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Combined time domain IP, ER and SP survey 1983

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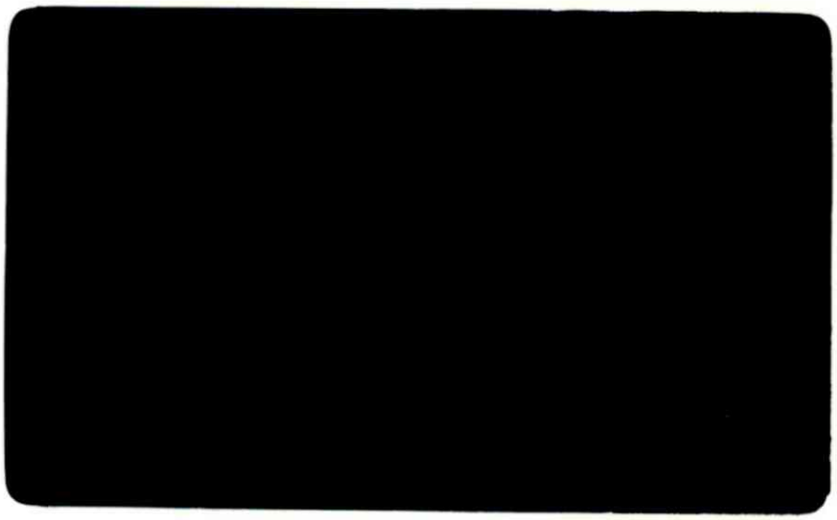
GEOTEAM



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ORKLA INDUSTRIER A/S

PROSPECTING FOR SULPHIDE ORE
- SVINSÅS
- ÅMOT
- HESTDALEN
- HØGÅSEN
- BJØRNLI
- GADDÅSEN

COMBINED TIME DOMAIN IP, ER AND SP SURVEY

1983

Report 7922.02 Oslo, February 1984

Prepared by
A/S GEOTEAM

TABLE OF CONTENTS

ÅMOT

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1. SUMMARY

A combined time-domain Induced Polarization (IP), Earth Resisitivity (ER) and Self Potential (SP) survey was performed at following locations in the Løkken area during summer and autumn 1983:

- o SVINSÅS
- o ÅMOT
- o HESTDALEN
- o HØGÅSEN
- o BJØRNLI
- o GADDÅSEN

Significant anomalies have been detected in all the mentioned areas. Pole-dipole electrode configuration was applied and the results are plotted as pseudosections giving an idea of horizontal and vertical extent of the anomalies.

Two testlines were measured over the known Løkken ore body. The typical rock cover is approximately 350-400 m and 750 m at Bjørnli and Gaddåsen respectively. The results from Bjørnli reveal an anomaly corresponding to the ore body. At Gaddåsen the correspondance is less pronounced, probably caused by interference with the mine shaft and also with a clay rich fracture zone parallel to the profile.

The measurements at Svinsås were a continuation of previous measurements from 1982. The anomaly structure at approximately 700 m N on line 600 W was followed down to approximately 400 m depth where the measurements were terminated.

2. INTRODUCTION

A combined Induced Polarization (IP), Earth Resistivity (ER) and Self Potential (SP) survey has been carried out by A/S GEOTEAM on behalf of ORKLA INDUSTRIER A/S.

This report contains results from the 1983 survey performed during periods from June 12 to October 13 in the following areas located east and west of Løkken Verk (see Appendix 1, Survey Location Map):

- SVINSÅSMARKA
- ÅMOT
- HESTDALEN
- HØGÅSEN
- BJØRNLI
- GADDÅSEN

The survey started at Svinsåsmarka as a continuation of previous measurements in 1982, Report 7922.01.

The electrode spread applied is pole-dipole with a=50 m and variable n-values. Time Domain transmitters (250 and 2500 W) were used.

The field programme, progress and priorities were continously discussed by geologist G.Grammeltvedt, ORKLA INDUSTRIER A/S and A/S GEOTEAM's representative.

3. DATA ACQUISITION

3.1 EQUIPMENT DESCRIPTION

Transmitter: (I) PHOENIX IPT-1 with a MG-2 2 kW motor generator as power supply.

(II) SCINTREX IPC-8/250 W battery-powered

Receiver: SCINTREX IPR 10A Digital Time Domain IP Receiver.

Current electrodes: Metal stakes

Potential electrodes: Porous pots containing saturated copper sulphate solution (non-polarizable).

Various: Cable reels (length up to 2000 m)
Radio communication.

3.2 FIELD OPERATION

During the first three days of the fieldwork one geophysicist and one electronic engineer from A/S GEOTEAM participated in the field. After a training period the operation was performed by the following crew (see fig no. 1):

1.	Geophysicist/El.engineer (A/S GEOTEAM)	Receiver operation and movement of one of the potential electrodes
2.	Current Man (ORKLA IND. A/S)	Transmitter operation
3.	Reel Man (ORKLA IND A/S)	Current electrode movement and cable reel handling.
4.	Pot Man (ORKLA IND A/S)	Scouting ahead and potential electrode movement.

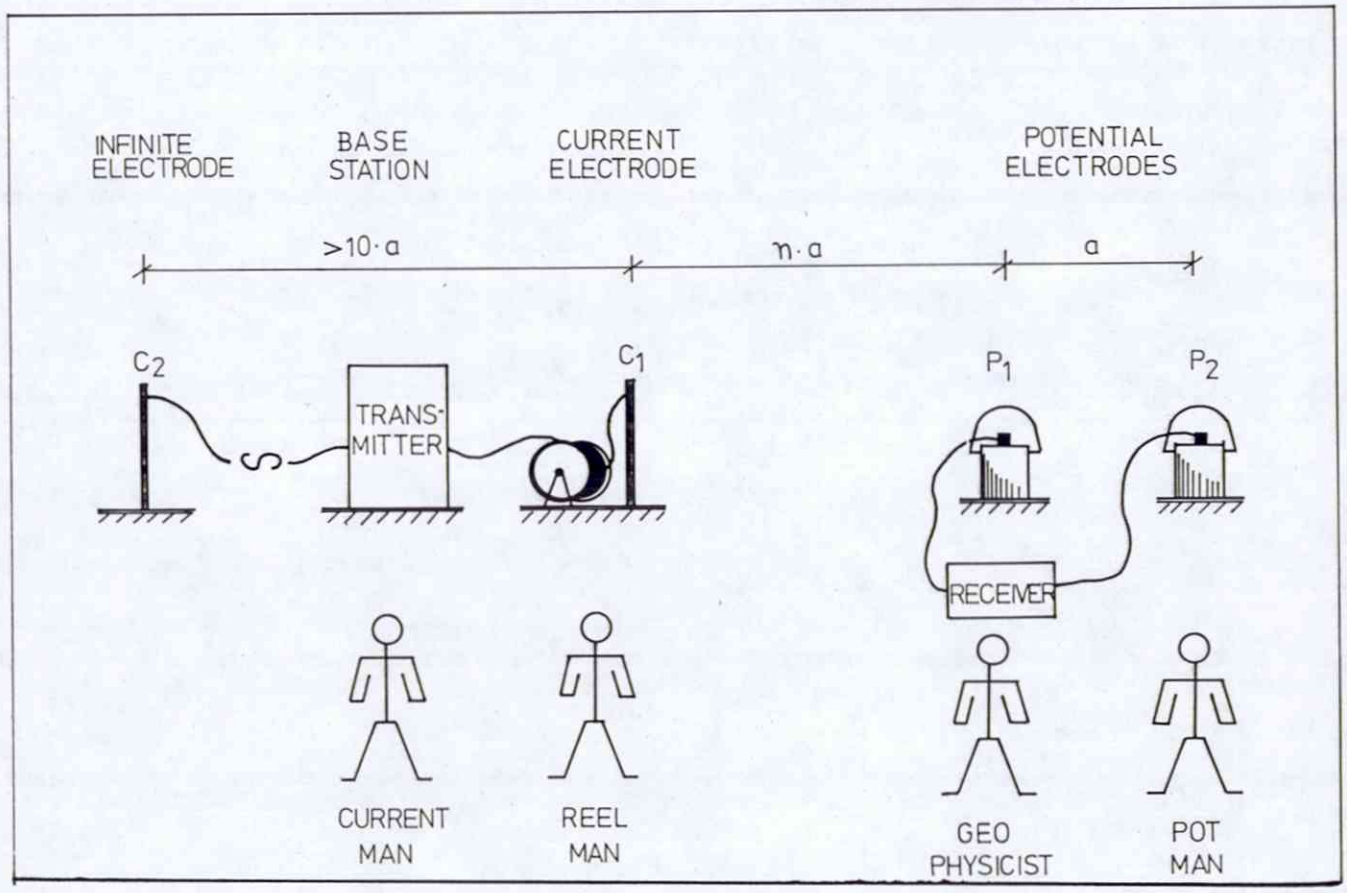


Fig. no. 1 Equipment layout and crew.
(Pole-dipole electrode spread)

The survey was carried out during two periods. The first period was from June 12 to August 6, and the second period from October 3 to October 13. Measurements were taken in the following areas at dates as listed below. Two different transmitters have been applied (see 3.1 "Equipment List"), according to the list below:

Location	Measuring period	Transmitter
SVINSÅSMARKA	June 12 - June 13	Phoenix
ÅMOT	June 14 - July 1	Phoenix
HESTDALEN	July 11 - July 25	
	and August 6	Phoenix*
BJØRNLI	July 28 - July 29	Scintrex
GADDÅSEN	August 3 - August 5	Phoenix
HØGÅSEN	October 3 - October 13	Scintrex

For each area (or line) a base station was established. "Infinite" electrode distances of 1-2 km have been applied.

Positioning, staking and clearance of surveylines were prepared by a separate crew from ORKLA INDUSTRIER A/S with a few exceptions when the geophysical measurements, staking and positioning were performed simultaneously.

Totally 20,3 km profilelines were covered by measurements with n-values up to 34.

*) Scintrex transmitter was used a few days at the southmost part of profile 2 Hestdalen due to breakdown of Phoenix transmitter.

4. DATA PRESENTATION / RESULTS

4.1 GENERAL

Survey Location Map in scale 1:100 000 is presented in Appendix 2.

Each individual area is presented with Survey Layout Map and Datasheets under the same main appendix number.

Values of IP, SP and ER from each line are displayed on each datasheet (for each line), based on the following readings:

Readings on receiver:

I) IP (Induced Polarization) represented by the chargeability in millivolts / volt.
II) SP (Self Potential) in millivolts
III) Vp (Primary Voltage) in millivolts

Readings on transmitter:

I Current introduced into the ground in Ampère.

ER (Earth Resistivity) represented by the apparent resistivity ϱ_a is calculated by the equation (pole-dipole configuration, see fig no 1).

$$\varrho_a = 2\pi \cdot n \cdot (n+1) \cdot a \cdot \frac{Vp}{I}$$

The IP and ER results are plotted in a two-dimensional "pseudosection" manner. The reading from each station is plotted on a vertical section at the point of intersection of 45° lines drawn from

the baseline (surface) starting at the midpoint of the two potential electrodes (P_1 and P_2) and at the nearest current electrode (C_1).

This way of presenting IP and ER data gives some idea of how the properties of the bedrock changes both laterally and vertically, but should not be looked upon as a real image of the actual sub-surface.

The standard field procedure was to measure with n=4 and 5 and a=50 m. However, at interesting sections along the lines measurements with n up to 21 was successfully performed. For n=20 the readings theoretically represent bedrock properties at a depth of approximately 500 m.

In sulphide ore prospecting anomalous areas with high chargeability and low resistivity are looked for.

To visualize the anomalous regions contours are drawn on the pseudo-section.
The following legend has been used:

IP:

thin contourline : contourinterval 5(mv/v)
thick contourline: 25(mv/v)

ER:

thin contourline : contourinterval 100(Ωm) up to 900.m
thick contourline : contourinterval 1000(Ωm) from 1000Ωm and upwards

On the section from Svinsås thin contours with intervals 100 (Ωm) are extended up to 2000 (Ωm).

4.2 SVINSÅS (LINE 600 W)

Survey Layout Map : Appendix 2.1
Data Sheet : Appendix 2.2

The measurements at Svinsås were a follow up investigation based on results from the survey performed 1982. The aim was to follow down into the depth by increasing n-values a relatively strong anomaly at approximately linemetre 700N. Measurements with n-value up to 21 were performed. The outline of the IP-anomaly shows a south-dipping trend, and there is a well developed strong anomaly at approximately n= 13-15 (i.e. approx 400 m depth). The same picture is shown by the resistivity anomaly, but there is also a well expressed perpendicular trend, which makes the interpretation of the results ambiguous.

During diamond core drillings an extensive fracture zone was met, and also relatively strong impregnation. This indicates a relatively complex structure where occurance of one ore more fracture zones may appear as an anomaly screening the mineralized structure.

4.3 ÅMOT

Survey Layout Map : Appendix 3.1
Data Sheet : Appendices 3.2 - 3.13

In the Åmot area investigations have been performed

along 9 NS-oriented parallel profiles and 3 cross profiles.

Along 6 of the parallel lines significant anomalies was encountered. Along the two lines at 300 E and 450 E and the line at 600 W no anomalies were observed.

Measurements along the cross lines were performed in order to outline the extent and connection of the various anomalies.

The measurements reveal 8 individual anomaly structures as shown on fig. 22, page 10. The anomalies are numbered from east towards west. The numbering represents a labelling and does not indicate any classification or ranking of the anomalies.

The general impression is that the anomalies have a NNE or NE oriented dip.

Anomaly no. 1, Åmot (fig. no. 2)

Anomaly no. 1 is recorded both on IP and ER and is seen on 3 lines (150E, 000 and 100N). Along both the parallel lines 150E and 000 the anomaly terminates before intersecting line 100N and the anomaly seen on line 100N probably originates from the structure actually located beside the line. The anomaly is clearly associated with the old Åmot Mine.

Along line 150E both IP and ER readings show the anomaly down to the maximum depth measured, approximately 300 m (n = 11). The resistivity anomaly measured on line 000 shows a limited depth extent

and terminates at approximately 150 m depth (n = 5-6), indicating that the main structure is located more towards line 150E.

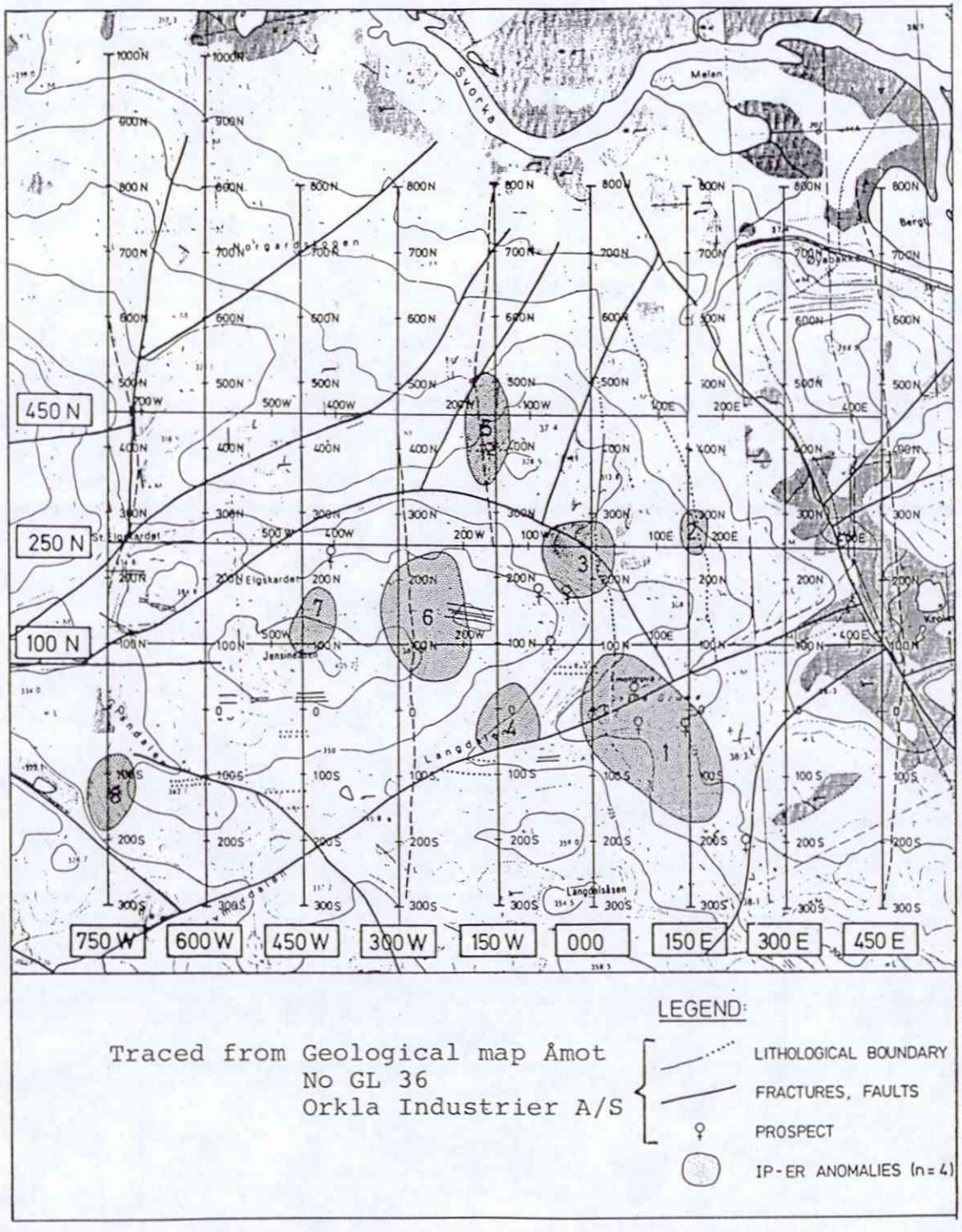


Fig. no. 2 Anomaly map Åmot.

