Bergvesenet

Postboks 3021, 7002 Trondheim

Rapportarkivet

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
BV 1699			Trondheim	
Kommer fra ..arkiv	**Ekstern rapport nr**	**Oversendt fra**	**Fortrolig pga**	**Fortrolig fra dato:**
	LV 23			

Tittel

Segelvann
The Svinsås area, diamond drilling

Forfatter	Dato	Bedrift
Bollingmo, Åse	25.04 1984	Orkla Industrier A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Meldal	Sør-Trøndelag	Trondheimske	15213	

Fagområde	Dokument type	Forekomster
Boring		
Råstofftype	**Emneord**	
Malm/metall		

Sammendrag

ORKLA INDUSTRIER A·S

MINING SECTION
EXPLORATION

GULF ORKLA

LØKKEN VENTURE

Report no: LV 23 Date: Apr. 84

Title: Segelvann
Svinsås area,
diamond drilling

O R K L A I N D U S T R I E R A.s.

MINING SECTION, EXPLORATION

Report no: LV 23 | Date: April 25., 1984

Title: Segelvann

The Svinsås area, diamond drilling

Prepared by: Åse Bollingmo | Area: Svinsås

Map no., name: 1521 III Løkken | Coordinates (UMT): 280020 NW corner

---

Fields work period(s): | Pages: 7

Enclosures: 10

Summary:

In Segelvann/Svinsås five drillholes were drilled in 1982-83. This was meant to follow up IP measurements and geological mapping. Although no new massive ore was discovered, we got some interesting information:

- There are several zones containing disseminated sulphides and altered greenstones in the area.
- The IP measurements gave a quite correct picture of the mineralization.
- The 'vasskis', which is known from old prospects, continues with a northerly dip down to a depth of at least 325 m, where it is intersected by Dh4.

Key words: Diamond drilling

Ase Bollingmo

12.04.84

Table of contents

ENCLOSURES

1. Location map'
2. Drillholes, columns, 1:1000
3. Vertical profile, drillholes and surface geology 1: 5000
4. Geochemistry, drillholes 1 and 3, 1:1000

   A Cu and Zn
   B Co
   C MnO and K_2O
   D Fe_2O_3 and CaO
   E Na_2O
   F Cr and Sr
   G S

5. Location of drillholes, 1:5000

INTRODUCTION

The diamond drilling in this southern part of the Segelvann area, was to a certain degree hindered by rock mechanical problems. We had several brakes because of caving in, and such difficulties were the reason why Dh3 was finished earlier than we had planned.

Deviation was controlled in Dh3, and at a depth of 300 metres it was 10 %.

All five drill-holes were drilled along north-south running profiles (Encl.1)

Dh1, Dh2, Dh3 and Dh 4 have a northerly dip, and Dh5 dips to the south.

The diamond drilling was meant to follow up earlier geological and geophysical work and first and foremost the IP measurements which were performed the summer 1982. They gave indications on zones rich in disseminated sulphides.

A 'vasskis' horizon was known from an old prospect further south. We drilled Dh4 and Dh5 to be able to regard the intersection between the possible feederzone and the continuation of the 'vasskis' horizon to the depth.

GEOLOGY

The greenstone complex

Lavas dominate in all five drillholes. In Dh1 and Dh 2 pillow structures are seen quite frequently. Some hyaloclastite is developed between the pillows, but still they seem close packed.

Varioles are not observed in these lavas, but vesicles are common. The vesicles are filled in with quartz, epidote or calcite.

In Dh3, Dh4 and Dh5, the lavas occur almost solely as massive lava flows. Also in these drillholes vesicles are common in the lavas. The massive lava flows contain hyaloclastite in vein-like structures. The grainsize in the lava flows varies from fine near the contacts to corse in the central parts.

In some instances it is difficult to distinguish between dykes and massive lava flows, because both appear with graded margins. Vesicles are seldom seen in dykes, so were such structures occur, they have been used as an indication on a lava origin of the rock.

'Vasskis', chert and jasper occur in Dh1, Dh3, Dh4 and Dh5.

