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TOMBSTONE

HEWLETT MANAGEMENT

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TOMBSTONE

Tombstone represents an opportunity to produce precious metals with a minimum capital investment. This is due to the following:

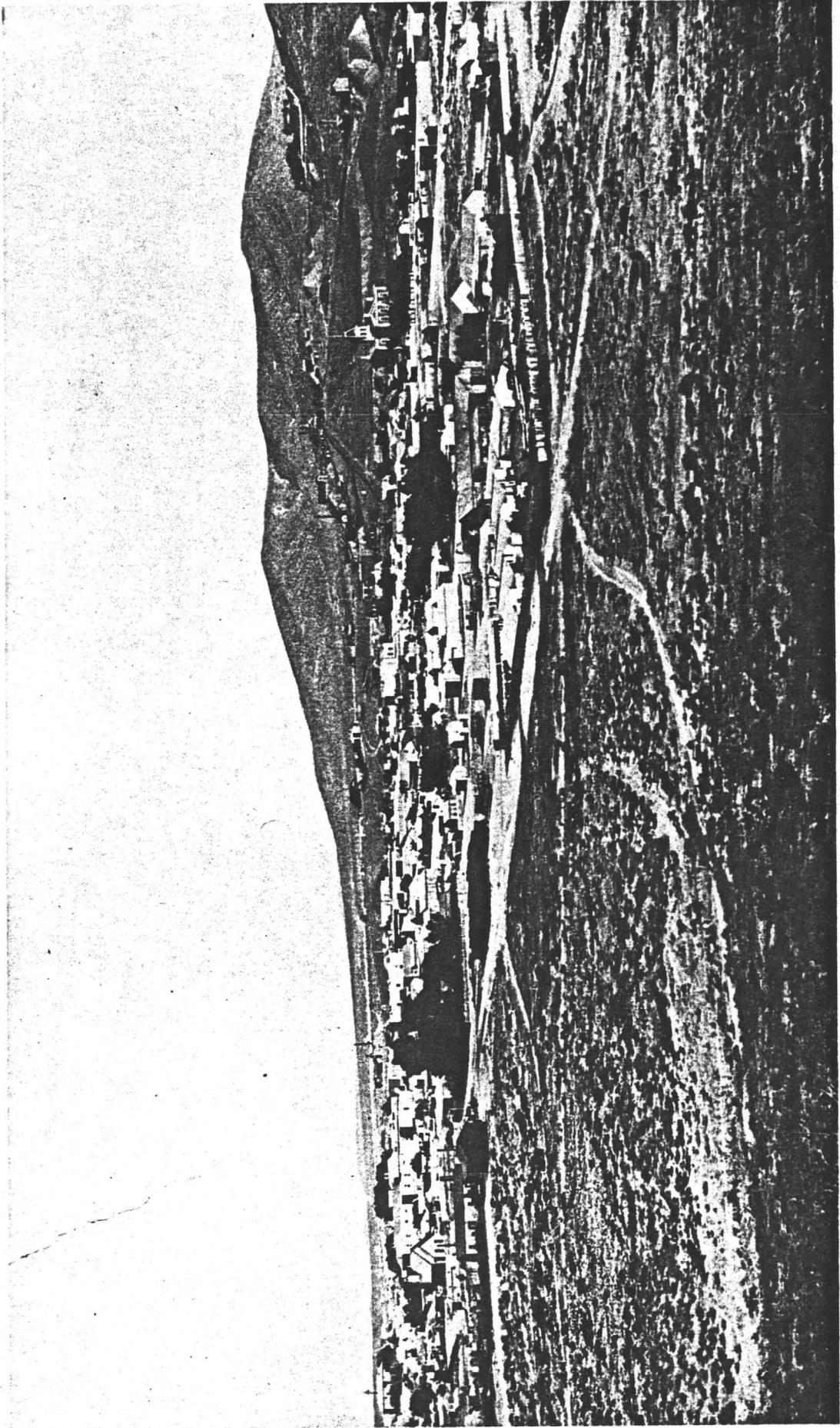
1. Extensive previous sampling;
 - A. Surface drilling
 - B. Underground drilling
 - C. Underground sampling
2. An existing heap of one-million tons that can be re-processed utilizing recent "heap leaching innovations"
3. Proven open-pit ore targets for development of open-pit ore reserves.

Potentials are estimated as follows:

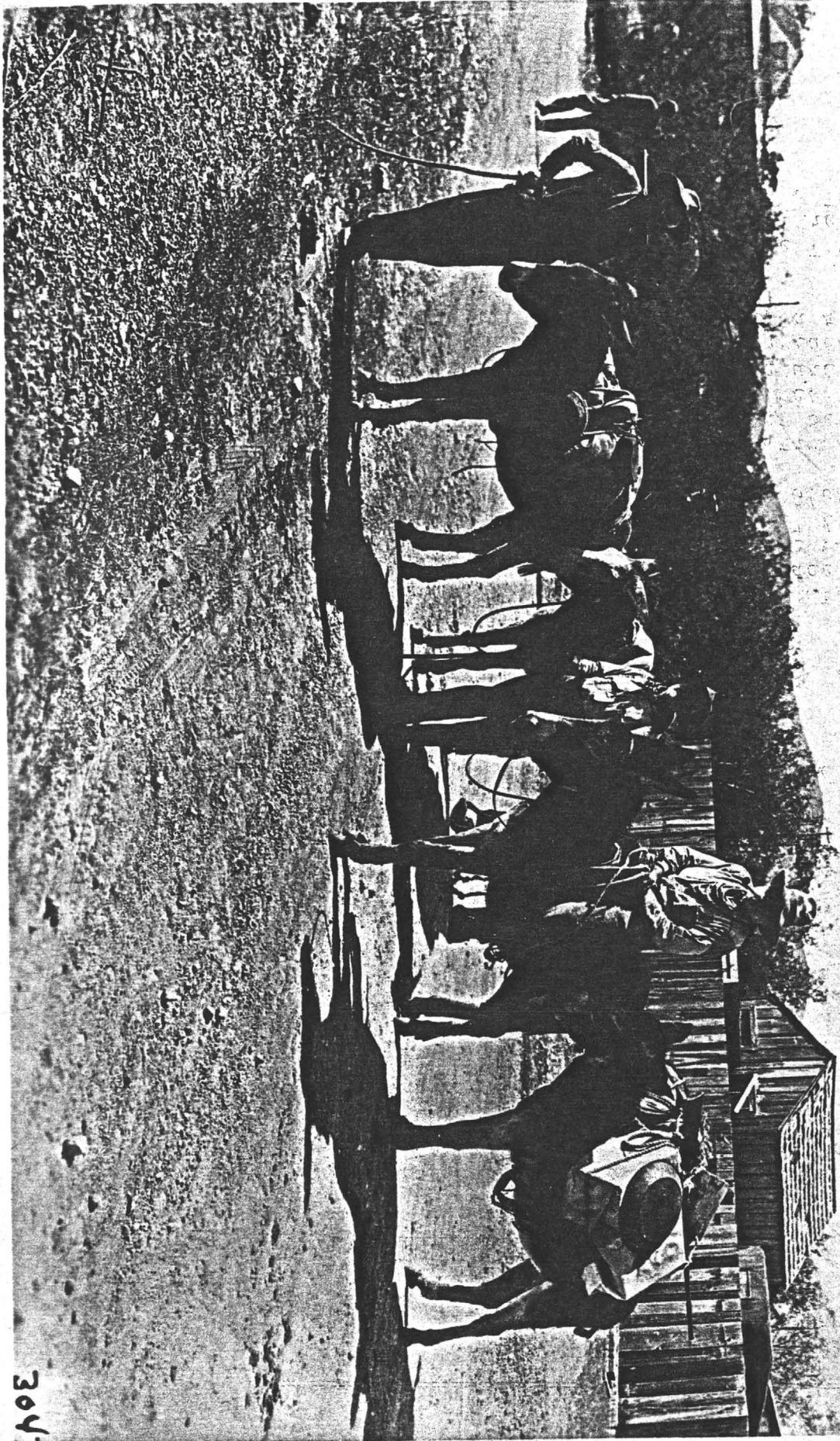
<u>Activity</u>	<u>Net Operating Profit</u>
Heap re-processing	\$ 3,250,000
Open Pit; Gob	18,821,000
"New Ore"	133,480,000
Underground	100,000,000

The most important fact to recognize is that due to the authors knowledge of the Tombstone District and heap leaching, the following activity sequence is possible:

- A. Initiate re-processing of heap
- B. Heap leaching profit finances;
 1. Continued heap leaching to net over \$3,000,000 in one year
 2. Exploration/development of open pit ore for heap leaching over three years (based on results-feasibility)
 3. Exploration of underground.



TOMBSTONE (1880's)



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TOMBSTONE

Tombstone, Arizona is in south-east Arizona in Cochise County, about 75 miles from Tucson. Following are a summary of past production and a discussion concerning the potential of the Tombstone Mining District.

DISCOVERY

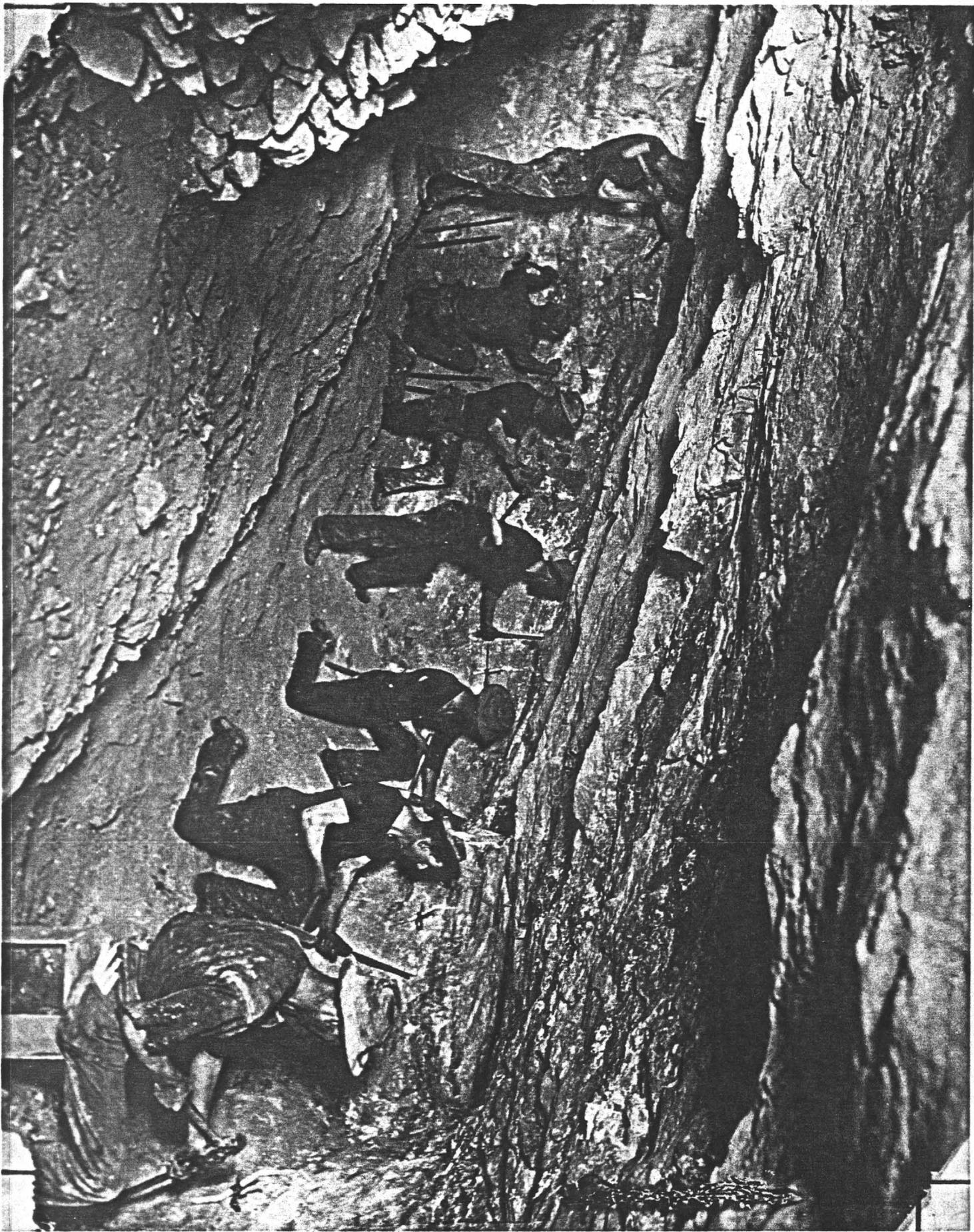
In 1877, Ed Schieffelin left Camp Huachuca and went prospecting in the area east of the San Pedro River. He was warned against the Apaches by "All you'll ever find in those hills, Ed, is going to be your tombstone." An unusual rock formation attracted his attention, and he took some samples to his brother, Al, at the Signal Mine. Dick Gird assayed his samples, and the three formed a partnership. The town was named after the warning made to Ed Schieffelin. The initial discovery by Schieffelin is unknown, but he later discovered and staked the Lucky Cuss. Soon the discovery was known and prospectors poured into Tombstone.

EARLY MINING

Outcropping ledges and fissures of high-grade ore made early mining easy, because the development could basically be done in ore. All original mines were developed by sinking on outcropping ore; the Goodenough Incline is an excellent example of early mining. Large tonnages of high-grade ore was mined on the surface from the apexes of anticlinal structures that predominate in the vicinity of the Toughnut Mine. Also, the "Million Dollar Stope" is on the south side of town, which has caved and remains as a "Glory Hole".

Subsequent mining was concentrated on the anticline structures which generally plunge easterly, fissures, replacement beds and veins, and along the contacts of the near vertical dikes that strike north-south through the district. These structures were pursued down to the water table and laterally for considerable distances. Many unknown structures were disclosed as a result, and blind ore bodies discovered and mined.

Photo on the next page shows underground mining in the Tombstone District in 1904. Notice that the mining is in a preferential limestone horizon; this is typical of the Goodenough and Toughnut mines.



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PRODUCTION

Early production is difficult to determine because of the following:

1. Mines that shipped directly to the numerous custom mills that operated in the Tombstone District kept no records.
2. High-grade ore was not milled locally but sent directly to the smelter (common of the plus 80 ounce silver).
3. Early mines with their own mills kept poor records.
4. Portions of mines were leased and very poor records were kept by the lessors.
5. Price fluctuations made production records kept in dollars difficult to relate back to the ore grades.
6. Smelters would cheat the miners by reporting lower grades and commonly not pay (or report) for the gold content.
7. "High-grading" was practiced which reduced the grade.

It is reported that 1,635,639 tons of ore was mined. The computed grades were as follows:

Average Silver grade = 20.67 t.oz./ton

Average Gold grade = .133 t.oz./ton

The yearly production is shown on the following page (table 1).

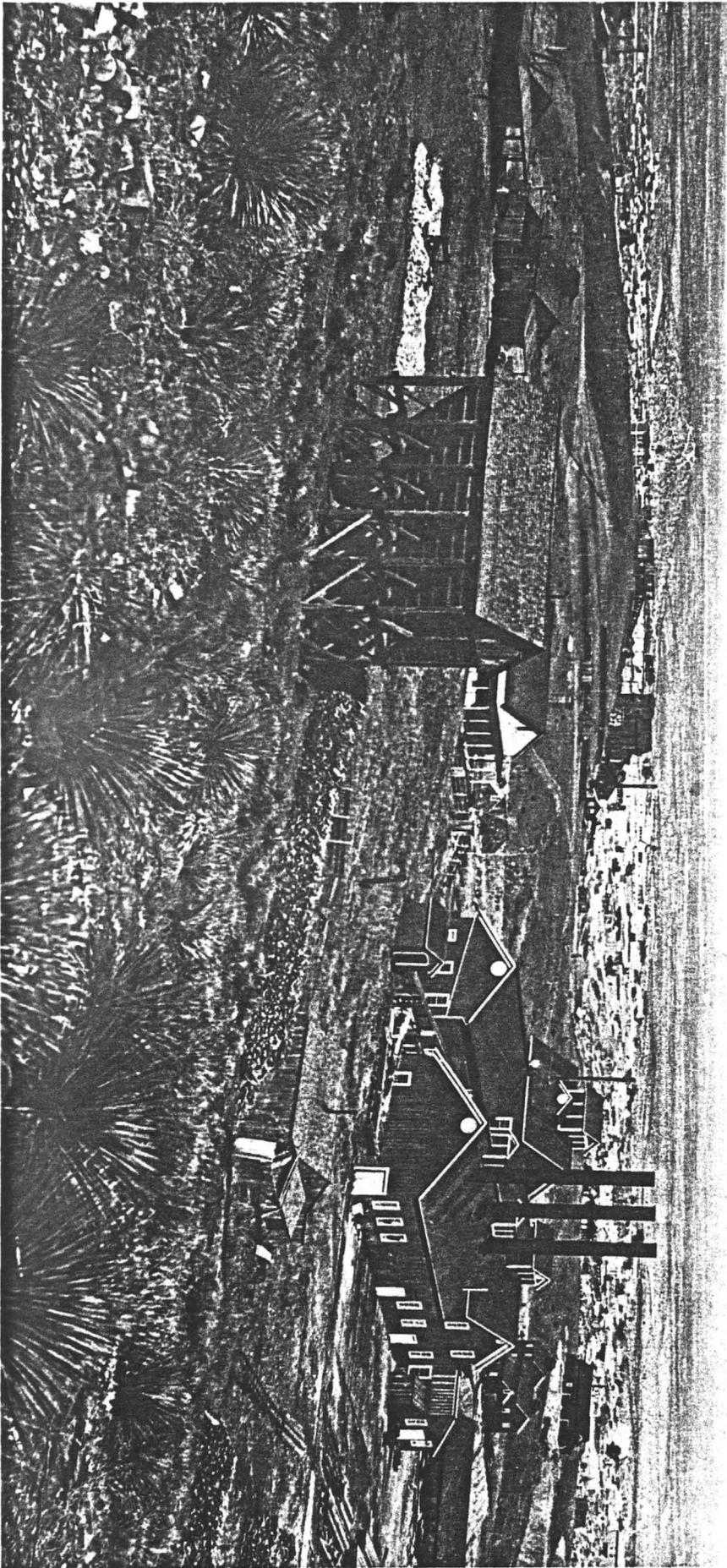
The actual value of the Tombstone production at today's prices are:

Actual Tombstone Production = \$ 38 million

Present Value of Production = \$225 million

Dr. C. J. Sarle reports the Tombstone production as \$ 79 million. In any event, the production was significant at that period of time.

GRAND CENTRAL MILL (1884)



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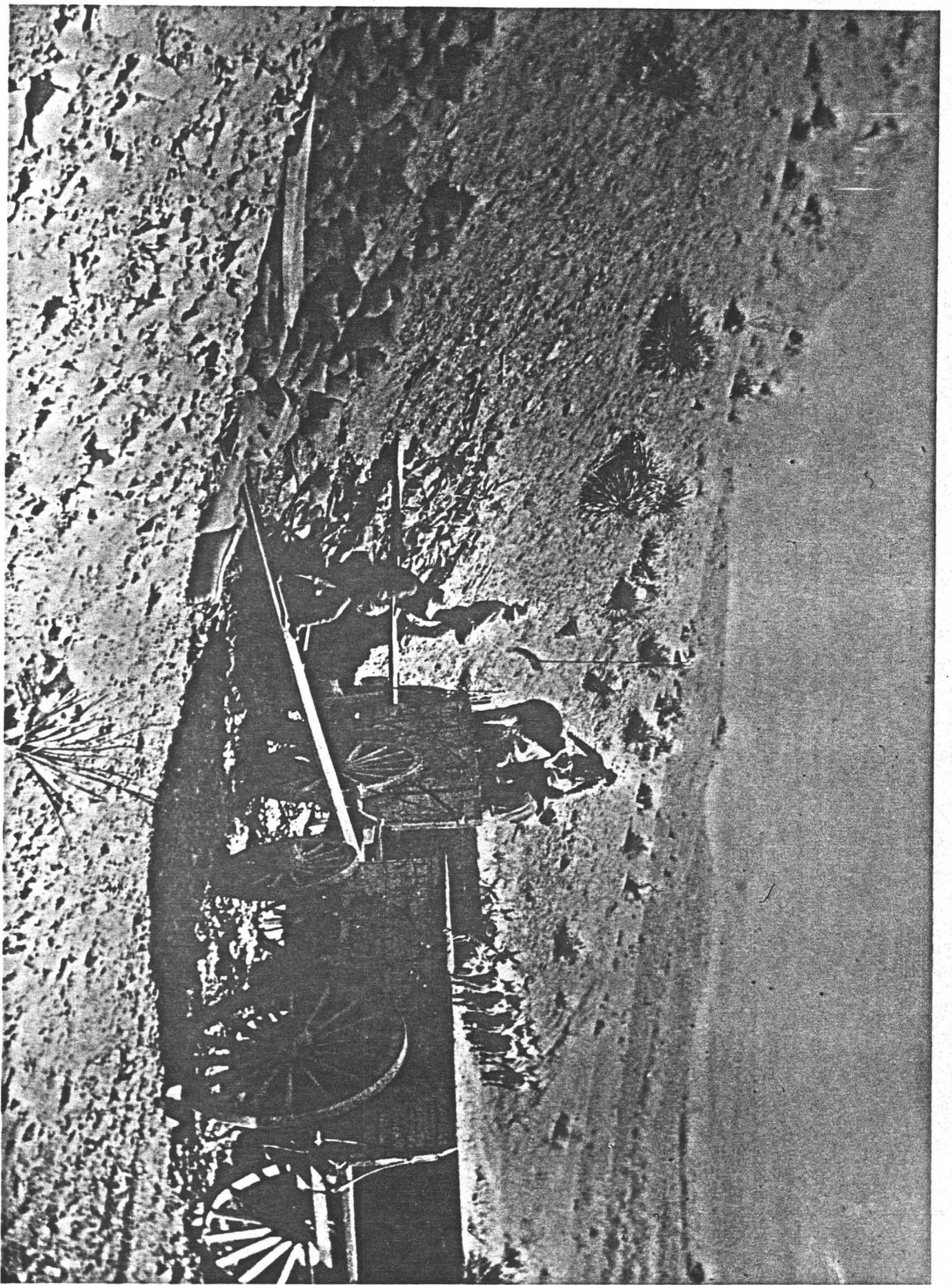
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Table 1.
TOMBSTONE PRODUCTION

<u>Year(s)</u>	<u>Tonnage</u>	<u>Au Heads</u>	<u>Ag Heads</u>
1879-1880	55,567	.094	34.00
81	128,452	.072	43.00
82	131,296	.075	34.00
83	75,249	.125	34.00
84	33,582	.262	34.00
85	31,736	.286	34.00
86	25,885	.333	34.00
87	14,500	.383	34.12
88	14,511	.453	34.00
89	5,512	.548	34.00
90	13,537	.416	34.00
91	15,362	.479	34.00
92	13,573	.315	34.00
93	14,127	.258	34.00
94	11,213	.258	34.00
95	11,213	.258	34.00
96	11,213	.258	34.00
1897-1901	135,608	.114	15.00
1902-1906	224,602	.114	15.00
07	48,444	.114	15.00
08	51,266	.080	6.97
09	27,123	.084	7.44
1910-1920	232,219	.090	12.11
1921-1930	266,330	.090	10.32
1931-1936	53,619	.269	17.47
	1,635,639	.133	20.67



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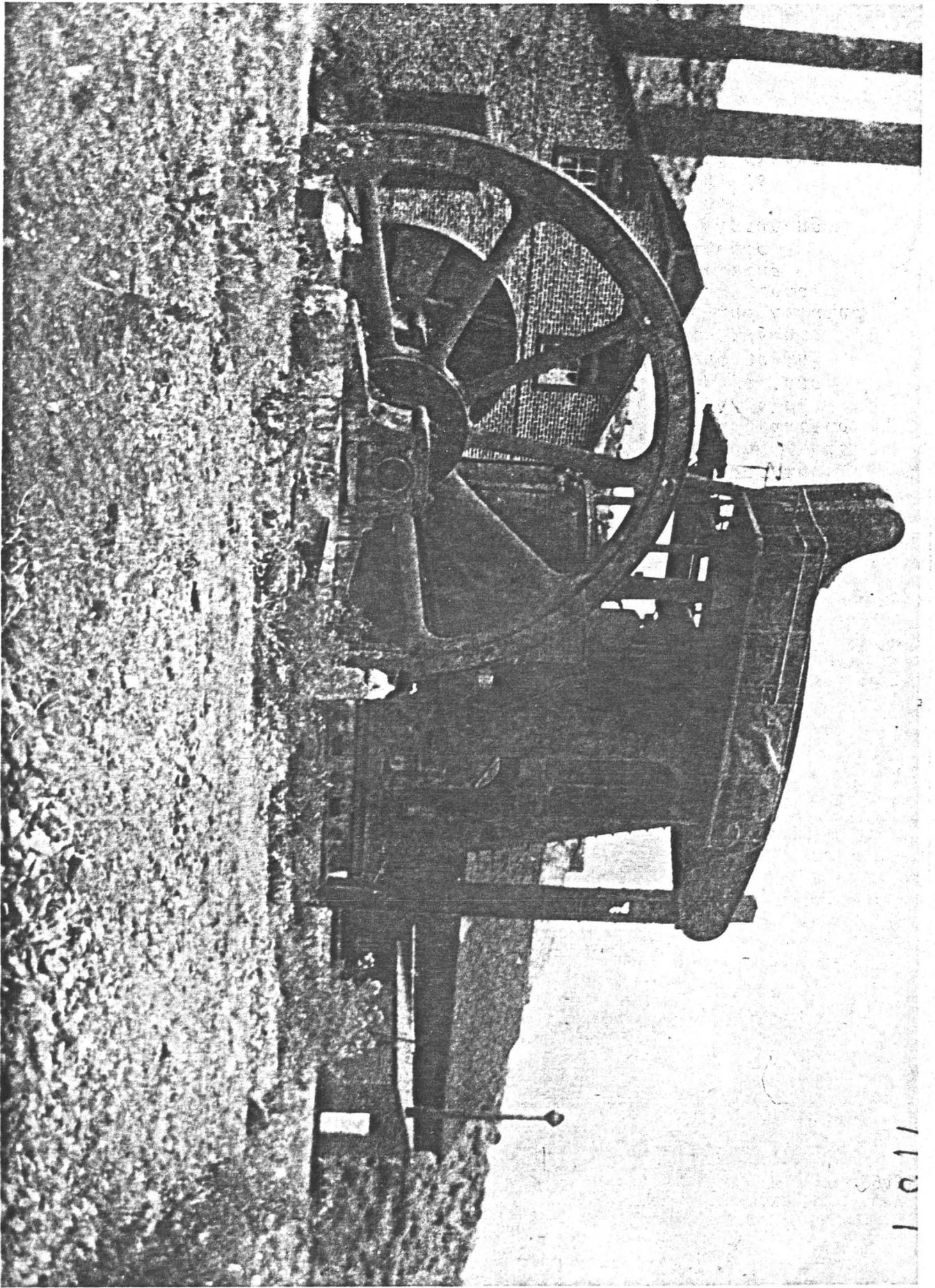
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Following are the production by mine:

<u>Mine</u>	<u>Date</u>	<u>Tons</u>	<u>Au</u>	<u>Ag</u>
Northwest	July '89 to '90	274	.141	87.1
"	June '90 to '91	458	.215	67.1
"	June '91 to '92	1,413	.35	87.8
"	June '92 to '93	1,427	.18	87.1
Toughnut	June '91 to '92	1,102	.55	88.5
"	June '92 to '93	2,096	.61	55.5
"	Apr. '20 to '25	5,203	.17	27.45
Empire	Apr. '20 to '23	159	.240	13.48
Tranquility	Apr. '20 to '23	1,978	.320	22.46
Silver Thread	Apr. '20 to '23	4,738	.270	25.47
"				
West Side	Apr. '88 to '89	632	1.794	84.40
"	Apr. '20 to '25	1,238	.560	38.58
West Side-Sulphuret	June '90 to '91	1,105	1.380	73.30
"	June '91 to '92	1,490	1.130	66.50
"	June '92 to '93	1,184	.82	48.60
Sulphuret	Apr. '89 to '90	500	1.931	84.80
Contention	Apr. '20 to '23	3,639	.198	13.57
Head Center	Apr. '20 to '23	1,738	.200	14.50
Grand Central	Apr. '20 to '23	1,438	.140	13.75
Lucky Cuss	Apr. '88 to '89	3,253	.576	41.10
"	Apr. '89 to '90	2,488	.466	44.60
"	June '90 to '91	2,271	.740	54.90
"	June '91 to '92	2,684	.460	43.60
"	June '92 to '93	3,729	.110	25.20
"	Apr. '20 to '21	5,560	.056	16.92
Oregon	Apr. '20 to '21	3,866	.013	23.00
Promter	Apr. '20 to '21	9,688	.017	16.50
Emerald	Apr. '20 to '21	119	.010	8.00
Bunker Hill	Apr. '20 to '21	100	.035	15.45



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CLOSING OF THE MINES

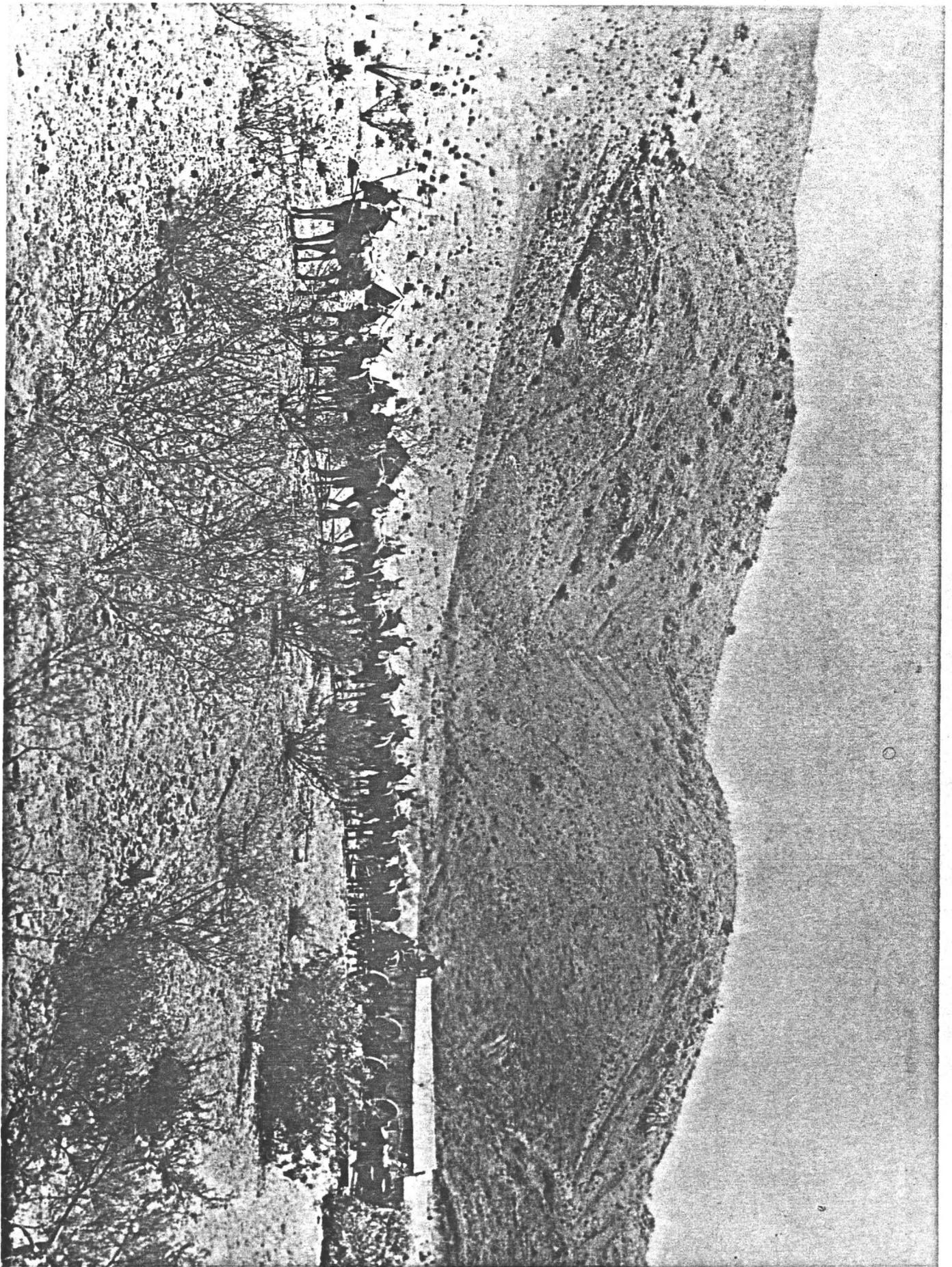
It was generally assumed that the water encountered in the mines was the reason for the closing of the Tombstone mining operations. However, the mines controlled the water level in the Pump Shaft; the mines are all interconnected with the Pump Shaft. In fact, I have talked to miners that went as far as Gleason to warn the miners there when the pumps were shut down after the fire in the pump house.

In general, the development of new ore was overlooked when the Bonanza ores were being mined. Also, leasers would "rob pillars" and in general leave the workings in an unsafe condition. When development costs were then related with lower-grade ores, uncertainty would exist concerning the economics of further underground development away from the main workings and this was further complicated by lower gold and silver prices; silver was under \$1.25/t.ounce.

Financing of the operations contributed to the complexity; when no working capital was available from an operation, it would take time to make additional financial arrangements. When the pump house burnt down and new Cornish pumps were required (see opposite page), it would have to take over one year to bring them "around the Horn". Then, when the mines flooded and the price of noble metals was still very low, all groups gave up and the mines remained closed.

GEOLOGICAL HISTORY

Quartz latite porphyry (Uncle Sam Porphyry) intruded the Naco and Bisbee limestone, shale, chert, sandstone, and quartzite formations. These sedimentary formations had previously been folded and faulted by tectonic activity, causing some doming. Along these zones of weakness the intrusives followed, including andesite porphyry and rhyolite porphyry dikes. Then a series of steeply dipping north-northeast fissures developed, perhaps due to the final intrusion of Schieffelin granodiorite. Subsequent to this episode and related to magmatic segregation of gold, silver, copper, manganese, lead, zinc, and other minerals was the migration of the mineralizing solutions along the various faults, fissures, joints, breccia zones, and open bedding planes until exsolution occurred producing the mineralized structures observed in the district. Every structure occurring within the structurally induced syncline is mineralized at some point and some throughout their entire extent.



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STRUCTURES AND HOST ROCKS

The most productive ore deposits in the Tombstone District exhibit a preferential order of priority to structures and host rocks.

Of highest priority are the porous or broken limestone capped by shale or other impermeable units.

Following are the relationships of structures and host rocks in order of their importance on productive mineralization:

Northeast fissures

North-south dike fissures

Other faults

Anticlines and rolls

MINERALIZING
STRUCTURES

HOST ROCK

Fault breccia & gouge

Blue limestone

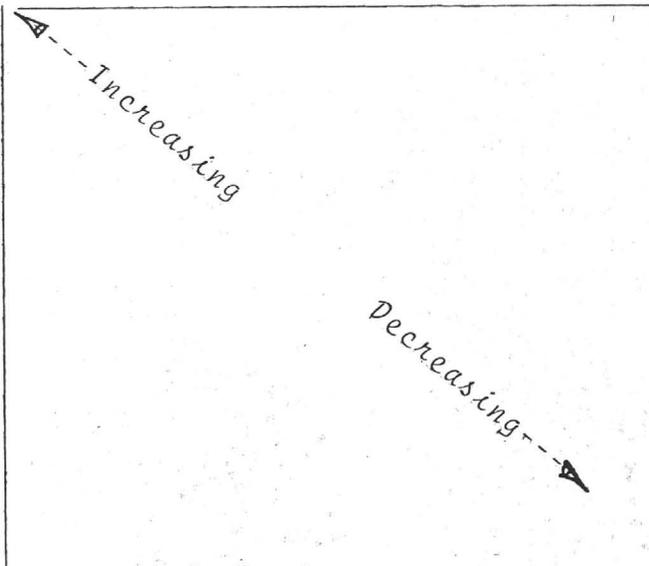
Novaculite

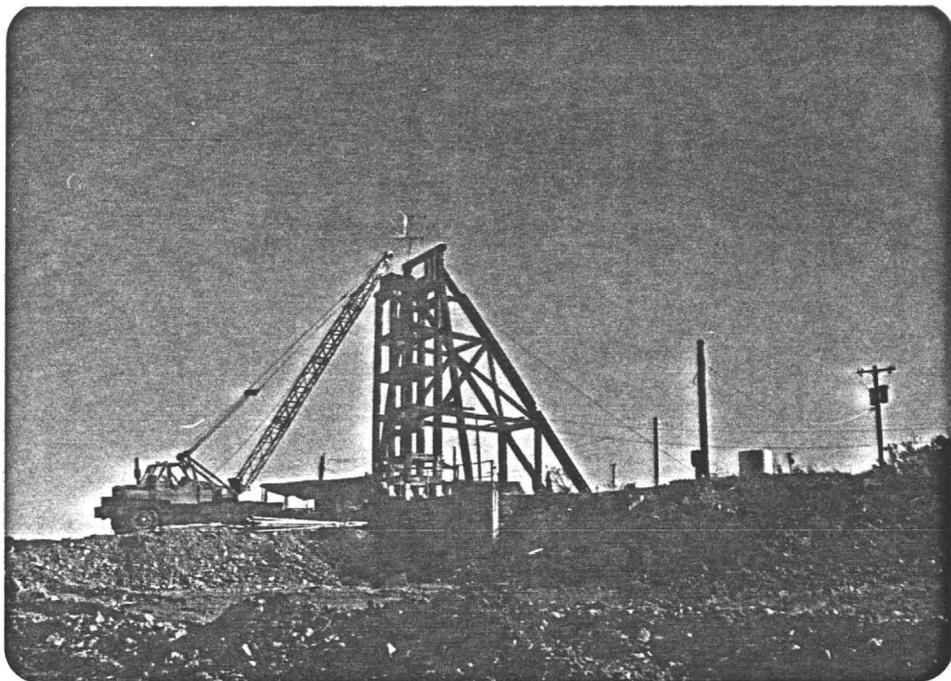
10'/6' limestone

Bisbee shales/ss.

Naco limestone

Dike material





WEST SIDE MINE: Source of water for 5 year heap leaching operation. Crane being used to lower submersible pump after repairs to the lagging in the shaft. When problems would come up, the City was very nice and would always allow us to use City water.

The author and others were underground a great deal, especially when we were leaching underground, and noted over the years that the water level changed only about 5-10 feet (lowered) by pumping at about 100 GPM.

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WATER TABLE

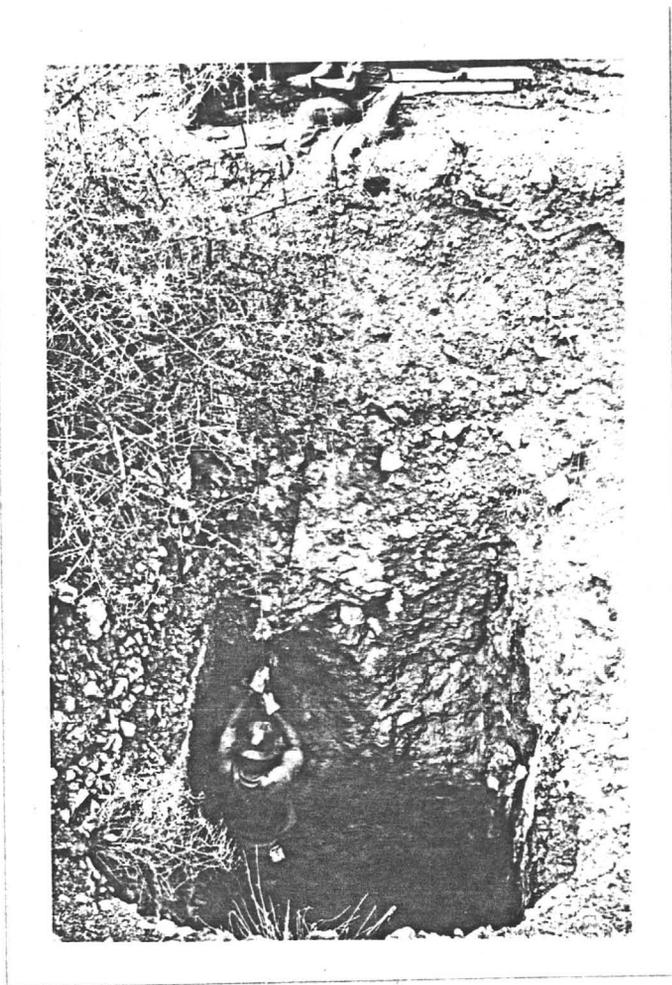
The water table at present is approximately 4115 feet above sea level or about 500 feet below the surface. It was known that the gold-silver values continued undiminished for short distances below the water table and there is good evidence that the values continue into the sulfide zone many hundreds of feet in depth below the water table. In general, the water table has not changed very much from the level during mineralization.

In an effort to exploit the ore under the water table, numerous attempts were made to dewater the Tombstone mines. All attempts seemed destined for failure because only temporary success resulted due to political hassles, carelessness, mechanical failures and caving ground forced the suspension of pumping. As was mentioned previously, the Pump shaft was sank to the 1,000 foot level and the water level was controlled for a short period of time.

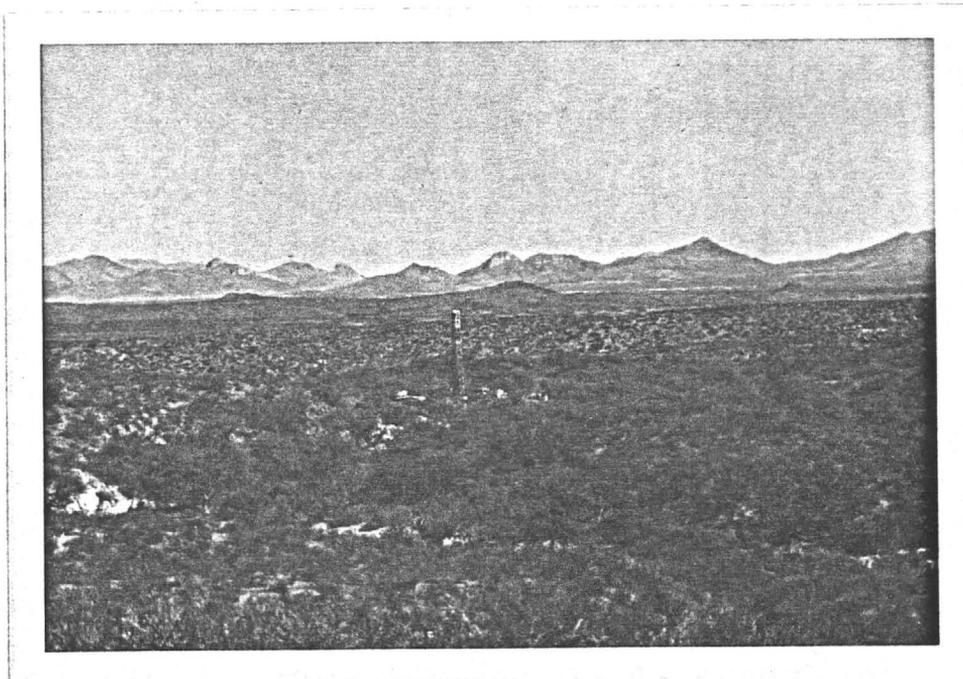
During the period of de-watering, it was proven that the ore continues downward wherever it has been pursued. In the Contention, Grand Central, Luck Sure, Emerald, West Side, and Silver Thread mines it was found that the ore not only continues below the water table, but that the gold and silver increases in grade, especially the gold. In addition, good values in lead, zinc, and mangnaese sulfides are increasing in value. This is also shown by deep diamond drill-holes.

The initial de-watering was accomplished at a rate of 4500 GPM to keep the 1000 foot level dry, and a steady gain was made to de-water the Tombstone Basin. About 2100 GPM would de-water to the 800 foot level. With modern pumps, the cost of de-watering would not be very expensive.

The water underground is not fit to drink due to the town of Tombstone dumping their sewage into old mine shafts. This was an advantage when the author needed water for a recent heap-leaching operation and leached underground because the author pointed out that the water was already contaminated. However, if water would be sold, as to Tucson, a treatment plant would be necessary; a treatment plant would be required for Tombstone water for consumption at Tucson. The author has looked into the possibility of selling underground Tombstone water to Tucson, and it is now possible with the twp-year old decision that water can be transported from one basin to another basin. The City of Tucson have said they were interested in the water, and would buy it at Tombstone; Tucson would pay for transporting the water and a treatment plant.



Famous underground team of Spear and Walker investigating the Ground Hog shaft. This team has been in most of the underground workings in the District.



ASARCO drilling near Robbers Roost for porphyry copper mineralization.

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PREVIOUS EXPLORATION

Maps made during the early mining period may still be available to some extent. The author has seen a number of them, and it would be easy to acquire (or copy) any available maps if a project were initiated. The author has been offered the opportunity to copy numerous maps, but at the time it was not necessary.

The earliest exploration was conducted by Eagle Pitcher (in the 30's). The author has been told that the data can be copied, but also (by Eagle Pitcher) that they got very poor core recovery due to their drilling method, and if they wanted drill-data from Tombstone, they would re-drill the same locations.

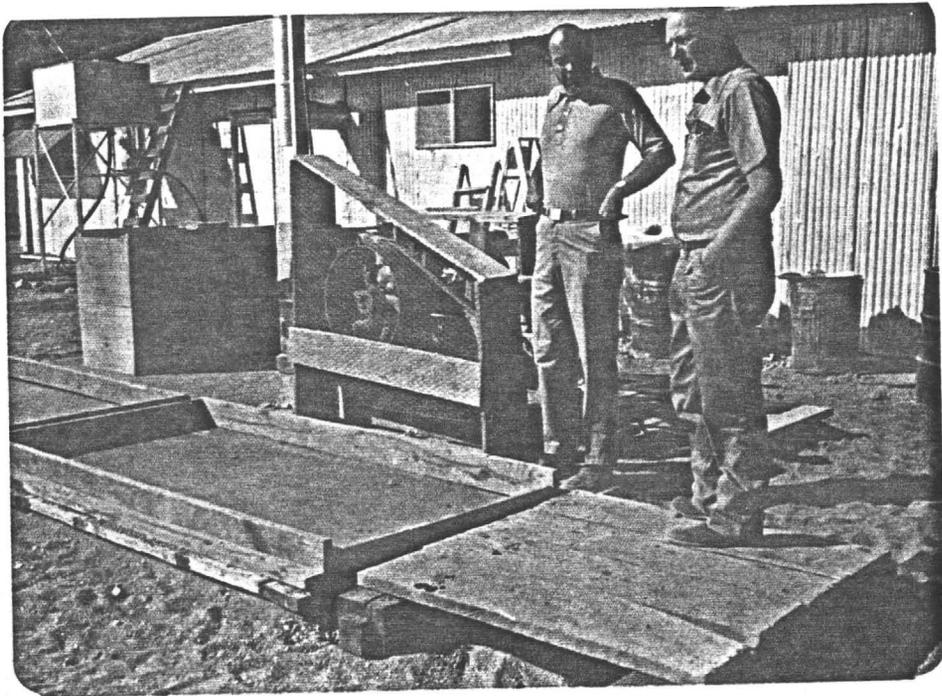
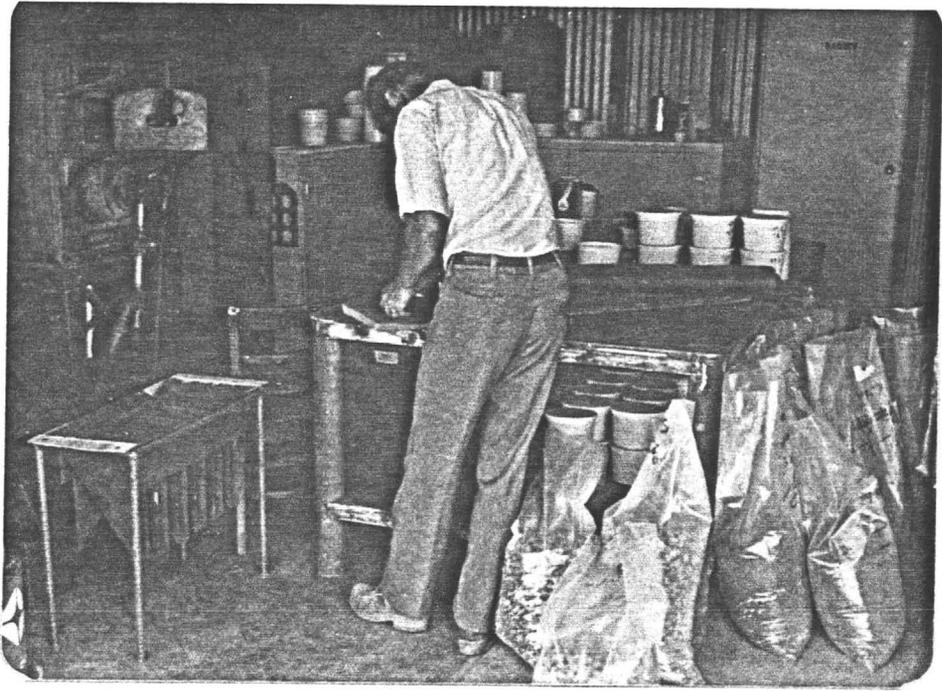
Newmont spent a great deal of money on surface drilling (core) and underground development. Much of their data is in Appendix A. Also, their core is in the core shed by the Empire mine. The author had it re-boxed where necessary and stacked in sequence; the roof was also patched and made water tight. The most interesting drill holes were #7 and #9. Data not included in this report could possibly be obtained from one of the Nebraska "farmer" owners. Bill Hight's address is as follows:

Mr. William Hight
1824 North Broadwell
Grand Island,
Nebraska (68801)

When Newmont began exploration/development in Tombstone, they formed a company, the Tombstone Development Company. After Fred Searles died, Newmont dropped their precious metal projects (Tombstone and Goldfield) and sold the company to Bill Hight and various other friends of Bill's (Frank Gallup, John Nefelt, etc.). They leased it to 71 Minerals. Height, et. al., paid \$160,000 for the 90 odd claims, most of which are patented. They would have taken an end-price of \$250,000 at the time of the 71 Mineral lease, but I could not convince my two partners to add that to the lease. As it turned out, Hight, et. al., were paid more than \$250,000 in royalties.

