mountain states mineral enterprises, inc.

ARABIAN MINING PROJECT

PHASE I DEVELOPMENT REPORT

PREPARED FOR

WESTAR HOLDING CORPORATION

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Ventura, CA 93001

Job. No. 4155
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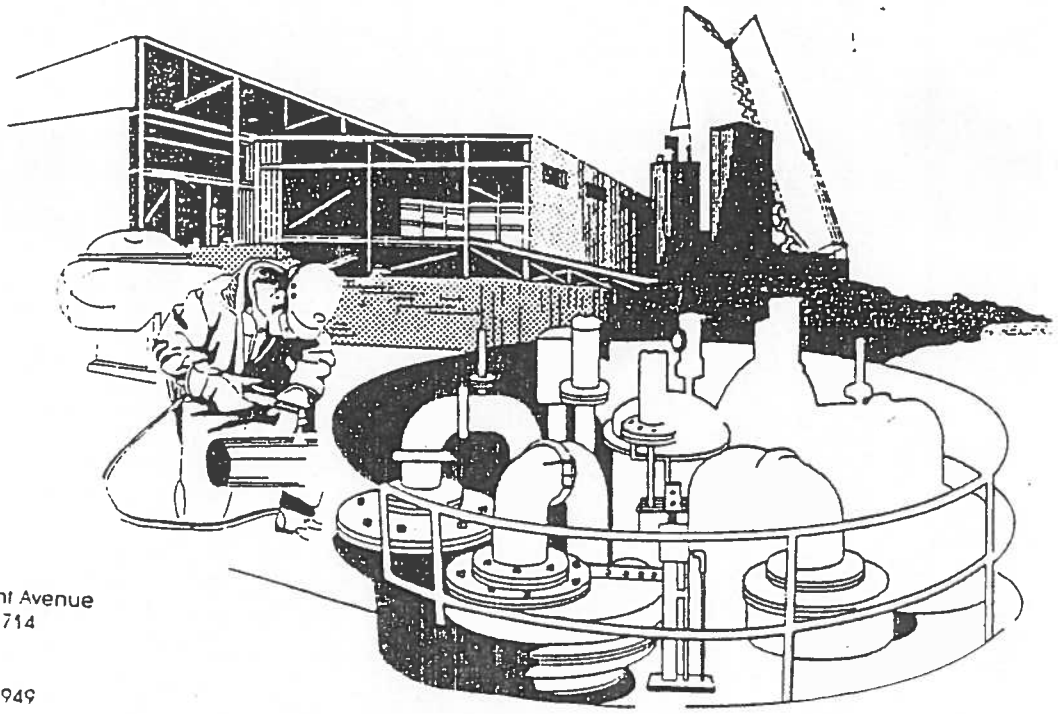

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1.0 INTRODUCTION

The Arabian Mining Project is located approximately nine (9) miles east of Bullhead City, Mohave County, Arizona. The project area is comprised of three (3) patented claims and 31 unpatented claims, forming a rectangular area approximately 6,800 feet N-S by 3,600 feet E-W. State Highway 68 bisects the area and passes through the patented claims. The unpatented claims are located on BLM land. More precisely, the project area is located in Section 20, T 21 N, R 20 W. Crown Resources has located unpatented claims in Sections 16, 17, 18, 19, 21, 28, 29 and 30 which border the Arabian Project Area.

As initial study by MSME of available data on the Arabian Project claims indicated reserves in excess of 500,00 tons of material averaging 0.046 ounces per ton of gold. These reserves were located predominantly in the patented claim area and south of the old Philadelphia workings. While these reserves could provide a development base, there was no sound information available as regards the potential for additional deposits, particularly within the unpatented claim areas.

Accordingly, it was decided to proceed in succeeding development phases which would provide decision points at various stages. Phase I of this program was outlined to:

1. Conduct surface geology investigations to locate those areas which might hold potential of ore grade mineralization.

2. Conduct a metallurgical test program on fresh samples to determine plant design parameters.

3. Prepare a topographic map of the mine at 1:200 scale with 4-foot contours of the project area for use in future design work.

4. Investigate the various permit requirements and procedures to be fulfilled in developing the project.

This report presents the results of the Phase I effort.

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2.0 SUMMARY

Phase I of the Arabian Mining Project Development Program was designed and carried out to:

- Provide geologic data on the project area outside of the main fault area.
- Provide topographic mapping of the entire area of suitable scale for use in engineering design work.
- Conduct metallurgical investigations to determine process requirements.
- Develop a basic open pit mine plan for explotation of the known ore body on the Rising Fawn claim.
- Investigate the various permitting requirements required to construct and operate a mine and treatment plant.
- Develop order of magnitude capital and operating cost estimates for use in studying the economic options of the property.

2.1 Geology

Mr. Joseph Shearer conducted a geological survey of the entire area with geochemical sampling of selected areas. The structural geology of the Arabian Fault is quite complex with multiple shears and faults. Principle rock units are:

- Quaternary alluvium: stream fill
- Tertiary rhyolite: dikes, welded tuffs, and flow breccias
- Precambrian granite: granite, diabase dikes, and pigmented bodies

Fault flexures (changes in direction and dip) occur in the central area of the claim area and where the fault crosses the highway. These flexures appear to have provided the dilation and other necessary conditions for deposition of the precious metals in the Rising Fawn ore body.

Geochemical assay data in general show that samples with high gold and silver have high As, Sb, and Hg. Geochem analyses of the twelve surface samples taken for metallurgical studies bear out this relationship.

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In summary, there are no indications of mineralization away from the fault zone that warrant investigation. Additional sampling is warranted along the fault to the north. A drill program will then be required to determine if mineralization extends to depth if surface results give positive results.

Mr. Shearer's report is included in Section 4.3 of this report.

2.2 Mining Program

Based upon new topography and samples taken over the surface of the Rising Fawn ore body proven and inferred reserves were increased to 772,337 tons of ore averaging 0.0452 ounces of gold. This calculates to $18.10 per ton gross value at a base price of $400.00 per troy ounce. Silver values have not been included due to the generally erratic grade and low recovery of this metal. As some 200,000 tons of this ore is considered inferred, a sampling and drilling program is recommended to confirm this tonnage and grade. Details of this program is found in Section 4.2.

As indicated by Mr. Shearer, the Rising Fawn ore body appears to have been influenced by flexures in the fault and therefore extension of the pit along the fault to provide additional reserves appears remote at this time. Accordingly the mine plan was developed to exploit only the projected reserves.

The mine program is based upon producing an average of 583 tons of ore per day on a one shift per day, six day per week schedule. This mining rate will produce 180,000 tons per year of ore for leaching and provide a 4.3 year mine life. As a good portion of this ore body is above the highway level (2400-2420' elevation) the first three years of operation will essentially be a benching operation with favorable stripping ratios. As pit operations progress below elevation 2400, the waste to ore ratio will increase and be quite high as the pit bottoms out at the 2340' elevation. Annual production rates and ratios are tabulated below:

Year	Ore	Waste	Total	W/O Ratio
1	180,000	102,956	282,956	0.57:1
2	180,000	263,555	443,555	1.46:1
3	180,000	427,888	607,888	2.38:1
4	180,000	427,639	607,639	2.38:1
5	52,337	242,451	294,788	4.63:1
Total	772,337	1,464,489	2,236,826	1.90:1

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Mine operations will be carried out on day shift using a bulldozer with ripper to break ore. Ore and waste will then be loaded into 25-ton capacity trucks by a front end loader for haulage to either the crushing plant or waste dump. These two areas will be relatively close as shown in the accompanying Plot Plan to minimize haulage distances.

It is anticipated that a significant quantity of material is rippable but blasting will still be required periodically. On some occasions it will be necessary to close traffic on SR68 temporarily and to provide a crew to clear the road of any stray rocks that may reach the road.

The subject of mining adjacent to the highway has been discussed with the Arizona Department of Transportation (ADOT) and there is no regulations against this as long as it does not encroach upon the right-of-way. The 100-foot wide ROW was granted in perpetuity to the state. ADOT has been advised by letter of this potential operation and no conflict is indicated.

2.3 Metallurgy

Two bulk samples were obtained for metallurgical testing at the MSRD laboratory in Tucson. The first sample was cut from four selected sites in the Rising Fawn Adit and represent some of the different ore characteristics found within the ore body. After each of these samples was assayed to confirm gold content three of them were composited and designated as the Adit Sample for testing. The second sample, designated the Surface Sample, was composited from 12 individual rock samples taken from a grid laid out on the surface on top of the ore body. The two test samples averaged as follows:

	Gold, OPT	Silver, OPT
Surface Sample	0.064	0.15
Adit Sample	0.052	0.77

A series of bottle roll cyanide leach tests were made on each sample with the test samples crushed to different sizes. One test was also made at -80 mesh size to verify that the gold was completely extractable.

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Summary results and conclusions are as follows:

24-Hour Extraction (%) - Bottle Leach

Particle Size	Surface Sample		Adit Sample	
	Au	Ag	Au	Ag
-½ Inch	37.24	18.21	35.11	7.10
-¼ Inch	44.53	16.75	32.96	6.23
-10 Mesh	56.48	42.11	48.98	9.69
-80 Mesh	95.37	70.63	95.05	35.94

Column Leach - % Extraction

Particle Size	Leach Time (Days)	Surface Sample		Adit Sample	
		Au	Ag	Au	Ag
-½ Inch	18	61.3	32.0	53.5	4.8
-¼ Inch	18	58.5	32.0	49.8	6.5
-10 Mesh	18	91.7	69.5	77.1	13.3

Average Reagent Consumption: Lime (CaO) 0.8 lb/ton
Cyanide (NaCN) 0.85 lb/ton

The surface sample consistently reported higher extractions on the coarse crushed material than the adit sample which may be attributable to the higher gold assay. However, both reacted similary under the duplicate test conditions and indicate that the extraction is directly related to the particle size.

It is concluded from these tests that:

1. The ore must be crushed to a nominal 10-mesh size in order to obtain acceptable extractions.

2. Gold extraction in the range of 75% (or higher) may be expected from a properly constructed heap leach if crushed fine enough.

3. In order to maintain the physical integrity of a leach pile of 10-mesh material it will be necessary to either: a) agglomerate the ore with lime and cement or, b) leach in a vat type structure which will constrain the pile perimeter.

4. An 18-day leach period will provide a near optimum time/extraction cycle.

5. Silver extraction will be erratic and generally low.

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2.4 Process Plant

In order to crush to minus 10-mesh size it will be necessary to use a roll crusher as the final crushing stage rather than a conventional cone crusher. It is recommended that the crushing plant be assembled from portable units purchased on the used equipment market. With this procedure it is necessary to locate and evaluate portable units that will perform in accordance with a flexible flowsheet to produce the desired tonnage throughout and final product. While the approach is different than designing a plant and then purchasing equipment to fit, the cost savings can be significant.

The final crushed product will be blended with lime and cement and then agglomerated with barren solution to provide a structurally competent agglomerate or pellet.

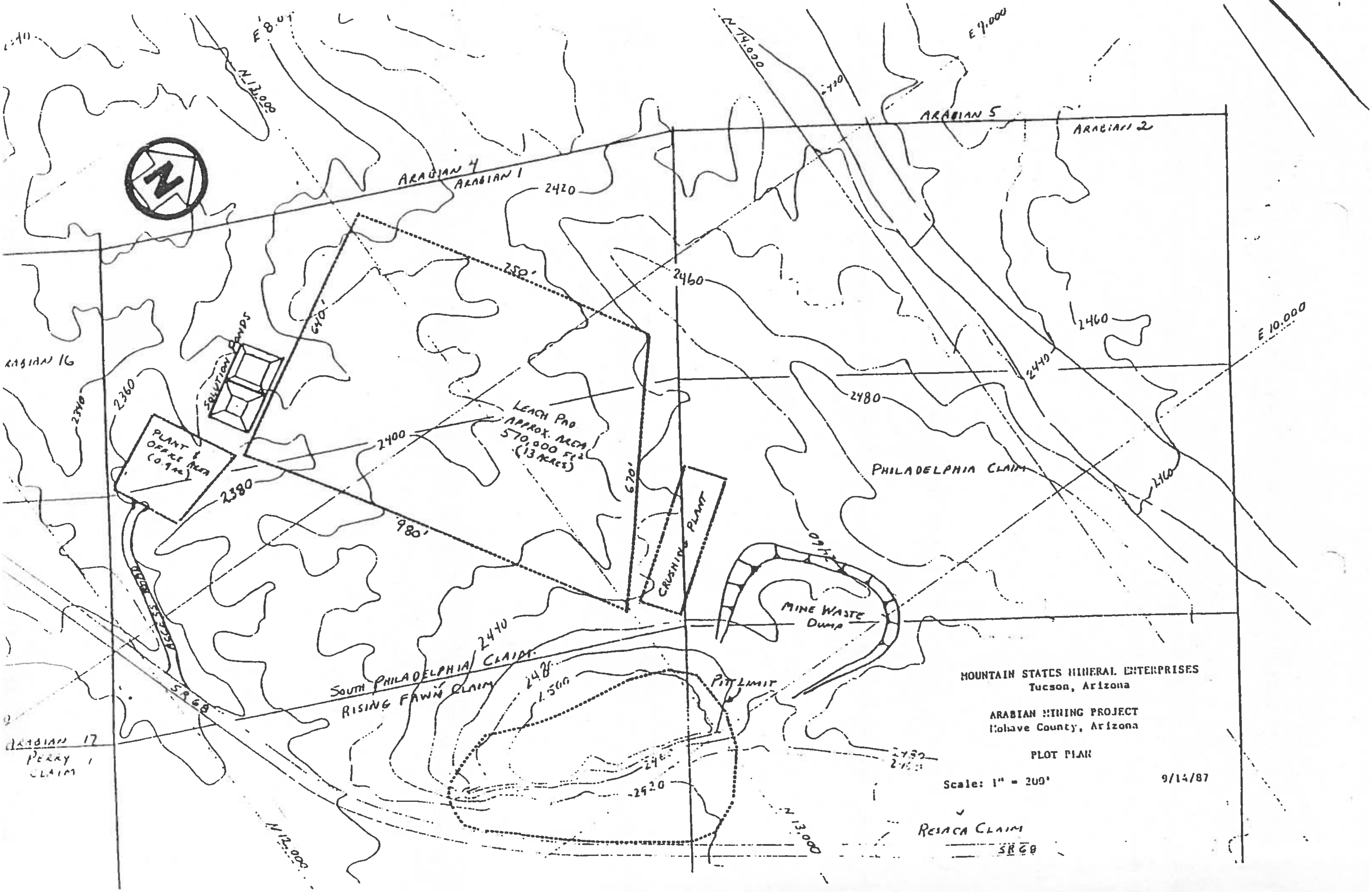
The agglomerated ore will be reclaimed from a small stockpile by front end loader and placed on the leach pad. When a pile is completed a series of solution lines with spaced sprinklers will be laid on the surface and leaching started. The solution, after passing through the ore, will gravity flow over the impermeable pad liner to a collection launder and storage pond. The solution ponds and pad lining will be constructed as described in Section 6.2.3.

The pregnant solution will be pumped to the recovery plant where the gold and silver will be extracted from solution by the Merrill-Crowe zinc precipitation process. The barren solution from this plant will be adjusted for cyanide content and pumped to the leach distribution and sprinkler system.

The M-C units will be purchased as packaged units and housed in a 1200-square foot building. Assay laboratory, sample preparation and precipitate smelting equipment will also be installed in this building. The precipitation plant will operate on a 24-hour basis as will leaching.

It is anticipated that power will be provided by two generators on a rental basis. A generator of approximately 500 kw capacity will be required to power the crushing plant on a dedicated basis. A generator of approximately 50 kw capacity will be required on a 24-hour basis to provide power for the process plant, lighting etc. Alternatively the Citizens Utilities Company may be able to supply power for either the entire load or the smaller, continuous load. This option should be investigated early in Phase II.

It is assumed that sufficient water for the operation can be obtained from the old mine workings. There are also two wells available on the property which may be equipped as production wells to augment the supply.


MOUNTAIN STATES MINERAL ENTERPRISES
Tucson, Arizona
ARABIAN MINING PROJECT
Mohave County, Arizona
PLOT PLAN
Scale: 1" = 200'
9/14/87
ARABIAN 4
ARABIAN 1
ARABIAN 5
ARABIAN 2
ARABIAN 16
ARABIAN 17
PERRY CLAIM
PHILADELPHIA CLAIM
SOUTH PHILADELPHIA CLAIM
RISING FAWN CLAIM
RESACA CLAIM
LEACH PAD
APPROX. AREA
570,000 FT2
(13 ACRES)
SOLUTION PONDS
PLANT & OFFICE AREA
(0.9 AC)
CRUSHING PLANT
MINE WASTE DUMP
PIT LIMIT
ACCESS ROAD
SR 68
250'
640'
670'
980'
2360
2380
2400
2420
2440
2460
2480
2520
E 8,000
E 9,000
E 10,000
N 12,000
N 13,000
N 14,000

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The process building and a small shop in the crushing plant area will be of prefabricated design. The balance of the structures required will be mobile trailer units supplied on a rental basis.

- what about 404 permit?

2.5 Permitting

Key permits required will be a Groundwater Quality Protection Permit from the Arizona Department of Environmental Quality (ADEQ) and a mining permit from the BLM. Other permits, while required, are of a more routine nature and will not require the effort these two require.

Upon decision to proceed, the permit applications can be initiated using the design data developed to this point.

3.0 RECOMMENDATIONS

Mining of the Rising Fawn ore body appears economically attractive based upon the capital cost, annual operating cost and potential return at current gold prices. However, a full economic analysis has not been made to evaluate the cost of capital, taxes, royalties, etc. as these can vary widely upon financing arrangements by Westar. It was envisioned earlier that at least a portion of the operating profits would be expended in exploration for additional ore to enhance the overall economics.

It is recommended that the following steps be taken at this time to forward the project to the next "go/no-go" decision point.

1. Implement the sampling and drill program outlined in Section 4.2 to verify or revise the reserves as now estimated.

2. Proceed with preparation of the application for the Groundwater Quality Protection Permit based upon the locations and conceptual designs in this report.

3. Proceed with preparation of the mining permit applications and others required.

4. Institute a search for appropriate crushing plant units for purchase.

5. Proceed to locate potential equipment renters for the mine operation. At least three should be located to compare and negotiate eventual rental prices.

6. Conduct laboratory investigations on available samples to determine the best agglomeration reagent and solution mix on -10 mesh material.

4.0 GEOLOGY

4.1 Introduction

The geologic study in this phase of the development program was primarily directed toward evaluation of the mineral potential in the unpatented claims areas lying on the easterly and westerly sides of the main Arabian fault line. This work was conducted by Mr. Joseph Shearer whose report has been included as Section 4.3. He has concluded from his investigation and that future exploration work consisting of surface sampling and drilling be conducted along the fault, particularly its northern extensions. The south extension through the Perry claim could be considered as a secondary target.

Surface sampling for metallurgical testing indicated a larger exposure at the surface than originally calculated but requires additional effort to rise it from an inferred to proven category. A first order program to accomplish this is outlined in Section 4.2.

4.2 Drill and Sample Program

The surface sampling for metallurgical test samples indicated a broader area of ore grade material above the Rising Fawn deposit than had been projected earlier from drill hole data. Additionally, better topographic data increased the volume of rock above the road level. The projection downward of the surface assay data plus the increased volume of material resulted in a calculated reserve in the 770,000 ton range. This is considerably higher than the original estimate and at least a portion must be considered as inferred rather than proven at this time. A first order sampling and drill program is outlined in the following subsections to prove up these reserves prior to start of a mining operation. Should this area prove economically viable to exploit, an additional drill program to the north and south along the Arabian fault should be implemented to search for additional minable reserves.

4.2.1 Surface Sampling Program

A 25'x 25' grid overlaying the estimated mineralized zone of the Rising Fawn will be the pattern for surface sampling. Each intercept on the grid is a sample point (See surface map 4.2). A total of 215 samples will be taken of approximately 15 pounds each, properly sacked, numbered and labeled. For grade determination of each square of the grid, the four (4) assays of each corner of the individual squares will be arithmetically averaged and the result is the grade of the square.

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4.2.2 Drill Program

The proposed location of four (4) diamond drill holes is shown on surface map 4.3.

The attitude of each of the holds is the following:

Section A:	Collar as per location on surface map 4.3
Depth:	165 feet
Direction:	N32° 30'W
Inclination:	82° 30'
Section B:	Collar as per location on surface map 4.3
Depth:	195 feet
Direction:	N32° 30'W
Inclination:	72° 30'
Section C:	Collar as per location on surface map 4.3
Depth:	200 feet
Direction:	N32° 30'W
Inclination:	62° 30'W
Section D:	Collar as per location on surface map 4.3
Depth:	145 feet
Direction:	N32° 30'W
Inclination:	78° 30'

Total diamond drilling will amount to 705 feet.

4.2.3 Estimated Exploration Cost

Diamond Drilling

Contract Diamond Drilling 705 ft @ $22.00/ft	$15,500.
Mobilization & Demobilization	1,000.
	$16,500.
Core Boxes @ $2.25/Box 71 needed	$ 160.
Core Splitting & Logging $15.00/ft	11,000.
Sample Sacks 220 @ $1.00	220.
	$11,380.
Prepare Geologic Sections 3 days	$ 700.
Calculate New Reserves 2 days	500.
	$ 1,200.

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Surface Grid Sampling

Total of 215 samples at ± 15 pounds per sample amounts to 3,225 pounds.

Grid Layout	$ 1,000.
Sample Bags 220 @ $1.00	220.
Sample Taking	1,500.
Hauling to Assay Lab	600.
Assaying 215 Sample @ $13.00/sample	2,800.
	$ 6,120.

Preparing Assay Map

Engineering	$ 700.
Report	400.
	$ 1,100.

Total Cost Diamond Drill & Surface Sampling Results

Diamond Drilling	$16,500.	
Sampling & Assaying	11,380.	
Reporting	1,200.	
	$29,080.	$29,080.
Surface Sampling & Assaying	$ 6,120.	
Reporting	1,100.	
	$ 7,220.	$ 7,220.
		$36,300.

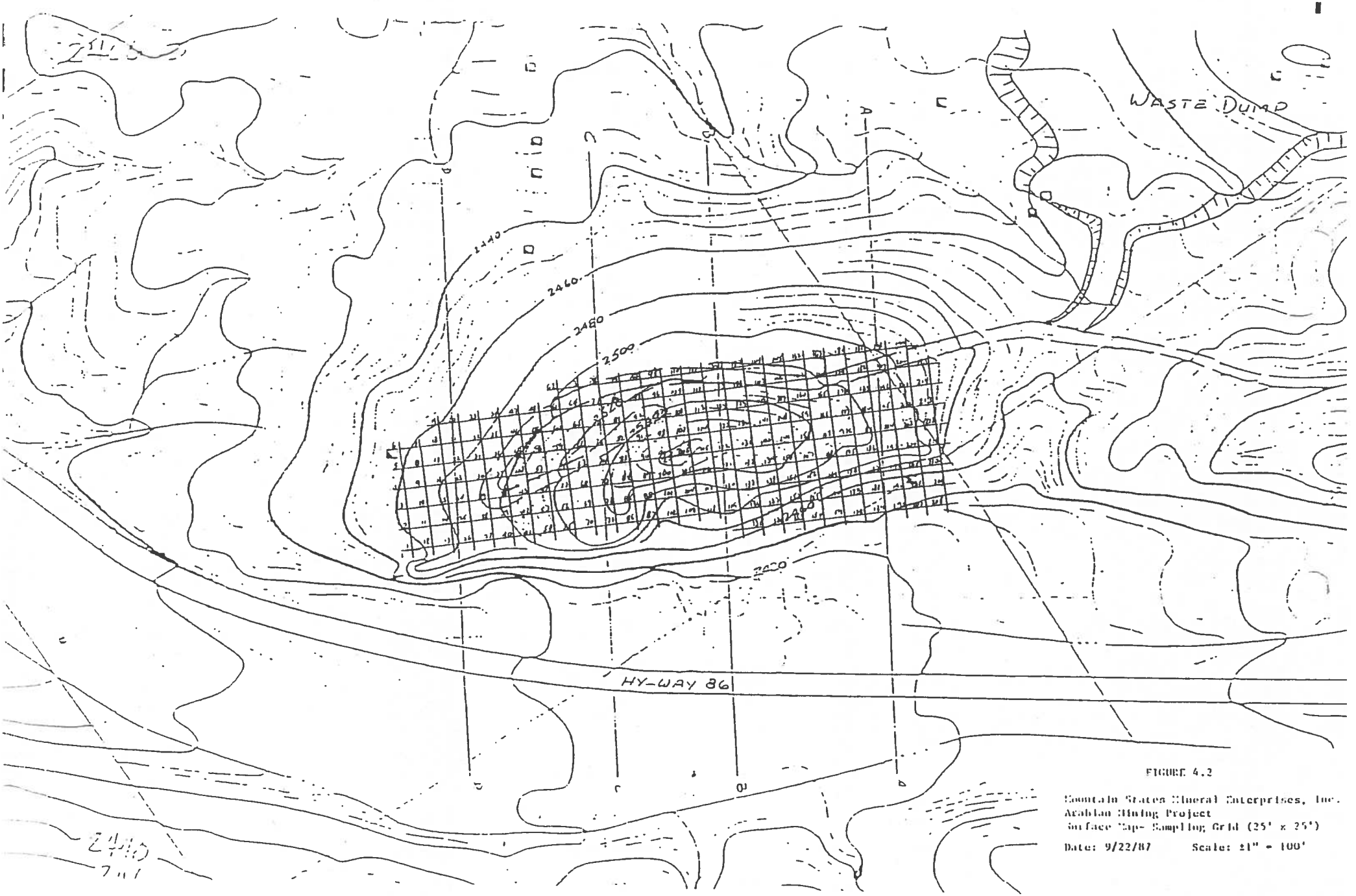

FIGURE 4.2

Mountain States Mineral Enterprises, Inc.
Arabian Mining Project
Surface Tape- Sampling Grid (25' x 25')

Date: 9/22/87 Scale: 1" = 100'

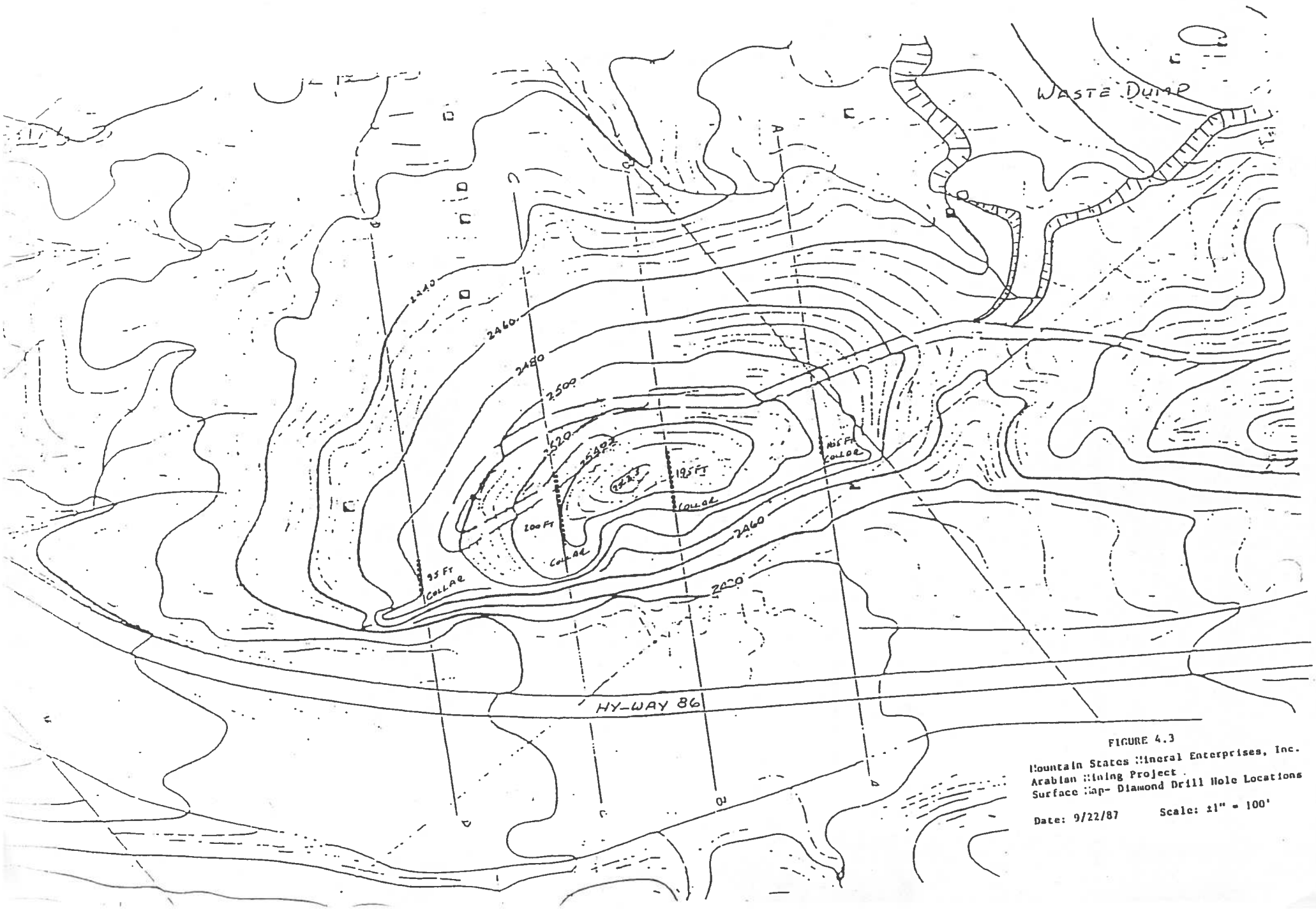

FIGURE 4.3

Mountain States Mineral Enterprises, Inc.
Arabian Mining Project
Surface Map- Diamond Drill Hole Locations

Date: 9/22/87 Scale: 1" = 100'

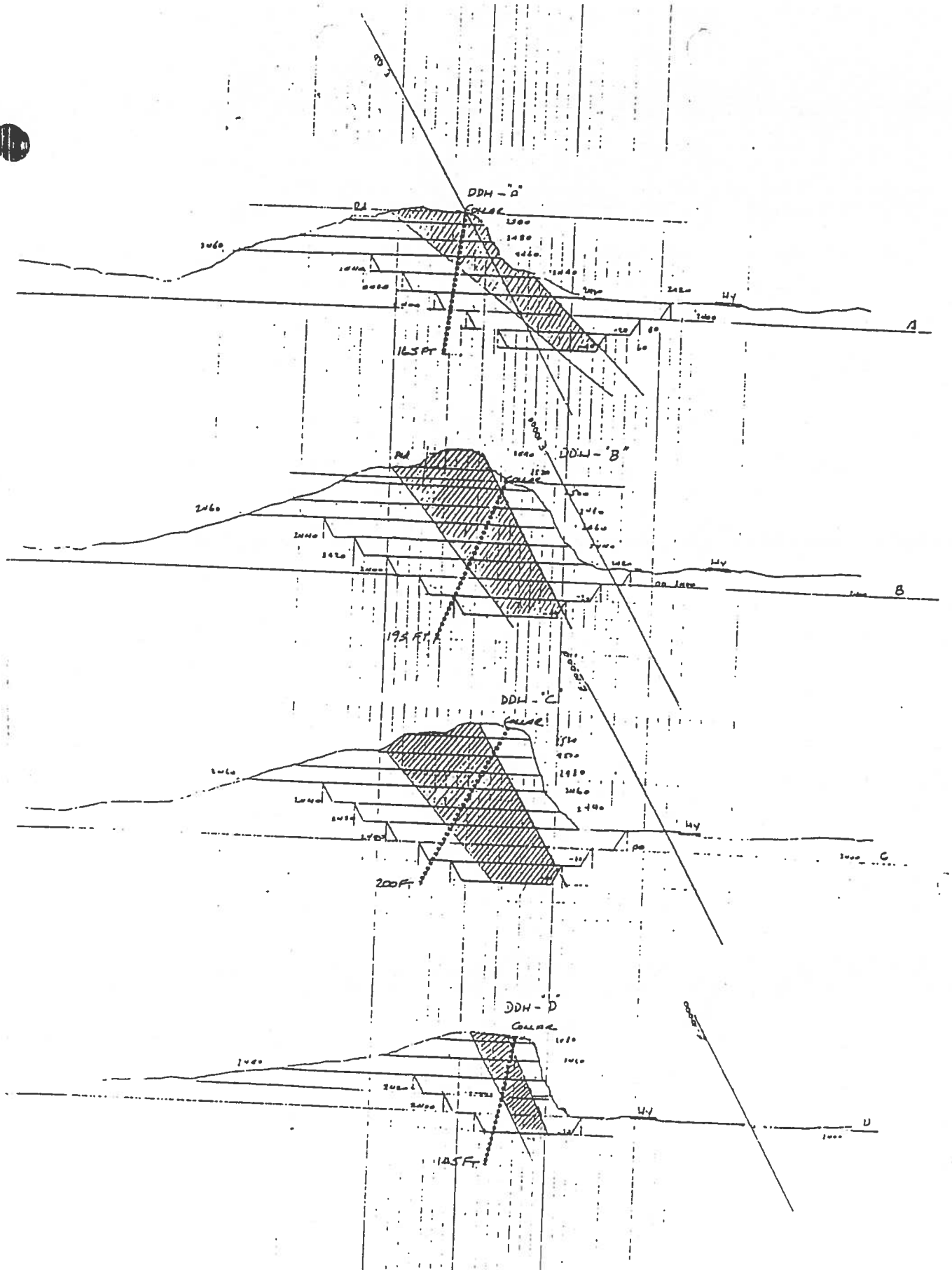

FIGURE 4.4

Mountain States Mineral Enterprises, Inc.
Arabian Mining Project
Sections Showing Diamond Drill Hole Attitude

Date: 9/22/87 Scale: 1" = 100'

ARABIAN MINE GEOLOGY REPORT

for

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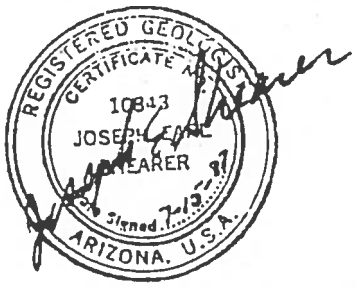
JULY 1987



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APPENDIX

INTRODUCTION

A geologic mapping and sampling program was conducted in connection with the investigation and development of the Arabian Mine Project area, Mohave County, Arizona. The Arabian Mine area consists of 34 mining claims of which 3 are patented and 31 are unpatented. These claims lie predominately in Section 20, T 21 N, R 20 W., G&SR B&M. The 3 patented claims and one unpatented claim along the Arabian Fault have been extensively studied in the past (Teel, 1987), therefore emphasis was placed upon evaluating the 30 unpatented claims outside of the main fault zone for potential mineral deposits.

The basic objectives of this program were as follows:

1. Evaluate the overall mineral potential of the 30 unpatented claims.

2. Identify local areas within the 30 claims that have the greatest potential for mineral deposits.

3. Outline a proposed exploration drill program.

In order to meet these objectives, the services included: field reconnaissance, geologic mapping, surface sampling (geochem and/or assay), a geologic report, and an exploration program outline. All samples were delivered to Skyline Laboratories for analysis.

LOCATION

The Arabian Mine area is located in Sections 17, 20, and 29, T 21 N, R 20 W, G&SR B&M, along State Highway 68, 8 miles east of Bullhead City, Mohave County, AZ (see appendix, plate I). The mine is part of the Union Pass Mining District, a mid-Tertiary epithermal gold-silver district extending from Union Pass in the Black Mountains west to the Colorado River.

GEOLOGY

In general, the Arabian Mine area consists of Tertiary rhyolites and Precambrian granites. These rocks are cut by a NE trending, high angle normal fault with the rhyolites forming the hanging wall and the granite forming the footwall. This normal fault provided the setting for epithermal gold-silver mineralization. In detail, the Arabian Mine area is much more complex.

PETROLOGY

The rock units and ages in the study area are as follows:

Qal - Quaternary alluvium: stream fill.
Tr - Tertiary rhyolite: dikes, welded tuffs, and flow breccias.
gr - Precambrian granite: granite, diabase dikes, and pegmatitic bodies.

The Quaternary alluvium fills narrow, NE trending washes localized along faults. Three principal washes have been mapped. The first is a N35E trending wash which follows the Arabian Fault. At the south end of the property, this wash cuts the Arabian Fault and continues along a N70E trend. The second is a N80E trending wash which crosscuts the Arabian Fault at the north end of the property. The third is an EW trending wash which changes abruptly to a N70E trend at the southeast end of the property.

The Tertiary rhyolite is composed of dikes, welded tuffs, flow breccias, and minor vitrophyre. Similar volcanics in the north-central Black Mountains have been correlated with the middle part of the Patsy Mine Volcanics (Wilkins, 1984). The rhyolite dikes, located in the western portion of the claim block, cut the Precambrian granite. Being more resistant than the surrounding granite, the dikes are normally found forming the cores of ridges. Most of the dikes trend from N40W to EW. One dike, however, trends N75E. An exceptionally large mass of rhyolite has intruded the northern end of the property forming Sugarloaf Mountain. Previous workers have recognized a rhyolite dike intruding the Arabian Fault (Teel, 1987). A thick sequence (400'+) of rhyolite welded tuffs and flow breccias covers the eastern portion of the claim block. Minor dikes of perlitic black vitrophyre, trending N45W, can be found cutting the sequence.

A large block of Precambrian, megacrystic granite, with phenocrysts up to 2" in length, is located in the western portion of the claim block. Equigranular, fine-grained granite outcrops in the wash south of the property near the southeast corner of section 20. This fine-grained granite is thought to be a phase of the Precambrian granitic basement. Minor diabase dikes and pegmatitic bodies, thought to be Precambrian in age, locally intrude the granite.

STRUCTURAL GEOLOGY

The Arabian Fault structure is a large, complex zone of multiple shears and faults. In the central portion of the claim block, where the fault crosses the highway, the zone changes

trend (flexures) from N15E to N35E, widens, and splits into two segments. Northeast of the claim blocks the two segments pass on either side of a block of rhyolite flow breccia. A northwest dipping fault scarp is present in the breccia, suggesting that the west segment has changed dip and overturned. The east segment continues to dip northeast as seen in a fault on the NE side of the rhyolite block.

Much of the rhyolitic rock on either side and adjacent to the fault is sheared, highly fractured and FeOx-stained. This is most noted south of the highway on the southeast side of the fault zone, and in the extreme northern part of the claims on the northwest side of the fault zone. The available evidence (change in trend and dip) suggests that the fracturing and FeOx-staining is occurring in the hanging wall. It would be difficult to determine any relative movement on the fault.

FeOx-staining also occurs on the north side of the EW-trending wash south of the property. The structure which follows this canyon appears to be dipping northward. Fractured areas extending between this fault zone and the Arabian Fault zone show local heavy FeOx-staining.

The Arabian Mine area contains many faults, rhyolite dikes, and lineaments that are visible on the aerial photos flown 6-8-87. It would have been very valuable to have had these photos at the time the field work was in progress. It is difficult to tell which structures cut which on the photos, since there are few offsets. In the field one of the quartz structures, extending through Arabian 2 and 5, appeared to cut one of the rhyolite dikes, while another quartz structure, extending into Arabian 13, did not appear to cut a rhyolite dike along which a trench had been dug. Some of the lineaments seen on the photos may be silicified shear zones and/or diabasic dikes or pegmatitic bodies in the granite.

Some active mining has been done to the west of the property in an area with a high concentration of faults or structural features (Spring Gold Property).

MINERALOGY

During the first day in the field a reconnaissance of the area to determine rock types, alteration pattern and structures that may contain potential precious metal mineralization was conducted. Three entities fulfilling this description were identified as follows:

1. Fractures and shear zones in rhyolite adjacent to the Arabian and the EW fault south of the property.

2. Two north-south quartz structures in the granite to the northwest of the Arabian Fault.

3. The northern part of the Arabian Fault, north west of the highway, which had not been drilled, and fracture zones in the rhyolites extending northwest in the northern part of the claims.

Figures 1 and 2 depict the FeOx in the fractures and shear zones. The one area is south east of the Arabian Fault and highway. It is the hanging wall of the Arabian Fault. The fault flexures (changes direction and dip) as it crosses the highway and again as it turns northerly at the northern most surface expression. At this point the fault reverses dip to the northwest and the FeOx area northwest of the fault is in the hanging wall.

Since the greatest mineral values found to date within the subject property is in the area between flexures it is probable that the flexures provided the dilation and other necessary conditions for deposition of the precious metals. The gold values, which average 0.06 oz/ton in the fault zone between flexures, are low in relation to many fault structures or quartz veins, such as at Oatman, which average 0.30 to 1.1 oz/ton (Durning, 1984). Because of the low tenor of the metals in the fault structure, it was not surprising to find little or no anomalous gold in the adjacent FeOx stained fractures and shears away from the fault.

