



D-Reef Exploration
April 7, 1986

MEMORANDUM

DATE: March 19, 1986

TO: Ed Morrow

FROM: Ed Follis

SUBJECT: Geologic Reserve Estimate-"D" Reef(L-D Mine)

INTRODUCTION

The purpose of the "D" Reef(Lovitt-Day Mine) reserve estimate is two-fold. First, to provide a realistic number for the "probable" reserves left in the old workings, and secondly, to use the available information to determine if any potential areas(drill targets) for additional mineralization exist.

Probable in-place geologic reserves are categorized in Blocks 1, 2 and 3 as designated by Lovitt. The reserves are also estimated for each lease, the reserves being confined to the WE. 21.5 and WE. 70 leases. Blocks 1 and 2 were mined extensively by Lovitt from 1949 to 1966, and the remaining workings are flooded below the 1100 Level(Block 1) and extensively caved above the 1250 Level(Block 2). Little mining was done on the few high grade areas outlined in Block 3. No attempts to determine mineable reserves were made. However, underground extraction of the remaining higher grade reserves left largely in pillars and stope-related caved areas would obviously be a problem. Open-pit extraction of a significant tonnage would be complicated by a high stripping ratio and environmental concerns. But, if additional tonnage is defined by the highly recommended drill targets above Block 3 and below Block 1, the economics of both underground and particularly open-pit mining could be appreciably improved.

The estimated overall reserves for the "D" Reef are summarized as follows:

0.040 Au opt Cut-off

<u>Lease</u>	<u>Tons</u>	<u>Grade</u>	<u>Ounces</u>
WE. 21.5	4,829,000	0.078	375,720
WE. 70	<u>1,880,000</u>	<u>0.103</u>	<u>192,950</u>
Total	6,709,000	0.085	568,670

0.100 Au opt Cut-off

WE. 21.5	1,371,000	0.153	209,820
WE. 70	<u>860,000</u>	<u>0.169</u>	<u>145,480</u>
Total	2,231,000	0.159	355,300

GENERAL CRITERIA FOR RESERVE ESTIMATION

The following guidelines were used in the reserve estimation:

1. Reserves are estimated as "probable in-place geologic reserves". This categorization implies that the estimates should be treated as generalizations only, and that considerable surface drilling and/or underground rehabilitation, sampling and drilling would be required to categorize the reserves proven.
2. All estimates were done on 50-scale cross sections on 100 foot centers constructed normal to the strike of the orebody. Beginning at 0 cross section on the southeast end line of the Gold King claim(see Composite Plan Map of "D" Reef), sections are numbered consecutively as 1(100 foot), 2(200 foot), etc. step-outs to the northwest.
3. A 0.040 Au oz./ton cut-off was used.
4. A 12.8 ft³/ton tonnage factor was used.
5. Grade for a particular block was based upon the arithmetic average (not weighed) of muck and drill hole samples falling in the given block. Grades over 1.000 Au oz./ton were not used, as were grades from stoped areas excluding access drifts and raises. However, in most cases high grade areas with any continuity were stoped by Lovitt, and the exclusion of the remaining high grade values should not serve in undervaluing the estimate.
6. In-place tonnages were calculated by planimentering the 50-scale cross sections. Mined tonnages were estimated from the available mine and assay maps and subtracted from the planimentered in-place tonnages to estimate the remaining tonnages.
7. It is emphasized that no attempt to categorize mining reserves from the estimated probable geologic reserves was made. Wright Engineers in their September 1983 report for United Mining(previous holders of WE. 21.5) state that 59 percent of their probable geologic reserves are underground mineable reserves. At this point in time I contend that their mineable estimate is meaningless. Tenneco's open-pit mineable estimate of 2,000,000 tons at 0.150 Au oz./ton presented in their December 1984 summary report appears to be realistic, but a high stripping ratio is estimated by Asamera.

