Aktomslag nr. 1039
for A 4

TVERRFJELLET.

Profiler av diamantborhull 1-17-

Tverrfjell

Bh. nr 1, boret i mai 1951

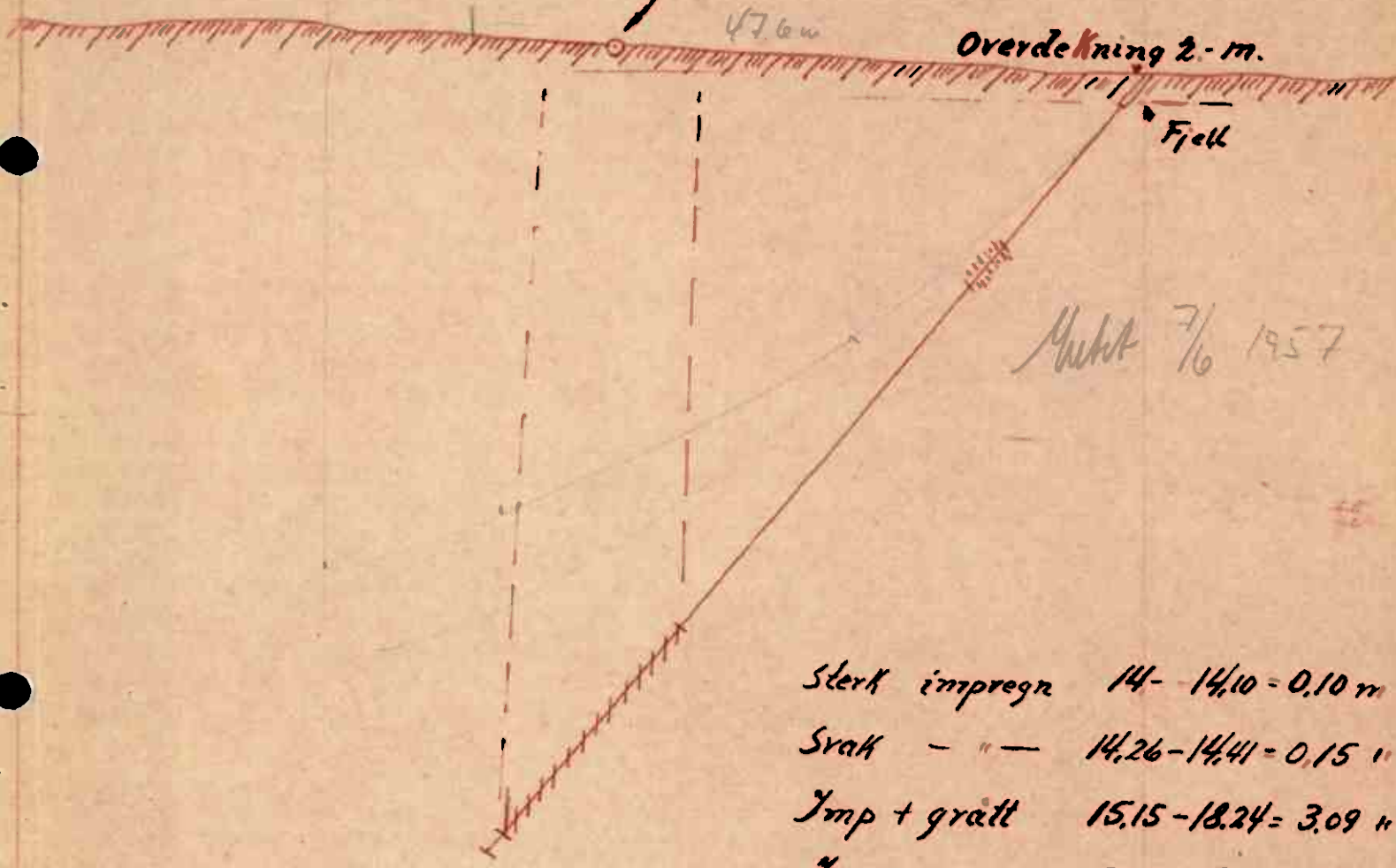
Fall = 50°

L = 74,- meter

K = 1915 V, 1277 N

M = 1:500

Indikasjonens beliggenhet på kartet



Sterk impregn 14 - 14,10 = 0,10 m

Svak — " — 14,26 - 14,41 = 0,15 "

Imp + grått 15,15 - 18,24 = 3,09 "

Impr. 52,07 - 52,38 = 0,31 "

Kis 52,38 - 72,60 = 20,22 "

Analyse, gjennomsnitt fra 52,38 - 72,60 m

Cu = 0,38 % Zn = 0,70 % S = 43,- % Fe = 38 %

Uoppl = 12,- % CaCO3 = 6,20 %

Tverrfjell

B.h. Nr 2 boret i juni 1957

Fall = 50°

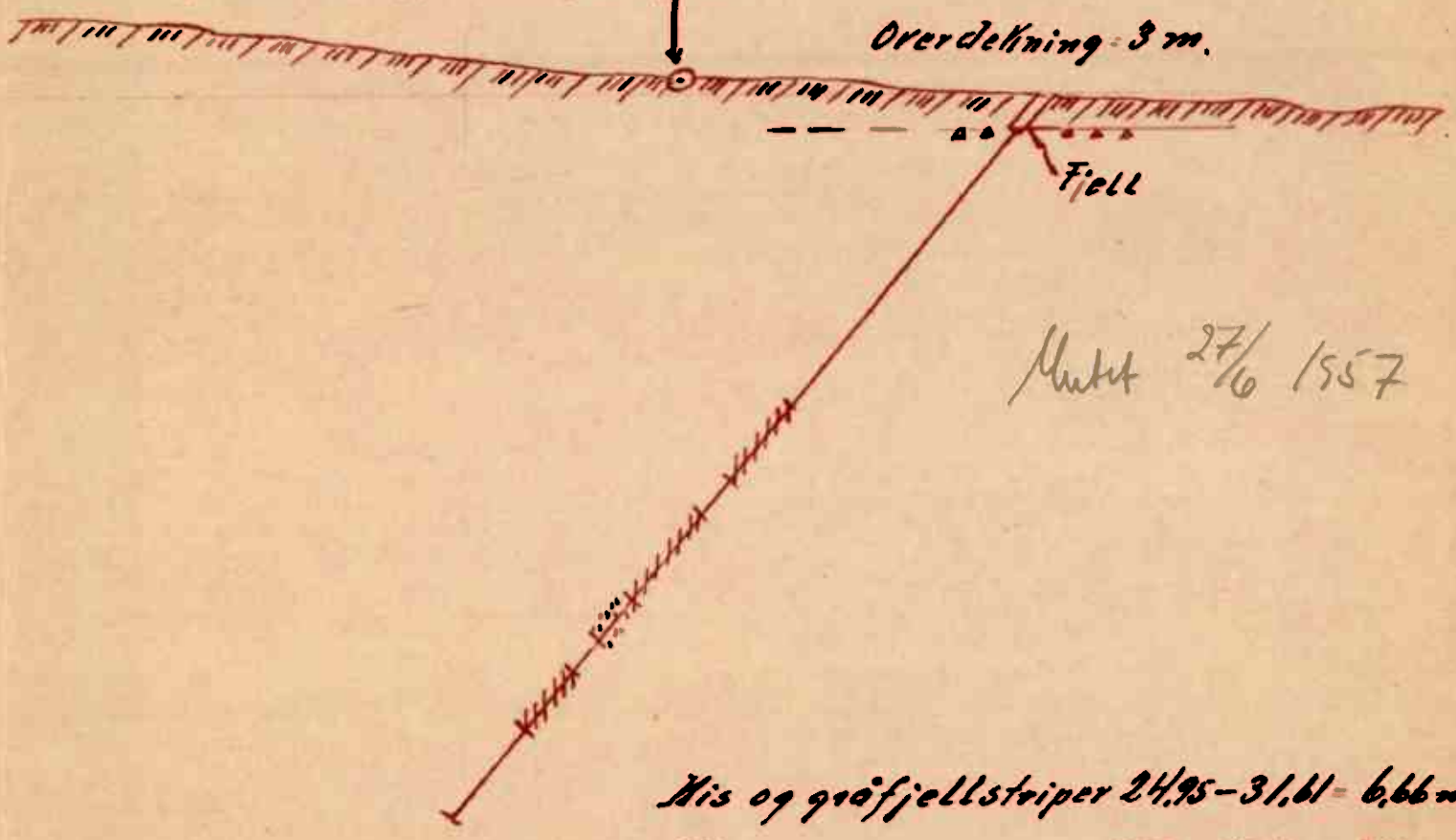
L = 62.- m.

H = 2045 V - 1222 N.

M. = 1:500

Overdekning = 3 m.

Indikasjonens beliggenhet på kartet



Målt 27/6 1957

Kis og grøfjellstriper 24.95 - 31.61 = 6.66 m

kis 34.50 - 42.40 = 7.90 "

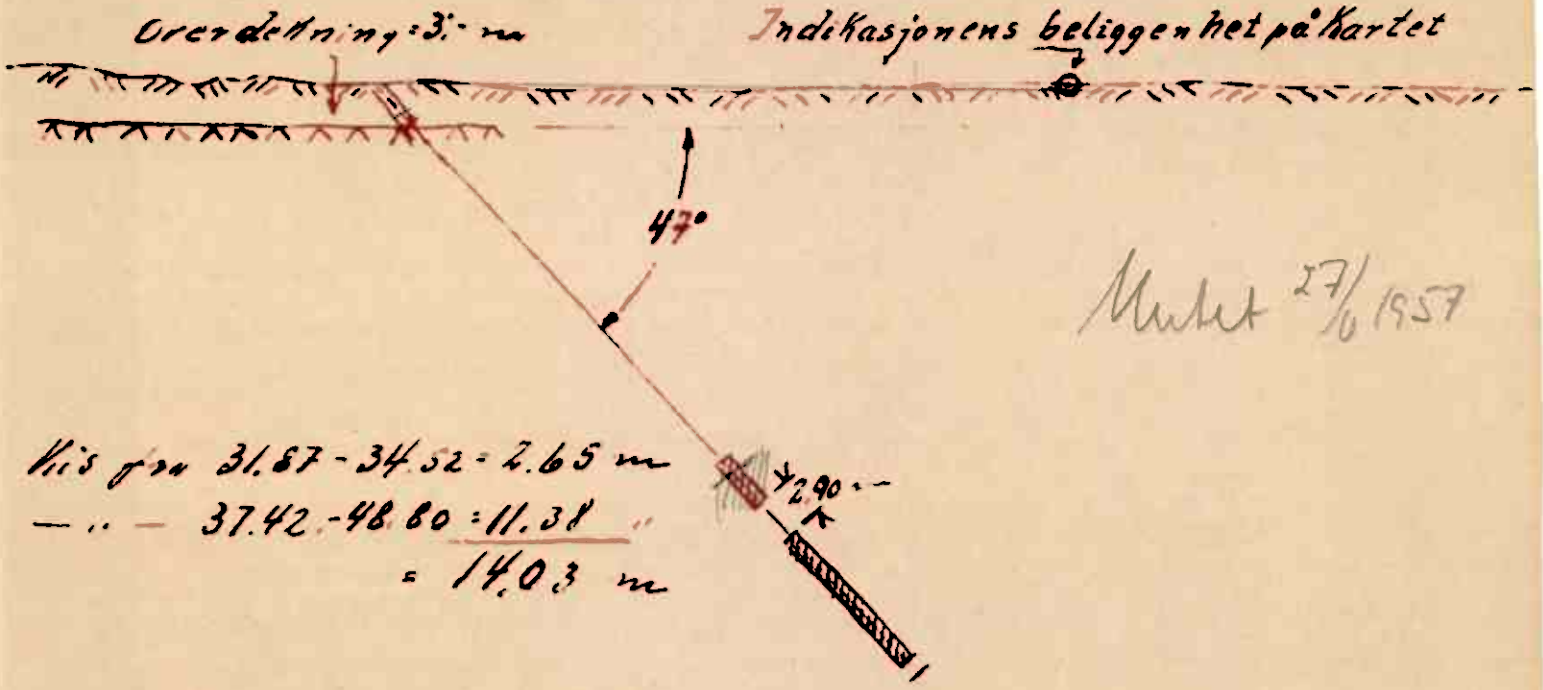
Imp. 42.42 - 45.90 - 3.50 "

Kis 48.80 - 54.- = 5.20 "

Analyse, gj.snitt fra 24.95 - 54.- m

Cu = 0.53 % Zn. = 1.25 % S - 32.50 %

Trerrfjellet:
B.h. Nr. 3 boret i juni 1951.
Fall: 47°
L = 50 m
N. = 2460 V - 1265 N på G. M.s kart
M. 1:500



Målet 27/6 1957

Kl.s gru 31.87 - 34.52 = 2.65 m
— " — 37.42 - 48.80 = 11.38 "
= 14.03 m

Analyse:		Gjennomsnitt
Cu:	0,54 %	Cu: 0.59 %
Zn.:	0,93 %	Zn: 0.95 %
S:	35.70 %	S: 37.60 %

Tverrfjell.

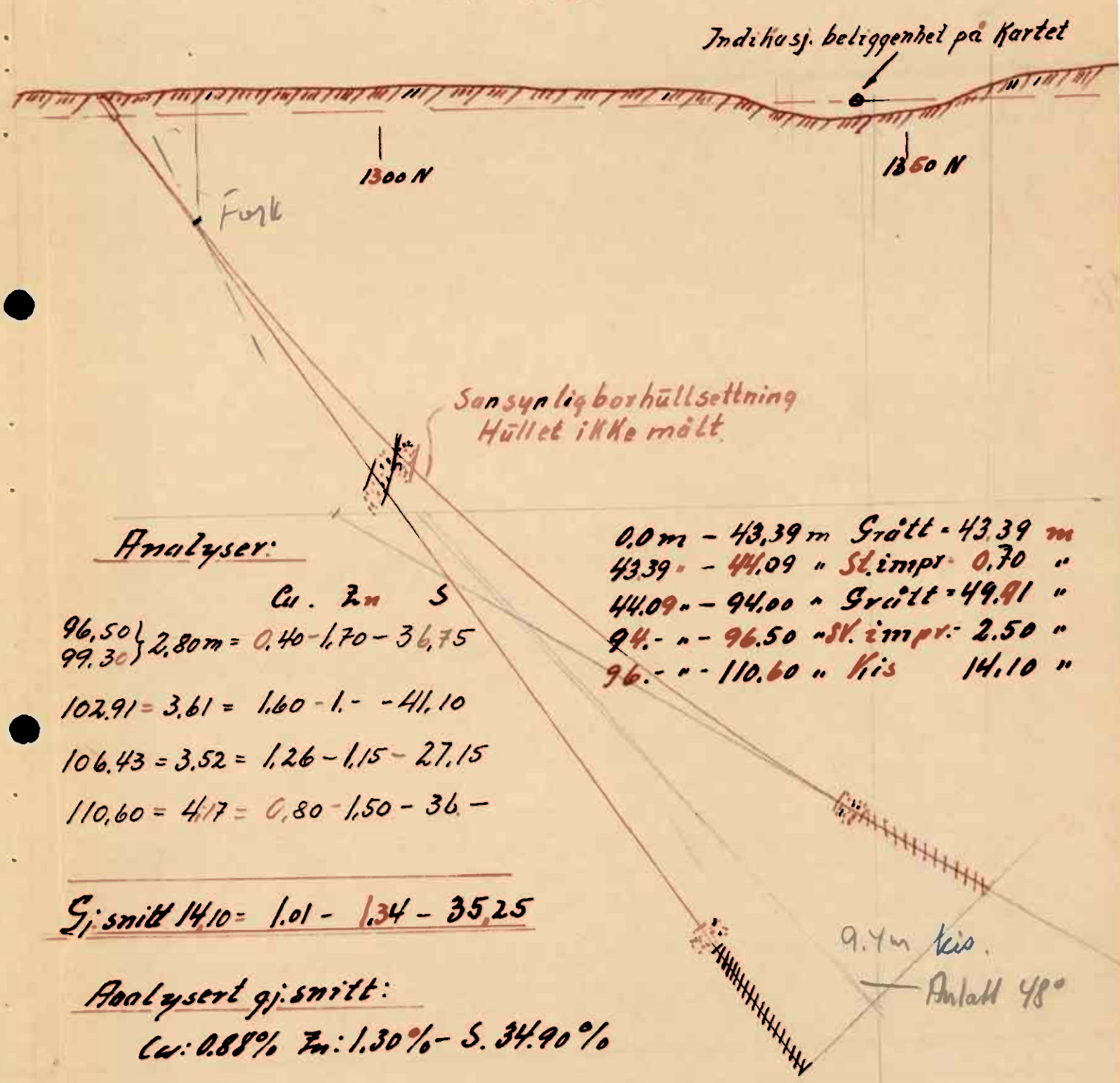
Bh. nr. 4, boret 20 juni - 3 juli 1957

Fall = 55°

L. = 110.60 m.

K. = 2600 V - 1275 N

M. 1:500



0.0 m – 43,39 m Grått = 43.39 m
43.39 " – 44.09 " St. impr. 0,70 "
44.09 " – 94.00 " Grått = 49.91 "
94.- " – 96.50 " St. impr. 2.50 "
96.- " – 110.60 " Kis 14.10 "

Analyser:

	Cu.	Zn	S
96,50 / 99,30 } 2,80 m =	0,40	1,70	36,75
102.91 = 3,61 =	1.60	1.-	41,10
106.43 = 3,52 =	1,26	1,15	27,15
110,60 = 4,17 =	0,80	1,50	36.-
Gj.snitt 14,10 =	1.01	1,34	35,25

Analysert gj.snitt:

Cu: 0.88% Zn: 1.30% - S. 34.90 %

Tverrfjell

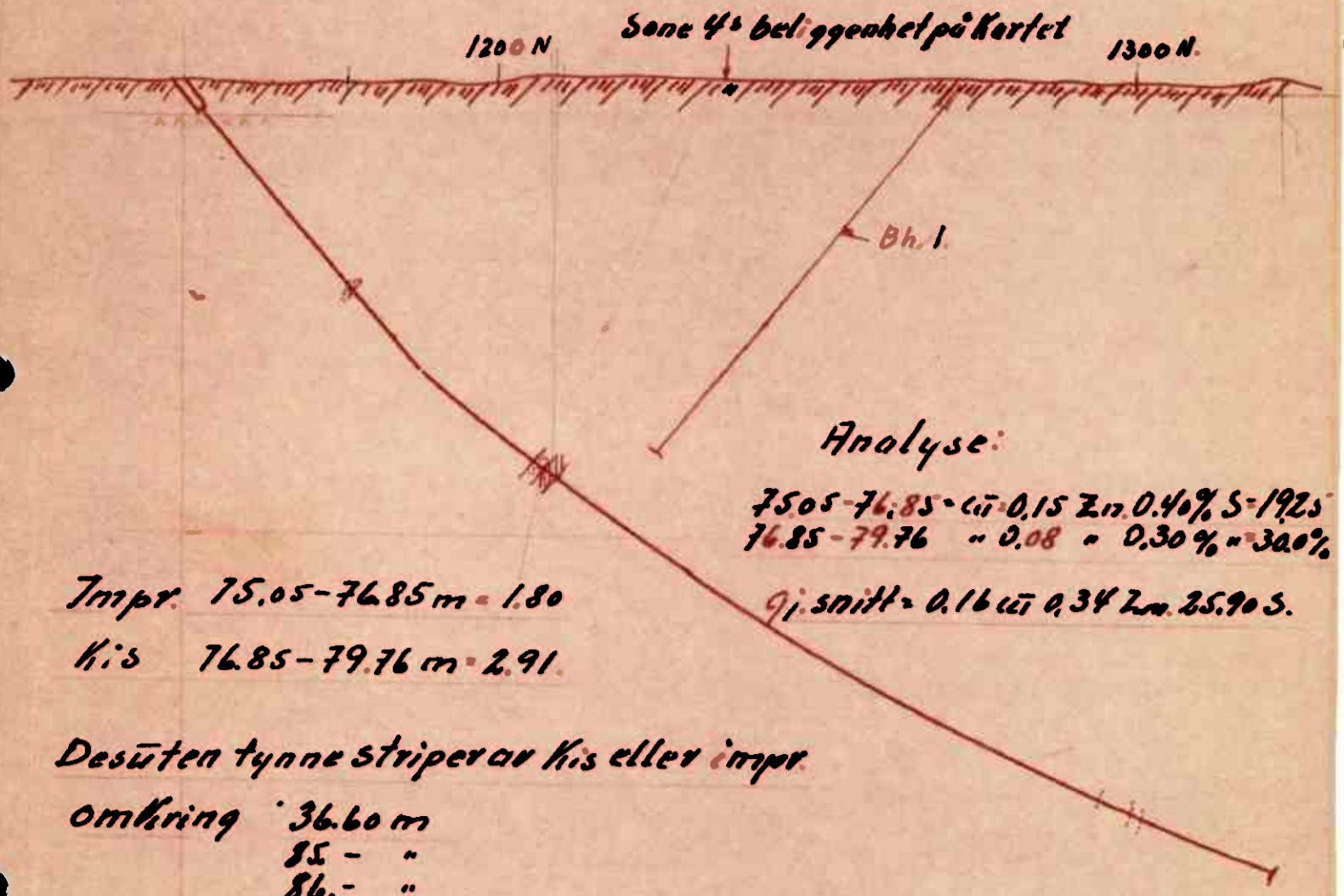
Bh. nr. 5 boret i juli 1957

Fall = 50°

L = 208 m.

K = 1950 V - 1150 N.

M. 1:1000



Analyse:

75.05 - 76.85 = cu 0.15 Zn 0.40% S - 19.2%
76.85 - 79.76 = " 0.08 " 0.30% " 30.0%

gj. snitt = 0.16 cu 0.34 Zn 25.90 S.

Impr. 75.05 - 76.85 m = 1.80

Kis 76.85 - 79.76 m = 2.91.

Desuten tynne striper av Kis eller impr.

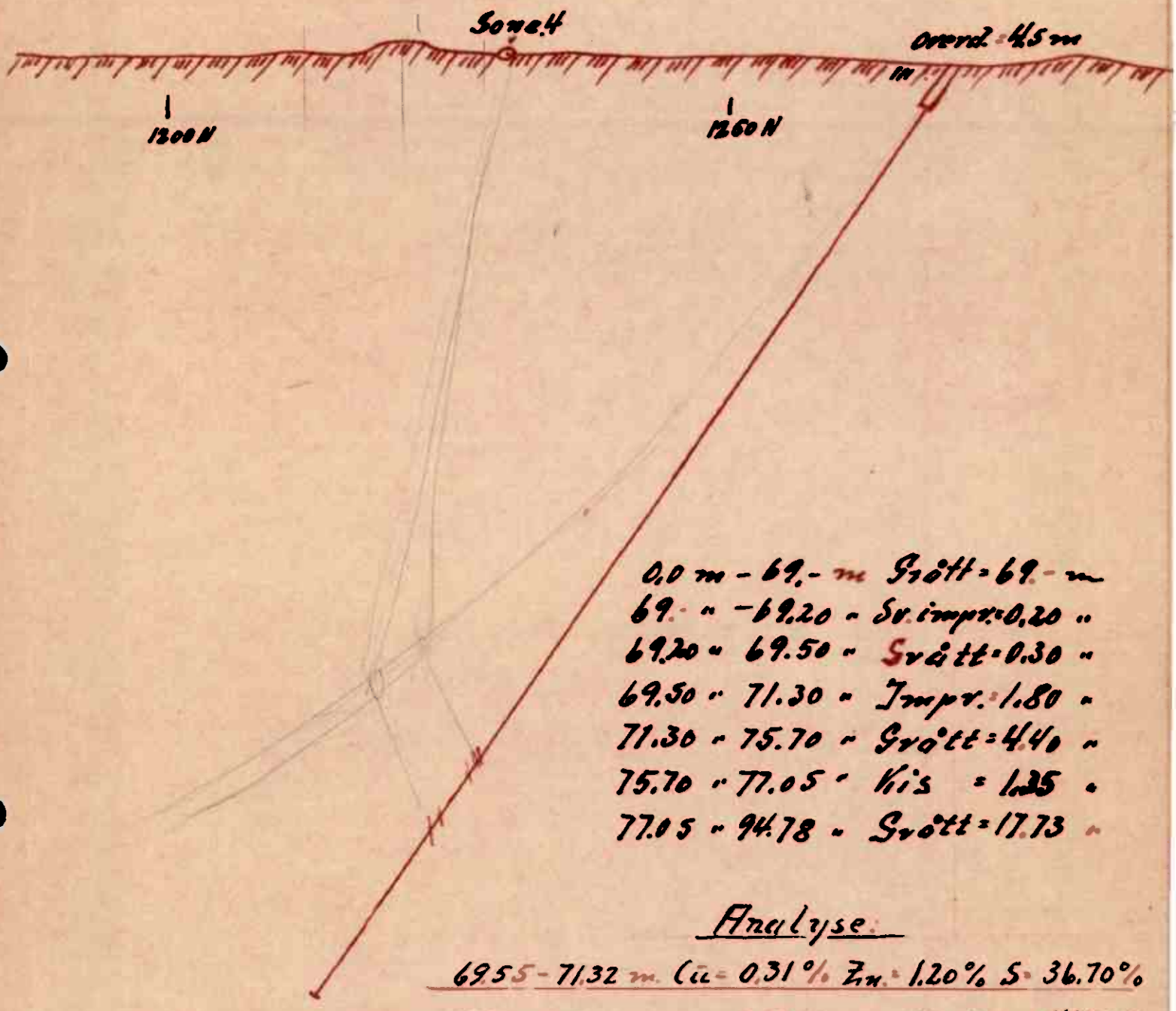
omkring 36.60 m
85 - "
86 - "
87 - "
88 - "
90 - "
174 - "
180 - "
183 - "
190 - " - 195.32 m.

NB. Måling av hullet viser at
det i et dyp av 80 m
skrått er avbøyet fra
50° til 34°

Trerrfjell

B.h Nr. 6 boret 12/7 - 19/7 1957

Fall - 55°
L. - 95.50 m
Vi = 1825 V - 1270 N
M. - 1:500



0.0 m - 69.- m Grått - 69.- m
69.- " - 69.20 " Sv. impr. 0.20 "
69.20 " 69.50 " Svått - 0.30 "
69.50 " 71.30 " Impr. - 1.80 "
71.30 " 75.70 " Grått - 4.40 "
75.70 " 77.05 " Vis - 1.35 "
77.05 " 94.78 " Grått - 17.73 "

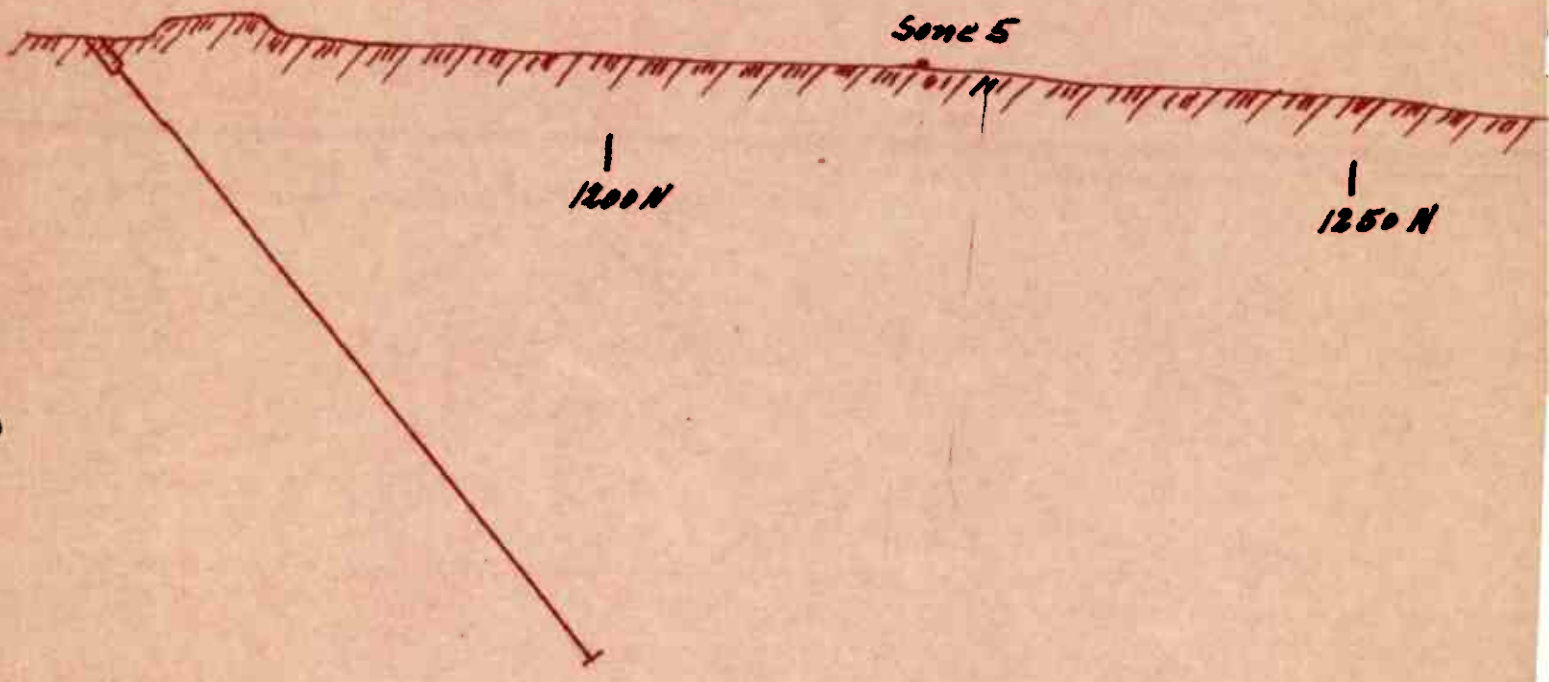
Analyse:

69.55 - 71.32 m. Cu - 0.31 % Zn - 1.20 % S - 36.70 %
75.70 - 77.05 " " - 0.07 % " - 1.60 % " - 41.20 %

Tverrfjell

Bh nr. 7 borel 22/7 - 1/8-1957

Fall 50°
L. 52 m
Y = 2149 V - 1166 N.
M. 1:500



Hullet måtte innstilles
på 52.-m. grunnet fastkjöring
i slepper.
Ingen kis.

Tverrfjell

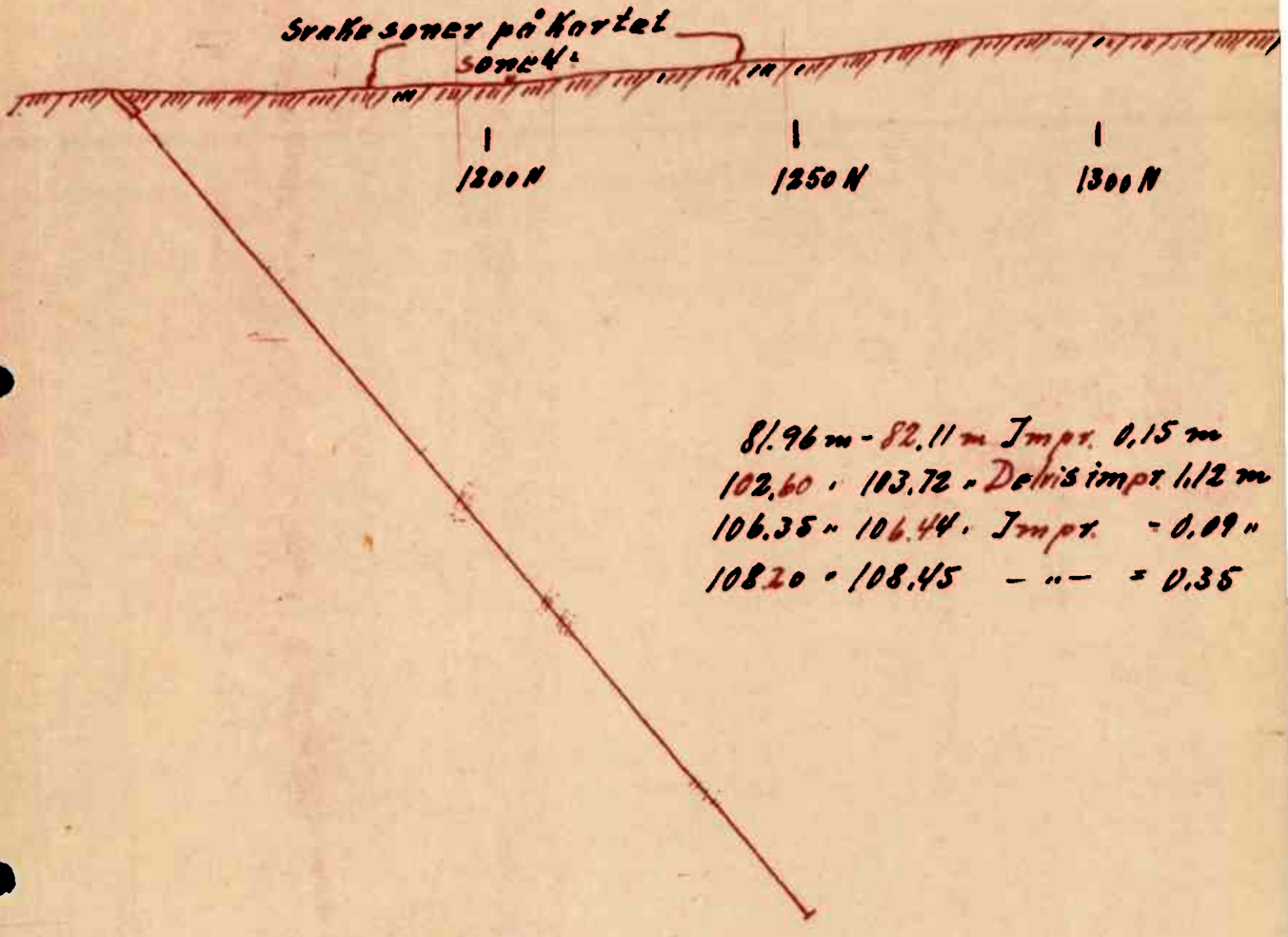
Bh. nr. 8 boret 30/7 - 16/8 1957

Fall = 50°

L. = 168.53 m

K. = 1700 V - 1140 N

M. = 1 : 1000



81.96 m - 82.11 m Impr. 0,15 m

102,60 - 103.72 - Delvis impr. 1,12 m

106.35 - 106.44 - Impr. - 0,09 "

108.20 - 108.45 - " - = 0.35

Tverrfjell.

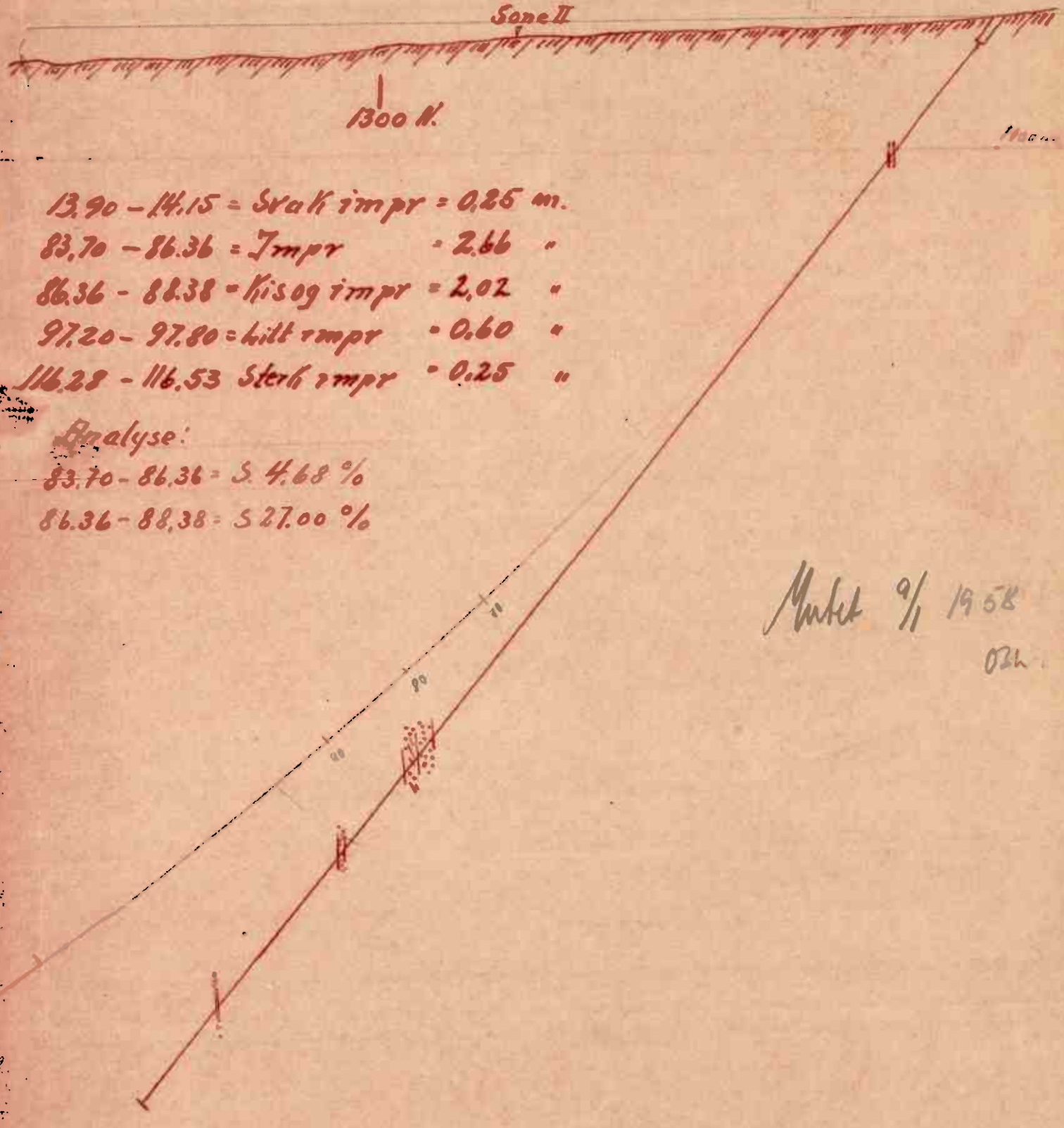
B.h. nr. 9 boret 6/8 - 22/8 1957

Fall = 50°

L. = 128,23 m

K. = 2150 V - 1360 N

M. 1:500.



13.90 - 14.15 = Svak impr = 0,25 m.
83.70 - 86.36 = Impr = 2,66 "
86.36 - 88.38 = Kis og impr = 2,02 "
97.20 - 97.80 = Litt impr = 0,60 "
116.28 - 116.53 Sterk impr = 0,25 "

Analyse:
83.70 - 86.36 = S 4,68 %
86.36 - 88,38 = S 27.00 %

Målet 9/1 1958
OZh.

Trerrfjell

Bh nr. 10 boret i aug-sept 1957

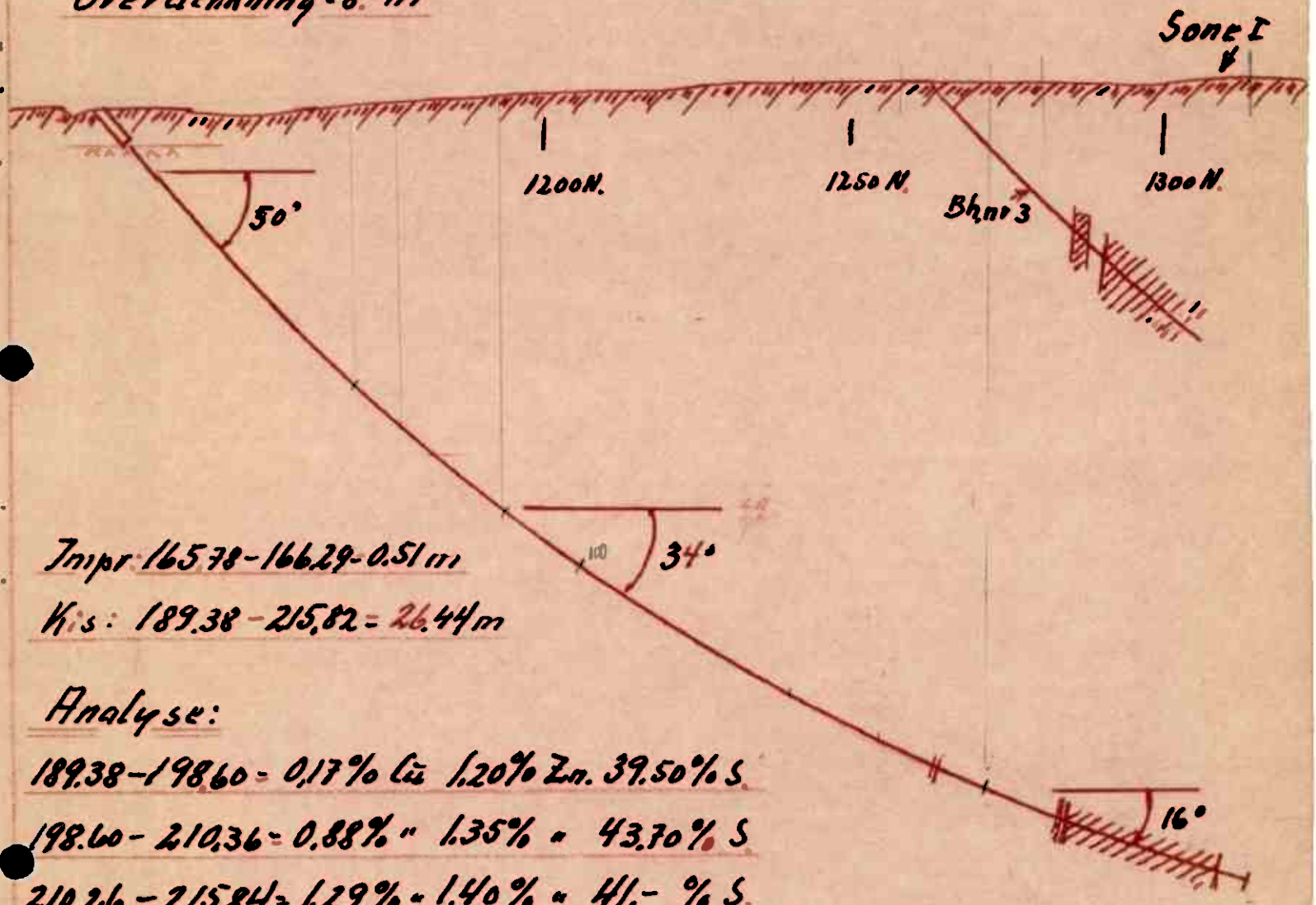
Fall 50°

L = 220.34 m

V. = 1130 N - 2450 V

M = 1:1000

Overdekkning = 8 m



Inipr 165.78 - 166.29 - 0.51 m

Kis: 189.38 - 215.82 = 26.44 m

Analyse:

189.38 - 198.60 = 0,17 % Cu 1.20 % Zn. 39.50 % S.

198.60 - 210.36 = 0.88 % " 1.35 % " 43.70 % S

210.26 - 215.84 = 1.29 % " 1.40 % " 41.- % S.

Hullet målt i 100 m dyp til 34°

" " 200 " " " 16°

Tverrfjell

Bh. nr II. boret i aug - sept 1957

Fall = 50°

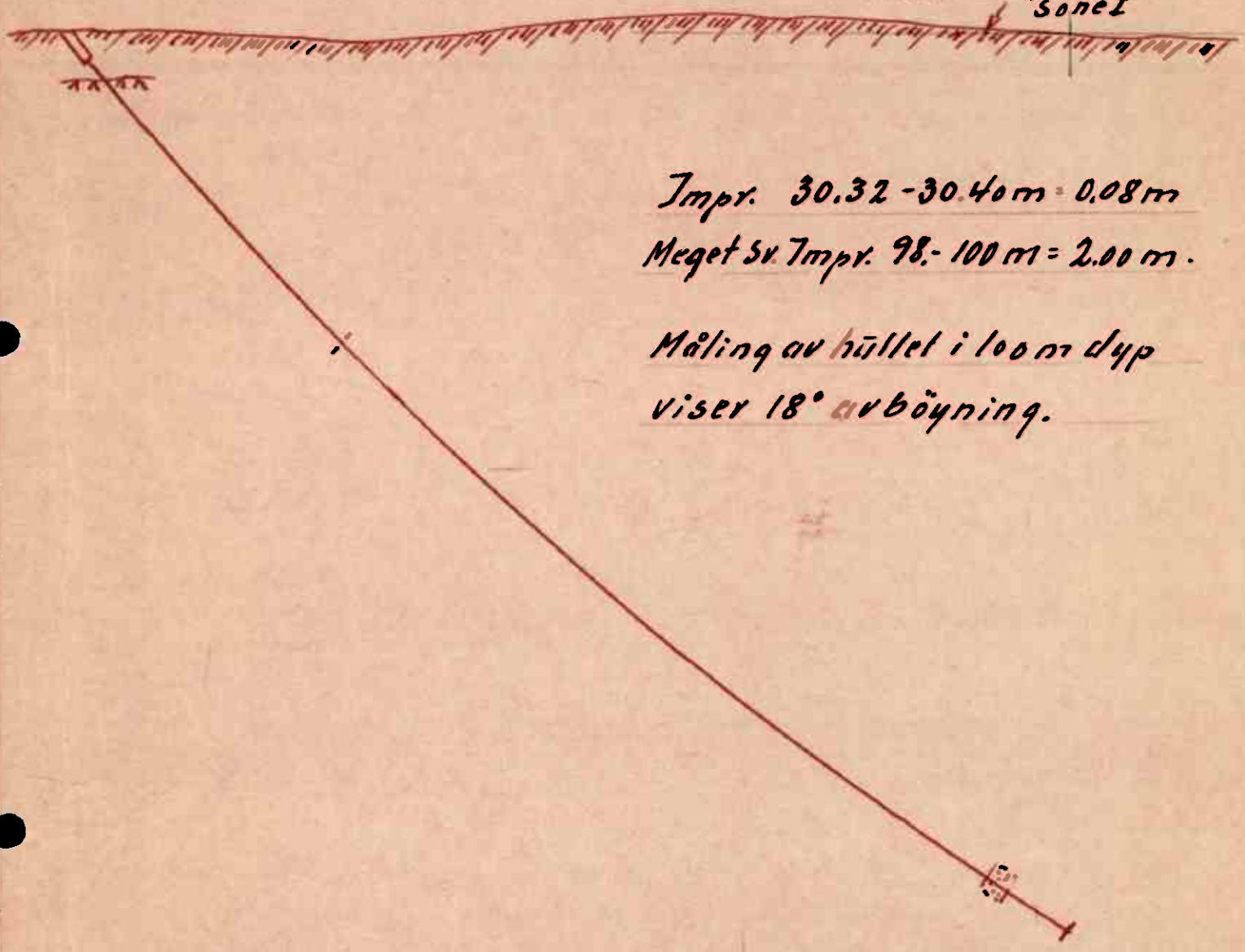
L = 106.50 m

K = 1225 N - 2300 V

M = 1:500.

5m overd. skrått

Antatt ind. på kartet sone I



Impr. 30.32 - 30.40 m = 0.08 m

Meget sv. Impr. 98.- 100 m = 2.00 m.

Måling av hullet i 100 m dyp viser 18° avböyning.

Tverrfjellet.

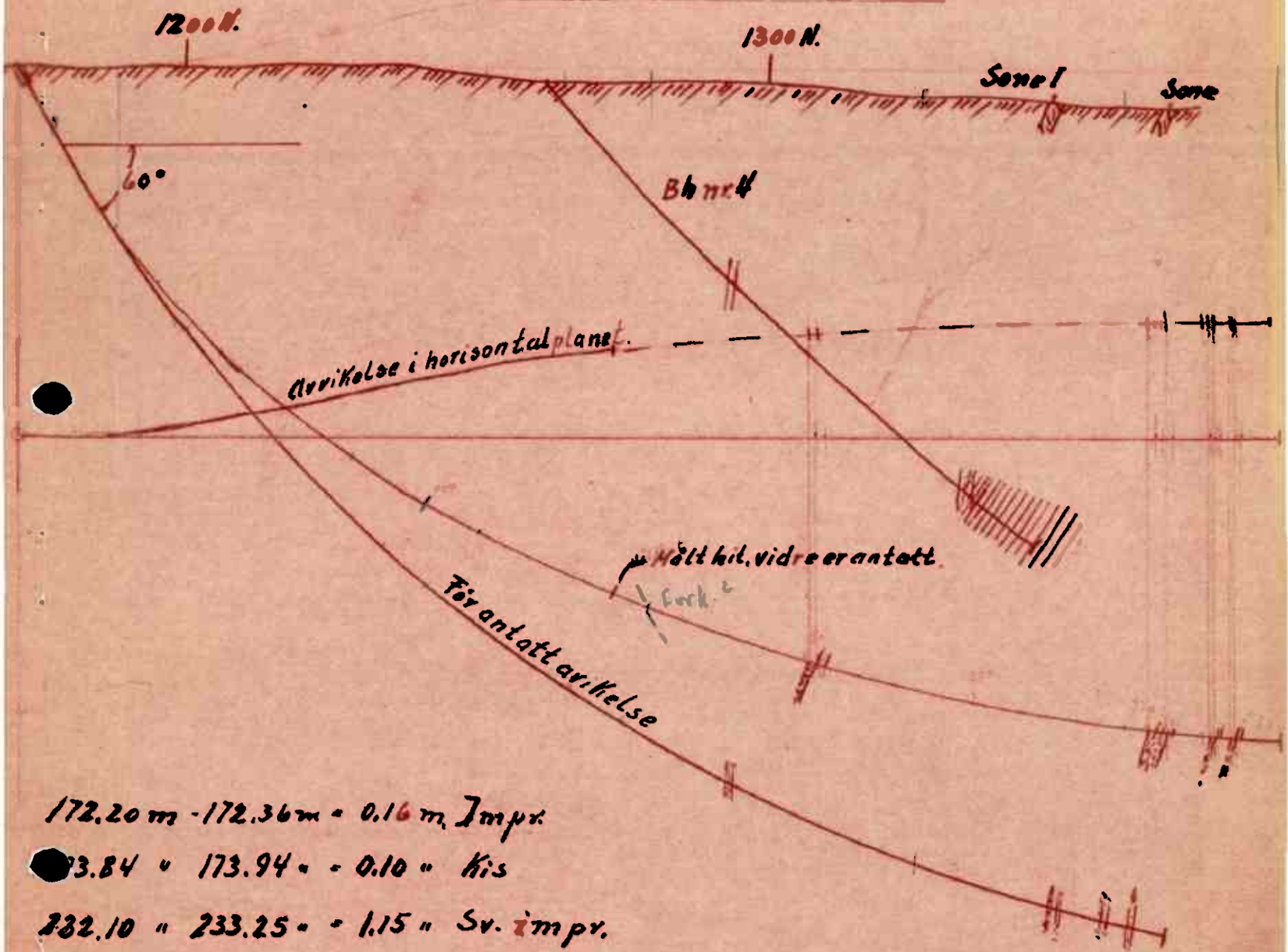
B.h nr 12 boret 11/9 - 12/10 1957

Fall · 60°

L = 253.66 m + 3.-m overdekkning

K = 2600 V - 1170 N

M. 1:1000



172.20 m - 172.36 m = 0.16 m. Impr.

173.84 " 173.94 " = 0.10 " Kis

232.10 " 233.25 " = 1.15 " Sv. impr.

233.25 " 233.35 " = 0.10 " Kis

233.35 " 234.91 " = 1.56 " Sv impr.

241.78 " 241.83 " = 0.05 " Kis

241.95 " 242.05 " = 0.10 " Kis

242.30 " 242.55 " = 0.25 " Kis

246.05 " 246.25 " = 0.20 Sl. impr.

246.25 " 246.83 " = 0.58 Sv. impr.

Tverrfjell

Bh. nr 13. boret i sept. 1957.

Fall = 55°

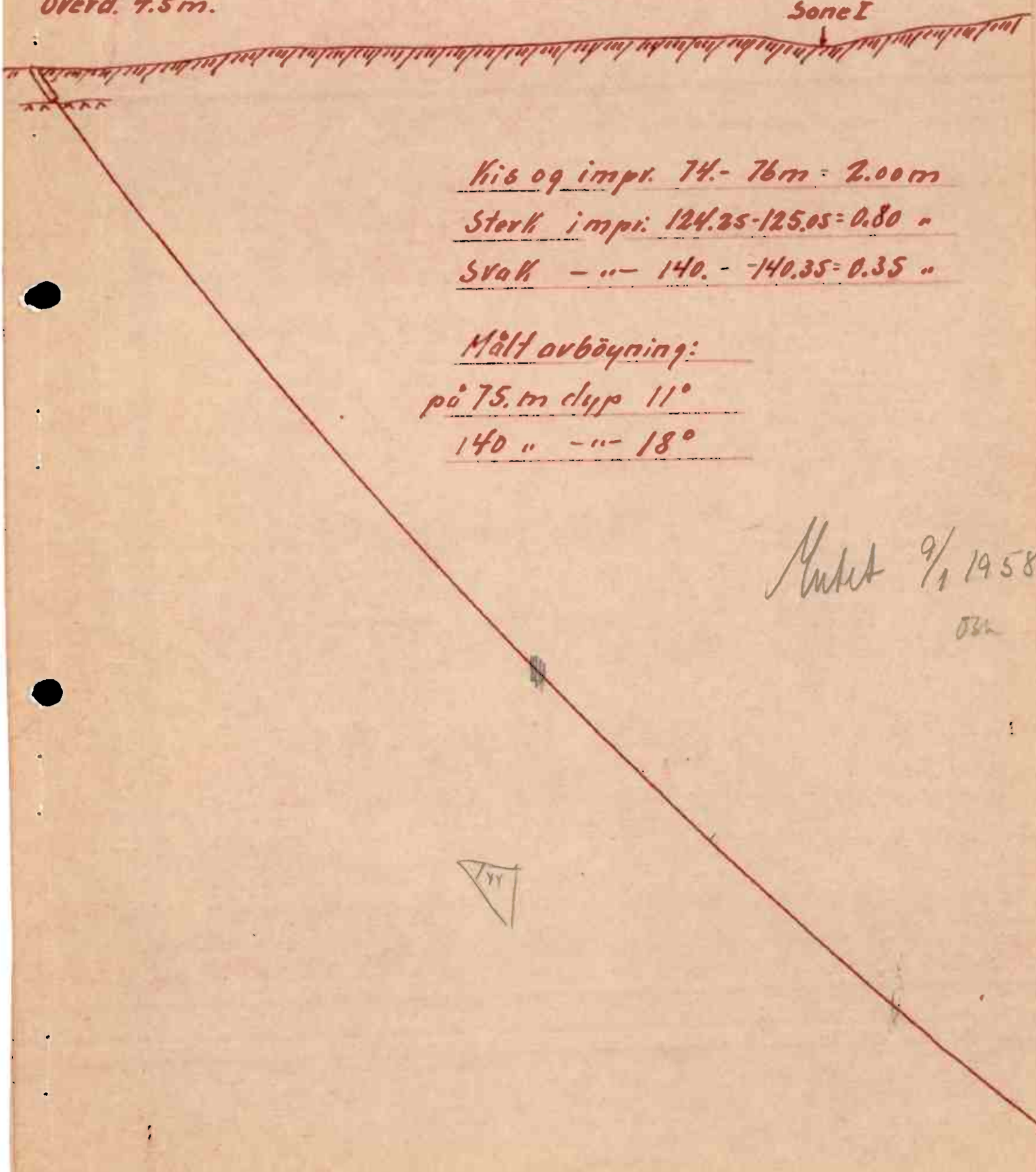
L. = 148.70

K. = 1280 N 2700 V.

M. = 1:500

Overd. 4.5 m.

Sone I



Kis og impr. 74.- 76m = 2.00 m

Sterk impr. 124.25-125.05 = 0.80 "

Svak -"- 140. - 140.35 = 0.35 "

Målt avböyning:

på 75. m dyp 11°

140 " -"- 18°

Målt 9/1 1958

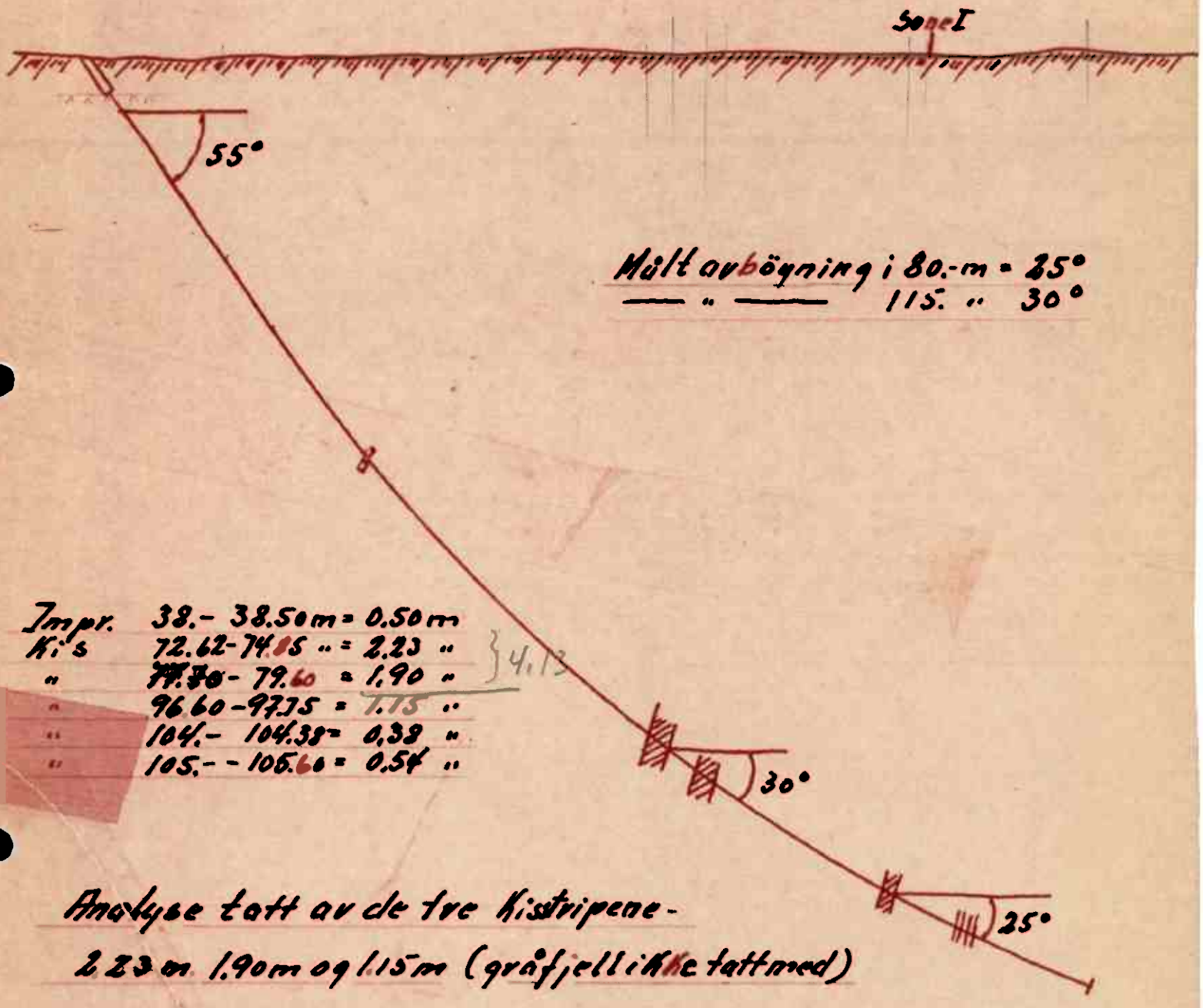
OSL

Tverrfjell Bh.nr 14 boret i oktober 1957

Fall = 55°
L. = 116.80 m
K. = 2350 V – 1225 N.

Overdekkning 3.5 m

M. = 1:500



Målt avbøyning i 80.-m = 25°
—— " —— 115. " 30°

Impr. 38.– 38.50 m = 0.50 m
Ki's 72.62–74.85 " = 2.23 "
" 78.30 – 79.60 = 1.90 " } 4.13
" 96.60 – 97.75 = 1.15 "
" 104.– 104.38 = 0.38 "
" 105.– 106.66 = 0.54 "

Analyse tatt av de tre kisstripene –
2.23 m 1.90 m og 1.15 m (gråfjell ikke tatt med)

2.23 m = Cu 0.55 % Zn = 2.60 % S = 32.– %
1.90 m = Cu 0.63 % Zn = 1.10 % S = 38.30 %
1.15 m = Cu 0.39 % Zn = 1.10 % S = 32.50 %
Gj.sn. Cu 0.60 % Zn 1.72 % S = 35.46 %

Tverrfjell. Bh. nr. 15 Sone I boret i oktober november 1957

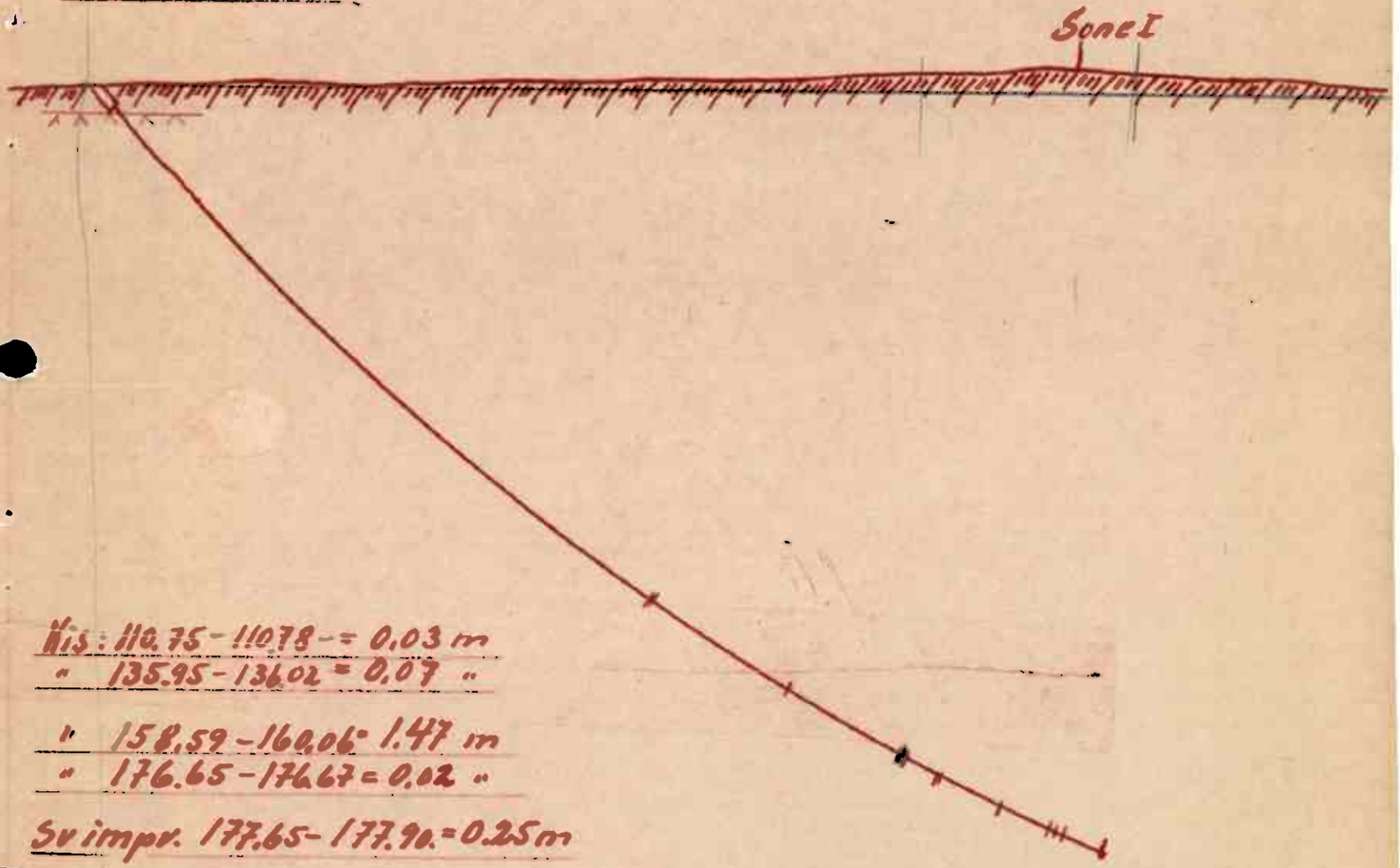
Fall = 53°

L = 193.18 m

V₁ = 2350 V - 1150 N.

M. = 1 : 1000.

Overd. 3.50 m.



Kis: 110.75 - 110.78 - = 0,03 m
" 135.95 - 136.02 = 0,07 "

" 158.59 - 160.06 = 1.47 m
" 176.65 - 176.67 = 0.02 "

Sv impr. 177.65 - 177.90. = 0.25 m

St. - " - 184.09 - 184.29 = 0.30 "

Kis - 185.42 - 185.44 = 0,02 "

Impr 186.60 - 186.70 = 0.10 "

Analyse:

158.59 - 160.06 = 1.47 m = Cu 0.73 % Zn. 0.40 % S. = 45 %

Tverrfjell

Bh. nr. 16 boret i november desember 1957

Fall = 60°
L. = 222.98 m (256.460 m)
K. = 1892 V-1360 N
K. Målt til 1839 V-1355 N
M. = 1:1000

Jordboring 6 m

1200 N Vei Sone III 1300 N

Kis	125.45 – 125.62	= 0.17 m
Impr.	162.00 – 162.10	= 0.10 "
"	162.75 – 163.10	= 0.35 "
"	167.20 – 167.27	= 0.07 "
"	167.75 – 168.00	= 0.25 "
"	173.00 – 173.10	= 0.10 "
Kis	176.10 – 176.20	= 0.10 "
Sv. Impr.	176.20 – 178.00	= 1.80 "
Impr.	180.00 – 180.06	= 0.06 "
"	187.40 – 187.50	= 0.10 "
"	191.10 – 191.15	= 0.05 "
Kis	241.55 – 251.43	= 9.88 "

Måling II
Måling I

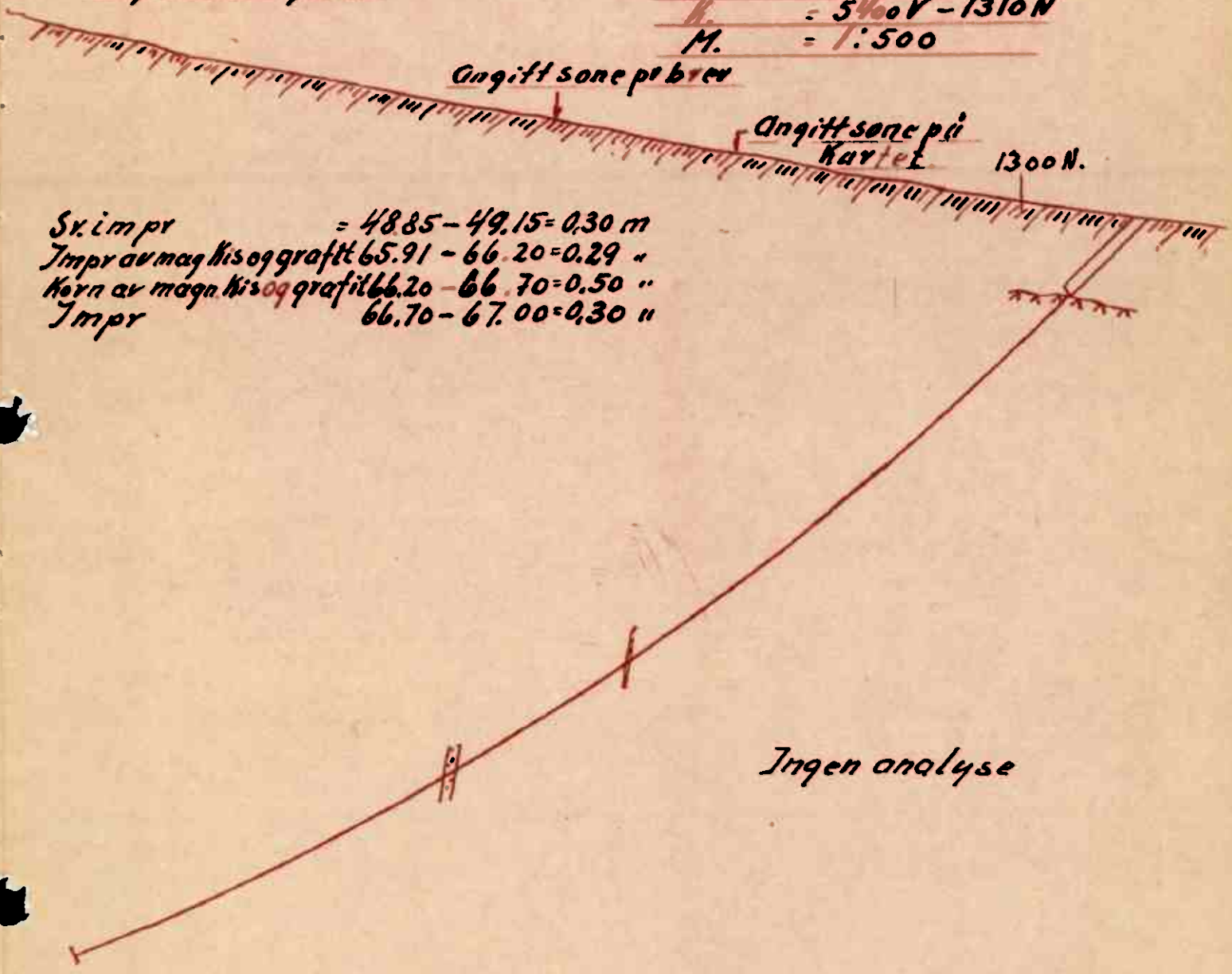
Forlenget 5/10-11/10-61 til 256.46 m.
241.50 – 244.68 – m. Cu = 0.63% Zn 1.30% S = 35.45 %
244.68 – 248.73 " " 0.64 " " 2.40 " 42.30 %
248.73 – 251.41 " " 1.40 " " 1.00 " 36.00 %

Hr. Kulsa i horisontalplanet

Tverrfjell Bh nr 17 boret i mai juni 1958

Jordboring 9m

Fall = 45°
L. = 100.75 m
K. = 5W00V - 1310N
M. = 1:500



Sv. impr = 48.85 - 49.15 = 0,30 m
Impr av mag kis og grafitt 65.91 - 66.20 = 0.29 "
Kern av magn kis og grafit 66.20 - 66.70 = 0.50 "
Impr 66.70 - 67.00 = 0,30 "

Ingen analyse

Teqne Kontor.

Aktemerke nr. 1039
for A4

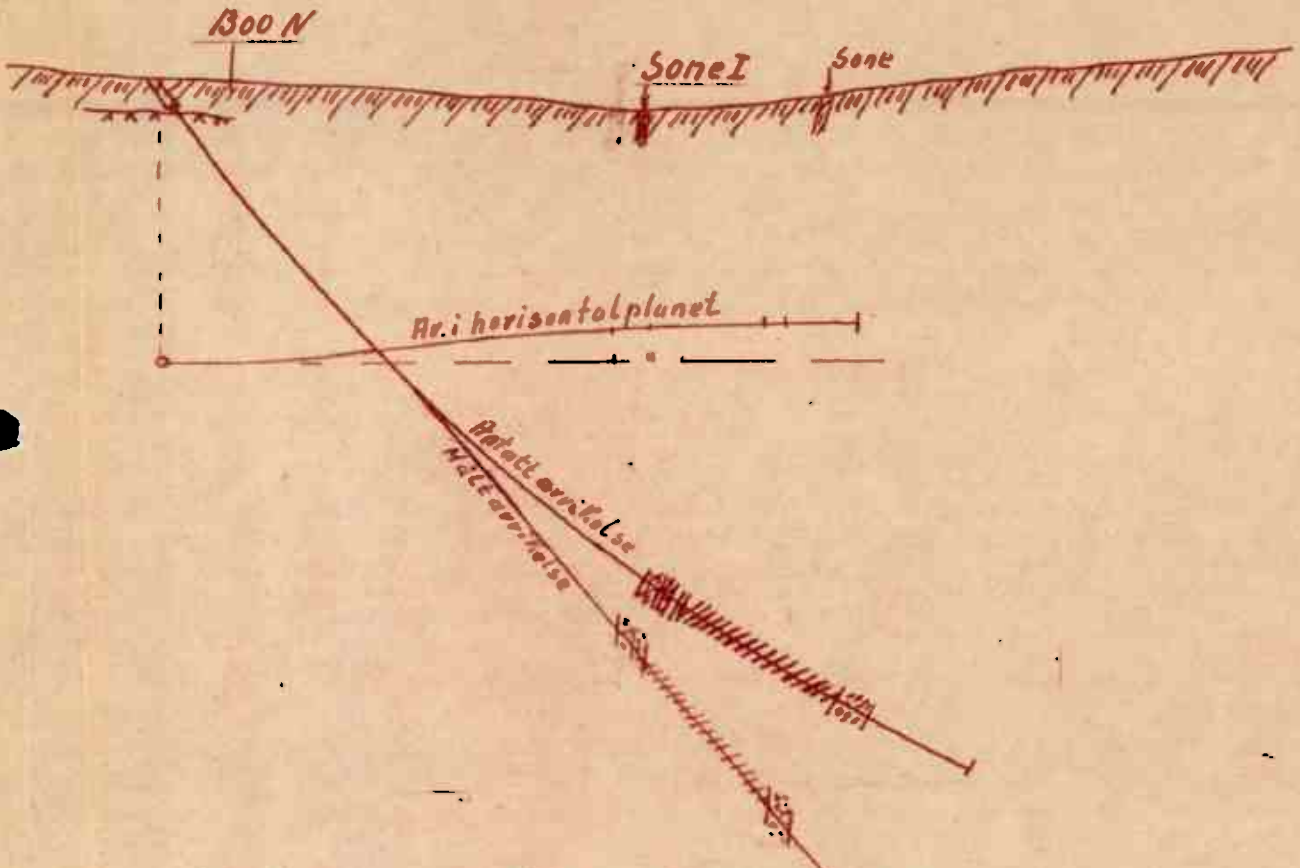
TVERRFJELLET.

Profiler av diamantborh. 18-29-51-54

Tverrfjell. Bh. nr. 18 boret juni juli 1958

Fall = 56°
L. = 140 m
K. = 2650V – 1290N
M. = 1:1000

Jordboring 4.5 m



Sterk impr.	89.83 - 92.65 = 3.82	m
Svak —"—	92.65 - 93.65 = 1.00	"
Sterk —"—	93.65 - 95.02 = 1.36	"
Kis	95.65 - 120.07 = 24.42	"
Sterk impr.	120.07 - 125.00 = 4.93	"

Analyse:

Fra 95.65 – 120.00 m Cu = 1.20 % Zn = 0.90 % S = 40.- %
" 89.83 – 125.00 " Cu = 1.00 % Zn = 0.80 % S = 34.30 %

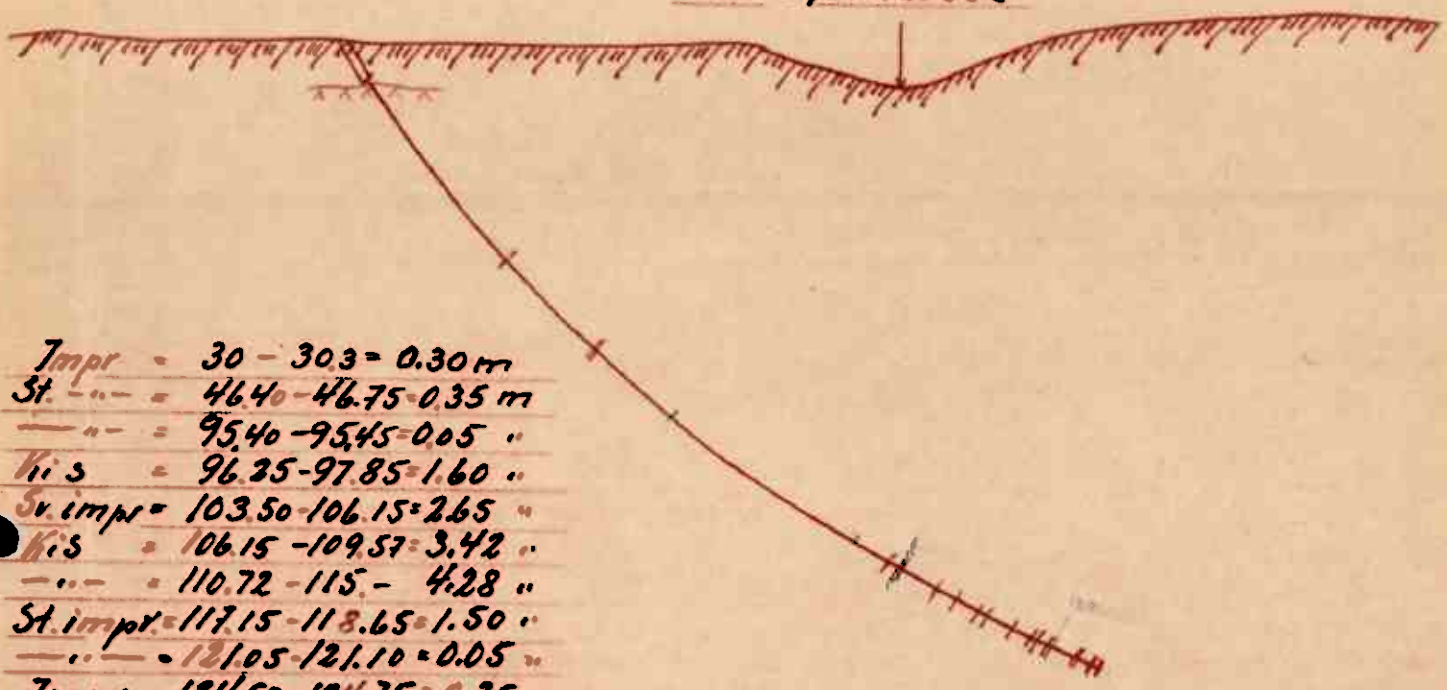
Tverrfjell Bh. nr. 19. boret i juli 1958

Fall = 57°
L = 128 m
K = 1260 N. - 2525 V.

M = 1 : 1000

Overd. 5.-m

Sone I på kartet



Impr. = 30 - 30.3 = 0.30 m
St. -"- = 46.40 - 46.75 = 0.35 m
-"- -"- = 95.40 - 95.45 = 0.05 "
Kis = 96.25 - 97.85 = 1.60 "
Sv. impr = 103.50 - 106.15 = 2.65 "
Kis = 106.15 - 109.57 = 3.42 "
-"- = 110.72 - 115.- = 4.28 "
St. impr. = 117.15 - 118.65 = 1.50 "
-"- = 121.05 - 121.10 = 0.05 "
Impr. = 124.50 - 124.75 = 0.25 "
-"- = 127.15 - 127.40 = 0.25 "

Analyse: 96.25-97.85 1.6 m Cu = 0.81% Zn = 1.20% S = 35.75%

106.15 - 109.57 3.42 m Cu = 0.77% Zn = 1.00% S = 39.30%

110.72 - 115.- = 4.28 m Cu = 1.84% Zn = 1.90% S = 39.00%

103.50 - 115 = 11.50 m Cu = 1.12% Zn = 1.05% S = 34.60%

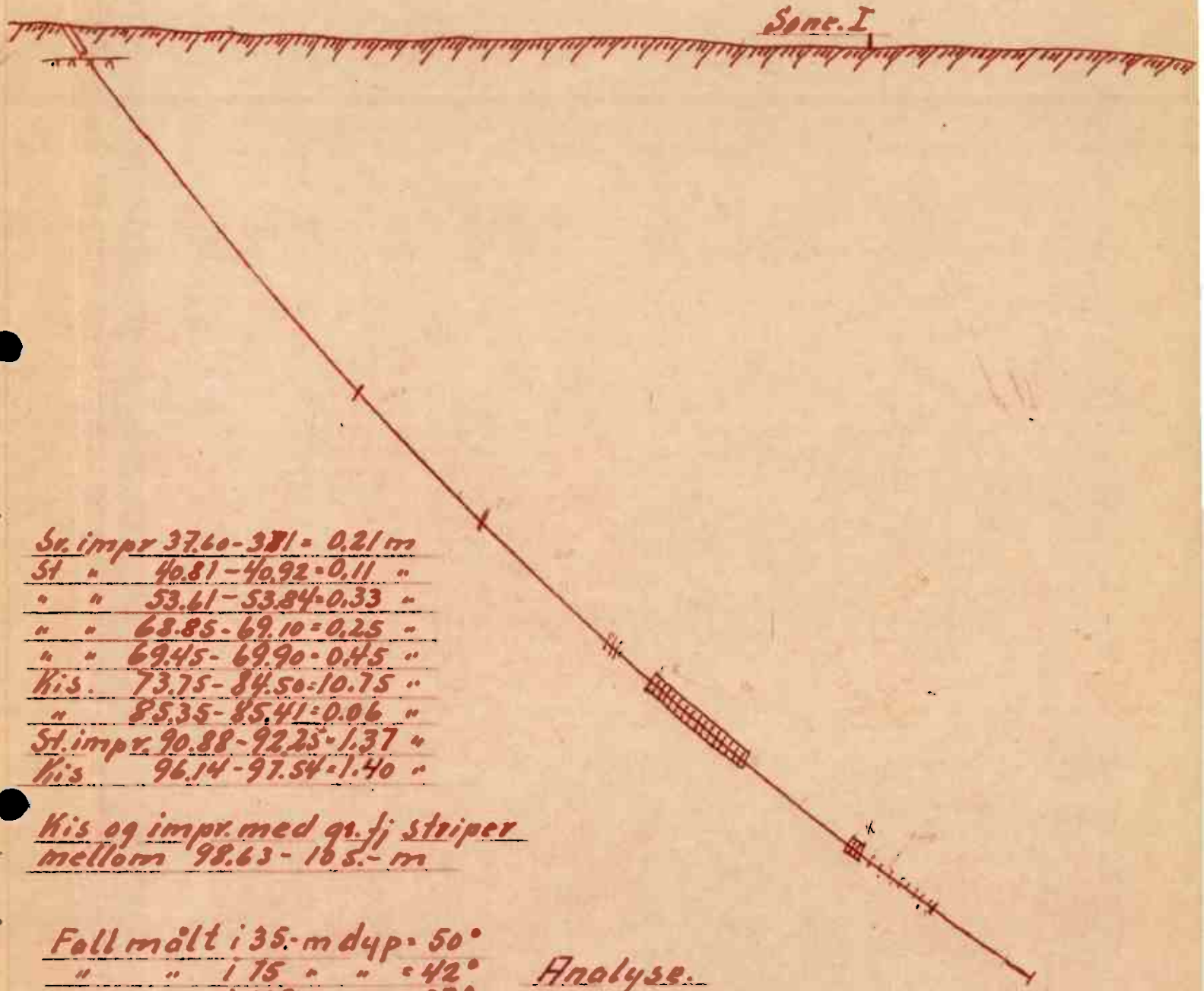
Tverrfjell

Bh. nr. 20 boret i juli 1958

Fall = 56°
L. = 115.97 m
K = 1240 N - 2450 V

Overd. = 3 m.

M. = 1:500



Sv. impr 37.60 - 38.1 = 0.21 m
St " 40.81 - 40.92 = 0.11 "
" " 53.61 - 53.84 = 0.33 "
" " 68.85 - 69.10 = 0.25 "
" " 69.45 - 69.90 = 0.45 "
Kis. 73.75 - 84.50 = 10.75 "
" 85.35 - 85.41 = 0.06 "
St. impr. 90.88 - 92.25 = 1.37 "
Kis 96.14 - 97.54 = 1.40 "

Kis og impr. med qu. lj striper mellom 98.63 - 105.- m

Fall målt i 35 m dyp = 50°
" " i 75 " " = 42°
" " i 115 " " = 37°

Analyse.

73.86 - 84.50 = 10.75 m Cu = 0.63% Zn = 1.50% S = 42.75%
90.88 - 92.25 = 1.37 " " = 0.45% " = 1.40% = 27.50%
96.14 - 103.62 = 7.48 "

Tverrfjell Bh. nr 21 boret i aug 1958

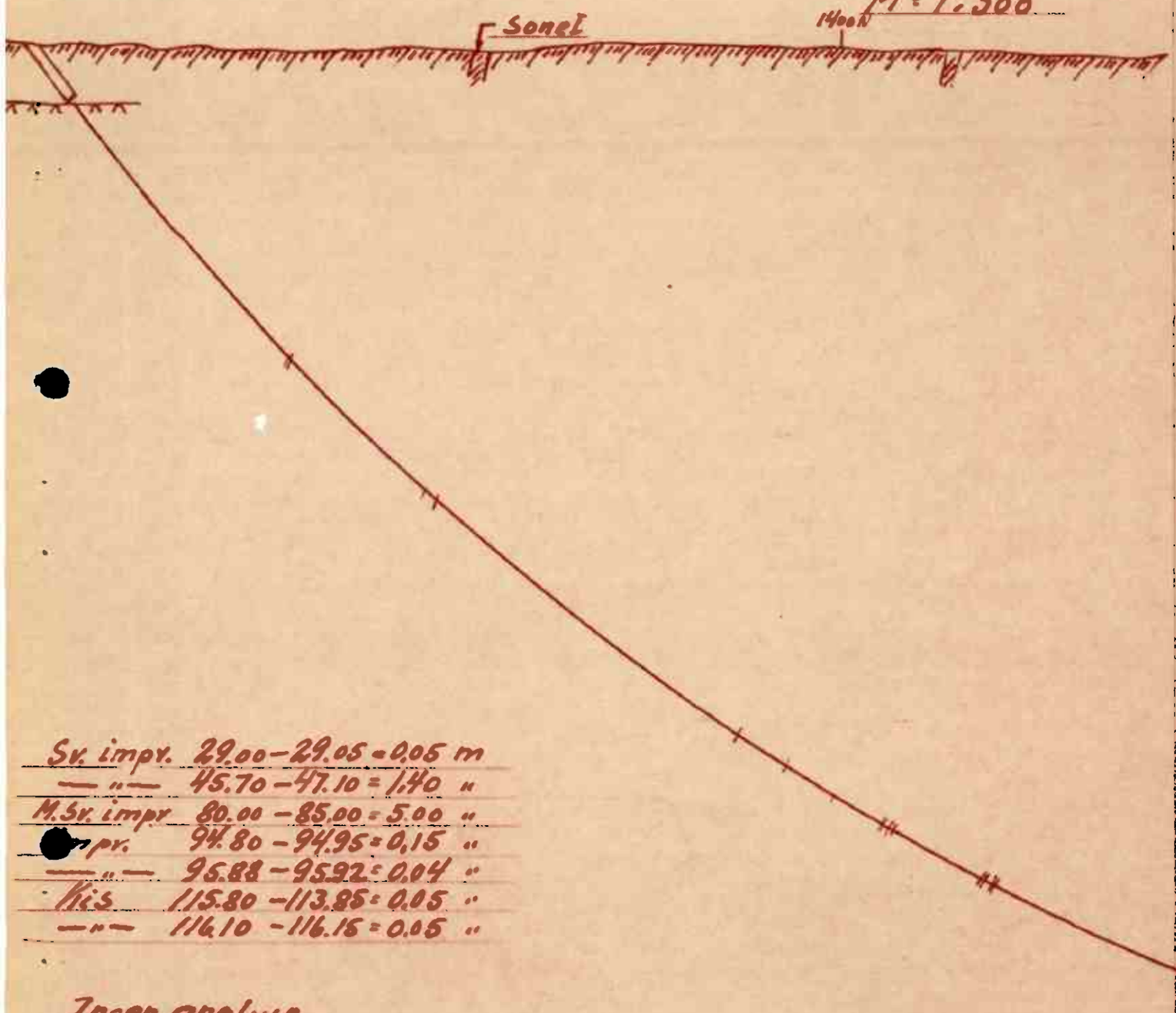
Fall = 55°

L = 131.61 m

H = 1330N - 2725V

M = 1:500

Overd 600 m



Sv. impr. 29.00 - 29.05 = 0.05 m
— „ — 45.70 - 47.10 = 1.40 „
M.Sv. impr 80.00 - 85.00 = 5.00 „
[illegible]pr. 94.80 - 94.95 = 0.15 „
— „ — 95.88 - 95.92 = 0.04 „
Kis 113.80 - 113.85 = 0.05 „
— „ — 114.10 - 114.15 = 0.05 „

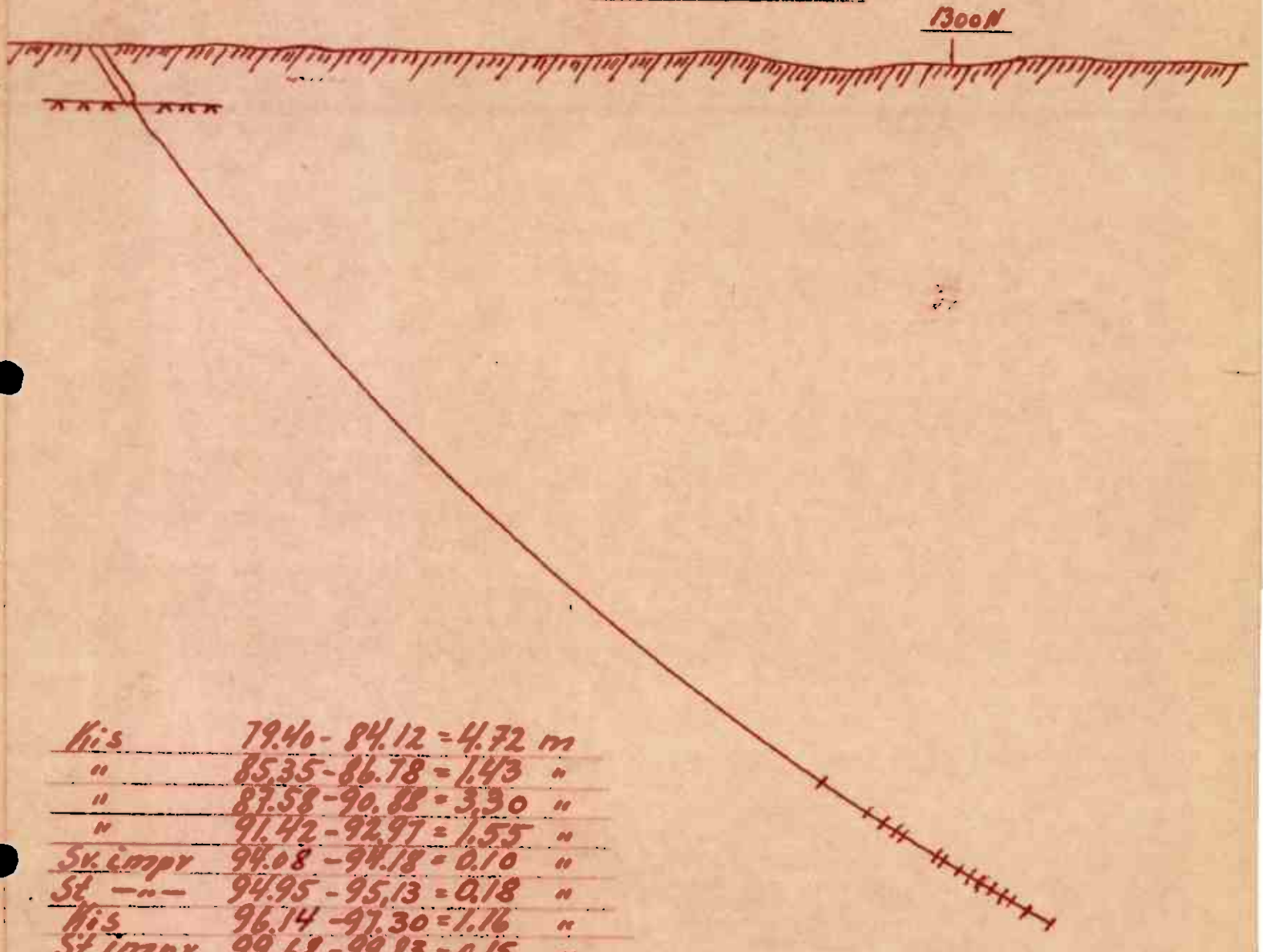
Ingen analyse

Trerrfjell Bh. nr 22 boret i august 1958

Fall - 55°
L = 101.86 m
H = 2400V - 1230N.

Oreid. 6.00 m

M. = 1:500



Kis	79.40 - 84.12 = 4.72	m
"	85.35 - 86.78 = 1.43	"
"	87.58 - 90.88 = 3.30	"
"	91.42 - 92.97 = 1.55	"
Sv. impr	94.08 - 94.18 = 0.10	"
St -"-	94.95 - 95.13 = 0.18	"
Kis	96.14 - 97.30 = 1.16	"
St impr.	99.68 - 99.83 = 0.15	"

Analyse:

1. 79.40 92.97 = 13.57 m Cu = 0.41 % Zn = 1.40 % S = 39.- %

2. 96.14 - 97.30 = 1.16 m Cu = 0.31 % Zn. = 1.50 % S = 38.90 %

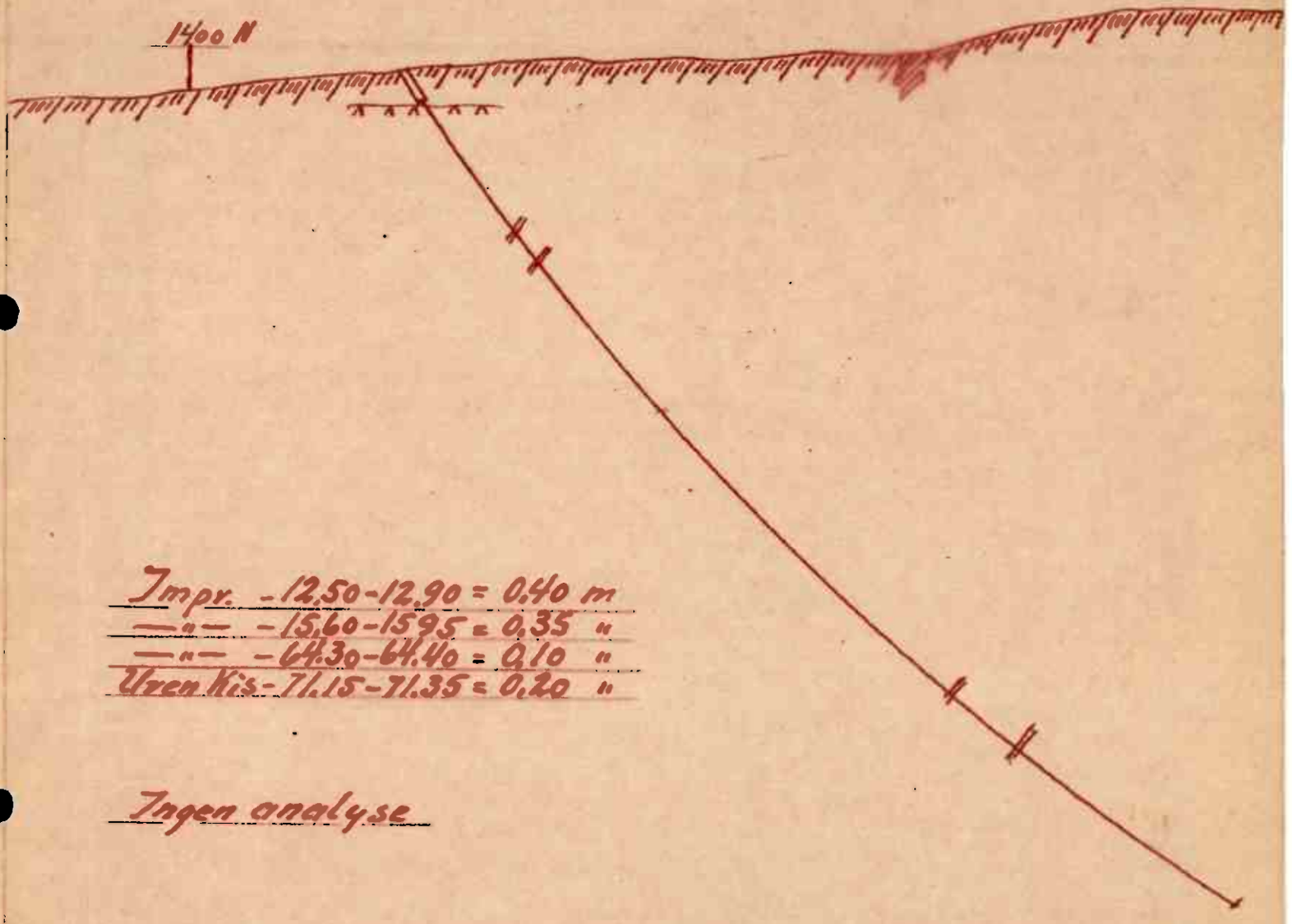
3. nr 1 og 2 Samlet Cu = 0.40 % Zn. = 1.40 % S = 39.15 %

Tverrfjell Bh. nr 23. boret i august-september 1958

Fall = 55°
l_u = 93.05 m
K. = 2600 V – 1415 N.

M. 1:500

Overd. 3.-m.



