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REGIONAL PATTERNS

A regional distribution of ore minerals was studied by analyzing the assay values from all of the dumps in the District. The results are shown in the following maps. The trend-surfaces show the following:

1. Gold is not widely distributed and it is the highest along the Empire-Contention-Grand Central trend.

2. Zinc is related to the gold mineralization. The zinc forms a halo around the gold high(where there is a zinc low) and the highest grade zinc is to the south and east of the gold high.

3. Silver exhibits a regional pattern similar to that of lead and copper. The silver high is shifted from the gold high in the eastern part of the District to a more central location around the Lucky Cuss and Emerald mines.

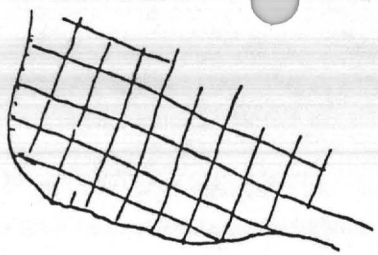
4. Lead exhibits a regional pattern with high-grade veins in the south-west portion of the District.

5. Copper is also widely distributed, with very high-grade copper having been mined in the Emerald(Central area). The copper trend to the southwest is in the breccia pipe area by the Charleston Lead Mine.

Topo maps with claim-group locations are presented following the regional distribution maps. The third map shows the location of some drill holes in the area.

Major Mines - Dumps

Tombstone



TOMBSTONE

Tough nut

Silver Thread

Empire

West Side

Tranquillity

Defence

Herschel

Ingersoll

Tribute

Bass

Sulfuret

Contention

Old Guard

Little Joe

Lucky Cuss

Grand Central

Merimac

State of Maine

Bonanza

Tomb. Ext.

Telephone

NW

San Diego

Sailor

Oregon

Prompter

Bunker Hill

Rattlesnake

Randolph

Emerald

Silver Plume

Comet

1 mile ½ 0 1 mile

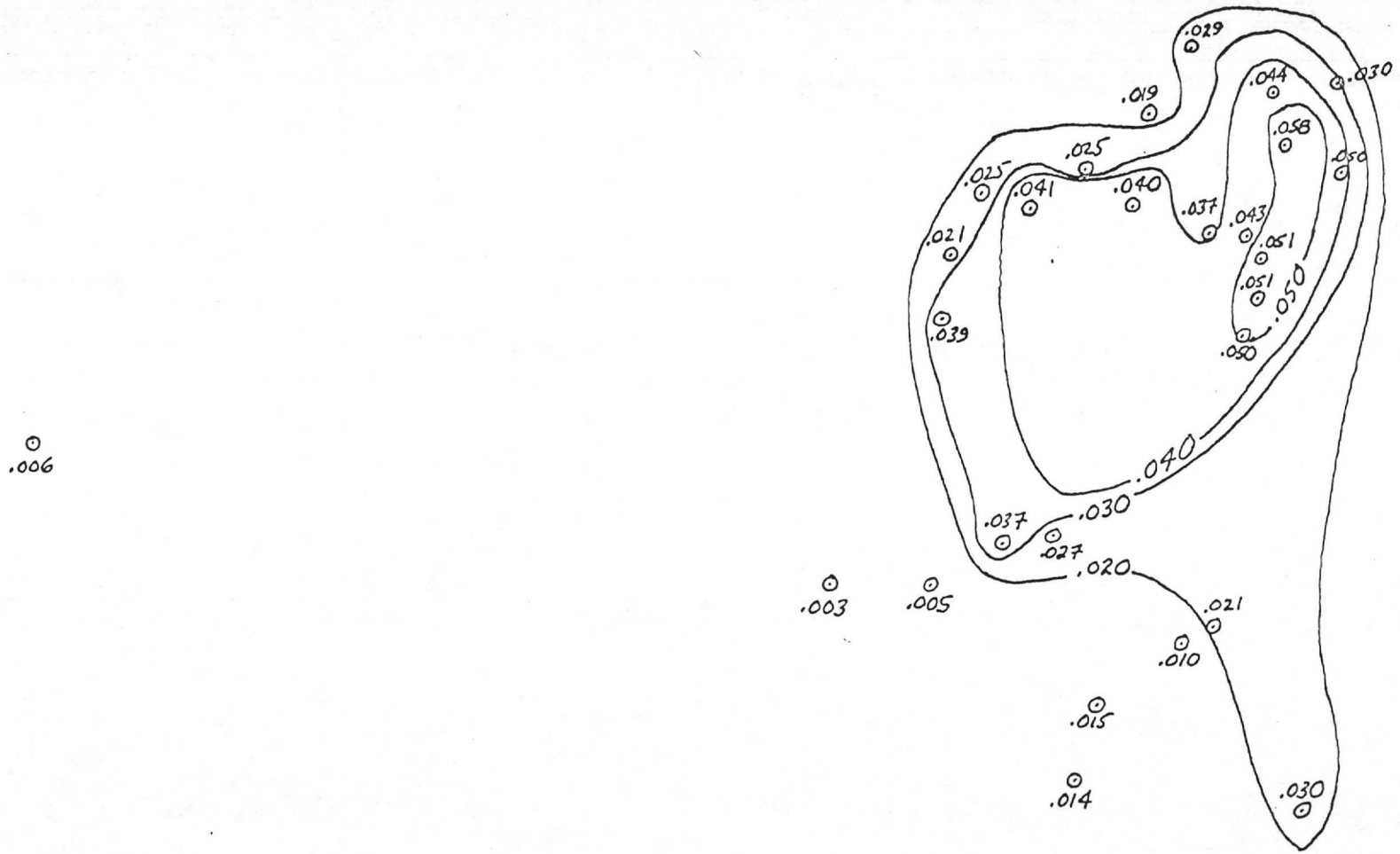
Ground Hog

Scale

RFH - June 13, 1977

TOMBSTONE DUMP ASSAYS

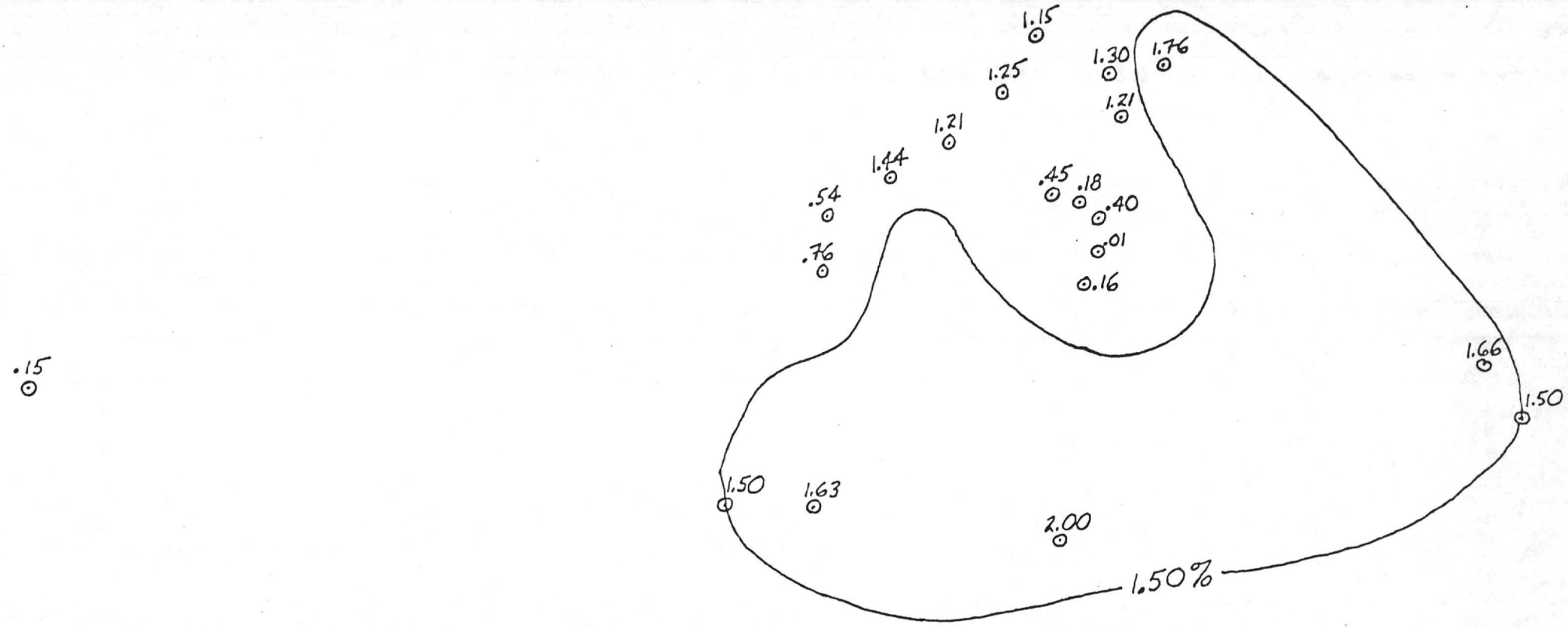
Gold (T.oz/ton)



RFH - June 13, 1977

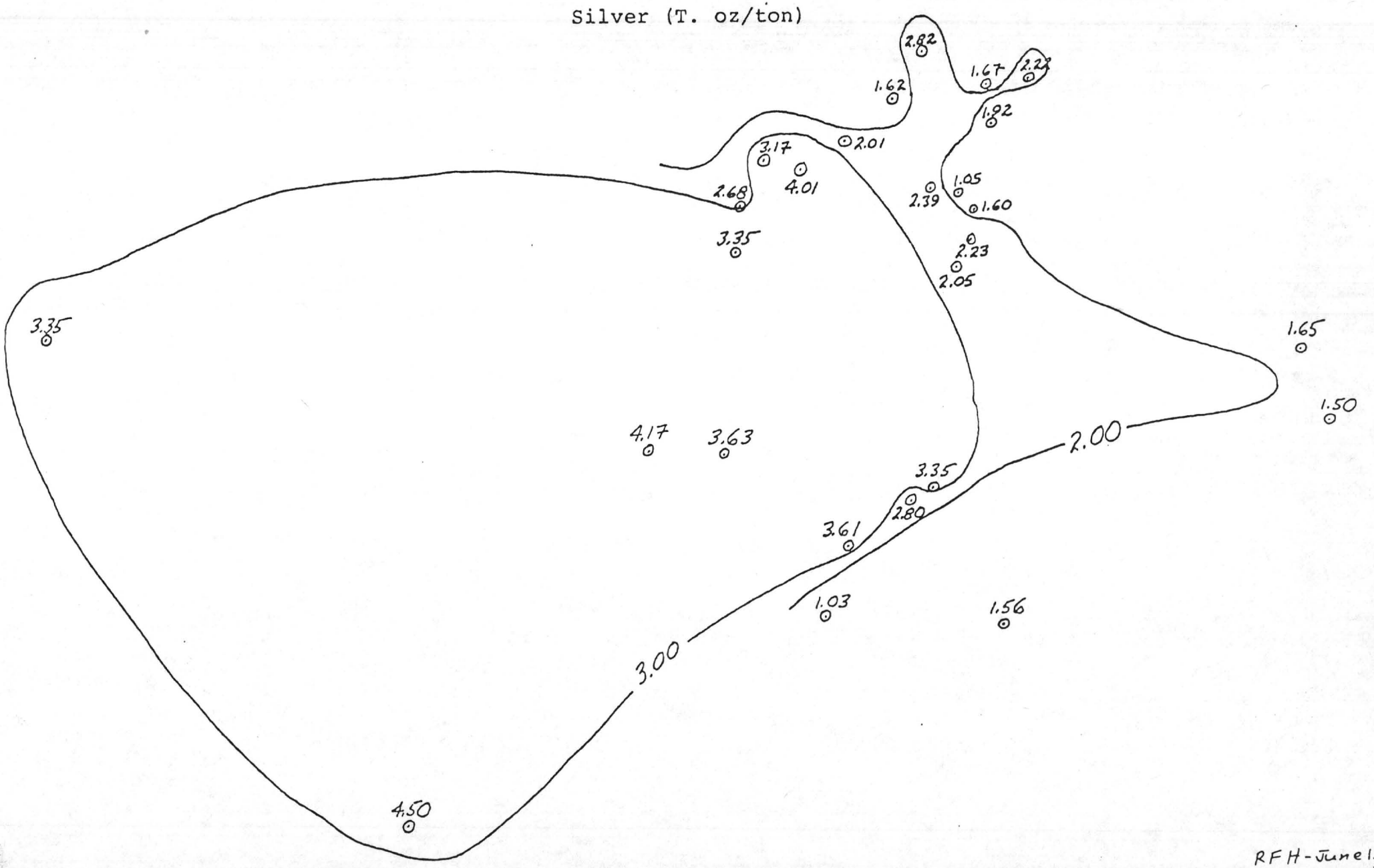
TOMBSTONE DUMP ASSAYS

Zinc (%/ton)



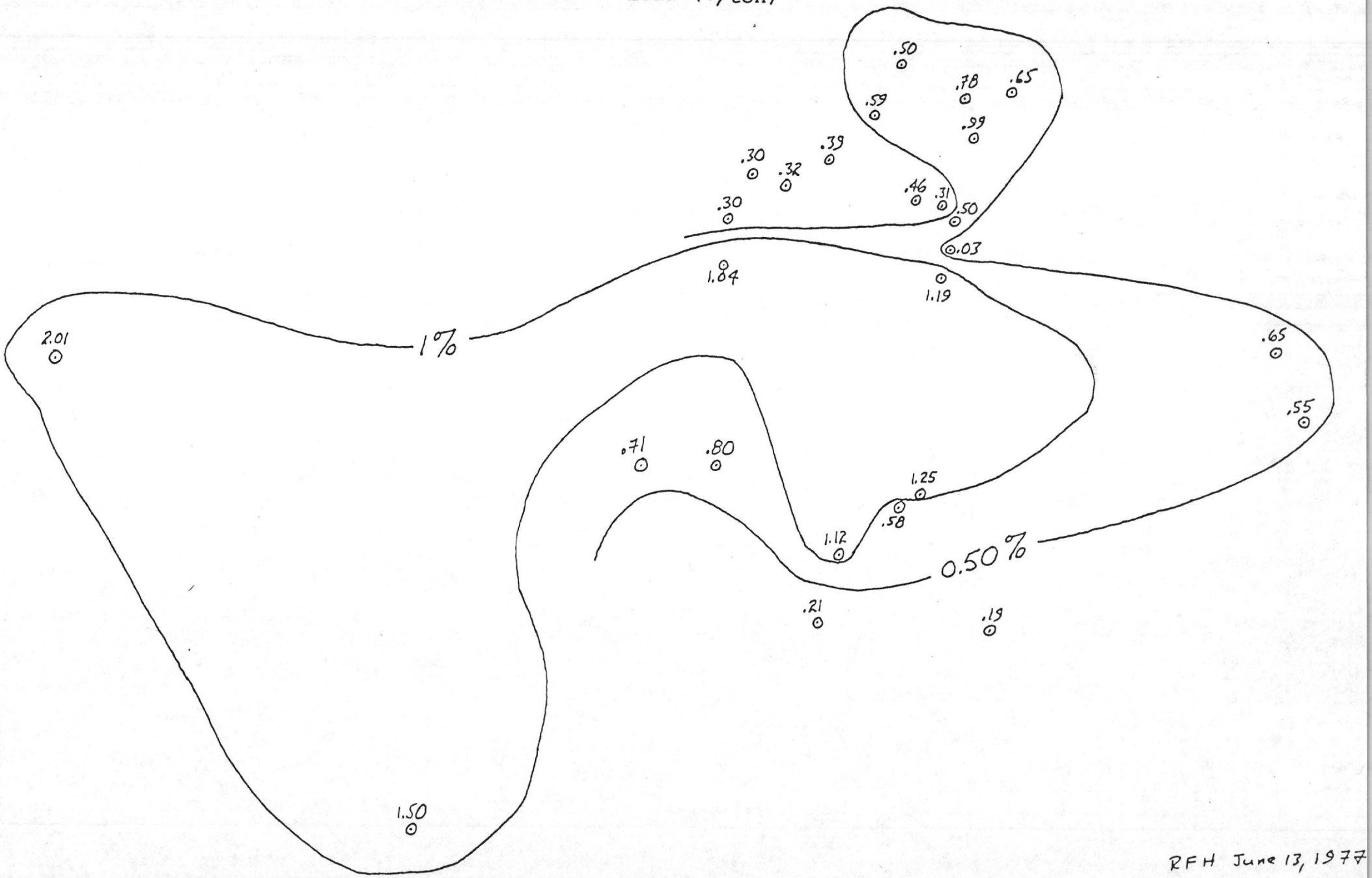
RF Hewlett - June 13, 1

TOMBSTONE DUMP ASSAYS



RFH-June 13, 1

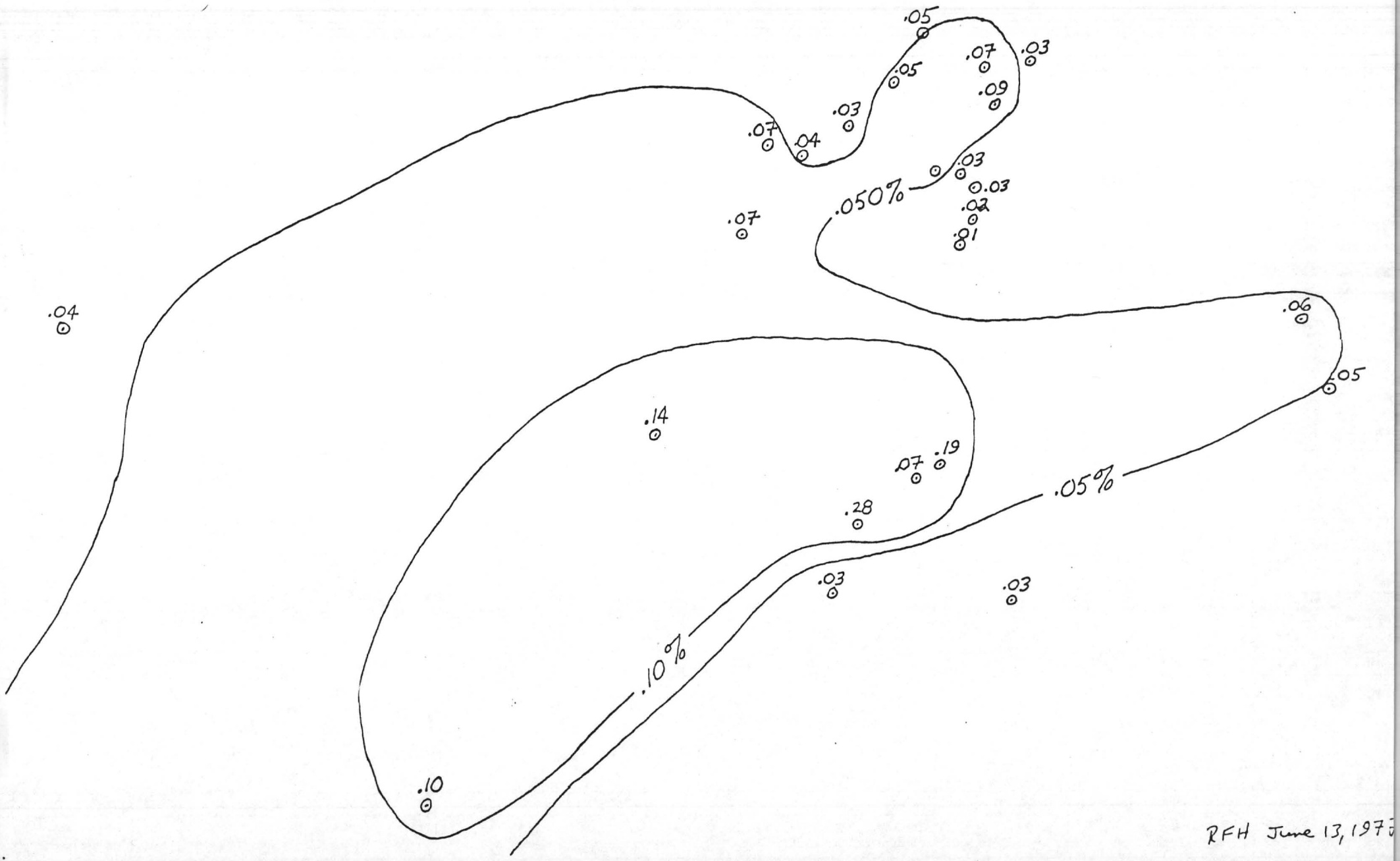
TOMBSTONE DUMP ASSAYS



RFH June 13, 1977

TOMBSTONE DUMP ASSAYS

Copper (%/ton)



RFH June 13, 1977

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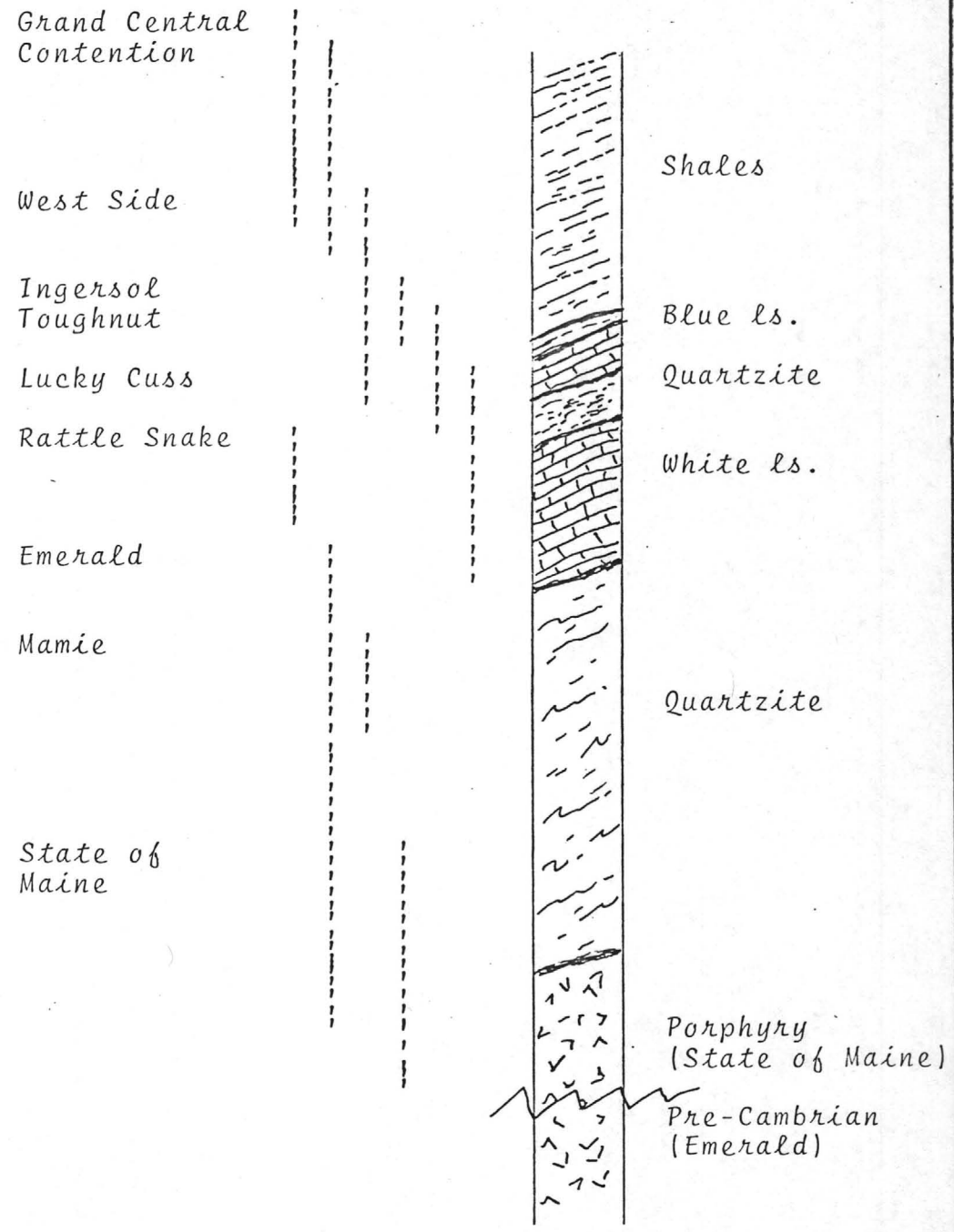
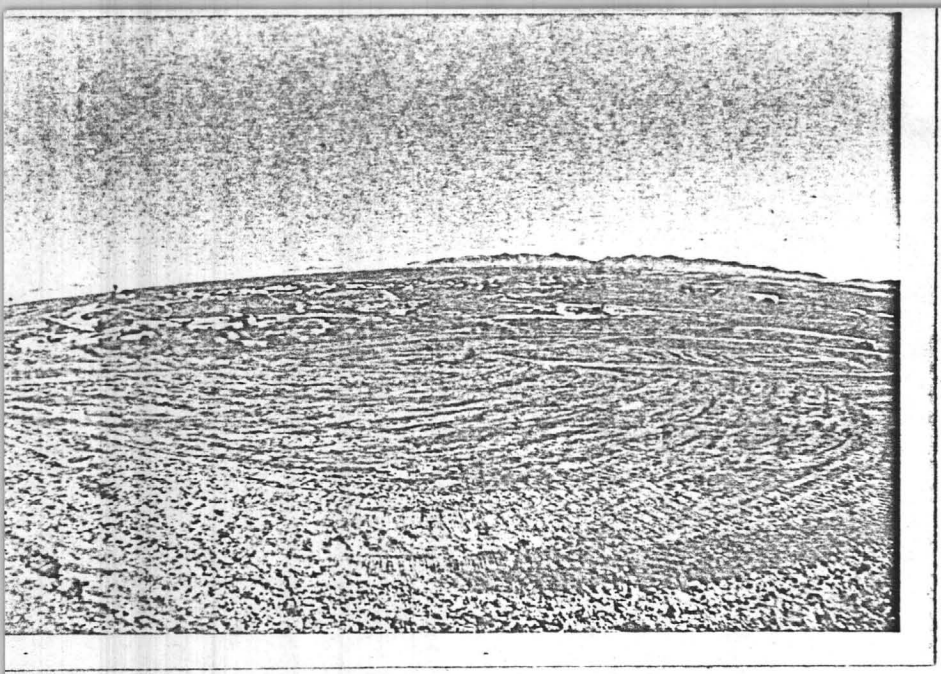
DEPOSIT DESCRIPTIONS

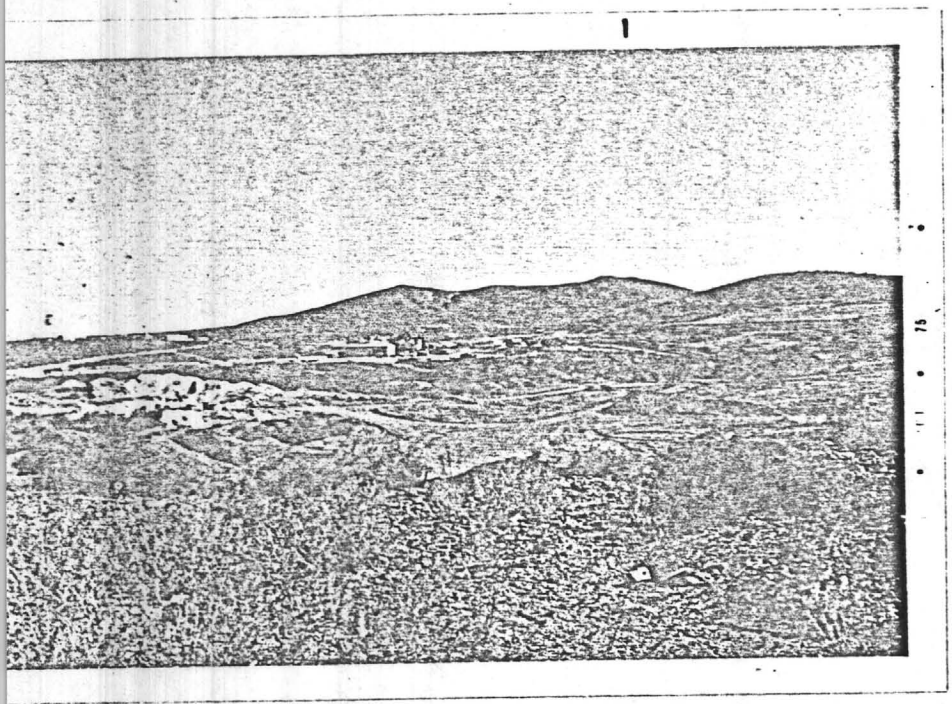
Broad geological environments present in the Tombstone District are the Contention-Toughnut Series in the Eastern part of the District(just south of town), the Manganiferous Limestone Group in the Central part of the District, and the Emerald Series in the Southwest part of the District(south of the Manganiferous Group).

The comparative geological position of various mines is shown....

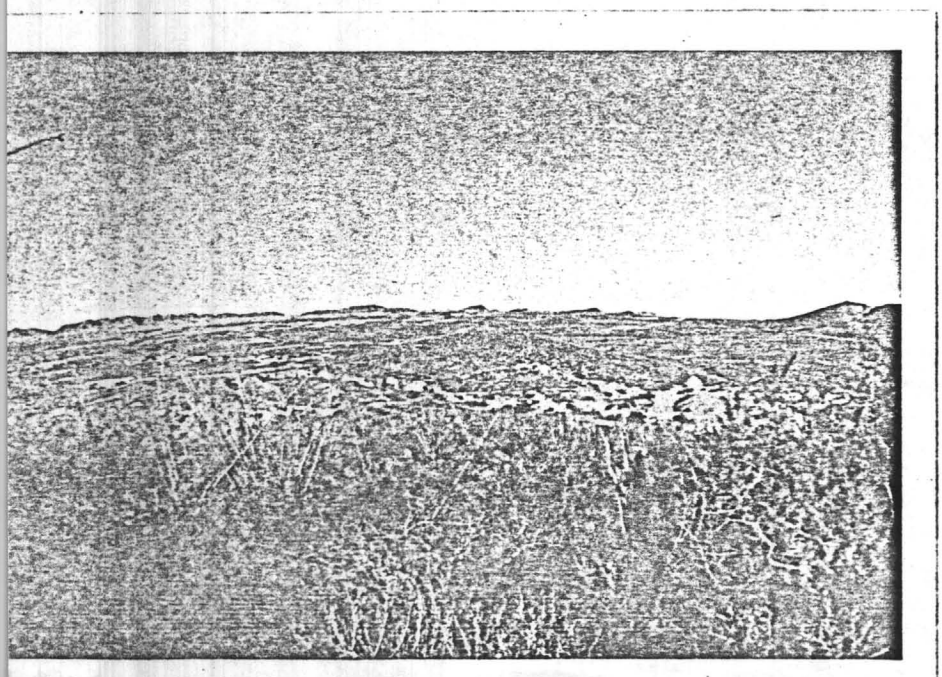




Contention-Toughnut Series area; West Side-Vizina on far left, Toughnut-Empire in center, and Contentment under heap in far right. Viewed from Contention dump area-dump removed.



Empire-Tranquillity area; looking over Tranquillity. Contention at far right and Spip shaft near blue pick-up. Viewed from the Empire mine area.



Contention dike area; Notice "line" of caved workings along the dike. This is an open-pit target, as well as underground. Very good values exist all along this structure. Also, very high-grade underground samples are found along this structure.

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The previous comparison of the location of the workings of the various mines in the geologic column shows that ore-grade mineralization transverses a large vertical interval. Underground workings have been extensively sampled, and based on deep drill holes, the vertical extent of ore-grade mineralization exceeds 3,000 feet.

Contention-Toughnut Series

This sequence of limestones, shales, quartzites, and other sedimentary members are Bisbee and Naco formations (see Geology in the Appendix). A stratigraphic section is on the following page. The mines in this series are in the eastern portion of the District. Mines included in this series are the Vizina, Toughnut, and Silver Thread on the north, the Empire, Tranqility, and West Side in the central portion of the series, and the Contention and Grand Central on the far south portion of the series.

Structural features in this series are dikes, veins, and fissures cutting limestone and other beds. Localization of the mineralization is at contacts of the vertical structures (that are "feeders") with sediments such as limestones, shales, and quartzites and "manto" type replacement along anticlinal structures. Drag folds on the upper-flanks of anticlines are the most important ore producer, especially on the lower limbs from intersecting vertical structures.

The main lines of flexure are:

1. Anticline through Defence, Intervenor, West Side, Sulphuret, Flora Morrison, and into the Contention. Approximate direction N. 68° W.

2. Anticline through Toughnut, Girard, towards the Tranquillity, Head Center, and Contentment. Approximate direction N. 68° W.

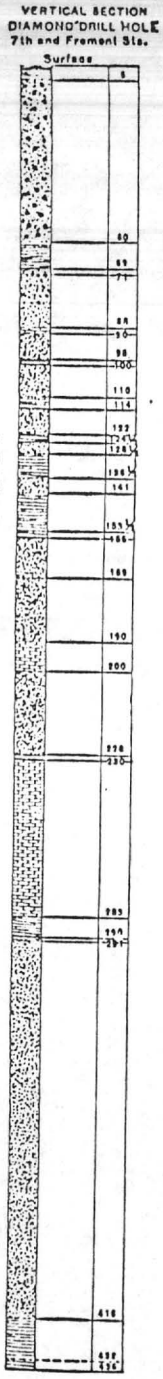
3. Anticline through Goodenough into Hawkeye and Little Wonder. The major axis of this blanket, if prolonged, would pass through the Empire and Silver Thread to the North Point claim. Approximate direction N. 70° W.

4. Vizina through the corner of Goodenough and Gilded Age and the western end of the Way Up. Direction of N. 77° W.

Formation.	Thickness.	Total Depth
1. Soil and "cement"—Caliche..	5	5
2. Detrital, Clay with loose rock of limestone and quartzite.	55	60
3. Shale, loose and broken.....	9	69
4. Blue Limestone.....	2	71
5. Broken Shale and Quartzite...	17	88
6. Blue Limestone.....	2	90
7. Grey Quartz, iron stained and broken.....	8	98
8. Black Shale, broken.....	2	100
9. White Quartz, iron stained...	10	110
10. Black Shale, broken.....	4	114
11. Grey Quartz, iron stained, broken.....	8	122
12. Black Shale.....	2½	124½
13. Quartzite, Grey.....	4	128½
14. Black Shale.....	8	136½
15. Quartzite, Grey.....	4½	141
16. Black Shale.....	12½	153½
17. Shale with calcareous seams..	2½	
18. Quartzite, brown stained.....	13	169
19. Quartzite, hard blue, with pyrites at bottom.....	21	190
20. Blue Limestone.....	10	200
21. Hard Quartzite, iron stained.	28	228
22. Black Siliceous Shale.....	2	230
23. Blue Limestone.....	53	283
24. Black flinty quartz, limestone and quartzite (assay 3.2 oz. silver).....	7	290
25. Blue Limestone.....	1	291
26. Quartzite, Novaculite.....	125	416
27. White Limestone.....	—	—
Water-level		432
Bottom of Hole.....		436

The so-called quartzites of this part of the Section are very fine in grain without the usual granular structure, and may be properly called novaculites, or hone-stones. This is true especially of the lower bed, 125 feet in thickness. It is a white, compact, dense rock, breaking with a conchoidal fracture and without visible grains.

FIG. 4.



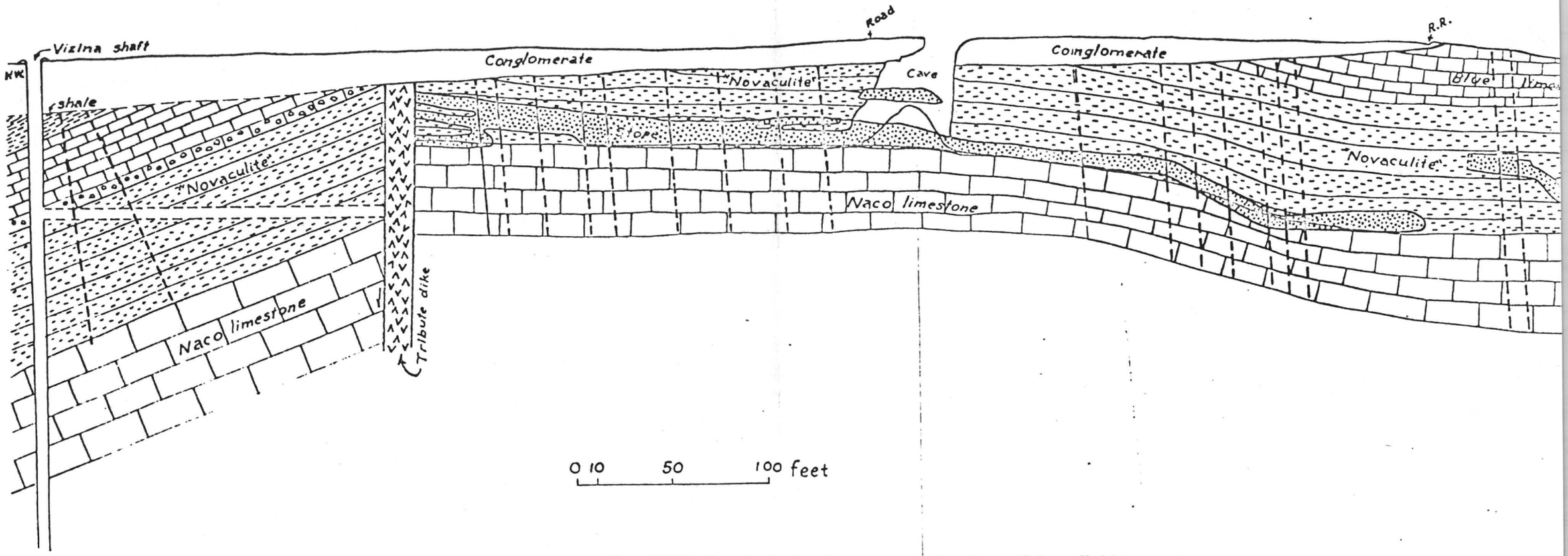


Plate XVIII.—Longitudinal section near axis of northeast Vizina roll, loking northeast.

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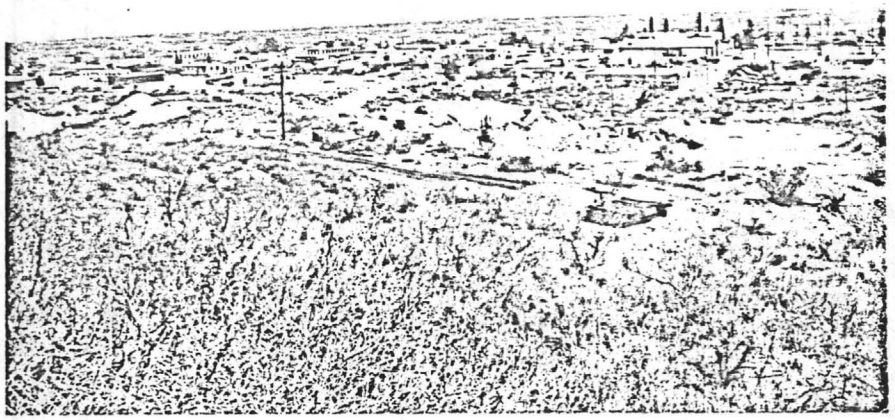
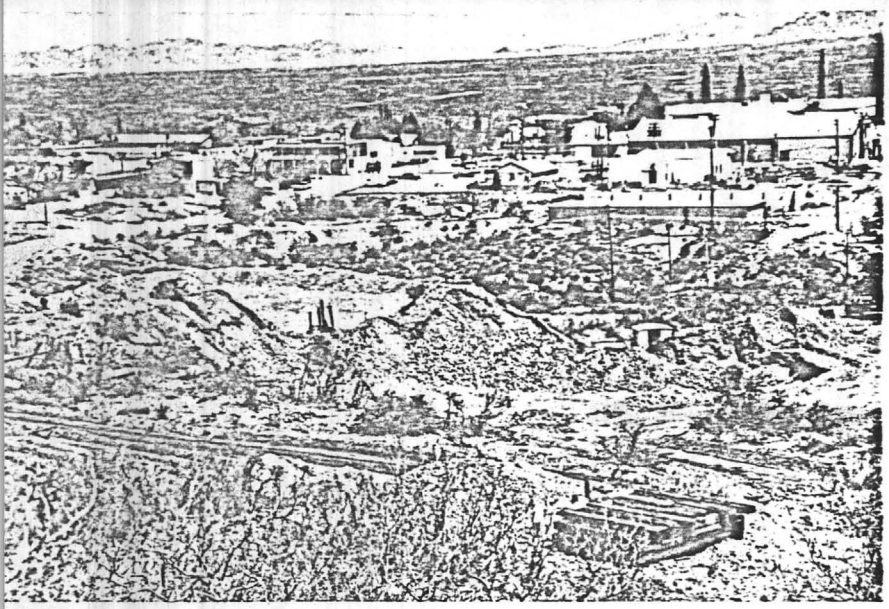
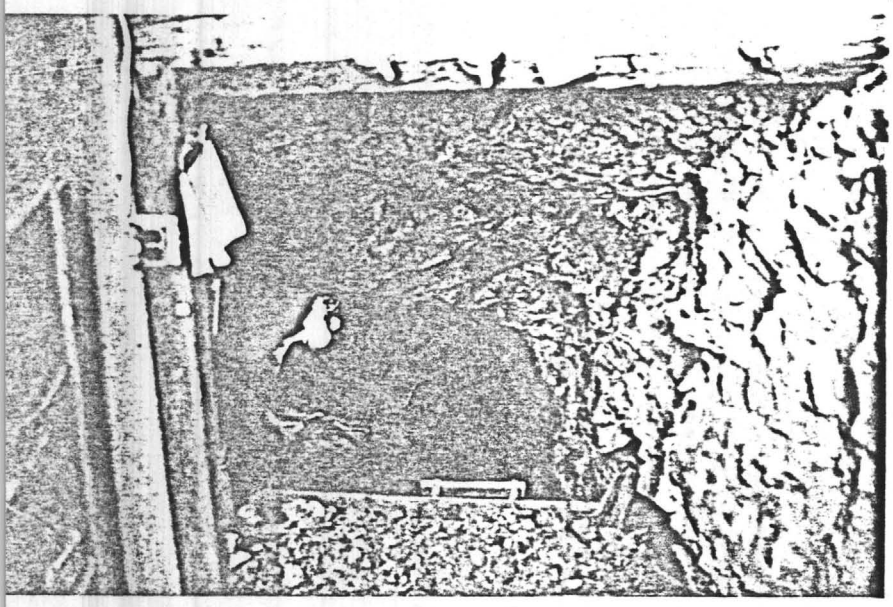
VIZINA: The Vizina mine was one of the closest to the town; the mine is south of the Nellie Cashman(in the south part of town). The Vizina roll is shown in the following plate. Notice that on the other side of the Tribute dike that the ore follows the Bisbee-Naco contact, with the main host being the Novaculite member.



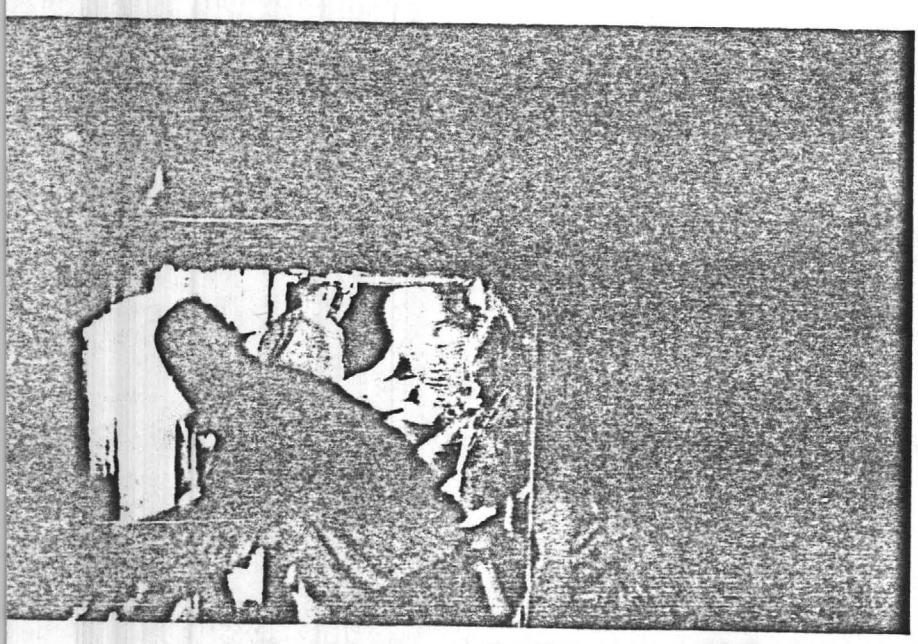
Vizina mine and dumps in center left, with an open-stope just beyond near the buildings. Covered-shaft is the Girard, which the author had re-timbered to the 400 level. Metal building between Girard and town is the Goodenough Incline with the Toughnut Incline to the left-near the small dumps.



Toughnut-Goodenough area; Toughnut east-dump lobe area. Goodenough Incline by small metal building in right cneter. Foreground covered shaft is Girard.



Incline portal; Incline is in very good shape-notice the lights down the decline. Gob starts at the surface.



Underground collection station for leach system. Station is on the 400 leve of the Goodenough. From here, all of the mines are interconnected; there are 200 miles of workings.

HEWLETT MANAGEMENT

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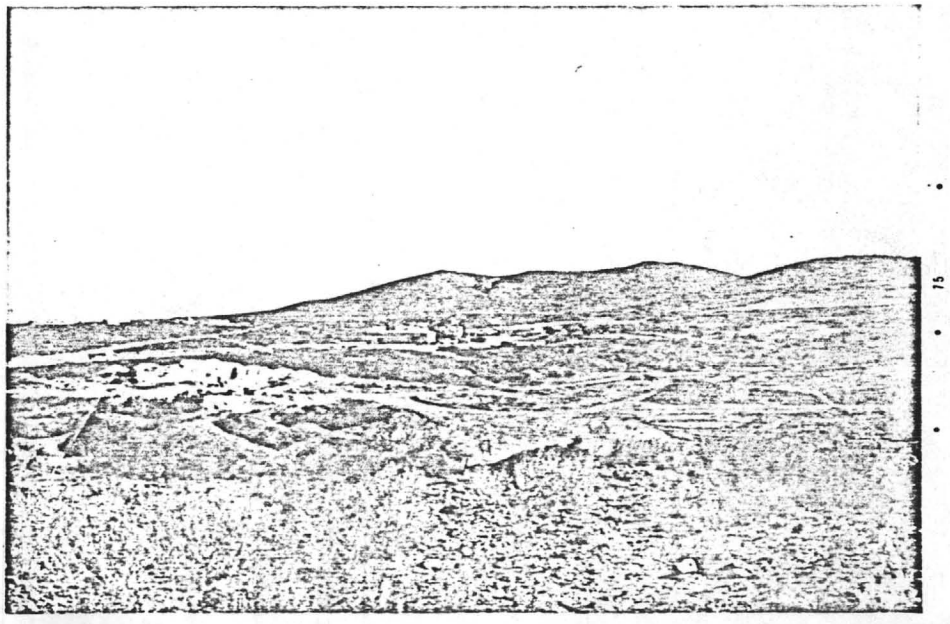
TOUGHNUT-GOODENOUGH-EMPIRE-TRANQUILLITY: The Goodenough Incline is the best access to the Tombstone underground workings in the District. The Incline is on a 45° dip down to the 300 level. There a cross-cut goes back toward the Toughnut and a decline goes to the 400 level. From there, access is to the Empire, West Side, Tranquillity, Silver Thread and the Silver Belt and Way Up which are under the town. The author and others have spent considerable time in these workings, sampling and mapping, and in situ leaching.

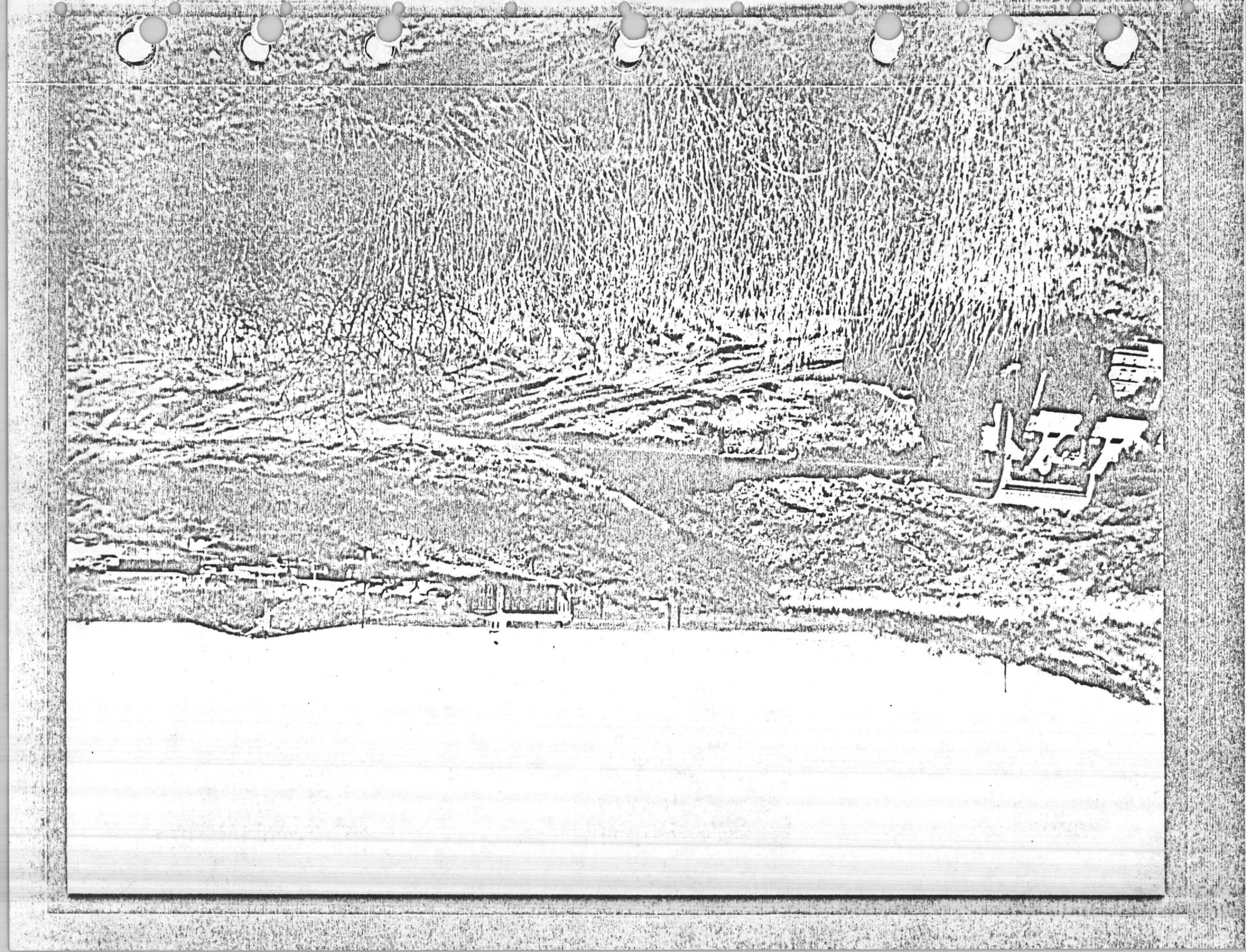
The Goodenough Incline was sank in a very-well mineralized blue limestone that was about 20 feet thick. Gob remaining in the Incline averages 10 ounces Ag and .10 ounces Au per ton.

Stopes with gob and un-mined commercial ore form a continuous sequences of workings. From the Goodenough and Toughnut Inclines (both with ore and gob) follows at the 400 level the China stope, the Gallery, Babe's stope, the Girard Stope, West Side stopes, etc.. The workings are in good shape; they were approved and checked by the Bureau of Mines at regular intervals. The only places where the air is bad is where sulfides are oxidizing, such as under the town on the 400 level(Silver Belt).

