Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
5396				

Kommer fra ..arkiv	Ekstern rapport nr	Oversendt fra	Fortrolig pga	Fortrolig fra dato:

Tittel

1958 CALCULATION OF ORE RESERVES AT BIDJOVAGGE

Forfatter	Dato	År	Bedrift (oppdragsgiver og/eller oppdragstaker)
C. O. Mathiesen	03.01	1959	Kautokeino Kobberfelter Statens Undersøkelser

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Kautokeino	Finnmark	Troms og Finnmark	18334	Nordreisa

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Malmberegning		Bidjovagge

Råstoffgruppe	Råstofftype
Malm/metall	Cu

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Dette er en engelsk utgave av rapp. nr. 5397

1958

CALCULATION

OF

ORE RESERVES

AT

BIDJOVAGGE

KAUTOKEINO KOBBERFELTER

C. O. Mathiesen

3/1-1959

Introduction and General Considerations

In the course of three years of exploration at Bidjovagge three separate ore-bodies have been found. These areas, denoted for convenience as A, B, and C, are located along the thick eastern limb of the Bidjovagge anticline.

- (A)   0N - 160N
- (B)   680N - 960N
- (C)   1220S - 1040S

Diamond drilling in these areas as well as trenching in one of them provides the basis for this ore evaluation.

Ore reserves are generally divided into three catagories which are variously listed as: Positive Ore or Ore Blocked Out, Probable Ore, and Possible Ore; Proved Ore, Probable Ore, and Prospective Ore; or Measured Ore, Indicated Ore, and Inferred Ore. Definitions often differ considerably from authority to authority and reflects an attempt to adapt, on the one hand, a means of classification to the general wide diversity of ore-deposits and, on the other, to suit a particular ore-occurrance. In the case of individual deposits a classification appropriate to one type of ore may be highly unsuitable to another.

At Bidjovagge, ore, though defined in areal extent, is variable internally. It would not be justifiable to consider an ore drilled with an interval of over twenty meters as proved. It is highly doubtful that an ore-body here of several million tons could be practically drilled to the extent of establishing proved ore which would satisfy demands of those exacting in this conception. Thus, the three following catagories have been adopted for this calculation:

Probable Ore within drill hole intersection. (Category 1). This catagory involves the volume of ore blocked out by drill hole intersection. Although ore-zones may expand or dilate between profiles or between intersections in a profile, continuity is considered probable and the existing intersections, when integrated, are considered to represent an approximate tonnage and tenor. Ore satisfying the definition of proved is for convenience placed in this catagory (Area A). Ore which, because of limited areal extent, defies application of this definition but is nevertheless considered to exist in the same degree of probability is included in this catagory (Area B).

Probable Ore in extention of drill hole intersection. (Catagory 2). In this catagory ore is extrapolated to a depth equal to the square root of the basal area of intersection, but not more than fifty meters, or an otherwise reasonable extention in keeping with this order of probability.

Possible Ore. (Catagory 3). This catagory involves ore for which estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few or no samples or measurements.

From a study of seventy specific weight calculations it has been determined than an ore consisting essentially of chalcopyrite and pyrite in approximately equal amounts in albite fels, which is the main ore type, has a specific weight of something over 2.9. When the ore contains abundant pyrrhotite and/or magnetite the specific weight rises over 3 (3.28 in the case of S120D). The conservative value of 2.8 has been chosen for use throughout these calculations.

Core loss, which is often considerable at
Bidjovagge, tends to depress tenors from what they might
have been had one hundred percent core recovery been
attained. Chalcopyrite, by its mechanical properties,
tends to disappear in the sludge in preference to the host
rock. To what extent this happens is difficult to estimate,
though an inspection of the core trays is convincing that
it does happen. A study is now being conducted to determine
the order of magnitude of this depression in tenor. This
phenomenon, however, tends at least to place the final
results on the conservative side.

Area (A).

Area (A), extending from 0N to 160N is the
most thoroughly explored of the three areas. Fourteen
diamond drill holes pierce the ore-body in eight profiles.
Trenches at ten meters intervals cross the ore-zone.

Ore in this area was sampled thoroughly enough
to satisfy the definition of proved ore but is nevertheless
included in category 1. Two means of computation are used.
The first (fig. 1) employs the principle of columns in
which each hole represents a rectangular column extending
half the horizontal distance to adjacent profiles and half
the vertical distance to other holes in the same profile.
Since, in this case, the portion of any rectangle below the
represented hole should not exceed the portion above the
hole, certain columns thus not represented by a hole are given
the average of the values of appropriate holes in adjacent
columns. The calculation is bounded by a line joining the
deepest drill holes.

By this means of calculation (Table 1),
363,958 tons averaging 1.84% copper is arrived at. If
marginal values are deleted (Table 2), 271,743 tons of ore
averaging 2.34% is obtained. Due to the relative consistency
of these marginal values it may be expected that any percentage
between 1.84% and 2.34% would represent a tonnage in approxi-
mation lying proportionately between the lower and higher tonnages.

ORE EVALUATION - AREA (A)

Calculation by use of columns - Alternative I.

		L	D	M	m³	%		%m³
0	B	20 x 46 x	6.0	5520 / 1.24	=	6845
		20 x 33 x	6.0	3960 / 1.11	=	4396
4	o₁	20 x 14 x	5.5	1540 / 1.04	=	1602
	o₂	10 x 14 x	6.25	875 / 0.96	=	840
	B	30 x 30 x	3.1	2790 / 2.01	=	5608
	A	30 x 41 x	4.3	5289 / 1.53	=	8092
6	o₁	10 x 16 x	6.75	1080 / 1.63	=	1760
	o₂	10 x 16 x	7.25	1160 / 2.04	=	2366
	A	20 x 44 x	13.8	12144 / 2.04	=	24774
(4A+8C)/2		20 x 31 x	8.25	5115 / 1.38	=	7059
8	o₁	10 x 12 x	9.0	1080 / 2.32	=	2506
	o₂	10 x 12 x	9.75	1170 / 3.00	=	3510
	B	20 x 28 x	15.25	8540 / 1.56	=	13322
	A	20 x 26 x	12.0	6240 / 4.07	=	25397
	C	20 x 20 x	12.2	4880 / 1.32	=	6442
	D			855 / 0.93	=	795
10	o₁	10 x 20 x	9.25	1850 / 2.35	=	4348
	o₂	10 x 20 x	9.25	1850 / 2.38	=	4403
	A	20 x 40 x	16.8	13440 / 2.30	=	30912
(8C+12A)/2		20 x 24 x	11.9	5712 / 1.59	=	9082
12	o₁	10 x 25 x	10.8	2700 / 2.41	=	6507
	o₂	10 x 25 x	12.5	3125 / 1.71	=	5344
	B	20 x 36 x	18.0	12960 / 1.17	=	15163
	A			2671 / 1.86	=	4968
14	A	20 x 57 x	21.5	24510 / 2.14	=	52451
16	A	10 x 46 x	13.2	6072 / 0.63	=	3825
				137128 / 1.84	=	252317

383,958 tons proved ore (catagory 1) at 1.84% (7065 tons Cu)

TABLE 2

ORE EVALUATION - AREA (A)

Calculation by use of columns - Alternative II.