BLOCK SUMMARY

Block One

Block 1 reserves are confined to the Gold King claim of the WE. 21.5 lease and are covered by cross sections 4 to 13. The block consists of 10 (00,0,1,2,3,4,5,6,7 and 8) distinct narrow(<1 foot wide) very high grade veins which occur within silicified and much lower grade mineralized sediments. The veins strike N40°E and are moderately to steeply dipping to the north, normal to the northwest striking and southwest steeply dipping sediments. The unit is bounded on the northeast by the northwest trending "Footwall Fissure" fault system, and much of the high grade mineralization occurs on the hanging wall side of the western strand of this fault system. Basically, the geology appears to be quite similar to that of the "B" North zone. Lovitt mined the high grade veins individually mostly by shrinkage stoping with some long-hole stoping, and appears to have done a quite thorough job

of removing the high grade from this block. No mining occurred below the 850 Level, but two significant diamond drill intercepts (9 feet of 0.370 and 1 foot of 0.570 Au oz./ton) were intersected on approximately the 750 Level (cross sections 8 and 9). Thus, the block is still open at depth. Currently the block is flooded below the 1100 Level. Probable geologic reserves for Block 1 are as follows:

0.040 Au opt Cut-off

<u>Lease</u>	<u>Tons</u>	<u>Grade</u>	<u>Ounces</u>
WE. 21.5	3,084,000	0.058	180,000

0.100 Au opt Cut-off

WE. 21.5	403,000	0.135	54,200
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(Note: All >0.100 Au opt reserves are above 1100 Level)

Block 2

Block 2 reserves are confined to the Macbeth claim of the WE. 21.5 lease and the WE. 70 lease, and are covered by cross sections 14 to 24. The block is physically separated from Block 1 by the "North-South Fault", Block 2 being offset some few hundred feet to the north of Block 1. Mineralization appears to be controlled at depth by the "Flat Fault", and although there has been only limited drilling below the known mineralization, it does not appear to be open at depth. Ore has been mined between the 1150 and 1645 Levels using long-hole stoping in areas containing high concentrations of high grade quartz veins. Caving of the workings from just above the 1250 Level to the surface has occurred and is related to the large stopes developed in this block. Although some quite good grades appear to be left in pillars and access drifts, the block would be difficult to mine by underground methods because of the extensive caving. Probable in-place geologic reserves for Block 2 are summarized as follows:

0.040 Au opt Cut-off

<u>Lease</u>	<u>Tons</u>	<u>Grade</u>	<u>Ounces</u>
WE. 21.5	1,698,000	0.113	191,860
WE. 70	1,050,000	0.114	119,630
Total	2,748,000	0.113	311,490

0.100 Au opt Cut-off

WE. 21.5	950,000	0.161	153,100
WE. 70	643,000	0.160	102,550
Total	1,593,000	0.161	255,650

Block 3

Block 3 reserves are contained primarily on the WE.70 lease of which Asamera and Breakwater control 63 percent. The reserves are covered by

cross sections 25 to 29. Exploration drifting by Lovitt was confined to the 1150 and 1250 Levels and no significant stoping was done. Although a considerable amount of unsuccessful long-hole drilling was done in areas near these two levels, it can be strongly inferred from the geology and limited Cyprus surface drill holes that mineralization may extend from above the workings to the surface. Cyprus drill holes DDH 8 and 18 both intersected substantial intervals of low grade mineralization well above the 1250 Level, but were drilled down-dip on the north striking/west dipping block. Because no areas were stoped in Block 3, all grades were used in estimating the reserves. The geologic reserves are as follows for Block 3:

0.040 Au opt Cut-off

<u>Lease</u>	<u>Tons</u>	<u>Grade</u>	<u>Ounces</u>
WE. 21.5	47,000	0.082	3,860
WE.70	<u>830,000</u>	<u>0.088</u>	<u>73,320</u>
Total	877,000	0.088	77,180

0.100 Au opt Cut-off

WE. 21.5	18,000	0.140	2,520
WE. 70	<u>217,000</u>	<u>0.198</u>	<u>42,930</u>
Total	235,000	0.193	45,450

GEOLOGIC RESERVE COMPARISONS: CYPRUS, WRIGHT, TENNECO AND ASAMERA

Table 1 presents comparisons of the following reserve estimates for the "D" Reef:

1. Cyprus Technical Services estimate of 1976.
2. Wright Engineers September 1983 estimate for United Mining.
3. Tenneco Minerals Company estimate of December 1984.
4. Asamera Minerals estimate by the author presented in this memo.