Anomaly no. 2, Åmot

The anomaly no. 2 is recorded on IP and ER on line 150E. The anomaly was not recorded on crossline 250N as was expected. Line 150E runs parallel to a lithological boundary where the anomaly is recorded. The geoelectric properties along the lithological boundary may be anomalous to the surrounding bedrock. Such a structure will be narrow and sheet-like. This may be the explanation of why the anomaly shows up on the line parallel to the boundary and not on the line normal to it.

Anomaly no. 3, Åmot

The anomaly is recorded on line 000 and 250N. It is appearing on the IP-pseudo sections for both lines, but the resistivity anomaly is less developed. This may indicate a relatively shallow mineralized structure associated with a fracture zone. If the fracture zone is clay rich the IP-effect, which is an interface effect, is more pronounced than the resistivity effect. On figure no. 2 fracture and fault zones are shown, and one zone is intersecting anomaly no. 3 supporting this interpretation.

Anomaly no. 4, Åmot

The anomaly is recorded on line 150W and is solely seen on the resistivity section with a limited depth extention. A fracture/fault zone is crossing the line at the appropriate location. It is probable that the anomaly is related to this zone. The zone has not given anomalous readings on line 300E and the mineralization around the Åmot Mine will heavily screen such an effect on the neighbouring lines 000

and 150E. The lines west of anomaly 4 has not been measured across the fracture zone.

If the fracture zone, at least locally, contains unconfined water a decrease of resistivity is anticipated simultaneously with a less pronounced IP-effect due to the good conducting ionic water.

Anomaly no. 5, Åmot

Anomaly no. 5 shows up on lines 150W and 450N. The anomaly is most distinct on line 150W where the approximate width is 150 metres and the structure is well developed towards the depth. Crossline 450N shows only a narrow anomaly solely on the IP-readings. The actual profile line follows a path west of the theoretical line. The anomaly coincides with a prospect at 400 m N on line 150 W. It is possible that the anomaly originates from the mineralization around the prospect and is interfering with the fracture zone crossing through line 150 W at 500 m N.

Anomaly no. 6, Åmot

The anomaly shows up on line 300 W and crosslines 100 N and 250 N. The IP-pseudo section shows a quite extensive depth range. Compared to the relatively high resisistivity of the surrounding bedrock (4000-10000Ωm) a quite large area of the cross section along line 300 W has anomalous low resistivity readings(2000-3000Ωm). The IP- and ER-anomalies are confirmed by the two crosslines. The anomaly most probably originates from mineral impregnation.

Anomaly no. 7, Åmot

The anomaly is recorded on line 450 W. Measurements along line 100 N were not performed further than 300 W, so the extention of the anomaly in EW-direction is not known. The anomaly is believed to correspond to at jasper and chert zone outcroping at approximately 0 m on line 450 W.

Anomaly no. 8, Åmot

Anomaly no. 8 is displayed on the pseudosections on line 750 W. Jasper zones are existing in the area and probably this anomaly is caused by a relatively narrow jasper zone.

4.4 HESTDALEN

Survey Layout Map : Appendix 4.1
Data Sheets : Appendices 4.2 and 4.3

Two parallel profiles with bearing NNE were investigated south of Styggtjønn in Hestdalen. A known jasper zone or successions of overlying jasper bonds are intersecting the profiles approximately at 700 m S and have given pronounced anomalies of ER and IP. The structure is dipping northwards.

Measurements along profile 2 were extended southwards in order to map the southern boundary of the jasper-anomaly. The width of the jasper is approximately 300 to 400 metres.

Anomalous high readings both of IP and ER are also encountered approximately 100 m N of the jasper, extending towards Styggtjønn. This structure has a

limited depth extent, down to approximately 200 m, and is more pronounced on the ER-section that on the IP-section close up to Styggtjønn. This may be explained by a higher degree of watercontent in the bedrock towards Styggtjønn.

4.5 HØGÅSEN

Survey Layout Map : Appendix 5.1
Data Sheets : Appendices 5.2-5.4

Data acquisition was performed along three parallel lines, the centerline extending further north than the adjacent lines.

Previous helicopter measurements revealed an anomaly probably corresponding to a jasper zone in the SW-limit of the area. The anomaly terminates just west of line 200 W. The influence of this structure is clearly seen on line 200 W, where especially the ER-readings reveal abrupt decrease of resisitivity caused by the jasper, as previously seen for similar structures. The formation is dipping northwards. The same trend is seen on the IP-readings where IP-values up to 44.7 are recorded at the anomaly boundary, but contrary to the ER-anomaly the IP-anomaly is extending also further north of the jasper boundary. There is also a branch of the anomaly dipping southwards underneath the jasper boundary. This may be caused by internal variations in the jasper, but the adjacent two lines reveal anomalies indicating structures dipping southwards. Line 000 is clearly influenced also by a north dipping structure both on IP and ER. This north dipping trend is not seen on line 200 E.

The complex anomaly structure most probably is caused by interference by two formations, the jasper dipping northwards, most pronounced in SW, and another structure dipping southwards central in the area.

4.6 BJØRNLI AND GADDÅSEN

Survey Layout Map : Appendix 6.1
Data Sheet Bjørnli : Appendix 6.2
Data Sheets Gaddåsen : Appendices 6.3 and 6.4

The measurements at Bjørnli and Gaddåsen are performed over the Løkken ore body to study the IP and ER-response from a known ore body at two different depths. Typical rock cover at Bjørnli is 350-400 m and at Gaddåsen 750 m.

Test Profile Bjørnli

The location of the ore body is shown on the Data Sheet, Appendix 6.2. To record data representative for the interesting depth (350-400 m) n-values up to 17 was applied. The IP-readings are heavily disturbed by EM-transients introduced by a power line transformer station at 275 N.

The measured anomalies of IP and ER corresponds satisfactorily with the actual location of the ore body. The width of the anomaly coincides well with the real model, but the depth to the ore body is somewhat underestimated and the dip is too steep.

Underestimation of the depth may be caused by the pseudosection plotting procedure partly as a result of current lines deviated towards the good conductor

so that the reading in fact represents deeper structures and also partly by the ignorance of terrain elevation. It is also a fact that the massive ore body is overlain by a mineralized halo which will highly influence the readings.

Test Profile Gaddåsen

Readings with n-values up to 34 were performed in order to test the depth penetration towards the ore body at approximately 750 m depth.

The actual location of the ore is shown on Appendix 6.3 and 6.4. There are anomalous readings showing up at the anticipated location, however both on the IP and ER section the anomaly is elongated upwards and downwards along a line dipping from south towards north. Especially the resisitivity anomaly shows a remarkable uniformity in the readings along the anomaly.

It is probable that the current field has been shorted by the shaft and also by a clay rich fracture zone intersecting the bedrock with strike parallel to the measured line.

5. EXPERIENCE

ELECTRIC NOISE

(1) Measurements under or along power lines were difficult, especially during or after rainfall, despite use of 50 Hz notch filter.

(2) Current from the activity in the mine, especially the elevator, gave significant noise on the readings during measurements along the profile at Gaddåsen.

(3) High negative IP-values were experienced when the current electrode was placed near a power line transformer at Bjørnli. The transformer is probably acting as a coil through its grounding system causing a high negative electromagnetic effect.

(4) Current from the railroad (16 2/3 Hz) gave noise when measurements were taken over good conductors (jasper) at Høgåsen and Hestdalen.

TRANSMITTER

A relatively high power transmitter, Phoenix IPT 1 and a less powerfull transmitter Scintrex IPC 81 250 W (see chapter 3.1) was used during the survey. Due to break-down of the Phoenix trannsmitter the Scintrex transmitter was used as replacement. Approximately 15 overlapping measurements were taken and the Scintrex readings are within the repeatability of the Phoenix transmitter, also for high n-values.

The lightweight battery powered Scintrex transmitter gave approximately half as much current as the

Phoenix transmitter. The relatively small difference in current output from the two systems is caused by the high resistive ground conditions. For low resistive ground conditions the difference in current output between the two transmitters would be significant higher.

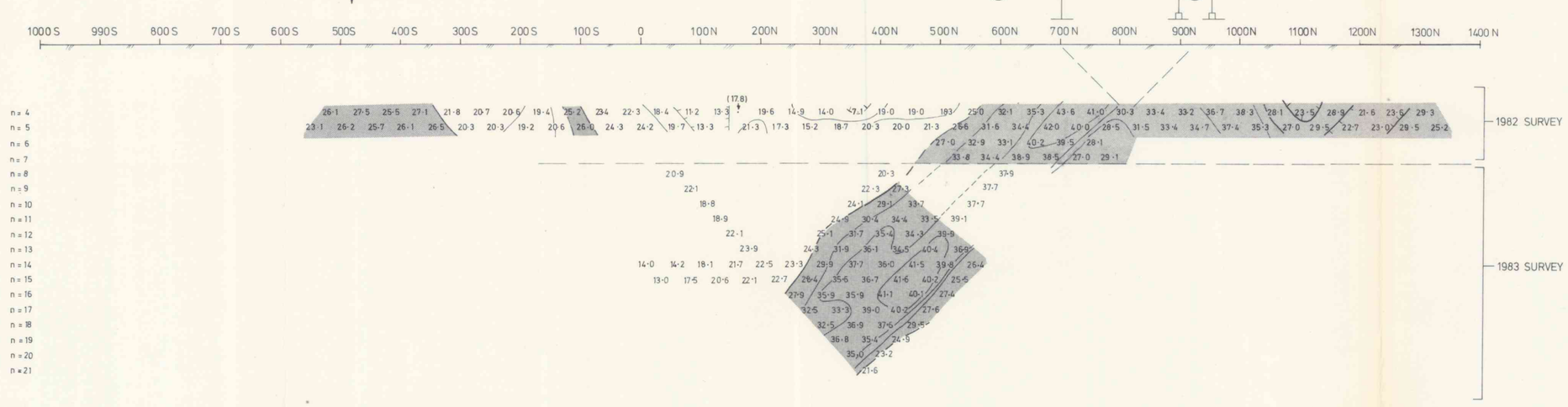
Oslo, 2 March 1984
for A/S G E O T E A M

Ole Chr. Pedersen

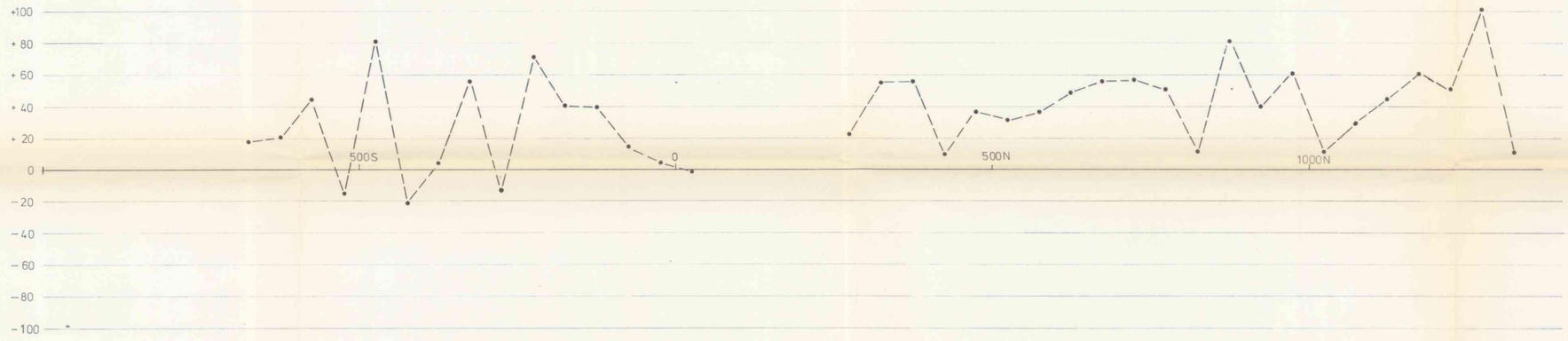
LINE 600W SVINSÅS

X
LINJE 475

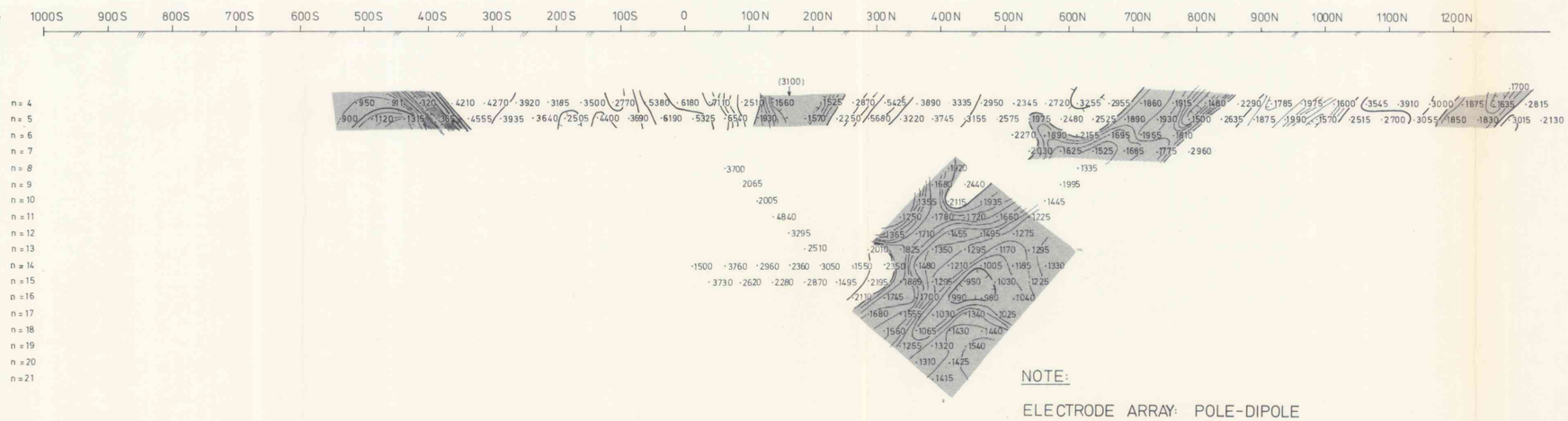
IP
(mV/V)



SP
(mV)



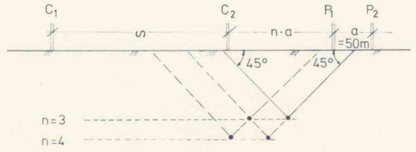
RESISTIVITY
(Ω m)



NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 1900 Ωm

THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

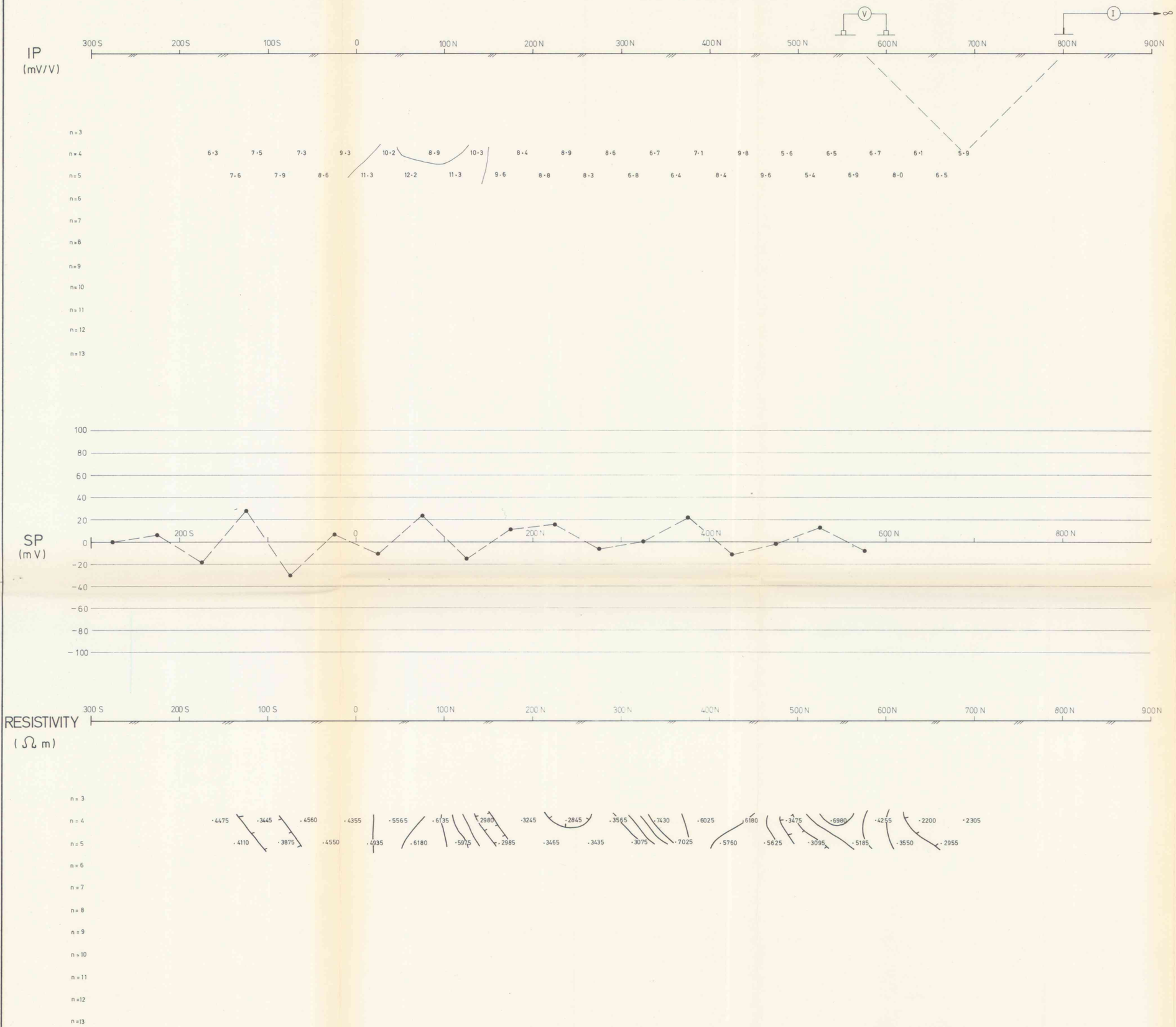
GEOTEAM

Data Sheet
IP, SP and ER
LINE 600W SVINSÅS

Client
Orkla Industrier A/S

Measured	1982 / 1983	Map no	Scale 1:5000
Calculated	1982 / 1983		Project no 7922.02
Drawn	1982 / 1983		Appendix no 2.2
Controlled			

LINE 450 E ÅMOT



LEGEND:

IP:

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THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

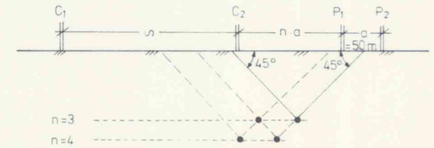
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



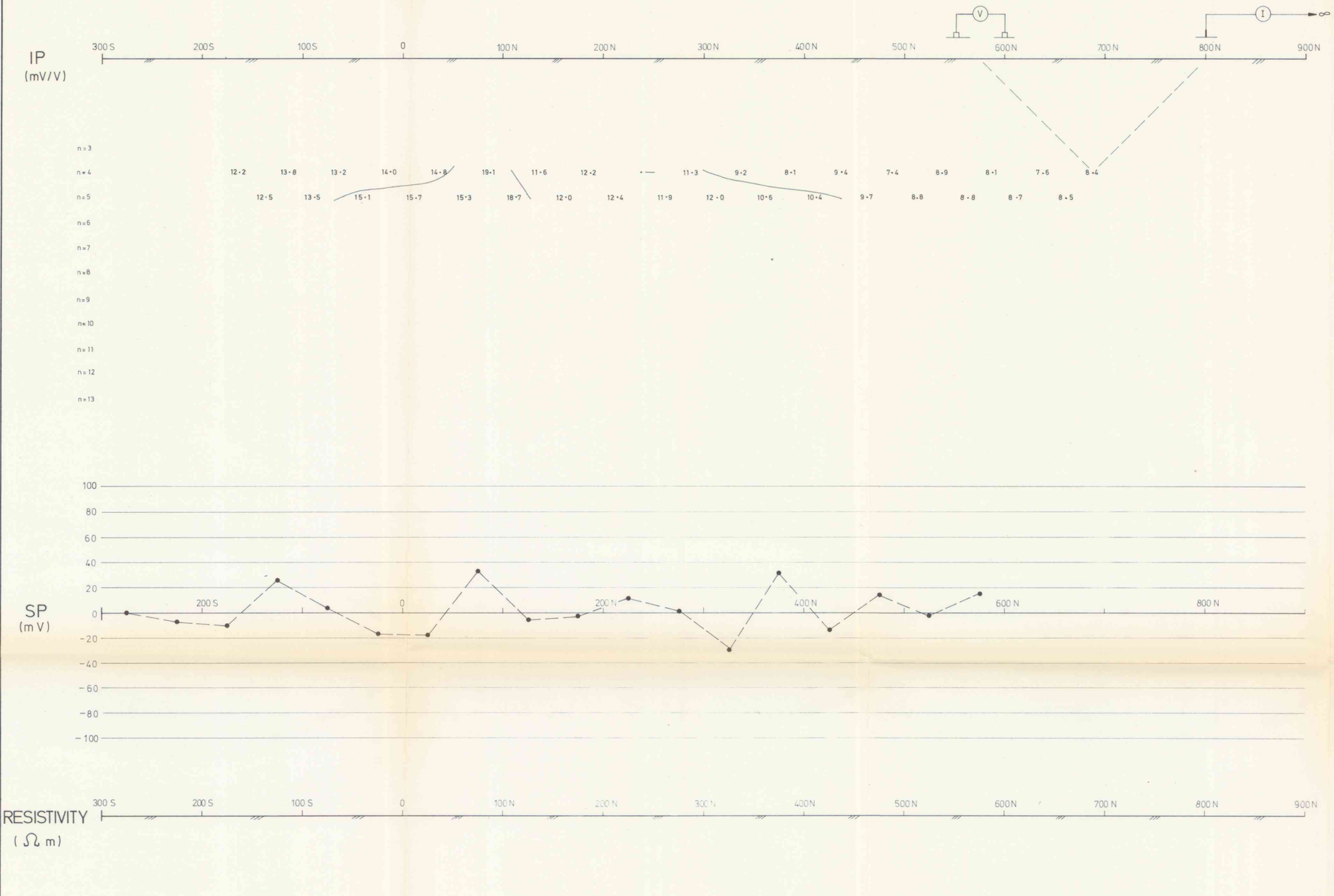
GEOTEAM

Data Sheet
IP, SP and ER
LINE 450 E ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2 500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.2
Controlled:			

LINE 300 E ÅMOT



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IP:

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THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

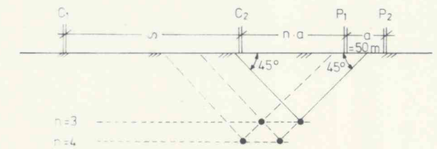
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

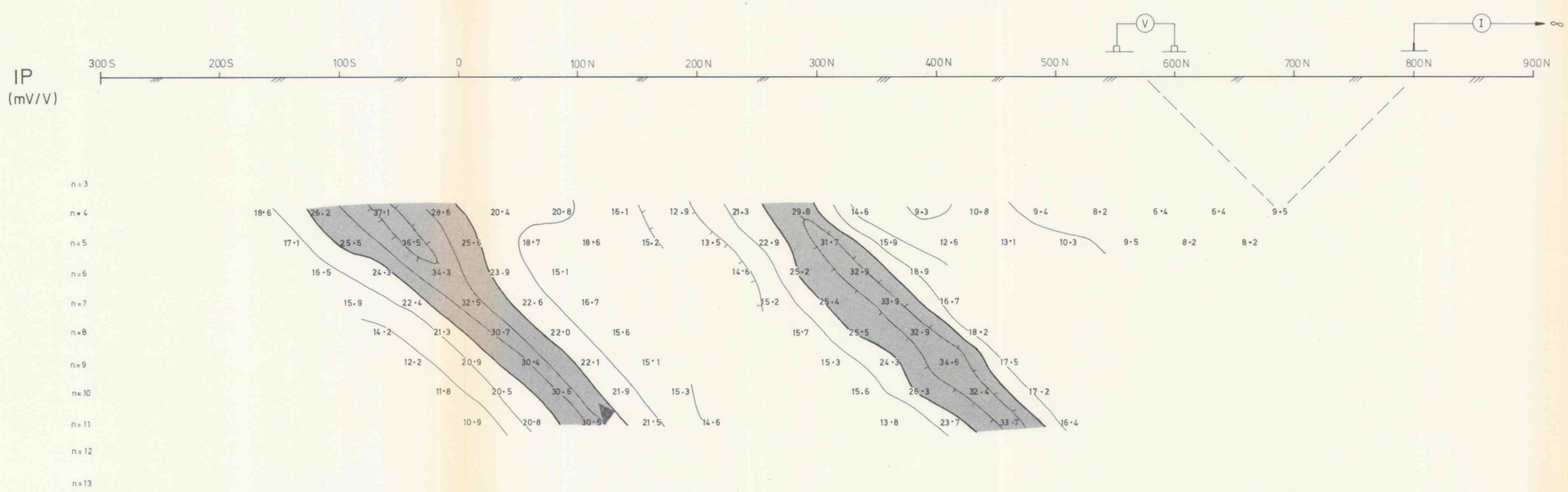
Data Sheet
IP, SP and ER
LINE 300 E ÅMOT

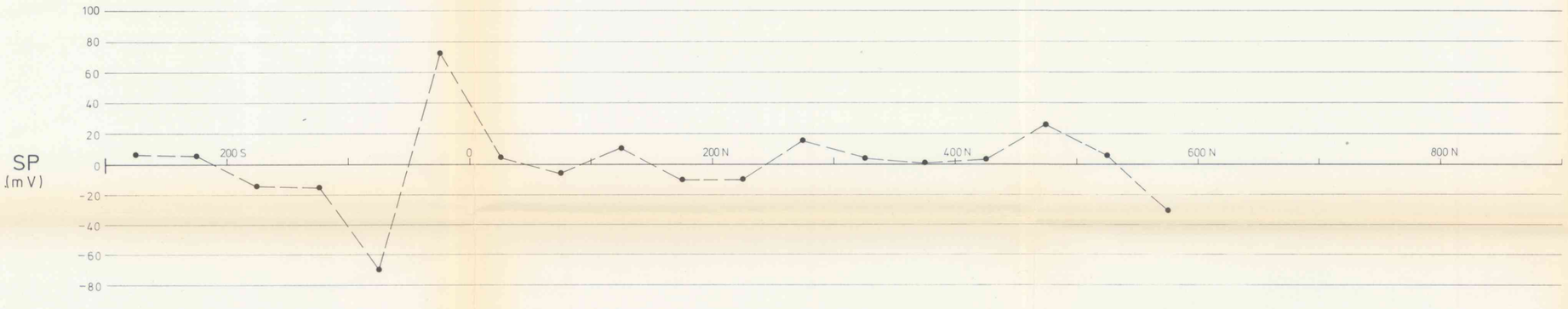
Client
Orkla Industrier A/S

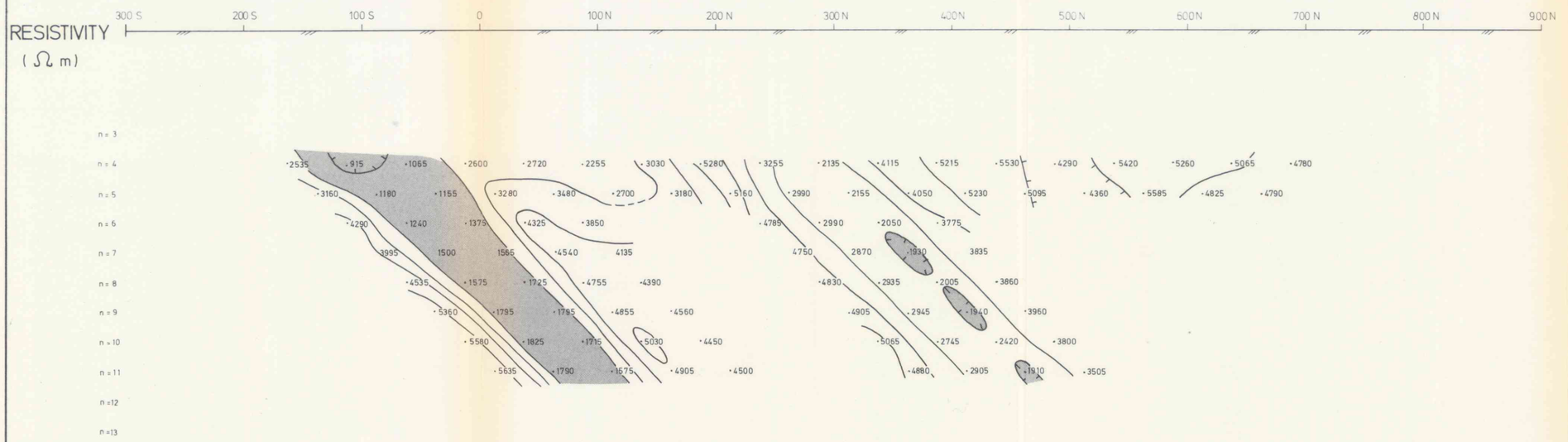
Measured	1983	Map no	Scale	1:2500
Calculated	1983		Project no	7922.02
Drawn	1983		Appendix no	3.3
Controlled:				

Levert av Sem & Stenersen A/S, Teknisk Avdeling, Oslo

LINE 150 E ÅMOT







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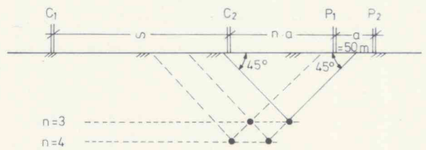
NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