The north-south quartz structures in the granite northwest of the fault contains anomalous gold and silver, but is to narrow (2"-4") and steeply dipping (55°) to be feasible for mining (samples #13, #14, and #32).

Assays taken from a trench cutting the fault zone were anomalous (samples 4, 5, & 6). This area had been previously sampled and drilled. The results did not indicate a need for further exploration.

The FeOx-stained zone in the extreme northeast corner of the Pittsburg claim was found to be anomalous (sample 33). This area may warrant some exploration since there is no indication of previous drilling.

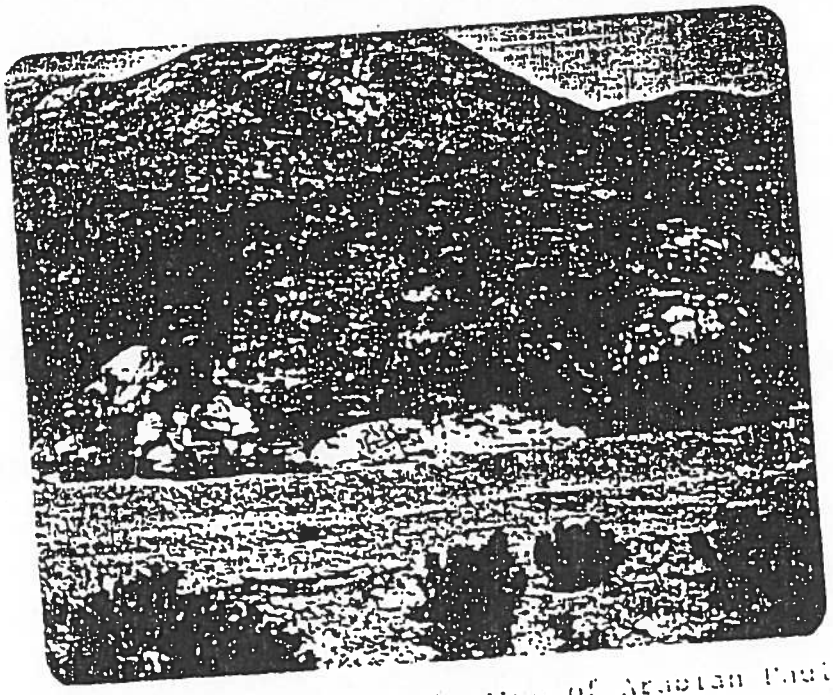

Fig 1. Fault-striations on the side of Arabian Fault near sample site AR-33

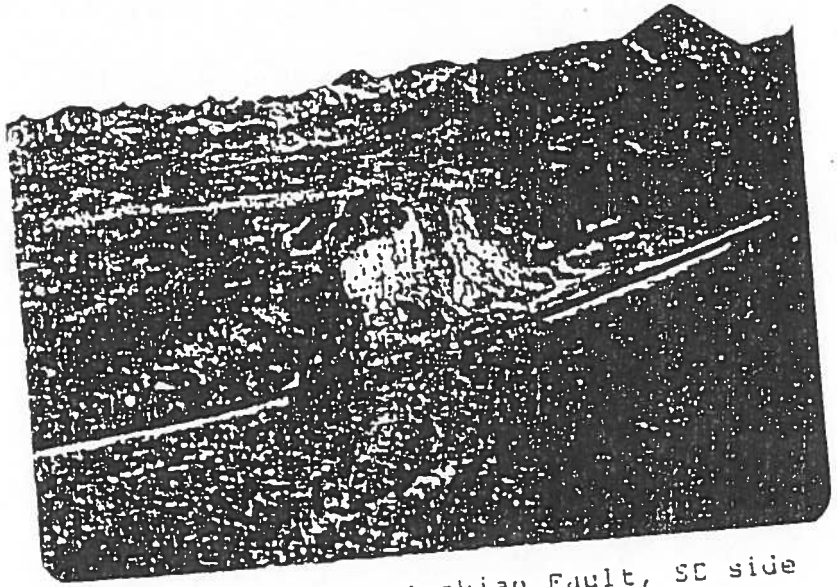

Fig. 2 - Fault along Arabian Fault, SE side near sample site AR-34.

ASSAY RESULTS

The assay results (Table I) indicate an epithermal system within the Arabian Fault zone which dispersed some metals outward along shears and fault structures. Plates have been prepared showing the anomalous dispersement of each of the five elements analyzed, and a gold to silver ratio (plates V - X).

In general, the samples with high Au and Ag values have high As, Sb, and Hg values as well. Hg was the least predictable metal, being concentrated along the wash south of the property. This may mean that the rocks at the surface are high in the epithermal system associated with the structures in this canyon. The low Sb values in the area are consistent with this geometry.

The Au/Ag ratios are somewhat erratic and do not indicate a trend. The three samples taken in the trench on the Perry patented claim do have similar ratios.

CONCLUSIONS

Epithermal mineralization occurs along and adjacent to the Arabian Fault, and in quartz structures and shear zones extending outward from the fault zone. The quartz structures are to narrow and steep to be considered a potential exploration target. The structures are singular and offer no potential of open pit mining. The FeOx-stained shears do not appear to offer much potential outward from the main fault system.

The fault zone and areas adjacent to the fault do offer potential exploration targets in the north end of the claims. The anomalous Hg in the southern end of the fault indicates that the surface rocks are high in the epithermal system. A drilling program to intercept the fault zone at depth could determine if the precious metal content increases with depth and help define the metal zoning. Drilling and sampling in the area, however, indicates that no ore grade material exists near the surface.

On the north end of the fault, the anomalous Sb indicates that the rocks on the west side of the fault are lower in the precious metal system. A shallow hole (500' or less) in the FeOx stained material would provide sufficient information as to the precious metal content and zoning. Also, a drill hole in this area would indicate if the Arabian Fault had indeed overturned.

In summation, there was no indication of mineralization away from the fault zone that should warrant investigation. The oxidized area in the northern part of the claims may warrant more sampling along and north of the fault. Providing that the samples give positive results, a drill hole or two may be warranted. Due to the above results, no exploration or drilling program has been prepared for this report.

TABLE I - ASSAY RESULTS

SAMPLE #	CLAIM	DESCRIPTION	Au ppm	Ag ppm	Au/Ag	As ppm	Sb ppm	Hg ppm
AR-01	21N 20W SWSE S.20	Rhyolite, highly fractured, FeOx-stained.	0.003	1.60	0.002	4	1	.08
AR-02	21N 20W NWNE S.29	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.40	0.000	10	1	.14
AR-03	21N 20W SWSE S.20	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.05	0.000	<2	<1	.34
AR-04	Cen. Perry	Prospect trench along Arabian Fault, fault trends N23E 72SE. Sample taken in southeast corner of trench in fault gouge. See also AR-05, AR-06.	0.460	1.30	0.354	10	1	.04
AR-05	Cen. Perry	Prospect trench along Arabian Fault, fault trends N23E 72SE. Sample taken in northeast corner of trench in fault gouge. See also AR-04, AR-06.	0.630	1.80	0.350	10	1	.06
AR-06	Cen. Perry	Prospect trench along Arabian Fault, fault trends N23E 72SE. Sample taken along south wall of trench in fault gouge. See also AR-04, AR-05.	0.570	1.50	0.380	10	<1	.0
AR-07	SE1/4 Perry	Shaft along road, in Arabian Fault zone, dump sample.	0.005	<0.05	0.000	24	<1	

TABLE I - ASSAY RESULTS (cont.)

SAMPLE #	CLAIM	DESCRIPTION	Au ppm	Ag ppm	Au/Ag	As ppm	Sb ppm	Hg ppm
AR-08	NW1/4 Phila.	Rhyolite, highly fractured, FeOx-stained, fractures trends N41W 63SW.	<0.002	<0.05	0.000	<2	1	.06
AR-09	NW1/4 Arab. 9	Rhyolite, highly fractured, FeOx-stained, resistant, near saddle.	<0.002	<0.05	0.000	<2	1	.04
AR-10a	SE1/4 Arab. 10	Altered rhyolite (fault gouge?) between quartz stringers in brecciated rhyolite and Precambrian granite. See also AR-10b	0.015	<0.05	0.000	<2	<1	.04
AR-10b	SE1/4 Arab. 10	Quartz stringers in brecciated rhyolite associated with Precambrian granite and altered rhyolite (fault gouge?). See also AR-10a.	0.100	0.20	0.500	8	<1	.02
AR-11	NW1/4 Arab. 3	Prospect pits along fault, dump sample. Pits associated with contact between rhyolite dike and Precambrian granite. Fractures in rhyolite trend N15E 82NW, fractures in granite trend N78E 82NW.	0.006	0.30	0.020	8	<1	.04
AR-12	SE1/4 Pitts.	Adit, sample of rhyolite taken from wall of tunnel.	0.002	<0.05	0.000	<2	1	.06

TABLE I - ASSAY RESULTS (cont.)

SAMPLE #	CLAIM	DESCRIPTION	Au ppm	Ag ppm	Au/Ag	As ppm	Sb ppm	Hg ppm
AR-13	SW1/4 Arab. 2	Prospect pit along fault. Sampled quartz vein in fault between contact of rhyolite dike and granite. Vein is 3"-4" thick, structure is 1' thick. Fault trends N3E 55NW. See also AR-14.	0.330	4.50	0.073	24	8	.06
AR-14	SE1/4 Arab. 5	Prospect pit along fault. Sampled quartz vein in fault between contact of rhyolite dike and granite. Vein 3"-4" thick, structure 1' thick. Fault trends NS 51W. See also AR-13.	0.900	30.00	0.030	22	3	.
AR-15	E1/2 Pigeon	Rhyolite, highly fractured, FeOx-stained, fractures trend N67W 87NE.	0.015	0.20	0.075	<2	<1	
AR-16	E1/2 Pigeon	Rhyolite, highly fractured, FeOx-stained.	0.005	<0.05	0.000	2	1	
AR-17	21N 20W NESE S.20	Rhyolite, highly fractured, FeOx-stained, zone approx 40' wide.	<0.002	<0.05	0.000	<2	<1	
AR-18	21N 20W NWSE S.20	Rhyolite, highly fractured, FeOx-stained, zone 20' wide, fractures trend N3W 86SW.	<0.002	<0.05	0.000	<2	<1	

TABLE I - ASSAY RESULTS (cont.)

SAMPLE #	CLAIM	DESCRIPTION	Au ppm	Ag ppm	Au/Ag	As ppm	Sb ppm	Hg ppm
AR-19	21N 20W NWSE S.20	Rhyolite, highly fractured, FeOx-stained, zone 30' wide, fractures trend N10E 84NW, zone trends EW.	<0.002	<0.05	0.000	<2	<1	.02
AR-20	21N 20W NWSE S.20	Rhyolite, highly fractured, FeOx-stained, zone 20' wide, fractures trend N45E vertical dip.	<0.002	<0.05	0.000	<2	<1	.02
AR-21	SE1/4 Pitts.	Rhyolite, highly fractured, FeOx-stained.	0.004	0.05	0.080	<2	1	.04
AR-22	SE1/4 Arab. 7	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.05	0.000	<2	<1	.04
AR-23	NW1/4 Arab. 8	Rhyolite, highly fractured, MnOx-stained.	0.002	0.05	0.040	<2	<1	.06
AR-24	NE1/4 Arab. 10	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.05	0.000	<2	<1	.02
AR-25	NW1/4 Arab. 9	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.05	0.000	<2	<1	.04
AR-26	SE1/4 Arab. 9	Rhyolite, highly fractured, FeOx-stained.	<0.002	<0.05	0.000	2	5	.02
AR-27	SW1/4 Pigeon 5	Rhyolite, highly fractured, FeOx-stained, zone 50' wide.	<0.002	0.15	0.000	<2	9	.02

TABLE I - ASSAY RESULTS (cont.)

SAMPLE #	CLAIM	DESCRIPTION	Au ppm	Ag ppm	Au/Ag	As ppm	Sb ppm	Hg ppm
AR-28	21N 20W SWSE S.20	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.10	0.000	<2	1	.04
AR-29	SW1/4 Pigeon 5	Rhyolite, highly fractured, FeOx-stained, fractures trend N12E 71NW.	<0.002	<0.05	0.000	<2	<1	.02
AR-30	Cen. E1/2 Perry	Rhyolite, highly fractured, FeOx-stained, fractures trend N33W 75SW, zone 125' thick.	<0.002	<0.05	0.000	2	<1	.02
AR-31	NW1/4 Perry	Hanging wall of Arabian Fault. Sample taken above trench running parallel to Arabian Fault.	0.030	0.35	0.086	6	1	.0
AR-32	21N 20W SWNW S.20	Quartz vein in granite, 20"-24" thick, trends N20W 75SW.	0.560	2.00	0.280	22	19	.
AR-33	NE1/4 Pitts.	Rhyolite, highly fractured, FeOx-stained, fractures trend N45W, vertical dip.	0.010	0.20	0.050	<2	5	
AR-34	SW1/4 Pigeon 2	Adit. Rhyolite, highly fractured, FeOx-stained, fractures trend N55W 60SW, N40E 46SE, N25W 22SW.	<0.002	<0.05	0.000	<2	<1	

TABLE I - ASSAY RESULTS (cont.)

SAMPLE #	CLAIM	DESCRIPTION	Au ppm	Ag ppm	Au/Ag	As ppm	Sb ppm	Hg ppm
AR-35	NW1/4 Pigeon 2	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.05	0.000	<2	<1	.02
AR-36	NE1/4 Pigeon 2	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.05	0.000	<2	<1	.02
AR-37	SW1/4 Pigeon 1	Rhyolite, highly fractured, FeOx-stained.	<0.002	0.10	0.000	4	<1	.02
AR-38	SW1/4 Pigeon	Rhyolite, highly fractured, FeOx-stained.	<0.002	<0.05	0.000	<2	<1	.04

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Teel, J.H., 1987, Arabian Mining Project, Development Program Study, MSME Job 4146: Tucson, Mountain States Mineral Enterprises, Inc., unpublished report.

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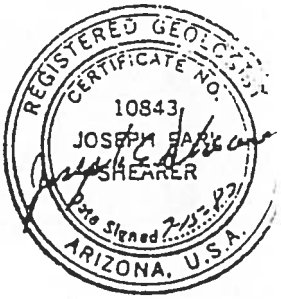
APPENDIX



ARABIAN MINE MAP

ALTERATION

LEGEND

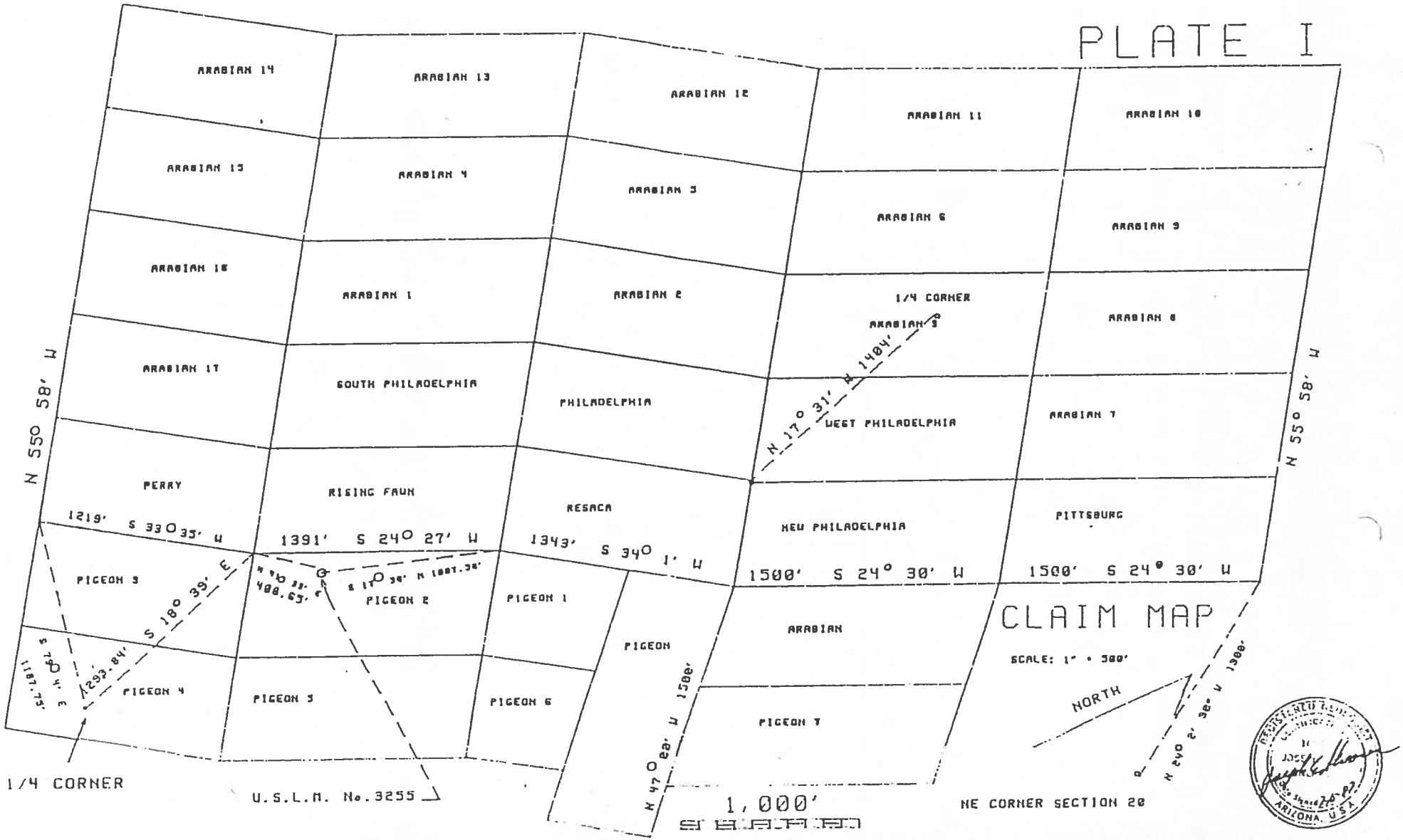
- Silicification
- Pyritization
- Argillation
- Calcification

north
23°

BASE MAP - USGS 7 1/2 MIN. UNION PASS, AZ TOPO. ENLARGED TO 1"=500'

1,000'

PLATE I


ARABIAN 14
ARABIAN 13
ARABIAN 12
ARABIAN 11
ARABIAN 10
ARABIAN 15
ARABIAN 4
ARABIAN 3
ARABIAN 6
ARABIAN 9
ARABIAN 16
ARABIAN 1
ARABIAN 2
1/4 CORNER
ARABIAN 5
ARABIAN 8
ARABIAN 17
SOUTH PHILADELPHIA
PHILADELPHIA
WEST PHILADELPHIA
ARABIAN 7
N 17° 31' W 1404'
N 55° 58' W
PERRY
RISING FAWN
RESACA
NEW PHILADELPHIA
PITTSBURG
1219' S 33° 35' W
1391' S 24° 27' W
1343' S 34° 1' W
1500' S 24° 30' W
1500' S 24° 30' W
PIGEON 3
PIGEON 2
PIGEON 1
PIGEON
ARABIAN
S 18° 39' E
1293.84'
S 79° 4' E
1187.73'
N 47° 08' W 1500'
PIGEON 4
PIGEON 5
PIGEON 6
PIGEON 7
1/4 CORNER
U.S.L.M. No. 3255
1,000'
NE CORNER SECTION 20
N 24° 2' 30" W 1308'
CLAIM MAP
SCALE: 1" = 500'
NORTH

ARABIAN MINE MAP

GEOLOGY

LEGEND

Qal	▭	Quaternary alluvium
mS	▭	mineralized structure
Tr	▭	Tertiary rhyolite
gr	▭	Precambrian granite
	55	fault with dip
	60	joint with dip
		Vertical joint
		contact
		lineament
	north 23°	

BASE MAP - USGS 7 1/2 MIN. UNION PASS, AZ TOPO. ENLARGED TO 1"=530'

1,000'

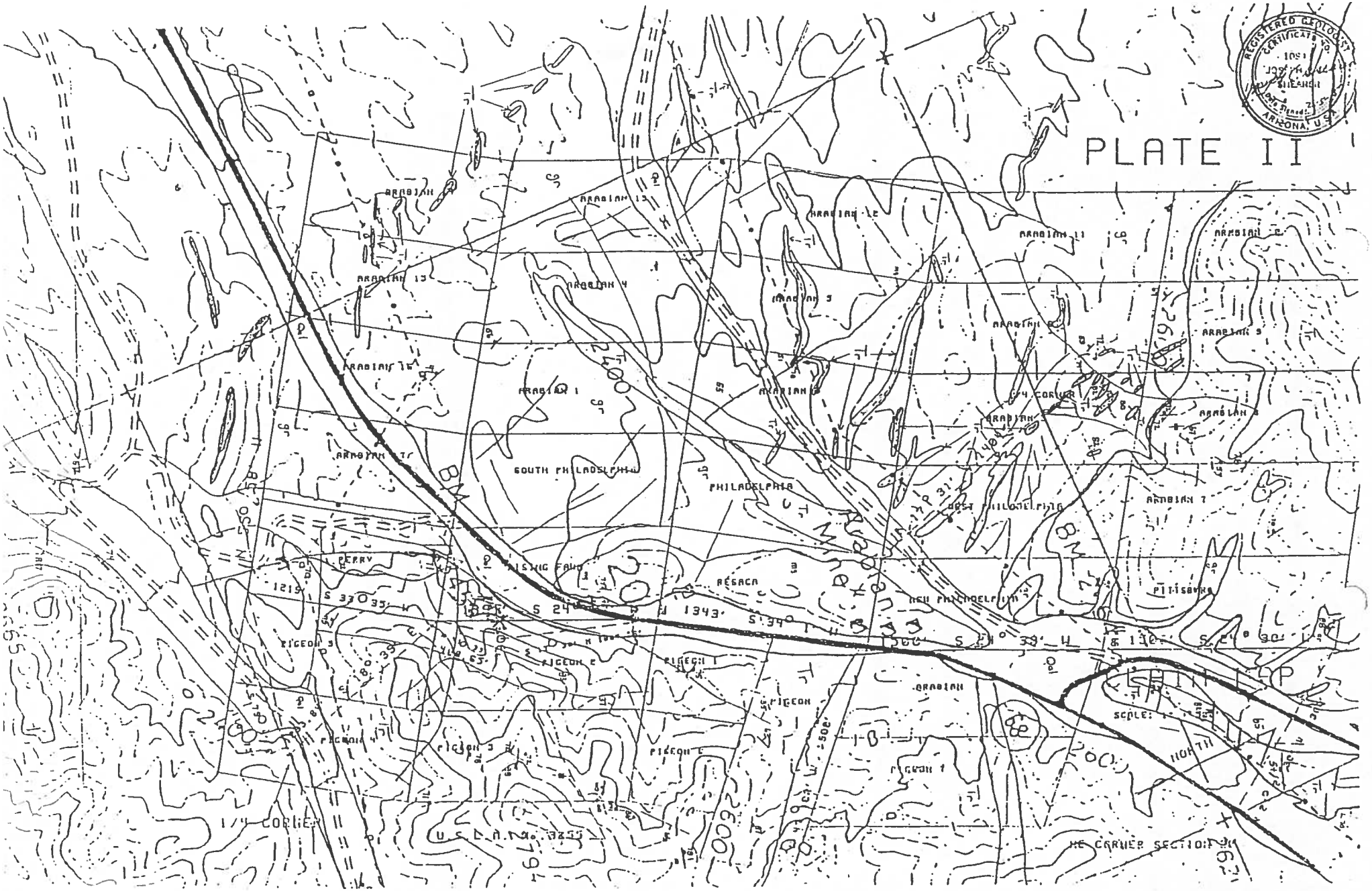


PLATE II
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ARIZONA, U.S.A.
ARABIAN
SOUTH PHILADELPHIA
PHILADELPHIA
WEST PHILADELPHIA
NEW PHILADELPHIA
PITTSBURG
PERRY
RESACA
PIGEON
CORLIER
SCALE:
HIGHTH

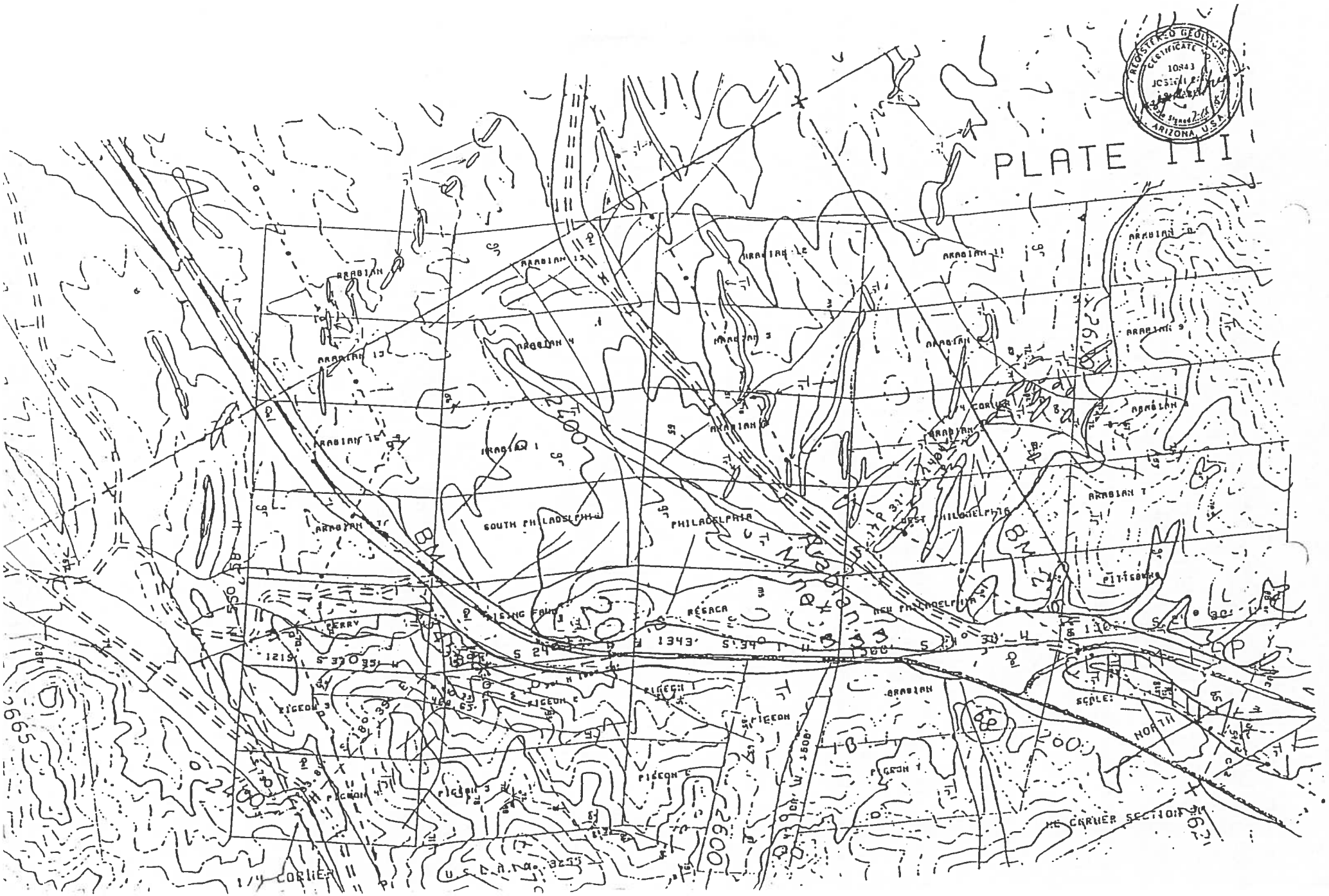


PLATE III
REGISTERED GEOLOGIST
CERTIFICATE
10943
ARIZONA, U.S.A.
ARABIAN
PHILADELPHIA
SOUTH PHILADELPHIA
WEST PHILADELPHIA
PITTSBURG
PIGEON
CARLIER
FERRY
RESACA
EXISTING FAULT
SCALE:
NORTH
U.S.A.A.A.
BM

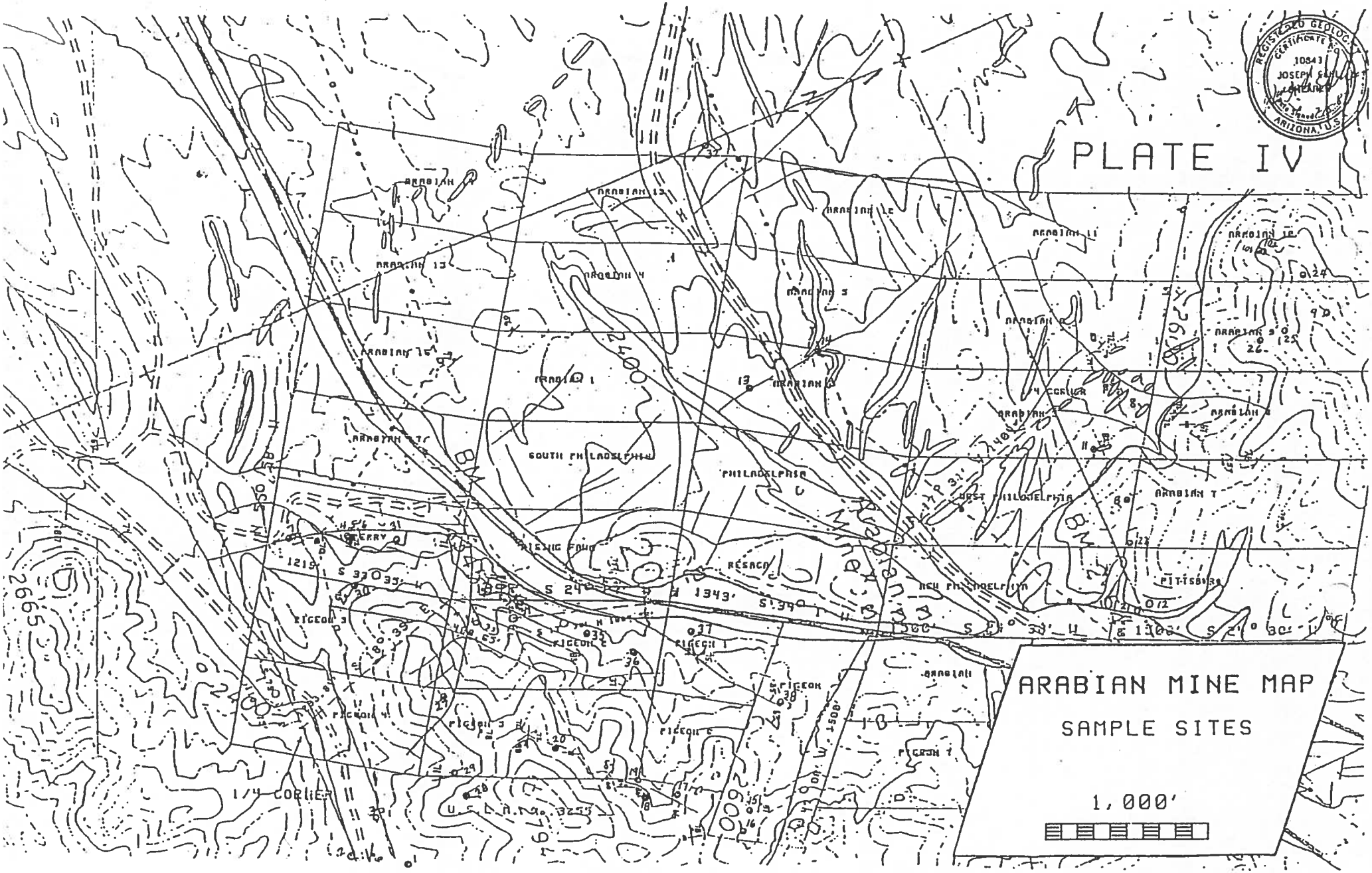


PLATE IV
ARABIAN MINE MAP
SAMPLE SITES
1,000'
REGISTERED GEOLOGIST
CERTIFICATE NO.
10843
JOSEPH E. [illegible]
ARIZONA, U.S.
SOUTH PHILADELPHIA
PHILADELPHIA
RESACH
PITTSBURG
CORLIE
ARABIAN
FIGEON

PLATE V

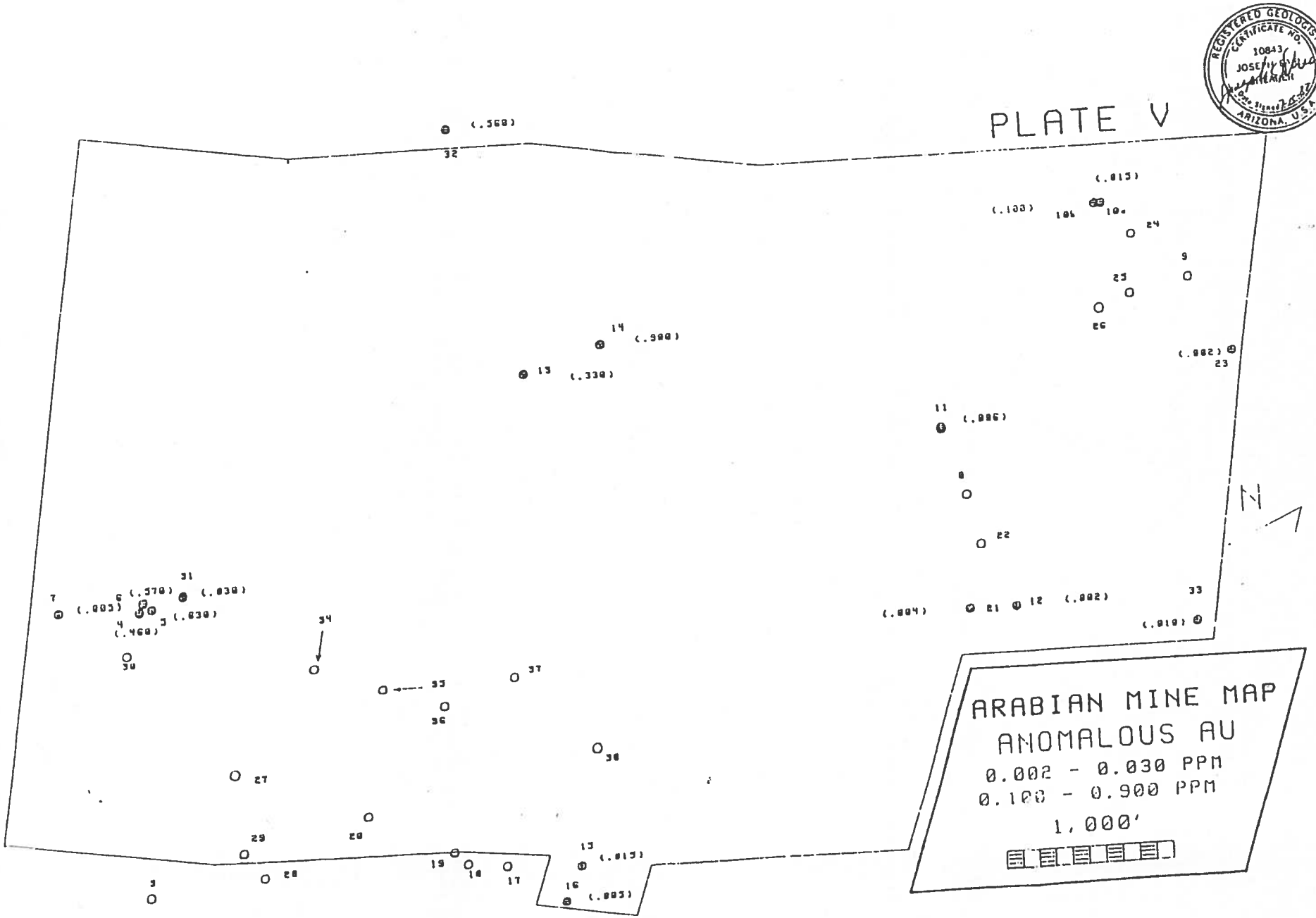
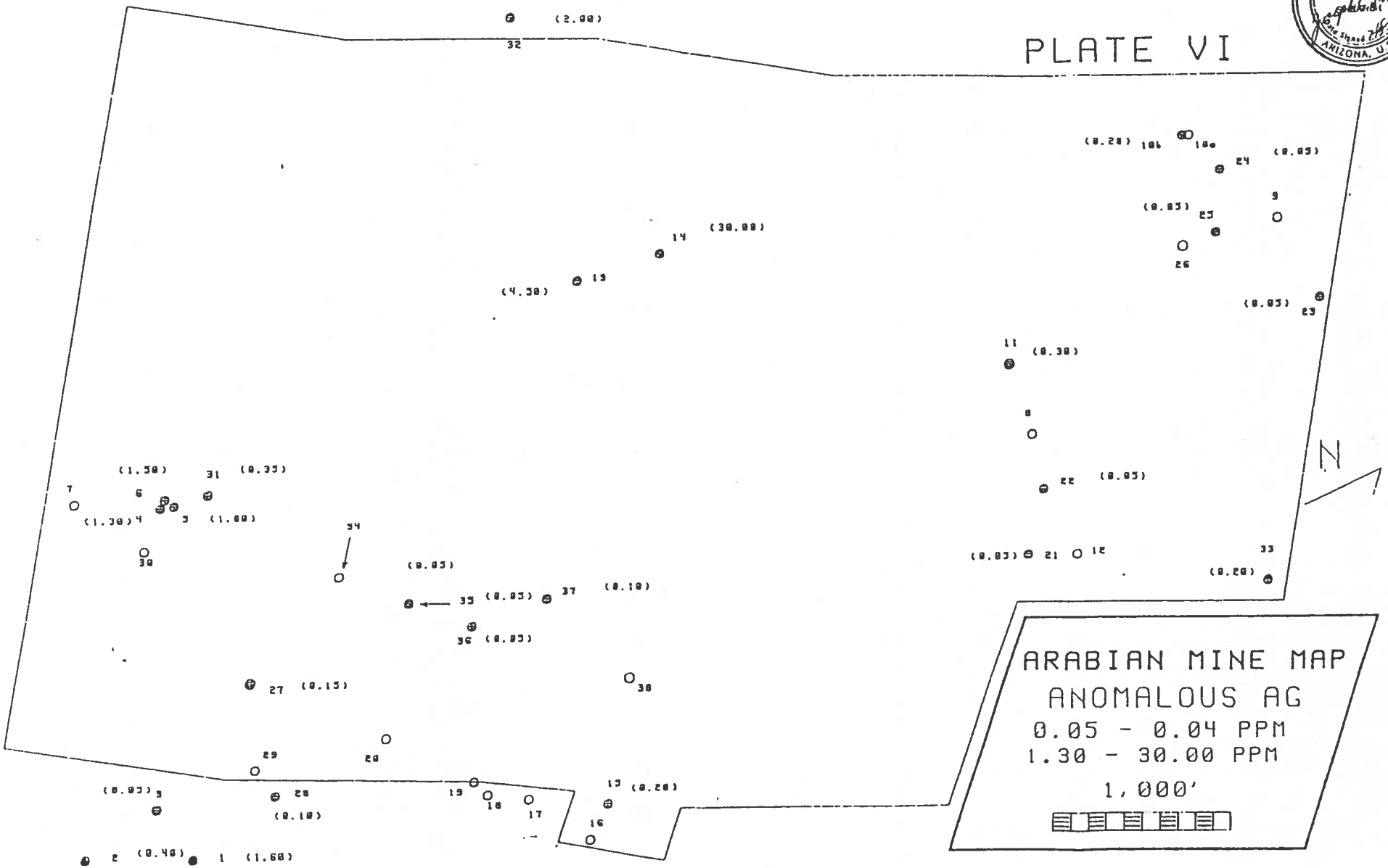

REGISTERED GEOLOGIST
CERTIFICATE NO.
10843
JOSEPH G. BLUE
ARIZONA, U.S.A.
(.560)
(.815)
(.103)
(.900)
(.330)
(.882)
(.886)
(.370)
(.830)
(.003)
(.830)
(.460)
(.884)
(.882)
(.810)
(.815)
(.805)
N
ARABIAN MINE MAP
ANOMALOUS AU
0.002 - 0.030 PPM
0.100 - 0.900 PPM
1,000'

PLATE VI



REGISTERED GEOLOGIST
CERTIFICATE NO.
10843
JOSEPH C. [illegible]
STATE OF ARIZONA, U.S.A.

