

000793

MEMORANDUM

TO: R. L. Haffner
FROM: M. O. Hampton
DATE: January 14, 1972
SUBJECT: DEVELOPMENT DIAMOND DRILLING

The accompanying report by Dave Jennings sets out a proposed development diamond drill program.

A suggested budget for the 1972 program would be:

Priority holes 5,500 ft. @ \$12.00/ft.	\$ 66,000
Contingency holes 2,500 ft. @ \$12.00/ft.	30,000
	<hr/>
TOTAL	\$ 96,000

M.O.H.
M. O. Hampton
Chief Engineer

MOH/mm

cc. N. G. Cornish
J. W. Mossop ←

*Question - amount
study - no mill or
smelter etc costs*

Jwm

MEMORANDUM

TO: M. O. Hampton
FROM: D. S. Jennings
DATE: December 28, 1971
SUBJECT: DEVELOPMENT DRILLING PROGRAMS

The accompanying map (Figure I) summarizes all exploration and definition drill holes in the vicinity of the Faro orebodies. Presently known limits of economic mineralization are shown by the revised orebody "shadows". These "shadows" are drawn on the basis of known economic mineralization in drill core with no regard for geologically probable extensions. Economic limits to the orebodies were defined using calculations summarized in Figure 2 and Appendix I. Use of Figure 2 is explained in this Appendix.

Sulfides encountered along the southwestern margin of zone 3 (see Figure I) during the 1971 development program are economic according to Figure 2. An additional 2.4×10^6 tons averaging 7.4% combined are indicated. A resume of this calculation is included as Appendix 2.

A summary of development drilling for the foreseeable future is included in Figure I. This drilling can be divided into two broad categories: 1) 1972 development work and 2) post-1972 development work. Proposed drilling within each of these categories will be briefly reviewed.

The proposed 1972 program should be concentrated in three areas outlined on Figure I. These areas are ranked as to priority with the area in red highest, followed by the area in blue, followed by that in black. Each of these areas will be discussed in turn.

Red:

The three high priority holes in the southern half of this area are proposed to test extensions of zone I to aid in development of the ultimate pit in this area. Since the west wall of the current pit will be extended to the west in 1973, development work in this area is required to fix the limits of the ultimate pit. Four contingency holes are proposed to further test economic intersections (if any). Additional contingency holes can be spotted as conditions dictate.

The high priority hole in the northern half of this area is planned to evaluate the thickness and grade of zone I between DDH 66-15 and DDH 65-5A for ore control purposes. Neither of the former holes penetrate the orebody in this region.

Blue:

Three high priority and three contingency holes are proposed to test the economic potential and geologic structure of the area surrounding DDH 71-210 and FRH-2. Limited economic mineralization is still possible in this area based on current drill hole spacing. In addition, the area affords 1973 dumpsite potential which would result in considerable haulage cost savings if proven void of economic mineralization.

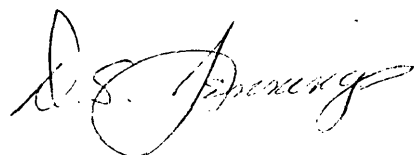
Black:

Drilling in this area is designed to test the westerly extent of zones 2 and 3, thereby defining the ultimate pit outline and its position relative to the presently active waste dump. The six priority and three contingency holes proposed for this area can be considered as straight development since north-easterly migration of the dump is not planned at this time. These holes would help define whether zones 2 and 3 are continuations of the same sulfide mass.

A total footage of 5500 feet is proposed for the 1972 high priority holes. This figure represents the minimum footage required to test the three areas for sulfide extensions since some contingency drilling will probably be required.

Post-1972 development drilling is not subdivided into distinct areas. Work in this category is to be completed as operational needs dictate. Definition drilling of zone 3 is of the most immediate concern.

In general, all high priority drill holes are spaced on 566 foot centers. It is hoped this spacing will define broad limits of mineralization which can then be filled in with fewer and more carefully chosen follow-up holes.



D. S. Jennings
Research Geologist

DSJ/mm

cc. R. L. Haffner
N. G. Cornish
J. W. Mossop
J. R. McLachlan
F. P. Forrest
P. M. Pettigrew
U. X. Jansons

APPENDIX I

Economic Evaluation of Sulfides Adjacent to an Existing Open Pit

The economic potential of sulfides intersected in drill core adjacent to an operating open pit can be roughly evaluated by comparing the total mining costs to the total value of recovered metals. Consider a vertical drill hole near the Anvil open pit margin which intersects 20 feet of sulfides at a depth of 700 feet assaying 8.0% combined Pb and Zn continuous with the presently mined orebody. Assume the sulfide mass to be nearly horizontal. Given the following data applicable to the Faro No. 1 orebody, this sulfide intersection can be evaluated as follows:

DATA

^{3,00}
\$.80/cubic yard = total mining costs

3.2 tons/cubic yard = weight/unit volume of ore

\$.12/pound = average combined metal saleprice

60% metal recovery in milling

20% profit margin for operation

1) Calculate mining costs:

For a vertical drill hole, assume the sulfide intercept applies to a column of sulfides 1 square yard in cross sectional area over the length of the intercept. Apply mining costs to the column of rock above for 1 square yard cross sectioned area.

