AN AMENDMENT TO GEOLOGIC REPORT AND EXPLORATION PROPOSAL ON THE ICE LAKE PROJECT AREA SAN JUAN AND SAN MIGUEL COS., COLORADO DOCKET NO. OME-6689

Replacing pages 37 through 53 of the original report.

Vitro Minerals Corporation

May, 1968

VII. PROPOSED EXPLORATION

General

During the first stage of exploration, we propose to drill eight diamond drill holes designed to intersect the Lucy-Last Hope, Diamond, and Columbus-Grand View veins where they cut the upper 300 feet of the favorable San Juan Formation. The collar locations of these proposed holes are shown on Plate V and cross-sections of the holes showing approximate inclination and bearing and estimated total depth are given in Figures 12 through 19. In summary, the holes are as follows:

Hole No.	Approximate Bearing	Approximate Inclination	Estimated Total Depth
1	N 44° E	-50°	600'
2	S 71° W	-60°	930'
2A	(S 54° 15' E)	(-47°)	(1,050')
3	N 56° 15' W	-58°	850'
3A	(N 82° 30' E)	(-65°)	(900')
4	S 48° E	-50°	800'
5	S 82° E	-50°	900'
6	N 45° E	-50°	700'
7	N 83° 45' E	-76°	950'
8	N 44° E	-55°	1,000'
		TOTAL FOOTAGE	6,730'
			(6,900')

Detailed Description of Drill Holes

Hole No. 1

The collar for Hole No. 1 will be located on the north shore of Fuller Lake at an approximate elevation of 12,590 feet. The hole will be drilled in a N 44° E direction at an inclination of -50°.