Impr. – 12.50–12.90 = 0.40 m
—"— – 15.60–15.95 = 0.35 "
—"— – 64.30–64.40 = 0.10 "
Uren Kis. – 71.15–71.35 = 0.20 "

Ingen analyse

Tverrfjell Bh nr. 24. boret i September 1958

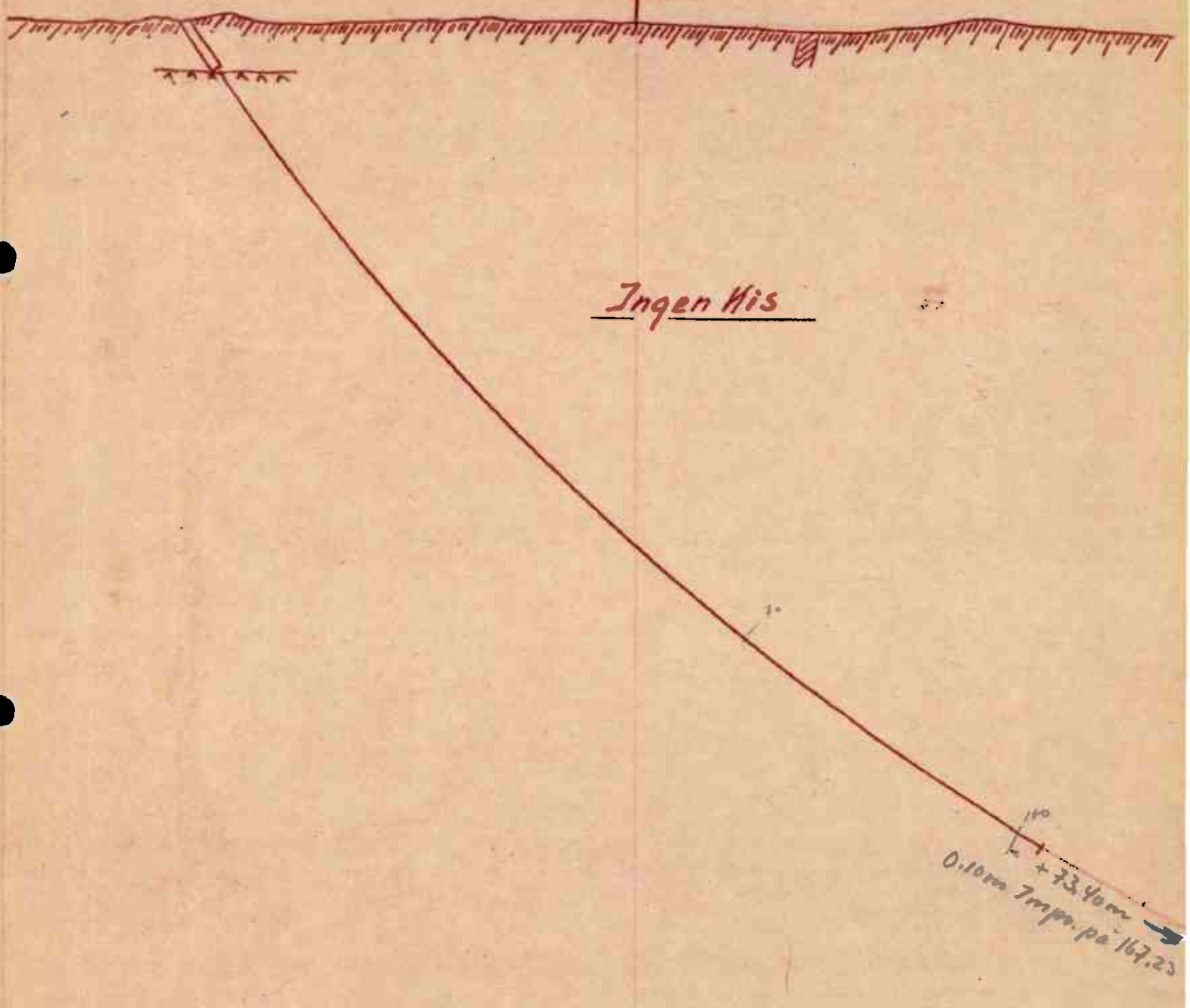
Fall = 55°
l_b = 100.10 m
H = 1850 V – 1060 N.

M 1:500

Forlenget 24/10 - 14/11 til 173.40

Overd = 5.50 m

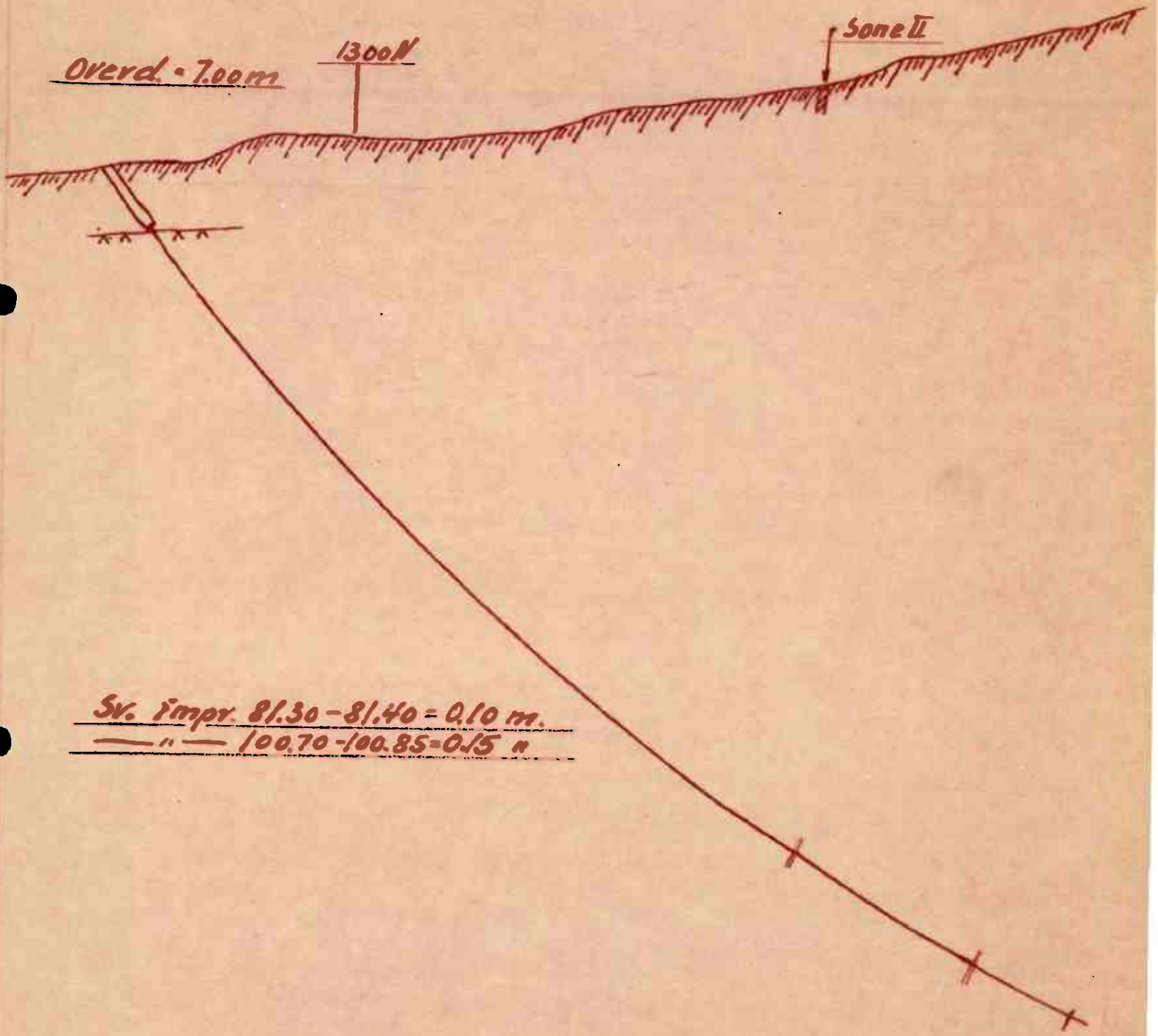
1100 N



Tverrfjell. Bh.nr. 25 boret i sept. 1958

Fall = 55°
L = 110.80 m
H = 2250 V – 1275 N

M = 1:500



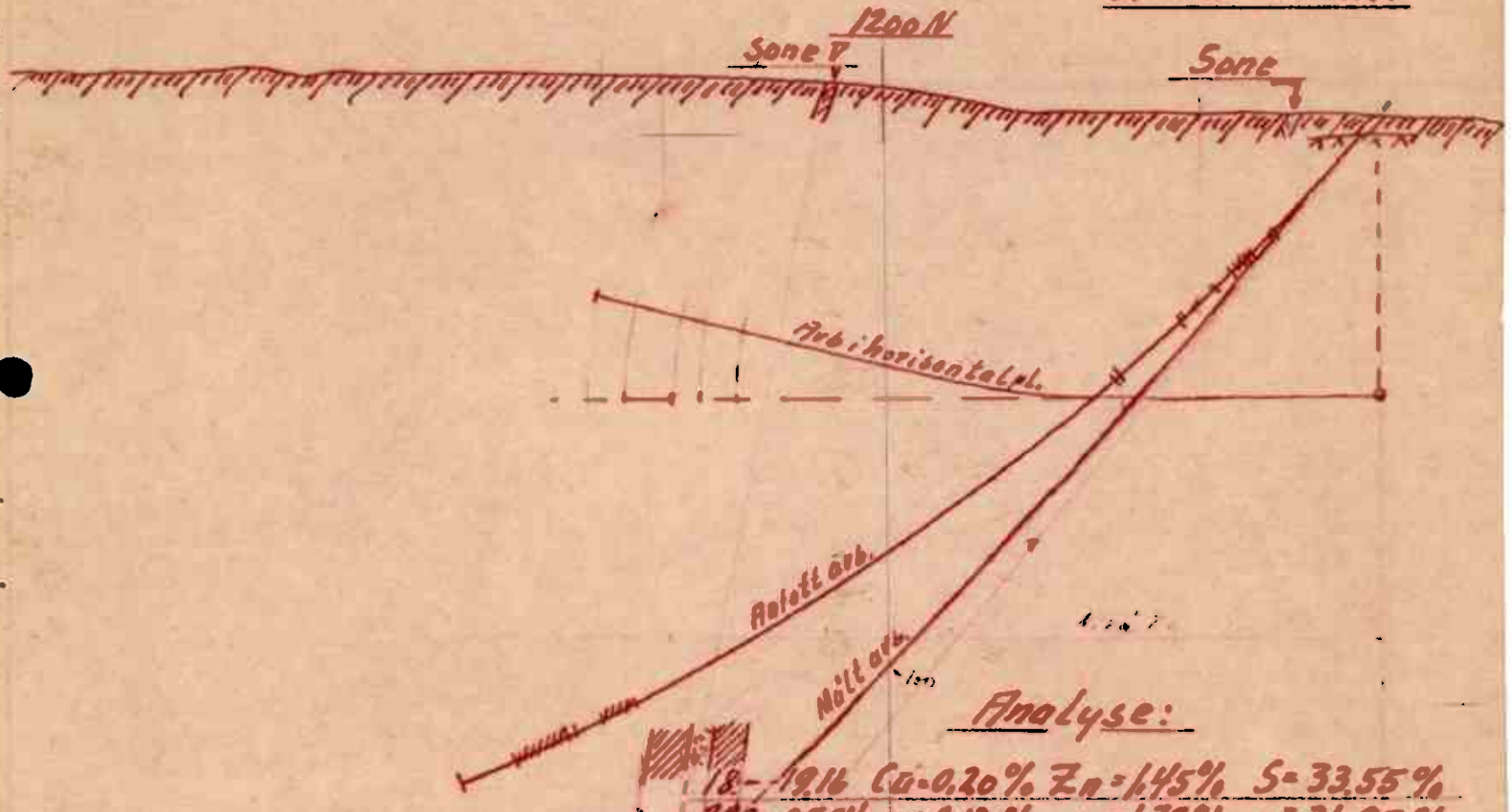
Sv. Impr. 81.30 – 81.40 = 0.10 m.
—"— 100.70 – 100.85 = 0.15 "

Tverrfjell Bh. nr. 26. boret i sept 1958

Fall = 50°
L. = 156.34 m
K = 2010 V - 1270 N.

M = 1:1000

Overd. - 3.00 m.



Kis 18.00 - 19.16 = 1.16 m
—"— 22.20 - 25.54 = 3.34 "
Impr. 25.54 - 26.44 = 0.90 "
St —"— 29.08 - 29.28 = 0.20 "
St —"— 29.74 - 29.89 = 0.15 "
St —"— 35.80 - 36.00 = 0.20 "
—"— 36.85 - 37.05 = 0.20 "
Kis 44.80 - 45.00 = 0.20 "
—"— 130.00 - 135.35 = 5.38 "
Impr 135.35 - 139.70 = 4.35 "
Kis 140.40 - 148.83 = 7.43 "

Analyse:

18.- 19.16	Cu = 0.20 %	Zn = 1.45 %	S = 33.55 %
22.20-25.54	" = 0.13 %	" = 1.75 %	" = 36.95 %
22.20-26.44	" = 0.18 %	" = 1.50 %	" = 33.97 %
18.00-26.44	" = 0.15 %	" = 1.20 %	" = 25.17 %
130.00-135.35	" = 1.90 %	" = 1.40 %	" = 39.47 %
140.40-148.83	" = 1.45 %	" = 1.10 %	" = 41.12 %
130.00-148.83	" = 1.76 %	" = 1.20 %	" = 34.80 %

Tverrfjell Bh.nr. 27 Boret i oktober 1958

Fall = 45°
h. = 16.67 m
K = 1925 V - 1233 N

Overd. 5.00 m

M. = 1:500

Hiš 7.70 - 9.70 = 2.00 m

Tverrfjell Bh. nr. 28 boret i november 1958

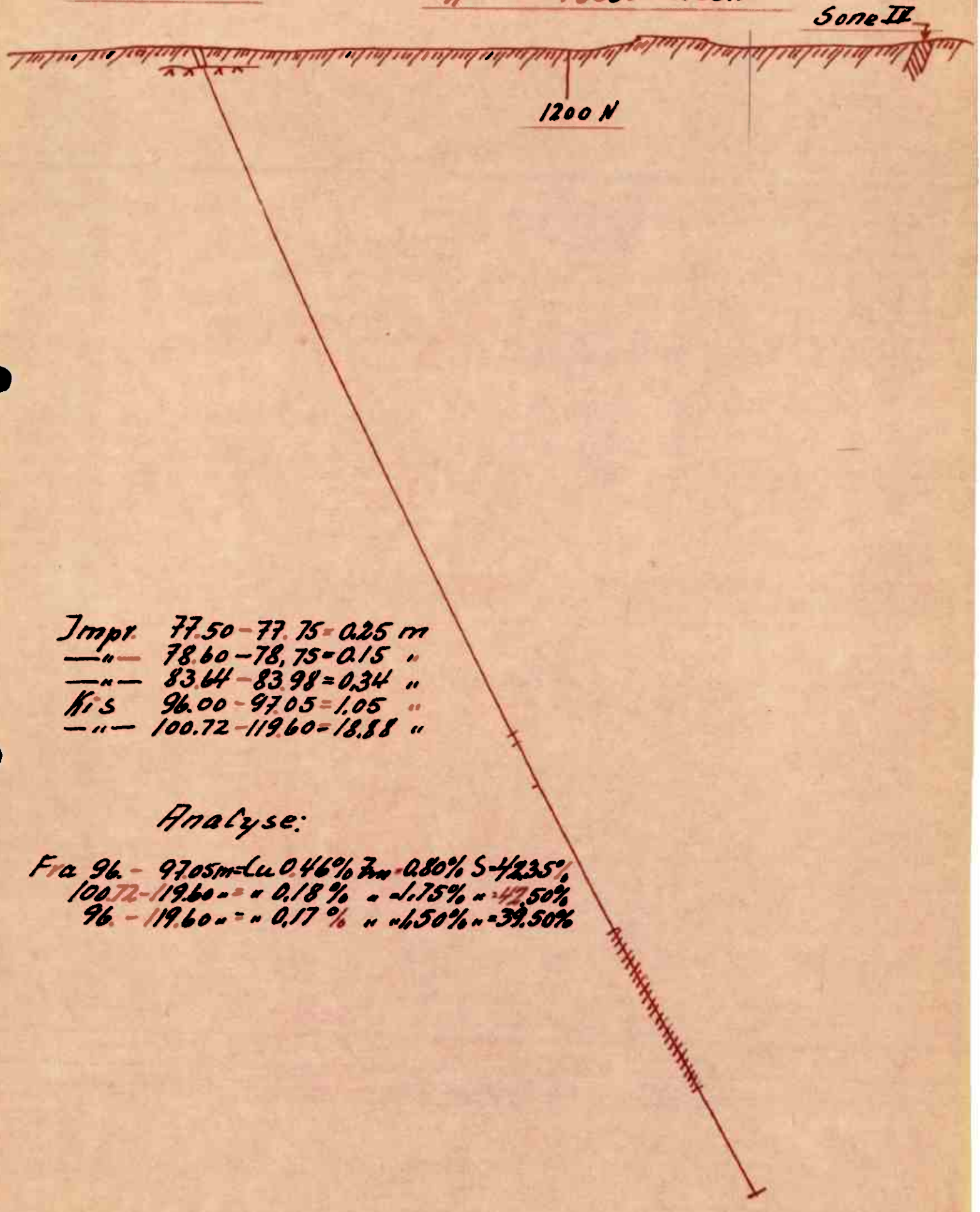
M. = 1:500

Overd. 2.-m

Fall = 67°

L = 135 m

H = 1860 V - 1160 N



Impr. 77.50 - 77.75 = 0.25 m
—"— 78.60 - 78.75 = 0.15 "
—"— 83.64 - 83.98 = 0.34 "
Kis 96.00 - 97.05 = 1.05 "
—"— 100.72 - 119.60 = 18.88 "

Analyse:

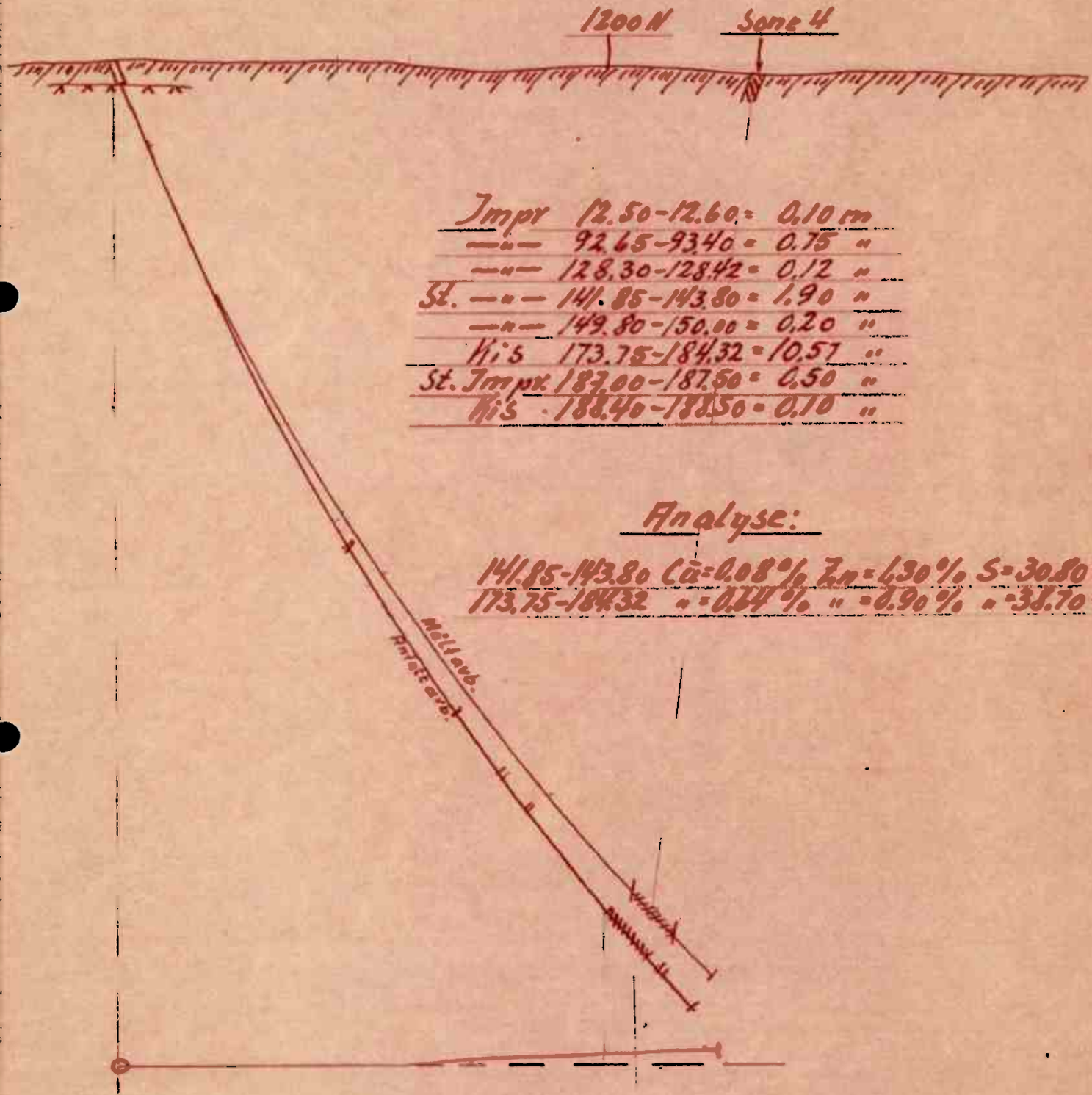
Fra 96. - 97.05 m = Cu 0.46% Zn 0.80% S 42.35%
100.72 - 119.60 " = " 0.18 % " 1.75% " 47.50%
96. - 119.60 " = " 0.17 % " " 1.50% " 39.50%

Tverrfjell Bh. nr. 29 boret i september-oktober 1958

Fall = 70°
L = 196.54 m
K = 1800V - 1110N.

Overd. 3.-m

M = 1:1000



Impr	12.50-12.60 =	0,10 m
—"—	92.65-93.40 =	0.75 "
—"—	128.30-128.42 =	0.12 "
St. —"—	141.85-143.80 =	1.90 "
—"—	149.80-150.00 =	0,20 "
Kis	173.75-184.32 =	10,57 "
St. Impr.	187.00-187.50 =	0.50 "
Kis	188.40-188.50 =	0.10 "

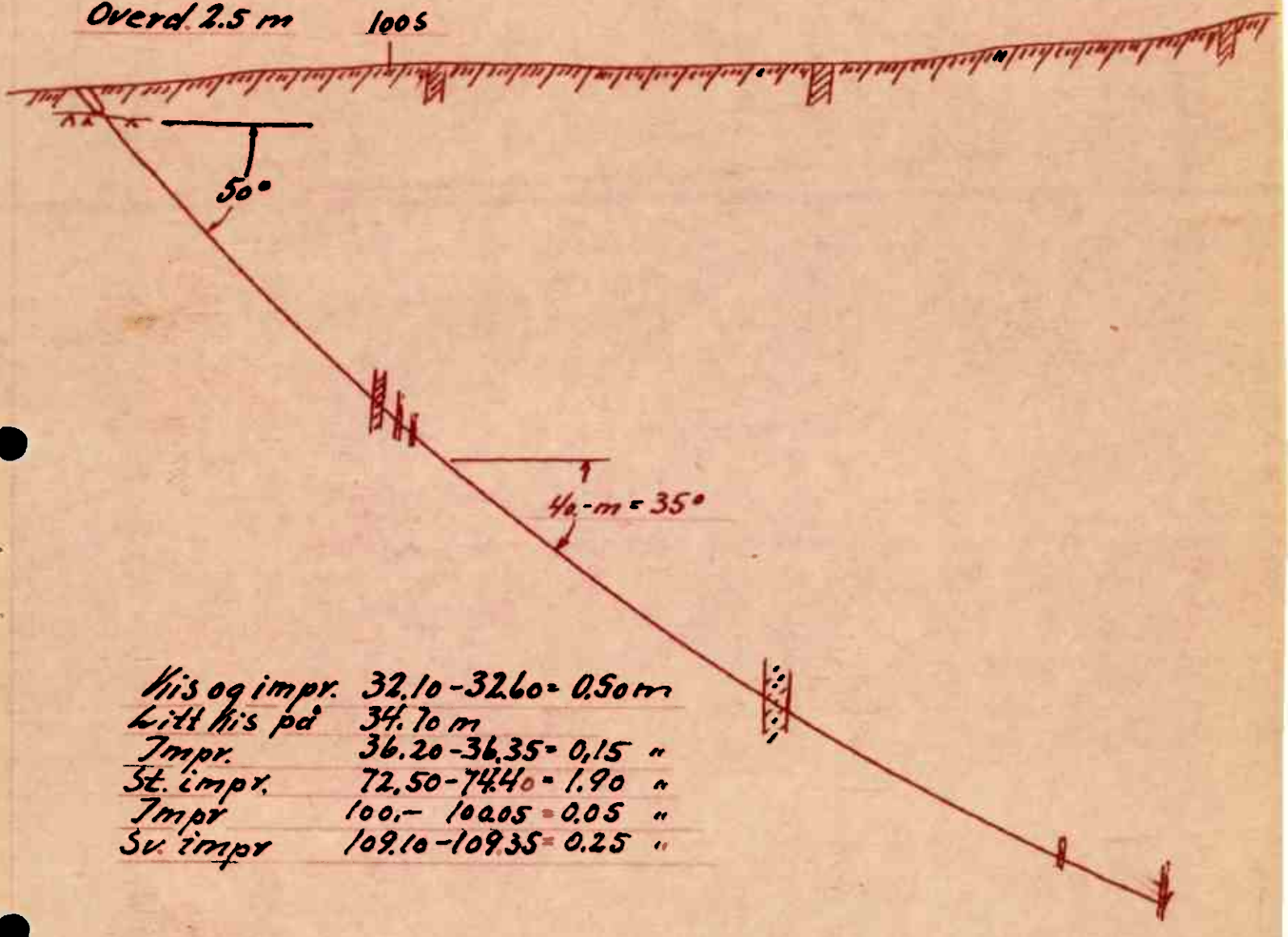
Analyse:

141.85-143.80 Cu = 0.08 % Zn = 4.30 % S = 30.80 %
173.75-184.32 " = 0.14 % " = 0.90 % " = 33.70 %

Tverrfjell Bh 51 boret i oktober 1957

M: 1:500

Fall = 50°
L. = 109.35 m
K = 2100 Ø - 125 S.

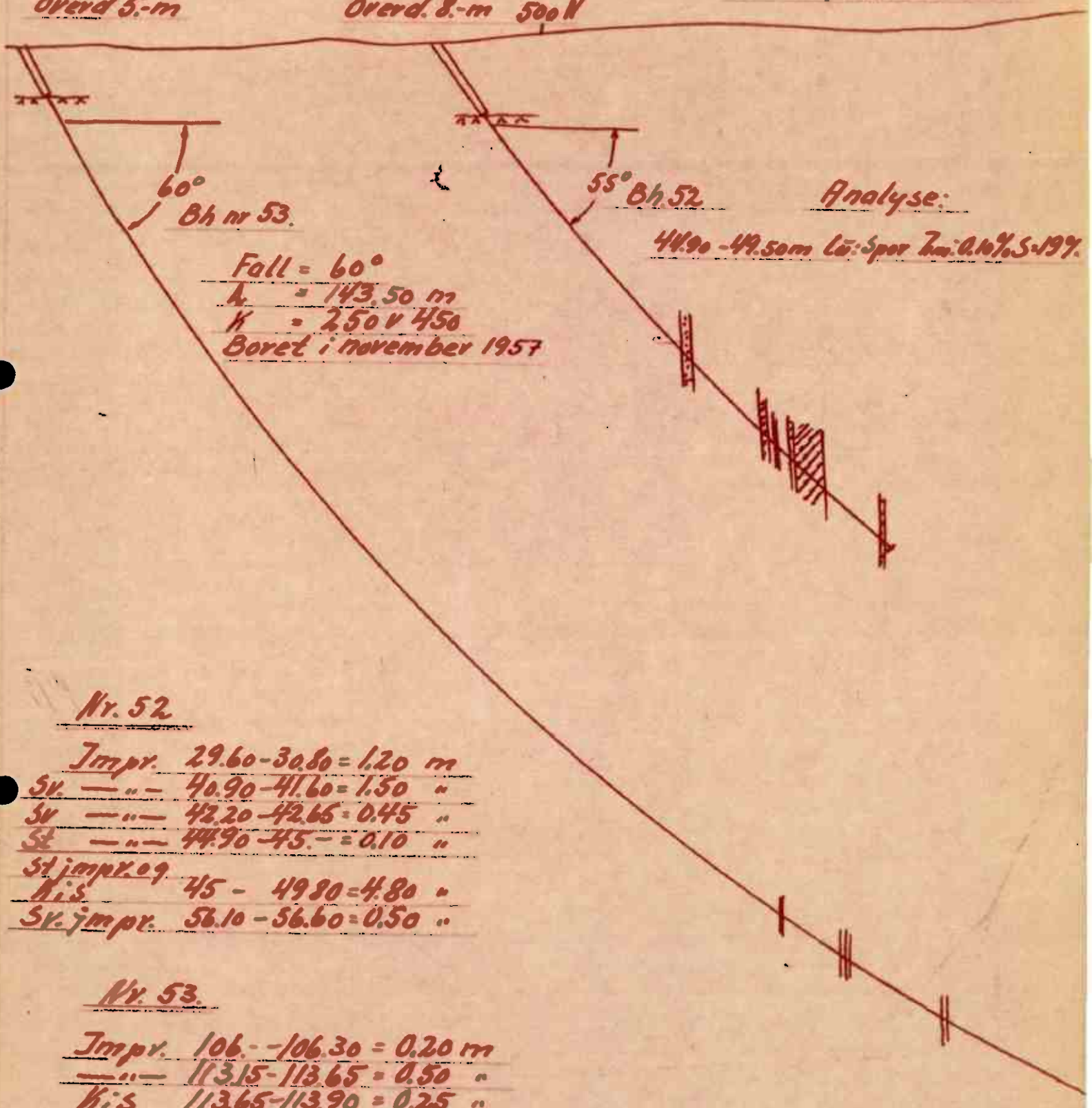


Kis og impr.	32.10 - 32.60 =	0.50 m
Litt kis på	34.10 m	
Impr.	36.20 - 36.35 =	0,15 "
St. impr.	72.50 - 74.40 =	1.90 "
Impr	100.- 100.05 =	0.05 "
Sv. impr	109.10 - 109.35 =	0.25 "

Tverrfjell. Bh 52 og 53 (Ved riksvei 50)

M. 1:500

Nr. 52
Fall = 55°
L = 57.60 m
K = 250V – 490 N
Boret i oktober 1957



Analyse:
44.90 – 49.50 m Lø: Spor Zn: 0.10% S: 19%

Fall = 60°
L = 143.50 m
K = 250 V 450
Boret i november 1957

Nr. 52

Impr.	29.60 – 30.80 = 1.20	m
Sv. —"—	40.90 – 41.60 = 1.50	"
Sv —"—	42.20 – 42.65 = 0.45	"
Sk —"—	44.90 – 45.– = 0.10	"
Sk impr. og Ki.s	45 – 49.80 = 4.80	"
Sv. impr.	56.10 – 56.60 = 0.50	"

Nr. 53.

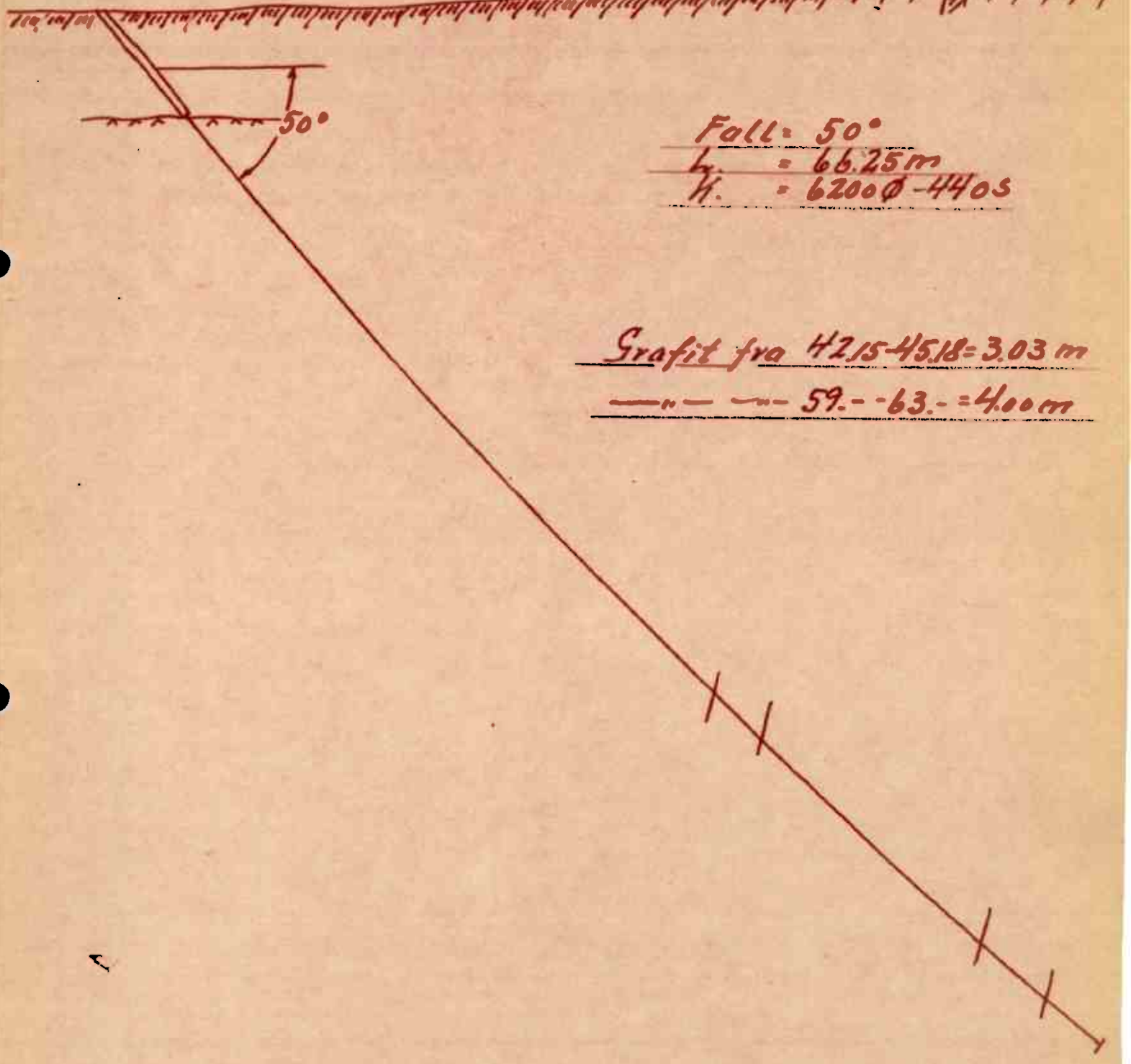
Impr.	106.– – 106.30 = 0.20	m
—"—	113.15 – 113.65 = 0.50	"
Ki.s	113.65 – 113.90 = 0.25	"

Kvitdalen bh nr. 54 boret i november 1960

M. 1:250

Overd. = 6.00 m

Sone
H = 400 s.



Fall: 50°
L = 66.25 m
H. = 6200 Ø - 440 s

Grafit fra 42.15-45.18 = 3.03 m
—"— —"— 59.- -63.- = 4.00 m

DIAMOND DRILL HOLE 21

Trondfjellet mine, Folldal Verk A/S
Exploration hole from 1958
Location: 1330 N - 2725 V
Inclination: 55°
Total length: 133.05 m + 6 m overburden

Description:

DDH 21

0.00 - 5.90 : Magnetite quartzite
(meta - oxide facies BIF)
grey with violet streaks, locally brownish or greenish coloured, banded, irregular alternation of quartzite bands (which may contain plates of biotite) with cm - thick layers or schlieren of magnetite - quartz, sporadically interlayers composed of carbonate, phyllosilicates, qtz and fspar which may be tuff beds.
Often disturbed banding being due to folding.
Schistosity / banding : 60°
Sharp contact

5.90 - 16.80 : High calcareous biotite - chlorite schist
(meta - mafic volcanic, supp altered basalt flow)
gi with brown rods and white schlieren, wide development of compositional banding - often strongly deformed, alternation of bands made by fine - fibrous chlorite which shows widely scattered fibrous aggregates and/or porphyroblasts of biotite with trains of granules or schlieren of carbonate, carbonate in addition occurs as scattered idioblasts on average 0.15 cm across within the phyllosilicate bands; several interlayers of calcareous biotite - sericite schist / phyllite (meta-felsic volcanic tuff) (6.02 - 6.27 m, 6.83 - 7.33 m, 7.53 - 7.83 m,

9.03 - 9.23 m); bands of quartzite (meta - chert) at : 10.12 - 10.32 m, 11.85 - 12.00 m, 14.49 - 15.19 m, 16.17 - 16.80 m.
Strongly folded, contact between layers of different composition and competency, less meta-chert, knife sharp and as bedding fault lines.

16.80 - 40.15 : Calcareous to high calcareous biotite - chlorite schist / phyllite
(meta - mafic volcanic sediment)
light grey with brown and grey schlieren or spots, often with distinct compositional banding which in places may be deformed, sometimes quite homogeneous, fine - crystalline, alternation of phyllosilicate bands with schlieren, lenses and thin layers mainly composed of carbonate which is accompanied by qtz, biotite tends to form porphyroblasts which are scattered and predominately oriented parallel to the compositional layering, carbonate besides being concentrated within crystal aggregates forms scattered xenomorphic porphyroblasts, huge amphibole crystals occur between 17.00 - 17.15 m; sparce intercalations of meta - chert (16.95 - 17.02 m, 28.22 - 28.47 m some clusters of py, 30.13 - 30.19 m some poikiloblasts of mt, 33.81 - 33.88 m, 36.32 - 36.55 m iron - grade dirty mt, 37.25 - 38.90 m); rare poikiloblasts of mt between : 38.90 - 39.50 m.

Lamination / banding: 20°
Sharp contacts

40.15 – 41.75 : Calcareous biotite-chlorite schist
(meta-altered basalt flow)
AA gr with white and brown spots, homogeneous, crudely developed lenticular texture due to carbonate which tends to be concentrated within lenses and schlieren, fibrous chlorite surrounds poikiloblasts of biotite which are homogeneously distributed and tend to be oriented parallel to each other; * ; at footwall interlayers of meta-chert and high calcareous biotite-sericite schist (tuff or tuffite), the latter carries clusters of py and supp. sph.
* sparce poikiloblasts of mt
chem. analysis 40.15 – 40.28 m
Sharp contact

● .75 – 42.10 : Biotite-sericite schist
(meta-pelite, weakly altered)
A gr with abundant brown rods, fine-crystalline, homogeneous, biotite forms max 0.25 cm long porphyroblasts which tend to be aligned parallel to the major foliation of the rock, in places lense-shaped aggregates composed of qtz, sparce idioblasts of py.
Gradually passing into following schist.

42.10 - 45.74 Calcareous to high calcareous chlorite-bear. biotite - sericite schist

A (meta-pelite with volcanic impurity, altered) gr with abundant brown spots, fine- (randomly oriented) fibrous sericite accompanied by porphyroblasts of biotite as schliren, layers and lenses in alternation with lenses composed of qtz and carbonate, the latter often carry spots of py, in places clusters of qtz which contain abundant carbonate, py either occurs as scattered hypidiomorphic blasts or forms irregular shaped aggregates or trains of granules, the sulphide amounts to < 1 % by volume of the rock; tiny scattered spots of either mt or il.

chemical analysis
42.10 - 43.10 m
43.10 - 44.10 m
44.10 - 45.70 m

43.20 - 43.40: calcareous qtz-sericite-chlorite-biotite schist (highly altered mafic volcanic)

AA greenish brown, medium-to coarse-crystalline, strongly small scale folded, phyllosilicates are concentrated within schlieren and deformed layers which surround clusters of qtz, carbonate is irregularly distributed; py occurs as scattered porphyroblasts and grades lesser 1 Vol.-%. Sharp deformed contacts.

45.74 - 47.10 : Calcareous biotite-chlorite-bear. quartzite
(meta - hydrothermal silica with intolayers of highly altered mafic volcanic)
gr with brown and gr silicen, silicen structure, phyllosilicates together with carbonate compose silicen and in places web-like features which alternate and are filled by fine-grained granoblastic quartz which may contain dusty but often is accompanied by scattered louse-like porphyroblasts of carbonate or crystals of biotite, py and lesser amounts of po form trains of granules of low-to medium grade mineralisations within cm-thick layers, the sulphides grade (average) 3 % by volume of the rock.
Strongly deformed due to folding.
Knife sharp boundaries.

A1

chemical analysis 45.74 - 47.10m

47.10 - 69.98 : Calcareous to high calcareous chlorite-quartz/phyllite
(meta - mafic volcanic sediment, may be altered basaltic lava)
gn, flaser - and lenticular structure, close irregular alternation of fine-fibrous chlorite layers which near the footwall contain randomly oriented porphyroblasts of biotite with silicen, clusters and thin layers composed of qtz and carbonate, space max. 0.1 cm large idio-

strongly folded until 82.50m

silicen

blasts of mt; interlayers of calcareous phyllosilicate-bear. quartzite (meta-hydrothermal silica with volcanic and terrigen impurity) at: 49.50 - 49.77 m, 49.83 - 49.95 m, 52.12 - 52.34 m, 54.78 - 55.18 m some schlieren of po and in places high-grade dissemination of dusty mt, 55.85 - 56.59 m low-grade dissemination of dusty mt and abundant not oriented poikiloblast of amphibole, 57.24 - 57.31 m low-grade dusty mt and abundant tiny needles of amphibole, 58.97 - 59.08 m, 59.20 - 59.52 m several cm-thick bands in alternation with chlorite-schist, 60.72 - 60.82 m, 64.31 - 64.40 m trains of granules of py at both footwall and hanging wall, 66.02 - 66.13 m, 66.27 - 66.38 m, 67.00 - 67.05 m.

Sharp contact

69.98 - 73.94 : Quartzite
(meta-chert)
grey white, fine-grained granoblastic qtz with sparse mm-thick layers of calcareous chlorite phyllite, spots of pyrite very locally.

Sharp contact

73.94 - 74.18 : Calcareous amphibole - qtz - fspar rock
(meta-felsic tuff)
milky white with dark green, porphyroblastic,

chemical analysis 73.90 - 74.28 m

inhomogeneous, huge porphyroblasts of amphibole showing no preferred orientation are embedded in a fine-crystalline matrix composed of qtz and fspar, locally biotite or chlorite join amphibole; sparce blasts of pyrite which tend to be close amphibole.
Strongly deformed.
Gradually passing into following rock.

74.18 - 74.97 : Quartzite
(meta-chert)
milkywhite to colourless, fine-grained granoblastic, massive, in places banded by mt and trains of granules of pyrite, locally occurrence of clusters of either carbonate or pyrite and huge crystals of amphibole which are pressed parallel the major foliation of the surrounding rocks.

chemical analysis 74.42 - 74.64 m

Banding: 65°
Sharp contact.

74.97 - 75.95 : Calcareous biotite-epidote schist
(meta-pelite)
grey with faint greenish tint, abundant brown spots, lenticular structure, interlocked qtz crystals as lenses and schlieren in non-

rhythmic alternation with schieven and layers composed of sericite and biotite, the latter forms scattered tiny porphyroblasts, carbonate displays lense-like aggregates which are nearly homogeneously distributed.

76.12 - 76.29 : slightly calcareous amphibole-fspar-qtz rock similar 73.94 - 74.31 m and quartzite which carries abundant carbonate and idioblasts of Py, the lithologies are suggested to be placed within the biotite-sericite schist by folding.
schistosity : 45°
sharp contact to following rock, bedding shear zone.

75.95 - 76.12 : Quartzite
(meta-chert)
colourless, massive, fine-grained granoblastic, incorporation of stringers filled with phyllosilicates is due to folding.
Destorted contact relationships with following rock.

76.12 - 77.74 : Biotite-amphibole-bear. chlorite-schist and quartzite
(meta-mafic volcanic sediment and meta-chert closely folded together)

Biotite - amphibole - bear. chlorite schist: gn, porphyroblastic, inhomogeneous often with flaser structure, large porphyroblasts of amphibole which randomly are oriented are surrounded either by fine-fibrous chlorite which forms schlieren and layers or fine-grained granoblastic qtz which displays lenses and discontinuous layers; pyrite as max. 0.4 cm large porphyroblasts is variably distributed, it amounts to 10 Vol-% between 76.74 - 77.08 m, elsewhere it grades less 2 Vol-%; sparce porphyroblasts of mt.

chemical analysis
76.39 - 76.74 m
76.74 - 77.08 m
77.08 - 77.37 m

Quartzite: colourless, massive, fine-grained granoblastic; rare spots of py.
Contact relationships with following rock are unclear which is due to folding.

77.74 - 78.66 : Calcareous biotite-sericite schist and quartzite
(meta-pelite and meta-dust closely folded together)
Calcareous biotite-sericite schist: similar: 74.97 - 76.44 m.
Quartzite: similar: 76.61 - 77.74 m.

Contact relationships with following rock

remain unclear which is due to folding and shearing.

78.66 - 80.55 : Calcareous biotite - sericite - chlorite schist (meta - mafic volcanic sediment with epiclastic sedimentary impurity; hydrothermally altered)

AA

gn with lighter bands and abundant brown flakes, inhomogeneous, strongly folded and sheared, S-shaped quartz bands of max. 0.2 cm thickness are embedded in a phyllosilicate matrix composed of fine-fibrous sericite and chlorite which are associated by porphyroblasts or crystal aggregates of biotite which often show a preferred orientation, carbonate forms lense-like aggregates which are variably distributed, rare hypidiomorphic porphyroblasts of pyrite.
Intercalations or infolded sections of quartzite (meta-chert) which carry subordinate pyrite as tiny idiomorphic crystals between: 79.89 - 80.03 m and 80.39 - 80.55 m.
Folded and sheared contact with following lithology.

80.55 - 81.18 : Calcareous biotite - bear amphibole - chlorite schist

(meta - mafic volcanic sediment)
similar: 76.12 - 77.74 m but without pyrite

Gradually passing into following rocks.

81.18 - 82.55 : Calcareous amphibole-bear. biotite - chlorite schist
(meta - mafic volcanic sediment with epi-clastic sedimentary impurity; hydrother-mally altered)
AA
similar: 78.66 - 80.55 m but no pyrite
81.91 - 81.97: pyrite - rich quartzite (meta - chert)
greyish, fine-grained granoblastic qtz forms the interior of the layer while pyrite occurs as high-grade dissemination within the quartz rims.
Folded contact.

83.55 - 83.86 : Calcareous biotite - chlorite schist
(meta - mafic volcanic sediment supp. hydro-thermally altered)
gn. strongly deformed, often with clusters of meta-chert, fine-fibrous chlorite ~~which~~ is associated by scattered, randomly oriented flakes of biotite, several lenses and nodules or discontinuous layers of carbonate or qtz; rare spots of wt; low- to medium-grade dissemination of py between: 826-

82.88 m.
Sharp deformed contact with following lithology.

83.86 - 84.55 : Calcareous biotite-bear. sericite schist (meta-pelite)
gy with faint greenish tint, lenticular structure, tiny lenses composed of either carbonate or qtz embedded in a fine-crystalline groundmass made by sericite which locally is accompanied by biotite.
Sharp contact.

84.55 - 86.97 : Calcareous chlorite schist / phyllite (meta-mafic volcanic sediment)
similar: 16.80 - 40.15 m but without biotite, abundant porphyroblasts of ut which are locally 0.5 cm across.

chemical analysis 85.67 - 85.85 m

85.29 - 85.78 : ut-bear. quartzite (meta-chert)
grwhite with faint violet tint, massive, in places banded, extremely fine-grained qtz with dusty ut which in places gets concentrated within up to 1 cm thick bands with either sharp or gradual boundaries, pyrite displays a massive lense 1 cm thick intercalayer at 85.50 m, from here it gets mobilized on fractures into the

neighbouring quartzite.
Sharp contacts

86.25 - 86.28. quartzite (meta - chert)
grwhite, massive, extremely fine-grained, sparce schlieren of chlorite - schist; pyrite displays schlieren on one side of the layer.

86.97 - 88.87 : quartzite
(meta - chert)
grwhite, in places milky white, massive, locally wide development of lamination which is due to trains of granules of pyrite or schlieren of chlorite schist, mt either as disst. like impregnation or with spotted appearence occurs between 87.30 - 87.59 m and 88.18 - 88.24m; pyrite as scattered idioblasts or trains of granules or schlieren is sporadically present, several intersections of amphibole - chlorite schist which is similar 76.12 - 77.74 m

chemical analysis 87.35 - 87.61 m

Knife sharp contact.

88.87 - 90.95 : Slightly calcareous amphibole - chlorite schist
(meta - mafic volcanic sediment, locally similar banded amphibolite)
Similar. 76.12 - 77.74 m, several interlayers with sharp boundaries of meta - chert: 89.00 - 89.10 m,

89.24 – 89.57 m (some spots of py, schlieren of nearly massive mt at 89.30 m), 90.12 – 90.17 m (infolded quartzite with sparse idioblasts of pyrite), 90.26 – 90.47 m (high-grade mt at 90.28 m, nearly massive pyrite layer on one side of the chert band), 90.52 – 90.57 m (laminated by carbonate and amphibole-chlorite schist), 90.77 – 90.84 m (discontinuous layers of mt, cluster of pyrite on one side of the band)

chemical analysis
88.93 – 89.17 m
89.52 – 89.74 m
89.98 – 90.50 m
90.72 – 90.84 m

Sharp contact.

90.95 – 91.20 : Magnetite-bear. Quartzite
(meta-chert)

graphite, massive, widely developed lamination which is caused by the tendency of mt to collect within schlieren and tiny bands, sometimes schlieren of chlorite schist and trains of granules of carbonate which are parallel the mt-lamination of the rock, rare spots of pyrite.
Knife sharp, distorted contact.

91.20 – 92.17 : Calcareous amphibole-chlorite schist
(meta-mafic volcanic, strongly hydrothermally altered)

deep gn with in places brown schlieren, strongly

folded, partly sheared, abundant clusters of milky qtz, inhomogeneous, chlorite forms fine-fibrous aggregates of irregular shape which host huge porphyroblasts of amphibole or sometimes crystal aggregates of biotite, carbonate forms lense-like aggregates, clusters or a high-grade dissemination; sparce, scattered idioblasts of mt; pyrite forms porphyroblasts or clusters which are of local occurrence.
Knife sharp contact.

AA/C

92.17 - 92.86 : Magnetite-bear. quartzite
(meta-chert)

~~chemical analysis 92.26-92.68m~~

greyish with faint violet tint, massive but sometimes with stringers of mt, dusty mt; single crystals of pyrite within hanging wall.
Knife sharp contacts on both side.

92.86 - 93.26 : Calcareous magnetite-biotite-amphibole-bear. chlorite schist
(meta-mafic volcanic, supp. tuff, strongly hydrothermally altered)

AA/C

~~chemical analysis~~

deepgn with black spots and slightly yellowish schliren and lenses, heterogeneous, onset development of layering due to compositional changes, fine-fibrous chlorite as

bands and schlieren in irregular alternation with lenses and discontinuous layers of carbonate which locally is accompanied by qtz and trains of flakes of biotite; mt is present throughout, it is variably distributed and occurs as either up to 0.35 cm large porphyroblasts or 0.1 cm large idioblasts which tend to form trains of granules being conformable with the major schistosity of the rock; pyrite displays a huge crystal aggregate within the middle part of the layer.
Layering / schistosity: 45°
Sharp contact

93.26 - 93.56: Magnetite - bear. quartzite
(meta-chert)

chemical analysis 93.26 - 93.61 m

gr white with violet layers and gr bands, extremely fine-grained granoblastic qtz as cm-thick layers or clusters (due to folding) in rhythmic alternation with mt-bands, py-layers and schlieren or bands of chlorite schist.
Layering: 30° - 45°
Sharp contact.

93.56 - 95.35: Slightly calcareous amphibole - chlorite schist
(meta-mafic volcanic, supp. tuff, strongly hydro-

thermally altered)

AA gn, homogeneous, porphyroblastic, ground-mass of fine-fibrous chlorite, abundant acicular crystals of amphibole on average 0.45 cm in length and often not oriented tend to form an open framework of bonding crystals; pyrite is locally present as hypidiomorphic porphyroblasts or clusters, it is concentrated between 94.92 – 95.02 m where it estimates 15 % by volume of the rock.

chemical analysis 94.67 – 95.27 m

94.00 – 94.13 : magnetite-bearing quartzite (meta-chert)

similar : 92.17 – 92.86 m but no pyrite.

94.82 – 94.92 : milky qtz with clusters of py.

Gradual contact.

95.35 – 100.07 : slightly calcareous, Tf biotite-amphibole-chlorite schist (meta-mafic volcanic, supp. tuff, slightly hydrothermally altered) (similar : TVN-IV-135, TVN-IV-14)

gn, crude development of compositional and textural banding, sometimes distinctly layered, fine-fibrous chlorite is accompanied by either amphibole which forms acicular, so called, crystals being not oriented or biotite which displays lense-like aggregates or flakes often being aligned with the schistosity and

chemical analysis 98.37 – 98.60 m

compositional banding of the rock, sporadically flat lenses or thin bands of qtz and ~~vein~~ layers with sharp boundaries of ~~fract.~~ ~~fract~~ (95.82 - 95.84 m, 96.00 - 96.01 m, 96.30 - 96.32 m, 96.34 - 96.38 m, 96.51 - 96.52 m, 96.57 - 96.59 m, 96.70 - 96.75 m, 98.82 - 98.87 m, 99.41 - 99.47 m), carbonate is variably distributed, it occurs within lense-like aggregates, as schlieren or laminae or it forms a dust-like dissemination; pyrite is found at: 94.66 m, 95.85 m (clusters within milky qtz), 96.92 m, 98.40 - 98.60 m (scattered porphyroblasts and trains of granules, average 3 Vol-%), 99.58 m.
Compositional banding / schistosity: 50°
gradual contact.

100.07 - 103.94: calcareous amphibole - chlorite - qtz - fspar rock
(meta-intermediate volcanic, supp. flow)
(similar: BH 18 sample 18/9 64.40 m)
blue-grey, crude development of compositional banding, porphyroblastic texture, fine-fibrous chlorite as schlieren alternate with areas being rich in fspar, qtz and carbonate, amphibole forms scattered, randomly oriented porphyroblasts, the needles being on average 0.25 cm long; local occurrence of pyrite.

Schistosity: 50°
Knife sharp contact

103.94 - 104.36: Phyllosilicate-bear. qtz - fspar schist
(meta - qtz - keratophyr)
milky white with greenish and brown schieren and flakes, schieren-texture, biotite and sericite form schieren and sometimes laminae which are surrounded by fine-grained granoblastic interlocking fspar and qtz crystals.
Schistosity: 65°
Gradually passing into following lithology.

104.36 - 107.02: Biotite - chlorite schist
(meta - mafic volcanic sediment)
lightgrey with abundant brown rods, wide development of compositional banding, fine-fibrous chlorite being associated by scattered lense-like porphyroblasts or crystal aggregates of biotite which are oriented at random as schieren and layers of variable thickness in alternation with lenses and sometimes clusters mainly composed of qtz, rare spots of Py.
Schistosity: 50°
Gradual contact

107.20 - 109.56 : Slightly calcareous biotite - chlorite - bear. amphibole schist
(meta - basalt flow)
gn, fine - crystalline, homogeneous, local occurrence of cm - thick interlayers with sharp boundaries of biotite - chlorite schist similar 104.36 - 107.02 m, here sometimes porphyroblasts of py, carbonate occurs widely as scattered round globular crystals or fills crosscutting tiny veins.
Gradual contact

109.56 - 110.00 : Biotite - chlorite schist
(meta - mafic volcanic sediment)
similar: 104.36 - 107.02 m, low - grade dissemination of pyrite within 1 cm thick qtz - band at 109.98 m.
schistosity: 45° - 50°
Gradual contact.

chemical analysis
109.56 - 110.00 m

110.00 - 111.15 : Calcareous biotite bear. chlorite - amphibole qtz - fspar rock / schist
(meta - intermediate volcanic, supp. flow)
(similar: 3H 18 sample 18/9 64.40 m)
similar: 100.07 - 103.94 m*; low - grade dissemination of pyrite within tuffaceous interlayer at 110.73 - 110.85 m which represents

* near hanging wall transgoing into banded amphibolite,

chemical analysis
110.73 - 110.85 m
110.96 - 111.15 m

a high calcareous amphibole - bear. biotite - chlorite - qtz schist and between 110.96 - 111.09 m.

111.09 - 111.25: phyllosilicate - bear. qtz - fspar rock / schist (meta - qtz - keratophyr) similar: 103.94 - 104.36 m, band of nearly massive pyrite / po at the footwall of the layer.

gradual contact.

111.15 - 114.55 : Slightly calcareous biotite - chlorite - bear. amphibole schist

chemical analysis 114.06 - 114.12 m

(meta - basalt flow)
similar: 107.20 - 109.56 m ; band of massive py with knife sharp boundaries at 115.06 - 115.12 m.
knife sharp boundary.

114.55 - 114.71 : ~~Amphibole~~ - bear. epidote - rich quartzite
(meta - chert with mafic volcanic intercalations)
greenish grey schisten and bands, banded, rhythmic alternation of fine - grained granoblastic qtz with schieren and layers made by epidote and amphibole, the latter displays acicular crystals of 0.2 cm length.
cm - thick bands of,
Sharp contact.

114.71 - 116.86: Qtz - fspar amphibole gneiss / schist (meta - mafic volcanic, supp. tuff) gn with faint bluish tint, porphyroblastic texture, crude development of compositional and textural banding, huge, lense - shaped porphyroblasts of amphibole form an open framework of boudins sometimes crossing crystals the interstices of which being filled by fine-grained granoblastic qtz and fspar which in places are joined by carbonate, locally the amphibole porphyroblasts are closely packed thus forming a coarse-grained amphibolite;* frequent occurrence of bands of magnetite-quartzite (meta-chert) with sharp boundaries which sometimes carry crystals of pyrite (114.88 - 115.04 m, 115.17 - 115.26 m, 115.37 - 115.38 m, 115.41 - 115.43 m, 115.74 - 115.77 m, 115.84 - 115.90 m, 116.16 - 116.38 m (near footwall 2 cm of massive py, 0.5 cm thick band of massive po at 116.26 m), 116.63 - 116.71 m (low-grade dissemination of py within lower portion)).

Gradual contact.

chemical analysis
116.16 - 116.27 m
116.56 - 116.71 m

* sparse crystals of mt;

116.86 - 118.13 : Calcareous amphibole schist
(meta-basalt flow)
gn, medium-crystalline, homogeneous, in places indistinctly banded, spotted carbonate, the often idiomorphic crystals being on average 0.15 cm across.
Sharp contact.

118.13 - 133.05 : Slightly calcareous amphibole schist
(meta-basalt flow)
gn, extremely fine-grained, nematoblastic texture, locally crosscutting qtz-veins, carbonate as subidiomorphic porphyroblasts is variably distributed, several intercalations with sharp but also gradual borders of fine- to medium grained amphibole schist which shows a
~~gn, fine- to medium grained, nematoblastic texture and with~~ crude development ~~to~~ of leopard texture, strongly parallel oriented lense-shaped amphibole crystals or crystal aggregates of mat ~~length~~ 0.45 cm length are embedded in a sparce matrix composed of plagioclase, at places irregular qtz-veining (121.19 - 122.25 m, 123.20 - 123.35 m, 123.85 - 125.70 m, 125.75 - 133.05 m), layers of exhalative qtz at: 123.35 - 123.85 m, 125.05 - 125.15 m, stringers and irregular veins of po, 125.70 - 125.75 m, 126.30 -

chemical analysis
125.05 - 125.15 m
126.30 - 126.35 m

126.35 m finest dissemination of po and some spots of py, sulphides show a crude tendency to collect within layers, total sulphide amount estimates to 7 Vol.-%, 126.60 - 126.62 m some clusters and stringers of po associated by py (5 Vol.-%).

133.05 m End of DDH

Frank-D. Priesemann
Aug. 1986

Chemical analysis: DDH 21

	% Cu	% Zn	% S
42.10 - 43.10 m			
43.10 - 44.10 m			
44.10 - 45.70 m			
45.70 - 47.10 m			
73.90 - 74.20 m			
74.42 - 74.64 m			
76.39 - 76.74 m			
76.74 - 77.08 m			
77.08 - 77.37 m			
81.91 - 81.97 m			
82.65 - 82.88 m			
88.93 - 89.17 m			
89.52 - 89.74 m			
89.98 - 90.50 m			
90.77 - 90.84 m			
91.92 - 92.00 m			
93.26 - 93.68 m			
94.67 - 95.27 m			
98.37 - 98.60 m			
109.56 - 110.00 m			
110.73 - 110.85 m			
110.96 - 111.15 m			
114.06 - 114.12 m			
116.16 - 116.27 m			
116.56 - 116.71 m			
125.05 - 125.15 m			
126.30 - 126.35 m			

85.67 - 85.85 m
87.35 - 87.61 m

Susceptibility DDH 21:

132.50	0.1
131.50	0.0

52.73	1.4
52.93	0.0
53.40	0.1
53.76	0.7
53.96	0.4
54.72	1.1
54.95	0.0
55.12	2.5
55.27	0.9
55.70	4.1
55.85	0.9
55.90	3.2
56.10	6.9
56.30	0.7
56.50	6.5
56.80	0.0
57.20	0.0
57.25	1.6
57.35	0.0
58.40	0.0
58.95	0.0
59.20	0.0
59.50	0.0
59.70	0.0
59.95	0.7
60.75	0.1
60.85	0.0
61.20	0.0
61.40	0.0
63.90	0.0
64.10	0.0
64.35	0.0
64.70	0.0
65.10	0.7
66.10	0.1
66.30	0.0

1.00	14.0
1.40	8.2
1.90	21.0
2.20	14.0
2.40	18.0
2.60	10.0
3.50	31.0
4.40	5.9
4.90	19.0
5.60	13.0

6.80	0.0
6.50	0.0
7.10	0.0
7.60	0.3
8.40	0.1
8.90	0.1
10.05	0.3
10.15	0.1
10.70	0.0
11.00	0.1
11.50	0.0
12.50	0.4
12.80	0.0
14.40	0.0
14.50	0.0
14.90	0.0
15.25	0.0
16.20	0.0
16.70	0.0
17.20	0.0
18.00	0.0
19.26	0.0
20.25	0.0
21.10	0.0
22.10	0.0
23.15	0.0
24.15	0.0
25.20	0.0
26.20	0.0
28.10	0.0
28.25	0.0
28.50	0.0
29.50	0.0
30.10	2.5
30.35	0.0
32.80	0.0
33.50	0.0
34.40	0.0
35.40	0.0
36.40	3.5
36.70	0.3
37.00	0.0
37.40	0.5
37.90	0.3
38.50	5.8
38.95	0.9
39.30	0.4
39.70	0.0
40.00	0.0
40.20	2.3
40.30	0.0
40.50	0.0

41.60	0.9
41.80	0.4
41.90	0.1
42.20	0.1
42.90	0.1
43.15	0.2
43.90	0.1
44.30	0.6
44.70	0.4
45.75	0.4
45.95	0.4
46.70	0.4
47.00	0.0
47.30	0.0
47.70	0.1
48.50	0.1
49.40	0.2
49.60	0.6
49.80	0.3
49.90	0.1
50.50	0.1
51.50	0.1
52.20	0.4

67.10	0.7
67.50	0.1
68.10	0.0
71.00	0.4
73.90	0.9
74.10	0.5
74.50	3.3
74.90	0.3
75.90	0.0
76.45	0.3
76.80	1.0
76.95	1.4
77.30	1.3
77.80	0.1
78.10	0.0
78.40	0.0
78.70	0.1
79.40	0.1
79.80	0.0
80.10	0.0
80.75	1.8
81.00	1.9
81.30	0.7
81.50	0.3
81.85	0.2
81.95	0.1
82.10	0.0
82.70	0.2

83.00	0.1
83.40	0.2
84.00	0.1
84.50	0.0
84.70	0.6
85.10	1.6
85.35	2.1
85.65	7.3
85.75	9.9
85.90	4.7
86.10	1.9
86.40	1.2
86.50	0.3
87.00	0.8
87.30	6.9
87.55	2.7
87.75	0.1
88.25	0.6
88.50	0.5
88.80	0.1
89.00	1.2
89.10	1.2
89.35	9.4
89.50	0.9
89.70	0.0
89.80	0.1
90.00	0.2
90.30	17.6
90.50	0.6
90.80	7.4
91.05	15.5
91.20	8.5
91.40	1.3
91.80	1.2
91.95	2.3
92.10	1.4
92.25	11.0
92.70	7.7
92.90	5.7
93.10	0.7
93.30	23.9
93.65	3.1
93.85	1.9
94.05	2.3
94.40	4.9
94.70	0.6
95.00	2.7
95.25	0.5
95.60	0.5
95.85	0.3
96.30	0.6
96.35	0.2

96.73	2.7
97.40	0.3
97.80	0.1
98.20	0.2
98.45	0.1
98.75	0.1
99.10	0.4
99.70	0.1
100.30	0.2
100.80	0.1
101.00	0.1
102.00	0.1
103.00	0.0
104.00	0.0
105.00	0.0
106.00	0.1
107.00	0.3
108.00	0.1
109.00	0.1
110.00	0.0
110.50	0.2
110.80	0.6
110.00	0.2
111.50	0.0
112.00	0.0
113.00	0.2
114.00	0.1
115.00	0.6
115.20	9.4
115.45	2.6
115.80	2.0
116.10	1.8
116.25	27.0
116.50	0.2
116.60	1.4
117.00	0.4
117.50	0.1
118.00	0.1
119.00	0.0
120.00	0.0
121.00	0.0
122.00	0.0
123.00	0.1
124.00	0.1
125.00	0.1
126.00	0.1
127.00	0.1
128.00	0.1
129.00	0.1
130.00	0.0

List of samples from the Hjørring area
(Mapsheet Hjørring 1519 III)

analysed for

base metals and sulphur

HJE -02 : Gula-group qtz-mica schist with poor po-mineralization
Ringveg near Geitberget.

HJE-03 : Po-mineralization of low-grade within banded iron-formation of Gula-group sediments. Distinctly cm-banded garnet-biotite-qtz rock, alternation of biotite-sulphide-bear. qtz and garnet-biotite layers.

HJE-05 : Ruststone within sericite schist of TOZ east of the main fault. Very low-grade dissemination of sulphides within qtz-rich band occurring within sericite schist.

Siehe Aufschluß weiter.

RAILROAD ADIT TO TVERRFJELLET - MINE

HJE-06 : Oxide - sulfide facies BIF from footwall meta-basalt east of main fault.
Cm-thick intelayer of quartzite with medium-grade dissemination of py.
Layer is continuous over the outcrop area (25 m).

HJE-07 : Oxide - sulfide facies BIF from footwall meta-basalt east of main fault near contact to underlying slightly calcareous chlorite schist.
Low-grade dissemination, sometimes trains of granules of pyrite within a phyllosilicate-bas. amphibole-rich quartzite of cm-thickness, the amphibole needles are concentrated within schlieren or ring layers, they form acicular, strongly parallel ~~oriented~~ crystals of lesse 0.3 cm length.
Layer is continuous over the scale of the outcrop (25 m).
(1.0 m stratigraphically below HJE-06)

HJE-08 : Medium-grade py dissemination within 3 cm thick quartz-sericite schist which is surrounded by amphibole-chlorite schist (meta-mafic volcanic sediment) which belong to footwall meta-basalt section.
(4.5 m stratigraphically below HJE-07)

HJE-09: Low-grade dissemination of pyrite within max. 1cm thick chlorite-bear. amphibolite from footwall meta-basalt east of main fault. The mineralized layer is joined by a thin dirty band containing abundant acicular crystals of amphibole. Both layers are continuous over the scale of the outcrop (5m). The footwall lithology is an amphibole-bear. sericite-chlorite schist (meta-mafic volcanic sediment with clastic input) which contains sparce porphyroblasts of il. The ~~hanging~~ ~~wall~~ ~~wall~~ stratigraphically upper rocks are chlorite schist and amphibole schists (meta-basalt flows). (2.5m stratigraphically below HJE-08)

HJE-10: low-grade dissemination of pyrite within sericite-quartz schist (meta-tuff with sericitization) of dm-thickness. The layer belongs to the schist sequence which underlies the footwall meta-basalt section. The mineralized layer is surrounded by biotite-sericite schist (meta-pelite). (2.5m stratigraphically below HJE-9)

HJE - 11a : High-grade pyrite and subordinate po (30 %) within quartz-layer of 2.2 cm thickness which is surrounded by carbonate banded biotite - sericite schist which contains sparce flakes of sulphide. The ~~stratigraphically upper~~ layer is flanked at its hanging wall by a ca 25 cm thick layer of ~~=~~ containing subordinate phyllosilicates and ~~=~~ low-grade ~~minerals~~ sulphide - mainly pyrite - which forms trains of granules or schlieren (HJE-11b).

HJE - 11b : See above

RAILROAD PROFILE

HJE - 12a : Amphibole - pyrrhotite-bear. quartzite
(meta - hydrothermal silica and iron-sulphide)
(black smoker deposit)
po amounts to 7% by volume of the rock

Biotite-bear. sericite - amphibole schist
(meta - Mg - Fe - rich sediment)
schlieren of po, the amount of sulphide is 1 to 2 % by volume of the rock.

HJE - 12b: Amphibole - bear. qtz - biotite - sericite schist
(meta - Mg - Fe - rich sediment with abundant hydrothermal silica)
schlieren, discontinuous laminae and flazes

of po, the sulphide amounts to 3% by volume of the rock.

NJE-12c: pyrrhotite - qtz rock
(meta-hydrothermal silica and iron-sulphide, supp. distal black smoker deposit)
variable distribution of po, sometimes high-grade.

NJE-12d: pyrrhotite - qtz rock
see above

NJE-12e: Biotite bear. pyrrhotite-rich quartzite
(meta-hydrothermal silica and iron-sulphide, supp. distal black smoker deposit)
variable distribution of po, layers, schlieren and clusters, the sulphide amounts on average 10% by volume of the rock.

siehe auch
videre

HJE-13 : sericite - biotite schist
(meta - tuff or tuffite or tuffaceous sediment)
brown with qz lenses and schieren, medium-crystalline, lenticular structure, ~~biotite~~ interleaved biotite crystals as schieren in close alternation with lenses of qtz and schieren of sericite and qtz; subordinate Py as schieren which are parallel (aligned) with the major foliation of the rock.
Surrounding ~~rocks~~ are biotite - sericite schists with or without carbonate bands.

HJE-14a : Exhalative quartzite with medium-grade pyrite mineralisation occuring as dissemination.
The sample originates from a 10 cm thick banded sequence which (which) shows a rhythmic alternation of bands made by hydrothermal qtz and sulphide and enriched in phyllosilicates.
Surrounding rocks are carbonate banded biotite - sericite - chlorite schists.

HJE-14 b : Pyrite - quartz rock
(meta - hydrothermal silica with abundant iron sulfide)
medium-grade pyrite dissemination within a quartz matrix. The layer is 12 cm thick and shows sharp contacts on either side.

HJE - 15a : Amphibole - chlorite - pyrite - qtz gneiss
(meta - oxide - sulphide facies BIF with mafic volcanic interlayer)
Several cm - thick layers of qtz which contain some needles of amphibole and high-grade dissemination of py.

HJE-15b : Pyrite - qtz rock
(meta - exhalative iron - sulphide layer, massive)
high - grade dissemination of py within a matrix of qtz.

HJE - 16a : Pyrite - bear. chlorite amphibolite
(meta - basalt flow)
Schlieren, laminae and trains of granules of py occur within a 26 cm thick interface of an amphibolite layer, the sulphide amounts to 10 % by volume of the rock.

HJE - 16b : Pyrite - qtz rock
similar: HJE - 15b

HJE - 17 : Pyrite - amphibole - qtz gneiss
(meta - hydrothermal silica and iron sulphide with mafic volcanic interlayers)
py occurs as thin layers or it is disseminated, it amounts to 10 % by volume of the rock.

NJE-18 : Discontinuous band of pyrite - sericite-beat. biotite - qtz rock within a meta-chert which caps the footwall meta-basalt section to the north. Pyrite estimates to 3% by volume of the rock.

ident as with video

BROOK FROM BRENDHØIN

HJE - 19 : Banded amphibolite with space, tiny stringers ~~of~~ and spots of sulphide (Py). Amphibolite section (FMB). Sampled layer is one of several mafic bands.

HJE - 20 : Plagioclase-amphibole schist with subordinate Po as spots and stringers homogeneously distributed. Amphibolite section (FMB).

HJE - 21 : Plagioclase - amphibole schist
similar: HJE - 20

HJE - 22 : Exhalative qtz layer of max 15 cm thickness with low-grade pyrite dissemination ~~within~~ surrounded by schistose amphibolites (FMB)

HJE - 23 : Plagioclase - amphibole schist
similar: HJE - 20

HJE - 24 : Exhalative qtz layer of 15 cm thickness with medium-grade pyrite dissemination and random occurrence of acicular crystals of amphibole. Hanging rocks are schistose amphibolites (FMB). ~~Lying~~ Chlorite schist occurs as footwall lithology.

DIAMOND DRILL HOLE 767 g

Tverrfjellet mine, Pilotort NIVA° VII, 1982
Location: X - 152.94, Y - 214.71, Z - 671.99
Azimuth: 237.84°
Inclination: 0°, measured deviation
Total length: 626.51 m

Description:

0.00 - 66.00 Schistose amphibolite
(meta-basalt flows)

pale gn, extremely fine-crystalline*, nemato-blastic texture, in places development of tiny lenses and schlieren of plagioclase which are supposed to represent extremely stretched amygdules, frequent occurrence of mm- to cm-thick bands of carbonate which are conformable with the foliation of the rock but may also crosscut it; abundant scattered poikiloblasts (average 0.15 cm size) of ilmenite with sutured boundaries between 0.00 - 2.10 m, elsewhere il forms extremely small crystals which are variably distributed.
Several cm-thick but sometimes dm-thick interlayers of slightly calcareous biotite-epidote-qtz-chlorite schist which always have knife-sharp boundaries

* sometimes dm-thick interlayers of medium-grained amphibolite (22.00 - 22.15 m, 27.97 - 28.34 m, 29.60 - 29.90 m, 32.80 - 33.46 m, 48.43 - 49.30 m, 58.47 - 58.75 m, 59.62 - 60.06 m, 60.98 - 61.15 m, 64.53 - 64.87 m)

with the surrounding (6.70 - 7.16 m, 9.45 - 9.49 m, 9.64 - 9.70 m, 12.28 - 12.55 m, 24.85 - 25.19 m, 38.55 - 38.72 m, 40.83 - 40.93 m, 42.25 - 42.42 m, 59.02 - 59.25 m, 60.00 - 60.27 m).

1.10 - 1.20: quartzite (meta-chert)
gs, extremely fine-grained, massive.

4.50 - 4.69: quartzite (meta-chert)
gs, extremely fine-grained, massive, only hanging portion with idioblasts of py which tend to form trains of granules.

34.24 - 34.40: magnetite quartzite (meta-chert)
violet, extremely fine-crystalline, massive, homogeneous distribution of dusty mt, irregular veins of epidote and carbonate.

39.40 - 39.64: magnetite quartzite (meta-chert)
see above

40.05 - 40.17: magnetite-bear. quartzite (meta-chert)
gs white with faint violet tint, extremely fine-crystalline, appearence of dust-like epidote forming irregular shapes, sparce porphyroblasts of amphibole (0.4 cm length) which are oriented parallel to the lower contact with amphibolite.

44.48 (see next side 2)

44.48 - 44.82 : magnetite - quartzite (meta - dol)

same as: 34.24 - 34.40 m

54.55 - 54.58 : quartzite (meta - dol)

same as: 1.10 - 1.20 m

Schistosity / banding: 9.00 m 70°, 19.50 m 58°, 27.00 m 74°, 36.70 m 76°, 47.45 m 74°, 55.15 m 76°, 64.10 m 76°.

66.00 - 75.90 : Slightly calcareous amphibolite or amphibole schist (meta- basalt flows) ~~with veinlets~~

fg, medium-crystalline, wide development of close to leopard texture
mineral preferred orientation, amphibole forms lense-like crystals or crystal aggregates of 0.15 cm size which are surrounded by sparse groundmass composed of plagioclase and epidote but sometimes also carbonate, variation in the amount of plagioclase and epidote causes differences in colour and texture. Several interlayers of calcareous biotite-epidote-qtz-chlorite schist which is characterized by more or less distinct
a ~~few~~ alternation of bands and lenses composed of either carbonate or epidote, biotite, qtz and carbonate and are rich, swelling up and down layers made by fine-fibrous chlorite, epidote and biotite, biotite always occurs within stretched lense-shaped crystal aggregates which are conformable with the banding of the rock (70.13 - 70.35 m, 71.18 - 71.70 m, 71.80 - 71.85 m, 72.02 - 72.35 m, 72.49 - 72.60 m).

sample: 767g-1
67.62 - 69.35 m
Thin section
whole rock
analysis

Foliation: 85°.

Sharp hanging wall, ~~contact with chlorite schist, where~~ ~~it sharply follows~~

75.90 - 83.25 : Schistose amphibolite

(meta- basalt flows) ~~intercalations~~;

similar: 0.00 - 66.00 m, * several tubelayers of calcareous biotite - epidote - qtz - chlorite schist which is similar chlorite schists from section 66.00 - 75.90 m; sparce idioblasts of py occur at: 76.65 - 76.85 m

Schistosity: 85°

Knife sharp contact.

* variable grain-size, gradually changing into fine- and medium-grained varieties; the latter often containing quite similar amphibolite from 66.00 - 75.90 m.

83.25 - 83.77: Epidote - bear. magnetite - rich garnet - biotite - sericite schist

(meta- tuffite or tuffaceous sediment) (very * gr with faint greenish tint, abundant brown rods and flakes, medium - crystalline, foliation structure with transitions into midly layered rock, tiny lenses and laminae dominated by qtz which is accompanied by sericite and biotite in alternation with foliation and bands composed of sericite, garnet and biotite, garnet crystals mainly with subidiomorphic outlines and sizes from 0.1 to 0.2 cm, biotite forms porphyroblasts or bundle-like aggregates which are homogeneously distributed, they mostly are cross the major foliation of the rock but may also be parallel; big crystals of py are concentrated within the footwall portion of the layer, it reaches 1 - 2 % of the total; abundant scattered idioblasts of mt which decrease in size and abundancy upsection.

* similar mt-marker tuff which lies stratigraphically and further down near the footwall of meta-lavas)

Schistosity: 85°

Sharp contact

83.77 – 86.25 Calcareous magnetite-bear. epidote-biotite-qtz-sericite schist / gneiss

(meta-cherty tuffite) (similar wt-wise to tuff which lies stratigraphically further down and near the footwall of meta-lahar)

qz with faint greenish tint, sometimes yellowish ~~coloured~~, abundant biotite schlieren, strong variation in composition and texture, mostly cm-layered, here alternation of bands composed of sericite and biotite with layers highly enriched in qtz (cherty intersections) and bands or lenses made by qtz, epidote and carbonate, locally dm-thick intercalations of qtz-rich biotite-sericite schist, big spots of py at 83.53m; low-grade dissemination of mostly tiny crystals of wt

Banding: 80–85°

Gradual contact

86.25 – 100.41 Slightly calcareous amphibole-bear. epidote-biotite-qtz-fspar gneiss

(meta-felsic tuff with meta-lahar intercalations)

qz, yellowish-gr. biotite, millimetre- and cm-compositional layering* plus ptygmatic alternation of feldspathic bands which always contain some biotite, amphibole and qtz with layers mainly composed of biotite ~~tuffite~~ relic in epidote ~~xxxx~~, qtz and fspar, with mostly sharp contacts but nearly ever so often transitional boundaries between the different layers, locally less distinct stratified,

occasional cm-thick massive quartzite (meta-chert) interlayers which contain subordinate amounts of disty ~~mt~~, carbonate tends to join fspar in the felsic layers and forms here thin lenses or trains of granules but sometimes it is homogeneously distributed, sparse crystals of Py occur sporadically; a low-grade dissemination of tiny crystals of mt seems to be present throughout.

Banding: 90.00m 86°

Gradual contact

100.41 - 103.00 Slightly calcareous biotite-bear. amphibole schist (meta-basalt flows)

light gr, abundant pale white augen, some brown rods, ~~fine-crystalline~~, blasto-amygdaloidal texture, stretched and flattened augen of plagioclase on average 0.2 cm in diameter are scattered within an fine-crystalline amphibole groundmass ~~rich~~ rich in epidote, biotite forms fascicular bundles and lense-shaped crystal aggregates which are parallel to the major foliation of the rock, they are homogeneously distributed, carbonate occurs within mm-thick layers or lense-shaped aggregates which only in places cross the foliation, subidioblastic porphyroblasts at several locations, the sulphide amount remains lower 1 % by volume of the rock.

Schistosity: 82°

Gradual contact

103.00 - 127.60 ~~amphibolite~~ schistose amphibolite (meta-basalt flows)

gn with faint yellowish tint, medium-crystalline, amphibole forms lense-like crystals or crystal aggregates of max 0.1 cm size which show a minor preferred orientation, the crystals are surrounded by plagioclase and epidote causing a ribbon-shaped pattern*, at several locations abundant lense-shaped aggregates of biotite which always are aligned with the major foliation of the rock, sometimes biotite gets accompanied by chlorite and carbonate to form a calcareous biotite-chlorite schist; very rich in scattered tiny crystals of il. (altered amphibolite)*2

Schistosity: 82°

Transition into following rock.

~~sharp contact~~ Epidote-bear.

107.73 - 108.25: biotite-qtz-fspar schist (meta-intermediate to felsic tuff)

Strongly with faint yellowish tint, crude development of layering which is due to the tendency of biotite to be concentrated within thin layers, fine-crystalline, ~~scattered~~ slightly porphyritic crystals of biotite which randomly are oriented are scattered within a granoblastic matrix composed of fspar, epidote and qtz.

Lamination: 80°.

* the texture sometimes gets blurred where the amphibole-crystals have been closely packed,

*2 (110.00 - 110.58 m, 111.50 - 111.73 m, 113.93 - 114.08 m, 114.71 - 116.30 m, 117.73 - 118.64 m, 127.47 - 127.50 m)

127.60 – 132.60 Slightly calcareous biotite-bear. amphibole schist (meta-basalt flow)

similar: 100.41 – 103.00 m, several intercalations of calcareous amphibole-bear. biotite-chlorite schist (altered amphibolite) which is similar chlorite schists from section 103.00 – 127.60 m, always gradual contacts between amphibole schist and chloritic intercalations, scattered crystals of ilmenit throughout.

Gradually passing in following unit.

132.60 – 142.30 Slightly calcareous biotite-epidote-bear. amphibole schist (meta-basalt flows)

similar: 103.00 – 127.60 m, but locally rich in epidote, intersections of amygdaloidal meta-basalt similar 100.41 – 103.00 m between: 137.23 – 137.75 m, 137.99 – 138.03 m, 138.15 – 138.69 m, 138.95 – 139.38 m, 139.73 – 139.96 m, 140.24 – 141.20 m, several dm-thick intercalations of calcareous biotite-qtz-epidote-chlorite schist (supp. representing former weathering surfaces); spots of py forming a mm-thick sulphide-band at 146.57 m, spots of ilmenite are mainly concentrated within the lower portion of the layer, they decrease in abundance and size upsection.

Schistosity: 75°

Gradual contact.

Amphibole-bear.

142.30 - 145.29 epidote - biotite - qtz - fspar schist (meta - tuff)

brownish gr with faint yellowish tint, crudely developed compositional layering, heterogeneous, including fspar and qtz crystals as tiny lenses in alternation with interleaved biotite crystals as schlieren and mm - thick discontinuous layers, biotite in places gets displaced by amphibole, the acicular crystals always being parallel to the foliation or layering of the rock, epidote is variably distributed, it tends to join feldspar and qtz as dirty impregnations, sometimes epidote seems to form pseudomorphs after garnet; low-grade dissemination of mt; locally idioblasts of py.

Schistosity/lamination: 85°
Sharp, distorted hanging wall

biotite bear.

144.02 - 144.27: slightly calcareous epidote - amphibole schist (meta - basalt flow)

gr with faint yellowish tint, fine - crystalline, with ghost-like blasto - amygdaloidal texture, crude development of layering due to variation in the amount of epidote, fine crystalline amphibole forms the schistose matrix for closely packed flat, lense-like augen of plagioclase (which are suggested to represent deformed amygdules), several bands and lenses of carbonate, scattered lenticular

crystal aggregates of biotite, spotted il.
Schistosity: 85°
Gradually passing into surrounding tuff over 2 cm thick zones of calcareous epidote-biotite-chlorite schist

145.29 - 177.52 Schistose amphibolite
(meta-basalt flow)
gr, fine-crystalline, homogeneous, several mm-thick bands of carbonate or qtz, locally slight indication for blasto-amygdaloidal texture*, the felsic (plagioclase or carbonate) augen are extremely stretched and occur mainly as flat lenses or streaks, locally biotite occurs forming lense-like crystals or crystal aggregates which are conformable with the schistosity of the rock, the biotite bearing zones often contain high amounts in finely dispersed epidote and lenses or schlieren of carbonate, these altered (weathered) zones always have gradual contacts with the surrounding; *2 poikiloblasts of il throughout; sometimes py occurs forming trains of granules or widely scattered coarse idioblasts (147.56 m, 160.15 m, 161.15 m, 153.40 - 153.42 m)

Schistosity: 85°
Gradually passing into following rock.

*1 (145.29 - 150.96 m, 153.65 - 153.96 m, 154.83 - 154.96 m, 156.35 - 156.40 m, 157.39 - 157.97 m, 158.50 - 158.75 m, 171.73 - 172.44;

sample: 7678-2 chemical analysis 145.29 - 152.00 m

*2 (149.02 - 149.05 m, 149.88 - 149.95 m, 158.08 - 158.09 m, 158.20 m, 158.31 - 158.34 m, 158.43 - 158.48 m, 158.79 - 158.80 m, 158.90 - 158.92 m, 159.35 - 159.38 m, 159.47 - 159.50 m, 160.58 - 161.64 m, 161.88 - 162.85 m, 162.88 - 171.20 m, 171.99 - 174.04 m, 172.73 - 172.95 m, 173.32 - 173.39 m, 174.65 - 174.85 m, 175.46 - 175.52 m, 176.20 - 176.31 m, 177.16 - 177.23 m)

177.52 – 188.91 Calcareous epidote-biotite-bear. plagioclase-rich amphibole schist

(meta-amygdaloidal basalt)

pale grey with grassy areas and white to yellowish bands and brown schlieren, abundant white aigen, blasto-amygdaloidal texture, inhomogeneous, often with nebulous compositional and textural banding, fine-fibrous amphibole as groundmass forming the foliation of the rock, abundant 0.1 – 0.5 cm large plagioclase aigen which often have been stretched ~~this~~ causing an indistinct lineation, schlieren of biotite which mainly parallel the foliation of the rock are variably distributed, they are highly concentrated within areas rich in epidote and carbonate which also carry some chlorite* (177.64 – 177.96 m, 178.02 – 178.13 m, 178.19 – 178.23 m, 178.63 – 178.80 m, 178.91 – 179.09 m, 179.23 – 179.25 m, 179.49 – 179.53 m, 179.77 m, 179.99 – 180.81 m, 180.57 – 180.60 m, 180.77 – 180.84 m, 180.99 – 181.08 m, 181.46 – 182.13 m, 182.68 – 182.80 m, 182.95 – 183.64 m, 184.18 – 184.21 m, 184.43 – 184.55 m, 184.58 – 184.70 m, 185.80 – 185.87 m, 188.14 – 188.23 m, 188.30 – 188.75 m), ~~they~~ layers always have gradual contacts with the surrounding vesiculated meta-basalt; finest crystals of il forming a low- sometimes medium-grade dissemination throughout; locally sparse crystals of py (177.92 m, 178.35 m, 180.57 m, 182.47 m, 183.63 m, 184.74 m), they tend to join quartzite

* and which normally lacks aigen of plagioclase

interlayers (meta-dust) always being lesser 2 cm thick which occur at: 177.96 m, 180.33 m, 180.41 m, 181.51 m, 182.47 m, 183.63 m.

Schistosity: 80°-75°

Sharp contact.

188.91 - 193.70 Slightly calcareous chlorite-bearing biotite-epidote-amphibole schist

(meta - strongly weathered basalt flow)

pale grey with yellowish tint, abundant brown schlieren, widely developed layering due to slow changes in mineral composition, cm-to dm-thick interlayers of biotite-bear. epidote-amphibole schist alternate with schlieren and cm-to dm-thick bands composed of epidote, biotite and amphibole (and in parts also of chlorite), the latter sections contain considerable amounts of carbonate which forms up to 1 cm thick bands or lenses and thin schlieren, biotite is the most conspicious mineral as it exists as fascicular bundles and spheroidic aggregates of 0.5 cm size; scattered crystals of it throughout.

Schistosity: 80°-75°

Gradual contact +

191.74 - 191.83: quartzite (meta-chert)

white, massive, extremely fine-crystalline, ~~massive~~, near footwall abundant porphyroblasts of amphibole (0.1-0.4 cm) which are randomly

oriented and form a framework of touching crystals; Py (1 Vol-%) found as scattered crystals within the amphibole-rich lower portion but forms trains of granules within the middle part of the layer.
Sharp contacts.

193.70 - 244.90 Slightly calcareous biotite-bear. epidote-plagioclase-rich amphibolite
(meta-amygdaloidal basalt in alternation with nonamygdaloidal meta-basalts)
similar: 177.52 - 188.91 m with intersections similar to those described with 188.91 - 193.70 m (194.20 - 194.92 m, 195.12 - 195.19 m, 195.44 - 197.63 m, 198.40 - 199.20 m, 201.25 - 202.50 m, 202.60 - 203.10 m, 207.28 - 208.35 m, 208.66 - 209.73 m, 212.08 - 213.80 m, 214.60 - 214.90 m, 215.25 - 217.05 m, 218.15 - 218.63 m, 220.58 - 221.00 m, 225.51 - 226.03 m, 232.64 - 233.09 m, 233.80 - 239.30 m, 239.80 - 240.53 m, 240.95 - 242.08 m, 242.18 - 243.07 m), several intercalations of calcareous amphibole-biotite-epidote-qtz-chlorite schist with either gradual or sharp boundaries to surrounding amphibolites (195.19 - 195.44 m, 196.30 - 196.40 m, 198.20 - 198.40 m, 202.50 - 202.60 m, 203.48 - 203.86 m, 204.33 - 204.70 m, 205.96 - 206.20 m, 209.73 - 209.95 m, 210.42 - 209.57 m, 211.42 - 211.57 m, 213.80 - 214.60 m, 214.90 - 215.25 m, 217.05 - 217.25 m, 221.40 - 221.69 m, 225.05 - 225.43 m, 226.03 - 226.43 m, 226.68 - 226.74 m, 226.98 - 227.86 m, 233.52 - 233.80 m, 242.08 - 242.19 m, 243.07 - 244.90 m), at some locations bands of quartzite (meta-chert): 196.98 - 197.04, 206.19 - 206.34 m, 206.45 - 206.57 m with dirty mt, 206.69 m with dirty mt, 213.70 - 213.74 m rare spots of Py, 238.71 - 238.74 m, scattered tiny crystals of ilmenite (5 Vol.-%) throughout, it is strongly enriched between

234.13 - 243.07 m, here it forms 0.1 - 0.25 cm large por-
phyroblasts and poikiloblasts which are homogeneously
distributed.
Schistosity: 75 - 80°, sometimes dm - thick zones with
small scale disharmonic folding.
Fault zone: 197.45 - 197.63 m
Gradual hanging wall.

244.90 - 246.86 ● High calcareous amphibole - epidote - bear chlorite - biotite - qtz - fspar schist / gneiss
(meta - tuff, altered)
brown gr with faint greenish tint, schlieren texture
with local transition into a distinct lamination*, close alterna-
tion of schlieren and laminae composed of either biotite
or biotite and chlorite with lenses, mm - thick
bands and schlieren dominated by felsic constit-
uents as fspar, qtz and carbonate, the latter mine-
ral locally also forms discrete laminae and schlieren,
amphibole accompanies as acicular crystals
the felsic bands while epidote occurs both within
the phyllosilicate and fspar - qtz layers, biotite is the
most conspicuous mineral as it sporadically forms
up to 0.2 cm large porphyroblasts which randomly
are oriented; low - grade dissemination of tiny
crystals of il throughout.
Schistosity / lamination: 85°, between 246.52 - 246.86 m
disharmonic folded.
Sharp hanging wall.

* heterogeneous schist changing composition from chlorite - domination to biotite - rich rock,

●

246.86 - 247.84 High calcareous amphibole-bear. chlorite - biotite (biotite - chlorite) schist

(meta-mafic tuff or altered meta-basalt)

brown, medium-crystalline, homogeneous, abundant lense-shaped aggregates of carbonate, amphibole forms scattered acicular crystals which are strongly parallel the major foliation of the rock; low degree in spots of il.

Schistosity: 80°-85°.

Gradual hanging wall.

247.84 - 248.10 High calcareous epidote-chlorite-bear. amphibole schist

(meta-basalt flow)

gn, fine-crystalline, bands and schlieren made by amphibole, epidote and chlorite in alternation with aggregates of carbonate and/or qtz as lenses and discontinuous bands, scattered flaky crystals of ilmenite amounting to 3 % by volume of the rock.

Schistosity: 75° - 80°.

Sharp hanging wall.

248.10 - 249.20 Chlorite-bear. epidote - qtz - fspar - biotite schist

(meta-tuff)

brown with faint greenish or yellowish tint, medium-crystalline, homogeneous with inplaces

crudely developed lamination caused by a close alternation of felsic (zonolithic) layers and biotite bands, biotite both is arranged within a parallel fashion and crosses the foliation of the rock; several crystals of Pg at footwall contact.
Edip. 80°-85°.
Sharp contact.

249.20 – 250.80 High calcareous biotite-chlorite-qtz-fspar schist
(meta-altered tuff)

gl with strongly schistose and stripes, heterogeneous, schistose, lenses and laminae made by phyllosilicates in alternation with lenses, spots and discontinuous bands composed of fspar, carbonate and qtz, sometimes "chicken-wire" texture between phyllosilicates and felsic components; rare spots of Pg.
Strongly deformed with disharmonic folding.
Sharp hanging contact.

250.80 – 256.47 Slightly calcareous amphibole schist
(meta-basalt flow)

gr, fine-crystalline, rhythmic alternation of cm-thick bands made by amphibole and laminae but sometimes bands composed of carbonate which always are conformable with the foliation of the rock, slowly increasing biotite within upper portion of the layer, biotite also is enriched within folded areas, scattered

crystals of il.
Schistosity: 80° - 85°, hinge zones of faults at 252.15 m and 254.80 m.
Gradually passing into following rock.

256.47 - 260.35 High calcareous amphibole bear. epidote - qtz - fspar biotite schist
(meta - tuff, altered)
similar: 244.90 - 246.86 m, interlayers of calcareous amphibole schist which is similar rock at 250.80 - 256.47 m. with gradual contacts
Lamination: 80°
Gradually passing into following rock.

260.35 - 261.85 Calcareous biotite - amphibole schist
(meta - basalt flow, weakly altered)
similar: 250.80 - 256.47 m but enriched in biotite and carbonate, biotite displays scattered flakes which are conformable to the major foliation of the rock or it forms schlieren or cm - thick interlayers; high amount in il which occurs as porphyroblasts max. 0.15 cm across.
Foliation: 80°
Gradual contact.

261.85 - 270.10 High calcareous epidote - sericite - chlorite - fspar - biotite schist
(meta - altered tuff with keratophyric interlayers

and bands of meta-chert)
brown with faint greenish tint, abundant pale-white bands, schistose texture which transgoes locally into a distinct lamination or even banding, schlieren and layers of biotite or biotite and chlorite in close alternation with lenses and discontinuous bands composed of fspar and qtz, in places layers made by epidote, chlorite and amphibole, the latter forms acicular crystals which tend to be not oriented, sometimes cm-thick intercalations of felsic tuff (qtz-keratophyr), carbonate displays schlieren and bands being parallel the lamination of the rock it also forms veins of granules or is homogeneously distributed (spotted carbonate), magnetite-quartzite (meta-chert) occurs between 266.39 - 266.43 m and 269.41 - 269.45 m.
Schistosity: 75°-85°, local occurrence of small-scale disharmonic folding, several fold hinges between 265.57 - 265.95 m.
Gradually passing into following rock.

AA

270.10 - 277.73 High calcareous epidote-biotite-qtz-fspar-chlorite schist/gneiss
(meta-tuff or tuffite mainly composed of mafic volcanic material)
brownish with abundant qz stripes, distinctly layered, rhythmic alternation of up to 1 cm thick

bands made by chlorite, biotite and epidote with layers and flat lenses composed either of carbonate or carbonate and qtz, in places biotite also forms discrete laminae, sometimes cm-thick intervals ~~with abundant~~ rich in + fera blastic layers (270.80 - 270.95 m, 271.10 - 271.30 m, 271.50 - 271.65 m, 272.36 - 272.77 m), between 270.60 - 270.69 m several cm-thick bands of mt-bear. quartzite (meta-chert) and at 270.95 - 271.10 m chert-layer which contains widely scattered porphyroblasts of py (1 Vol.-%); sparce crystals of py at 270.62 m; tiny spots of il within the lower portion of the layer, the hanging part contains coarse scattered porphyroblasts which locally may amount to 5 % by volume of the rock.

Layering: 80°-85°, from 273.00 m to 275.40 m hinge of large fold.

Gradual contact.

277.73 - 279.50 Calcareous epidote - biotite - amphibole - chlorite gneiss

(intermittent basalt-flows and mafic tuff layers)

gn and brown, cm-banding, rhythmic alternation of medium-to coarse crystalline chlorite-biotite bands which contain sufficient carbonate and layers of amphibole schist or

AA

amphibole - plagioclase schist (qtz - sericite - phyl), the latter layers always contain scattered porphyroblasts of il and spots, schlieren and lenses of carbonate.
Banding: 80°-85°, small-scale disharmonic folding between 276.85 - 277.90 m.
Gradually passing into following rock

279.50 - 289.95 Calcareous epidote-chlorite-sec. biotite-qtz-fspar gneiss

(meta-felsic tuff with highly altered mafic volcanic interlayers)

greenish brown, pale white, distinct cm-layering which locally gets isoclinally folded, rhythmic alternation of fine-grained, granoblastic felsic tuff bands (fspar, qtz, carbonate, some flakes of biotite, spotted ilmenite) and layers sometimes also schlieren dominated by medium-crystalline biotite which is accompanied by varying amounts of gr chlorite, epidote and carbonate, biotite tends to be oriented parallel to the layering of the rock but may also be not oriented forming a "chicken-wire" texture, carbonate in places forms trains of granules, here it constitutes subidiomorphic blasts of max. 0.25 cm size, from 288.40 m up-section decrease in carbonate and substitution of il by idioblasts of mt and increasing

qtz-amount within the felsic bands, the section thus contains considerable amounts in terrigenous epiclastic material.

