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Granted

' COPPER HILL

October 21, 1942

Copper Basin

Earl F. Hastings

**Reconstruction Finance Corporation
Preliminary Development Loan**

**Docket No.
Date Application Received
Date of Report**

**C-ND-Phx 47
October 18, 1942
October 21, 1942**

1. **Name and address of applicant (correspondent):**
Fred Gibbs, Sunnyslope, Prescott, Arizona.
2. **Character of project and estimated cost thereof:**
Dewater shafts and workings of the Copper Hill Mine to and including the 130 foot level to expose for sampling various copper-molybdenum veins known to exist, \$5,000.
3. **Location of property:**
Copper Basin Mining District, Sec. 20, T 13 N, R 3 W, G & SR, Yavapai County, Arizona.
4. **Applicant's interest in or ownership of property:**
Applicant is lessee.
5. **Loan requested:**
\$5,000.
6. **Loan recommended:**
\$5,000.
7. **Comments:**
 - (A) Added to the docket is an extract relative to this property from a report on the district by G. J. Sarle dated November 14, 1935.
 - (B) The applicant presents only two samples which can be definitely located and described as to width. This information was obtained from the notes of Howard Fields and its accuracy thereby assured. The Sarle report made during the operating period of the former owner of the property mentions other locations of commercial molybdenite occurrence and lists shipments made from the property with assay data on the molybdenite content. These independent sources combine to confirm the probable existence of commercial ores in the areas described.
 - (C) The Commercial and Loma Prieta groups are likewise mentioned in the Sarle report as probable molybdenum producers and they are all adjoining, the Commercial being in the center with the Copper Hill to the west.
 - (D) Further development of the mine would be relatively simple following confirmation of the existence of the anticipated deposits. The workings can be presumed

October 21, 1942

to be in good condition as operations were relatively recent. The main shaft is 330 feet deep but devoid of any lateral workings in the mineralized zones and downward extension of ores on the 130 foot level could be easily reached from the 300 foot level.

(B) The applicant is an excellent operator and can be depended upon to utilize funds made available to him to the best of advantage.

ARIZONA DEPARTMENT OF MINERAL RESOURCES

Earl F. Hastings, Assistant Director
and Projects Engineer

Jse.

RECONSTRUCTION FINANCE CORPORATION
MINING DIVISION
REPORT OF SUPERVISING ENGINEER

Fred Gibbs
ND-5405 - CND-7872
May 15, 1944

1. Name and Address of Applicant:

Fred Gibbs
Sunnyslope, Prescott, Arizona

2. Location of Project:

Copper Hill Mine, Sec. 20, T 13 N, R. 3 W, G&SR B & M, Copper Basin
Mining District, Yavapai County, Arizona.

3. Amount of Loan and Date of Authorization:

\$ 5,000 on Nov. 4, 1942
25,000 on May 3, 1943

\$30,000 Total loan

4. Purposes for which loan was Expended:

\$ 5,000 to dewater and rehabilitate the shaft and underground
workings of applicant's copper-molybdenum mine.

\$25,000 to do diamond drilling and rehabilitate lower workings
of mine as authorized by War Production Board.

5. Equipment:

a. Equipment purchased with loan funds and cost -

1	25HP gasoline powered hoist and cable	\$ 420.00
1400	ft. of used pipe, sizes 3/4" to 3"	183.94
1	Sheave Wheel	15.00
1	Small piston, air powered water pump	40.00
1000	8# mine rails	25.00
1	Fairbanks Morse centrifugal pump	15.00

Total \$ 698.94

b. All Equipment on hand considered worth salvaging is located at
the mine. Prices shown are estimated re-sale value.

May 15, 1944

Sup. Eng. Rep.

1	25 HP gasoline powered hoist & cable . . .	\$ 330.00
1	Sheave wheel	10.00
1	Small piston - air powered water pump . . .	20.00
1,000	Ft. 8# mine rail,	15.00
1	Fairbanks Morse centrifugal pump	10.00
	Total	\$ 385.00

c. Equipment Sold:

1400' used pipe sold on Dec. 16, 1943, for . . \$ 156.75
and proceeds deposited in loan account.

d. Applicant has been requested to liquidate the remaining equipment and he has informed me that he has contacted a number of second-hand dealers. The hoist is so big and heavy that it would be best to sell this item at the mine rather than bring it in to Phoenix for sale.

6. Property:

The property is held by lease, a copy of which is in the Washington files. It is my understanding that the applicant has forfeited his rights under this lease due to non-performance.

7. Comments:

I last visited this property on Sept. 2, 1943, and operations ceased on October 1, 1943.

On Nov. 29, 1943, applicant deposited \$59.30 in the loan fund which represents sale of drums, bits and small items.

On October 15, 1943, applicant deposited \$108.71 in loan fund which represents insurance deposits refund.

Present balance in loan acct. \$ 3,306.69

8. Conclusion:

The project failed to develop a large quantity of ore, and with the exception of the remaining equipment worth salvaging the property is believed to be of little value except as a prospect. Except for salvage value of equipment, the loan should be considered a loss.

9. Recommendation:

It is recommended that this account be closed when the remaining equipment acquired, in whole or in part, with loan or operation funds which is considered worth salvaging has been liquidated and proceeds applied on borrower's indebtedness.

WM. B. MAITLAND
Supervising Engineer

Fred Gibbs

NO 5405-CMD 7872

Feb 13, 1944

1. Name & Address of Applicant

Fred Gibbs

Sunyslope, Prescott, Arizona

2. Location of Project

Copper Hill Mine, Sec 20, T13N, R3W G+SRB+M

Copper Basin Mining District, Yavapai Co, Arizona

3. Amount of Loan and Date of Authorization

\$5000 on Nov 4, 1942

\$25,000 on May 3, 1943

\$30,000 Total Loan

4. Purposes For Which Loan Was Expended

\$5000 to de-water and rehabilitate the shaft and underground workings of applicants copper-molybdenum mine

\$25,000 to do diamond drilling and rehabilitate lower workings of mine as authorized by War Production Board

5. Equipment

a Equipment purchased with loan funds and cost

	1 - 25HP gasoline powered hoist & cable	420.00
50.00	1400 feet of steel pipe sizes 3/4" to 3"	183.94
21.00	1 - sheave wheel	\$15.00
8.80	1 - small piston gear powered water pump	40.00
70.00	1000' ^{8"} small mine rails	25.00
22.50	1 - Fairbanks Morse centrifugal pump	15.00
11.64	Total	\$698.94
<u>183.94</u>		

420
8
3360

b. All Equipment on hand, considered worth salvaging ^{is} and located at the mine. Prices shown are estimated resale value.

1 - 25 HP gasoline powered hoist + cable	\$ 330.00
1 - sheave wheel	10.00
1 - small piston - air powered water pump	20.00
1000' 8 th mine rail	15.00
1 - Fairbanks Morse centrifugal pump	10.00
Total	\$ 385.00

c. Equipment sold.

1400' used pipe sold on Dec 16, 1943 for \$156.75 and proceeds deposited in loan account

d. Applicant has been requested to liquidate the remaining equipment and he has informed us that he has contacted a number of second hand dealers. The hoist is so big and heavy that it would be best to sell this item at the mine rather than bring it in to Phoenix for sale

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On Oct 15, 1943 applicant deposited \$108.71 in loan fund which represents insurance deposits refund.
Present balance in loan acct \$3306.69

8 Conclusion

(standard form)

9 Recommendation

(standard form)

Wm B. Matthews

Rout - Chief - Mining Section - Washington
Re Fred Gibbs - Docket No C-ND-7872

In reference to your telegram of March 24 in regard to check sampling of the above project by Mr Anderson of the U.S.G.S., please be advised as to the following progress that has been made.

On March 29 and 30 I again visited the property in order to do the necessary check sampling. I found that Mr Charles A Anderson had just completed the cutting of thirteen samples and had already sent them to the Union Assay Office at Salt Lake City. These thirteen samples were taken with a pneumatic chipping hammer and cutting large horizontal channels along the walls of the crosscut thru the ore bodies. Since these samples were well accurately taken I saw no reason to duplicate the work at this point. However after thoroughly discussing every phase of this project with both Anderson and the applicant Fred Gibbs we decided that the R. S. C. should have ~~these 13 pulps~~ the pulps from these 13 samples checked by the firm of Hawley and Hawley in Douglas, Arizona and this work is now being done. These 13 samples were each 10 feet long so represent 130 feet of ore. ^{Anderson informs me that both the Union assay office and Hawley + Hawley have been found by him to be competent _{analyses for molybdenum}} In addition we all agreed that we should take 8 additional samples by means of cutting

horizontal channels along the walls of the drifts in other parts of the mine in order to completely sample all available ore showings. This work was done and the samples have been sent to Hawley and Hawley for analysis for MoS_2 and copper. If Hawley and Hawley can check the Union Assay Office on the first batch of 13 samples we feel confident that we can accept Hawley's results on the last 8 samples. We now feel that further sampling of the mine workings would be of little help unless more development is done or the mine is diamond drilled. Mr Anderson and his assistant started to remain at the mine until the end of the week in order to complete the mapping of the geology. They have been ^{very} ~~most~~ cooperative on ^{the} ^{other} projects.

When we get the results of these 21 new samples I believe we will have an accurate picture of the mine as now developed ~~after we obtain the results of these assays plus Anderson's report~~

In order to clarify the situation allow me to review the sampling and assaying that has been done in the past and point out why we cannot depend on the results that have been obtained to date.

1. The 61 samples that were previously taken on this property were assayed by five different assayers.
2. None of these assays checked each other and with the exception of Jacobs of Tucson and

the Union Assays Office of Salt Lake City they were not able to check ~~the~~ their own work.

3. Most of the pulps were split and prepared by Gordon of Mayer, Arizona but I have little confidence in this assayer so cannot depend upon his accuracy in preparing the samples that were correctly assayed by Union and Jacobs.

4. Many of the ^{first} samples were obtained by net drilling with a stoper and I believe this method introduces errors as molybdenite is easily lost when finely ground and mixed with water. The presence of oil from the stoper also tends to float off the "molly".

5. The first channel sampling done was not as accurate as that done by me the second time.

6. It is also true that the ~~so~~ development work done on this mine by the past operators was for copper prospecting so they paid no attention to the high grade molybdenum areas. Thus it is possible probable that the ore now exposed and sampled is not representative of the average ore that is contained in this deposit.

While no conclusions can ^{yet} be drawn as to the ultimate grade of the ore we can assume from the sampling that has been done that the grade of the ore now exposed will contain 0.30% to 0.78% MoS_2 and from 0.50% to 0.82% copper. Anderson is inclined towards the low figures while I believe that the upper figures are more correct for a limited tonnage. While the mine now has

exposed only 160,000 to 250,000 tons of ore of this grade both Anderson and I feel that there is a good possibility of developing a much larger tonnage.

at the time of my last visit I discussed more thoroughly a development program with Anderson and Gibbs. We have jointly concluded that instead of immediately embarking on the \$25,000 development program as outlined in my report it would be better to first do a limited amount of diamond drilling. I believe that a further loan of \$5000 would be sufficient to do this preliminary drilling. The money to be spent as follows:

1500 feet of diamond drill hole @ \$2/ft	\$3000
Assaying, and sampling + engineering	750
Supervision + insurance, supplies	1000
Misc. expense	250
Total for loan	\$5000

This drilling will consist of short holes from 75 to 200 feet long drilled from the 130 foot level of the mine main to block out ~~the~~ the ore now exposed and to determine whether the property is worthy of a large development program. Mr. Anderson is going to recommend a ^{drilling program to the M.S.P.S.} We believe that this drilling would be the quickest and ~~simplest~~ best method of procedure at this point for the following reasons: -

1. Mr. Gibbs has made arrangements for the immediate rental of a complete diamond drill outfit with operator at a cost of \$2.00 per foot. This is ~~\$400~~

a bargain price as most shales ask at least
\$3 per foot.

2. It is necessary to keep the shaft
unwatered by bailing. At the present time the
applicant is keeping the workings dewatered at
his own expense so an ~~speedy~~ early consideration
of this loan is suggested.

3. Mr Anderson has ~~been~~ is requesting the
U.S. G.S. to permit either ~~himself~~ ^{himself} or his assistant
to remain on the property to ~~direct~~ ^{supervise} the drilling
program. ~~and~~

I do not believe that the results
of this additional sampling will ~~have any~~ in
any way effect the ^{advisability of a} channel drilling program
as it is my opinion that the property should
be drilled in order to determine the extent of the
ore now exposed. The ultimate grade of the ore will
only determine the amount of bonus ^{per unit of MoS₂} ~~per~~ necessary
to make the project self sustaining. If the
war effort demands new sources of molybdenum
I believe that this property ^{shows} ~~offers~~ ample
indications of producing several million pounds
of ~~red~~ MoS₂ concentrates and hence warrants further
development as outlined above.

Wm B. K. [unclear]
Supt. Eng.

325 Heard Building
Phoenix, Arizona

September 3, 1943

Rait - Chief - Mining Section - Washington

Re: Fred Gibbs - Docket No. ND-5405

In response to your letter of August 24, addressed to Mr. Gohring, please be advised that I visited this project on September 2 and discussed with the applicant the advisability of closing this project and liquidating the assets of the loan.

I also discussed this matter with the U.S.G.S. Resident Geologist, Donald Kupfer. The applicant, Mr. Gibbs and the Geologist, Mr. Kupfer, both agreed that the results of the drilling to date have not been entirely satisfactory and they realize that the grade of ore in this property is too low to warrant additional development program and I concur with them in this.

However, they both strongly feel that it would be advisable to drill one more diamond drill hole on the 300' level before abandoning the property. At considerable expense to this Corporation, the applicant has de-watered the shaft to the 300' level and has made this level accessible, it was found that the tunnel does not reach the ore zone exposed in the upper levels, but they feel that a 200' horizontal hole drilled from the 300' level in an easterly direction would thoroughly prospect this deposit at depth. As you will note from the Progress Reports already submitted, there has been one hole drilled from the surface and 9 holes drilled from the 130' level.

Therefore, until the ore is cut on the bottom level of the mine, we will have no information as to the vertical range of the ore and that now that the shaft is de-watered and they are ready to drill this hole, it is their opinion that before a definite and clear-cut decision can be drawn as to the amount and grade of ore present here, this hole should be completed.

The applicant estimates that it will cost an additional \$1,000 to do this 200' of drilling. As of the 29th of August, the balance of the funds remaining in the account amounted to \$621.62. The only equipment purchased under loan funds consists of a hoist and a small amount of 2" pipe and it is my opinion that the liquidation value of this equipment will not exceed \$400.00. I do not know the exact amount of the outstanding obligations, but the applicant has estimated them to be in the neighborhood of \$500.00.

METALS RESERVE COMPANY

WASHINGTON, D. C.

Rait - Page No. 2

September 3, 1943

Therefore, it should not take at the most any more than \$1,500 additional funds to complete this drilling project and liquidate the outstanding debts. It is my opinion that if possible, this last hole should be drilled and the work then terminated. As it now stands, they are ready to start this hole and they have all the necessary equipment and man power to do this work.

However, I have advised them to close the job down and stop all expenditures until we hear from you. I would appreciate it if you would advise us as soon as possible your wishes in this matter.

Enclosed herewith are two copies of the report on the 16th week of diamond drilling at this project. As soon as possible I will submit to you a complete map and report on the work done to date under the loan.

WM. B. MAITLAND
Supervising Engineer

WBM:MJ
Enclosure
Log of Diamond Drilling

Mr. W. B. Gohring
325 Heard Building
Phoenix, Arizona

Re: Diamond Drilling Copper Hill
16th Week, Aug. 26- Sept. 1, 1943

Dear Mr. Gohring:

Drilling was resumed on Monday, August 30; and Hole #10 is now 140 feet long. Core recovery has been very poor (below 35%). The hole is probably bordering the southern edge of the breccia zone and this southern edge is fractured and faulted. The hole is probably paralleling many of these fractures and faults and so the core recovery is very low.

- 0-38 Good breccia, fair mineralization.
- 38-45 Kaolinized and sericitized rock, but poor mineralization.
- 45- Thin lamprophyre dike.
- 45-55 Good breccia, fair mineralization -- copper better than the molybdenite.
- 55-105 A zone of very poor recovery. What little core is recovered seems to indicate that the hole is still in breccia, but the molybdenite has dropped off considerably. Copper is weak. Probably paralleling a fault zone.
- 105-113 Massive quartz vein, a little molybdenite on edges and a little chalcopyrite all through it. Mostly pyrite.
- 113-118 Fine-grained, highly kaolinized, leucocratic rock.
- 118-121 Massive quartz vein.
- 121-140 A zone of very poor core recovery. A few fragments of vein-type quartz and a few fragments of epidotized, sericitized, and biotized coarse-grained granitic rock. Probably this material represents a highly altered zone near to the breccia, but not actually brecciated. Faults and fractures are probably also present.

A summary of Hole #5 has been included with this weeks report.

Very truly yours,

(Signed) D. H. Kupfer,
Jr. Geologist, U.S.G.S.

September 1, 1943

Hole Five

Drilling

Hole #5 is located in the short stub on the east drift of the 130 level. It bears S.83 E., up 15 degrees, from a point 50 feet south of the main crosscut. In Anderson's report (4/28/43) it was called Proposed Diamond Drill Hole #3. The hole was drilled July 7-23, 1943 and is 165.6 feet long. The average drilling speed while actually drilling was 2.3 feet per hour. The overall time was 11 feet per day. Core recovery averaged 85% by length and 80% by weight. Sludge recovery averaged 103%.

Log of hole

0 - 18 feet. Breccia. In general noticeably low in quartz. Several local spots of very high grade molybdenite and chalcopyrite, but the all over grade would be much lower.

18 - 62 feet. Barren horse of hornblende diorite. Much of the hornblende is altered to biotite, but no other appreciable mineralization. The very low core recovery and broken condition of the recovered core probably indicates a fault zone from 56 to 62 feet.

62 - 70 feet Good silicified breccia with good molybdenite mineralization and some chalcopyrite.

70 -100 feet Silicified breccia with moderate mineralization.

100 -142 feet Transition zone. The quartz diorite is silicified and somewhat mineralized adjacent to numerous, small quartz veins that cut the rock. However, much of the rock is almost unaltered.

142 -166 feet Quartz-hornblende diorite that is usually unaltered, but occasionally slight alteration or mineralization is found on or near fractures.

Assays

ZONE	WIDTH	MoS2	COPPER	VALUE	NOTE
Mineralized wedge (0-18 feet)	18 feet	0.33%	0.53%	\$4.24	
Unbrecciated wedge (18-62 ft.)	44 "	0.16%	0.48%	2.81	Drill cut 1"
Eastern breccia (62-100 ft.)	38 "	0.34%	0.42%	3.94	mineralized
Transitional (100-142)	42 "	0.12%	0.33%	2.01	vein at very
Country rock (142-166)	? "	0.09%	0.28%	1.62	low angle in zone 30-40

* Value per ton for molybdenite at 37¢/pound and copper at 17¢/pound

FOOTAGE	RECOVERY		MOLYBDENITE-ASSAYS			COPPER-ASSAYS-COPPER		
	CORE	SLUDGE	CORE	SLUDGE	WEIGHTED	CORE	SLUDGE	WEIGHTED
0-10	92	78	0.50	0.86	0.73	0.74	0.71	0.72
10-20	95	79	0.12	0.13	0.13	0.28	0.38	0.34
20-30	100	88	0.08	0.09	0.09	0.25	0.28	0.27
30-40	99	103	0.39	0.28	0.32	0.56	0.48	0.51
40-50	92	95	0.11	0.17	0.15	0.36	0.36	0.36
50-60	82	95	0.11	0.10	0.10	0.56	0.84	0.77
60-70	50	119	0.55	0.52	0.53	0.24	0.48	0.43
70-80	74	153	0.41	0.41	0.41	0.18	0.51	0.41
80-90	96	110	0.22	0.22	0.22	0.18	0.25	0.22
90-100	83	107	0.17	0.20	0.19	0.71	0.59	0.63
100-110	62	105	0.09	0.14	0.13	0.36	0.43	0.41
110-120	50	106	0.14	0.08	0.09	0.23	0.31	0.29
120-130	83	91	0.12	0.12	0.13	0.33	0.33	0.33
130-140	80	107	0.33	0.07	0.15	0.20	0.31	0.27
140-150	70	101	0.11	0.08	0.09	0.38	0.38	0.38
150-160	95	98	0.10	0.08	0.09	0.25	0.31	0.29
160-166	96	95	0.13	0.07	0.09	0.43	0.46	0.45
AVERAGE	80	103	0.23	0.21	0.22	0.36	0.44	0.40

325 Heard Building
Phoenix, Arizona
September 16, 1943.

TULLY - Ass't. Chief - Mining Section - Washington, D.C.

Re: Fred Gibbs, Docket No. ND-5405

Enclosed please find two copies of the
U.S.G.S. Report on the above captioned docket for
the 17th and 18th weeks of diamond drilling.

WM. B. MAITLAND
Supervising Engineer.

Enclosure
2 c U.S.G.S. Report

Mr. W. B. Gohring
325 Heard Building
Phoenix, Arizona.

Re: Diamond Drilling Copper Hill
17th Week, Sept..2-8,1943

Dear Mr. Gohring:

On September 1st, Hole #10 was completed to 162.7 feet.
The remainder of the log was as follows:-

140-155 Feet	Poor recovery. Epidotized, kaolinized, and biotized, coarse-grained diorite with occasional minute stringers of chalcopyrite.
155-156 $\frac{1}{2}$	Massive quartz vein, very rich in chalcopyrite.
156 $\frac{1}{2}$ -163	Fine-grained, epidotized, unmineralized, biotite diorite (?).

After receiving word to go ahead, the final hole (hole #11) was started from the bend of the 300 level. It was started on September 7th and bears S.80 E., up 5. By 10:00 PM on Sept. 8, it was in 50 feet and still in unmineralized diorite. This indicates that the west orebody either does not continue to depth, or that it is not in its normal position. The former seems more probable.

Summary reports of holes #6, #7, #8, and #9 are included with this report.

Signed (Donald H. Kupfer,
Jr. Geologist, U.S.G.S.

September 9, 1943.

HOLES EIGHT AND NINE

Drilling

The collar of Hole #8 is located in the face of the west drift of the 130 level and bears S.14°W., up 10°. The hole was drilled August 4-7 and is 83 feet long. Average drilling speed while drilling was 3.4 feet per hour and the overall speed was 35 feet per day. Core recovery averaged 79% by length and 75% by weight. Sludge recovery averaged 108%.

The collar of Hole #9 is located 30 feet from the face of the west drift of the 130 level and at the point where the short crosscut takes off. The hole bears S.51°W., up 10°, for 146.6 feet. Average drilling speed while drilling was 2.4 feet per hour; overall speed was 20 feet per day; drilling time was August 9-16. Core recovery averaged 78% by length and 72% by weight. Sludge recovery averaged 96%.

Log of Holes

HOLE 8	HOLE 9	WIDTH	MoS ₂	Cu	VALUE	description
	0-23	23 ft.	0.16	0.50	\$2.88	Good breccia, high in quartz, some mineralization.
	23-26	3 ft.	tr.	tr.		Unmineralized aplite dike.
	26-30	4 ft.	0.60	0.60	\$6.48	Quartz vein, center barren, edges feldspathized and mineralized.
0-7	30-42	12 ft.	0.60	0.35	\$5.63	Good breccia, mineralization fair (Hole #8 - molybdenite good, copper weak).
7-27	42-58	18 ft.	0.20	0.48	\$3.11	Biotized quartz diorite locally cut by quartz veins carrying MoS ₂ and chalcopyrite. Not breccia, but transitional from breccia to country rock.
7-21	42-50	11 ft.	0.08	0.44	\$2.08	Very little MoS ₂ , fair copper.
21-23	50-54	3 ft.	0.80	0.70	\$8.30	Good chalcopyrite and molybdenite mineralization in well silicified rock
23-26	54-57	3 ft.	0.08	0.30	\$1.60	Biotized quartz diorite, traces of mineralization.
26-27	57-58	1 ft.	0.08	0.30	\$1.60	Massive quartz vein with traces of mineralization.
27-83	58-147	7 ft	tr.	0.20		Quartz-hornblende diorite country rock. Sometimes altered and occasionally cut and mineralized by thin seams of quartz. Mostly unaltered and unmineralized.
0-27	0-60	60 ft.	0.30	0.46	\$3.80	Better mineralized zone.
0-23	26-54	30 ft.	0.40	0.44	\$4.45	Best mineralized zone.
<u>Actual assays</u>						
<u>Hole eight</u>						
	0-30	30 ft.	0.45	0.45	\$4.86	
	40-80	40 ft.	0.08	0.28	\$1.55	
<u>Hole nine</u>						
	0-40	40 ft.	0.25	0.46	\$3.43	
	0-60	60 ft.	0.24	0.47	\$3.39	
	20-40	20 ft.	0.34	0.41	\$3.94	

NOTE: All values are per ton and based on a price of 37¢/lb for MoS₂ and 17¢/lb for Cu.