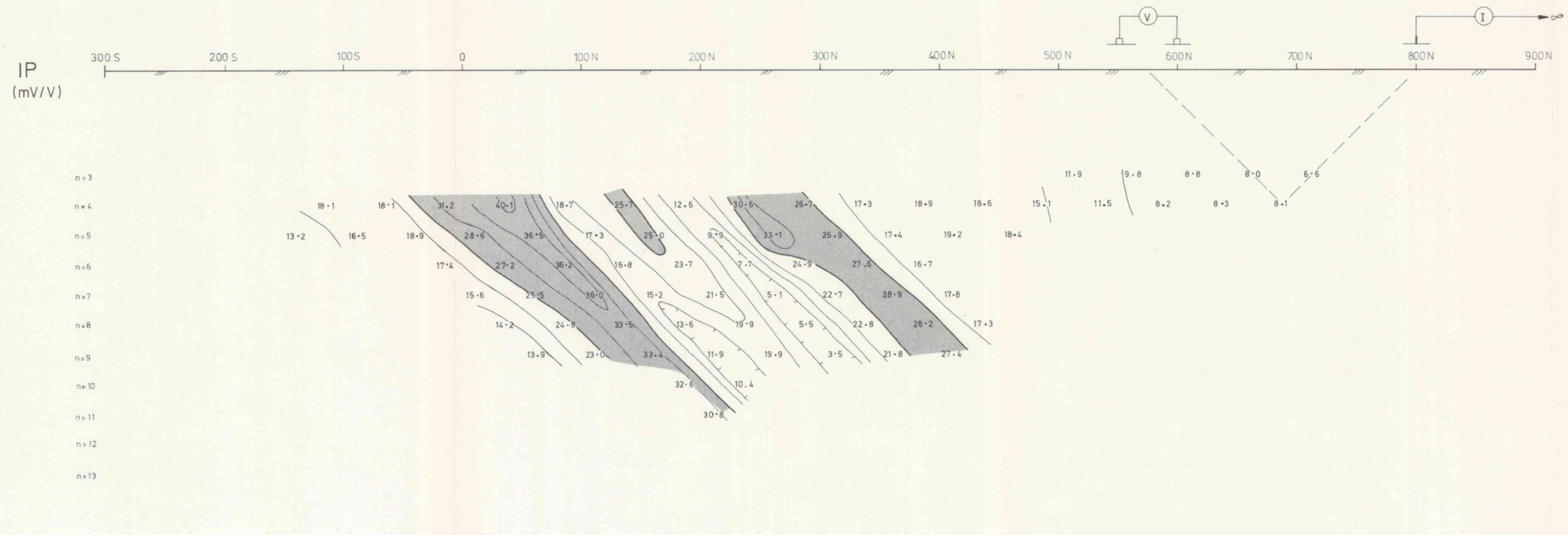
Data Sheet
IP, SP and ER
LINE 150 E ÅMOT

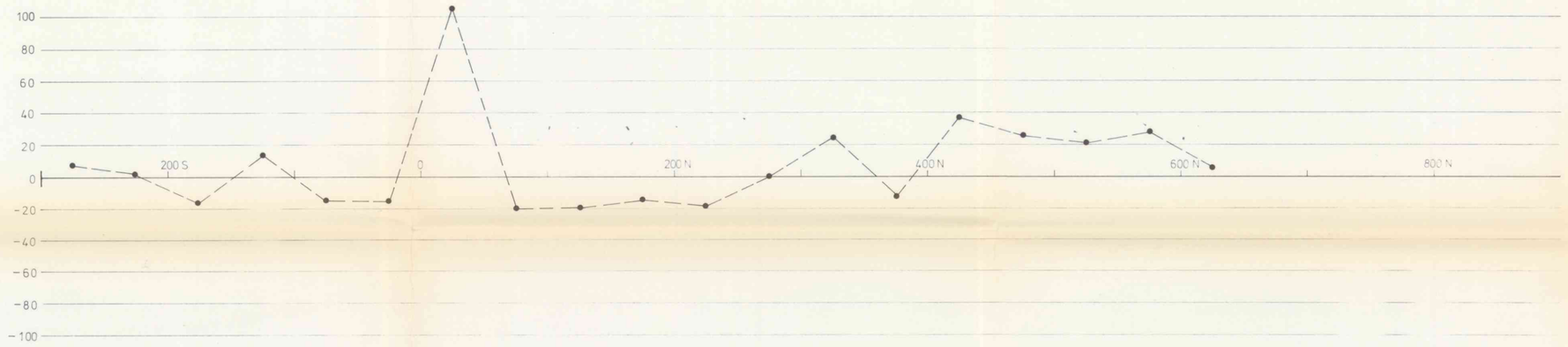
Client
Orkla Industrier A/S

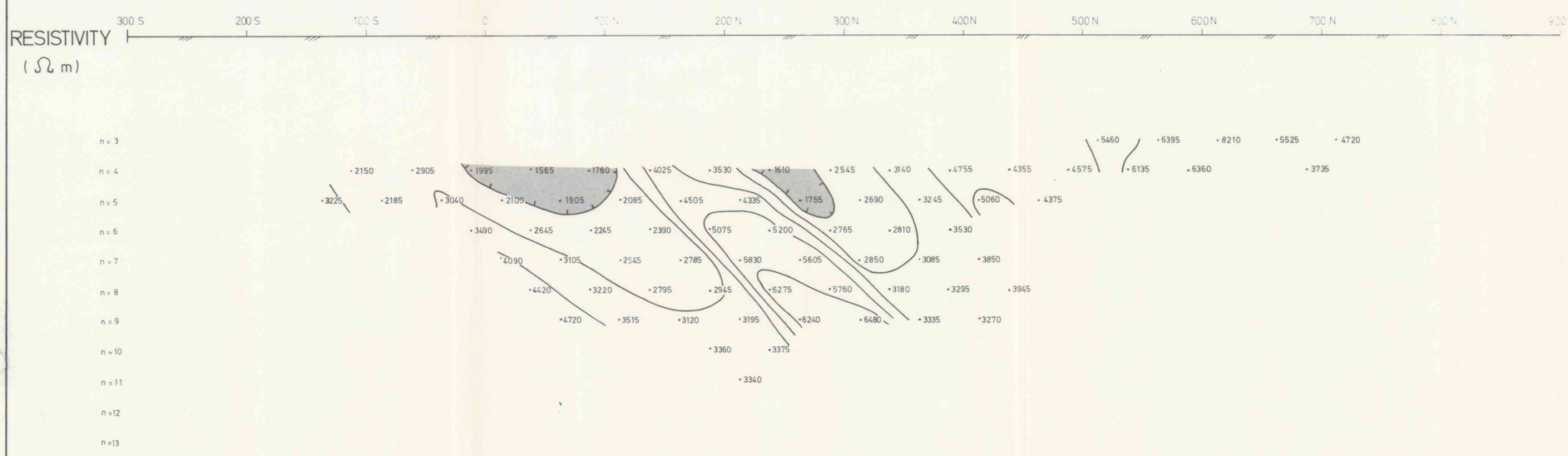
Measured	1983	Map no	Scale 1:2 500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.4
Controlled:			

Levert av Sem & Stenersen A/S, Teknisk Avdeling, Oslo

LINE 000 ÅMOT







LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

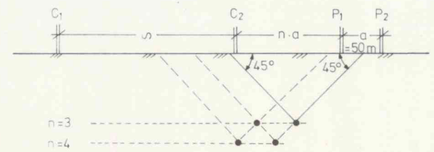
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



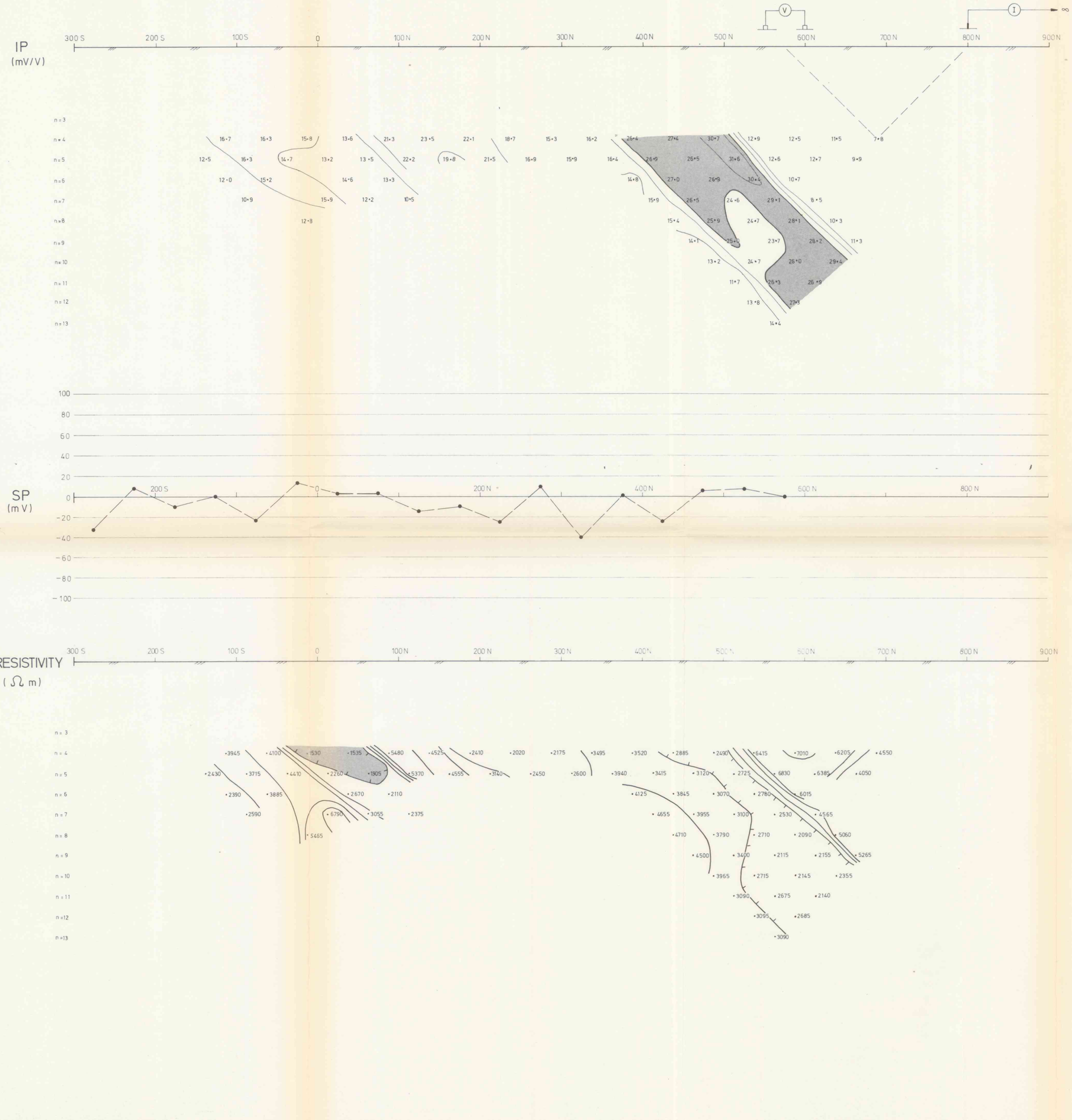
GEOTEAM

Data Sheet
IP, SP and ER
LINE 000 ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.5
Controlled:			

LINE 150W ÅMOT



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

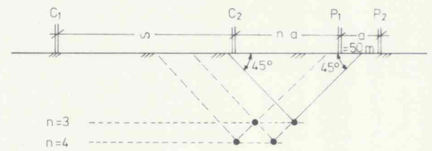
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

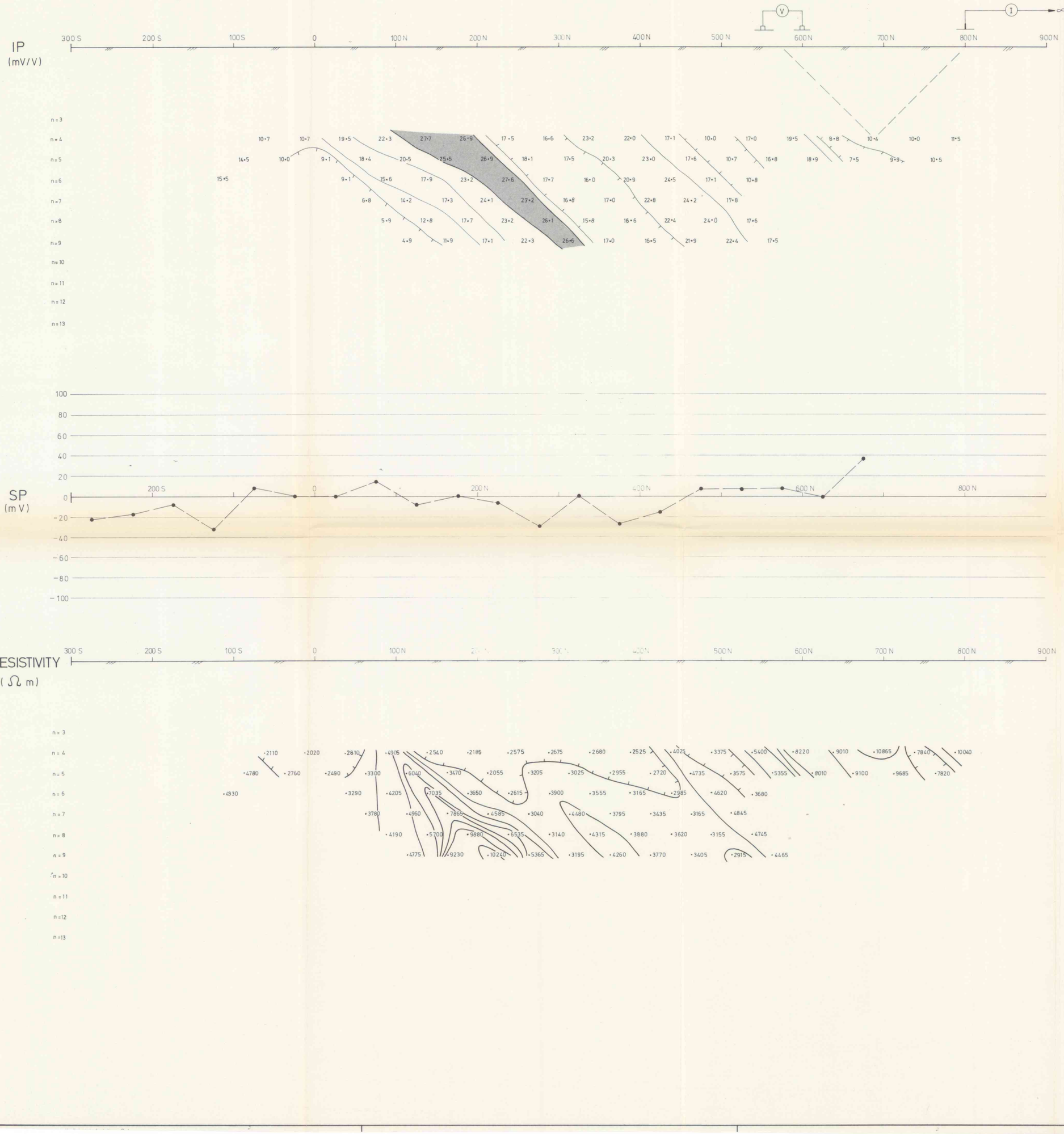
Data Sheet
IP, SP and ER
LINE 150W ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.6
Controlled			

Levert av Sem & Stenersen A/S, Teknisk Avdeling, Oslo

LINE 300W ÅMOT



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

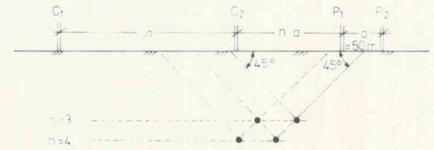
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE

