File

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

REGION III

TPT 2/21/52

OFFICE OF
REGIONAL DIRECTOR

1012 FLOOD BUILDING
870 MARKET STREET
SAN FRANCISCO 2, CALIFORNIA

February 8, 1952

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: Assistant Regional Director, Region III

Subject: Docket DMEA-2101—Penn Chemical Company, Campo Seco, California (Amended Production Loan Application) Copper-Zinc

After studied consideration of the above subject amended production loan application and consultation with Mr. Francis Frederick, Consulting Engineer of the applicant, and Mr. Edgar Bailey of the United States Geological Survey, Member of Field Team, Region III, I would recommend favorable action by the Defense Minerals Production Administration on the amended application.

The data submitted in justification for loan by the applicant is compiled from reliable sources. The total amount requested is $91,740. Nearly 90 percent of the amount is for additional milling facilities while the balance is for rehabilitating the No. 2 mine to the 1,100-foot level.

The greater part of the estimated ore reserves is in the flooded section of the mine below the 500-foot level and cannot be checked by field examination. The reserves are, however, compiled from data that I believe to be sound. They are based on a detailed study of the well-known J. Kruttschnitt report made for the American Smelting and Refining Company in 1926, the engineers' reports and maps of the Eagle Shawmut Company during the last important production period, and from the reports of George Heyl, formerly of the USGS. Mr. Heyl's confidential portion of the report listing or showing ore sections still unmined should be in the Washington Office file of the USGS.

By consulting the assay maps of the old Kruttschnitt report in comparison with the Eagle Shawmut stope maps, it can safely be assumed that the estimated indicated ores above the 500-foot level

exist as reported in 1926. It is also established that the greater part of the 125,000 tons mined below the 500-foot level by the Eagle Shawmut Company came from a section of the mine not included in the Kruttschnitt estimate of 1926. The total positive and prospective ore reserves in the Kruttschnitt report in the No. 2 and No. 3 shaft area was 175,000 tons.

From a long-range viewpoint it is probable that if the Penn Mine is again put on a profitable and productive basis that an exploration program carried on along the lines recommended by the United States Geological Survey could develop ore reserves comparable in size and grade to the total past production of the mine. This is an aim well worth consideration in final decision relative to current loan application.

S. Ricker
Assistant Regional Director,
Region III

C. F. FISK
PRESIDENT

HAROLD HANSEN
GEN'L SUPERINTENDENT

TELEPHONE
IONE 47-F-3

PENN CHEMICAL COMPANY, ~~INCX~~

CAMPO SECO, CALIFORNIA

February 7, 1952

Mr. H. C. Miller, Regional Director
Defense Materials Procurement Agency
1012 Flood Building
San Francisco 2, California

Re: Docket DMA-2101
Penn Chemical Company
Campo Seco, California

Dear Mr. Miller:

At the conference held in your offices on January 30, between Mr. Frederick and Mr. Barklow, representing this Company, and Mr. Ricker and Mr. Bailey, it was pointed out to our representatives that a major portion of our proposed exploration project in the No. 2 Shaft area, DMA-1966, was considered to be development work rather than exploration, and therefore would not qualify for government funds on a matching basis under Mineral Order No. 5.

Accordingly, we wish to amend our production loan application, DMA-2101, to include an additional amount of $12,011.00, to provide funds on a direct loan basis for carrying out part of the work in the No. 2 Shaft area which was previously included in the exploration project application. This work will include completing the unwatering and shaft reconditioning from the 500 to 1100 level, and reconditioning the 1000 and 1100 levels.

At the same time we wish to amend our production loan application slightly by proposing an alternative repayment schedule, and we also wish to supplement the application with a summary of ore reserves which are currently available for mining, or will be made available for mining by the time the proposed mill expansion is completed.

Full details are set forth in the enclosures, four copies of which are provided, inasmuch as the original application was submitted in quadruplicate.

We will submit to you shortly, by separate correspondence, a request that our exploration project application, DMA-1966, be amended by substituting a substantial exploration project in the

No. 3 Shaft area, along the lines worked out at the conference, to replace the exploration project in the No. 2 Shaft area.

We appreciate very much the courtesies extended to us and the counsel given to us by yourself, Mr. Ricker, and Mr. Bailey. We hope that our production loan application, as revised, will merit your early and favorable action.

Very truly yours,

C. F. Fisk

C. F. FISK
Partner and General Manager

RWB:jm

Request of Penn Chemical Company, Campo Seco, California for Amendment of Production Loan Application, Docket No. DMA-2101
(Penn Mine, Copper-Zinc)

I. It is requested that the amount of the loan originally requested be increased from $77,729.00 to $91,740.00. The additional amount, $12,011.00, is needed to cover the following:

1. Unwatering No. 2 Shaft and reconditioning shaft from 500 level to 1100 level.

(a) Equipment Required:

1200' 40# rails @ .90	$ 1,080.00	
700' power cable @ 2.00	1,400.00	
700' transite pipe @ 1.25	875.00	
700' 4" air pipe @ 1.00	700.00	
700' 1" water pipe @ .30	210.00	
	$ 4,265.00	
(b) Labor for installation and repairs @ 2.00/ft.	1,400.00	
(c) Power for pumping out water to below 1100 level (2760 hours @ 1.00/hr.)	2,760.00	
TOTAL SHAFT RENOVATION:		$ 8,216.00

2. Preparation of 1000 and 1100 levels.

(a) Equipment required:

3000' #12 rails @ .24	720.00	
1500' 2" air line @ .50	750.00	
1500' 1" water line @ .30	450.00	
	1,920.00	
(b) Labor for installation, repairs and cleanup @ 1.25 per foot	1,875.00	
TOTAL LEVELS PREPARATION:		3,795.00
TOTAL ADDITIONAL LOAN REQUESTED:		$ 12,011.00

Ore blocks which will be made available for mining with the proceeds of the additional loan requested above are designated as Nos. 13 to 20, inclusive, on the ore reserve table and ore reserve map attached.

Other necessary work in the No. 2 Shaft area to prepare the above ore blocks for mining will be completed by the Company without government assistance.

It is anticipated that production of cement copper from the mine water will yield a net return of several thousand dollars. (Production of cement copper from the No. 3 Shaft in recent months while pumping from the 500 level down to the 700 level resulted in net smelter returns in excess of $7,000.00). Proceeds from cement copper produced while pumping out the No. 2 Shaft could, if necessary, be applied immediately toward repayment of the loan, but preferably should be used by the Company to expedite development work between the 800 and 500 levels, preparatory to mining the ore blocks in that area of the No. 2 Mine.

II. It is proposed that an alternative schedule for repayment of the loan, (Question No. 2 on Form MF-101), be considered, under which payments on the loan would be made by our Company at a rate of 5% of the net smelter returns on all copper and zinc concentrates produced in the mill, as expanded with the proceeds of the loan, for a period of six months from the date first returns are received from the expanded production, or until we have completed payment of the balance of the purchase price on the mine property to the present owner of the Penn Mine, whichever occurs first. Thereafter, payments on the loan shall be made at a rate of 15% of the net smelter returns from copper and zinc concentrates produced in the expanded mill.

The reason we are proposing this alternative payment schedule is this: The balance owed by our Company to the present mine owner, Penn Mining Company, of Denver, Colorado, as of this date is approximately $40,000.00. This balance is being paid off at a rate in excess of $2,500.00 per month. Inasmuch as such payments are made at a royalty rate of slightly less than 10%, this rate of payment will be increased to a figure in excess of $5,000.00 per month with the more than doubled production from the expanded mill. By the time this loan might be approved and the mill expansion completed, the balance owing to the present mine owner will probably be reduced to less than $30,000.00, a figure which would be amortized in six months under the expanded production. Therefore, this revised plan for repayment of the loan would fit in better with the financial requirements of the Company by allowing for 5% payments to the government during the period that the 10% purchase royalty payments are being completed, and then provide for the accelerated rate of 15% thereafter until the loan is completely repaid.

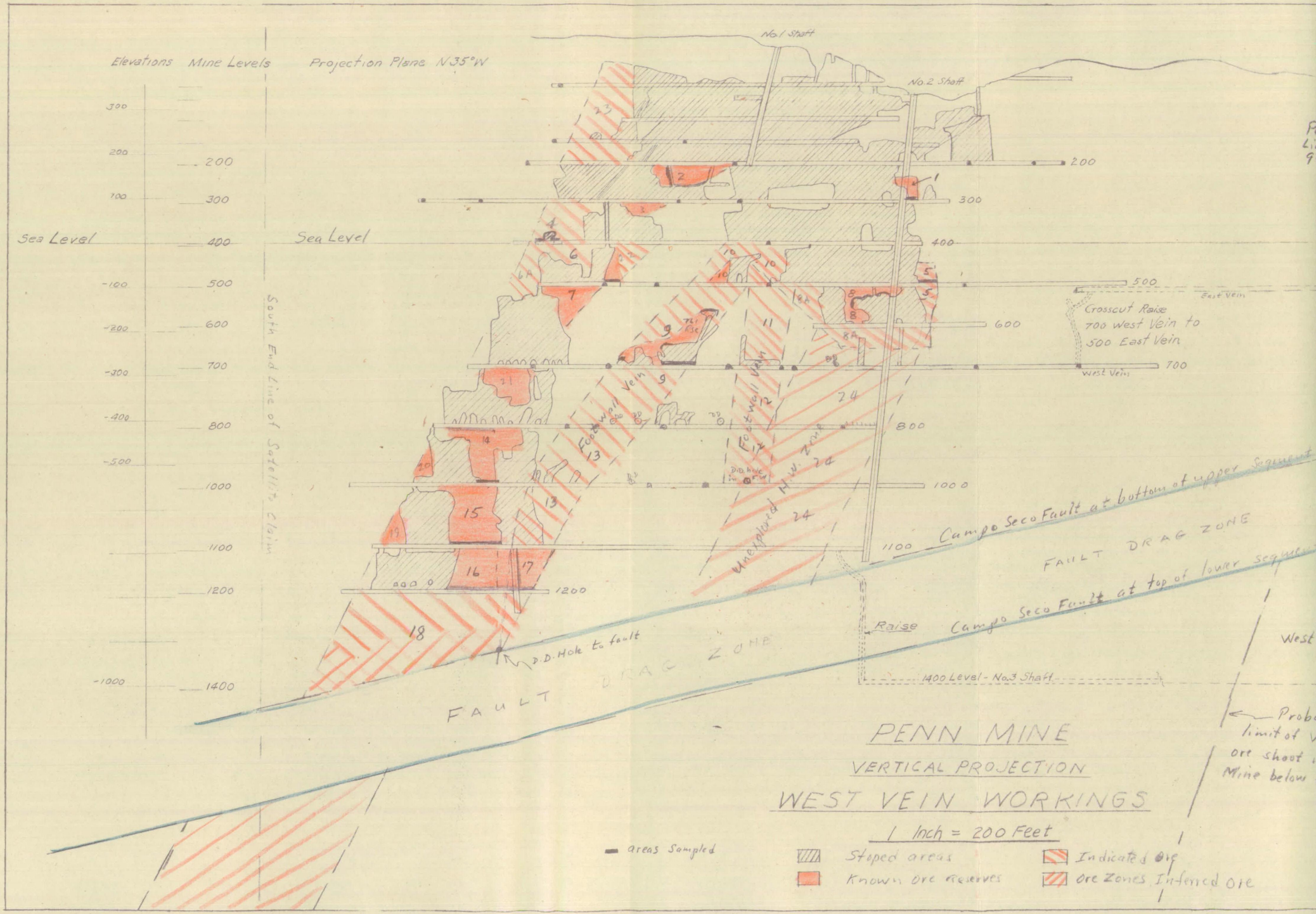
On the basis of present metal prices, which are 2¢ per pound higher in the case of zinc than at the time the loan application was originally submitted, it is anticipated that the revised repayment schedule proposed herein will result in repayment of the entire amount of the loan, including the additional amount requested under Item I, above, in less than eighteen months.

III. Ore reserves which are currently available for mining, or which will be available by the time the proposed mill expansion is completed, are set forth on the attached ore reserve table and ore reserve map, prepared by Francis H. Frederick, Consulting Mining Geologist.

Submitted this 7th day of February, 1952.

C. F. Fisk

C. F. FISK
Partner and General Manager


Elevations
Mine Levels
Projection Plane N35°W
Sea Level
300
200
100
-100
-200
-300
-400
-500
-1000
200
300
400
500
600
700
800
1000
1100
1200
1400
South End Line of Satellite Claim
No.1 Shaft
No.2 Shaft
Crosscut Raise
700 West Vein to
500 East Vein
East Vein
West Vein
Footwall Vein
Unexplored N.W. Zone
Campo Seco Fault at bottom of upper segment
Campo Seco Fault at top of lower segment
FAULT DRAG ZONE
Raise
1400 Level - No.3 Shaft
D.D. Hole to fault
Probable limit of West ore shoot in Mine below
PENN MINE
VERTICAL PROJECTION
WEST VEIN WORKINGS
1 Inch = 200 Feet
areas Sampled
Stoped areas
Known Ore Reserves
Indicated Ore
Ore Zones, Inferred Ore

PENN MINE ORE RESERVES

All levels of No. 2 Mine and No. 3 Mine above 700 Level

Map No. No. 2 Mine	(Assured or) MEASURED Tons	%Cu	%Zn	INDICATED Tons	%Cu	%Zn	INFERRED Tons	%Cu	%Zn
1	1,100	3.6	9.9	- - - -			- - - -		
2	10,000	3.5	4.0	- - - -			- - - -		
3	1,000	2.3	11.2	- - - -			- - - -		
4	- - - -			4,000	3.8	14.0	- - - -		
5	- - - -			3,000	2.9	7.6	- - - -		
6&6A	1,000	2.6	9.8	2,000	1.7	7.0	- - - -		
7	1,000	2.8	9.9	- - - -			- - - -		
8&8A	4,500	3.6	7.4	6,000	2.0	7.0	- - - -		
9	1,000	2.0	12.0	19,000	1.2	9.0	- - - -		
10	- - - -			5,000	0.8	6.0	- - - -		
11	- - - -			5,000	2.4	5.6	- - - -		
12	- - - -			12,000	3.2	2.1	- - - -		
*13	- - - -			20,000	0.9	9.0	- - - -		
*14	2,000	1.7	8.0	- - - -			- - - -		
*15	4,000	2.0	7.0	- - - -			- - - -		
*16	4,000	2.0	6.0	- - - -			- - - -		
*17	4,600	3.0	8.0	15,000	2.8	3.4	- - - -		
*18	- - - -			10,000	2.2	8.2	12,000	2.2	8.2
*19	1,200	1.8	8.1	- - - -			- - - -		
*20	900	1.9	11.0	- - - -			- - - -		
21	4,500	1.8	8.0	- - - -			- - - -		
22	4,000	1.0	6.0	12,000	1.0	6.0	- - - -		
23	- - - -			- - - -			30,000	2.3	7.0
24	- - - -			- - - -			100,000	2.5	7.5
Total - No. 2 Mine	44,800			113,000			142,000		
No. 3 Mine Above 700 Level									
25	10,000	1.0	8.0	10,000	0.8	5.0	- - - -		
26	- - - -			5,000	1.0	9.0	100,000	1.0	5.0
GRAND TOTAL	54,800			128,000			242,000		

NOTE: Gold content averages about .08 ounces per Ton, and Silver content averages about 3.0 ounces per Ton.

* Ore blocks 13 to 20, inclusive, will be available through the 1000 and 1100 levels.

Ore reserves data prepared by:
Francis H. Frederick
Consulting Mining Geologist

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

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FINAL REPORT

Idm-E529

DMEA-2885 (Copper), New Penn Mines, Inc.

Penn Mine

Calaveras County, California

John D. Warne, Mining Engineer
U. S. Bureau of Mines

Jacques F. Robertson, Geologist
U. S. Geological Survey

March 31, 1954

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Reviewed by
DMEA OPERATING COMMITTEE

_____
(date)

CONTENTS

	Page
Summary and Conclusions	1
Recommendations	2
Introduction	3
Description of work completed	4
Geology	6
Ore deposits	10
Diamond drilling exploration program	11
Ore reserves outlined by the DMEA drilling program	16
Expenditures	19
Efficiency of operations	23
Equipment purchased for the project	24
Other information	26

Appendix "A" - Plans and sections of diamond drill holes as determined by Tro-Pari Surveys.

Appendix "B" - Logs of diamond drill holes.

Appendix "C" - Samples analyzed by Bureau of Mines

ILLUSTRATIONS

Fig. 1. Location map - Penn Mine

Fig. 2. Plan showing diamond drill holes.

Fig. 3. Diagram showing ore reserves.

FINAL REPORT

Docket No.: DMEA-2885 (Copper)

Name and address of operator: New Penn Mines, Inc.,
70 Pine Street,
New York 5, N. Y.

Name and location of property: Penn Mine
Calaveras County, California

Contract No.: Idm-E529

SUMMARY AND CONCLUSIONS

Exploration for copper by diamond drilling at the Penn Mine located near Campo Seco, Calaveras County, Calif. (fig. 1), was begun June 15, 1953 and completed January 8, 1954.

Eleven diamond drill holes aggregating 6,589 feet were drilled from the 1100 and 1400 foot mine levels, and 2,679 feet of shaft, drifts, and crosscuts were reopened to afford underground drilling sites (figs. 2 and 3).

Three areas of the Penn Mine were explored for displaced ore shoots on the low angle, reverse Campo Seco fault. Five diamond drill holes from the 1400 level encountered mineralized sections in the northward extension of the altered quartz sericite schist of the West zone in the footwall of the Campo Seco fault. These mineralized ore intercepts average 4.5 feet in width and contain 52,400 tons of indicated and 58,900 tons of inferred ore reserves, with weighted average grades of 3.08 percent copper, 15.72 percent zinc, 3.73 ounces silver, and 0.035 ounces

of gold (figs. 2 and 3).

The total cost of the project, as reported monthly by the operator, was $94,199.30 of which the Government's participating share would be $47,099.65. These amounts may be slightly altered after final auditing and adjustments are made.

The total cost per foot of the diamond drilling exploration work accomplished was $14.30 per foot. The operator's rate of progress was satisfactory, but the cost of completing this project was excessive.

Materials and supplies which cost $4,776.76 were salvaged from the Penn mine upon termination of the project. The operator sold these items for $1,951.75, of which the Government's share would be $975.88.

RECOMMENDATIONS

Although further diamond drilling would probably result in finding additional ore shoots, no further exploration or development is warranted at this time. Costs of producing copper from this mine would be high.

A new ore body was outlined as a result of the exploration project, and it is recommended that a DMEA certificate of discovery be issued on the Penn Mine.

Production is perhaps economically feasible at the present price of copper, but the reserves indicated by diamond drilling were insufficient to induce the New Penn Mine, Inc. to perform further exploration, development, or mining work. The mine was closed upon failure of the exploration drilling project to locate several potential blocks of ore that would material-

ly increase the life of the mine.

INTRODUCTION

The Penn Mine is in secs. 3 and 4, T. 4 N., R. 10 E., and sec. 33, T. 5 N., R. 10 E., M.D.B.&M., Valley Springs quadrangle, Calaveras County, Calif.

The New Penn Mines, Inc. applied in winter of 1953 for Government assistance under DMEA to explore by diamond drilling several areas favorably outlined by Heyl[1/] and co-workers. After a report of investigation (R.I. 4224) by F. J. Wiebelt of the Bureau of Mines recommending approval, and with some modification of proposals by the DMEA Committee, the company's exploration program was approved. The program, which began June 15, 1953, involved unwatering and rehabilitation of the No. 3 shaft and workings to the 1400 level, followed by the underground diamond drilling. Actual diamond drilling began on August 12, and continued to January 9, 1954 when the drilling was terminated. The Government's contract with the New Penn Mines Co. is listed under Docket No. DMEA 2885, Idm-E529; the commodity is copper.

J. D. Warne of the Bureau of Mines inspected the progress of diamond drilling and by means of a Tropari compass surveyed drill holes, which he reported from time to time in the interim inspection reports. J. F. Robertson of the U.S. Geological Survey mapped critical underground workings, inspected drill cores, and advised on the locations of

1/ Heyl, G. R., Cox, M.W., and Eric, H.H., 1948, Penn Zinc-Copper Mine, Calaveras Co., Calif., in Jenkins, O.P., and others, Copper in Calif.: Calif. State Div. Mines, Bull. 144, pp. 61-84.

drill holes. The company engineer and superintendent, W. F. Criswell, lined up the drill holes, supervised the drilling operations and sampling, and logged the diamond drill cores. Assays of mineralized sections of the drill holes were done by Abbot A. Hanks of San Francisco, California and check assays were made by the Hydrometallurgical and Ore Dressing Branch of the Bureau of Mines in Reno, Nev.

DESCRIPTION OF WORK COMPLETED

The exploration project was begun on June 15, 1953 and completed January 8, 1954. A total of 6,589 feet of underground diamond drilling was done in connection with this program. Two holes aggregating 1,165.5 feet were drilled on the 1100 mine level; and nine holes drilled on the 1400 level had a total length of 5,423.5 feet. Actual drilling operations were performed during the period August 12, 1953 to January 8, 1954.

To perform the underground diamond drilling it was necessary to rehabilitate the No. 3 Penn Mine shaft from the surface to below the 1400 level, a distance of 1,486 feet; and to reopen 1,193 feet of drifts and crosscuts, and prepare drill stations on both the 1100 and 1400 mine levels. This work was performed from June 15 to August 26, 1953.

The various types of work done are described separately in this report.

Diamond drilling:

The eleven underground diamond drill holes, aggregating 6,589 feet are shown in plan in fig. 2.

The drilling work was performed under an independent contract by the Continental Drilling Co., 523 West Sixth Street, Los Angeles 14, Calif. Most of the drilling was accomplished with two drills, operating two shifts each per day, during the period August 12, 1953 to January 8, 1954. All drilling was of BX size (1-5/8 inch core size) with the exception of a few feet of NX size (2-1/8 inch core size) at the collar of each hole, and the last 68.5 feet of hole No. 2, and the final 538.5 feet of hole No. 10, which were drilled AX size (1-3/16 inch core size).

Logs of each drill hole are included in Appendix B of this report; pertinent data regarding the diamond drilling work is given in Table I.

Rehabilitation work:

The No. 3 shaft of the Penn Mine required repairs from the surface to below the 1400 level according to the operator, and unwatering was required from the 1100 level to the bottom of the sump below the 1400 level, a distance of 336 feet. A total of 1,303 feet of drifts and crosscuts were reopened or cleaned up on the 1100 and the 1400 mine levels to permit drilling from four underground sites. This work was performed as separate work items outlined in the exploration project contract by project employees working on an hourly wage plus an incentive bonus. The descriptions, dates, and amounts of this work were as follows:

TABLE I - Diamond Drill Hole Data

Hole No.	Date Begun	Date Completed	Mine Level	Coordinates North	Coordinates East	Initial Bear.	Aver. Bear. 1/	Initial Incli.	Aver. Incl. 1/	Total Length Feet 6/	% Core Recovery
10	8/12/53	9/9/53	1100	3740	3260	N 80.5 W	N83W	Horiz.	-12.5°	548.5	82.0
10A	9/14/53	9/30/53	1100	3740	3260	N 61 W	N66.5W	+5°	- 4°	617.0	88.0
6A	8/29/53 12/17/53 2/	9/19/53 1/8/54 2/	1400	4514	3634	S 87.5 W	S86.5W	Horiz.	- 9°	971.0	91.0
6B	9/21/53	10/7/53	1400	4514	3634	N 69 W.	N 74 W	Horiz.	- 5.8°	540.0	82.9
6C	10/8/53	11/3/53	1400	4520	3632	N 49 W	N 52 W	+ 1°	- 2.2°	590.0	70.6
6D	11/20/53	12/9/53	1400	4515	3650	N 69 W	N 77 W	+25.5°	+14°	479.0	87.7
6E	11/4/53	11/19/53	1400	4525	3655	N 49 W 3/	-	-45°	-43° 4/	371.0	77.1
6F	12/10/53	1/5/54	1400	4514	3664	-	-	Vert.	-84.5° 5/	492.0	86.3
11	10/1/53	10/15/53	1400	4225	3460	N 63E 3/	-	+30°	-	566.0	88.2
12	10/16/53	11/3/53	1400	4225	3460	N 37 E	N40.5E	+28°	+21.2°	624.0	86.2
2	11/4/53	12/17/53	1400	3700	3240	N 69 E	N69.5E	-31°	-18°	790.5	88.8

1/ Determined from Tro-Pari Survey - see Appendix "A"
2/ Hole extended to explore for "West" zone.
3/ Only hydrofluoric acid dip survey made - no bearings determined along hole.
4/ Final dip taken at 390-foot depth.
5/ Only hydrofluoric acid dip survey made - no bearings determined along hole.
6/ 6,589.0 feet - total drilled in 11 holes during project.

Table II - Rehabilitation work performed

Work item	Description of work	Date Begun	Date Completed	Footage
a	Rehabilitate 1100 level crosscut and prepare drill station	6/15/53	7/3/53	153
b	Unwater and rehabilitate No. 3 Shaft from 1100 to 1400 levels	7/9/53	8/8/53	336
c	Rehabilitate 1400 level drifts and crosscuts, and prepare drill stations	8/10/53	8/26/53	1,040
-	Repair shaft from surface to 1100 level	6/15/53	7/8/53	1,150
	Total footage rehabilitated			2,679

GEOLOGY

Introduction

Copper-zinc ore shoots in the No. 3 shaft area of the Penn Mine occur in two horizons, referred to as the "East" and "West" zones. The host rocks are siliceous sericite schist in the East zone and quartz sericite schist (called quartz porphyry at the mine) in the West zone. These rocks occur as layers interbedded in a chloritic greenstone country rock. Along with the general attitude of bedding and schistosity in the mine area, they strike N. 20°-30° W. and dip 60°-70° NE. The ore-bearing horizons are cut off below the 700 and 1000 levels by the Campo Seco reverse fault,

which strikes parallel to bedding, dips 25°-30° NE., and appears to have dip slip movement of about 800 feet. The footwall segment of the faulted West zone quartz porphyry is found on the 1200 and 1400 levels, and presumably the deeper Hinkley ore zone to east is the footwall segment of the East zone.

Lithology

The predominant country rock in the area of the Penn Mine is chloritic greenstone derived from andesitic flow rocks and pyroclastics. It is mostly massive and bedded, but portions of it are schistose. Some layers are lighter in color and siliceous, suggesting a more dacitic composition. The ore shoots in the No. 3 shaft area occur in two sericitic schist layers that are interbedded in the chloritic greenstone and are probably derived from rhyolitic rocks. The volcanic sequence to which these rocks belong has been tentatively correlated with the Amador group of Upper and possibly Middle Jurassic age[2].

The sericitic host rocks are readily distinguished from each other. The more westerly band or "West zone" quartz sericite schist is referred to as the "quartz porphyry" in allusion to its content of more or less abundant quartz phenocrysts, which range up to 6 mm. in diameter. Rock-forming minerals other than quartz, sericite, and calcite are not megascopically evident, although there may be some feldspars and mafics present. The easterly band or "East zone" siliceous sericite schist is

2/ Heyl, G. R., op. cit., p.66.

marked by the general lack of quartz phenocrysts and apparent higher content of sericite. Both sericitic schist bands are liberally impregnated with pyrite.

On the 500 level where both layers of sericitic schist are well exposed, the West zone "quartz porphyry" has a width that ranges from 80 to 140 feet and is exposed for a strike length of over 900 feet. The East zone sericitic schist has a width in excess of 100 feet and extends for 1400 feet along strike in the workings. The East zone is separated from the West zone by a thickness of roughly 320 feet (360 feet in the horizontal plane) of intervening greenstone.

A layer of bedded, gray, cherty hornfels 35 feet thick lies immediately adjacent to and on the west side of the East zone schist on the 500 level. Extensions of the hornfels as a unit could not be found on the levels above or below, but are probably represented by thin layers of siliceous rock interbedded sporadically in the greenstone.

Structure

Both bedding and schistosity in the No. 3 shaft area of the Penn Mine strike N. 20°-30° W. and dip 60°-70° NE. According to Meyi's observations of graded bedding in the mine area, tops of beds are to west, and therefore the beds are overturned. Folds are minor, chiefly local features of drag along faults or shear zones.

Schistosity is not everywhere developed, but occurs in zones of various thicknesses in the greenstone and in the sericitic schists, separ-

ated by layers of massive, and in places siliceous, greenstone. Although of variable intensity, schistosity is found throughout the sericitic rocks of the East and West zones.

Schistosity is well developed in the East zone schist, as commonly displayed underground by large planar surfaces of sericite, and by the tendency of the schist to slab off of the walls. In contrast, foliation is relatively weak but lineation is strong in the West zone quartz porphyry schist. The lineation is accounted for by the quartz phenocrysts that tended to roll during shear deformation, and impeded the development of large planes of foliation.

Most of the faults and shears strike in a northerly direction, close to the NW. strike of beds. A few cross faults exist, but they do not seem to have much displacement. At least one cross fault, observed in the 500 level East zone and having an attitude of N. 75° E. 75° N., seems to have served as a pre-mineral barrier impeding the spread of mineralizing solutions southward from the main ore shoot.

The most significant fault in the mine is the low angle, reverse, Campo Seco fault. It is a strike fault, trending N. 15°-30° W. and dipping 25°-30° E. The movements appear to have been post-mineral and mainly dip slip, on the order of 800 feet as indicated by the displacement of the East and West zones below the 700 and 1000 levels. The Campo Seco fault is discussed more thoroughly in this report in the section entitled "Structural implications of the Campo Seco fault." Numerous

vertical and westerly dipping, high angle, normal faults have been observed in the mine workings, but their effect on the structure in the mine is negligible.

ORE DEPOSITS

The ore occurs in bedded replacement deposits and partly replaced shear zones and consists of copper and zinc sulfides, carrying a little gold and silver, in the sericitic schists of the East and West zones. Pyrite occurs widely in the mine, but is more concentrated in the sericite schists, especially with chalcopyrite, bornite and sphalerite. The ore is characteristically fine-grained, and is commonly thinly banded from differential replacement of the host rock along bedding and shear planes. Ore shoots are lenticular and range from less than a foot to 30 feet wide, a few feet to as much as 400 feet in pitch length, and up to 300 feet along the strike.

The East and West zone ore bodies in the hanging wall of the Campo Seco fault above the 1200 level have been considerably explored and developed. Some stopes still contain remnants of ore, but not enough to sustain operations for a long period of time. Shoots rich in zinc sulfide but low in copper are considered uneconomic at the present price of zinc. According to the company geologist, R. F. Playter, the West zone ore, in general, contains a zinc to copper ratio of 5 to 1, whereas the ratio in the East zone is more nearly 1 to 1.

The so-called "Hinkley" ore zone in the lower workings below the 1400 level is believed to have characteristics similar to the East and West zones, and may actually be the faulted segment of the East zone in the footwall of the Campo Seco fault. Its ore shoot is small, with a developed reserve of perhaps 35,000 tons, as expressed by the company geologist.

DIAMOND DRILLING EXPLORATION PROGRAM

Objectives

For the diamond drilling exploration program at the Penn Mine shaft No. 3, three objectives were outlined by the New Penn Mines Co., based on the interpretations published by Hoyl. They were:

1. Explore for the faulted segment of the West zone ore shoots in the footwall of the low angle, reverse Campo Seco fault, west of the shaft.
2. Explore for the upward extension of the Hinkley ore body in the hanging wall of the Campo Seco fault, east of the mine workings.
3. Explore for ore shoots along the downward and lateral extensions of the sericitic schist zone on the 1400 level. This zone was thought to be the East zone sericite schist.

To accomplish the first objective diamond drill holes 10, 10A and 6A were drilled. Holes 10 and 10A from the 1100 level contained a series of greenstone layers, but encountered no sericitic schists nor

mineralized rock. Hole 6A was drilled from the 1400 level to check the ground below and farther north from hole 10A. It encountered only greenstone. From 280 to 291, however, sheared, brecciated, and altered greenstone was mineralized, but the quartz sericite schist that was expected along the extension of the 1400 level schist zone was missing. As far as the first objective was concerned the results were negative.

The second objective was explored by drill holes 11 and 12. Both holes penetrated only greenstone; no significant mineralized rock was encountered. The Campo Seco fault zone is believed to have been penetrated at around 115 feet in diamond drill hole 11 and between 55 and 59 feet in diamond drill hole 12.

The third objective was tested by drill holes 6A through 6F and by drill hole No. 2. Hole No. 2 explored the downward continuation below the 1400 level of the quartz sericite schist, which was encountered in the interval 670 to 781.5 feet, but only traces of zinc and copper were found. Holes 6A through 6F explored the northward extension of the quartz porphyry schist for possible ore shoots. 6A and 6D encountered copper and zinc sulfides in altered and sheared greenstone but contained no quartz porphyry. Holes 6B, 6C, 6E, and 6F contained quartz sericite schist (quartz porphyry) of the West zone in the footwall of the Campo Seco fault and, except for 6F, contained intervals of mineralized rock of ore grade. All together holes 6A through 6E outline a probable ore shoot (see fig. 2) in quartz porphyry that strikes N. 30° W. and dips

55° NE. This agrees well with the general structure in the mine.

Although holes 6A and 6D did not pass through the quartz porphyry, their mineralized sections are in logical extensions of the sulfide zone. The mineralized section in 6A occurs in a probable pre-mineral strike-slip fault that displaces the quartz porphyry. Mineralizing solutions travelled southward from the quartz porphyry and deposited sulfides for some distance along this fault, but drill hole 6A penetrated the mineralized section near the southern limit of the ore shoot. The mineralized section in 6D is at the intersection of the quartz porphyry zone and the Campo Seco fault, and probably is near the upper limit of the ore shoot.