		L.	B.	H.	m³	%	tm³
0	B	20 x 46 x	6.0		5520 / 1.24	=	6845
	C	20 x 33 x	1.0		660 / 4.10	=	2706
4	o_1	20 x 14 x	3.5		980 / 1.22	=	1196
	o_2	10 x 14 x	3.5		490 / 1.24	=	608
	B	90 x 30 x	1.1		990 / 4.40	=	4356
	A	30 x 41 x	2.15		2644 / 2.42	=	6398
6	o_1	10 x 16 x	5.0		800 / 1.81	=	1448
	o_2	10 x 16 x	6.0		960 / 2.28	=	2189
	A	20 x 44 x	10.0		8800 / 2.58	=	22704
(4A+8C)/2		20 x 31 x	7.2		4464 / 1.49	=	6651
8	o_1	10 x 12 x	6.75		810 / 2.86	=	2317
	o_2	10 x 12 x	7.25		870 / 3.90	=	3393
	B	20 x 28 x	9.0		5040 / 2.35	=	11844
	A	20 x 26 x	12.0		6240 / 4.07	=	25397
	C	20 x 20 x	12.2		4880 / 1.32	=	6442
	D				855 / 0.93	=	795
10	o_1	10 x 20 x	6.25		1250 / 3.17	=	3962
	o_2	10 x 20 x	7.5		1500 / 2.66	=	3990
	A	20 x 40 x	13.8		11040 / 2.64	=	29146
(8C+12A)/2		20 x 24 x	10.85		5208 / 1.68	=	8749
12	o_1	10 x 25 x	8.0		2000 / 2.90	=	5800
	o_2	10 x 25 x	7.0		1750 / 2.56	=	4480
	B	20 x 36 x	12.0		8640 / 1.35	=	11664
	A				2420 / 2.15	=	5203
14	A	20 x 57 x	16.0		18240 / 2.65	=	48336
					27051 / 2.335	=	226619

271,743 tons proved ore (category 1) at 2.34% (6.359 tons Cu)

This means of calculation derives its justifi-
cation from the nature of ore mineralisation at Bidjovagge.
The mineralization is by no means a homogenious one. It has
its greatest consistency in depth. Thus the volume represent-
ing any particular drill hole would be an ellipsoid with
its long axis vertical, or, in approximation, the columns
employed.

To arrive at a check for these calculations, the
conventional method of joining holes in a pattern of triangles
was used (fig.2) By this method (Table 3), 331,072 tons at
1.86% was obtained. This value is somewhat lower than that
obtained through the use of columns due to the exclusion of
ore-sections in the upper northern and southern portions of
the body under consideration. A close check is arrived at
(Table 4) by extracting segments extending from profiles 4
to 8 and from 8 to 12, which represent respectively the same
volumes, and comparing them independently.

Extending the northern part of the volume calcu-
lated as category 1 to the general depth reached by drill
hole 8D yields to category 2 a probable ore of 24,310 tons.

Considering that the general structural plunge
is toward the north it may be expected that the ore reaches
deeper in the northern part of the ore-body than in the
southern part and may be estimated at ca. 50,000 tons of
possible ore.

A smaller easterly zone seen in outcrop at 80N,
trenched upon in part at 149N, and intersected by drill hole
80 may be considered to contain a possible ore of approx-
imately 50,000 tons.

Mineralisation along the western anticlinal
limb in this area might also provide a certain amount of
minable ore.

TABLE 3

ORE EVALUATION - AREA (A)

Calculation by use of triangles - Alternative I

	m^3	%		$\%m^3$
1.	9047 / 1.60	-	14511
2.	8667 / 1.70	-	14734
3.	2532 / 1.64	-	4153
4.	3914 / 1.73	-	6771
5.	3476 / 1.75	-	6083
6.	7883 / 1.71	-	13480
7.	4928 / 2.20	-	10842
8.	5461 / 1.88	-	10267
9.	4405 / 2.51	-	11057
10.	5931 / 2.68	-	15895
11.	5720 / 2.40	-	13728
12.	3371 / 1.45	-	4887
13.	3792 / 1.34	-	5081
14.	4560 / 2.48	-	11308
15.	6977 / 2.06	-	14372
16.	3968 / 2.68	-	10634
17.	2740 / 2.12	-	5809
18.	2520 / 1.97	-	4964
19.	3911 / 1.89	-	7392
20.	2574 / 2.14	-	5508
21.	1503 / 1.57	-	2359
22.	2725 / 1.35	-	3679
23.	2615 / 1.35	-	3530
24.	3305 / 1.54	-	5089
25.	6955 / 1.22	-	8485
26.	4760 / 1.11	-	5284
	118240			**219902**

331,072 tons proved ore (catagory 1) at 1.86% (6157 tons Cu)

ORE EVALUATION - AREA (A)

Comparison of columns to triangles

		COLUMNS					TRIANGLES		
		m^3	%	$\%m^3$			m^3	%	$\%m^3$
(4 - 8)									
4	o2	875 /	0.96 =	840	13.		3792 /	1.34 =	5081
	B	992 /	2.01 =	1994	14.		4560 /	2.48 =	11308
	C	1806 /	1.53 =	2763	15.		6977 /	2.06 =	14372
					16.		3968 /	2.68 =	10634
6	o1	1080 /	1.63 =	1760	18.		2520 /	1.97 =	4964
	o2	1160 /	2.04 =	2366	19.		3911 /	1.89 =	7392
	A	12144 /	2.04 =	24774	20.		2574 /	2.14 =	5508
(4A+8C)/2		5115 /	1.38 =	7059	21.		1509 /	1.57 =	2359
8	o1	1080 /	2.32 =	2506	23.		2615 /	1.35 =	3530
	B	4270 /	1.56 =	6661	26.		2380 /	1.11 =	2642
	A	3120 /	4.07 =	12698					
	C	2440 /	1.32 =	3221			34800		67790
	D	480 /	0.93 =	446					
		34562		67088					

96,774 tons at 1.94 % (1,877 tons Cu)