Following are maps presenting the ore control; anticlinal structures intersected by vertical structures which serve as "feeders". Following are these structures:

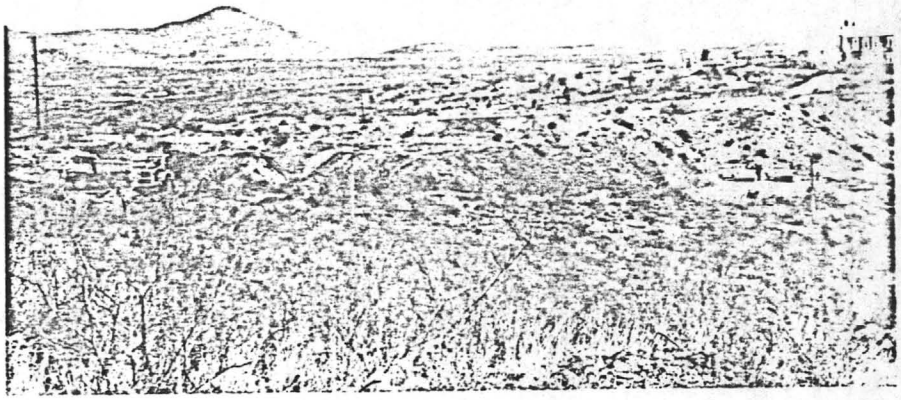
Anticlinal Structure	Vertical Structure
Goodenough roll	West Side Fissure
Quarry roll	Sulphuret Dike(s)
Holderness roll	"409" Fissure
	Empire Dike



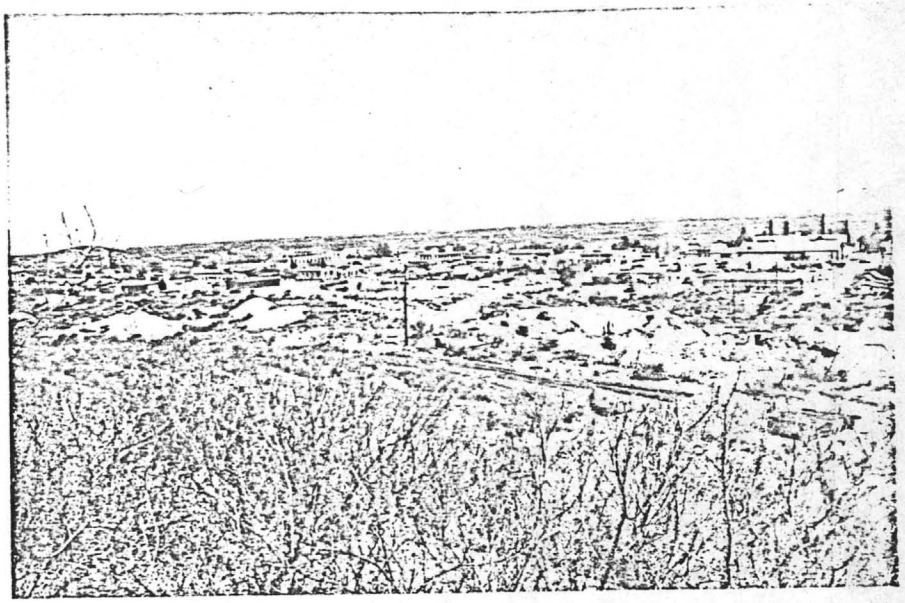


Toughnut dump;
Early phase of hauling
the dump to the heap.
Toughnut Incline is
beyond the pole to
the far left.

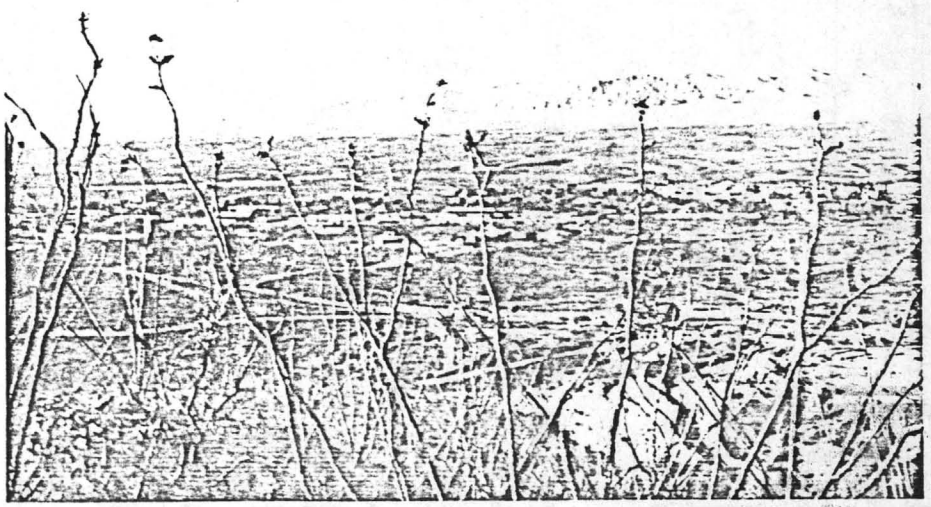
Photo on the facing
page is the early
testing-sampling
of the Toughnut
dumps.

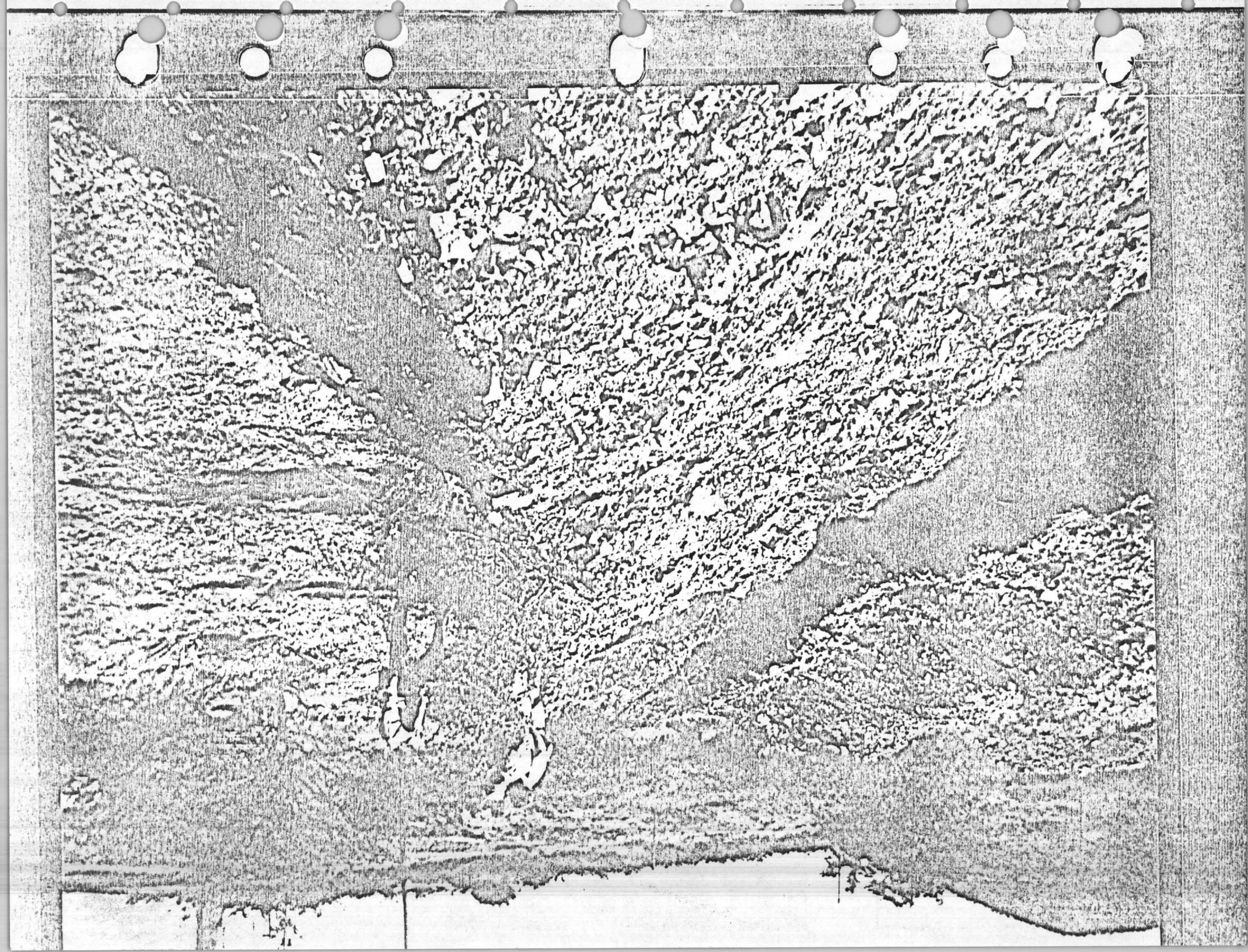


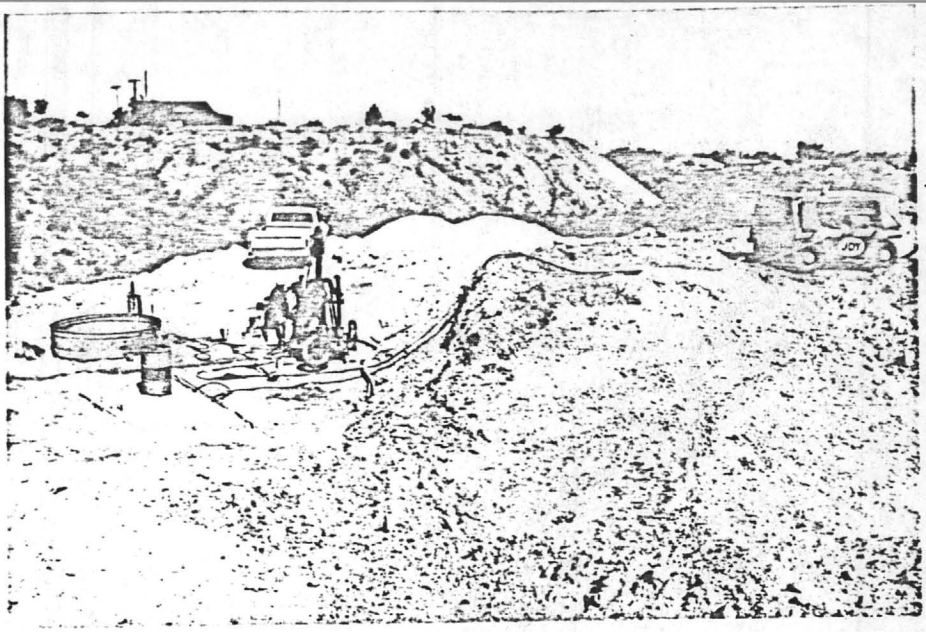
Toughnut dump area;
Most of the dump
has been hauled
to the heap. Work-
ings can be traced on
the surface from the
Goodenough Incline
(small building) to
the Toughnut Incline
(left of pole) and
near small dumps.
Blue limestone
outcrop's in this
area.



Toughnut-Goodenough-
Empire area from
the Contention
mine, looking
over the
Tranquillity
mine area.

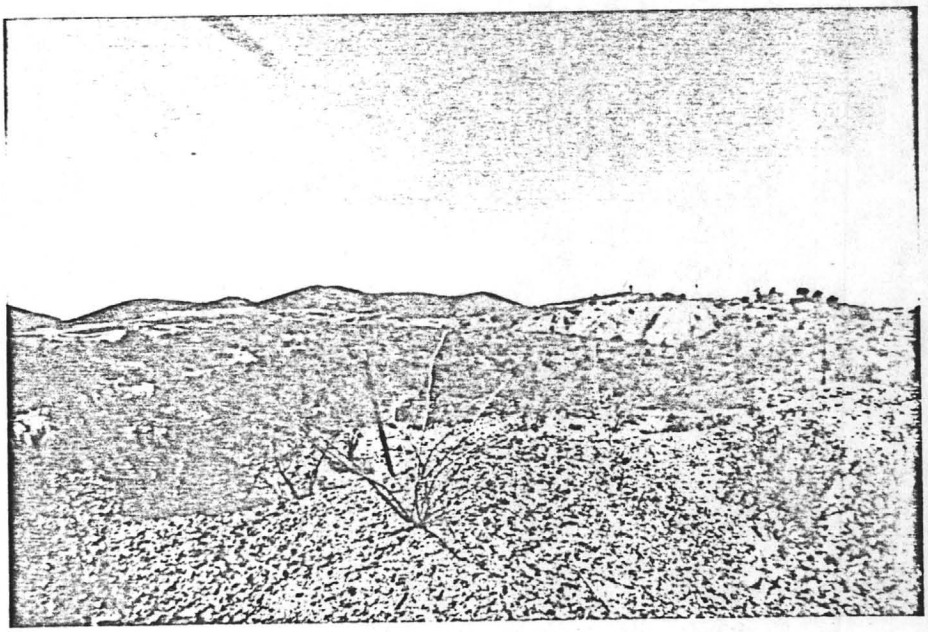




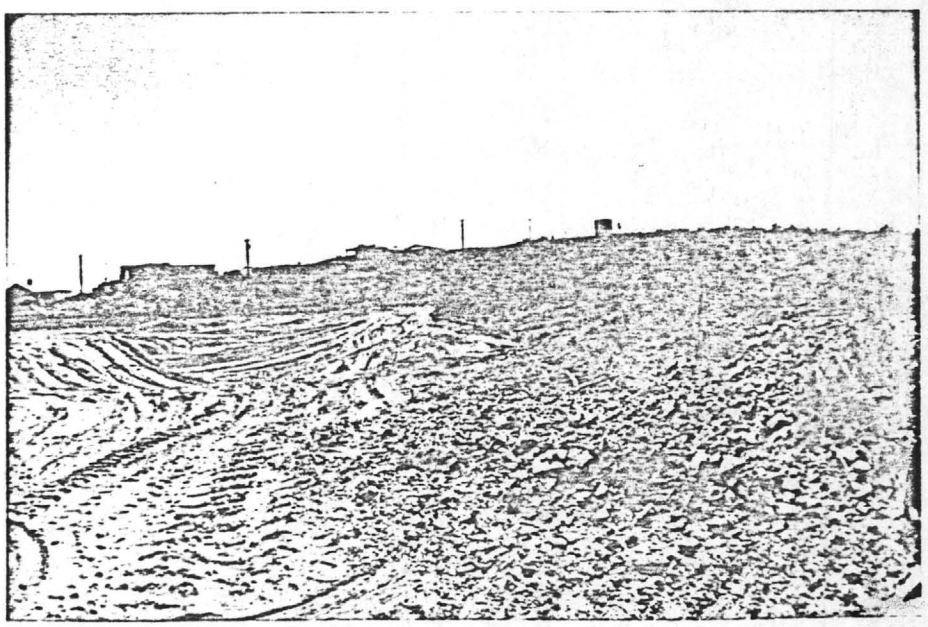


Drilling near Skip Shaft looking at Empire dump before it was hauled to the heap. Red building is where the core is stored.

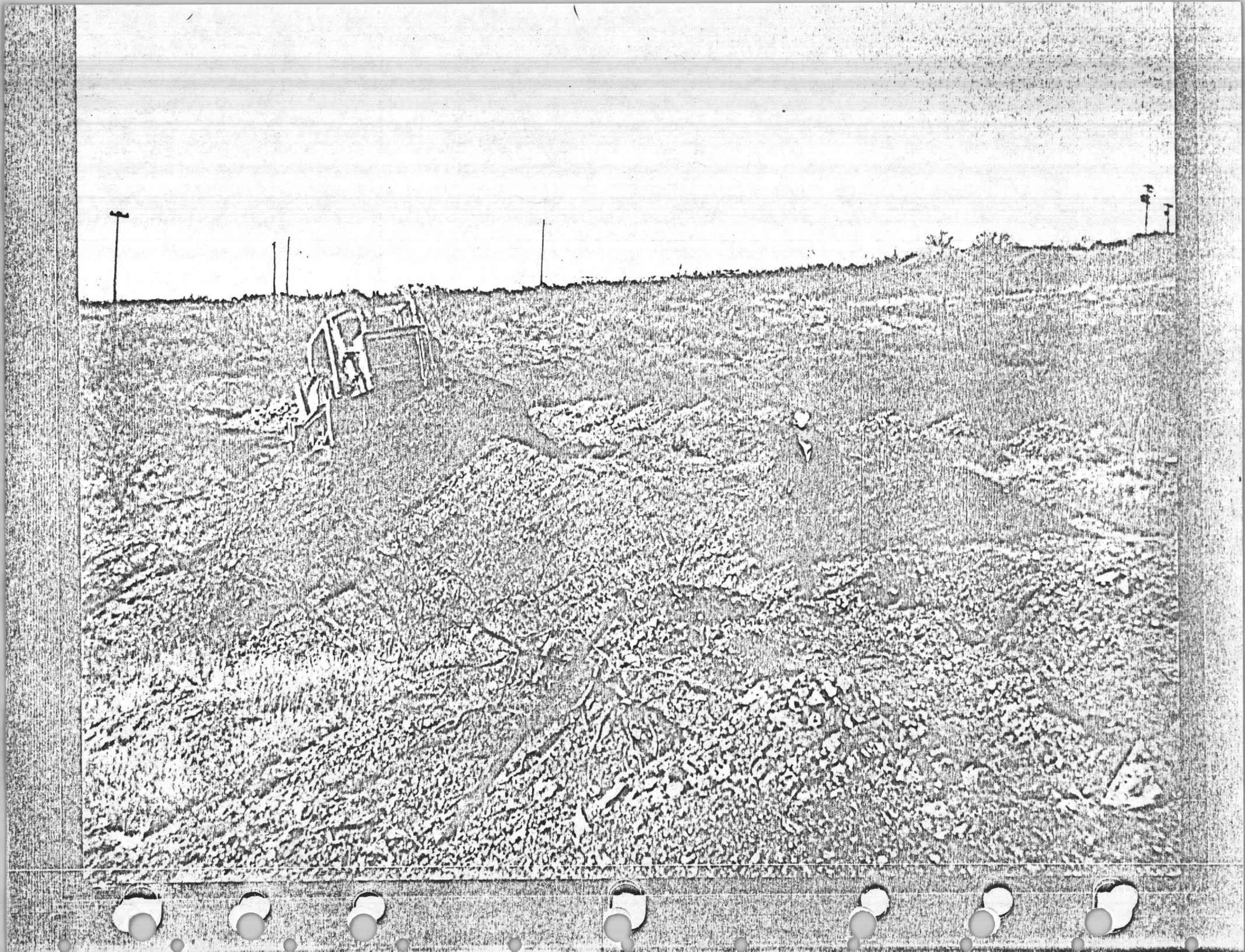
Back-hoe trench on opposite page is on Empire dump.



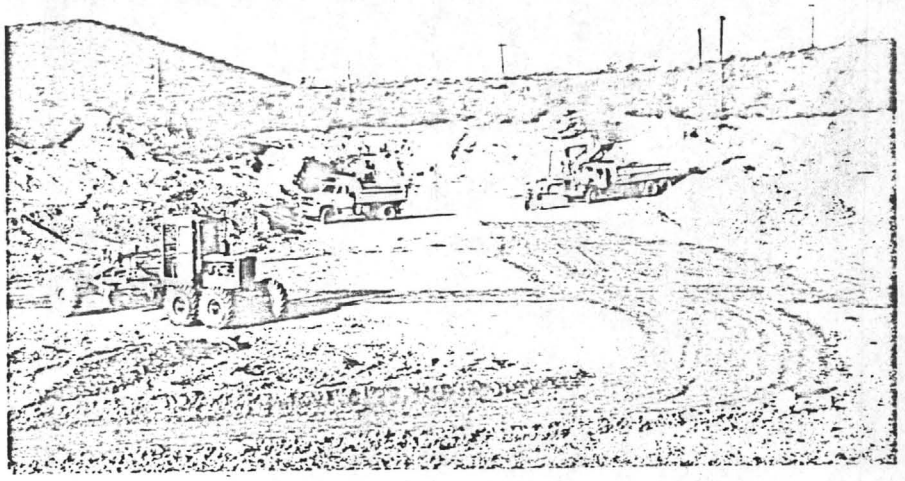
Empire dumps on right and the Tranquillity and Contention areas moving left. Viewed from the Silver Thread looking west. High-grade sulfides on Silver Thread dump; copper-lead-zinc.



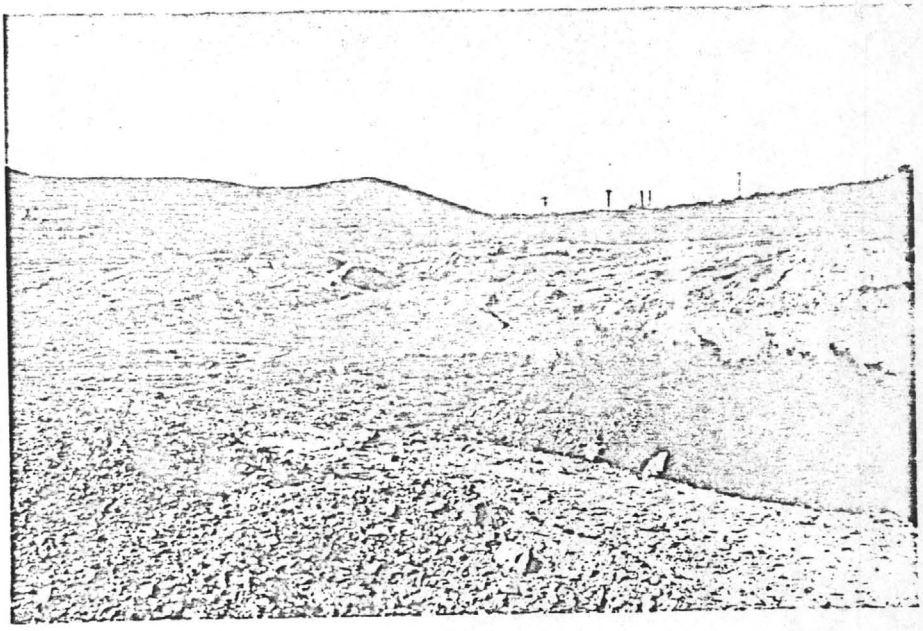
Empire dump area after removal to the heap. Area ready for exploration. Structures are now exposed.



Tranquillity area; Loading dump ore for haulage to the heap. Shaft is to the left-in bushy area over grader.

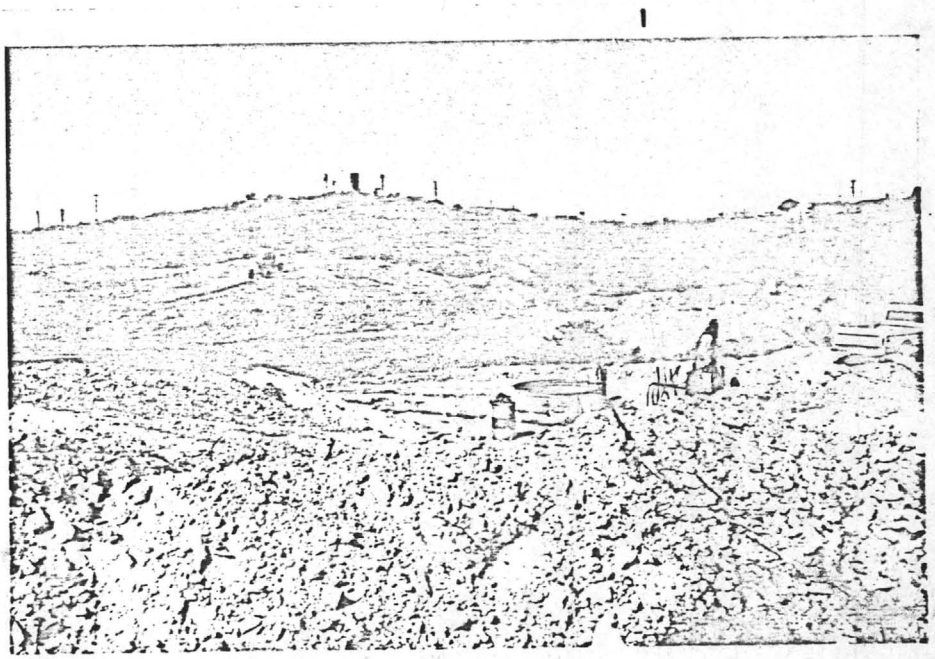


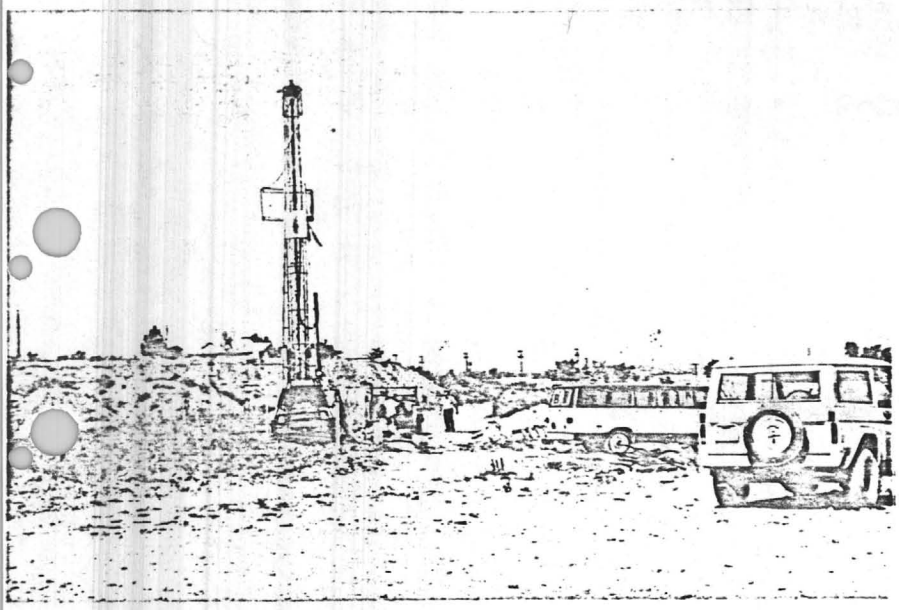
Late stage of dump hau;age to the heap. Skip Shaft in near foreground by the brush. Workings are accessable and they are very high grade;gold values from .10 to .85 t. ounces. Silver runs over 10 ounces.



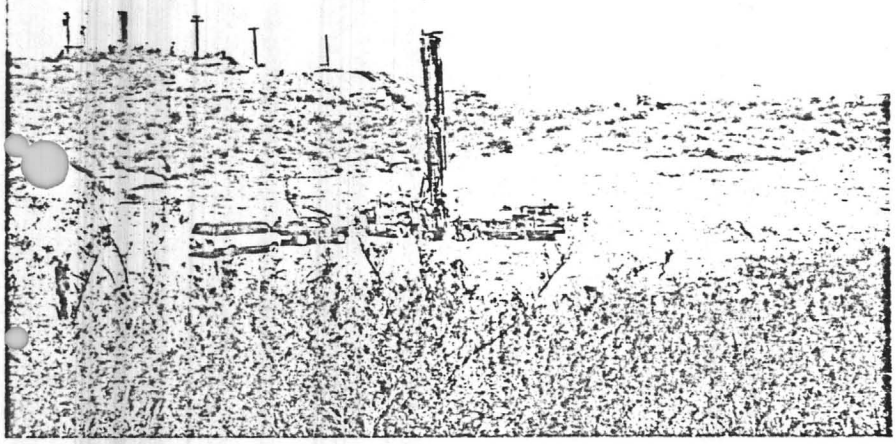
Final phase of dump clean-up;ready for sampling-mapping-drilling.

Skip Shaft area; good surface samples with continuity with depth.

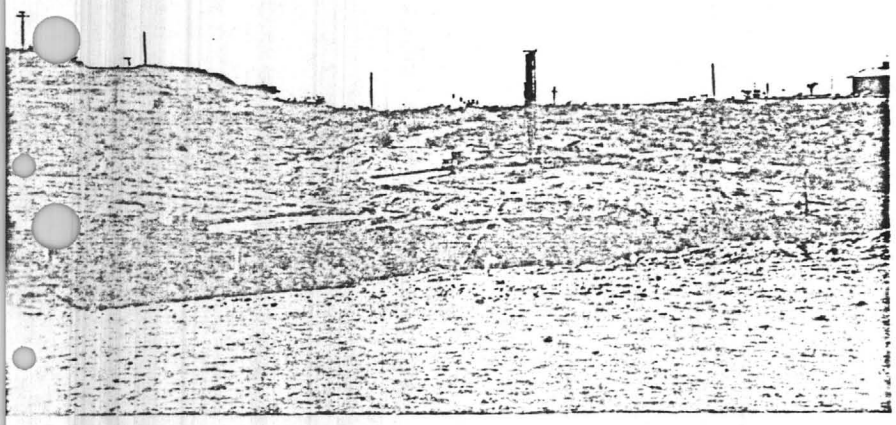




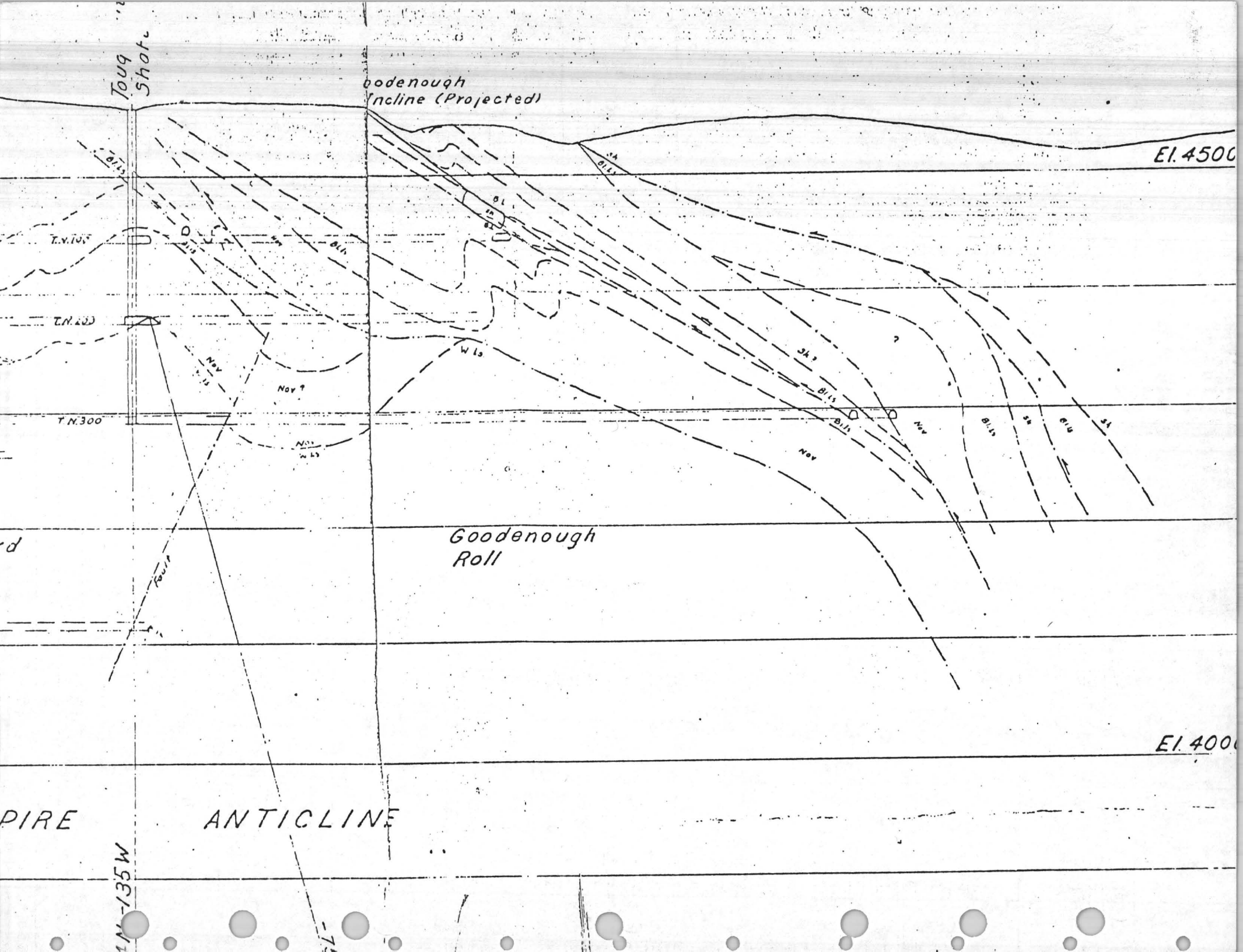
Reverse-Circulation drilling near Skip Shaft. Empire dump in the background.

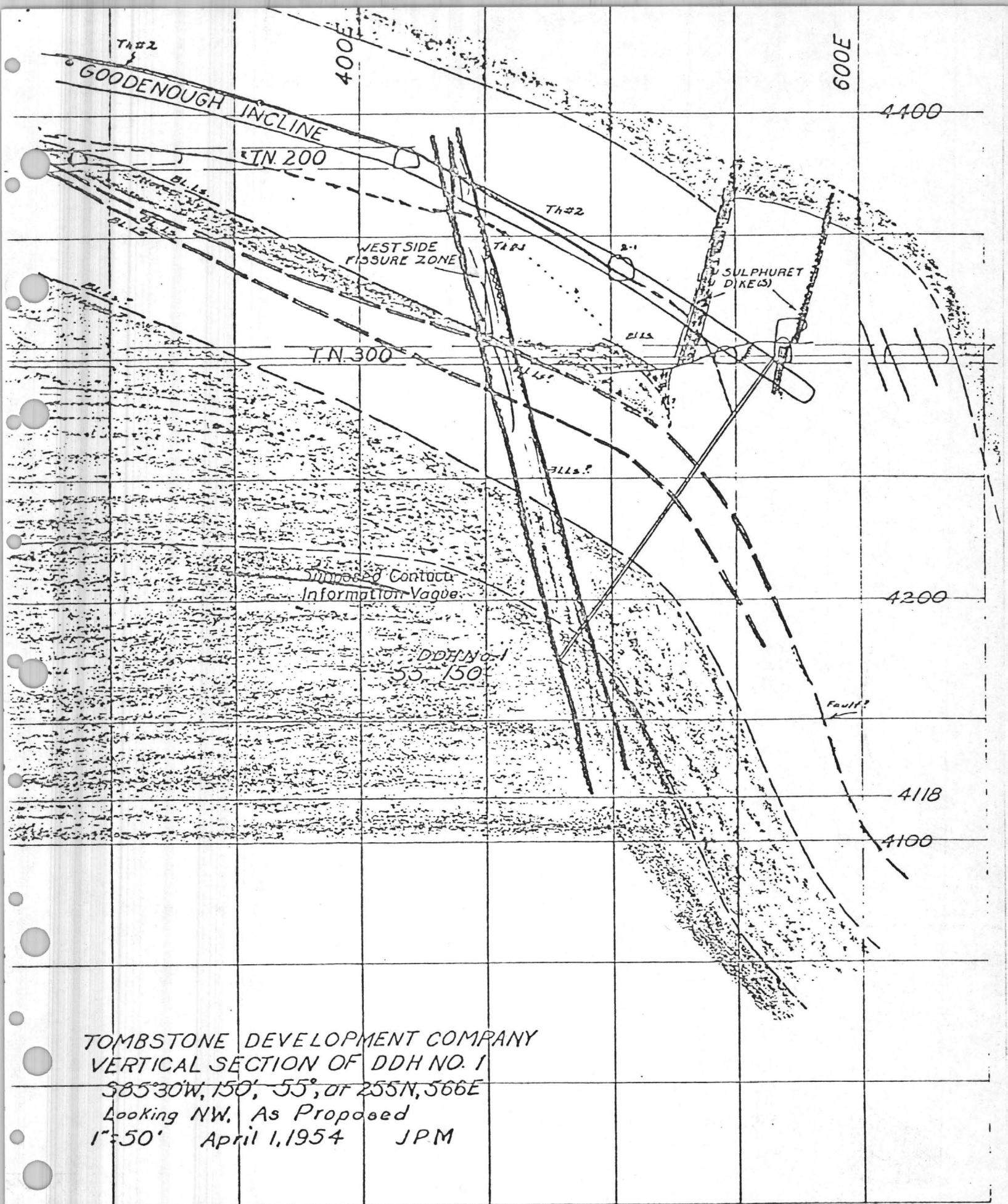


Drilling near Tranquillity Shaft area. Drilling was shallow and much was in overburden. Results are in Appendix. Gold and silver values were encouraging.



Tranquillity fault area; further drilling should follow surface mapping and sampling.

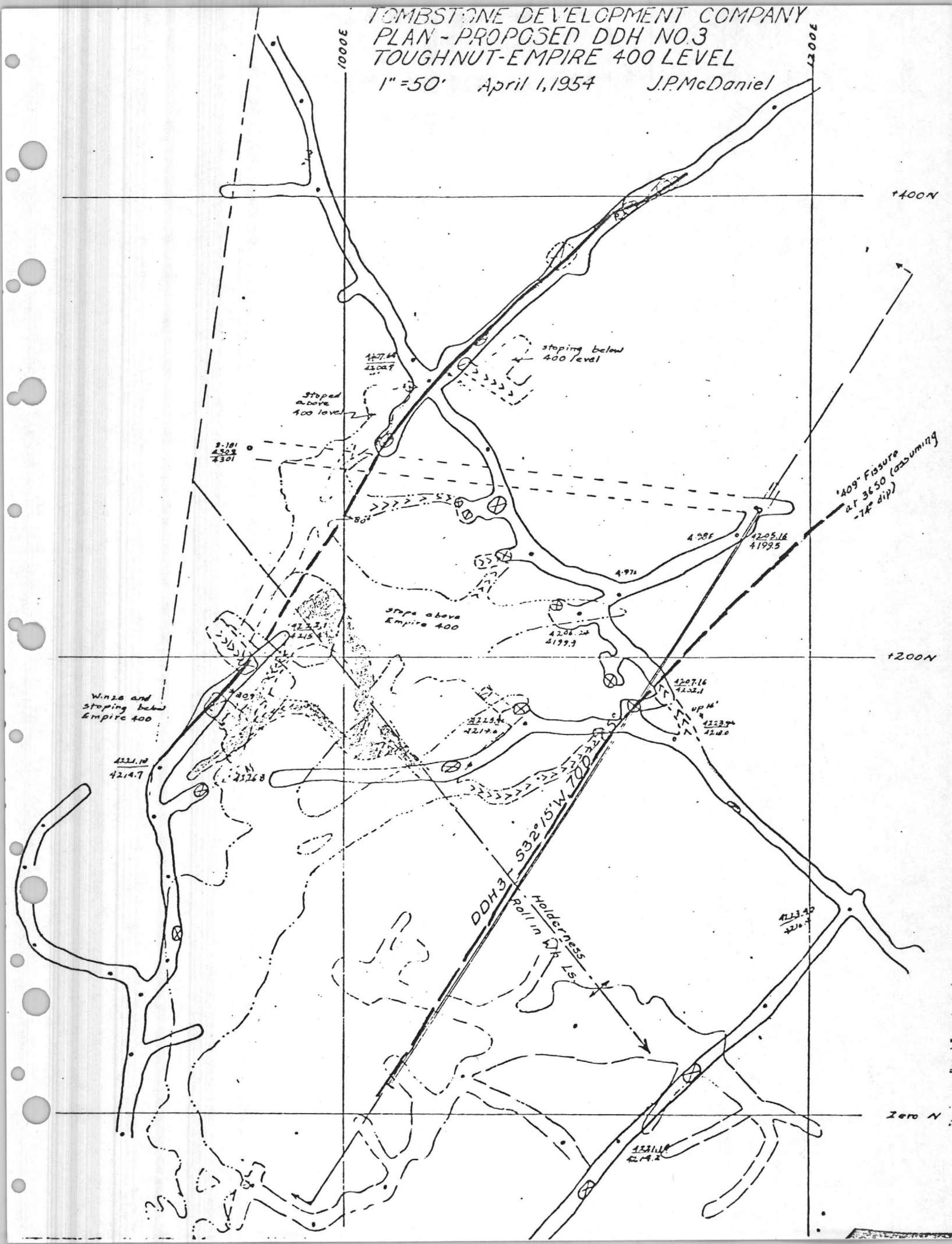

Toug
Shaft
Goodenough
Incline (Projected)
El. 4500
T.N.100
T.N.200
T.N.300
Nov
Bl Ls
Sh
Fault
Goodenough
Roll
El. 400
PIRE
ANTICLINE
N-135 W

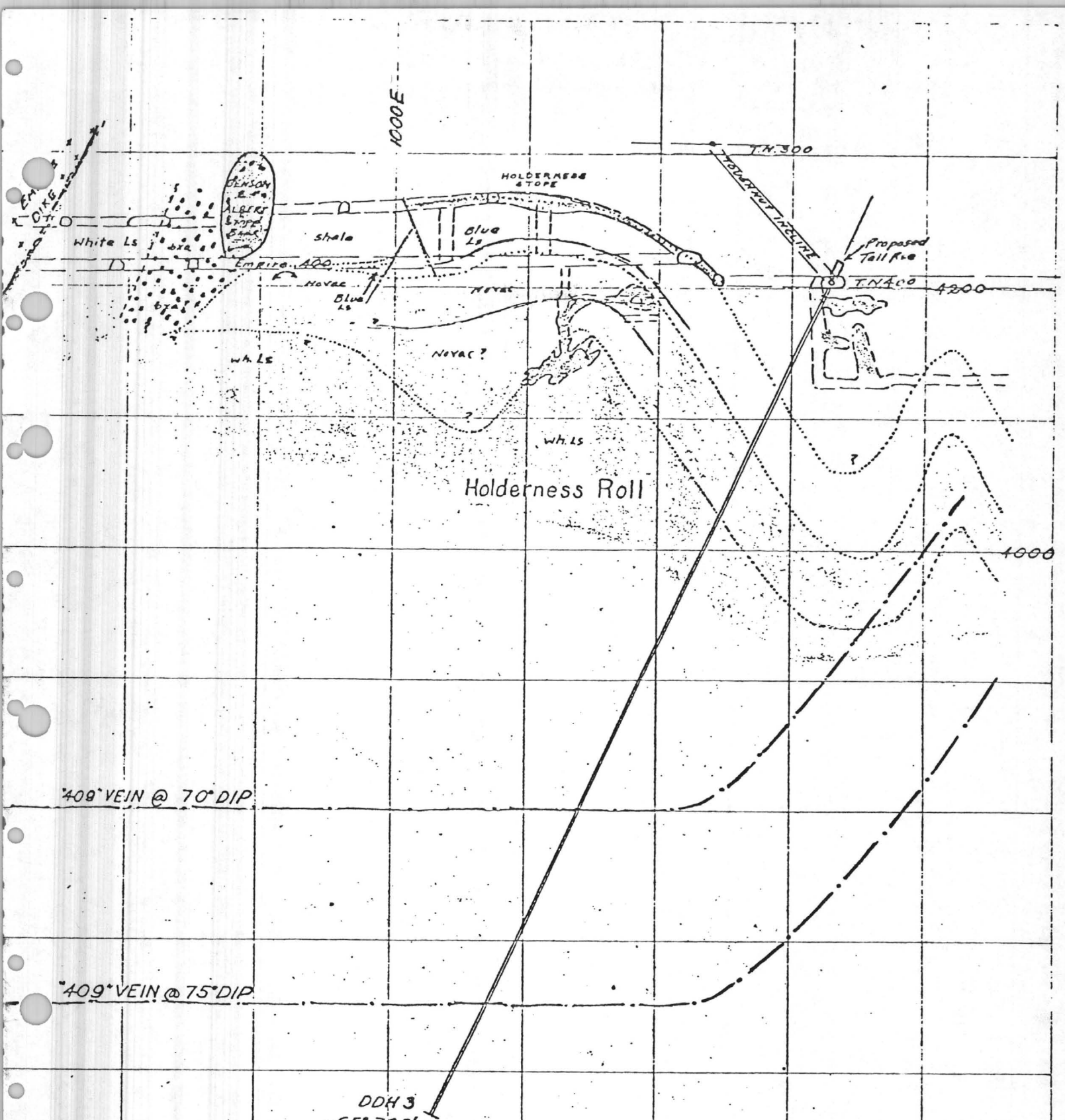


TOMBSTONE DEVELOPMENT COMPANY
VERTICAL SECTION OF DDH NO. 1
S85°30W, 150', -55°, at 255N, 566E
Looking NW. As Proposed
1"=50' April 1, 1954 JPM

NE _____ LOCATION _____ LEVEL _____
OLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
_____ E _____ EL. _____

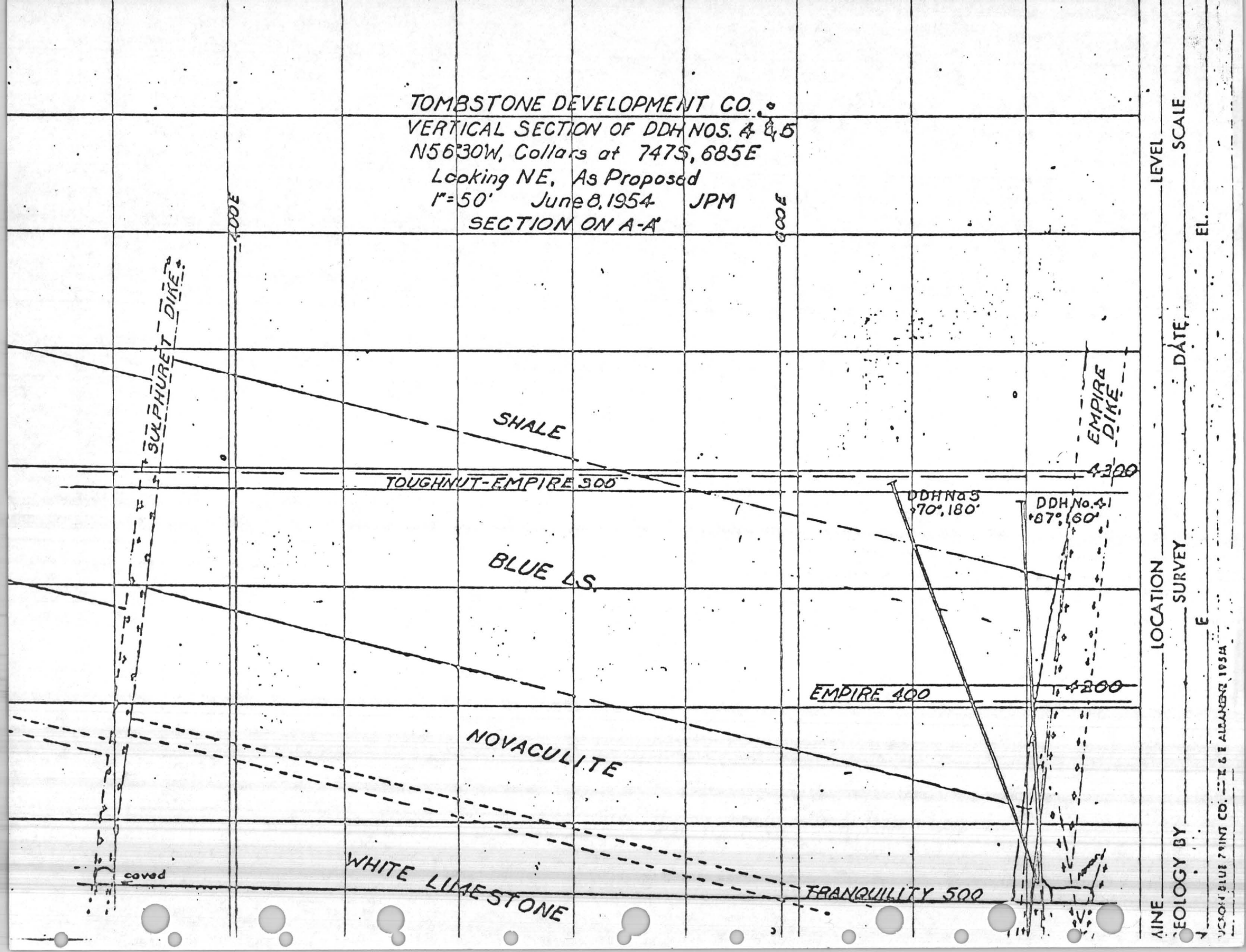
ON BLUE PRINT CO. — K & E ALBANENE 195M


TOMBSTONE DEVELOPMENT COMPANY
PLAN - PROPOSED DDH NO.3
TOUGHNUT-EMPIRE 400 LEVEL
1" = 50' April 1, 1954 J.P.McDaniel
1000E
1200E
+400N
+200N
Zero N
stoping below 400 level
Stoped above 400 level
"409" Fissure at 3650 (assuming -74° dip)
Stope above Empire 400
Winze and stoping below Empire 400
DDH3 - S32°15'W 700'
Holderness Roll in Wk Ls.



TOMBSTONE DEVELOPMENT CO
VERTICAL SECTION OF DDH NO 3
S32°15'W, 700', -65°, at 263N, 1178E
Looking NW, As Proposed
1"=100' April 1, 1954 JPM

E _____ LOCATION _____ LEVEL _____
EOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
E _____ EL


TOMBSTONE DEVELOPMENT CO.
VERTICAL SECTION OF DDH NOS. 4 & 5
N56°30W, Collars at 747S, 685E
Looking N.E. As Proposed
1"=50' June 8, 1954 JPM
SECTION ON A-A
400E
600E
SULPHURET DIKE
SHALE
TOUGHNUT-EMPIRE 300
BLUE LS.
NOVACULITE
WHITE LIMESTONE
caved
EMPIRE DIKE
4300
DDH No 3
-70°, 180'
DDH No. 4-1
-87°, 60'
EMPIRE 400
4200
TRANQUILITY 500
LOCATION
SURVEY
DATE
LEVEL
SCALE
EL.
E
GEOLOGY BY

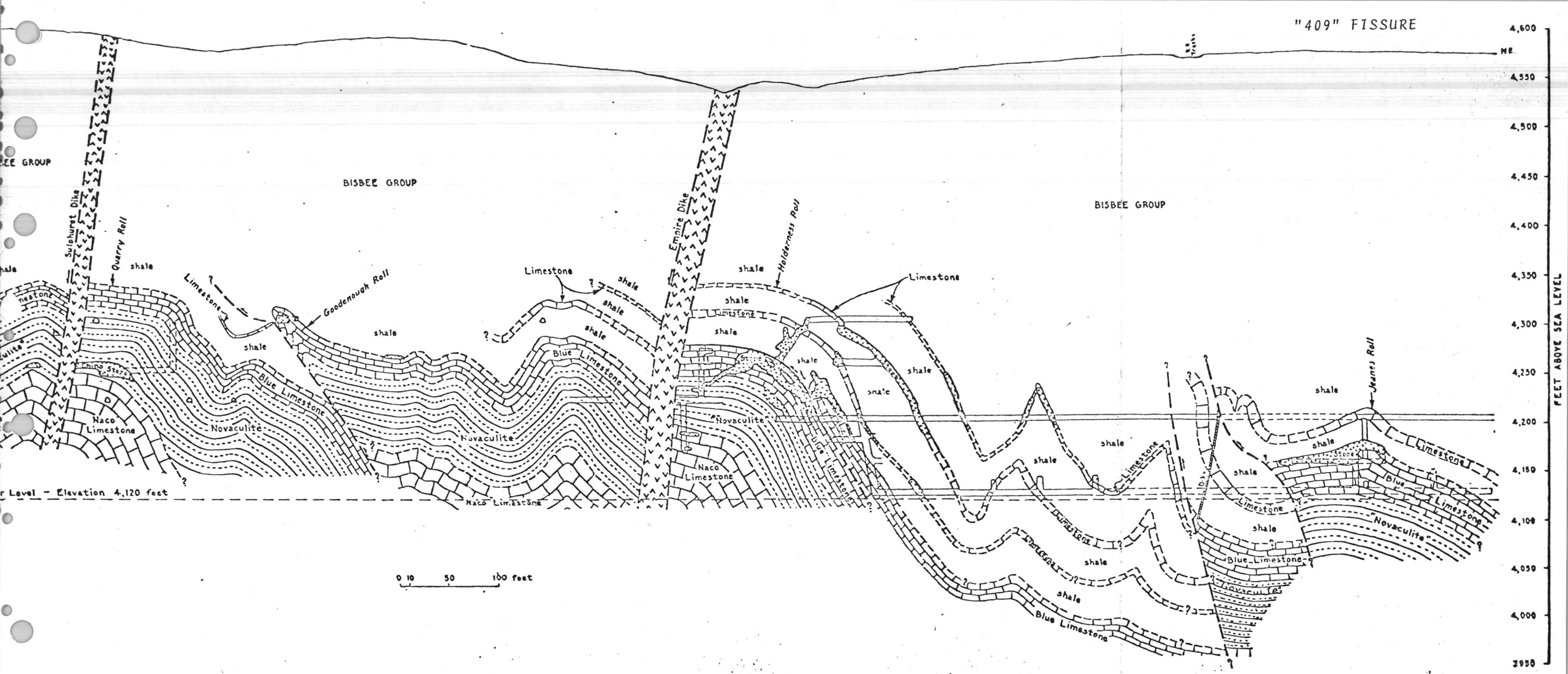


Plate XV.—Section along "409" fissure, looking northwest.

