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M E M O

TO: Ron Short, Carole O'Brien, Anthony Budge  
FROM: Don White  
DATE: February 16, 1989  
SUBJECT: Ash Peak silver/silica exploration proposal.

SUMMARY The Ash Peak argentiferous silica flux mine is principally a vein-type occurrence. It has never been tested at very great depth nor along strike or on certain recognized splay veins. Some ore controls are recognized and targets for new exploration are defined on the basis of those controls.

Any one of the seven vein-type targets could lead to discovery of new bodies on the order of the historical production from the Commerce or Shamrock deposits. That is, a new body could measure up as 200,000 to 400,000 tons grading 8 oz/t Ag, 0.03 oz/t Au and at least 75% silica. Five vein targets are within the present claim block and could be tested with one hole each for about \$125,000 drilling or \$150,000 all-inclusive costs. Two of the vein targets are outside the claim block and require some land work. They could be tested for about \$40,000 drilling or \$50,000 all-inclusive, for a total of \$200,000. Such a program would require about 2 months drilling, double-shift.

The manto-type target likelihood is best appraised after the vein drilling information is in hand. There is not much other useful data on the deep stratigraphy and that coming out of the proposed vein-target may well help define any manto target. Should one exist, it could well be at least 3,000 feet deep and each hole to that depth would cost \$75,000 to \$100,000. The deposit type at stake is very large and rich, and, if found, would support new shaft sinking, mill construction, plus the costly exploration.

All the proposed targets will require very careful work, top notch core recovery, down-the-hole survey control, and gleaning of all geologic information. Continuous, experienced, geologic supervision will be crucial.

INTRODUCTION Following a Nov. 14, 1988 mine visit, the tentative terms of an earn-in agreement for Budge's acquisition of a 50% interest in the Ash Peak Mine have been agreed upon. Budge's interests, according to Ron Short, are two-fold:

- 1) To find other Commerce/Shamrock size vein deposits; that is, 200,000 to 400,000 ton bodies grading 8 oz/t Ag and about 0.03 oz/t Au as minimum 75% silica for smelter flux;
- 2) To test for possible manto-type Pb-Zn-Ag mineralization at depth. Such a deposit would have to be large enough (>1 million tons) and rich enough (say 20% combined Pb-Zn and > 10 oz/t Ag) to support new shaft sinking. It would not be flux but rather mill feed.

The purpose of this memo is to better identify and prioritize the vein-type targets and estimate the cost of drill testing them, and to explain why