97,440 tons at 1.95 % (1,897 tons Cu)

		m^3	%	$\%m^3$			m^3	%	$\%m^3$
(8 - 12)									
8	O2	1170 /	3.00 =	3510	5.		3476 /	1.75 =	6083
	B	4270 /	1.56 =	6661	6.		7883 /	1.71 =	13480
	A	3120 /	4.02 =	12542	7.		4928 /	2.20 =	10842
	C	2440 /	1.32 =	3221	8.		5461 /	1.88 =	10267
	D	375 /	0.93 =	349	9.		4405 /	2.51 =	11057
10	o1	1850 /	2.35 =	4348	10.		5931 /	2.68 =	15895
	o2	1850 /	2.38 =	4403	11.		5720 /	2.40 =	13728
	A	13440 /	2.30 =	30912	12.		3371 /	1.45 =	4887
(8C+12A)/2		5712 /	1.59 =	9082	17.		2740 /	2.12 =	5809
12	o1	2700 /	2.41 =	6507			43915		92048
	B	6480 /	1.17 =	7582					
	A	1704 /	1.86 =	3169					
		45111		92286					

126,311 tons at 2.05 % (2,589 tons Cu)

122,962 tons at 2.10 % (2,577 tons Cu)

Area (B)

This area extends from 880N to 960N. Despite
a twenty meter interval of shallow drill holes and a forty
meter interval of deeper holes, this ore can not be considered
proved due to the limited extent of the ore along the strike.
The bulk of minable ore within 100 meters of the surface seems
to extend from profile 90 to ca. 95, being thus net in depth
by only the holes of profile 92. Assuming (fig. 3) that holes
88A, 90A, 92D, 94A, and 96B represent an average horizontal
cut across the ore-body to the depth of intersection of 92A
or 79 meters, 252,610 tons at 1.83% (Table 5) is computed,
and ascribed to catagory 1.

Using the vertical hole 92E, which reaches to
a depth of 96 meters in ore, to represent the depth of the
ore-body, 306,970 tons is computed and the difference
54,360 tons is classified as catagory 2.

Geologically, no limitation of ore-minerali-
sation in the immediate extention toward depth is in
evidence. Actually there is some evidence that the ore
may be expected to be somewhat better in depth. Possible
ore is thus set at an amount equal to or greater than the
amount to date in hand.

TABLE 5

ORE EVALUATION - AREA (B)

	ave.N	L	A	%	%A
88 A	6.375	x 10	63.75 /	2.03	129.41
90 A	15.125	x 10	151.25 /	1.63	246.54
"	18.75	x 10	187.50 /	1.63	305.62
92 D	18.75	x 10	187.50 /	1.38	258.75
"	18.00	x 10	180.00 /	1.38	248.40
94 A	18.00	x 10	180.00 /	2.58	464.40
"	13.80	x 10	138.00 /	2.58	356.04
96 B	5.40	x 10	54.00 /	1.41	76.14
			1142.00 /	1.826	2085.30

1142 x 79 = 90218 m^3 = 252,610 tons at 1.83% (Catagory 1)

1142 x 96 = 109632 m^3 = 306,970 tons (Catagory 2)

Area (C)

Area (C) has the largest extent of known mineralisation of the three and is certainly the most promising. It extends from ca. 1220S to 1640S. Eleven drill holes lie in 80-meter profiles at S120, (fig. 4), S112, (fig. 5), and S104, (fig. 6), with a single hole in a 40-meter profile at S108, (fig. 7). The volume of probable ore within drill hole intersection (category 1) is calculated as follows. Each profile provides a profile-area of intersected ore which extends to the depth of the deepest intersection in each ore-zone. Profile intersections are joined by straight lines which is the most conservative of possibilities assuming the ore to be continuous. The strike length is half the distance to the neighboring profile. By this means of calculation with marginal values incorporated to various degrees the following alternatives are arrived at:

1,222,480 tons at 1.67% (Table 6)
895,798 tons at 2.08% (Table 7)

In calculation of category 2 the values encountered in profile S120 are considered to extend 20 meters farther south. The extent of probable ore in depth is calculated as the square root of the basal area of ore intersection with a maximum of fifty meters. This leads to the following respective alternatives for probable ore outside of the volume enclosed by drill hole intersection:

595,700 tons (Table 8)
324,346 tons (Table 9)

The fact that profile S108 provides ore in two zones (as in S112) averaging 1.96% over 24.5 meters, indicates that the volume of ore to be found between S120 and S104 is greater than has been calculated. For the sake of proportion, if S108 is calculated as a profile to the depth of the respective zones in profile S112, the following alternative results are obtained:

TABLE 6

ORE EVALUATION - AREA (C)

Probable ore within drill hole intersection
Alternative I

		L	D	M	m³	%	%m³	tons
S104	A	40 x	(40+22)	x 7	17360	/ 1.91	33158	
	B	40 x	(22+43)	x 1	2600	/ 1.59	4134	
	C	40 x	(44)	x 9.5	16720	/ 0.75	12540	
					36680	/ 1.36	49832	102,704
S112	A	80 x	(7+18)	x 13	26000	/ 1.31	34060	
	B	80 x	(19+24)	x 11	37840	/ 1.45	54868	
	C	80 x	(24+46)	x 9	50400	/ 2.96	149184	
	D	80 x	(46)	x 9.5	34960	/ 1.73	60481	
					149200	/ 2.00	298593	417,760
	A	80 x	(36+17)	x 11	46640	/ 2.65	123596	
	B	80 x	(16+33)	x 10	39200	/ 0.69	27048	
	C	80 x	(33)	x 37	97680	/ 1.16	113309	
					183520	/ 1.44	263953	513,856
					332720	/ 1.69	562546	
S120	F	40 x	(5+17)	x 13	11440	/ 0.70	8008	
	D	40 x	(18+38)	x 21.5	48160	/ 1.96	97765	
	E	40 x	(38)	x 5	7600	/ 1.63	12388	
					67200	/ 1.69	118161	188,160
					436600	/ 1.67	730539	1,222,480

1,222,480 tons at 1.67% probable within the volume enclosed by
drill hole intersection (catagory 1).

ORE EVALUATION - AREA (C)

Probable ore within drill hole intersection

Alternative II

		L	D	M	m³	%	%m³	tons
S104	A	40 x	(40+22)	x 7	17360 /	1.91	33158	
	B	40 x	(22+43)	x 1	2600 /	1.59	4234	
	C	40 x	(44)	x 1.4	2464 /	2.21	5445	
					22424 /	1.91	42737	62,787
S112	A	80 x	(18+ 7)	x 11	22000 /	1.42	31240	
	B	80 x	(19+24)	x 11	37840 /	1.45	54868	
	C	80 x	(24+46)	x 9	50400 /	2.96	149184	
	D	80 x	(46)	x 8.4	30912 /	1.89	58424	
					141152 /	2.07	292716	395,225
	A	80 x	(36+17)	x 11	46640 /	2.65	123596	
	B	80 x	(16+33)	x 2	7840 /	1.72	13485	
	C	80 x	(32)	x 21.6	55296 /	1.53	84603	
					109776 /	2.02	221684	307,373
					250928 /	2.05	514400	
S120	F							
	D	40 x	(18+38)	x 17.4	38976 /	2.44	95101	
	E	40 x	(38)	x 5	7600 /	1.63	12388	
					46576 /	2.31	107489	130,413
					319228 /	2.08	664626	895,798

895,798 tons at 2.08 % probable within the volume enclosed by
drill hole intersection (category 1).