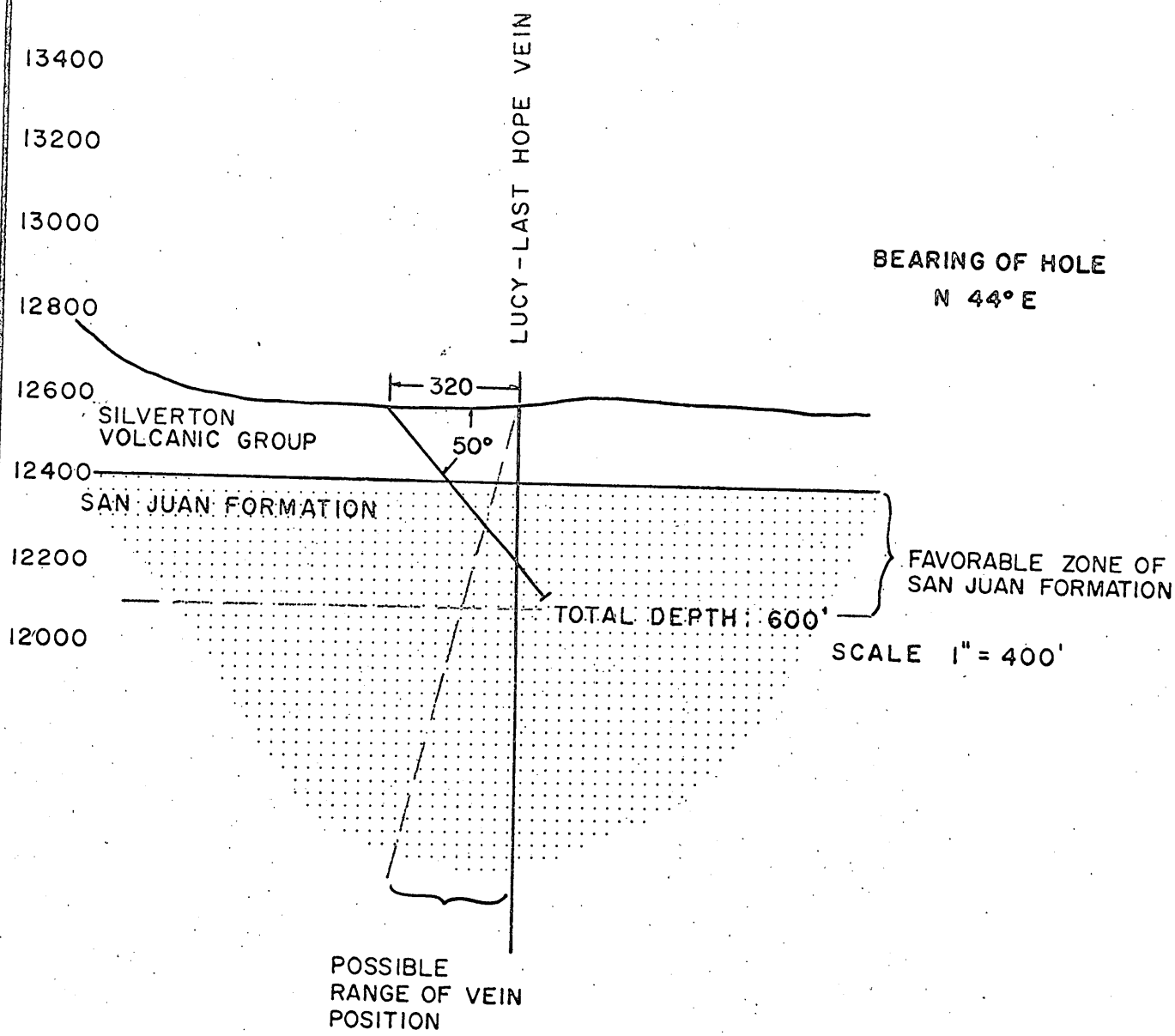


FIG. 12

DIAMOND DRILL HOLE NO. 1

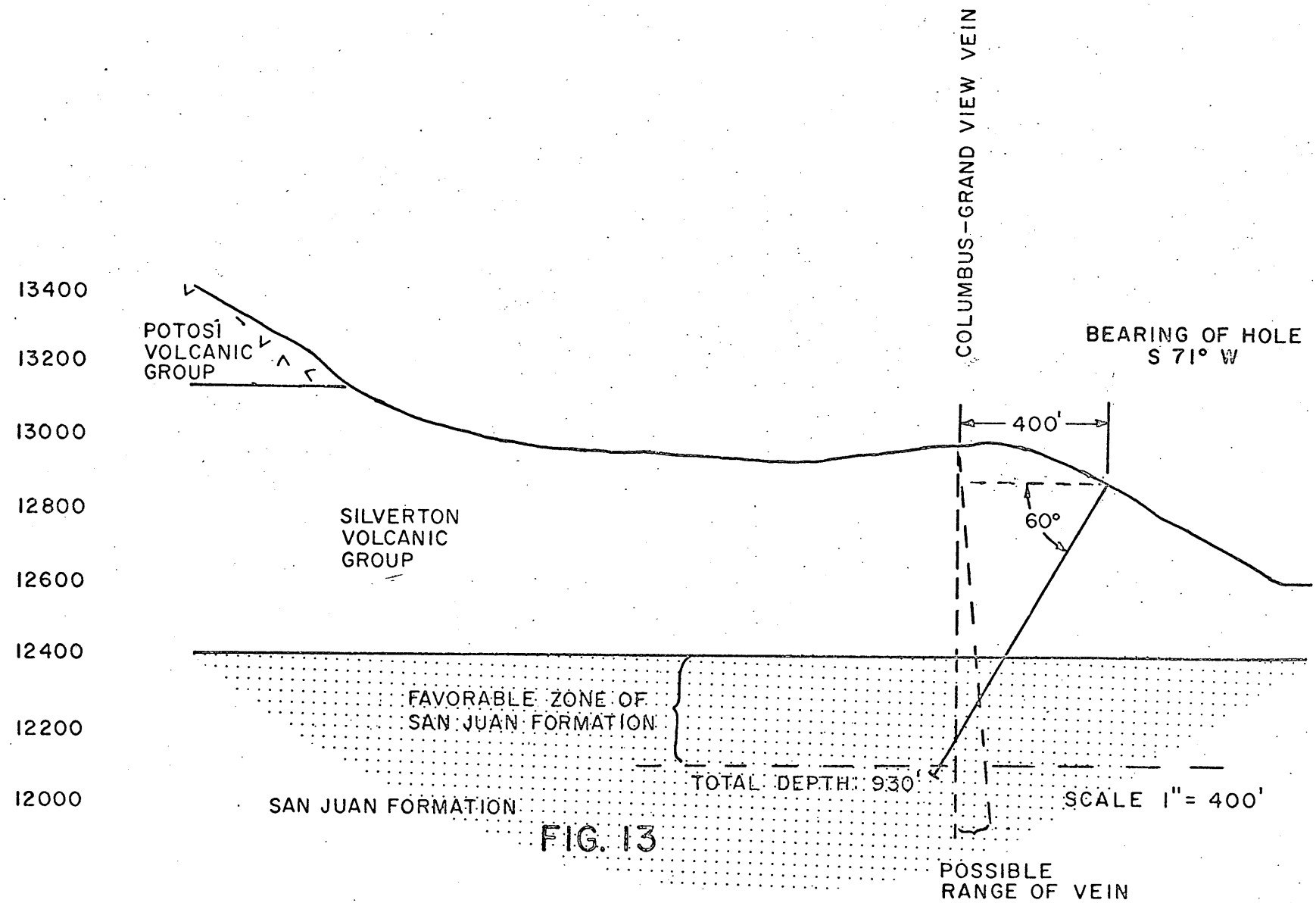


FIG. 13

DIAMOND DRILL HOLE NO. 2

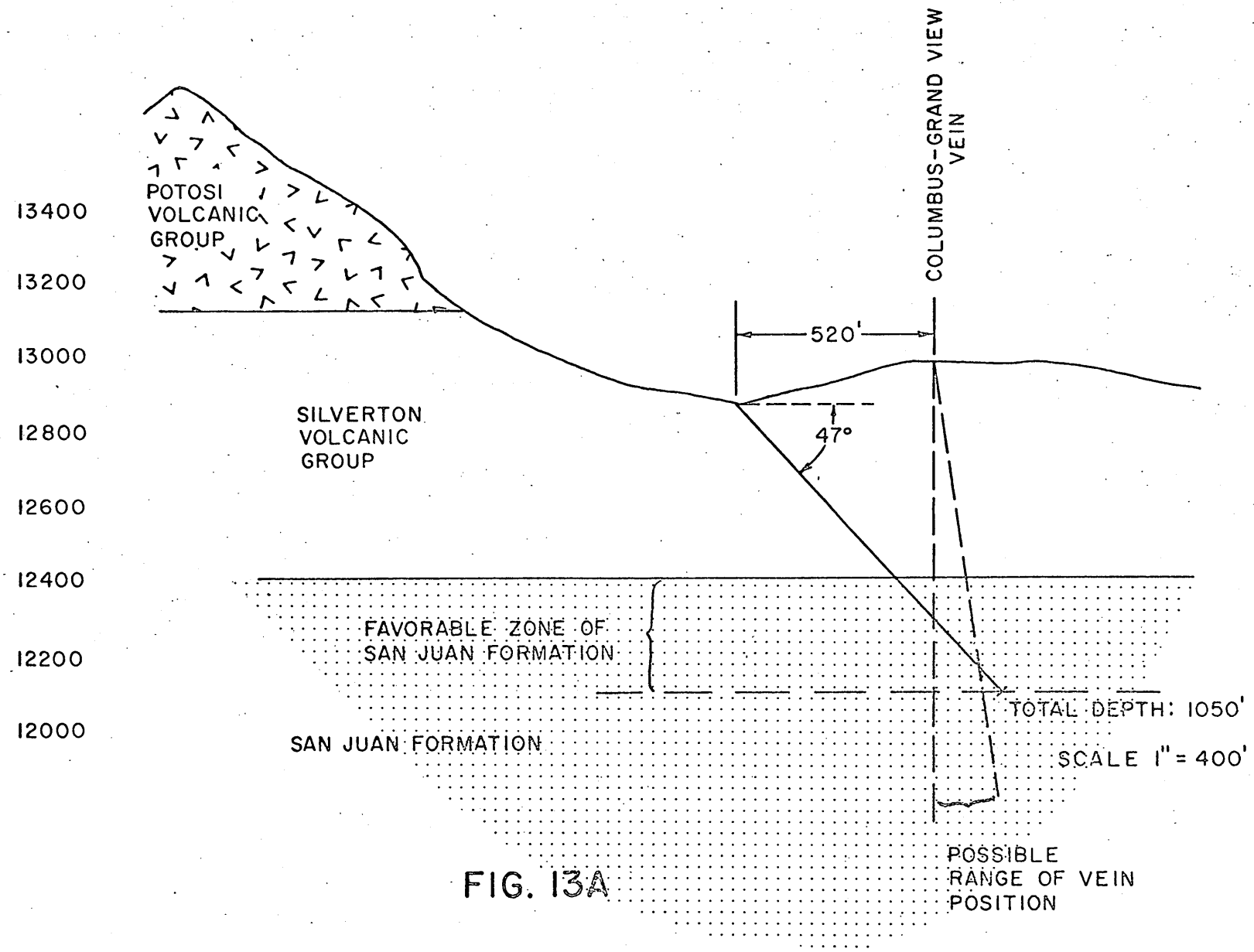


FIG. 13A

DIAMOND DRILL HOLE NO. 2A

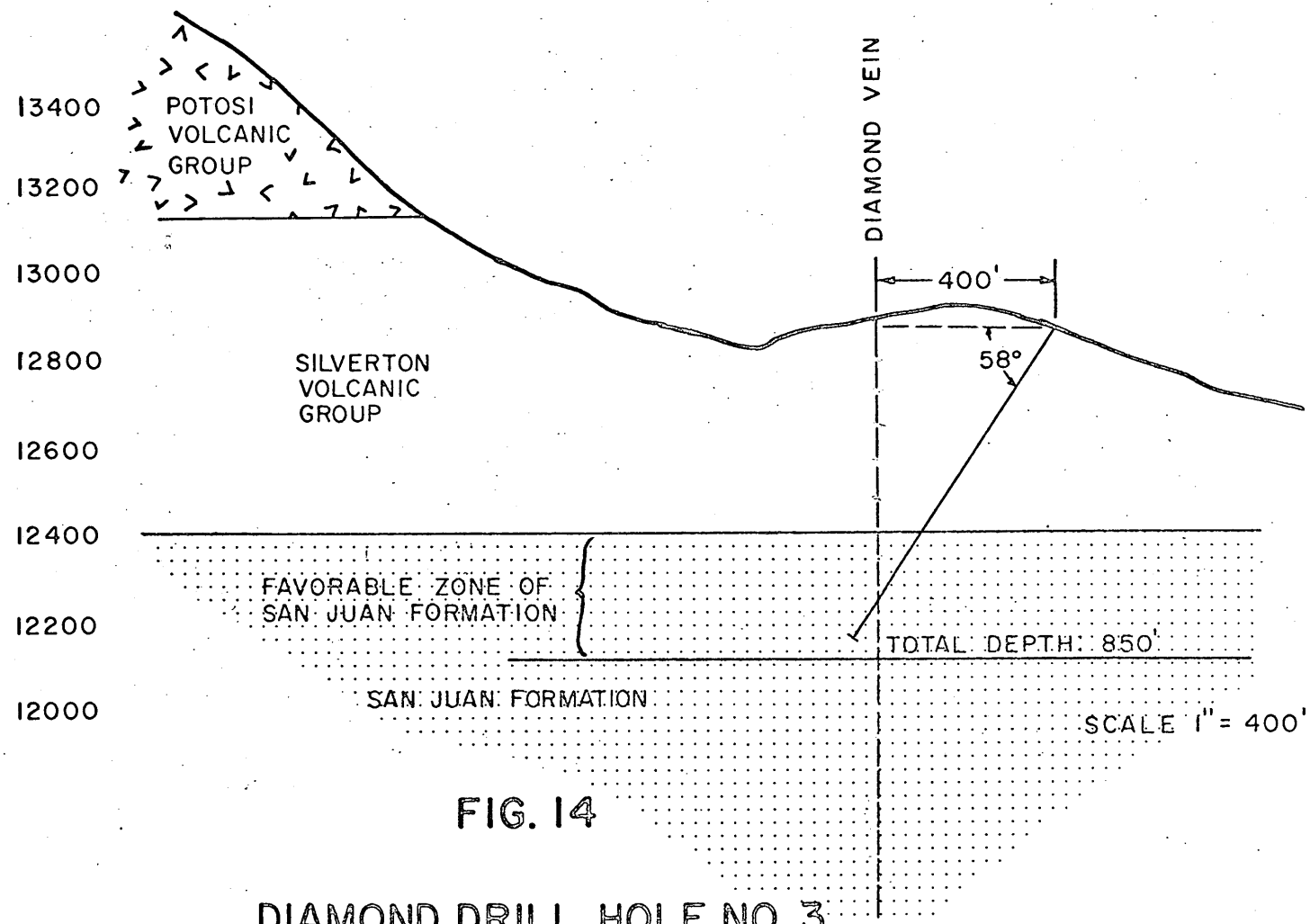


FIG. 14

DIAMOND DRILL HOLE NO. 3

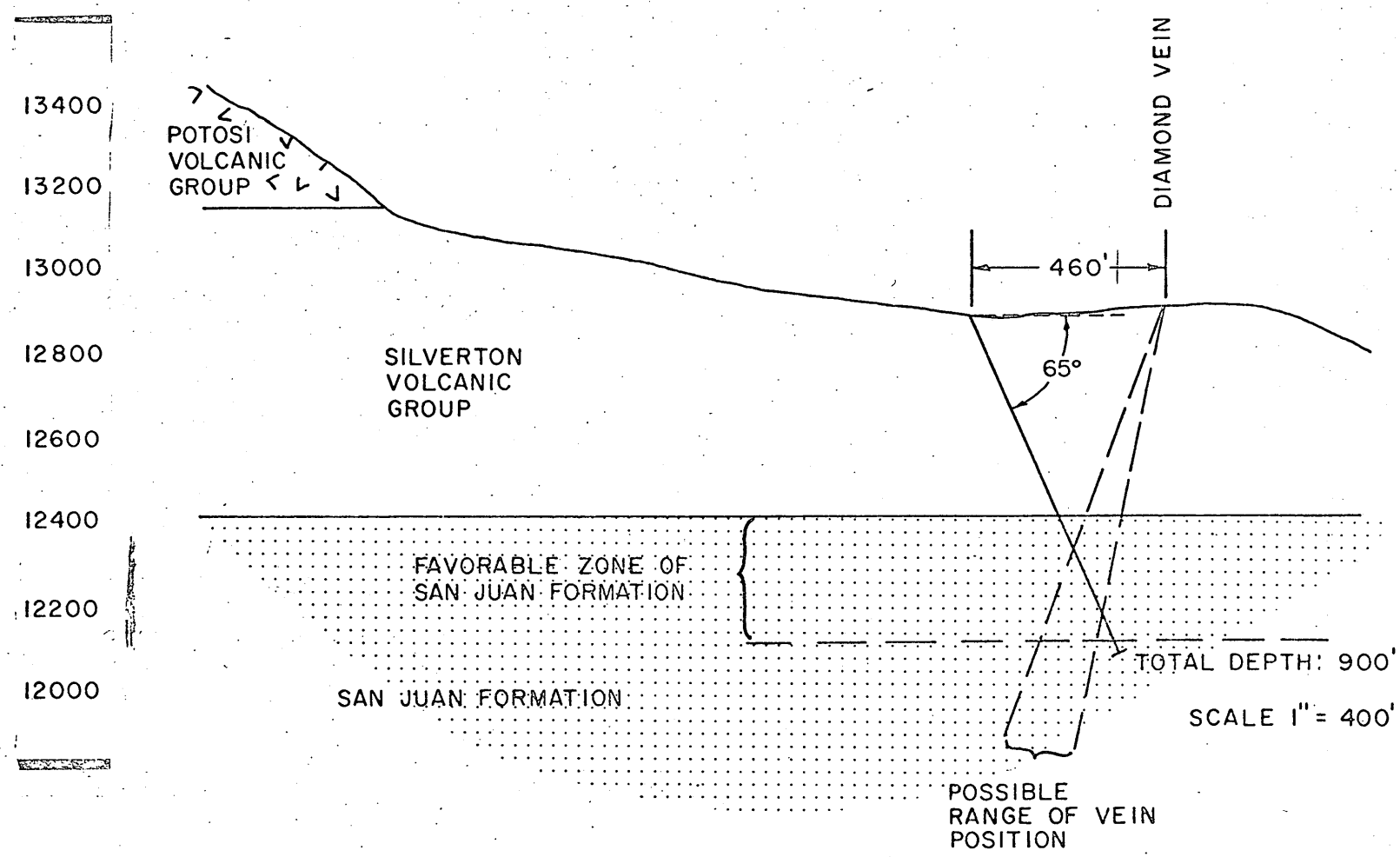


FIG. 14A

DIAMOND DRILL HOLE NO. 3A

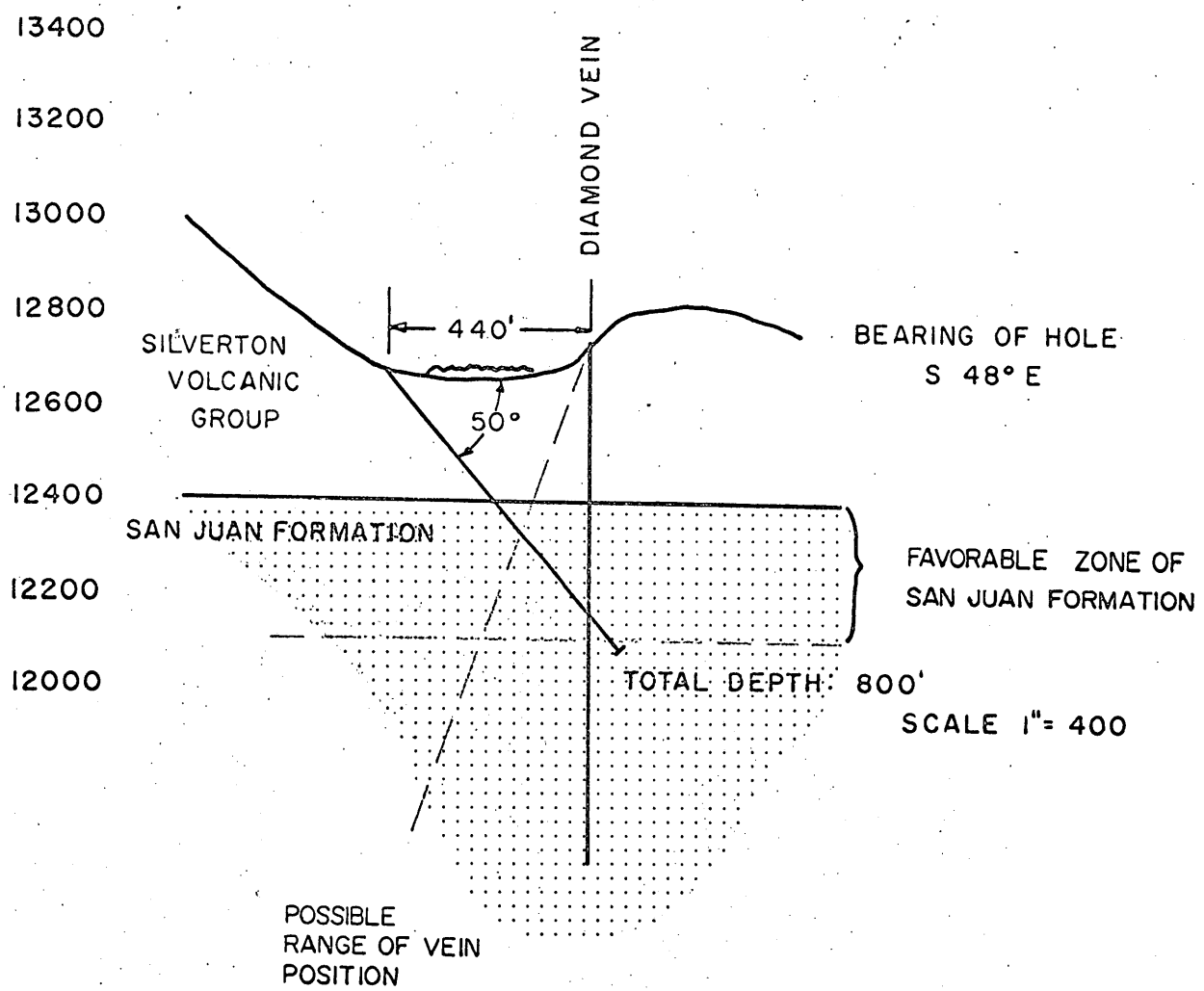


FIG. 15

DIAMOND DRILL HOLE NO. 4

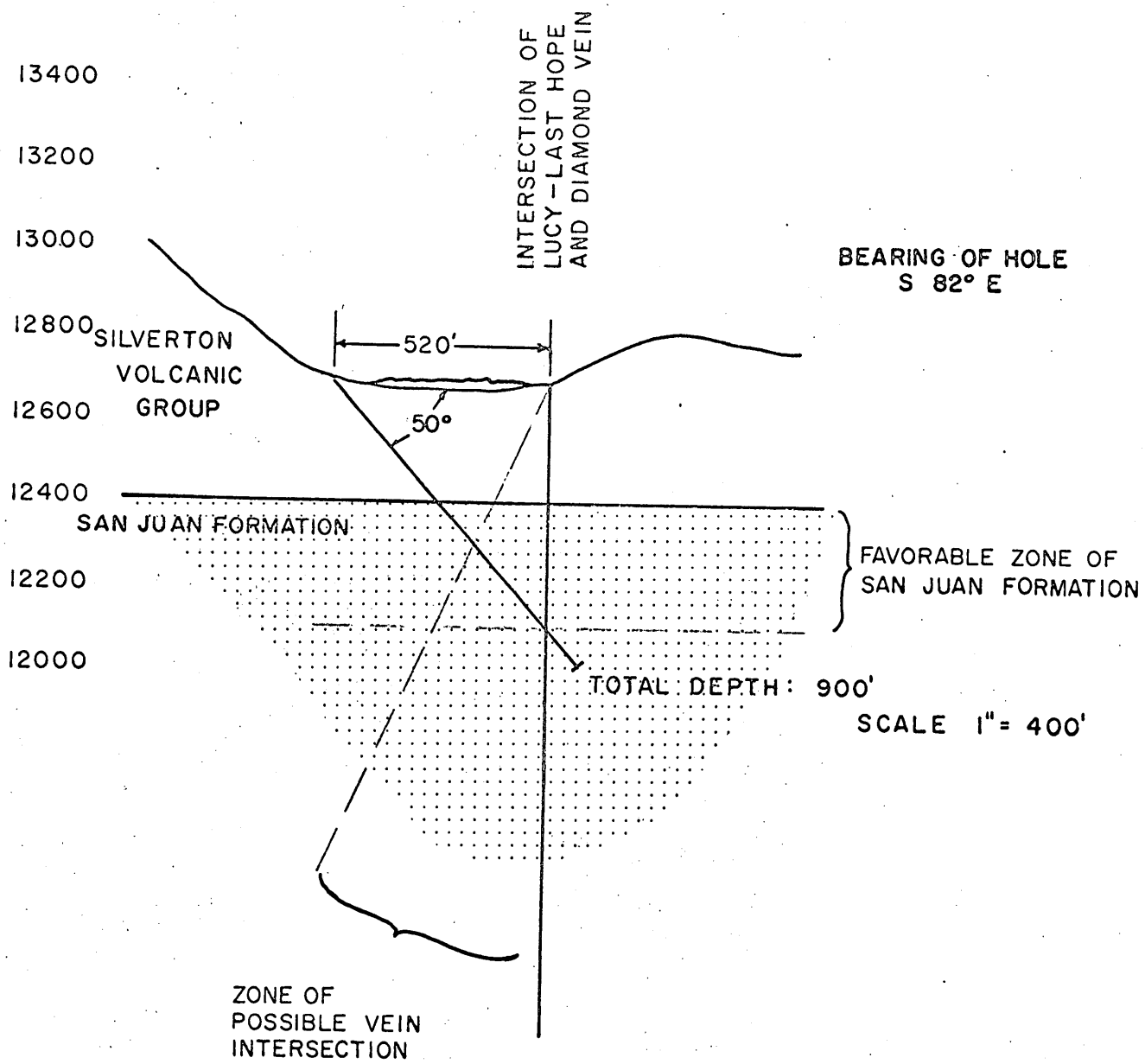


FIG. 16

DIAMOND DRILL HOLE NO. 5

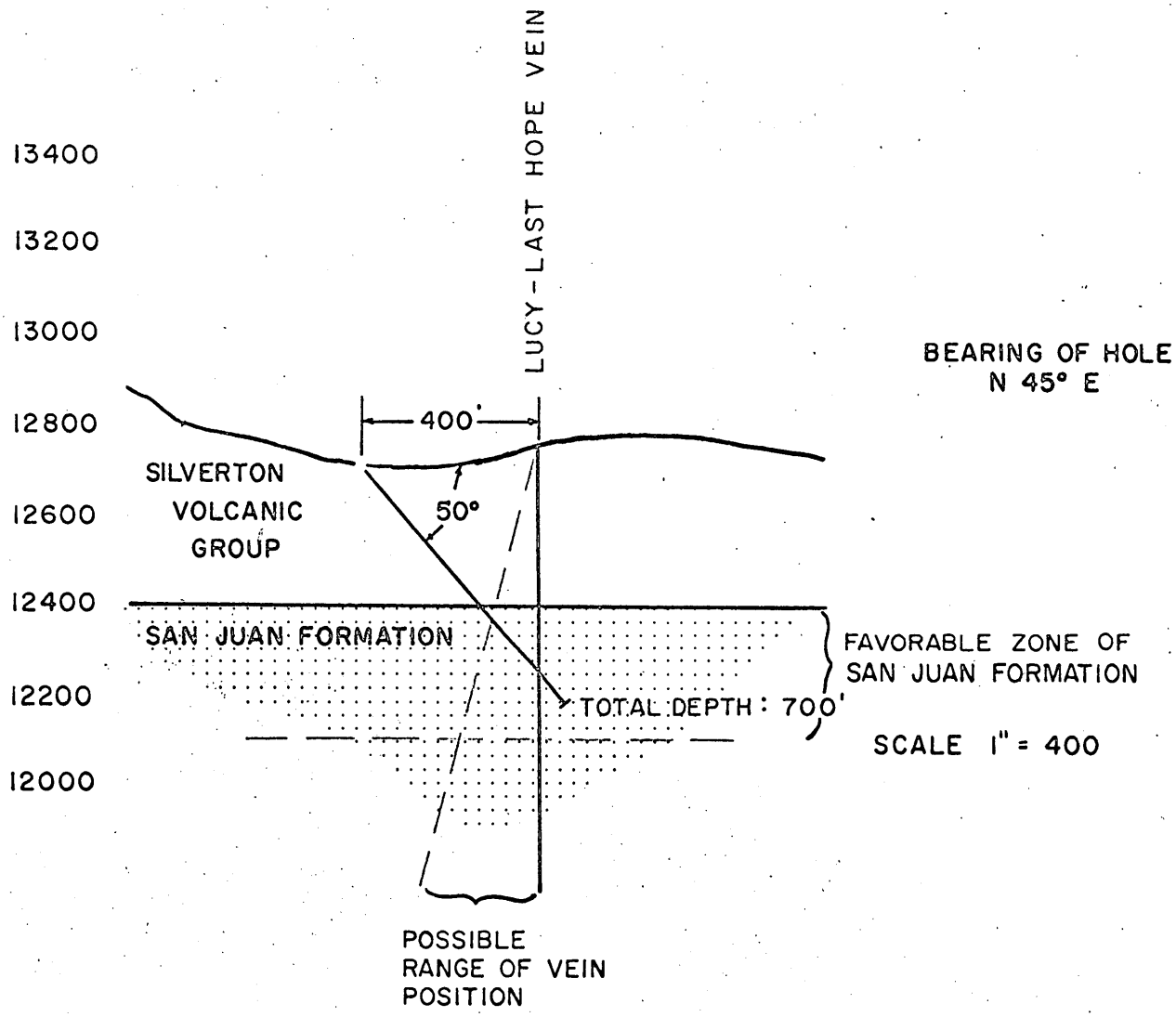


FIG. 17

DIAMOND DRILL HOLE NO. 6