PLATE VII

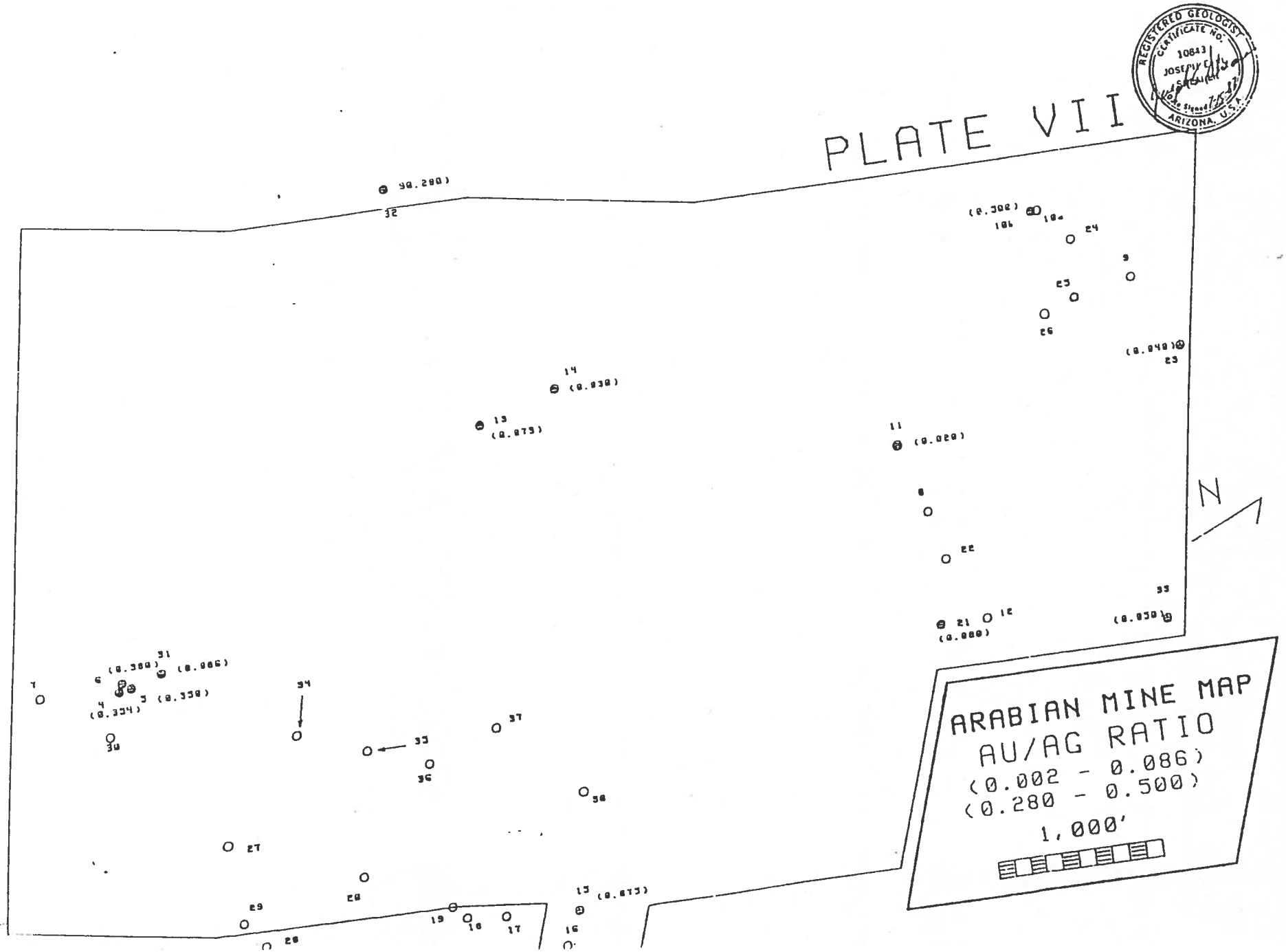
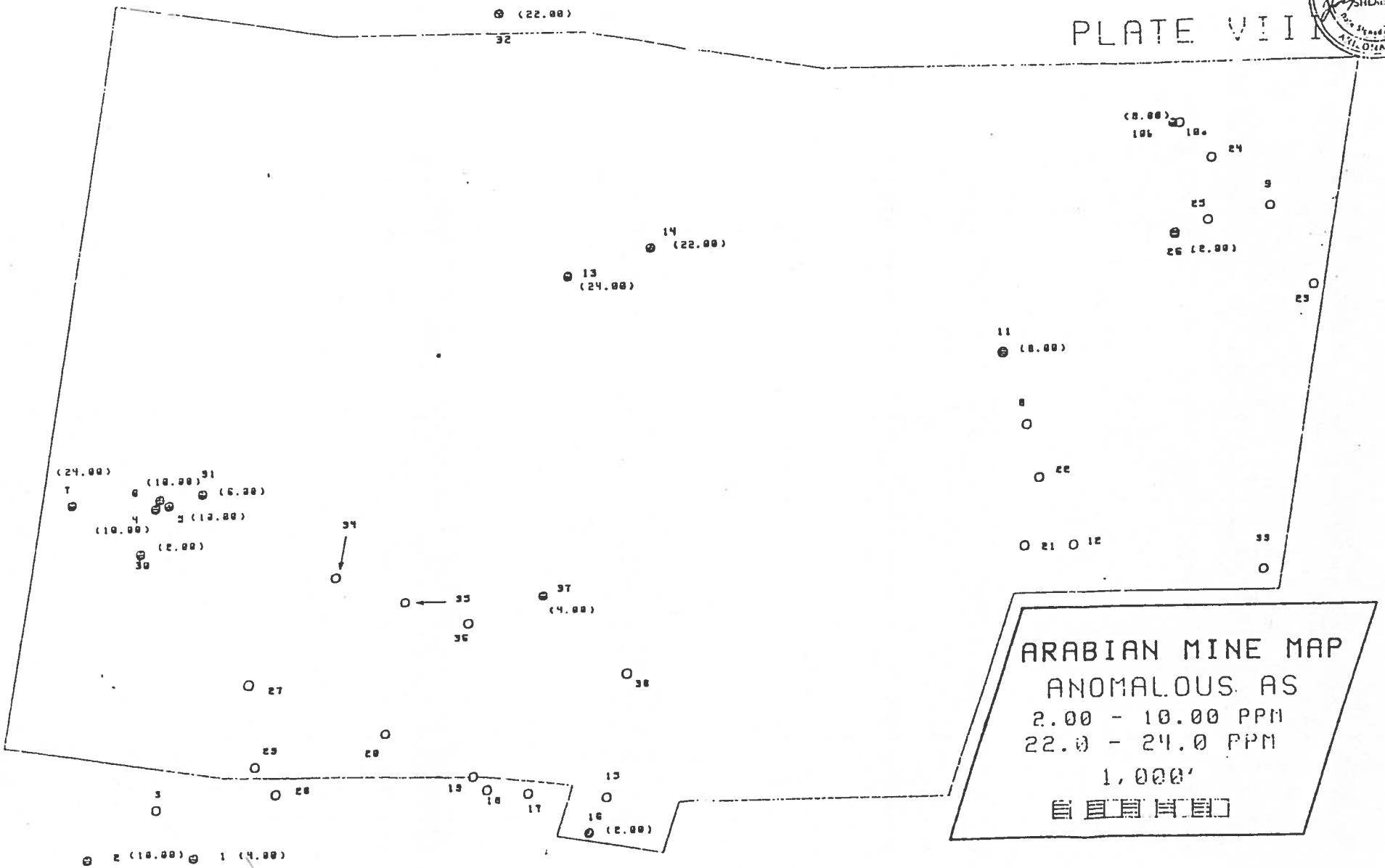

REGISTERED GEOLOGIST
CERTIFICATE NO.
10843
ARIZONA, U.S.A.
N
ARABIAN MINE MAP
AU/AG RATIO
(0.002 - 0.086)
(0.280 - 0.500)
1,000'

PLATE VIII



ARABIAN MINE MAP

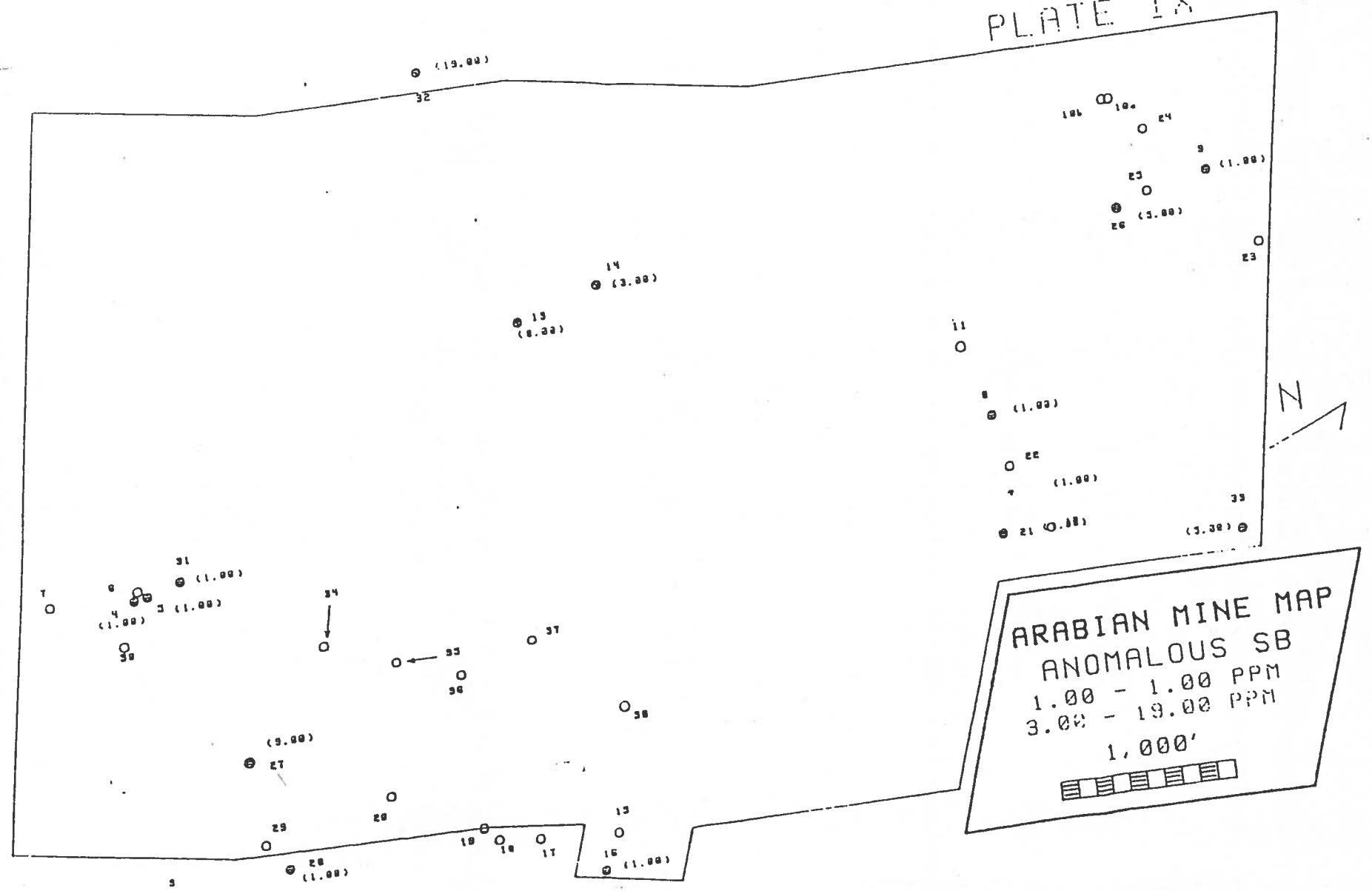
ANOMALOUS AS

2.00 - 10.00 PPM

22.0 - 24.0 PPM

1,000'

PLATE IX



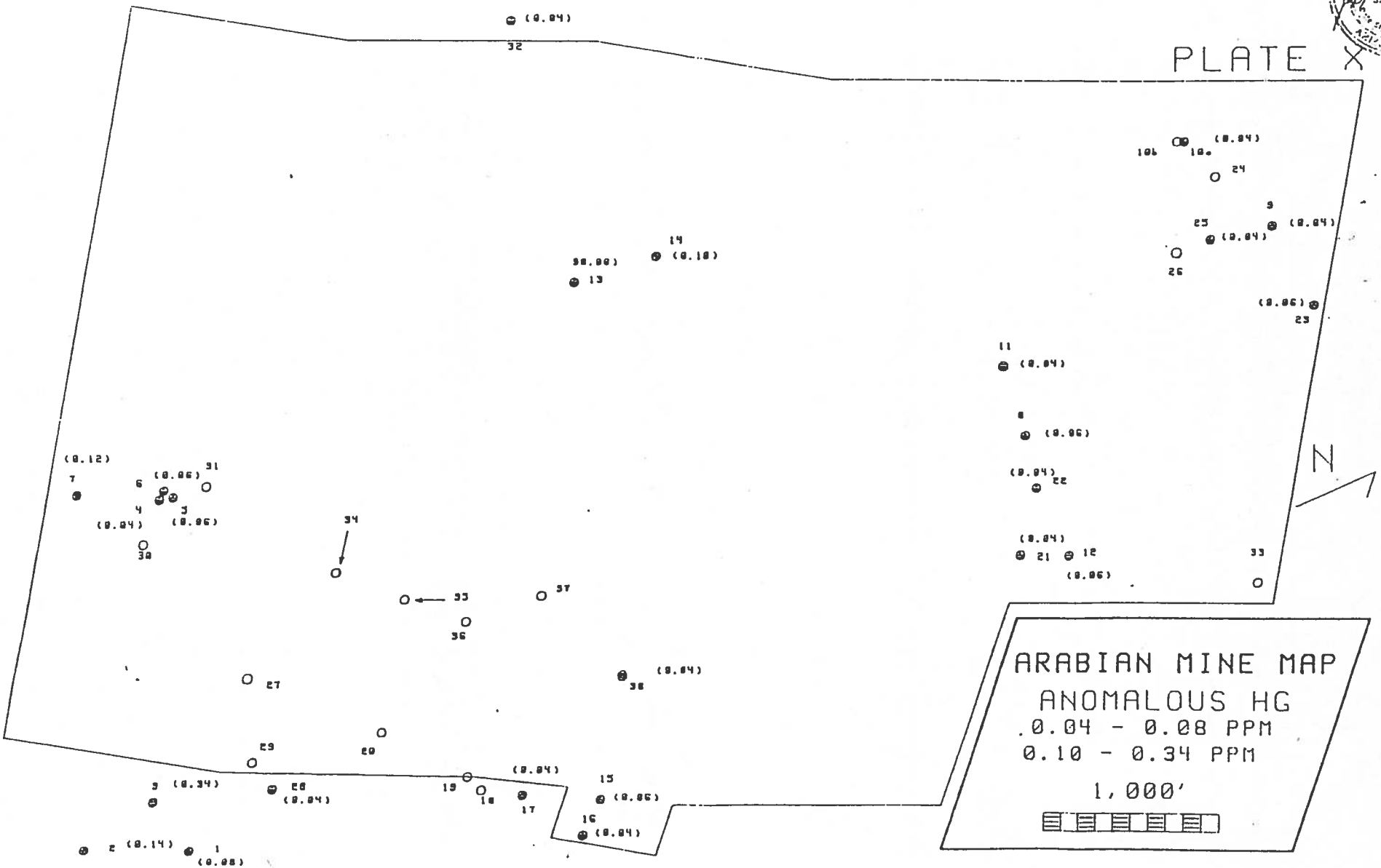


PLATE X
(0.04)
32
(0.04)
10b
10a
24
9
25
(0.04)
(0.04)
26
14
(0.18)
(0.08)
13
(0.06)
23
11
(0.04)
8
(0.06)
(0.04)
22
N
(0.12)
7
31
(0.06)
6
4
(0.04)
3
(0.06)
30
34
(0.04)
21
18
(0.06)
33
35
37
36
(0.04)
38
27
29
28
(0.04)
3
(0.34)
26
(0.04)
19
18
17
15
(0.06)
16
(0.04)
2
(0.14)
1
(0.08)
ARABIAN MINE MAP
ANOMALOUS HG
.0.04 - 0.08 PPM
0.10 - 0.34 PPM
1,000'

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5.0 MINING

5.1 Introduction

The potential mine area was visited in early August 1987 to get a first hand impression of the country and area in particular in order to form an idea of the type of equipment that would be suitable to use for the mining operation.

An obstacle that will affect the mining operation to a certain extent is Highway 68, because of its close location to the steep slope on the south-eastern part of the hill which is in the center of the area to be mined. Special precautions will be necessary to prevent damages to the road and it is foreseen that minor traffic stoppages may be required while blasting and dozing on the upper portion of the hill.

The operation proper is envisioned as a relatively easy and efficient procedure and should be operational year round because of the good prevailing weather conditions on this region.

Mining plans were developed based on 20-foot horizontal slices which are also the heights of the mining benches. From the road level down, three 20-foot benches were designed to follow the mineralized zone downward to a physical limit imposed by Highway-68. A northwesterly extension of the mineralized zone is not likely as evidenced from the existing drill hole information. Present indications show the mineralized zone to dip rather steeply towards the highway and project under it.

5.2 Mining Plans

The first stage surface mining plans were developed on blown-up areas of ±1"=100' produced with a Ricoh copier and enlarger from a 1"=200" topographic sheet which covers the extent of the claims enveloped in this project. The enlarged area covers the potential mining zone and its immediate surroundings (See Figures 5.1 through 5.8). Since the main contour lines are spaced at 20-foot intervals the mining heights for the benches was likewise chosen to be 20 feet. This height is compatible with the recommended mining equipment selected.

Since mining is confined in large part to taking down the ridge on the Rising Fawn claim, it was divided into 20-foot slices using each cor-

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responding contour line as the bench elevation. Eight (8) benches were designed for the first stage.

In the second stage, three (3) benches for excavation, (See Figure 5.9) were designed extending downward to a critical depth at elevation 2340-feet where the highway becomes a limiting factor which prevents additional benching and further extension of the pit units. Figure 5.10 shown the 2340-Bench (Ultimate pit) while figures 5.11 and 5.12 show benches 2380 and 2360, respectively.

At elevation 2340, additional extraction of the mineralized zone can be accomplished by underground stoping methods. Prior to proceeding with plans for stoping, it would be advantageous to drill an inclined hole in the center of the mineralized zone which extends under the highway to check the continuity and intensity of the zone, so as to justify additional investment in capital for underground development.

Below elevation 2400 there is evidence of water, which will be a problem that will have to be resolved once mining reaches to this point.

For the open pit mining in stage one, four (4) cross-sections were prepared, which traverse the ridge at irregular distances between these sections. The reason for the irregular distances between sections is that the pattern of profiles chosen to traverse the ridge were originally selected by the geologist and in order to maintain a certain conformity the same profile locations were used (See Figure 5.13).

5.3 Tonnage Calculations and Grade

The mining tonnage rates were set at 500 ST of ore and 1000 ST of discard (waste) for 1500 ST total per day.

Tonnages claculated follow:

Bench No.	Ore	Waste	Total	W/O Ratio
2540	19,638	4,664	24,302	0.24:1
2520	49,480	14,494	63,974	0.29:1
2500	75,636	36,818	112,454	0.49:1
2480	87,632	101,293	188,925	1.16:1
2460	116,287	186,592	302,879	1.60:1
2440	83,966	226,922	310,888	2.70:1
2420	78,968	166,830	245,798	2.11:1
2400	70,805	150,773	221,578	2.13:1
2380	78,469	215,414	293,883	2.75:1
2360	69,306	217,580	286,886	3.13:1
2340	42,150	143,109	185,259	3.40:1
TOTAL	772,337	1,464,489	2,236,826	1.90:1

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For 365 day/year operation and with a production of 500 TPD of ore and 1000 TDP of waste, the possible operating days and tonnages per year were estimated using a 1500 TDP rate:

Bench No.	Total Tons	Days
2540	24,302	14
2520	63,974	37
2500	112,454	64
2480	188,925	108
2460	302,879	173
2440	310,888	177
2420	245,798	140
2400	221,578	127
2380	293,883	168
2360	286,886	164
2340	185,259	106
TOTAL	2,236,826	1,278

1,278/312 = 4.10 years

Tons mined per year based on 312/day/year plan and 1750 TPD rate.

Yearly Production Estimate

Ore	180,000 TPY
Waste	360,000 TPY
	540,000 TPY

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YEAR	BENCH	ORE	WASTE	TOTAL TONS	DAYS	W/O RATIO
1	2540	80,000	4,664	24,302	14	0.24:1
	2520	49,480	14,494	63,974	37	0.29:1
	2500	75,636	36,818	112,454	64	0.49:1
	2480	35,246	46,980	82,226	47	1.33:1
		180,000	102,956	282,956	162	0.57:1
2	2480	52,386	54,313	106,699	61	0.04:1
	2460	116,287	186,592	302,879	173	1.60:1
	2440	11,327	22,650	33,977	19	2.00:1
		180,000	263,555	443,555	253	1.46:1
3	2440	72,639	204,272	276,911	158	2.81:1
	2420	78,968	166,830	245,798	140	2.11:1
	2400	28,393	56,786	85,179	49	2.00:1
		180,000	427,888	607,888	347	2.38:1
4	2400	42,412	93,987	136,399	78	2.22:1
	2380	78,469	215,414	293,883	168	2.74:1
	2360	59,119	118,238	177,357	101	2.00:1
		180,000	427,639	607,639	347	2.38:1
5	2360	10,187	99,342	109,529	63	9.75:1
	2340	42,150	143,109	185,259	106	3.38:1
		52,337	242,451	294,788	169	4.63:1
TOTAL		772,337	1,464,489	2,236,826	1,278	1.90:1

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In the previous tabulation, the fluctuation of the waste to ore ratio is readily noticeable. While the overall ratio is at 1.90 waste to ore, the yearly ratio fluctuates from as low as 0.57 to 1 in the first year to a high ratio of 4.63 to 1 for the remaining time in Year 5.

The fact that mining is performed on a ridge with a sharp break on the south-eastern flank reduces the mining of the uppermost benches to narrow platforms and confines the removal of material to just the mineralized area with minor waste, which is the reason for the very low waste to ore ratio during the first year of operation.

As mining proceeds downward on the ridge, it will become possible to mine two benches simultaneous at a time, allowing in this manner to balance the waste removal in a more logical manner than is shown in the year by year tonnage tabulation. This final waste to ore balance can be done at the last stage before mine start-up or even during the first year of operation as there will be adequate time to accomplish this procedure.

5.4 Grade and Gold Value

With the additional assay results, obtained from samples taken on the surface of the ridge during May of 1987, the mineralized zone has increased the reserves considerably from 580,458 tons to 772,337 tons. The latest tonnage evaluation will require additional sampling and diamond drilling to prove its definite existence, since these surface sample assay values were used rather freely in the projection of Au ore values to depth within the approximate limits of the deposit.

Figure 5.14 gives the estimated average grade, the dollar value and the aerial location of the gold values in the four cross-sections as well as the projected values used in the calculations for the estimated present assay and dollar value of the deposit. The average value and grade was estimated at 0.0452 ounces of gold giving an $18.098 dollar value at a base price of $400.00 dollars.

To obtain the estimated final grade, the values in each section were averaged arithmetically and multiplied by their corresponding distances of influence. These products were finally averaged to give the result as indicated above.

5.5 Operation

The operating strategy of this property is to schedule the plant operation for 7 days per week with the mine schedule for a 6 day-one shift operation. Daily tonnages will be 583 tons of ore for 6 days and 1167

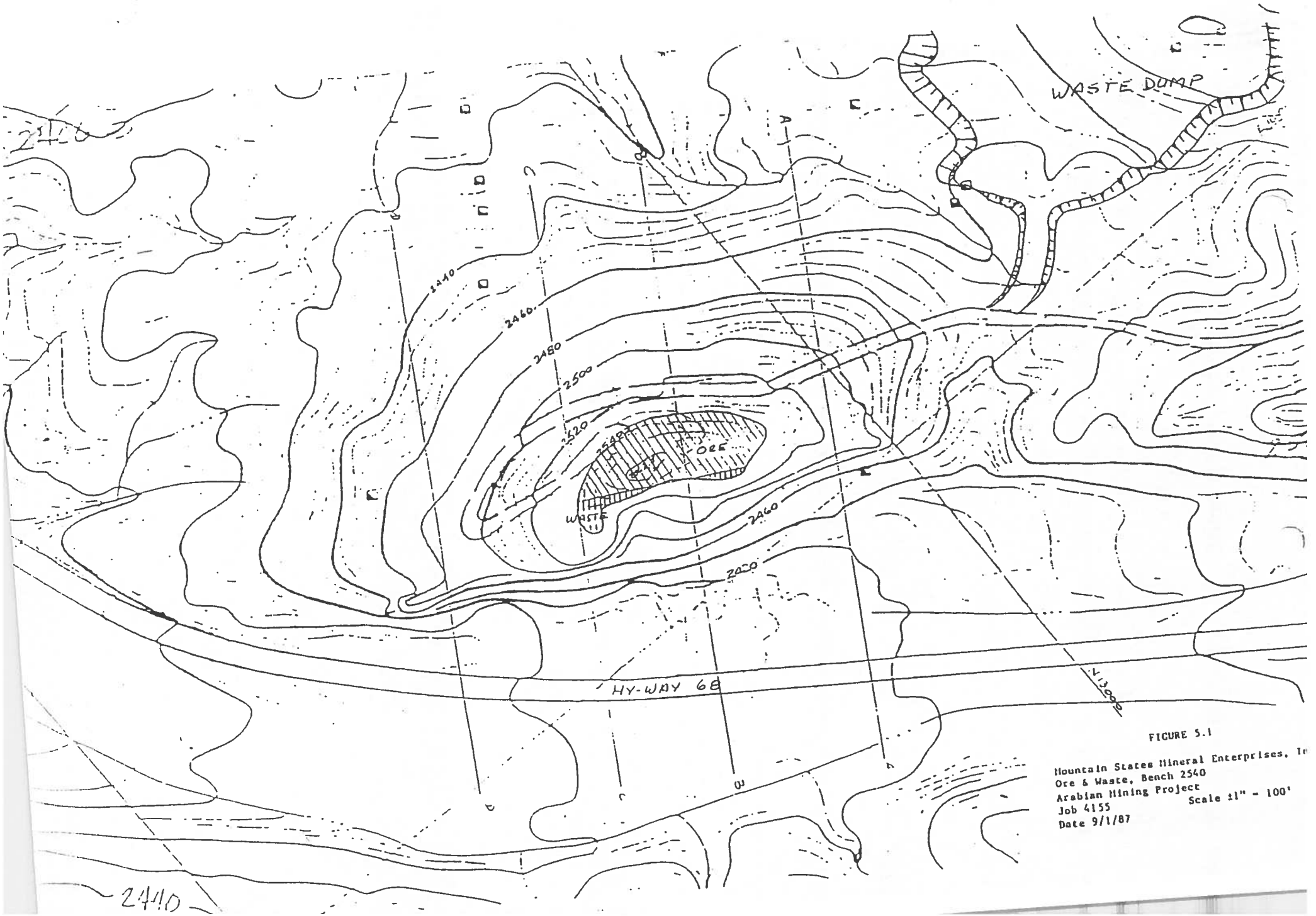


FIGURE 5.1

Mountain States Mineral Enterprises, In
Ore & Waste, Bench 2540
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87

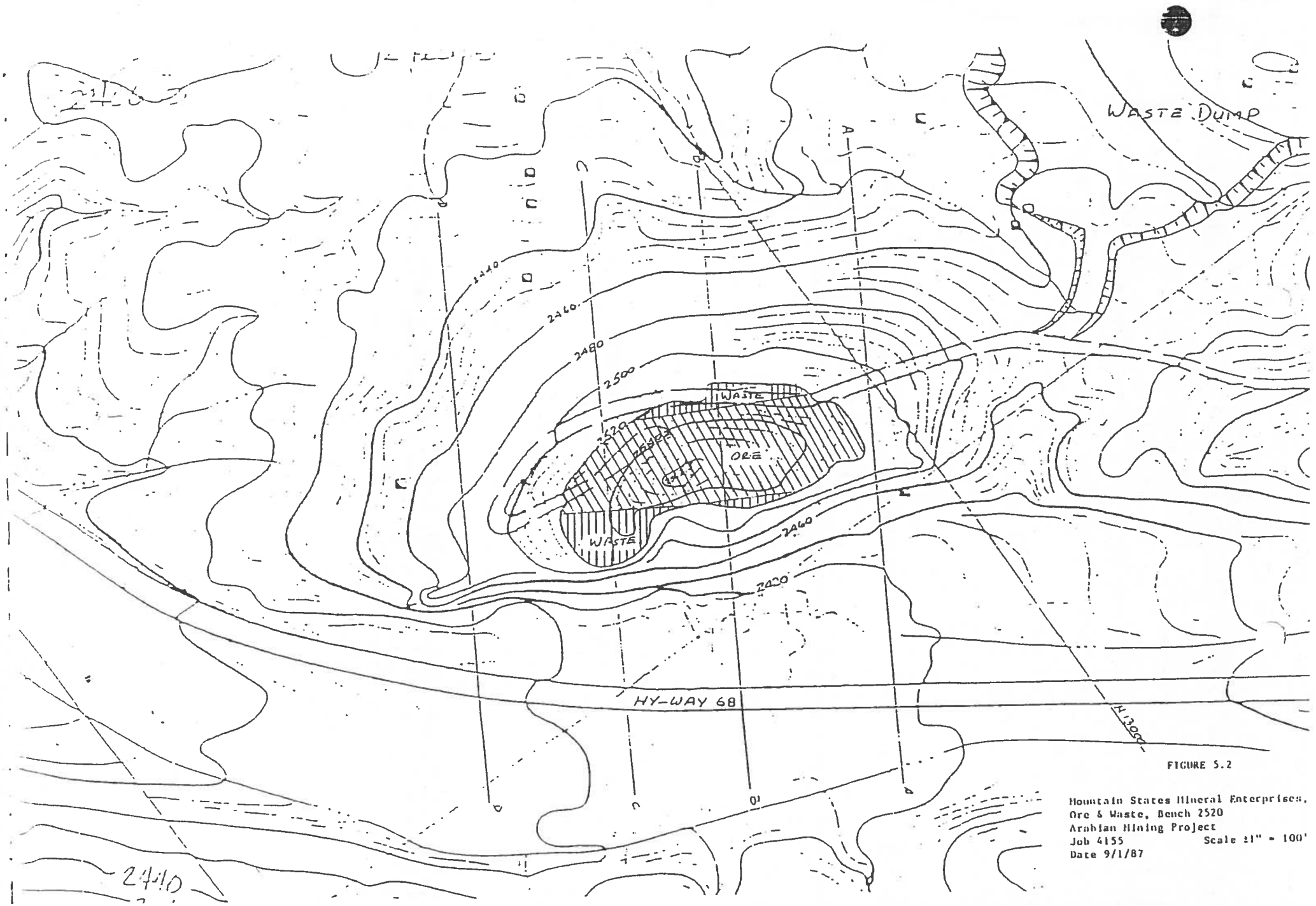


FIGURE 5.2

Mountain States Mineral Enterprises,
Ore & Waste, Bench 2520
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87

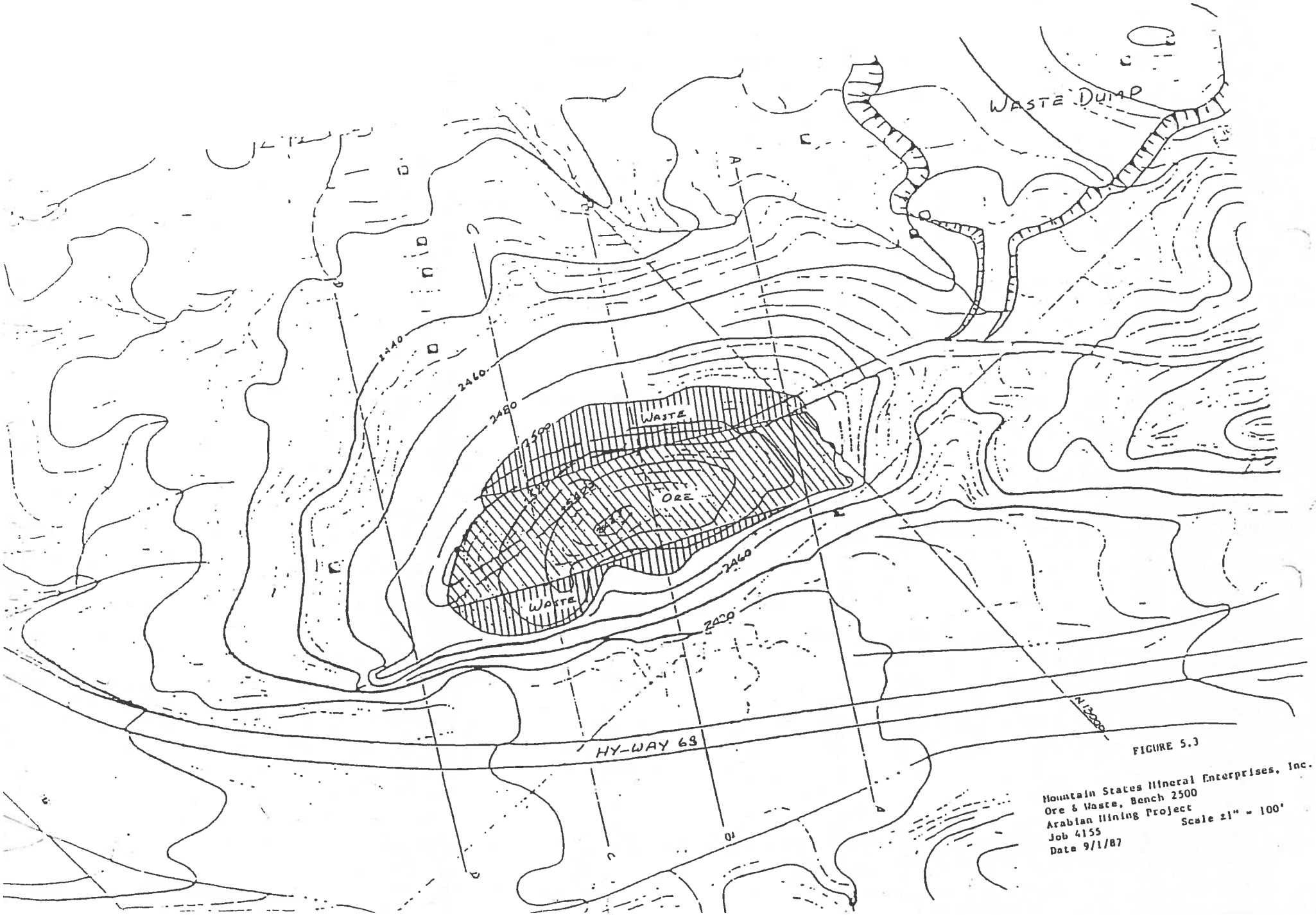


FIGURE 5.3

Mountain States Mineral Enterprises, Inc.
Ore & Waste, Bench 2500
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87

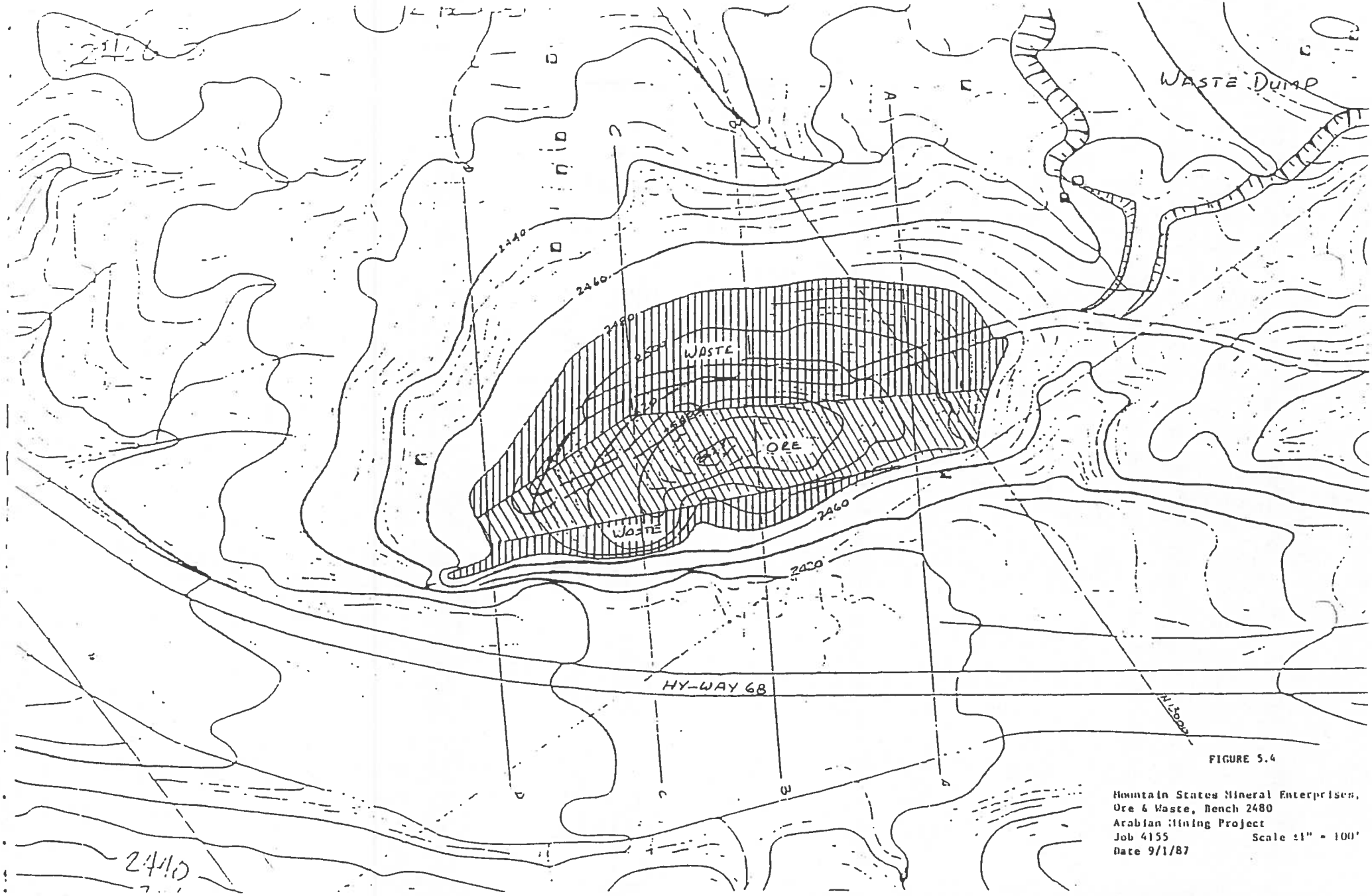


FIGURE 5.4

Mountain States Mineral Enterprises,
Ore & Waste, Bench 2480
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87

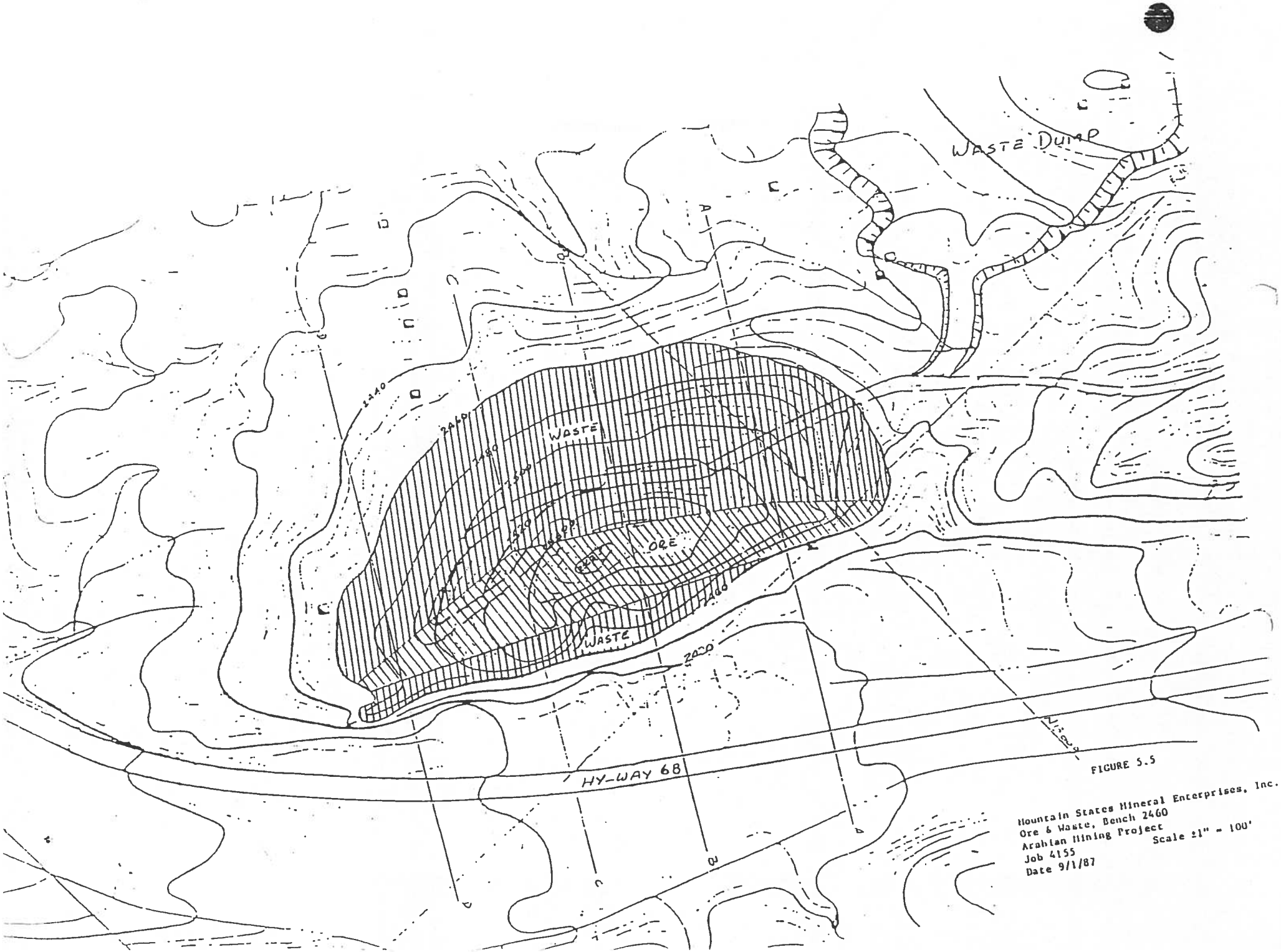


FIGURE 5.5

Mountain States Mineral Enterprises, Inc.
Ore & Waste, Bench 2460
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87