TABLE 8

ORE EVALUATION – AREA (C)

Probable ore in extension of drill hole intersection
Alternative I

S104	40 x	9.5	19.5
S112	80 x	9.5	27.5
"	80 x	37	54.4 (50.0)
S120	40 x	5	14.2

	L	D	M	m³	%	%m³	tonn
S104	40 x	19.5 x	9.5	7410 /	0.75	5558	
S112	80 x	27.5 x	9.5	20900 /	1.73	36157	
"	80 x	50.0 x	37	148000 /	1.16	171680	
S120	40 x	14.2 x	5	2840 /	1.63	4629	
½ profile S120				33600 /	1.76	59080	
				212750 /	1.30	277104	525,700

595,700 tons probable outside of the volume enclosed by
drill hole intersection (catagory 1).

TABLE 9

ORE EVALUATION – AREA (C)

Probable ore in extension of drill hole intersection
Alternative II

S104	40 x	1.4	7.5
S112	80 x	8.4	25.9
"	80 x	21.6	41.6
S120	40 x	5	14.2

	L	D	M	m³	%	%m³	tonn
S104	40 x	7.5 x	1.4	420 /	2.21	928	
S112	80 x	25.9 x	8.4	17405 /	1.89	32895	
"	80 x	41.6 x	21.6	71885 /	1.53	109984	
S120	40 x	14.2 x	5	2840 /	1.63	4629	
½ profile S 120				23288 /	2.31	53795	
				115838 /	1.75	202231	324,346

324,346 tons probable ore outside of the volume enclosed by
drill hole intersection (catagory 1).

1,377,264 tons at 1.76% (Table 10)
1,127,795 tons at 2.02% (Table 11)

It is obvious that the additional tonnage arrived at by including profile S108 can be attended considerably more attention than the accompanying percentages. As S108 is not included in the original calculation, that calculation may be considered conservative.

No geological structure limiting ore-mineralization toward depth is obvious, thus it is reasonable to evaluate possible ore as equal to or greater than the amount to date in hand.

Figure 3 is a block diagram showing the structural relations including ore-mineralization.

TABLE 10

ORE EVALUATION - AREA (C)

Profile S108 included in calculation - Alternative I

	L	m^3	%	$\%m^3$
S104	20	18340 /	1.36	24916
S108	40	92000 /	1.61	148120
"	40	64800 /	2.33	150984
S112	60	249540 /	1.69	421910
S120	40	67200 /	1.69	118161
		491880 /	1.76	864091

1,377,264 tons ore at 1.76 %

TABLE 11

ORE EVALUATION - AREA (C)

Profile S108 included in calculation - Alternative II

	L	m^3	%	$\%m^3$
S104	20	11212 /	1.91	21368
S108	40	92000 /	1.61	148120
"	40	64800 /	2.33	150984
S112	60	138196 /	2.05	385800
S120	40	46576 /	2.31	107489
		402784 /	2.02	813761

1,127,795 tons ore at 2.02 %

Summary and Conclusions

Table 12 is a summary of the ore reserves calculated for areas (A), (B), and (C). It may be noted in the calculations of areas (A) and (C), where alternatives are presented that the inclusion of marginal values has comparatively minor effect on the total amount of copper retrieved. In area (A), 383,958 tons of ore at 1.84% contain 7065 tons of copper (Alternative I). 271,743 tons at 2.34% contain 6359 tons of copper (Alternative II). This represents a difference in ore mined of 112,215 tons or 29.2% with a difference in copper content of 706 tons or 10.0%. In area (C), 1,222,480 tons of ore at 1.67% contain 20,415 tons of copper (Alternative I). 895,798 tons at 2.08% contain 18,633 tons of copper (Alternative II). The difference in mined ore is 326,632 tons or 26.7% with a difference in copper content of 1782 tons or 8.7%. In both cases the percent of reduction of mined mass is approximately three times the percent of reduction in total copper content. Since these computed marginal values comprise the foot and hanging walls of the ore-body, the tenor of ore chosen as mining grade is a matter of direct evaluation. Marginal values would, however, tend to cut dilution by wall rock during extraction.

Additional alternatives of still higher average copper precents can be obtained by further delition of marginal values.

Beside areas (A), (B), and (C), ore has also been intersected in profiles 108 and 348, but there drilling has not been extensive enough to provide an estimation of ore tonnage and grade. These profiles may be regarded as potential ore producers.

Drilling in the West anticline has shown the rock associations an structure to be similar to the Didjo-vagge anticline. The mineralisation, however, consists of abundant pyrrhotite with only minor chalcopyrite.

TABLE 12

ORE EVALUATION - SUMMARY

summary of areas (A), (B), and (C)