Duval spent a short time in Tombstone. Their data is included in the Appendix.

ASARCO drilled at least three deep holes in the breccia pipe area north of the Charleston Lead Mine. The holes were between 4-5,000 feet deep and intersected weak copper mineralization.



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RECENT ACTIVITIES

71 Minerals was formed by the author to process the dumps at Tombstone. A recent discussion of the operation is found in the back "pocket". Also, the author was very interested to conduct exploration in the whole District, but this activity was restricted by the author's other partners who were only in the limited partnership business and not familiar with mining. However, as a result, considerable knowledge was gleaned with the limited exploration conducted by the author and some very prestigious geologists.

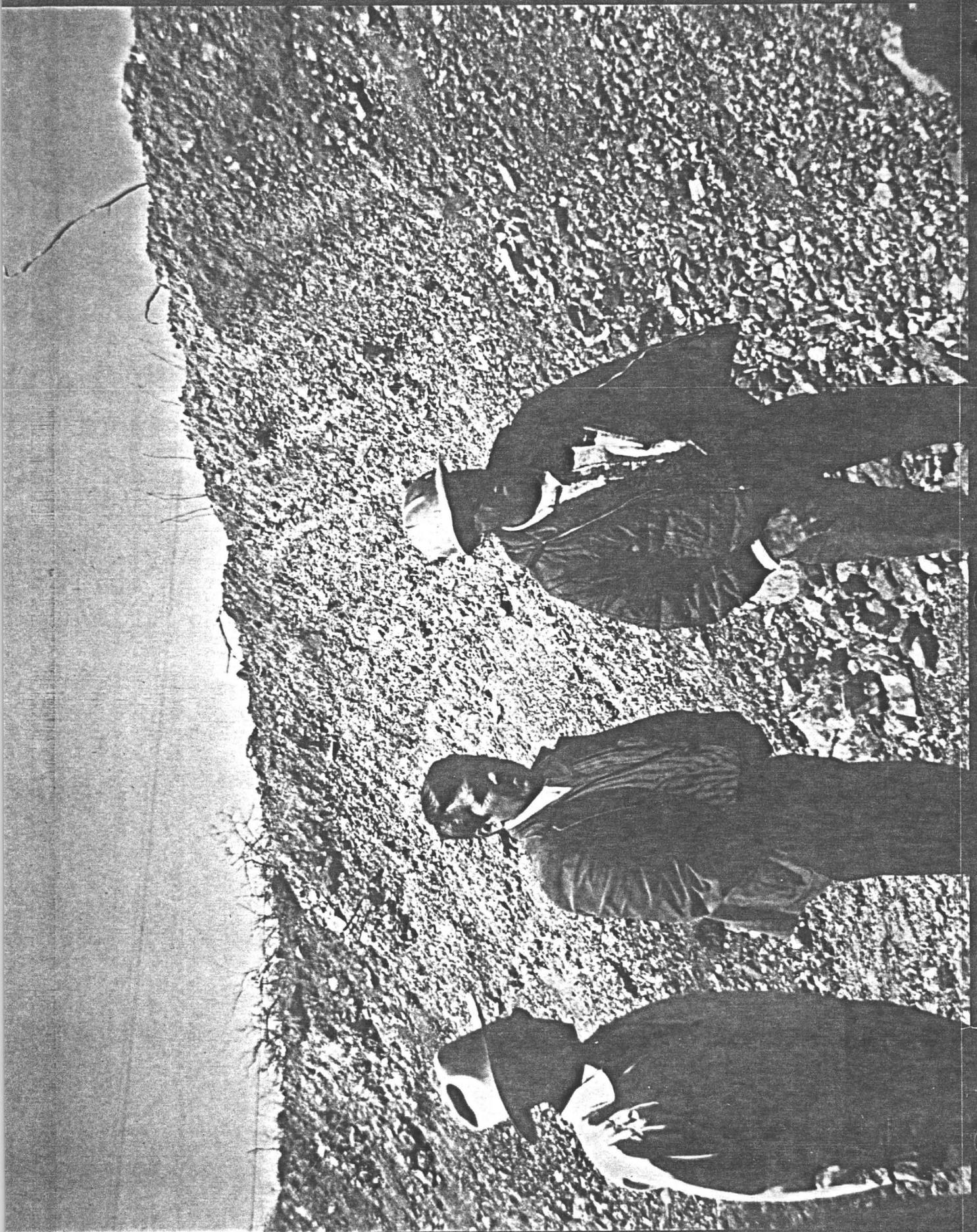
Important exploration conducted by 71 Minerals were as follows:

1. Detailed lithologic, alteration, and structural mapping of the Missy and Fox claims.
2. Underground examination of a large number of workings in the District.
3. Drilling in the Toughnut-Empire-Skip Shaft-Tranquility area (shallow reverse-circulation).
4. Mapping and drilling in the Robbers Roost breccia pipe area on the Charleston road.
5. Mapping and sampling (back-hoe and dozer) of the District as a whole.
6. Drilling and sampling on TMR claims.

Perhaps the greatest advantage of the above exploration is the intimate knowledge gained about the District by Messrs. Briscoe, Spear, and Hewlett. This is to say that "District knowledge" is an exploration factor that is a requisite for successful discovery.

The results of the 71 Minerals exploration will be discussed on an individual mine basis in the future potential section.

Therefore, another asset will be discussed in detail-the heap at Tombstone which can be re-processed.



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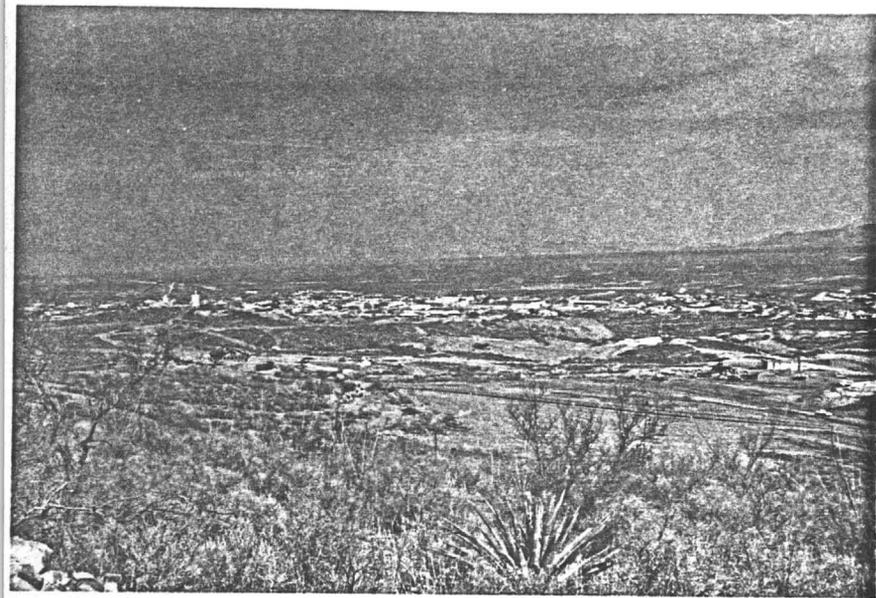
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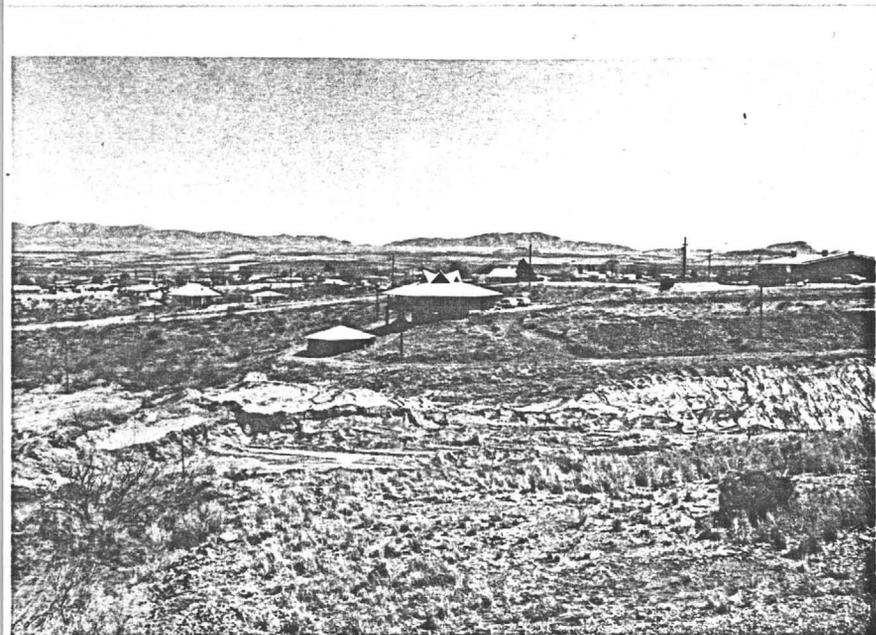
Extensive sampling was conducted on every dump in the District. This was done with back-hoe trenches. Channel samples were taken in intervals not to exceed 20 feet; sample intervals conformed with changes in the nature of the dump material. Screen analyses were made and it was found that even though screening up-graded the ore, it was still economic to take the entire dump with out screening. An analysis of crushing was conducted by the author at the same time, and it was concluded that crushing would about break-even at those lower precious metal prices (compared with present prices), especially because "IPS" had not been developed by the author at that time. Therefore, at that time, crushing liberated a great deal of values, but the fines created reduced the precolation and hence the recovery, losing everything gained by crushing.

TOMBSTONE DUMP ASSAYS

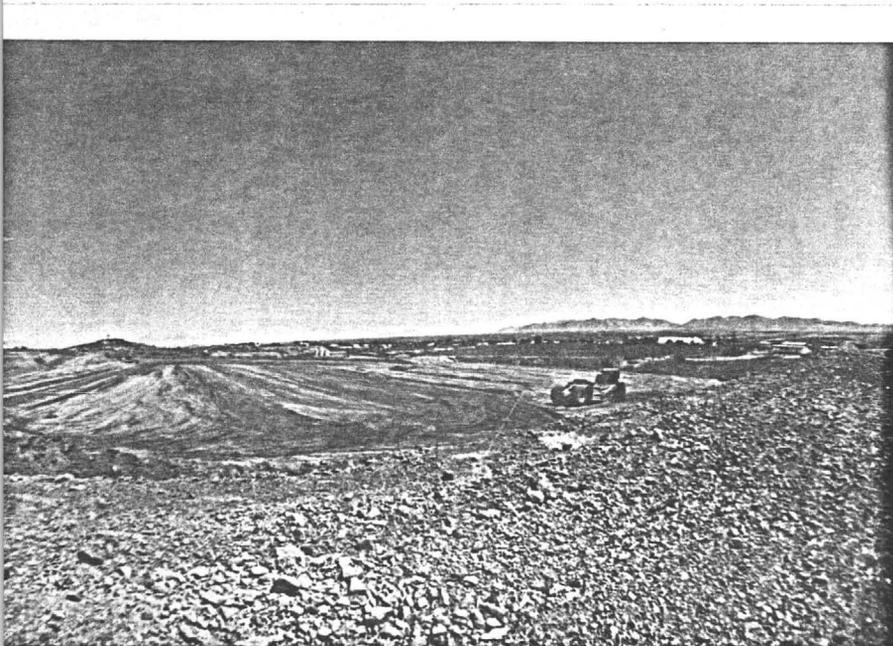
Dump	Tonnage	Au*	Ag*	Pb**	Cu**	Zn**	Mo**	Mn**	* = t.oz./ton
									** = %/ton
Empire	45,000	.044	1.67	.78	.07	-	.015	-	
Tranquility	45,000	.058	1.92	.99	.09	-	.008	-	
Toughnut	50,000	.029	2.82	.50	.05	-	.009	-	
St. of Maine	15,000	.006	3.35	-	-	-	-	-	
Contention	230,000	.051	1.60	.50	.03	.40	.001	-	
Lucky Cuss	55,000	.039	3.35	1.04	.07	.76	.001	-	
Emerald	70,000	.015	3.61	1.12	.28	-	.015	-	
Herschel	13,185	.025	3.17	.30	.07	-	-	-	
Ingersol	14,646	.041	4.01	.32	.04	1.44	.001	-	
Old Guard	11,413	.021	2.68	.30	.04	.54	-	.58	
Little Joe	20,000	.051	2.23	.03	.01	.01	.001	-	
Sulphuret	6,000	.043	1.05	.31	.03	.18	.005	-	
Silver Thread	16,000	.030	2.22	.65	.03	-	.006	-	
Bunker Hill	38,000	.021	3.39	1.25	.19	2.00	.005	-	
Boss	5,000	.037	2.39	.46	.09	.45	-	-	
Comet	30,000	.030	1.56	.19	.03	-	.001	-	
Defence	26,000	.025	2.01	.39	.03	1.21	-	-	
Oregon	15,000	.003	4.17	.71	.14	-	-	7.95	
Promter	4,000	.005	3.63	.80	-	-	-	6.90	
Rattlesnake	5,000	.010	2.80	.58	.07	-	-	-	
Silver Plume	25,000	.014	1.03	.21	.03	-	.006	-	
West Side	60,000	.019	1.62	.59	.05	-	.006	-	
Grand Central	100,000	.050	2.05	1.19	.01	.16	.001	-	
Telephone	5,000	.027	1.98	-	-	-	-	-	
Northwest	6,000	.037	1.75	-	-	-	-	-	
	910,244	.037	2.26						



Heap leaching site
south of the town of
TOMBSTONE; notice the
town in the middle
background. Photo
taken from Contention
Mine area.



Tailings site; Girard
tailings. Tombstone
is just north. Hatcher
home in far right.



Pad site; tailings are being
laid down with the blade
leveling into lifts of
about 3 inches and then
the leveled tailings are
watered for obtaining the
maximum compacted density.
This impermeable pad was
approved by the Bureau of
Mines and used for about
five years without problem.

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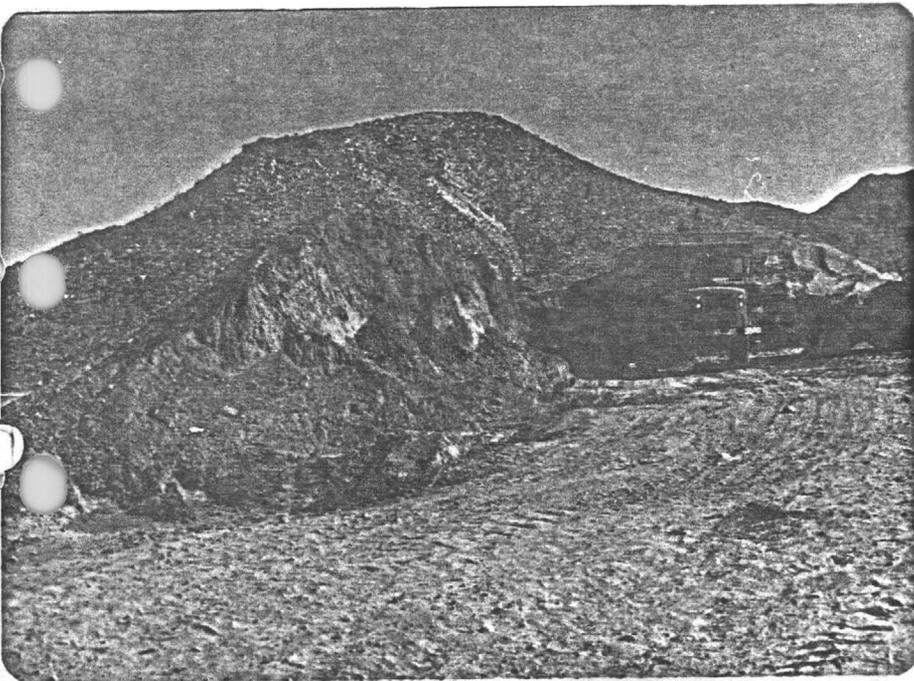
2602 Monte Verde Way
Sparks, Nevada 89431

Having determined the feasibility of heap-leaching the Tombstone dumps, a site was selected south of town that was not in view of the town, but still close enough for power and city water (see photos on opposite page).

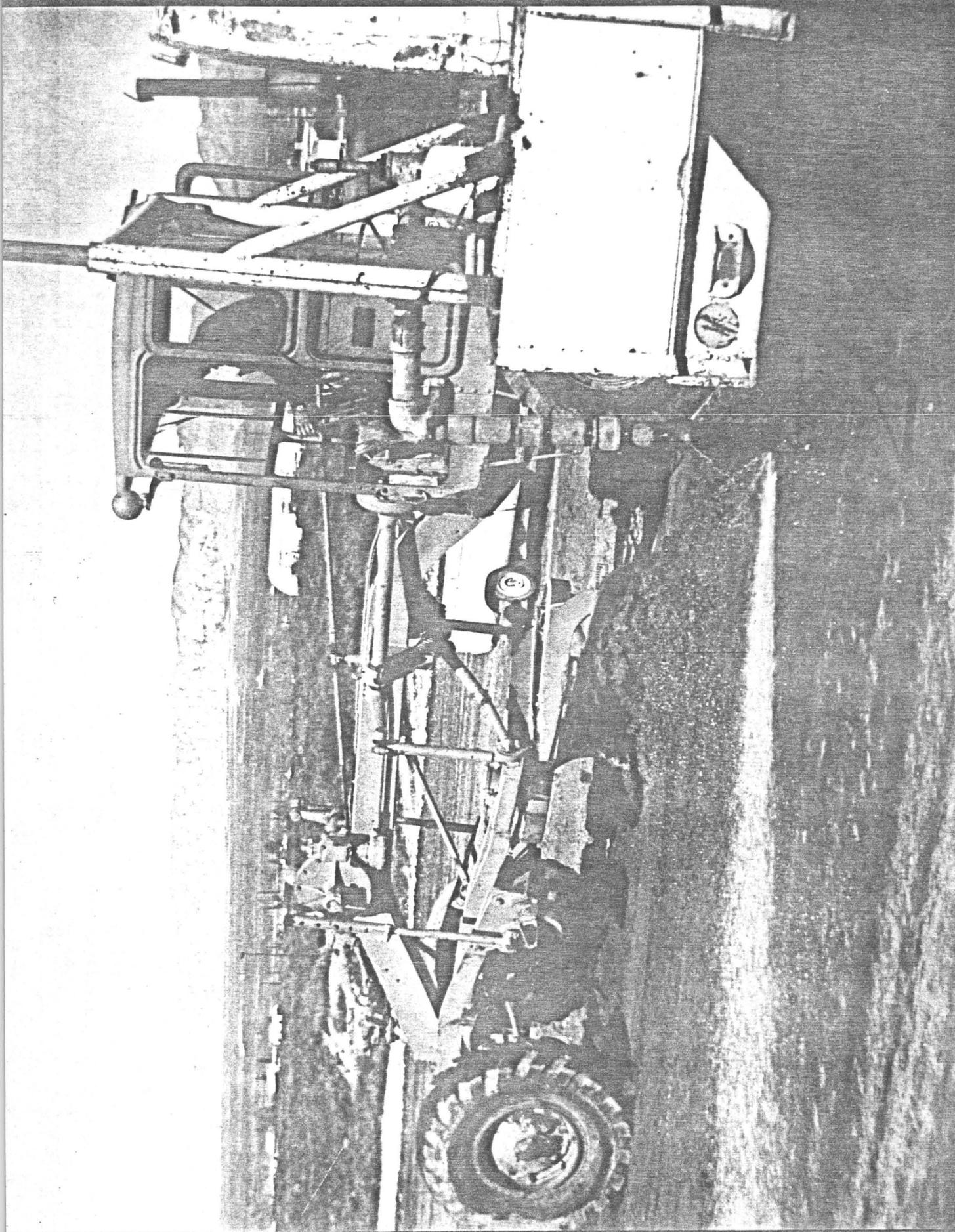
Tailings from the old Girard mill were used for pad material, as well as tailings from the West Side area. As is mentioned on the opposite page (last photo), the pad is still in good condition.

Following are the sequential development of the heap leaching operation.

Dozer pushing and ripping on the Contention dump. This facilitates the loading operation.

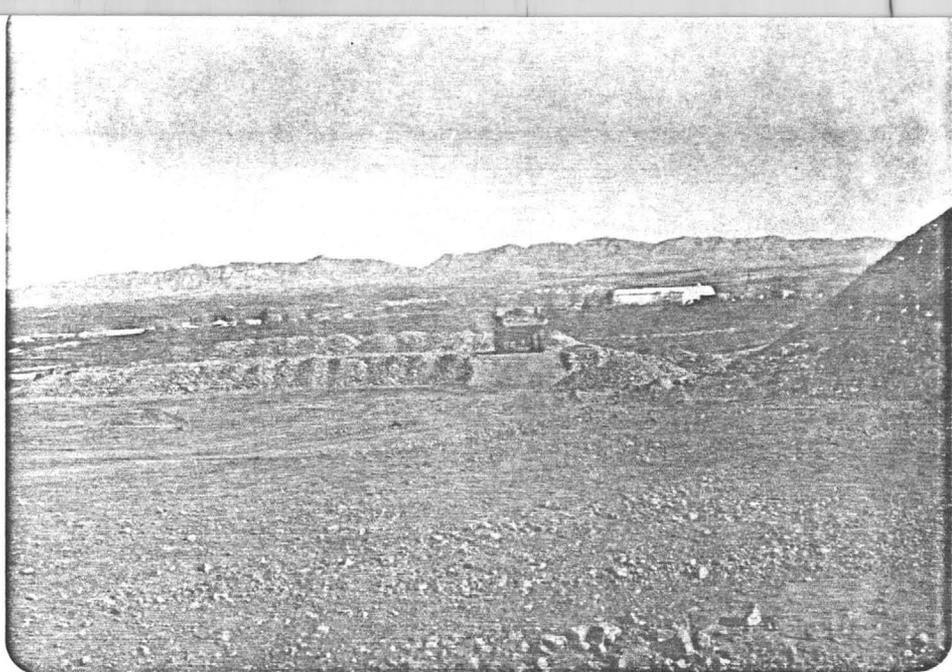


Loading at the Boss dump; Loader is a Cat 988 and Cat 35-ton trucks for haulage.

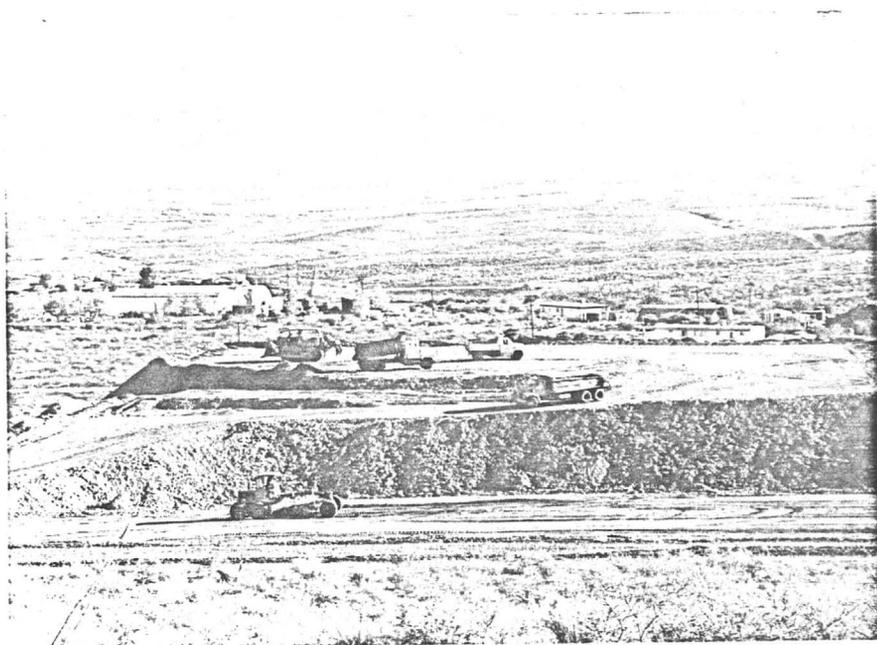


PHOTOGRAPH BY J. J. HARRIS, JR. FOR THE U.S. GEOLOGICAL SURVEY

Early loading of the heap from the Contention dump. Notice in the following photos that the heap will become 100 feet high.

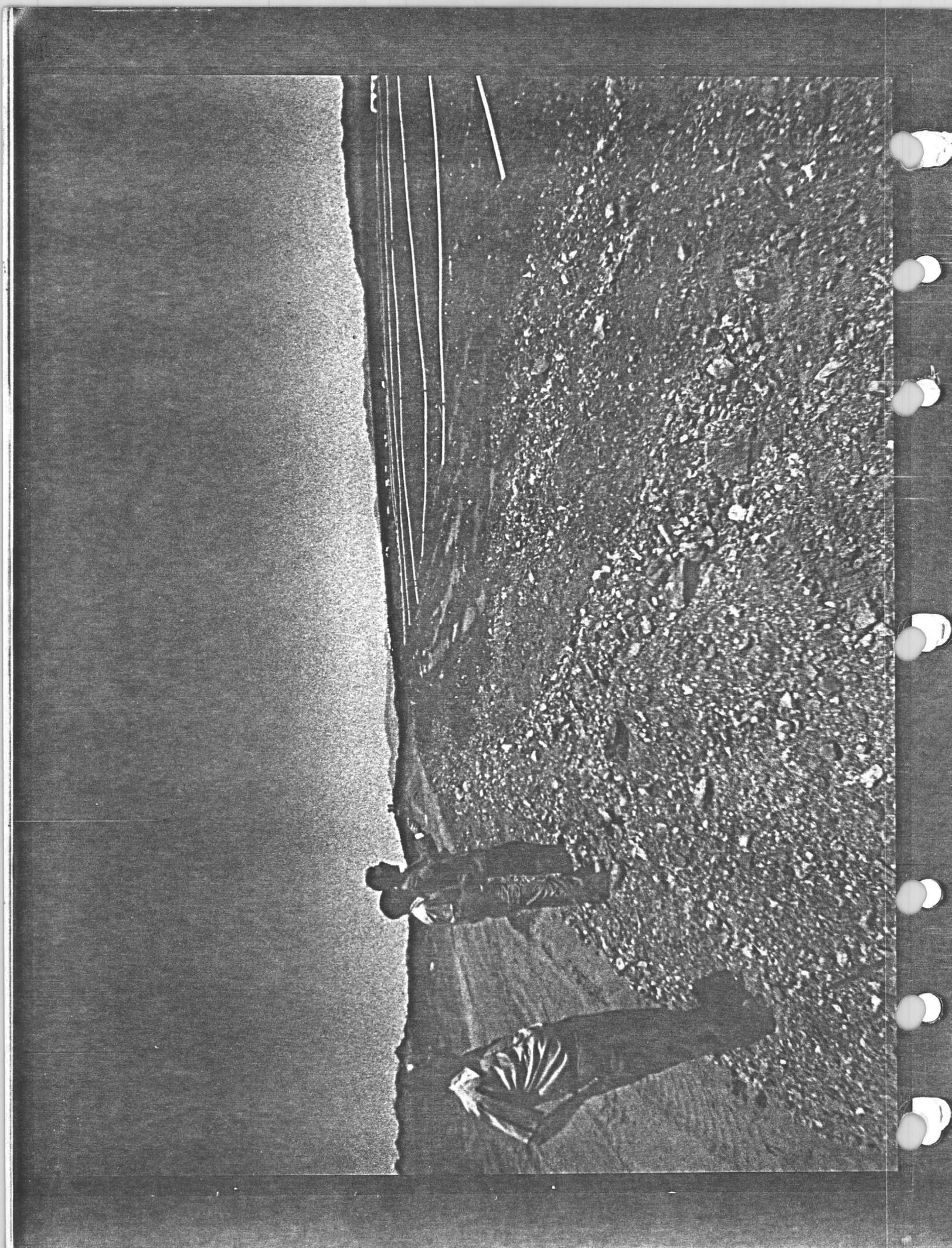


First lift on the north end of the heap; above is the south end. Notice that the first lift is about 25-feet high. The grader is preparing additional pad area.

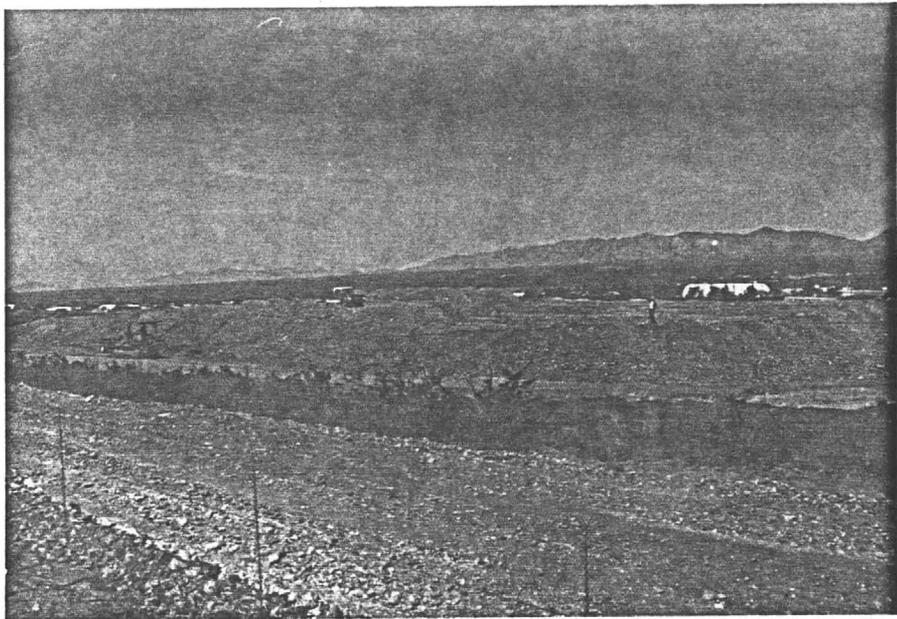


Top of leveled heap looking north. Notice that the north end is being leached. Then the spray lines will be moved to the south end and new ore will then be heaped on the north end; so goes the leaching cycle.

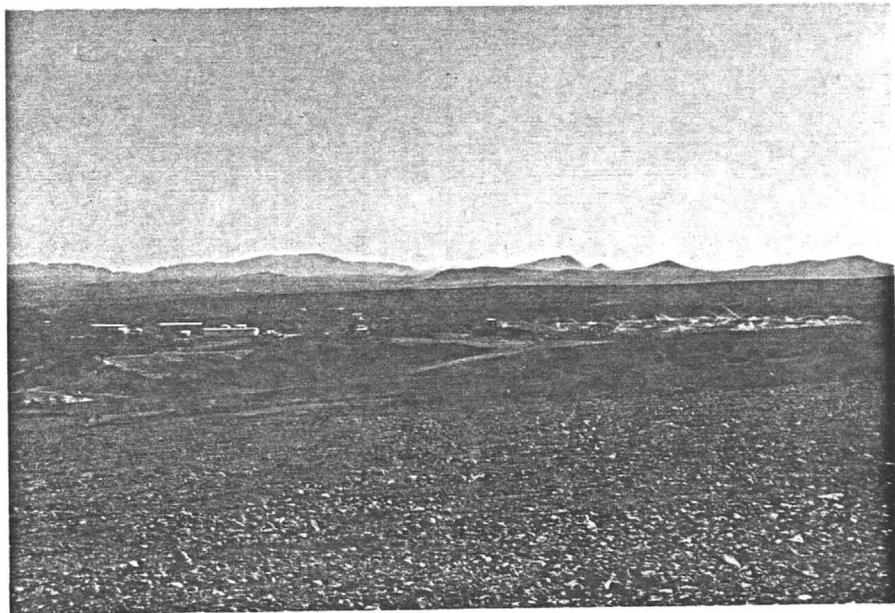




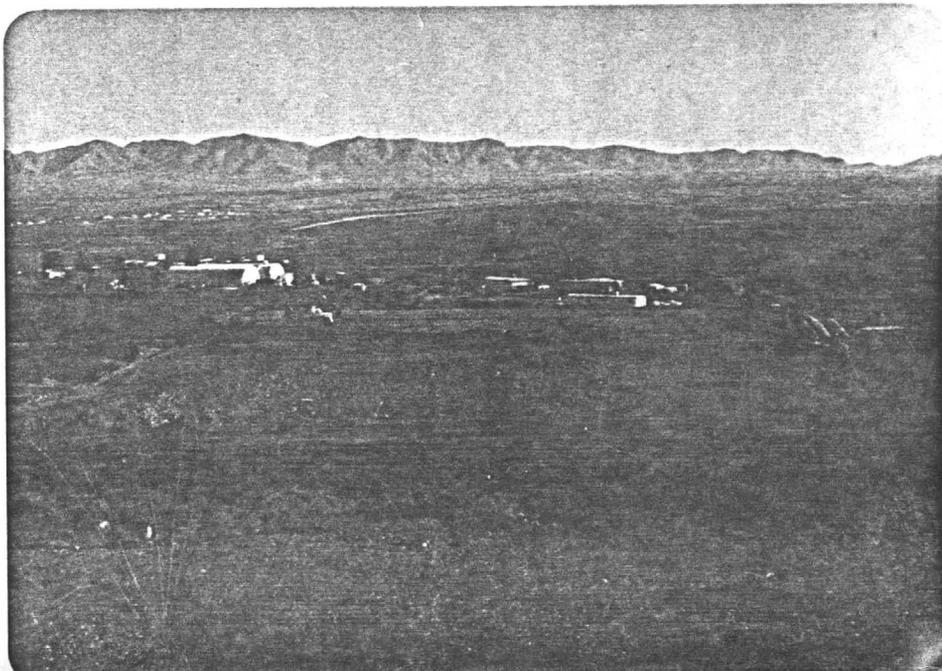
First lift increment
being prepared for
leaching. Notice
beyond and right of
the pick-up are the
heaps of ore dumped
by the trucks.

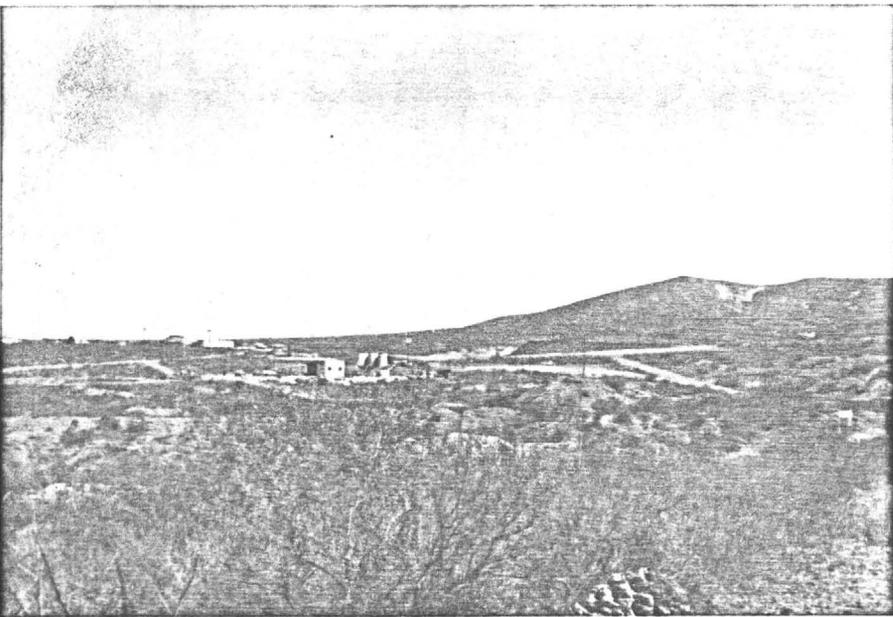


South area being
leached while the
ore is being heaped
on the north end.
Contention dump
site in foreground.

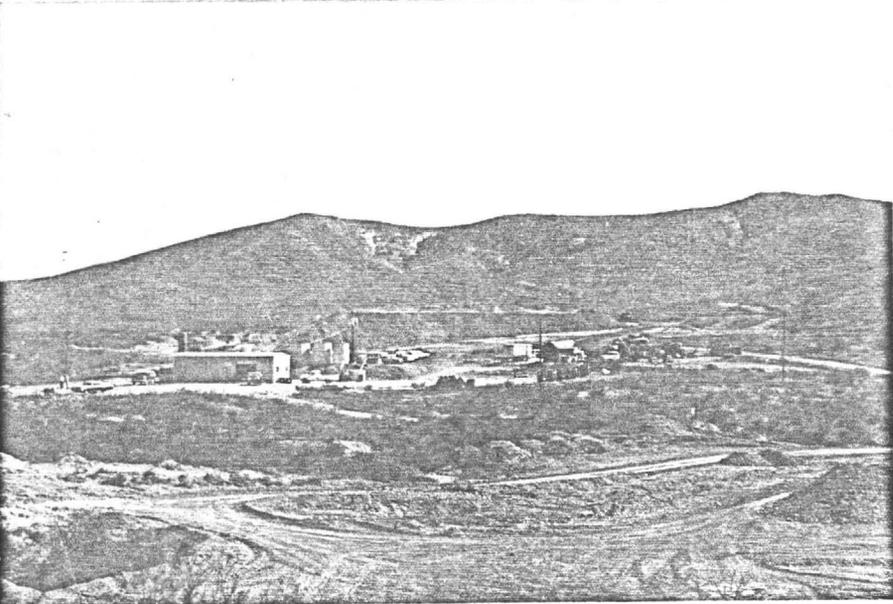


Completion of second
lift on the north end.

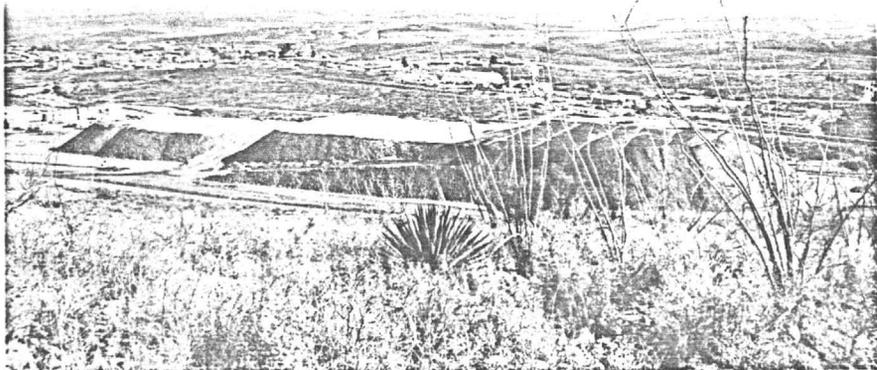




Leach plant and heap;
early stage phase of
the leaching operation.
Photo taken from Empire
dump area; looking over
Tranquility mine area.
Contention mine to the
far right-center.

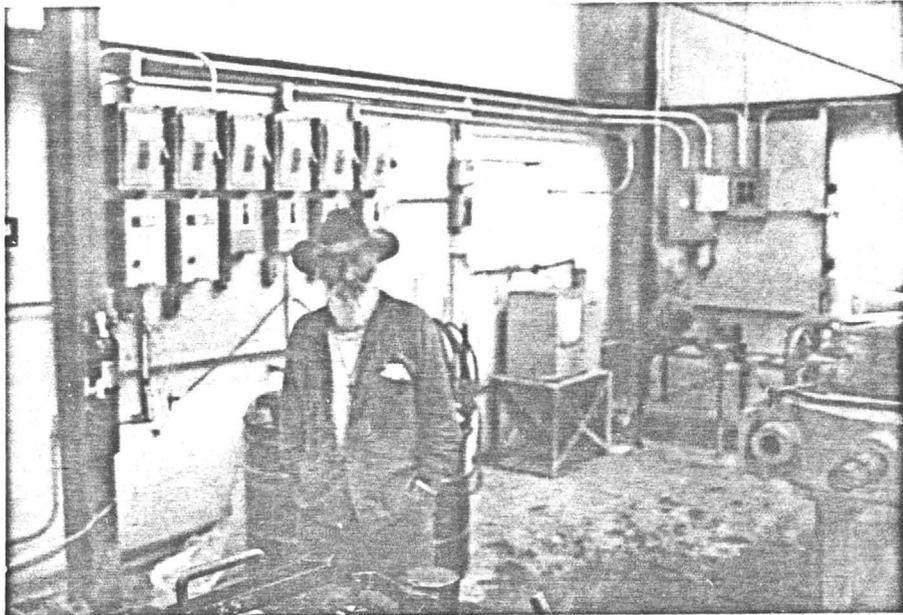


Leach plant and heap
after completion of
second lift on the
north side. Photo
taken from Tranquility
dump and mine area.

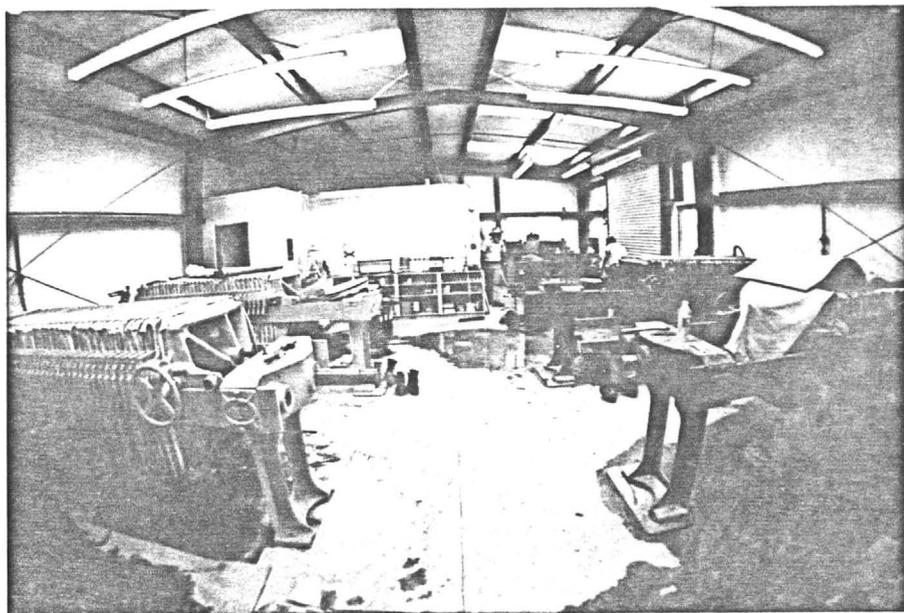


Spraying of third lift
on the far south end;
area on north being
loaded with ore-"heaped".
White crust on middle
section is dried caustic
and soluble calcite ppt.

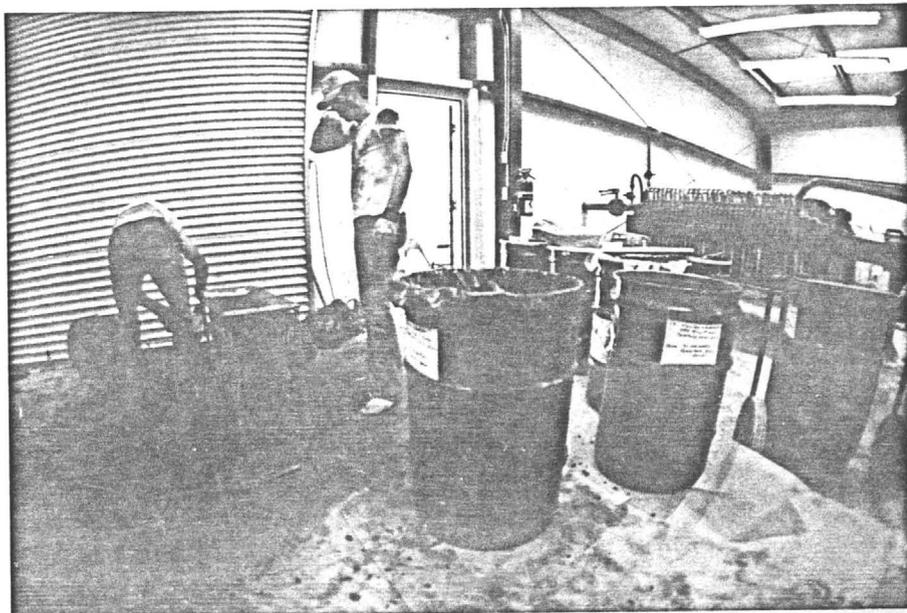
Chief metallurgist;
71 Minerals leach
plant. Plant was
a Merrill-Crowe
zinc precipitation
precious metal
recovery system.

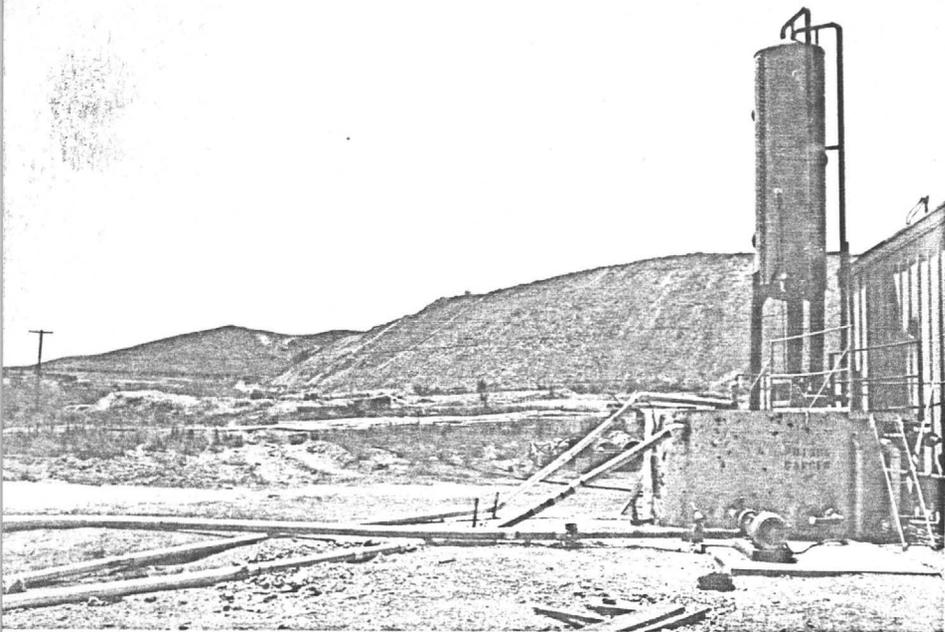


Leach plant;
Schrifer presses
on right are for
clarification and
the yellow presses
are for the precious
metal precipitates.
Each press held about
\$100,000 worth of
gold-silver precipitates.