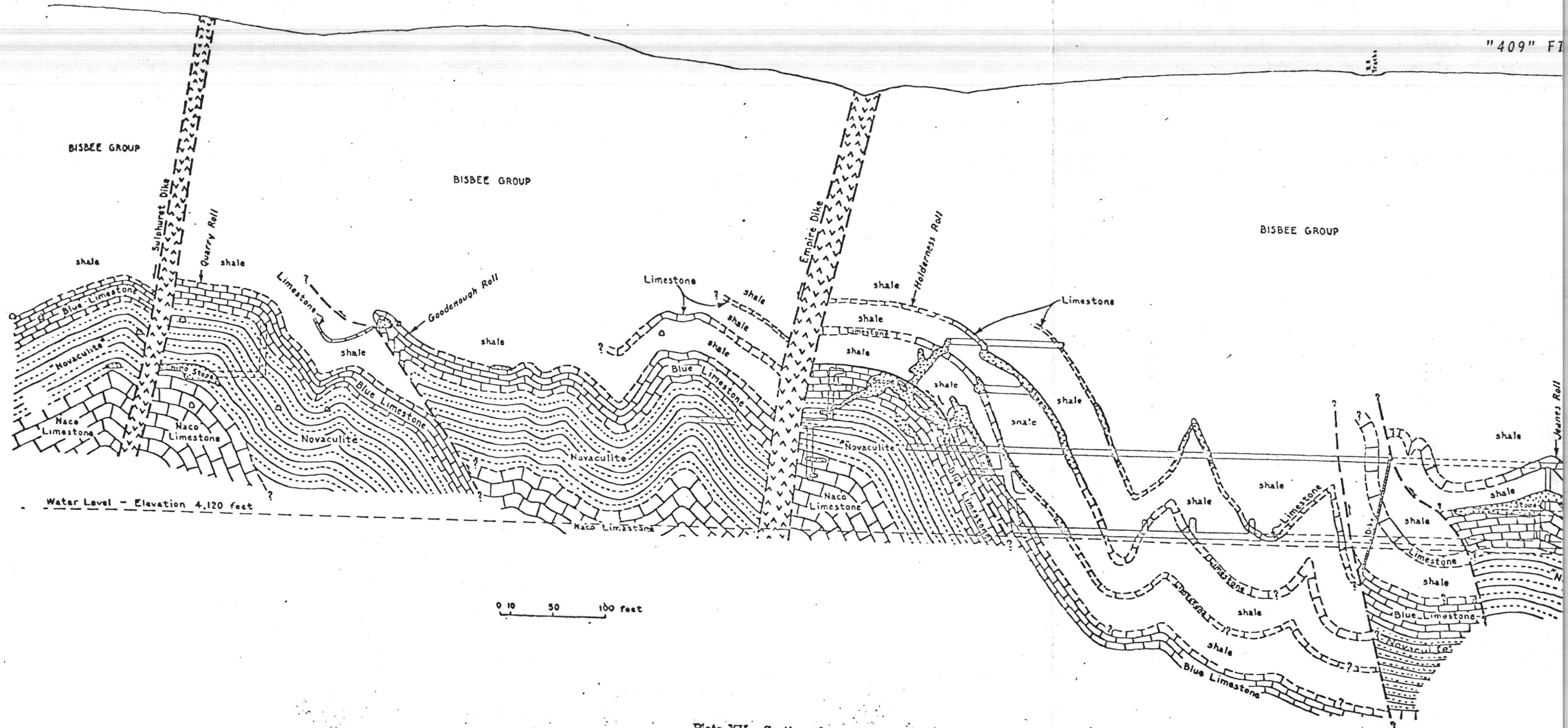


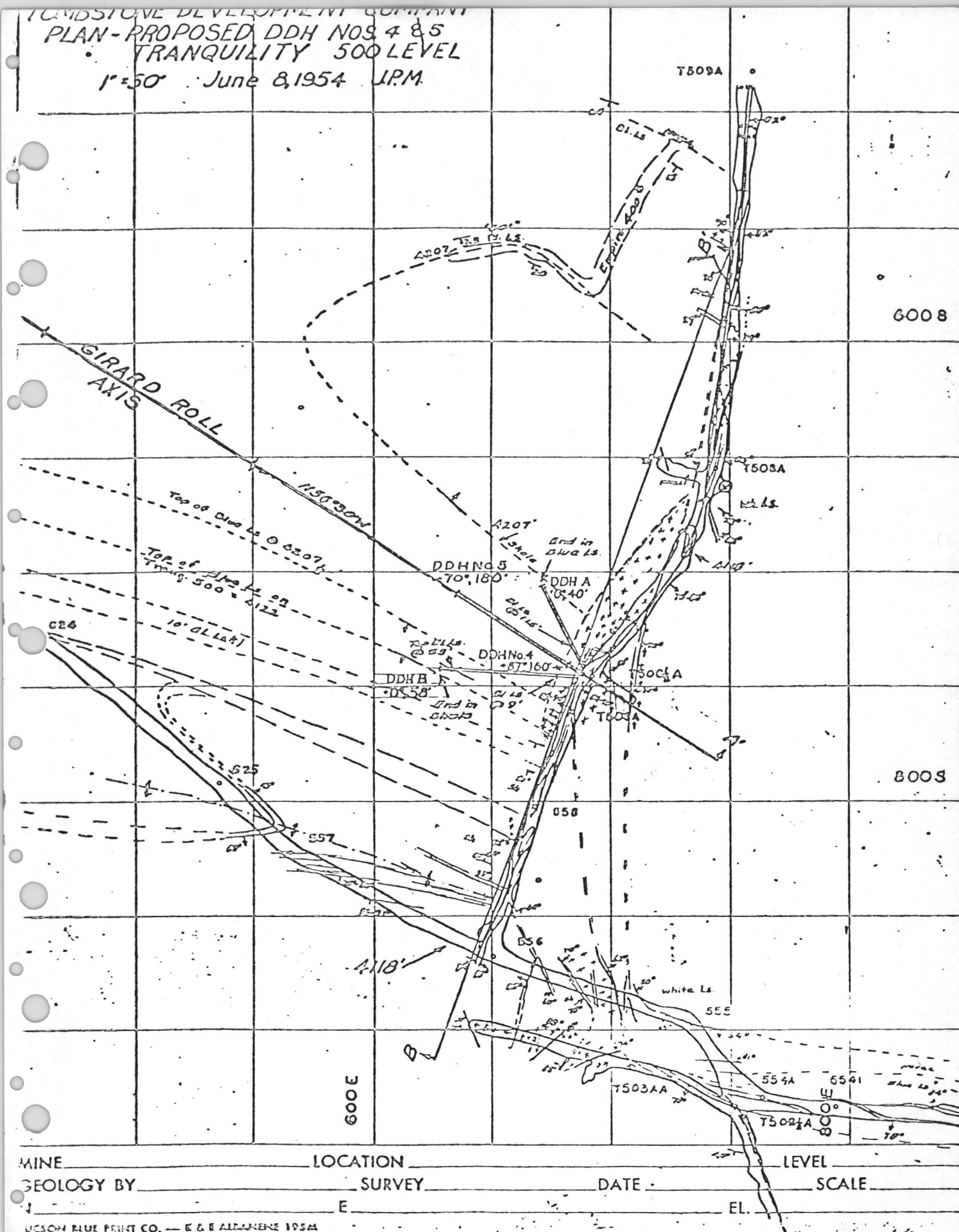
Plate XV.—Section along "409" fissure, looking northwest.

TOMBSTONE DEVELOPMENT COMPANY

PLAN - PROPOSED DDH NOS 4 & 5

TRANQUILITY 500 LEVEL

1" = 50' · June 8, 1954 · J.P.M.

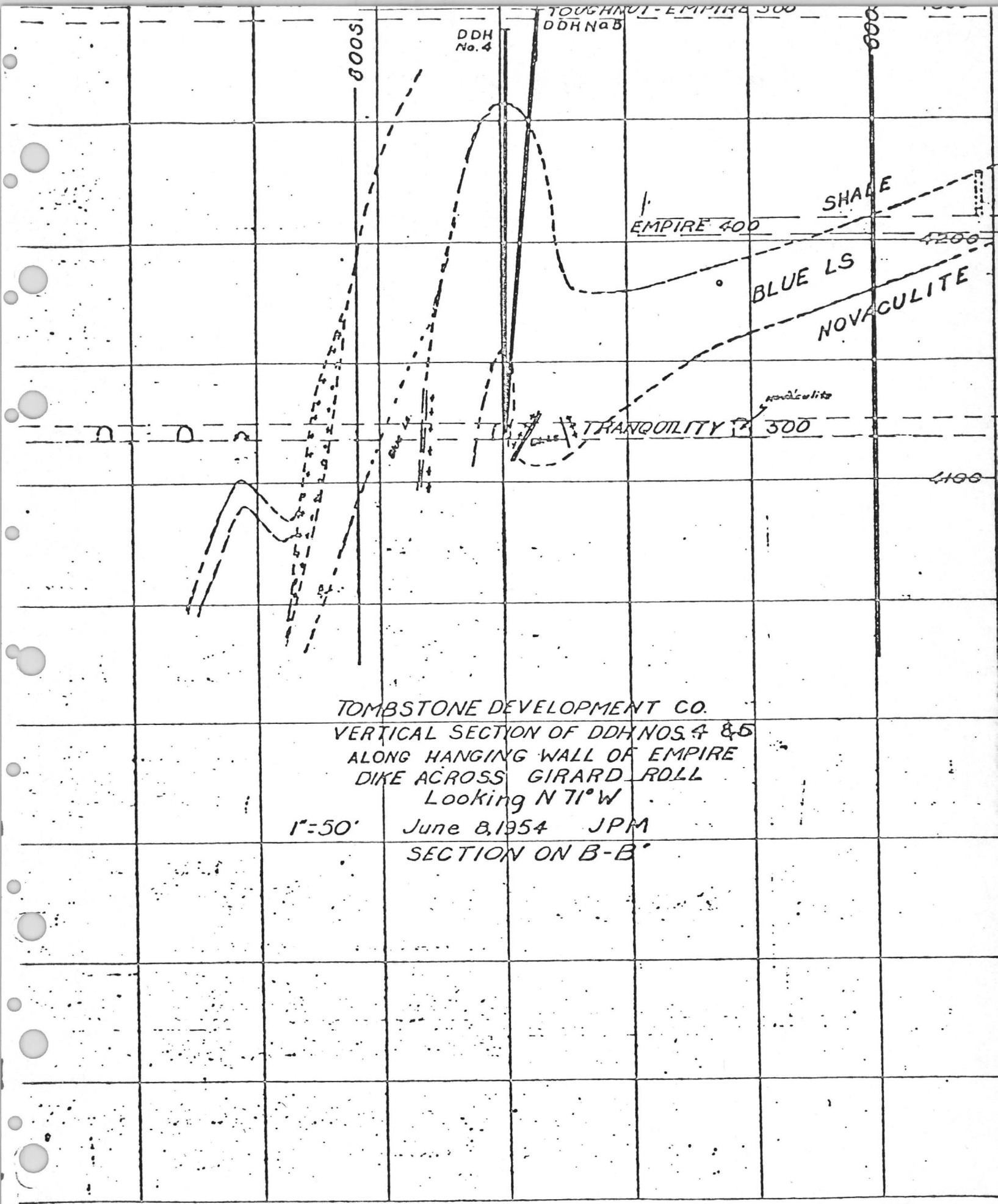


MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL. _____

TUCSON BLUE PRINT CO. — E & E ALBUQUERQUE 1954



TOMBSTONE DEVELOPMENT CO.
VERTICAL SECTION OF DDH NOS. 4 & 5
ALONG HANGING WALL OF EMPIRE
DIKE ACROSS GIRARD ROLL
Looking N 71° W
1"=50' June 8, 1954 JPM
SECTION ON B-B'

MINE _____ LOCATION _____ LEVEL _____
GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
N _____ E _____ EL. _____

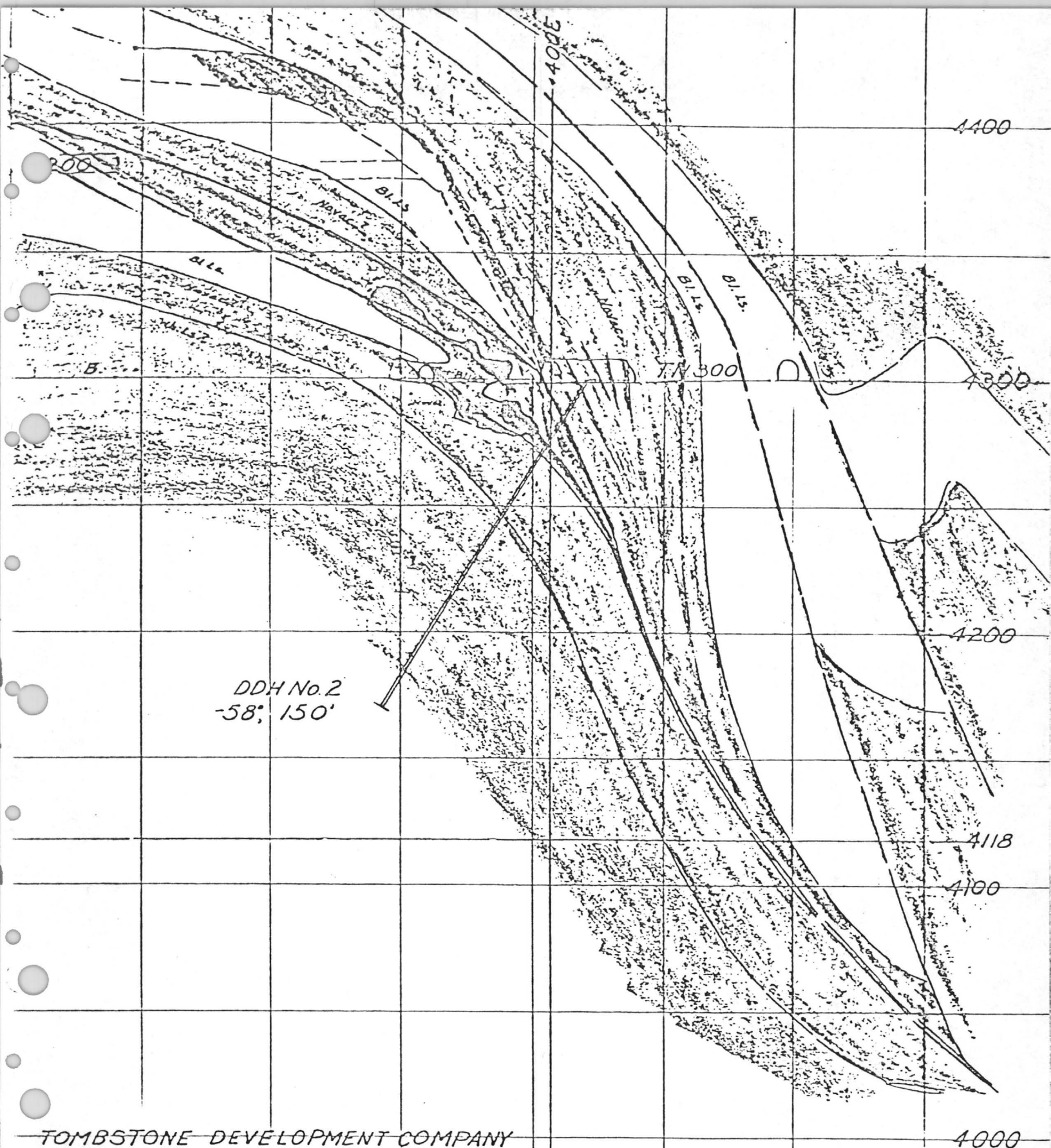
TUCSON BLUE PRINT CO. — K & E ALBANENE 10CM

NEVER DRILLED?
E.S. 4/76

TOMBSTONE DEVELOPMENT CO.
VERTICAL SECTION OF DDH NO 3
S32°15'W, 700'-65°, at 263N, 1178E
Looking NW, As Proposed
1"=100' April 1, 1954 JPM

LINE _____ LOCATION _____ LEVEL _____
GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
_____ E _____ EL. _____

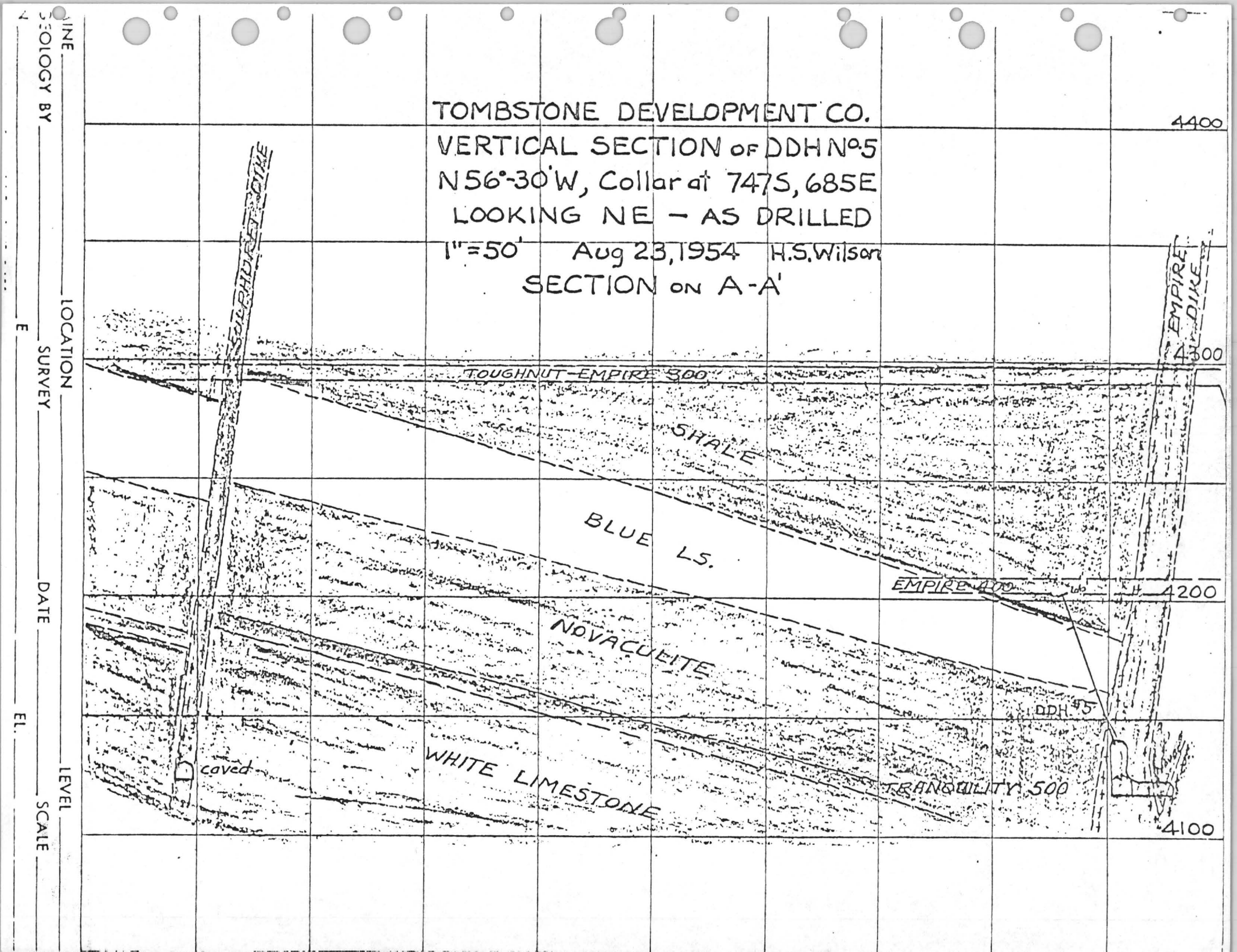
CSON BLUE PRINT CO. E & F AIRAVENE 1954



TOMBSTONE DEVELOPMENT COMPANY
VERTICAL SECTION OF DDH NO. 2
S59°0'W, 150', -58°, at 444N, 413E
Looking NW, As Proposed
1"=50' April 1, 1954 JPM

MINE _____ LOCATION _____ LEVEL _____
GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
N _____ E _____ EL. _____

TUCSON BLUE PRINT CO. — K & E ALBANENE 195M


TOMBSTONE DEVELOPMENT CO.
VERTICAL SECTION OF DDH No. 5
N 56°-30' W, Collar at 7475, 685E
LOOKING NE - AS DRILLED
1" = 50' Aug 23, 1954 H.S. Wilson
SECTION ON A-A'
4400
4300
4200
4100
SOUTH DIKE
EMPIRE DIKE
TOUGHNUT-EMPIRE 300
SHALE
BLUE LS.
EMPIRE 400
NOVACUITE
DDH 5
WHITE LIMESTONE
caved
TRANQUILITY 500
LOCATION
GEOLOGY BY
SURVEY
DATE
LEVEL
SCALE
EL.

TOMBSTONE DEVELOPMENT CO.

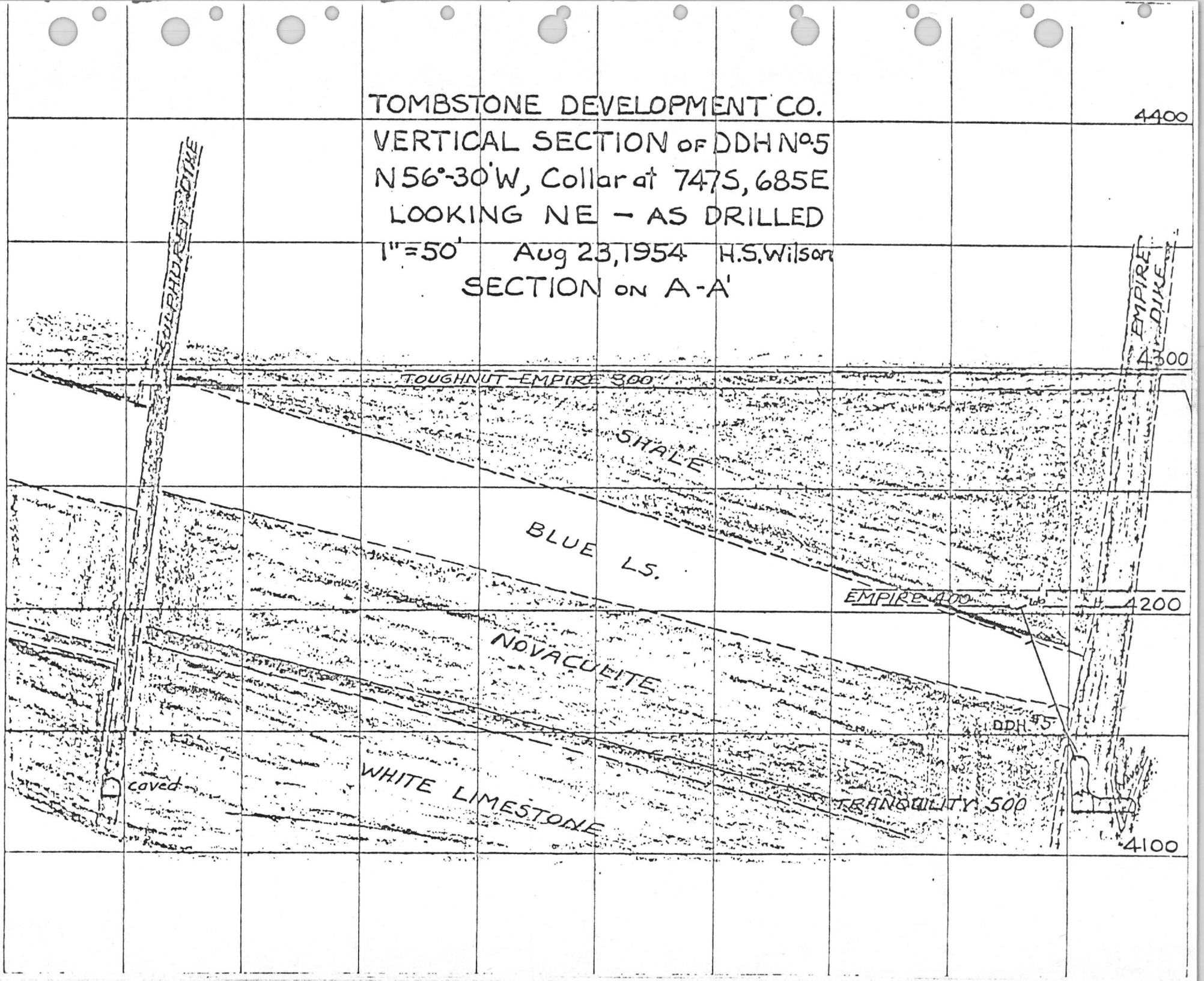
VERTICAL SECTION OF DDH No. 5

N 56°-30' W, Collar at 7475, 685E

LOOKING NE – AS DRILLED

1" = 50' Aug 23, 1954 H.S. Wilson

SECTION ON A-A'

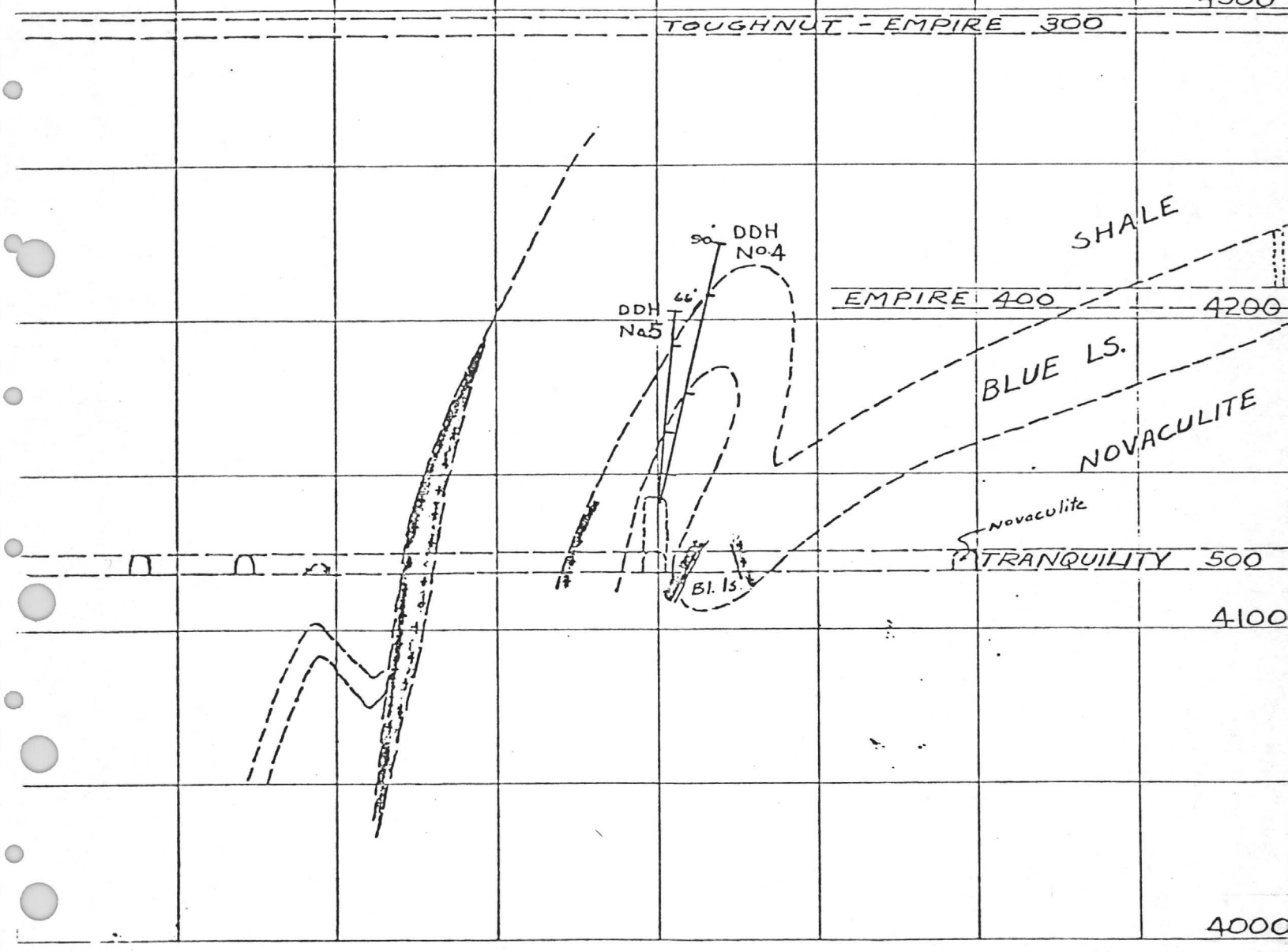


GEOLOGY BY _____ LOCATION _____ LINE

SURVEY _____ DATE _____ LEVEL

E _____ EL. _____ SCALE

TOMBSTONE DEVELOPMENT CO.
VERTICAL SECTION, DDHs No. 4&5
ALONG HANGING WALL OF EMPIRE DIKE
ACROSS GIRARD ROLL
LOOKING N71°W – AS DRILLED
1"=50' Aug 23, 1954 H.S. Wilson
SECTION ON B-B'

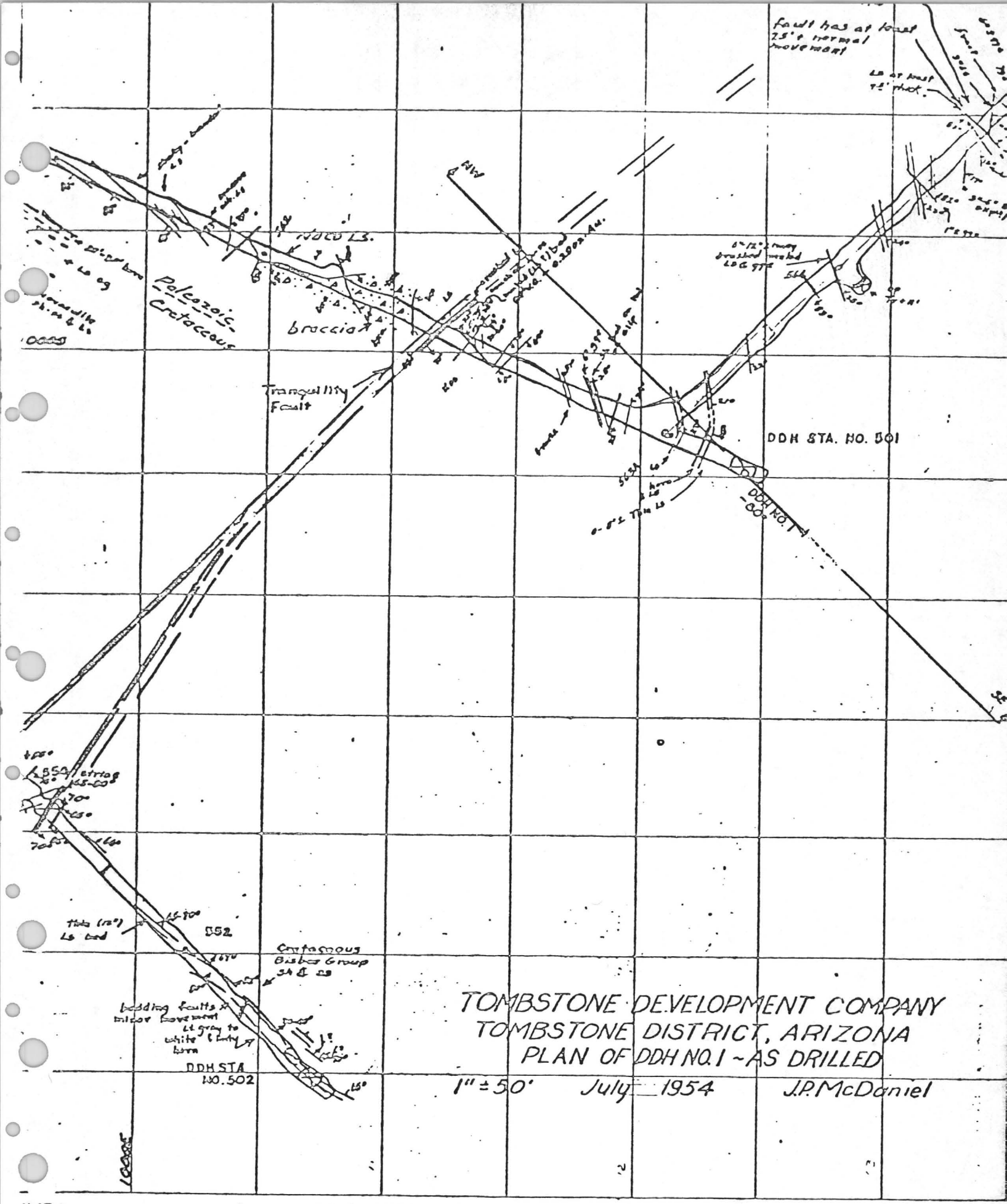


MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL. _____

TUCSON BLUE PRINT CO. — K & E ALBANENE 195M



TOMBSTONE DEVELOPMENT COMPANY
TOMBSTONE DISTRICT, ARIZONA
PLAN OF DDH NO. 1 - AS DRILLED

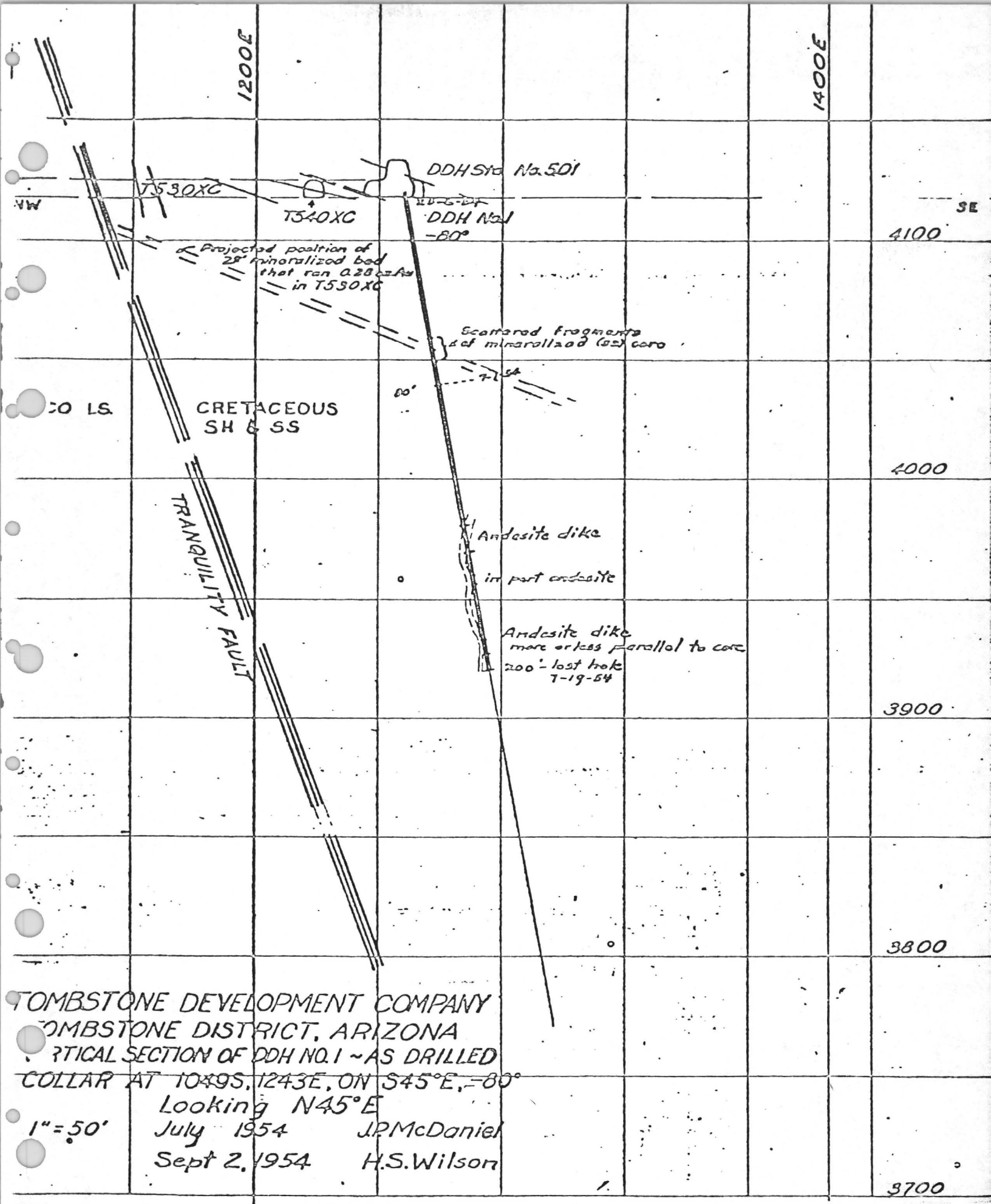
1" = 50' July 1954 J.P. McDaniel

LINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

_____ E _____ EL. _____

CSON BLUE PRINT CO. — K & E ALBANENE 1954



TOMBSTONE DEVELOPMENT COMPANY
TOMBSTONE DISTRICT, ARIZONA
VERTICAL SECTION OF DDH NO. 1 ~ AS DRILLED
COLLAR AT 1049S, 1243E, ON S45°E, -80°
Looking N45°E
1" = 50'
July 1954 J.P. McDaniel
Sept 2, 1954 H.S. Wilson

MINE _____ LOCATION _____ LEVEL _____
GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
N _____ E _____ EL. _____

DIETZGEN BLUE PRINT CO. — K & E ALBANENE 1954

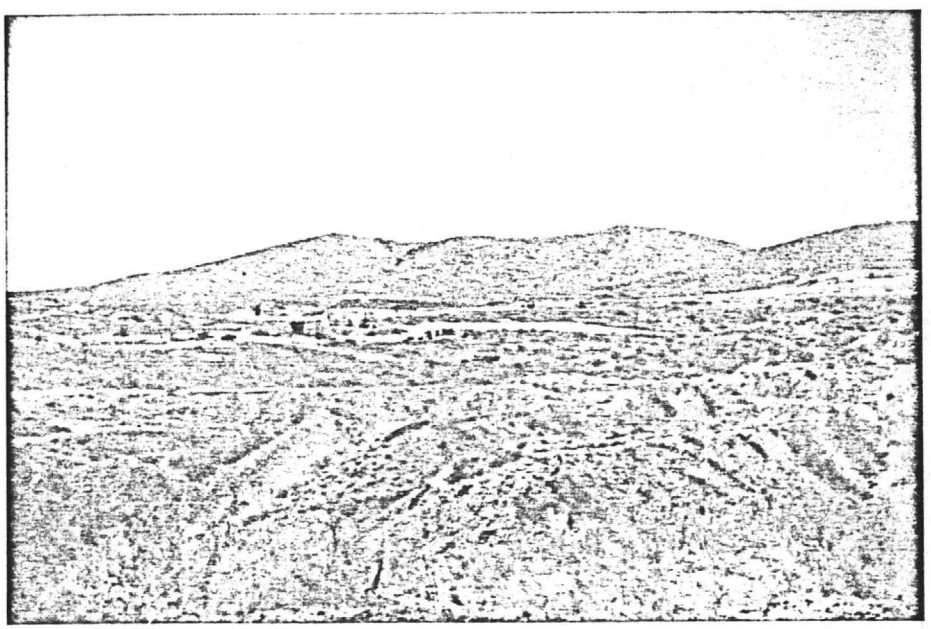
HEWLETT MANAGEMENT

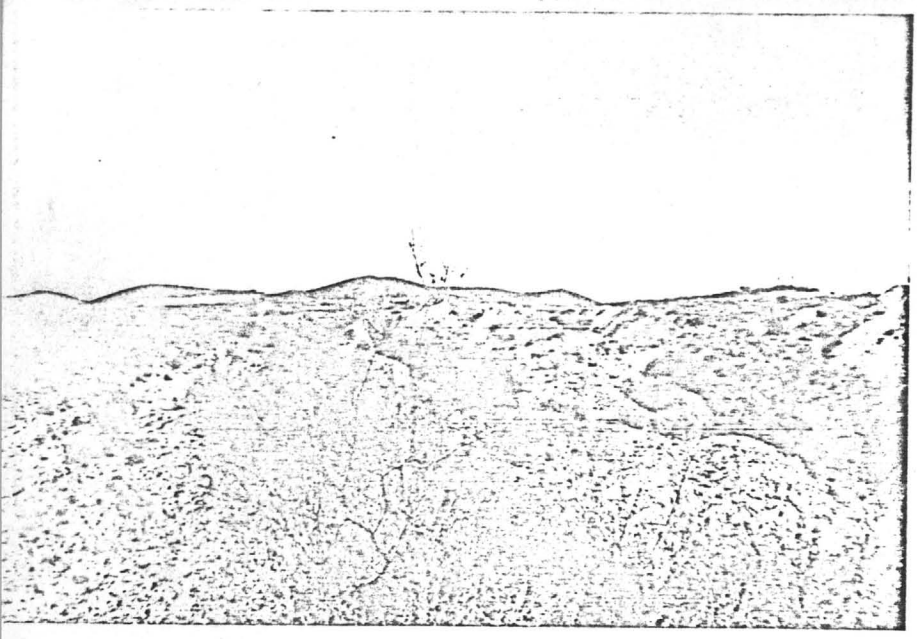
R. F. HEWLETT
PHONE (702)359-1069

2602 Monte Verde Way
Sparks, Nevada 89431

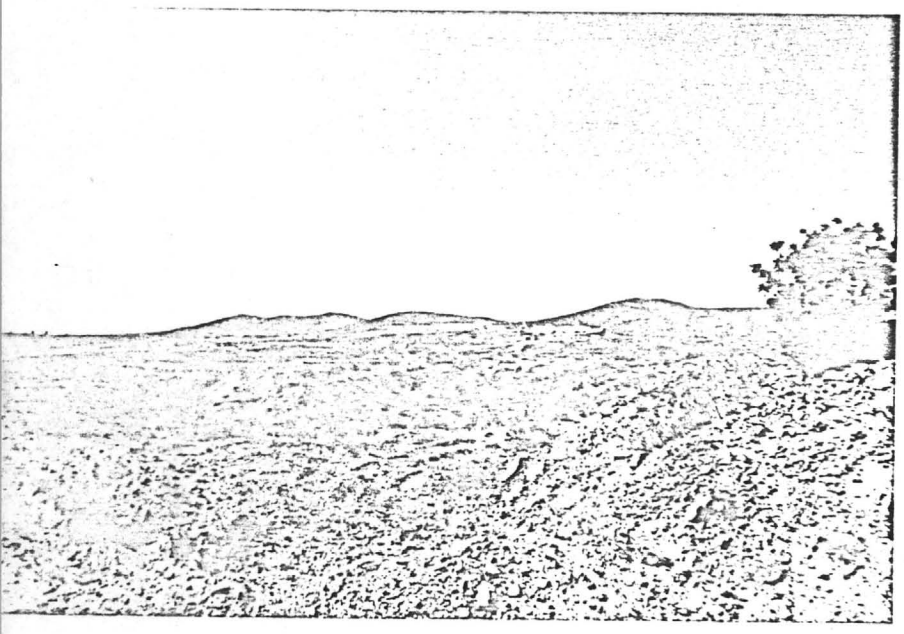
SKIP SHAFT-SILVER THREAD: The Skip Shaft area deserves much sampling and mapping, followed by drilling. Very encouraging results have been obtained in the past. The following plate shows the vast extent of the near-surface stopes; an excellant open-pit target. This "Tombstone Triangle" area deserves careful study due to the abundant structure; Empire dike, Skip Shaft fissure, and the Tranquillity fault zone intersect favorable limestone anticlinal structures.

Underground near and east (towards the Silver Thread) of the Empire shaft, the structures exhibit red hematite which is indicative of high-grade gold ores. The author has followed this structure for over one-half mile. Sulfides increase north and east of the Empire. The Silver Thread had zinc so high that it is stock piled in a dump because it could not be treated. The high-grade zinc ores were found south of the Silver Thread shaft about 200 feet. Lead-zinc vertical zoning is shown through the mine. Stopes on the 700-800 foot level were 8-28 feet wide and very high grade. The Silver Thread mine shows a definite zone of deposition or ore column which with other mines is in excess of 3,000 feet in depth.

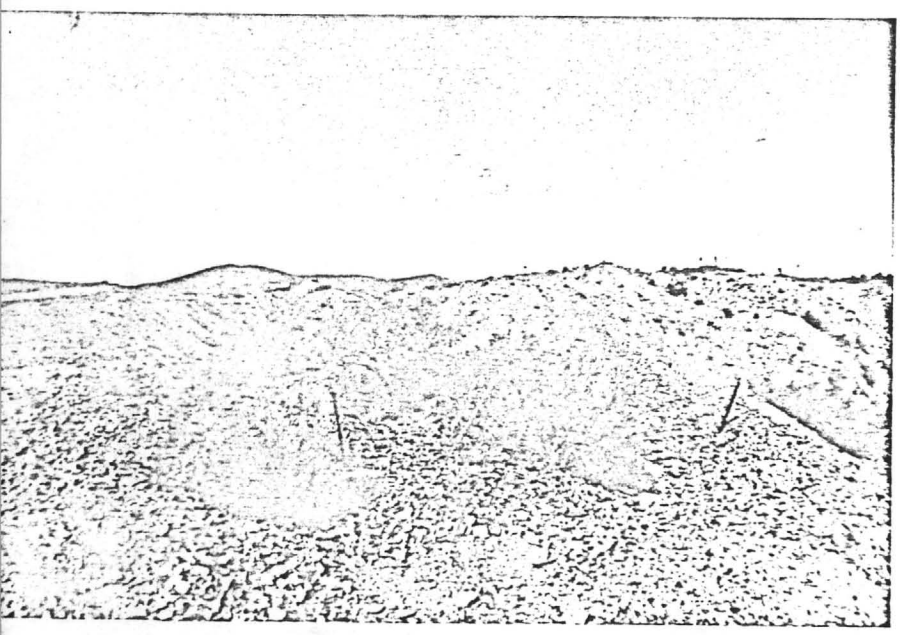




Silver Thread mine and dump area looking west toward Contention area. This is a target area for additional drilling.



Silver Tread looking at Contention and Grand Central area. Structures connect these mines with the Silver Thread. This area has higher base metal content, especially zinc. Dumps of zinc and other sulfides are scattered in this area.



Silver Thread sulfide dumps. A faulted-off-block of this ore body probably exists east. Notice the state claims we leased on topo-claim maps in regional patterns section. Drilling proved an intrusive(feeder) and sulfides with precious metal conten, starting on the surface.

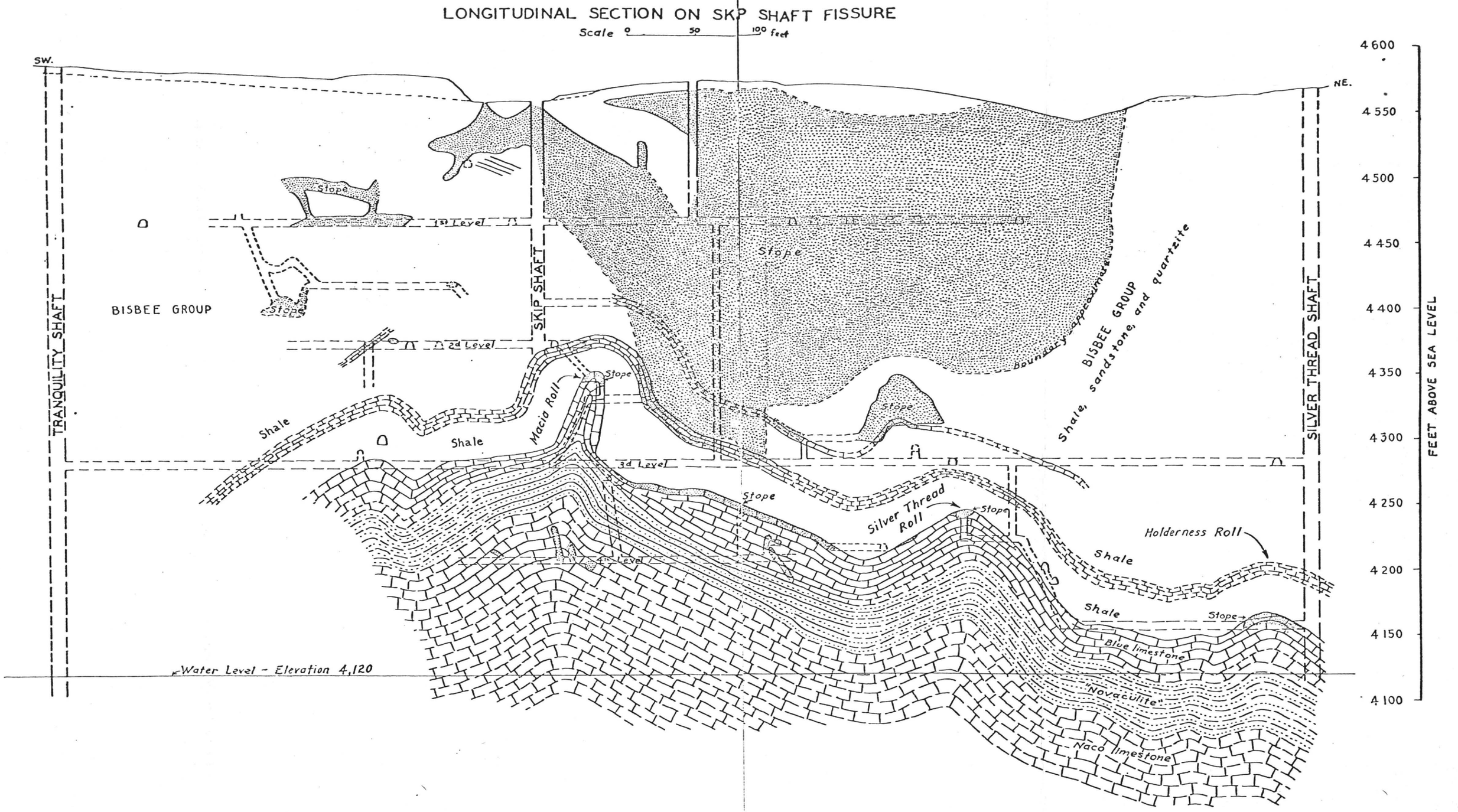


Plate XXIII.—Longitudinal section on Skip shaft fissure, looking northwest.