As shown in Table 1, similar total tonnages were calculated by Cyprus and Asamera using the 0.040 Au cut-off, but my grade is approximately 50 percent less. The fact that my grade estimates are consistently under this and almost all other companies' block estimates can probably be attributed to the fact that I omitted stope assays while the others did not. However, it is interesting to note that the Block 3 Wright and Asamera(0.100 Au cut-off) estimates are very similar; in this block I used all assays because the block was not stoped. The overall Wright and Asamera(0.100 Au cut-off) estimates are also within about 5 percent of each other.

Comparisons with the Tenneco reserves cannot be made because they have included only partial reserves from each block in an open-pit design of unknown size or stripping ratio. However, since their Block 3 reserves are stated as open-pitable, a very high stripping ratio (ie. greater than 9 or 10:1) is indicated.

CONCLUSIONS

The overall probable in-place geologic reserve estimate for the "D" Reef is 6,700,000 tons averaging 0.085 Au oz./ton using a 0.040 Au cut-off.

TABLE 1

COMPARISON OF CYPRUS, WRIGHT, TENNECO AND ASAMERA
 "D" REEF ORE RESERVE ESTIMATES

AREA	Cyprus *		Wright Eng. **		Tenneco ***		Asamera ****		Asamera *****	
	Tons	Grade	Tons	Grade	Tons	Grade	Tons	Grade	Tons	Grade
Block 1	3,329,970	.111	299,200	.263	508,200	.114	3,084,000	.058	403,000	.135
Block 2	3,685,450	.198	1,009,600	.236	1,139,200	.153	2,748,000	.113	1,593,000	.161
Block 3	543,600	.094	258,000	.192	376,700	.171	877,000	.088	235,000	.193
Totals	6,523,450	.176	1,566,800	.239	2,023,500	.149	6,709,000	.085	2,231,000	.159

Notes: *Cyprus estimate anticipating open-pitting of all Blocks 1 and 2.

**Wright estimate anticipating underground mining above 1100 Level.

***Tenneco estimate anticipating open-pitting of select, but specifically unknown, portions of all blocks.

****Asamera estimate above .040 Au opt cut-off. Anticipations open. Block 2 stripping ratio estimated to be ±10:1 with 50° pit walls.

*****Asamera estimate above .100 Au opt cut-off and above 1100 Level. Anticipations open.

Underground mining would be complicated by extensively caved workings and the fact that the higher grade mineralization occurs in pillars or areas immediately adjacent to stoped areas. However, certain portions of the mine could possibly be mined by some adaption of block caving.

Economic open-pit mining of a significant tonnage would be complicated by a high stripping ratio ($\pm 10:1$ for Block 2) and environmental concerns. However, assuming additional reserves could be outlined above the 1250 Level in Block 3, the economic attractiveness of open-pitting the "D" Reef could be substantially improved. The question of open-pitting should be considered immediately by Asamera management. One of the real factors that would influence the economics of open-pitting is using the overburden for Cannon Mine stope back-fill and tailings dam top-fill as required.

DRILL RECOMMENDATIONS FOR EARLY 1986

A budget for 15,000 feet of diamond drilling was estimated for 1986 on the "D" Reef. It was stated at the November 1985 budget meeting in Calgary that 7500 feet of drilling would be required to initially determine if the "D" Reef contained silicified/mineralized extensions. Although no Asamera personnel had studied the "D" Reef until the present time, the 7500 feet of drilling still remains a reasonable number to determine if the outlined targets exist. Specific drill recommendations in decreasing order of importance are:

Block 3: Two due east/moderate angle holes about 600 feet deep each and both collared near the NE Macbeth claim line on Section 25; to check for upper mineralized extensions to Block 3.

Two due east/moderate angle holes about 600 feet deep each collared on WE. 70 on Section 27; to check for upper mineralized extensions to Block 3.

One due east/angle hole about 1200 feet deep near the NE Macbeth claim line on Section 27; to check for deep extensions of Block 3.

Block 1: Two N50°E/angle holes about 1000 feet deep each collared on WE. 15 to test for deep extensions of mineralization at about the 500-600 Levels on Sections 8 and 10. May require helicopter drilling.