The vertical diamond drill hole 6F penetrated the quartz porphyry, but none of it was significantly mineralized. Apparently the hole was drilled south of the sulfide ore shoot. Greater width of ore in holes 6C and 6E indicate that the ore shoot extends mainly north of and below these holes.

Structural implications of the Campo Seco fault

Displacement on the Campo Seco fault has been the subject of considerable speculation, and the main issue upon which the DMEA diamond drilling exploration program was proposed. Heyl, who did not have access to the workings in the footwall side of the Campo Seco fault below the 1000 level, suggested[3/] that the fault had essentially dip slip movement amounting to only 30 to 90 feet, so that the East and West zones

3/ Heyl, G. R., op. cit., p. 77.

continued downward below the fault with little offset. This theory opened up possibilities for unexplored ore shoots west of the shaft on the 1000 level and below, and on the hanging wall side of the Campo Seco fault on the upward extension of the Hinkley ore shoot east of the workings.

Heyl's interpretation of the Campo Seco fault displacement opposed an earlier view expressed by Teiman[4], who suggested that (1) the reverse dip slip movement is on the order of 1000 feet, (2) the Hinkley ore zone is the faulted footwall segment of the East zone sericitic schist, and (3) the sericitic schist layer on the 1400 level is the faulted footwall segment of the West zone.

For the most part the Campo Seco fault has been inferred in the past from its displacement of the East and West ore zones below the 700 and 1000 levels. There are few places in the mine where it can be observed. Heyl observed it in the shaft between the 1000 and 1100 levels where it is marked by 1 to 2 feet of breccia. The spot is now lagged over because of heavy ground in that vicinity. Fault segments that agree with the downward projection of the Campo Seco fault were mapped in the cross-cuts on the 1100 and 1200 levels. A conspicuous set of closely spaced shears on the 1400 level, dipping 25° to 40° E., undoubtedly constitute the Campo Seco fault zone.

A company geologist, Harcourt, in 1949 suggested that the Campo Seco fault was exposed in some workings in the western end of the 700

4/ Teiman, C. F., 1935, The foothill copper belt of California: XVI Internat. Geol. Cong., Copper Resources of the World, vol. 1, pp. 247-250.

level, but the evidence does not support this idea. It probably does exist somewhere close to west of the 700 level workings, however, as shown by its projection from the lower workings.

Diamond drilling and extension of underground mapping under the DMEA program has now resolved the issue of displacement of the East and West ore zones by the Campo Seco fault in favor of the views of Tolman. Study of the sericitic schist host rock on the 1200 and 1400 levels has established that it actually is quartz sericite schist (quartz porphyry) and therefore belongs to the West zone quartz porphyry and not to the East zone schist as postulated by Heyl. This idea was substantiated when diamond drill holes 10, 10A, and 6A encountered no quartz sericite schist west of the shaft on the downward projection of the 700 level West zone. Two other drill holes that were drilled earlier by the Shawmut Company from the 900 and 1100 levels to the west similarly encountered greenstone, but not sericitic schist.

As was expected from these findings, holes 11 and 12 drilled eastward from the 1400 level did not encounter the upward projection of the Hinkley ore zone on the hanging wall side of the Campo Seco fault. It is concluded, therefore, that the Hinkley ore zone is the faulted footwall segment of the East zone schist, rather than a third ore shoot east of the East ore zone.

From all indications dip slip along the Campo Seco fault zone is approximately 800 feet. Movement was reverse and may have been dis-

tributed in several closely spaced shears.

ORE RESERVES OUTLINED BY THE DMEA DRILLING PROGRAM

Diamond drill holes 6A through 6E, drilled from the 1400 level, encountered mineralized sections containing copper and zinc sulfides. On the map and cross section are shown the weighted assays of drill hole intercepts considered to be of possible ore grade. These figures were calculated from core assays made by Abbot A. Hanks of San Francisco for the New Penn Mines Co. Splits of the same core sections were assayed by the Hydrometallurgical and Ore Dressing Branch of the Bureau of Mines and results are in close agreement. Following is a tabulation of Abbot Hanks assay results: (See page 17)

Sludge assays were not combined with the core assays, as the results are erratic and no data was obtained concerning sludge weights or percent recovery. In spite of the company superintendent's efforts, care was not always taken by the drillers to catch the sludges and no standards of sample taking were maintained. In addition, the altered sericitic schist in the drill cores is friable and tends to break down and wash out, so that dilution or salting of the samples was unavoidable. Some correspondence of values can be seen in the assay results in a general way. In fact, the sludge sample assays from hole 6E compares favorably with the corresponding core assays.

ASSAY DATA FROM DRILL DIAMOND DRILL HOLES

Interval of Core		Length of core	CORE ASSAYS oz. AU.	oz. AU.	% CU.	% ZN.	Percent CORE RECOVERY	SLUDGE ASSAYS oz. AU.	oz. AU.	% CU.	% ZN.
Hole 6-A	280-284*	4.0	0.020	2.10	2.33	12.10	73%				
280-284		4.0	0.02	2.1	2.33	12.1	73%				
284-284.5		0.5	0.01	0.4	0.20	0.9	100%	No reliable samples obtained.			
Hole 6-B	306-310.5*	4.5	0.023	3.53	2.09	16.45	81.4%	0.027	2.0	1.06	7.58
306-307.5		1.5	0.02	2.6	1.36	11.9	44.0%	0.02	1.3	0.65	5.40
307.5-309		1.5	0.03	3.7	2.18	17.4	100.0%	0.03	2.5	1.11	7.80
309-310.5		1.5	0.02	4.3	2.73	20.0	100.0%	0.03	2.2	1.41	9.5
Hole 6-C	530-536*	6.0	0.028	4.3	2.58	12.1	36.0%	0.01	1.1	0.60	3.55
530-535		5.0	0.03	4.8	2.72	13.8	22.0%	0.01	1.1	0.58	3.70
535-536		1.0	0.02	1.7	1.91	3.6	108.0%	0.01	1.2	0.70	2.80
536-537		1.0	0.01	0.9	0.65	1.6	125.0%	0.01	1.1	0.70	2.40
537-538.5		1.5	0.03	1.4	0.90	2.8	67.0%	0.01	1.2	0.70	2.70
538.5-540		1.5	0.02	0.4	0.70	4.3	111.0%	0.01	0.2	0.96	4.40
540-541		1.0	——	0.2	0.25	0.6	50.0%	0.01	0.8	0.63	2.60
541-542		1.0	0.03	0.5	1.15	3.9	67.0%	0.01	0.8	0.65	2.90
542-543		1.0	0.03	0.5	0.70	1.6	83.0%	0.01	0.6	0.70	3.00
543-544		1.0	0.03	0.3	0.30	0.8	92.0%				
544-545.5		1.5	0.04	0.4	1.45	2.5	122.0%				
545.5-548		2.5	0.03	0.5	1.15	3.1	83%	Hole caving			
Hole 6-E	304-315*	11.0	0.04	4.12	4.09	14.40	94.2%	0.14	4.06	4.20	12.75
303-304		1.0	0.01	0.5	1.02	1.9	50.0%	0.01	0.06	0.81	1.20
304-305		1.0	0.08	2.10	4.88	8.7	50.0%	0.03	3.80	3.31	9.40
305-306		1.0	0.02	1.20	1.22	5.0	108.0%	0.03	2.10	2.55	5.30
306-306.5		0.5	0.04	2.00	2.04	6.7	100.0%	Combined with 306.5-309			
306.5-309		2.5	0.03	6.10	4.18	16.1	97.0%	0.36	4.80	4.84	18.20
309-310		1.0	0.03	4.90	5.20	24.6	100.0%	0.07	4.30	2.90	11.10
310-312		2.0	0.03	5.30	5.66	23.4		Combined with 312-315			
312-315		3.0	0.05	3.50	3.62	9.9	97.0%	0.07	4.00	4.48	12.00
315-321		6.0	0.02	0.80	1.27	0.8	89.0%	0.07	3.40	2.80	5.30
Hole 6-D	466-468.7*	2.7	0.067	4.33	2.19	30.3					
458-463		5.0					18.0%	Tr.	0.20		
463-467	(1st. 21")	1.75	Tr.	0.10							
	(last 12")	1.08	0.08	5.40	2.44	28.4	69.0%	0.05	1.7	1.22	6.80
467-468.7		1.70	0.06	3.70	2.04	31.4					
468.7-469		0.3					108.0%	0.04	1.1	0.71	3.40
469-471		2.0					50%	0.03	0.7	0.45	2.70
471-472		1.0	0.01	0.10	0.15	0.1	100.0%	0.01	0.5	0.30	1.40
468.7-471		2.3	0.03	0.60	0.66	4.4					

* Ore section - weighted averages

Assays by Abbot A. Hanks, San Francisco

The ore sheet contains the following weighted average grade of metal: 3.08 percent copper, 15.72 percent zinc, 3.73 ounces silver, and 0.038 ounces gold. These values were obtained by multiplying the individual weighted averages for the ore sections in each hole, shown in the table of assay data, by the corrected width for each ore section, combining the results, and dividing by the sum of the widths. The average width of the ore sheet is 4.5 feet. For calculating reserve tonnages, it was assumed that there are 10 cubic feet of ore per ton.

In the diagram, fig. 3, a block of indicated ore of the above grade is outlined, containing 92,400 tons. The size of the block is based on the assumption that the same ore occurs between the drill holes, and extends for a radius of 50 feet outward from drill holes 6C, 6D, and 6E in the plane of the ore sheet, but is limited by the Campo Seco fault at the upper end and other geologic factors mentioned previously at the southeast end.

Inferred ore reserves amount to 38,900 tons within the outlines drawn in the diagram, assuming that the grade of ore and the thickness of the ore sheet does not change materially for a distance of 100 feet down dip below hole 6E and 100 feet northwest along the strike from hole 6C. Possibly, fault structures complicate the picture of inferred ore, but from the characteristic of the quartz porphyry host rock to continue unbroken by faults for considerable strike distances in the mine, the extrapolation is a reasonable one.

More ore may exist within the block outlined if the ore sheet is lenticular, but the thickness is practically limited by the thickness of the quartz porphyry schist, about 20 feet. The continuation of the ore body to north and at depth is purely a matter of speculation, although judging by the size of other ore sheets in the mine, the size of the block of inferred ore is generous. Further exploration of the West zone, however, in the footwall of the Campo Seco fault at lower levels and to north of the DMEA diamond drill holes probably would result in finding other ore sheets of comparable size and grade.

EXPENDITURES

Total approved:

The original exploration project contract, dated May 25, 1953, approved a total expenditure not to exceed $169,122.00, to which the Government would contribute 50 percent or $84,561.00. Six amendments were later made to the original contract which provided for changes in the diamond drilling program and for an incentive bonus to the rehabilitation crew. However, the total amount of the contract was not altered.

Total cost of the project:

The total cost of the project as reported by the New Penn Mines, Inc. was $94,199.30. This cost was derived after deducting receipts for salvageable property amounting to $1,951.75 upon the termination of project work. A recapitulation of costs taken from the operator's

monthly reports are the basis for the above costs, however, this amount would be subject to deductions or amendments following the final auditing of the contract. Recapitulation of the operator's monthly reports is shown in Table III.

A summary of costs for the separate items of work as reported by the operator and unit costs are contained in Table IV.

Government's share of exploration costs

The Government's share of the actual cost of this exploration project (as reported by the New Penn Mines, Inc.) would be $47,099.65 - computed as follows:

50% of $94,199.30 = $47,099.65

The approved share of the exploration cost, borne by the Government is not known at this time, and the above cost may be slightly changed after final auditing and adjustments are made.

The unexpended portion of the approved Government's share of expenditures in connection with this project is $37,461.00 computed as follows:

Total approved (estimated) cost of project	= $169,122.00
Government's participation @ 50% (estimated)	= 84,561.00
Less Gov'ts share of actual expenditures	= 47,099.65
Government's share, unexpended	$ 37,461.35

Only 6,589 feet of diamond drilling, or 68.3 percent of the planned diamond drilling exploration work was completed; and 55.7 percent of the authorized (or estimated) expenditures were made.

TABLE III - Recapitulation of Operator's Monthly Cost Reports

Period	Independent Contracts 1/	Labor & Supervision 2/	Opr. Mat'ls & Supplies 3/	Operating Equipment 4/	Miscellaneous 5/	Contingencies 6/	Monthly Total
6/15 - 7/31/53		$ 7,137.39	$ 6,307.68	$ 588.10	$1,922.97	$125.82	$16,081.96
8/1 - 8/31/53	$ 3,437.87	8,921.05	4,336.83	882.15	1,858.07		19,435.97
9/1-30/53	6,056.86	2,581.22	1,135.54	588.10	906.52		11,268.24
10/1-31/53	10,870.73	2,696.51	932.95	588.10	1,108.72		16,197.01
11/1-30/53	8,078.50	2,511.72	1,058.91	588.10	1,210.96		13,448.19
12/1-31/53	8,671.29	2,454.96	1,059.64	588.10	884.99		13,658.98
1/1-20/54	2,279.58	1,921.60	841.06	274.44	744.02		6,060.70
	Salvage value of property upon termination of project						(1,951.75) 7/
Totals	$39,394.83	$28,224.45	$15,672.61	$4,097.09	$8,636.25	$125.82	$96,151.05

Total cost of exploration project as reported by operator $94,199.30

1/ Diamond drilling contract - Continental Drilling Company, Los Angeles, California.
2/ Includes $4,500.00 charged to supervision by W. F. Criswell, Superintendent.
3/ Includes charges for timber, explosives, pipe, track, power, and miscellaneous supplies; total power charges $6,274.75. Salvage value of property sold upon termination of project $1,951.75.
4/ Depreciation charged on equipment furnished by the operator.
5/ Includes repairs to equipment, sampling and analysis, payroll taxes, insurance, workmens compensation, accounting, and other.
6/ Charges for hydrofluoric acid and bottles for drill hole surveys.
7/ Credit derived from sale of salvageable equipment after termination of project - not yet reported by operator.

TABLE IV - Summary of Total Project Costs

Type of Work	Item 1/	Units 2/ (Feet)	Cost per Foot 3/	Total Cost
Rehabilitation:				
Crosscut, 1100 level	a	153	$13.73	$ 2,101.01
Shaft No. 3, 1100 - 1400 levels	b	336	47.38	15,920.98
Drifts and crosscuts, 1400 level	c	1,040	10.25	10,655.52
Shaft No. 3, Surface, 1100 level	-	1,150	4.25	4,884.93
Diamond Drilling:				
Continental Drilling Co.	e	6,589	5.98	39,394.83 4/
Other	-	6,589	3.52	23,193.78 5/
Total				$96,151.05
Less salvage price of property				1,951.75 6/
Total cost of project				$94,199.30 7/
Cost per foot of daimond drilling				$ 14.30 8/

1/ Work items authorized by exploration project contract.
2/ Units of work accomplished, as claimed by operator.
3/ Cost per foot as distributed by operator.
4/ Independent contractor's charges - before final audit and adjustments.
5/ Includes costs for labor, supervision, operating materials and supplies, operating equipment, miscellaneous, and other - as submitted by operator.
6/ Salvage value received for jointly owned property - tentative.
7/ Total cost of project as reported by operator, subject to final audit and adjustments.
8/ Cost per foot of diamond drilling exploration accomplished during project.

Production during operations

The operator's final report lists a production amounting to $2,647.94 during the exploration project; and the Government's royalty or repayment at 5% as $132.40. This production is believed to have been derived from the recovery of copper from mine water extracted from the Penn Mine during the exploration program, however, the operator did not furnish details as to the source of his production.

If a certificate of discovery is issued as a result of this project, the $132.40 repayment to the Government toward the exploration loan would be requisite.

EFFICIENCY OF OPERATIONS

The overall cost of performing the 6,589 feet of diamond drilling exploration work was $14.30 per foot; this is considered high. The cost per foot for the contract diamond drilling was $5.98; supervision, labor, supplies, equipment and other expenses directly applicable to drilling were $3.52 per foot; and rehabilitation work required to accomplish the underground exploration amounted to $4.80 per foot of drilling.

Costs for performing the 2,629 feet of rehabilitation work averaged $12.53 per foot. This work entailed essentially clean-up of old workings and installation of air, water, ventilation and electrical facilities; only a small amount of mucking and retimbering work was required. A distribution of the costs of the project are contained in Table III, and unit costs of the rehabilitation work are shown in Table IV.

The operator's rate of progress in completing the rehabilitation and drilling work is considered satisfactory. But high costs for supervision and labor are reflected in the excessive costs for performing the exploration project. Some unnecessary expenses were observed in extra labor and the purchasing of materials and supplies, and in charges for equipment and transportation by the drilling contractor.

Sampling procedure and supervision of the drilling operations were considered poor. The operator's representative at the project (Mr. Wilbur F. Criswell, Superintendent) did not cooperate fully with DMEA inspecting engineers in supplying cost data and other information pertinent to the exploration program.

The cost of completing this exploration project is considered excessive.

EQUIPMENT PURCHASED FOR THE PROJECT

Operating equipment used on this project was furnished by the operator on a monthly rental basis, based on an annual depreciation of 10 percent of its value. In accordance with the terms of the contract, the monthly rental of this equipment (listed in the contract) was $588.10 per month.

Upon the termination of the project, the operator salvaged materials and supplies, which had an original purchase price of $4,776.76.

This property was sold to the joint account of the Government and the operator for $1,951.75. Salvaging operations were performed during the period January 9 to January 20, 1954.

Due to the corrosive character of the Penn mine water, and the excessive cost of removing all of the materials and supplies used underground, only a portion of them were salvaged. A list compiled by the operator which shows the quantities of materials salvaged and their disposition follows:

Item	Quantity	Cost	Sale Price
Transite pipe, 4-inch, 200 lb. test	377 feet	$557.96	$282.75*
Stainless steel pipe nipples, 2-1/2" x 12"	2 ea.	31.44	16.00*
" " " " 3" x 6"	2 ea.	80.28	36.00*
" " plug valve	1 ea.	20.25**	-
" " flange unions 3"	2 pr.	74.12	27.00*
" " check valve, 3"	1 ea.	168.09	124.50*
Brass pressure reduction valve	3 ea.	68.55**	-
Stainless steel wire rope, 1/8 inch	300 feet	65.70**	-
" " " " 3/16 inch	400 feet	84.00**	-
" " " " 1/4 inch	1,200 feet	442.40**	-
Rubber covered wire cable, 1/0 size, 600 v.	250 feet	312.50**	-
Ventube, 12" size (sold 375' @ $0.50/ft.	1,500 feet	1,559.75**	187.50*
Mine rail, 16 lb.	2,000 feet	711.20**	-
Black iron pipe, 2-inch size	1,000 feet	430.00**	210.00*
" " " 1-inch size (sold 680' @ $0.10 a foot	1,000 feet	200.00**	68.00*

Total cost to project	$4,776.36	
Sale price of items sold as a result of advertising		$951.75*
Sale price of balance of items purchased by New Penn Mines, Inc.		$1,000.00**
Total salvage value		$1,951.75

*Sold as a result of advertising to various buyers.
**Balance sold to operator, New Penn Mines, Inc.

The items of salvageable equipment were checked and inventoried at the mine site after the completion of the project by John D. Warne and recommended for salvaging. Some additional materials and supplies which were used in the mine in connection with the project were not deemed worth salvaging; or they could not have been removed from the mine and sold at a profit to the benefit of the Government.

A sale price of $951.75 was realized from the sale of a portion of the items (as indicated in the tabulation); and the balance of them were purchased by the operator, New Penn Mines, Inc. for $1,000.00. The total salvage value of property sold was $1,951.75; and the Government's share would be $975.88.

OTHER INFORMATION

Tro-Pari Surveying of diamond drill holes - Appendix A

Surveys of the diamond drill holes on this project were made by a Bureau of Mines engineer[5/] using a Tro-Pari instrument, manufactured by Trotter-Pajari Instruments, 82 Baker Street, Sudbury, Ontario, Canada. Inclinations and bearings of the holes were generally taken at intervals of 100 feet, while the drill was located at the site for placing the instrument and auxiliary equipment at the desired depth using the regular drill rods. To prevent delays in drilling, and to allow moving the drills when the holes were completed, some of the holes were surveyed at greater intervals. Plans and sections of the holes as determined from the surveys are given

5/ John D. Warne.

in Appendix A.

Inclinations of some of the holes were determined by the hydrofluoric acid bottle method by the operator when the Tro-Pari instrument was not available; these are also given on the drill hole logs.

Logs of diamond drill holes and core disposal - Appendix B

Logs of diamond drill holes as submitted by the operator are included as Appendix B to this report.

Cores derived from diamond drilling were transported from the project site to the Bureau of Mines core library at Reno, Nevada, for the purpose of retaining a permanent record of the formations encountered.

Cores taken from the most mineralized sections of the holes were used by the operator for metallurgical testing purposes. Analysis of these composite samples, and results of the tests have been requested from the operator.

Samples analyzed by the Bureau of Mines - Appendix C

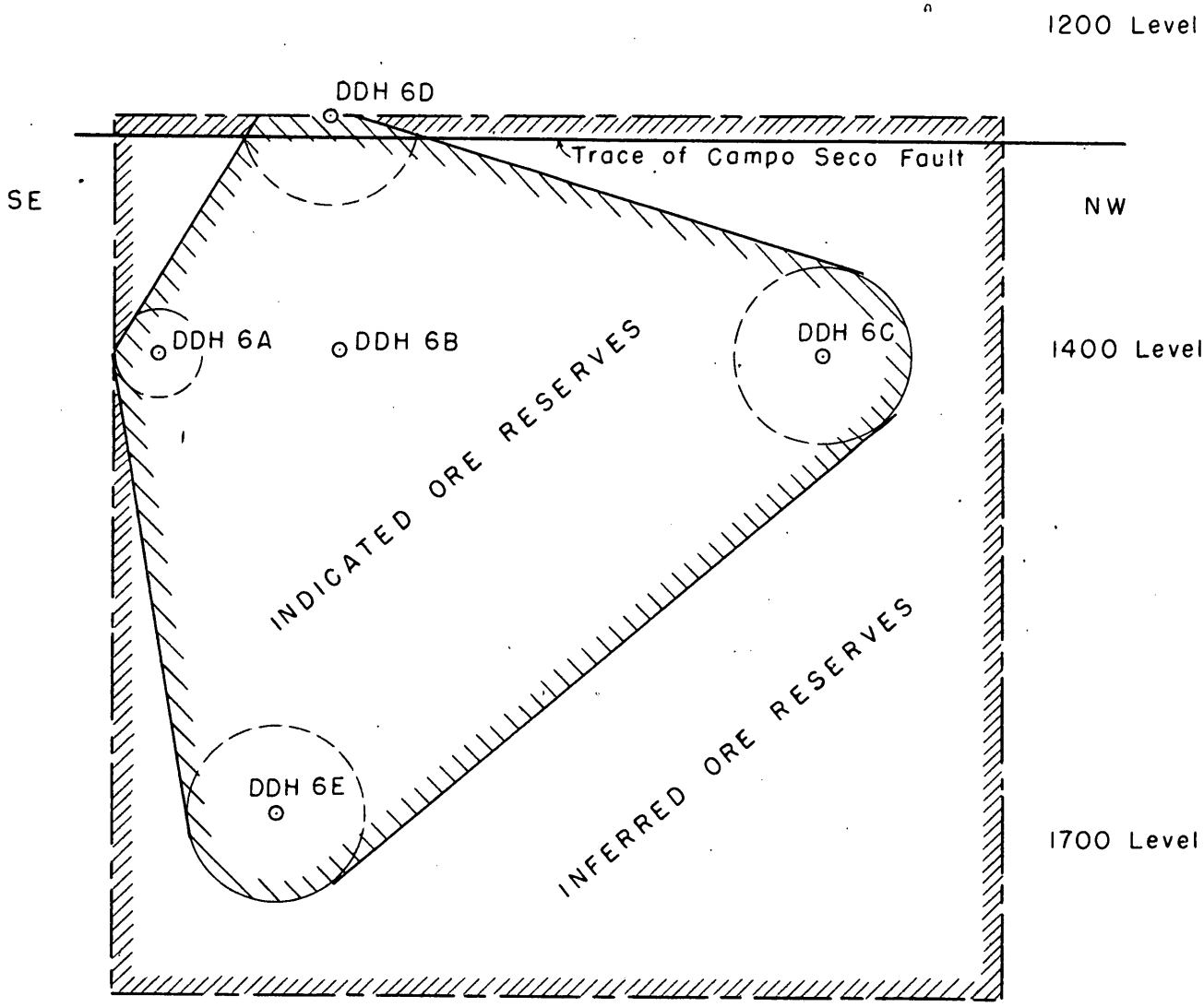
Check samples of cores and sludges taken from the mineralized sections of the diamond drill holes which were analyzed by the Hydrometallurgical and Ore Dressing Branch of the Bureau of Mines are given in the sequence of sample numbers as supplied by the operator in Appendix C to this report.

Final auditing and adjustments pertaining to the cost of this project

Auditing of final costs and expenditures which were submitted by the operator may alter the total cost figures contained within this report.

Some of the costs for supervision and labor incurred after Jan. 9, 1954 may not be applicable to the contract and the termination agreement in connection with the salvage of project equipment jointly owned by the Government and the operator.

Also, some of the costs submitted by the Continental Drilling Co., who performed the diamond drilling work under a cost-plus 8 percent contract arrangement may not be acceptable under the exploration project contract. Certain items of equipment, traveling expenses, etc. are not covered by the contract. Adjustments to the drilling company's invoices for equipment which was not used, or which was salvaged (such as core barrels, bits, diamonds, etc.) may be forthcoming.



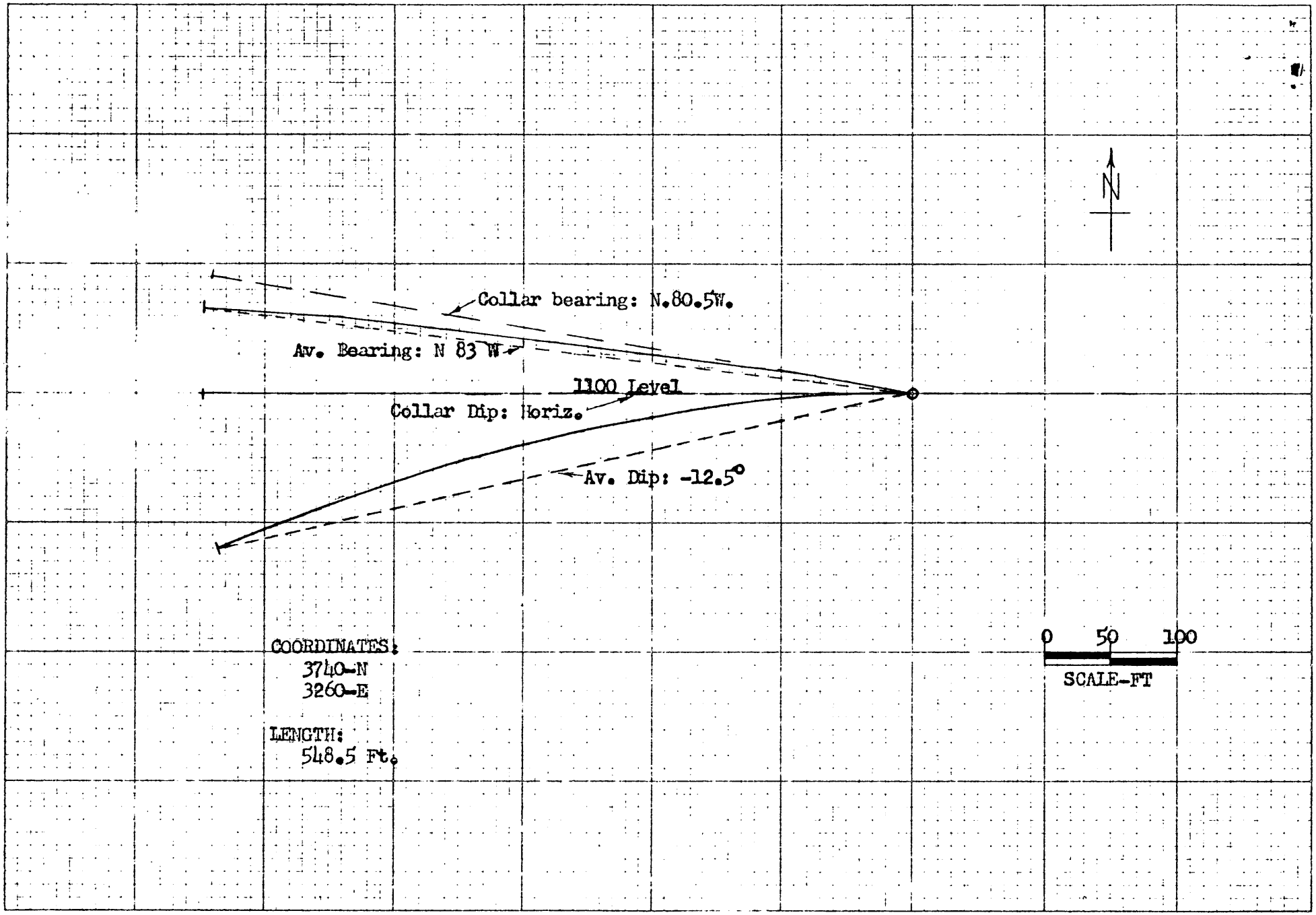
DIAGRAMMATIC LONGITUDINAL SECTION IN THE PLANE OF THE ORE SHOOT PENETRATED BY DMEA DIAMOND DRILL HOLES SHOWING INDICATED AND INFERRED ORE
PENN MINE, CALAVERAS COUNTY, CALIFORNIA

100 0 100 200 FEET

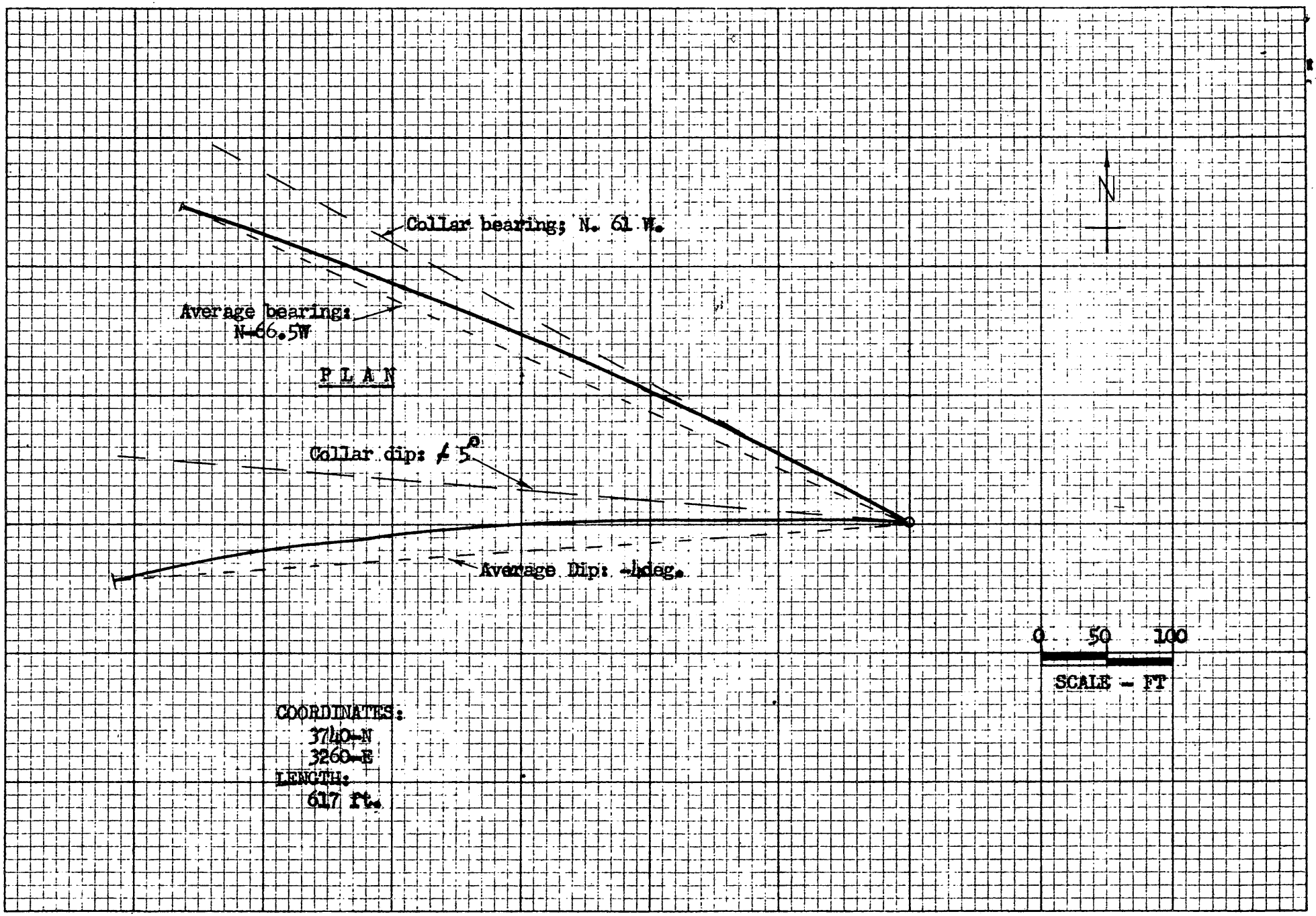
Figure 3

Appendix "A"

