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Alvarado Gold Mine

Yavapai County, Arizona

Prepared by: John Chronic

March, 1981

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ALVARADO GOLD MINE
Yavapai County, Arizona

INTRODUCTION

The Alvarado Mine has had a long and intermittent history of development and production since its discovery in 1897. Up to the present it has probably produced somewhat more than 25,000 ounces of gold and 32,000 ounces of silver, but the ore-bearing unit has only been about 15% mined out to a depth of 1,500 feet. It is located about four miles northeast of Congress Junction which is 60 miles northwest of Phoenix, in what has been called the Weaver or Rich Hill Mining District (Fig. 1). The Congress Mine is located about four miles to the west of Alvarado, and the Octave about six miles to the southwest (Fig. 2); both of these mines have produced several times as much as the Alvarado, and each has been mined to a much greater depth.

GEOLOGY

The southwest corner of the Weaver Mountains, in which the Alvarado Mine lies, is of Precambrian igneous and metamorphic rock much of which is granite, in which occur occasional thin, more or less parallel, beds or veins of white quartz and quartz porphyry, and dark gray diorite porphyry. Both generally have a strike trending northeast-southwest to east-west and a dip of less than 45° to the northwest or north (Fig. 3). There is a good possibility that at least this part of the present mountain mass may have been a sequence of early Precambrian sedimentary rock which was later in Precambrian time migmatized or partly liquified by high pressures and temperatures. At this time, the ore values were deposited or localized along a particularly quartz-rich bed

which may have originally been one to several thin beds of sandstone. Without further study of the region, the real origin of the bedrock and lode deposits remains speculative, although the deposits were almost certainly formed in Precambrian time.

The same general bedrock character, including the quartz units, extends westward at least as far as the Congress Mine and eastward through the Octave Mine, and it is possible that some of the ore-bearing quartz units are continuous across all the properties (Fig. 2).

At the Alvarado, the ore-bearing unit is a series of from one to about five quartz beds or "veins" totalling an average of 3.0 feet in thickness, dipping at about 26° northwest, with a strike of about north 55° east. This ore-bearing quartz unit is generally just below a black to dark green diorite or gabbro porphyry dike and is usually conformable with it. In some places the basic igneous unit is mineralized and contains considerable commercial ore. There are a few other thin white quartz units outcropping on the property, but none is as prominent or as mineralized as the unit which has been mined.

Mineralization of the ore-bearing unit is principally iron sulfide, with small amounts of lead, zinc and copper sulfide. It is not known whether the gold and silver values in the ore are within the pyrite masses or separate from them, but generally the greater proportion of pyrite in the sample, the higher the gold and silver content.

The quartz units are cut by one prominent fault in the mine, here called the Alvarado, which bears generally north 70° west and dips 80° to the north, but is somewhat variable in both strike and dip (Fig. 3 and 4). The horizontal displacement of the ore-bearing unit on this fault is about 40 feet, but the offset varies because of the variable nature of its surface. The "C" or main shaft intersects the fault approximately 100 feet from the surface and the southwest drifts encounter it progressively further southwest in the deeper drifts (Fig. 5 and 6). The effect of the fault on the values of the

ore body appears to be negligible, but the offset of the ore-bearing unit across it has caused some problems in mining.

In recent surface excavations between the two principal shafts, another small fault in the ore-bearing unit was located. It has an offset of about 5 feet, but the strike and dip of the fault surface could not be determined, although it is thought to be approximately parallel to the Alvarado Fault. Without any doubt other minor faults will be discovered in the area of the mine, but it does not appear that any of them will seriously affect mining activities.

HISTORY OF THE MINE

First located by Henry L. Scott, an employee of the famous Congress Gold Mine about three miles to the west, Alvarado produced a "small" amount of gold before 1905, from two inclined shafts, called B and C, about 800 feet deep. Patents for the Planet, Saturn, Mesa, Oro Fino, Oroville, Cottonwood, and Golden Bowl claims were issued in 1897 (Fig. 3), but the Planet Saturn Mining Company went bankrupt late in 1905 and developments ceased, as the mine was apparently not profitable to operate with gold at \$20 per ounce.

In 1907, an extensive study of the mine was made by James W. Neill, who reported that the mine could at that time afford an output of 200 tons per day for an indefinite period. He carefully computed the ore which he considered proved, and concluded from more than 500 assays taken at various sites in the mine, that there were at least 176,230 tons of ore down to the No. 10 level having an average value of \$5.33 per ton, considering gold to have a value of \$20 per ounce (Fig. 4).

In 1910, Mr. Neill again visited the mine and described "significant developments" which had taken place since his previous visit. From his letter report it can be concluded that the "C" shaft had been deepened to about 1100 feet, that mining and milling machinery had been installed, and that "larger

tonnages of low grade ore are now blocked out". So far as can be determined from the sparse records of the time, very little if any production of gold seems to have resulted from these optimistic reports, and the installation of milling and other machinery, and the mine was soon closed down because of litigation. In 1915, the mine was reactivated, but once again no production was recorded; and in 1920, the machinery and surface installations at the minesite were sold. During all the preceding activities, the Arizona Bureau of Mines has no record of gold or silver production, but their records are admittedly incomplete for this early period, and some recovery was surely made between 1897 and 1935.

Developments at Alvarado were nil between 1920 and 1935, but in that year the mine was reopened and substantial production began for the first time under the name Liberty Hill Gold Mines, Ltd. In 1938, a representative from the U.S. Bureau of Mines visited the mine and reported on it in Circular 6991. That report contains a discussion of the operations then taking place at Alvarado, and a map of the then-existing workings of the mine (Fig. 6). It is certain from present accounts of the miners who worked in the mine during this time, that after 1938, the workings were deepened to at least the No. 13 level and that a large proportion of the ore probably came from below the No. 10 level of the mine.

Between 1935 and the beginning of World War II, when the mine was shut down by the U. S. government, state records show the following production from Alvarado:

<u>Year</u>	<u>Gold</u>	<u>Silver</u>	<u>Ore Mined</u>
1935	98	116	650
1936	23	33	380
1937	No Records Available		
1938	3,709	4,241	14,808
1939	6,919	9,925	31,652
1940	5,898	7,794	37,302
1941	5,220	5,657	36,427
1942	2,873	3,398	18,993
1943	44	72	140
Totals	24,784 oz.	31,236 oz.	139,312 tons

During the productive interval, two U. S. Reconstruction Finance Corporation loans for a total of \$90,000 were made to operators of the Alvarado, and these were paid off quickly from the mine proceeds. As far as is known, there is no map now existing which shows the final location of shafts, tunnels and stopes when the mine was closed, and there is some disagreement as to whether the mine finally was deepened to 1,500 feet or not.

After a long period of complete inactivity, during which the mine filled up with water, William Munz in 1964 obtained title to the seven claims on which the mine lies and subsequently used the mine site as his intermittent winter-time home. In early 1980, Robert Scarth purchased the property, and later that year surface improvements were made, the C or "main" shaft was pumped out to about 500 feet from the surface, samples were taken across the surface outcrop and in the available mine openings, and two new adjacent claims, the North Star 1 and 2, were located at the northeast end of the patented ground (Fig. 3).

The patented claims known as Side Issue, Jupiter, Comet, Evening Placer, Scott Placer, and the Comet Millsite which adjoin the Alvarado Mine have never produced substantial tonnages of ore, but since they are contiguous to Alvarado, negotiations are proceeding to acquire them.

ORE VALUES AND VOLUME

In 1907, Mr. Neill suggested that the overall ore-bearing unit would yield \$5.33/ton in gold, or 0.27 oz/ton. In the records of production during 1935 to 1943, however, gold yield averaged 0.18 oz/ton, and in addition, 0.22 oz/ton silver was recovered.

In order to get a better assessment of the distribution of values in the Alvarado Mine, a map showing the higher values of the Neill sampling program was prepared (Fig. 7). An examination of this map, and a comparison of it

with Figure 4 will allow the reader to appreciate the distribution of all samples taken, compared to those which show higher gold values. From this comparison, it can be seen that the main shaft workings and the northeast part of the No. 10 level were fairly completely sampled, whereas there are almost no samples taken in the southwest half of the No. 10 level or in the "B" shaft below the No. 4 level. Based on this sampling program, it can be concluded tentatively that at least on the northeast the higher values probably increase in the deeper part of the mine, but the evidence is prejudiced somewhat by the irregular sampling. Unfortunately the levels below about 500 feet are at present flooded.

Besides the early data compiled by Mr. Neill, Charles Moores of Las Vegas, Nevada, has sampled the surface and shallow workings of the mine at 85 locations (Fig. 7) and found an average overall value of 0.17 oz. gold per ton of the gold-bearing unit and the immediately adjacent wallrock. The 21 surface assays of Moores had exactly the same value, and the subsurface assays, which extend down to the No. 6 level also show the same values, except that on the No. 6 level the average is only 0.11 oz/ton, while in the shallower levels the values are correspondingly higher. Mr. Neill's average values for the No. 6 level were also the lowest of any level sampled, that is 0.17 oz/ton.

It is surely of some significance that the average overall recovered gold values for the mine were 0.18 oz/ton, while the overall average of the assays of Moores is 0.17 oz/ton. Mr. Neill's higher figure 0.27 oz/ton, was probably caused by his relatively extensive sampling of the deeper mine levels, which show a significantly higher average than the ones on or near the surface.

The discrepancy between the Neill averages and the mine average, 0.09 oz/ton, probably represents values left in the tailings, less some lower values probably mined and milled because of the method used in mining. In addition, lack of knowledge of the amount and grade of ore mined below the No. 10 level leave the complete reason for the discrepancy and the true mining values somewhat obscure.

An important factor in the mining of Alvarado is the thickness of the ore-bearing unit. The Neill survey was the most detailed, by far, of any study made, and indicated that:

1. The unit varies from a negligible thickness to 8.0 feet, with an overall average of 3.0 feet, out of 498 measurements, distributed as shown in Figure 3.
2. In the shallower part of the mine, where the most measurements are located, the ore-bearing unit averages 2.8 feet, while below about 500 feet the unit averages 3.6 feet in thickness. However, there are fewer readings in the deeper levels, and these are considerably more localized in the northeast part of the mine, so the data are not completely representative of the ore body.

On the surface, the ore-bearing quartz unit averages about 3 ft. in thickness, the same as it does in the mine, and makes a prominent outcrop. Considering that the ore-bearing unit is about three feet in thickness, the volume of the unit within the Saturn and Planet Claims to a depth of 1,500 feet, is about 500,000 cubic yards, or 750,000 tons. If only 150,000 tons of this ore have been mined within this unit, approximately 600,000 tons remain as potentially minable. Obviously this is a gross generality which will be highly modified as mining proceeds and variation of values is determined, but at least it is a ball-park figure to help determine the possible size of future operations.

There is some possibility that mining could begin on the surface in order to recover some values before it is necessary to develop the underground mine. As a surface operation, it has been estimated that about 30,000 tons of ore could be quarried or mined from the two claims before the ore became impractical to surface mine, with a probable gross value of about \$3,000,000 at current gold and silver prices.

RECENT WALLROCK TESTING AND
EVALUATION ON COMET CLAIM

In 1974, a study was made of some of the surface rocks to the west of Alvarado by John Plaisted, a Technical Services Metallurgist for American Cyanamid Company. Mr. Plaisted examined outcrops on the Comet Claim, across which the ore-bearing unit of the Alvarado Mine extends, and his study bears on the suitability of the same ore as that occurring at Alvarado (Fig. 3). Mr. Plaisted sampled an aggregate of the wallrock on the Comet Claim to determine gold and silver values, believing that the obvious quartz-rich ore unit would contain at least as high values, and would be straight-forward or simple in treatment. His sampling was mainly within about one foot from the quartz unit on both sides of it. He states:

Two methods of extraction were tested on the aggregate (wall rock) ore. Both cyanidation at 10 mesh and bulk sulfide flotation indicated favorable rates of precious metal recovery. As is common to the ore type, the silver was less amenable to beneficiation than the gold. The following table summarizes results from the above mentioned metallurgical investigation.

Summary of Metallurgical Results

Process	Material Size	Head Au(o/t)	Assay Ag(o/t)	Recovery %	
				Au	Ag
Flotation	7% + 200 mesh	0.056	0.074	63.70	45.03
Cyanidation	+ 10 mesh	0.066	0.060	71.50	41.80

A quick glance at the data generated would indicate that cyanidation at a coarse size is feasible. With gold values at a conservative 630 dollars per troy ounce and with silver in the neighborhood of 15 dollars per troy ounce (as of July 1, 1980) a relatively small amount of tonnage (50,000 tons) could yield approximately 1.5 million dollars in recoverable values. Recoverable values at a coarse grind (+ 10 mesh) with cyanidation indicate a figure of about 30 dollars per ton.

A more extensive program for evaluation of this property is advisable; however, it is my opinion that the above mentioned property shows great promise for profitable development.

If these data are extrapolated to Alvarado, and every evidence suggests that they can be, then the ore values and reserves discussed previously, which include only the quartz-rich ore-bearing unit, may be quite conservative.

MINE DUMPS

As a result of mining during the 1935-43 interval, there is a dump at the mine which is estimated to contain about 140,000 tons of finely ground tailings, containing potentially recoverable gold values. A representative assay on these tailings has shown a gold value of about 0.05 oz/ton, well within the profitability range of modern efficient heap leaching. Recent correspondence with an Idaho gold recovery company also indicates that 65 to 80% of the fine gold which remains in these tailings can be recovered by dry recovery methods with little financial outlay. A concentrate from this dump, prepared by the Dri-Gold Company of Boise, Idaho was found to contain 0.84 oz/ton gold.

In addition, there are probably 100,000 tons of coarse material which was mined but not milled, and from part of which profitable gold and silver values may be obtained. At the nearby Octave Mine, about four miles southeast of Alvarado, an extensive secondary recovery program is being initiated, using similar tailings and dump material.

To assist in this evaluation, several assays were made of the dumps around the mine area, as shown in Figure 8. It is quite possible that recovery of values from at least part of these dumps and tailings would make a profitable operation at present gold and silver prices, even if bedrock mining operations were not renewed.

WATER

At Alvarado, water supply will be adequate for almost any operation that can be envisioned. In addition to mine water, estimated to be 50 gallons per minute, there is a good well upstream from the mine, whose location is shown in Figure 3. This well was pumped to determine its yield in 1980. According to Charles Moores, the water well will produce about 150 gallons per minute. There is also a good possibility that other wells can be located in Fool's Gulch, which drains a considerable area just east of Alvarado, to further increase the total yield of water needed in mining and processing operations.

CONCLUSIONS

To a depth of 1,500 feet in the Alvarado Mine, there are an estimated 600,000 tons of unmined ore present on the patented claims, and of course there is no reason to believe that the ore-bearing unit ceases at that level, as both the adjacent mines have been mined to much greater depths. Based on past experience, the gold and silver values which probably will be recoverable are more than \$55,000,000. The wallrock adjacent to the ore body contains sufficient values to be commercial, and tests have been made which confirm that treatment of this rock is practical, adding to the probable total potential of the mine.

Mining conditions will be good, although the slope of the ore-bearing unit is somewhat less than ideal and this may cause some added expenditure, over optimum, to get the ore out of the mine. The present mine shafts and tunnels should serve as adequate access for any further underground operations which may be developed, and other shafts can be easily excavated along the strike of the ore-bearing unit as it is readily accessible to vehicles and machinery.

Some surface recovery of ore may be economically practical, as the ore-bearing unit outcrops the entire length of the Saturn and Planet Claims, and can be easily excavated. In addition, gold recovery is likely to be profitable from the present mine tailings and dumps, of which there are probably at least 150,000 tons.

Electricity and telephone service are available at the mine, good roads are already present, and the water supply is almost certainly sufficient for any reasonable recovery and mining operations.

In view of all the factors considered above, the probable world-wide strength of gold and silver values, as well as that of our present economy, it is thought that the Alvarado Mine is now an excellent commercial venture which can be highly profitable to an aggressive and suitable operation.

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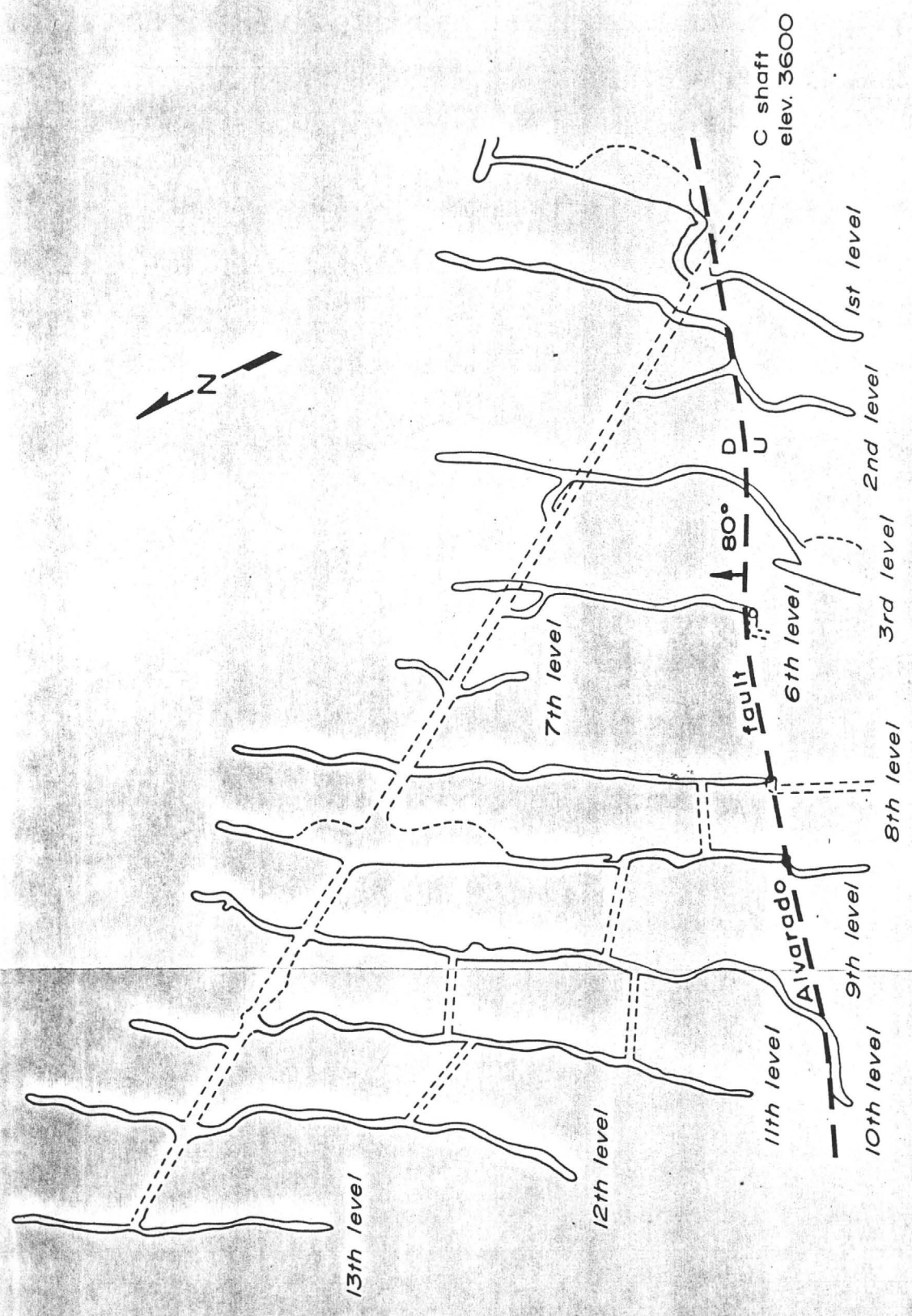
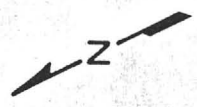
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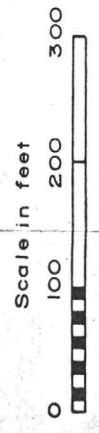
SCARTH OIL & GAS CO.