Layering: 85°-90°, slight isoclinal folding occurs between 285.40-285.85 m, upper portion with banding at 45°-65°, banding parallel core axis develops between 288.26-288.65 m, 30° layering is found within the hanging wall.

Gradually passing into following rock.

289.95 - 290.32 Epidote-biotite-sericite-rich quartzite

(meta-qtz arenite with volcanic impurity) gr with abundant pale gn stripes with faint yellowish tint, laminated or with schlieren texture, rhythmic alternation of (mm to cm-thick) bands and flat lenses composed of granoblastic qtz and schlieren and mm-thick layers composed of sericite, epidote and biotite.

Lamination: 30°, infolded section from further upsection

Sharp folded contact.

290.32 - 291.87 Calcareous epidote-chlorite-bear. biotite-qtz-fspar gneiss

(meta-felsic tuff with highly altered mafic volcanic interlayers)

similar: 279.50 - 289.45 m

Strongly folded with occurrence of several fold hinges, from 291.40 m until hanging wall the layering remains at 85°.

Sharp contact.

291.87 - 293.70 Epidote - sericite - biotite-bear. qtz-feldspar rock/gneiss (meta-felsic tuff, qtz-keratophyr)

milky white with yellowish-grey and brown schliren, lower portion fine-grained granoblastic, homogeneous, scattered tiny flakes of sericite cause a distinct foliation, upper portion mainly with gneissic texture, rhythmic alternation of mm- to cm-thick layers composed nearly exclusively of feldspar and qtz and schliren and thin bands made by biotite, epidote and sericite, the section carries some carbonate which forms scattered lense-like aggregates.

Schistosity/lamination: 72° until 292.90 m and from 293.22 m until T hanging wall, between 292.90 - 293.22 m small-scale isoclinal folding.

Gradual contact.

293.70 - 312.90 Qtz-chlorite-biotite-sericite schist (meta-semipelite with volcanic impurity) greenish-grey, flaser- and lenticular structure, including qtz-crystals as lenses and mm-

thick layers in rhythmic alternation with schieren and layers of phyllosilicates, chlorite and sericite appear to be fine-crystalline while biotite shows a slight tendency to form porphyroblasts which sporadically - only within lesse foliated areas - is oriented at random (cross-biotite); sparce blasts of Py within 3 m from footwall
Schistosity/lamination: 80°-85°, but often strongly disharmonic or isoclinally folded (small-scale): 293.70 - 298.74 m, 300.30 - 300.60 m, 301.54 - 301.70 m, 302.27 - 304.41 m, 304.63 - 306.80 m, 307.15 - 311.90 m.
Gradual contact.

311.90 - 328.20 Epidote - chlorite-bear. sericite - biotite-rich quartzite (meta-greywacke with transitions into semipelite) or with abundant greenish or stripes, laminated and with schieren and particular structure, interlocking qtz-crystals as bands and lenses in close alternation with laminae or thin schieren composed of phyllosilicates and epidote, from 317.85 - 322.60 m abundant subidiomorphic blasts of carbonate which are homogeneously distributed but also may form trains of granules.
Schistosity: 80°-85°, small-scale disharmonic and/or isoclinal folding between: 311.90 - 314.50 m, 324.37 - 324.55 m, 325.26 - 325.36 m, 326.00 - 326.30 m, 326.50 - 326.90 m.
Gradually passing into following semipelite.

328.20 – 344.10 Epidote-dioritic-bear. qtz-biotite-sericite schist
(meta-semipelite or siltstone)
similar: 293.70 – 312.90 m, sporadically with dirty carbonate within qtz aggregates, within 337.10 – 337.20 m strong concentration of huge idioblasts of carbonate.
Schistosity: 80°–85°, at several locations strongly disharmonic or isoclinally folded: 328.60 – 328.75 m, 329.00 – 329.16 m, 330.60 – 329.16 m, 334.65 – 335.65 m, 336.20 – 336.85 m, 339.25 – 339.80 m, 340.10 – 341.00 m, 341.60 – 342.10 m, 342.50 – 342.75 m, 342.90 – 343.00 m.
Gradually passing into following rock.

344.10 – 345.12 Qtz-rich biotite-sericite schist
(meta-pelite)
gr with faint greenish tint, flaser- and lenticular structure, including qtz-crystals as lenses and discontinuous bands of mm-thickness in alternation with schlieren and laminae composed of sericite and biotite which form the foliation of the rock, sporadically mm-thick interlayers rich in carbonate, increasing phyllosilicate amount towards hanging contact.
Schistosity: 75°–80°
Knife sharp contact.

345.12 – 346.74 Biotite-sericite-rich qtz-fspar schist/rock
(meta-felsic tuff, qtz-keratophyr)
milky white with brown and gr schliren and rods, homogeneous with evidely developed lamination, fine-grained granoblastic fspar-qtz lenses and layers in close alternation with streaks and sometimes laminae of sericite and biotite, the latter sometimes forms slightly porphyritic crystals which have the tendency to be oriented along the main foliation.
Schistosity: 80°–85°
Sharp contacts.

sample: 767 § /3
345.12 – 346.60 m
whole rock analysis

346.74 – 353.80 Chlorite-bear. qtz-rich. biotite-sericite schist
(meta-pelite to semipelite)
similar: 293.70 – 312.90 m but with minor qtz, scattered idioblasts of carbonate on average 0.2 cm large within 350.14 – 353.80 m, intercalayer of qtz-keratophyr with idioblasts of plagioclase scattered through between 349.64 – 350.14 m.
Schistosity: 80°–85°.
Gradual contact.

353.80 – 384.65 Chlorite-bear. biotite-sericite schist
(meta-pelite)
gr with faint greenish tint, distinct flaser- and lenticular structure, in places laminated, close alternation of

sample: 767 § /4
370.15 – 372.20 m
whole rock chemical analysis

lenses and schlieren (or laminae) of quartz and bands and schlieren composed of phyllosilicates, biotite tends to form porphyroblasts which often are not oriented, slight variation in the amount of qtz, sometimes grading into semipelite: 358.40 - 359.24 m, carbonate occurs sporadically as disty impregnation within qtz, but sometimes it forms scattered rhombs: 372.20-372.68 m; sparce crystals of mt within 353.80-354.35 m and between 378.55-384.65 m.

Schistosity: 80°-85°

Gradually passing into calcareous qtz-rich biotite-sericite schist.

361.59 - 363.25: sericite-chlorite-bear. qtz-fspar rock (meta-qtz-keratophyr)

milky white, fine-crystalline, granoblastic, homogeneous, wide development of foliation caused by preferred orientation of flazes and schlieren of sericite and chlorite.

Schistosity: 80° - 85°.

Knife sharp boundaries.

377.55 - 378.55: sericite-bear. fspar rock (meta-rhyolite)

milky white with faint reddish tint, fine-grained, granoblastic, massive with some schlieren of sericite, hanging wall sericite schist shows sparce needles of amphibole and idioblasts of mt.

Gradual borders.

380.75 - 380.94: sericite-chlorite-bear. qtz-fspar rock (meta-qtz-keratophyr)

similar: 361.59 - 363.25 m

384.65 - 399.89 Calcareous qtz-rich biotite-sericite schist (meta-pelite or may be even semipelite) gr with greenish tint, lamination which may in places transgo into a lenticular texture, porphyroblastic texture, rhythmic alternation of nearly cm-thick bands or lenses of qtz and mm- to cm-thick layers or sometimes schlieren made by phyllosilicates, biotite mainly is oriented parallel the major foliation / lamination of the rock but locally occurs as cross-biotite, abundant scattered idioblasts of carbonate on average 0.2 cm across which sometimes have been stretched, at several locations dm-thick interlayers with gradual borders of high calcareous biotite-sericite schist which is characterized by abundant scattered porphyroblasts of carbonate reaching locally 0.45 cm size (388.20 - 388.78 m, 392.21 - 392.70 m, 393.20 m, 393.82 - 394.25 m, 394.50 - 394.60 m).
Schistosity / foliation: 75°-85°.
Sharp contact.

399.89 - 418.10 Biotite-sericite schist
(meta-pelite)
similar: 353.80 - 384.65 m, interlayers with sharp boundaries of phyllosilicate-bearing qtz-fspar rock / schist (qtz-feldspathyl) at: 411.78 - 412.14 m, 414.97 - 415.80 m.

Strongly schistose with locally distinct crenulation ~~cleavage~~ and small-scale folding.
Gradually passing into following rock.

418.10 – 419.35 Slightly calcareous phyllosilicate-qtz schist
(meta-semipelite or siltstone)
gr, fine-crystalline, distinct flaser and lenticular structure which transpires into a lamination, close alternation of bands or laminae made by qtz which often carry dust-like carbonate and schlieren or thin bands of sericite which occasionally is joined by biotite.
Cemitated rock with often occurring small-scale folding.
Gradual contact

419.35 – 435.15 Slightly calcareous biotite-bear. qtz-rich sericite schist
(meta-pelite with tendency to semipelite)
gr with some brown flakes, fine-crystalline, lenticular structure which may pass into a lamination, interlocking qtz-crystals as lenses, discontinuous layers, laminae and bands in alternation with bands and schlieren composed by sericite which often carries scattered, not oriented flakes of biotite (cross-mica) or biotite schlieren which are parallel to the major foliation of the rock.

carbonate forms sparce porphyroblasts which locally ~~can~~ are stretched or it displays a dusty impregnation within qtz-layers, it is heterogeneously distributed,*

420.95 – 421.35 m: phyllosilicate-rich quartzite (meta-qtz arenite), strongly folded and with distinct cementation.

*abundant idioblasts occur at: 425.83 – 425.96 m, 428.88 – 430.15 m.

Strongly sandstone, often with small scale folding and distinct cementation, foliation at 75°-85° gradual contact

435.15 – 437.50 Slightly calcareous biotite – qtz – sericite schist (meta-semi-pelite or siltstone)

similar: 418.10 – 419.35 m, but enriched in biotite which mainly forms spotted, not oriented crystals.

Strongly sandstone and locally with small-scale folding.

Sharp contact.

437.50 – 626.51 Slightly calcareous qtz-rich biotite – sericite schist

(meta-pelite)

similar: 419.35 – 435.15 m, intc layers of calcareous to high calcareous (biotite)-sericite schist at: 444.19 – 444.27 m, 444.55 – 445.05 m, 512.50 – 512.88 m, 513.29 – 514.15 m, 517.00 – 520.80 m, 538.67 – 539.05 m, 605.20 – 605.20 m, 622.55 – 623.05 m. At several locations

qtz-enriched and more likely metamorphic semi-pelite : 440.00 - 444.00 m, 476.40 - 480.10 m, 529.65 - 530.90 m, 541.00 - 546.70 m, 566.50 - 566.60 m, 566.75 - 567.50 m, 567.70 - 571.70 m, 573.45 - 576.60 m, 585.50 - 587.00 m, 598.95 - 599.01 m, 600.15 - 601.00 m, 608.55 - 610.25 m, 617.17 - 620.45 m, 623.50 - 626.51 m. Intercalations of quartzite or phyllosilicate-rich quartzites at : 601.20 - 604.05 m, 612.70 - 617.17 m, 620.45 - 622.55 m, 623.05 - 623.50 m. Between 550.00 - 554.10 m, 558.50 - 561.50 m, 561.70 - 562.30 m, 563.03 - 563.50 m, 564.30 - 565.00 m, 566.23 - 566.50 m calcareous biotite-sericite - fspar - qtz schist (meta-felsic volcanic pyroclastic with epiclastic sedimentary impurity, qtz-keratophyr tuffite) white with abundant brown and gr schlieren, flaser structure, in places laminated, porphyroblastic texture due to scattered idioblasts of carbonate on average 0.35 cm across, biotite and sericite as schlieren in close alternation with lenses composed of qtz and fspar, occasionally cm-thick bands of slightly violet, due to disseminated mt, mylonite. Intercalations of biotite - sericite - rich qtz-fspar schist/rock (meta-qtz-keratophyr) at: 461.84 - 462.05 m, 487.75 - 487.85 m, 539.44 - 539.72 m, 595.90 - 596.02 m,

596.07 - 596.13m, 610.25 - 610.84m.

626.51m end of DDH

By Hans-D. Friesenhahn
Mai 1986

DDH

Susceptibility: 7675

0.50	0.0	44.00	0.1	87.00	1.0	140.00	0.0	188.00	0.0		
1.00	0.0	44.50	13.0	87.50	1.4	141.00	0.0	189.00	0.0		
1.10	0.0	44.60	14.0	88.00	0.4	142.00	0.0	190.00	0.1		
1.20	0.0	44.80	9.4	89.00	1.1	142.50	0.0	191.00	0.1		
2.00	0.0	45.00	0.1	90.00	1.9	142.89	1.5	192.00	0.1		
3.00	-0.1	46.00	0.2	91.00	2.4	142.98	0.2	193.00	0.0		
4.00	0.0	47.00	0.2	92.00	0.3	143.07	1.8	194.00	0.0		
4.60	-0.1	48.00	0.0	93.00	1.7	143.25	0.3	195.00	0.0		
4.70	0.0	49.00	0.0	94.00	0.4	143.50	0.2	196.00	0.0		
5.00	0.1	50.00	0.0	95.00	1.1	144.00	0.0	197.00	0.0		
6.00	0.1	51.00	0.0	96.00	2.5	144.50	0.1	198.00	0.1		
7.00	0.1	52.00	0.0	97.00	4.6	145.00	0.1	199.00	0.0		
8.00	0.0	53.00	0.0	98.00	0.9	146.00	0.1	200.00	0.0		
9.00	0.1	54.00	0.0	99.00	0.3	147.00	0.0	201.00	0.0		
10.00	0.0	55.00	0.0	100.00	4.6	148.00	0.0	202.00	0.1		
11.00	0.0	56.00	0.0	101.00	0.1	149.00	0.1	203.00	0.0		
12.00	0.0	57.00	0.1	102.00	0.1	150.00	0.0	204.00	0.0		
13.00	0.0	58.00	0.1	103.00	0.1	151.00	0.1	205.00	0.0		
14.00	0.0	59.00	0.1	104.00	0.2	152.00	0.1	206.00	0.0		
15.00	0.0	60.00	0.1	105.00	0.0	153.00	0.0	206.50	7.4		
16.00	0.0	61.00	0.0	106.00	0.0	154.00	0.0	206.69	0.1		
17.00	0.0	62.00	0.1	107.00	0.0	155.00	0.1	207.00	0.0		
18.00	0.0	63.00	0.1	108.00	0.1	156.00	0.1	208.00	0.0		
19.00	0.0	64.00	0.2	109.00	0.0	157.00	0.0	209.00	0.0		
20.00	0.0	65.00	0.1	110.00	0.1	158.00	0.0	210.00	0.0		
21.00	0.0	66.00	0.0	111.00	0.0	159.00	0.0	211.00	0.0		
22.00	0.1	67.00	0.0	112.00	0.1	160.00	0.0	212.00	0.0		
23.00	0.0	68.00	0.0	113.00	0.1	161.00	0.1	213.00	0.0		
24.00	0.0	69.00	0.0	114.00	0.1	162.00	0.0	214.00	0.1		
25.00	0.1	70.00	0.0	115.00	0.0	163.00	0.0	215.00	0.1		
26.00	0.0	71.00	0.0	116.00	0.0	164.00	0.1	216.00	0.1		
27.00	0.0	72.00	0.0	117.00	0.0	165.00	0.1	217.00	0.0		
28.00	0.0	73.00	0.0	118.00	0.0	166.00	0.1	218.00	0.0		
29.00	0.0	74.00	0.0	119.00	0.1	167.00	0.0	219.00	0.1		
30.00	0.1	75.00	0.1	120.00	0.1	168.00	0.0	220.00	0.1		
31.00	0.1	76.00	0.0	121.00	0.0	169.00	0.0	221.00	0.1		
32.00	0.1	77.00	0.0	122.00	0.0	170.00	0.1	222.00	0.0		
33.00	0.1	78.00	0.0	123.00	0.1	171.00	0.0	223.00	0.0		
34.00	0.0	79.00	0.0	124.00	0.2	172.00	0.0	224.00	0.0		
34.30	20.0	80.00	0.1	125.00	0.1	173.00	0.0	225.00	0.0		
35.00	0.1	81.00	0.1	126.00	0.1	174.00	0.0	226.00	0.0		
36.00	0.0	82.00	0.2	127.00	0.0	175.00	0.1	227.00	0.0		
37.00	0.0	83.00	4.8	128.00	0.0	176.00	0.0	228.00	0.1		
38.00	0.1	83.25	9.7	229.00	0.1	177.00	0.0	229.00	0.0		
39.00	0.0	83.50	1.2	130.00	0.0	178.00	0.1	230.00	0.0		
39.50	33.0	83.20	2.4	131.00	0.0	179.00	0.0	231.00	0.0		
40.00	0.1	83.90	0.6	132.00	0.0	180.00	0.0	232.00	0.1		
40.10	0.0	84.00	2.1	133.00	0.1	181.00	0.1	233.00	0.0		
40.20	0.1	84.50	3.3	134.00	0.0	182.00	0.0	234.00	0.1		
40.30	0.0	84.20	1.4	135.00	0.0	183.00	0.1	235.00	0.1		
41.00	0.1	85.00	0.5	136.00	0.1	184.00	0.1	236.00	0.1		
42.00	0.1	85.50	0.4	137.00	0.1	185.00	0.0	237.00	0.0		
43.00	0.0	86.00	9.0	138.00	0.1	186.00	0.1	238.00	0.0		
		86.50	1.8	139.00	0.1	187.00	0.0	239.00	0.0		
								240.00	0.0		

241.00	0.1
242.00	0.1
243.00	0.0
244.00	0.1
245.00	0.1
246.00	0.0
247.00	0.1
248.00	0.1
249.00	0.2
250.00	0.0
251.00	0.1
252.00	0.1
253.00	0.1
254.00	0.1
255.00	0.0
256.00	0.1
257.00	0.1
258.00	0.2
[illegible]	0.1
[illegible]	0.1
261.00	0.2
262.00	0.9
263.00	7.1
264.00	1.6
265.00	0.2
266.00	0.2
266.40	10.0
267.00	0.3
268.00	0.5
269.00	0.5
269.43	19.0
270.00	4.9
270.50	0.3
270.65	0.9
271.00	0.4
[illegible].50	0.6
272.00	0.4
272.50	9.8
273.00	0.3
273.50	0.3
274.00	0.8
274.50	0.1
275.00	0.3
275.50	0.2
276.00	0.3
276.50	0.2
277.00	0.2
277.50	0.4
278.00	0.4
278.50	0.3
279.00	0.4
279.50	0.3
280.00	2.1
280.50	2.6
281.00	2.8
281.50	5.1
282.00	4.1
282.50	0.9
283.00	1.7
283.50	0.5
284.00	0.5
284.50	2.6
285.00	1.0
285.50	0.9
286.00	2.0
286.50	0.7
287.00	1.3
287.50	0.5
288.00	2.6
288.50	4.2
289.00	3.2
289.50	2.6
290.00	1.3
290.50	0.3
291.00	1.1
291.50	0.6
292.00	0.1
292.50	1.0
293.00	0.0
293.50	0.0
294.00	0.1
294.50	0.3
295.00	0.2
295.50	0.3
296.00	0.1
297.00	0.2
298.00	0.2
299.00	0.2
300.00	0.4
301.00	0.3
302.00	0.2
303.00	0.3
304.00	0.3
305.00	0.3
306.00	0.3
307.00	0.3
308.00	0.4
309.00	0.4
310.00	0.3
311.00	0.3
312.00	0.1
313.00	0.1
314.00	0.2
315.00	0.2
316.00	0.1
317.00	0.1
318.00	0.1
319.00	0.1
320.00	0.1
321.00	0.1
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323.00	0.1
324.00	0.1
325.00	0.1
326.00	0.2
327.00	0.3
328.00	0.2
329.00	0.0
330.00	0.2
331.00	0.3
332.00	0.1
333.00	0.0
334.00	0.1
335.00	0.1
336.00	0.2
337.00	0.0
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339.00	0.1
340.00	0.2
341.00	0.1
342.00	0.2
343.00	0.3
344.00	0.2
345.00	0.0
346.00	0.1
347.00	0.3
348.00	0.4
349.00	0.4
350.00	0.2
351.00	0.3
352.00	0.3
353.00	0.2
354.00	0.3
355.00	0.2
356.00	0.2
357.00	0.4
358.00	0.2
359.00	0.2
360.00	0.3
361.00	0.2
362.00	0.0
363.00	0.1
364.00	0.3
365.00	0.2
366.00	0.2
367.00	0.4
368.00	0.4
369.00	0.3
370.00	0.2
371.00	0.1
372.00	0.2
373.00	0.3
374.00	0.3
375.00	0.3
376.00	0.3
377.00	0.5
378.00	0.2
379.00	0.3
380.00	0.7
381.00	0.6
382.00	0.5
383.00	0.5
384.00	0.8
385.00	0.4
386.00	0.4
387.00	0.3
388.00	0.2
389.00	0.0
390.00	0.1
391.00	0.2
392.00	0.3
393.00	0.2
394.00	0.0
395.00	0.0
396.00	0.0
397.00	0.1
398.00	0.1
399.00	0.3
400.00	0.2
401.00	0.3
402.00	0.0
403.00	0.0
404.00	0.1
405.00	0.2
406.00	0.2
407.00	0.2
408.00	0.1
409.00	0.2
410.00	0.3
411.00	0.2
412.00	0.0
413.00	0.1
414.00	0.2
415.00	0.1
416.00	0.1
417.00	0.2
418.00	0.2
419.00	0.2
420.00	0.5
421.00	0.4
422.00	0.3
423.00	0.2
424.00	0.2
425.00	0.4
426.00	0.3
427.00	0.3
428.00	0.1
429.00	0.0
430.00	0.0
431.00	0.4
432.00	0.1
433.00	0.2
434.00	0.2
435.00	0.0
436.00	0.1
437.00	0.2
438.00	0.1
439.00	0.2
440.00	0.3
441.00	0.3
442.00	0.2
443.00	0.4
444.00	0.2
445.00	0.1
446.00	0.4
447.00	0.2
448.00	0.0
449.00	0.2
450.00	0.1
451.00	0.0
452.00	0.2
453.00	0.3
454.00	0.5
455.00	0.1
456.00	0.3
457.00	0.3
458.00	0.6
459.00	0.5
460.00	0.4
461.00	0.1
462.00	0.0
463.00	0.1
464.00	0.1
465.00	0.1
466.00	0.1
467.00	0.4
468.00	0.1
469.00	0.1
470.00	0.0
471.00	0.1
472.00	0.1
473.00	0.1
474.00	0.0
475.00	0.1
476.00	0.1
477.00	0.1
478.00	0.1
479.00	0.1
480.00	0.2
481.00	0.2
482.00	0.3
483.00	0.2
484.00	0.2
485.00	0.3
486.00	0.2
487.00	0.1
488.00	0.2
489.00	0.1
490.00	0.2

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491.00	0.1	544.00	0.2	597.00	0.3
492.00	0.2	545.00	0.1	598.00	0.2
493.00	0.2	546.00	0.2	599.00	0.1
494.00	0.3	547.00	0.1	600.00	0.1
495.00	0.1	548.00	0.3	601.00	0.2
496.00	0.2	549.00	0.5	602.00	0.2
497.00	0.1	550.00	0.3	603.00	0.1
498.00	0.1	551.00	0.4	604.00	0.2
499.00	0.1	552.00	0.4	605.00	0.5
500.00	0.1	553.00	0.3	606.00	0.2
501.00	0.1	554.00	0.4	607.00	0.2
502.00	0.2	555.00	0.4	608.00	0.2
503.00	0.1	556.00	0.3	609.00	0.1
504.00	0.3	557.00	0.3	610.00	0.2
505.00	0.1	558.00	0.4	611.00	0.2
506.00	0.2	559.00	0.3	612.00	0.1
507.00	0.0	560.00	0.2	613.00	0.1
508.00	0.1	561.00	0.2	614.00	0.2
509.00	0.1	562.00	0.4	615.00	0.3
510.00	0.1	563.00	0.3	616.00	0.1
511.00	0.1	564.00	0.2	617.00	0.1
512.00	0.2	565.00	0.2	618.00	0.1
513.00	0.3	566.00	0.0	619.00	0.1
514.00	0.3	567.00	0.1	620.00	0.1
515.00	0.3	568.00	0.1	621.00	0.2
516.00	0.6	569.00	0.1	622.00	0.4
517.00	0.6	570.00	0.2	623.00	0.3
518.00	0.4	571.00	0.1	624.00	0.1
519.00	0.1	572.00	0.2	625.00	0.1
520.00	0.3	573.00	0.1	626.00	0.1
521.00	0.4	574.00	0.1		
522.00	0.4	575.00	0.1		
523.00	0.3	576.00	0.3		
524.00	0.3	577.00	0.3		
525.00	0.2	578.00	0.1		
526.00	0.3	579.00	0.2		
527.00	0.4	580.00	0.4		
528.00	0.3	581.00	0.5		
529.00	0.3	582.00	0.8		
530.00	0.2	583.00	0.4		
531.00	0.2	584.00	0.4		
532.00	0.0	585.00	0.2		
533.00	0.0	586.00	0.0		
534.00	0.0	587.00	0.1		
535.00	0.2	588.00	0.0		
536.00	0.0	589.00	0.1		
537.00	0.2	590.00	0.1		
538.00	0.3	591.00	0.2		
539.00	0.3	592.00	0.1		
540.00	0.3	593.00	0.2		
541.00	0.1	594.00	0.2		
542.00	0.3	595.00	0.1		
543.00	0.2	596.00	0.0		

DIAMOND DRILL HOLE 75

Hjerkinn, east of main fault, 1966

Location: Hjerkinn 1200 Ø 70 N

Azimuth: 157° N

Inclination: 45°

Total length: 135.10 m

Description:

0.00 - 2.02 : Phyllosilicate-rich quartzite
(meta - qtz arenite)
quartzite with abundant green sericite, distinct lenticular structure which places changes into mm-banding, including qtz crystals as lenses and sericite in alternation with mm-thick sericite bands of sericite, pyrite occurs as scarce slightly porphyritic crystals both within qtz and sericite, low-grade dissemination of tiny crystals of mt throughout
lamination: 34°

2.02 - 3.35 : milky qtz

3.35 - 5.45 : Phyllosilicate-rich quartzite
(meta - qtz arenite)
similar: 0.00 - 2.02 m

5.45 - 6.20 : quartzite
(meta - chert)
gr, dense, rare stringers of sericite which are accompanied by trains of granules of

magnetite, the crystals often being idiomorphic; py forms the footwall of the layer, it also occurs ~~as massive slices~~ as slices along the centre rim of core, it here contains idioblasts of mt. ~~containing idio-~~ ~~morphic mt at several location where~~ ~~it is due to folding.~~

6.20 - 6.70 : garnet - biotite - sericite schist
(meta-pelite)
gr with faint greenish tint, laminated, interlocked qtz crystals as mm-thick bands in rhythmic alternation with mm-layers composed of sericite and biotite, the latter forming porphyroblasts or bundle-like crystal aggregats on average 0.15 cm large and not oriented, garnet occurs as scattered round globular crystals max. 0.2 cm across; mt displays a low-grade dissemination.
folded, lamination : 4°
gradual contact

6.70 - 7.30 : chlorite bearing garnet - pyrite - biotite - sericite schist / gneiss
(meta-tuff with thin interlayer of exhalative pyrite and cherty magnetite)
chemical analysis 6.70 - 7.25 m
gngr with abundant brown rods and reddish brown spots, distinct layering, close alternation of phyllosilicate layers with bands composed of qtz and magnetite or qtz and

pyrite, sericite and chlorite always are fine-crystalline while biotite ~~occurs~~ displays ~~as~~ fascicular bundles of porphyroblasts of max. 0.15 cm size which tend to be not oriented, garnet seems to be invariably distributed, the crystals often with idiomorphic outlines on average 0.2 cm across; ~~not~~ either forms trains of granules within qtz layers or it displays idioblasts of max. 0.2 cm size; pyrite typically is scattered within a qtz-matrix, it reaches 5 to 10 Vol-%.
layering: 0° ~~folded~~ due to folding.
sharp contact

7.30 - 8.11: garnet bear. phyllosilicate-rich quartzite
(meta- ~~pelitic sandstone~~ qtz arenite)
similar: 0.00 - 2.02 m, but with garnet which joins ~~the~~ laminae composed of phyllosilicates, it tends to be strongly squeezed and stretched.
layering: 0° due to folding.
sharp contact

8.11 - 9.63: quartzite
(meta-chert)
greenish locally with faint bluish tint which is due to dusty, ~~not~~, dense, extremely fine-grained, clusters and trains of granules of pyrite which amounts to 3 Vol.-%, sub-

macroscopic mt as low-grade dissemination only within the lower portion.
Knife sharp contact, 17°.

9.63 - 13.10 : chlorite dom. sericite schist

(meta-pelite with volcanic impurity)
gngr, ~~massive~~ homogeneous, only locally with lenticular ~~structure~~, ~~homogeneous~~, rare porphyroblasts of garnet max. 0.5 cm across, mt forms a medium-grade dissemination the crystals being on average ~~0.1~~ 0.05 cm large and randomly show idiomorphic outlines.
Schistosity: 15° - 0° due to folding.
10.33 - 10.48 and 11.80 - 11.82 : infolded magnetite bearing quartzite (meta-chert) which contains little pyrite forming trains of grains, repetition of chert is due to folding, the true thickness of the layer is about 5 cm.

13.10 - 15.87 : phyllosilicate-rich quartzite

(meta-qtz arenite)
similar: 0.00 - 2.02 m but strongly folded, no mt.

15.87 - 18.95 : milky qtz

18.95 - 20.35 : phyllosilicate-rich quartzite

(meta-qtz arenite)
similar: 0.00 - 2.02 m

20.35 - 20.63 : milky qtz

20.63 - 20.82 : phyllosilicate-rich quartzite
(meta-qtz arenite)
similar: 18.95 - 20.35 m

20.82 - 21.98 : milky qtz

21.98 - 22.34 : high calcareous biotite-chlorite schist and phyllosilicate-rich quartzite py disharmonically folded, strongly sheared and squeezed material partly looking mylonitic

● AA/C

22.34 - 23.15 : milky qtz

23.15 - 23.45 : high calcareous biotite-chlorite schist
(mylonite with rock alteration)

23.45 - 23.88 : milky qtz

● 23.88 - 24.09 : high calcareous biotite-chlorite schist
(strongly folded and partly sheared meta-tuff)
gn with brown schlieren and white to yellowish white clusters, heterogeneous schist, stressinduced chlorite-biotite lamination, carbonate forms discontinuous trains of granules or displays clusters, py rarely occurs, it constitutes schlieren and small clusters.

24.09 - 24.28: milky qtz

24.28 - 25.88: slightly calcareous epidote - biotite - chlorite - qtz schist

(strongly folded and sheared tuffaceous meta-sediment)

gn, brown, grwhite, heterogeneous schist strongly disharmonically folded, qtz and/or epidote form big lenses or layers or irregular shaped aggregates which are surrounded by ~~division lamellae~~ flakes of biotite and chlorite, intercalated, parallel to ~~composed of~~ Py sporadically is present. ~~partly some Py~~.

transition into following schist.

25.88 - 28.49: calcareous biotite - chlorite - qtz - fspar schist

(strongly folded and sheared meta-tuffite)

grwhite, yellowish (weathered carbonate), gn, brown, heterogeneous schist strongly disharmonically folded and sheared, interlocking qtz and fspar crystals which may be accompanied by carbonate as disrupted squeezed layers in irregular alternation with strongly folded laminae composed of biotite and chlorite; pyrite forms discontinuous trains of granules, nerve-like features and sometimes clusters, its amount being 2 Vol-%.

chemical analysis
25.88 - 26.88 m
26.88 - 28.10 m

gradually changing into following schist

28.49 - 40.30 : high calcareous epidote bear. biotite-chlorite amphibole schist (meta - mafic tuff) (very similar meta-tuffs from Nivå IV below one-zone IV) gn with abundant brown rods and spots and white stripes and lenses, heterogeneous, intensity of folding slowly decreases upsection ~~of ridging folding~~, fine-fibrous chlorite and sericite are accompanied by slightly porphyritic crystals or crystalloaggregates of biotite which tend to be not oriented, ~~#~~ rarely locally further carry porphyroblasts of amphibole the acicular crystals max. 0.15 cm long, scattered and not oriented; carbonate forms lenses, schlieren and clusters often containing some crystals of biotite. ~~any occ~~ with subordinate amount 30.82-30.91 m, 32.61-32.84 m, 33.85-34.11 m, 34.83-34.93 m, ~~it is~~ associated with qtz and carbonate within discontinuous layers; ilmenite displays a low-grade dissemination composed of tiny xenomorphic crystals between 32.55 - 33.85 m.

chemical analysis
~~29.00~~ - 29.20 m,
30.82 - 30.91 m,
32.61 - 32.84 m,
33.85 - 34.11 m,
34.83 - 34.93 m

34.28 - 34.93 : phyllosilicate-rich qtz-fspar rock (meta-arenite with volcanic impurity) greyish green and brown schlieren, interlocking qtz and fspar crystals as schlieren and lenses alternate with schlieren and laminae composed of either biotite or biotite and

chlorite or chlorite with sericite; pyrite is present as rare spots while ilmenite forms a low-grade dissemination.

lamination, schistosity: folded, thus no even dip until 38.55 m, from there 32°–35°.

40.30 – 50.12 a) calcareous to high calcareous epidote bear. biotite-sericite-chlorite schist, b) biotite-sericite schist, c) qtz-rich biotite-chlorite-sericite schist (meta-tuffs and tuffites and tuffaceous sediments) distinct gneissic-granular striping, abundant brown rods and spots, laminated, in places banded, sporadically with lenticular structure, heteroblastic*, interlocking qtz, fspar, epidote or qtz crystals as laminae and lenses in close alternation with mm- locally cm-thick layers or schlieren composed of fine-crystalline chlorite or chlorite and sericite which are always accompanied by scattered porphyroblasts or bundles of biotite, the crystals or crystal aggregates on average 0.1 cm large, biotite locally also ~~locally separated porphyroblasts~~ sericite and chlorite forms discrete layers or schlieren or trains of granules, carbonate is submicroscopic it seems to be associated with the felsic compounds, only locally it displays discrete layers. *, several occurrences of medium- to high grade pyrite mineralization (exhalative sulphide) which occurs within qtz-carbonate layers: (40.69 m, 41.67 m, 43.98 –

* slight textural and compositional changes. a. and c.:

*, c.: pale grey with abundant brown spots, homogeneous, porphyritic texture, medium-crystalline sericite forms a slight orientation of the rock, biotite occurs as scattered porphyroblasts which are on average 0.1 cm large and show no orientation.

44.06 m, 44.39 - 44.67 m, 45.91 - 45.99 m, 48.80 - 48.85 m, 49.24 - 49.44 m, 49.76 m, 50.11 m); po occurs as tiny streaks or stringers and some lines within a web-like pattern

chemical analysis:

42.56 - 42.63 m,
43.86 - 43.98 m,
44.12 - 44.39 m,
44.39 - 44.67 m,
44.67 - 45.91 m,
45.91 - 45.99 m,
45.99 - 46.23 m,
46.66 - 47.09 m,
48.[illegible] - 48.27 m,
49.24 - 49.44 m,
49.71 - 49.79 m

within: 42.56 - 42.63 m several schlieren and tiny streaks (1 Vol.-%); 43.40 - 43.62 m rare schlieren (< 1 Vol.-%); 43.86 - 43.98 m several high-grade layers and also tiny streaks (2 Vol.-%); 44.12 - 44.39 m schlieren, streaks, nearly massive bands (10 Vol.-%); 44.67 - 45.91 m schlieren, tiny streaks, web-like mineralization (3 Vol.-%); 45.99 - 46.23 m stringers and tiny streaks (2 Vol.-%); 46.66 - 47.09 m schlieren, tiny streaks, web-like features (20 Vol.-%),
lamination: 38° changing to 42° downwards.
gradual contact.

50.12 - 54.21: epidote-plagioclase-rich schistose amphibolite (meta-basalt flow)
gn with faint yellowish tint, fine-crystalline, often distinctly layered, here close alternation of bands and lenses of amphibole and laminae or schlieren mainly composed of carbonate, which locally may contain biotite, carbonate also develops clusters and cross-cutting veins; ilmenite forms scattered round globular crystals with sutured boundaries, they are on average 0.12 cm across.
banding: 46°

52.91 - 52.93: high calcareous pyrrhotite - rich qtz rock (meta. iron sulphide and hydrothermal silica and carbonate)
web- or ribbon-shaped
like net pp mineralization within a grey mass composed of qtz and carbonate; sulphide estimates to 10 % by volume of the rock. sharp boundaries, 45°.

53.64 - 53.78: sericite - biotite bear. qtz - fspar rock / schist (qtz - kerato phyre) grey white, fine - crystalline, tiny streaks and seams of sericite and biotite in alternation with layers of interlocking qtz and fspar crystals. quite sharp boundaries, 45°

54.21 - 60.20 calcareous garnet - chlorite bear. qtz - fspar - biotite - epidote gneiss / schist (meta - mafic sediment) yellowish grey with transition to dark grey or bluish grey, abundant brown stripes, distinctly banded, ~~thin alternation of~~ layers composed of epidote, plagioclase and chlorite which are interlaminated by schlieren of biotite alternate with discontinuous stripes and laminae of biotite and lenses or thin layers composed of carbonate; ~~[illegible]~~ interlayers of carbonate and qtz containing Py occur

chemical analysis
55.98 - 56.23 m,
56.32 - 56.77 m,
56.77 - 57.31 m,
57.41 - 58.07 m,
59.51 - 60.20 m

between 55.98 - 58.08 m and 59.51 - 60.20 m, shows high concentrations
Py ~~is concentrated~~ between 56.32 - 56.76 m and 59.51 - 60.20 m.

fault mylonite: 57.50 - 57.60 m, 57.67 - 57.86 m, 58.03 - 58.20 m, 60.05 - 60.20 m.

lamination: 42°

fault contact.

60.20 - 63.20 : epidote bear. biotite-sericite schist (meta-pelite)

gr with faint greenish and yellowish hint (footwall), abundant brown spots, porphyroblastic, gradual decrease in the amount of epidote upsection, footwall: laminated with local occurrence of flaser and lenticular structure, epidote and sericite as layers and schlieren in alternation with schlieren or laminae of biotite and lense-shaped aggregates of carbonate and qtz; hanging portion: typical biotite-~~sericite~~ schist with widely developed lamination or lenticular structure, biotite forms scattered porphyroblasts being not oriented, they sometimes form trains of ~~granules~~ flakes; Py is enriched within cm-thick qtz-carbonate layers ~~qtz and carbonate~~ at: 61.43 - 61.48 m, 61.51 - 61.59 m, 61.67 - 61.80 m, 62.26 - 62.29 m, 62.51 - 62.59 m, 62.70 - 62.78 m, 62.81 - 63.10 m; quartzite (meta-

chemical analysis
61.43 - 62.00 m,
62.23 - 62.32 m,
62.49 - 62.64 m,
62.70 - 63.11 m.

chert) with rare spots of pyrite occurs between: 61.83 - 62.00 m and 62.78 - 62.80 m.
lamination: 45°
gradual contact.

63.20 - 65.17: calcareous to high calcareous feldspar-rich biotite - epidote - chlorite schist / phyllite (meta - mafic volcanic)

sample 75/1
65.88 - 66.00 m

gn with faint yellowish tint, abundant brown schlieren, lenticular and flaser structure, locally with distinct lamination, ~~fine fibrous~~ chlorite and sericite which are constitute a fine-* accompanied by epidote ~~and~~ biotite ~~(slightly porphyritic)~~ ~~are~~ ~~induration~~ ~~lified by schlieren and laminae composed of biotite~~ they often are accompanied by carbonate, qtz and fspar; po occurs as tiny streaks and schlieren and in places forms ribbon-shaped patterns, it estimates to 5 Vol.-%.
sharp contact.

* crystalline groundmass with is distinctly foliated, biotite always forms porphyroblasts on average 0.07 cm large, the flakes having a clear tendency to collect into schlieren and laminae,

65.17 - 84.79: calcareous to high calcareous feldspar-rich biotite - epidote - chlorite schist / phyllite (meta - mafic volcanic)

palegn, abundant brown spots mainly

concentrated within schliren and lenticular bodies*, fine-crystalline, interleaved ~~biotite and~~ chlorite ~~and~~ associated by epidote, fspar ~~and~~ ~~roundly accompanied by slightly~~ and porphyritic biotite as lenses and bands of varying thickness in irregular ~~alternation~~ with grains of flakes of biotite which often are joined by epidote, qtz and carbonate and bands or lenses composed of carbonate and qtz.

* indistinct banding due to compositional and textural changes, locally with lenticular or flaser structure caused by deformation.

74.62 - 74.71: calcareous quartzite (meta. hydrothermal silica and carbonate adjoined by sulphides)
grey white, fine-crystalline, interlocking qtz and carbonate crystals as bands and lenses in alternation with mm-dm layers of surrounding schist; pyrite forms traces of granules within the quartzite, it grades 2 Vol.-%.

81.12 - 81.18: high calcareous pyrite-~~qtz~~ rock (meta. exhalative iron-sulphide, silica and carbonat)
high-grade py-mineralization within a granoblastic carbonate-qtz ~~rock~~ groundmass.

layering: 66.60 m 45°, 69.40 m 42°, 72.50 m 38°, 84.50 m 45°.
transgoing into following schist.

84.79 - 93.05 : calcareous to high calcareous epidote-~~chlorite~~ - biotite - chlorite schist (meta-mafic volcanic)

~~colour~~ striping due to marked colour changes; distinctly ~~striped~~ + ~~with~~ pale gn, gr, yellowish gn and brown ~~colours~~. laminated, compositional and detrital banding, ~~heteroblastic~~ porphyroblastic, bands and stringers composed of ~~epidote~~, chlorite and epidote which usually carry some scattered blasts of biotite alternate with bands, stringers and laminae composed of either qtz and epidote or epidote and carbonate or biotite epidote and carbonate, biotite frequently also constitutes trains of flakes.

banding: 50-45° throughout.

93.05 - 97.40 : calcareous to high calcareous biotite - epidote - ~~carbonate~~ chlorite ~~schist~~ schist / phyllite (meta-mafic volcanic) ~~with interbedded~~

variably coloured: pale gn, gn, yellowish gn, grwhite, brown, laminated, banded, locally

disharmonic folded, cumulation cleavages, sericite, chlorite and epidote as laminae and bands in alternation with epidote+carbonate+biotite and carbonate+epidote layers and lenses, locally biotite is enriched forming a calcareous sericite-chlorite bear. epidote-biotite schist; low-grade Py within carbonate+qtz layer at 95.01; ilmenite as scattered globular crystals with sutured boundaries between 95.01 - 96.07 m.
lamination: 50°
transgoing into following schist.

97.40 - 100.70: calcareous to high calcareous epidote-biotite-chlorite schist/phyllite (meta-mafic volcanic)

similar: 84.79 - 93.05 m.
transgoing into following rock

100.70 - 105.87: calcareous biotite bear. feldspar-rich epidote-chlorite schist/phyllite (meta-mafic volcanic)

similar: 63.20 - 65.17 m
lamination: 55°
101.25 - 101.28: 1 layer of ~~Py~~ newly massive Py.
~~lamination~~:

105.87 - 106.56: tectonic breccia

106.56 - 111.10: slightly calcareous chlorite bear. biotite - sericite schist

(meta - pelite with volcanic related impurity) ~~[illegible]~~ grey with abundant brown schlieren and rods, mostly with distinct lenticular structure, onset development of lamination, interlocking qtz cristals as lenses surrounded by fine - crystalline sericite which is accompanied by scattered not oriented crystals or crystal aggregates of biotite, the rock often forms trains of flases or discontinuous laminae.

lamination: 45-50°

sharp contact.

111.10 - 128.17: calcareous to high calcareous feldspar-rich biotite - epidote - ~~[illegible]~~ - chlorite ~~[illegible]~~ schist / phyllite

(meta- mafic volcanic)

similar: 63.20 - 65.17 m.

lamination / layering: 60° often distorted. strongly schistose (45°) between 126.65 - 128.17 m

128.19 – 129.65: phyllosilicate bear. quartzite
(meta-arenite)
gr white with gr brown laminae, inter-locking qtz-crystals as cm-thick bands in alteration with mm-layers composed of biotite + epidote + sericite and chlorite, layering tends to be deformed.
sharp contact

129.65 – 133.25: high calcareous amphibole-chlorite phyllite
(meta-mafic volcanic, tuff)
gn with faint bluish tint, laminated, in places ~~massive~~ homogeneous ~~coarse~~, fine-fibrous chlorite forms schlieren and layers which alternate with laminae and schlieren mainly composed of carbonate, the latter also but locally occurs as scattered hypidiomorphic crystals being 0.1 cm large, amphibole displays tiny acicular crystals (porphyroblasts) of max. 0.3 cm length which ~~randomly~~ are oriented, they sometimes show a tendency ~~to form~~ to collect within strong layers; ilmenite is present as tiny ~~globular~~ round crystals within the lower portion; py crystals hosted by granoblastic qtz and carbonate ~~which form~~ as mm-thick interlayers occur at: 129.65 – 129.69 m and 130.49 – 130.54 m.
lamination: 50°
gradual contact

133.25 - 135.10 : calcareous to high calcareous chlorite-amphibole rock

(meta-basalt flow)

design, fine in places medium crystalline, wide development of layering / lamination due to carbonate which tends to form trains of granules, locally cross cutting qtz and carbonate veins; ilmenite occurs as found globular crystals with sutured boundaries throughout, its amount being 2 % by volume of the rock.

lamination: 53°

135.10 m end of DDH

F.D. Priesemann
1986

chemical analysis:

	% Cu	% Zn	% S
6.70 – 7.25 m			
25.88 – 26.88 m			
26.88 – 28.10 m			
29.00 – 29.20 m			
30.32 – 30.91 m			
32.61 – 32.84 m			
33.85 – 34.11 m			
34.83 – 34.93 m			
42.56 – 42.63 m			
43.86 – 43.98 m			
44.12 – 44.67 m			
44.67 – 45.91 m			
45.91 – 45.99 m			
45.99 – 46.23 m			
46.66 – 47.09 m			
48.01 – 48.27 m			
49.24 – 49.44 m			
49.71 – 49.79 m			
55.98 – 56.33 m			
56.32 – 56.77 m			
56.77 – 57.31 m			
57.41 – 58.07 m			
59.51 – 60.20 m			
61.43 – 62.00 m			
62.23 – 62.32 m			
62.49 – 62.64 m			
62.70 – 63.11 m			

Susceptibility: DDH 75

135.00	0.1	85.00	0.1	54.00	0.1	29.00	0.1
134.00	0.1	84.00	0.1	53.00	0.2	28.00	0.2
133.00	0.1	83.00	0.3	52.00	0.1	27.00	0.1
132.00	0.2	82.00	0.1	51.00	0.1	26.00	0.0
131.00	0.1	81.15	0.0	50.00	0.1	25.00	0.1
130.00	0.0	81.00	0.0	49.75	0.2	24.00	0.1
129.70	0.1	80.00	0.1	49.50	0.1	23.00	0.0
129.50	0.0	79.00	0.1	49.30	0.0	22.00	0.0
129.00	0.0	78.00	0.1	49.00	0.0	21.00	0.0
128.00	0.1	76.00	0.1	48.81	0.1	20.00	1.3
127.00	0.0	75.00	0.0	48.50	0.0	19.00	1.6
126.00	0.1	74.00	0.1	48.25	0.1	18.00	0.8
125.00	0.0	73.00	0.0	48.05	0.2	15.80	1.7
124.00	0.1	72.00	0.0	47.80	0.1	15.50	1.5
123.00	0.1	71.00	0.0	47.50	0.1	15.00	0.2
122.00	0.1	70.00	0.0	47.00	0.2	14.50	0.0
121.00	0.1	69.00	0.0	46.85	0.1	14.00	0.0
120.00	0.1	68.00	0.1	46.70	0.0	13.50	0.0
119.00	0.0	67.00	0.0	46.50	0.0	13.00	2.6
118.00	0.0	66.00	0.1	46.20	0.1	12.50	3.2
117.00	0.0	65.00	0.2	46.00	0.1	12.00	4.0
116.00	0.0	64.00	0.3	45.80	0.1	11.50	6.4
115.00	0.1	63.30	0.0	45.70	0.1	11.00	7.4
114.00	0.1	63.00	0.3	45.50	0.1	10.45	14.0
113.00	0.1	62.75	0.1	45.00	0.1	10.00	3.4
112.00	0.0	62.65	0.0	44.70	0.1	9.50	1.6
111.00	0.1	62.55	0.2	44.50	0.1	9.00	0.4
110.00	0.1	62.40	0.3	44.40	0.2	8.90	1.1
109.00	0.0	62.25	0.2	44.20	0.1	8.50	0.9
108.00	0.0	62.15	0.2	44.00	0.3	8.20	4.2
107.00	0.0	61.90	0.0	43.90	0.2	7.85	1.1
106.00	0.0	61.70	0.1	43.70	0.2	7.50	2.9
105.00	-0.1	61.50	0.1	43.50	0.3	6.00	3.2
104.00	0.0	61.35	0.1	43.00	0.0	5.50	4.1
103.00	0.0	61.00	0.0	42.60	0.1	5.00	0.8
102.00	0.0	60.50	0.0	42.00	0.0	4.00	1.0
101.30	0.0	59.90	0.1	41.00	0.1	3.50	1.3
101.00	0.0	59.60	0.2	40.00	0.1	2.00	0.8
100.00	0.1	59.50	0.0	39.00	0.1	1.50	0.0
99.00	0.0	59.00	0.0	38.00	0.0	1.00	1.3
98.00	0.1	58.50	0.3	37.00	0.0	0.50	0.9
97.00	0.1	57.60	0.8	36.00	0.1		
96.00	0.1	57.35	0.3	35.00	0.0		
96.00	0.2	57.25	0.2	~~34.00~~			
35.50	0.3						
94.00	0.2	57.00	0.3	34.90	0.0		
93.00	0.2	56.70	0.6	34.00	0.1		
92.00	0.1	56.50	0.3	33.90	0.1		
91.00	0.1	56.30	0.2	33.70	0.0		
90.00	0.0	56.10	0.2	33.00	0.1		
89.00	0.0	56.00	0.2	32.50	0.2		
88.00	0.0	55.90	0.3	32.00	0.1		
87.00	0.1	55.50	0.1	31.00	0.1		
86.00	0.1	55.00	0.0	30.00	0.2		

← leggmelse

DIAMOND DRILL HOLE 685 D

Hjerzinn, east of main fault, 1981
Location: X = -16, Y = 1082, Z = 1019 (1040N 6600V)
Azimuth: 16° (mine grid)
Inclination: 52° S
Total length: 610.65 m

Description:
0.00 - 64.50

phyllosilicates, biotite in places occurs as randomly oriented porphyroblasts, finest dissemination of <u>mt</u> from footwall until 70.10 m.

0.00 - 64.50 <u>calcareous to high calcareous biotite - epidote - chlorite - sericite schist</u> (sericite-chlorite)

(meta-pelitic sediment composed of volcanic related and terrigeneous clastic material; supp. distal facies of meta-lahar (see also DDH 768 52.15 - 111.20 m and DDH 769 57.50 - 218.80 m, correlates with greenish with abundant yellowish white lenses and layers, variation in the amount of qtz may result in phyllosilicate-rich quartzites, carbonate is variably distributed, gradually changes in the amount of sericite and chlorite, distinct centimetric structure sometimes lamination or banding, metablasting qtz, fspar and carbonate crystals as lenses or bands in alternation with cm-thick bands of schiefer composed of sericite, chlorite, epidote and biotite, the latter tend to forms scattered porphyroblasts mainly not aligned with the foliation of the rock, abundant round-globular spots of <u>mt</u> between: 56.50 - 57.10 m between: 60.40 - 61.65 m, tiny scattered crystals of ilmenite between: 33.80 - 34.50 m, 41.40 - 42.00 m, 46.20 - 47.30 m, 50.70 - 56.40 m, some spots of py: 39.00 - 39.20 m (here also spots of <u>mt</u>), 39.30 m, 57.10 m.

faults and fault mylonite: 20.80 - 21.40 m,

always distinct cremulation cleavage, F_2 - foliation between 40 and 50°.

gradual contact.

section 0.00 - 91.25 m of DDH 2000D)

sample 685D/5 57.20 m, 685D/6 34.40 m, 685D/7 27.10 m

qtz - fspar ~~an~~ aucist and transgoing into phyllosilicate-rich fspar-qtz idiost (s.d.); sporadically round globular porphyroblasts of mt: 78.85 m, 79.06 - 79.14 m; sparse scattered idioblasts of py between: 77.30 - 77.50 m.
schistosity: 56°

70.90 - 77.04 epidote-bear. ~~calcareous~~ phyllosilicate - fspar - qtz idist (meta - arkosic sandstone supp. with minor volcanic impurity)
milky white with gr to greenish gy schlieren and laminae, lenticular structure and lamination, including qtz, fspar and locally epidote ~~and calcite~~ crystals as lenses and thin bands in close alternation with schlieren or laminae composed of sericite and subordinate biotite; sparce scattered idioblasts of py the crystals mat. 05 cm across at: 74.45 - 76.00 m; low-grade dissemination of mt-crystals (0.05-0.15 cm Ø) throughout, the crystals getting more obvious within the upper part of the section.
schistosity: 60°
gradual hanging wall and sharp footwall.

64.50 - 70.90 calcareous biotite bear. epidote-chlorite-sericite idist (meta-pelitic sediment composed of volcanic related and terrigeneous clastic material; supp. distal facies of meta-lahar)
dark gr with green tint, strongly foliated, irregular alternation of lenses, laminae and bands composed of either qtz, fspar and carbonate or carbonate and bands or laminae made by

lamination / schistosity: 60°

gradual contact.

91.15 – 131.70 phyllosilicate-rich quartzite

(meta-greywacke)

gr, distinctly banded in places with pseudo-conglomerate structure which originates from tectono-fold deformation, hydrothermic alteration of mm-thick layers or schlieren of sericite which carries little amounts of biotite and cm-thick bands of quartz which contain subordinate * sericite;

scattered round globular porphyroblasts of mt at the following positions: 120.90 – 121.00 m, 126.25 m, 126.44 m, 126.70 m, 127.02 – 127.64 m, 128.40 – 128.75 m, 130.70 – 131.20 m.

* locally slightly epidote and chlorite bear. (121.00 – 122.70 m)

banding: 45–50°

gradual contact.

79.60 – 91.15 phyllosilicate-rich fspar-qtz schist/gneiss

(meta-arkosic sandstone)

greywhite with dark gr bands and schlieren, banded as with pseudo conglomerate structure, hydrothermic alteration of cm-thick bands composed of qtz and fspar and little biotite and sericite and mm-thick layers as schlieren made by phyllosilicates.

sample 685 D/4 83.30 m

banding: 52°

sharp boundary.

77.04 – 79.60 calcareous chlorite schist

(consolidated fault zone)

gn, homogeneous widely developed lamination between carbonate seams and chlorite bands within footwall slowly decreasing

oriented.

lamination: 62°

sharp contact.

135.50 – 137.40 slightly calcareous biotite-sericite schist (meta-pelite)

gr, with abundant tiny brown rods, banded but in places with widely developed lenticular structure, including qtz crystals as tiny schlieren or lenses in close alternation with phyllosilicate bands and schlieren, biotite forms slightly porphyritic crystals which tend to be aligned with the major plane of foliation of the rock, several 0.5 cm thick bands and flat lenses composed of carbonate and qtz, from 137.00 m upsection dusty mt which increases in its amounts towards the footwall of the layer.

banding: 60° → gradual contact.

136.38 – 136.44: magnetite-quartzite (meta-chert) wide development of banding due to variation in the amount of dusty mt

131.20 – 135.50 slightly calcareous biotite-bear qtz-sericite schist (meta-qtz pelite or siltstone, transitional unit/layer between quartzite and pelite)

gr, fine-crystalline, lenticular structure and locally with widely developed lamination, close alternation of phyllosilicate layers and schlieren with lenses and bands composed of qtz; scattered xenomorphic porphyroblasts of mt between: 131.20 – 133.20 m and 135.40 – 135.50 m.

biotite bear. qtz-sericite schist which is fine-crystalline and shows a distinct lamination, intercalations of quartzite which is ~~supp.~~ remobilized, random occurrence of py; rare tiny spots of mt.

banding: 60°

141.09 – 141.32 calcareous biotite bear. qtz-sericite schist
(meta-qtz pelite or siltstone)
similar: 144.10 – 146.13 m.

141.00 – 141.09 quartzite
(meta-chert)
gr, dense, wide development of layering due to sparse trains of granules of mt and py, banging and footwall marked by cm-thick layers of medium-crystalline biotite-sericite schist which carries scattered idioblasts of mt and py, the latter forms trains of granules, schlieren or ~~nearly~~ cm-thick bands; ~~subplaide~~ it amounts to 3 Vol-%.
sharp contact.

chemical analysis 141.00 – 141.09 m

137.40 – 141.00 sericite-rich magnetite quartzite
(meta-chert with pelitic sedimentary impurity)
violet, fine-crystalline, laminated and banded, rhythmic alternation of mm- to cm-thick bands composed of either qtz or qtz and sericite, magnetite or sporadically of carbonate, locally scattered tiny flakes of biotite which tend to be not

146.90 – 148.05 slightly calcareous biotite bear. qtz-sericite schist (meta-qtzpelite or siltstone with minor volcanic impurity)

chemical analysis 147.58 – 147.63 m

similar: 148.43 – 150.37 m, crystals of py which form discontinuous traces of granules between: 147.58 – 147.63 m.

lamination: 60°

146.13 – 146.90 calcareous biotite-sericite schist (meta-pelite or tuffaceous pelite)

similar: 153.30 – 166.30 m

gradual contact.

146.77 – 146.84: close together bands of dense quartzite (supp. meta-chert)

144.10 – 146.13 calcareous type-bear. qtz-biotite-sericite schist (meta-qtzpelite or siltstone with minor volcanic impurity)

gr, fine-crystalline, homogeneous with acide development of layering due to carbonate which has the tendency to collect within tiny bands or flat lenses, tiny rare spots of mt throughout. schistosity: 60°

141.32 – 144.10 slightly calcareous biotite-sericite schist (meta-pelite with minor volcanic impurity)

gr with brown rocks several white bands and lenses, textural and compositional banding, irregular alternation of medium-crystalline biotite-sericite schist locally carrying garnets and calcareous

148.28 - 148.43 sericite bear. quartzite
(meta - qtz arenite)
gr, lenticular structure and lamination, close alternation of cm-thick layers of qtz and schisten or laminae composed of sericite.
lamination: 70°
gradual contact.

148.13 - 148.28 garnet bear. biotite - qtz - sericite schist
(meta - qtz pelite)
gr with abundant brown rods, fine-crystalline with scattered, randomly oriented porphyroblasts of biotite and subidiomorphic crystals of garnet (0.15 cm across), lenticular structure, including qtz crystals as lenses in alternation with schisten or layers composed of sericite, biotite and garnet, within banding portion several trains of granules of py.
schistosity: 65°
sharp contact

chemical analysis 148.13 - 148.28 m

148.05 - 148.13 quartzite
(meta - chert)
grwhite, dense, contact with surrounding rocks ovo 2 cm thick zones of coarse-crystalline garnet - biotite - sericite schist (altered) which in the case of the lying zone carries big clusters of py.
gradual contact.

148.43 - 150.39 slightly calcareous biotite bear. qtz - sericite schist (meta - qtz pelite or siltstone with volcanic impurity, intercalations of tuffite)

gr, fine - crystalline, cm - banding with transition into laminated rock, including qtz crystals sporadically being accompanied by carbonate as tiny lenses in rhythmic alternation with fibre laminae or schlieren or bands dominated by sericite which sometimes carry scattered strongly and sporadically idioblasts of garnet parallel crystals of biotite, locally intercalations with gradual boundaries of garnet-biotite-sericite schist (al-rich meta-sediments supp. with volcanic impurity) which show porphyroblasts of biotite (cross-biotite) and homogeneously distributed subidiomorphic crystals of garnet (max 0.4 cm in diameter), scattered round globular blasts of mt.

chemical analysis 148.87 - 149.66 m

lamination / banding: 64°

gradual contact

148.89 - 149.66: quartzite (meta hydrothermal silica, typical for bordzones of sulphide deposits)

gr to white, dense, irregular distribution of single crystals or multi crystal aggregates of py and mt, coarse crystalline biotite - sericite schist (altered rock, tuffite) at the contacts

A with the surrounding schist as well as within the quartzite layer, the rock contains sufficient py as scattered idioblasts and as trains of granules (3 Vol.%)

sericite with mm-thick bands made by qtz and feldspar or carbonate, ~~more~~ locally the ~~laminations~~ small ~~bands~~ ~~composed of~~ qtz-carbonate bands ~~which~~ are common sub-idiomorphic blasts of py, ~~and~~ they also are emitted by scattered tiny crystals of ~~mt~~, py tends to form trains of granules or is collected within lense-shaped aggregates ~~mt disseminations~~, biotite occurs as randomly oriented porphyroblasts (0.05 - 0.15 mm) (cross-biotite) the crystals being scattered ~~and~~ ~~showing~~ within some bands which ~~are enriched~~ due to biotite ~~there are some bands where~~ show a typical spotted appearence, garnet is found locally either as scattered idiomorphic crystals or as irregularly shaped aggregates; more or less homogeneous distribution of tiny crystals of mt, spots of py at several locations, sulphide amount < 1 Vol.-%; intercalayers with sharp boundaries of dense quartzite (meta-chert) which contains subordinate thicky mt between: 151.60 - 151.70 m, 151.71 - 152.19 m.

chemical analysis
150.55 - 151.05 m
151.05 - 151.60 m
152.19 - 152.69 m
152.69 - 153.19 m

lamination: 55°

Gradual contact.

150.39 - 150.55 biotite bear. qtz-sericite schist (semipelite) (meta-qtz pelite or siltstone)

gr, fine-crystalline, homogeneous, biotite forms slightly porphyritic crystals being aligned with the main foliation of the rock, spotted tiny crystals of mt.

sharp contact.

as cm-thick bands and lenses in alternation with laminae or schlieren composed of sericite which carried sparse crystals of biotite and sometimes blasts of garnet, little epidote is found as dusty impregnation within the qtz-fspar bands; idioblasts and xenomorphic poikiloblasts of mt are homogeneously distributed.

153.30-160.30 calcareous biotite-sericite schist

(meta-tuffaceous pelitic sediment)/(similar sericite schists from 40.30-50.12 m DDH FS, 112.FS-126.25 m DDH 768 G or 142.70-165.35 m DDH 768 G or 190.10-210.10 m DDH 768 G and 226.FS-245.80 m DDH 769 G or 387.80-440.40 m DDH 769 G and Storfjellore zone)

chemical analysis

154.30-154.83 m, [redacted]25-155.55 m, 155.55-156.28 m.

gr, medium crystalline, gradual increase in the amount of qtz from 158.50 m upsection, interleaved sericite flakes which locally are accompanied by randomly oriented porphyroblasts of biotite as mm- and cm-thick bands in alternation with discontinuous tiny bands and thin layers composed of carbonate and qtz and tiny lenses of carbonate, qtz and carbonate form big clusters and vein-like features within 155.30-153.97 m, the upper part of the layer is strongly foliated and shows a distinct lenticular structure, the section contains some porphyroblasts of garnet which have been partly chloritizated and epidotized; abundant mt as scattered, tiny, often idiomorphic porphyroblasts; rare schlieren of cy often joined by clusters of qtz.
banding: 60°

150.55-153.30 calcareous to high calcareous biotite-bear. qtz-fspar-sericite schist

(meta-tuffite)

gr with faint greenish tint, fine- ~~fauni~~ crystalline, laminated, thinning alternation of mm-thick layers composed of

and laminae or schlieren composed of sericite and biotite, the latter is strongly aligned with the main foliation of the rock, epidote is found locally, it shows a clear tendency to join qtz; scattered 0.1-0.2 mm large idioblasts of mt between: 195.65 - 203.67 m.
gradual contact.

160.30 - 195.65 sericite bear. quartzite
(meta - qtz arenite)
gr with slightly greenish schlieren, flaser structure, alternation of qtz-bands which sporadically carry small amounts of dusty epidote and schlieren composed of sericite which is accompanied by some flakes of biotite, the crystals always parallel the major foliation of the rock*; single idiomorphic crystals of mt between: 184.80 - 185.70 m, scattered tiny mostly idiomorphic crystals of mt between: 161.29 - 161.57 m, 162.90 - 163.13 m, 168.19 - 183.75 m; at some locations ~~single~~ spots idioblasts of py: 178.40 - 178.75 m

*, sometimes phyllosilicate-qtz lamination, occasional garnet crystals.

fault mylonite: 160.30 - 160.55 m, 191.05 - 192.10 m.
gradual contact.

176.00 - 178.20 biotite bear. sericite - qtz - fspar schist
(meta - qtz-rich epiclastic sediment with felsic volcanic impurity)
gr white with greenish gr schlieren and blackish spots, banded with transitions into lenticular structured rock, including qtz and fspar crystals

203.82 - 208.85 biotite - sericite - quartzite
(meta - pelitic arenite)
similar: 214.90 - 222.00 m, but with more biotite, the porphyroblasts being not oriented, often dusty epidote, subidioblastic crystals of garnet which join the phyllosilicates between: 204.20 - 204.30 m, 204.92 - 208.85 m; scattered idioblasts of mt throughout, single crystals of Py at: 204.40 - 204.92 m, 207.39 - 208.85 m.

gradual contact.

203.67 - 203.82 garnet-bear. epidote - qtz - biotite - sericite schist
(meta - qtz pelite or siltstone)
gr with yellowish gn lenses and black spots, distinct crenulation cleavage, lenticular structure, interlocking qtz and epidote crystals as lenses in alternation with bands and schlieren composed of fine-crystalline * sericite and porphyritic biotite, irregular distributed hypidiomorphic blasts of garnet on average 0.2 cm across; scattered idioblasts of mt.

sharp contact.

195.65 - 203.67 biotite bear. sericite-rich quartzite
(meta - qtz arenite) distinct crenulation cleavage,
gr with faint greenish tint, laminated or with flaser structure, close alternation of lenses or laminae dominated by qtz

folded which is accompanied by tiny flakes of biotite
sil-zac T sericite, pale epidote ~~as dissemination~~
follows but forms
qtz ~~lenses and~~ also discrete
are most frequent between
schlieren which T : 217.90 - 219.42 m and 221.37 -
222.00 m ; idioblasts of mt (0.1 - 0.2 cm
size) throughout; scattered idioblasts of py the
crystals up to 0.35 cm in size at: 217.40 m,
217.50 - 219.00 m, 219.00 - 219.10 m, 219.38 - 222.00 m.
gradual contact.

214.85 - 214.90 biotite - sericite - qtz rock
(meta - pelitic arenite)
gr with abundant strong schlieren, distinct
flaser and lenticular structure which is
due to small-scale isoclinal folding and shearing,
in places laminated ~~rock~~, interlocking
qtz as lenses surrounded by interleaved
sericite and biotite, the latter tends to
form not oriented porphyroblasts but
locally may be aligned with the foliation
of the rock (tiny shear planes), epidote
is variably distributed, it occurs ~~in~~ with sub-
ordinate amount and is mostly associa-
ted with qtz; idioblasts of mt on average
0.1 cm across are found throughout;
several occurrences of idioblasts of py
of 0.1 - 0.4 cm size : 213.96 m, 214.50 - 214.90 m.
gradual contact

thin ~~sericite~~ of sericite layers which locally carry flakes of biotite which are strongly aligned with the foliation of the rock; mt as idioblasts of 0.1 - 0.2 cm size and xenomorphic poikiloblasts occurs between: 229.50 - 231.80 m, 233.86 - 233.96 m,* the crystals are ~~being~~ variably distributed.

fault mylonite: 260.93 - 261.10 m

schistosity: 20°

* 236.60 - 237.95 m, 239.10 - 239.85 m, 242.20 - 242.50 m, 242.90 - 243.10 m, 243.55 m, 243.86 m, 244.50 m, 246.00 - 248.15 m, 253.25 - 254.60 m, 259.90 - 264.40 m

gradual contact.

222.00 - 229.50: biotite bear. sericite — quartzite

(meta - qtz arenite)

similar: 229.50 - 264.20 m but with higher amount in biotite; the porphyroblasts being randomly oriented;* idioblasts of mt of 0.1 - 0.2 cm size throughout; scattered idioblasts of py up to 0.35 cm across at 222.13 m.

gradually ~~feather~~ contact.

within the lower portion sparse occurrence of epidote;

214.90 - 222.00: sericite — quartzite

(meta - qtz arenite)

gr with grey schlieren, sometimes with distinct yellowish grey tint, pseudo conglomerate structure, interlocking qtz crystals as big lenses surrounded by fine-crystalline

due to two different styles of foldings

sericite, qtz and biotite, ~~[illegible]~~ biotite is slightly porphyritic [and of] scattered [occurrence] and parallels ~~the~~ the banding of the rock; rare spots of il.

schistosity: 68°

267.73 – 274.25 chlorite - epidote bear. qtz - biotite - sericite schist [gradual contact]

(meta - pelite with volcanic impurity)

sample 685D/3 273.62 - 273.74m

similar: 285.50 - 288.50 m

schistosity, banding: 62°

gradual ~~contact~~ contact

264.20 – 267.73 chlorite bear. qtz - biotite - sericite schist

(meta - ~~qtz~~ pelite)

gr with faint greenish tint, abundant brown spots, distinct lenticular structure, interlocking qtz as lenses and layers in alternation with bands and schlieren composed of sericite, biotite and chlorite, biotite forms scattered porphyroblasts which tend to be not oriented, they only in places are parallel to the major foliation of the rock which ~~is caused by~~ characterizes a late deformation.

compositional banding: 70°

gradual contact

229.50 – 264.20 sericite ± ~~[illegible]~~ quartzite

(meta - qtz arenite)

gr with faint greenish tint, flaser and lenticular structure, interlocking qtz crystals as bands and lenses in alternation with schlieren and

caused by two-fold folding,

schistosity : 65°

281.25 - 285.20 chlorite - epidote bear. qtz - biotite - sericite schist
(meta - pelite with volcanic impurity)
similar : 285.50 - 288.50 m.
schistosity, layering : 63°.

278.11 - 281.25 epidote bear. qtz - biotite - sericite schist
(meta - pelite)
gr, homogeneous, widely developed lenticular structure, locally with indistinct compositional banding, interlocking qtz crystals as tiny lenses in close alternation with stringers composed of sericite and biotite, the latter mineral slightly coarse than sericite the flakes being aligned with the major foliation of the rock, locally cm - thick interlayers rich in epidote, the bands have sharp as well as gradual boundaries with the surrounding*; rare tiny idioblasts of il
schistosity: 67°
gradual footwall

*, often tiny bands and discontinuous layers of carbonate which are conformable with the foliation of the rock

274.25 - 278.11 chlorite - epidote bear. biotite - sericite schist
(meta - pelite with volcanic impurity)
grgr with faint yellowish tint, cm - banded, monorhythmic alternation of fine - crystalline sericite - epidote - chlorite layers with lenses and bands composed of qtz and with bands made by

285.50 - 288.50 chlorite (-epidote) bear. qtz-biotite-sericite schist (meta-pelite with volcanic impurity)

gl with faint greenish tint, fine-crystalline with biotite forming scattered porphyroblasts of average 0.1 cm size, which mainly lie aligned with the foliation of the rock, (may be a primary pelite - silt alternation) crude development of banding due to slight compositional and textural changes, interlocking qtz crystals as lenses and thin bands in alternation with fine-crystalline sericite-chlorite (-epidote) bands and schlieren and bands composed of qtz, sericite and biotite, the latter mineral ~~being~~ is widely scattered but sometimes collects to form trains of flakes, ~~the banding seems to be primary~~ (~~pelite silt alternation~~), carbonate is present locally as flat lenses which are conformable the layering of the rock.

schistosity, layering: 64°.

sharp contact.

285.20 - 285.50 chlorite (-epidote) bear. biotite-qtz-sericite schist (meta-qtz pelite)

gl with faint greenish tint, lenticular structure, locally with widely developed compositional banding, interlocking qtz crystals as lenses in close alternation with schlieren and bands dominated by phyllosilicates.

coarser than chlorite, it sometimes seems to be collected forming schlieren and thin laminae.
lamination: 62°
gradually passing into footwall rock.

292.70 - 293.50 high calcareous biotite-sericite-chlorite rock (meta-tuffaceous sediment or tuffite, altered)

gngr, medium-crystalline, massive, homogeneous, lense-shaped crystal aggregates of chlorite and sericite max. 0.15 cm large and flakes of biotite are homogeneously distributed and not oriented within a groundmass composed of qtz (fspar?), carbonate forms ~~porphyroblasts~~ round globular crystals (blasts) on average 0.15 cm large ~~being~~ ~~schistose~~. ~~unoriented~~ homogeneously distributed.

sharp contact

288.50 - 292.70 epidote-biotite-qtz-chlorite schist (meta-pelitic sediment with volcanic impurity)

similar: 293.50 - 294.10 m, qtz sometimes forms lense-shaped clusters; submacroscopic dissemination of mt.
schistosity, layering: 65°

Knife sharp contact.

lamination 52°

transitional footwall.

294.10 – 295.25 slightly calcareous chlorite - bios. garnet - amphibole - biotite - magnetite - quartz gneiss (meta - silicate facies B/F)

gr, reddish brown, brown, greenish brown, distinct compositional banding with either sharp or gradual contacts between the different layers, cm - alternation of layers composed of qtz with bands or sometimes *schlieren of variable composition (mt + qtz + biotite, garnet + biotite, qtz + biotite + mt + garnet, qtz + biotite + amphibole or chlorite + mt).

banding: 65°

Knife sharp contact.

293.50 – 294.10 epidote - biotite - qtz - chlorite schist

(meta - pelitic sediment with volcanic impurity)

light gr with faint yellowish tint, brown schlieren and flazes, white stripes and lenses, flaser and lenticular structure which changes locally into a distinct lamination, imbricking qtz crystals as lenses and laminae in alternation with bands and schlieren composed of chlorite, biotite and epidote, biotite often is homogeneously distributed, the flazes being slightly

quartzite layers, often knife-sharp boundaries between the different layers but also gradual contacts, within the lower portion of the layer ~~locally~~ infolded sections of chlorite-amphibolite (footwall rock).
layering: 72°.
knife sharp hanging wall and footwall.

295.78 - 305.10 epidote-qtz-plagioclase-chlorite-amphibole schist/rock
(meta-basalt flow)
similar: 316.15 - 322.11 m but with more clearly developed distinction between chlorite-amphibole multi-crystal aggregates and felsic groundmass.

295.25 - 295.78 slightly calcareous amphibole bear. epidote-rich chlorite schist
(meta-mafic volcanic sediment)
lightgn, fine-crystalline, layered with changes into flaser and lenticular structure, interlocking qtz and/or carbonate crystals as laminae, lenses and schlieren in close alternation with layers and schlieren composed of fine-crystalline chlorite which is accompanied by acicular crystals of amphibole, the latter are parallel to the major foliation of the rock; rare tiny spots of pl.

similar: 324.05 - 330.20 m but no crosscutting qtz veins.

lamination: 72°

sharp contact.

epidote bear.

308.20 - 314.26 chlorite - amphibole schist

(meta - basalt flow)

gn to blish gn, fine - crystalline, homogeneous with local occurrence of cm - compositional banding, here alternation of chlorite bands with layers composed of amphibole, qtz veining; ~~frequent~~ abundant (poikiloblastic) spots of ilmenite max. 0.2 cm across and with sutured boundaries are nearly homogeneously distributed; several interlayers of quartzite (meta - sed) which normally contain no mt (308.70 - 309.13 m magnetite-quartzite, 309.45 m with scattered porphyroblasts of Py, 309.50 m with scattered porphyroblasts of Py, 309.73 - 309.74 m, 310.40 m, 311.27 - 311.34 m alternation with bands of chlorite-amphibole schist, 311.78 - 311.88 m alternation with bands of chlorite-amphibole schist).

schistosity, banding: 63°.

transitional contact.

305.10 - 308.20 magnetite - sed

(meta - oxide facies BIF)

gn and violet, nonrhythmic cm - alternation of mt - barren dense quartzite layers, magnetite - qtz bands and magnetite bear.

amphibole - chlorite - biotite crystal aggregates are homogeneously distributed within a groundmass composed of plagioclase, epidote, qtz and carbonate, the ~~bound~~ ~~fraction~~ between the coloured crystal aggregates and the groundmass get blurred ~~get blur~~ which is caused by the ~~alteration~~ "hydrothermal alteration" of the rock, the foliation is most pronounced within the outer parts of the layer while the middel section nearly is massive.
sharp contact

314.90 - 316.50 amphibole - chlorite bear. biotite - epidote - quartz gneiss
(meta - silicate facies chert or tuffaceous sediment with chert intercalations)
similar: 322.25 - 323.80 m but with local occurrence of randomly oriented porphyroblasts of amphibole; 315.86 - 316.02 m amphibole - chlorite bear. biotite - epidote - magnetite - qtz gneiss
similar: 323.80 - 324.05 m with gradual borders to the surrounding.
lamination: 68°
sharp ~~contact~~ contact.

314.26 - 314.90 slightly calcareous amphibole bear. epidote - rich chlorite schist / gneiss
(meta - mafic volcanic sediment)

crudely oriented, they often are stretched and flattened parallel to the conformable fine lamination of the rock; rare occurrence of idioblasts of mt and schlieren of po.
lamination: 65°
gradual contact.

322.11 – 322.25 magnetite-quartzite
(meta-oxide facies BIF)
gr and violet, extremely fine-grained, dense mt-barren quartzite layer of 3-cm thickness is flanked on both sides by mt-layered quartzite which occasionally shows cm-thick interbeds composed of chlorite and amphibole or schlieren and laminae of chlorite-biotite schist, garnet occurs forming trains of granules or lense-shaped crystal aggregates, rare schlieren and spots of py
layering: 64°
sharp contact

316.50 – 322.11 slightly calcareous qtz-plagioclase (epidote-)-biotite-chlorite-amphibole schist/rock
(meta-basalt flow, leached supp. due to ascending autohydrothermal fluids or water-contact) and amphibolites
(same as leached amphibole schists from DDH 768 § 322.50 – 336.70m and DDH 76 24.53 – 31.50m and Svåni-Profile)
light gn, crudely developed leopard texture, distinction between lense-shaped

323.80 - 324.05 amphibole-chlorite bear. biotite-epidote-magnetite-qtz gneiss
(meta-oxide-silicate facies 3 IT)
white, gr, gn, yellowish gn, brown, violet,
* laminated and also cm-banded, interlocking
tiny qtz crystals as laminae and cm-
bands in close alternation with layers
composed of either qtz and magnetite or
biotite and epidote or amphibole and
chlorite, always sharp or knife sharp
boundaries between the different
bands; rare schlieren and small clusters
of po.
lamination:
~~gradual~~ sharp contact

* fine-crystalline with sporadic occurrence of randomly oriented porphyroblasts of amphibole,

322.25 - 323.80 chlorite bear. biotite-epidote-qtz gneiss/schist
(meta-silicate facies 3 IT or qtz-rich epi-
clastic sediment with volcanic impurity)
gr, gngn, brown, yellowish brown, laminated,
sometimes with flaser and lenticular
structure, interlocking tiny qtz crystals
as laminae, bands and lenses in
alternation with laminae ~~and~~, layers and
schlieren composed of either epidote and
biotite or biotite or chlorite, biotite
tends to form porphyroblasts which* are

330.56 m
with 334.79 - 334.85 m and 334.93 - 334.98 m some
mt and with 335.30 - 335.32 m and 335.41 -
335.53 m either medium-grade Py or stringers of
Po
layering: 72°

324.05 - 330.20 amphibole bear. epidote-rich chlorite schist
(meta-mafic volcanic sediment)
gn, fine-crystalline, onset development
of cm-to dm-banding, interleaved chlorite
and amphibole crystals as cm to dm thick layers
in alternation with lenses, tiny bands
and schlieren composed of qtz which
in places are discordant to the major foliation
of the rock, locally interlayers of chlorite-
amphibole schist or mt-banded cherts
tiny crystals of garnet which tend to collect in some trains of garnets
which often contain schlieren of sulphide and
(324.60 - 324.80 m, 325.00 - 325.23 m, 325.33 - 325.35 m, 326.40 - 325.45 m,
327.63 - 327.69 m, 327.76 - 327.88 m, 327.99 - 328.12 m, 328.35 -
328.58 m, 329.58 - 329.79 m); it occurs as scattered tiny crystals
only within the chlorite layers; *2
laying: 60°
sharp contact.

*2 between 325.50 - 325.78 m biotite-epidote-quartz schist (meta-silicate facies BIF) brownish-grey with faint yellowish tint, laminated and with flaser and lenticular structure, interlocking qtz crystals as mm-thick layers and lenses in alternation with laminae and layers composed of biotite, epidote and qtz, sometimes interlayers of chlorite schist, sporadically tiny idioblasts of mt and schlieren of Py.

335.95 - 336.15 sulphide bear mt-mgt quartzite
(meta-oxide and sulphide facies BIF)
gr with violet tint, strongly distorted cm-banding composed of alternate dense quartzite layers and bands characterized by fine-crystalline magnetite, the upper portion shows a web-like pattern of pyrite, the sulphide grading 5% by volume of the rock.
sharp contacts

335.85 - 335.95 milky qtz

330.20 - 335.85 slightly calcareous epidote-qtz-fspar-chlorite-amphibole gneiss
(meta-mafic volcanic sediment)
gn to grgn, dm-banding with superimposed lamination or cm-textural banding, non-rhythmic alternation of fine crystalline layers dominated by chlorite and sections characterized by randomly oriented porphyroblasts of amphibole which are embedded in a fine-grained groundmass composed of chlorite, epidote, qtz and fspar, the amphibole needles are variably distributed they either are widely scattered or can be enriched within cm-thick bands, carbonate tends to form scattered idioblasts the crystals on average 0.1 cm large; at several locations cm-thick interlayers of meta-chert which carries

with laminae or lenses made by qtz and carbonate, biotite forms slightly porphyritic crystals which show a tendency to collect within lenses or discontinuous layers which are conformable with the major foliation of the rock; it occurs as xenomorphic crystals (poikiloblasts) which show ~~typical~~ sutured boundaries, it amounts to lesser 1% by volume of the rock; py sporadically is present as subidiomorphic porphyroblasts which often form trains of granules.
lamination: 49°
sharp contact

341.22 – 342.06 slightly calcareous biotite-sericite schist (meta-pelite)

similar: 343.50 – 346.00 m, seems to be placed into the volcanic series by folding.

336.15 – 341.22 slightly calcareous biotite bear. epidote-qtz-chlorite schist
(meta-mafic volcanic sediment or meta-pelite with mafic volcanic impurity)
similar: 342.06 – 343.50 m; several thin layers rich in py (337.00 – 337.25 m, 338.15 – 338.28 m, 338.80 – 339.00 m, 339.59 – 339.73 m, 340.02 – 340.04 m)
lamination: 50°
sharp contact

and 351.36 - 351.41 m.

tectonized zone between: 349.80 - 351.01 m

schistosity: 64°

gradual contact

346.00 - 349.10 calcareous to high calcareous sericite schist (meta-pelite)

similar: 353.20 - 357.20 m, within the lower portion sometimes cm and dm-thick intercalations (see below) of calcareous biotite-sericite schist, the bands with sharp boundaries to the surrounding schist.

schistosity: 63°

gradual contact

343.50 - 346.00 slightly calcareous biotite-sericite schist (meta-pelite)

similar: 349.10 - 353.20 m but strongly deformed, tectonized zones between 344.30 - 344.95 m with thickness due to folding.

gradual contact.

342.06 - 343.50 slightly calcareous amphibole-biotite bear. chlorite schist (meta-mafic volcanic sediment or meta-pelite with volcanic impurity)

lightgrey, fine-crystalline, laminated or with widely developed lenticular structure, nonrhythmic alternation of bands predominated by fine-crystalline chlorite, the crystals showing a preferred orientation,

353.70 – 357.70 calcareous sericite schist

(meta-pelite)

gr, distinct lenticular structure, locally
crude development of lamination, hetero-
granoblastic, interlocking qtz and carbonate crystals
as lenses and layers sometimes crosscutting
bands in alternation with schistose
and layers composed of fine crystalline
sericite and subordinate biotite, the
upper portion is enriched in carbonate partly it forms idiomorphic
crystals being 0.05 cm across which are scattered.
gradual contact

349.10 – 353.70 calcareous biotite-sericite schist

(meta pelite)

gr with faint greenish tint, abundant
brown spots, flaser and lenticular structure,
interlocked qtz and carbonate crystals as
laminae and lenses in close alternation
with bands and schistose composed of
fine-crystalline sericite, biotite joins
sericite it forms 0.2 cm large porphyro-
blasts or imperfect spherulites the crystals
and crystalaggregates nearly being homogeneously
distributed thus causing a spotted
appearence of the rock, biotite mostly
is not aligned with the major foliation
of the rock, high-grade sulphide of either
combined po and py or py between 351.52-357.65m

sillicen and bands composed of sericite and bio like, the latter is variably distributed forming randomly oriented porphyroblasts mat 0.15 large*, idioblasts of garnet occur within the lower portion of the layer and frequent occurrence of py as sillicen, laminae and ribbon-shaped patterns, high-grade nearly massive py mineralization which contains some spots of Pg, occurs between 364.12-364.19 m, 364.95-365.00m, 370.00-370.10 m, elsewhere py amounts to 1% of the total or lesser;*2 mt displays idioblasts and big xenomorphic crystals with often sutured boundaries between 364.25-364.97m and 368.50-372.00 m, it grades lesser 1% by volume of the rock.

*1 within the upper portion biotite is fine crystalline and tends to be aligned with the major foliation of the rock

*2 it may be equally distributed but mostly forms scattered agglomerates, the subidiomorphic crystals are between 1 and 5 mm across.

*2 Pg displays a medium-grade mineralization between 363.79-364.00 m it occurs within a matrix of qtz (meta-chert, silfid facies)

schistosity: 72°

sharp contact

357.70 - 363.10 high calcareous sericite schist (meta-pelite)

similar: 374.40 - 378.50 m*; interlayers of nearly massive py within 362.65 - 362.80 m and 360.75 - 361.02 m, the latter band is accompanied by dense quartzite containing scattered py crystals which is situated at the footwall of the layer.

*, but with scattered xenomorphic crystals of mt between 361.25-362.20 m;

schistosity: 70°

sharp contact.

378.50 – 385.30 biotite - sericite schist

(meta-pelite)

gr with thoron rods and spots, distinct flaser and lenticular structure, interlocking qtz and carbonate as lenses and schlieren in alternation with schlieren and layers composed of sericite and biotite, the latter occurs as porphyroblasts on average 0.2 mm large which are scattered and random oriented.

sharp contact.

374.40 – 378.50 qtz-rich calcareous sericite schist

(meta-pelite)

gr, distinct flaser and lenticular structure, interlocking qtz and/or carbonate crystals as lenses and schlieren in alternation with schlieren of sericite; frequent occurrence of po which forms flakes, schlieren and ribbon-shaped patterns, the amount being 1 Vol.-%

tectonic zone between 375.00 - 375.27 m

schistosity: 23°

gradual contact.

363.10 – 374.40 slightly calcareous biotite - sericite schist

(meta-pelite)

gr with abundant thoron rods, flaser and lenticular structure, heterogeneous, interlocking qtz crystals as lenses, schlieren and layers in alternation with

~~faulted~~ tectonic zones: 412.42 - 411.80 m several tiny faults, 411.65 - 410.40 m

gradual contact

399.80 - 410.00 qtz-rich biotite bearing sericite phyllite (meta-qtz pelite)

with random brown spots porphyroblastic texture

gr, ~~fine-grained~~ single, homogeneous in places laminated, porphyroblasts of biotite on average 0.15 cm across are ~~homogeneously~~ scattered within a groundmass composed of fine-crystalline sericite and qtz, the mica forming the foliation.

strongly tectonized ~~disturbed~~ between: 410.00 - 405.00 m several tiny faults and discordant folding.

discovery of

gradual contact

385.30 - 399.80 biotite - sericite schist (meta-pelite)

gr with brown spots, homogeneous locally laminated due to carbonate which forms tiny layers being in the ~~of the core~~ and cm-thick bands composed of sericite + biotite + qtz, biotite forms scattered porphyroblasts and bundle-like aggregates on average 0.2 mm ~~size~~ large which are slightly ~~squeezed~~ flattened often parallel to the major foliation of the rock.

fault zones: 390.40 - 390.70 m

lamination: 65° within core portion, 45° at hanging wall

sharp contact.

crystals as groundmass,
with scattered slightly porphyritic crystals
of biotite which partly are
~~tend to be slightly~~ oriented
~~parallel~~, carbonate forms tiny xenomorphic
crystals (spots)
~~spots~~ which are homogeneously distributed.
sharp contact.

436.80 – 439.50 qtz - rich biotite - sericite schist / rock
(meta - qtz pelite)
gr, fine - crystalline, crudely schistose,
homogeneous, groundmass composed of
tiny crystals of sericite and qtz, the former causes a slight foliation,
biotite forms ~~tiny~~ slightly
porphyritic crystals which are homogeneously
distributed and not but sometimes
oriented.
fault-zones
~~fracture zones~~: 449.23 - 449.40 m, 437.60 - 437.75 m,
437.15 - 437.36 m

sharp contact.

419.00 – 436.80 biotite-sericite schist
(meta - pelite)
gr, homogeneous ~~only~~, sporadically ~~coarse~~ tendency
~~distinct~~ to lenticular structure, groundmass
composed of fine-crystalline sericite and qtz, biotite
occurs as scattered porphyroblasts and bundle-like aggregates
on average
0.1 cm across which are randomly oriented.
sample 685D/2
~~chemical~~ analysis
424.45 - 426.70 m
whole rock
lod
in places rich in carbonate, here often with distinct
~~lenticular~~ flaser and lenticular structure being due to a close alteration
~~of~~ of carbonate and threads made
of mm - large lenses ~~being~~ ~~schistose~~ by
sericite.

442.15 - 443.80 biotite bear. sericite - rich quartzite
(meta - qtz arenite)
gr, fine-crystalline, homogeneous distribution of tiny sericite flakes within a fine-grained granoblastic groundmass composed of qtz, a slight foliation is caused by parallel alignment of sericite crystals.
sharp contact

441.17 - 442.15 phyllosilicate-rich quartzite
(meta-graywacke)
gr, blasto psammitic texture, flattened and stretched rounded fragments of qtz and qtz-fspar rock (from fine pebble to medium sand fraction) embedded in a phyllosilicate dominated matrix composed of sericite + biotite + qtz, within the upper portion gradual decrease in grain size and transition into fine graywacke or qtz-arenite.
sharp contact, 80°

440.83 - 441.17 phyllosilicate-rich quartzite
(meta-graywacke)
similar: 441.17 - 442.15 m continuous transition from coarse sand fraction (footwall) to fine sand within hanging wall.
sharp contact, 80°

439.50 - 440.83 calcareous qtz-rich biotite-sericite schist/rock
(meta-pelite)
gr, homogeneous, wide development of foliation, interlocking fine-crystalline sericite and qtz

in phyllosilicate matrix.
sharp contact
446.05 - 446.20 : phyllosilicate-rich quartzite
(meta - greywacke)
gr. blasto psammitic texture, slightly stretched and flattened rounded fragments of qtz or qtz - fspar rock embedded in abundant matrix composed of biotite + sericite + qtz.
sharp contact.

444.40 - 445.15 phyllosilicate-rich quartzite
(meta - greywacke)
similar: 446.05 - 446.20 m gradually decreasing in grain size from fine pebble to fine sand upsection.
sharp contact.

443.80 - 444.40 qtz-rich biotite - sericite schist
(meta pelite)
gr with brown spots, homogeneous, un-banding, (within 10 cm of hw contact)
~~of~~ alternation of fine-grained granoblastic phyllosilicate-rich quartzite layers and qtz-rich biotite-sericite schist bands, which always have sharp contacts, elsewhere fine-crystalline sericite and qtz forming a granoblastic groundmass which contain scattered tiny blasts of biotite being randomly oriented.
banding: 70°
sharp contact.

tectonic zones characterized by closely spaced tiny faults at: 453.15 - 454.60 m and 458.85 - 460.60 m.
sharp contact.

449.80 - 450.75 calcareous phyllosilicate bear. fspar-qtz rock
(meta. paraconglomerate, pebbly mudstone)
gr, white, gn, distinct blasto psephitic texture, stretched and flattened subrounded to rounded fragments of cobble to pebble size composed of either qtz or qtz+fspar (qtz - bearing) are closely packed but surrounded by a sparce schistose matrix made of sericite and chlorite which locally carry some porphyroblasts or bundles of biotite, carbonate forms mm - thick deformed clasts, stringers which may constitute strongly, it further occurs as irregular dissemination within qtz - debris!
sharp contact

448.05 - 449.80 biotite - sericite schist
(meta - pelite)
gr with some brown spots, porphyroblastic, porphyroblastic, homogeneous, biotite forms scattered porphyroblasts or fascicular bundles size aggregates on average 0.15 cm large which tend to be not oriented, sometimes carbonate as vein-fillings.
sharp contact

445.15 - 448.05 slightly calcareous phyllosilicate - fspar - qtz rock
(meta paraconglomerate, pebbly mudstone)
similar: 449.80 - 450.75 m but slightly increased

sericite and biotite, the latter often forms porphyroblasts or fascicular bundles or sheaf-like crystal aggregates which tend to be aligned with the foliation* of the rock.
foliation: 90°-75°.
~~sharp-bearing contact~~.

469.00 - 473.70 biotite-chlorite bear. sericite schist
(meta-pelite)
gr with faint greenish tint, scattered brown ~~platelets~~ flakes, banded, interleaved sericite and chlorite flakes as cm-thick homogeneous bands alternate with max. 0.5 cm thick layers composed of sericite + qtz, biotite forms scattered porphyroblasts or fascicular bundles on average 0.15 cm large which are homogeneously distributed.
laying: 80°
sharp contact.

469.75 - 469.00 biotite-sericite schist
(meta-pelite)
gr with faint greenish tint, homogeneous, only sporadically with lenticular structure, biotite forms scattered porphyroblasts, fascicular bundles or imperfect sphaerolites on average 0.25 cm large ~~and bursts~~ which are homogeneously distributed within a fine-crystalline lepidoblastic matrix composed of sericite and qtz.

478.75 – 486.00 biotite – sericite schist

(meta-pelite)

gr weißl faint greenish tint, abundant dioron rods and spots, homogeneous, ~~with~~ widely developed lenticular structure,* biotite forms porphyritic crystals or crystal-aggregates lesser 0.1 cm large which are homogeneously distributed while they are oriented at random, very rare are bands of carbonate.

schistosity, lamination: 80°

gradual contact

486.18 – 485.40: calcareous qtz-biotite-sericite schist (meta-graywacke)

gr, blastopsammitic texture, lense-shaped fragments of pure qtz (vein-qtz) on average 0.5 cm large are embedded in a schistose matrix composed of carbonate ± biotite ~~and~~ + sericite.

gradual contacts on both sides of the layer.

* fine-crystalline granoblastic to lepidoblastic sericite-qtz groundmass,

477.10 – 478.75 bleached zone within biotite-sericite schist

473.70 – 477.10 high calcareous biotite bear. qtz-sericite schist (meta-graywacke)

gr white with ~~small~~ abundant dioron rods, blastopsammitic texture, lense-shaped fragments of sand size mainly composed of qtz (vein-qtz) are embedded in a fine-crystalline widely schistose matrix ~~composed~~ made of carbonate,

shear-induced
gr. flaser and lenticular structure ~~lying due to shearing~~; irregular alternation of layers granoblastic
and lenses of qtz with schlieren of sericite; no composes a ribbon-shaped pattern, it grades on average 5% by volume of the rock.
strongly folded.

sharp contact.
487.85 - 492.80 phyllosilicate poor quartzite
(meta - qtz arenite)

gr, fine-grained granoblastic qtz with schlieren and streaks composed of sericite which contain sometimes idioblasts of garnet.
folded and sometimes lectonized.

~~gradual contact~~

486.00 - 487.85 garnet - sericite bear. Biotite-rich quartzite
(meta - qtz arenite)

brownish gr, fine-crystalline, ~~rude~~ development of lamination, ~~due to addition of biotite~~, tiny crystals of biotite are scattered within a fine-grained granoblastic matrix of qtz.*
garnet forms widely scattered idioblasts max. 0.15 cm across.
lamination: 85°
gradual contact.

*biotite also shows a tendency to collect within mm-thick bands which causes a lamination of the rock,

sharp contact.

496.65 - 497.00 high calcareous sericite schist / phyllite
(meta-pelite)
gr., homogeneous ~~with~~, ~~lenticular structure~~,
tiny lenses composed of carbonate are
surrounded by interleaved sericite flakes
which compose a web-like texture.
sharp contacts.