ELECTRODE ARRAY POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



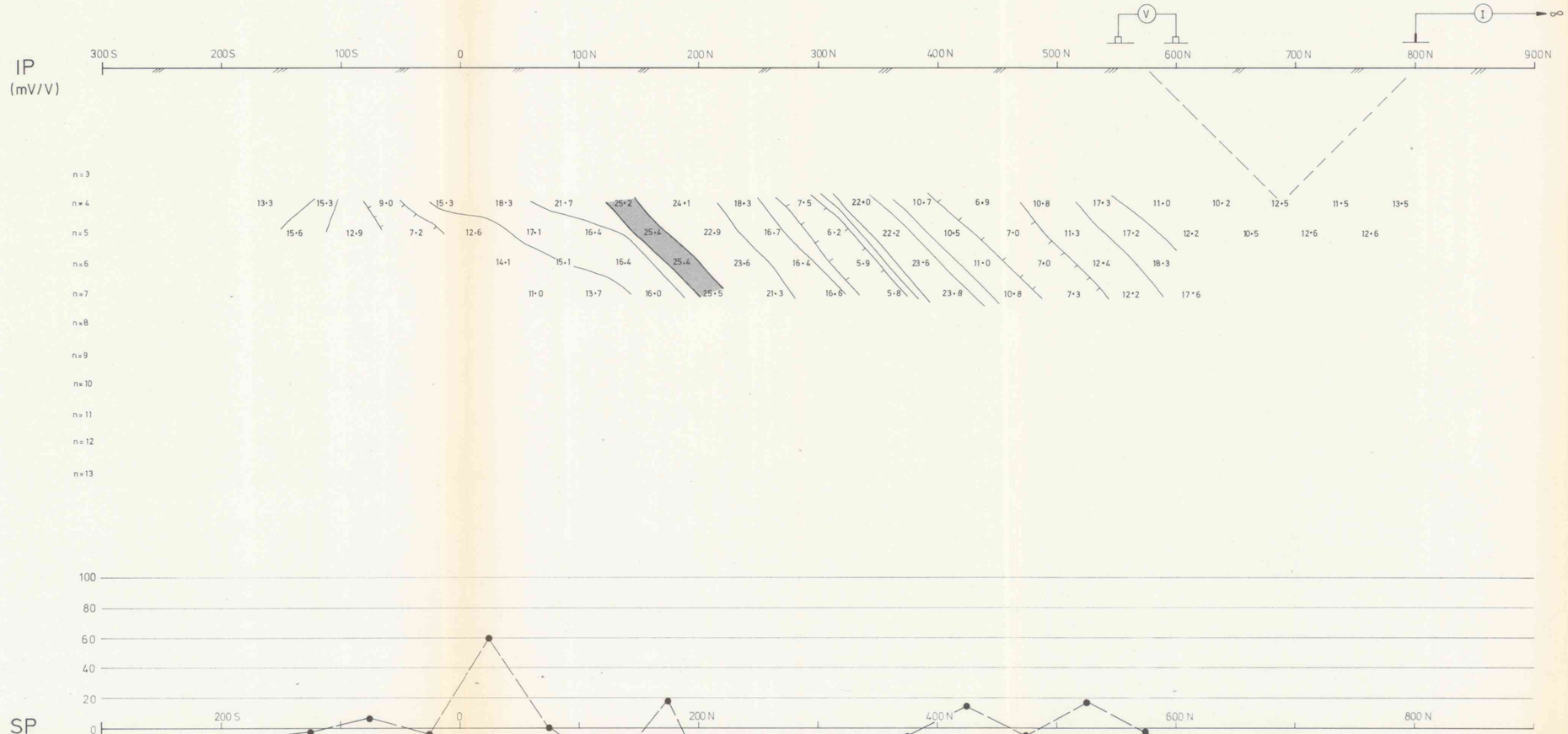
GEOTEAM

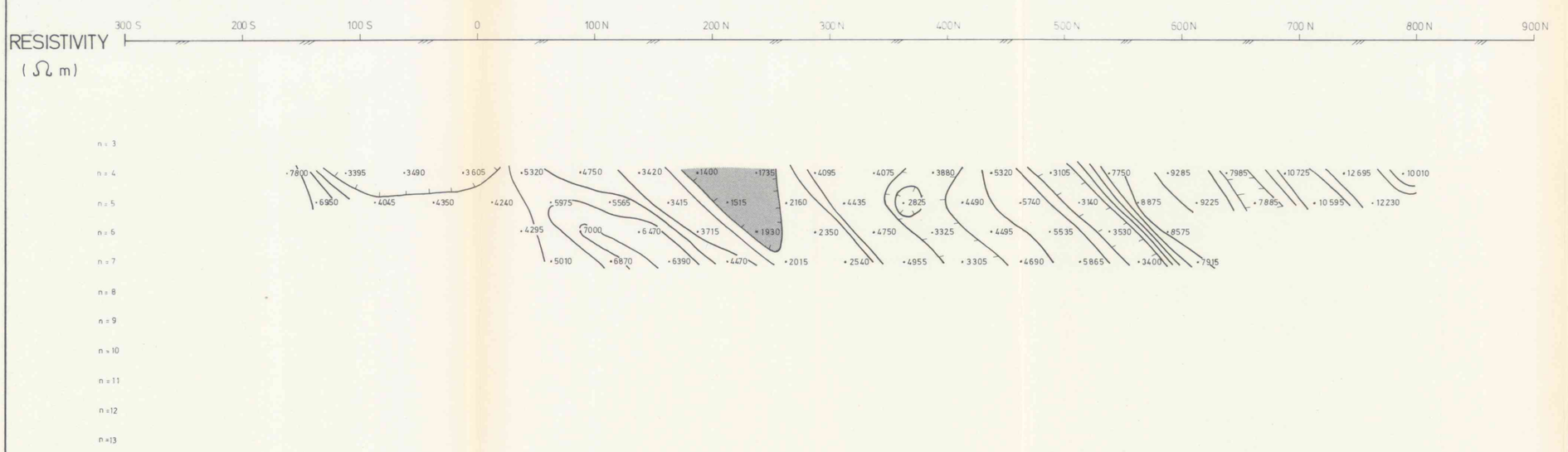
Data Sheet
IP, SP and ER
LINE 300 W ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1: 2500
Calculated	1983		Project no 792.02
Drawn	1983		Appendix no 3.7
Controlled			

LINE 450W ÅMOT





LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

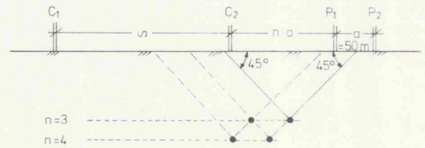
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm.

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

Data Sheet
IP, SP and ER
LINE 450W ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.8
Controlled			

LINE 600W ÅMOT

LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"

GEOTEAM

Data Sheet
IP and ER
LINE 600W ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.9
Controlled			

Lagret av Sem & Stenersen A/S, Teknisk Avdeling, Oslo

LINE 750W ÅMOT

LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"

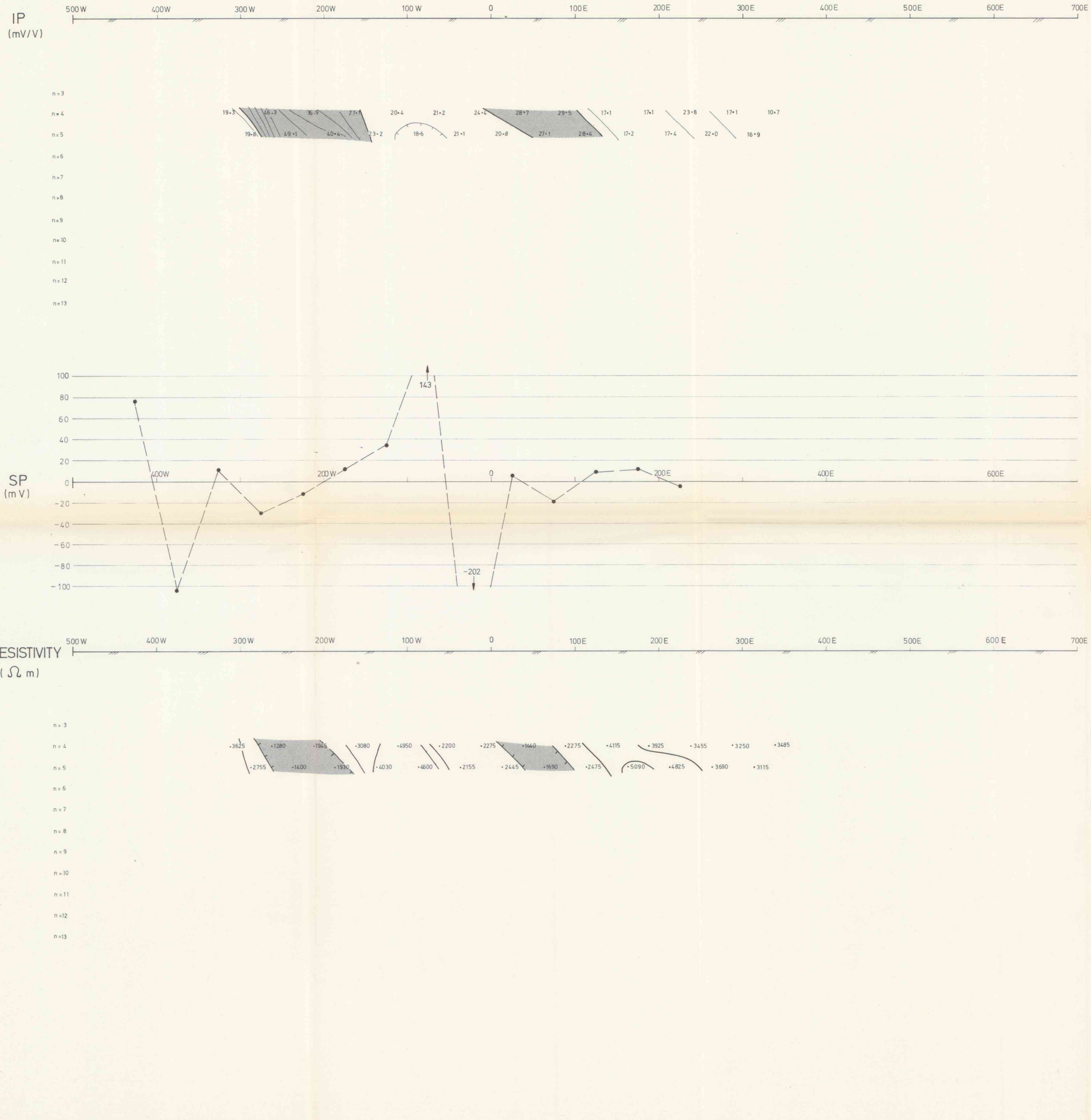
GEOTEAM

Data Sheet
IP, SP and ER
LINE 750W ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale	1: 2500
Calculated	1983		Project no	7922.02
Drawn	1983		Appendix no	3.10
Controlled:				

LINE 100N ÅMOT



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ω m UP TO 900 Ω m

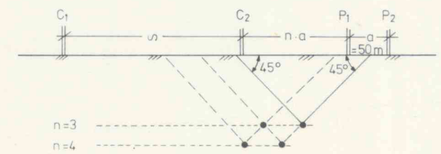
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ω m

: RESISTIVITY-VALUES LESS THAN 2000 Ω m

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



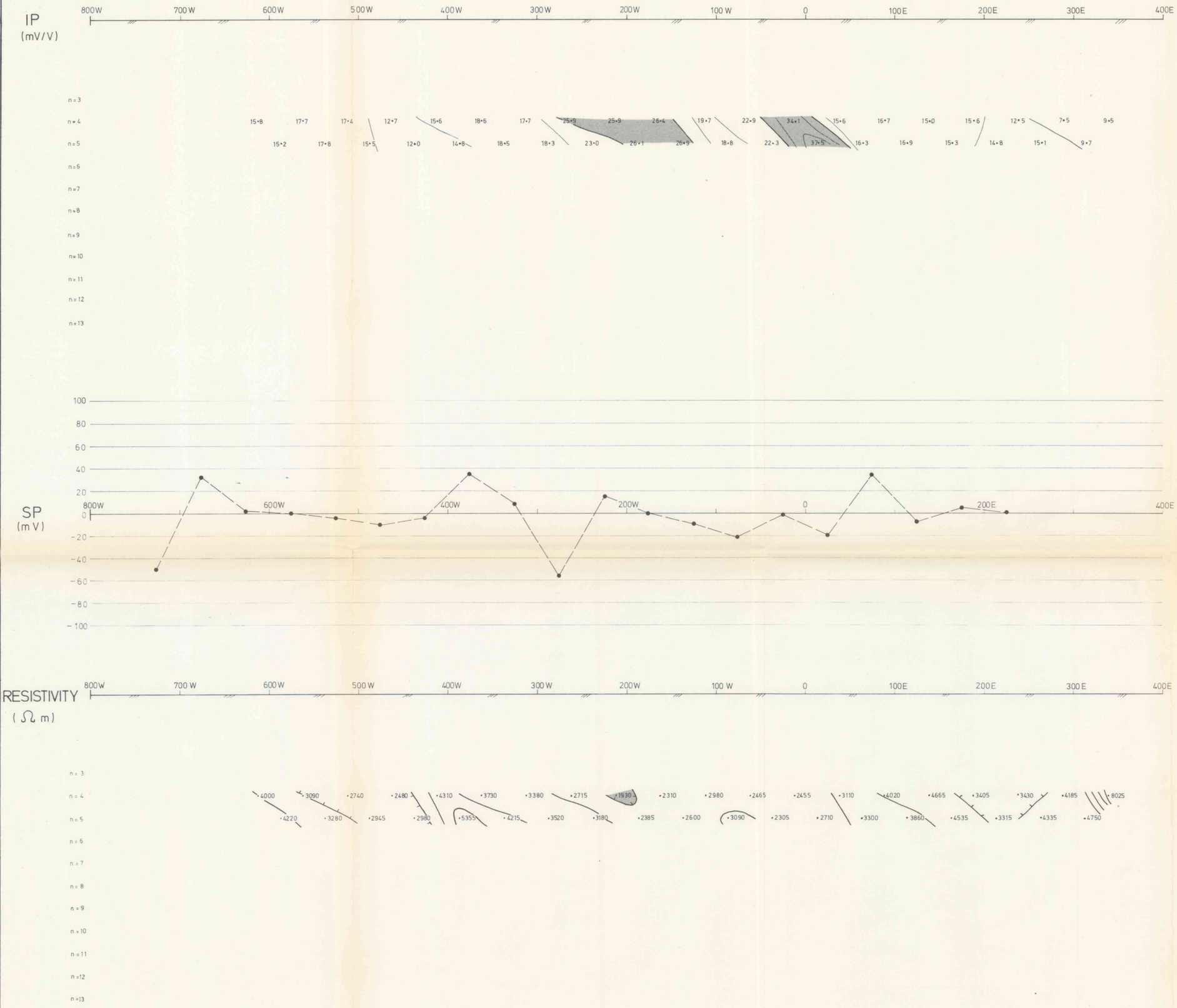
GEOTEAM

Data Sheet
IP, SP and ER
LINE 100N ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.11
Controlled			

LINE 250N ÅMOT



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

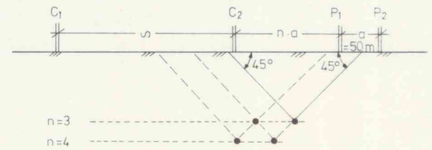
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

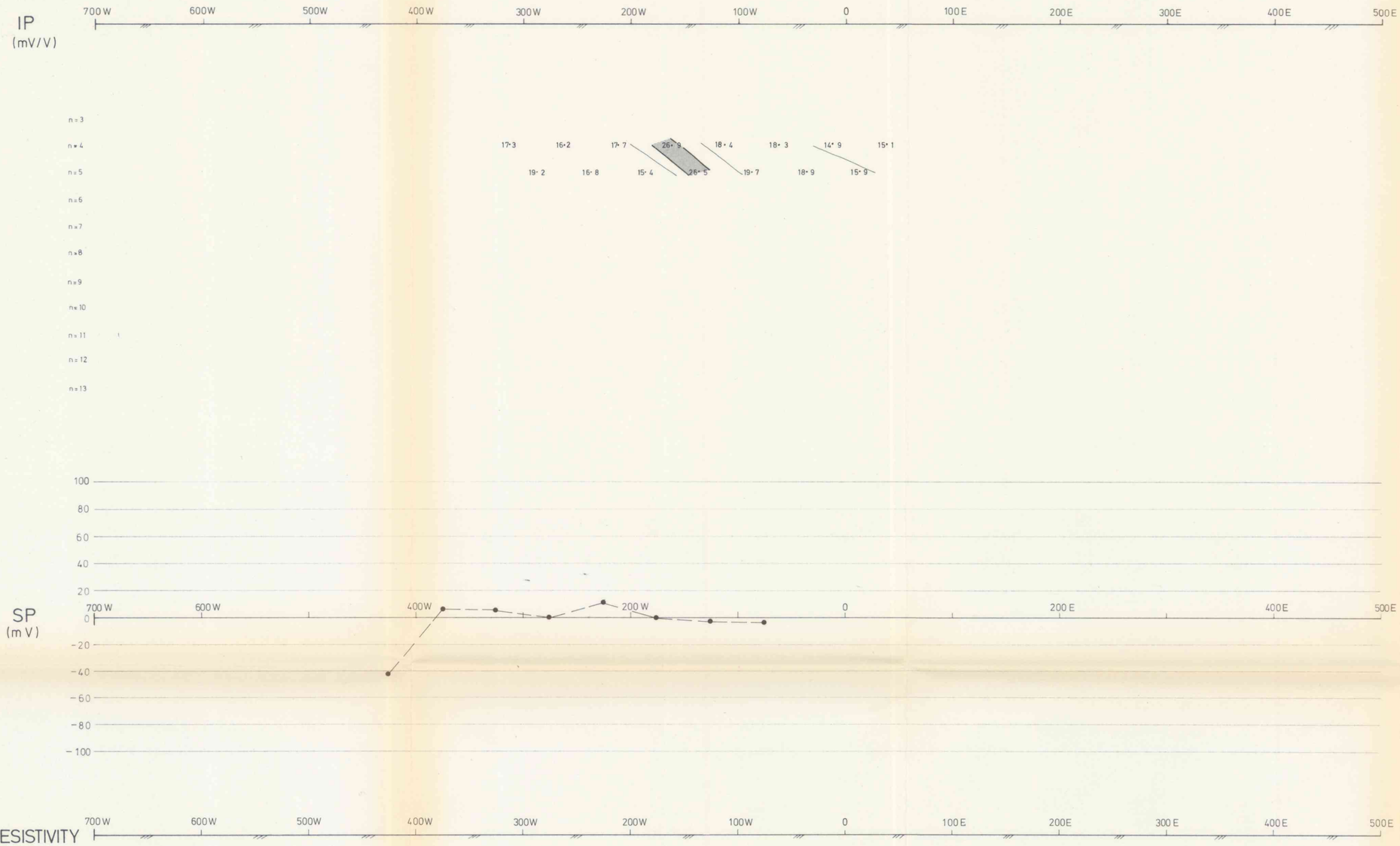
Data Sheet
IP, SP and ER
LINE 250N ÅMOT

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.12
Controlled:			