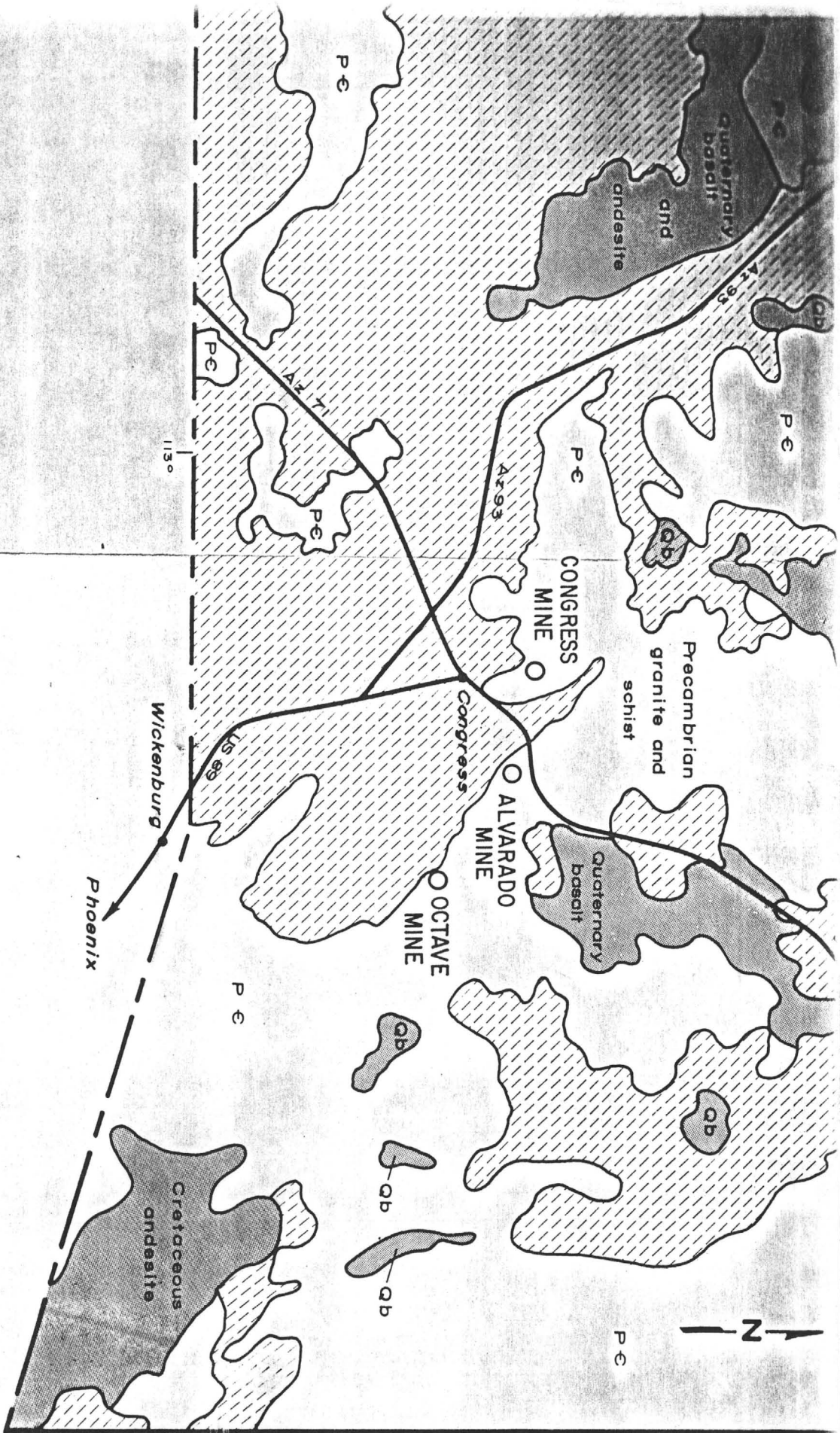
ALVARADO GOLD MINE
Yavapai County, Arizona

**MAP OF ACCESSIBLE PART OF
WORKINGS OF ALVARADO MINE,
INCLUDING LOCATION OF ALVARADO
FAULT, AND PROPOSED RAISES
AS OF 1938**

March, 1981

Figure 6





LEGEND

- ☐ Recent and Quaternary alluvium
- ☐ Precambrian granite and metamorphic rocks

Scale 1" = 31,250'

0 10 Miles

SCARTH OIL & GAS CO.

ALVARADO GOLD MINE

Yavapai County, Arizona

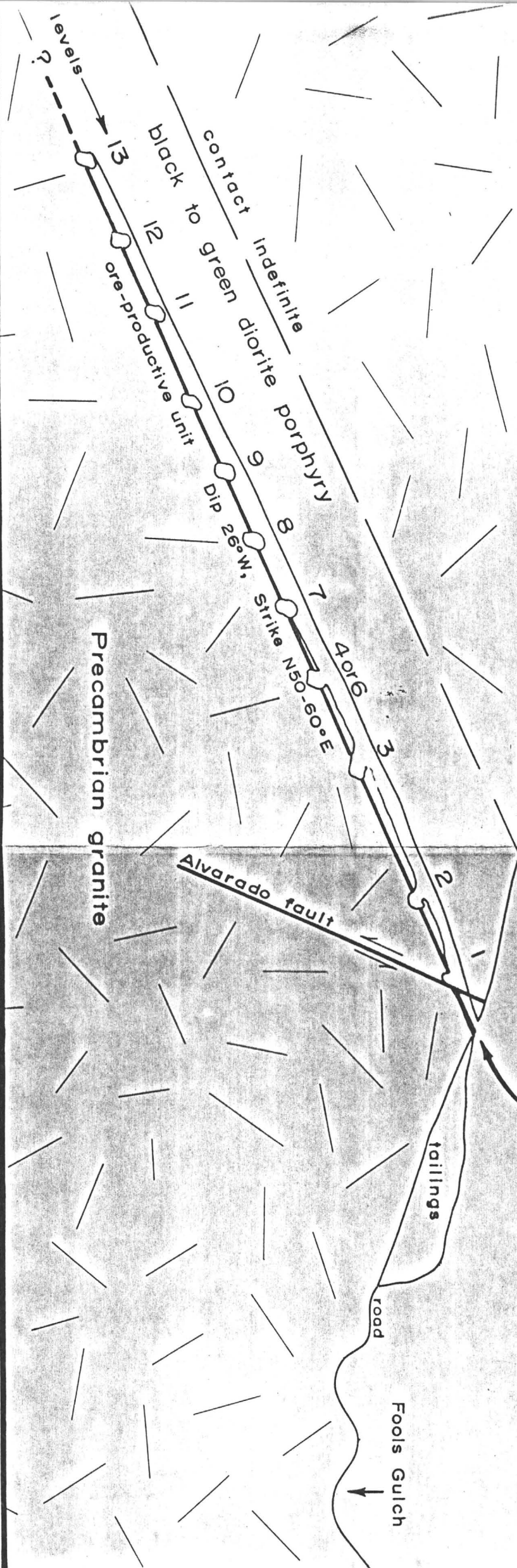
GENERALIZED GEOLOGIC MAP

March, 1981

Figure 2

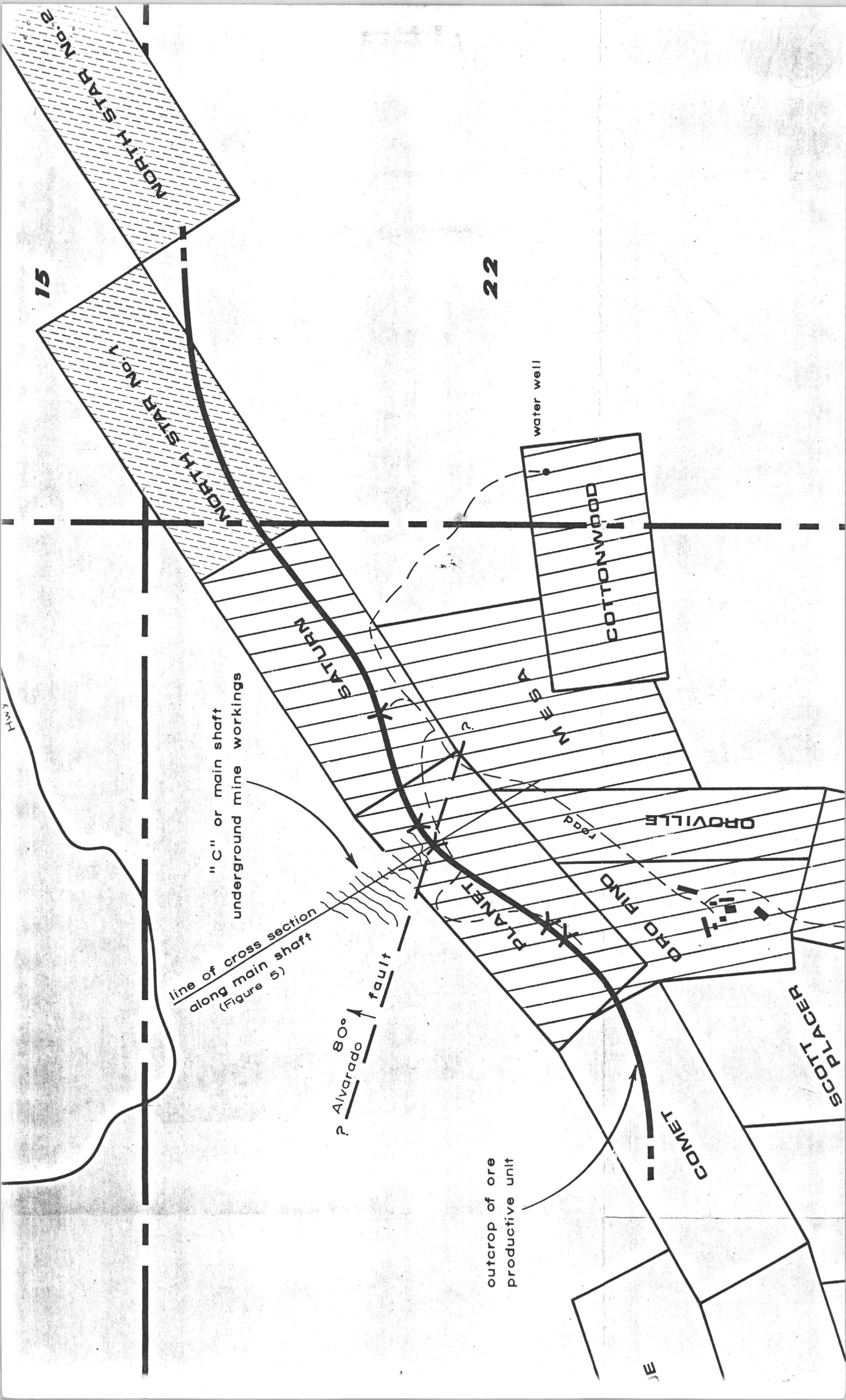
ian granite

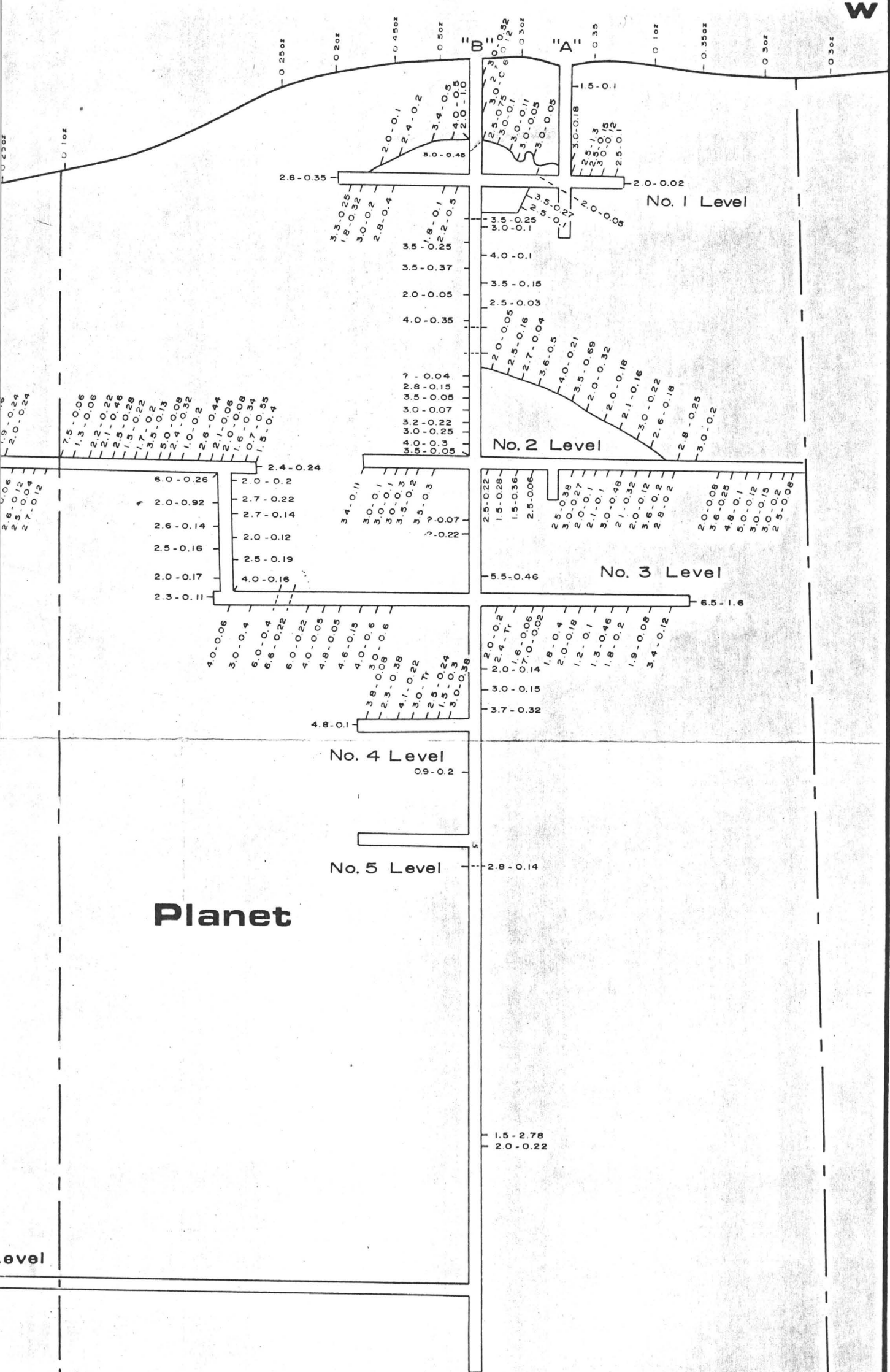
artz units not mapped in this bedrock.



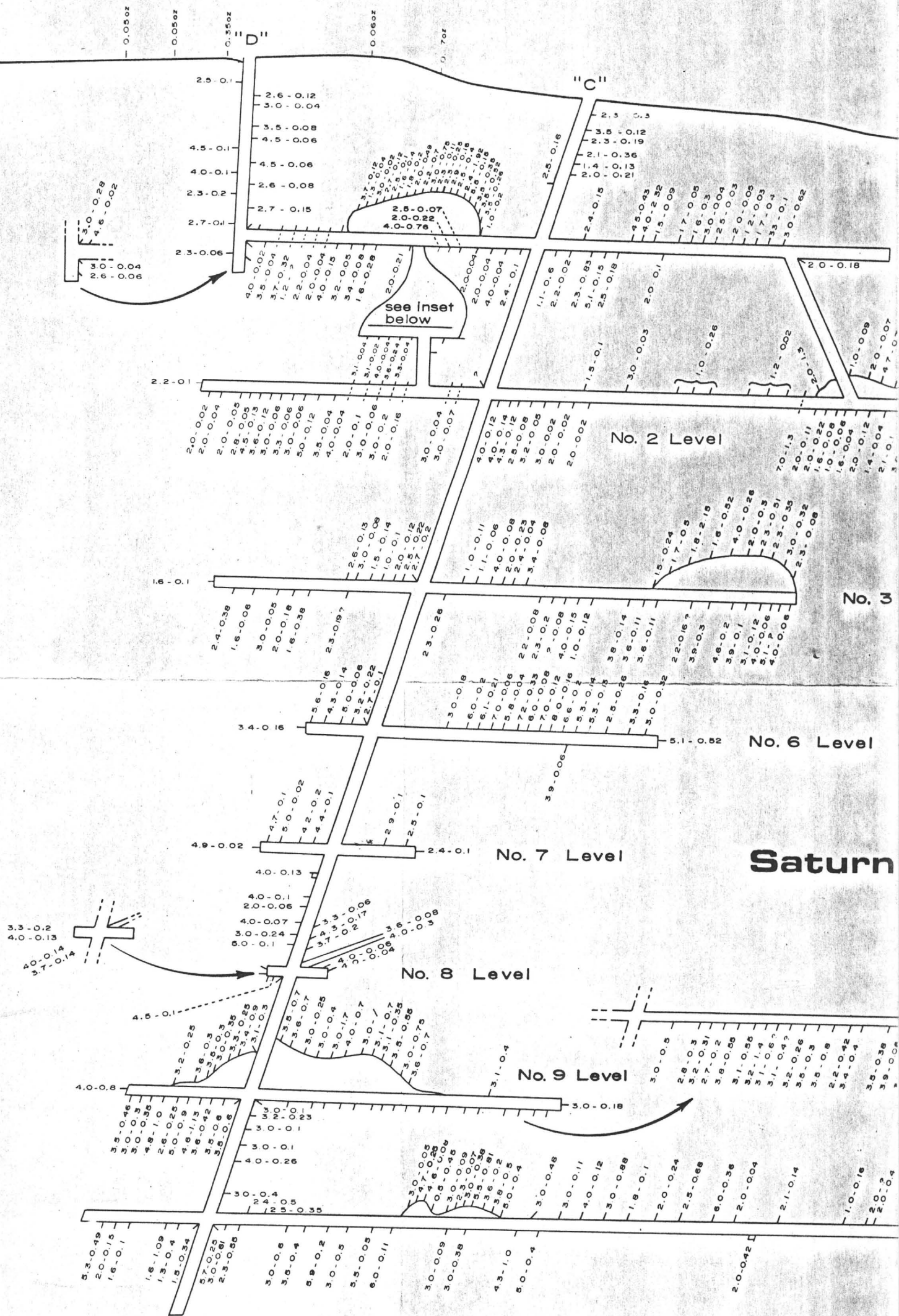
SCARTH OIL & GAS CO.