Holes Six and Seven

Drilling

The collar of Hole #6 is located on the 130 level, across the drift from Hole #5. It bears S.69°W., up 10 $\frac{1}{2}$ degrees. To Anderson's report (4/28/43) it was called proposed Hole #4. The hole was drilled July 23-26 and is 101 feet long. Average drilling speed while actually drilling was 3.4 feet per hour. Overall time was 40 feet per day. Core recovery averaged 60% by length and 54% by weight. Sludge recovery averaged 83%.

The collar of Hole #7 is located in the west drift of the 130 level, at a point 115 feet south of the main crosscut. The hole is 60 feet long and amounts to a continuation of Hole #6. It was drilled July 31-August 1, and bears N.77°W., up 3 degrees. Average drilling speed was 4 feet per hour, 60 feet per day. Core recovery averaged 96% by length and 91% by weight. Sludge recovery averaged 78%.

Log of holes

Hole #6

- 0- 27 feet Relatively barren biotized quartz dicrite of the central barren horse. Very crumbly core, the rock was probably both crushed and kaolinized.
- 27- 55 feet Good silicified breccia. Molybdenite disseminated throughout, but low in grade, Chalcopyrite well above average in grade.
- 55-101 feet Silicified breccia. Molybdenite and chalcopyrite mineralization both good. Much free quartz.

Gap between holes

- 0- 10 feet Silicified breccia.
- 10- 15 feet Fracture zone (N.20°W., 55°SW.)
- 15- 17 Feet Silicified breccia.

Hole #7

- 0- 20 feet Silicified breccia with good molybdenite mineralization and some chalcopyrite.
- 20- 27 feet Transitional. Not breccia, but cut by numerous mineralized quartz veins.
- 27- 60 feet Quartz-hornblende diorite country rock. Very little alteration. Mineralization confined to a few, narrow seams.

Mineralization grade by zones

ZONE	TRUE WIDTH	MoS ₂	COPPER	VALUE*
A-Hole #6 - Unbrecciated (0-27)	30 ft.	0.09%	0.44%	\$2.16
B-Hole #6 - Breccia (27-55)	25 ft.	0.12%	0.74%	\$3.40
C-Hole #6 - Breccia (55-101)	40 ft.	0.26%	0.64%	\$4.10
D-Gap - Breccia (0-10)	10 ft.	0.2%	0.6%	\$3.52
E-Gap - Fault zone (10-15)	5 ft.	0.5%	0.7%	\$6.08
F-Hole #7 - Breccia (0-20)	20 ft.	0.32%	0.47%	\$3.96
G-Hole #7 - Transitional (20-27)	7 ft.	0.2%	0.28	\$2.43
H-Hole #7 - Country rock (27-?)	7 ft.			

B-F Weighted composite 100 ft. 0.24% 0.63% \$3.92

C-F Weighted composite 75 ft. 0.28% 0.59% \$4.10

*- Value per ton of ore assuming 100% recovery, 37¢/lb for MoS₂, and 17¢/lb for Cu.

ASSAYS OF HOLES SIX AND SEVEN

FOOTAGE	RECOVERY		MOLYBDENITE ASSAYS			COPPER ASSAYS		
	CORE	SLUDGE	CORE	SLUDGE	WEIGHTED	CORE	SLUDGE	WEIGHTED
Hole #6								
0- 10	28	38	0.05	0.06	0.059	0.23	0.20	0.203
10- 20	51	78	0.11	0.12	0.118	0.79	0.51	0.564
20- 30	49	94	0.11	0.08	0.086	0.48	0.56	0.545
30- 40	64	95	0.11	0.11	0.110	0.59	0.64	0.628
40- 50	71	90	0.13	0.12	0.123	0.82	0.97	0.930
50- 60	68	92	0.16	0.14	0.145	0.69	0.89	0.839
60- 70	60	93	0.28	0.20	0.218	0.69	0.77	0.752
70- 80	57	63	0.24	0.20	0.209	0.46	0.62	0.578
80- 90	63	86	0.23	0.42	0.375	0.56	0.66	0.637
90-100	24	97	0.16	0.24	0.233	0.59	0.61	0.608
AVERAGE	58.5%	82.6%	0.156%	0.169%	0.165%	0.590%	0.642%	0.628%
Hole #7								
0- 10	84	50	0.38	0.27	0.304	0.46	0.41	0.426
10- 20	92	89	0.35	0.33	0.337	0.59	0.47	0.511
20- 30	95	88	0.18	0.36*	0.297*	0.33	0.25	0.278
30- 40	96	82	0.08	0.23**	0.176**	0.28	0.36	0.331
40- 50	82	78	Tr.***			0.2***		
50- 60	95	80	Tr.***			0.2***		
AVERAGE	90.7%	77.8%	0.250%	0.298%	0.235%	0.415%	0.372%	0.379%

- * Thought to be wrong, sludge probably picked up moly from other parts of the hole, the weighted average probably should be about 0.20% MoS₂.
- ** As above, weighted average probably should be 0.10% MoS₂.
- *** Core was very barren of mineralization, these percents are estimates, not assays. These figures are not included in the averages.

ASSAYS OF HOLES EIGHT AND NINE

FOOTAGE	RECOVERY		MOLYBDENITE ASSAYS			COPPER ASSAYS		
	CORE	SLUDGE	CORE	SLUDGE	WEIGHTED	CORE	SLUDGE	WEIGHTED
Hole #8								
0-10 ft.	65%	44%**	0.55%	0.81%	0.748%	0.36%	0.28%	0.299%
10-20	50	105%	0.07	0.06	0.062	0.51	0.38	0.404
20-30	79	109	0.56	0.54	0.546	0.61	0.64	0.631
30-40	95	107	0.14	0.17	0.159	0.38	0.31	0.335
40-50	92	109	0.08	0.07	0.067	0.28	0.35	0.326
50-60	77	lost	0.12	0.07	0.099	0.25	0.33	0.307
60-70	56	91	0.11	0.10	0.10 ²	0.23	0.23	0.230
70-80	88	125	0.06	0.05	0.053	0.25	0.28	0.270
AVERAGE	75.5%	98.9%**	0.208%	0.234%	0.230%	0.358	0.350	0.950
Hole #9								
0-10 ft.	37%	100%	0.12%	0.17%	0.161%	0.56%	0.59%	0.585%
10-20	59	98	0.12	0.17	0.156	0.46	0.43	0.439
20-30	64	95	0.25	0.35	0.319	0.41	0.41	0.410
30-40	23	116	0.21	0.39	0.370	0.21	0.43	0.406
40-50	76	124	0.07	0.39*	0.273*	0.51	0.46	0.478
50-60	76	97	0.14	0.19	0.172	0.41	0.41	0.410
AVERAGE	55.3%	105.0%	0.152%	0.277%*	0.242%*	0.427%	0.455%	0.471%

* - Sludge assay probably high, may have picked up molybdenite from rest of hole. Estimate weighted average may be about 0.10%, average of all sludges about 0.22%, and average of weighted averages about 0.213%.

** - No attempt was made to collect the first 5 feet of sludge, leaving outvsludge, the average is 107.7% recovery for hole.
this

Mr. W.B. Gohring,
325 Heard Building,
Phoenix, Arizona.

Re: Copper Hill Diamond Drilling
18th Week, September 9-15, 1943

Dear Mr. Gohring:

No drilling was done on September ninth as the compressor was under repair, Drilling stopped at ten PM on September 13th for lack of bits. The hole is 149 feet deep. Three more bits have been ordered and will probably arrive Friday (Sept. 17). To date, the log of the hole is:-

FOOTAGE	LOG
0- 2	Kaolinized and biotized quartz-diorite.
2- 6	Somewhat silicified quartz diorite, some chalcopyrite mineralization.
6- 40	Kaolinized and biotized quartz diorite with minor zones of silicification and mineralization at 10 and 20 feet.
40-58	Fresh, coarse-grained, quartz-hornblende diorite.
58-60	Fresh, fine-grained diorite (biotitic).
60-68	Fresh, coarse-grained, quartz-hornblende diorite.
68-71	Crushed and broken zone -- probably a fault.
71-87	Fresh, fine-grained biotite diorite.
87-87½	Several thin, molybdenite and chalcopyrite mineralized, quartz veins cut perpendicular to the core.
87½-103	Fine-grained biotite diorite with thin, mineralized quartz stringers every foot or so.
103-121	Alternating fine and coarse grained diorite. The fine-grained predominates and shows very little silicification. The coarse-grained is moderately silicified and contains a little molybdenite and chalcopyrite.
121-127	Fault zone, crushed rock and mud.
127-130	Fine-grained, unsilicified breccia, Fragments of 1/8 - 1 inch in diameter in a grey, sandy-clay matrix. A little mineralization.
130-140	Silicified and mineralized (MoS ₂ & Cpy.) breccia.
140-148	Alternating 6-12 inch zones of fine and coarse grained diorite. The fine-grained contains copper streaks and the coarse-grained contains both chalcopyrite and molybdenite.
148-149	Good silicified breccia with fair molybdenite and poor chalcopyrite.

The west breccia zone died out before reaching the 300 level, but probably is present 50-75 feet above the level. The eastern breccia zone is narrower (?) and weaker on the 300 level and may not continue far below the 300 level. No strong molybdenite mineralization has been observed. Apparently hole eleven is near the fine-coarse-grained contact. The very irregular nature of the contact is shown by the numerous alterations of fine- and coarse-grained rock.

Drilling will probably be resumed Friday and the hole should be completed by Saturday or Sunday (Sept. 18-19).

Signed (Donald H. Kupfer,
Jr. Geologist, U.S.G.S.

September 15, 1943.

COPY

my file

325 Heard Building
Phoenix, Arizona
August 17, 1943

TULLY-Asst. Chief - Mining Section - Washington.
Re:- 'FRED GIBBS, Docket No. NB-5405

This project was granted a \$30,000 Development Loan in May, 1943, and of this amount \$5,000 was to be used to repay a previous Accessibility Loan, \$6900.00 was to be used to do the diamond drilling and make accessible 300-foot level and the balance of \$18,100 was allocated for further underground development work. Of the \$25,000 available for developments of the mine under this program, the applicant has now nearly spent \$10,000, and has completed or will shortly complete nine diamond drill holes plus rehabilitating and making accessible the 300-foot level. The engineer from the U.S.G.S and myself originally planned on drilling seven holes, but since the poor core recovery was made in the first hole, we decided to experiment with different sized bits in order to determine the optimum size of bit for this type of deposit, therefore, we drilled two test holes thus increasing the number of holes to nine. The 300-foot level has not been inspected as yet but the U.S.G.S. Engineer on the property reports that this level is not in ore, and it is my opinion that it would be advisable to drill two or perhaps three horizontal holes from the 300-foot level in order to quickly and cheaply explore the ore depth. Therefore, I think it advisable that the applicant be allowed to use \$5,000 for the remaining \$10,000 in this loan in order to do this work.

The applicant who is a competent engineer attempted to economize in the drilling of the deposit and hence hired an independent drill contractor who is now doing the work. It was found, however, that due to lack of proper additional equipment and perhaps due to lack of experience in the part of the driller, the drilling cost more than anticipated, and in addition it cost more to rehabilitate the 300-foot level than originally thought when the mine was examined. The results of this drilling have shown that the ore is not as high-grade as originally anticipated although as yet no attempt has been made to determine the over-all average grade of the ore. However, if molybdenum and copper are still critical metals it would seem advisable to me to complete the drilling program as first contemplated. I believe that unless we do some diamond drilling on the 300-foot level, it will not be possible to obtain a good estimate of the ore possibilities of this mine. The applicant should be able to complete all of the necessary exploration work with this \$5,000 and have ample left over to do the necessary assaying and engineering work.

The resident U.S.G.S. Geologist that is in charge of the drilling has submitted weekly reports on the progress of the work, and a copy of all these reports have been forwarded to your office so that the data in Washington should give a clear picture of the progress and results obtained at this property.

W. B. MAITLAND, Supervising Engineer.

325 Heard Building
Phoenix, Arizona
July 24, 1943

Mr. Charles A. Anderson, Geologist
c/o Fred Gibbs, Sunnyslope
Prescott, Arizona

Dear Andy:

Received your letter of July 21st and the enclosed map and assays, for which I thank you. It certainly looks as though the Loma is a dud, although if the higher-ups in Washington wish to go ahead on such a marginal proposition I imagine the best thing for me to do is merely report the facts to the R.F.C. without recommendation. I am sorry that I will not be able to get to Prescott before you leave, but I hope to see you again soon, when you return to Arizona.

Katherine and I send our best regards both to you and to your wife.

Sincerely yours,

William B. Maitland
Supervising Engineer

WBM-b

my

July

Re: Copper Hill Diamond Drilling
Fourth Week (June 3 - 9, 1943)

Drilling

Drilling stopped from June 1 to noon of June 7, while the drillers waited for new bits and went to Nevada to get more drill rods. Hole #1 is now down 327' and still in breccia. However, the intensity of brecciation, silicification and mineralization has shown a marked decrease below about the 290 - 300' point.

Recovery

<u>Footage</u>	<u>Core (Vol)</u>	<u>Core (wt.)</u>	<u>Sludge</u>
272-282	46	37	90
282-292	84	72	87
292-302	72	56	87
302-312	67	54	drying
<u>312-322</u>	<u>55</u>	<u>47</u>	<u>"</u>
Average	65	51	88

Assays

The MoS₂ assays were reported to 0.001%, but in every case, the third figure was the same as the second. Because of this duplication and because Union Assay has never previously reported beyond 0.01%, the third figure has been tentatively dropped pending further information. That is, 0.099 has been called 0.09.

Sludge and core assays have been weighted according to the U.S. Bureau of Mines formula:-

$$\text{Assay average} = \frac{(\text{weight core} \times \text{core assay})}{\text{weight core} - \text{TWS}}$$

$$(\text{TWS} \times \text{sludge assay})$$

where TWS the theoretical weight of sludge, is the theoretical weight of all the rock removed from the hole, minus the weight of the recovered core.

Footage	Core		Sludge		Average		Core Recovery
	MoS ₂	Cu.	MoS ₂	Cu	MoS ₂	Cu.	
72 - 82	0.09	0.25	0.08	0.38	0.081	0.37	17%
82 - 92	0.07	0.43	0.05	0.48	0.053	0.48	8
92 - 102	0.05	0.20	0.08	0.25	0.078	0.25	16
102 - 112	0.07	1.63	0.05	0.56	0.052	0.69	31
112 - 122	0.06	0.28	0.11	0.59	0.108	0.58	11
122 - 132	0.06	0.54	0.11	0.51	0.108	0.51	9
132 - 142	0.06	0.43	0.12	0.64	0.114	0.62	27
142 - 152	0.32	0.64	0.07	0.51	0.122	0.54	54

Footage	Core		Sludge		Average		Core Recovery
	MoS ₂	Cu.	MoS ₂	Cu.	MoS ₂	Cu.	
152-162	0.03	0.20	0.07	0.43	0.067	0.41	21
162-172	0.03	0.59	0.13	0.41	0.113	0.45	45
Average	0.084	0.52	0.87	0.48	0.090	0.49	

West breccia zone

(1) Recent mapping shows that on the surface the western breccia zone ends about 60' north of Drill Hole #1. (The eastern breccia zone ends about 160' north of hole #1)

(2) The erratic brecciation and mineralization in the western breccia zone as shown by the cores of Drill Hole No. 1, suggests that the zone is dying out northward and that the drill hole is very near the north margin.

(3) The assays from Drill Hole #1 show that the western zone is not of ore grade at this northern margin.

NOTE: In contrast, the eastern breccia zone margin is farther to the north and the mineralization was more regular. It is probable, therefore, that this zone may be ore along the line cut by Drill Hole #1.

Change to AX core

The present drill will not take AX core barrels, but the drillers have ordered a new machine that will drill both LM and AX holes. The new machine is a Chicago Pneumatic #5 that was ordered by a firm in Mexico, but they could not get it released across the border. It has been lying idle at El Paso for over three months. Sunday, June 8, the drillers (Wm. F. Paine & Harold Winslow) air mailed the request for priorities to the Mining Branch of War Production Board at Washington, D.C. Once released, the drill can be delivered to Prescott in two to four days.

The new machine will not only drill the larger holes, but it is faster, and it can be used in cramped space as in a short drift or crosscut.

In view of the present poor core recovery and consequent uncertainty as to grade; Maitland, Gibbs and I believe that the next hole should be drilled for AX core to see if this won't increase the core recovery. The drillers say the AX drilling will be just as fast and possibly faster, as the core will not block in the bit as often. They have not calculated the cost yet, but they estimate it at 50¢ to 75¢ per foot more than the price for the LM Drilling. Naturally, this all hinges on whether the drillers

Fourth Week - Page 3.

get the priorities necessary to buy the new drill.

Dewatering

The pump at the Loma Prieta broke down and the water level rose to about 130'. A new electric pump has been installed and is lowering the water rapidly. The water level is now at about the 200' level.

The Copper Hill shaft is dewatered to about the 260' level.

Donald H. Kupfer
Junior Geologist, U.S.G.S.

June 9, 1943

cc to: CAA
WSB
WBG
DEK
SGL

ASSAYS - HOLE ONE - COPPER HILL
 May - July 1943
 U.S.G.S.-R.F.C.

HOLE ONE		MOLYBDENITE			COPPER		
FOOTAGE	CORE RECOVERY	SLUDGE	CORE	WEIGHTED	SLUDGE	CORE	WGHT.
72-82	20%	0.088	0.099	0.089	0.38	0.25	0.372
82-92	9%	0.055	0.077	0.056	0.48	0.43	0.477
92-102	17%	0.088	0.055	0.086	0.25	0.20	0.248
102-112	34%	0.055	0.077	0.058	0.56	1.63	0.684
112-122	12%	0.111	0.066	0.109	0.59	0.28	0.577
122-132	10%	0.111	0.066	0.110	0.51	0.54	0.512
132-142	29%	0.122	0.066	0.116	0.64	0.43	0.618
142-152	58%	0.077	0.322	0.126	0.51	0.64	0.536
152-162	22%	0.077	0.033	0.074	0.43	0.20	0.414
162-172	49%	0.133	0.033	0.116	0.41	0.59	0.437
172-182	18%	0.222	0.222	0.222	0.38	0.56	0.391
182-192	22%	0.166	0.366	0.181	0.36	0.41	0.364
192-202	40%	0.077	0.166	0.089	0.28	0.30	0.283
202-212	23%	0.166	0.255	0.176	0.71	0.51	0.694
212-222	18%	0.133	0.111	0.132	0.48	0.41	0.476
222-232	29%	0.089	0.089	0.089	0.55	0.53	0.548
232-242	17%	0.100	0.111	0.101	0.51	0.41	0.505
242-252	51%	0.111	0.489	0.176	0.46	1.10	0.571
252-262	40%	0.133	0.111	0.130	0.33	0.33	0.330
262-272	35%	0.111	0.266	0.130	0.51	0.56	0.516
272-282	40%	0.133	0.111	0.130	0.46	0.38	0.448
282-292	77%	0.122	0.226	0.149	0.38	0.41	0.388
292-302	60%	0.144	0.233	0.162	0.43	0.46	0.436
302-312	58%	0.133	0.144	0.135	0.38	0.23	0.350
312-322	51%	0.111	0.144	0.117	0.36	0.36	0.360
322-332	48%	0.133	0.199	0.144	0.43	0.46	0.435
332-342	60%	0.111	0.178	0.125	0.43	0.46	0.436
342-352	20%	0.099	0.155	0.103	0.41	0.43	0.411
352-362	11%	0.099	0.255	0.105	0.36	0.41	0.362
362-372	34%	0.111	0.278	0.130	0.43	0.59	0.449
372-382	23%	0.42	0.166	0.400	0.36	0.33	0.358
382-392	25%	0.18	0.178	0.180	0.30	0.15	0.287
392-402	15%	0.19	0.14	0.187	0.43	0.28	0.424
402-412	11%	0.14	0.10	0.139	0.30	0.36	0.304
412-422	28%	0.14	0.17	0.143	0.23	0.15	0.222
422-432	15%	0.13	0.12	0.129	0.28	0.41	0.287
432-442	18%	0.13	0.13	0.130	0.36	0.23	0.352
442-452	22%	0.12	0.14	0.121	0.33	0.28	0.326
452-462	20%	0.14	0.17	0.142	0.25	0.38	0.259
462-472	55%	0.24	0.17	0.227	0.36	0.41	0.369

Assays - Hole One - Copper Hill - Page No. 2.

HOLE ONE		MOLYBDENITE			COPPER		
FOOTAGE	CORE RECOVERY	SLUDGE	CORE	WEIGHTED	SLUDGE	CORE	WHTD.
472-482	65%	0.17	0.18	0.172	0.36	0.43	0.375
<u>482-486</u>	<u>56%</u>	<u>0.14</u>	<u>0.22</u>	<u>0.157</u>	<u>0.43</u>	<u>0.36</u>	<u>0.422</u>
Average	31.4%	0.132	0.164	0.138	0.414	0.435	0.419

Re: Copper Hill Diamond Drilling
Fifth week. June 10-16, 1943

Drilling

Hole #1 is down 450' and is expected to be completed by next Sunday (June 20). The capacity of the drill is 500'. At 450', the Hole is still in breccia, but the molybdenite mineralization has been almost nil since 385'. From 400 to 450', much of the feldspar in the rock has been altered to clay.

Core recovery for the last 100' is 19% (21% by length). Sludge recovery has averaged 140%.

Personnel

W. B. Maitland, Supervising Engineer, Reconstruction Finance Corporation, inspected the 'Copper Hill and 'Loma Prieta properties on June 12. C. A. Anderson, Geologist, U.S. Geological Survey, is starting to map the 'Loma Prieta Claims.

Equipment

Paine and Winslow still have no word from W.P.B. about the new drill they have requested.

Methods

Loss of molybdenite from samples

Graphs have been prepared for Hole #1 showing, (1) the amount of molybdenite visible to the eye in the recovered core plotted against position in the hole, and (2) the core recovery for each separate "pull." In comparing these two graphs, it has been noted that the sections richest in molybdenite are generally sections of very low core recovery (less than 20%). However, all sections of low core recovery do not have corresponding rich molybdenite sections. Although this is to be expected, in some of the cases only the barren material may have been recovered. Some, and possibly many, of these low recovery zones may contain a higher grade of molybdenite than the cores indicate. The reverse (the cores indicating too high a grade) is not likely, as the barren rock cores better than the mineralized rock.

Maitland and I suspect the sludge samples are also running low due to the loss of molybdenite in the grease on the walls of the hole, flotation losses, and other causes (see reports for 2nd and 3rd week). If so, then the present

Copper Hill Diamond Drilling - 5th week - June 10 - 16, 1943

drilling procedure is inadequate as neither the sludge nor core assays can be relied upon.

Experimental drilling

Mr. Maitland has suggested that the next holes drilled be experimental holes to test the accuracy and efficiency of LM, AX, & BX hole in the Copper Hill breccia. The procedure would be to drill three 30' holes; one LM, one AX, and one BX; parallel to, and as close as possible to the accurately sampled section in the eastern ore block on the 130 level. The holes would be horizontal, parallel, and one above another. With this set-up, it would be possible to check the sludge and core assays of the three sizes of holes against each other and against accurate channel samples. Later, if ore reserves warranted it, this whole block could be blasted out and milled, giving an accurate mill check on both core and channel assays.

Anderson, Gibbs, Maitland and I completely agree with this plan, and it will be started as soon as Hole No. 1 is finished and the drillers have received the new drill they have requested. As the present drill will not take AX and BX fittings, it can not be used for the above program. However, the first or LM hole can be drilled while waiting for the new drill.

Dewatering

Dewatering by bailing at the Copper Hill Shaft is just holding the water at about 230' and not lowering it. A pump will be installed.

The pump at the Loma Prieta is still causing trouble, delaying the dewatering program. The water is down to about the 300 level.

Donald H. Kupfer (Signed)
Jr. Geologist, U.S.G.S.

June 17, 1943

Re: Copper Hill Diamond Drilling
Seventh Week - June 24 - 30, 1943

Drilling

Hole #1

Complete assay returns not available yet.

Experimental drilling

The experimental holes on the 130 level start 130' east of the main shaft on the east wall of the west drift, 3' south of the south wall of the main crosscut. The holes parallel channel samples 8A, 9A, 10A and 11A. 2-1/2' of the wall were blasted away to make room for the diamond drill, therefore the drill holes will only overlap 7-1/2' of sample #8A. The drill holes (S80E) make an angle of 4° with the main crosscut (S84E) in order to avoid places where the Bureau of Mines blasted samples from the walls of the crosscut (the blasting was done after samples 8A-13A were taken and destroyed most of the channels.).