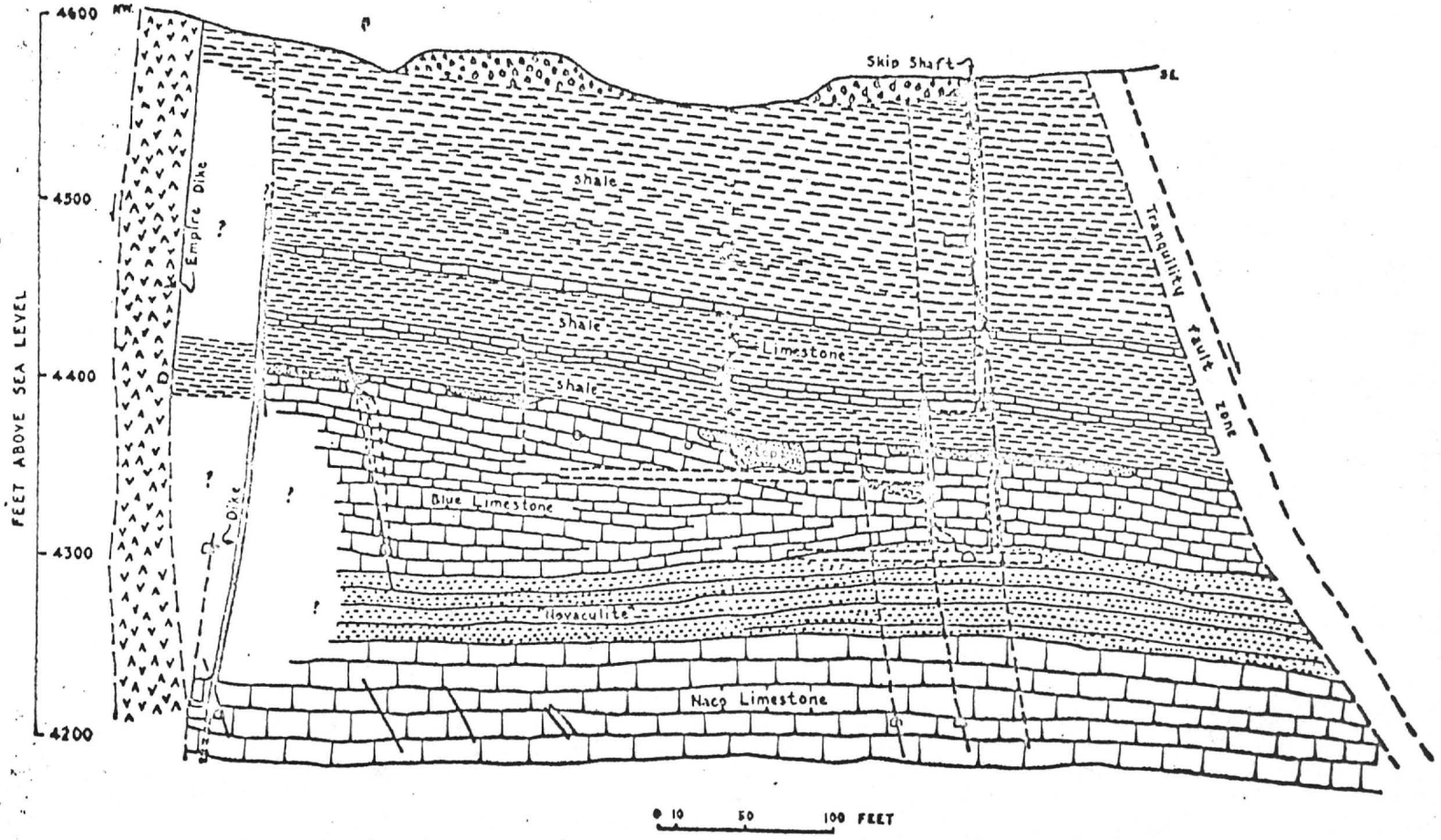


Plate XVII.—Longitudinal section near axis of Macia roll, looking northeast.

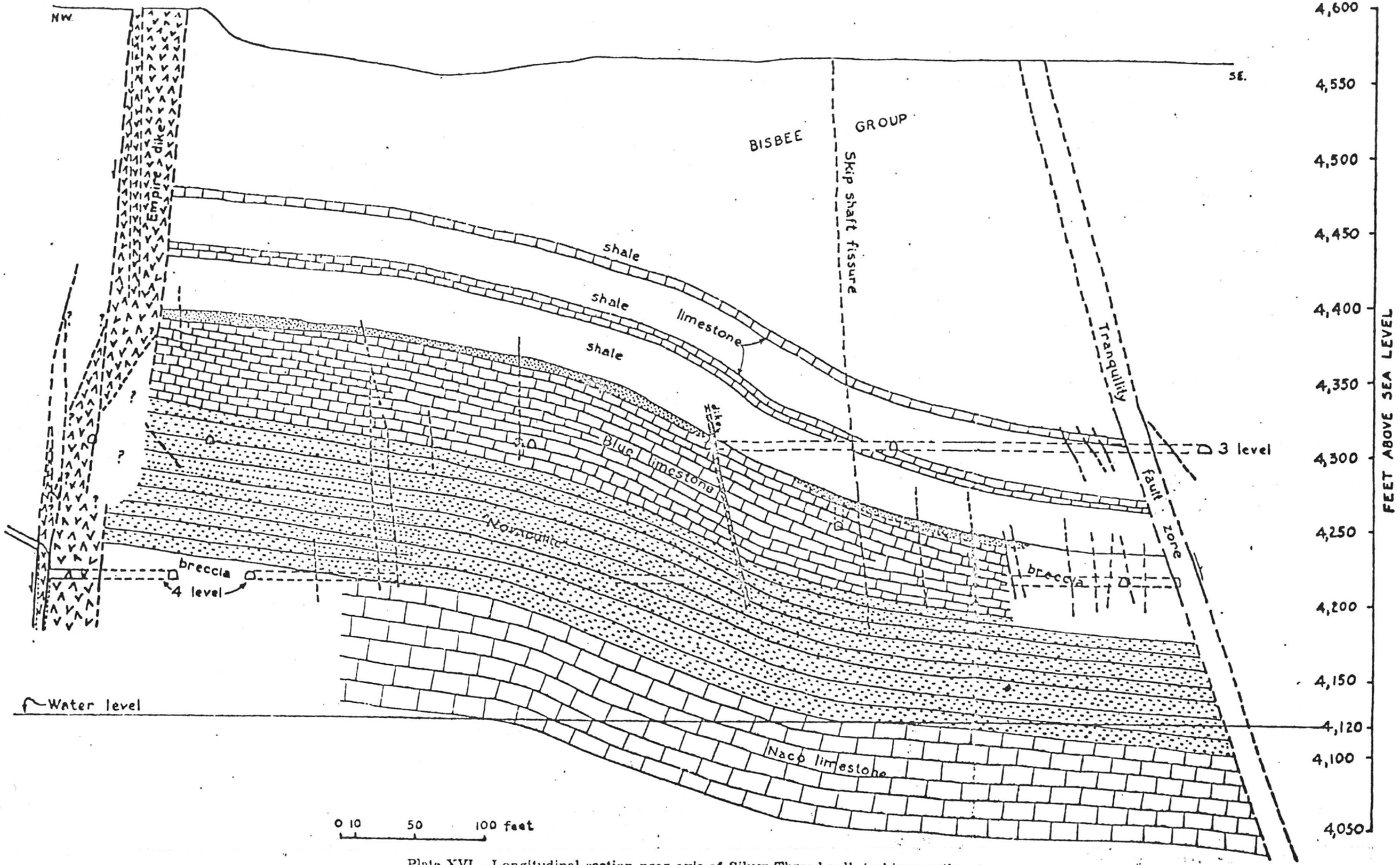


Plate XVI.—Longitudinal section near axis of Silver Thread roll, looking northeast.

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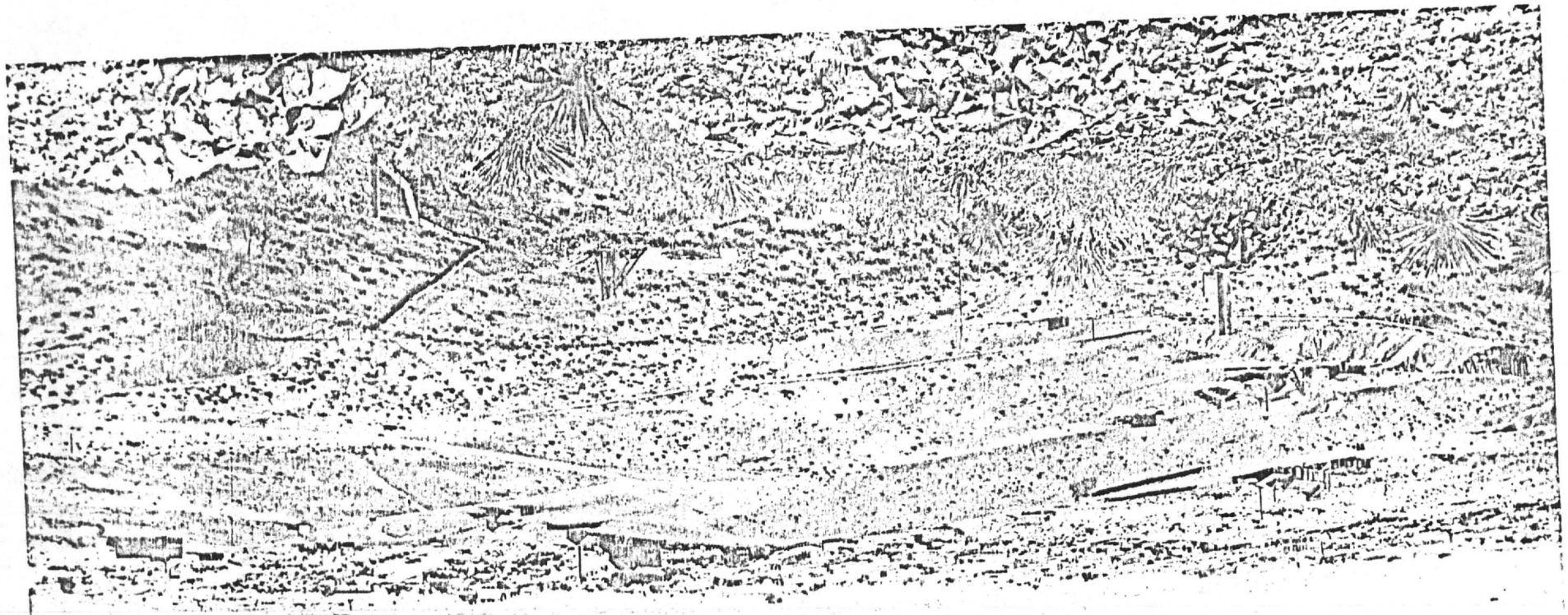
WEST SIDE: The high-grade silver ores of the old Camp were discovered on the Toughnut and the West Side fissure was found intersecting limestone beds on the Toughnut claim. The fissure was followed westerly(in ore) and the rich mine known as the West Side was discovered. Obviously, this was the westerly most mine in the District(now a drift connects the West Side and the Lucky Cuss-about one mile west of the West Side). The West Side fissure was followed from the anticline at the West Side mine easterly to another anticline in the Way Up claim(see following plate). In parts of its course, it is barely more than a "crevice". Notice that Shaft 3 reaches the water table in a continuous column of ore(called a chimney by local miners). The host are shales and limestones. In Shaft #1 the host is a quartzite and some white limestone.

The author has observed the West Side fissure(and the West Side workings) on the 300,400, and 500 level(water level). These are accessable from the Goodenough Incline, or one can climb down the ladders in the West Side or the Girard shafts because they have recently been re-timbered and approved by the Bureau of Mines. Also, the drift(400 level) from the Goodenough Incline was worked on and approved by the Bureau of Mines. Also, Newmont used the West Side for hoisting when they were conducting underground exploration and drilling in the District.

The ore left in the stopes, gob, and backfilling all represents a good sized tonnage. It has been found that as much "ore" was left in the mines as was hoisted. The grade is only about half of what was hoisted, but that is ore today(about 10 ounces Ag and .10 Au). Samples taken in the West Side workings would average the 10/.10, as do most of the other mines. This was the cut-off when silver was about $1/troy ounce. Actually, silver was used as the cut-off mineral;gold was considered a credit-just as at Virginia City(Comstock).



North South

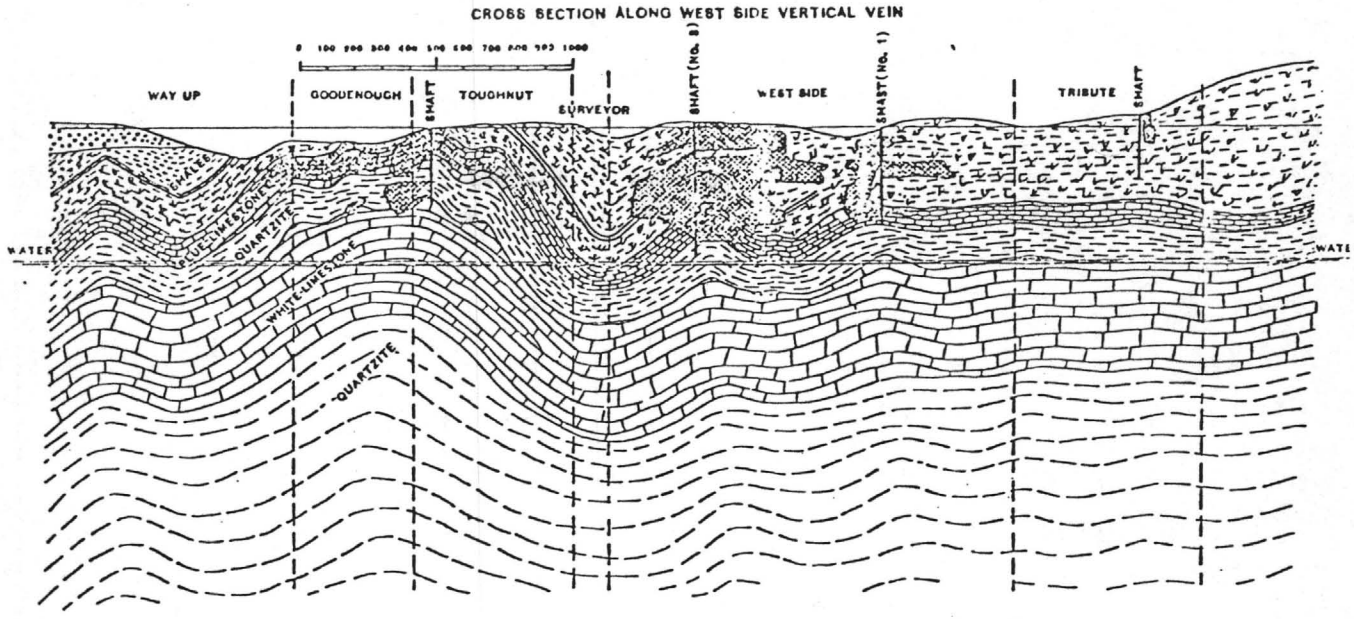
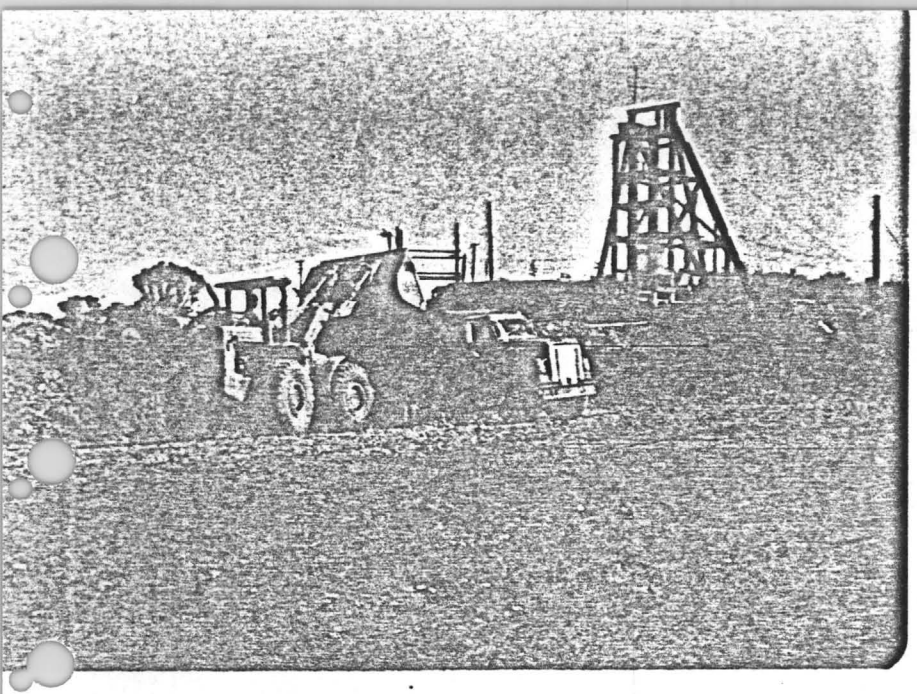


FIG. 15. *Cross-section of the Anticlines and Synclines Crossing the West Side Vertical Vein.*

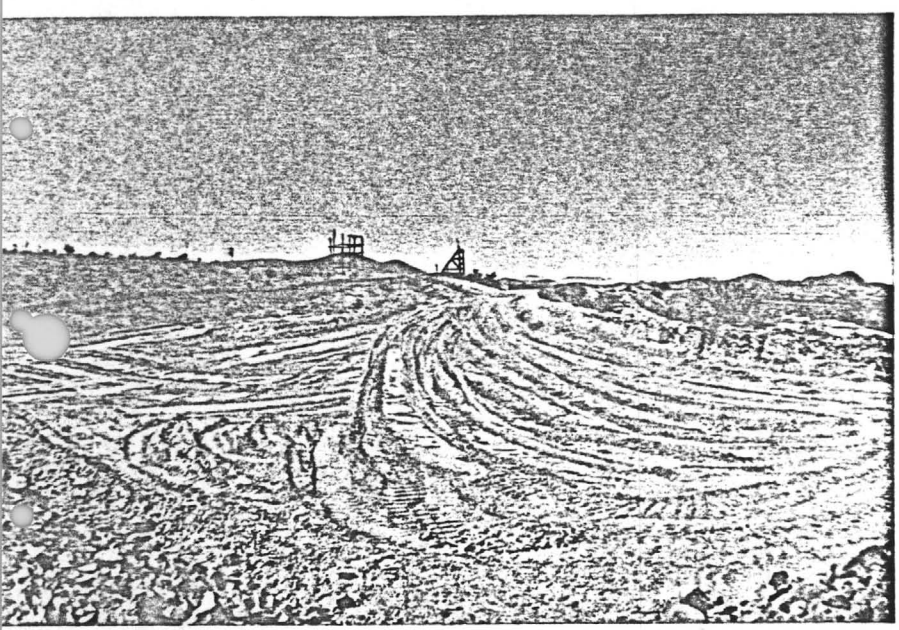
Above is the plate showing the West Side fissure from north(left) to south(right). North would be in the City limits of Tombstone. The shading indicates stoped-out ore. Notice the numerous areas that are unexplored, such as between the West Side and the Tribute. To date, no exploration has been conducted in that area; the drift from the West Side to the Lucky Cuss passes through this area. Also, good-grade ore still exists at shallow depths in the Goodenough and Toughnut areas.

The page facing this shows a photo of the area in 1880. Notice the Girard mill on the hill(center), the Sulphuret dump near right, the Flora Morrison shaft in near forerground, the West Side on the ridge down(SW) from the Girard(between the observer and the court house) and the Boss mine between the obserber and the West Side. The Tribute would be to the far left-off the photo a short distance. The Toughnut dumps are seen over the hill between the West Side and the Girard mill.

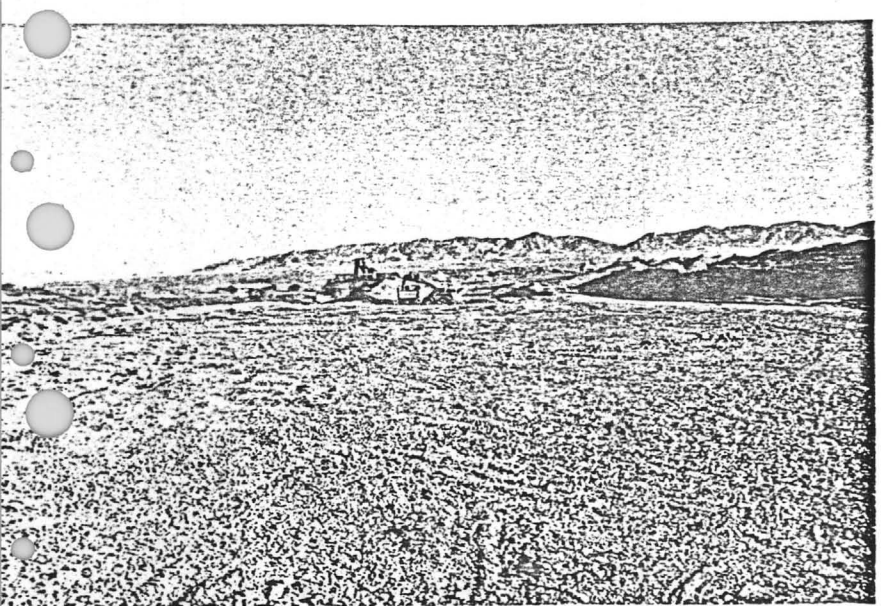
It is obvious from all early photos that all empasis was for the high-grade ores underground; no mining was done by open pit.



Initial stage of hauling West Side dump to the heap. Headframe is in good shape, as are the lagging and ladders.



Most of West Side dump has been hauled to the heap. No exploration has been done in this area after the removal of the dump. Notice in the plate that the shaft was sunk in ore.



Large area for mapping, sampling, and drilling. West Side fissure can be traced on the surface. Outcrops indicate heap-leach grade ore.

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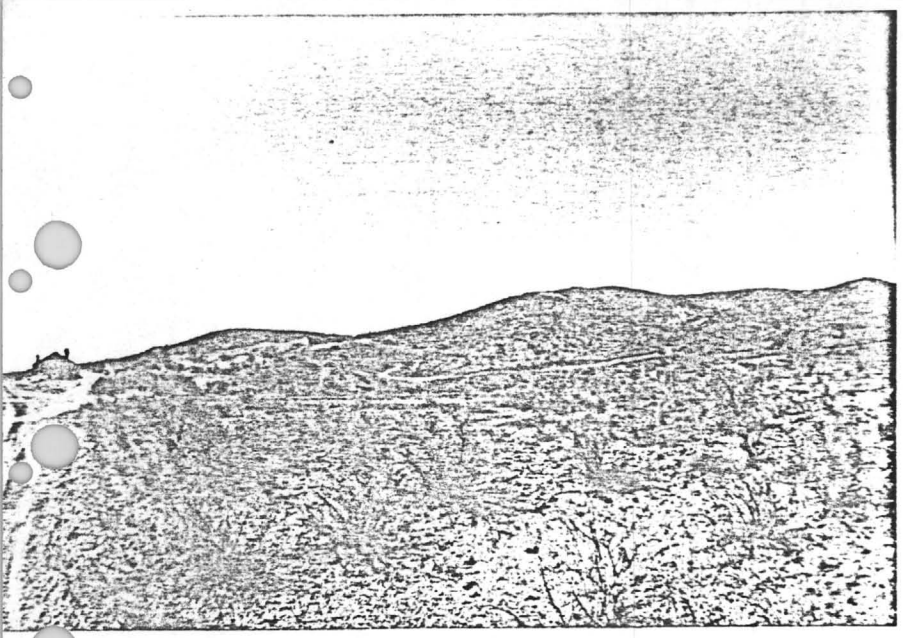
CONTENTION: Along the Contention-Grand Central lode there were over 20 miles of workings in 1902(William P. Blake-Tombstone and its Mines). How many more miles were added since that time is unknown. This quantification relating to the ore mined, or what the ore justified, is very important in considering both open-pit and underground targets at present precious metal prices. Also, the Contention is interconnected to the other mines.

The porphyry dike of the Contention and Grand Central mines extends not only through these mines but beyond through the Head Center into the Tranquillity and through the Empire mine. It is the leading vein or lode of the District. The dike is a crystalline igneous rock which has broken through and disrupted all the stratified beds in its path. However, it is closely connected with siliceous layers and impregnations and with the deposites of gold and silver found in the quartz alongside the dikes and also in the dike;hence the term lode.

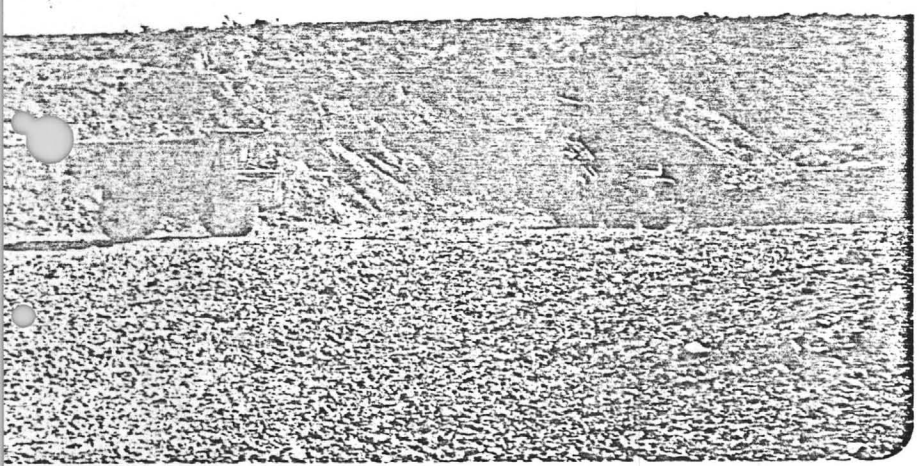
The Contention dike is dislocated by faulting which gives the semblance of two or more parallel dikes. For example, on the 207-foot level of the Contention(equivalent to the first level of the Head Center) the fault has dislocated the shales, limestones, and quartzites with a detectable throw-about 50 feet. On the 258-foot level from the South Shaft to the Flora Morrison it appears that three dikes exist parallel to each other, but it is a result of faulting. Here, the chief faulting plane trends north 25° to 30° west and dips to the northeast. It is marked by a heavy(thick) belt of crushed material of a bright red color. The distance of the throw is less than 250 feet. The dip of the strata is 45° to the east.

The thickness of the Contention dike is variable. In the Contention mine workings it is about 68 feet thick. Further north about 500 feet it is only two feet thick for a short distance(which could be a fault intersection) and then 400 feet further north it suddenly expands on both sides of a mass of shale.

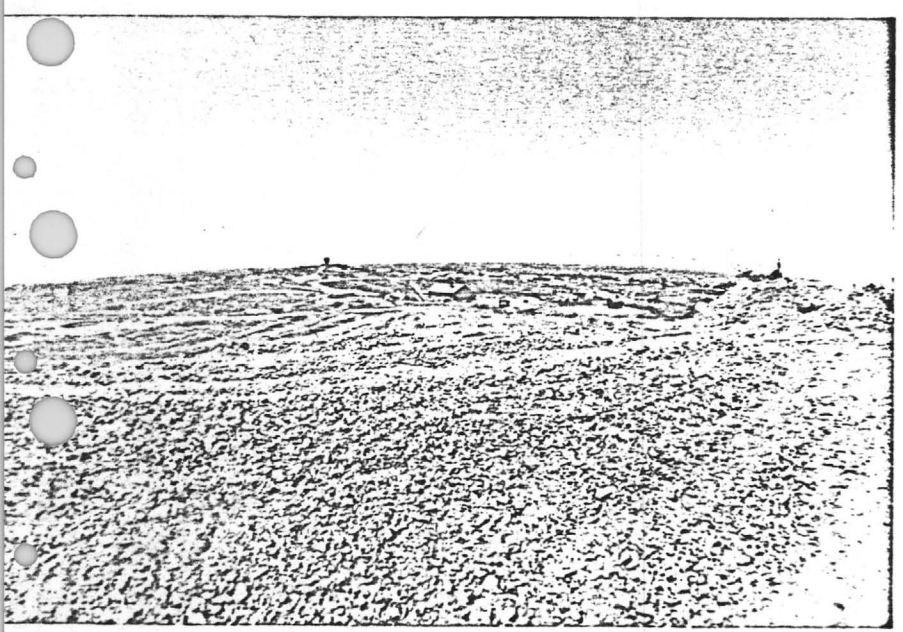
In addition to the Contention dike, the Tranquillity fault, the Sulphuret dike, and numerous other faults intersect or originate in this area. This is why most of the workings are in the Contention mine area(see large plate of all workings). This area would make a very good open pit, due to its location and the near-surface ore. A great deal of sampling has been done in this area with very good results(see sample-assay map).



Contention mine area; Contention dumps shown to the right of the old assay office. Sulphuret shaft is seen between the two; road shown goes to the Lucky Cuss-haul road built for dump haulage to the heap.



Loading at the Contention; This area should be mapped, sampled, and drilled. This area is the intersect of numerous structures.



Contention dump removed; Pump Shaft on far right. Sulphuret Shaft by assay building, and West Side and Boss left-center. This is the potential open-pit area.

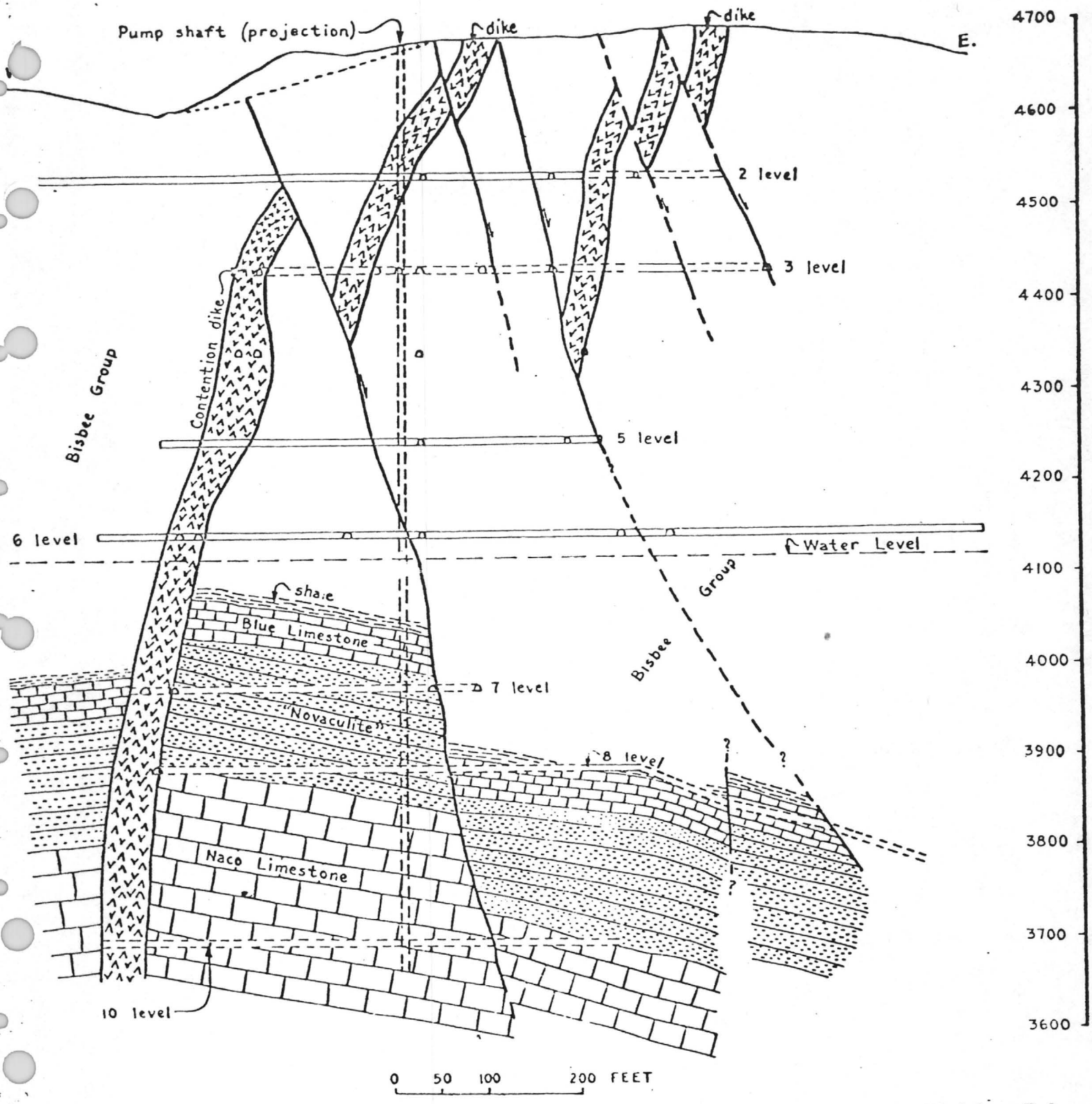
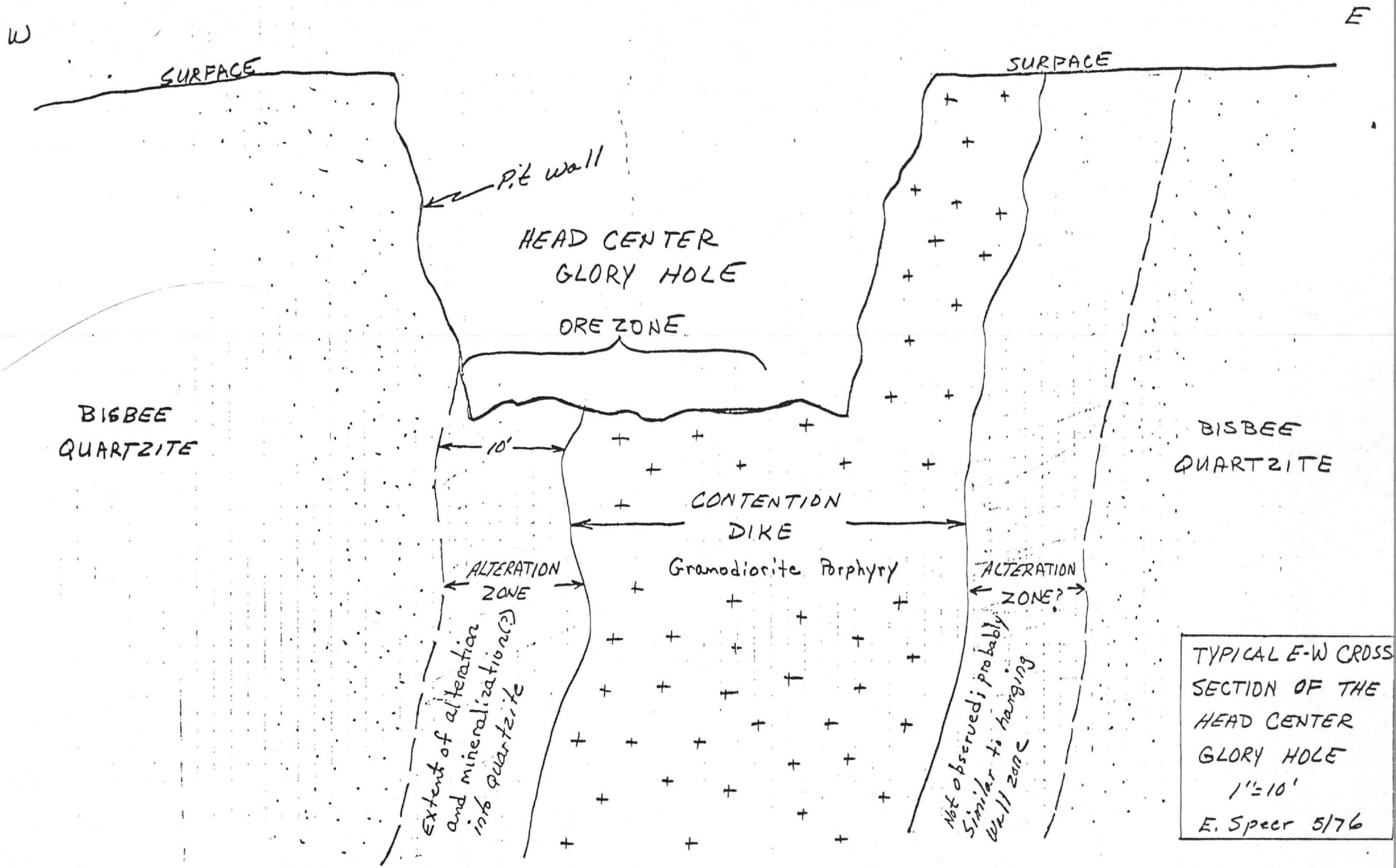
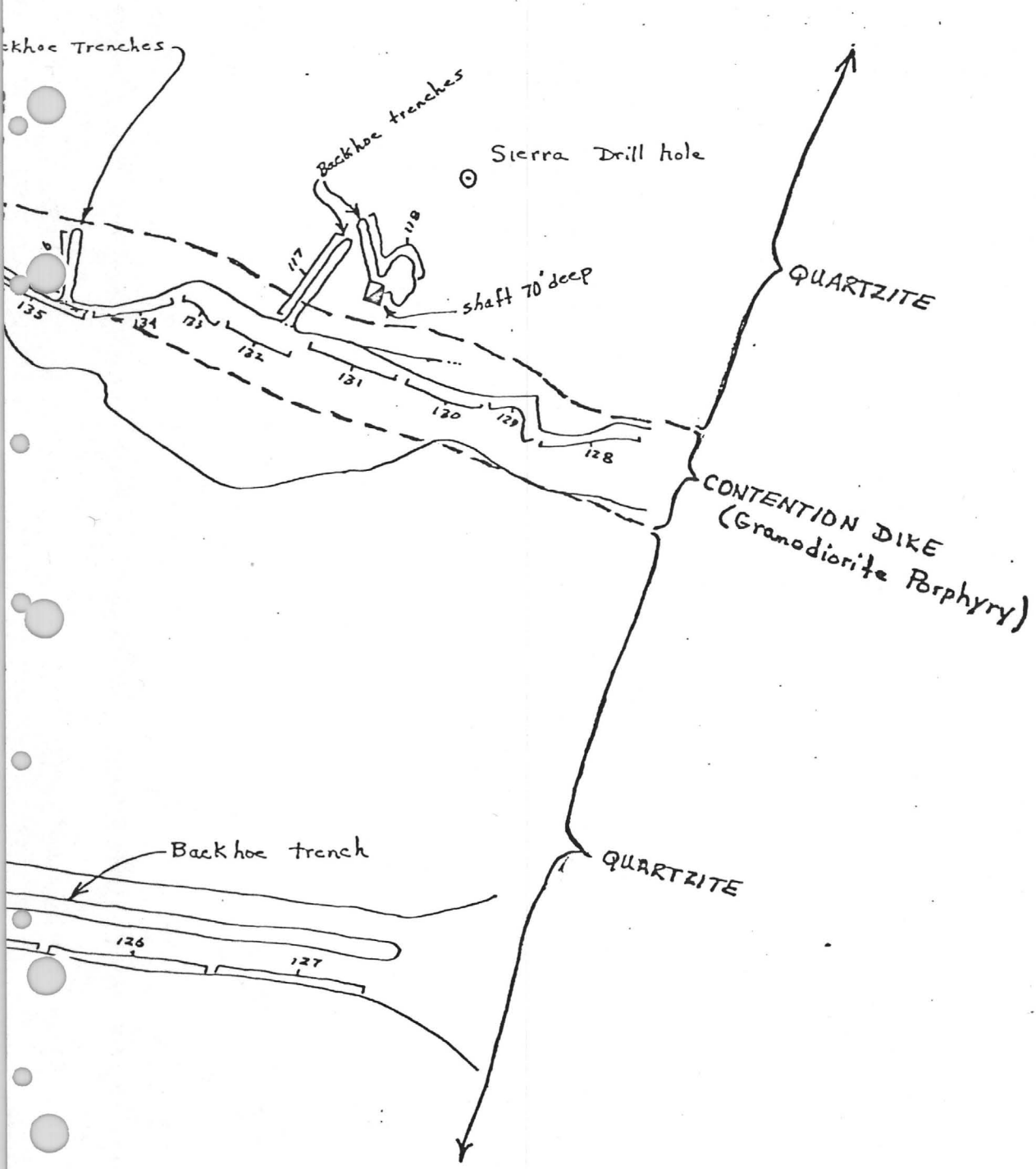


Plate VIII.—Generalized cross section through Contention dike at Pump shaft, looking north. (Modified from F. L. Ransome.)

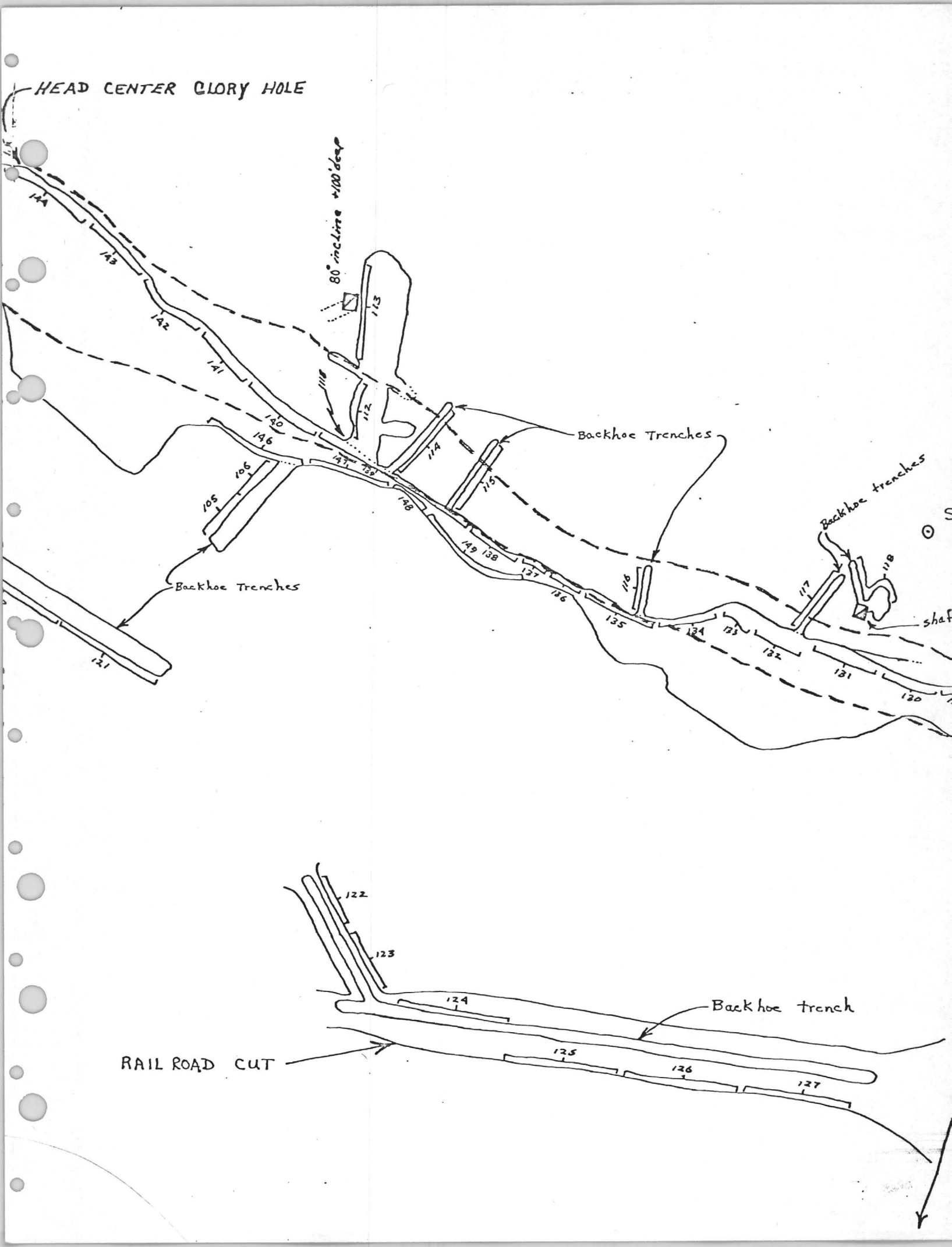


TOMBSTONE COCHISE CO., AZ



SAMPLE LOCATION MAP

HEAD CENTER GLORY HOLE WORKINGS
TOMBSTONE COCHISE CO., AZ
SCALE: 1" = 50 ft. DRAWN BY: E. Speer
LOCATION OF ES SERIES 104-149
MAY 1976


HEAD CENTER GLORY HOLE
80° incline +100' deep
Backhoe Trenches
Backhoe trenches
Backhoe Trenches
Backhoe trench
RAIL ROAD CUT
144
143
142
141
140
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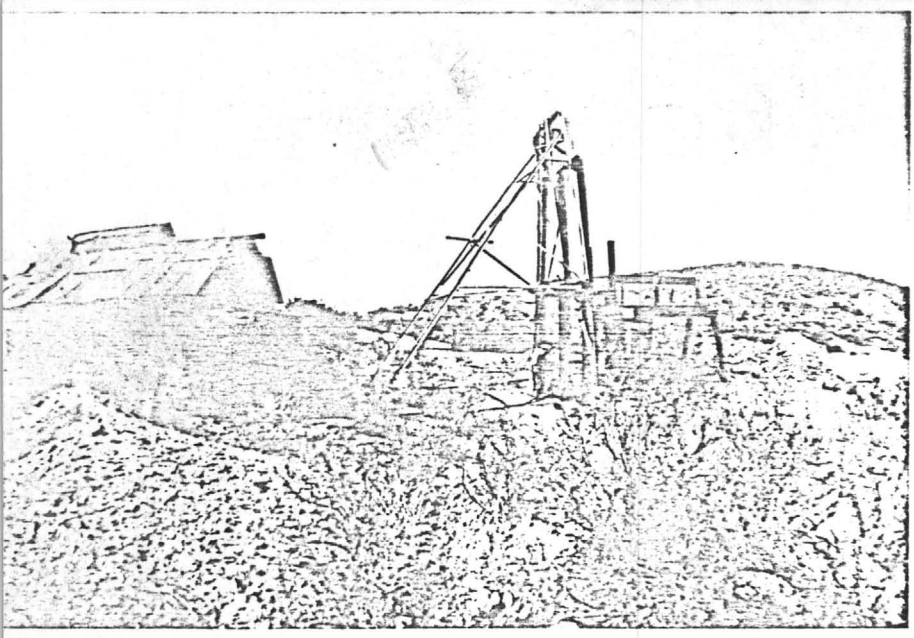
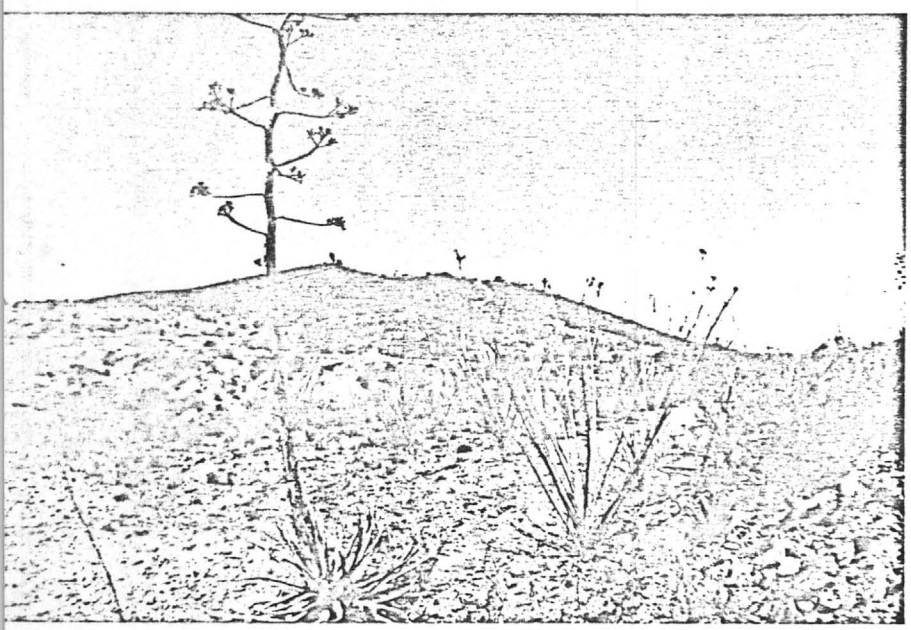
The Contention dike is highly crystalline in some areas, but in most portions it consists chiefly of a feldspathic base in which the feldspar crystals are obscure. It passes into a felsite which in the decay portions of the dike, it looks like partly decayed shales or quartzites. Most of the dike is penetrated by quartz and remant pyrite cube cavities are present in the oxidized-upper portion. In general, the dike looks like a spongy mass of porphyry or quartz. Much of the ore close to the dike(in the sediments) has been crushed by injection of the dike. This ore has a highly-colored red color which is hematite and an indicator of "pay ore". On the 600-foot level, the dike is a smooth(slickensides) and where it is the brilliant hematite red exists, so does ore-bearing ground below. The fissure containing the Contention dike was opened a second time and a parallel intrusion of diabase formed. This diabase is in close association with the high-grade ore(bottom of Sulphuret shaft, third level of the Head Center, etc.). On the 309-foot level of the Contention there were "scales" of gold in the diabase, as well as horn silver.

The Contention mine exhibits the largest tonnage of high-grade ore in the District. For example, samples taken on the 600-foot level (just abovr the water) ran 47.07 ounces Ag and 2.31 ounces gold. Some select ores ran 98 ounces silver and 3.20 ounces gold. However, along the Contention dike in the Tranquillity mine ore averaging 2.4 ounces gold, 98 ounces silver, and 14 % lead was shipped directly to the smetlers.

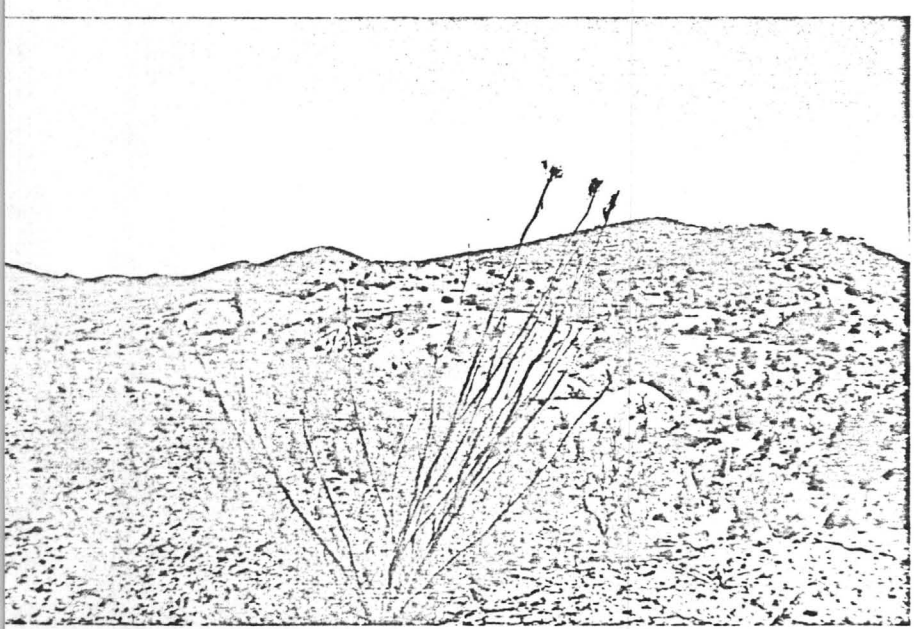
The ore is continuous from the surface down below the water in all mines, but it has been proven in the Contention;the ore bodies have been traced through the workings from the surface to below the water table. During pumping(de-watering) by the pumps in the Pump Shaft, the Contention vein was sunk-on(winze) and for 100 feet (total depth of the winze) the ore ran 5 ounces gold. In general, all winze's sunk below the past water table(during de-watering) averaged 2.5 ounces gold and 20 ounces silver. In all workings in the mines in the east part of the District, the gold increases at depth.



Little Joe shaft; sampled underground with good results. Notice the Contention dike cave in background-red color. Indiana shaft across the fault on hill in right center.



Grand Central left (dumps) and Little Joe headframe taken from Indiana side of fault (looking west). Open pit potential here is very good.



Contention dike-south; Little Joe and Grand Central areas. Good values found throughout the structural zone over 300 feet wide.