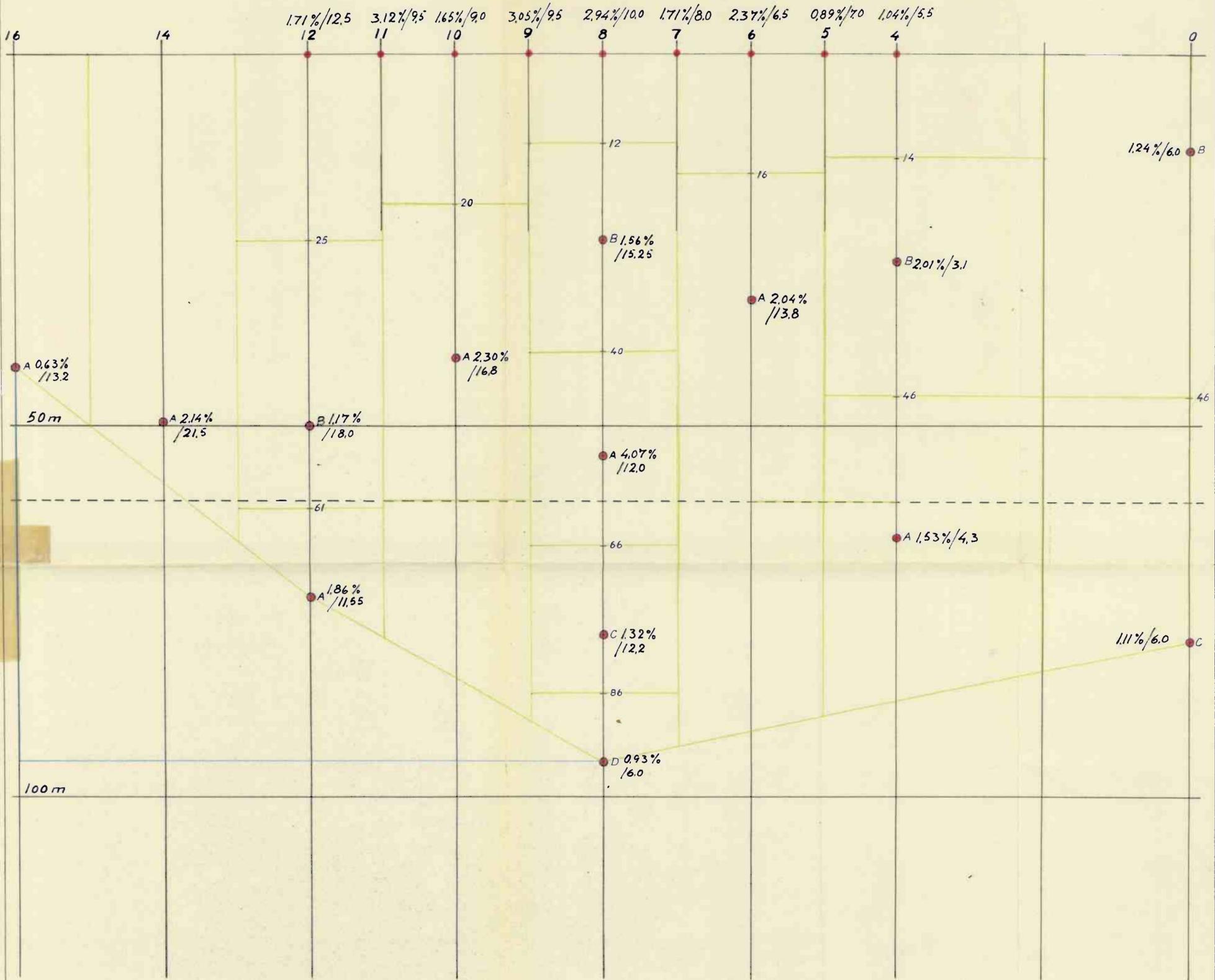|		Alternative I			Alternative II		
		tons	%	tons Cu	tons	%	tons Cu
Probable ore within drill hole intersection. (catagory 1)	A.	383,958	1.84	7065	271,743	2.34	6359
	B.	252,610	1.83	4623	252,610	1.83	4623
	C.	1,222,480	1.67	20615	895,798	2.08	18633
	sum	1,859,048	1.73	32103	1,420,151	2.09	29615
Probable ore in extension of drill hole intersection. (catagery 2)	A.	24,310			24,310		
	B.	54,360			54,360		
	C.	595,700			324,346		
	sum	674,370			403,016		

Drilling in the east zone of folding proved completely negative. The albite fels with which the ore is associated in the Bidjovagge anticline appears to be entirely absent here and copper mineralisation is extremely sparse.

BILAG TIL MALMBEREGNINGEN.

LENGDEPROFIL ETTER LIGGEN AV MALMEN.
DIAMANTBORHULLENE INNTEGNET.

M·1:400

Ⓐ

FIG. 1

16   14   1.71%/12,5   3.12%/9,5   1.65%/9,0   3.05%/9,5   2.94%/10,0   1.71%/8,0   2.37%/6,5   0.89%/7,0   1.04%/5,5   0
              12   11   10   9   8   7   6   5   4

12

1.24%/6,0 ● B

20

14

25

16

B 1,56%
/15,25

B 2,01%/3,1

A 2,04%
/13,8

A 0,63%
/13,2

A 2,30%
/16,8

40

46   46

50 m   A 2,14%   B 1,17%
        /21,5   /18,0

A 4,07%
/12,0

- -

61

A 1,53%/4,3

66

A 1,86%
/11,55

C 1,32%
/12,2

1,11%/6,0 ● C

86

100 m   D 0,93%
                                                /6,0

● A
  4.07%   Drill Hole A with 4.07 % over 12.0 meters.
  /12.0

| Ore of Catagory 1 bordered and subdivided
                  by Green.

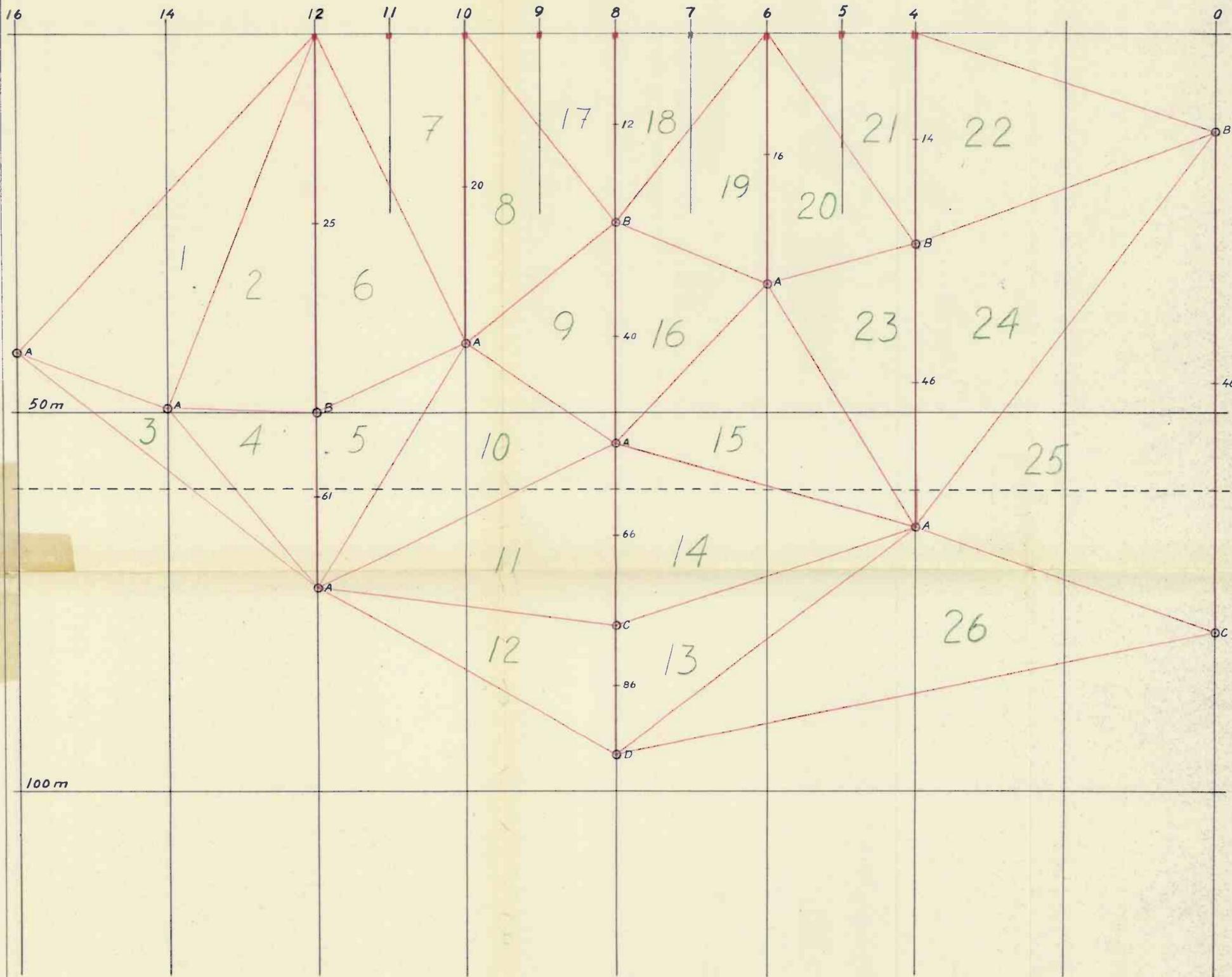| Ore of Catagory 2 bordered by Blue.