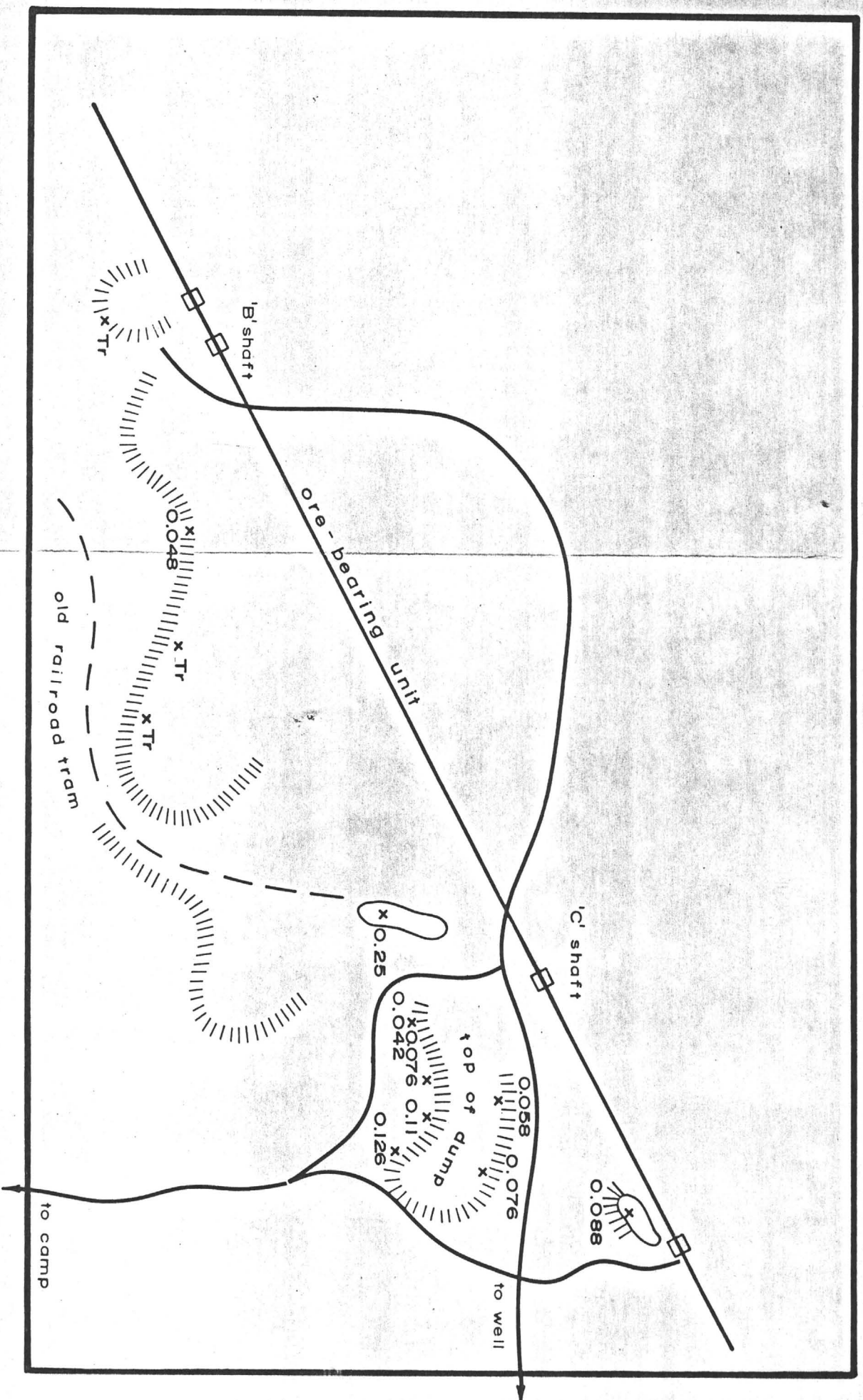
ALVARADO GOLD MINE





E





Approximate Scale 1"=200'



SCARTH OIL & GAS CO.

ALVARADO GOLD MINE
Yavapai County, Arizona
VALUES IN DUMPS AND
ORE PILES ASSAYED

PROJECT DESCRIPTION *

☐ Check if preliminary and expanded report is being prepared.

Date Feb 10, 1983Examined by GAP - officeUSGS, or NTS Map Coverage USGSCongress 7 1/2'

1. PROJECT NAME Alvarado Mine COMMODITY Ag
2. LOCATION: General Statement about 4 mi NE of Congress Junc.
 Lat. _____ Long. _____
 State or Province Arizona County Yavapai
 Accessibility 4 mi NE Km/Mi (M) From Congress Junc Via (Road, Rail, Air) Graded Rd
3. LAND STATUS: (Claims: Name, Number, Size, etc.) _____
 Due Dates ?
4. REFERRED BY Searth Oil & Gas DATE _____
5. OWNERSHIP: (Names & Addresses of Owners, Interests held) _____
Searth Oil & Gas
6. GENERAL GEOLOGY: (Type of Deposit, Geological Setting, etc.)
In area of Precambrian crystalline terrane has general NW-trending, NE dipping foliation. In a greenstone horizon have a thin (~3') Qtz vein parallel to foliation.
7. TARGET Similar veins to the Octave and Congress mines to the SE and NW, respectively
8. MINERALIZATION, ASSAYS, RESERVES 143,438 Tons @ 26 oz/Tb Ave width 3.57'
9. POTENTIAL Limited or 241,000 Tons @ .18 - .17 Tb
10. WORK DONE ON PROPERTY TO DATE: (History of DEVELOPMENT)
Mined in 1900-1910, Again from 1934-1937 - 19 Levels, approx 6000' of workings, past prod. ~ \$500,000
11. OWNER'S PROPOSED TERMS: (if known)
 Interest to be Acquired _____ % Subject to _____
 Cash Payments Totalling\$ _____ Over Period Of _____ Years
 Work Expenditures Totalling\$ _____ Over Period Of _____ Years
12. INITIAL COMMITMENT (If Any): Cash\$ _____ by _____
 Work Expenditure\$ _____ by _____
 Other _____
13. WORK PROGRAM: Nature & Extent of Work, Objective, Cost, Time Required _____
14. IF SUCCESSFUL, FOLLOW-UP PROGRAM _____
15. TIMING _____
16. ECONOMIC APPRAISAL (if appropriate) _____
17. RECOMMENDATIONS/ADDITIONAL COMMENTS: The vein dips about 30° to the NE, into the hill. Vein widths are narrow and grades are somewhat erratic. Ground conditions prob. not too good. Expensive mining, fairly low grade, relatively small potential. Probably not worth pursuing.

* Use additional pages where more space is needed.



DEKALB Mining, Inc.

January 27 1982

Mr. Stanley L. Scarth
Scarth Oil and Gas Company
205 Paramount Plaza
Amarillo, Texas 79101

Dear Mr. Scarth:

Rich Hill M/D
Gary Parkison, from our Albuquerque office, has shown me two reports; one on the Alvarado Gold mine in Yavapai County, Arizona, and the other on the Tule Canyon Placer in Esmeralda County, Nevada.

I have reviewed both offerings in the context of DEKALB's current exploration objectives and have concluded that we would not be interested in a venture on the Alvarado mine. Mr. Parkison will be returning the report to you.

I've asked our placer specialist in Denver, Kerry Stanaway, to also review the report on the Tule Canyon Placer. You will hear directly from him of any interest DEKALB might have. I've also asked him to return your report and maps if we have no plans to enter the Tule Canyon venture.

Let me personally thank you for submitting the two properties to DEKALB and wish you success in your mining activities.

Sincerely,

DEKALB Mining, Inc.

N. L. Archbold

N. L. Archbold
Senior Geologist

NLA:smp

cc: Gary Parkison
Kerry Stanaway

SCARTH OIL & GAS CO.

205 PARAMOUNT PLAZA • AMARILLO, TEXAS 79101
(806) 373-6932

Robert W. Scarth
President

December 14, 1981

*Return to
Scarth*

Dekalb Mining
Mr. Gary Parkinson
958 Antelope N.E.
Albuquerque, NM 87122

Dear Mr. Parkinson:

Pursuant to our telephone conversation of this morning, please find attached a copy of the Alvarado Gold Mine Report, the Tule Canyon Report, and the Tule Canyon Supplemental Report.

If I can be of further assistance to you on this matter, please do not hesitate to call me. If you are not interested in the properties, please return the reports to our office.

Yours truly,



Stanley L. Scarth

SLS:gm
Attachments

*Believe have ~300,000 Tons proven @ .10-.15 unit Au at
Alvarado Mine. Alvarado accessible at present to the
6th level. Have 153 acres. controlled.
These properties advertised in Min. Engineering, Nov 81, p. 1651
I did not ask him about the placer property, but as noted
in advertisement I asked him to send along this data
and would forward to you in Sparks.*

File

Alvarado Gold Mine

Yavapai County, Arizona

Prepared by: John Chronic

March, 1981

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Yavapai County, Arizona

INTRODUCTION

The Alvarado Mine has had a long and intermittent history of development and production since its discovery in 1897. Up to the present it has probably produced somewhat more than 25,000 ounces of gold and 32,000 ounces of silver, but the ore-bearing unit has only been about 15% mined out to a depth of 1,500 feet. It is located about four miles northeast of Congress Junction which is 60 miles northwest of Phoenix, in what has been called the Weaver or Rich Hill Mining District (Fig. 1). The Congress Mine is located about four miles to the west of Alvarado, and the Octave about six miles to the southwest (Fig. 2); both of these mines have produced several times as much as the Alvarado, and each has been mined to a much greater depth.

GEOLOGY

The southwest corner of the Weaver Mountains, in which the Alvarado Mine lies, is of Precambrian igneous and metamorphic rock much of which is granite, in which occur occasional thin, more or less parallel, beds or veins of white quartz and quartz porphyry, and dark gray diorite porphyry. Both generally have a strike trending northeast-southwest to east-west and a dip of less than 45° to the northwest or north (Fig. 3). There is a good possibility that at least this part of the present mountain mass may have been a sequence of early Precambrian sedimentary rock which was later in Precambrian time migmatized or partly liquified by high pressures and temperatures. At this time, the ore values were deposited or localized along a particularly quartz-rich bed

which may have originally been one to several thin beds of sandstone. Without further study of the region, the real origin of the bedrock and lode deposits remains speculative, although the deposits were almost certainly formed in Precambrian time.

The same general bedrock character, including the quartz units, extends westward at least as far as the Congress Mine and eastward through the Octave Mine, and it is possible that some of the ore-bearing quartz units are continuous across all the properties (Fig. 2).

At the Alvarado, the ore-bearing unit is a series of from one to about five quartz beds or "veins" totalling an average of 3.0 feet in thickness, dipping at about 26° northwest, with a strike of about north 55° east. This ore-bearing quartz unit is generally just below a black to dark green diorite or gabbro porphyry dike and is usually conformable with it. In some places the basic igneous unit is mineralized and contains considerable commercial ore. There are a few other thin white quartz units outcropping on the property, but none is as prominent or as mineralized as the unit which has been mined.

Mineralization of the ore-bearing unit is principally iron sulfide, with small amounts of lead, zinc and copper sulfide. It is not known whether the gold and silver values in the ore are within the pyrite masses or separate from them, but generally the greater proportion of pyrite in the sample, the higher the gold and silver content.

The quartz units are cut by one prominent fault in the mine, here called the Alvarado, which bears generally north 70° west and dips 80° to the north, but is somewhat variable in both strike and dip (Fig. 3 and 4). The horizontal displacement of the ore-bearing unit on this fault is about 40 feet, but the offset varies because of the variable nature of its surface. The "C" or main shaft intersects the fault approximately 100 feet from the surface and the southwest drifts encounter it progressively further southwest in the deeper drifts (Fig. 5 and 6). The effect of the fault on the values of the

ore body appears to be negligible, but the offset of the ore-bearing unit across it has caused some problems in mining.

In recent surface excavations between the two principal shafts, another small fault in the ore-bearing unit was located. It has an offset of about 5 feet, but the strike and dip of the fault surface could not be determined, although it is thought to be approximately parallel to the Alvarado Fault. Without any doubt other minor faults will be discovered in the area of the mine, but it does not appear that any of them will seriously affect mining activities.

HISTORY OF THE MINE

First located by Henry L. Scott, an employee of the famous Congress Gold Mine about three miles to the west, Alvarado produced a "small" amount of gold before 1905, from two inclined shafts, called B and C, about 800 feet deep. Patents for the Planet, Saturn, Mesa, Oro Fino, Oroville, Cottonwood, and Golden Bowl claims were issued in 1897 (Fig. 3), but the Planet Saturn Mining Company went bankrupt late in 1905 and developments ceased, as the mine was apparently not profitable to operate with gold at \$20 per ounce.

In 1907, an extensive study of the mine was made by James W. Neill, who reported that the mine could at that time afford an output of 200 tons per day for an indefinite period. He carefully computed the ore which he considered proved, and concluded from more than 500 assays taken at various sites in the mine, that there were at least 176,230 tons of ore down to the No. 10 level having an average value of \$5.33 per ton, considering gold to have a value of \$20 per ounce (Fig. 4).

In 1910, Mr. Neill again visited the mine and described "significant developments" which had taken place since his previous visit. From his letter report it can be concluded that the "C" shaft had been deepened to about 1100 feet, that mining and milling machinery had been installed, and that "larger

tonnages of low grade ore are now blocked out". So far as can be determined from the sparse records of the time, very little if any production of gold seems to have resulted from these optimistic reports, and the installation of milling and other machinery, and the mine was soon closed down because of litigation. In 1915, the mine was reactivated, but once again no production was recorded; and in 1920, the machinery and surface installations at the minesite were sold. During all the preceding activities, the Arizona Bureau of Mines has no record of gold or silver production, but their records are admittedly incomplete for this early period, and some recovery was surely made between 1897 and 1935.

Developments at Alvarado were nil between 1920 and 1935, but in that year the mine was reopened and substantial production began for the first time under the name Liberty Hill Gold Mines, Ltd. In 1938, a representative from the U.S. Bureau of Mines visited the mine and reported on it in Circular 6991. That report contains a discussion of the operations then taking place at Alvarado, and a map of the then-existing workings of the mine (Fig. 6). It is certain from present accounts of the miners who worked in the mine during this time, that after 1938, the workings were deepened to at least the No. 13 level and that a large proportion of the ore probably came from below the No. 10 level of the mine.

Between 1935 and the beginning of World War II, when the mine was shut down by the U. S. government, state records show the following production from Alvarado:

<u>Year</u>	<u>Gold</u>	<u>Silver</u>	<u>Ore Mined</u>
1935	98	116	650
1936	23	33	380
1937	No Records Available		
1938	3,709	4,241	14,808
1939	6,919	9,925	31,652
1940	5,898	7,794	37,302
1941	5,220	5,657	36,427
1942	2,873	3,398	18,993
1943	44	72	140
Totals	24,784 oz.	31,236 oz.	139,312 tons

0.17 oz Au/ton

During the productive interval, two U. S. Reconstruction Finance Corporation loans for a total of \$90,000 were made to operators of the Alvarado, and these were paid off quickly from the mine proceeds. As far as is known, there is no map now existing which shows the final location of shafts, tunnels and stopes when the mine was closed, and there is some disagreement as to whether the mine finally was deepened to 1,500 feet or not.

After a long period of complete inactivity, during which the mine filled up with water, William Munz in 1964 obtained title to the seven claims on which the mine lies and subsequently used the mine site as his intermittent winter-time home. In early 1980, Robert Scarth purchased the property, and later that year surface improvements were made, the C or "main" shaft was pumped out to about 500 feet from the surface, samples were taken across the surface outcrop and in the available mine openings, and two new adjacent claims, the North Star 1 and 2, were located at the northeast end of the patented ground (Fig. 3).

The patented claims known as Side Issue, Jupiter, Comet, Evening Placer, Scott Placer, and the Comet Millsite which adjoin the Alvarado Mine have never produced substantial tonnages of ore, but since they are contiguous to Alvarado, negotiations are proceeding to acquire them.

ORE VALUES AND VOLUME

In 1907, Mr. Neill suggested that the overall ore-bearing unit would yield \$5.33/ton in gold, or 0.27 oz/ton. In the records of production during 1935 to 1943, however, gold yield averaged 0.18 oz/ton, and in addition, 0.22 oz/ton silver was recovered.

In order to get a better assessment of the distribution of values in the Alvarado Mine, a map showing the higher values of the Neill sampling program was prepared (Fig. 7). An examination of this map, and a comparison of it

with Figure 4 will allow the reader to appreciate the distribution of all samples taken, compared to those which show higher gold values. From this comparison, it can be seen that the main shaft workings and the northeast part of the No. 10 level were fairly completely sampled, whereas there are almost no samples taken in the southwest half of the No. 10 level or in the "B" shaft below the No. 4 level. Based on this sampling program, it can be concluded tentatively that at least on the northeast the higher values probably increase in the deeper part of the mine, but the evidence is prejudiced somewhat by the irregular sampling. Unfortunately the levels below about 500 feet are at present flooded.

Besides the early data compiled by Mr. Neill, Charles Moores of Las Vegas, Nevada, has sampled the surface and shallow workings of the mine at 85 locations (Fig. 7) and found an average overall value of 0.17 oz. gold per ton of the gold-bearing unit and the immediately adjacent wallrock. The 21 surface assays of Moores had exactly the same value, and the subsurface assays, which extend down to the No. 6 level also show the same values, except that on the No. 6 level the average is only 0.11 oz/ton, while in the shallower levels the values are correspondingly higher. Mr. Neill's average values for the No. 6 level were also the lowest of any level sampled, that is 0.17 oz/ton.

It is surely of some significance that the average overall recovered gold values for the mine were 0.18 oz/ton, while the overall average of the assays of Moores is 0.17 oz/ton. Mr. Neill's higher figure 0.27 oz/ton, was probably caused by his relatively extensive sampling of the deeper mine levels, which show a significantly higher average than the ones on or near the surface.

The discrepancy between the Neill averages and the mine average, 0.09 oz/ton, probably represents values left in the tailings, less some lower values probably mined and milled because of the method used in mining. In addition, lack of knowledge of the amount and grade of ore mined below the No. 10 level leave the complete reason for the discrepancy and the true mining values somewhat obscure.

An important factor in the mining of Alvarado is the thickness of the ore-bearing unit. The Neill survey was the most detailed, by far, of any study made, and indicated that:

1. The unit varies from a negligible thickness to 8.0 feet, with an overall average of 3.0 feet, out of 498 measurements, distributed as shown in Figure 3.
2. In the shallower part of the mine, where the most measurements are located, the ore-bearing unit averages 2.8 feet, while below about 500 feet the unit averages 3.6 feet in thickness. However, there are fewer readings in the deeper levels, and these are considerably more localized in the northeast part of the mine, so the data are not completely representative of the ore body.

On the surface, the ore-bearing quartz unit averages about 3 ft. in thickness, the same as it does in the mine, and makes a prominent outcrop. Considering that the ore-bearing unit is about three feet in thickness, the volume of the unit within the Saturn and Planet Claims to a depth of 1,500 feet, is about 500,000 cubic yards, or 750,000 tons. If only 150,000 tons of this ore have been mined within this unit, approximately 600,000 tons remain as potentially minable. Obviously this is a gross generality which will be highly modified as mining proceeds and variation of values is determined, but at least it is a ball-park figure to help determine the possible size of future operations.

There is some possibility that mining could begin on the surface in order to recover some values before it is necessary to develop the underground mine. As a surface operation, it has been estimated that about 30,000 tons of ore could be quarried or mined from the two claims before the ore became impractical to surface mine, with a probable gross value of about \$3,000,000 at current gold and silver prices.