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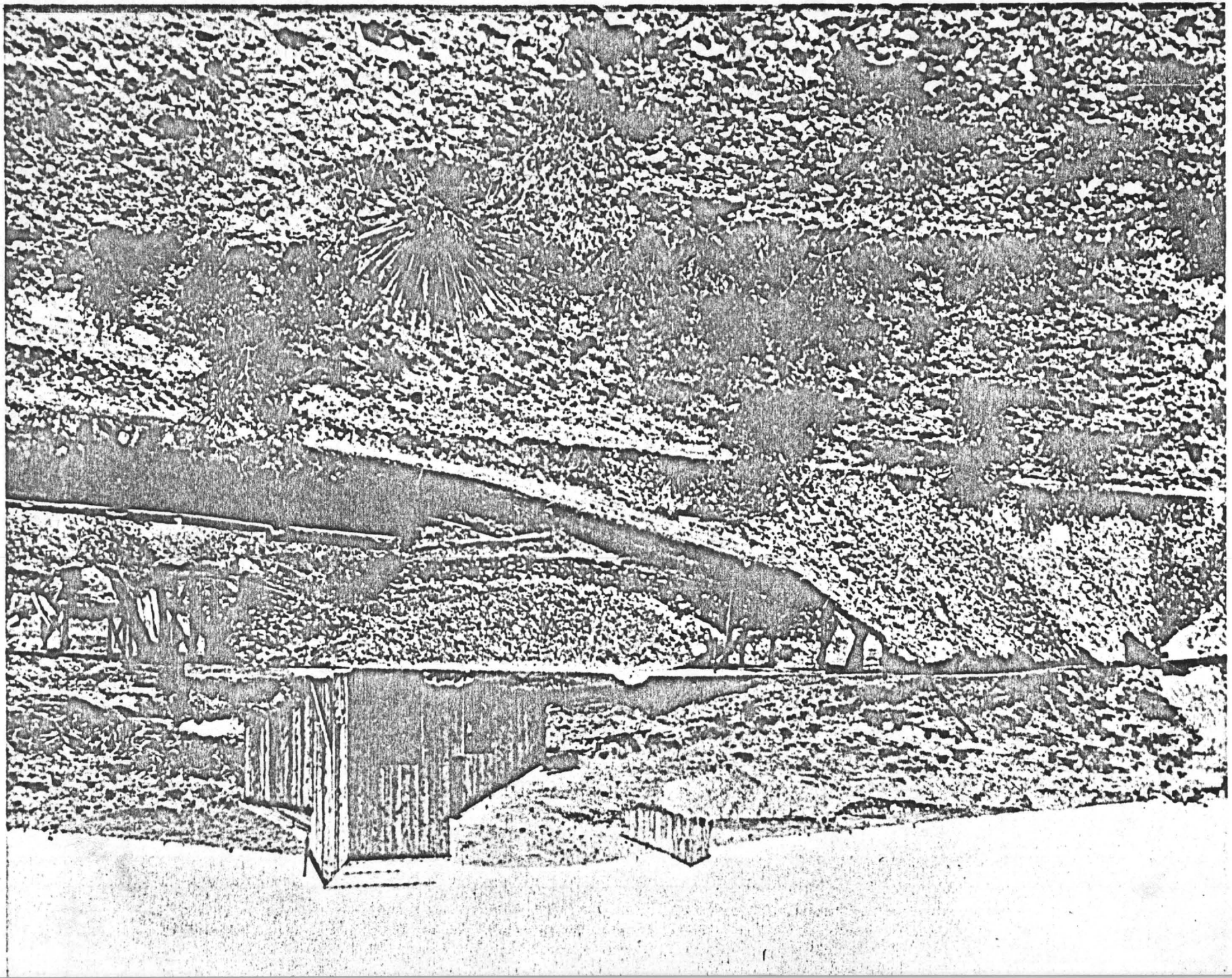
GRAND CENTRAL-LITTLE JOE-INDIANA: The Grand Central and other mines are along the Contention dike, or its southerly extension. The largest ore bodies exist in the northern part of the Grand Central and they are continuous below the water table. The three ore shoots in the Grand Central mine are all very good grade. One is the extension of the south Contention ore body, while the other two are more central and trend to the southwest.

Samples taken underground in the Grand Central, Little Joe, and Indiana mines show very good values in both gold and silver. Samples taken along the 65-foot level in the Little Joe averaged ½ ounce gold and 20 ounces silver. Surface samples also show open-pit grade throughout this area(see assay maps). The Indiana shaft has been sampled for about 200 feet and it also shows good open-pit values. Drilling in the area produced and average of .08 gold and 7 ounces silver.



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Manganiferous Limestone Group

These ore bodies are characterized by a series of thickly bedded massive limestones containing manganese ores and manganiferous silver. These ore bodies lie in the western and southern portion of the District. Mines included in this group are the Lucky Cuss, Luck Sure, Wedge, Sunset, Knoxville(Stonewall), Anchor, and the Grand Dipper. The limestone that crops out around the Lucky Cuss is Naco, with the Schieffelin granodiorite to the west and north. The limestone strikes N. 8° W., and dips 72° W. Further south the strike and dip change, curving toward the Emerald series. The north-south trending manganiferous limestones have a mineralized width of 1700 feet.

Ore bodies of this type exhibit a series of "pipe-like" structurally controlled ore bodies locally called "chimneys". The chimneys pitch eastwardly at an angle of about 45°. Manganese sulphide was found in a body of the Lucky Cuss mine; the mineral species Alabandite was found in some of the manganese kidney ore bodies. The silver came in with the manganese sulphide as tetrahedrite.

LUCKY CUSS MINE: Surface ores ran from 30 to 50 ounces silver per ton. The ore was high grade gold-silver-lead and continued below the water table. Also, much manganese oxide was mined and shipped.

The Lucky Cuss, Old Guard, and Herschel are along the strike of this limestone mass. Notice on the follwoing plate that some of the ore bodies were in the fault zone and the others in massive limestone. The author has entered the Lucky Cuss from a long drift starting in the Old Guard. The area is ideal for an open pit. The outcrops' are open pit grade; the area should have more sampling and drilling. Notice that the ore bodies all came to the surface(following plate), which provide surface ore that was below the cut-off during the mule-train days.

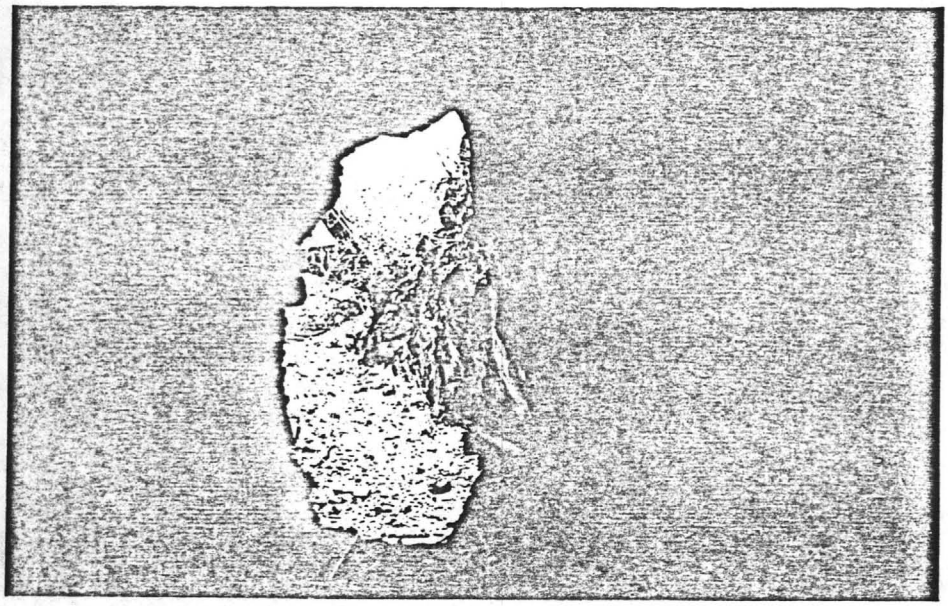
On the facing page is a photo of the old Lucky Cuss workings in about 1884, looking easterly. The upper shaft was later to be the largest workings and dump. The lower shaft and dumps did not develop much further. To the right and up hill is the Luck Sure. The Old Guard and Herschel is to the left over the ridge.

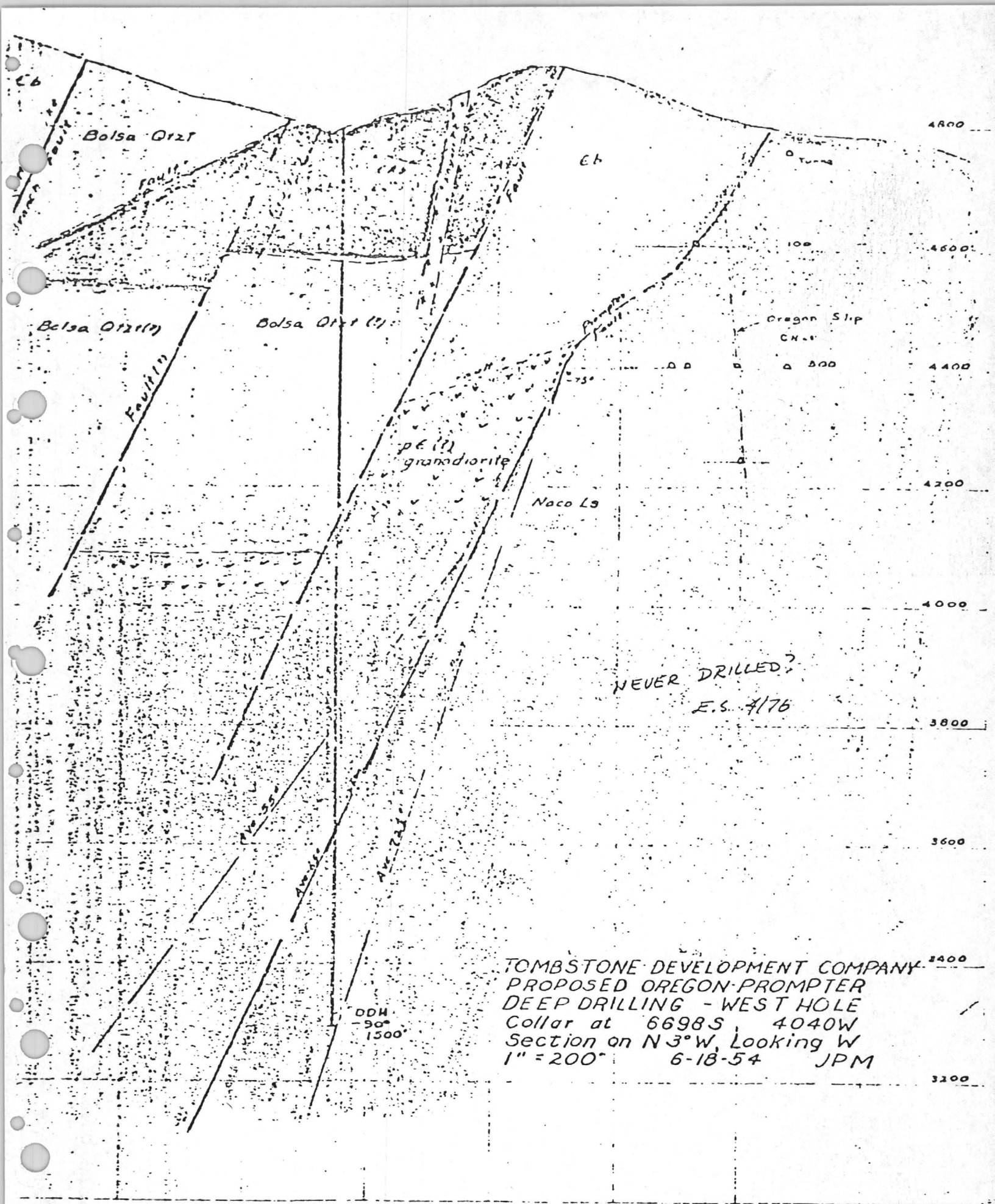
On the back of this page is a more recent photo of the Lucky Cuss dump and the Luck Sure on the side of the hill. Facing that photo is an 1880 photo of the Luck Sure.

Vertical photo showing dip at the Prompter; dip is to the south. The structure can be traced across the hill to the Oregon mine. Good values exist between the two mines in the structure. Gob would be at the lower workings (from 200 to 500 foot level) due to steep dip of the structure.

Numerous ore/stope exposures exist near the portal and east along the structure.

Oregon end of the long drift connecting the Oregon and Prompter mines. There are numerous workings that come to the surface and that provide access to the undergound stopes.

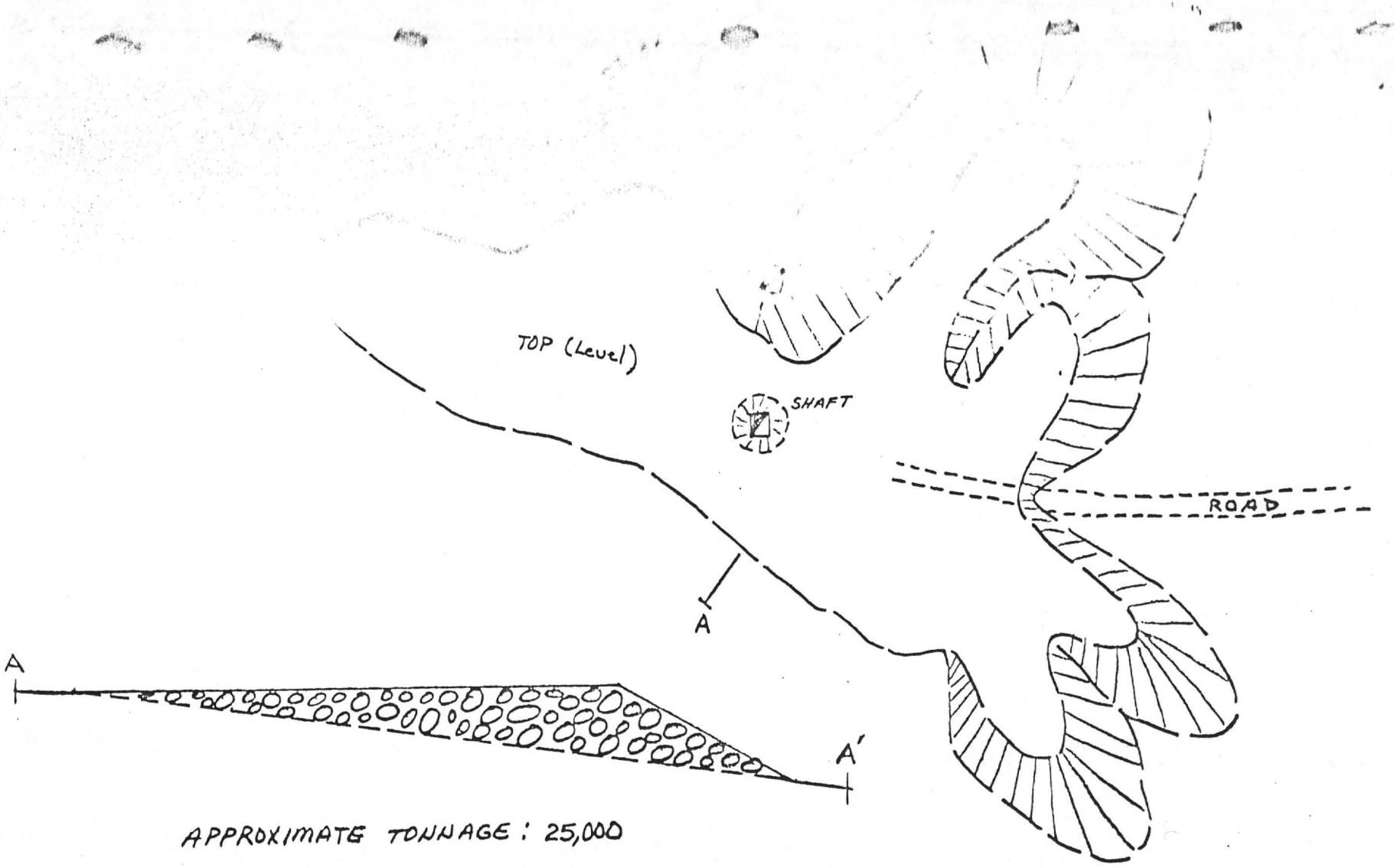




TOMBSTONE DEVELOPMENT COMPANY
PROPOSED OREGON-PROMPTER
DEEP DRILLING - WEST HOLE
Collar at 6698S, 4040W
Section on N 3° W, Looking W
1" = 200' 6-18-54 JPM

JE _____ LOCATION _____ LEVEL _____
OLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
_____ E _____ EL _____

ON BLUE PRINT CO. — K & E AIRANFINE 105M

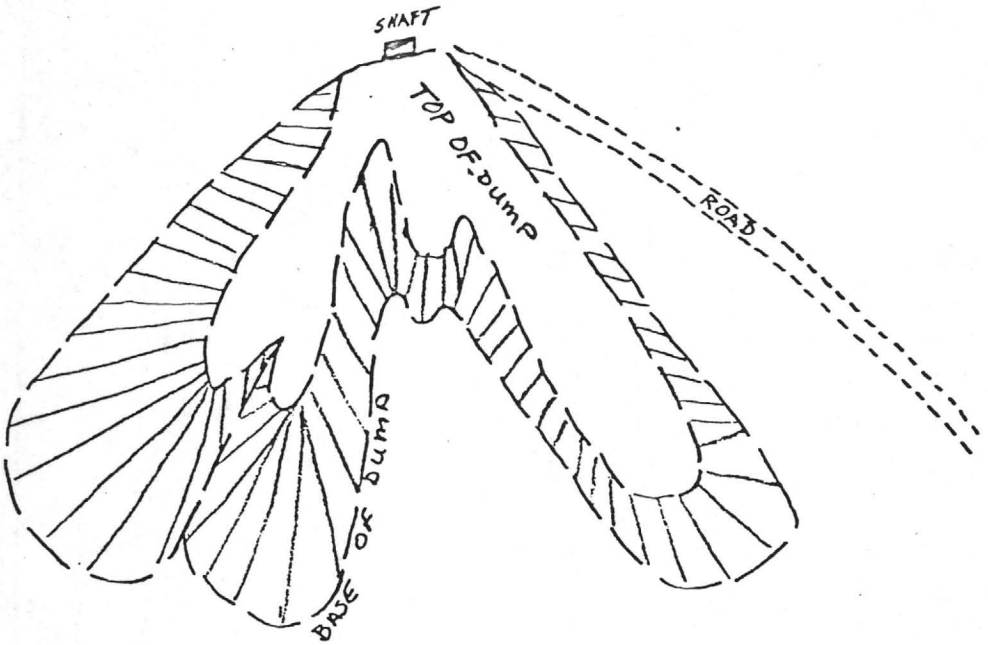


APPROXIMATE TONNAGE : 25,000

OREGON DUMP
1" = 50'

E. SPEER
7/76

GRAND DIPPER



APPROX. TONNAGE: 7,500

EMERALD GULCH

ROAD

GRAND DIPPER DUMP

1" = 50'

E. SPEER 7/76

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Emerald Series

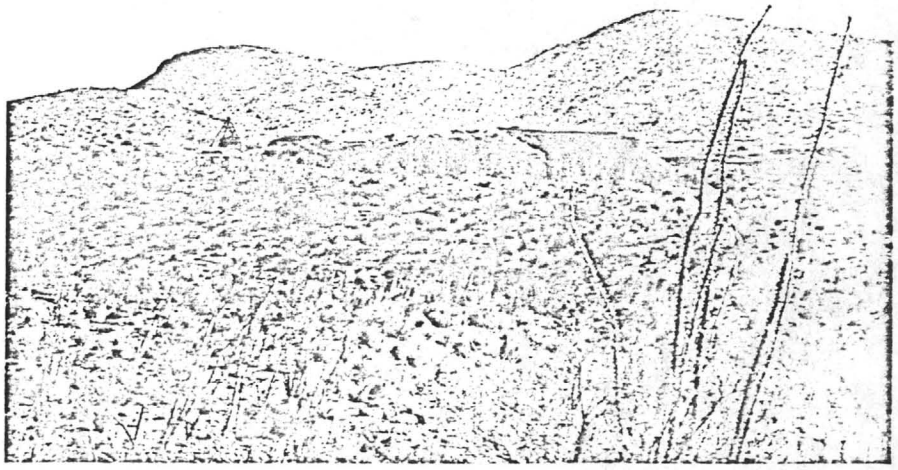
South of the Lucky Cuss are a series of beds of limestone, shales, and quartzites the crop out with extreme regularity and dip eastward at an angle of 30°, striking north-south. The upper members consist chiefly of massive limestone which forms the massive hill to the south of the Emerald mine. The limestones rest on argillaceous limestones with many shaly partings forming sharply defined linear croppings. Then under a bed of shales there is a foudation of regularly bedded clean quartzite of vitreous even grain that is limonite stained and over 400 feet thick. Two east-west structures separate the Emerald from the Lucky Cuss type ore bodies. The Bunker Hill mine is possibly dislocated by the structure; the Bunker Hill is in the Naco as are the Lucky Cuss type ore bodies.

EMERALD: The Emerald is the lowest in the Geological Column in the District, as follows;

Escabrosa ls.	Carboniferous
Martin ls.	Devonian
Abrigo ls.	Cambrian
Bolsa qtz.	Cambrian
Pinal Schist	Pre-Cambrian

In addition to manganiferous silver ores and gold, base metals were found. At the pre-Cambrian contact, chalcocite was mined and shipped that ran 40 % copper. Also, the vein was recently sampled and mapped and at the water table would run about $200 per ton. The north-south structure was examined by the team of Spear and Walker who report hugh stopes and interconnected workings. Surface samples indicate ore-grade vein walls over a large strike distance.

Emerald dump with headframe. Good area for open-pit exploration.



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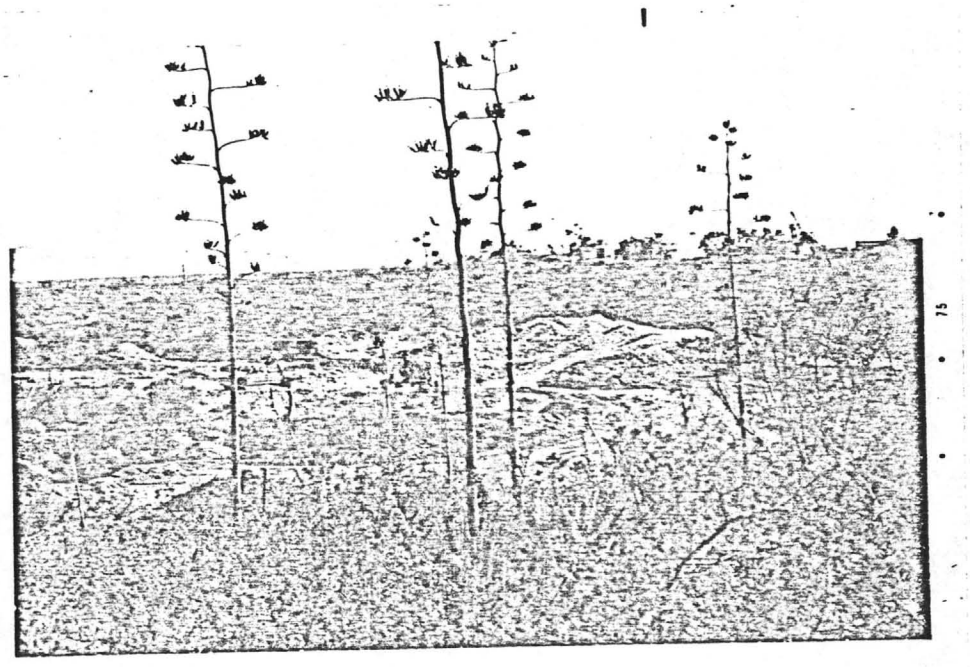
Tombstone Extension

This area is possibly faulted-off from the main District. The ore bodies are very much like the main District ore bodies, starting in Bisbee on the surface. The following plate shows in section the ore bodies which are in the upper Bisbee. The main mines were the Tombstone Extension, Carper, and the San Diego. Most of the lead or contained .071 ounces gold per ton. The Tombstone Extension Mine was the largest producer of lead in Arizona in 1932-1933.

Exploration conducted by the author determined that an intrusive outcrops in this area. The Teriary intrusive caused a large belt of alteration and was moderately mineralized at the surface. At a depth of 200 feet(maximum depth of hole) the grade was up to .06 Au and 5 ounces Ag. About 600 feet east of the alteration center is a breccia pipe. This area deserves more exploration. About 20 shallow drill-holes have been drilled and interesting precious metals and base metals were discovered.



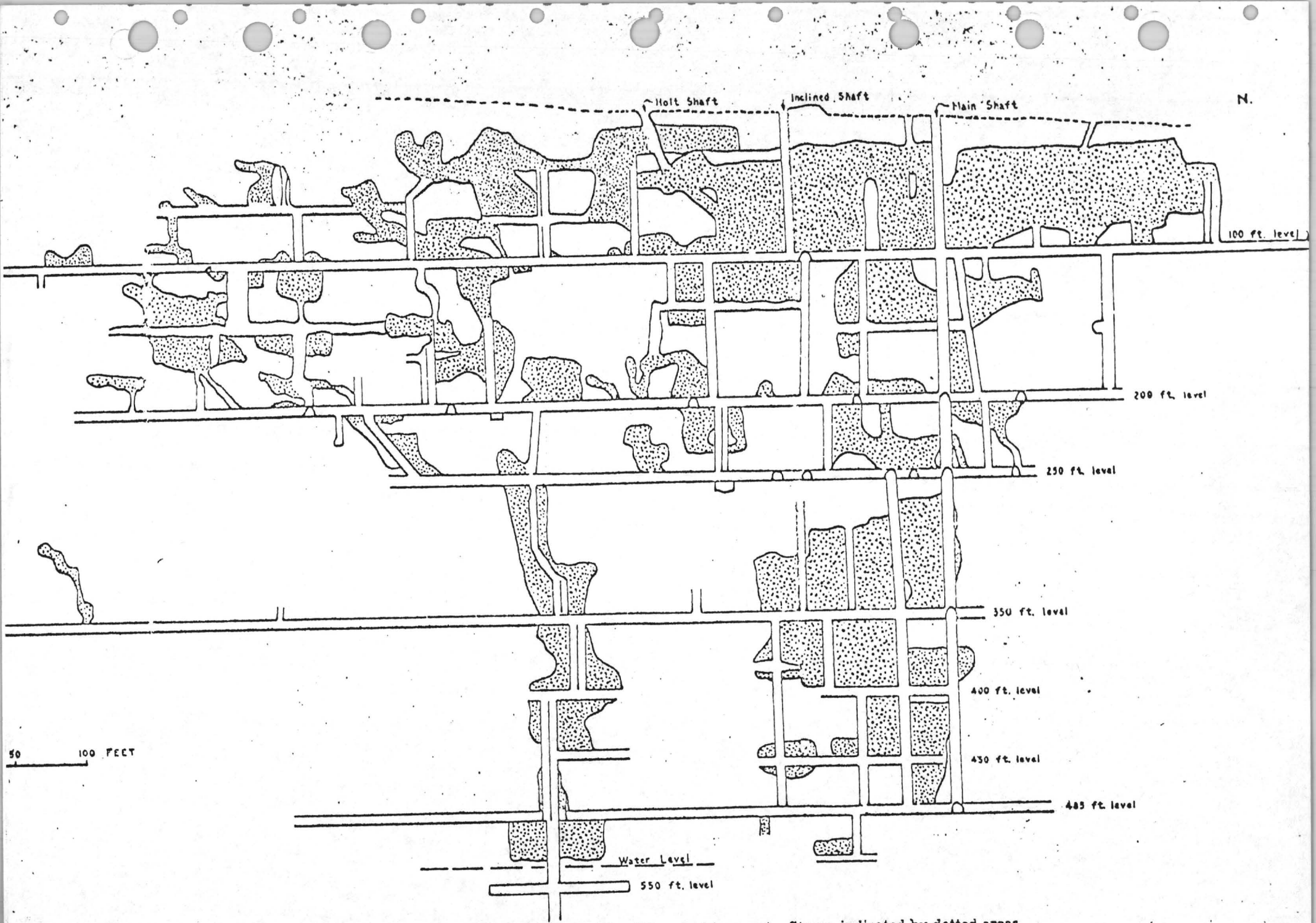
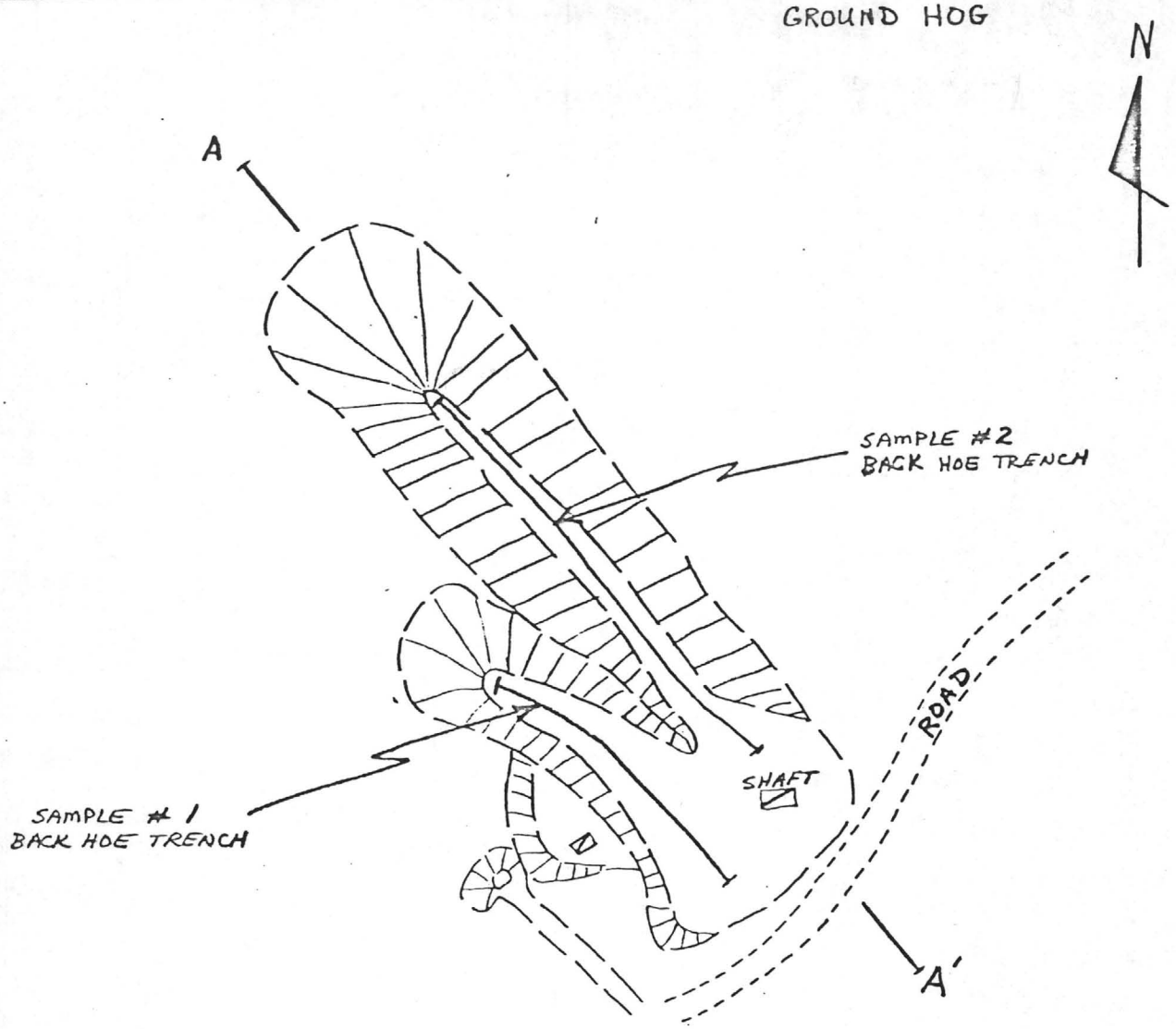
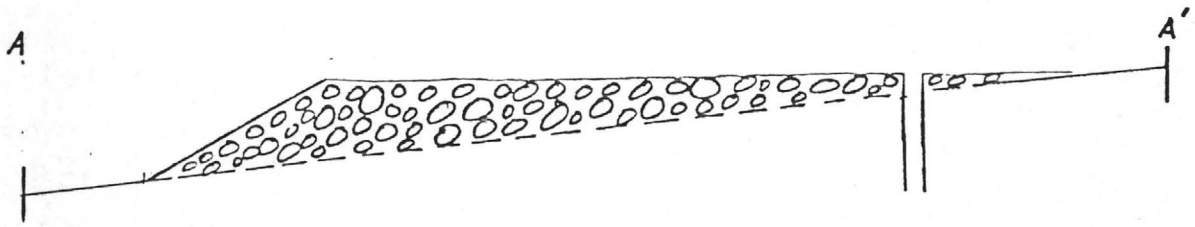


Plate X.—Longitudinal section of Tombstone Extension Mine, looking west. Stopes indicated by dotted areas.

GROUND HOG





SECTION ALONG AA'

APPROXIMATE TOTAL TONNAGE: 6,000

GROUND HOG MINE
LOWER DUMP
1" = 50'

E. SPEER 7/76

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EXPLORATION

Both underground and open pit exploration will be considered for the Tombstone District. However, there are more open pit targets than underground from an economic point-of-view.

The underground workings are generally in good shape. Because of this, the following approach is suggested:

1. Compilation of all data; determination of targets from roll and structural intersections.
2. Sample these areas underground-with whatever mapping is necessary.
3. Surface drilling using reverse circulation of determined targets.
4. Drifting along any high-grade intercepts.

Open Pit

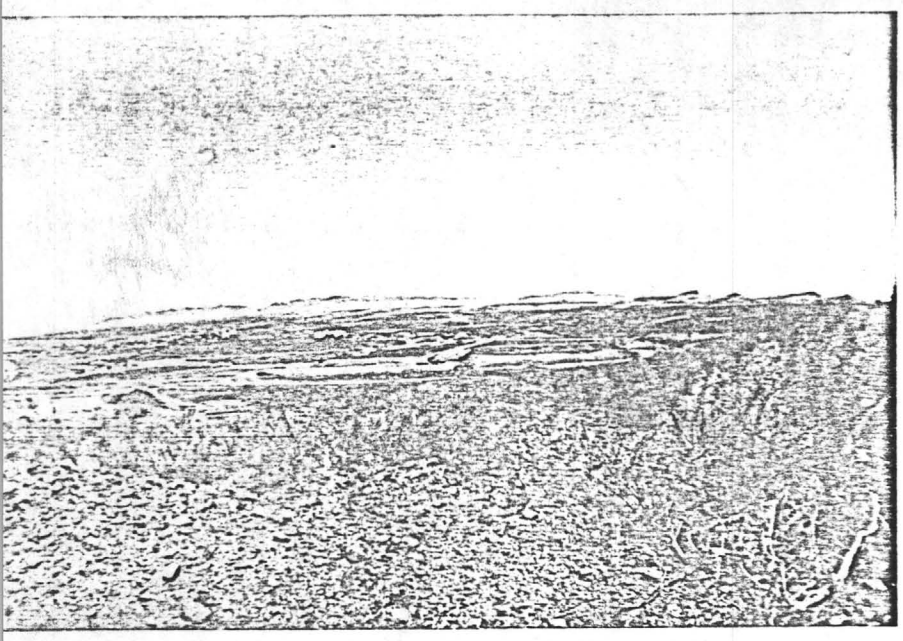
Considerable surface sampling has been done in the District. Also, extensive underground mapping and sampling has been done for many years. Based on these data and knowldge of the underground workings, the following open-pit targets exist in decreasing order of priority:

1. Contention dike structure
2. Silver Thread-Skip Shaft area
3. Lucky Cuss-Old Guard-Herschel area
4. Emerald area
5. Bunker Hill-Rattlesnake area
6. Tombstone Extension area.

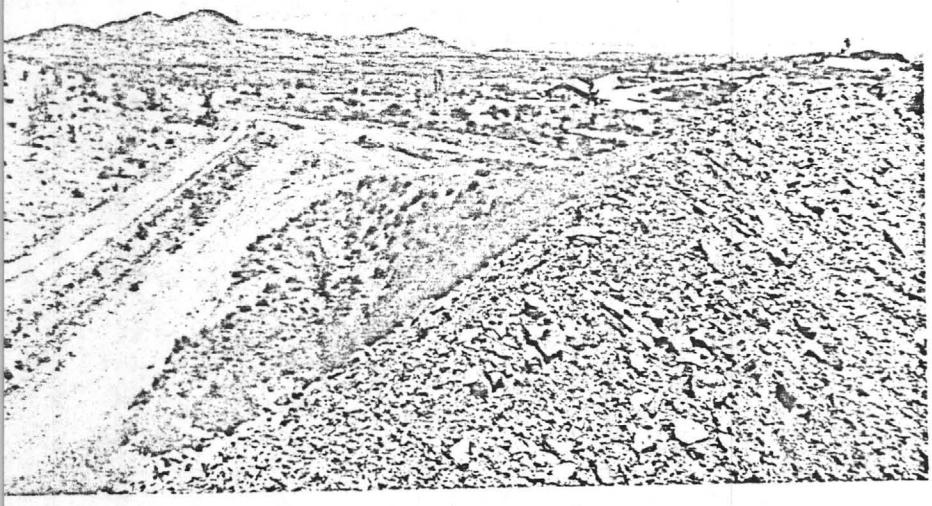
Underground

Underground mining is a very costly operation. Considering the economics and the past production of various mines, structure, extent of workings, grade of past production and present knowledge of ore extent, there is only one target-the Contention Dike. Therefore, it will be discussed along with the open pit consideration; the underground evaluation would be an extension of open pit evaluation.

The Contention is the only underground target that could potentially stand-on-its-own. However, the Lucky Cuss could justify an underground operation in combination with open-pit mining.



Contention dike area; viewed from ridge separating cave area from dike and faults. Breccia dikes in area.



Contention Shaft area; beyond hill with roads. Viewed from heap.

Contention Cave area; Outcrop showing red hematite-good gold values in this area.

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CONTENTION DIKE: This structure is rated as the best open pit and underground possibility in the District. As was mentioned, it will be discussed from the point of view that the underground mining would be an extension of open pit mining, from an evaluation standpoint.

Consider first the three maps showing the surface sampling in the Empire-Tranquillity-Contention-Grand Central zone (Duval, Homestake/Doherty, and Hewlett). Results of these samplings are:

Open-Pit Target Area	Average Grade	
	Au	Ag
Contention Shaft	.066	1.75
Contention Cave	.145	3.53
Grand Central	.058	3.12
Tranquillity	.063	1.66
Skip Shaft	.207	2.02

This zone is an obvious open-pit target, and it is also an underground target due to two basic facts, which are:

1. Continuity exists at depth and the gold values increase at depth.

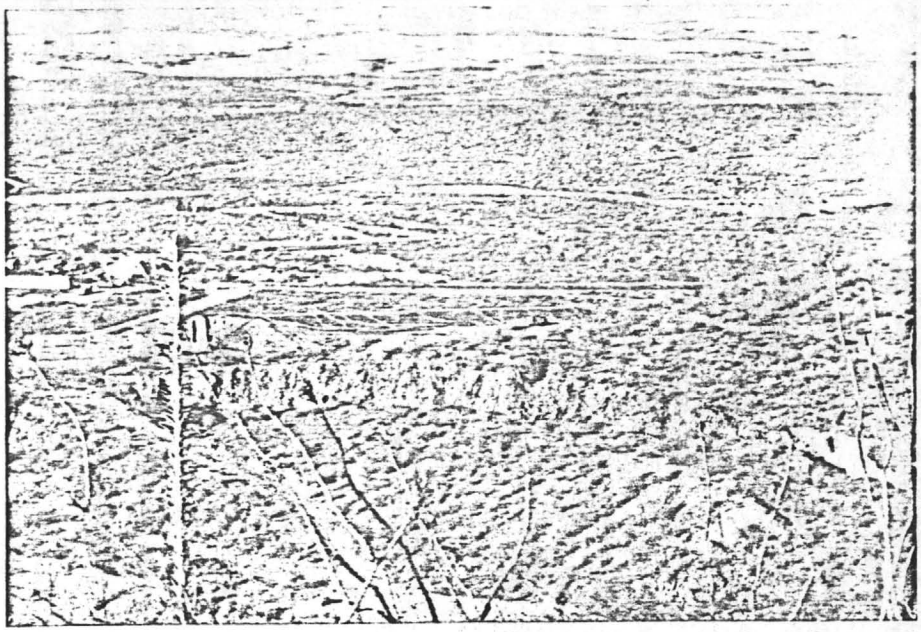
2. Water level curtailed mining very far below the water table due to previous pumping problems (see special maps showing the workings above and below the water).

Contention Cave area; Dike was mined and the ore was followed to the surface. Viewed from between the Contention-left and the Grand Central-right out of picture. Flora Morrison is to far left-lower.

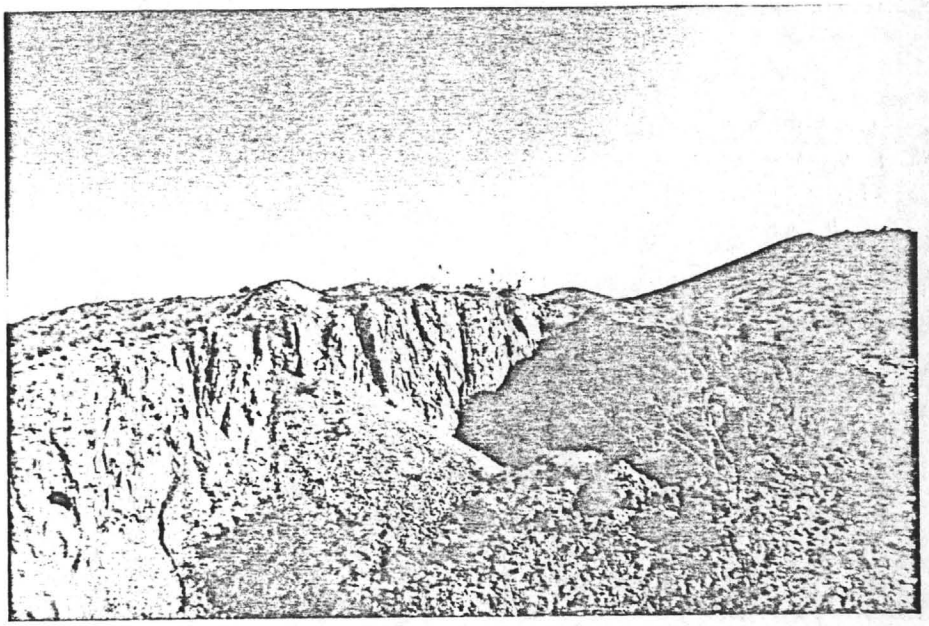
Contention; north end of caved area is separated by a silicious ridge that is mineralized. Notice other caved area on the other side if the road. This caved area is shown on sample maps.

Contention; numerous breccia zones (dikes/pipes). Little Joe headframe far right. This area averaged .145 Au & 3.53 Ag. Vein on south side runs over 1 ounce Au & 30 oz. Ag

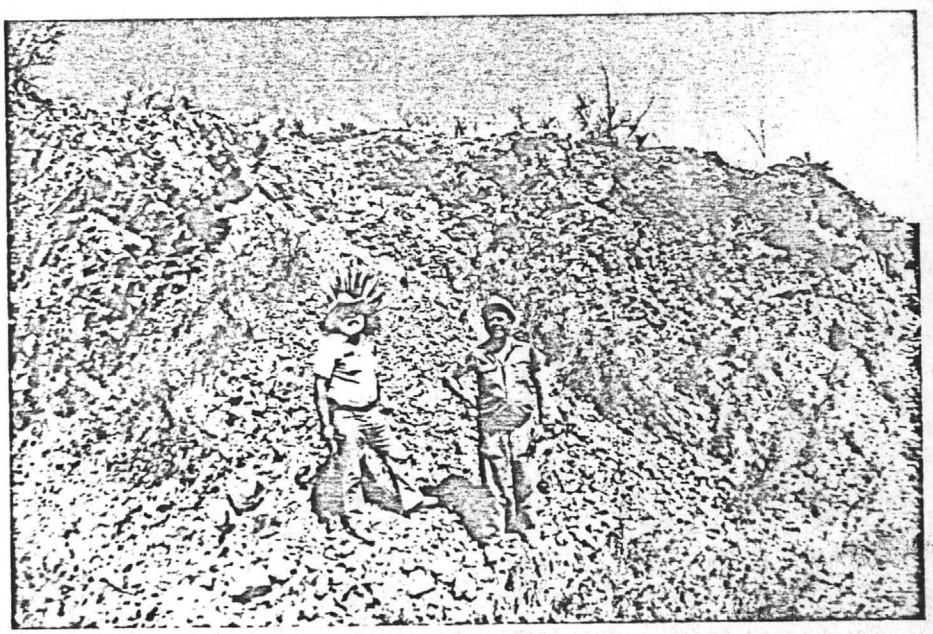
North end of the
Contention Cave;
Notice the alteration.

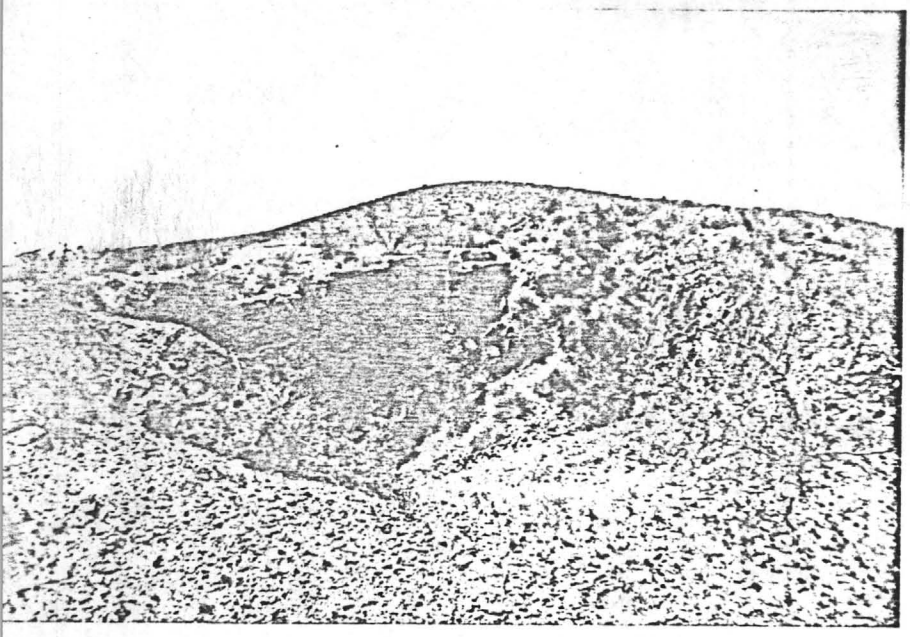


South end of caved area;
Back-hoe trenches found
many high-grade veins.

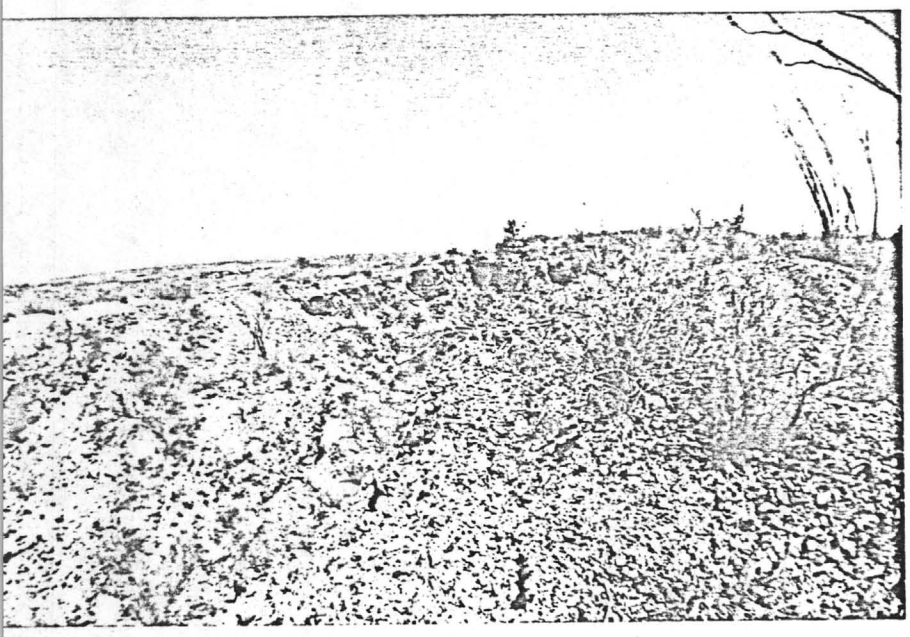


Walls of dike;
Notice the red
hematite-indicative
of gold values.





Contention Incline; Part of the structure in the Contention area. This is a north-east extension of the caved area along the Contention dike-close to the heap. Called the Little Contention; had high-grade gold in dumps. Structure carries good values.



Contention cave area; North end. Contention Incline over the ridge. This structure trends into Incline area(above) and under the heap to the Contentment Shaft.

Indiana Shaft area; behind obsever a short distance. Red altered area is railroad cut that extends about 700 feet. Samples taken along cut averaged .03 Au, which is a good indication of better ore at depth. Most areas have better gold values at 15 feet. Cut is close the caved area(looking NNE).

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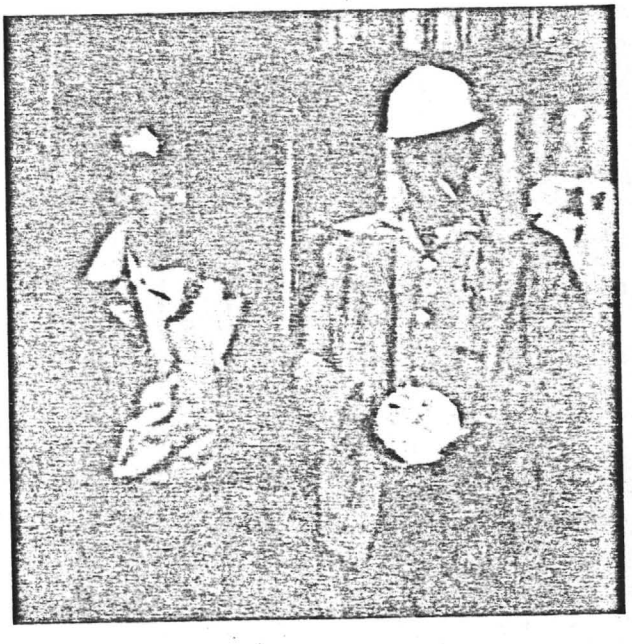
Below is a summary of the relationship of gold to depth:

	Grand Central	Contention	Sulphuret	West Side	Toughnut Goodenough	Lucky Cuss
Surface				1/3	Little	Tr
Water Level	5 oz.	5 oz.	1 oz.	2/3 oz.	1½ oz.	1 1/3 oz.
Below						2 ½ oz.

The above makes the obvious point that the gold increases with depth and that the south end of the Contention dike deserves the most serious exploration for both open pit and underground.



