CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

PART 3 of 4

09/26/97

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: MICA MULE

ALTERNATE NAMES:
SILVER MICA

YAVAPAI COUNTY MILS NUMBER: 867

LOCATION: TOWNSHIP 8 N RANGE 2 E SECTION 7 QUARTER C
LATITUDE: N 34DEG 03MIN 06SEC LONGITUDE: W 112DEG 11MIN 42SEC
TOPO MAP NAME: BLACK CANYON CITY - 7.5 MIN

CURRENT STATUS: EXP PROSPECT

COMMODITY:
MICA
GOLD

BIBLIOGRAPHY:
ADMMR MICA MULE FILE
BLM AMC FILE 30086
CLAIMS ALSO IN SEC. 18 T8N-R2E & SEC. 12 AND 13 T8N-R1E

A FEASIBILITY REPORT

on the

GEOLOGY, MINING, MILLING AND MARKETING

of

GROUND MICA PRODUCTS

from

PEGMATITE DEPOSITS

of

YAVAPAI COUNTY

ARIZONA

by

JOE WILKINS
Geologist

SUMMARY

The Mica Mule mining property 25 miles north of Phoenix contains a mineable tonnage of muscovite mica that if mined will yield a superb quality scrap mica. Minimum mineable tonnage on the property is 1,402,710 tons of 40-50% mica that can be mined by open-pit methods at a 1.5 to 1 stripping ratio. This tonnage contains 701,355 tons of high-quality scrap mica.

The mica is contained in a NNE-trending series of pegmatite dikes conformably intruding Pre-Cambrian Yavapai Group schists. The differential weathering of the pegmatites and schists results in ridge-valley topography with bold outcrops of pegmatite forming ridges. The nature of the pegmatite outcrops yields an excellent environment for mining.

The mica will be mined in 8 separate open-pit mines yielding 300 tons/day of mica with removal of 450 tons/day of waste. The ore will be processed in a 300 tons/day capacity mill located near Gillette, Arizona, on the banks of the Agua Fria River.

For 40 year life the Mica Mule Mine will yield a $27,323,533.00 profit after taxes (based on previous calculations - may be as much as 100% larger).

The total ore reserves at the Mica Mule Mine are estimated at 12,296,000 tons. At 300 tons/day and a 264 day year, this reserve will last for 155 years.

GENERAL

LOCATION

The Mica Mule mining claims are located in Yavapai County, approximately 2½ miles due east of Rock Springs-Black Canyon City, Arizona in the Tip Top Mining District. Specifically, the claims are located in Sections 12 and 13, T.8N., R.1E.; Sections 5, 6, 7, and 8, T.8N., R.1½E.; and Sections 17 and 18, T.8N., R.2E.

The mine area is currently accessible only by 4-wheel drive vehicle during the rainy seasons, but at other times, by any durable vehicle. The Table Mesa interchange, 22 miles north of Phoenix on Interstate 17 is the present access road into the mine area. From the interchange it is 5.6 miles Agua Fria River ford at Gillette via county maintained road. It is 8.6 miles from the river along the Tip Top Road to the southern boundary of the Mica Mule claims. With careful grading and a few cuts the road could be shortened to 3.5 to 4 miles.

TOPOGRAPHY - CLIMATE

The claimed area is situated in the foothills of the Bradshaw Mountains in gently rolling terrain. Several sharply incised drainage channels present minor - and the only - topographic obstacles to easy development of the Mica Mule Mine. The elevation ranges from 2000 to 2500 feet A.S.L. in the main area of interest.

This portion of the Bradshaw range is semi-arid desert receiving an estimated 12-14 inches of rainfall per year. Vegetation is typical Upper Sonoran, consisting of various cacti, mesquite, palo verde, desert shrubs, with riparian vegetation along major drainages. The annual rainfall should be sufficient to charge a small strategically placed reservoir to provide water at the mine site. In addition, numerous springs exist at or near the granite-schist contact that could easily be developed providing a steady water flow.

PROPERTY AND LEGAL STATUS

The Mica Mule claim block consists of 48 contiguous, unpatented lode mining claims located on Federal land administered by the U.S. Bureau of Land Management. As shown on Plate II, the claim block is rectangular in outline, 8 claims across and 6 claims long, covering in excess of 960 acres. Each claim is 600 ft. wide and 1500 ft. long with extra lateral rights. The claims are in good standing

and held virtue of annual accessment work as specified by Arizona Mining Law.

HISTORY

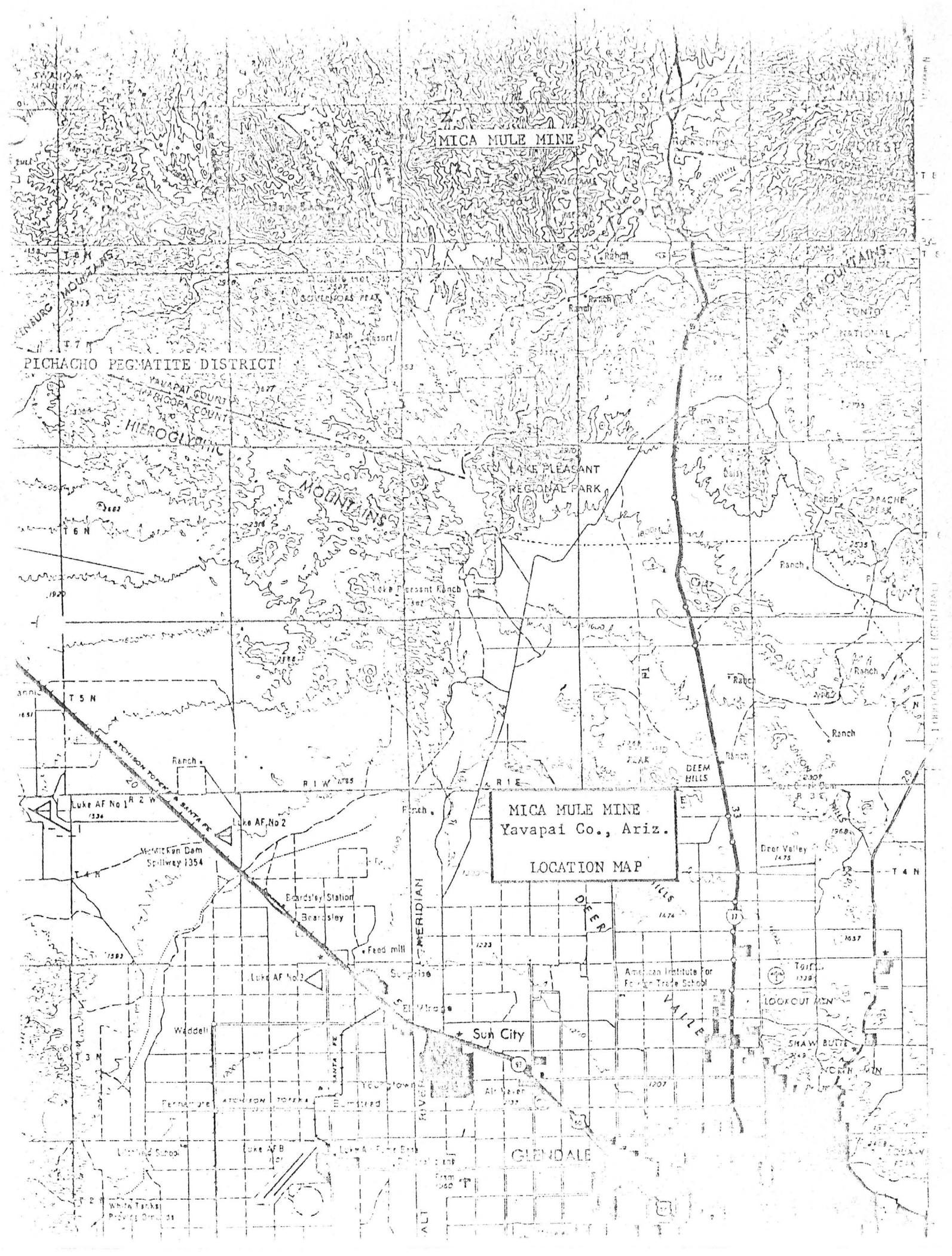
Although the Tip Top Mining District is one of the oldest in Arizona -- established in the 1870's -- no significant mineral production has transpired since the closing of the Tip Top Mine near the turn of the century. No known mica production of any sort has been recorded.