RECENT WALLROCK TESTING AND EVALUATION ON COMET CLAIM

In 1974, a study was made of some of the surface rocks to the west of Alvarado by John Plaisted, a Technical Services Metallurgist for American Cyanamid Company. Mr. Plaisted examined outcrops on the Comet Claim, across which the ore-bearing unit of the Alvarado Mine extends, and his study bears on the suitability of the same ore as that occurring at Alvarado (Fig. 3). Mr. Plaisted sampled an aggregate of the wallrock on the Comet Claim to determine gold and silver values, believing that the obvious quartz-rich ore unit would contain at least as high values, and would be straight-forward or simple in treatment. His sampling was mainly within about one foot from the quartz unit on both sides of it. He states:

Two methods of extraction were tested on the aggregate (wall rock) ore. Both cyanidation at 10 mesh and bulk sulfide flotation indicated favorable rates of precious metal recovery. As is common to the ore type, the silver was less amenable to beneficiation than the gold. The following table summarizes results from the above mentioned metallurgical investigation.

Summary of Metallurgical Results

Process	Material Size	Head Au(o/t)	Assay Ag(o/t)	Recovery %	
				Au	Ag
Flotation	7% + 200 mesh	0.056	0.074	63.70	45.03
Cyanidation	± 10 mesh	0.066	0.060	71.50	41.80

A quick glance at the data generated would indicate that cyanidation at a coarse size is feasible. With gold values at a conservative 630 dollars per troy ounce and with silver in the neighborhood of 15 dollars per troy ounce (as of July 1, 1980) a relatively small amount of tonnage (50,000 tons) could yield approximately 1.5 million dollars in recoverable values. Recoverable values at a coarse grind (± 10 mesh) with cyanidation indicate a figure of about 30 dollars per ton.

A more extensive program for evaluation of this property is advisable; however, it is my opinion that the above mentioned property shows great promise for profitable development.

If these data are extrapolated to Alvarado, and every evidence suggests that they can be, then the ore values and reserves discussed previously, which include only the quartz-rich ore-bearing unit, may be quite conservative.

MINE DUMPS

As a result of mining during the 1935-43 interval, there is a dump at the mine which is estimated to contain about 140,000 tons of finely ground tailings, containing potentially recoverable gold values. A representative assay on these tailings has shown a gold value of about 0.05 oz/ton, well within the profitability range of modern efficient heap leaching. Recent correspondence with an Idaho gold recovery company also indicates that 65 to 80% of the fine gold which remains in these tailings can be recovered by dry recovery methods with little financial outlay. A concentrate from this dump, prepared by the Dri-Gold Company of Boise, Idaho was found to contain 0.84 oz/ton gold.

In addition, there are probably 100,000 tons of coarse material which was mined but not milled, and from part of which profitable gold and silver values may be obtained. At the nearby Octave Mine, about four miles south-east of Alvarado, an extensive secondary recovery program is being initiated, using similar tailings and dump material.

To assist in this evaluation, several assays were made of the dumps around the mine area, as shown in Figure 8. It is quite possible that recovery of values from at least part of these dumps and tailings would make a profitable operation at present gold and silver prices, even if bedrock mining operations were not renewed.

WATER

At Alvarado, water supply will be adequate for almost any operation that can be envisioned. In addition to mine water, estimated to be 50 gallons per minute, there is a good well upstream from the mine, whose location is shown in Figure 3. This well was pumped to determine its yield in 1980. According to Charles Moores, the water well will produce about 150 gallons per minute. There is also a good possibility that other wells can be located in Fool's Gulch, which drains a considerable area just east of Alvarado, to further increase the total yield of water needed in mining and processing operations.

CONCLUSIONS

To a depth of 1,500 feet in the Alvarado Mine, there are an estimated 600,000 tons of unmined ore present on the patented claims, and of course there is no reason to believe that the ore-bearing unit ceases at that level, as both the adjacent mines have been mined to much greater depths. Based on past experience, the gold and silver values which probably will be recoverable are more than \$55,000,000. The wallrock adjacent to the ore body contains sufficient values to be commercial, and tests have been made which confirm that treatment of this rock is practical, adding to the probable total potential of the mine.

Mining conditions will be good, although the slope of the ore-bearing unit is somewhat less than ideal and this may cause some added expenditure, over optimum, to get the ore out of the mine. The present mine shafts and tunnels should serve as adequate access for any further underground operations which may be developed, and other shafts can be easily excavated along the strike of the ore-bearing unit as it is readily accessible to vehicles and machinery.

Some surface recovery of ore may be economically practical, as the ore-bearing unit outcrops the entire length of the Saturn and Planet Claims, and can be easily excavated. In addition, gold recovery is likely to be profitable from the present mine tailings and dumps, of which there are probably at least 150,000 tons.

Electricity and telephone service are available at the mine, good roads are already present, and the water supply is almost certainly sufficient for any reasonable recovery and mining operations.

In view of all the factors considered above, the probable world-wide strength of gold and silver values, as well as that of our present economy, it is thought that the Alvarado Mine is now an excellent commercial venture which can be highly profitable to an aggressive and suitable operation.

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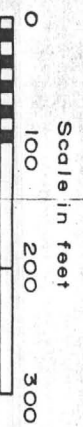
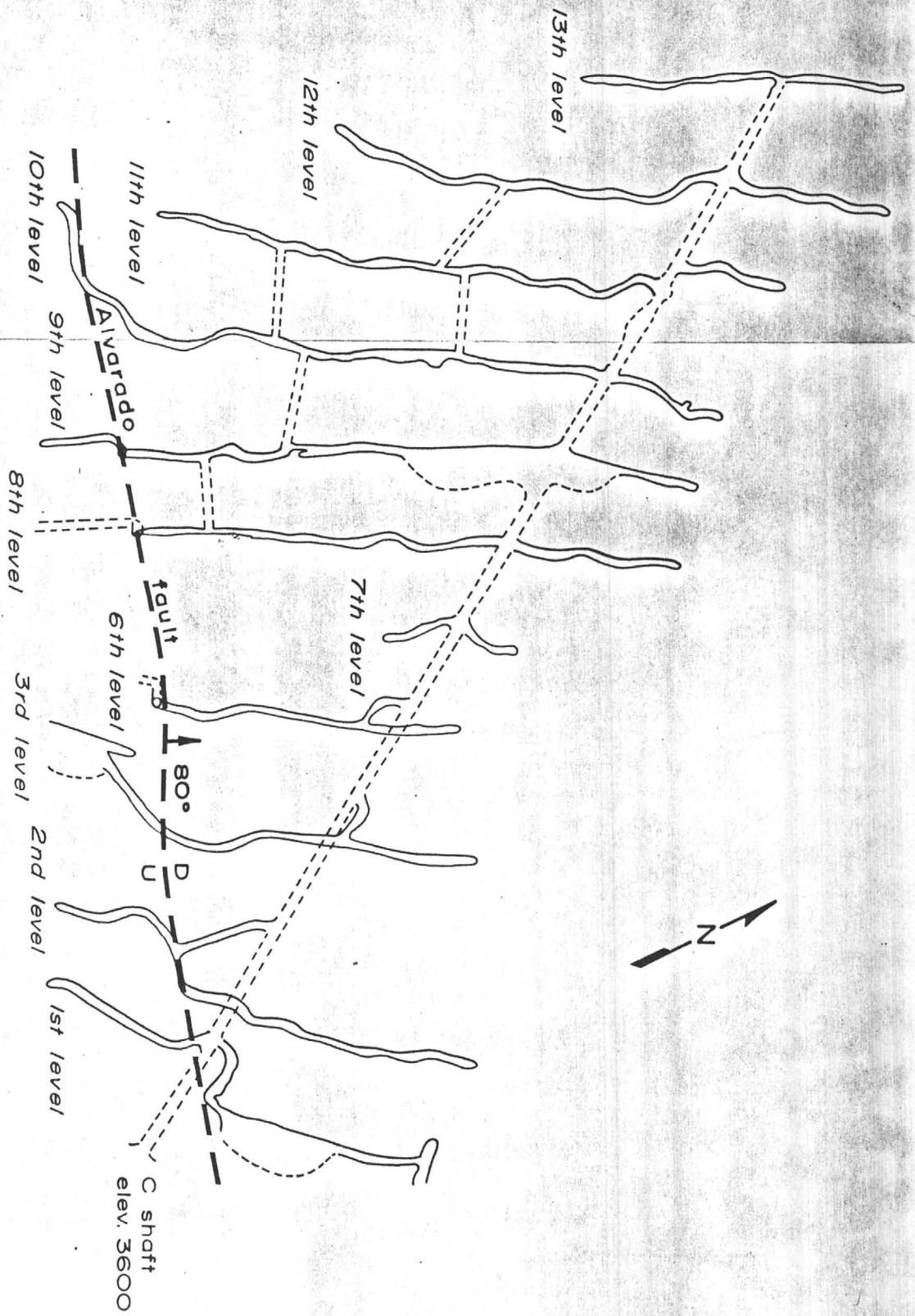
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SCARTH OIL & GAS CO.

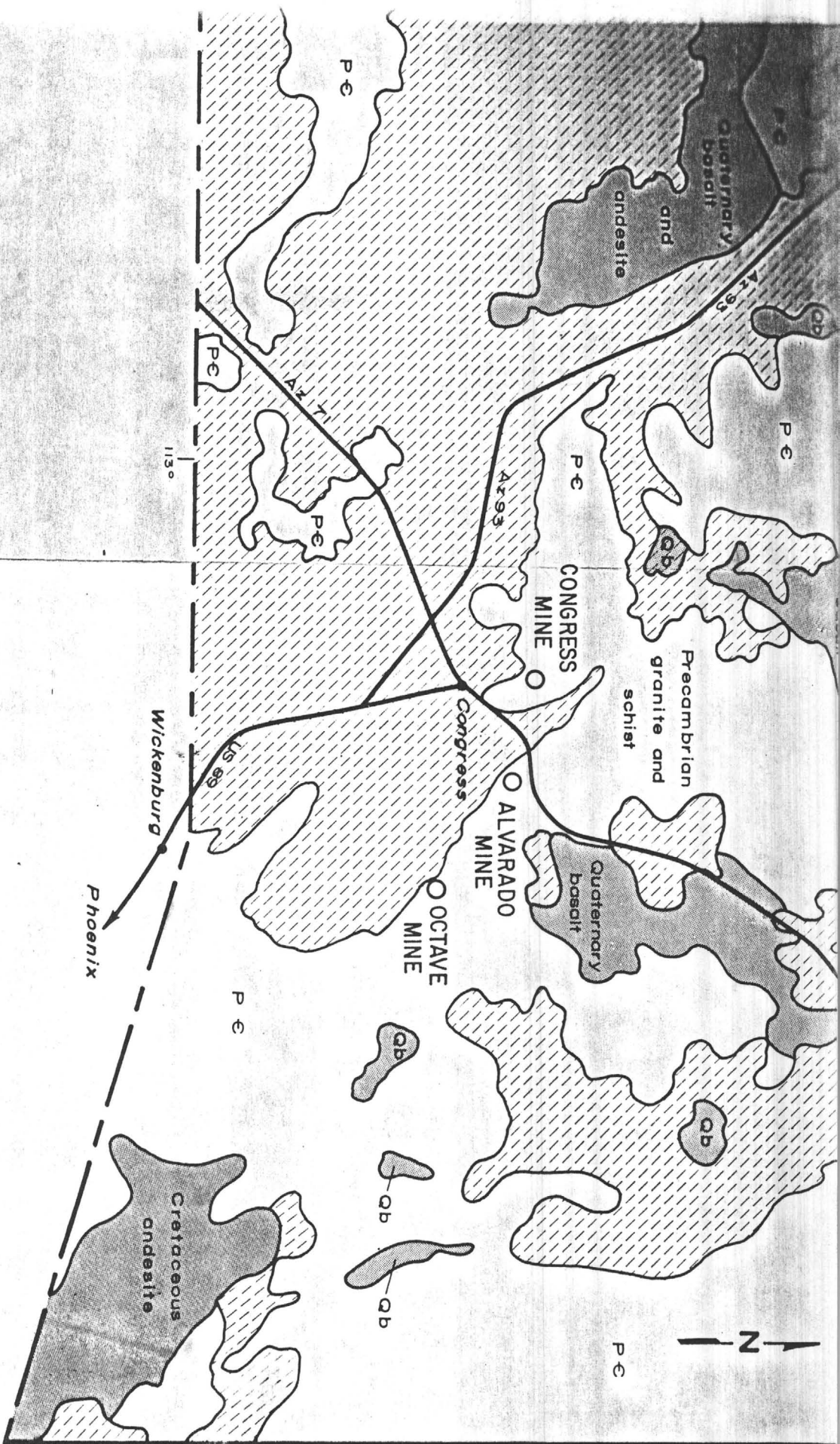
ALVARADO GOLD MINE

Yavapai County, Arizona

MAP OF ACCESSIBLE PART OF
WORKINGS OF ALVARADO MINE,
INCLUDING LOCATION OF ALVARADO
FAULT, AND PROPOSED RAISES
AS OF 1938

March, 1981

Figure 6



SCARTH OIL & GAS CO.