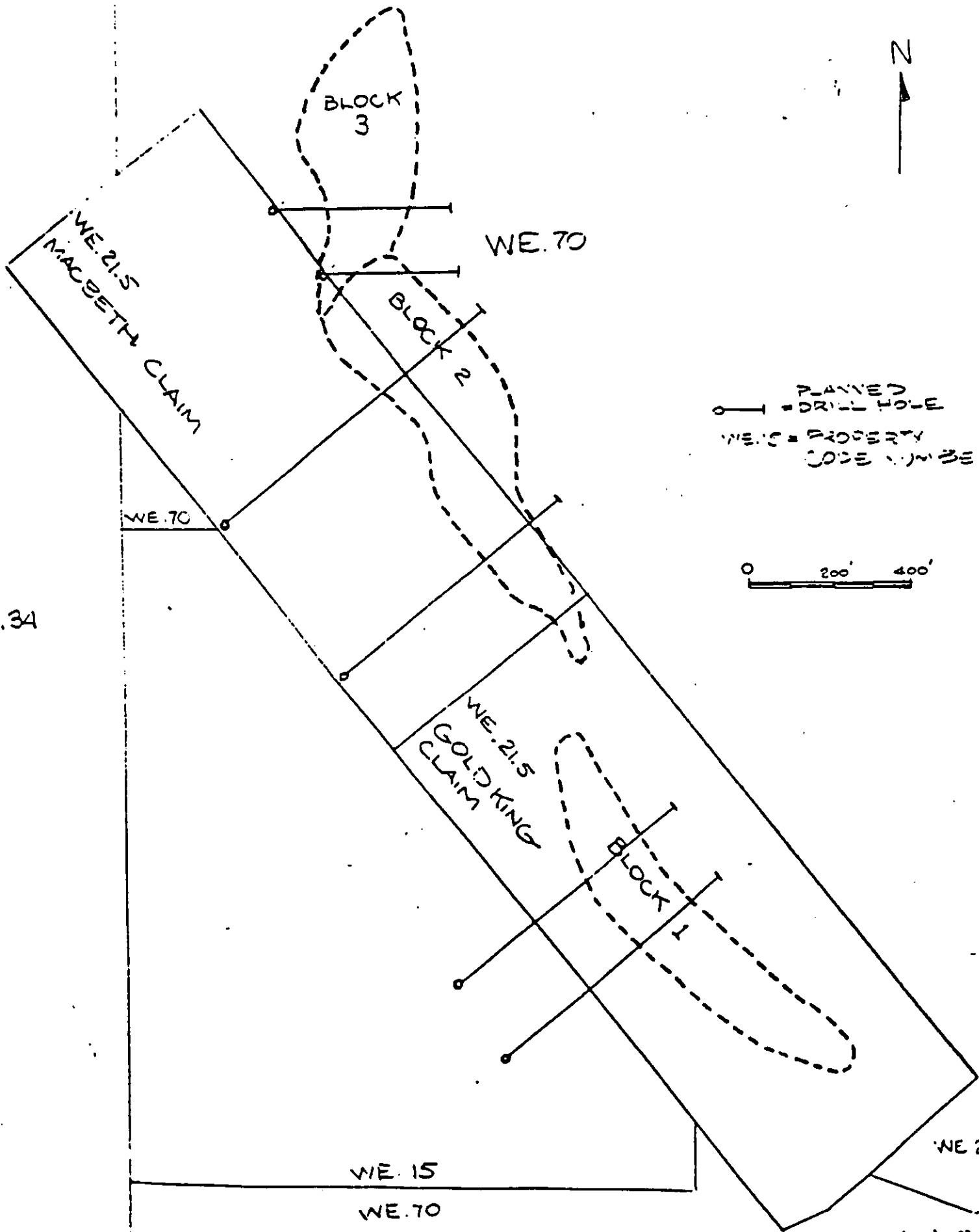
Block 2: Two N50°E/angle holes about 1000 feet deep each collared near the SW claim line on Sections 17 and 22 to test for mineralization below Block 2. Will require helicopter drilling.

ELF:elf

attachments

cc: R. Gill w/attach. and worksheets
R. Karlson w/attach. and worksheets
T. Kelly w/o attach.