496.00 - 496.65 slightly calcareous biotite-sericite schist /
phyllite
(meta-pelite)
similar: 497.55 - 498.85 m
sharp contact

494.95 - 496.00 high calcareous biotite-poor qtz-sericite schist
(meta-qtz-rich pelite)
gr with faint greenish tint, distinct lenti-
cular structure, irregular alternation of
lenses and layers composed of qtz with
schlieren and bands made by sericite ~~and~~ +
carbonate ~~and~~ + biotite, carbonate lies to
form tiny lenses or schlieren.
strongly folded.
sharp contact.
Pyrrhotite-rich,
492.80 - 494.95 qtz-biotite-sericite schist
(meta-qtz-rich pelite with iron sulphide
supp. formed by iron-reducing bacteria)

carbonate embedded in a matrix of fine-crystalline sericite with rare occurrence of porphyritic diorite.
lamination: 80°
sharp contact

497.55 - 498.85 slightly calcareous diorite - sericite schist / phyllite
(meta-pelite)
gr with faint greenish tint, homogeneous with crude development of banding, abundant tiny crystals of diorite which tend to be not oriented are scattered within a matrix of fine-crystalline interleaved sericite flakes, diorite is variably distributed which causes the banding of the rock; some cm-thick inter-layers of high calcareous diorite decr. sericite phyllite (s. below)
schistosity: 80°
sharp contact.

497.00 - 497.55 slightly calcareous epidote-chlorite decr. diorite - sericite phyllite
(meta-pelite with volcanic impurity)
brown gr with greenish tint, laminated, interleaved sericite and diorite flakes as schliren and layers in close alternation with mm-thick bands and schliren composed of diorite, epidote and carbonate.
lamination: 75°

507.90 - 520.57 calcareous biotite - sericite schist
(meta - carbonate banded pelite)
gr with faint greenish tint, abundant white stripes and brown schlieren and rods, laminated, interlocked qtz and carbonate crystals as mm - thick layers in close alternation with laminae composed of sericite and biotite, the latter tends to form mm - large porphyritic crystals or fascicular bundles which may be scattered while not oriented but often form traces of flakes, carbonate often occurs as lenses or cm - thick bands
lamination: 85° - 90°, folded and partly recrystallized between 509.50 - 512.00 m here sometimes clusters of milky qtz.

500.75 - 507.90 calcareous biotite bear. sericite schist
(meta-pelite)
similar: 525.60 - 543.80 m
lamination: 80° - 75°
sharp contact

498.85 - 500.75 calcareous to high calcareous biotite bear. sericite schist / phyllite
(meta - pelite)
gr with faint greenish tint, widely developed lamination, lenticular structure, mm - thick lense - like spots and schlieren composed of

lamination: 85-80°.
gradual contact
545.75 - 545.18: calcareous sericite phyllite
(meta-pelite)
gr, homogeneous with widely developed lenticular structure supp. due to cementation, interlocked carbonate crystals as lenses or tiny spherules surrounded by fine-crystalline sericite.
gradual hanging wall, sharp footwall.
schistosity: 85°

525.60 - 543.80 calcareous diorite bear. sericite schist
(meta-carbonate banded pelite)
gr with faint greenish tint, often white coloured bands, rare brown spots and lenses, homogeneous or with lenticular structure, sporadically with indistinct lamination, interleaved sericite flakes as bands and spherules in wide alternation with lenses or spherules composed of qtz and carbonate, the latter also forms cm-thick bands and lenses which have a frequent occurrence, diorite either occurs as imperfect spherulites and fasciculate bundles of max 0.5 cm size and often conformable with the major foliation of the rock as it displays schlieren and trains of flakes.
gradual contact.

520.57 - 525.60 tectonic zone within diorite-sericite schist

602.85 - 606.65 slightly calcareous biotite - sericite schist
(meta pelite)
similar: 610.45 - 610.65 m
gradual contact

601.70 - 602.85 calcareous biotite - sericite schist
(meta pelite, supp. conglomeratic siltstone, pebbly mudstone)
similar: 606.65 - 610.45 m
gradual contact

601.80 - 601.70 slightly calcareous biotite - sericite schist
(meta-pelite with carbonate bands)
gr with faint greenish tint, sometimes yellowish, abundant brown rods, porphyroblastic, homogeneous or laminated, the latter sometimes is widely developed with lenticular structure, interlocked sericite flakes often as schlieren and layers alternate with lenses or bands composed of qtz and carbonate which sporadically contain abundant epidote, biotite displays schlieren which are conformable with the major foliation of the rock, it locally has fewer scattered flakes or bow-tie shaped aggregated*, sometimes within lower portion occur* thick interlayers of calcareous epidote-biotite schist which have a distinct flaser structure due to close alternation of epidote schlieren and bands and schlieren composed of biotite and carbonate, the layers normally have gradual contact with the surrounding schist.

sample: 685D/1
551.25 m
chem. analysis
561.15 - 562.44 m
whole rock

*, carbonate often occurs as layers up to cm-thickness or it is concentrated within lenses or irregular shaped bodies

F.D. Priesemann, 1986

610.65 end of DDH 685-1

610.45 – 610.65 : slightly calcareous biotite – sericite schist
(meta-pelite)
gr with faint greenish tint, widely developed lamination and lenticular structure, porphyroblastic, inclosing qtz or qtz and carbonate crystals as schlieren and lenses in alternation with interleaved sericite flakes forming schlieren and layers, biotite displays scattered 0.1 cm large porphyroblasts or bow-tie shaped crystal aggregates which are oriented at random.
lamination: 85°

606.65 – 610.45 calcareous biotite – sericite schist with epidote lens.
(meta-pelite, ~~gr~~ supp. conglomeratic tillboide, pebbly mudstone)
light gr with abundant brown stripes, supposed ~~supposedly~~ with basloposephitic texture, lenses composed of biotite + carbonate + qtz ~~and~~ + fspar are surrounded by interleaved fine-crystalline sericite and biotite crystals which carry abundant carbonate and some epidote, biotite besides that constitutes ~~forms~~ distinct laminae or sometimes schlieren which cause a banding of the rock, carbonate in places occurs as idioblasts max. 0.2 cm across.
banding: 85°
sharp contact

Susceptibility : DDH 685 D

372.00	0.9
372.10	0.2
372.50	0.0
373.00	0.0
373.50	0.0
374.00	0.0
374.50	0.0
376.00	0.0
376.50	0.0
376.00	0.0
376.50	0.1
377.00	0.0
378.00	0.0
379.00	0.0
380.00	0.0

371.50	0.1
371.00	0.1
370.20	3.1
369.90	0.5
369.20	0.2
369.50	1.8
369.00	1.5
368.50	1.4
368.00	0.0
367.50	0.0
367.00	0.0
366.60	0.0
366.00	0.0
365.50	0.0
365.00	0.1
364.99	0.2
364.90	1.7
364.50	3.4
364.00	0.1
363.90	0.1
363.50	0.0
363.00	0.1
362.70	0.2
362.50	0.0
362.00	0.7
361.50	1.0
361.00	0.0
360.80	0.0
360.50	0.0
360.00	0.0
359.00	0.0
358.00	0.0
357.00	0.0
356.00	0.0
355.00	0.0
354.00	0.0
353.00	0.0
352.00	0.0
351.00	0.0

350.00	3.4
349.00	0.0
348.00	0.0
347.00	0.0
346.00	0.0
345.00	0.0
344.00	0.0
343.00	0.0
342.00	0.1
341.00	0.0
340.00	0.2
339.00	1.3
338.00	0.0
337.00	0.4
336.20	0.0
336.00	17.0
335.80	0.5
335.00	0.1
334.85	6.7
334.80	5.9
334.50	2.1
334.00	0.4
333.00	0.5
332.50	0.6
332.00	0.5
331.50	2.4
331.00	0.4
330.56	0.5
330.00	0.6
329.65	12.0
329.50	0.2
329.00	0.2
328.50	0.8
328.40	18.0
328.30	14.0
328.20	2.5
328.10	0.2
328.00	18.0
327.90	0.2
327.80	39.0
327.60	12.0
327.50	0.0
327.40	0.1
327.00	0.1
326.50	0.0
326.00	0.0
325.60	0.7
325.43	7.8
325.30	15.0
325.20	5.9
325.05	18.0
325.00	0.0
324.85	16.0

324.50	0.3
324.20	0.3
324.00	0.2
323.90	4.0
323.70	0.1
323.50	0.1
323.30	0.1
323.00	0.1
322.75	0.1
322.50	0.1
322.40	0.1
322.30	12.3
322.20	1.3
322.00	0.1
321.50	0.1
321.00	0.1
320.00	0.0
319.00	0.0
318.00	0.0
317.00	0.0
316.50	0.0
316.00	11.4
315.50	0.1
315.00	0.0
314.00	0.0
313.00	0.1
312.00	0.1
311.80	0.3
311.50	0.0
311.30	0.1
311.00	0.1
310.00	0.2
309.50	0.2
309.00	0.2
308.90	37.0
308.75	22.0
308.50	0.1
308.30	0.1
308.00	24.0
307.50	25.8
307.00	27.8
306.50	21.8
306.00	13.0
305.50	23.0
305.00	27.0
304.50	0.1
304.00	0.1
303.00	0.1
302.00	0.1
301.00	0.1
300.00	0.0
299.00	0.0
298.00	0.1

297.00	0.2
296.00	0.1
295.50	0.1
295.00	22.0
294.50	28.0
294.20	31.0
294.00	0.1
293.00	0.1
292.00	0.7
291.00	1.8
290.00	2.2
289.00	1.7
288.00	0.0
287.00	0.0
286.00	0.0
285.00	0.0
284.00	0.0
283.00	0.0
282.00	0.1
281.00	0.1
280.00	0.1
279.00	0.1
278.00	0.1
277.00	0.1
276.00	0.1
275.00	0.0
274.00	0.0
273.00	0.0
272.00	0.0
271.00	0.0
270.00	0.0
269.00	0.0
268.00	0.0
267.00	0.0
266.00	0.0
265.00	0.1
264.00	4.1
263.50	4.7
262.00	3.2
262.50	1.1
262.00	0.1
261.50	0.2
261.00	0.7
260.50	2.1
260.00	1.5
259.50	1.3
259.00	0.4
258.50	0.2
258.00	0.1
257.00	0.0
256.00	0.1
255.00	0.1
254.50	1.2

254.00	1.3	221.00	1.0	193.00	0.0	159.50	11
253.50	0.1	220.50	0.5	192.00	0.1	158.00	3.1
253.00	0.1	220.00	0.3	191.00	0.0	157.50	2.6
252.00	0.1	219.50	0.7	190.00	0.0	157.00	4.5
251.00	0.0	219.00	2.1	189.00	0.0	156.50	4.4
250.00	0.0	218.50	4.5	188.00	0.0	156.00	5.2
249.00	0.0	218.00	1.0	187.00	0.0	155.50	2.7
248.00	0.6	217.50	0.8	186.00	0.0	155.00	3.9
247.50	0.0	217.00	0.5	185.50	2.1	154.50	3.1
247.00	0.0	216.50	2.7	185.00	1.2	154.00	3.4
246.50	0.0	216.00	2.9	184.00	0.1	153.50	5.1
246.00	0.0	215.50	1.9	183.00	1.2	153.00	1.0
245.00	0.0	215.00	1.9	182.50	1.2	152.50	3.7
244.50	0.5	214.50	1.2	182.00	1.6	152.00	0.8
244.00	0.0	214.00	1.2	181.50	1.2	151.50	0.3
243.50	0.1	213.50	6.6	181.00	0.9	151.50	2.3
243.00	2.4	213.00	2.0	180.50	1.2	151.00	6.6
242.00	0.1	212.50	4.1	* 180.00	1.7	150.50	1.2
241.00	0.0	212.00	1.2	179.50	0.6	150.00	1.4
240.00	0.0	211.50	7.0	179.00	0.6	149.50	0.1
239.50	0.3	211.00	2.2	178.50	1.9	149.00	0.5
239.00	0.6	210.50	4.2	178.00	2.5	148.50	2.5
238.00	1.7	210.00	3.5	177.50	0.4	148.00	0.5
237.50	2.1	209.50	2.1	177.00	0.4	147.50	2.4
237.00	2.3	209.00	3.0	176.50	2.6	147.00	1.5
236.50	0.3	208.50	2.9	176.00	1.4	146.50	2.1
236.00	0.2	208.00	0.4	175.50	2.9	146.00	2.8
235.00	0.1	207.50	1.7	175.00	0.1	144.00	1.7
234.50	0.0	207.00	1.7	174.50	0.1	143.00	5.1
234.00	0.7	206.50	2.7	174.00	3.4	141.20	1.9
233.50	0.1	206.00	2.2	173.50	2.4	141.10	4.1
233.00	0.2	205.50	1.8	173.00	5.9	141.00	35.0
232.50	0.1	205.00	1.7	172.50	1.3	140.50	28.0
232.00	0.3	204.50	0.5	172.00	0.4	140.00	26.0
231.50	0.4	204.00	2.3	171.50	0.6	139.50	7.0
231.00	0.4	203.50	3.5	171.00	0.6	139.00	6.3
230.50	2.0	203.00	2.6	170.50	0.2	138.50	35.0
230.00	0.2	202.50	5.4	170.00	0.4	138.00	13.0
229.50	1.2	202.00	1.8	169.50	0.0	137.50	16.0
229.00	1.4	201.50	0.9	169.00	0.1	137.00	2.2
228.50	1.8	201.00	0.3	168.50	0.0	136.50	4.6
228.00	0.6	200.50	0.4	168.00	0.3	136.40	17.0
227.50	0.4	200.00	0.9	167.50	0.1	136.10	0.6
227.00	2.1	199.50	1.3	167.00	0.1	135.50	3.3
226.50	4.3	199.00	2.2	166.00	0.2	135.40	1.5
226.00	3.4	198.50	1.2	165.00	0.1	135.00	0.3
225.50	0.4	198.00	2.2	164.00	0.1	134.50	0.2
225.00	2.1	197.50	3.7	163.50	0.0	134.00	0.1
224.50	3.1	197.00	0.3	163.00	5.2	133.50	0.2
224.00	0.7	196.50	0.1	162.50	0.1	133.00	0.2
223.50	1.0	196.00	0.0	162.00	0.4	132.50	1.3
223.00	0.0	195.50	0.0	161.50	0.3	132.00	1.1
222.50	0.1	195.00	0.2	161.00	0.1	131.50	0.3
222.00	1.2	194.50	0.0	160.00	0.1	131.00	1.5
221.50	3.0	194.00	0.0	159.00	0.3	130.00	0.2

129.50	0.3
129.00	0.2
128.50	1.2
128.00	0.4
127.50	0.7
127.00	3.0
126.50	0.4
126.00	0.0
125.00	0.0
124.00	0.0
123.00	0.0
122.00	0.0
121.00	0.0
120.00	0.0
119.00	0.0
118.00	0.0
117.00	0.0
116.00	0.1
115.00	0.0
114.00	0.0
113.00	0.0
112.00	0.1
111.00	0.0
110.00	0.0
109.00	0.0
108.00	0.0
107.00	0.0
106.00	0.1
105.00	0.1
104.00	0.0
103.00	0.1
102.00	0.1
101.00	0.1
100.00	0.0
99.00	0.0
98.00	0.1
97.00	0.2
96.00	0.0
95.00	0.0
94.00	0.0
93.00	0.0
92.00	0.0
91.00	0.0
90.00	0.0
89.00	0.0
88.00	0.1
87.00	0.0
86.00	0.0
85.00	0.0
84.00	0.0
83.00	0.0
82.00	0.0
81.00	0.0
80.00	0.0
79.00	0.0
78.00	0.0
77.00	0.2

76.00	0.7
75.00	0.4
74.00	1.2
73.50	1.6
73.00	2.1
72.50	1.0
72.00	1.9
71.50	2.1
71.00	2.1
70.50	1.0
70.00	0.4
69.50	0.4
67.00	0.4
68.50	0.3
68.00	0.4
67.50	1.2
67.00	0.2
66.00	1.2
65.00	0.3
64.00	0.2
63.00	2.1
62.00	0.3
61.00	0.2
60.50	3.9
60.00	0.7
59.00	0.4
58.00	1.2
57.00	0.6
56.00	0.2
55.00	0.2
54.00	0.2
53.00	0.2
52.00	0.1
51.00	0.2
50.00	0.2
49.00	0.2
48.00	0.0
47.00	0.1
46.00	0.1
45.00	0.1
44.00	0.2
43.00	1.5
42.00	0.4
41.00	0.1
40.00	0.4
39.00	1.5
38.00	0.3
37.00	0.3
36.00	0.1
35.00	0.6
34.00	0.3
33.00	0.2
32.00	0.2
31.00	0.2
30.00	0.1
29.00	0.4
28.00	

27.00	0.1
26.00	0.1
25.00	0.1
24.00	0.1
23.00	0.2
22.00	0.7
21.00	0.1
20.00	0.4
19.00	0.1
18.00	0.6
17.00	0.3
16.00	0.4
15.00	0.3
14.00	0.2
13.00	0.4
12.00	0.3
11.00	0.5
10.00	0.3
9.00	
8.00	
7.00	
6.00	
5.00	
4.00	
3.00	
2.00	
1.00	

DDH 685 D

Occurrences of sulfide:

74.45 - 76.00 m	sparce idioblasts, Py
77.30 - 77.50 m	"
141.00 - 141.09 m	scattered idioblasts, Py
141.32 - 144.10 m	random occ, Py
147.58 - 147.63 m	crystals of Py
148.13 m	3 cluster of Py
148.13 - 148.28 m	crystals of Py
148.89 ~ 149.89 - 149.48 m	scattered idioblasts, Py, 3 Vol.-%
150.55 - 153.30 m	zonal spots, Py, 1 Vol.-%
175.20 - 175.75 m	idioblasts, Py
204.40 - 204.92 m	single crystals, Py
207.39 - 208.85 m	"
213.96 m	idioblasts, Py
214.50 - 214.90 m	"
217.40 m	scattered idioblasts, Py
217.50 - 218.00 m	"
219.00 - 219.10 m	"
219.38 - 222.00 m	"
222.13 m	"
309.45 m	scattered porphyroblasts, Py
309.50 m	"
322.11 - 322.25 m	rare sd. lenses and spots, Py
322.25 - 323.80 m	rare sdlenses, Po
323.80 - 324.05 m	rare sdlenses and clusters of Po
325.50 - 325.78 m	sdlenses of Py
335.30 - 335.32 m	medium-grade Py
335.41 - 335.53 m	stringers of Po
335.95 - 336.15 m	web-like Py, 5 Vol.-%
337.00 - 337.25 m	sd. Py
338.15 - 338.28 m	"
338.80 - 339.00 m	"
339.59 - 339.73 m	"
340.02 - 340.04 m	"
342.06 - 343.50 m	sparce crystals, Py
351.52 - 351.55 m	high-grade Py and Po
351.36 - 351.41 m	" Py
362.65 - 362.80 m	nearly mass. Py
360.75 - 361.02 m	"
363.10 - 374.04 m	sdlenses, laminae, ribbon-shaped patterns of Po, 1 Vol.-%
	364.12 - 364.19 m high-grade Po with spots of Py
	364.95 m "
	365.00 m "
	370.00 - 370.10 m "
363.79 - 364.00 m	medium-grade Py
374.40 - 378.50 m	flasers, sdlenses, ribbon-shaped patterns of Po, 1 Vol.-%
492.80 - 494.95 m	ribbon-shaped patterns of Po, 5 Vol.-%

DDH 685D → Occurrences of chert:

136.38 - 136.44	m	mt - quartzite
141.00 - 141.09	m	quartzite
146.77 - 146.84	m	"
147.05 - 148.13m → 148.89 - 149.06	m	"
294.10 - 295.25	m	silicate - oxide facies BIF
305.10 - 308.20	m	mt - quartzite
308.70 - 309.13	m	"
309.45 m		quartzite
309.50 m		"
309.83 - 309.84 m		"
310.40 m		"
311.27 - 311.34	m	quartzite with chlorite-amph. schist
311.78 - 311.88	m	"
322.11 - 322.25	m	mt - quartzite
322.25 - 323.80	m	silicate - facies BIF
324.60 - 324.80	m	mt - quartzite
325.00 - 325.23	m	"
325.33 - 325.35	m	"
325.40 - 325.45	m	"
325.50 - 325.78	m	silicate - facies BIF
327.63 - 327.69	m	mt - quartzite
327.76 - 327.82	m	"
327.99 - 328.12	m	"
328.35 - 328.58	m	"
329.58 - 329.79	m	"
330.56 m		"
334.79 - 334.85	m	"
334.93 - 334.98	m	"
335.30 - 335.32	m	quartzite
335.41 - 335.53	m	"
335.95 - 336.15	m	mt - rich quartzite

continuation

BH 2000 D

from 188.55 m

Emo Nr. 496 — 48 blad, linjert

which are ~~disturbed~~ at random, a slight compositional banding is obvious, the section contains no rock-fragments, schistosity varies between 42° and 55° gradual border to following rock

18930-19025: calcareous chlorite bearing epidote ~~biotite~~ + amphibole schist (meta-basic agglomerate or basic volcanic debris flow with basaltic lava intersections) grey with brown and white stripes or flasers, laminated sections mainly at hanging portion*, lying section strongly hetero-

generous often diachronically what is caused by the frequency of amphibolite fragments, *fine-fibrous amphibole layers alternate with stripes of slightly porphyric biotite which nearly always is accompanied by carbonate, *biotite is found as 0.1 cm large clots within the amphibolite layers.

*fine-fibrous amphibole is found forming lamina, irregular stripes and ellipsoidal fragments, epidote joins carbonate and qtz and form irregular features, *biotite is found as a slightly porphyric

mineral phase forming stripes, stringers or irregular shaped grains, it often surrounds the amphibolite fragments. rock contains rare xenomorphic spots of py, layering at 60° to core axis. some cm-thick intercalations of epidote-amphibole-qtz gneiss (silicate facies chert or clayey metatuff) (192.25-192.65, 193.50-193.65) gn, gr, yellow-banding, extremely fine-grained, laminated, alternate epidote, qtz and amphibole or mixed bands, subordinate amount of mt, rare spots of py always gradual borders to surrounding rocks,

lamination at 60°/to core axis.

192.25 - 193.00: amphibolesdust (meta-basic flow) gn, fine-grained, some irregular qtz veining, dikes of biotite within lying portion decrease rapidly in section. gradual lying wall.

193.00 - 199.50: high calcareous epidote-chlorite-qtz-fspar-amphibole gneiss (banded amphibolite) (meta-basic volcanic sed.) C grgn, crude development of banding, some sections massive, gradual compositional changes from amphibole dominated to qtz-fspar rich rock.

often with distinct spotted appeared what is caused by disseminated carbonate which tends to form idiomorphic crystals of 0.2 cm size, fine-fibrous chlorite, amphibole forms max. 0.5 cm large prisms which nearly always are not oriented, hanging portion with minor amphibole and light degree in biotite, here too some spots of py, crude laying at 80°, slightly tectonized rock from 98.10-98.30 m (fault), sharp lying contact.

98.50-100.75: slightly calcareous amphibole bear. sericite-chlorite-biotite-~~q+~~ epidote rock/gneiss

charty

(meta-basic volcanic sed.)

yellowish-grey with gr and brown flasers and spots, crude development of layering due to compositional changes mainly in epidote and biotite-amphibole, epidote tends to be accompanied by gt while biotite is joined by slightly porphyric amphibole which randomly is oriented and other phyllosilicates, due to small-scale folding & the occurrence of big crystal aggregates of coarse-grained

aggregates often showing a preferred orientation, the footwall portion contains several clusters of milky qtz this it displays chaotic a texture layering: 80°
sharp footwall.

201.75 - 203.00: slightly calcareous amphibole bear. biotite - qtz - fspar - epidote rock
(meta - felsic to intermediate tuff of high spilitization)
lightyellowishgn with gr streaks and lenses and brown rods, limbs and clusters, chaotic texture seems to be stressinduced, locally crude development of mm - layering which is strongly deformed, bands and clusters composed of qtz, fspar and epidote which

diotite, rare spots of py throughout. partly strongly folded, unfolded sections have layering at 75° to core axis. gradual contact to following rock

199.95 - 201.75: epidote bear. diotite-amphibole gneiss (intermittent basalt flows with spilite ~~dikes~~ in cores) alternate gn and dioren stripes, sometimes gr layers with faint yellowish tint, banding with local transition into laminated rock, rhythmic alternation of bands of fine-crystalline schistose amphibolite with layers or laminae composed of either diotite or diotite and epidote or qtz and epidote, the latter have a lepidoblastic or porphyritic texture, due to diotite which tends to form fascicular bundles or coarse crystal

occasionally are joined by
→ fascicular bundles of biotite
max. 0.3 cm large and not oriented
alternate irregularely with clusters
and sheafs of biotite and laminae
of qtz, amphibole is restricted to the
stratigraphically lowermost and upper-
most portions as porphyroblasts,
the needles and imperfect radiating
aggregates are max. 0.2 cm large and ori-
ented at random.
sharp footwall marked by clusters of
qtz.

203.00 - 206.00: slightly calcareous qtz - amphibole - biotite - chlorite schist / gneiss
(meta-mafic volcanic sediment)
gign with abundant brown schlieren
and rods and locally white spots, the
lower portion shows a poorly defined
cm-banding, otherwise exists a dis-
tinct mineral preferred orientation
but some intersections are massive,

* medium to coarse crystalline, the lower portion displays a close association of idioblasts of amphibole max. 0.5 cm long and schlieren of fine-fibrous chlorite which alternate with lenses and laminae composed of fine-grained granoblastic qtz which often is accompanied by scattered idioblasts of carbonate being max. 0.2 cm in diameter,

crystal aggregates of fine-fibrous chlorite in close association with fascicular bundles and schlieren of biotite, the phyllosilicates form a light framework with interstices being filled by fine-grained granoblastic qtz and epidote, amphibole only locally occurs remaining at subordinate amounts, it displays max. 1.0 cm long prisms being equally distributed and not oriented, carbonate in places exists as 0.2 cm large idioblasts.
schistosity: 75°
sharp footwall.

206.00 - 208.00: slightly calcareous qtz-biotite-fspar-epidote rock

(meta-felsic to intermediate tuff of high spilitization)

sample: 2000D/14 207.50m thinsection

same as: 201.75-203.00 m, but with no amphibole. sharp contact to underlying rock.

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of amygdule of 0.3 cm size often crosscutting the major foliation of the rock, spotted idiomorphic carbonate, rare sheared, rounded clasts of amphibolite which rarely exceed lapilli size.

schistosity: 90°. Minor fault-lines: 211.30m 58°, 211.45m 65°, 211.55m 85°, 211.62m 80°.

208.00 - 217.10 · slightly calcareous chlorite - biotite - qtz - amphibole rock

(meta - mafic volcanic sediment with coarse fragments and supp with epiclastic sedimentary impurity; possible slightly distal facies of subaqueous debris flow)

→ grn. chaotic texture, subrounded elongate fragments of fine-crystalline to medium and coarse granoblastic biotite, epidote-qtz rock, amphibolite, and amphibole-qtz-fspar rock (rhyolite) are scattered in matrix

sample 20003/20 209.60 m thinsection

* within the phyllosilicate matrix biotite displays giant bundles, bow-tie shaped aggregates and imperfect phenocrysts which often are discordant to the major plane of foliation,

both matrix and felsic fragment rarely contain spots of py.

strongly sheared rock between:
212.40 - 212.60m and 212.90 - 213.20m
foliation indicated by preferred orientation of fragments at: 85°.
sharp footwall marked by a
cm-thick band of milky qtz.

lahar)

217.10 - 224.95: high calcareous epidote - qtz - biotite - chlorite - schist (amphibole bear.)
(meta-mafic volcanic sediment partly with fine fragments and
supp. with epiclastic sedimentary
impurity*; possible distal facies
or upper succession of sub-
aqueous debris flow /
lahar)
similar: 16.90 - 19.00 m, and 49.70 - 54.80m, but
with abundant rounded
elongate felsic clasts com-
posed in decreasing order
of fspar, qtz, carbonate and

*, matrix support sediment,

sample: 2000D/15
221.80m
thinsection

accessory chlorite and biotite between: 221.65-222.20 m and 223.00-223.55 m, the fragments are embedded in a phyllosilicate matrix of fine-fibrouse chlorite which contains scattered lepidoblasts and imperfect spherulites of biotite while carbonate occurs as idioblasts max 0.15 cm across the crystals locally being stretched, carbonate mainly is concentrated between: 220.75-221.85 m and 224.05-224.95 m forming idioblasts max. 0.3 cm across, prisms of amphibole max. 0.7 cm long embedded without any orientation within phyllosilicates

are restricted to sections:
222.25-222.40m, 223.55-224.00m.

schistosity: 218.10m 75°,
219.30m 66°, 220.00m 61°,
220.30m 60°, 220.50m ⊥,
221.70m 52°, 222.50m 70°,
223.80m 48°, 224.70m 53°.
gradual boundary with
following rock

224.95-230.20: slightly calcareous epidote
biotite sear. chlorite-gt-
fspar amphibolite
(meta-mafic volcanic
sediment with fine ~~grained~~
and sparce medium
size mafic as well as
felsic fragments*, possible
distal facies of upper
succession of subaquae-
ous debris flow/lahar
or may be lapilli tuff)
similar: 195.55-199.95m,

*, matrix support sediment,

but with no intercalations of calcareous amphibole-qtz-fspar rock, fine grained fragments but locally medium grained clasts of vesicular schistose amphibolite and epidote-amphibole-qtz-fspar rock (rhyolite).

Schistosity:
225.40 m 58°, 226.00 m 59°, 226.80 m 75°, 227.80 m 63°, 229.30 m 75°, 229.80 m 71°, 230.10 m 64°;
gradual footwal.

230.20 - 231.75: schistose amphibolite (meta basic - flow)
qu, fine-grained, nemato-blastic texture, some mm-thick bands of qtz, in places fascicular

bundles of biotite which locally form discontinuous layers or tiny schlieren, * schistosity: 230.60 m 80°, 230.70 m 60° by biotite, 231.60 m 85°

* in lolayer of biotite-amphibole-chlorite schist (supp. debris flow; similar: 49.70-54.80 m) at: 231.26-231.36 m

231.75-232.45: gradual footwal

C high calcareous amphibole bear. chlorite-biotite-epidote-qtz rock/gneiss (meta-tuff)

gr with yellowish and brownish-gr or brown stripes, laminated with sometimes mesh-like texture, in places chaotically folded, laminae, schlieren and flasers of phyllosilicates (chlorite a. biotite) in alternation with cm-thick bands

chemical analysis 232.05-232.26 m

or sometimes lenses of epidote-quartzite which contain ~~big amount of~~ abundant carbonate, (in places) the felsic bands carry amphibole porphyroblasts which are oriented at random, a low-grade pyrite mineralization (mainly) as trains of granules is found between: 232.05-232.26m, otherwise pyrite is rare forming scattered sub-idiomorphic crystals.
banding: 68°
sharp contact to following rock.

232.45 - 235.30: slightly calcareous qtz - amphibole - biotite - chlorite schist
(meta-mafic volcanic sediment with fine (fragments) sand supp. with epiclastic

matrix support sediment,
sedimentary impurity; possible more distal facies or middle succession of subaqueous debris flow / lahar)

similar: 49.70 - 54.80 m, but here more flaser and lenticular texture, fragments of granoblastic epidote - qtz rock, slightly porphyroblastic amphibole bear qtz - feldspar rock and schistose amphibolite. Foliation: 85°, strongly stressed between: 234.45 - 234.53 m and 234.58 m 85°, 235.35 - 235.66 m 75°, 235.77 m 70°, 236.20 m 45°

235.30 - 238.20: calcareous biotite - qtz - epidote - amphibole rock / gneiss (meta - mafic volcanic, reworked supp. hyaloclastite)

C

gn with white stripes and intersections being gr with faint yellowish tint, chaotic texture predominates, locally with distinct compositional cm-banding, abundant subrounded flattened and stretched fragments of fine-fibrous schistose amphibolite which carries accessory biotite and idioblasts of carbonate 0.5 cm across and of non homogeneous distribution and clasts of meta-keratophyr composed of epidote and qtz or epidote, amphibole and qtz, they are of granoblastic texture but are distinctly porphyroblastic by occurrence of amphibole

which tends to form scattered not oriented idioblasts max 0.4 cm long, the matrix is sparse to abundant and displays locally a coarse crystalline biotite-amphibole schist but mainly is composed in variable frequency of biotite, amphibole, epidote, carbonate and qtz and shows a granoblastic or porphyroblastic texture.
fault: 239.90 m 45°
schistosity, layering: 236.30 m 74°, 236.70 m 66°, 237.30 m 78°, 237.45 - 237.80 m //, 237.90 m 74°, 238.50 m 67°.
gradual footwall.

of biotite which are parallel to the main foliation of the rock, carbonate is found as bro-grade dissemination, it forms xydio-to idiomorphic crystals of < 0.1 cm size, core to rim: 238.50 m 67°, Gradual wall to following rock

239.65 - 240.60: biotite - epidote - amphibole - fspar - gt gneiss similar: 236.20 - 238.20 m strongly diharmonic folded. sharp wall to following rock.

240.60 - 241.10: slightly calcareous epidote bearing chlorite-biotite-amphibole schist

same as: 238.20 - 239.65 m

gradual contact to following rock

241.10 - 251.85: calcareous epidote bear. amphibole-qtz-biotite-chlorite schist

(meta-mafic volcanic with coarse fragments and sediment* supp. with epiclastic sedimentary impurity; possible slightly distal facies or lower succession of subaqueous debris flow / lahar)

*, matrix support sediment,

similar: 49.70 - 54.80 m, but with additional epidote pining qtz, fspar and carbonate, fragments of fine-fibrous schistose

amphibolite which may be vesiculated and calcareous amphibole - qtz - epidote rock (felsic volcanic) which displays a distinct granoblastic texture, carbonate occurs as scattered idioblasts on average 0.2 cm across, amphibole forms fascicular bundles of max. 0.4 cm long dimension which parallel the major foliation of the host rock, scarce clasts composed of amphibole - epidote qtz - plagioclase rock (felsic volcanic) with poorly defined porphyroblastic texture due to amphibole which forms scattered not oriented prisms being 0.15 cm long.

schistosity: 241.80m 90°, 242.30m 85°, 243.10m 85°, 244.60m 76°, 245.10m 75°, 245.35 - 245.65m ⊄, 245.95m ⊅, 246.50m 76°, 247.10m 80°, 248.10m 80°, 250.00m 70°,

gradual footwall

251.85 - 258.10: schistose amphibolite with interlayers of amphibole bear. qtz - biotite - chlorite - epidote rock (meta-mafic volcanic, reworked supp. hyaloclastite)

gy-white striping with intersections being gy with faint yellowish tint, dm-banding, ~~weakly thinc~~ alteration ~~of~~ fine crystalline schistose amphibolite containing abundant

qtz and qtz-carbonate bands which mostly are conformable with the major plane of foliation is interstratified by conformable and disformable layers max. 200 cm thick composed ~~in decreasing order~~ of epidote, chlorite, biotite, qtz and amphibole (at: 251.85-253.90 m, 254.00-254.10 m, 254.50-254.70 m, 254.95-255.25 m, 255.60-256.35 m, 256.55-257.30 m), the relative proportions of the constituents vary strongly from layer to layer but also within each layer what is due to the chaotic conditions regarding structure and texture, amphibole tends to occur as idioblasts of

251.85-253.90 m, 254.00-254.10 m, 254.50-254.70 m, 254.95-255.25 m, 255.60-256.35 m, 256.55-257.30 m,

max. 0.5cm length being scattered within a mosaic of fine grained granoblastic epidote and qtz, the crystals are not oriented, it sometimes forms radiating aggregates or discontinuous trains of granules, biotite often displays giant bundles max. 0.5 cm long and 0.3 cm wide which form bands or clusters of irregular shape, pyrite occurs sporadically as 0.2 cm large spots.
layering: 254.20 m 75°, 255.10 m 90°, 255.80 m 75°, 257.50 m 90°, 257.65 m 85°.
sharp contact to following rock.

268.30m 67°, 269.30m 67°.

gradual border to following rock

258.10-261.10: amphibole-sericite bear. epidote-biotite-chlorite-qtz schist/gneiss (meta-mafic volcanic sediment mixed by epiclastic sediment?; some interlayers of meta-felsic tuff/ gngr to grgn with sometimes distinct yellowish tint, flaser to lenticular structure with local transition into cm-banded rock, interlocking epidote and qtz crystals as schlieren, lenses and bands in alternation with schlieren,

lenses and laminae composed of fine-fibrous chlorite which is associated by biotite forming mm-thick bands or schlieren always being parallel the major foliation, amphibole occurs as scattered idioblasts, the needles on average 0.2 cm long and not oriented, it in general is within phyllosilicates but is associated with qtz and epidote in the supposed felsic tuff layers, here too some pyrite exists as scattered elongate crystals on average 0.2cm large, it is most frequent within 258.75-258.80m remaining lesser 2 vol.-%, a thin band of meta-basalt

flow (epidote-biotite bear. fspar-qtz-amphibole schist) is found at 260.00-260.35m, the rock being fine crystalline showing a distinct nematoblastic texture, a lamination caused by parallel streaks of biotite is poorly developed.

schistosity, layering:
258.75m 55°, 259.10m 48°, 259.50m 49°, 260.00m 58°, 260.45m 60°, 261.00m 60°.

sharp distorted contact to following rock.

261.10 - 264.10: schistose amphibolite (meta-mafic volcanic, reworked supp. hyaloclastite) gn, fine crystalline, nematoblastic texture, abundant disconformable bands composed of coarse cryst-

alline amphibole, biotite, epidote and qtz predominately of chaotic texture (same as: 251.85-253.90m), sometimes clusters or trains of flazes of biotite, occasionally cm-large clusters of qtz with carbonate.

faults and mylonitic zones: 261.70m, 262.60m, 262.75-262.90m, 263.10m, 263.25-263.50m, 263.60-263.70m. fault contact to following rock

264.10 - 265.40: slightly calcareous amphibole bear. biotite. chlorite schist (meta-mafic volcanic sediment supp. with epiclastic sedimentary impurity; possible

distal facies or upper succession of subaqueous debris flow / lahar)

similar: 16.90 - 19.00 m, strongly deformed lower as well as upper portion, the middle zone shows a consistent schistosity of 63° to core-axis.

sharp footwall

265.40 - 266.80: epidote bear. sericite - biotite amphibole - qtz - fspar rock / gneiss

(meta-arenite / qtz-pelite with mafic volcanic impurity)

gr with faint greenish tint and brown as well as gn needles, porphyritic texture in places porphyroblastic

textural and compositional banding, rhythmic alternation of sericite-biotite-qtz rock (meta-qtz-pelite/arenite) and layers of amphibole-qtz-fspar rock or amphibole-sericite-qtz rock, distinct separation of biotite and amphibole, the former displays scattered fasicular bundles or imperfect spherulites max. 0.15 cm large and randomly oriented, amphibole occurs as idioblasts, the needles on average 0.3 cm long and equally distributed while not oriented, a low-grade dissemination of idioblasts of pyrite lesser 1% of the mode exists between: 265.75-265.95 m.

Banding: 265.70 m 85°, 266.10 m 75°.
sharp footwall.

266.80 - 269.50: calcareous to high calcareous

similar: 49.70 - 54.80 m, but with scattered subidiomorphic carbonate crystals max. 0.15 cm across.
schistosity: 267.10 m 85°, 267.35 m 55°, 268.00 m 45°, 268.30 m 67°, 269.30 m 67°.
gradual border to following rock.

epiclastic sedimentary section

269.50 - 270.50: chlorite bear. qtz-fspar rich biotite-sericite schist
(meta-pelite with felsic volcanic impurity)
gr with faint greenish tint and abundant brown schlieren and rods, porphyritic texture, crude development of compositional banding, often with distinct lenticular structure, interlocking qtz and qtz-fspar crystals as lenses and layer in alternation with bands composed of fine crystalline sericite and chlorite and distinctly coarse biotite, the latter forms fascicular bundles

or imperfect spherulites of max. 0.2 cm size which tend to be not oriented but locally are flattened and stretched thus parallel and sometimes form laminae.

lamination: 75°-80° > gradual footwall.

270.50 - 272.50: qtz-chlorite-biotite-sericite schist

(meta-paraconglomerate, supp. tilloide)

gr with often distinct grey tint and brown schlieren and rods, plastopsephitic texture, locally cm-banded, isolated stretched and flattened rounded fragments of fine-grained granoblastic quartzite more than 2 cm in long dimension

are embedded in abundant matrix composed of fine-crystalline sericite and chlorite and containing fascicular bundles or imperfect spherulites of biotite max. 0.3 cm large which are oriented at random but may also be stretched and parallel, intervalls with little or no fragments are similar: 269.50-270.50 m. ~~within~~ 272.08-272.38: high calcareous chlorite bear. biotite-sericite schist/rock (meta-pelite)

* schistosity and fragment orientation: 75°-80°.

gr with faint greenish tint, evidely schistose, homogeneous, porphyroblastic texture, idioblasts of carbonate 0.1 cm across and bundles of biotite being poorly directed embedded in a matrix of fine crystalline chlorite

and sericite, carbonate and biotite show highest concentration in the middel of the layer.
sharp contacts to the surrounding.

272.50 - 278.30: chlorite bear. qtz-fspar rich

* minor faults at: 275.70 m, 275.78 m, fault-zone at: 272.80 - 273.00 m.
lamination: 75° - 80°
sharp footwall.

same as: 269.50 - 270.50 m but locally with coarser bundles of biotite - max. 0.3 cm large.

*
275.60 - 275.85: high calcareous biotite bear. sericite schist
(meta-pelite)
similar: 272.08 - 272.38 m but with minor biotite forming only tiny fascicular bundles which poorly are oriented.

278.30 - 279.50: garnet bear. biotite-sericite schist
(meta-pelite)

dark gr, fine crystalline, poorly developed lenticular structure, widely spaced seam and lenses of carbonate in alternation with layers composed of fine crystalline sericite forming the foliation, biotite occurs as scattered fascicular bundles max. 0.1 cm large which often are oriented, garnet forms scattered idioblasts average 0.3 cm across.
minor faults: 278.70 m, 278.96 m, 279.10 - 279.20 m, 279.35 - 279.45 m.
schistosity: 85-90°.
gradual footwall.

279.50 - 281.55: slightly carbonaceous biotite bear. sericite - quartzite (meta-arenite)

gr, fine grained granoblastic, laminated, alternation of mm-thick laminae of sericite - biotite and seams of graphite containing minor sulphide with cm-thick layers of phyllosilicate poor quartzite, the rock looks strongly foliated with frequent occurrence of

of bedding fault lines.
fault-zone: 290.20 - 290.50 m
schistosity: 75°-85°
bedding fault line as lying contact

281.55-283.75: garnet-biotite-sericite schist
(meta-pelite)
gr with brown and reddish brown spots, porphyritic to porphyroblastic texture, poorly developed lamination and lenticular to flaser structure, interlocked gt crystal accompanied by scattered tiny flakes of biotite as lenses or layers/laminae in alternation with bands and schlieren of fine crystalline sericite which contains abundant scattered fasicular bundles of biotite max. 0.1 cm large and mostly being not oriented, they sometimes may be concentrated forming laminae or cm-thick intercalations, garnet (almandine) displays scattered idioblasts average

0.2 cm across which are not equally distributed.
some tiny faults: 281.80 - 281.95 m, 282.20 m.
schistosity: 85° - 90°.
gradual footwall.

283.70 - 284.40: slightly carbonaceous garnet - biotite bear. sericite - quartzite
same as: 279.50 - 281.55 m.
layering: 85° - 90°
partly slightly mylonized: 283.85 - 283.90 m

284.40 - 284.60: garnet - biotite - sericite schist
(meta - pelite)
same as: 281.55 - 283.75 m but with more qtz and lesser biotite.

284.60 - 286.65: calcareous amphibole bear. garnet - qtz - fspar - biotite - sericite schist
(meta - pelite with interbeds of

felsic volcanic)
gr with faint greenish tint and abundant brown schlieren and rods, dm-layering as monotonic alternation of meta-pelite bands and layers of (meta-)felsic (keratophyr) volcanic, always gradual contact, the pelite sections are similar 281.55-283.75 m but have biotite bundles being 0.2 cm long, garnet is equally distributed being average 0.1 cm across, carbonate forms scattered subidioblastic crystals or displays crystal aggregates as lenses and clusters of irregular shape, the keratophyric layers are widely mm- to cm banded and show a distinct porphyroblastic texture caused by amphibole which forms randomly oriented prisms max. 0.4 cm long and garnet as scattered idioblasts average 0.4 cm across which in places form huge crystal aggregates, biotite is present as fasciculär bundles.

layering: 85°
gradual footwall.

286.65 - 299.30: garnet - biotite - sericite schist
(meta-pelite)
similar: 281.55 - 283.75 but
biotite only being oriented
at random and max. 0.3 mm
in size, varying qtz - amount
thus sometimes reading qtz - mica
schist.
minor faults at: 271.71 m, 287.75 m,
290.66 m, 290.80 m, 290.93 m, 291.40
m, 291.83 m, 292.40 - 292.45 m, 292.87
m, 295.04 m, 295.10 - 295.25 m.
gradually passing into hanging rock.

299.30 - 301.40: slightly carbonaceous
garnet - biotite bear sericite -
quartzite
similar: 279.50 - 281.55 m
lamination at 75° - 80°
in places tiny bedding
fault lines
gradual footwall

301.40 - 304.50: slightly carbonaceous qtz - biotite - sericite schist (meta-pelite)

gr with several dar2gr or even black bands and laminae, porphyritic texture, distinctly banded and laminated, nonrhythmic alternation of cm-dm thick layers of metapelite similar 286.55 - 299.30 m and laminae and bands - max. 4 cm thick - of carbonaceous meta-pelite which is very poor in biotite, the contacts between the layers are sharp but locally (may be) gradual, a local phenomenon are network-like features of carbonaceous meta-pelite within meta-pelite.

minor faults often with slickensided graphite:

301.80 m, 302.00 m, 302.50 m, 302.60 m, 302.80 m, 303.45 m.

lamination: 80° - 85°.

gradual footwall

304.50 - 309.50: slightly carbonaceous sericite-biotite-quartzite (meta-qtz-pelite/arenite with intercalation containing graphite)

gr with abundant dark gr. laminae and nearly black bands, porphyritic texture, laminated, cm-thick layers composed of fine crystalline qtz and sericite which are accompanied by scattered fasicicular bundles max. 0.1 cm large of biotite which are oriented at random alternate with laminae of graphite phyllite being closely isoclinally folded, bands of graphite phyllite with max. 6 cm thickness which show a biotite lamination are sporadically intercalated, they occur mainly with sharp contacts.
local occurrence of bedding fault lines.

laminations at 80°, between 307.00 - 308.80 m at 60°. gradual footwall.

309.50 - 311.95: fspar - sericite bear. garnet - biotite - qtz schist (meta-arenite supp. with hydrothermal silica and felsic volcanic impurity) gr with brown rods and reddish brown streaks, porphyritic texture, ghost-bedding composed of alternate fine grained granoblastic qtz layers or lenses and bands or lenses of fine crystalline sericite - qtz which carry abundant fascicular bundles of biotite often being not oriented, garnet being of tiny occurrence forms closely packed trains of

*scattered tiny grains of p^{o} are always present

granules (laminae),* several cm-to dm-thick interlayer of biotite-qtz-fspar rock with indistinct gneissic texture, biotite forms here fascicular bundles or imperfect spherulites of max. 0.2 cm size which are oriented at random.
minor faults: 309.85 m.
milky qtz band: 311.26-311.60 m
lamination: 85°

311.95-325.85: biotite-sericite schist (meta-pelite)
same as: 281.55-283.75 m.
within 324.30-325.50 m strongly schistose with biotite being flattened and stretched and aligned along the major plane of foliation, from 325.50 m down-section decreased in phyllosilicates and

sample: 20000/16 312.30 m thin section

increased in qtz and with abundant k-spar and epidote (pervatophytic), low-grade dissemination of idiomorphic pyrite.
schistosity: 75° to 80°
gradual footwall.

basic volcanic sequence
325.85 - 333.30: high calcareous epidote amphibole - qtz - fspar rock / gneiss (banded amphibolite like)
C
grey, onset development of layering but with poorly defined mineral orientation, porphyroblastic texture, amphibole and carbonate form scattered porphyroblasts within a fine-grained matrix composed of epidote, qtz and fspar, the amphibole

prisms on average are 0.5 cm long and form an open framework of not crosscutting or touching crystals, they sometimes are parallel forming a slight foliation, carbonate displays idioblasts on average 0.4cm across, py sporadically occurs as 0.2 cm large idiomorphic crystals.
layering and schistosity:
326.15 80°, 326.90 67°, 327.90 65°, 328.80 64°, 329.50 59°, 330.80 59°, 331.60 61°, 332.80 65°, from 332.60 several small faults gradually passing into mylonite (tectonic breccia)

333.30 - 335.10: tectonic breccia

335.10 - 424.15 : slightly calcareous ~~chlorite~~ - biotite - amphibole - chlorite schist (meta-mafic volcanic sediment with medium size and coarse mafic and sparse felsic fragments, matrix support sediment; possible slightly distal or lower to middel succession of subaqueous debris flow/lahar or agglomeratic basalt) (comparable with sample SNO-26) similar: 49.70-54.80m, concentration of coarse clasts - 10% similar 75.35-79.20m - at:

Sample: 1000D/17
421.50m
thinsection

of the rock, the matrix in places may carry epidote and sometimes contains frequent idioblasts of carbonate: 341.70 - 346.65, the clasts are composed of fine-fibrous amphibole, they often contain mm-large augen of spar (amygdaloidal basalt)

between 421.00 - 422.00 round fragments of high calcareous mtr? - q to rock prover/2000/17

It is obvious that large and small clasts are sedimentated simultaneously, a poor sorting regarding the size of the clasts is obvious by the alternation of zones containing extremely

large clasts and zones containing a somewhat smaller fraction of clasts, concentration of large clasts with less matrix between 346.65 - 352.60 m, sections with only fine clasts at: 344.40 - 344.90, 345.60 - 346.70, 357.60 - 358.50, 382.40 - 395.20, 399.55 - 401.00 m, 407.20 - 411.25, 414.55 - 415.00 m, distinctly and fragmentation. *

357.85 58°, 359.30 80°, 359.75 65°, 360.00 53°, 360.53 77°, 361.05 - 361.55 (4), 361.75 17°, 361.95 - 362.30 (4), 362.40 30°, 362.40 - 362.85 ¢, 363.00 45°, 363.05 - 363.75 (4), 363.80 40°, 364.00 - 364.35 (4), 364.50 30°, 364.90 - 365.45 (4), 365.95 - 367.40 (4), 367.40 45°, 367.40 - 367.80 ¢, 367.80 - 368.75 (4), 368.80 45°, 369.20 65°, 369.40 - 370.30 (4), 370.50 30°, 370.80 45°, 371.20 45°, 371.30 - 371.70 (4), 371.80 80°, 371.85 - 372.10 ¢, 372.30 - 372.70 (4), 372.70 - 391.60 (4), 391.90 - 394.20 strongly deformed 50°, 397.50 75°, 407.50 67°, 408.00 57°, 409.50 45, 410.50 30°,

strongly faulted and deformed 360.70 - 391.90 m

358.16, 359.70 - 359.88, 365.32 - 365.48, 367.91 - 367.97, 368.86, 368.95, 371.48 - 371.75, 380.20, 381.10, 381.70 - 381.79, 382.15, 382.48, 384.18, 384.70 - 385.20, 390.60, 391.45 - 391.56, 397.95 - 398.00, 399.95 - 400.03, 400.45, 401.53,

403.45 - 407.20: chlorite-epidote biotite bearing qtz-fspar amphibole schist/gneiss light green, medium-grained, crude development of cm-layering mainly as a result of modal changes of biotite, nemato blastic texture, average 0.4 cm large prisms of amphibole

(intermittent basalt flows - leucobasalt similar SNØ-04) → (comparable with sample SNØ-04)

with preferred orientation forming the foliation are embedded in a fine-grained matrix composed of epidote, qtz and fspar, Biotite displays fascicular bundles or bow-tie crystal aggregates which parallel the amphibole needles, Py as tiny spots is present throughout.

sdiistosity and layering: 403.60 71°, 403.70 55°, 403.85-404.50 ⊥, 404.80 56°, 407.20 67°.

sharp hanging wall and gradual footwall

-chlorite

411.25 - 416.55: biotite-epidote bearing qtz-fspar amphibolite

(intermittent basalt flows - leucobasalt-; similar SN8-04)

see: 403.45 - 407.20, but ~~here~~ more distinctly an-banded*, alternation of bands of idiotopic qtz-fspar amphibolite and ~~medium grained~~ amphibole bearing qtz-fspar biotite-chlorite schist with distinct lepidoblastic texture, sporadical interlayers of amphibole qtz-fspar rock (lava top typ.).

layering: 412.70 63°, 413.50 45°, 414.30 46°, 415.30 55° 416.10 42°.

sharp hanging wall, gradual footwall.

* the contacts between individual layers being sharp,

424.15 – 434.90: amphibole schist (meta-basalt flow) gn, extremely fine ~~grained~~ to fine grained, homogeneous, rare lenses and leaves of qtz and qtz-carbonate or carbonate, scattered xenomorphic and hypidiomorphic - both often with sutured boundaries - and sporadically idiomorphic crystals of ilmenite max. 0.2 cm in diameter: between 427.80 - 431.00, 431.30 - 431.50, 431.80 - 433.20, variolitic amphibolite with 0.5 cm large flattened and stretched f-spar eyes at: 431.00 - 431.20, 431.60 - 431.70, 432.05 - 432.10

; tiny spots of py at 433.80 – 434.80 m.

strongly tectonized
rock between: 424.15 -
427.80, 430.40 - 430.80,
431.90 - 433.80.
Orientation and lineation
of f-spar eyes and il. crystals:
428.20 62°, 428.30 58°, 431.10
54°, 431.70 67°, 434.50 62°,
gradual footwall.

434.90 - 435.60 high calcareous amphibole-qtz-sericite-chlorite schist (banded amphibolite)

C grgn, medium-grained, crude development of layering, lenticular structure occurs where porphyroblasts of carbonate have been flattened and stretched, nematoblastic texture but porphyroblastic texture within stratigraphically lower portion, amphibole ~~forms~~

as idioblasts
~~slightly porphyritic~~ idiomorphic ~~crystals~~, the needles on average 0.3 cm long and either parallel or not oriented, ~~amphibole~~ is embedded in a matrix composed of fine-fibrous phyllosilicates and fine-grained qtz and carbonate, the latter displays scattered idioblast

forming a spotted texture of the rock within the lower portion of the layer,

rare thin-thick interlayers of exhalative qtz.

mineral orientation, layering: 435.10 80°, 435.50 85°.

sharp lying contact.

435.60 - 435.70: amphibole schist (meta-basic flow)

gn, extremely fine-grained, homogeneous with some nodules of qtz.

435.70 - 442.10: plagioclase amphibolite
(meta-basic flow)
gn, medium-grained within lower portion of coarse grained, chide
development of leopard texture, amphibole
tends to form bundles or imperfect spherulites which cause a slight foliation, the
crystal aggregates are embedded within a
fine grained mosaic of qtz-fspar and epidote,
the latter being more frequent within the coarse grained portion.
gradual contact with following amphibolite.

442.10 - 445.15: amphibole schist
(meta basalt flow)
gn, fine-grained, homogeneous with rare nodules
of qtz of irregular shape, low-
grade sulphide mineralization as scattered xenomorphic pyrite which
sometimes is accompanied

by bigger spots of po between: 442.50 - 442.90 m.
strongly stressed and partly mylonized between: 443.20 - 443.50 m
gradual footwall.

445.15 - 460.00: plagioclase amphibolite
(meta-basic flow)
see: 435.70 - 442.10, here medium-grained in places gradually changing into coarse grained, occasionally qtz and/or qtz-carbonate veining or nodules of milky qtz, intersections of schistose amphibolite being extremely fine-grained at: 448.45 - 449.30 m.

following gradual contact with altered amphibolite

460.00 - 462.25: calcareous qtz-f.spar-amphibole-chlorite (chlorite-amphibole) schist/rock (meta-altered basaltic volcanic, flow) (similarities with altered basalts at hanging wall of Tverrfjell ore)

A/C

gn, medium-grained, in places crudely developed lamination, gradual increase in the amount of amphibole upsection, the mode of chlorite changes inversely with that of amphibole, chlorite however, is most abundant between: 460.80 - 461.20m, amphibole forms idioblasts, the prisms

chem. analysis: 460.20 - 462.25

on average 0.4 cm long and generally lack orientation but sometimes are slightly parallel, which lay in a groundmass composed of interleaved, fine-fibrous chlorite and interlocked, fine grained qtz, fspar and carbonate. pyrite is found in minor amounts ~~throughout~~ and displays xenomorphic to hypidiomorphic crystals, sometimes nodules or veins of milky qtz.

foliation : 461.10m 45°, layering at 461.60m 72°, contact at 462.25m 53°.

Knife-sharp contact marked by a band of milky qtz.

462.25-462.70: high calcareous amphibole bearing chlorite schist/rock

AA/C (meta-highly altered basaltic volcanic ~~rock~~) (similar sample 4/14 BH4 Tverrfjell mine)

leucogra, hanging portion massive with distinct spotted appearance, the fine-fibrous chlorite groundmass sporadically contains tiny spherulites of amphibole and carries abundant scattered crystals of carbonate which mostly are hypidiomorphic and are on average 0.1 cm across, pyrite forms a low-grade dissemination while ilmenite occurs as frequent tiny spots*, this section gradually passes into amphibole bear. chlorite or amphibole-chlorite schist which carries little carbonate, no py and minor spots

*it is accompanied by minor mt

of ilmenite, amphibole forms max 0.5 cm large needles which always are aligned along the major plane of foliation, schistosity: 462.70m 48°. sharp contact or bedding fault line.

462.70 - 466.00: calcareous amphibole bear. chlorite - biotite - sericite schist

(meta-pelitic sediment with basic volcanic impurity, supposedly with hydroth. alteration) lightgr with in places giant white spots, strongly schistose with in places crenulation cleavage, crude lamina-

locally being strongly deformed by small-scale disharmonic or isoclinal folding.

tion, interleaved biotite as streaks and discontinuous bands closely alternate with layers composed of fibrous chlorite, carbonate appears as giant hydromorphic and idiomorphic crystals being equally distributed.

between: 462.90 - 464.00m, 464.90 - 465.00m, 465.40 - 465.55m, 465.80 - 466.00m, amphibole only sporadically is present forming average 0.5 cm large needles which are oriented at random.

Foliosity: 463.00m 51°, 463.40m 20°, 462.70 - 462.85m 20°,

464.00 - 464.70m 20°, 465.00m 48°, 465.40m 52°, 465.50m 20°, small faults: 463.25m, 464.30m, 464.70 - 464.75m, 465.00 - 465.30m.

466.00 - 466.20: high calcareous chlorite bear. qtz-fspar-amphibole gneiss / rock (meta-basic volcanic tuff)

C

light gr, the lowermost section being white/gr striped, upper position massive and homogeneous, even-grained but with scattered idioblasts or crystal aggregates of carbonate which are max. 0.2 cm in diameter, the stratigraphically lower section widely is laminated, the layering being

sample: 20003/18 466.10 m thinsection

due to the tendency of carbonate to form trains of granules which closely alternate with stripes or bands of qtz-fspar-amphibole, the latter present as idioblasts of 0.1 to 0.2 cm length which form a slight foliation. pyrite is most abundant but remains to subordinate amount near the footwall, its mode gradually decreases upsection. lamination: 466.15 m 58°. gradual footwall

466.20 - 466.60: slightly calcareous amphibole - sulphide - qtz - fspar gneiss (meta - rhyolite tuff

Chem. anal. lyst's 466.15–466.60

with sulphide layers) gr, cm-banding composed of alternate sulphide poor leuko phyr layers and bands of high-grade sulphide (rich in gangue qtz) (Py, Po), granoblastic texture throughout, amphibole forms small idioblasts max. 0.2 cm long which tend to be parallel forming a slight foliation, carbonate appears within 0.1 cm large hypidiomorphic crystals which are equally distributed but sometimes form trains of granules. layering: 466.20 m 66°, 466.55 m 85°.

sharp footwall as bedding fault line.

466.60 - 466.72 high calcareous amphibole schist

C (meta-basalt tuff/flow) gn with scarce white stripes, medium-crystalline, nematoblastic texture, laminated by discontinuous flasers and lenses of carbonate, irregular carbonate veining is due to intense fracturing (decarbonitation). lamination: 62° several small faults with little or no dislocation sharp lying contact

marked by a cm - band of qtz - carbonate.

466.72 - 466.75: slightly calcareous amphibole - biotite - chlorite schist

AA (meta - altered basaltic volcanic)

gn with brownish spots, medium - grained, lepidoblastic to nematoblastic texture, scarce stretched spots of carbonate.

schistosity: 60°

bedding fault line as footwall contact.

466.75 - 466.85: calcareous sericite - qtz - fspar - amphibole gneiss

(meta - cherty mafic tuff)

light gn, partly with white

oo slightly yellowish stripes and bands, fine-grained, widely developed mm- and cm-layering with always gradual contacts, bands of sericite-amphibole, amphibole bear. epidote qtz-fspar and qtz-carbonate, rare mm-large spots of py and po, low impregnation of mt. layering in rhythmic alternation, layering: 64° discordant fault contact.

466.85-467.30: calcareous chlorite bear. biotite-sericite schist (meta-pelite) lightgn with brownish flasers and stripes,

characterized by disharmonic folding

strongly sheared rock with laminae, flasers and irregular formed aggregates of biotite,* xenomorphic mainly rounded crystals of carbonate max. 0.1cm across are equally distributed but sporadically form trains of granules. nebulous border to underlying rock.

* alternate with layers of fine-fibrous chlorite-sericite

467.30 - 467.70: high calcareous amphibole schist
(meta-basalt tuff/flow)
same as: 466.60 - 466.72 m
but with nodules of milky qtz.
lamination: 80°.
gradual footwall.

467.70 - 467.80: high calcareous biotite-sericite schist

(meta-pelite or tuffaceous meta-pelite) light grey with brownish flasers and white spots, widely developed flaser structure, slightly porphyric dacite ~~texture~~ is strongly aligned along the major foliation of the rock*, carbonate displays round crystals max. 0.1 cm across which are equally distributed but in places form discontinuous layers.

*which is formed by fibrous sericite

schistosity: 78°

sharp lying contact

467.80 - 468.10: garnet-amphibole-fspar-qtz gneiss (meta-chert, silicate

facies banded iron formation)
light gn with red brown tint, banded rock composed of cm-thick layers of amphibole-garnet-qtz, garnet ~~bear~~.-qtz-fspar-amphibole and amphibole ~~bear~~.-qtz-fspar and minor bands of quartzite and laminae of garnet, the contacts of the layers tend to be gradual but locally they may be knife-sharp, the rock is fine-grained and shows a distinct foliation formed by idioblasts of amphibole, the needles on average 0.2 cm long, which parallel the layering of the rock, am-

phibole instead may be oriented at random within qtz-fspar dominated bands (quite lenticular looking). Pyrite forms minute spots and is present throughout but grades lesser Vol.-%, ilmenite forms a low-grade dissemination within the hanging portion, a slight mt mineralization is indicated from susceptibility measurements

layering: 74°
sharp footwall

468.10 - 469.15: slightly calcareous amphibole schist (meta-basalt flow)
gn, fine-grained, discontinuous laminae as well as tiny spots of carbonate, locally

cm-thick bands or nodules of irregular shape of qtz and carbonate, slightly stressed rock cut by several small faults.
schistosity: 74°
sharp footwall.

469.15 - 470.15: slightly calcareous amphibole-sericite bear. biotite-qtz schist
(meta-felsic tuffite locally with mafic volcanic impurity)
browngr with intersections being browngr, mainly medium-crystalline, lenticular to flaser structure locally being merged by shearing or disharmonic folding,

~~caused by~~ nodules of Qtz ~~which~~ are surrounded by flasers of fasciculate bundles of Diorite, amphibole sporadically is present forming subidioblastic porphyroblasts of max. 0.4 cm long dimension which are oriented at random, pyrite rarely occurs but displays a low-grade dissemination together with po between: 469.65 - 469.70 m. dip of layering: 66° gradual footwall.

chem. anal. Lyshi's 469.57 - 469.75

470.15 - 470.95: calcareous Diorite beds. amphibole schist (meta-basalt flow) gn with white and brown stringers and spots, fine-

crystalline, crudely laminated by mm-thick discontinuous layers of carbonate and stripes of biotite typical always is accompanied by some chlorite, pronounced orientation of amphibole which partly may be less conspicuous, minute xenomorphic spots of carbonate are concentrated within the central part of the sequence, pyrite forms frequent spots, flasers and lenses. schistosity and lamination: 80°

gradual footwall.

470.95-471.27: calcareous qtz-biotite schist

(meta- felsic tuff)
gribloan, lenticular-
to flaser structure,
elongate qtz - carbonate
aggregates alternate
with discontinuous
layers of parallel
biotite flakes, sporadi-
cally some idioblasts
of carbonate being
0.2 cm across, rock
is strongly mylonized
between: 471.05 - 471.15 m.
schistosity: 85°
sharp footwall.

471.27 - 471.50: slightly calcareous
biotite bear. amphibole
schist
(meta-basalt flow)
same as: 470.15 - 470.95
layering: 85°

netw lows contact to
underlying rock.
471.50 - 471.62: amphibole-qtz-fspar-biotite rock/
schist
(meta-felsic to inter-
mediate tuff)
grayish brown, medium-grained,
gently foliated, lepido-
blastic texture,
interlocking qtz-fspar
aggregates of irregular
shape in close alterna-
tion with slightly oriented
flakes of biotite and
prisms of amphiboles,
the latter gradually
increases in mode
downsection
indistinct contact to
underlying rock.
471.62 - 471.73: amphibole-fspar-qtz
gneiss

(meta-cherty mafic tuff) partly with porphyroblastic texture gr with gn stripes, cm-banded, alternation of fine-grained grano-blastic qtz or qtz-fspar layers with bands or trains of granules of medium to coarse amphibole, the ellipsoidal or prismatic porphyroblasts being oriented at random, they surround ~~to tock~~ either qtz or fspar-qtz and sulphide, po makes up 5 to 7 vol-% of the rock, it predominately is bound to amphibole but too forms fuzzy layers within felsic bands.

chemical analysis 471.62-471.73m

layering: 62°
sharp footwall. ~~contact~~

471.73 - 472.75 garnet bear. biotite - epidote-fspar - qtz rock
(meta - peratophyr)
dark gr with blurowish stringers, fine - grained, granoblastic texture
slightly schistose due to dimensional preferred orientation of biotite, ~~nearly even-grained with biotite being subporphyric~~, the tiny biotite flakes may be equally distributed but in places form discontinuous layers or network-like features, the latter supposely a result of a late deformation, rare idioblasts of garnets

chemical analysis
471.73 - 472.90

max. 0.15cm across are restricted to the stratigraphically upper parts of the layer, not forms a * schistosity: 74°-78° gradual ~~con-~~ footwall. ~~tact~~

* low- to medium-grade dissemination, the crystals being submegascopic.

472.75-477.65: epidote-amphibole-qtz-fspar gneiss (meta-pyroxenite) gr with huge green prisms and stellates, nonrhythmic cm- to dm-layering composed of fine-grained granoblastic qtz-fspar bands which contain not oriented slightly porphyritic prisms of amphibole and

layers of epidote-amphibole-qtz-fspar rock characterized by porphyroblasts of amphibole which are oriented at random and constitute in places radiating aggregates, the amphibole crystals predominately are elliptical in outline and reach maximum 1.5 cm = length, epidote mostly is concentrated within areas affected by stress, subordinate pyrite forming spots of irregular shape and discontinuous

chemical analysis
472.90 - 474.7 m

* mt displays a medium-grade locally low-grade dissemination, the crystals being submegascopic.

laminae is found between: 472.95 - 473.05 m and 474.02 - 474.15 m; *

banding: 472.95 52°, 473.50 66°, 474.20 82°.

minor faults: 473.96 m, 474.00 m, 474.12 m, 475.46 - 475.50 m, 475.56 m.

gradual footwall

474.65 - 482.59: amphibole schist (meta-basalt flow) gn, fine-grained, predominately with nematoblastic texture, often with irregular qtz-veining*, tiny spots of ilmenite occur between: 474.65 - 478.20 m, pyrite forms rare xenomorphic spots; dm insections of high epidote-qtz-

* qtz is accompanied by crystal-aggregates of biotite within stratigraphically lower parts,

plagioclase-amphibole schist with amphibole being medium-grained at: 474.88 - 475.00 m, ~~and~~ 475.45 - 476.15 m, ~~and~~ 476.87 - 476.90 m, 480.90 - 481.20, 481.40 - 481.50 m, 481.80 - 481.90 m and 482.15 - 482.30 m sharp contact at footwall.

482.59 - 483.20: magnetite - quartzite (meta-chert, oxide facies iron formation) gr with slight bluish tint, dense, finest low-grade dissemination of mt, coarse development of layering due to streaks and schlieren or trains of grannules of po.
lamination: 68°

sharp footwall. ~~contact~~.

483.20 - 483.38: amphibole - epidote - qtz - fspar gneiss (banded amphibolite, meta-mafic tuff) gn to yellowish gn, layered, close alternation of fine-grained granoblastic epidote - qtz - fspar layers and bands of porphyric amphibole, the crystals being oriented at random and locally form radiation aggregates, pyrite makes up 2 Vol.-% of the rock and mainly is concentrated within the lower portion of the section, it forms

chemical analysis 483.20 - 483.38 m

elongated crystals or crystal aggregates and often fills the interstices of the ~~By~~ amphibole blasts.
layering: 67°
sharp footwall. ~~contact~~.

483.38 - 485.05: Diorite - dolerite dear.
qtz-fspar amphibolite (meta-basalt flow)
grey, medium-grained, distinct foliation of mafic compounds parallel to axial plane, mide development of leopard texture, homogeneous, closely packed ellipsoidal crystal aggregates composed of fibrous amphibole or amphibole and

chlorite surrounded by fine-grained granoblastic qtz and fspar, biotite is restricted to an inter layer with

Chemical analysis 483.85 - 484.45 m

weak to strong ~~strong~~ ~~weak~~ to ~~strong~~ ~~weak~~ strong alteration which extends from 483.75 to 484.45 m, the highest alteration with biotite-schist and amphibole-chlorite schist - both containing subordinate pg - is centered around 484.20 - 484.40 m. layering, foliation: 75°

AA

485.05 - 494.40: chlorite-qtz-plagioclase amphibolite (meta-basalt flow

locally with rock alteration)
gign, locally strongly coloured, medium - but sometimes ~~often~~ coarse-grained, often with distinct leopard texture which is most conspicuous parallel to the lineation, closely spaced crystal aggregates composed of either amphibole or amphibole and chlorite surrounded by fine-grained granoblastic qtz-fspar which locally contains abundant epidote, thin-thick intersections of weakly sometimes strongly

A and AA

altered rock situated at: 485.40 - 485.55 m, 485.90 - 486.75 m, 493.00 - 494.40 m, the sections have gradual contacts with ~~the altered rock~~ the surrounding, the most characteristic mineral is biotite which forms multicrystal pseudomorphs (fascicular bundles or bow-tie crystal shapes) after amphibole and chlorite, thus the original texture of the rock is continuous despite areas where biotite forms closely spaced parallel streaks the orientation being stress induced.

sharp footwall contact

494.40 - 507.90 : chlorite bear. qtz-fspar amphibolite (meta-basalt, intermittent flows)

same as: 483.38 - 485.05 m

chemical analysis 494.52 - 495.67 and 502.54 - 503.35 m

* ren often with subordinate or higher amount of biotite, within 504.00 - 505.35 m and 506.70 - 507.90 m strong biotitization which decreases upsection, scattered mm - large idioblasts of garnet are characteristic for the stratigraphically upper zone with biotitization, pyrite forms a low-grade dissemination at 495.54 and at 499.50 m, slightly higher pyrite content is found within 502.54 - 503.35 m, a layer characterized by cm-large nodules of dense quartz surrounded by the granulite of the mafic crystal phase

chloritic amphibolite with abundant idioblasts of pyrite.

ranges from fine to coarse ~~white~~, the fabric ~~always is lepidoblastic~~, * num- large idioblasts of mt which make up 2 Vol.-% of the rock are restricted to the layer at 495.05 - 495.55 m, this layer contains too a finest, low-grade dissemination of py.

layering: 505.60 m 75°

503.35 - 503.45: magnetite-quartzite (meta-chert, oxide facies iron formation)

same as: 482.54 - 483.40 m but without po.

* ~~Hbl~~ may be massive or discrete-layer at 495.55 - 495.90 m is strongly disharmonic folded - while the stratigraphically lowest section is distinctly cm-banded, qtz and fspar form mm - large round and/or ellipsoidal crystal aggregates which alternate with fasciculas or imperfect spherulitic biotite,

507.90 - 508.20: garnet bear. biotite - chlorite - amphibole schist

(meta-basalt flow)

gn with brown and reddish brown streaks, fine-grained, strongly disharmonic folded, fine-fibrous amphibole is interlaminated by trains of granules of tiny crystals of garnet which are accompanied by streaks and ~~irregular shaped crystal aggregates~~ clots of fibrous biotite and chlorite.

gradually passing into underlaying rock.

508.20 - 508.60: garnet - biotite - qtz - fspar rock

chemical analysis
507.95 - 508.85 m

(meta-felsic tuff)
spec. meas: 495.55 - 495.90 m.
brownish gr, fine-grained with slightly porphyric tuffite which has a tendency towards parallelism, wide development of compositional banding, in places some acicular amphibole the amount gradually decreasing towards upsection, rare tiny spots of pyrite and locally ilmenite.
foliation a. layering: 38°
gradual footwall.

508.60 - 508.85: garnet - chlorite - amphibole schist
(altered meta-basalt flow)
gr, porphyroblastic tex-

kite, porphyric amphibole - needles on average 0.3 cm long - slightly being oriented embedded in a matrix of fine-fibrous dacite, garnet forms < 0.1 cm large idioblasts which equally are distributed but sporadically form trains of granules, occasionally mm-thick interlayers rich in qtz and fspar ~~and sometimes~~ (which rarely carry ~~with abundant~~ some) + pyrite. lamination: 48° knife-sharp disconformable footwall.

A

508.85-509.40: quartzite, altered amphibolite and silphide mineralization

chemical analysis
508.85 - 509.40 m

(boudined meta-dyt or migrated - nodule, vein - quartz)

chaotic, structure, irregular alternation of white dense quartzite and garnet-chlorite amphibolite or coarse-grained biotite-chlorite schist, always knife-sharp contacts between quartzite and mafic layers, po forms ~~huge cluster aggregates - irregular shaped textures~~ clusters which contain little pyrite and sporadically streaks of cp, the sulphide content does not exceed 10 Vol.-%.

partly f and ff

sharp footwall contact 45°

Borhull

2000 D

Slutdjup

509.40 m

509.40 - 509.65: biotite - amphibolite
(meta-basalt flow,
A weakly altered)
same as: altered sections
within 485.05 - 494.40
m, near footwall gradually passing
into schistose amphi-
bolite which is extre-
mely fine-grained
and ~~shows~~ a schisto-
blastic texture, here
tiny hypidiomorphic
spots of ilmenite equi-
ally being distributed.
knife-sharp footwall.
509.65 - 509.80: magnetite - quartzite
(meta-chert, oxide
facies iron formation)

same as: 482.59 - 483.20 m
but without po mineralization.
knife sharp footwall.

509.80 - 510.80: garnet bear. magnetite-amphibole schist
(meta-mafic tuff/flows)
gn, medium-crystalline, imperfect banding composed of cm-thick layers of garnet-magnetite-amphibole schist and ~~wehrlite~~ streaks of fine-grained granoblastic magnetite, traine of granules of garnet and mm-thick bands or flasers of sulphide which normally carry

chemical analysis 509.80 - 510.80 m

abundant qtz, amphibolite layers have nematoblastic texture, the garnet forms slightly porphyric idiomorphic crystals which equally are distributed, the ~~total~~ sulphide (py) - content of the section amounts to 2 Vol.-%. gradual footwall.

510.80 - 511.70 biotite bear. qtz-fspar amphibolite (meta-basalt flow) lightgn, medium-grained, slightly foliated, *~~nebu~~-lodring fascicular to bow-tie shaped crystal

*indistinct leopard texture

aggregates of amphibole and biotite in close alignment with mm-large irregular formed crystal aggregates of qtz and fspar, rare spots of py.
gradual footwall
511.70 - 522.25 idiotope amphibolite (meta-intermittent basalt flows)
gn locally grgn, mostly fine-grained with nematoblastic texture but locally medium-grained with tendency towards leopard texture, biotite as fascicular bundles occurs from

515.10 in section, it may either be equally distributed or is enriched within mm - sometimes cm - thick layers which carry abundant qtz and occasionally chlorite, scattered xenomorphic crystals of ilmenite ~~being~~ max. 0,1 cm across are found between 512.80-513.15 and 512.00 - 512.38 m, high amount of epidote is found with 511.80 - 511.97 m, here acicular amphibole-needles on average 0.2 cm long - form an

open framework of touching and cross-cutting crystals within ~~enclosed in~~ a fine-grained ~~granoblastic~~ mosaic ~~matrix~~ of epidote and subord. qtz.
gradual footwall contact

AA

511.70 - 511.80: biotite chlorite schist (meta - highly altered mafic volcanic)
strongly porphyroblastic texture, max. 0.3 cm large tabular shaped and imperfect spherulitic crystal aggregates of biotite surrounded

chemical analysis 511.70 - 511.80 m

by interleaved, fine-fibrous chlorite which seems to be oriented, a medium-grade dissemination of py occurs at 511.77m.

512.38 - 512.57: garnet becs. magnetite-amphibole schist (meta-mafic tuff/flows)
same as: 509.80 - 510.80 even richer in mt.

chemical analysis 512.38-512.57m

515.10 - 515.66: amphibole bear. qtz-fspar-biotite schist (meta-felsic tuff)
same as: felsic tuff within

494.40 - 507.90 m, here massive mikrait garnet but scattered hypidio- to idioblasts of fspar max. 0.2 cm across, amphibole and subordinate chlorite are concentrated within the lower portion of the layer ~~and~~ gradually decreasing upsection. sharp hanging wall, gradual footwall.

516.30 - 517.00: epidote bear. qtz - fspar - biotite schist (meta-felsic tuff)

same as: 471.50 - 471.62 m but with no amphibole,

~~and~~ cride lamination
due to tendency of
biotite to form streaks
and lenses which are closely
~~being~~ ~~to~~ paired and alternate with
fine-grained grano-
blastic interlocked qtz-fspar
which sporadically
are associated by epidote
lamination: 66° being
in places strongly
deformed, folded.
sharp hanging wall and
foot wall.
518.35-518.53: amphibole
qtz-fspar rock
(meta-granophyre)
gr-milky- with needles of

massive,
gn, porphyroblastic
texture, scattered
prisms of amphi-
bole max. 0.2 cm
long embedded in a matrix
of fine-grained
granoblastic qtz and
fspar, amphibole
needles show a faint
orientation, rare
spots of py.
indistinct contacts
to surrounding
amphibolite.

522.25-523.70: amphibole-biotite-sericite schist
(tuffaceous meta-
pelite)

gr. with faint greenish tint, onset development of flaser and lenticular structure, porphyroblastic texture, average 0.4 cm long needles of amphibole randomly oriented are equally distributed, biotite forms fascicular bundles or incomplete pericilites max. 0.3 cm large which are scattered through a matrix of fine-fibrous sericite forming the foliation, amphibole gradually increases in mode upsection.

gradual footwall

523.70 – 558.70: biotite – sericite schist (meta-pelite)

gr with faint greenish tint,* porphyroblastic texture throughout, scattered biotite forming fascicular bundles, bow-type crystal aggregates and incomplete spherulites being mat. 0.2 cm large, the

biotite clots are not in most of the cases oriented (cross-nicol) but they are in places are interlocking thus

but sporadically seem to be gradual upward

* homogeneous schist alternates with sections being banded and sections which are characterized by flaser or lenticular structure, the banded areas show a cm-layering composed of bands of fine-fibrous sericite poor in biotite, layers of qtz-biotite-sericite schist and qtz-dominated bands with tiny streaks of biotite and sericite which cause a superimposed imperfect lamination, the layering contacts are always sharp

constituting discontinuous layers or streaks which tend to be aligned along one or another plane of foliation. Biotite equally is distributed it sometimes however may increase to such an amount to form a sericite-biotite ~~schist~~ interlays, carbonate mainly lacks but is found as scattered hyp. idio- and idio blasts max. 0.2 cm across between 527.55 - 528.30 m, 531.70 - 532.05 m and 557.15 - 557.35 m.

a scarcity to the occurrence of porphyroblasts of amphibole the needles being max. 0.5 cm long and not oriented.

537.55 - 539.35: biotite - sericite - amphibole - qtz rock (meta-greywacke or coarse-grained sandstone) dark gr with faint greenish tint, medium-grained, massive, scattered cm-large elongate qtz-clasts with indistinct borders to the surrounding

sample 20000D/19a 538.00m
19b 537.67m

embedded in a matrix of fine-grained qtz and sericite and slightly porphyric amphibole-needles max. 0.15mm long- and/or biotite which forms fascicular bundles or bow-type aggregates, both mafic crystal phases are not oriented, amphibole and biotite seem to exclude themselves.
strongly lecturited between 538.75-539.35m.
gradual hanging wall

and tectonic foot-
wall contact.
556.70 - 558.70: <u>biotite-
sericite schist</u>
(meta-pelite or psephite
with abundant
matrix (paraconglomer-
ate ?))
gr with faint greenish
tint and
deep brown streaks and
layers, laminated,
some intersections with
lenticular structure
(blastopsephitic tex-
ture ?), here cm - large
nodules of elliptical
shape composed of

either carbonate or qtz-carbonate ~~breccia~~ surrounded by fine-fibrous sericite which contains crystal aggregates of biotite with sparce orientation; within 557.90 - 558.17 m carbonate-biotite-chlorite dust (AA-type dust) → layer contains a low-grade dissemination and minor limbs of po the latter being closely connected to streaks of cp

AA

chemical analysis 557.90 - 558.17 m

558.70 – 560.03: diorite dear. amphibole sericite fspar-qtz schist (meta-qtz-pelite with volcanic impurity)

gneiss, widely developed flaser to lenticular structure which becomes more distinct within the stratigraphical lower portion of the layer, here alternation of felsic compounds as layers, lenses and streaks with bands and flasers of phyllosilicates carrying

abundant porphyroblasts of amphibole on average 0.4 cm long which are oriented at random, the hanging portion looks quite massive and homogeneous with amphibole prisms being more abundant and equally distributed.
gradual hanging wall with at least sudden appearence of amphibole, 72°, knife-sharp footwall, 62° sipp. bedding fault line.

560.03 - 574.10: plag. amphibolite (meta-basalt flow) lightgn, medium-grained with stratigraphically lowermost portion being slightly increased in grain-size, crude development of mineral orientation - lineation of prismatic amphibole, slight compositional changes upsection: decrease in felsic compounds, increase in amphibole,

(568.10 - 574.10 m)
lowermost portion with
Poorly defined
leopard texture and with
abundant oval (mandelet)
nodules of
qtz or plagioclase which
on average are 0.4 cm
in size, ~~and elliptoidal~~
~~in shape~~.
intersections being strongly
sheared: 560.10 - 560.75 m and
564.70 - 564.75 m.
sharp footwall, 45°.

574.10 - 574.36: sulphide - quartzite
(meta - exhalite (volcano
chemite))
gr with lustre of sulphide,
web-like sulphide
mineralization (50 vol.-%) composed
of py which gradually
decreases upsection and

chemical analysis
574.10 - 574.36 m

and
po fine-grained granoblastic qtz fills the
(void)
open spaces of the
web.
sharp footwall.

57436 - 57466: biotite bear. amphibole-fspar-qtz rock (meta-keratophyr) lighter, porphyroblastic texture, decrease in amphibole in section, porphyric needles of amphibole max. 0.5 cm long and randomly oriented in a fine-grained granoblastic qtz-fspar matrix
abundant
which carries tiny fascia-

to bundles of biotite, rare crosscutting trains of coarse crystalline biotite which is accompanied by fibrous chlorite and locally by carbonate, scarce spots of py and po. gradual footwall.

57466-57530: biotite-chlorite bear. plag. amphibolite (interfingering of meta-basalt and altered tuff) grgn with brown streaks, nonrhythmic alternation of medium-grained plag. amphibolite with imperfect leopard texture

partly +A

with stripes and layers or crosscutting veins composed of coarse crystalline biotite fine-fibrous chlorite and - only locally - idioblasts of carbonate and minor spots of sulphide (po, py).

sharp footwall, 60°

575.30 - 683.18: schistose amphibolite (meta-basalt flow)

gr. extremely fine grained with intersections being fine grained, homogeneous with scarce mm-thick bands or

discontinuous layers of carbonate which sometimes cross cut the major plane of foliation, sporadically cm-thick interlayers of biotite-carbonate which contain elongate spots or trains of granules of Py, scattered interlocked elongate plagioclase crystals as lenses of max. 0.2 cm long dimension (vug fillings) between: 620.60-626.00 m,* 629.80-630.60 slightly calcareous

*finest dissemination of ilmenite - 3 Vol.% - between: 675.50-677.30 m; several streaks and giant spots of Py, the sulphide grading 1 to 2% by volume of the rock, between: 682.90-683.18 m.

carbonate banding: 577.00 m 66°, 579.90 m 79°, 582.90 m 45°, 587.00 m 60°.

biotite bear amphibole-chlorite-sericite-qtz-plag. gneiss (banded amphibolite, meta-mafic tuff) lightgr, cm-banding composed of alternate layers of biotite-chlorite-sericite schist, slightly calcareous amphibole qtz-fspar rock and amphibole-chlorite-sericite schist, the continuous banding in places is interrupted by intercalations of schistose amphibolite which are max. 10cm thick and have sharp

contacts with the surrounding rock, the un-banded sections display a porphyroblastic texture caused by randomly oriented idioblasts of amphibole being max. 0.4 cm long which are locally replaced by biotite. sharp contacts.
655.05 - 655.45: qtz - fspar chlorite - amphibole gneiss (banded amphibolite, meta - mafic tuff)
gn, crude development of layering due to slight

compositional changes, distinct porphyroblastic texture which is caused by the tendency of amphibole to form coarse ellipsoidal prisms which display an open framework of touching crystals the interstices being filled by fine-fibrous chlorite and fine-grained granoblastic qtz.
sharp contact.

683.18 - 684.17: amphibole qtz-fspar rock

chemical analysis 682.90 - 684.17 m

(meta-leucotophyr, flow) or with distinct reddish tint, homogeneous with crude development of gneissic texture, slightly porphyritic, interlocking elongate qtz-fspar or fspar crystals as layers or lenses in alternation with slightly porphyritic acicular amphibole forming the foliation. Py mainly is concentrated within the lowermost portion forming streaks and elongate giant spots,

it here amounts to 1 Vol.-%.
foliation: 75°
small faults at:
684.05 m, 683.88 m,
683.84 m
sharp hanging wall with 82° to core axis, bedding fault line as footwall contact.

684.17-689.90: calcareous amphibole schist
(intermittent basalt flows with mafic tuff interlayers)
gn, fine-grained, nematoblastic texture, homogeneous, carbonate

chemical analysis
684.17-685.17m

forms mm-layers or trains of granules normally conformable with the major plane of foliation within the stratigraphical upper part, it occurs as spotted carbonate-scattered idioblasts on average 0.4 cm across - within the footwall section, here it is strongly enriched, Py is found as tiny spots throughout its amount being lesser 1%; inter layers of mafic

cliff at: 685.05 - 685.45m, 686.30 - 686.35 m, 688.18 - 688.48m, 689.40 - 689.90m. calcareous to high calcareous chloride bear. qtz-plag. amphibole gneiss/rock

A

gn to lightgn with abundant white spots, medium-grained, crude development of compositional banding, idioblasts of carbonate max. 0.4 cm across being equally distributed but sometimes forming trains of granules or layers, low-grade

chemical analysis
686.30 - 687.30
687.30 - 688.30
688.30 - 689.40
689.40 - 689.90

dissemination of py forming xeno - to hypidiomorphic crystals or bigger elongated crystal aggregates, mainly sharp contacts with surrounding basalt, sometimes slight gradations - contact to lying sericite schist - or bedding fault lines.

689.90 - 701.60: biotite - sericite schist (meta - pelite) gr with faint greenish tint, crudely laminated, streaks and flasers and discontinuous

laminae of biotite in alternation with fine-crystalline qtz-sericite, biotite sporadically forms fascicular bundles or immature spherulites both being not oriented, the uppermost portion is strongly disharmonic folded with in places lenticular structure and contains abundant qtz-nodules which are surrounded by strongly foliated sericite and biotite, intersections with

high amount in scattered idiotblasts of carbonate max. 0.4 cm across between: 693.70 - 694.80 m. Porosity: 693.00 m 72°, 695.50 m 50°, 696.50 m 72°, 701.40 m 80°

701.60 end of DDH

DIAMOND DRILL HOLE 2000 D

Location: Gåvå Liseles, 532840 6904890 UTM grid, zone 32, Top. map 1519 IV Sundsvatta
Azimuth: 394,5°
Inclination: - 70°, measured deviation until 630.00 m.
Total length: 701.60 m
Started: 16 Sep. 1985
Finnished: 07. Nov. 1985

Description:

0.00 - 5.25 : overburden

5.25 - 8.30 : slightly calcareous amphibole bear. biotite - chlorite schist

(meta - mafic volcanic sediment with coarse mafic* fragments and supp. with epiclastic sedimentary impurity*4, possible slightly distal facies or middle succession of subaqueous debris flow / lahar).

* and felsic

Rock with abundant qtz clusters, distinct fragmental structure*, often chaotic, coarse rounded to subrounded stretched fragments of predominately basaltic composition (biotite bear. amphibolite) and sparce felsic clasts (amphibole - qtz - fspar rock) embedded in a matrix*3 composed of chlorite, biotite and qtz and subordinate carbonate, interlodged qtz and carbonate crystals as lenses and layers alternate with schisten and laminae composed of fine-fibrous chlorite and containing fasciculas bundles or trains of flakes of biotite, occasionally the phyllosilicates are accompanied by tiny prisms of amphibole

*4 matrix support sediment,

*2 schistose

*3 with often distinct flaser texture

gradual footwall.

8.30 - 13.60 : calcareous sericite bear. qtz - chlorite schist

(meta - mafic volcanic sediment with epiclastic sedimentary impurity)

greenish gr with abundant brown sl. lieren and laminae, distinct flaser and lenticular structure, in places weak - like facility, interlocking qtz and qtz and carbonate crystals as lenses and flasers alternate with sl. lieren and laminae composed of fine-fibrous chlorite, fine crystalline sericite and biotite which tends to form scattered fascicular bundles but sometimes displays trains of flakes (laminae), carbonate locally occurs as idioblasts max. 0.3 cm in diameter.

schistosity: 45°

gradual contact

13.60 - 16.90 : slightly calcareous plagioclase-amphibole rock

sample 20003/1 15.05 m thinsection

(meta - mafic crystal tuff)

*blastoporphyritic texture,

Eigtlgn. *spotted appearance, nearly equal distribution of slightly elongate augen of plagioclase (blast.) max. 0.4 cm across which locally are carbonatized and average 0.15 cm large spots of amphibole within a fine-crystalline and homogeneous matrix composed in decreasing

oides of plagioclase, amphibole, epidote and carbonate, there exists only a slight distinction between amphibole spots and matrix.

gradual contact

16.90 - 19.00 : slightly calcareous sericite - amphibole bear. biotite - chlorite schist

sample 2000D/2 from 17.70 m thinsection

(meta - mafic volcanic sediment supp. with epiclastic sedimentary impurity; possible distal facies or upper succession of subaqueous debris flow / lahar)

lightgn with abundant brown schlieren, flaser and lenticular structure, interlocking qtz, fspar and carbonate crystals forming a fine-grained mosaic as schlieren and lenses and sometimes cm-thick layers in alternation with layers and schlieren composed of fine-fibrous chlorite which is accompanied by scattered bundles of biotite max. 1.0cm in long dimension which are oriented parallel to the major plane of foliation but may sometimes be oriented at random, amphibole occurs as scarce tiny needles and tends to join chlorite

schistosity: 70°-75° flattens to 65° within lower most part

gradual contact.

19.00 - 23.40: calcareous chlorite bear. qtz - fspar - amphibole rock

(meta - mafic volcanic sediment with fine to medium sized mafic fragments, possible distal facies or upper succession of subaqueous debris flow / lahar, or ash fall tuff)

*½ matrix support sediment

grey, well developed fragmental structure* stretched and flattened mostly subrounded elongate fine and medium sized fragments of fine - crystalline chlorite - amphibolite which often is resistant forming abundant elongate plagioclase augen of max 0.3 cm long dimension (scoria) are embedded in a sparce matrix which in the lowermost part is predominated by amphibole and chlorite and otherwise is composed of carbonate, qtz and fspar and subordinate chlorite and amphibole, the latter forms fascicular bundles max. 0.3 cm large which always are aligned along the foliation of the rock. ~~The plano-laminate texture~~ is well developed* within the upper part of the layer, ~~while~~ else where the distinction between fragments and matrix is less conspicuous and sometimes even is lost, matrix support sediment,

schistosity: 70° within lowermost part

80° - 85°

gradual footwall.

23.40 - 31.80 : high calcareous biotite - chlorite schist

(meta-mafic volcanic sediment supp. with epiclastic sedimentary impurity)

deep gr with abundant brown schlieren and white spots, spotted appearence, flaser and lenticular structure with transition into laminated rock, interlocking qtz and qtz and carbonate crystals as tiny lenses and laminae in alternation with thick layers composed of fine-flaky chlorite which is accompanied by fasciculat bundles and rare imperfect spherulites max. 0.3 cm large of biotite, biotite further forms laminae or schlieren which are conformable with the foliation of the rock, carbonate displays scattered idioblasts max 0.3 cm across, ~~duc-thick intersection of~~ slightly calcareous biotite-chlorite schist similar 16.90 - 19.00 m occurs as duc-thick infolded sections.

schistosity: 24.50 m 70° from 25.00 to 31.80 m strongly folded rock, occurrence of fold hinges.

gradual contact

31.80 - 33.40 : slightly calcareous biotite bear. qtz - chlorite - amphibole gneiss/ schist

(meta - mafic volcanic sediment with fine to medium size mafic fragments*, possible distal facies or upper succession of subaqueous debris flow/ lahar, or ash fall tuff)

* matrix support sediment

similar: 19.00 - 23.40 m, but with strain induced gneissic texture, ~~strongly~~ folded.

gradual contact.

33.40 - 35.50: calcareous biotite - chlorite schist

(meta - mafic volcanic sediment supp. with epiclastic sedimentary impurity, possible distal facies or upper succession of subaqueous debris flow/ lahar)

similar: 16.90 - 19.00 m, but strongly folded, occurrence of fold nuges.

gradual contact

35.50 - 39.90 : calcareous qtz - fspar - amphibole schist

* matrix supported sediment

(meta-mafic volcanic sediment with fine to medium size mafic fragments*; possible distal facies or upper succession of subaqueous debris flow / lahar, or ash fall tuff)

similar: 31.80 - 33.40 m, clusters of milky qtz at: 37.70 - 38.20 m and 39.20 - 39.50 m, into layer of slightly calcareous biotite-chlorite schist at: 37.20 - 37.70 m.

gradual contact

39.90 - 47.20: slightly calcareous biotite-chlorite schist

(meta-mafic volcanic sediment supp. with epiclastic sedimentary impurity, possible distal facies or upper succession of subaqueous debris flow / lahar)

similar: 16.90 - 19.00 m, but strongly folded and with occurrence of fold hinges, clusters of milky qtz at: 44.00 - 44.60 m, 44.90 - 45.05 m, 45.40 - 46.00 m, 47.50 - 48.00 m.

sharp contact.

47.20 - 49.70: calcareous to high calcareous biotite-amphibole - chlorite schist

(meta-mafic volcanic sediment)

bronnishgr within lower section gigu, coarse-crystalline, strong compositional changes upsection, lower part with high chlorite and amphibole content and with rare round slightly elongated fine-grained fragments of amphibolite. the fragments are still distinctionable from matrix but tend to blend together to give a homogeneous amphibolite, matrix amphibole forms fascicular bundles or imperfect spherulites max. 0.5 cm large which poorly are directed, they originate a slight leopard texture, chlorite is finefibrous and joins the felsic compounds as being qtz, fspar and carbonate, the upper part contains abundant carbonate and biotite but strongly is decreased in chlorite and amphibole, the rock is homogeneous and shows a distinct porphyroblastic texture, biotite forms multi crystal pseudomorphs after amphibole as well as fascicular bundles and imperfect spherulites all being not oriented, biotite together with bundles of amphibole constitute an open framework the interstices of which being filled by interlocking carbonate crystals as elongate spots of average 0.2 cm size and accompanied by

qtz and fspar.

gradual footwall.

49.70 – 54.80 : slightly calcareous biotite bear. chlorite-amphibole rock / schist

(meta-mafic volcanic sediment with medium size* mafic fragments*; possible slightly distal or upper succession of subaqueous debris flow/lahar)

sample 20003/3
54.50 m
thinsection

well developed fragmental structure, stretched and flattened elongate clasts of basaltic composition reaching 50% of the total are surrounded by a schistose matrix with often distinct flaser and lepidoblastic structure composed in decreasing orders of chlorite, biotite, amphibole, qtz, fspar and carbonate, it is obvious that coarse and fine grained clasts are sedimentated simultaneously, ~~sorting may exist as a stratigraphic position~~, the fragments are composed of fine crystalline amphibole which is poorly directed but displays a distinct nemato blastic texture within the edges of the clasts and rarely contain chlorite and/or carbonate, they often are vesiculated the ellipsoidal-stretched and flattened - axigen max. 0.3

* matrix support sediment.

*½ slight grading characteristics may be present locally

an in long dimension being composed composed of plagioclase often with mortar texture, a fine grained mosaic of carbonate, qtz and fspar or a crystal aggregate of carbonate.

gradual footwall.