8
—•—   Trench.

BILAG TIL MALMBEREGNINGEN.

LENGDEPROFIL ETTER LIGGEN AV MALMEN.
DIAMANTBORHULLENE INNTEGNET.

M·1:400

(A)

FIG. 2

Drill Hole.

Hole join.

16   Triangle designation.

Trench.

BILAG TIL MALMBEREGNINGEN.

LENGDEPROFIL ETTER LIGGEN AV MALMEN.
DIAMANTBORHULLENE INNTEGNET.

M: 1:400

(B)

FIG. 3

96   94   92   90   88

B 1.41%/1.2

A 2.58%/21.6
(⊥ -18.0)

D 1.38%/21.2
(⊥ -18.0)

A 1.63%/24.0
(⊥ -19.5)

A
2.03%/2.0

50 m   C 1.29%/2.7

C 1.45%/18.0
(⊥ -18.0)

B 1.30%/25.9
(⊥ -20.5)

A 1.92%/19.6
(⊥ -18.0)

100 m

X   X₁

150 m
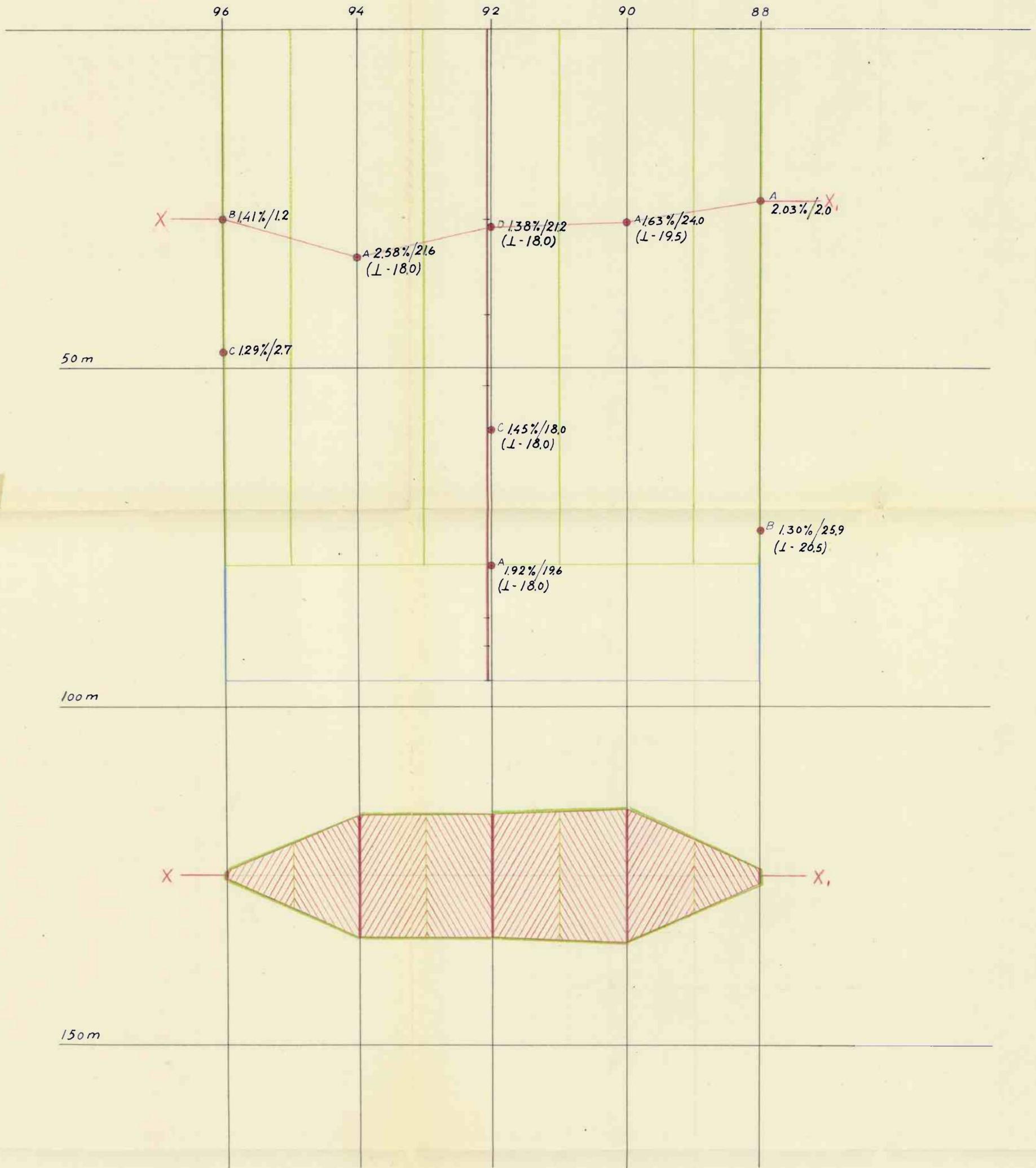
A 1.63%/24.0   Drill Hole A with 1.63% over 24.0
(⊥ 19.5)   meters. Corrected width - 19.5 meters.
               Section (Average horizontal section).
X —1— X₁   Catagory 1 bounded by Green.
               Catagory 2 bounded by Blue.

