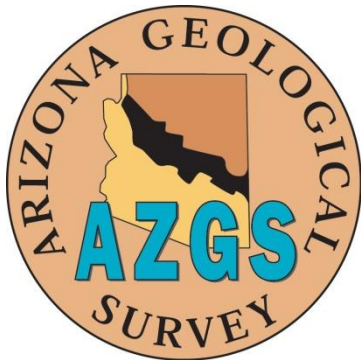




CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
<http://www.azgs.az.gov>
inquiries@azgs.az.gov

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Volume 9 ; Book 3

TOMBSTONE

Mining District

Cochise County

ARIZONA

Correspondence

7/3/79 to 12/14/79

2-36 RECEIVED JUL 9 1979

5-36 JAL

July 3, 1979

Memo to: R. F. Hewlett, TEI; cc: T. H. Schloss, J. A. Briscoe
From : J. G. Dean

REVIEWED

Subject: Experimental 200T Heap Leaches.

JUL 10 1979

By JHB

very good

Dear Dick:

The first installment of your memo on the above subject, dated 6/27, has been received and studied with careful interest. A few comments designed to be helpful are given below.

Leachable values in the heap are likely to be concentrated in: 1) fines which were not adequately contacted by cyanide, 2) coarse fractions impervious to solution contact, and 3) refractory ores such as the manganese which hold the values locked in insoluble matrices. Ores of this type may also include jarosite, and perhaps sulfides, and several other types.

In setting up an experimental heap, it is important insofar as practical to have some idea of the types of ore present, the leachable surface exposed per unit weight, the values present, e.g. the total by fire assay, the ultimately leachable with the solution being used, and the recovery likely by the technique being used.

At this stage, perhaps the more sure-fire technique would be to get a cut from the heap with a good percentage of fines which may have been missed due to channelling compounded by the 30+ feet lifts, and apply a conventional cyanide leach with deaeration and zinc precipitation, following the practice of Louis and Charlie Escapule.

If it is possible to set up a similar heap with freshly crushed ore of a similar type and apply a similar cyanide leach, we should get some measure of the leachable values missed because of simple inaccessibility. Every time you reduce the average particle size by half, the area is doubled. In progressing from 4 inch lumps to 100 mesh, the area is increased more than a thousand times. The effect on leaching may be substantially greater because of the fractures along faces of value concentration.

If these straightforward tests show promise, we can move to variations designed to unlock additional values and achieve better recoveries. Perhaps by that time we will have been able to make exploratory runs on a small scale to help guide the pilot tests.

In addition to piloting the chemistry, my suggestion is that we all conform in splitting samples for assay or leach tests with the Richards table available from Jim. At -4", one needs several tons and this must be reduced in stages to get down to -100 mesh when a 30g sample can be split for fire assay or testing. At -1/2", say for a barrel test, one needs from 75 to 3200lb, depending on the ore, and this is why Hazen uses big towers to get conclusive results.

JGD:bm

JGD

Very important

RECEIVED JUL - 9 1979

Mass. B. mine & Sp. ur
2-35 JAB

July 3, 1979

REVIEWED

JUL 10 1979

By

JAB *very nice*

Memo to: R. F. Hewlett, TEL

From : J. G. Dean

Subject: Comparative Thiosulfate and Cyanide Leaches of N. Ramp Ore.

Dear Dick:

The first experiments on the ore samples described in Ed Speer's letter of 6/27 were designed primarily to allow a comparison of thiosulfate and cyanide. The ore sample used was shale and quartzite from the north ramp; fire assay by Jacobs indicated 0.005Toz Au and 1.40Toz Ag/T.

The ore as received had been crushed to approximately -3/8". It was stage crushed to -14 mesh by 4 passes through the rolls, and then reduced to -100 mesh in a rod mill. The ground ore was dried at 105°C and a 75g sample split out for head assay.

This fairly fine grind was selected not only to facilitate representative sampling at manageable size, but to provide good solution access to the silver compounds. Comparisons of ultimate leaching with fire assays of the heads seemed likely to give maximum information as to comparative leaching action.

The leaching technique was simply to mix 150g of the -100 mesh ore with 450ml of leach solution and agitate by simple rotation in a closed bottle. After 5 hours the slurries were suction filtered with a 15cm. Buchner, the pregnant liquor recovered, and then the tails were thoroughly washed, dried, and sent back to Ed Speer for fire assay.

The thiosulfate leach solution was prepared by dissolving 2.5g/liter (5lb/T) of the pentahydrate with 0.2g/l sodium carbonate as protective alkalinity. Analysis of the solution before and after leaching gave the following results:

	Leach	Pregnant
Sodium thiosulfate, g/l ----	2.5	2.0
pH -----	7.3	6.5

There was thus some increase in acidity and decomposition of about 20% of the hypo in spite of the protected conditions.

The cyanide leach was carried out in an identical way with 1g/l sodium cyanide and 0.5g/l lime. It progressed smoothly and was easier to filter than the hypo, possibly due to the lime. It gave a positive Ag₂S test in comparison with the hypo which remained clear on the addition of Na₂S.

The fire assays and such special leach tests provide useful information leading up to barrel, column, and heap tests. Ore size is a dominant variable which relates to sample size and surface area; if we can control it and work with representative heaps, we should maximize progress toward a cash flow.

JGD:bm; cc: THS, JAB-WES

Regards,

JAB

RECEIVED JUL - 9 1979

2-39 JAB

FAMCO /

1700 Broadway • New York, New York 10019 • (212) 247-0420

REVIEWED

JUL 10 1979

By JAB
Very good
see above
memo

TOMBSTONE EXPLORATION, INC.

2 Week Program

TO: Dick Hewlett
James Briscoe
John Dean

FROM: Tom Schloss

DATE: July 6th, 1979

OBJECTIVE: (Clear, Concise, Quantifiable)

1. Test metallurgy by leaching on test leach pad. Ore should be at value higher than break even cost.
2. Develop cash flow to finance # 3 by leaching ore from the heap on a larger scale.
3. Cash flow to finance
 - (a) Drilling for ore control.
 - (b) Drilling in open pit areas to improve for leach.

PROBLEM: (What factors stand in way of achieving objectives)

1. Inadequate knowledge and experience of metallurgy and ore types
2. Capital to develop efficient;
 - (a) Drilling program feed control
 - (b) Metallurgy
3. Time - causing disillusionment of capital.

SOLUTION I : (To achieve objectives)

Conserve cash to insure best number of chances of finding ore of sufficient quality to test plant operation and start cash flow.

IMPLEMENTATION:

Take known data and assign priorities to five target areas.

1. Fully describe for each target all of the characteristics and reason why chosen including ore types, screen analysis, AA results

IMPLEMENTATION: (contd.)

1. contd.
quick cyanide analysis, estimate of amount of tonage, history and references.
- (.5 day per target x 5=2.5 days)
2. "Mountain and Valley" each to 5' to 10'
3. Scrape each side with dozer and send in scrapper to pick up 100 tons.
4. In highest priority target area, split that heap in half and crush half.
- (5 - 7 days)
5. Take sample for each of new 6 piles and send to Jacobs.
- (Concurrent with # 4 per target take 2 to 3 days)
6. Test each leach area separately.
7. Use straight cyanide for each test as a control test unless John approves another type of test.
8. Analyze results to determine:
 - (a) Cost for reagents.
 - (b) Time to set up and process heap.
 - (c) Best approach to crushing decision.
 - (d) Type and size for plant.

RESULTS:

1. Five areas analyzed with 100 tons each in a short time.
2. Knowledge of results in 48 hours after first "Mountain and Valley".
3. Ability to go back and dig holes with back hoe to quantify this quantity and quality of ore. (Implement Solution II).
4. Five chances to find ore.

COST:

- | | |
|--------------------------------------|-----------|
| 1. Scraper | No/Charge |
| 2. Dozer @ 6/hour for 2.5 days | \$144.00 |
| 3. Five large samples sent to Jacobs | \$250.00 |
| 4. Labor | |

SOLUTION II:

Fully analyze one given area (East I).

- | | |
|------------|--|
| 2 days | 1. Use back hoe to drill 4 to 10 holes. |
| 5 days | 2. Send assays to Jacobs for assaying. |
| 2 - 3 days | 3. Test heap leach ore from holes. May have to wait for results from Jacobs. |

Page 3
Tombstone Exploration, Inc.
July 6, 1979 - contd.

RESULTS:

1. Knowledge about one area.
2. Ability to extract information on this ore.
3. If results are poor then must start whole process over.
4. 10 Tons of ore per/hole x 4 to 10 holes = 40 ton to 1000 tons.

COST:

- | | | | |
|----|-----------|---|---------------|
| 1. | Back Hoe | - | \$400.00 |
| 2. | Man & Gas | - | \$ 30.00 |
| 3. | Lab Fees | - | \$200 - \$500 |
| 4. | Labor | - | |

Tom

THS/avc

RECEIVED JUL 16 1979

2-40
July 10, 1979
REVIEWED

JUL 16 1979

Memo to: R. F. Hewlett, TEI; cc: T. H. Schloss, FAMCO

SEA By *[Signature]*

From : J. G. Dean

Subject: Pretreatment of Mn-rich Emerald Mine Rock, S. End of Heap.

Dear Dick:

The second part of your memo, Tombstone Pilot Leach, has been studied with interest and is serving to guide leaching experiments on the Mn-rich ore. The tests were started with Ed's sample 623792, which according to Jacobs fire assay contains 0.015 Au and 2.45Toz Ag/T.

The general plan was to pretreat the ore with sulfuric acid so as to open up the manganese and jarosites, reduce the manganese oxides so as to liberate the gold and silver, then raise the redox potential, e. g. with hypochlorite, to solubilize the gold, then leach with 20% salt or cyanide, somewhat in accord with pp. 27-8 of your memo.

The 5lb sample of ore was first reduced to -14 mesh by 4 passes through the rolls, then a $\frac{1}{2}$ split was reduced to -100 mesh by dry rod milling. The sulfuric acid treatment was started on a 200g split, referring to your table of reagent costs, with the idea that a reasonable upper limit of acid consumption might be 50 cents/T solution or \$1.50/T ore.

This amount of acid did not provide the required acid pulp, but led to a buffered solution in which it was difficult to maintain a definite pH. So it was decided to start over with a first objective of determining the acid requirements for pretreatment.

After some experimentation, the following procedure evolved: 50g of ground ore was mixed with 150ml of 2 N H_2SO_4 (98g/l or approx. 10%) for 30 minutes, the pulp suction filtered, and the residual acid titrated with N NaOH, first to the methyl orange changepoint (pH 4) then to the phenolphthalein end point (pH 8).

The acid consumption by this test turned out to be very large: about 500 lb/t on a 100% basis or 700 lb on a 70% basis. It was also found that there was a substantial dissolution of metal salts in addition to the very large amount of calcite present, which strangely enough did not include much iron although the final pH was less than 2. The final pulp looked like a gel and tended to retain a large amount of liquid even with suction filtration.

This large consumption of acid, equivalent to about 25% of ore weight in reactive components, coupled with the physical problems, suggested difficulties with subsequent steps, starting with a large consumption of ferrous chloride or other reductant, and compounded by a problem of achieving a balance with the final oxidant, not to mention contamination of the leach with metal salts.

July 10, 1979

In spite of all these problems, the Mn-rich ores with their high metal values, appear to have real potential and merit perhaps extended research attention. This will take time and money and can hardly be recommended at the present time as a simple matter of economic common sense.

The iron-rich ores or limonitic clays discussed on pp. 24-6 of your memo are perhaps less complicated chemically than the Mn ores, but may present more of a physical problem in heap leaching because of the impervious clay content. Your pretreatment suggestions are noted and I am planning next to take a look at these ores. In the meantime, if there is any way to blend this type of ore into a heap so as to offset the problem with too much clay, this might be the best way to get started without having to wait for guidance from exploratory lab tests.

As of the moment, I still feel very strongly that the best way to achieve some progress is to set up some idealized 200T heaps of unleached ore containing good values with attention to a promising size mix, e.g. a -4" heap with, say, 50% - $\frac{1}{4}$ ", and apply a cyanide leach with pH control, coupled with deaerated zinc precipitation.

Tom mentioned that you have some ideas on how to drop some Contention ore from the sides of the exposed fault and haul it by scraper to a heap. From what I have seen of this ore at the Eocene mill, this might be a very good approach taking priority over complicated chemical pretreatments.

Regards,



JGD:bm

Comments

7/16/79 2:42 PM -

I agree with the above. I've not received a copy of RFH memo referenced by J.D. to my knowledge.

RECEIVED JUL 17 1979

REVIEWED

2-41

JUL 17 1979

July 12, 1979

By JGD

Memo to: J. A. Briscoe, SEA; cc: T. H. Schloss, R. F. Hewlett

From : J. G. Dean

Subject: Selection and Evaluation of Tombstone Ore Samples.

Dear Jim:

We have been applying pretreatments and leach tests to the various ore samples supplied by Ed and Dick. Although the actual data available are quite limited, they are supplemented by more extensive qualitative observations and the combined information seems to merit discussion.

We applied first comparable thiosulfate and cyanide leaches to the 10 lb shale and quartzite sample from the north ramp (Ed's #62379B), as described in the memo to Dick of July 3. The fire assay results from Jacobs are summarized below:

	Ag	Au
Initial results, sample prepared by Jacobs	1.40	.005
Feed pulp prepared by JGD -----	1.85	.01
Tails from thiosulfate leach -----	1.80	.005
Tails from cyanide leach -----	1.35	.02

The first two samples should have been identical, unless Jacobs did not conform to the Richard's minimum sample guide as a function of particle size. It would be of interest to have their full practice in handling this type of material, and also their evaluation of the precision which can be expected from their fire assays.

The second point of interest is that the figures for gold have a whimsical quality. My subsampling was with a very fine grind with meticulous mixing and splitting. These data rather conclusively suggest that we cannot use fire assay of tails as a guide to leaching unless we can achieve more precision. Your suggestions on this point will be appreciated.

If we can accept the silver assays, at least on the fine pulps, as more precise, then we can conclude that the thiosulfate was ineffective in leaching the silver (2.7% dissolution) and that the cyanide was only slightly more effective (27% dissolution). These observations are qualitatively in accord with my sulfide precipitation tests, especially as to the ineffectiveness of the thiosulfate.

Similar tests on some of the other samples supplied by Ed in this same shipment suggest that the low silver values resist dissolution even under ideal conditions. There seems no evidence of the usual silver carrying minerals; rather there is a suggestion that the silver may be present as refractory silicates. Can mineralogy help us find some more responsive feeds?

JGD:bm

John

RECEIVED JUL 16 1979

July 13, 1979

JUL 16 1979

By *JAB*

Memo to: Mr. W. E. Speer, SEA; cc: TMS, JAB, RFH

From : J. G. Dean

Subject: Tombstone Ore Samples - Coordination of Geology,
Mineralogy, Metallurgy.

Dear Ed:

The two high-grade samples shipped by UP 7/5 were received 7/12; although it takes about a week, delivery is right to the door here which saves time and pick-up expense on this end compared with airport delivery 17 miles away.

Sample 002209, representative of the Mn-rich rocks on the south end of the heap with Jacobs fire assays of Au 0.01 and Ag 7.30 Toz/T, seems also to be quite rich in copper, e.g. .5%, some as the silicate and some as the carbonate. Soluble copper gives problems both in thiosulfate and cyanide leaching, and of course the manganese oxides are notoriously refractory in direct leaching. Although this is a very interesting sample, it was concluded that a time-consuming leaching study had best be postponed at this critical point in our program.

Sample 002253 from the northern end of the heap assaying Au .005, Ag 12.85, is very rich in sulfides, notably pyrite. It is presumed that the gold and silver values are at least partially dispersed in the base metal sulfides, some of which are very refractory to direct leaching. So again it was concluded that an extractive research program had best be postponed.

The Tombstone ores are reported to be uniquely rich in silver halides, and these compounds are the most directly soluble in leaching with thiosulfate and cyanide. Metallic silver and silver sulfides are, of course slowly soluble in cyanide with aeration. Other forms of silver such as those mentioned above may be only fractionally soluble, while any silver locked in the silicates paralleling, say, copper in chrysocolla is totally insoluble.

These considerations suggest the importance of introducing a metallurgical extraction factor between fire assay values and dollar appraisal; it can range from 0 to 100%, depending on the minerals present, the extraction reagent and the method of treatment.

It appears that we face a real conglomerate of mineralogy on the heap, complicated by mixing in previous operations as well as leaching to varying degrees of effectiveness. We can expose new surfaces by moving and also crushing, but extractive results may have to be judged by actual recoveries. However, clues from the mineralogy may help and may really be of value as we sample new ores in place.

JGD:bm

JGD

2-44

Southwestern Exploration Assoc., Inc.
 4500 E. SPEEDWAY, SUITE 14
 TUCSON, ARIZONA 85712
 (602) 795-6097

FOR *James Briscoe, Dr. John
 Dean, & Tom Schloss*

HOW TO USE THIS

DAY/TIMER

Time Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail
 the white copy to us and keep the pink copy for your files.
 You'll save time and effort, and we'll have your answer
 much faster! Thank you.

MESSAGE

DATE:

*July 18, 1978*Plant

Vacuum Pump worked on - starter not working
 except manual. 3 plants working - zinc
 feeder was plugged.

Circulation started & need 6-4 inch
 couplers (sch. 40) as 2 inch saddle broke;
 the mine inspector would shut us down

Circulation uncomplet today.

Heap is nearly saturated, but

REPLY

BY

rain at 4:00 shut down the
 spraying due to the risk of
 more rain in the afternoon
 than our tank can handle
 and that the pig would
 overflow.

BY

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HOW TO USE THIS

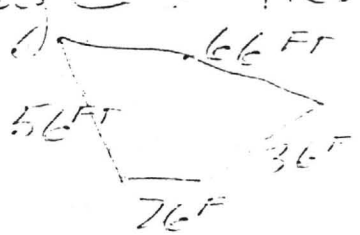
Time-Saver LETTER TO SAVE TIME.
 Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

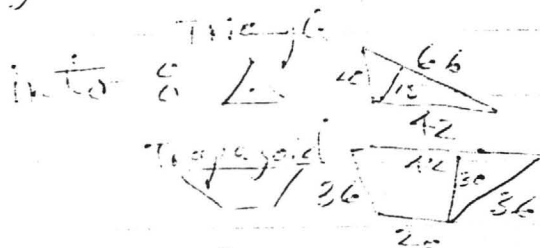
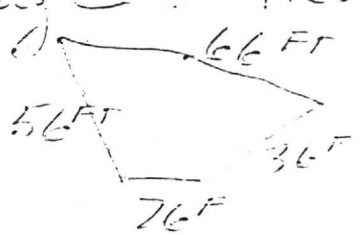
FOR B. E. Schloer - Dean Schloer
 - 2 -

DATE: July 18, 1975

Test A Parameters:

South end of Contention Dike Ore

1. Tonnage = Previous irregular heap
 was  which was divided



$$Vol. \triangle = \frac{1}{2} b h (\text{depth}) = \frac{1}{2} (66 \times 15 \times 2) = 990 \text{ FT}^3$$

$$Vol. \square = (b) \left(\frac{B_1 + B_2}{2} \right) \text{ depth}$$

$$= 70 \left(\frac{44 + 76}{2} \right) \frac{1}{2} = 2550 \text{ FT}^3$$

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FOR *Biscoe - Dean Schloss*
- 3 -

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Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE:

FOLD

Tonnage Factor :



$$\begin{aligned} \text{Volume} &= \pi r^2 h \\ &= \pi \left(\frac{18}{12 \times 2} \right)^2 \frac{28}{12} = 4.123 \text{ ft}^3 \end{aligned}$$

$$\text{Stack Weight} = 395 \text{ #}$$

$$\#/\text{ft}^3 = 395 \text{ #} / 4.12 \text{ ft}^3 = 95.8 \text{ #}/\text{ft}^3$$

Note: Previous dump tests were 100 #/ft³
71 mineral average

BY

REPLY

DATE:

$$\text{Tonnage Factor} = 95.873 \text{ Ft}^3/\text{ton}$$

$$\therefore \text{Test \# Tonnage} = 169 \text{ tons}$$

BY

Southwestern Exploration Assoc., Inc.
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FOR Biscuit - Dean - Schloss

4

HOW TO USE THIS

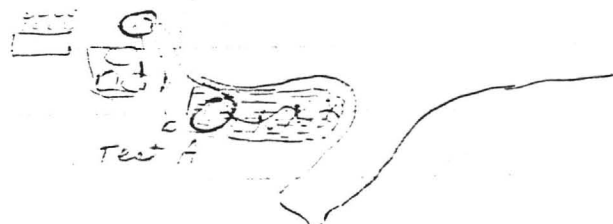
LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

DATE:

Cic on Test A - has been completed and marked - will be ready Thursday.

2 Parameters



Surface Area = $12,600 \text{ Ft}^2$

Terrace one Height

12,600	2'
3150	5'
6300	10'
9450	15'
12,600	20'

15,750 25'

18,900 30'

Tank (C=1) Spec

9' Dia. x 43 inches

DATE:

BY

$\text{Vol.} = \pi r^2 h = 228 \text{ Ft}^3$

$228 \text{ Ft}^3 \left(\frac{7.48 \text{ gal}}{\text{Ft}^3} \right) =$

1707 Gallons

7.1 Tons

EY

Southwestern Exploration Assoc., Inc.
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FOR

Briscoe - Dean - Schloss
- 5 -

HOW TO USE THIS

DAY/TIMER

Time-Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE:

Solution Charge:

1 # CN/Ton Solution

For each spray-tank full;

7 Tons (1 #/ton) = 7 # CN

Time added to each 7 ton = 80 #
due to nature of remaining time -
mostly insoluble

BY

REPLY

DATE:

On Wed (July 18) we sprayed

2 tank fulls or 14 tons of CN solution
(1 # CN/ton) onto the heap (A).

No return yet - stopped due to rain

BY

Southwestern Exploration Assoc., Inc.
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

FOR

Briscoe - Dean - Schloss
- G -

HOW TO USE THIS

MAILER

time-saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

DATE:

Saturation Period

$$16.9 \text{ tons} (10\%) = 16.9 \text{ tons}$$

Calc. Saturation period is 2.4 tank
fills → or about 1/2 of a tank-
full drift till weeping.

This will occur about 6:30 in the
morning (start at 5:00).

In yesterday's report I included

BY

my CN titration method.

DATE:

I had Tumbleton Drug weigh
2 1/2 grams AgNO_3 and had Drug
make up a 5% KI solution

so that we can do our own titrations
with Fries Reagents.

BY

Southwestern Exploration Assoc., Inc.
4500 E. SPEEDWAY, SUITE 14
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(602) 795-6097

FOR Priscoe - Dean - Schiess

- 1 -

HOW TO USE THIS

DAY/TIMER

Time Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

FOLD

DATE:

FOLD

South Contention Dike

Ore Reserves Calculation

Length = 300 FT

Width = 65 FT

Plus 12" on each side

→ requires more sampling

$$\text{Tonnage} = \frac{300(1)(65)}{1.5 \text{ bank}} = 1300 \text{ Tons}$$



North Contention Dike Area

South Contention Dike Area

FOLD

FOLD

BY

REPLY

DATE:

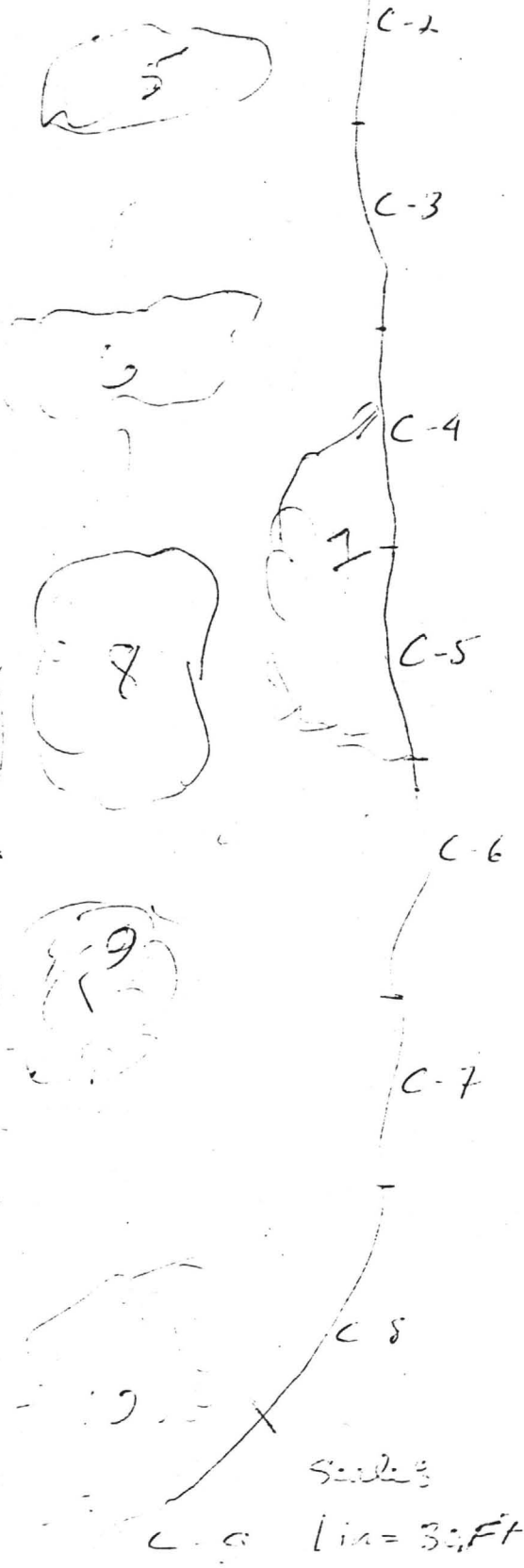
So. Cont. Dike

with our method of sampling - ripping - dogging we can project for production 10 ft in depth as we have

<u>Depth</u>	<u>Tonnage</u>
10 FT	13,000
25 FT	32,500
50 FT	65,000
100 FT	130,000

BY

South Centention Pike



West Wall t. 7/1000 vsc/s

Sample no.	lin	Ag	% Total
Ag. interm	.018	.27	6.66
C-1: Band-alt	-	.24	1.52
C-2: Cob- ^{alt} ^{alt} ^{alt}	.075	1.02	16.91
C-3: ^{alt} ^{alt} ^{alt}	.031	1.20	17.35
C-4: ^{alt} ^{alt} ^{alt}	.048	2.52	32.16
C-5: ^{alt} ^{alt} ^{alt}	.031	1.17	14.11
C-6: ^{alt} ^{alt} ^{alt}	.053	1.71	26.95
C-7: ^{alt} ^{alt} ^{alt}	.061	3.72	45.01
C-8: " "	.053	4.02	45.41
C-9: Sil. Hornfelds	.026	.33	5.14

Muck in bottom of R₁₂

1	.072	2.54	41.52
2	.030	1.52	22.80
3	.065	3.93	48.60
4	.051	1.86	21.60
5	.006	.57	6.00
6	.075	3.54	47.00
7	.090	4.56	58.50
8	.048	.99	15.52
9	.021	.81	11.77
10	.090	7.23	80.34
11	.024	.42	7.30
12	.065	4.56	53.70

S. 100

lin = 3.4 FT



North Station Lake

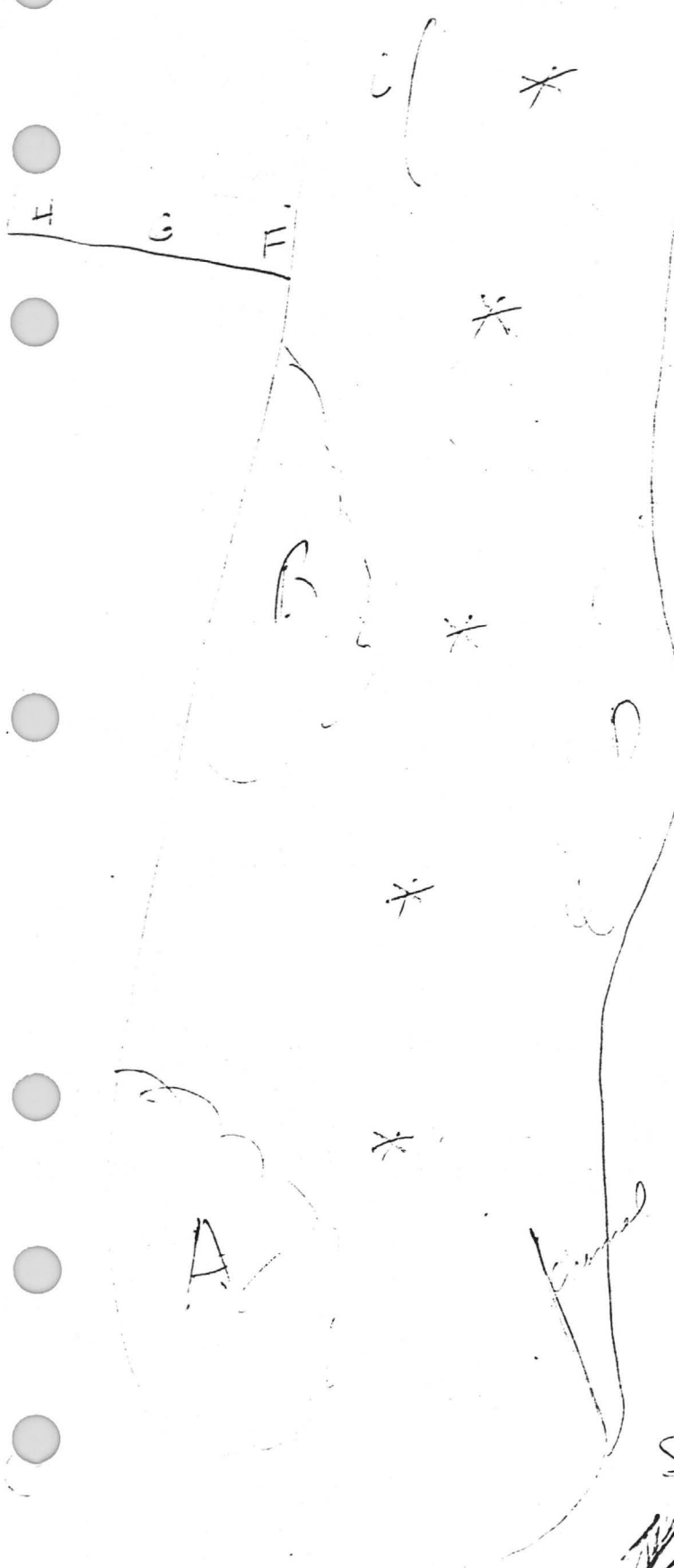
50 gals / 200 gal 2.1

Sample Run 2 April 2011

2.1 gal / 400 gal 2.2

Sample # 20 200 2000 Total

A	.048	1.68	\$25.44
B	.051	2.66	34.03
C	.039	1.81	24.23
D	.052	2.54	33.32
Channel	.045	.45	14.85
E Composite	.030	4.53	43.74
F - 5' Back	.024	2.91	29.28
G - 25' Back	.033	1.77	22.41
H - 50' Back	.027	.39	9.87



Scale:

1 in = 30 ft.

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(602) 795-6097

FOR Briscoe - Dean - Schloss
- 8 -

HOW TO USE THIS

DAY/DATE

One-Save LETTER TO SAVE TIME.

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DATE:

Estimated Ore Reserve For CN Leaching
Available For Push Loading / Scraper

South Contention Dike

15,000 tons @ \$25/ton = \$375,000
North Contention Dike

20,000 tons @ \$30/ton = \$600,000

Scraper Time Study

With John Escapule operating?

BY

DATE:

Tons Per Load = 10 tons
Cycle Time = 10 minutes
(New Road Completed Wed-Today)

Tons/hr = $(10 \text{ tons/load}) \left(\frac{60 \text{ min}}{10 \text{ min}} \right) = 60$
Tons/5 hr = $\left(\frac{60 \text{ tons}}{1 \text{ hr}} \right) (5 \text{ hrs}) = 300 \text{ tons}$

BY

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FOR

Barbara - Dean - Schless
- 9 -

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MESSAGE

DATE:

Tons per week = $\left(\frac{480 \text{ Tons}}{\text{day}} \right) \left(\frac{6 \text{ days}}{\text{week}} \right) = \underline{\underline{2880 \text{ tons}}}$

Gross Value } 2880 tons (81% Recovered) = \$43,200
per week

This could be accomplished on our
previously developed \$10,000/week
budget including the IP20 E.

