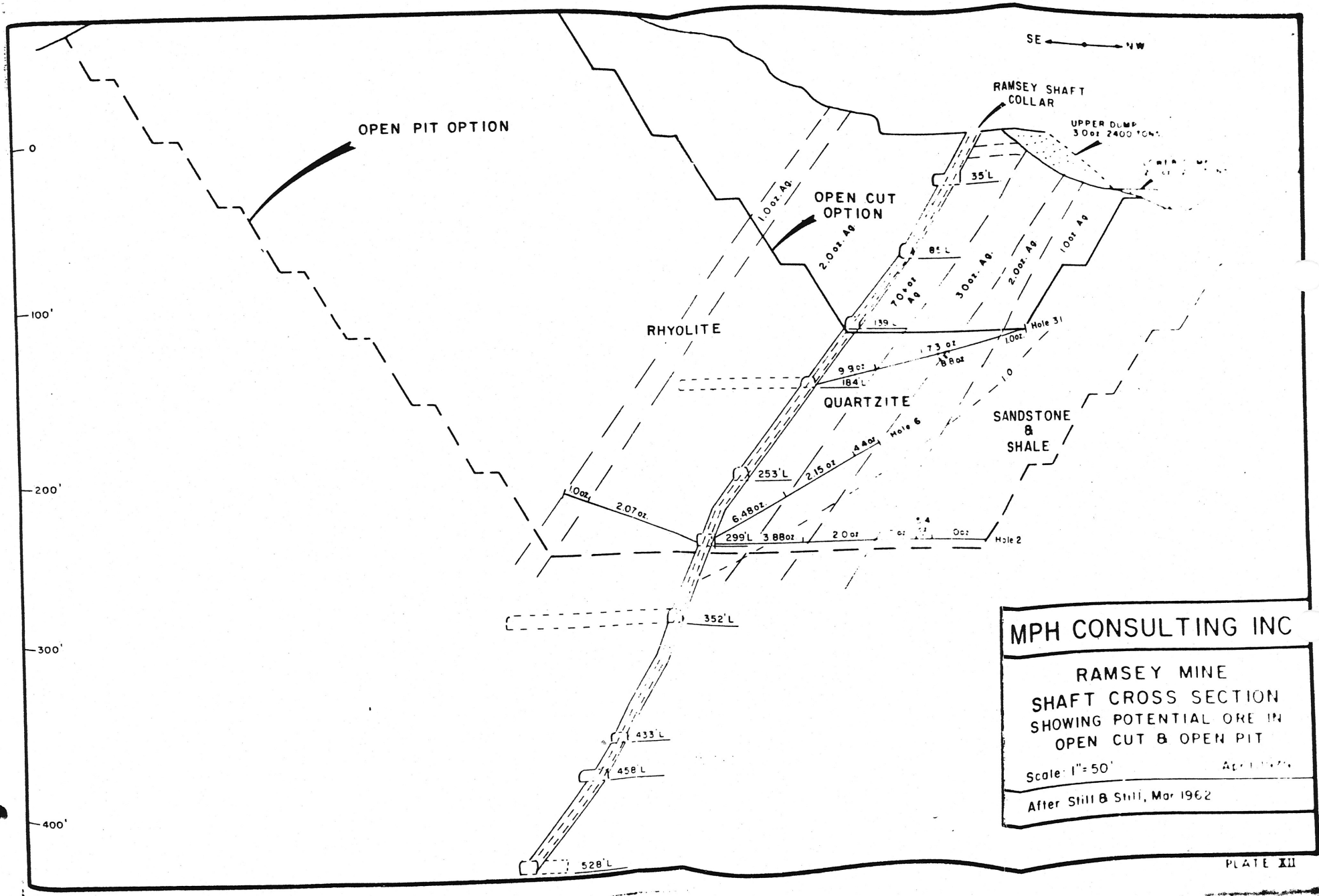
If the foregoing open cut operation is carried out successfully, at the Ramsey, the pit could subsequently be expanded and deepened to take in all potentially leachable surface ore.

Although estimates are very provisional, it is conceivable that as much as 1,500,000 tons of ore could be extracted from an open pit to a depth of 300 feet.

A mining operation of this magnitude could be carried out for several years depending upon the size of the silver extraction plant.