Layout by Sam A. Stangeland A/S, Teknisk Avdeling, Oslo

LINE 450 N ÅMOT



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

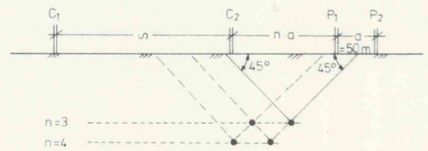
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

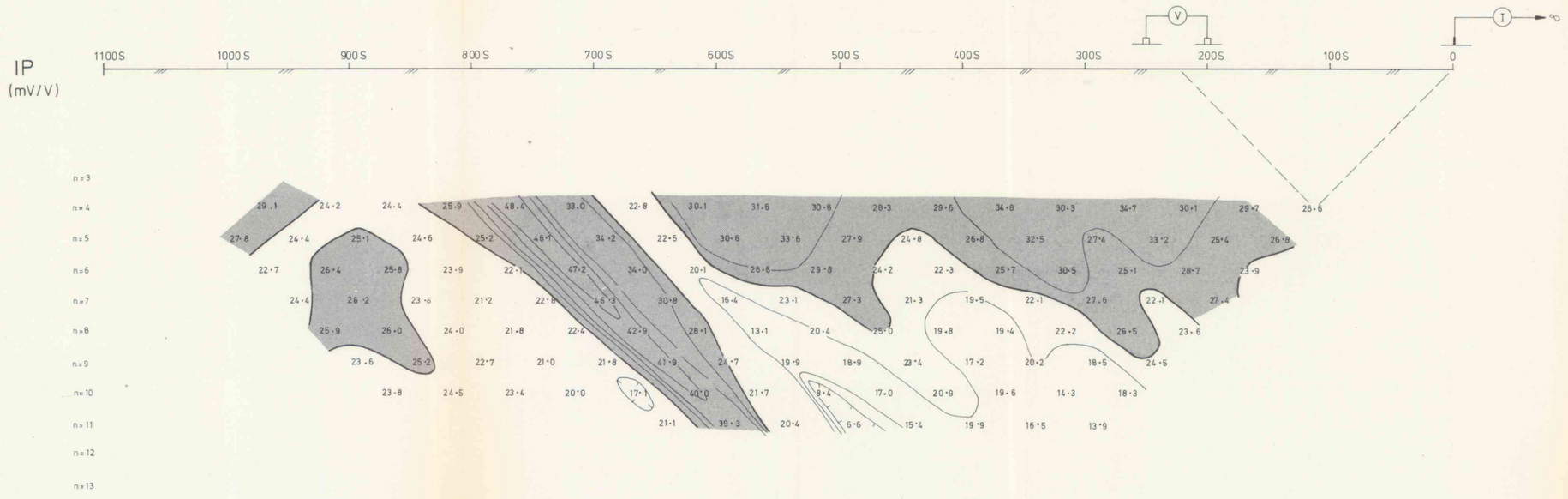
Data Sheet
IP, SP and ER
LINE 450 N ÅMOT

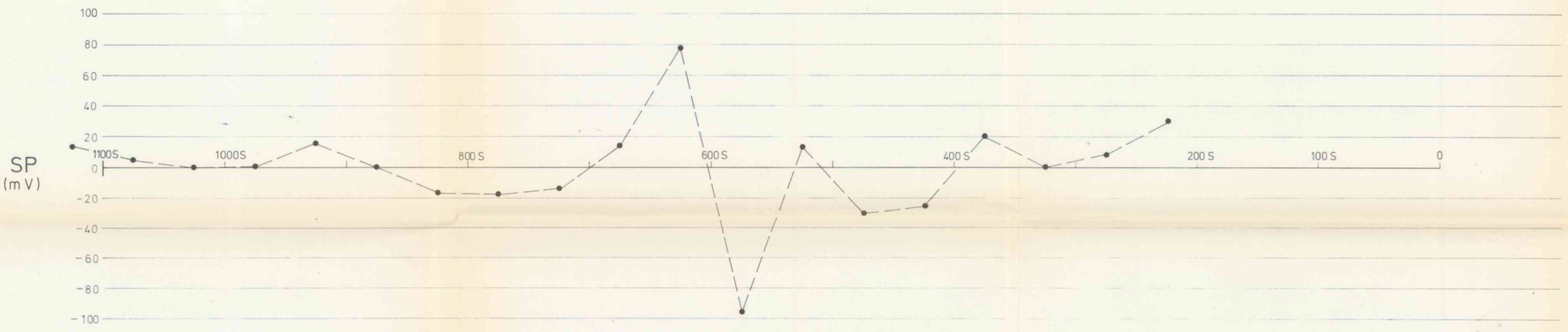
Client:
Orkla Industrier A/S

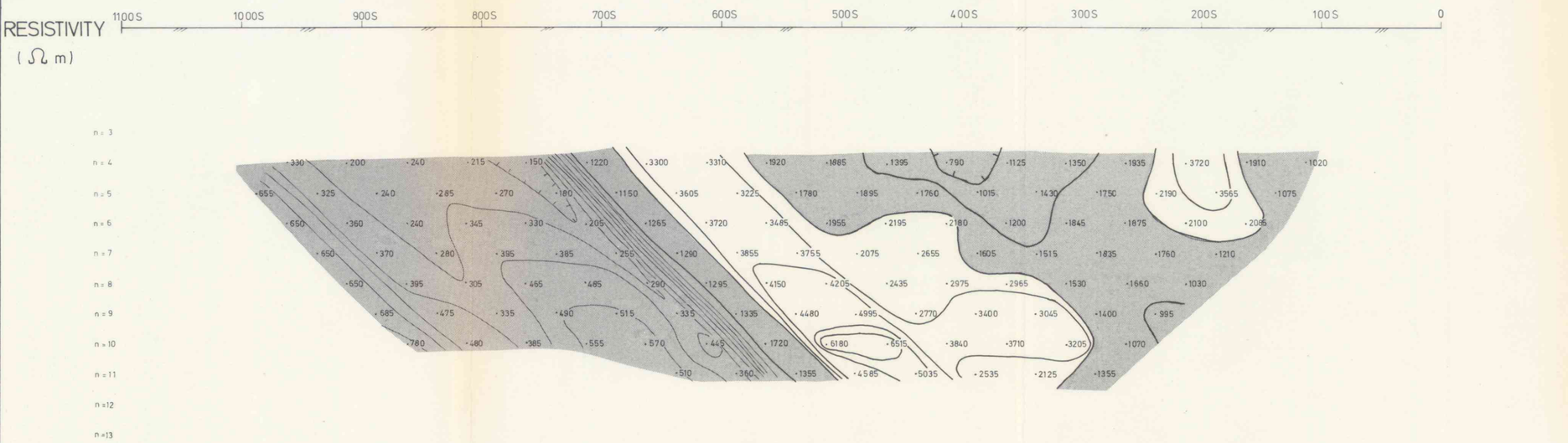
Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 3.13
Controlled:			

Levert av Sem & Stenersen A/S, Teknisk Avdeling, Oslo

PROFILE 1 HESTDALEN







LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

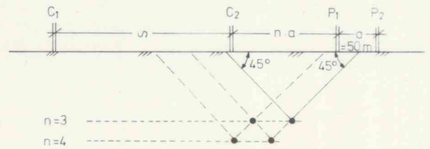
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

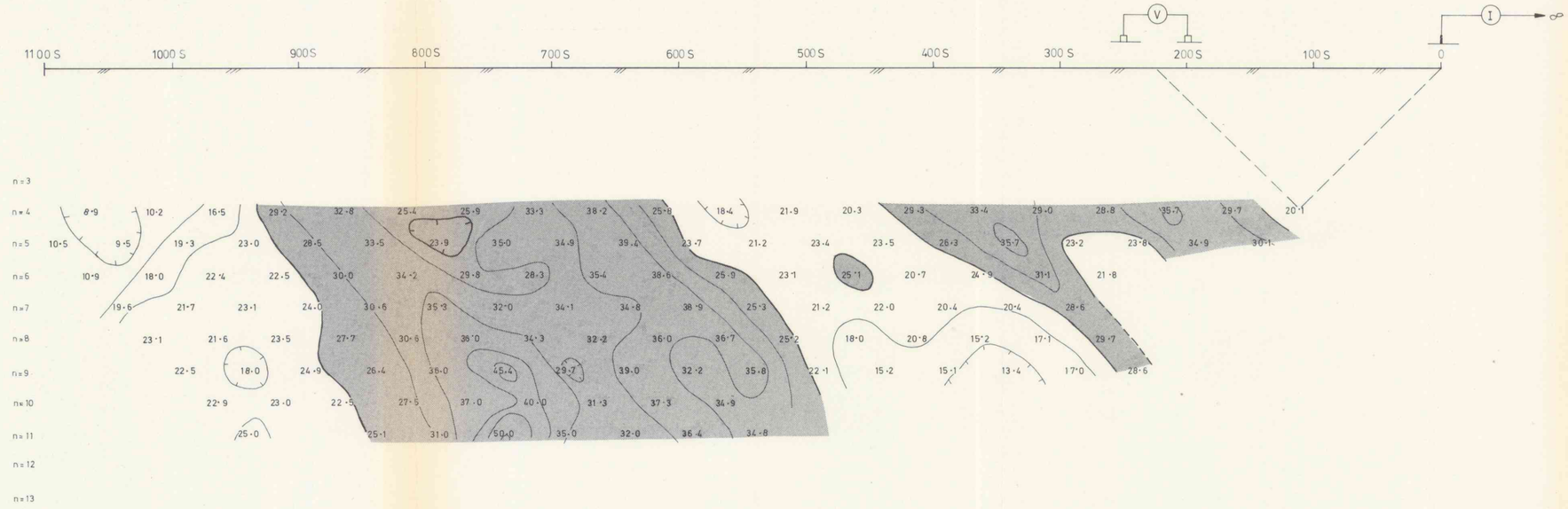
Data Sheet
IP, SP and ER
PROFILE 1 HESTDALEN

Client
Orkla Industrier A/S

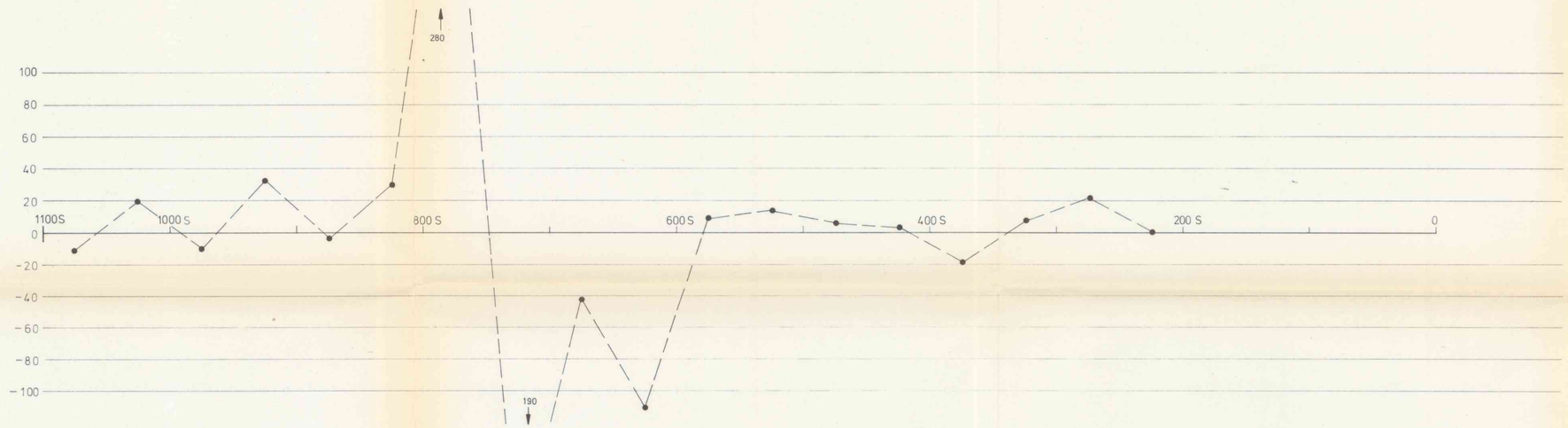
Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 4.2
Controlled			

PROFILE 2 HESTDALEN

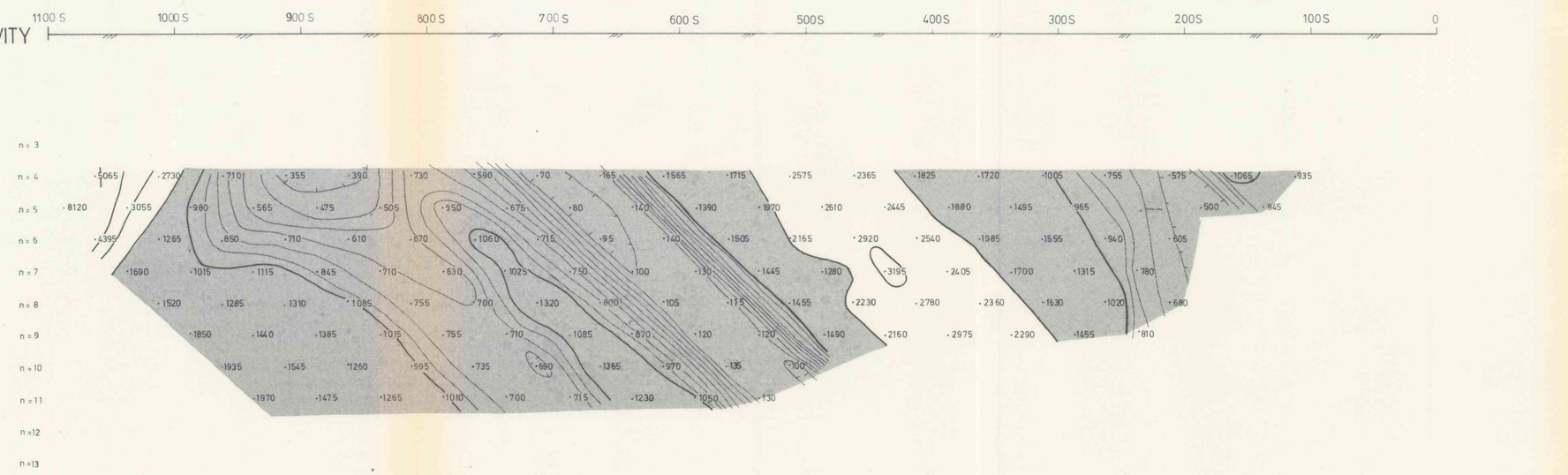
IP
(mV/V)