The district has however undergone extensive prospecting as witnessed by the abundant abandoned claims. The claims were apparently staked for base metals, precious metals and/or uranium but abandoned when economic amounts of these metals were not found.

During the late 1960's and early 1970's, the Mica Mule group of claims were staked by Herman Harrison and Associates of Phoenix, Arizona. In 1971, the Harrison Mining and Exploration Company, Inc. was incorporated under the laws of the State of Arizona. The 48 Mica Mule claims were then assigned to this corporation. Following assignment, an intensive program of sampling and trenching was undertaken by the company and an extensive road network was established to provide needed access. As a result of this exploratory effort it was concluded that a large body of high quality muscovite mica of sufficient size to support a moderate mining and milling operation existed on the property. At this time, Harrison Mining and Exploration, Inc. management made plans to establish a mine and mica mill to process the high grade muscovite mica and undertook a series of feasibility studies to establish the optimum mining and milling rate to provide the greatest economic return.

A feasibility report on mill size, milling flowsheet, milling characteristics of the mica, and general milling economics was completed by mica expert, P. S. Hoyt in June, 1972. It was concluded that the Mica Mule Muscovite will produce a scrap mica product ". . . OF SUPERLATIVE QUALITY AS TO WHITE COLOR, BRIGHTNESS AND INHERENT SHEEN AND BRILLIANCE."

This report follows and summarizes the favorable results obtained by Mr. P. S. Hoyt.


MICA MULE MINE
PICACHO PEGMATITE DISTRICT
YAVAPAI COUNTY
MARICOPA COUNTY
HIEROGLYPHIC MOUNTAINS
LAKE PLEASANT REGIONAL PARK
Lake Pleasant Ranch
Lake Pleasant
SOLDIERS PEAK
APACHE PEAK
DEEM HILLS
Deer Valley
Luke AF No 1
Luke AF No 2
Luke AF No 3
Luke AFB
Beardsley Station
Beardsley
Feed mill
Sunrise
El Mirage
Sun City
Waddell
Glendale
American Institute for Foreign Trade School
LOOKOUT MTN
SHAW BUTTE
NORTH MTN
ATCHISON TOPEKA & SANTA FE
SANTA FE
AGUA FRIA RIVER
GILA AND SALT RIVER MERIDIAN
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
T 3 N
R 1 W
R 2 W
R 1 E
R 2 E
MICA MULE MINE
Yavapai Co., Ariz.
LOCATION MAP

GEOLOGY

INTRODUCTION

During portions of January through March, 1973 a program of detailed mapping and sampling was undertaken at the Mica Mule property. Following a general reconnaissance of the claims, a small portion of the center of the claim block was selected for small-scale geologic mapping. The area covered contains an exceptionally large and persistent pegmatite dike swarm approximately 1 mile long and 200 to 1000 ft. wide containing 4 major dikes and innumerable smaller dikes. Each dike contains from 30 to 80% coarse- to medium-grained muscovite.

The dike swarm was mapped at 1 in. = 100 ft. scale with brunton and chain control. The geologic maps on Plates III and IV are the result of this mapping program. A total of 22,750 feet (4.31 miles) of pegmatite dike was mapped representing an estimated 50% of the existing dikes in the claimed area. During mapping, 19,000 feet of controlled traverses were made beginning at a known point and closing on that or another known point. Accuracy was excellent -- most traverses closing within 10 feet and never exceeding 25 feet.

As shown on the map, the width of each dike was measured at inflection points along with the attitude of each contact and the grade of muscovite estimated.

REGIONAL GEOLOGY

The mine area is situated along a major Pre-Cambrian pegmatite belt extending from Cleator, Ariz. in the north to the White Picacho District near Morristown, Ariz. in the southwest. The belt is arcuate paralleling the contact between the Yavapai Group schists and a major granitic batholith, both of Pre-Cambrian age. Recent volcanic flows cover a large area south and east of the claims but are not present on the claims.

The deposit consists of a major pegmatite dike swarm trending N.10°E. to N.30°E. about 600 to 1000 feet east of the granite-schist contact. Exposures of the dikes are excellent as they stand out in bold relief forming ridges and walls up to 25 feet in height above the intruded schist.

The pegmatite dikes generally are conformable with the intruded Yavapai Group schists but in a few instances cut

across the schist trend. The rock sequence is as follows:

Pegmatite dikes
Granite
Yavapai Group schists

The oldest rocks are the schists and the youngest the pegmatites -- all of older Pre-Cambrian age.

The Yavapai Group schists form the country rock throughout the claimed area. The schists are sericite-staurolite schists with porphyoblasts of staurolite set in a fine-grained sericite groundmass. The schist is quite soft weathering to topographic lows. It appears to be deeply weathered and should be easily rippable.

In one part of the claimed area, a thin but persistent rhyolite tuff breccia unit occurs with adjacent quartz-tourmaline veining. Several small, isolated occurrences of base metals exist along the margins of the rhyolite. Argentiferous and gold-bearing galena was noted at one prospect pit and oxidized chlacopyrite at several other small pits along the rhyolite-schist contact.

The Granite intrudes the schist along the schistosity but with numerous parallel and transverse granite dikes. Several large pegmatites parallel and cut the contact. The contact is marked by an abundance of these pegmatites. An example of the complex nature of the contact is illustrated in the southwest corner of the mapped area. Several granite dikes grade laterally into coarse grained pegmatites along strike of the dike. The granite-schist contact is highly sericitic, probably from assimilation and remobilization of the intruded sericite schist.

Several granite dikes are present east of the mapped area paralleling the pegmatite dike swarm. Often these sericitic granite dikes grade laterally into pegmatites along strike.

In all instances, the granite is highly sericitic, coarse-grained, and consists essentially of quartz, potassic feldspar, and sericite. A common genesis between the granite and pegmatites is obvious.

The Pegmatite dike swarm consists of numerous NNE-trending dikes that pinch and swell and merge and separate. The pegmatite is simple granitic consisting of very coarse to medium grained, subhedral to euhedral, crystals of milky quartz, potassic feldspars, and muscovite mica. No pronounced zoning of the components was noted except for a tendency in the larger masses for large aggregates of each mineral to occur together in an almost random fashion. In general, the larger the dike the larger the grain size.

Few accessory minerals were noted in the dikes. Noted were garnet, lithiophillite, and schorl tourmaline. The tourmaline occurs in the schist along the dike margins in irregular and inconsistent masses. Garnet and the manganese-bearing lithiophillite occur only on the northern and southern extremes of the deposit. Total accessory mineral content of the deposit will NOT exceed 0.1%.

The width of the dikes vary from 6 inches to 60 feet pinching and swelling along strike and probably with depth. In numerous instances several smaller dikes will merge along strike to form a single large dike and conversely. When visible along washes several dikes were seen to merge vertically forming a single unit. The Southern group of dikes is an excellent example of dikes merging along strike and with depth. Despite the pinching and swelling of the dikes, most are remarkably consistent along strike if an average width is considered. Most major dikes will maintain an average width for several hundred feet along strike. Along-strike characteristics of the dikes can be considered an excellent approximation of their depth characteristics.

Dips ranging from 45° to vertical were measured along the dikes. However, most of the dikes are essentially vertical. The shallow dips seems to represent an offshoot of a major dike and generally indicate merging of dikes with depth. The depth extent of the dike system is unknown but probably exceeds 500 feet -- this is the amount of relief between the North and South ends of the dike swarm.

Numerous NW to WNW fault zones cut and offset the dike swarm yielding an apparent echelon series. The faults are probably normal faults with a small strike-slip component. A large portion of the dikes have undergone extensive shearing perpendicular to strike yielding a crumbly shattered rock. This sheeted rock is not quite as resistent to weathering and generally forms low (3-5 ft.) walls but should provide excellent, easily crushable mill feed. An estimated 50% of the dike rock has undergone shattering.