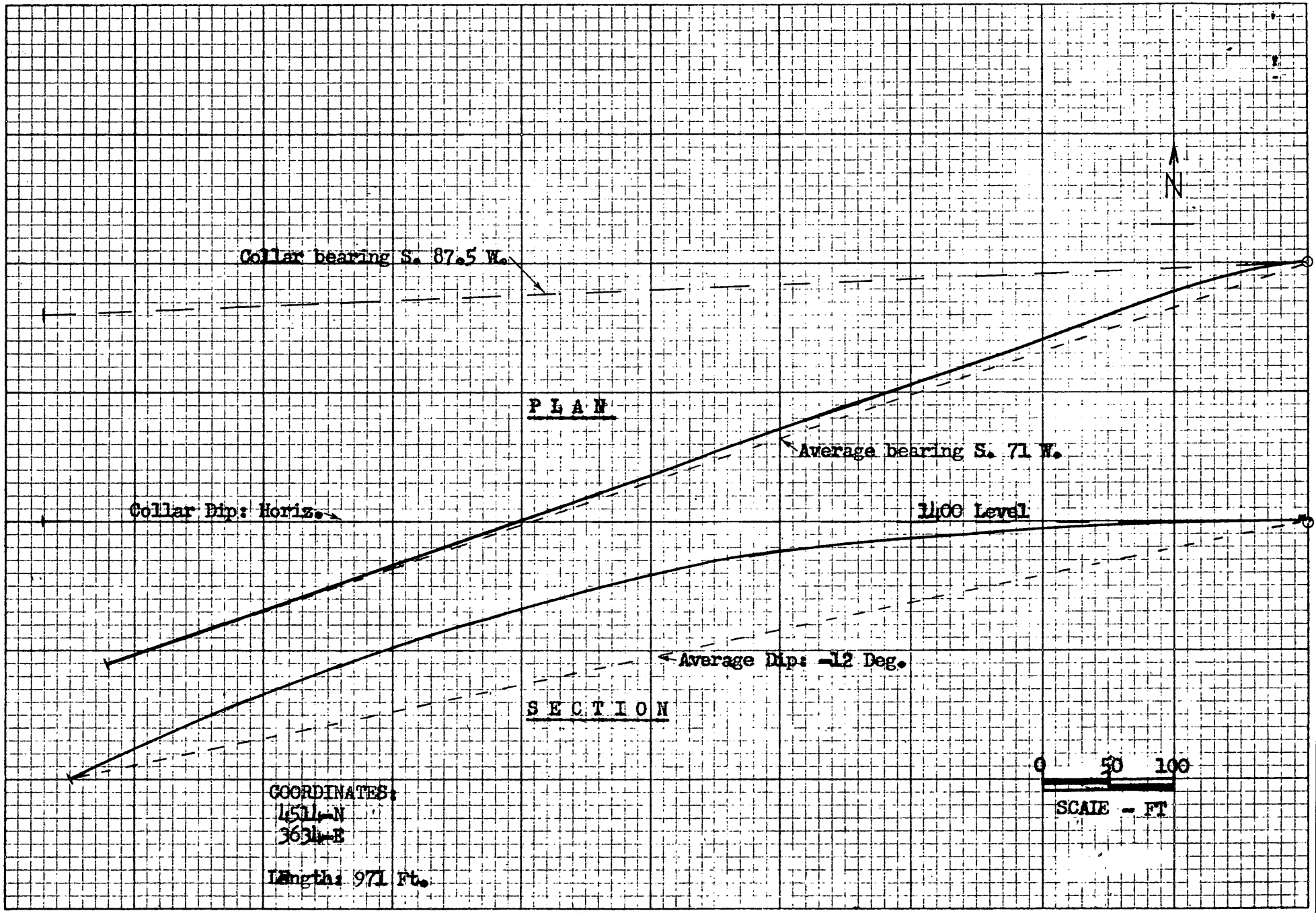
Plans and sections of diamond drill holes as determined by Tro-Pari Surveys



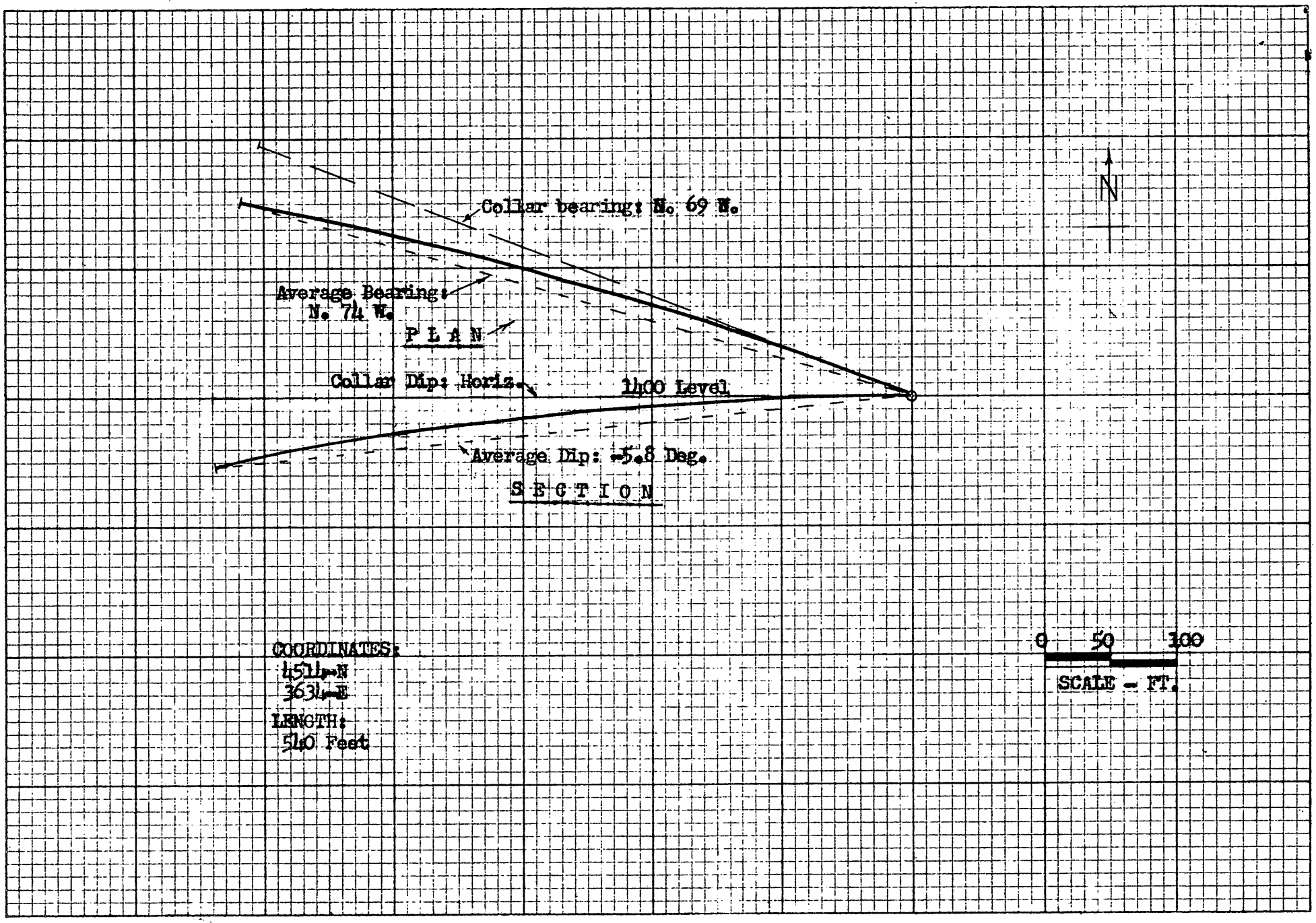
HOLE NO. 10 PLAN AND SECTION BY TRO-PARI SURVEY



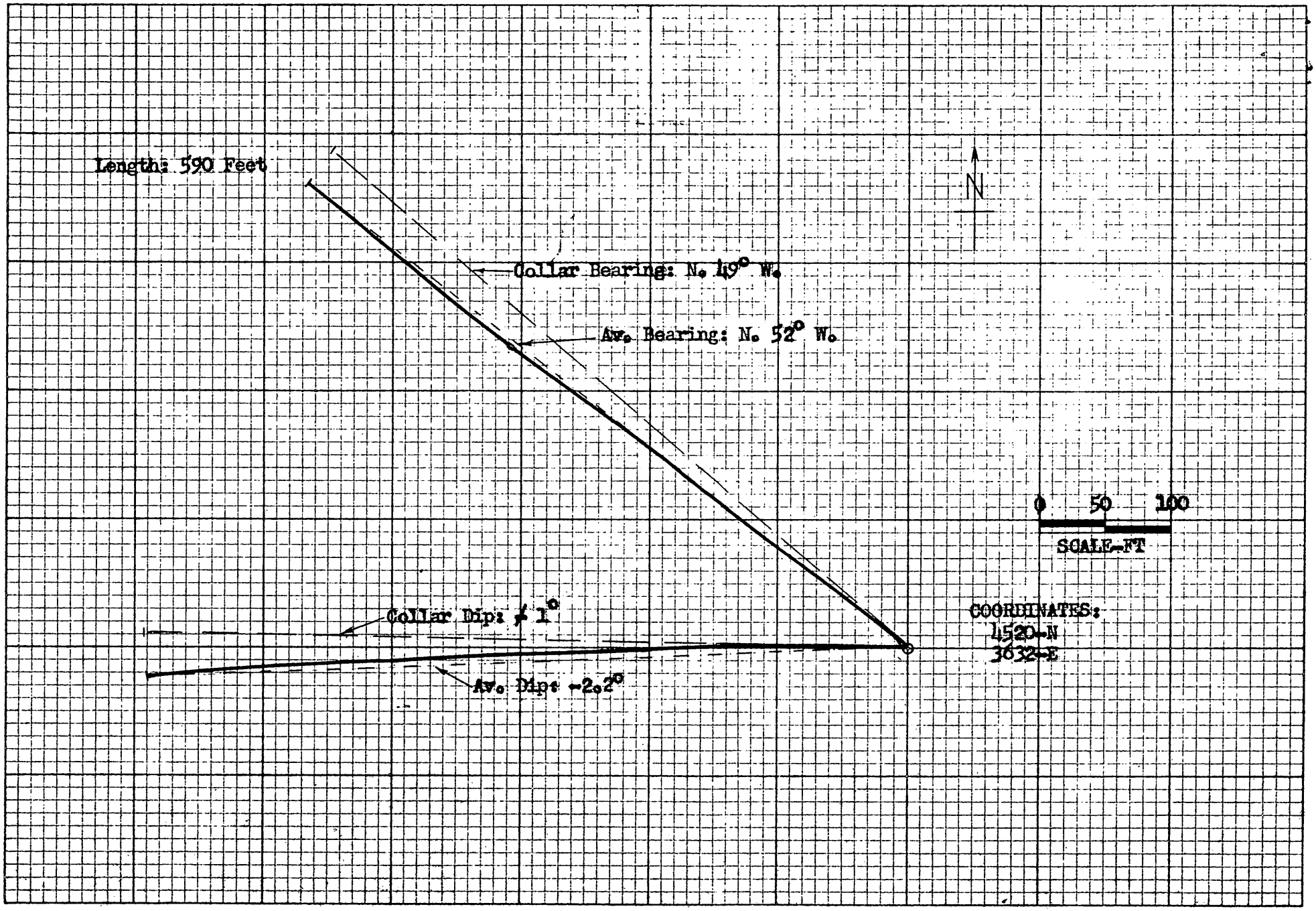
HOLE NO. 10-A PLAN AND SECTION BY TRO-PARI SURVEY



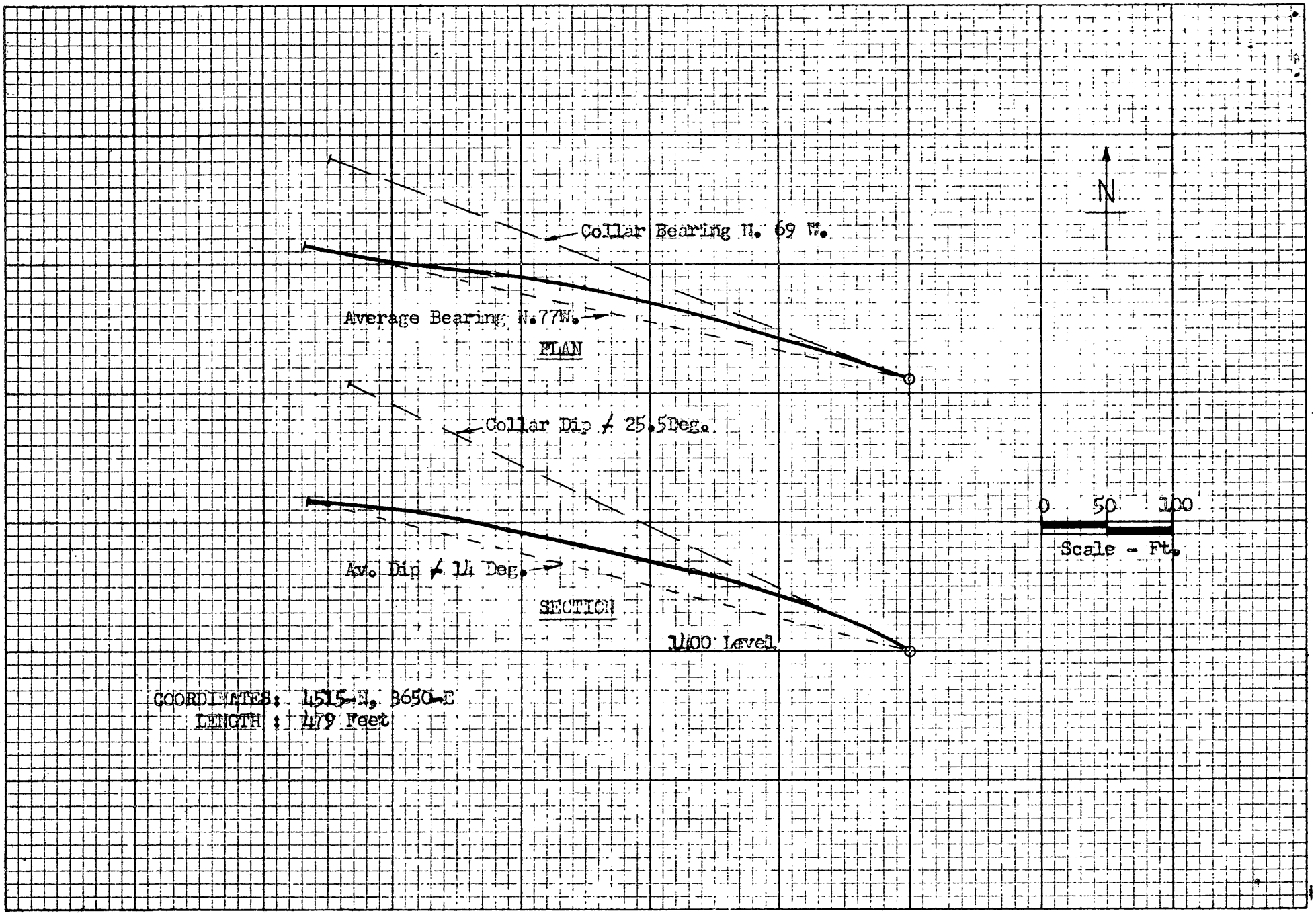
HOLE NO: 6A PLAN AND SECTION BY TRO-PARI SURVEY



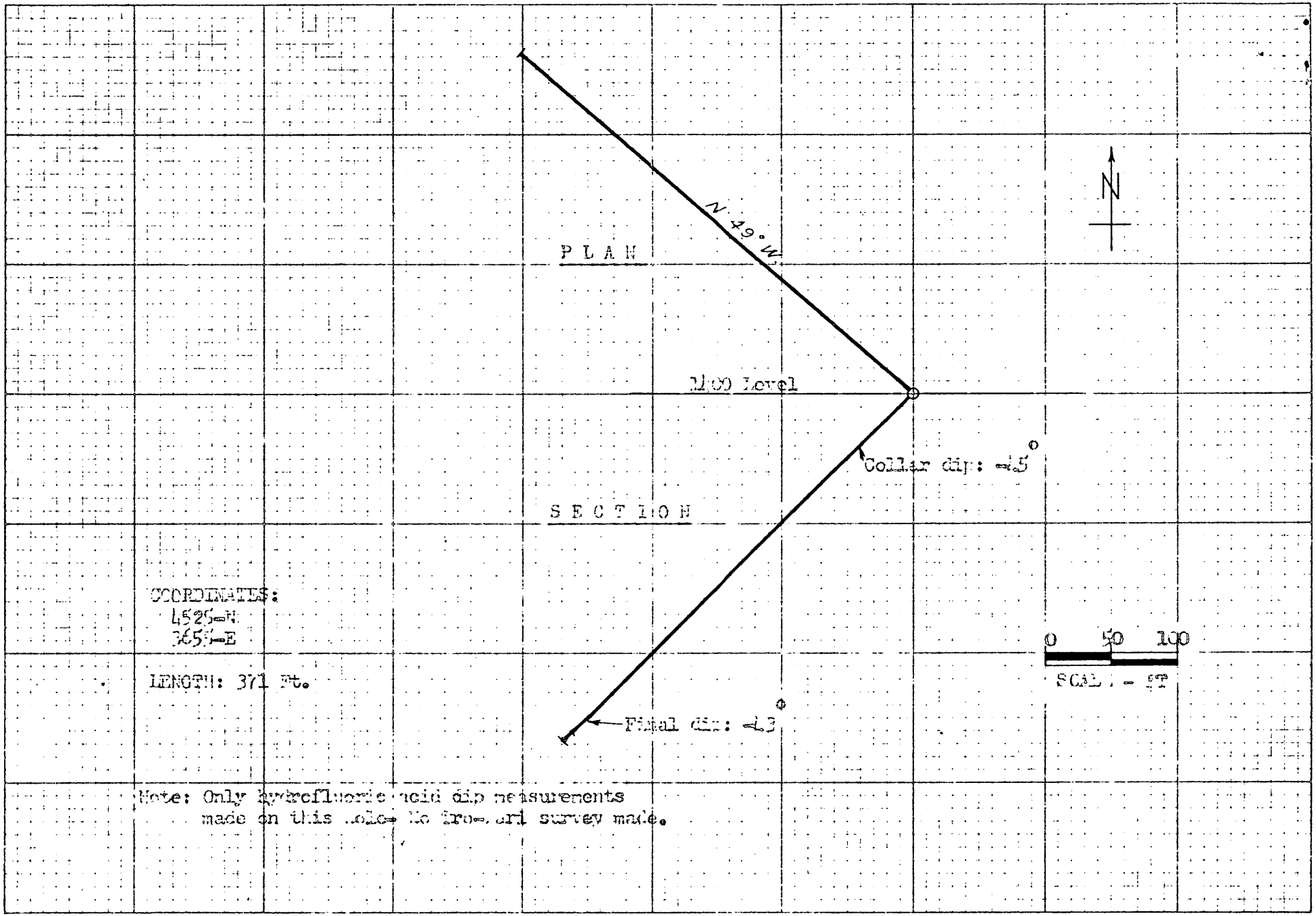
HOLE NO: 6B PLAN AND SECTION BY TRO-PARI SURVEY



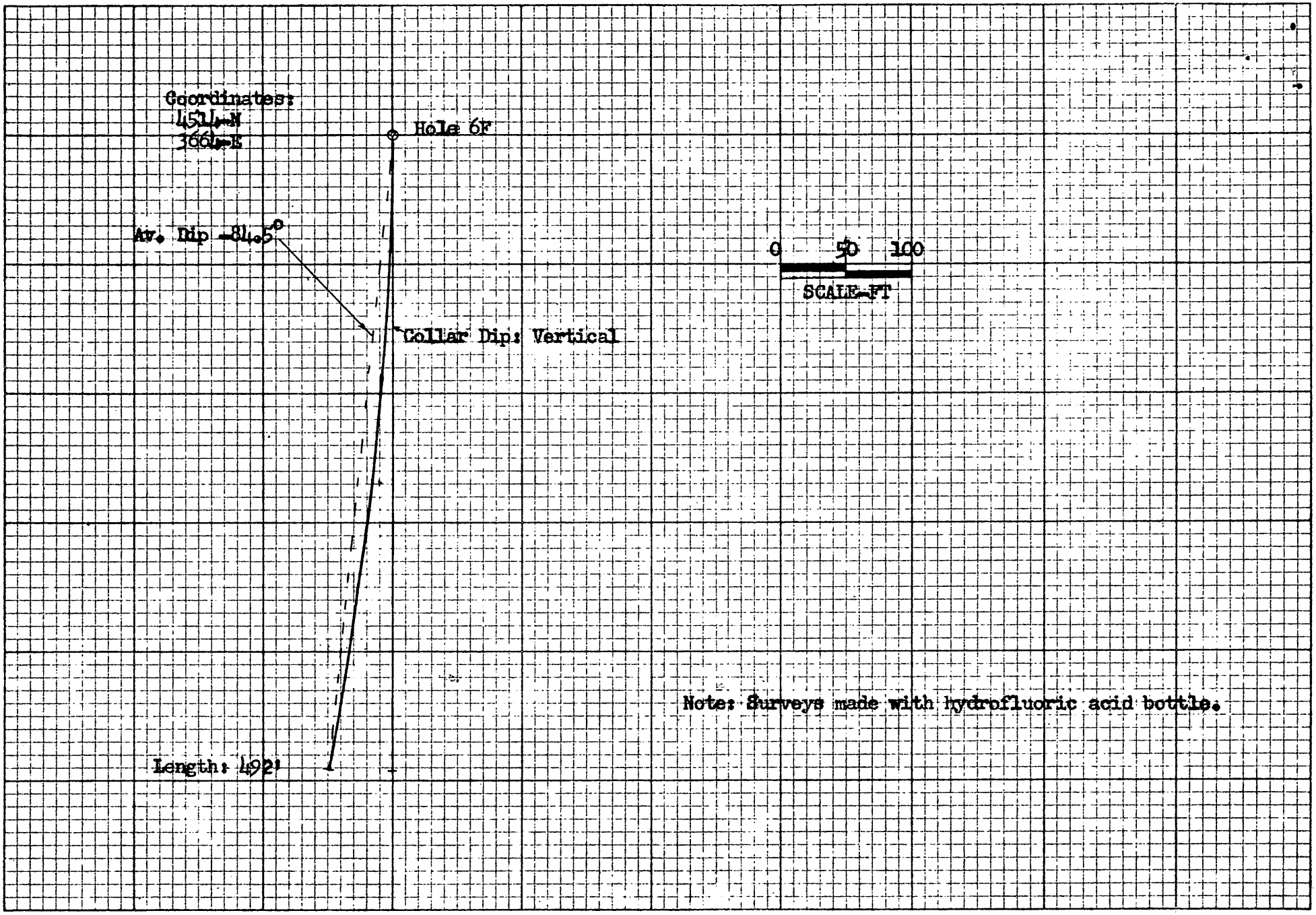
HOLE NO. 6-C PLAN AND SECTION BY TRO-PARI SURVEY



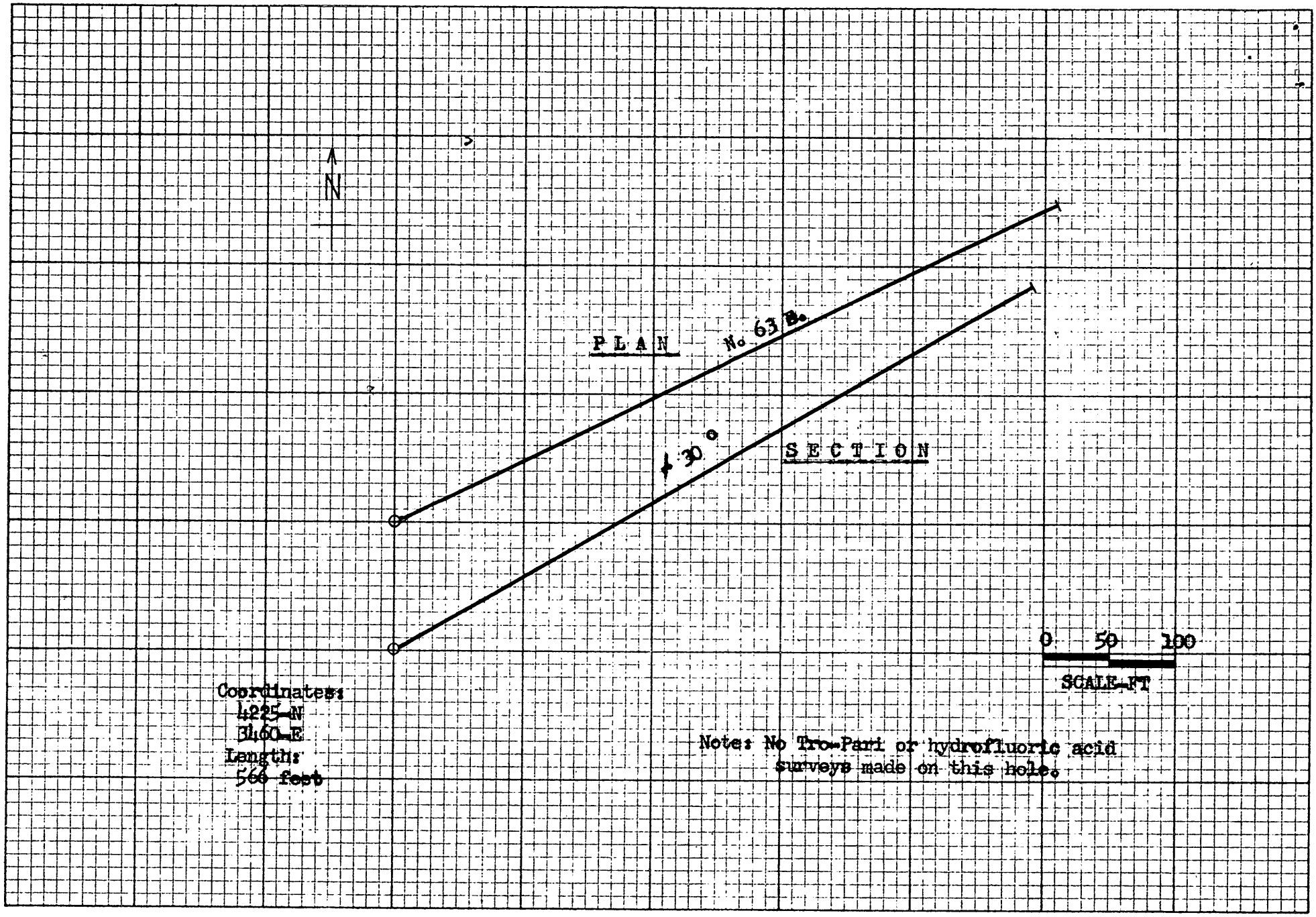
HOLE NO. 6D PLAN AND SECTION BY TRO- PARI SURVEY



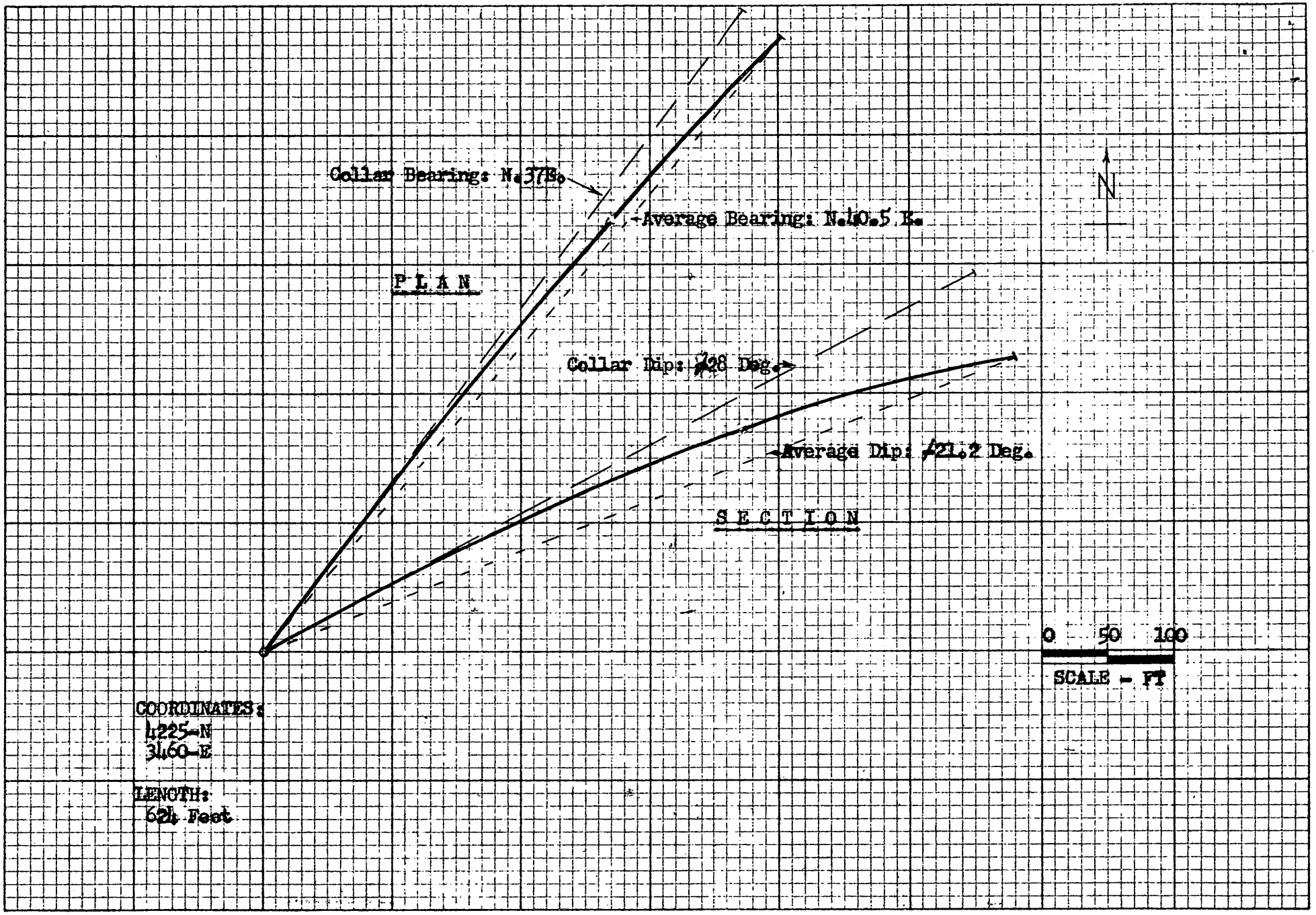
HOLE NO: 6E PLAN AND SECTION



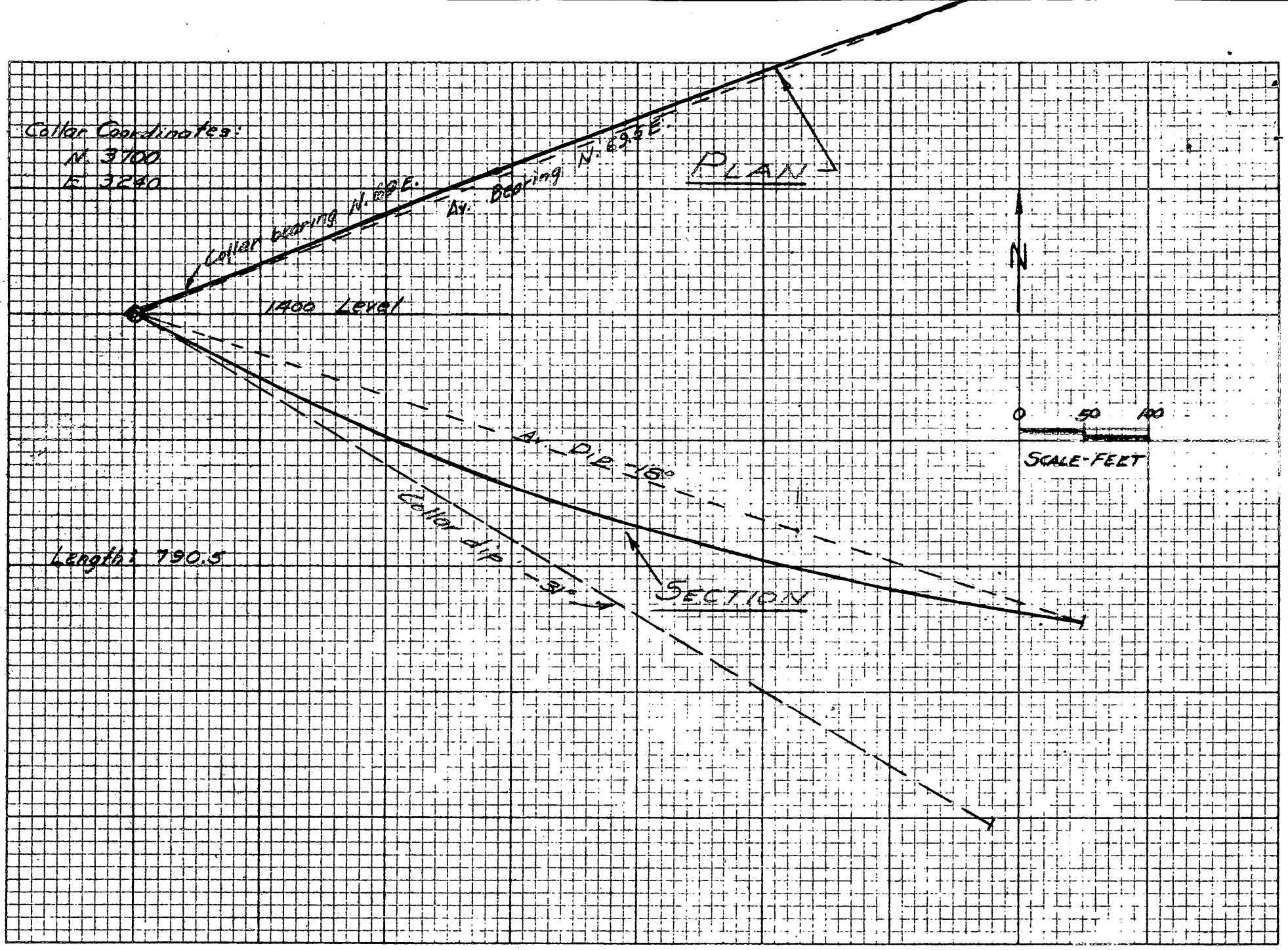
HOLE NO. 6-F VERTICAL SECTION



HOLE NO. 11 PLAN AND SECTION



HOLE NO: 12 PLAN AND SECTION BY TRO-PARI SURVEY



HOLE NO: 2 PLAN & SECTION BY TRO-PARI SURVEY

Appendix "B"

Logs of Diamond Drill Holes

D.H.S.A. DRILL HOLE NO.10

Collar Coordinates N 3740
E 3260

Bearing N 80° 30' W
Dip--Horizontal

Date started August 12, 1953 Completed September 9, 1953
Size: NX to five feet, BX 5 feet to 10 feet, AX to bottom.
Mineralization: No visible sulphides of copper or zinc in core. West Vein schist not pentrated.