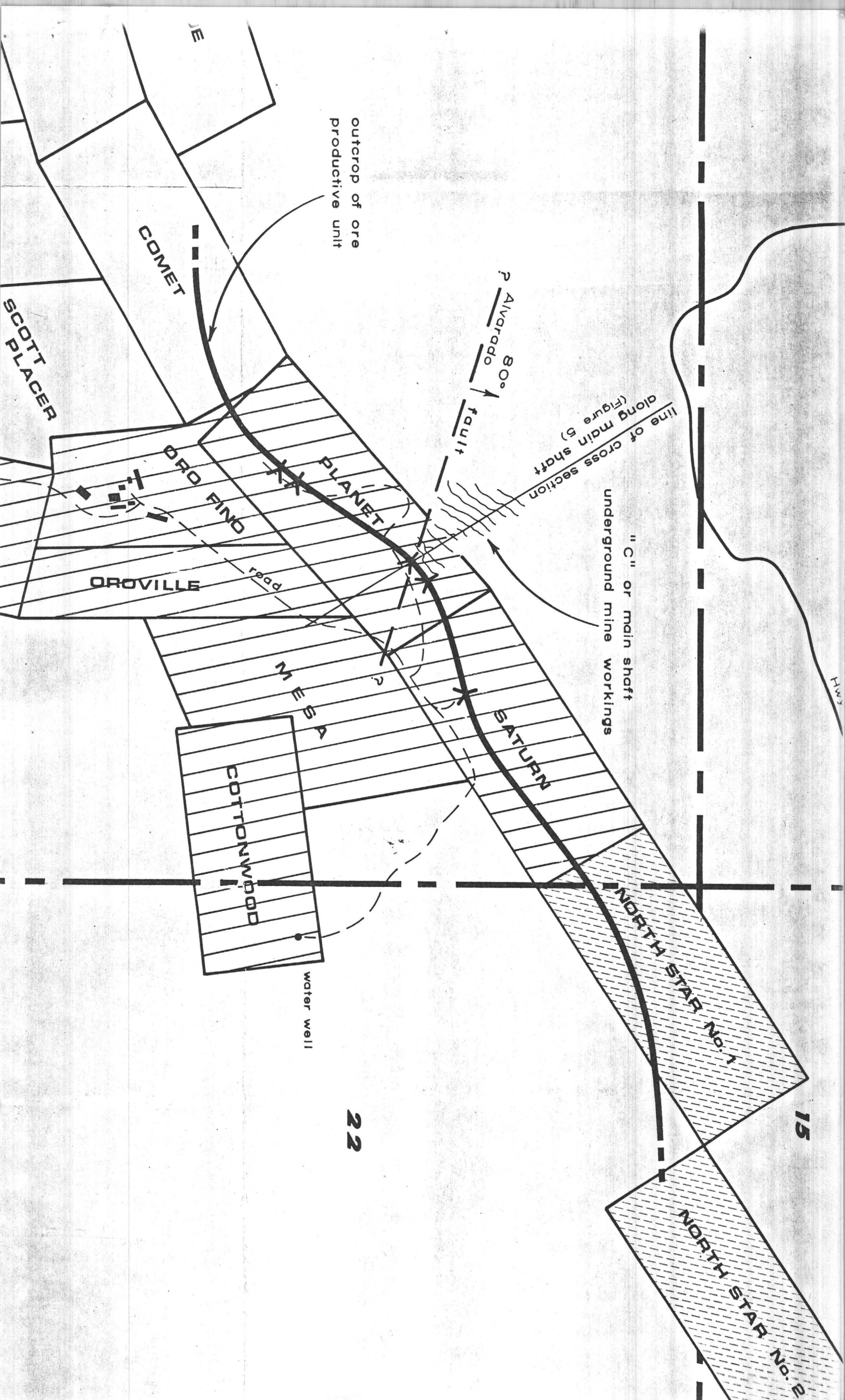
ALVARADO GOLD MINE

Yavapai County, Arizona

GENERALIZED GEOLOGIC MAP

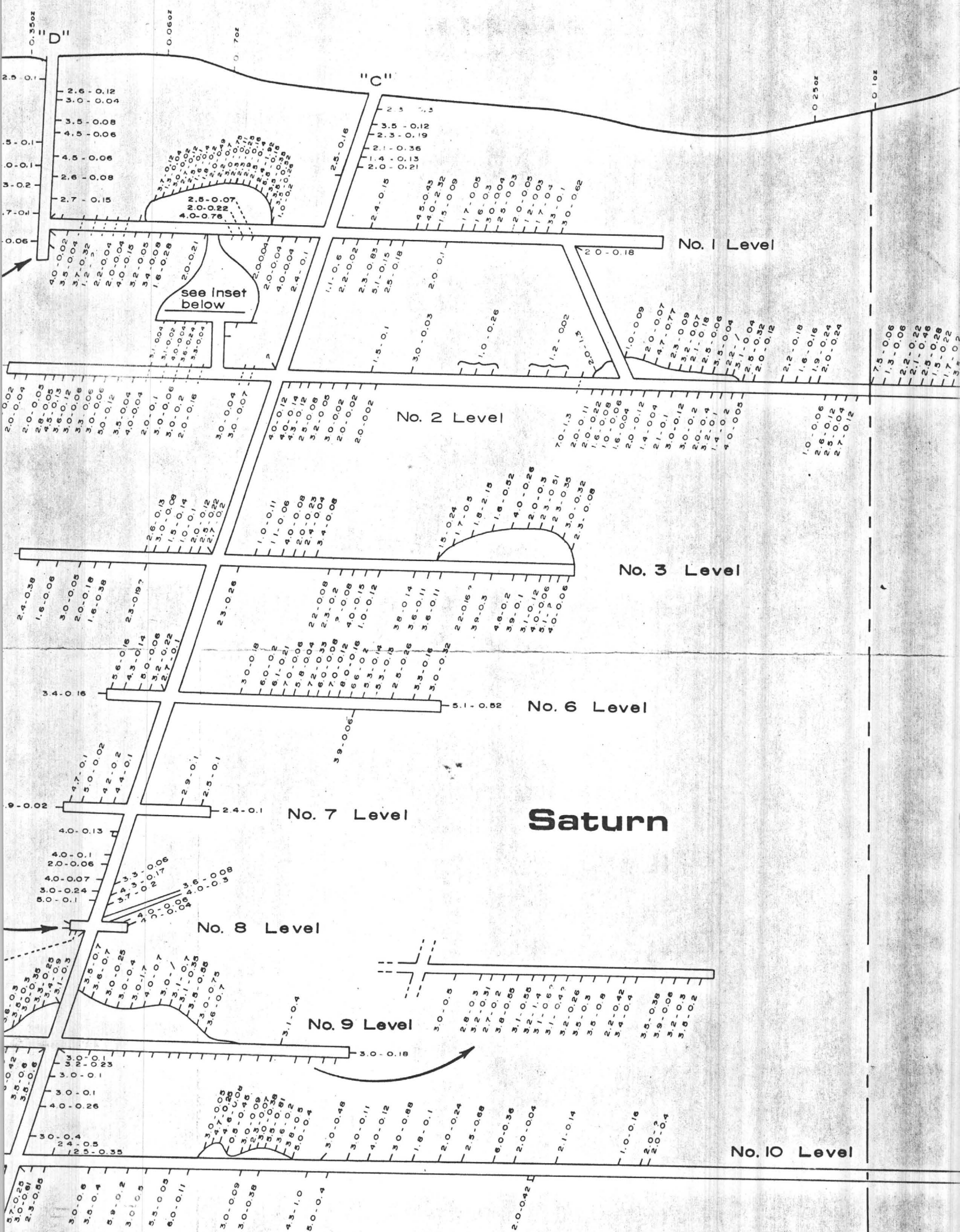
March, 1981

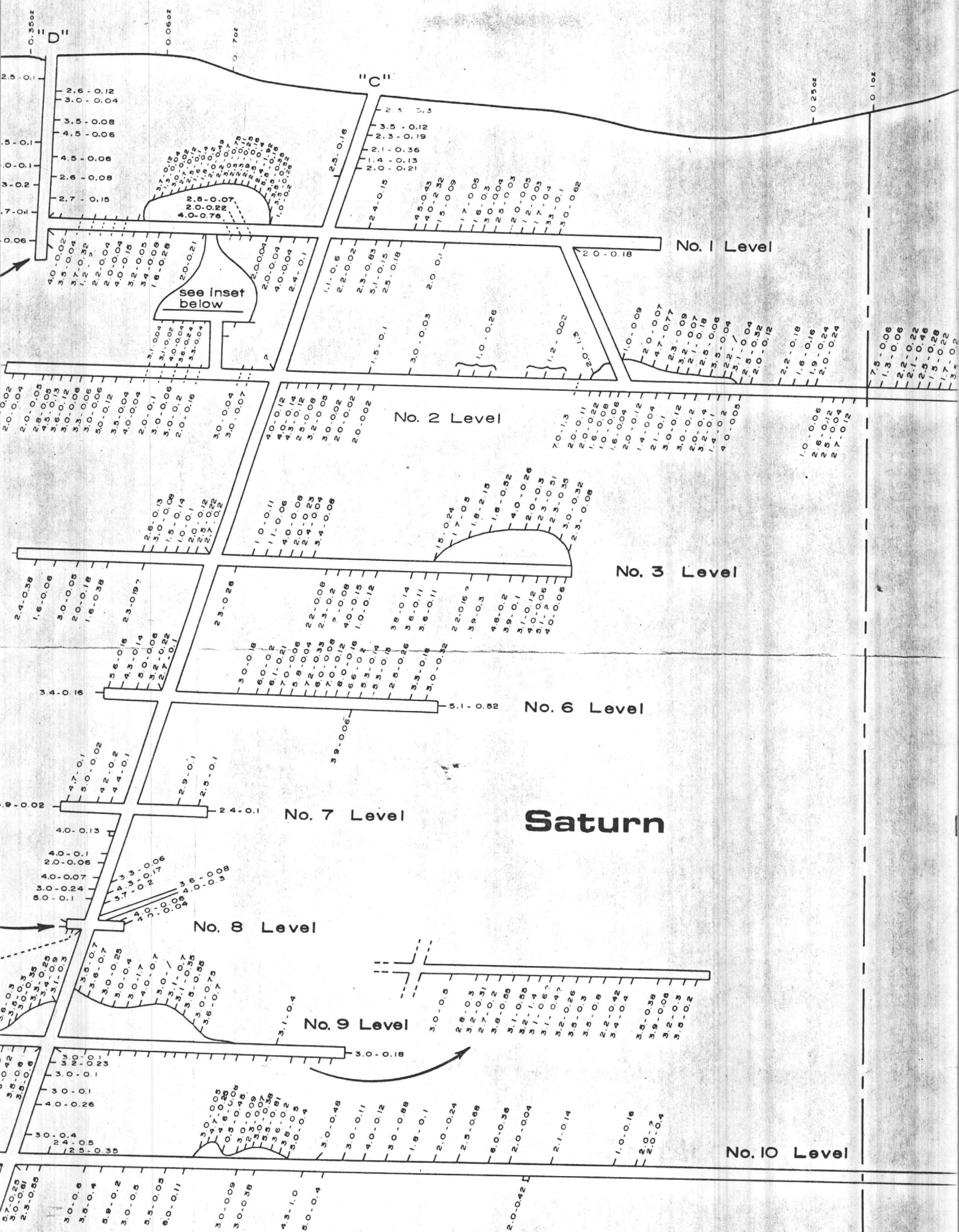
Figure 2



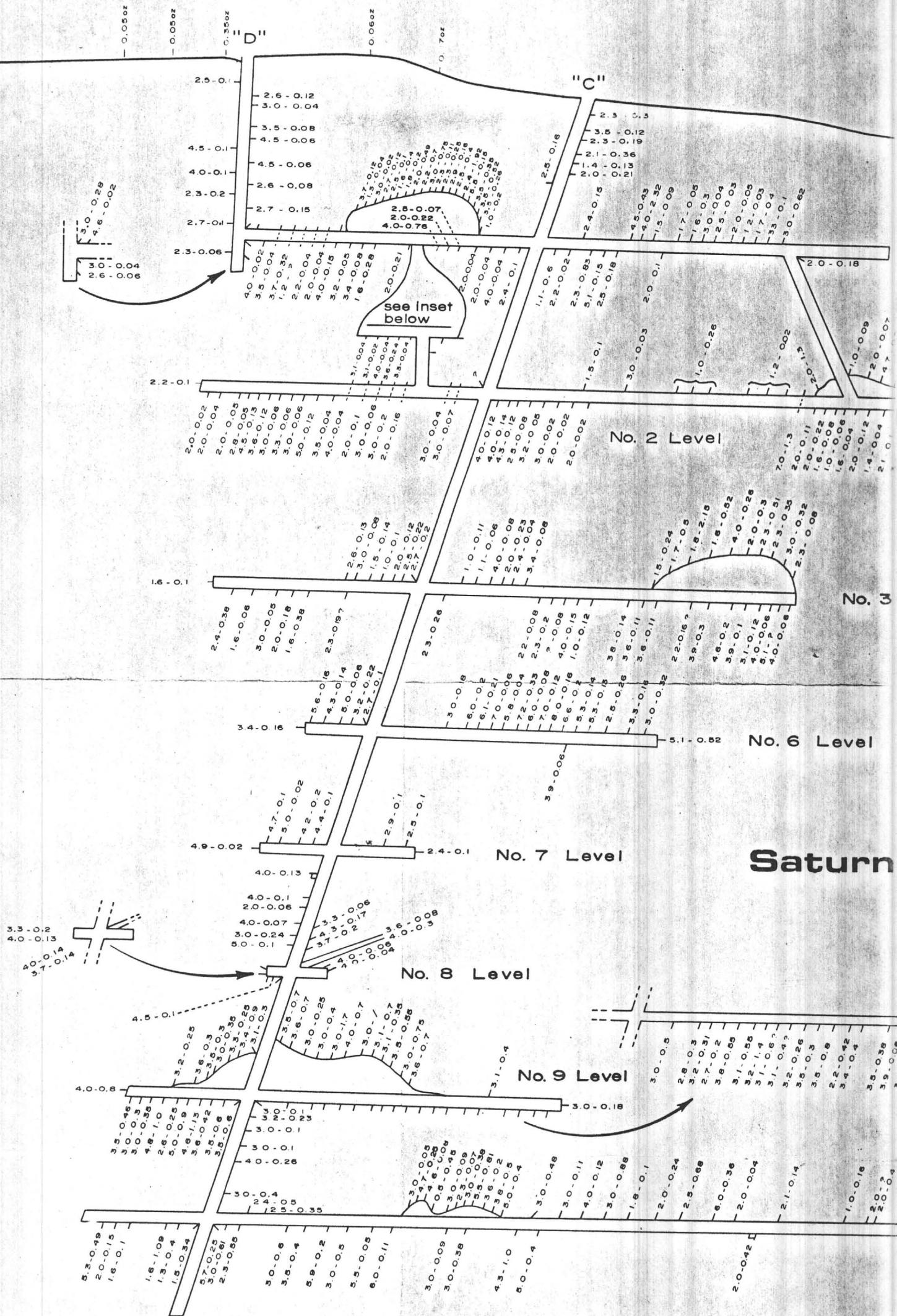
Planet

level





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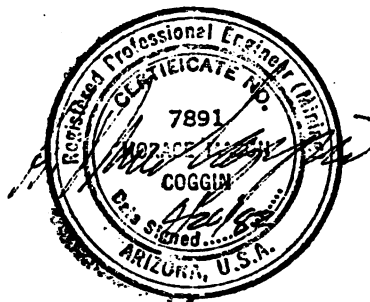


**ECONOMIC POTENTIAL
of the
ALVERADO GOLD MINE
YAVAPAI COUNTY, ARIZONA**

**by
H. MASON COGGIN, PE & LS**

APRIL 20, 1982

**prepared for
DYDAR RESOURCES**



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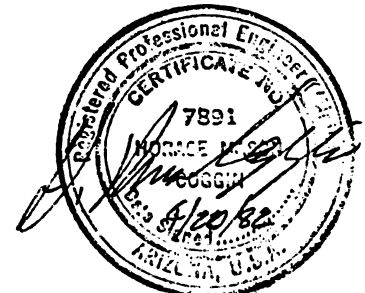
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APPENDIX A: ALVERADO RESERVE CALCULATIONS
APPENDIX B: BIMETALS RECOVERY SYSTEM



Little information is available from the last operator who worked the property from about 1934 to 1941 when it was closed by the Gold Mine Closing Order of 1941. The mine was apparently a profitable producer at that time. The operators were able to pay off two government loans of \$500,000 within a short period of time. The U. S. Government at that time was passing out loans primarily to strengthen a struggling economy.

The biggest question in evaluation of this property is determining what effect the development and exploration of the 1940 operation may have had on the reserves which were projected before they commenced operations.

The only known map of the underground operations in 1938 shows that the main shaft was deepened to the 13th level and that each level was drifted, but that no new stoping was done. This work was obviously a well organized effort of exploration and development. Whether or not they had actually stoped out any of the developed reserves can only be determined by dewatering the shaft and resampling the new levels.

Upon evaluation of the information thus obtained an additional investment of \$1.310 MM will be required to construct a 100 ton per day mill and initiate the mining operation.

The shaft has recently been dewatered to the 8th level without any stoping of the vein being found. The check sampling done at that time checked well with the 1907 Neill results.

The heap leach potential of the surface mine dumps and the shallow open-pitatable outcrops has not been determined. Test work to determine the best way to operate the heap leach potential will be developed in the initial \$500,000 program.

In view of the high potential of this property I recommend initiation of the program starting with dewatering and sampling as soon as possible.

RESERVE CALCULATIONS

The 1907 Neill map is the basis of the reserve calculation in Appendix A. The map consists of a sampling and mapping program. It included all of the vein that was exposed at the time of Neill's examination.

Each sample was given an area of influence according to its width, the distance to the next sample and the distance to the next level above or below. The grade of the assay was then divided by a tonnage factor of 12.5 cubic feet per ton and multiplied by the volume of influence. The individual results were then weighted to provide weighted averages of grades and widths.

The resulting total of this estimate was 143,438 tons at 0.26 ounces of gold per ton. The average width was 3.57 feet.

This reserve estimate included all of the areas sampled from the 1907 map. There is no way to determine how much of this reserve may have been mined. It can be assured however that at least those reserves above the 800 level are still intact. Charles Moore, a employee of Scarth reported no mining above that level from his 1980 dewatering to that level. He did not dewater below that level due to lack of funding. It is also known that the 1940 operations extended the shaft and developed several levels below the 9th level. Exactly how far this work was continued is unknown. The surface expression of the vein also goes beyond the limits of the developed workings. If these areas are explored there is a considerable chance of expanding reserves.

The entire sampled area, which probably represents all of the exposed vein in the workings, was used for estimating reserves to reflect the proposed mining method which will be a rapid mining system without selectivity.

The proposed system will mine the entire vein to an average width of six feet. Diluting the calculated reserve to this width yield the following results:

Fully diluted reserves:

241,000 tons at 0.18 ounces of gold per ton.

@ 75% recovery

143500	Tons
x 0.26 (75% recovery)	grade
28700.0	oz Au
x 400 (price)	
\$ 11,480,000	gross

PROPOSED MINING METHODS

Because of the low grade nature of the fully diluted reserves; the proposed mining method is designed for high efficiency low cost production. It is a method of overhand stoping on sandfill with rubber tired load haul dump equipment. The LHD's will store the mined materials in a muck bay and dump directly into a single skip for hoisting.

Each round blasted will be six feet wide, eight feet long and will extend eight feet up the vein. One round will contain approximately 30 tons. To maintain a mill feed rate of 100 tons per day on the basis of a seven day week the mine will have to produce 140 tons of ore per day on a five day per week basis. An additional capacity of 40 tons per day should be provided to allow exploratory drifting and handling of occasional waste.

Drilling and Blasting: Six rounds per day will be required to sustain the tonnage. Two drillers and two helpers will be necessary. Drilling will be with jacklegs and stopers. Blasting will be with prill and conventional electrical caps. The cost for this is estimated at \$800 per day or about \$4.40 per ton.

Mucking: All materials will be handled from the face to the muck bay with small rubber tired loaders with a bucket capacity of one ton. The average load haul dump time with a one way tram of 100 feet will be about 5.5 minutes. The mucking efficiency with this equipment is then 11 tons per hour. For an eight hour efficiency this equates to about 50 tons per shift. The balance of the shift will be involved in loading skips and moving the machines. With four LHD operators the cost of mucking is estimated at \$800 per day or \$4.40 per ton.

Sandfilling: Back filling a stope with sand fill will require at least two days in preparation. Preparation involves building a bulkhead to contain the sandfill, hanging the fill line and connecting the system. For a stope length of 200 feet the average lift will require 800 tons of sand fill. This can be delivered in one day if 800 tons of sand fill storage are available. The state of the art in sand filling requires that the mill tailings be deslimed through a cyclone, agitated mechanically and delivered to the stope through a schedule 80 steel pipe. The sands are transported to the workings at 50% solids. This will add about 100 gallons per minute to the mine pumping requirements. The last foot of sand fill normally receives about one sack of type II portland cement per yard. This provides a firm footing for the LHD's. The filled sections are filled to within a foot or two of the back. This provides an additional free face for blasting operations. The cost of sand filling is estimated at \$2.00 per ton.

Dilution: the calculated dilution for the above described method is 61%. Thus the grade of 0.26 ounces per ton will be diluted with wall rock to an overall grade of 0.18.

Hoisting: One hoistman and a toplander will be required to hoist ore, men, materials and maintain the pumps, compressors and other equipment. The hoist should have the capacity to hoist a maximum load of 10 tons at a maximum rope speed of 900 feet per minute. The federal mine inspectors (MSHA) have arbitrarily started to enforce the 100 times rope diameter ratio for all mine hoists and sheaves. This will no doubt deplete the used equipment market of all large diameter hoisting equipment. A search for suitable equipment should be started as soon as the project receives its initial funding to insure that this equipment will be available. The hoisting skip should have a 3 ton capacity and designed so that it is self dumping and can be loaded by the LHD's.

Cycle time for hoisting is estimated as follows:

loading	1.00 min
hoisting	2.00
dumping	0.10
return and spotting	2.00
total trip time-----	5.10-----
hoisting time for 200 tons	5.67 hours
hoisting costs will be about	\$2.00 per ton

Ventilation: To control fumes an estimated 50 cubic feet per second is required for each horsepower of diesel powered equipment operating in the mine. At 35 horsepower for each LHD this calculates to 7000 cfm of fresh air. A single stationary fiberglass ventilation pipe with tee's at each station and auxiliary fans should satisfy this requirement. Head loss for the system is estimated at a total of 8 inches of water gauge.

Working Places: The operating cycle for each stope is estimated as follows:

per 800 ton lift	
drilling and blasting	6.67 days
mucking	3.37
sandfilling	8.00
smoke time	3.37
Total	----- 21.41days -----

To sustain 180 tpd in production 5 stopes are required. This is equivalent to 3 levels being operated at the same time.

Required Tonnage: The required tonnage to support the 100 ton per day mill which has been proposed for this operation is summarized as follows:

Mill tonnage	100 tons per day
Mill schedule	36500 tons per year
Mine schedule	5 days per week
Mine tonnage	150 tons per day

Supervision: The staff for the entire operation is estimated as follows:

- 1 General superintendent
- 1 Staff Engineer with capabilities in geology and metalurgy
- 1 Bookeeper, warehouseman, safety engineer and medic
- 1 secretary

Annual cost of keeping this staff will be about \$200,000 per year or about \$0.28 per ton on the mining cost and a like amount on the milling cost.

TABLE 1**ALVERADO GOLD MINE****SUMMARY OF COSTS**

ITEM	COST /TON	ANNUAL
DRILLING AND BLASTING	4.40	160600
MUCKING	4.40	160600
SAND FILLING	2.00	73000
HOISTING	0.50	18250
SUPERVISION	0.28	10220
MISCL.	5.42	197830

TOTAL MINING COST	17.00	620500
MILLING	30.00	1095000
G&A	1.00	36500

TOTAL OPERATING COSTS	48.00	1752000

ANNUAL REVENUES**36500 TONS PER YEAR****0.18 OUNCES PER TON****0.97 RECOVERY****6570 OUNCES PER YEAR****400 GOLD PRICE ESTIMATE****2628000 ANNUAL SALES**

MILLING OPERATIONS

The mill will work 24 hours per day on a 365 day per year basis. At least two men should be on shift at all times. To meet this requirement 5 mill operators and five mill labors will be rotated through a five day per week schedule through holidays and vacations. The mill operation will be continuous stoping only for breakdowns and scheduled maintainence. The electrician and mechanic will be assigned to the mill although they will have mine responsibilities as well as the mill. Major repairs to the equipment will be farmed out to shops and facilities in Phoenix. The size of the operation will not support the shop facilities necessary to replace engines or reline ball mills.

The previous operators of the property apparently operated a counter current decantation mill on the property. The old tailings dump represents material which has been scraped away from a rotary filter. This type of filter was commonly used in counter current decantation to recover the last bit of preginate solution from the pulp. The resulting tailings were too dry to move through a slurry line and were apparently moved from the filter by a slusher.

This type of operation has been replaced today by the carbon in pulp system. It is more economical to construct and operate that the CCD and has a higher recovery.

At this time there has not been sufficient work on the Alverado materials to determine the optimum flow sheet for milling. This work will be undertaken as part of the initial investment. The costs used in the attached estimates are intended to represent general costs and are not intended to be a detailed estimate.

CAPITAL COSTS

Capital costs can not be estimated at this time. Lack of information that can only be acquired through the dewatering and samplling program is needed to design and specify the required equipment. Capital costs which have been used in the attached economic analysis are best guess estimates based on simillar operations in the authors experience.