THE ORE MINERALS

The primary ore minerals is muscovite mica, of exceptional quality and purity. Both gangue minerals quartz and potassic feldspars are potential by-products. In most of the areas to be mined the rock will average 40-50% mica with equal amounts of quartz and feldspar (25-30% each). Thus 10 tons of ore will theoretically yield:

4-5 tons of mica
2.5-3 tons of quartz
2.5-3 tons of potash feldspar

If markets can be found for both by-products there will be no waste from the milling operation.

Muscovite mica occurs in the pegmatite as unusually clean subhedral books with very few - if any - visible impurities. The books range in size from 12 in. across to less than 1/16 in. across. Average sizes throughout the area are 1/4 in. to 1 in. diameter books. The following size classification is used in this report:

Fine	- Less than 1/4 in.
Medium	- 1/4-1/2 in.
Coarse	- 1/2-1 in.
Very Coarse	- Greater than 1 in.

The average size of the mica in the main areas of interest is medium to coarse grained.

The average grade (as estimated) throughout the area is 35 to 45% with areas ranging up to 80% mica. The Geologic map on Plate IV shows the estimated mica content throughout the area mapped.

The muscovite is pale-green to yellow-green on fresh surface and occurs as aggregates of books. Often the aggregates constitute 80% of the rock in a pegmatite that averages 40% mica. The yield from these areas should be excellent as many aggregates are several feet in length and width. In the lower grade pegmatites the mica occurs as individual, non-oriented, discrete books. Owing to the nature of the muscovite as aggregates and fairly large discrete books, mill recovery should be excellent.

The muscovite at the Mica Mule Mine will provide an excellent high-purity product. Although the possibilities of sheet mica of good quality exist the primary product is scrap mica which will provide an excellent product for reconstituted mica, for paints, rubber filler, plastics, and wallpaper in addition to uses in the oil drilling industry, lubricants, welding rods, etc.

The byproduct feldspar and quartz are of sufficient quality and quantity to consider additional market research. The feldspars are microcline and orthoclase and suitable for the glass, ceramic, and pottery industries. The feldspar and quartz occur as discrete subhedral crystals and aggregates of crystals throughout the deposit. In general, feldspar exceeds quartz but quartz often forms veins or veinlike masses of pure quartz within the pegmatite. The individual crystal sizes are quite large in comparison with the micas with feldspars up to 2 ft. across noted.

All minerals in the deposit occur as separate, non-interlocking crystals so segregation should be quite simple.

ORE RESERVES

METHOD OF CALCULATION

Ore reserves were calculated by measurement of surface area of each dike and dike segment. The surface area was converted to tons per vertical foot by division by a tonnage factor of 12.5 cubic feet/ton. Then tonnages were calculated for walls above surface and for assumed vertical wall depths of 50, 100, 150, 200, and 500 feet.

Open pit tonnages were calculated by sectional data across the dike. Sections were constructed and a assymetrical pit designed, with 45° and 60° slopes, then the tonnage for each pit calculated.

ORE RESERVES

For a total dike length of 22,750 feet covering an area of 150,370 square feet, the potential tonnage is 122,960 tons per vertical foot. Assuming vertical contacts for the dikes, the tonnage for various depths can be calculated:

Depth	Tonnage
50 ft.	6,148,000 tons
100 ft.	12,296,000 tons
150 ft.	18,444,000 tons
200 ft.	24,592,000 tons
500 ft.	61,480,000 tons

Although the vertical contact assumption is not valid it will yield a good approximation of the tonnage for shallow depths (up to 100 ft.). Contacts that dip inward should be balanced by the number of contacts dipping outward yielding an average of vertical.

WALL TONNAGE

Walls of pegmatite above ground on the property are numerous ranging up to 25 ft. in height. Variations in wall heights are shown color-coded on Plate III. Only walls greater than 5 ft. height were included in the wall tonnage, although each dike forms a bold outcrop above the enclosing schist and always mineable.

Wall tonnage = 66,310 tons

In addition to the walls there is a large tonnage of boulders adjacent to the dikes that can and should be mined. The boulder tonnage is estimate at approximately 1/3 of the

wall tonnage:

Boulder tonnage = 20,000 tons

Thus the boulder and wall tonnage will yield approximately 86,000 tons of easily mineable material, enough to operate a 300 t/d mill for 1 year.

OPEN PIT TONNAGE

A total of 8 areas was selected as open-pit mine areas. This is by no means all inclusive and many other areas are present that will provide a substantial tonnage of open-pit mineable ore. Each pit is shown on Plate III and individual sections on Figures 1 through 6. Each pit was selected by size of outcrop, grade, location, and topographic relief. In three instances small pits with larger stripping ratios were included because of their very high mica content.

The pit name, tonnage, grade, and stripping ratio are as follows:

Pit	Tonnage	Grade	Stripping Ratio
North	450,000	40-60%	1:1
North #2	14,000	60-70%	2:1
Central	52,000	50-60%	1.5:1
Central #2	90,000	35-45%	1.5:1
North Central	18,200	50-60%	2:1
N.C. #1	7,200	60-70%	2:1
N.C. #2	5,000	70-80%	2:1
South pit complex	680,000	35-50%	1:1
Total Tonnage	1,316,400	40-50%	1.5:1

This is an open-pit tonnage of 1,316,400 tons grading 40-50% mica at a stripping ratio of 1.5 tons waste to 1 ton of ore exist on the Mica Mule property.

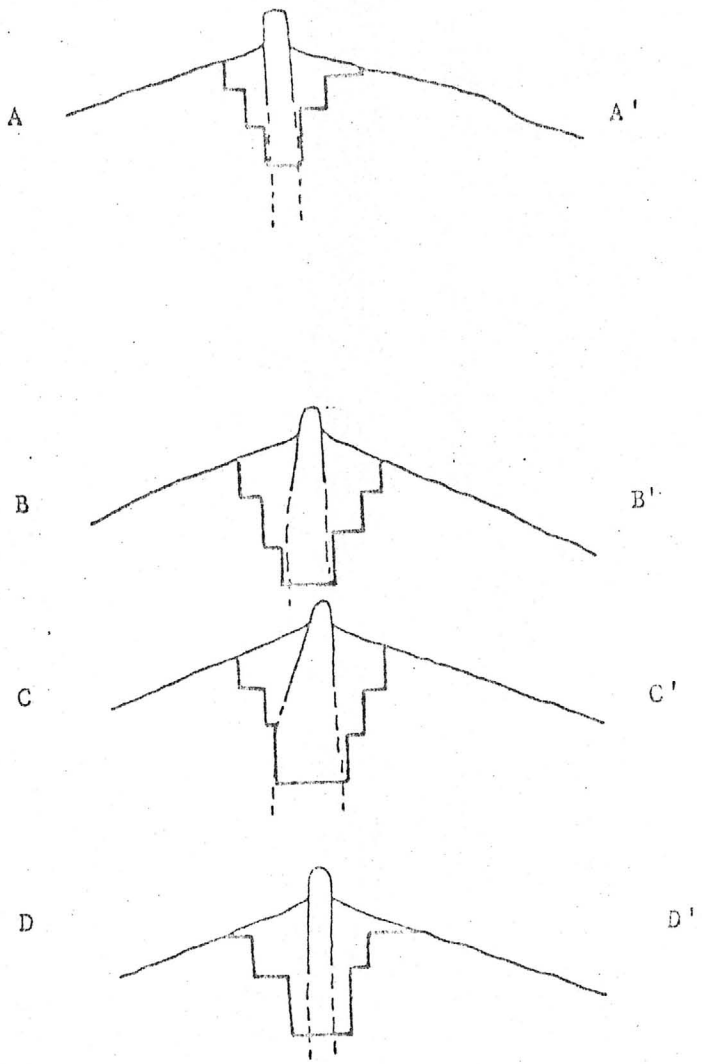
TOTAL MINEABLE TONNAGE

If the open-pit tonnages are combined with the wall and boulder tonnages, the total easily mineable tonnage available is:

Open-pit tonnage	:	1,316,400 tons
Wall tonnage	:	66,310 tons
Boulder tonnage	:	20,000 tons
Total	:	1,402,710 tons

If the ore is mined and processed at a rate of 300 tons per day and a 264 day year, this reserve will last for 4675 days or 18 years of operation.