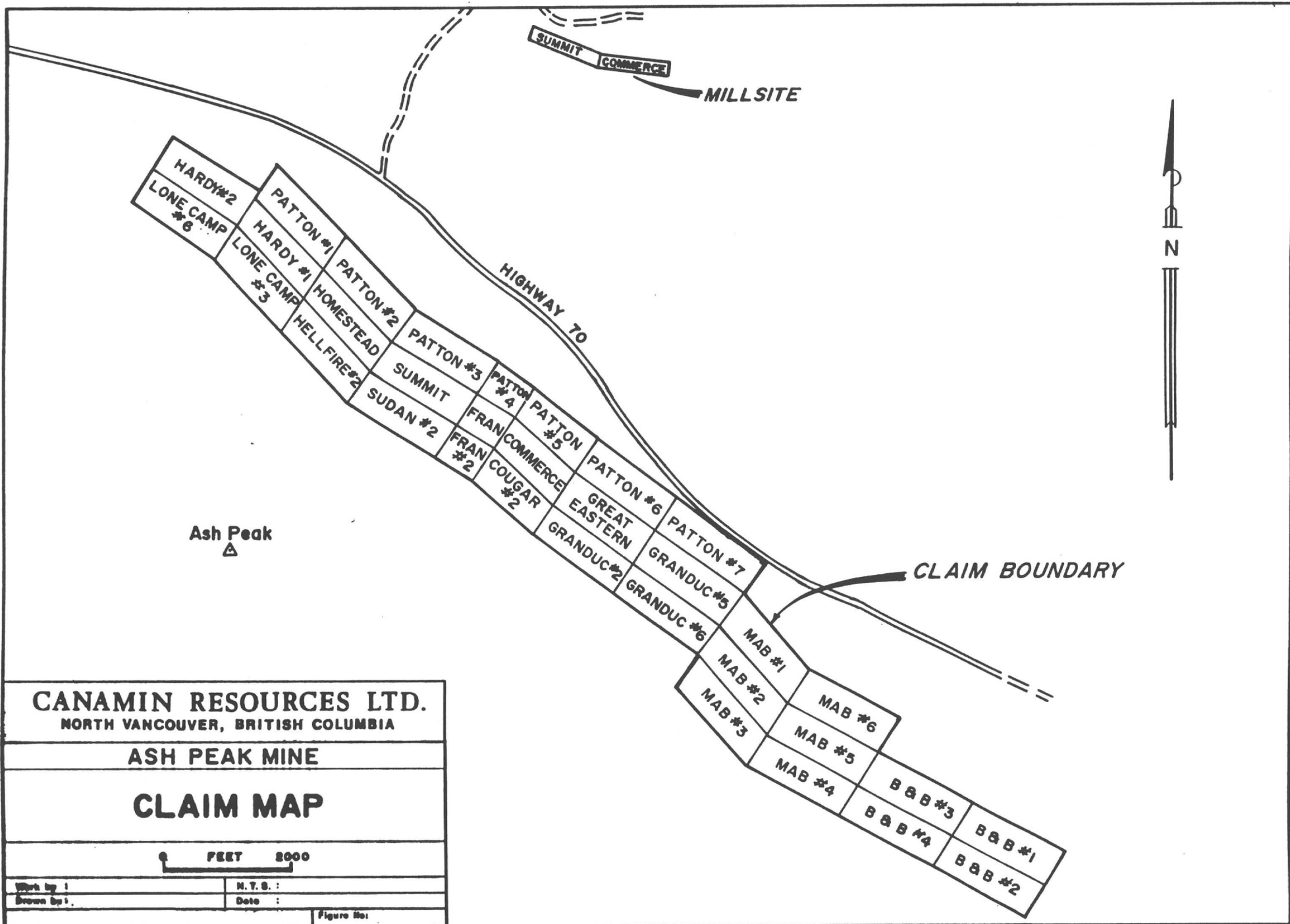


Figure No. 2 , to. memo by Don White, Feb. 1989

the manto-type target should only be considered after the information from the vein drilling is in hand.

There is a dearth of information on the geologic controls of Ash Peak mineralization despite voluminous historical records and abundant assay plots. The whys and wherefores of the old deposits are still nebulous and thus I must rely heavily on the opinions of those authors who have devoted more time to its study than I. They are mainly the Sage Associates' 1976 report and Richard Woodcock's 1988 report. Some additional exploration ideas are gleaned from the memos of Phelps Dodge and Inspiration (both former operating lessees).

### Geology salient to understanding the exploration ideas

Those controls of mineralization that we may now recognize are:

- 1) Fault control of epithermal quartz veins; the Ash Peak fault is the all-critical structural host for the main Ash Peak vein. Parallel or splay faults are thought to host the footwall and hanging wall veins and others. These faults are high angle features cutting the subhorizontal Tertiary volcanic rocks.
- 2) Flexures in the faults host the better thicknesses and grades; deflections (figures 4 and 5) in the surface trace of the Ash Peak fault correspond to the Commerce and Shamrock ore bodies and the Hardy shaft with its small amount of reported high grade. It seems likely that motion along the Ash Peak fault yielded better openings for subsequent silicification at those sites of kinks or bends in the fault. This yielded lense-shaped deposits with economic potential because the greater mining thicknesses correspond to higher grade silver.
- 3) Tendency of hanging wall portions of veins to be better than footwall portions; in other words better silver and more siliceous toward the top side of the vein as opposed to less silver and more calcite in the basal portions. Also more pure vein matter to the top and more wall rock breccia clasts to the bottom.
- 4) Possible elevation control on the best grade mineralization and systematic variance of the optimal elevation along strike; the suggestion at the Commerce and Shamrock deposits being a 600-foot range in elevation is optimal and that the top of that zone outcrops near the Commerce shaft, is at the 200-level in the Shamrock shaft and the 600-level in the Hardy shaft (see figure 5).
- 5) Tendency for highest grade zones to form vertical ore shoots within the confines of the other parameters already defined (see figure 3).