ECONOMIC ANALYSIS UNDERGROUND POTENTIAL

The following analysis of the underground economic potential is intended to show the possible cash flows of the project under varying conditions of gold prices and operating costs.

The first sets of tables and charts show the base case economics at \$400 gold and a \$48 operating cost. Since metal price and operating costs are the most likely values to change radically over the next few months. Several different scenarios have been used to represent ranges in metal price from \$300 to \$600 per ounce and from \$30 to \$70 per ton in operating costs.

Tables one through eight and figures 1 through 10 show these results in relation to the base case. In each case the other variables are held constant at the base case and only the variable being examined is allowed to change.

The figures which are presented as a graphic representation of the effects of each variable show only the cash flow line of each case. Both the annual cash flows and the accumulated cash flows are shown. The sensitivity of the project to each variable can easily be examined in each figure.

Table 10 shows a summary of the projected cash flows from the sensitivity analysis.

HEAP LEACHING

It is estimated that as much as 50,000 tons of old dump materials and 30,000 tons of surface outcrop may contain sufficient values to be heap leached at a profit. Preliminary sampling of these materials indicates that the grades are high enough to make this an attractive target. More sampling and some test work will be required to refine an estimate of this potential.

Heap leaching, especially in relatively frost free areas such as this, is an economical method of treating some low grade ores with low risk, low cost and quick returns.

The process consist of circulating a cyanide solution through a dump which has been placed on an impervious pad and winning the leached values from the solution either by zinc precipitation or carbon adsorption.

Recoveries are greatly enhanced by crushing the materials and agglomerating the fines. Even under optimum conditions the best recovery that can be expected is about 60% although recoveries as high as 90% have been reported. In the following economic forecast 60% recovery has been used.

The method of treatment considered for this study consist of preparing one 10,000 ton pad which will be leached and moved within one month. This pad will then be reloaded and cycled for the next month. Initially the materials will be mined from the outcropping veins, crushed to about minus one half inch and the fines agglomerated.

The pad will be located in or near the old tailings so that these materials can be used in pad construction. The initial would cover an area approximately 100 by 200 feet with a slope of about one percent so that the solution will return to a preginate solution pond at the bottom of the pad. A fresh water pond and a barren solution pond will be constructed to facilitate the operation of the heap. The pad and pond liner will be a 20 mil PVC material to contain the solutions. This material is available from Water Saver of Denver, Colorado.

The recovery system should be a carbon adsorption plant which is either constructed or purchased locally. The writer is presently involved in Bimetals Recovery Systems, Inc. a very young manufacturing company which manufactures a portable carbon adsorption plant. It is trailer mounted and contains the necessary equipment to adsorb the values, strip the carbon and electrowin on steel wool. A copy of the brochure on this equipment is attached (see appendix B).

The following is a summary of the heap leaching potential:

Estimate of materials:

	tons	ounces per ton
old mine dumps	50,000	0.05 gold
surface outcrops	30,000	0.20

Capital Requirements for the first pad.

site prep.	\$12,000
liners	30,000
recovery plant	30,000
crushing & placing	30,000
chemicals	25,000
mining	30,000
30 days of operating	30,000
contingencies	15,000

Total for the first pad \$202,000

for the next two pads

mining	\$30,000
crushing & placing	30,000
chemicals	25,000
operating	30,000
contingencies	25,000

total for the 2nd & 3rd pads 140,000

for the last five pads

crushing & placing	\$30,000
chemicals	25,000
operating	30,000
contingencies	25,000

total for pads 6 to 10 \$110,000

The costs of mining, crushing and agglomerating can be controlled by contracting this work out to local contractors who are both equiped and qualified for this job.

Table 9 shows the proforma of the heap leaching potential.

ALVERADO GOLD MINE

UNDERGROUND PROFDRMA

400 GOLD PRICE

BASE CASE

YEARS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	TOTAL
LAND COST	-30000	-30000											-60000
EXPLORATI	-250000	0											-250000
MINE COST	-250000	-250000											-500000
MILL COST		-1000000											-1000000

GROSS INC			2496600	2496600	2496600	2496600	2496600	2496600	2496600	2496600	2496600	2496600	24966000
ROYALTY			-187245	-187245	-187245	-187245	-187245	-187245	-187245	-187245	-187245	-187245	-1872450
OPER COST			-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1.752E7

NIJT			557355	557355	557355	557355	557355	557355	557355	557355	557355	557355	5573550
DEPREC			-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-1747000
DEPLETION			-191328	-191328	-191328	-191328	-191328	-191328	-191328	-191328	-191328	-191328	-1913275

TAXABLE I			191328	191328	191328	191328	191328	191328	191328	191328	191328	191328	1913275
TAX @ 50%			-95664	-95664	-95664	-95664	-95664	-95664	-95664	-95664	-95664	-95664	-956638

NIAT			95664	95664	95664	95664	95664	95664	95664	95664	95664	95664	956638
DEPREC			174700	174700	174700	174700	174700	174700	174700	174700	174700	174700	1747000
DEPLETION			191328	191328	191328	191328	191328	191328	191328	191328	191328	191328	1913275
WORK CAP			-500000									500000	0

CASH FLOW	-530000	-1280000	-38309	461691	461691	461691	461691	461691	461691	461691	461691	961691	2806913
												NPV AT 20	-219643
												1DCFRDI=	16.17

300 GOLD PRICE

YEARS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	TOTAL
LAND COST	-30000	-30000											-60000
EXPLORATI	-250000	0											-250000
MINE COST	-250000	-250000											-500000
MILL COST		-1000000											-1000000
<hr/>													
GROSS INC			1872450	1872450	1872450	1872450	1872450	1872450	1872450	1872450	1872450	1872450	18724500
ROYALTY			140434	140434	140434	140434	140434	140434	140434	140434	140434	140434	1404338
OPER COST			-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1.752E7
<hr/>													
NIDT			260884	260884	260884	260884	260884	260884	260884	260884	260884	260884	2608838
DEPREC			1122	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-1571178
DEPLETION			-131003	-43092	-43092	-43092	-43092	-43092	-43092	-43092	-43092	-43092	-518830
<hr/>													
TAXABLE I			131003	43092	43092	43092	43092	43092	43092	43092	43092	43092	518830
TAX @ 50%			-65501	-21546	-21546	-21546	-21546	-21546	-21546	-21546	-21546	-21546	-259415
<hr/>													
NIAT			65501	21546	21546	21546	21546	21546	21546	21546	21546	21546	259415
DEPREC			-1122	174700	174700	174700	174700	174700	174700	174700	174700	174700	1571178
DEPLETION			131003	43092	43092	43092	43092	43092	43092	43092	43092	43092	518830
WDRK CAP			-500000									500000	0
<hr/>													
CASH FLOW	-530000	-1280000	-304618	239338	239338	239338	239338	239338	239338	239338	239338	739338	539423
												NPV AT 20	-892449
												2DCFRDI=	-1.76

TABLE 4

ALVERADO GOLD MINE

UNDERGROUND PROFORMA

500 GOLD PRICE

YEARS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	TOTAL
LAND COST	-30000	-30000											-60000
EXPLORATI	-250000	0											-250000
MINE COST	-250000	-250000											-500000
MILL COST		-1000000											-1000000

GROSS INC			3120750	3120750	3120750	3120750	3120750	3120750	3120750	3120750	3120750	3120750	31207500
ROYALTY			-234056	-234056	-234056	-234056	-234056	-234056	-234056	-234056	-234056	-234056	-2340563
OPER COST			-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1.752E7

NIBT			1134694	1134694	1134694	1134694	1134694	1134694	1134694	1134694	1134694	1134694	11346938
DEPREC			-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-1747000
DEPLETION			-468113	-468113	-468113	-468113	-468113	-468113	-468113	-468113	-468113	-468113	-4681125

TAXABLE I			491881	491881	491881	491881	491881	491881	491881	491881	491881	491881	4918813
TAX @ 50%			-245941	-245941	-245941	-245941	-245941	-245941	-245941	-245941	-245941	-245941	-2459406

NIAT			245941	245941	245941	245941	245941	245941	245941	245941	245941	245941	2459406
DEPREC			174700	174700	174700	174700	174700	174700	174700	174700	174700	174700	1747000
DEPLETION			468113	468113	468113	468113	468113	468113	468113	468113	468113	468113	4681125
WORK CAP			-500000									500000	0

CASH FLOW	-530000	-1280000	388753	888753	888753	888753	888753	888753	888753	888753	888753	1388753	7077531

500 \$ GOLD

NPV AT 20 1023721

BASE CASE

YEARS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	TOTAL
LAND COST	-30000	-30000											-60000
EXPLORATI	-250000	0											-250000
MINE COST	-250000	-250000											-500000
MILL COST		-1000000											-1000000
<hr/>													
GROSS INC			3744900	3744900	3744900	3744900	3744900	3744900	3744900	3744900	3744900	3744900	37449000
ROYALTY			-280868	-280868	-280868	-280868	-280868	-280868	-280868	-280868	-280868	-280868	-2808675
OPER COST			-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1752000	-1.752E7
<hr/>													
NI8T			1712033	1712033	1712033	1712033	1712033	1712033	1712033	1712033	1712033	1712033	17120325
DEPREC			-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-174700	-1747000
DEPLETION			-561735	-561735	-561735	-561735	-561735	-561735	-561735	-561735	-561735	-561735	-5617350
<hr/>													
TAXABLE I			975598	975598	975598	975598	975598	975598	975598	975598	975598	975598	9755975
TAX @ 50%			-487799	-487799	-487799	-487799	-487799	-487799	-487799	-487799	-487799	-487799	-4877988
<hr/>													
NIAT			487799	487799	487799	487799	487799	487799	487799	487799	487799	487799	4877988
DEPREC			174700	174700	174700	174700	174700	174700	174700	174700	174700	174700	1747000
DEPLETION			561735	561735	561735	561735	561735	561735	561735	561735	561735	561735	5617350
WORK CAP			-500000									500000	0
<hr/>													
CASH FLOW	-530000	-1280000	724234	1224234	1224234	1224234	1224234	1224234	1224234	1224234	1224234	1724234	10432338
<hr/>													
600 \$ GOLD											NPV AT 20		
											2000453		

UNDERGROUND PROFORMA

40\$/TON OPERATING \$!!!!!!!

[illegible]

UNDERGROUND PROFORMA

\$60 /TON OPERATING COSTS !!!!!!!

[illegible]

UNDERGROUND PROFORMA

70\$/TON OPERATING \$!!!!!!!

[illegible]

APPENDIX A

Alverado Reserve Calculations

The attached reserve was calculated from the 1907 Neill's map of the Alverado Mine in Yavapai County, Arizona. The total reserve from this source was 143,000 tons carrying 0.26 ounces per ton of gold and averaging 3.57 feet in width. There is an additional 140,000 tons of material that was either unsampled or just beyond the workings. Since 1907 the mine was deepened and there may have been some mining of these reserves. The only known map of the mine after that time was a sketch in 1938 that shows that the mine was extended to the 13th level but no mining of the 1907 reserve was indicated.

ALVERADO GOLD MINE
 RESERVE CALCULATIONS
 APRIL 1982.00

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WT
-----100 - A	2.60	60.00	10.00	0.12	124.80	14.98	324.48-----
-----100 - B	4.50	60.00	20.00	0.10	432.00	43.20	1944.00-----
-----	4.00	60.00	20.00	0.10	384.00	38.40	1536.00-----
-----	2.30	60.00	20.00	0.20	220.80	44.16	507.84-----
-----	2.70	60.00	20.00	0.10	259.20	25.92	699.84-----
-----	2.70	10.00	10.00	0.15	21.60	3.24	58.32-----
-----100 - C	1.60	70.00	5.00	0.40	44.80	17.92	71.68-----
-----	1.80	70.00	5.00	0.20	50.40	10.08	90.72-----
-----	2.00	70.00	5.00	0.49	56.00	27.44	112.00-----
-----	2.20	70.00	5.00	0.70	61.60	43.12	135.52-----
-----	3.00	70.00	5.00	0.75	84.00	63.00	252.00-----
-----	2.30	70.00	5.00	0.11	64.40	7.08	148.12-----
-----	2.30	70.00	5.00	0.25	64.40	16.10	148.12-----
-----	2.90	70.00	5.00	0.16	81.20	12.99	235.48-----
-----	2.50	70.00	5.00	0.40	70.00	28.00	175.00-----
-----	2.40	70.00	5.00	1.92	67.20	129.02	161.28-----
-----	0.50	70.00	5.00	0.16	14.00	2.24	7.00-----
-----	0.50	70.00	5.00	0.38	14.00	5.32	7.00-----
-----	3.80	70.00	5.00	0.52	106.40	55.33	404.32-----
-----	3.00	70.00	5.00	0.26	84.00	21.84	252.00-----
-----100 - D	2.30	80.00	11.67	0.30	171.73	51.52	394.99-----
-----	3.50	80.00	11.67	0.12	261.41	31.37	914.93-----
-----	2.30	80.00	11.67	0.19	171.78	32.64	395.10-----
-----	2.10	80.00	11.67	0.36	156.84	56.46	329.37-----
-----	1.40	80.00	11.67	0.13	104.56	13.59	146.39-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----	2.00	80.00	11.67	0.21	149.38	31.37	298.75-----
-----100 - E	2.40	50.00	45.00	0.15	432.00	64.80	1036.80-----
-----100 - F	4.50	50.00	17.50	0.43	315.00	135.45	1417.50-----
-----	4.00	50.00	17.50	2.32	280.00	649.60	1120.00-----
-----100 - G	1.70	50.00	13.33	0.40	90.67	36.27	154.13-----
-----	3.30	50.00	13.30	0.10	175.56	17.56	579.35-----
-----	3.00	50.00	13.30	0.62	159.60	98.95	478.80-----
-----100 H	3.30	110.00	9.23	0.25	268.06	67.02	884.60-----
-----	1.80	110.00	9.23	0.32	146.20	46.79	263.17-----
-----	3.00	110.00	9.23	0.20	243.67	48.73	731.02-----
-----	2.80	110.00	9.23	0.40	227.43	90.97	636.80-----
-----	1.80	110.00	9.23	0.10	146.20	14.62	263.17-----
-----	2.20	110.00	9.23	0.50	178.69	89.35	393.12-----
-----	2.00	110.00	9.23	0.10	162.45	16.24	324.90-----
-----	2.40	110.00	9.23	0.20	194.94	38.99	467.85-----
-----	3.40	110.00	9.23	0.50	276.16	138.08	938.95-----
-----	4.00	110.00	9.23	0.50	324.90	162.45	1299.58-----
-----	2.00	110.00	9.23	1.00	162.45	162.45	324.90-----
-----	3.00	110.00	9.23	0.60	243.67	146.20	731.02-----
-----	2.50	110.00	9.23	0.75	203.06	152.30	507.65-----
-----100 - J	1.50	8.24	11.76	0.10	11.63	1.16	17.44-----
-----	3.00	8.24	11.76	0.11	23.25	2.56	69.76-----
-----	3.00	8.24	11.76	0.05	23.25	1.16	69.76-----
-----	3.00	8.24	11.76	0.05	23.25	1.16	69.76-----
-----	3.00	8.24	11.76	0.18	23.25	4.19	69.76-----
-----	2.50	8.24	11.76	1.30	19.38	25.19	48.44-----
-----	2.50	8.24	11.76	0.15	19.38	2.91	48.44-----
-----	3.00	8.24	11.76	0.12	23.25	2.79	69.76-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----100 - J	2.50	8.24	11.76	0.10	19.38	1.94	48.44-----
-----	2.00	8.24	11.76	0.02	15.50	0.31	31.00-----
-----	2.00	8.24	11.76	0.05	15.50	0.78	31.00-----
-----	3.50	8.24	11.76	0.27	27.13	7.32	94.95-----
-----	2.50	8.24	11.76	0.10	19.38	1.94	48.44-----
-----	3.50	8.24	11.76	0.25	27.13	6.78	94.95-----
-----	3.00	8.24	11.76	0.10	23.25	2.33	69.76-----
-----	4.00	8.24	11.76	0.10	31.00	3.10	124.01-----
-----100 - D	3.40	80.00	10.00	0.08	217.60	17.41	739.84-----
-----	1.60	80.00	10.00	0.28	102.40	28.67	163.84-----
-----	2.00	80.00	10.00	0.21	128.00	26.88	256.00-----
-----	4.00	80.00	10.00	0.76	256.00	194.56	1024.00-----
-----	2.00	80.00	10.00	0.22	128.00	28.16	256.00-----
-----	2.60	80.00	10.00	0.07	166.40	11.65	432.64-----
-----100 - P	2.10	80.00	10.00	0.60	134.40	80.64	282.24-----
-----	2.20	80.00	10.00	0.02	140.80	2.82	309.76-----
-----	2.30	80.00	10.00	0.30	147.20	44.16	338.56-----
-----	2.50	80.00	10.00	0.15	160.00	24.00	400.00-----
-----	3.10	80.00	10.00	0.18	198.40	35.71	615.04-----
-----100 - Q	3.50	110.00	15.00	0.37	462.00	170.94	1617.00-----
-----	2.00	120.00	20.00	0.05	384.00	19.20	768.00-----
-----	4.00	130.00	40.00	0.35	1664.00	582.40	6656.00-----
-----	2.00	140.00	30.00	0.04	672.00	26.88	1344.00-----

TOTALS	BLOCK 100	3.00		0.34	12857.33	4362.83	38512.14

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AA	2.00	140.00	5.42	0.02	121.33	2.43	242.67-----
-----	2.00	140.00	5.42	0.04	121.33	4.85	242.67-----
-----	2.00	140.00	5.42	0.05	121.33	6.07	242.67-----
-----	2.80	140.00	5.42	0.05	169.87	8.49	475.63-----
-----	4.50	140.00	5.42	0.13	273.00	35.49	1228.50-----
-----	3.60	140.00	5.42	0.12	218.40	26.21	786.24-----
-----	3.00	140.00	5.42	0.06	182.00	10.92	546.00-----
-----	3.30	140.00	5.42	0.06	200.20	12.01	660.66-----
-----	3.00	140.00	5.42	0.06	182.00	10.92	546.00-----
-----	5.00	140.00	5.42	0.12	303.33	36.40	1516.67-----
-----	3.50	140.00	5.42	0.04	212.33	8.49	743.17-----
-----	4.00	140.00	5.42	0.04	242.67	9.71	970.67-----
-----	2.00	140.00	5.42	0.10	121.33	12.13	242.67-----
-----	3.00	140.00	5.42	0.06	182.00	10.92	546.00-----
-----	3.00	140.00	5.42	0.20	182.00	36.40	546.00-----
-----	2.00	140.00	5.42	0.16	121.33	19.41	242.67-----
-----	3.00	140.00	5.42	0.04	182.00	7.28	546.00-----
-----	3.00	140.00	5.42	0.07	182.00	12.74	546.00-----
-----	3.10	140.00	5.42	0.04	188.07	7.52	583.01-----
-----	3.10	140.00	5.42	0.02	188.07	3.76	583.01-----
-----	4.00	140.00	5.42	0.04	242.67	9.71	970.67-----
-----	3.60	140.00	5.42	0.24	218.40	52.42	786.24-----
-----	3.30	140.00	5.42	0.04	200.20	8.01	660.66-----

