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1/3/74

Basic Data - Prelim. Feasibility
N. Delamar - Sommercamp

* Assume mining is contracted @ .50/ton material removed.

Reserves (Diluted @ Sommercamp - in place - Delamar)

	Strip Ratio	Tons x 10^6	oz. Ag/T	oz Au/T	Tons Waste
Somm.	3.57:1	2.1	5.32	.015	7.5
N. Delamar	1.97:1	2.3	2.85	.069	4.5

Price / Revenue (Yr) 312 working days

Au 100.00/oz x .015 x .73 = $1.10
Ag 3.00/oz x 5.32 x .94 = 15.00
Sommercamp $16.10 x 440,000 = $7.084 x 10^6

100.00/oz x .069 x .87 = $6.00
3.00 " x 2.85 x .86 = 7.35
N. Delamar 13.35 x 440,000 = $5.874 x 10^6

$12,958

Recovery (Hazen research, Cyanide Leach Rec x .98)

Sommercamp	.94 Ag	.73 Au
N. Delamar	.86 Ag	.87 Au

Mill Op Cost

Sommercamp	$3.95/ton
N. Delamar	$4.80/ton

Mine Op Cost

.50/Ton material removed (reduce capital cost)

Mill Capital Cost

$3.447 \times \frac{1400}{600}^{.7} = \$6.239 \times 10^6$

G & A

$.25/Ton Fed

Roads, Tailing Disposal, Water Supply et al

$.500 MM

Property Payments & Split

260,000 spent to 12/31/73, 125,000 paid to Pershing as of 12/31/73, Cont gets 7 1/2 of net profits

Combined N. Wetaman - Simmerenamp 1/3/74
Preliminary Feasability Study
contract mining @ 50¢/Ton Material moved, Mill rate, 1400 T/D, 440,000 T/Y

	-2	-1	1	2	3	4	5	6	7	8	9	10	
Roads, Tailings, Land, & Housing	.100	.400											
Exploration - Feasability	.150												
Mill Capital Cost		6.239											
Mine Capital Cost		.200					.100						
Pre-Production Costs		1.005											
all costs prior (260)													
Revenue			7.084	7.084	7.084	7.084	6.809	5.874	5.874	5.874	5.874	5.874	
Mine Op Cost			1.005	1.005	1.005	.925	.653	.653	.653	.653	.653	0	
Mill " "			1.738	1.738	1.738	1.738	1.738	1.738	1.738	1.738	1.738	1.738	
G&A			.110	.110	.110	.110	.110	.110	.110	.110	.110	.110	
Royalty & Min Adv. Roy	.025	.025	.535	.340	-	-	-	-	-	-	-	-	
Depreciation			.787	.787	.787	.787	.787	.787	.787	.787	.787	.787	
Idaho State Tax			.291	.310	.344	.352	.352	.259	.259	.259	.259	.324	
Pre Tax Profit			2.618	2.794	3.100	3.172	3.169	2.327	2.327	2.327	2.327	2.915	
Less Depletion			1.063	1.063	1.063	1.063	1.021	.881	.881	.881	.881	.881	
- Resulting #			1.556	1.731	2.037	2.109	2.148	1.446	1.446	1.446	1.446	2.034	
U.S. Tax @ 50%			.778	.865	1.018	1.054	1.074	.723	.723	.723	.723	1.017	
Post Tax Profit			1.840	1.928	2.081	2.117	2.095	1.604	1.604	1.604	1.604	1.898	
+ Depreciation			.787	.787	.787	.787	.787	.787	.787	.787	.787	.787	
+ Salvage			-	-	-	-	-	-	-	-	-	.634	
- Addn'l Capital Expend.			-	-	-	-	.100	-	-	-	-	-	
Cash Flows			2.627	2.715	2.868	2.904	2.782	2.391	2.391	2.391	2.391	3.319	26779
Silver Group's Share	(.535)	(7.869)	2.627	2.715	2.868	2.701	2.581	2.212	2.212	2.212	2.212	3.070	18775
Continental's Share			-	-	-	.203	.201	.179	.179	.179	.179	.249	
PV @ 15% of SG.	(535)	(6843)	1986	1785	1639	1343	1116	830	723	629	547	660	3580
Accumulated Cash Flow, Silver Gp	(.535)	(8.404)	(5.777)	(3.062)	(.193)	2.508	5.089	7.301	9.513	11.725	13.937	17.007	x.52
-2	(.275)	1.45875											51861
-1	(7.869	1.1341											
1	2.627	.8848											
2	2.715	.6891											
3	2.868	.5367											
4	2.701	.4179		DCF = 25%									
5	2.581	.3255											
6	2.212	.3535											
7	2.212	.1974											
8	2.212	.1538											
9	2.212	.1197											
10	3.070	.0933											

P/I = 2.0
ROI = 20%
Payback = 3.07 years

FRED H. BROOKS, P.E.
MINING ENGINEER

P. O. BOX 26545, DENVER, COLORADO 80226 (303) 986-6531

May 4, 1973

Mr. G. K. Ealy, Vice President
Earth Resources Company
P.O.Box 270
Golden, Colorado 80401

Dear Gene,

Enclosed herewith is my report covering a review of the ore reserves, costs and potential of your DeLamar property located in Owyhee County, Idaho.

Yours very truly,

Fred H. Brooks.

EARTH RESOURCES COMPANY

Subject: Reappraisal - DeLamar Property

Location: Owynee County, Idaho

Date: May 3, 1973

By: Fred H. Brooks

EARTH RESOURCES COMPANY

Subject: Reappraisal - DeLamar Property

Location: Owyhee County, Idaho

Date: May 3 1971

By: Fred R. Brooks

CONTENTS

SUMMARY	Page 1
PLANT DESIGN	Page 2
ORE RESERVES	Page 3
REVENUE	Page 5
MILLING COSTS	Page 6
MINING COSTS	Page 7
GENERAL	Page 9
DISCOUNTED CASH FLOW STUDIES	Page 9
Royalty	Page 10
Pre Production Costs	Page 10
Taxes	Page 10
Salvage	Page 11
SUMMARY AND RECOMMENDATIONS	Page 11

IN POCKET:

- Geologic Map - DeLamar area
- Cross Sections - Sommercamp
- Cross Sections - North DeLamar
- Ore Reserve Worksheets
- Cash Flow Worksheets

SUMMARY:

The purpose of this report was to re-examine the DeLamar property in the light of added data and changes in costs since the 1971 feasibility study.

Ore reserves were re-calculated using two cutoffs, one at 2 ounces and the other at three ounces/ton silver. In addition to drill-indicated reserves at the above cutoffs, an estimate was made of probable reserves in the relatively untested North DeLamar zone.

Capital and operating costs for two levels of operation were calculated using updated information from previous studies and from current data where the latter was considered more reliable.

From these data, six operating plans were examined to determine the expected rate of return by discounted cash flow.

At a 1000 ton/day milling rate, the present indicated and probable ore reserves in the DeLamar area will support a viable mining operation at $2.50/oz. silver and $90.00/oz. gold which will give a DCFROR of 23%.

The break even silver price, or that price below which the project would lose money, calculates to be $1.54 per ounce.

PLANT DESIGN:

A comparison was made to determine the most profitable plant to erect - cyanide or flotation. Costs were derived by updating Hazen Research Institute estimates to 1973 levels and comparing unit costs based upon a theoretical 600 tpd operation and reserves of 2.1 million tons.

Cyanide:

Capital costs - HRI x 1.06 (CPI Index)	$3,447,000
Capital cost/ton	$1.64
Operating cost/ton - Mill $4.16 x 1.06	4.41
Operating cost/ton Mine	2.64
G & A	1.00
Total	$9.69

Recoveries used, from HRI metallurgical tests, were 96% Ag and 75% Au.

Revenue: @ 5.32 oz.Ag/0.015 oz.Au
Ag at $2.50/oz. - Au at $90.00/oz.

Ag. 5.32 x .96 x $2.50	$12.768
Au 0.015 x .75 x $90.00	1.012
	$13.78/ton
Margin	$4.09

Flotation:

Capital costs	$2,162,400
Cost/ton Capital	$1.03
Operating cost/ton Mill	3.33
Operating cost/ton Mine	2.64
Smelting charge (including freight)	.67
G & A	1.00
Total	$8.67

Recoveries, from HRI metallurgical tests, for the flotation circuit were 84% Ag and 44.4% Au.

Revenue:

Ag	5.32 x .84 x 2.50	$11.172
Au	0.015 x .444 x $90.00	.599
Total		$11.77 / ton
Margin		$3.10

The cyanide plant, with its improved recoveries, appears to offer the best alternative. Additionally, the cyanide plant yields a finished product, eliminating dependence on freight rates and smelter schedules.

ORE RESERVES:

Sommercamp:

A complete recalculation of reserves in the western or Sommercamp area was made using all available data and using two mining cutoffs - 2.0 and 3.0 oz. Ag.

North DeLamar:

Insufficient data was available to compute a meaningfull ore reserve for this area, however, it is believed likely that additional exploration, particularly along the southerly boundary under the thrust plate, will develop at least 1.4 million tons of ore at a similar grade (5.32 Oz.) and stripping ratio (3.57:1) to the Sommercamp area. This potential tonnage has been used in Cash Flow studies IV & V.

ORE RESERVES: (cont'd.)

A final reserve calculation was made to evaluate the data that was available from drilling and trenching in this area, even though the sampling density was sparse. This yielded 428,000 tons @ 3.52 oz. Ag and 0.09 oz. Au. The stripping ratio was 2:1

Reserves for all studies are tabulated below:

Sommercamp:	Tons Ore	Oz. Ag	Oz.Au	Tons Waste
3.0 oz.cutoff	1,550,000	6.89	0.02	8,120,000
2.0 oz.cutoff	2,100,000	5.57	0.015	7,500,000
North DeLamar:				
1.0 oz cutoff	4,763,000	1.94	0.05	4,312,000
2.0 oz cutoff	1,216,000	3.05	0.09	2,401,000
Potential (not calculated)	1,400,000	5.57	0.15	5,000,000

Mineable reserves, using 95% recovery and 5% dilution yield:

Sommercamp:	Tons Ore	Oz.Ag	Oz.Au	Tons Waste
3.0 oz cutoff	1,550,000	6.57	0.015	8,120,000
2.0 oz cutoff	2,100,000	5.32	0.15	7,500,000
North DeLamar:				
1.0 oz cutoff	4,763,000	1.87	0.48	3,880,000
2.0 oz cutoff	1,216,000	2.92	0.085	2,401,000
Potential	1,400,000	5.32	0.015	5,000.000

Dilution was estimated, in all cases, to contain o.50 oz. Ag and 0.0 oz. Au.

The weighted average for Case Studies IV and V are:

Sommercamp	2,100,000 tons	@ 5.32/0.015
N. DeLamar	1,400,000 tons	@ 5.32/0.015
Total	3.500,000 tons	@ 5.32/0.015

Fro Case Study VI :

Sommercamp	2,100,000 tons	@ 5.32/0.015
N. DeLamar	1,216,000 tons	@ 2.92/0.085
Total	3,316,000 tons	@ 4.44/0.040

REVENUE:

In all Case Studies except V, a price of $2.50/oz. was used for silver and $90.00/oz. for gold.

In Case V, a silver price of $3.00 /oz. was used.