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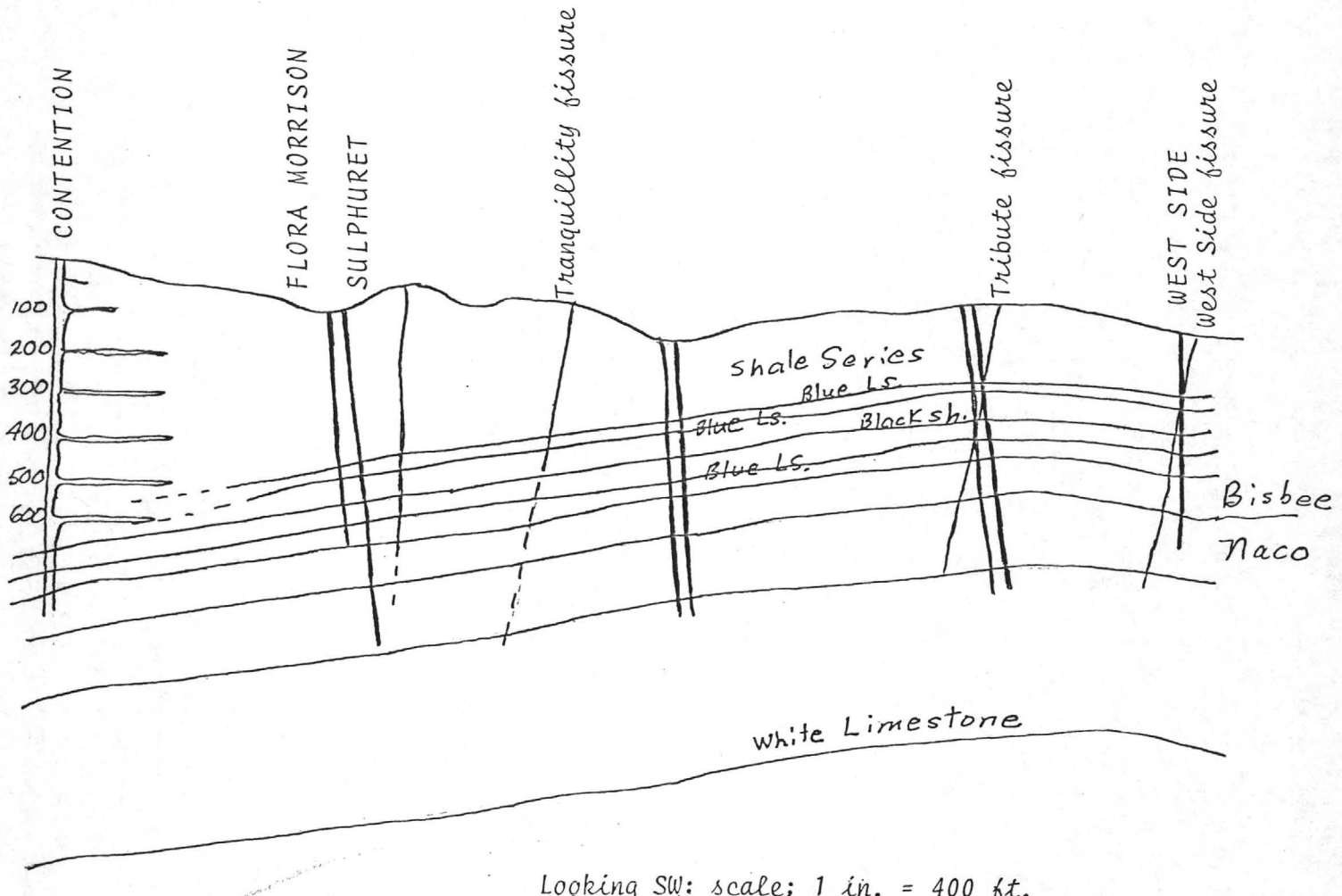
The West Side anticline is shown below, presenting the concept that at depth in the Contention mine exists high-grade ore bodies that are high-grade accumulations of the Bonanza ores found in the anticline near the surface (West Side, Tribute, Tranquillity, etc.). The ore bodies would be the highest grade near the intersection of the "ore-producing" horizons in the blanket ore zones and the Contention dike. Numerous examples of this fact have been found in isolated winze's, cross-cuts, and other lower workings. However, due to the fact that little mining was done during the de-watering period (see map showing workings below the water table), no concerted effort was made to mine these high-grade ores.



Looking SW: scale; 1 in. = 400 ft.

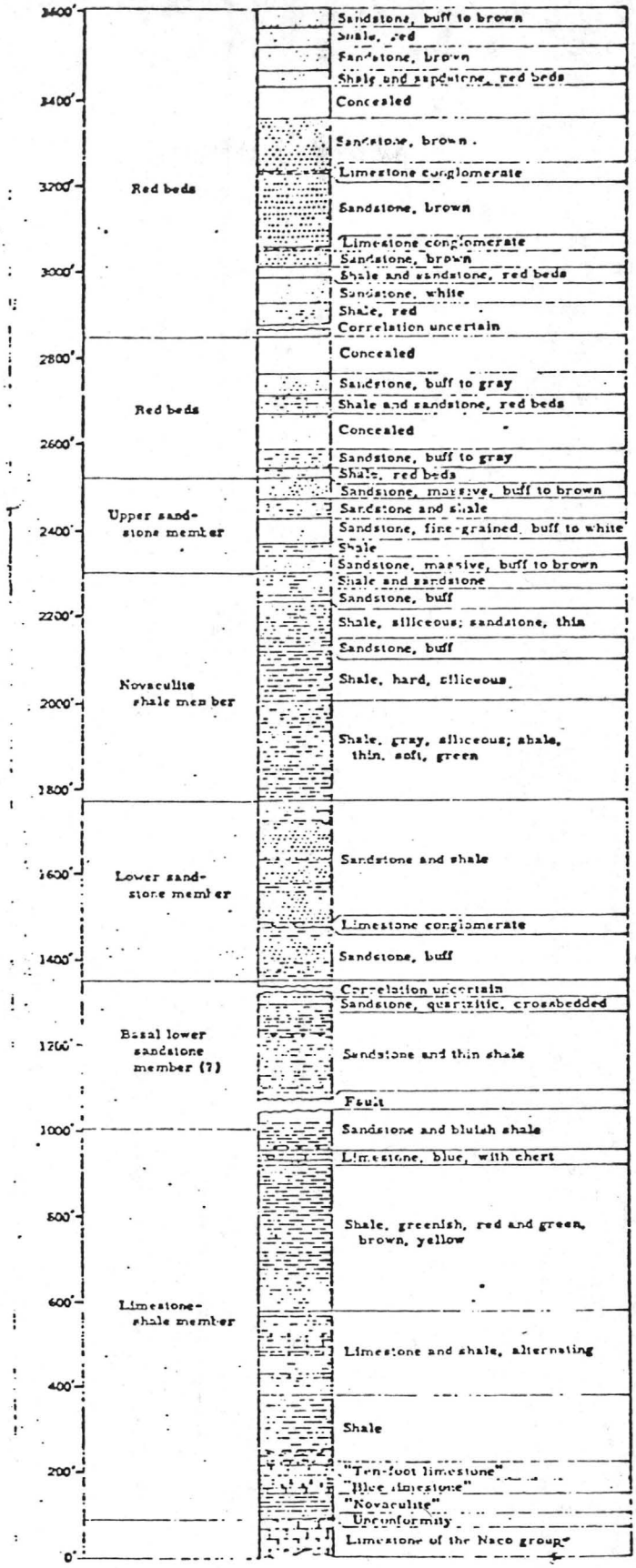


FIGURE 5.—Composite section of the Bisbee formation in the Tombstone mining district. After Lyden, O'Donnell, Hernon, and Higdon (unpublished mine repts., 1947).

The lowest and thickest is as much as 40 feet thick in places. These six beds of blue-gray and silty limestone contain abundant marine fossils. The formation contains at least two other beds of limestone 2 miles to the southwest; these contain fresh-water faunules. About 2 miles east of Dragoon Camp (Black Diamond), several thin beds of blue-gray shaly limestone occur in the Bisbee formation at a horizon that is many hundreds of feet stratigraphically higher (with respect to the local base of the formation) than these southern beds. The limestones near Dragoon Camp also contain a marine fauna, but so poorly preserved as to be of little service in correlation. The fauna is principally of interest because it shows the persistence, at least at times, of marine conditions during the deposition of the Bisbee formation as far north as Dragoon Camp.

Everywhere in the area the top of the Bisbee formation is an erosion surface, either ancient or recent. Accordingly, even if exposures were much better and structural complexities much less, it would be impossible to determine the original thickness of the formation. Under these conditions it is possible only to estimate the minimum thickness of the rocks. A careful study of the much-faulted and metamorphosed strata exposed in the mining district at Tombstone has been made by Messrs. J. P. Lyden, R. M. Hernon, Neil O'Donnell, and C. E. Higdon, who kindly supplied the following composite generalized section, synthesized from many partial sections measured in the Tombstone district.

Generalized composite section, Bisbee formation, Tombstone Hills.

	Feet
Erosion surface.	
1. Sandstone and shale, alternating; a few 10-foot limestone conglomerate beds; shale members chiefly red or maroon; sandstone beds buff to brown, a few gray or white; sandstone members range from 20 to 170 feet in thickness, predominate over the shale	1,040±
2. Sandstone, buff, gray, and white, some interbedded gray-green hard shale; thick bedded	220
3. Shale, gray to green, hard and siliceous, a few thin buff sandstone beds	540
4. Sandstone, buff, white, and brown, a few green shale beds, at least one thin bed of limestone	422±
5. Shale, green and bluish, some conglomerate	58
6. Limestone, massive, blue, cherty	25
7. Shale, green, mottled red and green, brown, and yellow	345
8. Limestone	10
9. Shale, some sandy beds	29
10. Shale and limestone, alternating in thin beds	15
11. Shale, greenish, some limy beds	30
12. Limestone	5
13. Shale, poorly exposed	53
14. Limestone	4
15. Shale, gray, green, and black	43
16. Sandstone, yellow	9
17. Shale, red and brown	65
18. Shale, black	14
19. Shale, green and gray, siliceous	42
20. Limestone, "Ten-foot bed" of miners	10
21. Shale, with arkose at base	21
22. Limestone, "Blue limestone" of miners	34
23. "Novaculite," silicified shale, local intercalations of limestone conglomerate	60
Total	3,097±

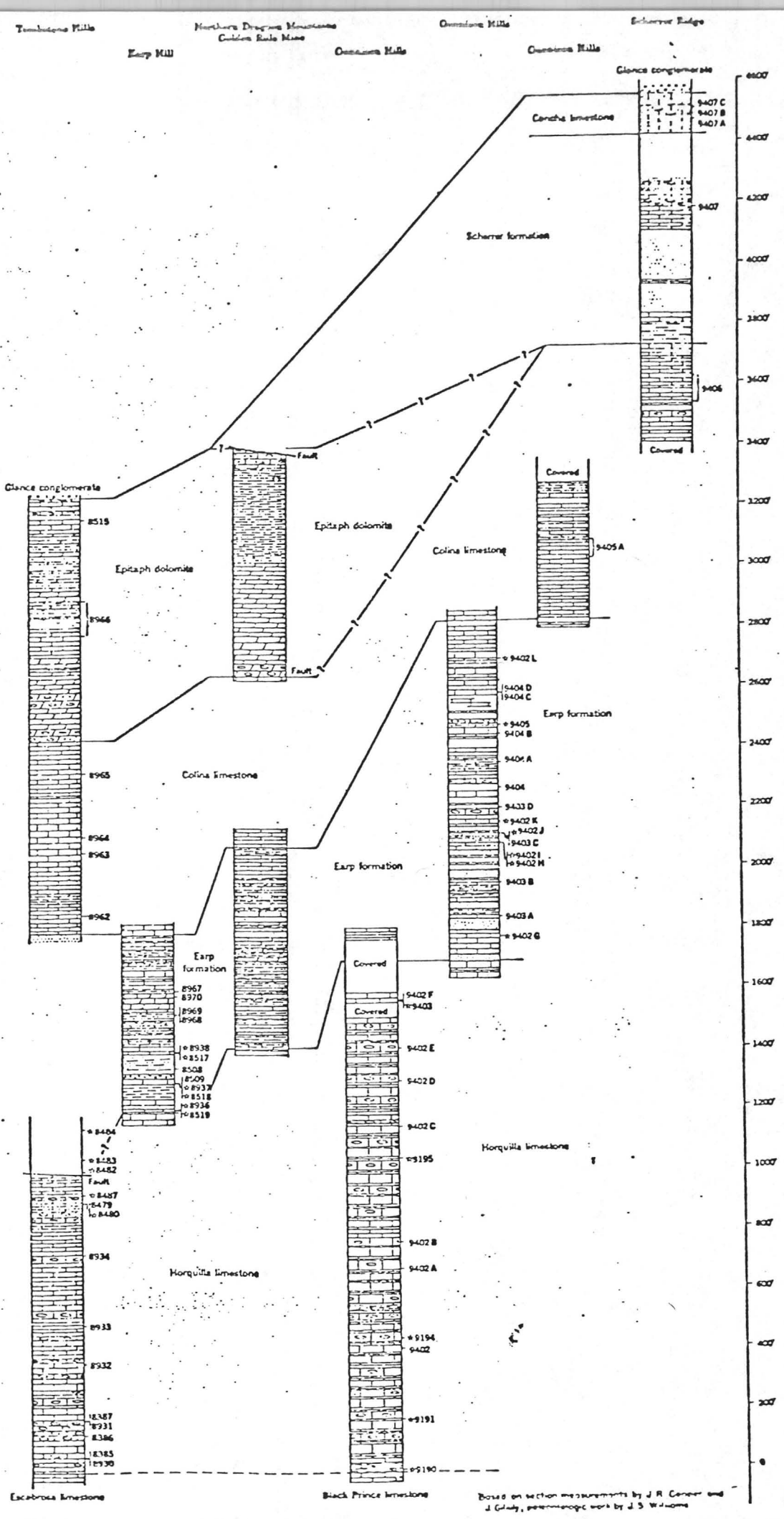
The above section cannot be considered accurate because it represents the synthesis of at least four partial sections, the correlations between which are all dubious. Nevertheless, as it was based on very detailed and careful work, there can be little doubt that it is as fair a representation of the stratigraphy of the formation at Tombstone as it is possible to give with the present exposures. It is shown graphically in figure 5. The formation elsewhere in the area is lithologically much the same.

No effort was made to measure a section of the Bisbee formation in the Dragoon Mountains; but from the dips and width of outcrop, it can be seen that there is about 15,000 feet of Bisbee rocks in the section northeast of Walnut Springs, where neither base nor top is exposed. This thickness, though large, is not surprising, as the aggregate thickness of the Bisbee group in the Mule Mountains was measured by Ransome (1904, p. 56) as 4,750 feet, with the top eroded. In the Little Hatchet Mountains, N. Mex., 80 miles to the east, Lasky (1938, p. 524–540) has found a section of Comanche rocks over 17,000 feet thick, of which fully 15,000 feet are of late Trinity (Glen Rose) age. The thinning of the Mural limestone northward from the Bisbee area does not, of course, imply the northward thinning of the clastic rocks above and beneath it. At any rate, whatever the a priori probabilities, the consistent attitudes and gradual changes in strike and dip of the section exposed northeast of Walnut Springs strongly oppose the idea that this section has been greatly repeated by faulting, despite the structural complexities of the mountains to the west.

CONDITIONS OF DEPOSITION

The Bisbee formation contains a few beds of definitely marine origin, at least as far north as the foothills east of Black Diamond Peak. On the other hand, fresh-water fossils have been found in the formation between Charleston and the Tombstone Hills. The fossils are confined to a few thin beds, and the great bulk of the rocks are unfossiliferous.

The sandstone beds are commonly current-bedded, with scour on their bases, ripple marks, and considerable grit or even fine conglomerate, and thus give evidence of shallow water at the time of their deposition. The mudstones are generally red, brown, maroon, or



CORRELATION OF THE PENNSYLVANIAN AND PERMIAN ROCKS WITH THOSE OF THE DRAGOON QUADRANGLE, ARIZONA

511333 O - 64 - 1 (In pocket)

SUMMARY

Following is a summary of our recent meeting in Tombstone (July 20-22):

1. Concentrate our efforts initially on the evaluation of the south portion of the Contention Dike by:

   A. Rock chip samples
   B. Trench channel samples
   C. Drill-hole cuttings.

2. Set-up testing laboratory to accomplish the following:

   A. Crushing capacity; samll jaw crusher
   B. Vibrating screens for crusher-6 mesh sizes
   C. Leaching facility
      1. Flask leach
      2. Barrel leach
      3. "Small Pad" pilot heap leach tests

3. Complete testing of the leaching characteristics of the south Dike area and the Contention Dike "South-half" ore:

   A. Tonnage under leach
   B. Grade
   C. PerCent gold and silver recovered
      1. Without crushing
      2. With crushing
   D. Cyanide and lime consumption
   F. Flow rates
   G. Gold and silver balance

4. Evaluation of the heap will occur at a later date.

SOUTH
CONTENTION DIKE

Evaluation of the South Contention Dike will result in ore reserve computations for various cut-off-grades. Also, all sample locations will remain so that the ore and waste can be "flagged" for production. Therefore, close ore control will result.

In order to compute ore reserves for various degrees of precision, standard deviations will be computed for various confidence intervals, as well as the routine statistical analysis used for computing ore reserves. Because the ore reserves must be computed in three dimensions, maximum sampling depth must be utilized where possible. This can be accomplished in loose material with a back-hoe and by ripping with one dozer tooth and drilling.

In the Contention Dike area, there are two basic types of material that are required to be sampled. The most common is the bedrock, which is exposed in the walls of the Dike and in the walls of the "Railroad-Cut". Elsewhere there is a thin mantle cover(± 6 inches).

Sampling of the Dike is being conducted as illustrated by James Briscoe in the Railroad Cut. In general, it is important to sample each strata, and the alteration and structural changes within the strata.

Following are the minimum number of samples required from the South portion of the Contention Dike for initial evaluation:

A. "Railroad Cut"; about 35 rock-chip samples from intervals about 15 feet long sampling strata-alteration-structure.

B. South Portion of Contention Dike Walls; about 65 rock-chip samples.

C. Bedrock perpendicular to(away from) the Contention Dike(South portion); 100 samples on 10 foot spacing along trench dug by backhoe or perferably ripped with TD20E ripper.

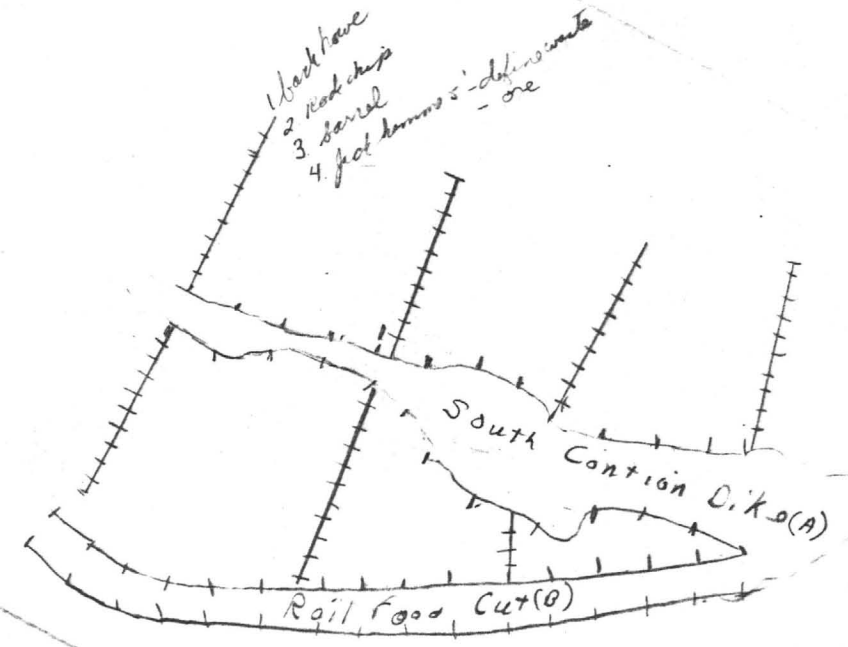
D. Bedrock above; following head assay and leaching results would be jack-hammer drilling to 5-10 ft. 200 samples would be taken for analysis.

E. Spalled/loose material in the Contention Dike will be sampled with a back-hoe trench every 100 feet initially. Channel and bulk samples will be taken for leaching tests. Depth will be 10 feet, with short channel intervals.

Following is the copy of the overlay for the 1 in= 100 ft. photo provided by S.E.A. Photography. All sample results will be plotted on photos with a scale of 1 in. = 20 feet.

Following the photo overlay is the outline for the proceedure for sampling the bedrock for ore reserve evaluation and grade control for production scheduling.

Dick Hewlett

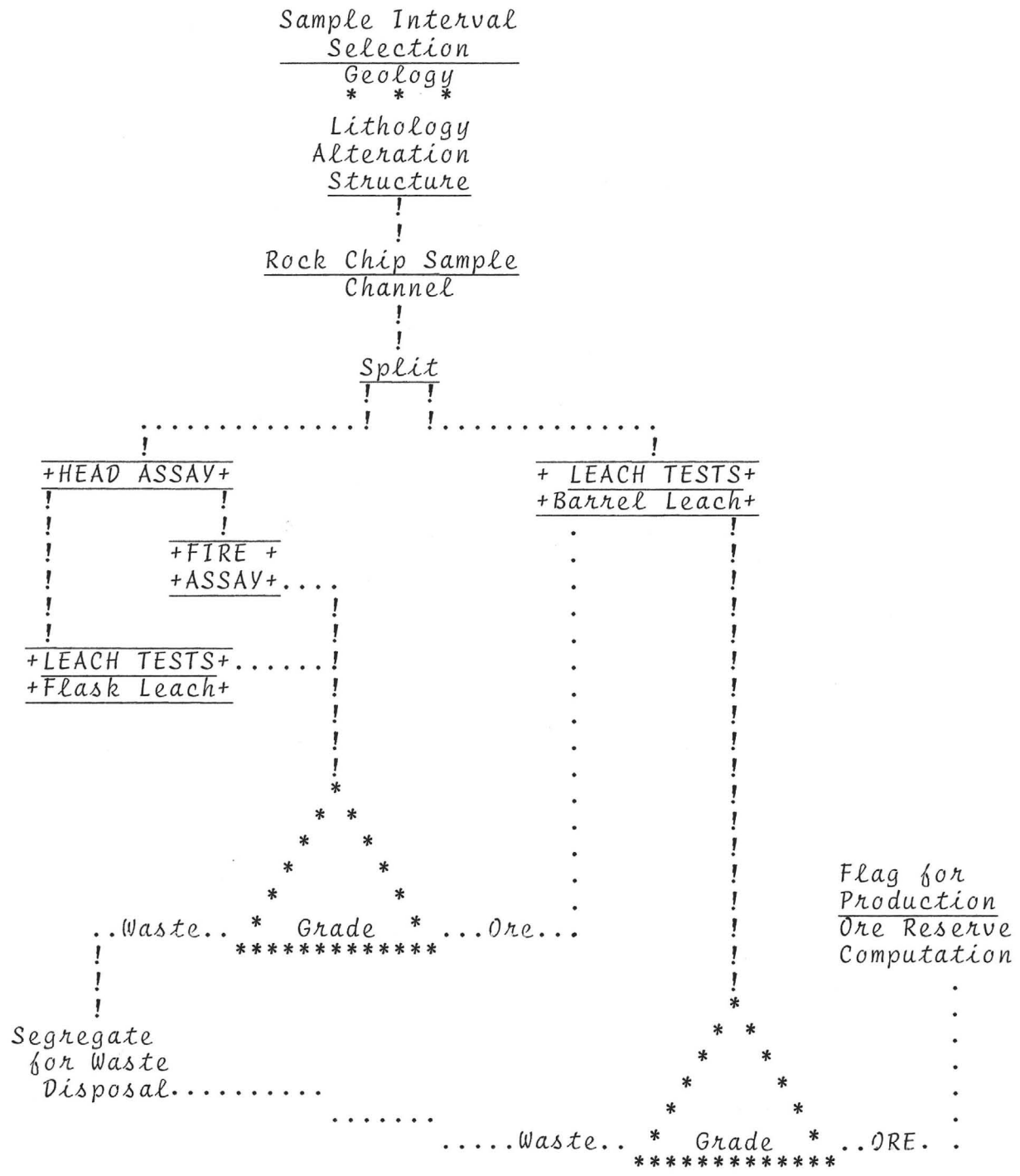


	Tonage	Time
A - 10'	13,000	2 units
25'	32,500	

B

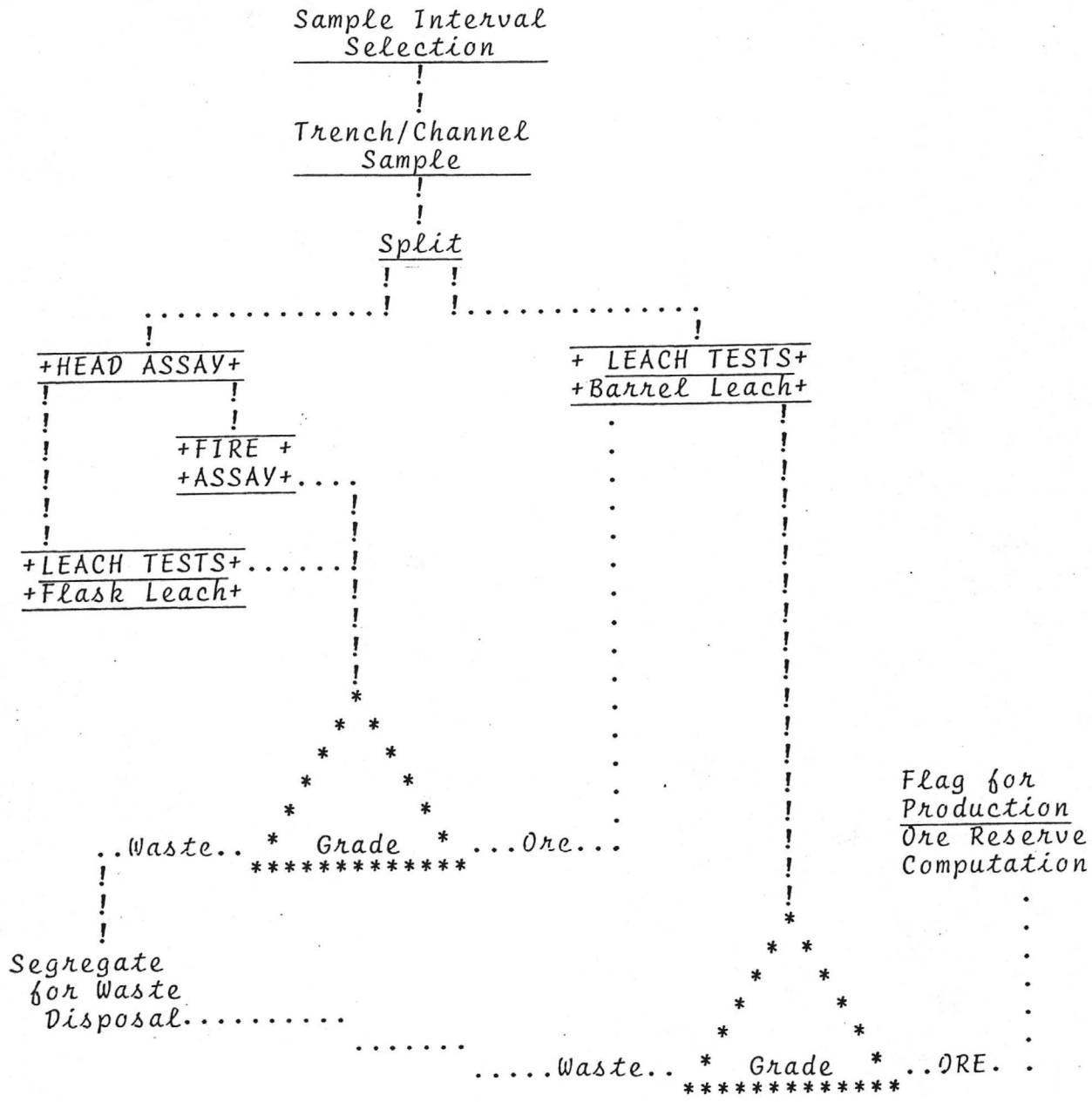
SAMPLING

Bedrock



SAMPLING

Spalled/Loose Material



TESTING LABORATORY

It was found after contacting about 30 equipment dealers/ salesmen/miners that the least expensive jaw crusher would be close to $7,000. Therefore, fixing Ernie Escapule's jaw is the only practical approach to our crushing needs. The electric motor and pulley will cost under $300. Vibrating screens are being built to hold six screens about 18"X24". The screen analysis can be done using all screens or one, or more based on desire or results.

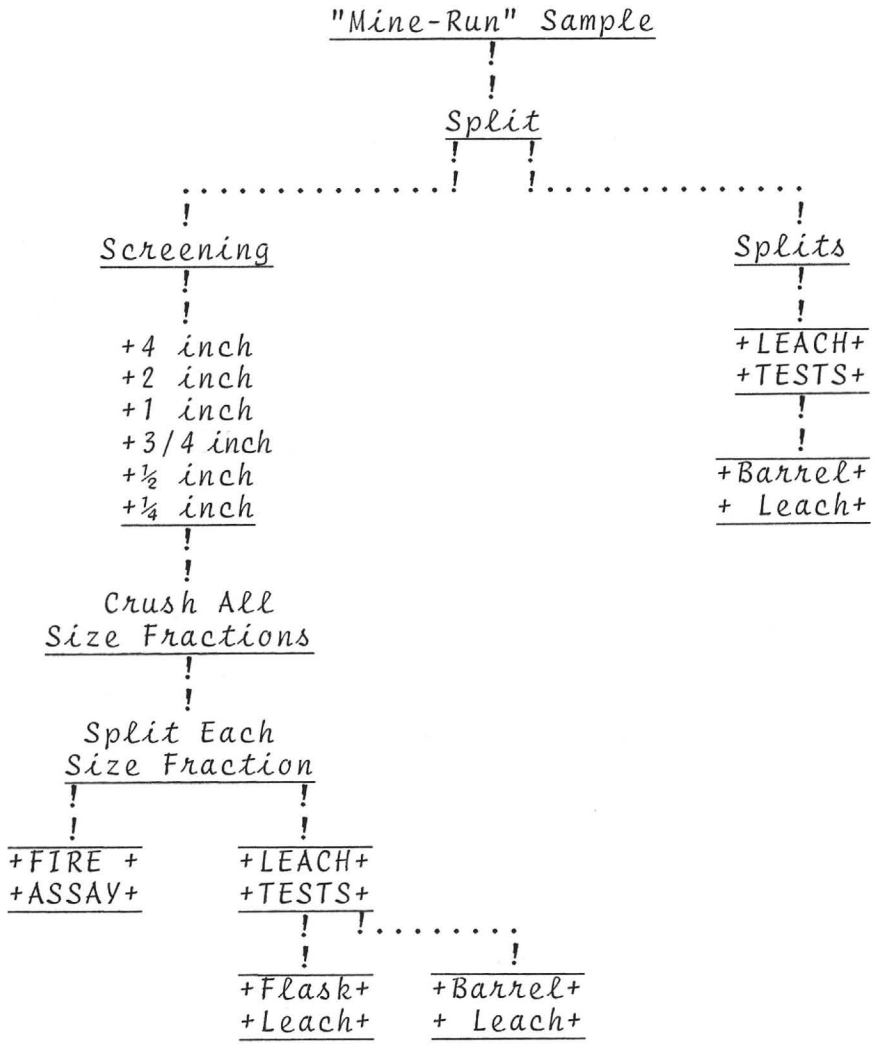
The following page presents the crushing proceedure as it applys to screen analysis-value distribution relationships and leaching tests vs. crush consists.

Following the crushing proceedure is the head assay proceedure.

Following the head assay proceedure is the leach proceedure for both the flask leach and the barrel leach. All of the testing laboratory will be housed in the 71 Minerals building as they are moving out next week.

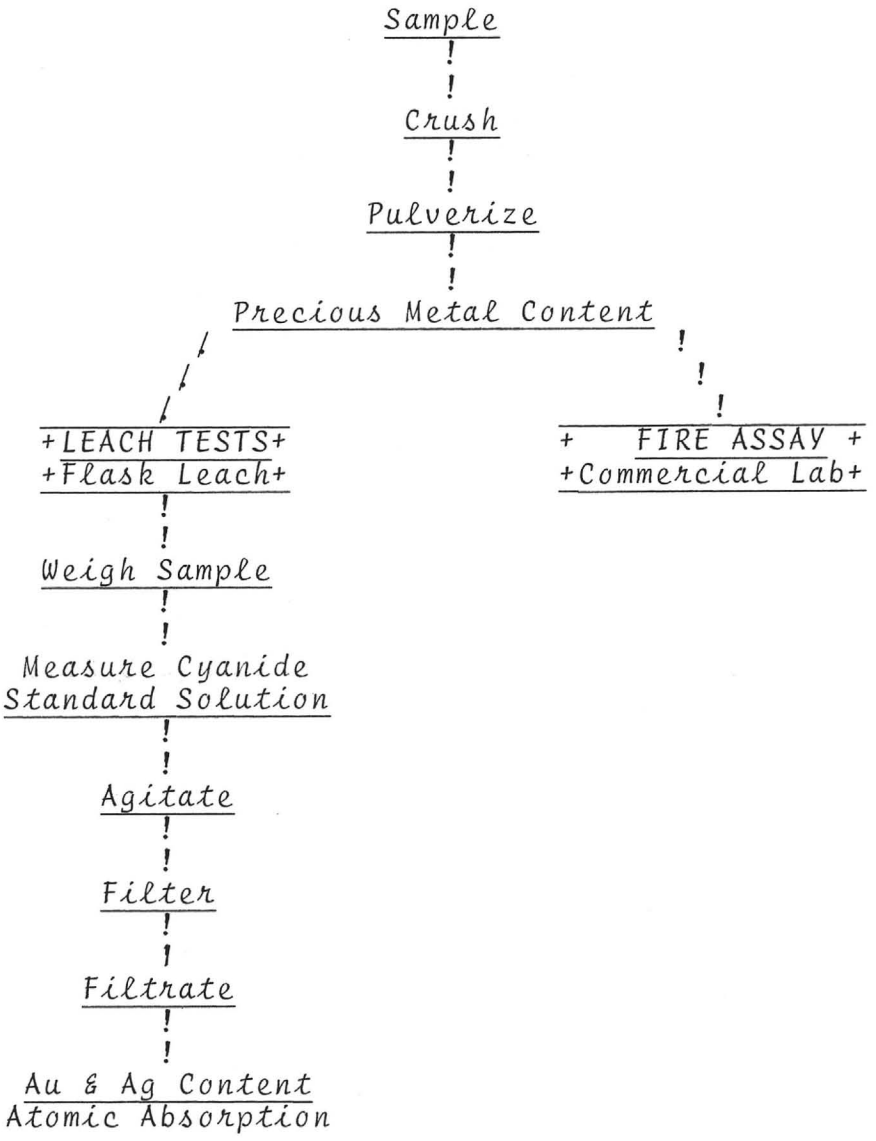
SAMPLING

Crushing



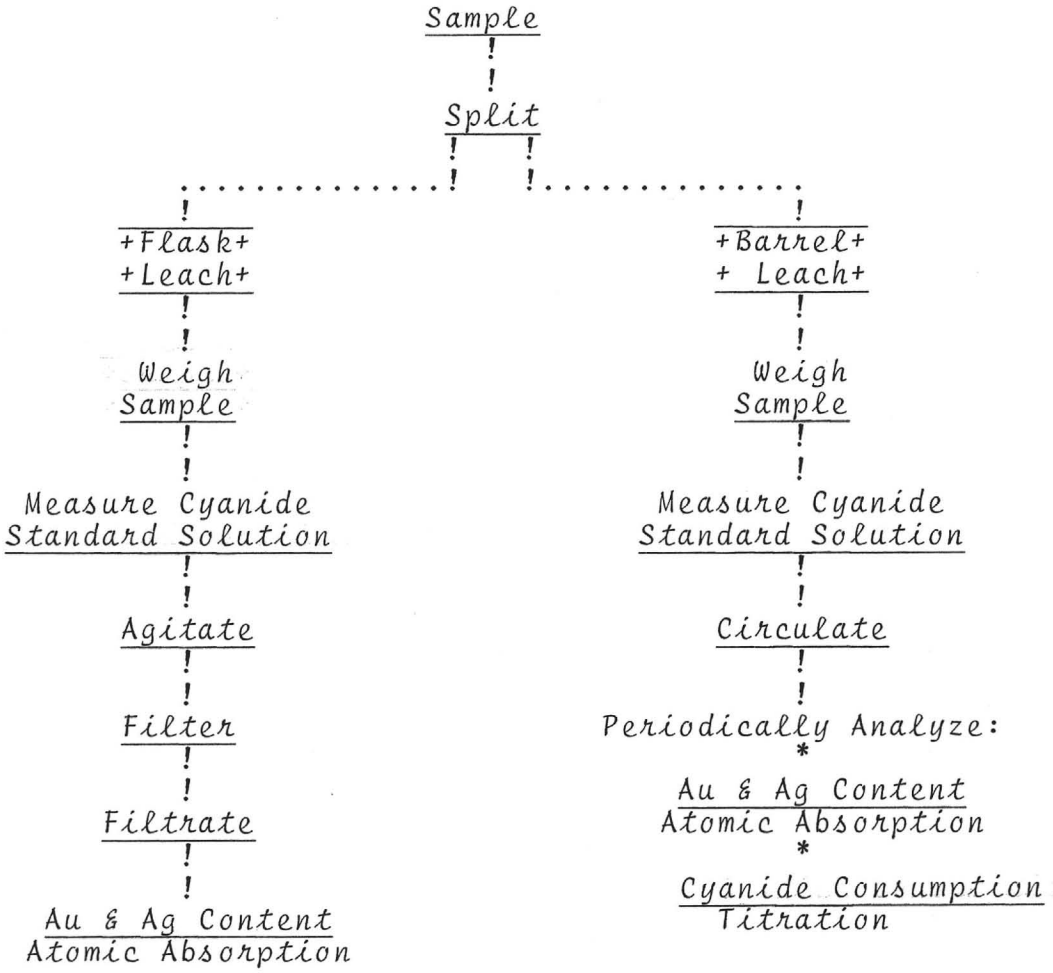
SAMPLING

Head Assay



SAMPLING

Leach Tests



TEST HEAP LEACH

Ore from two areas of the Contention Dike have been sampled, collected by the dozer onto a down-hill ramp, dozer loaded into our scraper, and hauled to the test pad area. The ore was from the southerly extension of the Contention Dike and the south half of the Contention Dike.

The pad was constructed of 18 inches of Contention tailings. Concern was expressed whether the pad is leaking. To test this hypothesis, three back-hoe trenches were dug through the pad on the north, south, and middle of the ore area of the pad where leaching had been occuring for the first test. In all cases, the tailings were slightly moist from top to bottom. This could be due to 1.) leaking of leach solutions through the pad at a very slow rate, or 2.) no leakage of leach solutions but retention of the moisture of saturation sprayed onto the pad during compaction of each lift of tailings. Also, three holes were "cupped" in the pad and water allowed to stand. After six hours, only a slight reduction in the height of water occured. This test will continue and observations made over a longer period of time. However, to be sure there is no leakage, mud gel is being purchased to mix with diesel fuel to make a slurry that will be sprayed over the surface of the heap to seal the pad. This is very inexpensive and will be very impermeable.

Complete testing of the two ores will be completed so that the percent recovery can be determined through to the bullion stage. Determined will be the following:

A. Bulk tonnage under leach
B. Screen analysis of the ore
C. Precious metal recovery for crushed and uncrushed
D. Flow rates in plant and sprays
E. Reagent and solvent consumptions
F. Gold and silver balance from preg and barren analysis.

Dump Leach & OP
and US (Jan. 27, 1979)

HEWLETT MANAGEMENT

R. F. HEWLETT
PHONE (702)359-1069

2602 Monte Verde Way
Sparks, Nevada 89431

I

Tombstone Dump Leach

II

Tombstone Open-Pit and Underground

January 27, 1979

Prepared for:

Karin Lake Exploration Limited

HEWLETT MANAGEMENT

R. F. HEWLETT
PHONE (702)359-1069

2602 Monte Verde Way
Sparks, Nevada 89431

TOMBSTONE DUMP LEACH

TOMBSTONE OPEN-PIT AND UNDERGROUND

HEWLETT MANAGEMENT

R. F. HEWLETT
PHONE (702)359-1069

2602 Monte Verde Way
Sparks, Nevada 89431

January 27, 1979

SUMMARY

Karin Lake Explorations Limited, and Pangea Limited, a Nevada Corporation and its Arizona subsidiary, each will acquire a 50% interest (Karin Lake Exploration Limited 50% - Pangea Limited, Nevada & Arizona subsidiary 50%) from Tombstone Development Company of all their mining properties in the Tombstone Mining District. These mining properties consist of 88 patented and 18 unpatented mining claims located in Sections 11, 12, 13, 14, 15, and 23, Township 20S, Range 22E, Cochise County, Arizona, U.S.A.

1971 Minerals of New York City, New York operated a heap leach on the property for over three years. They economically recovered gold and silver from waste dumps located on the property. Austral Oil Company of New York City, New York sampled and conducted metallurgical testing on the dump material prior to 1971 Minerals operation.

Examination of dump assays, recovery reported by the refinery, and a study of 1971 Mineral's recovery methods directs us to recommend processing of 1,000,000 tons of dump material utilizing advanced metallurgical heap-leaching technology. Significant gold and silver values exist in all of the dump material. Completed work totals $315,000 U.S. Dollars. Costs are verified as of January 27, 1979.

R. F. HEWLETT
PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

INTRODUCTION

This report was prepared at the request of Karin Lake Exploration Limited, Montreal, Canada. The writer has inspected all available information, public, state, and private (see attached report). This information consists of drill logs, trench assays, metallurgical testing of the dump ore, and check assays made by the writer on a large number of dump samples.

LOCATION AND ACCESS

The property held for discussion in this report is located 75 miles southeast of Tucson, Arizona, U.S.A. It is just south of the town of Tombstone, Arizona in the County of Cochise.

Access is excellent throughout the area. Numerous roads connect through the property.

LEGAL DESCRIPTION

TOMBSTONE DEVELOPMENT LEASE

Sections 11, 12, 13, 14, 15, and 23, Township 20S, Range 22E, Cochise County, Arizona, U.S.A. (2194 acres)

R. F. HEWLETT
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January 27, 1979

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DESCRIPTION OF THE DUMPS

The dumps were formed during the mining of the District during the late 1800's through 1924. At that time, this material was not economic to process by milling (see page 10 of attached report).

The dump ore consists of limestones, shales, quartzites, and siltstones that are chemically basic. The gold is mainly native with some near surface oxide minerals. The silver minerals are largely chlorides.

PRODUCTIVE HISTORY OF THE DUMPS

The dumps have been measured to contain 1,000,000 tons of material that averaged .037 troy ounces gold and 2.26 troy ounces silver per ton of material. This amounts to 33,679 troy ounces of gold and 2,057,151 troy ounces of silver.

1971 Minerals recovered 13,472 troy ounces gold and 720,003 troy ounces silver. This results in a precious metal inventory remaining in the dumps of 20,207 troy ounces gold and 1,337,148 troy ounces silver. At present precious metal prices, the gross value is over $12 million U.S. Dollars. Refer to attached report showing details of the dump sampling and precious metal values.

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January 27, 1979

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Metallurgical testing by various laboratories produced recoveries of from 50 to 75 percent. The ore must be crushed and pre-treated to induce percolation and then heap leached. Leaching would be conducted on an existing leach pad on the property. Also, numerous facilities exist on the property that would enable production shortly after the project is initiated.

A very careful analysis of the operating costs incurred by 1971 Minerals showed a total processing cost of slightly over $2.00 per ton treated. A detailed cost analysis made of six other precious metal heap leaching operations show that the costs of further processing of the Tombstone dumps would be about $2.50 per ton treated. The dumps represent a gross value of $11.40 per ton and, using a minimum metallurgical recovery of 50%, the recovered value is $5.70 per ton, or a net operation profit of $3.25 per ton. This represents a net operating profit of $3,250,000 (see pages 12 and 13 of attached report).

RECOMMENDATIONS

It is recommended that processing of the dumps proceed at once, starting with minor metallurgical testing to determine the most profitable dump areas for fast recovery.

R. F. HEWLETT
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January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

By utilizing recently developed heap-leaching technology, at least 50% of the remaining values can be recovered. The costs of precious metal recovery will be very low, resulting in a significant cash flow.

COSTS

The $315,000 U.S. Dollars represents the following turn-key complete work to get the property to the point of producing enough gold and silver to support the on-going production.

1.	Property research and title clearance	$ 5,000
2.	Leases, claims, and property consolidation	10,000
3.	S.E.A., Inc. test work and tonnage verification of:	
	a. Heap ore	
	b. Gob ore	
	c. Open-pit ore	50,000
4.	Heap Leaching and gob evaluation and testing:	
	a. Plant monitoring equipment	
	b. PVC pipe and leaching supplies	
	c. Recovery plant	
	d. Pumps	
	e. Chemicals for leaching	
	f. Crushing equipment	
	g. Dozing and blade work	
	h. Power	
	i. Water	250,000
	Total	$315,000

R. F. HEWLETT
PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

SUMMARY

Karin Lake Explorations Limited, and Pangea Limited, a Nevada Corporation and its Arizona subsidiary, each will acquire a 50% interest (Karin Lake Exploration Limited 50% - Pangea Limited, Nevada & Arizona subsidiary 50%) from Tombstone Development Company of all their mining properties in the Tombstone Mining District. These mining properties consist of 88 patented and 18 unpatented mining claims located in Sections 11, 12, 13, 14, 15, and 23, Township 20S, Range 22E, Cochise County, Arizona, U.S.A.

1971 Minerals of New York City, New York operated a heap leach on the property for over three years. They economically recovered gold and silver from waste dumps located on the property. Austral Oil Company of New York City, New York sampled and conducted metallurgical testing on the dump material prior to 1971 Minerals operation.

Examination of dump assays, recovery reported by the refinery, and a study of 1971 Mineral's recovery methods directs us to recommend processing of 1,000,000 tons of dump material utilizing advanced metallurgical heap-leaching technology. Significant gold and silver values exist in all of the dump material. Completed work totals $150,000 U.S. Dollars. Costs are verified as of January 27, 1979.

R. F. HEWLETT
PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

INTRODUCTION

This report was prepared at the request of Karin Lake Exploration Limited, Montreal, Canada. The writer has inspected all available information, public, state and private (see attached report).

This information consists of core and rotary surface drilling conducted by Newmont Mining Company in 1953-57, underground maps of structure and core drilling, assay sheets from the drilling, surface sampling by Duval Mining Company, surface sampling and rotary drilling by 1971 Minerals. Also, data from surface drilling by Phelps Dodge has been studied, as well as their geological maps and cross-sections showing underground working and the extent of the mined ore bodies. Numerous reports of the early mining was helpful to evaluate underground areas that are not accessible at this time.

The writer has spent considerable time underground and examining the surface outcrops and has done extensive sampling on the property.

R. F. HEWLETT
PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

LOCATION AND ACCESS

The property held for discussion in this report is located 75 miles southeast of Tucson, Arizona, U.S.A. It lies just south of the town of Tombstone, Arizona in the County of Cochise.

Numerous roads provide good access to all areas of the property. Most underground workings are accessible, but some work will be required in more remote workings.

LEGAL DESCRIPTION

TOMBSTONE DEVELOPMENT LEASE

Sections 11, 12, 13, 14, 15, and 23, Township 20S, Range 22E, Cochise County, Arizona, U.S.A. (2194 acres)

REGIONAL GEOLOGY

Quartz porphry intrusions cut sedimentary units comprising limestones, shales, sandstones, and quartzites that were previously folded and faulted by tectonic activity. Mineralizing fluids migrated into the sediments along faults, fissures, and other structures and deposited precious and other minerals along the structures or along contacts and in the limestone as manto deposits (see page 5 of attached report and "Regional Section").

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PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

GEOLOGY OF THE PROPERTY

The geology of each of the geological targets for open-pit and underground ore bodies are shown in detail in the attached report (see page 6 and the "Deposits Section"). Anticlinal structures were the largest single producer and most of these mineralized structures are very close to the surface; many of the bonanza ore bodies outcropped on the surface and were followed in depth.

All of the old mines have gob that is of economical grade, as well as disseminated mineralization that is economic at the present precious metal prices.

In addition to the open-pit ore bodies, mining could not progress much below 500 feet below the surface due to numerous problems of pumping the water in the early 1900's (see page 5 of the attached report). Very high-grade ore bodies exist at the water table, and it has been proven in over 10 of the 23 mines that good ore-grade continuity exists below the 500 foot level (see page 7 and "Exploration Section" of attached report). Gold values range from 1 to 5 ounces on the lower mine levels. Refer to enclosed maps showing the mine workings above and below the water table (see "Exploration Section" of attached report).

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PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

PRODUCTION HISTORY OF THE PROPERTY

From 1879 to 1936, 1,635,639 tons of ore were mined that averaged .133 troy ounces gold and 20.67 troy ounces silver. The present value of this production is over $225 million U.S. Dollars. The attached report contains the detailed production by mine and for the District (see pages 3 & 4).

A detailed study of drill-hole results, geological mapping and surface and underground sampling results in the following open-pit projections (see pages 14 through 17 of attached report).

Mine Area	Tonnage Previously Mined	Last Grade Mined		Economic Tonnage Projection	
		Au	Ag	Gob	Ore
Contention Dike	500,000	.207	15.22	500,000	1,150,000
Tranquillity	200,000	.307	23.25	100,000	250,000
Lucky Cuss	100,000	.056	16.92	70,000	126,000
Emerald	100,000	.010	8.00	70,000	126,000
Bunker Hill	50,000	.035	15.45	40,000	72,000
Tombstone Extension	70,000	.071	11.88	15,000	60,000

It has been estimated by the writer that the total potential net operating profit from open-pit mining of all mine areas is $18,821,000 from the gob and $133,480,000 from open-pit ore. (See details in attached report.)

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PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

Extending the known ore bodies at depth, below 500 feet, produces a large tonnage of high-grade ore. (See maps appended to this report.) The writer estimates a potential net operating profit from underground mining of over $100,000,000.00 U.S. Dollars.

RECOMMENDATIONS

It is recommended that drilling and surface sampling be initiated on the following properties to prove their potential and for open-pit development.

1. Contention Dike
2. Tranquillity Area
3. Lucky Cuss Area
4. Emerald Area
5. Bunker Hill Area
6. Tombstone Extension Area

Open-pit mining with heap leaching for precious metal recovery can be initiated shortly after the initial development sampling and drilling.

Underground evaluation and development will be concurrent with open-pit development.

R. F. HEWLETT
PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

COSTS

The $150,000.00 U.S. Dollars represents the following turn-key complete work to sample and drill the property sufficiently to develop open-pit ore to initiate precious metal recovery by facilities on the property. Also, underground evaluation and development will be progressed to a pre-production stage.

1. Geological mapping
2. Surface trench sampling
3. Geochemical sampling
4. Rotary drilling
5. Underground sampling
6. Open-pit development drilling

DATED AT TUCSON, ARIZONA, U.S.A., this 27th day of January, 1979.

Richard F. Hewlett
Chemical & Mining Engineer
State of Arizona

HEWLETT MANAGEMENT

R. F. HEWLETT
PHONE (702)359-1069

January 27, 1979

2602 Monte Verde Way
Sparks, Nevada 89431

REFERENCES

1. Enfield Bell
   Vice President
   Freeport Exploration Company
   Reno, Nevada

2. Hugh Matheson
   Placer Development
   Vancouver, B.C.
   Canada

3. Ralph Van Arsdale
   Occidental Petroleum Company
   Hawthorne, Nevada

MEMBERSHIP

1. Sigma Xi, National Honor Scientific Society
2. Colorado School of Mines Alumni Association
3. Mining and Metallurgical Society of America
4. American Institute of Mining, Metallurgical and Petroleum Engineers
5. Canadian Institute of Mining and Metallurgy
6. American Mining Congress

January 27, 1979

CERTIFICATE

I, Richard F. Hewlett of the City of Sparks, Washoe County, in the State of Nevada, U.S.A. hereby certify:

1. That I am a practicing Chemical and Mining Engineer in the States of Nevada and Arizona. My offices are at 2602 Monte Verde Way, Sparks, Nevada (89431).

2. That I am a graduate of Iowa State University and hold a Bachelor of Science Degree in Chemical Engineering and that I am a graduate of the University of Arizona and hold a Masters of Science Degree in Mining Engineering. Also, while completing my course work for a Doctorate in Geological Engineering, I was on the teaching faculty of the University of Arizona and the Colorado School of Mines.

3. That I have been practicing my profession as a Chemical and Mining Engineer since 1957.

4. That I have no interest, either direct or indirect, in the properties of Karin Lake Explorations Limited, and do not expect to receive, either directly or indirectly, any interest in the projects listed herein.

5. That the accompanying report is based on a study of all reports and maps available on the property with numerous visits to all surface and most underground sites mentioned in this report.

6. I hereby consent to inclusion of this report in the prospectus of Karin Lake Explorations Limited for the Vancover Stock Exchange.

DATED AT TUCSON, ARIZONA, U.S.A., this 27th day of January, 1979.

