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CHARGED POTENTIAL MEASUREMENTS AND
GEOLOGICAL MAPPING IN OTTA-AASOREN
AREA 1973

Otaniemi 1974-03-01

Kyösti Rönkkö

Pekka Lappalainen

SUOMEN MALMI OY



CHARGED POTENTIAL MEASUREMENTS AND GEOLOGICAL MAPPING IN OTTA-AASOREN AREA 1973

1. GENERAL

Suomen Malmi Oy carried out charged potential (mise-a-la-masse or "CP") measurements and preliminary structural geological mapping in Otta-Aasoren area.

The aim of the CP-measurements was to clear up the strike and connections of three ore horizons (zones A,B,C). In order to follow the zones low-frequency electric current was fed into each horizon from the drill holes. In each cases the electric potential values were measured on the surface and in drill holes. The measurements included about 9.1 profile kilometers over the ground surface and about 2730 m drill hole profiles.

The CP-results are presented as contour maps at scale 1 : 2000 (drill holes 1 : 1000) and as interpretation map at scale 1 : 5000 (appendix 1). The geological observations are presented in the appendices 5 - 6.

2. RESULTS OF CP-MEASUREMENTS

The interpretation of CP-results is shown in appendices 1, 7 - 19. The basic idea lies in the following fact: the higher (or more positive) ^{is} the potential measured, ^{the} better electrical contact (exist between the measurement point and the point of active current grounding (ore grounding). The measured potential reaches its highest value on the outcrop on the surface and will reduce when moving away from the grounding and the outcrop. In drill hole measurements the highest potential will be reached in places where the hole is intersecting the grounded ore. In the places where the

hole is intersecting other conductors which are not in galvanic contact to the grounded ore, the potential values are on the lower level and potential differences are very small.

According to the CP-measurements the mineralized zones A, B and C are continuing over the measuring area. The zones are striking to NNE in the northern part and curving to SE in the southern part (appendix 1). The dip is steeping from south to north (70° - 90°) E.

In each horizon (A, B, C) there exist from one to three pipe like mineral enrichments which are gently plunging to NNE (to the direction of the lineation, app. 5 - 6). The plunge in the southern part is about 40° - 50° NNE and in the northern part about 20° - 30° NNE. The strike of the zones and the outcrops of the grounded mineralizations are marked on the interpretation map (appendix 1).

From the drill hole measurement profiles the connections of different zones can be seen (appendices 7 - 19). It is remarkable to see that the zone A is divided into two different lenses which are also passing the hole 7 at the depths $h \sim 100$ m, 115 m. Even to the east of the zone A there exists a conductive zone (DH 7, $h \sim 53$ m, app. 10).

According to the potential maximum values ($A \sim +7,5$ mV, $B \sim +36,5$ mV, $C \sim +410$ mV) the zone A seems to be the most promising and the zone C the weakest one.

3. STRUCTURAL GEOLOGICAL MAPPING

On the area covering maps sheet Åsárliá BV 089-5-4 and sheet Veggums-
kampen BW 088-5-2 has been done preliminary structural geological mapping. By mapping was taken notice of only some structural features. The measurements were made observing following tectonic elements: the dip and the strike of schistosity, lineation and the drag-fold axes. The results of measurements are given on the map

appendices 5, 6. In the southern part of the ore deposit of Aasoren the strike of schistosity is about S - N and the dip 60° - 70° eastwards and the strike of the lineation is about SW - NE and plunges 40° - 50° to the northeast. In the northern part the strike of schistosity is about S - N and the dip varies 80° W to 80° E and the strike of lineation is about S - N and plunges 15° - 30° northwards. The structural geological mapping which was made, is to be considered preliminary. Quite strong movements and folding seems to be associated with the formation of ore.

4. RECOMMENDATIONS FOR FUTURE WORK

The outcrops in the southern part of the measuring area should be checked by drilling (zones A, C). It is also possible that the zones are continuing to the east in the southern part of the area. That could be checked by CP-method and also the possible continuity to the north or north-west in the northern part. Systematic electromagnetic (VLF or slingram) and magnetic measurements over the whole area would also be recommendable in order to find out mineralized zones.

In order to clear up the structure of the ore and the general tectonic features of the whole area the more detailed geological observations should be carried out, and also the geochemical sampling which is associated with the geological mapping would be useful.