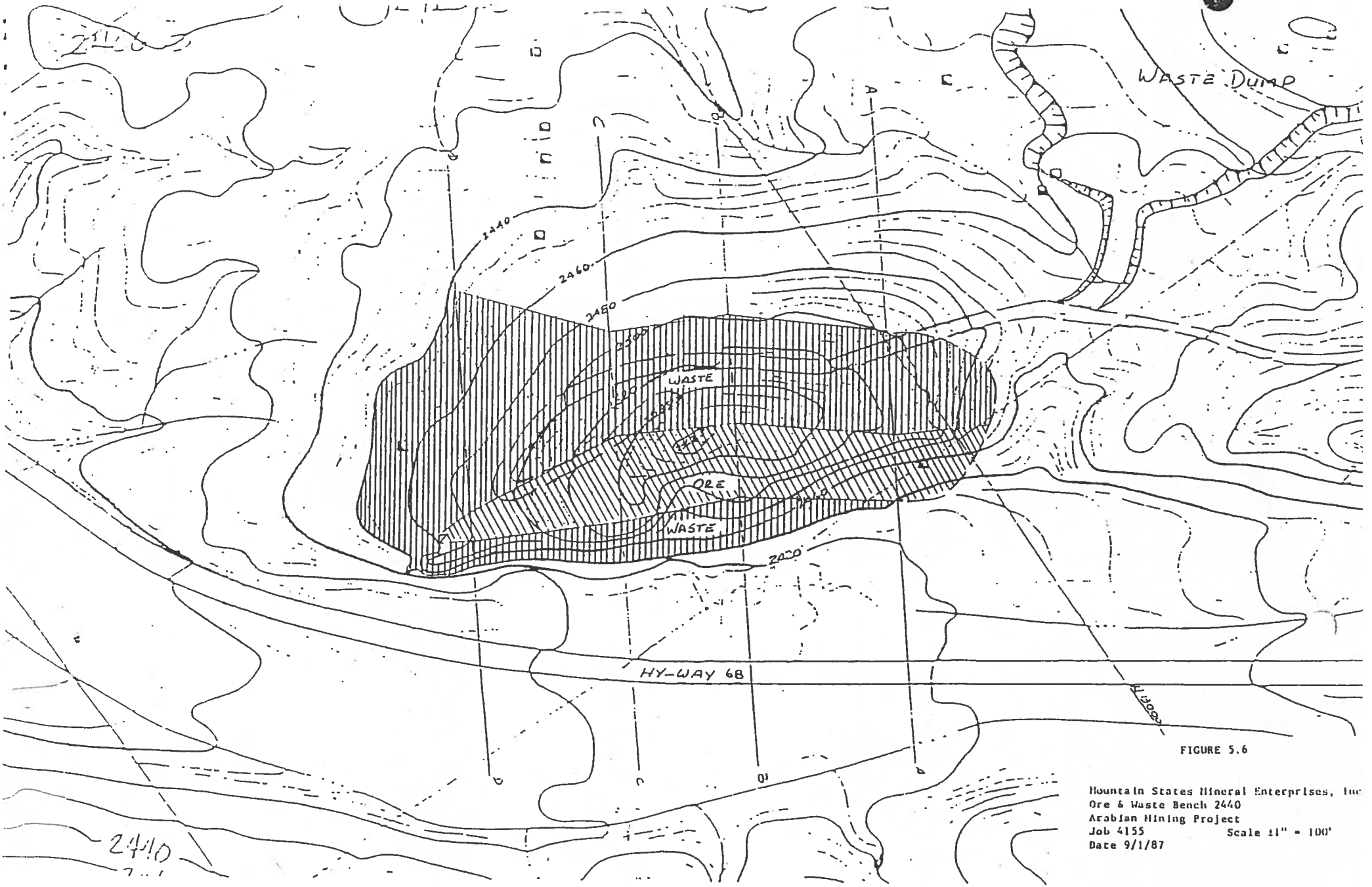
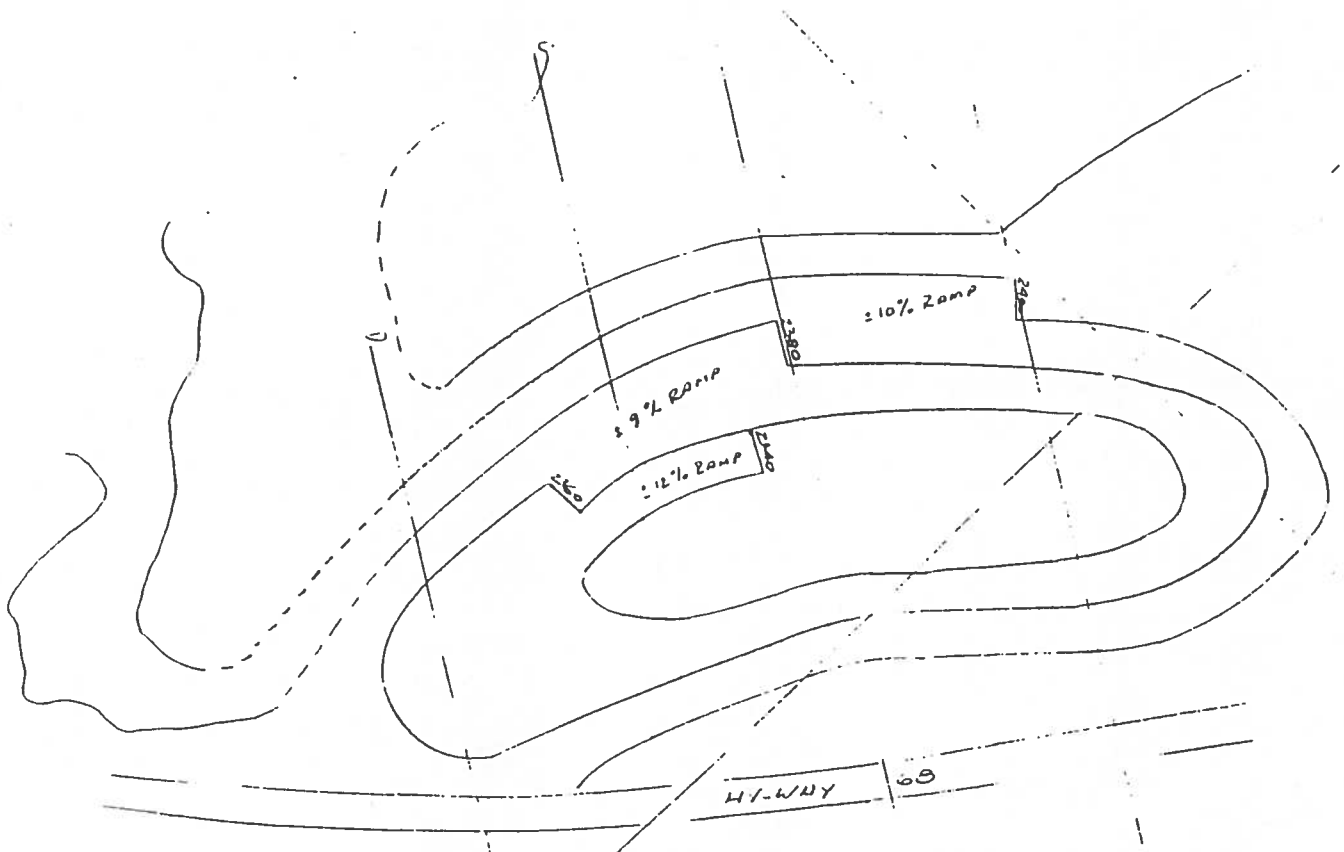


FIGURE 5.6

Mountain States Mineral Enterprises, Inc
Ore & Waste Bench 2440
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87



PROPOSED PIT LAY-OUT
FOR NEWBURN MINING
PROJECT 09/1/87

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FIG. 5.9

Job No. 4155 | Scale 1" = 100

REV. △

DWN B.A. FARRIS

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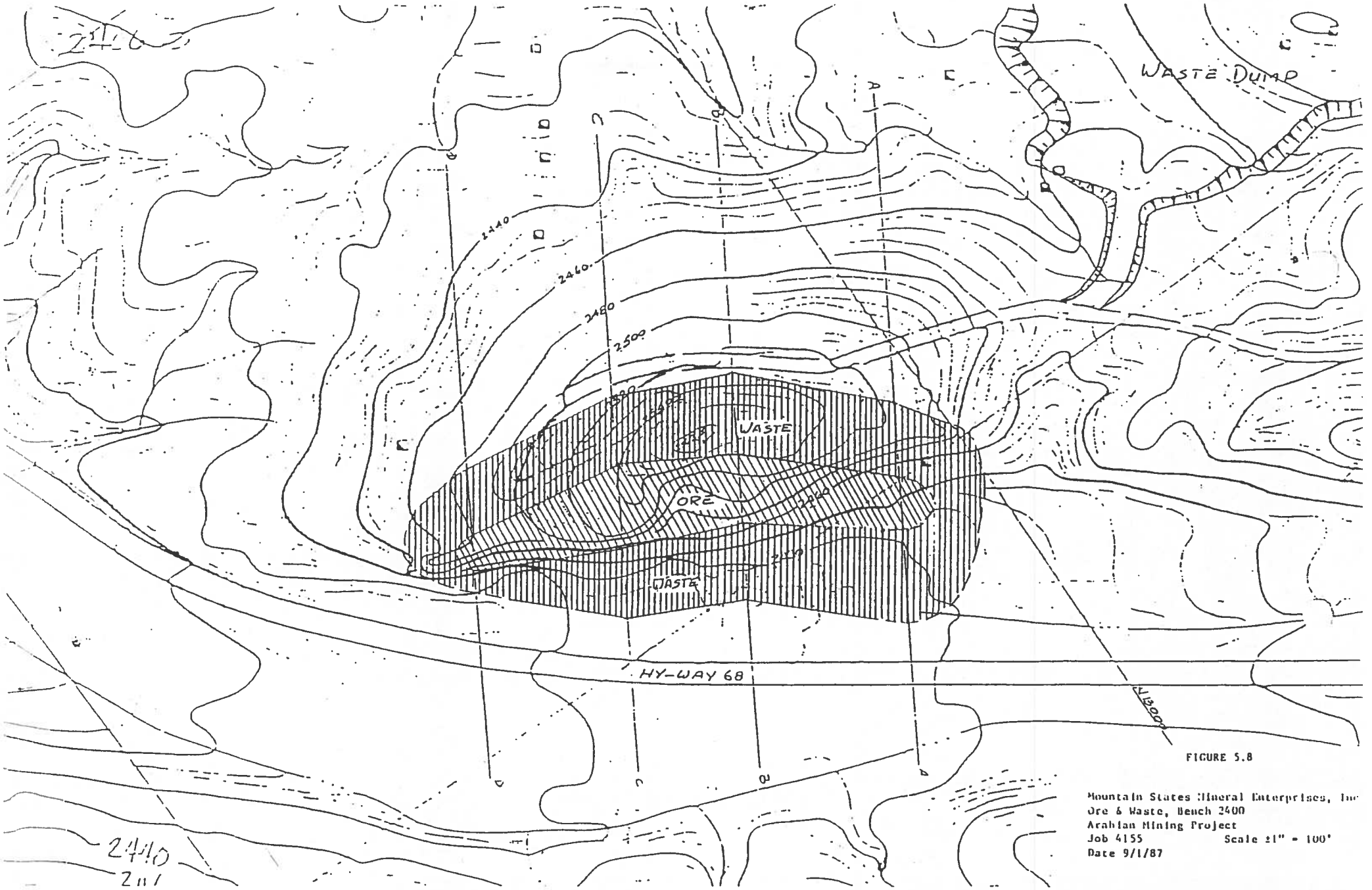


FIGURE 5.8

Mountain States Mineral Enterprises, Inc
Ore & Waste, Bench 2400
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87

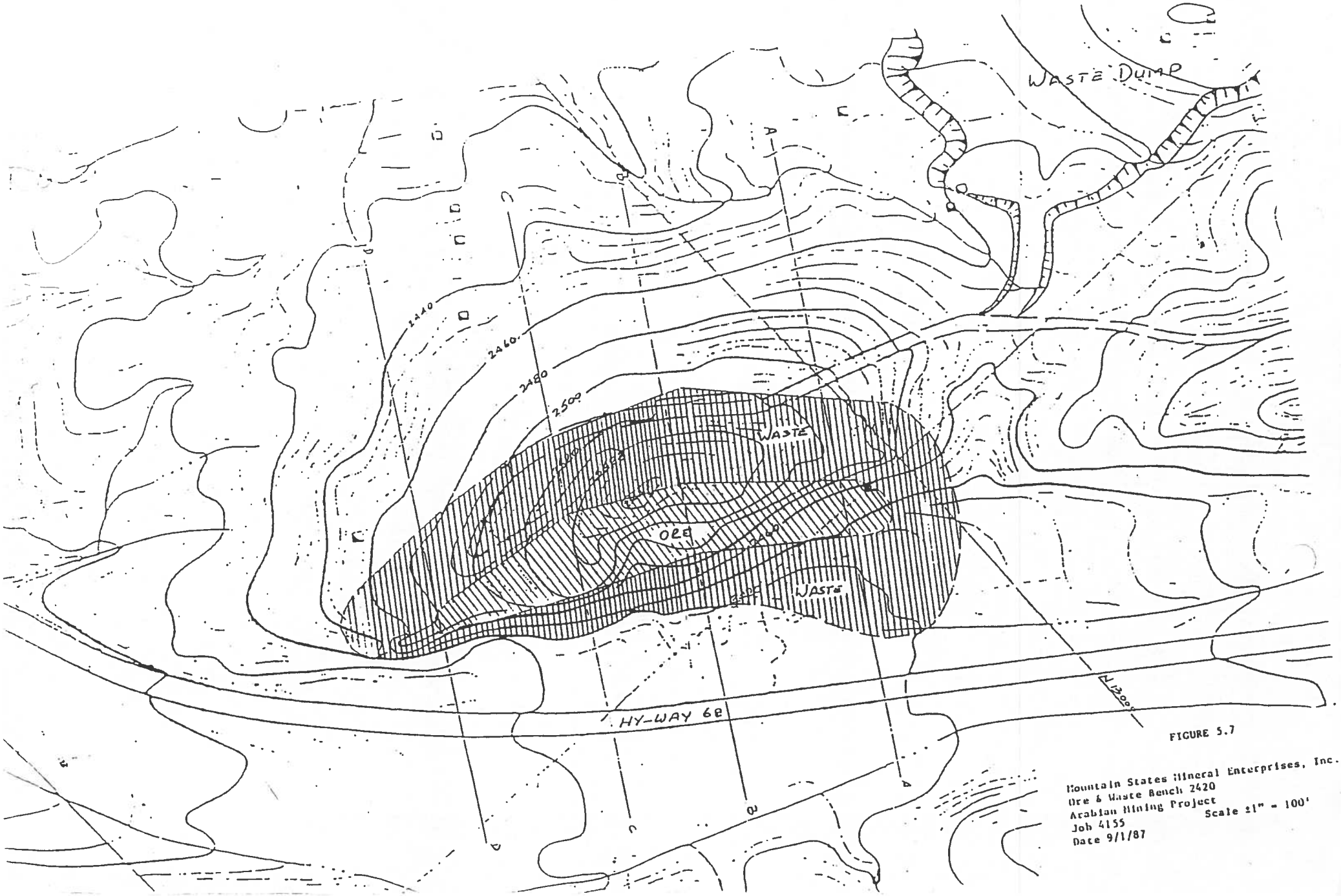
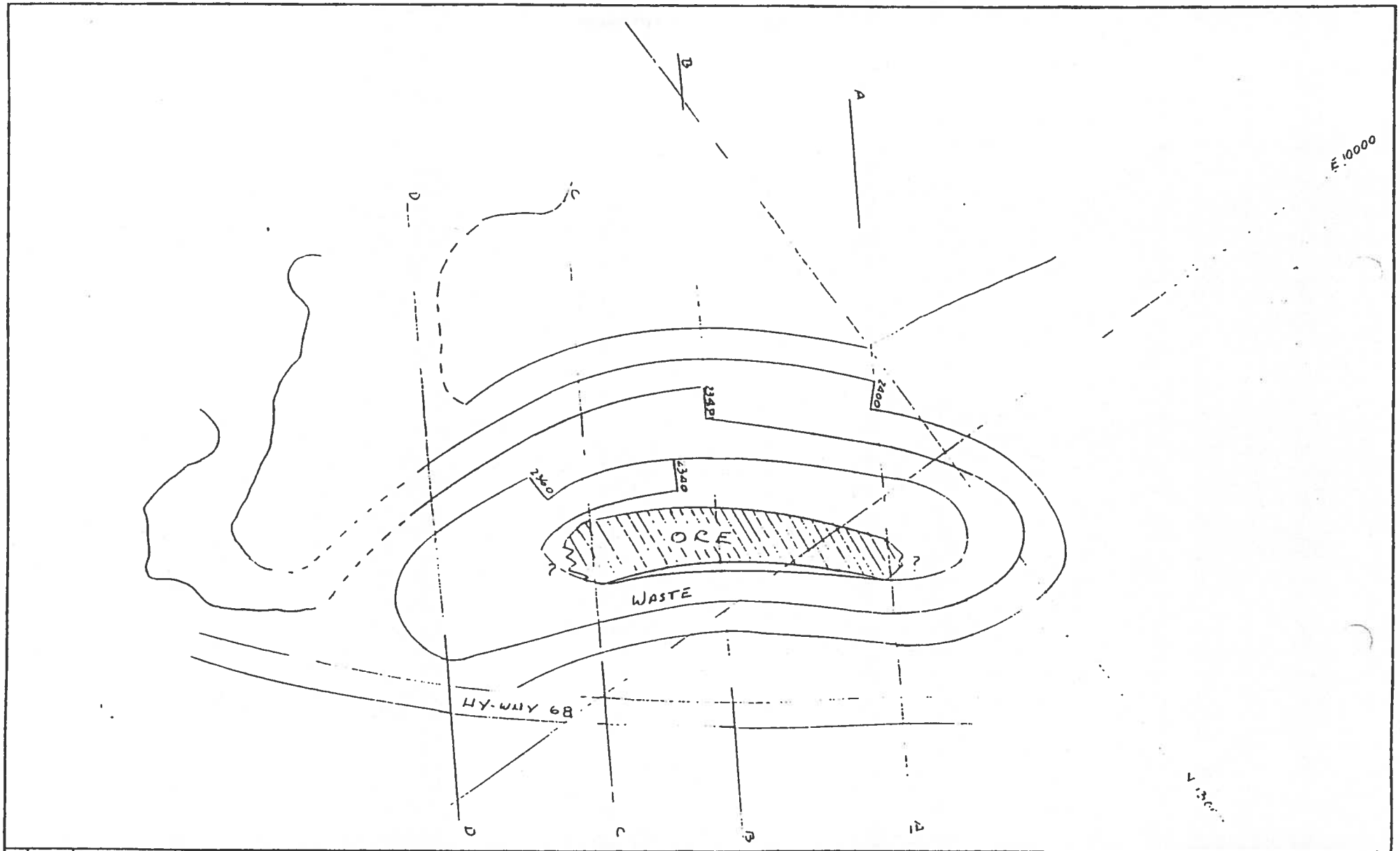


FIGURE 5.7

Mountain States Mineral Enterprises, Inc.
Ore & Waste Bench 2420
Arabian Mining Project
Job 4155 Scale 1" = 100'
Date 9/1/87



REF.	DWG.	DESCRIPTION

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APP.	
APP.	

REV. ISSUED	PRINT RECORD P-1	P-2	0	1	2	3
Client						
Vendor						
Interna						
Field						

ORE ON BENCH 23.10
ARABIAN MINING
PROJECT
09/1/31

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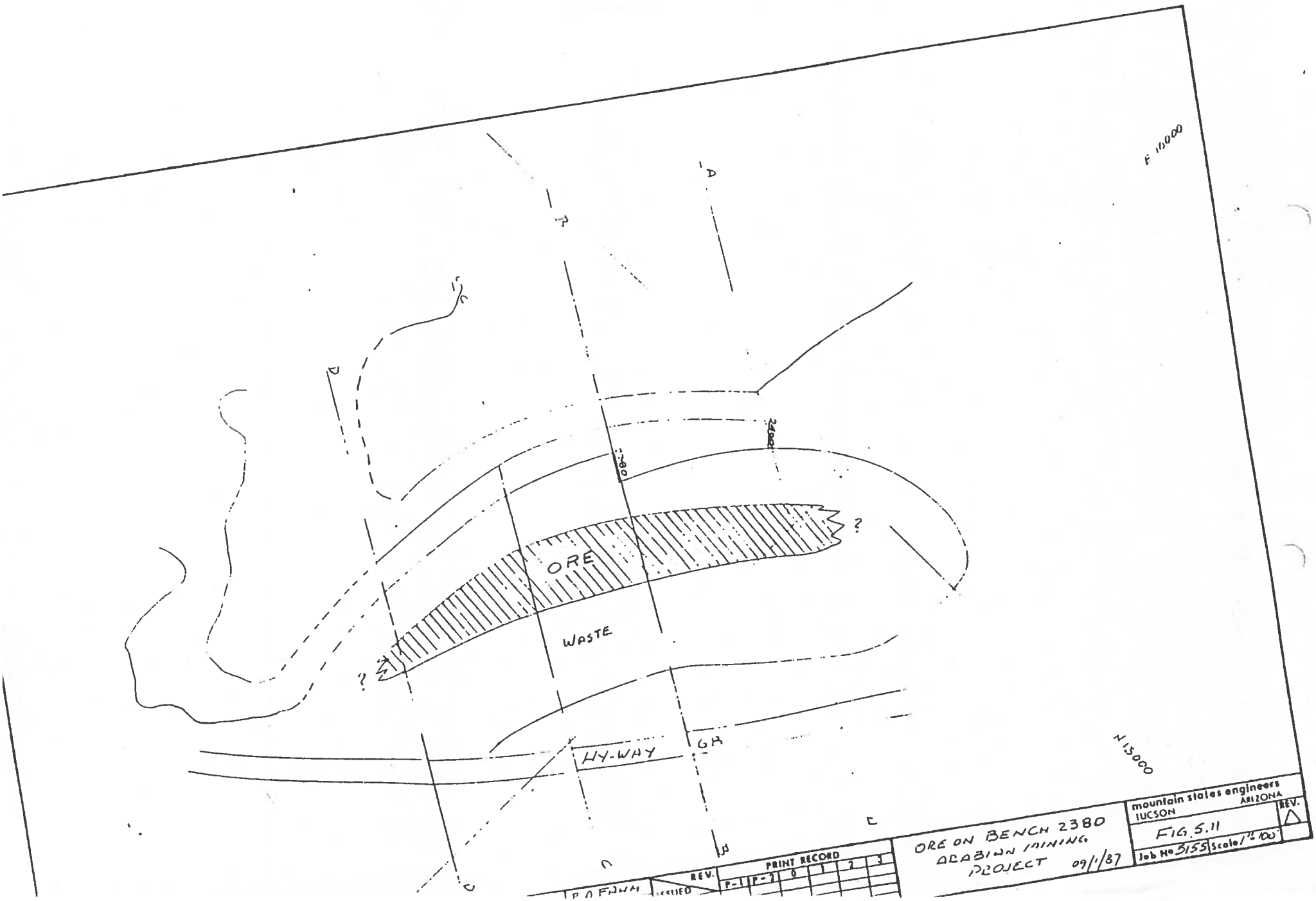
FIG. 5-10

REV.

Job No. 4155 Scale 1"=100'

GAF Polytrace 178



ORE ON BENCH 2380
ARABIAN MINING
PROJECT 09/1/87

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FIG. 5.11

Job No 3155 Scale 1" = 100'

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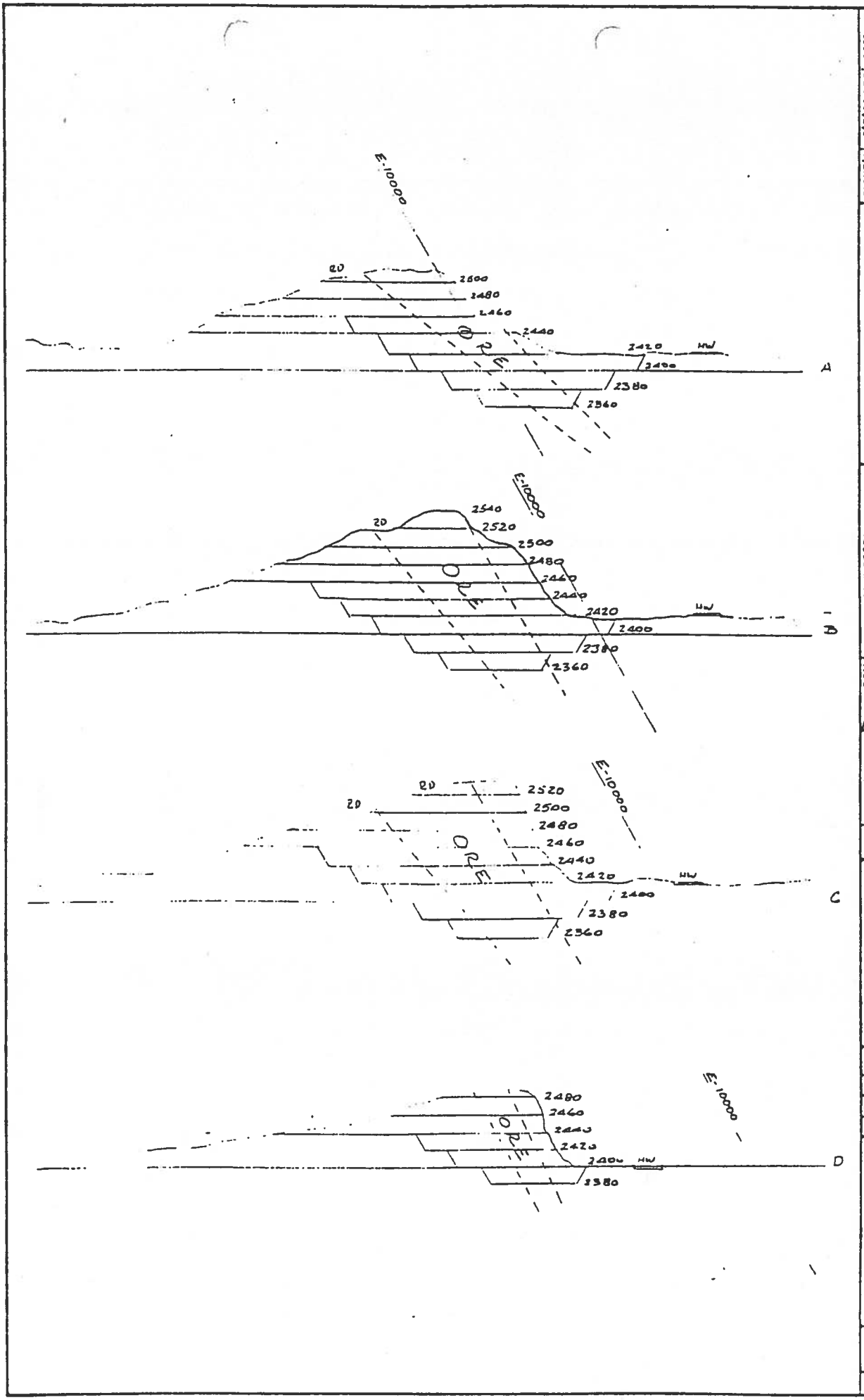
PRINT RECORD
P-1 P-2 0 1 2 3

REVISED



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REV.

FIG. 5.13

Job No. 4155 | Scale 1"=100'

PROFILES OF THE
ARABIAN MINERALIZED
MINING AREA

03/12/87

PRINT RECORD

REV.	P-1	P-2	0	1	2	3
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Client						
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Field						

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						APP.		
REF.		REV.						

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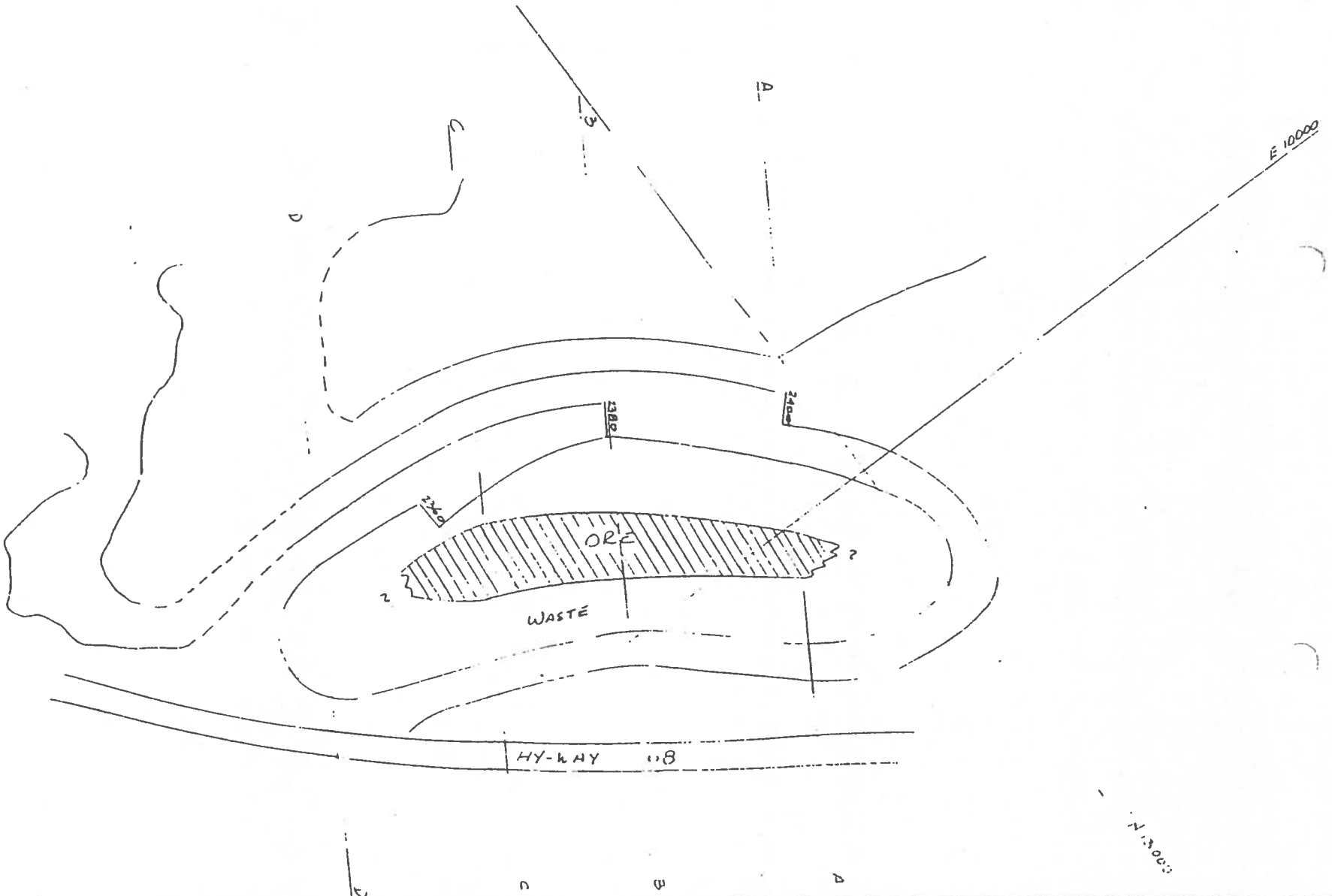

REF.	DWG.	DESCRIPTION

REV.	No	BY	APP	DESCRIPTION

DWN. BA FAHM
CHD.
APP.
APP.

REV	ISSUED	Client	Vendor	Internal	Field

PRINT RECORD					
P-1	P-2	0	1	2	3

ORE ON BENCH 2360
ARABIAN MINING
PROJECT
27/1/67

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FIG. 5.12

Job No 5159 Scale 1" = 100'

REV. △

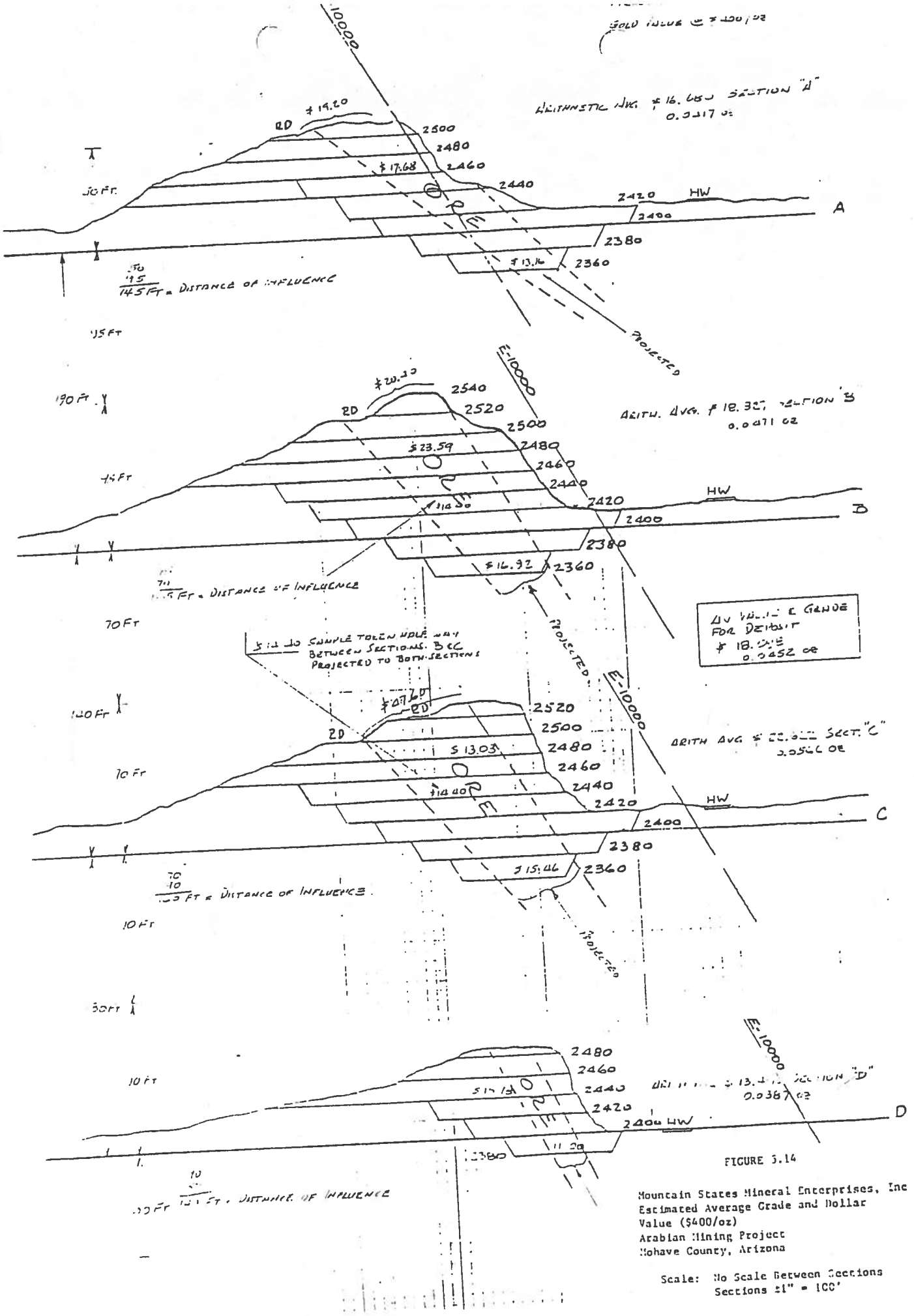

FIGURE 5.14

Mountain States Mineral Enterprises, Inc
Estimated Average Grade and Dollar
Value ($400/oz)
Arabian Mining Project
Mohave County, Arizona

Scale: No Scale Between Sections
Sections 1" = 100'

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tons of waste for 6 days. Total daily tonnage will be 1750 tons and will be mined during an 8-hour shift with 7-hour effective work.

Ore tonnages at a rate of 583 tons per shift will be dumped on a platform by the crusher. This material will be dumped into the crusher during the afternoon shift. For this purpose a front end loader will be required. This procedure will allow the maintenance for the plant and crusher to be done during day light hours.

The waste material will be hauled to the designated dump area and dumped at a pre-selected elevation (to be determined in the field) and advanced in a level manner. It is envisioned that, barring any unforseen situation, a second lift will be carried over the previous dump so as to accumulate this material in a reduced area. It is also possible that some of this material may be disposed of as fill for construction of diverse nature and be hauled away by interested parties, or in its effect the material could be crushed, screened and sold as aggregate. It is recommended that these and other concepts be explored further.

For the mining operation proper, it is expected that a large percentage of the crest to be mined will be rippable with the dozer with occasional drilling and blasting required. During actual blasting, being that Highway 68 is close by, it will be necessary to request the help from the Department of Public Safety (DPS) to control or stop traffic for short periods, to prevent any fly rock from causing possible damage or injury to vehicles and occupants. Also small piles of prepared black top material must be handy to repair any holes caused by fly rock.

Explosives and placing of these in the drill holes should be done on a contract basis with an explosives manufacturer. This procedure will eliminate the necessity to have explosive storage facilities on the site and in this manner eliminate many problems associated with this product.

6.0 METALLURGY AND PROCESS PLANT

6.1 Metallurgical Summary

The metallurgical test program was limited to samples obtained from the surface as there was no drilling program planned for this phase of development. In the absence of subsurface drill samples that might indicate to the contrary, it was assumed that the ore in the Rising

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Fawn ore body is relatively uniform and will respond metallurgically similar to samples obtained from the surface. This appeared on acceptable assumption as the Rising Fawn Adit was driven through the main vein at approximately the 2440 elevation while previous drill data indicated the vein surfaced at the 2540 elevation. Accordingly, two bulk samples were taken to provide a comparison between the surfaces and the adit (subsurface) types of material.

The first bulk sample was obtained by cutting 10-foot horizontal channels in four selected areas of the adit. These sample areas were selected in accordance with data obtained from an assay map of the adit in order to assure a composite bulk sample of suitable grade for testing. One of the four samples was subsequently discarded as too low in gold content. The three remaining samples were then composited to provide a test sample averaging 0.052 and 0.77 ounces/ton gold and silver respectively.

The second bulk sample was obtained by taking twelve surface samples in a three line grid across the area previously outlined as part of the ore body. Individual assays ranged from a low of 0.007 to a high of 0.852 ounces per ton of gold. The weighted average of these twelve original samples was 0.091 ounces/ton of gold but subsequent assays and test results gave an average assay of 0.064 gold and 0.15 silver. As the 0.852 assay was extremely high it is assumed it was due to a nugget effect that occurred during sample preparation. Assuming all other samples correct, this single sample would still be in the range of 0.5 ounces per ton, a respectable assay, in order to produce the composite test head of 0.064 ounces/ton.

Although this surface sample is very encouraging when compared to the calculated grade of the deposit, it must be viewed with caution at this time as emphasis was placed during sampling on obtaining a metallurgical sample of suitable grade and character and not upon obtaining a sample representing a given area. Sampling of the entire surface in a grid pattern should be undertaken to better define the ore body limits at the surface, as this cannot be adequately defined from available drill data (See Section 5.3 of this report).

The composite samples from the adit and the surface were tested separately in parallel in order to note any significant differences in mineral between the two areas. Testing on each consisted of a series of bottle (agitation) leaches and column (simulated heap) leaches.

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Each series was conducted on samples crushed to $-\frac{1}{2}$", $-\frac{1}{4}$" and -10 mesh size. In addition a bottle leach was performed on samples crushed to -80 mesh size to determine if the gold and silver were completely ameanable to cyanide extraction. Assay screen analyses were carried out on the feed and leached residue samples to provide additional information on the particle size/extraction relationship.

The MSRDI report located in Section 6.4 presents complete details and results of the test program.