54.90 - 65.90: slightly calcareous amphibole - biotite - chlorite schist

(meta - mafic volcanic sediment* supp. with epiclastic sedimentary impurity*3 possible distal facies of upper succession of subaquae-ous debris flow / lahar)

gn with abundant giant brown rods and clots, *2 porphyroblastic texture, fine to coarse elongate fragments of fine - crystalline schistose amphibolite which often are vesiculated carrying max. 0.1 cm large augen of plagioclase are embedded in a phyllosilicate matrix composed of fine - fibrous chlorite which contains abundant rods, fascicular bundles and nearly perfect spherulites of biotite, the crystal aggregates reach sizes between 0.5 and 1.0 cm, carbonate forms minute spots and joins qtz and fspar in tiny schlieren and lenses, the matrix in places is enriched

* with fine and coarse mafic clasts and

*3 matrix support sediment,

*2 poorly developed fragmental structure,

in qtz and fspar thin similar 49.70 - 54.80 m, clusters of milky qtz sometimes accompanied by cm-thick interlayers of pure biotite occur between 56.90 - 58.30 m, sparse spots of cp within qtz-carbonate are present at 59.80 - 60.10 m.

schistosity: 56.30 m 65°, 56.90 - 58.70 m disharmonic folded, chaotic, 59.00 m 70°, 59.60 - 61.00 m disharmonic small scale folding, 61.30 m 30°, 62.00 m 35°, 63.80 m 60°, 64.60 m 45°, 64.70 - 65.35 m small scale isoclinal folding ±, 65.50 m 90°, 65.70 m 20°.

gradual contact.

65.90 - 68.10 : slightly calcareous biotite bear. chlorite - amphibole rock / schist

(meta-mafic volcanic sediment with medium size mafic fragments, matrix supported sediment; possible slightly distal facies or upper to middle succession of subaqueous debris flow / lahar).

similar: 49.70 - 54.80 m, but strongly schistose, squeezing and stretching of fragments result in a distinct gneissic texture, locally small scale isoclinal folding.

schistosity: 66.70 m 50°, 67.70 m 60°, 68.00 m 45°.

gradual contact

68.10 - 75.35 : slightly calcareous biotite - plagioclase schist

(meta-mafic volcanic sediment supp. with epiclastic sedimentary impurity, possible distal facies of upper succession of subaquatic debris flow/lahar)

sample: 2000D/4 73.45 m thinsection

similar: 16.90 - 19.00 m, schist with much clearer separation of phyllosilicates and felsic components, more distinct flaser and lenticular structure, biotite in general coarse crystalline and more often the major foliation, from 74.40 m downsection occurrence of small fragments of amphibolite and sparse medium sized ellipsoidal fragments of felsic volcanic composed of qtz, fspar and little amphibole.

schistosity: 68.70 m 50°, 69.70 m 70°, 70.70 m 85°, 70.80 - 71.10 m ∠, 71.20 m 90°, 71.55 - 71.80 m ∠, 72.00 m 45°, 72.60 m ∠, 72.70 m 45°, 74.70 m 65°

gradual contact

75.35 - 79.20 : slightly calcareous diorite - diorit-amphibole schist / rock

(meta - mafic volcanic sediment with coarse mafic fragments, matrix support sediment. possible slightly distal or lower to middel succession of subaqueous debris flow/lahar)

gn with abundant brown schlieren, poorly developed fragmental structure, which results from little differences in colour of matrix and fragments, the rock has a sparse matrix* which is extremely poor in felsic compounds, it is characterized by a lamination composed of alternate layers of chlorite and schlieren or discontinuous layers of diorite. The fragments are large and cover maximum 5 cm of core, they are composed of fine-crystalline amphibole and nearly always carry elongate vesicules of plagioclase or epidote and plagioclase which may reach 0.3 cm in long dimension, clusters of milky qtz exist between 75.90 - 76.10 m.

* - approx. 30% of the total -

Schistosity: 76.50 m 55°, 77.75 m 45°.

gradual contact

79.20 - 81.20 : slightly calcareous amphibolite - biotite - chlorite schist

(meta-mafic volcanic sediment with fine and medium size mafic fragments, matrix support sediment. possible slightly distal facies of upper succession of subaquaeous debris flow/lahar)

similar: 75.35 - 79.20 m, but with smaller fragments approx. 10 % of the total.

schistosity: 80.40 m 60°.

sharp contact.

81.20 - 84.20 : epidote bear. qtz - fspar amphibolite

sample: 2000D/21 82.50 m thinsection

(meta-mafic volcanic sediment with fine fragments of amphibolite)

grey, massive, homogeneous, less distinct fragmental structure due to compositional similarities of matrix and fragments, medium-crystalline, subangular to subrounded fragments of cm-size composed of amphibole are widely scattered in a matrix composed of in decreasing order amphibole, qtz, fspar and epidote, amphibole forms needles, fasicular

bundles or imperfect radiating aggregates of max. 0.2 cm size which homogeneously are distributed forming an open framework the interstices of which being filled by fine-grained granoblastic qtz and fspar and epidote

sharp contact

84.20 - 88.20 : slightly calcareous amphibole - biotite - chlorite schist

(meta-mafic volcanic sediment with fine and medium size mafic fragments, matrix supported sediment, posible slightly distal facies or upper succession of subaqueous debris flow / lahar)

similar : 79.20 - 81.30 m, but with 30% fragments of the total.

distorsity: 86.20m 85°, 87.20m 85°.

sharp contact, 85°

88.20 - 90.45 : slight. calcareous amphibole bear. biotite - chlorite schist

(meta-mafic volcanic sediment with sparse medium size fragments and supp. with epiclastic sedimentary impurity, posible distal facies of upper succession of subaqueous debris flow / lahar)

similar : 16.90 - 19.00 m, but enriched

strain induced
in phyllosilicates, lamination instead of flaser and lenticular texture, sparse fragments* composed of fine-fibrous amphibole which extremely are stretched, at lower-most section similar: 54.70 - 65.90 m.

* - 5% of the total -

minor faults at: 90.40 - 90.45 m

schistosity: 88.20 m 85°, 89.20 m 75°, 90.20 m 85°.

sharp contact, bedding fault line.

90.45 - 90.70: epidote - biotite - amphibole - chlorite schist

(meta-mafic volcanic sediment with epiclastic sedimentary impurity; possible distal or upper succession of subaquaeous debris flow / lahar)

similar: 16.90 - 19.00 m, but disturbed ~~and~~ with small scale folding and several fold induced minor faults.

sharp footwall.

90.70 - 91.18: chlorite - epidote - amphibole - plagioclase rock

(meta-mafic crystal tuff)

gr with faint yellowish tint and tiny

sample: 2000D/5
91.00 m
thinsection

blackish spots, fine-crystalline, poorly developed porphyritic texture, equidistribution of tiny needles of amphibole which are poorly directed within a matrix composed of plagioclase, epidote and fine-fibrous chlorite, a sparse occurrence are fascicular bundles of biotite mat. 0.15 cm large which slightly are oriented, medium-grade dissemination of ilmenite the crystals being lesser 0.1 cm large and mostly show serrated boundaries.

slight orientation: 45°

sharp contact.

91.18 – 91.25: slightly calcareous amphibole bear. biotite-chlorite schist

(meta-mafic volcanic sediment supp. with epiclastic sedimentary impurity; possible distal facies of upper succession of subaqueous debris flow / lahar)

grey, laminated upper section, alternation of carbonate bear. feldspar layers with bands and schlieren of chlorite which near the footwall contain tiny needles of amphibole being oriented at random, biotite is always conformable the compositional layering and forms schlieren

which escorte the chlorite layers, the lower part displays a homogeneous chlorite schist with sparse occurrence of tiny flakes and bundles or imperfect spherulites of biotite, milky qtz is present locally as tiny veins and small clusters.

schistosity: 50°

sharp contact.

91.25 - 91.45: magnetite amphibolite

(meta - iron rich mafic volcanic)

chemical analysis 91.18 - 91.45 m

bluish black, medium crystalline, crude development of lamination, indistinct alternation of cm-thick layers composed of amphibole and subordinate mt with mm-thick qtz-magnetite bands (chert) amphibole forms 0.4 cm long needles strongly being parallel and forming the foliation, pyrite occurs as spots, stringers and network features its amount being less 1 Vol.-%.

layering: 55°

gradual contact.

91.45 - 92.50: slightly calcareous epidote bear. biotite-chlorite schist

(meta - mafic volcanic sediment supp. with epiclastic sedimentary

impurity; possible distal facies or upper succession of subaqueous debris flow / lahar)

similar: 16.90 - 19.00 m, but with epidote joining the mosaic of qtz, fspar and carbonate.

schistosity: 45°

minor faults: 91.75 - 91.78 m, strong deformation and with milky qtz clusters between: 92.40 - 92.50 m.

sharp disharmonic footwall.

92.50 - 94.62: amphibole - biotite - qtz - epidote - plagioclase rock

(meta - leucobasalt, spilite)

sample: 2000D/6 93.96 m thinsection

gr with faint yellowish tint, abundant qtz needles and brown rods and veins, heterogeneous in structure and composition, often chaotic, within the upper part wide development of layering as a result of rhythmic changes in the mode of qtz and amphibole, predominately with porphyritic texture, scattered amphibole needles max. 0.3 cm long and randomly oriented within a matrix composed of interlocking plagioclase and epidote, biotite forms fascicular bundles, bow-tie aggregates and clusters of mm and sometimes cm-size which variably are distributed, frequent occurrence of discon-

tiniories laminae of biotite which seem to follow no regularion, garnet sporadically is present forming tiny idioblasts, spots of pyrite are a local exception.

layering: 92.90 m 45°, 93.00 - 93.50m m.

sharp footwall.

94.62 - 94.75: qtz - biotite - chlorite - amphibole schist

(meta - mafic volcanic sediment with fine to medium size mafic fragments, matrix support sediment. possible distal facies or upper succession of subaqueous debris flow / lahar)

similar : 19.00 - 23.40 m.

schistosity: 45°

94.75 - 94.91: biotite bear. qtz - fspar - amphibole - epidote rock

(meta - mafic volcanic, tuff)

Chemical analysis 94.75 - 94.91 m

gr with distinct yellowish tint, heterogeneous in composition and texture, mainly fine grained granoblastic qtz - fspar - epidote rock which contains schlieren or fasci -

cular bundles of biotite forming the foliation and sparse amphibole needles max. 1.0 cm long which tend to be oriented, near the footwall 2 cm thick interlayer composed of coarse ellipsoidal amphibole and fibrous chlorite which contains 10% of pyrite filling the interstices of amphibole crysts.

layering: 45°

sharp contact

94.91 - 95.92: pyrite - epidote - amphibole - biotite - magnetite - qtz gneiss

(oxide - facies banded iron formation)

chemical analysis 94.91 - 95.98 m

dark grey to bluish black, extremely fine grained, granoblastic but often with porphyroblastic texture, laminated, close alternation of mm - thick layers composed of qtz, qtz - magnetite, epidote - amphibole - magnetite, qtz - magnetite - amphibole and magnetite - biotite - qtz, sparse cm - thick interlayers rich in pyrite which tends to form trains of granules up to 0.5 cm thick within a qtz matrix, amphibole displays porphyroblast- max. 0.7 cm in long dimension, the needles being oriented at random and often prolongate in adjoining layers, it supposely

locally
accompanied by prisms of cummingtonite, biotite forms fine fascicular bundles or schlieren which follow the lamination.

layering: 45°

96.42 - 96.58: amphibole bear. biotite - qtz - epidote schist

(meta - mafic tuff, spilite)

similar: 92.50 - 94.62 m, but enriched in biotite forming bow-tie aggregates and fascicular bundles which tend to be parallel forming the foliation.

knife sharp contacts.

95.92 - 100.82: magnetite bear. plagioclase - epidote - amphibole schist

(meta - intermittent basalt flows)

gn with interlices being yellowish, abundant black spots, medium crystalline, strong foliation which locally results in a compositional lamination, amphibole forms fascicular bundles max. 0.7 cm large which closely are packed and alternate with schlieren of granoblastic plagioclase and epidote, magnetite supp. accompanied by ilmenite* forms xenomorphic crystal

* makes up 2 to 3% by volume of the rock by variable distribution, it

aggregates being minor 1 mm which have sutured boundaries, locally mt gets remobilized and fills or joins small faults.

minor faults: 97.05 m, 97.15 m, 97.40 m, 98.40 m, 98.60 - 98.70 m.

× schistosity: 96.80 m 45°, 98.10 m 30°, 99.00 m 65°.

99.09 - 99.15: magnetite bear. quartzite (meta-chert)

chemical analysis 99.09 - 99.30 m

gr with faint bluish tint, dense, extremely fine grained, ghost-like lamination by trains of granules of mt.

sharp boundaries

99.15 - 99.30: amphibole - qtz - fspar rock / schist (felsic tuff)

gngr, fine crystalline, granoblastic qtz - fspar mosaic with scattered fascicular bundles of amphibole forming the foliation, mt displays a low-grade dissemination, the tiny spots sometimes have idiomorphic outlines. Pyrite makes up 1 to 2 % of the total and mostly forms coarse grains.

gradual footwall.

100.40 - 100.50: partly silicification of amphibole results in a medium to coarse crystalline qtz - fspar - amphibole - biotite rock which contains a low - grade dissemination of py (3 vol.-%).

A
chemical analysis
100.40 - 100.50 m

100.50 - 100.60: epidote - amphibole - qtz gneiss

(chiefly meta - tuff)

gn with bluish gr and slightly reddish brown and yellowish bands, strong variation in structure, composition and texture, banded, alternation of mm - thick magnetite - qtz layers with cm - thick bands composed of amphibole or epidote and amphibole, the latter occurs with a distinct porphyroblastic texture caused by growth of amphibole which forms max. 0.4 cm large prisms randomly being oriented*, the other layers are even grained and have either a nematoblastic or granoblastic texture.

*in a fine grained matrix of qtz and epidote,

gradual contacts

100.82 - 100.93: amphibole quartzite

(meta - sulphide bear. chert)

gr with gn and brownish stripes, dense

fine grained quartzite is irregularly interlayered by sericeous layers of fine-fibrous amphibole carrying a medium-grade pyrite mineralization mainly as trains of granules. hanging wall and footwall of the section show biotitization and chloritization in form of a coarse crystalline biotite-chlorite schist.

chemical analysis 100.82 - 100.93 m

AA

sharp boundaries.

100.93 - 104.65: qtz-biotite-epidote-plagioclase-amphibolite

(meta-basalt flow)

light gn, coarse crystalline, partly with distinct leopard texture, crystal aggregates composed of either amphibole or biotite and amphibole as bundles or imperfect spherulites of cm-size are scattered within a light gn matrix composed in decreasing order of plagioclase, epidote and amphibole the compounds being significantly fine grained than the phases which form the crystal aggregates.

sample: 2000D/7 101.65 m thin section

sharp tectonic contact at footwall.

104.65 - 104.85: fault or shearzone

milky qtz with liminae of slicen-

sided biotite and chlorite.

104.85 - 106.20: qtz - plagioclase amphibolite

(meta - mafic volcanic sediment with fine fragments of amphibolite)

similar: 81.20 - 84.20 m.

105.10 - 105.20: calcareous amphibole bear. epidote - biotite - qtz - fspar rock/ idst

(meta - felsic to intermediate volcanic, supp. tuff)

gs with brown rods and clots, widely schistose, lepidoblastic texture with poorly developed porphyritic texture, closely packed fasicular bundles or imperfect spherulites of biotite forming the foliation surrounded by a matrix of qtz, fspar and epidote, amphibole displays slightly porphyritic crystals which are sparse, the needles always not oriented, carbonate forms 0.2 cm large subidiomorphic porphyroblasts which equally are distributed, spots of cp are a local exception.

schistosity: 45°

sharp boundaries

106.20 - 106.45: plagioclase amphibolite

(meta-basalt flow)

similar: 107.12 - 110.80 m, but medium crystalline.

106.45 - 107.12: biotite - qtz - plagioclase rock

(meta - felsic volcanic)

gr, extremely fine grained with poorly developed porphyritic texture, granoblastic qtz - fspar mosaic with scattered tiny flakes of biotite which locally have the tendency to form bundles, the biotite crystals or crystal aggregates always are parallel and cause a poor foliation of the rock, pyrite occurs as rare subidiomorphic blasts max. 0.2 cm across.

sharp slightly sheared contact.

107.12 - 110.80: biotite bear. epidote - qtz - plagioclase amphibolite

(meta - basalt flow)

*, massive but with lowermost part being schistose, here also enriched in biotite,

grgn, coarse crystalline*, widely developed leopard-texture, distinct lineation of mafic mineral compounds, coarse crystal aggregates of amphibole or biotite and amphibole as imperfect spherulites but also fascicu-

lar bundles surrounded by a matrix composed of qtz, plagioclase and epidote.

schistosity: 110.70 m 80°.

sharp contact.

110.80 – 112.05: qtz - epidote - biotite schist

(meta - volcanic sediment, tuff)

grbrown with faint yellowish tint, slight compositional banding which follows no regulation, lepidoblastic texture, inclodring qtz and epidote crystals as stripes, schlieren and lenses in alternation with bundles, clots and bands of biotite, the latter often being deformable with the foliation of the rock, biotite in places forming net-work like features.

sharp distorted contact

112.05 – 113.25: epidote - garnet - sericite - biotite - kspar - qtz schist / gneiss

(meta - dacitic felsic tuff with epiclastic sedimentary impurity)
(comparable with: 232.60 – 233.00 m BH 635 § * and 156.45 – 165.35 m BH 768 §)

gr, often with faint yellowish tint, abundant brown and black rods and spots, poorly developed flaser and lenticular structure, sometimes even mm - or cm-banded, porphyritic

sample: 2000 D/8 112.80 m thinsection

texture, including qtz crystals as schlieren, lenses and laminae in alternation with bands and schlieren composed of qtz, fspar, biotite, sericite and epidote, the minerals are fine crystalline with the exception of biotite which forms fasciculas bundles, bow-tie aggregates and imperfect spherulites of max. 0.15 cm size, the crystal aggregates being disformable with or parallel to the compositional layering; magnetite* ~~only within the lower half part of the section~~ displays a low-grade dissemination as often idiomorphic crystals within the lower half part of the section, it is nearly absent from the upper part, pyrite forms sparse single crystals.

*, garnet as submegascopic crystals equally is distributed but has a tendency to be enriched within the phyllosilicate rich bands,

layering: 85° - 90°.

gradual contact.

113.25 - 113.90: garnet - sericite - biotite - chlorite - magnetite - qtz rock / gneiss

(meta-dacitic tuff supp. with epiclastic sedimentary impurity)
(comparable with: 232.60 - 233.00 m BH 635 g and 156.45 - 165.35 m BH 768 g)

gr to gngr with abundant black and reddish brown spots, oxide development

of compositional banding, alternation of laminated sections composed of layers of magnetite - quartzite which often carry sulphides, rut bear amphibolite, quartzite and biotite - chlorite schist with cm and dm - thick massive units composed in decreasing order of qtz, magnetite, chlorite, biotite, sericite and garnet, the latter intercalations are characterized by a distinct porphyroblastic texture which is caused by the frequent occurrence of idioblasts of rut max. 0.3 cm across, garnet max. 0.1 cm in diameter and sericite max. 0.4 cm large and biotite which forms huge bundles of locally 1.0 cm size, the porphyroblasts are scattered in a fine crystalline matrix of qtz, chlorite and epidote.

sample: 2000D/9
113.45 m
thinsection

layering: 85°

sharp contact.

113.90 - 114.25 : amphibole bear. qtz-biotite-epidote rock

(meta-mafic tuff, spilite)

brown, yellow, heterogeneous, compositional cm-banding as irregular alternation of layers composed of qtz-amphibole-epidote, biotite and biotite-epidote or amphibole-

epidote, amphibole tends to form randomly oriented idioblasts the prisms max. 0.7 cm long forming an open framework of touching and sometimes crosscutting crystals, the interstices are filled by fine grained epidote and qtz, biotite is present as imperfect spherulites which may coalesce forming discrete bands.

banding: 85°

sharp contact

114.25 - 114.85: biotite - epidote - qtz amphibolite (meta-mafic volcanic, supp. tuff)

gn with faint yellowish tint and several brown schlieren or clots, medium crystalline, homogeneous, crudely schistose, closely packed fascicular bundles of amphibolite surrounded by fine grained granoblastic epidote and qtz, biotite forms bundles and imperfect spherulites of less 0.15 cm size which are variably distributed, they sometimes are grouped around minor faults forming disformable biotite bands.

sharp contact.

114.85 - 115.65: epidote - biotite - amphibole - qtz gneiss (banded amphibolite)

(meta - cherty mafic tuff)

alternate gn and gr with often distinct yellowish tint, cm - banding composed of alternate qtz, qtz - amphibole and amphibole - qtz - epidote bands, porphyroblastic texture due to amphibole which forms needles of 0.3 cm long dimension mainly being aligned along the compositional banding.

banding: 70°

gradual contact

115.65 - 117.30 : calcareous chlorite bear. qtz - plagioclase - epidote - amphibole tuff

(meta - weakly altered mafic volcanic tuff)

A gign with faint yellowish tint, crude development of compositional banding, medium-crystalline, in places with porphyroblastic texture, idiomorphic crystals of amphibole max. 0.4 cm long and to be oriented but sometimes are not directed forming an open framework of touching crystals the interstices of which being filled by fine-grained interlocking crystals of qtz, fspar and epidote, carbonate displays idioblasts max. 0.4 cm across which like to join each other forming cm-thick bands or lenses rich in carbona-

le crystals.

gradual contact.

117.30 - 119.80 : high calcareous epidote - chlorite bearing qtz - plagioclase - biotite schist/gneiss (meta - tuff)

grayish green with abundant qtz spots, massive as well as schistose in places chaotically folded, porphyritic texture, biotite forms bundles of max 0.25 cm long dimension which sporadically are accompanied by chlorite, Pl crystal aggregates are surrounded by a mosaic of qtz and fspar which contain locally epidote, carbonate displays ~~scattered~~ multi-crystal porphyroblasts on average 0.25 cm across - max. 0.4 cm large - which nearly are equally distributed, clusters of milky qtz occur at: 118.35 - 118.50 m and 118.60 m

sample: 2000D/10 117.95 m thinsection

folding : 117.30 m strongly folded, 118.50 - 119.30 m strongly disharmonic and isoclinal folding with infolded 115.65 - 117.70 m rock.

gradual contact.

119.80 - 126.10 : biotite - qtz - plagioclase - epidote - amphibole gneiss (meta - intermittent basalt flows

with spilite intersections, may be hyaloclastite)
alternate grgn, gr, brown and light-yellow, nonthythmic mm- and cm-compositional banding with often superimposed plase-structure or lamination, mostly gradual contacts but also nebulous boundaries between layers, alternation of cm-thick bands of fine-crystalline epidote bear plag.-amphibolite with nematoblastic texture, seams composed of qtz, epidote and biotite, schlieren and laminae of biotite-epidote or qtz-plagioclase-epidote and schlieren or bands composed of epidote, amphibole, plagioclase and biotite, the compounds are fine- to medium-crystalline with biotite always being slightly coarser, it tends to form bundles of 0.15 cm size but sometimes displays imperfect foliation, the crystal aggregates often being deformed and parallel to the compositional banding, garnets occur within sparse crystals of 0.1 to 0.4 cm size.

sample: 2000D/11 122.35 m thinsection

layering: 119.95 m 80°, 120.30 m 90°, 120.75 - 120.87 m fault zone, 120.95 m 80°, 121.60 m 80°, 122.30 m 80°, 123.30 m 85°, 124.15 m 80°, 124.25 - 124.65 m isoclinal folding, 125.30 m 85°.

gradual contact.

126.10 - 128.90 : amphibole - epidote - biotite - qtz - fspar rock / gneiss

(meta - mafic tuffs and flows)

rock similar 115.65 - 117.30 m, 117.30 - 119.80 m and 119.80 - 126.10 m in close alternation as a result of folding, rocks strongly folded and often sheared and locally brecciated.

128.90 - 129.90 : plagioclase - biotite - epidote rock

(meta - leuco basalt, spilite)

sample: 2000D/12 129.40 m thin section

chemical analysis 128.90 - 130.30 m

brown with abundant yellowish-gr needles, medium-to coarse-crystalline, blasto porphyritic texture (tradytic), abundant needles of saussuritized plagioclase average 0.7 cm in long dimension are scattered in a matrix composed of biotite, epidote, plagioclase and qtz, the prisms show a poorly developed linear preferred orientation, sulphides as py and po are present sporadically forming small discrete crystals.

slight lineation: 65°

sharp contact as bedding fault line

129.90 – 130.30 : biotite - garnet - amphibole - epidote - qtz - fspar rock

(meta - evaporite or rhyolite)

gr with light yellowish tint, homogeneous, porphyritic texture, prisms of amphibole max. 0.4 cm long and not oriented as well as tiny fascicular bundles and bow-tie shaped aggregates of biotite are stacked in abundant matrix of fine-grained granoblastic fspar, epidote and qtz, pyrite amounts to 1 Vol.-% of the rock and forms xenomorphic crystals.

Knife sharp footwall.

130.30 – 174.90 : schistose amphibolite

(meta-basalt flow with zones of amygdaloidal basalt*)

*(comparable with variolitic basalt at Twerfiellet and section 59.90 – 77.70m of BH 6356)

gr, fine-grained, nematoblastic texture, homogeneous with sparse cm-thick conformable and disformable interlayers rich in biotite, chlorite and epidote (meta-montronite, saponite), occasionally mm-thick bands of milky qtz and qtz fracture fillings, clusters of milky qtz especially between 142.30 – 143.00m, several interlayers with vesiculated basalt – stretched and flattened augen, composed abundant on average 0.3 cm in long dimension

of plagioclase and epidote – at: 143.20 – 143.40 m, 144.20 – 144.22 m, 144.72 – 144.74 m, 144.93 – 145.00 m, 147.25 – 147.35 m, 148.25 – 148.30 m, 150.85 – 151.35 m, 151.73 – 152.04 m, 155.43 – 155.80 m, 157.30 – 157.65 m, 160.80 – 161.05 m, 162.05 – 162.15 m, 163.20 – 163.95 m.

foliation a. banding: 134.70 m 60°, 139.30 m 45°, 143.80 m 45°, 147.20 m 45°, 150.40 m 50°, 152.30 m 90°, 157.45 m 45°, 159.30 m 55°, 160.70 m 45°, 162.40 m 45°, 163.20 m 45°, 165.90 m 45°, 168.00 m 50°

folded contact

166.45 – 167.30: slightly calcareous biotite – epidote – amphibole – fspar – qtz – chlorite gneiss (banded amphibolite)

(meta – mafic tuff)

alternate qu and qz, cm – banding with sharp layering contact, ~~alte~~ ~~nation of~~ bands composed of epidote and chlorite which often contain sd. lieven and laminae of biotite or randomly oriented porphyro – blasts of amphibole on average 0.4 cm in long dimension alternate with lenses and bands of fine – grained granoblastic qtz, fspar

and carbonate.

layering: 60° to 70°.

sharp contacts with surrounding amphibolite.

174.90 – 176.70 : calcareous qtz – biotite – chlorite schist

(meta – mafic volcanic sediment supp. with epiclastic sedimentary impurity, possible distal facies or upper succession of subaqueous debris flow/talus)

sandwiching with white spots, flaser structure, close alternation of interlocked qtz crystals as lenses with schlieren or layers composed of fine-fibrious chlorite and fasciicular bundles of biotite forming the foliation, abundant idioblasts of carbonate max. 0.4 cm across which locally are deformed.

schistosity: 45°, uppermost part with small scale isoclinal and disharmonic folding.

gradual contact.

176.70 – 178.30 : schistose amphibolite

(meta – mafic volcanic sediment with coarse mafic and felsic frag-

ment, matrix support sediment, possible subaquatic debris flow / lahar or hyaloclastite)

similar: 208.00 - 217.10 m

schistosity: 45°

gradual contact.

178.30 - 188.15 : slightly calcareous qtz - amphibole - biotite - chlorite schist

(meta - mafic volcanic sediment with medium size mafic fragments and supp. with epiclastic sedimentary impurity*; possible distal facies or upper succession of subaqueous debris flow / lahar)

*, matrix support sediment,

similar: 49.70 - 54.80 m, 5 to 10% by volumen fragments.

sharp footwall

188.15 - 189.30 : calcareous epidote bear. qtz - fspar - biotite - amphibole gneiss

(meta - mafic tuff, similar banded amphibolite)

grey with light coloured bands and lenses, laminated, porphyroblastic texture, interlocking qtz - fspar crystal aggregates with or without epidote and carbonate as lenses and layers in alternation with schlieren and laminae of biotite and occasional trains of granules of amphibole, amphibole mainly forms idioblast max. 0.7 cm long which tend to be not oriented thus forming an open framework of touching or crossing crystals, the interstices are filled by granoblastic qtz, epidote and/or fspar

carbonate.

layering, foliation: 45°-50°

gradual footwall.

189.30 - 192.25: slightly calcareous chlorite bear.

epidote - biotite - amphibole gneiss

(intermittent basalt flows with spilite intersections or mafic tuff)

gn with white and brown stripes and schlieren, locally being yellowish gn, distinct cm-banding with superimposed lamination and local transition into laminated rock, in places the banding is irregular having similarities with a "blasto-psephitic texture" (fragment basalt), cm-thick layers of fine-fibrous schistose amphibolite which again is laminated by interlocked elongate qtz and carbonate or schlieren of biotite alternate with granoblastic qtz-carbonate bands lesser 1 cm thick and laminae or schlieren of biotite, the uppermost portion (189.30 - 189.70) shows a distinct mm- as well as cm-banding composed of alternate qtz-carbonate, amphibole and qtz-epidote layers which always have sharp contacts, pyrite occurs as single crystals max. 0.3 cm across, ilmenite forms a low-grade dissemination of minute crystals between: 189.45 - 189.47 m and 190.50 - 190.75 m.

lamination: 60°
sharp footwall.

192.25 - 193.10: biotite bear amphibole schist

(meta-basalt flow)

gn, fine-crystalline, nematoblastic texture; crosscutting veins of qtz locally being accompanied by accessory carbonate; biotite is most abundant within the lower portion where it forms imperfect spherulites max. 0.3 cm large while it elsewhere occurs as widely scattered tiny bundles which strongly are alinged along the major plane of foliation.

gradual footwall.

193.10 - 195.55: calcareous qtz-fspar-biotite-chlorite-amphibole schist

(meta-mafic volcanic sediment, tuff)

brownish gn, medium crystalline, porphyroblastic texture, slight compositional and textural changes, biotite mainly is concentrated within the lower portion while chlorite is enriched within the upper part of the section, amphibole forms idioblasts, the prisms increase in size upsection from max. 0.4 cm at lower levels to max. 1.0 cm within the upper portion

the needles constitute an open framework of sometimes crossing prisms what is most distinct in the upper parts, the interstices of the framework are filled by fine-fibrous crystal aggregates of chlorite, fine-grained granoblastic qtz which locally are accompanied by crystals of epidote and bundles of imperfect spherulites of biotite, carbonate either exists as fine crystals joining qtz or forms scattered idioblasts max. 0.2 cm across.

comp. banding: 70°

gradual footwall.

195.55 - 199.95: slightly calcareous chlorite - qtz - fspar amphibolite

(meta-mafic volcanic sediment with fine ~~grained~~ mafic* fragments, possible distal facies or upper succession of subaqueous debris flow / lahar or may be lapilli tuff)

* and some coarse felsic

*matrix support sediment,

gn, in places grn to even greenish gr, massive with crude development of mineral preferred orientation, mainly chlorite-qtz-fspar amphibolite but locally gradually passing into calcareous amphibole - qtz - fspar rock with ghost-like gneissic texture, always little distinction between fragments and matrix

due to compositional and textural similarities of both, ~~an~~ large round elongate clasts of fine-fibrous amphibole and sparce clasts of amphibole-qtz-fspar rock (rhyolite) embedded in abundant matrix composed in decreasing order of amphibole, chlorite, qtz, fspar and carbonate, amphibole tends to form imperfect spherulites but too fascicular bundles which may be stretched forming a slight foliation, its habit locally cause a slight leopard texture, carbonate when present forms scattered idiob clasts max. 0.2 cm across, the lowermost portion (195.55 - 195.85 m) is marked by a distinct cumbanding which is the result of sedimentation of large felsic fragments — amphibole - qtz - fspar rocks of fine-grained granoblastic texture with amphibole forming imperfect spherulites and fascicular bundles max. 1.2 cm in long dimension and needles always being poorly directed — which are embedded in a matrix of the kind described above.

minor faults: 196.15 m, 197.30 m, 197.70 m, 198.10 - 198.40 m, 198.70 m, 199.00 m, 199.20 m, 199.35 m, 199.40 m.

lamination: 85°

sharp footwall marked by clusters of milky qtz.

occurrence of sulphide

59.80 - 60.10 m: sparse spot of cp
91.25 - 91.45 m: spots, stringers, net-work features of py, 1 Vol.%
* 94.87 - 94.89 m: big crystals of py joining amphibole crysts, 10 Vol.%
99.15 - 99.30 m: coarse grains of py, 1 to 2 Vol.%
100.40 - 100.50 m: scattered grains of py, 3 Vol.%
100.82 - 100.93 m: some stringers of py
105.10 - 105.20 m: sparse spots of cp
106.45 - 107.12 m: sparse crystals of py
112.05 - 113.25 m: "
128.90 - 129.90 m: sparse discrete crystals of py and po
129.90 - 130.30 m: spotted py, 1 Vol.%
189.30 - 192.25 m: single crystals of py
231.75 - 232.45 m: sparse crystals of py
232.05 - 232.26 m: trains of granules of py, 2 Vol.%
251.85 - 258.10 m: sparse spots of py
265.75 - 265.95 m: idioblasts of py, < 1 Vol.%
325.50 - 325.85 m: low-grade dissemination of py, < 1 Vol.%
325.85 - 333.30 m: sparse spots of py
403.45 - 407.20 m: spots of py, < 1 Vol.%
433.80 - 434.80 m: sparse tiny spots of py
442.50 - 442.90 m: scattered py and po, 1 Vol.%
460.60 - 462.25 m: spots of py
462.25 - 462.75 m: low-grade dissemination of py, 2 Vol.%
* 466.20 - 466.60 m: several stripes of nearly massive py and po
466.75 - 466.85 m: sparse spots of py and po
467.80 - 468.10 m: minute spots of py, < 1 Vol.%
469.15 - 470.15 m: sparse spots of py and po
470.15 - 470.95 m: frequent spots, flasers and lenses of py, 1 to 2 Vol.%
* 471.62 - 471.73 m: big crystals of po surrounded by amphibole, 5 - 7 Vol.%

	472.75 - 474.65 m :	sparse spots of py
	474.65 - 482.59 m :	sparse spots of py
	482.59 - 483.20 m :	streaks, schlieren and trains of granules of po, 1 Vol.%
	483.20 - 483.38 m :	crystals of py, 2 Vol.%
	484.20 - 484.40 m :	sparse crystals of py
	495.54 m :	crystals of py
	499.50 m :	crystals of py
	502.54 - 503.35 m :	dissemination of py, 5 Vol.%
	508.20 - 508.60 m :	sparse spots of py
*	508.85 - 509.40 m :	clusters of po with little py and sparse schlieren of cp, 10 Vol.%
*	509.80 - 510.80 m :	schlieren and streaks of py, 2 Vol.%
	511.77 m :	dissemination of py, 5 Vol.%
*	512.38 - 512.57 m :	schlieren and streaks of py, 2 Vol.%
	518.35 - 518.53 m :	sparse crystals of py
	557.90 - 558.17 m :	limbs and spots of po, streaks of cp, < 1 Vol.%
*	574.10 - 574.36 m :	web-like py mineralization with po, 50 Vol.%
	574.36 - 574.66 m :	sparse crystals of py and po
	682.90 - 683.18 m :	streaks and giant spots of py, 1 to 2 Vol.%
	683.18 - 684.17 m :	streaks and elongate spots of py, < 1 Vol.%
	684.17 - 689.90 m :	tiny spots of py, < 1 Vol.%
	685.05 - 685.15 m :	dissemination of py, < 1 Vol.%
	686.30 - 686.35 m :	"
	688.18 - 688.48 m :	"
	689.40 - 689.90 m :	"

* stands for high concentration of sulphides

Occurrence of oxides

90.70 - 91.18 m:	spotted ilmenite, 5 Vol.%
91.25 - 91.45 m:	magnetite chert
94.90 - 95.92 m:	magnetite chert
95.92 - 100.82 m:	spotted mt, 2 to 3 Vol.%, subp. some ilmenite 99.09 - 99.15 m: magnetite chert
112.60 - 113.25 m:	low-grade dissemination of mt
113.25 - 113.90 m:	idioblasts of mt, 10 - 15 Vol.%
189.30 - 189.47 m:	low-grade dissemination of ilmenite
190.50 - 190.75 m:	"
427.80 - 431.00 m:	spotted ilmenite, 5 Vol.%
431.30 - 431.50 m:	"
431.80 - 433.20 m:	"
462.25 - 462.75 m:	abundant ilmenite, 8 Vol.%, some mt
466.75 - 466.85 m:	low-grade dissemination of mt
467.80 - 468.10 m:	" of ilmenite, some mt
471.73 - 472.75 m:	dissemination of mt
472.75 - 474.65 m:	"
474.65 - 478.20 m:	dissemination of ilmenite
480.10 - 481.80 m:	"
482.59 - 483.20 m:	magnetite chert
495.05 - 495.55 m:	idioblasts of mt, 2 Vol.%
503.35 - 503.45 m:	magnetite chert
508.20 - 508.60 m:	sparse crystals of ilmenite
509.65 m :	crystals of ilmenite
509.65 - 509.80 m:	magnetite chert
509.80 - 510.80 m:	mt-rich amphibolite
512.38 - 512.57 m:	"
675.50 - 677.30 m:	dissemination of ilmenite, 3 Vol%

sediments with carbon content

279.50 - 281.55 m, 283.20 - 284.40 m, 299.30 - 301.40 m, 301.40 - 304.50 m, 304.50 - 309.50 m, 325.50 - 325.85 m.

samples for Isotopical analysis

91.18 - 91.45 m:
94.75 - 94.91 m:
99.09 - 99.30 m:
100.40 - 100.50 m:
100.82 - 100.93 m:
128.90 - 130.30 m:
232.05 - 232.26 m:
460.20 - 462.25 m:
466.15 - 466.60 m:
469.57 - 469.75 m:
471.62 - 471.73 m:
471.73 - 472.90 m:
472.90 - 474.17 m:
483.20 - 483.38 m:
483.85 - 484.45 m:
494.52 - 495.67 m:
502.54 - 503.35 m:
507.95 - 508.85 m:
508.85 - 509.40 m:
509.80 - 510.80 m:
511.70 - 511.80 m:
512.38 - 512.57 m:
557.90 - 558.17 m:
574.10 - 574.36 m:
682.90 - 684.17 m:
684.17 - 685.17 m:
686.30 - 687.30 m:
687.30 - 688.30 m:
688.30 - 689.40 m:
689.40 - 689.90 m:

Susceptibility measurements

DDH 2000 D (Scintrex SM-5)

Results

susceptibility:

15.50	0.0	68.50	0.0	103.50	0.0
16.50	0.1	69.50	0.1	104.50	0.0
17.50	0.1	70.50	0.0	105.50	0.0
18.50	0.0	71.50	-0.1	106.50	0.0
19.50	0.1	72.50	0.0	107.50	0.0
20.50	0.0	73.50	0.0	108.50	0.0
21.50	0.0	74.50	0.0	109.50	0.0
22.50	0.0	75.50	0.0	110.50	0.1
23.50	0.0	76.50	0.0	111.50	0.0
24.50	0.0	77.50	0.0	112.30	0.1
25.50	0.0	78.50	0.0	112.50	3.9
26.50	0.0	79.50	0.0	112.60	4.2
27.50	0.1	80.50	0.0	112.80	1.2
28.50	0.1	81.50	0.1	113.00	3.1
29.50	0.0	82.50	0.0	113.10	4.0
30.50	0.0	83.50	0.0	113.25	4.5
31.50	0.0	84.50	0.0	113.35	6.5
32.50	0.0	85.50	0.0	113.40	22.0
33.50	0.1	86.50	0.0	113.50	1.9
34.50	0.0	87.50	-0.1	113.60	0.0
35.50	0.0	88.50	0.0	113.80	0.0
36.50	0.0	89.50	0.0	113.90	0.9
37.50	0.1	90.50	0.1	114.00	0.3
38.50	0.1	91.00	0.0	114.20	0.1
39.50	0.1	91.20	0.1	114.35	0.0
40.50	0.0	91.30	29.0	114.50	0.1
41.50	0.0	91.40	21.0	115.30	0.1
42.50	0.0	91.50	0.1	115.50	0.2
43.50	0.0	92.30	0.1	116.50	0.2
44.50	0.0	92.70	0.1	117.50	0.1
45.50	0.1	93.00	0.1	118.50	0.2
46.50	0.0	93.50	0.0	119.50	0.4
47.50	0.0	93.70	0.1	119.90	0.3
48.50	0.1	94.50	0.1	120.50	0.4
49.50	0.0	94.60	0.0	121.50	0.3
50.50	0.0	94.85	0.0	122.50	0.1
51.50	0.0	94.95	47.0	123.50	0.1
52.50	0.1	95.10	36.0	124.50	0.1
53.50	0.1	95.30	48.0	125.50	0.1
54.50	0.1	95.50	0.2	126.50	0.1
55.50	0.0	95.60	53.0	127.50	0.1
56.50	0.1	95.70	39.0	128.50	0.0
57.50	0.0	95.80	55.0	129.50	1.0
58.50	0.0	96.00	0.5	130.50	0.0
59.50	0.0	96.50	0.1	131.50	0.0
60.50	0.1	97.50	4.3	132.50	0.0
61.50	0.1	98.50	0.7		
62.50	0.1	99.15	2.3		
63.50	0.0	99.30	2.1		
64.50	0.1	99.50	6.8		
65.50	0.0	99.70	2.5		
66.60	0.0	100.50	3.0		
67.50	0.0	101.50	0.0		
		102.50	0.0		

Susceptibility:

392.50	0.0
393.50	0.0
394.50	0.1
395.50	0.0
396.50	0.0
397.50	0.0
398.50	0.0
399.50	0.0
400.50	0.0
401.50	0.0
421.50	0.0
422.50	0.0
423.50	0.0
424.50	0.0
425.50	0.0
426.50	0.0
427.50	0.0
428.50	0.1
429.50	0.0
430.50	0.0
382.50	-0.1
383.50	0.0
384.50	-0.1
385.50	0.0
386.50	0.0
387.50	0.0
388.50	0.0
389.50	-0.1
390.50	0.0
391.50	-0.1
402.50	0.0
403.50	0.0
404.50	0.0
405.50	0.0
406.50	-0.1
407.50	0.0
408.50	0.0
409.50	0.0
410.50	0.0
411.50	0.0
372.50	0.0
373.50	0.1
374.50	0.1
375.50	0.1
376.50	0.0
377.50	0.0
378.50	0.0
379.50	0.1
380.50	0.1
381.50	0.1
323.50	0.1
324.50	0.1
325.50	0.1
326.00	0.0
326.50	0.3
327.50	0.0
328.50	0.1
329.50	0.1
330.50	0.2
331.50	0.0
332.50	0.6
333.20	0.1
314.50	0.0
315.50	0.1
316.50	0.1
317.50	0.1
318.50	0.0
319.50	0.1
320.50	0.1
321.50	0.1
322.50	0.2
269.50	0.1
280.50	0.2
271.50	0.1
272.50	0.1
273.50	0.0
274.50	0.0
275.50	0.0
276.50	0.1
277.50	0.1
278.50	0.0
279.50	0.0
280.50	0.1
281.50	0.1
282.50	0.1
283.50	0.0
284.50	0.0
284.90	0.1
285.30	0.1
285.50	0.0
286.30	0.0
286.50	0.0
287.50	0.0
288.50	0.0
289.50	0.0
290.50	0.0
291.50	0.0
292.50	0.1
293.50	0.1
294.50	0.0
295.50	0.1
296.50	0.0
297.50	0.0
298.50	0.0
299.50	0.0
300.50	0.1
301.50	0.1
302.50	0.1
303.50	0.2
304.50	0.1
305.50	0.0
306.50	0.1
307.50	0.0
308.50	-0.1
309.50	0.1
310.50	0.1
311.50	0.1
312.50	0.1
313.50	0.0
250.50	0.1
251.50	0.0
252.50	0.1
253.50	0.0
254.50	0.0
255.50	0.1
256.50	0.1
257.50	0.0
258.50	0.0
258.78	0.3
259.50	0.0
260.50	0.0
261.50	0.0
262.50	0.0
263.50	0.0
264.50	0.0
265.50	0.0
265.85	0.0
266.50	0.0
267.50	0.0
268.50	0.0
269.50	0.0
249.50	0.0
248.50	0.1
247.50	0.1
246.50	0.1
245.50	0.0
244.50	0.0
243.50	0.0
242.50	0.0
241.50	0.0
240.50	0.0
239.50	0.1
238.50	0.1
237.50	0.2
236.50	0.2
235.50	0.3
234.50	0.4
233.50	0.1
232.50	0.0
232.10	0.1
231.50	0.2
230.50	0.1
229.50	0.1
228.50	0.0
227.50	0.1
226.50	0.0
225.50	0.1
224.50	0.0
223.50	0.0
222.50	0.1
221.50	0.0
220.50	0.1
219.50	0.0
218.50	0.0
217.50	0.1
216.50	0.1
215.50	0.1
214.50	0.0
213.50	0.1
212.50	0.1
211.50	0.2
210.50	0.0
209.50	0.0
208.50	0.0
208.20	0.1
207.50	0.6
206.50	0.2
205.50	0.0
204.50	0.0
203.50	0.1
202.50	0.0
201.50	0.0
200.50	0.0
199.50	0.1
198.50	0.2
197.50	0.1
196.50	0.0
195.50	0.0
194.50	0.0
193.50	0.0
192.50	0.1
191.50	0.0
190.50	0.0
189.50	0.3
188.50	0.3
187.50	0.1
186.50	0.1
185.50	0.0
184.50	0.1
183.50	0.1
182.50	0.2
181.50	0.2
180.50	0.0
179.50	0.0
178.50	0.0
177.50	0.0
176.50	0.1
175.50	0.1
174.50	0.1
173.50	0.1
172.50	0.1
171.50	0.1
170.50	0.1
169.50	0.0
168.50	0.1
167.50	0.1
166.50	0.1
165.50	0.0
164.50	0.0
163.50	0.0
162.50	0.1
161.50	0.1
160.50	0.0
159.50	0.0
158.50	0.0
157.50	0.1
156.50	0.0
155.50	0.0
154.50	0.0
153.50	0.0
152.50	0.0
151.50	0.1
150.50	0.1
149.50	0.1
148.50	0.1
147.50	0.1
146.50	0.1
145.50	0.1
144.50	0.1
143.50	0.0
142.50	0.0
141.50	0.0
140.50	0.0
139.50	0.0
138.50	0.1
137.50	0.0
136.50	0.0
135.50	0.0
134.50	0.1
133.50	0.0
~~132.50~~	
~~131.50~~	
~~130.50~~	

susceptibility:

532.50	0.1
531.50	0.0
530.50	0.1
529.50	0.0
528.50	0.0
527.50	0.0
526.50	0.1
525.50	0.1
524.50	0.0
523.50	0.0
522.40	0.1
521.50	0.1
520.60	0.0
519.50	0.0
518.50	0.1
517.50	0.0
517.00	0.1
516.20	0.1
515.50	0.0
514.50	0.0
513.50	0.1
512.50	1.7
512.40	38.0
512.20	0.0
511.90	0.0
511.75	0.0
511.50	0.0
510.75	0.1
510.60	11.0
510.50	33.0
510.40	23.0
510.25	29.0
510.15	24.0
510.05	52.0
509.90	1.4
509.75	2.6
509.60	0.0
509.50	0.0
509.30	4.3
509.10	1.4
508.95	1.6
508.70	12.0
508.50	0.4
507.00	0.0
507.50	0.0
506.50	0.1
505.50	0.3
504.50	0.1
503.30	1.0
503.20	0.8
503.10	1.9
502.90	1.4
502.80	0.9
502.50	0.0

502.00	0.1
501.50	0.1
500.50	0.1
499.50	0.1
498.50	0.0
497.40	0.0
496.50	0.0
495.80	0.1
495.50	0.1
495.30	1.8
495.10	1.6
495.00	0.1
494.85	0.9
494.70	1.1
494.50	0.4
494.25	0.1
493.50	0.1
492.50	0.1
491.50	0.1
490.50	0.0
489.50	0.0
488.50	0.0
487.50	0.0
486.50	0.1
485.50	0.0
484.55	0.0
484.35	1.2
484.25	0.8
484.18	0.3
483.90	0.0
483.50	0.1
483.35	6.0
483.25	0.4
483.15	6.3
483.00	6.0
482.90	4.7
482.70	6.0
482.60	10.0
482.45	0.1
482.30	0.1
482.15	0.3
481.60	0.1
481.50	0.1
480.50	0.1
479.50	0.0
478.50	0.2
477.50	0.1
476.50	0.1

503.45 0.0

476.00	1.4
475.50	0.1
475.20	0.0
474.70	2.4
474.60	0.2
474.40	0.3
474.20	0.1

474.10	9.2
474.00	3.1
473.90	4.6
473.80	7.8
473.70	6.0
473.60	2.7
473.50	6.9
473.40	4.0
473.25	1.6
473.10	1.0
473.00	3.8
472.90	1.7
472.80	3.1
472.70	2.1
472.60	2.3
472.50	1.0
472.35	0.8
472.20	3.0
472.10	1.8
472.00	1.3
471.90	1.7
471.80	2.4
471.70	2.4
471.55	0.0
471.45	0.0
471.20	0.0
470.80	0.0
470.50	0.0
469.90	0.0
469.70	0.6
469.60	0.0
469.40	0.0
468.50	0.0
468.20	0.0
468.10	0.3
467.95	0.7
467.70	0.0
467.50	0.0
467.20	0.1
466.80	0.5
466.70	0.1
466.55	0.7
466.50	0.3
466.20	1.9
466.00	0.0
465.80	0.2
465.60	0.3
465.00	0.0
464.50	0.0
463.80	0.1
463.40	0.1
463.00	0.4
462.60	0.0
462.45	0.1

462.30	0.2
462.20	0.4
462.10	0.2
462.00	0.1
461.80	0.3
461.60	0.1
461.50	0.3
461.30	0.5
461.10	0.4
460.90	0.2
460.80	0.1
460.70	0.1
460.50	0.1
460.00	0.0
459.50	0.0
458.50	0.0
457.60	0.0
456.60	0.0
455.50	0.0
454.50	0.0
453.50	0.0
452.50	0.0
451.50	0.0
450.50	0.0

362.50	0.0
363.50	0.0
364.50	0.0
365.50	0.0
366.50	0.0
367.50	0.0
368.50	0.0
369.50	0.0
370.50	0.0
371.50	0.0
372.50	0.0

343.50	0.1
3444.50	0.1
3445.50	0.1
3446.50	0.1
3447.50	0.1
3448.50	0.1
3449.50	0.1
3450.50	0.0
3451.50	0.0
3452.50	0.1

352.50	0.0
353.50	0.1
354.50	1.0
355.50	0.0
356.50	0.1
357.50	0.1
358.50	0.1

359.50	0.1
360.50	0.1
361.50	0.1
362.50	0.0

440.50	0.0
441.50	0.1
442.50	0.0
443.50	0.1
444.50	0.0
445.50	0.0
446.50	0.0
447.50	0.0
448.50	0.0
449.50	0.0
450.50	0.0

333.50	0.2
334.50	0.0
335.50	0.1
336.50	0.2
337.50	0.4
338.50	0.2
339.50	0.0
340.50	0.0
341.50	0.0
342.50	0.0

411.50	0.0
412.50	0.1
413.50	0.1
414.50	0.0
415.50	0.0
416.50	0.0
417.50	0.0
418.50	0.0
419.50	0.0
420.50	0.0

431.50	0.0
432.50	0.0
433.50	0.0
434.50	0.0
435.50	0.0
436.50	0.0
437.50	0.0
438.50	0.0
439.50	0.0
440.50	0.0

Süszeptibilität

637.50	0.0	654.50	0.0	660.50	0.2
638.50	0.1	655.50	0.0	661.50	0.2
639.50	0.1	656.50	0.0	662.50	0.2
640.50	0.1	627.50	0.1	663.50	0.1
641.50	0.1	628.50	0.1	664.50	0.0
642.50	0.0	629.50	0.2	665.50	0.0
643.50	0.1	630.50	0.1	666.50	0.1
644.50	0.0	631.50	0.1	667.50	0.2
645.50	0.1	632.50	0.1	668.50	0.0
646.50	0.0	633.50	0.0	669.50	0.1
647.50	0.2	634.50	0.1	670.50	0.1
648.50	0.1	635.50	0.1	671.50	0.1
649.50	0.1	636.50	0.1	672.50	0.1
650.50	0.1	637.50	0.1	673.50	0.0
651.50	0.1	657.50	0.1	674.50	0.0
652.50	0.0	658.50	0.1	675.50	0.0
653.50	0.1	659.50	0.2	676.50	0.0

susceptibility:

696.50	0.4
697.50	0.3
698.50	0.1
699.50	0.6
700.60	0.2
701.50	0.2
578.50	0.0
577.50	0.0
576.50	0.1
575.50	0.1
574.80	0.5
574.50	0.0
574.40	0.0
574.30	0.1
574.15	2.2
573.80	0.2
573.50	0.2
572.50	0.1
571.50	0.2
570.50	0.1
569.50	0.2
568.50	0.0
567.50	0.0
566.50	0.0
565.50	0.0
564.50	0.0
563.50	0.0
562.50	0.1
561.50	0.0
560.50	0.0
559.50	0.0
558.50	0.0
558.00	0.1
557.50	0.1
556.50	0.1
555.50	0.1
554.50	0.1
553.50	0.1
552.50	0.1
551.50	0.1
550.50	0.1
549.50	0.1
548.50	0.0
547.50	0.1
546.50	0.0
545.50	0.0
544.50	0.0
543.50	0.0
542.50	0.0
541.60	0.0
540.50	0.1
539.50	0.1
538.50	0.0
537.50	0.1
536.50	0.1
535.50	0.1
534.50	0.0
533.50	0.0

~~[illegible] [illegible] [illegible] [illegible]~~

susceptibility:

686.50	0.0
677.50	0.1
678.50	0.0
679.50	0.0
680.50	0.0
681.50	0.0
682.50	0.0
683.50	0.1
684.50	0.0
685.50	0.0
686.50	0.0

623.00	0.0	623.20	0.1
683.00	0.2		

susceptibility:

686.30	0.0
686.50	0.0
687.50	0.0
688.20	0.1
688.50	0.1
689.50	0.1
689.80	0.0
690.10	0.1
690.50	0.1
691.50	0.1
692.50	0.2
693.50	0.5
694.50	0.1
695.50	0.2

600.50	0.1
599.50	0.0
598.50	0.1
597.50	0.1
596.50	0.0
595.50	0.0
594.50	0.0
593.50	0.1
592.50	0.1
591.50	0.0
590.50	0.0
589.50	0.1
588.50	0.0
587.50	0.0
586.50	0.0
585.50	0.0
584.50	0.0
583.50	0.0
582.50	0.1
581.50	0.0
580.50	0.1
579.50	0.1
578.50	0.1

626.50	0.1
625.50	0.1
624.50	0.1
623.50	0.1
622.50	0.1
621.50	0.1
620.50	0.1
619.50	0.1
618.50	0.1
617.50	0.1
616.50	0.1
615.50	0.1
614.50	0.2
613.50	0.1
612.50	0.1
611.50	0.1
610.50	0.1
609.50	0.1
608.50	0.1
607.50	0.1
606.50	0.0
605.50	0.0
604.50	0.0
603.50	0.1
602.50	0.0
601.50	0.1

15 ~~chlorite~~

2000D 4 ~~high~~ calcareous zoicite-amphibole bear. (qtz - fspar) biotite - chlorite schist

(mota - ....

grey with abundant ~~fla~~ brown schlieren;

~~and~~ felsic nodules aniger fine grained mosaic of qtz-fspar with ling flakes of chlorite + biotite and sometimes relicts of plag.

2000D 13 calcareous qtz - fspar - biotite - chlorite schist

chlorite = fine - fibrous

fascicular bundles or imperfect spherulites of biotite

fragments: slightly calca. qtz-fspar rock

fine-grained ~~granoblastic~~ mosaic often with ling flakes of chlorite and biotite, sometimes relicts of blasts of plagioclase

2000D 3 high calcareous: qtz - fspar - epidote - biotite - amphibole - chlorite schist

fine - fibrous chlorite, amph fragments with extinc.

fine - ~~fibrous~~ crystal amphibole distinct nematoblastic aredges of fragments when fragment small, extreme random oriented.

blastic texture, aniger composed of plagioclase, carbonate and epidote - plag - qtz.

lapilli size felsic fragments like 2000D 15

2000D 2 slightly calcareous qtz - biotite - chlorite schist

biotite bear.

2000D 5 qtz - amphibole - epidote - plagioclase rock

relict rock nadel texture plag

2000D 1 slightly calcareous ~~qtz~~ plagioclase - amphibole rock

rolled aniger of plagioclase partly being carbonited and clasts of amphibole embedded in a matrix composed of ~~idiomorphic~~ plagioclase (~~subophitic~~) amphibole and epidote, ~~carbona~~ ~~barag~~ carbonate forms xenidiomorphic crystals being equally distributed

2000D 5 chlorite - epidote - amphibole - plag
similar: 2000D/1

qtz
2000D 6 amphibole - biotite - epidote - plagioclase rock.

2000D 7 qtz - biotite - epidote - plagioclase amphibolite

2000D 8 qtz lenses, layers and schlieren of epidote, biotite, sericite and plagioclase, layers biotite - fspar - qtz, epidote - sericite - fspar - qtz

2000D 9 granet - sericite - biotite - chlorite - qtz

2000D 10 epidote - chlorite bear. qtz - plag. - carbonate - biotite rock

2000D 11 layers: plag amphibolite porphyroblastic texture with not oriented amphibole needles bearded in abundant matrix of plag and qtz, plag. amphibole epidote laminae of biotite - epidote, plagioclase epidote, epidote bear. biotite - amphibole - plagioclase.

2000D 12 plagioclase - biotite - epidote rock
granulitic texture

BESKJED

Dato 01./11. 1985.

til Frank

fra Milosh

angående:

På bunn d.v.s. 630,00m, bull 20000.

$\Delta X \rightarrow 0{,}80\,m$

$\Delta y \rightarrow 38{,}4\,m$ } $\Sigma avvik = 38{,}5m$

$\Delta Z \rightarrow 2{,}80m$

Starte på 394,5 ø
299m på 371,0 ø bøyes på av midten til best
i bunn på 386,0 ø

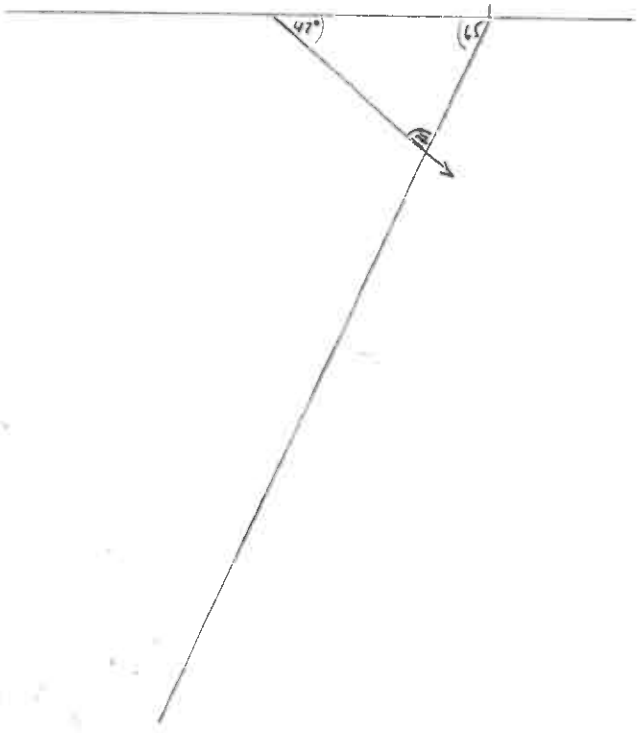
Starte på 20° d.v.s. ÷70°
19° ÷71°

mellom 100-360m { pendle mellom 19-20° } = ÷70° — ÷71°

mellom 360-500m { 21° = ÷69°
i bunnen 24° = 66°

Ring telefon (90) Innen kl. 15.30

Hamar-Trykk Grafisk A.s



631.20m

104 x 6

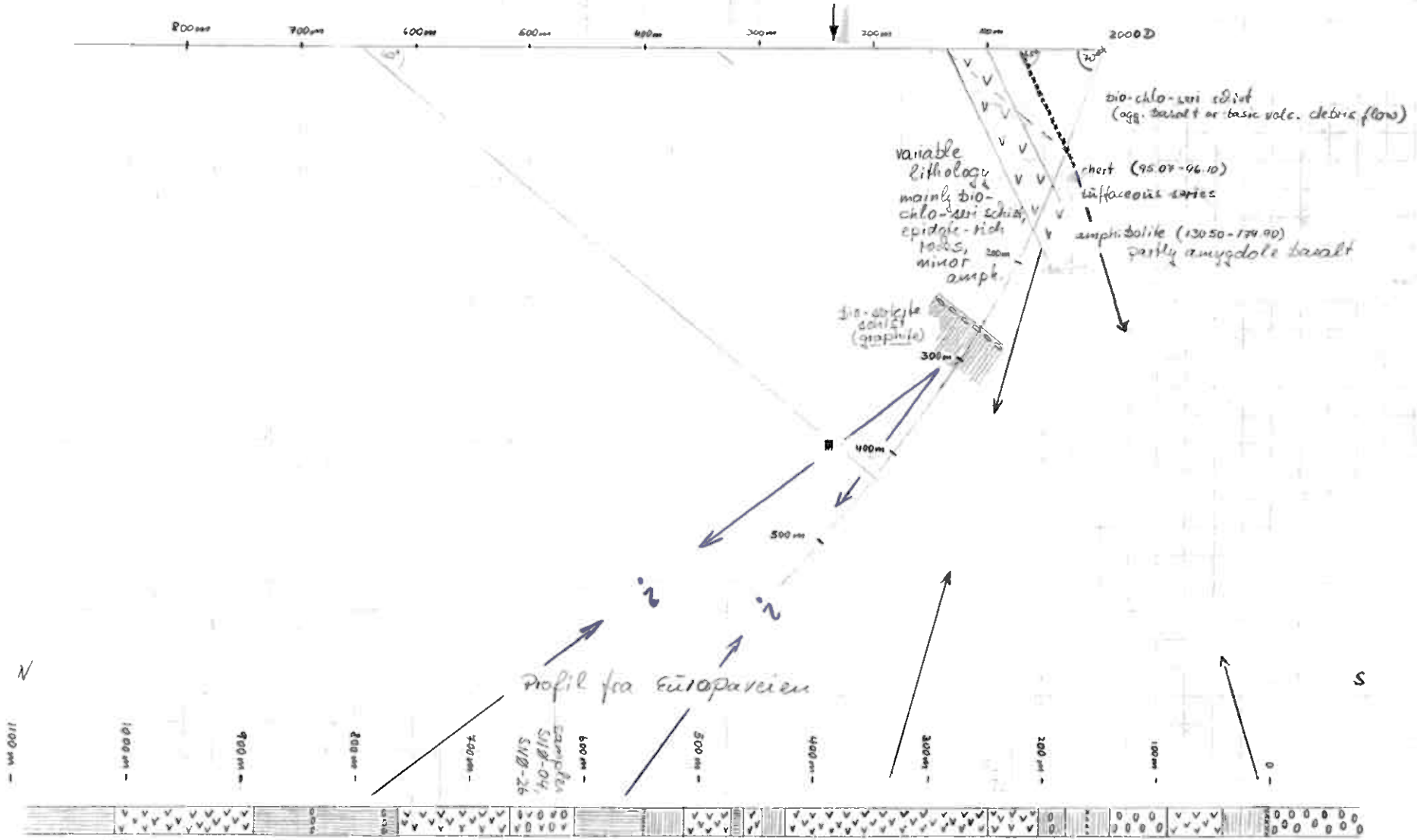
+ 4,5m

628.50

110° NW

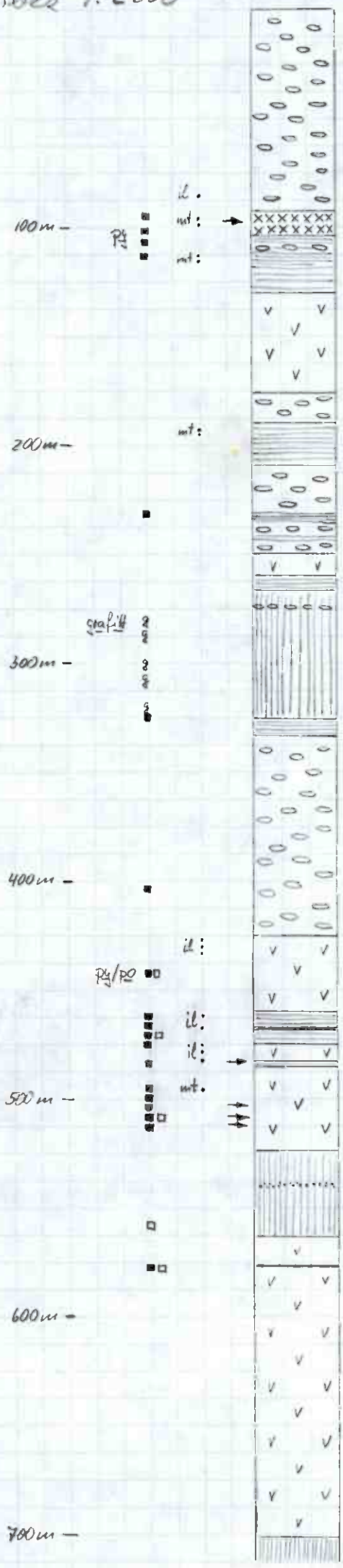
30° NW | 650

BORHÜLL GÅVÅLISETER



målestokk 1:2500

ZH 2000 1



biotitt - klorittt - sericitt skifer

magnetitt quartzite

tuffer, tuffitter

amfibolitt, mellomlag av mandelstein amfibolitt

biotitt - klorittt - sericitt skifer

tuffer, tuffitter

biotitt - klorittt - sericitt skifer

tuffer, tuffitter, bio. - klo. - seri. skifer

amfibolitt

biotitt - sericitt skifer delvis med grafitt

tuffer

biotitt - klorittt - sericitt skifer

amfibolitt

tuffer, tuffitter

amfibolitt

biotitt - sericitt skifer

amfibolitt

kvartsfyllitt

Litologie av Torhill 2000 D

bio-chl-ser schist
(agg-basalt ↑ basic
volc. debris flow)

tuffaceous series, chert,
agg basalt

amphibolite, partly variolithic

agg. basalt, tuffs,
keratophyre, mixed volc. epicl. sed.,
minor amphibolites

amphibolite

sericite schist, minor keratophyr.
zeolit

plag. ampli (SNB-04)

leopard serlit amph.

leopard serlit amph.

0707

tel.: 456618 O. Nilsen

Instruksjoner til dem som passer på boring ved Gåvålivatn, BH 2000 D

Borhull 2000 D stå ved idag (2/10-95) ved 313.50 m. Det er hatt opp kjerner av hovedsakelig karbonatholdige biotitt-chloritt-serisitt skifre som ofte inneholder mindre fragmenter av amfibolitt som i det fleste tilfeller er av lapilli størrelse. Ved siden av denne bergarten forekommer karbonatrike båndete amfibolitter, kvartsfyrer, jernrike kvartsitter, amfibolitter, granat-biotitt-serisitt skifre og en stor mengde av en epidot dominert bergart.
Hva det gjelder korrelasjonen mellom bergartene fra borhullet 2000 D og denne fra profilen ved Europaveien er forholdene enda ikke helt klart. Det er mulig og knytte sammen denne første chert-horisont som vi har møtt ved 95.07-96.10 m i borhullet 2000 D med en tilsvarende chert-lag fra 0 m av Europa-veiprofilen (se kart). Denne andre korrelasjon mellom amfibolittene som er foretatt i skissen kan man vaere mere sikker på. Begge de meta basalter er karakterisert av en lett, finkornet amfibolitt som stedvis inneholder innsprengte linser av plagioklas, typisk

for en amygdaloid basalt. Amfibolitten fra borhullet blir fulgt av en heterogen serie bestående av karbonatholdige diorit-gloritt- serisitt skifre med og uten amfibolitt-fragmenter, svak båndete karbonatrike amfibolitter, amfibol-kts-fspar gneiser (keratofyrer) og en del epidotrike amfibolitter. Serien inneholder ved siden en betydelig mengde av epidotrike- og epidotdominerende bergarter. Noen liggende bergarter er kjernet med avsnitt 425 til 550 m av kjernaprofilen. Serien blir så fulgt av en ca 20 til 50 m mektig serie av en gansre homogent (granat)-diorit- serisitt skifre som stedvis fører litt grafitt. Noen sammenliggende bergarter (skifre med grafitt) har vært kjernet med 269.50 til 313.50 m i borhullet 2000 D. Denne skifre viser mellom 270.50 og 272.50 m en foliasjonsakse horisontal som tyder på kjernet bare fra en granat-diorit-serisitt skifre sørvest liggendes ca 150 m stratigrafisk nær fra denne øvre horisonten. Men denne lavere skifresonen er ikke kjernet for å være grafittisk.

Jeg er som sagt ikke sikkert i hvilken nivå (skifre) vi befinde os med idag. Jeg anbefaler dersom å undersøke denne skifresonen vi bare i nøyaktig på en andre konglomeratharisont som vil inneholde ved siden av kvarts- og kvartsporfyr fragmenter tynne lag av karbonat. Det skal ved siden møter Garbenskifre. Hvis denne andre fragmentharisont ikke oppdage så kan man være temmelige sikkert på at man befinde seg i det øvre skifre nivå. Det sistnevnte skifre grense i ligg på en middelskornig plagioklase-amfibolitt (prøve SNØ-04) med 0.3 til 0.4 cm store amfibol nåler som skjelden er parallel orientert. Denne lyse amfibolitt har mellomlag av en lapilli tildels agglomeratisk basalt som har vært prøvetatt med prøver SNØ-26. Ofte denne pyroklastiske basalt vil dere møte en amfibolitt skifre delvis med leopardhetter som viser tynne lag av magnetitt-kvarts og skjelden band av svovelkies (anomal:?).

DIAMOND DRILL HOLE 57

Hyperion, east of main fault, 1957

Location: 2100 E - 125 S

Azimuth: 157° N

Inclination: 50°

Total length: 112.08 m, 2.62 m overburden

Description:

2.62 - 21.88: calcareous plagioclase-rich diorite-amphibole dyke

(meta-basalt flow)

grey with faint bluish tint, medium-grained, sometimes fine-grained, amphibole forms needles, fascicular bundles and sometimes imperfect spherulites the crystals and crystal-aggregates show a preferred orientation which in places may be less distinct, amphibole tends to be joined by fine-fibrous chlorite the multi-crystal aggregates being max 0.2 cm large they are scattered within a matrix of plagioclase, carbonate forms scattered hypidio- to idiomorphic crystals of max. 0.2 cm size it locally forms lense shaped clusters or trains of granules both conformable with the foliation of the rock; hydrothermally altered rock is present

between: 15.30 - 16.57 m and 18.50 - 19.65 m, the rock displays calcareous amphibole bear. epidote - plagioclase - chlorite schist which is characterized by a flaser structure caused by a more or less rhythmic alternation of fine-fibrous chlorite schisten and lenses being accompanied by amphibole and lenses and schisten composed of epidote and plagioclase, carbonate forms scattered hypidiomorphic crystals of mat. 0.1 cm size, occurrences of milky qtz at: 15.40 - 15.78 m, 16.57 - 16.90 m.

schistosity: 50°

sharp contact

6.85 - 7.00: amphibole bear. magnetite-rich quartzite

<— — quartzite

<——x (meta-chert)

<— — greyish white faint bluish tint, laminated, ~~alternation of~~ cm-thick layers of dense qtz ~~which~~ being ~~is~~ characterized by a low-grade dissemination of tiny crystals of magnetite and which carries small amounts of 0.15 cm large needles of amphibole alternates with laminae composed of amphibole, pyrite and amphibole and amphibole and chlorite, the footwall shows a close alternation of cherty layers, amphibole-chlorite bands, amphibole bands and trains of granules of pyrite.

chem analysis 7.00 - 7.12 m

7.00 - 7.12: pyrite bear. qtz-amphibole gneiss

(alternation of mafic volcanic and cherty material)

gn with bluish tint, laminated, close alternation of up to 1 cm thick layers composed of amphibole and lenses and schlieren of qtz which is accom-

panied by pyrite, pyrite is most concentrated at the hanging wall where it forms a medium-grade mineralization of 1 cm thickness, the total sulphide amount is about 3 Vol.-%.
sharp hanging contact.

7.12 - 7.25: magnetite-quartzite
(meta-chert)
gr with bluish tint, dense fine-crystalline quartz is interstratified by one or two 0.5 cm thick layers of strongly schistose amphibolite, magnetite is restricted to the quartz-zones where it constitutes a low-grade dissemination.

21.80 - 22.56: amphibole bearing magnetite-rich chlorite ~~gneiss~~ schist
(meta-ut-rich basalt flow with interlayers of magnetite-qtz)
gn, fine grained, ~~laminated to~~ banded, cm-thick bands composed of fine-crystalline chlorite and magnetite amphibole, the latter forming 0.2 cm large acicular crystals which parallel the foliation / banding of the rock, alternate with stripes

composed of qtz, locally occurs cm-thick bands of qtz-magnetite rock (oxide facies BIF).
Banding: 59°
sharp contact.

22.56 - 23.10: calcareous amphibole ~~schist~~ -epidote bear. fspar-qtz- ~~syenite~~ diorite ~~phyllite~~ schist
(meta-mafic volcanic sediment)
light gn with faint greenish tint, planar and lenticular structure, including qtz crystals as max 0.5 cm large lenses and stringers in close alternation with schlieren composed of fine-crystalline ~~metamorphic~~ chlorite which carry subordinate amphibole, the latter constituting lenticular crystals being aligned to the foliation of the rock, carbonate occurs as xenomorphic to hypidiomorphic crystals which often are stretched, they are homogeneously distributed.
Foliosity: 60°
sharp boundary.

23.10 - 24.00: garnet bear. magnetite-chlorite-qtz-amphibole gneiss
(meta-int-mic basaltic volcanic with intercalations of magnetite-chert)
distinct gn-white striping, mm- to cm-

thick bands composed of medium-grained amphibole and fine-fibrous chlorite accompanied by tiny scattered crystals of mt alternate with schlieren and layers of dense quartz which locally ~~carries~~ high amounts of magnetite, garnet is sometimes incorporated within amphibole layers, the crystals being 0.1 cm across, it otherwise forms trains of granules.
banding. 60°
sharp contact.

24.00 - 26.00: calcareous chlorite bear plagioclase amphibolite
(meta-basalt flow)
gn, medium-grained within hanging wall coarse crystalline, wide development of hopard texture, acicular crystals, bow-tie shaped crystal aggregates and imperfect spherulites of amphibole are associated with fine-fibrous chlorite forming lense-like crystal aggregates of 0.1 to 0.25 cm size which are surrounded by plagioclase, carbonate occurs as spots throughout it randomly presents lense-shaped crystal aggregates.
gradual boundary to following rock.

26.00 - 50.30 : slightly calcareous epidote-plagioclase-chlorite amphibole schist (meta-basalt flow)

light gn, fine crystalline*, mide development of mineral preferred orientation, amphibole forms acicular crystals which tend to be isolated by plagioclase and epidote grains, only locally form radiating aggregates*2; ilmenite is present at 26.00 - 28.10 m, 29.60 - 31.10 m, 34.60 - 36.00 m and 44.80 - 45.00 m, it constitutes tiny xenomorphic spots but locally dendritic features and lense-like clusters of max. 0.2 cm in size, the boundaries of which showing sutured relationships with the surrounding silicates, the amount of il varies from place to place, a 3% average concentration seems likely*3; several intercalayers of amphibole bear. epidote-rich fspar-qtz-chlorite schist*4 (28.11 - 28.23 m, with platelets of po; 31.24 - 31.53 m, with platelets and clusters of po (1 - 2 Vol.-%); 32.32 - 32.60 m with schlieren and platelets of po (3 Vol.-%); 32.70 - 34.30 m, very similar to 22.56 - 23.10 m, within hanging portion rare platelets of po; 36.75 - 37.52 m, with schlieren of po between 36.88 - 36.92 m; 38.98 - 39.02 m; 47.14 - 48.50 m, platelets of po between 47.20 - 48.14 m) the

*1 with dm-thick intercalations being medium-grained and texturally similar to above mentioned rock,

*2 epidote predominates as tiny veins and laminae, sometimes it constitutes net-work like features

*3 high-grade po-mineralization between 35.56 - 35.60 m, 43.00 - 43.01 m, 45.74 - 45.75 m, cm-thick intercalayers of meta-chert between 46.72 - 46.81 m;

*4 (meta-mafic volcanic sediment)

rocks always are fine-crystalline, laminated or with flaser or lenticular structure, amphibole forms scattered fasicular crystals of mat 0.2 cm in long dimension.

50.29 - 53.27 : slightly calcareous amphibolite
(meta-basalt flow)
gn, extremely fine grained, massive, irregular qtz and carbonate veining.
gradual contact.

53.27 - 65.98 : ~~slightly~~ calcareous to high calcareous biotite-amphibole bearing fspar-qtz-chlorite ~~phyllite~~ schist
(meta-mafic volcanic sediment)
sample: 51/1 (53.54 - 53.59m), 51/2 (60.96 - 60.03m), 51/3 (63.08 - 63.14m)

slightgn with faint bluish tint, laminated in places homogen, sporadically distorted and with high clusters of qtz or carbonate, fine-crystaline phyllosilicates are associated with mat. 0.15 cm large fasicular crystals of amphibole which tend to be parallel the major foliation of the rock, biotite occurs locally it forms fasicular bundles or bow-tie shaped crystal aggregates of mat. 0.15 cm size which are oriented at random, qtz forms mm-thick bands conformable with the schistosity of the rock, it sometimes displays crosscutting

features or big clusters; ilmenite is present throughout forming tiny spots rarely being idiomorphic, it is concentrated ~~but~~ never overstimating 2% of volume between 55.93 - 57.44 m, 61.94 - 62.78 m, 63.75 - 64.93 m, inbetween layers of slightly calcareous chlorite bearing plagioclase amphibolite (meta-basalt flow) which is similar 24.00 - 26.00 m occur at 63.44 - 63.68 m, 64.38 - 64.42 m, 64.55 - 64.63 m, 64.95 - 65.50 m, the layers have always knife-sharp boundaries with the surrounding schist; po-mineralization is found within quartzite (meta-chert) forming stringers between 54.79 - 54.83 m and at 63.40 m, the sulphide content grades 2 Vol.-% within the former zone, it is about 40 Vol.-% within the latter.

schistosity: 65°

sharp contact.

65.98 - 66.17 : calcareous pyrite - quartz rock
(meta - sulphide-rich exhalite)

chem. analysis 65.98 - 66.17 m

greyish, wide development of banding, granoblastic qtz associated by hypidio- to idiomorphic crystals of py on average 0.05 cm large which often form crystal aggregates or trains of granules, the sulphide amounts to 10 - 15 Vol %, carbonate occurs as discontinuous bands or constituting lense-shaped

clusters it further accompanies qtz as small crystals, rarely are found schlieren composed of chlorite and sericite which also carry some spots of Po.
sharp boundary

66.17 - 66.30: slightly calcareous epidote bear. chlorite - amphibole schist (meta - basalt flow)
gn with faint bluish tint, fine crystalline, acicular crystals of amphibole on average 0.15 cm large are embedded in a matrix composed of epidote and fine-fibrous chlorite, locally chlorite is concentrated within schlieren which are conformable with the slight foliation of the rock, qtz forms tiny veins, Po is found as schlieren and small clusters it amounts to less 1 Vol.-%.
sharp contact, 70°

66.30 - 66.63: slightly calcareous qtz-plagioclase-epidote-sericite-chlorite-amphibole schist / gneiss
(meta-mafic-felsic volcanic sediment) ~~with epiclastic sedimentary impurity~~)
gn to light gn, crudely laminated, nema to blastic texture, mm- to cm-alternation of bands composed of amphibole-epidote-chlorite and sericite, layers predominated

by phyllosilicates and laminae rich in qtz and fspar,* amphibole is the most pronounced mineral as it forms acicular crystals max. 0.25 cm long which tend to be aligned to the layering of the rock, chlorite and sericite are fine-crystalline as well as qtz and fspar which are fine-grained granoblastic, the rock contains little po especially within its hanging part.

* the compositional changes happen gradually

lamination: 58°

sharp contact.

66.63 - 66.70: massive pyrrhotite layer

(meta-iron sulphide supp. formed by sulphate-reducing bacteria in an anoxic-reducing environment, suggested volcanochemite)

metal brown, web-like po-mineralization, granoblastic qtz as lense-like crystal aggregates surrounded by po, sporadically occur schlieren composed of phyllosilicates

× phyllosilicate schlieren: 58°

Quite sharp boundary: 58°

66.70 - 66.98: slightly calcareous amphibole bear. sericite-chlorite schist

(meta-mafic volcanic sediment)

↳ similar 53.27 - 65.98 m, but no biotite and no

qtz or carbonate veining, here low-grade spotted mineralization of po
foliation: 54°
sharp contact:

66.98 - 72.74: plagioclase amphibolite
(meta-basalt)
similar: 24.00 - 26.00 m, low-grade dissemination of tiny spots of ilmenite between 67.15 - 68.80 m and 71.65 - 72.29 m; po ~~mineralization~~ forming occurs at: 68.52 - 68.63 m as a low-grade mineralization within amphibolite, it is concentrated within the hanging portion of the section where it displays a vein-like high-grade enrichment within a cm-thick chlorite quartz layer, at 69.13 - 69.40 m po plus a high-grade stringer mineralization which is characterized by a close alternation of laminae of qtz-pyrrhotite and tiny layers of amphibolite, the mineralization is restricted to the lower portion of the section, the upper part ~~is characterized by~~ shows a vein-like po enrichment (2 Vol.-%) within amphibolite 72.00 - 72.74 m some rare platelets of po, the sulphide-amount slightly increases upsection.
sharp contact.

chem. analysis 69.13 - 69.40 m

72.74 - 73.71: amphibole bear. chlorite schist and sulphide-rich quartzite
(meta-mafic volcanic sediment with layers composed of hydrothermal silica, carbonate and iron sulphides)

folded section, ~~irregular alternation of~~ cm-thick layers composed of fine-fibrous chlorite and porphyroblasts of amphibole, the latter being max. 0.25 cm in longdimension, alternate with bands characterized by a close nonrhythmic alternation of granoblastic qtz, amphibole bear. chlorite schist and amphibole bear. qtz-pyrrhotite/pyrite rock, the sulphide amounts on average 10 ~~to~~ 15 Vol.-%.
gradual contact.

chem. analysis 72.74 - 73.71 m

73.71 - 74.27: amphibole-pyrrhotite-magnetite-quartz gneiss
(meta-oxide-silicate facies chert with some intercalations of altered mafic tuff)
greenish gr, laminated, close alternation of laminae of magnetite quartzite, pyrrhotite quartzite, quartzite and amphibole quartzite, within the footwall several cm-thick intercalations of calcareous chlorite-biotite-amphibole schist ~~which~~ suppl. to represent an altered mafic tuff.
lamination: 66°
sharp contact.

chem analysis 73.71 - 74.27 m

74.27 - 99.85: epidote bear. plagioclase amphibolite
(meta-basalt flow)

with intersections being fine-grained gn, medium-grained, locally with distinct leopard texture, amphibole tends to form imperfect spherulites which cause a slight foliation, the crystal aggregates are of max. 0.25 cm size they are surrounded by fine-grained granoblastic fspar-epidot and qtz; ilmenite is*, it forms max. 0.15 cm large spots which have sutured boundaries with the surrounding minerals;

* present between 78.28 - 79.40 m, 79.78 - 81.37 m, 84.16 - 86.50 m, 87.80 - 88.35 m, 89.10 - 90.53 m, 90.95 - 91.32 m, 92.54 - 94.34 m, 94.72 - 99.85 m where it grades on average 1 to 2 Vol.-%

chlorite
75.43 - 75.90: slightly calcareous epidote-amphibole-~~schist~~ (meta-mafic volcanic sediment)

sample: 51/4
75.54 - 75.61 m

gn with faint bluish tint, layered, cm-thick bands composed of fine-fibrous chlorite ~~and~~ or chlorite and amphibole ~~and~~ alternate with mm-thick layers and schlieren or lenses of qtz and carbonate; po is present as tiny flasers being conformable with the lamination of the rock or max. 0.3 cm large spots, it tends to be concentrated within the phyllosilicate layers, its amount being 1 to 2 Vol.-%; ilmenite forms max 0.2 cm large spots which are less frequent than po.

lamination: 59°

sharp contacts.

78.07 - 78.12: massive pyrrhotite layer (meta-iron sulphide supp. formed by sulphate-reducing bacteria in an anotic-reducing environment, supp volcanochemic)
similar: 66.63 - 66.70 m.

knife sharp boundaries.

81.43 - 83.85: calcareous qtz-fspar rich amphibole-chlorite schist (meta-tuff, some similarities to banded amphibolite)
light grey with abundant white stripes, laminated, porphyritic texture, fine-grained granoblastic qtz associated by carbonate as lenses and mm-thick layers in alternation with schlieren and bands composed of fine-fibrous chlorite and amphibole, the latter forms randomly oriented porphyroblasts of max. 0.7 cm in long dimension which tend to prolongate into the qtz-carbonate layers.
lamination: 68°
gradual boundary.
83.85 - 84.06: amphibole-chlorite schist (meta-mafic volcanic)
dark grey with faint bluish tint, groundmass composed of fine-crystalline chlorite, amphibole is present as acicular crystals of max. 0.15 cm needle length which are oriented at random, locally bands of dense qtz (meta-chert).

84.06 - 84.16: sulphide bear. quartzite (meta-chert)
grwhite, dense qtz with low-grade dissemination of po as flasers and tiny spots. knife sharp contacts.

87.42 - 87.80: calcareous amphibole bear. epidote-qtz-fspar rich chlorite schist (meta-mafic volcanic sediment)
light gr with abundant grwhite stripes, laminated, mm-thick bands and schlieren composed of fine-crystalline chlorite and acicular crystals of amphibole which tend to be ~~are~~ parallel to the lamination of the rock alternate with lenses, laminae and schlieren of qtz and/or carbonate.
lamination: 72°.
sharp footwall, gradual hanging wall.

88.35 - 89.10: high-calcareous amphibole bear. epidote-T qtz-fspar-chlorite schist (meta-pelite with volcanic impurity)
sample: 51/5 88.20 - 88.87 m
similar: 81.43 - 83.85 m but lesser amphibole

90.57 - 91.77: sulphide-amphibole bear. quartzite (meta chert)
grwhite, dense, wide development of banding due to tiny needles of amphibole which form trains of granules, po occurs as rare tiny spots.

knife-sharp borders.

91.77 - 92.54 : calcareous amphibole bear. epidote-qtz-fspar ~~schist~~ - chlorite schist (meta-mafic volcanic sediment)

similar: 81.43 - 83.85 m but minor amphibole, no forms a high-grade mineralisation within cherty-quartzite between 92.38 - 92.41 m.

94.34 - 94.72: calcareous amphibole bear. epidote-qtz-fspar ~~schist~~ - chlorite schist (meta-mafic volcanic sediment)

similar: 87.42 - 87.80 m

sharp boundaries.

99.85 - 103.70 : calcareous amphibole bear. epidote-qtz-fspar ~~schist~~ - chlorite schist (meta-mafic volcanic sediment)

lightgrey with faint bluish tint, homogeneous, in places laminated or with lenticular or flaser structure*, fine-crystalline phyllosilicates are rarely accompanied by acicular crystals of amphibole max. 0.2 cm long which mostly are aligned with the foliation of the rock, within laminated sections the phyllosilicates form mm-thick layers which alternate with lenses or schlieren composed of qtz which is associated by carbonate, in places occur biotite, it

* often rich in veins of qtz and carbonate, locally clusters of qtz,

displays fascicular bundles or bow-tie crystal aggregates ~~of~~ max. 0.15 cm large which are not oriented; ilmenite constitutes clusters and/or tiny spots between 100.35 - 101.30 m; Po forms a high-grade mineralization within dark quartzite between 100.10 - 100.14 m.

lamination: 64°.

sharp contact

103.70 - 103.85: schistose amphibolite

(meta-basalt flow)

dark gn, fine-crystalline, nematoblastic texture, some tiny veins of qtz.

sharp contact

103.85 - 103.87: quartzite

(meta-chert)

greenish with faint bluish tint, dense, fine-crystalline, crude development of lamination due to parallel platelets of Po.

sharp contact

103.87 - 104.95: epidote-chlorite rich schistose amphibolite

(meta-basalt flow)

light gn, extremely fine-grained with intersections ~~T~~ coring fine-crystalline, homogeneous with locally occurring veins or clusters

of qtz and/or carbonate; low-grade dissemination of po between 103.87 - 104.01 m and 104.06 - 104.42 m, ilmenite occurs as scattered crystals between 104.42 - 104.92 m. gradual contact to leopard amphibolite.
104.01 - 104.06: sulphide bear. quartzite (vassi's) layers of fine-grained granoblastic qtz in alternation with bands of sulphide-rich quartzite or even massive pyrite, sometimes with thin trains of granules of py, pyrite is the only sulphide and makes up 5% of the total rock.
banding: 85°
knife sharp contacts

chem. analysis 104.01 - 104.06 m

104.95 - 108.20: epidote rich plagioclase amphibolite (meta-basalt flow) (Similar leopard textured amphibolites of Svåni-Profile; BH 76 19.54 - 21.13 m) X
~~a... BH 76 [illegible] 322.50 - 336.70 m~~
qu spots in a yellowish gr matrix, distinct leopard texture, amphibole forms lense-shaped crystal aggregates on average 0.3 cm large which tend to be not oriented, the amphibole aggregates are surrounded by a fine-grained granoblastic matrix composed of plagioclase and epidote, interlayers of amphibole bear. sericite qtz-fspar rock (meta-intermediate to felsic volcanic material) occur at 105.74 - 105.95 m and 107.57 -

107.74 m, the layers showing knife sharp boundaries with the surrounding leopard amphibolite.
gradual contact between leopard amphibolite and following rock.

108.20 - 109.08: slightly calcareous to calcareous qtz - fspar - amphibole - chlorite schist
(meta - mafic tuff to tuffit, close to banded amphibolite)
light grey with abundant dark grey needles, wide development of banding, porphyroblastic to porphyritic texture, lenses and small layers composed of fine - crystalline chlorite alternate with bands and lenses of qtz and fspar which contain some carbonate, the lamination is superimposed by a less distinct cm - banding which results from accumulations of porphyroblasts of amphibole within layers, the crystals being 0.35 cm long and tend to be not oriented.

lamination: 76°
sharp contact.

109.08 - 109.41: pyrrhotite bear. quartzite
(sulphide enriched meta - chert)
greyish, widely laminated, fine - grained

granoblastic qtz being interlaminated by veins of granules of pyrrhotite, sometimes occur po-seams or 0.5 cm thick nearly massive po-bands, the po-content estimates to ~ 5 Vol. %.
lamination: 75°
knife sharp contact.

109.41 - 109.50: slightly calcareous qtz-plagioclase-chlorite amphibole gneiss (banded amphibolite)
(meta-mafic tuff)
gn, banded, porphyroblastic texture, cm-thick bands of amphibole and chlorite alternate with mm-thick lenses or layers of fspar and qtz, amphibole forms scattered porphyroblasts of max. 0.4 cm length which tend to be not oriented.
banding: 78°
gradual boundary.

109.50 - 109.76: schistose amphibolite
(meta-basalt flow)
gn, fine-crystalline, nemato-blastic texture, crude development of layering due to mm-thick qtz lenses and layers which are aligned to the foliation of the rock.
lamination: 80°.

sharp contact.

109.76 - 110.21: calcareous qtz-fspar-amphibole ~~schist~~ bearing chlorite schist
(meta-mafic volcanic sediment)
similar: 53.27-65.98m but no biotite
lamination: 75°
gradual contact.

110.21 - 112.08. calcareous qtz-fspar-chlorite-amphibole rock / schist
(meta-basalt flow)
gn, fine-crystalline in places medium crystalline bec mica oxide development of leopard texture, amphibole forms bundle-like crystal aggregates or imperfect spherulites which tend to be accompanied by fine-fibrous chlorite, the multi-crystal aggregates locally reach 0.2 cm in diameter, the matrix for the colored compounds consists of fine-crystalline granoblastic qtz and fspar, abundant crosscutting layers and tiny veins of qtz.

112.08m end of DDH

F.D. Priesemann
1986

samples for chemical analysis:

	% Cu	% Zn	% S
7.00 – 7.12 m			
65.98 – 66.17 m			
69.13 – 69.40 m			
72.74 – 73.71 m			
73.71 – 74.27 m			
104.01 – 104.06 m			

Samples for thin section:

~~Prover~~ 51/1 53.54 - 53.59 m

prover 51/2 60.96 - 60.73 m

~~prover~~ 51/3 63.08 - 63.14 m

~~pr~~ 51/4 ~~75~~.54 - 75.61 m

susceptibility: **DDH 51**

111.50	0.0	81.00	0.0	64.00	0.1	30.00	-0.1	15.00	0.0
110.50	0.0	80.00	0.1	63.00	0.1	29.00	0.1	14.00	0.0
109.50	0.1	79.00	0.3	62.00	0.2	28.00	0.1	13.00	0.0
107.30	0.1	78.30	0.0	61.00	0.1	27.00	0.0		
109.00	0.1	78.10	0.3	60.00	0.2	26.00	0.0		
108.00	0.1	77.90	0.0	59.00	0.1	25.00	0.1		
107.00	0.1	77.00	0.0	58.00	0.2	24.75	0.0		
106.00	0.0	76.00	-0.1	57.00	0.1	24.65	0.0		
105.00	0.1	75.80	0.3	56.00	0.1	24.45	0.0		
104.50	0.2	75.50	0.2	55.00	0.1	24.10	0.0		
104.10	0.3	75.00	0.1	54.00	0.1	23.95	0.3		
104.05	0.3	74.30	0.0	53.00	0.1	23.75	21.4		
103.90	0.2	74.20	1.0	52.00	0.1	23.65	24.4		
103.00	0.0	74.00	10.4	51.00	0.1	23.45	19.4		
102.00	0.1	73.90	1.9	50.00	0.2	23.15	20.4		
101.00	0.1	73.80	0.0	49.00	0.1	23.00	0.0		
100.60	0.1	73.60	0.1	48.00	0.1				
100.12	0.2	73.50	0.0	47.00	0.0	42.00	0.0		
99.80	0.0	73.40	0.0	46.00	0.0	41.00	-0.1		
99.00	0.0	73.30	0.0	45.00	0.0	40.00	0.0		
98.10	0.0	73.00	0.2	44.00	0.1	39.00	-0.1		
97.10	0.0	72.60	0.1	43.00	0.0	38.00	0.0		
96.00	0.0	72.50	0.1			37.00	0.0		
95.00	0.0	72.30	0.1	Begynner her		36.00	0.0		
94.10	0.0	72.20	0.2	3.00	0.1	35.00	0.1		
93.20	0.1	72.00	0.1	4.00	0.0	34.95	0.3		
92.50	0.1	71.00	0.1	5.00	0.1	33.00	0.0		
92.40	0.2	70.00	0.0	6.00	0.1				
92.00	0.0	69.50	0.3	6.70	1.0	22.50	8.8		
91.70	0.2	69.20	0.2	6.90	0.7	22.40	17.6		
91.60	1.3	69.00	0.0	7.10	17.6	22.30	21.4		
91.00	0.0	68.60	0.1	7.20	7.6	22.20	17.6		
90.00	0.0	68.50	0.2	7.35	0.0	22.10	27.6		
89.00	0.0	68.00	0.1	8.00	0.0	22.00	12.6		
88.00	0.0	67.50	0.2	9.00	0.0	21.90	18.6		
87.20	0.0	67.00	0.2	10.00	0.0	21.80	0.0		
86.00	0.0	66.85	0.2	11.00	0.0	21.50	0.0		
85.00	0.0	66.75	0.3	12.00	0.0	21.00	0.0		
84.20	0.0	66.50	0.1			20.00	0.0		
84.10	0.1	66.20	0.1	32.45	0.1	19.00	0.1		
84.00	0.1	66.00	0.1	32.35	0.1	18.00	0.0		
83.20	0.0	65.80	0.2	32.00	-0.1	17.00	0.0		
83.00	0.1	65.00	0.0	31.50	0.0	16.00	0.0		
82.00	0.1			31.00	0.0				

DIAMOND DRILL HOLE 52

Njoseiun, east of main fault, 1957
Location: 250 V - 490 N
Azimuth: 157° N
Inclination: 55°
Total length: 57.60 m + 8 m overburden

Description:

000 - 5.75 : slightly calcareous qtz - biotite - sericite schist (meta-conglomeratic tillonite, matrix supported sediment) grey with white stripes and clusters, heterogeneous, blastopsephitic texture which locally changes into cm-banded rock, isolated stretched and flattened rounded fragments of quartzite, quartz - fspar rock with accessory sericite and biotite (lvatoplut debris), biotite - fspar - qtz rock (granitoid clasts) and fine crystalline chlorite schist are embedded in tillite matrix composed of sericite and biotite, the mica flakes showing a preferred orientation ~~which~~ parallel to the long axis of fragments, carbonate forms mm-thick discontinuous layers or lenses, it may in places ~~may~~ constitute deformed clasts; coarse greywacke layers occur at 4.49 - 4.83 m and 5.37 - 5.75 m, the bands show sharp contacts to the surrounding paraconglomerates, gradual hanging wall.