In this situation it is suggested that a 1000-ton per day leaching plant could be installed and supplemented by a 100-ton per day conventional flotation plant -- the latter to recover silver from high grade ore more efficiently than by the heap leaching process. Only the lower grade material would be heap leached.

During the course of developing the "larger" open pit, other veins of high grade silver ore may be encountered in the wallrocks, similar to the Ramsey or the Creosote veins. This would be an obvious bonus.


SE
NW
RAMSEY SHAFT COLLAR
UPPER DUMP 3.0oz 2400 TONS
OPEN PIT OPTION
OPEN CUT OPTION
RHYOLITE
QUARTZITE
SANDSTONE & SHALE
1.0 oz. Ag.
2.0 oz. Ag.
3.0 oz. Ag.
7.0 oz Ag
35'L
85'L
139'L
184'L
253'L
299'L
352'L
433'L
458'L
528'L
Hole 31
Hole 6
Hole 2
1.0oz
1.73 oz
8.8oz
9.9oz
4.4oz
2.15 oz
6.48oz
3.88oz
2.0oz
2.07 oz.
0
100'
200'
300'
400'
MPH CONSULTING INC
RAMSEY MINE
SHAFT CROSS SECTION
SHOWING POTENTIAL ORE IN
OPEN CUT & OPEN PIT
Scale: 1"=50'
After Still & Still, Mar 1962
PLATE XII

ECONOMIC CONSIDERATIONS

Dump Leaching Operation

The initial pilot operation would involve heap leaching the Ramsey stockpiles and mine dumps and any supplemental material from the Creosote shaft site. A look at the economics of such an operation indicates marginal profitability. Should this operation be undertaken as a R&D phase, it would likely turn out to be a break-even proposition.

The following provisional economic analysis shows a potential net return before taxes of $13,740 on an investment of $45,500, in one month--based on silver priced at $7.00 per ounce. There are no large safety contingencies or escalations built into these figures, therefore, the risk at this stage is very high.

TABLE IV

RAMSEY MINE-DUMP LEACHING ECONOMIC POTENTIAL

RESERVES

U.D. -	2,400 tons	@ 3.50oz. =	4,200 oz.	=	$ 29,400
L.D. -	1,200 tons	@ 1.50oz. =	900 oz.	=	6,300
S.P. -	600 tons	@ 7.00oz. =	2,520 oz.	=	17,650
	4,200 tons		7,620 oz.		

$53,340 - Gross Income

MINING, HAULING & PROCESSING		
4,200 tons @ $2.50	$10,500	
		$10,500
CAPITAL COSTS		
Pipe & Sprinklers	$ 300	
Leach Plant 65TPD	$ 4,000	
Electrolytic Plant	500	
Reduction Plant	300	
Generator	6,000	
Water Reservoirs	1,000	
Plastic 40,000 sq. ft. @$0.16	6,400	
Chemicals & Lab Apparatus	1,000	
Water & Water Haul	2,500	
Buildings	1,000	
		$23,000
EQUIPMENT RENTAL		
Loader 5 days @$200	$ 1,000	
Buldozer 5 days @$200	1,000	
Pickup 30 days @$50	1,500	
Truck 5 days @$100	500	
		$ 4,000
ENGINEERING	$ 5,000	
		$ 5,000
SUB TOTAL COST		$42,500
Plus Royalty @5% of Gross Ag Value		$ 3,000
GROSS COST		$45,500

Approximate 30 - 60 day operation

GROSS COST (CONT'D)	$45,500
GROSS PROFIT	$ 7,840
Plus Salvage $11,800 @50%	5,900
PROFIT -- NET BEFORE TAXES --	$13,740

Open Cut Leaching Operation

Using the same economic approach and considering the project on a larger scale a considerably expanded and longer lasting operation comes into the realm of potentiality. Ramsey stockpile and dump material would be supplemented with mineralized wallrock, mined by open cut methods to a depth of 140 feet.

In this case, a coordinated mining and heap building operation would be conducted simultaneously. Mining would take place at the rate of approximately 1250 tons per day and, using a 300-ton per day (liquid) leach plant, the operation should last about one year.