Otaniemi 1974-02-28

Kyösti Rönkkö *Pekka Lappalainen*
Kyösti Rönkkö Pekka Lappalainen

LIST OF APPENDICES

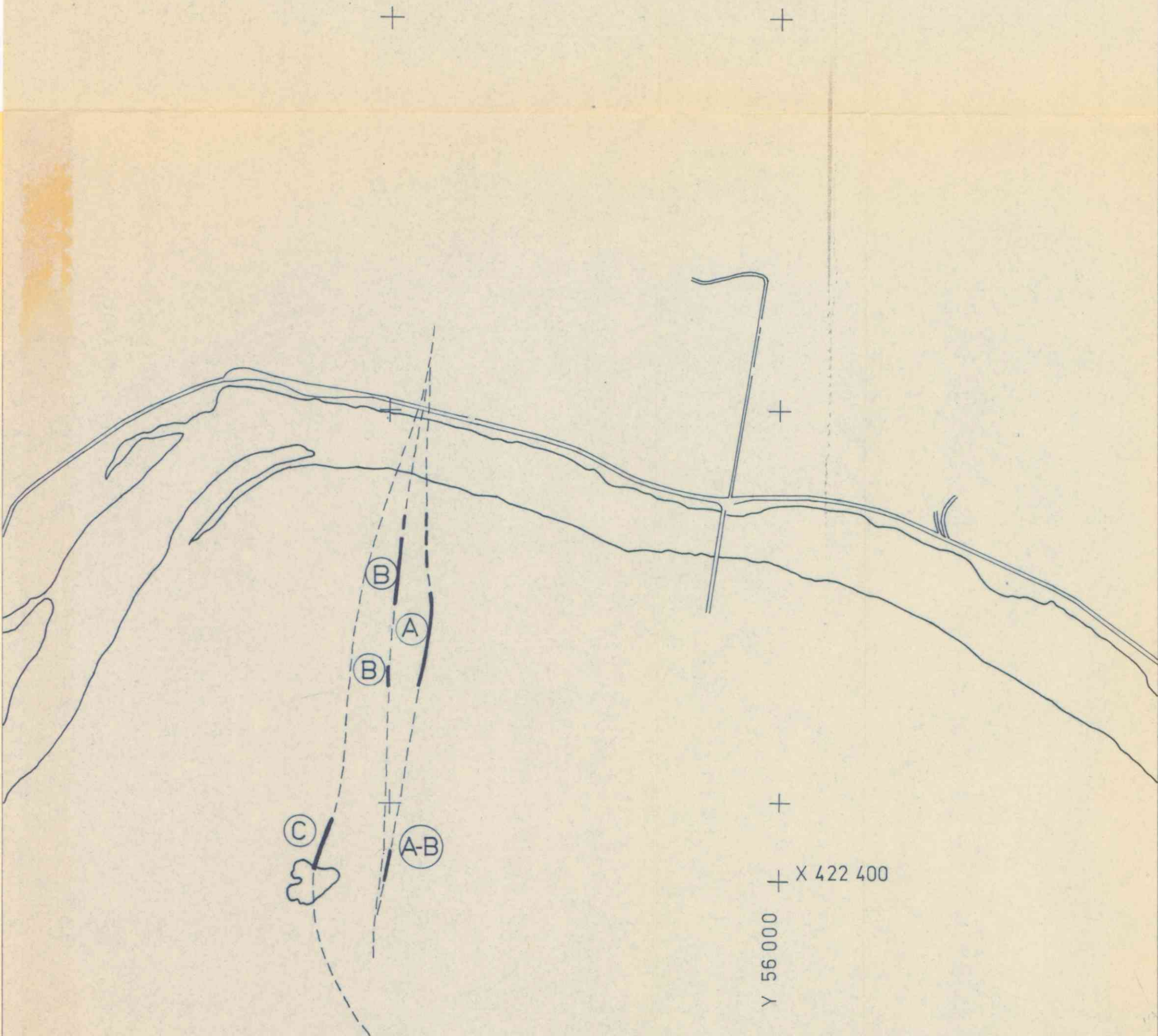
- 1. Interpretation of charged potential results
- 2 - 4 Charged potential maps, zones A, B, C
- 5 - 6 Geological maps, structural observations
- 7 - 10 Charged potential profiles, zone A
- 11 - 15 " " " , zone B
- 16 - 19 " " " , zone C

LEGEND:

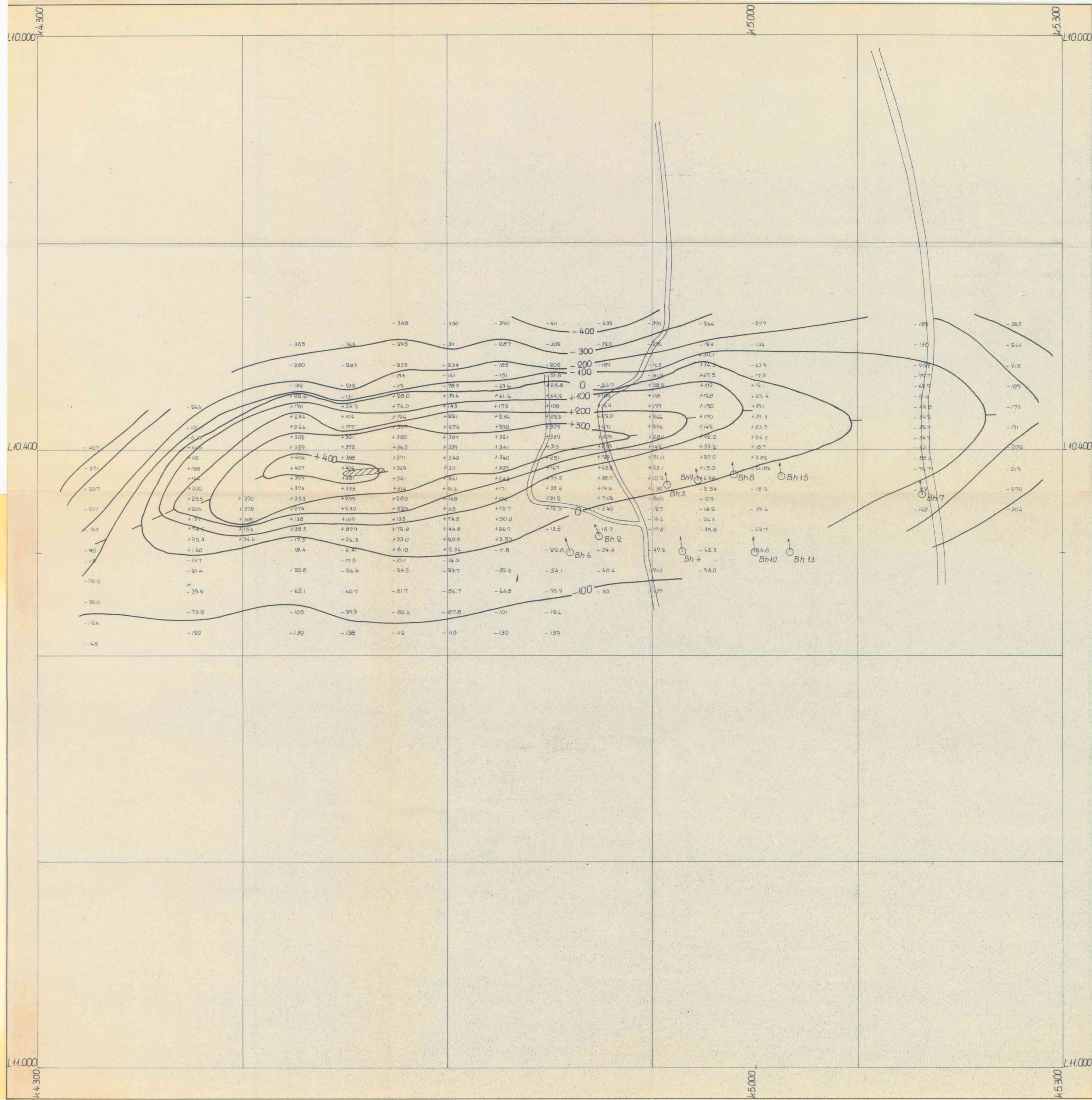
— OUTCROP

Ⓐ Ⓑ Ⓒ ZONE

----- STRIKE OF HORIZON



SUOMEN MALMI OY	1:5000	MEAS	TK	2.74
		MADE	PL	2.74
INTERPRETATION OF CHARGED POTENTIAL RESULTS				
OTTA, AASOREN				

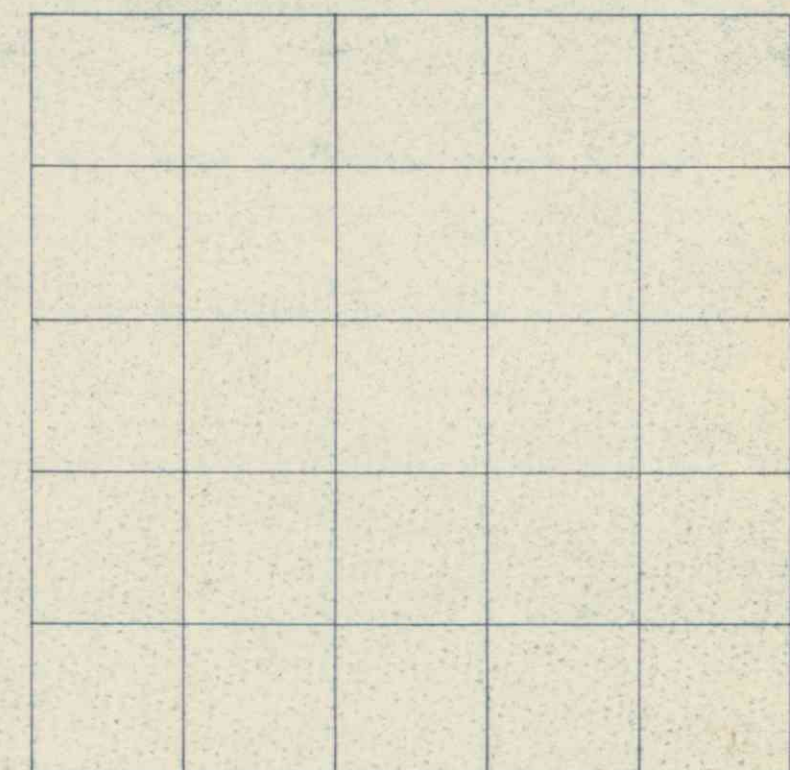


Current source in hole Bh 6, h~135 m (zone C)

Potential reference at point k 4.830 L 10.457

Contours -400, -300, -200, -100, 0, +100, +200, +300, +400 mV

Current 0,5 A



SUOMEN MALMI OY 1:2000

mit. TK 8.73
piirt. SM 10.73
tark. PL 10.73

Charged potential map

OTTA

AAS-6-71

X 422 400 Y 54 400

Y 57 600 X 422 400

APP. 5

X 420 000 Y 54 400

X 420 000 Y 57 600

Legend

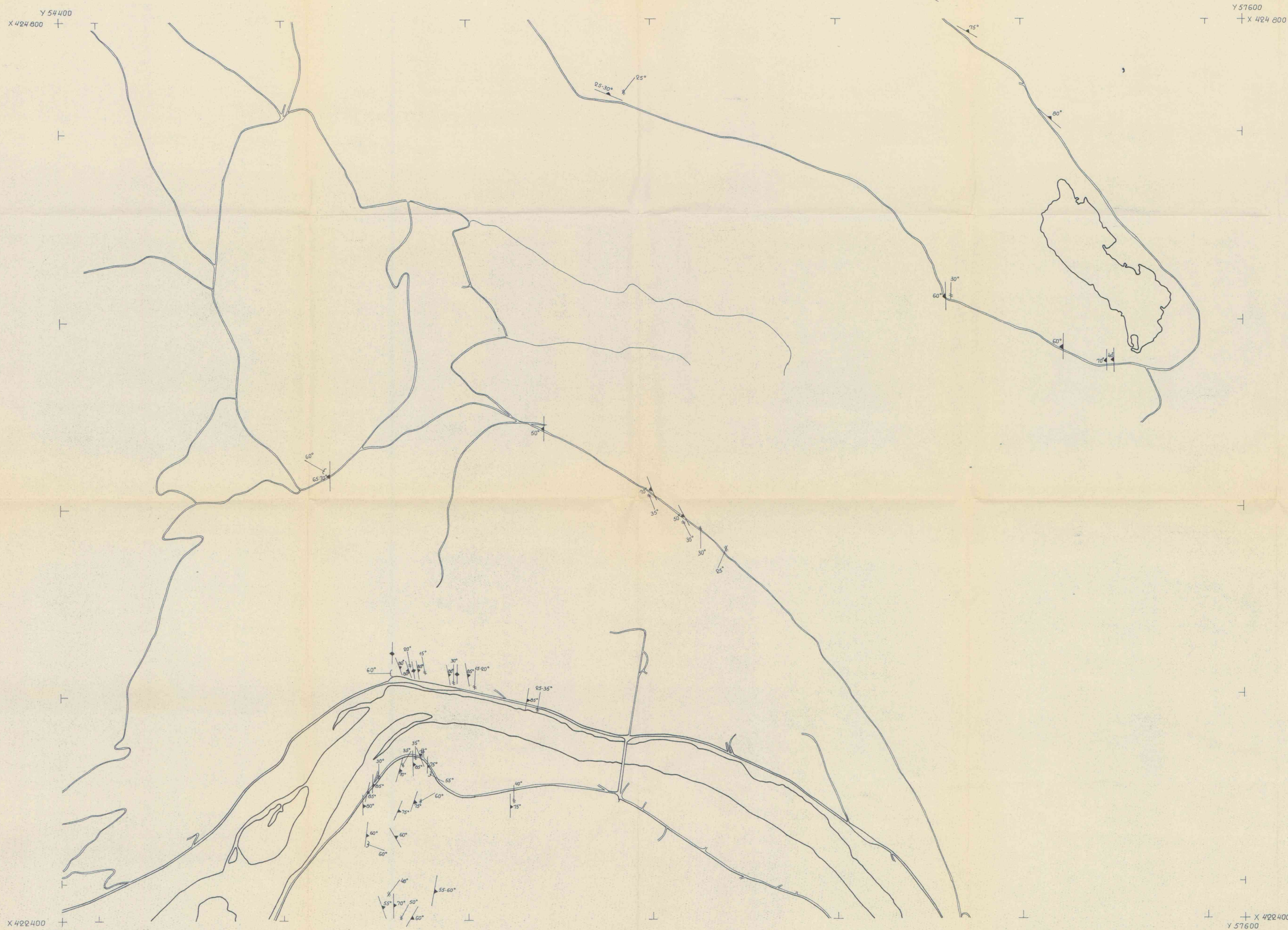
- 15° strike and dip foliation
- 30° strike and vertical dip of foliation
- lineation
- 60° drag fold (minor fold) axes