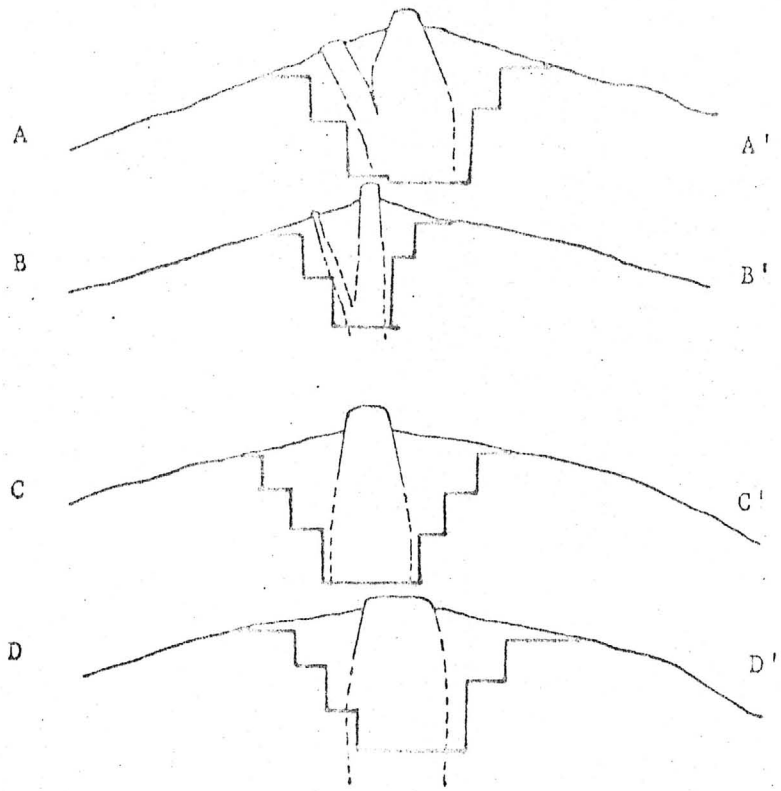
MICA MULE MINE



NORTH CENTRAL PIT

Tonnage: 18,200 Tons
Grade: 50-60 % Mica
Stripping Ratio: 2 : 1

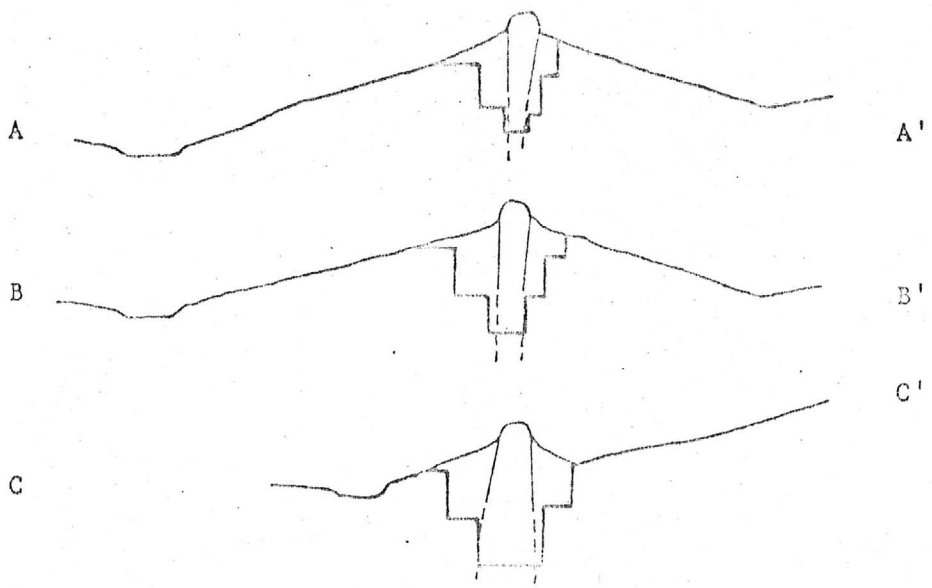
MICA MULE MINE



CENTRAL PIT

Tonnage: 49,000 Tons
Grade: 50-60 % Mica
Stripping Ratio: 1.5 : 1

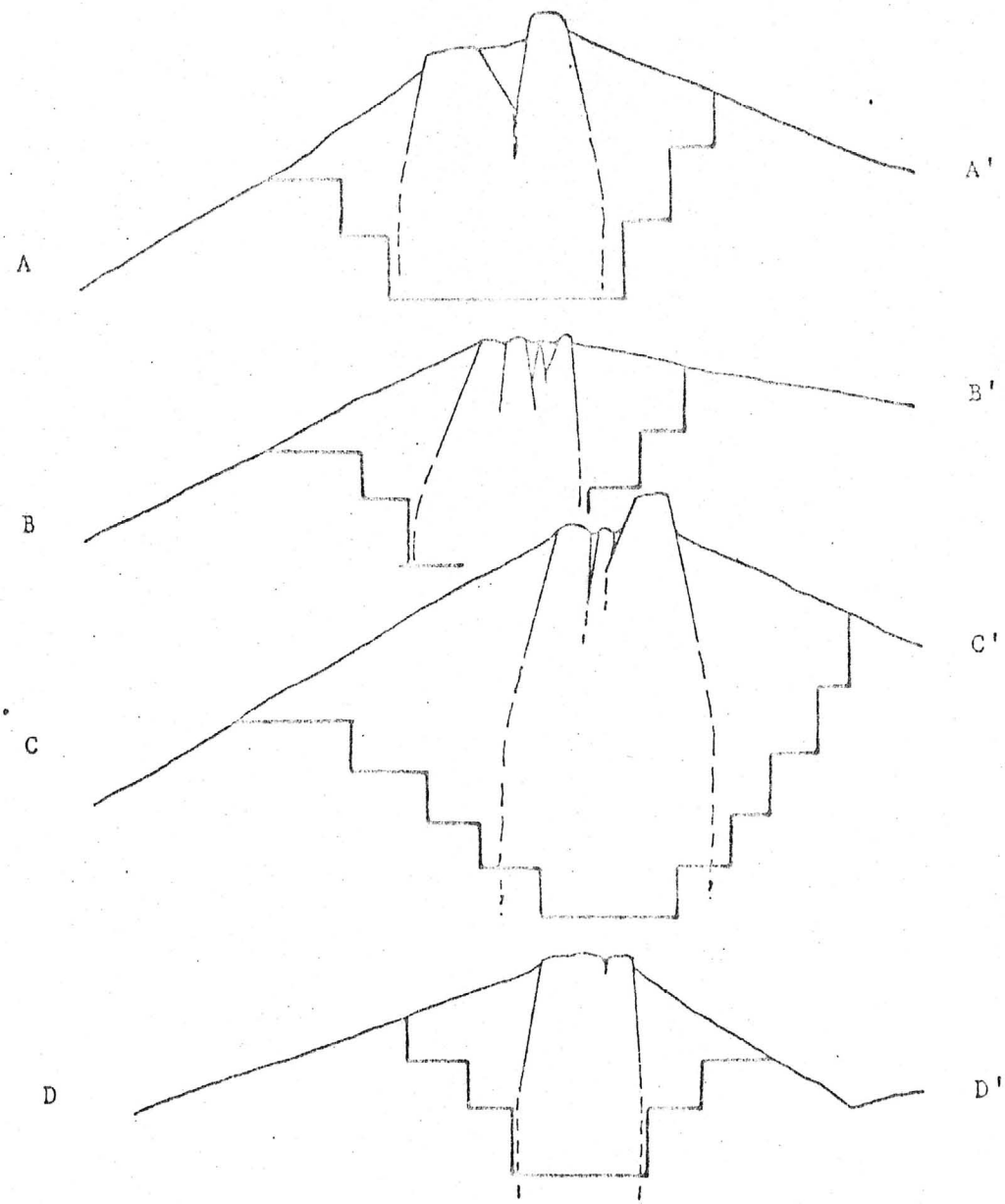
MICA MULE MINE



NORTH PIT # 2

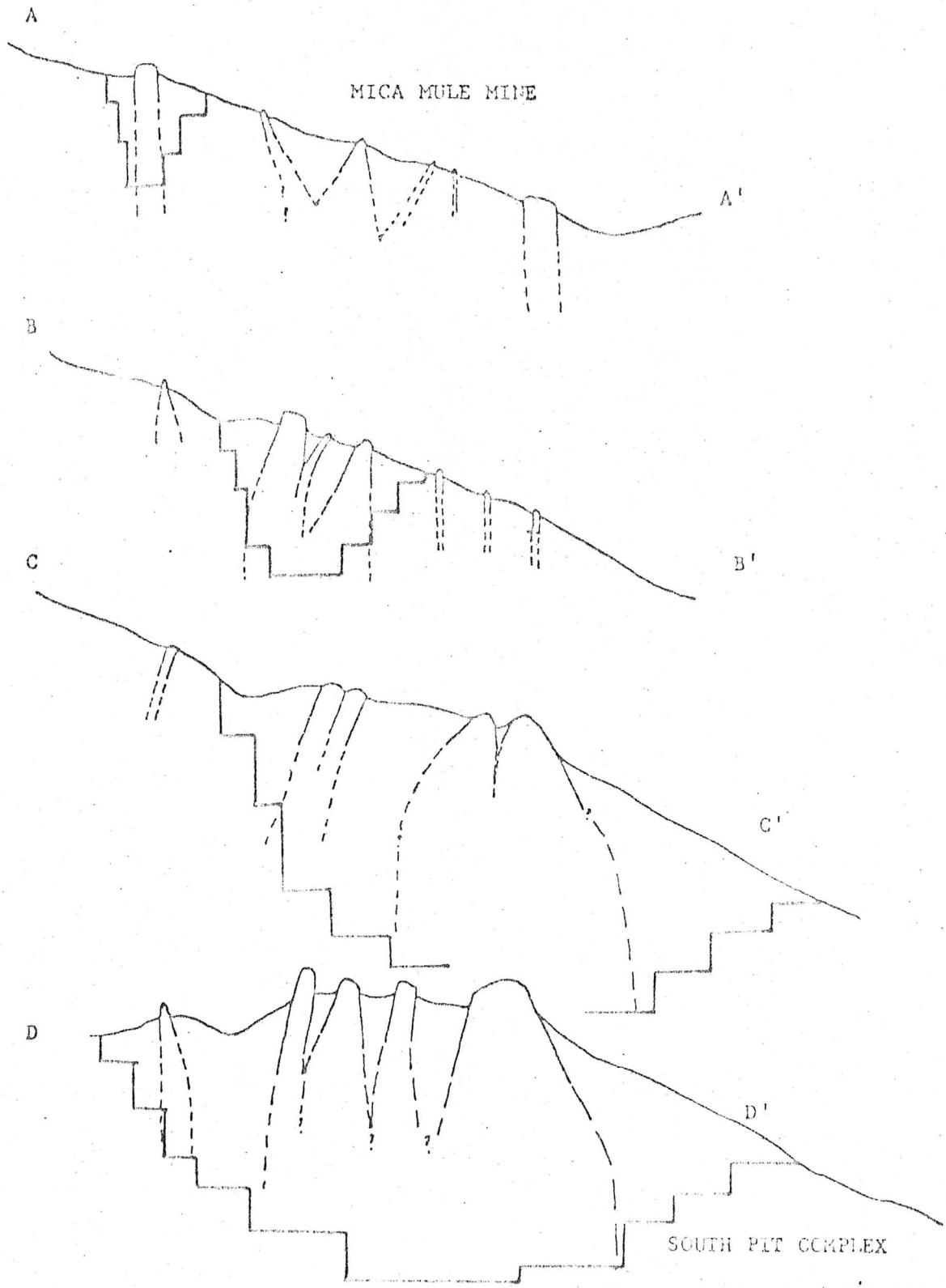
Tonnage: 16, 800 tons
Grade: 60-70 % Mica
Stripping Ratio: 2 : 1

MICA MULE MINE



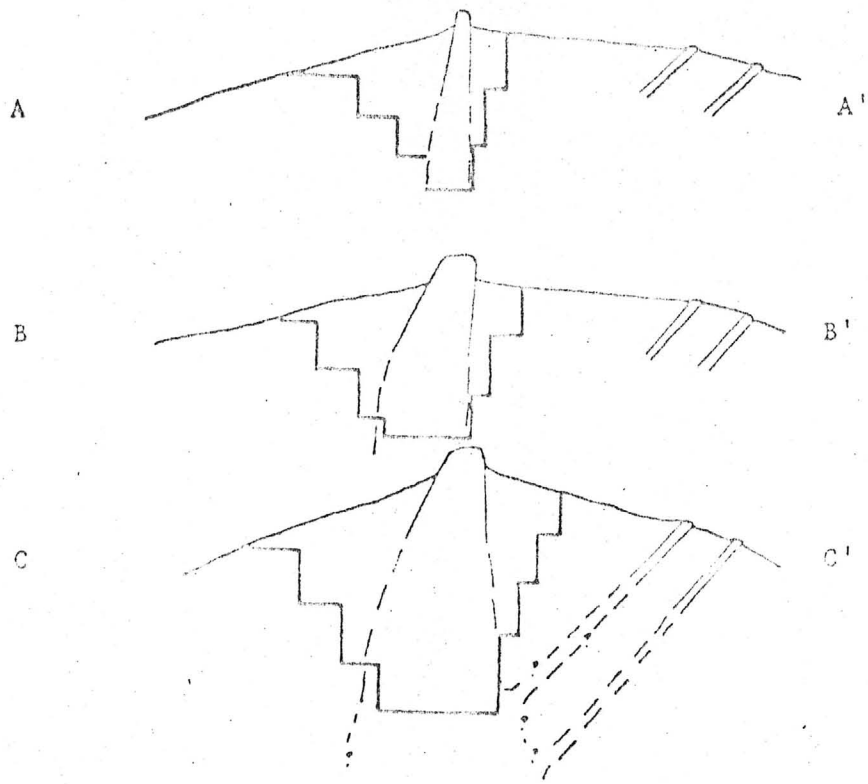
NORTH PIT

Tonnage; 450,000 Tons
grade: 40-60 % Mica
Stripping Ratio: 1 : 1



Tonnage: 680,000 Tons
Grade: 35-50 % Mica
Stripping Ratio: 1 : 1

MICA MULE MINE



CENTRAL PIT # 2

Tonnage: 90,000 Tons
Grade: 35-45 % Mica
Stripping Ratio: 1.5 : 1

DRILLED RESERVES

QUANTITY TO APPROX.