Revenues per ton at the various grades used in the cash flow calculations are:

Case I & IV:	Ag 5.32 x .96 x$2.50	$12.768
$2.50 Ag	Au 0.015 x .75 x$90.00	1.012
	Total	$13.780
Case II:	Ag 6.57 x .96 x$2.50	$15.77
$2.50 Ag	Au 0.015 x .75 x $90.00	1.01
	Total	$16.78
Case V:	Ag 5.32x .96 x $3.00	$15.322
$3.00 Ag	Au 0.015 x .75 x 90.00	1.012
	Total	$16.334
Case VI:	Ag ~~4.44 x~~ .96 x $2.50	$10.656
$2.50 Ag	Au ~~0.085 x~~ .75 x 90.00	~~5.738~~ 2.700
	Total	~~$16.394~~ 13.356

error

MILLING COSTS:

Hazen Research, in their report of August 1971, proposed a 600 ton/day cyanide plant with an estimated capital cost of $3,252,000 with projected operating costs of $4.16 per ton. Although I have no quarrel with these capital cost figures, the operating costs, compared to similar plants in the U.S. and Canada (1971) appear to be high by 50 to 100%.

These comparative figures are:

Mill	Capacity	Type	Op.Cost/ton
Bralorne	500 tpd	CN & Amal.	$2.60
Camflo	1,000	Cn	1,26
Lamaque	2,150	CN	1.07
Malartic	2,200	CN	.86
Renabie	500	CN & Flot.	2.51
Sigma	1,400	CN	1.13
Superior Oil(est)	500	CN	1.70

However, from the limited test work done, the reagent costs are high and therefore, for this study, the HRI costs have been used and adjusted to January 1973 levels(CPI Index) and, where necessary, expanded to higher capacity using the six-tenths formula.

The resulting figures are:

Plant Size	Capital Cost	Operating Cost
600 tpd	$3,447,000	$ 4.41
1,000 tpd	4,757,000	3.65

Milling at the two levels is based on a 7 day week or 350 operating days/year.

MINING COSTS:

Capital costs were estimated using the basic equipment outlined in J.K.Sturgess' report (8/71) and adjusting costs and quantities to 1973 figures.

The resulting Capital costs are summarized below:

Item	No.Req'd.	600 tpd	1,000 tpd
Air Compressors	2	$81,000	
	3		$122,000
Drills-Air Trac.	2	71,000	
	3		106,500
Loaders-Cat 988	2	198,000	198,000
Trucks - Cat 769	3	300,000	
	5		500,000
Grader	1	45,000	45,000
D-8 Dozer	1	100,000	100,000
Water Truck	1	16,000	16,000
Shop & Maint truck	1	65,000	65,000
Powder Truck	1	6,000	6,000
Pickup trucks	2	8,000	
	3		12,000
Equipment Total		$890,000	$ 1,169,600
Land acquisition	$ 10,000		$20,000
Water system	310,000		310,000
Roads,Tailings	250,000		300,000
Housing	100,000		150,000
Total	$670,000 x 1.06	$710,000	$810,000
Total		$1,600,000	$ 1,979,600
Contingency @ 10%		160,000	197,900
Total Mine Capital		$1,760,000	$ 2,178,000

Operating Costs:

Mine operating costs were calculated two ways, first by updating the costs of the previous study and, second, by using current open pit costs being experienced in Arizona

MINING COSTS: (cont'd.)

mines and adjusting these costs to the required size.

1) J.K.S. 1971 costs:

Cost/ton ore (inc. 6%)		$.703
Cost/ton waste	.52 x 1.06 x 3.57	1.968
Cost/ton ore mined		2.671

Average cost/ton material 2.671 - 4.57=$0.58

2) Arizona costs@20,000 tpd = $0.30 /ton material

Reduction to 600 tpd or 3840 tpd material

$\frac{3840}{20,000}$ = .192 size ratio or 0.370 cost ratio

20,000 x .30 x .370 ÷ 3840 = $0.578/ton material

960,000 tpy @ 0.578 ÷ 210,000 tpy =$2.64

Therefore, for a 600 tpd operation, I used a cost of $2.67 per ton mined. This cost applies to Case I.

Similarly, for the 1000 tpd capacity (6400 tpd material), the adjusted costs become:

1) J.K.S.	(0.47¢/ton material)	$2.16
2) SOCO	cost/ton ore mined	$2.14
	Use	$2.15

These costs were applied to Cases III and IV.

Case II, mining at 600 tpd with higher grade ore and a higher stripping ratio (5.24:1), gives the following unit costs:

J.K.S.	cost/ton ore mined	$2.60
SOCO	" " " "	3.18
	Use	$3.18

MINING COSTS: (cont'd.)

Case VI , mining at 1000tpd (47¢/ton material)

3,316,000 tons ore
9,901,000 tons waste w/o ratio = 3:1

Therefore 1 ton of ore requires mining of 4 tons of material - 4x.47 $1.88/ton

GENERAL:

From the above data and estimates, we can calculate a fairly accurate break even price for silver, i.e. that price below which, under normal operating conditions, the operation will actually lose money.

Using these assumptions:

1000 tpd milling rate
Sommercamp grades, i.e. 5.32 oz Ag/0.015 oz.Au

Capital cost: 7195-3,500,000	$2.06
Operating: Mine, mill, G&A	6.80
Break even cost	$8.86

The break even price for silver , assuming the gold constant at 0.015 oz./$90.00, would be:

5.32 oz Ag x .96 x X = $8.86-1.01(Au)

X = $1.54 /oz.

Breakeven Ag for mining w/o stripping = 2.1 oz Ag/Ton

(5.32 oz)(.96 Rec) X = 8.86 - 1.35

X = 1.47/oz

DISCOUNTED CASH FLOW STUDIES:

Six DCF Rate of Return studies were figured in order to bracket the various possibilities of tonnage, grade, and silver price.

DISCOUNTED CASH FLOW STUDIES: (Cont'd)

The criteria used for the six cases and the DCFROR realized are tabulated below:

ROYALTY:

Continental Materials: This interest has been negotiated to a 7 1/2% net profits interest and is shown as a cost after repayment of capital.

Canadian Superior: The interest owned by Canadian Superior is a working interest. Although affecting the cash flow due E R C ,it does not affect the DCFROR.

Rushing, et al: This interest is stated to be 7 1/2% net smelter with an upset cost of 1 million dollars. Estimating the net smelter value, if a flotation circuit had been used, at $10.66/ton, this royalty becomes $0.80/ton for the first 1,250,000 tons.

PRE PRODUCTION COSTS:

Although this money has been spent and is often listed as "sunk costs", they have been included in these studies as depletable expenses. Costs to all parties to date total $260,000.

TAXES:

State and local taxes are estimated at 10% of operating income. Federal taxes were estimated at 50% of income.

DISCOUNTED CASH FLOW STUDIES: (Cont'd)

SALVAGE VALUE:

Salvage was estimated at 10% of capital cost.

Summary:

Case	Tons/ore	Grade Ag	Grade Au	Milling tpd	Payback Years	DCFROR
I	2,100,000	5.32	0.015	600	6.34	5.98%
II	1,550,000	6.57	0.015	600	4.79	6.00%
III	2,100,000	5.32	0.015	1000	3.85	13.29%
IV	3,500,000	5.32	0.015	1000	4.17	17.82%
V	3,500,000	5.32	0.015	1000	3.25	23.46%
VI	3,316,000	4.44	0.040	1000	3.18	23.90%

In all cases except No.V, prices of $2.50/oz.for silver and $90.00/oz for gold were used. In Case V, a price of $3.00/oz. was used for silver.

Copies of the DCF worksheets are in the pocket.

SUMMARY AND RECOMMENDATIONS:

The Sommercamp area of DeLamar, with reserves in the order of 2 million tons of 5-6 oz. silver, appears to be adequately sampled. Further drilling in this area, though it may provide technical data for mine planning, would have little effect on the overall grade of the deposit.

SUMMARY AND RECOMMENDATIONS: (Cont'd.)

The North DeLamar area, however, has a much greater potential for developing new ore which, with the marked increase in gold values, may provide a significant increase in profitability.

Most of the drilling and sampling to date, has been on or near the apparent outcrop north of the Sommercamp Thrust-plate contact.Of the three holes which penetrated the overthrust block, all were mineralized and one quite highly so. This would lead to the belief that deeper penetrations in this area of intense underground mining would reveal good mineralization between the multiple high-grade veins which were mined in the past.

Sampling of this area will doubtless, be difficult. However, whether by reopening underground workings, or by drilling with "Concor" type equipment, every effort should be made to evaluate this area.

In the event that these intra vein pillars are shown to contain ore, it would open the possibility of underground mining some time in the future, as with the advances in large tonnage mining equipment, costs can be quite competitive with deep open pit operations.

Submitted by:

Fred H. Brooks
P.O.Box 26545
Denver, Colorado 80226
May 3,1973

From the desk of . . .

SXM

JAN 24 1974

RECEIVED

GENE EALY

Don,

The ~~subject~~ missing report is Bulletin 11, Idaho Bureau of Mines & Geology. It deals primarily with Florida Mountain, nearby, and for that reason I haven't included it herein.

The Hagni report was prepared by Canadian Superior & is the one I request you treat as "strictly confidential," returning it to me @ my home address when Paul is through using same

GXE

OWYHEE RECONNAISSANCE PROJECT
IN THE
SILVER CITY DISTRICT
SOUTHERN IDAHO

Geo
please give me
your written
[illegible]

12,800
250
1560

Summer 1972

By

Richard D. Hagni

CONTENTS

Page

I. DE LAMAR MOUNTAIN 1

A. Sommercamp Section 1

1. Stratigraphic Sequence of Volcanic Units 1

a. Unit 1 1
b. Unit 2 1
c. Unit 3 2
d. Unit 4 2
e. Unit 5 2
f. Unit 6 2
g. Unit 7 2
h. Unit 8 3
i. Unit 9 3
j. Unit 10 3
k. Unit 11 3
l. Unit 12 3

2. Structure 3

a. Attitude of Quartz Porphyries 3
(1) Flow-Banding Attitude in Trenches 4
(2) Flow-Banding Attitude in Diamond-Drill Core 4
(3) Flow-Banding Attitude in the Fourth Level of the Sommercamp Mine 4
(4) Correlation of Volcanic Units between Diamond-Drill Core and Trenches 4
b. Attitude of Tuffs in Sommercamp Thrust Plate and Southern Extension of Sommercamp Thrust Fault . . 5
c. Tuffs at West Edge of Sommercamp Section 5
d. Henrietta Fault 6

3. Mineralization and Controls 6

B. Main De Lamar Section 7

II. OTHER PROPERTIES IN THE SILVER CITY DISTRICT 9

A. Glen Silver Zone 9

I. DE LAMAR MOUNTAIN

De Lamar Mountain consists of a complex sequence of volcanic rocks in a variety of structural positions. The stratigraphic sequence of volcanics on De Lamar Mountain is best revealed in core from the three diamond-drill holes in the Sommercamp Section.