In Dh1, there is only a thin, pink chert layer, at about 154 m, lying in pillow lava with reddish alteration colour.

In Dh3 there are 'vasskis' layers, a few mm thick, at a depth of about 225m. In Dh 4 ' vasskis' is seen at 304,318 and 322 metres, and in Dh5 by 224,225 and 233-235 metres.

All the 'vasskis' layers which are mentioned, lie in a black chert, rich in magnetite.

Cherts without sulphide layers occur in Dh4 and Dh5. In Dh4, the chert formation is about 50 metres thick, from 292 - 340 metres of depth. Most of this chert is not pure.

In Dh5 there is a chert horizon at about 208 - 212 metres. It contains disseminated pyrite and partly pyrite layers.

Jasper is seen in Dh3, Dh4 and Dh5. In Dh3 we find it in connection with, and structurally above the 'vasskis' layers.

Dh4 contains several jasper lenses/layers. By 179 and 187 metres we find jasper, and also further down, within the chert formation (by 292 - 340 metres) and in between the 'vasskis' layers.

In Dh5 jasper occurs at 28 - 39 metres and at 225 metres between the 'vasskis' layers.

Greenstone/jasper breccia is seen in Dh5, at about 88 metres. This rock is mentioned in connection with the 1979 genesis of the Høydal ore, east of Løkken. (T.Grenne, G.Grammeltvedt and F.M.Vokes 1979, Cyprus-type deposits in the western Trondheim district, central Norwegian Caledonides).

Diabas dykes occur in Dh1, Dh2 and Dh3, intruding the lavas. Most often they have finegrained margins, but where this isn't so, it is difficult to decide whether it is a massive lava flow or a dyke.

The thickness of the diabase dykes varies from one cm to five metres. Multiple dykes are common.

Later intrusives

Quarts-feldspar porphyrite and quartz porphyrite occur, but rarely, in this part of the Segelvann area. In Dh1, a three metres thick dyke of a quartz-feldspar porphyrite is seen by 253 metres. It is intruding a pillow lava.

The last 10 metres of Dh5 are drilled through a quartz porphyrite . Comparable rocks, from which we have both thin sections and analyzes, have an extremely finegrained matrix and contains 70-80 % SiO_2.

Hydrothermal alteration and mineralization

In Dh1, Dh2, Dh3 and Dh4, parts of the lavas and diabase dykes have an unnormal, bluish or reddish grey colour. In some instances these lavas show a high magnetite content, detectable by hand magnet. Other places, the hematite content is high.

It is difficult to decide whether this high iron oxide content is a primary feature or a result of hydrothermal alteration.

Both in Dh1 and Dh2 the unnormal colour occurs irregularly through the whole core down to about 175 metres.

In Dh3 and Dh4 the unnormal colour is very rarely seen.

There is no simple connection between mineralization and the iron oxide content.

Disseminated sulphides are seen in both normal and unnormal coloured rocks.

The most common sulphide mineral is pyrrhotite, very often assosiated with small amounts of pentlandite. Besides these minerals, there are traces of pyrite, magnetite and chalcopyrite. Maximum contents of sulphides is 10 %, estimated by microscoping.

Shear zones

In Dh2 there is a 10 cm thin, strongly sheared zone at a depth of 159,65-159,75 metres. Primary structures are not preserved. This shear zone is the border between pillow lava and a dyke. A similar zone is seen at 247,7 - 247,9 metres.

Dh3 has a zone with clay, probably a result of shearing. It is about 2 cm thick and lies on the border between lava and a dyke.

As we go further south, to Dh4 and Dh5, shear zones occur more frequently. In Dh4 there is a strongly sheared and laminated rock at a depth of 119 - 121,6 metres. In spite of the tectonization, vesicles are found here. That probably indicates that it is a sheared lava.

At 282,4 metres, there is a clay zone, about 2 cm thick. A similar zone is seen at 347,25 - 347,7 metres.

Dh5 has several shear zones: At 66,25 metres there is a thin clay zone. From 104,5 - 106,65 and at 124,4 metres there are several zones with clay, probably shear zones.

By 165-165,35 metres there is a soft and sheared zone with hyaloclastite structures.