TOTAL AA	3.32			0.08	4355.87	352.29	14454.44

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AB	4.00	140.00	11.11	0.12	497.78	59.73	1991.11-----
-----	4.00	140.00	11.11	0.14	497.78	69.69	1991.11-----
-----	4.30	140.00	11.11	0.12	535.11	64.21	2300.98-----
-----	2.50	140.00	11.11	0.08	311.11	24.89	777.78-----
-----	3.20	140.00	11.11	0.05	398.22	19.91	1274.31-----
-----	3.00	140.00	11.11	0.02	373.33	7.47	1120.00-----
-----	2.00	140.00	11.11	0.02	248.89	4.98	497.78-----
-----	2.00	140.00	11.11	0.02	248.89	4.98	497.78-----
-----	1.50	140.00	11.11	0.10	186.67	18.67	280.00-----
-----TOTAL AB	3.25			0.08	3297.78	274.52	10730.84-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AC	3.00	140.00	40.00	0.03	1344.00	40.32	4032.00-----
-----TOTAL AC	3.00			0.03	1344.00	40.32	4032.00-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AD	1.20	140.00	50.00	0.26	672.00	174.72	806.40-----
-----TOTAL AD	1.20			0.26	672.00	174.72	806.40-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AE	1.20	110.00	70.00	0.02	739.20	14.78	887.04-----
-----TOTAL AE	1.20			0.02	739.20	14.78	887.04-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----*200 AF	7.00	140.00	10.00	1.30	784.00	1019.20	5488.00-----
-----	2.00	140.00	10.00	0.11	224.00	24.64	448.00-----
-----	2.00	140.00	10.00	0.22	224.00	49.28	448.00-----
-----	1.00	140.00	10.00	0.09	112.00	10.08	112.00-----
-----TOTAL AF	4.83			0.82	1344.00	1103.20	6496.00-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AG	1.60	140.00	5.00	0.08	89.60	7.17	143.36-----
-----	1.00	140.00	5.00	0.06	56.00	3.36	56.00-----
-----	1.60	140.00	5.00	0.04	89.60	3.58	143.36-----
-----	2.00	140.00	5.00	0.12	112.00	13.44	224.00-----
-----	1.40	140.00	5.00	0.04	78.40	3.14	109.76-----
-----	2.10	140.00	5.00	0.10	117.60	11.76	246.96-----
-----	3.00	140.00	5.00	0.12	168.00	20.16	504.00-----
-----	3.00	140.00	5.00	0.20	168.00	33.60	504.00-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----AG CONT	2.00	140.00	5.00	0.40	112.00	44.80	224.00-----
-----	3.20	140.00	5.00	0.10	179.20	17.92	573.44-----
-----	1.40	140.00	5.00	0.20	78.40	15.68	109.76-----
-----	4.00	140.00	5.00	0.05	224.00	11.20	896.00-----
-----	2.00	140.00	5.00	0.07	112.00	7.84	224.00-----
-----	4.70	140.00	5.00	0.77	263.20	202.66	1237.04-----
-----	2.30	140.00	5.00	0.09	128.80	11.59	296.24-----
-----	3.20	140.00	5.00	0.07	179.20	12.54	573.44-----
-----	2.10	140.00	5.00	0.18	117.60	21.17	246.96-----
-----	2.50	140.00	5.00	0.06	140.00	8.40	350.00-----
-----	3.50	140.00	5.00	0.05	196.00	8.82	686.00-----
-----	2.20	140.00	5.00	0.10	123.20	12.32	271.04-----
-----	3.10	140.00	5.00	0.04	173.60	6.94	538.16-----
-----	2.50	140.00	5.00	0.32	140.00	44.80	350.00-----
-----	2.00	140.00	5.00	0.12	112.00	13.44	224.00-----

-----TOTAL AG	2.76			0.17	3158.40	536.34	8731.52-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
-----200 - AH	2.20	140.00	15.75	0.18	388.08	69.85	853.78-----
-----	1.60	140.00	15.75	0.16	282.24	45.16	451.58-----
-----	1.90	140.00	15.75	0.24	335.16	80.44	636.80-----
-----	2.00	140.00	15.75	0.24	352.80	84.67	705.60-----

-----TOTAL AH	1.95			0.21	1358.28	280.12	2647.76-----

BLOCK NO.	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WT
-----200 AI&J	1.00	140.00	8.20	0.06	91.84	5.51	91.84
-----	2.60	140.00	8.20	0.12	238.78	28.65	620.84
-----	2.50	140.00	8.20	0.04	229.60	9.18	574.00
-----	2.70	140.00	8.20	0.12	247.97	29.76	669.51
-----	7.50	140.00	8.20	0.06	688.80	41.33	5166.00
-----	1.30	140.00	8.20	0.06	119.39	7.16	155.21
-----	2.20	140.00	8.20	0.22	202.05	44.45	444.51
-----	2.10	140.00	8.20	0.46	192.86	88.72	405.01
-----	2.50	140.00	8.20	0.28	229.60	64.29	574.00
-----	1.50	140.00	8.20	0.22	137.76	30.31	206.64
-----	1.70	140.00	8.20	0.20	156.13	31.23	265.42
-----	3.50	140.00	8.20	0.13	321.44	41.79	1125.04
-----	5.00	140.00	8.20	0.08	459.20	36.74	2296.00
-----	2.40	140.00	8.20	0.32	220.42	70.53	529.00
-----	1.00	140.00	8.20	0.20	91.84	18.37	91.84
-----	2.60	140.00	8.20	0.44	238.78	105.06	620.84
-----	2.10	140.00	8.20	0.06	192.86	11.57	405.01
-----	2.00	140.00	8.20	0.08	183.68	14.69	367.36
-----	1.60	140.00	8.20	0.34	146.94	49.96	235.11
-----	0.70	140.00	8.20	0.55	64.29	35.36	45.00
-----	1.50	140.00	8.20	0.40	137.76	55.10	206.64
-----	6.00	140.00	8.20	0.26	551.04	143.27	3306.24
-----	2.00	140.00	8.20	0.92	183.68	168.99	367.36
-----	2.60	140.00	8.20	0.14	238.78	33.43	620.84
-----	2.50	140.00	8.20	0.16	229.60	36.74	574.00
-----TOTAL AI&	3.44			0.21	5795.10	1202.19	19963.26

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WGT
----- 200 - AK	2.40	150.00	10.42	0.24	300.00	72.00	720.00-----
-----	2.00	150.00	10.42	0.20	250.00	50.00	500.00-----
-----	2.70	150.00	10.42	0.22	337.50	74.25	911.25-----
-----	2.70	150.00	10.42	0.14	337.50	47.25	911.25-----
-----	2.00	150.00	10.42	0.12	250.00	30.00	500.00-----
-----	2.50	150.00	10.42	0.19	312.50	59.37	781.25-----
-----	3.40	150.00	10.42	0.11	425.00	46.75	1445.00-----
-----	3.00	150.00	10.42	0.10	375.00	37.50	1125.00-----
-----	3.00	150.00	10.42	0.10	375.00	37.50	1125.00-----
-----	2.80	150.00	10.42	0.15	350.00	52.50	980.00-----
-----	3.50	150.00	10.42	0.05	437.50	21.87	1531.25-----
-----	3.00	150.00	10.42	0.07	375.00	26.25	1125.00-----

TOTAL AK	2.83			0.13	4125.00	555.25	11655.00

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WGT
----- 200 - AL	3.00	110.00	8.57	0.30	226.29	67.89	678.86-----
-----	3.50	110.00	8.57	0.20	264.00	52.80	924.00-----
-----	3.50	110.00	8.57	0.30	264.00	79.20	924.00-----
-----	3.20	110.00	8.57	0.22	241.37	53.10	772.39-----
-----	3.00	110.00	8.57	0.25	226.29	56.57	678.86-----
-----	4.00	110.00	8.57	0.30	301.71	90.51	1206.86-----
-----	3.50	110.00	8.57	0.05	264.00	13.20	924.00-----

----- TOTAL AL	3.42			0.23	1787.66	413.27	6108.96

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T
----- 200 - AM	2.50	60.00	15.91	0.22	190.91	42.00	477.27-----
-----	1.50	60.00	15.91	0.28	114.55	32.07	171.82-----
-----	1.50	60.00	15.91	0.36	114.55	41.24	171.82-----
-----	2.50	60.00	15.91	0.06	190.91	11.45	477.27-----
-----	2.50	60.00	15.91	0.38	190.91	72.55	477.27-----
-----	3.00	60.00	15.91	0.27	229.09	61.85	687.27-----
-----	2.00	60.00	15.91	0.10	152.73	15.27	305.45-----
-----	2.10	60.00	15.91	0.10	160.36	16.04	336.76-----
-----	3.00	60.00	15.91	0.48	229.09	109.96	687.27-----
-----	2.10	60.00	15.91	0.32	160.36	51.32	336.76-----
-----	2.00	60.00	15.91	0.12	152.73	18.33	305.45-----
-----	3.60	60.00	15.91	0.20	274.91	54.98	989.67-----
-----	2.80	60.00	15.91	0.20	213.82	42.76	598.69-----
-----	4.00	60.00	15.91	0.21	305.45	64.15	1221.82-----
-----	3.50	60.00	15.91	0.69	267.27	184.42	935.45-----
-----	2.00	60.00	15.91	0.32	152.73	48.87	305.45-----
-----	2.00	60.00	15.91	0.18	152.73	27.49	305.45-----
-----	2.10	60.00	15.91	0.16	160.36	25.66	336.76-----
-----	3.00	60.00	15.91	0.22	229.09	50.40	687.27-----
-----	2.60	60.00	15.91	0.18	198.55	35.74	516.22-----
-----	2.80	60.00	15.91	0.25	213.82	53.45	598.69-----
-----	3.00	60.00	15.91	0.23	229.09	52.69	687.27-----

----- TOTAL AM	2.71			0.26	4284.00	1112.69	11617.20

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WGT
----- 200 - AN	2.00	130.00	11.43	0.08	237.71	19.02	475.43-----
-----	3.60	130.00	11.43	0.25	427.89	106.97	1540.39-----
-----	4.80	130.00	11.43	0.10	570.51	57.05	2738.47-----
-----	5.00	130.00	11.43	0.12	594.29	71.31	2971.43-----
-----	3.00	130.00	11.43	0.15	356.57	53.49	1069.71-----
-----	3.00	130.00	11.43	0.20	356.57	71.31	1069.71-----
-----	2.50	130.00	11.43	0.08	297.14	23.77	742.86-----

----- TOTAL AN	3.73			0.14	2840.69	402.93	10608.00
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TOTAL	BLOCK	200
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BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WGT
TOTAL AA	3.32			0.08	4355.87	352.29	14454.44
TOTAL AB	3.25			0.08	3297.78	274.52	10730.84
TOTAL AC	3.00			0.03	1344.00	40.32	4032.00
TOTAL AD	1.20			0.26	672.00	174.72	806.40
TOTAL AE	1.20			0.02	739.20	14.78	887.04
TOTAL AF	4.83			0.82	1344.00	1103.20	6496.00
TOTAL AG	2.76			0.17	3158.40	536.34	8731.52
TOTAL AH	1.95			0.21	1358.28	280.12	2647.76
TOTAL AI&J	3.44			0.21	5795.10	1202.19	19963.26
TOTAL AK	2.83			0.13	4125.00	555.25	11655.00
TOTAL AL	3.42			0.23	1787.66	413.27	6108.96
TOTAL AM	2.71			0.26	4284.00	1112.69	11617.20
TOTAL AN	3.73			0.14	2840.69	402.93	10608.00

TOTAL	BLOCK 200	3.10		0.18	35101.97	6462.63	108738.43
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BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	Wt
-----300 BA	1.60	130.00	20.00	0.10	332.80	33.28	532.48-----
-----	2.40	130.00	15.00	0.38	374.40	142.27	898.56-----
-----	1.60	130.00	20.00	0.06	332.80	19.97	532.48-----
-----	3.00	130.00	15.00	0.05	468.00	23.40	1404.00-----
-----	2.00	130.00	12.00	0.18	249.60	44.93	499.20-----
-----	1.60	130.00	30.00	0.38	499.20	189.70	798.72-----
-----	2.60	130.00	5.00	0.13	135.20	17.58	351.52-----
-----	2.30	130.00	12.00	0.19	287.04	54.54	660.19-----
-----	3.00	130.00	10.00	0.08	312.00	24.96	936.00-----
-----	1.50	130.00	10.00	0.14	156.00	21.84	234.00-----
-----	1.00	130.00	8.00	0.10	83.20	8.32	83.20-----
-----	2.60	130.00	12.00	0.12	324.48	38.94	843.65-----
-----	2.80	130.00	5.00	0.22	145.60	32.03	407.68-----
-----	2.70	130.00	5.00	0.20	140.40	28.08	379.08-----
-----TOTAL BA	ERROR			ERROR	3840.72	679.83	8560.76-----
-----							-----
-----							-----
-----BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	Wt-----
-----300 BB	2.30	130.00	15.00	0.26	358.80	93.29	825.24-----
-----	1.00	130.00	15.00	0.11	156.00	17.16	156.00-----
-----	1.10	130.00	10.00	0.06	114.40	6.86	125.84-----
-----	4.00	130.00	12.00	0.08	499.20	39.94	1996.80-----
-----	2.00	130.00	10.00	0.23	208.00	47.84	416.00-----
-----	2.40	130.00	8.00	0.04	199.68	7.99	479.23-----

-----	3.40	130.00	11.00	0.08	388.96	31.12	1322.46-----
-----	2.20	130.00	12.00	0.08	274.56	21.96	604.03-----
-----	2.30	130.00	10.00	0.21	239.20	49.75	550.16-----
-----	2.00	130.00	10.00	0.15	208.00	31.20	416.00-----
-----	4.00	130.00	11.00	0.12	457.60	54.91	1830.40-----
-----	1.00	130.00	12.00	0.14	124.80	17.47	124.80-----
-----	3.80	130.00	31.00	0.11	1225.12	134.76	4655.46-----
-----	3.60	130.00	12.00	0.24	449.28	107.83	1617.41-----

-----TOTAL BB	ERROR		ERROR	4903.60	662.08	15119.83-----
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-----BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WT-----
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-----300 BC	1.70	70.00	15.00	0.00	142.80	0.00	242.76-----
-----	1.80	70.00	18.00	2.15	181.44	390.10	326.59-----
-----	1.60	70.00	15.00	0.52	134.40	69.89	215.04-----
-----	4.00	70.00	13.00	0.26	291.20	75.71	1164.80-----
-----	2.00	70.00	10.00	0.30	112.00	33.60	224.00-----
-----	2.30	70.00	10.00	0.51	128.80	65.69	296.24-----
-----	2.30	70.00	12.00	0.35	154.56	54.10	355.49-----
-----	3.00	70.00	8.00	0.32	134.40	43.01	403.20-----
-----	2.30	70.00	7.00	0.08	90.16	7.21	207.37-----

-----TOTAL BC	ERROR		ERROR	1369.76	739.30	3435.49-----
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BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WGT
300 - BD	3.60	60.00	30.00	0.11	518.40	57.02	1866.24
	2.20	60.00	15.00	0.16	158.40	25.34	348.48
	3.90	60.00	20.00	0.30	374.40	112.32	1460.16
	4.60	60.00	10.00	0.20	220.80	44.16	1015.68
	3.90	60.00	12.00	0.10	224.64	22.46	876.10
	3.10	60.00	8.00	0.12	119.04	14.28	369.02
	4.00	60.00	8.00	0.06	153.60	9.22	614.40
	5.10	60.00	9.00	0.06	220.32	13.22	1123.63
	0.06	60.00	5.00	0.06	1.44	0.09	0.09
TOTAL BD	ERROR			ERROR	1991.04	298.12	7673.80

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	WGT
300 - BE	3.00	180.00	18.00	0.40	777.60	311.04	2332.80
	6.00	180.00	12.00	0.40	1036.80	414.72	6220.80
	6.00	180.00	30.00	0.22	2592.00	570.24	15552.00
	6.00	180.00	12.00	0.22	1036.80	228.10	6220.80
	4.00	180.00	16.00	0.05	921.60	46.08	3686.40
	4.80	180.00	13.00	0.05	898.56	44.93	4313.09
	4.00	180.00	11.00	0.15	633.60	95.04	2534.40
	4.00	180.00	11.00	0.60	633.60	380.16	2534.40
	4.00	180.00	65.00	0.60	3744.00	2246.40	14976.00
TOTAL BE	ERROR			ERROR	12274.56	4336.70	58370.69

-----BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T-----	

-----300 - BF	5.50	80.00	12.00	0.46	422.40	194.30	2323.20-----	
-----	2.00	80.00	15.00	0.20	192.00	38.40	384.00-----	
-----	0.01	80.00	13.00	0.01	0.83	0.01	0.01-----	
-----	0.06	80.00	8.00	0.06	3.07	0.18	0.18-----	
-----	0.02	80.00	18.00	0.02	2.30	0.05	0.05-----	
-----	0.40	80.00	12.00	0.40	30.72	12.29	12.29-----	
-----	0.18	80.00	13.00	0.18	14.98	2.70	2.70-----	
-----	0.10	80.00	15.00	0.10	9.60	0.96	0.96-----	
-----	0.46	80.00	8.00	0.46	23.55	10.83	10.83-----	
-----	0.20	80.00	21.00	0.20	26.88	5.38	5.38-----	
-----	0.08	80.00	18.00	0.08	9.22	0.74	0.74-----	
-----	0.12	80.00	15.00	0.12	11.52	1.38	1.38-----	
-----	1.60	80.00	15.00	0.16	153.60	24.58	245.76-----	

TOTAL BF	ERROR			ERROR	900.67	291.79	2987.47	
TOTAL	BLOCK 300	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	W&T

	TOTAL BA	ERROR			ERROR	3840.72	679.83	8560.76
	TOTAL BB	ERROR			ERROR	4903.60	662.08	15119.83
	TOTAL BC	ERROR			ERROR	6273.36	1401.39	18555.32
	TOTAL BD	ERROR			ERROR	3360.80	1037.42	11109.29
	TOTAL BE	ERROR			ERROR	14265.60	4634.82	66044.49
	TOTAL BF	ERROR			ERROR	900.67	291.79	2987.47

TOTAL	BLOCK 300	ERROR			ERROR	33544.75	8707.33	122377.16

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W
-----400 - CD	3.80	100.00	12.86	0.08	390.86	31.27	1485.26-----
-----	2.30	100.00	12.86	0.38	236.57	89.90	544.11-----
-----	4.10	100.00	12.86	0.22	421.71	92.78	1729.03-----
-----	3.00	100.00	12.86	0.01	308.57	3.09	925.71-----
-----	2.50	100.00	12.86	0.24	257.14	61.71	642.86-----
-----	1.50	100.00	12.86	0.30	154.29	46.29	231.43-----
-----	3.00	100.00	12.86	0.38	308.57	117.26	925.71-----
-----TOTAL	3.12			0.21	2077.71	442.29	6484.11-----
-----							-----
-----							-----
-----BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W-----
-----600 - EA	3.40	100.00	65.00	0.16	1768.00	282.88	6011.20-----
-----	5.60	100.00	10.00	0.16	448.00	71.68	2508.80-----
-----	4.30	100.00	10.00	0.14	344.00	48.16	1479.20-----
-----	5.00	100.00	10.00	0.06	400.00	24.00	2000.00-----
-----	3.20	100.00	10.00	0.20	256.00	51.20	819.20-----
-----	2.70	100.00	10.00	0.10	216.00	21.60	583.20-----
-----TOTAL	3.90			0.15	3432.00	499.52	13401.60-----