A. SOMMERCAMP SECTION

1. Stratigraphic Sequence of Volcanic Units

Twelve volcanic units can be distinguished in core from diamond-drill hole No. 3 (see Fig. 1). The units differ only slightly in lithologic characteristics and the contacts between units appear to be gradational. The units are distinguished on the basis of their banding, color, geodes and spherulites, abundance of quartz and feldspar phenocrysts, and thickness. These characteristics may, however, show rapid lateral changes. The general vertical sequence is from rhyolite-quartz-porphyry flow units in the upper portions of the drill holes, through transitional units, to tuffaceous units with few quartz phenocrysts in the lower portions of those drill holes. The units are numbered 1 through 12 (top to bottom) for the purposes of discussion in this report.

a. Unit 1

Unit 1 is over 47 feet thick and consists of greenish-gray to gray feldspar-quartz porphyry. The phenocrysts are relatively abundant, mostly quartz, but with some potash feldspar phenocrysts. Geodes are abundant, particularly toward the base of the unit; they become more abundant toward the west in DDH 1 and DDH 2. Spherulites are also common, especially toward the west in DDH 1. The unit is massive; it shows no banding.

b. Unit 2

Unit 2 varies in thickness from 27 to 33 feet, becoming thicker to the west. It consists of gray rhyolite-quartz porphyry. Quartz phenocrysts are common; feldspar phenocrysts less common. Geodes and spherulites are characteristic of the unit; geodes are most common in the upper

portion of the unit, and spherulites in the lower portion. The unit is massive.

c. Unit 3

Unit 3 is a breccia of gray quartz porphyry cemented by fine-grained quartz or chalcedony. Although the breccia appears to consistantly occur at the same stratigraphic position, it is connected with a conformable quartz vein, and formed subsequent to the deposition of the rhyolites. The unit is four to five feet thick.

d. Unit 4

Unit 4 varies in thickness from 25 to 38 feet thick; it exhibits the greater thicknesses to the west in DDH 1 and DDH 2. The unit consists of light gray quartz porphyry. Quartz is the common phenocryst mineral, but potash feldspar is locally abundant, particularly in the upper portion of the unit. The unit is characterized by moderately-well-developed, thin banding, but to the west, the central portion of the unit lacks this banding. Geodes and spherulites are generally lacking from this unit.

e. Unit 5

Unit 5 is 18 to 20 feet thick, and it appears to represent a transition from the quartz porphyry units above, to tuffaceous units below. It is a light gray, massive rock, which is light weight like the tuffs below, but it contains some quartz phenocrysts. The quartz phenocrysts are similar to those in the quartz porphyry units above, but they are less abundant. An occasional geode is present in the unit.

f. Unit 6

Unit 6 is the most distinctive unit in the stratigraphic succession covered by the diamond-drill holes. It is a light gray tuff, 27 to 32 feet thick, which displays well-developed, thin, wavy banding. Only a few quartz and feldspar phenocrysts are present; geodes are very rare.

g. Unit 7

The next three units are thin ones, distinguished in DDH 2 and DDH 3. Unit 7 is light gray tuff. It is light weight, contains a

few quartz phenocrysts, and lacks banding. The unit is only four to five feet thick.

h. Unit 8

Unit 8 is a thin unit, five to six feet thick, and distinguished from the unit above and below by its thin banding. It is a light gray tuff.

i. Unit 9

Unit 9 is more than 15 feet thick and comprises a lithology similar to Unit 7. It is a massive, light weight, gray tuff containing some quartz pehnocrysts.

j. Unit 10

Unit 10 is not a stratigraphic unit, but rather a breccia associated with the crosscutting Idaho Footwall Vein. The breccia fragments are of diverse rhyolite lithologies, cemented by a dark gray to black, fine-grained quartz matrix. The breccia was cored in DDH 1 and DDH 3, but a stope is present in this position in DDH 2. The highest silver assays were recorded for this breccia in DDH 3.

k. Unit 11

Unit 11 is 29 feet thick in DDH 1 and part of this unit probably correlates with a 12-foot unit of similar lithology in DDH 3. The unit consists of light gray, tuffaceous rhyolite with few to a moderate number of quartz phenocrysts. Feldspar phenocrysts are moderately abundant locally. Thin banding is weak to moderately well-developed.

l. Unit 12

Unit 12 is a dark green rhyolite (or perhaps dacite?). Few quartz phenocrysts are present. The unit is at least 12 feet thick in DDH 3, where the hole bottoms in this unit; this possibly is equivalent to a unit more than 65 feet thick in DDH 1, but the rock is agglomeratic there.

2. Structure

a. Attitude of Quartz Porphyries

The structural attitude of the quartz porphyries in the Sommercamp Section can be determined from (1) the attitude of flow banding

in some of the units in the trenches; (2) the angles at which the flow banding traverses the diamond-drill core; (3) the attitude of flow banding underground in the fourth level of the Sommercamp Mine; and (4) the correlation of units logged in the diamond-drill holes with units mapped in the trenches.

(1) Flow-Banding Attitude in Trenches. The strike of flow banding as measured in the trenches is northwest or north-northwest. The dip of flow banding is at high angles to nearly vertical. In trenches located at the highest elevations, the dip is most commonly to the northeast but this is not invariably so. For example, the dips of flow banding measured for three of the units in trench number 2 were to the northeast in angles of 65 to 81 degrees, while the other two were 72 and 81 degrees to the southwest. Similarly, in trench number 3, two measured flow-banding dips are to the northeast 70 and 81 degrees, while one is 50 degrees to the southwest. In trench number 3, flow banding measured in three rhyolite units indicates dips 66 to 80 degrees to the northeast. In contrast to the above, however, in trench number 1--located at a relatively lower elevation--the dip is 60 degrees to the south.

(2) Flow-Banding Attitude in Diamond-Drill Core. The angle at which flow banding traverses the diamond-drill core, from the three diamond-drill holes, is predominantly at a high angle to nearly perpendicular to the axis of the core. This indicates a dominant dip to the southwest.

(3) Flow-Banding Attitude in the Fourth Level of the Sommercamp Mine. The attitude of flow banding underground in the fourth level of the Sommercamp Mine shows considerable variation from place to place. The rhyolites showing the best-developed flow banding have a strike N.38°W. and dip about 45 degrees southwest. Locally the dip is as much as 70 degrees southwest.

(4) Correlation of Volcanic Units between Diamond-Drill Core and Trenches. Finally, correlation of the units enumerated above in the stratigraphic section of the report with the lithologies mapped in the trenches, indicates a predominant dip to the southwest of about 60 degrees. Figure 2 is a cross section showing the correlation between lithologies logged in DDH 1 and those mapped in trench number 2. The

contacts between lithologic units 1 and 2, and between 5 and 6 are picked up in the trench as well as the drill core, and they indicate average dips of 58 and 64 degrees southwest. Figure 3 is a cross section showing the correlation of lithologic units between DDH 2 and trench number 8. The contacts between lithologic units 1 and 2 and between units 2 and 3 indicate an average dip of 58 degrees to the southwest. Figure 4 is a cross section showing the correlation between DDH 3 and trench number 3; the contact between lithologic units 1 and 2 indicates an average dip of 58 degrees to the southwest. Figure 5 is a cross section based only upon dips measured in trench number 1.

In summary, although the measured dips of flow banding in most of the trenches is at a high angle most commonly to the northeast, flow banding in the diamond-drill core and underground, and correlations of lithologic units, all require an overall dip to the southwest. Apparently, flow banding which are vertical to northeast dipping at the surface in the trenches, bend at depth of dip to the southwest.

b. Attitude of Tuffs in Sommercamp Thrust Plate and Southern Extension of Sommercamp Thrust Fault

The attitude of rhyolite tuffs in the Sommercamp Thrust Plate to the east of the quartz porphyries discussed above, were measured only in a few outcrops. In those outcrops, the tuffs have strikes of N.10-70°E. and dips 45 to 60 degrees southeast. The strike and dip may vary significantly within a single outcrop.

The extension of the Sommercamp Thrust Fault to the south beyond the Henrietta Fault, I believe, is midway between drill holes 20 and 35 in trench number 3, and the purple breccia in the vicinity of drill hole 20 belongs to the tuff unit of the Sommercamp Thrust Plate. The purple breccia here is composed of tuff fragments with a lithology similar to that of the upper-plate tuff. The tuff probably is brecciated due to its position adjacent to the Sommercamp Fault.

c. Tuffs at West Edge of Sommercamp Section

The tuffs located in the topographically lower or west-southwestern portions of the trenches of the Sommercamp Section are very similar in lithology to the tuffs in the Sommercamp Thrust Plate. It is

likely that these tuffs are not in stratigraphic continuity with the quartz porphyries, but rather that they are separated from them by a fault and that the purple breccia is a fault breccia. The purple breccia consists of tuff fragments with a lithology like that of the unbroken tuff. The breccia fragments are cemented by fine-grained quartz which has probably been subsequently introduced. In many places, the purple breccia is a mosaic breccia in which the individual breccia fragments have been moved only slightly. Drilling this past summer encountered fault gouge in a position which would support this interpretation.

d. Henrietta Fault

The Henrietta Fault was indicated to be a thrust fault by Jim Knox, but believed to be a normal fault by R. R. Asher (1968).

3. Mineralization and Controls

Mineralization occurs in the above-discussed volcanics in a variety of manners:

(a) Veins consisting of very fine-grained quartz contain varying amounts of silver and gold. Streaks of fine-grained disseminated silver mineralization can be observed megascopically in portions of most quartz veins where they are examined closely. The streaks occur most commonly near the margins of those quartz veins.

(b) Silver mineralization has also leaked out into the volcanic host rock, particularly adjacent to the quartz veins. Up to about 3-oz-per-ton silver was detected in three grab samples of silicified rhyolite near mineralized quartz veins in trench number 1 (Fig. 5).

(c) The quartz cement of rhyolite breccias carries silver-gold mineralization, and such quartz generally is pyrite-poor. Some rhyolite breccias are cemented by fine-grained quartz along with abundant pyrite. The Idaho Footwall Vein is comprised principally of pyrite-bearing rhyolite breccia. The breccia fragments are of diverse lithologies. Pyrite-bearing siliceous breccias may carry high-grade silver mineralization.

Most zones of mineralization strike north-northwest and dip to the southwest. Comparison of mineralized zones in Figs. 2, 3, 4, and 5 with stratigraphic correlations shows that the two are roughly conformable. The general conformity of veins with most rhyolite structures can also be seen in the trenches, but locally the veins slightly transgress the flow banding and may bifurcate.

The Idaho Footwall mineralized zone, in contrast, dips to the northeast, crosscutting across the attitude of the host volcanics. It shows a dip of 52 degrees northeast in the fourth level of the Sommercamp Mine. Correlation of the projection of the Idaho Footwall zone in trench number 2 with the projection of that zone from the Sommercamp Mine into the cross section of Fig. 2, together with mineralization intersected in drill hole 14, indicates a dip of 62 degrees northeast. The diverse breccia-fragment lithology is in accord with the transgressive nature of the Idaho Footwall mineralized zone.

B. MAIN DE LAMAR SECTION

The main De Lamar and Sommercamp Sections are believed by Asher (1968, Fig. 31, p. 68) to represent an originally-continuous vein system separated by displacement along the Sommercamp Fault. He believes the Sommercamp Fault was an early northeasterly-trending fault along which the northwest block moved in a southwest direction, carrying the northwest extension of the main De Lamar vein system to the present position of the Sommercamp Section. If this idea were correct, it would be likely that one could detect a sequence of rhyolite units in the main De Lamar Section which would be similar to that in the Sommercamp Section. The rhyolites were carefully examined in the main De Lamar Section with this thought in mind. Although the lithologies in the De Lamar trenches and outcrops are similar to some of those present in the Sommercamp Section, a sequence similar to that of the Sommercamp Section cannot be worked out in the main De Lamar Section. Most of the rhyolites exposed in trenches in the De Lamar Section are greenish-gray feldspar-quartz porphyries. They are more commonly silicified by subsequent mineralizing solutions than in the Sommercamp Section.

The andesite agglomerate exposed in the northeastern portion of trench number 4 can be traced only a short distance eastward from the trench in float fragments. The andesite breaks down readily and is not well preserved as outcrops or as float. Thus, the lack of areal extent of the andesite aggolomerate much beyond the trench, may indicate that it has restricted areal dimensions, or it may simply be a function of its low resistance to weathering.

The eastward extension of the fault (77" vein zone) between the quartz porphyries of the main De Lamar Section and the tuffs, appears to pass close to drill hole 19 and then east-northeastward just north of an old mine shaft near the crest of the hill. The fault contact can then be readily traced down the slope of the hill to the southeast by the presence of quartz-porphyry outcrops on the northeast side versus tuff float on the southwest side. The fault contact is exposed about 500 feet down the hill in the wall of an old adit now closed by slumping. From this point the trace of the fault is more difficult to follow, but it appears to trend south for about 600 feet, then southeastward again.