At 262 metres there is a thin shear zone on the border between a lava and chert.

GEOCHEMISTRY

Samples for geochemical analyzes were picked from Dh1 and Dh3. These holes were choosen because they intersected the most distinct IP anomalies. 10 cm long samples were taken systematically each 20 metres along the core. Besides, extra samples were taken where special features occured, such as sulphide veins.

The samples were analyzed with regards to Cu, Zn, Co, MnO, Fe_2O_3, CaO, Na_2O, K_2O, Cr, Sr and S.

For all these elements, except for Cr, Sr and S, the analyzes were done after multi acid total digestion. The detection limit and methodes of analyzing for each element can be seen in the following table:

	Lower detection limit	Method
Cu	1 ppm	Atomic absorption
Zn	1 ppm	Atomic absorption
Co	1 ppm	Atomic absorption
MnO	0,01 %	DC Plasma
Fe_2O_3	0,01 %	DC Plasma
CaO	0,01 %	DC Plasma
Na_2O	0,01 %	DC Plasma
K_2O	0,01 %	DC Plasma
Cr	2 ppm	X-ray Fluorescence
Sr	1 ppm	X-ray Fluorescence
S	0,01 %	X-ray Fluorescence

When we compare the Svinsås values to normal ocean floor tholeiites (Encl. 6 Grenne, report nr. LV 21), the following conclusions may be drawn:

- Copper values are quite normal, but we have some weak anomalies, both negative and positive. The highest values are between 100 and 150 ppm, and the lowest negative anomaly is 4 ppm.

- Zinc is anomalous positive for almost all samples, containing more than 85 ppm Zn, which is the average of normal greenstones in the Løkken area. Several especially high anomalies approach 200-250 ppm, and one single peak (three samples) lies at 550 ppm.

- Cobolt has about normal values, the general level lying between 30 and 45 ppm.

- MnO values vary within a narrow interval, only one distinct anomaly is seen in Dh3, at 0,30 %.

- Fe_2O_3 seems to have a quite constant level in Dh1, a bit low (8-9 %) in the beginning, and a bit high further down (10-11 %).

- The whole area seems to be somewhat depleted in CaO, with some distinct negative anomalies. In Dh1 the general level is lying below 8,5 with some "negative peaks" down below 3 %. In Dh1 there is also one distinct positive anomaly: 18,3 %. In Dh 3 the general level is even lower, below 7,5 and the lowest values down to about 3 %.

- Na_2O seems to have quite normal values. In Dh1 they vary between 3 and 4 %. In Dh3 the level is a bit high with a top at about 7,5 %.

- K_2O has an area of distinct positive anomalies. So this element is clearly affected by alteration.

- In Dh1, the Sr values vary, but not so much. There is one distinct positive anomaly with values up to 250 ppm.

  In Dh3, the level is low in the upper half of the hole, and normal in the lower half.

- Sulfur content reflects the sulphide content of the sample.

Between some of the elements there is quite a good correlation:

- Samples which are enriched in zinc seem to be weakly depleted in copper.

- Between CaO and Na_2O there is no clear correlation, but in Dh1 there is only one negative anomaly, 3 %, and this coincides with an eurichment in Na_2O.

- In Dh3 there is an area with several obvious positive zinc anomalies, the highest value is 550 ppm.

  In the same part of the drillhole, K_2O has low values, around 0,15 %. Also a positive MnO anomaly coincides with the highest Zn anomaly.