BY

REPLY

DATE:

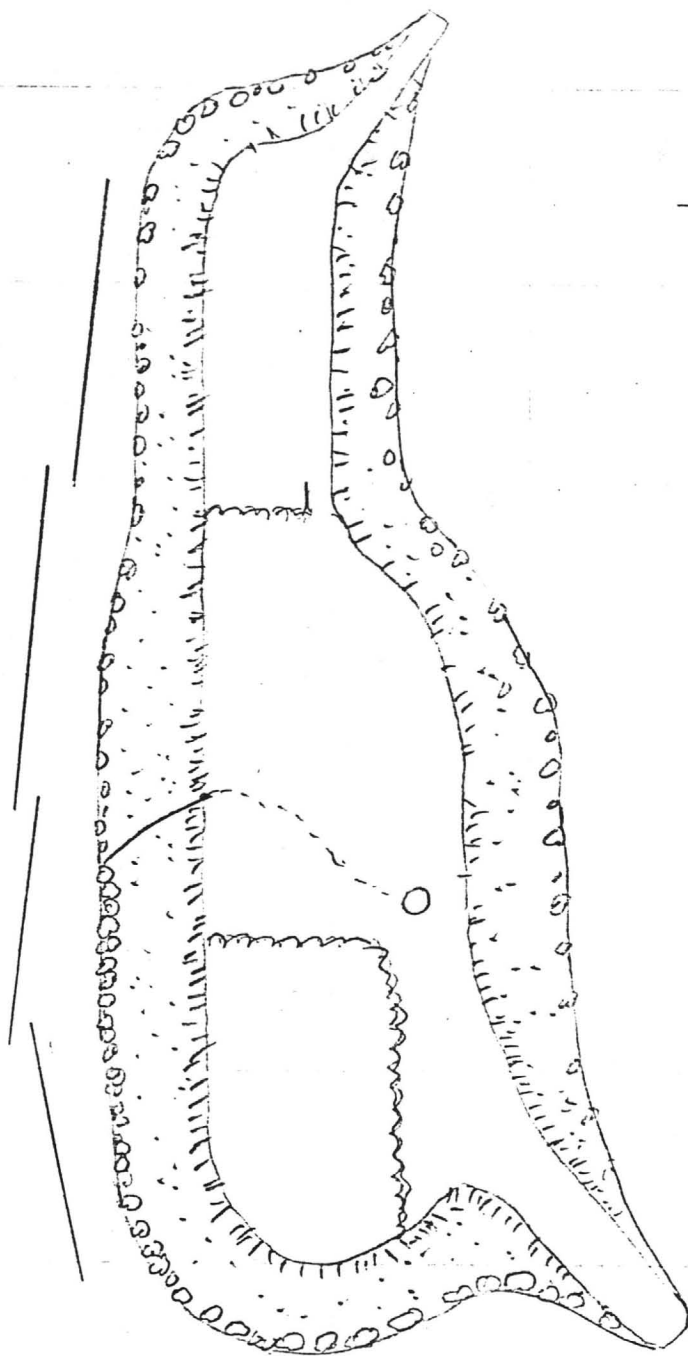
BY

"South Ramp"

Tombstone
Heap

June 25, 1979
RFH

Scale: 1 in = 200 Ft

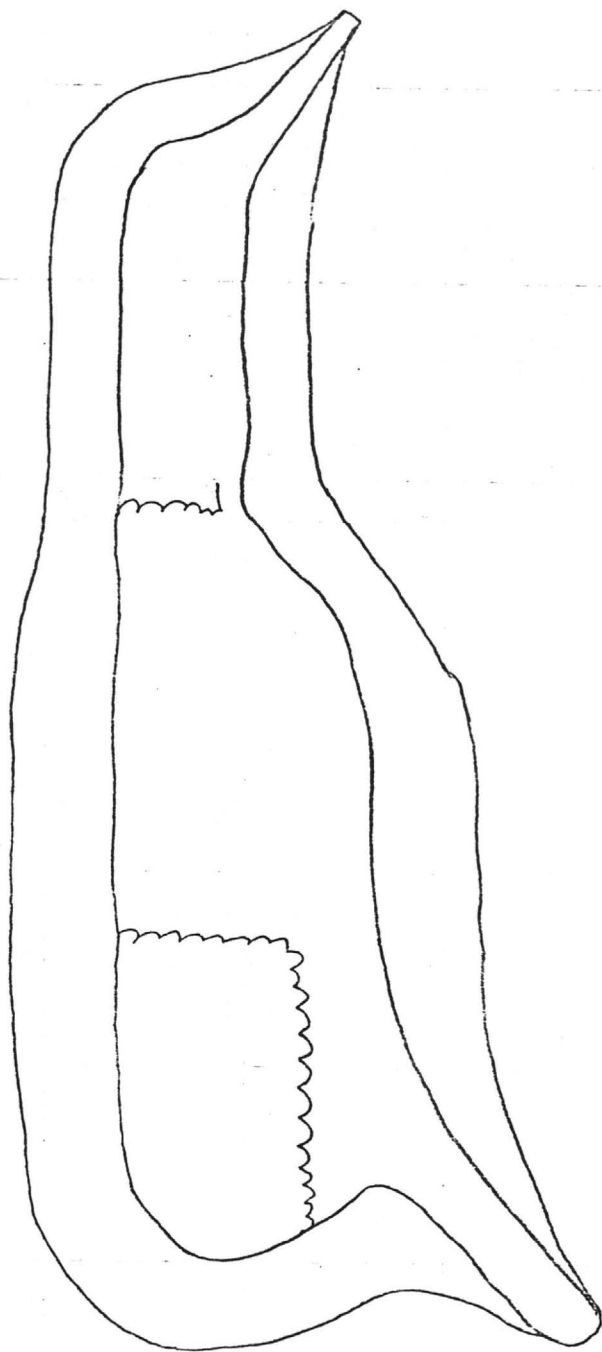


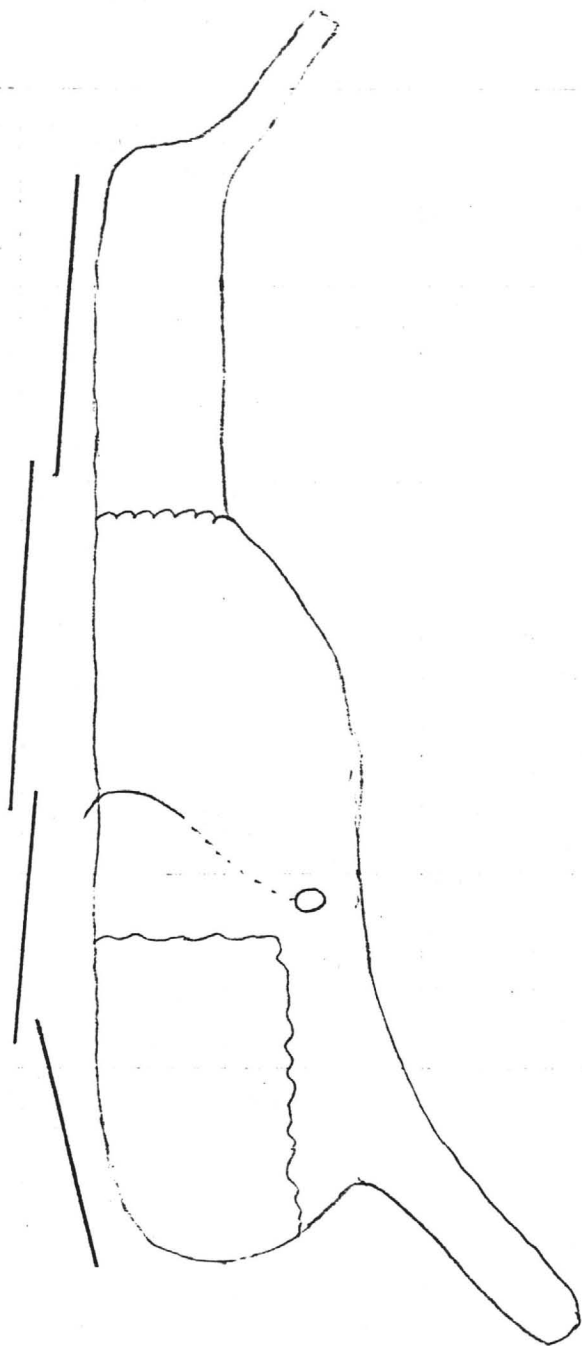
"North Ramp"



Pond

Plant
Area





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~~DAY/DATE~~ Time-Saver LETTER TO SAVE TIME.

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FOR Briscoe - Dean - Schloss

-10-

DATE: July 18, 1979

By renter lease-purchase of the
TD.20 E for \$6700/month included
in the \$10,000/week package.

No hypothesis on supplemental cash
flow from the heap has been
presented as follows:

A. Push 15,000 - 20,000 tons per day
with TD.20 E from heap onto pad.

B. Put under CN beach each

DATE:

Day at least 15,000 tons
and recover \$1 per ton
using cyanide.

Following are cell cyanide beach results
from 1974/75 not even on surface of heap

100x100 Ft. Sample - Heap Surface
 5 samples each 100x100 ft. area - 5 =

100 ft. Sample + 300 ml CMC 10/2

ID #	Gr	Ag	\$ Au	\$ Ag	\$ Total
1	.012	.36	3.00	2.88	5.88
2	.015	.42	3.75	3.36	7.11
3	.015	.36	3.75	2.88	6.63
4	.018	.15	4.50	1.20	5.70
5	.009	.09	2.25	.72	2.97
6	.012	.15	3.00	1.20	4.20
7	.015	.15	3.75	1.20	4.95
8	.018	.12	4.50	.96	5.46
9	.006	.12	1.50	.96	2.46
10	.006	.27	1.50	1.68	3.18
11	—	.18	—	1.44	1.44
12	.003	.12	.75	.96	1.71
13	.012	.21	4.50	1.68	6.18
14	.012	.09	3.00	.72	3.72
15	.006	.09	1.50	.72	2.22
16	—	.24	—	1.92	1.92
17	.030	.12	7.50	.96	8.46
18	.018	.06	4.50	.48	4.98
19	.009	.09	2.25	.72	2.97
20	.003	.21	.75	1.68	2.43
21	.033	.06	5.25	.48	5.73
22	—	.09	—	.72	.72
23	.018	.03	1.50	.24	1.74
24	.012	.15	3.00	1.20	4.20
25					
26	.015	.15	3.75	1.20	4.95
27					

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HOW TO USE THIS

SAVES

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Briscoe - Dean - Schlerer

- 11

DATE:

Pushing 15,000 tons/day [1/2 day]
yields the following:

$$\text{Tons / month} = (15,000 \text{ TPD})(20 \text{ DPM}) = 300,000 \text{ Tons}$$

$$\frac{\text{Gross Recovery Value}}{\text{Month}} = (\$1 \text{ per ton})(300,000 \text{ tons}) = 300,000 \text{ per month}$$

This budget would possibly be
\$50,000 per month - higher diesel, etc.
and samplers.

BY

REPLY

DATE:

I would suggest that we test heap
surface ore on test pad using
cy wheel - as with our open pit ore.

The TP20E would accomplish a
large test (10,000 tons) quickly.

BY

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(602) 795-6097

FOR

Briscoe - Dean - Schloss

- 12 -

HOW TO USE THIS

DAY/TIMER

Time Saver

LETTER TO SAVE TIME.

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MESSAGE

DATE:

Leach Cycle for 30,000 tons Heap Ore

Pool Requirements 300' x 200', extend
our 70' x 180' to an expansion of
+ times of the surface area.

Additional Surface Area = 17,400 ft^2

Truck Trail = 7,500

Trucks Hauled = $(125) \left(\frac{\text{pool}}{7 \text{ min}} \right) \left(\frac{60 \text{ min}}{\text{hr}} \right) = 1,071 \text{ Trucks}$

Haulage Hours Required = 36, or

4 Haulage Shift Days

REPLY

DATE:

with water haulage & compacting,
completion of the pool would
require 6 - 8 days

BY

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LETTER TO SAVE TIME.
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Episco - Dear - Schloss
 - 13 -

MESSAGE

DATE:

A. Done, time to push 2-15,000 ton lifts onto pad from North end of heap = 1 day

B. Lay lines and Spray Second day

C. Saturation Time

$$30,000 \text{ Tons} (10\%) = 3000 \text{ Tons}$$

$$\text{No. Sprays} = 8 \times 12 = 96$$

$$\text{GPM} = 96 (5) = 480 \text{ GPM or } 2 \text{ Tons/min}$$

$$\text{Saturation time} = \frac{3000 \text{ Tons}}{2 \text{ Tons/min}} = 1500 \text{ min} = 25 \text{ hours} \text{ (One Full Day)}$$

DATE:

D. Leaching (CN) = 2 days

E. Push to Push is 4 days

F. Proj. Cost Flow

4 days $\rightarrow$ 30,000 tons

8 Perceived	86 on Value
411 ton	30,000
411 ton	30,000

BY

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FOR

Bräuer-Dean-Schloss

— 14 —

HOW TO USE THIS

DAY/TIMER

Time-Saver

LETTER TO SAVE TIME.

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17E-55A, G, H

DATE: _____

FOLD

The combined processing of the Heart + Open Pit are:

Day Friday 25-28

FD-35 (11-60)

Scrap

Wickley
Cross Income
Heap Con Pit

Thurs	Back Hesp	Open Pit
Fri	Open Pit	
Sat		
Sun		
Mon		
Tue		
Wed		
Thurs		
Fri		
Sat		

7,000 T² 15 Round

BY

REPLY

DATE:

This would be a 400,000 gross per month with expenses (budget) of about \$50,000.

This would persist for over a year,
expecting higher values at depth
in both the being and open pit.

BY

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(602) 795-6097

HOW TO USE THIS

DAY/DATE

Time Saver LETTER TO SAVE TIME.

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Re: Briscoe - Dean - Schloss

- 15 -

DATE:

Required for cyanide recovery will
be a 200 GPM Generation chamber.
Chuck + Louis Escudé are going to make
a bid on constructing the chamber.

Also, some new PVC and components
will be required to replace very
old and "leaky" sections.

BY

DATE:

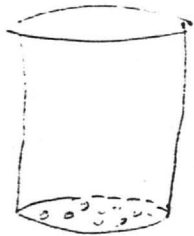
Sincerely,

Richard L. Hunt

BY

TESTING

Water Retention



Barrel filled with
ore - 150 #

Water was added
and allowed to drain
through bottom.

Water drained for
3 days

Wgt. ore = 150 #

Retained H_2O = 18.69 #

Total % 168.69

11% water retained

PERMIT STUDIES

(Previous Tombstone)

Average + 1 mesh 45.5 %
(Pumps)

Range is from 2.2 to 47 %

mesh % Retained

	<u>air Bulk</u>	<u>Pumps - fines on top</u>
4	57.41	10
8	64.81	51
28	77.57	70
48		77
80		88
200		95

Density Studies

(Previous Tombstone)

	<u>#/FT³</u>	<u>Tonnage Factor</u>
Bulk		
Bulk	99.71	20.06
Coarse (+3 ^m)	89.20	22.42
- 4 mesh	97.28	20.56

2.45

REVIEWED

JUL 19 1979

By

JHB

July 10th, 1979

Dear Mr. Hewlett ✓

&

Dr. Dean

Tom has asked me to type up this report re:
Combined Progress Report and "Pilot Test" Design.

Would you kindly review and/or correct where
needed. We have the original hand written copy
on hand here at our office.

Thank you.

Sincerely,

Angie Cassidy

Angie Cassidy
Secretary to
Thomas H. Schloss
Chairman of the Board

MS/

Attch:

FAMCO /

1700 Broadway • New York, New York 10019 • (212) 247-0420

*Jim's for yourself
if you need me
just call me
done and*

FAMCO

1700 Broadway

New York, New York 10019

(212) 247-0420

TOMBSTONE

TO: Tom Schloss, Dr. John Dean, James Briscoe
DATE: June 27th, 1979
FROM: Dick Hewlett
RE: COMBINED PROGRESS REPORT AND "PILOT TEST" DESIGN

TOMBSTONE PILOT LEACH

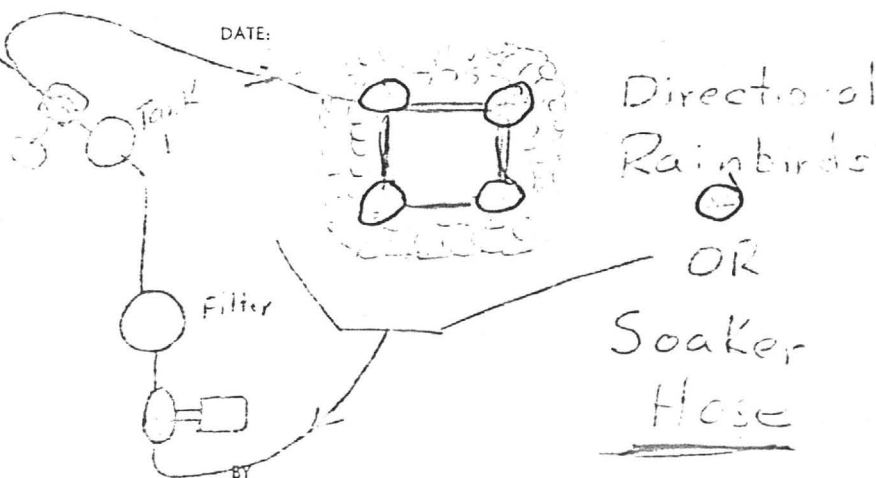
A pad and leaching area will be constructed on the north side of the heap, starting near the north ramp and extending north around the heap (see sketch A).

Activities required are:

1. Doze brush and prepare site.
2. "Grade" area to level and build in a drainage slope.
3. Haul tails on to site.
4. Level to 3-inch lift.
5. Water -saturate with water truck
6. Compact with loaded - loader
7. Repeat 3-6 until 4-3 inch lifts are layed down, leveled, saturated & compacted.

The above constructed in a manner such that in addition to provide an impermeable base for "pilot" leach tests, the pad will later be used for production without further construction.

The "pilot" leach
will be as
shown opposite →



Page 2, contd.

Heap Pilot Tests:

Tonnage for each test to be "heaped" on each separate section of the pad will be 200 tons. This will occupy a square area of:

$$200 \quad T = \frac{L \quad w \quad h}{TF} \qquad = \frac{Lw \quad (5 \text{ ft high})}{\text{Tonnage factor}} \\ 18.5$$

$$200 \quad T = \quad L \quad w \quad \frac{5}{18.5} \qquad Lw = 740 \text{ ft.}^2 \\ \text{or } L=w= 27 \text{ ft.}$$

Therefore, the area would be 30' x 30' and 5 foot high.



Pilot Spray Parameters:

<u>Lift Height</u>	<u>Ore Mean Surface Area</u>	<u>Number Sprays</u>	<u>Tons Treated per Spray</u>	<u>Gal/min per Spray</u>	<u>Gal/Min per 100 ft²</u>
5'	740 ft ²	4	50	5	0.68

Flow Rates:

$$20 \text{ 6PM} = \frac{20 \text{ 6PM (60 M.P.Hr.)}}{240 \text{ Gal/Ton}} = 5 \text{ ton/hour}$$

For Spray Mainfold for 20 6 PM

$$\text{Pipe size (Di)} = \frac{2.2 W}{e} \frac{0.45}{0.31} \quad \left. \vphantom{\frac{2.2 W}{e} \frac{0.45}{0.31}} \right\} \text{Di} = 1.9 \text{ or } 2 \text{ inches}$$

Where Di = Pipe Diameter
W = Weight flow (thousand #'s mass/hr)
e = Fluid density = mass/ft³

Solution Balance:

A. Water of saturation
10% of tonnage = 0.10 (200 T) = 20 tons

B. Period of total saturation

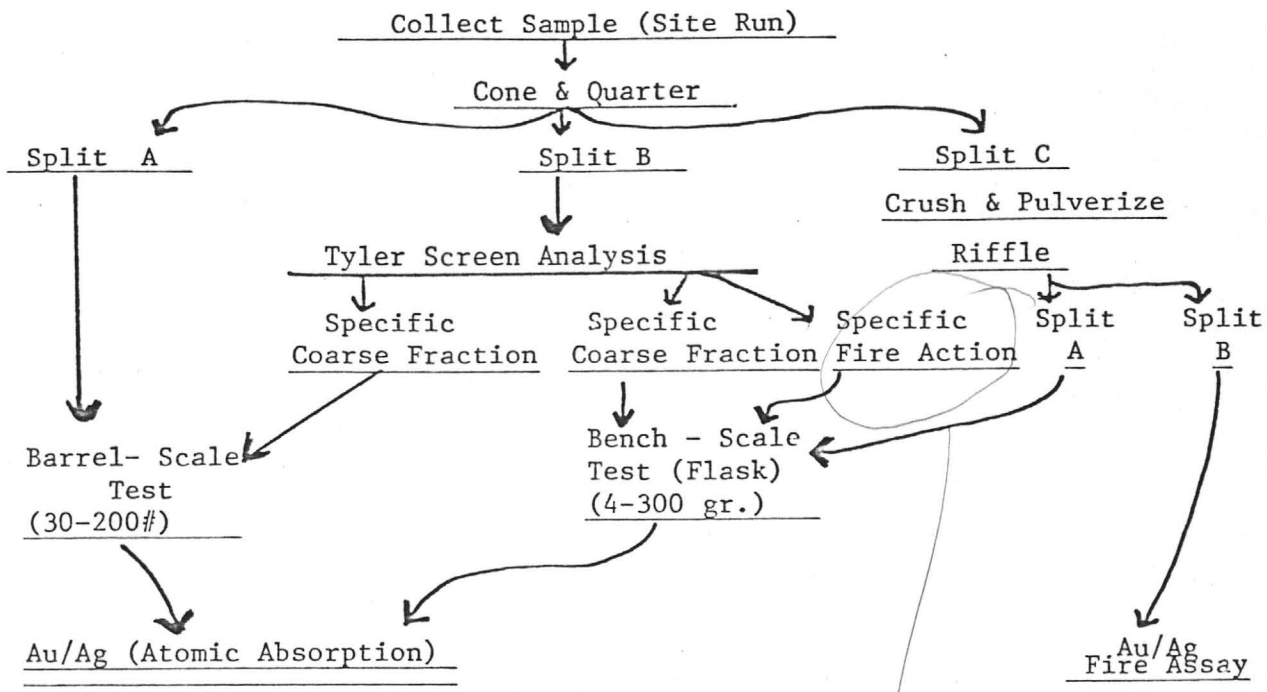
$$\frac{20 \text{ tons}}{5 \text{ tons/hr}} = 4 \text{ hours}$$

C. Circulation Rate: 5 tons/hour

D. Evaporation: Very small because no pond will be used for circulation. (the pond will be used to test -evap. 9 decomposition of hypo, etc.)

7/19/79
I don't agree with this as most evap. would occur in the sprays (surface area) not in the ponds. HB

General Analysis Procedure:



DISCUSSION OF GENERAL ANALYSIS
PROCEDURE:

I don't think this is enough - 50 lbs much better.

A. Objective - Solvent Analysis & Economics

1. Collect 5 # sample → crush & pulverize.
2. Cone & quarter if other tests are to be made from this site.
3. Riffle to obtain desired sample sizes.
4. Send 1 # sample for fire assay (lab uses 1 assay ton $\approx$ 30 grams)
5. Weigh as many samples as there are solvent tests. I usually use 30 grams.
6. Label and charge each sample (30 grams) with solvents previously prepared. Save a blank solvent sample 50 ml.
7. Shake 8. filter
9. Determine Au & Ag concentration using atomic absorption

FOLD

DATE:

FOLD

50 lbs
Collect
5 # Sample

Crush & Pulverize (-4 mesh)

Weight
Samples

Riffle

Fire Assay
Au/Ag Per Ton Ore

Std. A B C D E
Solvent Various Solvents
and or Concentrations

Shake
Each
Flask

Filter

BY

Usual Case

REPLY

30 gr. Sample
90 ml. Solvent Solution
Shake 2 hours - Room Temp.

DATE:

Filtrate

Test for
Interference
no yes
Correct

$$AA \left(\frac{t. oz.}{ton Soln} \right) \left(\frac{90}{30} \right) = \frac{t. g. Precious Metal}{Ton Ore}$$

Determine Au/Ag Concentration
using Atomic Absorption

ATOMIC ABSORPTION METHODS

Basic are:

1. Sample size (4 → 200 grams)
2. Sample Type: A. Screened → Fires
B. Sample Run → Coarse & Fires
C. Crushed & Pulverized
3. Sample Weight: Solution weight ratio

Procedure:

- A. Weigh sample
- B. Select solvent c. agitate (shaker)
- C. Filter
- D. Prepare filtrate for AA determination

Conversion of AA determination (t. oz./ton soln) to t. oz./ton ore:

$$\left[\begin{array}{c} \text{AA Determination} \\ \text{(t.oz./ton soln)} \end{array} \right] \left[\begin{array}{c} \text{wgt. soln.} \\ \text{wgt. ore} \end{array} \right] = \frac{\text{t. oz.}}{\text{ton ore}}$$

EXAMPLE:

$$\left[\begin{array}{c} \text{AA} \end{array} \right] \left[\begin{array}{c} 90 \text{ ml} = 90 \text{ gr. soln} \\ 30 \text{ gr.} \end{array} \right] = \left[\begin{array}{c} \text{AA} \end{array} \right] \frac{90}{30} \text{ or } 3$$

Other Example: Larger Test

$$\frac{300 \text{ ml soln}}{30 \text{ gr. sample}} = \left[\begin{array}{c} \text{AA} \end{array} \right] \left[\begin{array}{c} 300 \\ 30 \end{array} \right] = \left[\begin{array}{c} \text{AA} \end{array} \right] 10 = \frac{6 \text{ oz.}}{\text{Ton Ore}}$$

Atomic Absorption Interference Problems:

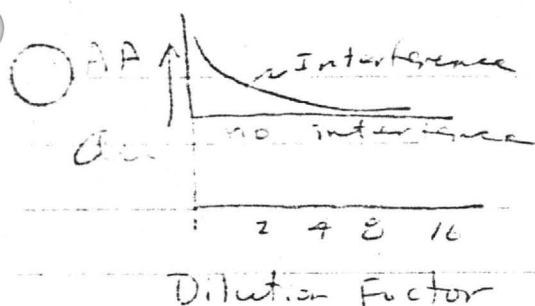
Effect of common elements on absorbance of Au resonance lines

		(Air- C ₂ H ₂)
Solution		Au 242.8
1000 ppm	K	.002
1000 ppm	Na	.003
1000 ppm	Al	.030
1000 ppm	Mg	.002
1000 ppm	Ca	.015
1000 ppm	Fe	.017

Therefore, when aqua regia or other acid digests (as Hbr + Br₂) are used, various elements as mentioned above cause interference in the gold wave length yielding a false Au reading.

Interference Test: Gold wave length

Dilution



Dilute sample and compare calc. Au value with AA reading is higher than calculated and various interference.

Note: Yellow or colored flame indicates possible interfering element. Also blank of solvent solution indicates and quantifies interference except for interfering soluble elements as aqua regia and iron (acid soluble).

Example 3

Dilution Factor

	1	2	4	8	16	32	
AA	.21	.069	.033	.017	.00625	.003125	Interfer
(Au)	.10	.05	.025	.0125	.00625	.003125	No Inter.

200ml Sol. + Resin + Shake → Filter/Wash → 200 ml (1/4) → AA

Solve } by Load Au on Resin → Filter → Wash Residue →
Elute with equal vol. 1/4 Aqua Regia

Page 7, contd.

Ferrous Sulphate

Source: McKesson - Tucson

50 # Bags

Bags

4 - 9
10 - 39
40 - 100
+ 100

Price

\$24.15/100 #
19.50/100 #
14.15/100 #
12.65/100 #

Ferrous Chloride

Source: McKesson - Tucson

Chem West - Fontana, Calif.

Tank car = 50,000# = 25 tons
30% solution → \$140/ton } anhydrous F.O.B. L.A.



10.478
#/Gal
50,000 #
↓
4772 Gal

Price Tankcar
\$1050 = \$0.021/#

Total \$2,275

Freight LA-Tombstone(May Frt. Rate)

\$2.45/100 #
\$1,225

\$.477/Gal T
.0455/# T 30%

Solvent/Reagent Prices

Na OCl (Sodium Hydpochlorite)

Source: Copper States -Tucson
14% Solutions -55 gal Drums

Quantity: 55 gal. Drums

Price:

Plus \$30.00/Drum Deposit

1-5	.90/gal
6-9	.85/gal
10-14	.80/gal
15+	.75/gal

<u>14% Soln</u>	
<u>NaOCl</u>	
Sp. Gr.	= 1.1365
Gr/	= 159.1
#/Gal	= 1.328
[9.475 # ^T /Gal]	

Fe Cl₃ Ferric Chloride

Source: McKesson- Tucson

55 Gal Drums

Drums

1-4

\$9.50/100#

<u>Be</u>	<u>Sp.Gr</u>	<u>FeCl₃</u>	<u>Gr/l</u>	<u>#/FT³</u>
42.3	1.4118	44%	621.2	38.78

[11.77 ^T #/Gal]
5.184 #/Gal.

ACID

Source: Apache Powder = St. David

NITRIC
60% HNO_3
\$150/100% Ton

SULFURIC
70% H_2SO_4
\$6/100% Ton

Average tanker wgt = 22 tons

60% HNO_3 = 6.843 #/Gal
= 1.3667 Sp. Gr.
= 11.394 #/Gal
= 175.5 Gal/Ton

70% H_2SO_4 = 9.408 #/Gal.
= 1.6105 Sp/Gr.
= 13.472 #/Gal.
= 148.96 Gal/Ton

22T (HNO_3) = 3861 Gal.
22 (.60) = 13.2 100% Tons
(13.2) (\$150/T) = \$1980

22T (H_2SO_4) = 3277.12 Gal.
22 (.70) = 15.4 100% Tons
(15.4) (\$6/Ton) = 92.30

+ Freight = 90

+ Freight = 90

HNO_3 \$ 2070

\$94.09/Ton
.047/#
.078/# - 100%
.536/Gal-Dil
.894/Gal-100%

COST

Ton (dil.)
(dil.)
(undil)
Gal (dil)
Gal (undil)

H_2SO_4 \$182.40

\$8.29/Ton
.004/#
.006/# - 100%
.056/Gal - dil.
.080/Gal - 100%

IRON PELLETS

Kore Industries
Georgetown, S. Carolina

1-803-546-2525

Texas Steel
Beaumont, Texas
A.R. Holzworth

1-713-768-1251

Oregon Steel
Bill Bottomley

1-503-286-9561

Page 10, contd.

Midoex

Source: Charleston Steel Mills

Lime

Source: Paul Spur- , Douglas, Ariz.

Processed - Stock Dust (62% CaO)

\$6/Ton or \$.003/#

Sodium Thiosulfate: $(\text{Na}_2 \text{S}_2 \text{O}_3 \cdot \text{SH}_2\text{O})$

Source: Hills Bros., Tucson Ariz.

	<u>Bags</u>	<u>Price</u>
100#	1-10	\$24.60/100 #
Bags	20	\$19.70

\$0.197/#

Salt:(NaCl)

Source: Southwest Salt - PHX
\$15/ton + \$15/ton Freight = $\frac{\$30}{2000\#}$ or 1½¢/#

SUMMARYChemical & Reagent Cost - Delivered to Tombstone

<u>Name</u>	<u>(% Soln.)</u>	<u>Solutions</u>	
		<u>Cost-Dil</u>	<u>Cost/# - 100% (Tombstone)</u>
NaOCl	14%	75¢/gal	\$.560/#
FeCl ₃	44%	1.12/gal	.216/#
FeCl ₂	30%	47.7¢/gal	.150/#
H ₂ SO ₄	70%	5.6¢/gal	.006/#
HNO ₃	60%	53.6¢/gal	.078/#

Solids

<u>Name</u>	<u>Cost/# - Tombstone</u>
Fe SO ₄ · H ₂ O	\$.1265/#
Na ₂ S ₂ O ₃ · 5 H ₂ O	.197/#
NaCl	.015/#
Lime	.003/#
NaCN	.587/#
Zn Dust (Memllite)	.662/#
Na ₂ S	.248/#
Lead Acetate	2.30/#
Na ₂ O	.18/#

SR-3 Resin

\$ 6.50/# - Small Lots

LEACH TEST SOLVENTS

For Bench Scale ; then Barrel; the pilot

<u>Type of Solvent Phase</u>	Case A (Limontic Clay-Ls)	Case B (Limontic Clay-Ls.)	Case C (Mn-in Ls. with limontic → jarosites)
Pre-treatment	H ₂ SO ₄ + NaCl + NaOCl	H ₂ SO ₄ + NaCl + NaOCl	H ₂ SO ₄ + Fe Cl ₃ + NaCl
Leach (ag)	Na ₂ S ₂ O ₃ · SH ₂ O	NaCN Lime	Na ₂ S ₂ O ₃ SH ₂ O or CN

Page 12, contd.

Computation of Solvent Concentrations Having the Same Cost/Ton Solution

Method A: Cost/Ton Soln. Method

Example:

X = 1/# & concentration = 1#/Ton Soln.

$$\frac{60 \text{ ml} @}{\text{gal}} = \frac{\$.0011023/\#}{\text{gal}/\#} \left(\frac{\text{Dil. Cost}}{\text{gal}/\#} \right) \left(\frac{3785.4118 \text{ ml}}{\text{gal}} \right)$$

Method B: # / Ton Soln. Method

$$\frac{60 \text{ ml} @}{\text{gal}} = \frac{\text{Economic}}{\# / \text{TON}} \left(\frac{\text{Ton Soln.}}{340 \text{ Gal.}} \right) \left(\frac{\text{Gal}}{3,785.4118 \text{ l}} \right) \left(\frac{\text{Gal}}{\# X} \right) \frac{3785.4118}{\text{Gal.}}$$

Solvents/Reagents
Delivered to Tombstone

Table of Comparative Solvent Strengths (50¢/Ton Solution)

<u>Solvent</u>	<u>\$/#</u>	<u>50¢/Ton</u> <u>#/Ton</u>	<u>gr/l</u>	<u>ml Soln./</u>
H ₂ SO ₄ (70%)	\$.006	83.3	-	37.2
NaOCl (14%)	.560	.9	-	2.8
Fe Cl ₂ (30%)	.150	3.3	-	4.4
HNO ₃ (60%)	.078	6.4	-	3.9
FeCl ₃ (44%)	.216	2.3	-	1.9

<u>Solvent</u>	<u>\$/#</u>	<u>50¢/Ton</u> <u>#/Ton</u>	<u>gr/l</u>
NaCl	.015	33.3	16.7
Na ₂ S ₂ O ₃ .5H ₂ O	.197	2.5	1.3
NaCN	.587	.9	.45
FeSO ₄ .H ₂ O	.1265	4.0	2.0

MEMO

To: R.F. Hewlett

Copies To: John Dean, Tom Schloss

From: J.A. Briscoe

Date: July 19, 1979

Re: Sample Collecting Procedure, Tombstone Project P-418,
Tombstone Hills, Tombstone Mining District, Cochise
County, Arizona

The following will standardize our sample collecting procedures for all future sampling at Tombstone, and will remain in effect until written changes should be received superceding this procedure, by myself and/or John Dean.