II. OTHER PROPERTIES IN THE SILVER CITY DISTRICT

A. GLEN SILVER ZONE

The Glen Silver Zone is located just west of the Sommercamp Section on De Lamar Mountain. The distribution of lithologies in the area is complicated by the presence of the De Lamar, Chataqua, and several other faults (Fig. 6). Quartz porphyry is restricted to three parts of the area; the majority of the area consists of rhyolite tuffs, andesite agglomerate, and basalt and latite.

The four trenches furthest to the northwest (trenches 7N, 8N, 9N, and 10N) expose quartz porphyry in a portion or all of the trench. A change in lithology in trench 7N to silicified rhyolite tuff suggests the presence of a fault trending northwest through trenches 7N, 8N, and 9N. The mineralization of trenches 7N and 8N is closely associated with this fault and is especially developed in the quartz porphyry. The mineralization is accompanied by much silicification and this area is perhaps the most promising of the Glen Silver Zone. Possibly the Chataqua Fault passes a little further north than is shown in Fig. 6. If this is the case, this area of mineralization is located at or near the juncture of several faults. Gouge in the southwest portion of trench 5N, and an outcrop of highly silicified breccia between trenches 5N and 6N, support this idea. Gouge in the northeast portion of trench 7N indicates the presence of a third, northerly-trending, fault in this area.

East of the north-trending fault and north of the east-west-trending Chataqua Fault, a large area of vesicular basalt, latite, and spherulitic obsidian is exposed in parts of trenches 7N, 6N, 5N, 4N, 3N, 2N, and 1N. Most of the rocks in this area have a very gentle southeasterly dip. The rock is devoid of significant mineralization.

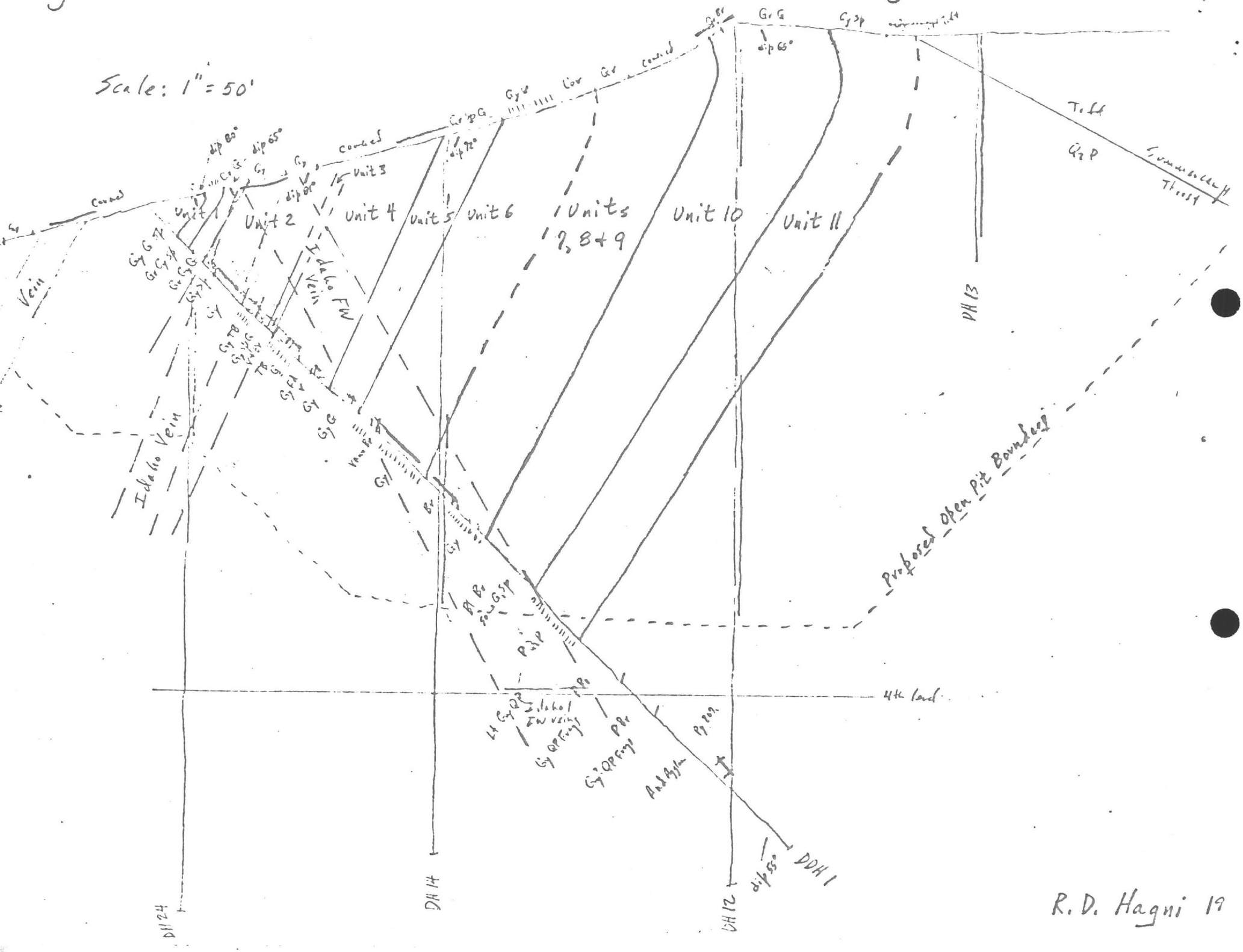
The area between the Chataqua and De Lamar Faults consists of quartz porphyry, rhyolite tuff, and andesite agglomerate. The andesite agglomerate can be seen in trench 3S and in a shallow pit between trenches 2S and 3S to have a gentle dip to the southeast. The wavy west contact of the andesite agglomerate with rhyolite is due primarily to the effect of

topography. The southern contact of the andesite agglomerate with quartz porphyry probably is a fault contact; it is exposed in trench 3S where the contact dips about 30 degrees north. The mineralization in this area is confined mostly to the quartz porphyries, but locally is present in the tuffs. It is positioned immediately to the west of the andesite agglomerate. The quartz porphyry on the south boundary of the andesite agglomerate, however, does not contain significant mineralization.

South of the De Lamar Fault, the rocks exposed in trenches 5S, 6S, 7S, and 6S Extension Southwest, consist of thin-banded rhyolite tuffs. They dip moderately steep to the south and southeast. Mineralization in trenches 6S and 7S possibly may be controlled by a north-south fault which has been indicated to the north of the De Lamar Fault. Its projection to the south lies directly through the mineralization in both trenches; iron staining of rock in trenches 5S and 6S may mark the trace of the fault to the south. The thin-banded tuff in the southwest portion of trench 6S Extension Southwest contains chert nodules, has a distinctive network of quartz veinlets, and is similar to the lithology near the portal of the Sommercamp fourth-level mine which has been referred to by Earth Resources geologists as a possible water-laid tuff. An assay of a grab sample from this tuff (#5715-G), showed only 0.6-oz silver and a trace of gold.

Figure 2

Cross Section of Trench 2 - DDH 1 (looking NNW)



R. D. Hagni 19

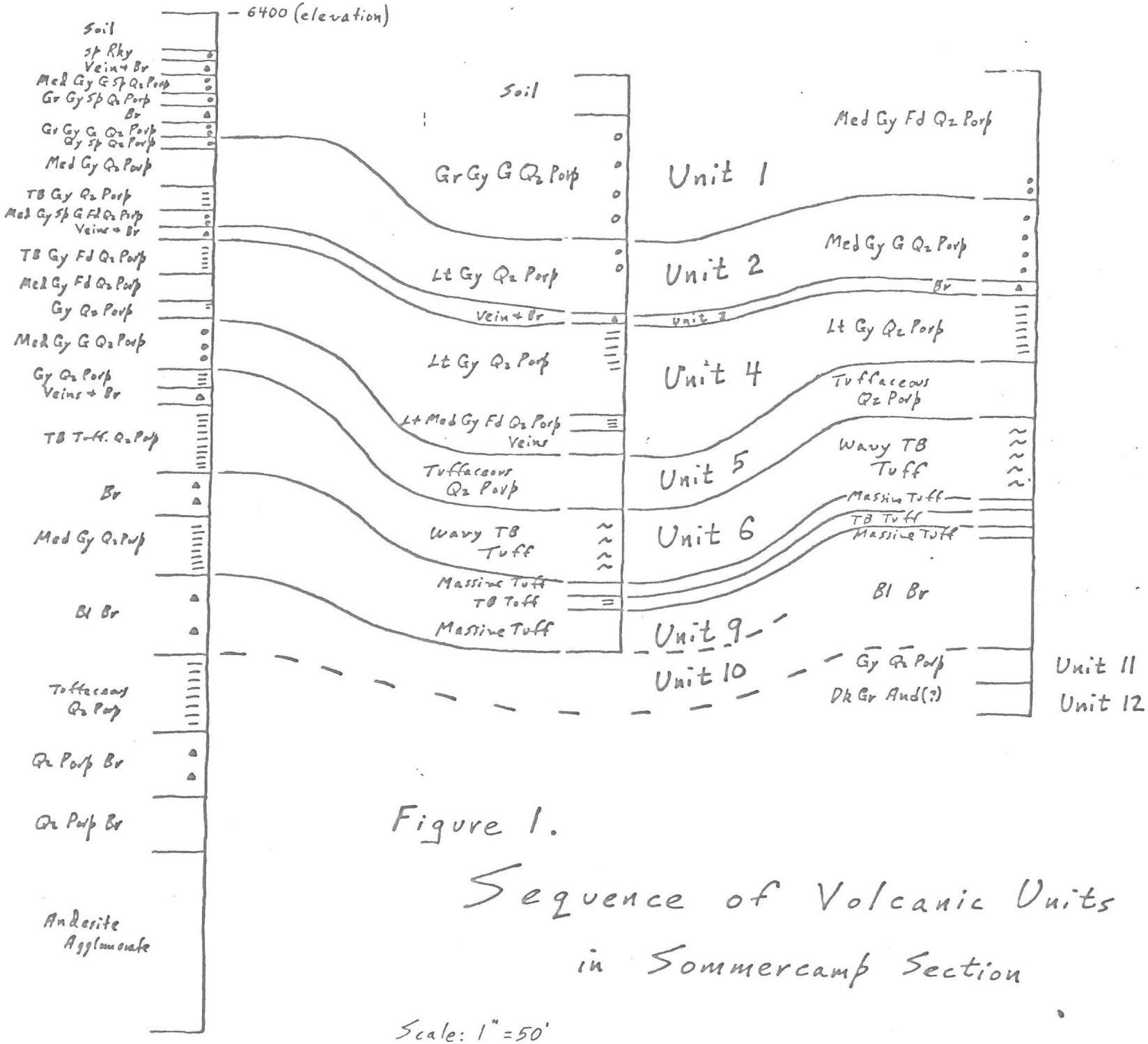


Figure 1.