720' to base of sulfides

240 cy vertical rock column*

240 cy x \$.80/cy = \$192 to mine column ✓

Add 20% profit margin of \$38

Total mining costs + profit = \$230

2) Calculate return on metal value:

20' of sulfides = 6.7 cy
6.7 cy x 3.2 tons/cy = 21.4 tons
21.4 x 8% = 1.72 tons metal
1.72 tons x 60% = 1.03 tons metal recovered
1.03 x 2000 = 2060 lbs. metal recovered
2060 lbs. x \$.12 = \$247
Total return on metal value = \$247

* Note that consideration of a vertical rock column in evaluating sulfides marginal to a pit is realistic because stripping the existing 45° slope back to expose each increment of ore is equivalent to removing a vertical column above each increment.

A comparison of costs plus profit versus returns indicates the sulfide intersection to be economic at present conditions and is therefore worth mining. Similar calculations can be made for any depth of intersection, any intercept thickness and any grade at any profit margin. On a graph of grade versus thickness for a given depth of intersection, the dollar difference between costs plus profit and returns is plotted for varying combinations of grade and thickness. A smooth curve is then interpolated between these points to define an economic cutoff at a 20% profit margin. This procedure has been followed for the general range of grades, thicknesses and depths of sulfide mineralization encountered in the Faro deposits generating the family of curves shown in Figure 2. To use these curves, locate the grade (usually a weighted average over an interval) and thickness of drill core sulfides on the abscissa and ordinate of Figure 2 respectively. If their point of intersection lies above the curve drawn for the depth of sulfide intersection, the sulfides are economic e.g. the intersection of 8% and 20 feet lies above the 700 foot curve. Conversely, co-ordinate intersections below a depth of intersection curve are uneconomic e.g. 20 feet of 7% at 700 feet.

It is emphasized that this type of calculation is approximate but it provides a convenient "yardstick" to judge whether sulfides marginal to the Anvil pit are economic and worthy of additional development drilling. All drill holes in proximity to the Faro orebodies have been reviewed in light of Figure 2 to generate the development drilling program summarized in Figure I. The calculations leading to Figure 2 are pointedly conservative and can be changed to fit variable operating conditions.

APPENDIX 2

1971 Development Drilling Evaluation

1971 and selected older drill holes not included in the original orebody "shadow" for zones 1 and 3 outline a tabular sulfide mass shown on Figure I. Each drill hole is assumed to have a length of influence equal to 142 feet, half the distance between drill hole centers. An "order of magnitude" estimate of sulfide tonnages contained in this sheet is calculated as follows:

<u>D D H</u>	<u>Sulfide Intercept</u>	<u>Grade *</u>	<u>Product</u>
71-2	41'	5.0%	205.0
71-3	50'	4.7%	235.0
70-12	45'	12.7%	571.5
71-4	44'	6.2%	272.8
71-5	40'	8.3%	332.0
70-13	12'	10.0%	120.0
66-E7	5'	10.3%	51.5
FRH-16	30'	7.1%	213.0
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Total	267'		2000.8