Hole #2 LM bit - 7/8" core

Hole #2 is to be drilled 37½', 17½' parallel to samples 8A and 9A without the use of grease on the rods and 20' parallel to samples 10A and 11A with grease. The hole was drilled 11' on Saturday (6/26), but is temporarily shut down till new bits arrive. Drilling a horizontal hole does not break up the core as even as drilling a steeper hole, consequently, recovery (by length) for the 11' has averaged 78% compared with 37% average for hole #1. However, the recovered core is very badly broken and crushed and such recovery could only be maintained under the most favorable conditions.

Hole #3 AX bit - 1-1/8" core

To be drilled 27-1/2' without grease. The hole was started Friday (6/25), but the bit was faulty and broke immediately. Another bit has been ordered.

Hole #4 BX bit - 1-5/8" core

The hole was to have been drilled 27½1/2', without grease, but at the end of 25 1/2' the bit was worn out. The hole will probably not be completed for the last 2'. The hole was drilled Tuesday and Wednesday (6/29 - 6/30). The recovery is very good, averaging 89% (by length) with lots of 100% recovery. The core is often broken and on steeper holes the recovery would drop, as as the broken pieces are large, recovery should still be good (possibly 60-80%).

However, the core was getting more and more broken

with increasing depth and recovery was dropping. Recovery for the first 18' was 94% and then dropped to 77% for the last 7'. This may have been caused by a local broken area (faults cross at 18 and 28½') or it may be that with increasing length, the vibration of the IM rods in the BX hole increases and breaks the core up. If the latter is the case, the vibration would probably be quite severe at 100 to 250' depth.

Equipment

The priority for the new Chicago Pneumatic #5 drill has been Oked by W.P.B. The drill is scheduled to arrive July 5.

Methods

On Hole #1, grease was removed from the rods on ten pulls from 282-308' (a zone of good core recovery). Arizona Assay Office, Phoenix, assayed part of the sample and got 0.32% MoS₂. Union Assay Office, Salt Lake obtained 0.722% MoS₂ on another part of the same sample. This difference may be due to irregularities of distribution of the molybdenite in the grease. The following estimates have been made to try to evaluate this error:-

65 pounds of grease were used on Hole #1.
 $65/48 \times 295/240 = 1.65$ pounds of greased used per 10' run in zone where grease was assayed (282-308')
 $1.65 \times .0032 = .0053$ pounds MoS₂ lost in grease (Arizona).
 $1.65 \times .0072 = .0119$ pounds MoS₂ lost in grease (Union)

Footage	Sludge Assay	Sludge Assay Corrected for Grease		Pulls	Sludge Assay Corrected for Grease on # Pulls Basis		Core Assay	Core Rec'y
		Arizona	Union		Ariz.	Uni.		
262-272	0.11	0.14	0.17	3	0.13	0.16	0.26	35%
272-282	0.13	0.16	0.19	3	0.15	0.18	0.11	40%
282-292	0.12	0.15	0.18	5	0.16	0.20	0.23	77%
292-302	0.14	0.17	0.20	3	0.16	0.19	0.23	60%
302-312	0.13	0.16	0.19	5	0.17	0.21	0.14	58%
312-322	0.11	0.14	0.17	4½	0.14	0.18	0.14	51%
322-332	0.13	0.16	0.19	4½	0.16	0.20	0.20	48%

The difference between the sludge and the core assays and the amount of molybdenite in the grease samples, both show that

a significant amount of molybdenite is removed from the sludges by the grease. Considering (1) the variations in the grease assays, (2) the variations between the attempted corrections for grease and the core assays (3) the variations in the amounts of grease used (4) variations in the number of pulls per 10' run, (5) the final distribution of the grease in the hole, on the rods and in the sludge; a correction factor for the grease cannot be safely applied to the sludge assay results.

Because Hole #2 is so short, very little grease will be used on the rods. Therefore, the first 17½' (without grease) may not show a significant difference from the last 20' (with grease). However, this will not prove that grease does not effect the results on longer holes.

All future holes will be drilled without the use of grease on the rods.

Loma Prieta

Sampling of the 150 level is completed and sampling of the 400 level is underway.

Donald H. Kupfer
Jr. Geol. U.S.G.S.

July 1, 1943

Re: Copper Hill Diamond Drilling
8th Week - July 1-7, 1943

Assays - Hole One

The copper values on the attached sheet of assays for hole one, show good agreement, are reasonable and probably are close to accurate. They may be a little on the conservative side.

I don't believe the molybdenite sludge assays or the weighted average have any significance. The molybdenite core assays are probably nearest to correct, but due to the low core recovery they should not be trusted too much. Individual core assays may be quite erratic, but the average over wide zones is probably more trustworthy. Due to the loss of molybdenite on the seams, the core assays probably are conservative.

I have not had an opportunity to carefully evaluate the assays and their significance, but apparently the drill hole penetrated the western breccia zone at its northern margin. The grade at this point is less than 0.1% MoS₂ and 0.47% Cu. The eastern breccia zone is more favorable, a zone about 210' wide appears to run better than 0.2% MoS₂ and 0.43% Cu.

HOLE ONE		MOLYBDENITE		COPPER	
FOOTAGE	WIDTH	CORE	WEIGHTED	WEIGHTED	
0-72	72'	0.072	No assays		Country rock
72-142	70'	0.072	0.089	0.470	Western Zone
142-172	30'	0.129	0.105	0.462	Center barren
172-242	70'	0.189	0.144	0.466	Eastern zone
242-382	140'	0.211	0.152	0.418	" "
382-486	104'	0.156	0.157	0.330	East. marginal
172-382	210'	0.204	0.149	0.434	East. zone

I may have switched the numbers of the core samples for the 132-142 and 142-152 zones. This is suggested by the log of the hole which shows the first 10' as in good grade molybdenite and the second 10' as nearly barren - which is just the reverse of what the assays show. If this is true, the above table would read:-

72-142	70'	0.109	0.091	0.50	Western zone
142-172	30'	0.044	0.088	0.43	Center barren

which is more reasonable.

Recovery - Holes 2-4

(Continued)

Recovery - Holes 2-4

Core size	IM 7/8"	AX 1-1/8"	BX 1-5/8"
Volume recovery (%)	62%	79%	90%
Weight recovery (%)	73%	83%	89%
Condition of core	Badly broken and crushed	Often badly broken	A few badly broken places

No assay returns are available yet, so that it is premature to draw conclusions. However, the following ideas are suggested:-

- (1) IM core is not satisfactory. Even though recovery is 60-70%, the core is too broken to be useful.
- (2) AX core is complete enough to give a good idea of the rock penetrated, but the core is fragmented in the best molybdenite zones so that appreciable molybdenite may be lost into the sludges. With steeper holes, recovery would probably drop to around 50-70%.
- (3) BX core gives the best recovery and its large size increases its accuracy for sampling. The molybdenite rich zones are still broken by the BX bit, but the fragments are large enough that most of them will be recovered.
- (4) For exploratory drilling, AX core will probably be satisfactory. For drilling in which an accurate determination of grade is necessary, BX core should be used.
- (5) New holes should be laid out as near to horizontal as possible and preferably be pointed up a little.
- (6) Pending assay returns, the value of sludges is indeterminate.

Drilling

The proposed -45° hole bearing N 67 E (old #2) has been temporarily by-passed to see if the conclusions reached as a result of the experimental drilling will effect it and to see if the zone can be more satisfactorily explored from the 300 level.

Meanwhile, the $+15^{\circ}$ hole bearing S83 E (old #3) is being started with AX core. This is hole #5.

DONALD H. KUPFER (Signed)
Jr. Geologist, U.S.G.S.

July 10, 1943

Copper Hill Diamond Drilling
Ninth Week - July 8-14, 1943

Hole Five

Hole #5 is located in the short stub on the east drift of the 130 level. It bears S8 3E up 15 degrees from a point 50 feet south of the main crosscut. In Anderson's report (4-28-43) it was called Proposed Diamond Drill Hole #3. The hole was started July 7th and was drilled to 70 feet by July 10th. No drilling has been done since as the drillers say they lack sufficient air. Another compressor (the one now being used for sampling at Loma Prieta) will be hooked in with the present one and drilling should again be resumed by July 15th.

Log of Hole #5

- 0 - 18 feet: Breccia. In general noticeably low in quartz. Several local spots of high grade molybdenite and chalcopyrite, but all over grade would be low. Probably marginal ore. CORE RECOVERY - 94%
- 18 - 56 feet: Barren horse of hornblende diorite. Much of the hornblende is altered to biotite, but no other appreciable mineralization. CORE RECOVERY - 99%
- 56 - 62 feet: Starting into a quartz rich breccia zone; the first part of which at least, is very good ore. CORE RECOVERY - 37%

(NOTE: Best ore, poorest recovery)

Loma Prieta

Sampling of the Loma Prieta will be concluded Thursday, July 15th, and the shaft will then be allowed to fill with water. The funds of the RFC loan have already been exceeded.

/s/ DONALD H. KUPFER

Donald H. Kupfer
Jr. Geologist, U.S.G.S.

July 14, 1943

MS File

Mr. W. B. Gohring
Reconstruction Finance Corp.
325 Heard Building
Phoenix, Arizona

Dear Mr. Gohring: Re: Copper Hill Diamond Drilling
Tenth Week - July 15-21, 1943

Hole #5

Hole #5 was drilled 133' by noon, Monday, July 19. There has been no drilling since for lack of bits. Core recovery to date has averaged about 80%. The log is as follows:

- 0 - 18 Moderate mineralized breccia (see last report)
- 18 - 56 Unmineralized, unaltered rock(" " ")
- 56 - 70 Good silicified breccia with good molybdenite mineralization and some chalcopyrite.
- 70 -110 Silicified breccia with moderate mineralization.
- 110 -133 Poorly mineralized and slightly altered rock.

Dewatering

The pump at the Loma Prieta was transferred to the Copper Hill shaft and actual pumping was started at 6:00 PM yesterday when the water was just below the 130 level. At 5:00 P.M. today (July 21) the water was just above the drift on the 300 level.

Donald H. Kupfer
Jr. Geologist, U.S.G.S.

July 21, 1943

Mr. W. B. Gohring
Reconstruction Finance Corporation
325 Heard Building
Phoenix, Arizona

Re: Copper Hill Diamond Drilling
11th Week - July 22-28, 1943

Hole Five

Drilling on Hole Five was resumed on July 22, and the hole was completed (165.6') on July 23. The hole was stopped because the mineralized and brecciated zone was passed and the face of the hole was in quartz-hornblende diorite country rock. The rock was relatively barren for the last 45' and even the hornblended crystals were almost unaltered for the last 20'.

The average core recovery for the hole was 85% by volume and 80% by weight. However, through the best ore zone (60-120') the core recovery was only 69% by weight. In general, the condition of the core was good, but locally, the core was broken and crushed.

The log of the last part of the hole was as follows:-

133-134	Bull quartz
134-141	Poorely mineralized and slightly altered rock
141-142	Narrow, siliceous, mineralized zone.
142-153	Poorly mineralized and slightly altered rock.
153-156	Slightly altered quartz-hornblende diorite.
156-158	A little mineralization, slight silification.
158-166	Unaltered quartz-hornblende diorite.
166'	End of the hole.

Hole Six

Hole Six (proposed Hole #4 in Anderson's report of 4/28/43) was started from the same point in the east drift of the 130 level as Hole Five, but in the west wall instead of the east wall. The bearing of Hole Six was changed somewhat from the original plan in an attempt to avoid obstructions along the west drift. The obstructions are, first the back of the west drift is caved up to 25' above the level, second an inaccessible stope of unknown size rises from the level, and third a secondary shaft connects the level with the surface. It was decided to point the hole S 75 W and up 10-1/2° toward a point where the back of the west drift was only 15' high. The hole would then pass 13' north of the secondary shaft, 17' south of the assumed position of the inaccessible stope and 7' above the back of the west drift. However, the compass bearing used to align the hole was wrong (even though checked by three methods) and the hole struck the main shaft and was abandoned at a length of 101'. Apparently the true bearing of the hole is about N 68 W, up 10-1/2°.

The hole was drilled from July 23 to July 26. The core recovery averaged 60% by volume and 54% by weight. In general, the core was badly broken and in very poor condition.

The log of the hole was as follows:-

Mr. W.B.Gohring
Page No. 2.

11th Week Drilling Copper Hill

0 - 15	Relatively barren biotized quartz diorite of the central barren horse. Very crumbly core, the rock was probably both crushed and kaolinized.
15 - 27	Transitional from barren rock above to breccia below.
27 - 59	Good Silicified breccia. Chalcopyrite well above average in grade. Molybdenite disseminated throughout, but low in grade.
59-100.7	Silicified breccia. Molybdenite and chalcopyrite mineralization both good. Much free quartz.
100.7-101.0	Pinus ponderosa. Age, Recent.

Future Holes

As Hole Six did not penetrate the zone west of the west drift as originally planned, a short hole, Hole Seven, is planned to cut this zone. This hole will start from the west drift at a point 115' south of the main crosscut and 15' south of the secondary shaft. The hole will head WNW and about 3 degrees up.

Because of the very poor core recovery on Holes Five and Six, the drillers have been told to get all the necessary equipment to drill BX holes. Hole Eight (Anderson's proposed Hole #5) will be drilled with BX bits.

Dewatering

Continual trouble with pumps, generators and engines has delayed the dewatering of the 300 level at Copper Hill. As a final blow, the motor froze up and the power plant had to be taken to Prescott, where a new motor is being installed. The overhauled power plant is to be delivered tomorrow (July 29) and dewatering should be resumed very soon thereafter.

The water has now risen in the shaft to above 6' above the back of the 300' level.

Very truly yours,

DONALD H. KUPFER /s/

Jr. Geologist, U.S.G.S.

July 28, 1943

Mr. W. B. Gohring,
325 Heard Building,
Phoenix, Arizona.

Re: Copper Hill Diamond Drilling
15th Week, August 19-25-1943

Dear Mr. Gohring:-

Drilling

Hole #10 is in 50 feet and still in breccia. The first 40 feet were drilled BX, drilling in now with AX. Friday night (Aug. 20) the compressor broke down (rings, bearings, and rods) and parts will have to be shipped from Connecticut. It is expected that drilling will be resumed about the first of next week.

Mr. Frisbie, R.F.C., came up from Phoenix on August 25th to consult with Mr. Gibbs and myself about future drilling plans. It was decided to move down to the 300 level as soon as Hole #10 is finished and drill two or three holes from there. No further decisions will be made until more data is available on the 300 level. The first hole on the 300 level will be as suggested in last weeks report.

Ohio Ferro-alloy Drilling

Three diamond drill holes were drilled by Ohio Ferro-alloys Corporation in 1937. Ferro-alloys reports that their records have been lost or mislaid. The holes were drilled from the surface and have been located. All were drilled with BX bits (7/8" core).

O.F.A. Hole #1 is on the NNE side of Red Hill (a 15 foot high knob of silicified and mineralized rock similar to that outcropping on Copper Hill), S-29 W. 590 feet from the main Copper Hill shaft (co-ordinates 4020N - 2300E). The hole was drilled toward Red Hill (S.10 E) on an 80 degree dip; but according to Fred Schemmer, who drilled the hole, it did not hit any significant mineralization. Schemmer says that the hole was drilled for about 500 feet and paralled many thin mineralized seams. The pieces of core scattered around the surface are of fine-grained country rock with disseminated pyrite. The fact that the hole did not hit the mineralized material that outcrops a few feet south of it indicates that the Red Hill breccia pipe (?) plunges to the south at less than 80 degrees, or that it is only very shallow. The former seems more probably and this is significant, because the Copper Hill pipe appears to plunge to the south too.

O.F.A. Hole #2 has not been found, but its location is known within a few feet. It is located about 270 feet S.3 E. of the main shaft and near the old mess house. The first 20-30 feet were drilled by Fred Schemmer and the hole was completed by a driller from Phoenix. The hole is reported to have been drilled about 250 feet at an 80 degree dip, presumably pointed in the direction of Copper Hill (about N 40-50° E). After passing through alternating fine- and coarse-grained country rock, the hole was said to have struck molybdenite mineralization. The sludges of the mineralized zone were assayed and the cores were stored. The hole was stopped short of the desired depth because the hole caved.

All of the above is hearsay and it is quite possible (especially in the light of the negative results of D.D.H.#9) that the ferro-alloy hole was drilled along a mineralized seam or series of seams. The core scattered around the surface is about half fine-grained and half coarse-grained. Some of the coarse-grained contains a little alteration and silicification of the type found along seams bordering the breccia pipe. No true breccia was seen (but according to reports, the mineralized rock was removed from the area for storage).

O.F.A. Hole #3 is located S. 5 W. 410 feet from the main Copper Hill shaft. (Coordinates 4135N-2560E). It was drilled N.47 E at 78 degrees. The core around the hole is principally coarse-grained, but some of it is fine-grained. Some of the core contains a little pyrite and quartz. The depth of the hole is unknown and there is even some doubt as to who drilled it.

(Signed) D.H. Kupfer
Jr. Geologist, U.S.G.S.

August 26, 1943

Mr. W. B. Gohring
Reconstruction Finance Corporation
325 Heard Building
Phoenix, Arizona

Re: Copper Hill Diamond Drilling
11th Week - July 22-28, 1943

Hole Five

Drilling on Hole Five was resumed on July 22, and the hole was completed (165.6') on July 23. The hole was stopped because the mineralized and brecciated zone was passed and the face of the hole was in quartz-hornblende diorite country rock. The rock was relatively barren for the last 45' and even the hornblended crystals were almost unaltered for the last 20'.

The average core recovery for the hole was 85% by volume and 80% by weight. However, through the best ore zone (60-120') the core recovery was only 69% by weight. In general, the condition of the core was good, but locally, the core was broken and crushed.

The log of the last part of the hole was as follows:-

133-134	Bull quartz
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142-153	Poorly mineralized and slightly altered rock.
153-156	Slightly altered quartz-hornblende diorite.
156-158	A little mineralization, slight silification.
158-166	Unaltered quartz-hornblende diorite.
166'	End of the hole.

Hole Six

Hole Six (proposed Hole #4 in Anderson's report of 4/28/43) was started from the same point in the east drift of the 130 level as Hole Five, but in the west wall instead of the east wall. The bearing of Hole Six was changed somewhat from the original plan in an attempt to avoid obstructions along the west drift. The obstructions are, first the back of the west drift is caved up to 25' above the level, second an inaccessible slope of unknown size rises from the level, and third a secondary shaft connects the level with the surface. It was decided to point the hole S 75 W and up 10-1/2° toward a point where the back of the west drift was only 15' high. The hole would then pass 13' north of the secondary shaft, 17' south of the assumed position of the inaccessible slope and 7' above the back of the west drift. However, the compass bearing used to align the hole was wrong (even though checked by three methods) and the hole struck the main shaft and was abandoned at a length of 101'. Apparently the true bearing of the hole is about N 68 W, up 10-1/2°.

The hole was drilled from July 23 to July 26. The core recovery averaged 60% by volume and 54% by weight. In general, the core was badly broken and in very poor condition.

The log of the hole was as follows:-

- 0 - 15 Relatively barren biotized quartz diorite of the central barren horse. Very crumbly core, the rock was probably both crushed and kaolinized.
- 15 - 27 Transitional from barren rock above to breccia below.
- 27 - 59 Good Silicified breccia. Chalcopyrite well above average in grade. Molybdenite disseminated throughout, but low in grade.
- 59-100.7 Silicified breccia. Molybdenite and chalcopyrite mineralization both good. Much free quartz.
- 100.7-101.0 Pinus ponderosa. Age, Recent.

Future Holes

As Hole Six did not penetrate the zone west of the west drift as originally planned, a short hole, Hole Seven, is planned to cut this zone. This hole will start from the west drift at a point 115' south of the main crosscut and 15' south of the secondary shaft. The hole will head WNW and about 3 degrees up.

Because of the very poor core recovery on Holes Five and Six, the drillers have been told to get all the necessary equipment to drill BX holes. Hole Eight (Anderson's proposed Hole #5) will be drilled with BX bits.

Dewatering

Continual trouble with pumps, generators and engines has delayed the dewatering of the 300 level at Copper Hill. As a final blow, the motor froze up and the power plant had to be taken to Prescott, where a new motor is being installed. The overhauled power plant is to be delivered tomorrow (July 29) and dewatering should be resumed very soon thereafter.

The water has now risen in the shaft to above 6' above the back of the 300' level.

Very truly yours,

DONALD H. KUPFER /s/

Jr. Geologist, U.S.G.S.

July 28, 1943

Mr. W.B. Gohring
 R.F.C., 325 Heard Bldg.
 Phoenix, Arizona

Mr. W.B. Gohring
 Reconstruction Finance Corp.
 325 Heard Building
 Phoenix, Arizona

Re: Copper Hill Diamond Drilling
 Twelfth Week, July 29 - Aug. 4, 1943

Dear Mr. Gohring:

Hole Five

Footage	Core Recovery	MOLYBDENITE			COPPER		
		Core	Sludge	Weighted	Core	Sludge	Weighted
0-10	92%	0.50	0.86	0.727	0.74	0.71	0.721
10-20	95%	0.12	0.13	0.126	0.28	0.38	0.342
20-30	100%	0.08	0.09	0.086	0.25	0.28	0.268
30-40	99%	0.39	0.28	0.324	0.56	0.48	0.512
40-50	92%	0.11	0.17	0.148	0.36	0.36	0.360
50-60	62%	0.11	0.10	0.102	0.56	0.84	0.770
60-70	50%	0.55	0.52	0.526	0.24	0.48	0.432
70-80	74%	0.41	0.41	0.410	0.18	0.51	0.411
80-90	96%	0.22	0.22	0.220	0.18	0.25	0.223
90-100	83%	0.17	0.20	0.190	0.71	0.59	0.630
100-110	62%	0.09	0.14	0.128	0.36	0.43	0.413

No further assay results received to date.

Hole Seven

W.N.W. up 3 degrees from a point in the west drift (130 level) that is 115' South of the main crosscut. The hole is 60' long and was completed August 1. As the hole was mainly drilled in country rock (which cores very well), the core recovery was high -- 96% by length, 91% by weight.

- 0-10 Silicified breccia with good molybdenite mineralization and some chalcopyrite.
- 10-14 Poorly mineralized, silicified breccia.
- 14-17 Biotized quartz diorite, unmineralized
- 17-20 Silicified diorite - not breccia. Some chalcopyrite and molybdenite.
- 20-27 Biotized quartz diorite, silicified along scattered veins and fractures.
- 27-60 Quartz-hornblende diorite country rock. Completely unaltered except along a few, very narrow, mineralized fractures.

Dewatering

The shaft of the Copper Hill has been dewatered to the 300 level, but the drift is caved 30' back from the shaft. The work of removing the cave has been started.

D. H. KUPFER /s/
 Jr. Geologist, USGS

Mr. W. Bohring
Reconstruction Finance Corp.
325 Heard Building, Phoenix, Ariz.

Re: Copper Hill Diamond Drilling
Thirteenth Week, Aug. 5-11, 1943

Dear Mr. Gohring:

Experimental Holes

All assay returns are now available. A report is included with this weekly review.

Drilling

Hole #8 was drilled S 12 W up 10 degrees, from the face of the west drift of the 130 level. This hole was drilled with AX bits as the BX equipment had not arrived. Mr. Gibbs requested this hole to explore the southern boundary of the ore zone. Core recovery was 74% by weight. A brief log follows:-

0— 7 feet	Good silicified breccia, very high in vein quartz, molybdenite good, copper weak.
7— 29	Biotized quartz diorite locally cut by quartz veins carrying molybdenite and copper.
29— 76	Quartz-hornblende diorite, locally biotized and occasionally even some silicification on or near a fracture. Traces of molybdenite and copper.
76— 83	Quartz-hornblende diorite.

Probably only the first ten feet will be ore, although the 20-40 foot zone will show a tenth or so of molybdenite and fair copper.

Hole #9 was started at the point where the short crosscut joins the 130 level west drift (30 feet back from the face). This is a BX hole and bears S51W up 10 degrees. It is pointed toward the place where an old surface drill hole is reported to have struck ore. The hole is in 30 feet and still in mineralized breccia. Core recovery is very poor.

Assays

The following assays were received this week. They are all core assays. The sludge assays will be delayed. Because of the labor shortage, Union Assay Office has balked at the large samples. The sludge samples will be split before they are sent.