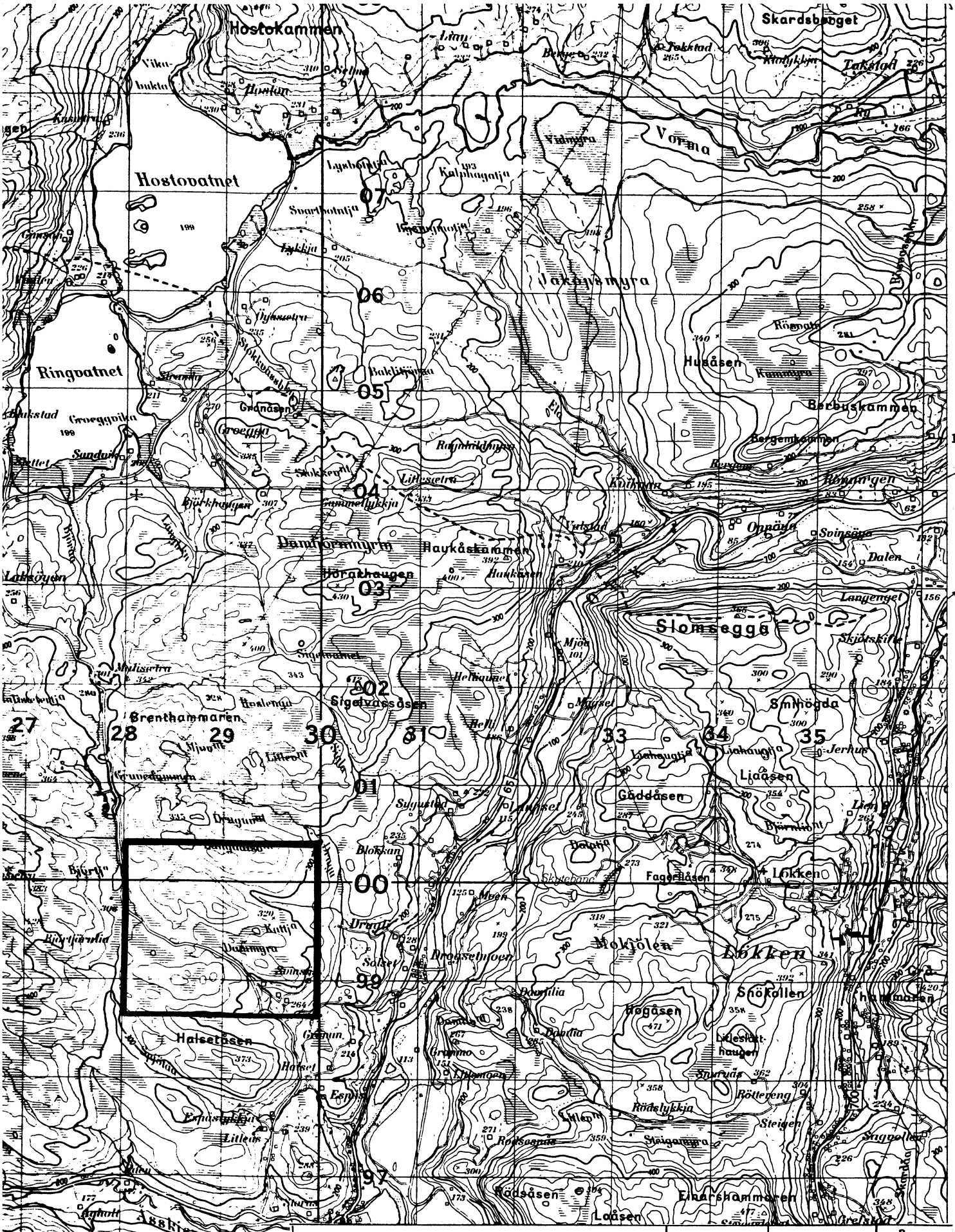
CONCLUSIONS

The diamond drilling in the Segelvann/Svinsås area in 1982 did not result in any ore discovery.

Zones with disseminated sulphides, which were indicated by the preceding IP measurements, are seen in all five drillholes.

The 'vasskis' which was known from old prospects was intersected by Dh5 and Dh6.

The geochemical data from Dh1 and Dh3 gave some weak indications of a hydrothermal alteration. Zinc has the most unnormal values. Especially one part of Dh3, from 100 m to 300 m, Zn has an anomalous positive area. The same part of this drillhole shows a quite clear depletion of K_2O, and the most distinct Zn anomaly coincides with a positive MnO anomaly. But although there are several unnormal features of the geochemical pattern in the two drillholes which are investigated, no distinct zoning or systematical variations can be seen. - Therefore the geochemical results will not be followed up.