$$\text{Average thickness} = 267/8 = 33.3'$$

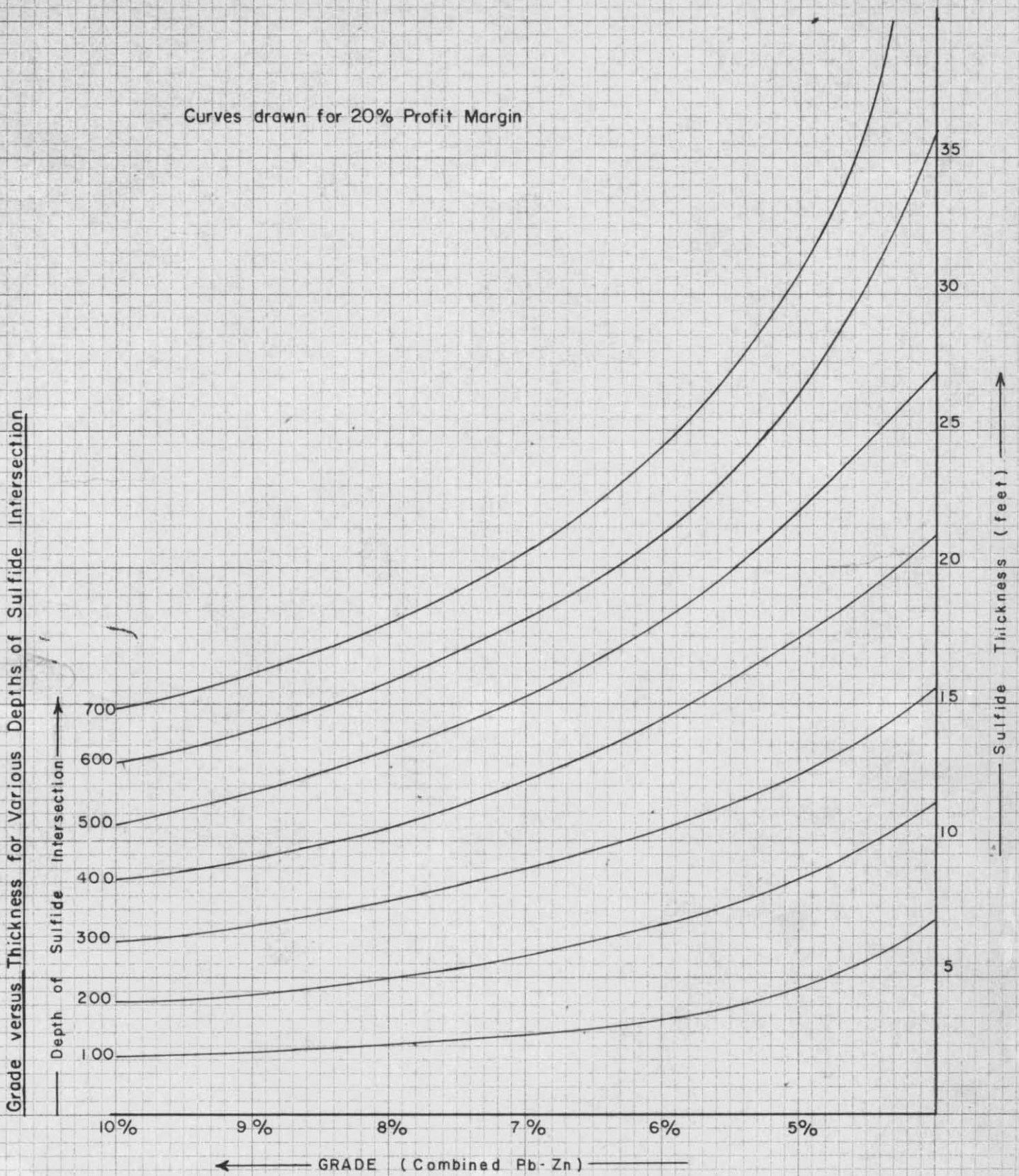
$$\text{Average grade} = 2000.8/267 = 7.4\%$$

$$\text{Volume} = 2123' \times 283' \times 33.3' = 707.6y \times 94.3y \times 11.1y = 754,011 \text{ cy}$$

$$3.18 \text{ tons/cy} \times 754,011 \text{ cy} = 2,412,834 \text{ tons} = 2.4 \times 10^6 \text{ tons}$$

* Weighted average over intercept

Curves drawn for 20% Profit Margin



(Figure 2)

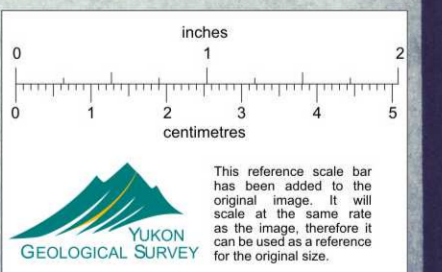


SYMBOLS

- Economic limit of orebody close
- Economic limit of orebody open
- Drill hole intersecting economic mineralization (intersection footage and weighted average of combined Pb/Zn values over the interval given in parentheses)
- Drill hole intersecting non-economic mineralization (intersection footage and weighted average of combined Pb/Zn values over the interval given in parentheses)
- Drill hole encountering no mineralization
- Proposed 1972 development drill hole; high priority (depth to evaluate mineralized zone in parentheses)
- Proposed 1972 contingency development drill hole (depth to evaluate mineralized zone in parentheses)
- Proposed development drill hole; high priority (depth to evaluate mineralized zone in parentheses)
- Proposed development drill hole; low priority or contingency basis (depth to evaluate mineralized zone in parentheses)
- Proposed area of 1972 development drilling
- Surface projection of sulfides encountered in 1971

Note: Geologic interpretation of Faro area given an drawing No. FX-7123

GEOLOGY BY:
D. JENNINGS
J. HESLOP



ANVIL MINING CORP.
FARO
Development Drilling Program
FARO AREA (with pt sections)

DATE: 28 DEC 71
SCALE: 1" = 400'
DRAWN BY: JHC

DRAWING No. FX-7140
FILE: 1