The main parameters in sample collection are:

1. The sample should be representative of the rock or mineral environment which it is meant to test. Therefore, great care should be used in determining the sample boundaries in relation to:
 - a. Rock type
 - b. Mineral zonation
 - c. Oxidation state
 - d. Geologic structures
 - e. The amount of continuity that can be determined for the above characteristics so that the volume of rock represented by the sample can be calculated.
2. Whether or not the sample is representative of the rock volume it is meant to test is a critical factor which relates to:
 - a. Size of the sample taken
 - b. Coarseness and degree of homogeneity of the mineral contained within the sample

- c. Its physical characteristics with regard to breaking and ease of homogenization
- d. Its unit value.

This is a very complex subject as you know. However, correct sampling is critical to our evaluation of the precious metal content of material proposed for treatment at Tombstone. Appended is a Xerox copy of page 5-72 to 5.4.2 of the SME Mining Engineering Handbook, Volume 1 which is a good guide to sample size and crushing sizes required before splitting. This guide should be adhered to as closely as possible.

impossible *photography*
S.E.A. has used standardized sampling procedures over the last 5 years. These procedures include numbered sample sacks, wooden sample stakes with possible metal tags, character sample sacks, standard geochem assay forms, and topography of the sample site after the sample has been taken, using a 35mm camera. Notes on the photography are taken on standard NCR photographic note forms similar to the geochem sample form.

I'm transmitting to you with this memo 150 individual forms issued for 150 samples and 150 photographs, and 10 rolls of Kodak Ektachrome ASA64 35mm in 36-shot cassettes. I'm also transmitting to you 100 8-lb. size sample sack kits which include a cloth sample sack with number imprinted on it and two wooden stakes to be placed at the beginning and end of the channel sample. These wooden stakes have metal embossable tags for annotation of the sample number. Also enclosed is a plastic character sample sack. Monday I am sending you large 100-lb. ore sacks with essentially the same kit attached. The sampling procedure will be as follows: identify a specific rock type - mineralogic type or other feature which will be meaningful to sample. Obviously for very large features in excess of 20 to 30 feet (this may vary according to circumstances) multiple samples should be taken. First, mark the sample location with green spray paint, then take channel chip samples or other samples as

may be appropriate with careful description on the attached sample bags. When the sample is completed, raise numbered sample sack along the painted sample spray paint mark and with your 35mm camera photograph the sample location. If specific geologic or mineralogic features justify, take a close-up view of those features. Be sure and keep sample sack with the number visible in the photographic frame. In this manner, the photograph will always be identified with the sample. Take a small geologic character sample and place it in the transparent plastic bag. The remainder of the sample can be assessed for analysis. Careful notes of rock type, mineralogy and all other pertinent features should be annotated onto the NCR sample forms along with the sample number. The photograph can also be briefly noted on the NCR photo note sheet.

If any of this is not clear, please write your questions to me and I will reply to them in writing.

James A. Briscoe

JAB/kar

P-418

5.4.2—FOR ANALYSIS

Care must be exercised in the selection and preparation of material for analysis so that it represents an accurate sample of the material under study. The principal elements for consideration are the weight of the sample and the method of selection.

The weight of the sample is dependent on several factors: size of the largest particle, size of mineral liberation and density of the various minerals are most important. These factors recently have been reduced to a sampling formula and a slide rule by Gy¹⁰⁶ in which

$$M = \frac{Cd^3}{S^2}$$

with M the weight of sample in grams; C, constant developed from mineral shape factor, particle size, liberation factor, and mineralogic composition; d, dimension of the largest pieces of the lot in centimeters; and S, the measure of statistical error committed by sampling or the error which can be tolerated in the assay of the sample. This equation also is useful in sample selection of mill products.

TABLE 5-7—Minimum Permissible Sample Weight at Different Particle Size

Diameter of Largest Pieces		Very Low Grade or Very Uniform Ore, Lb	Medium Ores, Lb	Rich or Spotty Ores, Lb
In.	Mesh			
4		4,800	35,556	
2		1,200	8,889	51,200
1		300	2,222	12,800
0.5		75	556	3,200
0.25		19	139	800
0.131	6	5.15	38.1	220
0.065	10	1.29	9.5	55
0.0328	20	0.322	2.37	13.76
0.0164	35	0.081	0.59	3.44
0.0082	65	0.020	0.15	0.86
0.0041	150	0.005	0.038	0.215

Richards¹⁰⁶ has prepared a table (5-7) which presents a guide to sample-size selection based on type of ore and size of largest particles.

Either Gy's formula or Richard's table is used to determine the size reduction to be achieved in the crushing or grinding step preceding sample division.

Working the sample down to an analytical pulp requires care and is a step that is frequently slighted. The preparation procedure should include alternate crushing, blending and splitting steps until the desired quantity and product are obtained. The equipment should be thoroughly cleaned between samples and properly maintained to give accurate sample division. In the final preparation step, it often is necessary to screen the pulp and regrind oversize material to reduce the complete sample to the desired size before use in the analysis. On ores which contain high specific gravity minerals or minerals difficult to digest in the chemical procedure, such as tungsten, molybdenum or gold ores, it is necessary to reduce all material to minus 150- or 200-mesh for the sample pulp.

When sampling zones from open cuts or trenches, select large samples if the rock is coarse and blocky and not of a uniform nature. This material generally can be stored and moved in 55-gal drums, then reduced to sample pulps with commercial crushing and handling equipment.

Drill core is best split or sawed along the longitudinal axis, with half being used for assay or metallurgical tests and half for permanent storage and/or future reference. When large quantities are required, it may be possible to take a color photograph of the boxed core for the permanent file and crush all material for the testing program. Under such a program, occasional samples of core or chips should be selected and also stored for reference and mineralogic examination.

In modern drilling programs, the samples often are collected as wet sludge from a rotary drill or dry fine ore from a wagon or percussion drill. Special equipment is required for sample collection and handling, and this varies with the drilling method. Care is required to collect representative samples of both the fine and coarse fractions as many ores, such as vanadium and uranium sandstones, have the values concentrated in the finer fractions. Wet collection procedures also are used for obtaining sludge samples from churn drills or diamond drilling.

Smaller samples generally are collected in a geochemical program, and a number of special procedures have been developed for handling these materials. Care always should be taken to seal each sample to avoid cross contamination or possible salting. Contamination is best avoided by using plastic bags or heavy paper envelopes with waterproof glue. The bags can be closed with wire and a lead seal. Soil samples can be prepared in the field by screening out oversize materials using an aluminum household tea strainer. In the laboratory, the samples are screened on sieves with plastic frames and silk or nylon mesh. Any pulverizing step is best carried out with high-purity aluminum-oxide plates. Care should be taken to avoid preparation and analysis of geochemical samples in laboratory areas used for higher-grade ore samples.

5.4.3—FOR ORE TESTING AND ENGINEERING STUDIES

The procedures used in the selection of samples for an ore-testing program are similar to those for analytical needs. The size of samples varies with the testing program. Small bench-scale flotation or ore-dressing studies can be completed on 50 to 500 lb of material, while pilot-plant studies often require 25 to 1,000 tons of ore feed. The samples selected for the metallurgical work should be retained in a coarse size so that the metallurgist can measure crushing and grinding index and the effects of various methods of size reduction on the process under study. The natural oxidation of sulfide ores is held to a minimum by retaining coarse samples and storing the samples dry in sealed containers, or by storing damp samples in a freezer. Lubricants and chemical contaminants must be excluded from samples to be used in flotation test work.

The collection of metallurgical samples often is overlooked in the early stages of an exploration program. Several inexpensive steps can be taken to insure the availability of samples if the need for metallurgical studies should develop. Excess drill cuttings or trench samples can be placed in plastic-lined gunnysacks, labeled, and stored in sealed drums near the sample site. Samples can be selected at a later date after the drilling data are available. It is a common practice in uranium drilling to leave small piles of cuttings by footage in a line near the drill hole. They may remain several years with little disturbance.

It is recommended and a desired practice that all reject samples be saved in an active exploration program which may develop a commercial ore body. If large amounts of material are available, it is best to set aside the rejects after crushing to ¾ or ½ in. If finer crushing is required for analytical needs, then 6-mesh is a desirable size for metallurgical work. The samples should be kept separate and labeled until sufficient information is available to develop composite lots for a test program. Such lots are made up from geologic and analytical data to represent individual rock types, unusual ore or gangue mineralization, or probable stages in the mining program.

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degrees to quartz-sericite-clay assemblages. The subject includes many variations among districts. A simple model consists of a core of potassic alteration surrounded vertically and laterally by quartz-sericite. Vertical dimensions of this simplified model are uncertain because the total vertical length is not known for any one deposit. Indications are that minimums of at least a few of the largest deposits were, prior to erosion, at least 10,000 ft and probably much greater. It is important to attempt to estimate the vertical position which a newly discovered deposit may occupy in a model. The tops of several major ore bodies have been discovered in recent years at depths of 2,000 to 3,500 ft. These discoveries have been due to recognition of vertical and horizontal zonal characteristics.

2. The interpretation of leached outcrops, or "capping," is based on the subtleties of the chemistry of oxidation and leaching of iron, copper and molybdenum sulfide minerals, and on the geologic history of those processes. Oxidation proceeds slowly, and in many regions it has been outstripped by erosion because these disseminated deposits all originated in broad belts of contemporaneous or subsequent mountain-building. If original iron/copper sulfide ratios were less than about 5:1, indigenous limonites having a black to seal-brown color, with a bright-red streak (in contrast to transported limonites with similar color but an orange streak), indicate that chalcocite originally was present. Diffused orange, brick-red and yellowish limonites indicate that pyrite with little, if any, copper sulfide was present. Parallel thin ribs in cavities, together with brownish limonites, suggest the original presence of chalcopyrite. Pale-yellow ferro-molybdenite, of course, indicates that molybdenite was present. These features are quantitatively diagnostic only if the original metal contents were more than about 0.5% Cu or 0.2% MoS₂.

The evaluation of exploration possibilities of newly discovered disseminated sulfide prospects involves a number of variables and uncertainties, but many aspects of the problem are subject to understanding and prediction if geological observations of physiographic and tectonic history, rock types, structures, alteration and limonites are made first.

5.2.5D—SPECIAL EXPLORATION TECHNIQUES—PLACER DEPOSITS

JOHN H. WELLS

Placer exploration involves four basic steps: (1) reconnaissance of the lands, (2) sampling, (3) sample processing, and (4) evaluation of results. These steps may be taken separately or combined. Each is important in itself and each may be critical in relation to the end result. Work related to exploration drilling or to otherwise testing a placer deposit commonly is referred to under the general term "prospecting."

Reconnaissance—A preliminary inspection of the lands should precede any detailed placer examination or sampling work. If the property is small, this may take less than an hour but if it is large, or if it contains significant mineral exposures, several days of presampling reconnaissance may be in order. Aerial photographs can be most useful in dealing with topography, drainage and many other features not easily seen on the ground. There is an unfortunate tendency to minimize the importance of the reconnaissance step. The history of a district can help in selecting and interpreting placer samples in the reconnaissance phase. Any sign of old workings should be carefully investigated. Production records are invaluable, and nearby mines should be visited and examined whenever possible. Reconnaissance procedures must be tailored to suit each situation, and the time and effort required depend on the examining engineer's experience and perception.

The reconnaissance evaluator should have a thorough knowledge of placer mining and the various operating methods. In particular, he should know the principal limitations and major pitfalls.

Sampling—Contrary to popular belief, representative placer samples are difficult to obtain. In most cases, sample results require careful interpretation. Some important considerations are:

EXPLORATION

Large Particle Size—The typical placer deposit is a mixture of fine sand, pebbles and boulders varying from a few tens to perhaps hundreds of pounds each, making it very difficult to take a small representative sample.

High Unit Value of Gold—Any error in mineral content of a placer sample will be highly magnified in the end result. In a commercial placer the relative amount of gold (by volume) may be on the order of one part gold to a hundred million parts of gravel. Ground having a gold-gravel ratio 1:100,000,000 by volume is worth approximately 15¢ per cu yd @ \$35 per oz. A single small particle of gold in a pan of gravel can be equivalent to 2 to 5¢ per cu yd. This is illustrated by Table 5-4.

Minerals Other Than Gold—Placers chiefly valuable for minerals such as monazite, rutile, cassiterite, ilmenite, etc., generally are easier to sample and evaluate than gold placers. These minerals commonly have a relatively low unit value and make up a larger part of the mass, so that extraneous particles have little effect on calculated values.

TABLE 5-4—Effect of Single Small Gold Particle on Placer Sample of Typical Size

Size of Drill Hole or Channel, In.	Size of Gold Particle and Effect on Sample, \$ per Cu Yd		
	20-Mesh (6.57 Mg)	40-Mesh (0.91 Mg)	60-Mesh (0.27 Mg)
7½ dia.....	\$0.58	\$0.08	\$0.02½
5½ dia.....	1.18	0.16	0.05
3 dia.....	3.60	0.50	0.14
3 × 6.....	1.42	0.02	0.06
6 × 6.....	0.71	0.10	0.03
6 × 12.....	0.35	0.05	0.01½
12 × 12.....	0.18	0.02½	0.00¾
16-in. pan*.....	1.18	0.16	0.05

*180 pans per cu yd.

Values shown are those which would result from one gold particle in a 1-ft sample increment or drive, and are based on gold weights determined by the author, with gold @ \$35 per oz.

effect on calculated values. Often such deposits are of well-sorted small-sized detrital materials, such as beach sand, making it easier to obtain representative samples.

Erratic Distribution of Values—Valuable minerals are not distributed uniformly through the typical placer deposit. Heavy minerals and gold in particular commonly are confined to narrow discontinuous pay streaks with little or no value between them. Coarse gold is exceptionally erratic and reliable evaluation of results requires more than taking a few small samples and an exercise in arithmetic.

In theory, these problems can be overcome by taking bulk samples (measured in tons rather than pounds) but this seldom is resorted to in actual practice. Some argue that taking a large number of small samples will statistically cancel the eccentricities of a given deposit, but practical considerations seldom permit this approach.

Industry Practice—In modern practice by established placer organizations, an employee is placed in charge of evaluation who has wide experience with the type of deposit. Limited credence may be given to any one sample and, instead, a thorough study of all prospecting data (perhaps with taking of additional check samples), experience-based adjustments, or "correction factors," are applied to initial sample data where needed. Successful placer companies rely as much on experience and the insight of management and prospecting personnel as they do on initial sample results.

Choosing a Sampling Method—The unique characteristics of each deposit make it difficult to apply universally a single, or a "best," method of sampling. A thorough presampling reconnaissance usually will indicate whether pits, shafts, drilling, etc., are to be used. Commonly, the things which are to be determined by sampling are the very things which should govern the type of sample to be taken in the first place. It is good practice, therefore, to progress from a simple beginning, through a series of carefully evaluated steps, to the final decision, each phase of the work designed to give a "go" or "no-go" answer for subsequent work.

Those interested in the details of placer sampling and methods are referred to Wells.⁷² Some of the general methods to be considered are:

- Sampling existing exposures.
- Hand-dug excavations.
- Machine-dug shafts.
- Backhoe pits or trenches.
- Bulldozer trenches.
- Churn drill holes.

Drilling Methods—In the United States, large placer deposits usually are explored by a gasoline-powered "placer" drill with a 6-in. drive pipe (casing) and 7½-in.-dia. drive shoe. A special vacuum-type sand pump removes the sample as drilling progresses.

A lightweight hand-powered churn drill used extensively in South America is known as the "Ward" drill. In Asia and in parts of Africa, a unit consisting essentially of flush-jointed casing equipped with a serrated cutting shoe has been widely used, particularly for sampling tin placers. This is the "Banka," or "Empire," drill. The casing is rotated by a man- or animal-powered sweep attached to the upper section. Men standing on an attached platform chop up the drill core and remove it from the casing with hand-powered tools. Placer-drilling methods and evaluation have been described by Daily,⁷³ Doheny,⁷⁴ McCallum,⁷⁵ Smith,⁷⁶ Wells,⁷² and Wolff.⁷⁷ Griffith⁷⁸ has described the Banka drill in detail.

Widespread placers with broad mineral distribution usually are explored by drill holes on a grid pattern. Narrow placer channels are drilled at relatively close intervals along lines laid out at right angles to the general trend of the stream or deposit. Hole spacing along lines may be 100 ft or less and distance between lines on the order of 500 ft or more. Relatively narrow pay channels can be delineated in this manner. Typical drill patterns and calculating procedures are illustrated in Figs. 5-9 and 5-10.

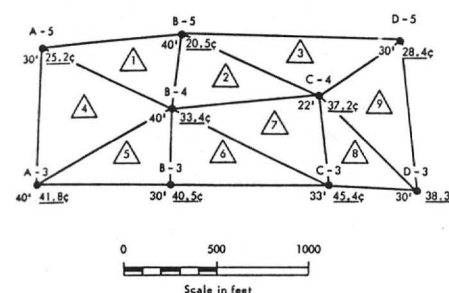
Shafts sometimes are put down over selected drill holes to establish a correction, or "shaft" factor which, combined with experience-based judgment, is used to adjust calculated values. Visual inspection of the gravel in place permits a better evaluation of physical characteristics of the deposit.

Drilling Costs—Drilling costs and records usually are considered confidential information by established placer companies. They vary widely, depending upon the time spent in moving and setting up, actual drilling, stuck or lost tools, breakdowns, pipe pulling, etc. Under a variety of drilling conditions in the United States, Canada and South America, it has been found that power drills average approximately 15 ft per 8-hr day over the life of a project. Costs of placer drilling reflect cost of labor, particularly the scarcity of experienced placer drillers and panners, who command premium wages. The minimum direct cost for operating a placer drill in the United States, on a one-shift basis, can easily exceed \$200 per day.

McCallum⁷⁵ reports on hand-powered Ward drill costs under a variety of South American conditions, which vary from \$1.58 to \$8.03 per ft in a region where laborers earn \$1 per day. In Bolivia, 80-ft holes in river gravels required 10 to 12 days for each hole, using a 5-in. Ward drill. A 6-in. power drill operating on the same river bar took 5 days to complete a similar hole.

Number of Samples Required—There are no simple rules governing the number of samples to be taken. Each project should be planned on the basis of the reconnaissance findings. Is the deposit large and regular, with the valuable mineral

Step 1—GRAPHIC DISPLAY OF PROSPECT DATA



Step 3—VALUE CALCULATION

TOTAL VOLUME = 2,012,305 cubic yards^{2/}

GROSS VALUE = \$684,065^{2/}

AVERAGE VALUE = $\frac{\$684,065}{2,012,305} \times 100$
= 34.0c per cubic yard

^{2/} From Step 2.

Step 2—DETERMINE VOLUME AND VALUE FOR EACH TRIANGLE

Δ NO.	HOLE	DEPTH FT.	VALUE c	D x V	AVER. DEPTH	WEIGHTED VAL. c	AREA 1/ SQ. YDS.	VOLUME CU. YDS.	VAL
1	B-4	40	33.4	1336	36.6	26.52	20,500	250,100	66,600
	B-5	40	20.5	820					
	A-5	30	25.2	756					
		110		2912					
2	C-4	22	37.2	818	34.0	29.16	17,700	200,010	58,800
	B-4	40	33.4	1336					
	B-5	40	20.5	820					
		102		2974					
3	C-4	22	37.2	818	30.7	27.06	20,500	209,100	56,600
	B-5	40	20.5	820					
	D-5	30	28.4	852					
		92		2490					
4	B-4	40	33.4	1336	36.6	34.24	30,100	367,220	125,700
	A-3	40	41.8	1672					
	A-5	30	25.2	756					
		110		3764					
5	B-3	30	40.5	1215	36.6	34.43	16,800	204,960	78,800
	B-4	40	33.4	1336					
	A-3	40	41.8	1672					
		110		4223					
6	C-3	33	45.4	1498	34.3	39.32	19,650	224,010	88,800
	B-3	30	40.5	1215					
	B-4	40	33.4	1336					
		103		4049					
7	C-3	33	45.4	1498	31.7	38.42	22,850	242,210	93,800
	C-4	22	37.2	818					
	B-4	40	33.4	1336					
		95		3652					
8	C-3	33	45.4	1498	28.3	41.80	13,100	123,140	51,800
	C-4	22	37.2	818					
	D-3	30	38.3	1149					
		85		3565					
9	C-4	22	37.2	818	27.3	34.31	21,050	191,555	65,800
	D-3	30	38.3	1149					
	D-5	30	28.4	852					
		82		2819					
TOTALS							182,250	2,012,305	\$684,000

1/ Measured by planimeter.

Fig. 5-9—Use of the "triangle" method of calculating prospect values where the deposits are drilled on a grid pattern.

broadly distributed, or is it a boulder-strewn stream-type deposit containing coarsely erratically distributed values? The smaller and more uniform the size of the gravel and the more evenly distributed the mineralization, the fewer are the samples needed for evaluation (Wells⁷²).

There is a great difference between sampling during initial evaluation of a prospect, where a few judiciously selected samples might show it to be worthwhile and the comprehensive program necessary to establish mining limits and plan a successful mining operation.

JUL 31 1979

By J. H. B.

July 23, 1979

Arizona Bureau of Geology & Mineral Technology
Geology Building Room 134, Univ. Arizona
Tucson, Arizona 85721

Memo of visits by
J. A. Briscoe
T. H. Schloss
J. G. Dean

David D. Rabb, Mining Engineer

Subject: Gold and Silver Production, Tombstone Area

A brief visit with a tour of the metallurgical facilities was made on July 19, paving the way for a longer discussion on July 23. Mr. Rabb teaches a course on heap leaching and has become thoroughly familiar with the Tombstone area through his work for the state.

He advised that he felt cyanide leaching, especially by the heap technique with its low labor requirements, was the most promising method of treating the Tombstone ore. He appeared to be familiar with all of the older methods such as the Patio process, salt roasting, thiosulfate leaching, etc. and supplied on loan a photo copy of a book by M. Eissler, "Metallurgy of Silver", Van Nostrand 1891. He was also familiar with the work of the Bureau of Mines at Reno including the hypochlorite process, acid pretreatment, agglomeration for induced percolation, etc. and seemed to have high regard for the quality of the work there except perhaps for the economic interpretations.

Assays

Mr. Rabb stated that fire assays on samples properly prepared according to the Richard's rules were still regarded as the most reliable method of determining total gold and silver. Atomic absorption is best for determining leach solution concentrations; these data can be supplemented by fire assays on the tailings, and this combination of data permits establishment of an accurate metallurgical balance which provides a conclusive check.

Leaching Tests

Mr. Rabb confirmed that particle size was a key variable in leaching tests, first because of the critical relationship with the minimum permissible sample size, then as a factor both as to leaching rate and ultimate leachability. 200-300 pound barrel tests on samples crushed at least to minus 1" is one of the most effective leaching tests. He really prefers to crush to minus $\frac{1}{4}$ " for these tests as it speeds the extraction, facilitates comparisons between ores, and aids in the study of other key variables. Finer grinds should be used in testing smaller samples down to at least -100 mesh for bottle tests and fire assays involving 30-300 g. of ore.

Recoveries and Pretreatments

Mr. Rabb suggested that ores vary widely in their responses to leaching tests and that optimum economic results may be obtained at recoveries

of 20% or even less. The Tombstone ores contain precious metals in several forms which exhibit a wide range of responses to leaching. The manganese-rich components are typically refractory to leaching; acid pretreatments are not regarded as having practical potential in heap leaching for several reasons, such as the high quantities of acid required, e.g. 1000 lb/T ore, to react with the limestone, the formation of equally large quantities of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ which expand and stop percolation, the dissolution of heavy metals such as zinc, copper, iron, etc. and related environmental hazards.

Heap Preparation

The preparation of an impervious pad for the heap is of great importance. The use of clays is preferred over plastic sheeting because the latter is likely to get perforated during the loading process and involve hidden leaks. Desert sands tend to be porous and are to be avoided. Old tailings can be very effective if the grind is fine enough. The pad should be tested by impounding water over specific areas and measuring the seepage loss as a function of time.

The control of particle size in setting up the heap is an important consideration, but the cost of crushing and extra handling must be more than offset by improved recoveries. Penetration of fissures in rocks by leach solutions takes time and may be only partially effective. The leach solution must penetrate to the minerals, dissolution occur and then the reverse migration take place. Dissolved values after reaching the interstices may still be lost by precipitation or adsorption as the solutions percolate down to the pad. Thus excessive fines can aggravate losses and slow percolation. A heap of minus 1" to 2" is often a good compromise, but good results may be achieved with coarser material and longer leach times.

Dissolved air in leach solutions is essential to the dissolution of gold and some silver minerals, notably sulfides. Better results are often obtained with the use of shallow lifts. New small lifts are added as extractions begin to wane. Continued recoveries at reduced rates from the lower lifts may be achieved over long periods, sometimes for years. Good heap leaching is an art but is facilitated by effective metallurgical control. Mr. Rabb suggested that Charlie and Louis Escapule have perfected a good technique for the Tombstone area.

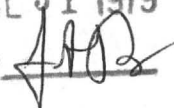
Mining Control

Ore sampling and testing is important both for outlining economic reserves and for separating ore from barren reject material during the mining process. A trained geologist with pertinent experience can usually recognize visually suitable feed material and is essential to this part of the project. Mr. Rabb suggested that Bailey Escapule, a recent graduate in geological engineering, would be ideal for this work. He might be able to suggest other recent graduates and help in finding qualified people for other jobs in the operation.

JGDean:fm



JUL 31 1979

By 

RECEIVED JUL 30 1979

July 24, 1979

2-58

Memo to: J. A. Briscoe, SEA; cc: THS, RFH

From : J. G. Dean

Subject: TEI Project. Preliminary Tests on Heap.

Dear Jim:

In accord with your suggestion for sampling the heap, we took one exploratory sample during our visit last week and carried it through an exploratory test procedure.

Dusty operated the backhoe with the objective of trenching a pit 2'x10'x10' deep. The sides tended to cave until the trench widened to 6-8', but we got a fair sample, split it with the backhoe and finally picked up about 500lb for transport in the scoop to the work area. This operation took about 30 minutes.

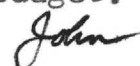
We then coned and quartered the sample on a plastic sheet, removing about 25% of plus $2\frac{1}{2}$ " pieces by handcobbing. The $-2\frac{1}{2}$ " material contained perhaps 40% $-\frac{1}{4}$ " and seemed a good mixture for percolation testing.

Approximately 200lb dry basis was charged to a heavy plastic barrell and leached by recycling 2lb sodium cyanide/T plus lime for 4 hours. The leach solution remained virtually barren as judged by the sodium sulfide test. It seemed quite definite that further leaching of this particular area of the heap would yield at best very marginal results.

We then broke up the $+2\frac{1}{2}$ " material with hand hammers until 10lb was reduced to about -1". The product did not contain many fines, perhaps 5-10% $-\frac{1}{4}$ "; it was leached by hand agitation in a pail. Within 30" we got positive silver dissolution estimated at 0.4Toz/T ore. This crude and preliminary test seemed to confirm the idea that there are recoverable values still present in the coarser pieces of the heap, but whether they are of any economic interest remains to be established.

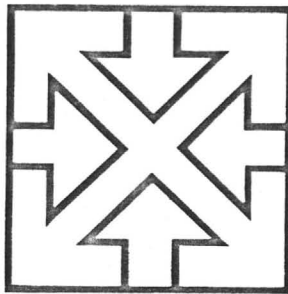
We also made a 200lb barrel test on material brought down from the area of the cut where we crawled into the addit for our discussion. Within 10 minutes of leaching we got a very positive test for silver and the solution soon corresponded to greater than 5Toz/T in the feed. In contrast to the heap, there seems to be every encouragement to develop at least a conclusive test program for the Contention dike area.

A well organized sampling and test program could be quite expensive and time-consuming. It should lead to data showing realistic cyanide leaching results which can be expected from the method to be used, as well as ore reserves, mining costs, etc. My general impression is that we will have to beef up our technical capabilities by orders of magnitude to do a conclusive job and that the economic success of the program can not be taken for granted. It seems particularly important at this critical stage to project both a clear plan and a realistic budget.



Consultants in:

- Hydrometallurgical recovery
- Heap and conventional leaching
- Precious and base metals
- Uranium/Vanadium
- Tungsten
- Worldwide Mobilization



TEW
Division of
Southwestern Exploration Associates

4500 E. Speedway, Suite 14
Tucson, Arizona 85712
(602) 795-6097



S.E.A. Hydromet, Inc.

August 9, 1979

Mr. Dusty Escapule
Nellie Cashman Apts.
Cottage #2
121 E. 5th
Tombstone, AZ 85638

Dear Dusty,

This letter is to confirm our conversation yesterday, August 8, 1979 with regard to the use of your 2 wheel drive, $\frac{1}{2}$ ton pickup by S.E.A. Hydromet, Inc. in its operations in Tombstone, Arizona.

S.E.A. Hydromet, Inc. has agreed to pay a rate of \$0.20 per mile and \$10.00 per day for use of this vehicle only while on the job. In keeping with this agreement, your obligation is to keep records of the miles traveled. This record keeping must be done on standard S.E.A. Vehicle Mileage forms which must be turned in to the S.E.A., Inc. offices in Tucson at the end of each month. It is from these forms that reimbursement is made; therefore, these must be accurate and up to date.

If the above is agreeable to you, please indicate your approval and compliance by signing below.

Sincerely,

Thomas E. Waldrip, Jr.

Thomas E. Waldrip, Jr.
Program Manager

Dusty Escapule
Dusty Escapule

Aug 11 1979
Date

:cmd
P-418

TOMBSTONE
July Summary Report

REVIEWED

AUG 7 1979

By JLB

Messrs. Briscoe, Lee, & Dean

There are two main assets on the Tombstone Development property. One is the heap and the other is the open-pit and underground ore yet unmined.

The heap still contains values in the following:

1. Fines that have not been leached due to blinding
2. Clays that inhibit percolation and lock values
3. Coarse ore that the leaching solutions can not penetrate
4. The manganese ore (iron & manganese locked values).

Previous work with the small dozer of Robert Cowans proved that percolation can be induced mechanically by dozing from the top of the heap and forming "thin" layers of 5 feet. The coarse rolls down ahead of the fines, which end up on or near the top of the lift. Use of a larger and faster dozer would allow pushing 30,000 tons per ton for heap leaching. Obviously, the fines are only going to be leached. However, by leaching the fines with the dozer-shallow lift method, cyanide can be used to recover some gold and silver values. Pre-treatment for the manganese ore could follow the construction of shallow lifts. Presently, all work is concentrated on the evaluation of the heap and open pit ore during July, with the following results:

<u>Surface Sample</u> <u>Location</u>	<u>Average Grade</u>		<u>Value (\$250/\$8)</u>		
	<u>Au</u>	<u>Ag</u>	<u>Au</u>	<u>Ag</u>	<u>Total</u>
Top of Heap	.014	.19	\$3.50	\$1.52	\$5.02
Contention Dike	.050	2.28	12.50	18.24	30.74

Based on results of cyanide leaching comparisons, as summarized above, Tom Schloss wanted to evaluate the open pit area.

Required for the evaluation of the Contention Dike area are basically geological mapping and sampling, followed by shallow drilling. Ore reserves and grade control are the resulting technical data obtained from an evaluation.

AUG 7 1979

EV 111

-2-

Test leaching of the Contention Dike proved an initial success from the point of view that the preg's were very high during the initial circulation. Also, it was shown in a barrel test designed by Dr. Dean that the ore from the top of the heap leached slowly and was not very high in values, while in 10 minutes the similar (230 #'s) test made on ore from the Contention Dike was saturated (+6 ounces silver per ton). All flask leach tests with cold cyanide show the same results; very fast dissolution of precious metals. Detailed metallurgical tests (barrel and pilot tests) will quantify these relationships.

Required to complete are:

- A. Crusher tests; leaching recovery for various screen sizes-optimum crushing size
- B. Brushing for geologic mapping and sampling
- C. Sampling of north end of the Contention Dike and elsewhere
- D. Finish testing of pilot ore on pad
- E. Set-up metallurgical testing (pilot/barrel)
- F. Prepare lab for shaking and atomic absorption
- G. Map compilation and plotting of geology and structure from old maps and reports.
- H. Surveying of sample sites-topo
- I. Assessment for 18 un-patented claims

Sincerely,



Richard F. Hewlett

AUG 7 1979

By LRB

August 1, 1979

State Department of Natural Resources, the BLM, the Arizona Bureau of Mines, etc..

Also, I am contacting as many "old timers" who worked in these mines and they have much information, and many have maps. I have not yet determined the best strategy to obtain copies of their maps.

Map sorting was done and study made of the various level maps and cross-section. Obvious are the following:

- A. Many maps of the Tranquillity, Empire area
- B. Some maps of the West Side, Toughnut, and Silver Thread.
- C. Few maps of the Oregon-Prompter, Bunker Hill, & Rattlesnake.
- D. No maps for;
 - 1. Contention Mine
 - 2. Little Joe Mine
 - 3. Grand Central Mine
 - 4. Lucky Cuss.

I am most interested presently in maps from the Contention Dike area. Could it be that Newmont bought no maps when they purchased the Contention-Grand Central-Lucky Cuss? Ownership prior to Newmonts aquisition could lead to the maps.

Sincerely,

Richard F. Hewlett

Richard F. Hewlett

REVIEWED

AUG 7 1979

By JLB

TOMBSTONE DAILY PROGRESS REPORT

August 1, 1979

Messrs. Briscoe, Lee, & Dean

Sampling of the north end of the Contention Dike is progressing, according to Jim Briscoe's procedure.