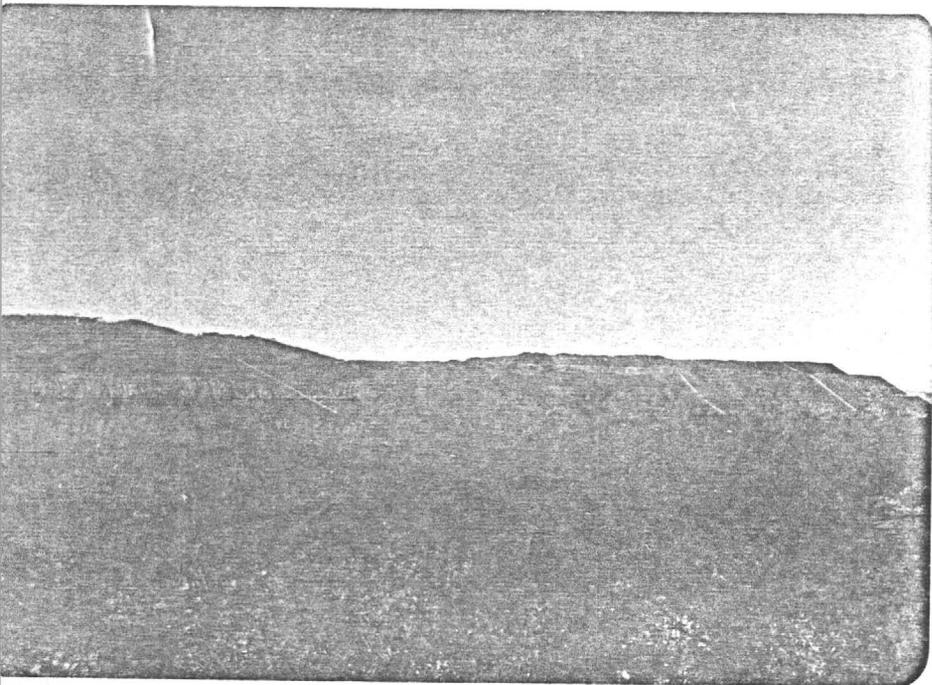


Precious metal precip
press clean-up. Black
color is unused zinc.
Precip's are sealed in
the black cyanide
barrel's and shipped
to the refinery.

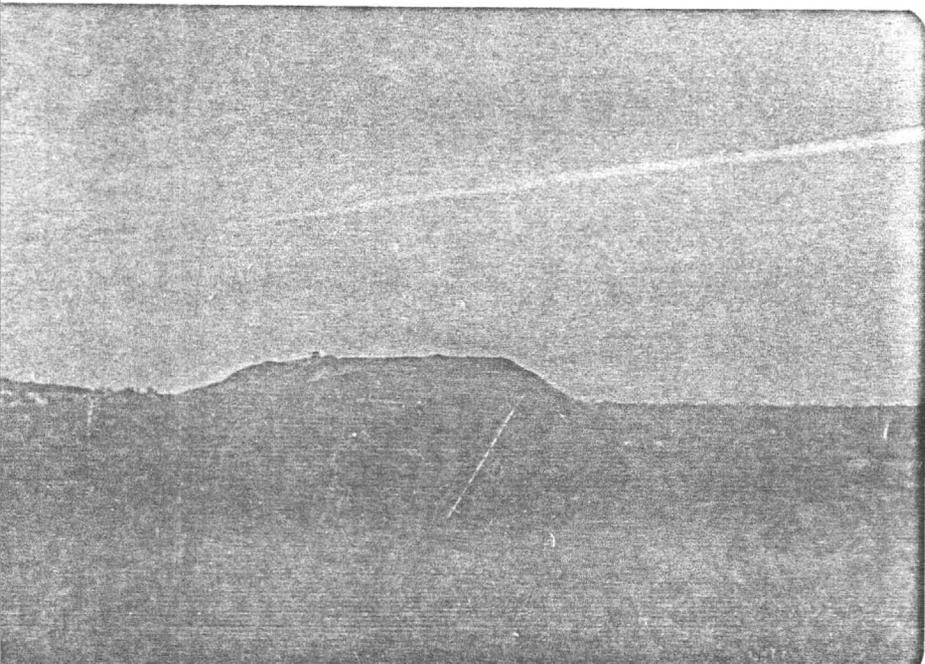




Present heap at Tombstone; The heap is about 100 feet high. Compare this photo with previous when 25-50 feet high. Hauling new ore to the heap was stopped over two years ago. Production continued by secondary recovery methods.



Final stages of leaching heap; south end was Emerald and Bunker Hill ore. Notice that the south end is becoming saturated.



Present heap viewed from the south. Notice dozer on top pushing ore and ripping to increase percolation.

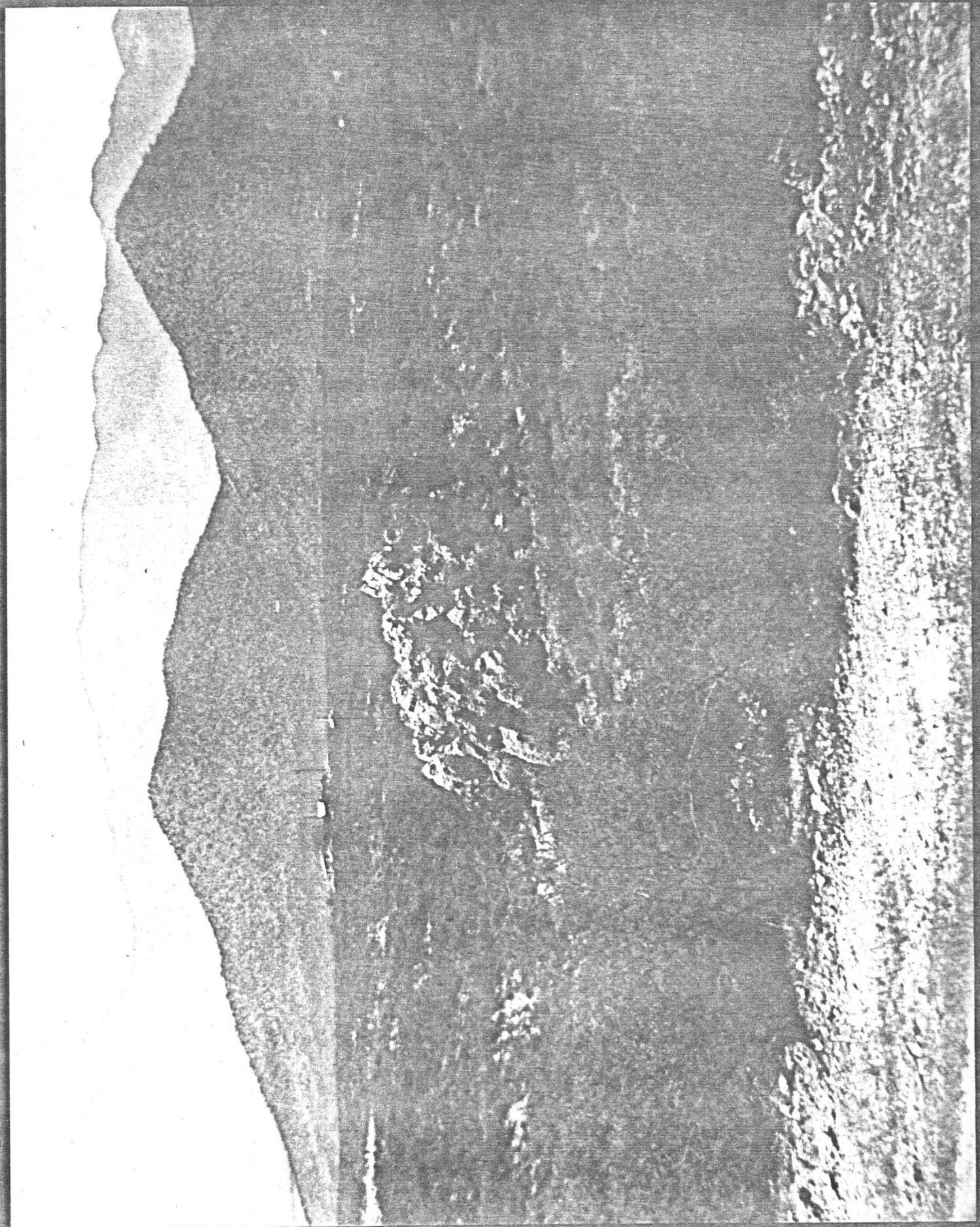


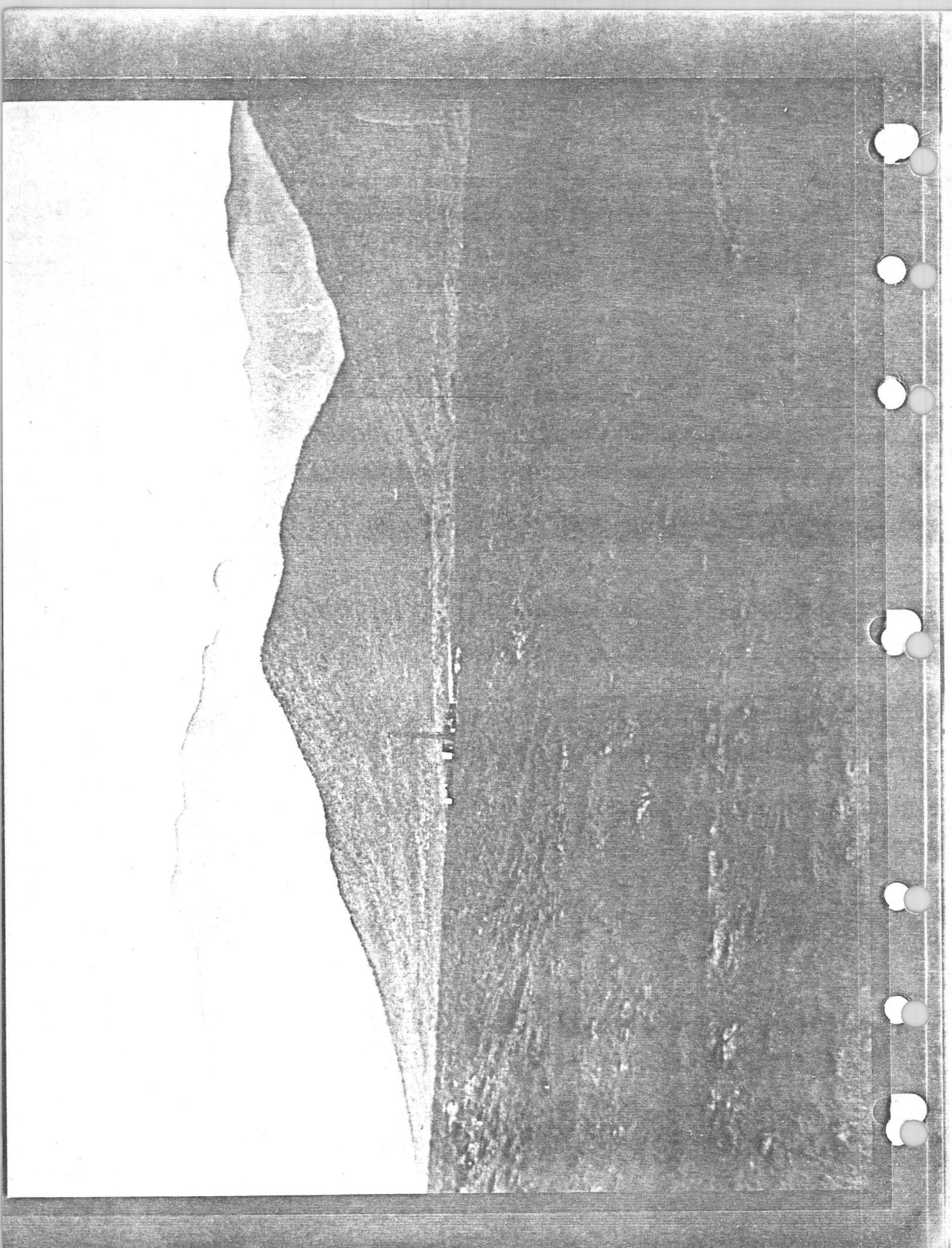
Exposed fracturing on Seth Horne/TMR property. This type of fracturing is one requirement for the occurrence of a porphyry copper deposit.



ABOVE: Kenyon Richard examining breccia pipes.
BELOW: Drill site on TMR property to test for sulphides.







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FUTURE POTENTIAL

Tombstone represents three potential economic assets:

1. Heap; for re-processing.
2. Open-pit and underground ore.
3. Water; for possible sale to Tucson and locally for irrigation.

These will be discussed, but the water potential was mentioned in the section called WATER TABLE. Little can be added concerning the water potential without further discussions with the City of Tucson.

Heap Re-Processing

Gross value of the heap is known by the dump samples taken and the samples taken from the heap during truck-dumping and the heap leveling. Also, samples were taken after an area was leached to estimate percent recovery. In all, good sampling was done as an important phase of production monitoring.

The gross amounts and values in the heap are:

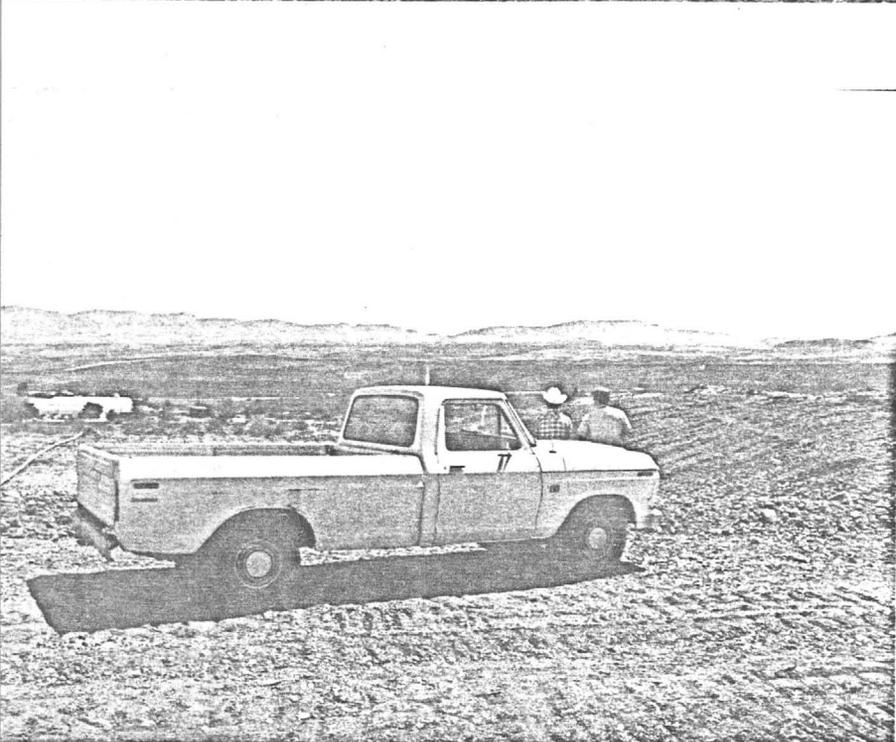
<u>Precious Metal</u>	<u>Troy Oz.</u>	<u>Present \$ Value</u>
Gold	33,679	\$ 6,735,806
Silver	2,057,151	\$ 11,314,333

From the refinery receipts and the computed recoveries:

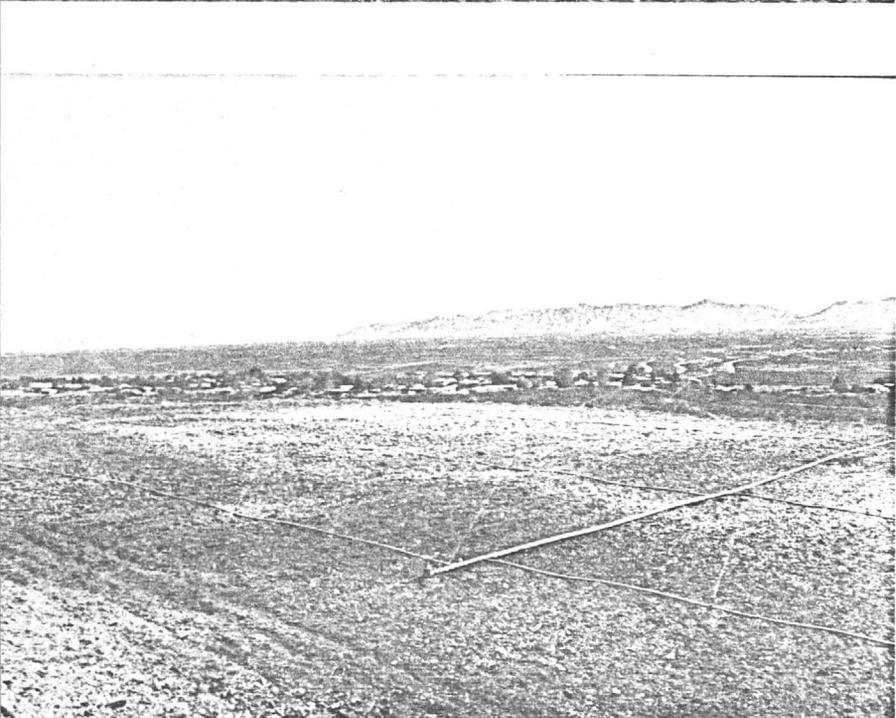
<u>Precious Metal</u>	<u>Troy Ounces</u>	<u>Present \$ Value</u>
Gold	20,207	\$ 4,041,483
Silver	1,337,148	\$ 7,354,316
		<hr/>
		\$ 11,395,799



Recent dozer activity; pushing and ripping increases percolation. Clay and fines cause channeling and blinding in the heap, reducing the recovery to about 35-40 percent.



Area east (behind) pick-up was dozed down 15 feet and ripped, producing additional values in the preg which lasted for 6 months; the heap represents a real asset that simple re-working can produce a significant cash flow.



Above area being leached. Notice the caustic crust which indicates this section of the heap has de-watered for about two weeks.

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A financial analysis of the Tombstone heap follows:

Gross Value Remaining in Heap; \$ 11.40/ton (for 1 mm tons)

Minimum recovery with crushing
and "IPS" treatment; 50 %

Minimum recoverable value; \$ 5.70/ton.....

Processing Costs; Operating Cost/Ton

Crushing \$ 0.25

Dozing .50

Leaching .50

"IPS" .50

Plant .30

Admin. & Overhead .25

Shipping & Refining .15

\$ 2.45.....

Minimum net profit;

Gross Value \$ 5.70/ton

Operating Cost 2.45/ton

Net Operating Profit \$ 3.25/ton

Net Operating Profit from
Re-Processing Heap \$ 3,250,000

Required Capital Investment = \$ 200,000

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Open Pit Potential

At the present prices of precious metals and by utilizing new innovations in heap-leaching technology, relatively small open pit tonnages are required to be developed to produce a very significant cash flow.

It has been observed in the underground workings that at least the same tonnage (in the form of gob) is still underground as was hoisted to the surface and placed in the "waste dumps". In most (if not all) cases, the gob is higher-grade than the waste dumps; Goodenough gob averaged .15 Au and 10 ounces Ag. Old miners tell me that the gob is the lower-grade material (ore) that was expected to be milled at a later date. The waste was assumed to be too low grade to ever be processed. Because it was economic to process the "waste dumps", it will be shown that if we assume to discover the same gob tonnage as was dumped on the surface ("waste dumps") that an open pit operation would make money if no additional ore would be discovered. That really reduces the risk.

Following are the assumptions and factual data used to make ore reserve estimates:

<u>Deposit Name</u>	<u>Last Production</u>		<u>Waste Dump</u>			<u>Gob Assumed</u>		
	<u>Au</u>	<u>Ag</u>	<u>Tons</u> <u>(X1000)</u>	<u>Au</u>	<u>Ag</u>	<u>Tons</u> <u>(X1000)</u>	<u>Au</u>	<u>Ag</u>
Contention "Dike"	.207	15.22	381	.051	1.75	500	.050	2.10
Tranquillity Skip-Ag Thd.	.307	23.25	61	.051	1.99	100	.058	1.92
Lucky Cuss- Old Guard	.056	16.92	66.4	.036	3.23	70	.039	3.50
Emerald	.010	8.00	70	.015	3.61	70	.015	3.50
Bunker Hill	.035	15.45	38	.021	3.39	40	.021	3.40
Tombstone Extension	.071	11.88	6	.031	6.50	15	.025	5.00

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Present open-pit mining and heap-leaching costs have been used for the computation of gross value, net operating profit before tax (NOPBT), and total open-pit mining cost. Costs used are:

Ore operating cost/ton = \$2.25
Waste haulage/ton = .50

For example, for a stripping ratio of 5.5:1 = \$5.00/ton ore.

Preliminary open pits were designed for the six open-pit targets previously defined as having good potential. Criteria used were:

- A. 45° pit slopes
- B. 50-foot minimum width at bottom bench
- C. Pit depth does not exceed ore body width.

The above criteria allows comparison of the various "target" ore bodies on an equitable basis.

After an analysis of the underground maps and personal knowledge, the following resulted from the "mineable open-pit-ore-reserves":

<u>Deposit Name</u>	<u>Pit Total Tonnage</u>	<u>% Ore Tonnage</u>	<u>Ore Value/Ton</u>
Contention Dike	9,100,000	12.6 %	\$ 80.00
Tranq-Ag Thread	4,220,000	5.9 %	80.00
Lucky Cuss	1,580,000	8.0 %	68.00
Emerald	1,340,000	9.4 %	36.94
Bunker Hill	1,150,000	6.3 %	65.00
Tomb. Extension	650,000	9.2 %	58.00

Notice that the dumps had an ore value of \$ 20.96/ton and that the past ore production had an ore value of \$ 150.62/ton. The estimated ore values above from underground samples falls about half way between the previously mined ore and the dump values.

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As will be presented on the following page, with a realistic projection of deposit ore reserves, a very significant cash flow results. However, it is very interesting to evaluate the individual "target deposits" from the following minimum risk point-of-view:

- A. For the designed pits, it is assumed that no ore will be discovered or developed.
- B. For the designed pits, it is assumed that only gob exists; the gob has been observed and sampled.

Using the previously mentioned open-pit mining costs, the net operating cost before taxes was computed mining only gob. Also, the "break-even" gob tonnage was computed to relate to the minimum gob tonnage required to develop and not lose any money. It is easy to relate to this approach, because it is quickly seen that relatively small tonnages are required to break even. For example, tonnages smaller than the "waste dump" tonnages are required. Following are these computations:

OPEN PIT RISK ANALYSIS (Only Gob-No Ore)

<u>Deposit Name</u>	<u>Total OP Mining Cost-Gob & Waste</u>	<u>Gross Value Gob</u>	<u>NOPBT Gob-MM</u>	<u>Break Even Gob Tonnage</u>
Contention	\$ 5,425,000	\$ 11,300,000	\$ 5.875	240,044
Tranq.-Ag Th.	2,285,000	2,312,000	.027	98,832
Lucky Cuss	912,500	2,016,000	1.104	31,684
Emerald	792,500	1,680,000	.888	33,021
Bunker Hill	645,000	984,000	.339	26,220
Tomb. Extens.	328,750	525,000	.196	9,393

Following are the computed economics for the projected ore and the gob within each designed open pit.

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OPEN PIT POTENTIAL

<u>Deposit Name</u>	<u>Open Pit Dimensions</u>			<u>Estimated Ore Reserves</u>			<u>Economics</u>		
	<u>Length</u>	<u>Width</u>	<u>Depth</u>	<u>Type</u>	<u>Au</u>	<u>Ag</u>	<u>Tons</u>	<u>Gross Value</u>	<u>Net Op. Profit</u>
"Contention Dike"- Grand Central- Contention- Tranquillity	2,000'	350'	300'	Ore	.100	10.0	1.15MM	\$92.0MM	
				Gob	.050	2.10	.50MM	11.3	\$95.93MM
Tranquillity- Skip Shaft- Silver Thread	900'	300'	300'	Ore	.100	10.0	.250MM	\$20.0MM	
				Gob	.058	1.92	.100MM	2.312	\$19.59MM
Lucky Cuss- Old Guard	700'	200'	200'	Ore	.040	10.0	.126MM	\$8.6MM	
				Gob	.039	3.50	.070MM	2.0	\$ 9.451MM
Emerald	600'	250'	200'	Ore	.005	6.0	.126MM	\$4.7MM	
				Gob	.015	3.5	.070MM	1.7	\$ 5.321MM
Bunker Hill	500'	200'	200'	Ore	.025	10.	.072MM	\$4.7MM	
				Gob	.021	3.4	.040MM	.984	\$ 4.893MM
Tombstone Extension	300'	250'	200'	Ore	.050	8.	.060MM	\$3.48MM	
				Gob	.025	5.	.015MM	.525	\$ 3.55MM

- seems way too high

REGIONAL

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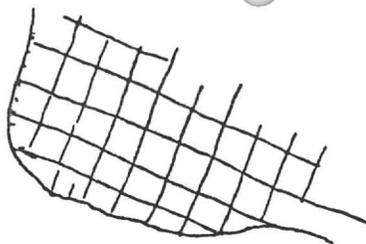
REGIONAL PATTERNS

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



Merimac

Toughnut
West Side
Defence
Herschel
Ingersoll
Old Guard
Lucky Cuss
Empire
Silver Thread
Tranquillity
Tribute
Bass
Sulfuret
Contention
Little Joe
Grand Central

State of Maine

Bonanza

Sailor

Randolph

Telephone
NW
Oregon
Prompter

Bunker Hill
Rattlesnake

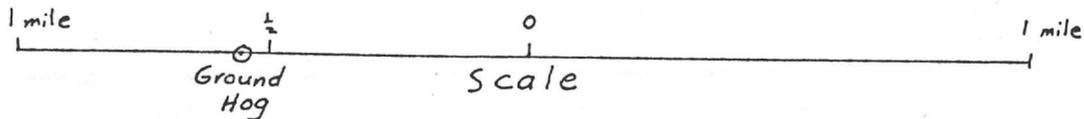
Emerald

Silver Plume

Comet

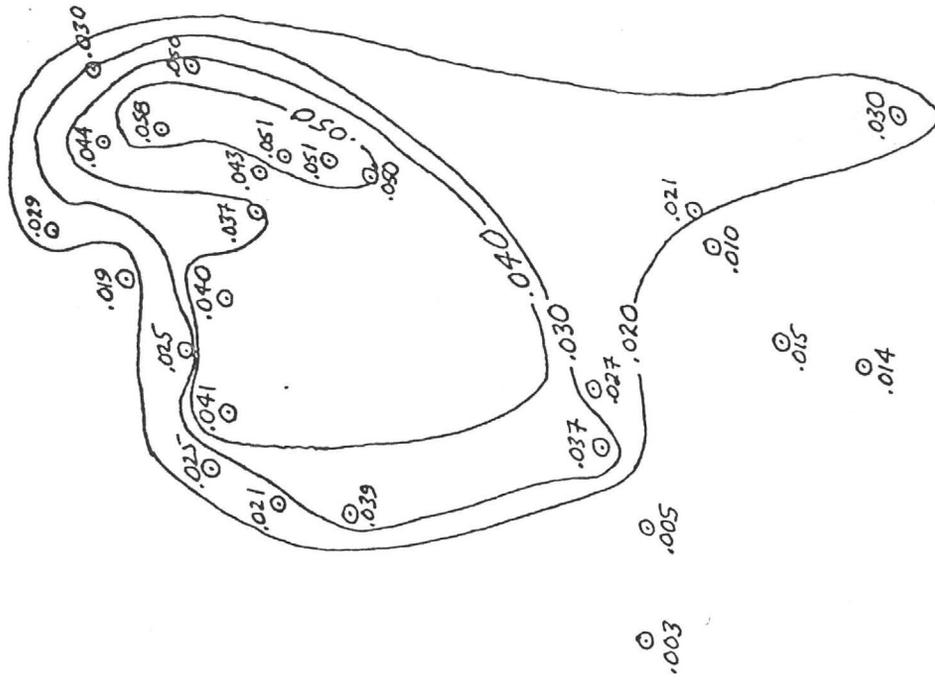
Tomb. Ext.

San Diego



TOMBSTONE DUMP ASSAYS

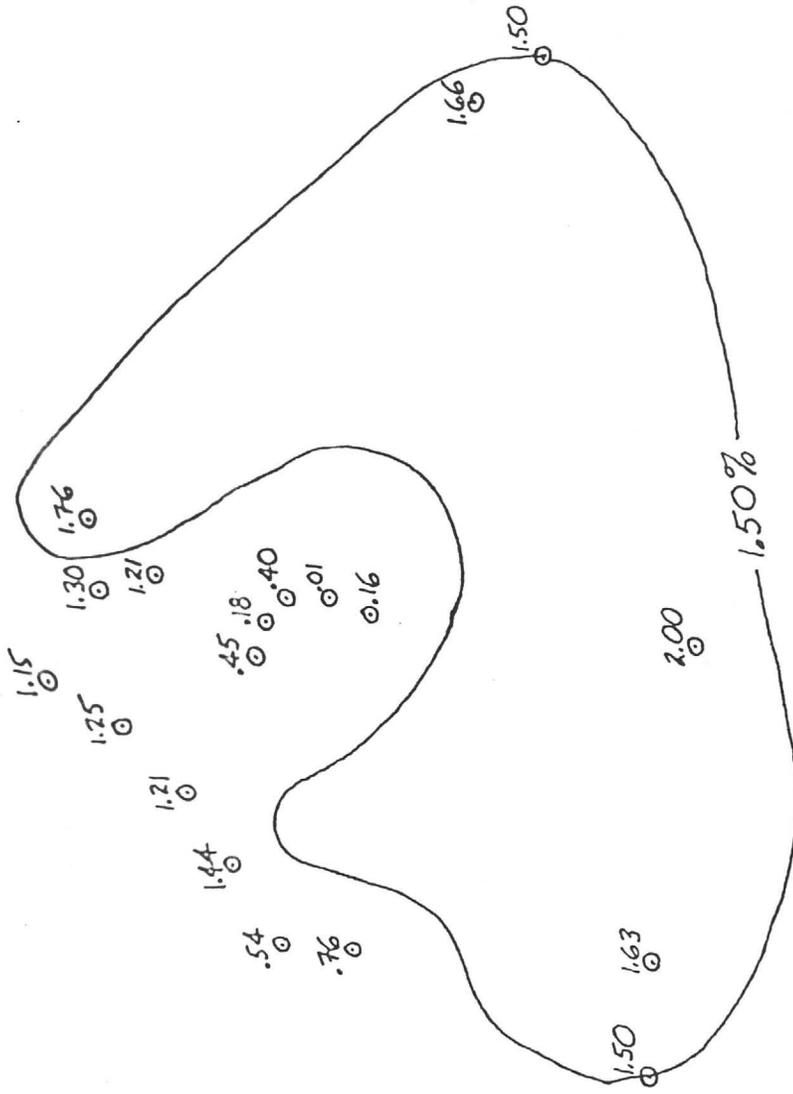
Gold (T.oz/ton)



⊙
.006

TOMBSTONE DUMP ASSAYS

Zinc (%/ton)

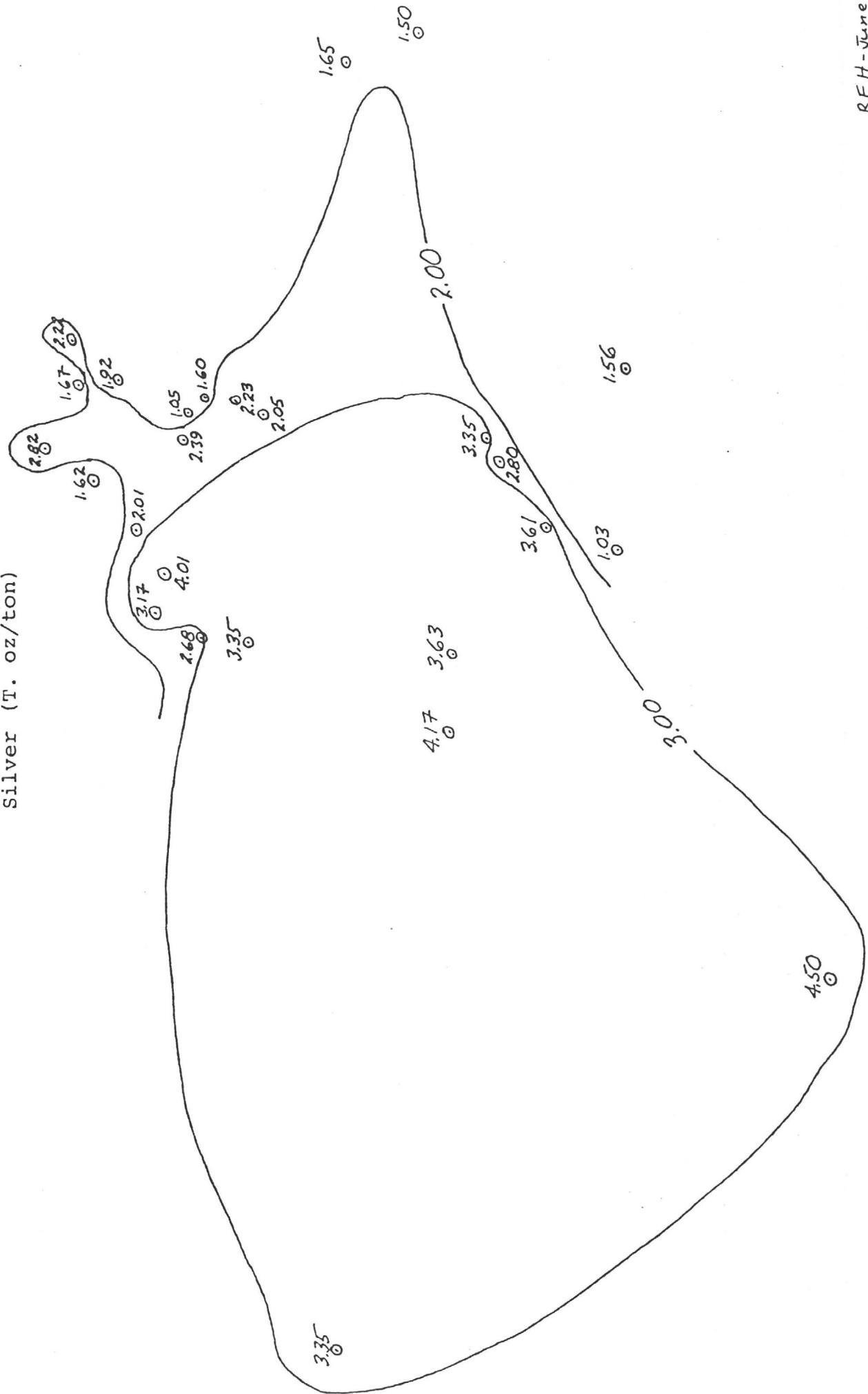


0.15

0.20

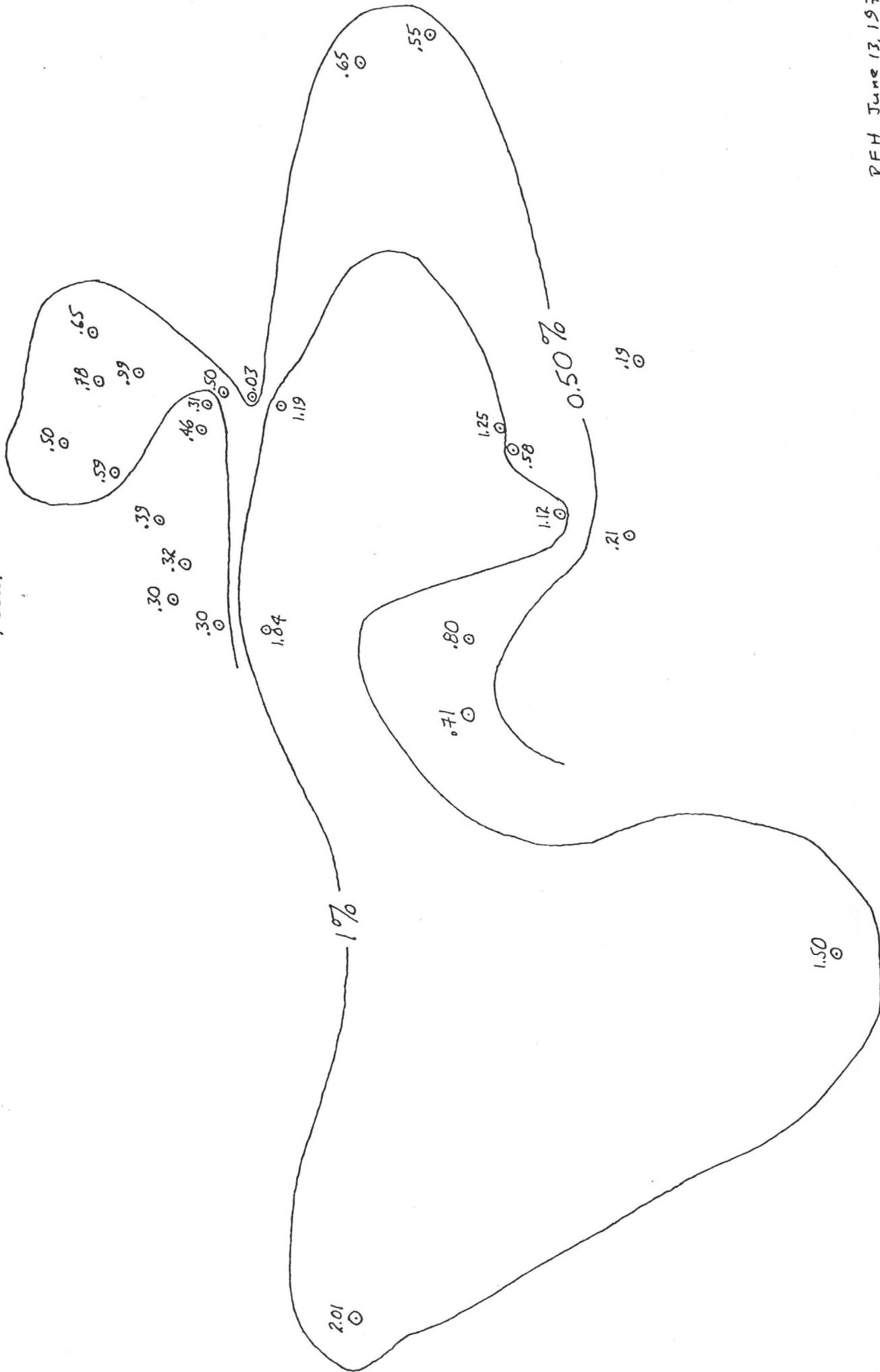
TOMBSTONE DUMP ASSAYS

Silver (T. oz/ton)



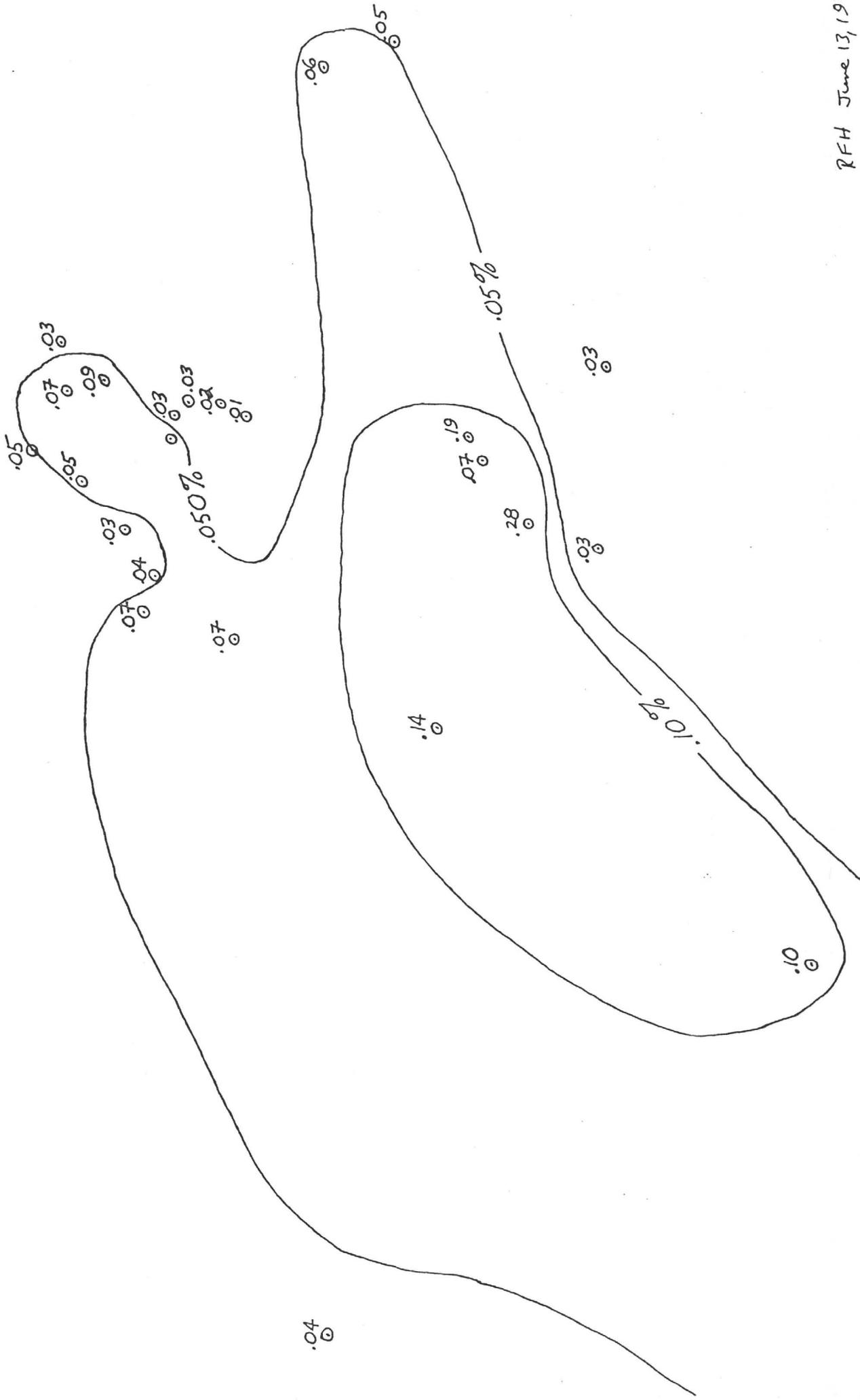
TOMBSTONE DUMP ASSAYS

Lead (%/ton)



TOMBSTONE DUMP ASSAYS

Copper (%/ton)

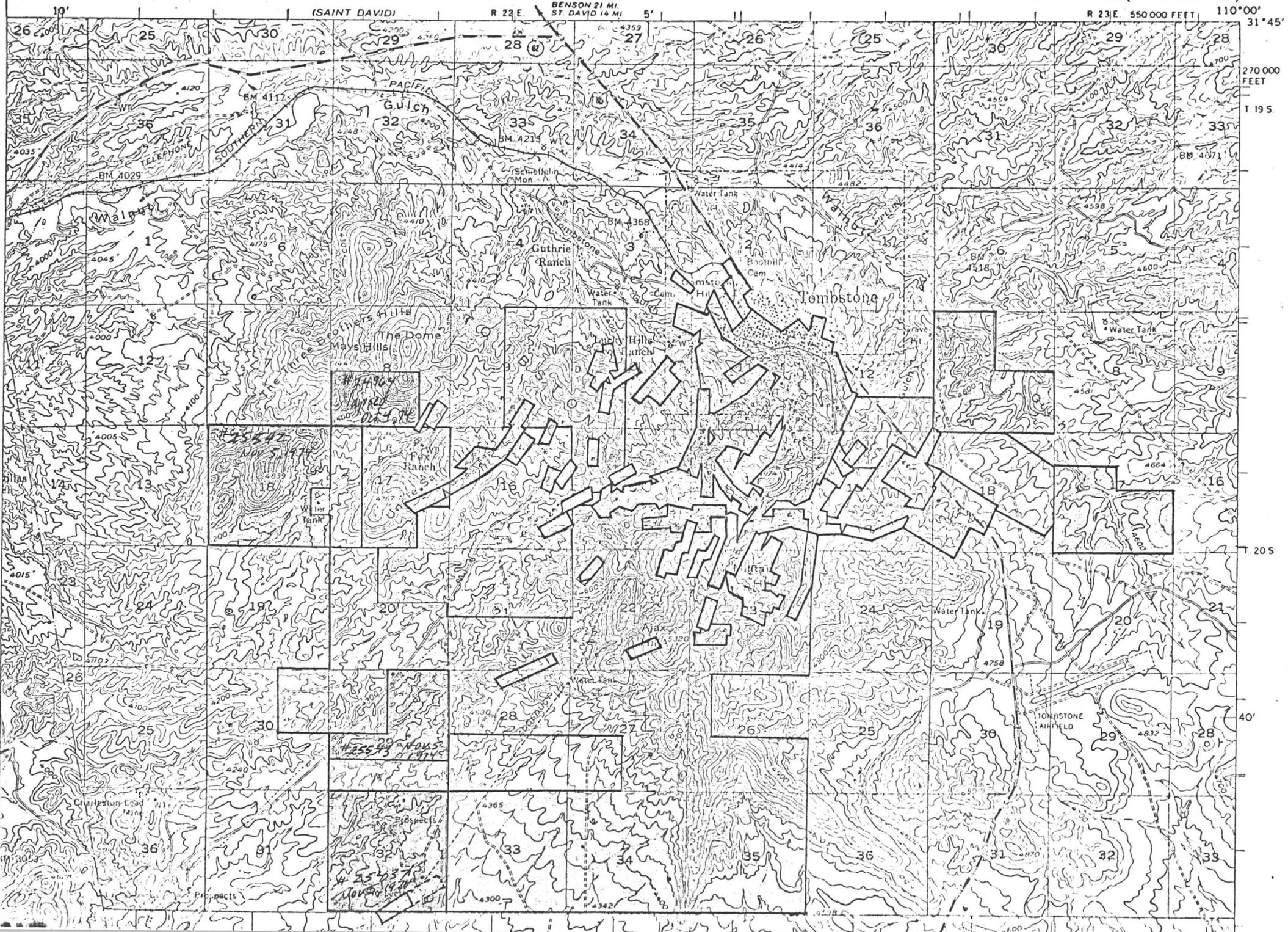


RFH June 13, 1977

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

TOMBSTONE QUADRANGLE
ARIZONA-COCHISE CO.
15 MINUTE SERIES (TOPOGRAPHIC)

(PEARCE)



Present
LAND STATUS
MAP

PATENTED CLAIMS

UNPATENTED
CLAIMS

STATE LANDS
PROS. PERMITS

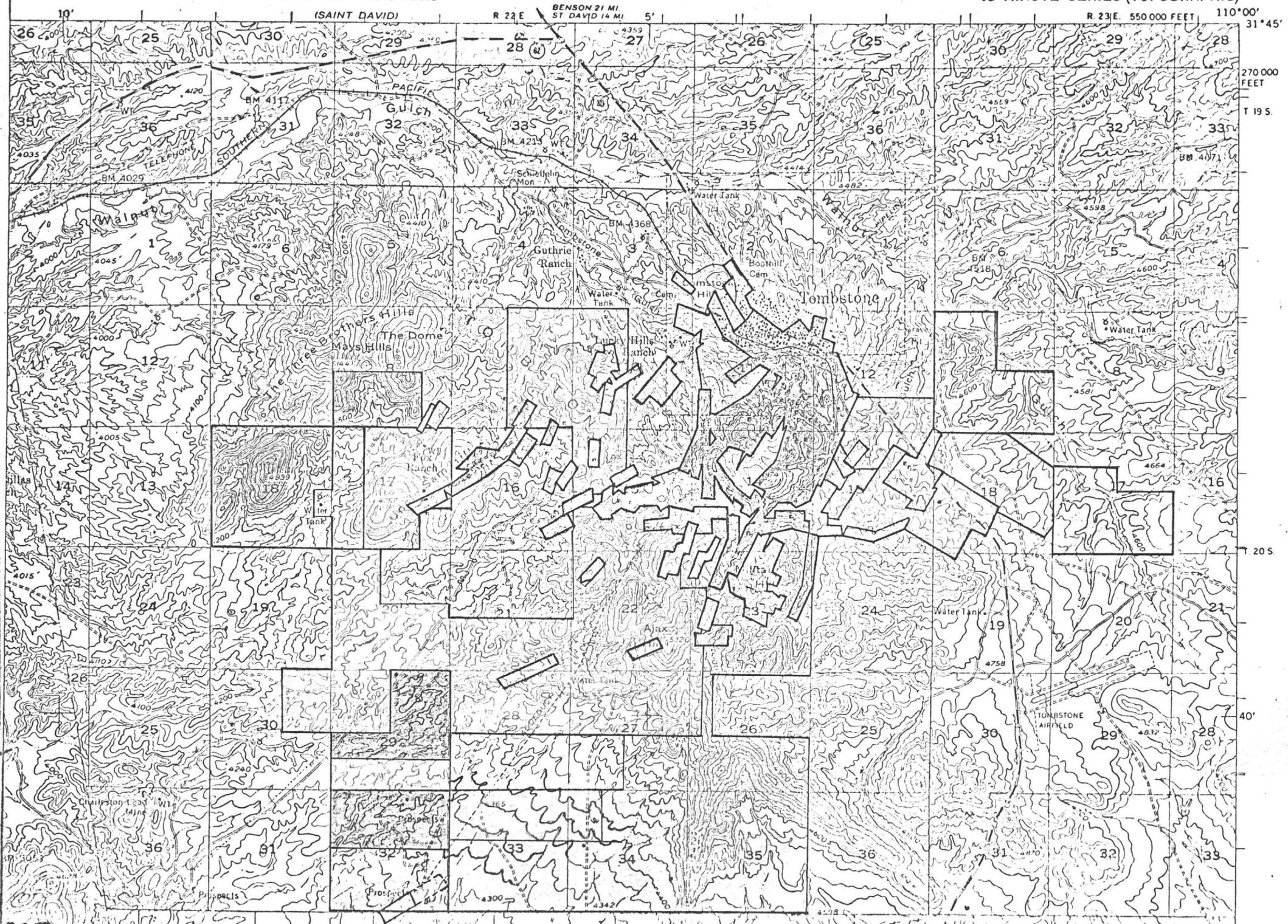
OPEN LAND &
OTHER OWNERS



UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

TOMBSTONE QUADRANGLE
ARIZONA-COCHISE CO.
15 MINUTE SERIES (TOPOGRAPHIC)