5.75 - 14.26 : slightly calcareous biotite - sericite schist (meta-pelite)

gr with greenish tint and abundant brown rods, porphyritic texture, lenticular to flaser structure locally changing into laminated rock, close alternation of lenses or mm-thick bands of qtz and/or carbonate with bands and schlieren of fine-crystalline sericite which contains abundant scattered fascicular bundles of biotite mat. 0.1 cm large and mostly not oriented.
schistosity 50°
gradual contact

14.26 - 19.90 : slightly calcareous biotite-sericite schist (meta-pelite)
same as: 5.75 - 14.26 m but with minor biotite, the crystals or crystal aggregates are widely scattered and not oriented and are of mat 0.2 cm size.
schistosity: 50°
gradual contact.

19.90 - 21.27: slightly calcareous biotite bear. sericite schist (meta-pelite)
gr with faint greenish tint, lenticular to flaser structure, close alternation of lenses of qtz and/or carbonate with schlieren and laminae of sericite; low-grade mineraliza-

tion of po ~~as~~, tiny schlieren but locally ~~as~~ wavy bands of mm-thick ~~accent~~ are inhomogeneously distributed, sulphide content is lesser 1 Vol.-%.
schistosity: 45°-50°
sharp contact

21.27 - 21.91 : slightly calcareous qtz-sericite schist
(meta-pelite)
gr with faint greenish tint, ghost-like lenticular structure, interlocked qtz crystals as tiny lenses and cm-thick layers in alternation with flasers and schlieren of fine-crystalline sericite which sporadically is accompanied by tiny flakes of biotite, carbonate often accompanies qtz but also forms isolated lenses and discontinuous layers.
schistosity: 65°
sharp contact

21.91 - 29.20 : slightly calcareous biotite-sericite schist
(meta-pelite)
gr with greenish tint, abundant brown spots, porphyroblastic texture, flaser and lenticular structure, in places distinctly mm-banded, interlocking qtz and qtz and carbonate crystals as lenses and layers in alternation with schlieren and lenses of

fine-crystalline sericite which is accompanied by scattered fascicular bundles and spherulites of biotite of max. 0.3 cm size, the crystals and crystal aggregates tend to be not oriented; scattered idiomorphic crystals of garnet (reddish brown) of max. 0.2 cm in diameter are present between 25.55 - 28.26 m; po is found throughout forming tiny schlieren which parallel the major foliation of the rock, the sulphide amount is < 1 Vol.-%. schistosity a. lamination: 50° - 65° sharp contact

29.20 - 33.98: slightly calcareous to calcareous biotite bear. qtz-sericite schist

(meta-pelite)

gr with faint greenish tint, flaser and lenticular structure, alternation of lenses and schlieren composed of either qtz or qtz and carbonate with schlieren, lenses and bands of fine-crystalline sericite which by chance carries tiny crystals of biotite; po forms mm-large schlieren which are homogeneously distributed, they naturally accompany qtz, cm-thick stripes

rich in po are restricted to a 20 cm thick section at the footwall and a 15 cm thick layer at the hanging wall, po forms here a network-like mineralization within qtz, sporadically po is accompanied by py, the sulphides average < 1 Vol.-% of the

schistosity: 65°-70° } rock.
sharp contact }

33.79 - 33.80: pyrite - pyrrhotite rich quartzite (meta-sulphide facies BIF, vassdis), network-like po-py mineralization of medium grade within fine crystalline dense quartz
knife sharp contacts, 75°

33.98 - 37.45: calcareous sericite schist
(meta-pelite)
gr with faint greenish tint, cm-layered rock, ~~alteration of~~ mm- to cm-thick bands, lenses and schlieren of qtz which often is accompanied by grains of carbonate ~~and~~ alternate with layers and schlieren of fine-fibrous sericite which contain a lot of hypidiomorphic crystals of carbonate max. 0.1 cm in diameter.
schistosity: 65°
gradual contact.

37.45 - 39.63 : calcareous to high calcareous qtz - sericite schist

(meta - pelite)

gr with faint greenish tint, ghost-like lenticular structure, interlocking qtz-crystals as lenses and schlieren with indistinct boundaries in close alternation with lenses, schlieren and layers composed of qtz and sericite, carbonate forms discontinuous layers, it further constitutes scattered hypidiomorphic crystals on average 0.1 cm large which tend to join into crystal aggregates; po occurs sporadically in very small amounts, it displays tiny platelets ~~schlieren~~ or ~~blebs~~ spots of max. 0.15 cm size.

schistosity: 65°

sharp contact

39.63 - 41.72 : calcareous to high calcareous chlorite bear. epidote - pyrrhotite - ~~sericite~~ - qtz schist

(meta-pelite with syn-sedimentary iron sulphide supp. formed by sulphate-reducing bacteria in an anoxic-reducing environment)

white gr with faint yellowish and faint greenish schlieren and stripes, lenticular to flaser structure, non-rhythmic alternation of lenses and schlieren sometimes clusters of qtz with schlieren and tiny bands

composed either of epidote or sericite
the latter being locally
~~which~~ is accompanied ~~locally~~ by
chlorite, carbonate is inhomogeneously
distributed forming trains of granules,
clusters or scattered hydio- to idio-
morphic crystals, po occurs as
tiny ~~seldom~~ platelets, flasers and bands or
it constitutes vein-like features,
its amount ~~strongly varying~~ varies strongly from
place to place, the average content
is 3 vol.-%.
sharp contact

41.72 - 44.90 : high calcareous qtz-sericite schist
(meta-pelite)
same as: 37.45 - 39.63 m, but locally it is
enriched in sericite forming a cal-
careous sericite schist like between
33.98 - 37.45 m.

* sunsedimentary iron sulphides supp. formed by sulphate-reducing bacteria in an anoxic-reducing environment)

42.15 - 42.34: calcareous chlorite bear. sericite-
qtz schist (meta-pelite with *) same as:
39.63 - 41.72, but with minor po

44.90 - 49.50 : qtz-pyrrhotite-pyrite rock
(metamorphosed iron-sulphide enrichments supp. formed by sulphate-reducing bacteria, in an anoxic-reducing environment)
and medium-grade
high-grade pyrite, pyrite-pyrrhotite and
pyrrhotite mineralizations in dm-
alteration with sulphide-barren calca-

reais sericite schist which locally may contain some chlorite, sometimes occur Tenticulems of qtz possibly of exhalative origin. The sulphides mainly are fine-grained with pyrite being slightly coarser than pyrrhotite, medium-grade pyrite are ~~typically~~ is ~~displays a spotted~~ characterized by ~~occurrence of~~ mainly mat. 0.2 cm large hypidiomorphic crystals of pyrite embedded in a fine-crystalline qtz matrix. sharp contact.

49.50 - 50.57: slightly calcareous to calcareous sericite schist
(meta-pelite)
gr with faint greenish tint, intelocking qtz crystals as tiny lenses and schlieren in close alternation with schlieren and layers of fine-crystalline sericite, carbonate forms 0.1 cm large hypidiomorphic crystals which locally ~~form~~ constitute discontinuous trains of granules but elsewhere are scattered forming a more or less homogeneous dissamination, po is very ~~sparse~~ rare and displays flake-like crystal aggregates.

Small fault : 49.81 m
schistosity : 60°
sharp contact.

50.57 - 51.60 : calcareous biotite - sericite schist (chlorite bear.)
(meta - pelite)
gr with greenish tint, abundant brown bundles and rods, lenticular structure, porphyritic texture, interlocking qtz crystals which often are accompanied by carbonate in alternation with schlieren and layers of fine - crystalline sericite which contains abundant fascicular bundles or flares of biotite on average 0.15 cm large, carbonate in places forms mm - thick schlieren or lenses, only sometimes it occurs as isolated hypidiomorphic crystals. Knife sharp contact, 55°

51.60 - 52.16 : high calcareous biotite bear. qtz - sericite schist
(meta - pelite)
gr with faint greenish tint, distinct lenticular structure which gradually changes into laminated rock, interlocking qtz or carbonate crystals as schlieren and lenses of mm - thickness in close

alteration with schlieren and layers composed of qtz and fine-crystalline sericite which contains scattered tiny crystals of biotite.
Knife sharp boundary, 50°.

52.16 - 53.08 : calcareous chlorite bear. biotite - sericite schist
(meta - pelite)
same as: 50.57 - 51.60 m
Knife sharp boundary, 55°.

53.08 - 54.42 : high calcareous biotite bear. qtz - sericite schist
(meta - pelite)
same as: 51.60 - 52.16 m.
sharp contact, 80°.

54.42 - 54.48 : high calcareous sericite bear. qtz - fspar schist / rock
(meta - qtz - keratophyr / rhyolite)
gowlite, ← fine - crystalline qtz and fspar is interlayered by discontinuous trains of granules of carbonate, py forms scattered tiny plakes being conformable with the carbonate layering within the stratigraphically lower part ~~while~~, it displays a medium-grade mineralization accompanied by py within the upper portion of the layer.

knife sharp contact, 60°.

54.48 - 55.70 : slightly calcareous biotite - chlorite - sericite schist

(meta - pelite with mafic volcanic impurity)

grgn, intersections with scattered brown rods or spots, porphyroblastic texture, fine - crystalline chlorite and sericite accompanied by poikiloblasts or crystal aggregates of biotite which are oriented at random and on average 0.15 cm large, biotite is most abundant within the lower portion of the layer, carbonate forms mm - thick stringers, discontinuous trains of granules or ~~sometimes~~ isolated crystals of 0.1 cm size, qtz which sometimes seems to be accompanied by fspar exists as lenses or layers ~~which are very~~ sporadic occurrence.

~~sporadic~~.

sharp contact.

55.70 - 56.67 : high calcareous chlorite - biotite bear. sericite - qtz - fspar schist

(meta - tuffaceous sediment or tuffite)

gr, lenticular to flaser structure, sometimes laminated, interlocking qtz and fspar or carbonate crystals as lenses and mm-layers in non-systematic alternation with sericite and laminae composed of sericite, chlorite and biotite, the latter tends to form fascicular bundles of max. 0.15 cm size which parallel the lamination of the rock; po is present throughout, it displays mm-large platelets being aligned along the schistosity / lamination of the rock, within 56.15 - 56.17 m po forms a high-grade mineralization, the groundmass being qtz and carbonate; py is found constituting mm- to cm-thick layers of medium-grade mineralization at: 55.80 m, 55.98 m, 56.16 - 56.23 m and 56.26 m.

sharp contact

56.67 - 57.60 : <u>amphibole bear biotite-chlorite schist</u>

(meta-mafic volcanic sediment supp. with epiclastic sedimentary impurity) gn with faint bluish tint, porphyroblastic texture, fine-crystalline amphibole and chlorite form the foliation

of the rock. Diabase displays scattered porphyroblasts of mat. 0.3 cm size which are oriented at random, the crystals in places join each other constituting mm - thick discontinuous bands; several interlayers of magnetite - chert with knife - sharp borders to the surrounding schist are incorporated. They occur at: 56.80 - 56.93 m, 57.06 - 57.07 m, 57.18 - 57.23 m, 57.27 - 57.30 m

57.60 m end of DDH

Frank-D. Priesemann
1986

chemical analysis:

44.90 - 49.50 m: Cu: traces, Zn: 0.01 %, S: 19 %

Susceptibility : DON 52

57.50	0.0
57.25	0.2
57.10	0.0
57.05	0.0
56.90	0.0
56.80	0.1
56.70	5.5
56.60	0.5
56.55	0.0
56.00	0.1
55.90	0.0
55.80	0.0
55.50	0.1
55.00	0.1
54.00	0.2
53.00	0.0
52.75	0.0
52.00	0.0
51.00	0.0
50.00	0.0
49.00	0.0
48.00	0.1
47.00	0.1
46.00	0.0
45.00	0.1
44.00	0.0
43.00	0.0
42.00	0.0
41.00	0.1

DIAMOND DRILL HOLE 762 D

Hyösime, east of main fault, 1981
Location: 2000 E 3705
Azimuth: 214,28°
Inclination: 25° N
Total length: 364.60 m

Description:

0.00 - 112.50 biotite - sericite schist
(meta-pelite often with marble bands)
gr with faint greenish tint, abundant
brown spots and schlieren, predominately
with flaser and lenticular structure,
locally laminated or banded, porphyro-
blastic, interlocking qtz-crystals as
lenses and layers in alternation with
interleaved sericite flazes as schlieren
and layers, biotite forms porphyro-
blasts, bow-tie aggregates or fascicular
bundles which are variably distributed,
carbonate has a frequent occurrence, it displays bands
and/or lenses which tend to be conformable
with the major foliation of the
rock. From the beginning until
28.50 m the biotite - sericite schist
is interlayered by zones rich in
epidote and biotite which sometimes

carry significant amounts in fspar (keratophyric material).

gradual contact.

112.50 – 114.65 calcareous epidote-qtz-fspar-chlorite schist (meta-mafic volcanic sediment) (similar chlorite schists from DDH 51) lightgn, fine-crystalline, flaser and lenticular structure with tendency to laminated rock, interlocking qtz and fspar crystals as tiny lenses and laminae in close alternation with schistose and layers composed of chlorite + epidote, carbonate forms scattered xenomorphic blasts max 0.07 cm across it sometimes collects and displays mm-thick layers.

114.65 – 116.85 schistose amphibolite (meta-basalt flow) lightgn, fine-crystalline, homogeneous, acicular crystals of amphibole show a preferred orientation; scattered crystals of ilmenite, the blasts on average 0.1 cm across and with sutured boundaries.

116.85 - 118.00 amphibole bear. epidote - qtz - fspar - chlorite schist
(meta - mafic volcanic sediment)
(similar chlorite schists from DDH 51)
similar: 112.50 - 114.65 m dark with scattered acicular crystals of amphibole; interlayers of qtz - fspar rich rock (qtz - leukophyrs)

118.00 - 121.70 schistose amphibolite
(meta - basalt flow)
similar: 114.65 - 116.85 m; interbeds of high calcareous biotite - qtz - fspar schist/rock (meta - tuffs)

121.70 - 123.60 calcareous biotite - qtz - fspar gneiss/schist
(meta - felsic tuff)
121.65 - 121.77: quartzite (meta - chert)

123.60 - 124.60 schistose amphibolite
(meta - basalt flow)
similar: 114.65 - 116.85 m

124.60 - 127.90 epidote bear. qtz - fspar - biotite schist/gneiss
(meta - felsic tuff)
several interlayers of meta - chert: 125.70 - 126.00 m, 126.20 - 126.60 m, 126.70 - 126.80 m, 127.10 - 127.45 m.

127.90 - 128.70 calcareous amphibole bear. epidote - qtz - fspar - chlorite gneiss
(meta - tuff with carbonate inter-layers)
close alternation of mafic and felsic layers and bands of carbonate.

128.70 - 129.10 epidote bear. qtz - fspar - biotite schist/gneiss
(meta - tuff)

129.10 - 130.45 quartzite
(meta-chert; silicate and sulphide facies)
X hanging wall rich in biotite and carbonate and with medium-grade Py mineralization (130.00 - 130.50 m).

130.45 - 136.40 calcareous amphibole bear. epidote - qtz - fspar - chlorite schist
(meta - mafic volcanic sediment)
(similar chlorite schists from DDH 51)
similar: 116.85 - 118.00 m; spotted porphyroblasts of il between 132.80 - 136.40 m; some spots of Py between 130.45 - 130.55 m.

136.40 - 147.70 schistose amphibolite
(meta - basalt flow)
similar: 114.65 - 116.85 m; rich in il; several

bands of qtz which contain schlieren, flakes and ribbon-shaped patterns of po : 138.75m, 138.78m, 139.14m, 141.00m, 141.14m, 141.35m, 141.76m, 141.94 - 142.08m, 144.35 - 144.68m.

147.70 - 148.10 qtz - fspar - chlorite gneiss
(meta - tuff)
sporadically tiny flakes of po.

148.10 - 151.10 ● schistose amphibolite
(meta - basalt flow)
similar : 114.65 - 116.85m, several interlayers of calcareous quartzite which contains bands, ribbon-shaped patterns and schlieren of po : 148.90 - 149.00m, 149.20 - 149.32m, 149.42 - 149.62m, 150.30 - 151.10m.

151.10 - 163.40 ● amphibolite
(meta - basalt flow)
gn, fine- and medium-crystalline, massive with widely developed mineral preferred orientation, homogeneous but variation in grain size, amphibole forms patch-like crystal aggregates which are surrounded by granoblastic plagioclase, epidote and qtz; spotted ilmenite throughout.

163.40 - 169.13 schistose amphibolite
x (meta-basalt flow)
similar: 114.65 - 116.85 m.

169.13 - 169.36 amphibolite
(meta-basalt flow)
similar: 151.10 - 163.40 m.

169.36 - 192.95 schistose amphibolite and amphibolite
(meta-basalt flow)
10% similar 114.65 - 116.85 m alternates with 10% similar 151.10 - 163.40 m; at several locations mineralization of po: 169.75 - 170.15 m flazes, 170.05 - 170.15 m high-grade po, 171.75 - 171.85 m flazes, 173.02 - 173.10 m schlieren.

192.95 - 193.40 calcareous qtz-fspar-epidote-amphibole-chlorite schist
(meta-mafic volcanic sediment)
(similar chlorite schists from DDH 51 and close banded amphibolite)

lightgn with abundant white stripes, laminated, porphyroblastic texture, included qtz and fspar crystals as lenses and laminae in close alternation with schistose and bands composed of fine-crystalline chlorite and porphyroblasts of amphibole, the acicular crystals max. 0.5 cm long and randomly oriented.

0 - 227.65 schistose amphibolite
(meta-basalt flow)
similar: 114.65 - 116.85 m with local interlayers of medium-crystalline amphibolite from 151.10 - 163.40 m,

coarse-grained leopard textured amphibolite occurs between 224.75 - 225.95 m.

227.65 - 228.15 calcareous amphibole (epidote-) bear. qtz-fspar-chlorite schist
(meta-mafic volcanic sediment)
(similar chlorite schists from DDH 51)
similar: 192.95 - 193.40 m

228.15 - 247.95 schistose amphibolite
(meta-basalt flow)
similar: 114.65 - 116.85 m, fractures until 239.75 m.

247.95 - 248.65 calcareous qtz-fspar-(epidote) amphibole-chlorite schist
(meta-mafic volcanic sediment)
(similar chlorite schists from DDH 51)
similar: 192.95 - 193.40 m.

248.65 - 256.40 schistose amphibolite
(meta-basalt flow)
similar: 114.65 - 116.85 m.

256.40 - 256.50 calcareous amphibole (epidote-) bear. qtz-fspar-chlorite schist
(meta-mafic volcanic sediment)
(similar chlorite schists from DDH 51)
similar: 112.50 - 114.65 m but with acicula

crystals of amphibole, sporadically sdrieven and flakes of po.

256.50 - 260.00 sdristose amphibolite
(meta-basalt flow)
similar: 114.65 - 116.85 m.

260.00 - 260.70 epidote-rich amphibole-biotite-qtz sdrist/gneiss
(meta-silicate facies BIF)
high-grade mt mineralization, po as sdrieven throughout, massive po layer at 260.65 - 260.70 m.

260.70 - 265.70 calcareous epidote-qtz-fspar-amphibole-chlorite sdrist
(meta-mafic volcanic sediment)
(similar chlorite sdrists from DDH S-1)
similar: 192.95 - 193.40 m, several inter-layers of medium-crystalline amphibolite which is similar 151.10 - 163.40 m; * frequent occurrence of sulphides mainly as py ~~mainly forming~~ which tends to be highly enriched ~~grade mineralizations~~: 261.59 - 261.61 m, 261.79 - 261.90 m several mass. py bands, 263.00 - 263.10 m, 263.10 - 263.14 sdrieven of po, 263.75 - 263.77 medium-grade py enrichment, 264.26 - 264.27 rare crystals of py, 264.42 - 264.50 m, 264.76 - 264.79 m.

* silicate facies meta-chert with low-grade po mineralization within 262.10 - 262.28 m;

265.70 - 267.60 schistose amphibolite
(meta - basalt flow)
similar: 114.65 - 116.85 m, within
266.45 - 266.50 m two bands of
medium-grade py.

267.60 - 268.85 calcareous amphibole bear. epidote - qtz - fspar chlorite schist
(meta-mafic volcanic sediment)
(similar chlorite schists from DDH 51)
similar: 256.40 - 256.50 m.

268.85 - 274.20 schistose amphibolite
(meta-basalt flow)
similar: 114.65 - 116.85 m but without
ilmenite.

274.20 - 274.80 calcareous epidote - qtz - fspar - amphibole - chlorite gneiss / schist
(meta-tuff) (very similar banded amphibolite)
massive py mineralization at 274.20 m,
medium-grade po enrichment between
274.59 - 274.64 m.

274.80 - 275.30 schistose amphibolite
(meta-basalt flow)
similar: 114.65 - 116.85 m but without i

275.30 - 275.90 calcareous epidote - qtz - fspar - amphibole - chlorite gneiss / schist (meta - tuff) (very similar banded amphibolite)

similar: 274.20 - 274.80 m, local changes into banded amphibolite.

275.90 - 286.90 calcareous amphibole bea. epidote - qtz - fspar - chlorite schist (meta - mafic volcanic sediment) (similar chlorite schists from DDH 57)

* similar: 130.45 - 136.40 m.

several silphide interlayers: 285.35 - 285.44 m po py, 285.60 - 285.78 py, 285.90 - 286.10 m py, 286.40 - 286.45 m py, 286.63 - 286.68 m py, 286.76 - 286.80 m py.

276.90 - 278.50 garnet - magnetite - biotite rock / gneiss (meta - chert)

286.90 - 289.60 amphibolite (meta - basalt flow)

similar: 151.10 - 163.40 m with distinct leopard texture, no il.

289.60 - 290.10 calcareous epidote - qtz - fspar - chlorite - amphibole gneiss / schist (meta - tuff) (very similar banded amphibolite)

high-grade py between 290.13 - 290.21 m.

290.10 - 302.25 schistose amphibolite and amphibolite (meta-basalt flow) but with no il, rock similar 114.65 - 116.85 m alternates with medium-crystalline amphibolite from 151.10 - 163.40 m which sporadically occurs with distinct leopard texture; schlieren of py and po between 306.93 - 306.95 m.

308.25 - 309.30 calcareous epidote-qtz-fspar-chlorite-amphibole gneiss (meta-tuff) (very similar banded amphibolite)

309.30 - 352.50 schistose amphibolite (meta-basalt flow) similar: 114.65 - 119.85 m, sometimes intercalations of calcareous epidote-qtz-fspar-chlorite schist; rare schlieren of po between 313.87 - 313.92 m.

352.50 - 353.65 calcareous biotite bear. epidote-qtz-fspar-chlorite schist (meta-mafic volcanic sediment) (similar chlorite schists from DDH 51) similar: 112.50 - 114.65 m.

353.65 - 364.60 <u>schistose amphibolite</u> and <u>amphibolite</u>
(meta - basalt flow)
similar: 290.10 - 308.25 m.

364.60 m end of DDH 762D

DIAMOND DRILL HOLE 76

Hosinun, east of main fault, 1966

Location: Ho Simbo 2600 Ø 200 S

Azimuth: 157° N

Inclination: 50°

Total length: 62.90 m, 4.52 m overburden

Description:

4.52 - 5.15 : amphibolite

(meta-basalt flow)

gn with faint bluish tint, extremely fine-grained ophitic grading into fine-grained to even medium-grained rock, massive, within the upper portion wide development of foliation, abundant crosscutting veinlets filled with qtz; ilmenite forms scattered crystals mostly being less 0.1 cm large, it reaches about 3 Vol-%

5.15 - 11.18 : calcareous to high calcareous amphibole bea. chlorite schist / phyllite

(meta-mafic volcanic sediment often strongly altered)

gn with faint bluish tint, laminated, in places banded, fine-fibrous and sometimes medium-crystalline chlorite is nearly always accompanied by porphyroblasts of acicular crystals amphibole grading 0.15 cm to 1.0 cm in size which are mostly not oriented, qtz and

C

(AA/C)

carbonate form mm-thick interlayers or lenses, ~~it~~ carbonate ~~veins~~ causes locally a spotted texture of the rock as it occurs as scattered xenomorphic ~~round~~ crystals of 0.2 cm size, biotite sometimes is present, it either forms scattered slightly coarse grained chlorite flakes being aligned along ~~to~~ the major foliation of the rock, it sporadically forms discrete ~~is scattered within~~ max. 10 cm thick bands where it is accompanied by porphyroblasts of amphibole.

lamination: 56°.

8.42 - 8.62: slightly calcareous chlorite-biotite-amphibole gneiss (meta-mafic tuff)

gn with brown stripes, ~~layered~~ banded, cm-alternation of bands composed either of amphibole and chlorite or biotite or biotite and amphibole or amphibole or magnetite-qtz, the layers ~~have~~ are always accentuated by sharp boundaries ~~between them~~, amphibole tends to form coarse porphyroblasts mainly lense-like in shape which are oriented at random, biotite and chlorite are fine-crystalline and seem to be strongly parallel.

8.62 - 8.77: magnetite quartzite (meta-oxide facies meta chert)

violet, sometimes white, interlocked fine-grained qtz crystals

~~it~~ mt is variably distributed it sometimes is absent while it elsewhere forms a high-grade dissemination.
sharp boundaries.

11.18 – 12.73 : high calcareous chlorite-amphibole bear. biotite schist
(meta-tuff)
brown with abundant white spots, evidely developed lamination, web-like texture, medium-crystalline biotite which is accompanied by fine-fibrous chlorite and acicular crystals of amphibole mat 0.15 cm large form the foliation of the rock, carbonate is abundant it predominately occurs as scattered 0.1 cm large round crystals or crystal-aggregates which locally have been stretched forming schlieren and lenses being conformable with the foliation of the rock.
foliation: 58°
gradual footwall, sharp hanging wall.

12.73 – 19.54 : plagioclase amphibolite
(meta-basalt flow)
grades within a pale-white matrix, medium-crystalline, porphyroblastic texture, lense-like crystals or crystal aggregates of amphibole ~~which~~ on average 0.15 cm and max. 0.3 cm large but mostly are ~~not~~ may be ~~oriented~~ ~~or not~~ ? parallel

notoriented, ~~fg~~ they ~~fg~~ within 4
a matrix predominately composed of plagioclase; ilmenite occurs as scattered tiny crystals
the amount being subordinate between 13.30 - 15.60 m ~~forming~~
~~scattered tiny crystals~~; rare idiomorphic crystals of
py are present between 13.27 - 13.30 m.

19.54 - 21.13 : epidote - plagioclase amphibolite
(meta - basalt flow)
dark gn with yellowish white nerve - like features,
coarse - crystalline, crude development of
foliation, leopard texture, fascicular bundles
and imperfect crystal aggregates of amphibole
on average 0.5 cm in diameter are surrounded
by fine - grained granoblastic plagioclase and epidote, the latter ~~occurs~~ in places
also occurs as schlieren which are conformable
with a slight orientation of the amphibole
multi - crystals blasts, rare spots of py.
sharp contacts on either side.

21.13 - 24.00 : plagioclase amphibolite / idiotope plagioclase
amphibolite
(meta - basalt flow)
gn, medium crystalline within hanging
portion fine crystalline, massive or with
crude development of mineral preferred
orientation, between 21.90 - 22.90 m strongly
idiotope and folded, here ~~sparse~~ rare single clusters

acicular crystals,
of mil2g gtz, amphibole forms fascicular bun-
dles and imperfect radiating aggregates
being surrounded by plagioclase which rarely
contains some epidote, the ~~boundaries~~ distinction
between amphibole and plagioclase matrix ~~are~~
starts to get ~~hazy~~ ~~blurred~~ lost which may be due to a
slight alteration; ilmenite forms scattered
tiny crystals between 23.40 - 24.00 m.
sharp boundary

24.00 - 24.53: garnet bear. magnetite - biotite - amphibole schist
(meta - oxide - silicate facies BIF)
dark-brown with greenish tint, wide develop-
ment of lamination, only in places distinctly
layered, more or less homogeneous distribu-
tion ~~of~~ of flakes of biotite and acicular crystals of amphibole on
average 0.2 cm long which show a pronounced
mineral preferred orientation ~~within~~
~~biotite~~, garnet forms tiny idiomorphic (?) crystals which
tend to ~~compose~~ produce trains of granules; not
forms a medium to high-grade dissemina-
tion, the crystals being of microscopic
size.
sharp contact

24.53 - 31.50: calcareous to high calcareous epidote - plagioclase -
chlorite - amphibole rock / schist
(meta - basalt flow, looking extremely leached)
(similar BH 681 322.50 - 336.70 m and Svání - profile)

gn lenses or stringers within a whitegn matrix, strongly schistose sections alternate with areas being not foliated, the former present a distinct lenticular to flaser structure while the latter is characterized by a nebulous leopard texture, amphibole forms scattered lense-like crystal aggregates of 0.25 to 0.4 cm size which are decomposed to a fibrous mass of chlorite in varying degree, the crystal aggregates are surrounded by a fine-crystalline matrix composed of carbonate, epidote, plagioclase and some chlorite it sometimes carries flakes of biotite, the contacts between the coloured crystal aggregates and the light matrix are faded due to the intense alteration of the rock.

sharp contact

31.50 - 32.50: calcareous epidote-amphibole - chlorite schist (meta - mafic volcanic sediment, near footwall very similar to banded amphibolite) (similar chlorite ~~phyllites~~ schists from DDH 51)

lightgn with abundant dark gn needles, laminated, porphyritic texture, fine-fibrous chlorite which is accompanied by randomly oriented acicular crystals of amphibole of average 0.25 cm needle length

(footwall portion: lense-like amphibole porphyroblasts of max. 0.7 cm length) forms stringers, lenses and layers being interlaminated by mm-thick lenses or discontinuous laminae composed of qtz and/or carbonate.
lamination: 55°
gradual hanging wall.

31.96 - 32.03: amphibole bear. quartzite (meta-oxide-silicate BIF)
grwhite, violett, greenish, cm-banded rock, alternation of po bearing quartzite bands with layers composed of amphibolite and stripes of magnetite-quartzite, the stratigraphically upper part is composed of amphibole, qtz, magnetite and po, ± amphibole ~~what~~ none forms TO 15 cm acicular crystals which form a distinct foliation.
both sides with sharp contacts.

32.50 - 37.32: plagioclase amphibolite
(meta-basalt flow)
lightgn, medium-crystalline, lense-like crystals or crystal aggregates of amphiboles on average 0.2 cm large and often with no preferred orientation are surrounded by fine-grained granoblastic plagioclase

which is ~~occited~~ suggested to carry qtz and epidote, qtz and carbonate sometimes constitute small veins or lense-like clusters, strong foliation is present between 34.62 - 35.43 m; band of massive py occurs at 34.61 m. gradual contact.

37.32 - 38.20: calcareous epidote-amphibole-chlorite schist (meta-mafic volcanic sediment) ~~(ditto)~~ (similar chlorite schists from DDH 51)

similar: 31.50 - 32.50 m hanging portion.
lamination: 54°
gradually changing into amphibolite.

38.20 - 55.69: amphibolite to schistose amphibolite (meta-basalt flow)

gn, fine-grained with intersections being medium-crystalline, in general widely developed foliation, closely packed lense-like crystals or crystal aggregates of amphibole surrounded by sparce matrix composed of plagioclase which finely is accompanied by epidote, sometimes irregular qtz or carbonate veining; ilmenite occurs as round spots having sutured boundaries but also as idiomorphic crystals being homogeneously distributed between 37.90 - 38.72 m, ~~and~~ 40.10 - 41.10 m*, the amount in it estimates to 2 vol-%.

* 47.47 - 47.81 m, 48.30 - 49.79 m and 52.05 - 55.69,

4167 - 4169: massive pyrrhotite layer (metamorphion-sulphide enrichment formed by exhalation) (correlates with DDH 51 ~~core~~ 68.59 - 68.61 m)
massive pyrrhotite accompanied by ~~core~~ fine-crystalline quartzite, po is found also within the surrounding amphibolite close to the sulphide layer, it forms here minor 1.0 cm large platelets which are conformable to the schistosity of the rock.
Knife sharp boundaries, 57°.
4979 - 4992: quartzite (meta-dol)
white-gr, layered to laminated, dense fine-crystalline quartzite is interstratified by schlieren and trains of granules of po and schlieren of chlorite; the sulphide content estimates to 3 Vol.-%.
lamination: 52°
Knife sharp boundaries
50.60 - 51.27: high calcareous, ~~sulphide rich~~ quartzite (meta-morphion-sulphide, ~~from exhalation~~ amorphous ~~coast~~ ~~hydro-thermal~~ silica and carbonate of exhalative origin)
chem. analysis 50.72 - 51.27 m
quartz and carbonate form the matrix for pyrite and po (less abundant) which occur as scattered xenomorphic to idiomorphic crystals or form trains of granules

or nearly massive layers, within footwall portion scattered needles of amphibole occur the crystals mat. 0.3cm long and not oriented; mt ~~as tiny crystals~~ is present as tiny crystals at the hanging wall of the layer; sulphides amount to 30 vol.-%.
sharp contacts.

52.44 - 52.58: high calcareous sulphide-rich quartzite (meta iron-sulphide, amorphous silica and carbonate from hydrothermal exhalation) quartz and carbonate form the fine-crystalline granoblastic host - for pyrite which constitutes schlieren and web-like patches; mt forms a low-grade dissemination throughout the layer, it seems to be concentrated near the footwall; Py amounts to 30 vol-%.
knife sharp contacts, 49°.

chem. analysis 52.48 - 52.58 m

epidote-qtz-fspar-

55.69 - 55.96: slightly calcareous amphibole bear chlorite rock

(meta-mafic volcanic sediment)

~~(similar chlorite pelites from DDH 51)~~ lightgn, ~~fine crystalline~~, laminated, layers composed of fine-fibrous chlorite which is accompanied by single acicular crystals of amphibole alternate with mm-thick lenses and liminae composed of carbonate and qtz; rare platelets of po being conformable

with the foliation of the rock.
lamination: 65°
Gradual footwall, sharp hanging contact.

55.96 - 57.08 : high calcareous pyrite qtz rock
(meta - hydrothermal silica and iron - sulphides)
qtz and carbonate form the matrix for pyrite enrichments which occur as either ~~a~~ low-grade dissemination or high-grade mineralisations, the latter forms layers of dm thickness, Py is concentrated within the lower halvpart of the section, where it amounts to 20 vol-%, the upper part contains only subordinate py which is accompanied by Po, both sulphides form schlieren or locally low-grade dissemination, the rock contains several interlayers composed of chlorite which normally carries acicular crystals of amphibole but sometimes also biotite.
gradual contact.

● Sem analysis 56.05 - 56.65 m

57.08 - 57.95 : calcareous to high calcareous amphibole epidote-qtz-fspar. bear. chlorite ~~phyllite~~ rock
(meta - tuffite)
gn with faint bluish tint, laminated or with lenticular structure, fine-fibrous chlorite as layers and schlieren in alternation with mm-thick discontinuous bands and lenses composed of carbonate, qtz and fspar, amphibole forms

ting but anyways porphyritic crystals, the needles being not oriented, they occur within the dolomite layers as well as in the light coloured bands, carbonate sporadically tend to form scattered isolated crystals of max 0.2 cm size, they cause a spotted appearence of the rock.
lamination: 55°.
sharp contact.

57.95 - 58.18 : amphibole bear. quartzite
(meta-chert)

pale white with gn interlayers, laminated to banded, gradual changes between qtz dominated bands and laminae which often contain stringers of po and scattered acicular crystals of amphibole with thin bands and laminae predominated by amphibole, within the upper portion it forms a medium-grade mineralization being characterized by a dissemination of idio- to hypidiomorphic crystals of 0.1 cm size; po amounts to 1 Vol.-% of the total.
lamination: 55°
knife sharp contact.

58.18 - 59.00 : epidote-qtz-fspar- calcareous amphibole bear. chlorite schist (meta-~~potsite with~~ mafic volcanic ~~incr~~ radiolarite ~~purity~~ segment) / (similar chlorite ~~phyllite~~ schist from DDH 51)

similar: 55.69 - 55.96 m but without po

lamination: 56°

gradual contact.

59.00 - 62.34 : sheared amphibolite, amphibolite (meta-basalt flow)

gn, fine-crystalline, sections with mineral preferred orientation gradually pass into unfoliated rock, rich in carbonate and qtz veining; ilmenite occurs as scattered spots max. 0.15 cm across between 59.00 - 60.50 m, it amounts to less 2 vol.-%.

62.07 - 62.17 : sulphide-rich quartzite (meta-sulphide facies chert)

chem analysis 62.07 - 62.17 m

dense fine-grained quartzite with high-grade Py-po mineralization, rare crystals of amphibole which are aligned to the crudely developed banding of the rock.

sharp contacts.

62.34 - 62.51 : high calcareous amphibole bear. qtz-chlorite-biotite schist

(meta - clasty tuff) (similar: 31.96 - 32.03 m)
brown and blackish gn, normally chloritic alteration of layers × composed of biotite - amphibole and carbonate and bands predominated by fine - fibrous chlorite, carbonate tends to form round ~~spots~~ globular crystals max. 0.1 cm across which are ~~irregularly~~ variably distributed, they are mainly enriched within the biotite - amphibole layers; py occurs as fine platelets throughout, it is enriched within 62.27 - 62.28 m where it displays a massive sulphide layer.
banding: 57°
sharp contact.

62.51 - 62.90 : biotite - amphibolite
(meta-basalt flow)
dark brown gn, fine-crystalline, homogeneous distribution of biotite, ~~veinlets~~ ~~amphibolite~~, thin veins of carbonate, in places spotted carbonate.

62.90 m end of DDH

F.D. Diesemann, 1986

Susceptibility : DDH 76

61.90	0.1	39.00	0.0
60.60	0.1	38.00	0.0
61.50	1.2	37.00	0.0
61.27	0.4	36.00	0.0
61.10	0.2	35.00	0.0
61.00	0.2	34.00	0.0
60.00	0.0	33.80	0.2
59.00	0.0	33.00	0.0
58.90	0.0	32.40	0.1
58.10	17.0	32.00	7.0
58.00	0.5	31.90	0.0
57.90	0.0	31.00	0.0
57.30	0.0	30.00	0.0
57.10	0.0	29.00	0.0
56.90	0.0	28.00	0.0
56.70	-0.1	27.00	0.0
56.40	0.0	26.00	0.0
56.30	0.0	25.00	0.0
56.10	0.1	24.70	0.0
56.00	0.0	24.30	2.0
55.80	0.0	24.20	16.0
55.00	-0.1	24.10	0.1
54.00	0.0	23.90	0.0
53.00	0.1	23.50	0.0
52.98	0.1	23.00	0.1
52.60	0.0	22.00	0.1
52.50	0.5	21.00	0.1
52.45	0.3	20.00	0.1
52.00	0.1	19.00	0.1
51.40	0.0	18.00	0.0
51.00	-0.1	17.00	0.0
51.75	-0.1	16.00	0.0
51.50	0.0	15.00	0.0
51.10	0.2	14.00	0.0
51.00	0.2	13.00	0.0
50.00	0.0	12.00	0.0
49.00	0.0	11.00	0.0
48.00	0.0	10.00	0.1
47.00	0.0	9.00	0.0
46.00	0.0	8.90	0.0
45.00	0.0	8.65	31.0
44.00	0.0	8.55	3.8
43.00	0.0	8.00	0.1
42.00	0.0	7.00	0.0
42.80	0.2	6.00	0.0
42.70	0.7	5.70	0.0
42.60	0.3		
42.00	0.0		
41.00	0.0		
40.00	0.0		

← Begynnelse

chemical analysis:

	% Cu	% Zn	% S
50.72 - 51.27 m	0.05	0.04	24.1
52.48 - 52.58 m	0.03	0.01	23.9
56.05 - 56.65 m	0.03	0.02	26.1
62.07 - 62.17 m	0.03	0.01	30.2

DIAMOND DRILL HOLE 13

Tverrfjellet mine, Folldal Verk A/S, Exploration hole from 1957

Location: 1280 N - 2700 W

Inclination: 55°, 75m 44°, 140m 37°

Total length: 196.86 m (4.5m ore-burden)

Description:

DDH 13

0.00 - 13.10 : slightly carbonaceous garnet bear. biotite - sericite schist
(meta-pelite)
greenishgr., fine-grained, wavy-lenticular texture to flaser-texture, porphyric biotite as cross-wise, biotite cause spotted appearence of the rock, occurs in varying degrees, some sections even biotite-poor, garnet often idiomorphic and max. 0.5 cm in size, not equially distributed, rare spots of carbonate, occasionally chlorite-pseudomorphs after amphibole-porphyroblasts.
gradial hanging wall
30°

13.10 - 14.70 : ~~slightly~~ carbonaceous biotite bear. qtz-sericite schist
(meta-pelite)
bluegngr, fine-grained, flaser-texture, spotted carbonate sometimes forming traces of granules, rare stringers of po throughout always conformable with schistosity, band of stringers or web-like po - mineralization (low-grade): 14.10 - 14.11 m.
gradial hanging wall.
45°

14.70 - 16.95 : slightly carbonaceous garnet-biotite bear. amphibole-sericite schist (garbenschist)
(tuffaceous meta-pelite)
lightgreenishgr with gr garben, fine-grained biotite-

sericite matrix, porphyroblasts of amphibole as ellipsoidal crystals often forming spheroids, randomly oriented, mainly very coarse with 2.0 cm length and 0.3 cm width, in general equally distributed, idiomorphic garnets as max. 0.5 cm large crystals.
gradual hanging wall.

16.95 - 18.28 : carbonaceous biotite - chlorite bear. qtz - sericite schist
(tuffaceous meta-pelite)
bluegrey, fine-grained, flaser-texture gradually changing into distinctly laminated rock and vice versa, biotite mostly fine grained, within layered sections increased in grainsize and randomly oriented, always together with chlorite; rare cm-interlayers of qtz-amphibolite, coarse grained with gradual contacts.
sharp hanging wall.
50°

18.28 - 18.38 : quartzite
(meta-chert)
white, fine-grained, flasers of po conformable with schistosity of neighboring schists.
sharp hanging wall.
50°

18.38 – 18.66 : biotite-amphibole bear. qtz-sericite schist
(Garbenschist)
(tuffaceous meta-pelite)
same as: 14.70 – 16.95 m
gradual hanging wall

18.66 – 19.50 : slightly carbonaceous qtz-biotite-sericite schist
(meta-pelite)
gr, fine-grained, flaser-texture, porphyric biotite randomly oriented (cross-mica), biotite cause spotted appearence of the rock, increasing qtz-content upsection, web-like po-mineralization: 19.38 – 19.46 m.
gradual hanging wall
50°

19.50 – 19.60 : biotite-qtz-fspar gneiss
(meta-qtz-keratophyr)
whitegr, fine-grained, laminated, biotite-clots (multi-crystals) strongly aligned with foliation, distinct light-dark banding.
gradual hanging wall

19.60 – 20.35 : quartzite
(meta-chert)
white sometimes transparent, sporadically mm-interlayers of chlorite-schist with rare spots of py, footwall slightly mineralized by po.
sharp hanging wall.

20.35 - 20.79 : biotite-amphibole bear. qtz-fspar gneiss
(meta-qtz-dacitophyr)
same as: 19.50 - 19.60 m, rare porphyroblasts of amphibole randomly oriented, web-like po-mineralization: 20.44 - 20.45 m, 20.48 - 20.51 m high-grade po stratigraphically ~~followed~~ by a cm-band of altered basic-volcanic.
sharp hanging wall.
45°

20.79 - 21.47 : carbonaceous qtz-biotite-sericite schist
C (meta-pelite)
same as: 18.66 - 19.50 m, footwall tuffaceous
AA/C and highly altered (biotite-sericite schist).
gradual hanging wall.
45°

21.47 - 24.20 : garnet-biotite bear. amphibole-sericite schist
(garben schist)
(tuffaceous meta-pelite)
same as: 14.70 - 16.95 m, biotite more coarser grained and randomly oriented (cross-mica), irregularily distributed.
sharp hanging wall.

24.20 - 74.00 : slightly carbonaceous garnet bear. biotite-sericite schist
(meta-pelite)
same as: 0.00 - 13.10 m, interlays of low-grade

dissemination of py: 31.81 - 31.82 m
sharp hanging wall.
78°, 48.67 m fault

74.00 - 75.96 : high carbonaceous chlorite-sericite bear. garnet - pyrrhotite-qtz-rock
(meta - felsic - tuff with high-grade po)
C
po - mineralization
brown, medium - grained with fine - grained pyrrhotite, web - like po - mineralization sometimes flasers sometimes massive bands, hypidiomorphic plagioclase with varying amounts, spotted carbonate, in places slightly distorted.
gradual hanging wall

75.90 - 76.76 : high carbonaceous biotite bearing pyrrhotite - sericite qtz schist
(meta - tuffite, highly altered)
greenish gr, medium - grained, mm - and cm - layered,
A1/C
po - mineralization
alternate biotite - chlorite bands and qtz - carbonate rich layers, often disharmonic folded, low - grade po - mineralization as stringers and web - like features mainly within felsic bands.
85°

76.76 - 77.41 : garnet - epidote rock
(fault - mylonite)

DDH 13

77.41 - 85.50 : high carbonaceous biotite-sericite bear. garnet-chlorite-~~fspar~~-qtz rock/schist

A/C

(meta-tuffite, (andesitic comp.), altered)

greenish brownish gr., ~~fine-grained with wavy-lenticular texture~~, medium-grained widely layered and schistose, nebulous textute due to alteration, fine-fibrous chlorite, often porphyric biotite as cross-mica, varying amount of idiomorphic garnets max. 0.2 cm large ~~content swelling up and closed~~, spotted ~~and~~ but also flasery carbonate, rare spots of idiomorphic ~~mt~~, very rare spots of py.

sharp hanging wall

75°

85.50 - 88.20 : slightly carbonaceous biotite-~~epidote~~-chlorite bear. garnet-amphibole-qtz-fspar rock

(meta-dacite/rhyolite, flow or tuff)

gngr, medium to coarse grained, widely layered due to variation in the content of amphibole ~~content~~, amphibole as porphyroblasts randomly oriented, elliptical crystals not crossing or bordering of 0.7 cm length and 0.2 cm width, idiomorphic garnets of max. 0.3 cm size nearly equally distributed, but modal some variation possible, ~~biotite~~ rare flasers of biotite and chlorite, ~~and chlorite very sporadically present mainly as small flasers~~, rare spots of py.

sharp hanging wall.

DDH 13

88.20 - 88.75 : carbonaceous biotite-chlorite-fspar-qtz rock

(meta-andesite, flow, altered)

gr, mainly fine-grained, flaser-texture often nebulous due to alteration, fine-fibrous chlorite always accompanied by slightly coarser biotite which mainly in parallel foliation, carbonate as irregular aggregates or flasers equally distributed, web-like py-mineralization of low-grade: 88.25-88.26m.

A/C

gradual hanging wall.

90°

88.75 - 89.90 : slightly carbonaceous chlorite bear. amphibole-qtz-plagioclase rock

(meta-andesite, flow, compare with DDH-18 77.00-82.50m)

greenish gr, medium-grained, prisms of amphibole max 0.3 cm long and randomly oriented, fine-fibrous chlorite, rare spots of carbonate mostly hypidiomorphic, very rare spots of py

sharp hanging wall.

89.90 - 93.00 : slightly carbonaceous plag amphibolite

(meta-basalt, flow)

grgn, medium to coarse grained, amphibole accented by milli-crystal porphyroblasts of elliptical shape, plag. and qtz filling interstices of the amphibole crystals, spots and minute veins of carbonate.

gradual hanging wall

DDH 13

93.00 - 93.67 : carbonaceous chlorite bear. amphibole - plagioclase - qtz 10d2
(meta - andesite, flow)
same as 88.75 - 89.90 m
gradual hanging wall

93.67 - 96.40 : carbonaceous biotite - amphibole bear. sericite - chlorite - fspar - qtz - 10d2
(meta - dacite, tuff or tuffite, correlation with: DDH 4 53.80 - 54.80 m)
greenish gr, fine - grained, widely schistose, flasers of nebulous destine. fine - fibrous chlorite, equally distributed biotite often as clots conforming Dirt too conformable schistosity, random phenos of amphibole max. 0.2 cm long mostly not oriented, mode of biotite and amphibole changes with the degree of alteration, irregular shaped carbonate mostly equally distributed.
A/C
gradual hanging wall.
90°

96.40 - 107.81 : carbonaceous to high carbonaceous sericite - garnet bear. biotite - chlorite - fspar - qtz 10d2
(meta - andesite, tuff; highly altered, see: DDH 4 72.00 - 77.30 m)
AA/C
light green, fine- and medium - grained, often nebulous destine due to intense alteration, compositional changes mainly caused by varying degree of alteration, fine - fibrous chlorite, biotite often as porphyroblasts randomly oriented

DDH 13

but sometimes parallel a slight lineation, footwall even basaltic with prisms of amphibole (porphyroblasts) randomly oriented, crystals mainly elliptical in outline with max. 0.7 cm length, strongly varying garnet content, rare spots of mt-thoroughout, crystals or crystal aggregates mainly xenomorphic, mainly idiomorphic crystals with max. 0.3 mm in cross section, some with idiomorphic outlines, dusty carbonate often accreted to discrete stringers and/or lamina, interlayers of quartzite rich in py and po, mainly low-grade laminated ~~mineralization~~ ore quartzite: 96.85 - 96.95 m, 97.15 - 97.20 m, 98.40 - 98.55 m high-grade exhalative mt as laminated ore making up upper half part of the mineralization, rare interlayers of quartzite (chert): 105.04 - 105.06 m, 106.07 - 106.09 m.

gradual hanging wall.

107.81 - 109.48: high carbonaceous biotite bear. sericite-dolomite-fspar-qtz rock/schist

(meta-dacite, tuff, highly altered)

AA/C greenish gr, fine-grained, flaser-texture due to accretion of fine-fibrous chlorite to semi-conformable floors and lenses which are surrounded by felsic components highly enriched in dusty carbonate, biotite as finest flakes always conformable to slight lineation

DDH 13

of the rock, sericite seems to be equally distributed.

gradual hanging wall

75°

109.48 - 123.65 : high carbonaceous biotite-amphibole bear. fspar-qtz-chlorite schist/rock (meta-basalt, tuff or flow, highly altered) bluish-gn, flaser-texture in places disharmonic folded, fine-fibrous chlorite interlayered by lenses, stringers and lamina of qtz or qtz with carbonate, amphibole as tiny prisms possibly conformable with foliation, giant spots of mt (multi-crystal spots): 109.60 - 110.60 m, AA/C

114.00 - 114.61m, 117.25 - 122.90m, rare spots of py throughout; interlayers of quartzite rich in carbonate and always laminated by chlorite: 109.54 - 109.59 m lamina rich in finely mt, 109.85 - 110.05 m rare bands of nearly massive py, several flasers and laminae of finely mt, 110.15 - 110.16 m some rare flasers of mt, 110.36 - 110.37 m lamina of py, 112.60 - 112.75 m low-grade vein-like py-, po-mineralization, 115.50 - 115.60 m some spots of py and po, rare flasers of mt; interlayer of quartzite (dust) with rare spots of po or py: 113.59 - 113.62 m, 114.61 - 114.80 m, 116.30 - 116.45 m, 116.75 - 116.85 m, 118.80 - 119.30 m, 119.50 - 119.65 m repeated by folding, 120.00 - 120.56 m possibly isoclinal folded, 121.60 - 121.66 m, 121.79 - 121.81 m

DDH 13

123.25 - 123.26 m, 123.52 - 123.65 m
sharp hanging wall.
90°, abundant isoclinal folding, 119.57 m ↻.
120.00 - 120.30 m ⊼, chert supposely be repeated several times.

123.65 - 124.75: carbonaceous biotite-chlorite-fspar-qtz gneiss (meta-andesite/-basalt, tuff, highly altered, correlation with DDH 20 ?0.10 - ?3.85 m)
light gn, mm- and cm-layered, alternate mm-thick qtz-layers with cm-thick bands of carbonate biotite-chlorite schist, clots of biotite randomly oriented and surrounded by fine-fibrous chlority, spots and flasers of carbonate, slowly increasing Py-content towards hanging portion, from 124.25 m upsection alternation of cm-thick carbonate biotite-chlorite schist with cm- to dm-thick layers of medium-grade Py-ore (qtz-pyrite rock) which contains ambundant cp.
AA/C
Ore zone
bedding fault line at hanging contact
50°

124.75 - 126.50: carbonaceous to high carbonaceous biotite-chlorite-fspar-qtz gneiss/schist (meta-dacite, tuff or tuffite, highly altered)
slightly brownish gr, mainly fine-grained, laminated with sections being more massive and nearly coarse-grained, lamina of phyllosilicates alternate with
AA/C

DDH 13

~~with~~ slightly thicker felsic bands rich in carbonate, coarse-grained more massive looking sections rich in biotite and chlorite (carbonaceous qtz biotite-chlorite schist) sporadically embedded which carries a low-grade dissemination of py with some spots of cp; several interlayers of medium-grade py-ore between: 125.92-126.05 m.

sharp hanging wall.

85°

126.50 - 129.60 : carbonaceous to high carbonaceous biotite-chlorite-fspar-qtz schist/gneiss (meta-andesite, tuff or tuffite, highly altered)

AA/C

grey, mainly fine-grained, laminated to widely banded, alternate felsic bands or flasers and phyllosilicate dominated layers, porphyric biotite forming randomly oriented clots or conformable sheets or lenses, lower portion with slightly altered porphyroblasts subordinate amount of ~~porphyroblasts~~ (~~altered~~) of amphibole, max. 0.7 cm long and elliptical in shape, always randomly oriented, carbonate ~~mostly banded~~ sometimes of spotted appearence but mostly as finest dissemination ~~mainly~~ ~~clotty~~ within qtz, rare spots of py, xenomorphic spots of ~~un~~ throughout.

sharp hanging wall.

50°, partly isoclinal folded: 128.00 m ↻, 128.30 m ↺, 128.54 - 129.00 m ↻.

DDH 13

129.60 – 131.00 : high carbonaceous biotite-amphibole bear. fspar-qtz-chlorite schist

AA/C

(meta-basalt, tuff., highly altered)

same as: 109.45 – 123.65 m, spots of mt to about 130.60 m.

gradual hanging wall.

75°

131.00 – 134.45 : high carbonaceous biotite bearing chlorite-fspar-qtz schist

(meta-andesite, tuff or tuffite, highly altered)

gn, laminated with often flaser- or wavy-lenticular texture, some sections even cm-banded, here alternate quartzite or carbonaceous quartzite with dusty mt and highly altered intermediate to even basic volcanics in places carrying mm-layers of pyrite; fine-fibrous chlorite, porphyric biotite mainly as cross-mica, some sections with poikiloblasts of amphibole max. 1.7 cm long randomly oriented, carbonate as lenses, flasers or lamina, only sporadically of spotted occurrence, abundant pyrite mainly as scattered idiomorphic crystals but sometimes as mm-interlayers, spots of mt mainly with xenomorphic outlines, interlayers of quartzite (chert)

AA/C

DDH 13

often with flasers or more rarely interlayers of high carbonaceous biotite - chlorite schist and sometimes with dusty mt: 131.95 - 132.10 m areas with dusty mt, 132.20 - 132.35 m layers bordered by dusty mt, 133.56 - 133.84 m, 133.96 - 134.00 m, sharp hanging wall.
60° 131.50 m, 35° 132.00 m, 80° 132.80 m, 60° 133.90 m, 45° 134.00 m

134.45 - 136.20 : slightly carbonaceous quartzite (meta-chert with interlayers of mafic volcanics) white, extremely fine grained, in places chaotically folded, web-like carbonate, scattered mt, always xenomorphic crystals of mm-size, cm- and dm-interlayers of pyrite bearing carbonate - quartzite and biotite bearing qtz - chlorite - amphibole schist (meta-basalt-tuff, weakly altered), coarse grained, amphibole-porphyroblasts of average 1.7 cm length, abundant py as trains of granules or dissemination, interlayer of pyrite-rich quartzite: 134.57 - 134.63 m.
sharp hanging wall.
45°

DDH 13

136.20 – 138.28 : high carbonaceous biotite - fspar - qtz - chlorite schist

(meta - basalt, flow or tuff, highly altered)

AA/C

gr, fine-grained, laminated with tendency to lenticular - texture, some sections with nodular texture supposely due to folding, fine - fibrous chlorite, biotite slightly coarse grained and strictly aligned with foliation, sometimes as porphyroblasts randomly oriented, lenses and flasers of carbonate, qtz forming nodules of irregular shape as well as mm - layers or flasers; giant spots of mt with sutured boundaries: 136.20 – 137.30 m, rare spots and sometimes discontinuous laminae of Py; interbeds of quartzite with abundant pyrite and/or mt: 137.18 – 137.20 m high-grade dirty mt, 137.43 – 137.55 m cm - layers of high-grade dirty mt and cm - band of medium - grade Py - ore, sharp hanging wall.
65°, sometimes distorted

138.28 – 139.80 : high carbonaceous biotite - chlorite - fspar - qtz schist

(meta - andesite, tuffite, highly altered)

AA/C

DDH 13

gn, fine-grained, laminated sometimes ~~sporadically~~ with tendency to lenticular-texture, decrease in alteration towards hanging portion, fine-prismatic amphibole from 138.95 injection, here minor biotite and chlorite, spots of mt throughout, mainly of irregular shape and with sutured grain boundaries, carbonate forming flasers and lenses, rare spots of pyrite which in places constitute trains of granules.

A/C

sharp hanging wall

45°

139.80 - 142.00 carbonaceous biotite-chlorite-qtz schist (meta-dacite, tuffite, altered)

greenish gr, fine-grained, crudely laminated with tendency to nodular-texture, biotite and chlorite strongly aligned with foliation, flasers, lenses, nodules and layers of qtz alternate with stringers or lamina of phyllosilicates, rare spots of mt sometimes forming giant spots which sporadically occur idiomorphic outlines, carbonate mainly forms flasers or mm-layers or web-like features.

A/C

140.00 - 140.40: high carbonaceous biotite-chlorite schist in close alternation with mt-rich qtzs

AA/C

DDH 13

(tuffaceous sequence, alternate dark and basic tuffs, highly altered)
low-grade pyrite mineralization occurring as dissemination within biotite-chlorite schist, high-grade chicky mt restricted to ~~veins~~ in dirty layers.
45°

142.00 - 155.63 carbonaceous biotite-amphibole bearing fspar-chlorite-qtz schist
(meta-basalt/-andesite; tuffite or tuff, altered),
A/C gn, fine-grained, widely laminated with tendency to flaser-texture, some sections well layered and highly enriched in carbonate and intensively altered: 143.00-
AA/C 143.15 m, 144.20 - 144.80 m; fine-fibrous
X chlorite, biotite slightly coarse grained and always conformable with schistosity, amphibole as minute prisms (max. 0.15 cm lengths) strongly aligned foliation, qtz forming nodules and flasers or web-like features, spotted carbonate, giant spots of mt throughout, interlayers of quartzite with subordinate mt occurring mainly as stringers:
145.00 - 145.12 m, 147.09 - 147.26 m, 149.60 - 149.10 m,
149.45 - 149.60 m, 149.67 - 149.87 m, 151.25 - 151.32 m,

DDH 13

152.73 - 153.02 m with flasers and mm - interlayers or web-like features of py and po, 153.50 - 153.82 m, 154.97 - 155.17 m hanging wall with interlayers of py, 155.40 - 155.50 m,

155.63 - 163.10 : slightly carbonaceous biotite bearing chlorite - amphibole - fspar - qtz gneiss / sdst (meta-basalt ± ~~andesite~~, tuff, weakly altered)

qu to grgn, medium-grained, mm - and cm-layered sections alternate with more massive parts, several interlayers of quartzite (dst), in places disturbed, prisms of amphibole max. 0.4 cm long and often not oriented, chlorite forming fine-fibrous aggregates, biotite - clots mainly conformable foliation or layering, gradual compositional changes due to variation in the degree of alteration, highly altered section (garnet biotite - chlorite sdst): 158.20 - 158.32 m, 158.54 - 158.70 m, 159.90 - 159.92 m, 162.36 - 162.56 m; several interlayers of quartzite (dst) mainly slightly mineralized ~~with~~ by mt: 156.40 - 156.65 m, 156.99 - 157.50 m, 157.65 - 158.20 m partly with high-grade dusty mt and mm-layers of massive py, 158.32 - 158.54 m laminated by fi/c - basalt, high-grade dusty mt, some rare

A

AA

spots of py, 158.70 - 159.30 m, 159.80 - 159.90 m several layers of dusty mt, 161.00 - 161.15 m, 161.55 - 161.72 m, 162.22 - 162.42 m several cm-thick interlayers of chlorite bearing amphibole schist; rare stripes or discontinuous layers of py: 155.73 - 155.83 m within qtz-fspar amphibolite, 160.34 - 160.44 m within qtz amphibolite; interlayer of amphibole-fspar-qtz rock (qtz-feldspar layer): 160.54 - 160.90 m.

gradual hanging wall.
65 to 70°, often strongly disturbed.

163.10 - 169.36 : slightly carbonaceous biotite bearing chlorite-amphibole schist

(meta-basalt, flow, weakly altered)
gn, fine- to medium grained, widely laminated or layered, decrease in the degree of alteration towards uppsection, lower part rich in biotite always as milli-crystal porphyroblasts mainly conformable foliation and chlorite (fine-fibrous appearance), amphibole as minute prisms strictly aligned schistosity, rare spots of py throughout, hanging portion with little biotite and too subordinate chlorite, here mainly amphibole schist.

A

DDH 13

sharp hanging wall.
75 to 85°, partly distorted

169.36 - 170.58: high carbonaceous biotite-chlorite-plagioclase-amphibole-qtz gneiss
(meta-basalt/-andesite tuff with tuffaceous sediment interlayers)
gneiss, medium-grained, widely cm-banded, mainly gradual compositional changes, bands of carbonaceous biotite-chlorite schist, chlorite-amphibole schist and carbonaceous to high carbonaceous chlorite-amphibole bear. qtz-fspar rock, amphibole as mat. 0.3 cm long prisms randomly oriented, fine-fibrous chlorite, biotite slightly coarser than chlorite forming clots mainly veins conformable with compositional layering, spotted carbonate often forming discrete layers, some rare spots of Py; medium-grade dissemination of Py: 169.61 - 169.63 m.
sharp hanging wall.
60°

C

170.58 - 171.07: high carbonaceous chlorite bearing biotite-sericite-qtz-fspar rock/schist
(meta-tuffite, dacitic composition)
gr, medium-grained, flaser-texture, large idiomorphic crystals of carbonate equally

A/C

DDH 13

distributed.
gradual hanging wall.

171.07 - 173.87 : high carbonaceous chlorite - sericite bearing amphibole - fspar - qtz rock / gneiss
(meta - dacite / - rhyolophyr, tuff)
gr, medium-grained, widely layered, alternate amphibole-rich and -poor layers, amphibole forming porphyroblasts of max. 0.7 cm length, primar randomly oriented, carbonate mainly forming traces of granules ~~or~~ but sometimes large aggregates; inlayers of low-grade pyrite - mineralization: 171.47-171.50 m; band of slightly mt bearing quartzite (chert): 171.52 - 171.62 m.
sharp hanging wall, sheared.
strongly folded.

C

173.87 - 174.69 : high carbonaceous biotite - chlorite - fspar - qtz schist
(meta - rhyolophyr)
white with brown stripes, mm - bands or flasers of biotite - chlorite alternate with high carb. fspar - qtz layers.
gradual hanging wall.
strongly folded, $

AA/C

174.69 – 176.65 : high carbonaceous fspar - biotite - chlorite - qtz schist

(meta - andesite, tuff, highly altered)

X-X/C

grgn, medium - to coarse - crystalline biotite surrounded by fine - fibrous chlorite, flaser - and lenticular - texture partly due to strong small - scale folding, carbonate mainly accompanying qtz and fspar occurring within irregular shaped aggregates, some thicky carbonate within ~~phyllosilicate~~ made by phyllosilicates flasers and lenses, ~~towards hanging portion~~, slow wthg. increase of amphibole forming 0.4 cm long prisms being randomly ~~oriented~~ towards hanging portion oriented, band. of py within 175.39 m.

gradual hanging wall.

strongly folded. §

176.65 – 179.17 : carbonate - biotite bearing chlorite - plagioclase - amphibole - qtz gneiss / rock

(meta - basalt / - andesite, tuff)

grgn, medium - grained, widely layered, gradual compositional changes, porphyric amphibole, prisms average 0.4 cm long and always not oriented, fine - fibrous chlorite, sporadic clots of biotite being

DDH 13

conformable with compositional layering, idiomorphic crystals of py sometimes forming trains of granules or cm-interlayers of low-grade dissemination, some lenses and flasers of po.
sharp hanging wall.
90°

179.17 - 179.42 : mt-bearing quartzite
(meta-chert)
whitegr, fine-grained, dense, some rare tiny flasers of mt
sharp hanging wall.

179.42 - 182.25 : biotite-chlorite bearing qtz-plagioclase-amphibole gneiss
(meta-basalt, tuff)
gn to grgn, coarse-grained, crudely cm-layered, amphibole ~~aff~~ ellipsoidal shaped porphyro blasts of 1.0 cm length and 0.2 cm width not oriented, sometimes altered sections of biotite-chlorite amphibolite; cm- to dm-thick interlayers of chert (alternation chert-basaltic volcanic) within 180.17 - 180.54 m.
45°

182.25 - 183.80 : stressed amphibolite
fault-zone

DDH 13

183.80 - 185.71: chlorite bearing biotite - sericite schist
(meta - pelite)
gr, fine - grained, ~~with~~, porphyroblasts of biotite ~~totally~~ always concordant to foliation ~~randomly oriented~~, ~~biotite~~ cause spotted appearance of the rock, laminated to wavy - lenticular texture, small - scale folding.

185.71 - 188.53: qtz - fspar amphibolite
(meta - basalt, tuff)
same as: 179.42 - 182.25 m, no altered sections, footwall and hanging wall rich in fspar and qtz; low - grade dissemination of pyrite: 185.71 - 185.72 m; mm-to cm-bands of nearly massive py: 188.30 - 188.53 m.
gradual hanging wall.

188.53 - 188.60: qtz - rich pyrite rock
(sulphide layer, high - grade pyrite ore)
pyrite ore
medium - grained.
gradual hanging wall.

188.60 - 192.36: carbonate bearing amphibole schist
(meta - basalt, flow)
gr, fine - grained with tendency to extremely fine-grained, spots of idiomorphic carbonate sometimes forming traces of granules which often ~~mainly~~

DDH 13

ore
Tconformable with schistosity, interlayers of chert at several locations: 190.30 - 190.35 m, 190.45 - 190.47 m; pyrite - mineralizations at: 189.00 - 189.02 m, 190.20 - 190.26 m.

192.36 m end of DDH

Composition of ore:

74.00 - 75.00 m = 1.0 m = 0.02 % Cu, 0.015 % Zn,
75.00 - 76.00 m = 1.0 m = 0.024 % Cu, 0.023 % Zn,
76.00 - 76.80 m = 0.8 m = 0.015 % Cu, 0.041 % Zn,
124.25 - 124.66 m = 0.41 m = 0.632 % Cu, 0.809 % Zn,
124.66 - 125.15 m = 0.49 m = 0.466 % Cu, 0.114 % Zn,
188.23 - 188.69 m = 0.46 m = 0.063 % Cu, 0.025 % Zn,

Thin section

13/2 22.50 m
13/9 74.30 m
13/8 76.70 m
13/11 79.30 m
13/25 86.30 m

SVÅNI (E6) PROFILE
(north of Grønbakken)

northern part

starting point: 531200 6906300 UTM grid, zone 32
Top map. 1519 IV SNØHETTA

June 1985

by: Dr. F.D. Riesemann

0.00 - 3.50 : ~~carbonaceous~~ calcareous biotite bearing epidote-plagioclase-qtz-chlorite-amphibole rock

(meta-basalt, flow, weakly altered)

A/C

sample: SNØ-18
thinsection
whole rock analysis

green, coarse-grained, leopard-texture, ~~fan-~~ ~~shaped~~ ~~biotite-~~ ~~crystal-~~ chlorite-amphibole aggregates ~~of lenti-~~ ~~cular shape~~ of max. 1.0 cm length and 0.3 cm widths are scattered within a matrix of ~~carbonaceous~~ calcareous chlorite bearing epidote-amphibole-fspar-qtz of decussate texture which contains slightly porphyric amphibole of minor 0.2 cm length which always is strongly aligned with a slight foliation.

sharp hanging wall

3.50 - 3.70 : mt-bearing epidote-amphibole quartzite

(oxide-silicate ~~banded~~ facies iron-formation)

qtz with slightly bluish tint, extremely fine-grained, mm-as to cm-layering, alternate magnetite-qtz, epidote-amphibole and magnetite-amphibole-qtz bands and flasers, amphibole always being slightly porph (average 0.4 cm lengths)

HC is strongly aligned with the compositional banding.

shape hanging wall.

250 - 12.15 : plagioclase amphibole schist
(meta-basalt, flow)
gn to grgn, medium-grained, ~~prisms of amphibole strongly aligned foliation~~, dm-or mm-thick intersections of ~~calcareous~~ epidote-plagioclase-qtz-chlorite amphibolite (same as: 0.00 - 3.50m) which shows gradual borders to the surrounding plag. amphibole schist.
sharp hanging wall.

12.15 - 13.15 : biotite-amphibole bearing quartzite
(partly silicate facies ~~banded~~ iron formation)
bluish
bright, dense qtz with slight extremely fine-grained
interlaminated or sometimes boudinaged by mm-thick bands of
biotite-amphibole, mica-flakes and prisms
of amphibole are strongly aligned with the compositional banding, qtz-
layers sporadically carry idiomorphic pyrite.
sharp hanging wall.

X 13.15 - 17.50 : biotite bearing and biotite-rich plagioclase -qtz-amphibole

sample: SNØ-17
thinsection
whole rock analysis

~~Ø~~ rock
(meta-~~andesite~~ basalt, flow)
grgn, medium-grained, lepidoblastic texture, prisms of amphibole on average
0.3 cm long always being ~~strongly~~ aligned with a slight
foliation of the rock, biotite forms multi-crystal porphyroblasts
being equally distributed and showing a preferred
orientation parallel to the widely developed
foliation, footwall is without any biotite and shows
a stockwork of
~~biotite~~ hornblendite. ~~intrusion~~.
gradual hanging wall

17.50 - 18.00 : biotite bearing amphibole - sericite - qtz schist
(meta - ~~sediment~~, tuffite, may be tuffaceous meta-pelite)
dk gr, lepidoblastic texture, scattered prisms of amphibole on average 0.3 cm long are strongly aligned with the major plane of foliation, fine - fibrous sericite.
sharp hanging wall, bedding fault line

18.00 - 18.50 : epidote - chlorite - biotite - sericite - plagioclase - amphibole - qtz gneiss
(metamorphosed cherty tuff or tuffite with intelayers of basaltic composition)
gr, gngr, lighter, medium - to coarse-grained, porphyroblastic to lepidoblastic texture, mm - to cm - banded, alternate light qtz, epidote - amphibole, amphibole, chlorite - biotite - sericite - amphibole and qtz - amphibole layers, porphyroblasts of biotite and amphibole both randomly oriented, amphibole prisms max. 1.5 cm long sometimes forming spherolites which are parallel to the compositional banding, fine - fibrous chlorite and extremely fine grained and dense qtz.
sharp hanging wall.

18.50 - 27.00 : amphibole bearing biotite - sericite schist
(meta - pelite)
gr, fine - grained, porphyroblasts of biotite and amphibole, latter forms thin needles of max. 1.5 cm length lying randomly oriented, biotite equally distributed and not oriented cause spotted appearence of the rock.

27.00 - 40.00 : fragment horizon

high ~~carbonaceous~~ calcareous amphibole bearing epidote - biotite - chlorite schist

(meta - paraconglomerate sipp. meta - tilloide)

yellowish gr, predominately with chaotic texture, stratified, containing beds of paraconglomerate grading from sandy mudstone to pebbly mudstone which alternate with dm - to m - thick discontinuous layers of qtz - rich biotite - sericite schist which may contain clasts, rounded highly deformed and stretched

sample: SNØ-08
SN 531200 6906400
Thinsection

fragments of ~~carbonaceous~~ calcareous epidote - amphibole - biotite - chlorite - qtz rock (sipp. basic volcanic debris), carbonate, amphibole bearing qtz-fspar gneiss (qtz - keratophyr) and quartzo - feldspatic rock/gneiss (sipp. granitic debris) embedded in a matrix of high ~~carbonaceous~~ calcareous chlorite - biotite schist and in places phyllosilicate - rich carbonate, chlorite mainly being fine - crystalline while biotite forms multi - crystal porphyroblasts which randomly are oriented, carbonate occurs as fractured idiomorphic crystals within the mica schist while is forms layer or irregular shape aggregates within the mica - rich carbonate matrix, fragments grade from 1.0 cm to 10 cm in length with widths ranging between 0.3 cm and 30 cm (average size 5 x 1.5 cm).

~~30.00 m 146/36° SW~~

sharp hanging wall.

146/36° SW at 30.00 m.

40.00 - 51.00 : slightly ~~carbonaceous~~ calcareous sericite - plagioclase - biotite - qtz schist / gneiss

(meta - arenite / pelite)

gr to brownish, porphyroblastic texture, widely layered, porphyroblasts of biotite mainly of ellipsoidal shape randomly oriented but partly parallel

the major plane of foliation, cause spotted appearence of the rock, some cm-thick discontinuous interlayers of sericite-biotite-qtz schist which is distinctly fine-grained as host rock and shows strongly aligned mica-flakes, ✕ lenses and flasers of sericite bearing quartzite (sandy or meta-greywacke) occur near the footwall of the succession, rock has a distinct grainy appearence giving evidence of being a metamorphosed coarse-grained* greywacke (comparable with greywacke-layers from meta-tilloide from railroad profile: 161.85 - 163.75 m (south), 165.65 - 166.05 m (south))

sharp hanging wall.

~~4800m: 142/34° SW~~

~~D_z 54/38° SE~~

~~fracturing: 198/66 E~~

142/34° SW at 18.00 m, fracturing 198/66 E.

✕ 51.00 - 52.00 : biotite - sericite schist

(meta-pelite)

or porphyroblastic texture, scattered porphyroblasts of biotite preferably cross major foliation cause spotted appearence of the rock.

sharp hanging wall.

52.00 - 56.00 : fragment horizon

mica-schist

(meta-paraconglomerate supp. meta-tilloide)

~~54.00 m: 134/40° SW~~

~~fracturing: 2/72° E~~

gign, nodular-texture, stratified, containing ~~alternate~~ layers of sandy mudstone and pebbly mudstone which alternate in a rhythmic manner with contacts always being gradational, rounded highly deformed and flattened

clasts of qtz-fspar rock and carbonaceous qtz-fspar rock (supp. qtz-keratophyr) as well as milky qtz and chlorite-sericite-qtz-fspar rock (basic volcanic debris) of average 2 cm length and 0.7 cm thickness (max. 20 × 3.5 cm) are scattered within a matrix of ~~carbonaceous~~ sericite-chlorite-biotite schist which in places carries some needles of amphibole, biotite and chlorite form porphyroblasts which scarcely are aligned with the plane of foliation.
gradual hanging wall ~ 134/40° SW at 54.00 m, fracturing 2/72° E

56.00 - 73.00 : amphibole-garnet bearing biotite-sericite schist (meta-pelite)

gr. porphyroblastic texture,
scattered porphyroblasts of biotite (cross-unica) cause spotted appearence of the rock, amphibole as huge needles of max. 4 cm length forming spherolites (spherolites) which lie within the plane of foliation, they partly are so abundant as to form garbenschist, garnet forms tiny idiomorphic crystals which fully are equally distributed.
sharp hanging wall.

73.00 - 119.00 : slightly calcareous (calcareous and ~~carbonaceous~~) garnet-biotite-sericite schist (meta-pelite)

sample: SNB-16 thinsection whole rock analysis

gr. porphyric-texture, crudely laminated in places, porphyroblasts of biotite (cross-unica) equally distributed, cause spotted appearence of the rock, strong variation in the mode of carbonate mainly changing gradually from subordinate amount to possibly 10 to 15 Vol.-% partly C
mainly scattered idiomorphic crystals, only sporadically forming discontinuous layers ~~of carbonate~~, occasional occurrence of lense-shaped (clasts?) garnet bearing carbonaceous quartzite which contains some tiny spots of idiomorphic Pg.

sharp hanging wall.
120/30° SW at 94.00 m, 88/27° S at 112.00 m, 92/24° S at 98.00 m, 104/32° S at 103.00 m.

119.00 - 129.00 : fragment horizon

mica-schist and ~~carbonaceous~~ calcareous mica-schist (meta-para conglomerate supp. meta-tilloide) (partly very similar to meta-tilloides from Hjeltsinnho and Tverrfjellet) stratified, containing beds of tilloide which are interlayered by discontinuous bands of carbonate, ~~carbonaceous~~ calcareous biotite-sericite schist (meta-pelite) and high ~~carbonaceous~~ calcareous amphibole-qtz-fspar gneiss / mixed volcanic-sedimentary rock); meta-tilloide: gr to gngr, all stages between sandy mudstone and pebbly mudstone, no sorting but sometimes a crude stratification, rounded greatly deformed and flattened fragments of carbonate and quartzo-feldspatic gneiss / rock of 0.5 cm to 50 cm length and 0.1 to 5 cm thickness (average 6 × 1 cm) are scattered through a matrix consisting predominately of biotite, amphibole (porphyroblasts randomly oriented) and qtz, with high amount of carbonate clasts the content of carbonate (idiomorphic crystals) and chlorite within the matrix increases while amphibole often is absent; meta-pelite: gr, spotted appearence due to

sample: SNØ-15
chem. analysis of carbonate

partly c

scattered porphyroblasts of biotite which randomly are oriented, wavy- lenticular texture; mixed volcanic - sedimentary layers: gngs, distinct compositional banding of alternate bands of carbonate and high ~~carbonaceous~~ calcareous amphibole - qtz - fspar rock as well as ~~carbonaceous~~ calcareous amphibolite, amphibole - qtz - fspar rock is characterized by idiomorphic crystals of carbonate which are equally distributed and prisms of amphibole of average 0.4 cm length being randomly oriented, amphibolite layers show fine - crystalline amphibole which always is parallel the compositional banding.

129.80 - 169.00 slightly ~~carbonaceous~~ calcareous biotite - sericite schist (meta - pelite)

gr to greenish gr, porphyroblastic - texture, porphyric biotite as cross - unca cause poiked appearance of the rock, sporadically some coarse (max. 2.0 cm long) needles of amphibole which often are parallel to the slaty cleavage of the rock, cm - thick discontinuous interlays with subordinate sulphide occurs close to the border to fragment horizon.

~~152.00 m, 30° SW~~

sharp hanging wall.

134/30° SW at 159.00m.

was for 14 hall!

169.00 - 173.00 biotite - quartzite (meta - arenite) (same as 73.40 - 87.54m BH10, sample HJ)

equigranular fine-grained qtz, gr with brown spots, porphyric biotite crystals equally distributed predominately parallel main foliation but also crosscutting.

~~124/32° SW~~

sharp hanging wall.

124/33° SW.

173.00 - 238.00: amphibole schist (meta - basalt, flows)

sample: SNØ-13 and SNØ-14 Thinsection whole rock analysis

gr, medium - grained, some intersections being Thinsection.

coarse-grained, amphibole-needles sub-parallel to the plane of schistosity, coarse-grained rock varieties often with distinct leopard-texture which is due to fan-shaped crystal aggregates of ~~coarse~~ amphibole being of ~~within~~ fine-~~large~~ size which are ~~large~~ surrounded by plagioclase, qtz and epidote (see SNØ-13) sharp hanging wall.

248.00 - 248.00 : sericite-amphibole-plagioclase-qtz-rock/schist (meta-~~andesite~~ basalt, flow)

sample: SNØ-12
Thinsection
whole rock analysis

light gr., fine-grained with slightly porphyric amphibole prisms of max. 0.3 cm lengths often being parallel to the plane of ~~main~~ foliation, wide development of layering due to modal changes of amphibole and plagioclase or qtz.

248.00 - 250.50 : filament horizon

amphibole schist

(meta-basic lapilli tuff or volcanic debris flow)

gn., poorly sorted, rounded to greatly deformed and flattened ~~subrounded~~ fragments of fine-grained amphibolite, mainly medium-crystalline plagioclase-amphibolite and amphibole qtz-plagioclase rock embedded in a matrix variable in composition but mostly basaltic consisting of carbonate, amphibole, plagioclase and minor sericite, amphibole is the most prominant mineral forming prisms of average 1.0 cm length which are randomly orient

250.50 - 370.00: amphibole schist, plagioclase amphibolite

sample: SN8-11
~~Intersection~~
~~250.50 m, 123/43° SW~~
whole rock analysis
~~Intersection 370.00 m, 112° SW~~

(meta-basalt, flow) intersections being gn. medium-grained with minor fine-grained, often with distinct leopard-texture, some interlayers of agglomeratic basalt or basaltic lapilli tuff, near footwall contact towards mica-schist abundant high-calcareous epidote-sericite-biotite-fspar-amphibole-qtz gneiss (banded amphibolite, supp. basaltic tuff) ∠ 123/43° SW at 251.00m, 120/42° SW at 365.00m

* sometimes sericite-amphibole-plagioclase-qtz rock/schist (meta-andesite, flow) (similar: 238.00 - 248.00 m),

370.00 - 375.00: garnet bearing biotite-sericite schist

X (meta-pelite)

gl. porphyroblastic-texture, porphyric biotite as cm-size-mica equally distributed, occasionally lense-shaped accretions of sulphide (pyrite). sharp hanging wall (cause spotted appearance of the rock)

375.00 - 376.00: biotite-amphibole bearing quartzite

~~121/44° SW~~ (meta-arenite)

whitegr. well-layered, cm-thick often discontinuous qtz-bands interlaminated by mm-layers dominated by phyllosilicates (biotite, some sericite) carrying sometimes huge needles (max. 1.5cm) of amphibole which always are parallel the compositional banding. sharp hanging wall. ∠ 121/44° SW

0 - 1m (true thickness)

376.00 - 376.50: amphibole-qtz-fspar gneiss

(meta-qtz-feldspar porphyry)

0 - 50cm (true thickness)

greyish, fine-grained with in places richly staining porphyroblasts of amphibole (max. 2.0 mm long) being randomly oriented, widely cm-layered, rare spots of sulphide (pyrite); meta-qtz-feldspar porphyry locally is accompanied by magnetite-quartzite (oxide facies iron formation); footwall occasionally consisting of:

0 - 35 cm (true thickness)

0 - 35 cm (true thickness)

~~127/48° SW~~

amphibolite, plag-amphibolite, garnet bearing sericite-biotite-amphibole-hypar.gtz gneiss (meta-basalt, tuff/flow)

gn to grgn, medium-grained in places even coarse grained, very variable lithology grading within a few meters of strike from homogeneous amphibolite to banded amphibolite, with cm-layering composed of alternate sericite-biotite-gtz-amphibole and amphibole-gtz bands.

127/48° SW.

376.20 - : garnet bearing chlorite-sericite schist (meta-pelite)

~~386 m 108/37° S~~

greenish gr, porphyroblastic texture, porphyric biotite as cross-mica being equally distributed, biotite raise spotted appearence of the rock, in places inter-layers of high calcareous amphibole-chlorite-sericite schist characterized by randomly orien-ted needles of amphibole (average 1.0 cm long) which partly are replaced by biotite and scattered idiomorphic crystals of carbonate.

108/37° S at 386.00 m.

SVÅNI (EG) - PROFILE

(north of Gjendebken)

southern part

starting point: 531200 6906300 UTM grid, zone 32

Top. map 1519 IV SNØHETTA

08.1984 / June 1985

by: Dr. F.D. Priesemann

0.00 - 2.00 : amphibole schist
(meta - basalt, flow)
gn, fine-to medium grained with minor inter-calations being coarse - grained, crude development of layering due to changes in either amphibole or plagioclase content, coarse - grained layers with leopard - texture similar 0.00 - 3.50 m (north).
granoblastic - to nematoblastic texture.

sharp hanging wall.
dip 43° SW at 2.00 m.

2.00 - 2.20 : magnetite - quartzite
(oxide facies iron formation)
dark gr with slightly bluish tint, dense quartz with high-grade dissemination of magnetite which sometimes constitutes an indistinct layering.
sharp hanging wall.

2.20 - 4.70 : ~~carbonaceous~~ calcareous plagioclase amphibolite
(meta - basalt, flow)
gr gn, medium - grained, crude development of leopard-texture due to scattered prisms of amphibole mainly of 0.5 cm lengths which are randomly oriented, idiomorphic crystals of carbonate being equally distributed.
gradual hanging wall.

4.70 - 30.10 : amphibole schist (structure)

(meta-basalt, flow, crudely developed pillow-

~~12.50 m: dip 39° SW~~
~~14.00 m: dip 30° SW~~

sample: SNØ-19
thinsection
whole rock analysis

gn, mainly medium-grained, sometimes thin interlayers of plagioclase amphibolite, rare bands or flasers of carbonate, within hanging portion some stringers of biotite often accompanied by carbonate, rare spots of py, somewhat higher pyrite amount (1 Vol-%) within 19.50 - 20.00 m, medium-grade dissemination of mt within 17.00 - 17.02 m.

gradual hanging wall.
dip 39° SW at 12.50 m, dip 30° SW at 14.00 m.

30.10 - 39.00 : biotite bearing epidote-plagioclase-qtz-chlorite amphibolite

(meta-basalt, flow, weakly altered)

~~33.50 m: dip 47° SW~~

grgn, coarse-grained, leopard texture, lenticular ~~shaped~~ multi- chlorite-amphibole crystal-aggregates of average 1.2 cm lengths and 0.2 cm widths surrounded by a matrix of epidote amphibole-plagioclase-qtz.

sharp hanging wall.
dip 47° SW at 33.50 m.

39.00 - 45.30 : slightly ~~carbonaceous~~ calcareous amphibole schist

(meta-basalt, flow, crudely developed pillow-structure)

~~43.60 m: dip 40° SW~~

gn, medium-grained with sections more coarse-grained, m-alternation of amphibole schist and plagioclase-amphibole schist mainly with gradual borders between, some

times carbonate veining, crosscutting features of qtz-carbonate-epidote of cm-thickness rarely developed.

sharp hanging wall.
dip 40° SW at 43.60 m.

45.30 - 55.50 : slightly ~~carbonaceous~~ calcareous biotite bearing epidote-plagioclase-qtz-chlorite amphibolite (meta-basalt, flow)

sample: SNØ-20
Thinsection
whole rock analysis
~~48.70 m: dip 45° SW~~

same as: 30.10 - 39.00 m (south), contact to hanging mica-schist with low-grade dissemination of po and py.

sharp hanging wall.
dip 45° SW at 48.70 m

55.50 - 57.15 : sericite bearing fspar-biotite-qtz rock/schist (meta-pelite)

true thickness 50 cm

sample: SNØ-01
SN 531225 6906243
Thinsection

brownish, fine-grained, lepidoblastic texture, scattered crystals of slightly porphyric biotite which show a preferred orientation, discontinuous lamina of fine-crystalline magnetite sporadically present, interlayers of dense quartzite (oxide facies iron formation) which carries tiny flakes of biotite and subordinate magnetite, talc mainly is concentrated at the contacts to mica schist, very rare spots of py and/or po.

~~55.50 m: dip 45° SW~~

sharp hanging wall.
dip 45° SW at 55.50 m

57.15 - 59.70 : slightly ~~carbonaceous~~ calcareous biotite bearing epidote-plagioclase - qtz - chlorite amphibolite (meta-basalt, flow)

sample: SNØ-21
thinsection
whole rock analysis

A

same as: 30.10 - 39.00 m (south), at hanging wall slightly increased in biotite, some spots of Py
sharp hanging wall.

59.70 - 59.85 : sericite - biotite bearing pyrite - qtz rock (metamorphosed silphide facies exhalite)

true thickness 10 cm

medium-grained, granoblastic texture, high-grade dissemination of pyrite, mainly idiomorphic crystals of 0.1 cm size, phyllosilicates show a preferred orientation and cause a slight schistosity.
sharp hanging wall.

sample: SNØ-02
SW 531225 6906240
chem. analysis

59.85 - 63.90 : amphibole bearing magnetite quartzite (oxide facies iron formation)

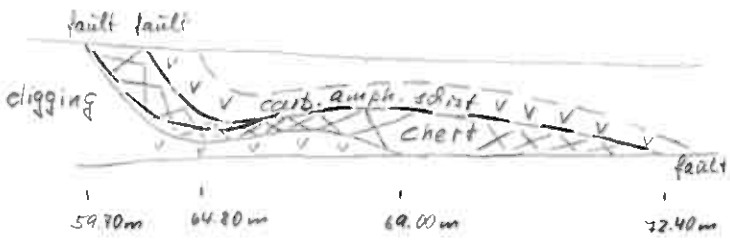
true thickness 2.40 m

dark grey with slightly bluish tint, fine-grained, dense mt-quartzite develops a crude cm- to dm-layering which mainly is caused by modal changes of magnetite, tiny bands of amphibole-rich mt-quartzite are interlaminated with amphibole forming coarse needles which always are parallel the compositional banding.
sharp hanging wall

dip 45° calcul. 41 m...

63.90 - 64.80 : ~~carbonaceous~~ calcareous amphibole schist
(meta-basalt, flow)
gn to grgn, medium-grained, scattered idiomorphic crystals of carbonate.
gradual hanging wall.

64.80 - 73.30 :



E6

73.30 - 76.60 : sericite bearing amphibole - qtz - fspar rock
(meta-leuco-basalt, flow)
Sample: SNØ-22
Thin section
~~74.90m - dip 27°~~
Whole rock analysis
greenish gr, lepidoblastic texture, slightly porphyric amphibole needles of max. 0.4 cm lengths randomly oriented.
gradual hanging wall.
dip 27° W at 74.90 m.

76.60 - 91.00 : amphibole schist
Sample: SNØ-23
Thin section
Whole rock analysis
(meta-basalt, flow, distinct pillow-structure)
gn, fine - towards medium-grained, slight changes in the mode of plagioclase, sometimes irregular carbonate accompanied by diorite.
sharp hanging wall.
~~89.30m - 126/45° SW~~
126/45° SW at 89.30 m

91.00 - 91.15 : amphibole bearing magnetite-quartzite (oxide facies iron formation)

true thickness 10 cm

sample: SNØ-03
SN 531175 6906195
Thin- and polished section

~~91.00 m dip 47° SW~~

blueish black, extremely fine-grained, dense mt-quartzite intelaminated by amphibole-rich mt-quartzite and flasers of milky-white qtz which in places form web-like features supposely as a result of deformation.
sharp hanging wall.
dip 47° SW at 91.00 m.

91.15 - 93.00 : epidote bearing biotite-amphibole-qtz-plagioclase rock / gneiss (meta-qtz-keratophyr)

sample: SNØ-24
Thin section
whole rock analysis

whitegr, wide lamination due to slightly porphyric amphibole and biotite which mainly are aligned with the major plane of foliation and tend to form discrete layers of mm-thickness or trains of granules, amphibole prisms are on average 0.3 cm long and form thin needles, biotite sporadically displays crystal aggregates (clots) which cross-cut the lamination.
sharp hanging wall.

93.00 - 101.60 : carbonate bearing plagioclase-amphibole schist (meta-basalt, flood)

sample: SNØ-25
Thin section
whole rock analysis

gn, medium-grained, nemato-blastic texture, rare spots of carbonate equally distributed,

sometimes carbonate veining.
sharp hanging wall.

101.60 – 102.70 : high ~~carbonaceous~~ calcareous biotite - sericite - amphibole-qtz - plagioclase schist
(meta - basic tuff or tuffite)

C

gign, mainly coarse-grained, lepidoblastic texture, crudely mm - to cm - layered due to modal changes from Fe-Mg silicate domination to quite felsic composition, mainly gradual changes, biotite often forms crystal aggregates which may be aligned with the compositional banding, amphibole characteristically develops porphyroblasts of max. 1cm lengths which are oriented at random, spotted carbonate but also mm-bands, lenses and stringers.
sharp hanging wall.

102.70 – 107.00 : biotite bearing qtz - plagioclase - amphibole schist
(meta - basalt, supp. lapilli tuff)

gign to greenish gr, medium-grained, spotted appearence, scattered lenticular particles of qtz - plagioclase and plagioclase on average 0.3cm in diameter, small amount of lense-shaped clasts of amphibolite with nemato blastic texture grading 0.5 to 2.2 cm in lengths and

0.2 to 0.4 cm in widths, lapilli strongly deformed and flattened (always being parallel to the major plane of foliation, matrix is composed of plagioclase and amphibole, latter forms 0.4 cm long discrete needles which are oriented at random as well as crystal aggregates of cm-size which often crosscut the schistosity, the hanging portion of the layer is characterized by the random occurrence of extremely sheared and flattened fragments of amphibole bear qtz-plagioclase which grade from 3 × 0.4 cm to 13 × 1.5 cm in size, the clasts are embedded in a matrix of equal composition but which shows a distinct lepidoblastic texture. sharp hanging wall.

107.00 - 108.50: amphibole schist

(meta-basalt, flow)

~~107.00m: dip 53°SW~~

gn, fine-to medium-grained, distinct nemato-blastic texture.

sharp hanging wall.
dip 53° SW at 107.00 m.

X108.50 - 135.00: biotite bearing plagioclase-amphibole rock/schist

Sample: SNB-26
Thin section
Whole rock analysis

(meta-basaltic pyroclastic rock or basic volcanic detritic flow)

gn, grainy appearence, scattered highly deformed

and shredded lapilli of basaltic composition grading 5.5×1.0 cm to 0.5×0.2 cm in size, abundant subrounded to rounded slightly deformed fragments of vesicular basalt (scoria) (the pores being filled by plagioclase) which may reach sizes of 20×7 cm, fragments are embedded in a matrix very similar to that of lapilli tuff of 102.70 - 107.00 m. hanging wall bedding fault line

135.00 - 144.00 : amphibole - qtz - fspar rock / gneiss

~~135.00 m : 160 / 35° SW~~
~~140.00 m : dip 46° SW~~

(meta-leuco-basalt, tuff may be intermittent flows, beds of basaltic pyroclastic rock or basic volcanic debris flow, leuco basalt / same as: TVN IV 37)

gngr, medium-grained with intersections being fine-grained, some layers of coarse-grained appearence, predominately with lepidoblastic texture, cm- to dm-layering with superimposed mm- to cm-lamination, banding is caused by textural and compositional changes which take place slowly but may also happen in advance and variations in grain size, amphibole forms slightly porphyric needles of max. 0.4 cm length, they may be oriented at random but normally are subparallel to the banding of the rock, fine-grained beds often show a distinct rusty staining which points to a slight

sample: SNB-04
GK 531220 690178
thin section
whole rock analysis

sulphide mineralization, rare intercalations of basaltic lapilli tuff (same as: 102.70 - 107.00 m) which always have sharp contacts to the surrounding meta-andesite, layer of meta-andesite starts with a fragment horizon of 40 cm thickness which is characterized by scattered, highly deformed and stretched qtz and qtz-fspar clasts of 10 x 1.5 cm size being embedded in a matrix of amphibole-qtz-plagioclase which is of the same characteristic as it is found in the following banded rock.

sharp hanging wall, strongly deformed schist (see below)
160/35° SW at 135.00 m, dip 46° SW at 140.00 m.

144.00 - 144.10 : qtz-chlorite-biotite bearing sericite schist (strongly deformed meta-pelite) (similar sericite bearing qtz-fspar-chlorite-biotite schist of NIVA° IV Ruuhfjell-mine)

gr to strongly, wavy-lenticular structure due to tendency of qtz to form lense-shaped crystal-aggregates, wavy sericitic surfaces being slickensided.

sharp wavy hanging contact

144.10 - 145.60 : ~~carbonaceous~~ calcareous chlorite bearing amphibole - biotite - sericite schist
(tuffaceous meta-pelite)
gs, porphyroblastic texture, porphyroblasts of amphibole and biotite are scattered through a fine-crystalline matrix of qtz and sericite, amphibole has a tendency to form lense-shaped crystal-aggregates which are on average 0.5cm in diameter and are oriented at random, spotted carbonate, crystals showing idiomorphic outlines.
gradual hanging wall.

145.60 - 147.60 : biotite - amphibole - sericite - fspar-qtz rock / gneiss
(very likely metamorphose qtz-keratophyr)
gs, porphyroblastic-to lepidoblastic texture, crude lamination caused by the tendency of biotite and amphibole to form discontinuous trains of granules, porphyroblasts of amphibole mainly parallel to the major plane of foliation but sometimes oriented at random, prisms on average 1.0cm long often standing alone but sometimes closely

sample: SN0-05
SN 531220 690176
Thinsection

joined by coarse crystals or crystal-aggregates of biotite.
gradual hanging wall.

147.60 - 150.10 : ~~carbonaceous~~ calcareous chlorite bearing amphibole-biotite-sericite schist

~~150.00 m: 148/42° SW~~

(tuffaceous meta-pelite)

same as: 144.10 - 145.60 m (south)
gradual hanging wall.
148/42° SW at 150.00 m.

150.10 - 150.40 : quartz-sericite schist

(meta-pelite)

~~151.30 m - dip 43° SW~~

gr, fine-grained, wavy-lenticular texture, micaceous streaks surround lense-shaped nodules of qtz.

gradual hanging wall.
dip 43° SW at 151.30 m.

150.40 - 152.30 : high ~~carbonaceous~~ calcareous biotite-sericite schist

(meta-pelite)

C

gr, porphyroblastic texture, scattered porphyroblasts of biotite randomly oriented cause spotted appearence of the rock, carbonate as idiomorphic crystals equally distributed, rare veinlets of qtz accompanied by carbonate.
sharp hanging wall.
dip 52° SW at 152.30 m.

152.30 - 152.42 : micaceous quartzite
(meta-arenite)
gr, fine-grained, scattered shreds of sericite surrounded by equigranular qtz, rare flakes of parallel biotite which in places develop a crude cm-layering.
sharp hanging wall.