Dr. Dean believes that sodium sulfide (Na_2S) will help us to identify high silver zones. We are able to run between 50 to 100 samples per hour. However, it is very difficult to determine the silver value under .5 t.oz./ton solution. The procedure that I use is as follows:

- A. Pulverize ore or use "run of sample"
- B. Add 30 grams ore to flask
- C. Add 90 ml of warm NaCN ; we do not have a hot plate.
- D. Agitate for 30 minutes & filter
- E. Add 10 ml. of filtrate to a 100 ml beaker and add drops of 5% Na_2S solution. One drop gives a colormetric indication of over .5 t.oz./ton solution, but this is 1.5 t.oz./ton ore due to my solution dilution factor.

Note that at \$9/t.oz. silver, that the minimum level of detection using sodium sulfide is \$13.5 per ton ore. This is not even adequate for ore control, because our costs would be under \$5/ton ore. Also, the gold is not detected using sodium sulfide. Until the atomic absorption unit arrives and is set-up and working, some other test must be utilized. James Briscoe had some experience with a scintillometer using gamma ray bombardment. Radioactivity is measured based on the emission of light by certain crystals under impact by gamma rays. Jim Briscoe has found that certain gold-related minerals emit radiation, which must be further tested in order to determine if it could be a "ore-control" tool.

Two objects, a dozer and a reservoir, were used for local control for scale for the aerial photos being prepared by S.E.A. Photography. The largest scale map will be 1 in. = 20 feet, which is very adequate.

Mr. Vernon Dale, the State Mine Inspector (for our area) visited and RFH showed him our heap and open-pit area (Contention Dike). Vernon cautioned me on safety, and suggested to check the State Agencies for underground maps in the Contention area-in addition to geology and assay plans. Vernon suggested Mr. Jett of the

REVIEWED

AUG 7 1979

BY HHB

TOMBSTONE DAILY PROGRESS REPORTS

August 2, 1979

Messrs. Briscoe, Lee, & Dean

Worked on Lithology and structural data for descriptions of rock units mapped and sampled in the rail-road cut area. Locations must be field checked.

Met with Bill Hight and Frank Gallup from 8:00 o'clock until James Briscoe arrived around 3:00, at which time we all went to inspect the 18 unpatented claims that belong to Tombstone Development Company.

Messrs. High and Gallup have bought for the Tombstone Development Company the Southern Pacific railroad right-of-way from the town of Tombstone (near 9th street) past the USDA quanset building, past the plant (east), through the Houghton claim, and around the south side of the hill SE of the Contention Dike and up to the Contention shaft (Pump Shaft). We inspected this area, and looked at the Contention Dike area. Appreciation for the need of large equipment to mine-load-haul the ore was recognized by Frank Gallup and Bill Hight.

Upon James Briscoe's arrival, High and Gallup went with us to look at the area southeast of the Contention Dike area where the 18 unpatented claims are located. RFH has previously directed the assessment when he was a general partner of '71 Minerals. Previous work has consisted of road-building, air-trac drilling (Watterson), and dozer cuts and trenches. Mapping by Beeder and his drill-hole results are not available through '71 Minerals.

Of most interest in the Tombstone Extension area is the alteration and the igneous intrusive. There are limited maps of the workings. Exploration under the cover between the Tombstone Extension area and the Contention could be very interesting for new ore body discovery.

Sincerely,



Richard F. Hewlett

TOMBSTONE DAILY PROGRESS REPORT

August 3, 1979

REVIEWED

AUG 7 1979

BY JH

MESSRS. Briscoe, Lee, & Dean

Vernon Dale, the mine inspector revisited today to inform us that he was removing our acid requirements.

The crusher is being made so it is portable, with Ernie Escapule's help. In addition, it is possible to get Ernie's ball mill working next week with the drive also from the V-8 auto motor that powers the crusher.

Brushing is being done to enable rapid mapping of the exposed rock faces.

The surface and underground maps are being studied for features relating to ore mineralization that can be incorporated with the mapping by James Briscoe and the aerial photo utilization for exploration planning.

Sample plotting continues and report writing.

Sincerely yours,



Richard F. Hewlett

REVIEWED

AUG 7 1979

By JAB

TOMBSTONE DAILY PROGRESS REPORT

August 4, 1979

Messrs. Briscoe, Lee, & Dean

O.C. Miller did not work, and Keith Scroggins worked a very brief period due to the bugs-nats that attacked while he was brushing. Brushed to date are the workings/cut from the north end of the Contention Dike to the Boom Shaft, and working over toward the Pump Shaft. To finish this job completely, and including the Flora Morrison down to the Little Joe and along the Contention Dike, another week is required (two men).

RFH spent the morning with the 1 inch = 20 feet photographs on the ground around the Contention Dike, locating all sample sites on overlays. This is not finished, as the correlation of higher silver samples (Na_2S), sample locations, geological mapping, etc. progresses with field checks very frequently.

August 5, 1979

Continuation of plotting, and field checking the locations was done today.

Also, there were some bad areas noticed Saturday along the Contention Dike, especially on the east wall close to the north end of the Dike exposure (glory hole) where the rock spalled on RFH and other larger loose slabs are obvious. Also, many areas do not have adequate exposure due to sluff, old dump material, etc.. The slabs and the un-exposed walls must be cleaned-up and made safe for sampling and mapping. Vernon Dale keeps pointing out that safety is our responsibility.

Sincerely,



Richard F. Hewlett

REVIEWED

AUG 7 1979

By JHS

TOMBSTONE DAILY PROGRESS REPORT

August 6, 1979

Messrs. Briscoe, Lee, Dean

Robert Cowan took the dozer and his other equipment that we were renting. He was promised his payment (over \$3,000) and was not paid last week. He was paid \$500 Monday morning, which is several days late and \$2500 short. Bobby Cowan is upset with our lack of payment, and I would not be able to ask him to use his equipment again, as he puts faith in the local people to get him his payments.

Moved into the '71 Minerals building, storing chemicals, etc., in the locked cage. We will use the office until this Friday, when the remaining portion of the "Gun Runners" equipment will be taken to their new building at Bisbee (bench and blueing tanks).

Talked to Al Watterson and he said that he had talked with Jim Briscoe on Sunday and that he was starting to work this coming Wednesday. Al will be a real important addition to our staff due to his experience in Tombstone with '71 Minerals and his wide practical experience in surveying and heap leaching.

Frank Molina, who previously worked for me underground at Tombstone (Goodenough-Toughnut-Empire-West Side) stated that his father would tell him of the high-grade gold mined from the 1st to the 3rd levels of the Contention. My best estimate is that we are 150 feet above the first level of the Contention Mine. Drift maps would help us direct our exploration.

Also, the Little Joe has high-grade ore starting on the 50-foot level (sampled by Carlos Raymundo) and Frank Molina leased there in the 30's.

I must contact John Beeder of Minerals Engineering in Denver to obtain his Tombstone maps and drill-hole results.

Sincerely,



Richard F. Hewlett

REVIEWED

AUG 7 1979

By 412

TOMBSTONE DAILY PROGRESS REPORT

August 7, 1979

Messrs. Briscoe, Lee, & Dean

Tom VandenBrock said that the "Briscoe Apartment" would be finished today (painting, etc.) and that it can be occupied on Wednesday. It will be furnished and rents for \$140/month.

Sample storage is being organized in the red building that was previously a repair parts shop. Until there is enough of the 71 Minerals building available, numerical storage for the sample sacks must be accomplished so that rapid retrieval of any sample number can be made and either geological, metallurgical, or assay data obtained.

Will go to Tucson for a meeting with Jim at 4:30 PM.

Working on reports.

Sincerely,



Richard F. Hewlett

Copy For TEW

To: Tom Schloss, Dwight Lee, FAMCO
From: James A. Briscoe
Date: August 9, 1979

RE: Daily Progress Report Tombstone Project, 8/8/79, Cochise County, Arizona

In the morning preparations were made for JAB and TEW's (Thomas E. Waldrip, Jr.) departure for Tombstone. This included gathering of equipment, maps, checks from the Accounting Department for payroll and for suppliers and subcontractors who had previously done work at Tombstone.

Five thousand dollars was confirmed as having arrived from New York to the Tombstone general account that morning - transmitted by Dwight Lee at the request of JAB. An itemization of these checks was mailed 8/8/79 in the morning with the previous day's report.

As mentioned in yesterday's report, Mr. Richard F. Hewlett was terminated from project management on 8/7/79. At approximately 10:30, JAB and TEW departed for Tombstone. At approximately 12:15, JAB and TEW met Dusty Escapule and spent approximately 1/2 hour with him in the Wagon Wheel Cafe discussing RFH resignation and management change. Dusty Escapule enthusiastically received this news and indicated a willingness and enthusiasm to work with JAB and TEW. He indicated that increased cooperation from Ernie Escapule and Messers Charlie and Louie Escapule could also be expected.

A chain of command was established with FAMCO at the top flowing through JAB then to TEW then to Mr. Al Watterson and to Dusty Escapule and others who might be employed as the project progresses. It was explained that detailed time records, budget projections, cash record and short, concise, meaningful daily reports would be required.

Various aspects of the mining and metallurgical operation were discussed and after these have been more thoroughly reviewed by all parties at the site, as well as discussed with Dave Rabb and compared with the experience of the State of Maine mining operation, specific suggestions will be made.

However, briefly and most importantly on these suggestions are as follows:

1. Substantial danger may exist from open stopes below the Contention open cut. Extreme hazard may be involved in driving heavy equipment across the Glory Hole Area. At this point no one is sure how to alleviate this danger but working from the side of the cut with a long reach backhoe is probably the most viable. Safety considerations must come first in this operation.

2. The sides of the cut are raveling and slabby because of its echelon and parallel vein structure. This causes dangers from overhangs and falling of several pounds to several tons and possibly several tens of tons. A substantial rock fall could cause death or injury. The sides must be slabbed down or barred down by some method. Some work has been done with the small Ernie Escapule backhoe, but this is inadequate to the task.
3. Orientation sampling with smaller samples should be made prior to large barrel tests and still larger heap tests.
4. Mining the open cut by scraper is not appropriate because of;
a) the danger of falling into an open stope in the old Contention working, b) inability to selectively mine ore.

Dusty Escapule again indicated enthusiasm for the project and JAB reiterated that he expected complete honesty and candor in all relationships with Dusty as well as clear and concise constructive comments from him on all matters.

Dusty's truck is the only one being used at Tombstone and he indicated that he desired a formal method of compensation for its use. We agreed that \$.20 per mile and \$10.00 per working day would be agreeable - and I strongly recommend this be instituted immediately. Mileage is to be calculated only on business associated mileage - not personal mileage, and records will be kept on standard S.E.A. auto mileage forms.

We then inspected the S.E.A. office/apartment at the Nellie Cashman Apartments. It is still in the process of being painted but should be ready Thursday or possibly Friday. JAB and TEW as well as other personnel involved with the project will stay at this apartment in order to keep costs down and avoid motel charges. The rent is \$140.00 per month. A telephone will be installed in this apartment Friday as well as phone installation at the 71 Minerals Plant.

We then drove to the 71 Minerals Plant and inspected it and the inventory. Material has been moved from the Willet truck into the 71 Minerals Plant. The gun people are still in the plant but they must be vacated by Friday at which point we will have its complete floor space available to us. The value of this plant building is \$35,000 to \$40,000. Monthly rental from TDC is \$180.00 per month.

We then met Al Waterson at approximately 1:30 and I reviewed with him Dick Hewlett's resignation and asked whether he had any inseperable loyalties to RFH. He explained that they were close friends but that he understood the situation and this would not interfere with his work for the Tombstone Project. He indicated a willingness and capability to work with Dusty Escapule and I explained to him the needs for close record keeping and complete candor and truthfullness in all dealings with company personnel and associated parties.

Tom Schloss, Dwight Lee
August 9, 1979
Page 3

We inspected the brushing work being done by O.C. Miller and Norman Scruggin. This is being done in order that JAB can carefully and in detail map the geology in and surrounding the Contention open cut. This work can be improved and speeded up as it is not going as rapidly as I had anticipated. On Thursday we plan on getting a pitchfork and an extra saw as well as possibly a brush hook. We also anticipate paying Miller and Scruggin's on a job basis, (piece basis) rather than hourly in order to give them some incentive to wrap up the work. I anticipate this job will take until Friday to complete but it is critical so the mapping can be done in a careful efficient manner.

The remainder of the afternoon was spent in "fence mending". JAB, TEW, DE, and AW drove to the Robert Cowan Ranch which happens to be the largest in southern Arizona, and gave him a check for \$2,500.00. However, he had added up the time charts from the time clock on the bulldozer and found that we still owed him another \$875.00 (see Attachment 1). I said that I would get this to him next week so that he is fully paid. He also indicated a strong willingness to work with us in the future and he indicated that future transactions would be on a more formal basis with time cost estimates - informal written contacts, careful time keeping, and prompt payment for equipment usage.

We then drove back to Tombstone and stopped to visit the State of Maine mine area and the Escapule operations. We spent approximately 45 minutes talking with Louie Escapule. Charlie and Bailey Escapule had left for Tucson. Louie indicated a strong willingness to work with us under the new management situation. We inspected work that he had been doing with the new International Trackmounted hydraulic backhoe and found it to be very effective and a likely tool to use in mining operations in the Contention area. Its use would allow: a) selective mining of potential high grade streaks in the Contention ore, b) operations from a safe distance from underground workings which otherwise might result in loss of equipment and life.

Plans for Thursday, 8/9/79, were discussed with AW and DE. They will get together immediately in the early morning and itemize lists of necessary equipment, costs, and their concepts of a general operating outline. Both of these gentlemen have detailed experience with this type of operation and are capable of making this input. At approximately 10:00 Tom Waldrip will start working with them in order to get this equipment into a cash flow budget projection.

At 5:06 JAB and TEW left for Tucson in order to attend an AIME professional meeting and talk entitled, "Technology for Processing Low Grade Gold and Silver Ores" by George Potter, Mountain States Engineers. We arrived in Tucson at 6:39 and prepared for the meeting.

At the AIME meeting I talked with Mr. Dave Rabb regarding the situation at Tombstone and solidified our meeting for Friday morning, describing what we require of him. Mr. Potter's talk was then given. The information was quite timely and useful to our Tombstone Project and several new ideas were generated. We have a tape recording of Mr.

Tom Schloss, Dwight Lee
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Page 4

Potter's talk available for any interested personnel from the project or FAMCO. After the talk, I talked with Charlie and Bailey Escapule, whose equipment was featured in some of the slides. I informed Charlie of the ~~some of~~ the changes at Tombstone. He expressed great enthusiasm with working with me and expressed a desire to help in any way he could. He also expressed without my asking, his willingness to do AA assaying work for us. I also indicated that he could get delivery of a reconditioned AA unit from the middle west and if he could get an order from us he would fill out an order for four machines which should lower the cost to all parties. Approximate cost would be \$2,500.00 and these machines would be delivered by air freight. I highly recommend that we take Charlie up on this. If we do not obligate for this group deal - we can do it later at a higher cost on our own. I think the AA is absolutely vital to our work in Tombstone and feel that we should take advantage of this kind offer.

James A. Brisoe

JAB/mh
P-418

No 1455

FRONTIER EQUIPMENT COMPANY
P. O. Box 908 — Tombstone, Arizona 85638
Phone 457-3447 or 457-2283

Date Ordered _____

Completion Date 8/8/79

Sold To: _____

Tombstone Exploration

Ordered By: _____

☐ Bid Price

Materials Used

Cost

DESCRIPTION OF WORK

108 hrs at \$35
2 hrs 1 \$35

Dozer

3805.00

Grader

20.00

Backhoe

Other

\$3875.00

Credit 2 check
R.E.C. ch # 1021

3000.00

\$875.00

Mileage

TOTAL

Materials

Sales Tax

Finance Charge

Balance Due

\$875.00

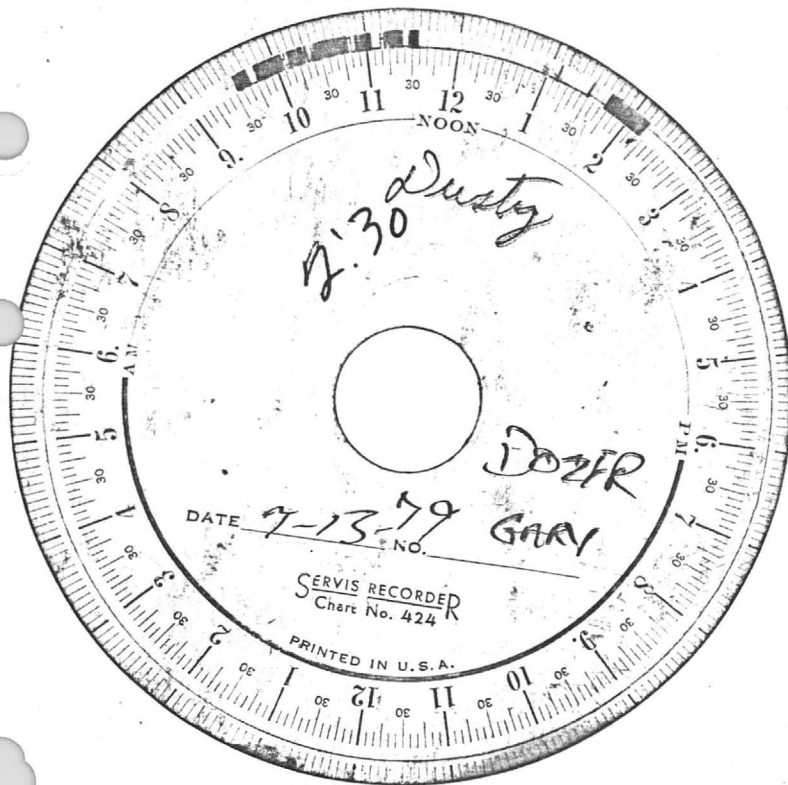
Total Materials Used

Sales Tax

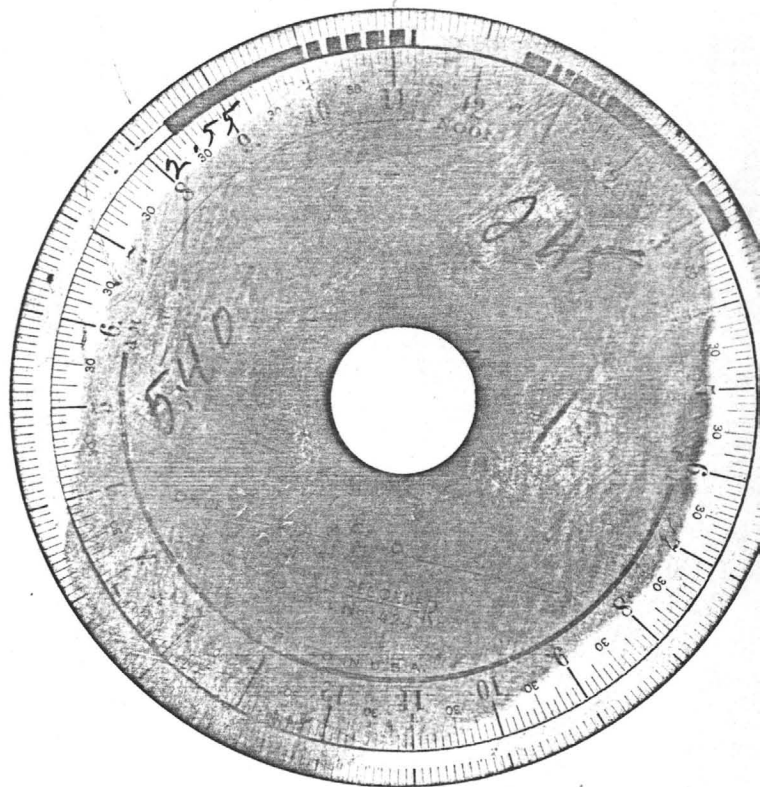
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AT
10
page 1 of 4

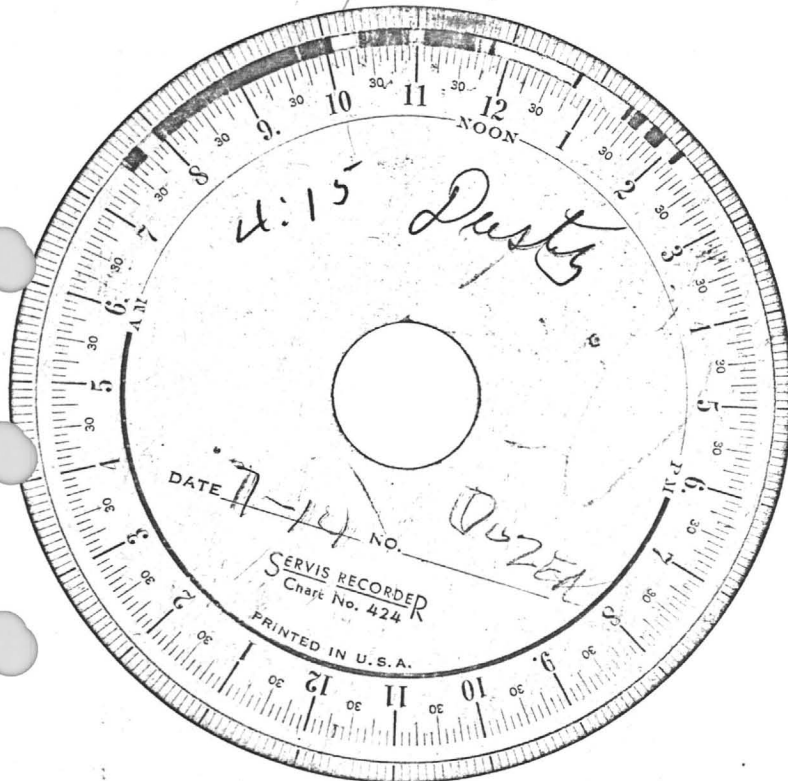
7/13/79



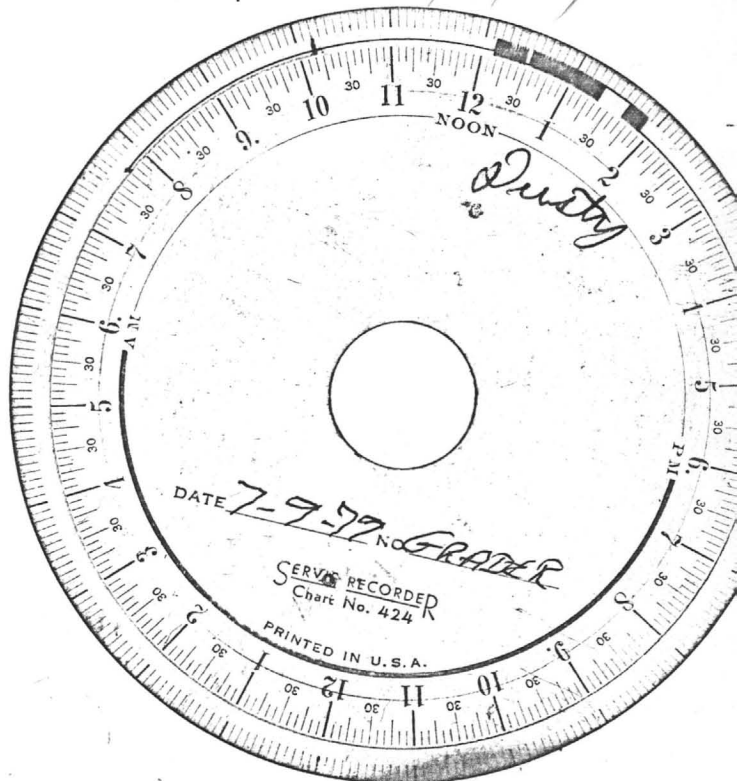
7/6/79



7/14/79

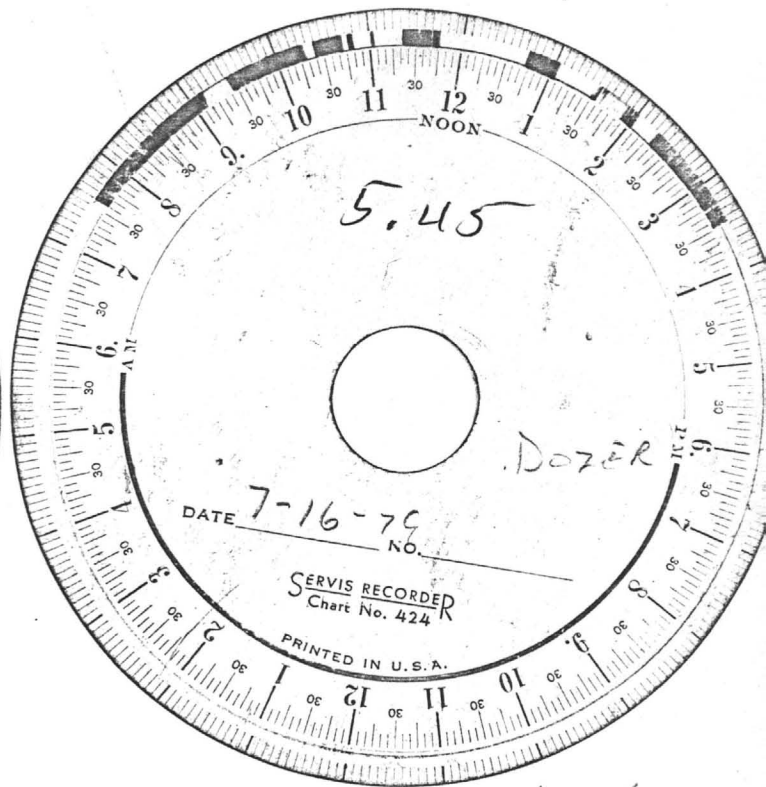
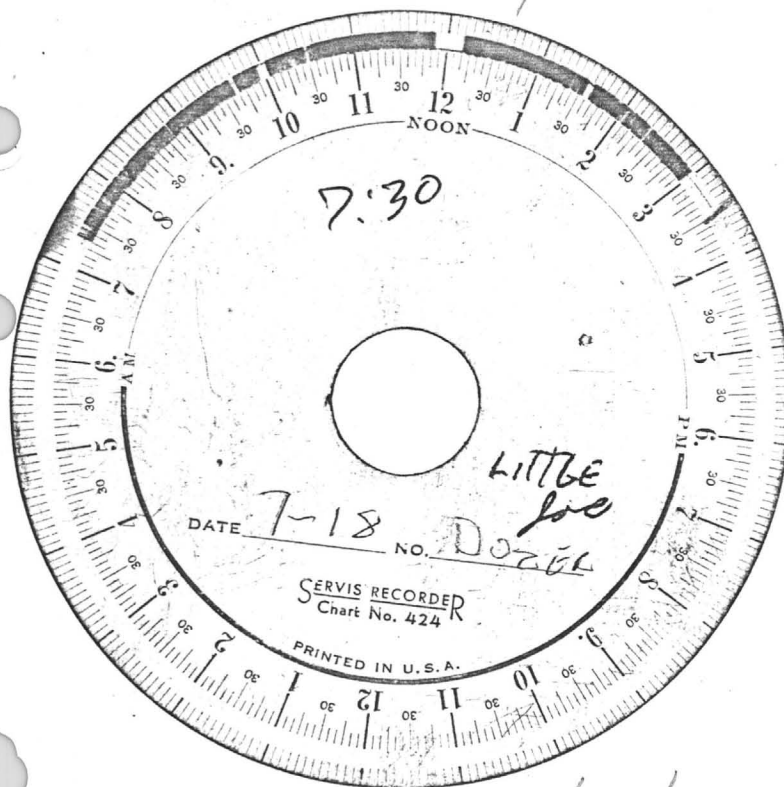


7/9/79



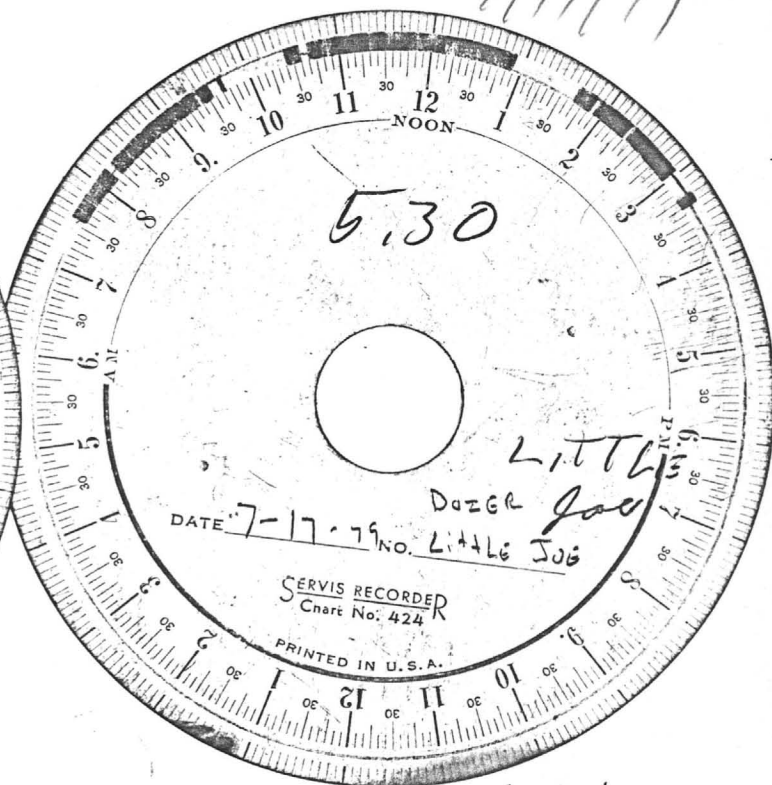
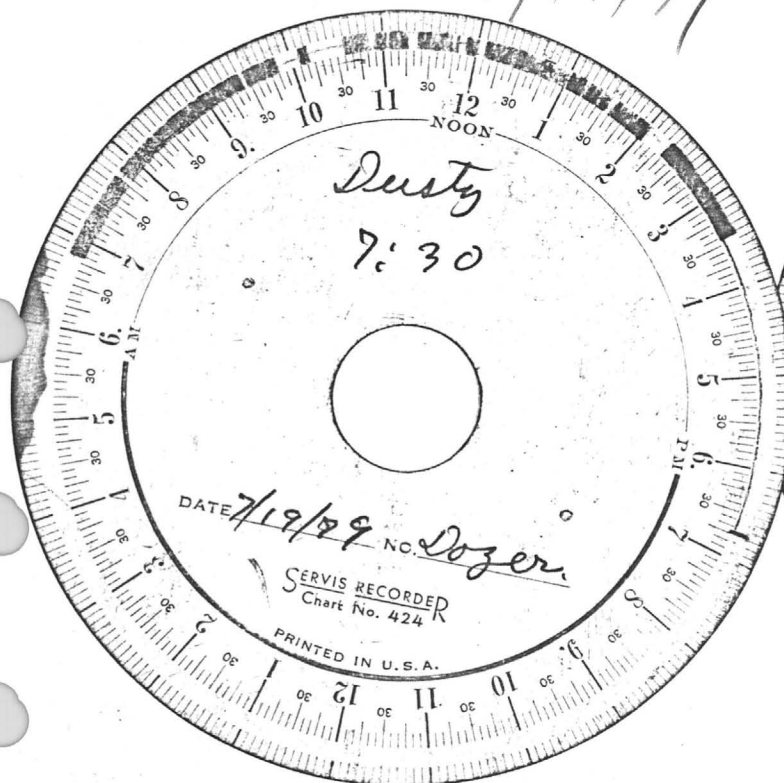
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AH 1
page 3 of 4
7/16/79

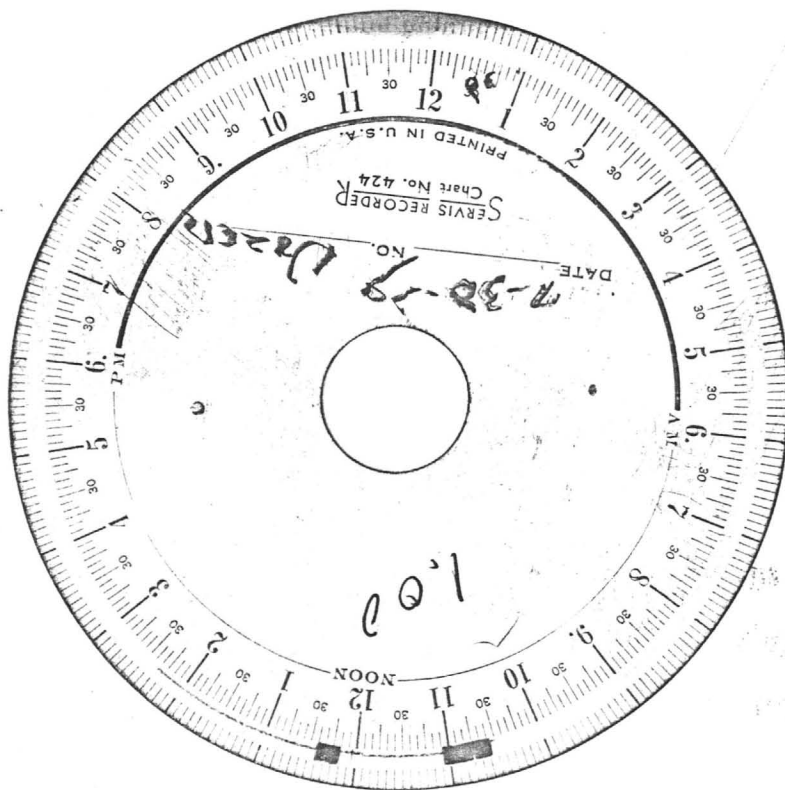
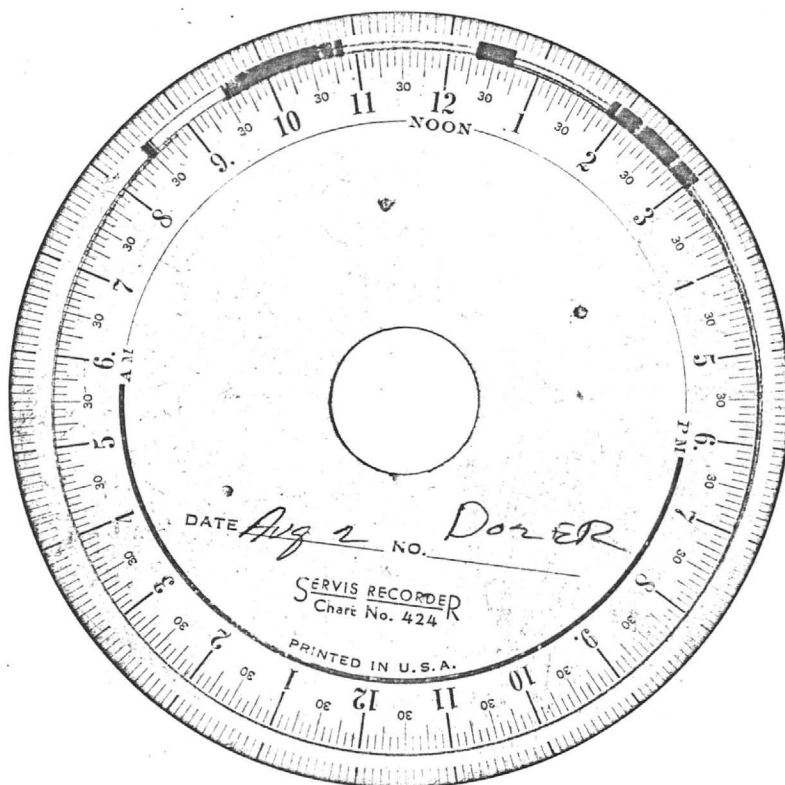


7/19/79

7/17/79



Att 1
 page 4 of 4
 8/2/79



8/30/79

isk 00-021. The date is Friday, August 10, 1979. Location is the State of Maine Mine, Escapool (ph) dump and heap leach operation.