Core Recovery: 82% Average
Total Depth: 548.5 feet
Total Drill Shifts(setting up, tearing down, surveying) 34
Average footage drilled per shift. 16.1

Survey Using Hydrofluric Acid

DEPTH	DIP
150	Minus 9°
250	Minus 15°
350	Minus 20°
450	Minus 20°
549	Minus 27°

Survey Using Toperi Instrument

DEPTH	MAGNETIC BEARING	TRUE BEARING	DIP
150	S 79° 00' W	N 83° 30' W	Minus 8°
350	S 79° 30' W	N 83° 00' W	Minus 17°
540	S 76° 30' W	N 86° 00' W	Minus 22°

FOOTAGE	CORE RECOVERY	REMARKS
0-20	83%	Siliceous Greenstone
20-23	69%	Greenstone somewhat bleached
23-30	65%	Siliceous Greenstone with numerous small stringers of quartz
30-34	81%	Siliceous greenstone small quartz stringers and visible pyrite
34-41	64%	Greenstone
41-53	57%	Siliceous greenstone
53-80	100%	Siliceous greenstone with quartz veinlets, some carbonate veinlets and lightly bleached
80-86	94%	Siliceous greenstone with scant visible pyrite
86-108	92%	Siliceous greenstone
108-113	80%	As above but with visible pyrite
113-126	76%	Siliceous greenstone
126-132	100%	Siliceous greenstone with numerous quartz stringers
132-138	68%	Greenstone slightly bleached
138-150	92%	Siliceous greenstone with numerous quartz stringers and occassional pyrite
150-169	68%	Siliceous greenstone showing moderate bleaching and carrying quartz veinlets with associated carbonates

FOOTAGE	CORE RECOVERY	REMARKS
150-180	42%	Greenstone, Section 179 to 180 feet shows much massive quartz and some pyrite with intervening greenstone well bleached
180-185	35%	Well bleached greenstone with much quartz. Hole caving.
185-193	18%	Core consists only fragments of strongly bleached greenstone and quartz pebbles and shows much shearing and strong cleavage.
193-208	62%	Well bleached greenstone with quartz veinlets.
208-212	83%	Greenstone
212-230	64%	Siliceous greenstone with occassional quartz veinlets carrying carbonates, Pyrite visible
230-249	74%	Bleached greenstone, moderate silicification and occassional quartz stringers.
249-268	86%	Silicified greenstone with many quartz veinlets and fair development of cleavage
268-271	78%	Siliceous greenstone with quartz and visible pyrite
271-300	87%	Siliceous greenstone with numbrous quartz veinlets carrying associated carbonates. Several lengths of core show brecciation and later re-cementation with quartz
300-304	100%	As above but with visible pyrite
304-311	96%	As above but without observed pyrite
311-366	98%	Siliceous greenstone with numerous quartz veinlets in association with carbonates. Cleavage only moderately developed. Many sections moderately bleached.
366-387	98%	Well bleached greenstone showing small amount of fine pyrite.
387-464	85%	Siliceous greenstone with occassional quartz veinlets.
464-468	91%	As above but with visible pyrite
468-506.5	100%	Fine grained siliceous greenstone. Most of core bleached to a light gray green.
506.5-509.7	100%	Greenstone, platy, chloritic, soft material which crumbles easily.
509.7- 517	92%	Fine grained greenstone light grayish green in color and with only moderate cleavage developed. Considerable quartz present and occassionally visible pyrite.
517-521.5	103%	Siliceous greenstone with few quartz veinlets and some chlorite.
521.5- 541.5	100%	Fine grained greenstone, occassionally visible pyrite.
541.5- 548.5	100%	Siliceous greenstone with veinlets of quartz.

D.M.E.A. DRILL HOLE NO. 10-A

Collar Coordinates N 3740
E 3260

BEARING: N 63° W
DIP: Plus 5°

Dated Started : September 14, 1953 Completed: September 30, 1953
Size: NX to 2 feet, BX 2 feet to bottom.
Mineralization: No visible sulphides of copper or zinc in any section of core. Occassional scattered pyrite. West Vein schist not penetrated.

Core Recovery: 88%
Total Depth: 617 feet.
Total Drill Shifts:(setting up, surveying etc.) 27
Average footage drilled per shift: 22.8

Survey Using Tro-pari Instrument

DEPTH	MAGNETIC BEARING	TRUE BEARING	DIP
20	N 79° 30' W	N 61° 30' W	Minus 4°
200	N 82° 30' W	N 65° 00' W	Horizontal
390	N 87° 30' W	N 70° 00' W	Minus 6°

Due to obstruction in hole at 390 feet no deeper readings were obtained.

FOOTAGE	CORE RECOVERY	REMARKS
0 - 28	88%	NX to 2 feet. BX started at 2 feet. Firm hard fresh greenstone, generally siliceous though quartz is not prominent and faintly pyritic.
28-39	114%	Siliceous greenstone, few narrow quartz veinlets, scant pyrite.
39-125	94%	Greenstone, slightly siliceous, few narrow quartz veinlets and occassionally massive quartz, few short sections slightly bleached.
125-144	98%	Fine grained greenstone somewhat chloritic. Core mostly fragments.
144-172	78%	Siliceous greenstone.
172-174.5	100%	12 inches fresh hard greenstone, remainder shows well developed cleavage.
174.5-189	85%	Siliceous fine grained greenstone with a few small quartz veinlets.
189-192	89%	Greenstone, last 12 inches of core consisting of massive quartz with associated carbonates.
192-207	76%	Granular siliceous greenstone with fair cleavage. Many quartz veinlets carrying associated carbonates.
207-233.5	83%	Siliceous, fine grained greenstone.
233.5-243	70%	Greenstone, mottled appearance with strong cleavage.

FOOTAGE	CORE RECOVERY	REMARKS
243-258	51%	Greenstone, strong shearing and cleavage. Crumbles readily, platy, much massive quartz.
258-264	92%	8 inches massive quartz, 31 inches speckled greenstone, 4 inches massive quartz, remainder speckled platy greenstone.
264-273	105%	Speckled greenstone, last 20 inches much quartz and showing strong shearing and cleavage.
273-318	97%	Generally siliceous greenstone showing weak shearing and cleavage, fine grained to granular with occassional showings of massive quartz and associated carbonates.
318-348.5	83%	Siliceous, granular textured, light colored greenstone showing generally well developed cleavage.
348.5-363	91%	Siliceous greenstone fairly massive and lightly bleached with some massive quartz and carbonates.
363-400	89%	Fresh hard greenstone, mottled speckled appearance, faint cleavage, some massive quartz and narrow quartz veinlets.
400-476	76%	Massive greenstone with little cleavage and tending to a bleached color and speckled appearance. Few quartz veinlets.
476-548	95%	Fine grained siliceous greenstone with little cleavage and octassional narrow quartz veinlets.
548-556	98%	Siliceous greenstone mottled appearance.
556-566	94%	Greenstone, granular texture.
566-603	88%	Typical greenstone, hard, firm and fresh.
603-617	108%	Siliceous greenstone with much massive quartz.

LOG D.M.E.A. DRILL HOLE 6-A

Collar Coordinates: N 4514
E 3634

Bearing: S 87° 30' W
Dip: Horizontal

Date Started: 8-29-53
Continued: 12-17-53

Completed: 9-19-53 to depth of 570'
Completed: 1-8-54

Size NX to 3 feet; BX 3 feet to bottom at 971 feet.

Mineralization: 280 feet to 302.5 feet mineralized schist showing sulphides of iron copper and zinc. Section from 280 to 284 best mineralization, with remainder showing occassional sulphides. From collar to 280; and from 325 to 971 cored nothing but greenstone.

Core Recovery: 91.0%
Total Depth: 971 feet
Total Drill Shifts (setting up, surveying, drilling, etc.) 78.5
Average footage drilled per shift: 12.4

Survey Using Tro-pari Instrument

Depth	Magnetic Bear.	True Bearing	Dip	Dip H_2F Acid Bottle
100	S 69° 00' W	S86° 30' W	-2°	
300	S 71° 30' W	S89° 00' W	-5°	
400	S 70° 30' W	S 88° 00' W	-7°	
500				-13°
600				-17°
700				-19°
840				-22°
971				-24°

Footage	Core Rec. %	Remarks
0-7	107	NX core to 3 feet. 3 feet on BX. Hard fresh typical greenstone.
7-11	90	Siliceous greenstone with narrow quartz veinlets and occassional massive quartz up to 8 inches
11-29	111	Typical greenstone, visible pyrite
29-43	98	Greenstone, numerous large pyrite crystals, quartz scant but uniformly distributed, also some epidote.
43-56	98	Siliceous greenstone, occassional epidote.
56-69	97	Siliceous greenstone, some epidote visible pyrite
69-88	85	Greenstone, faint cleavage, visible pyrite.
88-93	65	Chloritic greenstone, much quartz, no visible sulphides.
93-100.5	88	Siliceous greenstone, quartz, epidote, visible pyrite.
100.5-107	73	Siliceous greenstone.
107-120	69	Ordinary greenstone.
120-143	98	Light greensih, slightly bleached greenstone, slight shearing, and faint cleavage. Felsitic texture, some chlorite, and some sections with much secondary quartz.
143-178	95	Siliceson greenstone, felsitic texture, many narrow quartz veinlets, some massive quartz in association with carbonates, occassional epidote.
178-180	137	Greenstone, fine grained, appears bleached.
180-194	115	Greenstone, core mostly fragaments and some mud. appears altered and well bleached.

Footage	Core Rec. %	Remarks
194-212	88	Coarse grained greenstone with much massive quartz, granular texture.
212-215.5	83	Core consisting mostly of fragaments, fine texture, siliceous greenstone.
215.5-235	90	Siliceous greenstone with much quartz, some sections crumbly and appears bleached.
235-240	100	50 inches massive quartz, rest fine texture, slightly bleached greenstone with visible pyrite.
240-245	100	10 inches shattered brecciated greenstone cemented with quartz. Rest fine texture greenstone. Core fairly coherent.
245-250	100	Siliceous greenstone, much quartz.
250-262	72	Siliceous greenstone, grayish color, fine granular texture much quartz and occassional epidote.
262-280	94	Greenstone, much quartz and epidote.
280-284	73	2 inches fine grained greenstone. Rest of core sericitic schist heavily mineralized with pyrite. Quartz, bornite, chalcopyrite, sphalerite also present. Core recovery 73%
284-286.5	100	Six inches sericite schist mineralized with pyrite. Rest of section a fine grained, altered, bleached greenstone.
286.5-290.5	96	2 inches fine grained greenstone altered and bleached, 5 inches sericite schist mineralized with pyrite and sphalerite, remainder of section very silicious schist with traces of pyrite.
290.5-292.5	117	6 inches heavy sulphide mineralization, mostly pyrite but containing visible sphalerite, bornite, chalcopyrite, and considerable quartz. Remainder bleached schist.
292.5-296	57%	Some schist, loght colored with good cleavage. Rest chloritic greenstone well silicified and with much massive quartz.
296-299.5	38	Schist, massive quartz, scant bornite and pyrite.
299.5-302.5	86	2 inches massive quartz, 2 inches finely ground sulphides showing pyrite, bornite, chalcopyrite. (Perhaps cave material) Remainder schist with scant pyrite.
302.5-306	76	Light colored schist with scant pyrite.
306-311	91	Siliceous greenstone, fine grained, strong shearing and cleavage, scant pyrite.
311-325	80	Siliceous greenstone, fine grained, strong shearing and cleavage. No visible sulphides, last foot showing 6 inches of quartz and epidote and then six inches of fresh greenstone.
325-389	96	Greenstone, fine grained, little schistosity, occassional quartz, veinlets up to two inches width.
389-394	92	24 inches normal greenstone, 25 inches soft altered bleached crumbly greenstone. 6 inches normal fresh greenstone.
394-412	88	Greenstone, granular texture.
412-417	70	Greenstone, granular texture. One small piece of pyrite schist observed, probably cave.
417-422	65	As above with two pieces of pyritic schist.
422-462.5	86	Greenstone, some epidote, much massive quartz sometimes associated with carbonates.
462.5-475.5	106	Siliceous greenstone with much quartz and some visible pyrite.
475.5-486	80	Siliceous greenstone with much quartz and some visible pyrite, coarse grained with well developed schistosity.
486-500	86	Greenstone fine grained and lightly bleached with visible pyrite.
500-509	88	Firm, fine grained greenstone, last 12 inches 508-509 shows much quartz with associated carbonates and some epidote.
509-511	87	Hard fresh greenstone with occassional veinlets of secondary quartz.

Footage	Core Rec. %	Remarks
561-570	94	Siliceous greenstone, felsitic texture, several bands massive quartz up to six inches width.

Hole completed to this depth September 19, 1953. Drilling resumed 12-20-53 after reaming from 280 to 570 which commenced 12-17-53.

570-575	95	Siliceous greenstone, hard and fresh.
575-604	53.2	Siliceous greenstone, core only fragments, fine grained with indistinct cleavage.
604-642	72.6	Greenstone, siliceous, granular and with indistinct cleavage. Occasional narrow bands of quartz. Section 635-642 shows moderate bleaching and presents mottled appearance.
642-714	93.9	Siliceous greenstone, granular texture, cleavage indistinct, good coherent core.
714-726.5	94.5	Dark, fine-grained siliceous greenstone. Slightly mottled appearance and with fair cleavage.
726.5-736	96.7	Siliceous greenstone, normal and typical, cleavage indistinct streaked with epidote.
736-794	91.2	Granular, siliceous greenstone, bleached. Faint cleavage, broken core.
794-819	90.3	Granular greenstone, indistinct cleavage. Moderate bleaching, unsilicified.
819-833.5	89	Granular greenstone, chloritic, noticeable shearing and fair cleavage.
833.5-869	97.4	Granular greenstone, massive with no cleavage.
869-881	96	Siliceous, granular greenstone
881-882	23	Altered, chloritic, bleached greenstone. Some massive quartz. Strongly sheared.
882-971	96.4	Siliceous granular greenstone.

D.M.E.A. DRILL HOLE NO. 6-B

Collar Coordinates N 4514
E 3634

Bearing: N 69° W
Dip: Horizontal

Date Started: September 21, 1953 Completed: October 7, 1953
Size: NX to 2 feet, BX 3 feet to bottom.
Mineralization: East Vein schist zone penetrated 302-335 foot interval. Mineralized section from 306-310.5 feet showed sulphides iron, zinc and copper in that order of preponderance. Core analysis of mineralized section indicates average assay over 4.5 feet of 2.1% copper and 16.5% zinc. Other than section 302-335, hole cored only greenstone.

Core Recovery: 82.9% average
Total Depth: 340 feet
Total drill shifts(inc. of setting up surveying, etc.) 30
Average footage drilled per shift 11.0

SURVEY TRI-PARE INSTRUMENT

DEPTH	MAGNETIC BEARING	TRUE BEARING	DIP
100'	N 77° 0' W	N 68° 30' W	Plus 1°
170'	S 88° 0' W	N 74° 30' W	Minus 3°
345'	S 85° 30' W	N 77° 0' W	Minus 7° 30'

FOOTAGE	CORE RECOVERY	REMARKS
0-55	88%	Hard, dense, siliceous greenstone with occasional narrow bands of massive quartz and some epidote. Frequently pyrite is visible occurring as rather large isolated crystals.
55-92	95%	Greenstone, moderately silicified, scant pyrite and occasional bands of massive quartz.
92-110	91%	Hard, fresh, massive greenstone. Cleavage only faintly developed. Texture fine grained. Massive quartz veinlets numerous.
110-164	97%	Siliceous greenstone, fairly coarse grained and showing more or less epidote. Fair cleavage.
164-183.5	89%	Greenstone, siliceous, felsitic texture and little cleavage.
183.5-205	102%	Siliceous greenstone, brecciated appearance with fragments re-cemented by much quartz. Shows strong cleavage and schistosity.
205-228	75%	Greenstone, bleached appearance, granular texture. Fairly well developed cleavage and some shearing.
228-252	84%	Siliceous greenstone, bleached appearance, good cleavage and strong shearing. Core consists largely of fragments.
252-277.5	101%	Greenstone, more massive and only faint cleavage, visible pyrite, fine grained texture.
277.5-283	88%	Siliceous greenstone with prominent cleavage.
283-296	96%	Greenstone, faint cleavage, weakly bleached.
296-302	99%	12 inches greenstone followed by 29" massive quartz carrying associated carbonates. 22inches brecciated greenstone fragments re-cemented by quartz and carbonates.

FOOTAGE	CORE RECOVERY	REMARKS
302-306	50%	Brecciated greenstone fragments re-cemented by massive quartz with associated carbonates.
306-310.5	81%	Sericitic schist mineralized with sulphides of iron, zinc and copper. Some Quartz.
310.5-320	52%	Schist, mostly chloritic, much quartz and some pyrite. Core mostly consists of fragments.
320-331.5	72%	Sericitic schist with scant pyrite.
331.5-342	97%	Greenstone with strong cleavage and shearing. Some chlorite developed. Bleached appearance.
342-355	86%	Fine grained greenstone, generally siliceous, faint cleavage. Occassional masses of quartz.
355-405	37%	Greenstone granular texture, no silicification, strong cleavage and shearing. Core consists only of fragments.
405-415	89%	Greenstone, massive coherent core. Silicification not noticeable, poorly developed cleavage.
415-427	69%	Siliceous greenstone, granular texture, cleavage not pronounced, few massive quartz veinlets.
427-451	82%	Fine grained granular greenstone, grayish green color, moderate silicification, faint cleavage.
451-480	62%	Granular gray-green greenstone, occassional siliceous sections and frequent narrow bands of quartz some to 18 inches in width. Fair cleavage and poor.
480-504	95%	Granular greenstone. Bleached appearance. Good core.
504-540	90%	Granular greenstone with occassional narrow bands of quartz, good core.

NEW PENN MINES, INC.

CAMPO SECO, CALAVERAS COUNTY,
CALIFORNIA

LOG D.M.D.A. DRILL HOLE 6-C

Collar Coordinates: N 4520
E 3532

Bearing: N 49° 0' W
Dip: Plus 1°

Size: NX to 3 feet, Bx 3 feet to bottom.
Hole collared: October 3, 1953 Completed: November 3, 1953
Mineralization: Hole stopped in greenstone at conclusion of night shift November 3, 1953 at 590 feet. East Vein schist intersected 529 to 573 feet and the remainder of the hole was through greenstone. Copper- Zinc mineralization from 529 to 573 with best and strongest from 539 to 546.

Core Recovery: 7%. 58% average
Total Depth: 590 feet.
Total drill shifts (including moving, setting up, etc.,) 46
Average footage drilled per shift. 12.8

SURVEY BY TRO-PARI INSTRUMENT

DEPTH	MAGNETIC BEARING	TRUE BEARING	DIP
Collar		N 49° 0' W	Plus 1°
150	N 70° 30' W	N 53° 0' W	Minus 1°
300	N 71° 30' W	N 54° 0' W	Minus 2°
475	N 68° 30' W	N 51° 0' W	Minus 3°
590	Unavailable		

FOOTAGE	CORE RECOVERY	REMARKS
0 - 29	94%	Typical hard fresh greenstone with streaks of epidote and occassional scattered, large crystals of pyrite.
29 - 46	93%	Greenstone still streaked with epidote but less dense and more siliceous with more pronounced cleavage.
46 - 69	82%	Siliceous greenstone, felsitic texture, dense.
69 - 72	50%	12 inches massive quartz followed by 6 inches siliceous greenstone fragments.
72 -101	47%	Dark colored, felsitic, siliceous greenstone. Core recovered badly broken up or as just fragments.
101-119	85%	Dark green siliceous greenstone with faint cleavage. Granular texture. Scattered pyrite occassionally visible.
119-145	87%	Light green, felsitic, siliceous greenstone with epidote associated with occassional narrow bands of quartz. Scattered pyrite.
145-149	69%	Two feet of chloritic greenstone showing good cleavage, followed by nine inches of pale green, felsitic greenstone.
149-160	49%	Pale green, felsitic, siliceous greenstone fragments.
160-175	70%	Fragments of granular, siliceous greenstone with numerous bands of massive quartz up to six inches in width.
175-190	56%	Fine grained, dark green, siliceous greenstone with poor cleavage. Core consists of only fragments.
190-198	66%	Fragments of pale green siliceous greenstone. Poor cleavage. Much massive quartz.

FOOTAGE	CORE RECOVERY	REMARKS
198-284.5	78%	Granular siliceous greenstone, faint cleavage. Core often only fragaments. Fracture surfaces often display a reddish stain possibly an iron oxide.
284.5-319	69%	Greenstone, granular texture, poor cleavage. Core only fragaments. Bleached appearance.
319-328	85%	Bleached, altered, chloritic greenstone. Strong cleavage and shearing. Core only fragaments.
328-355	45%	Siliceous greenstone, granular texture, bleached appearance. Generally core consisting of fragaments only.
355-368.5	82%	Siliceous greenstone, fine grained, bleached appearance.
368.5-375	85%	Greenstone, granular texture, bleached appearance.
375-503	53%	Greenstone, siliceous, granular texture, bleached appearance, poor cleavage, core recovery generally only fragaments. Section 434 to 442 very siliceous.
503-529	89%	Siliceous greenstone, faint cleavage, granular texture, considerable pyrite. Core consists of large fragaments. Some sections lightly bleached.
529-530	33%	Sericitic schist weakly mineralized with sulphides of iron, zinc and copper.
530-535	22%	Sericitic schist strongly mineralized with sphalerite, pyrite, and less important amounts of chalcopyrite and bornite.
535-548	91%	Sericitic schist and occassional bands of gouge. Sphalerite present in significant quantities with less copper sulphides.
548-569	83%	Siliceous schist uniformly but weakly mineralized with pyrite. Occassional narrow bands of very weak copper-zinc mineralization.
569-573	63%	Seven inches of massive quartz and greenstone mineralized with pyrite. Fourteen inches schist mineralized with quartz, pyrite and sphalerite. 9 inches of schistose greenstone.
573-576.5	67%	Schistose greenstone, slightly bleached, with visible pyrite. Moderate silicifieation.
576.5-590	106%	Granular greenstone, moderate silicification, good cleavage.

[illegible]

NEW PENN MINES, INC.

CAMPO SECO, CALAVERAS COUNTY,
CALIFORNIA

100 D.Z.D.A. DRILL HOLE 6-E

Collar Coordinates: N 4565
E 3665

Bearing: N 49° 01' W
Dip: Minus 45°

Size: NX to 3 feet, BX--3 feet to bottom.
Hole collared: November 4, 1953 Completed: November 17, 1953
Mineralization: Hole stopped at 371 feet in greenstone. Cored only greenstone to 301. 301 to 315.25 hole intersected East Vein Schist. Heavy sulphide mineralization 301 to 315 feet. Schist slightly mineralized principally by sphalerite from 315 feet to 321 feet. Last 14 feet to 335 feet weakly mineralized by pyrite. Section 301 to 315 contains much sphalerite as well as subordinate amounts of copper sulphides, principally chalcopyrite, but significant bornite.

Core Recovery: 77.09%
Total Depth: 371.0
Total Drill Shifts (including moving, setting up, surveying, etc.) 26
Average footage drilled per shift: 14.3

ACID BOTTLE SURVEY

DEPTH	DIP
Collar	Minus 45°
100'	Minus 45°
200'	Minus 45°
250'	Minus 43°

FOOTAGE	CORE RECOVERY	REMARKS
0 - 4	75%	Talcent
4 - 22	92%	Greenstone, siliceous, streaked with epidote, good cleavage.
22 - 34	105%	Greenstone, siliceous, felsitic.
34 - 82	93%	Siliceous greenstone, granular texture, occasional narrow bands of massive quartz, strong cleavage. Section from 69 to 82 feet somewhat bleached and streaked with quartz and carbonates.
82 - 104	72%	Siliceous greenstone, felsitic texture, mostly fragments.
104-121	37%	Chloritized fragments of felsitic greenstone, strong cleavage and shearing, somewhat bleached with occasional narrow bands of quartz and epidote. Poor core recovery.
121-137	47%	Greenstone, granular texture, bleached and chloritized.
137-170	39%	Fragments of siliceous, felsitic greenstone, sugary. Poor core.
170-221	75%	Siliceous typical greenstone, good cleavage.
221-263	83%	Fragments of siliceous greenstone, occassional narrow bands of massive quartz, granular texture, sugary and gravely.
263-295	79%	Siliceous greenstone, brecciated and shattered with subsequent re-cementation by massive quartz, good cleavage, felsitic texture.
295-301	43%	As above but indistinct cleavage and bleached appearance.

LOG D.M.E.A. DRILL HOLE 6-E Page 2

Footage	Core Recovery	Remarks
301-303	83%	4" massive quartz followed by 6 inches of quartz-porphry schist weakly mineralized by chalcopyrite and sphalerite.
303-304	50%	4 inches of pyritic quartz-porphry schist followed by 2 inches well mineralized with sulphides of copper and zinc. Sericitic.
304-321	92%	Heavily mineralizedquartz-porphry schist. Sericite, chalcopyrite, bornite, sphalerite.
321-338.5	115%	Schist, weakly mineralized with chalcopyrite, sphalerite, pyrite. 335.25 to 338.5 greenstone.
338.5-371	94%	Siliceous greenstone, fine grained, good cleavage.

LOG D.M.E.A. DRILL HOLE 6-F

Collar Coordinates: N 4514
E 3664

Bearing: ----------
Dip: Vertical

Size: Nx to 3 feet; Bx to bottom at 492 feet.
Hole Collared: 12-10-53 Completed: 1-5-54

Mineralization: No mineralization of economic importance was found in this hole. From the collar to 352.5 feet, and from 481 to bottom at 492 feet, only greenstone was encountered. The sericitic quartz-porphry schist was cored from 352.5 feet to 481. Mineralization, consisting of chalcopyrite, sphalerite, and a good deal of pyrite commenced in the greenstone at 350 feet and extended throughout the schist. Values as indicated by sludge samples never exceeded 0.25% copper and 0.30% zinc. These were for the most part confined to the hanging wall section 350 to 386 feet, after which they declined to approximately half this amount, and continued through out the remainder of the schist. Analysis of the core failed to reveal any values at all.

Core Recovery: 86.3%
Total Depth: 492 feet
Total Drill Shifts (including setting up, surveying, etc. 38
Average footage drilled per shift 12.95

Survey Using Hydro-fluric Acid

Depth	Dip
Collar	Vertical
100	-87
200	-85
300	-83
400	-82
492	-78

Footage	Core Rec. %	Remarks
0-3	None	Cement
3-36	96.0	Hard, fresh, fine grained greenstone lightly streaked with epidote. Cleavage faint, good core, siliceous.
36-45	100.0	Coarse, granular, siliceous greenstone. Massive, with much epidote. Poor cleavage and good core.
45-65	99.3	6 feet as above. Remainder fine-grained greenstone with moderate bleaching and silicification. Last twelve inches consists of chloritized, bleached, granular greenstone.
65-73	92.0	Chloritic, bleached greenstone fragamnets with poor cleavage 68.5 to 70.5 feet fine-grained, siliceous, greenstone.
73-109	96.1	Granular greenstone, with occassional development of carbonates and epidote. Locally siliceous.
109-125	58.8	Greenstone fragamnets, strongly bleached and altered, chloritic. 6 inches of heavy gouge at 113 feet.
125-147	57.8	Bleached, chloritic greenstone fragaments. Occassionally some silicification. Rarely sections of 3 to 6 inches of massive quartz.
147-159	89.4	Siliceous greenstone with moderate bleaching
159-173	89.8	Greenstone fragaments, granular and bleached. Sometimes siliceous, sometimes chloritic. Generally indistinct Cleavage. Occassional bands of massive quartz.

Footage	Core Rec. %	Remarks
173-		Hole cemented 169 to 195 feet because of caving.
173-184	79.5	Fine-grained, siliceous greenstone. Fair Core. Moderate bleaching and silicification. Indistinct cleavage. Occassional bands of massive quartz.
184-225	82.7	Granular greenstone, siliceous, with moderate bleaching. Occassional narrow bands of massive quartz. Poor cleavage. Fairly good core.
		Hole continued to give some trouble down to 191 feet due to caving below end of cemented section at 169 feet.
225-236	54.8	Fragaments of fine-grained, chloritic greenstone. Moderate bleaching and silicification.
236-253	64.7	Siliceous "hornfels" with frequent 12 to 14 inch sections of massive quartz.
253-282	96.0	Greenstone, fine-grained and siliceous
282-295	81.4	Fragaments of quartz and bleached, chloritic greenstone. Generally poor cleavage.
295-305	88.2	Granular greenstone, mottled appearance, siliceous and poor cleavage.
305-315	60.8	Siliceous greenstone, felsitic texture, poor cleavage. Poor core.
315-326	66.7	Greenstone fragaments, well bleached and either strongly silicified or else chloritic. Frequent 12 to 16 inch sections of massive quartx.
326-335	86.1	Greenstone, strongly bleached, chloritized and sericitized.
335-353	76.3	Siliceous greenstone, bleached, strong cleavage. Strongly streaked with epidote. Much massive quartz. Core mostly fragamnets, some chloritic. Last six inches sericite schist mineralized with pyrite.
353-386	99.8	Sericite schist strongly mineralized with pyrite.
386-461	94.6	Sericite schist, weakly mineralized with pyrite. Numerous bands of massive quartz to 10 inches in length. Good core.
461-481	102.0	First 6 inches massive quartz. Remainder quartz porphry schist. (sericitic) No visible sulphides.
481-492	100.0	Greenstone.

LOG D.M.E.A. DRILL HOLE NO. 11

Collar coordinates: N 4225
E 3460

Bearing: N 63° E.
Dip: Plus 30°

Size: NX to 4 feet, BX 4 feet to bottom.
Hole Collared: October 1, 1953 Completed: October 13, 1953
Mineralization: Greenstone cored throughout except section from 507 to 517 feet which cored a dark, siliceous schist, weakly though uniformly mineralized with fine sulphides of iron, zinc, and copper in that order of abundance. Core assays are not yet available but sludge assays show copper content as 0.20% and 0.40% zinc.

Core Recovery: 8[illegible].2% average
Total Depth: 566 feet.
Total Drill Shifts (including moving, setting up etc.) 26.62
Average footage drilled per shift. 21.2

SURVEY: Unavailable at this time.

FOOTAGE	CORE RECOVERY	REMARKS
0-4	75%	Chloritic greenstone.
4-12	64%	Siliceous greenstone bleached appearance.
12-36	60%	Greenstone, mottled appearance, core mostly fragments, fair cleavage, occassional narrow bands of massive quartz.
36-55	52%	Siliceous greenstone, mostly fragments, light colored, bleached appearance, good cleavage.
55-83	81%	Siliceous greenstone, fairly coherent core strong cleavage, much quartz.
83-134	85%	Siliceous greenstone, good core, strong cleavage, and shearing. Many sections of massive quartz some up to twenty inches in length. Some epidote, carbonates and sericite.
134-183	90%	Greenstone with thin white colored streaks, strong cleavage, and some epidote.
183-187	50%	Greenstone, chloritic tabular fragments showing strong cleavage and much shearing. Campo Seco fault thought by Robertson of U.S.G.S. to have intersected hole at this point.
187-226	98%	Greenstone with thin white colored streaks, fairly well developed cleavage. Good core. At 195 feet one inch of vuggy greenstone with cavities filled with hematite.
226-239	91%	Granular greenstone with some epidote. Some light colored streaks as before.
239-337	94%	Fine grained greenstone, hard and dense. Faint cleavage, occassional narrow bands of quartz some epidote, generally light gray green color.
337-388	90%	Fine grained greenstone, occassional narrow bands of massive quartz, some epidote. Moderate silicification. Thin purplish streaks throughout giving a distinct purplish cast to color of core.

FOOTAGE	CORE RECOVERY	REMARKS
388-475	93%	Dense, hard, fine grained siliceous greenstone. Occassional narrow bands of massive quartz, and infrequently a small amount of epidote. Section 472 to 473 consists of massive quartz.
475-485	98%	Dark colored, felsitic greenstone. Faint cleavage.
485-490	87%	Light green, granular greenstone, no cleavage.
490-499	97%	10 inches dark siliceous schistose rock showing pyrite, 33 inches highly siliceous schistose greenstone and quartz (very nearly massive quartz) showing pyrite, and 45 inches siliceous greenstone with bands of quartz and epidote.
499-507	105%	Felsitic greenstone, dark colored and siliceous.
507-517	98%	Dark colored, highly siliceous schist, weakly but uniformly mineralized with the sulphides of iron, zinc and copper in in that order of abundance. Small amount sericite developed. Copper 0.20% and zinc 0.40% in sludge.
517-526	57%	Granular greenstone showing fairly well developed cleavage and schistosity. Occassional narrow bands of siliceous schist.
526-534	90%	50 inches of granular, siliceous greenstone. 36 inches of dark, siliceous schist weakly and uniformly mineralized with fine pyrite.
534-566	91%	Fine grained, dense, greenstone with only faint cleavage, moderately silicified. Occassional narrow bands of massive quartz. Scattered fine pyrite visible.

NEW PENN MINES, INC.