152.42 - 155.10 : biotite-sericite schist
(meta-pelite)
gr, porphyroblastic texture, in parts laminated, scattered porphyroblasts of biotite in places crystal aggregates always being oriented at random, cause spotted appearence of the rock.
gradual hanging wall.

155.10 - 155.90 : quartz-sericite schist
(meta-pelite)
same as: 150.10 - 150.40 m (south)
sharp hanging wall.
dip 51° SW at 155.90 m

X 155.90 - 156.25 : high ~~carbonaceous~~ calcareous biotite-sericite schist
(meta-pelite)
same as: 150.40 - 152.30 m (south)
gradual hanging wall.

156.25 - 156.40 : biotite - fspar - qtz rock
(supp. meta - qtz - keratophyr)
with in places greenish or brownish tint
gr, porphyroblastic te+ture, crude lamination due to parallel micaceous streaks composed of porphyric crystals of biotite, subordinate pyrite forming tiny crystals being equally distributed.
sharp hanging wall.
dip 50° SW at 156.30 m.

156.40 - 157.10 : slightly calcareous ~~carbonaceous~~ biotite - sericite schist
(meta - pelite)
gr, fine-grained, crude development of lamination due to parallel streaks of slightly porphyric biotite.
sharp hanging wall which in places contains sheared meta-pelite which is very similar the sericite schist from 144.00 - 144.10 m (sonic).

157.10 - 160.10 : high calcareous ~~carbonaceous~~ epidote - biotite - chlorite bearing amphibole - plagioclase - quartz gneiss (banded amphibolite)
(meta - basic tuff or tuffite with cherty inter-layers)
gr, greenish gr, gn, porphyroblastic to lepidoblastic te+ture, distinctly mm - to cm - layered, caused by compositional and te+tural changes which mainly happen

in advance, alternate qtz-plag.-chlorite-amphibole, amphibole-plag.-qtz, epidote-plag.-qtz, biotite and carbonate bands or lamina, distinct porphyroblasts of amphibole max. 3.0 cm in length throughout, phenos are oriented at random but sometimes parallel the layering of the rock, carbonate rarely form slightly porphyric idiomorphic crystals which equally are distributed, within hanging portion the mode of amphibole gets so abundant as to form plag amphibole schist which leads to overlying amphibole schist.
gradual hanging wall.
157/50° SW at 157.10 m, dip 49° SW at 157.00 m.

160.10 - 171.00: amphibole schist
(meta-basalt, flow)
gn, fine-grained, nemato blastic texture.
sharp hanging wall.

171.00 - 179.60: slightly ~~carbonaceous~~ calcareous biotite bearing epidote-qtz-plagioclase-amphibole schist
(meta-basalt, flow may be pyroclastite)

epidote partly c

slightly grgn, medium-grained, nemato-blastic texture (nebulous structure), laminated but often with flaser-texture, epidote-qtz-plagioclase

as well as biotite-carbonate form streaks and sporadically cm-thick layers which in places constitute an open framework filled by amphibole schist, amphibole normally get distinctly coarser grained at the borders to epidote-qtz-plagioclase, the prisms often prolonging for several mm into the felsic material

sharp hanging wall.

dip 43° SW at 175.00 m.

179.60 – 181.00 : biotite-sericite quartzite (meta-arenite)

whitegr, laminated, alternate phyllosilicate layers and nearly pure qtz bands, strongly foliated.

sharp hanging wall.

dip 52° SW at 179.60 m.

181.00 – 187.00 : slightly ~~carbonaceous~~ calcareous biotite-sericite schist (meta-pelite)

gr, slight flaser-structure due to accretion of qtz into mm- to cm-large lenses and flasers, scattered porphyroblasts of biotite oriented at random cause spotted appearence of the rock, subordinate amount of garnets being 0.2 cm in diameter within footwall

portion.

187.00 - 203.00 : no outcrop

203.00 - 207.50 : garnet (-biotite) bearing sericite-amphibole-fspar-qtz gneiss
(meta-qtz-feldspathyr)
gr, granoblastic to porphyroblastic texture, cm- to dm- layering with superimposed mm- to cm- lamination, banding is caused mainly by textural changes due to the crystallization status of amphibole but does results from compositional changes and further is due to variations in the degree of foliation, amphibole is the most prominant mineral and occurs as idioblasts being tabular and prismatic that may reach 3 cm lengths, the crystals are oriented at random and form an open framework of touching and crosscutting needles, they sometimes are concentrated in distinct layers to form trains of granules, only sometimes the prisms get oriented parallel to the layering of the rock, biotite mainly forms individual lamina which are discontinuous, it sporadically accompanies amphibole as single

sample: SNØ-06
SN 531200 6906130

crystals, qtz and plagioclase and sericite form a fine-grained equigranular mosaic, they in places form discrete layers which look as being of clastic sedimentary origin, the meta-qtz-feldspar gradually passes into ~~carbonaceous~~ calcareous epidote-biotite bearing amphibole-fspar-qtz gneiss which is similar a banded amphibolite at hanging wall.
gradual hanging wall.

207.50 - 209.00: high ~~carbonaceous~~ calcareous amphibole bearing biotite-chlorite-fspar-qtz gneiss
(metamorphosed tuff or tuffite sequence, alternate felsic and basic to intermediate tuff or tuffite layers) (comparable with sample TVN IV 11, 11a, 11b, 13, 13b, 14, 14b which immediately underly ore zone IV)
gr, dasgr, gnbrown, slightly yellowish, distinctly cm-layered with occasional mm-lamination being superimposed, compositional and thus detrital banding, alternate high ~~carbonaceous~~ calcareous biotite-chlorite, ~~carbonaceous~~ calcareous chlorite-biotite-fspar-qtz and phyllosilicate-carbonate bearing fspar-qtz layers which mainly have sharp contacts,

sample: SNØ-07
SN 531200 6906125
Thinsection

some streaks of carbonate, biotite and chlorite form slightly porphyric flakes which always are parallel to the banding of the rock, carbonate occurs as scattered idioblasts which in places form trains of granules, carbonate has a clear tendency to accompany the phyllosilicates, tiny spots of sulphide are present throughout.
gradual hanging wall.

20900 - 23000 : calcareous to high calcareous epidote - biotite - chlorite - plagioclase - amphibole - qtz gneiss (banded amphibolite) (meta - basic tuff or tuffite with cherty layers)

C

epidote

granoblastic - to porphyroblastic or lepidoblastic texture,
white gr to gn or grgn, medium - to coarse grained, cm - to dm layering, alternate carbonate, amphibole, plag - qtz - amphibole, chlorite - amphibole, biotite amphibole bear. plagioclase - qtz and qtz (chert) bands, amphibole is the most prominant mineral and it forms porphyroblasts grading from 0.4 cm to 30 cm in length, the prisms are oriented at random but sometimes parallel the layering, spherolites are found being continuous with the compositional banding, ~~free pistacite chlorite~~, biotite is slightly porphyric and randomly is oriented and tends to form trains of granules, carbonate is found as idiomorphic crystals within all types of layers but forms too discrete bands or lenses which sometimes are discordant to the layering, ~~occurs as one spot~~, near hanging contact the banded amphibolite often gets interlayered by

dm - thick bands of plagioclase - amphibole schist (intermittent basalt flows), a discontinuous low-grade py mineralisation of 50 cm thickness is situated close to the lying amphibole schist, the pyrite dissemination occurs within a biotite - fspr. quartz gneiss (metamorphic meta - exoclasty) which shows a distinct lamination caused by a rhythmic repetition of mm - thick layers of biotite which often are discontinuous, biotite forms besides that porphyroblasts which randomly are oriented.

sharp hanging wall, develops in places a bedding fault line.

137/48° SW at 211.00 m, 133/51° SW at 228.00 m.

230.00 - 278.00 : amphibole schist to plagioclase - amphibole schist (meta - basalt, flow, crude development of pillow structure) gn to grgn, fine - grained with sections being more medium - grained, here mainly plag-amphibole schist, often crosscut by irregular veinlets of epidote and carbonate, some dm - interlayers of calcareous epidote - amphibole - chlorite - biotite schist, gn, brown, gs, medium - grained, mm - layered, alternate fine - grained amphibole bands and layers composed of carbonate - chlorite - amphibole and biotite which always are medium crystalline; sporadically intolayered sections of biotite - amphibole schist, gn, fine - fibrous amphibole, discontinuously banded by mm - layers of coarse - crystalline biotite which sometimes are composed to a mm - like feature;

sample: SNØ-27 Thin section whole rock analysis

sample: SNØ-28 Thin section whole rock analysis

near hanging contact meta-basalt gradually changes into amphibole-plagioclase-qtz schist / IOO_2 (supp. andesitic flow), grey, medium-grained, lepidoblastic texture, slightly porphyric amphibole prisms max. 0.4 cm long are randomly oriented.

257.00 - 257.20: magnetite banded quartzite (meta-chert), fine-grained, cm-layers of qtz in alternation with mm-bands or streaks of mt

sharp hanging wall, slightly tectonic.

131/44° SW at 230.00 m, 174/40° SW at 238.00 m, 159/55° SW at 275.00 m.

278.00 - 282.00: biotite-sericite schist

(meta-pelite)

gl. porphyric biotite as cross-wise cause spotted appearence of the IOO_2, some cm-thick discontinuous layers of sericite-quartzite intercalated.

gradual hanging wall.

160/59° SW at 278.00 m.

282.00 - 290.00: slightly ~~calcareous~~ calcareous chlorite bearing biotite-sericite-epidote-qtz-fspar-amphibole schist/gneiss

high epidote (meta-basalt, flow may be pyroclastic)

similar: 171.00 - 179.60 m (south), epidote too forms discrete bands, flasers and lenses which often crosscut schistosity. gradual hanging wall.

290.00 - 334.00: ~~carbonaceous~~ calcareous to high ~~carbonaceous~~ calcareous epidote-biotite-chlorite-plagioclase-amphibole-qtz gneiss (banded amphibolite)
(meta-basic tuff to tuffite with cherty interlayers)
same as: 209.00 - 230.00 m (south), between 331.50 - 333.50 m several interlayers of epidote-amphibole-quartzite (cherty tuff), layered rock with alternate qtz, epidote-qtz and amphibole or amphibole-qtz bands
sharp hanging wall, strongly foliated, supp. bedding fault line.
174/32° SW at 291.00 m, 157/34° SW at 232.00 m.

high epidote

334.00 - 339.00: schistose amphibolite to plagioclase amphibole schist
(meta. amygdaloid basalt)
gn, nematoblastic texture, cm-large deformed and streched plagioclase crystals which equally are distributed.
sharp hanging wall.
156/38° SW at 334.00 m.

339.00 - 340.60: calcareous ~~carbonaceous~~ epidote - plagioclase - qtz - amphibole schist

(meta - basalt, supp. pyroclastite, stressed(?))

gn to grgn, medium - grained, crude development of layering, latter ~~layering~~ possibly due to ~~foliation~~ stress, alternate carbonate, epidote - amphibole and epidote - amphibole - plagioclase - qtz bands, which ~~are~~ often are discontinuous, amphibole forms prisms on average 0.7 cm long which ~~are~~ mainly are aligned with the layering / foliation.

high epidote

sharp hanging wall

340.60 - 343.00: plagioclase amphibolite

sample: SNB-29
thin section
whole rock analysis

(meta - basalt, flow)

lepidoblastic - texture, grgn, medium - grained, prismatic amphibole on average 0.5 cm long ~~and~~ always randomly oriented.

343.00 - 377.00: no outcrop

377.00 - 379.00: amphibole schist

(meta - basalt, flow)

nematoblastic texture, gn, fine - grained, some mica - flakes or lamination of carbonate which always are ~~being~~ conformable with the schistosity, abundant irregular disconformable bands and lamina of biotite - chlorite or epidote - plagioclase - amphibole which always contain prismatic amphibole on average 0.4 cm long.

140/48° SW at 378.00 m.

379.00 - 387.50 : no outcrop

387.50 - 400.20 : amphibole schist

(meta-basalt, flow, partly may be pyroclastite)

sample: SNB-30
Thinsection
whole rock analysis

gn, fine-grained, nematoblastic texture, some flasers or laminae of epidote and/or carbonate often conformable but sometimes crosscutting schistosity, sporadically embedded crystal aggregates of biotite which often are accompanied by epidote, sometimes cm- or even dm-thick sections which are distinctly layered, banding consists of alternate epidote or epidote-amphibole, biotite and carbonaceous plagioclase-qtz-amphibole layers. banded sections always are medium-grained and show a porphyroblastic to lepidoblastic texture with amphibole-phenos being randomly oriented.

sporadically high epidote

158/43° SW at 395.50 m.

400.20 - 402.00 : epidote-plagioclase-amphibole-qtz gneiss (banded amphibolite)

(meta-basic tuff of tuffite)

gngn, gr, lightgn, porphyroblastic to lepidoblastic texture, medium-grained, cm-layered, alternate amphibole, epidote-plagioclase-amphibole-qtz and carbonate bear. epidote-amphibole bands, typical porphyric amphibole which randomly is oriented.

high epidote

402.00 - 407.00 : no outcrop

407.00 - 421.00 : amphibole schist

(meta-basalt, flow)

same as: 387.50 - 400.20 m (south)

151/45° SW at 402.00 m, 128/53° SW at 417.00 m, 130/54° SW at 420.00 m.

421.00 - 436.00 : no outcrop

436.00 - 452.00 : slightly calcareous amphibole schist (meta-basalt, flow)

same as: 387.50 - 400.20 m, spotted carbonate within some sections.

145/51° SW at 438.00 m.

471.00 - 473.00 : calcareous epidote - biotite - chlorite - plagioclase - amphibole - qtz gneiss (banded amphibolite) (meta-basic tuff or tuffite with clasty intercalations)

same as: 209.00 - 230.00 m.

129/42° SW at 453.00 m.

473.00 m end of profile

RAILROAD PROFILE

(Hjerkinn)

southern part

183.10 m southprolonging from point

527850 6899650 UTM grid, zone 32

Top map. 1519 III Hjerkinn

By: Dr. F.D. Priesemann

FOLLDAL VERK ⅛ - 1 - (south)

avd. Tverrfjellet

southwards
downsection

0.00 - 4.80 : Magnetite - biotite quartzite

(meta - chert, oxide and silicate facies iron formation)

chemical analysis HJE-18

alternate gr with bluish tint and browngr, mm- to cm-compositional banding with some interlayers being dm-thick, always sharp layering contacts, more or less rhythmic alternation of dense magnetite quartzite with biotite phyllite to biotite schist, sparse intercalations of magnetite poor quartzite, discontinuous band of pyrite-bear. ~~sericite~~/~~schist~~ (-sericite) biotite -qtz rock at 1.40 - 1.42 m.

Dip: 0.00 75° N, 2.00 m 74° N, 4.80 m 80° N .

Sharp footwall.

4.80 - 5.48 : Qtz - plagioclase rich biotite - amphibole schist

(meta - basalt, flow)

gn, medium - grained, nematoblastic texture, biotite as tiny flakes and discontinuous layers always parallel the major plane of foliation, rare spots of hypidiomorphic py.

Dip: 5.48 m 70° N.

Sharp footwall.

5.48 - 6.07 : Magnetite quartzite

(meta - chert, oxide facies banded iron formation)

darkgr sporadically with distinct bluish tint, dense, laminated, close alternation of magnetite quartzite and mt - barren quartzite, rare mm- thick crosscutting veins of epidote.

Dip: 6.07 m 79° N.

Sharp footwall.

6.07 - 8.50 : Schistose amphibolite, amphibolite

(meta - basalt, flow)

gn, fine-to medium-grained, partly with nematoblastic texture, crudely layered by tiny bands of qtz - carbonate, pyrite is present occasionally , it slightly is enriched (< 2 Vol.-%) between 7.83 - 7.91 m.

Dip: 8.00 m 80° N.

southwards
downsection

8.50 - 15.17 : Amphibole bear. biotite - sericite - chlorite schist
(meta - mixed mafic volcanie and epiclastic sedimenttary layer)
gn to grgn, layered with flaser-structure caused by nodules of qtz and carbonate which equally are distributed amphibole forms slightly porphyric needles which are parallel to the planar fissility of the rock, minor bands of carbonate are present between 8.62 - 8.78 m and 9.76 - 10.52 m, a qtz - keratophyr interlayer with low - grade dissemination of pyrite occurs at 9.00 - 9.05 m, pyrite is somewhat enriched (2 Vol.-%) between 12.27 - 12.57 m.
Dip: 12.00 m 83° N.

15.17 - 15.24 : Magnetite quartzite
(meta - chert, oxide facies banded iron formation)
blackish with distinct bluish tint, extremely fine - grained, dense, laminated by medium - grained schistose amphibolite which in places shows idioblasts of carbonate, dust-like magnetite is found within chert as well as in amphibolite, latter carries occasionally some pyrite which forms discontinuous laminae.
Dip: 15.24 m 81° N.

15.24 - 16.76 : Schistose amphibolite
(meta - basalt, flow)
gn, medium - grained, nematoblastic texture, sometimes with crudely developed flaser - structure being due to scattered, tiny nodules of qtz or carbonate.
Dip: 16.86 m 83° N.
Sharp footwall contact.

16.76 - 16.81 : Magnetite - quartzite
(meta - chert, oxide facies banded iron formation)
same as: 15.17 - 15.24 m.

16.81 - 18.79 : Amphibolite
(meta - basalt, flow)
gn, fine - to medium - grained, sporadically with epidote veining, rare spots of py.
Di : 17.10 m 85° N.

southwards
downsection

18.79 - 19.63 : Qtz - rich biotite-bear. sericite - chlorite schist
(meta - altered mafic volcanic tuff)
AA
gn to grgn, fine - crystalline, near footwall keratophyr increase in grain size towards coarse - grained rock, distinct compositional layering with sparse laminae of biotite.

19.63 - 19.65 : Amphibole-bear. qtz ≠ fspar rock
(meta - keratophyr)
chemical analysis HJE-17
gr to slightly greenishgr, fine - grained granoblastic with not oriented slightly porphyric needles of amphibole, low - grade dissemination (± 3 Vol.-%) of py.
Dip: 19.63 m 76° N.

19.65 - 19.71 : Schistose amphibolite
(meta - basalt, flow)
gn, fine - grained, nematoblastic texture.

19.71 - 19.88 : Amphibole - qtz ≠ fspar gneiss
(meta - keratophyr with intermittent mafic tuff)
chemical analysis HJE-17
gr to gngr, fine - grained granoblastic qtz - fspar layers which carry slightly porphyric needles of amphibole being oriented at random alternate with laminae of fine - grained amphibolite; pyrite makes up on average 10 Vol.-% of the rock, it occurs as finest dissemination within qtz - fspar layers and forms discontinuous laminae.
Dip: 19.88 m 78° N.

19.88 - 20.05 : Schistose amphibolite
(meta - basalt, flow)
gn, fine - to medium - grained, nematoblastic texture, rare spots of pyrite.

20.50 - 21.28 : Calcareous qtz - rich biotite-bear. sericite - chlorite schist
(meta - altered mafic volcanic tuff)
AA
gn to lightgn, fine - crystalline, compositional layering with stringers and lenses of carbonate.
Dip: 20.80 m 78 ° N.

southwards
downsection

21.28 - 21.44 : qtz-rich schistose amphibolite
chemical analysis HJE-16b
~~Amphibole-bear. qtz - fspar rock~~
(meta - ~~keratophyr~~ basalt flow) with interlayers of hydrothermal silica
same as: ~~19.71~~ 22.62 - ~~19.88~~ 22.37 m , band of massive pyrite.
Dip: 21.30 m 71° N.

21.44 - 21.62 : Magnetite - quartzite
(meta - chert, oxide facies banded iron formation)
darkgr with bluish tint, extremely fine - grained, dense, mm - alternation of magnetite rich and magnetite poor quartzite bands.
Dip: 21.62 m 80° N.

21.62 - 22.37 : Chlorite-bear. qtz-rich schistose amphibolite
~~Amphibolite~~
(meta - basalt, flow)
HJE-16a
gn, fine - grained with intersections being medium - grained, homogeneous but sometimes distinctly layered, lenses and stringers of carbonate throughout; ~~medium - grade dissemination (10 Vol.-%) of pyrite at : 21.79 - 22.05 m~~. schlieren laminae and trains of granules of pyrite are restricted to an interface which extends from 21.79 - 22.05 m, the sulphide amounts to 10 % by volume of the rock.
Dip: 22.00 m 77° N.

22.37 - 22.43 : Magnetite-quartzite
(meta - chert, oxide and sulphide facies banded iron formation)
same as: 21.44 - 21.62 m, occasionally mm - thick bands of massive pyrite.
Dip: 22.40 m 77° N.

22.43 - 24.33 : Plagioclase amphibole schist
(meta - basalt , flow)
gn, medium - grained, nematoblastic texture; rare spots of pyrite.
Dip: 22.70 m 79° N.

24.33 - 24.83 : Biotite-bear. qtz - rich amphibole schist
(meta - basalt , flow)
gn, predominantly fine - grained, laminated with in places flaser - structure which is due to the tendency of quartz and biotite to from nodules and flasers res-

southwards
downsection

pectively, rare spots of pyrite.
Gradual contact to underlying rock.

24.83 - 25.33 : Amphibole bear. qtz - rich sericite - chlorite schist
(meta - tuffite ; a tuffaceous sediment)
lightgn, laminated with superimposed flaser - structure, irregular alternation of laminae of chlorite which sporadically are accompanied by porphyroblasts of amphibole with rare spots of py. Dip: 25.00 m 79° N.

25.33 - 25.35 : Pyrite - sericite - amphibole schist
(meta - slightly altered mafic tuff with sulphide impregnation ; a sulphide layer)
gn, fine - grained, preferred orientation of sericite and amphibole, medium - grade dissemination of pyrite (< 15 Vol.-%) quartz

25.35 - 25.50 : Sericite bear. qtz - amphibole schist
(meta - mafic tuffite)
gn to grgn, fine - as well as medium - grained, flaser-structure, porphyroblastic texture due to coarse prisms of amphibole being surrounded by fine - fibrous sericite and fine - grained qtz, rare spots of pyrite.
Gradual footwall.

25.50 - 29.50 : Amphibole bear. qtz - rich chlorite - biotite - sericite schist
(meta - tuffaceous pelitic sediment)
lightgn, porphyroblastic texture, mm - large porphyroblasts of amphibole which randomly are oriented decrease in amount towards downsection, thus the rock gradually passes into underlying pelitic schist which carries no amphibole, biotite forms slightly porphyric crystals which sporadically are aligned along the major foliation of the rock.
Dip: 26.00 m 73° N, 29.50 m 79° N.

29.50 - 55.10 : Biotite-bear. sericite schist
(meta - pelite)
gr with slight greenish tint, often with flaser struc-

24.83 - 25.33 : Calcareous sericite - chlorite schist
(meta - Mg - Fe - rich sediment)
lightgn, lamination with superimposed
flaser - structure, irregular alternation of
laminae made by chlorite which spora-
dically is accompanied by porphyroblasts
of amphibole and bands and discontinu-
ous layers composed of carbonate.
Sharp contact

25.33 - 25.35 : amphibole - chlorite - pyrite - qtz gneiss
(meta - hydrothermal silica and sulphide in alternation
with mafic volcanic interlayers) (similar: HJE-11a)
alternating gn and white or colourless,
cm - alternation of amphibole - chlorite
schist and amphibole - bear. quartzite
which in most of the cases shows a
high - grade dissemination of pyrite,
mostly sharp layering-contacts but
sometimes gradations between bands
of different composition. The banded
layer may join into a 10 cm thick band
of pyrite - qtz rock.

chemical analysis HJE-15a

chemical analysis HJE-15b

Sharp contact.

25.35 - 29.50 : Calcareous biotite-bear. sericite- chlorite schist
(meta - Mg - Fe - rich sediment)
similar: 24.83 - 25.33 m

southwards
downsection

ture, locally passing into laminated rock, porphyroblastic texture, interlocking qtz crystals as layers or lenses in alternation with layers composed of fibrous, parallel sericite, biotite forms porphyroblasts and fascicular aggregates which are oriented at random, it is equally distributed thus cause a spotted appearence of the rock, pyrite sometimes occurs forming max. 0.2 cm large xenomorphic crystals.
Dip: 53.00 m 85° N.
Gradual footwall.

55.10 - 58.52 : High calcareous biotite bear. sericite schist
(meta - pelite)
same as: 29.50 - 55.10 m but with scattered idioblasts of carbonate on average 1 mm across, locally cross - cutting carbonate veins, the mode of carbonate varies strongly without exceeding 20% by volume of the rock.
Dip: 56.00 m 79° N, 58.00 m 84° N.
Gradual footwall.

58.52 - 60.70 : Slightly calcareous biotite bear. sericite schist
(meta - pelite)
same as: 55.10 - 58.52 m but with lesser carbonate (< 1 Vol.-%).
Dip: 59.00 m 81° N.
Gradual footwall.

60.70 - 61.70 : Calcareous biotite - sericite schist
(meta - pelite)
same as: 55.10 - 58.52 m but with lesser carbonate.
61.22 - 61.30: Biotite - sericite - qtz gneiss (meta - exhalative qtz intercalated by pelitic sediment which shows volcanic impurity) distinctly cm-banded, alternation of bands made by qtz and sulphide and layers predominated by phyllosilicates, Pyrite forms a medium-grade dissemination within the qtz-bands while it is nearly totally absent from the phyllosilicate layers.

chemical analysis
HJE-14 a

southwards
downsection

61.70 - 61.88 : Slightly carbonaceous biotite - sericite bear. pyrite ~~fspar~~ - qtz rock
(meta- ~~sulphide - rich felsic volcanic~~ siliceous and sulphide ")
light gr, medium-grained granoblastic quartz with medium-grade pyrite dissemination, sporadic occurrence of mm-thick schliren or layers composed of phyllosilicates and carbonate, sometimes clusters of carbonate, the sulphide amounts on average to 15% by volume of the rock.
Dip: 61.70 m 77° N

chemical analysis
HJE-145

61.88 - 63.08 : Slightly calcareous biotite bear. sericite schist
(meta - pelite)
same as: 58.52 - 60.70 m.
62.56 - 62.62: Biotite bear. qtz - fspar rock
same as: 61.22 - 61.30 m.

63.08 - 63.43 : Slightly calcareous quartz - schist
(meta - quartz - sandstone with pelitic impurity)
lightgr with slightly greenish streaks, flaser-structure, interlocking elongate qtz crystala layers or lenses in alternation with streaks of fine - fibrous sericite, carbonate forms sparse layers of mm to cm thickness.
Dip: 63.00 m 88° N.
Gradual footwall.

63.43 - 76.20 : Calcareous sericite schist
(meta - pelite with marble layers)
same as: 29.50 - 55.10 m but only locally with cross - biotite, frequent mm- to cm- thick bands of carbonate.
Dip: 64.00 m 81° N.
Gradual footwall.

76.20 - 78.70 : Carbonate - biotite bear. qtz - rich sericite schist
(meta - qtz - rich pelite)
same as: 29.50 - 55.10 m, carbonate always is bound to qtz thus rarely it forms discontinuous layers of mm- to

southwards
downsection

cm thickness.
Dip: 73.00 m 84° N.
Gradual footwall.

78.70 - 79.40 : Calcareous biotite - sericite schist
(meta - pelite with marble layers)
same as: 63.43 - 76.20 m but richer in biotite which tends to be oriented parallel to the major foliation/ lamination of the rock.
Gradual footwall.

79.40 - 87.80 : Slightly calcareous biotite-bear. sericite schist
(meta - pelite)
similar: 29.50 - 55.10 m but with rare cm - thick bands of carbonate which sometimes crosscut the major foliation. At 83.00 m thin interlayer of sericite - biotite schist which contains subordinate py as schlieren which are parallel aligned with the major foliation of the rock.
Dip: 80.00 m 74° N

chemical analysis
~~87.80 - 88.52~~ :
HJE - 13

HJE - 1c

with interlayered fasicular or bow - tie shaped biotite which occasionally forms wavy layers, low-grade dissemination of po and rare flasers or lenses of interlocking granular po, total sulphide amount: 5 Vol.-%.

88.06 - 88.52: biotite bear. quartzite
(meta - chert)
gr, fine - grained granoblastic, scattered mm - large biotite flakes with preferred orientation, low - grade dissemination of po, sometimes flasers and lenses of interlocking fine - grained po, sulphide amount varies between 5 and 10 Vol.-%.

HJE - 12b

slightly calcareous biotite-sericite schist
(meta-pelite)
gr with faint greenish tint, abundant tiny brown spot-, flaso- and lenticular structure, ~~phyllo-silicate~~ layers and schlieren of phyllosilicates in alternation with lenses and mm-thick bands of varying thickness made by qtz and sometimes carbonate, sericite is fine-crystalline while biotite occurs as scattered porphyroblasts which on average are 0.05 cm large.
sharp contact

87.20 - 87.86 : Amphibole-bear. sericite schist
(meta-pelite with volcanic impurity)
gr with abundant dark-gn needles, fine-fibrous sericite with scattered, not oriented idioblasts of amphibole, the needles from 0.1 to 1.0 cm in length.
Sharp contact

87.86 - 88.02 : ~~Amphibole~~-pyrrhotite-bear. quartzite
(meta-hydrothermal silica and iron-sulphide, supp. distal black smoker deposit)
schlieren and stringers and laminae of po and strongly oriented amphibole needles are inhomogeneously distributed within colourless qtz; po amounts to 7 % by volume of the rock.

chemical analysis HJE-12a

88.02 - 88.07 : Biotite - bear. sericite - amphibole schist
(meta - mafic volcanic with epiclastic sedimentary impurity)
gign, medium - crystalline, strongly parallel oriented idiomorphic crystals of amphibole joined by fine - fibrous sericite and slightly coarse biotite which tends to be widely scattered, schlieren of po which are parallel to the foliation of the rock, are homogeneously distributed the amount of sulphide is 1 to 2 % by volume of the rock. Sharp contact.

chemical analysis NJE-12a

88.07 - 88.67 : Amphibole - bear. qtz- biotite - sericite schist
(meta - tuffaceous sediment)
biorongr, fine - crystalline, crude development of compositional lamination which is due to the tendency of biotite to collect within distinct layrs or lenses, sericite is fine - crystalline, while amphibole forms idioblasts which are parallel ~~the major foliation of the rock~~ aligned with but also can be cross the major foliation of the rock, the acicular crystals reach ~~up to~~ lengths of 1.0 cm, loro-grade dissemination of mt.
Gradual contact

88.67 - 88.75 : Amphibole-bear. qtz-biotite - sericite schist
(meta - tuffaceous sediment with abundant hydrothermal silica)

brown with abundant white to colourless, f. bands and lenses, lenticular structure which transgoes into a cm-banding, schistose and layers composed of phyllosilicates in nonhydrothermic alteration with bands and lenses of quartz which contains tiny crystals of amphibole; schistose ~~and~~, discontinuous laminae and flakes of po, the sulphide amounts to 3% by volume of the rock.
Sharp contact.

chemical analysis HJE-12b

88.75 - 88.82: Pyrrhotite - qtz rock
(meta - hydrothermal silica and sulphide, supp. distal black smoker deposit)

brownish, ~~high-grade po within a matrix of~~ qtz variable concentration of po within white to colourless qtz, often high-grade but sometimes as low-grade dissemination.
Sharp boundaries.

chemical analysis HJE-12c

88.82 - 89.22: Biotite - sericite schist
(meta-pelite)

light grey to white qtz with abundant brown flakes, ~~fine-grained~~, laminated or with lenticular structure, close alternation of mm-thick layers composed of fine-fibrous sericite and porphyroblasts of biotite which are on average 0.15 cm large and mostly parallel to

the major foliation of the rock and mm-thick bands or lenses of qtz, several flakes and ~~streaks~~ stringers of po.
sharp boundaries

89.22 - 89.28 : Pyrrhotite - qtz rock
(meta - hydrothermal silica and sulphide supp. from black smoker activity)
chemical analysis HJE - 12d
similar ~~to~~ ~~as~~ : ~~HJE - 12c~~ HJE - 12c

89.28 - 89.58 : Biotite - sericite schist
(meta - pelite)
similar : 88.82 - 89.22 m.

89.58 - 89.66 : Pyrrhotite - qtz rock
(meta - hydrothermal silica and sulphide supp. from black smoker activity)
similar : HJE - 12c

89.66 - 90.61 : Calcareous amphibole - biotite - bear. sericite schist
(meta - pelite with minor volcanic impurity) gr with sparce biotite and gn flakes and needles, homogeneous, fine-crystalline sericite and qtz form the groundmass while amphibole and biotite occur as scattered porphyroblasts of mm-size which always are aligned with the major foliation of the rock, carbonate is concentrated within up to 1 cm-thick bands and lenses.

Sharp contact.

90.61 - 90.71 : Schistose amphibolite
(meta-basalt flow)
gn, medium-crystalline, strong ~~pref~~ preferred orientation of needles of amphibole; subordinate po which occurs as schlieren or stringers being parallel aligned with the major foliation of the rock.

Sharp contact.

90.71 - 91.96 : pyrrhotite-rich quartzite
(meta-hydrothermal silica and sulfide supp. originated from black smoker activity)
translucent qtz with variable amount of po, the latter forms laminae, discontinuous layers, clusters and schlieren which seem to be either parallel or of any direction, biotite is concentrated within schlieren and wavy laminae ~~and~~ and locally forms a ribbon-shaped pattern, the sulphide amounts on average 10 % by volume of the rock.
Sharp footwall contact.

biotite-bearing

chemical analysis HJE-12e

91.96 - 93.10 : biotite-sericite schist
(meta-pelite)
similar : 88.82 - 89.22 m.
gradually passing into biotite-sericite schist without po-mineralization.

southwards
downsection

88.52 - 88.96 : Biotite - sericite schist
(meta -pelite)
browngr, laminated, close alternation of mm- thick layers or discontinuous bands composed of either biotite or sericite or qtz, rare spots of po.

88.96 - 89.06 : Sericite - biotite bear. quartzite
(meta - chert with minor amount in pelitic sediment, silicate facies iron formation)
gr with brown streaks, mainly fine - grained granoblastic, crude development of layering due to tendency of biotite and sericite to form streaks and minute bands being in alternation with granular qtz layers and flasers and lenses of po, additional po as finest dissemination, sulphide content amounds to 15 Vol.-%.
Dip: 89.00 m 85° N.

HJE-12c

89.06 - 98.10 : Calcareous biotite - sericite schist
(meta - pelite)
same as: 29.50 - 55.10 m but with biotite being oriented parallel to the major foliation of the rock, scattered idioblasts of carbonate, rare spots of po.

98.10 - 93.10 : Slightly calcareous biotite - sericite schist
(meta - pelite)
same as: 29.50 - 55.10 m but locally with scattered idioblasts of garnet.
Dip: 90.00 m 84° N.

93.10 - 93.85 : Calcareous biotite - sericite schist
(meta - pelite with marble layers)
same as: 78.70 - 79.40 m.

93.85 - 96.90 : Slightly calcareous biotite - sericite schist
(meta - pelite)
same as: 89.10 - 93.10 m.

96.90 - 98.00 : Calcareous biotite - sericite schist
(meta - pelite with marble layers)
same as: 78.70 - 79.40 m.

southwards
downsection

98.00 - 111.30 : Slightly calcareous biotite bear. sericite schist
(meta - pelite)
same as: 79.40 - 87.80 m
101.73 - 101.85 :laminae with low - grade po - mineralization, sulphide amounts to 1 Vol.-%
104.90 - 105.15 :low - grade dissemination of po, 1 Vol.-%.

111.30 - 113.30 : Sericite - biotite rich quartzite
(meta - quartz - sandstone with pelitic impurity)
same as: 63.08 - 63.43 m but only laminated and without carbonate.
Dip: 111.30 m 88° N.

113.30 - 159.40 : Biotite bear. qtz - rich sericite schist
(meta - siltstone)
same as: 29.50 - 55.10 m but with a distinct lamination, biotite crystal aggregates show a preferred orientation, a scarcity are small lenses of carbonate.
Dip: 133.00 m 86° N.

159.40 - 161.85 : Biotite - sericite bear. quartzite
(meta - qtz - sandstone with interbeds of meta - pelite and coarse - grained meta - sandstone)
gr, distinctly layered, thick bands of quartzite with pelite impurity alternate with laminae of biotite - sericite schist and coarse - grained micaceous quartzite, the latter is characterized by elongate clasts of qtz or qtz - fspar max. 1.0 cm in length which are embedded in a quartzy matrix with scattered flakes or crystal aggregates of biotite and lesser abundant of sericite, the contacts between the different layers tend to be sharp, crosscutting veins of carbonate of mm- sometimes cm-thickness are rarely developed.
Dip: 160.50 m 80° N.
Sharp footwall.

161.85 - 163.75 : Slightly carbonaceous biotite - sericite bear. quartzite
(meta - coarse grained sandstone/greywacke)

southwards
downsection

gr, blastopsammitic texture, foliated with linear preferred orientation of elongate clasts and mica flakes, gradual decrease in relict sedimentary grain - size upsection, the continuous gradation however locally is interupted by banded sections of alternate coarse - grained and medium - to fine - grained greywacke layers, furthermore micaceous streaks exist far down in the coarse - grained basis, the fabric of the rock is that of felsic elongate clasts of predominately blue qtz which are equally distributed within a quartzy matrix with scattered flakes or streaks of biotite and sericite.
Dip: 161.85 m 82° N, 162.50 m 81° N, 163.00 m 80° N.
Gradual footwall.

163.75 - 164.65 : Fragment horizon
biotite - sericite - fspar qtz rock
(meta - paraconglomerate supp. meta - tilloide)
gr with light gr clasts, blastopsephitic texture, poorly stratified, foliated with linear preferred orientation of elongate clasts and mica flakes, stretched and flattened subrounded to rounded fragments of vein - qtz - qtz - sandstone and supp. qtz - keratophyr with long dimensions being lesser than 15 cm are scattered in a greywacke matrix with blastopsammitic texture (same as: 161.85 - 163.75), the amount of coarse clasts more suddenly decreases within the hanging portion forming a poorly defined gradation upsection.
Dip: 163.75 m 79° N.
Sharp footwall.

164.65 - 165.65 : Qtz - rich biotite - sericite schist
(meta - pelite)
same as: 29.50 - 55.10 m but with biotite showing a preferred orientation.
Dip: 165.00 m 81° N.

165.65 - 166.05 : Calcareous biotite - sericite quartzite
(meta - coarse grained sandstone/greywacke)
same as: 161.85 - 163.75 m.
Dip: 166.00 m 82° N.

southwards
downsection

166.05 - 173. 65 : Slightly calcareous biotite - sericite - rich quartzite
(meta - fine to medium grained qtz - sandstone interstratified by coarse greywacke layers)
gr, blastopelitic to blastopsammitic texture, distinct grain - size banding composed of alternate fine crystalline phyllosicate dominated layers and medium - grained biotite - sericite rich quartzite bands with poorly developed clastic texture, rare interlayers of coarse - grained meta - sandstone/greywacke with distinct blastopsammitic texture (similar:161.85 - 163.75 m), locally veinlets or idioblasts of carbonate.
Dip: 170.00 m 82° N.

173.65 - 174.50 : Fragment horizon
biotite - sericite - fspar - qtz rock
(meta - paraconlomerate supp. meta - tilloide)
same as: 163.75 - 164.65 m but with sharp hanging wall.

174.50 - 183.10 : Micaceous quartzite
(meta - qtz - sandstone)
gr, laminated with poorly developed lenticular or flaser structure, often strongly isoclinally folded, interlocking qtz - crystals as cm- thick layers and lenses in alternation with mm- thick bands of interleaved sericite which sometimes is accompanied by biotite and garnet.
Dip: 175.00 m 82° N.
Sharp footwall.

183.10 : Slightly calcareous biotite - sericite schist
(meta - pelite)
same as: 29.50 - 55.10 m.

No outcrops
end of profile

RAILROAD PROFILE
(Hjerkinn)

southern part

183.10 m southprolongation from point
527850 6899650 UTM grid, zone 32
Top map. 1519 III HJERKINN

Dr. F. D. Priesemann

southwards downsection

0.00 - 4.80 : magnetite - biotite quartzite
(meta-chert, oxide and silicate facies iron formation)
alternate gr with blackish hint and brownish gr, mm- to cm-compositional banding with some interlayers being dm-thick, always sharp layering contacts, more or less rhythmic alternation of dense ~~fine-grained granoblastic~~ magnetite quartzite with biotite phyllite to biotite schist, scarce intercalations of magnetite poor quartzite, discontinuous band of pyrite bear. sericite schist at 1.40 - 1.42 m.

dip: 0.00m 75°N, 2.00m 74°N, 4.80m 80°N
sharp footwall contact

4.80 - 5.48 : qtz-rich (plagioclase) biotite - amphibole schist
(meta-basalt flow)
gn, medium-grained, nemato blastic texture, biotite as tiny flakes and discontinuous layers always ∥ parallel the major plane of foliation, rare spots of hypidiomorphic py.

dip: 5.48m 70°N
sharp footwall contact.

southwards
downsection

5.48 - 6.07: magnetite quartzite
(meta-chert, oxid facies banded iron formation)
dark gr sporadically with distinct bluish tint, ~~fine-grained granoblastic~~ dense, laminated, close alternation of magnetite quartzite and int-banded quartzite, rare mm-thick crosscutting veins of epidote.
dip: 6.07 m 79°N
sharp footwall contact.

6.07 - 8.50: schistose amphibolite, amphibolite
(meta-~~basalt~~ flow)
gn, fine- to medium grained, partly with nematoblastic texture, crudely layered by tiny bands of qtz-carbonate and/or carbonate, in places spotted carbonate, pyrite is present occasionally, it slightly is enriched (< 2 Vol.-%) between 7.83 - 7.91 m.
dip: 8.00 m 80°N

* 8.50 - 15.17: amphibole bear. biotite-sericite-chlorite schist
(meta-mixed ~~basic~~ mafic volcanic epiclastic sedimentary layer)
gn to grgn, layered with flaser-structure caused by ~~being due to~~ nodules of qtz and carbonate which equally are distributed,

southwards downsection

amphibole forms slightly porphyric needles which are parallel to the planar fissility of the rock, minor bands of carbonate are present between 8.62 – 8.78 m and 9.76 – 10.52 m, a qtz-feldspar interlayer with low-grade dissemination of pyrite occurs at 9.00 – 9.05 m, pyrite is somewhat enriched (< 2 Vol-%) between 12.27 – 12.57 m.

dip: 12.00 m 83° N

sharp footwall contact.

15.17 – 15.24 : magnetite quartzite

(meta-chert, oxide facies banded iron formation)

blackish with distinct bluish tint, extremely fine-grained, dense, laminated by medium-grained schistose amphibolite which in places shows idioblasts of carbonate, chert like magnetite is found within chert as well as in amphibolite, latter carries occasionally some pyrite which forms discontinuous laminae.

dip: 15.24 m 81° N

15.24 – 16.86 : schistose amphibolite

(meta-basalt flow)

southwards downsection

gn, medium-grained, nemato-blastic texture, sometimes with crudely developed plano-fabric (some) Tolic to scattered, tiny nodules of qtz or carbonate
dip: 16.86 m 83° N
sharp footwall contact

16.68 - 16.81 : magnetite - quartzite
(meta-chert, oxide facies banded iron formation)
same as: 15.17 - 15.24 m

16.81 - 18.79 : amphibolite
(meta-basalt flow)
gn, fine- to medium-grained, sporadically epidote veining, rare ~~some~~ spots of py
dip: 17.10 m 85° N

18.79 - 19.63 : qtz-rich biotite bear. sericite-chlorite schist
(meta-altered ~~felsic~~ mafic volcanic tuff)
gn to grgn, fine-crystalline, near footwall keratophyr increase in grain size towards T coarse-grained rock, distinct compositional layering with scarce laminae of biotite.

AA

19.63 - 19.65 : amphibole bear. qtz-fspar rock
(meta - keratophyr)
gr to slightly greenish gr, fine-grained granoblastic with not oriented slightly porphyric needles of amphibole, low-grade dissemination (± 3 Vol.-%) of Py.
dip: 19.63 m 76° N

19.65 - 19.71 : sdistose amphibolite
(meta - basalt flow)
gn, fine-grained, nematoblastic texture.

19.71 - 19.88 : amphibole - qtz - fspar gneiss
(meta - keratophyr with intermittent ~~felsic~~ mafic diff.)
gr to gngr, fine-grained granoblastic qtz-fspar layers which carry slightly porphyric needles of amphibole being oriented at random alternate with laminae of fine-grained amphibolite, pyrite makes up on average 10 Vol.-% of the rock, it occurs as finest dissemination within qtz-bear. and amphibole layers but forms sporadically discontinuous laminae.
dip: 19.88 m 78° N

19.88 - 20.05: massive amphibolite
(meta - basalt flow)
gn, fine- to medium-grained, nemato-blastic texture, rare spots of pyrite.

20.05 - 21.28: calcareous qtz-rich biotite bear. sericite-chlorite schist
(meta - altered mafic volcanic tuff)
gn to lightgn, fine-crystalline, compo-sitional layering with stringers and lenses of carbonate
dip: 20.80 m 78°N

TA/C

* 21.28 - 21.44: amphibole bear. qtz-fspar rock
(meta - keratophyr)
same as: 19.71 - 19.88 m; band of massive pyrite.
dip: 21.30 m 71°N

21.44 - 21.62: magnetite - quartzite
(meta - chert, oxide facies banded iron formation)
dark gr with bluish tint, extremely fine-grained, dense, mm - alternation of magnetite rich and magnetite poor quartzite bands.
dip: 21.62 m 80°N

21.62 - 22.37: amphibolite
(meta - basalt flow)
gn, fine-grained with intersections

southwards downsection

being medium-grained, homogeneous but sometimes distinctly layered, lenses and stringers of carbonate throughout, medium-grade dissemination (< 10 Vol-%) of pyrite at: 21.79 - 22.05 m.
dip: 22.00 m 77° N

22.37 - 22.43: magnetite quartzite
(meta-chert, oxide and sulphide facies banded iron formation)
same as: 21.44 - 21.62, occasionally mm-thick bands of massive pyrite.
dip: 22.40 m 77° N

22.43 - 24.33: plagioclase amphibole schist
(meta-basalt flow)
gn, medium-grained, nematoblastic texture
rare finest spots of pyrite
dip: 22.70 m 79° N

24.33 - 24.83: biotite bear. qtz-rich amphibolite schist
(meta-basalt, flow)
gn, predominately fine-grained, laminated with in places flaser-structure which is due to the tendency of quartz and biotite to form nodules and flasers respectively, rare spots of pyrite.
gradual contact to underlying rock.

24.83 - 25.33: amphibole bear. qtz-rich sericite-chlorite schist
(meta-tuffite)

southwards downsection

gn, laminated with superimposed flaser-structure, rare spots of Py.
dip: 25.00 m 79° N

25.33 - 25.35 : pyrite - sericite - amphibole schist
(meta - slightly altered mafic tuff with silphide impregnation)
gn, fine-grained, preferred orientation of sericite and amphibole, medium-grade dissemination of pyrite (< 15 Vol.-%)

25.35 - 25.50 : sericite bear. qtz-amphibole schist
(meta - mafic tuffite)
gn to grgn, fine- as well as medium-grained, flaser-structure, porphyro-blastic texture due to coarse prisms of amphibole being surrounded by fine-fibrous sericite and fine-grained qtz, rare spots of pyrite.
gradual footwall contact.

25.50 - 29.50 : amphibole bear. qtz-rich chlorite-biotite-sericite schist
(meta - tuffaceous pelitic sediment)
lightgn, porphyroblastic texture, mm-large porphyroblasts of amphibole which randomly are oriented decrease in amount towards downsection, thus

southwards downsection

the rock gradually passes into underlying pelitic schist which carries no amphibole, biotite forms slightly porphyric crystals which ~~early~~ sporadically are aligned along the major foliation of the rock.

dip: 26.00 m 73°N, 29.50 m 79°N

29.50 - 55.10 : biotite bear. sericite schist

(meta-pelite)

gr with slight greenish tint, often with flaser structure, locally passing into laminated rock, porphyroblastic texture, including qtz crystals ~~crystalaggregates~~ as layers or lenses in alternation with ~~with~~ ~~layers~~ of interleaved- fibrous-, parallel sericite, biotite forms porphyroblasts and fascicular ~~crystal~~ aggregates which are oriented at random, it is equally distributed thus causing a spotted appearence of the rock, pyrite sometimes occurs ~~that~~ forming max. 0.2 cm large xenomorphic crystals.

dip: 53.00 m 85° N gradual footwall contact.

55.10 - 58.52 : high calcareous biotite bear. sericite schist

(meta-pelite)

but with scattered idioblasts of carbonate, on average 1 mm across, locally cross-cutting carbonate vein

same as: 29.50 - 55.10 m

C

carbonate vein, the mode of carbonate varies strongly without exceeding 20% by volume of the rock.

dip: 56.00 m 79° N, 58.00 m 84° N

gradual footwall contact.

58.52 - 60.70: slightly calcareous biotite bear. sericite schist

(meta-pelite)

same as: 55.10 - 58.52 m but with lesser carbonate (< 1 Vol.-%).

dip: 59.00 m 81° N

gradual footwall contact.

60.70 - 61.70: calcareous biotite-sericite schist

(meta-pelite)

same as: 55.10 - 58.52 m but with lesser carbonate.

61.22 - 61.30: biotite bear. qtz-fspar rock

(meta-felsic tuff)

gr, fine-grained granoblastic, crudely developed foliation by slight orientation of biotite flakes, low-grade dissemination of idiomorphic crystals of Py on average 0.1 cm

across and fine-grained aggregates of po, ~~total~~ sulphide amounts to max. 10 % by volume of the rock.

61.70 - 61.88: slightly carbonaceous biotite - sericite bear. pyrite - fspar - qtz rock (meta - sulphide-rich felsic volcanic)
lightgr, medium-grained granoblastic, mm - interlayers composed of carbonate - biotite - sericite with subordinate graphite and bands and lenses of carbonate, medium-grade dissemination of mm - large idiomorphic crystals of pyrite, pyrite crystals in places seem to be granulated this forming fine-grained flasers and laminae which are conformable with the phyllosilicate layers, the sulphide amount estimates to 10 to 15 Vol-%.
dip: 61.70 m 77°N
sharp footwall contact

61.88 - 63.08: slightly calcareous biotite bear. sericite schist (meta - pelite)
same as: 58.52 - 60.70 m

62.56 - 62.62: biotite bear qtz - fspar rock (meta - felsic tuff)
same as: 61.22 - 61.30 m

63.08 - 63.43: slightly calcareous quartz - schist
(meta - quartz - sandstone with pelitic impurity)

southwards downsection

lightgr with slightly greenish streaks, flaser structure, interlocking elongate qtz ~~crystal aggregates~~ as layers or lenses in alternation with streaks of fine-fibrous sericite, carbonate forms rare layers of mm to cm thickness.
dip: 63.00 m 88°N
gradual footwall

63.43 – 76.20 : calcareous sericite schist
(meta-pelite with marble layers)
same as: 29.50 – 55.10 m but only locally with cross-biotite, frequent mm-to cm-thick bands of carbonate.
dip: 64.00 m 81°N
gradual footwall

76.20 – 78.70 : carbonate-biotite bear. qtz-rich sericite schist
(meta-qtz-rich pelite)
same as: 29.50 – 55.10 m, carbonate always is bound to qtz thus rarely forming discontinuous layers of mm- to cm-thickness
dip: 73.00 m 84°N
gradual footwall

78.70 – 79.40 : calcareous biotite-sericite schist
(meta-pelite with marble layers)

southwards downsection

same as: 63.43 - 76.20 m but richer in biotite which tends to be oriented parallel to the major foliation / lamination of the rock.
gradual footwall

79.40 - 87.80: slightly calcareous biotite bear. sericite schist (meta-pelite)

same as: 29.50 - 55.10 but with rare cm-thick bands of carbonate which sometimes crosscut the major foliation.
dip: 80.00 to 84° N

87.80 - 88.52: po-mineralization

87.80 - 88.06: biotite - fspar - qtz rock (meta-felsic tuff supp. not meta-chert)

brownish gr, gently foliated, interlocking qtz-fspar sometimes being accompanied by carbonate as lenses in close alternation with interleaved fascicular or bow-tie shaped biotite which occasionally forms wavy layers, low-grade dissemination of po and rare flasers or lenses of interlocking granular po, total sulphide

88.06 - 88.52: biotite bear. quartzite
(meta-chert)
gr, fine-grained granoblastic, scattered mm-large biotite flakes with preferred orientation, low-grade dissemination of po, sometimes flasers and lenses of interlocking fine-grained po, sulphide amount varies between 5 and 10 Vol.-%

88.52 - 88.96: biotite - sericite schist
(meta-pelite)
browngr, laminated, close alternation of mm-thick layers or discontinuous bands composed of either biotite or sericite or qtz, rare spots of po.

88.96 - 89.06: sericite - biotite bear. quartzite
(meta-chert with minor amount in pelitic sediment, silicate facies iron formation)
gr with brown streaks, mainly fine-grained granoblastic, wide development of layering due to tendency of biotite

southwards downsection

and sericite to form streaks and minute bands being in alternation with granular qtz layers and flasers and lenses of po, additional po as finest dissemination, sulphide content amounts to 15 Vol.-%.
dip: 89.00 m 85° N

89.06 - 89.10 : calcareous biotite - sericite schist (meta-pelite)
same as: 29.50 - 55.10 m but with biotite being oriented parallel to the major foliation of the rock, scattered idioblasts of carbonate, rare spots of po.

89.10 - 93.10 : slightly calcareous biotite - sericite schist (meta-pelite)
same as: 29.50 - 55.10 m but locally with scattered idioblasts of garnet.
dip: 90.00 m 84° N

93.10 - 93.85 : calcareous biotite - sericite schist (meta-pelite with marble layers)
same as: 78.70 - 79.40 m

93.85 - 96.90 : slightly calcareous biotite - sericite schist (meta-pelite)
same as: 89.10 - 93.10 m

southwards dowsection

96.70 – 98.00: calcareous biotite - sericite schist
(meta - pelite with marble layers)
same as: 78.70 – 79.40 m

98.00 – 111.30: slightly calcareous biotite bear. sericite schist
(meta - pelite)
same as: 79.40 – 87.80 m
101.73 – 101.85: laminae with low-grade po-mineralisation, sulphide amounts to 1 Vol-%
104.90 – 105.15: low-grade dissemination of po, 1 Vol.-%

111.30 – 113.30: sericite - biotite rich quartzite
(meta - quartz-sandstone with pelitic impurity)
same as: 63.08 – 63.43 m but only laminated and without carbonate.
dip: 111.30 m 88° N

113.30 – 159.40: biotite bear. qtz-rich sericite schist
(meta - siltstone)
same as: 29.50 – 55.10 m but with distinct lamination and biotite crystal aggregates which show a preferred orientation, a scarcity an small lenses of carbonate.
dip: 133.00 m 86° N

159.40 – 161.85: biotite - sericite bear. quartzite
(meta - qtz - sandstone with intebeds of meta-pelite and coarse-grained meta-sandstone)

southwards downsection

gr, distinctly layered, thick bands of quartzite with pelite impurity alternate with laminae of biotite - sericite schist and coarse-grained micaceous quartzite (the latter is characterized by elongate clasts of qtz or qtz-feldspar max. 1.0 cm in length which are embedded in a quartzy matrix with scattered flakes or crystal aggregates of biotite and lesser abundant of sericite, the contacts between the different* layers tend to be sharp, cross-cutting veins of carbonate of mm - sometimes cm - thickness are rarely developed.
dip: 160.50 m 80° N
sharp footwall

161.85 - 163.75 : slightly carbonaceous biotite-sericite bear. quartzite
(meta-coarse grained sandstone/greywacke)
gr, blastopsammitic texture, foliated with linear preferred orientation of elongate clasts and mica flakes, gradual decrease in relict sedimentary grain-size upsection, the continuous gradation however locally is interrupted by banded sections of alternate coarse-grained and medium to fine-grained greywacke

layers, furthermore micaceous streaks exist. far down in the coarse-grained basis, the fabric of the rock is that of felsic elongate clasts of predominately blue qtz which are equally distributed within a quarty matrix with scattered flares or streaks of sio like and sericite.

dip: 161.85 m 82° N, 162.50 m 81° N, 163.00 m 80° N
gradual footwall

163.75 - 164.65: fragment horizon
sio like - sericite - hypar - qtz rock
(meta - paraconglomerate supp. meta - rhyolite)

gr with light gr clasts, blastopsephitic texture, poorly stratified, foliated with linear preferred orientation of elongate clasts and mica flakes, stretched and flattened subrounded to rounded fragments of vein - qtz, qtz - sandstone and supp. qtz - feldspar with long dimensions being less than 15 cm are scattered in a greywacke matrix with blastopsammitic texture (same as: 161.85 - 163.75). the amount of coarse clasts more suddenly decreases within the hanging portion forming a poorly

southwards downsection

defined gradation in section.

dip: 163.75 m 79° N

sharp footwall

164.65 - 165.65: qtz-rich biotite - sericite schist (meta-pelite)

same as: 29.50 - 55.10 m but with biotite showing a preferred orientation.

dip: 165.00 m 81° N

165.65 - 166.05: calcareous biotite - sericite quartzite (meta - coarse grained sandstone / greywacke)

same as: 161.85 - 163.75 m

dip: 166.00 m 82° N

166.05 - 173.65: slightly calcareous biotite - sericite rich quartzite

(meta - fine to medium grained qtz-sandstone interstratified by coarse greywacke layers)

qz, blastopelitic to blastopsammitic texture, distinct grain-size banding composed of alternate fine-crystalline phyllosilicate dominated layers and medium-grained biotite - sericite rich quartzite bands with poorly developed clastic texture, rare interlayers of coarse grained meta-sandstone / greywacke with distinct blastopsammitic texture (similar: 161.85 - 163.75 m), locally veinlets

or idioblasts of carbonate.
dip: 170.00 m 82° N

173.65 – 174.50 : fragment horizon
biotite - sericite - fspar - qtz rock
(meta-paraconglomerate supp. meta-tilloide)
same as: 163.75 - 164.65 m but with sharp hanging wall.

174.50 - 183.10 : micaceous quartzite
(meta-qtz-sandstone)
qt, laminated with poorly developed lenticular or flaser structure, often strongly isoclinally folded, including qtz-crystals as cm-thick layers and lenses in alternation with mm-thick band of interleaved sericite which sometimes is accompanied by biotite and garnet.
dip: 175.00 m 82° N, 181.00 m 88° N.
sharp footwall.

183.10 - : slightly calcareous biotite-sericite schist
(meta-pelite)
same as: 29.50 - 55.10 m.

no outcrops
end of profile

RAILROAD PROFILE
(Hjerkinn)
northern part

24300 m northprolongings from point
527850 6899650 UTM grid, zone 32
Top. map 1519 III HJERKINN

by: Dr. F.D. Priesemann

northwards upsection

0.00 - 9.20 : amphibole bear. biotite - sericite schist

(meta-pelite with basic volcanic impurity)

gr with faint greenish tint, laminated, porphyroblastic texture, close alternation of qtz-dominated bands with phyllosilicate layers, slightly porphyric amphibole and biotite, the latter forming fascicular bundles, being parallel to the major plane of foliation, the mode of amphibole decreases gradually upsection, rare spots of Py.

dip: 5.00 m 80° N

9.20 - 11.80 : calcareous biotite - sericite schist

(meta-pelite)

gr with faint greenish tint, laminated, close alternation of qtz-dominated bands with phyllosilicate layers, biotite forms slightly porphyric crystals which tend to be aligned along the major plane of foliation, tiny scattered idioblasts of carbonate, rare spots of Py.

11.80 - 22.20 : qtz rich biotite bear. sericite schist

(meta-pelite)

same as: 29.50 - 55.10 m (southern part) but normally with parallel biotite, in places mm- or even cm-thick bands of carbonate, sporadically

northwards upsection

cm-thick veins or layers of remobilized milky qtz.

dip: 12.00 m 80° N

22.20 - 43.00 : carbonate bear. qtz-biotite-sericite schist (meta-pelite)

same as: 9.20 - 11.80 m but with higher qtz amount and minor carbonate.

dip: 28.00 m 81° N, 36.00 m 83° N

43.00 - 45.70 : qtz rich biotite-sericite schist (meta-pelite)

similar: 11.80 - 22.20 m

dip: 43.00 m 80° N

X 45.70 - 135.00 : biotite-sericite bear. quartzite (meta-qtz-sandstone with pelitic impurity)

same as: 174.50 - 183.10 m (southern part) but no garnet, dissemination of idiomorphic crystals of mt on average 0.07 cm across

bridge at 96 m

between: 58.00 - 59.00 m, 62.00 - 68.00 m, 68.00 - 73.00 m, 102.00 - 109.00 m.

dip: 58.00 m 86° N, 72.00 m 81° N, 82.00 m 83° N, 106.00 m 80° N, 120.00 m 88° N, 134.00 m 82° N.

135.00 - 135.80 : qtz-biotite-sericite schist (meta-pelite)

similar: 29.50 - 55.10 m (southern part) but qtz-enriched.

northwards upsection

135.80 - 142.00 : biotite - sericite rich quartzite
(meta - qtz - sandstone with pelitic impurity)
similar: 174.50 - 183.10 m (southern part) but no garnet, locally with interlayers of quartzphyllite.

142.00 - 146.00 : qtz rich biotite - sericite schist
(meta - pelite)
similar: 29.50 - 55.10 m (southern part) but strongly isoclinally folded, varying qtz - amount sometimes increasing to form a micaceous quartzite, medium-grade dissemination of Py (5-10 Vol.-%) mainly of idiomorphic crystals average 0.04 cm across.
dip: 146.00 m 90°

146.00 - 150.00 : biotite - sericite rich quartzite
(meta - qtz - sandstone with pelitic impurity)
similar: 174.20 - 183.10 m (southern part) but no garnet.

150.00 - 151.50 : biotite - magnetite - qtz rock
(meta - chert, silicate and oxide facies iron formation)
dark gr., fine - grained, crudely schistose, biotite forms ling idiomorphic crystals

northwards upsection

which equally are distributed, high-grade dissemination of ~~ut~~ mt

dip: 150.50 m 78° S

151.50 - 151.60 : qtz rich biotite - sericite schist (meta-pelite)

same as: 142.00 - 146.00 m

151.60 - 160.00 : qtz - biotite - sericite schist (meta - pelite)

same as: 135.00 - 135.80 m

dip: 158.00 m 90°

160.00 - 201.00 : no outcrop

201.00 - 205.00 : biotite - sericite schist (meta - pelite)

same as: 29.50 - 55.10 (southern part) but often with parallel biotite.

dip: 201.00 m 90°

205.00 - 240.50 : biotite - sericite rich quartzite (meta - qtz - sandstone with pelitic impurity)

same as: 135.80 - 142.00 m

dip: 205.00 m 88° S, 226.00 m 87° S, 235.00 m 87° S, 240.00 m 82° S.

240.50 - 243.00 : qtz rich biotite - sericite schist (meta - pelite)

same as: 135.00 - 135.80 m

dip: 242.00 m 81° S

northwards
upsection

243.00 : no outcrop

Mine area: drill holes

BH 4 location 2600 V - 1275 N
inclination 55° towards N, no deviation measured
length 110.60 m
1957

BH 5 location 1950 V - 1150 N
inclination 50° N
partly deviation
length 208 m
1957

BH 8 location 1700 V - 1140 N
inclination 50° N
deviation not measured
length 168.53 m + (6 m overb)
1957

BH 9 location 2150 V - 1360 N
inclination 50° S
deviation: 80 m 34°
100 m 34°
200 m 16°
length 128.23 m
1957

BH 10 location 2449 V - 1130 N
inclination 50° N
deviation: 100 32°
length 220.34 m + (8m overbu
1957

BH 12

location 2600 V - 1170 N

inclination 60° N

deviation: 175 m 19°
245 m 12°

length: 253.66 m + (3m overb.)

1957

BH 13

location 2700 V - 1280 N

inclination 55° N

deviation: 75m 44°
140m 37°

length: 148.70 m + (4.50 m overb.)

1957

BH 14

location 2350 V - 1225 N

inclination 55° N

deviation: 80 m 30°
115 m 25°

length: 116.50 m + (3.50 m overd.)

1957

BH 16

location: 1885 V - 1360 N

inclination:

deviation:

length: 251.48 m

BH 18

location: 2650 V - 1290 N

inclination: 56° N

deviation: 60 m 33°

length: 140 m + (4.5 m overb.)

1958

BH 20 location: 1240 N - 24.50 V

inclination: 56° N

deviation: 35 m 50°
75 m 42°
115 m 37°

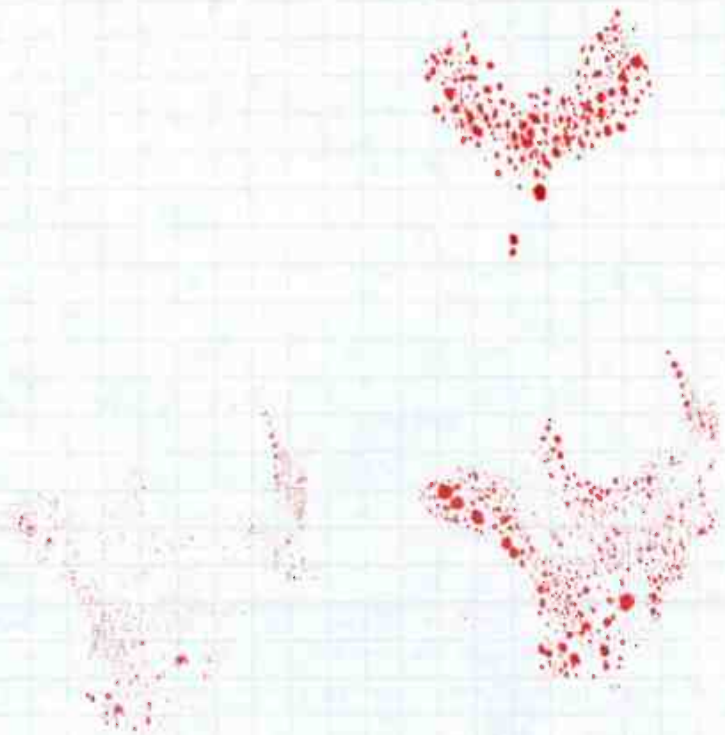
length: 115.97 m + (3 m overb.)

1958

BH 26 location: 2010 V - 12 TON

inclination: 50° S

deviation:



4/1 high carbonaceous chlorite - epidote - amphibole - qtz - fspar rock
(meta - andesite, flow)
gngr, medium grained, widely developed of compositional banding, ~~gradually changing from~~ chlorite - amphibole rich layers changing gradually into qtz - plagioclase dominated bands, amphibole prisms of max. 0.1 cm size and randomly oriented, porphyroblasts, porphyroblasts of hypidiomorphic carbonate equally distributed (spotted carbonate)

titanite

4/2 carbonaceous chlorite bearing epidote - qtz - plag - amphibole schist
(basalt flow)
gngn, fine to medium grained, fibrous amphibole mainly parallel foliation, huge spots of carbonate irregular distributed, mainly hypidiomorphic poikiloblasts in places forming traces of granules being discordant schistosity.

titanite

4/3 epidote - plag. - qtz bear. amphibolite
(meta - basalt, flow)
gn, medium grained, widely schistose, ellipsoidal multi - crystal amphibole,

surrounded by xenoblastic plag-qtz mosaic, low-grade dissemination of opacites sporadically decomposed to titanite

4/4 carbonaceous to high carbonaceous chlorite-epidote bearing amphibole-qtz-fspar rock (meta-andesite/-dacite, flow) slightly ~~gngr.~~ ~~cristaly~~ banded due to amphibole forming sporadically almost monomineralic layers or traces of granites, pleuratic poikiloblasts of amphibole mat. 0.5 cm long, randomly oriented only within more monomineralic amphibole layers slightly aligned with layering, granoblastic qtz-fspar mosaic, hypidomorphic porphyroblasts of carbonate equally distributed, opacites often decomposed to titanite, some rare spots of fine Py

Zeipiel 4/5 porphyroblast of plag. 140/117.6, 11.6/16.2 chlorite: c.qu.for.be.rhomb qu, a grain-boundary

high carbonaceous biotite-sericite bearing chlorite-plagioclase-qtz rock (meta-dacite/-andesite, crystal tuff) light-bluish gr, fine grained, crudely schistose, nebulous texture (pp. due to high carb. content and alt. phyllosilicates strongly parallel, sometimes cross-biotite, spotted carbonate mainly

con. rippr. 10/6

as xenomorphic crystals, finely dispersed titanite sometimes forming discontinuous traces of granules.

4/6 slightly carbonaceous qtz - plag - epidote bearing amphibole schist
(meta - basalt flow)
gn, fine grained, fibrous amphibole always parallel schistosity, irregular qtz and carbonate veining, sometimes only stringers, opaques totally decomposed to titanite

4/7 high carbonaceous epidote - biotite - chlorite bear. qtz - amphibole - plagioclase rock
(meta - andesite - flow / tuff)
C greenish gr, fine grained, porphyroblasts and poikiloblasts of amphibole randomly oriented, phenos mat. 0.4 cm large, spotted carbonate idiomorphic and hypidiomorphic porphyroblasts randomly large 0.1 cm often forming crystal aggregates, low-grade dissemination of Py

chlorite, example for 4/7 - matrix grain, & biotite - idiomorphic

Beispiel

4/8 high carbonaceous epidote bear. biotite - amphibole - chlorite - qtz - plagioclase rock
(meta - andesite - flow / tuff)
greenish gr, fine grained with poikiloblasts

example for 4/7 highly altered

AA/C

chlorite: carbonate

of biotite equally distributed and randomly oriented, nebulous texture due to high alteration, spotted carbonate as often irregularly shaped grains or grain aggregates, low-grade dissemination of Py

4/9
11/C

high carbonaceous chlorite-qtz-biotite-plagioclase rock
(meta-andesite-flow/tuff)
bluish greenish gr, fine grained with huge poikiloblasts of biotite equally distributed, crystals mat. 0.2 cm large forming often aggregates which reach 0.4 cm size, nebulous texture due to intense alteration, spotted carbonate sometimes forming crystal aggregates of bigger size, qtz and plagioclase form granoblastic mosaic with sutured grain boundaries especially between adjoining fspar-crysts.

chlorite-carbonate above

4/10
11A/C

carbonaceous plag. bear biotite-qtz-chlorite schist
(meta-basalt-flow)
gn, ~~fibrous chlorite with cementation cleavage~~, ~~often forming~~ wavy lenticular texture, qtz mainly accreted within lense shaped crystal aggregates, fine-fibrous chlorite with

chlorite: significant birefringence, willkeurig, a little brown

(max 10 × 0.3 cm)

cremilation cleavage, some huge ↑ clots of biotite irregularly distributed, finest spots of carbonate often accreted to slightly bigger spots, random crosscutting veinlets of carbonate

4/11 carbonaceous biotite - qtz - plagioclase - chlorite
11A/C schist
(meta-andesite / -basalt - flow / tuff)
blastoporphyritic, widely laminated, ~~weak~~ lenticular ~~texture~~ mainly ~~mainly~~ lepidoblastic ↑ due to extreme alteration, distinct accretion of qtz and plagioclase by metamorphic differentiation, spotted carbonate often irregularly shaped sometimes crystal-aggregates, in places lamina or stringers rich in felsic components surrounded by huge crystals of biotite, low-grade dissemination of Py

4/12 carbonaceous biotite - qtz - plagioclase - chlorite
11A/C schist
(meta - basalt - tuff)
- fibrous chlorite
gn, fine ~~grained~~ ↑ tuffite occasional huge poikiloblasts of biotite randomly aligned with foliation, widely cm-banded, alteration of chlorite-dominated layers with bands rich in qtz and ~~or~~ plagioclase,

banding only partly due to metamorphic differentiation, carbonate mainly as lenseshaped large spots equally distributed (multi-crystal pseudomorphs of idio. carbonate), low-grade dissemination of Py

4/13 carbonaceous biotite-qtz-chlorite schist
XA/C (meta-basalt-flow)
fine-fibrous chlorite,
gn, widely development of wavy lenticular bedding, irregular veins, veinlets, nodules, stringers of qtz randomly accompanied by carbonate but sometimes carrying cp and po or Py as irregular stringers, carbonate as giant spots of ellipsoidal shap (multi-crystal aggregate), mt as irregular crystal aggregates equally distributed.

chlorite-albite bio. product of biotite: hellgrün-millbrün, ∆ mole H - Kieferstein

4/14 carbonaceous biotite-chlorite-pyrite-plagioclase rock
XA/C Py (low-grade pyrite ore, felsic volcanic of dacitic compos.)
sign, medium grained, widely layered, mm to cm alternation of chlorite-biotite layers with pyrite-plagioclase bands, seemingly gradual borders, plagioclase as idiomorphic crystals max 0.1 cm size (spotted plag.), carbonate

as minute spots or sometimes as slightly bigger crystal aggregates mainly equally distributed, low-grade Py dissemination which sometimes increases towards medium-grade ore.

14/15 slightly carbonaceous biotite bear. pyrite-qtz-sericite schist
(meta-pelite with low-grade diss. of Py)
gr. crudely layered but mostly wavy lenticular texture, lenses and discontinuous
Py bands of qtz rich in disseminated Py, poikiloblasts of biotite equally distributed (clots-mica), low-grade dissemination of pyrite throughout, often idiomorphic crystal faces.

14/16 carbonaceous pyrite-sericite bear. biotite-
AA/C chlorite-qtz schist
(feeder basalt)
biotite gr., coarse grained, chaotically folded, nodules, stringers, bands of qtz surrounded by biotite-chlorite often rich in carbonate carrying idiomorphic crystals of pyrite of max. 0.2 cm size, additional low-grade dissemination of iron-titanium oxides.

chlorite-biotite-schist ca above & green

31.90 - 34.00: 4/1

33.17 - 33.20: several bands of massive po and py in alternation with qtz-plagioclase and amphibole layers, tight section.

34.00 - 35.90 4/2

35.90 - 39.80 see 4/1

39.25 - 40.75: amphibole idist
gn, fine grained, fibrous amphibole, in places ~~slightly~~ biotite bear, ~~frozen~~ ~~veins~~ closely interfingering by tiny veins of qtz often being conformable with foliation, rare spots of py

40.75 - 42.80: 4/3

42.75 - 42.80: felsic layer with medium-grade py dissemination

42.80 - 44.55: amphibole idist
see 39.80 - 40.75, sometimes huge nodules of qtz
43.39 - 44.09: felsic layer with high grade py
qtz. resa. section is cut by a small fault

44.55 - 45.40: carbonaceous to high carbonaceous amphibole-biotite bear. chlorite-qtz-plagioclase rock
(meta-dacite, tuff)
1/C
see also 4/5
green/grey, fine grained, wavy lenticular texture, remaining to lapilli tuff, qtz nodules of max 0.5 cm size equally distributed and aligned with foliation, nebulous texture due to alteration, carbonate as minor spots and sometimes limits.

45.40 - 46.65: carbonaceous - plagioclase - chlorite - amphibole idist
(meta-basalt. flows)
gn to grgn, fine grained, sometimes un layered, wave alternation of qtz with amphibole bands, irregular qtz veining throughout

texture very close to banded amphi? 46.65 - 52.00: 4/4 sometimes cm interlayers of qtz-bearing with low-grade py: 48.00, 47.65, 50.70 - 50.82,

52.00 - 53.80: high carbonaceous biotite bear amphibole - chlorite - qtz - plagioclase rock
(meta-andesite-flow)
4/C
slightly bluish green/grey, fine grained with porphyric phases of amphibole being both conformable and ~~discordant~~ to randomly oriented, phases max. 0.1 cm size, often nebulous texture, sometimes irregular shaped qtz nodules or bands, spotted carbonate

53.80 - 54.20 : 4/5

54.80 - 59.70 : high carbonaceous amphibole bearing biotite - chlorite qtz - plagioclase rock / schist (meta-andesite flow / tuff)

11/C

see 4/8 and 4/9

slightly greenish grey, mostly massive but sporadically well bedded, in places strong variation in modal composition grading into high carbonaceous chlorite - qtz - plagioclase - biotite rock, fine grained with poikiloblasts of biotite being aligned with layering or randomly oriented, sometimes cm interlayers of qtz - Py always with some Py : 58.70 - 58.80, 58.73 - 58.75, 59.15 - 59.25,

59.70 - 60.30 : 4/6

interlayers of qtz - Py with rare spots of Py : 60.96 - 61.00

60.30 - 77.30 : 4/7

some sections highly altered to high carbonaceous biotite - chlorite - qtz - plagioclase rock / schist see 4/8 and 4/9 : 66.00 - 67.00, 67.90 - 69.00, 72.00 - 77.30

AA/C

77.30 - 94.55 : 4/10, 4/11, 4/12, 4/13

giant spots of mt : 93.60 - 94.25

feeder 93.50 - 94.55 at hanging wall sometimes bands of pure biotite schist

94.55 - 95.10 : 4/14

95.10 - 95.25 : chert with some laminae of Py and Po

95.20 - 95.70 : see 4/16 feeder

95.20 - 96.25 : 4/15

96.25 - 96.50 : 4/16 feeder

96.50 - : Py ore

98.25 - 98.60 : chert

DIAMOND DRILL HOLE 4

Trollfjellet mine, Folldal Verk A/S. Exploration hole from 1957.
Location: 2600 V – 1275 N
Inclination: 55° N, no deviation measured
Total length: 113.20 m (2.60 m overburden)

Description:

0.00 – 27.25: slightly carbonaceous garnet bear. biotite-sericite schist
(meta-pelite)
lightgr., layered with wavy-lenticular texture, alternation of qtz with phyllosilicate, qtz-poor layers or stringers, poikiloblasts of biotite randomly oriented (cross-mica)
5.33 – 5.53: sericite bear. quartzite (sed.)
lightgr., fine grained, massive, some irregular spots and traces of granules of carbonate.
25.20 – 25.40: slightly carbonaceous garnet-chlorite bear. biotite-sericite schist (garben-schist)
A
(meta-pelite)
see above, poikiloblasts of chlorite mat. 1.5 cm size randomly oriented, pseudomorphs after amphibole

27.85 - 31.90: slightly carbonaceous biotite - sericite schist
(meta-pelite in places tuffaceous meta-pelite)
gr to brownish gr, layered with in places wavy-lenticular bedding, biotite often aligned with foliation in places forming discrete lamina, sporadically porphyroblasts of amphibole which in places are altered to chlorite (chlorite-pseudomorphs), locally medium-to even high-grade dissemination of py always connected to highly altered dacitic layers (high carbonaceous biotite - chlorite-qtz-plagioclase schist): 30.40 m, 32.20-32.25 m

AA/C
gradual hanging wall >

31.90 - 34.00 high carbonaceous chlorite - epidote - amphibole - qtz - fspar rock
(meta-andesite, flow)
gngr, medium-grained, mildely development of compositional banding, chlorite-amphibole-rich layers gradually change into qtz-plagioclase dominated bands, amphibole prisms max. 0.1 cm long and randomly oriented (porphyroblasts), porphyric, hypidiomorphic crystals of carbonate (spotted carbonate)

C

33.17 - 33.20: several mm - bands of nearly massive po and py in alternation with qtz and amphibole layers.

34.00 - 35.90: carbonaceous chlorite bear. epidote - qtz - plag. - amphibole schist
(meta-basalt, flow)
grey, fine-to medium-grained, fibrous amphibole mainly parallel schistosity, disseminated huge spots of carbonate, mainly as hypidiomorphic poikiloblasts which in places form traces of granules being discordant schistosity
sharp hanging wall
45°

35.90 - 39.85: high carbonaceous chlorite - epidote - amphibole - qtz - fspar rock
(meta-andesite, flow)
same as: 31.90 - 34.00
several interlayers of qtz-fspar rock (qtz-keratophyr) with high-grade dissemination of py: 36.20 - 36.22 m, 36.25 - 36.28 m, 36.35 - 36.37 m, 36.85 - 36.90 m mainly basaltic
20 Vol-%, 39.80 - 39.85 m
45°
sharp hanging wall

39.85 - 40.75: amphibole schist
(meta-basalt, flow)
gn, fine-grained, fibrous amphibole, in places biotite bearing, closely interfingered by tiny veins of qtz often being conformable with schistosity, rare spots of Py
gradual hanging wall

40.75 - 42.80: epidote - plag. - qtz bear. amphibolite
(meta-basalt, flow)
gn, medium-grained, crudely schistose, ellipsoidal multi-crystal amphibole surrounded by xenoblastic plag. - qtz mosaic, low-grade dissemination of opaques which sporadically are decomposed to titanite, qtz - plagioclase rock (qtz-bearalophyr) with medium-grade dissemination of Py: 42.75 - 42.80 m
sharp hanging wall

42.80 - 44.55: amphibole schist
(meta-basalt, flow)
same as: 39.85 - 40.75 m
sometime clots of qtz with sutured boundaries
42.39 - 44.07: qtz - fspar rock (qtz-bearalophyr) with high-grade py, cut by small fault
gradual hanging wall

44.55 - 45.40: carbonaceous to high carbonaceous amphibole - biotite - sericite (var. chlorite - plagioclase - qtz rock)
(meta - dacite, tuff) see too 53.80 - 54.80 m
A/C
greenish gr, fine-grained, nebulous texture due to alteration, chidely developed wavy-lenticular texture remaining to lapilli tuff, qtz - nodules of max. 0.5 cm size equally distributed and always parallel to a slight foliation, carbonate as minor spots but sometimes as stringer limps.
sharp hanging wall

45.40 - 46.65: carbonaceous - plagioclase - chlorite - amphibole schist
(meta - basalt, flow)
gn to grgn, fine-grained, sometimes cm-layered, here alteration of qtz - with amphibole bands, irregular qtz - veining throughout.
gradual hanging wall

46.65 - 52.00: carbonaceous to high carbonaceous chlorite-epidote (var. amphibole - qtz - fspar rock)
(meta - andesite / - dacite, tuff or flow)
slightly gygr, banded due to amphibole forming sporadically almost monomineralic layers of traces of granules, texture very close to banded amphibolite, amphi-

dole with prismatic outlines, porfiloblasts max. 0.5 cm long randomly oriented but slightly aligned with layering within more monomineralic amphibole layers, granoblastic qtz-fspar mosaic, hypidiomorphic porphyroblasts of carbonate equally distributed, opaques (Fe-Ti oxides) often decomposed to titanite, some rare spots of tiny Py, sometimes intralayers of qtz-fspar rock (qtz-feldspar porphyr) with low-grade Py: 48.00 m, 47.65 m, 50.70-50.82 m.

gradual hanging wall
60°

52.00 - 53.80 : high carbonaceous biotite bear. amphibole chlorite - qtz - plagioclase rock
(meta-andesite, flow)

C

A/C

dkish greenish gr, fine-grained, often nebulous-bt-like prisms of amphibole being conformable and randomly oriented, porphyroblasts mainly 0.1 cm long, sometimes nodules or bands of qtz, spotted carbonate
gradual hanging wall

53.80 - 54.80 : high carbonaceous biotite - sericite bear. chlorite - plagioclase - qtz rock
(meta-dacite, crystal tuff)

A/C light bluish gr., fine-grained, crudely schistose, undulous-texture supposely due to high carbonate content and alteration, phyllosilicates strongly parallel, sometimes cross-biotite, spotted carbonate mainly as xenomorphic crystals, finely-dispersed titanite sometimes forming discontinuous traces of granules.
gradual hanging wall.

54.80 - 59.70: high carbonaceous amphibole bear. biotite-chlorite - qtz - plagioclase rock / schist (meta-andesite, flow or tuff) see too 66.30 - 77.30 m. AA/C - sections

AA/C slightly greengr., mostly massive but sporadically well bedded, fine-grained with poikiloblasts of biotite being aligned with layering or randomly oriented, in places highly enriched in biotite, sometimes cm-interlayers of qtz-fspar rock (qtz-keratophyr) always carrying some py: 55.70 - 55.80 m, 58.73 - 58.75 m, 59.15 - 59.25 m.
sharp hanging wall.

59.70 - 66.30 : slightly carbonaceous qtz - plagioclase - epidote bear. amphibole schist
(meta - basalt, flow)
gn, fine-grained, fibrous amphibole always parallel schistosity, irregular qtz and carbonate veining, sometimes only stringers, opaques decomposed to titanite, interlayers of qtz - fspar rock (qtz - bearing type) with rare spots of Py:
60.96 - 61.00 m.
sharp hanging wall.

66.30 - 77.30 : high carbonaceous epidote - biotite - chlorite bear. qtz - amphibole plagioclase rock
(meta - andesite, flow or tuff)
greenish gr, fine - grained, porphyroblasts of amphibole randomly oriented, prisms max. 0.4 cm long, spotted carbonate as hypidiomorphic and idiomorphic porphyroblasts randomly larger 0.1 cm, often crystal aggregates of carbonate, slightly mineralized by Py, some sections highly altered to high carbonaceous epidote bear. biotite - amphibole - chlorite - qtz - plagioclase rock or high carbonaceous chlorite - qtz - biotite - plagioclase rock
greenish gr, fine - grained with poikiloblasts of biotite equally distributed and

randomly oriented, vesicular texture due to extense alteration, spoked carbonate often as irregularly-shaped grains or grain aggregates, slightly mineralized by py : 66.00 - 67.00 m, 67.90 - 69.00 m, 72.00 - 77.30 m. gradual hanging wall.

77.30 - 93.60 : X carbonaceous plag. bear. biotite- qtz-chlorite schist

(meta-basalt, flow and tuff)

gn, fine-fibrous chlorite with occasional large poikiloblasts of biotite randomly aligned with schistosity, crudely development of wavy-lenticular texture, in places crudely cm-banded with alternate chlorite-dominated layers and qtz- and/or plagioclase-rich bands, banding when present only partly due to metamorphic differentiation, chlorite always with distinct crenulation cleavage, finest spots of carbonate often accreted to bigger (giant) spots which normally are lense-shaped and equally distributed (multi-crystal carbonate), random cross-cutting rivlets of carbonate, slightly

AA/C

mineralized by py, irregular qtz-veining throughout, sometimes mineralized by py and/or po. gradual hanging wall.
45°, 75.20 m D, 80.70 m 65°, 84.80 m 60°, 85.30 m D, 89.85 m D, 90.85 m 45°, 93.05 m 40°

93.60 - 94.55 : carbonaceous biotite - qtz - chlorite schist
(meta-basalt, flow, feeder)
gn, fine-fibrous chlorite, widely development of wavy-lenticular bedding, irregular veins, veinlets, nodules, stringers of qtz randomly accompanied by carbonate but sometimes carrying cp and po or py as irregular stringers or spots, carbonate as giant spots of ellipsoidal shape (multi-crystal aggregate), but as huge irregular shaped spots equally distributed, at hanging wall some interlayers of pure biotite-schist
sharp hanging wall

AA/giant C feeder

94.55 - 95.10 : carbonaceous biotite - chlorite - pyrite - plagioclase rock
(meta-felsic volcanic supp. dacitic composition)

grgn, medium-grained, widely layered, mm- to cm-alteration of biotite-chlorite layers with pyrite-plagioclase bands, mostly gradual borders, plagioclase as idiomorphic crystals (shortprismatic) max. 0.1 cm size (spotted plag.), carbonate as minute spots and sometimes as bigger crystal-aggregates equally distributed, average low-grade dissemination of py
sharp hanging wall

AA/C disseminated ore

95.10 - 95.25: quartzite
(chert or qtz-keratophyr)
gr, fine-grained, massive, some tiny stringers or lamina of py and po
sharp hanging wall

95.25 - 95.70: carbonaceous pyrite-sericite bear. biotite-chlorite-qtz schist
(meta-basalt, feeder)
brownish, coarse-grained, chaotically folded, nodules, stringers, bands of qtz within a biotite-chlorite matrix with abundant carbonate, phyllosilicate matrix contains low-grade dissemination of iron-titanium oxides

AA/C feeder

within idiomorphic py of max. 0.2 cm size

sharp hanging wall

95.70 - 96.25 : slightly carbonaceous biotite bear. pyrite - qtz - sericite schist (meta - pelite)

low-grade dissemination of Py

gr, crudely layered but mostly wavy-lenticular texture, lenses and discontinuous bands of qtz rich in disseminated py, poikiloblasts of biotite equally distributed (cross - mica), low - grade dissemination of pyrite throughout, often idiomorphic crystal faces

sharp hanging wall
40°-35°

96.25 - 96.50 : carbonaceous pyrite - sericite bear. biotite - chlorite - qtz schist (meta - basalt, feeder)

AA/C feeder

same as: 95.25 - 95.70 m

sharp hanging wall

96.50 - 110.60 : Py-ore (massive sulphide layer)

medium-grade, massive, intercalation of dust with irregular sulphides: 98.25 - 98.60 and altered basalt: 106.43 - 106.93 m, 108.60 - 109.10 m.

110.60 m end of DDH

Chemical composition of ore:

96.50 - 99.30 m = 2.80 m = 0.40 % Cu, 1.70 % Zn, 36.75 % S

99.30 - 102.91 m = 3.61 m = 1.60 % Cu, 1.00 % Zn, 41.10 % S

102.91 - 106.43 m = 3.52 m = 1.26 % Cu, 1.15 % Zn, 27.15 % S

106.43 - 110.60 m = 4.17 m = 0.80 % Cu, 1.50 % Zn, 36.00 % S

Thin sections:

4/1	33.60 m
4/2	34.70 m
4/3	41.80 m
4/4	49.40 m
4/5	54.50 m
4/6	60.55 m
4/7	69.60 m
4/8	73.75 m
4/9	75.90 m
4/10	77.60 m
4/11	83.60 m
4/12	92.40 m
4/13	94.20 m
4/14	94.80 m
4/15	95.85 m
4/16	96.40 m

Tverrfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

PAGE 1

From	To	Description BH 4	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
slightly garnet carbonaceous		bearing biotite - chlorite schist (dacitic volcanic)									
	27.85	lightgr. spotted bio, well layered,									
		occasionally lapilli tuff structure,									
		idiomorphic garnet up to 0.5 cm size, increasing biotite towards hanging dark tuff									
		5.33 - 5.53: chlorite schist with lepos (bio) plugs.									
		massive fine grained chlorite (pseudomorph amphibole)									
		25.20 - 25.40: 1.0 cm large ~~amphibole~~ biotite randomly orientated, only some ~~increasing~~ carb.									
27.85	28.18	lapilli tuff ~~is~~ maybe agglomeratic vol felsic,									
		cm to mm layering, high gt, high biotite and sometimes									
		spherulites of biotite pseudomorph amphibole,									
		in places relict of amphibole, ~~carb~~									
		randomly orientated, up to 20 cm size									
		carbonate as lenses and spots									
28.18	32.25	carbonaceous biotite - chlorite schist (dacitic tuff) sometimes lapilli									
		gr. well bedded, spotted carb,					high carb 28.50m, 30.20 m				
		py diss. in laminations: 30.40 m, 32.20 - 32.25 m 1dm ne 40 Vol-%									
		32.25 to 32.95 amphibole bearing 0.1-0.2 cm amphibole randomly oriented see 10/33									
31.90	34.00	high carbonaceous amphibole - chlorite rock (andesitic flow)					4/1 33.60				
		gr. medium grained, randomly orientated amphibole									
		needles, spotted carb, see also sample 10/20									

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DIAMOND DRILL LOG

Tverrfjellet

FOLLDAL VERK A/S

PAGE 2

From	To	Description BH 4	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
34.90	96.50	basalt section			4/2	34.70 m					
		first description on page 5 ~~mostly fine crystalline, flow type rock predominates~~									
		~~34.00 - 39.80 : spotted carbonate~~		39.50 massive		py occ 5cm thick, 45° cax					
		40.75 - 42.80 : medium crystalline same as 10/22			4/3	4.50 m					
		43.20 - 44.20 : hyaloplytic section with high py ore (sometimes stressed) disturbed borders								silpiede at 175.25m BH 10	
●		44.20 - 45.30 : carbonaceous basalt (flow) spotted, fine to medium cryst, mostly massive, in places chloritic									
		46.65 - 50.00 : basaltic to intermediate tuff, high carbonaceous (spotted), 0.1 - 0.5 cm amphiboles									
4/4		randomly oriented (looks too 176.24 to 177.00 m BH 10 10/23), med cryst, well layered on scale in places 1cm to mm hyaloplyr interlayers									
		50.00 - 50.80 : hyaloplyr and with spots of py and stringers 3 Vol % (40° cax)									
		50.00 - 59.70 : medium crystalline basalt (mainly flow), med in carbonate, spotted texture, decreasing amphibole towards middle part, here more chlorite and biotite, often very homogeneous, some parts really rich in biotite hornblende from 53.75									
4/5		normally good layered (tuff) (54.73 and 58.73 m), some spots of py sometimes bands of felsic mat									
●		55.70 - 55.80 : hyaloplyr interlayer, 20° cax, with some stringers py 2 Vol - %									
		59.70 - 63.30 : basalt (flow)									
4/6		fine grained, 45° cax, interlayered some cm bands of high chlorite here too py spots									
		visable, irregular carbonate (fuzzy bodies) small stringers, veinlets often crosscutting									
		63.30 - 64.70 : carbonaceous basalt (flow to tuff)									
		med. to fine grained, finest network of carbonate veins, spots sometimes fuzzy 0.5 cm bodies, 40° cax, banded and massive									

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH 4	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		64.70 - 64.80 : basalt see 59.70 - 63.30 m (flows)									
		64.80 - 72.40 : carbonaceous basalt (tuffaceous foot wall flow)									
		4/4 med. crystalline, slightly layered, often homogeneous, spotty carbonate									
		in places biotite - chlorite assemblages (66.10 - 66.70 m) (high carbonate spotted)									
		45° cax									
	72.40 -	: altered carbonaceous to high carb basalt (flow) slightly andesitic									
		amphibole - biotite - chlorite assemblage, med crystalline,									
		massive and homogeneous, spotted bio + carb, bio pseudomorph amphibol,									
		sometimes carb veins, 45° cax, slowly increasing alteration factor,									
		75.20 :), 80.70 : 65° cax, 84.80 : 60° cax, 85.30° :), 89.85), 90.85 45° cax,									
		79.30 - 79.45 : qtz keratophyre tonb, may be intolayer, spots of PO									
		80.25 qtz keratophyre tonb also 81.60 m, 81.90 m, 82.90 m, 83.15 - 83.30 m,									
		81.95 - 82.50 : qtz keratophyre intolayer (flow), upper post tonb, sharp walls									
		(high 4) 82.75 - 82.77 : " "									
		83.80 - 83.90 : qtz keratophyre intolayer, small dics of PO, 70° cax									
		84.60 - 84.75 : " , sharp irregular borders									
		85.30 - 85.35 : " , as cm layer									
		85.45 : end of qtz keratophyre									
		85.60 : "									
		87.50 - 87.80 : qtz keratophyre intolayer, sharp borders									
		alt. tuf. int → 88.00 - 88.30 : "									

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

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PAGE 4

From	To	Description BH 4	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		89.60 - 89.70: Keratophyr band									
		90.50 - 90.55: "									
		90.80 - 90.90: " with fine discs of po < 1 Vol %									
		Keratophyr: 93.05 (40° cax), 93.60, 93.88 with good po + py, 94.20 with cy and po (40° cax).									
		93.60 - 94.30: spots of mt in altered basalt									
		94.25 - 94.50: Keratophyr with stringers and spotty po 2 Vol-% and cp									
		94.85 - 95.10: High carb. chlorite-biotite rock with po dissemination partly reaching 60 Vol-% widely banded appearance									
4/14											
		95.10 - 95.20: Keratophyr with mm bands of po and py sometimes spotty 2 Vol-%									
		95.20 - 95.70: high altered basalt with spotty py < 1 Vol-%									
		95.70 - 96.25: carb sericite-biotite-chlorite schist (~~inclusions~~ pelsic vol) spotted biotite of 0.1 to 0.2 both randomly orientated well layered mm to cm scale discs py mostly arranged in cm bands 10 Vol-% border sharp 40-35° cax									
4/15											
		96.25 - 96.50: Coarse crystalline altered basalt spotty cy and py									
4/16											
		(Grab sample: cy, py)									

Tverrfellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH 4	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		sample 4/1 33.60 m	sample 4/12	92.40 m							
		sample 4/2 34.70 m	" 4/13	94.20 m							
		" 4/3 41.80 m	" 4/14	94.80 m							
		" 4/4 49.40 m	" 4/15	95.85 m							
		" 4/5 54.50 m	" 4/16	96.40 m							
		" 4/6 60.55 m									
		" 4/7 69.60 m									
		" 4/8 73.75 m									
		" 4/9 75.90 m									
		" 4/10 77.60 m									
		" 4/11 83.60 m									
		basalt section									
		34.00 - 35.90: medium cryst. well foliated, 45° ca., spotted carb. (flow)					4/2 34.20			target flow [redacted]	
		35.90 - 39.80: med. cryst, layered more crudely, 0.1 to 0.3 mm amphibole needles randomly orientated, spotted carbonate, in places chloritic and biotitic, homogeneous									
		36.20 Py ore band 45° ca (2 cm) high-grade									
		36.25 Py " " (3 cm) "									
		36.35 Py " " (2 cm) "									
		36.85 Py dissem in basalt 20 Vol-% (5 cm)									
		39.80 - 39.85 Py ore ~~band~~, massive			45°						

13/2 garbenschist
high carbo. biotite bearing po- sericite - qtz rock

13/8 } high carbonaceous ~~biotite~~ - ~~garnet~~ ~~bearing~~
13/9 } chlorite bearing garnet - po - qtz rock

79.30 13/11 carbonaceous garnet bearing biotite - chlorite - fspar qtz schist/rock
(meta - tuff, tuffite, intermediate comp., altered).