TIME: MILEAGE: DATE: 08/10/79
PROJECT NO: 418 BY: JAB
FIELD NO: P-JAB-80-21; P-JAB-80-22; P-JAB-80-23

OFFICE NO:
STATE: ARIZONA COUNTY: COCHISE
AREA: TOMBSTONE
T: R: SEC:

FIELD PLOT:
COMMENTS:

Panning left to right shows the cyanide caustic soda makeup in the square tank with a pipe leading into the cylindrical tank which sits in front of the tin building. Cylindrical tank is the makeup tank with the filters in the tin building right behind the cylindrical tank. Photo 23 shows the pregnant solution pond with styrofoam pontoons. Suction pump is sucking up water at the rate of 60 gpm over about an 18" wide swath about 3' long and about 2" to 3" deep so that it is only picking up the surface chlorified water. The muddy solutions, therefore, stay on the bottom. *clarified*

TIME: 11:43 MILEAGE: DATE: 08/10/79
PROJECT NO: 418 BY: JAB
FIELD NO: P-JAB-80-24; P-JAB-80-25; P-JAB-80-26

OFFICE NO:
STATE: ARIZONA COUNTY: COCHISE
AREA: TOMBSTONE
T: R: SEC:

FIELD PLOT:
COMMENTS:

Southside view and northside view of the Escapool 300 tpd precipitation plant. Marrow (ph) coal (ph) type.

IME: 11:46 MILEAGE: DATE: 08/10/79
PROJECT NO: 418 BY: JAB
FIELD NO: P-JAB-80-27

OFFICE NO:
STATE: ARIZONA COUNTY: COCHISE
AREA: TOMBSTONE
T: R: SEC:

FIELD PLOT:
COMMENTS:

Looking south towards the Escapool dump which consists of the State of Maine Mine dump. The spray solution is applied with Robertson spray heads, adjustable so that they can spray either 360° area or a 45° area, and can be adjusted for fineness of spray and length of spray up to about 90 feet. This dump is small enough so that Rainbirds are the best way of applying the solution, though perforated pipe and/or wigglers could be used. In the left, upper portion of this slide is the George Juwet (ph) operation which lies just to the left of the Triple X Mine and in the upper right hand portion of the frame is the International hydraulic back hoe being operated on the Triple X dump by the Escapools. Seeing it is being leased from Modern Equipment Company. These heads cost \$4.50 each and spray 2-1/2 gallons a minute. These heads are available with different orifices in them, up to 4 gallons per minute per head which is what is being used here.

TIME: 12:04 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-80-28; P-JAB-80-29

DATE: 08/10/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

This is a small test plant that runs 65 gallons per ~~day~~ cost is \$~~3,750~~ Tankage requirements are met by 55 gallon drums.

TIME: 12:29 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-80-30

DATE: 08/10/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

The Escapool ^{w/a} barrel leach test in operation. The small barrels with 50#'s of fine rock or ~~other~~ rock.

mine run

TIME: MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-80-31

DATE: 08/10/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

View of the wrist shaker for quick cyanide test.

TIME: 12:46 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-80-32; P-JAB-80-33; P-JAB-80-34; P-JAB-80-35

DATE: 08/10/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Interior of the Escap^{n/c}ool precipitation laboratory
including the precip tanks and the Varian AA unit.

The date is Thursday, August 16, 1979. The location is Tombstone Mining District, Cochise County, Arizona.

TIME: MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-1

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

This is the northeast end of the Contention open cut and the location of the mine test, prior to any excavation work. In this frame the Escap^{n/c}ool Geodesic, John Deere C10 backhoe front end loader is working on the small dump on the northeast end of the Contention open cut. Al Waterson is the operator. The dump, which forms two prongs, has been flattened off with a bulldozer, and the backhoe has dug a sampling cut through the center of the dump. The backhoe is currently working on the northeast prong.

TIME: MILEAGE: DATE: 08/16/79
PROJECT NO: 418 BY: JAB
FIELD NO: P-JAB-81-2; P-JAB-81-3; P-JAB-81-4; P-JAB-81-5

OFFICE NO:
STATE: ARIZONA COUNTY: COCHISE
AREA: TOMBSTONE
T: R: SEC:

FIELD PLOT:
COMMENTS:

Photo 2 is A closer view of the dump sampling operation, while photos 3, 4, and 5 are additional views of this sampling operation.

TIME: MILEAGE: DATE: 08/16/79
PROJECT NO: 418 BY: JAB
FIELD NO: P-JAB-81-6

OFFICE NO:
STATE: ARIZONA COUNTY: COCHISE
AREA: TOMBSTONE
T: R: SEC:

FIELD PLOT:
COMMENTS:

Photo 6 is the same backhoe working on the north end, or entrance to the Contention cut, making a backhoe sample trench to be used in sampling, preparatory to the mining test this weekend.

TIME: 12:50 MILEAGE: DATE: 08/16/79
PROJECT NO: 418 BY: JAB
FIELD NO: P-JAB-81-7; GS-4031

OFFICE NO:
STATE: ARIZONA COUNTY: COCHISE
AREA: TOMBSTONE
T: R: SEC:

FIELD PLOT:
COMMENTS:

East side of the Contention cut, Tombstone Mining District. The photos that follow will be photos of samples taken at 20 foot intervals along the east side of the Contention open cut. They start with sample 4031 which is represented by this photograph. The orange line marks the location of the channel chip sample and wooden pegs mark the beginning and end emphasized by vertical orange lines painted on the face of the cut. This is

sample 4031. Backhoe trenching has covered up part of the sample location, but the rock here is, in part, Contention dike material and part shattered Bisbee Group sediments.

TIME: 12:52 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-8; GS-4030

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Sample 4030 from 20 to 40 feet; shattered Bisbee Group sediments.

TIME: 12:53 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-9; GS-4029

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Shattered Bisbee Group sediments with some porphyry material. Visible in this photograph is a shallow cross cut about 10 feet deep which probably represents a relatively high grade cross structure. Sample was not run into this crosscut, but was kept parallel to the face, simply started in rock essentially continuous with the material to the left of the cross cut.

TIME: 12:57 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-10; GS-4028

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Sample 4023. Again shattered Bisbee Group sediments. Note close-~~spaced~~ loose jointing at approximately right angle to the trend of the vein. Also, a fault structure is visible about half way between the south of _____ and the end stakes in the right hand portion of the frame. This fracture trends at right angles to the strike of the Contention vein.

TIME: 12:59 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-11; GS-4027

DATE: 08/16/79
BY: JAB

OFFICE NO:
STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Crosscut visible on the sides of the Contention open cut and this sample as well as strong fracturing in Bisbee Group sediments. In this area a large block of ground behind the crosscut has started to fall away from the open cut. General alteration and brecciation in this area as well as between the greatest width of the Contention open cuts suggests that ore values might be greatest here.

TIME: 1:01 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-12; GS-4026

DATE: 08/16/79
BY: JAB

OFFICE NO:
STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Again, a fractured Bisbee group sediment. Black manganiferous material can be seen in the center of this frame, directly above the sample site.

TIME: 1:02 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-13; GS-4025

DATE: 08/16/79
BY: JAB

OFFICE NO:
STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE
T: R:

SEC:

FIELD PLOT:
COMMENTS:

Again, brecciated Bisbee Group sediments.

TIME: 1:03 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-14; GS-4024

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Shattered Bisbee Group sediments.

TIME: 1:04 MILEAGE:
PROJECT NO: 418
FIELD NO: GS-4023

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Rock type changes in this sample at about 3 to 4 feet to the right of the sample start marker and is proceeding from left to right, or from north to south. Rock to the right of this point is Contention dike porphyry. Alteration consists of argillic to sericitic type alteration of the granodiorite porphyry which is cut by veins of quartz and black manganese oxide material. Veins parallel the face strongly in this area.

TIME: 1:06 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-15; GS-4022

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Rock type here is shattered Contention dike porphyry.

TIME: 1:07 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-16; GS-4021

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Again, Contention dike porphyry. In this case, much of the black material which is on the face is in the ~~planned~~ *plane* of a black manganese oxide-quartz vein cutting porphyry. Approaching the narrowest portion of the Contention cut and it is assumed that this material is lower grade than the previously sampled Bisbee Group sediments to the north.

TIME: 1:10 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-17; GS-4020

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Rock type in 4020 is shattered Contention porphyry with black manganese veins cutting it parallel to the length of the dike. In the upper right hand portion of the frame, there is a red paint number marked B-1. This is the entrance to a crosstrench which was probably dug in the 1930's or possibly earlier for sampling. At the end of this trench is a shaft which angles back towards the Contention open cut and is probably at least 200 feet deep.

TIME: 1:12 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-18; GS-4019

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

This photo shows the B-1 sample trench which is at the south end of sample 4019. This frame looks easterly at the cut.

TIME: 1:13 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-19; GS-4018

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again shattered Contention porphyry. In the upper right hand portion of the frame is another easterly-trending surface sampling trench.

TIME: 1:14 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-20; GS-4017

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again shattered porphyry being less altered in this area. Green and red sample marks in numbers are samples taken by RFH and ~~probably~~ have no significance. *here.*

TIME: 1:15 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-21; GS-4016

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE

COUNTY: COCHISE

T: R: SEC:

FIELD PLOT:
COMMENTS:

Again, this is shattered Contention porphyry. In the center of this frame is green paint number 3952. This is from an earlier RFH sample and has no significance here.

TIME: 1:16 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-22; GS-4015

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Again, shattered Contention porphyry. Rather poor alteration this area.

TIME: 1:17 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-23; GS-4014

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

GS-4014,
~~Note~~ Note in lower right hand portion of frame². Here the rock is also Contention porphyry. There is a definite break in alteration type about 5 feet to the right of the beginning of this sample number, ~~and~~ although the two alteration types were included together. This appears to be in part of the Contention fault zone and see rock, light colored, on which green sample number 2599 and 2593 are written, is substantially brecciated due to faulting. It may be necessary to take a separate sample of this material, although it is very thin, probably a few inches to a few feet in thickness.

TIME: 1:19 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-24; GS-4013

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again we have fault breccia in Contention granodiorite porphyry. Sample numbers 2597 and 2596 in green paint are visible in this space. They have no significance related to this sample.

TIME: 1:21 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-25; GS-4012

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Rock type as before, green sample numbers visible in this frame are 2595, 2594, 2593 and 2592. Again, they have no significance here.

TIME: 1:23 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-26; GS-4011

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

This crosses the fault zone^{seen} in the samples to the north and reenters what appears to be strongly altered Bisbee Group sediments.

This is the end of a series and the next sample in non-sequence and immediately to the south of sample 4011 will be sample 4040.

TIME: 1:27 MILEAGE:
PROJECT NO: 418

DATE: 08/16/79
BY: JAB

FIELD NO: P-JAB-31-27; GS-4040

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

This is immediately to the south of sample 4011. This is again faulted and fractured Bisbee Group sediments, possibly mixed in with some porphyry material.

TIME: 1:30 MILEAGE:

PROJECT NO: 418

DATE: 03/16/79

BY: JAB

FIELD NO: P-JAB-31-28; GS-4037

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Shattered Bisbee Group sediments. In the upper portion of this frame you can see a surface sampling trench dug at least in the 30's if not before. A 100+ foot shaft dug about 15 to 20 feet behind this face in the trench. Below the orange sample line, approximately where the sample is taken, breccia zone of sediments cemented with black manganese oxide and quartz forms what appears to be a high grade, rather tabular feature which will show more strongly in samples and photos to the south.

Disk 00-021.

TIME: 1:32 MILEAGE:

PROJECT NO: 418

DATE: 08/16/79

BY: JAB

FIELD NO: P-JAB-31-29; GS-4036

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Visible in this frame is a short adit, approximately 15 feet long that, according to Dusty Ecsapeel, his grandfather drove in the 30's. According to rumor he hand *cobbed* ~~copped~~ some material that went as high as \$1,000 per ton at that time. (Note this is an unvarified report). Green

paint sample 2573 is over this cut. Sample 4036 was taken along the orange line which is generally through the breccia zone.

Disk 00-021.

TIME: 1:36 MILEAGE:

DATE: 08/16/79

PROJECT NO: 418

BY: JAB

FIELD NO: P-JAB-81-30; GS-4035

OFFICE NO:

STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE

T: R:

SEC:

FIELD PLOT:

COMMENTS:

Again brecciated sediments cut by dike material. This sample contains dike material about half way through sample. This may require some additional sampling.

Disk 00-021.

TIME: 1:37 MILEAGE:

DATE: 08/16/79

PROJECT NO: 418

BY: JAB

FIELD NO: P-JAB-81-31; GS-4034

OFFICE NO:

STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE

T: R:

SEC:

FIELD PLOT:

COMMENTS:

Shattered Contention porphyry dike material.

Disk 00-021.

TIME: 1:38 MILEAGE:

DATE: 08/16/79

PROJECT NO: 418

BY: JAB

FIELD NO: P-JAB-81-32; GS-4033

OFFICE NO:

STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE

T: R:

SEC:

FIELD PLOT:

COMMENTS:

Shattered Contention porphyry material.

Disk 00-021.

TIME: 1:39 MILEAGE:

DATE: 08/16/79

PROJECT NO: 418
FIELD NO: P-JAB-81-33; GS-4032

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:

COMMENTS:

Shattered dike material. This is the last sample at the southerly entrance to the Contention open cut.

Disk 00-021.

TIME: 1:41 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-34

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:

COMMENTS:

This is looking northerly along the south entrance to the Contention open cut as of this date. Note sample 4032 in the lower right hand portion of this frame, and the orange sample line which defines the location of the 20 foot long each, chip channel samples taken by Bruce Prior (BMP) and John Kasprovicz (JDK). Again, the purpose of these samples is to gain a quick idea of what the average value along the face of the cut might be in cyanide soluble silver and gold. Additional more detailed samples will have to be taken as geologic mapping progresses.

Disk 00-021.

TIME: 1:44 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-35

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:

COMMENTS:

Looking northerly from approximately the center of the Contention open cut about 75 to 100 feet south of the narrow constriction point in the cut. The east side of the cut is to the right and the orange dayglow line

defines the location of the 20 foot channel chip samples mentioned above. The State of Maine Mine Inc. International payloader, which is being used to prepare for the mine test, can be seen at the north end of the open cut.

Disk 00-021.

TIME: 1:51 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-81-36

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Looking southeastly from the northwest side of the ^{the} Contention open cut. This frame shows Dusty Escapool operating the Robert Cowen Cat D6B bulldozer, preparing the haul road and starting place for the backhoe mine test to ~~being~~ Saturday, August 18, and to run through Sunday, August 19. *begin*

Disk 00-021.

TIME: 2:00 P.M. MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-1; GS-4041

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

We are starting on the south end of the Contention open cut on the west side. Sample 4041 is of strongly-altered Contention dike material, possibly intermixed with Bisbee Group sediments.

Disk 00-021.

TIME: 2:01 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-2; GS-4042

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

This is of shattered Bisbee Group sediments.

Disk 00-021.

TIME: 2:02 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-32-3; GS-4044

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

(Please note sample ^{sack} 4043 is missing and was not collected). Rock in this sample is in altered Bisbee siltstone. Note veins at right angles to the open cut which is of course at right angles to the Contention vein system, cutting the walls, particularly noticeable to the right of the sample bag at intervals of about 6" to 1 foot. Also we ran out of flourescent orange paint and had to go to red paint.

Disk 00-021.

TIME: 2:04 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-32-4; GS-4045

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Again, shattered Bisbee Group sediments.

Disk 00-021.

TIME: 2:05 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-5; GS-4046

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Again, shattered Bisbee sediments. Only aboutt half of this sample is exposed and the only part sampled is that which is actual bedrock.

Disk 00-021.

TIME: 2:06 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-6; GS-4047

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again shattered Bisbee Group sediments.

Disk 00-021.

TIME: 5:46 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-7; GS-4048

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Shattered and limonite stained Bisbee Group siltstone and sandstone--redbed material.

Disk 00-021.

TIME: 5:48 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-8; GS-4049

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again, shattered Bisbee Group redbeds, silt to sand-sized particles. This sample taken in the open cut near narrows.

Disk 00-021.

TIME: 5:49 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-32-9; GS-4050

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again, shattered Bisbee Group siltstone--sandstone--redbed facies. Sample taken just on the north side of the Contention narrows where it begins to widen to the north.

Disk 00-021.

TIME: 5:51 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-10; GS-4051

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again, shattered Bisbee Group ^{MnOx}sediments, veined with quartz veins, carrying black ~~mno~~x. (note from DEC operator. I don't know what is wrong with this particular tape, but I can't get the volume very loud and am having a hard time hearing--it appears to be the tape as last one didn't have that type of trouble.) (This is tape T25)

Disk 00-021.

TIME: 5:53 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-11; GS-4052

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE

SEC:

FIELD PLOT:
COMMENTS:

Again, Bisbee Group sediments shattered by Contention* vein. This photo shows good vein sheeting, consisting of quartz with associated black manganese oxides which probably carry silver.

Disk 00-021.

TIME: 5:55 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-12; GS-4053

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Shattered Bisbee Group sediments.

Disk 00-021.

TIME: 6:01 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-13; GS-4054

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

Shattered Bisbee Group sediments. Right below the sample site in this photograph is a contact with more intensely brecciated rocks below, which is not recorded in this sample, and less intensely brecciated and jarosite-colored rock above which was included in the sample. It is not clear whether this is a bedding plane or some kind of a structural ~~disconformity~~ ^{misconformity}, but since it appears to ~~be~~ cut across bedding, it may be more of a structural discontinuity than bedding plane.

Disk 00-021.

TIME: 6:04 MILEAGE:
PROJECT NO: 418
FIELD NO: P-JAB-82-14; GS-4055

DATE: 08/16/79
BY: JAB

OFFICE NO:

STATE: ARIZONA
AREA: TOMBSTONE
T: R:

COUNTY: COCHISE
SEC:

FIELD PLOT:
COMMENTS:

This sample is taken mostly in the lower, more intensely altered facies, although all of the rock in this space is Bisbee Group sediments. Directly above the sample bag #1253 is a breccia dike. Not clear whether this is a
4055

fault feature or something fluidized, but it appears more likely that it is of fault origin.

Disk 00-021.

TIME: 6:11 MILEAGE:

PROJECT NO: 418

FIELD NO: P-JAB-82-15; GS-4056

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE

T: R:

SEC:

FIELD PLOT:

COMMENTS:

Brecciated Bisbee Group sediments with moderate to strong limonite stain. Sample is taken about 9/10ths below the sub-horizontal contact above the red line and about 1/10th above that contact.

Disk 00-021.

TIME: 6:14 MILEAGE:

PROJECT NO: 418

FIELD NO: P-JAB-82-16; GS-4057

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE

T: R:

SEC:

FIELD PLOT:

COMMENTS:

Brecciated Bisbee Group sediments.

Disk 00-021.

TIME: 6:16 MILEAGE:

PROJECT NO: 418

FIELD NO: P-JAB-82-17; GS-4058

DATE: 08/16/79

BY: JAB

OFFICE NO:

STATE: ARIZONA

COUNTY: COCHISE

AREA: TOMBSTONE

T: R:

SEC:

FIELD PLOT:

COMMENTS:

Brecciated Bisbee Group sediments.



Office of State Mine Inspector

705 West Wing, Capitol Building
Phoenix, Arizona 85007
602-255-5971

REVIEWED

AUG 13 1979

By _____

HEALTH AND SAFETY INSPECTION REPORT

COMPANY NAME: SEA HYDROMETALLURGY
MINE/PLANT NAME: 71 Minerals Leach Dump
ADDRESS: P. O. Box 370
Tombstone, Arizona 85609

PHONE NUMBER: 457-3733 ID #:

INTRODUCTION: This report is based on an inspection made pursuant to Arizona Revised Statutes 27-124 and 27-128.

TYPE OF INSPECTION: SPOT DATE OF INSPECTION: August 1, 1979

INSPECTION #: 7

GENERAL INFORMATION:

EMPLOYMENT: 3

COMPANY OFFICIALS:

Richard Hewlett, General Manager

WORK SCHEDULE:

Hours per shift: 8
Shifts per day: 1
Days per week: 5

TYPE OF OPERATION: Dump Leach

NEAREST TOWN: Tombstone

PRINCIPAL PRODUCT: Silver

COUNTY: Cochise

INSPECTION PARTY: Richard Hewlett, General Manager
Vernon Dale, Deputy Mine Inspector

RECEIVED AUG 10 1979

cc: SEA HYDROMETALLURGY

6/79

James A. Briscoe - 4500 East Speedway, Suite 14, Tucson, AZ. 85712

0991

SEA HYDROMETALLURGY
71 Minerals Leach Dump
8/1/79

WITHDRAWALS: PRIOR INSPECTION OF MAY 30, 1979

Violations #1, #3, #4, #5, #6 and #7 from this inspection have been withdrawn.

NOTE: Violations were withdrawn because the metallurgical plans have changed and Mr. Hewlett has advised that no sulphuric acid will be used for probably six months.

COMMENT: At present a sampling program of the contention mineral structure is being carried out. If sample results are favorable, ore will be mined from an open pit and transported to a cyanide leach pad adjacent to the 71 Minerals Leach Dump.

It was recommended to Mr. Hewlett that he obtain all underground mine maps in the proposed pit area and draft an overlay of each mine level workings so that men and equipment do not drop into one of the old underground workings.

/s/ Vernon Dale
Deputy Mine Inspector

MEMO

TO: FAMCO

Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report

Thursday, August ⁹~~8~~, 1979

Tombstone employees, Mssrs. Al Waterson and Dusty Escap^{nik}ool spent the day in Tombstone working on Dusty Escap^{nik}ool's kitchen table since we do not have office facilities in Tombstone at the present time. They collaborated in devising a working plan and listing equipment required to institute that working plan which was in accordance with instructions discussed during our Tuesday, August 7 meeting.

Mssrs. Thomas E. Waldrip, Jr., (TEW) and James A. Briscoe (JAB) spent the day in the S.E.A., Inc. office preparing lists of equipment needed, getting catalogs and other price lists together as well as textbooks, reference books, and the basic working material. TEW was able to leave for Tombstone approximately 3:00 in the afternoon while JAB left at approximately 6:30 in the evening. The most significant event during the day was the telephone

call from Mr. Vernon Dale of the Arizona Bureau of Mines - the state agency that is charged with mine safety. He had, that morning, visited the Escap^{ed} operation at the State of Maine mine and had been informed that R. F. Hewlitt had been terminated. He immediately visited the Contention open cut with the intention of talking with me and found no one there as office work was being performed that day. He then called me approximately 3:00 in the afternoon reference PC # ⁷⁶ 7778. He was concerned because of the danger from potential cave-ins of large stopes which underlie the Contention area. He had visited the Contention area the previous week and left a report with ~~H. F.~~ ^{R. F.} Hewlitt stating that before any work should progress in the open cut, that we should obtain underground mine maps and survey in their location on the surface so that we did not inadvertently break into the large underground stopes and have both men and equipment disappear in these large workings. While Dick Hewlitt did verbally tell me that he had a visit from Vernon Dale, he did not forward a copy of Dale's report nor convey to me the intensity of Dale's concern for the safety hazard caused by the stopes.

I concur with Vernon Dale's concern and will place no more equipment in the Contention open cut until the exact position of the stopes can be ascertained.

At the open cut, O. C. Miller and Norman Scruggins continued brushing mesquite and cactus from the edges of the open

cut so that JAB can do a detailed mapping of the geology surrounding the cut.

A handwritten signature in dark ink, appearing to read "J. A. Briscoe". The signature is written in a cursive, flowing style.

James A. Briscoe

JAB/db

P-418

00-021

MEMO

TO: FAMCO
Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report
Friday, August 10, 1979

JAB, TEW, AW and DE met with Mr. Dave Rabb from the Arizona Bureau of Geology and Mineral Technology at the heap site at about 8:10 A.M. At about the same time the gun people arrived at the 71 Minerals Building which they were vacating completely as of that date. We spent a few minutes talking with them and then TEW, AW and DE started cleaning out the 71 Minerals Building, while Dave Rabb and JAB made a tour of the property. JAB first took Rabb up to the top of the heap and reviewed the situation there including discussing details of the problems encountered with R.F.H. Metallurgy--the acid pretreatment, whether there were still values to be recovered from the heap, and sampling techniques and metallurgical techniques which would be applicable.

JAB and Rabb then traveled to the Contention open cut where

about an hour to an hour and a half was spent in walking through the cut and associated sampling trenches, examining the rock characteristics and geology as they might pertain to mining and metallurgical problems. Rabb and JAB then returned to the 71 Minerals Building where it was found that the gun people wanted to tear down a lean-to structure that they had constructed on the east side of the building because we didn't want to pay \$400 they requested for its use. This resulted in a trip to the Tombstone Courthouse to talk with Tom Pitcher, who is the TDC Company's representative in Tombstone. We prevailed upon Col. Pitcher to talk with the gun folks, result being that the building was not taken down and we will have its use after some repairs have been made to it.

After leaving Pitcher's office, JAB, TEW, DE, AW, and Dave Rabb traveled to the State of Maine Mine area run by Charles and ^{Louis}~~Murry~~ Escap^{n/a}ool. We were given a thorough tour through all aspects of the Escap^{n/a}ool operation and received detailed descriptions of their operating and metallurgical procedures. The State of Maine Mine exploits veins which cut Uncle Sam porphyry which is a ^Laramide ignimbrite or welded ash flow tuff. Compositionally, it is very similar to the Schefflin granodiorite which is the igneous rock in the Contention dike area. Thus, the geology and metallurgy at the State of Maine has significant similarities to that anticipated in the Contention open cut.

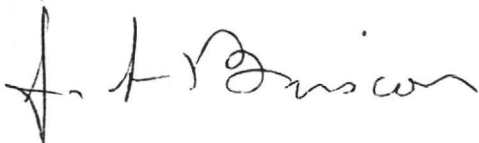
The Escap^{n/a}ool operation is very professionally done, even

though neither Charlie nor Louie Escapool has a formal education. They have spent over a year, probably more like two years, testing and perfecting their heap leaching techniques, metallurgical techniques and cyanide plant construction. Both plants, which in both cases use swimming pool filters rather than the traditional filter presses standard in past years for the Merrill - Crowe process. The plants come in two sizes: a small - pickup portable-size plant which will process 65 tons of solution per shift and costs \$3,750. The larger plant which can also be truck mounted, though requiring a larger truck, will process 65 gallons per minute, or approximately 300 tons of solution per shift and costs \$16,500. The small plant is very applicable for test work, or possibly leaching very high grade, carefully controlled leach pads, while the large plant is a production unit. Additional units of the large size can be added so that almost any rate of production can be obtained on a production heap. This unitized plant concept has the advantage of extreme reliability. That is, if one component in the plant breaks down, only one circuit is shut down for repairs while the remaining plant capacity is still on stream. The converse is true in a large capacity plant with only one circuit, since if one component breaks down, the entire plant is out of commission until that component is repaired. Using multiple Escapool^{h/e} units to obtain a large volume of solution throughput negates the possibility of a major plant shutdown, and also makes it unnecessary to keep a large stock of emergency spare parts or to go to heroic measures to get spare parts if a plant breakdown should occur. It is almost an ideal

way of increasing plant capacity incrementally and at a low capital expenditure. Considering the ease of operation and research that has gone into these plants, they are quite inexpensive.

Charlie and Louie Escap^uool are going out of their way to make all of their facilities available to us at a very low cost, and are willing to make all of their information available at no cost. We could not ask for better treatment nor hope to be able to work with more pleasant, honest individuals than these two gentlemen.

JAB invited Charlie and Louie Escapool for lunch with the group and after lunch, lasting from approximately 1:00 until 2:00 P.M., JAB and Dave Rapp and Al Waterson discussed metallurgical factors on the heap, and in the Contention open cut in relation to Escap^uool's operation, and their willingness to allow us to use their facilities. It was concluded that there still may be potential in the heap, both for some initial releaching, though more probably in screening and crushing the unleached coarse material within the heap. At this point, the question of how to mine the Contention open cut without risk of dropping into an open stope was unresolved.



James A. Briscoe

MEMO

TO: FAMCO
Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report
Saturday, August 11, 1979

Starting at approximately 7:00 A.M., JAB and TEW started geologic mapping procedures in the Contention open cut.

At 10:00 A.M. TEW and JAB met AW and DE at DE's kitchen table to work out detailed price lists of equipment needed. After reviewing what was necessary, JAB left the three others at work--to visit Ernie Escapool^{nle}.

A visit with Ernie Escapool revealed that he is extremely unhappy because of a complex series of horse trading by RFH. Ernie Escapool^{nle} (DE's father) found that all of his various tools and equipment had been used by RFH on a no pay basis at RFH's convenience while Ernie was away in Mexico. The situation does not sit well with Ernie and his opinion is that we are even as far as accounts between us go, including our work on his crusher.

His crusher, ^{it} turns out, he will have to use in his new mining operation which he started the preceeding week in partnership with his father. Thus, the crusher will only be available to us at their mine site, not at our convenience.

We concluded our negotiation by my warranting that all future business with Escap^{nl}ool Geodisic (ph) would be conducted in a business-like fashion with written agreements and specific rental prices for all equipment--no complex horse trading, etcetera involved. At conclusion of this discussion of a rather complex situation, Ernie indicated a willingness to do whatever he could to give us a hand.

JAB then returned to the DE kitchen table conference to view progress and report that we no longer have the use of Ernie Escap^{nl}ool's crusher. After reviewing progress at the kitchen conference, JAB drove to the State of Maine Mine and found that operations had ceased there until Monday morning. JAB then went to Charlie Escap^{nl}ool's home.

A conference with Charlie Escap^{nl}ool ensued between 12:48 and 2:42. The conference was very amiable with Charlie Escap^{nl}ool indicating a great willingness to help us in any way that he could. He made various suggestions which were enthusiastically received by JAB. These include the following:

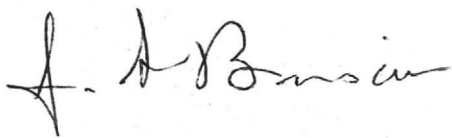
1. The State of Maine Mine will run all of our cyanide assay

(shaker tests) on orientation samples until we get our lab set up, on a toll basis. This will include crushing, pulverizing, splitting and cyanide shaker tests with AA analysis for gold and silver.

2. They will analyze all of our barrel test cyanide solutions on the AA, again giving us analytical results for gold and silver.
3. They are getting a crushing unit set up for their own crushing, and they will run crushing tests for us when this is set up in approximately three weeks.
4. They will not be using their International Harvester ~~track mounted~~ ~~frammatted~~ backhoe on the weekends and would be willing to have us rent it from them. Officially, we will contract for them to do the work. *because of their lease agreement with I.H.,*
5. They will be happy to build us a standard State of Maine large cyanide plant using all the components of ours that we have on hand. This should reduce our cost for the plant construction by \$1,000 to \$1,500.
6. They will allow us to use their International Harvester front end loader when they are not using it. Our charge on this loader will be \$25 per hour vs. their charge to anyone else using it of \$35 per hour.

While at Charlie Escap^{nle}ool's house, JAB met Gabriel Helvay, a German geologist to whom Charlie has leased two claims in the Tombstone District and sold a small cyanide plant to. Mr. Helvay's long range plans are to take this plant to Ajijic, Jalisco, Mexico where he has silver properties. However, he wishes to operate in the Tombstone District to gain experience with the plant where he can consult with the Escap^{nle}ool's. The claims that the Escap^{nle}ool's leased to him are surrounded by TDC ground, and he would like to work out some type of a deal where he could place a leach pad on TDC claims. It may be feasible and advantageous to have him do so and JAB will check further into the situation. It may be possible to trade him out of the use of his small plant until he is ready to start operations on his pad.

The remainder of the day was occupied with additional work with TEW, DE, and AW working out details of the coming mine test using the Escap^{nle}ool International backhoe.