Richard F. Hewlett
Chemical & Mining Engineer
State of Arizona

R. F. HEWLETT
PHONE (702)359-1069

2602 Monte Verde Way
Sparks, Nevada 89431

The budget for Tombstone is as follows:

		Expenditures Phase	Expenditures Total
1.	Property Research & Title Clearance	$ 5,000	$ 5,000
2.	Leases, claims, and property consolidation (Tombstone Development)	10,000	15,000
3.	S.E.A., Inc. test work and tonnage verification of:		
	a. Heap ore		
	b. Gob ore		
	c. Open-pit ore	50,000	65,000
4.	Data Compilation	3,000	68,000
5.	Surface Sampling/Metallurgy	4,000	72,000
6.	Heap Re-Processing:		
	a. Water	15,000	
	b. Power	12,000	
	c. Pumps (spray, precep, etc.)	20,000	
	d. Building & Laboratory	35,000	
	e. Plant	50,000	
	f. Chemicals	5,000	
	g. Management	8,000	
	h. Operators	5,000	
		150,000	222,000
7.	Drilling	40,000	262,000
8.	Crushing-Dozing	53,000	315,000

1st Prog Report (2-22-79)

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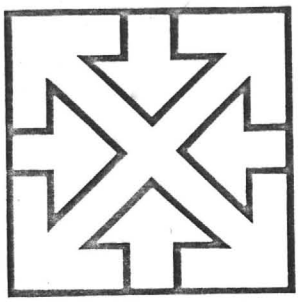

4500 E. Speedway, Suite 14
Tucson, Arizona 85712
(602) 795-6097

James A. Briscoe, President
Registered Professional
Geologist

Southwestern
Exploration Associates, Inc.

February 22, 1979

Mr. William Hight
Holiday Inn
Rural Raod and Apache
Tempe, Arizona

Dear Bill,

Enclosed, please find our first progress report. Data compiled this week is being copied at a blueprint company in order to remove from 71 Minerals office. We will obtain this data and forward it to Grand Island next week.

Best personal regards,

Dick

Richard F. Hewlett

RFH/slr
P-418
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James A. Briscoe, President
Registered Professional
Geologist

Southwestern Exploration Associates, Inc.

TOMBSTONE DEVELOPMENT COMPANY

Progress report for period of Feb. 4, 1979 to Feb. 22, 1979.

Summary

February 4-9: Grand Island, Nebraska; lease agreement with TDC.
February 10-11: Drive from Reno to Tucson.
February 12-20: Tombstone with a few days in Tucson.

Lease

The agreement is acceptable without change by James A. Briscoe, his investors, and certainly myself. Activities we are doing with regard to the lease:

1. James Briscoe and investors are getting their financial information to send along with signed lease (signed by Briscoe and investors).

2. Obtaining the performance bond and insurance as directed by the lease, naming TDC additional insured.

3. Obtaining Arizona Workmans Compensation.

4. Obtaining design and bids on building.

All of the above will be sent to Grand Island as each portion is completed. For example, the insurance company has to visit the property and facilities in order to determine the cost. I am waiting for their visit.

In regard to the insurance, we discussed in Grand Island that TDC must be protected by insurance from ourselves (Southwestern Exploration Associates, Inc.-investor group), United Sporting Arms, and Rocksmith. Our insurance will name TDC "additional insured" as we agreed. Now, our insurance protects TDC. Does the insurance of United Sporting Arms and Rocksmith Tours protect TDC and ourselves? Our insurance company wants a copy of the United Sporting Arms and Rocksmith insurance policies to be sure we don't have to insure them and that TDC is protected (see letter to Tom Pitcher).

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• remote sensing • color aerial photography
• interpretation-image processing
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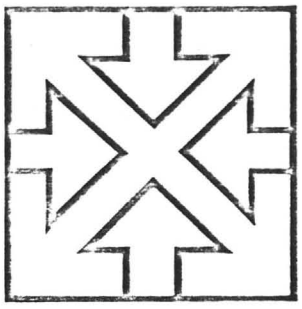

4500 E. Speedway, Suite 14
Tucson, Arizona 85712
(602) 795-6097

James A. Briscoe, President
Registered Professional
Geologist

Southwestern
Exploration Associates, Inc.

February 22, 1979

Mr. Tom Pitcher
TOMBSTONE DEVELOPMENT COMPANY
Tombstone, AZ 85638

Dear Mr. Pitcher:

In the interest of TDC, and to satisfy our insurance company for our $2,000,000 policy covering the TDC patented and unpatented claims, we both must be sure that "Rock Smith-Mine-Tours" and the "United Sporting Arms" have adaquate insurance. For example, consider someone getting seriously hurt or killed on the mine tour or in the gun factory. Who is responsible? Could the injured party (or the survivors) sue TDC-S.E.A. (ourselves)? Also who signed the "United Sporting Arms" agreement for TOMBSTONE DEVELOPMENT COMPANY?

Our basic concern is that Tom Pitcher and TOMBSTONE DEVELOPMENT COMPANY could be held liable for accidents relating to the Mine Tour and the Gun Factory. Please inform me how we can help this situation.

Sincerely,

Richard F. Hewlett

Richard F. Hewlett

RFH:cmd
P-418

Bill, I also talked with George Jewitt and told him I would be very happy to honor your agreement with him concerning dump ore testing in his plant.

Tombstone Activities

The first week was spent at Tombstone and Tucson evaluating the available facilities and formulating budgets based on existing situations at the plant facility. The budgets were broken into two groups:

1. Heap re-processing including heap moving to prepare a pad area for the open pit ore.

2. Open pit exploration and development.

The first phase of 1 (above) is shown on the following page.

For our first years budget of $500,000 (rounded from $465,000) the remaining $322,400 will be spent on open pit exploration and development and underground evaluation. That budget follows:

Open Pit & Underground Budget

1. Sampling
   A. Two underground samplers
   B. Two surface samplers.....$10,000

2. Geology
   A. Surface
   B. Underground.....$27,400

3. Assays, Geochemistry, and Metallurgical Testing

4. Initial Drilling.....$50,000

5. Second Stage Exploration
   A. Geologic mapping
   B. Surface trench sampling
   C. Geochemical sampling
   D. Rotary drilling
   E. Underground mapping/sampling.....$100,000

6. Open Pit Development
   A. Drilling
   B. Laboratory
   C. Metallurgical testing
   D. Process design
   E. Plant design and construction
   F. Chemicals
   G. Leaching supplies
   H. Crushing and grinding equipment
   I. Loading and haulage contract.....$135,000

TOTAL $322,400

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TOMBSTONE HEAP RE-PROCESSING BUDGET

Following is the initial capital investment required for re-processing the Tombstone Heap.

Item	Expenditure
Initial Property Payment	$ 6,000
Geological Report	3,000
Lease Expenses	3,000
Engineering	4,000
Power Hook-Up Deposit	3,500
Electrical Wiring	2,500
Pump Installation	3,000
West Side Water Line	2,500
Office Support	2,500
Pre-Production Royalty	7,500
Consulting Fees	5,000
Spray Lines/Manifolds	3,000
Directional Rainbirds	200
Preg Pond Lining	400
Pad Preparation	15,000
Laboratory	10,000
Building	15,000
Office	2,500
Recovery Plants	10,000
Reagent Tanks	3,000
Crushing - Working Capital	40,000
Chemicals	15,000
Insurance and Bond	5,000
Management	6,000
Labor	10,000
	$177,600

Following are other Tombstone activities conducted during this period:

Process Design

Using the barren-precip pond as the preg pond, the following would be circulated:

GPM	Daily Solution Tonnage 1-shift	2-shifts	3-shifts
50	100	200	300
100	200	400	600
150	300	600	900
200	400	800	1200

With sprinklers at 5-6:00p.m.

GPM	No. Rainbird Sprinklers
50	10
100	20
150	30
200	40
240	48

Note that at 240 GPM, the resulting circulation rate is one ton of solution per minute.

Crushing Of The Heap

Following are hourly crushing rates and monthly production:

Crushing Rate	Monthly Production
25 TPH	1,000 Tons
50 TPH	2,000 Tons
100 TPH	4,000 Tons
150 TPH	6,000 Tons
200 TPH	8,000 Tons
275 TPH	11,000 Tons

It is our plan to start at a lower crushing rate and develope our "Induced Percolation System" and then increase our production rate monthly.

Power Hook-up

I met with Arizona Public Service (Dave and Max Bishop) and am submitting information on our power service requirements.

Electrical Wiring

Bill Magee and Pete Milword have been suggested as local electricians.

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James A. Briscoe, President
Registered Professional
Geologist

Southwestern Exploration Associates, Inc.

February 22, 1979

Mr. Max Bishop
ARIZONA PUBLIC SERVICE
P.O. Drawer J
Bisbee, Arizona 85603

Dear Mr. Bishop,

We desire power service in the Tombstone area. We have leased from the TOMBSTONE DEVELOPMENT COMPANY the mining leases previously leased by 71 Minerals. We would like basically the same service they had, which was to the 71 Minerals plant facility and to the Westside Mine for the water pump.

At the old 71 Minerals plant, there is a conflict with "United Sporting Arms", which have a lease for six (6) months. Because of this, we will have a temporary building near that facility, which would be about 200 feet south of your "main-service" power pole close to the 71 Minerals building. We are very flexible as to the location of our meter box, as we will run lines to pumps, plants, etc., from that location. The service to the Westside would be the same as before, (by 71 Minerals).

Our operation will have a five-year life. Our financial commitments to TOMBSTONE DEVELOPMENT COMPANY, plus our leaching operation, open-pit and underground exploration require a minimum of five (5) years to complete various phases of our activities.

The hours per day would be as follows:

West Side

Eight (8) hours per day for the first several weeks, then intermittent; just enough make-up water to compensate for evaporation.

Plant

Eight (8) hours per day for the first three (3) months, then sixteen (16) hours per day and then three (3) shifts in six (6) months.

The days per week will be five (5), and then after three (3) months, two (2) shifts at the plant.

Please contact me concerning any questions you may have concerning our request.

Sincerely yours,

James A. Briscoe
President

JAB/slr
P-418
2052

Also, Cochise Electric could do contract wiring for us at the facility.

Plant Equipment

Ralph Van Arsdale, who operated the 71 Minerals plant most recently, has agreed to meet me in Tombstone on March 2nd and 3rd to go over condition of manifolds and the pumps, electrical gear and plant equipment. We feel our expenditures will be justified to better evaluate your equipment and to determine what we could use effectively.

PVC Pipe Laying - Westside to Plant Water Line

Cleaning of the ditch from the Westside to the 71 Minerals plant area has begun. Three inch PVC has been ordered and should be delivered next Monday from Tucson. It seems like 3,000 feet will be required, plus connecting pipe at the Westside, with valves (relief valves).

The sequence of activities we are following are:

1. Clean ditch with Bobby Cowars blade.
2. Lay three (3) inch PVC.
3. Cover PVC with dirt.

Spray Manifolds and Lines

Inspection of spray manifolds and lines are being conducted. Repairs will be made where necessary.

Directional Rainbirds

In addition to the existing rainbirds (360^{o}), directional rainbirds are being purchased to allow selected angles of spray.

Preg Pond

A backhoe trench was cut for protection in case of heavy rains. This will be repaired, but left empty till the power is hooked up and the pumps reinstalled.

Pad

Pad construction for open pit ore will start following our engineering survey, which is being done at this time.

Basically, the pad will be extended north and south and to the west from the existing heap. In order to accomplish this, the existing heap will be moved a little at a time, but in so doing it will be crushed and treated with "Induced Percolation Substances: and heap leached. This will generate an immediate cash flow, while preparing the pad for the open pit ore.

Laboratory

Atomic Adsorption and the required laboratory equipment is being ordered.

Building

Due to the leasing of the 71 Minerals building by Tom Pitcher, another building must be constructed. Plans are being designed and drafted and sites are being investigated.

Plants

A 200 gallon per minute plant is being constructed. It should be completed within two-four weeks.

Tanks

It is necessary to replace the three reagent tanks sold from the property. A search is being made for available tanks.

Contractors

Contractors contacted concerning the crushing of heap and open pit ore are:

1. Karl Ronstadt, New Pueblo Contractors, Tucson, Arizona.
2. Jack Gilbert, A.J. Gilbert Construction Co., Bisbee, Arizona.
3. Maddox Crushing, Douglas, Arizona

They are submitting bids.

Chemicals

Prices have been obtained from local sources as shown on the following page.

Data

Ed Speer has obtained his first batch of data. It is being copied and will be sent to TDC. He must continue to collect, compile, copy and send the data to TDC.

13. Chemicals:

A. Lime, processed ($.021/#)

B. Lime, hydrated ($0.12/#) - Copper States

C. Lime, stack dust (65% CaO) ($14/ton + freight) - Paul Spur, Douglas

D. Cement ($0.04/#)-$3.75/94# - Grant Road Lumber

E. Fly ash ($0.01)-$20/ton - Western Ash, Phoenix

F. Diatamaceous Earth ($.10/#)

G. Salt ($.005 - .16/#)

H. NaOCl ($.90/gal) - Hill Chemical

I. $Na_2S_2O_3$ ($0.18/#) - Hill Chemical

J. NaCN ($0.44/#)($0.56/#) - Small Lots - McKesson

K. Na_2 S ($0.195/#)

L. Resin ($6.50/#....100#...$650)

M. Powdered Zinc ($.68/#)($0.662/#) - Merrillite-McKesson

TOMBSTONE PRECIOUS METAL PROCESSING

One million tons of gold and silver ore has been "heaped" into a large pile 1500 feet long, 400 feet wide, and 100 feet high. Processing of the ore was incomplete in the past. Crushing and chemical pre-treatment of the ore has been proven to liberate the gold and silver values.

Samples taken in February show a combined gold and silver value of $23 per ton of ore. This confirms previous sampling of the ore taken before it was heaped, when precious metal prices were 1/3 of today's prices. Existing leaching facilities on the property make the chemical processing of the ore very feasible and economic.

The cash flow from the processing of the ore would pay back a $200,000 capital investment in from 4 to 6 months, assigning 50% of the net operating profit to retiring the capital investment. However, the project would be structured in capital investment increments of $50,000 because the expected required capital investment is under $100,000. Following are the profits participating interest and return for various required investment increments:

Required Investment Increment	Profits Participating Interest	Expected Return
Under $100,000	15%	$1,500,000
$100,000-$150,000	20%	2,000,000
$150,000-$200,000	25%	2,500,000

One important feature of this investment is that the lease provides for taking "product in kind", which allows the investor to hold certificates of ownership of gold and silver issued by the refinery. Also, bullion can be owned and stored. Because of possession of bullion in some form, the time of sale and quantity sold is determined by the owner, and the "taxable event" occurs at the time of the sale.

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TOMBSTONE HEAP RE-PROCESSING BUDGET

Following is the capital investment required for re-processing the Tombstone Heap.

Item	Expenditure
Initial Property Payment	$ 6,000
Geological Report	3,000
Lease Expenses	3,000
Engineering	4,000
Power Hook-Up Deposit	3,500
Electrical Wiring	2,500
Pump Installation	3,000
West Side Water Line	2,500
Office Support	2,500
Pre-Production Royalty	7,500
Consulting Fees	5,000
Spray Lines/Manifolds	3,000
Directional Rainbirds	200
Preg Pond Lining	400
Pad Preparation	15,000
Laboratory	10,000
Building	15,000
Office	2,500
Recovery Plants	10,000
Reagent Tanks	3,000
Crushing - Working Capital	40,000
Chemicals	15,000
Insurance and Bond	5,000
Management	6,000
Labor	10,000
	$177,600

However, an expenditure of about $80,000 is only required to generate the cash flow necessary for continued production. That budget follows:

Item	Expenditure
Initial Property Payment	$ 6,000
Lease Expenses	3,000
Geological Reports	3,000
Engineering	4,000
Power Hook-Up Deposit	3,500
Electrical Wiring	2,500
Pump Installation	2,000
West Side Water Line	2,500
Office Support	2,500
Pre-Production Royalty	7,500
Consulting Fees	5,000
Spray Lines/Manifolds	2,000
Directional Rainbirds	200
Preg Pond Liner	400
Pad Preparation	2,000
Laboratory	50,000
Building	2,000
Office	2,500
Recovery Plants	4,000
Reagent Tanks	1,000
Crushing Working Capital	5,000
Chemicals	5,000
Insurance and Bond	2,000
Management	4,000
Labor	4,000
	$80,600

The projected cash flow is as follows, based on a 15 day delay in payment from the refinery:

Month	Net Operating Profit Before Tax		Crushing Rate
	Heap Slope Leach	Crushing	
April 15, 1979	$20,000	$ 10,000	25 TPD
May 15, 1979	30,000	40,000	200 TPD
June 15, 1979	35,000	40,000	200 TPD
July 15, 1979	15,000	80,000	400 TPD
Aug. 15, 1979	-	80,000	400 TPD
Sept. 15, 1979	-	120,000	600 TPD
Oct. 15, 1979	-	120,000	600 TPD
Nov. 15, 1979	-	600,000	3,000 TPD
Dec. 15, 1979	-	600,000	3,000 TPD
Jan. 15, 1980	-	600,000	3,000 TPD
"	"	"	"
"	"	"	"
"	"	"	"
Jan. 15, 1981	"	"	"

At this time, open-pit ore must be developed to continue at the above rate.

The payback schedule for a $100,000 investment out of 50% net operating profit is as follows:

Month	50% NOPBT Payback ($100,000)	
	Monthly	Cumulative
April	$15,000	$ 15,000
May	35,000	50,000
June	37,500	87,500
July	47,500	100,000

TOMBSTONE PROJECT

There are two separate aspects of the Tombstone Leaching Project. One is to spray the existing heap in order to generate an immediate cash flow and the other more involved phase is to crush the heap and heap leach the crushed ore.

A. Spray East Slope of Heap

The barren-precip pond would be used as a preg pond. Circulated would be:

Daily Solution Tonnage

GPM	1 Shift	2 Shifts	3 Shifts
50	100	200	300
100	200	400	600
150	300	600	900
200	400	800	1200

with sprinklers at 5 GPM:

GPM	No. Rainbird Sprinklers
50	10
100	20
150	30
200	40

At Nelson, the "heap weep" was 0.035 Au and 0.50 Ag (per ton solution). This would be $12.50 per ton solution. If we assume 1/2 that value, we would generate:

Daily Gross

GPM	1 Shift	2 Shifts	3 Shifts
50	$ 625	$1250	$1875
100	1250	2500	3750
150	1875	3750	5625
200	2500	5000	7500

Starting to spray on the northeast portion of the heap, where the height is 100 feet and with an angle of repose of 45°, the slope distance would be 140 feet. With a spray radius of 20 feet, a slope pattern of 6 lines horizontal along the slope with 8 rainbirds per line would result in 48 rainbirds. At 5 GMP, this would be 240 GPM or 1 ton solution per minute. The barren-precip pond would hold over 50,000 gallons or 200 tons of solution. Therefore, on start-up, less than 200 tons would be circulated as pre-treatment using NaOCl and lime.

Then, as the heap saturates and begins to weep, a "circulating solution balance" can be obtained and controlled in the barren-precip pond. It would take about 3 days to reach this balance. A precautionary measure would be taken so that if excessive "heap weepage" occurs, the excess would flow by gravity to the lower preg pond (about 200,000 gallons capacity).

For each slope increment treated, the following should be recovered:

Slope Surface Area of 6x8 birds = 140x180=25,000 ft^2

Assuming a 1/3 vertical penetration of solutions:

$$\text{Tonnage} = \frac{(1/2\ b\ h)}{3}\ \frac{(180')}{18.5} = 16{,}216 \text{ tons}$$

If we assume a grade 1/4 that of the "heap weep" from Nelson, a gold grade of .008 results in $2 per ton and a silver grade of .14 results in $1, or $3 per ton ore, or $48,000.

This could be recovered in about a week of circulation.

Notice that about 8 such increments exist along the northeast and east portions of the heap's slope.

The expected gross would then be from $48,000 to $384,000. From a risk point-of-view, it is safe to project $50,000, which would more than pay for the initial capital investment.

Required capital investment for the slope leach is as follows:

A.	Power hook-up		$2400
B.	Electric		2000
C.	Pump installation/electric		1000
D.	Water line installation		2040
E.	Spray lines/manifolds		100
F.	Directional rainbirds		80
G.	Preg pond		100
H.	Laboratory		100
I.	Building		200
J.	Plants		2200
K.	Tanks		1000
L.	Chemicals		
	1. Resin-SR-3	100#	650
	2. Lime	1000# (.087)	87
	3. Salt		
	4. NaOCl	5-55 gal	247.50
	5. $Na_2S_2O_3$	300#	73.80
	6. NaCN	1000#	561.50
	7. Na_2S	400#	99.20
	8. Powd. Zinc	100#	66.20
M.	Insurance and bond		4500
N.	Management		4000
O.	Labor		2000
P.	Misc.		1495
			$25,000

B. Crushing and Leaching of Heap

Crushing would be done to 1/2 inch and "Induced Percolation Substances" would be added to accelerate the leaching rate and maximize the recovery. It has been estimated that a $10 per ton ore profit can be generated. Following are the computed net operating profit before taxes for the heap re-processing:

Crushing Rate	Monthly Net Operating Profit	Crushing Duration
200 Tons per Day	$ 40,000	250 months
400 "	80,000	125 "
600 "	120,000	83.3 "
1000 "	200,000	50 "
3000 "	600,000	16.7 "

Following are recent samples taken from the heap, grouped by screen size and mineral:

Ore Type	Troy Oz./Ton Au	Troy Oz./Ton Ag	Value* Au	Value* Ag	Total Value
Clay	.041	.26	$10.25	$1.95	$12.20
Fines	.086	.29	21.38	2.18	23.56
Large	.038	.53	9.38	3.94	13.32
Manganese	.155	1.44	38.75	10.80	49.55

The above were weighted by their respective weight percentage (15%, 25%, 40% & 20%) and the average value ($250 Au & $7.50 Ag*) is $22.95. Assuming a 65% recovery, the resulting ore value would be $15.00 The operating costs will be under $5.00 per ton ore, yielding a net operating profit before taxes of $10.00 per ton ore.

The following illustration presents the recent sampling results.

TOMBSTONE DETAILED COST ESTIMATE

Following are the details of the cost estimates discussed by cost item determined February 11 through 21, 1979.

Power Hook-Up

Arizona Public Service provides the power. Contacted were:

Dave (Bisbee)	432-2281
Max Bishop	432-2281

I met with Dave on Wednesday and Max on Friday. Their estimated costs for the same service as 71 Minerals were:

Plant	West Side
$1800	$600

The above estimate is approximately what they will formally quote, provided we show good faith, longevity, and a reasonable financial statement for responsibility.

Therefore the estimated cost:

Plant	$1800
West Side Pump	600
	$2400

Required is a letter to:

Mr. Max Bishop
Arizona Public Service
P.O. Drawer J
Bisbee, Arizona 85603

A. Length of operation - 5 years

B. Hours per day
   1. West Side: 8 hours per day for first several weeks - then intermittant
   2. Plant: 8 hours per day for first three months then 16 hours per day and three shifts in 6 months

C. Days per week - 5

D. Name and address of responsible party

2. Electrical - General:

A. Bill Magee - Tombstone; general wiring

B. Pete Milword - Tombstone; Jimmy Hart's landlord - lives there - reported to be good

C. Cochise Electric - Sierra Vista; licensed contractor - but more expensive than above.
   Estimated costs are $2,000

3. Pump Installation/Electrical

Ralph Van Arsdale has arranged to come to Tombstone on March 2 and 3 due to his daughter's wedding. I talked with him (by phone) on Wednesday and he will go over each pump and make his recommendations concerning specific pumps, configurations, etc.

Then electrical wiring will be required.

Estimated costs are $1,000.

4. PVC Pipe Installation:

A. Water line - West Side

71 Minerals dug a back-hoe trench from the plant to the West Side and "strung" a 3 inch PVC line. The City of Tombstone bought the pipe and removed it, but had to cut it for removal. I talked with Joe Perrodi on Friday and he thought the City may sell the pipe back, but on Saturday I talked with Tom Pitcher (457-3497) who is the City Engineer and he said he needs the pipe.

On Tuesday I contacted:

Carlson Brick
3670 E. Speedway
Tucson, AZ (325-3369)

Their price quote for 3 inch PVC (Schedule 40) was $74.66/100 foot and we need 2,000 feet, which they have in stock. We would also need 4 cans each of cleaner and PVC glue.

I could not make a deal with Charley and Louise Escapule for "Tombstone Services" but they said they would make their AA available.

Therefore, I talked with Dusty Escapule concerning him laying the pipe. Dusty Escapule, P.O. Box 1103, Tombstone, AZ 85638 (457-3429). My estimate is that it would take him and a helper 3 days and he would probably charge $6 + $4 per hour

($10/hr)(8)(3 days) = $240

Back-hoe; cleaning
Trench and dirt back
over pipe 10 hrs ($25/hr) = $250

Therefore the cost estimate is:

Pipe (2,000 ft) ($75/ft)	$1500
Cleaner and Glue	50
Pipe laying labor	240
Back hoe	250
	$2040

B. Spray lines/manifolds

All necessary spray lines and manifolds are on the property. Cost of moving and connecting lines are only labor, estimated at $100.

5. Directional rainbirds:
20 @ $4 = $80
(Melnor - Yellow Front - Sierra Vista)

6. Preg Pond:
Minor work must be done to utilize the barren-precip pond between the plant and the heap as our preg pond. This would also save much money in pumping from the old preg pond back to the heap.

Estimated Cost: $100

7. Pad:

An extension of the pad from the existing heap toward to plant must be made in order to initiate re-processing of the heap.

An initial area of 100 feet by 400 has been selected. Desert dirt will be compacted into an impermeable pad 12 inches thick.

Tonnage of pad material is:

$$\frac{100' \times 400' \times 1'}{20\ ft^3/ton} = 2000 \text{ tons}$$

George Jewitt has a 20 ton dump truck and Dusty Escapule has a 10 ton truck.

If I would have George Jewitt load and haul, it would take 100 loads. The desert dirt would come from south of the heap of 2500 feet.

Assume a mile round trip and an average of 10 MPH, or a cycle time of 6 minutes. Therefore, the required pad material could be hauled in about two days.

George Jewitt is anxious for our tailings and dump ore to process in his plant (100 TPD). If we would pay $1 per ton, then we would owe George Jewitt $2000 in tailings or dump ore.

Pad preparation with a blade would take one day. We could rent Bobby Cowen's blade for $25 per hour with Dusty Escapule operating.

The operation sequence would be:

A. Pad preparation - blade

B. "Dirt" haulage;
   1. Initial 4 inch lift
      a. water with sprinklers
      b. compact with loaded trucks
   2. Next 4 inch lift
      a. water with sprinklers
      b. compaction
   3. Last 4 inch lift
      a. water with sprinklers
      b. compaction

The cost summary is:

Trucks and loader.....	Assume trade
Labor (D. Escapule).....	
4 days @ $50/day.....	$200
Blade.....	
(6 hrs +4+4+4) 18 ($25/hr).....	450
	$650

If caliche can be located, it will be worked into the pad material after each lift. Otherwise, lime can be used.

8. Laboratory:

George Jewitt wants to make a deal which he has done to exchange lab work for tailings or dump ore.

Eocene has a lab in town (Lucky Cuss Apts) and they have a AA (was in 71 Minerals plant), shakers, etc.

Therefore, with the lab supplies and equipment I have, only minor supplies will be required.

Esimated cost: $100

9. Building:

The "Gun Company" has the 71 Minerals plant building rented. We will need a small building for the plant.

Estimated cost: $200

10. Plants:

To save plant costs, no deaeration will be used.

Process Chemistry:

A. NaCl - NaOCl System;

1. Silver

a. $Ag_2S + 4OCl^- = 2 AgCl + SO^{=}_4 + 2Cl^-$

b. $AgCl + 3 Cl^- = Ag Cl^{-3}_4$

c. Recovery*

1. Silver tetrachloro complex precipitated by Na_2S

2. Silver tetrachloro complex changed to cyanide complex and then Na_2S or Zn precipitation or reduction

2. Gold

$2 Au = Cl_2 = 2 AuCl$

$AuCl + Cl_2 + Cl^- = AuCl_4$

and $AuCl + Cl^- = AuCl^-_2$

Recovery*

1. Aurous chloride recovered on ion-exchange resins

2. Aurous chloride changed to cyanide complex and recovered on ion-exchange resins or zinc reduction

B. $Na_2S_2O_3$ System;

$AgCl + Na_2S_2O_3 = Ag_2S$

Recovery*

Recovered or powdered zinc without deaeration

Each filter is a 50-65 GPM Hayward Filter, yielding over 200 GPM.

Costs are:

4 filters @ $275	$1100
Feeder	200
Pipe (PVC)	100
4 valves @ $150	600
Labor	200
	$2200

11. Tanks:

Reagent tanks are required

Estimated cost: $1000

12. Crushing:

Karl Ronstadt of New Pueblo Contractors and Dick Yagger met with me on Wednesday. Following are their estimates:

150 tons per hour crushing rate (1 shift - 24,000 tons/month)

Monthly rate;		
Rental (jaw rolls, elevators/ conveyors 988 Loader		$20,000
Labor	16,000	
Misc.	4,000	
	$40,000	

Therefore the cost would be from $1.67 to $2.00 per ton crushed.

Their estimated crushing rates are:

Inch Opening	TPH
5/8	200
1/2	150 - 100

In general, in the range down from 3/4 inch, you lose 100 TPH for each 1/8 inch size reduction.

It was further their estimate that to come in and set-up they would need 1-1/2 months expenditures in advance, or $60,000.

In general, they expressed doubt in whether a cash flow would result as I projected and I do not think they want to finance the costs themselves for a profits interest.

In addition to the crushing operating costs plus set-up, there are the following costs (one shift basis)

Crushing Rate	Weekly IPS* Cost	Weekly IPS** Tons
25 TPH	$ 1,500	5
50 TPH	3,000	10
100 TPH	6,000	20
150 TPH	9,000	30
375 TPH	22,500	75

* $1.50 per ton ore
** 10#/ton ore

To evaluate what is a reasonable initial crushing rate consider:

A. Gross value/ton = $15

B. No delay in precious metal payment

C. IPS cost of $1.50/ton

D. Gen cost $1.50/ton

			Weekly			
			Operating Costs		Net Op. Profit	
Crushing Rate/Hr	Daily Tons	Weekly Tons	Crushing Costs/Ton		Crushing Costs/Ton	
			Gilbert $0.75	Ronstadt $2.00	Gilbert $0.75	Ronstadt $2.00
25	200	1,000	$3,750	$5,000	$11,250	$10,000
50	400	2,000	$7,500	$10,000	$22,500	$20,000
100	800	4,000	$15,000	$20,000	$45,000	$40,000
150	1200	6,000	$22,500	$30,000	$67,500	$60,000
375	3000	15,000	$56,250	$75,000	$168,750	$150,000

From the above, it is obvious that a crushing rate over 50 tons per hour would cost too much for operating costs.

Because it seems that Ronstadt's preliminary estimate is entirly too high - I contacted:

Mr. Jack Gilbert
A.J. Gilbert Construction Co.
P.O. Box 5288
Bisbee, Arizona
Office: 432-2078
Home: 432-3946

Mr. Jack Gilbert is going to make us a proposal within two weeks. His comments were that his cost for crushing 1000 tons per day would be the same as crushing 3000 tons per day to 1/2 inch. A general comment was that the costs for the 3000 tons per day would be under $.075 per ton crushed. However, the previous table showing the capital requirements for a high crushing rate is to great at this time. It would take at least six months to be ready for such a high crushing rate operating expense.

I am also getting an estimate from:

Leonord Maddux
Maddux Crushing
Douglas, Arizona
364-7564

In the Tombstone area, there are a number of smaller crushers available:

A. George Jewitt	50 TPH Jaw
B. TMR	50 TPH Jaw 50 TPH Cone
C. 71 Minerals	50 TPH Jaw 70 TPH Cone
D. Dusty Escapule	50 TPH Jaw 70 TPH Cone

George Jewitt paid $2800 for his 50 TPH Jaw Crusher and conveyors.

Charley Escaupule talked with a fellow at Octave, Arizona who paid $5,000 for a 10 TPH Jaw and Cone Crusher with elevators/conveyors and a stacker.

The best soluton seems to be to start with Dusty Escapule and his equipment:

10 ton dump truck
Back hoe - loader
2 Jaw Crushers (25 & 50 TPH)
Conveyor belts

His backhoe - loader has a capacity of 2 tons. By setting the crusher close to the NW corner of the heap, a cycle time of 5 minutes would result and with a coarse ore bin with a hopper, the 2-ton loader could heap up with the crusher.

The cost of using Dusty Escapule's backhoe - loader and crusher would not exceed $1 per ton crushed.

Note: Dusty estimated 40 tons/hr, which would be

$$\frac{(\$25/hr)}{40\ tons/hr} = \$0.625/ton$$

For the grizzly and "IPS" feeders, I would estimate $1000

13. Chemicals:

A. Lime, processed ($.021/#)

B. Lime, hydrated ($0.12/#) - Copper States

C. Lime, stack dust (65% CaO) ($14/ton + freight) - Paul Spur, Douglas

D. Cement ($0.04/#)-$3.75/94# - Grant Road Lumber

E. Fly ash ($0.01)-$20/ton - Western Ash, Phoenix

F. Diatamaceous Earth ($.10/#)

G. Salt ($.005 - .16/#)

H. NaOCl ($.90/gal) - Hill Chemical

I. $Na_2S_2O_3$ ($0.18/#) - Hill Chemical

J. NaCN ($0.44/#)($0.56/#) - Small Lots - McKesson

K. Na_2 S ($0.195/#)

L. Resin ($6.50/#....100#...$650)

M. Powdered Zinc ($.68/#)($0.662/#) - Merrillite-McKesson

14. Insurance and Performance Bond:

Insurance - annual $3,000

Performance Bond (annual)

($10/$1000) (150,000) = $1500

RESINS

Basic Parameters: SR-3

A. Gold Loading;
Resin capacity = 150 gr/l
Resin density = 800 gr/l

Basis: 1 l

$$\frac{150 \text{ gr Au}}{800 \text{ gr Resin}} = 18.75\% \text{ by weight}$$

B. Resin Cost;

$$\frac{\$SR\text{-}3}{gr} = \frac{\$Price}{ft^3} \quad \frac{(3.53\ ft^3)(1)}{(100\ l)} \quad \frac{}{(800\ gr)}$$

Quantity	Price	Price SR-3 Gr	Price SR-3 #
Min. 50 ft^3	\$200/ft^3	\$0.0088255	\$4.003
10-10 #	\$6.50/#		

C. Ignition Economics:

Basis; 1 l SR-3 Resin

Gold Value (150 gr)(1/32)(\$250) = \$1171.88
Pounds Resin/l = 1.764

Price SR-3	Cost Resin/l	\$ Value Au / \$ Resin
\$4/#	\$ 7.05	\$166.22
6.50/#	11.46	102.26

D. SR-3 Summary Per Pound:

1. Price..... \$6.50
2. Value Au loaded;

$$\frac{\$Au}{\#SR\text{-}3} = \frac{(150 \text{ gr Au})(1 \text{ SR-3})(453.6 \text{ gr})}{(1 \text{ SR-3})(800 \text{ gr})(\quad \#\quad)}$$

$$\frac{(\$250 \text{ Au})(\text{t. oz.})}{(\text{t. oz})(32 \text{ gr.})}$$

$$= \$664.45$$

3. Au loaded;

2.658 t. oz.

Contention Dike Sample Maps (8/1-2/79)

West Wall RR-Cut

Scale ≈ 1 in = 20 Ft

N

Aug 1, 1979
RFH

Cum. Interval feet	Sample Number	Ag/ton ore Na_2S test
160		
	2558	
139		
	2526	
127		
	2525	
121		
	2524	
115		
	2523	
100		
	2522	
96		
	2521	
93		
	2520	
85		
	2519	
79		
	2518	
73		
	2517	
69		
	2516	
65		
	3 Ft 2515	
60.5		
	2514	
54		
	2513	
50		
	2512	
45		
	2511	
40		
	2510	
35		
	2505	
21.5		
	2504	
14.5		
	2503	
6.5		
	2502	
0		

No detectable Color (Ag_2S) - Below .25 e.g. Ag/ton

K&E ALBANENE ® GUIDE LINE 10 5641
NON-REPRODUCIBLE 10 X 10 TO THE INCH
KEUFFEL & ESSER CO.
MADE IN U.S.A.

East Wall RR - Cut

Cum Interval ft.	Sample Number	Na_2S Test Ag / ton Ore
188		
	2554	
174	2552	2 Ft
169	2553	
162	2551	
158	2550	
150	2549	9.5 Ft
142	2548	7 Ft
128	2547	3 Ft
121	2546	
110		
105	2545	
	2544	
90	2543	
85	2542	
78	2541	
72	2540	
67	2539	
57	2538	
54	2537	
46	2536	
38	2535	
33	2534	
31	2533	
27	2532	
24	2531	
22	2530	
15	2529	
13	2528	
7		
0	2527	

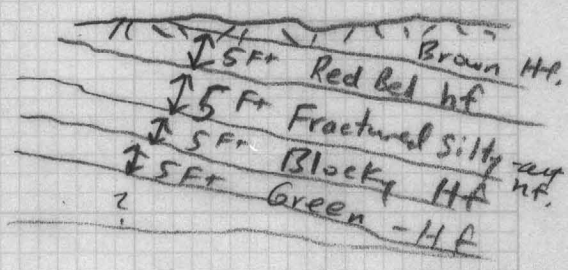
Under .5 } Est. Ave .25 e.g. Ag

No detectable Ag

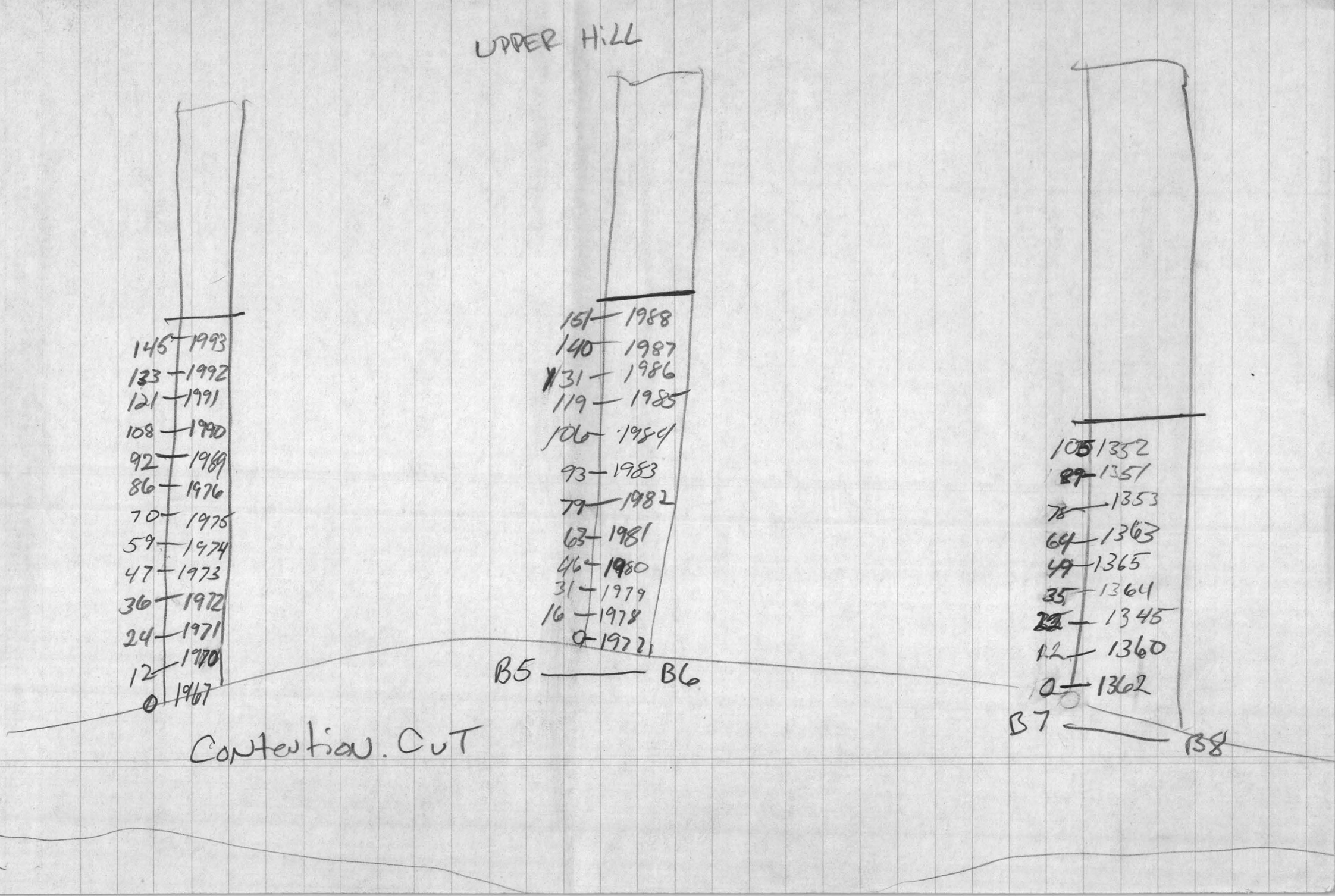
Scale: 1 in = 20 ft.

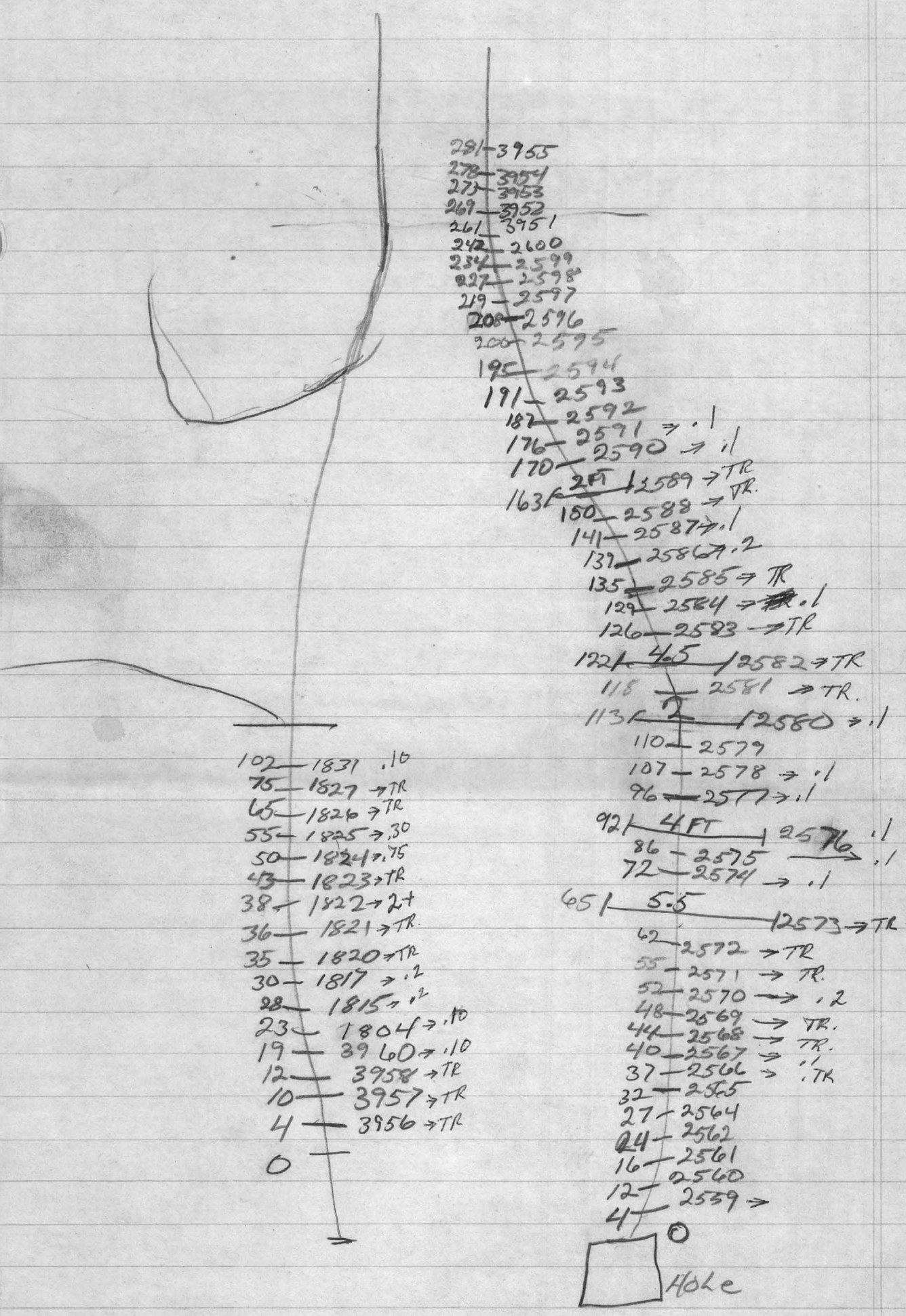
N

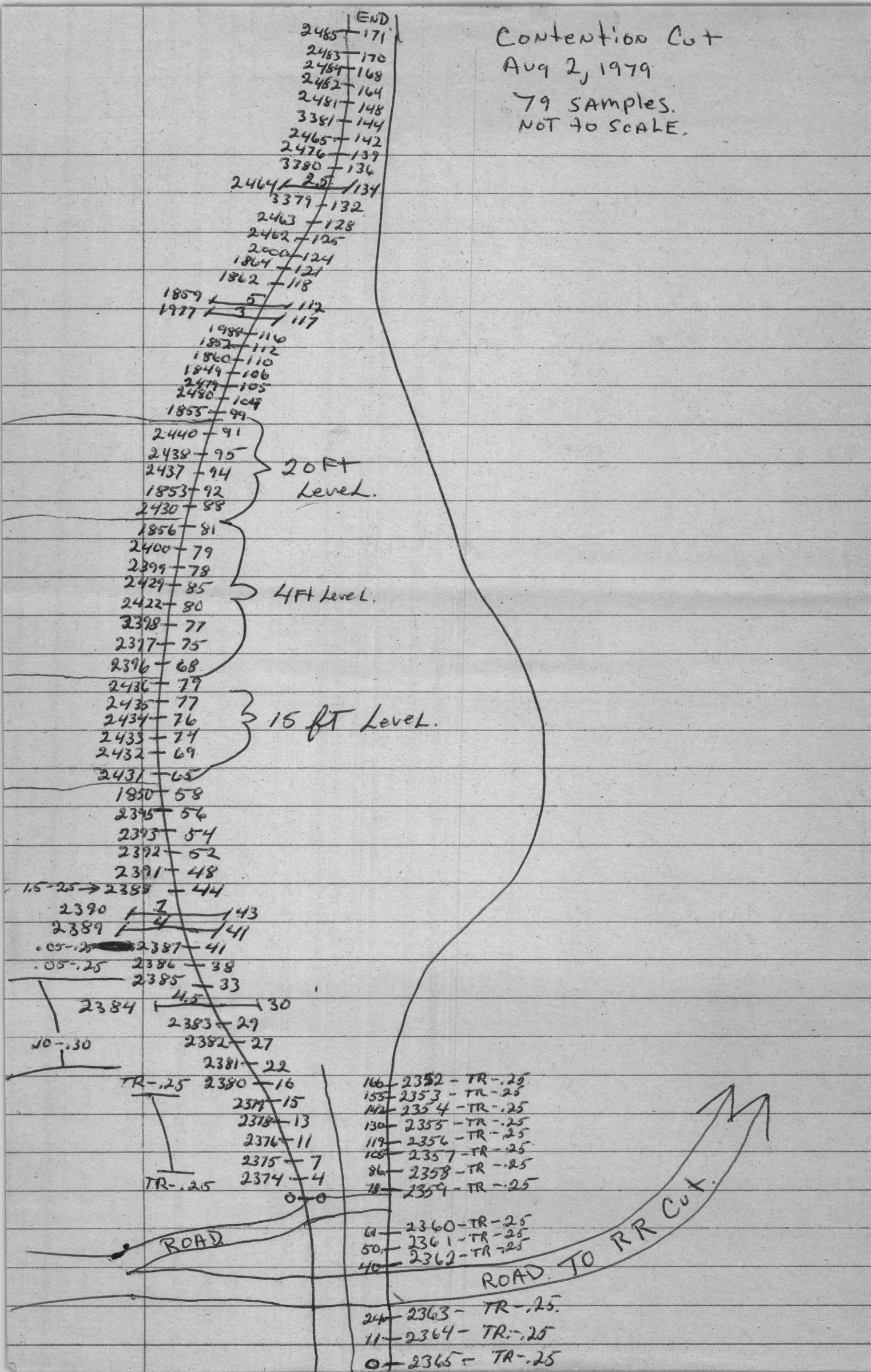
Aug. 2, 1979
RFH

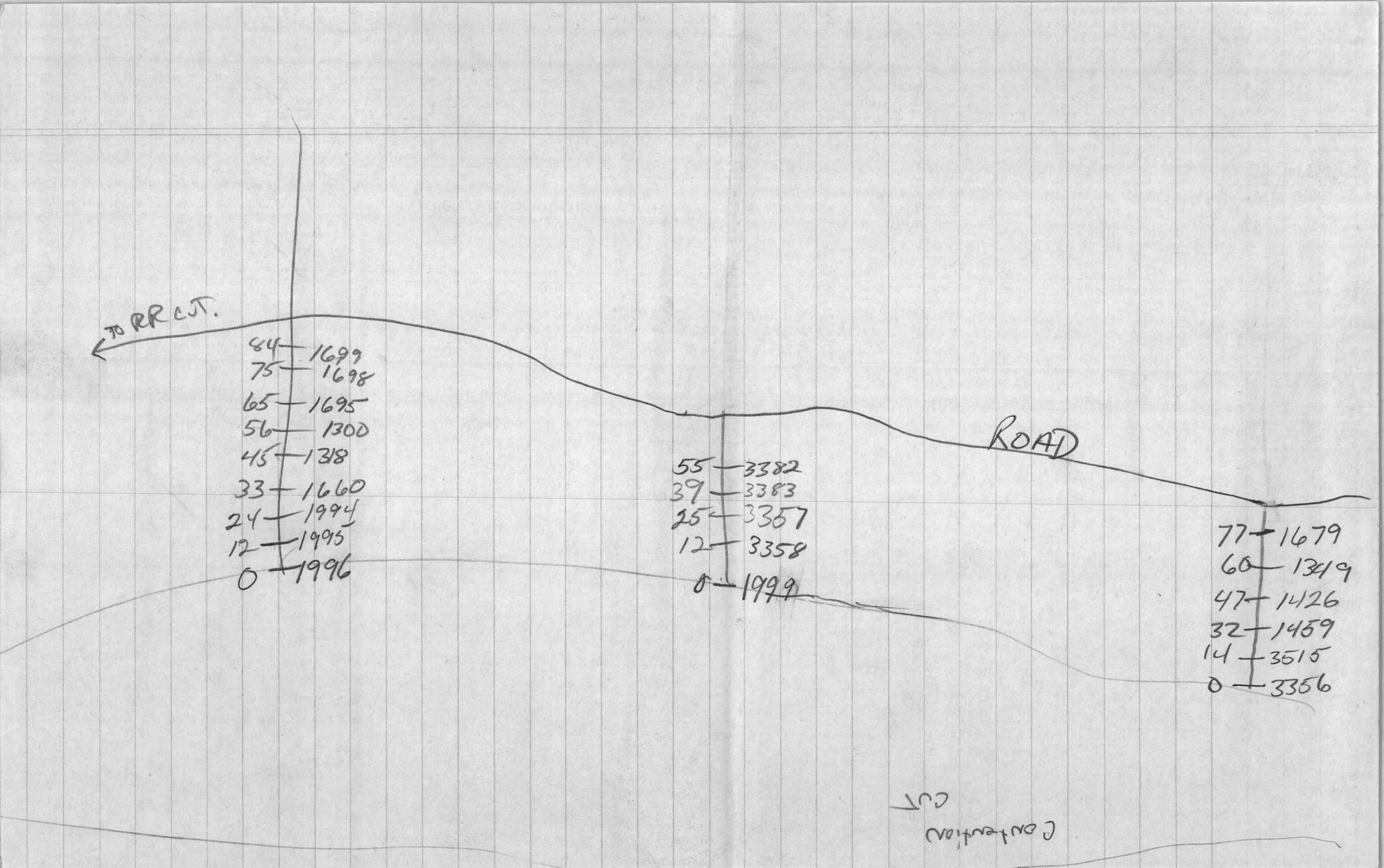


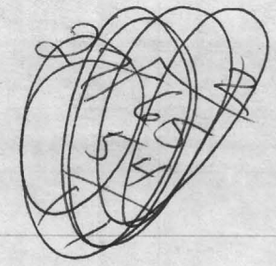
K&E ALBANENE ® GUIDE LINE 10 5641
NON-REPRODUCIBLE 10 X 10 TO THE INCH
KEUFFEL & ESSER CO.
MADE IN U.S.A.