130-140 feet, Hole 5,	Copper 0.20%	MoS2 0.33%
140-150 feet, Hole 5,	0.38%	0.11%
150-160	0.25	0.10
160-165.6	0.43	0.13
0- 10 feet Hole 6	0.23	0.05
10- 20	0.79	0.11
20- 30	0.48	0.11
30- 40	0.59	0.11
40- 50	0.82	0.13
50- 60	0.69	0.16
60- 70	0.69	0.28
70- 80	0.46	0.24
80- 90	0.56	0.23
90-100	0.59	0.16

300 Level

The 300 level is now open and being made accessible. A preliminary examination (made while the level was still partially filled with water) showed the level to be unmineralized and unbrecciated. The trend is as shown as Arizona Molybdenum Corp. maps (Anderson Report 4-26-43, Plate 2).

August 12, 1943

(Signed) D. H. Kupfer
USGS

C O P Y

U. S. Geological Survey
CONFIDENTIAL

Quotation**

Mr. W.B. Gohring
Reconstruction Finance Corp.
325 Heard Building, Phoenix, Ariz.

Not for Public Inspection or ↑
Re: Copper Hill Diamond
Drilling
14th Week, Aug. 12-18,
1943

Dear Mr. Gohring:

Hole Nine

Hole #9 was completed August 16th at 146.6 feet. The first 60 feet were drilled with a BX bit, but then the load became too great for the capacity of the drill. The last 86.6 feet were AX. Core recovery (by length) was only 55% through the brecciated area (0-41½ feet); 87% for the rest of the hole; and 78% for the whole hole. The log of the core was as follows (briefed):-

0 - 23	Good breccia, high in quartz, moderate Mo and Cu.
23 - 26	Aplite dike, unmineralized.
26 - 30	Quartz vein, edges feldspathic and mineralized.
30 - 41½	Good breccia, fair mineralization.
41½ - 54	Transitional; not breccia, but cut by many quartz stringer veins; fair mineralization for last three feet, rest weak in MoS ₂ but copper OK throughout
54 - 60	Kaolinized and biotized quartz diorite.
60 - 67	Quartz-hornblende diorite, slight biotization.
67 - 75	Leucocratic rock, feldspars with porcellaneous luster, oversaturated.
75 - 79	Quartz-hornblende diorite, slight biotization.
79 - 80	Leucocratic rock, feldspars with porcellaneous luster, oversaturated.
80 - 84	Biotized diorite with some fresh hornblende diorite.
84 - 90	Melanocratic dike of very fine grained diorite (?).
90 - 95	Quartz-hornblende diorite
95 - 110	Quartz-hornblende diorite
96 - 99	No recovery, apparently broken zone, may be a fault zone
110 - 116	Highly kaolinized quartz-hornblende diorite.
116	Broken zone, no recovery, possible fault.
116 - 129	Quartz-hornblende diorite
124 - 126	Broken zone, no recovery, possible fault.
129 - 130	Fractured and silicified zone, some MoS ₂ .
130 - 133	Biotized diorite.
133 - 134	Fractured and silicified zone, some MoS ₂ .
134 - 167	Quartz-hornblende diorite.

Analysis

L. F. Reber, Chief Geologist for Phelps Dodge Corporation, took a composite sample of the rejects left from Anderson's sampling of the 400 level at the Loma Prieta Mine. Several cuts were made through the reject pile and a 50-75 pound sample was taken. The sample was analyzed at the Phelps Dodge Laboratory at Clarkdale, Arizona, on August 11, 1943.

Copper

Total copper -----	0.83%
Acid soluble (carbonates) -----	0.00
Water soluble (sulphates) -----	0.00
i.e. all the copper was in the form of sulphides.	

Molybdenum

Mo -----	0.065%
MoS ₂ (calculated) -----	0.018

Confidential* Others

Ag --- 0.075	SiO ₂ -- 64.6%	Al ₂ O ₃ -- 13.3%
Au --- trace	Fe ---- 3.7	Ca) --- 2.5
Zn ---- 0.2	S ----- 2.0	Mg) --- 2.24

Total --- 89.5%

Others probably present:- O₂ (with part of Fe), Na₂O, K₂O, CO₃, and minor constituents.

Reber says that assays of railroad car lots from the Commercial Mine will sometimes (about 1 out of 10-15) show 0.1% zinc and very rarely a car will go as high as 0.2% zinc. He has not located the zinc bearing mineral as yet.

Remembering that this is an analyses of a mineralized rock with much quartz and other introduced material, it is of interest to compare it with a normal diorite. The low alumina can be accounted for by dilution. High silica and iron represent the quartz and pyrite. The low CaO is significant, especially since some CaCO₃ is present in the area as a fissure filling. It supports the theory that the mineralization has brought in secondary feldspar (mostly albite, probably potash feldspar too) at the expense of the soda-lime feldspars. The Na₂O and K₂O probably represent a large portion of the 10% unaccounted for in the above analyses.

Hole #10 (see sketch map)

Hole #10 was started today. It bears S 67 E, up 10 degrees from the junction of the west drift with the stub crosscut. This hole was placed between the two faults shown on the sketch map, as this was the only possible place where the set up could be made. The hole will explore the south end of the mineralized area, and possibly give some information on the faulting. Surface evidence is quite meager, but seems to indicate that the fault pattern is quite complex and that the east-west zone is a series of sub-parallel faults. The north-south fault of the adit level is probably later than this east-west faulting and displaces the east side of the zone to the south about 50-150 feet. Relationships are obscure and vague. On the sketch map, the east-west fault zone is simplified to one, unbroken fault, and a suggested offset along the fault is shown.

Proposed holes

Holes #11, 11-A, 12 (see sketch map). Because the ~~dit~~ information from drill hole #1 was very meager, the following holes are recommended for adoption. Holes #11 and #12 would bear N 50 E, 10 degrees up and would be about 450 and 350 feet long respectively. They would cut the northern zone of both the east and west breccia blocks and would complete the broad pattern of the ore on the 130 level. If 800 feet of hole is considered too extensive at this stage of the game, hole 11-A (alternate) is suggested at N 63 E, 10 degrees up. It should be about 450 feet long, but even a 350 foot hole would give much essential information.

Holes on 300 level. A hole from the 300 level (S 80 E, 10 up) is suggested in order to explore the section below the area mineralized on the 130 level. The hole would start at the east end of the timbered area, at the point where the 300 level bends sharply south (the point indicated by the #2 on the sketch map of the 300 level accompanying last weeks report).

If this hole strikes ore, a more extensive program could be planned. If it does not strike ore two further holes have been suggested. I suggest that a hole might be drilled S 83 E, 20 degrees down, from the main crosscut of the 130 level at a point near the shaft. This hole would explore for the lower limits of the two breccia blocks.

Fred Gibbs has suggested a hole from the 300 level (about S 45 W, 10 up) from the small stub in the center of the timbered area (near the "4" on last week's sketch map of the 300 level). As a couple of factors suggest that the breccia pipe may plunge to the south (probably at a very high angle); Gibbs suggests this second hole to check for the breccia farther to the south.

S/d Donald H. Kupfer
Donald H. Kupfer
Jr. Geologist, USGS

August 18, 1943

I neglected to explain the difference between "breccia" and "altered rock" on the sketch map. The altered rock is not true breccia, but is cut by veins and mineralized fissures. In general the "altered" area will run less than 0.2% MoS_2 ; while the "breccia" will generally run greater than 0.2%. However, the boundaries are transitional and so are the assays (what few are in).

In general the hornblende is the first mineral to show signs of alteration as the mineralized area is approached. The presence of altered hornblende is used to distinguish "altered rock" from the "unaltered" country rock. The distinction between altered rock and breccia is less definite. The breccia usually has an abundance of quartz in irregular shapes and patterns scattered throughout the rock. No very large fragments of quartz free (vein type quartz) rock are found in the breccia. In the altered rock quartz occurs in definite veins and seams. Long pieces of quartz free core occur (pieces up to 10 feet long).

In drilling, the holes have been drilled through the altered zone and into the country rock before they have been stopped. For exploratory work, this is the recommended method as it gives less chance of overlooking concealed mineralized zones. However, if the drill program is to be curtailed, future drill holes could be stopped when the altered zone is reached. However, I would not recommend such measures except as a last resort.

S/d D. H. Kupfer
Donald H. Kupfer
Jr. Geologist, USGS

August 19, 1943

Ore Reserves

	GRADE		VALUE*	INDICATED	INFERRED	TOTAL
West Orebody						
Grade A ore	1%	MoS ₂ 2½% Cu	\$15.00	3,000 t.	500 t.	3,500 t.
Grade B ore	0.3%	MoS ₂ 0.5% Cu	4.00	20,000 t.	22,000 t.	42,000 t.
Grade C ore	0.2%	MoS ₂ 0.5% Cu	3.00	50,000 t.	120,000 t.	170,000 t.
Total				73,000 t.	142,000 t.	215,000 t.
East Orebody						
Grade A ore	1%	MoS ₂ 0.8% Cu	\$10.00	4,000 t.	2,000 t.	6,000 t.
Grade B ore	0.3%	MoS ₂ 0.45% Cu	3.75	-----	45,000 t.	45,000 t.
Grade C ore	0.2%	MoS ₂ 0.45% Cu	3.00	80,000 t.	200,000 t.	280,000 t.
Grade unknown, but probably C grade			-----	-----	70,000 t.	70,000 t.
				84,000 t.	317,000 t.	401,000 t.
Total both ore bodies			\$ 3.25	157,000 t.	459,500 tons	<u>616,500 tons</u>

TABLE I: Estimated ore reserves at the Copper Hill mine for various grades of molybdenite and copper. (*) = Value per ton at 17¢ copper and 37¢ molybdenite

Ore Reserves

Grade A ore (1% molybdenite and 0.8-2.0% copper) is found in the fractured zones associated with fault intersections. The zones are usually narrow and well defined. When diamond drilling through these zones core recovery usually dropped below 10%. Several fault intersections of the type favorable to the localization of ore of this type (grade) have been indicated on Plates 20-22. Further exploration along the faults and fractures would probably develop a total of about 10,000 tons of grade A ore.

Grade B ore (0.3% molybdenite and 0.45-0.50% copper) is found scattered irregularly throughout the breccia pipe. The grade B ore blocks shown on the maps and sections should be considered as favorable areas for exploration rather than as definite ore blocks. This ore grades into grade C. ore without any marked boundaries. 85,000 tons are estimated to be present.

Grade C ore (0.2% molybdenite and 0.45-0.50% copper) makes up most of the breccia pipe. As the boundaries of grade C ore are gradational, the assay

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cut-off could be raised or lowered and the reserve tonnages thus decreased or increased. With the inclusion of grade A and grade B blocks, over 600,000 tons of ore are present that would average between 0.20% and 0.25% molybdenite and between 0.45% and 0.50% copper. At 37¢ per pound molybdenite and 17¢ per pound copper, this ore would be worth about \$3.25 per ton. According to the engineers who have visited the property, this is less than it would cost just to mine the ore.

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DESCRIPTIVE DATA ON THE GIBBS DIAMOND DRILL HOLES
 'COPPER HILL MINE, YAVAPAI COUNTY, ARIZONA
 May-September 1943

HOLE NUMBER	1	2	3	4	5	6	7	8	9	10	11
Anderson Number(a)	1	-	-	-	3	4	-	-	7(b)	5(b)	-
Core size (c)	LM	LM	AX	BX	AX	AX	AX	AX	AX-d	AX-d	AX
Location of collar Level	(e)	130	130	130	130	130	130	130	130	130	330
Drift	(e)	West	West	West	East	East	West	West	West	West	(f)
Distance (g)	-	5	5	5	50	53	115	170	140	140	-
Elevation (h)	5329	5206	5207	5205	5211	5210	5210	5209	5211	5210	5010
Bearing	S83E	S80E	S80E	S80E	S83E	S69W	N77W	S14W	S51W	S67E	S79E
Vertical angle	- 25	+ 1	+ 1	+ 1	+ 15	+10½	+ 3	+ 10	+ 10	+ 10	+ 5
Length (feet)	486	38	27½	25½	165½	101	60	83	146½	162½	179½
Drilling started	5/13	6/26	7/1	6/29	7/7	7/23	7/31	8/4	8/9	8/18	9/7
Drilling finished	6/23	7/3	7/2	6/30	7/23	7/26	8/1	8/7	8/16	9/1	9/21
Core recovery (l)	37%	76%	83%	89%	85%	60%	96%	79%	78%	30%	54%
Core recovery (w)	31%	66%	81%	90%	80%	54%	91%	75%	72%	30%	51%
Sludge recovery	112%	80%	103%	80%	103%	83%	78%	108%	96%	136%	301%

FOR ALL HOLES	NUMERICAL AVERAGE	WEIGHTED AVERAGE
Core recovery (l)	70%	56%
Core recovery (w)	65½%	52%
Sludge recovery	116%	130%

TABLE 2: Descriptive data on the Gibbs-USGS-RFC diamond drill holes drilled at Copper Hill Mine, Yavapai County, Arizona.

- a- Number used by Anderson in his April report when he proposed the holes.
- b- Position of holes changed somewhat from Anderson's original recommendation.
- c- LM = 7/8 inch diameter core; AX = 1-1/8 inch; BX = 1-5/8 inch.
- d- The first 60 feet of hole #9 and first 40 feet of hole #10 were BX
- e- Hole #1 was drilled from the surface at a point N51E, 142 feet from the main shaft.
- f- Hole #11 was drilled from the bend of the 300 level.
- g- Distance (in feet) south of the main crosscut of the 130 level.
- h- Elevation above sea level.
- l- By length.
- w- By weight.

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ASSAYS OF GIBBS DIAMOND DRILL HOLE ONE
COPPER HILL MINE, YAVAPAI COUNTY, ARIZONA

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May-July 1943

FOOTAGE	CORE RE-COVERY	MOLYBDENITE				COPPER		
		SLUDGE	CORE	WEIGHTED	ASSUMED	SLUDGE	CORE	WEIGHTED
72-82	20%	0.09%	0.10%	0.089%	0.10%	0.38%	0.25%	0.372%
82-92	9	0.05	0.08	0.056	0.08	0.48	0.43	0.477
92-102	17	0.09	0.06	0.086	0.07	0.25	0.20	0.248
102-112	34	0.05	0.08	0.058	0.07	0.56	1.63	0.684
112-122	12	0.11	0.07	0.109	0.11	0.59	0.28	0.577
122-132	10	0.11	0.07	0.110	0.12	0.51	0.54	0.512
132-142	29	0.12	0.32	0.142	0.35	0.64	0.64	0.640
142-152	58	0.08	0.07	0.075	0.08	0.51	0.43	0.494
152-162	22	0.08	0.03	0.074	0.03	0.43	0.20	0.414
162-172	49	0.13	0.03	0.116	0.04	0.41	0.59	0.437
172-182	18	0.22	0.22	0.220	0.30	0.38	0.56	0.391
182-192	22	0.17	0.37	0.181	0.40	0.36	0.41	0.364
192-202	40	0.08	0.17	0.089	0.19	0.28	0.30	0.283
202-212	23	0.17	0.26	0.176	0.30	0.71	0.51	0.694
212-222	18	0.13	0.11	0.130	0.11	0.48	0.41	0.476
222-232	29	0.09	0.09	0.090	0.11	0.55	0.53	0.548
232-242	17	0.10	0.11	0.101	0.11	0.51	0.41	0.505
242-252	51	0.11	0.49	0.176	0.40	0.46	1.10	0.571
252-262	40	0.13	0.11	0.130	0.13	0.33	0.33	0.330
262-272	35	0.11	0.27	0.130	0.26	0.51	0.56	0.516
272-282	40	0.13	0.11	0.130	0.13	0.46	0.38	0.448
282-292	77	0.12	0.23	0.149	0.25	0.38	0.41	0.388
292-302	60	0.14	0.23	0.162	0.25	0.43	0.46	0.436
302-312	58	0.13	0.14	0.135	0.14	0.38	0.23	0.350
312-322	51	0.11	0.14	0.117	0.14	0.36	0.36	0.360
322-332	48	0.13	0.20	0.144	0.19	0.43	0.46	0.435
332-342	60	0.11	0.18	0.125	0.16	0.43	0.46	0.436
342-352	20	0.10	0.16	0.103	0.15	0.41	0.43	0.411
352-362	11	0.10	0.26	0.105	0.23	0.36	0.41	0.362
362-372	34	0.11	0.28	0.130	0.28	0.43	0.59	0.449
372-382	23	0.42	0.17	0.400	0.20	0.36	0.33	0.358
382-392	25	0.18	0.18	0.180	0.15	0.30	0.15	0.287
392-402	15	0.19	0.14	0.187	0.14	0.43	0.28	0.424
402-412	11	0.14	0.10	0.139	0.11	0.30	0.36	0.304
412-422	28	0.14	0.17	0.143	0.13	0.23	0.15	0.222
422-432	15	0.13	0.12	0.129	0.13	0.28	0.41	0.287
432-442	18	0.13	0.13	0.130	0.13	0.36	0.23	0.352
442-452	22	0.12	0.14	0.121	0.14	0.33	0.28	0.326
452-462	20	0.14	0.17	0.142	0.18	0.25	0.38	0.259
462-472	55	0.24	0.17	0.227	0.18	0.36	0.41	0.369
472-482	65	0.17	0.18	0.172	0.18	0.36	0.43	0.375
482-486	56	0.14	0.22	0.157	0.20	0.43	0.36	0.422
AVERAGE	31.4%	0.132%	0.164%	0.138%	0.155%	0.414%	0.435%	0.419%

TABLE 3: Core recovery and assay results from Gibbs diamond drill hole #1. "Assumed" column represents the grade thought to be nearest to the grade of the zone actually penetrated. This is an estimated grade, weighing all available data.

EXPERIMENTAL DIAMOND DRILL HOLES 2 - 4
COPPER HILL MINE, YAVAPAI COUNTY, ARIZ.

July 1943

ASSAYS

FOOTAGE	CORE RECOVERY	MOLYBDENITE			COPPER		
		SLUDGE	CORE	WEIGHTED	SLUDGE	CORE	WEIGHTED
Hole Four ** BX Core * 1-5/8"							
0.0- 8.8	99%	0.11	0.20	0.152	0.18	0.20	0.189
8.8-17.5	89%	0.10	0.05	0.079	0.48	0.46	0.472
17.5-25.5	81%	0.11	0.11	0.110	0.38	0.31	0.353
Hole Three * AX Core * 1-1/8"							
0.0- 7.5	74%	0.22	0.15	0.200	0.25	0.25	0.250
7.5-17.5	78%	0.19	0.16	0.181	0.77	0.59	0.716
17.5-27.5	91%	0.13	0.20	0.152	0.43	0.51	0.456
Hole Two ** IM Core ** 7/8"							
0.0- 7.5	68%	0.11	0.08	0.102	0.41	0.26	0.376
7.5-16.8	67%	0.20	0.11	0.180	0.54	0.38	0.504
16.8-27.5	64%	0.11	0.06	0.099	0.43	0.31	0.404
27.5-37.5	60%	0.16	0.14	0.156	0.46	0.38	0.444

TABLE 4: Assay results of experimental diamond drill holes #2, #3, & #4.

RECOVERY

FOOTAGE CORE TYPE	0 - 7½		7½ - 17½		17½ - 27½		Average	
	Length	Weight	Length	Weight	Length	Weight	Length	Weight
BX (1-5/8")	93	99	94	89	79	81	89	90
AX (1-1/8")	81	74	88	78	79	91	83	81
IM (7/8")	77	68	80	67	71	64	76	66
Average	84	80	87	78	76	79	82	79
Grand Average	82		82½		77½		81	

TABLE 5: Core recovery by length and weight for the experimental diamond drill holes #2 (IM), #3 (AX), and #4 (BX).

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ASSAYS OF GIBBS DIAMOND DRILL HOLES 5, 6, AND 7

COPPER HILL MINE, YAVAPAI COUNTY, ARIZONA

July 1943

FOOTAGE	CORE RECOVERY	MOLYBDENITE				COPPER			
		CORE	SLUDGE	WEIGHTED	ASSUMED	CORE	SLUDGE	WEIGHTED	ASSUMED
Hole five									
0-10	92%	0.50%	0.86%	0.727%	....%	0.74%	0.71%	0.721%%
10-20	95	0.12	0.13	0.126		0.28	0.38	0.342	
20-30	100	0.08	0.09	0.086		0.25	0.28	0.268	
30-40	99	0.39*	0.28*	0.324*		0.56	0.48	0.512	
40-50	92	0.11	0.17	0.148		0.36	0.36	0.360	
50-60	62	0.11	0.10	0.102		0.56	0.84	0.770	
60-70	50	0.55	0.52	0.526		0.24	0.48	0.432	
70-80	74	0.41	0.41	0.410		0.18	0.51	0.411	
80-90	96	0.22	0.22	0.220		0.18	0.25	0.223	
90-100	83	0.17	0.20	0.190		0.71	0.59	0.630	
100-110	62	0.09	0.14	0.127		0.36	0.43	0.412	
110-120	50	0.14	0.08	0.092		0.23	0.31	0.293	
120-130	63	0.11	0.12	0.118		0.33	0.33	0.330	
130-140	80	0.33	0.07	0.154		0.20	0.31	0.274	
140-150	70	0.11	0.08	0.089		0.38	0.38	0.380	
150-160	95	0.10	0.08	0.088		0.25	0.31	0.286	
160-165 $\frac{1}{2}$	96	0.13	0.07	0.093		0.43	0.46	0.448	
AVERAGE	79.9%	0.228%	0.213%	0.213%		0.365%	0.436%	0.417%	
Hole six									
0-10	28%	0.05%	0.06%	0.059%		0.23%	0.20%	0.203%	
10-20	51	0.11	0.12	0.118		0.79	0.51	0.564	
20-30	49	0.11	0.08	0.086		0.48	0.56	0.545	
30-40	64	0.11	0.11	0.110		0.59	0.64	0.628	
40-50	71	0.13	0.12	0.123		0.82	0.97	0.930	
50-60	68	0.16	0.14	0.145		0.69	0.89	0.839	
60-70	60	0.28	0.20	0.218		0.69	0.77	0.752	
70-80	57	0.24	0.20	0.209		0.46	0.61	0.578	
80-90	63	0.23	0.42	0.375		0.56	0.66	0.637	
90-100	24	0.16	0.24	0.233		0.59	0.61	0.608	
AVERAGE	53.5%	0.158%	0.169%	0.168%		0.590%	0.642%	0.628%	
Hole seven									
0-10	84%	0.38%	0.27%	0.304%		0.46%	0.41%	0.426%	
10-20	92	0.35	0.33	0.337		0.59	0.47	0.511	
20-30	95	0.18	0.36	0.297	0.20	0.33	0.25	0.278	
30-40	96	0.08	0.23	0.176	0.10	0.28	0.36	0.331	0.30
40-50	82	0.16	0.16	0.160		0.43	0.31	0.347	
50-60	95	0.10	0.10	0.100		0.23	0.23	0.230	
AVERAGE	90.7%	0.208%	0.241%	0.229%	0.200%	0.387%	0.338%	0.354%	0.349%

TABLE 6 : Core recovery and assay results for Gibbs diamond drill holes #5, #6, and #7.

* = Hole paralleled a thin, highly mineralized molybdenite seam.

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ASSAYS OF GIBBS DIAMOND DRILL HOLES 8, 9, AND 10

COPPER HILL MINE, YAVAPAI COUNTY, ARIZONA

August 1943

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FOOTAGE	CORE RE-COVERY	MOLYBDENITE				COPPER			
		CORE	SLUDGE	WEIGHTED	ASSUMED	CORE	SLUDGE	WEIGHTED	ASSUMED
Hole eight									
0- 10	65%	0.55%	0.81%	0.748%	....%	0.36%	0.28%	0.299%%
10- 20	50	0.07	0.06	0.062		0.51	0.38	0.404	
20- 30	79	0.56	0.54	0.546		0.61	0.64	0.631	
30- 40	95	0.14	0.17	0.159		0.38	0.31	0.335	
40- 50	92	0.06	0.07	0.067		0.28	0.35	0.326	
50- 60	77	0.12	0.07	0.099		0.25	0.33	0.307	
60- 70	56	0.11	0.10	0.102		0.23	0.23	0.230	
70- 80	88	0.06	0.05	0.053		0.25	0.28	0.270	
AVERAGE	75.5%	0.208%	0.234%	0.230%		0.358%	0.350%	0.350%	
Hole nine									
0- 10	37%	0.12%	0.17%	0.161%		0.56%	0.59%	0.585%	
10- 20	59	0.12	0.17	0.156		0.46	0.43	0.439	
20- 30	64	0.25	0.35	0.319		0.41	0.41	0.410	
30- 40	23	0.21	0.39	0.370		0.21	0.43	0.406	
40- 50	76	0.07	0.39	0.273	0.10	0.51	0.46	0.478	
50- 60	76	0.14	0.19	0.172	0.15	0.41	0.41	0.410	
AVERAGE	55.8%	0.152%	0.277%	0.242%	0.209%	0.427%	0.455%	0.471%	
Hole ten									
0- 10	31%	0.24%	0.27%	0.266%		0.69%	0.66%	0.665%	
10- 20	52	0.13	0.29	0.250		0.41	0.48	0.463	
20- 30	13	0.25	0.37	0.365		0.47	0.66	0.653	
30- 40	37	0.11	0.12	0.118		0.64	0.64	0.640	BX Core
40- 50	42	0.16	0.15	0.151		0.56	0.66	0.644	AX Core
50- 60	37	0.12	0.06	0.068		1.25	0.61	0.698	
60- 70	24	0.15	0.13	0.132		0.20	0.38	0.364	
70- 80	26	0.08	0.09	0.089		0.41	0.31	0.320	
80- 90	14	0.10	0.11	0.109		0.31	0.36	0.358	
90-100	15	0.10	0.09	0.091		0.74	0.43	0.447	
100-110	45	0.12	0.08	0.087		0.41	0.33	0.344	0.38**
110-120	54	0.10	0.16	0.148		0.28	0.41	0.384	*
120-130	8	0.20	0.10	0.103		0.10	0.33	0.322	*
130-140	12	0.11	0.09	0.091		0.48	0.31	0.318	0.40**
140-150	22	0.09	0.08	0.081		0.95	0.36	0.408	0.50*
150-160	44	0.10	0.11	0.109		2.66***	1.05	1.312	2.50**
160-163	50?	0.02	---	---		0.15	---	---	---
AVERAGE	30.1%	0.135%	0.145%	0.141%		0.660%	0.499%	0.520%	0.608%

TABLE 7 : Core recovery and assay results for Gibbs diamond drill holes #8, #9, and #10.