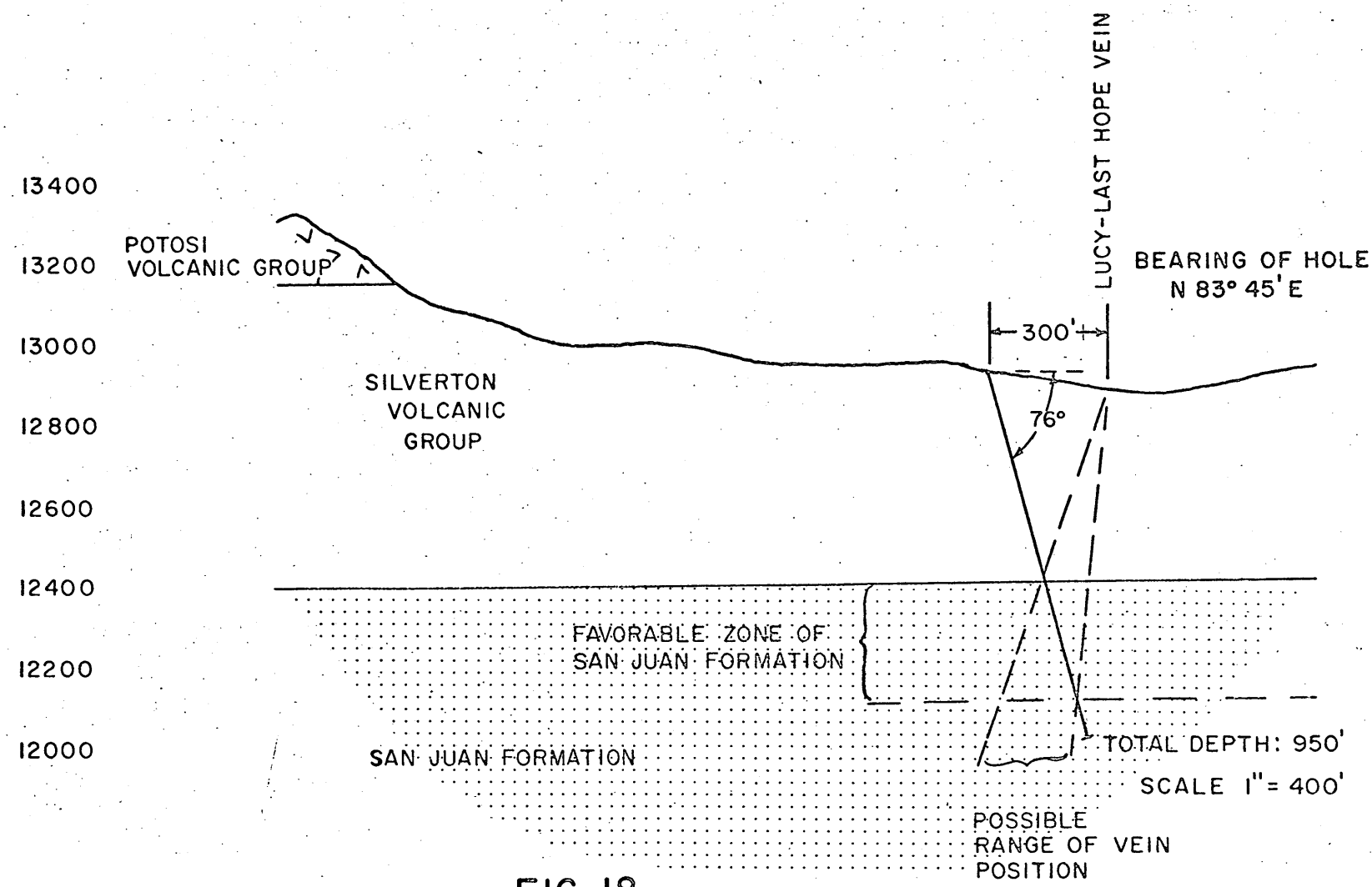


FIG. 18

DIAMOND DRILL HOLE NO. 7

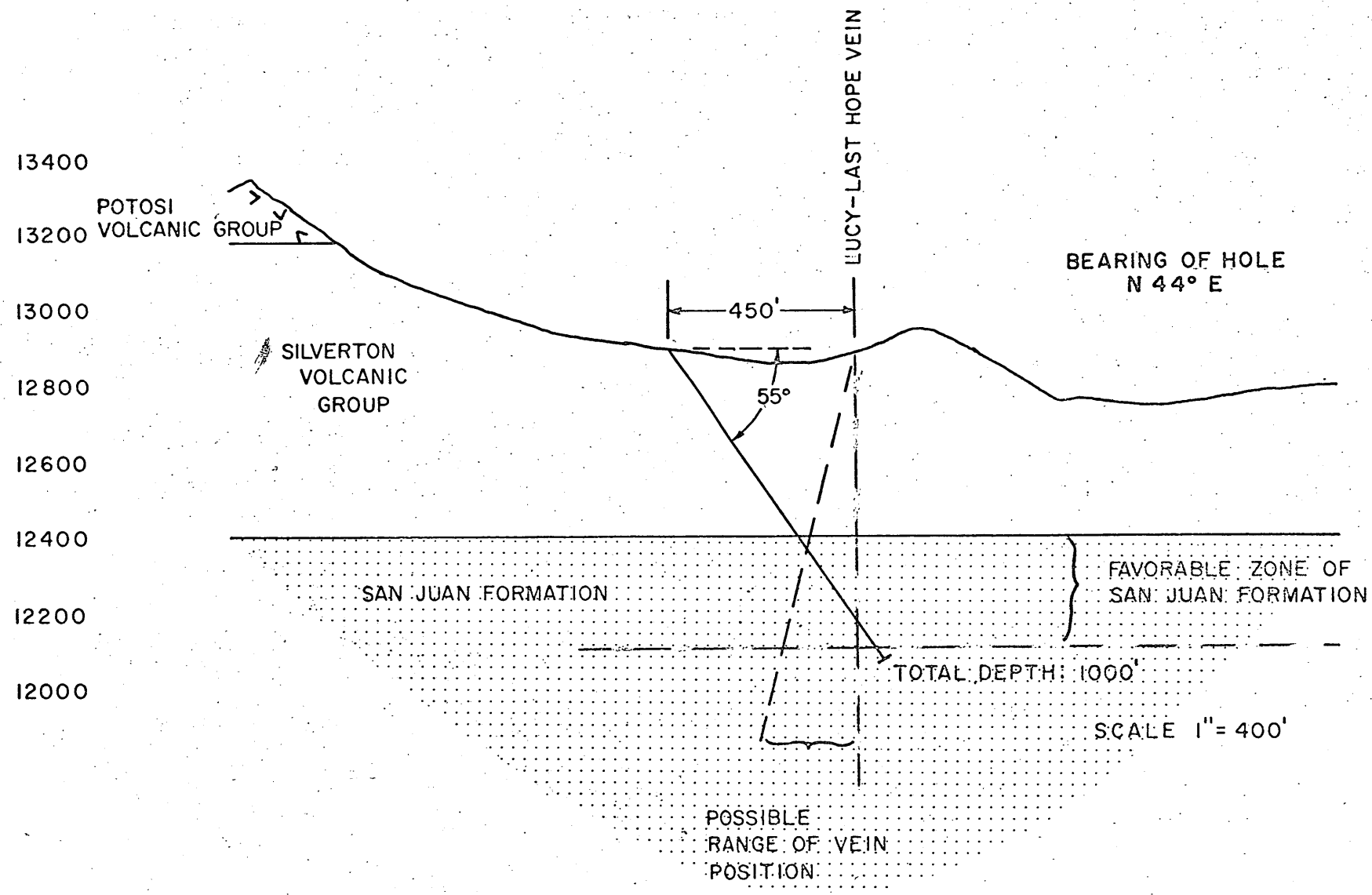


FIG. 19

DIAMOND DRILL HOLE NO. 8

This hole is designed to test the Lucy-Last Hope vein within the upper 300 feet of the San Juan Formation near its southeasternmost exposure in the area where it appears to split into several smaller fractures.

At this point, the San Juan Formation is believed to be covered by approximately 190 feet of the lower Silverton Volcanic Group. This estimate is subject to some uncertainties caused by the possible slight regional dip and the unconformity which separates the San Juan Formation from the overlying Silverton Volcanic Group. For these reasons, in drawing all of the drill hole cross-sections, we have assumed that the Silverton-San Juan contact lies at an elevation of 12,400 feet as mapped in Ice Lake Basin about 2500 feet east of this drill hole. Considering the relatively small area involved in this drilling program and the effects of the other variables which cannot be estimated, the errors due to this assumption are relatively slight.

The dip of the Lucy-Last Hope vein just north of Fuller Lake is not known. The small adit driven on the vein at this point is caved and there are no other exposures. Dips measured on rock joints close to the vein position range from vertical to 65° to the west. However, it is not known if these are related to the vein or some regional structural feature. An examination of the aerial photographs shows that the strike of the vein outcrop is almost straight in this area, suggesting that the vein is nearly vertical.

As shown on Fig. 12, Hole No. 1 has been oriented so as to intersect the Lucy-Last Hope vein within the upper 300 feet of the San Juan Formation whether the vein is found to be vertical or is found to dip as much as 70° to the west.