100 FT. DEPTH

D/S	STRIP CY	DIKE CY	% MICA	TONS MICA	MONTH @ 3000T/MO	FLOOR ELEV.	DIKE WIDTH
# 1	2,460	10,700	20.00	4,280	1.4	2270	15'
# 2	6,180	8,990	8.77	1,580	0.5	2240	13'
# 3	269,000	250,220	18.00	90,100	30.0	2250	30 to 70
# 4 & 6	59,400	108,000	27.22	58,800	19.6	2300	15'
# 5	33,300	25,300	19.15	9,690	3.2	2300	10'
# 7	19,020	16,200	21.92	7,100	2.4	2300	15'
# 8	42,830	51,800	14.67	15,200	5.1	2300 to 2420	15'
# 9	175,700	175,700	20.00	70,280	23.5	2525	N/A
#11	112,400	55,850	20.00	22,340	7.4	2300 to 2375	10'
#12	141,900	81,270	25.00	40,638	13.5	2200 to 2225	26'
	862,190	784,030	20.41	320,008	106.6 @ 3,000 tons per month		

8.9 years of operation @ 3,000 tons mica per month

13.3 years of operation @ 2,000 tons mica per month

DRILLED RESERVES

INCREASE DEPTH OF
D/S 1 THRU 12 50 FT.