(PEARCE)



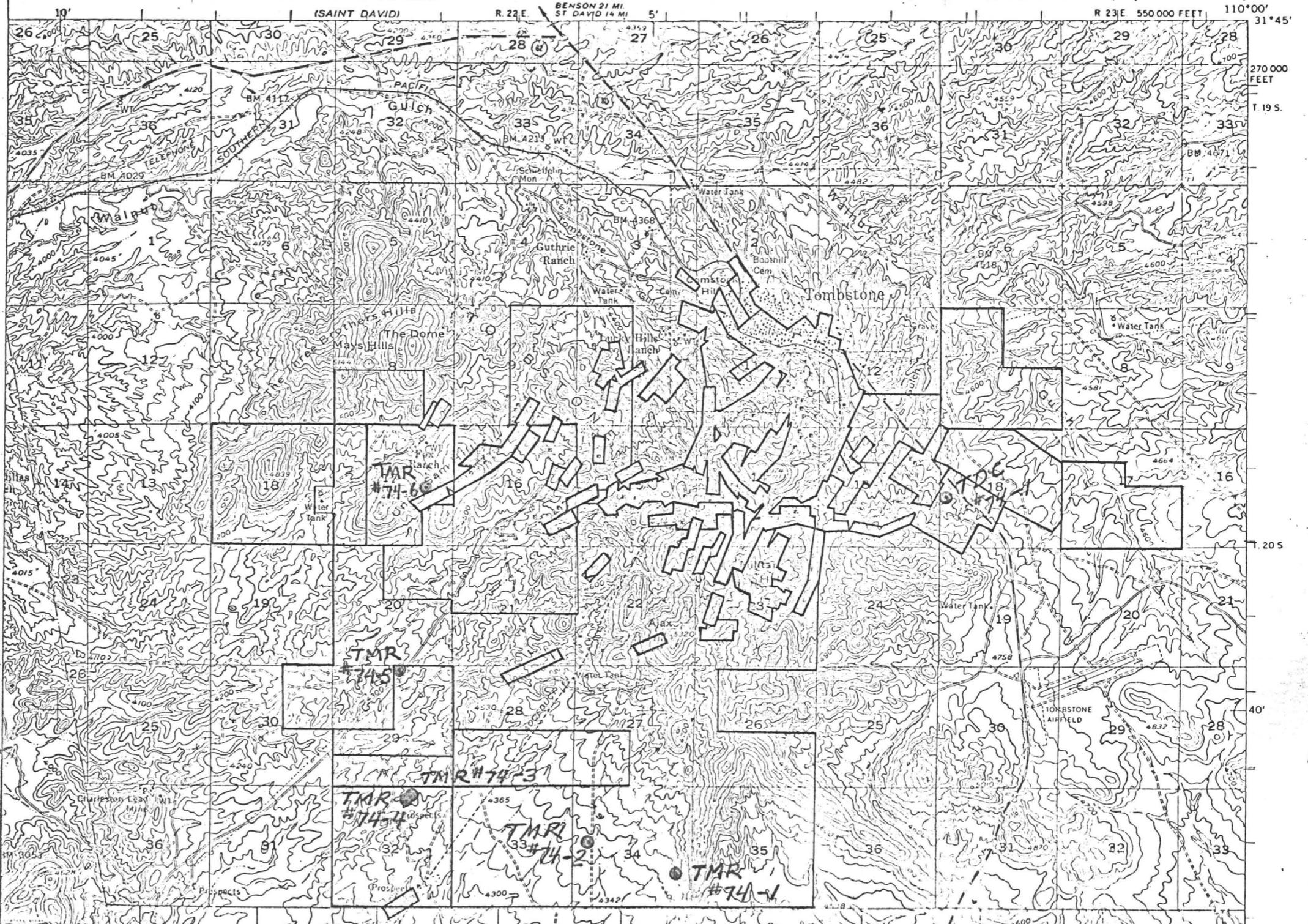
STATE LANDS
OWED TO LARSE

UNPATENTED
LANDS TO BE
DROPPED

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

TOMBSTONE QUADRANGLE
ARIZONA-COCHISE CO.
15 MINUTE SERIES (TOPOGRAPHIC)

(PEARCE)



Hole Location
Map

Drill Hole

DEPOSITS

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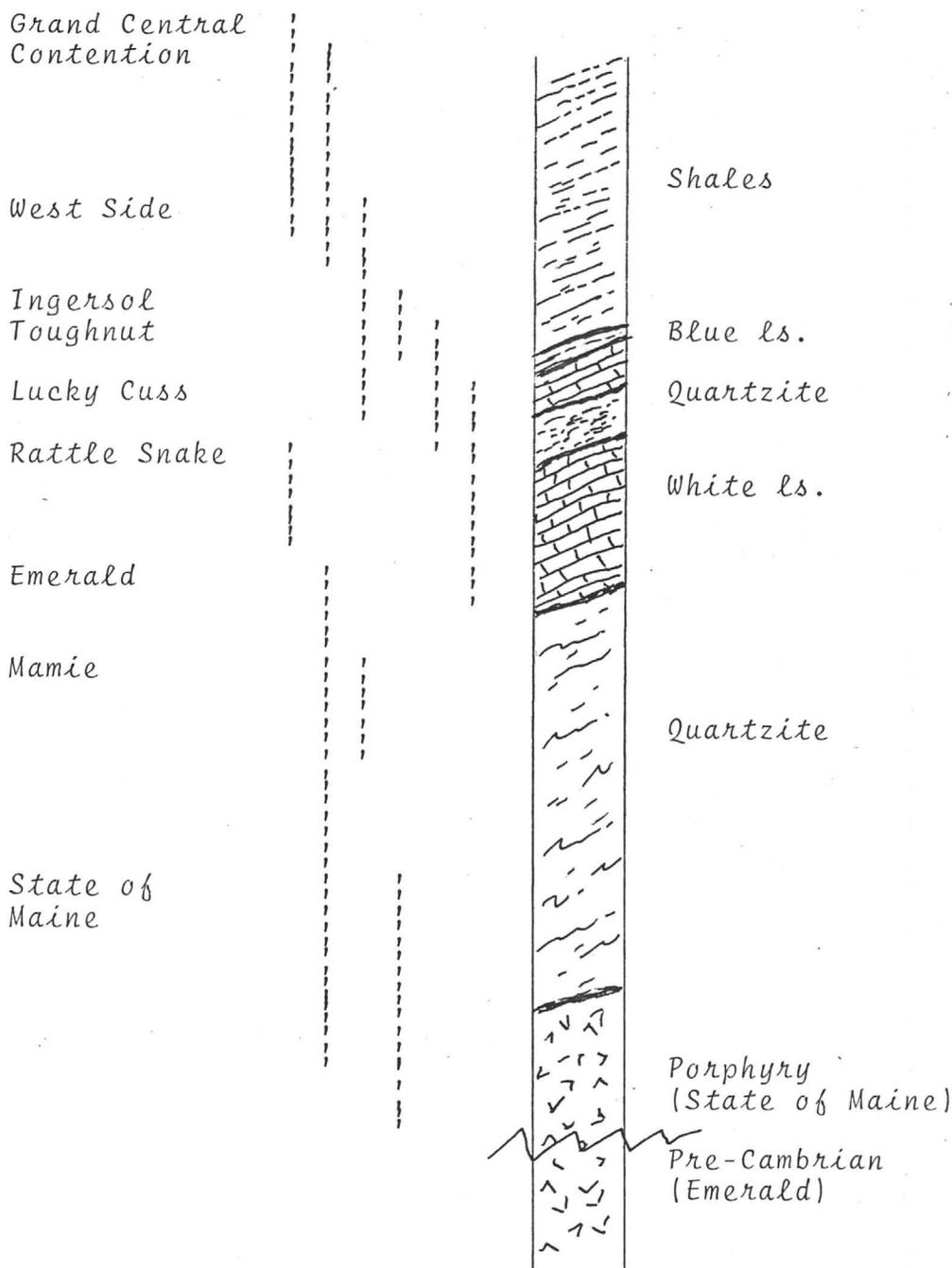
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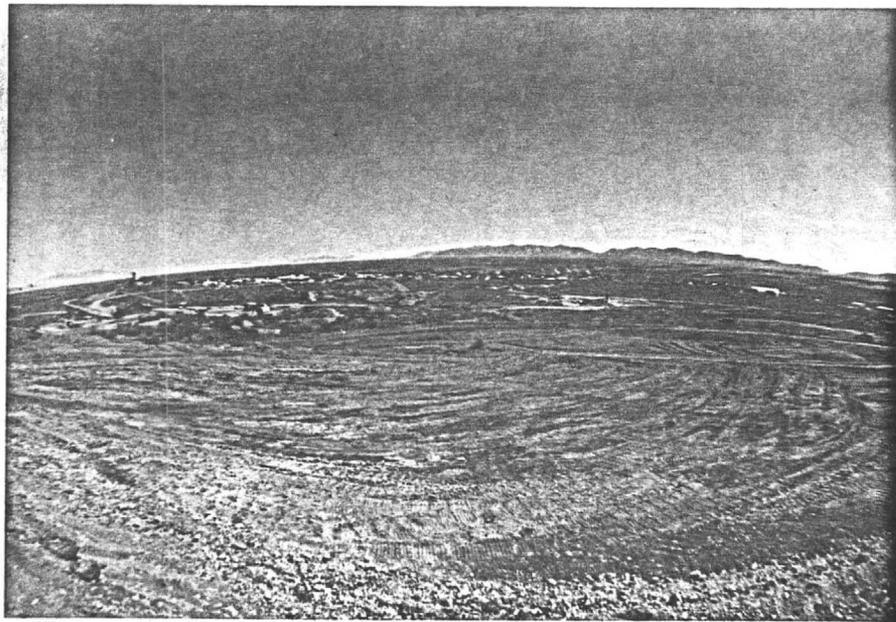
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DEPOSIT DESCRIPTIONS

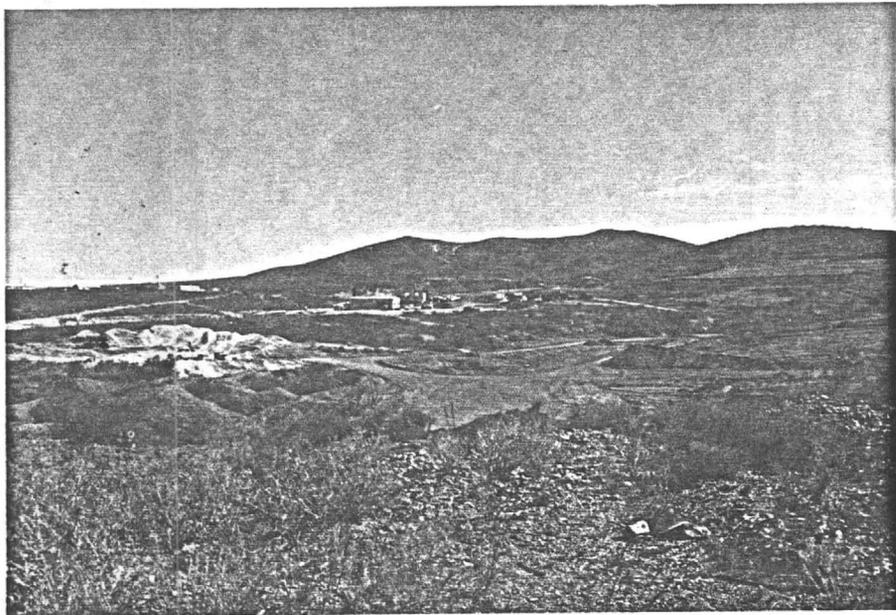
Broad geological environments present in the Tombstone District are the Contention-Toughnut Series in the Eastern part of the District (just south of town), the Manganiferous Limestone Group in the Central part of the District, and the Emerald Series in the Southwest part of the District (south of the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

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

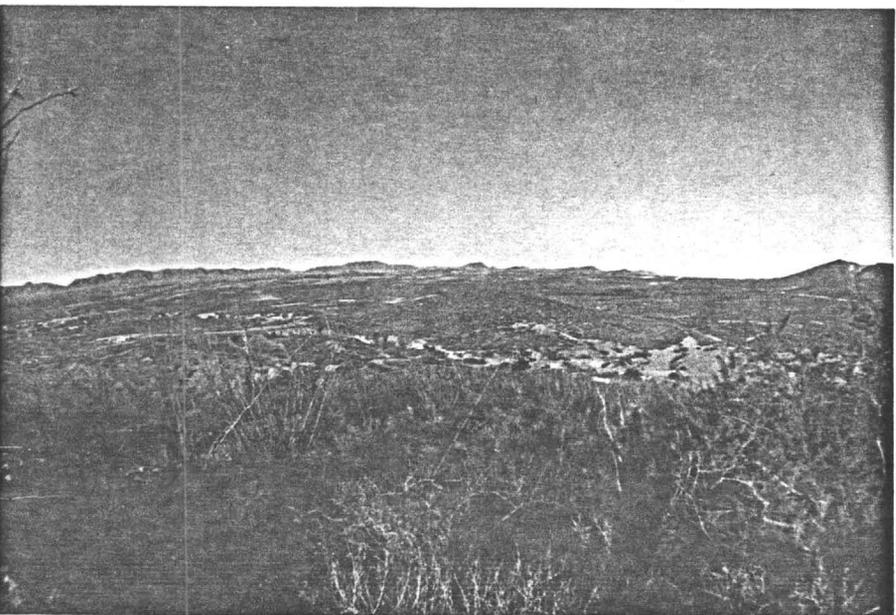




Contention-Toughnut
Series area;
West Side-Vizina on far
left, Toughnut-Empire
in center, and Contentment
under heap in far right.
Viewed from Contention
dump area-dump removed.



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 under-
ground. 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, Tranquility, 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.

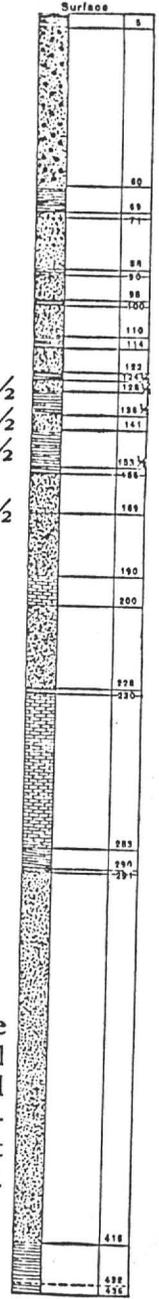
The main lines of flexure are:

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

FIG. 4.

VERTICAL SECTION DIAMOND-DRILL HOLE 7th and Fremont Sts.



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.

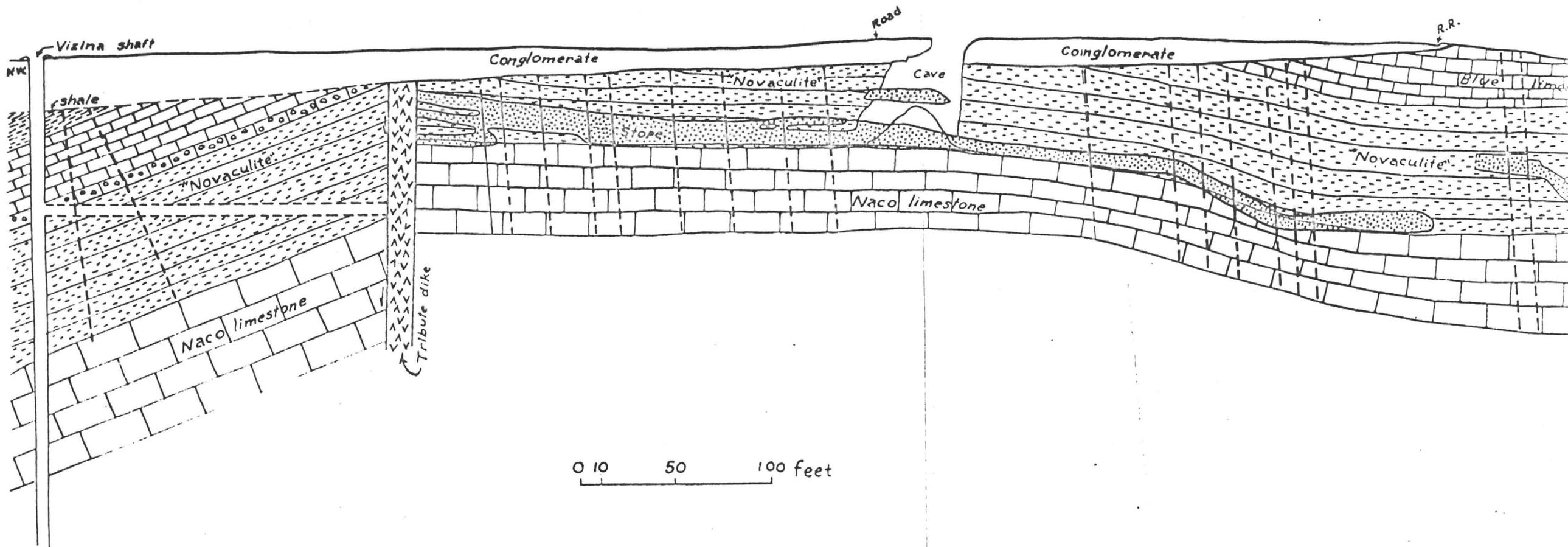


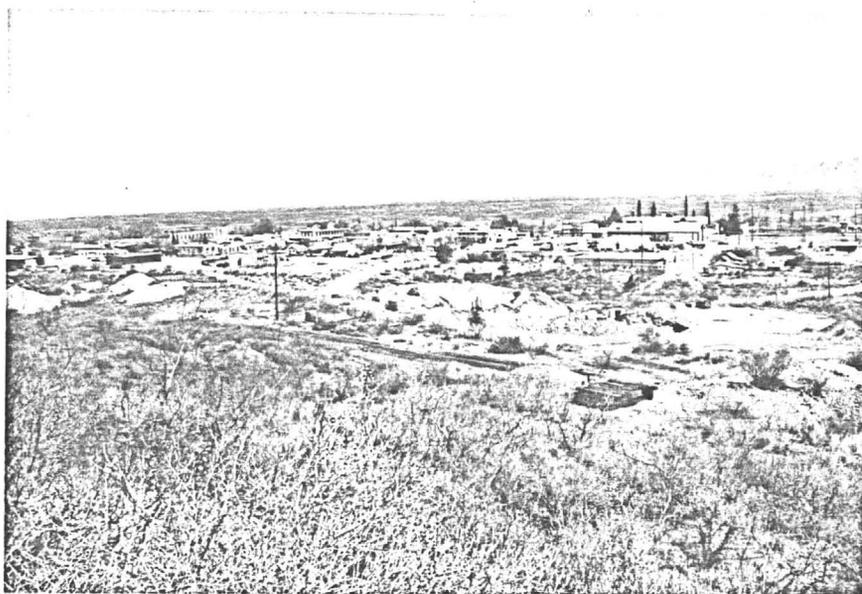
Plate XVIII.—Longitudinal section near axis of northeast Vizina roll, looking northeast.

HEWLETT MANAGEMENT

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Sparks, Nevada 89431

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 center. Fore-
ground 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 level
of the Goodenough. From
here, all of the mines
are interconnected; there
are 200 miles of workings.

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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.

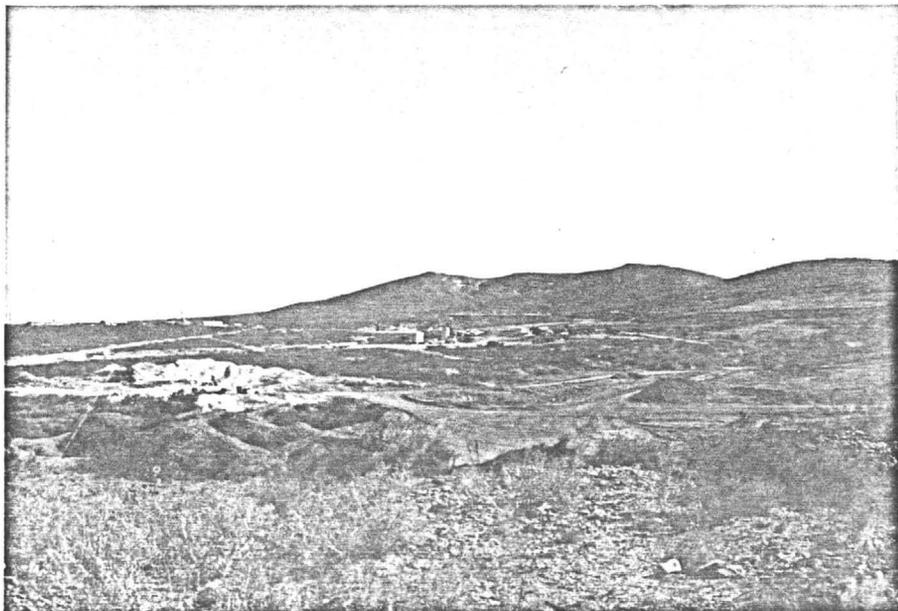
The Goodenough Incline was sank in a very-well mineralized blue limestone that was about 20 feet thick. Gob remaining in the Incline averages 10 ounces Ag and .10 ounces Au per ton.

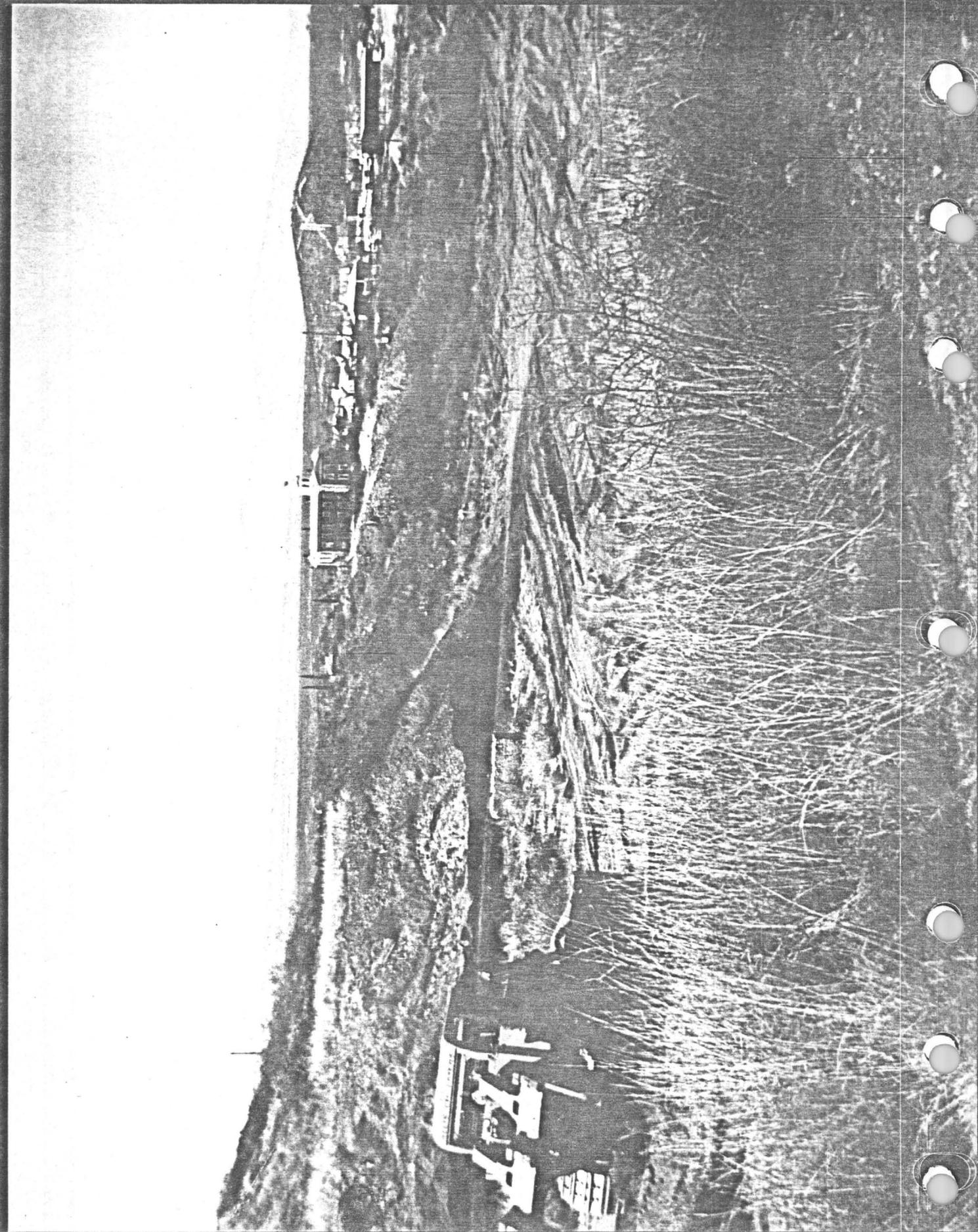
NO WAY
WES to JAD
1/2/79

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:

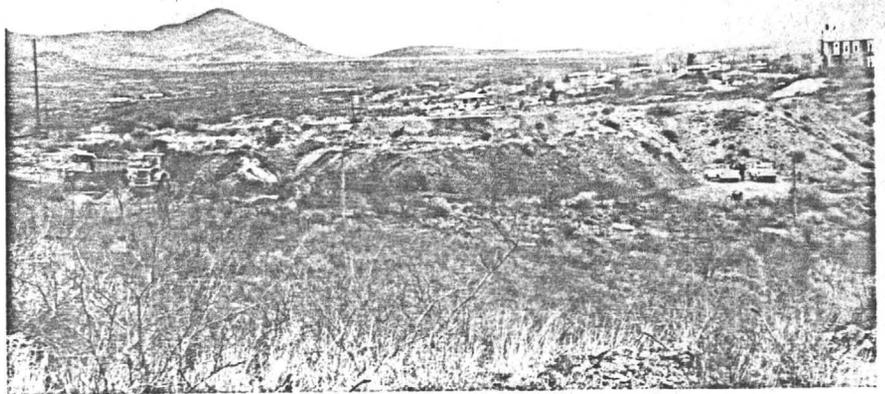
<u>Anticlinal Structure</u>	<u>Vertical Structure</u>
Goodenough roll	West Side Fissure
Quarry roll	Sulphuret Dike(s)
Holderness roll	"409" Fissure
	Empire Dike



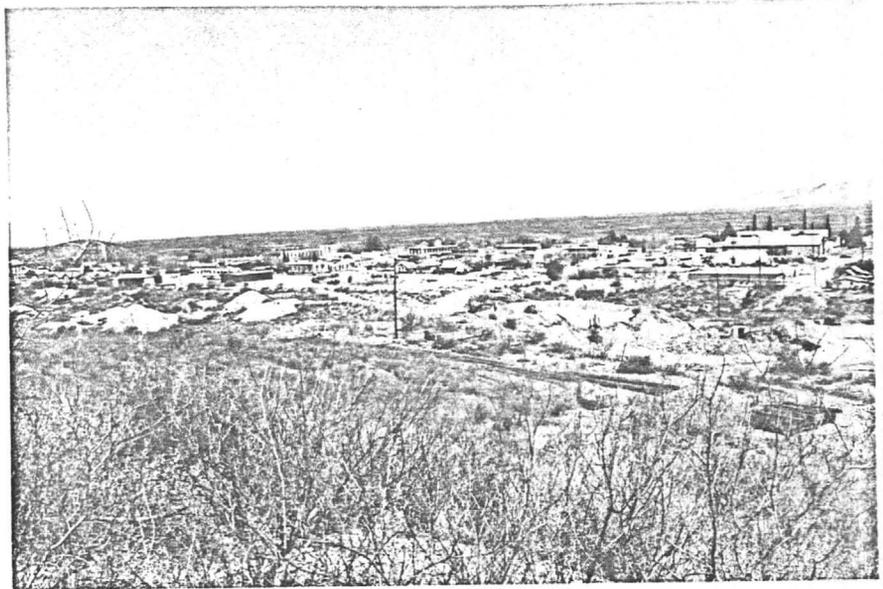


Toughnut dump;
Early phase of hauling
the dump to the heap.
Toughnut Incline is
beyond the pole to
the far left.

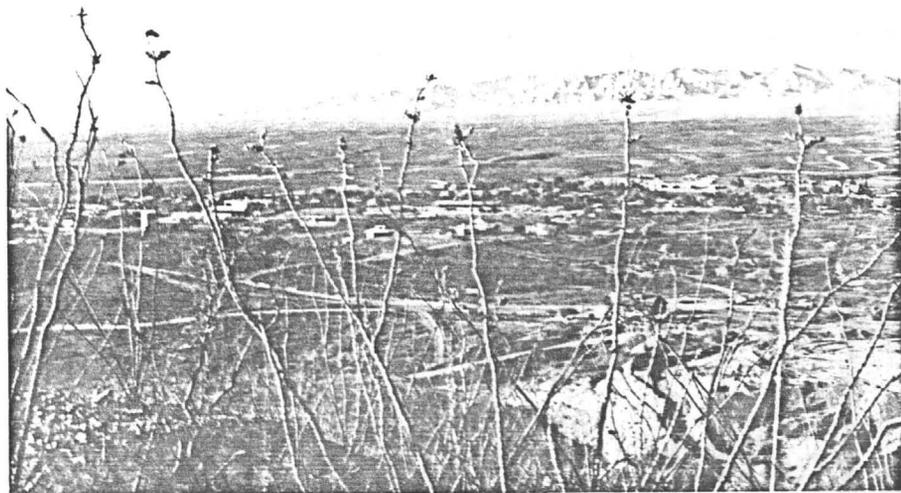
Photo on the facing
page is the early
testing-sampling
of the Toughnut
dumps.

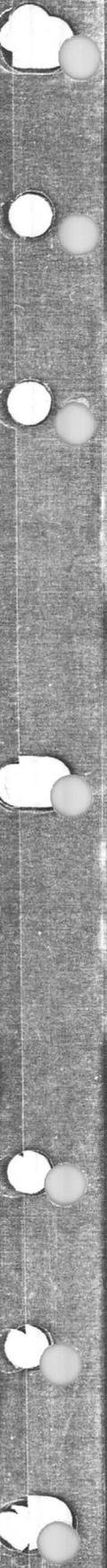
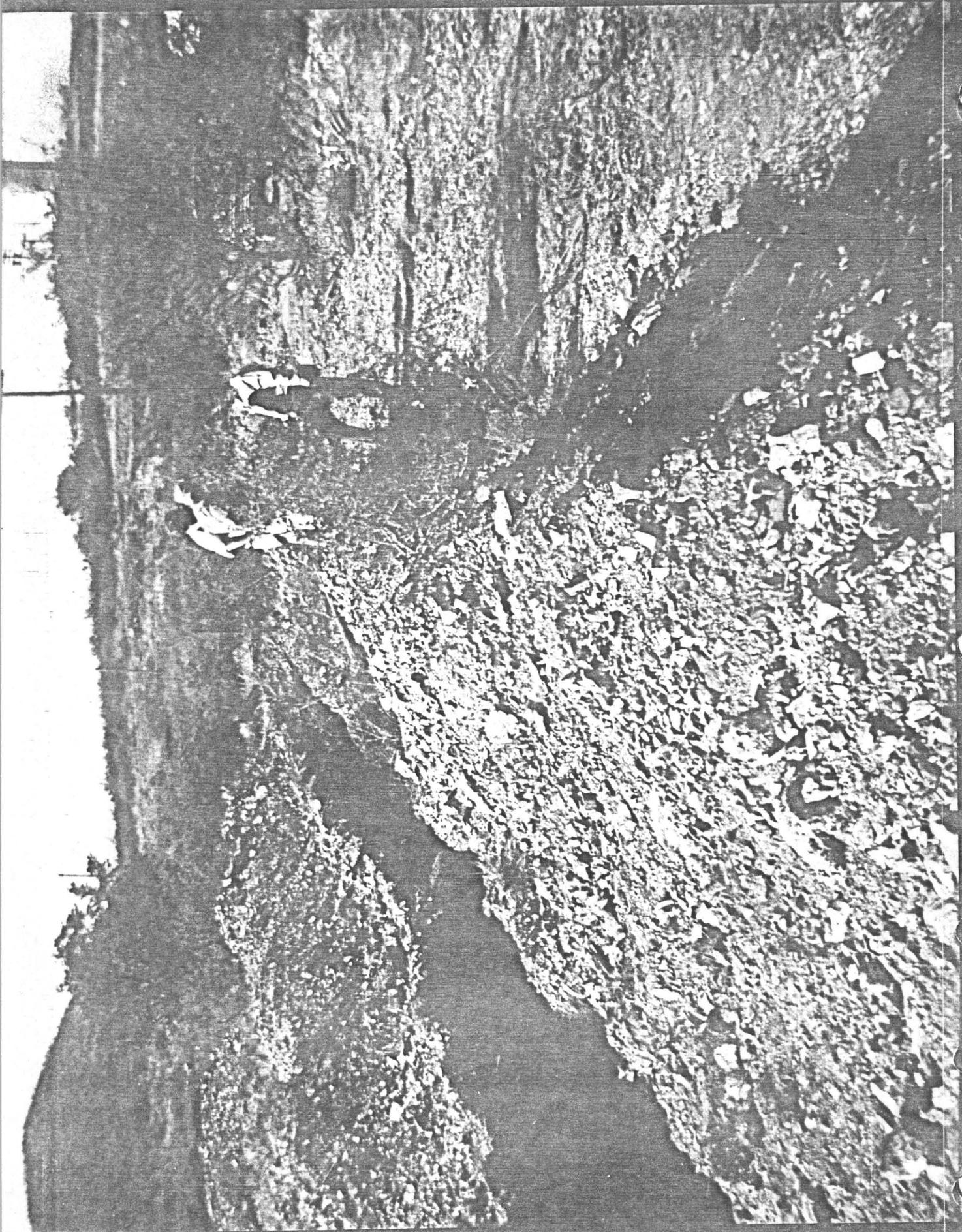


Toughnut dump area;
Most of the dump
has been hauled
to the heap. Work-
ings can be traced on
the surface from the
Goodenough Incline
(small building) to
the Toughnut Incline
(left of pole) and
near small dumps.
Blue limestone
outcrop's in this
area.



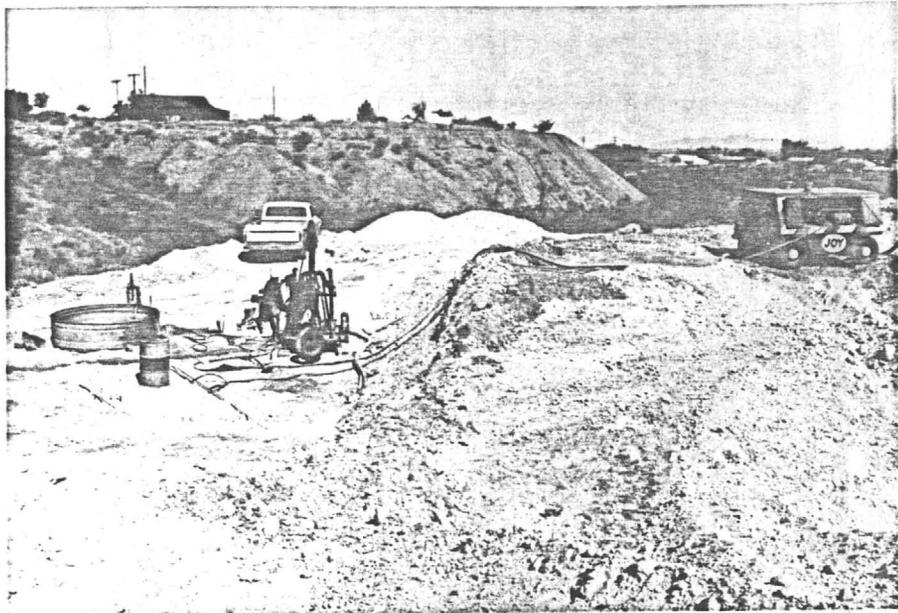
Toughnut-Goodenough-
Empire area from
the Contention
mine, looking
over the
Tranquillity
mine area.



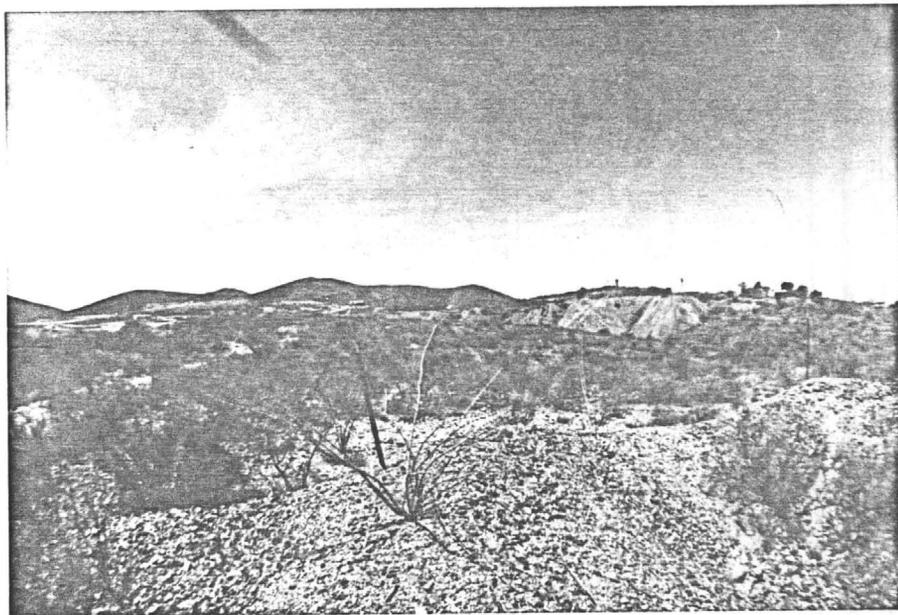


Drilling near Skip Shaft looking at Empire dump before it was hauled to the heap. Red building is where the core is stored.

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

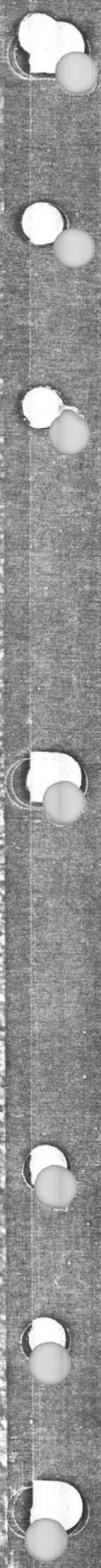
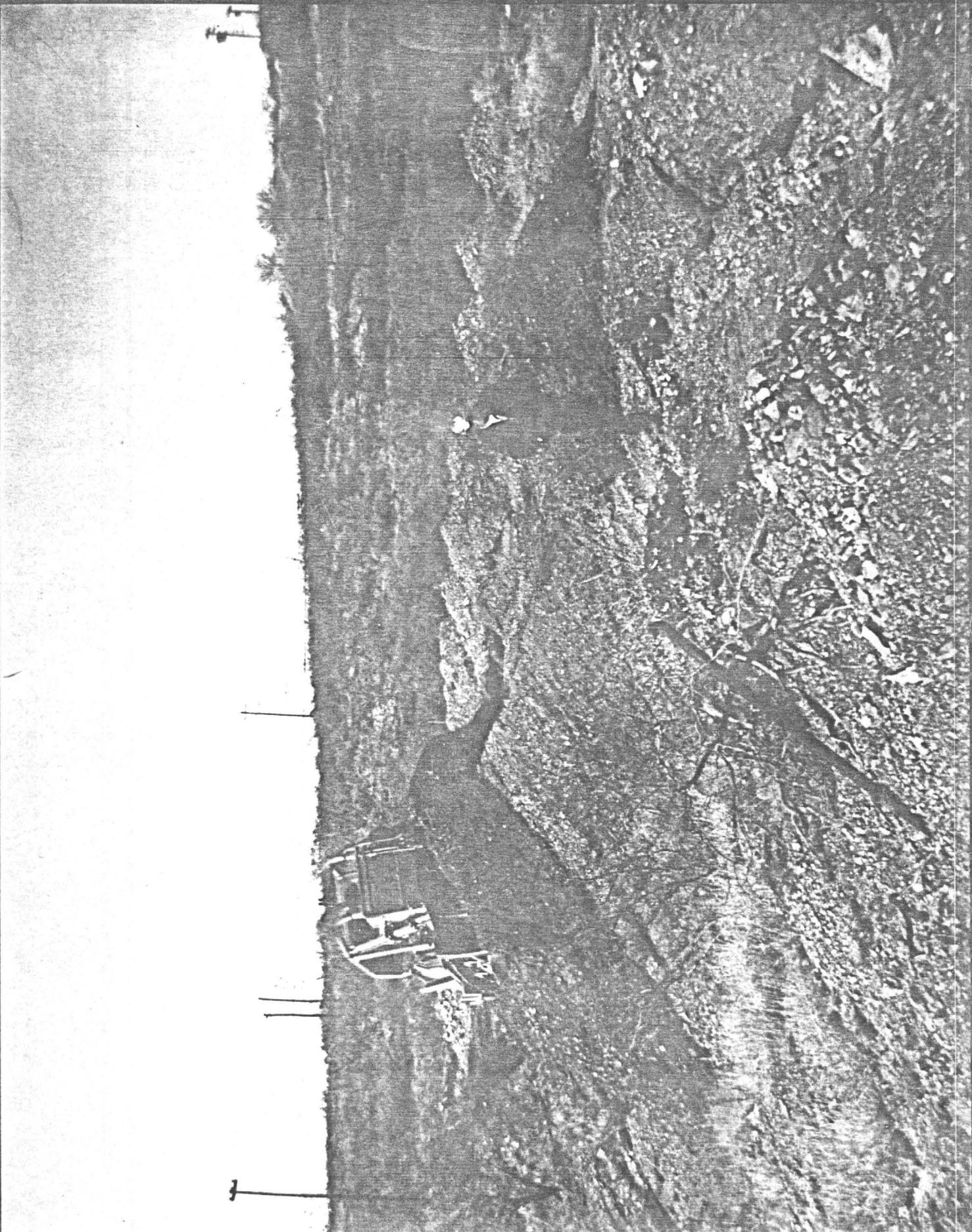


Empire dumps on right and the Tranquillity and Contention areas moving left. Viewed from the Silver Thread looking west. High-grade sulfides on Silver Thread dump; copper-lead-zinc.



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

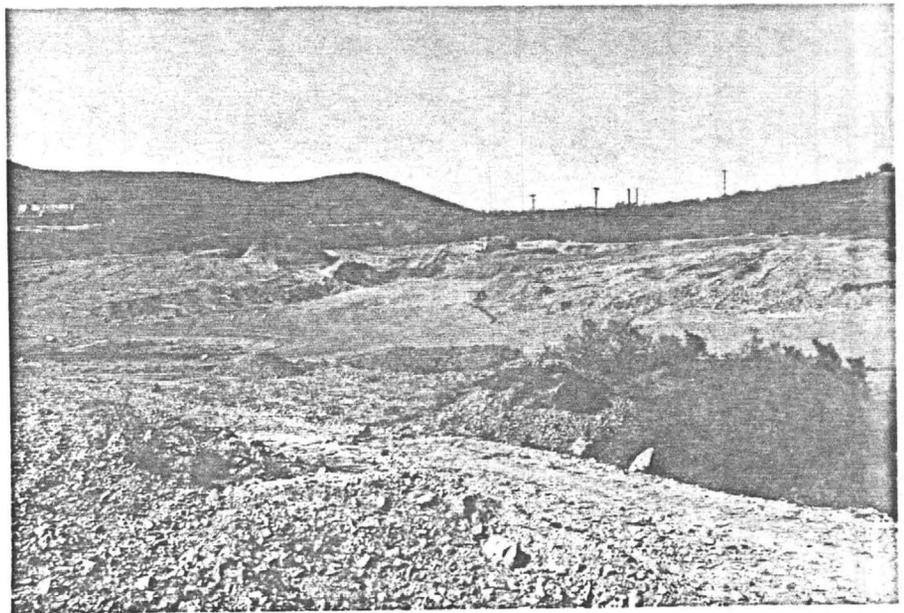




Tranquillity area;
Loading dump ore
for haulage to the
heap. Shaft is to
the left-in bushy
area over grader.

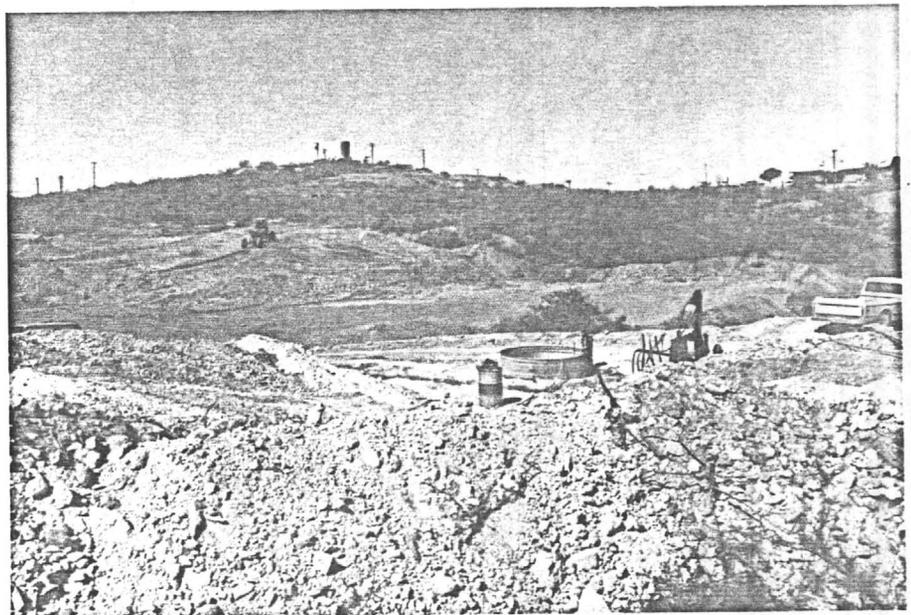


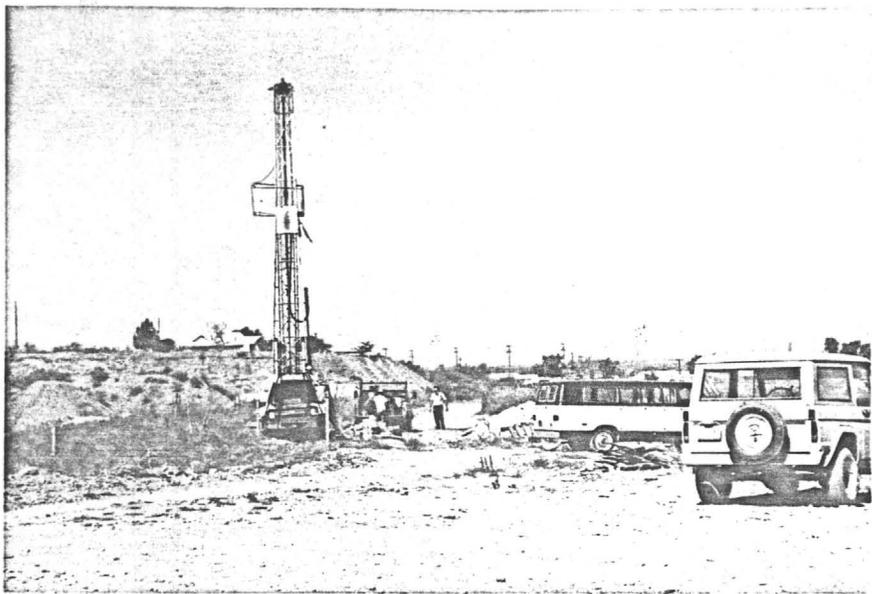
Late stage of dump
haulage to the heap.
Skip Shaft in near
foreground by the
brush. Workings
are accessible and
they are very high
grade; gold values
from .10 to .85
t. ounces. Silver
runs over 10 ounces.