SP
(mV)



RESISTIVITY
(Ω m)



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

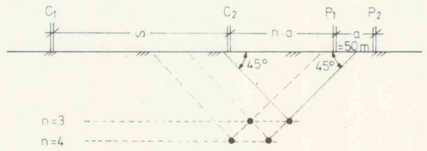
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



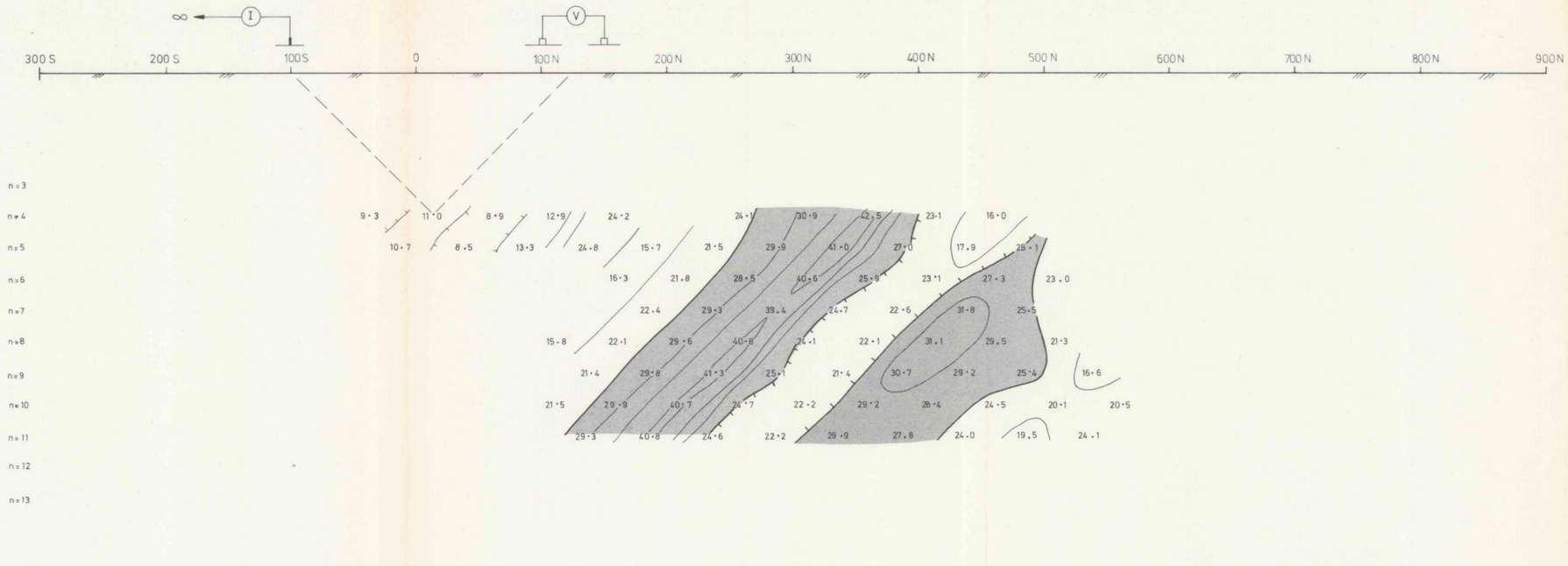
GEOTEAM

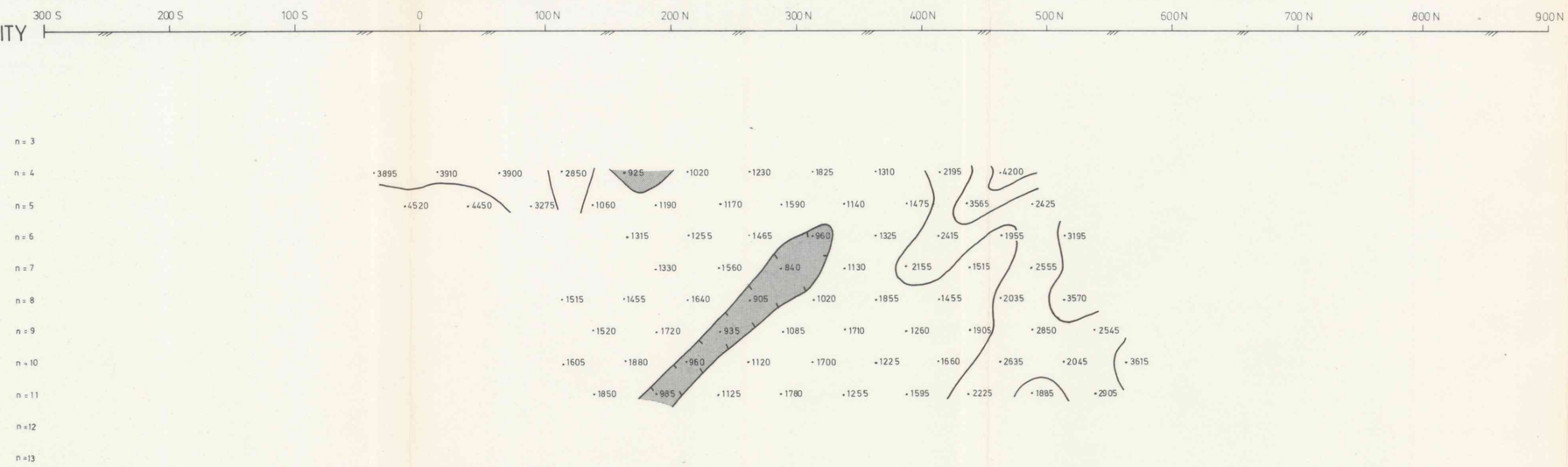
Data Sheet
IP, SP and ER
PROFILE 2 HESTDALEN

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 4.3
Controlled			

LINE 200E HØGÅSEN





LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

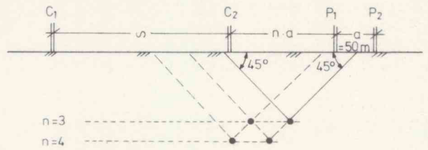
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

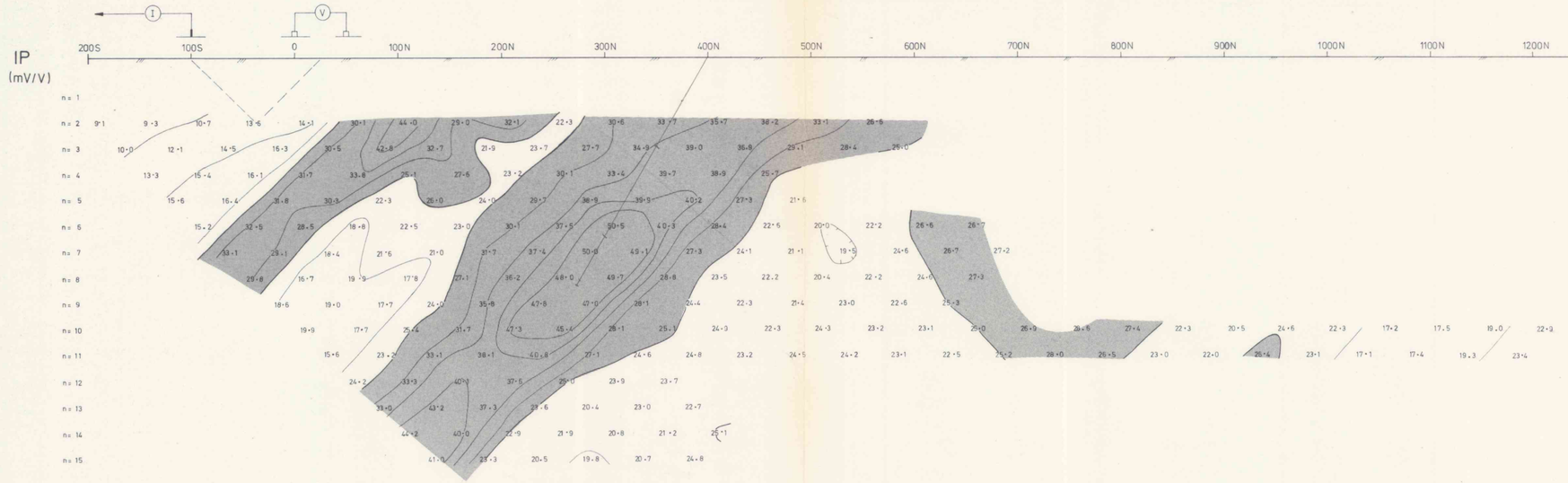
Data Sheet
IP, SP and ER
LINE 200E HØGÅSEN

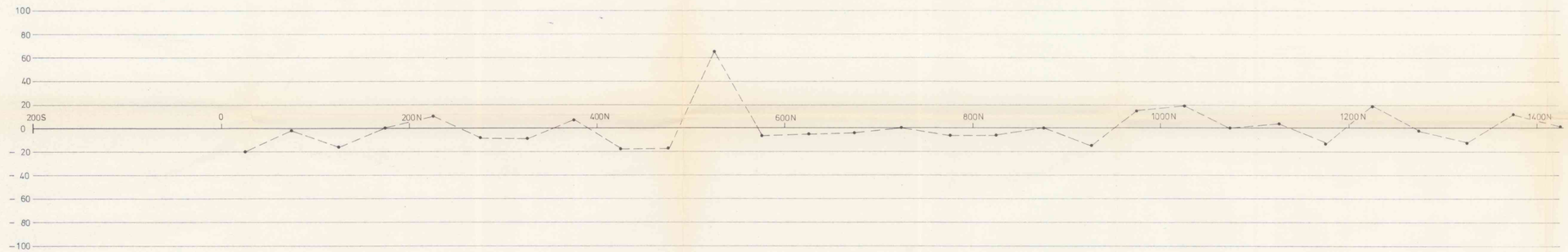
Client:
Orkla Industrier A/S

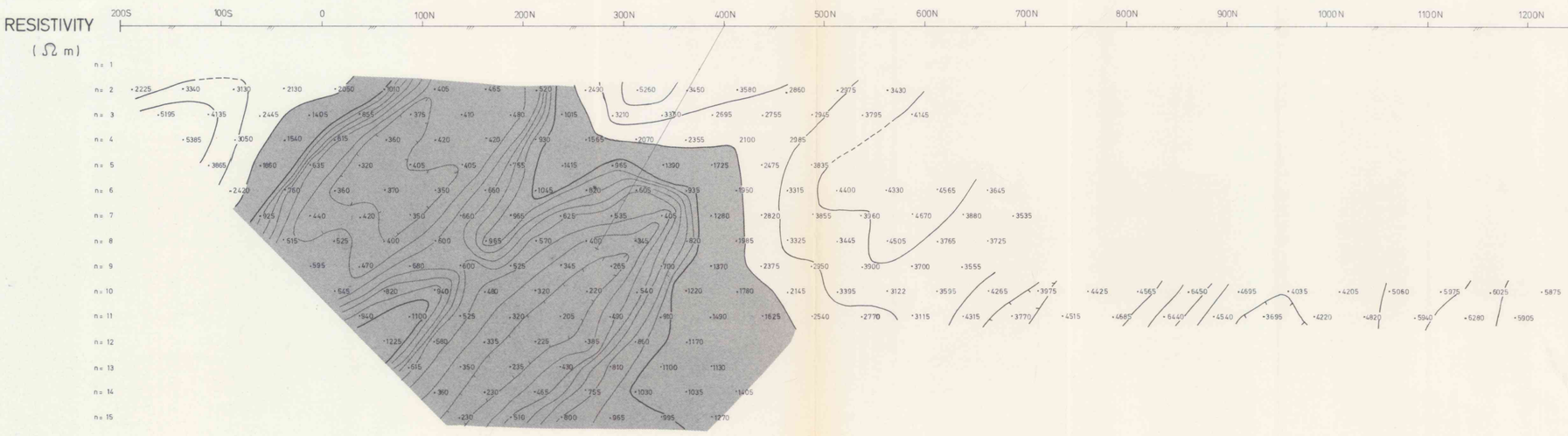
Measured: 1983	Map no.	Scale	1:2500
Calculated: 1983		Project no.	7922.02
Drawn: 1983		Appendix no.	5.2
Controlled:			

Layout by Sam E. Stangeland A/S, Teknisk Avdeling, Oslo

LINE 000 HØGÅSEN







LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

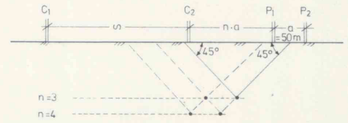
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



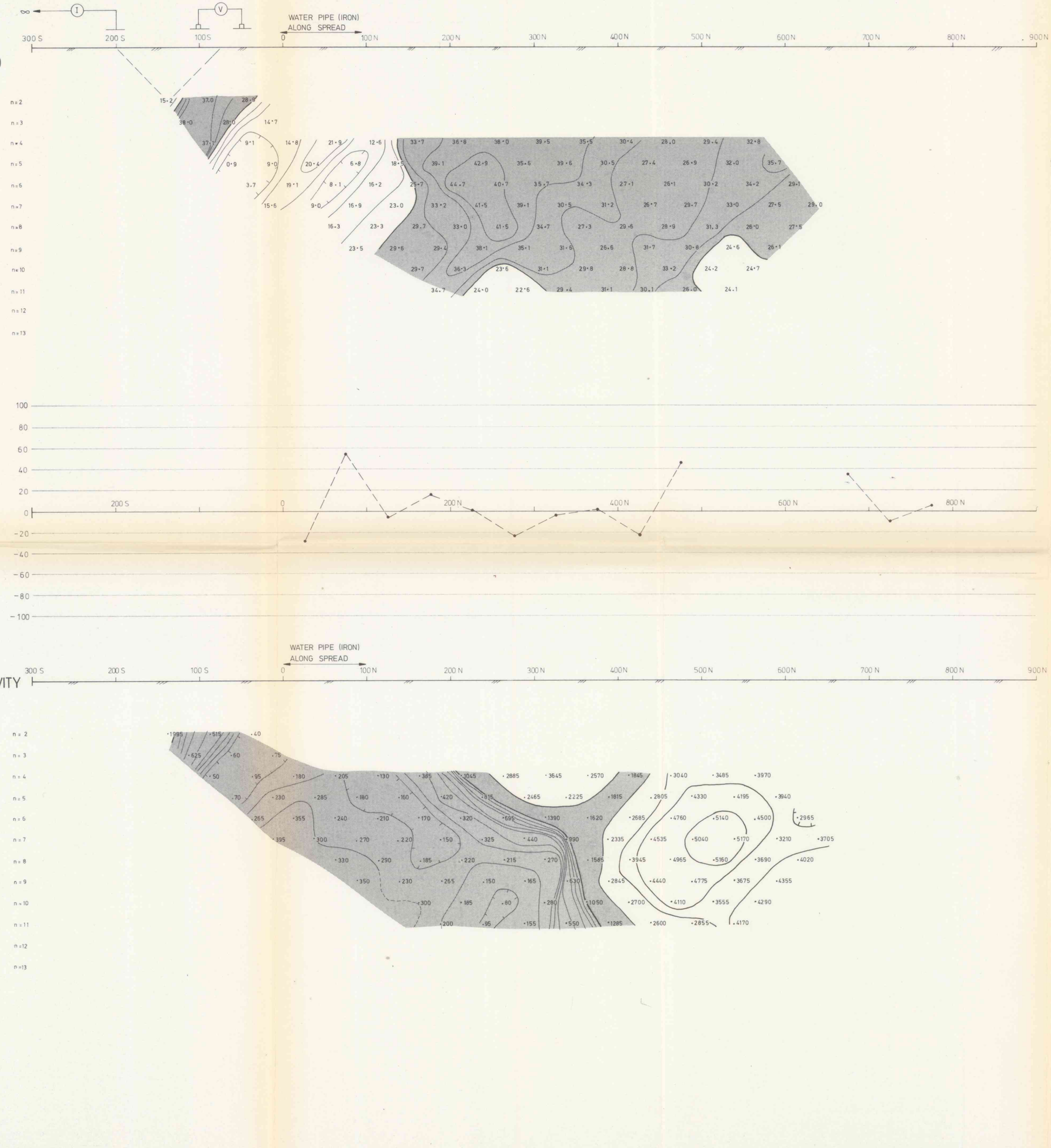
GEOTEAM

Data Sheet
IP, SP and ER
LINE 000 HØGÅSEN

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 5.3
Controlled			

LINE 200W HØGÅSEN



LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

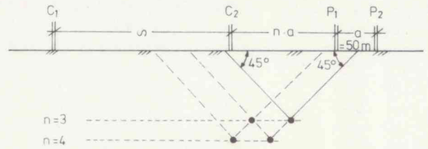
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