CAMPO SECO, CALAVERAS COUNTY.
CALIFORNIA

DDH D.T.L.L. DRILL HOLE 12

Collar Coordinates: [illegible]
[illegible]

Bearing: N 37°E
Dip: Plus 28 degree

Size: [illegible] to 1 foot—[illegible] 1 foot to bottom at 62[illegible].
Hole collared October 1[illegible], 1953 Completed November 7, 1953
Mineralization: Other than pyrite in a dark, siliceous at last cored from 56[illegible] to 5[illegible], none. It was first thought this interval would contain traces, at least, of copper and zinc but assaying proved otherwise. The hole cored only greenstone from the collar to 56[illegible] feet, and from 5[illegible] to bottom at 62[illegible] feet.

Core Recovery: [illegible]
Total Depth: 62[illegible]
Total Drill Shifts (including moving, setting up etc.) 12
Average footage drilled per shift. [illegible]

SURVEY BY ERO-AMI INSTRUMENT

DEPTH	MAGNETIC BEARING	TRUE BEARING	DIP
Collar		N 37°E	Plus 28°
200	N 81° 0' E	N 2[illegible]° 3[illegible]'E	Plus 3[illegible]°
1[illegible]	N 7[illegible]° 0' E	N 41° 3[illegible]'E	Plus 1[illegible]°
6[illegible]	Unavailable		

FOOTAGE	CORE RECOVERY	REMARKS
0 - 39	5[illegible]%	Siliceous greenstone, granular texture, generally poor cleavage, occasional narrow quartz veinlets. Recovered core largely consists of only fragments.
39-55	1[illegible]%	Fine grained, siliceous greenstone, poor cleavage, core mostly fragments, occasionally narrow bands of massive quartz.
55-59	63%	24 inches as above followed by 7 inches of white, chloritic, fragments showing strong cleaving.
59-71	83%	Greenish texture, siliceous greenstone.
71-133	72%	Fine grained, siliceous greenstone riddled with carbonates and epidote. Fair cleavage. Frequent bands of massive quartz, some to 1[illegible]" in width.
133-159	60%	Greenstone, granular texture, stained with carbonates and quartz. Scattered pyrite from 1[illegible] feet.
159-172	88%	Greenstone, hard, dense, felsitic texture.
172-185	71%	Greenstone, last 1[illegible] inches consists of only bleached fragments showing cleaving and/or slight cleavage. Core shows thin, closely spaced, gray to streaks.
185-201	65%	Greenstone showing thin, closely spaced, purple streaks. Cleavage prominent. Somewhat bleached.
201-205	3[illegible]%	As above but without the purple streaks.
205-216	92%	Greenstone showing thin streaks of carbonates and quartz. Strong cleavage.
216-250	91%	Fine grained siliceous greenstone streaked by carbonates, quartz and epidote. Dense, hard and fresh.

FOOTAGE	CORE RECOVERY	REMARKS
330-380	98%	As above but with only moderate silicification and generally less well developed cleavage. Core recovery generally good and usually coherent.
380-389	60%	Fragments of fine grained siliceous greenstone.
389-410	91%	Fine grained greenstone, moderately silicific, good core streaked with quartz and epidote. Fair cleavage.
410-456	94%	Hard fresh siliceous greenstone.
456-565.5	90%	Fine grained siliceous greenstone. Frequent sections show strong brecciation and later recementation by quartz associated with epidote. Section 481 to 511 exhibits somewhat coarser texture. 545-554 consists of massive quartz.
565.5-570	93%	3.5 feet of extremely siliceous schist very nearly completely replaced by quartz exhibiting weak pyritic mineralization.
570-573	104%	8 inches fine grained greenstone; 15 inches siliceous greenstone containing pyrite, followed by 16 inches of siliceous felsitic greenstone followed by 60 inches of sericitic schist with plentiful pyrite.
573-583	73%	Dark sericitic schist weakly mineralized by pyrite.
583-588	95%	34 inches of schist followed by 23 inches of siliceous greenstone.
588-598	93%	58 inches of brecciated greenstone recemented with and streaked by quartz, carbonates, and epidote. Following is 25 inches of pyritized schist and 21 inches of brecciated greenstone as before.
598-603	65%	Brecciated greenstone recemented by quartz and epidote.
603-624	96%	Greenstone, felsitic texture, thin streaks of carbonates and quartz. Occassional sections brecciated and recemented by quartz.

[illegible] D.M.S.A. [illegible] HOLE 2

Collar Coordinates: N 3700
E 3240

Bearing: N 69° 0' E
Dip: -31°

Size: [illegible] to 3 feet; BX 3 feet to 722 feet; AX 722 feet to 795.5 feet (bottom)
Hole collared: 11-4-53 Completed: 12-17-53
Mineralization: No mineralization of economic importance found in this hole. From the collar to a depth of 670 feet only greenstone was penetrated. From 670 to 731.5 feet the sericite schist was encountered. It was uniformly mineralized with fine pyrite, and occasional, infrequent sections assayed to a maximum of 0.1% copper with a trace of zinc. From 731.5 feet to the bottom of the hole at 795.5 feet, the hole intersected greenstone.

Core Recovery: 96.8%
Total Depth: 795.5 feet
Total Drill Time (incl. setting up, surveying etc.) 36 5/8
Average footage drilled per shift [illegible]

Survey By Pressure Instrument				Acid Bottle
Depth	Mag. Bearing	True Bearing	Dip	Dip
Collar		N 69° 0' E	-31°	
100	N 51° 30' E	N 69° 0' E	-27°	-31°
200	N 52° 30' E	N 68° 0' E	-24°	-26°
300	N 52° 30' E	N 70° 0' E	-21°	-24°
400	N 52° 0' E	N 69° 30' E	-17°	-21°
500	N 57° 30' E	N 70° 0' E	-15°	-19°
600	N 53° 0' E	N 70° 30' E	-13°	-17°
700				-12°
795.5				-10°

Footage	Core Rec. %	Remarks
0- 17	93	Siliceous, granular greenstone
17- 29	93	Siliceous, granular greenstone, strong cleavage, broken core
29- 70	99.4	Siliceous greenstone, good cleavage. Section [illegible]
70-100	99.4	Siliceous greenstone, some only fragments. [illegible] appearance
100-105	87	Twelve inches siliceous, chloritic greenstone. Forty inches black, mottled siliceous greenstone of foliation to core.
105-110	110	24 inches brecciated greenstone re-cemented by quartz. 12 inches granular, siliceous greenstone with mottled appearance
110-114	99.5	Granular greenstone, occasional narrow bands of massive sulfide. Occasional sections moderately silicified. Generally indicated cleavage. Core largely fragments 108-112
114-134	89.4	Siliceous, felsitic greenstone, occasional sections present a mottled appearance. Generally fair cleavage development.
234-240	99.3	Granular greenstone, mottled appearance, fair cleavage.
240-247	54.4	Siliceous greenstone-cleavage faint and irregular. Core mostly bleached fragments.

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Appendix "C"

Samples analyzed by Bureau of Mines

Hole No.	Sample No.	Type	Footage From	Footage To	Percent Cu	Percent Zn	Percent Pb	Ounces Au/T	Ounces Ag/T
6B	7	Core	309	310.5	2.60	18.7	0.9	0.025	3.65
	8	"	307	309	2.15	16.3	0.2	0.015	3.20
	9	"	306	307.5	1.85	11.0	0.2	0.025	2.30
6A	10	"	280	284	2.30	11.2	0.2	0.05	1.40
	11	"	284	284.5	0.15	0.8	0.2	0.01	0.10
11	13	"	507	512.3	0.03	0.4	0.3	Tr.	Tr.
	14	"	512.3	517	0.04	0.4	0.2	Tr.	Tr.
6C	15	"	529	530	0.10	1.0	0.2	Tr.	Tr.
	16	"	530	535	2.33	13.7	0.2	0.015	4.20
	17	"	535	536	1.88	2.7	0.2	0.01	1.30
	18	"	536	537	0.62	1.5	0.2	0.01	0.50
	19	"	537	538.5	0.70	2.8	0.2	0.01	0.70
	20	"	538.5	540	0.60	4.5	0.1	0.01	0.20
	21	"	540	541	0.15	0.4	0.2	0.005	Tr.
	22	"	541	542	1.00	3.8	0.2	0.01	0.20
	23	"	542	543	0.62	1.4	0.2	0.02	Tr.
	24	"	543	544	0.18	0.3	0.1	0.02	Tr.
12	37	"	565.5	570	0.03	0.4	0.2	Tr.	Tr.
	38	"	570	573.7	0.03	0.3	0.2	Tr.	Tr.
	39	"	573.7	575.7	0.04	0.3	0.2	Tr.	Tr.
	40	"	575.7	578	0.10	0.3	0.1	Tr.	Tr.
	41	"	578	583	0.05	0.2	0.2	Tr.	Tr.
	42	"	583	585.7	0.05	0.2	0.1	Tr.	Tr.
	43	"	593	595.7	0.02	0.2	0.2	Tr.	Tr.
6C	44	"	544	545.5	1.46	2.3	0.2	0.02	0.30
	45	"	545.5	548	1.20	2.9	0.2	0.01	0.20
	46	"	548	549	0.04	0.2	0.2	0.01	Tr.
	47	"	549	551	0.08	0.3	0.2	0.01	Tr.
	48	"	551	552.5	0.08	0.2	0.2	0.005	Tr.
	49	"	552.5	554.5	0.04	0.2	0.2	Tr.	Tr.
	50	"	554.5	556.5	0.03	0.2	0.1	Tr.	Tr.
	51	"	556.5	557.5	0.05	0.2	0.1	Tr.	Tr.
	52	"	557.5	559	0.05	0.2	0.1	Tr.	Tr.
	53	"	559	560	0.05	0.2	0.1	Tr.	Tr.
	54	"	560	564	0.03	0.2	0.1	Tr.	Tr.
	67	"	509	573	0.17	2.9	0.1	0.01	0.20
	68	"	564	569	0.03	0.7	0.1	Tr.	Tr.

Hole No.	Sample No.	Type	Footage From	Footage To	Percent Cu	Percent Zn	Percent Pb	Ounces Au/T	Ounces Ag/T
6E	69	Core	306	306.5	1.95	7.2	0.1	0.02	2.00
	70	"	305	306	1.25	4.9	0.1	0.015	0.90
	71	"	304	305	4.73	9.0	0.2	0.05	1.85
	72	"	321	327	0.07	0.7	0.1	Tr.	Tr.
	73	"	327	334	0.20	0.3	0.2	Tr.	Tr.
	74	"	303	304	0.70	1.4	0.2	0.01	0.50
	75	"	301	303	0.10	0.2	0.2	Tr.	Tr.
	76	"	315	321	1.15	0.4	0.2	0.02	0.90
	77	"	312	315	3.15	9.9	0.3	0.05	3.05
	78	"	309	310	5.10	23.1	0.2	0.03	4.70
	79	"	306.5	309	4.72	15.6	0.2	0.04	6.00
	80	"	310	312	5.52	22.8	0.2	0.04	5.00
	81	"	334	335.2	0.08	0.3	0.1	0.005	Tr.
6D	82	Sludge	458	463	0.03	0.1	0.1	Tr.	Tr.
	83	"	463	467	1.07	6.5	0.1	0.02	1.70
	84	"	467	469	0.58	2.6	0.1	0.02	0.80
	85	"	469	471	0.42	2.1	0.1	0.02	0.50
	87	Core	458	463	0.02	0.2	0.1	Tr.	Tr.
	88	"	463	467	0.03	0.2	0.1	Tr.	Tr.
	89	"	463	467*	2.25	26.8	0.1	0.05	5.15
	90	"	467	468.7	1.86	29.2	0.1	0.05	3.35
	91	"	468.7	471	0.47	3.4	0.1	0.02	0.40
	92	"	471	472	0.08	0.2	0.1	Tr.	Tr.
2	93	Sludge	664	670	0.02	0.3	0.1	Tr.	Tr.
	94	"	670	678.5	0.01	0.2	0.1	Tr.	Tr.
	95	"	678.5	685	0.07	0.5	0.1	Tr.	Tr.
	96	"	685	690	0.06	0.3	0.1	Tr.	Tr.
	97	"	690	695	0.04	0.3	0.1	Tr.	Tr.
	98	"	695	697	0.11	0.6	0.1	Tr.	Tr.
	99	"	697	699	0.11	0.5	0.1	Tr.	Tr.
	100	"	699	702.5	0.08	0.4	0.1	Tr.	Tr.
	101	"	702.5	704	0.07	0.3	0.1	Tr.	Tr.
	102	"	704	706.5	0.03	0.3	0.1	Tr.	Tr.
	103	"	706.5	708.5	0.06	0.2	0.1	Tr.	Tr.
	104	"	708.5	709.5	0.05	0.3	0.1	Tr.	Tr.
	105	"	709.5	710.5	0.04	0.2	0.1	Tr.	Tr.
	106	"	710.5	712	0.02	0.3	0.1	Tr.	Tr.
	107	"	712	712.5	0.04	0.2	0.1	Tr.	Tr.
	108	"	712.5	715	0.04	0.2	0.1	Tr.	Tr.
	109	"	715	717.5	0.03	0.2	0.1	Tr.	Tr.
	110	"	717.5	721	0.02	0.2	0.1	Tr.	Tr.
	111	"	721	729.5	0.02	0.2	0.1	Tr.	Tr.
	112	"	729	732.5	0.02	0.2	0.1	Tr.	Tr.

Hole No.	Sample No.	Type	Footage From	Footage To	Percent Cu	Percent Zn	Percent Pb	Ounces Au/T	Ounces Ag/T
2	113	Sludge	732.5	736.5	0.02	0.2	0.1	Tr.	Tr.
	114	"	736.5	738	0.02	0.2	0.1	Tr.	Tr.
	115	"	738	740.5	0.03	0.2	0.1	Tr.	Tr.
	116	"	740.5	746	0.02	0.2	0.1	Tr.	Tr.
	117	"	746	751	0.01	0.2	0.1	Tr.	Tr.
	118	"	751	755	0.04	0.2	0.1	Tr.	Tr.
	119	"	755	768.5	0.03	0.1	0.1	Tr.	Tr.
	120	"	768.5	777	0.02	0.1	0.1	Tr.	Tr.
	121	"	777	781	0.02	0.1	0.1	Tr.	Tr.
	122	"	781	790.5	0.03	0.1	0.1	Tr.	Tr.
	123	Core	781	782.5	0.01	0.1	0.1	Tr.	Tr.
	124	"	777	781	0.02	0.1	0.1	Tr.	Tr.
	125	"	768.5	777	0.03	0.1	0.1	Tr.	Tr.
	126	"	765	768.5	0.03	0.1	0.1	Tr.	Tr.
	127	"	755	765	0.02	0.1	0.1	Tr.	Tr.
6F	128	Sludge	350	353	0.19	0.2	0.1	Tr.	Tr.
	129	"	353	356	0.11	0.1	0.1	Tr.	Tr.
	130	"	356	361	0.08	0.1	0.1	Tr.	Tr.
	131	"	361	366	0.14	0.3	0.1	Tr.	Tr.
	132	"	366	371	0.01	0.1	0.1	Tr.	Tr.
	133	"	371	372.5	0.08	0.2	0.1	Tr.	Tr.
	134	"	372.5	377.5	0.15	0.2	0.1	Tr.	Tr.
	135	"	377.5	382	0.27	0.3	0.1	Tr.	Tr.
	136	"	382	386	0.23	0.3	0.1	Tr.	Tr.
	137	"	386	391	0.15	0.3	0.1	Tr.	Tr.
	138	"	391	396	0.15	0.3	0.1	Tr.	Tr.
	139	"	396	401	0.14	0.3	0.1	Tr.	Tr.
	140	"	401	406	0.18	0.2	0.1	Tr.	Tr.
	141	"	406	411	0.p4	0.2	0.1	Tr.	Tr.
	142	"	411	421	0.15	0.2	0.1	Tr.	Tr.
	143	"	421	430	0.14	0.2	0.1	Tr.	Tr.
	144	"	430	435	0.13	0.2	0.1	Tr.	Tr.
	145	"	435	839	0.11	0.2	0.1	Tr.	Tr.
	146	"	439	443	0.15	0.2	0.1	Tr.	Tr.
	147	"	443	447	0.20	0.2	0.1	Tr.	Tr.
2	148	Core	746	751	0.15	0.2	0.1	Tr.	Tr.
	149	"	751	755	0.19	0.2	0.1	Tr.	Tr.
6F	150	Sludge	450	451	0.15	0.2	0.1	Tr.	Tr.
	151	"	451	455	0.20	0.2	0.1	Tr.	Tr.
	152	"	455	456	0.20	0.2	0.1	Tr.	Tr.
	153	"	456	457	0.22	0.2	0.1	Tr.	Tr.
	154	"	457	461	0.30	0.2	0.1	Tr.	Tr.
	155	"	461	465	0.17	0.2	0.1	Tr.	Tr.
	156	"	465	475	0.18	0.2	0.1	Tr.	Tr.
	157	"	475	481	0.15	0.2	0.1	Tr.	Tr.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

COPY

420 Custom House
555 Battery Street
San Francisco 11, Calif.

June 10, 1954

Memorandum

To: George C. Selfridge, Chairman, Operating Committee, DMEA
Interior Building, Washington 25, D. C.

From: Docket No. DMEA-2885 (Copper-Zinc)
New Penn Mines, Inc.
Penn Mine, Calaveras County, California
Contract No. Idm-E529

Reference is made to the Final Report on the subject property by John D. Warne, Mining Engineer, U. S. Bureau of Mines, and Jacques F. Robertson, Geologist, U. S. Geological Survey, dated March 31, 1954, of which four copies were sent to you with my covering memorandum dated April 15, 1954.

In view of the statements made by the writers of the report as given on pages 24 to 28 of that report, an attempt was made to get Mr. Warne to amplify his statements and to make them more specific.

In reply to my request of April 30, 1954, to Mr. A. C. Johnson, Mr. Warne prepared a memorandum dated May 12, 1954, to Mr. A. C. Johnson, giving information that should be made a part of the Final Report of March 31, 1954.

Attached are four copies of Mr. Warne's May 12, 1954, memorandum which should be considered a supplement to the cited Final Report and filed therewith.

It is apparent from the May 12, 1954, memorandum that Mr. Warne's statements on pages 24 to 28 of the Final Report were premature and would

Reviewed by
DMEA OPERATING COMMITTEE

(date)

not have been made had all the facts been available to him at the time he wrote that section of the report.

/s/ H. C. Miller
Executive Officer
DHEA Field Team, Region III

Attachment
Copy to: Roscoe Smith, USGS
A. C. Johnson, Reno
Finance Officer, Region III
George Mavor

A. C. Johnson, Chief, Mining Div., Reg. III May 12, 1954

John D. Warne, Mining Engineer, Bureau of Mines, Region III

Docket DMEA-2885 - Copper-Zinc
New Penn Mines, Inc.
Penn Mine, Calaveras County, Calif.
Contract Idm-5529

In reply to Mr. Miller's memorandum dated April 30, 1954, statements made in the "Efficiency of Operations" section of this final report are based on overall costs of the project shown in Tables III and IV, pages 21 and 22, of the report. Opinions based on these actual costs, and observations made during the inspections, are also given to fully describe the efficiency of the operations. Although I was not impressed by the cost efficiency of the operation (as shown on pages 23 and 24), no violation of the contract is claimed. Data included on page 28 merely points out possible alterations to my cost figures which could result from the final audit. Copies of invoices, payrolls, and the operator's original application are not on file in this office to make a more complete appraisal of the operator's cost efficiency or to furnish exact figures. Time available for intermittent inspections allows only a superficial or overall appraisal of the operator's efficiency.

Statements made under "Efficiency of Operations" section of this final report were based almost entirely on overall costs of the project given in Tables III and IV, pages 21 and 22. In fairness to the operator I think that the following statement should have been

Reviewed by
DMEA OPERATING COMMITTEE

_____
(date)

included: "The operator is credited with careful planning and preparation of project reports. The overall objective of the exploration project was accomplished; and no provisions of the exploration contract were violated."

The basis for statements made in this report (which are quoted) are as follows:

Page 23, paragraph 3:

Overall costs of project stated: Contract drilling; supervision, labor and supplies; and rehabilitation work; derived from Tables III and IV, pages 21 and 22.

Page 23, paragraph 4:

Cost per foot for rehabilitation derived from Table IV, page 22, and general statement as to the difficulty of this operation.

Page 24, paragraph 1:

"High costs for supervision and labor are reflected in excessive costs for performing the exploration project" refers to actual costs for labor and supervision, (in column 2 of Table III, page 21) which was $28,224.45 or 30% of the total project cost. Incentive bonuses paid to the labor by amendments Nos. 1 and 3 to the contract are also a part of the basis for the above statement. Labor costs were considered high for the period June 15 to July 31, 1953 as reflected in Table III, column 2, page 21. Copies of payrolls are not available in this office to give the exact (bonus plus wages - per man) figures. The bonus system was based on previously estimated costs -- which were high.

"Some unnecessary expenses were observed in extra labor and the purchasing of materials and supplies, and in charges for equipment and transportation by the drilling contractor." This statement refers to labor, materials and supplies charged by the drilling contractor which did not appear to be allowed under the drilling contract, and to which are outlined in your memorandum to Mr. C. C. Mittendorf on February 12, 1954. A small (perhaps inconsiderable quantity) of supplies (such as timber, carbide, etc.) were also furnished him by the mine operator - and this was also considered in the statement. An extra man was noted on one of the contractor's monthly invoices and brought to the attention of the operator -- and an adjustment was later made by the contractor.

A considerable quantity of drilling equipment, which was not actually used, (some of it remained in shipping crates) such as drill rods, core barrels, hole deflecting equipment, etc., was observed at the mine during interim and final inspections. The hole deflecting equipment was ordered by the project superintendent. Transportation of all or part of the drilling equipment may have been charged against the project under the "cost plus 8%" independent contract. The drilling contract was not considered "cost-efficient" -- but this is not the operator's fault.

Page 24, paragraph 2:

"Sampling procedure and supervision of drilling operations were considered poor." The marking of core depths and taking of sludge samples was left up to the drillers. Only a portion of the sludge was caught -- usually one bucket. The superintendent spent very little time

in connection with the underground drilling and sampling operations during my inspections and extensive surveys of drill holes. The geologist's section (page 16) mentions that "no standards of sample taking were maintained."

Relations between the project supervisor and the drillers were poor; however, the results of drilling exploration were correct, and the project did not suffer as a result of the sampling or supervision.

"The operator's representative at the project did not cooperate fully with UAEA inspecting engineers in supplying cost data and other information pertinent to the exploration program."

Cost data pertaining to the project was not always supplied completely in a cooperative manner, but no information was withheld or refused.

Certain project planning information and amendments requested by the operator were not volunteered or disclosed to the inspecting engineer. And, some information, which would have been helpful during the inspection was gained through correspondence at a later date.

Page 21, paragraph 3:

"The cost of completing the exploration project is considered excessive" is based on recapitulation of costs in Tables III and IV, pages 21 and 22 and breakdown of these costs given in paragraphs 3 and 4 under "Efficiency of Operations," page 23.

Page 26, paragraph 1:

At the time of completion of this report, possible future disallowances or alterations (which could result from final auditing

and adjustments) of expenditures reported by the operator were considered and drawn to the reader's attention.

Page 28, paragraph 2:

It was noted that the project superintendent charged $600.00 for his full monthly salary for January 1954. Project operations were concluded January 5, 1954, and the narrative report for January 1954 states that the salvage operations were completed January 20, 1954. Costs for labor and supervision for January 1954 appeared to be subject to disallowances, which would also alter total cost figures contained in the final report.

Page 28, paragraph 3:

This paragraph refers to further alterations to the cost figures contained in this report, which could result from charges made by the drilling contractor -- in excess of those allowed by the contract (such as supplies, equipment, parts, travel expenses for drillers, etc.). These charges were fully explained in Mr. Miller's memorandum, dated February 12, 1954, to Mr. G. O. Mittendorf.

The final sentence of this paragraph refers to equipment shipped to the project - which was not used, and possible salvage value of supplies and equipment (such as core barrels, bits, diamonds, etc.) which were charged against the project for which adjustments may or may not be made by the drilling contractor (which) would also alter the cost figures in this report.

/s/ John D. Warne
John D. Warne

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

COPY

Office of
Executive Officer
DMEA Field Team
Region III

1012 Flood Building
870 Market Street
San Francisco 2, Calif.

AIR MAIL

Memorandum

To: George C. Selfridge, Chairman, Operating Committee, DMEA, Interior Building, Washington 25, D. C.

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA-2885 (Copper-Zinc)
New Penn Mines, Inc., Penn Mine, Calaveras County, Calif.

Reference is made to your subject letter, dated February 26, 1953, requesting a field examination of the Penn Mine.

Attached are two copies of a report entitled "DMEA-2885, Penn Mine, Calaveras County, California, (Copper-Zinc)," by Frank J. Wiebelt, Mining Engineer, U. S. Bureau of Mines, dated March 26, 1953. Two other copies of the report, including the copy of report by Mr. J. Kruttschnitt, Jr., dated March 2, 1926, are going forward to you today by regular mail.

Attached to the copies being sent under separate cover is a copy of a memorandum from Mr. A. C. Johnson to me, dated March 26, 1953, indicating that Mr. Johnson concurs with the recommendations made by the examining engineer. Mr. Bailey and I have read and discussed the report and conclude that the application, with changes suggested by Mr. Wiebelt, should be given favorable consideration, subject to agreement between you and the company's New York office on the proposed changes.

/s/ H. C. Miller
Executive Officer
DMEA Field Team, Region III

Attachments

Copy to: DMEA, Washington, D. C. (Regular Mail with 2 copies of reports)
E. H. Bailey, USGS
A. C. Johnson, Reno

COPY

March 26, 1953.

Memorandum

To: Mr. H. C. Miller, Executive Officer, DMEA Field Team
Region III

From: Chief, Mining Division, Region III

Subject: Docket DMEA-2885 (Copper-Zinc), New Penn Mines, Inc.
Penn Mine, Calaveras County, California

Enclosed are six copies of a report by Mr. Frank J. Wiebelt of the Bureau of Mines, on the above mentioned property in connection with application for a Defense Minerals exploration loan.

The examining engineer was of the opinion that the Penn Mine should be explored at this time, while it is unwatered. The Bureau of Mines, in years past, has also made recommendations for the drilling of this property. The only difference being that the Bureau's holes were proposed from the surface while the holes proposed in the docket would be from more favorable underground stations. The work is based on the geologic work that has been done by G. R. Heyl of the U. S. Geological Survey.

Holes 1 to 6 inclusive on the 1400 level (to East Zone) to remain as originally proposed. An additional hole (No. 15) from the 1400 level has been included in the program to explore the upward extension of the Hinckley orebody 8-b, just above the 1900 level, marked "L" on the vertical projection, from the top of the raise connecting the 1400 and 1700 levels at approximately North 4200 East 3450.

No change is recommended for holes 7-10 inclusive, 1100 level (To West Zone).

Holes 11 to 14 as originally set up, to be drilled from the 1100 level (To Hinckley Zone), would not be long enough to reach the target (the upward extension of the Hinckley Zone above the Campo Seco fault). The holes should be drilled as follows:

1100 level - To Hinckley Zone

Hole No.		As proposed Docket	Recommended	
11	3985N,3265E, N58°E,Horizontal	400	Horizontal	500
12	3985N,3265E, N33°E,Horizontal	400	Plus 32°	450
13	4135N,3125E, N42°E,Horizontal	400	Horizontal	600
14	4135N,3125E, N23°E,Horizontal	500	Plus 25°	575
		1700		2125

Reviewed by
[illegible]

(date)

Mr. H. C. Miller, Executive Officer, DMEA Field Team, Region III

The examining engineer is of the opinion that the drilling contract should be given on a footage basis instead of on the monthly rate as proposed in the docket.

The proposal for rehabilitating the 1100 foot level, the 1400 foot level and the shaft are based on periods of three months each, for each stage of the rehabilitation work. Mr. Wiebelt believes that adequate time has been given for each stage of the rehabilitation.

The exploration work, as proposed, has merit and I concur with the recommendations that have been made by the examining engineer.

The docket and correspondence relating thereto are returned, herewith.

This will answer the questions in your memorandum of March 25.

/s/ A. C. Johnson

Encls.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION
REGION III

DMEA-2885, Penn Mine, Calaveras County, Calif.

(copper-zinc)

Frank J. Wiebelt, Mining Engineer
U. S. Bureau of Mines

March 26, 1955

Docket No.: DMA-2885 (copper-zinc)

Name and address of applicant: C. O. Lindberg, President
New Penn Mines, Inc.,
70 Pine Street,
New York 5, N. Y.

Name and location of property: Penn Mine, Calaveras County, Calif.

The Penn Mine, near Campo Seco, California, was visited by Frank J. Wilbelt, an engineer of the Bureau of Mines, on March 11 to 13, 1953. The purpose of the visit was to obtain information in connection with their application for aid in an exploration project. Mr. Edwin E. Cashier, superintendent of the mine, accompanied the examiner under ground and reviewed and discussed the various phases of the proposed program with him.

The log of two completed and one incomplete diamond drill holes, drilled to date in the vicinity of the proposed exploration area, follows:

Diamond drill hole 3-9E-1 Shawmut Hole on 900 level.

Coordinates: N.5685, E.3175
Bearing: S. 75° W.
Dip: -85°
Length: 500 feet

Log (supplied by Mr. Cahier)

Feet From	Feet To	Description
0	7.5	No core.
7.5	17.0	Siliceous, chloritic, felsitic rock with some sericite, pyrite through out.
17	19	Gray siliceous, cherty rock with considerable sericite To 19 is footwall zone of fast vein.
19	28	Medium dark green rock with prominent altered mafic mineral and probable feldspar; strongly chloritic.
28	35	Dark reddish-brown siliceous, gran. rock locally with cons. epidote.
35	45	Mottled feldspar? and slt. mafic min. with some sericite and sml. qts. phenocrysts. Cons. chl'tn. Sil'cn. becomes apparent near end of run.
45	48	Siliceous zone - same rock type.
48	61	Gran. drk. green rock; rather massive in struct. with no vis. phenocrysts.
61	89	More sil. zone of same rock type with con. chlorite and some sericite. Rock is irreg. banded green to creamy-white color with some irreg. lentils. of qts.
89	91	Pale green, well banded schistose rock with few small qts. phenocrysts.
91	98	Pale green massive schistose rock with numerous large and small qts phenocrysts. (Beyl's qts. porphyry 89-98?)
98	105	Qts. chl. zone of siliceous pale green felsite.
105	147	Gen. f. g. sil. schist, locally more gran. especially 140-147 which section is more chloritic.
147	156	More massive rock; drk. green irreg. mottled with qts. and some epidote. Weak irreg. sch'ty. (Flattening of dip of sch'ty is vaguely indicated on both sides of this section. Driller reports gouge at 147 feet).
156	217	Dark green mass rock, locally gran. tex. with some feldspar? Much chl'tn. throughout and 1 foot qts.-chl. at 180. Sch'ty appears to flatten from 156. Dip (Strike?) is approx. normal throughout.

Feet From	Feet To	Description
217	228	Same gen. rock type with small 1 - 6" bands and irreg. pieces of pale green felsite with local prem. mafic phenocrysts.
228	240	Same as 156-217. Sch'ty appears within 5° of normal to core.
240	287	Tuff! Med. green matrix with intercalated pieces and lenses of paler green felsite. qTz.-chl.-epid. and carb. at 241, 248, and 264.
287	299	Med. green matrix with abun. xls. of white carbonate with some small pale green cherty lentils of felsite which are more abundant from 290 to end of sec. Tuff! 290-298.
299	310	Fault zone; qtz.-chl.-epidote-carb.-chlorite with strong chl'tn. of section. Sch'ty. about 30°, much shearing. Hole apparently following a fracture thru part of section.
310	322	Irreg. banding due to chl'tn, some qtz, and con. carb. Sch'ty. about normal to hole.
322	367	Same rock type as above, prob. more chl'tn., and locally much qtz. and chl.
367	383	Siliceous sect. with con. epidote.
383	387	Dark gray to green rock with numerous sub-ang. white carb. spots; some carb. in vs. carb. gradually increases from little at 370.
387	428	Variable sect. - much epidote and more prom. mafic min. Rock more mass. with irreg. frax. and gen. more gran. tex. Locally what appears to be foreign inclusions of cream-white felsitic rock with fleck of mafic. min.
428	460	Gen. same rock type as preceding section but with more carb. and more mottled appear. from carb. or felds. and sil. with ferr-mag. min. Section shows little if any orientation of min.
460	472	Prob. same rock type, with some local sect. of more felsitic type but still showing sml. white carb. spots. May be course tuff or agg.
472	500	Same rock type with blotchy appearance more obvious because of coarser particles. Sch'ty vague, but approaching normal to dip.

Note: From 19-500 is all greenstone.
Sludge samples taken from 5-60
gave high of 0.45% Cu and 1.00% Zn.
from 11 samples.

D. D. Hole 3-11-41.

Coordinates: 43640 23150 (scaled off map).
Bearing: S. 55° E. (scaled off map).
Dip: Horizontal
Length: 500 feet

The following data on the log of the above drill hole was copied verbatim from a letter written by Mr. Edwin Ashier, superintendent, New Penn Mines, Inc. to his New York office.

(a). Entire hole is in greenstone.

(b). From 0-160 the greenstone resembles the rock types found in H.W. of West Vein on both the 700 level and the 900 level.

(c) At about 160 the hole encountered a different texture of greenstone and this rock continued to about 221 ft. at which point the hole entered typical greenstone again. From 160 to 221 feet there was evidence of shearing and more sericitization. This particular section has more pyrite mineralization than any other section of the entire hole and in addition to this pyrite several small specks were identified as chalcopyrite at approx. 165 feet.