UPPER HILL
145 — 1993
133 — 1992
121 — 1991
108 — 1990
92 — 1989
86 — 1976
70 — 1975
59 — 1974
47 — 1973
36 — 1972
24 — 1971
12 — 1970
0 — 1967
151 — 1988
140 — 1987
131 — 1986
119 — 1985
106 — 1984
93 — 1983
79 — 1982
63 — 1981
46 — 1980
31 — 1979
16 — 1978
0 — 1977
B5 — B6
105 1352
89 — 1351
78 — 1353
64 — 1363
49 — 1365
35 — 1364
22 — 1345
12 — 1360
0 — 1362
B7 — B8
Contention. Cut

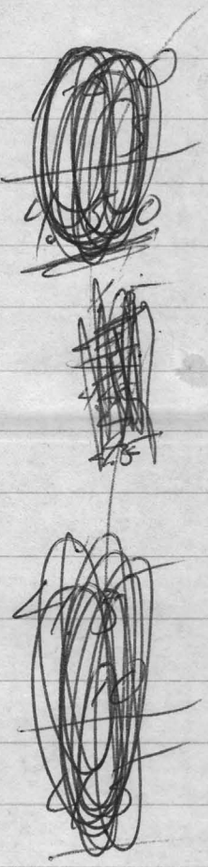

291 — 3955
278 — 3954
273 — 3953
269 — 3952
261 — 3951
242 — 2600
234 — 2599
227 — 2598
219 — 2597
208 — 2596
200 — 2595
195 — 2594
191 — 2593
182 — 2592
176 — 2590 → .1
170 — 2589 → TR
163 — 2588 → TR
150 — 2587 → .1
141 — 2586 → .2
137 — 2585 → TR
135 — 2584 → .1
129 — 2583 → TR
126 — 2582 → TR
122 — 2581 → TR
118 — 2580 → .1
113 — 2579
110 — 2578 → .1
107 — 2577 → .1
96 — 2576 → .1
92 — 2575 → .1
86 — 2574 → .1
72 — 2573 → TR
65 — 2572 → TR
62 — 2571 → TR
55 — 2570 → .2
52 — 2569 → TR
48 — 2568 → TR
44 — 2567 → .1
40 — 2566 → TR
37 — 2565
32 — 2564
27 — 2562
24 — 2561
16 — 2560
12 — 2559 →
4 — 0
Hole
102 — 1831 .10
75 — 1827 → TR
65 — 1826 → TR
55 — 1825 → .30
50 — 1824 → .75
43 — 1823 → TR
38 — 1822 → 2+
36 — 1821 → TR
35 — 1820 → TR
30 — 1817 → .2
28 — 1815 → .2
23 — 1804 → .10
19 — 3960 → .10
12 — 3958 → TR
10 — 3957 → TR
4 — 3956 → TR
0
SOUTH
CONTINUATION C.T.


Contention Cut
Aug 2, 1979
79 SAMPLES.
NOT TO SCALE.
END
2465 — 171
2463 — 170
2464 — 168
2482 — 164
2481 — 148
3381 — 144
2465 — 142
2476 — 139
3380 — 136
2464 — 2.5 — 134
3379 — 132
2463 — 128
2462 — 125
2000 — 124
1864 — 121
1862 — 118
1859 — 5 — 112
1977 — 3 — 117
1988 — 116
1852 — 112
1860 — 110
1849 — 106
2479 — 105
2480 — 104
1853 — 99
2440 — 91
2438 — 95
2437 — 94
1853 — 92
2430 — 88
20 FT Level.
1856 — 81
2400 — 79
2399 — 78
2429 — 85
2422 — 80
2398 — 77
2397 — 75
2396 — 68
4 Ft Level.
2436 — 79
2435 — 77
2434 — 76
2433 — 74
2432 — 69
2431 — 65
15 ft Level.
1850 — 58
2395 — 54
2393 — 54
2392 — 52
2391 — 48
1.5-2.5 → 2388 — 44
2390 — 3 — 43
2389 — 4 — 41
.05-.25 2387 — 41
.05-.25 2386 — 38
2385 — 33
2384 — 4.5 — 30
2383 — 29
2382 — 27
.10-.30
2381 — 22
TR-.25 2380 — 16
2379 — 15
2378 — 13
2376 — 11
2375 — 7
2374 — 4
TR-.25
0-0
166 — 2352 - TR-.25
155 — 2353 - TR-.25
142 — 2354 - TR-.25
130 — 2355 - TR-.25
119 — 2356 - TR-.25
108 — 2357 - TR-.25
86 — 2358 - TR-.25
78 — 2359 - TR-.25
61 — 2360 - TR-.25
50 — 2361 - TR-.25
40 — 2362 - TR-.25
ROAD
ROAD TO RR Cut.
24 — 2363 - TR-.25.
11 — 2364 - TR-.25
0 — 2365 - TR-.25

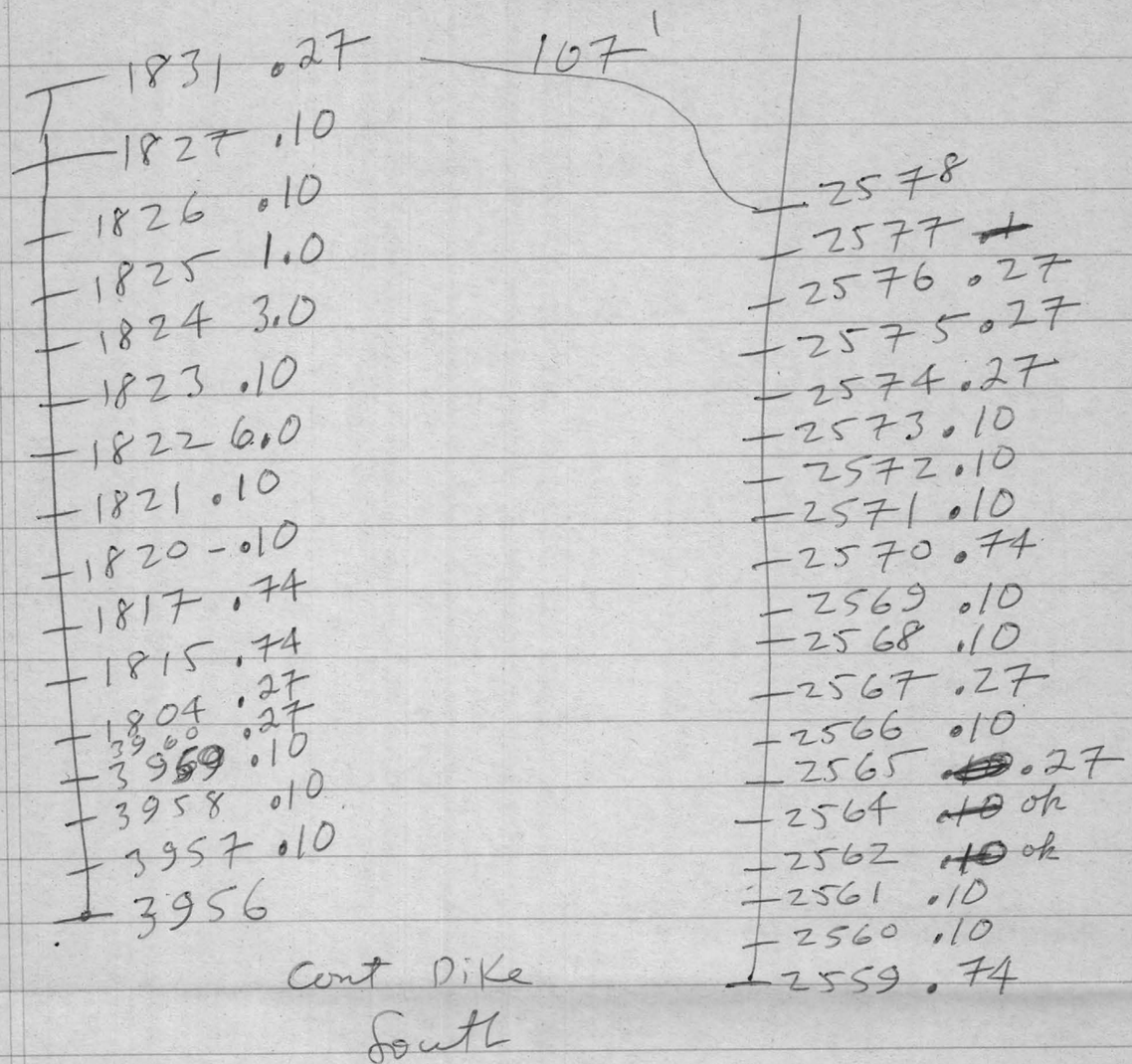

TO RR CUT.
84 — 1699
75 — 1698
65 — 1695
56 — 1300
45 — 1318
33 — 1660
24 — 1994
12 — 1995
0 — 1996
ROAD
55 — 3382
39 — 3383
25 — 3357
12 — 3358
0 — 1999
77 — 1679
60 — 1319
47 — 1426
32 — 1459
14 — 3515
0 — 3356
Excavation
CUT



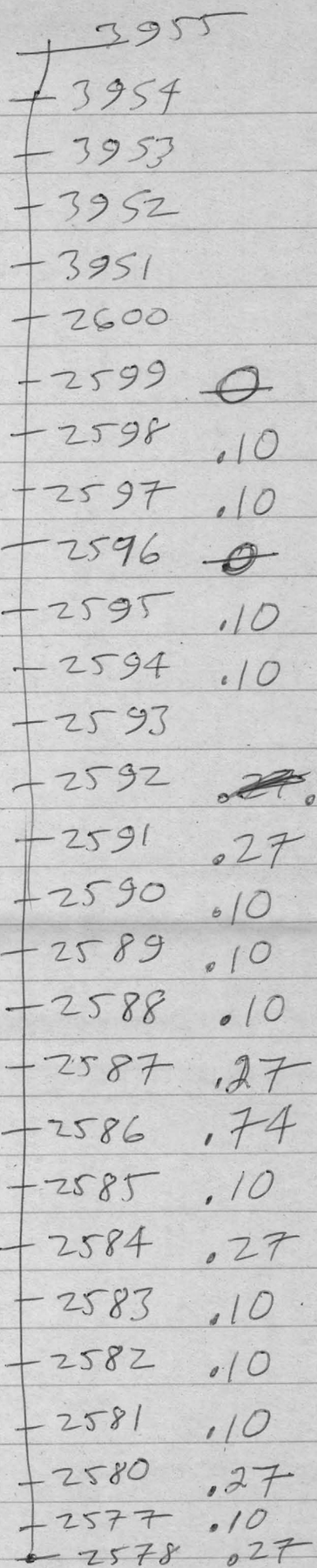
2600	TR. — .25
1428	TR. — .25
1349	.10 — .35+
1459	.10 — .35+
3356	TR — .25
3515	TR — .25
1679	TR — .15
3357	.15 — .30
3383	.20 — .50
3953	.20 — .50
3952	.15 — .30
1861	1.00 — 1.50
1999	TR — .25
3358	.25 — 50
1698	TR — .25
3951	.25 — .50
1695	TR — .25
1318	TR — .25
1699	TR — .25
1994	TR — .25
1996	TR — .25
1995	TR — .25
1240	TR — .25



1843	.15 — .30
1844	.10 — .30
1845	.20 — .40
1846	.15 — .35
1847	.10 — .30
1848	.15 — .35

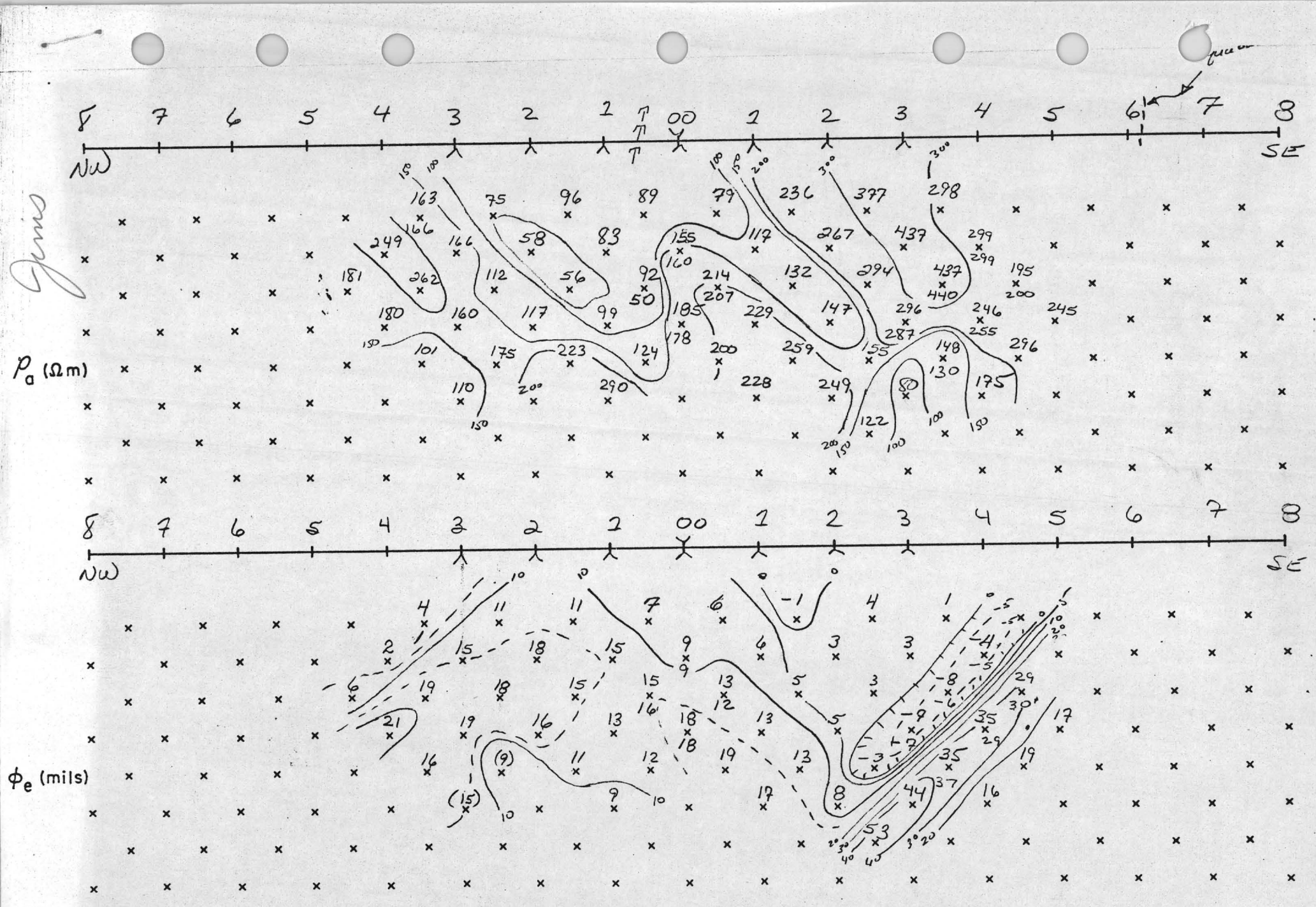


Cont Dike
South



So. pike
middle

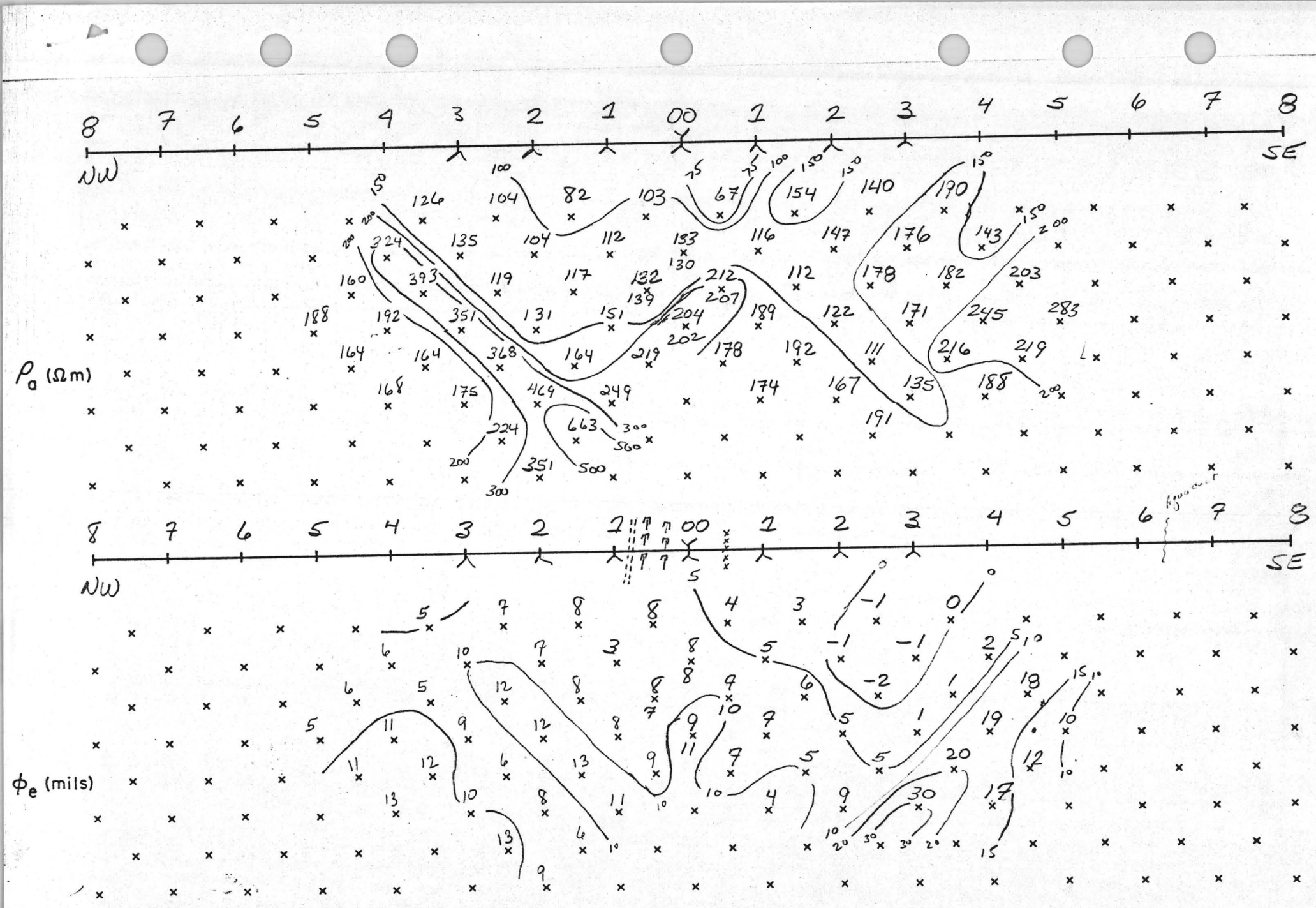
Resistivity Profiles (5/75)



AREA Tombstone SW STATE Arizona LINE NO. 1 (N48°W) DATA BY CET DATE 5/75

TRANSMITTER ET-20 RECEIVER Phoenix II MKIV

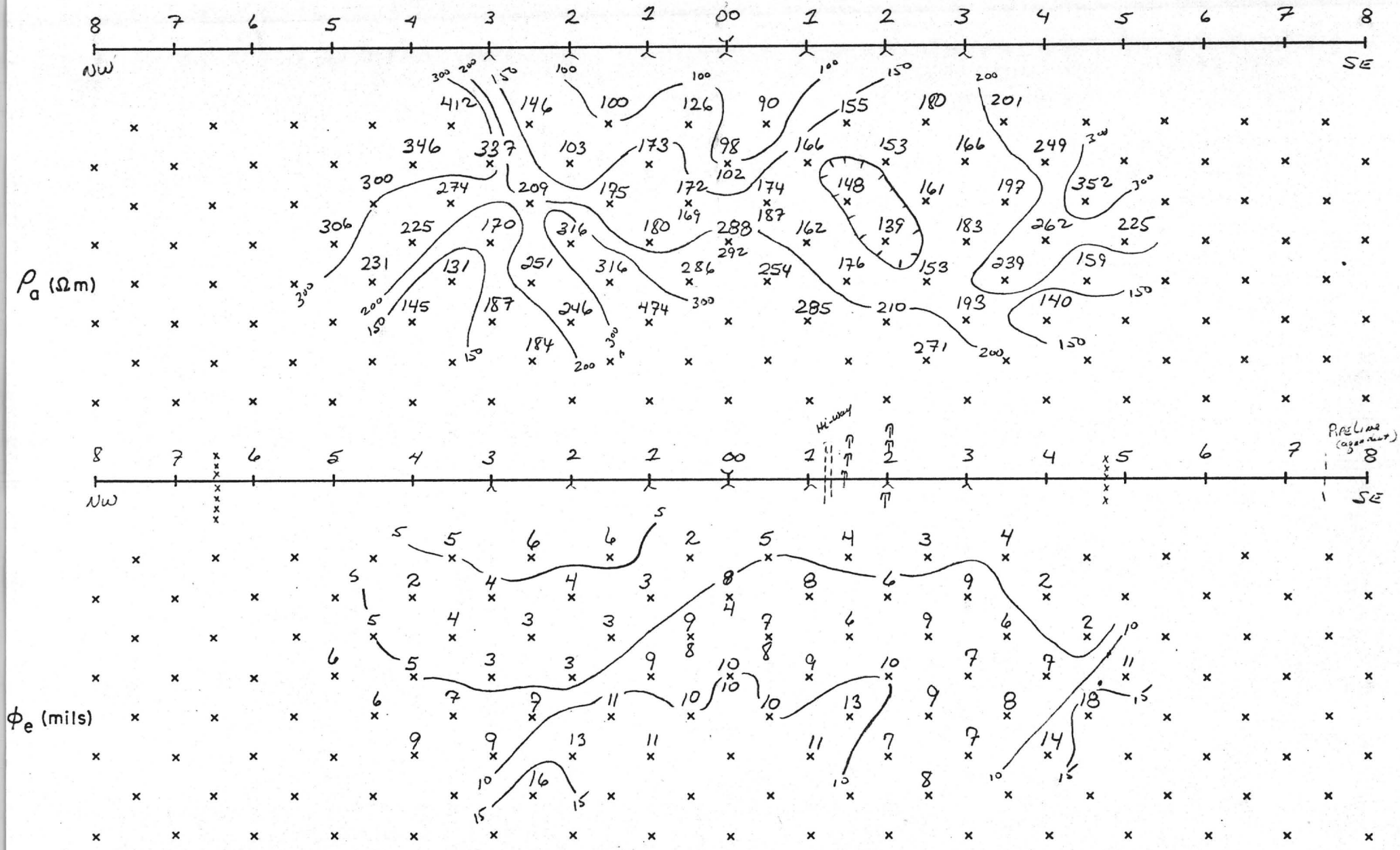
DIPOLE – DIPOLE ARRAY a = 1000 FEET



AREA Tomb Stone SW STATE ARIZONA LINE NO. 2 (N48°W) DATA BY C.E.T. DATE MAY 1975

TRANSMITTER FT-20 RECEIVER MKII #8 & Probe II

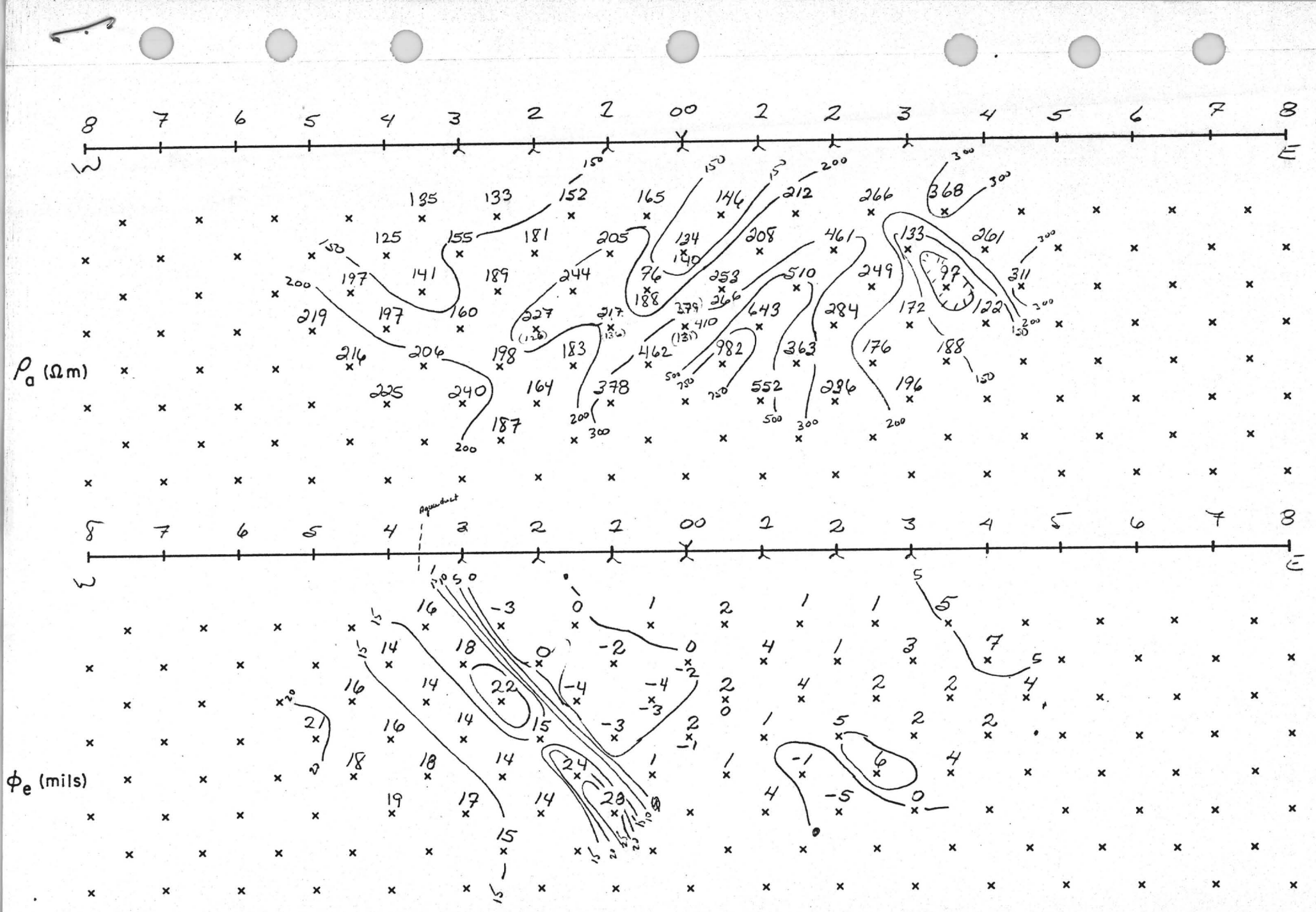
DIPOLE - DIPOLE ARRAY a = 1000 FEET



AREA Tombstone SW STATE ARIZONA LINE NO. 3 N54°W S50°E DATA BY C.E.T. DATE May 1975

TRANSMITTER E+-20 RECEIVER MkIV # 8 Proto II

DIPOLE - DIPOLE ARRAY a = 1000 FEET



AREA Tombstone SW STATE ARIZONA LINE NO. 4 (E-W) DATA BY CET DATE May 1975

TRANSMITTER FT-20 RECEIVER MK IV #8 Proto II

DIPOLE – DIPOLE ARRAY a = 1000 FEET

Paul M. Turney (8-31-81)

217

PAUL M. TURNEY
REGISTERED PROFESSIONAL ENGINEER
3715 HASH KNIFE
TUCSON, ARIZONA 85715

PHONE (602) 749-3573

August 31, 1981

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

Gentlemen:

In reply to our telephone conversation of July 23, 1981, your note of August 23, and your letter of August 24 authorizing the monitoring of Tombstone Exploration activities on your property; I have made three visits to the property at Tombstone.

August 19 - met with Dustin Escapule --

August 26 - met with Tom Pitcher (received partial copy of the Lease between TDC & TEI) --

August 29 - met with J. Blankenship (TEI geologist) and arranged for sampling procedure on leach ore to begin September 1, 1981.

The intent of our representing Tombstone Development Company is to make sure the Lease terms are upheld. In addition, it is hoped that during the course of ensuring that the Lease is enforced, we may collect information of value in operating the property.

During September we will have for your use:

1. A flowsheet showing the disposition of leach ore, mid-ore, and mine waste.
2. Flowsheet showing disposition of leach ore, tailings, pregnant and spent solutions, precipitates, doré and slag.
3. A glossary of mining terms as defined in the Lease to prevent misunderstandings.
4. Assays and tonnage.

Examinations to-date indicate your contract with TEI is equable, particularly since their treatment charge of 10% to a max of $15/ton is based on net smelter (marketable) value instead of gross metal value.

In answer to your question concerning recovery --- I am informed and suspect that the average amount of silver in the ore after leaching (tailings) will be about 0.4 oz Ag/ton. If this proves to be the case it becomes obvious that leaching ore containing 1.5 oz Ag/ton could only recover 73% of the silver or 1.1 oz Ag/ton. The 80% and 85% recoveries mentioned are probably from leach tests in the laboratory or perhaps considerably higher grade ore was used.

From the reports given me by Tom Pitcher covering the first six months of operation in 1981:

	Bullion	Tons	Recovery
January	4537.94 oz.	11.041	0.38 oz/ton
February	2160.62	4800	0.45
March	3316.32	5822	0.57
April	4556.90	24,514	0.186
May	6552.58	29,016	0.223
June	13,153.87	30,933	0.425

These figures are not too important until tonnage, grade, and bullion can be verified. Also the lag between tonnage to the crusher and leaching of this tonnage makes the figures subject to error on a monthly basis - over a period of time the lag in tonnage and leaching will be minimized.

What these figures do indicate is that a recovery of less than 0.5 oz bullion/ton was made the first six months of 1981.

Very truly yours,

P. M. Turney

PMT:bj
Encs.

George Rosevear (9-29-81)

226

2526 East Blacklidge Dr.
Tucson, Arizona 85716
September 29, 1981

TOMBSTONE PROJECT

Attention: Paul Tommey

2 trips--145 mi.	$29.00 20¢/mile
Motel	23.10
Meals	14.30
2 1/2 days	750.00
Total	$816.40

Geo Roseveare

GEO. ROSEVEARE,
Metallurgical Consultant

GR:b

JAMES A. WILLIAMS
Route 2 - Box 130
Duncan, Arizona
(602) 687-1556

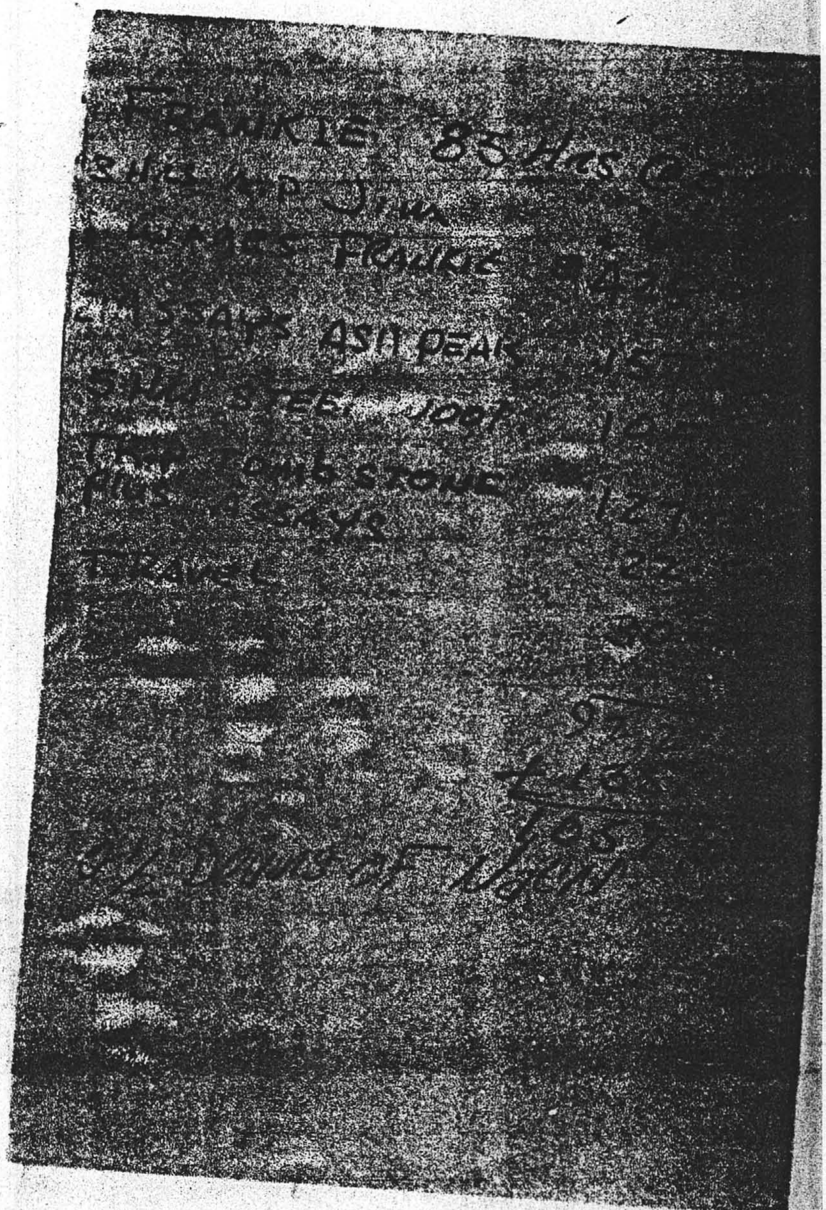
SAMPLE IDENTIFICATION	SILVER	GOLD
1. T.E.I. Crushed Ore	1.22	0.005
2. T.E.I. Tails Pad #3	1.80	0.01
3. T.E.I. Tails Pad	0.86	Trace

REGISTERED ASSAYER CERTIFICATE NO. 7411 JAMES A. WILLIAMS Date Signed 9/23/81 ARIZONA, U.S.A.

James A. Williams

September 14, 1981

T. E. I.
Tombstone, Az.


FRANKIE 83 HRS [illegible]
3 HRS [illegible] P JIM
WAGES FRANKIE [illegible]4[illegible]
[illegible]SSAYS ASH PEAK 15[illegible]
[illegible] STEEL [illegible] 10[illegible]
[illegible] TOMBSTONE
PLUS ASSAYS 12[illegible]
TRAVEL 22[illegible]
[illegible]
[illegible]
[illegible]05[illegible]
3½ DAYS OF [illegible]

SAMPLE CALCULATION - ONE MONTH

ASSUMED DATA - ORE TO PROCESSING (CRUSHER) 200

MOISTURE - 4.5%

AVERAGE MONTHLY GRADE
SILVER 1.4 oz/TON GOLD 0.01 o

AVERAGE MONTHLY PRICE H&N
SILVER 9.50 GOLD 450.00

BULLION PRODUCED - 12000 OUNCE
SILVER 85% GOLD 1% - OTHER MET

NET TONS OF ORE = 20000 - (4.5% X 20000) = 19100 DRY TONS

BULLION VALUE - SILVER - 12000 X .85 X 9.50 = 96900
GOLD - 12000 X .01 X 450.00 = 54000
TOTAL = $150900

GROSS VALUE OF ORE = 150900/19100 = 7.90 PER TON
TREATMENT CHARGE = 7.90 X .1 = $.79/TON

ROYALTY TO TDC

7.90 - 0.79 = 7.11 X .05 = $0.3555/TON X 19100 T = $6790.05

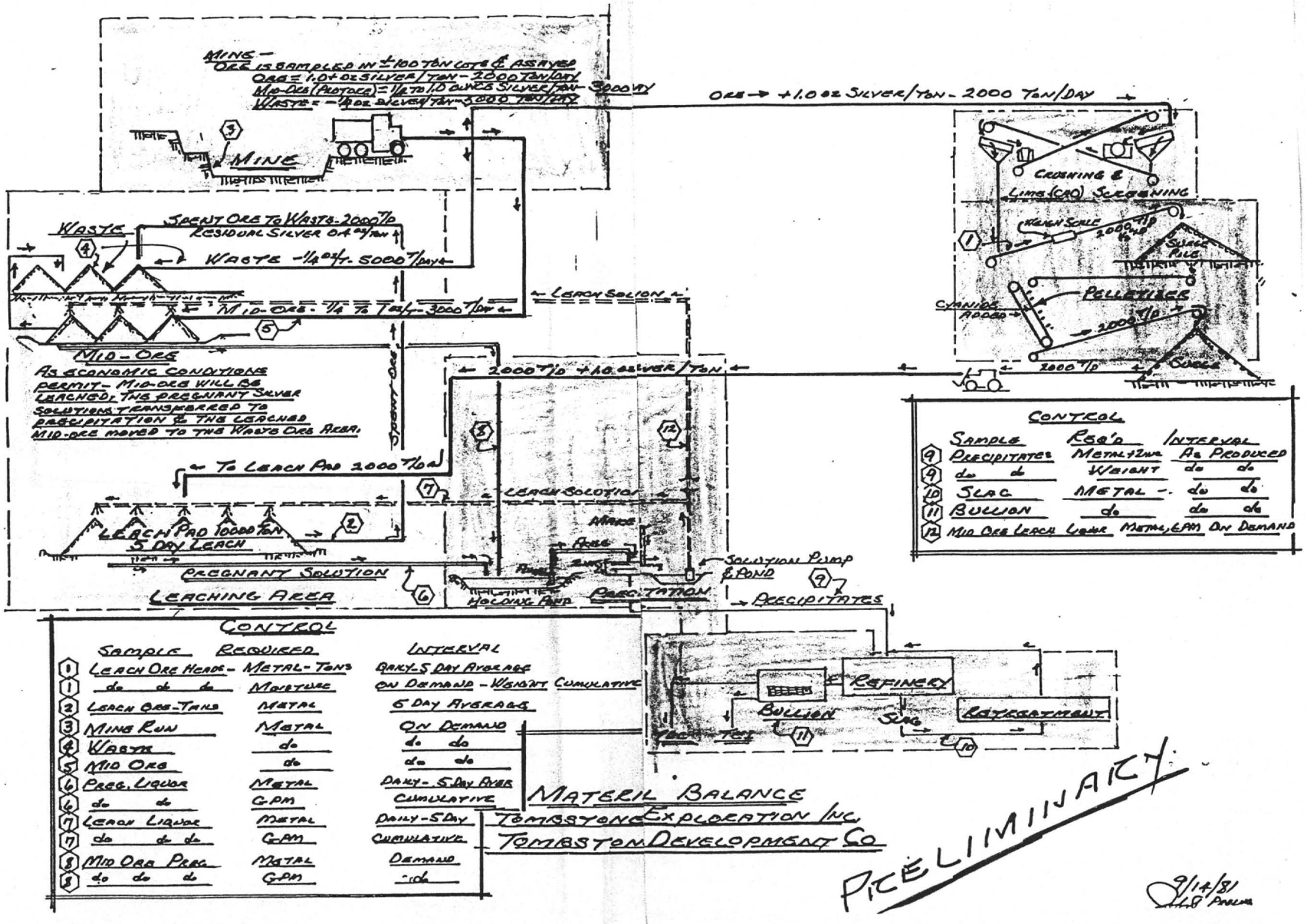
RECHECK - 150900 X 90% X 5% = 6790.05

RECOVERY SILVER
BULLION = 12800 X .85 = 10200 = 38.15%
ORE = 19100 X 1.4 = 26740

GOLD
12000 X .01 = 120 = 62.83%
19100 X .101 = 191

SAMPLE CALCULATION

230


MINE –
ORE IS SAMPLED IN ± 100 TON LOTS & ASSAYED
ORE = 1.0+ OZ SILVER/TON – 2000 TON/DAY
MID-ORE (PROTOCA) = 1/2 TO 1.0 OUNCE SILVER/TON – 3000 TON/DAY
WASTE = – 1/2 OZ SILVER/TON – 3000 TON/DAY
MINE
ORE → +1.0 oz SILVER/TON – 2000 TON/DAY
CRUSHING & LIME (CaO) SCREENING
WASTE
SPENT ORE TO WASTE-2000 T/D
RESIDUAL SILVER OZ/TON
WASTE – 1/2 OZ/T. 5000 T/DAY
MID-ORE. 1/4 TO 1 OZ/T. – 3000 T/DAY
LEACH SOLUTION
MID-ORE
AS ECONOMIC CONDITIONS PERMIT – MID-ORE WILL BE LEACHED. THE PREGNANT SILVER SOLUTIONS TRANSFERRED TO PRECIPITATION & THE LEACHED MID-ORE MOVED TO THE WASTE ORE AREA.
SPENT ORE
2000 T/D +1.0 SILVER/TON
TO LEACH PAD 2000 T/DAY
LEACH SOLUTION
LEACH PAD 100,000 TON
5 DAY LEACH
PREGNANT SOLUTION
LEACHING AREA
HOLDING POND
PRECIPITATION
SOLUTION PUMP & POND
PRECIPITATES
CYANIDE ADDED
PELLETIZER
2000 T/D
SLAG
REFINERY
BULLION
REFRIGERATOR
CONTROL
SAMPLE REQUIRED INTERVAL
1 LEACH ORE HEADS – METAL – TONS DAILY-5 DAY AVERAGE
1 do do do MOISTURE ON DEMAND – WEIGHT CUMULATIVE
2 LEACH ORE-TAILS METAL 5 DAY AVERAGE
3 MINE RUN METAL ON DEMAND
4 WASTE do do do
5 MID ORE do do do
6 PREG. LIQUOR METAL DAILY-5 DAY AVER
6 do do GPM CUMULATIVE
7 LEACH LIQUOR METAL DAILY-5 DAY
7 do do do GPM CUMULATIVE
8 MID ORE PREG. METAL DEMAND
8 do do do GPM ON
9 PRECIPITATES METAL/TONS AS PRODUCED
9 do do WEIGHT do do
10 SLAG METAL – do do
11 BULLION do do do
12 MID ORE LEACH LIQUOR METAL/GPM ON DEMAND
MATERIL BALANCE
TOMBSTONE EXPLORATION INC.
TOMBSTON DEVELOPMENT CO
PRELIMINARY
9/14/81

George Roeveare (10-5-21)

MEMORANDUM: Paul Tourney October 5, 1981

Re: Tombstone Project

	Date of Assay	
Barren	10-5-81	0.01 to o.03 oz. Ag./T.
Preg.	10-5-81	0.38 to 0.65 oz. Ag./T.

A note on report by Davidson on tonnage:

N. Pit	Positive Ore	2988 Tons @ 1.5 oz. Ag./T.
	Indicated Ore	3,361,000 Tons @ 1.0 oz. Ag./T.
S. Pit	Positive ore	1,200 Tons @ 1.29 oz. Ag./T.
	Indicated Ore	3,525,000 Tons @ 1.0 to 1.2 oz. Ag./T.

The plant was down on account of breakdown at noon. The plant appears to have considerable down time.

The new assayer arrived 10-5-81; has had considerable experience.

Did not get the assays from Jacobs on C O (heads) and tailing.

The moisture sample taken off the conveyer, September 23, 1981, (where the scale is located) was 4.7 percent by weight.

Through the grape vine from a Phoenix source, 1100 pounds of metal was shipped in July and 400 pounds later to some processing plant in Phoenix. How true this is I don't know.

Enclosed is a list of samples picked up on October 5, 1981. In some cases there are extra samples by the same number--Lot 284, 291, 293.

Geo. Roseveare

GEO. ROSEVEARE,
Metallurgical Consultant

SAMPLES COLLECTED October 5, 1981

Samples

10-2-81	Tailing Pad	9-26-81	C O
10-3-81	" "	9-29-81	C O
9-23-81	C O	9-30-81	C O
9-25-81	C O	10-1-81	C O

Bullion

Lot 251	8-19-81	
" 259	8-20-81	
" 260	8-20-81	
" 261	8-21-81	
" 265	8-21-81	
" 266	8-22-81	
" 267	8-24-81	
" 269	8-22-81	
" 270	8-13-81 - 2 samples	
" 271	No date	
" 272	" "	
" 275	8-4-81	
" 277	8-13-81	
" 278	8-14-81	
" 279	8-14-81	
" 280	8-14-81	
" 281	No date	
" 283	8-14-81	
Lot 284	8-18-81	
" 284	8-20-81	
" 285	8-18-81	
" 286	8-20-81	
" 287	8-25-81	
" 288	8-26-81	
" 289	8-26-81	
" 290	8-31-81	
" 291	9-1-81	
" 291	9-31-81	
" 292	9-1-81	
" 293	No date	
" 293	9-2-81	
" 294	9-7-81	
" 295	9-7-81	
" 296	9-7-81	
" 284	8-18-81	
" 306	10-2-81	

Paul M. Turner (10-10-81)

220

PAUL M. TURNEY
REGISTERED PROFESSIONAL ENGINEER
3715 HASH KNIFE
TUCSON, ARIZONA 85715

PHONE (602) 749-3573

October 12, 1981

To: Tombstone Development Company
P. O. Box 1445 - Grand Island, Nebraska 68801

Subject:
Summary of Tombstone Exploration for September, 1981

Appended:
Glossary of Terms
Memo - George Roseveare
Assays
Preliminary Material Balance

Operations by Tombstone Exploration were curtailed during September largely due to crusher repairs.

Samples and assays for Tombstone Development Company were inconclusive but indicate metal recovery may be substantially less than hoped.

Sampling procedures by TEI have, in our opinion, not been normalized and we are attempting to aid them in that respect.

Bullion as produced is apparently high in zinc and possibly copper - we are waiting for assays.

TEI (Dustin Escapule) is sending us his production report from this date on.

We have a large number of samples for assay which will be available during October.

PMT:bj
Encs.

10/13/81

GLOSSARY OF LEASE TERMS

Gross Value/Ton — Net smelter returns divided by tons ore produced and sold (pp 3, item 3, 2nd paragraph).

Net Smelter Returns — Value received from smelter for ore, concentrates or other, less haulage cost from TDC property boundary to smelter.

Value received from concentrates, bullion, ore or other paid for on the property.

Processing Cost — Charge incurred by TEI for processing or otherwise producing a marketable product.

Processing — The preparation of mined ore by milling, leaching, crushing screening, or other to produce a marketable product.

Processing Fee — TEI deducts 10% to a maximum of $15/ton from the gross value of the ore that is processed.

Mid-Ore (Protore)* — Material that cannot be economically processed or shipped (at present ½ - 1.0 oz silver).

Waste* — Material at present less than ½ oz silver.

Ore* — Material containing +1.0 oz silver.

* = Classifications may vary with metal prices and economics.

Royalty payable to TDC — Marketable bullion (gold & silver) or other material produced each month by TEI divided by dry tonnage of leach ore delivered to the crusher per month - times average monthly value of silver and gold (H & H Index) equals average monthly gross value per ton of bullion produced. This value less 10% to a maximum of $15/ton equals the average value of the bullion produced per month that is subject to TDC Royalty which is:

0 - 15	5%
15 - 20	6%
20 - 25	8%
25 - 40	9%
40 - 80	10%
80 - 100	12%
100 - 150	15%
150 - +	20%

In the case of ore shipped to a smelter refinery without processing at plant site -- The average gross value of the ore is the net smelter returns less freight which value then becomes subject to TDC Royalty.

10-12-81
PMT:bj

George Roseveare (10.14.81)

MEMORANDUM: PAUL TOURNEY October 14, 1981

RE: TOMBSTONE PROJECT

Pulp samples from the heads to the leach pads, taken daily and assayed, were cut and delivered to me by T.E.I. The cut samples were assayed by JACOBS ASSAY OFFICE, and the results are given below:

Date of Assay	Oz. Au/T.	Oz. Ag/T.
9-17/81 - O C	0.012	0.40
9-18-81 - O C	0.011	1.30
9-22-81 - O C	0.013	0.55
9-23-81 - O C	0.010	0.30

The results are very erratic and some are too low to be considered ore.

Geo. V. Roseveare

GEO. ROSEVEARE,
Metallurgical Consultant

122

1433 SOUTH 10TH AVENUE
TUCSON, ARIZONA 85713

Jacobs Assay Office

Registered Assayers

PHONE 622-0813

Tucson, Arizona, 17 Oct. 1981

Sample Submitted by Mr. George Rosaaen

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore*	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
9/19/81	0.012	—	0.40	—				
9/18/81	0.011	—	1.30	—				
9/22/81	0.013	—	0.55	—				
9/23/81	0.010	—	0.30	—				

*Gold Figured @ 100.00 per oz. Troy

Charges $ 30.00

Very respectfully,

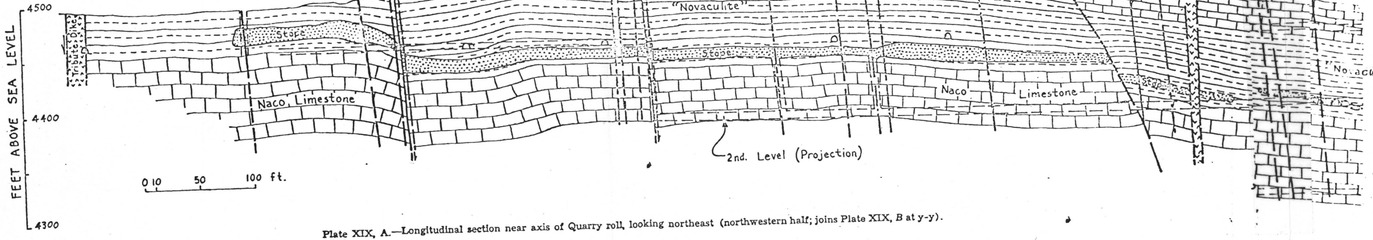


Plate XIX, A.—Longitudinal section near axis of Quarry roll, looking northeast (northwestern half; joins Plate XIX, *B* at y-y).

QUARRY ROLL

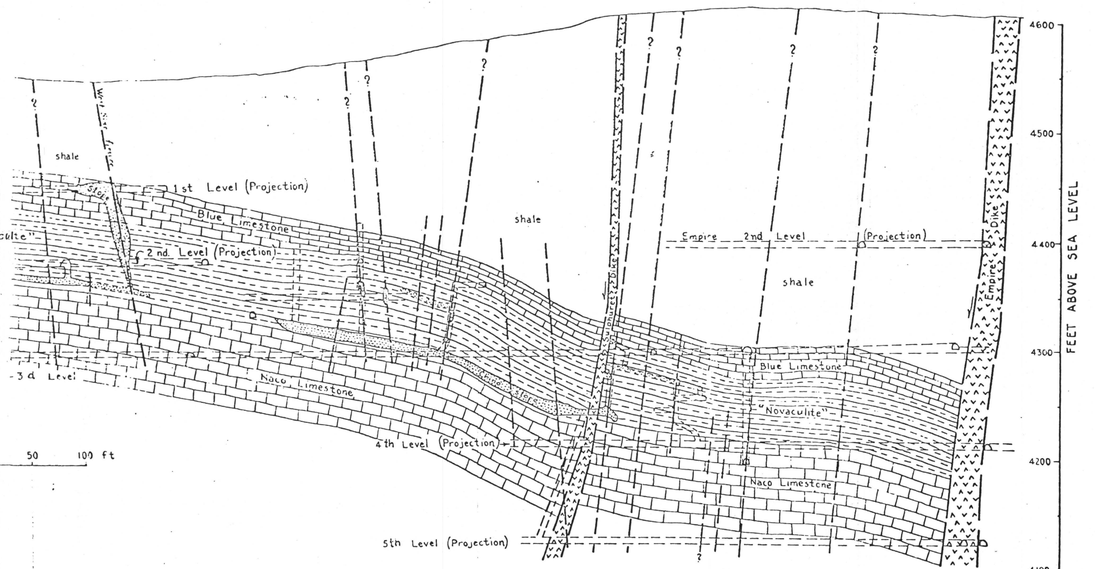


Plate XIX, B.—Longitudinal section near axis of Quarry roll, looking northeast (southeastern half; joins Plate XIX, *A* at y-y).