Summary results and conclusions are as follows:

24-Hour Extraction (%) - Bottle Leach

Particle Size	Surface Sample		Adit Sample	
	Au	Ag	Au	Ag
$-\frac{1}{2}$ Inch	37.24	18.21	35.11	7.10
$-\frac{1}{4}$ Inch	44.53	16.75	32.96	6.23
-10 Mesh	56.48	42.11	48.98	9.69
-80 Mesh	95.37	70.63	95.05	35.94

Column Leach - % Extraction

Particle Size	Leach Time (Days)	Surface Sample		Adit Sample	
		Au	Ag	Au	Ag
$-\frac{1}{2}$ Inch	18	61.3	32.0	53.5	4.8
$-\frac{1}{4}$ Inch	18	58.5	32.2	49.8	6.5
-10 Mesh	18	91.7	69.5	77.1	13.3

Average Reagent Consumption: Lime (CaO) 0.8 lb/ton
Cyanide (NaCN) 0.85 lb/ton

The surface sample consistently reported higher extraction on the coarse crushed material than the adit sample which may be attributable to the higher gold assay. However, both reacted similarly under the duplicate test conditions and indicate that the extraction is directly related to the particle size.

It is concluded from these tests that:

1. The ore must be crushed to a nominal 10-mesh size in order to obtain acceptable extractions.

2. Gold extraction in the range of 75% (or higher) may be expected from a properly constructed heap leach if crushed fine enough.

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3. In order to maintain the physical integrity of a leach pile of 10-mesh material it will be necessary to either a) agglomerate the ore with lime and cement or, b) leach in a vat type structure which will constrain the pile perimeter.

4. An 18-day leach period will provide a near optimum time/extraction cycle.

5. Silver extraction will be erratic and generally low.

6.2 Plant

The plant and infrastructure facilities to treat the ore from the Arabian Project is divided into specific areas for accounting and control purposes. These are:

Area	Description
100	Mine
200	Crushers and Conveyors
300	Leach Pad and Solution Storage
400	Process Plant
500	Services
600	Ancillaries
900	Administration

As development proceeds each of these major areas can be sub-divided to provide the level of detail required to provide necessary accounting.

Area 100 - Mine, is covered in Section 5.0.
Areas 200 through 600 and 900 will be covered in this section.

6.2.1 Design Criteria

The following design criteria are based upon those findings developed during this Phase I effort and are the basis for the plant design described herein.

Ore Reserves (open pit minable):		772,000 DST
Average Grade:	Gold	0.045 Ounces/ton
Extraction	Gold	75%
Mine Operation:	Hours/day	8
	Days/week	6
	Ore	583 TPD
	Ore bluk density	90 #/ft^3
	Waste	1167 TPD

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Crushing Operation:	Hours/day	8
	Days/week	6
	Rate	80 TPH
	Product size	-10 mesh
Leaching Operation:	Hours/day	24
	Days/week	7
	Leach cycle	21 days
	Solution flow rate	0.0045 gpm/ft^2
	Total flow	105 gpm
Merrill-Crowe Plant:	Hours/day	24
	Days/week	7

6.2.2 Crushing Plant Design (Area 200)

The metallurgical test work indicated that it will be necessary to crush the Arabian ore to approximately -10 mesh (0.0787 inches) size in order to obtain extractions in the 75% range. In order to produce this fine size it well be necessary to install a three stage crushing system with the third stage reduction by a roll crusher, gyrodisc crusher or Gundlach cagepactor.

Heap leaching of finely crushed ore leads to instability of the pile as it becomes saturated with leach solution and it becomes subject to slope failure and "run-out". It will therefore be necessary to agglomerate the crushed ore with cement and lime as stabilizers before placing in the leach pile.

Figure 6.1 - Crushing Plant (Typ.) is a simplified flowsheet for a typical plant to provide the necessary three-stage crushing and agglomeration required. Conceptually this plant is based upon delivery of ore in 24-ton capacity trucks to the mine ore hopper or by front end loader from stockpile. The ore may be withdrawn by either a vibrating feeder or apron feeder and fed to a jaw crusher as the primary crushing unit.

A surge pile area will be provided near the hopper where the trucks will dump if the hopper is full. The surge pile will then be fed to the crushing plant by front end loader when the mine is not hauling.

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FACILITY ARABIAN MINE
LOCATION MOHAVE COUNTY AZ

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Tucson, Arizona
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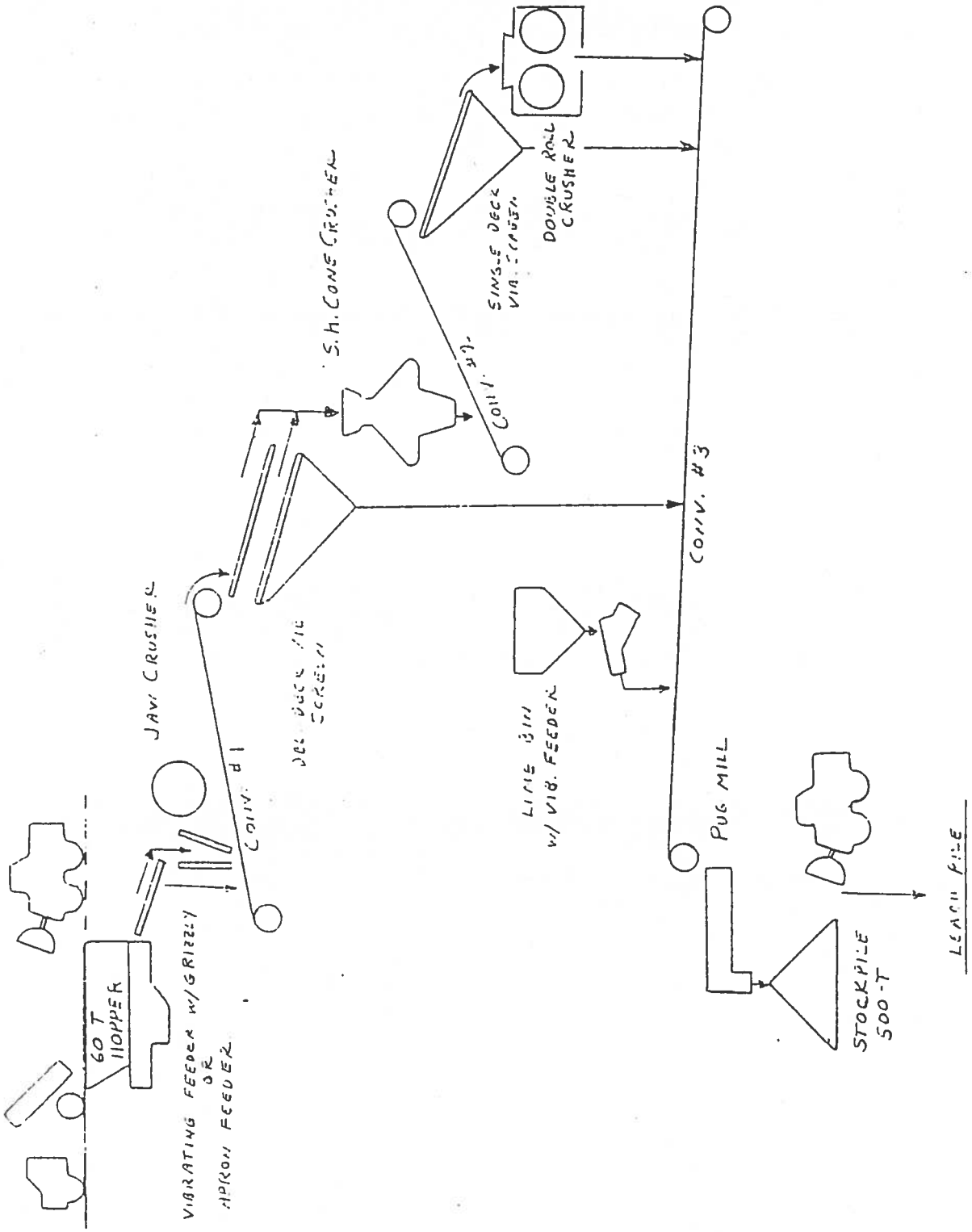
REV. NO. ____
DATE SEP 11 1987
JOB NO. 4155

BY J.H.T.
CHECKED ____

FIGURE 6.1 CALCULATIONS
for CRUSHING PLANT (TYP.)



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The primary crusher is conveyed to a secondary screen which removes finished size material and discharges the oversize to the secondary cone crushers. This crusher discharge is again screened to reduce the crushing load on the tertiary roll crusher. The combined final crushed product is conveyed to a pug mill for agglomeration. Prior to the pug mill both lime and cement are added dry to the ore. Depending upon conditions Portland cement may be required in amounts ranging from 2 to 10 pounds per ton. This must be determined by prior test work in order to establish the blend necessary to provide a competent agglomerate that will maintain its strength under pressure and wetting. Barren solution with cyanide content is added to the pug mill to provide the moisture required for agglomeration. Final moisture content may be as high as 12.5%. Again, this must be determined by test work.

The agglomerated ore is discharged from the pug mill to a stockpile from which it is withdrawn by a front end loader and placed on the leach pile.

The actual plant flowsheet for the Arabian Project will differ in details from the foregoing but still include all of these main elements. Portable crushing plants of suitable capacity are presently available on the used equipment market. These plants will each be of different design and probably require some mechanical modification but have a minimal construction and installation cost. They are generally designed for outdoor service and thus no buildings will be required.

Portec-Kolberg markets a portable unit consisting of an ore receiving hopper, feeder, conveyor belt, lime bin and feeder and the pug mill. A unit such as this, coupled with a portable crushing plant will provide the complete crushing plant flowsheet depicted in Figure 6.1.

6.2.3 Leach Pad and Solution Storage (Area 300)

The terrain in the area of the proposed operation is rugged with an overall slope in a southwesterly direction of approximately six percent. State Road 68, which borders the mine area on the north east side has an average grade of 4.4% as does the Arabian Wash on the northwest side. The area selected for the leach pad area and solution ponds is located on the west side of the mine area. The area selected is shown in the

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Plot Plan found in Section 2.0, Summary. As detail engineering design is carried out it is anticipated the boundaries will relocate to some extent to take advantage of the terrain and limit earth cut and fill. As shown, the area is approximately 13 acres with an average slope of 7%. The capacity when filled to the upper 2440-foot elevation is approximately 768,000 tons.

The pad area will be prepared by grading to smooth contours and compacting with clay or sand. When final grading is completed, leak detection lines of ½ inch polypropylene tubing with perforations at 1-foot intervals will be placed perpendicular to the solution flow and approximately 70-feet apart with a header collection system to the pregnant solution sump. These tubes will be overlain by a layer of geotextile fabric underliner. A 20-mil PVC liner will then be placed over the geotextile underliner. All PVC seams shall allow 6-feet of overlap and be glued for a minimum of 1-foot width. A series of 3-inch perforated, corrugated polyethylene tubes will be laid on top of the PVC liner in the direction of the solution flow. These tubes will be held in place by a second geotextrile liner. Final design will incorporate a series of low, parallel berms in the main slope direction.

Higher berms will be constructed at the easterly and westerly outer perimeters to channel any side flow to the main solution collection ditch along the south perimeter of the pad. This collection ditch will deliver the pregnant solution to the pregnant solution pond constructed south of the pad.

Prior to loading ore on the pad, a two foot layer of crushed rock with minimal fines will be spread to provide a filter bottom which will assure free flow of the solution.

Due to the projected 4+ years life of the Rising Fawn ore body, it is anticipated that approximately ½ of the pad will be constructed initially and the second half early in year three.

Two solution ponds will be provided at a location to the south and at a lower elevation than the leach pad and plant. The ponds will be constructed adjacent to each other with a common wall and an overflow launder such that solution can flow between the ponds in the event an overfilled condition occurs

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in one pond. The pregnant solution pond will be approximately 110-feet square at the surface, 40-feet square at the bottom and have a depth of 10-feet. The sides will have a 3:1 slope to enable proper compaction and installation of a geotextile liner overlain by a hypalon or ultra violet stabilized plastic. This design will provide approximately 530,000 gallon capacity, or 3.5 days operation at the design rate of 105 gpm. In actual practice it will be operated at a midpoint depth to provide adequate safeguard for any unusual stoppages or occurrences as it will receive all runoff from the leach area. In order to assure a zero discharge the pregnant pond must be capable of containing a 100-year, 24-hour storm event. As presently located the runoff from such an occurrence will be limited to the 13 acres covered by the pad. Based on a projected runoff of 4.15 inches in 24-hours the total runoff will be on the order of 26,500 gallons. The design capacity is quite adequate to contain this extra and unusual flow.

The second pond is an evaporation pond. All waste solutions from the operation will be delivered to this pond for disposal by natural evaporation. The pond will be of the same design as the pregnant solution ponds with surface dimensions approximately 110-feet square but only a 6-foot depth. The bottom will be approximately 74-feet square after allowing for a 3:1 slope on the sides. Total volume is approximately 168,000 gallons.

Pregnant solution will be pumped from the pond directly to the process plant by a pump with sufficient suction life to empty the pond. Pregnant solution will be pumped from the pond to the plant and barren solution from the plant to the leach piles through 4-inch polyethylene pipe. Flowmeters will be installed on each line for control and record purposes.

Barren solution to the leach pile will be distributed through a series of headers and laterals to from a sprinkler system that will provide uniform coverage of the area to be leached. Senniger Wobbler No. 12 sprinklers operating at 10 psi pressure and 3.1 gallons per minute flow are recommended. Approximately 34 sprinkler units consisting of a pressure regulator and sprinkler head will be required for sprinkling with a second set available for installation on the newest leach pile. These two sets will be progressively moved from a leached area to new ore.

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6.2.4 Process Plant (Area 400)

A 25' x 48' prefabricated steel building with 10-foot eave height will be provided to house the process plant. The Merrill-Crowe zinc precipitation system will be used for extracting gold and silver from the pregnant solution. Two package M-C units of 300-TPD capacity each as supplied by the State of Maine Mining Company are recommended to treat the expected flow rate of 105 gallon per minute solution. These units include all of the equipment shown in Figure 6.2, Merrill-Crowe Precipitation Plant except for the pregnant and barren solution tanks.

An oil-fired crucible furnace, similar to the Lindberg Heviduty Type 61-SF unit will be provided for smelting of precipitates and melting of dore metal for casting into bars. Separate graphite crucibles will be provided for each service. The furnace will be located in a partitioned area of the process building. Appropriate ventilation will be installed for this area to carry off combustion and smelting fumes. A fire assay furnace will also be installed in this room in order to minimize the ventilation requirements.

A second partitioned area will be provided to house the analytical laboratory. The laboratory will include an atomic adsorption analyzer as well as a fume hood and wet assay area.

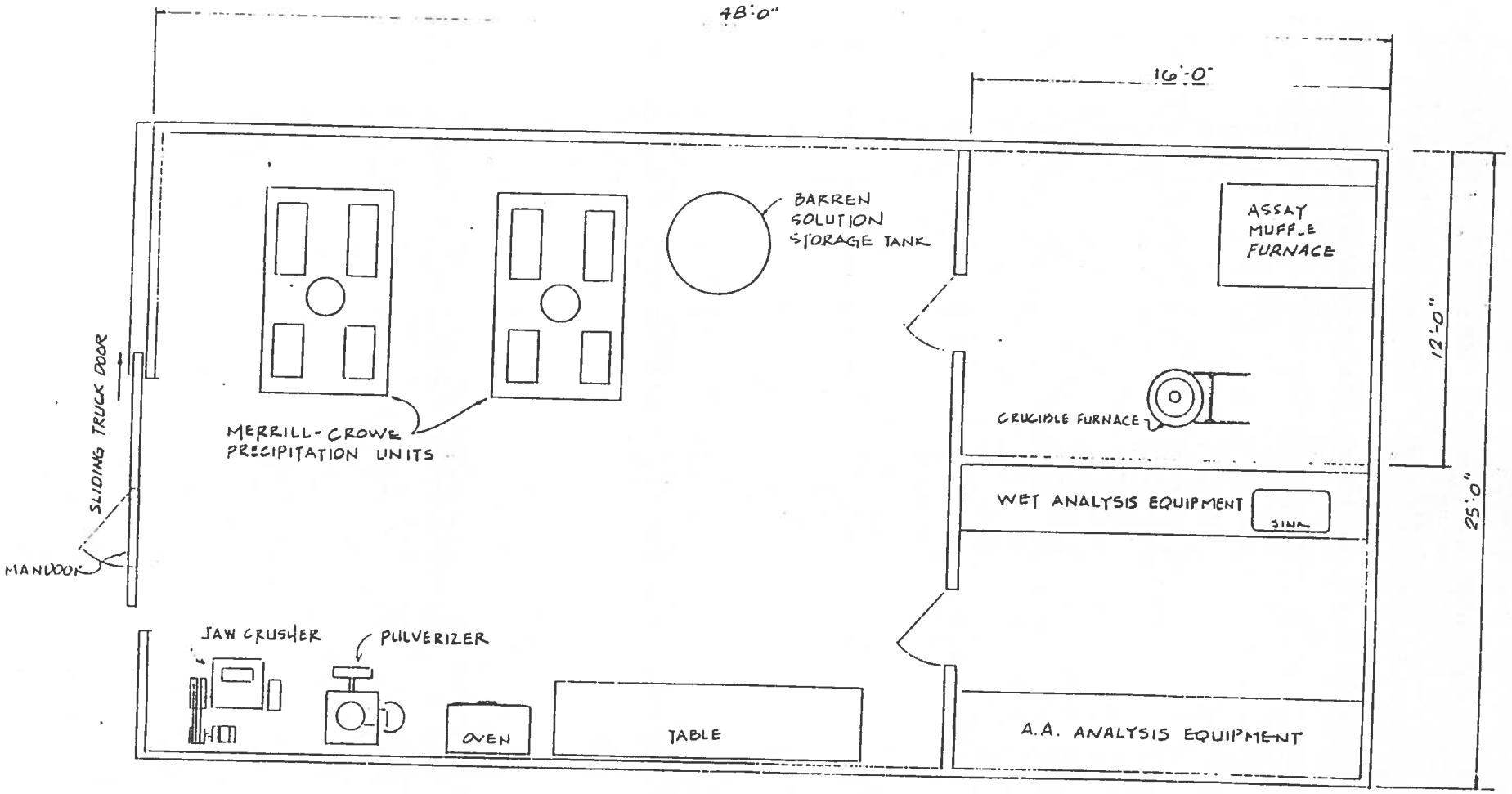
Laboratory crushing and sample preparation equipment will be located within the general open area of the building along with the M-C units. This equipment will be used to prepare mine samples for assay as well as treat slag for recovery of pulls prior to shipping to a smelter.

Figure 6.3 shows a preliminary layout of the Process Building.

6.2.5. Services (Area 500)

Principle services required for the project are:

- Power
- Water
- Communications



REF. DWG.	DESCRIPTION

REV.	No.	BY	APP	DESCRIPTION

DWN.
CHD.
APP.
APP.

REV. ISSUED	PRINT RECORD P-1	P-2	0	1	2	3
Client						
Vendor						
Internal						
Field						

ARABIAN MINE PROJECT
FIGURE 6.3
PROCESS PLANT GEN. ARRGMT.

mountain states engineers
TUCSON ARIZONA

REV. △

Job No. 4155 Scale 1/8"=1'-0"

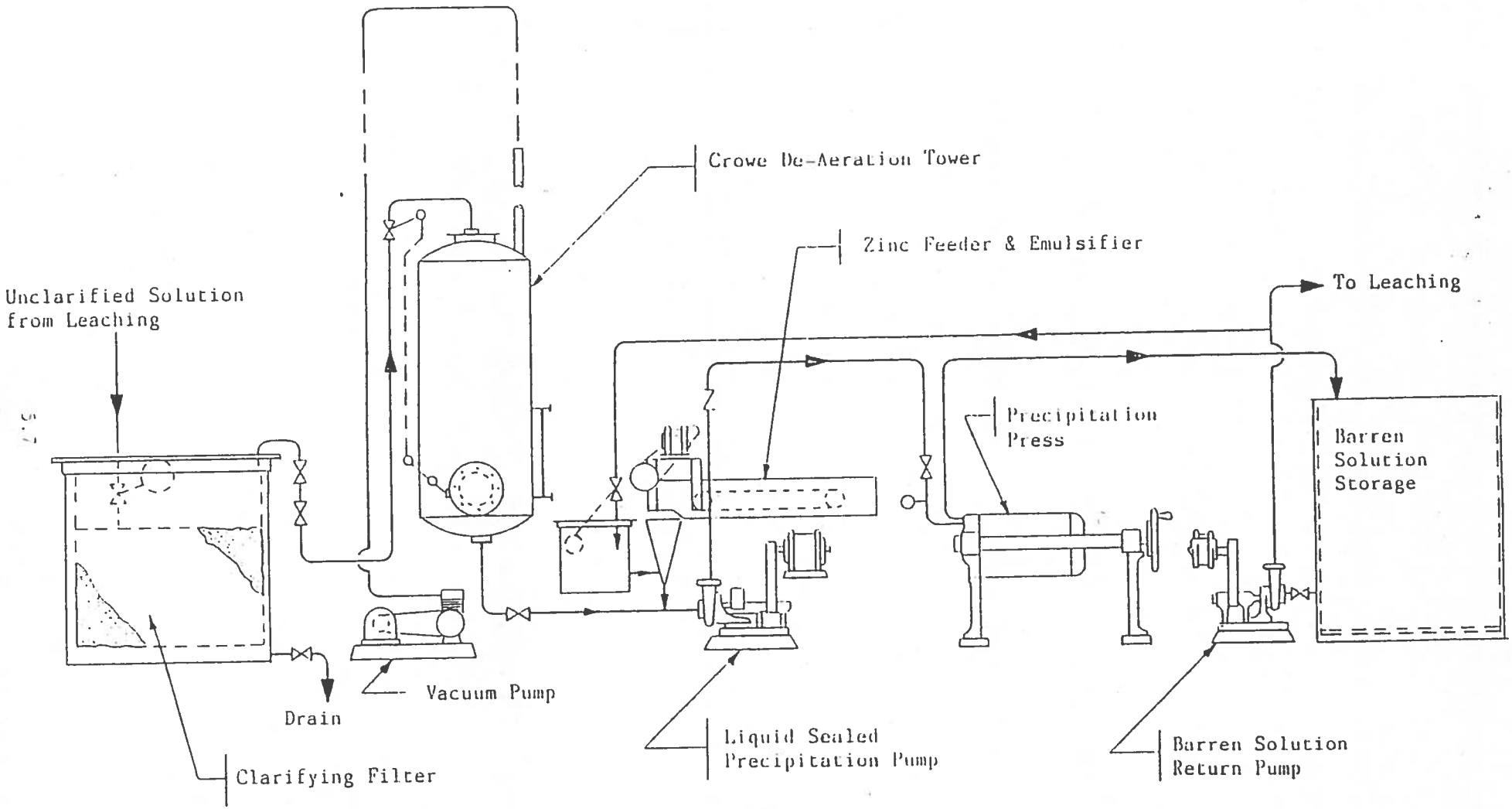


Figure 6.2 MERRILL-CROWE PRECIPITATION PLANT
(Filter Press Type)

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Power

Power for the project can be supplied either as purchased power from the Citizens Utilities Company line that crosses the project area or by diesel generation. Discussions as to the cost of connection to the Citizens Utilities system and subsequent power rates have not been half to this time but should be investigated prior to making a final decision.

An alternative to purchased power is the installation of rental diesel generators. The power load for the crushing plant is estimated to be in the range of 400-450 kW on an 8-10 hour daily schedule. The plant, shops and offices will require power on a 24-hour basis and be in the range of 30-35 kW. Oil storage tanks will be provided by the distributor selected to supply the fuel to the project. This alternative is recommended in order to conserve initial capital.

Water

The underground workings presently are flooded and will supply at least a portion of the water required by the project. In addition three wells have been drilled in Section 20 in the Arabian claim area. These wells encountered water at 75, 6 and 20 feet respectively and are identified as W-1, W-8 and W-9 in Table 6.1 Well Data.

It is understood that water from these wells may be appropriated as they have all been classified as Exempt and they are not located in a water management area. Should the mine not produce enough water for the operation it will be necessary to convert at least one of these wells into a producing well.

The wells listed in Table 6.1 were identified from the Arizona Department of Water Resources records and are all of the wells recorded for the six sections surrounding Section 20. Figure 6.4 shows the approximate location of each well.

Capital costs will include provisions of pumps, pipelines and a head storage tank for raw water. A small water treatment plant will be required in the plant area to provide domestic service. Bottled water can be provided for drinking purposes, if required.

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Communications

Telephone service in the area is provided by the Citizen Utilities Company. Cost of a hard line connection will need to be determined and compared to use of a mobile telephone installation at the office. Due to the close proximity of Bullhead City, it is anticipated communication needs at the plant may be minimal.

6.2.6 Ancillaries (Area 600)

The Ancillary facilities will consist primarily of office, changeroom, warehouse and shop buildings.

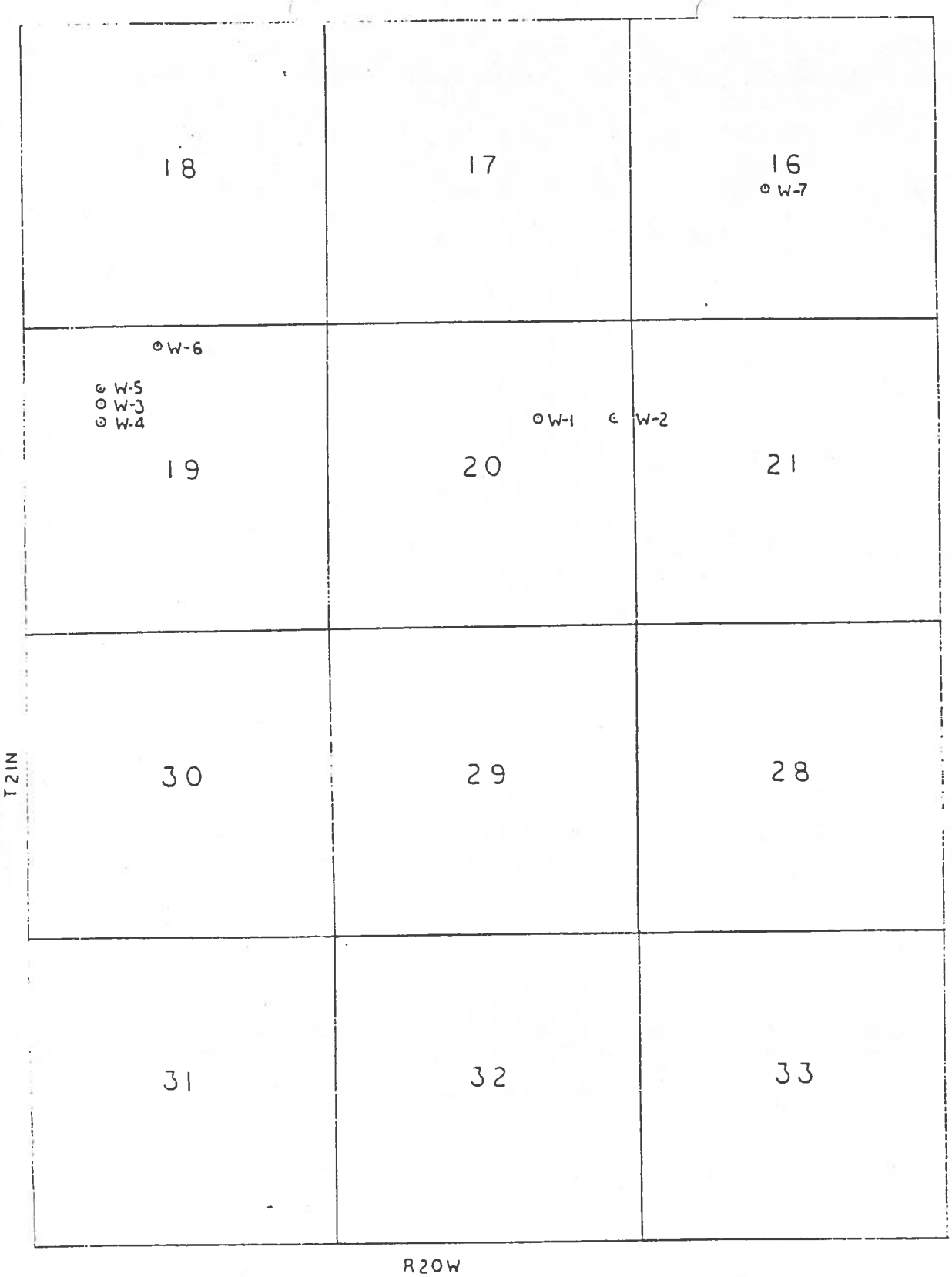
It is recommended that trailer units be obtained and located in the plant area to provide the office, changeroom and warehouse facilities. It is recommended these be rented to conserve capital.

A prefabricated building of approximately 20' x 20' will be required in the crushing plant area to provide the necessary equipment and tools for maintenance of the crushing plant equipment. The mine equipment will be maintained by others on a rental/maintenance agreement.

A two-ton capacity flat bed truck with A-frame hoist will be provided to use for haulage of supplies and use in maintenance work.

6.2.7 Administration (Area 900)

This account is primarily to collect those corporate expenses involved with operation of the project and reflect business expenses rather than capital expenses. However, Working Capital is included in this area account.



NOTE: NO RECORDED WELLS IN SECTIONS 17,18,21,28,29,30,31, & 32

FIGURE 6.4

WATER WELL LOCATIONS

Arabian Mining Project
Mohave County, Arizona

Well data as recorded by the
Arizona Dept. of Water Resources.

ARABIAN MINING PROJECT

Table 6.1

Water Well Data

No.	Name or Owner	Type	T	R	S	Location In Section	Depth	Water Level	Draw Down	Yield	Uses	Date Issued	Reference
W-1	Heridian Land Mineral	Exempt	21N	20W	20	ACA	-	75	-	-	Industrial	6-14-82	WR646925
W-2	Heridian Land	Exempt	21N	20W	20	ADC	-	30	-	-	Industrial	6-14-82	WR646926
W-3	Springold Mining Inc.	Exempt	21N	20W	19	B	170	66	-	5	Industrial	6-17-82	WR650820
W-4	Springgold Mining Inc.	Exempt	21N	20W	19	B	160	90	-	5	Industrial	6-17-82	WR650821
W-5	Springold Mining Inc.	Exempt	21N	20W	19	B	125	70	-	5	Industrial	6-17-82	WR650823
W-6	Springold Mining Inc.	Exempt	21N	20W	19	BAA	115	60	10	15	Mining	x-x-81	WR086936
W-7	Bonelli	Exempt	21N	20W	16	CAA	240	85	125	20	Mining	8-17-85	WR512084
W-8	Brock	Exempt	21N	20W	20	-	30	6	-	30	Mining	6-16-82	WR651195
W-9	Brock	Exempt	21N	20W	20	-	600	20	-	-	Mining	6-16-82	WR651196

CYANIDE LEACH TESTS ON ARABIAN MINE SAMPLES

For

MOUNTAIN STATES MINERAL ENTERPRISES INC.
4370 So. Fremont
Tucson, AZ 85714

By

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Approved by: Roshan B. Bhappu
Roshan B. Bhappu
President

Project No. 5016

Date: 8-19-87

TABLE OF CONTENTS

SECTION 1

INTRODUCTION

At the request of Mr. Joel Teel of Mountain States Mineral Enterprises (MSME), Mountain States R & D International, Inc. (MSRDI) performed a metallurgical test program on two ore samples one from the surface and the other from an adit. These samples were from the Arabian Mine in Mohave County, Arizona. The objective of the testing program was to determine grade of gold and silver in the samples and amenability of extracting the precious metals by cyanide leaching. Upon receipt of the samples for testing on May 15, 1987, the program was initiated. The results of that test program is the subject of this report.

SECTION 2

SUMMARY AND CONCLUSIONS

1. Assays (ounces/ton)

	Gold	Silver
Surface Sample	0.065	0.11
Adit Sample	0.052	0.77

2. The results of the bottle and column leach tests on the two samples under investigation are summarized in Table 1.

3. The results of bottle leach tests on the two samples clearly indicate that the degree of extraction is directly related to the particle size. In both cases, gold extractions ranged from about 40 percent for minus 1/2-inch material to as high as 99 percent for minus 80-mesh product.

4. The results of gold extractions, in column leach tests over a 19 days of trickle leaching of 1/2-inch, 1/4-inch and minus 10-mesh samples were:

Sample	Size	Extraction (%)
Surface	1/2	58.5
Surface	1/4	61.3
Surface	10 M	91.7%
Adit	1/2	53.5
Adit	1/4	49.8
Adit	10 M	77.1%

Gold extractions versus time for column leach tests are graphically illustrated on Figures 1 and 2.

5. Cyanide and lime consumptions were less than 1 pound per ton of ore.

6. Assayed screen analysis of surface and adit samples crushed to 1/2-inch show that the gold is evenly distributed throughout the size range. Refer to Tables 2 and 4 for details.

7. Examination of assayed screen analysis of 1/2-inch surface and adit leached residue indicates that significant gold leaching occurred in the minus 10 mesh size ranges. Please refer to Tables 3 and 5.

   Interpretation of gold extraction from the coarse fractions, 1/2-inch by plus 6 mesh, is inconclusive because of; 1) spotty occurrence of gold and 2) non-representation of sample at these sizes.

The samples of Arabian Mine material tested by MSRDI showed that they must be crushed to a fine particle size (about 10-mesh) to achieve exposure of gold to cyanide solution. Material crushed to minus 1/4-inch and minus 1/2-inch yielded only 50 to 60% gold extractions during bottle and column leaching. A prolonged trickle leach may have increased the extraction by an additional 10 percent.

TABLE NO. 1

Project No. — TEST SUMMARY — No. 3016

Sample ID	Test Number	Test Condition	Particle Size	Head Assay Au	Head Assay Ag	Calc. Au	Head Ag	Overall Extraction (%) Au	Overall Extraction (%) Ag	Time 24 Hrs Au	Time 24 Hrs Ag	48 Hrs Au	48 Hrs Ag	72 Hrs Au	72 Hrs Ag	102 Hrs Au	102 Hrs Ag
SURFACE SAMPLE																	
Surface	BM-1	Bottle	-80M	0.065	0.11	0.104	0.146	99.03	72.68	95.37	70.83	99.05	72.81	97.20	70.83	99.05	72.68
Surface	BM-2	Bottle	+10M	0.065	0.11	0.097	0.125	73.06	51.96	56.40	42.11	65.28	48.92	68.19	48.92	73.06	51.96
Surface	BM-3	Bottle	-1/4-Inch	0.065	0.11	0.039	0.133	56.74	20.92	44.53	16.73	51.91	19.55	54.20	19.55	56.74	20.92
Surface	BM-4	Bottle	-1/2-Inch	0.065	0.11	0.048	0.120	47.70	24.81	37.24	18.21	43.51	22.31	45.61	23.14	47.70	24.81
Calc.Hds		Bottle				0.072	0.133										
Surface	BM-11	Column	-10M			0.066	0.311	91.67	69.63	19.45	56.96	61.50	64.20	73.41	66.34	79.14	67.17
Surface	BM-10	Column	-1/4-Inch			0.048	0.096	61.29	32.41	16.57	12.94	36.44	21.69	44.75	24.95	48.84	26.43
Surface	BM-9	Column	-1/2-Inch			0.043	0.082	58.53	33.12	18.13	14.12	33.59	21.78	41.14	24.63	43.62	26.48
Calc.Hds		Column				0.052	0.163										
Calc.Hds		Average				0.064	0.146										
ADIT SAMPLE																	
Adit	BM-5	Bottle	-80M	0.032	0.77	0.061	0.761	96.70	36.93	93.05	35.94	96.63	36.44	93.05	36.44	96.63	36.93
Adit	BM-6	Bottle	-10M	0.032	0.77	0.054	0.757	66.48	11.43	48.98	9.69	56.05	10.81	57.73	10.68	66.48	11.43
Adit	BM-7	Bottle	-1/4-Inch	0.032	0.77	0.053	0.865	51.31	10.99	32.96	6.23	40.45	7.83	44.01	8.73	51.31	10.99
Adit	BM-8	Bottle	-1/2-Inch	0.032	0.77	0.051	0.753	60.55	13.68	33.11	7.10	39.05	8.80	44.97	9.87	60.55	13.68
Calc.Hds	Adit	Bottle				0.055	0.734										
Adit	BM-14	Column	-10M			0.052	0.719	77.11	13.45	20.38	6.16	53.10	10.19	60.12	10.94	63.91	11.35
Adit	BM-13	Column	-1/4-Inch			0.046	0.697	49.82	6.58	20.77	3.94	30.07	4.69	31.87	4.76	38.05	5.22
Adit	BM-12	Column	-1/2-Inch			0.064	0.795	53.54	4.81	27.98	2.73	31.84	2.99	38.86	3.47	41.34	3.68
Calc.Hds		Column				0.054	0.737										
Calc.Hds		Average				0.054	0.764										

FIGURE 1

GOLD EXTRACTION VS TIME PROJECT 5016
SURFACE SAMPLE
COLUMN LEACH

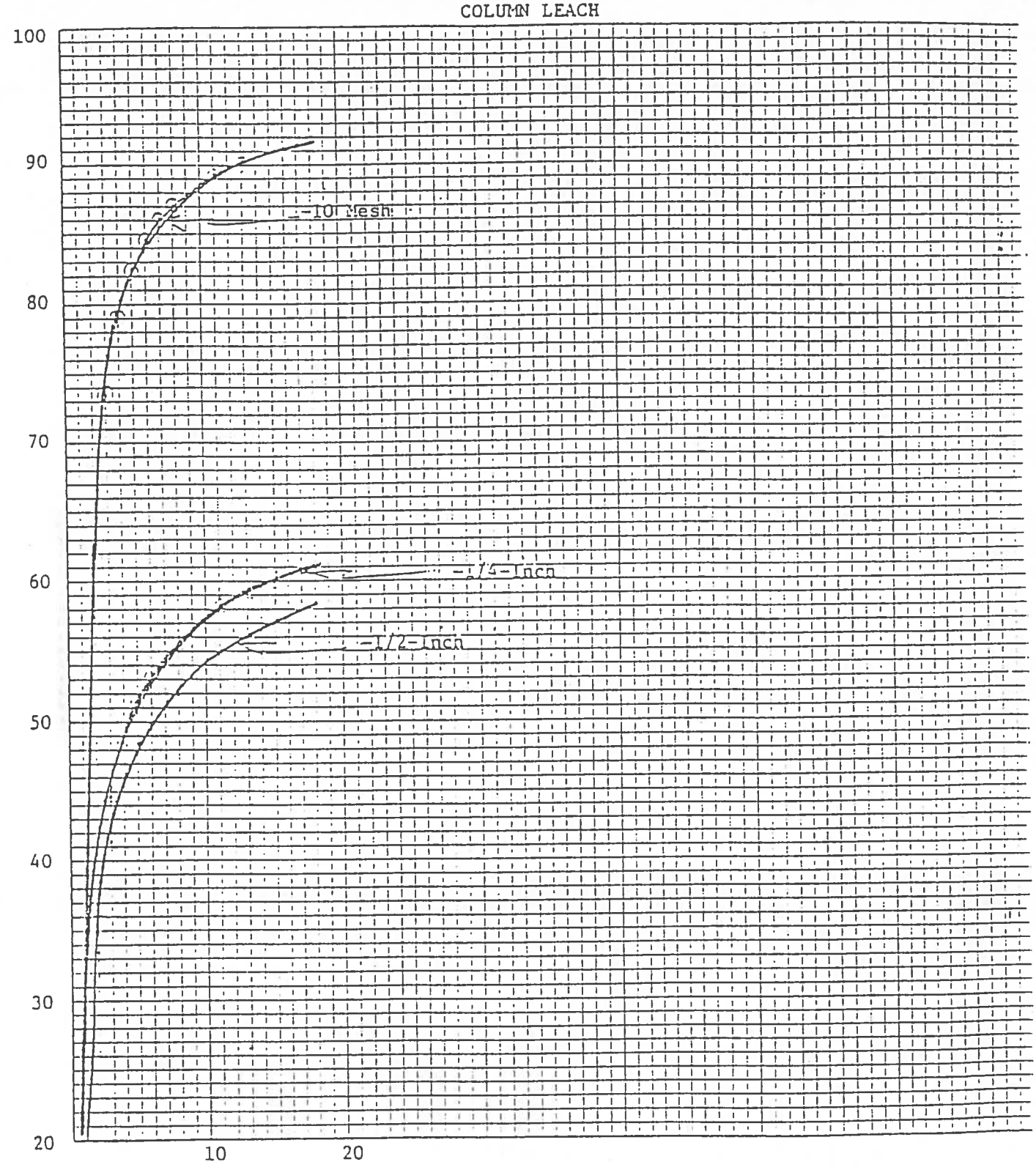
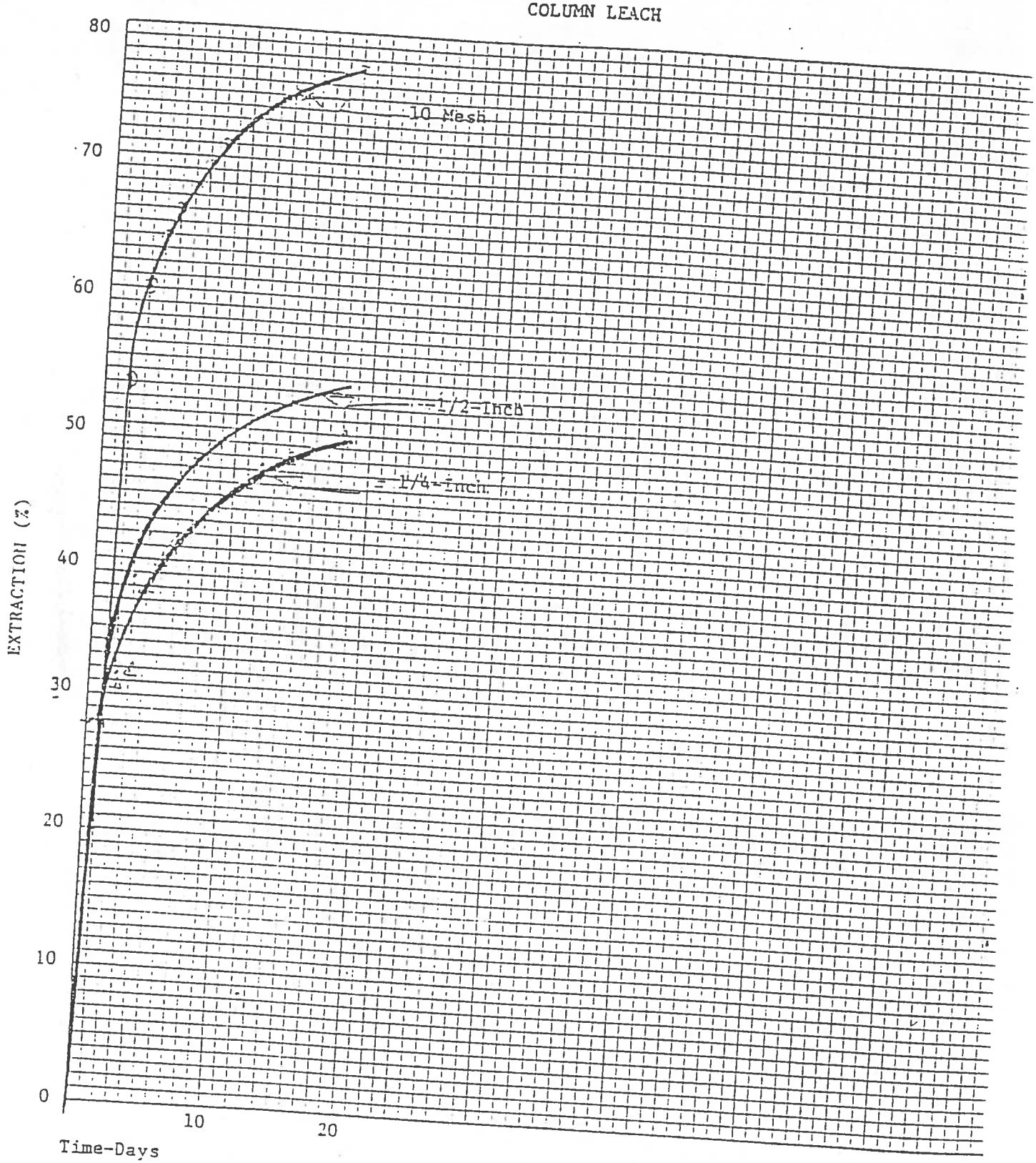


FIGURE 2

GOLD EXTRACTION
ADIT SAMPLE
COLUMN LEACH

PROJECT 5016



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Metallurgical Results

Project No. 5016 | Date 5-28-87 | Sample ID 1/2-inch Surface Feed | Test No.