These observations provide the key guidance to exploration for more vein-type ore bodies. But there is also the recognition that similar vein silver-silica deposits, particularly to the south in Mexico, have been traced downward

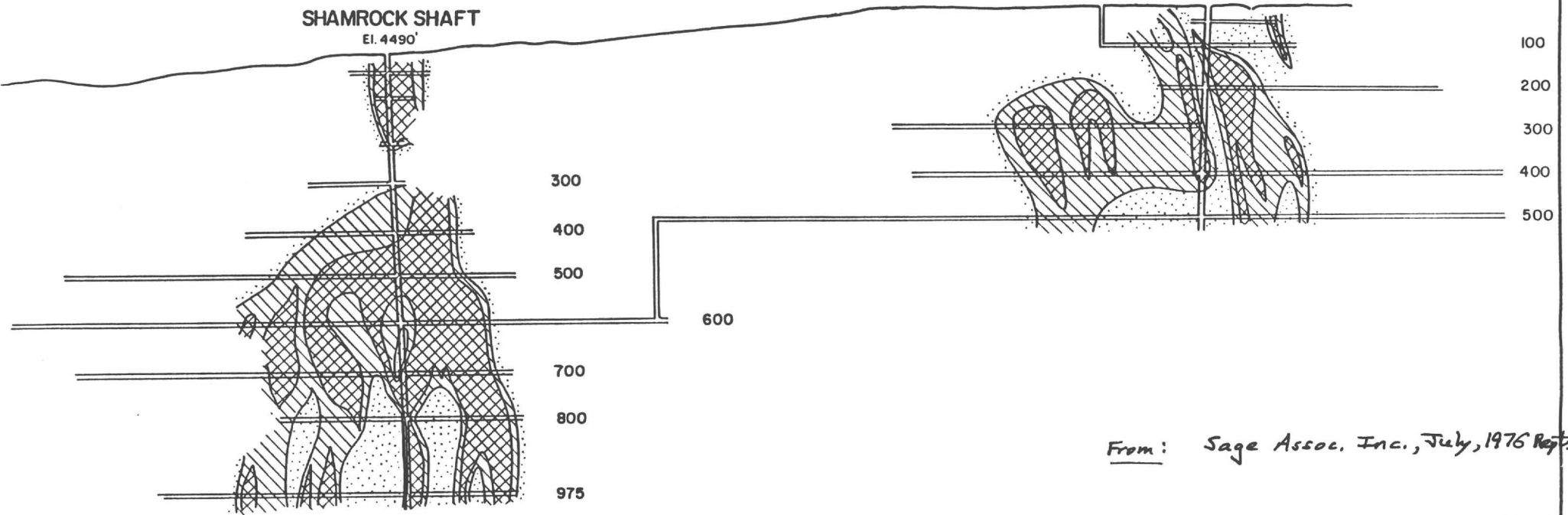
NW

SE

# Longitudinal Section, Ash Peak Vein

SHAMROCK SHAFT  
El. 4490'

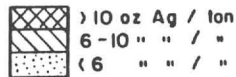
COMMERCE SHAFT  
El. 4592'



From: Sage Assoc. Inc., July, 1976 Rept.

Note near vertical attitude of highest grade ore shoots. They plunge straight down dip at approximately 75° SW.

### ORE GRADE



CANAMIN RESOURCES LTD.  
NORTH VANCOUVER, BRITISH COLUMBIA

ASH PEAK MINE  
GREENLEE COUNTY, ARIZONA  
SHAMROCK-COMMERCE SHAFTS  
CONTOURED SILVER GRADE

0 200 400 600 FEET

Work by:	Map Grid:
Drawn by:	Date:
Scale: As shown	Figure No.:

Figure No. 3, to memo by Don White - Feb. 1989

ASH PEAK PLAN

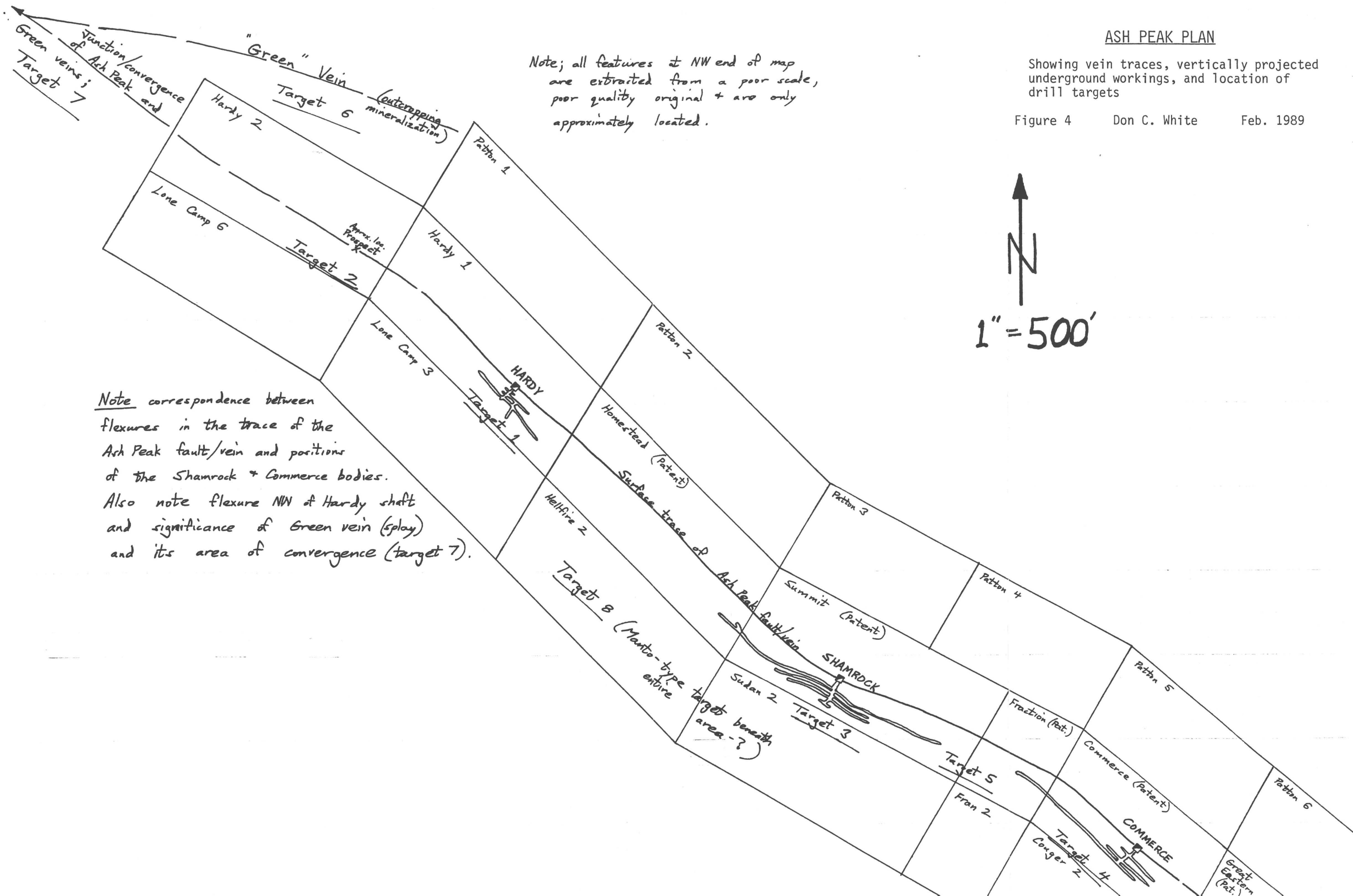
Showing vein traces, vertically projected underground workings, and location of drill targets

Figure 4 Don C. White Feb. 1989

Note; all features at NW end of map are extracted from a poor scale, poor quality original + are only approximately located.