James A. Briscoe

JAB/db

P-418

00-021

MEMO

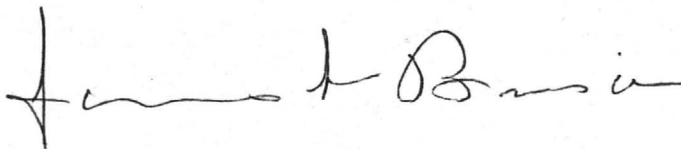
TO: FAMCO
Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report
Sunday, August 12, 1979

Heavy rains precluded the work at Tombstone. AW and DE were given Sunday, Monday and Tuesday off in anticipation of working the following Saturday and Sunday on the mining and leach test. Al Waterson, who just arrived last week, needed the time to get moved into his new home in Tombstone. JAB returned to Tucson on Sunday.



James A. Briscoe

JAB/db

P-418

00-021

MEMO

TO: FAMCO

Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report

Monday, August 13, 1979

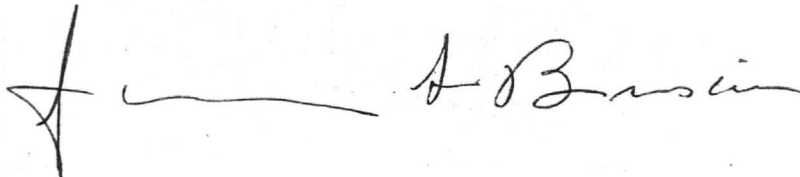
Al Waterson and Dusty Escapool off.

JAB made telephone report to Dwight Lee of FAMCO at approximately 8:45 Arizona time. Continued report from 9:30 to 10:41 Tucson time. Spoke with Dave Rabb of the Arizona Bureau of Mines regarding operations in Tombstone, at 11:15 to 11:24 reference TC-7787. Spoke again with Dwight Lee at 1:45 reference TC-7788. Again spoke with Dave Rabb 1:46 to 2:05 reference TC-7789. Conference call with Dwight Lee, the FAMCO office New York, Dr. John Dean in his New York Home, Dave Rabb of the Arizona Bureau of Mines at his office at the Bureau, and JAB at his S.E.A. Tucson office. Discussed previous week's work at Tombstone, the proposed mining and metallurgical test and procedures for additional test work. Everybody was in agreeance that if test work were carefully done, the mining test proposed by JAB using the backhoe

to reach over the edge of the Contention open cut

_____ to avoid problems with open stopes to proceed the
following weekend. *should*

TEW spent all day Monday working on running down prices for various equipment for a laboratory, making cost projections, laying out budgetary items, etc.

A handwritten signature in cursive script, appearing to read "James A. Briscoe". The signature is written in dark ink on a light background.

James A. Briscoe

JAB/db

P-418

00-021

MEMO

TO: FAMCO
Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report
Tuesday, August 14, 1979

Al Waterson and Dusty Escap^uool off.

JAB - telephone report and conference with Dwight Lee reference TC-7793, #819326 regarding mining test. Various tries to get in contact with the Escap^uools which were unsuccessful until contacted Charlie Escap^uool at 4:04 to 4:26 reference TC-7794. Found out the following:

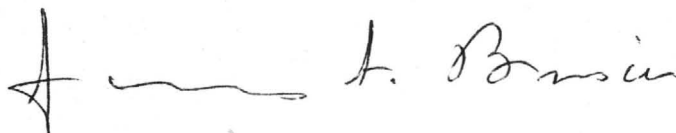
1. That his delivery date on a large plant--45 days because of parts availability. Cost is \$16,500 which includes all required tankage.
2. Small plant delivery is 30 days. Cost is \$3,750.
3. Charge on shaker test samples - \$6 per sample including all

crushing, grinding, splitting, cyanide dissolution and AA analysis for gold and silver from resulting cyanide solutions.

For AA determinations on our solutions from barrel testing, charge will be \$1.75. Charles or Louie Escap^{ule}ool will prepare procedure sheet on shaker test for John Dean.

4. We will be able to use the International front end loader for \$25 per hour whereas they are renting it to everyone else for \$35 per hour.
5. They will charge us \$20 per hour for the backhoe, including fuel and Charlie Escap^{ule}ool offered to run the backhoe.

Two additional phone calls from Dwight Lee reference TC-7799 and TC-7800 regarding future in long range of the Tombstone project. JAB suggested that best future potential was for discovering high grade underground ore such as had been mined in the past, but that substantial ^{could} ore should be discovered in the Contention area. _{open pit}



James A. Briscoe

MEMO

TO: FAMCO

Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report

Wednesday, August 15, 1979

At Tombstone AW and DE start work - gather together equipment needed for preliminary work in preparation for weekend mining test. This includes Robert Cowen (ph) D6B Catapillar bulldozer, road grader to be used in preparing the roads for the trucks, Escap^{ule}ool Geodisic (ph) backhoe to be used in sampling the dump on the N.E. side of the Contention Cut. that must be moved and also in backhoe trenching in the open cut area, and State of Maine Mine, Inc. International front end loader to be used to repair the test leach pad and to off load previously tested rock to make room for this weekends mining test material.

Tucson: TEW spends the entire day running down equipment, working on price lists, etc. in preparation for this weekend's test. JAB telephone conversation with Dwight Lee reference TC-7802, 6:37 through 6:54, review work at Tombstone with Dwight

Lee and pass on the Mountain Bell phone number Douglas so that he can pursue arrangements for telephones on the Tombstone project. Between approximately 7:00 and 8:00 A.M. preparation for departure to Tombstone is undertaken. At approximately 8:00 A.M., JAB departed for Tombstone in one Blazer while BMP and JDK also departed in a second Blazer. Arrival in Tombstone at 9:36.

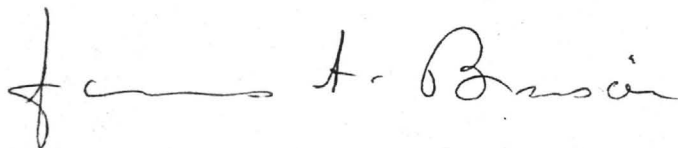
Reviewed open cut procedure with AW. Then spent the time from approximately 10:14 through 12:12 instructing BMP and JDK in sample collection procedure. The sample procedure used initially is as follows:

The objectives of this first sampling campaign is to get a general idea of the tenor of rock exposed on the east side of the Contention open cut. Therefore, a 300 foot cloth surveying tape was layed along the east side of the Contention open cut and assay samples were taken by the channel chip method over 20 foot intervals, irrespective of rock or structural changes. The method used was to take a geology pick and chip fragments in a continuous chip sample into the cloth sample bag which holds approximately 8 to 10 pounds of material. The sample sack was filled completely full and tied securely. Then a plastic rep sample sack with the same number was filled with an adequate number of representative chip samples for later geologic reference. The location of the chip sample was marked with orange fluorescent spray paint and the ends were marked with wooden pegs with metal

embossable tags with the sample number on them. The Contention open cut was found to be 590 feet long so that approximately thirty 20 foot channel chip samples will be required from each side of the cut. It is realized that this samples parallel the structure exposed in the cut, but later surface backhoe cuts will be made at right angles to the Contention vein structures for samples at right angles to the cut. Samples taken along the cut will give us some indication of the tenor of the vein system along its length.

A check was delivered to State of Maine Mine, Inc. in the amount of \$500 for analytical work.

The remainder of the afternoon until 4:00 was spent in getting some paycheck problems straightened out and one telephone call reference 7805 was made to Dwight Lee in New York confirming order of \$6,200 in expense money and lack of success in negotiating for a reduced rate from the telephone company.



James A. Briscoe

PJAB/db
00-029

MEMO

TO: FAMCO
Mssrs. Tom Schloss and Dwight Lee

FROM: J. A. Briscoe, Southwestern Exploration Associates

DATE: Wednesday, August 15, 1979

SUBJECT: Project 418 - Tombstone Project, Daily Report
Thursday, August 16, 1979

Tucson

TEW continues with paper work and purchase of necessary equipment for Tombstone barrel test lab setup, and required first aid material to meet EMSHA requirements. This required entire day, running around picking up various supplies.

Tombstone

People on the job in Tombstone included JAB, Bruce M. Prior, and John Kasproicz, geologists from S.E.A., Inc., Al Waterson, and Dusty ^{Escapole} Escapool, project employees.

BMP and JDK continued sampling the periphery of the Conten-

tion open cut on 20 foot intervals, using standard sample sacks containing approximately 8 to 10 pounds of rock. Again, these are ~~grid~~^{drift} samples paralleling the elongation of the Contention dike and fault system. At about 2:30 this afternoon, approximately 30 of these samples were delivered to the State of Maine Mine for crushing, pulverizing, and shaker cyanide tests analyses. Unfortunately, a power switch over to three phase power is underway at the State of Maine operation and they will be without electricity until about Friday noon. Thus, little progress can be made on the samples. The most important samples, approximately five in number from the northeast side of the Contention cut will be pulverized by hand and the analyses returned to us about noon tomorrow. However, most of the samples will not be ready until Monday.

The main task for the day, aside from sampling, was getting the leach pad prepared for the mine test and preparing the northeast end of the Contention open cut for the backhoe mining test.

Dusty Escap^uool spent the day in the following manner:

Used the State of Maine Mine International front end loader to off load the last leach test from the test leach pad and set it to one side. He also repaired the backhoe cuts in the leach pad that were placed to test for leakage in the pad. The pad was then repaired. Dusty spent the remainder of the day preparing the haul road from the northeast end of

the Contention down to the test leach pad. This will require a graded road in order for the trucks to operate efficiently and for this to be a valid mine test. The bulldozer Cat. D6B was used to dig down to bedrock through soil cover in the northeast edge of the Contention open cut for a truck turnaround, and also for rock sampling to determine how wide the mineralization is along the Contention open cut. The bulldozer could approach no closer than about 20 feet from the edge of the cut because of the danger of cave in and the loss of the bulldozer and its ^{operator} driver. The afternoon was spent in this endeavor, and apparently mineralized Bisbee Group sediments were exposed for some distance back to the east from the edge of the Contention cut.

Al Waterson performed the following:

1. Put a backhoe sample trench through the dump on the ~~west~~^{east} side of the Contention cut. This dump will have to be moved to allow mining along the cut, and we believe that it may be of ore grade material. Thus, the backhoe cut through the dump, in order that ~~drill~~^{barrel} test samples could be taken to determine the leachable gold and silver content of the cut.
2. Backhoe cut from the north end of the Contention open cut along the trend of the Contention vein to approximately 60 feet north of the cut. This area may contain mineralization that could be mined in the mine test. BMP and JDK will take

channel chip samples of this backhoe cut on Friday. If these are positive, barrel test samples will then be taken.

3. After lunch, Al Waterson, using the S.E.A., Inc. transit, surveyed in the perimeter of the Contention open cut, as well as the top of the Contention open cut. This will allow us to calculate exact volumes removed and determine where the original edge of the cut was after it has been mined. This was necessary for assaying and mine control work.
4. The late afternoon Al Waterson operated the Escapool^{ule} Geodesic backhoe to remove overburden from the northeast edge of the Contention open cut. It was too close to the edge for the bulldozer to get, in preparation for the open pit mining operation.

JAB performed the following work during the day:

1. Supervision of sample collecting, and lining out work for the various members of the crew. Spent an hour discussing various equipment with LEM^{Robson} of Modern Equipment Inc. LEM described the various mining equipment available on the lease purchase plan from Modern Equipment and the mining rates of the various sized backhoes that are available were discussed, as well as other approaches that might be used in mining the Contention open cut area. LEM suggested the use

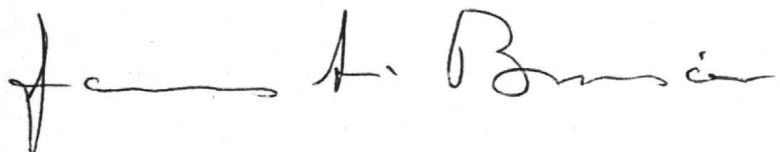
of a large front end loader as a load-haul-dump unit to transport material from the Contention open cut area to the leach pad. In this manner, only one piece of equipment will be necessary for both mining and hauling until distance necessitated ore trucks.

2. JAB photographed and dictated notes on each sample site and then transported the samples to the State of Maine Mine lab. A tour was taken with Charlie Escap^{ula}~~ool~~ to examine the results of the backhoe work over the last day or so ^{because} ~~as~~ the type of rock and type of operation is applicable to our mine test at the Contention open cut.
3. Geologic examination of the bulldozer cuts on the northeast end of the Contention open cut, as well as further sample description and photography and supervision of the sampling operation occupied the remainder of the afternoon.
4. JAB returned to Tucson, leaving Tombstone at about 7:30; arriving Tucson at about 9:00 P.M.

At this point preparation for barrel testing, and the progress of sampling is approximately a day behind schedule. Because of the importance of leach testing before any mining commences, it was the concensus opinion that the mine test should be postponed until the following weekend. This weekend will be

occupied in cutting some additional sample trenches using the large backhoe and finalizing and putting into operation barrel tests.

Crew including JAB, AW, DE, and TEW, will work Saturday and Sunday in order to accomplish necessary ⁵trampling and barrel test prep. AW and DE, will take Monday and Tuesday off and be ready to continue work on Wednesday through Sunday in order to accomplish the mine test and test leach operation.

A handwritten signature in dark ink, appearing to read "James A. Briscoe". The signature is fluid and cursive, with a long horizontal stroke extending from the first name.

James A. Briscoe

JAB/db

P-418

00-021



RECEIVED AUG 15 1979

Office of State Mine Inspector

705 West Wing, Capitol Building
Phoenix, Arizona 85007
602-255-5971

REVIEWED

AUG 17 1979

By 4/12

REPORT OF VISIT

COMPANY NAME: SEA HYDROMETALLURGY

MINE/PLANT NAME: 71 Minerals Leach Dump & Contention Dump

ADDRESS: 4500 East Speedway, Suite 14

Tucson, Arizona 85712

PHONE NUMBER: 795-6095

ID #:

TYPE OF OPERATION: Pad Leach

NEAREST TOWN: Tombstone

COUNTY: Cochise

NEAREST MILEPOST: 315.6

VISITED BY: Vernon Dale
Deputy Mine Inspector

DATE OF VISIT: August 9, 1979

COMMENTS: Richard Hewlett, Gen. Mgr., has resigned from the company. South-western Exploration Associates in Tucson are presently doing feasibility studies on the operation. I called James Briscoe, President of S.E.A., to advise that if an open pit operation is planned, underground maps of the old Contention operation must be obtained and overlays made for each level. Danger areas to the open pit operation can then be spotted and staked out on the surface. I requested the Phoenix office to mail Mr. Briscoe a copy of the last inspection report. There was no one on the property at the time of this visit.

cc: James Briscoe ✓

6/79

APPROVED

AUG 20 1979

By AB8-17-79
RECEIVED AUG 20 1979

Jim.

I thought you might
want to put this in
your file on T Stone.

Thanks so much for the
time you spent with
Frank Gallup and I
when we were in your
office 1st of mo.

Hope you are getting things
going the way you want.

Thanks

Bill Hight

REVIEWED

AUG 20 1979

By AB

Confidential

J. Q. Brasure

August 17, 1979

Mr. Dwight Lee
FAMCO, Inc.
1700 Broadway
New York, N. Y. 10019

Dear Dwight:

In accord with your request, I have reviewed background developments relating to our working arrangements with the main objective of proposing a new plan which might better meet the the changing circumstances of the Tombstone project.

In April at the start of the project, I submitted one of our standard Agreements covering a consulting arrangement with FAMCO, WITH A per diem of \$300 per day plus expenses. In June Tom submitted a counter proposal incorporating most of the previous paragraphs, but shifting the agreement to TEI with consulting to Richard Hewlett.

On June 19, Tom and I went to Tombstone to observe the progress of Dick's thiosulfate leaching of the heap. It gradually became apparent through tests we made, confirmed by the small yield of metal, that this program was not working and possibly was not based on sound concepts or adequate lead information.

It, of course, became very apparent under these clouded conditions that it would not be in the best interest of FAMCO for me to consult to Dick, when the very urgent need was for me to check his chemistry and leaching plan. It became equally clear that my working agreement should not be with TEI when its very foundation was threatened.

We then went into a phase of very intensive night and day work even through the weekends to check Dick's acid pretreatment, thiosulfate leach, zinc precipitation process without deaeration, and confirmed that it was unlikely to work. We also began intensive work on cyanide leaching of independent samples in order to develop a new program of promise.

It soon became obvious that my time was urgently needed far beyond any provision in the previously drafted Agreements. We evolved an interim plan under which I would bill for out-of-office time at \$300 per day and for half the time worked here, with the balance being carried forward for a possible participation interest. This plan was used for the June and July statements; I also agreed to reduce my time to a practical minimum

D. Lee

2.

Aug. 17, 1979

Perpetual Union Skin
during August while Tom was away. In view of the critical problems which you are having to face, this plan has seemed to require some flexibility with another critically important trip to Tombstone under day-by-day consideration.

During this second critical phase when my continuing help promises to be very important, it still seems essential that I report to you and Tom and that we work cooperatively in a framework of friendly trust and assured financial resources. A working agreement or stock interest in a corporation "of convenience" would not be in harmony with the requisite personal relationship for effective, bluntly honest and dedicated effort.

My suggestions, based on this review are as follows:

1. My statement for July is in accord with the plan used and accepted in June, and projected for July in my letter of July 2 to Tom. Prompt payment through whatever account best meets your requirements is respectfully requested.
2. At the earliest possible moment, but certainly before another trip to Tombstone, please outline a definite working plan which will forestall misunderstandings during this critical interim period.
3. We should very soon be able to project a sound plan for developing the seemingly considerable resources of the Tombstone area and this should pave the way for developing a working agreement involving reduced fees and an equity interest. I shall look forward to cooperating in every way I can with a sensible and effective arrangement of this type.

Sincerely,



John G. Dean

JGD:bm
Encl.

DAY/TIMER

Time Saver

LETTER

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712

(602) 795-6097

IN REFERENCE TO:

P-418 Tombstone
project. Daily ReportsFIRST CLASS MAIL ☒ INTER-OFFICE ☐

FOR

Mr. Dwight Lee, President
FAMCO

HOW TO USE THIS

DAY/TIMER

Time-Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail
the white copy to us and keep the pink copy for your files.
You'll save time and effort, and we'll have your answer
much faster! Thank you.

MESSAGE

REPLY

FOLD

DATE

8/18/79

Transmitted herewith are:

DATE

FOLD

1. My daily reports for Aug. 9
- 16, 19792. Two state mine inspectors reports
for Aug. 1 & Aug. 9, 19793. JAB dictated photo & sample
notes from the contention open
cut 20' drift-channel-chip
Samplescc: John Dean
Tombstone Office

SIGNED

JAB

SIGNED

DAY/TIMER

REORDER FORM No. B2419L, DAY-TIMERS, Allentown, Pa. 18001

State of Maine Mining Company

P. O. BOX 453
CHARLES ESCAPULE

TOMBSTONE, ARIZONA 85638

PHONE 457-3601
LOUIS ESCAPULE

August 21, 1979

Southwestern Exploration Associates
4500 E. Speedway, Suite 14
Tucson, Arizona 85712

Dear Sirs:

The following is an explanation of the method used on the
Shaker Tests.

Entire sample crushed to $\frac{1}{2}$ " and quartered down to
approximately 100 grams. This 100 grams pulverized
to 20 mesh fine.

42 grams pulp
42 milliliters .05% cyanide solution
.05% caustic soda

Put on shaker for 30 minutes - filtered - assayed on
Atomic Absorption Spectrometer.

The remaining crushed sample and pulp were returned to
Southwestern Exploration Associates.

Sincerely,

Charles B. Escapule

RECEIVED AUG 25 1979

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712

(602) 795-6097

DAY/TIMER

Time-Saver

LETTER

Tombston Ark

IN REFERENCE TO:

P-418 - new
tellurate minerals from
Contention area

FIRST CLASS MAIL ☒

INTER-OFFICE ☐

FOR

Mr. Dave Rabb, Mining Engineer
Ariz. Bureau of Mineral Technology
Geology Building, Room 134
University of Ariz. 85721

HOW TO USE THIS

DAY/TIMER

Time-Saver

LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail
the white copy to us and keep the pink copy for your files.
You'll save time and effort, and we'll have your answer
much faster! Thank you.

MESSAGE

REPLY

DATE

8/22/79

DATE

FOLD

Dear Dave; As per our telephone conv.
this AM (JC #7858) please find enclosed a
copy of Sid Williams article in the Am.
Mineralogist about the ~~the~~ new tellurate
minerals from the Contention area, Tombston.

The deep green mineral I gave you
Sunday may be one of these, & if so
could be of important scientific value.
As Williams says these minerals are

SIGNED

soluble in a basic
solution, they may be
cyanide soluble, unlike
tellurides. Let me
know what Bob
O'Hare thinks.

Thanks for the help.

Jim Busch
CC FAMCD

SIGNED

Dr. John Dean

REORDER FORM No. B2419L, DAY-TIMERS, Allentown, Pa. 18001

3-42

RECEIVED AUG 31 1979

JOHN G. DEAN

401 -- 934-0060

Elmdale Road, Box 102, Route 2, North Scituate, Rhode Island 02857

Aug. 27, 1979

REVIEWED

Memo to: J. A. Briscoe, SEA; cc: DL-THS, FAMCO.

From : J. G. Dean

AUG 30 1979

By 

Subject: Data on Tranquility, Empire and Toughnut Dumps.

Dear Jim:

I have studied with interest the extensive compilation of data on the Minerals 71 Heap material which accompanied your memo of 8/22 and, in accord with your request, will give pertinent comments.

These data are potentially valuable as a guide to our project and it would seem worth developing some detail as to how they were taken. In the meantime, I will assume that they represent fire assays on samples split and ground in accord with the Richards table. It would, of course, be very helpful to be able to relate them to cyanide leach tests with a recovery factor for heap leaching.

In order to help get a rough indication of the values in the coarse and fine fractions, the following averages were calculated:

	Silver, Toz/T	
	+1½"	-¾"
Tranquility	1.21	2.13
Empire	1.37	1.27
Toughnut	1.01	2.17

These data suggest that the fine fractions from the Tranquility and Toughnut are about twice as rich in silver as the really coarse fractions, while the values are about the same throughout the screen fractions for the Empire. Heap leaching was the right approach for these lean materials and probably was profitable.

The coarse fractions from a few areas are high in values, e.g. Tranquility 40-11, Ag 6.03oz/T in the +1½" fraction, and the Empire 41-3A, 4.70 Ag in the +¾" portion. For the most part, however, they are around 1 oz/T. Crushing would liberate a portion of this, but does not appear of much economic potential at such a low level.

The success of the present effort would seem to depend on finding some good ore, perfecting a technique of mining mainly ore of economic interest, and of course guiding the operation through realistic and effective test techniques. Particle size must be considered in both sampling and leaching tests for cumulative progress, even if we have to use test heaps for conclusive results.

JGDean:bm 

RECEIVED AUG 30 1979

P-418

U.S. DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
2721 North Central Avenue, Suite 900
Phoenix, Arizona 85004



August 27, 1979

Richard Hewlett, General Manager
Southwestern Exploration Association
Suite 14
4500 East Speedway
Tucson, Arizona 85712

Dear Mr. Hewlett:

A Federal inspection was conducted of the Tombstone Heap Leach Facilities (I.D. No. 02-01521) Tombstone, Cochise County, Arizona, on the date of June 7, 1979. The inspection was made pursuant to Public Law 91-173 (83 STAT. 742) as amended by Public Law 95-164 (91 STAT. 1290).

The type and number of actions taken during the inspection were:

ORIGINAL ACTION THIS INSPECTION	TYPE AND NUMBER OF:	
	Citations	Orders
Issuances	0	0
Terminations	0	0
Modifications	0	0
Replaced by Order	0	0
Vacated	0	0
ACTIONS ON PREVIOUS VIOLATIONS		
Modifications	0	0
Extensions	0	0
Terminations	0	0
Replaced by Order	0	0
Vacated	0	0

Records of the Mine Safety and Health Administration indicated that the incidence rate of your operation as compared to the national average is:

Incidence Rate:	Fatal	Nonfatal
Industry		----
This Operation		----

Sincerely,

Robert E. Riley
Robert E. Riley
Subdistrict Manager

JOHN G. DEAN

401 -- 934-0060

Elmdale Road, Box 102, Route 2, North Scituate, Rhode Island 02857

Aug. 28, 1979

REVIEWED

SEP 1 1979

By *JG*

Memo to: J. A. Briscoe, SEA; cc: DL-THS, FAMCO.

From : J. G. Dean

Subject: Refractory High-manganese Ore, Tombstone area.

Dear Jim:

In Dick's massive report of 2/20/79, p. 70, he indicates that about 20% of the Minerals 71 heap is made up of high-manganese ore averaging 0.155 oz/T gold and 1.44 oz/T silver, suggesting gross values of \$60/T at todays prices.

If we can accept these figures, which presumably were obtained by fire assay, this Mn-fraction would seem to contain substantial values still in place because of the refractory nature of the material to direct cyanide leaching.

Questions arise as to whether this material can be readily segregated from the main heap, whether additional sources of this same kind of material are readily available, and of course whether there is a possibility of economic treatment.

The USBM has done some research on this type of material, notably with sulfurous and sulfuric acids, and has reported encouraging results. This suggests still another question as to whether this fraction can be isolated from the limestone abounding in the area so that there is a possibility of getting the acid requirements down to a manageable level.

There is also some possibly of developing a process which can work in the presence of limestone by shifting to reducing agents which can work in the alkaline range. Considerable pertinent information on this approach has been developed in work on manganese nodules and wad which may contain nonferrous values of interest.

I shall look forward to a discussion of this subject with you and in the meantime any background information you can develop will be of interest.

Best regards,

John

RECEIVED SEP 1 1979

JGDean:bm

ESTIMATED EXPENDITURES FOR TRAVEL EXPENDITURE CONTINUED
 FOR MONTH OF August, 1979 PROJECT 418

PAGE 1 of 10

ESTIMATE - CAPITAL - DUTY		11/79	12/79	1/80	2/80	3/80	4/80	5/80	6/80	7/80	8/80	9/80	10/80	11/80	12/80	1/81	2/81	3/81	4/81	5/81	6/81	7/81	8/81	9/81	10/81	11/81	12/81	1/82	2/82	3/82	4/82	5/82	6/82	7/82	8/82	9/82	10/82	11/82	12/82	1/83	2/83	3/83	4/83	5/83	6/83	7/83	8/83	9/83	10/83	11/83	12/83	1/84	2/84	3/84	4/84	5/84	6/84	7/84	8/84	9/84	10/84	11/84	12/84	1/85	2/85	3/85	4/85	5/85	6/85	7/85	8/85	9/85	10/85	11/85	12/85	1/86	2/86	3/86	4/86	5/86	6/86	7/86	8/86	9/86	10/86	11/86	12/86	1/87	2/87	3/87	4/87	5/87	6/87	7/87	8/87	9/87	10/87	11/87	12/87	1/88	2/88	3/88	4/88	5/88	6/88	7/88	8/88	9/88	10/88	11/88	12/88	1/89	2/89	3/89	4/89	5/89	6/89	7/89	8/89	9/89	10/89	11/89	12/89	1/90	2/90	3/90	4/90	5/90	6/90	7/90	8/90	9/90	10/90	11/90	12/90	1/91	2/91	3/91	4/91	5/91	6/91	7/91	8/91	9/91	10/91	11/91	12/91	1/92	2/92	3/92	4/92	5/92	6/92	7/92	8/92	9/92	10/92	11/92	12/92	1/93	2/93	3/93	4/93	5/93	6/93	7/93	8/93	9/93	10/93	11/93	12/93	1/94	2/94	3/94	4/94	5/94	6/94	7/94	8/94	9/94	10/94	11/94	12/94	1/95	2/95	3/95	4/95	5/95	6/95	7/95	8/95	9/95	10/95	11/95	12/95	1/96	2/96	3/96	4/96	5/96	6/96	7/96	8/96	9/96	10/96	11/96	12/96	1/97	2/97	3/97	4/97	5/97	6/97	7/97	8/97	9/97	10/97	11/97	12/97	1/98	2/98	3/98	4/98	5/98	6/98	7/98	8/98	9/98	10/98	11/98	12/98	1/99	2/99	3/99	4/99	5/99	6/99	7/99	8/99	9/99	10/99	11/99	12/99	1/00	2/00	3/00	4/00	5/00	6/00	7/00	8/00	9/00	10/00	11/00	12/00	1/01	2/01	3/01	4/01	5/01	6/01	7/01	8/01	9/01	10/01	11/01	12/01	1/02	2/02	3/02	4/02	5/02	6/02	7/02	8/02	9/02	10/02	11/02	12/02	1/03	2/03	3/03	4/03	5/03	6/03	7/03	8/03	9/03	10/03	11/03	12/03	1/04	2/04	3/04	4/04	5/04	6/04	7/04	8/04	9/04	10/04	11/04	12/04	1/05	2/05	3/05	4/05	5/05	6/05	7/05	8/05	9/05	10/05	11/05	12/05	1/06	2/06	3/06	4/06	5/06	6/06	7/06	8/06	9/06	10/06	11/06	12/06	1/07	2/07	3/07	4/07	5/07	6/07	7/07	8/07	9/07	10/07	11/07	12/07	1/08	2/08	3/08	4/08	5/08	6/08	7/08	8/08	9/08	10/08	11/08	12/08	1/09	2/09	3/09	4/09	5/09	6/09	7/09	8/09	9/09	10/09	11/09	12/09	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	11/10	12/10	1/11	2/11	3/11	4/11	5/11	6/11	7/11	8/11	9/11	10/11	11/11	12/11	1/12	2/12	3/12	4/12	5/12	6/12	7/12	8/12	9/12	10/12	11/12	12/12	1/13	2/13	3/13	4/13	5/13	6/13	7/13	8/13	9/13	10/13	11/13	12/13	1/14	2/14	3/14	4/14	5/14	6/14	7/14	8/14	9/14	10/14	11/14	12/14	1/15	2/15	3/15	4/15	5/15	6/15	7/15	8/15	9/15	10/15	11/15	12/15	1/16	2/16	3/16	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	1/17	2/17	3/17	4/17	5/17	6/17	7/17	8/17	9/17	10/17	11/17	12/17	1/18	2/18	3/18	4/18	5/18	6/18	7/18	8/18	9/18	10/18	11/18	12/18	1/19	2/19	3/19	4/19	5/19	6/19	7/19	8/19	9/19	10/19	11/19	12/19	1/20	2/20	3/20	4/20	5/20	6/20	7/20	8/20	9/20	10/20	11/20	12/20	1/21	2/21	3/21	4/21	5/21	6/21	7/21	8/21	9/21	10/21	11/21	12/21	1/22	2/22	3/22	4/22	5/22	6/22	7/22	8/22	9/22	10/22	11/22	12/22	1/23	2/23	3/23	4/23	5/23	6/23	7/23	8/23	9/23	10/23	11/23	12/23	1/24	2/24	3/24	4/24	5/24	6/24	7/24	8/24	9/24	10/24	11/24	12/24	1/25	2/25	3/25	4/25	5/25	6/25	7/25	8/25	9/25	10/25	11/25	12/25	1/26	2/26	3/26	4/26	5/26	6/26	7/26	8/26	9/26	10/26	11/26	12/26	1/27	2/27	3/27	4/27	5/27	6/27	7/27	8/27	9/27	10/27	11/27	12/27	1/28	2/28	3/28	4/28	5/28	6/28	7/28	8/28	9/28	10/28	11/28	12/28	1/29	2/29	3/29	4/29	5/29	6/29	7/29	8/29	9/29	10/29	11/29	12/29	1/30	2/30	3/30	4/30	5/30	6/30	7/30	8/30	9/30	10/30	11/30	12/30	1/31	2/31	3/31	4/31	5/31	6/31	7/31	8/31	9/31	10/31	11/31	12/31	1/32	2/32	3/32	4/32	5/32	6/32	7/32	8/32	9/32	10/32	11/32	12/32	1/33	2/33	3/33	4/33	5/33	6/33	7/33	8/33	9/33	10/33	11/33	12/33	1/34	2/34	3/34	4/34	5/34	6/34	7/34	8/34	9/34	10/34	11/34	12/34	1/35	2/35	3/35	4/35	5/35	6/35	7/35	8/35	9/35	10/35	11/35	12/35	1/36	2/36	3/36	4/36	5/36	6/36	7/36	8/36	9/36	10/36	11/36	12/36	1/37	2/37	3/37	4/37	5/37	6/37	7/37	8/37	9/37	10/37	11/37	12/37	1/38	2/38	3/38	4/38	5/38	6/38	7/38	8/38	9/38	10/38	11/38	12/38	1/39	2/39	3/39	4/39	5/39	6/39	7/39	8/39	9/39	10/39	11/39	12/39	1/40	2/40	3/40	4/40	5/40	6/40	7/40	8/40	9/40	10/40	11/40	12/40	1/41	2/41	3/41	4/41	5/41	6/41	7/41	8/41	9/41	10/41	11/41	12/41	1/42	2/42	3/42	4/42	5/42	6/42	7/42	8/42	9/42	10/42	11/42	12/42	1/43	2/43	3/43	4/43	5/43	6/43	7/43	8/43	9/43	10/43	11/43	12/43	1/44	2/44	3/44	4/44	5/44	6/44	7/44	8/44	9/44	10/44	11/44	12/44	1/45	2/45	3/45	4/45	5/45	6/45	7/45	8/45	9/45	10/45	11/45	12/45	1/46	2/46	3/46	4/46	5/46	6/46	7/46	8/46	9/46	10/46	11/46	12/46	1/47	2/47	3/47	4/47	5/47	6/47	7/47	8/47	9/47	10/47	11/47	12/47	1/48	2/48	3/48	4/48	5/48	6/48	7/48	8/48	9/48	10/48	11/48	12/48	1/49	2/49	3/49	4/49	5/49	6/49	7/49	8/49	9/49	10/49	11/49	12/49	1/50	2/50	3/50	4/50	5/50	6/50	7/50	8/50	9/50	10/50	11/50	12/50	1/51	2/51	3/51	4/51	5/51	6/51	7/51	8/51	9/51	10/51	11/51	12/51	1/52	2/52	3/52	4/52	5/52	6/52	7/52	8/52	9/52	10/52	11/52	12/52	1/53	2/53	3/53	4/53	5/53	6/53	7/53	8/53	9/53	10/53	11/53	12/53	1/54	2/54	3/54	4/54	5/54	6/54	7/54	8/54	9/54	10/54	11/54	12/54	1/55	2/55	3/55	4/55	5/55	6/55	7/55	8/55	9/55	10/55	11/55	12/55	1/56	2/56	3/56	4/56	5/56	6/56	7/56	8/56	9/56	10/56	11/56	12/56	1/57	2/57	3/57	4/57	5/57	6/57	7/57	8/57	9/57	10/57	11/57	12/57	1/58	2/58	3/58	4/58	5/58	6/58	7/58	8/58	9/58	10/58	11/58	12/58	1/59	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ESTIMATED EXPENDITURES FOR TONNAGE EXPANSION COMPANY
FOR MONTH OF AUGUST, 1979 PROJECTIONS