Product	Weight (%)	Assay (Oz/Ton)			Contents			Distribution %		
		Au	Ag		Au	Ag		Au	Ag	
+1/2-inch	5.35	0.066	0.12		0.0035	0.0064		7.32	7.40	
-1/2 + 1/4-inch	41.85	0.049	0.07		0.0205	0.0293		42.89	33.87	
-1/4 + 6 Mesh	23.90	0.042	0.13		0.0100	0.0311		20.92	35.95	
-6 + 10 Mesh	10.11	0.037	0.05		0.0037	0.0051		7.74	5.90	
-10 + 20 Mesh	7.17	0.040	0.03		0.0029	0.0022		6.07	2.55	
-20 + 35 Mesh	3.84	0.019	0.04		0.0007	0.0015		1.47	1.73	
-35 + 65 Mesh	4.33	0.052	0.09		0.0023	0.0039		4.81	4.51	
-65 + 100 Mesh	1.16	0.076	0.13		0.0009	0.0015		1.88	1.73	
-100 Mesh	2.29	0.143	0.24		0.0033	0.0055		6.90	6.36	
Totals	100.00	0.048	0.09		0.0478	0.0865		100.00	100.00	

Remarks:

Grinding Data

Mesh	Wt. (%)

mountain states research & development, inc.

TABLE 3

Metallurgical Resul

Project No. 5016 | Date 7-14-87 | Surface -1/2" Leach Sample ID Residue | Test No. BM-9

Product	Weight (%)	Oz/Ton			Oz/Ton			Distribution %	
		Cum Wt. %	Au	Ag		Au	Ag	Au	Ag
+ 1/2"	1.97	1.97	0.182	0.24		0.0036	0.005	12.9	4.4
+ 3 Mesh	22.40	24.37	0.036	0.13		0.0081	0.029	29.1	25.7
+ 6 Mesh	26.76	51.13	0.032	0.09		0.0086	0.024	30.8	21.2
+ 10 Mesh	17.18	68.31	0.032	0.16		0.0055	0.027	19.7	23.9
+ 20 Mesh	11.99	80.30	0.013	0.06		0.0016	0.007	5.7	6.2
+ 35 Mesh	8.46	88.76	N.D.	0.10		0.0000	0.008	0.0	7.1
+ 65 Mesh	5.38	94.14	0.003	0.07		0.0002	0.004	0.7	3.5
+ 100 Mesh	2.07	96.21	N.D.	0.14		0.0000	0.003	0.0	2.7
-100 Mesh	3.79	100.00	0.007	0.15		0.0003	0.006	1.1	5.3
Head (Calc.)	100.00		0.028	0.11		0.0279	0.113	100.0	100.0
Head Assay									

Remarks:

Grinding Data

Mesh	Wt. (%)

TABLE 4

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Metallurgical Results

Project No. 5016 | Date 5-28-87 | Sample ID 1/2-inch Adit Feed | Test No.

Product	Weight (%)	Assay (Oz/Ton)			Contents			Distribution %		
		Au	Ag		Au	Ag		Au	Ag	
+ 1/2-inch	5.86	0.071	1.17		0.0042	0.0686		9.50	8.47	
- 1/2 + o/4-inch	35.77	0.024	0.81		0.0086	0.2897		19.46	35.76	
- 1/4 + 6 Mesh	24.78	0.051	0.82		0.0126	0.2032		28.51	25.08	
-6 + 10 Mesh	11.51	0.064	0.75		0.0074	0.0863		16.74	10.65	
-10 + 20 Mesh	8.71	0.060	0.75		0.0052	0.0653		11.76	8.06	
-20 + 35 Mesh	5.01	0.054	0.65		0.0027	0.0326		6.11	4.02	
-35 + 65 Mesh	4.79	0.038	0.77		0.0018	0.0369		4.07	4.55	
-65 + 100 Mesh	1.01	0.066	0.74		0.0007	0.0075		1.59	0.92	
-100 Mesh	2.56	0.038	0.78		0.0010	0.0200		2.26	2.49	
Totals	100.00	0.044	0.81		0.0442	0.8101		100.00	100.00	

Remarks:

Grinding Data

Mesh	Wt. (%)

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TABLE 5

Metallurgical Result

Project No. 5016 | Date 7-14-86 | Acid -1/2" Leach Sample ID Residue | Test No. BM-12

Product	Weight (%)	Oz/Ton			Oz/Ton		Distribution %		
		Cum Wt. %	Au	Ag		Au	Ag	Au	Ag
+ 1/2"	3.24	3.24	0.010	0.94		0.0003	0.030	0.9	4.6
+ 3 Mesh	28.95	32.19	0.031	0.75		0.0090	0.217	26.5	33.5
+ 6 Mesh	24.83	57.02	0.047	0.80		0.012	0.199	35.4	30.7
+ 10 Mesh	16.17	73.19	0.044	0.70		0.0071	0.113	20.9	17.5
+ 20 Mesh	10.28	83.47	0.032	0.74		0.0033	0.001	9.7	0.2
+ 35 Mesh	6.72	90.19	0.022	0.55		0.0015	0.037	4.4	5.7
+ 65 Mesh	4.03	94.23	0.011	0.58		0.0004	0.023	1.2	3.6
+ 100 Mesh	1.70	95.92	0.008	0.53		0.0001	0.009	0.3	1.4
- 100 Mesh	4.08	100.00	0.004	0.45		0.0002	0.018	0.7	2.8
Head (Calc.)	100.00		0.034	0.65		0.0339	0.647	100.0	100.0
Head Assay									

Remarks:

Grinding Data

Mesh	Wt. (%)

SECTION 3

RECOMMENDATIONS

The grade of material tested, as well as, the rate and degree of gold extraction at minus 10 mesh warrants additional investigation on more representative samples from the deposit.

1.) If the grade of the deposit will sustain the cost of vat leaching then samples of the ore should be evaluated for that process.

2.) If vat leaching is not an economical process, due to grade of the ore, then testing of material crushed to minus 10 mesh and agglomerated with cement for heap leaching should be investigated.

SECTION 4

SAMPLE PREPARATION AND ASSAYS

Sample Preparation

On May 15, 1987, MSRDI received 32 bags of samples, 12 bags identified as "S" or surface samples and 20 bags identified as "A" or adit samples.

Surface Samples

The 12 bags of samples were each marked separately as follows:

S1 - 4 Samples marked 1 through 4
S2 - 4 Samples marked 1 through 4
S3 - 4 Samples marked 1 through 4

Each of the 12 samples were prepared separately as follows:

1. Sample was weighed and weight recorded.
2. Sample was crushed to all passing 1/2-inch.
3. Sample was mixed through a riffle-splitter and an assay sample split out.
4. Based on assay results the 12 individual samples were composited into one (1) sample.
5. Composite sample was mixed using standard cone and quartering procedures and a 75 pound sample was split at 1/2-inch.
6. Balance of sample was crushed to all passing 1/4-inch, crushed material was mixed through a riffle splitter and a 100 pound sample removed at minus 1/4-inch.
7. Remainder of minus 1/4-inch material was crushed to all passing 10 mesh, mixed through a riffle splitter and a 75 pound sample removed.
8. Remainder of minus 10 mesh material was bagged and saved.
9. A composite sample was sized and assayed over the range, plus 1/2-inch to minus 100-mesh (Refer to Table 2 for results).

Adit Sample

The Adit sample consisted of 4 individual samples of 5 bags each or 20 bags total. Samples were identified as follows:

A1 - 5 bags
A2 - 5 bags
A3 - 5 bags
A4 - 5 bags

Each of the 4 samples were weighed, crushed to minus 1/2-inch and an assay sample removed as detailed under Surface sample. Based on assay results, samples A2, A3 and A4 were composited into one (1) sample. Sample A1 was omitted because of low assay results.

Composite sample was processed through crushing and screening in the same manner as the Surface sample except that 100 pound aliquots of minus 1/2-inch and minus 1/4-inch was removed and 75 pounds of minus 10 mesh. Remainder of material at minus 10 mesh was bagged and saved. A composite sample was sized and assayed over the range, plus 1/2-inch to minus 100-mesh (Refer to Table 4 for results).

Test Samples

The various size fractions of both samples were each split into test charges after being mixed through a riffle splitter as follows:

1/2-inch fractions
- 5 pounds for assay screen analysis
- 5 pounds for bottle leach test
- 45 pounds for column leach test
- 20 or 45 pound remainder - bagged and saved

1/4-inch fractions
- 5 pounds for bottle leach test
- 45 pounds for column leach test
- 50 pound remainder - bagged and saved

Minus 10 mesh fraction
- 1000 grams for head assay
- 500 grams for bottle leach test
- 3-500 gram charges for grind test and one (1) bottle leach test
- 45 pounds for column leach test
- 50 pounds - combine with minus 10 mesh from crushing and screening

Column Leach Residues

After column leach test was terminated and residue water washed for 6 days the residue was removed from the column, oven dried and weighed. Dried residue was mixed through a riffle splitter and 1/2 removed for assay. Remaining 1/2 split was bagged and saved. The assay sample was crushed to minus 10 mesh, riffle mixed and split into 2 portions. A 500 gram sample was split from each portion and prepared for assay. Thus, 2 separate pulps were submitted for analysis from each column test.

An assayed screen analysis was made on the 1/2-inch leached residue. A 1000 gram sample was split from each residue for this purpose.

SECTION 5

BOTTLE LEACH TESTS

Summary of Bottle Leach Tests

A bottle leach was performed on each composite sample at 4 different particle sizes; minus 1/2 inch, minus 1/4-inch, minus 10 mesh and minus 80 mesh. Details and results of these tests are reported on test data sheets BM-1 through BM-8.

Summary of Surface Sample Tests

Particle Size	Calculated Head		Extraction (%) 48 Hrs.		102 Hrs.	
	Au	Ag	Au	Ag	Au	Ag
-1/2-inch	0.048	0.12	43.51	22.31	47.70	24.81
-1/4-inch	0.039	0.14	51.91	19.55	56.74	20.92
-10 Mesh	0.097	0.13	65.28	48.92	73.06	51.96
-80 Mesh	0.104	0.15	99.05	72.81	99.03	72.68

Summary of Adit Sample Tests

Particle Size	Calculated Head		Extraction (%) 48 Hrs.		102 Hrs.	
	Au	Ag	Au	Ag	Au	Ag
-1/2-inch	0.051	0.75	39.05	8.80	60.55	13.68
-1/4-inch	0.053	0.87	40.45	7.83	51.35	10.99
-10 Mesh	0.053	0.76	56.05	10.81	66.48	11.43
-80 Mesh	0.061	0.76	96.63	36.44	96.70	36.95

STANDARD CYANIDE TEST FOR GOLD AND SILVER ORE SAMPLES (500 Gram Sample)

Equipment:	1 Tared Gallon Bottle, Narrow Mouth 1 Laboratory Rod or Ball Mill 1 Laboratory Rolls
Sample:	Weight - 500 grams
Reagents:	Sodium Cyanide 0.50 gms. = 2 lbs./ton Ore Calcium Oxide To maintain pH 10.5 - 11.0

Method 1 - No Grinding

1. Crush sample to required particle size.
2. Blend sample and split out a representative sample weighing 500 grams.
3. Place 500 grams in gallon bottle.
4. Add 500 milliliters of water to give 50% solids.
5. Add 0.50 grams calcium oxide - swirl mixture, sample and check pH.

   0.50 grams CaO = 2 lbs./ton ore)

   0.50 grams CaO = 2 lbs./ton solution)
6. Add 0.50 grams sodium cyanide - swirl mixture

   Tonnage equivalents same as CaO.
7. Place bottle on rolls - agitate 30 minutes.
8. Remove bottle from rolls - let solids settle - pipet 10 mls of clear solution for titration - measure and record pH of slurry.
9. Titrate solution sample for CaO and NaCN content.
10. Add reagents if required to maintain minimum levels:

    CaO = 0.1 lb./ton solution (pH 10.5 - 11.0)
    NaCN = 2.0 lb./ton solution

11. After reagent adjustments, if required, return bottle to rolls.

NOTE: If reagent adjustment was required, repeat Steps 8 through 11 as frequently as necessary until reagent consumption ceases.

12. Roll bottle for a total elapsed time of 24 or 48 hours or whatever time is desired.

13. (a) At end of leach period, transfer slurry to filter (do not wash bottle at this point), filter solution from solids, save filtrate.

    (b) Intermediate samples, for Au and Ag analysis, may be removed at desired time periods per Step 8.

14. Wash all solids from bottle into filter and wash filter cake using approximately 200 mls fresh water in three stages on top of cake. Save wash filtrate.

15. Dry filter cake, weigh, prepare for assay.

16. Strong filtrate (pregnant solution) measure volume, titrate sample for CaO and NaCN content, assay sample for Au and Ag content.

17. Record volume of wash solution, assay sample for Au and Ag.

18. Gold and Silver Calculations (Metallurgical Balance)

    Solution: Au or Ag Content

    Example

Product	Wt./Vol.	% Wt.	Assay (Oz./Ton) Au	Assay (Oz./Ton) Ag	Content Au	Content Ag
Pregnant Solution	500 mls		0.11			
Wash Solution	600 mls		0.02			
Residue	500.0 gms		0.05			

Determine % Wt.:

Use residue as 100%

Pregnant Solution: $\frac{500}{500.0} \times 100 = 100.0\%$ of residue weight

Wash Solution: $\frac{600}{500.0} \times 100 = 120.0\%$ of residue weight

Determine Content:

$\frac{\%\ Wt.}{100} \times$ Assay = Units

Pregnant Solution	1.00 x 0.11 = 0.1100	0.1340
Wash Solution	1.200 x 0.02 = 0.0240	
Residue	1.00 x 0.05 = 0.0500	
Calculated head		0.1840 or 0.18 oz. Au/ton

Total Units = Calculated Head Assay of Test Sample

Extraction (%):

$\frac{\text{Solution Content}}{\text{Calculated Head}} \times 100 = \%$ Extraction

$\frac{0.1340}{0.1840} \times 100 = 72.83\%$

Method 2 - Grind Sample

1. Crush sample to all minus 10-mesh screen size.
2. Blend sample and split out a representative sample weighing 500 grams.
3. Place 500 gram test charge into a laboratory rod or ball mill. Add -300 milliliters of tap water to yield 62.5% solids. Grind to desired fineness usually until 5 to 10% of the solids is retained on a 65-mesh screen.
4. Discharge contents of mill into a tared 1-gallon bottle.
5. Let solids settle until enough clear solution can be siphoned off to leave 1000 grams of slurry in bottle (equivalent to 500 grams solids, 500 grams water or 50% solids).
6. Steps 5 through 18 same as Method 1.

STANDARD CYANIDE TEST FOR GOLD AND SILVER ORE SAMPLES (1000 Gram Sample)

Equipment: 1 Tared Gallon Bottle, Narrow Mouth
1 Laboratory Rod or Ball Mill
1 Laboratory Rolls

Sample: Weight - 1000 grams

Reagents: Sodium Cyanide 1.00 gms = 2 lbs./ton Ore
Calcium Oxide To maintain pH 10.5 - 11.0

Method 1 - No Grinding

1. Crush sample to required particle size.
2. Blend sample and split out a representative sample weighing 1000 grams.
3. Place 1000 grams in gallon bottle.
4. Add 1000 milliliters of water to give 50% solids.
5. Add 1.00 grams calcium oxide - swirl mixture, sample and check pH.

   (1.00 grams CaO = 2 lbs./ton ore)

   (1.00 grams CaO = 2 lbs./ton solution)
6. Add 1.00 grams sodium cyanide - swirl mixture.

   Tonnage equivalents same as CaO.
7. Place bottle on rolls - agitate 30 minutes.
8. Remove bottle from rolls - let solids settle - pipet 10 mls of clear solution for titration - measure and record pH of slurry.
9. Titrate solution sample for CaO and NaCN content.
10. Add reagents if required to maintain minimum levels:

    CaO = 0.1 lb./ton solution (pH 10.5-11.0)
    NaCN = 2.0 lb./ton solution

mountain states research & development, inc. 72 Hr. Bottle Leach 80M **Cyanidation Test Log**

Project No. 5016	Date 5-26-87	Sample ID 80M Surface Sample Weight 500 gms	Test No. BM-1

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions				Reagent Addition			Solution Strength	
	Time Mins.	Solids (%)	pH	Temp.	Lbs./Ton Ore CaO	Lbs./Ton Ore NaCN		Lbs./Ton Soln. CaO	Lbs./Ton Soln. NaCN
Grind	125	67			1.00				
Condition	0	50	9.3		1.00				
	15	50	11.2						
	30	50	11.2					0.25	
Cyanidation	Hours 0	50	11.2			1.00			
	0.25	50	11.2					0.25	0.95
	24	50	10.7					0.20	0.90
	48	50	10.7					0.15	0.90
	72	50	10.4					0.05	0.90
Reagent Consumption	120	50	10.4					0.05	0.90

Remarks: Residue: Assay Total Weight
3-500 ml. washes of plain H_2O

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Assays (Oz./Ton) Ag	Contents (Oz./Ton) Au	Contents (Oz./Ton) Ag	Distribution (%) Au	Distribution (%) Ag
24 Hr. Preg.	96.0	0.103	0.108	0.0989	0.1037	95.37	70.83
48 Hr. Preg.	96.0	0.107	0.111	0.1027	0.1066	99.04	72.81
72 Hr. Preg.	96.0	0.105	0.108	0.1008	0.1037	97.20	70.83
120 Hr. Preg.	96.0	0.107	0.109	0.1027	0.1064	99.03	72.68
Leach Residue	100.0	0.001	0.040	0.0010	0.0400	0.97	27.32
Head (Calc.)		0.104	0.146	0.1037	0.1464	100.00	
Head Assay		0.065	0.110				

Remarks: Procedure: Grind 500 gms -10M - 23.5 Mins. with 500 mls water and 0.25 gms CaO. Thicken Mill Discharge to 50% solids - 1000 gm slurry wt. Check pH add CaO to pH 10.5-11.0 Check pH every 15 mins and titrate CaO until pH stabilizes for 30 mins. Add 0.25 gms NaCN - check every 15 mins until NaCN stable at 1.0 #/Ton for 30 min.

Screen Analysis Residue
Mesh (%)

Sample 24, 48, 72 hours - Assay Au, As, CaO, NaCN

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Cyanidation Test Lo

Project No. 5016 | Date 5-26-87 | Sample ID -10 M Surface Sample Weight 500 gms | Test No. BM-2

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions: Time Mins.	Solids (%)	pH	Temp.	Reagent Addition: Lbs./Ton Ore CaO	NaCN	Solution Strength: Lbs./Ton Soln. CaO	NaCN
Condition	0	50	8.1		2.00			
	15	50	10.2		1.00		0.05	
	30	50	11.6				0.55	
Cyanidation	Hours 0	50	11.6			1.00		
	0.50	50	11.6				0.45	1.05
	24	50	10.9				0.20	0.95
	48	50	10.3				0.10	0.90
	72	50	9.8				0.05	0.30
	120	50	9.5				0.05	0.65
Reagent Consumption					2.95	0.35	-	

Remarks: Residue - Assay total weight
3-500 ml. washes of plain H_2O.

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Ag	Contents (Oz./Ton) Au	Ag	Distribution (%) Au	Ag
24 Hr. Preg.	94.0	0.058	0.056	0.0545	0.0526	56.48	42.11
48 Hr. Preg.	94.0	0.067	0.065	0.0630	0.0611	65.28	48.92
72 Hr. Preg.	94.0	0.070	0.065	0.0658	0.0611	68.19	48.92
120 Hr. Preg.	94.0	0.075	0.069	0.0705	0.0649	73.06	51.96
Leach Residue	100.0	0.026	0.060	0.0260	0.0600	26.94	48.04
Head (Calc.)		0.097	0.125	0.0965	0.1249	100.00	100.00
Head Assay		0.065	0.110				

Remarks: Procedure:
500 gms -10 Mesh Sample
500 mls Tap Water
Add Lime - Agitate 15 minutes
Every 15 min. check pH and titrate CaO.
Maintain pH 10.5 - 11.0 for 30 minutes
When pH is stabilized start adding NaCN.
Cyanide - add 0.25 gms check every 30 minutes until stable.
Maintain 1 #/T in soln.

Screen Analysis Residue
Mesh (%)

Samples 24, 48, 72 ...

mountain states research & development, inc.

Cyanidation Test Lo:

Project No. 5016	Date 5-26-87	Sample ID -1/4" Surface Sample Weight 1000 gms	Test No. BM-3

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions: Time Mins.	Conditions: Solids (%)	Conditions: pH	Conditions: Temp.	Reagent Addition:	Reagent Addition: Lbs./Ton Ore CaO	Reagent Addition: Lbs./Ton Ore NaCN	Reagent Addition:	Solution Strength: Lbs./Ton Soln. CaO	Solution Strength: Lbs./Ton Soln. NaCN	
Condition	0	50	8.0			1.00					
	15	50	11.3								
	30	50	11.3						0.25		
Cyanidation	Hours 0	50	11.3				2.00		0.20	2.05	
	0.50	50	11.3						0.20	2.05	
	24	50	10.0			0.50			N.D.	2.0	
	48	50	10.1			0.50			0.10	1.65	
	72	50	10.3						0.05	1.55	
	120	50	9.7						0.05	1.35	
Reagent Consumption						1.95	0.65				

Remarks: Residue: Split out 1/2 for Assay
3-100 ml washes of plain H_2O.

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Assays (Oz./Ton) Ag	Contents (Oz./Ton) Au	Contents (Oz./Ton) Ag	Distribution (%) Au	Distribution (%) Ag
24 Hr. Preg.	97.0	0.018	0.024	0.0175	0.0233	44.53	16.73
48 Hr. Preg.	97.0	0.021	0.028	0.0204	0.0272	51.91	19.55
72 Hr. Preg.	97.0	0.022	0.028	0.0213	0.0272	54.20	19.55
120 Hr. Preg.	97.0	0.023	0.030	0.0223	0.0291	56.74	20.92
Leach Residue	100.0	0.017	0.110	0.0170	0.1100	43.26	79.08
Head (Calc.)		0.039	0.139	0.0393	0.1391	100.00	100.00
Head Assay		0.065	0.110				

Remarks: Procedure:
1000 gms -1/4" Sample
1000 mls - Tap Water
Add lime agitate 15 mins.
Every 15 mins. check pH and titrate CaO
Maintain pH 10.5-11.0 for 30 minutes
when pH stabilzes start adding NaCN
Cyanide - Add 1.0 gms check every 30 minutes until stable
Maintain 1#/Ton Soln. NaCN

Sample 24, 48, 72 hours assay for Au, Ag, CaO, NaCN

Screen Analysis Residue

Mesh	(%)

mountain states research & development, inc.

Cyanidation Test L

Project No. 5016 | Date 5-26-87 | Sample ID -1/2" Surface | Sample Weight 2000 gms | Test No. BM-4

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions: Time Mins.	Solids (%)	pH	Temp.	Reagent Addition: Lbs./Ton Ore CaO	NaCN	Solution Strength: Lbs./Ton Soln. CaO	NaCN
Condition	0	50	7.7		1.0			
	15	50	11.4					
	30	50	11.3				0.25	
	Hours 0	50	11.3			1.0		
	0.50	50	11.3				0.25	1.00
	24	50	10.2		0.10		0.15	1.0
	48	50	10.0		0.25		0.10	0.85
	72	50	10.0				0.05	0.85
	120	50	9.6				0.05	0.80
Reagent Consumption					1.30	0.20		

Remarks: Leach Tails: 1/2 - For Assay
1/2 - Save "As Is"
3-1000 ml. washes of plain H_2O

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Ag	Contents (Oz./Ton) Au	Ag	Distribution (%) Au	Ag
24 Hr. Preg.	99.0	0.018	0.022	0.0178	0.0218	37.24	18.21
48 Hr. Preg.	99.0	0.021	0.027	0.0208	0.0267	43.51	22.31
72 Hr. Preg.	99.0	0.022	0.028	0.0218	0.0277	45.61	23.14
120 Hr. Preg.	99.0	0.023	0.030	0.0228	0.0297	47.70	24.81
Leach Residue	100.0	0.025	0.090	0.0250	0.0900	52.30	75.19
Head (Calc.)		0.048	0.120	0.0478	0.1197	100.00	100.00
Head Assay		0.065	0.110				

Remarks: Procedure: 2000 gms -1/2" Sample
2000 mls - Tap Water
Add Lime - agitate 15 minutes
Every 15 mins. check pH and titrate CaO
Maintain pH 10.5 - 11.0 for 30 minutes
When pH is stabilized start adding NaCN
Cyanide - Add 1.0 gms check every 30 minutes until stable - Maintain 1#/Ton in soln.
Sample 24, 48, 72 hours - assay for Au, Ag, CaO, NaCN

Screen Analysis Residue

Mesh	(%)

mountain states research & development, inc.

Cyanidation Test Lo

Project No. 5016	Date 5-26-87	Sample ID -30M Adit Sample Weight 500 gms	Test No. BM-5

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions				Reagent Addition			Solution Strength		
	Time Mins.	Solids (%)	pH	Temp.		Lbs./Ton Ore CaO	Lbs./Ton Ore NaCN		Lbs./Ton Soln. CaO	Lbs./Ton Soln. NaCN
Grind	125	67				1.00				
Condition	0	50	9.2			1.00				
	15	50	11.0							
	30	50	11.0						0.20	
Cyanidation	Hours 0	50	10.9				1.00			
	0.25	50	10.5						0.20	0.90
	24	50	10.5			0.40			0.15	0.90
	48	50	10.9						0.20	0.85
	72	50	10.7						0.10	0.85
Reagent Consumption			10.6			2.30	0.15		0.10	0.85

Remarks: Residue: Assay Total Weight
3-500 ml. washes of plain H_2O

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Assays (Oz./Ton) Ag	Contents (Oz./Ton) Au	Contents (Oz./Ton) Ag	Distribution (%) Au	Distribution (%) Ag
24 Hr. Preg.	96.0	0.060	0.285	0.0576	0.2736	95.05	35.9
48 Hr. Preg.	96.0	0.061	0.289	0.0586	0.2774	96.70	36.4
72 Hr. Preg.	96.0	0.060	0.289	0.0576	0.2774	95.05	36.4
120 Hr. Preg.	96.0	0.061	0.293	0.0586	0.2813	96.70	36.9
Leach Residue	100.0	0.002	0.480	0.0020	0.4800	3.30	63.0
Head (Calc.)		0.061	0.761	0.0606	0.7613	100.00	100.0
Head (Assay)		0.052	0.770				

Remarks: Procedure: Grind 500 gms -10M - 12.5 mins. with 500 mls water and 0.25 gms CaO
Thicken Mill Discharge to 50% solids - 1000 gms slurry wt.
Check pH add CaO to pH 10.5-11.0 check pH every 15 mins and titrate CaO until pH stabilizes for 30 mins. Add 0.25 gms NaCN - check every 15 mins until NaCN stable at 1.0 #/Ton for 30 min.

Sample 24, 48, 72 hours - Assay Au, As, CaO, NaCN

Screen Analysis Residue
Mesh (%)

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Cyanidation Test Log

Project No. 5016 | Date 5-26-87 | Sample ID -1/4" Adit | Sample Weight 1000 gms | Test No. BM-7

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions: Time Mins.	Solids (%)	pH	Temp.	Reagent Addition: Lbs./Ton Ore CaO	NaCN	Solution Strength: Lbs./Ton Soln. CaO	NaCN
Condition	0	50	7.9		1.00			
	15	50	11.4					
	30	50	11.3					
Cyanidation	hours 0	50	11.2				0.25	
	0.50	50	11.2			2.00		
	24	50	10.1				0.20	1.85
	48	50	10.3		0.50		0.05	1.70
	72	50	10.1		0.20		0.10	1.60
	120	50	9.7				0.05	1.55
Reagent Consumption							0.05	1.35
					1.65	0.65		

Remarks: Residue: Split out 1/2 for assay
Save 1/2 "As Is"
3-1000 ml washes of plain H2O

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Ag	Contents (Oz./Ton) Au	Ag	Distribution (%) Au	Ag
24 Hr. Preg.	98.0	0.018	0.055	0.0176	0.0539	32.96	6.23
48 Hr. Preg.	98.0	0.022	0.069	0.0216	0.0677	40.45	7.83
72 Hr. Preg.	98.0	0.024	0.077	0.0235	0.0755	44.01	8.73
120 Hr. Preg.	98.0	0.028	0.097	0.0274	0.0951	51.31	10.99
Leach Residue	100.0	0.026	0.770	0.0260	0.7700	48.69	89.01
Head (Calc.)		0.053	0.865	0.0534	0.8651	100.00	100.00
Head Assay		0.052	0.770				

Remarks: Procedure: 1000 gms -1/4" Sample
1000 mls - Tap Water
Add lime - agitate 15 mins.
Every 15 mins. check pH and titrate CaO
Maintain pH 10.5-11.0 for 30 minutes
When pH stabilizes start adding NaCN
Cyanide - add 1.0 gms check every 30 minutes until stable
maintain 1 #/Ton soln. NaCN

Sample 24, 48, 72 hours assay for Au, Ag, CaO, NaCN

Screen Analysis Residue
Mesh (%)

mountain states research & development, inc.

Cyanidation Test Lc

Project No. 5016 | Date 5-26-87 | Sample ID -1/2" Adit, Sample Weight 2000 gms | Test No. BM-8

CONDITIONS AND REAGENTS

POINT OF ADDITION	Conditions: Time Mins.	Solids (%)	pH	Temp.	Reagent Addition: Lbs./Ton Ore CaO	NaCN	Solution Strength: Lbs./Ton Soln. CaO	NaCN
Condition	0	50	7.8		1.0			
	15	50	11.3					
	30	50	11.2				0.20	
	Hours							
Cyanidation	0	50	11.2			1.0		
	0.50	50	11.1				0.15	1.00
	24	50	9.9		0.25		0.05	0.95
	48	50	10.0		0.25	0.35	N.D.	0.65
	72	50	9.9					
	120	50	9.6				0.05	1.00
Reagent Consumption					1.45	0.35		

Remarks: Leach Tails: 1/2 - For assay
1/2 - Save "As Is"
3-1000 ml. washes of plain H_2O

METALLURGICAL RESULTS

PRODUCT	Weight (%)	Assays (Oz./Ton) Au	Ag	Contents (Oz./Ton) Au	Ag	Distribution (%) Au	Ag
24 Hr. Preg.	99.0	0.018	0.054	0.0178	0.0535	35.11	7.1
43 Hr. Preg.	99.0	0.020	0.067	0.0198	0.0663	39.05	8.8
72 Hr. Preg.	99.0	0.023	0.075	0.0228	0.0743	44.97	9.8
120 Hr. Preg.	99.0	0.031	0.104	0.0307	0.1030	60.55	13.6
Leach Residue	100.0	0.020	0.650	0.0200	0.6500	39.45	86.3
Head (Calc.)		0.051	0.753	0.0507	0.7530	100.00	100.0
Head Assay		0.052	0.770				

Remarks: Procedure:
2000 gms -1/2" sample
2000 mls - Tap Water
Add lime
Every 15 mins. check pH and titrate CaO
Maintain pH 10.5 - 11.0 for 30 minutes
When pH is stabilized start adding NaCN
Cyanide - add 1.0 gms check every 30 minutes until stable - Maintain 1 #/Ton in soln.

Screen Analysis Residue
Mesh (%)

SECTION 6

COLUMN LEACH TESTS

Summary of Column Leach Tests

A column leach test was performed on each composite sample at 3 different particle sizes; minus 1/2-inch, minus 1/4-inch and minus 10 mesh. Details and results of these tests are reported on test data sheets BM-9 through BM-14.

Summary of Surface Sample Tests

Particle Size	Calculated Head Oz/Ton		Extraction (%) 2 Days		19 Days	
	Au	Ag	Au	Ag	Au	Ag
-1/2-inch	0.043	0.08	33.59	21.78	58.53	33.12
-1/4-inch	0.048	0.10	36.44	21.69	61.29	32.41
-10 Mesh	0.066	0.31	61.50	64.20	91.67	69.63

Summary of Adit Sample Tests

Particle Size	Calculated Head Oz/Ton		Extraction (%) 2 Days		19 Days	
	Au	Ag	Au	Ag	Au	Ag
-1/2-inch	0.064	0.80	31.84	2.99	53.54	4.81
-1/4-inch	0.046	0.70	30.87	4.69	49.82	6.58
-10 Mesh	0.052	0.72	53.10	10.19	77.11	13.45

TEST PROCEDURE
COLUMN LEACH TEST

Ore should be crushed to required particle size.

Ore charge: About 4000 grams for 3-inch diameter column
10,000 grams for 4-inch diameter column
63,000 grams for 8-inch diameter column

1. Set up column about 48" long, equipped with bottom drain and a screen false bottom. Arrange a solution feeding system to deliver 0.0045 GPM/sq.ft.).

2. Screen out sufficient coarse material from sample to cover bottom screen to a depth of 1" to 1 1/2".

3. Thoroughly mix the remainder of the sample with sufficient water (50 to 100 ml) to agglomerate the fines and load into column distributing particle sizes as uniformly as possible.

4. Feed to column a solution of $Ca(OH)_2$ of pH 11.0 until effluent has a pH of 10.0 to 10.5. Measure effluent, mix and sample.

5. Add 0.5 gpl NaCN (1.0 lb./ton solution) to the lime solution and continue feeding to column. Collect effluent.

   Note: If ore is known by previous test to not be acidic, somewhat better extraction results can be obtained by using the lime-cyanide solution for agglomeration and initial wetting of the ore.

6. After each 24-hour period, measure effluent, mix and sample.

7. Check NaCN and CaO levels in effluent and assay for Au and Ag. Check pH.

8. When test is to be terminated, flush column with water for 24 hours. Let drain for several hours and then measure, mix and sample washing.