SUOMEN MALMI OY	1:5000	Meas Draw	K.R. A.S.	10/73 12/73
Geological map Structural observations				
VEGGUMSKAMPEN	BW 088-5-2			

Y 54400
X 424 800

Y 57600
X 424 800

APP. 6



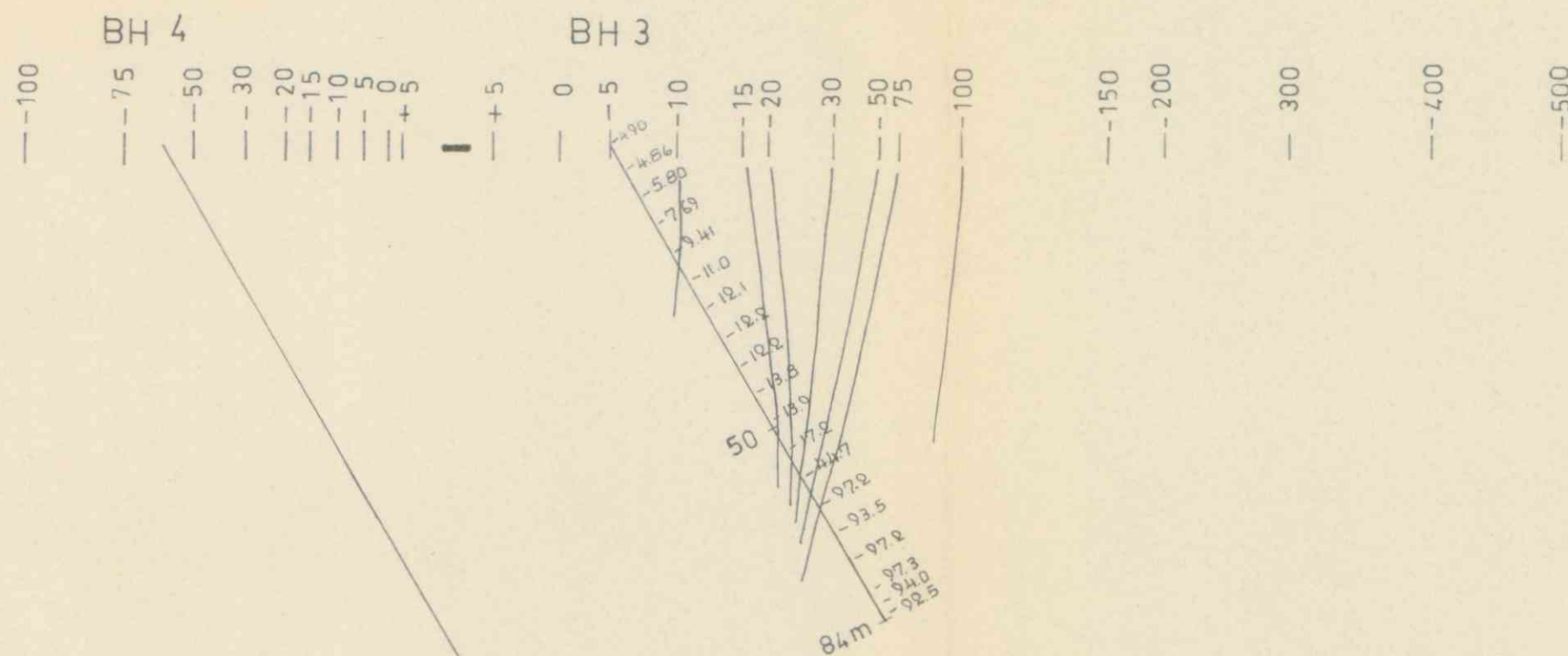
Legend

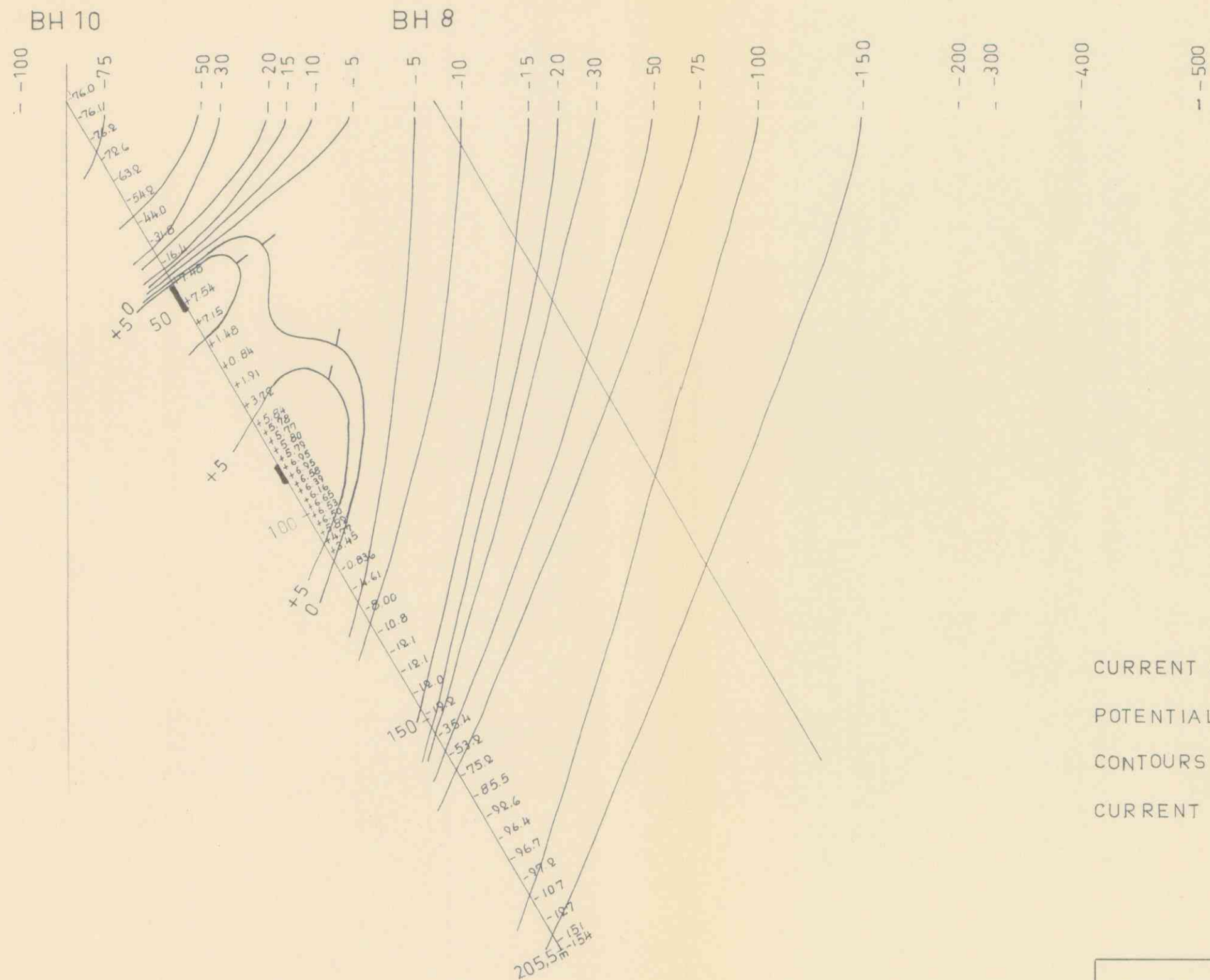
- strike and dip foliation