Sequence of Volcanic Units in Sommercamp Section

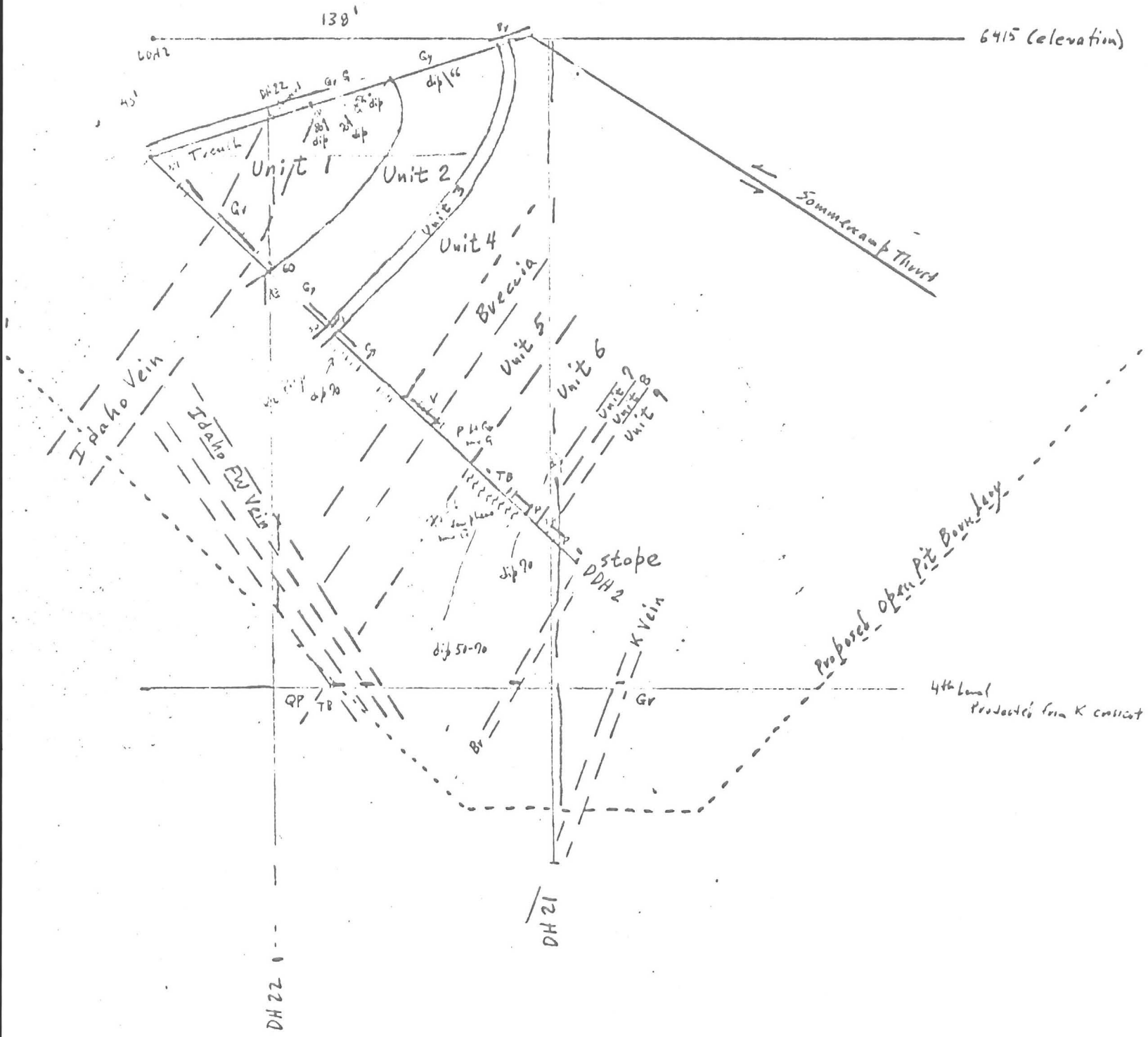
Scale: 1" = 50'

R. D. Hagni 197c

Figure 3

Cross Section of Trench 8 - DDH 2 (looking NNW)

Scale: 1" = 50'



R D U.

Figure 4

Cross Section of Trench 3 – DDH 3 (looking NNW)

Scale: 1" = 50'

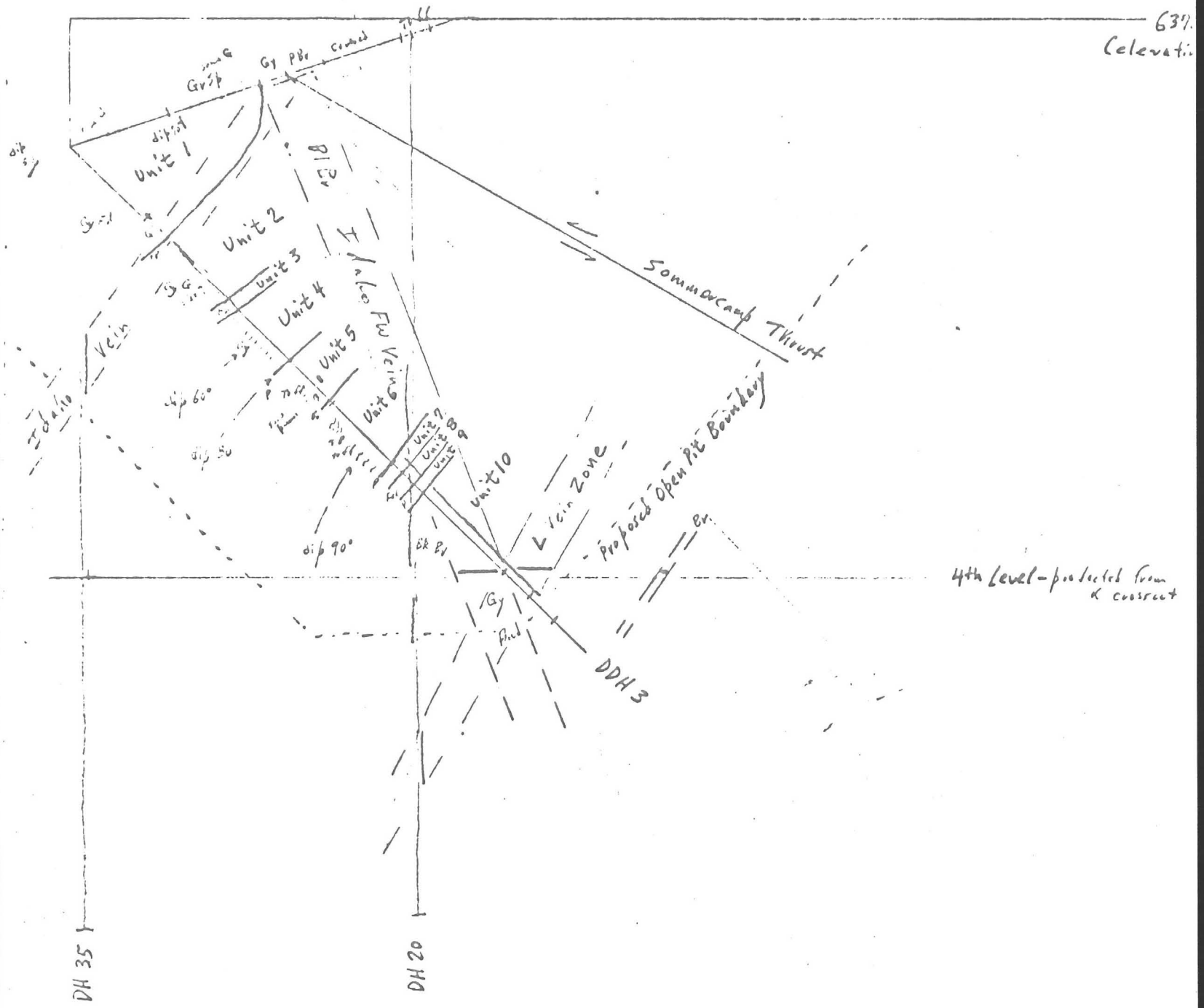


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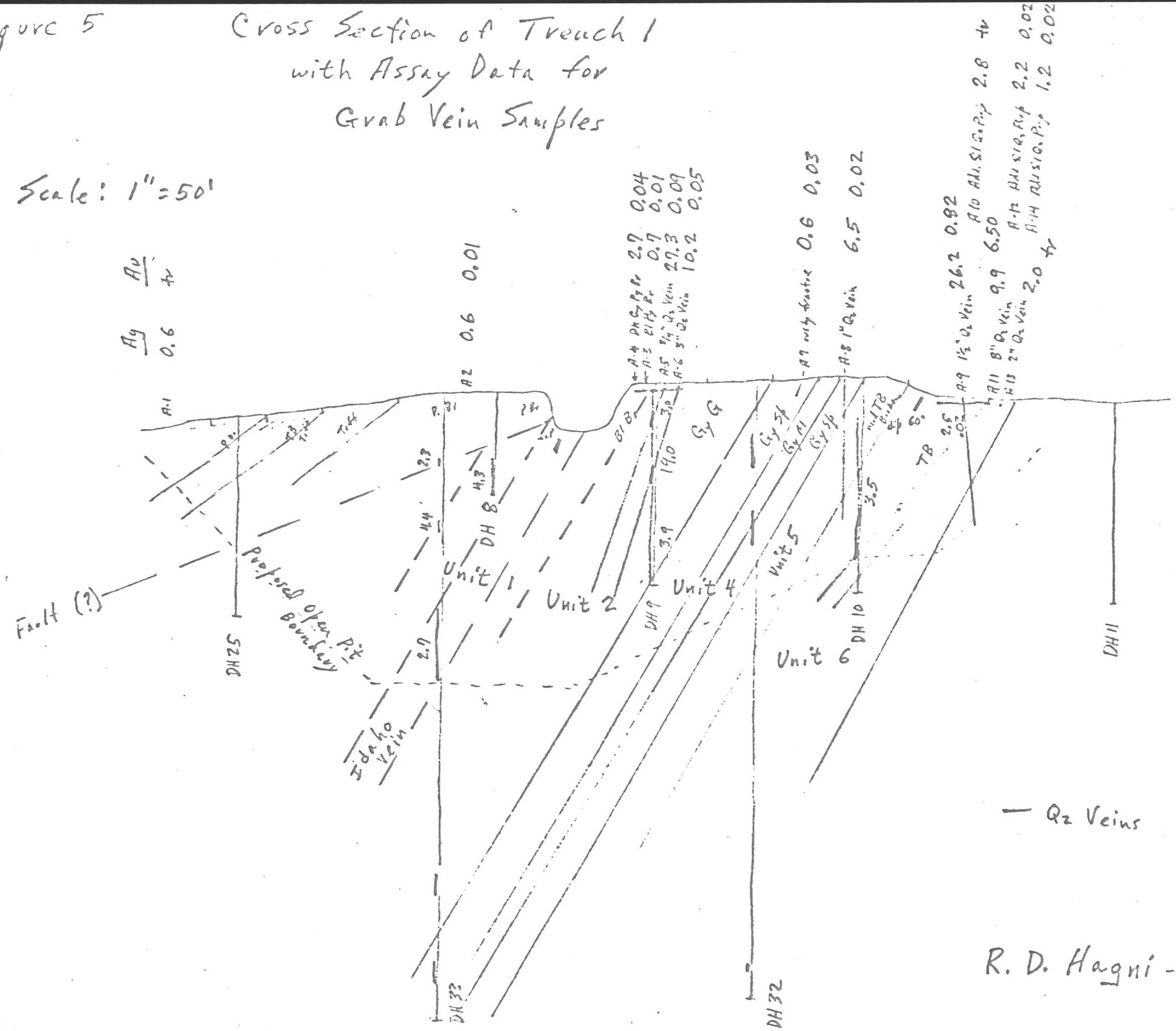
Figure 5

Cross Section of Trench 1
with Assay Data for
Grab Vein Samples

Scale: 1" = 50'



R. D. Hagni - 19

OWYHEE COUNTY.

The mines of Owyhee County have continued throughout the past year to maintain an important output of gold and silver, and while not as large a yield was made as formerly by reason of the apparent exhaustion of the Trade Dollar Mine and its consequent idleness, the yield of bullion is still considerable, and the new development work in progress at several points is likely to result in the near future of maintaining the reputation of Silver City and tributary districts as a source of profitable mining business indefinitely. The principal source of metal from this county now is from the operation of the Delamar Mine.