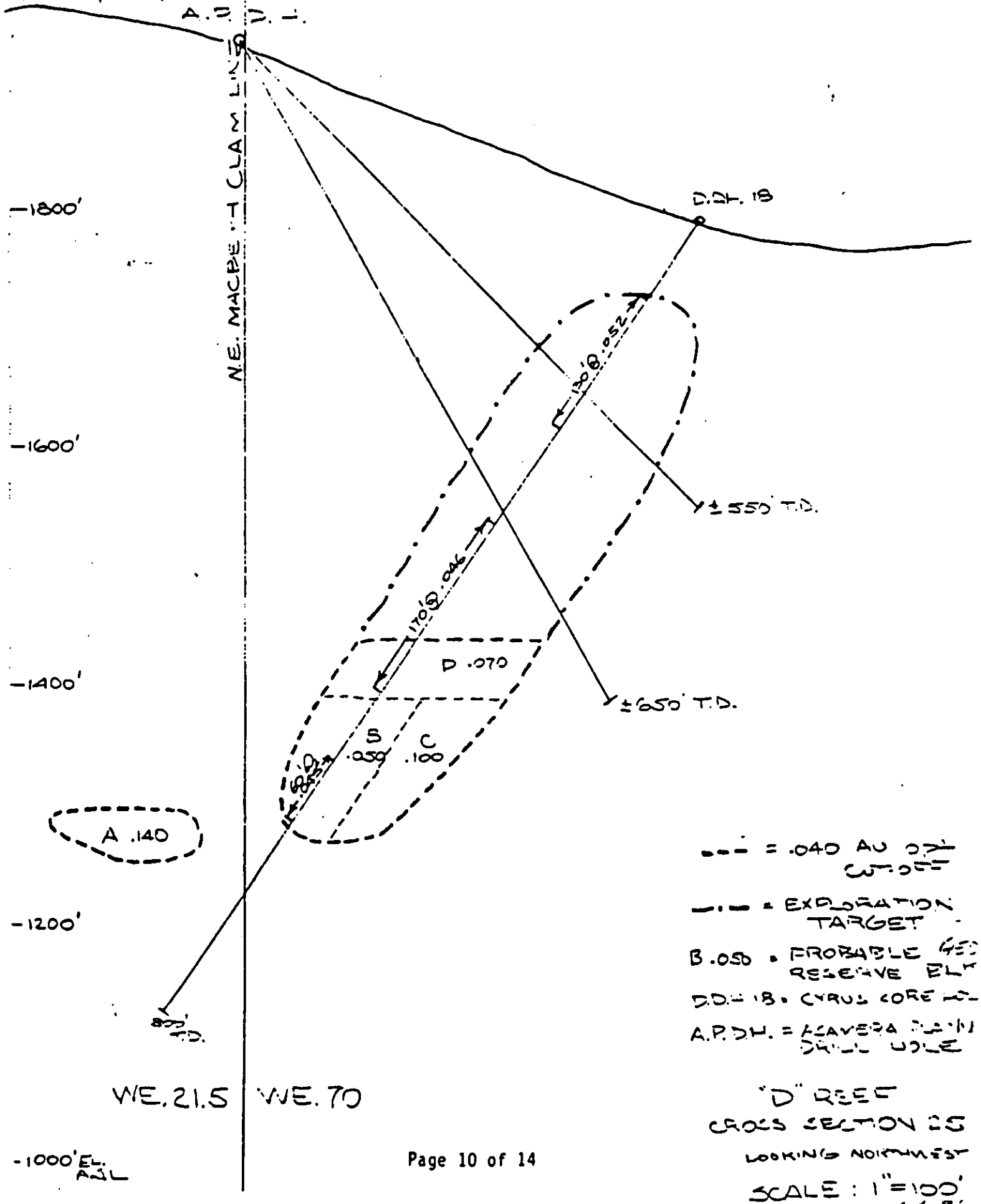
GENERALIZED DRILL PLAN



E.34

WE.15
WE.70

4-4-86



"D" REEF
 CROSS SECTION IS
 LOOKING NORTHWEST
 SCALE: 1" = 100'
 4-4-86