(d) From 221 ft. to the bottom of the hole the rock is made up of the general rock type known as greenstone with disseminated pyrite in very small specks thruout almost the entire length of the hole. There are also numerous small veinlets of pyrite scattered thruout this lower portion of the hole. These veinlets are not over 1/64 inch thick.

(e) Rock from 160 to 221 fits description of Harcourts Shawmut hole 3-9-41 from 300 to 400 ft. Harcourt's log does not mention any pyritization in hole 3-9-41 and our hole shows a considerable amount of pyrite in the section 160-221 with the above mentioned disseminated pyrite thruout other sections of the hole.

(f) In view of the above it is our opinion that section 160-221 feet is the west alteration zone without the quartz porphyrite, the favorable host rock, being present in this horizon. The rocks which would ordinarily be expected to enclose the quartz porphyrite intrusion are, however, present in this particular section of our hole. This leads us to believe that we are still north of any possible quartz porphyrite at this horizon.

(g) Francis Frederick and I are of the opinion that the results of this first hole to the west substantiate the fault theory of the U. S. G. Survey.

* * * * * * *

D. D. Hole 3-11-E2 on 1100 level

Mr. Edwin E. Oehler gave the writer the following log for D. D. Hole 3-11-E2 now being drilled by his company.

Coordinates N 3670 E 3190 1100 level
Bearing: N. 55° E.
Dip: -35°

0 - 495	Greenstone.
495- 630	At 495 the siliceous qtz. porphyrite schist series begins and continues to present bottom of hole 630 feet. At 597 pyrite mineralization begins. On Mar. 11th hole is 630 feet in length.

Notes: Almost 100% core recovery in greenstone.
575-630 - 20 to 25% core recovery.
A drill hole at same location with N. 60° E. bearing and -33° dip was abandoned at 350-feet depth account trouble in fault? material from 300 to 350 feet.
A new hole 3-11-E2 above was started to replace the lost hole.
Survey of dip of hole 3-11-E2 at 100' gave - 35°
" " " " " " 200' " - 33°

PROPOSED DRILL HOLES

Mr. Edwin Cashier, superintendent of New Penn Mines, Inc. and the writer reviewed the original list of proposed drill holes and have suggested changes in the original holes in line with the comments on the drill hole locations in the letter of Feb. 17, 1953 from C. H. Johnson, Bureau of Mines to E. W. Ellis, DMEA and the letter of Feb. 20, 1953 from E. L. Newcomb and A. H. Kinkel, Jr. to E. W. Ellis, DMEA.

Holes 1 to 6 inclusive on the 1400 level (to East Zone) to remain as originally proposed. An additional hole (No. 15) from the 1400 level has been included in the program to explore the upward extension of the Hinckley orebody S-h, just above the 1900 level, marked "L" on the vertical projection, from the top of the raise connecting the 1400 and 1700 levels at approximately North 4200 East 3450.

No change is recommended for holes 7-10 inclusive, 1100 level (To East Zone).

Holes 11 to 14 as originally set up, to be drilled from the 1100 level (To Hinckley Zone), would not be long enough to reach the target (the upward extension of the Hinckley Zone above the Campo Seco fault.) Consequently these holes have been extended in length. As originally proposed, these holes were to be horizontal ones. In order to explore the area at a higher elevation in the same area, it was recommended that only two of the holes be drilled horizontally and the other two holes be up holes.

PROPOSED DRILL HOLES

Hole No.	Original Program: 1400 level - To east Zone	Plus or minus	Suggested Program	
1	3700N, 3240 E, N50°E, -33°,	1250	No change	1250
2	3700N, 3240 E, N69°E, -50°,	1100	" "	1100
3	3700N, 3240 E, N85°E, -25°,	1000	" "	1000
4	3700N, 3240 E, S.82°E, -14°,	1050	" "	1050
5	4500N, 3640 E, S17°W, -56°,	600	" "	600
6	4520N, 3630 E, S58°W, -50°,	500	" "	500
		5500		
15	1400 level - To Hinckley Zone		N4200, S3450, N. 71° 30' E, -25°	800
				6300
	1100 level - To east Zone			
7	3840N, 3150 E, S5°W,	Horizontal 500	No change	500
8	3770N, 3310 E, S7°W,	" 750	" "	750
9	3955N, 3215 E, S48°W,	-15°, 500	" "	500
10	4130N, 3125 E, S48°W,	-15°, 500	" "	500
		2250		2250
	1100 level - To Hinckley Zone			
11	3985N, 3265 E, N58°E,	Horizontal 400	Horizontal 500	
12	3985N, 3265 E, N53°E,	" 400	Plus 32° 450	
13	4135N, 3125 E, N42°E,	" 400	Horizontal 600	
14	4135N, 3125 E, N25°E,	" 500	Plus 25° 575	
		1700	2125	
GRAND TOTAL (Original)		9250	(Suggested)	10,675

COST OF REHABILITATION OF THE OLD BROWN MINE WORKINGS

1. 1100 Level

This level at present is accessible within 25 feet of where drift starts. Going northerly, old maps indicate first 100 feet of that drift are apparently in the schist and are timbered. Then it

appears that remainder of the drift is in greenstone. However, some timber is shown. The crosscut leading to proposed DMA holes 11 and 12 is apparently all in greenstone and not timbered. So it seems there may be about 100 feet of bad ground to reach the drill sites.

It is the writer's opinion that the rehabilitation of this level may require less than two months, althe the estimate, to be on the safe side, should remain at 3 months.

2. No. 3 Shaft (from 1100 to 1400 levels)

From what the writer saw from the 1100 level station of this shaft, it appears that the timber sets in the shaft from the 1100 to 1400 levels will be found to be in good condition and that the timber that will have to be replaced will consist mostly of lagging. The shaft appears to be full of debris, including long, wooden staves from old wooden pipe. In regard to actual muck in the shaft, no estimate can be made and it could vary from very little to a considerable amount.

The writer believes that shaft rehabilitation may require not more than two months. However, the three months allowance should remain in the estimate.

3. 1400 level

The drill site for collar of holes 1 to 4 inclusive is at the shaft station.

To get to collar of holes 5 and 6, there appears to be 360 feet of crosscut all in greenstone and no timber. Then turn north in a drift for 250 feet all in greenstone. Thence, crossing schist zone

there is probably 60 feet of timber and then to underground shaft station there is 320 feet apparently all in greenstone and no timber.

Rehabilitation of this level may require less than two months. Worst ground may only amount to 60 feet. However, to be on safe side estimate should call for three months.

The writer visited several levels including the 1100 from shaft number 3 and found that workings in greenstone were in good condition and required no timber. Workings in schist and alteration zones require timber and in old workings rehabilitation consists of relagging and installation of additional sets of timber.

COMMENTS ON SUPPLEMENT TO FORM MF-105

Page 5 (b). The three heistmen will be necessary. Pumping is done at No. 2 and No. 3 shafts. Two heistmen are required at No. 3 shaft and one at No. 2 shaft.

The mechanic and miner mentioned are really the pumpman and his helper.

As the operations call for two shifts, a superviser and an engineer as stated should be okey.

In regards to Consultants, it is this writers opinion, this item should be omitted. An occasional visit by a U. S. G. S. geologist should be sufficient.

(c) Power: According to the mine accountant, this item appears to be okey.

(d) Operating equipment owned by applicant to be used on "use allowance" basis:

(Based on cost estimate by Supt. Oshier)

Heist and motor, $11,000/60 x 10 months	=	$1,833
Compressor and motor, $11,000/60 x 10 months	=	$1,833
3 Pumps (3 x $3,745)/60 x 10 months	=	$1,872
Blower, $800/60 x 10 months	=	$ 133
Total		$5,671

Page 6 6(e) The hoisting cable 2,000' - $800 is already installed and in use, so this item should be eliminated from supplies item.

Page 4 6(a). Independent contracts:

The applicant contemplates a flat rate per drill shift per month for the diamond drill contract.

The writer does not believe the Government should enter into such a contract. Considering the length of most of the holes, the applicants estimate of $4.66 per foot appears to be too low. The writer believes the actual cost per foot will be from $6.50 to $7.00.

In case a drilling program is set up and same is based on a footage basis, the contract should include estimates on the following:

Standpipe or NX size hole) drilling to include
BX, AX, and EX " ") casing costs.
Reaming AX to BX and EX to AX size holes.
Cementing, by the <u>feet</u>. (Not on hourly rate).
Extras, such as surveying, etc. by the <u>hour</u>.

Based on a monthly basis, too much reliance has to be placed on the drillers as the operator makes same amount of money under such a contract regardless of footage, i.e., the less footage drilled per shift the greater the profit.

RECOMMENDED PROCEDURE OF WORK SCHEDULE

Simultaneously, rehabilitation and unwatering of shaft and rehabilitation of 1100-foot level should be started. This work should be completed in from 2 to 3 months.

Diamond drilling operations can be started at once commencing with hole No. 7 at the 1100-foot level shaft station. In about two weeks, a second hole No. 8 on this level could be started.

At the end of about the second month or not later than third month, drilling operations should commence on holes 1 to 4 inclusive, near the 1400-foot level shaft station. The drilling of these holes can be done simultaneously with the rehabilitation of the 1400-foot level.

Operating rehabilitation work on 2-shift per day basis and operating 2 diamond drill shifts 2 shifts per day, it is estimated that the entire project may be completed in possibly 8 months.

CONCLUSIONS AND RECOMMENDATIONS

The actual cost of the proposed diamond drilling is excessive on account of necessary rehabilitation work and pumping operations.

For the month of August 1952, the company received $9.962 per ton, mining costs were $7.165 per ton, indirect costs $1.583 per ton and development costs were $7.198 per ton, resulting in a loss of $5.966 per ton of ore. With zinc quoted at 15¢, the net per ton of smelter return zinc concentrates was $102.91; and when zinc quotations dropped to 12.083 cents, the net value was $62.85 per ton of zinc concentrates. The present company ceased mining and milling operations because they were unprofitable at present zinc quotations.

From a purely economic view, it appears that, even if the proposed program did result in substantial additions to ore reserves, mining operations would be unprofitable at the present low price of zinc.

However, from a long range and geologic angle, it appears advisable to approve the proposed rehabilitation work and diamond drilling program now, before the mine is allowed once again to fill up with water. The cost of the program is rather high but if not done

now, the cost of such a program at some time in the future, may be prohibitive. The information obtained by the completion of this program would settle once and for all the status of this property regarding future operations and also as to ore reserves below the Campo Seco fault.

The New York office of the New Penn Mines, Inc. prepared Form NT-100 and altho the superintendent Mr. Cahier at the mine and I concurred in the contents of this report, any changes in the loan application would have to be made by the New York office in case approval by the Government is anticipated.

If approval of loan is granted, all rehabilitation and diamond drilling should be required to operate on a double shift per day, six days per week basis. If this is done, the entire contemplated program may be completed within possibly 8 months. Otherwise, proposed work may cost more than sum allotted allowing only partial completion of project.

The project has been set up on the theory that G. S. Heyl's (of U.S.G.S) interpretation of the Campo Seco fault is correct. If drilling proves his theory wrong, then the mine will not have much further large scale value but if Heyl's theory is correct, there is a possibility of developing as much ore as that already produced. Drilling in the east alteration zone, below Campo Seco fault, constitutes the most important target in the entire program. The drilling in the west alteration zone below the Campo Seco fault and the drilling in the Hinckley alteration zone are secondary targets. How-

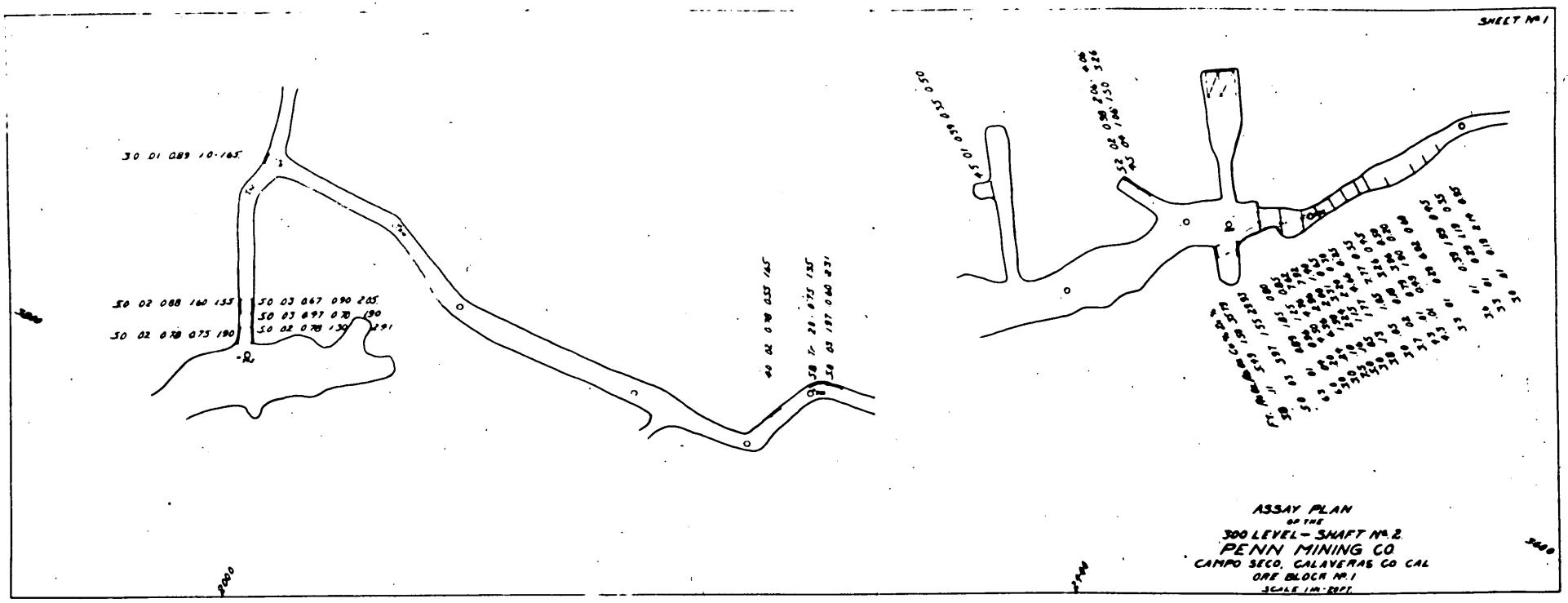
ever, as the work, preliminary to actual drilling, constitutes the major portion of the costs, it is advisable to diamond drill all targets while mine conditions permit the work and thereby reduce cost per foot of drilling.

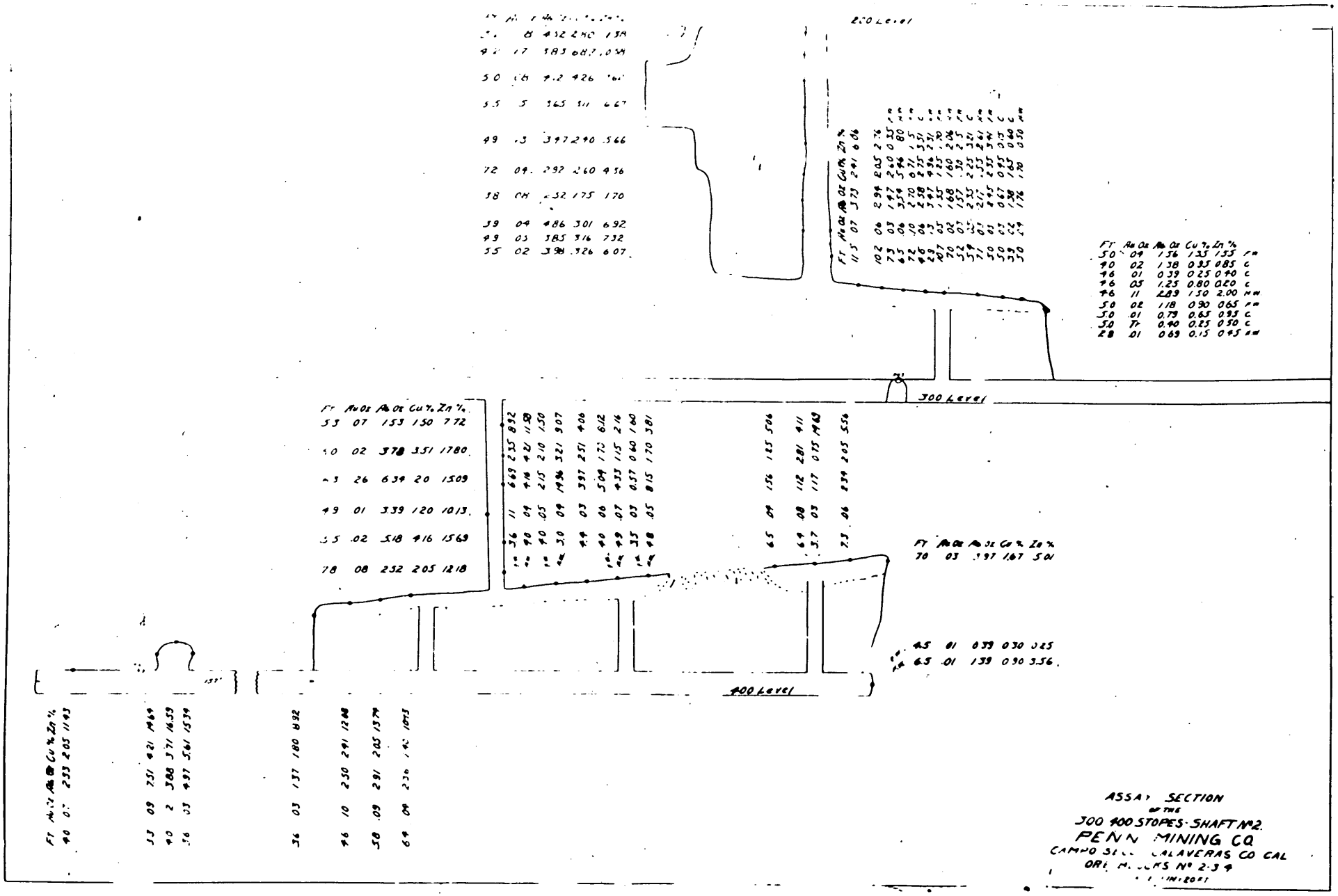
The suggestion for a Bureau of Mines project at the Penn Mine has been under consideration from time to time since 1940. In 1949 a Preliminary Report of the Penn Copper Zinc Mine by S. Ricker, recommended that the Bureau of Mines diamond drill, from the surface, (2,600 to 5,000 feet of hole that would cost from $15,000 to $30,000) the Hinckley alteration zone. The program was based on Heyl 's interpretation of the Campo Seco fault. At that time, had the mine been unwatered to the extent it is now, it is probable that the proposed drilling would have been done from underground stations.

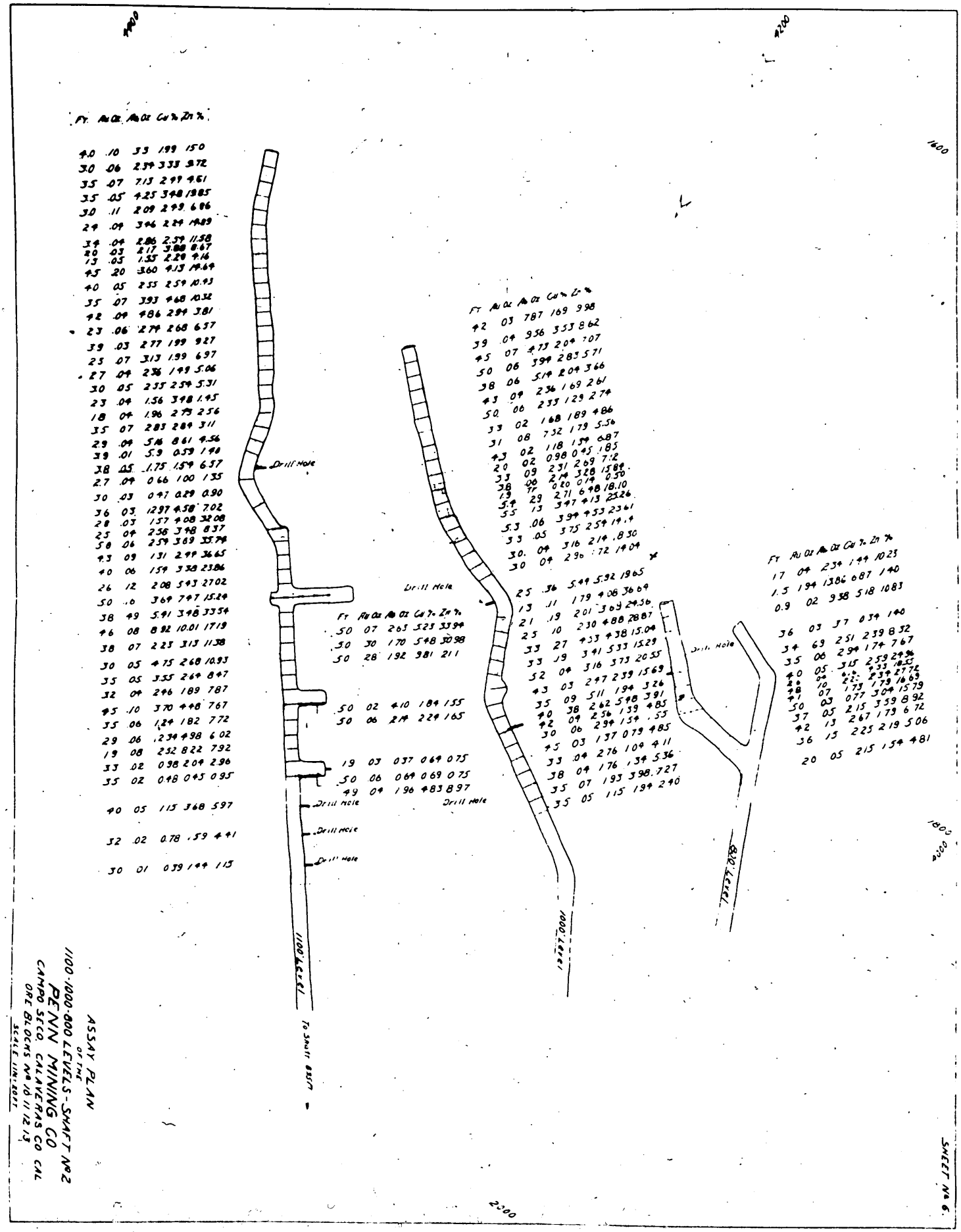
It is also recommended that the progress and log of diamond drill hole 3-11-52, collared on 1100 level and at time of the writer's visit to the mine, and which was 630 feet in depth, should be requested from the company as there is a possibility that although this hole may cut the East Zone at too high an elevation, mineralization found in this hole may furnish valuable geologic information important to the proposed program.

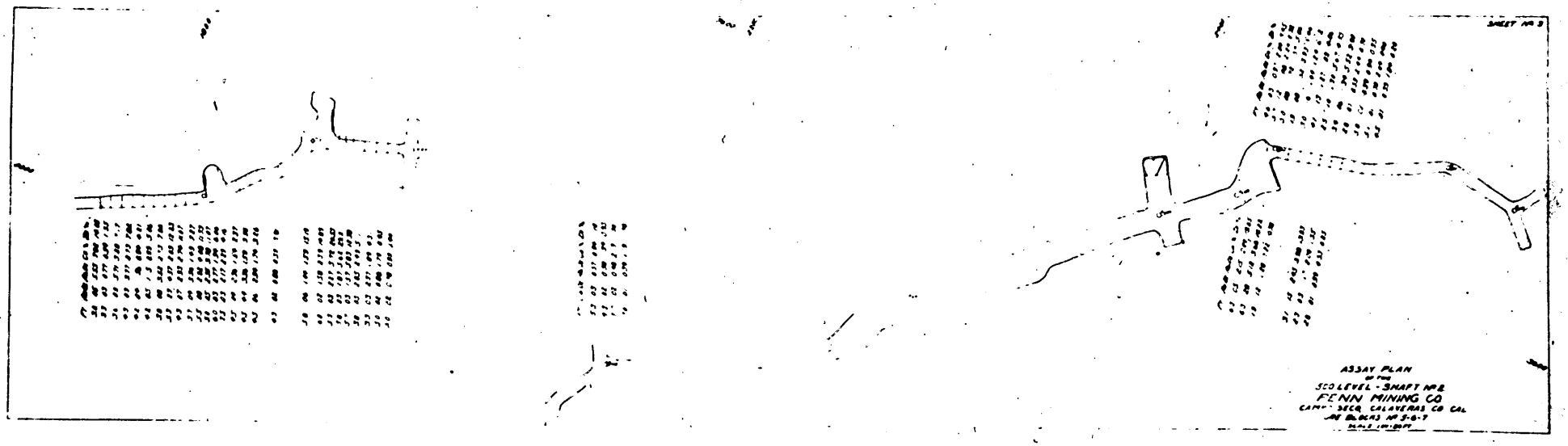
If approval of a loan is contemplated, the applicant should be asked to prepare a new estimate of costs based on suggested changes in the proposed program, such as changes in drilling contract, changes in original drilling program, changes in operating equipment owned by the applicant to be used on rental basis, etc.

It is the writers opinion that with the exception of estimate for Independent Contracts, the cost estimate of other items appear to be quite liberal. The independent contract may actually be closer to $77,000. However, if the work is done in a workmanlike manner, the program, even with this added cost of drilling, should not be more than the company's original estimate.


SHEET No 1
ASSAY PLAN
OF THE
300 LEVEL – SHAFT No 2.
PENN MINING CO.
CAMPO SECO, CALAVERAS CO CAL
ORE BLOCK No 1
SCALE 1IN=10FT.


200 Level
300 Level
400 Level
ASSAY SECTION
OF THE
300 400 STOPES-SHAFT Nº 2.
PENN MINING CO
CAMPO SECO CALAVERAS CO CAL
ORIGINAL WORKS Nº 2-3-4


4400
4200
1600
1800
4000
2000
Drill Hole
1100 LEVEL
1000 LEVEL
800 LEVEL
TO SHAFT 8857
ASSAY PLAN
OF THE
1100-1000-800 LEVELS-SHAFT No 2
PENN MINING CO
CAMPO SECO, CALAVERAS CO CAL
ORE BLOCKS No 10 11 12 13
SCALE 1 INCH = 20 FT
SHEET No 6.


SHEET No 3
ASSAY PLAN
OF THE
300 LEVEL - SHAFT No 2
PENN MINING CO
CAMP SECO, CALAVERAS CO CAL
AS BLOCKS No 5-6-7

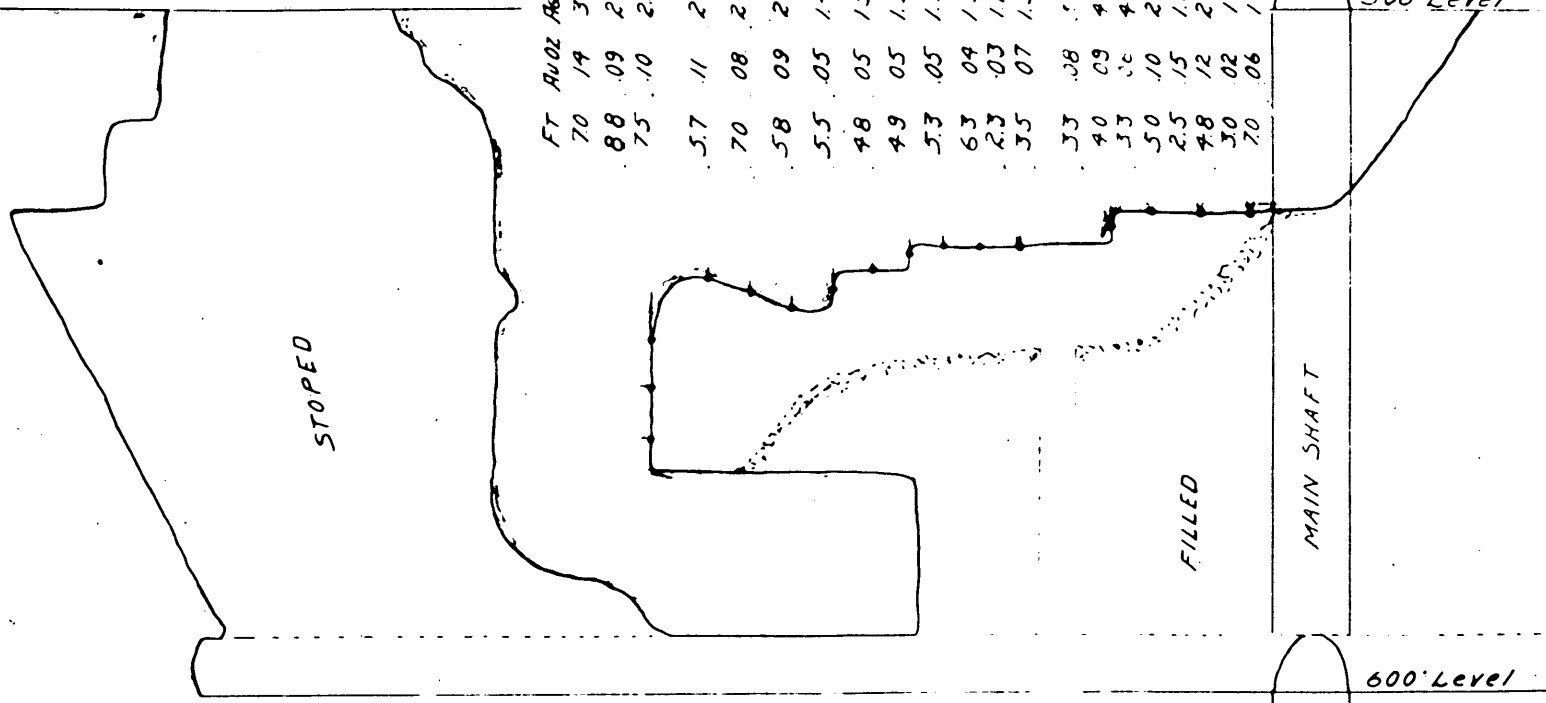
SHEET No. 5.

FT	Au oz	Ag oz	Cu %	Zn %
3.8	.06	3.54	1.30	14.28
3.3	.11	3.19	1.30	10.38
2.2	.05	7.95	2.51	28.67
3.1	.02	1.38	1.94	8.37
3.0	.08	11.52	2.21	21.96
2.8	.07	4.33	2.31	20.8
2.9	.03	5.77	3.06	31.98
3.4	.03	3.97	2.61	31.68
2.5	.09	3.11	2.41	24.71
2.1	.03	1.97	1.25	20.40
2.3	.06	2.54	1.50	19.40
2.6	.01	2.79	1.15	18.80
1.7	.09	3.61	4.66	21.15
2.0	.09	4.91	2.25	16.74

FT	Au oz	Ag oz	Cu %	Zn %
3.7	.04	1.16	1.19	1.25
4.0	.02	0.88	1.54	2.50
4.1	.03	0.82	1.37	2.82
3.5	.02	0.82	1.07	1.72
3.5	.03	0.91	1.12	1.15
4.0	.01	0.72	1.72	0.80
4.5	.02	0.72	1.21	1.35
4.5	.03	0.87	1.09	1.35
4.5	.03	0.74	1.09	0.80
4.5	.02	1.18	0.79	1.55
4.0	.01	0.49	0.90	1.01
4.5	.01	0.59	0.80	0.90
5.1	.02	0.58	1.84	1.15
3.3	.07	0.93	2.04	0.90
4.1	.04	0.76	1.19	1.65
3.6	.02	0.58	1.14	1.40
2.9	.01	0.72	1.84	0.80
3.3	.05	1.05	2.49	1.20
4.6	.02	0.98	2.44	5.66
5.3	.04	0.76	4.33	2.20
2.2	.02	0.48	2.33	1.25
3.0	.05	0.35	2.84	4.51
4.5	.02	0.58	2.54	1.50
2.5	.02	0.46	1.84	1.35

ASSAY PLAN
OF THE
700 LEVEL - SHAFT No. 2
PENN MINING CO.
CAMPO SECO. CALAVERAS CO. CAL
ORE BLOCK No 9.
SCALE 1IN=20FT.