The hole will be drilled to a point 100 feet beyond the vein intersection in order to penetrate any splits of the main vein. The maximum depth of the hole is estimated to be 600 feet.

Hole No. 4

The dip of the Diamond vein is unknown. There are no exposures of the vein, and all of the old workings on the vein are inaccessible due to ice or cave. The strike of the vein surface expression is straight suggesting a near-vertical dip. The dips of rock joints close to and paralleling the vein are all vertical. The dellenite dike, which appears to occupy the same or a closely-related fissure to the northeast of this immediate area, cuts across topography without appreciable change in the strike of the outcrop suggesting a near-vertical dip for the dike-filled fissure. Thus, it is necessary to place the collar of this hole, which is designed to explore the Diamond vein near its intersection with the Lucy-Last Hope vein, in a position which will allow the hole to cut the vein within the upper 300 feet of the San Juan Formation regardless of the dip of the vein. Several locations for the collar were considered, but the one shown on the Drill Hole Location map, Plate V, is the only possible location

which will satisfy the requirements. This is not the most accessible location, nor perhaps the easiest from which to drill, but is the best location from which to drill the specified hole.

Hole No. 4 will be collared on the northwest shore of Diamond Lake at an approximate elevation of 12,700 feet and will be drilled S 48° E at an inclination of -50°. The hole will be drilled 100 feet beyond its intersection with the Diamond vein and is estimated to have a maximum total length of 800 feet.

Hole No. 3

Hole No. 3 is designed to test the Diamond vein within the upper 300 feet of the San Juan Formation. We believe that the Diamond vein is nearly vertical, but the holes proposed for this exploration program will be drilled in such a sequence that more exact data on the dip of this vein will be available from Hole No. 4 before Hole No. 3 is drilled. If the vein is vertical or nearly so, Hole No 3 will be drilled. If the vein dips as much as 70° to the northeast, Hole No. 3 will not intersect the favorable zone at a good drilling angle, and an alternate location, Hole No. 3A, will be used.

Hole No. 3 will be collared at an approximate elevation of 12,880 feet. The hole will be drilled in N 56° 15' W direction at an inclination of -58°. The angle of inclination of this hole will be altered if it is found that the vein has a dip of less than 90°.

The hole will be drilled 100 feet beyond the vein intersection and its total depth is estimated to be 850 feet.

Hole No. 3A

If the data from Hole No. 4 indicates that the Diamond vein dips 70° - 80° to the northwest, a hole drilled from the proposed position of Hole No. 3 will not intersect the vein at a favorable angle. In this case, Hole No. 3A will be drilled instead of Hole No. 3.

Hole No. 3A will be collared at an elevation of about 12,870 feet and will be drilled in a N 82° 30' E direction at an inclination of -65°. The inclination of the hole will be varied as necessary depending upon the data from Hole No. 4. The hole will be designed to intersect the vein within the upper 300 feet of the San Juan Formation.

The total depth of the hole, which will be drilled 100 feet beyond the vein intersection, is estimated to be 900 feet.

Hole No. 2

Hole No. 2 is designed to test the strength of vein and mineralization on the Columbus-Grand View vein within the upper 300 feet of the San Juan Formation. Two possible collar locations for this test

are proposed. The final selection of collar location will depend upon whether Hole No. 3 or Hole No. 3A is chosen to cut the Diamond vein, because Holes No. 2 and 3 will be collared from the same drill site. The same is true of Holes No. 2A and 3A.

The Columbus-Grand View vein has been observed in several places to have a vertical dip. Rock joints close to the vein are also vertical. However, the geologic map and aerial photographs show that the vein outcrop changes direction slightly suggesting either a minor change in strike or a very steep dip, perhaps 85°, to the east. Holes No. 2 and 2A are designed to cut the vein within the favorable zone whether the dip is vertical or 85° to the east.

Hole No. 2 will be collared at an elevation of about 12,880 feet and will be drilled S 71° W at an inclination of -60°. This hole will intersect the Columbus-Grand View vein within the upper 300 feet of the San Juan Formation, and the hole is estimated to have a total depth of 930 feet.

Hole No. 2A

If Hole No. 3A is chosen to explore the Diamond vein, Hole No. 2A will be drilled to explore the Columbus-Grand View vein instead of Hole No. 2. This plan to drill either Holes No. 2 and 3 or Holes No. 2A and 3A will eliminate one move for this particular drill rig.

Hole No. 2A will be collared at an approximate elevation of 12,870 feet and will be drilled S 54° 15' E at an inclination of -47°. The hole will intersect the Columbus-Grand View vein within the upper 300 feet of the San Juan Formation. The total depth of the hole is estimated to be 1050 feet.

Hole No. 6

Hole No. 6 is designed to test the strength of mineralization in the Lucy-Last Hope vein near (300 feet north) its intersection with the Diamond vein. This hole can be conveniently drilled from the same station as Holes No. 4 and 5 by re-orienting the drill.

The trace of the Lucy-Last Hope vein north from Diamond Lake through the notch indicates that the vein dips about 78° to the west in that portion of its length. Rock joints in that area have similar dips. The course of the vein on the Webster and Last Hope claims suggests that the vein is nearly vertical. Hole No. 6 is designed to cut the Lucy-Last Hope vein within the upper 300 feet of the San Juan Formation if the vein is vertical or dips as much as 75° to the west.

Hole No. 6 will be collared, as are Holes No. 4 and 5, at an elevation of about 12,700 feet on the northwest shore of Diamond Lake. The hole will be drilled N 45° E at an inclination of -50°. The hole will be drilled 100 feet beyond its intersection with the

Lucy-Last Hope vein. The total depth of the hole will depend upon the dip of the vein, but the maximum total depth of the hole is estimated to be 700 feet.

Hole No. 5

Considering the strength of known mineralization in the Lucy-Last Hope and Diamond veins, we consider it desirable to test the intersection of these two veins for a possible ore shoot. As mentioned previously, there is some uncertainty concerning the dip of both veins, and therefore, there is compounded uncertainty concerning the direction and angle of rake of their intersection. However, all our data indicates that the intersection is either vertical or rakes at a high angle to the northwest. Regardless of the uncertainties, the position of this vein intersection is known closely enough so that if it is the locus for an ore shoot which extends outward for any appreciable distance along the veins, a drill hole oriented as Hole No. 5, below, should intersect the ore shoot if not the trace line of intersection.

Hole No. 5 will be drilled, by merely swiveling the drill, from the same location as Hole No. 4. This will eliminate most of the time required to move the drill to a new location. However, this site is ideal for drilling the intersection and is not chosen merely to save the moving time.

Hole No. 5 will be drilled in a S 82° E direction at an inclination of -50°. The hole should cut the zone of intersection between the Lucy-Last Hope and Diamond veins within the favorable upper 300 feet of the San Juan Formation and will be drilled 100 feet beyond the mineralized zone expected at this intersection. The total depth of the hole is estimated to be 900 feet.

Hole No. 8

Hole No. 8 is designed to test the Lucy-Last Hope vein within the favorable upper 300 feet of the San Juan Formation in the area of the Webster and Last Hope claims.

The hole will be collared at an elevation of about 12,900 feet and will be drilled N 44° E at an inclination of -55°. There is again some uncertainty concerning the true dip of the vein at depth, but the maximum total estimated depth of the hole is 1,000 feet including 100 feet of drilling beyond the vein.

Hole No. 7

Hole No. 7 will be drilled to explore the Lucy-Last Hope vein near its intersection with the Dover-Ben structure and a small, slightly mineralized east-trending fault near the south end of the Webster claim. Since there is some uncertainty concerning the exact

dip of the Lucy-Last Hope vein and because of the complexities involved in the intersection of these three structures, Hole No. 7 is designed not to penetrate the exact intersections of any of these veins, but only to test the Lucy-Last Hope vein near the intersections of these structures.

We believe that it is most probable that the Lucy-Last Hope vein dips 75° - 85° to the west in this area. Hole No. 7 as shown in Fig. 18 is designed to test the vein at this point if it lies between those limits of dip. Data from Hole No. 8 will be available to alter the bearing and inclination of Hole No. 7 if necessary.

Hole No. 7 will be collared at an elevation of about 12,940 feet and will be drilled N 83° 45' E at an inclination of -76°. The hole will be drilled 100 feet beyond its intersection with the Lucy-Last Hope vein and its maximum total depth is estimated to be 950 feet.