Ore intersections joined by straight lines
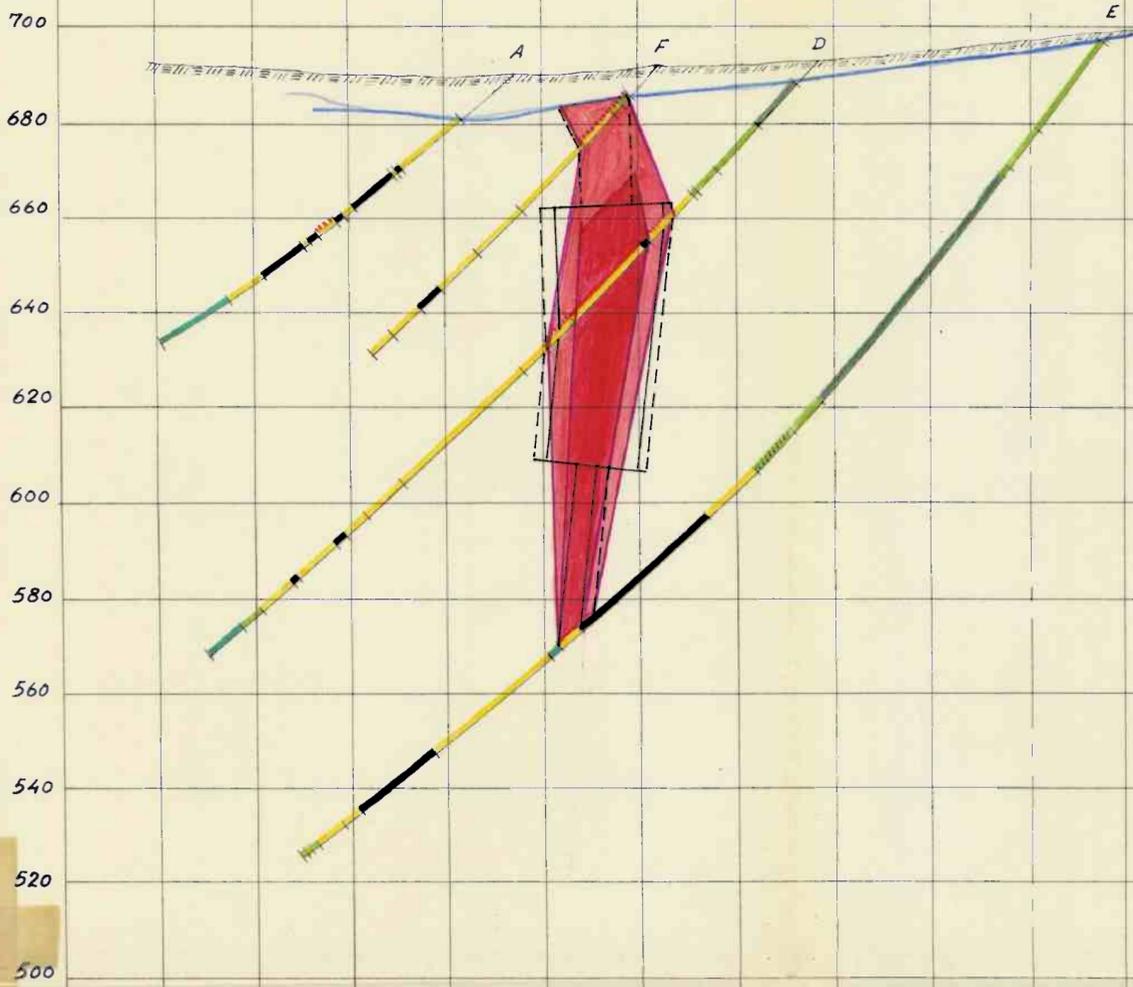Dark Red represents ore concentration
(values over 1%). Light Red represents
marginal values (values 0.5-1%).

Black line denotes actual area calculated.
Dashed line represents Alternative I.
Solid line represents Alternative II.

PROFIL S120

M=1:1000

FIG. 4

År	Borh.	Heln.	Koordinater		Höyde	Lengd.
			x	y		
1957	A	45°	143473,2	63630,0	690,7	91,50
1958	D	47,4°	143474,0	63692,5	693,6	178,05
1958	E	53,8°	143473,8	63753,0	699,9	243,12
1958	F	48,9°	143475,1	63660,7	695,2	85,00

Top axis labels: 20 40 60 80 900Ø 20 40 60 80 1000Ø 20 40 60 80 1100Ø 20 40 60

Left axis labels: 700 680 660 640 620 600 580 560 540 520 500 480 460 440 420 400 380 360 340 320 300 280 260 240 220
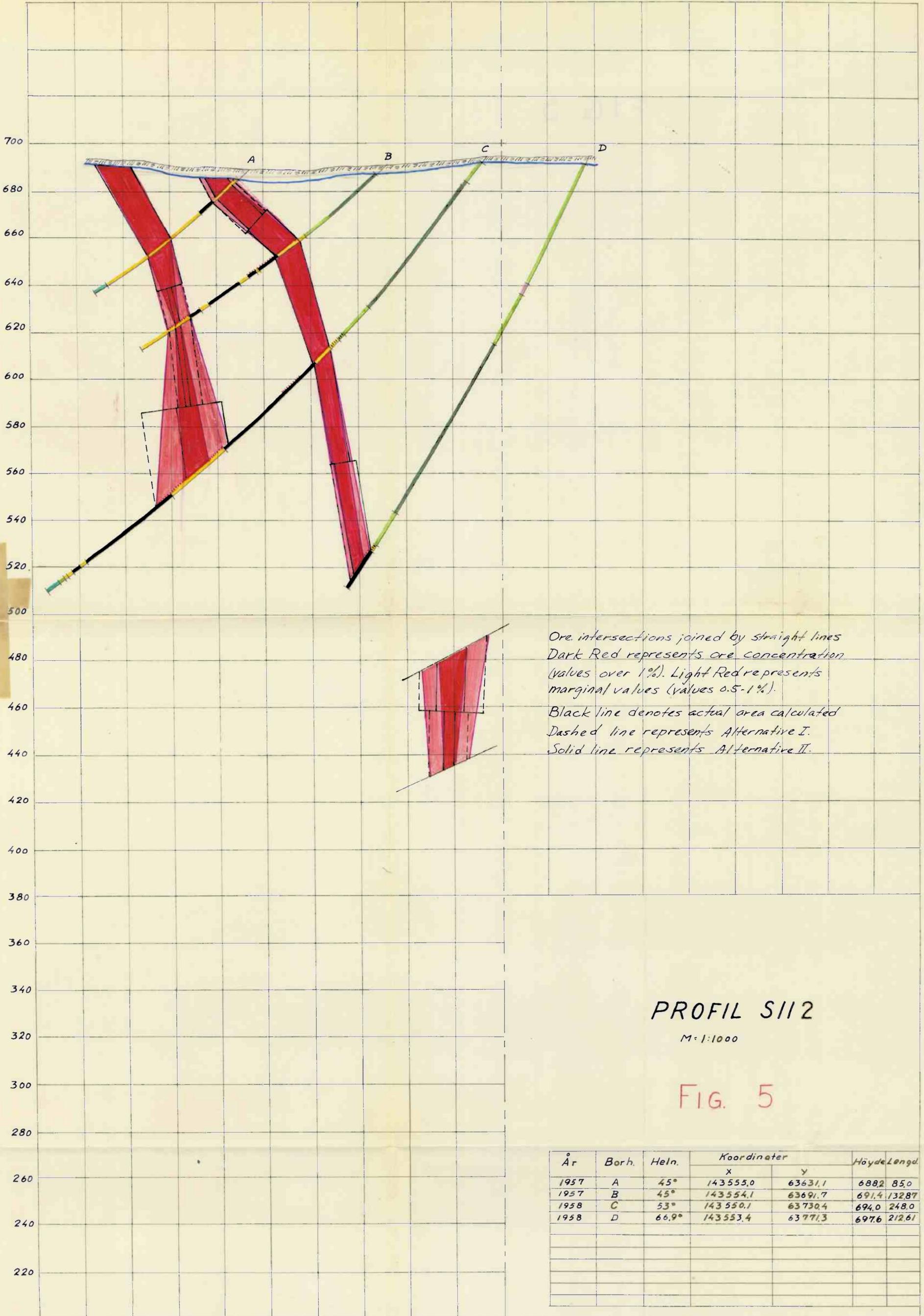
Borehole labels: A B C D