	DIKE WIDTH	VOL CY.	TONS ORE	% MICA	TONS MICA
D/S # 1	15'	5,700	11,400	20.00	2,280
# 2	13'	8,185	16,370	8.77	1,436
# 3	15'	19,000	38,000	18.00	6,840
# 4 & 6	15'	63,900	128,000	27.22	34,800
# 5	10'	13,333	26,666	19.15	5,213
# 7	15'	8,333	16,666	21.91	3,651
# 8	15'	24,400	48,800	14.67	7,170
# 9	15'	18,000	36,000	20.00	7,200
#11	10'	29,600	59,200	20.00	11,840
#12	26'	61,148	122,296	25.00	30,574
		251,599	503,398	22.05	111,004

3.1 years @ 3,000 tons per month

4.6 years @ 2,000 tons per month

RESERVES MAPED BUT NOT DRILLED

MINED TO 100 FT. DEPTH

11-1-79

DS No.	Dike Length Ft.	Depth Ft.	Width Ft.	Tons Ore	% Mica	Tons Mica	% Mica	Tons Mica
1-N	1800	100	10	132000	15	19800	20	26400
4-W	400	100	10	30000	15	4500	20	6000
5-E	1450	100	10	106000	15	16200	20	21600
6-E	1600	100	10	120000	15	18000	20	24000
7-E	900	100	10	68000	15	10200	20	13600
8-W	2100	100	25	388000	15	58200	20	77600
8-N	700	100	10	52000	15	7800	20	10400
9-N	550	100	10	40000	15	6000	20	8000
11-W	1450	100	10	108000	15	16200	20	21600
11-S	800	100	25	148000	15	22200	20	29600
11-E	1450	100	10	108000	15	16200	20	21600
12-E	1400	100	10	104000	20	20800	25	26000
	14,600			1,406,000		216,100		286,400

3000 Ton per month — 6 years — 8 years

2000 Ton per month — 9 years — 12 years

Appendix 4

PROFESSIONAL BACKGROUND

of

JOE WILKINS

Tucson, Arizona

Joe Wilkins was awarded a B.S. in Geophysics - Geochemistry (with Distinction) and Honors in Geology from the University of Arizona in 1966. Mr. Wilkins was a graduate student at the same university on the Special Masters program 1966-1967 with a teaching assistantship in geology and will be awarded a Master of Science degree in Geology upon completion of thesis.

Since graduation Mr. Wilkins has been employed by Duval Corporation (a subsidary of Pennzoil Corp.) as a geologist and chief geophysicist. During this period, he has obtained a broad background in mining and mining exploration including exploration, evaluation, and mining of copper, molybdenum, gold, silver, uranium, tungsten, barite, vermiculite, sulfur, potash, and phosphate. Mr. Wilkins was directly involved in exploration and evaluation of deposits in the U.S., Canada, Mexico, and Alaska.

Joe Wilkins is affiliated with the following professional and honorary societies:

American Institute of Mining Engineers
American Geophysical Union
Society of Exploration Geophysicists
Society of Geoelectricity and Geomagnetism of Japan
Sigma Gamma Epsilon (Earth Science Honorary)
Arizona Geological Society

Recently Mr. Wilkins was instrumental in the development of an induced polarization continuous borehole logging unit and new borehole techniques for evaluation of porphyry copper deposits.

Silver King Mines, Inc.
1204 DESERET BLDG. SALT LAKE CITY, UTAH 84111
(801) 521-3827

June 26, 1973

Mr. Herman Harrison
Harrison Mining and Exploration Inc.
3019 West Wethersfield Rd.
Phoenix, Arizona 85029

Dear Mr. Harrison;

This past weekend I was contacted here in Salt Lake City by Mr. Joe Wilkins concerning his April, 1973 feasibility report on the geology, mining, and milling of the Mica Mule Property, Yavapai County, Arizona. As you know, it was unfortunate that we were unable to examine the property directly due to flooding of the Aqua Fria River. However, I was able to read the entire text concerning the geology, mining, and milling of the Mica Mule ores and can attest that the synthesis presented by Mr. Wilkins appeared quite rigorous, complete, and very well documented.

As for the geologic setting and nature of your mica deposit, it appears to most closely resemble that of the Dixie Queen which is also associated with pegmatite dikes crosscutting granite-mica schist. The extreme strike continuity of this deposit as well as the Mica Mule as demonstrated by Mr. Wilkins' mapping is certainly a big plus for your deposit and will certainly help reduce mining costs.

Unfortunately, not having examined the property first hand, I have no feel for reasonable mining or milling costs or the variability in color, sheet thickness and size, or nature of structural defects-impurities of your ores; however, this portion of Mr. Wilkins report appeared well documented and detailed. Having

known Mr. Joe Wilkins personally and professionally for nearly 10 years now, it would be my feeling that his feasibility study of your Mica Mule Property could be taken at face value and planning and development could be initiated according to his recommendations. Best of Luck in placing this property into production.

Sincerely,

Tom L. Heidrick

Tom L. Heidrick

EXECUTIVE OFFICES
1270 AVENUE OF THE AMERICAS, NEW YORK, N.Y. 10020
PLAZA 7-9700

AMAX EXPLORATION, INC.
SUBSIDIARY OF AMERICAN METAL CLIMAX, INC.
2510 N. CAMPBELL AVE., TUCSON, ARIZONA 85719

TELEPHONE
AREA CODE 602
795-4731

To Whom It May Concern:

I have known Joe Wilkins for approximately eight years during his career as a professional geologist-geophysicst. I have always found him to be completly honest and reliable in all my dealings with him both professionally and privatly. I, also, have never seen cause to question his judgement on any professional matter which he has always carried out with the highest ethical standards.

I am currently the Southwestern Regional Geophysicst based in Tucson for AMAX Exploration, Inc.

F. P. Fritz

April 14th, 1972

Harrison Mining & Exploration Inc.,
3019 West Wethersfield Road
Phoenix, Arizona 85029

Att: Mr. Herman S. Harrison

FEASIBILITY REPORT ON A
MICA-FELDSPAR-SILICA PROJECT
IN YAVAPAI COUNTY, ARIZONA

Dear Herman:

Pursuant to your instructions we had a brief look at the above project on Sunday, April 9th accompanied by yourself and associates and we are outlining below some comments and suggestions pertaining to the project and its further development.

For the record, the project covers 48 lode mining claims laying in a rectangular shape, eight claims wide and six claims long, covering approximately 4800 x 9000 feet, or 960 acres. The road access is adequate for present needs with a new hauling road for ores to be laid out more directly into the Black Canyon and US Highway 17 which will shorten the distance to about three miles.

GEOLOGY

The area included in the claims covers a stockworks of pegmatite dykes which are the end products of the large pegmatite zone that occupies the area from Clearor, Arizona southeasterly thru Horse Thief Basin and down into the lower and southeast end of the Bradshaw Range.

The major feature to deal here with is the attitude and size of the pegmatite bodies as indicated on the surface, these being simple pegmatite magmas that are end products from this immense pegmatite body to the north. The dykes showing on the surface indicate deep seated bodies, trending northerly and southerly, with varying widths and lengths, being parallel bodies, narrow but persistant.

The pegmatites seem uniform as to their content of mica, feldspar and quartz, with a notable absence of black minerals such as tourmaline and biotite. No accessory minerals were observed such as beryl or the rare earhhs altho there may be such minerals in some of the lenses of pegmatite that have not yet been thoroughly examined.

Some large quartz blow-outs are present in the area particularly on the northeast edge of the present claims and it is recommended that these quartz bodies be located and the claims tied to the group as there may be mica bodies as well as rare earth minerals along the selvage contact with the country rock which should be examined. The quartz itself may have economic value.