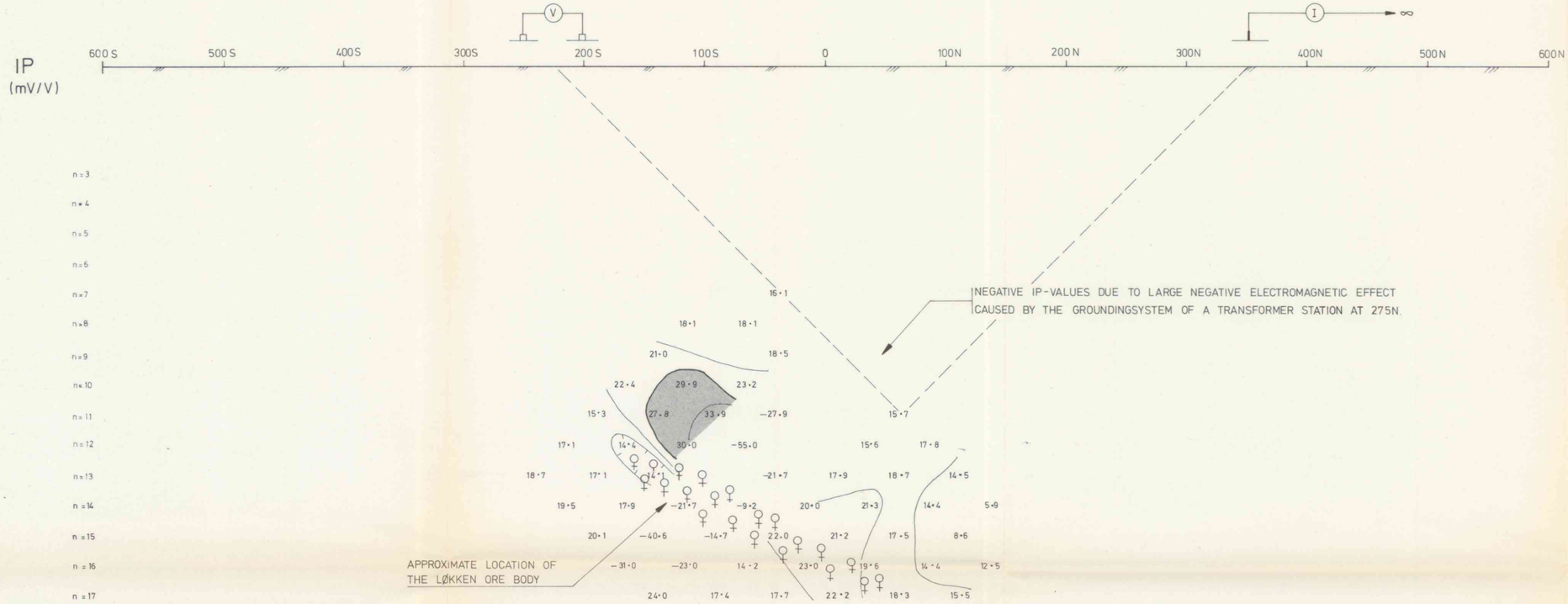
Data Sheet
IP, SP and ER
LINE 200W HØGÅSEN

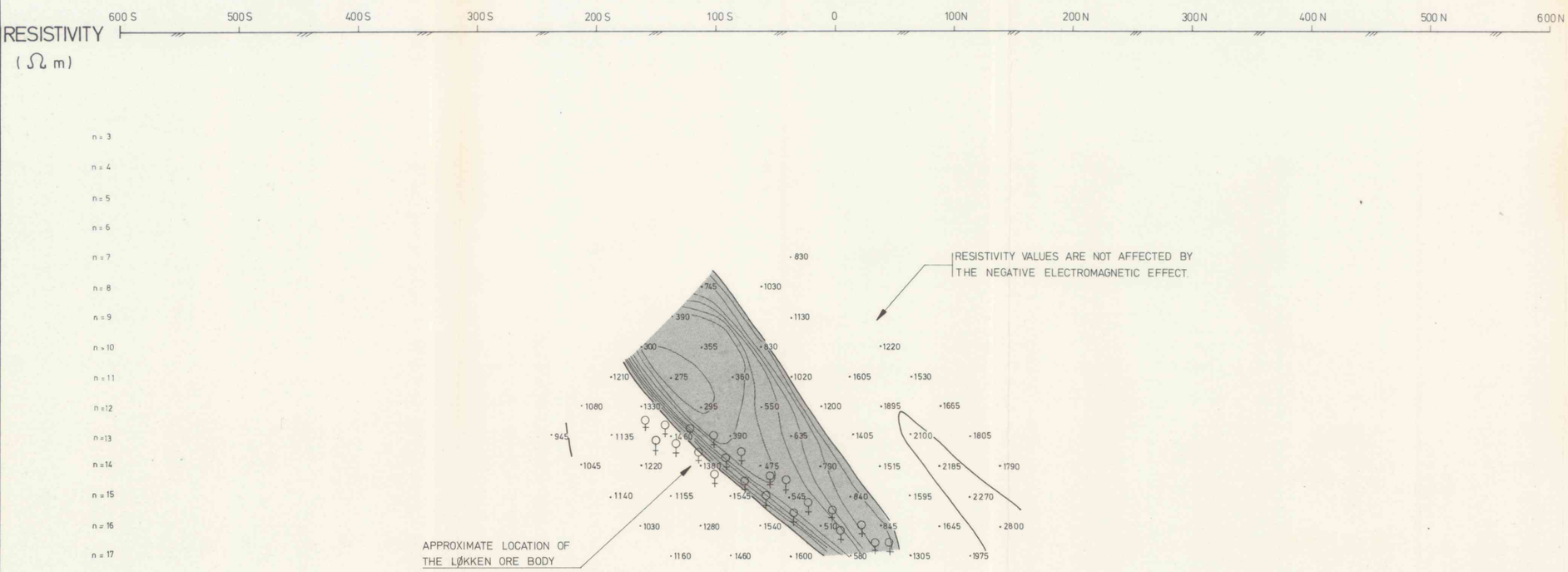
Client:
Orkla Industrier A/S

Measured: 1983	Map no	Scale	1:2500
Calculated: 1983		Project no	7922.02
Drawn: 1983		Appendix no	5.4
Controlled:			

App. 6

TEST PROFILE BJØRNLI





LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

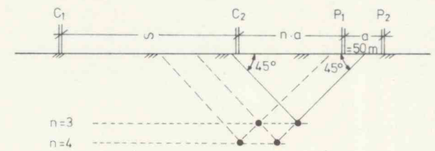
THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm

NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"



GEOTEAM

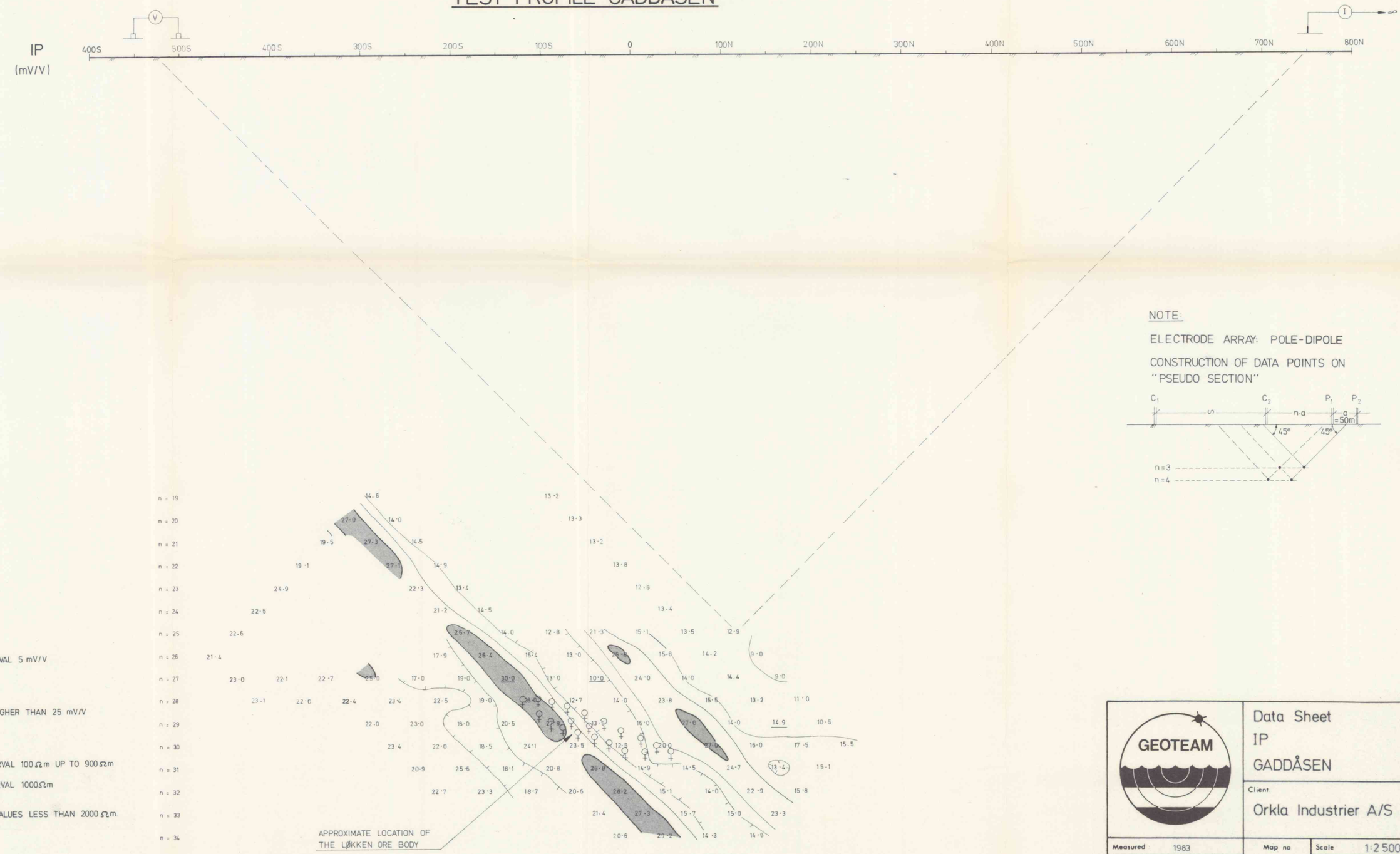
Data Sheet
IP and ER
BJØRNLI

Client.
Orkla Industrier A/S

Measured: 1983	Map no	Scale	1:2500
Calculated: 1983		Project no.	7922.02
Drawn: 1983		Appendix no.	6.2
Controlled:			

Levert av Sem & Stenersen A/S, Teknisk Avdeling, Oslo

TEST PROFILE GADDÅSEN



NOTE:

ELECTRODE ARRAY: POLE-DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"

LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm.

GEOTEAM

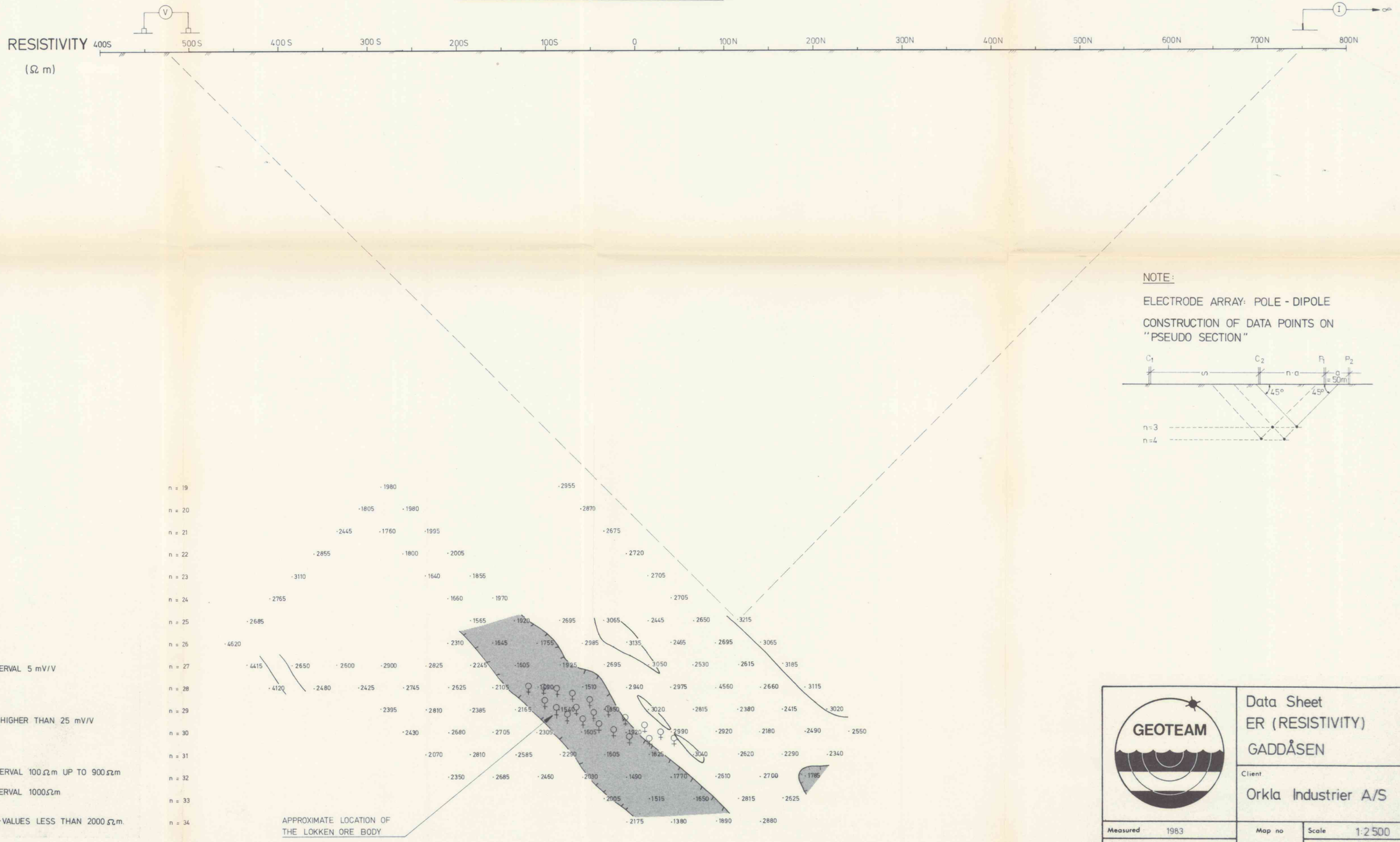
Data Sheet
IP
GADDÅSEN

Client:
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2 500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 6.3
Controlled:			

TEST PROFILE GADDÅSEN

RESISTIVITY (Ω m)



NOTE:

ELECTRODE ARRAY: POLE - DIPOLE

CONSTRUCTION OF DATA POINTS ON "PSEUDO SECTION"

LEGEND:

IP:

THIN CONTOURLINE : CONTOURINTERVAL 5 mV/V

THICK CONTOURLINE : 25 mV/V

: IP-VALUES HIGHER THAN 25 mV/V

RESISTIVITY (ER):

THIN CONTOURLINE : CONTOURINTERVAL 100 Ωm UP TO 900 Ωm

THICK CONTOURLINE : CONTOURINTERVAL 1000 Ωm

: RESISTIVITY-VALUES LESS THAN 2000 Ωm.

GEOTEAM

Data Sheet
ER (RESISTIVITY)
GADDÅSEN

Client
Orkla Industrier A/S

Measured	1983	Map no	Scale 1:2500
Calculated	1983		Project no 7922.02
Drawn	1983		Appendix no 6.4
Controlled :			