- * = Sludge recovery over 150%
- ** = Sludge recovery over 200%
- *** = Zone from 154.8 to 156.5 feet (1.7 feet) ran 12.12% Cu. while the rest of the zone ran 0.72% Cu.

ASSAYS OF GIBBS DIAMOND DRILL HOLE ELEVEN
COPPER HILL MINE, YAVAPAI COUNTY, ARIZONA
September 1943

FOOTAGE	RECOVERY		MOLYBDENITE				COPPER			
	CORE	SLUDGE	CORE	SLUDGE	WEIGHTED	ASSUMED	CORE	SLUDGE	WEIGHTED	ASSUMED
0- 10	53%	90%	0.03%	0.04%	0.038%	....%	0.23%	0.38%	0.350%%
10- 20	37	88	0.02	0.02	0.020	....	0.18	0.36	0.337	....
20- 30	1 $\frac{1}{2}$	144	0.01	---	---	0.02	0.10	---	---	0.10
30- 40	11	204	0.02	---	---	0.02	0.13	---	---	0.13
40- 50	81	397	0.05	---	---	0.05	0.13	---	---	0.13
50- 60	88	325	0.03	0.01	0.016	0.03	0.05	0.13	0.121	0.07
60- 70	82	330	0.02	0.03	0.027	0.02	0.13	0.10	0.109	0.12
70- 80	65	214	0.02	0.02	0.020	....	0.07	0.13	0.116	0.08
80- 90	55	172	0.12	0.04	0.059	0.12	0.18	0.18	0.180	....
90-100	3	370	0.06	0.04	0.040	0.05	0.61	0.15	0.155	0.20
100-110	12	284	0.07	0.04	0.041	0.07	0.19	0.20	0.200	....
110-120	72	296	0.14	0.04	0.067	0.14	0.56	0.20	0.295	0.56
120-130	35	282	0.15	0.07	0.081	0.15	0.18	0.18	0.180	....
130-140	91	625	0.11	0.03	0.057	0.11	0.56	0.23	0.342	0.56
140-150	87	440	0.11	0.08	0.090	0.11	0.84	0.25	0.442	0.84
150-160	69	530	0.02	0.05	0.042	0.02	0.25	0.23	0.235	0.25
160-170	68	282	0.07	0.05	0.055	0.07	0.69	0.31	0.407	0.69
170-180	12	343	0.07	0.04	0.041	0.06	0.71	0.25	0.269	0.71
AVERAGE	51.3%	301%	0.067%	0.040%	0.040%	0.062%	0.322%	0.218%	0.249%	0.316%

TABLE 8: Core and sludge recovery, and assay results from Gibbs diamond drill hole eleven on the 330 level. Because of the excessive sludge recovery, indicating much dilution from various caves in the hole, in most cases the core assay is considered as the more correct value (see ASSUMED column).

U. S. Geological Survey
CONFIDENTIAL

Not for Public Inspection
or Quotation

325 Heard Building
Phoenix, Arizona

Tully - Asst. Chief - Mining Section - Washington - May 29, 1943
Re: Fred Gibbs - Docket Number ND 5403

Enclosed please find two reports from the United States Geological Survey on the drilling being done by the RFC and supervised by the U. S. G. S. on the Fred Gibbs molybdenum property.

As you will note, the results to date have been very unsatisfactory, and it is my off-hand opinion at this time that unless the balance of this hole shows a better core recovery than it has to date, we should investigate the advisability of using a larger bit - even as large as 1 5/8 inches core. Such a large bit will make slower work in drilling and be more costly, but I believe it will increase our core recovery and give us more reliable results. I have discussed this with the Sullivan Diamond Drilling crew now working at the J. L. McIver property, and they concur in this opinion.

I understand that the drilling now being done on the Gibbs property is costing nearly \$2 per foot, and for the sake of economy, Mr. Gibbs thought advisable to start the small outfit.

WM. B. MAITLAND
Supervising Engineer

WBM:B

325 Heard Building
Phoenix, Arizona

April 20, 1943

D. M. Rait - Chief - Mining Section - Washington

Re: Fred Gibbs, Sunnyslope, Prescott, Arizona - Docket No.
ND-5405

I finally concluded the assaying and sampling of the above captioned mine and am submitting herewith, all the data available to this Office. Attached to this letter, is my map of the Copper Basin Mine, showing the locations of all of the assays I consider reliable. No attempt has been made to map the geology of this deposit as this has been done by Mr. C.A. Anderson of the U.S.G.S. and I understand that his maps and reports are now on file in Washington.

Attached to this letter are copies of all of the assay certificates and a comparison of the assay results (as shown by my comparison of sampling). As you will note from this comparison, the assaying firm of Hawley and Hawley checked very closely with the Union Assay Office and you will also notice on the comparison of the work of the Phoenix Assayers, that after running the samples two, and sometimes three times, they are still unable to check themselves. In the future, we will not send any samples to the local assayers, but will use either Hawley & Hawley, or the Union Assay Office.

Referring again to the comparison of samples taken by Mr. Anderson and myself, as well as a number of samples taken by Mr. Gibbs and assayed by Jacobs and the Union Assay Office, the average of 28 samples from all these sources shows a copper content of .81% and a MoS₂ of .46%. Both Mr. Anderson and I believe that we now have accurately sampled all of the faces of ore now available for sampling and except for a few minor parts of the mine, I do not feel that further sampling would increase our knowledge of this deposit.

Since writing a Progress Report to you on April 10, I have been attempting to gain additional information on the condition of the Copper Basin Shaft below the 130' level not inspected by us and I find that the Ohio Ferro-Alloy Corporation of Canton, Ohio, have also de-watered the shaft and sampled the underground workings. In addition, they have drilled three diamond drill holes from the surface of the ground. I do

D. M. Rait, Chief, Mining Section
Page No. 2.

April 20, 1943

not have the results of their work, but Mr. Burbank of the U.S.G.S. said that he would request the War Production Board to contact this firm and learn the results of their work. The men who did this work for the Ohio Ferro-Alloy Corporation informed me that they believe that two of these diamond drill holes were in good ore; the third being out of the ore zone. They also said that there were two short levels off the shaft and below the 130' level, but that the shaft was in very bad shape just above the bottom level, an approximate depth of 250' below the collar. They also believe that it would be a difficult matter to clean out the shaft and make accessible the 300' level. They could not tell me whether either of these two lower levels were in ore or not. I believe the results of these diamond drill holes should be very interesting to us.

Referring to my Progress Report of April 10, I stated therein that I had information that the Arizona Molybdenum Corporation drilled two holes from the 130' Level and Mr. Anderson, of the U.S.G.S. has the results of their work. It is my opinion, that after our Corporation has the Arizona Molybdenum data and the Ohio Ferro-Alloy Corporation's findings, we will then have the complete picture of the project.

It might be interesting to you also to learn that the Loma Prieta Mine, which is being de-watered by Mr. Duyn, is now being made accessible under a \$5,000.00 Loan and we expect that within the next month or two, we should be able to sample and map this deposit, also, and since the geology of the two mines are similar, this will give us a better picture of the District.

I also understand that Dr. Rieber, Geologist for the Phelps-Dodge Corporation, is mapping the geology of the the Commercial Mine which is located between the Loma Prieta and the Copper Basin and the results of his work should also be available to us.

If I can supply you with any further data or do any further work on this project, please inform me.

WM. B. MATTLAND
Supervising Engineer

WEM:MJ
Enclosures
Assay Map
" Certificates
" Data

Calculating recoveries - continued

Core recovery (wt.) = $\frac{\text{Weight of core recovered}}{\text{Theoretical weight of 10' of core (7.06 pounds)}} \times 100$

Core recovery (length) = $\frac{\text{Length of core recovered (in.)}}{120"} \times 100$

Sludge recovery = $\frac{\text{Weight of sludge recovered}}{\text{Theoretical weight of material in bore hole, minus weight of core recovered}} \times 100$

The core recovery calculated by relative lengths is probably very inaccurate as the core is usually very badly broken and worn.

The scale used for obtaining weights is accurate to about ± 0.1 pound.

Drilling time

The drill was shut down from Friday noon (5/28) until Monday noon (5/31) while the drillers obtained more drill rold and Fred Gibbs got another compressor. Two compressors are now operating simultaneously. The drill was shut down again at 9:30 a.m. Tuesday (6/1) to correct a badly made adapter (from LM to EX rods). Drilling will probably resume Thursday (6/3).

Assays

Sludges and cores from 172 to 272' were sent to the Union Assay Office this morning (6/2). No assay returns available yet.

Change to AX core

Fred Gibbs thinks that we should wait until more drilling has been done before deciding whether or not to change to AX (1-1/8") bits. He believes that core recovery may increase in the lower part of hole #1. As it is not practical to increase the size of the present hole, delay will do not harm; and later on, assay results may be available that will aid in making a decision. However, I see no reason to expect a marked change in core recovery and if the present 27% recovery continues, it would certainly seem advisable to try a larger size hole.

If a change is to be made, the drillers will need at least a week's notice to enable them to buy an AX core barrel and bits.

Caving

The caving in the hole does not seem to be localized at any particular point or points.

Grease on rods

Fred Gibbs and I do not believe that cleaning the grease from the rods after every run and adding it to the sludge sample would materially aid the accuracy of the sampling. The walls of the hole are covered with a thick coat of grease and it is assumed that the grease on the rods and on the walls are intimately mixed together during the drilling. Any molybdenite collected in the grease and removed at the end of a run would not necessary be from the zone just drilled, but from anywhere in the hole.

As an experiment, an attempt was made to collect the grease from the rods with a rag. Only about 20% of the grease was removed, the remaining 80% sticking tenaciously to the rods. Apparently, if the grease is to be removed from the rods, it will have to be done with gasoline.

I will have a sample of rod grease assayed to give us a rough idea of how much molybdenite is collecting in the grease.

Dewatering

Copper Hill - 200'

Loma Prieta - 180'.

DONALD H. KUPFER, J.G. (Signed)

UNITED STATES DEPT. OF
THE INTERIOR
GEOLOGICAL SURVEY

Re: Copper Hill Diamond Drilling
Third Week (May 27 - June 2)

Hole #1 Depth 282'. Depth on May 31 was 278½'.

Log in brief

0-71 Dioritic country rock
 71-193 First ore block. Molybdenite and chalcopryrite mineralization irregular.

139-184 Central pillar of country rock -- scattered chalcopryrite.
 184-282 Second ore block. Chalcopryrite and molybdenite mineralization more regular than first block. At 282', the molybdenite grade is at its best, but the chalcopryrite grade is dropping off (eye estimates).

Core and sludge recovery (percentage)

Footage	Core (wt.)	Core (length)	Sludge
172-182	17%	27%	102%
182-192	20	28	110
192-202	37	43	99
202-212	21	30	101
212-222	17	27	98
222-232	27	34	112
232-242	16	20	108
242-252	47	63	110
252-262	37	50	131
<u>262-272</u>	<u>33</u>	<u>43</u>	<u>80</u>
Average	27.2%	28.5%	105.1%

Calculating recoveries

In calculating recoveries, I am using a specific gravity of 2.7 or a density of 169 pounds per cubic foot. That is the average of 11 specimens of various kinds of rocks, all of which seem to have about the same specific gravity.

325 Heard Building
Phoenix, Arizona
September 27, 1943

TULLY - Ass't. Chief - Mining Division - Washington, D.C.

Re: Fred Gibbs, Docket No. ND-5405

Enclosed please find two copies of the Copper Hill Diamond drilling for the 19th week.

This terminates the work as planned for this project. As soon as all of the assay results are available, I will transmit to you my report on this project.

WM.B. MAITLAND
Supervising Engineer

Enclosure

2 c Copper Hill Diamond drilling

Mr. W.B. Gohring
325 Heard Building
Phoenix, Arizona.

Re: Copper Hill Diamond Drilling
19th Week, Sept. 16-22

Dear Mr. Gohring:

The drilling program is now ended. Drilling started on May 13, 1943 and was completed September 21, 1943. The drill was operating only 55 of the 132 days. The other 77 days were spent waiting for new equipment (principally bits) or for the old equipment (principally the compressors) to be repaired. Eleven holes totaling 1476 feet were drilled. The overall drilling speed was 11 feet per day. The average hole was 134 feet long and required 12 days to drill. Core recovery averaged 50% and sludge recovery averaged 130%.

When the bits arrived on Monday, September 20, drilling of Hole #11 was resumed. (Drilling had stopped on September 13). A water course was cut at about 175 feet. The flow of water became so strong (30-60 gallons per minute) that the hole had to be abandoned at 179.6 feet. The hole was abandoned on September 21 and the final sludges and cores were dried and shipped to the assayer on September 22. Core recovery for hole 11 averaged 51% and sludge recovery averaged 300%. The log of the last part of the hole was as follows:-

- 148-152 Good silicified breccia with fair molybdenite and poor copper.
- 152-157 Fresh quartz-hornblende diorite occasionally altered to biotite.
- 157-170 Silicified and biotized diorite with some kaolinization of the feldspars. Some molybdenite and chalcopyrite.
- 170-175 No recovery, probably a fault. Water course. Water issued from the hole at the full volume of the hole.
- 175-180 Silicified diorite, very little mineralization.

FOOTAGE	RECOVERY		ASSAYS			HOLE TEN			
	CORE	SLUDGE	MOLYBDENITE CORE	SLUDGE	WGHTD	COPPER CORE	SLUDGE	WEIGHTED	
0- 10ft	31%	87%	0.24%	0.27%	0.266%	0.69%	0.66%	0.665%	
10- 20	52	86	0.13	0.29	0.250	0.41	0.48	0.463	
20- 30	13	93	0.25	0.37	0.365	0.47	0.66	0.653	
30- 40	37	91	0.11	0.12	0.118	0.64	0.64	0.640	* AX CORE
40- 50	42	90	0.16	0.15	0.151	0.56	0.66	0.644	AX CORE
50- 60	37	89	0.12	0.06	0.068	1.25	0.61	0.698	
60- 70	24	93	0.15	0.13	0.132	0.20	0.38	0.364	
70- 80	26	89	0.08	0.09	0.089	0.41	0.31	0.320	
80 - 90	14	98	0.10	0.11	0.109	0.31	0.36	0.358	
90-100	15	143	0.10	0.09	0.091	0.74	0.43	0.447	
100-110	45	258	0.12	0.08	0.087	0.41	0.33	0.344	(0.38)*
110-120	54	159	0.10	0.06	0.148	0.28	0.41	0.384	
120-130	8	150	0.20	0.10	0.103	0.10	0.33	0.322	
130-140	12	218	0.11	0.09	0.091	0.48	0.31	0.318	(0.40)*
140-150	22	188	0.09	0.08	0.081	0.95	0.36	0.408	(0.50)*
150-160	44	238	0.10	0.11	0.109	2.66**	1.05	1.312	(2.50)*
AVGE	30%	136%	0.135%	0.145%	0.141%	0.660%	0.499%	0.520%	(0.608%)*

* Due to dilution of sludges (note recovery) these estimates are thought to be more accurate than the weighted averages. They agree with the notes on the core and have been used in the averages below.

**Zone from 154.8 to 156.5 (1.7 feet); ran 12.12% Cu. Rest of zone ran 0.72% Cu.

0-30 ft	0.29% MoS ₂	0.59% Cu (4.25)	60-140 ft	0.11% MoS ₂	0.37% Cu (\$2.04)
30-60 ft.	0.11% MoS ₂	0.66% Cu (3.07)	140-160 ft.	0.09% MoS ₂	1.50% (\$5.82)

Values per ton based on 37% molybdenite and 17% copper.

(Signed) Donald H. Kupfer

September 24, 1943.

MEMORANDUM OF VISIT

FRED GIBBS
- DOCKET NO. ND 5405 -

This low grade disseminated copper-molybdenum mine was granted first a \$5000 accessibility loan and later a \$30,000 development loan of which amount \$5,000 was used to repay the first loan.

I visited the property on June 12, 1943, in order to inspect the progress being made. At the time of my visit the applicant had spent only \$633.20 of the loan and was engaged in drilling a surface diamond drill hole. The first hole was down 380 feet and the driller was making about 12 feet per 8 hours.

Attached to this report is a U. S. G. S. map showing the proposed diamond drill holes. Since the U.S.G.S has assigned a Junior Geologist to log the cores, I am enclosing copies of two of his reports (3rd and 4th weeks).

It is apparent from these data that the core recovery using the EX Bit (7/8") has been unsatisfactory and the assays to date do not indicate even low grade ore.

In order to check our work and obtain a "yardstick" for future drilling, I have requested the applicant's drill contractor to obtain three sizes of bits EX (7/8"), AX (1-1/8"), and BX (1-3/8") and drill one hole of each size parallel and close to the 30 feet of channel sampling we have already done on the 130 Foot Level. This would check our core recovery in relation to the different sizes of bits and also check the assays of core versus channel sampling.

While the drill contractor is doing the diamond drilling the applicant is dewatering the main shaft from the 130 foot to the 300 foot level. The water is being removed by bailing on two shifts and the hoistman doing the bailing also takes care of the compressors that are furnishing the air power for the drilling.

At the time of my visit to the mine I took a 5 ounce sample of the cap grease that is being used to grease the diamond drill rods. This grease assayed 0.19% Mo. The drillers pull the rods about every 5 feet of hole in order not to grind up the core and they use from 10 to 20 ounces of grease on each run so it is apparent that the sludge sample runs much too low in molybdenum as the grease is robbing the sludge. The grease contains much more molybdenum than any of the sludge samples. In this type of work it would be much better if one of the new type of drills could be used as these drills reverse the circulation direction and the sludge comes up the inside of the rods and the clear water down the outside. In any event, if a good core recovery can be made using a large bit the sludge loss will not be so important.

WILLIAM B. MAITLAND
Supervising Engineer

2 copies

Memorandum of Visit

Fred Gibbs

Docket No. MD 5405

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Wm B M

ARIZONA TESTING LABORATORIES

ANALYTICAL AND CONSULTING CHEMISTS
ASSAYERS, MINING ENGINEERS
823 EAST VAN BUREN STREET

ASSAY CERTIFICATE

PHOENIX, ARIZONA April 30, 1943

Mr. W. B. Maitland, Supervising Eng., RPC

325 Heard Building, Phoenix, Arizona

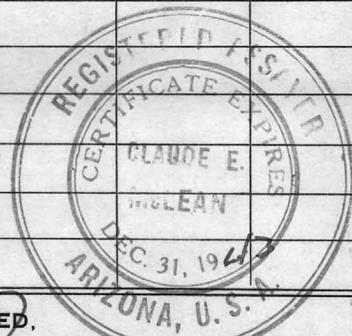
WE HAVE ASSAYED THE SAMPLES RECEIVED FROM YOU AND FIND THE RESULTS AS FOLLOWS:

GOLD FIGURED AT \$ _____ PER OUNCE.

SILVER FIGURED AT \$ _____ PER OUNCE.

LAB. FORM 2 (R E-R U N)

LAB. NO.	SAMPLE	GOLD		SILVER		PERCENTAGES (Element)		
		Oz. PER TON	VALUE	Oz. PER TON	VALUE	COPPER	LEAD	Molybdenum (Mo)
	CND - 7872							
46992	#4							0.75%
46994	#6							0.03%
46996	#8					0.69%		



RESPECTFULLY SUBMITTED,
ARIZONA TESTING LABORATORIES

BY Claude E. McLean ASSAYER

CHARGES \$ _____

East ore body

E outbody	1-7	20-21	1-7	75.50
W. outbody	8-13	15-19	20-21	4.60
				$90 \overline{) 20.10} = 0.22\%$
				E ore body \nearrow 90Mo_2

	8-13	14.00	60
	15	4.35	5.5
	16	3.40	7.4
	17	0.99	9.9
	18	7.04	3.5
	19	1.56	3.4
		31.34	89.7'

W. ore body 0.35% Mo_2

$\frac{3.4}{12} \overline{) 41.1}$
 $\frac{3.6}{50}$
 $\frac{48}{20}$

$189.7 \overline{) 54.04} = 0.29\%$ Mo_2
 21 (all) \nearrow
 over all samples

E outbody $90 \overline{) 61.80} = 0.69\%$ Cu

W 11 $89.7 \overline{) 81.92} = 0.91$

aver of all assays 0.80

14.00
 7.48
 29.97
 8.81
 11.80
 9.86

over

Ferro Alloys Co.
Canton, Ohio

MOS₂. Madera Canyon, Old Baldy District. See *Lead Moly*
See bulletin by Frank C. Schrader. N.G. Co.

Duffy + Winn

The watchman, at Boston Arizona Zinc Mine, is
the man who knows the condition of the shaft
Mr. Gibbs is unwatering.

Bill Martin

M. G. Vogan
1301 Berge Blvd
Pittsburgh, Pa.

maps of mile wide mines
has Snow map

	#2 Drehl	Mose Mctun #2	Check	Drehl #2	Cre Mctun 2	Check
1	12.55	12.72	12.64	4.20	2.32	4.20
2	0.74	5.95	0.77	3.50	3.50	3.50
3	0.52	0.48	0.48	2.80	2.76	2.76
4	8.18	9.38	9.38	6.68	4.28	4.88
5	0.90	.81	0.84	1.05	0.75	1.05
6	0.24	0.15	0.15	1.05	1.11	1.08
7	0.45	0.45	0.45	1.11	1.32	1.11
8	4.00	3.80	3.70	7.00	6.90	7.00
9	18.20	14.70	17.92	0.70	.84	0.70
10	13.05	14.90	14.98	2.25	1.85	1.85
	60.84					
	1.22					

ARIZONA TESTING LABORATORIES

ANALYTICAL AND CONSULTING CHEMISTS
ASSAYERS, MINING ENGINEERS
823 EAST VAN BUREN STREET

ASSAY CERTIFICATE

PHOENIX, ARIZONA March 24, 1943

M. R. W. B. Waitland, Supervising Eng., RPC

325 Heard Building, Phoenix, Arizona

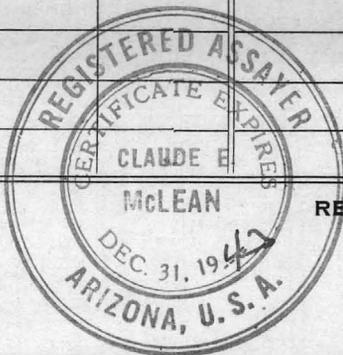
WE HAVE ASSAYED THE SAMPLES RECEIVED FROM YOU AND FIND THE RESULTS AS FOLLOWS:

GOLD FIGURED AT \$ _____ PER OUNCE.

SILVER FIGURED AT \$ _____ PER OUNCE.