Delamar Mine—This old property continues to employ a force of 250 men and produces about 20,000 ounces of bullion per month.

Its vitality is wonderful in view of the past testimony of expert talent which has seen its finish and exhaustion every year for the past ten years, but, in spite of advancing operating cost and other adverse conditions the enterprising and judicious management with which its operations are blessed have been able to adjust the milling processes and make a little margin of profit on the year's operation on continually receding values, besides carrying a necessarily large force on development work in addition to ore extraction, the latter item involving one of the largest costs of ore production to maintain the milling requirements of about 150 tons per day.

The company performed nearly two miles of underground development work during 1912 searching for new ore bodies and endeavoring to solve the geological problems its complicated ore deposits involve.

The company's territory is quite extensive. It has been a large producer during the past 20 years, with an output

approximating ten million dollars, the predominant value of which was gold.

In the early years of its operation this property was noted for some remarkably rich bonanza ore shoots and made a production of mineral that contained average values of $100.00 per ton as fed into a large mill. At that time the process of treatment employed involved an operating cost of $16.00 per ton, due to high fuel costs and to the expensive chemicals required by the process. The present method of treating the ore is by all slime straight cyaniding methods and without concentration of amalgamation and costs about $2.00 per ton. This has permitted of the remining all the old stope fills that were made during the early operations of the mine, and also large low grade ore dumps are worked in, together with numerous small stringers of ore that were left in the early-day operations, and also large virgin bands of low grade mineral are also utilizd, that were left as valueless by the earlier operators of the property.

An important production has also been made from the Sommercamp side of the property, on the opposite slope of the mountain from Delamar, and some good ore has been found as low as the twelfth level in the old ore channels.

The bonanza values of this property in its upper level terminated at a pronounced fault called an iron dike, which consists of a wide, soft, blue, leathery talc, richly impregnated with iron sulphide. It is not a settled fact from the nature of this fault whether it is of later or earlier date than the ore deposits. If it should prove of later date than the ore formation, which is not unlikely, there still remains the chance of recovering the faulted end of the famous old bonanza stopes and the re-establishment of the property in all its former glory as a high grade ore producer and dividend payer.

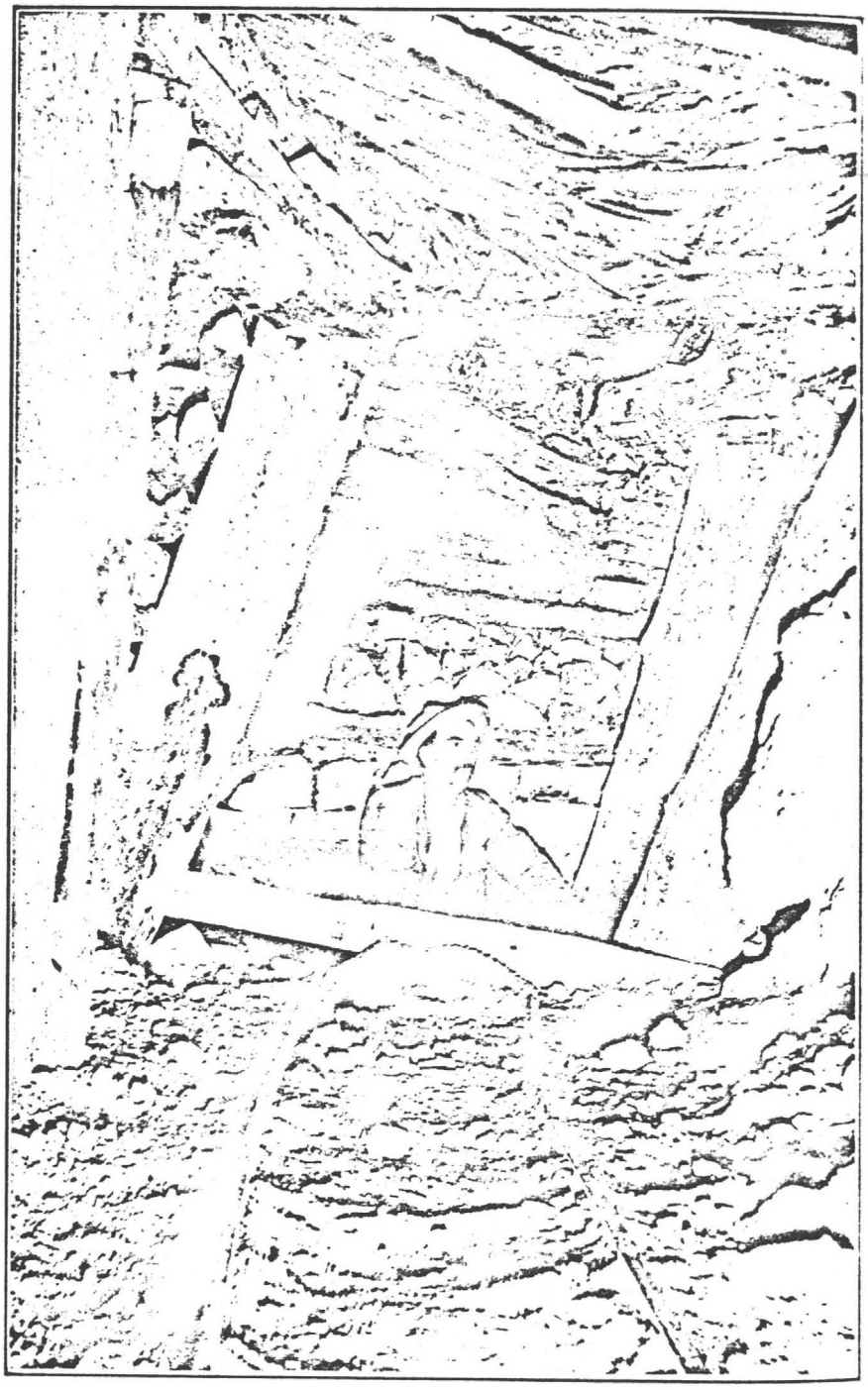
Considerable work is being done by the present management on the opposite side of this great fault for the pur-

pose of determining the extent of its displacement and the virtue of the geological theory involved.

The property is owned by a conservative and responsible English company, but the cream of the deposits were gone before the property came into their possession and their investment has not paid 2 per cent interest, in spite of the large aggregate amount of bullion they have produced, and in its present condition, with the low grade values available, the property is run largely for the benefit of the labor community that depend upon it for a living, as it is nip and tuck with the management to make a profit on the operation with the ore values now available.

The sole producion of this company is the money metal of the country, and it is inconceivable how an intelligent Government should harass such an enterprise as this the way our Federal authorities have in their efforts to recover at an unjust retail price claim for timber that the company has used and paid for during its extensive period of operation. Such a claim is morally if not legally outlawed and never had any real virtue in fact, for when this enterprise was started American mining law was liberally administered and local rules and customs of the district were one of its chief features. It was then, and has been since, until recently, the local practice of all western mining districts to use such material as was absolutely necessary for their operation as the adjacent Government lands afforded, which were bought and paid for in this instance at excessively high rates from local wood rustlers, who furnished it at so much per cord or running foot.

This company has been further embarrassed during the past year by an effort of the Federal Interior Department, through a special agent, by injunction proceedings in the Federal court, to stop it from cutting or purchasing timber from the desert mountain sections of the township in which their property is situated, claiming that it was nonmineral land, while as a matter of fact and record, the township in which this property is situated, from the op-



SWELLING GROUND, DE LAMAR

eration of this and other mines has produced $30,000,000 worth of gold and silver in the past 20 years, and practically all the timber of lumber value which it ever possessed, which was very scrubby at best, was removed by the operation of the adjacent War Eagle Mountain District prior to 20 years ago, or between 1860 and 1890.

The isolation of the Delamar Mine is such, over a very road, as to make the cost for fuel hauled from the railroad almost prohibitive, and for its rough requirements of mine lagging and cordwood, the latter largely used by the miners and their families with which to cook their meals, the local desert mountain slopes' growths of mahogany, juniper and other desert brush wood has been drawn upon for their essential requirements. This kind of timber has absolutely no value as a conservator of snow, or for lumber of future forest purposes. It is has been purchased by this company for the use of its employes at from $10.00 to $14.00 per cord, and is largely packed on mule back from the steep mountain slopes to points of access by wagon by Italians and others, who make a business of supplying this class of fuel to this company and other residents of the district.

If the Government succeeds in this unjust persecution of a legitimate money producing enterprise it will put this company definitely out of business, and the soft, swelling nature of the ground in which its extensive operations are carried on is such as would close together in a few years and would be forever lost as a source of gold, as it would hardly be likely that anybody would ever again undertake to reopen its present extensive old levels to follow out the interesting geological problems the deposits present, which in its present stage of operation, besides making an appreciable tribute to the real money supply of the country, still contains the strong probability of the recovery of its faulted virgin ore bodies and a very large increased output of the most desirable metal for which mining operations are followed.

Flint Mines—Next in importance to the Delamar operations in this section is the new development enterprise at Flint, a short distance southeast of Delamar on the border of the same township.

At this point another English company, known as the Flint Mines, Limited, have been actively developing an extensive group of claims throughout the year, covering a pronounced series of quartz filled fissures varying from a few inches up to 14 feet in thickness. These are old properties, and one of them, under the name of the Perseverance Mining Company, a precedent ownership, having been quite extensively developed through a shaft 500 feet deep and several levels.

This particular feature of the property carries a vein seven feet wide with a paystreak 4 feet wide containing average assay values from $25.00 to $30.00 per ton, with quite an important reserve of this grade of ore blocked out.

The prevailing values in this ore are silver, but there is also an appreciable amount of gold.

This particular property was originally owned by some of the Bonanza kings of Comstock fame, and during the early Comstock days two of these old Comstock operators personally wintered on this property.

The ore values are asosciated with grey copper and some antimony minerals and were difficult to treat at such a remote district, 200 miles from the railroad transportation at that time, which acounts for the lack of bullion output from this enterprise and the fact of its ore resources remaining intact to the present day.

Since this property and a number of adjacnt claims were purchased by the present company at a total cost of $135,000 a conservative plan of development has been under progress, which has inclined the extension of 1,500 feet cros-cut tunnel, which taps the shaft development on the main vein. This work has been done by hand, and in the meantime extensive investigations have been made through

large shipments of the working average of the ore resources for the purpose of determining the most feasible method of extracting the values, and it is believed that one of the modern processes has been adapted to the successful handling of this ore, and a reconstruction of the old milling plant with new machinery and appliances, including a 40 stamp battery for crushing, is planned for additional equipment of the property next summer.

During the past season, several new camp buildings were erected and a power line was extended from the Rich Gulch terminal of the Idaho-Oregon Electric Power Company, and a large electric driven air compressor installed, together with the necessary motors and a brick transformer-house, and the camp was also connected by telephone with the Silver City lines, its water supply rebuilt, and many other improvements made, and the enterprise is now in shape to prosecute the further development of the property in an active manner.

This feature of the enterprise is under the direction of the well known enginering firm of Bainbridge, Seymour & Company of London, England. Mr. Arthur Courtney is General Manager and Mr. J. M. Morgan, the resident mine manager, and the company's agent in Idaho. At present there is a force of 25 men employed at the mine, which will be largely increased as development progresses, as the plans in this respect involve the immediate sinking of the main shaft from the tunnel level an additional 500 feet and a full exploration of the ore channels at that depth.

There is definite evidence from preliminary surface work of a number of distinct and important ore shoots on the property. It is well financed and in the hands of capable up-to-date operators, and there seems no reason to doubt the ultimate success of the venture as a profitafle gold and silver mining enterprise of considerable capacity.