TOTAL \$ 6,410

	4th week				5th week			
	Aug. 27th 1979	Aug. 28th 1979	Aug. 29th 1979	Aug. 30th 1979	Aug. 27th 1979	Aug. 28th 1979	Aug. 29th 1979	Aug. 30th 1979
1 CAREER FOUNDED								
2 G. Sodium Sulfide	0	600-	2603-	40-	21500-	560-	160-	0
3 H Sodium Hydroxide (EURECH)								
4 I Sodium Chloride								
5 J Sodium Hydroxide								
6 K DE.								
7 L Silver Nitrate		20-						
8 M Gold Chloride								
9 N Potassium Iodide		6-						
10 O								
11 P								
12 Q								
13 R								
14 S								
15 T MISC.								
16								
17 TOTAL METALS & REAGENTS								
18 CHEMICALS	0	26-	0	0	0	0	0	0
19								
20 4 OFFICE SUPPLIES:								
21 A. Postage								
22 B. Xeroxing				10-				10-
23 C.								10-
24 D								
25 E								
26 F. Misc.								
27								
28 TOTAL OFFICE SUPPLIES	0	0	0	10-	0	0	0	20-
29								
30 C. OPERATING EXPENSES - FIXED ASSETS:								
31 1. LABORATORY - TESTING EQUIP.								
32 A. WATER PUMPS (SMALL)								
33 B. BATTERIES (PLASTIC)								
34 C. BATH TUBS (PLASTIC)		55-						500-
35 D. LAB GLASS WARE		20-						
36 E. A.A. UNIT								
37 F. SCALE #1'S OR'S								25-
38 G. DRYING OVEN		25-						
39 H. HOT PLATE								
40								
PAGE TOTAL	0	726-	2605-	50-	21500-	560-	160-	0
								24420-
								25-
								175-

C. GREENWOOD COMPANY 2212 BIRCH PT. APRIL FOR 1176 MADE IN U.S.A.

ESTIMATE: ESTIMATED FOR DOMESTIC EXPLORATION COMPANY
FOR MONTH OF AUGUST, 1979 PROJECT 411

	4TH WEEK				5TH WEEK				6TH WEEK			
	Aug 27 1979	Aug 28 1979	Aug 29 1979	Aug 30 1979	Aug 31 1979	Aug 31 1979	Aug 31 1979	Aug 31 1979	Aug 31 1979	Aug 31 1979	Aug 31 1979	Aug 31 1979
1 CARRIED FORWARD												
2 I Squirrel Cleaner												
3 J Tumbler												
4 K Sample Sacks												
5 L Benches												
6 M Shaker												
7 N												
8 D												
9 P Misc.												
10												
11 TOTAL LAB EQUIPMENT												
12												
13												
14 2. Leaching Equipment												
15 A. Reaction Plant												
16 B. Plastic Pipe (PVC)												
17 C. Fittings (PVC)												
18 D. Sprinkler heads 1.54												
19 E. Tanks (Storage)												
20 F. Pumps												
21 G												
22 H												
23 I												
24 K												
25 L												
26 M. Misc.												
27												
28												
29 TOTAL LEACHING EQUIPMENT												
30												
31 3. Mining Equipment:												
32 A.												
33 B.												
34 C												
35 D												
36 E. Misc.												
37												
38												
39 TOTAL MINING EQUIPMENT												
40												
PAGE TOTALS												

PAGE 5 of 10

	Aug 20th 1979	Aug 21st 1979	Aug 22nd 1979	Aug 23rd 1979	Aug 24th 1979	Aug 25th 1979	Aug 26th 1979	Aug 27th 1979	Aug 28th 1979	Aug 29th 1979	Aug 30th 1979	Aug 31st 1979
4. CAREERED FOLIOES												
A. MILING EQUIPMENT												
B. SAND CRUSHER												
C. SCISSORS												
D												
E												
F. MISC.												
TOTAL MILING EQUIPMENT	0	0	0	0	0	0	0	0	0	0	0	0
5. OFFICE EQUIPMENT												
A. DESKS												
B. CHAIRS												
C. CALCULATOR												
D. TYPEWRITER												
E												
F												
G												
H												
I												
J												
K												
L												
M. MISC.												
TOTAL OFFICE EQUIPMENT	0	0	0	0	0	0	0	0	0	0	0	0
6. BUILDING FIXTURES												
A. Storage Shelves												
B. Book Shelves												
C. EXHAUST FAN												
D. Light Bulbs												
E. Door & Frame												
F												
G												
H												
TOTAL BUILDING FIXTURES	0	0	0	0	0	0	0	0	0	0	0	0
PAGE TOTAL	0	874-	2878-	50-	215-	560-	160-	0	0	2420-	25-	170-

ESTIMATED EXPENDITURE FOR DOMESTIC EXPLORATION COMPANY
FOR MONTH OF August, 1979 PROJECT 418

PAGE 6 OF 10

		2ND WEEK				3rd week				4th week			
		Aug 8th 1979	Aug 9th 1979	Aug 10th 1979	Aug 11th 1979	Aug 12th 1979	Aug 13th 1979	Aug 14th 1979	Aug 15th 1979	Aug 16th 1979	Aug 17th 1979	Aug 18th 1979	Aug 19th 1979
1	CARRIED FORWARD	525-	0	490-	40-	0	0	0	1455-	630-	200-	40-	40-
2	7 SAFETY EQUIPMENT												
3	A. FIRST AID KIT												
4	B. RUBBER APRONS									35.00			
5	C. FIRE EXTINGUISHERS									19.00			
6	D. STRETCHER									50-			
7	E. SAFETY SIGNS									60-			
8	F									60-			
9	G												
10	H												
11	I. MISC.												
12										9-			
13	TOTAL SAFETY EQUIPMENT	0	0	0	0	0	0	0	0	233.00	0	0	0
14													
15													
16	D. OPERATING EXPENSES (RENTALS) @												
17	1. MINING RENTALS												
18	A. BULLDOZER D-6-B \$35	1875-											
19	B. BACKHOE - TRACTOR \$19												
20	C. BACKHOE - CRAWLER \$20								200-				
21	D. FRONT END LOADER \$25												
22	E. ROAD GRADER \$25	75-											
23	F. DUMP TRUCKS \$78/day												
24	G												
25	H												
26	I												
27	J												
28	K												
29	L												
30	M MISC.												
31													
32	TOTAL MINING RENTAL	1950-	0	0	0	0	0	0	200-	0	0	0	0
33	EXPENSES												
34													
35	2. MILLING RENTAL												
36	A												
37	B												
38	C												
39	D												
40	E												
	PAGE TOTALS	2475-	0	490-	40-	0	0	0	1655-	863-	200-	40-	40-

ESTIMATED EXPENDITURES FOR TOMESTONE EXPROPRIATION COMPANY

First 10 of 10

2nd week

3rd week

4th week

	Aug 8th 1979	Aug 9th 1979	Aug 10th 1979	Aug 11th 1979	Aug 12th 1979	Aug 13th 1979	Aug 14th 1979	Aug 15th 1979	Aug 16th 1979	Aug 17th 1979	Aug 18th 1979	Aug 19th 1979
1												
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ESTIMATE EXPENDITURES FOR MONTH OF August 1979

8 of 10

		2nd week				3rd week				4th week			
		Aug 8th 1979	Aug 9th 1979	Aug 10th 1979	Aug 11th 1979	Aug 12th 1979	Aug 13th 1979	Aug 14th 1979	Aug 15th 1979	Aug 16th 1979	Aug 17th 1979	Aug 18th 1979	Aug 19th 1979
1	CARRIED FORWARD	2475-	0	490-	40-	0	0	0	1650	863-	200-	40-	40-
2	E Operation, Supplies -												
3	Outside Service												
4	1. Accounting												
5	A. Subline & Co. Travel												
6	B. Station Testing												
7	C. A.A. Analyzed Ag-A.I. 25												
8	D												
9	E												
10	F												
11	G												
12	H. Misc												
13													
14	Total Accounting Expenses	0	0	0	0	0	0	0	0	0	0	0	360-
15													
16													
17	2. Drafting & Reproductions												
18	Supplies												
19	A. Titebond Blueprint												
20	B. S.E.A. Drafting												
21	C												
22	D												
23	E												
24	F												
25													
26	Total Drafting & Reproductions	0	0	0	0	0	0	0	0	0	0	0	0
27	Supplies												
28													
29													
30	3. Misc Services -												
31	A												
32	B												
33	C												
34	D												
35	E												
36	F												
37	G												
38													
39	Total Misc. Services	0	0	0	0	0	0	0	0	0	0	0	0
40	Page Totals	2475-	0	490-	40-	0	0	0	1705-	863-	200-	40-	40-

ESTIMATE EXPENDITURES FOR TONKAWA EXTENSION CONTINUED
FOR MONTH OF August, 1979 PROJECT 418

7 of 10

	2nd week				3rd week				4th week			
	Aug 8th 1979	Aug 9th 1979	Aug 10th 1979	Aug 11th 1979	Aug 12th 1979	Aug 13th 1979	Aug 14th 1979	Aug 15th 1979	Aug 16th 1979	Aug 17th 1979	Aug 18th 1979	Aug 19th 1979
1 CARRIED FORWARD	2415-	0	490-	40-	0	0	0	1705-	865-	200-	40-	400-
2 F. Paved - Other												
3 1. Apartment												
4 a) Gas - Electric												
5 b) Telephone								50-				
6 c) Rent								140-				
7 d)												
8 e) Misc.												
9												
10												
11 Total Apartment Rental	0	0	0	0	0	0	0	190-	0	0	0	0
12												
13 2. SEA Equipment												
14 A. Whistle	90-		180-							300-		
15 B. Survey Equip												
16 C. Deep-sea Equip.												
17 D.												
18 E												
19 F												
20 G												
21 H												
22 I												
23 Total SEA Equipment	90-	0	180-	0	0	0	0	0	0	300-	0	0
24												
25 3. Property Lease												
26 A. TDC mining claims												
27 DATED & DEDICATED												
28												
29												
30												
31 Total Property Lease	0	0	0	0	0	0	0	0	0	0	0	0
32												
33												
34												
35												
36												
37												
38												
39												
40												
	2565-	0	670-	40-	0	0	0	1895-	865-	500-	40-	400-

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

DAY/TIMER

time-Saver

LETTER

IN REFERENCE TO:

FIRST CLASS MAIL ☐ INTER-OFFICE ☐

FOR

Tom Waldrup

4500 E Speedway Tucson Ariz
85712

HOW TO USE THIS

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LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE:

9-7-79

FOLD

Ran plant till 5AM shut down to dismantel so Ernie Escuaplo could pick it up. Had it already to go at 8AM. 9AM Ernie picked plant up. Then started decanting precipis. Took Last Preg and Barr samples to state of maine for Assays recieved results at 10AM called Tom to inform him on preceding data.

Took afternoon off to do personal Business

FOLD

FOLD

BY

B.W. Matteson

REPLY

DATE:

BY

Southwestern Exploration Assoc., Inc.
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

DAY/TIMER

Time-Saver

LETTER

IN REFERENCE TO:

3-58

FIRST CLASS MAIL ☐ INTER-OFFICE ☐

FOR
TO: TE WAIDRIP
FROM: M.C. BAUMANN
DATE: 9/7/79

SUBJECT: INFORMATION CONCERNING MINES &
MINE WORKINGS AT TOMBSTONE

HOW TO USE THIS

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Time-Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE: 9/7/79

ARIZONA BUREAU OF MINES (845 N. PARK) 626-2733

APPROX 50 MAPS - AVERAGE SIZE 1.5 BY 2.5 FT = 3.75 Sq. FT.

VELLUMS WOULD COST $3.75 \times 50 = 187.50$ Sq. FT. $\times$ ^{EST.} $\$1.80/\text{Sq. FT.} = \150.00

THIS INCLUDES MINE PLAN MAPS AND CROSS SECTIONS BY

F.L. RANSOME, 1910. SOME NOTATIONS PRESENT ON ORIGINALS

NOT ON PUBLISHED MAPS.

UNIV. OF ARIZ. - SPECIAL COLLECTIONS 1. TOMBSTONE & ITS MINES - BLAKE [M9791 - 5635]

2. STAUNTON, WILLIAM FIELD (1879-1910) REPORTS AND PAPERS - ALSO A

MAP PORTFOLIO - 20 MAPS - APPROX SIZE 1.5 X 2.5 FT = 3.75 Sq. FT. = 75 Sq. FT.

$75 \text{ Sq. FT.} \times \$1.80/\text{Sq. FT.} = \$160.00$ [AZ-152]

3. BERT DEVERE - ASARCO - HAS A COLLECTION OF OLD PHOTOGRAPHS OF

TOMBSTONE AREA

REPLY

JCB

DATE: 9/11/79

JIM SAID THAT ABG&T HAS A FEW MAPS BY
E.D. WILKSON LIKE A WHOLE FILE DRAWER - I DON'T
KNOW IF MCTB SAW THESE BUT THEY ARE DOWN IN THE
DRAFTING AREA AND NEAR THE CORNER - VERY UNORGANIZED
but useful.

Tom

BY

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

DAY/TIMER

Time-Saver

LETTER

IN REFERENCE TO:

FIRST CLASS MAIL ☐ INTER-OFFICE ☐

FOR

Tom Waldrip
4500 E Speed Way
Tucson Ariz 85712

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MESSAGE

FOLD

DATE: 9-11-79

FOLD

Checked Barrel Test for PH. Dried some real wet precip
acquired from pulling finger filters apart and washing them.
10:30am met Jim Aspell as per letter of introducing from
Jim Brisco. Showed him around job, Talked over leaching
procedures. Then took him to state of maine and introduced
him to Escalpes.

checked with Ernie Escouple about use of 310 Bk hoe.
he is going to be using it steady for awhile. He gave me
bill for 2 weeks plant Rental and 10 hrs Bk Hoe work from
aug.

FOLD

FOLD

BY

EW Watterson

REPLY

DATE:

BY

RECEIVED SEP 14 1979

Sept. 11, 1979

Memo to: J. A. Briscoe, SEA; cc: T. H. Schloss, FAMCO.

From : J. G. Dean

Subject: Tombstone Silver and Gold Project - Plans.

REVIEWED

SEP 14 1979

By JGD

Dear Jim:

Following up on our phone conversation yesterday, there seems to be general agreement that there is vast potential for silver, gold, and possibly other metal production in the Tombstone area. The big challenge is how to put together a program with the right elements to assure success through cumulative progress.

The program I keep visualizing has a big component of very astute and highly professional geology capable of building on past foundations and innovatively extending far beyond them, coupled with a similar high quality and professionally innovative metallurgical extraction component, both cemented together with effective management sharp enough to draw on whatever additional specialized help is needed to assure success.

The program I am visualizing needs an assured budget projected for, say, at least one year. This budget should include a small laboratory equipped to process, leach, and assay samples with a qualified full-time technician with access to an AA unit. This operation might involve a capital outlay of, say, \$25,000 and an operating budget of \$2,000/mo.

In addition to the laboratory we will probably need pilot scale test facilities both for heap leaching and milling. These have potential for paying part of the expenses through production, particularly as it becomes feasible to expand the scale.

If realistic numbers are put together for an approach of this type, it is obvious that a substantial amount of capital will be required to sustain the project until it can pay its way.

Your suggestion of developing a system of deferred compensation for personnel seems like one good way of reducing start-up costs. Another way is to substitute an earned equity interest for a portion of payment to personnel. These special arrangements may have to be developed on a case-by-case or at least class basis. In my experience, they should be both as definite and as assured as possible.

Similarly lease payments might preferably be on at least a partly deferred basis, so as to be less burdensome during the lean start-up period. All of which suggests, perhaps, that we should start over again and try to project a more ideal plan adequately financed and staffed.

Regards,

John

JGD:bm

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

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LETTER

IN REFERENCE TO:

FIRST CLASS MAIL ☐ INTER-OFFICE ☐

FOR

Tom Waldrip
4500 E Speedway
Tucson ARIZ 85712

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Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE: 9-12-79

Met Jim Briscoe & Tom Schloss, Dusty Escaple at 71 Mineral Bldg. Had meeting to determine method of sampling main heap and open pit areas. Decide we needed 2 rent 100 Ton plant from State of Maine and buy 65 Ton plant. We will spray Bench on main heap with 100 Ton plant. Excavator will make 4 cuts on Area 1 main heap. Then make cross cuts in Contention Cut area as per Jim Briscoe designation. The four of us went to State of Maine talked with Charlie and Louie Escaple about using Excavator and time in getting plants.

BY

JW Waterson

REPLY

DATE:

BY

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

DAY/TIMER

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LETTER

IN REFERENCE TO:

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FOR

Tom Waldner

4500 E Speedway Suite 14

Tucson Az. 85712

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Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE: 9-13-79

Pulled Test samples to to state of main. Checked with
charlie on use of Excavator. Said we could use it.
checked area 1 Locate Excavator Cuts.
filled out Daily Reports and Barrel Test Reports

BY

B W Watterson

REPLY

DATE:

BY

DAY/TIMER

time-Saver

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

LETTER

IN REFERENCE TO:

FIRST CLASS MAIL ☐ INTER-OFFICE ☐

FOR

Tom Waldrip
4500 E Speedway Suite 14
TUCSON, AZ 85712

HOW TO USE THIS

DAY/TIMER

time-Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE: 9-17-79

FOLD

Dusty back to work - Spent morning checking sprinklers and piping for sprays on Areal Bench. Did not get Excavator over weekend as it was in use.

Made List of Supplies needed to finish Shaker.

Started on Barrel Test Report

FOLD

FOLD

BY

E W Waltham

REPLY

DATE:

BY

DAY/TIMER

Time-Saver

LETTER

IN REFERENCE TO:

Southwestern Exploration Associates
4500 E. SPEEDWAY, SUITE 14
TUCSON, ARIZONA 85712
(602) 795-6097

FIRST CLASS MAIL ☐ INTER-OFFICE ☐FOR *Tom WALDRIP**4500 E. SPEEDWAY, SUITE 14**TUCSON, ARIZ. 85712*

HOW TO USE THIS

DAY/TIMER

Time-Saver LETTER TO SAVE TIME.

Type or write your reply in the space below. Then mail the white copy to us and keep the pink copy for your files. You'll save time and effort, and we'll have your answer much faster! Thank you.

MESSAGE

DATE: *9/19/79*

FOLD

Tom:

AS PER OUR CONVERSATION ON 9/19/79 REFERENCE DRAGLINE AND MISC. MINING EQUIP. AT BISBEE SALVAGE I AM ENCLOSEING A LIST INCLUDING PRICES. I AM ALSO ENCLOSEING THE ESTIMATED BUDGET FOR COMPLETION OF THE NEW PREG POND. PLEASE KEEP IN MIND THAT THIS BUDGET IS AN APPROXIMATE ESTIMATION. I AM WORKING ON A CONSTRUCTION ^{BUDGET} FOR THE INSTALLATION OF THE EQUIPMENT ON THE ENCLOSED LIST.

WOULD YOU PLEASE RETURN A COPY OF THE POND BUDGET FOR MY RECORDS,

FOLD

BY

Thank You
Dusty Hooper

FOLD

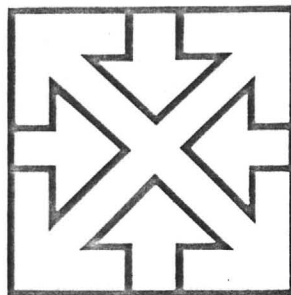
REPLY

DATE:

BY

Consultants in:

- base & precious metals • uranium
 - coal • geothermal • environment
 - remote sensing • color aerial photography
 - interpretation-image processing
- Worldwide Mobilization



**Southwestern
Exploration Associates, Inc.**

4500 E. Speedway, Suite 14
Tucson, Arizona 85712
(602) 795-6097

James A. Briscoe, President
Registered Professional
Geologist

September 21, 1979

Tombstone Development Corporation
Messrs. Bill Hight and Frank Gallup
P.O. Box 1445
Grand Island, Nebraska 68801

Re: Project 418, Tombstone Project, Filing of Annual Assessment Work for 1979, and Required Filing of Location Papers and Assessment Work with The Bureau of Land Management Prior to October 21, 1979 Deadline. Prepared for Program Manager, J. A. Briscoe by Project Manager T. E. Waldrip Jr., Southwestern Exploration Associates, Inc.

Dear Messrs. ~~Hight~~ and Gallup,

We again appreciate your concern and warning on meeting Organic Act filing deadlines on the unpatented TDC 1 through 18 claims located in Tombstone Mining District, Cochise County, Arizona, currently under lease by ourselves and FAMCO.

We fully intend to file the Assessment Records and Location Notices with the Arizona area office of the Bureau of Land Management in Phoenix on or before September 28, 1979, approximately three weeks before the required Organic Act deadline of October 21, 1979. In addition, Assessment Work records will be filed at the same time with the Cochise County Recorder's Office, completing necessary documentation of work under Organic Act Regulations and U.S. Mining Law statutes.

Currently, work is proceeding to acquire necessary documentation of location papers from the Cochise County Recorder's Office, and Assessment Papers (Proof of Labor records) are being prepared by my staff. In addition, due to a change in the Arizona Mining Statutes (September 1978), we are preparing to file an additional map with the Cochise County Recorder's Office prior to December 31, 1979, as required by the new and revised Arizona statutes.

Messrs. Bill Hight and Frank Gallup
September 21, 1979
Page 2

Work is progressing in a timely fashion and will be filed with appropriate agencies with time to spare. Upon receipt of all recorded documents by our office, a package of Assessment records, maps, and B.L.M. Mining Claim file numbers will be compiled and sent to your address for your records.

Again, we appreciate your help and comments on the matter.

Respectfully submitted,

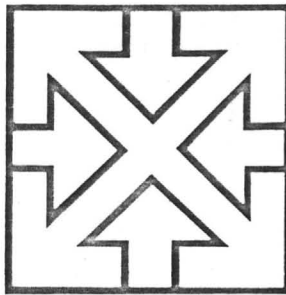
Thomas E. Waldrip Jr.

Thomas E. Waldrip, Jr.
Tombstone Project Manager and
Manager of S.E.A., Inc. Land Division

TEW/db
P-418
03-020

Consultants in:

- base & precious metals • uranium
 - coal • geothermal • environment
 - remote sensing • color aerial photography
 - interpretation-image processing
- Worldwide Mobilization



4500 E. Speedway, Suite 14
Tucson, Arizona 85712
(602) 795-6097

James A. Briscoe, President
Registered Professional
Geologist

**Southwestern
Exploration Associates, Inc.**

September 27, 1979

Christine Rhodes
Cochise County Recorder
Office of the Recorder
Bisbee, Arizona 85603

Re: Filing of Annual Proof of Labor Document For The T.D.C.
Claim Group

Dear Ms. Rhodes,

Enclosed, please find the Proof of Labor document for the T.D.C. claim group located in the Tombstone Mining District, Cochise County, Arizona.

We are requesting that this affidavit be recorded in your county, so that we will be in compliance with Section 27-208 of the legal statutes for the state of Arizona, and certain regulations as outlined in Title 43, United States Codes, Section 3833.2-2 (a), concerning filing of annual assessment work within the county of claim group recordation.

A check for \$3.00 is also enclosed to cover the cost of the recording fee.

Respectfully submitted,

Clark D. Green
Geologist/Landman

CDG/slr

P-418

encs. Proof of Labor Document
S.E.A. Check # 4714
Purchase Order # 5599

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(602) 795-6097

James A. Briscoe, President
Registered Professional
Geologist

**Southwestern
Exploration Associates, Inc.**

September 28, 1979

U.S. Department of the Interior
Bureau of Land Management
2400 Valley Bank Center
201 N. Central Avenue
Phoenix, Arizona 85073

Attention: Records Section. Robert Peterson

Re: Recording of Certificates of Location and Annual Proof
of Labor for T.D.C. Unpatented Lode Mining Claim Group.

Dear Mr. Peterson,

Enclosed, please find copies of the recorded Certificates of Location for the T.D.C. unpatented lode mining claim group. These claims are located in the Tombstone Mining District, Cochise County, Arizona.

The claim group is accompanied by a location map depicting the claim locations with reference to appropriate surveyed features, and set forth the boundaries and positions of the individual claims. Quarter section(s), descriptions with township(s), ranges(s), meridian and state are provided with each claim location certificate, along with the current name and address of the owner.

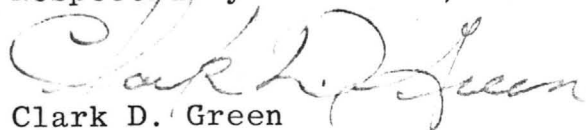
A copy of the Annual Proof of Labor for the above referenced claims is enclosed. For information related to local county filing and legal descriptions for originally recorded location notices, please see Attachment 1 of Annual Assessment Work instrument.

We are requesting the recording of these documents with your state (regional) office, so that we will be in compliance with Title 43 C.F.R., Subparts 3833.1-2 (a) & (c), 3833.2-1 (a) and 3833.2-2, concerning the recording of the Certificate of Location and record of annual assessment work for mining claims located on public lands before October 21, 1976.

A check for \$90.00 is also enclosed to cover the cost of the recording fees.

Thank you for your assistance.

Respectfully submitted,



Clark D. Green
Geologist/Landman

CDG/slr

P-418

encs. 18 Certificates of Location
Proof of Labor Document
S.E.A. Check #
Purchase Order #

RECEIVED OCT - 4 1979

JOHN G. DEAN

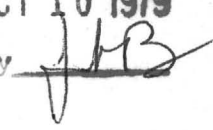
401 -- 934-0060

Elmdale Road, Box 102, Route 2, North Scituate, Rhode Island 02857

Oct. 1, 1979

REVIEWED

OCT 10 1979

By 

Mr. J. A. Briscoe
Southwestern Exploration Assoc's.
4500 E. Speedway, Suite 14
Tucson, Arizona 85712

Dear Jim:

Enclosed is an article on the Micropanner which we discussed. It is quite a remarkable tool, but as you will note, the samples take a bit of preparation. It works most accurately with uniform sized particles, so you really need a lab with grinding and sizing equipment.

The one we have was imported from Chs. W. Cook & Sons, Ltd., University Works, 97, Birmingham, England about 10 years ago at a cost of about \$800. Importation took a bit of doing, but it was worth it for special projects.

The chunky vein sample you gave me from the Contention cut may be an ideal material for micropanning. I haven't been able to work on it yet, but an examination of the loose material that fell out in transit revealed the presence of well-defined galena. Identification of mineral components of this type would certainly be of interest to the project.

I am sorry the project seems to be evolving through such a painful stage, but the heap leaching seems to be working, and a little cash flow may work miracles.

The checks for my July and August statements was appreciated more than I can possibly say. I have tried very hard to help get the project successfully underway, but all efforts to be generous seem to have a way of backfiring, and I haven't yet been able to find a good plan.

With kindest regards,



John G. Dean

JGD:bm

JAG

JOHN G. DEAN

401 - 934-0060

Elmdale Road, Box 230, Route 2, North Scituate, Rhode Island 02857

October 1, 1979

FAPCO, Inc.
1700 Broadway
New York, N. Y. 10019

Attention: Mr. T. H. Schloss, Chairman of the Board

Statement for Sept., 1979 re: Tombstone gold and silver project

SERVICES:

Continued development work on the Tombstone project,
planning conferences and phone discussions (12 hours),
and visit to the project.

Five day portion of time on project @ \$300/day \$1500.00

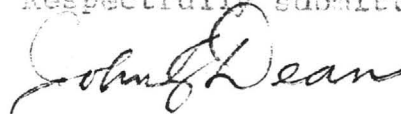
EXPENSES:

Trip to Tucson and Tombstone, 9/22-26 -- no charge

Long distance telephone, 8/21 SEA ----- \$23.00 23.00

Total for September ----- \$1523.00

Respectfully submitted,



John G. Dean, Ph. D.
Consultant

JGD:bm
cc: JABriscoe, SEA-TEI

John -
I gather Tom is taking over the paying of bills
in N.Y., so this statement is sent for your information.
Hopefully, it is kept under the present arrangement
and note!
John

The Micropanner—An Apparatus for the Gravity Concentration of Small Quantities of Materials*

L. D. MULLER,† B.Sc.

RECEIVED OCT - 4 1979

622.767.53
622.7.001.4

SYNOPSIS

The micropanner, a small-scale version of the Haultain superpanner, is designed for the gravity concentration and separation of very small quantities of minerals or other materials, and is intended primarily for use on the stage of a stereoscopic microscope. The panner, its method of operation, and some applications are described and discussed; the alternative use of both heavy and light liquids is indicated.

THE DETERMINATIVE MINERALOGIST, mineragrapher and sedimentary petrologist are among many who frequently have need to separate small multi-component mineral fractions into their individual constituents or, alternatively, to concentrate from such a fraction one specific mineral. Many classic techniques are available for these purposes among which may be cited magnetic and electrostatic separation, the use of heavy liquids, dielectric separation and, when a pure sample is called for, the tedious and time-consuming technique of hand-picking under a binocular microscope. Additional to these well-known methods, there exists the Haultain superpanner—a tool widely used within the field of mineral dressing but which does not appear to have become so well-established outside this field, possibly because it has not been adapted for use with the very small quantities of materials so often met with in the mineralogical laboratory.

Haultain¹ has described his superpanner as being a mechanized and sensitive development of a combination of the vanning shovel, 'sichertrog' ('saving trough', for catching minerals) and shaking trough. It is essentially a batch concentrator for the recovery of small percentages of heavy minerals, and water is normally used as the liquid medium. Under certain conditions it can separate minerals or other materials having a specific gravity differential of only 0.5. For maximum efficiency, sized or sorted fractions within the range of 65 to 325 mesh Tyler are preferable, though it has been found at Lake Shore² that, using samples containing minerals having large gravity differentials, quantitative results are obtainable down to 14 μ , with qualitative results for smaller sizes. A minimum weight of about 1 g is usually required. Taggart and others³⁻⁵ have given descriptions of the Haultain superpanner together with a brief mention of its

*Paper received on 25th April, 1958, by the Institution of Mining and Metallurgy and published on 2nd October, 1958; to be discussed at a General Meeting of the Institution to be held on 16th October, 1958.

†Mineralogist, Mineral Dressing Group, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment, Harwell.

†etc. See list of references at the end of the paper.

applications de Rycker and Rey describe modifications to the superpanner and in a further paper de Rycker *et al.* outline its uses in the field of geology; Edwards⁶ has also contributed a short note on the apparatus and its uses.

The micropanner, unlike the superpanner, is designed primarily for use with very small quantities of materials. It incorporates the same basic principles of operation as the superpanner and, although its construction differs, it possesses similar variables and controls. Due to its comparatively small size, suitably chosen heavy liquids (and liquids with densities less than unity) may be used on it in economic amounts so that materials having gravity differentials of less than 0.5, and ranging into very fine sizes, may often be successfully separated. As it is mainly intended for use with milligram quantities of fine materials, it is normally operated mounted on the stage of a stereoscopic binocular microscope to facilitate control of the concentration or separation being attempted.

DESCRIPTION OF THE MICROPANNER

The micropanner (Figs. 1, 2, 3, Plates I and II) consists essentially of a shallow rectangular V-section metal deck covered with linoleum and carried on a reciprocating shaft which is supported in three bearings secured to a frame. This frame is hinged to a base plate and has a pair of cams which enables the slope of the frame, and thus of the deck, to be varied.

The reciprocating shaft is actuated by an 18-tooth ratchet-wheel which is driven, through a pair of gears, by a fractional h.p. electric motor.* The shaft is spring-loaded and also carries a threaded stop-nut and lock-nut which enables the amplitude of the shaft movement to be varied from zero to $\frac{3}{8}$ in., the maximum depth of the ratchet-wheel teeth. A second milled nut on the shaft allows the compression on the return spring to be varied. A rocking motion, transverse to the axis of the shaft, is applied to the deck through a linkage mechanism and an adjustable eccentric mounted on the ratchet-wheel spindle.

Two types of deck may be used, a weired deck (Fig. 2, Plate II) on which the depth of the pool at the rear end may be varied, and an open-ended deck (Fig. 3, Plate II). The weired deck is fitted with a small Terry clip to hold a bent capillary tube connected, through a bottle trap, to a suction point.

Ancillary to the micropanner is the electric motor which is adjustably mounted on a bracket and stand (Fig. 1, Plate I); a short length of rubber tubing forms an adequate and flexible coupling between the motor drive shaft and the main shaft to the gear train. The motor speed is controlled by a Variac, and water or other liquids are siphoned as required to the micropanner deck, through a glass stop-cock and capillary tube, from a container fitted to the stand carrying the motor.

The following variables can be imposed on the micropanner deck:

- (i) Length of stroke; by adjustment of the stop-nut and thus the

*Klaxon, Type EK3UBI-W.3, 100/110 V, A.C./D.C., cont., 100 r.p.m., geared.