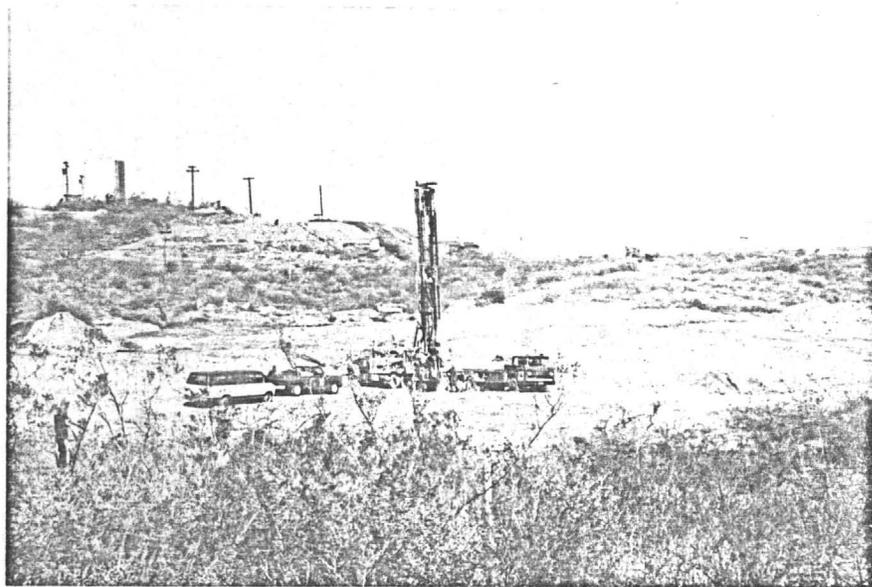
Final phase of dump
clean-up; ready for
sampling-mapping-
drilling.

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

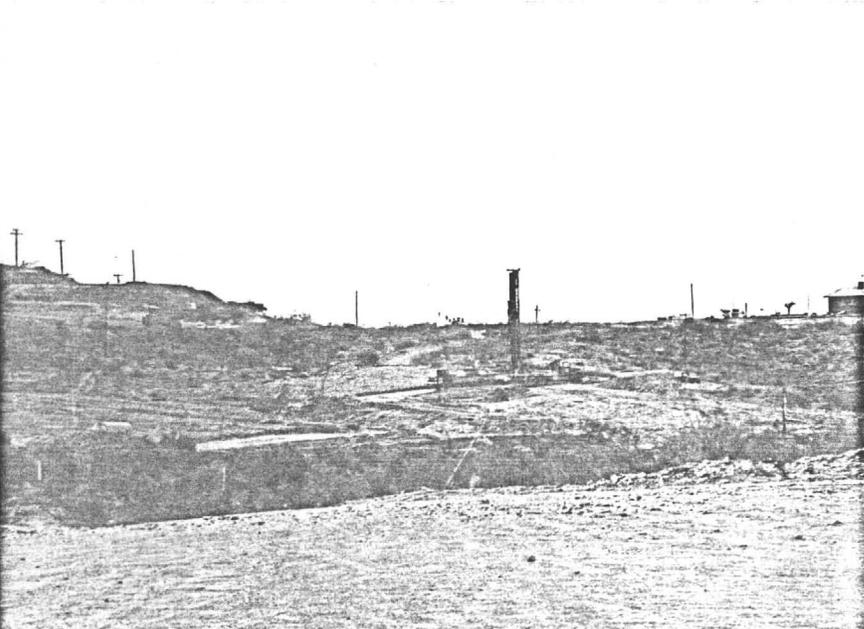




Reverse-Circulation
drilling near Skip
Shaft. Empire dump
in the background.



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.

4N-135W

PIRE

ANTICLINE

-75

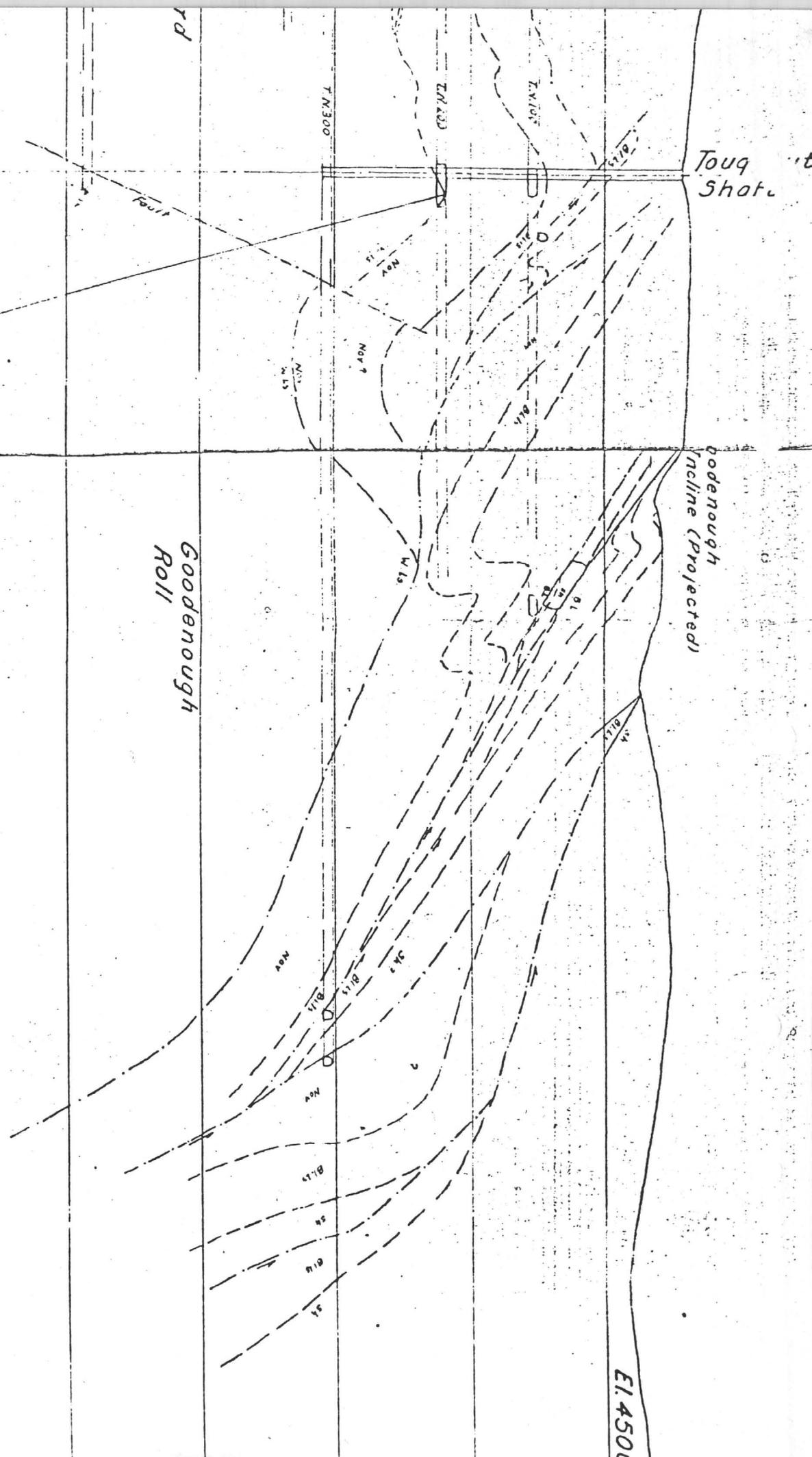
Goodenough
Roll

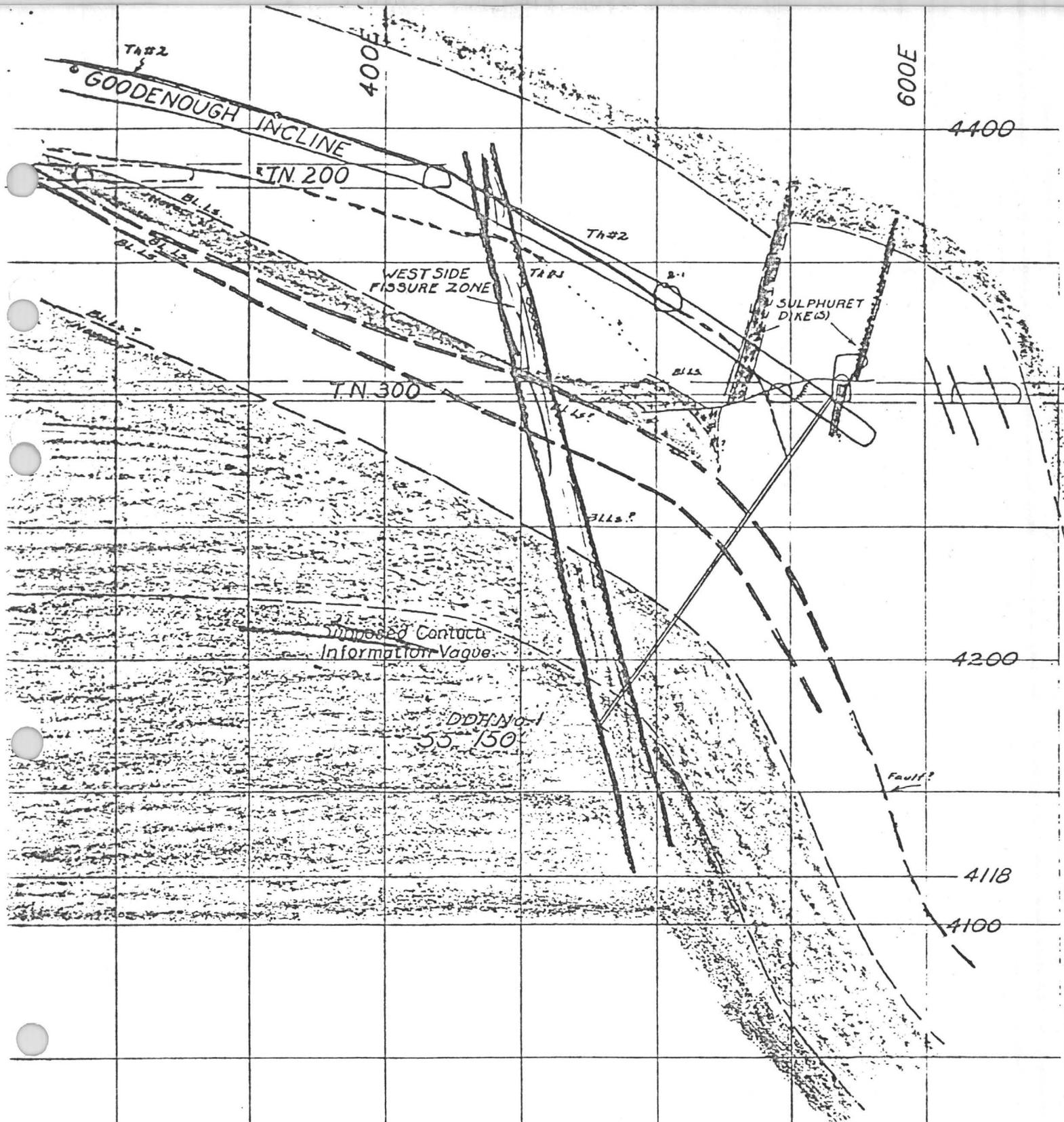
Touq
Shot

Goodenough
Incline (Projected)

E1400

E1450

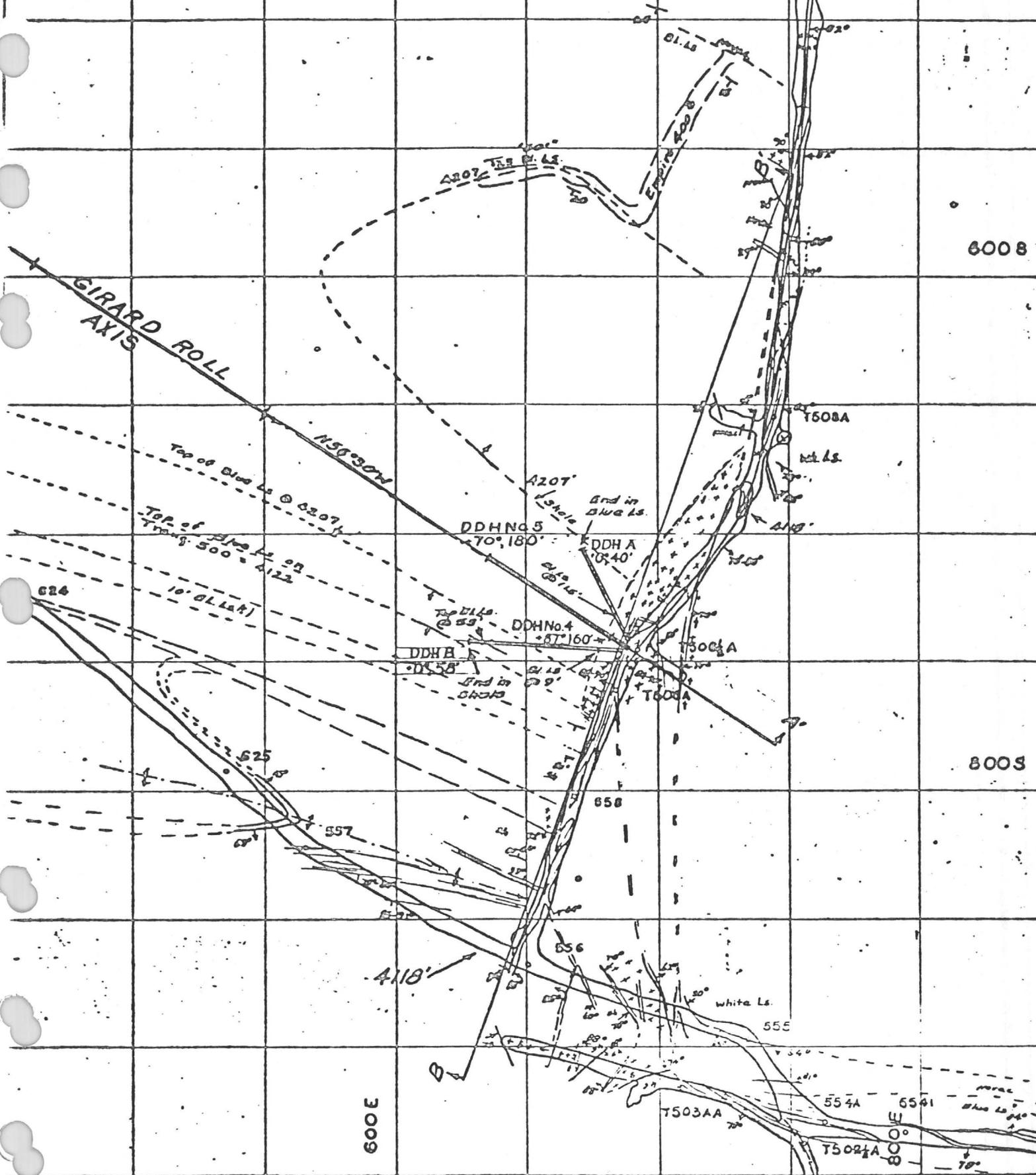




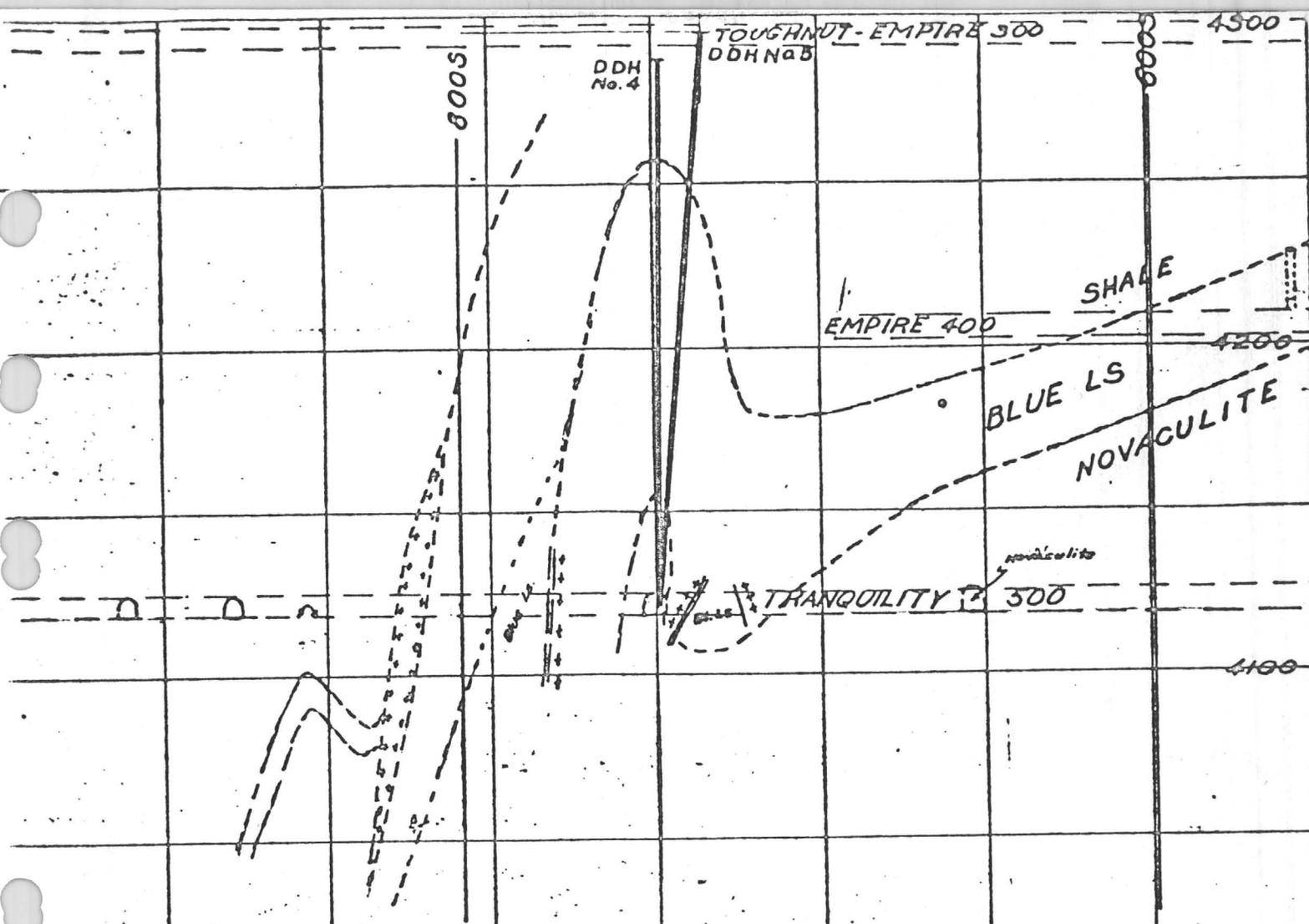
TOMBSTONE DEVELOPMENT COMPANY
 VERTICAL SECTION OF DDH NO. 1
 S85°30'W, 150', 55°, or 255N, 566E
 Looking NW. As Proposed
 1"=50' April 1, 1954 JPM

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

TCMBSTONE DEVELOPMENT COMPANY
PLAN-PROPOSED DDH NOS 4 & 5
TRANQUILITY 500 LEVEL
 1"=50' June 8, 1954 J.P.M.

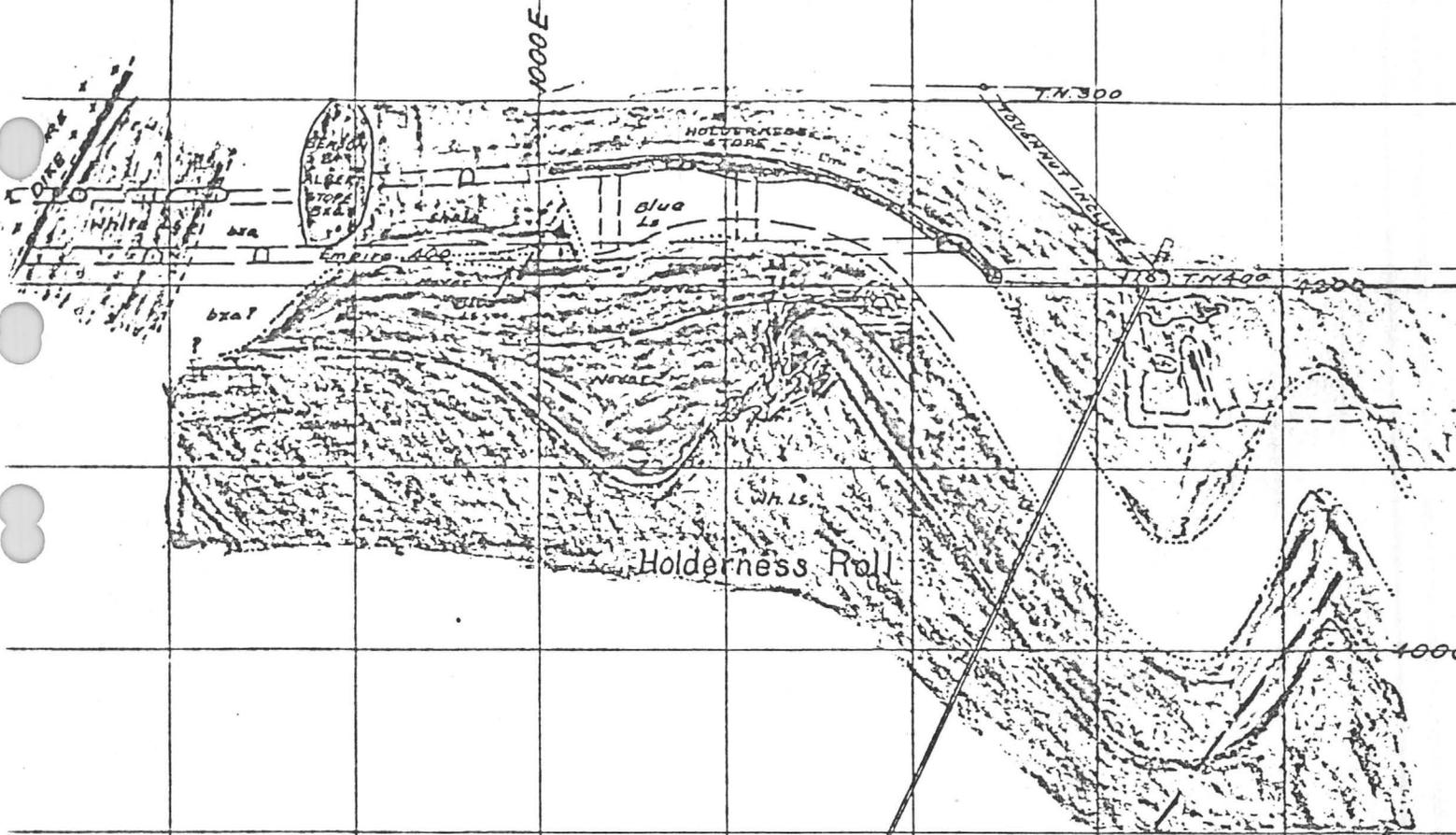


MINE _____ LOCATION _____ LEVEL _____
 GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
 E _____ EL. _____



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. _____
 TUCKER BLUE PRINT CO. — K & B ALBANY 1964



409° VEIN @ 70° DIP

409° VEIN @ 75° DIP

DDH 3
-65°.700'

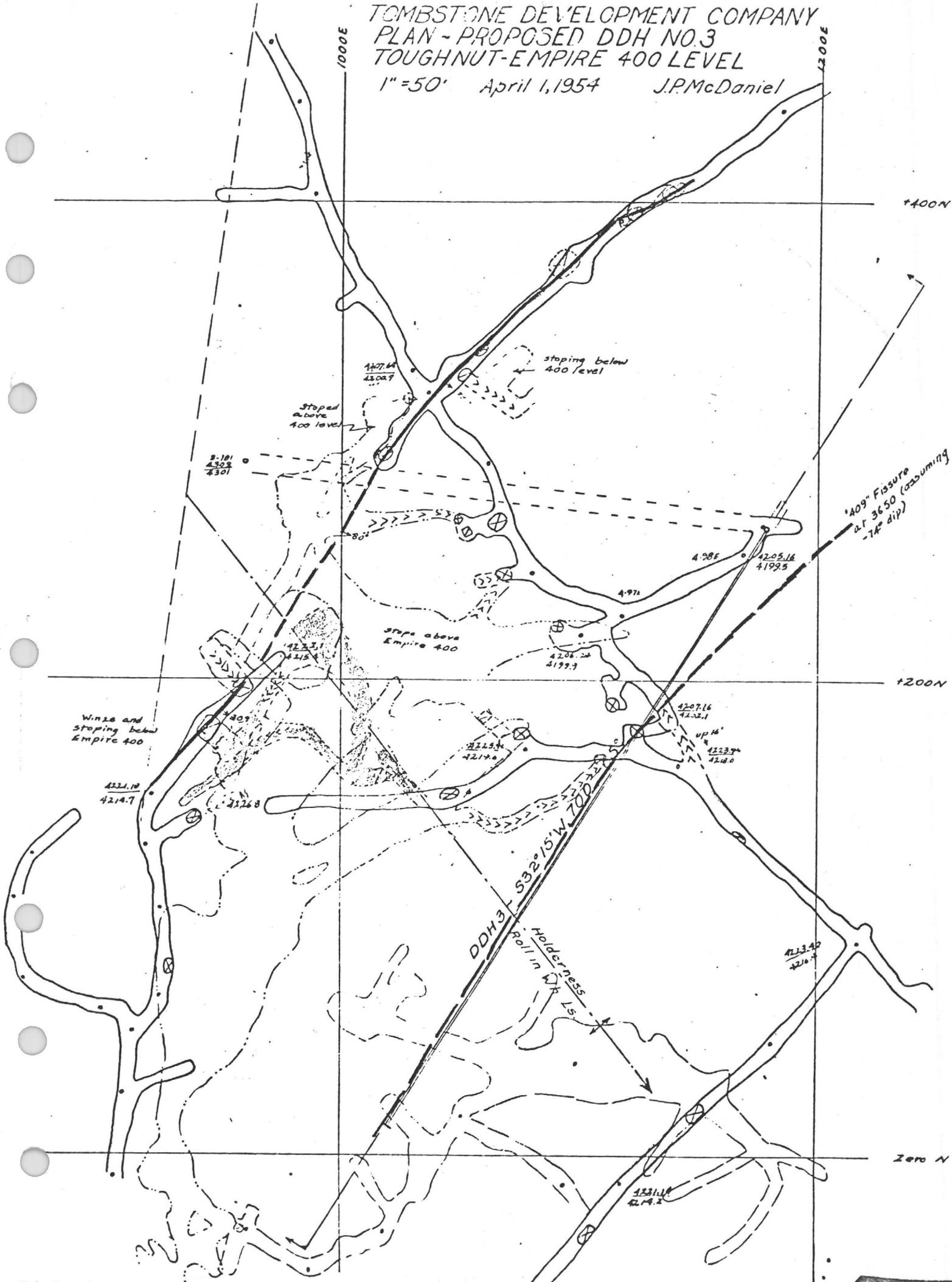
NEVER DRILLED?
E.S. 4/76

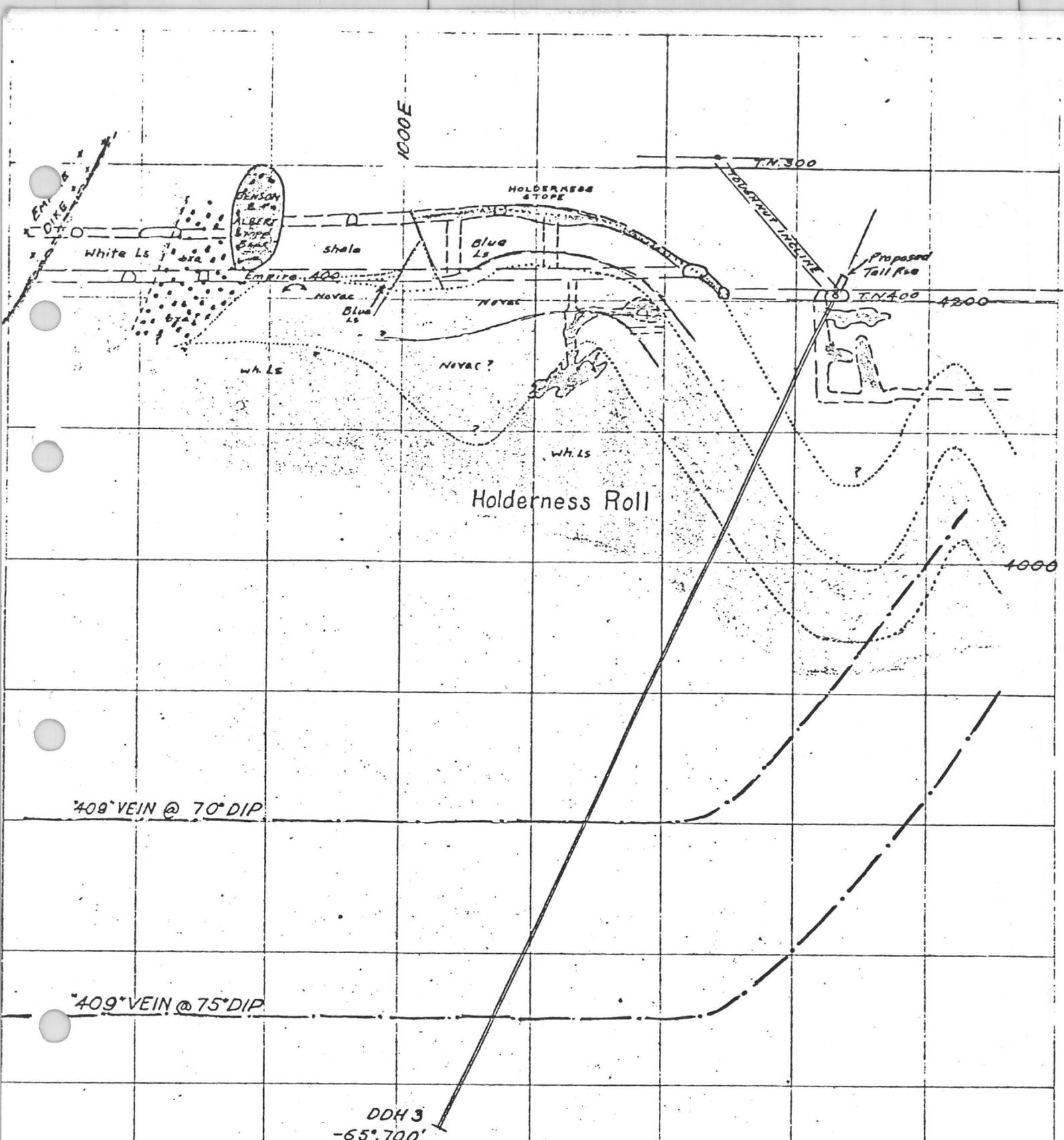
TOMBSTONE DEVELOPMENT CO.
VERTICAL SECTION OF DDH NO. 3
S32°15'W, 700'-6.5', at 263N, 1178E
Looking NW, As Proposed
1"=100' April 1, 1954 JPM

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

TOMBSTONE DEVELOPMENT COMPANY
PLAN - PROPOSED DDH NO.3
TOUGHNUT-EMPIRE 400 LEVEL

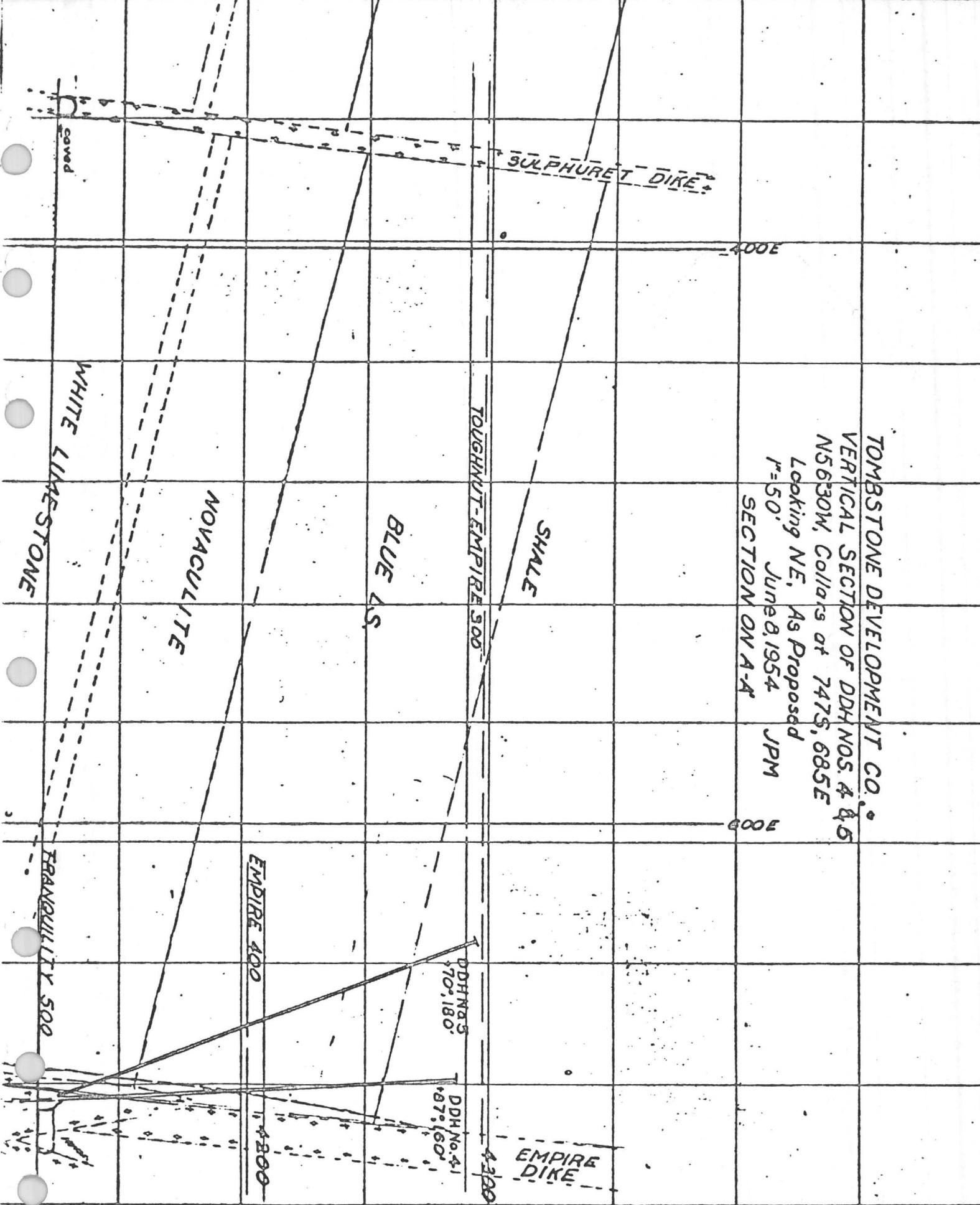
1" = 50' April 1, 1954 J.P. McDaniel





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

MINE _____ LOCATION _____ LEVEL _____
 GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
 N _____ E _____ FI _____



TOMBSTONE DEVELOPMENT CO.
 VERTICAL SECTION OF DDH NOS. 4 & 5
 N56°30M, Collars at 747S, 685E
 Looking NE, As Proposed
 Iⁿ = 50° June 8, 1954 JPM
 SECTION ON A-A'

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

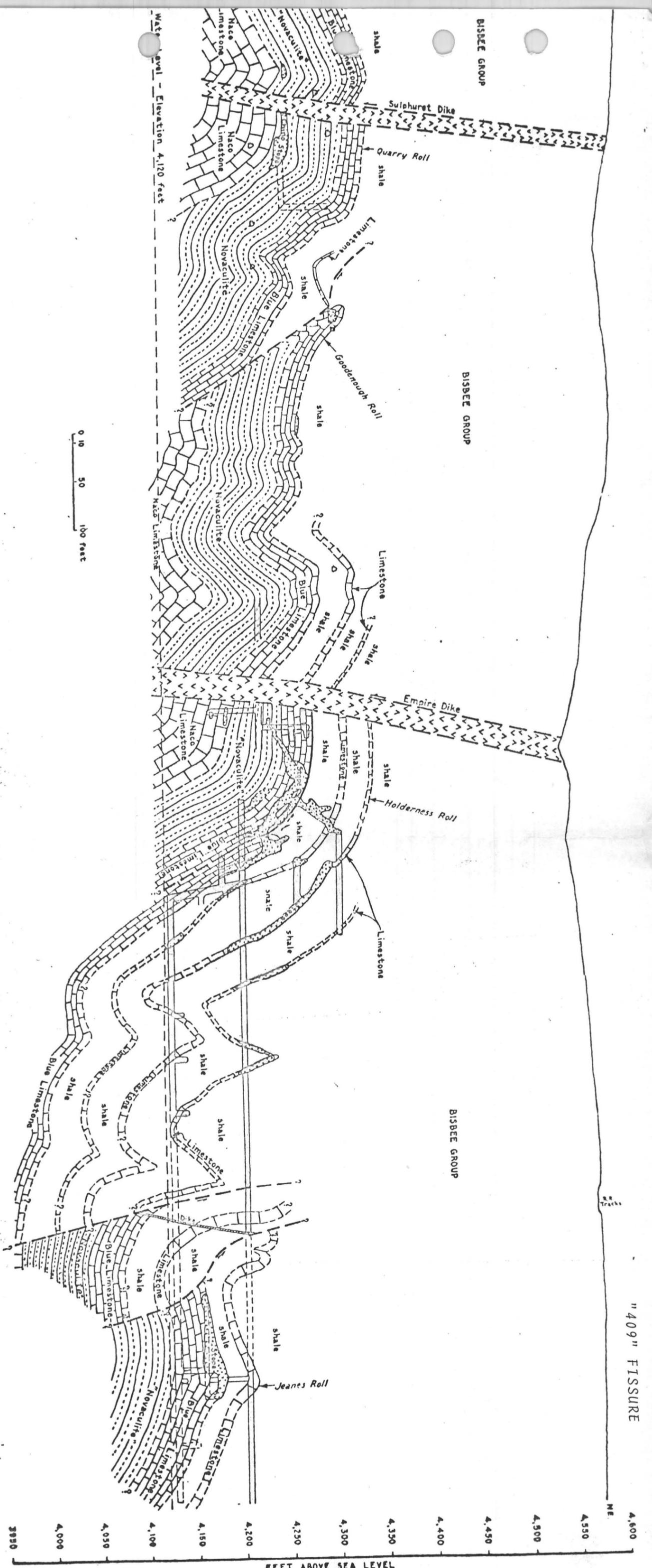


Plate XV.—Section along "409" fissure, looking northwest.

"409" FISSURE

NE

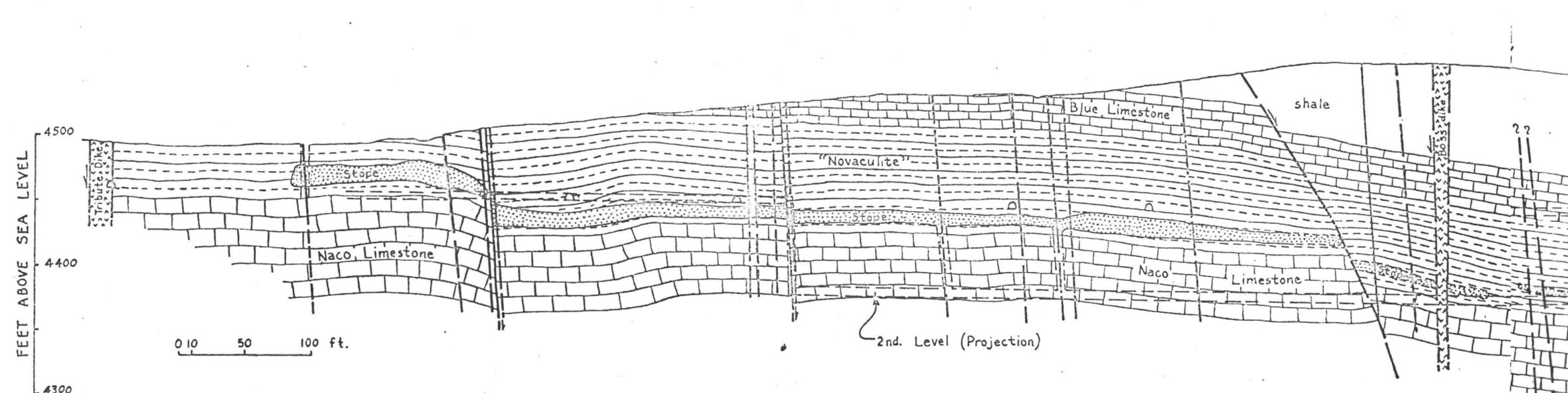


Plate XIX, A.—Longitudinal section near axis of Quarry roll, looking northeast (northwestern half; joins Plate XIX, B at y-y).

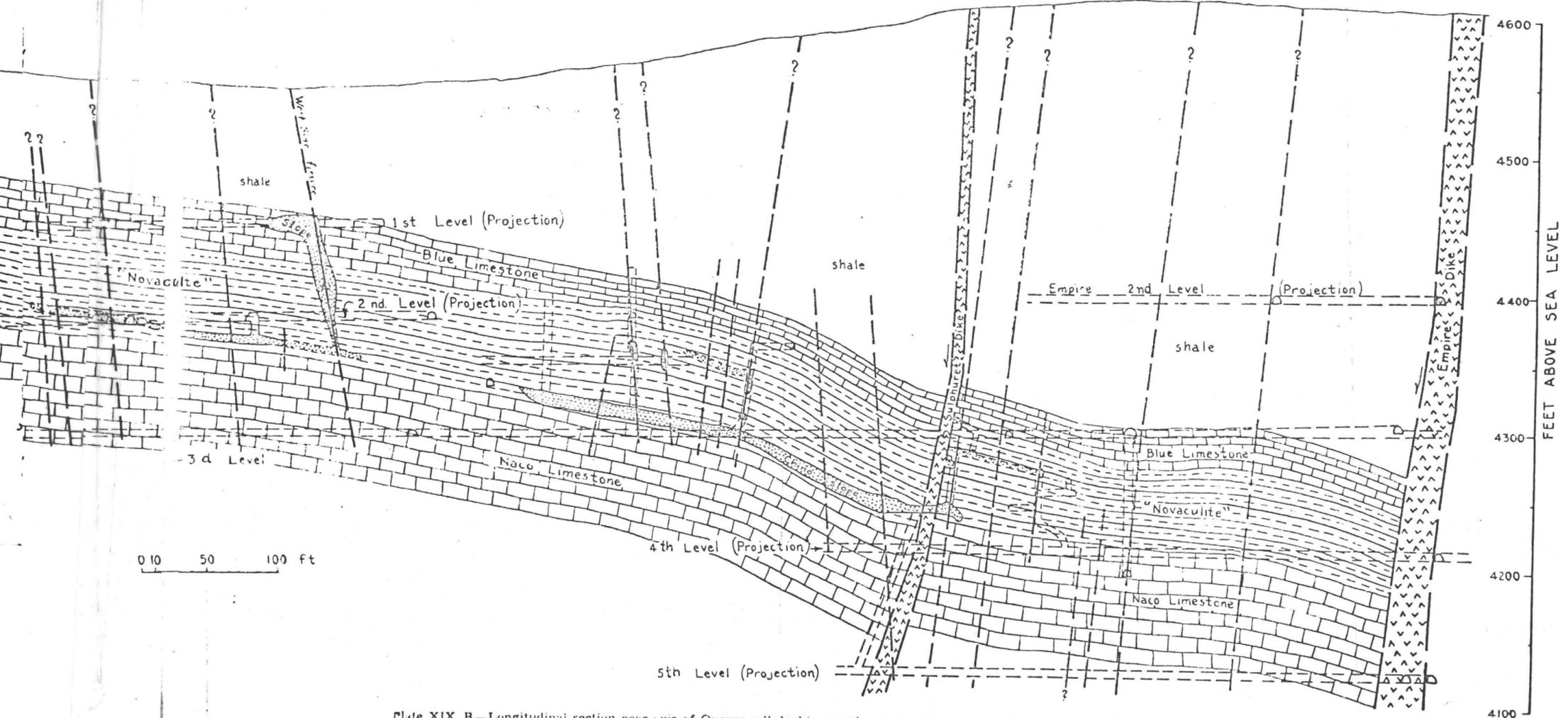


Plate XIX, B.—Longitudinal section near axis of Quarry roll, looking northeast (southeastern half; joins Plate XIX, A at y-y).

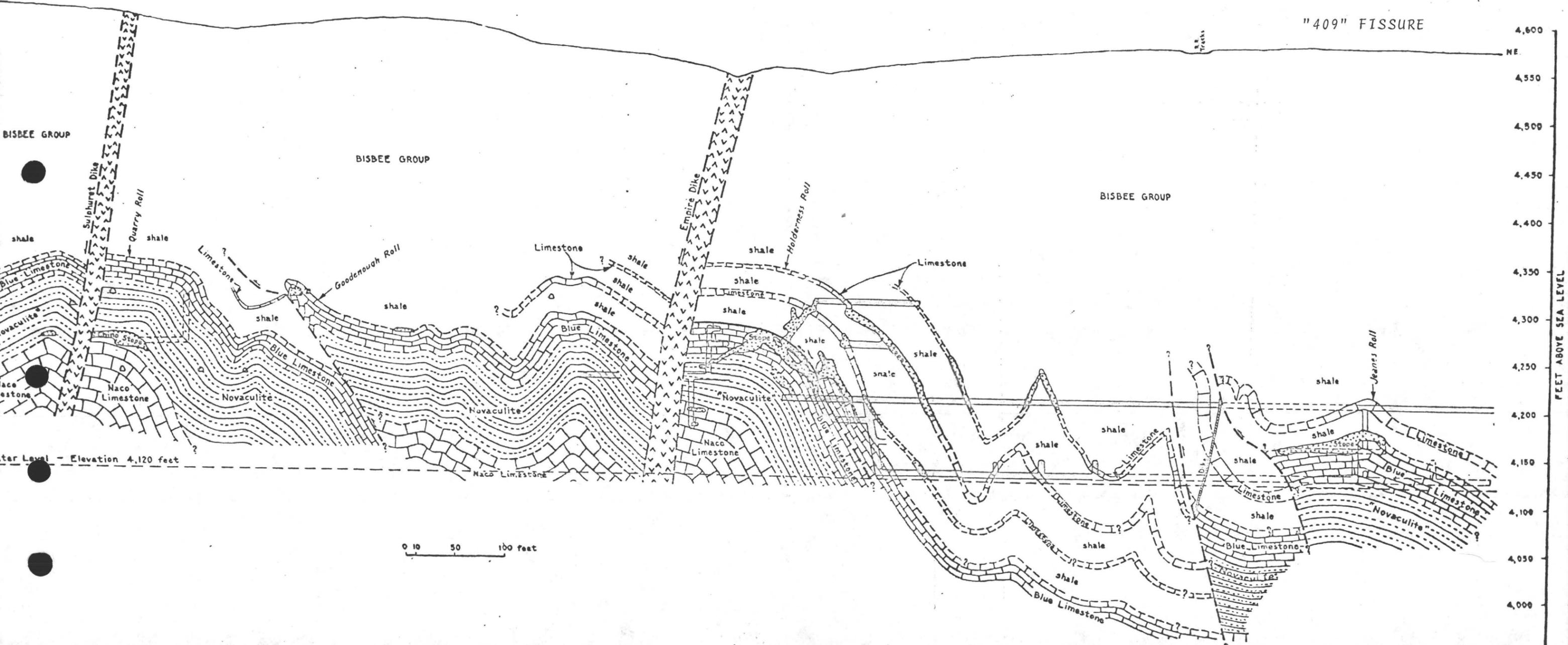
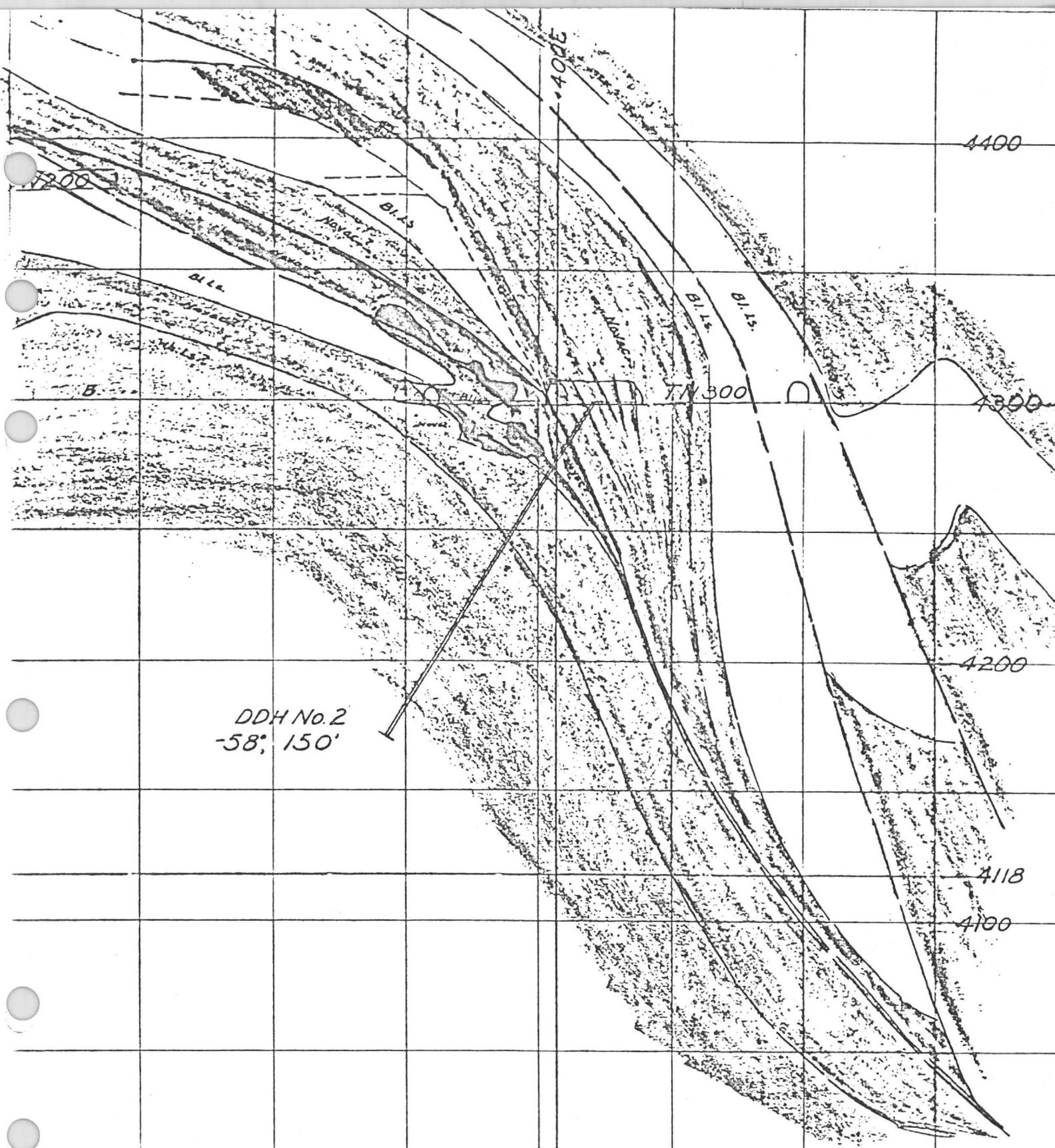


Plate XV. Section along "409" fissure.