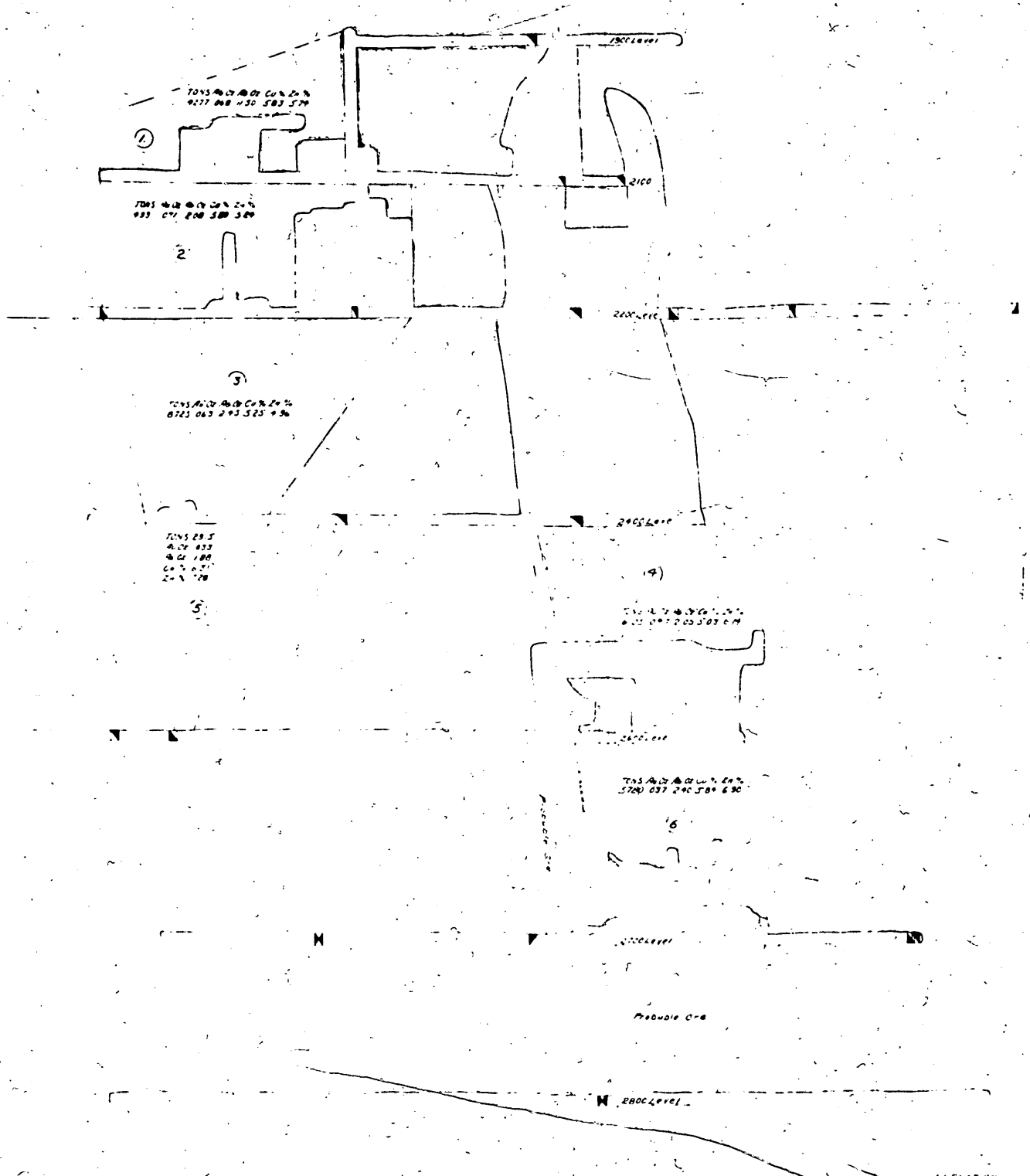
SHEET Nº 4.



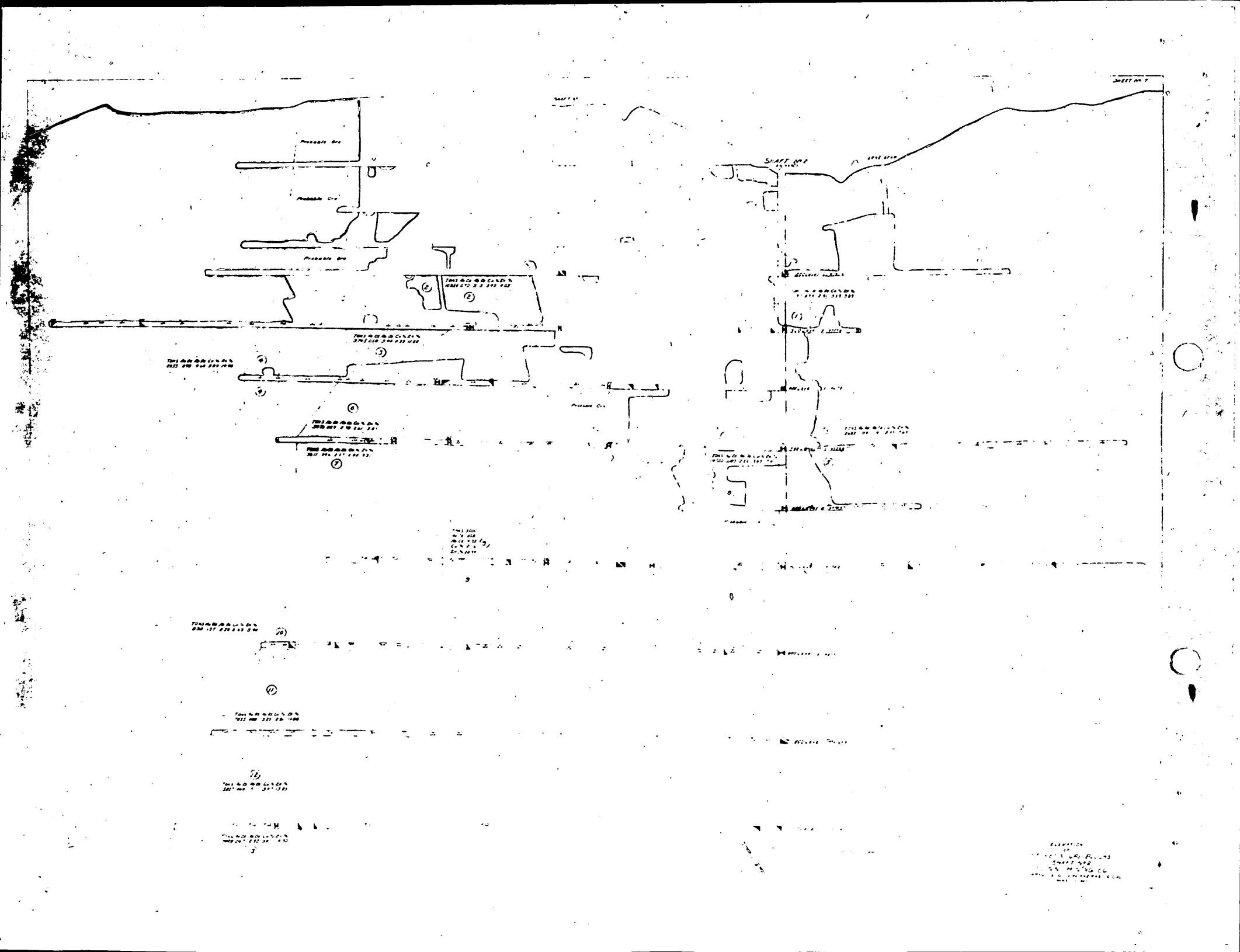
FT	AU OZ	AG OZ	CU %	ZN %	
7.0	.14	3.16	4.25	13.43	
8.8	.09	2.51	3.58	12.18	
7.5	.10	2.50	3.43	11.68	
5.7	.11	2.19	2.01	12.68	
7.0	.08	2.32	1.90	9.07	
5.8	.09	2.11	2.80	8.62	
5.5	.05	1.45	3.46	2.66	
4.8	.05	1.55	2.79	4.81	
4.9	.05	1.35	2.59	3.16	
5.3	.05	1.35	4.03	4.21	
6.3	.04	1.36	3.63	4.21	
2.3	.03	1.17	3.98	0.65	NW
3.5	.07	1.53	5.55	5.21	FW
3.3	.08	[illegible]	7.8[illegible]	[illegible]	[illegible]
4.0	.09	4	5.03	8.02	[illegible]
3.3	[illegible]	4.74	3.32	3.61	NW
5.0	.10	2.50	2.69	9.42	FW
2.5	.15	1.85	4.08	3.81	NW
4.8	.12	2.68	4.63	9.62	FW
3.0	.02	1.18	2.69	0.30	NW
7.0	.06	1.34	3.08	6.51	FW

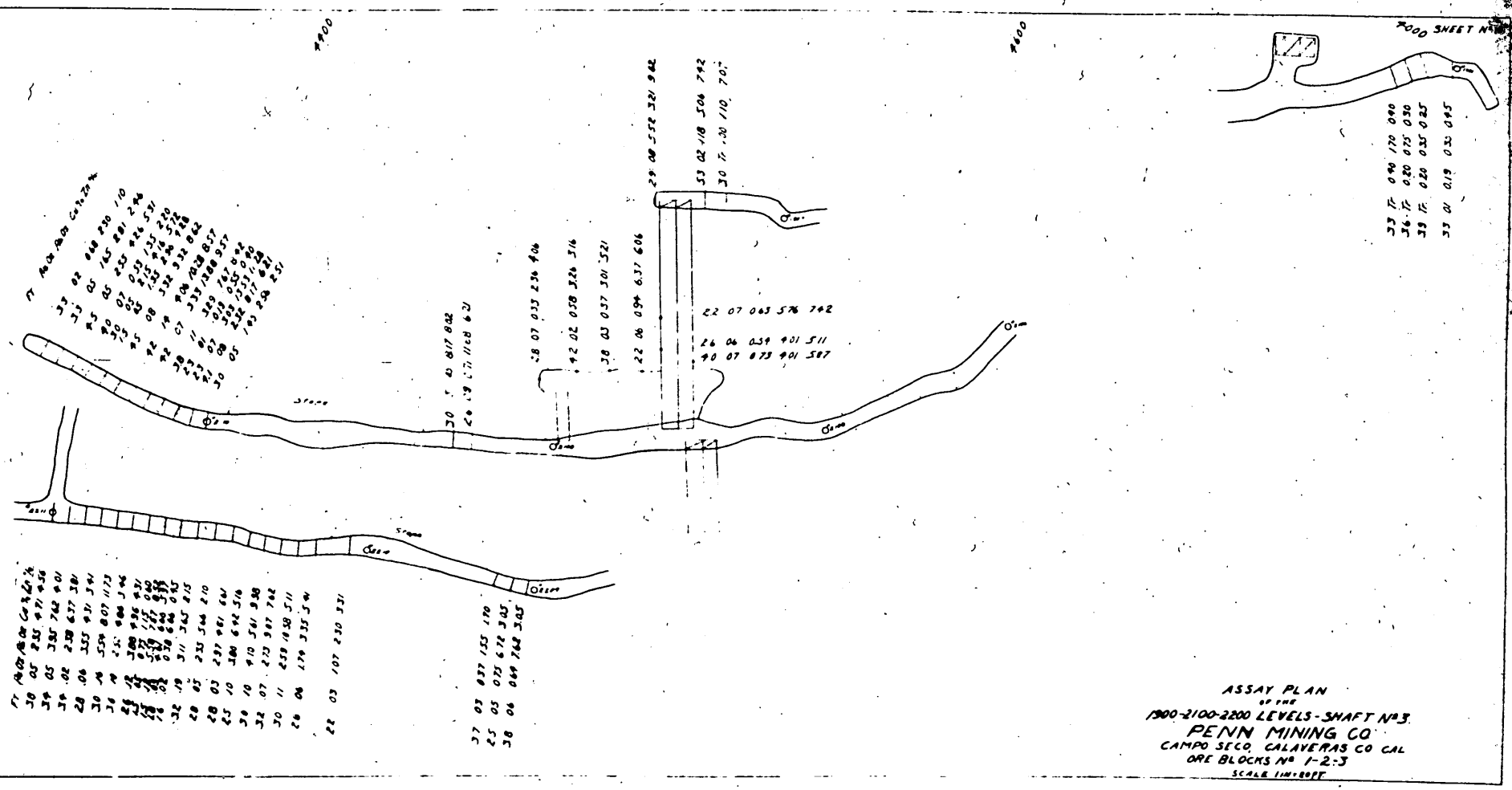
ASSAY SECTION
OF THE
600 STOPE - SHAFT Nº 2
PENN MINING CO
CAMPO SECO, CALAVERAS, CO CAL
ORE BLOCK Nº 8
SCALE 1 IN 20 FT

SHEET No 11



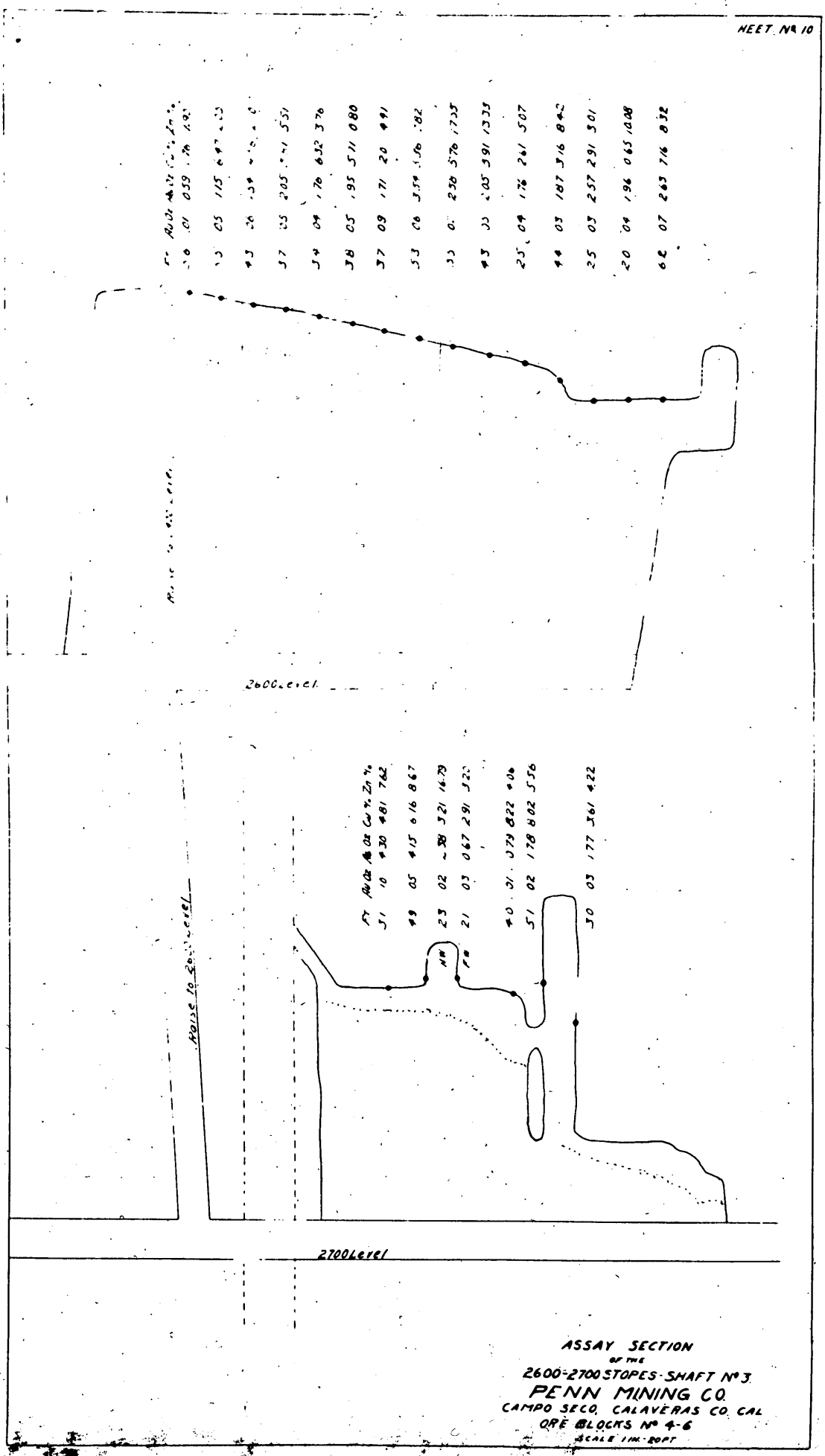
ELEVATION
OF
STOPES & ORE BLOCKS
1900 to 2800 LEVELS SHAFT No 3
PENN MINING CO
CAMPO SECO CALAVERAS CO CAL
SCALE 1 IN = 40 FT





ASSAY PLAN
OF THE
1900-2100-2200 LEVELS - SHAFT No 3
PENN MINING CO
CAMPO SECO, CALAVERAS CO CAL
ORE BLOCKS No 1-2-3
SCALE 1 IN: 80 FT

SHEET No. 10



ASSAY SECTION
OF THE
2600-2700 STOPES-SHAFT No 3.
PENN MINING CO.
CAMPO SECO, CALAVERAS CO. CAL
ORE BLOCKS No 4-6
SCALE 1 IN-10 FT

SHEET No. 9.

FT	Au Oz	Ag Oz	Cu %	Zn %
36	.03	3.47	4.41	10.38
30	.17	4.93	12.28	17.34
17	.09	3.31	4.87	3.26
10	.06	2.34	8.32	17.70
25	.01	1.99	2.06	5.97
15	.02	1.98	2.75	9.22
30	Tr	0.20	0.60	0.40
17	.03	1.37	2.36	2.60
19	.01	0.89	2.30	3.81
48	.02	0.38	0.80	2.00
19	.01	1.39	3.16	3.91
19	.02	0.88	3.26	4.61
19	.01	0.19	1.50	0.35
20	.03	0.67	3.26	3.11
24	.02	1.28	3.06	6.56
27	.01	0.79	2.61	2.15
49	.02	0.38	3.31	2.15
58	.01	0.19	1.80	1.60
51	Tr	0.10	1.15	0.75
38	.01	.029	1.20	0.55
40	.01	0.19	0.75	0.40
33	.01	0.09	0.85	0.30
33	.02	0.18	0.95	0.50
30	.01	Tr	0.70	0.30
36	Tr	Tr	0.25	0.90

FT	Au Oz	Ag Oz	Cu %	Zn %
36	.03	1.37	10.38	18.74
55	.04	2.76	17.04	8.32
68	.05	2.95	14.19	10.58
45	.01	0.69	2.69	3.05
35	.01	0.79	.90	2.00
35	.02	1.18	.05	1.60
28	Tr	Tr	0.5	0.20

ASSAY PLAN
OF THE
2400-2600 LEVELS - SHAFT No. 3.
PENN MINING CO.
CAMPO SECO, CALAVERAS CO. CAL.
ORE BLOCKS No. 3-5.
SCALE 1 IN. = 20 FT.

U. S. Geological Survey

April 28, 1953

Defense Minerals Exploration Administration
U. S. Department of the Interior
Washington 25, D. C.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 29 1953

Attention of Mr. C. L. Knouse

Ref: Docket No. DMA 2085

Dear Sirs,

Enclosed herewith please find, in quadruplicate, "Amended Supplement to Form MF-103" to replace the supplement that accompanied our application dated February 13th, 1953. I have rewritten the entire supplement and have incorporated within it the various changes and suggestions discussed since our original application was filed. I believe this amended supplement covers the entire subject so that reference to previous correspondence will not be necessary. New maps have been prepared to show the proposed diamond drilling as discussed with you last week and as described in the enclosure.

Also enclosed please find photostatic copies of two property maps. On the larger of these, the property owned by the company is shown in such a way that the descriptions as given in the deed from Penn Mining Company to New Penn Mines, Inc., copy of which you have, can be followed. This larger map covers all the patented ground. On the smaller map, the unpatented claims are shown as well as their relationship to two of the patented claims and the section corner. I believe these maps are adequate to enable your attorneys to follow the title descriptions, particularly as concerns that part of the property in which this particular exploration project is to be conducted.

I trust that the enclosures with this letter provide all the information necessary. If they do not, please advise me at once and I shall provide as promptly as possible anything that is missing.

Kindest regards,

Sincerely yours,

(Sgd.) Robt. F. Playter

R. F/tm
Encls.

[U. S. Geological Survey]

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

RECEIVED
APR 20 1955

SUPPLEMENT TO FORM MF-103
Amended April 27, 1955
(Numbers and letters indicate answers to questions on Form MF-103)

1. (a) New Penn Mines, Inc., 70 Pine Street, New York 5, N.Y.

   (b) A corporation, incorporated in the State of Nevada.

   (c) Officers and Directors:

   Pres. & Director - C.O. Lindberg, 70 Pine St., N.Y.5, N.Y.
   V.Pres. & Director - W.C. Browning, 1211 Pacific Mutual Bldg., Los Angeles 14, California
   Director - R.F. Playter, 70 Pine St., N.Y.5, N.Y.
   Director - C.F. Fisk, Murphys, California
   Director - E.L. Harp, Coresman, California
   Secretary & Treasurer- J.H. Nicholls, 70 Pine St., N.Y.5, N.Y.

   (d) Not applicable.

2. No answer required.

3. (a) See description in deed attached hereto.

   (b) Penn Mine.

   (c) New Penn Mines, Inc. is owner of the land.

   (d) Not applicable.

   (e) There are no liens or encumbrances.

   (f) See description in deed attached hereto.

4. (a) See Form MF-100.

   Mine workings of No. 2 Shaft are accessible for examination to 1100 level. Mine workings of No. 3 Shaft are accessible to 1100 level, except where old workings on East Ore Zone are caved.

   (b) See Form MF-100.

   (c) The following brief description of the geology of the Penn Mine is quoted from the "Abstract" of the report on the mine by George R. Hoyl, Manning W. Cox, and John

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

4. (e) (Cont'd)

M. Eric, published as part of Bulletin 144 of the California Division of Mines (1948):

"The Penn copper-zinc deposits in Calaveras County, California, are in slightly metamorphosed Jurassic volcanic rocks and intrusive quartz porphyry. Bedding schistosity, and cleavage strike northwest and dip steeply northeastward. Two main types of faults are present; High-angle schistosity faults, and younger low-angle reverse faults. There are six main alteration zones, in which rocks have been sericitized, silicified, and pyritized.

"The ore bodies are sulphide replacement deposits either at contacts of alteration zones, or along faults within these zones. The ore bodies are steeply pitching lenses. Their pitch length ranges from 150 to 1,000 feet; breadth, from 100 to 400 feet; width from 4 to 30 feet. The ore is a mixture of pyrite, sphalerite, chalcopyrite, and a little bornite, tetrahedrite, and galena. Gangue minerals are barite, calcite, and quartz."

More detailed descriptions of the geology and the exploration possibilities were filed with the applications of Penn Chemical Company for Government assistance. Form NF-103 was filed August 11, 1951, and was assigned Docket No. 1966. An amendment was filed March 31, 1952, outlining a program for testing three potentially productive ore zones. The present program is designed to test these same zones.

Geological evidence indicates the likelihood that the West and East ore zones, which were mined to the 1100 levels of the No. 2 and No. 3 shafts, respectively, were faulted by the Campo Seco fault, and that the extensions of these orebodies below that fault may be found. Furthermore, the evidence indicates that the Hinckley orebody, mined from the 1700 to the 2800 ft. level, also may have been faulted by the Campo Seco fault and that an extension of that orebody may be found above the fault.

The program here proposed is intended to test by diamond drilling the three possibilities. Attached are a plan, longitudinal projection, and cross section showing the proposed work.

We consider the major objective to be the extension of the East Zone orebody below the Campo Seco fault. To

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

4. (e) (Cont'd)

make the tests conclusive we believe it will be necessary to drill from the 1400 level in order to obtain satisfactory angles of intersection between the diamond drill holes and the objective. Hence, as a part of the program we have included the task of unwatering and reconditioning the No. 3 Shaft to the 1400 Level, and also the reconditioning of that level to the collar of the old No. 3 winze, from which the Hinckley oreshoot was mined between the 1700 and 2000 levels.

Also important are the tests of the West Zone below the Campo Seco fault, and the Hinckley Zone above the Campo Seco fault. The test of the West Zone can be made satisfactorily from the 1100 level of No. 3 Shaft, but it will be necessary to reopen the crosscut from the Shaft to the drift on the East Zone, about 250 feet. This will not be difficult, for the crosscut is in good condition and needs only to be cleaned out and new track laid. It is hoped that the first 125 feet of the East Zone drift can be recovered too with comparatively little work. Provision is made in the estimate for the rehabilitation of the 1100 crosscut and the first 125 feet of the drift.

The Hinckley Zone above the Campo Seco fault will be tested by drilling inclined holes upward from the 1400 level, after it has been reopened. It may prove to be desirable to rehabilitate the north 125 feet of the old 1400 level drift in order to obtain a suitable drill site. Provision has been made for this work in the proposal.

The specific holes recommended are listed below and are shown on the accompanying plan and cross section.

PROPOSED DRILL HOLES

1400 Level - To East Zone

Hole No. 1.	3700N,	3240E,	N50E,	-33°,	± 1100'
2.	3700N,	3240E,	N49E,	-33°,	± 1100'
3.	3700N,	3240E,	N85E,	-32°,	± 1100'
4.	3700N,	3240E,	S82E,	-30°,	± 1100'
5.	4500N,	3640E,	S17W,	-62°,	± 600'
6.	4500N,	3640E,	S68W,	-70°,	± 500'
					5500'

The bearings and vertical angles of the above holes are tentative. The intention is to intersect the center of the "schist zone" at horizontal intervals of approximately

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

4. (c) (Cont'd)

200 feet, and at a depth approximately 400 feet vertically below the 1400 level. As information is gained from the earlier holes, the bearings and vertical angles of the later holes can be altered as needed to accomplish the intended purpose.

1100 Level - To West Zone

Hole No. 7.	3640N, 3150E, S9W, Hor.		± 400'
8.	3770N, 3310E, S7W, Hor.		± 750'
9.	3640N, 3150E, N85W,	-42°	± 400'
10.	3770N, 3310E, N84W,	-17°	± 600'
			2150'

Holes 9 and 10 are planned to intersect the vein about 150 feet below the 1100 level.

1400 Level - To Hinckley Zone

Hole No. 11.	4200N, 3450E, N63E,	+30°	± 400'
12.	4220N, 3450E, N37E,	+26°	± 500'
13.	4300N, 3370E, N32E,	+24°	± 500'
14.	4300N, 3370E, N14E,	+17°	± 600'
			2000'

These holes are planned to intersect the Hinckley Vein zone about 150 feet vertically above the 1400 level. Holes 13 and 14 are planned under the assumption that the extreme north 125 feet of the old 1400 level drift will be reconditioned and made accessible. If not, they could be drilled from the same site as holes 11 and 12, but the bearings and vertical angles would have to be changed.

(d) Property is 5½ miles from Valley Springs, California on the Southern Pacific Railroad, and is accessible by 4 miles of paved road and 1½ miles of good gravel road. Valley Springs is on California Highway No. 12, a main highway.

(e) Manpower is available in the community, near the Mother Lode county. Materials and supplies are available from Mother Lode supply houses. All major equipment for mine and mill is installed on the property. Water is available in quantity and at all times from the Mokelumne River which adjoins the property. 2300 Volt power lines, with necessary transformers, etc., are installed on the property. Power is supplied by Pacific Gas & Electric Company.

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

5. (a) Copper and zinc with accessory gold, silver and lead.

(b) See Paragraph 4(c).

(c) The work will start within ten days and be completed within ten months from the date of an exploration project contract.

(d) New Penn Mines, Inc. is controlled by The Gold Fields American Development Co., Ltd., an established mining company. E. H. Gehier has resigned his position of Superintendent, effective June 1, 1953. As soon as we have engaged a man to replace him, the D.M.E.A. will be advised.

6. (a) Independent Contracts: Diamond drilling is to be contracted to Continental Drilling Co., of Los Angeles, California, on the basis of a maximum of $4,400 per month for the use of one machine and crew of two men a shift, two shifts per day, six days per week. All work necessary to advance the hole and obtain maximum core recovery will be done by the contractor, including reaming, casing, cementing and any other work needed.

Attached hereto is a statement showing the actual cost of the diamond drilling done during the four months' period from December through March, and a copy of the actual invoice for the month of March, 1953. This work was done for New Penn Mines, Inc., by the Continental Drilling Company of Los Angeles under the cost-plus contract, copy of which has been submitted to the D.M.E.A. This statement shows an average direct cost of $4.27 per foot for the 1667 feet of drilling done up to April 1.

The February and March drilling was on hole 3-11-E2, from the 1100 level station of No. 3 Shaft downward to the East Zone. The drilling in February, when the cost averaged $3.65 per foot, was in the "greenstone" footwall of the "sericitic schist" zone. That drilling was done with "BX" equipment, and footage of 464 feet was accomplished working one shift per day only. In March, when the cost went up to $5.35 per foot, the hole went through the soft "sericitic schist" zone, where progress was slower. During that period the hole was reduced first from "BX" to "AX" size and later from "AX" to "EX" size. Some time was required to set casing.

The work to date shows an average monthly footage, working one shift per day, six days per week, to be 416 feet. On this basis two shift operations should average something over 800 feet per month. On the long holes pro-

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N. Y.

posed to be drilled to the East Zone on the 1400 ft. level this average probably cannot be bettered. However on the shorter holes proposed to be drilled to the West Zone on the 1100 level and to the Hinckley zone on the 1400 level this average should be bettered.

Attached hereto is an estimated time schedule based on the above assumption, but with allowance made for time lost in shifting from one hole to another, and taking into consideration the particular holes. We contemplate starting drilling operations in the second month, after the rehabilitation of the crosscut on the 1100 level has been completed. One machine will be used until the 7th month, by which time rehabilitation of the 1400 level will have progressed sufficiently to allow use of two machines. The use of two machines is contemplated through the 9th month and one machine in the 10th month, to complete the program. Actually we believe the program may be completed by the end of the 9th month.

Using the above as a basis, and assuming the maximum charge of $4400 per machine per month, each machine working two shifts a day and 6 days a week, 12 machine months would be required (the last one of which would not be a full month), making the total expenditure for drilling $52,400, or an average of $5.43 per foot for 9650 feet. It will be observed that this figure checks very closely with the maximum figure of $5.35 per foot actually obtained in our drilling to date.

Although we believe that the work done to date is about typical of that contemplated in the program under consideration, our drilling at the Penn Mine is hardly adequate to permit a certain statement that all of the proposed work can be done at the rate and cost indicated by our work to date. We believe that the average cost may be held to about $5.00 per foot, but unpredictable difficulties or bad luck might make the cost for a month or two as great as $6.00 or even more. Therefore we request that a maximum direct drilling cost of $6.00 per foot be allowed, and that this maximum be applied against the average cost per foot of the entire program.

We also enclose another time schedule of estimated expenditures. This schedule is based upon the time schedule of work to be performed.

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

6. (b) Labor, Supervision and Consultants

In estimating labor costs we have assumed operations will be conducted two shifts per day, six days per week. On this basis we have assumed 26 working days per month, 21 week days and 5 Saturdays. In estimating monthly labor cost we have therefore calculated 21 days at the wage rate and 5 days at 1.5 times the wage rate.

As permanent labor, to be used throughout the entire program, we have included 5 men, three hoistmen, one mechanic and one miner. Two of the hoistmen will operate the hoist on the No. 3 Shaft two shifts daily. The other man will have to be available at the hoist at the No. 2 Shaft a few hours each day while the mechanic and miner are underground attending to the pumps in the No. 2 Shaft.

The question can rightly be asked why it is necessary to run the pumps in the No. 2 Shaft, when the maps show the two shafts to be connected. Although the two shafts were connected, the 1400 level has caved and blocked the connection so that water does not flow from one to the other. We have no idea as to how large or secure the "dam" between the two is. Therefore, it would be unsafe to allow the water to rise in the No. 2 Shaft while men were working on the 1400 level of No. 3 Shaft. For that reason we have had to allow for pumping in the No. 2 Shaft, which makes an extra hoistman necessary.

The mechanic and miner will operate and maintain the pumps in both shafts, check the shafts and mine workings to keep them safe, maintain the hoists and compressors, and in general keep things in safe operating condition. Their services will be needed throughout the entire program of 10 months. The following is the estimated cost of labor:

3 Hoistmen at $12.50	=	$37.50
1 Mechanic at $16.00	=	16.00
1 Miner at $12.50	=	12.50
		$66.00 per day
21 x 66 + 5 x 99	=	$1881.00 per month
10 x 1881	-	$18,810.00

Supervision

As stated above, the present Superintendent has submitted his resignation to take effect June 1st. His salary is

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

$600 per month, and in our original estimate we allowed $6,000 to cover supervision ($600 x 10 months). It is possible that we will have to pay $800 per month to obtain a man capable of supervising the operation. Therefore we include $8,000 as the cost of supervision for the 10-month period.

Engineering

As previously explained, it will be necessary to employ an Engineer to prepare a set of maps suitable to cover the project. This may take 3 months and we have included an estimate of $1200 to cover this.

Consultants

The $3,000 charge for Consultants has been eliminated.

Summary

The estimated cost of labor, supervision and Consultants, as revised, is as follows:

Labor	10 months at $1881	=	$18,810.00
Supervision	10 months at $800	=	8,000.00
Engineering	3 months at $400	=	1,200.00
Consultants	---		---
			$28,010.00

(c) Operating Materials and Supplies

As it may be necessary to excavate some ground, a small allowance for explosives has been added. The revised estimate is as follows:

Power	$1400/mo. x 10 months	=	$14,000.00
Lubricants	$25/mo. x 10 months	=	250.00
Water	$10/mo. x 10 months	=	100.00
Explosives		=	200.00
Miscellaneous		=	200.00
			$14,750.00

(d) Operating Equipment Owned by Applicant to be used on "The Allowance" Basis.

The principal items of equipment are the hoists at the No. 3 and No. 2 Shafts, and the compressor at the No. 3 Shaft. None of this equipment is new. It was old when we took over the mine in June, 1952. Therefore

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

6. (d) Cont'd.

we cannot show a present value based on cost less depreciation. We submit that a fair value for each of the hoists and for the compressor at the No. 3 Shaft, with their motors, is $11,000 each, or $33,000 in all. We also submit that these amounts should be depreciated over a period not greater than 10 years.

The next most important items of equipment are the pumps. Because of the acid water they have to handle these are stainless steel pumps that cost $3,745 each. Four are in use, two in each shaft. In spite of the fact they are made of stainless steel, their life is relatively short and we believe they should be depreciated over a period not greater than 5 years.

The other items are relatively unimportant, rock drills, mine cars and mine skips. Mechanical mucking machines are available on the property, if needed, but no provision is made for their use, for the amount of mucking anticipated is relatively little.

The following table shows the "use allowance" we suggest:

Item	Value	Annual Depreciation %	Annual Depreciation $	10 months' Depreciation
Hoist -				
No. 3 Shaft	$11,000	10	1100	$ 917
" 2 "	11,000	10	1100	917
Compressor -				
No. 3 Shaft	11,000	10	1100	917
Pumps (4)	14,980	20	2996	2497
Rock Drills (2)	1,000	33-1/3	333	278
Mine Cars (4)	400	10	40	33
Skips	400	10	40	33
Blower	800	10	80	67
Totals	$50,500		$6789	$5659

(e) Rehabilitation and Repairs

The No. 3 Shaft is a three compartment shaft but only one hoisting compartment is equipped with rails for haulage. It is not our intention to equip the second hoisting compartment as part of the program under discussion.