- strike and vertical dip of foliation
- lineation
- drag fold (minor fold) axes

X 422 400
Y 54400

X 422 400
Y 57600

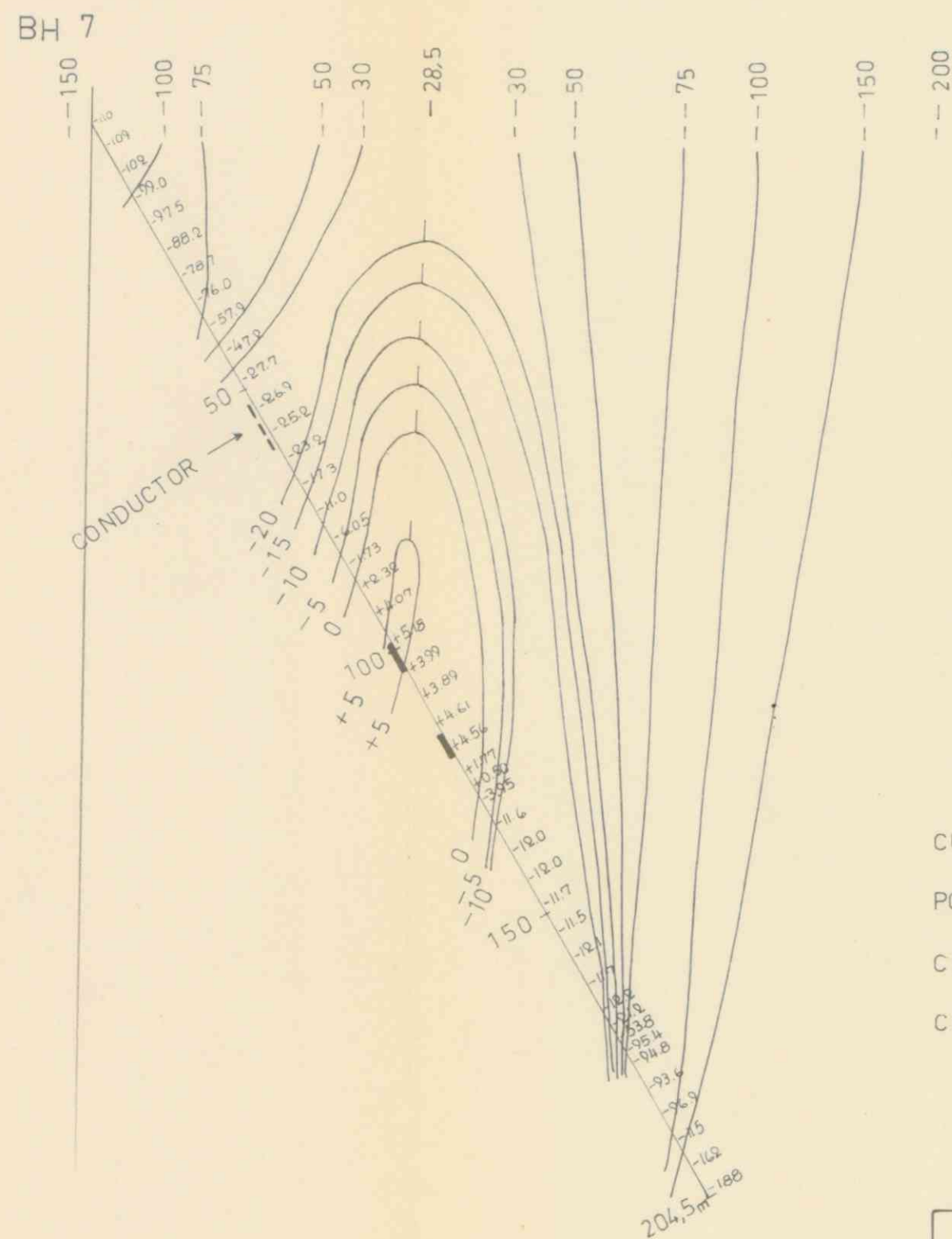
SUOMEN MALMI OY	1:5000	Meas.	K.R.	10
		Draw.	A.S.	12
Geological map Structural observations				
ÅSÄRLIA		BW 089-5-4		