LAB. FORM 2

LAB. NO.	SAMPLE CND - 7872	GOLD		SILVER		PERCENTAGES (Element)		
		OZ. PER TON	VALUE	OZ. PER TON	VALUE	COPPER	LEAD	Molybdenum
46989	#1					1.32%		1.91%
46990	#2					1.00		0.10
46991	#3					0.69		0.07
46992	#4					0.57		
46993	#5					0.25		
46994	#6					0.37		
46995	#7					0.44		
46996	#8					0.44		0.23
46997	#9					0.12		1.26
46998	#10					0.37		1.79



RESPECTFULLY SUBMITTED,

ARIZONA TESTING LABORATORIES

BY

C. E. McLean
Claude E. McLean

ASSAYER

CHARGES \$ _____

~~Sangley~~ ~~alta~~

1
10

~~Jan~~

~~Paradise~~

148

13
8
21
7

49

~~Walt~~

4.20

1.48

5.68

1192

~~Quinn~~

12.64

11.92

24.56

~~Ed D...~~

		Cu MoS ₂		MoS ₂	
CH3	3.4'	0.77	2.62	0.37	1.26
4	4.2'	0.62	2.60	0.36	1.51
28	10'	0.61	7.32	1.38	16.56
29	11.5'	1.23	14.15	0.95	10.93
CH5	13'	0.33	4.29	0.23	2.99
	$\frac{44.1}{5}$		30.98		33.25
	8.8'	0.70%		0.75	
	130.0	56.20		29.30	
	59.8	103.80		25.19	
	8.0	5.68		24.56	
	44.1	30.98		33.25	
	241.9	196.66		112.30	
	4.9'	0.81		0.46	

189.8

122

Comparison of Samples Taken by C.A. Anderson, U.S.G.S. and Wm. B. Maitland, R.F.C.

Sample No	Width	Copper %			MoS ₂ %			
		Hawley + Hawley	Union Assay office	Average	Hawley + Hawley	Union Assay office	Average	
CH 1A	10'	0.48%	0.48%	0.48%	0.15%	0.17%	0.16%	
CH 2A	10'	0.49	0.51	0.50	0.14	0.13	0.13%	
CH 3A	10'	0.35	0.36	0.35	0.14	0.17	0.16	
CH 4A	10'	0.61	0.61	0.61	0.15	0.11	0.13	
CH 5A	10'	0.41	0.43	0.42	0.12	0.11	0.11	
CH 6A	10'	0.44	0.43	0.43	0.21	0.20	0.20	
CH 7A	10'	0.51	0.56	0.53	0.66	0.66	0.66	
CH 8A	10'	0.23	0.23	0.23	0.14	0.11	0.12	
CH 9A	10'	0.52	0.51	0.51	0.16	0.13	0.14	
CH 10A	10'	0.39	0.43	0.41	0.19	0.22	0.20	
CH 11A	10'	0.24	0.25	0.24	0.21	0.24	0.23	
CH 12A	10'	0.42	0.43	0.41	0.40	0.39	0.39	
CH 13A	10'	0.49	0.51	0.50	0.28	0.31	0.30	
Average 13 samples	10'	0.42	0.44	0.43	0.23	0.23	0.23	Samples taken by Anderson
CH 14A	10'	0.76	0.80	0.78	0.26	0.30	0.28	
CH 15A	5.5'	1.36	1.48	1.42	0.79	1.35	1.07	
CH 16A	7.4'	4.05	2.99	3.52	0.54	4.00	2.27	
CH 17A	9.9'	0.89	5.81	3.35	0.10	10.99	6.04	
CH 18A	3.5'	3.37	11.80	7.58	2.01	7.04	4.52	
CH 19A	3.5'	2.90	10.11	6.50	0.46	1.61	1.03	
CH 20A	10'	1.89	1.90	1.89	0.24	2.33	2.28	
CH 21A	10'	0.91	9.10	5.00	0.22	2.20	2.20	
Average of 8 samples	59.8 / 7.5"		10.95	1.74	0.17	5.17	0.42	Samples taken by Anderson + Maitland
Average of 21 samples	9.04'			0.84			0.29	Average of all of Above Samples sampled by Maitland
Average of 2 samples	4'			0.71			3.07	Assayed by Phoenix Assayers
Average of 5 samples	8.8'			0.70%			0.75%	Average of 5 samples Taken by Gibbs CH 3, 4, 5, 28, 29. Various assayers.
Aver of 28 samples all of A	8.64'			0.81			0.46%	Average of All of above Samples and all samples on map

12

~~166~~

Copper

MoS₂

No	Width	Diehl		McLean		Check or Average	Diehl		McLean		Check or Average
		1st Time	2nd Time	1st Time	2nd Time		1st Time	2nd Time	1st Time	2nd Time	
1	4'	3.14	2.83	2.72	3.18	3.16	1.05	1.05	0.58	1.32	1.05
2	3 1/2'	0.53	0.21	0.27	0.17	0.22	1.10	1.00	0.30	1.00	1.00
3	4'	0.31	0.13	0.16	0.12	0.12	0.83	0.70	0.10	0.69	0.69
4	7 1/2'	1.44	1.09	1.21	1.25	1.25	0.65	0.89	0.13	0.57	0.65
5	3'	0.29	0.30	0.27	0.27	0.28	0.40	0.35	0.02	0.25	0.35
6	3'	0.01	0.08	0.05	0.05	0.05	0.62	0.35	0.03	0.37	0.36
7	3'	0.23	0.15	0.15	0.15	0.15	0.31	0.37	0.04	0.44	0.37
8	10'	1.22	0.40	0.37	0.38	0.37	0.72	0.70	0.19	0.69	0.70
9	7'	3.36	2.60	2.56	2.10	2.56	0.10	0.70	0.02	0.12	0.10
10	Grab	4.40	3.01	2.52	2.98	2.98	0.45	0.45	0.06	0.37	0.37
Aver. 10	5'	1.43%	1.22%	0.99%	1.27%	1.23	0.63%	0.61%	0.16%	0.51%	0.56%

34
05
-42
8.4

Arizona Testing Laboratory Phoenix, - McLean
Arizona Assay Office, Phoenix - Diehl

144
128
166
8
9

144) 160
144
160
144

Report of Supervising Engineer

In Nov. 1942 this project was granted a \$5000 accessibility loan to deepen the 300 foot vertical shaft to the 130 foot level and make all important workings accessible for sampling. This work has been completed and the \$5000 loan fund has been spent. all work to date has been well done and the loan funds were well spent. The shaft is equipped with a gasoline powered hoist with skip.

Docket No. C-ND-7872

Date authorized for Examination Received - C Loan

Date of Examination inclusive March 6, 7, 8, 1943

Date of Report March 22, 1943

1. Name and Address of Applicant

Name - Fred Gibbs

Address - Summingslope, Prescott, Ariz

2. Character of Project

To develop thru a shaft a copper-molybdenum mine

3. Location of Mine - Copper Hill Mine

Township, range, section Sec 20, T13N, R3W
G + S. R. B and M.

County and State - Yavapai Co., Ariz (Copper Basin Mining District)

Name + distance by road nearest Railway station -

The mine is 6 miles east of Skull Valley a station on the Santa Fe Railroad

Condition + Seasonal accessibility of road, mine to railway - This is a graded dirt road accessible at all times of the year and it is a down hill haul from the mine to the railway loading point.

4 Applicant

Mr. Fred Gibbs, the applicant, is an energetic middle aged mining engineer. He is a graduate of the Michigan ^{College} School of mines and has had several years experience with the Aluminum Corp. of America as field engineer in South America and the West Coast of Africa. Gibbs has had been very successful in developing a number of properties in Yanaguai County. He promoted the Iron King Mine now being operated by the Shattuck Denn Co., he opened up and sampled the Hackberry Mine now being operated under a P.F.C. loan ~~by~~ by R. P. M. Davis. I have checked some of Gibbs sampling and engineering work and have found him to be accurate.

I believe him to be thoroughly reliable and entirely competent to operate this project.

5 Loan Requested

The applicant requests a loan of \$30,000 of which amount \$5000 will be used to repay the Preliminary Loan already granted.

(2)

6 Description of Project

4. General Features

The applicant informed me that a copy of his lease accompanied his original application for the "C" Loan.

I understand that the lease calls
the lease

for a \$100 per month minimum royalty payment. The applicant ^{states} informed me that he will attempt to have these payments subordinated to the R.F.C. loan.

Exploring Development

The property is developed by a two compartment vertical shaft 300 feet deep. The 300 foot level was not dewatered as claimed this drift was not reported to be ~~in ore~~, the ^{have been driven in the direction} of the ore zone.

600' On the 130 foot level off the shaft there has been ^{performed} ~~done~~ 600 feet of drifting and crosscutting. Since this work was done the prospect for copper, the drifts are not in the ~~main part~~ of the zones of molybdenum mineralization altho the crosscuts do cut these ^{ore} ~~zones~~ areas.

350 An adit tunnel comprising 350 feet of work ^{was} ~~does~~ not ^{was} driven on the molybdenum ore but followed stringers of copper ore.

In addition a number of shallow surface shafts and open cuts expose the ore bodies above the 130 foot level.

③ The applicant has mapped the workings in detail and Dr C. A. Anderson of the U.S.G.S. has mapped the geology of the deposit. These maps accompanying this report and the location of the assays taken by this engineer are marked in red on Anderson's map.

Geology of the Ore Deposit.

Attached to this report is a ~~brief~~ short report by Dr Charles A. Anderson of the U.S.G.S. Briefly the ore consists of two brecciated zones

in quartz diorite. The Breccia has been cemented by silica and mineralized by pyrite, chalcocite, and molybdenite. On the surface ~~and~~ and extending for a depth of ~~perhaps~~ ^{less than} 20 feet we find the ore ~~is~~ minerals, ^{partly} oxidized to malachite, azurite, and molybdenite.

Ore Deposit

The ore consists of molybdenite and chalcocite disseminated thru a fractured and silicified quartz diorite. Where the rock has not been crushed there is no mineralization. The length of the ^{two} ore bodies has not as yet been determined.

The western mineralized zone is 60 feet wide, is exposed for a length of 150 feet and should extend at least 20 feet below the 130 foot level for a vertical range of 150 feet. This block should contain 110,000 tons of probable ore ~~and~~

The eastern mineralized zone is 70 feet wide, is exposed for a length of 60 feet and has a vertical range of 150 feet. This block contains 50,000 tons of probable ore.

Therefore we find that the mine as now developed contains 160,000 tons of probable ore that according to ^{the average of all} ~~my~~ assays should run 0.78% MoS_2 and 0.82% Copper.

Attached to this report are the assay certificates of the 10 samples taken by me and on the applicants map is a record of his samples. On the map of Dr. Anderson I have plotted the location of my samples. Following is a recapitulation of the samples taken:-

6 X 150 X 150
10
150
90
13,5000

5
70 X 60 X 150
12
350
150
175
35
52,500

(4)

Assay Record

No of Samples Assayed	Sampler	Assayer	Average Width	% MoS ₂	% Copper
2	Fred Gibbs	Jacobs Tucson, Ariz	3.75'	0.29	0.46
29	" "	Gordon Mayer, Ariz	8.63'	0.90	0.97
10	" "	Union Assay Office Salt Lake City	8.64	0.46	0.76
10	Maitland	Arizona Test Lab Phoenix	5.00'	0.99	0.16
10	Maitland	Arizona Assay office Phoenix	5.00'	1.43	0.63
61	Average	5 assayers	5.8'	0.78	0.82

analyses
split
pulpes

15
15
75
15
2.25
24.20
6.45
16 14
70 30
4.20

From a study of the above table and the check sampling done by the applicant it is obvious that the local assayers are not skilled in the determination of molybdenum. By averaging all of the various assays taken it was hoped that the errors made by the assayers would be in part cancelled out. While the samples taken by me ~~was~~ are not considered as representative of the ^{average} value of the ore bodies they do indicate the grade of ore that will be mined in parts of the ore zone.

⑤

It is not practical to attempt to calculate, ^{definitely} the dollar value of the ore unless the price paid for molybdenum concentrates is known and unless a mill test has been run on the ore to determine the ratio of concentration and percentage extraction. It is obvious that the mine will not pay as a copper producer alone ~~and~~ but if molybdenum sells for 45¢ per lb (90%) f.o.b. railroad it is ^{probable} possible that the combined metal value

75
15
45

is sufficient to make a ^{self-liquidating} large scale operation of 250 tons per day or greater. ~~Self-liquidating~~

The applicant has sent a representative sample of the ore to the University of Arizona for a mill test and until the results of this test are at hand it can but estimate the results that would be obtained in a 250 ton mill.

My calculations are as follows: (Insert)

Equipment

Equipment now on the property consists

1 - 25 H.P. gasoline hoist that will be large enough for the work contemplated under this loan.

1 wooden headframe - adequate for operation

1 hoist house, one blacksmith shop and one store house on property.

2 small dwelling houses are also on the claims.

Water Supply + Power Supply

(6) It is probable that sufficient water for a 250 ton mill can be developed around the mine from the main shaft on the Copper Basin Claims, from the Loma Prieta shaft and from numerous other mills and shafts in ^{this} area. Water from a larger mill would have to be piped in from Skull Valley which is 6 miles away.

For the development of the property under the projected loan gasoline power is contemplated. If a mill is erected, electric power can be obtained from a 44,000 volt line passing within one mile of the property.

Estimated Cost of Project

I have checked Mr. Libbs application and find his statements to be correct after thoroughly discussing the project with him we agreed upon the following expenditures:-

Expenditures

Equipment + Supplies

Gasoline driven 320 cubic ft. compressor \$2500.00

Bank house equipment 250.00

Change room 250.00

Tools, drill steel, bits, etc 450.00

Pump for shaft 250.00

Building ore bin, etc 100.00

Purchase and install skip + dump 500.00

2 jackhammers and 2 stopers 2500.00

6 ore cars 360.00

Total \$7,160.00

Underground Development

250' of north-south drift in ore @ \$18/ft \$4500.00

200' of crosscut dog holes off drift @ \$12/ft 2400.00

50' extension of east crosscut on 130' level
to complete crosscutting of ore body

@ \$18/ft 900.00

420' of raises from 130' level to
surface @ \$12/ft

5040.00

Total underground development \$12,840.00

Misc Costs

Insurance \$1000.00

Supervision 1000.00

Repay C Loan 5000.00

Interest + contingencies 3000.00

Total for loan

Total misc

\$10,000.00

\$30,000.00

The purpose of this ~~pool~~ loan ~~would~~ ^{is} be to more thoroughly develop and block out in part the two ore bodies between the 130 foot level and the surface. This development work would also be slope preparation so that after the loan funds have been spent the property should contain sufficient positive ore to warrant development below the 130 foot level and then later the construction of a mill on the property.

Before this project could become self-liquidating at least an additional \$100,000 must be spent for the mill, power supply, water development, etc.

Economic Considerations

The applicant intends to employ 11 men on a one shift basis. These men would include:

- 1 hoistman \$ 7.25 per day
- 1 blacksmith & mechanic \$ 8.00 per day
- 1 superintendent (applicant) \$ 300 per month
- 4 miners @ \$ 7.10 per day
- 4 shovelers @ \$ 6.60 per day

at the present time there are no men employed on this project.

The rock in this mine stands very well so mining costs should be reasonable, at the nearby Commercial mine I inspected open stopes 60 feet wide and 120 feet long that have stood open ^{for over 10 years} without slipping.

Climate at the mine is ideal and the elevation (about 5000') is such that there is no extremes of temperature.

14 45
 70
 56 30 7
 .78
 9
 702
 45
 5
 82
 9
 738
 2
 14.76
 9
 5
 485
 14
 15
 70
 2
 414.2
 09275
 20710
 28994
 8284
 37278
 384170.50
 442.8
 0485
 22140
 25424
 35424
 17712
 2147580

Mr. Andersen of the U.S.G.S. has suggested that the property be core drilled. Both the applicant and this engineer are in favor of such a program as a preliminary to the development as outlined. The applicant has available a diamond drilling rig and operators which the ^{nearby} Cron King Mine will furnish for \$1.50 per foot which is very reasonable. The chief advantage of developing the property by means of drifts and raises lies in the fact that such underground development work can later be used as slope preparation and if drilling confirmed the presence of a large commercial ore body, this work would be ^{then} necessary anyway. However the drilling program would explore the ore below the 130-foot level and this must be done by some means before a mill would be warranted.

Comments of the Supervising Engineer

(9)

This is one of the best molybdenum prospects I have ~~examined~~ examined and if there is a critical shortage of molybdenum I believe this project warrants a loan as outlined in this report.

I do not believe that the sampling done by this engineer or the applicant is representative of the ore as will be mined. This statement is based on the fact that all of the development

work to date has been along the best copper showings and the molybdenum was ignored.

The average assay of 0.78% MoS_2 is perhaps too high and it is my opinion

in addition the five different assayers have not been able to check each other so this also introduces a question of probable error.

However I believe this property is worthy of development as it is very probable that at least 500,000 tons of ore can be mined from this deposit. We already have 160,000 tons of probable ore, ^(containing 1348 tons of MoS_2 + 1312 tons of copper) exposed above the 130 foot level and there is no reason to believe that this ore will not extend to at least 450 feet in depth. Another factor that makes this property more attractive for a large scale producer of molybdenum is the fact that both the ~~add~~ adjoining Commercial Mine and the Loma Prieta mine also contain similar disseminated bodies of molybdenum and copper ore. The Commercial Mine is owned by Phelps Dodge Corporation and the Loma Prieta has applied for an accessibility loan. One mill could handle the ore from the three properties.

(10) This project will, ^{ultimately} require fairly large amounts of equipment and supplies and will require already scarce labor ~~as~~ as it must be remembered that this ore will require milling before molybdenum and copper can be placed on the market.

It would be my suggestion that after the Loma Prieta has been dematted and development work begun on this project that the U.S. Geological Survey map the area in detail and if possible the Bureau of Mines should diamond drill the various ore bodies exposed on the three properties.

Until further sampling of this mine has been done and a mill test made on the ore I am unable to state ^{definitely} whether this ore can be mined and milled at a profit. However if MoS_2 sells at 45¢ per lb f.o.b., railroad and no unusual metallurgical problems are encountered the present sampling results indicate that a large amount of molybdenum and copper can be ~~obtain~~ produced at a profit at this mine.

Wm B Mantel
Superintendent Engineer

U. S. GEOLOGICAL SURVEY

REPORT ON A BRIEF EXAMINATION OF THE MOLYBDENITE PROSPECTS

AT COPPER BASIN, YAVAPAI COUNTY, ARIZONA

By Charles A. Anderson

February 1943

INTRODUCTION

Three days, February 21 - 23, 1943, were spent in a brief examination of the molybdenite prospects in Copper Basin, Yavapai County, Arizona, assisted by Donald H. Kupfer. Fred Gibbs and F. S. Schemmer were helpful in conducting us around the mineralized areas. Three molybdenite prospects are present, the Copper Hill, Commercial Mine and Loma Prieta, and their relative position is indicated on plate 1.

Copper Basin is located 11 miles west of Prescott and 7 miles east of Skull Valley, the latter is on the A. T. & S. F. Railroad. A fair gravel road with down grade to Skull Valley is now being used by F. S. Schemmer to truck copper ore to the railroad. This same road continues eastward to Prescott. The elevation is approximately 5500 feet with little winter snow.

At present water for domestic purposes is piped down from the east where springs at higher elevation are the source. These are owned by Phelps Dodge Corp. There is a well one quarter of a mile from the Copper Hill shaft that could supply additional domestic water. According to F. S. Schemmer, water for milling could be obtained from wells 4 miles to the southwest. Timber can be obtained locally from the mountains to the east but at present Schemmer is buying timber from Camp Wood, 50 miles from the Commercial Mine. The Arizona Power Company line is located about a mile south of the Commercial Mine.

COPPER HILL MINE

Ownership: The mine is owned by F. S. Schemmer and Mr. Erickson and is under lease to Fred Gibbs, Sunnyslope, Prescott, Arizona and Nick Duyn, 319 E. Fort Lowell Road, Tucson, Arizona. The lessees have received an RFC loan for dewatering the mine and have completed the job below the 130-foot level.

Development and past production: Plate 2 is a composite map and illustrates the present underground workings. The past development was done for copper with about 1400 feet of adits, drifts and cross-cuts connected in part by a main shaft 300 feet deep and by smaller shafts and one winze. An inaccessible stope is present on the 130 level but its dimensions are unknown. It is reported that in 1916 - 1918, 1800 tons of ore were mined, 300 tons averaged around 5% MoS₂. How much of the 1800 tons was shipped and where the ore came from is not known. Some of it presumably came from the upper levels where higher grade ore is now exposed.

Geology and mineralization: The country rock is quartz diorite containing inclusions of metamorphic rock. It has been faulted and brecciated and silicified with the introduction of pyrite, chalcopyrite and molybdenite. Two pronounced zones, striking roughly north and south form two separate mineralized bodies and are exposed by a

drift from the main shaft on the 130 level. The western zone is about 60 feet wide and the eastern zone is over 70 feet wide. The faults paralleling these mineralized zones dip at high angles to the west and the disposition of the upper levels also indicate a westerly dip for the western ore zone.

Sampling and assaying: The mineralized rock is very hard and the sulphides are irregularly distributed throughout the brecciated and silicified granitic rock. The lessee, Fred Gibbs, started taking horizontal channel samples with a single jack and moils but abandoned this method and instead used a machine drill, driving holes at a low angle to the walls and at a slight angle upward, catching the sludges for assaying. The sludges from three or more holes were combined into one sample, the width of sampled rock is indicated in the table below. There was some loss in decantation and as the molybdenite slimes easily, it is possible that the samples are slightly low in MoS₂ content. It is my opinion that the sampling was carefully and thoroughly done by Mr. Gibbs.

The assaying to date has been done by Gordon of Mayer, Arizona, with a few by Jacobs of Tucson. A comparison of the results of CH 3 in the table below indicates some variation in the results of the two assayers. Until some of the pulps have been checked by an assayer known to be reliable for MoS₂, the present assays can only be accepted provisionally. Mr. Gibbs is having this checking done by Union Assay Office in Salt Lake City, but at present the results are not available.

Present Assay Record

Upper tunnel				%	%
No.	Type	Assayer	Width	MoS ₂	Cu.
CH 2	Grab-copper carbonate ore	Giroux			2.80
Old shaft				%	%
No.	Type	Assayer	Width	MoS ₂	Cu.
CH 6	Channel	Gordon	32"	2.00	0.35
Incline open cut				%	%
No.	Type	Assayer	Width	MoS ₂	Cu.
CH 7	Channel	Gordon	38"	2.91	3.30
CH 8	"	"	74"	5.73	0.50
CH 9	"	"	58"	4.20	1.20
CH 10	"	"	43"	1.43	1.90
44-Foot level				%	%
No.	Type	Assayer	Width	MoS ₂	Cu.
CH 29	Channel	Gordon	11' 6"	1.15	1.19
56-Foot level				%	%
No.	Type	Assayer	Width	MoS ₂	Cu.
CH 30	Channel	Gordon	54"	1.38	2.00

130-Foot level - 1st South Crosscut

No.	Type	Assayer	Width	% MoS ₂	% Cu.	Oz. Au.	Oz. Ag.
CH 3	Channel	Jacobs	40"	0.42	0.73	Tr.	0.40
"	Pulp check	Gordon		0.95	0.55	"	0.60
" 4	Channel	Jacobs	50"	0.36	0.62	"	0.30
" 24	Drill hole sludge	Gordon	10'	0.67	1.75		
" 25	" " "	"	10'	1.00	0.55		
" 26	" " "	"	10'	0.66	1.98		
" 27	Vertical channel	"	48"	4.05	2.78		
" 28	Chip	"	12'	2.19	1.35		
Average CH 3, 4, 24, 25, 26				0.62	1.13		
" 33	Composite pulps 24-26	"		0.34	1.07	0.01	0.30

130-Foot level - east drift - western mineralized zone

No.	Type	Assayer	Width	% MoS ₂	% Cu.	Oz. Au.	Oz. Ag.
CH 5	Channel	Jacobs	13'	0.23	0.33		0.30
CH 19	Drill hole sludge	Gordon	10'	0.38	0.75		
CH 20	" " "	"	12'	0.76	0.35		
CH 21	" " "	"	12'	0.57	1.25		
CH 22	" " "	"	12'	0.50	0.55		
CH 23	" " "	"	13'	0.44	0.35		
CH 32	Composite pulps 19-23	"		0.48	0.56	0.01	0.29
Average CH 19 - 23 inclusive				0.53	0.64		

130-Foot level - east drift - eastern mineralized zone

No.	Type	Assayer	Width	% MoS ₂	% Cu.	Oz. Au.	Oz. Ag.
CH 11	Drill hole sludge	Gordon	10'	1.00	0.30		
CH 12	" " "	"	10'	0.31	0.50		
CH 13	" " "	"	10'	0.31	2.20		
CH 14	" " "	"	10'	0.45	1.38		
CH 15	" " "	"	10'	0.40	0.80		
CH 16	" " "	"	17'	0.45	1.30		
CH 17	" " "	"	7' 6"	0.35	1.60		
CH 18	" " "	"	42"	0.43	0.50		
CH 31	Composite pulps, 11-16	"		1.00	0.76	0.03	0.57
Average CH 11 - 16 inclusive				0.48	1.10		

Ore reserves: For the western mineralized zone, a width of 60 feet, length of 150 feet and a vertical range of 150 feet seem partly assured indicating that 110,000 tons of probable ore are present. From the available assays the expected grade would be about 0.5% MoS₂ and Cu. slightly under 1%. However, the richest molybdenite showings are in the higher level of this block and the grade in MoS₂ might be higher. However, a final statement is not in order until the assays have been checked.