CONTINUED PAGE 17

----- BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W-----
-----600 - EB	3.00	100.00	65.00	0.18	1560.00	280.80	4680.00-----
-----	6.00	100.00	10.00	0.20	480.00	96.00	2880.00-----
-----	6.10	100.00	10.00	0.21	488.00	102.48	2976.80-----
-----	7.00	100.00	10.00	0.06	560.00	33.60	3920.00-----
-----	5.80	100.00	10.00	0.04	464.00	18.56	2691.20-----
-----	7.20	100.00	10.00	0.33	576.00	190.08	4147.20-----
-----	6.00	100.00	10.00	0.08	480.00	38.40	2880.00-----
-----	7.00	100.00	10.00	0.12	560.00	67.20	3920.00-----
-----	8.00	100.00	10.00	0.16	640.00	102.40	5120.00-----
-----	6.60	100.00	10.00	0.20	528.00	105.60	3484.80-----
-----	5.30	100.00	10.00	0.14	424.00	59.36	2247.20-----
-----	5.30	100.00	10.00	0.13	424.00	55.12	2247.20-----
-----	2.50	100.00	10.00	0.26	200.00	52.00	500.00-----
-----	3.50	100.00	10.00	0.16	280.00	44.80	980.00-----
-----	3.00	100.00	10.00	0.32	240.00	76.80	720.00-----
-----	5.10	100.00	60.00	0.52	2448.00	1272.96	12484.80-----
-----	3.90	100.00	10.00	0.06	312.00	18.72	1216.80-----

-----TOTAL EB	5.35			0.25	10664.00	2614.88	57096.00-----

CONTINUED PAGE 18

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W-----
----------	-------	--------	--------	---------	------	-------	----------

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&M
700 - FA	4.80	100.00	50.00	0.02	1920.00	38.40	9216.00
	4.70	100.00	7.50	0.10	282.00	28.20	1325.40
	5.00	100.00	7.50	0.02	300.00	6.00	1500.00
	4.20	100.00	7.50	0.20	252.00	50.40	1058.40
	4.40	100.00	7.50	0.10	264.00	26.40	1161.60
	4.00	100.00	7.50	0.30	240.00	72.00	960.00
	4.00	100.00	7.50	0.10	240.00	24.00	960.00
	2.00	100.00	7.50	0.06	120.00	7.20	240.00
	4.00	100.00	7.50	0.07	240.00	16.80	960.00

TOTAL FA	4.51			0.07	3858.00	269.40	17381.40
----------	------	--	--	------	---------	--------	----------

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&M
700 - FB	2.90	110.00	50.00	0.10	1276.00	127.60	3700.40
	2.50	110.00	18.00	0.10	396.00	39.60	990.00
	2.40	110.00	50.00	0.10	1056.00	105.60	2534.40

TOTAL FB	2.90			3.00	1276.00	127.60	3700.40
----------	------	--	--	------	---------	--------	---------

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W
-----800 -6A	4.20	110.00	4.50	0.85	166.32	141.37	698.54-----
-----	3.60	110.00	4.50	0.30	142.56	42.77	513.22-----
-----	3.50	110.00	4.50	0.30	138.60	41.58	485.10-----
-----	3.00	110.00	4.50	0.35	118.80	41.58	356.40-----
-----	3.30	110.00	4.50	0.25	130.68	32.67	431.24-----
-----	3.40	110.00	4.50	0.90	134.64	121.18	457.78-----
-----	3.10	110.00	4.50	0.30	122.76	36.83	380.56-----
-----	3.00	110.00	4.50	0.24	118.80	28.51	356.40-----
-----	5.00	110.00	4.50	0.10	198.00	19.80	990.00-----
-----	3.50	110.00	4.50	0.46	138.60	63.76	485.10-----
-----	3.00	110.00	4.50	0.30	118.80	35.64	356.40-----
-----	3.00	110.00	4.50	0.35	118.80	41.58	356.40-----
-----	4.50	110.00	4.50	1.00	178.20	178.20	801.90-----
-----	2.60	110.00	4.50	0.25	102.96	25.74	267.70-----
-----	5.00	110.00	4.50	0.90	198.00	178.20	990.00-----
-----	4.60	110.00	4.50	1.13	182.16	205.84	837.94-----
-----	3.60	110.00	4.50	0.42	142.56	59.88	513.22-----
-----	3.50	110.00	4.50	0.60	138.60	83.16	485.10-----
-----	3.50	110.00	4.50	0.60	138.60	83.16	485.10-----

TOTAL 6A	3.76			0.54	2728.44	1461.44	10248.08

----- BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	TW-----
-----800 - 68	3.50	80.00	7.43	0.70	166.40	116.48	582.40-----
-----	3.60	80.00	7.43	0.70	171.15	119.81	616.16-----
-----	3.00	80.00	7.43	0.25	142.63	35.66	427.89-----
-----	3.00	80.00	7.43	0.40	142.63	57.05	427.89-----
-----	3.00	80.00	7.43	0.70	142.63	99.84	427.89-----
-----	4.00	80.00	7.43	0.70	190.17	133.12	760.69-----
-----	3.00	80.00	7.43	0.70	142.63	99.84	427.89-----
-----	3.10	80.00	7.43	0.70	147.38	103.17	456.89-----
-----	3.10	80.00	7.43	0.35	147.38	51.58	456.89-----
-----	3.50	80.00	7.43	0.55	166.40	91.52	582.40-----
-----	3.00	80.00	7.43	0.75	142.63	106.97	427.89-----
-----	3.60	80.00	7.43	0.07	171.15	11.98	616.16-----
-----	3.10	80.00	7.43	0.26	147.38	38.32	456.89-----
-----	3.00	80.00	7.43	0.10	142.63	14.26	427.89-----
-----	3.00	80.00	7.43	0.10	142.63	14.26	427.89-----
-----	3.20	80.00	7.43	0.23	152.14	34.99	486.84-----
-----	3.00	80.00	7.43	0.10	142.63	14.26	427.89-----
-----	3.00	80.00	7.43	0.50	142.63	71.31	427.89-----
-----	2.80	80.00	7.43	0.30	133.12	39.94	372.74-----
-----	3.20	80.00	7.43	0.31	152.14	47.16	486.84-----
-----	2.70	80.00	7.43	0.20	128.37	25.67	346.59-----
-----	3.80	80.00	7.43	0.55	180.66	99.36	686.52-----
-----	3.10	80.00	7.43	0.55	147.38	81.06	456.89-----
-----	3.20	80.00	7.43	1.40	152.14	212.99	486.84-----
-----	3.10	80.00	7.43	0.62	147.38	91.38	456.89-----
-----	3.10	80.00	7.43	0.42	147.38	61.90	456.89-----

-----	3.20	80.00	7.43	0.26	152.14	39.56	486.84	-----
-----	3.50	80.00	7.43	0.30	166.40	49.92	582.40	-----
-----	3.50	80.00	7.43	0.80	166.40	133.12	582.40	-----
-----	2.20	80.00	7.43	0.42	104.59	43.93	230.11	-----
-----	3.40	80.00	7.43	0.40	161.65	64.66	549.60	-----
-----	3.50	80.00	7.43	0.38	166.40	63.23	582.40	-----
-----	3.90	80.00	7.43	0.06	185.42	11.13	723.13	-----
-----	3.20	80.00	7.43	0.30	152.14	45.64	486.84	-----
-----	3.50	80.00	7.43	0.20	166.40	33.28	582.40	-----

-----TOTAL GB 3.25 0.44 5353.33 2358.36 17422.56-----

----- BLOCK NO WIDTH HEIGHT LENGTH OZ/T AU TONS OZ AU T&W-----

-----900 - HA 3.76 110.00 90.00 0.54 2977.92 1608.08 11196.98-----

-----TOTAL HA 3.76 0.54 2977.92 1608.08 11196.98-----

----- BLOCK NO WIDTH HEIGHT LENGTH OZ/T AU TONS OZ AU T&W-----

-----900 - HB 3.25 110.00 260.00 0.44 7436.00 3271.84 24167.00-----

TOTAL HB 3.25 0.44 7436.00 321.84 24167.00

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W
-----1000-1A	5.30	140.00	20.00	0.49	1187.20	581.73	6292.16-----
-----	2.00	140.00	10.00	0.15	224.00	33.60	448.00-----
-----	1.60	140.00	10.00	0.10	179.20	17.92	288.72-----
-----	1.60	140.00	40.00	0.09	716.80	64.51	1146.88-----
-----	1.30	140.00	10.00	0.40	145.60	58.24	189.28-----
-----	1.50	140.00	10.00	0.34	168.00	57.12	252.00-----
-----TOTAL 1A	3.29			0.31	2620.80	813.12	8615.04

BLOCK NO	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	T&W
-----1000-1B	5.70	140.00	10.80	0.55	689.47	379.21	3929.99
-----	3.00	140.00	10.80	0.20	362.88	72.58	1088.64
-----	2.50	140.00	10.80	0.40	302.40	120.96	756.00
-----	3.00	140.00	10.80	0.20	362.88	72.58	1088.64
-----	3.50	140.00	10.80	0.50	423.36	211.68	1481.76
-----	5.90	140.00	10.80	0.05	713.66	35.68	4210.62
-----	3.00	140.00	10.80	0.11	362.88	39.92	1088.64
-----	5.50	140.00	10.80	0.09	665.28	59.88	3659.04
-----	6.00	140.00	10.80	0.38	725.76	275.79	4354.56
-----	3.00	140.00	10.80	1.00	362.88	362.88	1088.64
-----	3.00	140.00	10.80	0.40	362.88	145.15	1088.64
-----	4.30	140.00	10.80	0.40	520.13	208.05	2236.55
-----	3.00	140.00	10.80	0.50	362.88	181.44	1088.64
-----	2.40	140.00	10.80	0.35	290.30	101.61	696.73
-----	2.50	140.00	10.80	0.05	302.40	15.12	756.00
-----	3.00	140.00	10.80	0.26	362.88	94.35	1088.64
-----	4.70	140.00	10.80	0.08	568.51	45.48	2672.01

-----	4.60	140.00	10.80	0.45	556.42	250.39	2559.51
-----	0.50	140.00	10.80	0.09	60.48	5.44	30.24
-----	3.00	140.00	10.80	0.07	362.88	25.40	1088.64
-----	2.30	140.00	10.80	0.38	278.21	105.72	639.88
-----	5.50	140.00	10.80	0.81	665.28	538.88	3659.04
-----	3.60	140.00	10.80	0.20	435.46	87.09	1567.64
-----	3.80	140.00	10.80	0.50	459.65	229.82	1746.66
-----	5.00	140.00	10.80	0.40	604.80	241.92	3024.00

-----TOTAL IB 4.18 0.35 11164.61 3907.01 46689.35

----- BLOCK NO WIDTH HEIGHT LENGTH OZ/T AU TONS OZ AU T&W

-----1000-IC	3.00	140.00	22.31	0.11	749.54	82.45	2248.62
-----	4.00	140.00	22.31	0.12	999.38	119.93	3997.54
-----	3.00	140.00	22.31	0.88	749.54	659.59	2248.62
-----	1.80	140.00	22.31	0.10	449.72	44.97	809.50
-----	2.00	140.00	22.31	0.24	499.69	119.93	999.38
-----	2.50	140.00	22.31	0.68	624.62	424.74	1561.54
-----	6.00	140.00	22.31	0.38	1499.08	569.65	8994.46
-----	2.00	140.00	22.31	0.04	499.69	19.99	999.38
-----	2.00	140.00	22.31	0.42	499.69	209.87	999.38
-----	2.10	140.00	22.31	0.14	524.68	73.45	1101.82
-----	1.00	140.00	22.31	0.16	249.85	39.98	249.85
-----	2.00	140.00	22.31	0.40	499.69	199.88	999.38
-----	2.00	140.00	22.31	0.40	499.69	199.88	999.38

-----TOTAL IC 3.14 0.33 8344.86 2764.30 26208.86

ALVERADO RESERVE CALCULATION

SUMMARY SHEET

BLOCK	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS	OZ AU	Wt
BLOCK 100	3.00			0.34	12857.33	4362.83	38512.14
TOTAL AA	3.32			0.08	4355.87	352.29	14454.44
TOTAL AB	3.25			0.08	3297.78	274.52	10730.84
TOTAL AC	3.00			0.03	1344.00	40.32	4032.00
TOTAL AD	1.20			0.26	672.00	174.72	806.40
TOTAL AE	1.20			0.02	739.20	14.78	887.04
TOTAL AF	4.83			0.82	1344.00	1103.20	6496.00
TOTAL AG	2.76			0.17	3158.40	536.34	8731.52
TOTAL AH	1.95			0.21	1358.28	280.12	2647.76
TOTAL AI&J	3.44			0.21	5795.10	1202.19	19963.26
TOTAL AK	2.83			0.13	4125.00	555.25	11655.00
TOTAL AL	3.42			0.23	1787.66	413.27	6108.96
TOTAL AM	2.71			0.26	4284.00	1112.69	11617.20
TOTAL AN	3.73			0.14	2840.69	402.93	10608.00
TOTAL BA	2.23			0.18	3840.72	679.83	8560.76
TOTAL BB	3.08			0.14	4903.60	662.08	15119.83
TOTAL BC	2.51			0.54	6273.36	1401.39	18555.32
TOTAL BD	3.85			0.15	3360.80	1037.42	11109.29
TOTAL BE	4.76			0.35	14265.60	4634.82	66044.49
TOTAL BF	3.32			0.32	900.67	291.79	2987.47
TOTAL DA	3.12			0.21	2077.71	442.29	6484.11
TOTAL EA	3.90			0.15	3432.00	499.52	13401.60
TOTAL EB	5.35			0.25	10664.00	2614.88	57096.00

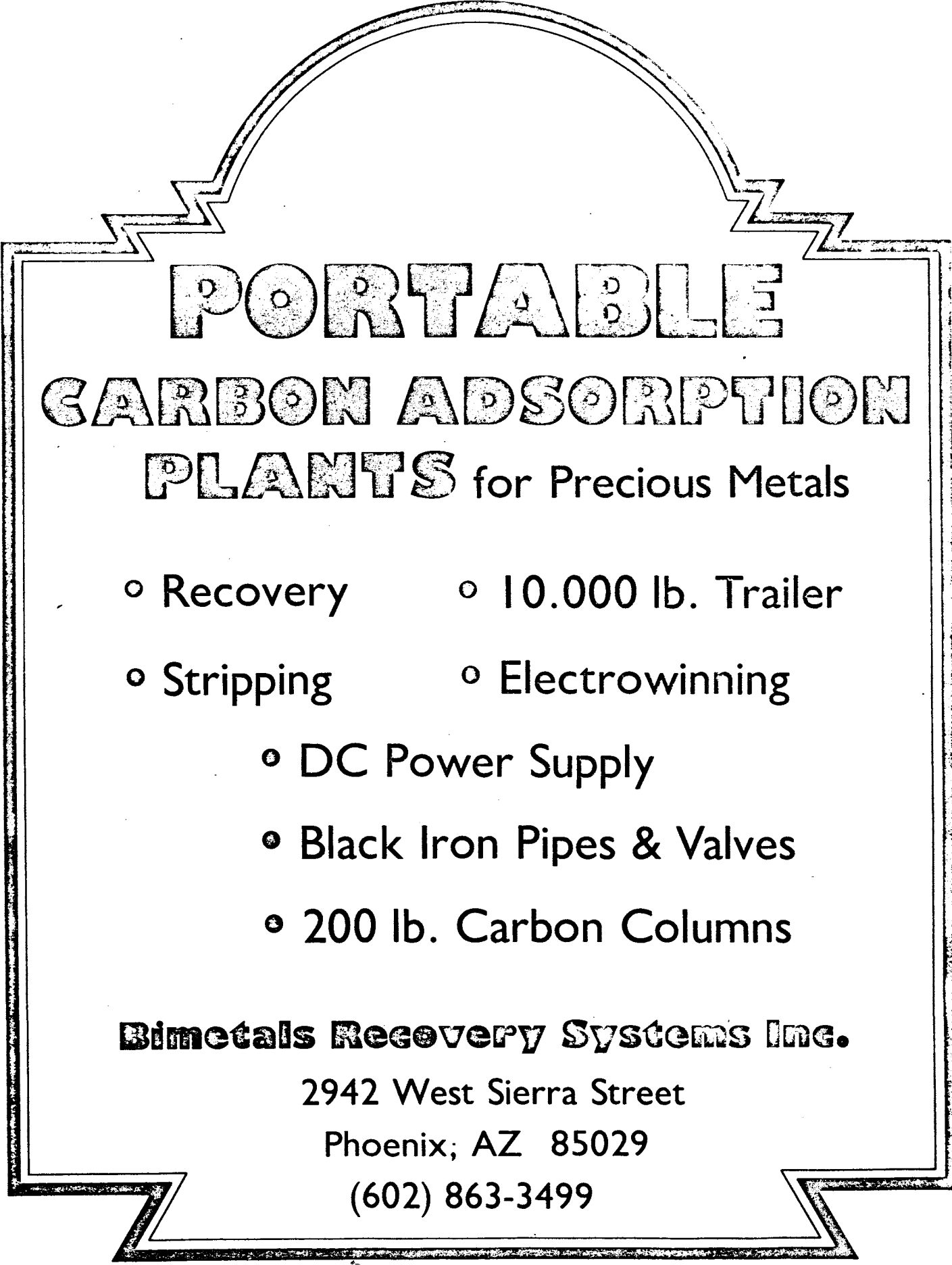
RESERVE CALCULATION SUMMARY

BLOCK	WIDTH	HEIGHT	LENGTH	OZ/T AU	TONS		
----- TOTAL FA	4.51			0.07	3858.00	269.40	17381.40 -----
----- TOTAL FB	2.90			0.10	1276.00	127.60	3700.40 -----
----- TOTAL GA	3.76			0.54	2728.44	1461.44	10248.08 -----
----- TOTAL GB	3.25			0.44	5353.33	2358.36	17422.56 -----
----- TOTAL HA	3.76			0.54	2977.92	1608.08	11196.98 -----
----- TOTAL HB	3.25			0.44	7436.00	321.84	24167.00 -----
----- TOTAL IA	3.29			0.31	2620.80	813.12	8615.04 -----
----- TOTAL IB	4.18			0.35	11164.61	3907.01	46689.35 -----
----- TOTAL IC	3.14			0.33	8344.86	2764.30	26208.86 -----
-----							-----
TOTAL	3.57			0.26	143438	36721	512239

APPENDIX B

THE BIMETALS RECOVERY SYSTEM

The attached brochure describes the Bimetals recovery system portable recovery system for precious metals. It is a trailer mounted unit containing five 18 inch by seven foot six inch carbon columns, a hot alcohol with caustic stripping section and an electrowinning section. It is capable of handling the off solutions from a 10,000 ton heap leaching operation and producing electrowon gold and silver on steel wool. The steel wool is leached with sulfuric acid, decanted and dried to produce a sludge which is saleable to a refiner or annealed to a dore metal.



PORTABLE CARBON ADSORPTION PLANTS for Precious Metals

- Recovery
- 10.000 lb. Trailer
- Stripping
- Electrowinning
- DC Power Supply
- Black Iron Pipes & Valves
- 200 lb. Carbon Columns

Bimetals Recovery Systems Inc.

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Phoenix; AZ 85029

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