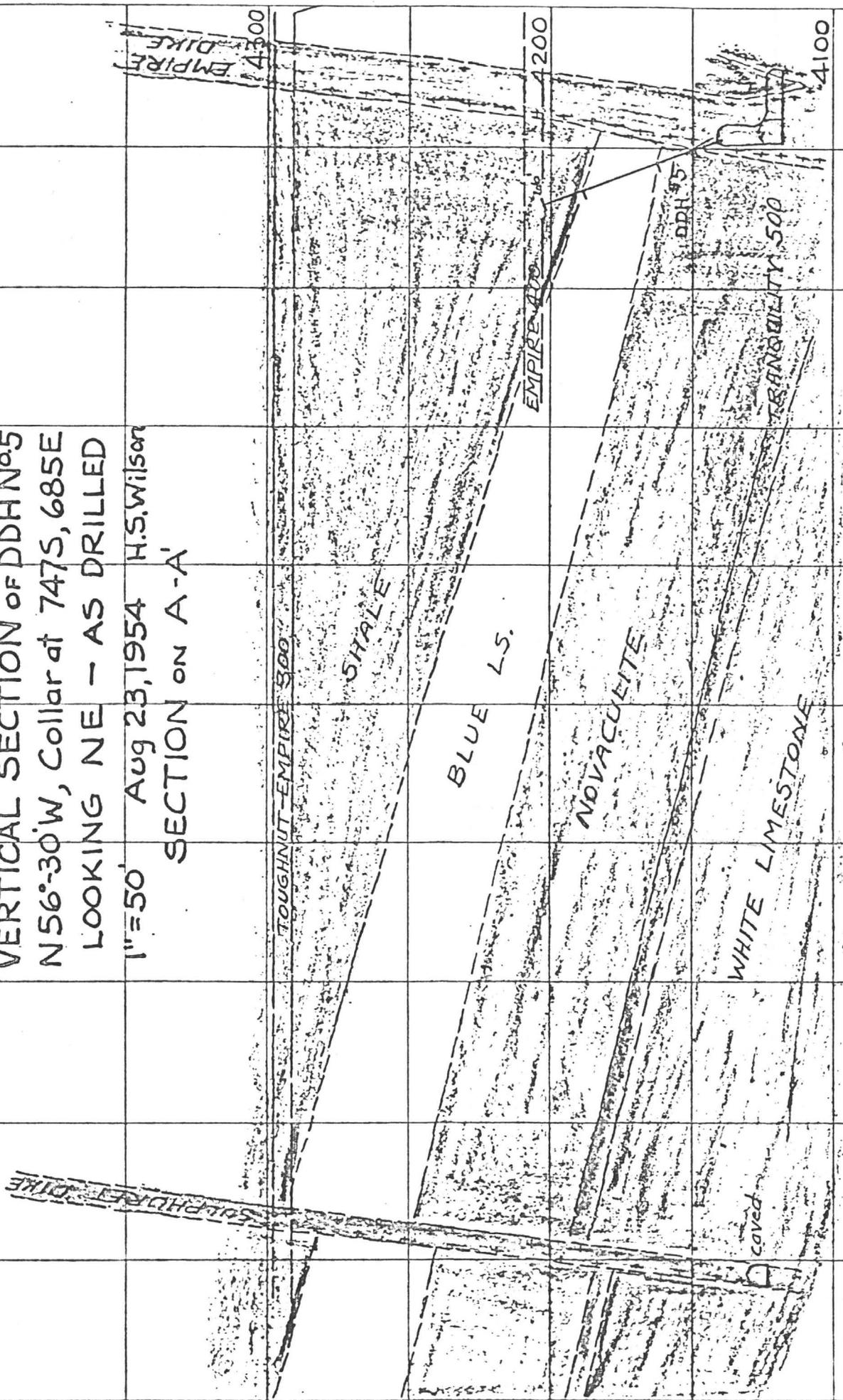


TOMBSTONE DEVELOPMENT COMPANY
 VERTICAL SECTION OF DDH NO. 2
 S59°0'W, 150', -58°, at 444N, 413E
 Looking NW, As Proposed
 1"=50' April 1, 1954 JPM

LINE _____ LOCATION _____ LEVEL _____
 GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
 ↓ _____ E _____ EL. _____
 UCSON BLUE PRINT CO. — K & E ALBANY 195M

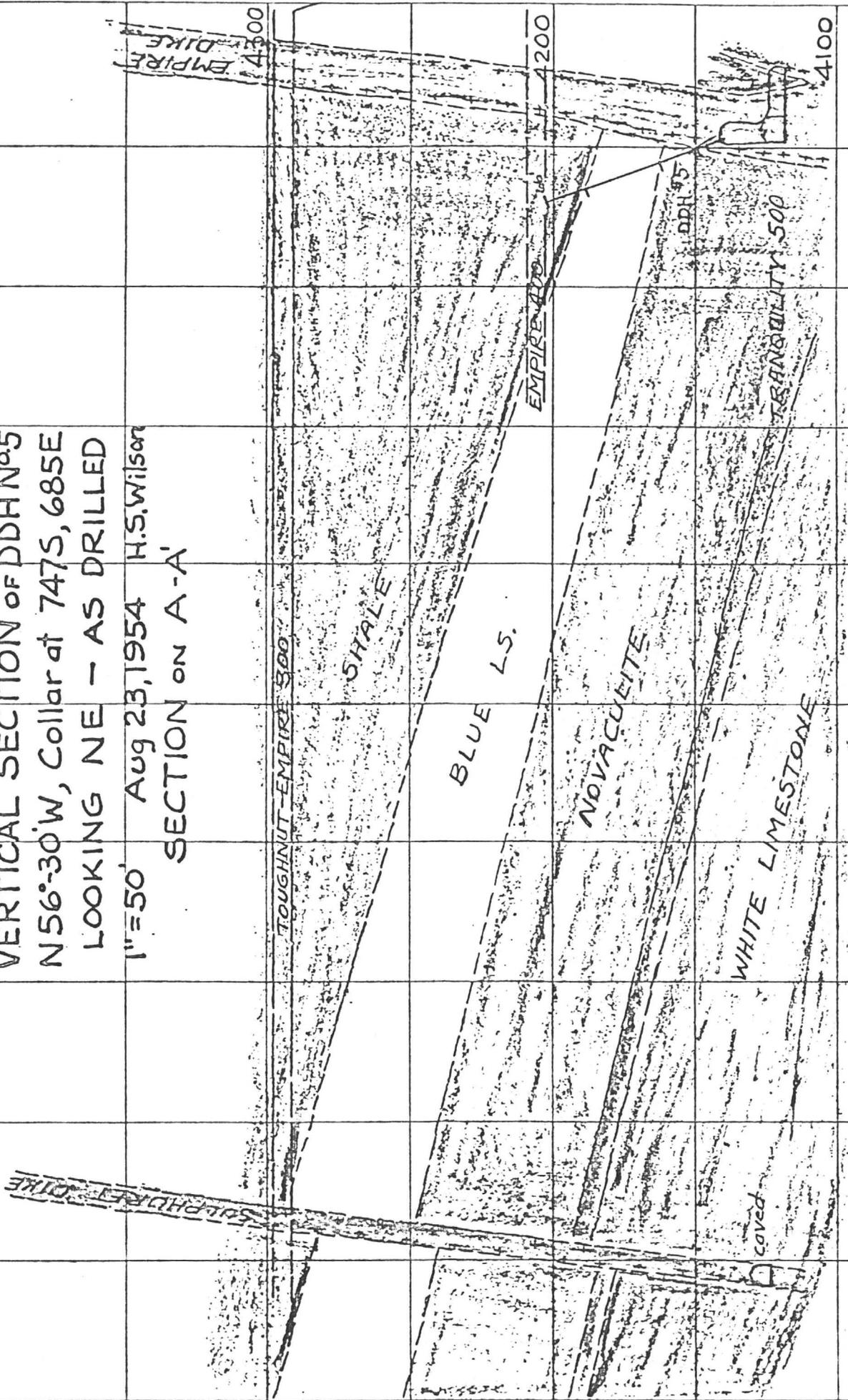
TOMBSTONE DEVELOPMENT CO.
 VERTICAL SECTION OF DDHN#5
 N56°30'W, Collar at 7475, 685E
 LOOKING NE - AS DRILLED
 1"=50' Aug 23, 1954 H.S. Wilson
 SECTION ON A-A'

4400



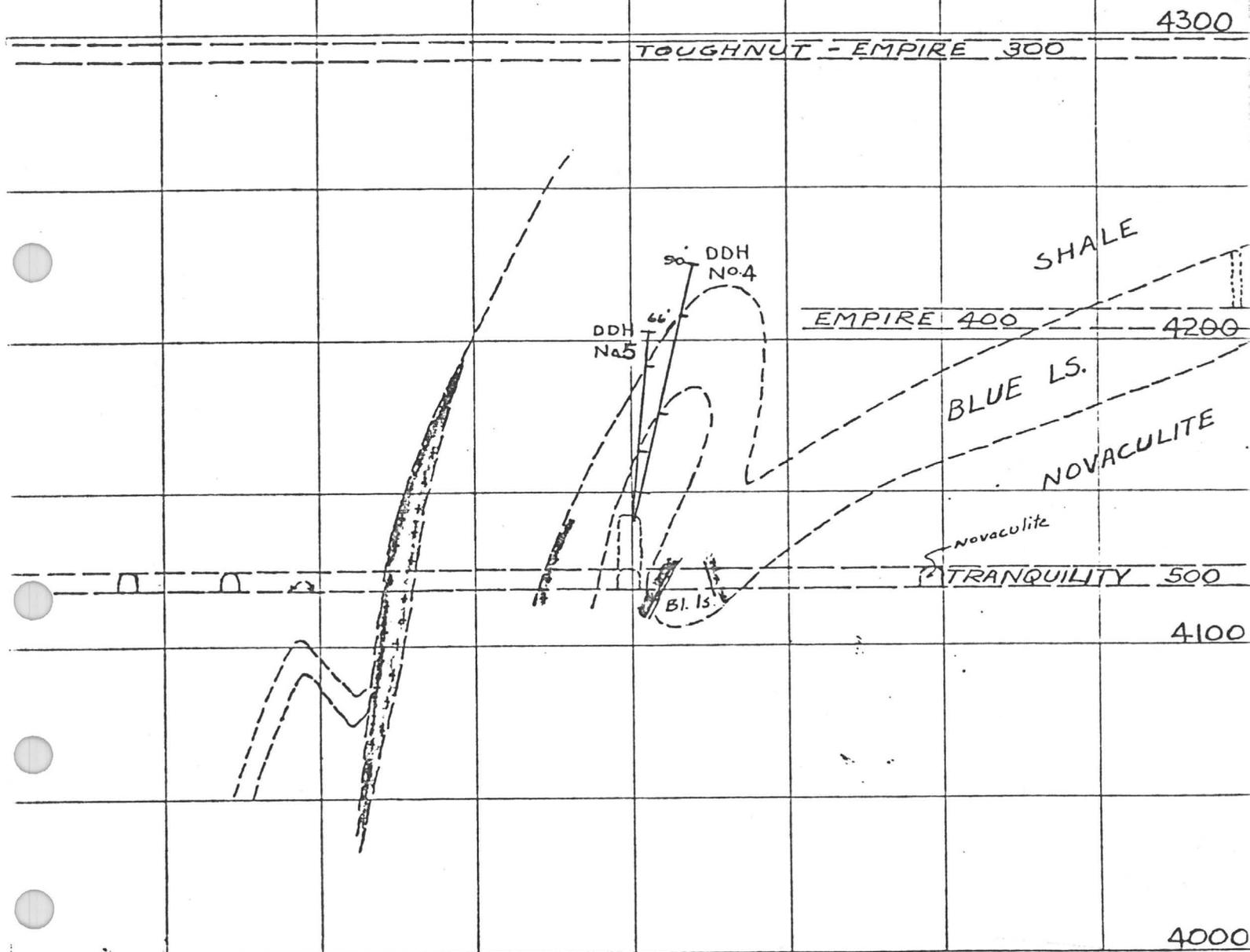
TOMBSTONE DEVELOPMENT CO.
 VERTICAL SECTION OF DDH N°5
 N56°30'W, Collar at 747S, 685E
 LOOKING NE - AS DRILLED
 1"=50' Aug 23, 1954 H.S. Wilson
 SECTION ON A-A'

4400

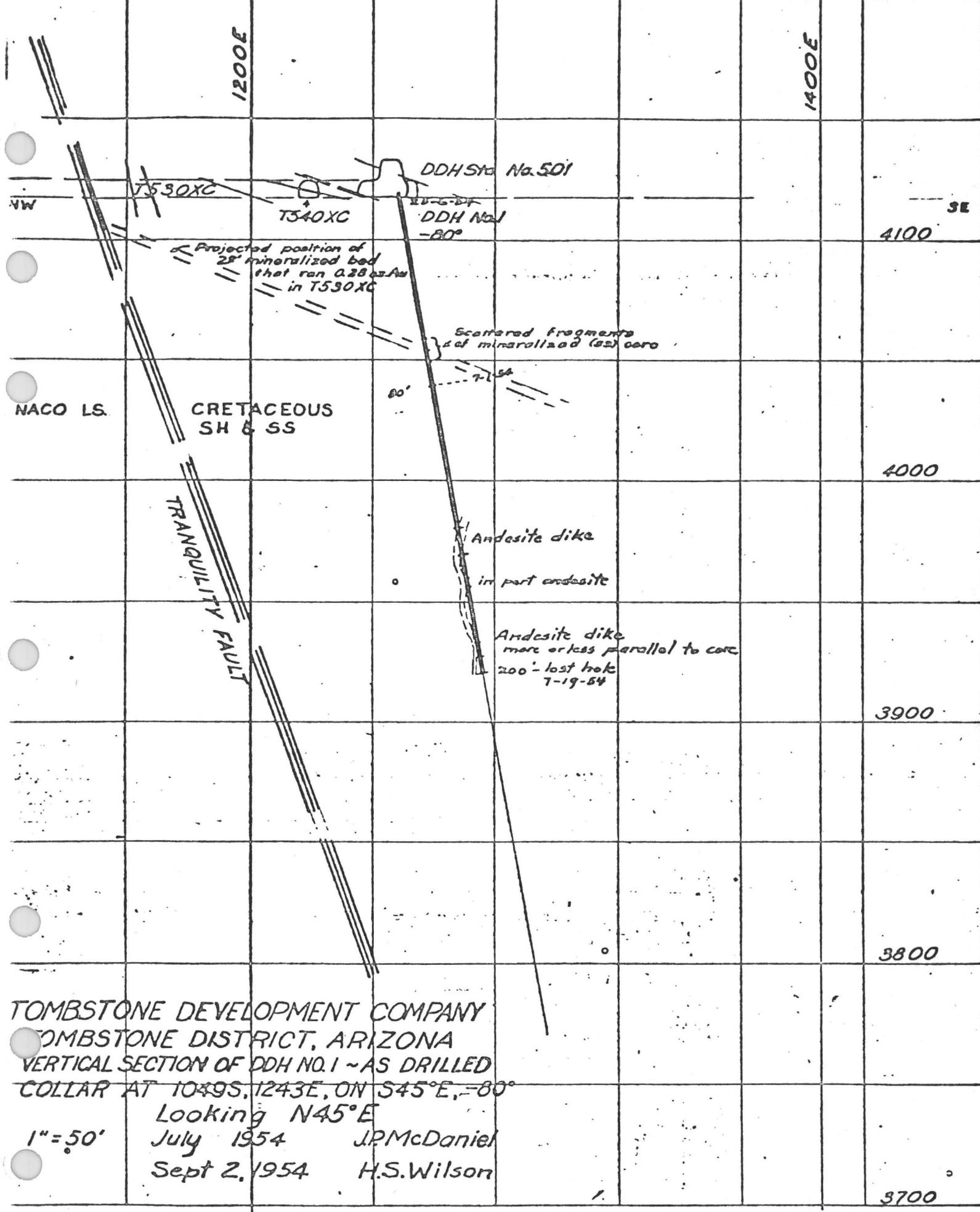


NAME _____ LOCATION _____ LEVEL _____
 GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
 N _____ E _____ EL. _____

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. _____



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

LINE _____ LOCATION _____ LEVEL _____
 GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____
 N _____ E _____ EL. _____
 UNION BLUE PAINT CO. - E & E ALBANY 1954

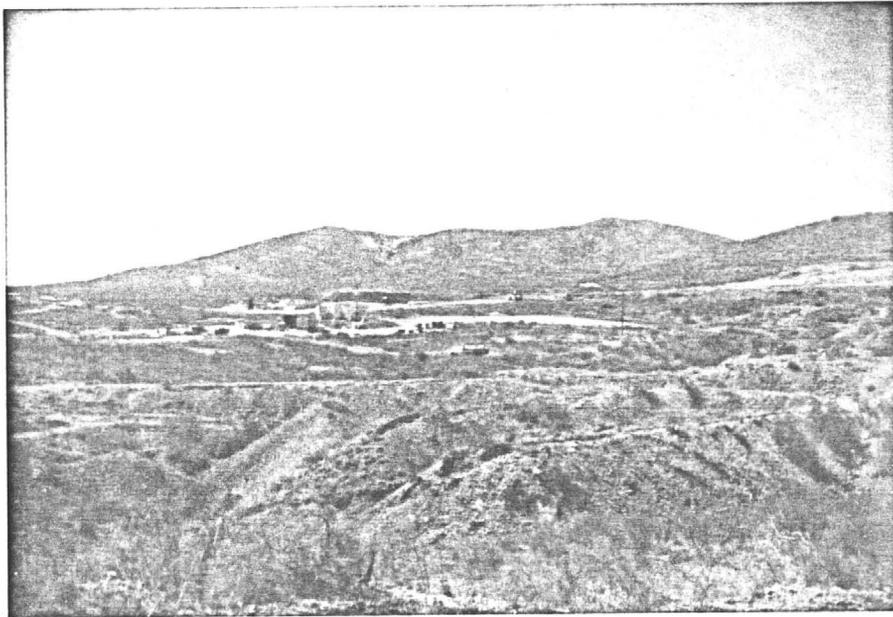
HEWLETT MANAGEMENT

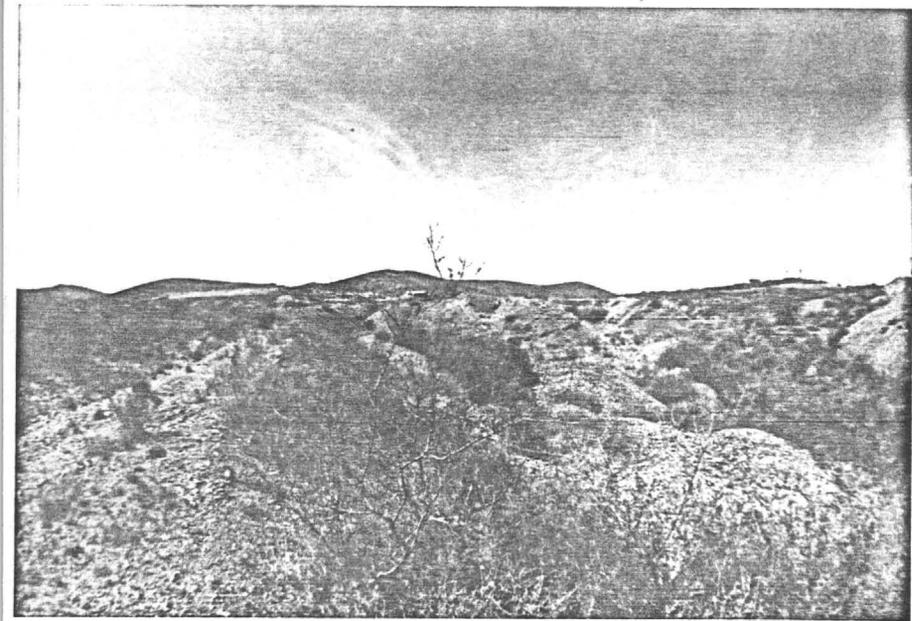
R. F. HEWLETT
PHONE (702) 359-1069

2602 Monte Verde Way
Sparks, Nevada 89431

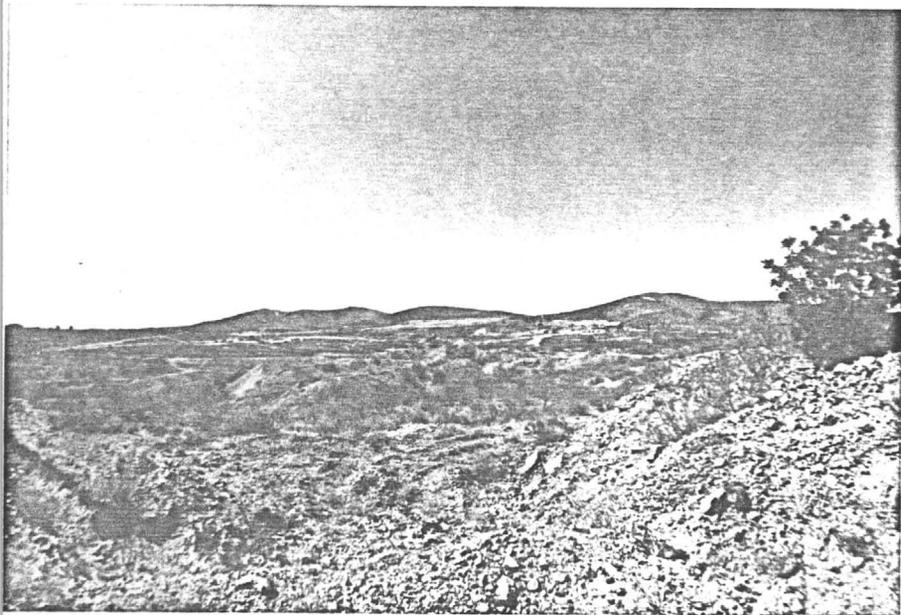
SKIP SHAFT-SILVER THREAD: The Skip Shaft area deserves much sampling and mapping, followed by drilling. Very encouraging results have been obtained in the past. The following plate shows the vast extent of the near-surface stopes; an excellent open-pit target. This "Tombstone Triangle" area deserves 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.

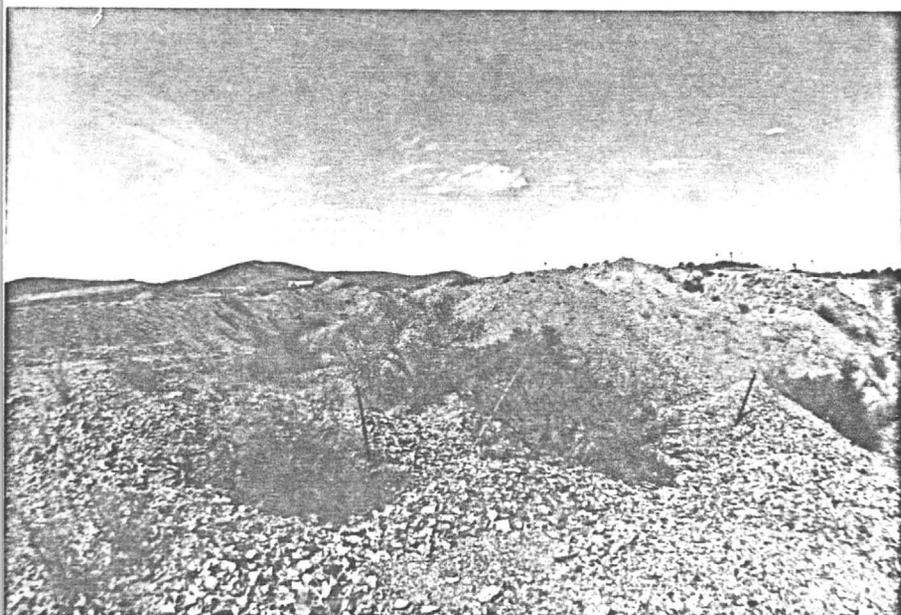




Silver Thread mine and dump area looking west toward Contention area. This is a target area for additional drilling.



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 content, starting on the surface.

LONGITUDINAL SECTION ON SKP SHAFT FISSURE

Scale 0 50 100 feet

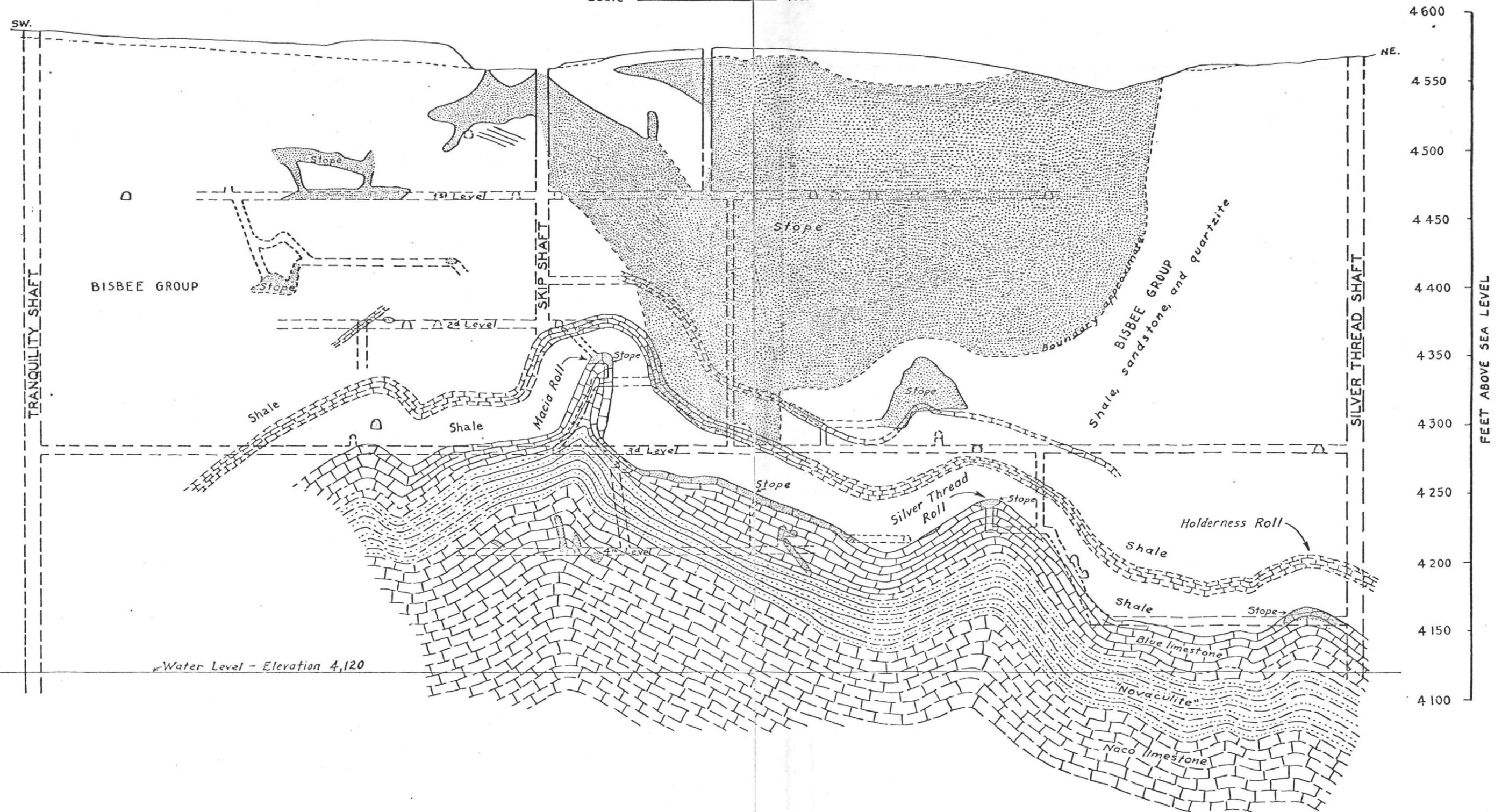


Plate XXIII.—Longitudinal section on Skp shaft fissure, looking northwest.

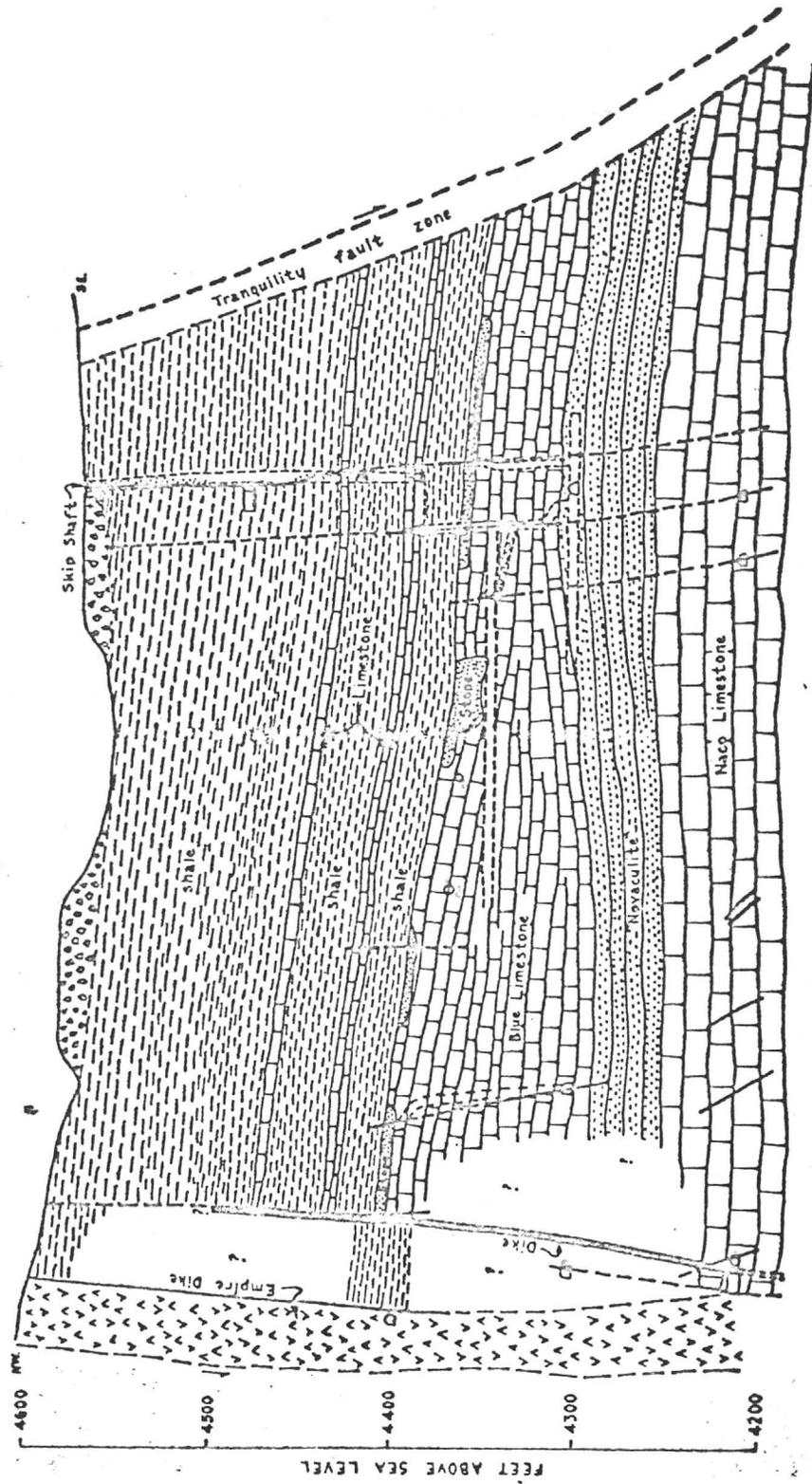
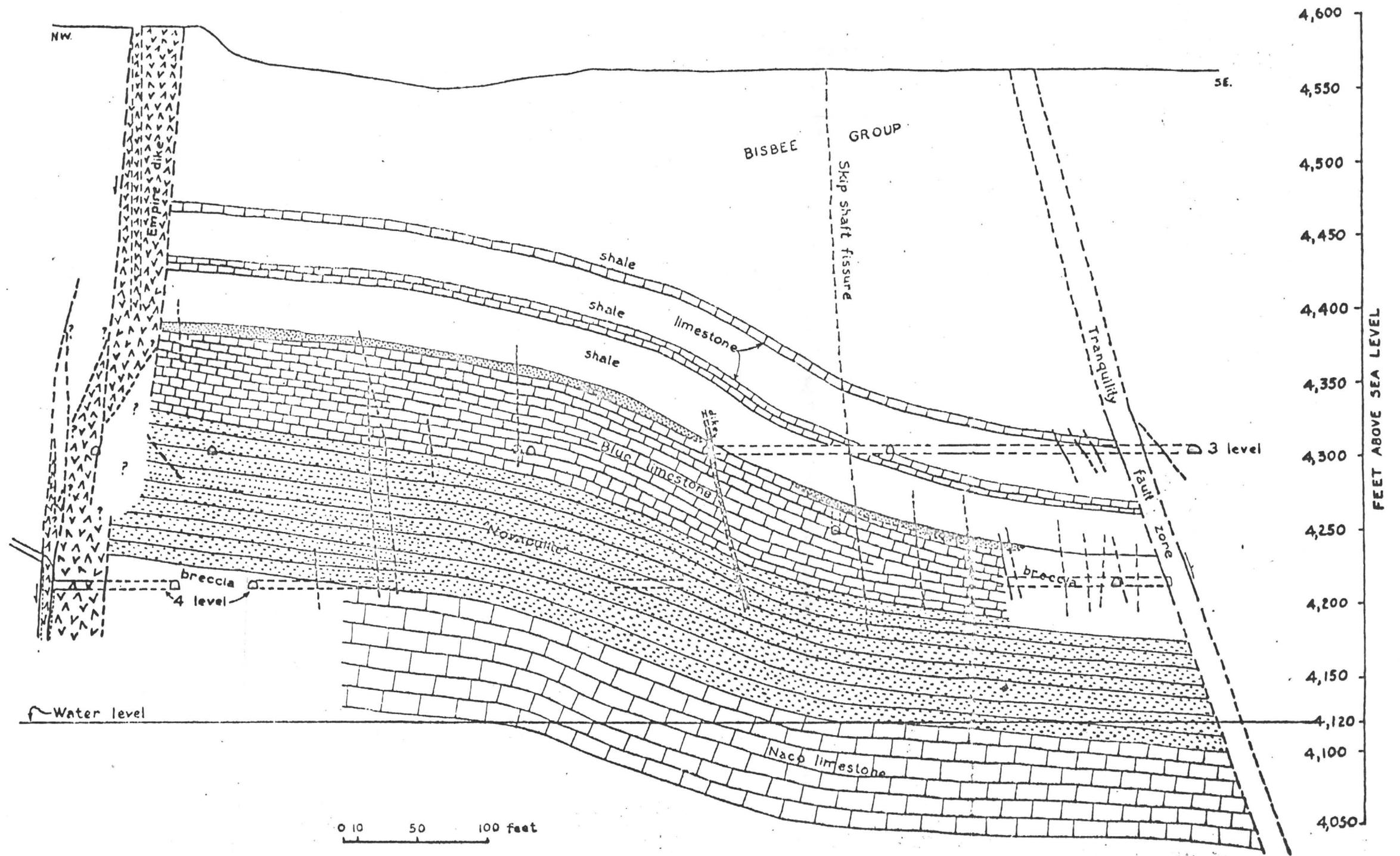


Plate XVII.—Longitudinal section near axis of Macia roll, looking northeast.



Plata 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 accessible 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

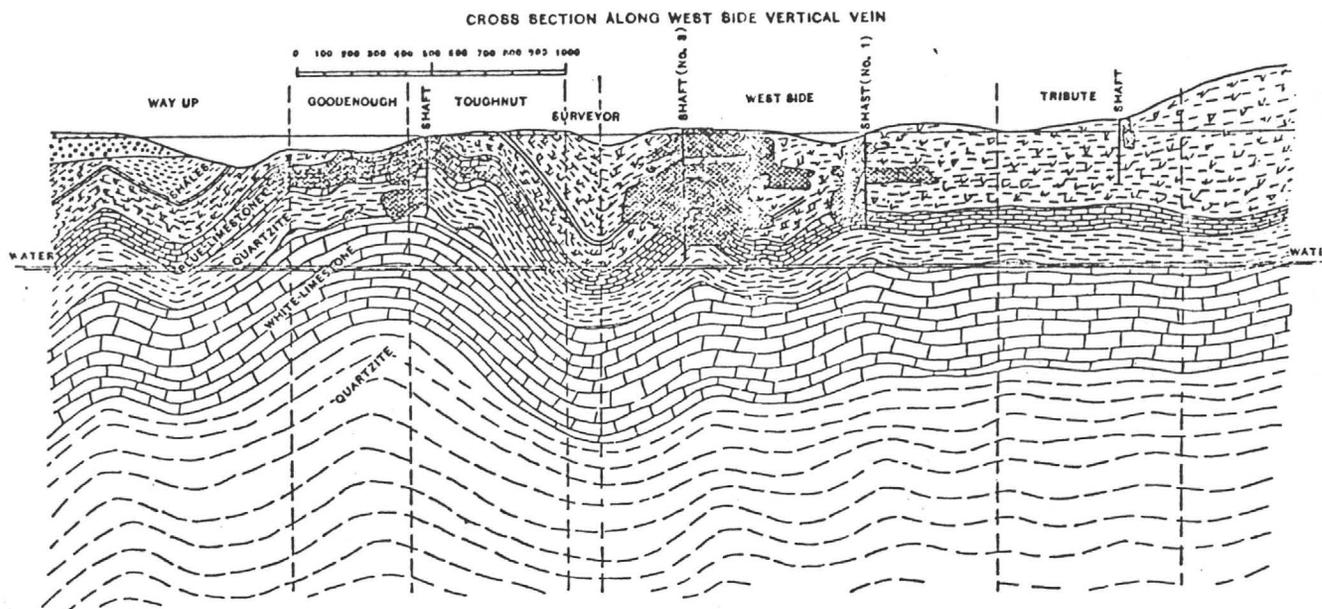
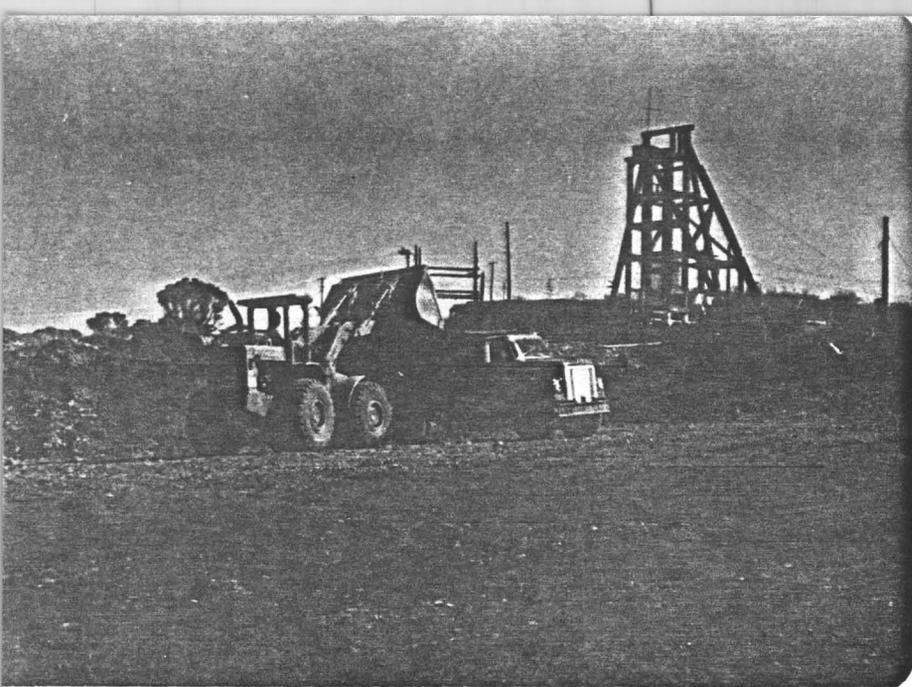


FIG. 15. Cross-section of the Anticlines and Synclines Crossing the West Side Vertical Vein.

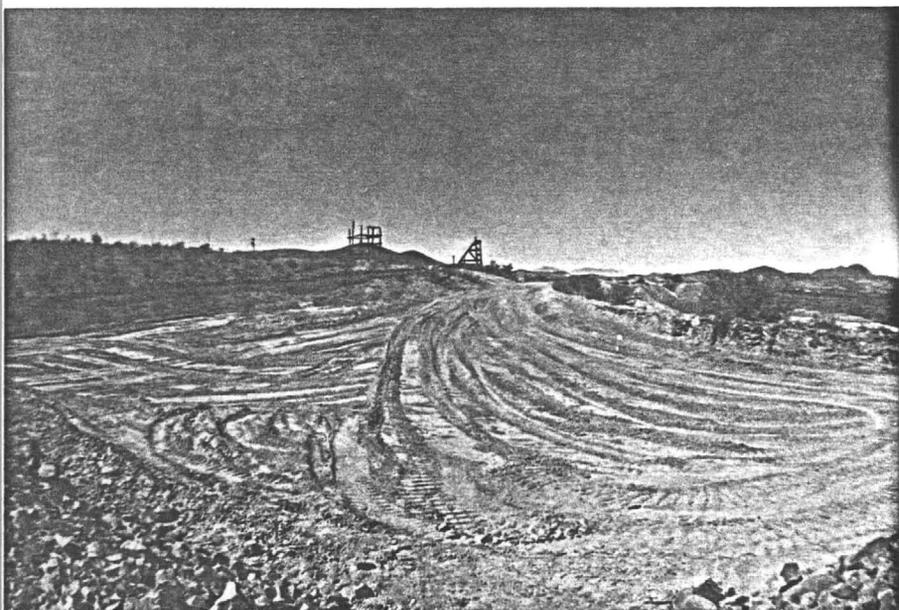
Above is the plate showing the West Side fissure from north (left) to south (right). North would be in the City limits of Tombstone. The shading indicates stoped-out ore. Notice the numerous areas that are unexplored, such as between the West Side and the Tribute. To date, no exploration has been conducted 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 foreground, the West Side on the ridge down (SW) from the Girard (between the observer and the court house) and the Boss mine between the observer 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.

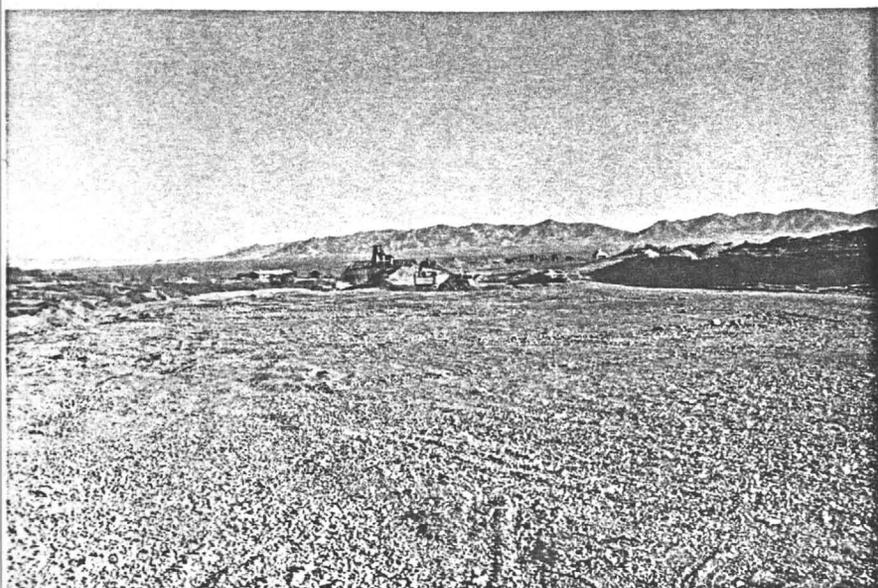
It is obvious from all early photos that all emphasis was for the high-grade ores underground; no mining was done by open pit.



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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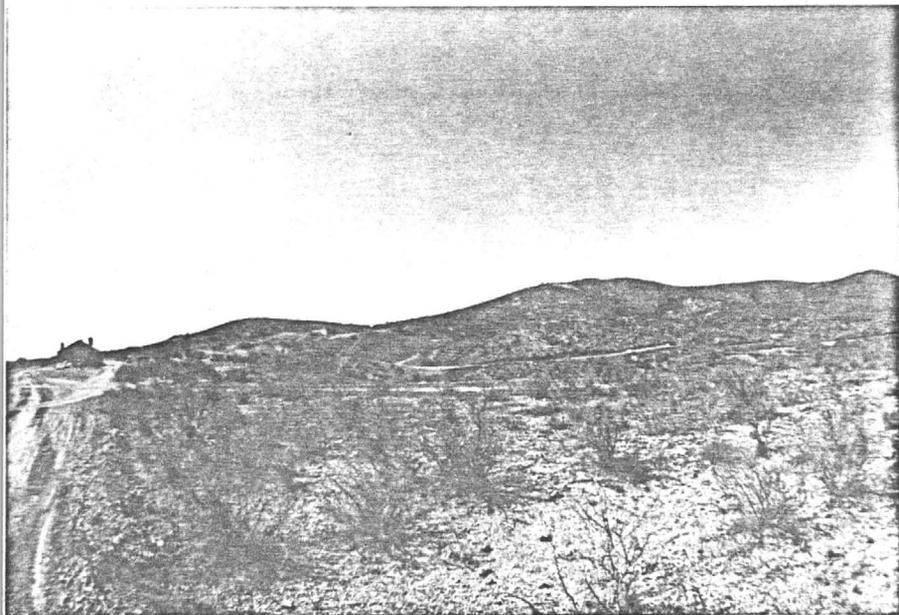
CONTENTION: Along the Contention-Grand Central lode there were over 20 miles of workings in 1902 (William P. Blake-Tombstone and its Mines). How many more miles were added since that time is unknown. This quantification relating to the ore mined, or what the ore justified, is very important in considering 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 deposits of gold and silver found in the quartz alongside the dikes and also in the dike; hence the term lode.