CURRENT SOURCE IN HOLE BH 2, ~ h 22.5 m (ZONE A)
 POTENTIAL REFERENCE AT POINT K 4,830 L 10,457
 CONTOURS -150, -100, -75, -50, -30, -20, -15, -10, -5, 0, +5 mV
 CURRENT 0,5 A

SUOMEN MALMI OY	1:1000	meas.	TK	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILES				
OTTA	BH 8,10			



CURRENT SOURCE IN HOLE BH 2, $h \sim 22,5$ m (ZONE A)
 POTENTIAL REFERENCE AT POINT K 4,830 L 10,457
 CONTOURS -150, -100, -75, -50, -30, -20, -15, -10, -5, 0, +5 mV
 CURRENT 0,5 A

SUOMEN MALMI OY	1:1000	meas.	TK	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILE				
OTTA BH 7				



CURRENT SOURCE IN HOLE BH9, h ~ 45 m (ZONE B)

POTENTIAL REFERENCE AT POINT K 4,830 L 10,457

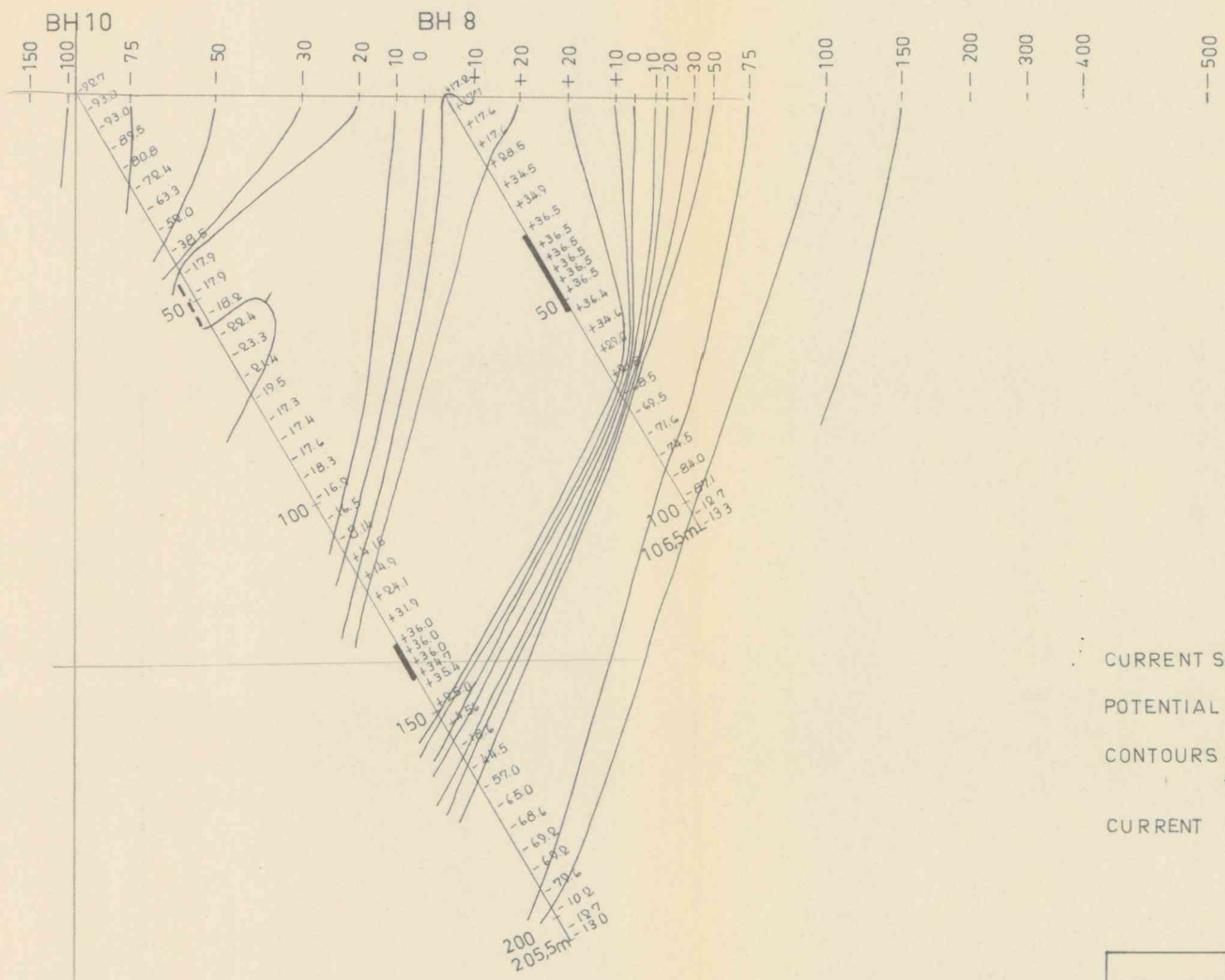
CONTOURS -200, -150, -100, -75, -50, -30, -20, -10, 0, +10, +20, +30 mV

CURRENT 0.5 A

SUOMEN MALMI OY	1:1000	meas.	TK	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILE				
OTTA BH 2				