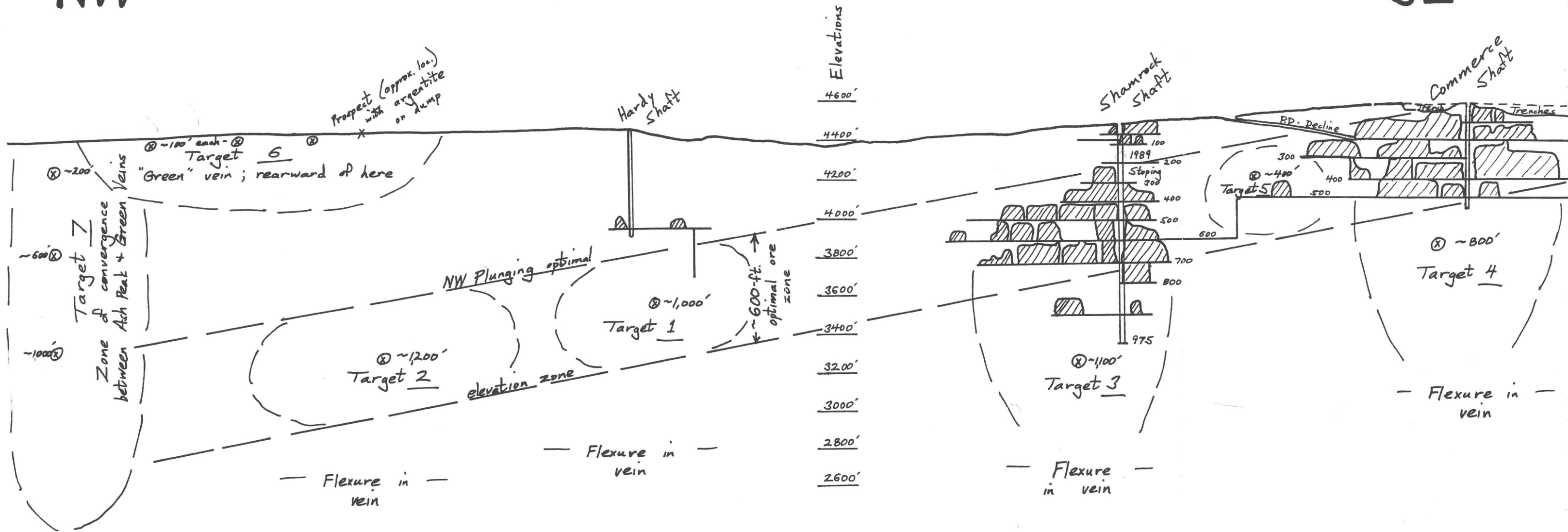
Note correspondence between flexures in the trace of the Ash Peak fault/vein and positions of the Shamrock + Commerce bodies. Also note flexure NW of Hardy shaft and significance of Green vein (splay) and its area of convergence (target 7).



NW

Longitudinal Section - Looking NE

SE



Target B = Manto-type Pb-Zn-Ag sulfide  
 ≥ 1,500' minimum potential at depth (merits of testing to be evaluated in course of vein-type target drilling).  
 Prob. > 3,000' and, may be worth testing to ~ 8,000' if indications are strong & reliable.

1" = 500'

ASH PEAK LONGITUDINAL SECTION

Showing old stopes, major ore trends, and proposed drill targets

to major lead-zinc-silver deposits. Without much other evidence pro or con, it is our wish to at least determine whether conditions exist for such a deposit beneath the Ash Peak vein deposits. If so, this deeper, higher grade, sulfidic, manto-type deposit is to be tested too.

### The principal targets

Having distilled all the available reports and data, the following are offered as the most likely sites of undiscovered mineralization. The numbers 1 through 8 correspond to the targets in plan (figure 4) and longitudinal section (figure 5). The numbers do not indicate a priority either of size, chances of success, or even drilling order. There are many obfuscating issues of drilling logistics, claim boundaries, and sequentially dependent information that are important.

<u>Number</u>	<u>Target</u>	<u>Drilling depth (ft)</u>
1	Hardy area beneath the 600 level	1,000
2	NW of Hardy, beneath the 800 level	1,200
3	Down dip from Shamrock	1,100
4	Down dip from Commerce	800
5	Between Shamrock and Commerce	400
6	Green vein, near surface	100
7	Intersection of Green and Ash Peak veins	100 - 1,000
8	Manto-type target at depth	3,000+ ?

Targets 1 through 5 are those with the best support data. They all lie within the best understood fault/vein system and within the present claim block. A number of holes could very usefully be drilled in each of them without any geologic overkill. However, a bare one hole cast at each of the initial five targets will still total about 5,000 feet. At \$25./ft all-inclusive contractors cost, that's \$125,000. One could only embark upon such a program if they realize that certain targets will require more drilling for convincing evidence.

Targets 6 and 7 are both very intriguing. They come from Sage and Associates' recommendations now 13 years old but still apparently never acted upon. The Green vein (target 6) has all the geochemical hallmarks of another Ash Peak vein, including Ag. It should be tested by a minimum of three 100-foot holes spaced along its trace.