For the eastern mineralized zone, a width of 70 feet, length of 60 feet and vertical range of 150 feet can be assumed for probable ore, indicating 50,000 tons in this block. The available assays indicate an expected grade of .5% MoS₂ and 1% Cu.

The vertical and horizontal extent of the ore zones is not known and from the information available, it is possible that twice as much tonnage may be present. Insufficient study was made to conjecture inferred tonnage at this time.

COMMERCIAL MINE

Ownership: The Commercial Mine is owned by Phelps Dodge Corporation but is under lease to F. S. Schemmer of Prescott, Arizona, who is now mining copper carbonate ore. At present, he is driving a new haulage tunnel and production is erratic.

Development and past production: There are over 4000 feet of workings in the Commercial Mine, only a part of these are shown on plate 3. From the viewpoint of molybdenite mineralization, it is the north end of the workings as shown on plate 3 that are of interest. The past production has been of copper carbonate ore but no figures are available as to amount.

Geology and mineralization: From the brief examination made it appeared that there are several facies of igneous rocks exposed in the mine, quartz porphyry, diorite porphyry and quartz diorite. No exposures clearly revealed the relationship of these rocks to each other. Further detailed work is necessary for the complete geologic picture.

There are two parallel veins, the Gabarino and Tripod, which outcrop at the surface and have been mined for copper carbonate. On the Smelter Hill level, the Gabarino vein widens considerably and it is here that the bulk of past production of carbonate ore has been obtained.

To the northeast of the large carbonate ore area on the Smelter Hill level, there is some molybdenite mineralization. The quartz porphyry is faulted with some brecciation and subsequent silicification and addition of molybdenite and chalcopyrite. Unlike the Copper Hill Mine, no recognizable breccia zones are present, at least none were recognized during the brief examination. The breccia appeared erratic in distribution with resultant erratic areas of molybdenite mineralization. This area was sampled by the Arizona Molybdenum Corp. and the results were furnished through the courtesy of Phelps Dodge Corp. The location and value of the assays are shown on plate 3. The average of the 5 assays is 0.46% MoS₂ but three of these were collected from the richer areas. Phelps Dodge has one assay for copper, 0.55%. It is my opinion that the bulk of this mineralized area would run only 0.2% MoS₂ and less than 1% Cu.

The Gabarino Crosscut, 75 feet above the Smelter Hill level also cuts through some molybdenite mineralization above the large area of copper carbonate mineralization. The walls of the crosscut are masked by a heavy coating of copper sulphate but some brecciated silicified porphyry was observed carrying molybdenite. At the time of the examination, I was not impressed by the showing. Subsequently I obtained the assays made by the Arizona Molybdenum Corporation through the courtesy of Phelps Dodge Corp. and these have been plotted on plate 3. The average is 0.43% MoS₂ and 2.20% Cu. Separating the underlying stopes is only a 20-foot floor pillar so little potential tonnage is present. Only rare molybdenite was noted in the underlying stopes.

On the lowest level (400 plus foot level) a crosscut was driven east of the main shaft and near the end of the crosscut good molybdenite ore is reported by A. B. Peach, Superintendent of mining operations at the time of exploration. Brecciated and silicified porphyry carrying molybdenite are present on the dump confirming this statement. The shaft and lower level are now under water and Phelps Dodge Corp. has no intention of dewatering.

Ore reserves: Estimation of reserves is difficult owing to the lack of information as to ore control as no continuity can be suggested. For the northeastern area on the Smelter Hill level, an area 50 by 75 feet can be assumed to be mineralized and a vertical range of 50 feet is reasonable indicating 15,000 tons of probable ore with the grade probably not more than .2% MoS₂ and less than 1% Cu.

For the molybdenite on the Gabarino tunnel level, not more than 5000 tons of molybdenite ore can be estimated from the available information, the grade around .4% MoS₂ and Cu. 2%, the latter in the form of carbonate and sulphate.

LOMA PRIETA WORKINGS

Ownership: The Loma Prieta is owned by H. C. Smoot of Prescott and is under lease to Nich Duyñ and Fred Gibbs. They have applied for an RFC loan to dewater the mine.

Development: A shaft 414 feet deep has two levels at 150 and 400 feet, with 265 feet of crosscuts on the 150-foot level and over 750 feet of workings on the 400-foot level. There has been no past production.

Geology and mineralization: There are no exposures around the collar of the shaft as the basement rock is mantled by terrace gravels. The dump material consists of quartz diorite that has been brecciated and silicified and mineralized with chalcopyrite, pyrite and molybdenite. The ore resembles the Copper Hill in this regard.

A complete report and assay maps were made by W. Tocote in 1917; copies of the assay maps are attached (plates 4, 5 & 6). Unfortunately no MoS₂ determinations were made as the chief interest was the copper mineralization. According to Tocote there are 500,000 tons of probable ore averaging 1.25% Cu. with additional values in MoS₂. He also reported that the molybdenite is thoroughly intergrown with the ore and is also found massive, with the MoS₂ sometimes extending beyond the copper area.

The only information as to MoS₂ grade is from dump samples, one by Smoot, the owner, made by taking 30 grab samples around and half way down the dump, assaying 0.35% MoS₂. A similar grab sample collected by Duyñ assayed 0.24% MoS₂, Cu. 1.25%. Mr. Gibbs recently made a carefully selected sample including good and lean ore and his results are MoS₂ 0.2%, Cu. 1.00%. A picked sample by Mr. Smoot assayed 0.8% MoS₂.

CONCLUSIONS AND RECOMMENDATIONS

The Copper Hill Mine shows promise of developing into a fairly large tonnage low grade molybdenum copper deposit, but with additional exploration

needed to determine the vertical and horizontal extent of the mineralized zones. Since I have only carefully examined the 130-foot level and made little surface studies, I suggest that before any formal recommendation be made for a drilling project by the U. S. Bureau of Mines, that the U. S. Geological Survey make a detailed study of the surface and underground workings. Such a study should only require 10 days to two weeks field work and I recommend that it be started immediately. At the completion of this field work, the results of the check assays will be known.

Nothing can be done at the Loma Prieta until it is dewatered, and if dewatering is done, I recommend that the Survey map the underground workings as soon as possible to determine the ore control and distribution of the molybdenite.

The Commercial Mine is owned by Phelps Dodge Corporation and L. A. Reber, Geologist, is starting a comprehensive study of the Copper Basin for his company. He will thoroughly examine the Commercial Mine and since the molybdenite possibilities are not too encouraging from the present information, I do not recommend additional work on the Commercial Mine by the Survey. Also I see no need for the Survey to duplicate the regional studies to be made by Mr. Reber.

March 5, 1943
Tucson, Arizona

Respectfully submitted,

(Signed) Charles A. Anderson
Geologist

Copper Hill Drill Contract

LM	\$1.50	1st 100'	25¢ more	for each 100'	thereafter.
AX	\$2.25	" "	" "	" "	" "
BX	\$3.00	" "	" "	" "	" "

Applicant furnishes air + water + cement.

Q. Promised 1500' of Hole - 15 days notice

1st Hole	486'	LM	- 22'/8hrs
2nd "	25½'	BX	- 15'/8hrs.
3rd "	27½'	AX	- 17'/8hrs
4th "	38'	LM	

No. 321 Ma

Phoenix, Arizona,

CHAS. A. DIEHL

Mar. 13, 1943.

ARIZONA ASSAY OFFICE

Phone 3-4001

815 North First Street

P. O. Box 1148

This Certificate That samples submitted for assay by Mr. Wm. P. Maitland,

contain as follows per ton of 2000 lbs. Avoir.

MARKS	SILVER		VALUE (Oz.)	GOLD		VALUE (Oz.)	TOTAL VALUE Of Gold and Silver	PERCENTAGE			REMARKS
	Ounces	Tenths		Ounces	Hundths			%		%	
1								1.05	2.83		
2								1.10	.48		
3								.83	.28		
4								.65	1.30		
5								.40	.26		
6								.62	.01		
7								.31	.21		
8								.72	1.10		
9								.10	3.03		
10								.45	3.96		

Charges \$ 60.00

Assayer ARIZONA ASSAY OFFICE

Chas. A. Diehl

ARIZONA TESTING LABORATORIES

ANALYTICAL AND CONSULTING CHEMISTS
ASSAYERS, MINING ENGINEERS
823 EAST VAN BUREN STREET

ASSAY CERTIFICATE

PHOENIX, ARIZONA

March 15, 1943

M. W. B. Maitland, Supervising Eng., RFC

325 Heard Building, Phoenix, Arizona

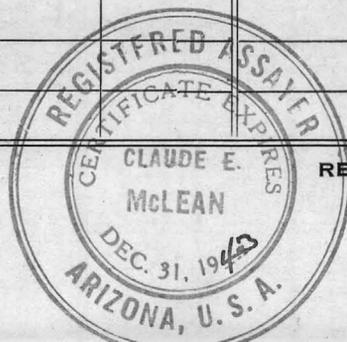
WE HAVE ASSAYED THE SAMPLES RECEIVED FROM YOU AND FIND THE RESULTS AS FOLLOWS:

GOLD FIGURED AT \$ _____ PER OUNCE.

SILVER FIGURED AT \$ _____ PER OUNCE.

LAB. FORM 2

LAB. NO.	SAMPLE CND--7872	GOLD		SILVER		PERCENTAGES (element)		
		Oz. PER TON	VALUE	Oz. PER TON	VALUE	COPPER	LEAD	Molybdenum
46989	#1					0.58%		1.64%
46990	#2					0.30		0.16
46991	#3					0.10		0.10
46992	#4					0.13		0.73
46993	#5					0.02		0.16
46994	#6					0.03		0.03
46995	#7					0.04		0.09
46996	#8					0.19		0.22
46997	#9					0.02		1.54
46998	#10					0.06		1.52



RESPECTFULLY SUBMITTED,

ARIZONA TESTING LABORATORIES

BY

C. E. McLean
Claude E. McLean

ASSAYER

CHARGES \$ 40.00

No 8 - 10'

disseminated granite
in separate ore zone

No 9 - 7'

Molybdenite with scant
molybdenite partly substituted
granite
upper level undrained

No 10 - grab
off 12 tons or
dump

from inclined open
cut
molybdenite with
some sulfide of molybdenum

Griggs Molly

March 8, 1943

Sample 1 - 48" Silicified basic dike
Chalco + Molly.
rich ore in fault zone

No 2 - 40" - In shattered & coarse
granul granite in presence
but no recrystallizing qtz

No 3 - 50" - Same material as No 2
just a little more silica

Sample No 4 - Grate from
shot drill hole
across 7 1/2' in disseminated granitic

Sample No 5 - grate from
shot drill hole
3' in recrystallized
breccia

Sample No 6 - " " well silicified
" " " breccia
3'

Sample No 7 " " " " " "
" " " " " "
3' " "

Drilling outfit from Clear King
at least 300' hole + drill runner

Want 1200' of hole @ \$1.50/foot

Can get within 2 wks.

(4)

COMPARISON OF SAMPLES
TAKEN BY
C. A. ANDERSON, U.S.G.S. AND WM. B. MAITLAND, R.F.C.

Sample No.	Width	COPPER %			MoS ₂ %		
		Hawley & Hawley	Union Assay Office	Average	Hawley & Hawley	Union Assay Office	Average
CH 1A	10'	0.48	0.48	0.48	0.15	0.17	0.16
CH 2A	10'	0.49	0.51	0.50	0.14	0.13	0.13
CH 3A	10'	0.35	0.36	0.35	0.14	0.17	0.16
CH 4A	10'	0.61	0.61	0.61	0.15	0.11	0.13
CH 5A	10'	0.41	0.43	0.42	0.12	0.11	0.11
CH 6A	10'	0.44	0.43	0.43	0.21	0.20	0.20
CH 7A	10'	0.51	0.56	0.53	0.66	0.66	0.66
CH 8A	10'	0.23	0.23	0.23	0.14	0.11	0.12
CH 9A	10'	0.52	0.51	0.51	0.16	0.13	0.14
CH 10A	10'	0.39	0.43	0.41	0.19	0.22	0.20
CH 11A	10'	0.24	0.25	0.24	0.21	0.24	0.23
CH 12A	10'	0.42	0.43	0.41	0.40	0.39	0.39
CH 13A	10'	0.49	0.51	0.50	0.28	0.31	0.30
Average 13 Samples	10'	0.42	0.44	0.43	0.23	0.23	0.23
Samples taken by C. A. Anderson							
CH 14A	10'	0.76			0.26		
CH 15A	5.5'	1.36			0.79		
CH 16A	7.4'	4.05			0.54		
CH 17A	9.9'	0.89			0.10		
CH 18A	3.5'	3.37			2.01		
CH 19A	3.5'	2.90			0.46		
CH 20A	10'	1.89			0.24		
CH 21A	10'	0.91			0.22		
Average of 8 Samples	7.5'			1.74			0.42
Samples taken by C.A. Anderson & Wm.B. Maitland							
Average of 21 Samples	9.04'			0.84			0.29
Average of all of above samples,							
Average of 2 Samples	4'			0.71			3.07
Assayed by Phoenix Assayers, sampled by Mr. Maitland							
Average of 5 Samples	8.8'			0.70			0.75
Average of 5 samples taken by Gibbs CH3,4,5,28,29, various assayers							
Average of 28 Samples	8.64'			0.81			0.46%
Average of all of above samples and all samples on map							

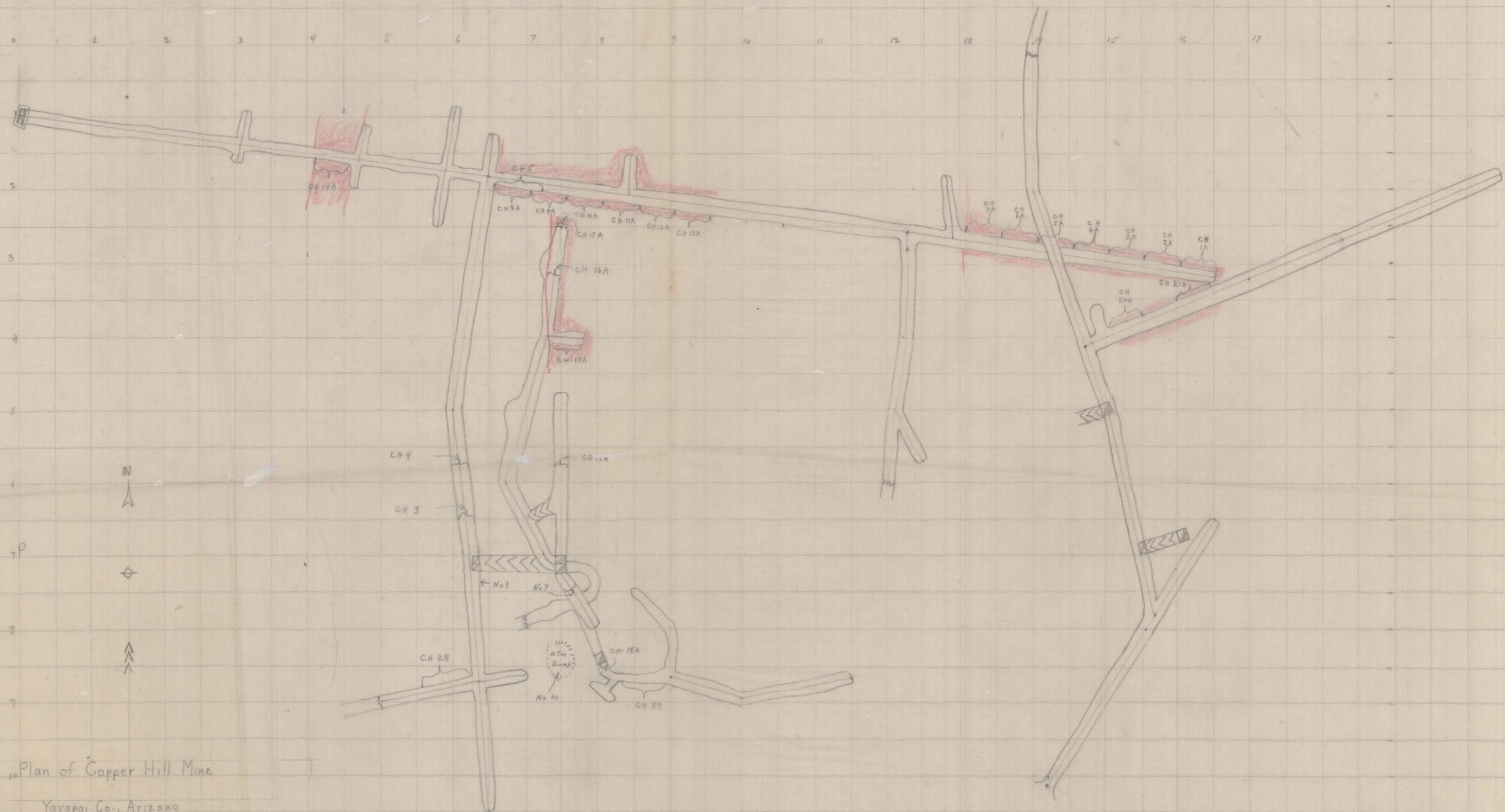
		<i>MoS₂</i>					<i>Copper</i>				
No.	Width	Diehl 1st Time	Diehl 2nd Time	McLean 1st Time	McLean 2nd Time	Check or Average	Diehl 1st Time	Diehl 2nd Time	McLean 1st Time	McLean 2nd Time	Check or Average
1	4'	3.14	3.14	2.72	3.18	3.16	1.05	1.05	0.58	1.32	1.05
2	3-1/2'	0.53	0.21	0.27	0.17	0.22	1.10	1.00	0.30	1.00	1.00
3	4'	0.31	0.13	0.16	0.12	0.12	0.83	0.70	0.10	0.69	0.69
4	7-1/2'	1.44	1.09	1.21	1.25	1.25	0.65	0.89	0.13	0.57	0.65
5	3'	0.29	0.30	0.27	0.27	0.28	0.40	0.35	0.02	0.25	0.35
6	3'	0.01	0.08	0.05	0.05	0.05	0.62	0.35	0.03	0.37	0.36
7	3'	0.23	0.15	0.15	0.15	0.15	0.31	0.37	0.04	0.44	0.37
8	10'	1.22	0.40	0.37	0.38	0.37	0.72	0.70	0.19	0.69	0.70
9	7'	3.36	2.60	2.56	2.10	2.56	0.10	0.10	0.02	0.12	0.10
10	Grab	4.40	3.01	2.52	2.98	2.98	0.45	0.45	0.06	0.37	0.37

Average											
10	5'	1.43%	1.22%	0.99%	1.27%	1.23	0.63%	0.61%	0.16%	0.51%	0.56%

Arizona Testing Laboratory,
Phoenix, Arizona - McLean

Arizona Assay Office,
Phoenix, Arizona - Diehl

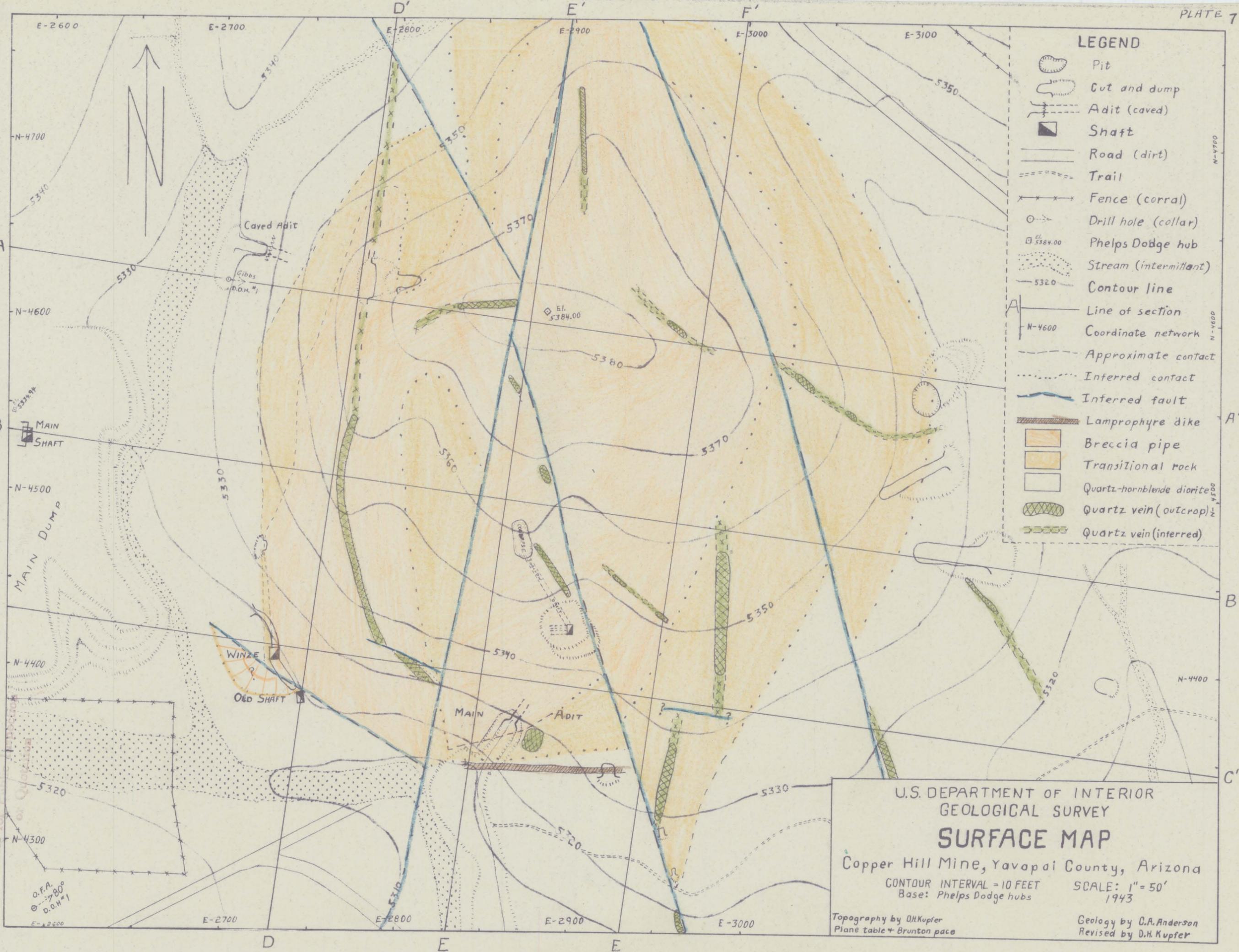
1" = 20'