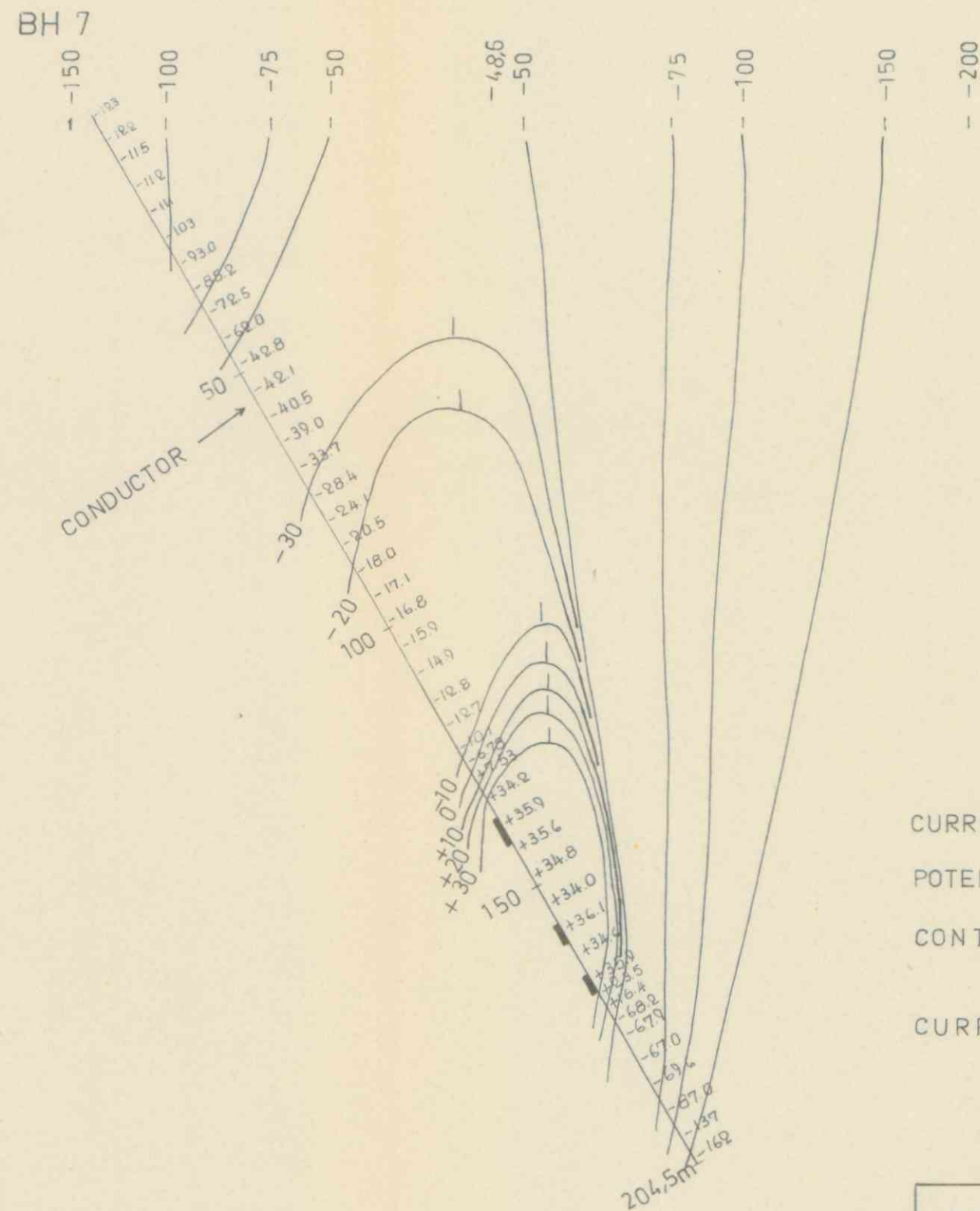
CURRENT SOURCE IN HOLE BH 9, h~45m (ZONE B)
POTENTIAL REFERENCE AT POINT K 4,830 L 10,457
CONTOURS -200,-150,-100,-75,-50,-30,-20,-10, 0,
+10,+20,+30 mV
CURRENT 0.5 A

SUOMEN MALMI OY		1:1000		meas. TK 1973		draw. SM 1974	
CHARGED POTENTIAL PROFILES							
BH 3, 4				OTTA			



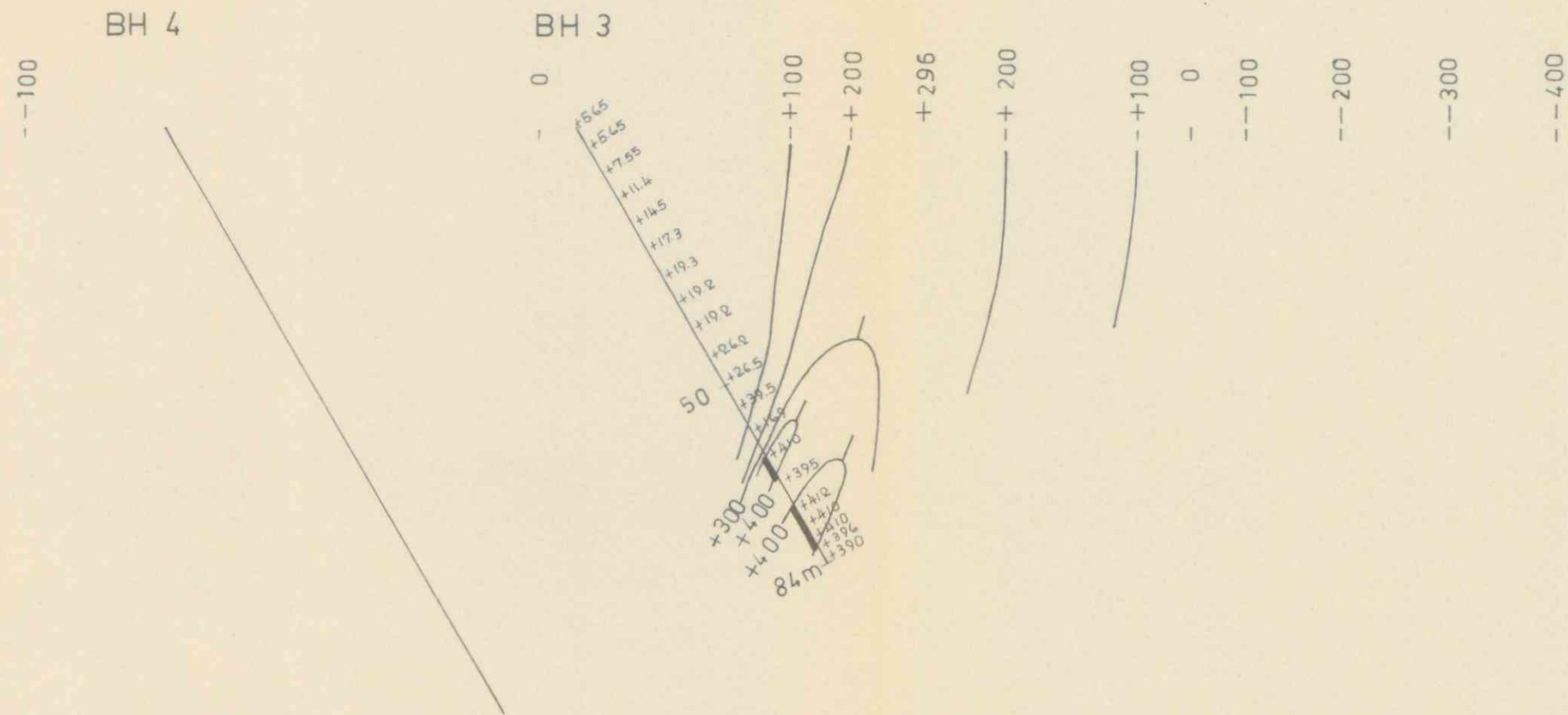
CURRENT SOURCE IN HOLE BH9, h~45 m (ZONE B)
POTENTIAL REFERENCE AT POINT K 4,930 L 10,457
CONTOURS -200, -150, -100, -75, -50, -30, -20, -10, 0,
+10, +20, +30 mV
CURRENT 0.5 A