Both the Green vein and the intersection of Green and Ash Peak veins (target 7) apparently lie beyond the NW boundary of the present Ash Peak Partner's claims. This needs to be checked out with the partners and in



the courthouse. Staking a few supplemental claims may be needed. In any case, target 7 may be a very good bet. Testing the vein intersection at various depths, say 100', 300', and 600', would be the minimum recommended.

Only with the vein-testing information in hand could one appraise the merits of the manto-type target (8). The vein testing proposed would be the deepest to date and likely the most thorough. It would probably yield critical information on stratigraphy, vertical continuity of structure and mineralization, and geometric information that must be combined to figure whether a manto target is plausible, and if so, where. A target in excess of 3,000 feet deep is quite to be expected.

### Drill testing

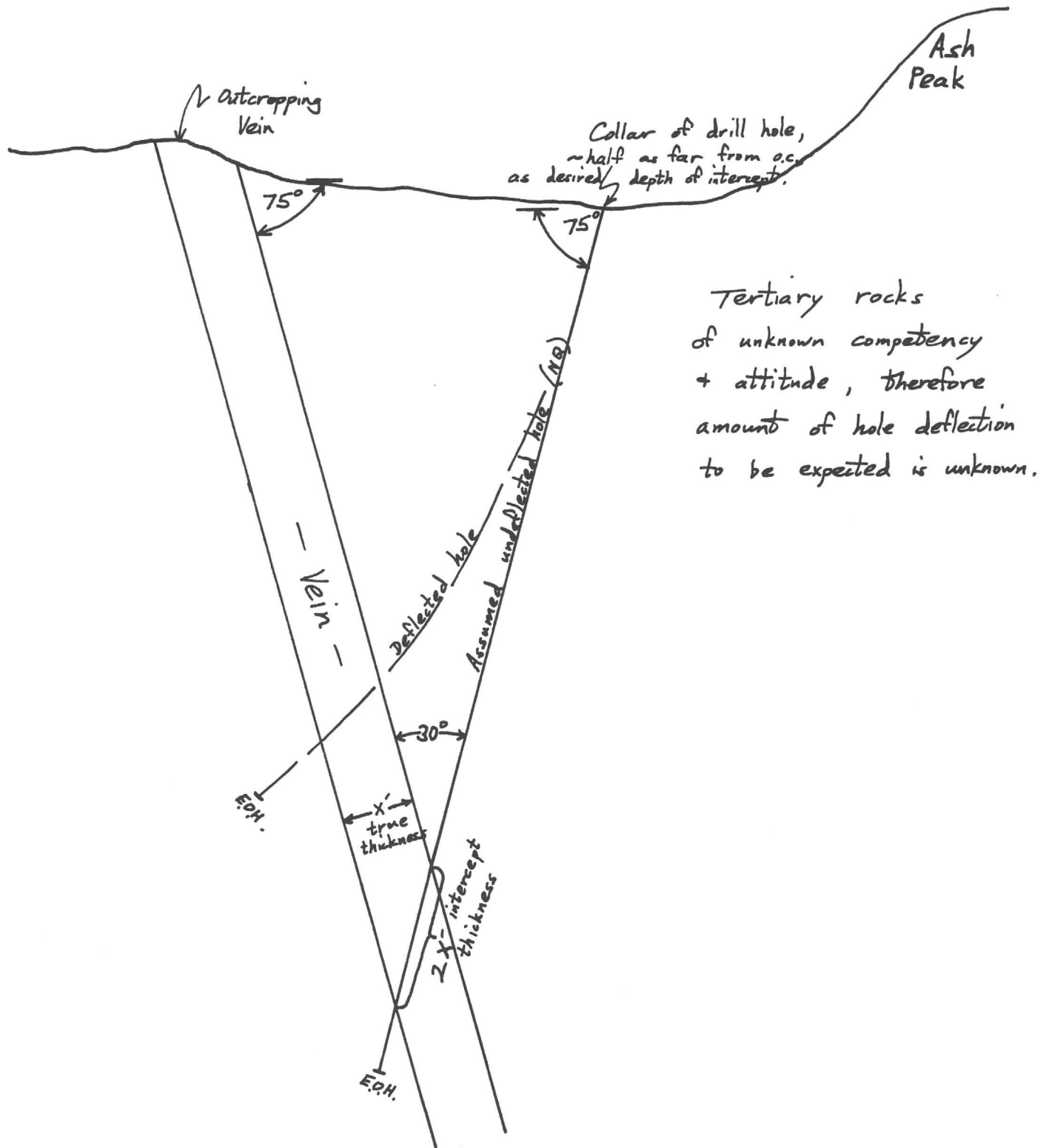
The proposed targets 1 through 7 all lie along steeply dipping faults/veins. Dips average about 75° to the southwest. For all but the shallowest holes, dips of about 75° for the drill string at the collar will be about right. If angled to the northeast and undeflected by the Tertiary stratigraphy, then an angle of intercept of 30° will be made with the vein (figure 6). This is good for it yields an intercept length twice that of the true thickness. At about \$25,000. per deep intercept, the more footage intercepted the better. More assayable footage means more statistical significance for the little hole in the huge target. The minimum core size recommended is NQ.