Ore intersections joined by straight lines
Dark Red represents ore concentration
(values over 1%). Light Red represents
marginal values (values 0.5-1%).

Black line denotes actual area calculated
Dashed line represents Alternative I.
Solid line represents Alternative II.

PROFIL S112

M: 1:1000

F.I.G. 5

År	Borh.	Heln.	Koordinater		Höyde	Lengd.
			x	y		
1957	A	45°	143555,0	63631,1	688,2	85,0
1957	B	45°	143554,1	63691,7	691,4	132,87
1958	C	53°	143550,1	63730,4	694,0	248,0
1958	D	66,9°	143553,4	63771,3	697,6	212,61
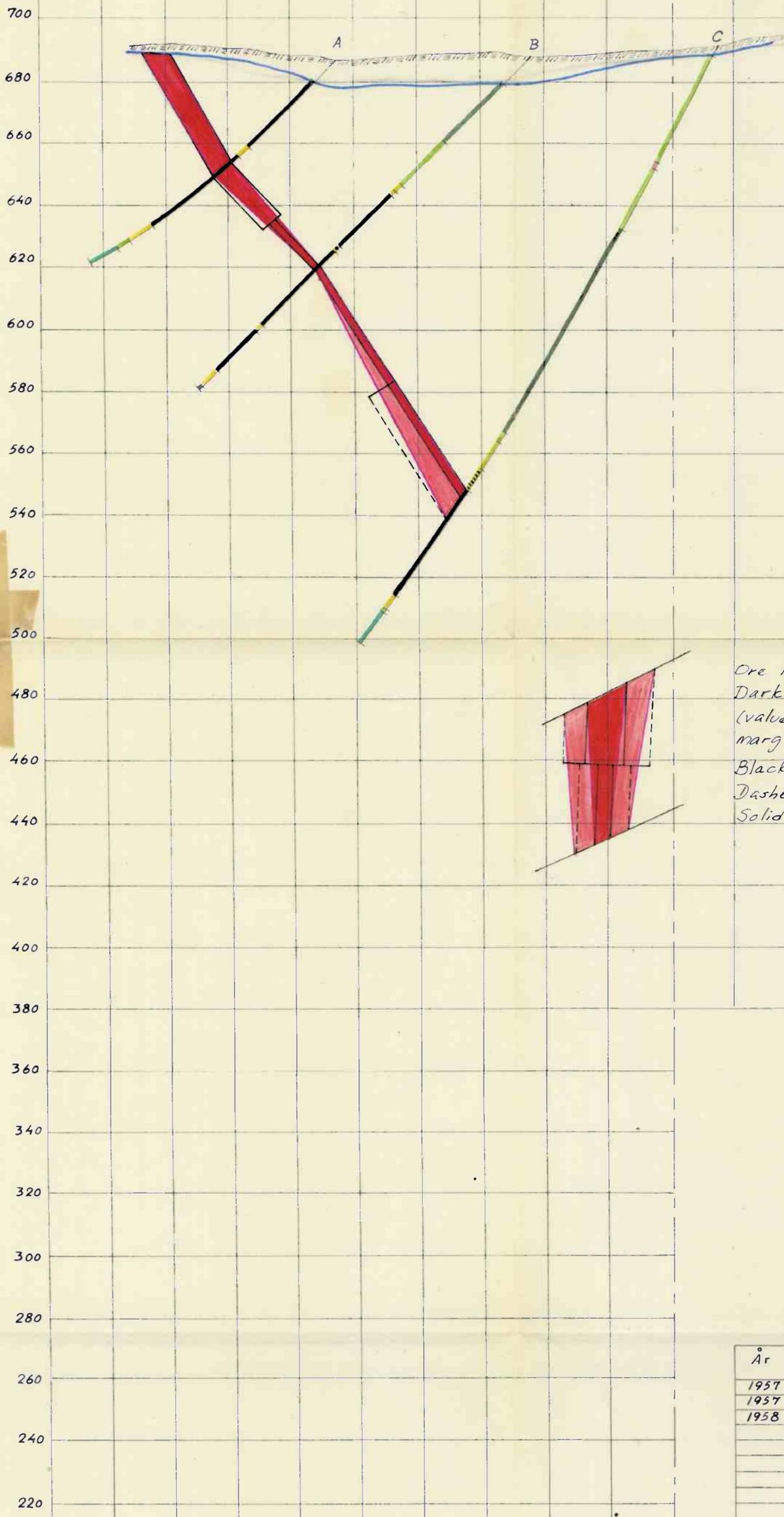
20   40   60   80   900 Ø   20   40   60   80   1000 Ø   20   40   60   80   1100 Ø   20   40   60

700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220

A   B   C

Ore intersections joined by straight lines
Dark Red represents ore concentration
(values over 1%). Light Red represents
marginal values (values 0.5-1%).
Black line denotes actual area calculated
Dashed line represents Alternative I.
Solid line represents Alternative II.

PROFIL S104

M = 1:1000

FIG. 6

År	Borh.	Heln.	Koordinater		Höyde	Lengde
			x	y		
1957	A	45°	143 663,1	63 631,1	685,9	102,15
1957	B	45°	143 634,3	63 693,2	687,8	151,22
1958	C	65,2°	143 632,7	63 751,3	692,1	224,80

Dark Red represents ore concentration
(values over 1%). Light Red represents
marginal values (values 0.5–1%).

PROFIL S108.

M·1:1000

FIG. 7

År	Borh.	Heln.	Koordinater		Höyde	Lengde
			X	Y		
1958	A	47°	143594,1	63665,4	687,6	119,8