13/25 ~~biotite~~ carbonaceous epidote bear. garnet - chlorite - amphibole - qtz - fspar rock
(meta - intermediate / felsic volcanic)

Trondfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

PAGE 1

BH 13 D

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		overburden (?)									
	24.00	carbonaceous (biotite - garnet - diopside) schist (dacitic tuff to lapilli tuff)				start correlates with 115.00 m BH 10					
		light grey, fine crystalline, mm to cm lenses (nodules) of quartz and or carbonate concordant (sometimes lithic to lapilli tuff), 40° cax, 50° cax at 28.30 m, from about 24.10 m significant spotted texture (biotite)				sample 13/1				10.30 m	
		14.50 - 17.00: randomly oriented amphibole (homogeneous, additional) porphyroblasts, amphibole 0.3 - 2.0 cm in size and with actinolites at 17.80, 17.90								supposely correlates with 10/31, 10/18 and 10/32 BH 10	
		18.40 - 18.60: massive quartzite									
		20.30 - 20.50: quartzite interlayer (sedimentary?) rich, homogeneous, massive									
		19.80 - 21.00: quartz-wacke-phyr tuff carbonaceous, biotite - garnet rock (diopside - orthoclase porphyroblasts) in places needles of amphibole bands of highly altered sulphide (pyrrhotite)									
		21.30 - 24.10: see 14.50 - 17.00				sample 13/2				22.50 m	
		33.60 - 38.00: garnet, mm to occasionally cm garnets often idiomorph.				sample 13/3				29.00 m	
		41.70 - 74.00: "	12° cax afterwards mostly flat			sample 13/4				42.30 m	
						sample 13/5				53.00 m	
						sample 13/6				62.90 m	
						sample 13/7				72.30 m	

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DIAMOND DRILL LOG

FOLLDAL VERK A/S PAGE 2

From	To	Description 24-13	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
74.00	78.30	ore horizon magnetitic impregnated carbonate rich qtz-sericite-chlorite schist	sericite-pyrite-chlorite				sample	13/8		74.30 m	
		massive to network like py mineralization in places					sample	13/9		76.90 m	
		accompanied by strongly					sample	13/10		77.80 m	
		very inhomogenic habit, sometimes looking like recrystd. pyroclastic - lapilli - texture,									
		grade of mineralization slowly outfalying to									
		the hanging wall, highest concentration about									
		74.80 m, highly destructiv textire at 77.60 may be fault plane									
		77.80 - 78.30: pyrite bearing chlorite-amphibole schist (basalt?)						77.80 - 78.30			
		qtz, highly destructiv texture, lenses of qtz irregular							1st fracture zone		
		embedded in a wild mass of chlorite and amphibole schist, and accompanied									
		carbonate, ~~impregnated stringers and veinlets~~									
		~~N-qtz~~ ~~veinlets mostly parallel to foliation~~									
		~~carbonaceous to~~ rock									
78.30	85.50	high carbonaceous ~~garnet~~ chlorite-sericite schist (intermediate lapilli tuff or arenite)		dacitic							
		light gr, fine crystalline, ~~intensive~~ lenticular texture, mm to cm									
on	C	nodules and lenses of qtz and carbonate (may have been lapilli tuff),						sample 13/11		79.30 m	
		spotted carbonate 80° cax, spotted pyrite garnet concentration									
		stark, varying sometimes ~~garnet~~ masses concentrated in									
		~~mineralized~~ mineralized bands, some spots of py									
		~~carbonaceous~~ rock 2. activation ~~schist~~ schist (basalt to andesite ?)									
85.50	end	gr to light gr, fine to medium crystalline									

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH-13	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
85.50	88.20	garnet - biotite - amphibole - chlorite schist/rock (dacitic flow)					correlates with BH 10				10/3
		grgn. fine grained, porphyritic amphiboles					correlates with 18/1				
		as 0.2 - 1.5 cm rare randomly orientated,									
		banded, in places amphibole accumulates within			65°						
zone III		cm bands,									
88.20	91.00	andesitic flow (chlorite bearing plag. amphibole rock)									
		grgn, fine to med grained, massive					sample 13/12			84.00 m	
		slightly porphyritic texture, amphibole					correlates 30 - 31 m BH 18				
		randomly orientated,									
91.00 III	91.60	basalt flow (plagioclase amphibole rock)									
		gn, fine grained, massive, some									
		irregular carbonate veining,									
		Min: rare spots of py									
91.60 III	93.50	basalt flow (plagioclase amphibolite rock)				?	correlates good 168.30 m BH 10				
		gn, medium grained, massive ellipsoidal cooling				•	correlates good 4/3				
93.50 III	110.50	andesitic to dacitic flows and tuffs					~~correlates with 70.00 - 71.00 BH 18~~				13/10
		93.50 - 96.70: carbonaceous qtz-rich amphibole - chlorite rock (more dacitic looking here than qtz feldspar phyric)									
		light gn, fine grained, needles 0.1 cm amphibole,					correlation 38 ossw BH 18				
		massive to spotted texture									
		96.70 - 98.60: carbonaceous amphibole - chlorite schist (andesitic to basaltic tuff)									
		gn, fine grained, irregular, mildly banded,									

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH-13	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		0.2 to 1.5cm amphibole needles randomly									
		oriented, porphyric texture, spots of mt									
		96.85 - 96.95: qtz keratophyr						sample 13/13 96.90m			
		network-like py and po min.						correlation BH 18 42.20 m			
		10 Vol-%									
		97.15 - 97.20: "									
		mt spots grading too in country rock									
		98.40 - 98.50: qtz keratophyric tuff high carb									
		stringer po and py mineralization (10 Vol-%)									
		mt section of 0.5 cm thickness fine									
		laminated, crosscutting carbonate,									
		garnets 90 Vol-%									
		98.60 - 101.50: carbonaceous garnet-biotite-chlorite rock (andesitic to dacitic flow)									
		light gn, fine to medium crystl, evidently bedded,						sample 13/14 98.90m			
	C	often massive, in places amphibole needles									
		with 0.2 to 0.7 cm size round oriented,									
		sometimes stringer texture, varying garnet									
		enrichment			80°						
		101.50 - 107.02 carbonaceous garnet-biotite-chlorite schist (dacitic tuff sometimes grading andesitic tuff)									
		light gn, fine grained, well bedded,						sample 13/15 103.90m			
	C	spots of mt									

DIAMOND DRILL LOG

Trondfjellet

FOLLDAL VERK A/S

BH 13

From	To	Description	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		105.95 - 105.97: qtz-feldspar band	po bearing		87°						
		106.20 - 106.23:	"	po bearing							
		107.00 - 107.02:	"		90°						
		107.02 - 107.81: andesitic to basaltic flow carbonaceous biotite bearing chloritic schist gn. massive, fine grained									
		107.81 - 110.55: high carbonaceous sericite - biotite - chloritic schist (dacitic tuff)								sample 13/16 109.- from felsic mat.	
	C	lightgn. fine cryst., well banded, variation gnn more andesitic to qtz feldspar. mostly dacitic, stringers and dots of po mostly in qtz feld bands or sections have too some chal ept as lamina (109.70) giant spots of ept here at hanging									
110.50	122.00	high altered basalt, way gnn grade to andesite tuff (high carbonaceous biotite bearing chloritic rock) lightgn, massive sometimes crudely bedded, irregular carbonate, very inhomogeneous features, lapilli, relicts fine cryst., grading upward in some lines more andesitic mat. interbeds of qtz-feldspar			90°				sample	13/26	111.80 m

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description DH 13	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		112.60 - 112.75: dacitic to keratophyric mat with stringer po mineralization, 5 sometimes over 7 Vol-%, often spotted dolomite or fetheric "glassy" (chlorite, carbonate, qtz)									
		113.70 - 113.75: quartz keratophyr sharp taimodasys, homogeneous, finest silphide (Po, py) feeders (carbonate, chlorite, qtz)			85°						
		114.75 - 114.90: "									
		115.70 - 115.80: "									
		116.30 - 116.45: "									
		116.75 - 116.85: "									
		118.20 - 119.30: dot wk, massiv, additional amounts of sulfide, finest spots of carbonate occasionally as stringers, sharp taimodasites						may correlate with translucent qtz from 87.85-87.95 DH 12			
		119.50 - 119.65: see 113.70 - 113.75 without ore (carbonate, chlorite, sulfide, qtz)					sample 13/17			119.80 m	
		120.25 - 120.50: keratophyric agglomerate bombs of ~~qtz~~ chlorite sulfide qtz-vein surrounded by stringers of carbonate and chlorite			85°						

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH - 13	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
122.00	124.20	andesitic tuff									
		carbonaceous qtz-rich biotite bearing chlorite schist			65°						
		lightgn, fine crystl, well banded, lenses bands stringers of qtz + carb., biotite increasing towards									
	High	the ore zone, clots of 0.5 cm size pseudomorphs									
		to amphibole randomly orientated, here slightly porphyric									
		hyalophyr bands at 123.60 - 123.20 m									
124.20	126.05 ~~126.66~~	py ore zone									
		disseminated py with rare spots of cy concentrated									
		in qtz - hyalophyr layers of cm to dm size, intercalated						sample 13/18 intercalated		125.60 m	
	High	by carbonaceous - biotite - chlorite schist as before									
		ore grades to 60 Vol %									
~~126.05~~	126.50	andesitic tuff									
		carbonaceous biotite-chlorite schist			70°						
		light gn, fine to medium grained, laminated									
126.50	126.60	qtz hyalophyr tuff									
	C	high carbonaceous chlorite bearing biotite-qtz rock									
		intercalations, fine grained, well laminated			70°						
126.60	129.60	dacitic tuff									
	C	high carbonaceous biotite - chlorite schist									
		dk gn, fine grained, well banded, in places									

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH 13	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		0.3 to 0.5 cm amphibolites have porphyric texture, spots of mt in places occuring, changing composition to andesitic material in places.									
		qtz keratophyre interlayers: 128.00 - 128.10 m, 128.30 - 128.40 m						sample 13/19			129.30
		128.45 - 128.50 m									
129.60	168.00	highly altered basalt to supposely andesite (tuff)									
		high carbonaceous biotite bearing chlorite schist						sample 13/27			138.00 m
		gr. fine grained, massive to crudely banded to well schistose, homogeneous to very irregular, gradual variations in composition from nearly chlorite rock to carb-qtz-bio-chl assemplages			65°						
		in places mt spots mainly concentrated within zone of keratophyric interlayers									
		qtz-keratophyre interlayers: 131.95 - 132.30 m : high carbonaceous, some interbeds of altered basalt, spots of mt all through too in country rock basalt, exhalative mt lamina at 132.25-132.30 m 45° cat									
		132.59 - 132.80 m: homogeneous often finest laminated, sediment. rimmed 0.1 to 0.3 cm mt spots all through at hanging wall some po stringers									
		132.35 m : tonb									
		133.45 - 133.60 m : massive with giant spots of py, hanging wall with spots of mt									

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		BH 13									
		133.65 - 133.75 m : minor spots of Py									
		133.85 - 133.90 m : band with some dissem. of Py 45° cax									
		134.55 - 136.15 m : massive with cm to dm interlayers of coarse fibrous-chlorite or amphibole-chlorite assemblages (basalt highly altered), section with high carb 134.70 - 135.00 m, spots of Py, zones with mm-fine/coarse disseminations of									
		mt									
		137.30 - 137.32: exhalative mt, laminated section, with some felsic volc.									
				137.50	137.70						
		138.90 - 140.40: distortion zone with Qz-alopligic wat, supposely stringer wat, high altered basalt (high t, giant c) intersigned by qtz-carbonate bands, veins, Min: spo Hg, cp, po, Py, exhalative laminated mt 90° cax									
		qtz-Qz-alopligic band: 142.50 - 142.65 m stringers po, 145.05 - 145.15 m: stringers po 45° cax									
		144.65 - 144.67: exhalative mt, laminated section with some felsic volc.									
		qtz-Qz-alopligic band: 147.09 - 147.20 m some exhalative mt									
		qtz-Qz-alopligic bands: 149.00 - 149.10 m, 149.60 - 149.65 m									
		149.75 - 150.00 m, 151.25 - 151.35 m Py									

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FOLLDAL VERK A/S

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		3H 13									
		152.70 - 153.82 m : with cm to dm wide layers of altered basalt, sometime bands or spots of Po and py									
			152.86 - 153.02 : Po impreg. 10 Vol.-%								
		155.00 - 155.20 m : with rare spots of py									
		155.35 - 155.45 m :									
		155.70 - 155.72 : py ore band									
		155.72 - 156.40 : several py layers mostly of mm size within highly altered basalt									
		156.40 - 156.70 : qtz - feldspar with mt band									
		156.95 - 157.50 : qtz - feldspar translucent qtz some stringers of py			60°						
		157.60 - 159.20 : mainly qtz - feldspar with highly altered basalt interlayers of dm size rich in relative mt, some small bands of spots of py						sample 13/28 158.50 m with ehual: mt			
		159.20 - 163.10 : slightly carbonaceous chlorite - amphibole schist basaltic to andesitic tuff gn, medium grained, well layered, randomly oriented amphiboles						sample 13/22 165.15 m			

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DIAMOND DRILL LOG

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FOLLDAL VERK A/S

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From	To	Description BH 13	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
168.00	172.20	slightly altered to nearly unaltered basalt flows with tuffs									
		slightly carbonaceous qtz-bearing chlorite amphibolite to schist									
		gn. medium to fine crystalline, irregular carbonate banding,									
		in places very distinct features, some giant									
		spots of py or fuzzy bodies									
		some due to cm intercalayers of qtz-keratophyr here high carb.									
		sometimes bands of qtz-keratophyr									
172.20	173.70	slightly carbonaceous qtz-plag rich sericite-bio bearing amphibole rock									
		gr, medium grained, randomly orientated									
		amphibols, evidely banded			50°						
173.70	175.25	high carbonaceous chlorite-biotite qtz rock									
		qtz-keratophyr					sample	13/29		174.00 m	
		gr to blgr, fine grained, well banded alternation									
		of biotite-rich and qtz+carb-rich layers,									
	U1	variation in chlorite content sometimes high									
		grade biotite-chlorite-carbonate schist,									
		very folded mat									
175.25	176.80	highly altered taballic agg. or lapilli tuff									
		high carbonaceous biotite-amphibole-chlorite schist					correlates	with	12/28	good	
	High A/C	gn. med. to slightly coarse grained, agg. to lapilli									
		structure, very inhomogeneous									

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DIAMOND DRILL LOG

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FOLLDAL VERK A/S

From	To	Description BH 13	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag	
176.80	179.40	basalt flow										
		slightly carbonaceous plag-amphibole diorite schist/rock										
		gr. medium grained, needles of amphibole						sample	43/23		176.95 m	
		rand. orientated, slightly porphyric texture,										
		spots of Py some stringers of qtz and carbonate										
		178.60: bom bc of qtz keratophyr										
		179.00 - 179.01: band of massive Py										
		179.10 - 179.40: qtz-keratophyr layer										
179.40	182.20	altered basalt tuff and or flow										
		biotite-diorite-amphibolite										
	A	gr. coarse grained, decreasing alteration to-										
		wards hanging, inclusions of qtz-keratophyr										
		with Py and Po										
182.20	183.75	basalt flow										
		amphibolite										
		gr. fine grained, massive, qtz-carbonate										
		veining.										
183.75	185.75	keratophyr to dacitic tuff										
		amphibole-biotite-diorite-qtz assemblage										
		gr to lightgr, fine grained, well banded,			45°				sample	13/24	184.80 m	
		mostly homogeneous but too pyroclastic										

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Trørfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description BH -13	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		irregular (lapilli)									
185.75	188.00	basalt flow									
		amphibolite									
		gn, medium cryst to slightly coarse, homogeneous, massive in places, 02 to 05 amphibole ellipsoids									
188.00	188.70	leskopkyr with basalt									
		alteration close of amphibole-rich bands and chlorite-qtz									
		light gn, med. cryst., well bedded									
		188.20 – 188.60: massive py ore									
188.70	192.36	basalt flow									
		slightly carbonaceous garnet bear. amphibolite									
		gn, fine cryst, massive, garnet oil dying towards hanging									
		192 36 a.o. BH									

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DIAMOND DRILL HOLE 14

Tverrfjellet mine, Folldal Verk A/S, Exploration hole from 1957.

Location: 2350 V - 1225 N

Inclination: 55° N, 80 m 30°, 115 m 25°

Total length: 120.00 m (3.50 m overburden)

Description:

0.00 - 18.10 : garnet bearing biotite - sericite schist
(meta - pelite)
gr, fine grained, in places wavy - lenticular texture, nodules of qtz surrounded by phyllosilicates, sometimes cm-banding of alternate qtz-rich layers with sericite bands, porphyric biotite always as cross - micas, responsible for spotted appearence of the rock, garnets max. 0.4 cm in size and mainly equally distributed, seem to occure more often within parts with wavy - lenticular texture, rare spots of carbonate.
gradual hanging wall.
45° 10.00 m, 45° 15.00 m

18.10 - 19.25 slightly carbonaceous biotite - sericite quartzite
(meta - tilloide)
gr, wavy-lenticular texture, sometimes banded, nodules of qtz surrounded by fine grained sericite with minor chlorite and porphyric biotite often crossing foliation, qtz-nodules mainly of 0.3 cm width and 1.0 cm length, seem to be flattened or squeezed clasts, cm-banding at 18.85 - 19.25 supposedly is due to sedimentation and flattening of larger qtz-clasts, matrix is here rich in silica.
sharp hanging wall.
45°

19.25 - 20.10 : garnet bearing biotite - sericite schist
(meta - pelite)
same as: 0.00 - 18.10 m, at hanging wall distinctly enriched in chlorite
sharp hanging wall
50°

20.10 - 23.95 : garnet bearing biotite - sericite - quartzite
(meta - tuffoide)
same as: 18.85 - 19.25 m, sometimes cm-thick interlayers of garnet bear. biotite - sericite schist, porphyroblasts of amphibole part of matrix for flattened and stretched qtz-and qtz-hexatophyr clasts (22.00 - 22.45 m, 23.38 - 23.58 m) prisms max. 0.5 cm long and often not oriented.
sharp hanging wall.
45°, 15° 23.70 m

23.95 - 26.40 : carbonate bearing biotite - amphibole - fspar - qtz gneiss
(meta - qtz-hexatophyr, tuff)
gr, fine grained with porphyroblasts of amphibole mainly of lenticular shape randomly oriented but sometimes aligned with foliation, crystals max. 1.2 cm long, mainly mm-banded (due to extreme foliation) sometimes sections cm-layered with alternate qtz-fspar bands and traces of granules of amphibole, biotite only within foliated sections, resulting from decomposition of

amphibole, always parallel foliation.
gradual hanging wall.
15°, foliated sections 45°

26.40 - 37.60 : slightly carbonaceous garnet-chlorite bear. biotite-sericite schist
(meta-pelite, slightly tuffaceous)
gngr, fine grained, crude development of wavy-lenticular texture, in places laminated, alternate qtz-bands and phyllosilicate-layers, porphyric biotite as cross-nicol, qtz mainly as lenticular-shaped nodules (accretion due to folding and metamorphism), 36.48-36.52: carbonaceous quartzo-feldspatic gneiss (meta-qtz-keratophyr-tuff) laminated, alternation of qtz and fspar-qtz and carbonate lamina with bands and stringers of Py (average 5 Vol.-%).
gradual hanging wall
45°

37.60 - 38.33 : carbonate-rich biotite-sericite-quartzite
(tuffaceous meta-pelite)
gr, wavy-lenticular texture with transition into distinctly laminated rock, porphyric biotite as cross-nicol, within laminated sections always parallel layering / foliation, sporadically some porphyroblasts of amphibole main

restricted to even basic looking inclusions, cm - interlayers of qtz with dissemination of Py (meta - felsic tuff) : 36.85 m, 36.95 - 36.98 m, 37.40 m.
sharp hanging wall.
45°

38.33 - 39.33 : carbonate - rich sericite - chlorite bear. amphibole - fspar - qtz gneiss
(meta - tuffite / meta - andesite, tuff)
grgn, medium-grained, cm - sometimes mm - banded, alternate qtz-or fspar-qtz-bands and amphibole layers rich in qtz and fspar, inplaces layers of chlorite - sericite schist, prisms of amphibole max. 0.3 cm long and randomly oriented, rare spots of Py throughout, medium - grade Py mineralization within qtz - layer : 38.35 - 38.39 m
sharp hanging wall.
45°

39.33 - 41.88 : carbonate - rich qtz - fspar - amphibole schist
(meta - basalt, flow)
gn, fine grained, crude development of layering, sometimes cm-interlayers of medium-grained chlorite bear amphibolite, prisms randomly oriented, spotted carbon, also often ~~fornicing~~ traces of granules, always idiomorphic crystals.
sharp hanging wall.
45°

41.88 - 42.30 : qtz-fspar amphibolite
(meta-basalt, flow)
gign, medium-grained, randomly oriented amphibole-prisms max. 0.3 cm size
sharp hanging wall

42.30 - 61.22 : carbonate bear. amphibole schist
(meta-basalt, flow)
gn, fine-grained, in places laminated, alternation of qtz and amphibole beds, spots of idiomorphic carbonate sometimes forming traces of granules, in places getting more abundant stratigraphically upwards
lamina or stringers of biotite, in cm layers of quartzite (chert): 47.52 - 47.60 m, 48.49 - 48.55 m, in general low-grade dissemination of py often forming traces of granules, always sharp borders to amphibole schist.
sharp hanging wall.
45°

61.22 - 62.40 : carbonaceous amphibole-qtz-plagioclase gneiss
(meta-basalt/-andesite, tuff)
gign, medium-grained, cm-layering mostly crudely developed, prisms of amphibole max. 0.3 cm long and always randomly oriented, spotted carbonate, hyidiomorphic crystals sometimes forming traces of granules, fine spots of py throughout
gradual hanging wall.
45°

62.40 - 66.10 : amphibole schist
(meta-basalt, flow)
gn, fine-grained, slightly varying qtz-plagioclase content, some irregular qtz-veining, sporadically some clots of biotite strongly aligned with schistosity, interlayers of quartzite (dm-t) : 67.10 - 67.11 m, 67.15 - 67.17 m.
sharp hanging wall
60°

66.10 - 72.00 : carbonaceous qtz-plagioclase-chlorite-amphibole gneiss
(meta-basalt, tuff, weakly altered)
A/C
gn to grgn, medium-grained, am-banded with gradual contacts, alternation of amphibole or amphibole-chlorite layers with qtz-plagioclase dominated bands, prisms of amphibole max. 0.4 cm long and randomly oriented, fine-fibrous chlorite, mainly spotted carbonate, sometimes as stringers, towards hanging wall some biotite, rare spots of Py, giant spots of mt: 69.45 - 70.45 m.
gradual hanging wall.
45°

72.00 - 74.33 : carbonaceous amphibole-/biotite bear. chlorite schist
AA/C
(meta-basalt, highly altered)

gn, fine-grained, fine-fibrous chlorite together with giant clots of biotite (multi-crystal porphyroblasts), in places prisms of amphibole max. 0.3 cm long and randomly oriented, here no biotite, irregularly shaped carbonate not equally distributed, rare spots of Py.
sharp hanging wall.
80°

33 - 74.85: qtz-rich pyrite rock
(massive sulphide layer)
one zone
medium-grained.
sharp hanging wall.

74.85 - 75.00: carbonate bear. amphibole-fspar-qtz gneiss
(meta-andesite, tuff)
greenish gr, cm-banding, alternate amphibole-rich layers with qtz-fspar bands poor in amphibole, prisms of amphibole max. 0.3 cm long and randomly oriented, rare spots of carbonate, rare spots of Py
sharp hanging wall.
75°

75.00 - 76.00: carbonaceous qtz-amphibole-chlorite schist
(meta-basalt, flow, highly altered)
AA/C
same as: 72.00 - 74.33 m, high-grade dissemination of pyrite with qtz: 75.85 - 75.86 m
sharp hanging wall

76.00 - 76.60 : amphibole schist
(meta-basalt, flow)
gn, fine-grained, some irregular qtz-veining.
sharp hanging wall.

76.60 - 77.45 : sericite-amphibole-fspar-qtz rock
(meta-andesite, tuff)
greenish gr, widely laminated, prisms of amphibole max. 0.3 cm long and randomly oriented, sometimes compositional changes towards amphibole schist.
sharp hanging wall.
80°

77.45 - 77.70 : carbonaceous amphibole-chlorite schist
(meta-basalt, flow or tuff, altered)
A/C
gn, fine-fibrous chlorite surrounding porphyroblasts of amphibole of max. 1.0 cm length and 0.3 cm width, lense-shaped crystals randomly oriented, carbonate mainly filling interslices between amphibole porphyroblasts.
sharp hanging wall.

77.70 - 79.60 : qtz-bear/rich pyrite rock
(massive sulphide deposit)
ore zone
medium-grained, modal changes from medium- to high-grade ore.
sharp hanging wall.

79.60 - 81.90 : carbonaceous sericite bear. biotite - chlorite - qtz - plagioclase rock / schist

A/C

(meta - andesite, flow or tuff, altered)

greenish gr, fine - grained, porphyric biotite mainly aligned with schistosity, sometimes crosscutting traces of granules, lense - shaped carbonate paralleling biotite, rare stringers and lamina of qtz only sporadically crosscutting.

gradual hanging wall.

85°

81.90 - 85.19 : biotite bear. qtz - plagioclase-amphibole schist

(meta - basalt, flow)

gn, fine-grained, some irregular qtz and carbonate, biotite as milki - crystal porphyroblasts sporadically embedded, some banded sections ~~and~~ rich in qtz and plagioclase, interlayers of quartzite (chert) with rare spots of Py: 84.15 - 84.25 m, 84.35 - 84.42 m, 84.92 - 85.19 m.

sharp hanging wall.

85.19 - 96.60 : carbonaceous amphibole bear. qtz - biotite - chlorite schist

(meta - basalt, flow, highly altered)

gn, fine - grained, only in places slightly banded, gradual changes in modal composition towards altered andesite, always fine - fibrous chlorite.

giant clots of biotite (milki-crystal)
in places pseudomorph amphibole, biotite
decreases when amphibole occurs,
amphibole mainly as tiny prisms ran-
domly oriented but sometimes as
porphyroblasts of sporadically 1.0 cm
size always randomly oriented, carbonate
as stringers or irregular formed crystal
aggregates, sometimes of spotted type,
interlayer of quartzite with amphibole
lamination and some spots of py: 88.10 -
88.35 m, medium-grade pyrite minera-
lization: 90.76 - 90.81 m
sharp hanging wall.

96.60 - 97.75: qtz-rich pyrite rock
(massive sulphide layer)
medium-grained, varying qtz-amount,
97.05 - 97.15: carbonaceous chlorite bear. quartzite
(meta-felsic-tuff)
gr. fine-grained, laminated, alternate
chlorite-and qtz-layers and stringers
of carbonate, spots of py and mt.
sharp foot-and hanging wall.
85°

ore zone

97.75 - 100.50: biotite-chlorite bear. quartzo-feldspatic gneiss
(meta-qtz-kwatophyr with transitions to meta-tuffaceous quartzite, strongly
folded and tectonized)

gr sometimes white, chaotically folded in places strongly foliated, laminated sections alternate with wavy-lenticular or flaser-textures, phyllosilicates in places coarse-grained with biotite often forming randomly oriented

97.75 - 100.50 clots, sometimes phyllosilicates strongly squeezed and aligned with foliation, ~~strongly~~ varying fspar content, highest concentrations at: 97.75 - 97.95 m, 99.40 - 100.15 m, (strongly foliated qtz-leucoplasts), in places some spots of carbonate.
sharp hanging wall

100.50 - 101.10 : high carbonaceous biotite-chlorite bear. sericite-qtz-fspar rocks
(meta-dacite, tuff)
C gr, fine-grained, some flasers of biotite and chlorite irregularly distributed sometimes forming quartz-like layers.
sharp hanging wall.

101.10 - 102.00 : biotite-chlorite bear. sericite-quartzite
(meta-pelite, slightly tuffaceous)
gr, wavy-lenticular textur, porphyric biotite often as cross-mica sometimes forming flasers together with chlorite.
sharp hanging wall.

102.00 - 103.90 : high carbonaceous biotite - sericite foco. chlorite qtz - fspar rock / schist

A/C

(meta - dacite, crystal - tuff (?), altered)

light grey, mainly fine - grained, widely laminated in places, nebulous texture, fine - fibrous chlorite, sometimes some clots of biotite randomly oriented, spotted carbonate mainly as xenomorphic crystals, in thin layers of low - to medium grade Py - ore: 102.00 - 102.03 m, 102.35 - 102.36 m. sharp hanging wall.

103.90 - 107.70 : carbonaceous biotite - qtz - chlorite schist

(meta - basalt, tuffite)

gn to grgn, cm - layered sometimes wavy - lenticular texture, compositional changes from basaltic to intermediate or even felsic (sed.), fine - fibrous chlorite, clots of biotite mainly parallel layering, carbonate as xenomorphic aggregates irregularly distributed, rare spots of Py, intersections of low - to medium - grade Py - mineralization within qtz - fspar rock (meta - felsic - tuff) : 104.15 - 104.25 m 104.35 - 104.42 m, 105.06 - 105.54 m, quartzite - layer (chert) : 106.80 - 106.86 m

gradual hanging wall.

85°

107.70 - 108.50 : carbonate bear. biotite - qtz - chlorite - sericite schist
(tuffaceous meta-pelite)
slightly, wavy-lenticular textured due to accretion of qtz and phyllosilicates, porphyric biotite as cross-mica but sometimes parallel foliation / schistosity.
gradual hanging wall
70°

108.50 - 116.50 : carbonate bear. amphibole - qtz - fspar - chlorite gneiss / rock
(meta - basalt / - andesite, tuff may be tuffite)
qu, cm-banding sometimes passing into nearly massive rock, alternate amphibole-chlorite layers and qtz-/spar bands poor in Fe-Mg silicates, more massive sections bear a crude banding due to traces of granules of amphibole within fine-fibrous qtz-chlorite rock, porphyroblasts of amphibole often are ellipsoidal in shape (max. 1.4 cm long a. 0.3 cm thick) and always are randomly oriented, irregular changes in the mode, sometimes very felsic.

116.50 end of DDH

BH 14

composition of ore:

72.62 - 74.85 m = 2.23 m = 0.55 % Cu, 2.60 % Zn, 32.00 % S

77.70 - 79.60 m = 1.90 m = 0.63 % Cu, 1.10 % Zn, 38.20 % S

96.60 - 97.75 m = 1.15 m = 0.39 % Cu, 1.10 % Zn, 32.50 % S

BH 49, 1:1 Scale 2

Tverrfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

PAGE 1

From	To	Description BH 14	DDH No.	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
	18.10	garnet biotite - sericite schist									
		grey, fine grained, biotite flakes - clusters									
		randomly orientated, spotted bio features									
		in places nodules and lenses of qtz + carb.									
18.10	19.25	felsic lapilli tuff (garnet-sericite-biotite-qtz schist) slightly carb									
		significant layering on scale, fine grained, white grey									
19.25	20.10	garnet biotite - sericite schist									
		see above									
20.10	23.95	felsic lapilli tuff with agglomeratic bands (20.80 - 21.50m, 23.30 - 23.65m) (garnet - sericite - biotite - qtz schist)									
		fine grained, well layered on to mm scale, often lapilli feature.									
23.95	38.46	biotite sericite - schist (dacitic tuff) to tuff more at bandings)									
		slightly increasing biotite content to amphibole sections: here often two zones of biotite schist, lighter dark banding with dark rock.									
		25.25 - 26.95, amphibole laths of 0.3 to 1.0 cm size randomly orientated		144.40	148.00 m	BH 10					
		27.70 - 28.05 : "									
		37.64 - 38.46 : randomly orientated amphiboles (carbonaceous sericite-amphibole-biotite schist)									
						BH 10	155.50 - 156.25 m.				
		osthemly layered mm to cm scale									
		qtz veins: 37.85 m, 36.95 - 37.00 m, 38.36 - 38.46 m (mid bands)									
38.46	39.33	carbonaceous sericite-biotite-amphibole schist / andesitic tuff)				see BH 10					

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DIAMOND DRILL LOG

Furuhjellet

FOLLDAL VERK A/S

PAGE 2

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		See new pages BH. 14									
39.33	74.33	basalt lavas									
74.33	74.85	ore band =									
74.85	75.15	andesitic tuff (carbonate bearing qtz-plag rich amphibole schist)									
		mm to cm layered									
75.15	77.90	basalt (amph - bio - dilo assemblage mostly slightly carb). ~~(basalt porphyritic)~~									
77.90	79.74	ore band									
79.74		basalt amphibolite chloritic Biotite-amphibole slightly carb mostly fill									
		84.00 - 84.13 m hyalophyr band = (amphibole-biotite-chlorite assemblage): 84.70 - 93.90 m slightly carbonaceous here of the tuffaceous									
		84.15 - 84.20 m qtz bombs									
		84.70 - 84.95 m hyalophyr band =									
		85.10 - 85.20 m hyalophyr band =									
		88.10 - 88.40 m " =	10mm Py spots								
		90.75 - 90.80 m Py discs ca 40 Vol.%									
		amphibole - bio - chlo assemblage, slightly carb: 94.70 - supposedly tuffaceous or mixed									
96.60	97.76	Schist ore									
97.30	100.63	silicified bio - chlorite - qtz schist (hyalophyr tuff)			may be related to 20957 BH 16						
		light dark banding, strongly deformed, only in places									
		slightly carbonaceous									
							sample	14/1	97.85 m		
							sample	14/2	100.55 m		
100.63	101.17	hyalophyr tuff (high carbonaceous/sericite-biotite qtz rocks)									
							sample	14/3	101.00 m		

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Tverrfjellet DH 14

DIAMOND DRILL LOG

FOLLDAL VERK A/S

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
101.74	~~102.32~~	dioritic - ~~dacitic~~ andesitic schist dacitic tuff									
		102.00: py discs in Qvartzphyr									
		102.32: "									
~~102.32~~		102.32 - 103.50: massive variation spotted cord.									
		105.06 - 105.54: ore band =?									
		105.03 - 105.75: Qvartzphyr									
		107.94 - 108.34: qtz Qvartzphyr band ~~mm~~									
		108.20 - 116.50: amphibole as 0.2 to 1.0 cm needles randomly oriented									
		~~Hard~~ - may be even in place already an andesitic tuff									

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Tverrfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

PAGE

From	To	Description BH - 14	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		Basalt section									
39.33	41.88	gr, fine cryst. well layered in mm scale, greenschist, some spots of carbonate, homogeneous (flow)			45°						
41.88	42.30	gr, medium crystalline, 0.1-0.2 mm amphibole needles randomly orientated, sometimes little chlorite,			45°						
		rare spots of py									
42.30	61.25	greenschist (flow with cm to dm tuff interlayers) gr, fine crystalline, mostly ~~massiv~~ homogeneous bit well layered (laminated) in places wider qtz interbeds, sometimes spotted carb, sometimes slightly biotite			45°						
		46.60 - 46.70: chert layer enveloped by an altered basalt zone chlorite assemblage with spots, linkets of py			30°						
61.25	62.40	gngr, medium crystalline, plagioclase amphibolite, (flow) 0.1 to 0.2 cm amphibole needles widely orientated, cm layering, carbonate-rich in places			~~45°~~						
62.40	66.10	greenschist (flow) sometimes grading to medium crystalline varieties gr, massive, fine crystalline, laminated, in places slightly carbonaceous			50°						

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DIAMOND DRILL LOG

Trollfjellet

FOLLDAL VERK A/S

PAGE

From	To	Description BH 14	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
66.10	68.50	greenschist to schist (flow)									
		gr. medium crystalline, laminated to massiv,			45°						
		homogeneous mostly dirt sometimes ~~not~~ really irregular features,									
		some cm bands of qtz and carbonate, biotite									
		leaving in places too chlorite									
68.50	74.33	slightly altered basalt			45°						
		chlorite-biotite-amphibole assemblage									
		gr. fine to medium crystalline, well layered too									
		in places massiv, increasing alteration towards									
		to hanging here (72.15 m) already a biotite-									
		chlorite schist									
74.33	74.85	ore									
74.85	75.00	basaltic tuff			45°						
		qtz-rich amphibole schist									
		gr. medium crystalline, well layered cm to mm scale, homogeneous									
		some spots of Py									
		75.00 qtz band									
75.00	76.00	altered basalt			85°						
		biotite-amphibole-chlorite assemblage									
		gr. fine crystalline, 0.3 to 1.5 cm amphibole needles (<1 Vol.-%)									
		randomly orientated, rare biotite pseudomorphs									

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DIAMOND DRILL LOG

Tverrfjellet

FOLLDAL VERK A/S

PAGE

From	To	Description BH - 14	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		75.80: py ore as 1 cm band in basalt									
76.00	76.70	basalt (flow)									
		gn. fine to medium crystalline, massive to slightly to even well layered, gradual grain increase towards hanging			45°						
76.70	77.90	altered basalt									
		biotite-amphibole-chlorite assemblage									
		gn. coarse grained, homogeneous, massive									
77.90	79.74	ore									
79.90	29.00	slightly altered basalt flow			90°						
		chlorite-biotite-amphibole schist									
		gn. fine crystalline, homogeneous, some spotted cordierite that netbook like features in places mm to cm bands of coarse grained biotite-chlorite (bio pseudo after amphibole), gradually less altered towards the hanging, ineffective bands of qtz									
		84.15 - 84.25: qtz-feldspar band			90°						
		mm-size finest dess of py									
		84.70 - 84.90:			45°						
		85.05 - 85.20: chlorite-amphibole banded qtz-feldspar mm to cm layering			45°						

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DIAMOND DRILL LOG

Tverrfjellet

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PAGE

From	To	Description BH-14	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		88.10 - 88.35: qtz keratophyr									
		stringer and lamina of chlorite and			75°						
		amphibole									
		88.60 qtz tomb s									
		88.85 "									
89.00	95.60	altered basalt see BH 4 4/10 and following massiv to slightly layered, some discordant gn. fine crystalline, randomely 0.5 cm lather of chlorite			75°						
		of biotite, at the footwall upon some amphibole			91.50						
		lath of 0.1 to 0.4 cm size randomly orientated,			94.00 30°						
		slightly carbonaceous, spots and small layers or									
		stringers, some mm to cm bands of qtz and									
		qtz keratophyr, occasionally spots of Py									
		90.80 - 90.85: qtz keratophyr with disseminated Py		20 Vol.-%	50°S						
		90.40. mt idio up to 0.5 cm size									
95.60	95.90	qtz-rich (silicified) basalt (alteration?)									
		grn. extremely fine grained, laminated slightly,									
		homogeneous									
95.90	96.60	see 89.00 - 95.60 m									
96.60	97.75	ore									
97.75	98.10	silicified qtz-keratophyr (tuff) mm layering alteration qtz.			45°						
98.10	99.30	qtz-rich altered basalt (tuff)									
		coarse biotite and chlorite, very inhomogeneous, layered cm scale			90°		(high A)				

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18/9 amphibole max 4.5 mm Ø 1.2 mm

high carbonaceous epidote-chlorite - plag - qtz - amphibole rock. slight lineation of amphibole needles which mainly are randomly oriented, spots of carbonate, diffuse chlorite enrichment

18/10 high carbonaceous epidote bear. chlorite - amphibole-qtz-plag rock (formerly crystal tuff or amygdaloid basalt)

grgn. fine to medium grained, massive, fibrous ragged amphibole randomly oriented, lenticular structure, qtz-plagioclase or carbonate lenses or spots of max 0.5 cm size discontinuously surrounded by amphibole and chlorite, spotted carbonate.

18/11 high carbonaceous epidote - plagioclase - qtz - amphibole - chlorite gneiss (banded amphibolite)

grgn. medium grained, slight light-dark banding in a cm scale due to alternation of amphibole - chlorite layers with plagioclase - qtz bands, mainly gradual changes. amphibole prisms of max 0.5 cm size randomly oriented, spotted carbonate mainly idiomorphic crystals, spots of py throughout often enriched within mafic layers.

basaltic

obs.

18/13 ~~high~~ carbonaceous epidote-chlorite-amphibole-plagioclase-qtz rock

andesitic dacitic

gngr, fine grained with porphyric amphibole, prisms max 0.3 cm long and randomly oriented, widely laminated, indistinct alteration of mm thick felsic layers with cm section rich in chlorite and amphibole, carbonate as leaves or stringers mainly conform. with layering, finely-dispersed sulphide mainly Py

18/12 high carbonaceous epidote-biotite bear. qtz-plagioclase rich chlorite schist

N basalt

gn, fine grained with porphyric biotite, max 0.2 cm flakes randomly oriented, nebulous texture supposely due to mineral alteration, spotted carbonate showing tendency to form strings, some irregular bands rich in carbonate and qtz with some sericite

18/14 high carbonaceous chlorite schist

high N/C basalt

gn, massive, fine grained, carbonate as minute spots homogeneously distributed, sometime bigger spots due to accretion, rare crosscutting veinlets of qtz after bordered by carbonate

decomposed garnets
17.1/113 u. 48/112.9

18/15 — biotite bear carbonaceous chlorite schist

high A/C basalt

gn, fine grained with porphyric biotite flazes seemingly oriented with foliation, giant spots (max 0.7 cm in diameter) of carbonate often accompanied by qtz and fspar, always strongly folded.

18/16 — carbonaceous qtz-chlorite-plagioclase schist (crystal tuff)

granulated plag
Mega cryst
24/106.4

A basalt to andesite

grgn, fine grained, widely bedded, conformable lenses of qtz-carbonate and granulated fspar of max 0.3 cm size, strongly chlorite, some rare spots of Py

18/17 — high carbonaceous chlorite-biotite-sericite schist

high A/C andesitic to dacitic tuff

light greenish gn, medium grained, massive porphyric flazes of cors-biotite, spotted carbonate, in places widely laminated, alternation of felsic (plagioclase) and micaceous layers, trains of granules of Py within this section.

decomposed quartz above Rand Mine

18/18

light f/c basalt

high carbonaceous sericite bear qtz-plagioclase-chlorite schist

gn, massive to crudely laminated, flaser like structure, irregular distributed carbonate as minute crystals, irregular shaped, but mostly lense-like, qtz-carbonate, sporadically disharmonic small scale folding.

18/19

basalt tuff

carbonaceous biotite bear qtz-amphibole-chlorite schist (Gastonschist)

gn to grgn, crudely layered, porphyroblasts of amphibole - mainly elliptical crystals - randomly oriented, prisms up to 2.0 cm in size, spotted carbonate irregularly distributed mainly as minute spots, minute particles of sulphide.

18/20

carbonaceous amphibole schist

gn, fine grained, fibrous amphibole strongly aligned with schistosity, idiomorphic carbonate homogeneous distributed (spotted rock), sometimes irregular shaped qtz nodules.

DIAMAND DRILL HOLE 18 E

Trænfjellet mine, Folldal Verk A/S, Exploration hole from 1958

Location : 2650 V - 1290 N

Inclination: 56° N at 60 m 33°

Total Length: 144.50 m (4.50 m over burden)

Description:

BH 18

0.00 - 27.85: slightly carbonaceous biotite-sericite schist (metapelite)
× lightgr., wavy lenticular texture, slightly layered, mainly alternation of qtz-rich bands and phyllosilicate qtz-poor layers, banding supposedly × due to metamorphic differentiation,
× porphyroblasts of biotite, mainly cutting the older foliation (crossmica).

gradual hanging wall >

27.85 - 28.30: garbensschist, carbonaceous to high carbonaceous biotite bearing amphibole-chlorite-fspar-qtz schist (meta-volcanic shale/siltstone)
grsgr., laminated to cm layered, close alternation of chlorite-rich, carbonate-rich and qtz-rich layers, in places wavy lenticular texture, porphyro-
× blasts of amphibole randomly
× oriented, prisms of 0.2 to 1.2 cm size and often ellipsoidal formed, interlayers of qtz-fspar rock (supp. meta-qtz-keratophyr) with some spots of Py.

sharp contact at hanging wall >

28.30 - 28.70 : carbonaceous garnet-chlorite plag-amphibole schist
(meta-basalt-flow, weakly altered)
× gn, medium grained, crudely
A × layered, varying amount in chlorite,
× amphibole as poikiloblasts mainly
parallel foliation, prisms max.
× 0.3 cm long, garnets slightly corroded
and less 0.3 mm large, invariably
× distributed, irregular enrichments
× in qtz and fspar, smallo intercalations
of qtz-fspar rock (meta-qtz-keratophyr)
at: 28.40 m, 28.55 m and 28.60 m, al-
ways with low-grade or even medium
grade dissemination of po, max.
10 Vol.-%.

gradually passing into hanging amphibole schist

28.70 - 30.00 : × garnet bear. plag-amphibole schist
(meta-basalt-flow)
gn, fine grained, irregular stringers
of qtz sometimes conformable
× with foliation, garnets variably
distributed.

sharp contact at hanging wall

30.00 - 36.70 : high carbonaceous chlorite-sericite-
qtz-fspar rock
(meta-dacite crystal tuff or tuffite)

BH 18

lightgreenish
lightgreenish gr, extremely fine grained,
C footwal slightly coarse (coarse) grained,
spotted carbonate mainly with dusty
× boundaries, sometimes clots (clots) of
biotite

35° >

36.70 - 41.60 : high carbonaceous biotite - chlorite
(bea.) bea. amphibole - qtz - fspar rock
(meta - andesite, - dacite, supp.
tuff)
greenish gr, slightly schistose and
C crudely (crudely) laminated, porphyric (porphyric)
texture, prisms of amphibole
randomly (randomly) oriented, needles mainly
× 0.2 cm long, some more (more) spots of
Py

41.60 - 45.60 : high carbonaceous sericite bea. chlorite -
qtz - fspar rock
(meta - dacite, tuff or tuffite)
grey, fine grained, slightly coarse
× grained towards a (a) hanging wall,
× crudely schistose (schistose), in places slightly
C porphyric crystals of (of) biotite, minute
bands and stringers of qtz always
irregular, sporadically enriched in
× mesh - like (like) pockets accompanied

BH 18

by qtz-fspar iods (supp. qtz-hexa-dophyr): 41.70 - 41.75 (40 Vol.-% po), 41.75 - 41.96 (low-grade), 42.20 - 42.32 (60 Vol.-% po)

45.60 - 51.93 : high carbonaceous chlorite-amphibole-qtz-fspar iods
(meta-andesite, flow may be tuff)
greenish gr, medium grained, slight foliation present by subparallel alignment of prisms of amphibole, amphibole needles max 0.2 cm long, spotted carbonate more distinct within the hanging pospartion, irregular bands of qtz with carbonate, borders often nebulous.

51.93 - 53.80 : carbonaceous chlorite-amphibole schist
(meta-basalt-flow)
gn, fine grained, spotted carbonate often mesh-like arranged.

53.80 - 57.00 : high carbonaceous chlorite-amphibole qtz-fspar iods
(meta-andesite, flow may be tuff)
same as: 45.60 - 51.93

sometimes minor spots of Py

57.00 - 62.75 : high carbonaceous epidote (epidote?) - sericite bear. qtz - fspar - chlorite schist

A/C

(meta-andesite, tuff)
greenish gr, fine grained, crudely (crudely) laminated, nebulous (nebulous) texture supp. due (due) to alteration, sporadically minute (minute) prisms (prisms) of amphibole always not oriented (oriented), irregular accretion of qtz always accompanied by carbonate, (?) rare spots of Py. qtz-fspar rock (supp meta-qtz-keratophyr) with low-grade Py mineralization as spots and stringers: 57.30 - 57.50 m

gradual hanging wall >

62.75 - 66.30 : high carbonaceous epidote-chlorite-fspar-qtz-amphibole rock (rock)
(meta-basalt to-andesite, supp tuff)

A/C

lightgreen, slightly schistose (schistose) schistose, crudely laminated, randomly oriented porphyric (porphyric) prisms of amphibole mainly 0.1 cm long, mat. size 0.4 cm, qtz and carbonate often irregularly

× accreted, minute qtz-veining, fuzzy and spotted carbonate. gradual hanging wall. 45°

66.30 - 70.00 : carbonaceous sericite-biotite-chlorite-dust

(meta-andesite, supp. tuff)

lightgn, fine grained with slightly porphyric amphibole of 0.1 to 0.3 cm crystal length, randomly × oriented, metaloric texture only slightly idiotrope, carbonate as fuzzy aggregates and sometimes minute spots.

gradual hanging wall 80° > qtz-fspar rock (supp. meta-qtz-keratophyr) with low-grade py mineralization: 68.80 - 68.85

70.00 - 71.00 : high carbonaceous epidote bearing chlorite-qtz-fspar-amphibolite

(meta-basalt, crystal tuff or amygdaloid basalt)

C gign, medium grained due to multi-crystal ellipsoidal chlorite-amphibole, qtz-plagioclase or

carbonate lenses or spots of max. 0.5 cm size discontinuously surrounded by amphibole and chlorite, also spotted carbonate

7100 - 71.61 : Mylonite within amphibolite

71.61 - 72.70 : high carbonaceous epidote - plagioclase - qtz - amphibole - chlorite gneiss (banded amphibolite; meta-basic tuff)

A/C

× grey to blue-grey, medium grained, slight light- dark banding mainly in a cm-scale due to alternation of amphibole - chlorite layers with plagioclase - qtz and × carbonaceous plagioclase - qtz bands, contacts between distinct layers often gradual, amphibole prisms max. 0.5 cm in size and randomly oriented, spotted carbonate mainly with idiomorphic outlines, spots of Py throughout often concentrated within mafic layers. gradual hanging wall

72.70 - 75.10 : high carbonaceous epidote - biotite bear. qtz-plagioclase-rich chlorite schist
(meta-basalt-flow, altered)
A/C
gn, fine grained with porphyric biotite, max. 0.2 cm large flakes randomly oriented, sometimes somewhat larger clots (crystal aggregates), nebular texture due to mineral alteration, spotted carbonate showing tendency to form trains of granules, qtz-carbonate accompanied by sericite as crosscutting minute veins

75.10 - 77.00 : biotite-chlorite bear. amphibolite
(meta-basalt-flow, weakly altered)
A
gn, fine grained with porphyric amphibole, prisms randomly oriented
gradual hanging wall.

77.00 - 82.50 : carbonaceous epidote-chlorite-amphibole-plagioclase-qtz rock
(meta-andesite,-dacite-flow)
ggn, fine grained with porphyric amphibole, prisms max. 0.3 cm

long and randomly oriented, crudely laminated, indistinct alteration of mm-thick felsic layers with cm-sections rich in chlorite and amphibole, carbonate as veins or stringers mainly conformable with lamination, finely-disposed silphide, mainly py
gradual hanging wall.

82.50 - 87.95 : carbonaceous to high carbonaceous chlorite schist
(meta-basalt-flow, highly altered)
gn, fine grained fibrous chlorite, in places porphyric habit possibly parallel with foliation, carbonate as minute spots, sometimes giant spots (max. 0.7cm in diameter) of carbonate which are often accompanied by qtz and plagioclase, rare crosscutting veinlets of qtz often together with carbonate. interlayers of qtz-fspar rock (meta-qtz keratophyre): 84.20 - 84.30, 84.60 - 84.62, 85.55 - 85.95 with low-grade py dissemination,

high A/giant C

minute beds of biotite-chlorite schist.

87.69 - 87.75: carbonaceous qtz-chlorite-plagioclase schist
(meta-andesite, -dacite, supp crystal tuff)
grgn, fine grained, crudely bedded, conformable lenses of qtz-carbonate and granulated fspar of max. 0.3 cm size, stringy chlorite, rare spots of po and cp

A

87.85 - 87.95: translucent qtz
(meta-chert)

gradual hanging wall
schistosity a. laying 50° to 60°

87.95 - 89.83: high carbonaceous chlorite-biotite-sericite schist
(meta-andesite, -dacite, tuff)
lightbluishgn, medium grained, cross-biotite as porphyroblasts, spotted carbonate, in places crudely laminated, alternation of felsic (plagioclase) and biotite-chlorite layers, trains of granules of py within layered sections. interbeds of qtz-fspar rock

BH 12

(qtz-feldspar porphyr): 88.10 - 88.25, 89.00 - 89.30.
gradual hanging wall.
schistosity a layering: 45°, 88.30 m
↓

89.83 - 95.65: carbonaceous to high carbonaceous biotite bear. chlorite schist

high A/giant C feeder

(meta-basalt-flow, highly altered)
same as 82.50 - 87.95 m
some spots of mt, crosscutting features of qtz with stringers of po and cp,
feeder material: 89.83 - 92.65 high-grade feeder ore, 92.65 - 93.65 low-grade feeder ore, 93.65 - 95.02 high-grade feeder ore.

95.65 - 120.25: massive pyrite ore
(massive sulphide layer)

120.25 - 124.95: high carbonaceous sericite bear. qtz-plagioclase-chlorite schist

high A/giant C

(meta-basalt-flow, highly altered)
gn, chiefly laminated, suggestion of glass texture, mainly coarse chlorite, sporadically disharmonic small-scale folding, irregularly distributed carbonate as minute crystals of

BH 18

mainly anhedral shape, often giant, lense-like spots of carbonate accompanied by qtz, stringy mineralization and some times spots of po, py and cp, inter-layers of qtz-fspar rock (qtz-feldsplyr) at: 123.13 - 123.23 with high-grade py mineralization, 124.00 - 124.95 high-grade py mineralization. gradual hanging wall.
foliation at 30°

124.95 - 129.30 : carbonaceous biotite bear. qtz-amphibole-chlorite schist (carbonschist) (meta-basalt-tuff, weakly altered) gn to grgn, mildely layered sometimes well banded, banded sections composed of alternate granoblastic (qtz-fspar) and schistose layers, porphyroblast of amphibole - mainly elliptical crystals (10 cm / 126.54 m) roundly oriented prisms of up to 2.0 cm in size, spotted carbonate irregularily distributed mainly as minute spots, some smaller crystals of py, mt as 0.1 to 0.2 cm spots: 126.54 - 127.00, 127.20 - 127.40, 127.75 - 127.85, 128.20 - 128.75,

A

128.77 - 129.30. Subalgos of qtz-fspar rock (meta-qtz-wackophyr, tuff)
: 127.00 - 127.20 slightly mineralized by dissly mt, some stringers of po,
127.40 - 127.75 little mt, some spots of py, 127.85 - 128.20 stringers mt and stringers po, some rare spots of py,
128.75 - 128.77 rare spots of py.
sharp hanging contact.
layering 30°, 129.40)

129.30 - 130.10 : slightly carbonaceous amphibole bear. qtz-fspar rock
(meta-dacite, - qtz-wackophyr, supp. tuff)
gr, widely layered by trains of granules of amphibole, amphibole as porphyroblasts often with elliptical crysal face and max. 1.0 cm long randomly oriented, amphibole layers sometimes accompanied by fibrous chlorite, varying carb. content, in places lamina of carbonate, here some finest spots of mt and some biotite besides chlorite (alteration)
gradual hanging wall

130.10 - 130.90 : high carbonaceous amphibole bear. chlorite - biotite - qtz - fspar schist (meta - dacite, - qtz - feldspar. tuff)

gn to grgn, laminated, alternation of carbonate layers with chlorite-biotite bands and sections of granoblastic qtz-fspar rock in places carrying prisms (max. 0.2 cm size, elliptical) of amphibole, sometimes cm-thick interlayers of qtz-fspar rock, finely bedded with low-grade dissemination of py, spots of py throughout, sometimes forming trains of granules

high A/C

130.80 - 130.83 : qtz - fspar rock (meta-qtzfeldspathyr) laminated by ± mt and carbonate, some bigger spots of mt

C

sharp hanging wall

130.90 - 133.90 : carbonaceous qtz - fspar - amphibole - chlorite schist

(meta - basalt, altered tuff)

gn, chiefly layered, wavy lenticular texture, porphyroblasts of amphibole

A/C

mainly elliptical in shape and max. 1.5 cm long randomly oriented, in places slightly parallel align with foliation / schistosity, qtz-carbonate as flasrs and irregular layers throughout.
sharp hanging wall.

133.70 - 133.75: qtz-fspar rock
(meta-qtzkeratophyr)

133.75 - 134.10: carbonaceous chlorite bear. amphibole-qtz-fspar rock
(meta-dacite, supp. tuff)
gr to greenish gr, mildly layered, porphyric amphibole as max. 1 cm large crystals mainly elliptical, randomly oriented, spotted carbonate
sharp hanging wall

134.10 - 136.10: plagioclase amphibole schist
gr, medium grained, mildly laminated, conformable bands of carbonate, fine spot of py throughout, stripes of massive py: 134.75 - 134.76, 135.50 - 135.80
134.76 - 134.96: high carbonaceous chlorite-qtz fspar rock
(meta-dacite, tuff)

BH 18

low-grade dissemination of Py, finest spots of mt

136.10 m end of DDH

Thin sections:

18/1	28.00 m
18/2	28.40 m
18/3	29.75 m
18/4	32.85 m
18/5	36.80 m
18/6	43.95 m
18/7	48.40 m
18/8	58.60 m
18/9	64.40 m
18/10	70.30 m
18/11	72.35 m
18/12	74.80 m
18/13	78.70 m
18/14	85.40 m
18/15	86.80 m
18/16	87.70 m
18/17	89.70 m
18/18	125.30 m
18/19	131.60 m

DH 18

composition of ore:

95.65 - 120.00 m = 24.35 m - 1.20% Cu, 0.90% Zn, 40.0% S

89.83 - 125.00 m = 45.17 m = 1.00% Cu, 0.80% Zn, 34.30% S

Dünndarm liff 18/20

124.95 - 133.65 lamina of mt

129.90 - 130.90 what 10cm

133.92 - ende "

DIAMOND DRILL LOG

Transfjellet

FOLLDAL VERK A/S

PAGE 1

BH - 18

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
Hole beginning	28.30	biotite - chlorite schist light gn, layered to lapilli tuff texture, fine crystal, spotted biotite, slightly carbonaceous 27.85 - 27.90: qtz keratophyr with bigger spots of Py 27.90 - 28.20: amphibole laths 0.2 to 12 mm size randomly orientated 28.20 - 28.30: keratophyr tuff, some carb, bio			45° 45°	18/1	28.00 m	high carb. bio bear amphibole chlorite - qtz - f-spar schist			
28.30	95.65	basalt sequence 28.30 - 28.70: slightly altered basalt carbonaceous garnet - chlorite - amphibole schist gn, medium grained, mm layered, inter-beds of qtz keratophyr with dess. po up to 10 vol% (28.40 m, 28.55 m, 28.60 m), amphibole needles orientated as well not dacite to qtz keratophyr				18/2	28.40 m	carbonaceous garnet - chlorite plag. - amphibole schist			
						18/3	29.75 m	garnet bear plag. amphibole schist			
		28.70 - 30.90: basalt flow gn, fine to slightly med. grained, some lenses garnet bearing, massive to schistose. slightly carbonaceous									
		30.90 - 36.70: tuffitic flows high carbonaceous chlorite - sericite - qtz - f-spar rock (may be epiclastic sediment) gn, extrem fine grained, foliation med to fine gradually passing in up-wards, some lines 0.5 cm altite rings, massive, in places clusters of biotite				18/4	32.85 m	high carbonaceous chlorite - sericite - qtz - f-spar rock (tuffite or dacitic crystal tuff)			
		36.70 - 41.60: basalt flow			35°	18/5	36.80 m	high carbonaceous bio - chlo bear amphibole qtz - f-spar rock (int. flow)			

Hamar Trykk A/S

DIAMOND DRILL LOG

Tverrfjellet — FOLLDAL VERK A/S — PAGE 2

From	To	Description BH-18	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		biotite bear. chlorite-amphibolite schist grey med cryst. evenly bedded, 0.1 to 0.2 cm amphibole needles mostly randomly oriented but to well lineated, homogeneous, some rare spots of py									
	41.60 - 45.60:	dacitic to qtz keratophyric (flow) (may be epiclastic sediment, quartzite)									
		high carbonaceous sericite chlorite amphibolite				qtz 10cm	18/6	43.95m	high carbonaceous sericite bear. chlorite qtz-fspar rock (tuffite or dacitic tuff)		
		grey, very fine cryst., extremely massive, some irregular features of qtz and ca carb, some lenses 0.1 cm lath of biotite slightly increasing in grain size to the hanging									
		41.70 - 41.76: po impreg 40 Vol-%									
		41.85 - 41.96: po impreg 1 Vol.-%					10g/ton	0.52m	po		
		42.20 - 42.32: po impreg in qtz keratophyric reading 60 Vol-% to intermediate									
	45.60 - 51.93:	altered basalt flow carbonaceous to high carb qtz-fspar-rich chlorite-amphibolite	can be correlated with	4/7			18/7	48.40m	high carbonaceous chlorite amphibole qtz-fspar rock (int. flow)		
		gr. med. cryst., homogeneous, slightly carb. getting higher and dark towards the hanging, here very spotted carb									

Hamar Trykk A/S

DIAMOND DRILL LOG

Tverrfjellet — FOLLDAL VERK A/S — PAGE 3

From	To	Description — BH - 18	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		51.93 - 53.80: basalt flow									
		carbonaceous chlorite amphibolite									
		gn. fine crist., massive, spotted carb., network mm veining of carb.									
		53.80 - 57.00 : see 45.60 - 51.93 m									
		some spots of py, nebulous texture									
	mm	57.00 - 62.75 : ~~altered~~ ~~basaltic~~ andesitic to dacitic flow									
		carbonaceous to high carb. biotite - chlorite schist (sericite bearing)				(remained to dacitic tuff)					
		lightgn. fine crystal., massive to slightly laminated, some spots of py, some lenses 0.1 to 0.2 cm needles of randomly orientated amphibole, nebulous texture				18/8	58.60 m	high carbonaceous sericite bear. qtz-fspar chlorite schist (intermediate tuff)			
		57.30 - 57.50: qtz keratophyr with strongly and spotty po min 3 Vol.-%									
	mm	62.75 - 66.30 : slightly altered basalt flow (to intermediate) (45.60 - 51.93)			45°						
		carbonaceous amphibole - chlorite rock		correlation		with way to 13/12 or 4/7					
		gn. medium grained, slightly schistose and banded, randomly orientated amphibole needles, fuzzy and spotty carb.				18/9	64.40 m				
	mm	66.30 - 70.00 ~~altered basaltic~~ andesitic to dacitic flow									

Hamar Trykk A/S

DIAMOND DRILL LOG

Trondfjellet

FOLLDAL VERK A/S

BH - 18

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		carbonaceous sericite - biotite - chlorite rock light gr. fine to slightly medium grained, in placer 0.1 to 0.3 cm amphibole needles always not orientated, massive, carbonate often fuzzy sometimes spotty.									
		= 68.80 - 68.85. gtz keratophyr some spots of po < 1 Vol-%			80°						
		70.00 - 71.00 : basalt flow plag amphibolite gr. medium crystalline, ellipsoidal looking amphiboles, randomly orientated, some spots of carbonate				18/10	70.30				
		71.00 - 71.61 : fault zone with squeezed fine gr. basalt			71.00 m to 71.61 m						
		71.61 - 72.70 : altered andesite fault- high carbonaceous biotite-chlorite schist grey to dark gr, medium to slightly coarse grained, relicts of amphibole needles, bio and chlo often pseudomorph amphibole well an layered with alternation of high bio and high qtz carb. layers.				18/11	72.35				

DIAMOND DRILL LOG

FOLLDAL VERK A/S

PAGE 5

Tverrfjellet

BH - 18

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		intermediate flow									
		72.70 - 75.10 : carbonaceous to slightly carb biotite - chlorite schist gr. fine grained, massive, 0.2 to 0.5 cm biotite flakes and clusters randomly oriented, some irregular carbonate bands, porphyritic texture						18/12	74.80 m		
		75.10 - 77.00 : slightly altered basalt flow gr. fine grained, porphyritic amphibole, greenschist, chlorite water									
		77.00 - 82.50 : basaltic to andesitic slightly altered basalt flow			in places 30°						
		2. chlorite bearing chlorite amphibolite 100% gr. medium to slightly fine grained, randomly oriented amphibole porphyritic texture.						18/13	78.70 m		
		82.50 - 87.95 : altered basalt flow carbonaceous biotite - chlorite schist				correlation with 13/16					
		see 72.70 - 76.00, carbonate at places as fissure spots						18/14	85.40 m		
		(high K, in places fissure) 84.20 - 84.30: qtz hexaplyr			50°			18/15	86.80 m		
		84.60 qtz hexaplyr band 2 cm						18/16	87.70 m		
		85.50 "									
		85.55 - 85.95 qtz hexaplyr fine grained, massive with weakly layering, some fissure spots of po, interbeds of bio - chl. schist weakly cm size			60°						

Hamar Trykk A/S

89.83 - 92.65 m skrz imp.

92.65 - 93.65 m skrz imp.

93.65 - 95.82 m skrz imp.

DIAMOND DRILL LOG

Trastjellet

FOLLDAL VERK A/S

BH - 18

From	To	Description	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		87.69 - 87.75: qtz keratophyr irregular texture, skinny carbonate irregular sharp wall, bad veining Min: PO, Cy < 1 Vol-%									
		87.85 - 87.95: translucent quartz (chert)									
		87.95 - 89.83: intermediate to felsic tuff				correlates well with BH 4					
		high carbonaceous qtz-rich sericite - biotite chert yellowish to, med grained, homogeneous, interbeds of coarse biotite-chlorite assemblage and qtz keratophyr.			45°		18/17	89.70 m			
		= 88.10 - 88.25: qtz keratophyr high carb. sericite-quartz rock, fine grained, homogeneous,			88.30 ⊥ 45°						
		89.00 - 89.30: "									
		89.83 - 95.65: altered basalt (high Acy) biotite - chlorite assemblage carbonaceous see 87.50 - 87.95 m Min: spots of net idio. Py, Cy, PO irregular feeders									
		(high Acy, giant C, Cy)									

DIAMOND DRILL LOG

Troefjelet

FOLLDAL VERK A/S

PAGE 7

From	To	Description DH - 18	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
95.65	120.25	~~95.65~~ 120.25 ore zone									
120.25	133.65	basalt zone (high & dirty part C)					18/18 125.30 m				
		high carbonaceous biotite - chlorite schist					18/19 131.60 m				
		gr. med. grained, irregular carbonate and qtz mixing, giant spots of carbonate, in places			30°						
		laminated by feldspathic mat.									
		Min: po, py and cp as irregular stringers and spots					~~Mo~~				
							127.00				
							126.54 spots of mt				
							127.20 - 127.40 "				
							127.75 - 127.85 mt				
							128.20 - 128.75 mt	128.77 - 129.30 mt			
							porphyroblasts of amphibole see 18/19 from 126.54 increasing towards hanging				
123.13 - 123.23:		feldspathic intercalayer with disseminated py 50% } pyrite									
124.90 - 124.95:		" " py 50% }									
		in places some cp									
124.95 - 133.65:		altered basaltic tuff carbonaceous qtz-chlorite schist									
		gr. fine cryst. well bedded mm to cm ~~very inhomogeneous texture~~									
		scale by qtz and carbonate-rich layers.			30°						
		Min: spots of mt			129.40						
		127.00 - 127.20: qtz feldspathic intercalayer slightly mineralized by disseminated some stringers of po									
		127.40 - 127.75: "									
127.85 - 128.20 m		qtz - carb stringers mt and stringers po one rare spot of py									
		~~128.44~~ 129.30 - 130.90: qtz feldspathic to dacitic tuff									
128.75 - 128.~~77~~ m		qtz feldsp rare spots of py									
		high carbonaceous qtz-rich chlorite - biotite rock/schist									
C		fine laminated, in places porphyritic texture, otherwise fine crystalline									

slowly increasing amphibole towards the hanging (127.75) big needles 0.5 - 0.7 cm randomly orientated, porphyritic texture, sometimes 1.5 cm crystals

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129.30 - 130.10: slightly carb
~~high carbonaceous~~ amphibole bearing qtz-fspar rock
(dacitic to felsic volcanic tuff sipp)
gn, crudely layered by trains of granules
of amphibole, amphibole as porphyroblast
often with elliptical outlines and max 1.0cm long
randomly oriented, ~~sometimes~~ amphibole layers
sometimes accompanied by fibrous chlorite,
varying carb content, in places lamina of carbonate,
rare some finest spots of ~~py~~ ~~diss~~ disseminated and
~~slightly~~ some biotite besides chlorite (alteration)

130.10 - 130.90: high carbonaceous amphibole bear chlorite-biotite-qtz-fspar rock
gr to grey, lamination of carbonate with obvious mica layers
and ~~gr~~ sections of granoblastic qtz-fspar rock in places carrying ~~py~~
high A/C
felsic tuff
pyrite (max. 0.2 cm size, elliptical) of amphibol, spots of
py throughout, sometimes forming trains of granules,
sometimes cm-thick layers of qtz-fspar rock finely laminated
with lowgrade dises of py.,

C
130.80 - 130.83: ~~lamina~~ qtz-vein ~~with fines~~ laminated by ~~pyrite~~ and
carbonate, some bigger spots of ~~py~~ disseminated

130.90 - 133.20: carbonaceous qtz-fspar-amphibole-chlorite rock
(meta-basalt-~~flow~~/tuff, altered)
A/C
gn, crudely layered, ~~schistose~~ wavy lenticular texture,
porphyroblasts of amphibole mainly elliptical in shape and
max 1.5cm long randomly oriented, in places slightly
parallel foliation/schistosity, qtz-carbonate as flasers and
irregular layers throughout.

DIAMOND DRILL LOG

Tverrfjellet

FOLLDAL VERK A/S

From	To	Description BH-18	DDH No.	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		Min: spots of py mt as 0.1 to 0.2 mm spots and sometimes lamina, here enriched with 2 Vol %			25°						
133.65	136.10	intermediate liff (slightly altered gradual ongoing to not altered)									
		qtz-HBl amphibole-diabase dikelet passing in qtz-rich amphibolite									
		gr to grgn, fine to medi crystl, laminated, some stringers of py are intrbedded, spots of mt									
		136.10 m end									
		samples									
		18/1 28.00 m	18/8 58.60 m	18/15 86.80 m							
		18/2 28.40 m	18/9 64.40 m	18/16 87.80 m							
		18/3 29.75 m	18/10 70.30 m	18/17 89.20 m							
		18/4 32.85 m	18/11 72.35 m	18/18 125.30 m							
		18/5 36.80 m	18/12 74.80 m	18/19 131.60 m							
		18/6 43.95 m	18/13 78.70 m								
		18/7 48.40 m	18/14 85.40 m								

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133.70 - 133.75 : qtz-feld

133.75 - 134.10 : carbonaceous chlorite tear amphibole qtz-fspar rock
(dacitic tuff)
gr to greenish gr, crudely layered, porphyric amphibole
as max. 1cm crystals mainly elliptical randomly
oriented, spotted carbonate.

134.10 - end : plagioclase amphibole ~~rock~~
gr to slightly grn, medium grained,
~~very~~ ~~slight~~ indistinct lamination ~~of~~ by
changes in comp, conformable bands
of carbonate, fine spots of ~~qtz~~ throughout

134.75 - 134.76 : several mm - stripes of massive py

134.76 - 134.96 : high carbonaceous chlorite - qtz fspar rock
(meta-dacite tuff)
low-grade diss of py, fine spots of qtz

135.50 - 135.80 : medium-grade py min. as diss
together with chloritized amphibolite
fine spots of qtz throughout.

DIAMOND DRILL HOLE 20

Tverrfjellet mine, Folldal Verk a/s, exploration hole from 1958.

Location: 1240 N - 2450 V

Inclination: 56° N, 35m 50°, 75m 42°, 115m 37°.

Total length: 118.97 m (3m overburden)

34 20

0.00 - 9.10 : garnet bear. biotite - sericite schist
(meta-pelite)
dark gr, fine-grained, lenticular-texture often grading towards wavy-lenticular texture, porphyroblasts of biotite as cross-mica, in places ~~coarse~~ clots (multi-crystal) randomly oriented, biotite causing spotted appearance of the rock, equally distributed garnets of max. 0.4 cm size, often idiomorphic, rare spots of xenomorphic carbonate.
gradual hanging wall.
60°, from 5m 45°

9.10 - 13.34 : carbonaceous sericite bear. biotite - qtz-fspar gneiss
(meta-qtz-keratophyr)
gr to brownish, laminated with in places flaser-texture, strongly folded, mm-layers of biotite alternate with slightly thicker bands of qtz accompanied by carbonate, in places traces of granules of porphyroblasts of amphibole strongly aligned with foliation, very rare spots of mostly idiomorphic py.
gradual hanging wall.
45°, strongly disharmonic folded, squeezed

13.34 - 18.80 : slightly carbonaceous garnet - biotite - sericite hbl quartzite
(meta - arenite)
greenish gr, flaser-texture, close alternation of

qtz with phyllosilicates, cross-biotite.
sharp hanging wall.
50°

18.80 - 28.25 : slightly carbonaceous garnet-chlorite-biotite bear. sericite schist
(meta-pelite)
dark greenish gr, fine-grained, some flasers or lenses of qtz, porphyric biotite often as cross-mica but sometimes flattened and aligned with schistosity, biotite cause spotty appearence of the rock, strongly dispersed idiomorphic garnet of max. 1.0 cm size.
gradual hanging wall.
mainly 60°.

28.25 - 31.35 : carbonaceous chlorite-biotite-qtz-sericite schist
C (tuffaceous meta-pelite)
gngt, fine-grained, laminated, alternate carbonate-qtz layers and phyllosilicate-bands, porphyric biotite often as cross-mica but sometimes streched and aligned with schistosity, sporadically mm-layers of chlorite-biotite with coarse multi-crystal biotite randomly oriented, * interlayers of medium-grade py within qtz-rock:
30.14 - 30.15 m, low-grade dissemination of py: 30.90 - 31.35 m.
gradual hanging wall, conformable
60° changing towards 45°

* distinct increase in biotite and chlorite and decrease in sericite within hanging portion,

31.35 - 35.87 : carbonaceous chlorite - amphibole - qtz - plagioclase gneiss (banded amphibolite)
(meta - andesite, tuff)
gngn, medium - grained, crudely cm - layered mainly due to variation of chlorite (fine - fibrous) and amphibole, latter forming prisms of max. 0.7 cm size ~~always~~ being randomly oriented, spotted carbonate, in places flaser or lenses conformable with indistinct banding, rare spots of idio - morphic py.
gradual hanging wall.
45°

C

35.87 - 68.87 : slightly carbonaceous amphibole schist
(meta - basalt, flow)
gn, fine to medium grained, in places laminated or crudely banded due to mm- or cm-inter - layers of quartz, clots of biotite often as cross - wise and sometimes forming traces of granules (layers) : 57.20 - 58.90 m and again at 59.66 - 68.87 m, latter section often enriched in chlorite and more laminated (weak alteration), carbonate as rare spots of mostly lense - like shape, sporadically spotted carbonate mainly idiomorphic crystals : 38.00 - 39.40 m, 41.30 - 42.95 m, inter layers of quartzite (chert) with

A

C

DDH 20

subordinate amounts of mt and py: 37.20 - 37.35 m, 57.35 - 57.37 m, 57.60 - 57.65 m (ermt), 59.41 - 59.66 m, ~~59.96~~ - ~~59.99 m~~, 60.10 - 60.22 m, 66.12 - 66.19 m, occasional interbeds rich in py, pyrite mineralization often accompanied by quartz sometimes embedded in amphibolite: 37.60 - 37.70 m 10 Vol.-% py, 40.82 - 40.93 m 60 Vol.-% py, 43.80 - 43.81 m 80 Vol.-% py, 45.75 - 45.76 m rare spots of py, 46.75 - 46.76 m 60 Vol.-% py, 50.12 - 50.57 m low-grade dissemination or web-like py (cliff sequence), 52.95 - 52.96 m 60 Vol.-% py, 53.61 - 53.86 m 90 Vol.-% py.
sharp hanging wall.

68.87 - 69.10: qtz-pyrite rock
(disseminated pyrite layer)
medium-grained, medium-grade pyrite-ore, disseminated pyrite sometimes forming faces of granules.
sharp hanging wall.

69.10 - 69.50: quartzite
(meta-chert)
white, extremely fine-grained, subordinate pyrite as minute spots and mm layers.
sharp hanging wall.

69.50 - 69.95: qtz-rich pyrite rock
(massive sulphide layer)
medium-grained
sharp hanging wall (bedding fault line)

DDH 20

69.95 - 70.10: carbonaceous sericite - amphibole - chlorite - qtz - fspar rock / gneiss

A/C

(meta - andesite, tuff, weakly altered)

gn to lightgn, medium - grained, wide development of cm - layering, fine - fibrous sericite and chlorite, porphyric amphibole max. 0.3 cm long and randomly oriented, sometimes elliptical in shape, minute spots of carbonate equally distributed. gradual hanging wall.

70.10 - 72.36: chlorite bear. sericite - amphibole - qtz - fspar rock

(meta - andesite, flow or tuff)

grgn, medium - grained, prisms of amphibole max. 0.2 cm (long) always randomly oriented, rare spots of idiomorphic py, band of massive pyrite: 72.31 - 72.33 m. gradual hanging wall.

72.36 - 73.85: carbonaceous biotite - qtz - chlorite - amphibole schist / gneiss

A/C

(meta - basalt, tuff, weakly altered)

grgn, fine - grained with footwall more medium - grained, here more intensively altered and distinctly banded, amphibole prisms average 0.2 cm long and often parallel

layering, giant spots of mt: 73.00 - 73.75 m, minute spots and stringers of carbonate throughout.
sharp hanging wall.

73.85 - 84.50: qtz-bear. pyrite rock
(massive sulphide deposit)
medium-grained, gradual changes in qtz-content, clusty pyrite-ore of low-grade: 80.25 - 80.70 m slightly mt bearing, close alternation of highly altered andesitic tuff with high-grade pyrite: 84.38 - 84.50 m
sharp hanging wall

OH zone

84.50 - 87.90: carbonaceous amphibole (biotite) bear. chlorite-feldspar-qtz schist
(meta-andesite/-basalt, tuff, highly altered)
lightgr, fine-grained, laminated with in places wavy-lenticular texture, sometimes chaotical, spotted appearence due to scattered minute flakes of biotite, fine-fibrous chlorite, carbonate often associated with qtz forming irregular aggregates and stringers or even bands, rare spots and stringers of Py, rare layers of quartzite (chert) with py mineralization:
85.36 - 85.70 m footwall and hanging wall marked by cm-layers of massive py, 85.92 - 85.95 m subordinate py, 86.13 - 86.18 m traces of granules of py low-grade mineralization.

AA/C

gradual hanging wall.
85°

88.90 - 90.88 : high carbonaceous chlorite - biotite bear. sericite-qtz-fspar rock
(meta-qtz-porphyr, tuff)
grwhite, fine-grained, biotite mainly as porphyroblasts randomly oriented (cross-biotite) not equally distributed, carbonate as minute spots often accreted within layers or nodules, carbonate in places major compound, intersections of carbonaceous (carbonaceous amphibole-sericite-qtz-fspar rock): 88.57 - 88.77 m, 89.13 - 89.40 m, 90.00 - 90.88 m, porphyroblasts of amphibole (extremely coarse sometimes as spherolites) randomly oriented, interlayers of quartzite with mt and py: 88.10 - 88.18 m low-grade py, 88.77 - 89.13 m rare spots of py, dissemination of mt, 89.40 - 89.46 m rare spots of mt,
sharp hanging wall.

90.88 - 91.16 : quartzite
(meta-chert)
whitegr, extremely fine-grained, increasing py content towards hanging portion, barren footwall.
gradual hanging wall.

91.16 – 92.25: qtz - pyrite rock
(massive sulphide lager)
ore zone
medium-grained, sporadically translucent qtz.
sharp hanging wall.

92.25 – 96.19: high carbonaceous sericite bear. biotite - chlorite - qtz - plagioclase schist
(meta-andesite, flow or tuff, very similar 66.30 - 77.30 m DDH 4)
11/C
lightgn, fine-fibrous chlorite, porphyroblasts of biotite forming traces of granules conformable with schistosity, sometimes isolated clots of biotite as cross-mica, carbonate as minute spots often scattered but sometimes as traces of granules, footwall contains porphyroblasts of amphibole randomly oriented, prisms decrease in size upsection (max. 1.0 cm long). sharp hanging wall, bedding fault line. 45°, strongly folded §

96.19 – 105.40: high carbonaceous qtz - biotite - chlorite schist
(meta-basalt/-andesite, flow or tuff, highly altered)
gn to lightgn, mainly coarse-grained, chaotically folded only sometimes harmonic with crude

development of banding, huge multi-crystals of biotite surrounded by medium-grained chlorite, dissemination of pyrite, occasional some prisms of amphibole, ~~strongly~~ in folded ~~together~~ ~~with~~ high-grade py-ore: 96.14 - 96.30 m, 96.35 - 97.20 m, 98.10 - 98.30 m, 98.70 - 98.85 m, 99.65 - 99.80 m, 102.00 - 102.15 m low-grade py, 103.32 - 103.60 m medium-grade py, 104.95 - 105.15 m medium-grade py. gradual hanging wall.
strongly folded §

105.40 - 108.90 : carbonaceous chlorite bearing amphibole-plagioclase-qtz rock (banded amphibolite)
(meta-andesite/-basalt, tuff)
grgn, medium-grained, porphyroblasts of amphibole max. 0.4 cm long randomly oriented, idiomorphic carbonate equally distributed, very sporadically forming traces of granules, rare spots of py. crude development of banding
107.30 - 108.90: high carbonaceous amphibole bearing qtz-chlorite schist
(meta-andesite/-basalt, tuff, highly altered)
lightgn, fine-fibrous chlorite, rare prisms of amphibole (0.4 cm long) randomly oriented, coarse idiomorphic carbonate equally distributed, in places forming irregular aggregates,

hanging portion with low-grade dissemination of py.
sharp / hanging wall.
45°

108.90 - 109.00: quartzite
(meta-dst)
white, extremely fine-grained, interlayers of massive py
sharp hanging wall.

109.00 - 109.40: qtz-rich pyrite rock
(massive sulphide layer, repeated by folding)
medium-grained
sharp discordant hanging wall.

109.40 - 109.60: high-carbonaceous amphibole bear. qtz-chlorite schist
A1/C (meta-andesite /- basalt, tuff, highly altered)
same as: 107.30 - 108.90 m

X 109.60 - 115.97: carbonaceous to high carbonaceous chlorite-bear. amphibole-plagioclase-qtz rock / gneiss
(banded amphibolite)
C (meta-andesite /- basalt, tuff)
same as: 105.40 - 107.30 m, some interlayers of low-grade py within quartzite: 110.45 - 110.70m, 111.59 - 111.72 m D, 115.80 - 115.97 m.

115.97 end of DDH

DDH 20

Chemical composition of ore:

73.85 - 84.50 m = 10.75 m = 0.63 % Cu, 1.50 % Zn, 42.75 %

90.88 - 92.25 m = 1.37 m = 0.45 % Cu, 1.40 % Zn, 28.50 %

96.14 - 103.62 m = 7.48 m =

DIAMOND DRILL LOG

Trondfjellet

FOLLDAL VERK A/S

From	To	Description 34 – 20	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
section II		start with dacitic tuff								
		biotite - sericite - chlorite schist								
9.10	18.50	Vera topligt								
		biotite - sericite - qtz - fspar rock								
18.50	31.20	dacitic tuff								
		biotite - sericite - chlorite schist								
		see further new page								

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DIAMOND DRILL LOG

FOLLDAL VERK A/S

BH - 20

From	To	Description	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
31.20	36.00	andesitic tuff								
		carb. qtz-fspar-sericite-chlorite-amphibole schist		45°						
		grgn, medium grained and fine grained, laminated,								
		porphyric amphibole of average 0.2 cm size								
		randomly orientated, gradual overgoing in to								
		basaltic section								
36.00	68.80	basaltic section (III)								
		36.00 - 68.80: greenschist		45°						
		carb to slightly carb. amphibole schist								
	∈ 38.00 - 39.00 and 41.25 - 42.80	gn. fine grained, homogeneous, in								
		places spotted carb.								
		37.20 - 37.35: translucent qtz								
		37.60 - 37.70: qtz-hexatophyr								
		with cm band of high diss py								
		(20 Vol.-%)								
		40.82 - 40.93: qtz-hexatophyr								
		with py one 60 Vol-%								
		43.30: band of qtz-hexatophyr								
		45.75: "								
		49.60 - 50.20: qtz-hexatophyr with inbetween								
		or lamina of basalt								

cont. BH-10 157.00 - 161.60 and others

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DIAMOND DRILL LOG

Tverrfjellet

FOLLDAL VERK A/S

BH - 20

From	To	Description	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		50.20 - 50.50: basalt in close alternation with qtz-keratophyr some stringers and spots of Py Po and Py min., total < 2 Vol-%								
		52.95 - 53.00: Py ore								
		53.50 - 53.70: Py ore								
		53.90 - 54.10: Translucent qtz								
		55.50 - 56.00: slightly altered basalt flow / tuff chlorite-amphibole schist laminated, some spots of Py								
		57.10. band of qtz-keratophyr								
		57.55 - 57.60: close alternation of basalt with qtz-keratophyr some spots of Py								
		57.60 - 68.80: slightly alteration within basalt (increasing towards hanging) dio. pseudomorphic amphib. some lamina of carb. often laminated dio.-amphib with layered qtz-keratophyr inbetween layers: 59.50 - 59.70, 59.90 - 59.95, 60.10 - 60.25, 66.15 - 66.20.								
									cont. BH - 8 about 25.00 - 37.00 m	
									cont. BH - 29 about 67.00 - 83.90 m	

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Tranfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

BH - 20

From	To	Description	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
68.80	85.00	Py ore zone (section IV)								
		68.80 - 69.10: qtz-keratophyr with dissem. Py mineralization, 25 Vol.-%								
		69.10 - 69.50: qtz-keratophyr extremely fine grained, massive								
		69.50 - 69.95: Py ore, 80 Vol.-% within qtz-keratophyr								
high A		69.95 - 70.10: high altered basaltic to andesitic volc slight carb. sericite - chlorite - biotite schist dgr, medium to slightly coarse grained, in places porphyric textures, clusters of bio								cont. BH - 13 125.56 - 125.80 m
		70.10 - 70.90: dacitic volc qtz-fspar-sericite rock gr to light gngr, fine grained, massive,								
		70.80 - 70.90: qtz-keratophyr band with clusters of carbonate surrounded and giant spots of Py								cont. BH - 13 125.00 - 125.05
A/C and high A/C		70.90 - 73.75: andesitic to even basaltic tuff carb. biotite - chlorite schist gr-bl to grgn, medium grained, laminated,								cont. BH - 13 125.05 - 125.30 m

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DIAMOND DRILL LOG

Trondfjellet

FOLLDAL VERK A/S

BH - 20

From	To	Description	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		homogeneous, gradual change from footwall andesitic to hanging basaltic								
		73.00 - 73.75: some spots of mt								
		71.25: band of massive py								
		73.75 - 80.00: massive py ore								
		80.00 - 80.70: dissaminated py ore, total 30 Vol-% qtz-keratophyr								
		80.70 - 84.88: massive py ore								
		84.88 - 85.00: close alternation of massive py ore with high altered basalt								
85.00	109.60	section V								
		85.00 - 88.20: andesitic to even dacitic tuff								
high A/C		carb. bio.-sericite-chlorite schist								
		light gr, fine grained, laminated, often lamina or cm inbetween of qtz-keratophyr, sometimes irregular folded,								
		88.20 - 88.60: qtz-keratophyr								
	≤	carb. sericite-qtz-fspar rock								
		light gr, fine grained, massive to crudely laminated, homogeneous								
		88.20 - 88.30: finest diss of py, < 3 Vol-%								

cont. BH - 13 129.60 - 131.80 m

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Tverrfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

BH-20

From	To	Description	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		88.60 - 88.70: andesitic volc. qtz-fspar-sericite-amphibole rock light grey, porphyric amphibole of max 20 cm size randomly orientated					T			
		88.80 - 89.10: qtz-keratophyr qtz-fspar rock gr, fine grained, massive, some diss. of mt								
		89.10 - 89.30: see 88.60 - 88.70								
		89.30 - 90.10: qtz-keratophyr								
	≤	high carb. qtz-fspar rock								
		90.10 - 90.88: see 88.60 - 88.70					I			
		90.88 - 92.25: mineralized qtz-keratophyr								
	≤	carb qtz-fspar rock disseminated py, po min, often enriched within cm bands, total amount 30 Vol.-%								
		92.25 - 105.40: high altered basaltic to andesitic diff/flow								
light l/c		carb. qtz-fspar-amphib.-sericite-bio.-chl. schist light gr, fine grained with in places porphyric amphibole, bio. pseudomorphs amphibole, * in places even coarse grained, here chlorite, bio. assemblage								

Corr BH-29 96.40 - 97.60 m and others / es. BH-18 129.40 - 134.00 m

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DIAMOND DRILL LOG

Tverrfjellet

FOLLDAL VERK A/S

PAGE 7

BH - 20

From	To	Description	Interval From	Interval To	Assays Cu	Mo	Pb	Zn	Au	Ag
		96.14 - 96.30 : py ore								
		96.35 - 97.20 : "								
		98.10 - 98.30 : " more diss. within qtz-keratophyr								
		98.70 - 98.85 : "								
		99.65 - 99.80 : "								
		102.00 - 02.15 : qtz-keratophyr diss. of py. 10 Vol-%								
		103.32 - 103.60 : diss py within altered basalt, 15 Vol-%								
		104.95 - 105.15 : diss py within altered basalt and qtz-keratophyr 15 Vol-%								
		105.40 - 107.30 : slightly altered basalt carb. plagioclase amphibolite grgn. medium grained, pisolithic amphibole randomly orientated, spotted carb., homogeneous								
		107.30 - 108.90 : high altered andesitic tuff high carb. qtz-fspar-bio-chlorite schist lightgn., fine grained, spotted carb., laminated, homogeneous								

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Tverrfjellet

DIAMOND DRILL LOG

FOLLDAL VERK A/S

BH - 20

From	To	Description	Interval From	Interval To	Cu	Mo	Pb	Zn	Au	Ag
		108.90 - 109.40: py ore								
	high t/c	109.40 - 109.60: high altered basalt high carb. chlorite schist light gn to gn, fine grained, massive, idiomorphic carb (spotted)								corr. BH-29 136.05 - 137.78 m
	≤	109.60 - 115.97 dacitic flow grading into andesitic unit carb. qtz-fspar-chlorite-amphibole rock grgn, medium to slightly coarse grained, massive, homogeneous, spotted carb., some interlayers of carbonaceous qtz- hematite: 110.45 - 110.70, 111.59 - 111.72 (with diss py), 115.80 - 115.97 (with diss py)								corr. BH - 26 94.50 - 103.20 m

DIAMOND DRILL HOLE 35 8

Tverrfjellet mine, Folldal Verk A/S, ore zone V, level IV

Location: x + 39.22, y + 499.92, z + 8

Azimuth: 345°

Inclination: 0°

Total length: 34.38 m

Description:

000 - 3.05, carbonaceous biotite - chlorite - sericite schist

(tuffaceous meta - pelite)

A/C

light blueish gr, wavy - lenticular bedding, often chaotically folded, discontinuous bands and stringers and nodules of qtz, porphyric biotite always connected to carbonate spots mainly of giant - type, only very sporadically typical cross - biotite, transitions to carbonate biotite - chlorite - qtz - sericite schist with very distinct wavy - texture.
sharp hanging wall.

3.05 - 7.52 carbonaceous biotite bear. sericite - chlorite schist

(tuffaceous meta - pelite)

greenish gr, fine grained, irregular nodules and stringers rich in qtz, mainly fine grained biotite but sometimes porphyroblasts always crossing schistosity, rare idiomorphic garnets of 0.7 cm Ø: 4.15 - 7.52.
sharp hanging wall.

7.52 - 8.42 pyrite - magnetite ore

(exhalative ore)

violett, fine grained, mm - banding of py within magnetite.
sharp hanging wall.

8.42 - 10.70 massive pyrite ore

(sulphide layer)

medium grained massive ore with cherty - magnetite layer: 8.80 - 8.98.
sharp hanging wall.

10.70 - 11.26 amphibole bear. chlorite - qtz - plagioclase gneiss

A (meta - basalt, tuff)

gn, medium grained, compositional bedding of alternate chlorite, chlorite - amphibole, qtz - plagioclase and qtz - pyrite layers, bands often mm - thick.
sharp hanging wall.

11.26 - 11.60 massive pyrite ore

(sulphide layer)

medium grained, massive.
sharp hanging wall.

11.60 - 12.32 : amphibole bear. chlorite - qtz schist

A (meta-basalt, tuff)

same as: 10.70 - 11.26.
sharp hanging wall.

12.32 - 12.60 : pyrite ore

(massive sulphide layer)

medium grained, massive.
sharp hanging wall

12.60 - 12.85 : plagioclase - qtz rock / gneiss

(meta-qtz-keratophyr)

gr, fine grained, lamina of fine grained pyrite.
sharp hanging wall.

12.85 - 13.01 : pyrite ore

(massive sulphide layer)

medium grained, massive.
sharp hanging wall.

13.01 - 13.80 : amphibole bear. pyrite - biotite - sericite - fspar - qtz rock / gneiss

(meta-dacite, tuff)

greenish gr. medium grained, compositional banding as alternate phyllosilicate-rich layers

A and phyllosilicate-poor qtz bands rich in py, some small bands of massive py. biotite and sericite forming clots (multi-crystal aggregates, amphibole as minute prisms parallel layering, low-grade dissemination of pyrite throughout.

sharp hanging wall.

13.80 - 15.50 : carbonaceous to high carbonaceous biotite - chlorite - qtz - sericite schist

(tuffaceous meta-pelite)

C

greenish gr., fine-grained, laminated and partly wavy-lenticular texture, alteration of qtz-layers or lenses with phyllosilicate band/lamina, biotite slightly coarser grained as chlorite and sericite, always parallel layering, carbonate as mm-spots and sometimes bigger aggregates (lense shaped) equally distributed, rare spots of minute grains of py throughout. sharp hanging wall.

15.50 - 17.22 high carbonaceous sericite bear qtz-biotite-chlorite schist

A/C

(tuffaceous meta-pelite)

grgn, fine grained, wavy-texture, nodules and stringers of qtz with or without carbonate surrounded by fine-fibrous chlorite with some crystals of biotite, spots and lumps of carbonate irregularly distributed, intelayers of fspar-qtz-rock (qtz-leuko-phyr) with medium grade py mineralization: 15.75 - 15.97 m, 16.30 m.
sharp hanging wall.

17.22 - 17.75 carbonaceous qtz-amphibole schist

(meta-basalt, flow)

C

grgn, fine grained, mm to cm layering, alteration of amphibole layers with qtz-carbonate bands, slightly chloritic,
sharp hanging wall.

17.75 - 18.20 : carbonaceous to high carbonaceous chlorite - amphibole - qtz - fspar gneiss

A/C

(meta - basalt / andesite, tuff)

light green, medium grained, compositional banding in cm - scale, alternate amphibole bear. chlorite layers with carb. chlorite bear. qtz - fspar - amphibole bands and carb. amphibole bear. qtz / fspar - qtz layers, fine - fibrous chlorite, porphyroblasts of amphibole max 0.4 cm size randomly oriented, some rare spots of py

sanded sample

sharp hanging wall.

18.20 - 19.10 : carbonaceous chlorite - qtz - amphibole schist

C

(meta - basalt, flow)

gn, extremely fine grained and fine grained, laminated, minute bands of qtz or carbonate in alternation with cm - bands of amphibole, coarse idiomorphic spots of carbonate (spotted carb.) often forming traces of granules, some rare spots of idiomorphic pyrite, highly altered zone: high carbonaceous amphibole bear. qtz - chlorite schist : 18.20 - 18.50

AA/C

sharp hanging wall

19.10 - 19.50 : carbonaceous to high carbonaceous chlorite - amphibole - qtz - fspar gneiss

(meta - basalt / - andesite, tuff)

same as : 17.75 - 18.20

sharp hanging wall

19.50 - 21.49: slightly carbonaceous qtz-amphibolite schist
(meta-basalt, flow)
gn, fine grained, in places slightly banded, rare spots of py, interlayer of fspar-qtz rock (qtz-keratophyr): 20.02 - 20.20 m low grade dissemination of py, interlayer of carbonaceous amphibole-chlorite-fspar-qtz rock (meta-andesite, tuff): 20.45 - 20.75 m
sharp hanging wall

21.49 - 21.59: fspar-qtz rock
(meta-qtz-keratophyr)
gr, fine grained, finest stringers of py, sometimes bigger spots, high-grade ore: 21.57 - 21.58 m
sharp hanging wall

21.59 - 21.95: slightly carbonaceous chlorite bear amphibole-qtz-plagioclase gneiss
(meta-basalt, tuff)
grgn, medium grained, chidely layered, prisms of amphibole strongly aligned with foliation, average 0.5 cm in size, fine-fibrous chlorite as matrix together with qtz and fspar
sharp hanging wall

21.95 - 22.30: pyrite-qtz gneiss
(meta-qtz-keratophyr)
gr, alternate pyrite and qtz layers, medium grade ore

sharp wall ;-)

22.30 - 22.40 : again 21.59 - 21.95 due to folding

22.40 - 22.55 : again 21.95 - 22.30 due to folding

22.35 - 26.40 : chlorite bear. amphibole schist
(meta - basalt, flow)
gn, rare irregular veinlets of qtz, some spots of carbonate often forming traces of granules, interlayer of quartzite (meta - qtz - keratophyr) with stringy py mineralization : 24.88 - 24.91 m
gradual hanging wall

26.40 - 29.92 : high carbonaceous chlorite - amphibole - qtz - plagio-clase rock / gneiss
(meta - basalt / - andesite, tuff)
gign to gngr, medium grained in places slightly fine grained, widely cm - layered, sometimes even massive, fine - fibrous chlorite, porphyric prisms of amphibole max. 0.4 cm long and randomly oriented, spotted carbonate, idiomorphic crystals often forming trains of granules conformable with layering, rare spots of pyrite, some interlayer. of fspar - qtz rock (meta - qtz - keratophyr) with high-grade py mineralization : 28.50 - 28.65 m, 29.65 - 29.75 m
sharp hanging wall

29.92 - 31.75 : quartzite
(chert)
gr, extremely fine grained light, some flasers of py throughout, interlayer of massive py : 30.04 - 30.10 m
sharp hanging wall

31.75 - 34.38 : amphibole schist
(meta-basalt, flow)
gn, fine grained, wavy-texture due to nodules and stringers of qtz, altered rock : chlorite - amphibole schist at footwall : 31.75 - 32.50 m, interlayer of quartzite (chert) : 33.00 - 33.08 m, occasional low-grade py-min. : 32.50 - 32.70 m, 33.60 - 33.66 m

A

34.38 ~~m~~ end of DDH