9. Dump contents of column into a tared pan and wash all solids from screen and column into pan.

10. Dry in oven, weigh and sample.

11. Calculations:

* Contents of Daily Effluents

$$\frac{\text{Vol. Effluent}}{\text{Weight of Ore Sample}} \times \text{Assay} = \text{Contents}$$

Distribution (%) or Extraction (%)

$$\frac{\text{Contents}}{\text{Assay Head}} \times 100 = \text{Extraction (\%)}$$

* Specific gravity of effluent assumed to be 1.00

MOUNTAIN STATES RESEARCH & DEVELOPMENT

CYANIDE COLUMN LEACH LOG-30 Day Test

Job No 5016 Feed Siz-1/2 Inc Weight 10000

Date 6/8/87 Test No. BM-9

Surface Sample

Leach Solution(Lbs/Ton) NaCN 2.20 CaO 0.50

Date/Day	Pregnant Solution Vol	pH	NaCN #/T	CaO #/T	Assays (oz/Ton) Au	Ag	Contents Au	Ag	Distribution (%) Daily Au	Ag	Accumulated Au	Ag
n Calc. Head					0.043	0.082						
6/12-1	1960	11.3	1.2	0.8	0.04	0.059	0.0079	0.0124	16.57	12.34	16.57	12.34
13-2	2025	11.2	2.2	0.6	0.033	0.031	0.0095	0.0084	19.88	8.76	36.44	21.69
14-3	1920	11.1	2.2	0.5	0.017	0.013	0.0040	0.0031	8.31	3.26	44.75	24.95
15-4	1940	11.2	2	0.35	0.01	0.007	0.0019	0.0014	4.08	1.48	48.84	26.43
16-5	2110	11.1	2	0.2	0.006	0.004	0.0014	0.0011	2.84	1.18	51.68	27.61
17-6	2060	11.1	1.95	0.25	0.003	0.003	0.0009	0.0007	1.86	0.69	53.55	28.30
18-7	2120	11	2	0.15	0.002	0.003	0.0005	0.0007	0.38	0.73	54.52	29.03
19-8	2160	11.1	1.35	0.15	0.002	0.002	0.0004	0.0007	0.91	0.68	55.44	29.71
22-11	6600	10.8	1.9	0.1	0.002	0.001	0.0013	0.0007	2.73	0.68	58.17	30.39
23-12	2180	11	2	0.2	0.001	0.001	0.0002	0.0002	0.45	0.23	58.62	30.62
24-13	2220	11.2	1.9	0.25	0.001	0.001	0.0002	0.0002	0.45	0.23	59.07	30.84
25-14	2180	11.2	1.9	0.3	0.001	0.001	0.0002	0.0002	0.44	0.22	59.52	31.06
26-15	2200	11.2	1.95	0.25	0.001	0.001	0.0002	0.0002	0.46	0.23	59.97	31.29
29-18	6430	10.3	2	0.15	0.001	0.001	0.0006	0.0006	1.32	0.65	61.29	31.95
30-19	2480	11.1	2	0.25	0	0.002	0.0000	0.0002	0.00	0.24	61.29	32.18
7/1-W1	2290	11.1	0.8	0.25	0	0.001	0.0000	0.0002	0.00	0.22	61.29	32.41
2-W2	2010	10.7	0	0.1	0	0	0.0000	0.0000	0.00	0.00	61.29	32.41
6-W6	6280	8.2	0	0	0	0	0.0000	0.0000	0.00	0.00	61.29	32.41
Residue	9961.4				0.018	0.055	0.0185	0.0648	38.71	67.59	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
Totals							0.0477	0.0959				
Reagent Consumption(#/T)			0.85	0.91								

MOUNTAIN STATES RESEARCH & DEVELOPMENT
CYANIDE COLUMN LEACH LOG-30 Day Test

Job No 5016 Feed Siz-1/4Inch Weight 10000
Date 6/8/87 Test No. BM-10 Head AssAssays(oz/Ton)
Surface Sample

	Au	Ag
Calc. Head	0.048	0.096

Leach Solution(Lbs/Ton)

NaCN	CaO
2.20	0.50

Date/Day	Pregnant Solution Vol	pH	NaCN #/T	CaO #/T	Au	Ag	Contents Au	Contents Ag	Distribution (%) Daily Au	Daily Ag	Accumulated Au	Accumulated Ag
6/12-1	1880	11.4	1	0.9	0.042	0.066	0.0078	0.0116	18.13	14.12	18.13	14.12
13-2	2153	11.3	2.1	1	0.044	0.033	0.0067	0.0063	15.46	7.66	33.59	21.78
14-3	2085	11.3	2.2	0.8	0.019	0.015	0.0033	0.0025	7.55	3.05	41.14	24.33
15-4	1770	11.4	2.05	0.45	0.011	0.008	0.0019	0.0014	4.49	1.66	45.62	26.48
16-5	2260	11.3	2	0.3	0.006	0.005	0.0013	0.0008	2.93	1.03	48.55	27.51
17-6	2220	11.2	2	0.3	0.004	0.003	0.0006	0.0006	1.43	0.75	49.98	28.27
18-7	2330	11	1.95	0.35	0.002	0.003	0.0004	0.0006	0.98	0.78	50.96	29.05
13-8	2180	11.1	1.95	0.2	0.002	0.003	0.0004	0.0004	1.00	0.53	51.96	29.57
22-11	6500	11.1	1.9	0.2	0.002	0.001	0.0013	0.0007	3.05	0.31	55.01	30.38
23-12	2160	11.1	2	0.2	0.001	0.001	0.0002	0.0002	0.50	0.27	55.52	30.64
24-13	2160	11.2	1.9	0.3	0.001	0.001	0.0002	0.0002	0.51	0.27	56.03	30.92
25-14	2110	11.2	1.9	0.3	0.001	0.001	0.0002	0.0002	0.50	0.27	56.53	31.18
26-15	2180	11.2	1.9	0.25	0.001	0.001	0.0002	0.0002	0.51	0.27	57.04	31.45
29-18	6230	11.1	1.9	0.15	0.001	0.001	0.0006	0.0006	1.49	0.78	58.53	32.23
30-19	2290	11.1	1.9	0.25	0	0.001	0.0000	0.0005	0.00	0.61	58.53	32.64
7/1-W1	2130	11.2	0.9	0.25	0	0.001	0.0000	0.0002	0.00	0.28	58.53	33.12
2-W2	1910	10.9	0	0.15	0	0	0.0000	0.0000	0.00	0.00	58.53	33.12
6-W6	8360	8.6	0	0.05	0	0	0.0000	0.0000	0.00	0.00	58.53	33.12
Residue	9973				0.0185	0.065	0.0179	0.0548	41.47	66.88	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
Totals							0.0432	0.0819				

Reagent Consumption(#/T) 0.97 0.51

MOUNTAIN STATES RESEARCH & DEVELOPMENT

CYANIDE COLUMN LEACH LOG-30 Day Test

Job No 5016 Feed Siz -10 M Weight 10000

Date 6/8/87 Test No. BM-11

Surface Sample

Assays (oz/Ton) Calc. Head Au 0.0657 Ag 0.3110

Leach Solution NaCN 2.20 CaO 0.50 Daily

Date/Day	Pregnant Solution Vol	pH	NaCN #/T	CaO #/T	Au	Ag	Contents Au	Contents Ag	Distribution (%) Daily Au	Daily Ag	Accumulated Au	Accumulated Ag
6/12-1	2060	11.2	0.6	0.4	0.062	0.86	0.0128	0.1772	19.45	56.96	19.45	56.96
13-2	2680	11.2	2.1	0.6	0.103	0.084	0.0276	0.0225	42.05	7.24	61.50	64.20
14-3	2300	11.2	2.2	0.7	0.034	0.029	0.0078	0.0067	11.91	2.14	73.41	66.34
15-4	1980	11.4	2.1	0.45	0.019	0.013	0.0038	0.0026	5.73	0.83	79.14	67.17
16-5	2220	11.4	2	0.4	0.01	0.008	0.0022	0.0018	3.38	0.57	82.53	67.74
17-6	2260	11.4	2	0.45	0.006	0.005	0.0014	0.0011	2.07	0.36	84.59	68.10
18-7	2260	11.3	2	0.45	0.004	0.004	0.0003	0.0009	1.38	0.23	85.97	68.33
19-8	2380	11.2	2	0.35	0.003	0.003	0.0007	0.0007	1.09	0.23	87.06	68.62
22-11	7150	11.2	2	0.25	0.002	0.002	0.0014	0.0014	2.18	0.46	89.23	69.08
23-12	1780	11.2	2	0.25	0.002	0.001	0.0004	0.0002	0.54	0.06	89.78	69.14
24-13	2070	11.2	1.9	0.3	0.001	0.001	0.0002	0.0002	0.32	0.07	90.09	69.21
25-14	2120	11.2	1.9	0.3	0.001	0.001	0.0002	0.0002	0.32	0.07	90.41	69.27
26-15	2160	11.2	1.9	0.3	0.001	0.001	0.0002	0.0002	0.33	0.07	90.74	69.34
29-18	6030	11	1.95	0.2	0.001	0.001	0.0006	0.0006	0.93	0.20	91.67	69.54
30-19	1420	11	2	0.2	0	0.001	0.0000	0.0001	0.00	0.05	91.67	69.58
7/1-W1	1540	11.1	1.9	0.2	0	0.001	0.0000	0.0002	0.00	0.05	91.67	69.63
2-W2	1330	11.1	0.4	0.3	0	0	0.0000	0.0000	0.00	0.00	91.67	69.63
6-W6	8550	9.8	0	0.05	0	0	0.0000	0.0000	0.00	0.00	91.67	69.63
Residue	9941.9				0.0055	0.095	0.0055	0.0344	8.33	30.37	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
Totals							0.0657	0.3110				
Reagent Consumption			0.76	0.50								

[illegible] & DEVELOPMENT

CYANIDE COLUMN LEACH LOG-30 Day Test

Job No 5016 Feed Siz-1/2 inc Weight 10000

Date

Test No. BM-12

Adit Sample

		Au	Ag
Assays (oz/Ton)	Calc. Head	0.064	0.795

Leach Solution (Lbs/Ton)	NaCN	CaO
	2.20	0.50

Date/Day	Pregnant Solution Vol	pH	NaCN #/T	CaO #/T	Au	Ag	Contents Au	Contents Ag	Distribution (%) Daily Au	Daily Ag	Accumulated Au	Accumulated Ag
6/12-1	1780	11.2	1.2	0.4	0.05	0.122	0.0180	0.0217	27.98	2.73	27.98	2.73
13-2	2260	11.2	2.2	0.6	0.011	0.003	0.0025	0.0020	3.86	0.26	31.84	2.99
14-3	2150	11.2	2.1	0.8	0.021	0.018	0.0045	0.0033	7.02	0.43	38.86	3.47
15-4	1800	11.3	2.05	0.35	0.011	0.009	0.0020	0.0016	3.08	0.20	41.94	3.68
16-5	2220	11.3	2	0.3	0.008	0.006	0.0018	0.0013	2.76	0.17	44.70	3.84
17-6	2200	11.2	2	0.3	0.005	0.005	0.0011	0.0011	1.71	0.14	46.41	3.98
18-7	2220	11.1	2	0.25	0.004	0.004	0.0009	0.0009	1.38	0.11	47.79	4.09
19-8	2250	11	1.95	0.25	0.003	0.004	0.0007	0.0009	1.05	0.11	48.84	4.21
22-11	6510	10.9	2	0.15	0.002	0.002	0.0013	0.0013	2.02	0.16	50.86	4.37
23-12	2200	11	2	0.2	0.002	0.002	0.0004	0.0004	0.68	0.06	51.55	4.43
24-13	2340	11.2	1.9	0.25	0.001	0.002	0.0002	0.0005	0.36	0.06	51.91	4.48
25-14	2020	11.2	1.9	0.25	0.001	0.002	0.0002	0.0004	0.31	0.05	52.23	4.54
26-15	2260	11.2	1.95	0.25	0.001	0.002	0.0002	0.0005	0.35	0.06	52.58	4.59
29-18	6220	11.1	1.9	0.2	0.001	0.002	0.0006	0.0012	0.97	0.16	53.54	4.75
30-19	2400	11.1	2	0.2	0	0.001	0.0000	0.0002	0.00	0.03	53.54	4.78
7/1-W1	2490	11.2	0.85	0.25	0	0.001	0.0000	0.0002	0.00	0.03	53.54	4.81
2-W2	2290	10.7	0	0.1	0	0	0.0000	0.0000	0.00	0.00	53.54	4.81
6-W5	9750	9.2	0	0.05	0	0	0.0000	0.0000	0.00	0.00	53.54	4.81
Residue	9962.1				0.03	0.76	0.0233	0.7571	46.46	95.13	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
Totals							0.0643	0.7954				
Reagent Consumption			0.80	0.74								

MOUNTAIN STATES RESEARCH & DEVELOPMENT

CYANIDE COLUMN LEACH LOG-30 Day Test

							Leach Solution (Lbs/Ton)					
Job No	5016	Feed Siz-1/4-inc	Weight		10000		NaCN	CaO				
Date	6/8/87	Test No. BM-13			Assays(oz/Ton)		2.20	0.50				
		Adit Sample			Au	Ag						
			Calc.	Head	0.046	0.697			Distribution (%)			
Date/Day	Pregnant Solution						Contents		Daily		Accumulated	
	Vol	pH	NaCN #/T	CaO #/T			Au	Ag	Au	Ag	Au	Ag
6/12-1	1820	11.2	0.9	0.4	0.052	0.151	0.0095	0.0275	20.77	3.94	20.77	3.94
13-2	2000	11.2	2.2	0.8	0.023	0.026	0.0046	0.0052	10.10	0.75	30.87	4.69
14-3	240	10.8	2.1	0.3	0.019	0.02	0.0005	0.0005	1.00	0.07	31.87	4.76
15-4	1340	11.3	2	0.5	0.021	0.024	0.0028	0.0032	6.18	0.46	38.05	5.22
16-5	2180	11.3	2	0.5	0.004	0.006	0.0009	0.0013	1.91	0.19	39.96	5.41
17-6	2160	11.4	2	0.5	0.003	0.005	0.0006	0.0011	1.42	0.15	41.39	5.56
18-7	2100	11.3	2	0.5	0.002	0.004	0.0004	0.0008	0.92	0.12	42.31	5.68
13-8	2130	11.2	1.9	0.3	0.002	0.004	0.0004	0.0009	0.94	0.12	43.24	5.81
22-11	6400	11.1	1.9	0.25	0.002	0.003	0.0013	0.0019	2.81	0.28	46.05	6.08
23-12	2200	11.2	1.9	0.25	0.002	0.002	0.0004	0.0004	0.97	0.06	47.02	6.14
24-13	2200	11.2	1.9	0.25	0.001	0.002	0.0002	0.0004	0.48	0.06	47.50	6.21
25-14	2160	11.2	1.95	0.25	0.001	0.002	0.0002	0.0004	0.47	0.06	47.98	6.27
26-15	2260	11.2	1.95	0.25	0.001	0.002	0.0002	0.0005	0.50	0.06	48.47	6.33
23-18	6160	11.1	1.9	0.15	0.001	0.002	0.0006	0.0012	1.35	0.18	49.82	6.51
30-19	2340	11.1	2	0.2	0	0.001	0.0000	0.0002	0.00	0.03	49.82	6.55
7/1-W1	2390	11.2	0.9	0.25	0	0.001	0.0000	0.0002	0.00	0.03	49.82	6.58
2-W2	2220	10.8	0	0.15	0	0	0.0000	0.0000	0.00	0.00	49.82	6.58
6-W6	9500	9.1	0	0.05	0	0	0.0000	0.0000	0.00	0.00	49.82	6.58
Residue	9938.2				0.023	0.655	0.0229	0.6510	50.18	93.42	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
							0.0000	0.0000	0.00	0.00	100.00	100.00
Totals							0.0456	0.6968				
Reagent Consumption			0.91	0.53								

MOUNTAIN STATES RESEARCH & DEVELOPMENT
SUMMARY SHEET
Cyanide Column Leach Log-30 Day Test

Job No 5016 Feed Siz-10 MeshWeight(g 10000

Date 6/8/87 Test No. BM-14

Adit Sample

Leach Solution(Lbs/ton): NaCn 2.20, CaO 0.50

Assays(oz/Ton): Calulated Head Au 0.0518, Ag 0.71942

Date/Day	Pregnant Vol	Solution pH	NaCN #/T	CaO #/T	Assays Au	Assays Ag	Contents Au	Contents Ag	Distribution (%)ted Daily Au	Daily Ag	Accumulated Au	Accumulated Ag
6/12-1	1920	11	0.3	0.2	0.055	0.231	0.01056	0.0444	20.38	6.16	20.38	6.16
13-2	2230	11	2.1	0.4	0.076	0.13	0.01695	0.0290	32.72	4.03	53.10	10.19
14-3	2140	11.1	2.2	0.5	0.017	0.025	0.00364	0.0054	7.02	0.74	60.12	10.94
15-4	1360	11.3	2.1	0.35	0.01	0.015	0.00196	0.0029	3.78	0.41	63.91	11.35
16-5	2200	11.3	2	0.3	0.005	0.011	0.00110	0.0024	2.12	0.34	66.03	11.68
17-6	2100	11.2	2	0.35	0.004	0.009	0.00084	0.0019	1.62	0.26	67.65	11.95
18-7	2150	11.2	2	0.35	0.004	0.008	0.00086	0.0017	1.66	0.24	69.31	12.19
19-8	2180	11	2	0.35	0.004	0.007	0.00087	0.0015	1.68	0.21	70.99	12.40
22-11	6960	11.2	1.95	0.25	0.002	0.004	0.00139	0.0028	2.69	0.39	73.68	12.78
23-12	2190	11.2	2	0.25	0.002	0.003	0.00044	0.0007	0.85	0.09	74.53	12.88
24-13	2210	11.3	1.9	0.3	0.001	0.003	0.00022	0.0007	0.43	0.09	74.95	12.97
25-14	2160	11.3	1.9	0.2	0.001	0.003	0.00022	0.0006	0.42	0.09	75.37	13.06
26-15	2170	11.3	1.9	0.25	0.001	0.003	0.00022	0.0007	0.42	0.09	75.79	13.15
29-18	6830	11.1	2	0.2	0.001	0.002	0.00068	0.0014	1.32	0.19	77.11	13.34
7/1-W1	2160	11.2	1.5	0.2	0	0.002	0.00000	0.0004	0.00	0.06	77.11	13.40
2-W2	1950	11.1	0	0.3	0	0.002	0.00000	0.0004	0.00	0.05	77.11	13.45
6-W6	8300	9.7	0	0.05	0	0	0.00000	0.0000	0.00	0.00	77.11	13.45
Residue	9883.2				0.012	0.63	0.01186	0.6226	22.89	86.55	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
							0.00000	0.0000	0.00	0.00	100.00	100.00
									0.00	0.00	100.00	100.00
Totals							0.05180	0.7194				
Reagent Comsumption			0.81	0.70								

YLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

INVOICE
NET 30 DAYS

JOB NO.TCU 021
April 30, 1982
SHIPMENT NO. MER-4

MERIDIAN LAND & MINERAL COMPANY
Attn.: Mr. Doug Grisham
1074 Sycamore, #35
Kingman, Arizona 86401

Analysis of 54 Rock Samples

54	Au(ppm) @ $ 4.10	$	221.40
54	Ag(ppm) @ $ 2.50	$	135.00
30	Cu(ppm) @ $ 1.58*	$	60.04
30	Pb(ppm) @ $ 1.58*	$	60.04
30	Zn(ppm) @ $ 1.58*	$	60.04
30	Mn(ppm) @ $ 5.00	$	190.00
3	SPEC @ $16.00	$	48.00
54	Samples crushed, split and pulverized @ $ 3.60	$	194.40
	Sub-Total		968.92
	Freight charges	$	58.85
	Pick up charges	$	4.00
	TOTAL		$1031.77

* Multiple element discount

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TCU 021
April 30, 1982
SHIPMENT NO. MER-4

MERIDIAN LAND & MINERALS
Attn.: Mr. Doug Grisham
1074 Sycamore, #35
Kingman, Arizona 86401

Analysis of 54 Rock Samples

ITEM	SAMPLE NO.	Au ppm	Ag ppm
1	AC2-105	<.02	<.2
2	AC2-110	<.02	<.2
3	AC2-115	<.02	<.2
4	AC2-120	<.02	<.2
5	AC2-125	<.02	<.2
6	AC2-130	<.02	<.2
7	AC2-135	<.02	<.2
8	AC2-140	<.02	<.2
9	AC2-145	<.02	1.8
10	AC2-150	<.02	<.2
11	AC2-155	<.02	<.2
12	AC2-160 *	0.00 *	0.0 *
13	AC2-165	<.02	<.2
14	AC2-170	<.02	<.2
15	AC2-175	<.02	<.2
16	AC2-180	<.02	<.2
17	AC2-185	<.02	<.2
18	AC2-190	<.02	<.2
19	AC2-195	<.02	<.2
20	AC2-200	<.02	<.2
21	AC2-205	<.02	<.2
22	AC2-210	<.02	<.2
23	AC2-215	<.02	.4
24	AC2-220	.89	2.2
25	AC2-225	.22	2.4

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 021
April 30, 1982

ITEM	SAMPLE NO.	Au ppm	Ag ppm
26	AC2-230	2.80	6.0
27	AC2-235	1.40	3.8
28	AC2-240	.33	1.8
29	AC2-245	.22	.8
30	AC2-250	.23	1.0
31	AC2-255	.13	.6
32	AC2-260	.11	.6
33	AC2-265*	0.00*	0.0 *
34	AC2-270	.22	.2
35	AC2-275	.09	.4
36	AC2-280	.16	.4
37	AC2-285	.15	.6
38	AC2-290	.14	.4
39	AC2-295	.17	.6
40	AC2-300	.18	1.8
41	AC2-305	1.30	2.6
42	AC2-310	.51	3.0
43	AC2-315	.52	4.6
44	AC2-320	.25	2.6
45	AC2-325	.08	.8
46	AC2-330	<.02	.6
47	AC2-335	.02	.8
48	AC2-340	<.02	.4
49	AC2-345	<.02	.2
50	AC2-350	<.02	.2

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin

.KYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 021
April 30, 1982
PAGE 3

ITEM	SAMPLE NO.	Au ppm	Ag ppm
51	AC2-355	<.02	.2
52	AC2-360	<.02	.4
53	AC2-365	<.02	1.6
54	AC2-370	<.02	2.0
55	AC2-372	<.02	2.4
56	AC2-655	.16	.6

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lohmbeck
Arizona Registered Assayer No. 9435

James A. Martin

SKYLINE LABS, INC.
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Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 021
April 30, 1982

ITEM	SAMPLE NO.	Cu ppm	Pb ppm	Zn ppm	Mn ppm
18	AC2-190	<5.	30.	50.	280.
19	AC2-195	<5.	20.	30.	160.
20	AC2-200	<5.	30.	30.	200.
21	AC2-205	<5.	20.	20.	160.
22	AC2-210	<5.	25.	35.	240.
23	AC2-215	<5.	20.	60.	450.
24	AC2-220	10.	5.	30.	460.
25	AC2-225	30.	<5.	65.	1100.
26	AC2-230	25.	<5.	60.	900.
27	AC2-235	15.	<5.	50.	740.
28	AC2-240	5.	5.	45.	390.
29	AC2-245	10.	5.	55.	430.
30	AC2-250	5.	5.	40.	380.
31	AC2-255	5.	5.	40.	360.
32	AC2-260	5.	5.	45.	300.
33	AC2-265*	0.*	0.*	0.*	0.*
34	AC2-270	10.	5.	50.	550.
35	AC2-275	10.	5.	65.	550.
36	AC2-280	5.	<5.	50.	510.
37	AC2-285	5.	5.	45.	350.
38	AC2-290	10.	50.	55.	400.
39	AC2-295	5.	5.	45.	590.
40	AC2-300	5.	5.	25.	1100.
41	AC2-305	5.	5.	20.	740.
42	AC2-310	5.	5.	25.	620.

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer

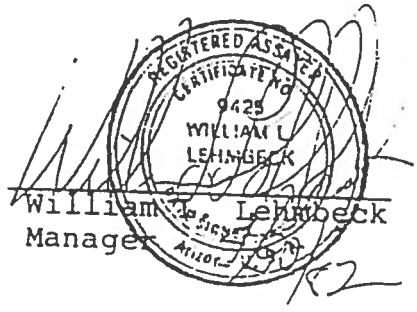
KYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 021
April 30, 1982

ITEM	SAMPLE NO.	Cu ppm	Pb ppm	Zn ppm	Mn ppm
43	AC2-315	5.	5.	25.	900.
44	AC2-320	20.	5.	40.	2000.
45	AC2-325	10.	<5.	65.	470.
46	AC2-330	15.	5.	80.	490.
47	AC2-335	30.	5.	85.	570.
48	AC2-340	20.	<5.	80.	610.
49	AC2-345	15.	25.	90.	530.
50	AC2-350	10.	5.	100.	600.
51	AC2-355	15.	<5.	95.	570.
52	AC2-360	20.	5.	70.	540.
53	AC2-365	20.	10.	105.	750.
54	AC2-370	25.	5.	130.	430.
55	AC2-372	30.	5.	110.	410.
56	AC2-655	5.	5.	50.	600.

*NOTE: Item 12 and 33 not received in the lab for analysis.

cc: Meridian Land & Minerals
First Northwestern Bank Center
P.O. Box 2521
Billings, Montana 59103-2521
Attn.; Mr. Doug Grisham



William L. Lehmbeck
Manager

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

REPORT OF SPECTROGRAPHIC ANALYSIS

JOB NO. TCU 021
April 30, 1982
SHIPMENT NO. MER-4

MERIDIAN LAND & MINERALS
Attn.: Mr. Doug Grisham
1074 Sycamore, #35
Kingman, Arizona 86401

Analysis of 3 Samples

The attached pages comprise this report of analysis. Values are reported in parts per million (ppm), except where otherwise noted, to the nearest number in the series 1, 1.5, 2, 3, 5, 7, 10, etc. within each order of magnitude. These numbers represent the approximate boundaries and midpoints of arbitrary ranges of concentration differing by the reciprocal of the cube root of ten. The 'accepted' value is considered to be within + or - 1 step of the range reported at the 68 % confidence level and within + or - 2 steps at the 95 % confidence level.

William L. Lehmbeck
Manager

cc: Meridian Land & Minerals
First Northwestern Bank Center
P.O. Box 2521
Billings, Montana 59103-2521
Attn. ;Mr. Doug Grisham

YLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 021
PAGE 2

ITEM NO. SAMPLE NO.
20 = AC2-200
40 = AC2-300
50 = AC2-350

ITEM	20	40	50
ELEMENT			
Fe	2%	5%	7%
Ca	.15%	7%	1.5%
Mg	.15%	.2%	.7%
Ag	<1	2	<1
As	<500	<500	<500
B	<10	<10	<10
Ba	300	300	500
Be	<2	15	<2
Bi	<10	<10	<10
Cd	<50	<50	<50
Co	<5	5	15
Cr	<10	<10	50
Cu	<2	7	20
Ga	<10	<10	15
Ge	<20	<20	<20
La	<20	<20	50
Mn	200	1500	700
Mo	<2	<2	<2
Nb	<20	<20	20
Ni	<5	20	20
Pb	15	<10	10
Sb	<100	<100	<100
Sc	<10	<10	10
Sn	<10	<10	<10
Sr	100	200	150
Ti	1000	3000	7000
V	<10	20	30
W	<50	<50	<50
Y	<10	<10	20
Zn	<200	<200	<200
Zr	150	70	200

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TCU 022
April 30, 1982
SHIPMENT NO. MER-6

MERIDIAN LAND & MINERAL COMPANY
Attn.: Mr. Doug Grisham
1074 Sycamore, #35
Kingman, Arizona 86401

Analysis of 56 Rock Samples

ITEM	SAMPLE NO.	Au ppm	Ag ppm
1	AC-4-15	<.02	.6
2	AC-4-20	.19	1.8
3	AC-4-25	<.02	.6
4	AC-4-30	.12	1.0
5	AC-4-35	<.02	.2
6	AC-4-40	<.02	<.2
7	AC-4-45	.04	.2
8	AC-4-50	<.02	.2
9	AC-4-55	<.02	.2
10	AC-4-60	<.02	.2
11	AC-4-65	<.02	.2
12	AC-4-70	<.02	.2
13	AC-4-75	.15	.4
14	AC-4-80	.20	.4
15	AC-4-85	<.02	.4
16	AC-4-90	.06	.2
17	AC-4-95	.20	.2
18	AC-4-100	.14	.2
19	AC-4-105	.09	.2
20	AC-4-110	.09	.2
21	AC-4-115	.03	.2
22	AC-4-120	.26	.4
23	AC-4-125	.28	.2
24	AC-4-130	.29	.2
25	AC-4-135	.20	.2

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. [illegible]

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 022
April 30, 1982
PAGE 2

ITEM	SAMPLE NO.	Au ppm	Ag ppm
26	AC-4-140	1.10	1.0
27	AC-4-145	.42	.4
28	AC-4-150	.49	.8
29	AC-4-155	.18	.4
30	AC-4-160	.07	.4
31	AC-4-165	.15	.4
32	AC-4-170	.46	1.4
33	AC-4-175	.35	1.6
34	AC-4-180	.09	.8
35	AC-4-185	.24	1.2
36	AC-4-190	.80	4.4
37	AC-4-195	.31	1.4
38	AC-4-200	.69	9.0
39	AC-4-205	.70	6.8
40	AC-4-210	1.10	6.6
41	AC-4-215	.67	7.0
42	AC-4-220	.62	5.2
43	AC-4-225	.69	3.6
44	AC-4-230	.14	.6
45	AC-4-235	.06	.6
46	AC-4-240	.11	.2
47	AC-4-245	.14	.2
48	AC-4-250	.20	.8
49	AC-4-255	.12	.2
50	AC-4-260	.73	.4

S /LINE LABS, INC.
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Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 022
April 30, 1982
PAGE 3

ITEM	SAMPLE NO.	Au ppm	Ag ppm
51	AC-4-265	.23	.4
52	AC-4-270	.08	.2
53	AC-4-275	.23	.4
54	AC-4-280	.10	.6
55	AC-4-285	.03	.2
56	AC-4-291	.08	.4

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No.

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 022
April 30, 1982

ITEM	SAMPLE NO.	Cu ppm	Pb ppm	Zn ppm	Mn ppm
31	AC-4-165	<5.	25.	75.	800.
32	AC-4-170	5.	10.	35.	550.
33	AC-4-175	<5.	10.	40.	510.
34	AC-4-180	<5.	5.	20.	90.
35	AC-4-185	<5.	15.	45.	490.
36	AC-4-190	5.	5.	50.	580.
37	AC-4-195	10.	5.	90.	1300.
38	AC-4-200	10.	<5.	60.	460.
39	AC-4-205	10.	5.	65.	530.
40	AC-4-210	10.	5.	60.	560.
41	AC-4-215	10.	<5.	60.	480.
42	AC-4-220	15.	<5.	45.	1000.
43	AC-4-225	15.	<5.	40.	900.
44	AC-4-230	15.	5.	45.	390.
45	AC-4-235	30.	5.	40.	300.
46	AC-4-240	10.	5.	80.	510.
47	AC-4-245	20.	5.	95.	520.
48	AC-4-250	15.	<5.	105.	630.
49	AC-4-255	20.	<5.	85.	520.
50	AC-4-260	15.	5.	105.	620.
51	AC-4-265	15.	5.	85.	530.
52	AC-4-270	10.	<5.	85.	550.
53	AC-4-275	10.	<5.	85.	480.
54	AC-4-280	15.	<5.	90.	530.
55	AC-4-285	15.	<5.	100.	470.
56	AC-4-291	20.	<5.	95.	570.

cc: Meridian Land & Minerals
First Northwestern Bank Center
P.O. Box 2521
Billings, Montana 59103-2521
Attn.: Mr. Doug Grisham

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

REPORT OF SPECTROGRAPHIC ANALYSIS

JOB NO. TCU 022
April 30, 1982
SHIPMENT NO. MER-6

MERIDIAN LAND & MINERAL COMPANY
Attn.: Mr. Doug Grisham
1074 Sycamore, #35
Kingman, Arizona 86401

Analysis of 3 Samples

The attached pages comprise this report of analysis. Values are reported in parts per million (ppm), except where otherwise noted, to the nearest number in the series 1, 1.5, 2, 3, 5, 7, 10, etc. within each order of magnitude. These numbers represent the approximate boundaries and midpoints of arbitrary ranges of concentration differing by the reciprocal of the cube root of ten. The 'accepted' value is considered to be within + or - 1 step of the range reported at the 68 % confidence level and within + or - 2 steps at the 95 % confidence level.

William L. Lehmbeck
Manager

cc: Meridian Land & Minerals
First Northwestern Bank Center
P.O. Box 2521
Billings, Montana 59103-2521
Attn.: Mr. Doug Grisham

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 022
PAGE 2

ITEM NO. SAMPLE NO.
25 = AC-4-135
36 = AC-4-190
44 = AC-4-230

ITEM	25	36	44
ELEMENT			
Fe	2%	2%	2%
Ca	1.5%	2%	.3%
Mg	.2%	.3%	.3%
Ag	<1	5	<1
As	<500	<500	<500
B	<10	<10	<10
Ba	700	300	200
Be	3	7	2
Bi	<10	<10	<10
Cd	<50	<50	<50
Co	<5	<5	<5
Cr	<10	10	20
Cu	<2	2	50
Ga	<10	<10	<10
Ge	<20	<20	<20
La	20	<20	20
Mn	700	700	500
Mo	<2	<2	<2
Nb	<20	<20	<20
Ni	<5	15	7
Pb	15	10	<10
Sb	<100	<100	<100
Sc	<10	<10	<10
Sn	<10	<10	<10
Sr	100	100	<100
Ti	1500	3000	3000
V	<10	15	20
W	<50	<50	<50
Y	<10	<10	<10
Zn	<200	<200	<200
Zr	200	70	150

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11132

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TCU 071
September 3, 1982
SHIPMENT NO. MER-26

MERIDIAN LAND & MINERAL COMPANY
Attn.: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 86 Drill Cutting Samples

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
1	ARR-3-5	<.02	7.6	.11
2	ARR-3-10	<.02	5.0	.13
3	ARR-3-15	<.02	2.8	.06
4	ARR-3-20	<.02	2.6	.07
5	ARR-3-25	<.02	3.4	.12
6	ARR-3-30	<.02	1.8	.09
7	ARR-3-35	.08	7.2	.17
8	ARR-3-40	<.02	1.2	.01
9	ARR-3-45	<.02	.8	.03
10	ARR-3-50	<.02	.6	.03
11	ARR-3-55	<.02	.4	.03
12	ARR-4-5	.80	1.2	.02
13	ARR-4-10	.26	1.8	.03
14	ARR-4-15	.48	8.6	.04
15	ARR-4-20	1.10	7.0	.04
16	ARR-4-25	.70	2.4	.04
17	ARR-4-30	1.00	2.6	.01
18	ARR-4-35	.66	1.4	.01
19	ARR-4-40	1.40	3.4	.02
20	ARR-4-45	.63	1.2	.03
21	ARR-4-50	.28	1.0	.05
22	ARR-4-55	.77	1.4	.01
23	ARR-4-60	1.20	3.2	.02
24	ARR-4-65	.67	1.8	.03
25	ARR-4-70	.53	3.0	.03

plotted

Charles E. Thompson

William I. Lehmbeck

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 071
September 3, 1982

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
26	ARR-4-75	.66	5.6	.04
27	ARR-4-80	1.60	5.8	.02
28	ARR-4-85	.19	3.0	.05
29	ARR-4-90	.02	.8	.05
30	ARR-4-95	.75	6.0	.04
31	ARR-4-100	1.80	5.4	.05
32	ARR-4-105	1.60	7.4	.02
33	ARR-4-110	.71	7.2	.02
34	ARR-4-115	1.10	3.6	.04
35	ARR-4-120	.24	1.0	.03
36	ARR-4-125	.06	.6	.05
37	ARR-4-130	.06	.4	.01
38	ARR-4-135	.06	.4	.01
39	ARR-4-140	.34	.4	.03
40	ARR-4-145	<.02	<.2	.03
41	ARR-4-150	<.02	<.2	.03
42	ARR-4-155	<.02	<.2	.01
43	ARR-4-160	<.02	<.2	.02
44	ARR-4-165	<.02	<.2	.02
45	ARR-4-170	<.02	<.2	.03
46	ARR-4-175	<.02	<.2	.03
47	ARR-4-180'	<.02	<.2	.01
48	ARR-4-185	<.02	<.2	.01
49	ARR-4-190	<.02	<.2	.02
50	ARR-4-195	<.02	<.2	.04

Charles E. Thompson

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 071
September 3, 1982

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
51	ARR-4-200	<.02	<.2	<.01
52	ARR-4-205	<.02	<.2	.01
53	ARR-4-210	<.02	<.2	.02
54	ARR-4-215	<.02	<.2	.02
55	ARR-5-5	5.50	95.0	.09
56	ARR-5-10	2.80	74.0	.04
57	ARR-5-15	2.80	51.0	.04
58	ARR-5-20	1.40	35.0	.05
59	ARR-5-25	1.40	26.0	.04
60	ARR-5-30	1.30	13.0	.05
61	ARR-5-35	1.10	9.4	.03
62	ARR-5-40	.31	6.4	.03
63	ARR-5-45	.84	2.0	.03
64	ARR-5-50	.59	2.0	.05
65	ARR-5-55	.48	1.4	.02
66	ARR-5-60	1.10	1.0	.02
67	ARR-5-65	.46	2.0	.04
68	ARR-5-70	.68	1.2	.04
69	ARR-5-75	.81	1.0	.05
70	ARR-5-80	1.60	1.2	.02
71	ARR-5-85	3.90	15.0	.04
72	ARR-5-90	.90	.4	.03
73	ARR-5-95	.30	.8	.06
74	ARR-5-100	.20	.4	.02
75	ARR-5-105	.14	.8	.03

Charles E. Thompson

S..YLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 071
September 3, 1982
PAGE 4

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
76	ARR-5-110	.24	1.0	.04
77	ARR-5-115	.90	12.0	.06
78	ARR-5-120	.15	1.0	.06
79	ARR-5-125	.42	.8	.03
80	ARR-5-130	1.90	3.4	.05
81	ARR-5-135	1.60	2.0	.05
82	ARR-5-140	1.30	2.0	.04
83	ARR-5-145	.58	2.6	.01
84	ARR-5-150	.35	2.0	.01
85	ARR-5-155	.71	1.4	.02
86	ARR-5-160	.28	.6	.03

cc: Meridian Land & Minerals
P.O. Box 2521
Billings, Montana 59103-2521
Attn.: Mr. P.C. Cavanaugh

REGISTERED ASSAYER CERTIFICATE NO. 9427 CHARLES E. THOMPSON ARIZONA U.S.A.