Of course hole deflections must be expected and must be well documented under these circumstances. The location and angle of intercept must be known very accurately. Thus it will be imperative to have available a down-the-hole survey instrument.

The shallower targets should be tested first so as to learn the drill deflection characteristics. These lessons can then be incorporated in the collar site and orientation selections for the deeper holes.

All the vagaries of drilling such long holes and getting good core return in the key intercepts demands a top notch driller. I have used all the majors for various clients but find none as reliable or as cost-competitive as S.D.S., newly relocated to Reno. They would be willing to work double shift, 10 days on, 4 days off, drilling NQ with their truck-mounted or skid-mounted rig. They routinely drill for a fixed, all-inclusive, cost. There are no extras for mobilization, bits, mud, moving, or anything! When all is said and done their rates are 10% to 50% less than Longyear, Boyles, or Joy. Their rates of advance would probably be about 80 to 100 feet per shift or 3,000 to 4,000 feet per month. Thus an initial one-hole test of targets 1 through 7 could be had in two months duration, and a manto-target hole may require a month of its own. The approximate cost of S.D.S. is \$25./ft.

As already mentioned, one hole into each of the initial five targets would require about 5,000 ft. drilling or \$125,000. direct drilling expenditure. Targets 6 and 7, if drilled beyond the present claim boundary, would be another



Tertiary rocks  
of unknown competency  
+ attitude, therefore  
amount of hole deflection  
to be expected is unknown.

Ash Peak Mine  
Schematic, vertical drill section,  
looking SE, to show  
intercepts, deflections, etc.

1,500 feet or so or an additional \$40,000. Each hole expended on manto-target testing, at a guessed 3,000 ft. depth, would require about \$75,000.