Sequence of Drilling

Because, in a number of instances previously cited, information gained from one drill hole will be used to establish the collar location or vary the angle of inclination of a subsequently-drilled hole, it is important to drill the proposed eight holes in a specific order.

As set forth in more detail below, three drill rigs will be needed to complete this program within one field season. These drill rigs will be numbered 1, 2, and 3. Drill #1 will drill the holes near Fuller Lake (Holes No. 1, 2, and 3); rig #2 will drill the Diamond Lake holes (Holes No. 4, 5, and 6); and rig #3 will drill the Webster holes (Holes No. 7 and 8).

The sequence of operations must be:

1. Rig #2 is moved in to start Hole No. 4.

2. Rig #3 is moved in to start Hole No. 8.

3. Rig #1 is moved in to start Hole No. 1.

By the time Hole No. 1 is completed, it is hoped that Hole No. 4 will have been completed, thus making known the dip of the Diamond vein. This will allow a choice to be made between Hole No. 3 and Hole No. 3A for rig #1.

4. Rig #2 is turned to drill Hole No. 6.

5. Rig #1 is moved to drill either Hole No. 3 or 3A.

6. Rig #3 is moved to drill Hole No. 7.

7. Rig #2 is turned to drill Hole No. 5.

8. Rig #1 is turned to drill either Hole No. 2 or 2A depending upon whether Hole No. 3 or 3A had been previously drilled.

Method of Exploration

All holes will be drilled with wireline diamond core drilling equipment provided by a competent, independent contractor. To this end, bids for the drilling were solicited from three drilling companies (See Appendix IV). All holes will be drilled so as to set casing in bedrock, from which point BX wireline core will be recovered to the end of the hole. It is recognized that difficulties encountered in the drilling may require that at some point the core size be reduced. It is proposed that the completed drill holes be left in such condition that they can be easily recovered, and therefore some casing may be left in the holes. Casing from the surface to bedrock will be left in all holes.

Because of the short working season, we plan to save time by moving the drilling equipment to the several drill sites from Silverton by helicopter, rather than break the drilling equipment into the small-sized pieces which could be packed by a mule.

Camp facilities for the drilling personnel, geologic staff, and helicopter pilot will be furnished in Ice Lake Basin by a separate contractor. He will provide tents, cots, and meals, and horses which will be used when necessary to move the crews from camp to drill rig and return. Camp will be established and maintained in accordance with U. S. Forest Service regulations.

All holes will be cored from bedrock to the bottom of the hole. Core will be placed in cardboard core boxes and accurately logged by a member of Vitro's geologic staff. All mineralized core will be split and assayed for gold, silver, lead, zinc, and copper. Occasional rock samples will be taken for thin section study. Facilities for core storage will be rented in Silverton.

The Vitro geologic staff will prepare periodic reports on the project as required by conventional Company practice and OME regulations.

Drilling Program

We estimate that drilling will progress at an average rate of 15 feet per rig per shift. This estimate is based upon our experience in other drilling programs and takes into consideration the high

altitude, drilling time lost during reaming, cementing, casing, setting up, etc. Since the work period available in Ice Lake Basin is about 12 weeks long (late June to late September), three rigs will be needed to complete the proposed program in one season.

Since each rig will require two men per shift, a total of 12 drillers and helpers, plus two supervisors, will be needed to man the 3 rigs.

Helicopter Services

It is planned to use a helicopter to move all drilling equipment from Silverton to the several drill sites, move the drilling equipment when drill sites are changed, and to return the equipment to Silverton at the end of the project. The helicopter would also be used for other supporting activities such as taking gasoline and other necessary supplies to the drilling rigs during the project, taking core from the project area to Silverton for storage, and transporting drillers to and from the camp and drill sites, weather permitting. In the interest of safety at this remote location, it is planned to base the helicopter at the camp and thus have it available in case of emergency.

Five helicopter companies (Sky Choppers, Inc. of Durango, Aerial Applicators, Inc. of Salt Lake City, Mountain West Helicopters of Provo, Pease-Hamilton, Inc. of Denver, and Page Aircraft Maintenance, Inc. of Holloman Air Force Base, New Mexico) were asked to quote on providing helicopter service for this project. The requirements as set forth in the requests to bid (See Appendix IV) called for helicopters capable of transporting 500 pounds at an elevation of 13,200 feet. All five companies submitted bids, claimed that their helicopters were capable of fulfilling the requirements, and proposed to supply a helicopter of the Bell 47G3B-1 type for this project. Information provided by the Bell Helicopter Company indicates that the Bell 47G3B-1 type of helicopter can safely transport such loads at these altitudes.

In order to estimate the amount of flying time required for this project, we have listed the necessary drilling equipment, approximate weights, and helicopter trips required.

Equipment	Approximate Total Weight in Pounds	Trips Required
Move in:		
3 hydraulic drill rigs	7,170	15
3 drilling pumps and engines	3,075	6
3 water pumps and engines	2,400	5
3,000 feet BX drill rods	12,000	24
300 feet NX rods	1,470	3
800 feet NX casing	6,240	13
300 feet BX casing	1,900	4
Cement	2,000	4
Mud	700	2
3,000 feet plastic water hose	700	2
3 mud tanks		3
9 tripod poles		3
1 week supply of gasoline @ 50 gal/day/rig	6,300	18
1 week supply of core boxes and oil		1
Miscellaneous items (filters, tools, etc.)	2,000	4
Personnel (16 men)		8
Total Move in:		115 trips
Move out:		
(Same as "move in" less cement, mud, gasoline, core boxes, oil, casing, tripod poles)		
Total Move out:		70 trips

The time for a round-trip flight from Silverton to Ice Lake Basin is estimated to be 20 minutes. Therefore, the 185 round trips required for move-in and move-out will take 61 2/3 hours of flight time.

The two interim moves of the drill rigs within Ice Lake Basin are estimated to require 18 hours of flight time.

Transport of drilling crews from camp to drill rig will require one-half hour per shift or 1 hour of flight time per day.

Supply of gasoline, core boxes, transport of core, etc. will require a minimum of 1 hour flight time per day.

Total flight time estimates are:

Move in----------	61-2/3	hours
Move out----------		
Interim moves----------	18	hours
Transport (1 hr/day for 94 drilling days)----------	94	hours
Support (1 hr/day for 94 drilling days)----------	94	hours
Total Estimated Flight Time:	267-2/3	hours

VIII. EXPLORATION COSTS AND BUDGET

Diamond Drilling Costs

Boyles Bros. Drilling Company of Denver, Colorado; Sprague & Henwood, Inc. of Salt Lake City; and E. J. Longyear Company of Salt Lake City, were asked to bid on the diamond drilling phase of this project (See Appendix IV). A comparison of the bids indicates that the Sprague & Henwood, Inc. bid is the lowest and their figures are used in preparing these costs for eight drill holes totalling up to 6,900 feet drilled by 3 rigs manned by 6 crews.

1.	Mobilization and demobilization of men and equipment to and from the Silverton, Colorado area		$ 2,450.00
2.	Drilling of overburden - estimated to average 75 feet per hole or 600 feet @ $10.50		6,300.00
3.	BX Core Drilling	1,400 feet @ $8.35	11,690.00
		2,000 feet @ $8.65	17,300.00
		1,800 feet @ $8.95	16,110.00
		1,050 feet @ $9.25	9,712.50
		50 feet @ $9.55	477.50
		6,900 feet	
4.	Reaming - estimated 800 feet @ $5.50		4,400.00
5.	Cementing - estimated 480 hours @ $26.00		12,480.00
6.	Cement and mud		4,000.00
7.	Moving and setting up, moving from site to site estimated at 350 hours @ $18.00/hr.		6,300.00
8.	Standby time, hole surveys - estimated at 320 hours @ $22.00/hr.		7,040.00
9.	Cardboard core boxes to hold 10 feet of core each @ $0.90		567.00
10.	Casing lost in holes; estimated 800 feet @ $3.00/foot		2,400.00
	TOTAL		$101,227.00
	Cost of drilling per foot		$ 14.67

61,590.00

Helicopter Costs

As stated, bids for the helicopter service were requested from five companies (See copies of the bids in Appendix IV).

Our estimates of flight time requirements indicate that the helicopter will be used for 106 hours the first month, 76 hours the second month, and 85 2/3 hours the third month. Based on these estimates, and assuming a 90-hour minimum contract the first month and third month, and a 60-hour minimum contract the second month, Aerial Applicators, Inc. of Salt Lake City has submitted the lowest bid and their figures are used below.