Rehabilitation of No. 3 Shaft from 1100 to 1400 Level

Labor:

2 Shaftmen at	$15.00	=	$30.00
4 " "	14.00	=	56.00
2 Top Men "	10.00	=	20.00
			$106.00 per day

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N. Y.

6. (e) Cont'd.

21 x 106 + 5 x 159 = $3,221.00 per month

3 x 3,221 = $9,663.00

Supplies:

Timber 20,000 bd. ft. at $75 =	$1,500
Rails - 600', 40# = 4T at $140=	560
Transite Pipe - 300' at $1.30 =	390
Air Pipe - 300', 4" at $1.86 =	558
Water Pipe - 300', 1" at $0.20=	60
Track Spikes & Nails 100# =	25
Pipe Fittings	100
Tools	300
Pipe Clamps & Hangers	200
Ladders	300
Bell Cord (Stainless Steel) 300' at $0.50 =	150
Telephone and Wire	300
Hoisting Cable - 2,000'	800
Electric Cable - 300' at $4.00=	1,200
Miscellaneous	500
Total	$6,943

Total Rehabilitation of No. 3 Shaft from 1100 to 1400

Labor	$9,663
Supplies	6,943
	$16,606

Rehabilitation of 1100 Level

Labor:
4 Timbermen at $12.00 = $48.00/day
21 x 48 + 5 x 72 = $1,368/mo. x 1 = $1,368.00

Supplies:

Rails - 750', 16# = 2T x $150 =	$300	
Timber, 10 sets at $20 =	200	
Air Line - 375', 2" at $0.40 =	150	
Water Line - 375', 1" at $0.20 =	75	
Track Ties - 125 at $0.60 =	75	
Track Spikes & Nails =	8	
Pipe Fittings =	25	
Pipe Hangers =	15	
Tools =	50	
Other =	100	
	$998	998.00

Total Rehabilitation of 1100 Level $2,366.00

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

6. (e) Cont'd.

Rehabilitation of 1400 Level

Labor:

4 Timbermen at $12.00	=	$48.00	per day
2 Top Men at $10.00	=	20.00	" "
		$68.00	per day

21 x 68 + 5 x 102 = $1938 per month x 5 = $9,690

Supplies:

Rail - 3000', 16# = 8# at $150	=	$1200	
Timber - 80 sets at $20	=	1600	
Air Line - 1500', 2" at $0.40	=	600	
Water Line - 1500', 1" at $0.20	=	300	
Track Ties - 500 at $0.60	=	300	
Track Spikes & Nails	=	30	
Pipe Fittings	=	120	
Pipe Hangers	=	60	
Tools	=	175	
Vent Pipe, 1000' at $1.00	=	1000	
Other	=	300	
		$5685	5,685
Total Rehabilitation of 1400 Level			$15,375

Recapitulation of All Rehabilitation

No. 3 Shaft (1100 to 1400)			
Labor	$9663		
Supplies	6943	$16,606	
1100 Level			
Labor	$1368		
Supplies	998	2,366	
1400 Level			
Labor	$9690		
Supplies	5685	15,375	
		Total	$34,347

(f) **New Buildings, Improvements, Installations**

None

(g) **Miscellaneous**

The principal changes in this section are in the charges for Workmens Compensation Insurance and Payroll Taxes due

NEW PENN MINES, INC.
70 PINE STREET
NEW YORK 5, N.Y.

6. (g) Cont'd.

to the revision of the estimated total payroll. Also we have reduced the charge for Accounting from $450 per month to $250 per month because we believe we can arrange to have the accounting done on a part time basis.

The revised tabulation is as follows:

Repairs and Maintenance	$3000	
Drill Stations	1000	
Core Boxes - 250 at $4.00 =	1000	
Sampling and Assaying	2000	
Accounting - 10 mo. at $250 =	2500	
Workmens Compensation Insurance (12.6% of payroll)	6140	
Payroll Taxes, 4.5% of Payroll	2194	
Other	1000	
		$18,834

(h) Contingencies

10% = $15,400	$15,400

RECAPITULATION OF COST ESTIMATES

(a) Independent Contracts	$52,400
(b) Labor, Supervision and Consultants	28,010
(c) Operating Materials and Supplies	14,750
(d) Operating Equipment	5,659
(e) Rehabilitation and Repairs	34,347
(f) New Buildings, etc.	—
(g) Miscellaneous	18,834
(h) Contingencies	15,400
Total Estimated Cost	$169,400

7. (a) Yes.

(b) With money except for the equipment rentals listed under 6(d).

RFP/K
4/27/53

DIAMOND DRILLING CHARGES

December 1952 through March 1953

	Dec. & Jan.	February	March	Total
Wages	$ 1,686.80	$ 739.20	$ 719.20	$ 3,145.20
Compensation Insurance	136.80	53.73	52.28	242.81
Unemployment Insurance at 2.7%	45.54	19.95	19.41	84.90
FOAB at 1.5%	25.30	11.08	10.78	47.16
Rental on Equipment	600.00	300.00	300.00	1,200.00
Diamond Loss	256.05	223.56	376.74	856.35
Casting Charges & Bits	311.50	130.00	245.75	687.25
Core Barrels	168.00	89.00	-	257.00
Freight	41.54	-	23.88	65.42
	$ 3,271.53	$ 1,566.52	$ 1,748.04	$ 6,586.09
8% Profit	261.72	125.32	139.84	526.88
	$ 3,533.25	$ 1,691.84	$ 1,887.88	$ 7,112.97
Footage Drilled	850	464	353	1,667
Cost per Foot	$ 4.16	$ 3.65	$ 5.35	$ 4.27

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P
X

CONTINENTAL DRILLING COMPANY
Drilling Contractors
Pacific Mutual Building, 523 West Sixth Street
Los Angeles 14, California

No. 3144
Date 3-31-53

In Account With-

New Penn Mines, Inc.,
1211 Pacific Mutual Bldg.
523 West Sixth Street
Los Angeles 14, California

Diamond Drilling at New Penn Mine for the month of March, 1953

Wages Paid:

Wk. ending Mar. 7	1 Dr.	48 hrs.	at 105.	per	wk.		105.00	
	1 Hr.	40 hrs.	at 1.90	"	hr.		76.00	
		8 hrs.	at 2.85	"	"	OT	22.80	
	1 Hr.	8 hrs.	at 1.50	"	"		12.00	
Mar. 14	1 Dr.	48 hrs.	at 105.	"	wk.		105.00	
	1 Hr.	40 hrs.	at 1.90	"	hr.		76.00	
		8 hrs.	at 2.85	"	"	"	22.80	
Mar. 21	1 Dr.	2 days	at 105.	"	wk.		35.00	
	1 Dr.	32 hrs.	at 2.15	"	hr.		68.80	
	1 Hr.	8 hrs.	at 1.50	"	"		12.00	
	1 Hr.	8 hrs.	at 1.50	"	"		12.00	
Mar. 28	1 Dr.	40 hrs.	at 2.15	"	"		86.00	
		8 hrs.	at 3.22½	"	"	"	25.80	
	1 Hr.	40 hrs.	at 1.50	"	"		60.00	
							719.20	719.20

Compensation insurance at 7.27%	52.28
Unemployment insurance at 2.7%	19.41
FOAB at 1.5%	10.78

Rental On Drill and Equipment

March 1953 at 300.00per month	300.00

Supplies Used;

Diamond Core Bits

3 BX Core Bits	Diamond	set up	42.16	cts.	
	"	cut out	33.20	"	
	"	Loss	8.96	"	8.96
11 AX Core Bits	Diamond	set up	134.53	cts.	
	"	cut out	109.40	"	
	"	Loss	25.12	"	25.12
4 EX Core Bits	Diamond	set up	37.58	cts.	
	"	cut out	29.80	"	
	"	Loss	7.78	"	7.78
					41.86 at 9.00 376.74

New Penn Mines, Inc.

Casting Charge and Blank Bits		
3 BX Core Bits	at 12.00	36.00
11 AX Bits	at 10.25	112.75
4 BX Bits	at 8.75	35.00
1 - BX Diamond strip set Reamer		62.00
Freight Bill - Southern Pacific Company (inclosed)		
3 Qts Casing		23.88
		1,748.04
Plus 8% Profit		139.84
		1,887.88

jam
4-23-53

ESTIMATED TIME SCHEDULE
(Feet of Work)

ITEM	1st Mo.	2nd Mo.	3rd Mo.	4th Mo.	5th Mo.	6th Mo.	7th Mo.	8th Mo.	9th Mo.	10th Mo.	Totals
REHABILITATION											
No. 3 Shaft	100	100	100								300
1100 Level	250	125									375
1400 Level				350	250	100	350	125			1,175
TOTAL REHABILITATION	350	225	100	350	250	100	350	125			1,850
DRILLING											
1100 Level											
Holes 7 & 9		800									800
Holes 8 & 10			900	450							1,350
1400 Level											
Holes 1 - 6				450	800	800	800	800	1,150	700	5,500
Holes 11 - 14							800	800	400		2,000
TOTAL DRILLING		800	900	900	800	800	1,600	1,600	1,550	700	9,650

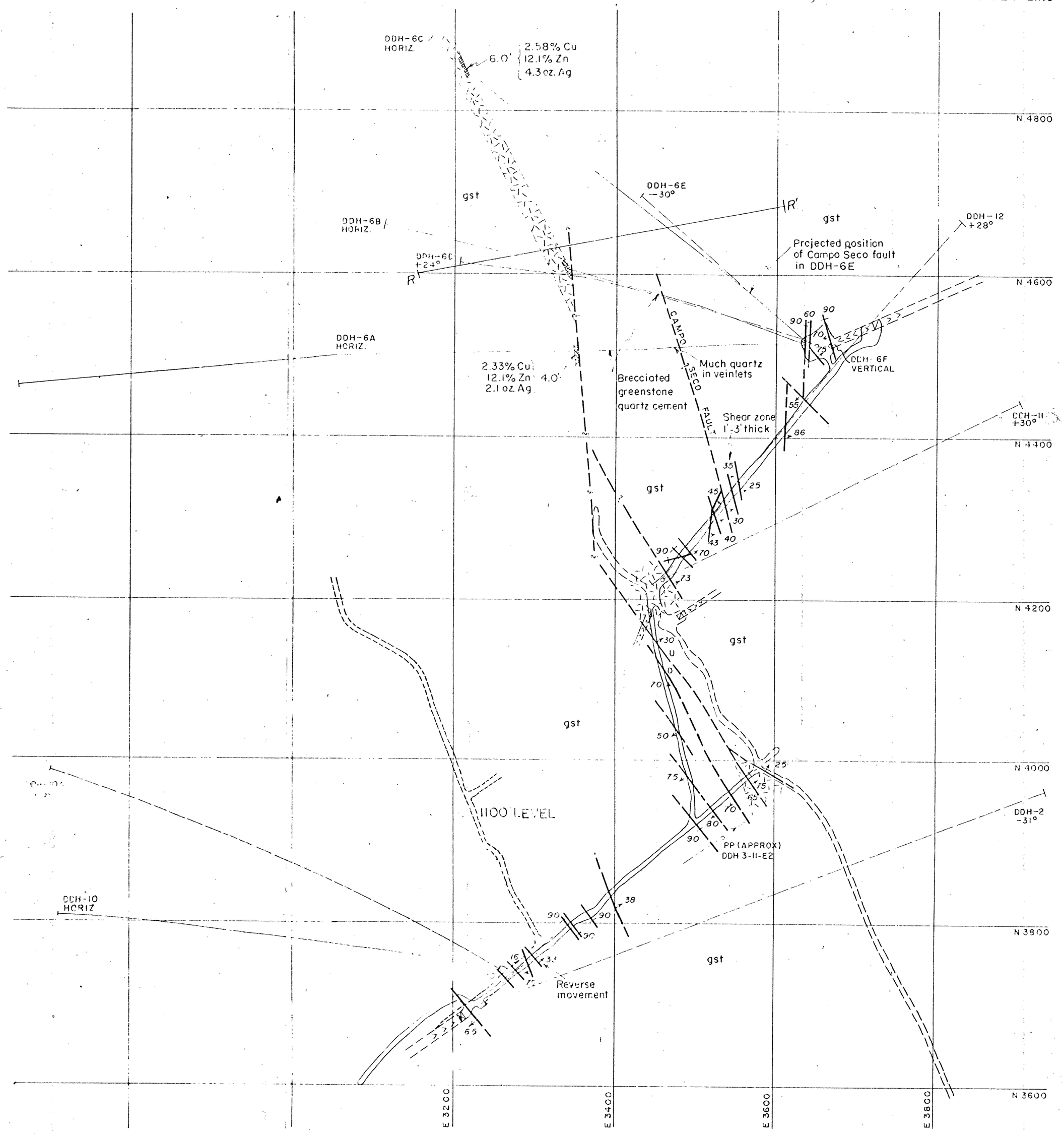
ESTIMATED TIME SCHEDULE
(Expenditure)

Item	1st Month	2nd Month	3rd Month	4th Month	5th Month	6th Month	7th Month	8th Month	9th Month	10th Month	Total
6 (a)		4,400	4,400	4,400	4,400	4,400	8,800	8,800	8,800	4,000	52,400
6 (b)	3,081	3,081	3,081	2,681	2,681	2,681	2,681	2,681	2,681	2,681	28,010
6 (c)	950	1,475	1,475	1,475	1,475	1,475	1,650	1,650	1,650	1,475	14,750
6 (d)	566	566	566	566	566	566	566	566	566	565	5,659
6 (e)	7,901	5,535	5,536	3,075	3,075	3,075	3,075	3,075			34,347
6 (f)											
6 (g)	1,965	2,267	1,967	1,680	1,680	1,680	2,360	2,260	1,628	1,347	18,834
6 (h)	1,540	1,540	1,540	1,540	1,540	1,540	1,540	1,540	1,540	1,540	15,400
Totals	16,003	18,864	18,565	15,417	15,417	15,417	20,672	20,572	16,865	11,608	169,450

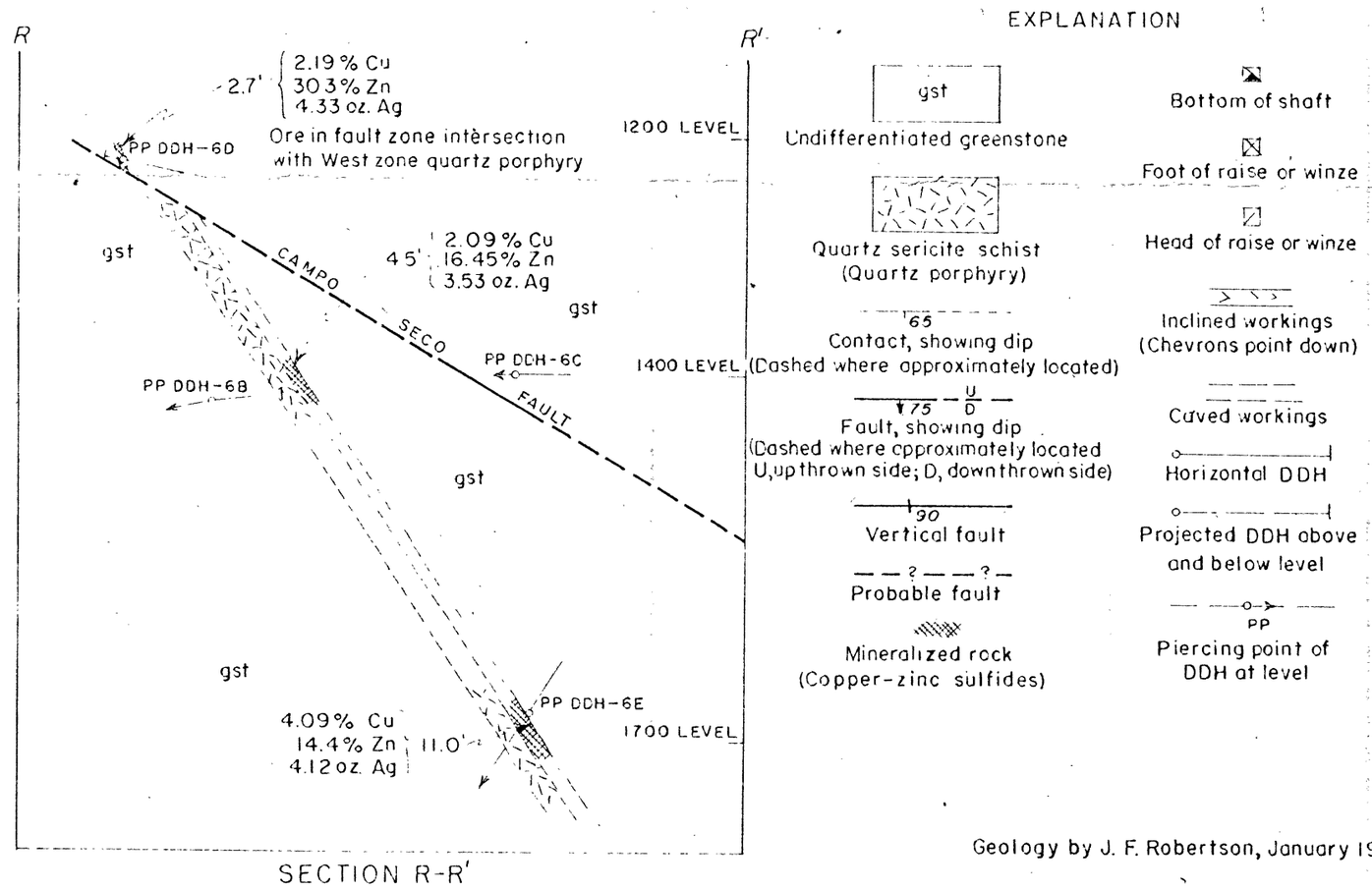
bm

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DMEA—2885
COPPER—ZINC



1400 LEVEL



SECTION R-R'

EXPLANATION

- gst — Undifferentiated greenstone
- Quartz sericite schist (Quartz porphyry)
- 65 — Contact, showing dip (Dashed where approximately located)
- 75 U/D — Fault, showing dip (Dashed where approximately located U, upthrown side; D, downthrown side)
- 90 — Vertical fault
- ? — Probable fault
- Mineralized rock (Copper-zinc sulfides)
- Bottom of shaft
- Foot of raise or winze
- Head of raise or winze
- Inclined workings (Chevrons point down)
- Caved workings
- Horizontal DDH
- Projected DDH above and below level
- PP — Piercing point of DDH at level

Geology by J. F. Robertson, January 1954

NOTE: INCLINATIONS GIVEN FOR DIAMOND DRILL HOLES ARE THOSE TAKEN AT COLLARS OF HOLES.

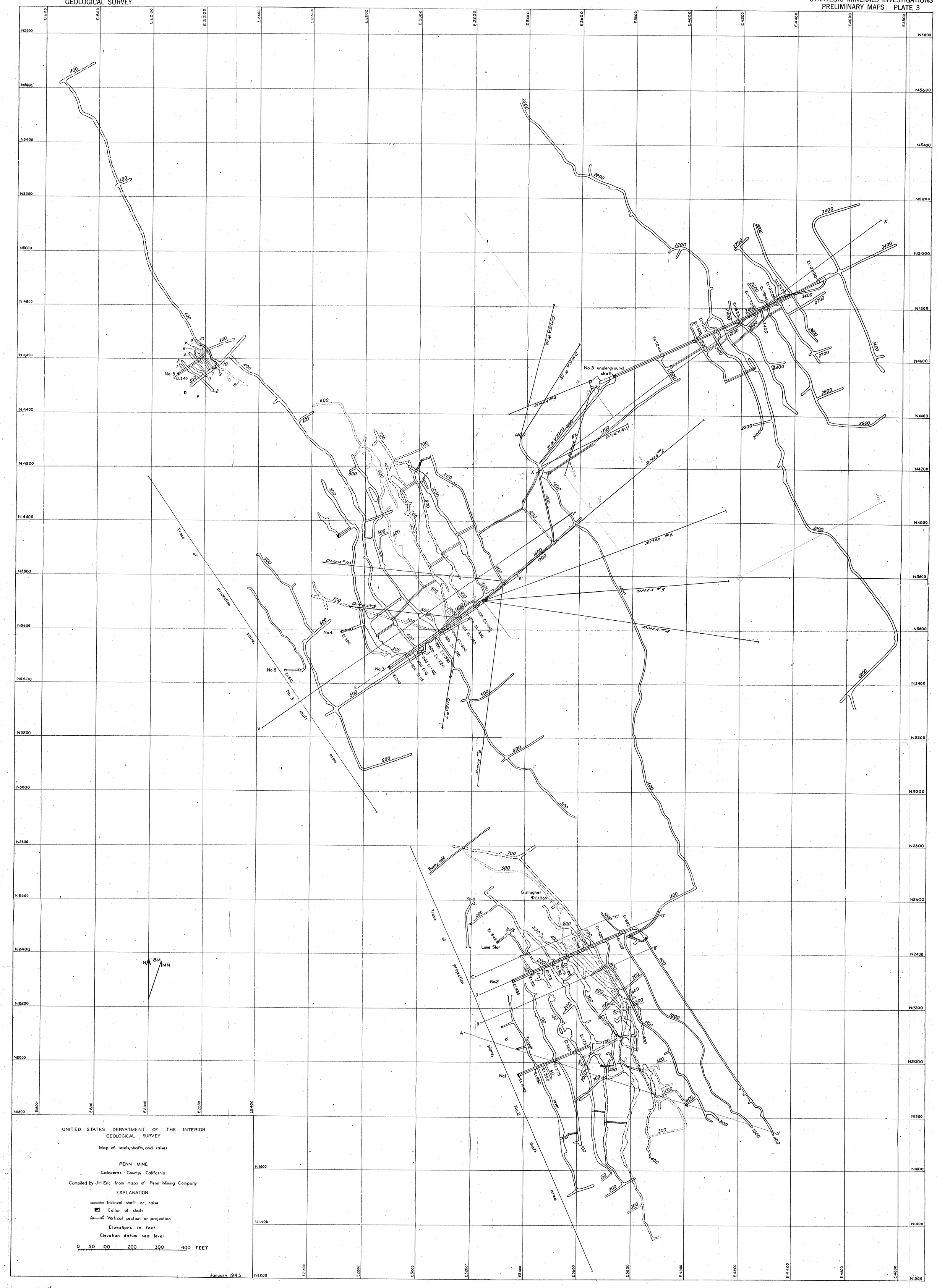
PENN MINE, CALAVERAS COUNTY, CALIFORNIA

100 0 100 200 FEET

Figure 2.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STRATEGIC MINERALS INVESTIGATIONS
PRELIMINARY MAPS PLATE 3



PLAT

SHOWING

MINERAL SEGREGATIONS AND LOTS

—IN—

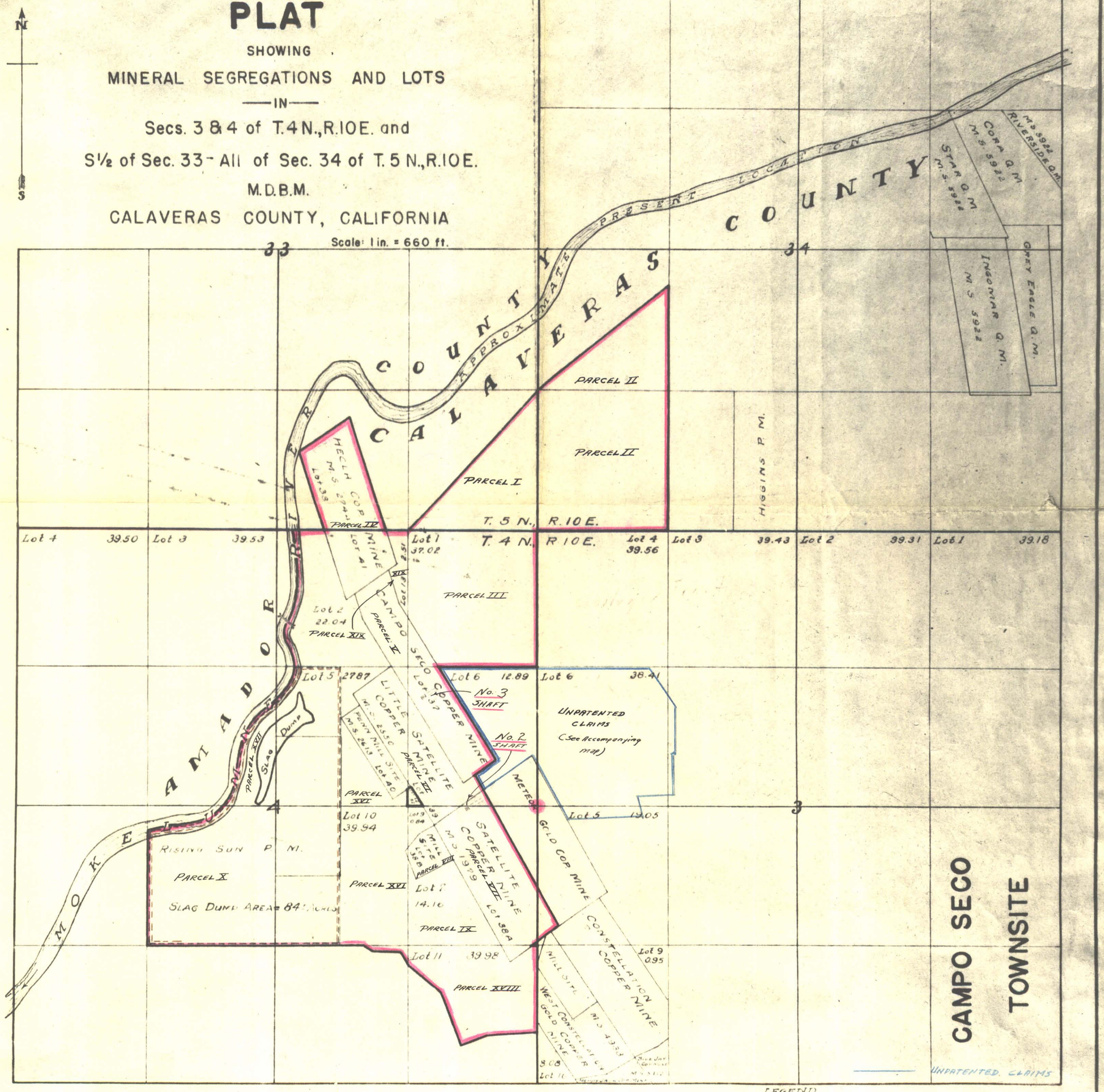
Secs. 3 & 4 of T.4N., R.10E. and

S½ of Sec. 33 - All of Sec. 34 of T.5N., R.10E.

M.D.B.M.

CALAVERAS COUNTY, CALIFORNIA

Scale: 1 in. = 660 ft.



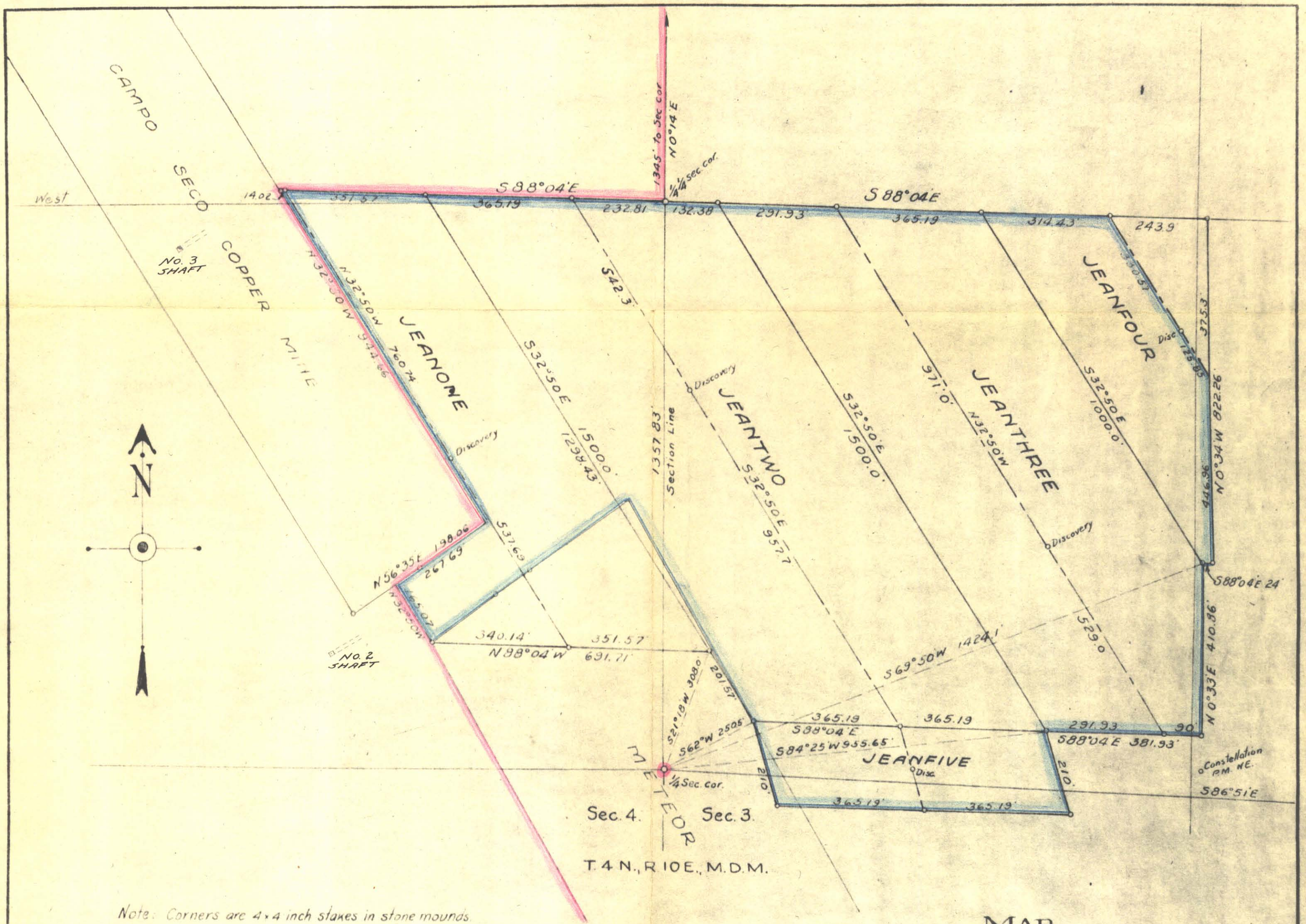
AGGREGATE AREA - PENN MNG COMPANY PROPERTY

LEGEND

Penn Mng. Co Boundary = PATENTED CLAIMS

Slag Dump Reservation = - - - - -

BEE 9



Note: Corners are 4 x 4 inch stakes in stone mounds.

MAP
of
JEANONE, JEANTWO, JEANTHREE, JEANFOUR AND JEANFIVE MINING LOCATIONS

CAMPO SECO MINING DISTRICT
CALAVERAS COUNTY, CALIFORNIA
Scale 1 in. = 200 ft.

Oliver C. Wythe, County Surveyor Oct & Dec. 1942

UNPATENTED CLAIMS
PATENTED CLAIMS

S35E
V
X
No.3 shaft
dump
No.4 shaft
gossan inferred
7b
7a
7
Campo Seco fault
Sea level
-500'
-1000'
-1500'
-2000'
-2500'
-3000'
L
8b
8a
M
Kruttschnitt ore blocks
Kruttschnitt ore blocks
elevation approximate
X
VERTICAL PROJECTION
EXPLANATION
Shaft or raise
Crosscut toward observer
Crosscut away from observer
Gossan
Ore mined
Ore in place
Stringers of sulphides
Pitch of minor folds
Grades of samples
more than 4 percent copper
2 to 4 percent copper
trace to 2 percent copper
Area favorable for exploration
Ore body number
MINE LEVEL
N35W
V-S55W
300
400
500
600
700
900
1000
1100
1200
1400
1700
1900
2100
2200
2400
2600
2700
2800
3400
No.3 shaft
Tertiary gravel
ore projected above this point
projected southward about 50 feet
WEST ALTERATION ZONE
EAST ALTERATION ZONE
HINCKLEY ALTERATION ZONE
Interpretation below 1000 level is based on data from company maps.
Campo Seco Fault
recently drilled by Penn Mines
Drilled by Shamrock Projected from
DHEA #8 Projected
DHEA #9 Projected
DHEA #7 Projected
ore shown by Salman
S
U
W
V'N55E
X-S54W
partially silicified
possible trace of mineralized zone
DHEA #11
DHEA #1
DHEA #6 Projected
DHEA #5 Projected
No.3 underground shaft
V
section offset 200 feet
probable footwall of mineralized zone
M
X'-N54E
Sea level
-500'
-1000'
-1500'
-2000'
-2500'
-3000'
SECTION V-V', X-X'
EXPLANATION
Gossan
Ore mined
Massive ore
Stringers of sulphides
Undifferentiated schist and greenstone
Sericitized schist
Sericitized and silicified schist
Quartz porphyry
Sericitized quartz porphyry
Sericitized and silicified quartz porphyry
Meta-andesite and meta-dacite pyroclastics
Meta-rhyolite tuff
Meta-felsite pyroclastics
b - intercalated meta-basalt
Meta-agglomerate and tuff
Meta-basalt
Meta-felsite volcanics
Stratigraphic units
s Schist, presumably sericite schist - below 1000 level
g greenstone - below 1000 level
Geologic contact
Fault
Workings not in plane of section
Area favorable for exploration, referred to in text
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
VERTICAL PROJECTION
AND
SECTION V-V', X-X'
No.3 SHAFT AREA
PENN MINE
Calaveras County, California
0 50 100 200 300 400 500 feet
Elevation datum sea level
Source of data:
Stopes above 1100 level from section by H.S. Jordan dated March 1919
Stopes and assay data below 1100 level from report by Julius Kruttschnitt, 1926
Outline of workings from company maps
Geology by Geological Survey, 1943-44-45