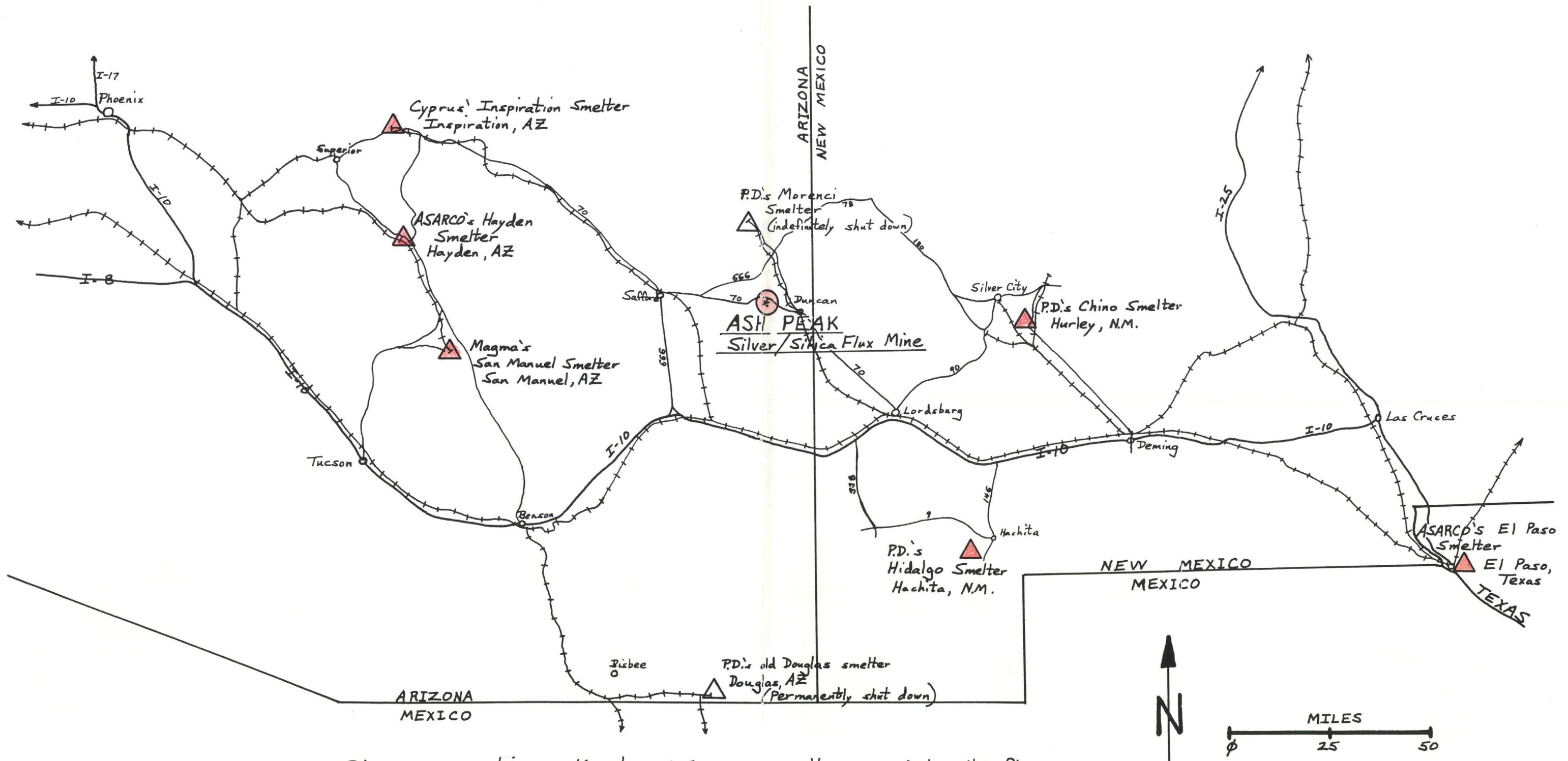
To drilling costs must be added dozer costs for pads and drill roads, surveying, geologist, and some assays (though the on-site radiometric analyser will be utilized for most assays). All these costs are summarized:

COST SUMMARY

<u>Drilling</u>	All-inclusive contractor cost @ \$25./ft.	
	Initial 5 targets, one hole each, 5,000 ft.	\$125,000
	Targets 6 and 7, three holes each, 1,500 ft.	40,000
	Manto-target holes, each 3,000+ ft (?) or \$75,000 apiece	
	Drilling total for targets 1 through 7	<u>165,000</u>
<u>Cat Work</u>	Assumed 2 hr/hole @ \$50./hr	1,000
<u>Surveying</u> (surface)		1,000
<u>Down-hole surveying</u> (rental of instrument)		4,000
<u>Geologic supervision</u> (3 months @ \$5,000)		15,000
<u>Contingency</u> (@ about 8%)		<u>14,000</u>
	TOTAL for targets 1 through 7	About <u>\$200,000</u>

CONCLUSIONS The seven vein-type targets at Ash Peak could be drill tested in at least a first-pass fashion (a bare one hole each) within a couple months of double-shift drilling for about \$200,000. Each manto-target hole thereafter would probably cost \$75,000 to \$100,000.

DW:sk



Six major, operating, southwestern U.S. copper smelters requiring silica flux:

<u>Firm</u>	<u>Smelter</u>	<u>Location</u>	<u>Firm</u>	<u>Smelter</u>	<u>Location</u>
ASARCO	El Paso	El Paso, TX	Magma	San Manuel	San Manuel, AZ
	Hayden	Hayden, AZ		Phelps Dodge	Chino
Cyprus	Inspiration	Inspiration, AZ	Hidalgo		Hachita, NM

ASH PEAK LOCATION MAP

With respect to road and rail haulages to area smelters requiring silica flux