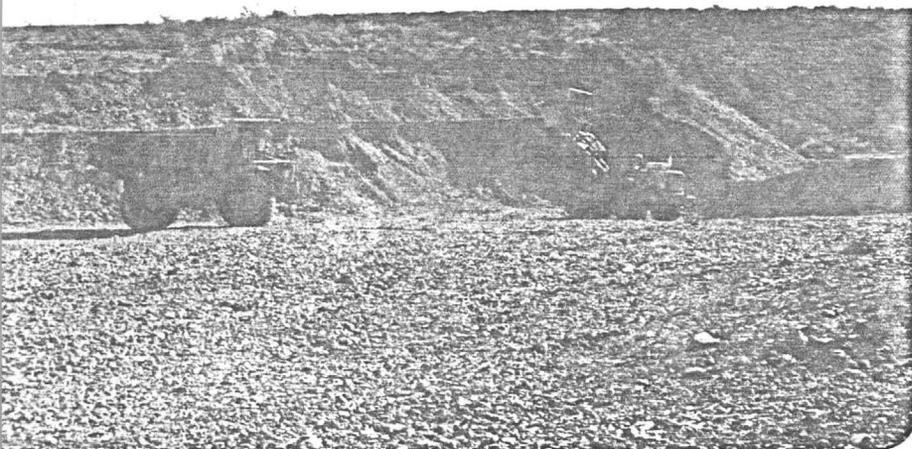
The Contention dike is dislocated by faulting which gives the semblance of two or more parallel dikes. For example, on the 207-foot level of the Contention (equivalent to the first level of the Head Center) the fault has dislocated the shales, limestones, and quartzites with a detectable throw-about 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.

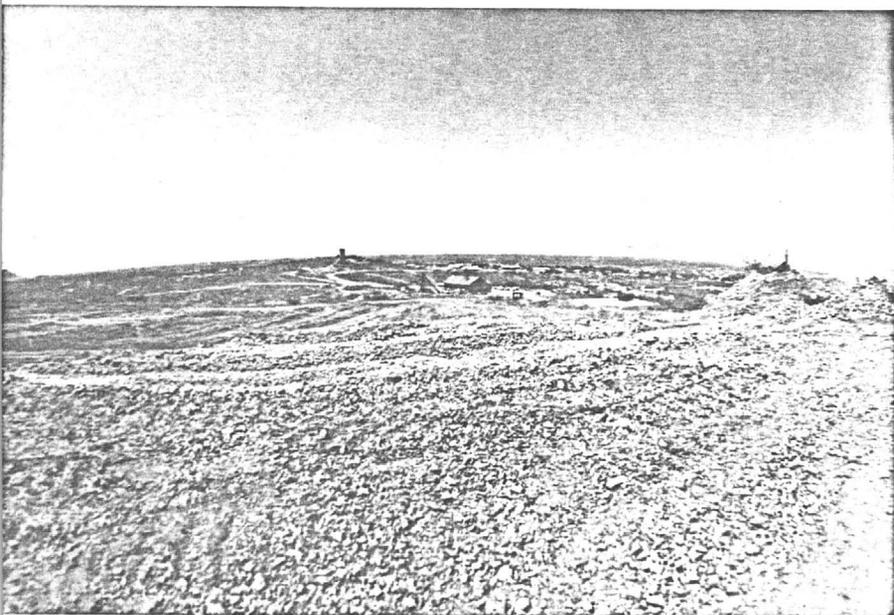
In addition to the Contention dike, the Tranquillity fault, the Sulphuret dike, and numerous other faults intersect or originate in this area. This is why most of the workings are in the Contention mine area (see large plate of all workings). This area would make a very good open pit, due to its location 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.

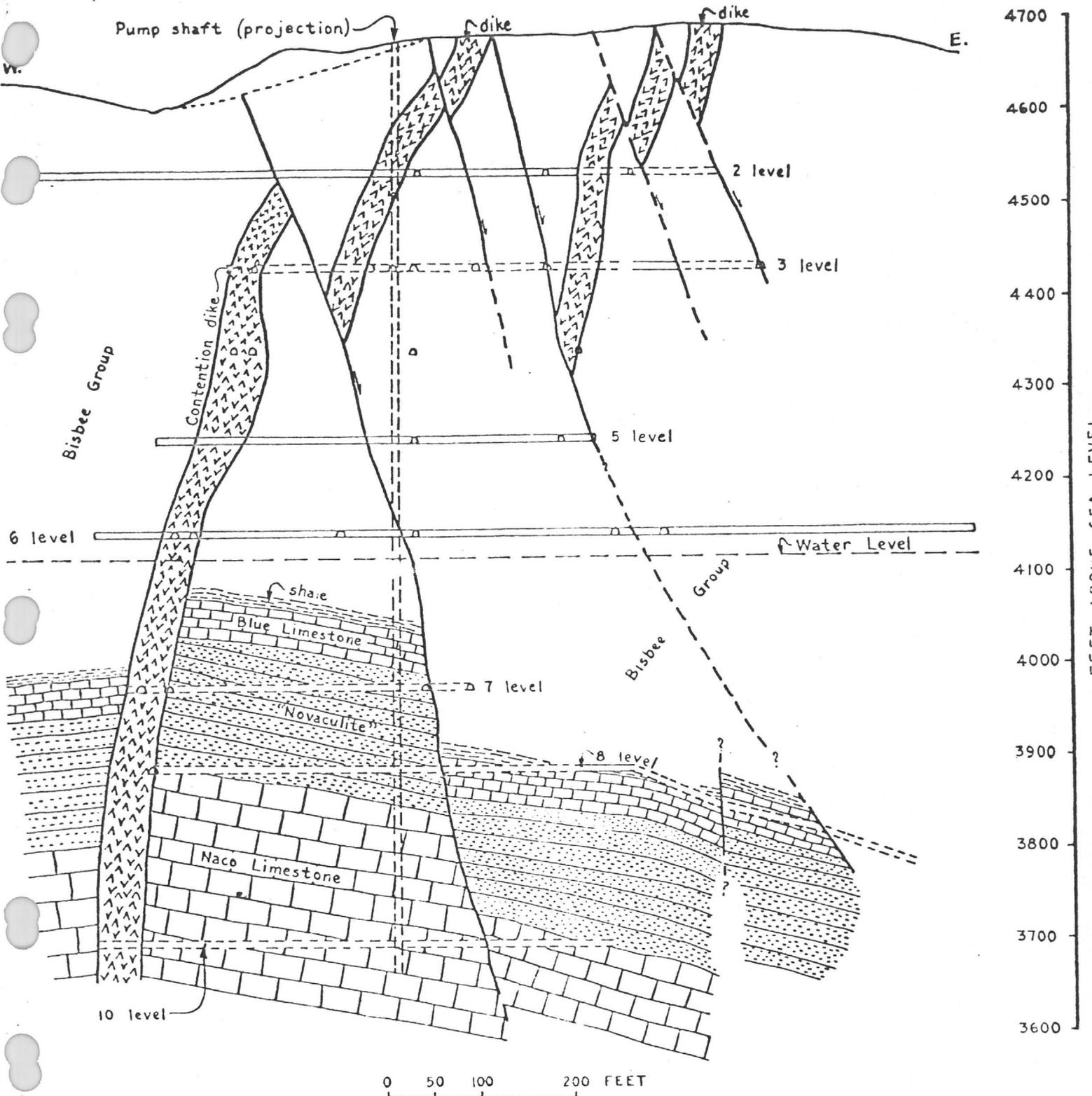
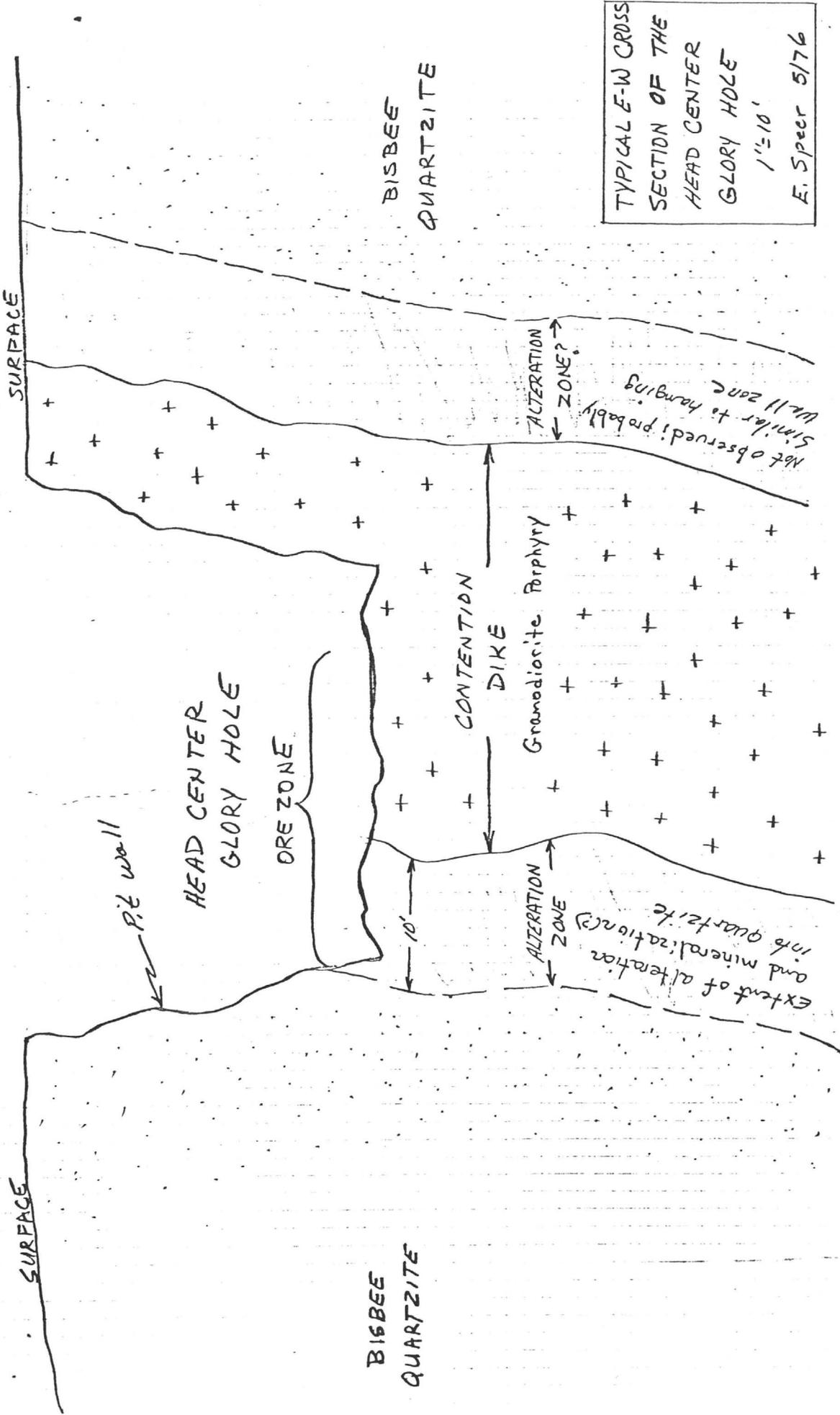


Plate VIII.—Generalized cross section through Contention dike at Pump shaft, looking north. (Modified from F. L. Ransome.)

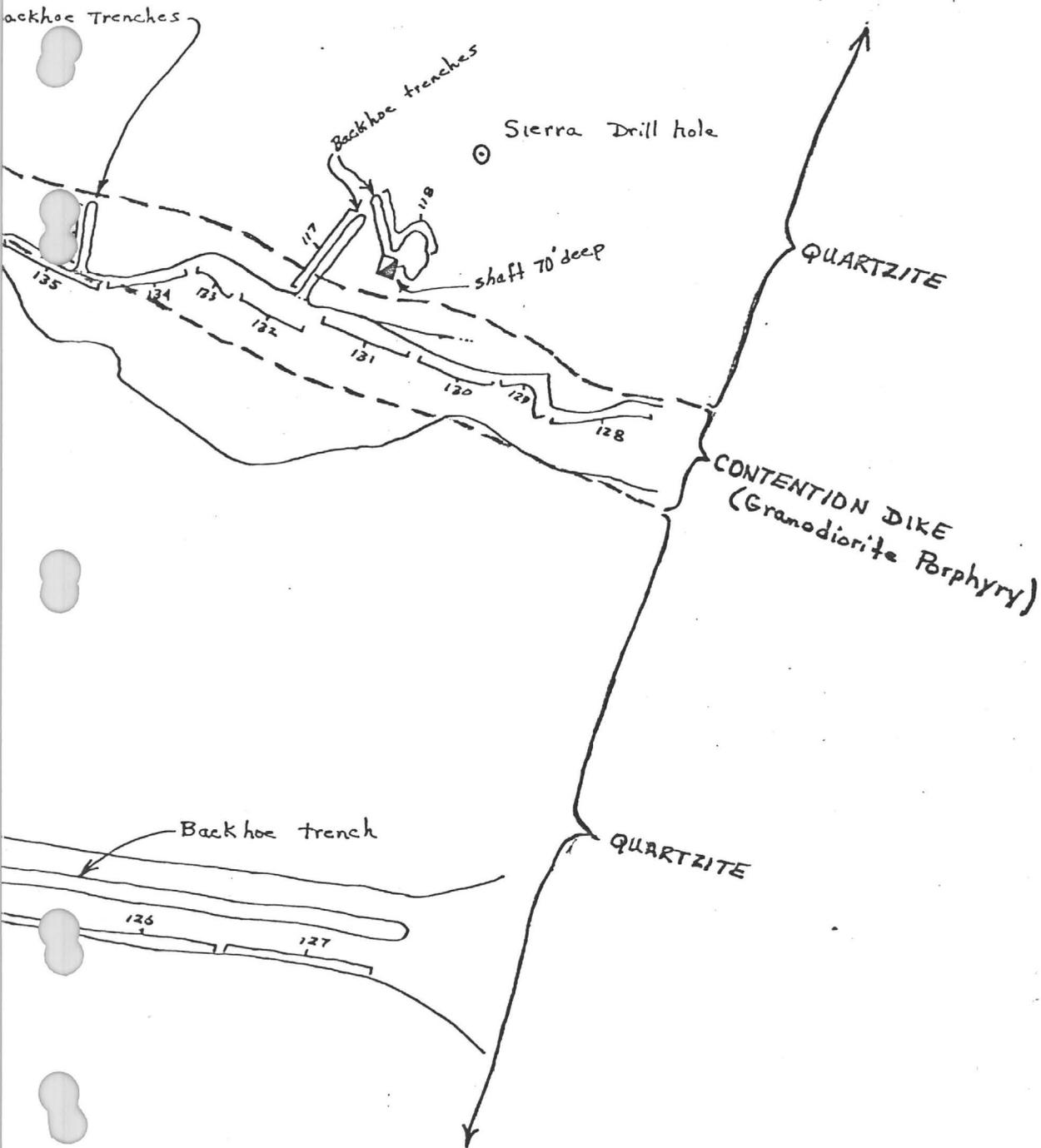
E

W



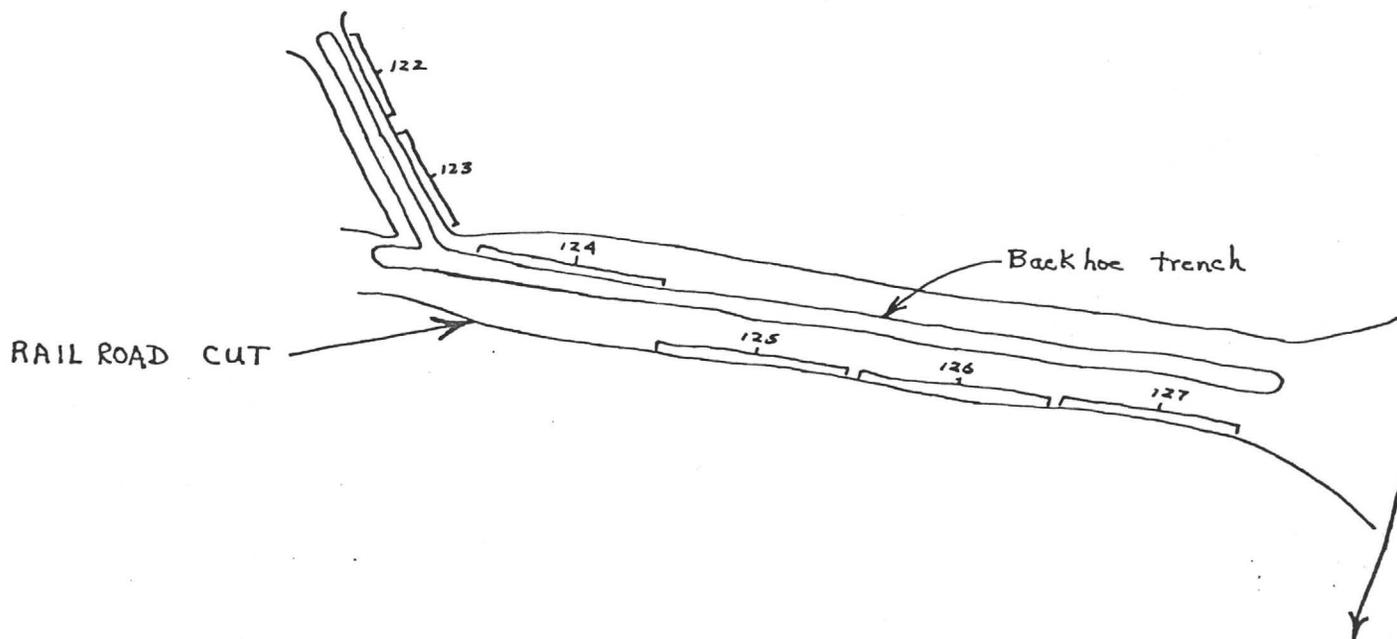
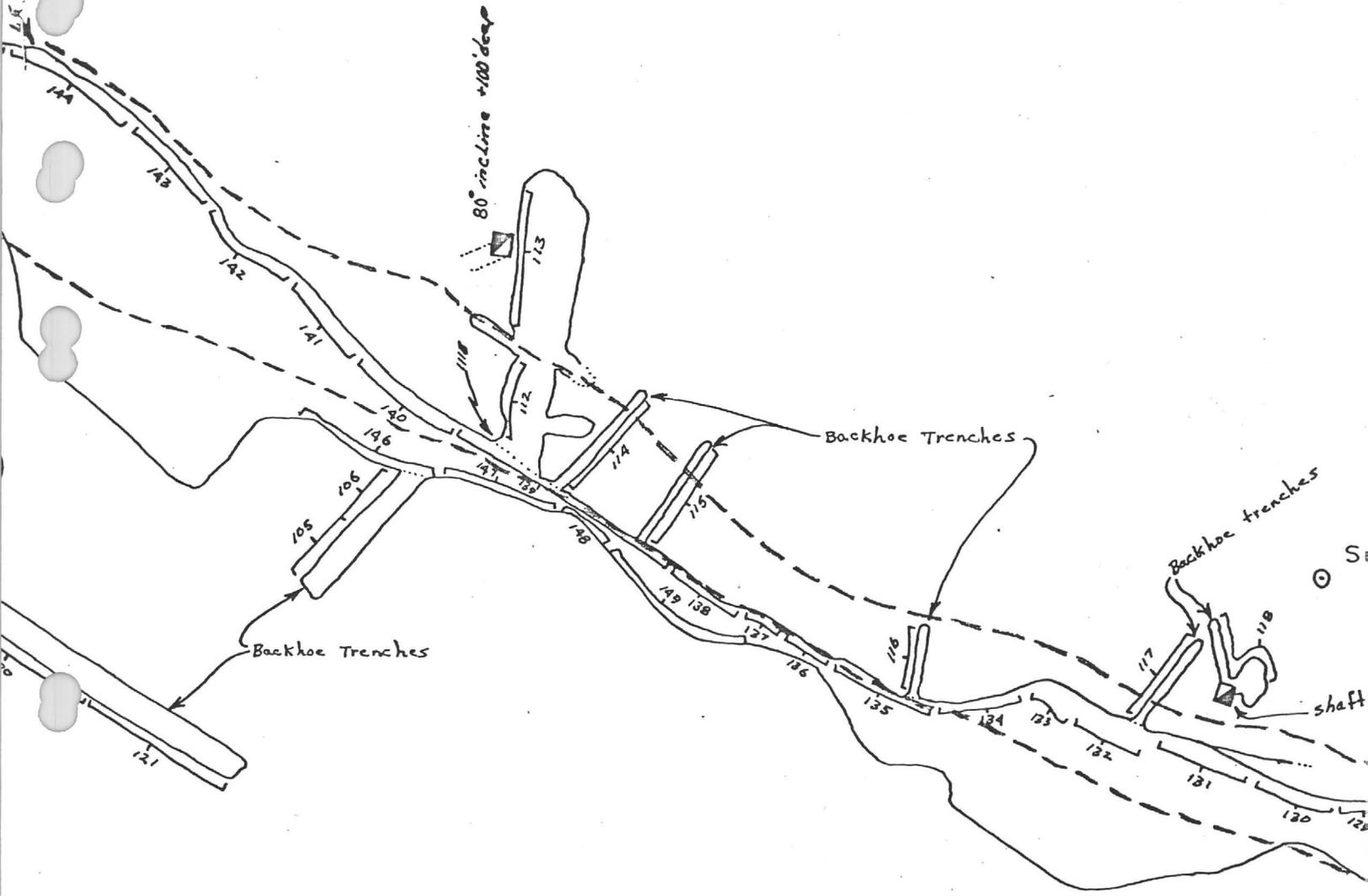
TYPICAL E-W CROSS
 SECTION OF THE
 HEAD CENTER
 GLORY HOLE
 1"=10'
 E. Speer 5/76

TOMBSTONE COCHISE CO., AZ



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

HEAD CENTER CLORY HOLE



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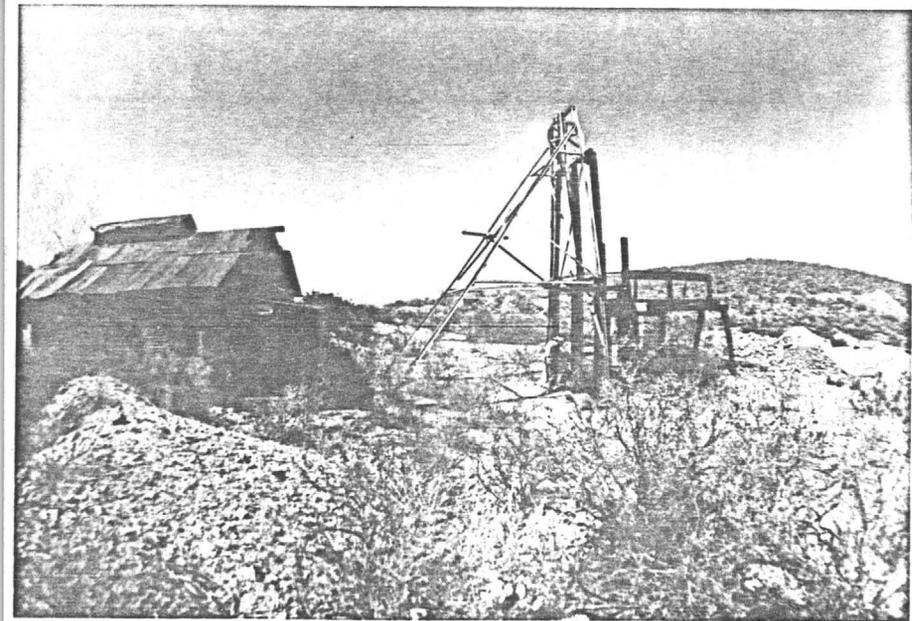
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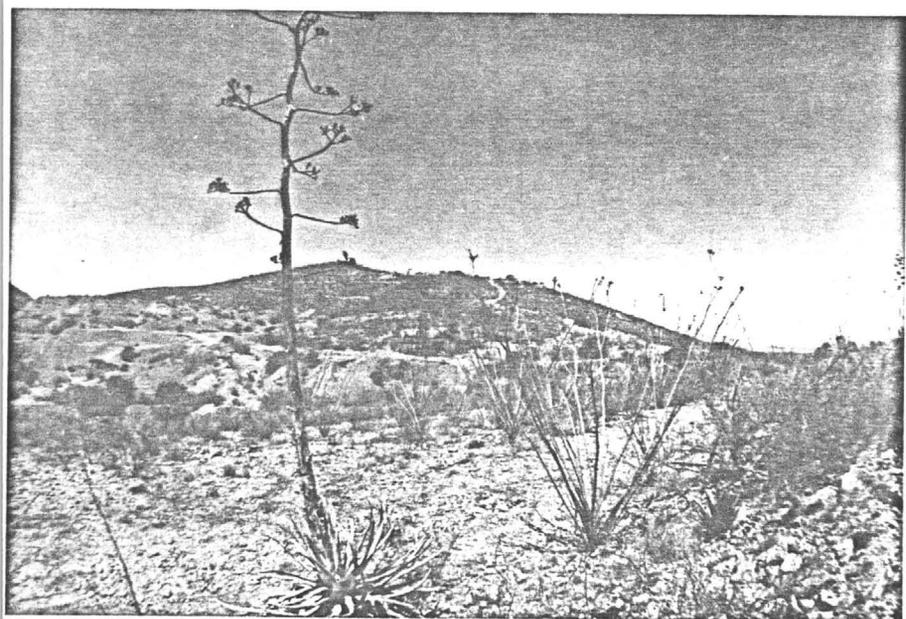
The Contention dike is highly crystalline in some areas, but in most portions it consists chiefly of a feldspathic base in which the feldspar crystals are obscure. It passes into a felsite which in the decay portions of the dike, it looks like partly decayed shales or quartzites. Most of the dike is 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 above 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 smelters.

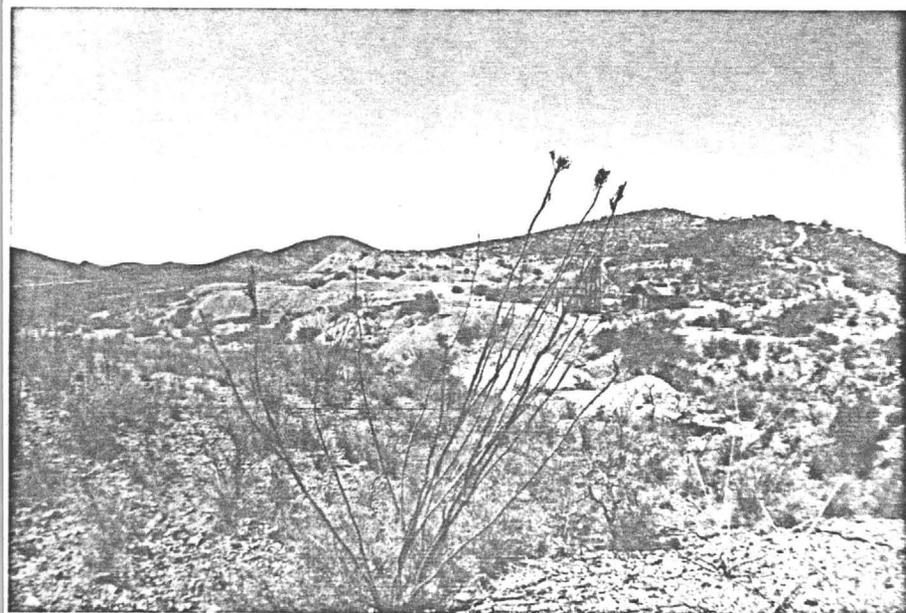
The ore is continuous from the surface down below the water in all mines, but it has been proven in the Contention; the ore bodies have been traced through the workings from the surface to below the water table. During pumping (de-watering) by the pumps in the Pump Shaft, the Contention vein was sunk-on (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.

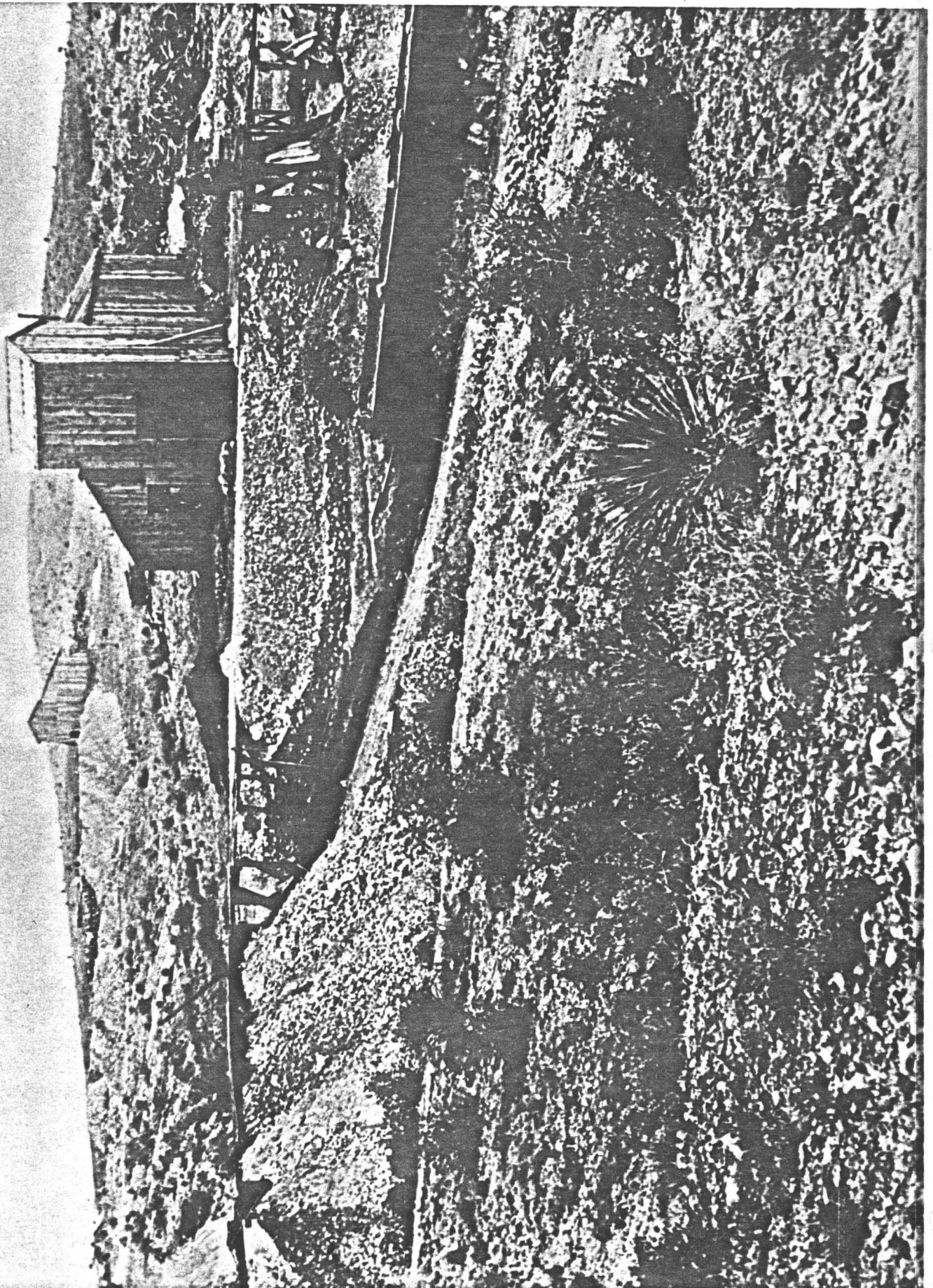
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GRAND CENTRAL-LITTLE JOE-INDIANA: The Grand Central and other mines are along the Contention dike, or its southerly extension. The largest ore bodies exist in the northern part of the Grand Central and they are continuous below the water table. The 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 $\frac{1}{2}$ 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 an 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.

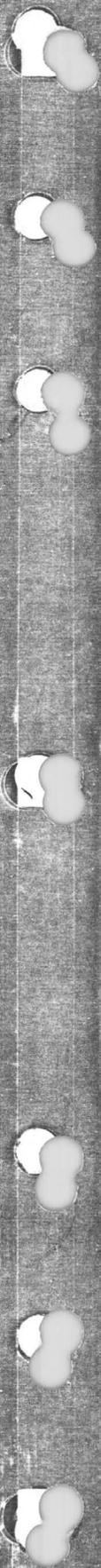
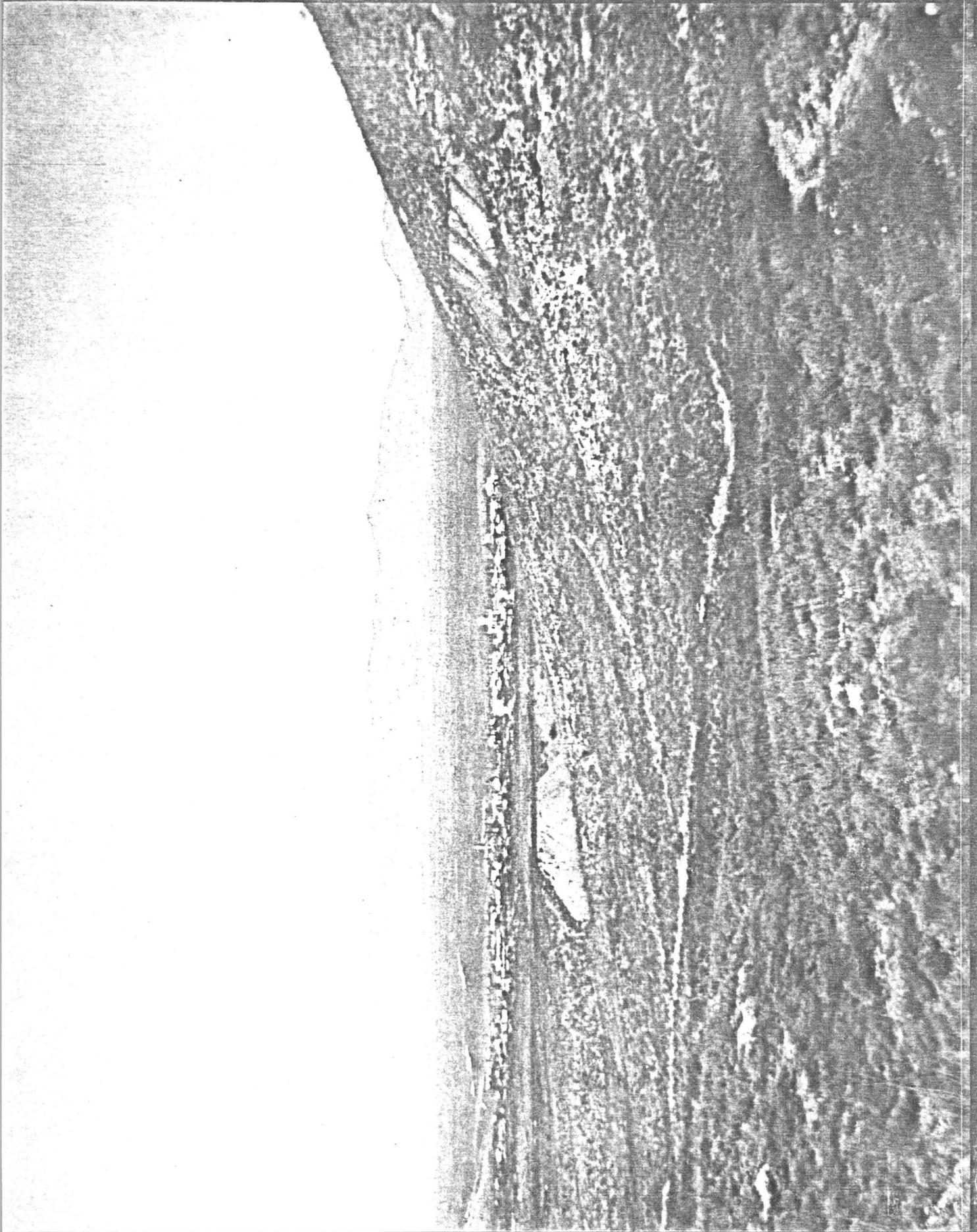
Ore bodies of this type exhibit a series of "pipe-like" structurally controlled ore bodies locally called "chimneys". The chimneys pitch eastwardly at an angle of about 45°. Manganese sulphide was found in a body of the Lucky Cuss mine; the mineral species Alabandite was found in some of the manganese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

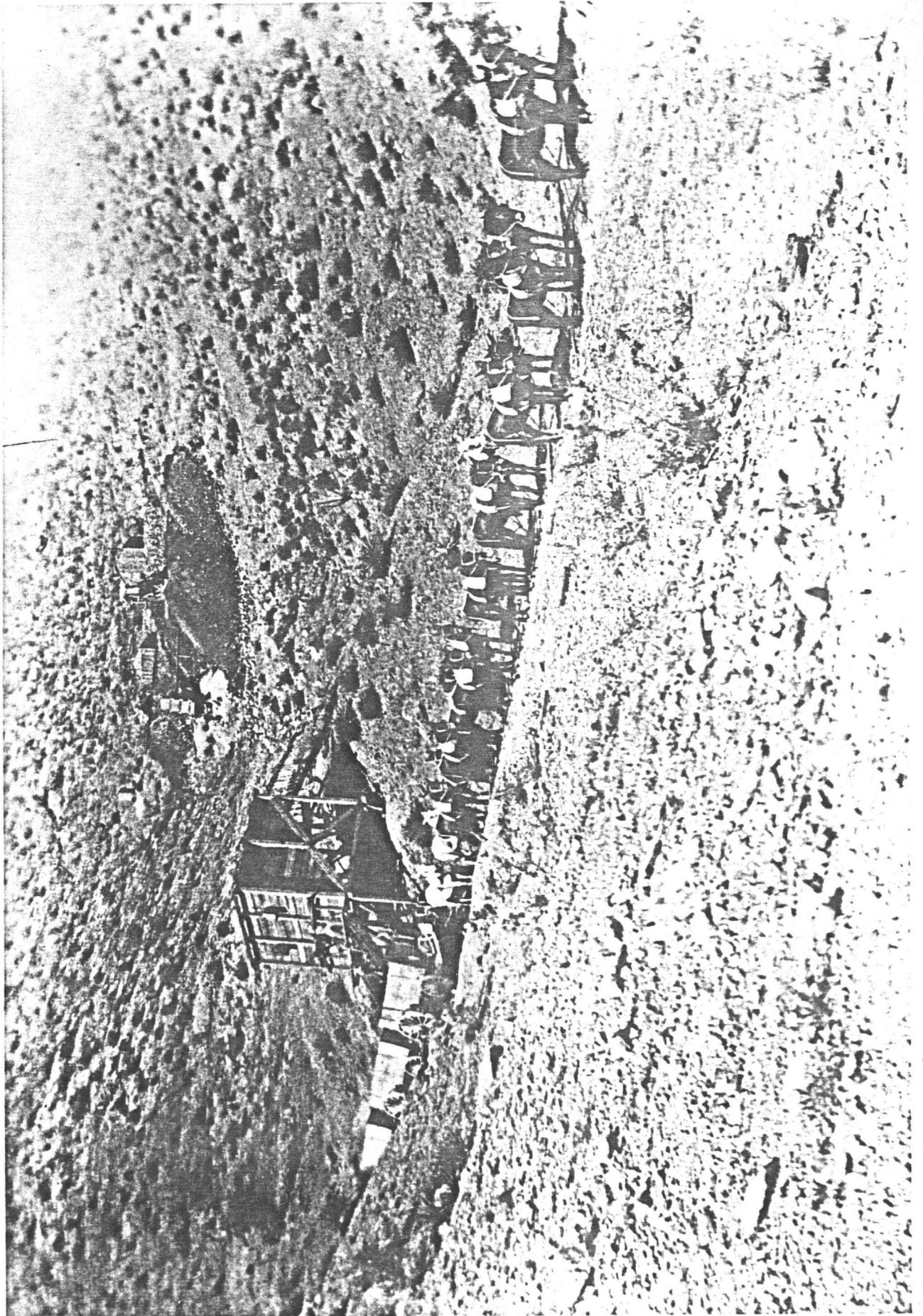
LUCKY CUSS MINE: Surface ores ran from 30 to 50 ounces silver per ton. The ore was high grade gold-silver-lead and continued below the water table. Also, much manganese oxide was mined and shipped.

The Lucky Cuss, Old Guard, and Herschel are along the strike of this limestone mass. Notice on the following 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.



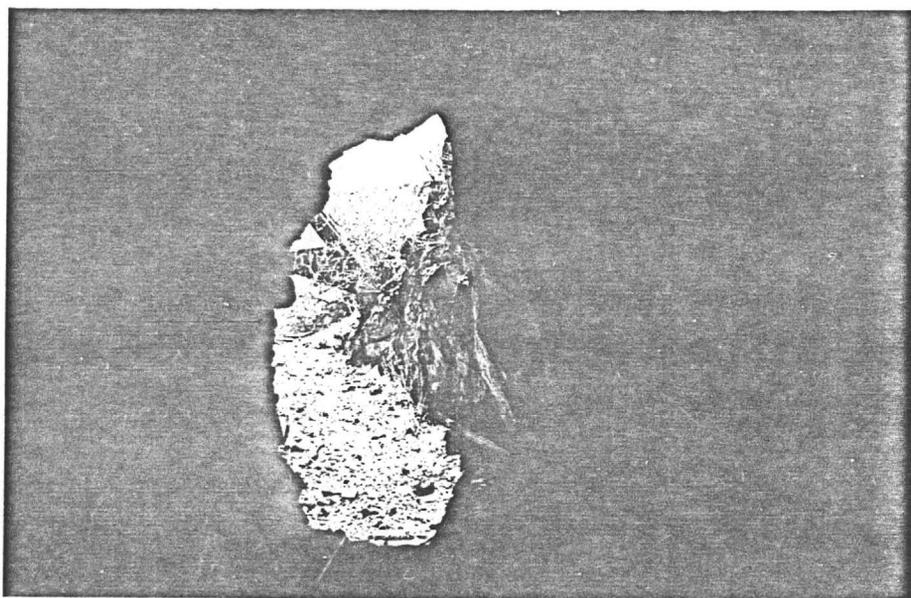




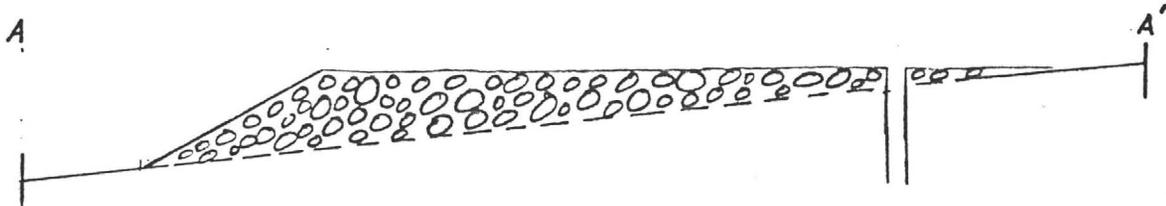
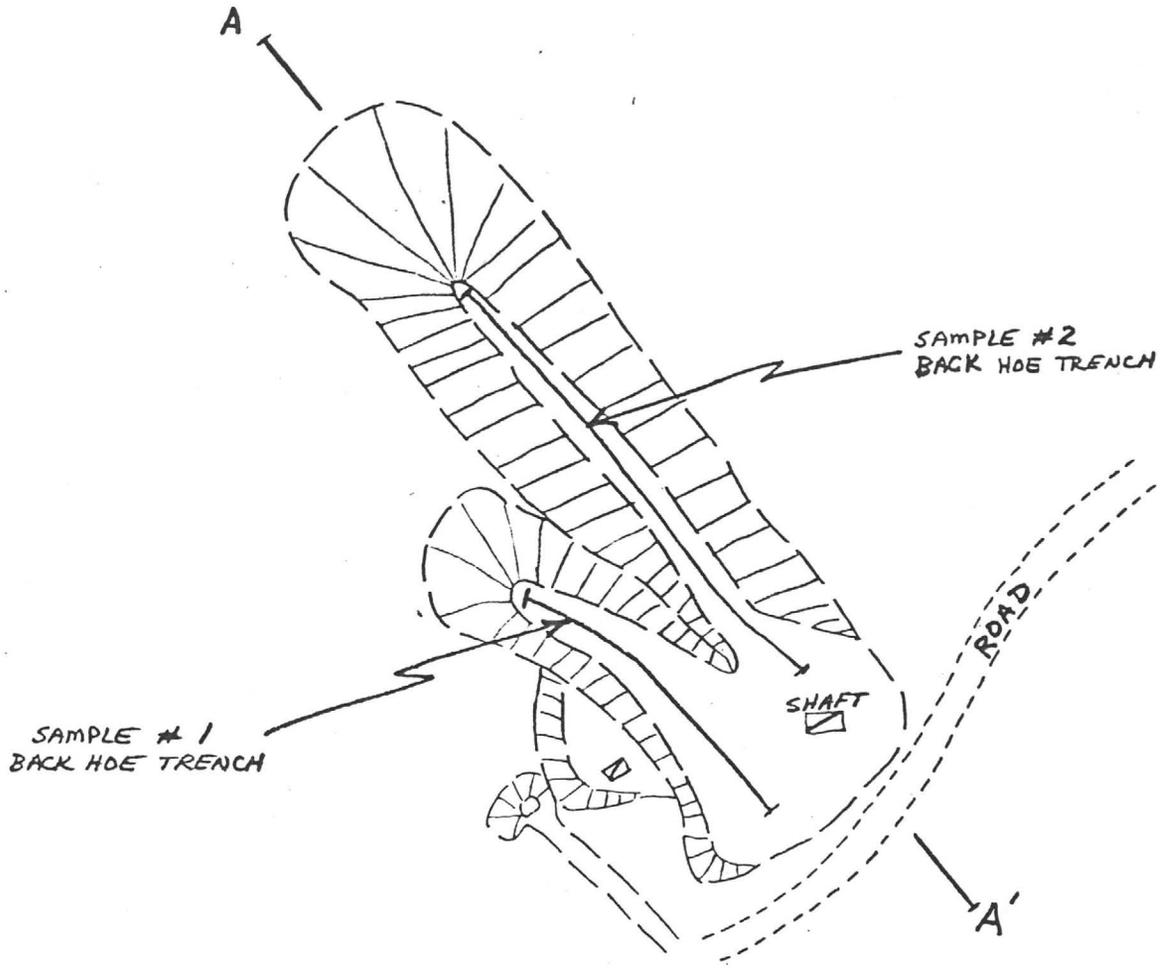
Vertical photo showing dip at the Prompter; dip is to the south. The structure can be traced across the hill to the Oregon mine. Good values exist between the two mines in the structure. Gob would be at the lower workings (from 200 to 500 foot level) due to steep dip of the structure.

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 underground stopes.