Plan of Copper Hill Mine
 Yavapai Co., Arizona

Docket ND 5404 March 30, 1943

Scale 1" = 20' Wm B. Millland



LEGEND

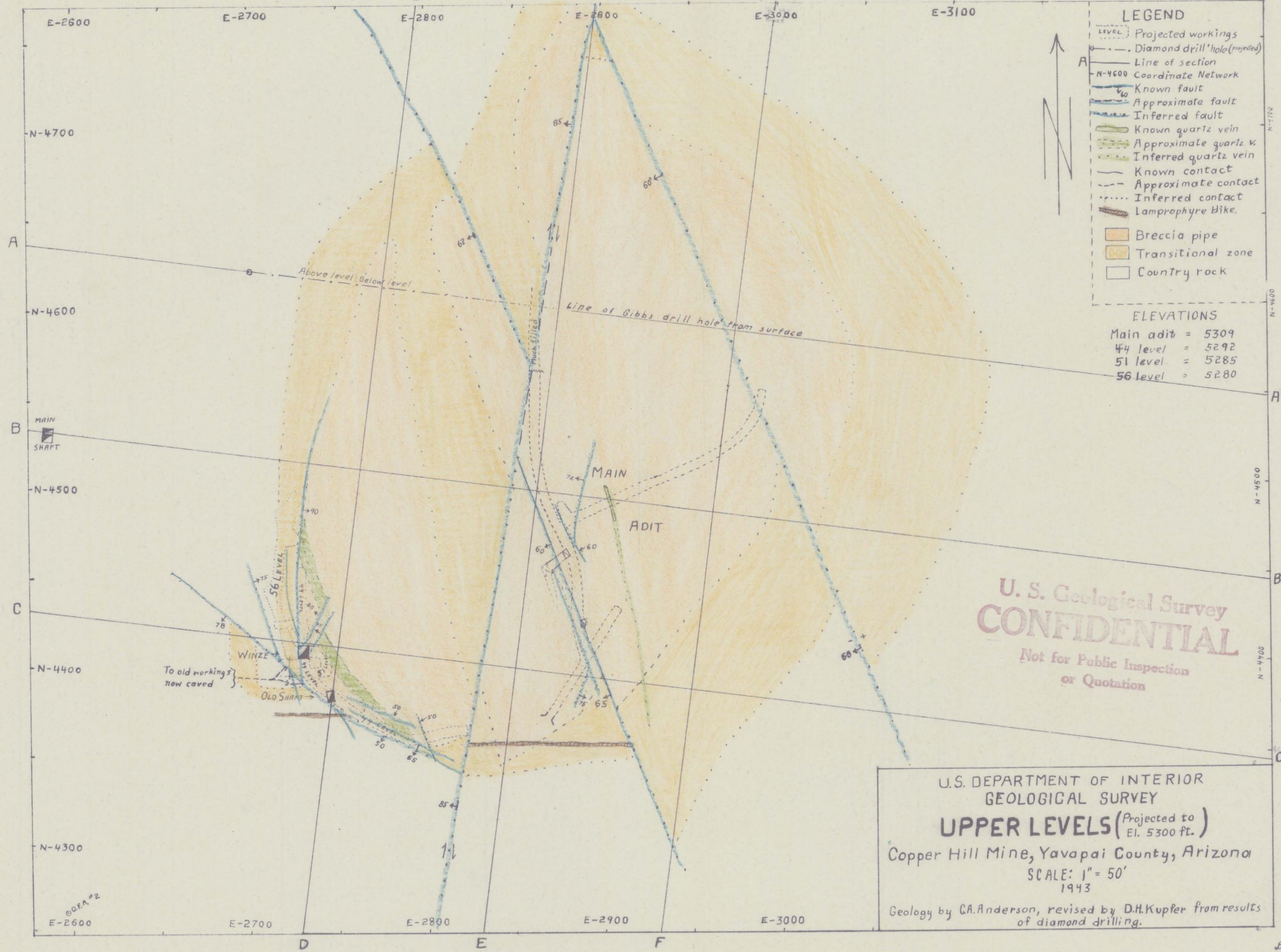
- Pit
- Cut and dump
- Adit (caved)
- Shaft
- Road (dirt)
- Trail
- Fence (corral)
- Drill hole (collar)
- Phelps Dodge hub
- Stream (intermittent)
- Contour line
- Line of section
- Coordinate network
- Approximate contact
- Inferred contact
- Inferred fault
- Lamprophyre dike
- Breccia pipe
- Transitional rock
- Quartz-hornblende diorite
- Quartz vein (outcrop)
- Quartz vein (inferred)

U.S. DEPARTMENT OF INTERIOR
 GEOLOGICAL SURVEY
SURFACE MAP
 Copper Hill Mine, Yavapai County, Arizona
 CONTOUR INTERVAL = 10 FEET SCALE: 1" = 50'
 Base: Phelps Dodge hubs 1943
 Topography by D.H. Kupfer
 Plane table + Brunton pace
 Geology by C.A. Anderson
 Revised by D.H. Kupfer

U.S. Geological Survey
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O.F.A. 80°
 D.O.H.#1

FAK



LEGEND

- LEVEL (dashed line) Projected workings
- Diamond drill hole (projected) (line with dots)
- Line of section (solid line)
- Coordinate Network (dotted line)
- Known fault (blue line with 'v' symbols)
- Approximate fault (blue line with 'v' symbols)
- Inferred fault (blue line with 'v' symbols)
- Known quartz vein (green line)
- Approximate quartz v. (green line)
- Inferred quartz vein (green line)
- Known contact (solid line)
- Approximate contact (dashed line)
- Inferred contact (dotted line)
- Lamprophyre dike (hatched area)
- Breccia pipe (orange shaded area)
- Transitional zone (yellow shaded area)
- Country rock (white area)

ELEVATIONS

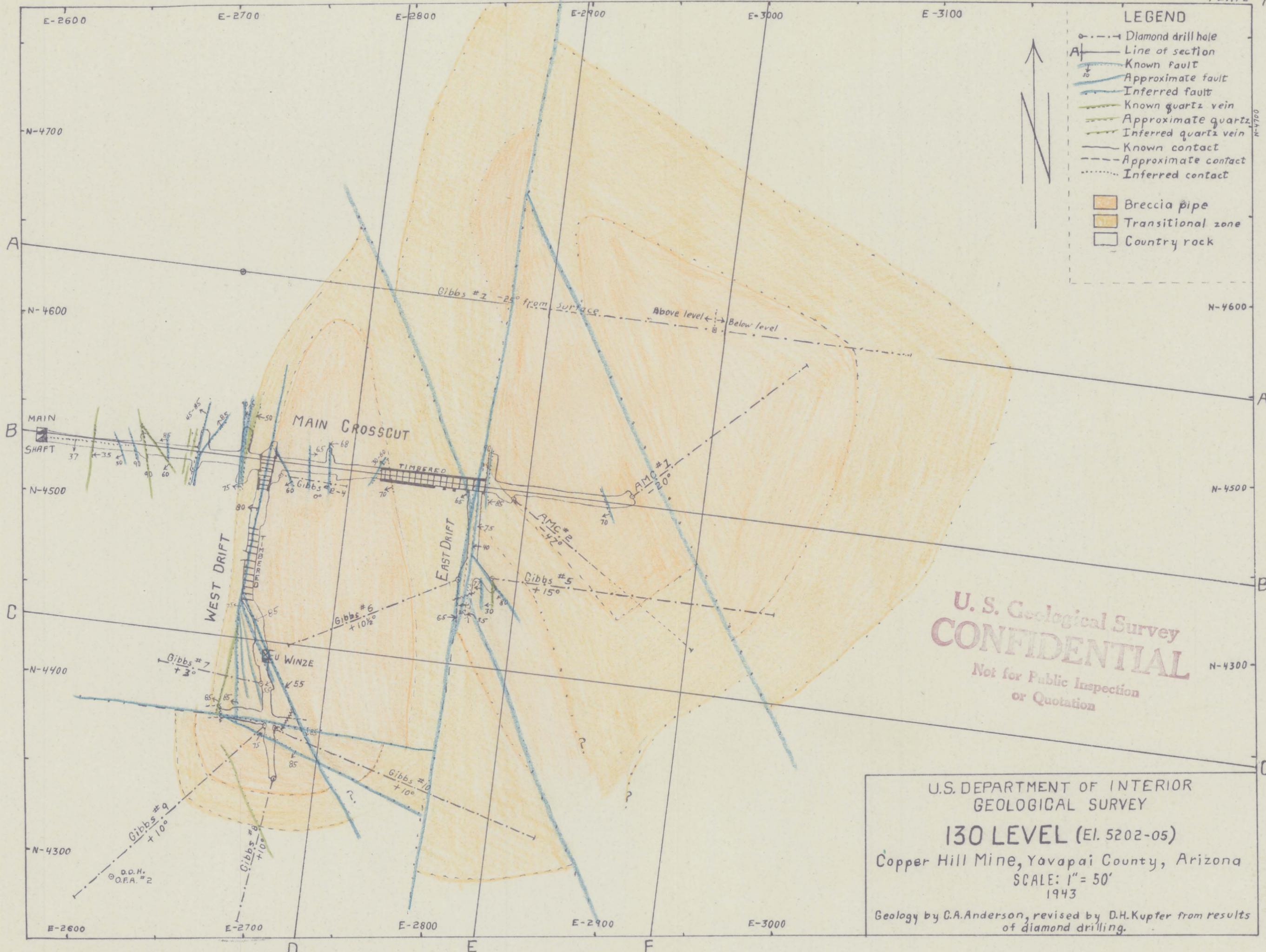
Main adit	= 5309
44 level	= 5292
51 level	= 5285
56 level	= 5280

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U.S. DEPARTMENT OF INTERIOR
 GEOLOGICAL SURVEY
UPPER LEVELS (Projected to El. 5300 ft.)
 Copper Hill Mine, Yavapai County, Arizona
 SCALE: 1" = 50'
 1943
 Geology by G.A. Anderson, revised by D.H. Kupfer from results of diamond drilling.

© D.F.A. #2
 E-2600

DHA



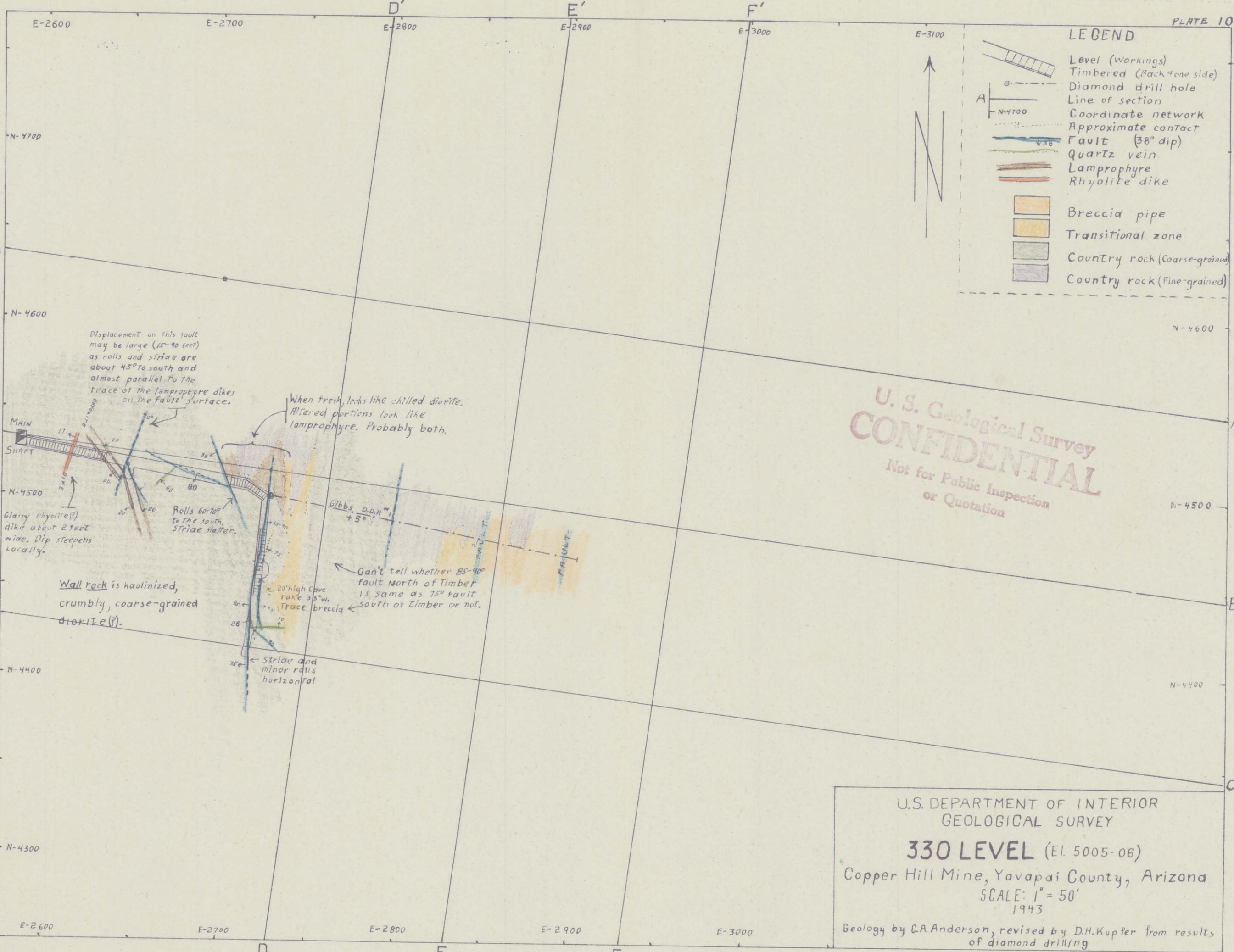
LEGEND

- Diamond drill hole
- A| Line of section
- Known fault
- - - Approximate fault
- - - Inferred fault
- Known quartz vein
- - - Approximate quartz vein
- - - Inferred quartz vein
- Known contact
- - - Approximate contact
- - - Inferred contact

Breccia pipe
 Transitional zone
 Country rock

U. S. Geological Survey
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U.S. DEPARTMENT OF INTERIOR
 GEOLOGICAL SURVEY
130 LEVEL (El. 5202-05)
 Copper Hill Mine, Yavapai County, Arizona
 SCALE: 1" = 50'
 1943
 Geology by C.A. Anderson, revised by D.H. Kupter from results
 of diamond drilling.



LEGEND

- Level (Workings)
- Timbered (Back 4 one side)
- Diamond drill hole
- Line of section
- Coordinate network
- Approximate contact
- Fault (38° dip)
- Quartz vein
- Lamprophyre
- Rhyolite dike
- Breccia pipe
- Transitional zone
- Country rock (Coarse-grained)
- Country rock (Fine-grained)

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Displacement on this fault may be large (15-90 feet) as rolls and striae are about 45° to south and almost parallel to the trace of the lamprophyre dikes on the fault surface.

When fresh, looks like chilled diorite. Altered portions look like lamprophyre. Probably both.

Gibbs D.D.H. + 5°

Can't tell whether 85-90° fault north of Timber is same as 75° fault south of Timber or not.

20' high Cove rake 35° W. Trace breccia

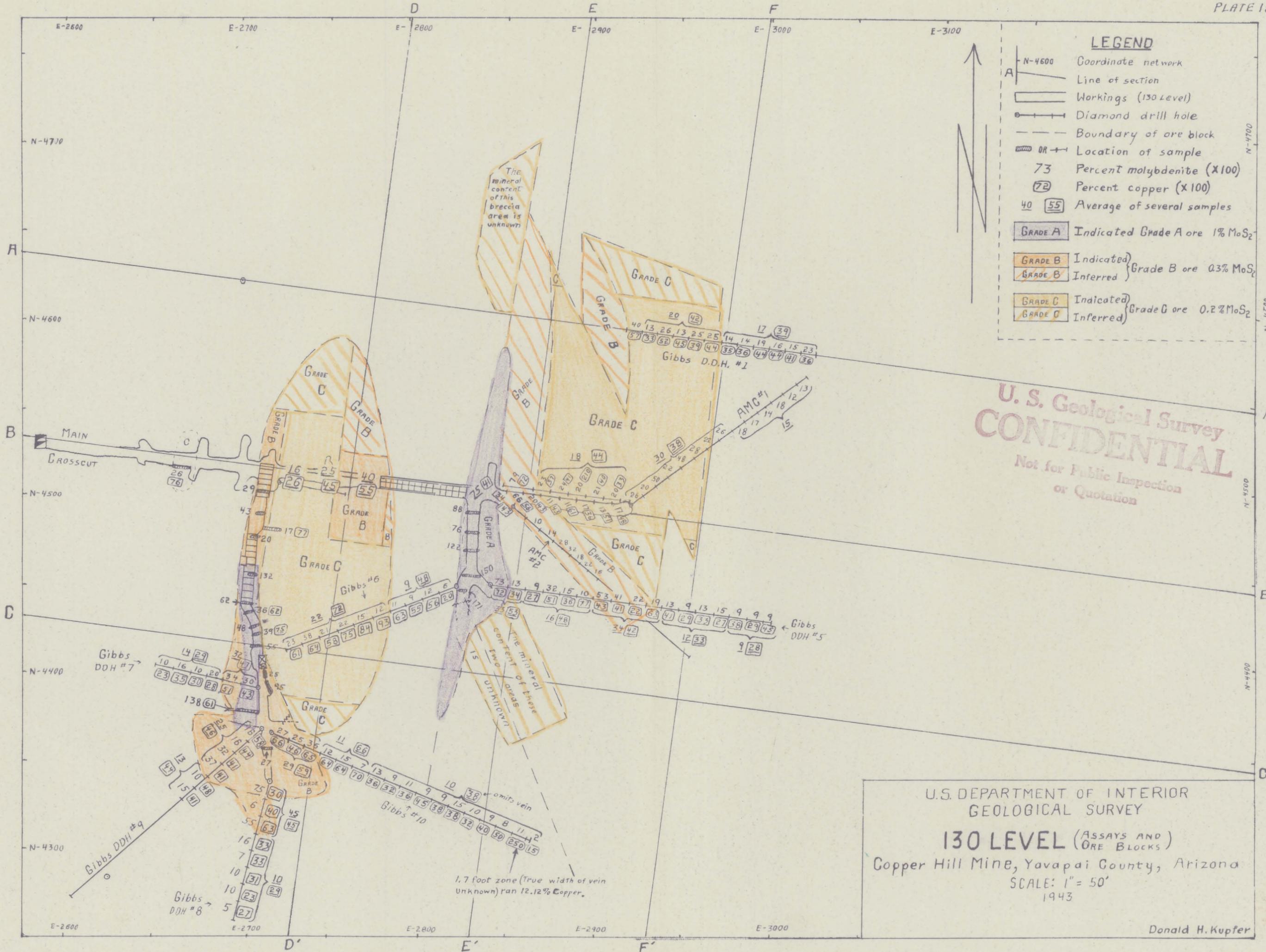
Striae and minor rolls horizontal

Rolls 60-70° to the south, striae shaller.

Wall rock is kaolinized, crumbly, coarse-grained diorite(?)

Glassy rhyolite(?) dike about 2 feet wide. Dip steepens locally.

U.S. DEPARTMENT OF INTERIOR
 GEOLOGICAL SURVEY
330 LEVEL (El. 5005-06)
 Copper Hill Mine, Yavapai County, Arizona
 SCALE: 1" = 50'
 1943
 Geology by G.A. Anderson, revised by D.H. Kupfer from results of diamond drilling



LEGEND

- N-4600 Coordinate network
- A Line of section
- Workings (130 Level)
- Diamond drill hole
- Boundary of ore block
- OR Location of sample
- 73 Percent molybdenite (X100)
- 72 Percent copper (X100)
- 40 55 Average of several samples
- GRADE A Indicated Grade A ore 1% MoS₂
- GRADE B Indicated } Grade B ore 0.3% MoS₂
- GRADE B Inferred }
- GRADE C Indicated } Grade C ore 0.2% MoS₂
- GRADE C Inferred }

U. S. Geological Survey
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U.S. DEPARTMENT OF INTERIOR
 GEOLOGICAL SURVEY
130 LEVEL (ASSAYS AND ORE BLOCKS)
 Copper Hill Mine, Yavapai County, Arizona
 SCALE: 1" = 50'
 1943

Donald H. Kupfer

The mineral content of this breccia area is unknown

The mineral content of these two areas is unknown

1.7 foot zone (True width of vein unknown) ran 12.12% Copper.

omits vein

MAIN CROSSCUT

Gibbs D.D.H. #1

AMC #1

AMC #2

Gibbs DDH #5

Gibbs DDH #7

Gibbs DDH #9

Gibbs DDH #8

Gibbs #10

GRADE C

GRADE B

GRADE C

GRADE C

GRADE B

GRADE C

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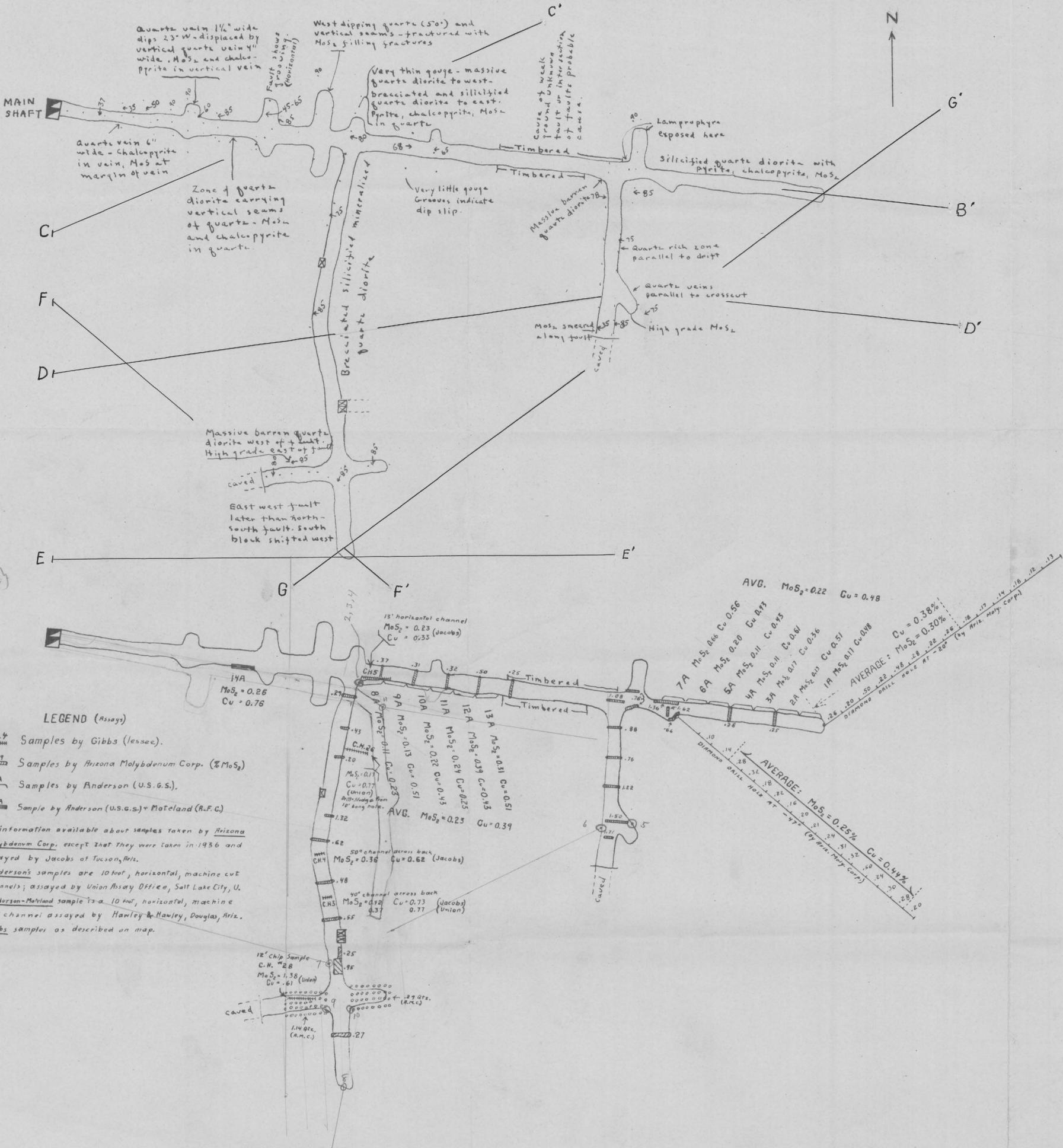
MACARDLE, DOROTHY

"THE UNINVITED"

FRANK LUKE JR.

FEB 2 - 1948 NH 31

Ohio Ferro-alloy Corp
Canton, Ohio



Send Hawley & Hawley
 Pulp to High
 1A-27A

Elev. collar
 5033

No 1	N51E	142'	from Main shaft	Elev 5329
	Note	S83E	-25° 486' LM	
No 2	S70E	+1°	38' LM	
3	S80E	+1°	27 1/2' AX ↓ below No 2	
4	S70E	+1°	25 1/2' BX ↓ below No 2	
5	S83E	+15°	165.6' AX	
6	N68W	+10 1/2°	101' AX	
7	-	+10°	60' AX	
8	-	+10°	83' AX	
9	S51W	+10°	60' BX, 86.6' AX	
10	S67E	+10°	40' BX, 122.7' AX	
11	S70E	+10°	200'	

(Hit shaft)

- LEGEND (Assays)**
- CH.4 Samples by Gibbs (lessee).
 - .27 Samples by Arizona Molybdenum Corp. (%MoS₂)
 - 2A Samples by Anderson (U.S.G.S.).
 - 14A Sample by Anderson (U.S.G.S.) + Mateland (R.F.C.)

- (1) No information available about samples taken by Arizona Molybdenum Corp. except that they were taken in 1936 and assayed by Jacobs at Tucson, Ariz.
- (2) Anderson's samples are 10 foot, horizontal, machine cut channels; assayed by Union Assay Office, Salt Lake City, U.
- (3) Anderson-Mateland sample is a 10 foot, horizontal, machine cut channel assayed by Hawley & Hawley, Douglas, Ariz.
- (4) Gibbs sampler as described on map.

- LEGEND (Geology)**
- 60 Fault with 60° dip
 - 30 Quartz vein with 30° dip
 Chalcopyrite, molybdenite

US GEOLOGICAL SURVEY
 LEVEL MAP
COPPER HILL MINE
 COPPER BASIN, ARIZ.
 130 LEVEL
 SCALE 1" = 30'
 MARCH-APRIL 1943

Brunton tape map supplied by Fred Gibbs
 Geology by C. A. Anderson
 D. H. Kupfer

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