SUOMEN MALMI OY	1:1000	meas.	TK	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILES				
OTTA BH 8,10				



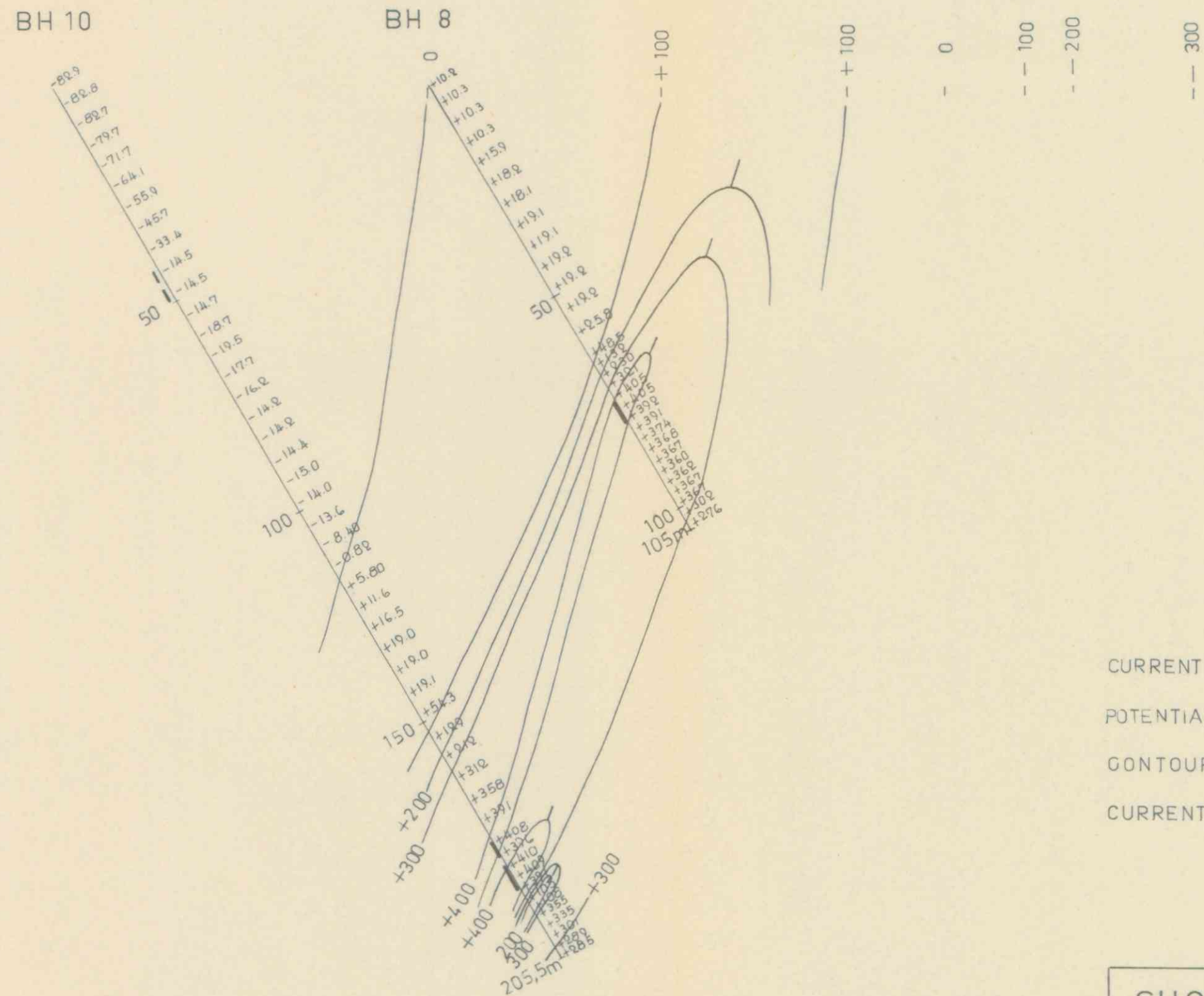
CURRENT SOURCE IN HOLE BH 9, h ~ 45 m (ZONE B)
 POTENTIAL REFERENCE AT POINT K 4.830 L 10.457
 CONTOURS -200, -150, -100, -75, -50, -30, -20, -10, 0,
 +10, +20, +30 mV
 CURRENT 0.5 A

SUOMEN MALMI OY	1:1000	meas.	T K	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILE				
OTTA BH 7				



CURRENT SOURCE IN HOLE BH 6, h~135m (ZONE C)
POTENTIAL REFERENCE AT POINT K 4,830 L 10,457
CONTOURS -400,-300,-200,-100, 0, +100,+200,+300,+400 mV
CURRENT 0,5 A

SUOMEN MALMI OY	1 1000	meas.	TK	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILES				
OTTA BH 3, 4				



CURRENT SOURCE IN HOLE BH 6, h~135m (ZONE C)
POTENTIAL REFERENCE AT POINT K 4,830 L 10,457
CONTOURS -400, -300, -200, -100, 0, +100, +200, +300, +400 mV
CURRENT 0.5 A

SUOMEN MALMI OY	1:1000	meas.	TK	1973
		draw.	SM	1974
CHARGED POTENTIAL PROFILES				
OTTA BH 8, 10				