Assuming the existence of the estimated 320,000 ton ore potential can be confirmed; an estimated $998,000 net (before taxes) may possibly be realized from a gross investment of $1,716,000, in one year--based on a silver selling price of $7.00 per ounce. Because of the size of this operation and its potentially larger cash flow some contingencies have been built into the estimates. Obviously, if the recommended exploration and testing work is carried out beforehand the risk will be somewhat reduced, particularly if the initial stockpile and dump leaching phase proves viable.

TABLE V

RAMSEY MINE - OPEN CUT LEACHING ECONOMIC POTENTIAL

OPEN PIT ORE GROSS RETURNS

1.	(+) 7 oz. Ag	20 x 140 x 50 ÷ 12.5 =	11,200 tons	= 54,880 oz.	=	$ 384,160
2.	(+) 3 oz. Ag	30 x 125 x150 ÷ 12.5 =	45,000 tons	= 81,000 oz.	=	$ 567,000
3.	(+) 2 oz. Ag	90 x 100 x300 ÷ 12.5 =	216,000 tons	=216,000 oz.	=	$1,512,000
4.	(+) 1 oz. Ag	20 x 100 x300 ÷ 12.5 =	48,000 tons	= 24,000 oz.	=	$ 168,000
			320,000 tons	375,880 oz.		$2,631,160

DUMP & STOCKPILE

4,260 tons = 7,620 oz. @ $7.00		53,340
	GROSS RETURN	$2,714,500

MINING COSTS

Ore

320,000 tons @$1.50 — $ 320,000

Waste

100,000 tons @$1.25 — $ 125,000

PROCESSING COSTS

320,000 tons @$2.00 — $ 640,000

CAPITAL COSTS

300 oz./day Leach Plant (4 oz./ton solution)	$20,000 (s)
Electrolysis Plant 2 unit ($1200)	$ 3,000 (s)
Reducing Plant ($500) x 2	$ 1,000 (s)
Generator 8.5 kva ($6000) x 2	$12,000 (s)
Water Reservoir	$ 3,000 (s)
Plastic 60,000 sq. ft. @ 0.20 + miscell.	$12,000
Building (150sq' x 2 x $10)	$ 3,000 (s)
Glassware Package	100
Pipe & Sprinkler Fittings	$ 1,000
Chemical - Inventory	$ 3,000

(1200 oz. Ag/day (250 days)

Capital Cost (Cont'd)	B.F.	$48,600	
Pickup Trucks		10,000 (s)	
Loader		60,000 (s)	
Trucks 3 @ $35,000		100,000 (s)	
Drills		50,000 (s)	
Miscell.		11,400	
Contingency 10% (approx.)		27,000	$ 317,000
SITE PREPARATION			
Clearing 150 Acres @$50/A		$ 7,500	
Excavating & Dikes		10,000	
Roads (1 mile + grading)		5,000	
Miscell.		5,000	
		$27,500	
Contingency 10%		3,000	$ 30,500
ENGINEERING, ADMIN. & SUPER			
320,000 tons x $0.50			$ 160,000
	TOTAL COST		$1,592,500
	Plus - Royalty 5% Gross Sales		132,000
			$1,724,500
	Less - Salvage $262,000 @50%		161,000
			$1,563,500
	Plus - Interest on Cap. 338,500 @15%		50,775
	Plus - Interest on Work Cap. 1,245,000 @15%/2		93,375
			$1,716,650
	PROFIT - NET BEFORE TAXES ----------		$ 997,850

N.B. Approximately one year operation

Open Pit Leaching Operation

Finally, a very preliminary look has been taken at what might be the ultimate open pit potential for the mine.

In this case the same parameters are used as above; however, the assumption here is that a reserve of close to 1.5 million tons of leachable ore and wallrock will be available to a pit depth of approximately 300 feet.

The only bases upon which this operation can be justified are:

(1) As a continuation and expansion of a successful dump and open cut operation, as mentioned before; and/or, (2) Following an extensive exploration and engineering phase which proves the 1.5 million ton reserve, its leachability and its economic feasibility.

A very provisional look at the economics of this larger operation indicates a potential $3,858,000 net before taxes, based on a gross outlay of $7,423,000, in five years. Again, these calculations are based on silver priced at $7.00 per ounce.