The formation in which these ore bodies occur is an eruptive granite, and several of the veins are accompanied

with intrusive dikes and show a close comparison in the nature of their origin and formation with the famous Trade Dollar Mine nearby, that has produced $20,000,000 at a net profit of $10,000,000.

Rich Gulch Mine.—The Rich Gulch Mining Company, a Utah corporation, whose property is situated on the west slope of Florida Mountain, between Flint and Silver City, has continued under steady operation throughout the year and has about completed the erection of a substantial mill of 100 tons daily capacity.

This property has considerable shallow surface development work, is situated near the head of Rich Gulch, and its deposits evidently formed one of the principal sources of the placer values that have been mined in that tributary. The main deposit on the property is a fissured zone in a thin structured basic igneous rock that is highly silicified. It contains well marked wall gouges and fairly well defined courses of ore along these walls.

This zone is fully 50 feet thick, and underground it resembles the famous 77-foot vein of the Delamar Mine. At the surface it is covered with debris consisting, below the line of its apex, of disintegrated lode material that shows handsome pannings in free gold for a considerable width, indicating definite underlying ore shoots. This, together with some shallow tunnel work on another ore shoot, seemed to warrant the extensive development of the deposits through a long cross-cut tunnel, which has been driven in from a convenient point lower down the gulch, a distance of 3,000 feet, where it has intersected the main vein of the property at a convenient point for drifting between the two main ore shoots, and undercut it at a vertical depth under the highest ore shoot of nearly 1,000 feet.

This property is equipped with an electric driven air compressor and a number of convenient camp buildings and has been a well handled piece of mine development work. There has been several hundred feet of drifting done since the vein was cut.

The company maintains an assay office on the ground and carefully samples the work as it progresses, occasionally obtaining some very high values, but the management is conservative in its estimates of its ore resources and is figuring them on an average basis of $8.00 to $10.00 per ton in gold.

The south drift from the main cross-cut has been extended 200 feet and has already passed through a handsome looking shoot of ore 4 feet wide that is said to maintain these values, while the north drift is being pushed out and will undercut the shallow tunnel work on the north ore body at a depth of 600 feet. In this drift the values are also said to average $10.00, and when a connection will have been made through to the old works, and the new milling plant fully completed, the enterprise should be in shape to anticipate some important mining profits by the successful treatment of these ore values.

Florida Mountain Mines—Between the Rich Gulch property and the Trade Dollar Mine near by, the Ontario group of claims, owned by Sullivan & Matterson, was operated during the year by a small force of men on a leading basis. This group carries some small shoots of a very rich ore. It shipped 30 tons of ore in 1911 that yielded smelting returns of $9,000, and a similar amount in 1912 that was milled at Silver City and gave a return of nearly $200.00 per ton in free gold.

This property has recently been sold to a new company and a substantial payment made on the purchase price. The new owners are sinking a winze on the main ore shoot to determine its extent at further depth with a view of ultimately tapping the deposit by cross-cut tunnel driven in from the very steep mountain slope on which it occurs.

The small rich ore shoots are accompanied by a large zone of highly altered rhyolite formation very pronouncedly fissured and said to carry low values throughout a very considerable width, and it is believed this deposit can be trated by modern cyanide method on a large scale.

Similar conditions prevail in several adjacent properties, and it is also believed by people conversant with the extensive upper horizons of the now idle Trade Dollar Mine that large tonnage of old fills and trimmings remain on that property that can be handled at a profit by modern cyanide methods, and there was current a report in the district involving the transfer of the Trade Dollar to new owners with a view of utilizing this resource of low grade ore.

At Long Gulch, on the south end of Florida Mountain, near Silver City, the Banner Mining Company was working a force of 15 men on development and had a nice reserve of milling ore in sight above the 200-foot level and a similar shoot on the 400-foot level.

These ore shoots, it was believed by the management, would give milling results of about $20.00 per ton.

The Banner group is well equipped with a splendid new milling plant and has considerable development. It embraces a very pronounced fissure vein that parallels the Trade Dollar vein a short distance to the west. All its development to date, however, is in the overlying basalt formation of Florida Mountain, and in no place has it so far penetrated the underlying granite which was so productive in the adjacent mine.

The nature of this vein has not been fully appreciated in the past operations and the development has been largely confined to one wall. The principal ore shoot that has been found has produced some wonderfully rich specimen gold and silver ore and it is believed that the deposit is a wide fissured zone similar to that of the Rich Gulch property, and similar to some of the Delamar veins, rather than a narrow fissure like the Trade Dollar.

This enterprise is suffering for a lack of capital for its more complete development, which is well warranted by its surface manifestations at different points along its strike and its close association with the neighboring bonanza.

The further extension of its drifts to the north along the vein, especially from the 400-foot level, with a view of getting further under the main mountain and into the underlying granite formation, would be likely to bring results in buried ore shoots of commecial importance and probably bonanza values.

Systematic cross-cutting should be done in this drifting work so as not to overlook any parallel shoots, for it is a notable fact that its famous neighbor had a very closely paralleled system of ore channels that were alternately productive of rich ore.

Florida Mountain is a peculiar geological example of dome shaped uplift of eruptive granite, which has subsequently been intruded by dikes of basalt and rhyolite. Each of these intrusions have produced an immense overflow of its characteristic lavas, producing immense mushroom-shaped caps of this basic and acidic igneous rocks over the granite. The whole series was subsequently fissured on the line of the original intrusive basalt dike and mineralized by hot ascending solutions carrying gold and silver.

The values in the Trade Dollar show a marked variation in the formations that the fissure traverses, and until the lower granite formation is penetrated by the Banner workings it will always remain a splendid development chance that should be fully investigated.

Immediately adjoining the town of Silver City, at the mouth of Long Gulch, the Silver City Mining and Milling Company have continued the extension of their long cross-cut tunnel through an interesting group of claims adjoining the Trade Dollar property to the east and embracing a strong branch fissure to the Main Trade Dollar vein, which makes a very attractive showing at the surface and is likely to contain some of the high values for which the Trade Dollar was noted, when it is encountered in the new tunnel and drifted upon.

This new tunnel will tap the main ore course of the property at approximately 800 feet in depth below the croppings.

There are several other veins on the group that will be penetrated by the tunnel and opened for further convenient exploration by drifting, and the enterprise is a mine development venture that well warrants its cost from the favorable situation and surface showings that the property makes.

War Eagle Mines—On War Eagle Mountain, east of Silver City, several small mining operations were in progress by owners and lessees. Among these the Ruth Mine, owned by Mr. George Wstlake, made a production of ri milling ore, a shipment of which was made to the Add Mill and treated with profitable results.

The Owyhee range, extending southeast from Silver City to Castle Creek and northwest to Cow Creek, and all the tributaries of both its slopes throughout its length embraces an extensive area of the favorable ore bearing formations associated with the Silver City deposits, whose total production to date, since discovery, exceeds $50,000,000, and this territory today presents a most attractive field for the prospector and investor by reason of its many interesting showings of high and low grade ores.

South Mountain Mines.—South of Silver City, 20 miles nearer the southwest corner of Owyhee County, the South Mountain Mines were idle throughout the year except the necessary assessment work where claims have not obtained patent.

At this point some remarkably flattering ore deposits exist that promise immense tonnage of profitable mines when more fully developed.

South Mountain is an ellipitical shaped uplift in a level plateau region. It is over 10 miles long and 5 miles broad and consists essentially of eruptive grano-diorite. Traversing its central axis is a pronounced zone of sharply folded

sheered and schisted limestone that has been reduced to marble and carries on the property of the South Mountain Mining Company a remarkable surface manifestation of underlying ore bodies in the form of immense brown, spongy iron gossan croppings, associated with metamorphic minerals, together with zinc, lead and copper oxides. These gossans are in places 50 feet thick. The property was originally operated as a lead-silver deposit and has the credit of supplying the primary lead-silver smelting enterprise in Idaho, as it was equipped with a small lead stack as far back as 1873, at which time the district attracted a great deal of attention and was the scene of a boom mining excitement. Several hundred thousand dollars' worth of rich silver bearing lead bullion was run out from these ores, at a comparatiively shallow depth, however, the high grade lead carbonate ores were replaced with sulphide mixtures with zinc and copper iron sulphides which resisted treatment by the crude metallurgical methods of that day.

A tunnel has been extended in towards the main ore showing over 1,000 feet but still lacks a little of undercutting the best surface evidences of the deposit. If extended 2,000 feet farther, it would gain a maximum face depth of 800 feet and average about 500 feet all the way and should be in the most productive zone of the deposit the entire distance.

The grossan croppings along this great mineral zone are generally associated with green copper carbonate, from which selected samples show high values in both copper, gold and silver, and at one point on the surface shaft has been sunk 50 feet deep, which discloses a well defined paystreak of copper iron sulphide ore in a silicious gangue, richly impregnated with iron carbonate and calcite crystals that average about 10 per cent copper, 30 ounces silver, and $1.50 gold per ton.

This is a very interesting development in connection

with such extensive gossan croppings, indicating big reserves of similar mineral that would afford an ideal ore for treatment in a reverbatory furnace with cordwood fuel (like the old method employed at Butte in its early days), from which a very rich gold and silver bearing copper matt could be produced that ought to stand transportation charges during the favorable weather periods of the year to the railroad under present conditions.

This copper sulphide ore carries occasional kidneys of clean galena containing very high values in silver up to several hundred ounces per ton that could be hand sorted out a separate shipping product. Accompanying this relatively high grade copper sulphide ore, which promises to be the prevailing mineral of the property at further depth, there is a pronounced streak of coarse grained zinc sulphide that carries very little gold or silver that could readily be concentrated to a high grade shipping product that would prove highly profitable if railroad transportation was more convenient to the property.

There is some talk and prospect of the construction of a railroad from the Snake River Valley to the Western or Central Pacific at Winnemucca, Nevada, passing along the base of South Mountain.

The construction of this line would give easy access to these deposits, and doubtless result in their extensive operation, and the establishment of a large and profitable smelting ore mining enterprise at this point.

The smelting ores of this district are invariably rich in associated gold and silver values, and, while the silver values predominate, occasional assays are encountered that run up several hundred dollars per ton in gold.

The peculiar pseudomorphic quartz gangue so characteristic of the rich gold-silver ore association of the Lamar mine were originally crystals of barite, calcite and other minerals, which have been completely replaced by silica and indicate a mineralogical relationship betwe

the DeLamar and the South Mountain ores, as these crystal gangue minerals are richly manifested in their original unaltered form in the South Mountain deposits, together with some sandy garnet and epidote rock, and other rare contact metamorphic mineral forms.

The South Mountain deposits, while at a serious disadvantage from a railroad transportation standpoint, being about 100 miles distant over the best wagon road route at present, nevertheless contain the elements of a successful and productive mining district of desirable smelting ores and are likely to some time be recognized and become an important factor in the mineral industry of Owyhee County.