MICA

The mica present in these pegmatite is all muscovite and of the best quality, its inherent brilliance and sheen will produce a scrap [illegible] grade, which, when ground, will bring the highest prices in the [illegible].

The feldspar observed in present openings is all microcline and orthoclase, both potash spars, and suitable for specifications in glass, pottery and all other ceramic uses in presently established industries using feldspar.

The quartz is of good quality, and when ground, would be marketable into many uses where silica is presently being used both for melts and as a filler in abrasives and polishing products.

CONCLUSIONS

There is undoubtedly a large and commercial tonnage of pegmatite in the many lense-like bodies showing on the claims. The problem will be how they can be mined at low cost. Pegmatites less than 50 feet in width present mining problems especially when there is pinching and swelling of these lenses along their strike of the dyke and when and if less than this 50 foot width problems occur in endeavering to reach suitable depth in the dykes which would allow for bench mining without disturbing the enclosing walls. There are undoubtedly many places in these dykes where adequate width is present to provide ore for low cost removal and it is my suggestion that the next phase of your development be to locate several of these wide zones, especially in the gulch bottoms where the pegmatite dykes cross them.

The objective now should be to find such places as above described and to then calculate the tonnage potential present that can be mined at low cost. During this exploration work some information can then be developed as to the average tenor of mica, feldspar and quartz in the ore and a more positive tonnage calculated to insure the further financing of the project.

RECOMMENDATIONS

To accomplish the above further exploration it is recommended that some further work be done at the present location where the compressor is located, by drilling a shooting off a bench in the east wall and follow the contact down to a depth of 40 or 50 feet in the wall zone. This will involve lowest cost exploration as it can all be done by drilling and shooting and dozing the broken wall rock down the slope to the east. When this has been accomplished to prepare a patio onto which broken ore from the dyke can be stockpiled and thus furhish an adequate tonnage of pegmatite material to give us the information necessary to properly evaluate one of these lenses and its content. There will be another approximately fifty feet of backs developed in the dyke to the south and I am suggesting this because you have already cleaned off the surface and exposed the dyke in place and we should take advantage of this work already done.

There should be two additional locations examined to the north where the gulch cuts thru the dyke which has eigher been faulted and laid back to the west, or there may be two seperate dykes trending parallel in a northerly direction the gulch cutting around the respective ends of these dykes and offering a suitable location for further exploration which would provide approximately 200 feet of backs from the gulch level.

These features will be shown on a map that will be developed shortly by a reconnaissance over the whole group and there may be other locations where the topography will be favorable for further exploration of the pegmatites where the exposed dykes showing in the gulches provide the best locations for further

As mentioned previously there seems adequate tonnage of pegmatite ores present in these claims, the problem being can they be mined at low enough cost for commercial needs and provide percentages of mica, feldspar and quartz to justify their mining and milling. This can only be determined by further exploration work as recommended. The aggregate length needed in these combined lenses is 9000 feet, having a depth of mineable ore to 100 feet and not less than 50 feet in width. Having these dimensions there should be approximately 4,000,000 tons of recoverable low cost open pit ore. Estimating, from the small samples taken, a 15% mica recovery of mica would furnish 600,000 tons of mica; 60% quartz content of 2,400,000 tons; and 20% feldspar contant of 80,000 tons. An estimated crude value in these three minerals will aggregate $24,000,000 of mica value, $12,000,000 of quartz value, and $600,000 of feldspar value, all in crude ore values prior to milling into commercial products. Thus an aggregate value of ore in the project would indicate some $36,000,000.

If you agree, an overall report can be made up that will cover the costs involved in mining and milling this tonnage, and a P&L made up on a proforma basis to furnish values in the production and sales of these products. Also the time factor in producing and milling the ores based on the marketing potential into which they will be sold.

The critical factor here is the ore bodies and their recovery on a low cost mining basis. The hauling and milling can be set up on accurate cost basis. Hence I recommend the work be done as recommended above as this is the vital factor in its further development.

Respectfully submitted,

AIME '59.

P&H:k

PROFESSIONAL BACKGROUND
OF

PHILIP S. HOYT

CONSULTING MINING GEOLOGIST & ECONOMIST
3049 NORTH MARIGOLD DR
PHOENIX, ARIZONA 85018

SOURCE REFERENCE

1. INTERNATIONAL BLUE BOOK - "Who's Who in the World" - 1909-1940 by Hyacinthe Ringrose - New York: Belgrave Press.

   EXTRACT:
   "Geologist and Mineralogist, Born June 5, 1896, at Bozeman, Montana, of Scotch-Irish parentage. Discovered and pioneered the first commercial production of kyanite, olivine and vermiculite and others in the Industrial Mineral specialities, and new flotation reagents and milling processes".

2. From domestic publications of the U.S. Bureau of Mines, State Mining Bureaus, and others, including Engineering & Mining Journal and other technical papers: 33 years in the discovery, acquisition, exploration and development of the industrial mineral specialty products, including mica, asbestos, feldspar, fluorspar, lithium minerals, kyanite, dumortierite and andalusite, flint pebbles for grinding media, tremolite for acid filters, vermiculite, beryllium minerals, paligorskite in Alaska and others. Most of this work was done on a consulting basis on special project with the larger U.S. and British mining and industrial concerns, including:

   Lacledge-Christy Clay Products Co., St. Louis
   Chief Geologist - 10 years.

   Asst. State Geologist - Wyoming - 2 years (See E&MJ, November 8th, 1924)

   Johns-Manville Corp. - 2 years, Consulting on a Special Project

   Lithium Corp. of America - 2 years, Consulting on a Special Project

   Beryllium Corp. - Western Representative, 3 years - Research area.

   Mineral Research Company - U.S. and [illegible]
   Consultant two years - Legal

Southeastern Asbestos Corp. - V.P. 1957-1959
Amphibloe asbestos in the southeast

James Stewart Company - Supt. Construction mica mill 1958 completed.

International Minerals and Chemical Corp. - Consulting 1958-1959 - Tax work

Industrial Minerals Corp. of Nevada - Director and Consulting Engineer 1958-1959

U.S. Bureau of Mines - Employment and Consulting Rating - GS-11

During the last war developed and produced for own account, fluorspar, mica, ocher, flint pebbles, paligorskite (Alaska), tremolite (Alaska) and others. Made good profits on all operations.

In 1955 began exploration for and acquisition of rare earth minerals including especially those involved in the developing technology of the uses of nuclear energy, both fission and fusion. These rare earths include particularly beryllium, samarium, gadolinium, yttrium, germanium, selenium, etc.

3. MEMBER OF:

American Institute of Mining and Metallurgical Engineers, 24 years.
Arizona Small Mine Owners Association - over 10 years
Western Mining Council - Life Membership
New Mexico Mining Association

PAST MEMBER OF:

Pan-American Institute of Mining & Metallurgical Engineers
American Ceramic Society
Geological Society of America

Was a member of the "Industrial Advisory Committee" of the War Production Board, during the war for "Dry Ground Mica".

Was a member of the Industrial Minerals "Milling Committee", AIMME-1945.

New milling processes developed are shown in Taggart's "Handbook of Mineral Dressing" under Southern Mica & Milling Company.

Appendix 3

GENERAL MICA MARKETING INFORMATION

HISTORY

Mica can be divided into two classifications, sheet mica and scrap mica. Our project will not produce any appreciable quantities of sheet mica and no calculations have been made in the income figures on this grade of mica, its value being in dollars per pound. Both grades vary widely in their markets and uses. Sheet mica is an important insulating and dielectric material in the electronic and electrical industries. Scrap mica is ground into various mesh sizes and used as a filler and surface fireproof coating in numerous industries throughout the country.

Since scrap mica has been the dominant tonnage product of the U.S. mica industry and since the supply available from the ores owned by this Company is in this scrap mica classification all further comment and information will pertain only to the production of scrap and ground mica.

MARKET USAGE AND APPLICATIONS

The principal use of scrap mica is the production of ground mica. The ground mica, in various mesh screen sizes, is used extensively as a filler and surface coating for roofing materials, rolled roofing and asphalt shingles, as a filler in wall board and joint cements, and as an ingredient in paints, drilling muds, plastics, pipeline enamels, welding rods, tires and other rubber products.