TABLE VI

RAMSEY MINE - OPEN PIT LEACHING ECONOMIC POTENTIAL

1.	7 oz. Ag (+)	24,000 tons	168,000 oz.	$ 1,176,000	@$7.00
2.	3 oz. Ag (+)	108,000 tons	324,000 oz.	$ 2,268,000	@$7.00
3.	2 oz. Ag (+)	480,000 tons	160,000 oz.	$ 6,720,000	@$7.00
4.	1 oz. Ag (+)	864,000 tons	864.000 oz.	$ 6,048,000	@$7.00
	Totals	1,476,000 tons	2,316,000 oz.	$16,212,000	
	Gross Return	--- @ 70% Recovery			$11,348,400

PRODUCTION COST ESTIMATE

*1.	Exploration & Engineering (See attached)		$ 500,000
2.	Ore Mining		
	1.5 Million tons @ $1.00/ton	$ 1,500,000	$1,500,000
3.	Waste Mining		
	1.5 Million tons @ $1.00/ton	$ 1,500,000	$1,500,000
4.	Extraction Costs		
	Milling 7 oz. (+) ore 24,000 tons @$2.00	$ 48,000	
	Leaching 1-3 oz. (+) ore 1,450,000 tons @$1.50	2,175,000	
			$2,223,000
5.	Plant		
	100 TPD Plant @$5,000/ton	$ 500,000	
	1000 TPD Leach Plant @$50,000	50,000	
	Loaders	100,000	
	Trucks 4 @ $100,000	400,000	
	Drills	50,000	
	Pickups, etc.	50,000	
	Buildings	50,000	
			$1,200,000
6.	Site Prep & Miscell.		$ 500,000
	TOTAL COST		$7,423,000
	--Less Plant Salvage @ 30% (-)		400,000
		NET COST	$7,123,000
		GROSS RETURN	$4,325,400

(Gross Return)*	$4,325,400
Less Royalties @ 5% of Gross	567,400
NET AFTER ROYALTIES:	$3,353,000
Less Taxes @ 46%	$1,774,680
NET RETURN (5 Year Operation)	$1,770,820

*1. EXPLORATION COST ESTIMATE

UNDERGROUND REHAB.

Timbering & Ladders	$20,000	
Ventilation	10,000	
Drill site preparation	10,000	
Shaft-Hoist & Headframe	20,000	
Compressor & Generator	20,000	
Tools, Safety & Permits	10,000	
Miscell.	10,000	
		$ 100,000

DRILLING

12,000/f. @ $10,00	$ 120,000

ENGINEERING & SUPERVISION

Geol. & Eng., Assaying & Testing	$ 100,000
	$ 320,000

FEASIBILITY & ENVIRONMENTAL IMPACT STATEMENT

Est'd.	$ 180,000
TOTAL ENGINEERING	$ 500,000

NB. Approximately a five-year operation

CONCLUSIONS

This preliminary examination and evaluation of the Ramsey Mine Property indicates that the potential for a profitable cyanide leaching operation probably exists. Enough stockpile and dump material, that appears to be good heap leaching material, is at hand to warrant a pilot-scale operation for a period of one to two months. This would be a high risk venture and would involve approximately $50,000 in development and operating capital.

Should this pilot-scale operation be undertaken and prove economically profitable, the potential for a larger open cut heap leaching operation appears to exist. An investment of approximately $1.5 million and a potential net return (before taxes) of approximately $1.0 million is the order of magnitude of this larger operation.

Provisionally, the underground geology suggests the possibility for a 300-foot deep open pit and an even larger heap leaching operation. Should the necessary exploration, engineering and test work be carried out to prove up this larger potential, a five year operation could evolve at an estimated $7.5 million investment and net before taxes potential of approximately $3.8 million.

RECOMMENDATIONS

In view of the present availability of the Ramsey Mine Property, the current rising silver price, and the apparent leachability of Ramsey ore and mine dumps, the following recommendations are made:

(1) Acquire the property on reasonable royalty terms, i.e. 2.5% - 5% of gross.

(2) Locate additional contiguous claims to provide surface operating room and protection.

(3) Finance and initiate a pilot-scale stockpile and mine dump cyanide leaching operation using a 65-ton per day Escapule - type plant. An estimated $45-50,000 investment is required.

(4) Monitor and evaluate the pilot operation over a period of one to two months. If it proves successful and profitable, begin to plan and finance exploration, engineering, and test work for either of the subsequent larger potential open cut or open pit operations outlined herein.

Respectfully Submitted,

E.D. Black, M.Sc., P. Eng.