First Month:	106 flight hours @ $110.00/hr. for first 90 hours and $90.00/hr. for all time over 90 hours	$11,340.00
Second Month:	76 flight hours @ $125.00/hr. for first 60 hours and $115.00/hr. for all time over 60 hours	9,340.00
Third Month:	85 1/3 flight hours @ $110.00/hr. for first 90 hours and $90.00/hr. for all time over 90 hours	9,900.00
	TOTAL	$30,580.00

Camp Costs

We have considered the possibility of maintaining the drilling crews and geologic staff in Silverton, but have rejected this because of room and board costs (estimated at $12.00/man/day), the impossibility of walking or riding from South Mineral Campground to the drill sites and return each day, and the fact that helicopter transport from Silverton to the drill sites and return cannot be guaranteed for each drilling day. The need to maintain a certain degree of secrecy during the project also recommends that a drilling camp be established in Ice Lake Basin.

Three camp contractors were asked to bid (See Appendix IV) on the establishment of a camp plus provision of board: George Lancaster, Silverton; Cap Atwood, Grand Junction; and Sid Simpson, Paonia. The lowest bid was that of George Lancaster and his bid prices are used in the camp cost estimate below.

Camp costs are figured on a $10.50 per man per day basis. Considering that the camp will be operated for 93 days and the attendance will be 17 men (12 drilling crewmen, 2 supervisors, 2 geologists, and 1 helicopter pilot), the costs will be:

Camp and Board: 93 x 17 x $10.50	$16,600.50

A minimum of 4 saddle horses will be required during the project for use in transporting the drillers to the drill sites when the helicopter cannot fly, and for emergencies. The cost of these horses will be $6.50 each per day. Therefore:

Horses: 93 x 4 x $6.50	2,418.00
Mobilization:	100.00
TOTAL	$19,118.50

Assaying and Petrographic Costs

8 50-foot sections, 1 foot/sample = 400 samples

400 samples assayed for: Au, Ag, Pb, Zn, Cu
($3.50 + $2.00 + $2.00 + $1.50 = $9.00)

400 samples @ $9.00/sample	$ 3,600.00
15 thin sections/hole for 8 holes @ $2/thin section	240.00
Examination of sections @ $5/section	600.00
	$ 4,440.00
Core storage space rental in Silverton: $50/month for 3 months	150.00
TOTAL	$ 4,590.00

Technical Costs*

This category includes the immediate costs of technical supervision of the Ice Lake project, report writing, secretarial services, drafting, and map reproduction.

1 Exploration Geologist (full time): 3 months @ $1,100/month	$ 3,300.00
1 Geologic Field Assistant (full time): 3 months @ $600/month	1,800.00
Chief Geologist (one-third time): 3 months @ $1,200/month	1,200.00

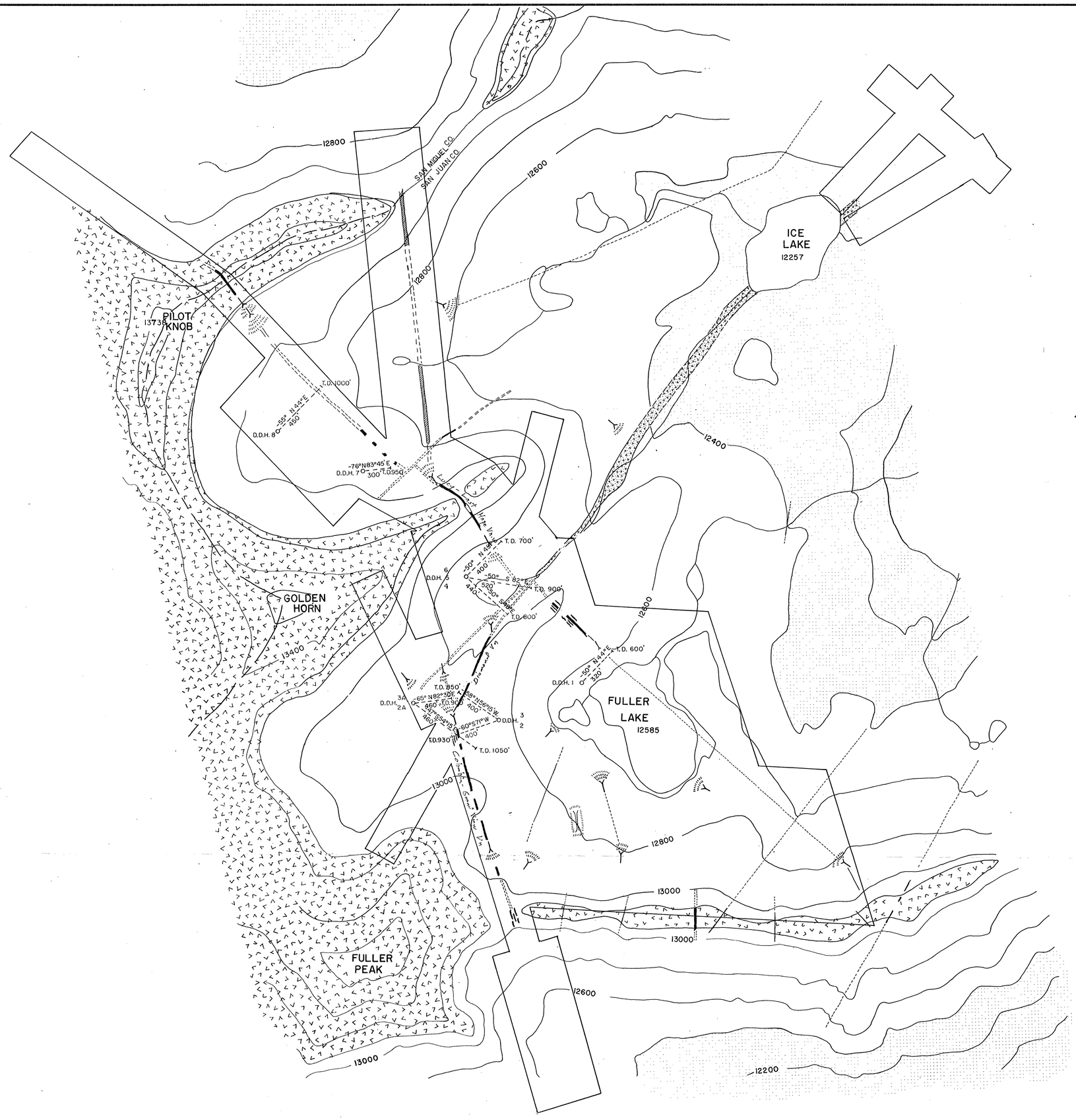
*/ This portion of the contract costs will be provided by Vitro through its normal payrool and accounting procedures.

Exploration Manager (one-quarter time): 3 months @ $1,500/month	$ 1,125.00
Secretarial Services: 60 hours @ $2.75/hour	165.00
Draftsman: 60 hours @ $2.50/hour	150.00
Total Wages	$ 7,740.00
FICA, unemployment, etc. figured @ 7.5% of total wages	580.50
	$ 8,320.50
Travel expense: $150/man/month	1,200.00
Vehicle expense: 2 vehicles for 3 months @ $30/month	180.00
Telephone and telegraph	300.00
Reproduction (maps and reports) 500 sq. ft. @ 10¢/sq. ft.	50.00
TOTAL	$ 10,050.50*

Total Cost of Ice Lake Project

Diamond Drilling Costs	$101,227.00
Helicopter Costs	30,580.00
Camp Costs	19,118.50
Assaying and Petrographic Costs	4,590.00
Technical Costs*	10,050.50*
TOTAL	$165,566.00

*/ This portion of the contract costs will be provided by Vitro through its normal payroll and accounting procedures.



N

SCALE 1" = 400'

LEGEND AND EXPLANATION

- POTOSI VOLCANIC GROUP
- HORNBLENDE DELLENITE DIKE
- SILVERTON VOLCANIC GROUP
- SAN JUAN FORMATION

NUMBER — DIP / HORIZONTAL DISTANCE TO VEIN — BEARING — TOTAL DEPTH

CLAIM OUTLINE

CONTOUR INTERVAL: 200'

PLATE V

VITRO CORPORATION OF AMERICA

REVISED D.D.H. LOCATION MAP

LUCY-LAST HOPE VEIN AREA
UPPER ICE LAKE BASIN
SAN JUAN COUNTY, COLO.

SCALE: 1" = 400'

MAY, 1968