GROUND HOG



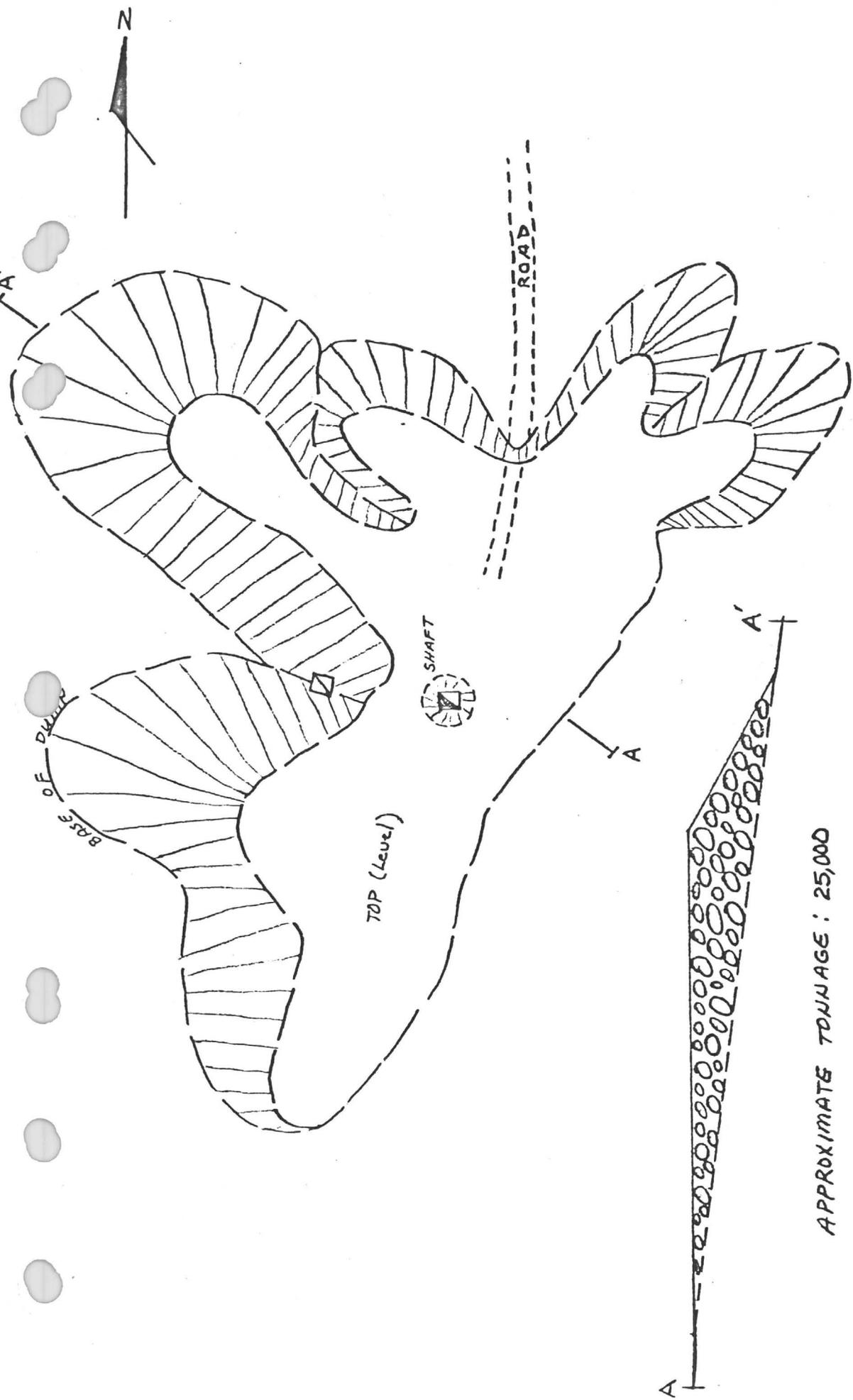
SECTION ALONG AA'

APPROXIMATE TOTAL
TONNAGE: 6,000

GROUND HOG MINE
LOWER DUMP

1" = 50'

E. SPEER 7/76

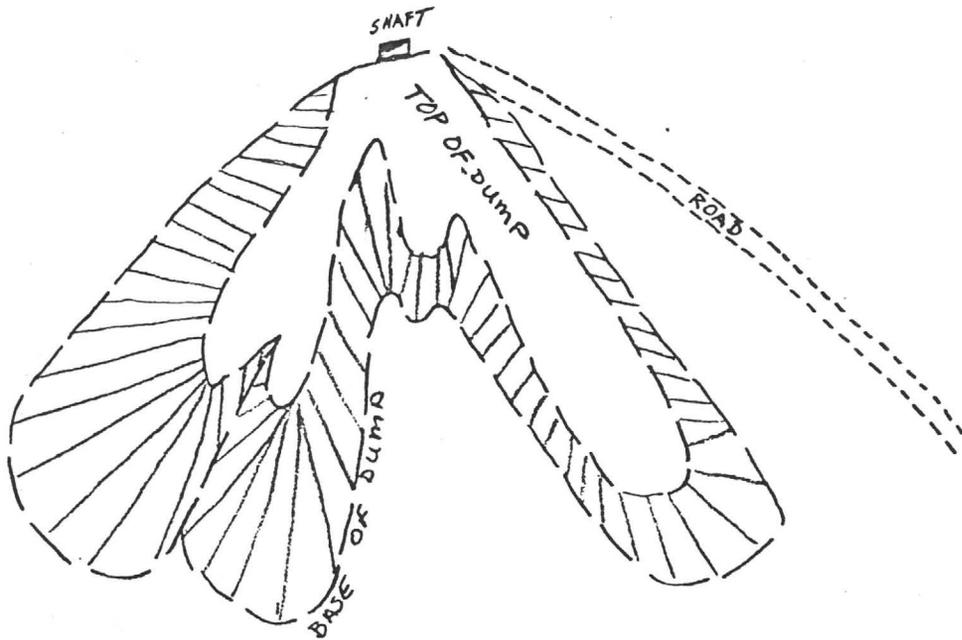


APPROXIMATE TONNAGE : 25,000

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

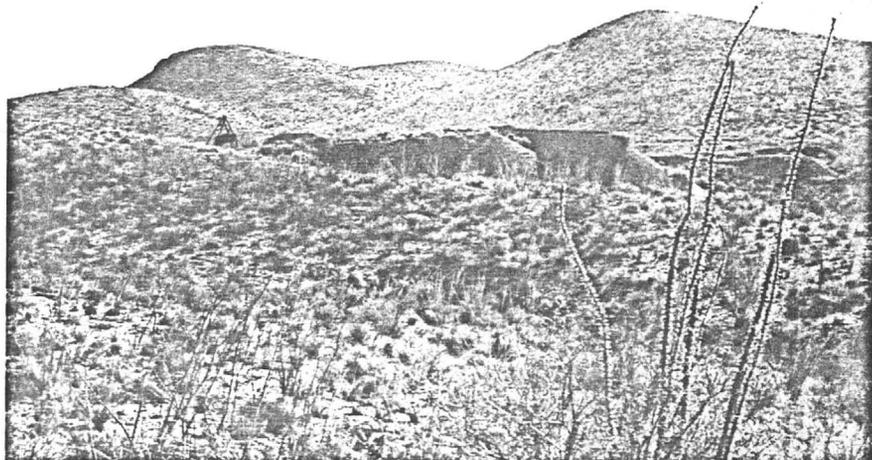
South of the Lucky Cuss are a series of beds of limestone, shales, and quartzites the crop out with extreme regularity and dip eastward at an angle of 30° , striking north-south. The upper members consist chiefly of massive limestone which forms the massive hill to the south of the Emerald mine. The limestones rest on argillaceous limestones with many shaly partings forming sharply defined linear croppings. Then under a bed of shales there is a foundation 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 manganese 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 high 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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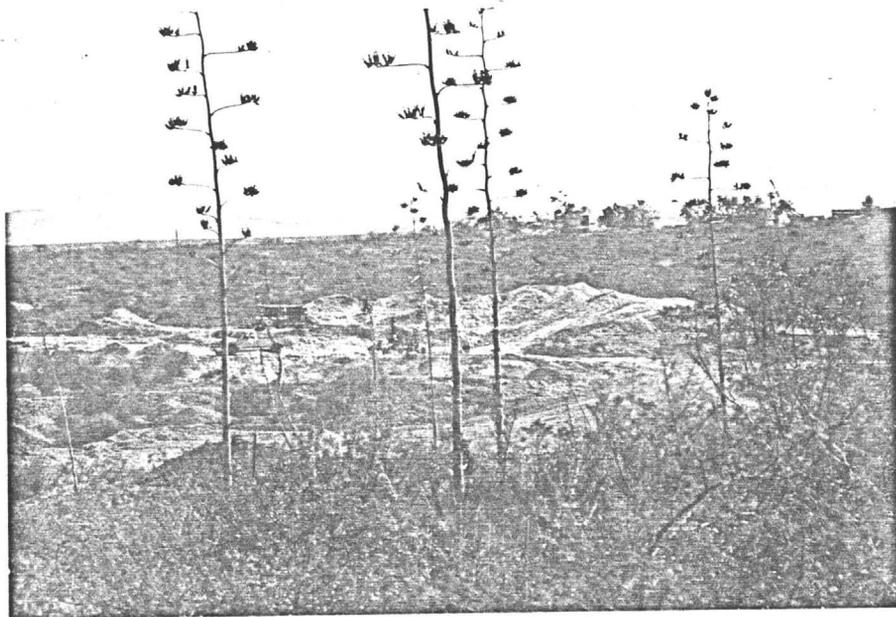
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Tombstone Extension

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 ore 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 Tertiary 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.



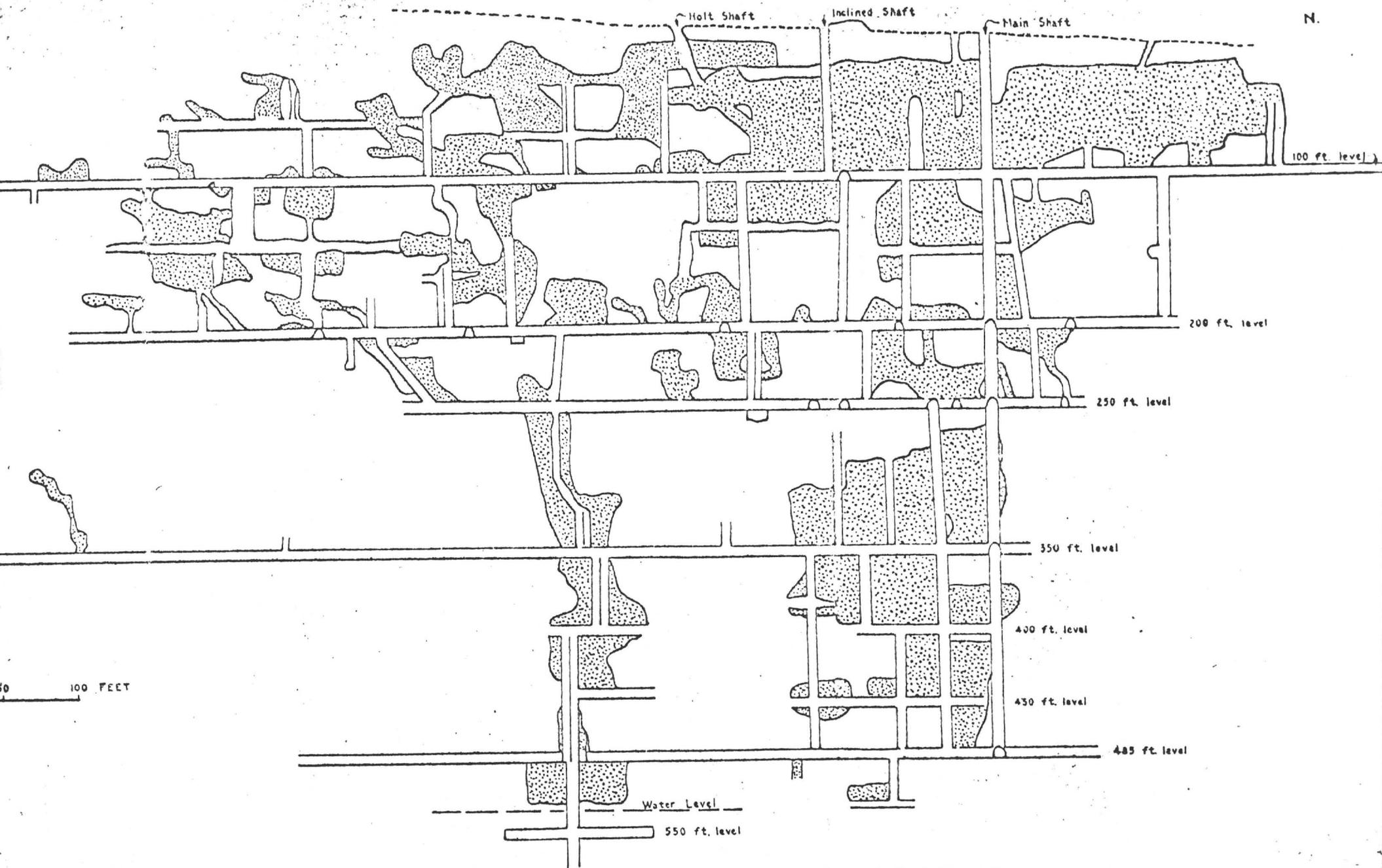


Plate X.—Longitudinal section of Tombstone Extension Mine, looking west. Stopes indicated by dotted areas.

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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

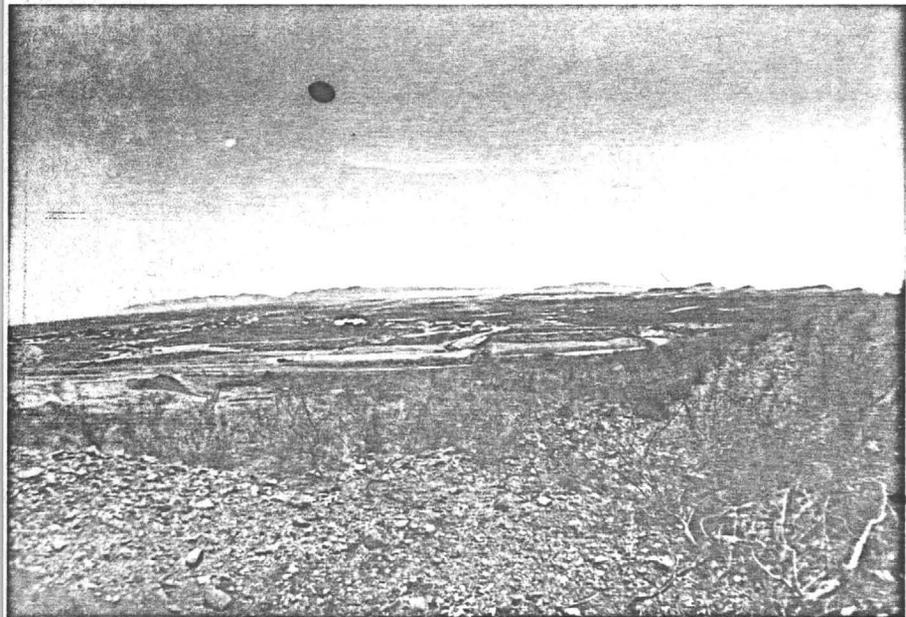
Considerable surface sampling has been done in the District. Also, extensive underground mapping and sampling has been done for many years. Based on these data and knowledge of the underground workings, the following open-pit targets exist in decreasing order of priority:

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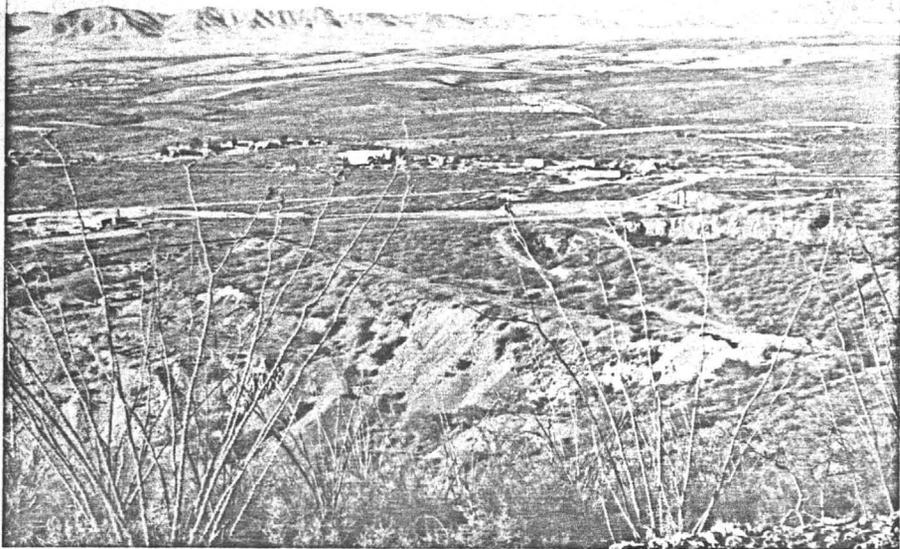
CONTENTION DIKE: This structure is rated as the best open pit and underground possibility in the District. As was mentioned, it will be discussed from the point of view that the underground mining would be an extension of open pit mining, from an evaluation standpoint.

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:

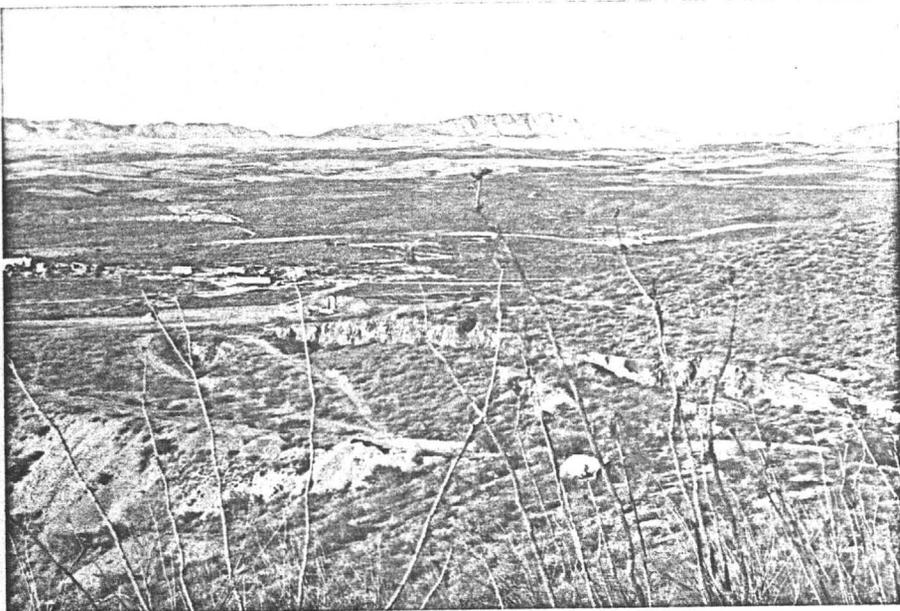
<u>Open-Pit Target Area</u>	<u>Average Grade</u>	
	<u>Au</u>	<u>Ag</u>
Contention Shaft	.066	1.75
Contention Cave	.145	3.53
Grand Central	.058	3.12
Tranquillity	.063	1.66
Skip Shaft	.207	2.02

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

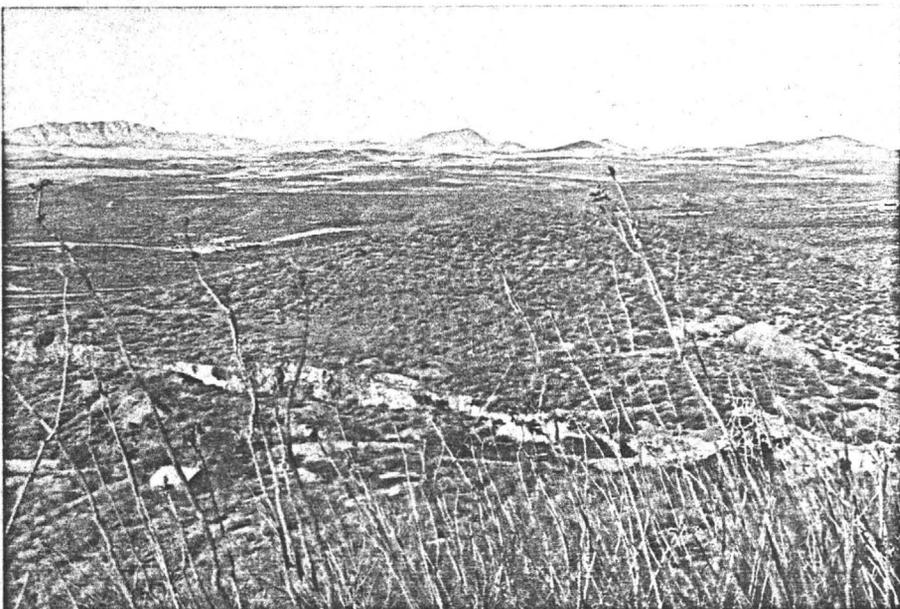
1. Continuity exists at depth and the gold values increase at depth.
2. Water level curtailed mining very far below the water table due to previous pumping problems (see special maps showing the workings above and below the water).



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.

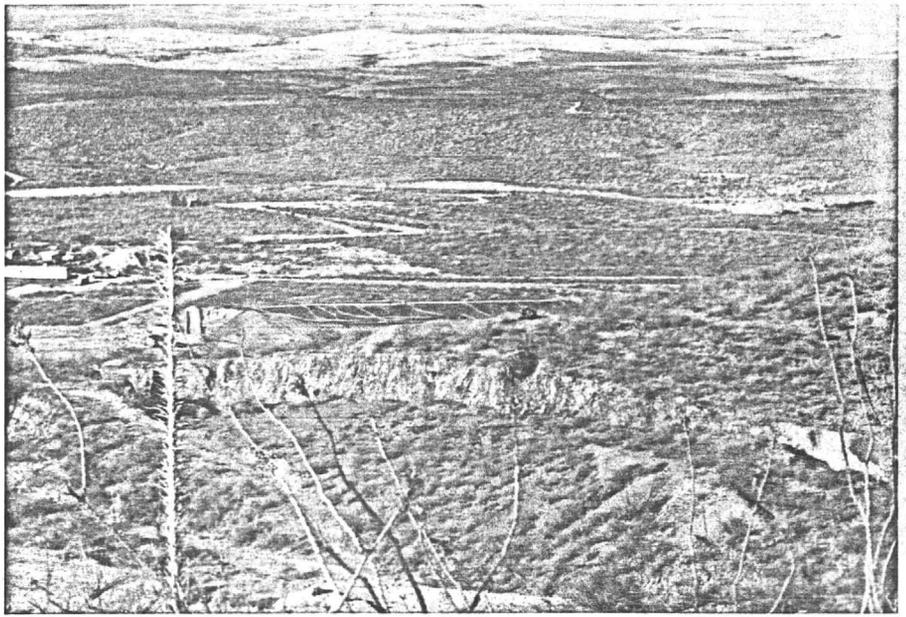


Contention; north end of
caved area is separated
by a silicious ridge
that is mineralized.
Notice other caved area
on the other side of the
road. This caved area
is shown on sample maps.

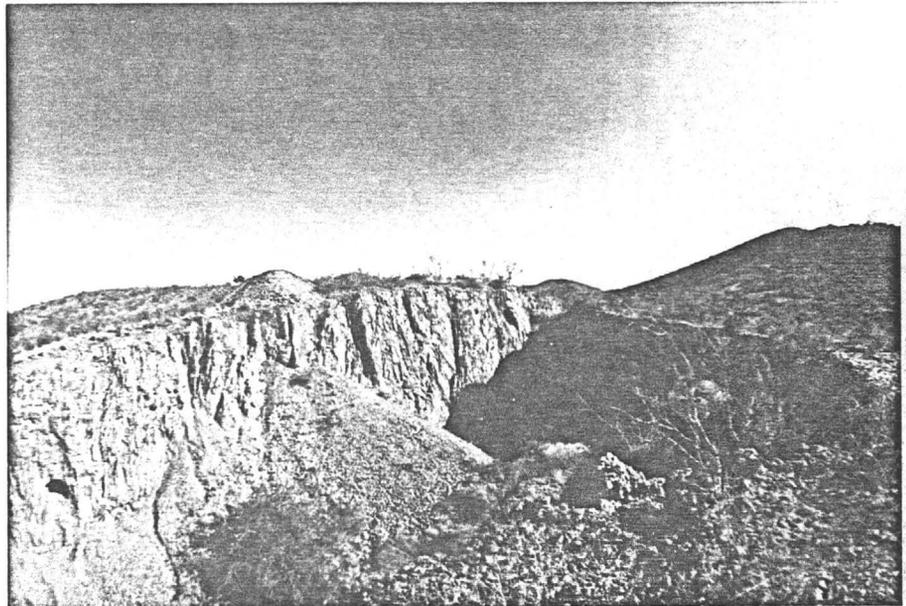


Contention; numerous breccia
zones (dikes/pipes). Little
Joe headframe far right.
This area averaged
.145 Au & 3.53 Ag.
Vein on south side runs
over 1 ounce Au & 30 oz. Ag

North end of the
Contention Cave;
Notice the alteration.

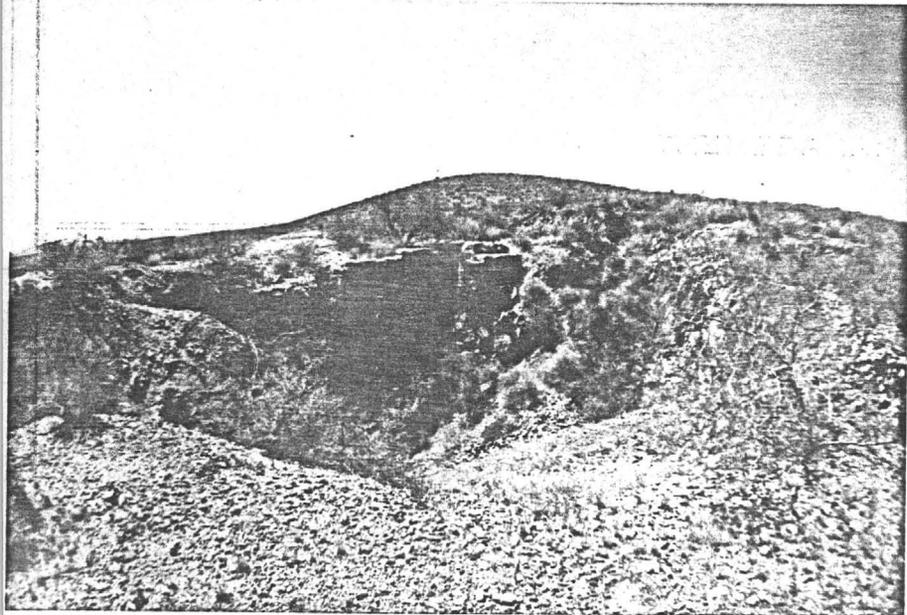


South end of caved area;
Back-hoe trenches found
many high-grade veins.



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

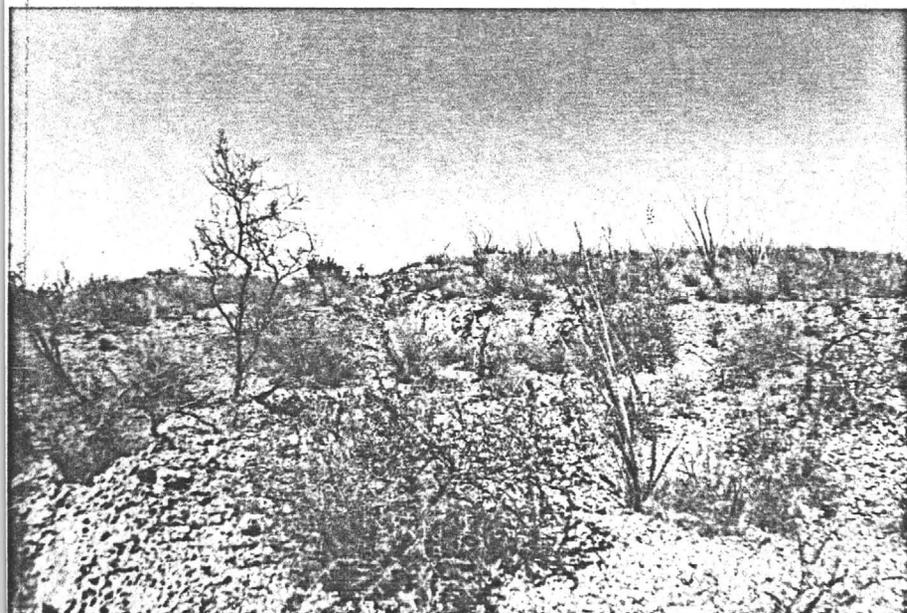




Contention Incline;
Part of the structure
in the Contention area.
This is a north-east
extension of the caved
area along the Contention
dike-close to the heap.
Called the Little Cont-
ention; had high-grade
gold in dumps. Structure
carries good values.



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
observer a short distance.
Red altered area is rail-
road 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).

HEWLETT MANAGEMENT

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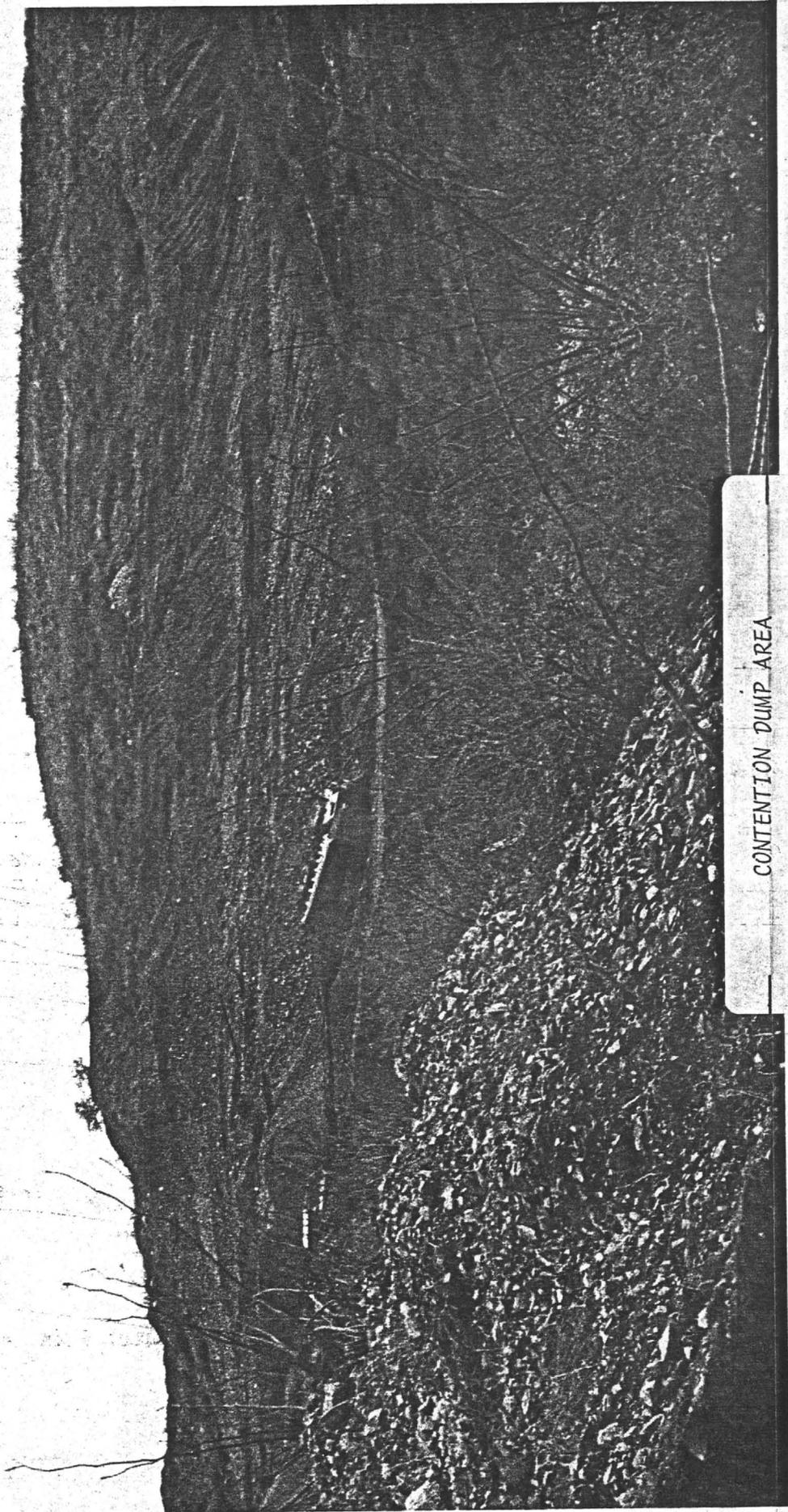
2602 Monte Verde Way
Sparks, Nevada 89431

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

	<u>Grand Central</u>	<u>Contention</u>	<u>Sulphuret</u>	<u>West Side</u>	<u>Toughnut Goodenough</u>	<u>Lucky Cuss</u>
Surface		-		1/3	Little	Tr
Water Level	5 oz.	5 oz.	1 oz.	2/3 oz.	1 1/2 oz.	1 1/3 oz.
Below						2 1/2 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.





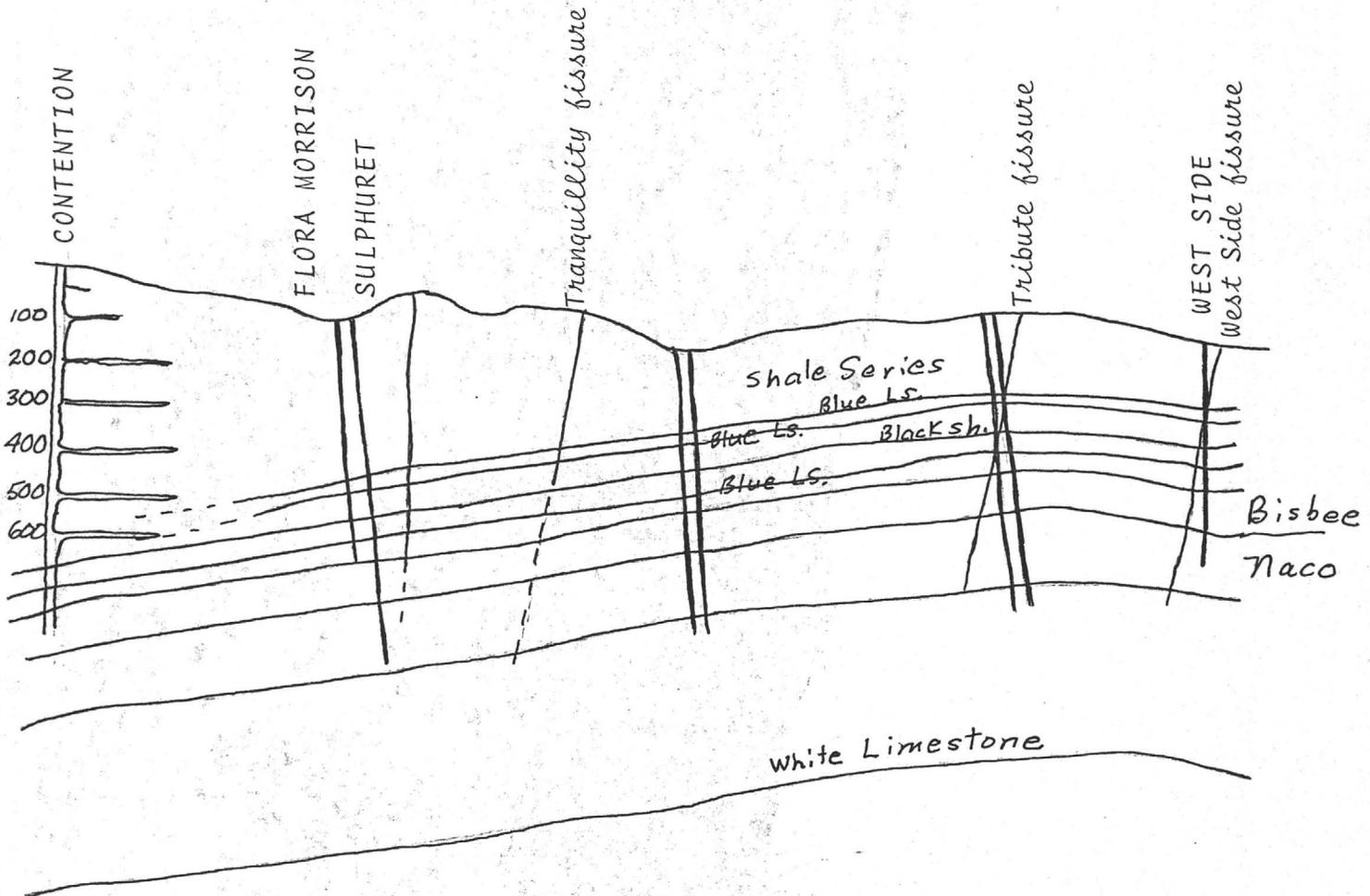
CONTENTION DUMP AREA

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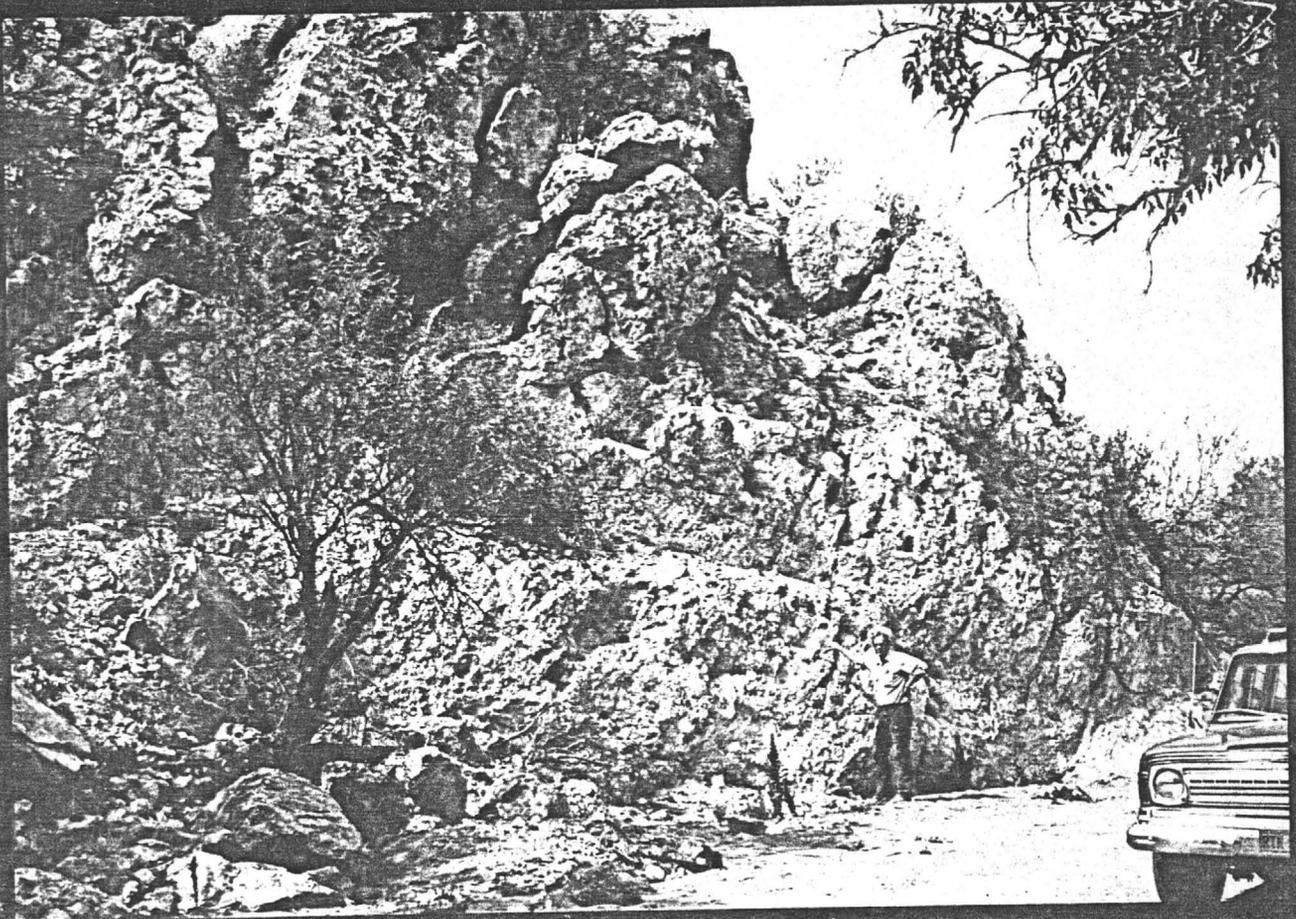
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The West Side anticline is shown below, presenting the concept that at depth in the Contention mine exists high-grade ore bodies that are high-grade accumulations of the Bonanza ores found in the anticline near the surface (West Side, Tribute, Tranquillity, 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.

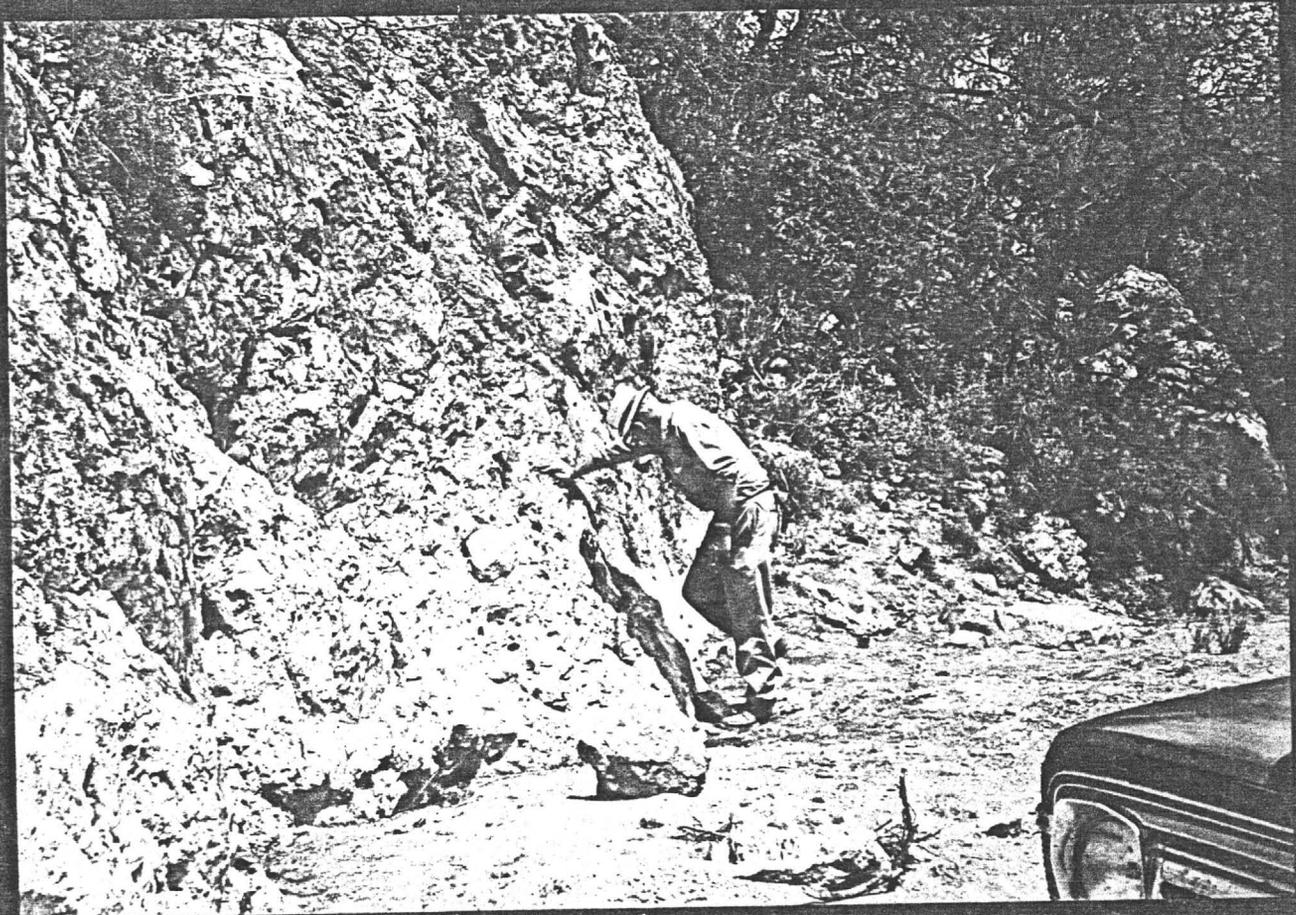


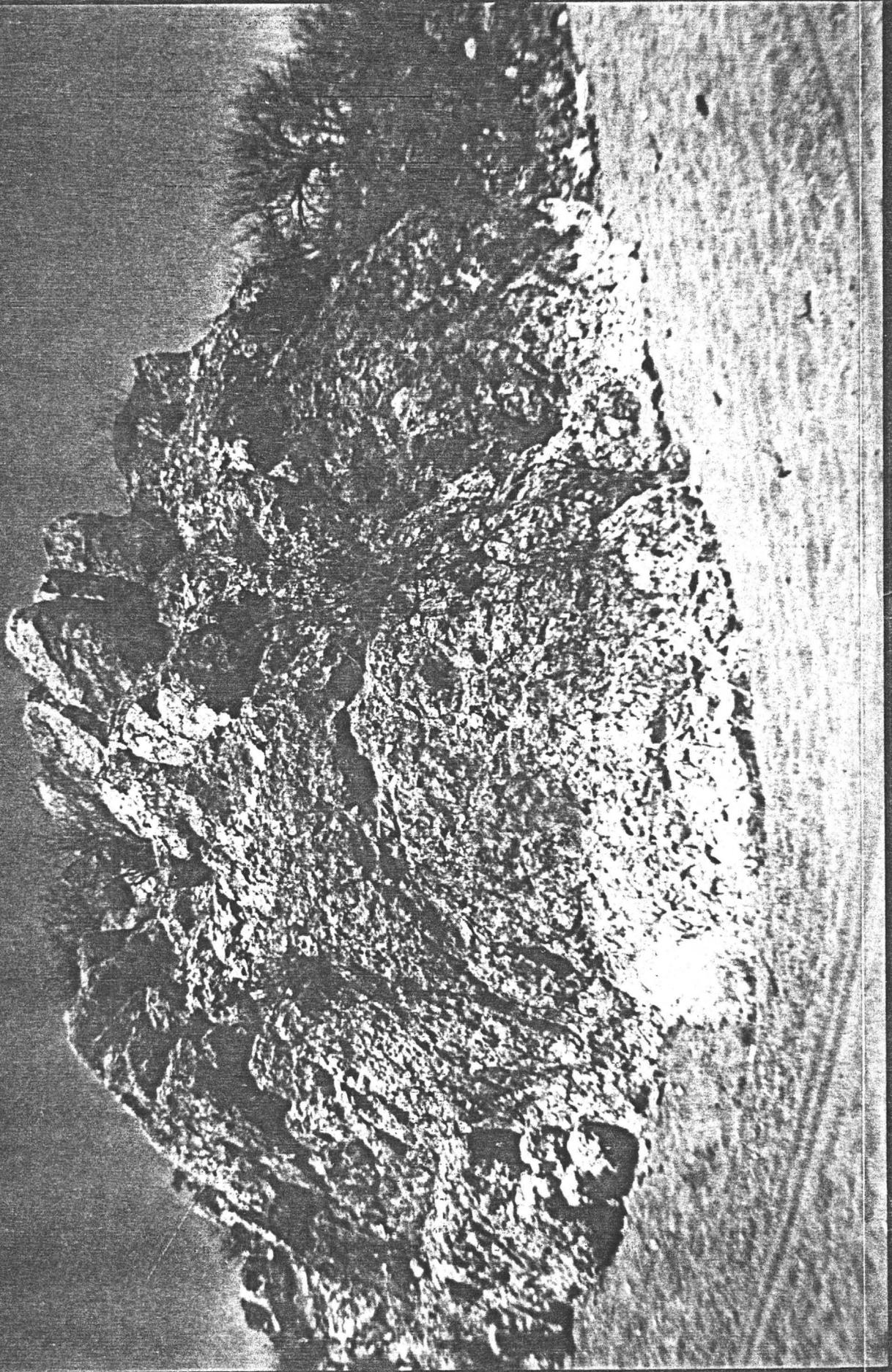
Looking SW: scale; 1 in. = 400 ft.

DATA



Jim Briscoe and Kenyon Richard examining a breccia pipe that shows good indications of mineralization.





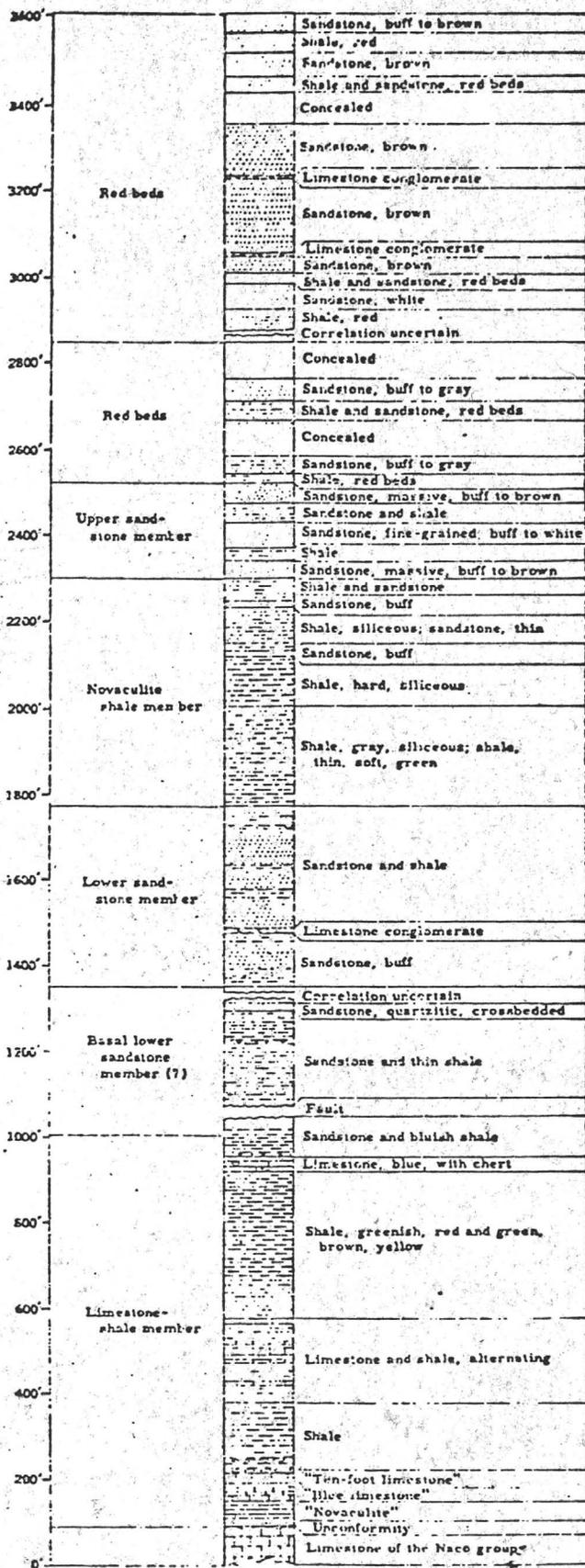


FIGURE 5.—Composite section of the Bisbee formation in the Tombstone mining district. After Lyden, O'Donnell, Hermon, and Higdon (unpublished mine report, 1907).