The following table provides the approximate average recent years distribution of ground mica in U.S. industries. No figures are available for foreign exports, although the Japanese have indicated some interest in our mica production for export through San Pedro harbor.

Consuming Industry	Tonnage	Value**
Roofing	38,980	$1,370,000.00
Joint Cements	24,625	1,603,000.00
Paint	23,597	1,890,000.00
Rubber	6,979	728,000.00
Wallboard	1,269	168,000.00
Welding Rod	1,169	56,000.00
Other*	20,632	various
	117,251	

* Other includes: Plastics, well drilling muds, moulded electrical insulation, Christmas tree "Snow," and annealing.

** Value: Includes average price paid for all grades of ground mica within the industry.

THE FOLLOWING ASSAY REPORTS WERE MADE PERIODICALLY OVER THE LAST 10 TO 12 YEARS. THE VEIN WAS RUNNING NORTH - SOUTH & PARALLEL TO THE PEGMATITE DIKES AND ASSAYS TAKEN FROM SAMPLES PICKED UP DURING ASSESSMENT WORK.

ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.
815 WEST MADISON ST. PHOENIX, ARIZONA 85007 PHONE 254-6181

For: Silver Mica Mining Company
2521 West Mandalay Lane
Phoenix, Arizona 85023
Fran Harmon Silversmith

Date: June 4, 1975

Lab. No.: 9527

Sample: Rock

Marked: Pit 3 - Pegmatite

Received: 5-29-75

Submitted by: Frank Higgins

REPORT OF LABORATORY TESTS

Potassium Oxide, K_2O	=	9.6 %
Sodium Oxide, Na_2O	=	3.6 %

Respectfully submitted,

ARIZONA TESTING LABORATORIES

C. E. McLean, Jr.

Petroleum Development

ARC LABORATORIES

Division of Arizona Research Consultants, Inc.

9238 NORTH 10TH AVE. PHOENIX, ARIZONA 85021 943-0573

Jar Herman Harrison

FOR: Harrison Mining & Exploration Co.
3320 N. 66th St.
Scottsdale, Arizona

DATE 10/12/70

LAB No. 12034

81 on #3

RESULTS

Mica	62.0 ± 1.0 %

Respectfully submitted,
ARC LABORATORIES

John T. Lewis, Jr.

ANALYTICAL REPORT

complete
CHEMICAL ANALYSIS X SPECTRO-CHEMICAL WET ANALYSIS SPECIFIC GRAVITY

FIRE ASSAY ATOMIC ABSORPTION PROCESS EXTRACTION RESEARCH PROCESS AMALGAM

Sample submitted by: Vic Whittemore DATE 4-1-75

8624 E. Holly, Scottsdale Arizona 85057

Sample description: Silver ore? OTL8029

Aluminum	Major constituent
Magnesium	4.62 to 9.00%
Iron	3.52 to 7.04
Sodium	1.70 to 3.40
Calcium	1.32 to 2.64
Lead	0.52 to 1.04
Silicon	0.44 to 0.88
Vanadium	0.39 to 0.78
Titanium	0.19 to 0.38
Nickel	0.17 to 0.34
Lanthanum	0.17 to 0.34
Manganese	0.10 to 0.20
Chromium	0.088 to 0.176
Tungsten	0.066 to 0.132
Rubidium	0.052 to 0.104
Molybdenum	0.044 to 0.088
Copper	0.020 to 0.040
Tin	0.020 to 0.040
Gallium	0.020 to 0.040
Yttrium	0.017 to 0.034
Cobalt	0.007 to 0.014
Zirconium	0.002 to 0.004

Potassium	trace
Scandium	trace
Ytterbium	trace
Erbium	trace
Niobium	trace
Beryllium	trace
Hafnium	trace
Arsenic	trace
Thallium	trace
Tantalum	trace
Boron	trace

PRECIOUS METALS

Palladium	0.05 to 0.10 oz. p/t
Silver	4.00 to 8.00 oz. p/t
Iridium	trace
Platinum	trace
Osmium	trace
Gold	0.60 to 1.20 oz. p/t

Spectrograph reports must be given in a range rather than an exact figure. However, the particular model spectrograph which OTL uses, is superior in that it detects metals that could be overlooked by other methods of determination. It is especially suited to the trace and near trace elements.

The above figures are not necessarily indicative of the values obtainable by conventional extraction methods. All quantities shown in 'ounces per ton'.

Most samples containing the platinum group metals are of a 'complex' nature. In the make-up of these 'complexes' are many 'unstables' that tend to outweigh the 'stable' portion and act to suppress, or even prevent, the extraction of the 'stables'. OTL has been successful in overcoming this problem. We have established what we believe to be all the required basic production processes for the extraction of the precious metals from domestic ores.

OTL is equipped to perform the research needed to establish the feasibility and adaptability of ores to the OTL RECOVERY METHODS.

TEST FEE $25.00 PD.

ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE C. McLEAN & SON LABORATORIES, INC.
817 WEST MADISON ST. PHOENIX, ARIZONA 85007 PHONE 254-6181

for Herman Harrison

For Harrison Mining & Exploration
3019 West Bethersfield Road
Phoenix, Arizona 85029

Date February 27, 1974

Sample of Ore Received: 2-26-74

Submitted by: same

ASSAY CERTIFICATE

Gold figured at $ 200.00 per ounce Silver figured at $ 5.00 per ounce

LAB. NO.	IDENTIFICATION	GOLD		SILVER		PERCENTAGES	
		OZ. PER TON	VALUE	OZ. PER TON	VALUE	COPPER	
6233	3 on 37 schist on side walls [illegible]			0.60	$3.00	0.11%	

Respectfully submitted,

ARIZONA TESTING LABORATORIES

[signature]

[illegible] McLean Jr.

ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.
817 WEST MADISON ST. PHOENIX, ARIZONA 85007 PHONE 254-6181

For Harrison Mining & Exploration
3219 West Wethersfield Road
Phoenix, Arizona 85029

Date April 3, 1974

Sample of Ore

Received 4-1-74

Submitted by same

ASSAY CERTIFICATE

Gold figured at $ 200.00 per ounce. Silver figured at $ 5.00 per ounce.

LAB. NO.	IDENTIFICATION	GOLD		SILVER		PERCENTAGES	
		OZ./DEDUCTION	VALUE	OZ./DEDUCTION	VALUE		
0494	#A2-33	0.12	$24.00	44.	$220.00		

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean

ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.
815 WEST MADISON STREET PHOENIX, ARIZONA 85007 PHONE 254-6181

For Eggars & Locke Date March 7, 1975

for Herman Hansen

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES		
		GOLD	SILVER	COPPER		
8920	Middle Vein	0.23	350	2.35%		

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean, Jr.

ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.
915 WEST MADISON STREET PHOENIX, ARIZONA 85007 PHONE 254-6181

For Goggans & Locke Date March 5, 1975
for Norman Harrison

ASSAY CERTIFICATE

LAB NO.	IDENTIFICATION	OZ. PER TON		PERCENTAGES			
		GOLD	SILVER	COPPER			
8920	Overburden 3-3-75	0.06	77	0.48%			

Respectfully submitted,
ARIZONA TESTING LABORATORIES

ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.
517 WEST MADISON ST. PHOENIX, ARIZONA 85007 PHONE 254-6181

For H. S. Harrison
3019 W. Wethersfield Road
Phoenix, Arizona 85029

Date August 16, 1973

Sample of Ore

Received:

Submitted by: Base

ASSAY CERTIFICATE

Gold figured at $ 100.00 per ounce

Silver figured at $ 2.00 per ounce

LAB. NO.	IDENTIFICATION	GOLD		SILVER		PERCENTAGES	
		OZ. PER TON	VALUE	OZ. PER TON	VALUE		
5013	A1-33	0.56	56.00	460	$920.00	2.80	

Respectfully submitted,

ARIZONA TESTING LABORATORIES

Claude E. McLean Jr.

Chief Chemist