- degree of engagement of the shaft with the ratchet-wheel teeth.
- (ii) Frequency of stroke; by variation of the motor speed.
- (iii) Rate of return and force of impact; by alteration of the return spring compression.
- (iv) Amplitude of transverse motion; by adjustment of the eccentric.
- (v) Speed of transverse motion; by variation of the motor speed.
- (vi) Longitudinal slope; by rotation of the frame cams.
- (vii) Amount of wash liquid.
- (viii) Depth of pool on weired deck; by height adjustment of the glass capillary tube.

SOME BASIC PRINCIPLES UNDERLYING OPERATION OF THE MICROPANNER

To the several variables ascribed to the micropanner must be added those due to the materials to be separated or concentrated, as these also introduce factors which affect their behaviour on the deck; the most important are those of specific gravity, shape and size. The majority of all these variables cannot readily be quantified so that it is not possible to detail a standard set of operating instructions applicable to all heterogeneous mixtures of materials, and each separation must be treated as an individual problem; successful operation is thus a matter of experience based on a knowledge of certain underlying fundamental principles.

In both the superpanner and micropanner the basic principle affecting separation is that known as film-sizing, wherein a liquid film, normally water in laminar flow across a surface, in this case the panner deck, has zero velocity at its contact with this surface and a maximum velocity just below the liquid-air-interface. In such a film particles of differing specific gravities in an open bed tend to sort and stratify themselves in order of their densities. Hence the heaviest particles are in contact with the deck surface and in the region of zero velocity while the lighter particles lie in the regions of increasing velocity. Thus the flow of the liquid film down the sloped deck of the panner tends to separate the light and heavy particles, the light ones travelling faster down the deck. If, in addition to the action of the liquid film flow, the deck is in reciprocating motion the momentum developed in the heavy particles in contact with the deck jerks them preferentially towards the head as the motion of the deck is sharply arrested at the completion of each cycle. The two factors thus combine to give maximum separation of the heavy and light particles. Therefore in a sample comprising several different minerals, the minerals eventually tend to separate along the length of the deck into adjacent fractions, the order of specific gravity increasing towards the head of the deck.

The micropanner is designed to make use of these two factors, and its operating variables are such that the two factors may be adjusted relative to each other by variation of the liquid flow rate, deck slope, amplitude and speed of longitudinal stroke, rate of return and force of impact. The two factors can, however, only operate successfully to produce

separation if the mineral particles are in a loose or open bed on the panner deck. As particles settling in a liquid medium have a natural tendency to form a closed or packed bed it is essential to prevent this occurring during operation of the panner. The transverse motion imposed on the deck by the eccentric and linkage is designed to aid in maintaining this required condition, the degree of which may be controlled to a certain extent by adjustment of the eccentric.

As already stated, in addition to specific gravity, the size and shape of the mineral particles themselves also introduce factors which affect their behaviour on the deck, though, as de Rycker⁶ has pointed out, a natural unsized feed is often perfectly adequate, particularly when the gravity differentials are large. For difficult separations, for example where the gravity differentials are small, a screen-sized feed markedly increases the performance of the panner; ultimate efficiency is generally obtained using a hydro-sized or hydraulically classified material.

Heavy liquids may also be used in difficult cases to increase the probability of separation. A gravity differential of 0.5, as between a given pair of minerals, is often accepted as the lower limit for satisfactory separation in water, but, by increasing the density of the operating liquid, the Taggart 'concentration criterion'³ existing for such a pair of minerals may, at times, be increased sufficiently above the stipulated lower limit of 1.25 to enable a separation to be achieved which may otherwise be impossible using water. Similarly, liquids with densities less than unity may be used with advantage with very fine materials, as the apparent densities of the particles are increased and they thus tend to settle more readily into contact with the deck.

OPERATING TECHNIQUES

As the micropanner is virtually a small-scale version of the Haultain superpanner the method of operation used is very similar to that used on the superpanner, and for those familiar with the superpanner and its use the micropanner presents no difficulties, though it may be stressed that, as with the superpanner, successful operation is a matter of experience.

The method of operation normally used on the superpanner is applicable only to the weired type of deck which enables quantities of up to about 4 g to be handled. The material to be separated is placed in a pool of water formed at the foot of the deck using the maximum slope; side-shake and end-bump are applied to allow the material to stratify. Water flow is then commenced and the deck slope and other variables are adjusted as necessary to draw the heavy minerals up towards the head of the deck. Adjustment of the height of the capillary tube enables the level of the pool to be varied as required during operation; the tube may continuously remove the light tailings fraction which is retained in the bottle trap.

The open-ended deck is suitable for use with very small quantities of materials of the order of 50 mg; it is operated rather differently from the normal procedure in that the material is initially placed in a small pool of liquid, usually water with a little wetting agent, formed at the head of the deck. The cams controlling slope are designed to give a reverse slope to

the deck to enable this pool to be formed in the first instance. Having allowed the material to stratify in the pool, by applying side-shake and end-bump, the deck slope is reversed to a suitable gradient, water is fed to the deck and the apparatus is operated to wash the light fraction of the material down the deck and to retain the heavy fraction at the head. If necessary the concentrate may be cleaned by washing or by carefully brushing it a short distance down the deck and then working it back towards the head. In a normal separation, and due to the small amounts of material on the deck, concentration is generally complete before the tailings fraction overflows the end of the deck, but in any case it is convenient to allow it to wash off into a suitably placed Petri dish (Fig. 1).

With either deck, the normal speed of operation is in the range of 350 to 550 strokes/min—considerably higher than that used with the superpanner—while for most separations, the water flow-rate is in terms of drops/min rather than as a continuous flow.

When using heavy liquids as an aid to separation the optimum density of the liquid required for the separation being attempted must be empirically determined in each instance, owing to the fact that such a density must be related to the gravity differential existing between the minerals to be separated and also to the order of their specific gravities. Although application of the 'concentration criterion' formula gives a guide to the liquid density required, something below the theoretical optimum must normally be used, the 'heavies' otherwise tending to become too buoyant and ceasing to be controllable on the deck. Present experience has shown that an operating liquid of sp. gr. 1.6 to 1.8 has proved satisfactory in separating minerals with differentials of the order of 0.5 and with sp. gr. in the range 2.7 to 5.3. With liquids having densities less than unity, such as acetone or benzene, care should be exercised in choosing a suitable liquid as it has been found that, with some minerals, flocculation of the very fine particles may occur, thus vitiating any possibility of successful separation; however, the use of a suitable wetting agent might overcome this difficulty.

In either case, when using organic liquids, the lino-covered decks cannot be employed, as the adhesive securing the lino tends to be dissolved; an aluminium deck makes an effective substitute.

Experience has shown that although there are many variables that may be altered during operation of the equipment, in most separations undertaken it is normally only the slope of the deck, speed of impact and the wash water that need to be adjusted. It is also thought that, for most separations, a coarse feed requires a relatively long slow longitudinal stroke, the converse applying for fine materials.

To obtain experience of the use of the micropanner in the first instance, it is suggested that a — 65 + 150 mesh Tyler synthetic mixture of quartz, sphalerite (or pyrite) and galena, containing a few per cent of the sulphides, is a very suitable feed for experiment. With this feed, using quantities appropriate to the type of deck fitted, a clean galena tip followed by sphalerite (or pyrite) and a clean quartz tailing should be obtainable easily and rapidly (Fig. 4, Plate III). A few tests should be sufficient to provide experience of the general order of flow-rate, length of stroke, rate of

end-bump and the impact force required; maximum side-shake is normally used.

To collect and remove from the deck the small amounts of concentrates usually made it is convenient to use a short capillary tube, fitted with a rubber teat or connected to a suction point.

SOME EXAMPLES OF THE USE OF THE MICROPANNER

The illustrations reproduced in Figs. 4 to 8 (Plates III and IV) demonstrate some of the applications of the micropanner and its flexibility in dealing with a variety of problems of separation and concentration. Their significance is described and discussed below.

Fig. 4.—The photograph illustrates a simple type of separation using the weired deck and water. 4 g of a synthetic mixture of quartz, pyrite (5 per cent) and galena (3 per cent) in the size range 72 to 150 mesh Tyler, have been used to give a clean galena tip followed by pyrite and a clean quartz tailing. This type of separation is readily achieved owing to the relatively large gravity differentials existing between each pair of minerals. Concentration was obtained in about four minutes and gave an almost 100 per cent recovery of the two heavy minerals.

Fig. 5.—The monazite concentrate was recovered from a — 36 + 100 mesh 'sinks' fraction of a heavy-liquid separation (bromoform; $\rho = 2.9$). The weired deck and water were used; concentration was obtained in 10 minutes. The fraction, which comprised major ilmenite (sp.gr. 4.68-4.79), with minor zircon (> 4.5 -4.86), rutile (4.25), garnet (4.02-4.12), spinel (3.58-3.68) and hornblende (3.05-3.47), was initially panned as received but failed to give a clean monazite concentrate. It was therefore hydrosized using a small hydraulic classifier, the flow-rate being adjusted to give an overflow fraction comprising about half (by weight) of the original fraction. This fraction (1.5 g approx.) was repanned to give the monazite tip illustrated. Much of the hornblende, spinel, garnet and rutile was removed as a tailings fraction. This type of separation illustrates the use of the micropanner as an additional means of further separating small amounts of 'black sands' concentrates beyond the range of the normal heavy liquids and the need, in certain instances, of using hydraulically classified material.

Fig. 6.—The photograph shows a — 325 mesh zircon tip derived from a 56-mg — 42 mesh fraction of a Glen Urquhart gneiss. The fraction, initially obtained as a superpanner concentrate, contains a little coarse to fine kyanite (sp.gr. 3.7), coarse to fine rutile (sp.gr. 4.25) and fine zircon (sp.gr. 4.7); a lino-covered open-ended deck and water were used to obtain a zircon tip which was developed in rather less than five minutes. It is this tip which is illustrated. As the tip was contaminated with very fine rutile it was transferred to the open-ended aluminium deck and repanned to give a clean zircon tip using a bromoform/acetone mixture of density 1.7; only a few ml of the heavy liquid were used. In this instance, as the zircon was eventually required for age-determination studies, the use of Clerici solution was considered undesirable owing to the possibility of lead contamination by the solution.

Fig. 7.—The secondary uranium mineral tip (probably salecite; sp.gr. 3.27) was concentrated from a small quantity of a -100 mesh $+43\mu$ feed comprising essentially a brown mica and iron-stained silicates (sp.gr. 2.7). The feed was a low-grade concentrate representing the best separation that could be obtained using the Haultain superpanner. Further up-grading on the micropanner was not possible using water, but was achieved using a heavy liquid (bromoform/benzene of density 1.8) and the aluminium deck; about 10 ml of the heavy liquid was required. For purposes of photography, the tip was rendered fluorescent using an ultra-violet source (2537 Å).

Fig. 8.—The black ilmenite concentrate was recovered from a 72-mg synthetic mixture of $-10 + 4\mu$ quartz and a few per cent of -7μ ilmenite. Acetone and the open-ended aluminium deck were used to obtain concentration; the alternative use of water failed to produce a satisfactory tip. Each mineral was initially prepared by separate elutriation under the same conditions to give, when mixed, the equivalent of a hydrosized product. Similar tips were obtained using quartz/monazite and quartz/riebeckite mixtures.

Acknowledgements.—The author wishes to thank Mr. C. G. Whettam of Engineering Services (A.E.R.E. Harwell) to whose craftsmanship and design modifications much is due.

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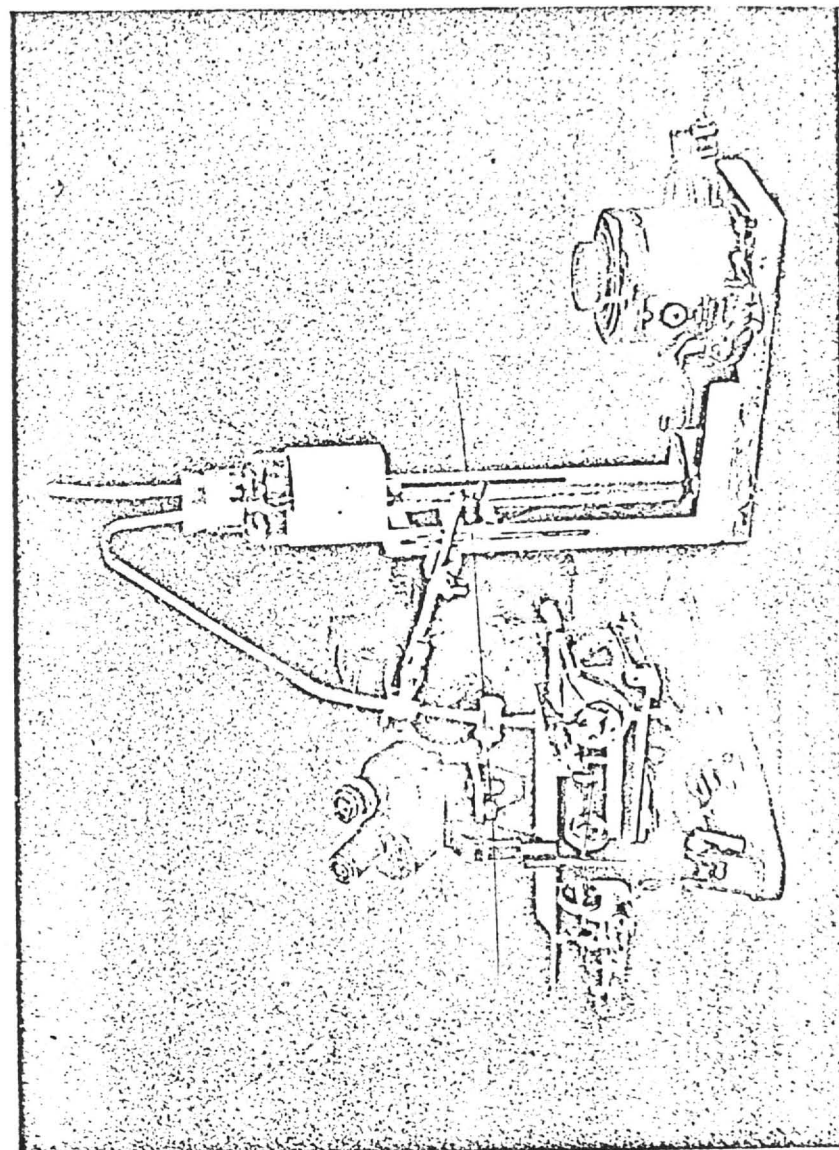


Fig. 1.—The micropanner and ancillary equipment, ready for use.

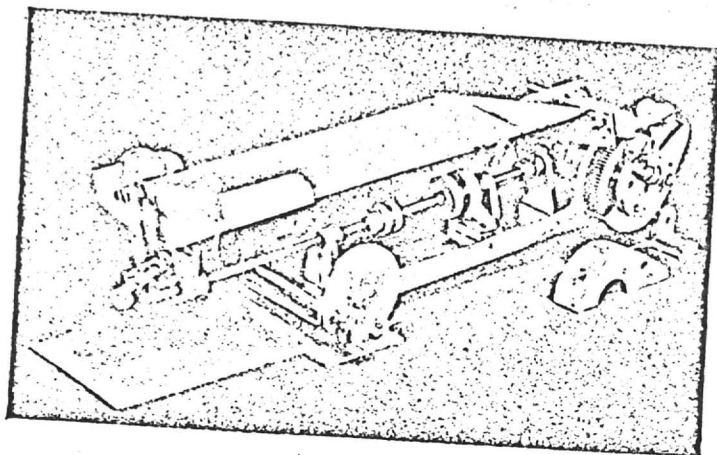


Fig. 2.—The micropanner fitted with the weired type lino-covered deck. $\times \frac{1}{4}$.

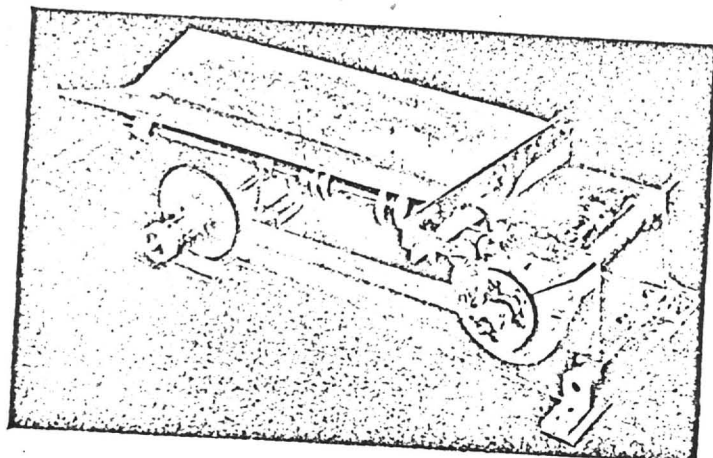


Fig. 3.—The micropanner with the open-ended aluminium deck; for use with organic liquids. $\times \frac{1}{4}$.

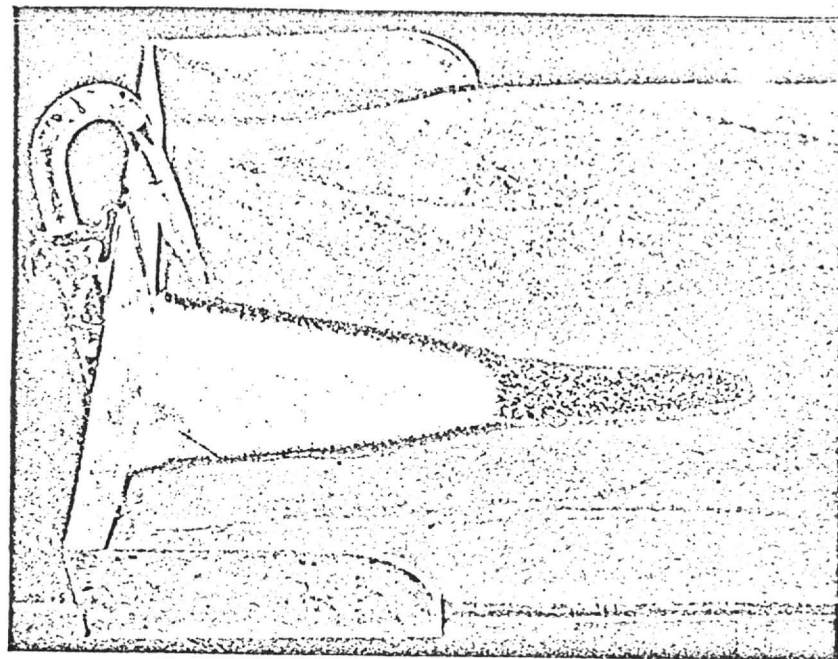


Fig. 4.—A galena/pyrite concentrate from quartz. $\times \frac{1}{4}$.

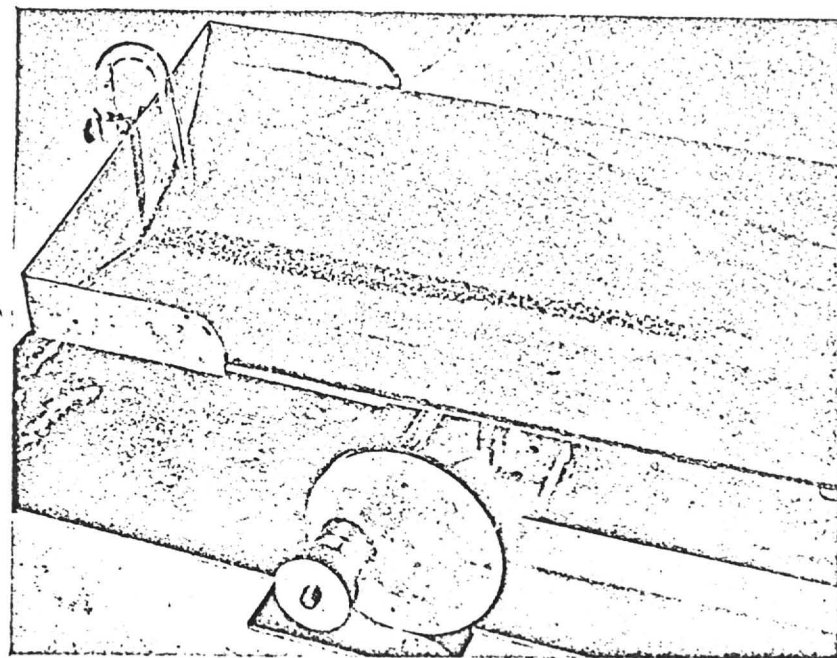


Fig. 5.—Monazite concentrate from a heavy-liquid 'sinks' fraction. $\times \frac{1}{4}$.

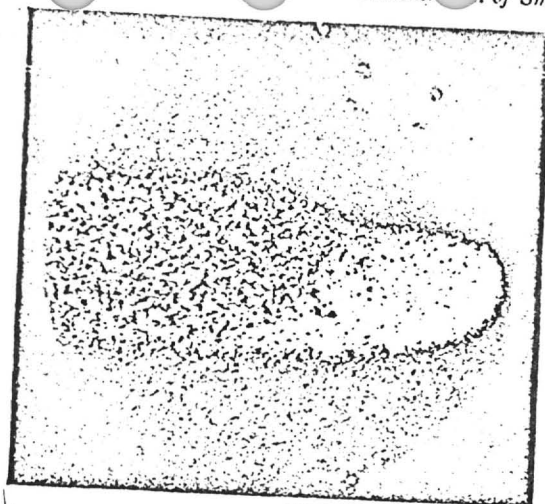


Fig. 6.—A 50μ zircon tip (white) with part of a coarse rutile middlings (black). A little white kyanite is present with the rutile. $\times 5$

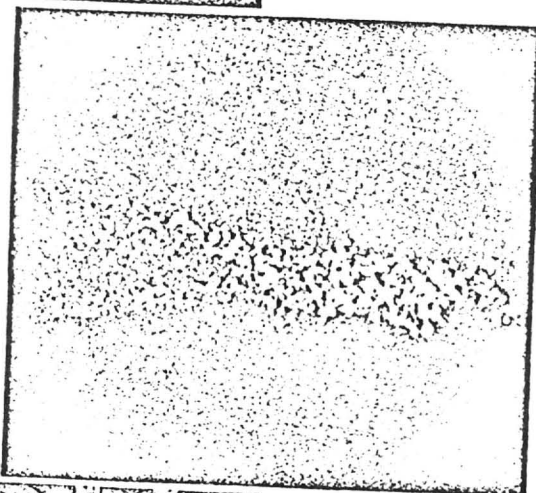


Fig. 7.—A secondary uranium mineral tip. A small part of the gangue tailing is in the field of view. $\times 4$

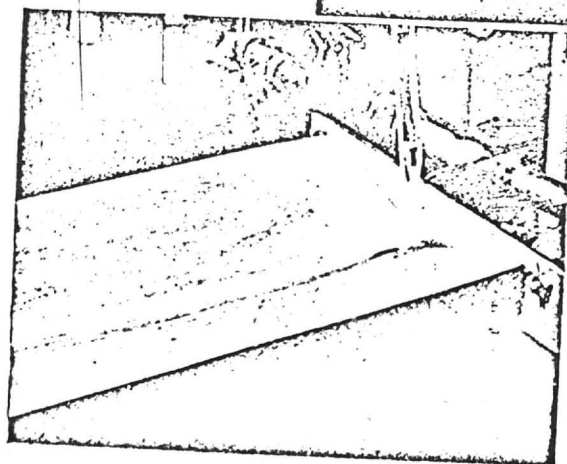


Fig. 8.—Minus 7μ ilmenite (black) and quartz tailing (white) on the aluminium deck. $\times \frac{1}{2}$

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4-8
RECEIVED OCT - 9 1979

JOHN G. DEAN

401 -- 934 - 0060

Elmdale Road, Box 230, Route 2, North Scituate, Rhode Island 02857

Oct. 3, 1979

REVIEWED

Memo to: T. H. Schloss, FAMCO; cc J. A. Briscoe, SEA

From : J. G. Dean

Subject: Working Agreement Plans for TEL.

OCT 8 1979

By 

Dear Tom:

My association with the TEL project over the last six months has reaffirmed the vast potential in the Tombstone area, but the bottleneck to its realization has clearly resided in personnel and associated interrelationships.

The meteoric rise in the price of gold and silver, while encouraging on the one hand, is symptomatic of basic economic problems such as inflation, taxes, welfare, declining productivity, lack of incentive, etc. Perhaps our real basic challenge is to find a new way to offset all these negatives in the dealings with personnel.

I have been trying in an amateur way to find a new key for applying my specialized services to struggling projects with big potential responsive to dedicated talent, but short on financial resources. My basic plan, as you know, has been to charge for just enough time to cover my tax deductible overhead, and apply whatever additional time seemed needed toward an equity interest which might eventually yield a capital gains reward.

It is recognized that this plan is simplistic and may be laced with pitfalls, but it is still hoped that at least the objective can be realized if enough qualified experts put their shoulders to the wheel. Thus far it hasn't seemed to work not because of legal or tax difficulties, but because of lack of belief and support.

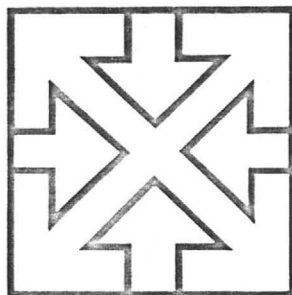
One thing now seems clear: there must be reciprocal agreements with the other parties involved. For example, a formula between time and investment money and equity interest should be developed to assure that everyone has maximum incentive for making his contributions. For example, I have now applied 20+ unpaid days to the project with a value of, say, \$300/D or \$6000+. If this contribution is related to a percentage equity interest, it would seem worthwhile to develop the accounting base and confirm it in a meaningful way. Each special arrangement with key personnel must be both well conceived and have full credibility to be effective in stimulating incentive.

JGD:bm



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James A. Briscoe, President
Registered Professional
Geologist

**Southwestern
Exploration Associates, Inc.**

October 3, 1979

Christine Rhodes
Cochise County Recorder
Office of the Recorder
Bisbee, Arizona 85603

RE: FILING OF LOCATION MAP FOR T.D.C. CLAIM GROUP

Dear Mrs. Rhodes,

Enclosed please find the claim group location map for the T.D.C. unpatented lode mining claim group, located in the Tombstone Mining District, Cochise County, Arizona.

We are requesting that this instrument be recorded in your county, so that we will be in compliance with Section 27-210 of the Legal Statutes for the State of Arizona, concerning the filing of a location map for unpatented lode mining claims, located prior to September 3, 1978. For information related to local county filing, Bureau of Land Management serial numbers and legal descriptions for originally recorded Location Notices, please see Attachment 1 of map.

A check for \$9.00 is also enclosed to cover the recording fee.

Respectfully submitted,


Clark D. Green
Geologist/Landman

CDG/slr
P-L418

encs. Location Map
S.E.A. Check #1131
Purchase Order #5586

U. S. Department of Labor

Mine Safety and Health Administration
4015 Wilson Boulevard
Arlington, Virginia 22203



NOV 27 1979

MEMORANDUM FOR: ALL METAL AND NONMETAL MINE OPERATORS

FROM: THOMAS J. SHEPICH
Administrator for Metal and Nonmetal
Mine Safety and Health

SUBJECT: Compliance Assistance Visits

The attached press release outlines a new program to assist operators to comply with the provisions of the Federal Mine Safety and Health Act of 1977. The program makes inspectors available, upon the request of operators, to conduct compliance assistance visits (CAV) in the following categories:

1. New mines not yet producing;
2. Seasonal, closed, or abandoned mines prior to reopening;
3. New facilities or new installation of equipment in an operating mine.

A CAV will be conducted after a request made by an operator to the appropriate subdistrict manager. In order that MSHA may be most responsive, such requests should be made at least one to two weeks in advance of the date on which you want the visit. The CAV would cover one or more of the following areas as requested by the operator:

1. Miscellaneous iron installations (guards, walkways, stairways, etc.);
2. Equipment with moving parts (conveyor belts, crushers, screens, etc.);
3. Mobile equipment (trucks, loaders, etc.);
4. Proposed plans and designs;
5. Planned training, and
6. Other areas as appropriate.

The inspector, while conducting a CAV, will issue notices of violation whenever he observes a potential violation or imminent danger situation. Each notice will be clearly marked "CAV-NONPENALTY" and will not be included in any fashion in the assessment process. The purpose of the notice is to alert the mine operator to a potentially hazardous condition or practice so that it may be corrected prior to the beginning of operations, or use of the installation, equipment or plan, etc. You should be aware, however, that regular inspections will

News

United States
Department
of Labor



Office of Information

Washington, D.C. 20210

MINE SAFETY AND HEALTH ADMINISTRATION

USDL: 79-818

CONTACT: FRANK O'GORMAN
OFFICE: 703-235-1452
AFTER HOURS: 703-524-5280

FOR RELEASE: IMMEDIATE
Tuesday, November 20, 1979

MSHA INITIATES COMPLIANCE ASSISTANCE VISITS IN METAL AND NONMETAL MINING INDUSTRY

The Labor Department's Mine Safety and Health Administration (MSHA) has initiated a program of compliance assistance visits (CAVs) in the metal/nonmetal (non-coal) mining industries, under which an inspector will point out violations of the 1977 Mine Act without penalties being assessed.

The CAVs will cover the following categories: new mines not yet producing; seasonal, closed or abandoned mines prior to reopening; new facilities or new installations of equipment in an operating mine. The program would not apply to any on-going construction or other work being performed.

During the visit, the inspector will issue notices of violations to alert the operator to potentially hazardous conditions so that corrective action may be taken prior to the beginning of operations or the use of installations, equipment or plans. No monetary penalties will be assessed for the violations cited. However, once operations are begun and a regular inspection is being conducted, the inspector will check all notices issued during the CAV to ensure that the conditions or practices noted have been corrected.

The program will have another important impact. MSHA experience and statistics show that the most dangerous period in mining comes at the start of an operation or with the installation of new equipment. The CAV program can pick up dangerous situations before the miners are exposed to them and can start the operation on a safe path.

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U.S. Department of Labor
Mine Safety and Health Administration
Arlington, Va. 22203

Official Business
Penalty for Private Use, \$300

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First Class Mail

Lab-441



RECEIVED JAN 21 1980

0201521 CNTY: COCHISE
TOMBSTONE HEAP LEACH FACILITIE
SOUTHWESTERN EXPLORATION ASSOC
4500 E. SPEEDWAY, SUITE 14
TUCSON AZ 85712

Dear Tom,

11-27-79

RECEIVED "M" 29 1979

re yours 9-21-79 & our
Phone conversation regarding the
filing of our claim with
Cochise Co. Its been almost
2 mo & we have no record
from Co recorder that assessment
work has been recorded
could you please follow this
up & supply us with necessary
records. also things mentioned
in last Par. your letter.

might mention to Jim. we have
never recd an operation report
from Schloss. wrote him today
asking for same. we recd
Nov ad Royalty

REVIEWED

DEC 20 1979

By JM

Sincerely

Bill Hight

Consultants in:

- base & precious metals • uranium
 - coal • geothermal • environment
 - remote sensing • color aerial photography
 - interpretation-image processing
- Worldwide Mobilization



**Southwestern
Exploration Associates, Inc.**

December 14, 1979

4500 E. Speedway, Suite 14
Tucson, Arizona 85712
(602) 795-6097

James A. Briscoe, President
Registered Professional
Geologist

Mr. Bill Hight
Tombstone Development Company
P.O. Box 1445
Grand Island, Nebraska 68801

Dear Mr. Hight,

My sincere apologies for not getting the requested materials to you sooner, but my work and thoughts on Tombstone have digressed to other project areas with little time left for catching up on past work.

Information from Tombstone has been very fragmental. Last I heard, before Thanksgiving, things were progressing well. They were about to take delivery of a 300 ton per day precipitation plant and were getting ready to install a crusher to do some test crushing and leaching. Most of this information is second hand, from the Escapules. To my knowledge only two conversations with Tom Schloss have been carried out since our last telephone conversation, and these were both very uninformative and short. Secrecy seems to be the order of the day.

In regards to the materials requested, I'm including all materials pertinent to 1979 assessment recordings with Cochise County. To date we have not received a reply back from the Bureau of Land Management (B.L.M.), which is normally customary, for acknowledgement of receipt of yearly assessment records and recordings of Claims. Often, though, the owner of record will receive this acknowledgement and agents, such as ourselves, never receive necessary paper work. To this end, my assistants have been in contact with the Bureau of Land Management in Phoenix, and have assured me all necessary materials are filed and in order. You will please note that we have annotated B.L.M. serial numbers to our Attachment 1 or Master Claim List. In the future, you may wish to use this as an attachment to the proof of labor, as it is required by the B.L.M. Should it be necessary to contact the B.L.M. in regards to the T.D.C. claim group, you will need to reference the serial numbers also. (B.L.M. - Phoenix, Arizona, telephone number (602) 261-3706, Land Records Division Open 10:00 A.M. to 4:00 P.M. weekdays).

Bill Hight
Tombstone Devl. Co.

Dec. 14, 1979
Page 2

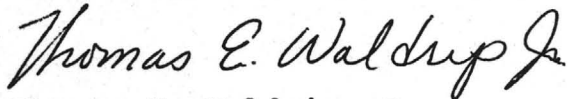
Other materials included are:

1. Xerox copies of location notices for T.D.C. One through 18 claim papers with annotated information about owners of records and location by quarter section as required by the B.L.M. and not found on the original claim paper.
2. Original copy of recorded assessment document for year 1979, recorded in Cochise County and transmitted to B.L.M.
3. Master Claim List
4. County recorded copy of map and claim list as required by Revised Arizona Statutes, October 1978.

All requirements have thus been met, both federal and state, for the 1979 Assessment Year and Organic Act Regulation deadlines. The claims are valid for another year.

Our best regards are transmitted during the Holiday Season, with a wish for a fruitful and prosperous New Year for yourself and your family.

Sincerely,



Thomas E. Waldrip, Jr.
Land Division Manager

TEW/db
P-418
03-020/19