Table No 6 Continued

Earth Resources Co. Summercamp - Lamar Property

CASH FLOW AND PRESENT WORTH CALCULATIONS

(Dollars in Thousands)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Total
2. Silver Price of $4.00 Per Ounce And Gold Price Of $150 Per Ounce													
Annual Revenue - $4.00/oz Ag + $150/oz Au			$ 9738	$ 9738	$ 9738	$ 9738	$ 9312	$ 8460	$ 8460	$ 8460	$ 8460	$ 6580	$ 88684
Capital Expenditures	$ 2200	$ 7300											
Production Expenditures	25	25	$ 3629	$ 3433	$ 3093	$ 3093	$ 3058	$ 2848	$ 2673	$ 2673	$ 2673	2533	29705
Depreciation			830	830	830	830	830	830	830	830	830	830	8300
Gross Income			$ 5280	$ 5475	$ 5815	$ 5815	$ 5424	$ 4782	$ 4957	$ 4957	$ 4957	$ 3217	$ 50679
Depletion			1461	1461	1461	1461	1397	1269	1269	1269	1269	987	13304
Taxable Income			$ 3819	$ 4014	$ 4354	$ 4354	$ 4027	$ 3513	$ 3688	$ 3688	$ 3688	$ 2230	$ 37375
Federal Taxes	(350)	(250)	1910	2007	2177	2177	2014	1757	1844	1844	1844	1115	18689
Net Income			$ 3370	$ 3468	$ 3638	$ 3638	$ 3410	$ 3025	$ 3113	$ 3113	$ 3113	$ 2102	$ 31990
Total Cash Flow	$ (1875)	$ (7075)	$ 4200	$ 4298	$ 4468	$ 4468	$ 4240	$ 3855	$ 3943	$ 3943	$ 3943	$ 2932	$ 40290
Continentals Royalty			—	—	301	335	318	299	296	296	296	220	2351
ERC Cash Flow	(975)	(3679)	2184	2335	2167	2149	2039	1854	1896	1896	1896	1410	19826
Present Worth @ 20%	(737)	(2782)	1436	1335	1068	929	766	606	539	469	407	264	4300
	(812)	(2555)	1264	1126	871	720	569	431	367	306	255	158	2700

Table No 6

Earth Resources Co. Summer Camp & Delamar Property

CASH FLOW AND PRESENT WORTH CALCULATIONS

(Dollars in Thousands

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Total
Production Statistics													
Tons of Ore Processed													
Summer Camp			450	450	450	450	300						2100
North Delamar							150	450	450	450	450	350	2300
Total			450	450	450	450	450	450	450	450	450	350	4400
Tons of Waste Stripped		1000	1700	1700	1700	1700	1600	1000	500	500	500	100	12000
Ounces of Silver Produced			2250	2250	2250	2250	1868	1103	1103	1103	1103	858	16138
Ounces of Gold Produced			5	5	5	5	12	27	27	27	27	21	161
1. Silver Price of $3.00 per Ounce And Gold Price of $120 Per Ounce													
Annual Revenue - $3.00/oz Ag + $125/oz Au			$ 7350	$ 7350	$ 7350	$ 7350	7083	$ 6550	$ 6550	$ 6550	$ 6550	$ 5094	$ 67727
Capital Expenditures													
Depreciable	$ 1500	$ 6800											
Expense	700	500											
Total	$ (2200)	$ 7300											
Production Expenditures													
Mining			158	158	158	158	158	158	158	158	158	158	1580
Stripping			595	595	595	595	560	350	175	175	175	35	3850
Processing			2025	2025	2025	2025	2025	2025	2025	2025	2025	2025	20250
General & Admin			315	315	315	315	315	315	315	315	315	315	3150
Min Adv Royalty	25	25	535	340									875
Total			$ 3628	$ 3433	$ 3093	$ 3093	$ 3058	$ 2848	$ 2673	$ 2673	$ 2673	$ 2533	$ 29705
Depreciation			830	830	830	830	830	830	830	830	830	830	8300
Gross Income			$ 2892	$ 3087	$ 3427	$ 3427	$ 3195	$ 2872	$ 3047	$ 3047	$ 3047	$ 1731	$ 29772
Depletion			1102	1102	1102	1102	1062	983	983	983	983	764	10166
Taxable Income			$ 1790	$ 1985	$ 2325	$ 2325	$ 2133	$ 1889	$ 2064	$ 2064	$ 2064	$ 1967	$ 19606
Federal Taxes	(350)	(250)	895	993	1163	1163	1067	945	1032	1032	1032	484	9806
Net Income			$ 1997	$ 2094	$ 2264	$ 2264	$ 2128	$ 1927	$ 2015	2015	2015	$ 1247	$ 19966
Total Cash Flow	(1875)	(7075)	$ 2827	$ 2924	$ 3094	$ 3094	$ 2958	$ 2757	$ 2845	$ 2845	$ 2845	$ 2077	$ 28266
Continental's Royalty					8	232	222	207	213	213	213	156	1464
ERC Cash Flow	(1975)	(3679)	1470	1520	1605	1488	1423	1326	1369	1369	1369	999	9284
ERC Present Worth @ 15%	$ (818)	$ (1782)	$ 967	$ 999	$ 918	$ 710	$ 615	$ 498	$ 448	$ 389	$ 338	$ 259	2540
→ @ 20%	(812)	(2554)	851	733	645	498	397	308	265	221	184	117	847

Brocks Report

300 19th St
Golden 80401

1) U.S.G.S.
2) Joint Venture Partners
3) U.S.B.M.
Don't have geo report by ER geologist

4W & Bronco 2-drill rigs 2- microscopes
1-rotary drilling calculators
Typewriters
$270,000 office & furniture

Uranium
8 sections N.Mex N of Gallup
Church Rock district $300,000
Marathon oil $300,000

KM has major ore body

Sunalt Sept 1976 preferred list gold & conc
includes cost recd. $21 (71)
salary or labor $33 (74)
right to renegotiate

can get out you can but don't don't come back

11.6 ¢

4-8 oz

Delamar Prospect, near Silver City, ~~Utah~~ Idaho
Oyhee County S.E. of Boise
Near Jordan Valley

2 carried interests
+ joint venture deal

Owners:
Mrs Rushing & Mr. Lark (Oregon) - 10% Royalty
on value of Au, Ag minus
processing costs (milling, N.S.R.)
depreciation of mill
$995,000 - $125,000 - Buy out

~~Continental Materials~~

~~[illegible]~~ $25,000 minimum advance
3 years
$50,000
100,000

Continental Materials has
7½% "net profits" interest
applies after all capitalization
is recovered

Joint Venture
52% Earth Resources 48% Superior Oil
Ben Dickerson

	Ag	Au	stripping
(1) Sommer Camp			
2.1 million tons	5.32	0.05	3.57/1
(2) North Belamar			
2.3 million tons	2.85	0.069	1.97/1

Rotary Holes
60-70 ?

Andesite Porphyry

Numerous small veinlets
& disseminated mineralization

Hazen metallurgical Tests.

E.R. has spent $260,000

Day Mines & Callahan dropped
out when Ag was $1.40

10 year life @ 1400 T.P.D.

Building in Denver $270,000 B.F.

Staff Gene Ealy V.P.
Bill Cole Exp. Mgr
Bob Swinderman Geol ex KCC & Cities Service
Dan Gorski Geol Sed. Cu expert
Scott Huntsman (W.B.) Geol
Sec. 2
Draft 1

Files · Wisser - Mexico
Vitro's Files
Library

Disseminated Ag. program U.S.A. completed
Now Mexico for
Diss. Au & Ag } Consultant John Simmons $90,000 year

Oxide Deposits - Korn Kob, USNR, Utah.
Sedimentary Cu Program

Minero Frisco - Joint Program
Sed. Cu & Rio Tinto

Uranium Program - Good files
$8,000 year
8 sections near Kerr McGee
joint with Marathon 50-50 0:1 } mobil Gulf.

Earth Resources 1968

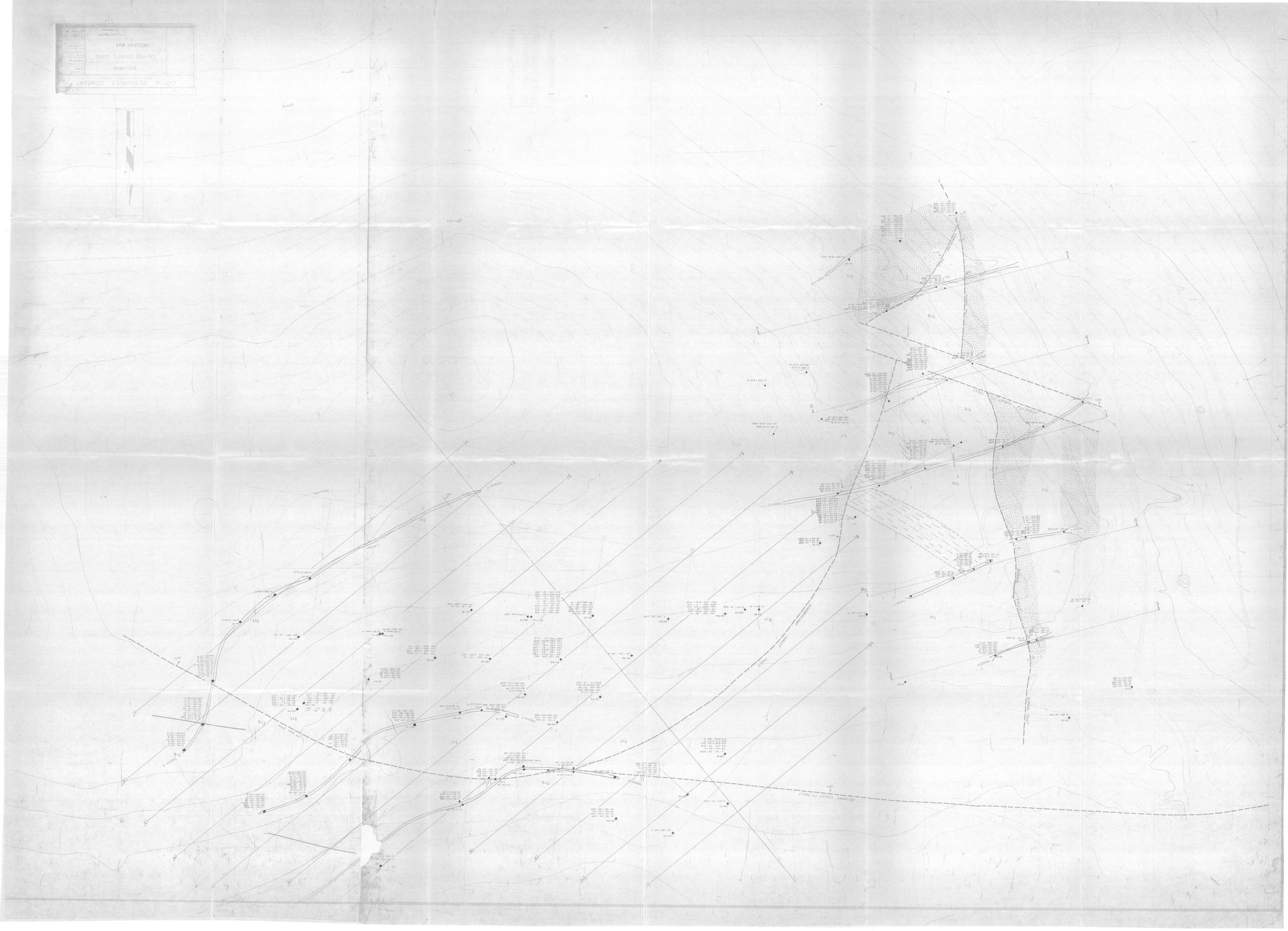
(1) Disaster in Mexico
Bill Hall
El Pilar de Moriz
$150,000 purchase
+ bundle of money
50 tpd Ag mill

(2) Nacimiento - $12,500,000
1970-73

(3) Exploration 68-73
6-7 million $

1974 Exploration Budget
$900,000.00
(100,000 non cash payment)

To be sent to us by Ealy
Brooks Report
Geological Report
D.G. Flow.


EARTH RESOURCES COMPANY
DELAMAR
OWYHEE COUNTY, IDAHO
GEOLOGIC MAP
DELAMAR THRUST (?) FAULT
SQUAWCRAP THRUST FAULT
HOMESTAKE CREEK FAULT
HIGHWAY 51
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