William L. Lehmbeck
Manager
9/3/82

KYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

INVOICE
NET 30 DAYS

JOB NO.TCU 071
September 3, 1982
SHIPMENT NO. MER-26

MERIDIAN LAND & MINERAL COMPANY
Attn.: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 86 Drill Cutting Samples

86 Au(ppm)	@ $ 4.10	$ 352.60
86 Ag(ppm)	@ $ 2.50	$ 215.00
86 Hg(ppm)	@ $ 2.50	$ 215.00
86 Samples pulverized	@ $ 1.30	$ 111.80
	Sub-Total	894.40
Freight charges		$ 148.50
Pick up charges		$ 4.00
	TOTAL	$1046.90

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TCU 072
August 24, 1982
SHIPMENT NO. MER-26

MERIDIAN LAND & MINERAL COMPANY
Attn.: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 136 Drill Cutting Samples

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
1	ARR-6-5 *	0.00 *	0.0 *	0.00 *
2	ARR-6-10 *	0.00 *	0.0 *	0.00 *
3	ARR-6-15 *	0.00 *	0.0 *	0.00 *
4	ARR-6-20 *	0.00 *	0.0 *	0.00 *
5	ARR-6-25	<.02	<.2	.10
6	ARR-6-30	<.02	<.2	.05
7	ARR-6-35	<.02	<.2	.04
8	ARR-6-40	<.02	<.2	.03
9	ARR-6-45	<.02	<.2	.03
10	ARR-6-50	<.02	<.2	.04
11	ARR-6-55	<.02	<.2	.05
12	ARR-6-60	<.02	<.2	.04
13	ARR-6-65	<.02	<.2	.03
14	ARR-6-70	<.02	.2	.07
15	ARR-6-75	<.02	<.2	.09
16	ARR-6-80	<.02	<.2	.02
17	ARR-6-85	<.02	<.2	.07
18	ARR-6-90	<.02	<.2	.05
19	ARR-6-95	<.02	<.2	.05
20	ARR-6-100	<.02	<.2	.03
21	ARR-6-105	<.02	<.2	.03
22	ARR-6-110	<.02	<.2	.05
23	ARR-6-115	<.02	<.2	.04
24	ARR-6-120	<.02	.2	.02
25	ARR-6-125	.06	<.2	.04

Charles E. Thompson

SKYLINE LABS, INC.
R.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 072
August 24, 1982

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
26	ARR-6-130	<.02	<.2	.07
27	ARR-6-135	<.02	.2	.05
28	ARR-6-140	<.02	.2	.04
29	ARR-6-145	<.02	<.2	.08
30	ARR-6-150	<.02	<.2	.10
31	ARR-6-155	<.02	<.2	.04
32	ARR-6-160	<.02	<.2	.03
33	ARR-6-165	<.02	<.2	.04
34	ARR-6-170	<.02	<.2	.04
35	ARR-6-175	<.02	<.2	.05
36	ARR-6-180	<.02	<.2	.04
37	ARR-6-185	<.02	<.2	.07
38	ARR-6-190	.04	<.2	.05
39	ARR-6-195	<.02	<.2	.08
40	ARR-6-200	<.02	<.2	.07
41	ARR-6-205	<.02	<.2	.07
42	ARR-6-210	<.02	<.2	.07
43	ARR-6-215	<.02	<.2	.03
44	ARR-6-220	<.02	<.2	.02
45	ARR-6-225	<.02	<.2	.09
46	ARR-6-230	<.02	<.2	.08
47	ARR-6-235	<.02	<.2	.02
48	ARR-6-240	<.02	<.2	.04
49	ARR-6-245	<.02	<.2	.04
50	ARR-6-250	<.02	<.2	.09

Charles E. Thompson

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 072
August 24, 1982

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
51	ARR-6-255	<.02	<.2	.08
52	ARR-6-260	<.02	<.2	.05
53	ARR-6-265	<.02	<.2	.08
54	ARR-6-270	<.02	.2	.05
55	ARR-6-275	<.02	<.2	.02
56	ARR-6-280	<.02	<.2	.04
57	ARR-6-285	<.02	.4	.05
58	ARR-6-290	<.02	.2	.05
59	ARR-6-295	<.02	<.2	.03
60	ARR-6-300	<.02	.4	.03
61	ARR-6-305	<.02	.4	.03
62	ARR-6-310	<.02	.4	.05
63	ARR-6-315	<.02	.2	.04
64	ARR-6-320	<.02	.2	.03
65	ARR-6-325	<.02	.2	.05
66	ARR-6-330	<.02	.2	.05
67	ARR-6-335	<.02	.2	.05
68	ARR-6-340	<.02	.2	.04
69	ARR-6-345	.03	.4	.04
70	ARR-6-350	.02	.2	.04
71	ARR-6-355	<.02	.6	.05
72	ARR-6-360	<.02	.2	.04
73	ARR-6-365	.09	.4	.03
74	ARR-6-370	.09	.2	.04
75	ARR-6-375	.22	.2	.04

Charles E. Thompson

S..YLINE LABS, INC.
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JOB NO. TCU 072
August 24, 1982
PAGE 4

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
76	ARR-6-380	.18	.2	.02
77	ARR-6-385	.37	1.8	.02
78	ARR-6-390	2.30	5.0	.08
79	ARR-6-395	.70	2.0	.05
80	ARR-6-400	.68	2.4	.04
81	ARR-6-405	.47	1.6	.07
82	ARR-6-410	.83	4.4	.11
83	ARR-6-415	.58	1.8	.10
84	ARR-6-420	.98	4.2	.09
85	ARR-6-425	1.90	7.2	.08
86	ARR-6-430	1.40	6.0	.20
87	ARR-6-435	1.20	8.6	.09
88	ARR-6-440	.86	3.0	.10
89	ARR-6-445	.26	.4	.15
90	ARR-6-450	.23	1.0	.12
91	ARR-6-455	.12	.2	.11
92	ARR-6-460	.06	.2	.12
93	ARR-6-465	<.02	.2	.17
94	ARR-6-470	<.02	.2	.13
95	ARR-6-475	<.02	.2	.08
96	ARR-6-480	.04	<.2	.04
97	ARR-6-485	<.02	.2	.03
98	ARR-6-490	.06	.2	.08
99	ARR-6-495	.04	.2	.05
100	ARR-7-5	.05	.4	.10

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lohmbeck

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 072
August 24, 1982
PAGE 5

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
101	ARR-7-10	<.02	.2	.05
102	ARR-7-15	<.02	.4	.04
103	ARR-7-20	<.02	.2	.07
104	ARR-7-25	<.02	.2	.13
105	ARR-7-30	<.02	.2	.09
106	ARR-7-35	<.02	.2	.07
107	ARR-7-40	<.02	<.2	.05
108	ARR-7-45	<.02	.2	.08
109	ARR-7-50	<.02	.2	.09
110	ARR-7-55	<.02	.2	.09
111	ARR-7-60	.05	.6	.11
112	ARR-7-65	.03	1.0	.11
113	ARR-7-70	3.10	6.0	.20
114	ARR-7-75	6.90	11.0	.22
115	ARR-7-80	1.40	6.2	.33
116	ARR-7-85	2.90	9.2	.28
117	ARR-7-90	.04	.4	.26
118	ARR-7-95	.68	30.0	.33
119	ARR-7-100	.59	8.0	.13
120	ARR-7-105	.63	13.0	.24
121	ARR-7-110	1.30	2.6	.10
122	ARR-7-115	.37	1.8	.11
123	ARR-7-120	.67	2.6	.07
124	ARR-7-125	.47	1.2	.14
125	ARR-7-130	.86	1.6	.13

Charles E. Thompson

SKYLINE LABS, INC.
P.O. Box 50106 • 1700 West Grant Road
Tucson, Arizona 85703
(602) 622-4836

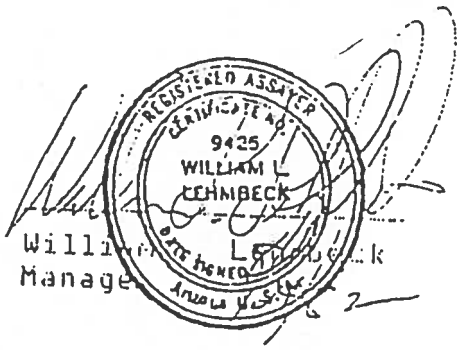
JOB NO. TCU 072
August 24, 1982
PAGE 6

ITEM	SAMPLE NO.	Au ppm	Ag ppm	Hg ppm
126	ARR-7-135	1.70	3.8	.10
127	ARR-7-140	1.90	1.2	.08
128	ARR-7-145	.94	1.6	.09
129	ARR-7-150	1.80	1.8	.05
130	ARR-7-155	.43	.8	.04
131	ARR-7-160	.17	1.8	.05
132	ARR-7-165	2.60	3.6	.07
133	ARR-7-170	1.00	1.2	.09
134	ARR-7-175	.50	3.4	.05
135	ARR-7-180	.25	2.4	.05
136	ARR-7-185	.24	.6	.04
137	ARR-7-190	.10	.6	.07
138	ARR-7-195	.29	.6	.03
139	ARR-7-200	.03	.8	.03
140	NO NUMBER	<.02	<.2	.02

*NOTE: The following samples were not received:

Item 1 Sample No. ARR-6-5
Item 2 Sample No. ARR-6-10
Item 3 Sample No. ARR-6-15
Item 4 Sample No. ARR-6-20

cc: Meridian Land & Minerals
P.O. Box 2521
Billings, Montana 59103-2521
Attn.: Mr. P.C. Cavanaugh



William L. Lehmbeck
Manager

Charles E. Thompson
Arizona Registered Assayer

William L. Lehmbeck

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

REPORT OF ANALYSIS

JOB NO. TCU 111A
July 22, 1983
DOUG GRISHAM
ARR 18-5

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 1779
Billings, Montana 59103-1779

Analysis of 1 Pulp Sample

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	Ag (oz/t)
146	ARR 19-250	.280	.56

William L. Lehmbeck
Manager

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin

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

REPORT OF ANALYSIS

JOB NO. TCU 111
July 15, 1983
DOUG GRISHAM
ARR 18-5

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 1779
Billings, Montana 59103-1779

Analysis of 152 Drill Cutting Samples

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
1	ARR 18-5	1.70	1.0	.16
2	ARR 18-10	1.30	1.2	.22
3	ARR 18-15	.68	.2	.14
4	ARR 18-20	.58	.4	.09
5	ARR 18-25	.35	1.6	.03
6	ARR 18-30	1.20	.4	.05
7	ARR 18-35	.39	.4	.04
8	ARR 18-40	1.40	1.0	.10
9	ARR 18-45	.26	.6	.09
10	ARR 18-50	.44	.6	.07
11	ARR 18-55	.36	.2	.04
12	ARR 18-60	.10	.6	.03
13	ARR 18-65	1.50	.6	.05
14	ARR 18-70	.04	<.2	.11
15	ARR 18-75	.09	<.2	.06
16	ARR 18-80	2.80	2.2	.04
17	ARR 18-85	.08	.2	.09
18	ARR 18-90	.86	.4	.05
19	ARR 18-95	1.50	1.4	.08
20	ARR 18-100	2.00	1.4	.05
21	ARR 18-105	.55	2.0	.07
22	ARR 18-110	.65	1.6	.05
23	ARR 18-115	.47	2.2	.09
24	ARR 18-120	4.00	3.2	.05
25	ARR 18-125	.26	3.0	.05

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

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

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
26	ARR 18-130	1.00	8.4	.20
27	ARR 18-135	.95	1.0	.07
28	ARR 18-140	.32	1.0	.05
29	ARR 18-145	.10	1.2	.02
30	ARR 18-150	.17	1.0	.06
31	ARR 18-155	.09	1.8	.07
32	ARR 18-160	.46	1.4	.05
33	ARR 18-165	.05	1.6	.02
34	ARR 18-170	.13	1.4	.08
35	ARR 18-175	.16	1.6	.04
36	ARR 18-180	.07	2.2	.05
37	ARR 18-185	.41	1.0	.05
38	ARR 18-190	1.50	1.0	.10
39	ARR 18-195	.46	1.6	.06
40	ARR 18-200	.10	1.2	.04
41	ARR 18-205	.21	1.2	.04
42	ARR 18-210	.38	1.2	.02
43	ARR 18-215	.17	1.8	.06
44	ARR 18-220	.22	1.6	.06
45	ARR 18-225	.16	1.2	.02
46	ARR 18-230	.30	1.2	.01
47	ARR 18-235	.15	1.0	.01
48	ARR 18-240	.58	1.0	.01
49	ARR 18-245	.50	1.2	.05
50	ARR 18-250	.11	1.4	.06

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
17[illegible] W. Sahuaro • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

JOB NO. TCU 111
July 15, 1983

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
51	ARR 18-255	.28	3.2	.10
52	ARR 18-260	1.60	6.2	.37
53	ARR 18-265	2.45	12.0	.38
54	ARR 18-270	.10	6.4	.14
55	ARR 18-275	<.02	1.2	.25
56	ARR 18-280	<.02	.4	.30
57	ARR 18-285	<.02	.2	.26
58	ARR 18-290	<.02	.4	.12
59	ARR 18-295	<.02	.4	.13
60	ARR 18-300	<.02	.4	.10
61	ARR 20-5	.39	.8	.05
62	ARR 20-10	1.60	.6	.02
63	ARR 20-15	.20	.8	.01
64	ARR 20-20	.59	.4	.01
65	ARR 20-25	2.70	.4	.01
66	ARR 20-30	.36	.4	.01
67	ARR 20-35	.58	.6	.05
68	ARR 20-40	.77	1.0	.04
69	ARR 20-45	.27	1.4	.05
70	ARR 20-50	.34	1.4	.02
71	ARR 20-55	.90	1.0	.13
72	ARR 20-60	.28	.6	.02
73	ARR 20-65	.18	.6	.02
74	ARR 20-70	.20	.8	.02
75	ARR 20-75	.44	.8	.02

Charles E. Thompson
Arizona Registered Assayer No 9427

William L. Lehmbeck
Arizona Registered Assayer No 9425

James A. Martin
Arizona Registered Assayer No. 11122

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

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
76	ARR 20-80	.14	1.2	.05
77	ARR 20-85	.25	.8	.06
78	ARR 20-90	.31	1.0	.04
79	ARR 20-95	.45	1.8	.02
80	ARR 20-100	.27	2.0	.02
81	ARR 20-105	1.60	1.8	.04
82	ARR 20-110	.06	1.4	.06
83	ARR 20-115	.16	3.0	.06
84	ARR 20-120	.27	6.0	.05
85	ARR 20-125	.60	13.0	.01
86	ARR 20-130	1.30	27.0	.06
87	ARR 20-135	1.20	16.0	.02
88	ARR 20-140	1.10	30.0	.06
89	ARR 20-145	.60	10.0	.12
90	ARR 20-150	.85	8.6	.08
91	ARR 20-155	1.60	7.8	.10
92	ARR 20-160	3.00	9.0	.12
93	ARR 20-165	5.00	12.0	.14
94	ARR 20-170	2.50	6.8	.16
95	ARR 20-175	.72	3.8	.16
96	ARR 20-180	.17	2.0	.13
97	ARR 19-5	.21	1.0	.01
98	ARR 19-10	1.00	10.0	.01
99	ARR 19-15	.13	.2	.09
100	ARR 19-20	.09	.2	.04

100' - 170'
.041 oz/T Au
.318 oz/T Ag

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

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(602) 622-4836

JOB NO. TCU 111
July 15, 1983
PAGE 5

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
101	ARR 19-25	.14	.2	.05
102	ARR 19-30	.14	.4	.05
103	ARR 19-35	.69	.4	.09
104	ARR 19-40	.23	.4	.12
105	ARR 19-45	.76	.4	.05
106	ARR 19-50	.06	.2	.01
107	ARR 19-55	.33	1.2	.02
108	ARR 19-60	.25	1.4	.04
109	ARR 19-65	.35	1.0	.05
110	ARR 19-70	.18	.8	.07
111	ARR 19-75	.33	.8	.04
112	ARR 19-80	.29	.8	.02
113	ARR 19-85	1.20	2.6	.02
114	ARR 19-90	.26	2.4	.04
115	ARR 19-95	.17	2.2	.06
116	ARR 19-100	.57	11.0	.10
117	ARR 19-105	.40	11.0	.08
118	ARR 19-110	.54	1.6	.02
119	ARR 19-115	.22	3.0	.20
120	ARR 19-120	.53	6.8	.01
121	ARR 19-125	.21	4.0	.14
122	ARR 19-130	.71	6.8	.05
123	ARR 19-135	1.80	21.0	.04
124	ARR 19-140	.77	15.0	.10
125	ARR 19-145	.25	6.6	.04

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

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

JOB NO. TCU 111
July 15, 1983
PAGE 6

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
126	ARR 19-150	.35	6.4	.05
127	ARR 19-155	.25	7.0	.13
128	ARR 19-160	.32	5.8	.14
129	ARR 19-165	.44	6.2	.17
130	ARR 19-170	.19	4.6	.05
131	ARR 19-175	.37	6.0	.09
132	ARR 19-180	.05	3.4	.02
133	ARR 19-185	.13	8.8	.08
134	ARR 19-190	.29	12.0	.16
135	ARR 19-195	.26	8.8	.05
136	ARR 19-200	~1.90	22.0	.20
137	ARR 19-205	~.87	11.0	.29
138	ARR 19-210	.26	5.2	.08
139	ARR 19-215	.24	8.0	.05
140	ARR 19-220	.21	6.8	.08
141	ARR 19-224	.06	2.6	.09
142	ARR 19-230 *	.00 *	.0*	.00*
143	ARR 19-235 *	.00 *	.0*	.00*
144	ARR 19-240	3.70	28.0	.42
145	ARR 19-245	6.30	28.0	.35
146	ARR 19-250	)10.00**	22.0	.29
147	ARR 19-255	~4.90	20.0	.12
148	ARR 19-260	~3.50	15.0	.05
149	ARR 19-265	5.90	12.0	.08
150	ARR 19-270	7.70	14.0	.07

235' - 270'
.175 oz/T Au
.58 oz/T Ag

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9125

James A. Martin

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

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
151	ARR 19-275	.11	3.4	.16
152	ARR 19-280	.05	1.6	.12
153	ARR 19-285	<.02	1.0	.04
154	ARR 19-290	<.02	1.0	.05

*NOTE: Item 142 ARR 19-230 and Item 143 ARR 19-235 not received.

**NOTE: Fire assay results to follow as TCU 111-A.

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

REPORT OF ANALYSIS

JOB NO. TCU 109
July 1, 1983
D.H. GRISHAM
ARR-15-5

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 1779
Billings, Montana 59103-1779

Analysis of 108 Drill Cutting Samples

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
1	ARR 15-5	.040	1.2	.01
2	ARR 15-10	.190	5.0	.03
3	ARR 15-15	.230	4.4	.02
4	ARR 15-20	4.100	9.4	.02
5	ARR 15-25	.670	11.0	.03
6	ARR 15-30	.370	22.0	.02
7	ARR 15-35	.780	25.0	.02
8	ARR 15-40	4.400	25.0	.05
9	ARR 15-45	1.400	15.0	.06
10	ARR 15-50	.630	14.0	.08
11	ARR 15-55	1.200	22.0	.08
12	ARR 15-60	3.100	6.0	.10
13	ARR 15-65	2.600	7.6	.03
14	ARR 15-70	9.700	17.0	.03
15	ARR 15-75	7.400	26.0	.04
16	ARR 15-80	2.600	12.0	.06
17	ARR 15-85	.710	21.0	.06
18	ARR 15-90	2.100	70.0	.03
19	ARR 15-95	3.100	70.0	.04
20	ARR 15-100	1.200	50.0	.12
21	ARR 15-105	.510	14.0	.09
22	ARR 15-110	.240	11.0	.14
23	ARR 15-115	.240	19.0	.46
24	ARR 15-120	1.000	24.0	.11
25	ARR 15-125	1.700	65.0	.14

Charles E. Thompson
Arizona Registered Assayer No. 9127

William L. Lehmbeck

James A. Martin

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

JOB NO. TCU 109
July 1, 1983
PAGE 2

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
26	ARR 15-130	1.800	11.0	.14
27	ARR 15-135	9.600	13.0	.03
28	ARR 15-140	.990	42.0	.70
29	ARR 15-145	1.100	60.0	.24
30	ARR 15-146	1.700	70.0	.27
31	ARR 16-5	.180	3.2	.03
32	ARR 16-10	.190	3.8	.05
33	ARR 16-15	6.700	7.8	.05
34	ARR 16-20	1.500	9.4	.02
35	ARR 16-25	.680	14.0	.03
36	ARR 16-30	.540	22.0	.03
37	ARR 16-35	1.700	23.0	.06
38	ARR 16-40	.400	25.0	.07
39	ARR 16-45	.710	28.0	.03
40	ARR 16-50	.300	14.0	.03
41	ARR 16-55	.250	12.0	.06
42	ARR 16-60	.050	7.6	.07
43	ARR 16-65	.780	13.0	.06
44	ARR 16-70	.570	6.0	.05
45	ARR 16-75	.180	2.2	.06
46	ARR 16-80	.680	3.0	.03
47	ARR 16-85	1.200	3.8	.03
48	ARR 16-90	3.100	6.4	.03
49	ARR 16-95	6.300	4.8	.03
50	ARR 16-100	1.700	5.0	.02

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin

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

JOB NO. TCU 109
July 1, 1983
PAGE 3

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
51	ARR 16-105	1.700	4.8	.03
52	ARR 16-110	2.300	3.8	.02
53	ARR 16-115	2.300	3.0	.02
54	ARR 16-120	4.500	5.6	.02
55	ARR 16-125	.180	1.8	.03
56	ARR 16-130	.710	2.2	.03
57	ARR 16-135	.370	2.0	.02
58	ARR 16-140	.280	1.6	.02
59	ARR 16-145	1.300	3.0	.03
60	ARR 16-150	.230	2.2	.03
61	ARR 16-155	2.300	4.2	.03
62	ARR 16-160	2.900	6.2	.27
63	ARR 16-165	.670	5.2	.16
64	ARR 16-170	.430 .28 oz/t	6.2	.09
65	ARR 16-175	)10.000 **	14.0	.03
66	ARR 16-180	3.500	40.0	.03
67	ARR 16-185	.760	28.0	.11
68	ARR 16-190	.250	6.8	.50
69	ARR 16-195	1.900	3.2	.03
70	ARR 16-200 *	.000 *	.0 *	.00 *
72	ARR 17-5	.270	2.0	.26
73	ARR 17-10	1.100	2.0	.03
74	ARR 17-15	.800	2.0	.03
75	ARR 17-20	.330	1.2	.03
76	ARR 17-25	.200	1.6	.02

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer

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

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
77	ARR 17-30	.280	2.0	.24
78	ARR 17-35	1.500	2.0	.05
79	ARR 17-40	.230	2.2	.03
80	ARR 17-45	.250	2.2	.03
81	ARR 17-50	.220	2.0	.04
82	ARR 17-55	.400	2.2	1.00
83	ARR 17-60	.810	2.0	.01
84	ARR 17-65	1.500	3.8	.77
85	ARR 17-70	.350	2.6	.32
86	ARR 17-75	.530	2.6	.24
87	ARR 17-80	1.500	2.2	.12
88	ARR 17-85	1.000	2.6	.09
89	ARR 17-90	1.100	3.4	.02
90	ARR 17-95	3.500	2.8	.05
91	ARR 17-100	1.800	3.4	.02
92	ARR 17-105	1.100	4.6	.02
93	ARR 17-110	.680	6.2	.25
94	ARR 17-115	3.200	9.2	.02
95	ARR 17-120	2.100	9.4	.02
96	ARR 17-125	2.100	4.8	.01
97	ARR 17-130	1.300	5.6	.02
98	ARR 17-135	3.200	4.8	.02
99	ARR 17-140	2.800	6.4	.02
100	ARR 17-145	4.000	5.8	.02
101	ARR 17-150	2.300	7.2	.05

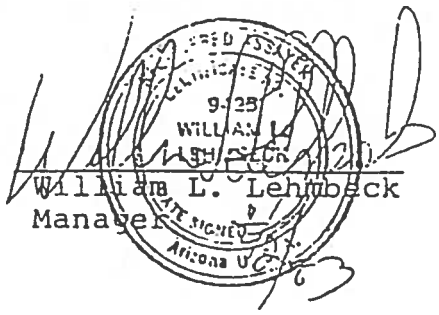
SKYLINE LABS, INC.
1775 W. Sahuaro • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
102	ARR 17-155	3.000	8.6	.02
103	ARR 17-160	2.800	7.8	.01
104	ARR 17-165	.810	30.0	.07
105	ARR 17-170	1.500	44.0	.19
106	ARR 17-175	4.100	9.2	.09
107	ARR 17-180	.500	11.0	.08
108	ARR 17-185	.840	14.0	.14
109	ARR 17-190	1.200	14.0	.05
110	ARR 17-195	2.100	21.0	.14
111	ARR 17-198 *	.000*	.0*	.00*

*NOTE: Item 70 ARR 16-200 and Item 111 ARR 17-198 not received.

**NOTE: Greater than normal geochemical range. Please advise if fire assay is needed.

NOTE: Item 71 ARR 16-205 and Item 112 ARR 17-200 received but analysis not done.



William L. Lehmbeck
Manager

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

REPORT OF ANALYSIS

JOB NO. TCU 106A
July 6, 1983
DOUG GRISHAM
ARR-14-5 THRU 172

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 1 Pulp Sample

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	Ag (oz/t)
2	ARR-14 10	.670	.67

REGISTERED ASSAYER
CERTIFICATE NO. 9425
WILLIAM L. LEHMBECK
SIGNED
Arizona U.S.A. 83

William L. Lehmbeck
Manager

Charles E. Thompson

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

REPORT OF ANALYSIS

JOB NO. TCU 106
June 22, 1983
DOUG GRISHAM
ARR-14-5 THRU 172

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 35 Drill Cutting Samples

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
1	ARR-14 5	.11	2.2	.03
2	ARR-14 10	>10.00 *.67opt	19.0 .67opt	.04
3	ARR-14 15	.08	9.8	.02
4	ARR-14 20	.06	2.8	.01
5	ARR-14 25	.02	.2	<.01
6	ARR-14 30	.07	1.5	.02
7	ARR-14 35	.07	.6	.03
8	ARR-14 40	.12	1.2	.04
9	ARR-14 45	.31	3.7	.01
10	ARR-14 50	.02	1.4	.02
11	ARR-14 55	.06	1.0	.02
12	ARR-14 60	.18	3.0	.09
13	ARR-14 65	.32	3.8	.12
14	ARR-14 70	2.60	6.2	.08
15	ARR-14 75	.24	5.7	.08
16	ARR-14 80	.50	7.1	.06
17	ARR-14 85	.70	4.6	.10
18	ARR-14 90	.95	2.1	.01
19	ARR-14 95	2.10	7.4	.09
20	ARR-14 100	2.10	13.0	.12
21	ARR-14 105	.86	11.0	.20
22	ARR-14 110	.46	11.0	.15
23	ARR-14 115	.03	1.9	.10
24	ARR-14 120	.09	1.9	.21
25	ARR-14 125	2.00	4.4	.17

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

James A. Martin

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

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
26	ARR-14 130	.99	4.2	.16
27	ARR-14 135	.46	5.1	.18
28	ARR-14 140	.61	4.7	.13
29	ARR-14 145	.72	3.3	.14
30	ARR-14 150	2.00	1.3	.15
31	ARR-14 155	.37	.6	.21
32	ARR-14 160	.93	.4	.17
33	ARR-14 165	.70	.6	.07
34	ARR-14 170	1.60	1.3	.18
35	ARR-14 172	.61	1.6	.19

*NOTE: Greater than normal geochemical range.
Please advise if fire assay is needed.

William L. Lehmbeck
Manager

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

REPORT OF ANALYSIS

COPY

JOB NO. TCU 104
May 26, 1983
ARR-13-30 THRU 280

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 51 Drill Cutting Samples

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
1	ARR-13-30	<.02	.2	.05
2	ARR-13-35	.06	.2	.08
3	ARR-13-40	<.02	<.2	.06
4	ARR-13-45	.03	.4	.03
5	ARR-13-50	<.02	.2	.04
6	ARR-13-55	<.02	.2	.07
7	ARR-13-60	<.02	.2	.06
8	ARR-13-65	<.02	.2	.05
9	ARR-13-70	<.02	<.2	.06
10	ARR-13-75	<.02	<.2	.04
11	ARR-13-80	<.02	<.2	.05
12	ARR-13-85	<.02	<.2	.05
13	ARR-13-90	<.02	<.2	.08
14	ARR-13-95	<.02	<.2	.11
15	ARR-13-100	<.02	<.2	.11
16	ARR-13-105	<.02	.2	.06
17	ARR-13-110	<.02	.2	.08
18	ARR-13-115	<.02	.2	.10
19	ARR-13-120	<.02	.2	.06
20	ARR-13-125	<.02	.2	.10
21	ARR-13-130	<.02	<.2	.13
22	ARR-13-135	<.02	<.2	.09
23	ARR-13-140	<.02	.2	.10
24	ARR-13-145	<.02	.2	.10
25	ARR-13-150	.05	.2	.16

Charles E. Thompson William J. Lehmbeck

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

COPY

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
26	ARR-13-155	.51	1.4	.24
27	ARR-13-160	.69	3.4	.26
28	ARR-13-165	1.30	3.2	.12
29	ARR-13-170	2.40	4.0	.11
30	ARR-13-175	1.00	2.6	.12
31	ARR-13-180	.72	2.8	.06
32	ARR-13-185	.43	1.2	.07
33	ARR-13-190	.33	1.4	.07
34	ARR-13-195	.47	2.6	.05
35	ARR-13-200	.32	3.4	.08
36	ARR-13-205	.34	4.4	.11
37	ARR-13-210	.81	5.2	.12
38	ARR-13-215	1.10	8.0	.14
39	ARR-13-220	.18	3.0	.20
40	ARR-13-225	.14	2.0	.06
41	ARR-13-230	.21	2.8	.12
42	ARR-13-235	.27	3.2	.11
43	ARR-13-240	.21	2.6	.10
44	ARR-13-245	.07	.8	.06
45	ARR-13-250	.10	.6	.07
46	ARR-13-255	.03	.2	.05
47	ARR-13-260	<.02	<.2	.03
48	ARR-13-265	.02	<.2	.03
49	ARR-13-270	<.02	<.2	.02
50	ARR-13-275	<.02	<.2	.02
51	ARR-13-280	<.02	<.2	.02

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

REPORT OF ANALYSIS

JOB NO. TCU 103
May 26, 1983
ARR-11-15 THRU 575

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 167 Drill Cutting Samples

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
1	ARR-11-15	.07	.2	.02
2	ARR-11-20	.11	.4	.03
3	ARR-11-25	.07	.6	<.01
4	ARR-11-30	.07	1.0	.07
5	ARR-11-35	.02	.6	<.01
6	ARR-11-40	.10	.8	.05
7	ARR-11-45	.06	.2	.02
8	ARR-11-50	.10	.2	.01
9	ARR-11-55	.11	<.2	.01
10	ARR-11-60	.22	.2	.01
11	ARR-11-65	.03	<.2	.05
12	ARR-11-70	.07	<.2	.03
13	ARR-11-75	.04	<.2	<.01
14	ARR-11-80	<.02	<.2	<.01
15	ARR-11-85	<.02	<.2	<.01
16	ARR-11-90	<.02	<.2	.03
17	ARR-11-95	<.02	<.2	.01
18	ARR-11-100	<.02	<.2	.01
19	ARR-11-105	<.02	<.2	.02
20	ARR-11-110	<.02	<.2	.03
21	ARR-11-115	<.02	<.2	.05
22	ARR-11-120	<.02	<.2	.01
23	ARR-11-125	<.02	<.2	<.01
24	ARR-11-130	<.02	<.2	.01
25	ARR-11-135	<.02	<.2	.02

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

James A. Martin

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

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
26	ARR-11-140	<.02	<.2	<.01
27	ARR-11-145	<.02	<.2	.01
28	ARR-11-150	<.02	<.2	<.01
29	ARR-11-155	.04	<.2	<.01
30	ARR-11-160	<.02	<.2	<.01
31	ARR-11-165	<.02	<.2	<.01
32	ARR-11-170	<.02	<.2	<.01
33	ARR-11-175	<.02	<.2	.01
34	ARR-11-180	<.02	<.2	.01
35	ARR-11-185	<.02	<.2	<.01
36	ARR-11-190	<.02	<.2	.01
37	ARR-11-195	<.02	<.2	<.01
38	ARR-11-200	<.02	<.2	.01
39	ARR-11-205	<.02	<.2	.01
40	ARR-11-210	<.02	<.2	.01
41	ARR-11-215	<.02	<.2	.02
42	ARR-11-220	<.02	<.2	<.01
43	ARR-11-225	<.02	<.2	.01
44	ARR-11-230	<.02	<.2	.02
45	ARR-11-235	.07	<.2	.02
46	ARR-11-240	.05	<.2	.01
47	ARR-11-245	.07	<.2	.02
48	ARR-11-250	.09	<.2	.04
49	ARR-11-255	.07	<.2	.02
50	ARR-11-260	<.02	.2	.01

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

JOB NO. TCU 103
May 26, 1983

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
51	ARR-11-265	<.02	1.0	.02
52	ARR-11-270	<.02	.6	.01
53	ARR-11-275	<.02	<.2	.01
54	ARR-11-280	<.02	.2	.01
55	ARR-11-285	.02	.2	<.01
56	ARR-11-290	.03	.2	<.01
57	ARR-11-295	<.02	.2	.01
58	ARR-11-300	.05	.2	.01
59	ARR-11-305	.10	.2	<.01
60	ARR-11-310	.03	.2	.01
61	ARR-11-315	<.02	.2	<.01
62	ARR-11-320	<.02	.2	<.01
63	ARR-11-325	<.02	.2	<.01
64	ARR-11-330	<.02	<.2	<.01
65	ARR-11-335	<.02	<.2	.01
66	ARR-11-340	<.02	.2	<.01
67	ARR-11-345	<.02	<.2	<.01
68	ARR-11-350	<.02	.2	<.01
69	ARR-11-355	<.02	<.2	<.01
70	ARR-11-360	<.02	<.2	<.01
71	ARR-11-365	<.02	.2	<.01
72	ARR-11-370	<.02	<.2	<.01
73	ARR-11-375	<.02	<.2	<.01
74	ARR-11-380	<.02	.4	<.01
75	ARR-11-385	<.02	.4	<.01

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

JOB NO. TCU 103
May 26, 1983
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
76	ARR-11-390	<.02	.2	<.01
77	ARR-11-395	<.02	.2	<.01
78	ARR-11-400	<.02	.2	<.01
79	ARR-11-405	<.02	.2	.01
80	ARR-11-410	<.02	.2	.02
81	ARR-11-415	<.02	.4	.03
82	ARR-11-420	<.02	.6	.03
83	ARR-11-425	.11	.8	.04
84	ARR-11-430	.14	.8	.04
85	ARR-11-435	.15	1.0	.05
86	ARR-11-440	.18	1.0	.07
87	ARR-11-445	.13	1.0	.09
88	ARR-11-450	.05	.6	.05
89	ARR-11-455	.06	2.0	.13
90	ARR-11-460	.29	1.4	.10
91	ARR-11-465	.78	4.0	.08
92	ARR-11-470	.31	3.2	.15
93	ARR-11-475	.25	3.0	.25
94	ARR-11-480	.41	15.0	.12
95	ARR-11-485	1.10	5.4	.40
96	ARR-11-490	5.80	5.2	.36
97	ARR-11-495	.87	3.6	.15
98	ARR-11-500	.20	1.2	.12
99	ARR-11-505	.14	1.4	.11
100	ARR-11-510	.55	2.6	.05

SKYLINE LABS, INC.
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(602) 622-483C

JOB NO. TCU 103
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
101	ARR-11-515	.21	2.0	.11
102	ARR-11-520	.70	2.4	.04
103	ARR-11-525	.39	2.0	.05
104	ARR-11-530	.21	2.0	.05
105	ARR-11-535	.08	2.2	.06
106	ARR-11-540	.05	2.8	.05
107	ARR-11-545	.03	.2	.17
108	ARR-11-550	.04	.4	.11
109	ARR-11-555	.13	1.4	.05
110	ARR-11-560	.03	2.2	.05
111	ARR-11-565	.04	1.6	.06
112	ARR-11-570	<.02	.8	.04
113	ARR-11-575	<.02	1.2	.09
114	ARR-12-30	<.02	<.2	.07
115	ARR-12-35	<.02	.2	.06
116	ARR-12-40	<.02	.2	.06
117	ARR-12-45	<.02	<.2	.07
118	ARR-12-50	<.02	.2	.04
119	ARR-12-55	<.02	.2	.03
120	ARR-12-60	<.02	<.2	.03
121	ARR-12-65	.03	.2	.03
122	ARR-12-70	.07	<.2	.02
123	ARR-12-75	.05	<.2	.03
124	ARR-12-80	.03	.2	.03
125	ARR-12-85	.03	.2	.04

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

James A. Martin

SKYLINE LABS, INC.
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(602) 622-4836

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
126	ARR-12-90	<.02	<.2	.04
127	ARR-12-95	<.02	<.2	.06
128	ARR-12-100	<.02	.2	.09
129	ARR-12-105	<.02	.2	.07
130	ARR-12-110	<.02	.4	.11
131	ARR-12-115	<.02	.4	.06
132	ARR-12-120	<.02	.4	.06
133	ARR-12-125	<.02	.8	.06
134	ARR-12-130	<.02	1.2	.06
135	ARR-12-135	<.02	.8	.06
136	ARR-12-140	<.02	1.0	.09
137	ARR-12-145	<.02	2.2	.12
138	ARR-12-150	.07	1.6	.12
139	ARR-12-155	.30	4.4	.08
140	ARR-12-160	.33	4.0	.08
141	ARR-12-165	.16	4.6	.07
142	ARR-12-170	.96	3.2	.04
143	ARR-12-175	.15	1.8	.02
144	ARR-12-180	.39	3.8	.05
145	ARR-12-185	.72	1.6	.03
146	ARR-12-190	.79	1.4	.04
147	ARR-12-195	.30	1.2	.04
148	ARR-12-200	.52	1.0	.03
149	ARR-12-205	1.50	1.2	.04
150	ARR-12-210	1.60	1.8	.04

Charles E. Thompson
William L. Lehmbeck
James A. Martin

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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
151	ARR-12-215	3.10	1.6	.02
152	ARR-12-220	1.70	2.0	.03
153	ARR-12-225	2.60	1.4	.03
154	ARR-12-230	2.20	1.6	.03
155	ARR-12-235	9.00	.8	.03
156	ARR-12-240	1.60	.8	.04
157	ARR-12-245	.24	.6	.03
158	ARR-12-250	.53	1.0	.02
159	ARR-12-255	.36	1.0	.02
160	ARR-12-260	.48	.8	.01
161	ARR-12-265	.59	.8	.01
162	ARR-12-270	.15	.8	.01
163	ARR-12-275 *	.00 *	.0 *	.00 *
164	ARR-12-280	1.80	2.0	.04
165	ARR-12-285	.53	1.8	.04
166	ARR-12-290	.06	1.8	.04
167	ARR-12-295	.88	.8	.04
168	ARR-12-300	.22	.6	.01

*NOTE: Item 163 ARR-12-275 not received.

REGISTERED ASSAYER CERTIFICATE 9127 CHARLES E. THOMPSON Arizona U. S. A.

William L. Lehmbeck
for Manager

5/27/83

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

REPORT OF ANALYSIS

JOB NO. TCU 105
May 24, 1983
ARR-8-60 THRU 340

MERIDIAN LAND & MINERALS COMPANY
Attn: Mr. Doug Grisham
P. O. Box 2521
Billings, Montana 59103-2521

Analysis of 118 Drill Cutting Samples

ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
1	ARR-8-60	<.02	.6	.24
2	ARR-8-65	<.02	.4	.26
3	ARR-8-70	<.02	.4	.27
4	ARR-8-75	<.02	.6	.17
5	ARR-8-80	<.02	.2	.18
6	ARR-8-85	<.02	.2	.09
7	ARR-8-90	<.02	.2	.08
8	ARR-8-95	<.02	.2	.10
9	ARR-8-95A **	<.02	.2	.11
10	ARR-8-100	<.02	.2	.10
11	ARR-8-105	<.02	.2	.11
12	ARR-8-110	<.02	.2	.11
13	ARR-8-115	<.02	.2	.11
14	ARR-8-120	<.02	.2	.14
15	ARR-8-125	.06	.2	.10
16	ARR-8-130	.03	.4	.06
17	ARR-8-135	<.02	.4	.06
18	ARR-8-140	<.02	.2	.08
19	ARR-8-145	<.02	.2	.05
20	ARR-8-150	<.02	.2	.06
21	ARR-8-155	<.02	.2	.06
22	ARR-8-160	<.02	<.2	.04
23	ARR-8-165	<.02	<.2	.08
24	ARR-8-170	<.02	<.2	.11
25	ARR-8-175	<.02	<.2	.07

SKYLINE LABS, INC.
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
26	ARR-8-180	.02	<.2	.06
27	ARR-8-185	<.02	<.2	.09
28	ARR-8-190	<.02	<.2	.05
29	ARR-8-195	<.02	<.2	.05
30	ARR-8-200	<.02	<.2	.05
31	ARR-8-205	<.02	<.2	.05
32	ARR-8-210	<.02	<.2	.03
33	ARR-8-215	<.02	<.2	.04
34	ARR-8-220	<.02	<.2	.03
35	ARR-8-225	<.02	<.2	.08
36	ARR-8-230 *	.00*	.0*	.00 *
37	ARR-8-235	<.02	<.2	.07
38	ARR-8-240	<.02	<.2	.07
39	ARR-8-245	<.02	<.2	.03
40	ARR-8-250	<.02	<.2	.48
41	ARR-8-255	<.02	<.2	.03
42	ARR-8-260	<.02	<.2	.03
43	ARR-8-265	<.02	<.2	.02
44	ARR-8-270	<.02	<.2	.02
45	ARR-8-275	<.02	<.2	.01
46	ARR-8-280	<.02	<.2	.02
47	ARR-8-285	<.02	<.2	.02
48	ARR-8-290	<.02	<.2	.02
49	ARR-8-295	<.02	<.2	.02
50	ARR-8-300	<.02	<.2	.02

SKYLINE LABS, INC.
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
51	ARR-8-305	<.02	<.2	.03
52	ARR-8-310	<.02	<.2	.02
53	ARR-8-315	<.02	.2	.06
54	ARR-8-320	<.02	<.2	.02
55	ARR-8-325	<.02	<.2	.02
56	ARR-8-330	<.02	<.2	.01
57	ARR-8-335	<.02	<.2	.02
58	ARR-8-340	<.02	<.2	.02
59	ARR-9-15	.18	7.6	.19
60	ARR-9-20	.40	8.8	.22
61	ARR-9-25	.06	6.6	.14
62	ARR-9-30	.04	3.8	.11
63	ARR-9-35	.04	1.4	.10
64	ARR-9-40	<.02	.4	.08
65	ARR-9-45	.03	.2	.10
66	ARR-9-50	.04	.6	.07
67	ARR-9-55	.03	.2	.10
68	ARR-9-60	.04	.2	.14
69	ARR-9-65	.03	.2	.11
70	ARR-9-70	.03	<.2	.11
71	ARR-9-75	.05	<.2	.12
72	ARR-9-80	<.02	<.2	.16
73	ARR-9-85	.03	.2	.10
74	ARR-9-90	.03	.2	.15
75	ARR-9-95	.03	1.8	.28

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. [illegible]

SKYLINE LABS, INC.
1775 W. Sahuaro • P.O. Box 50106
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
76	ARR-9-100	.04	11.0	.42
77	ARR-9-105	.23	16.0	.40
78	ARR-9-110	1.40	19.0	.22
79	ARR-9-115	.36	20.0	.20
80	ARR-9-120	.16	12.0	.26
81	ARR-9-125	.32	30.0	.55
82	ARR-9-130 *	.00 *	.0 *	.00 *
83	ARR-9-135	.03	6.0	.55
84	ARR-9-140	.05	7.0	.50
85	ARR-9-145	.05	4.0	.42
86	ARR-9-150	.02	.8	.09
87	ARR-9-155	.06	1.0	.07
88	ARR-9-160	<.02	.2	.02
89	ARR-9-165	<.02	.8	.03
90	ARR-9-170	<.02	.6	.03
91	ARR-9-175	<.02	.2	.02
92	ARR-10-15 *	.00 *	.0 *	.00 *
93	ARR-10-20 *	.00 *	.0 *	.00 *
94	ARR-10-25 *	.00 *	.0 *	.00 *
95	ARR-10-30 *	.00 *	.0 *	.00 *
96	ARR-10-35 *	.00 *	.0 *	.00 *
97	ARR-10-40 *	.00 *	.0 *	.00 *
98	ARR-10-45 *	.00 *	.0 *	.00 *
99	ARR-10-50 *	.00 *	.0 *	.00 *
100	ARR-10-55 *	.00 *	.0 *	.00 *

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

James A. Martin

SKYLINE LABS, INC.
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JOB NO. TCU 105
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
101	ARR-10-60	.11	13.0	.60
102	ARR-10-65	.38	17.0	1.20
103	ARR-10-70	.13	9.0	1.00
104	ARR-10-75	.07	5.8	.20
105	ARR-10-80	.06	4.8	.36
106	ARR-10-85	.05	4.8	.34
107	ARR-10-90	.10	.4	.06
108	ARR-10-95	<.02	.2	.05
109	ARR-10-100	<.02	1.2	.16
110	ARR-10-105	<.02	.4	.12
111	ARR-10-110	<.02	<.4	.04
112	ARR-10-115	.11	.2	.06
113	ARR-10-120	<.02	.2	.06
114	ARR-10-125	<.02	<.2	.03
115	ARR-10-130	<.02	<.2	.02
116	ARR-10-135	<.02	<.2	.02
117	ARR-10-140	<.02	<.2	.02
118	ARR-10-145	<.02	<.2	.03
119	ARR-10-150	<.02	<.2	.01
120	ARR-10-155	<.02	<.2	.02
121	ARR-10-160	.02	.4	.06
122	ARR-10-165	<.02	<.2	.02
123	ARR-10-170	<.02	<.2	.02
124	ARR-10-175	<.02	<.2	.02
125	ARR-10-180	<.02	<.2	.02

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck

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JOB NO. TCU 105
May 24, 1983
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ITEM	SAMPLE NUMBER	Au (ppm)	Ag (ppm)	Hg (ppm)
126	ARR-10-185	<.02	<.2	.02
127	ARR-10-190	.02	<.2	.02
128	ARR-10-195	<.02	<.2	.02
129	ARR-10-200	<.02	<.2	.02

*NOTE: Items 36, 82, 92, 93, 94, 95, 96, 97 98, 99 and 100 not received.

**NOTE: Received two samples numbered ARR-8-95 so made one ARR-8-95A.

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK STATE OF ARIZONA

William L. Lehmbeck
Manager