SVINSÅS

Location map

Scale: 1:50.000

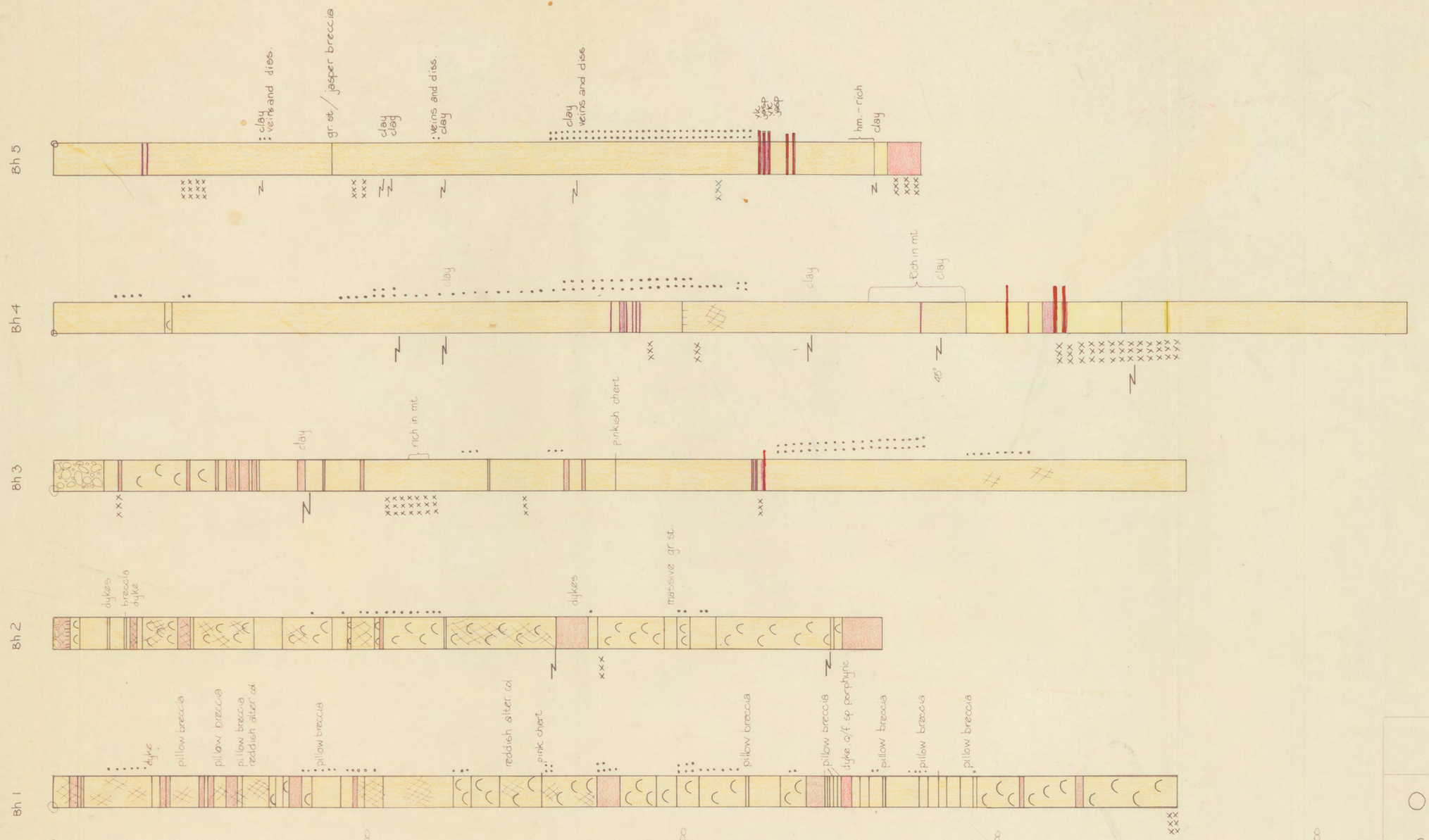
Draw	ÅB
Trac	AM
Date	07.84

No

Encl. no: 1

Orkla Industrier AS
7332 LØKKEN VERK

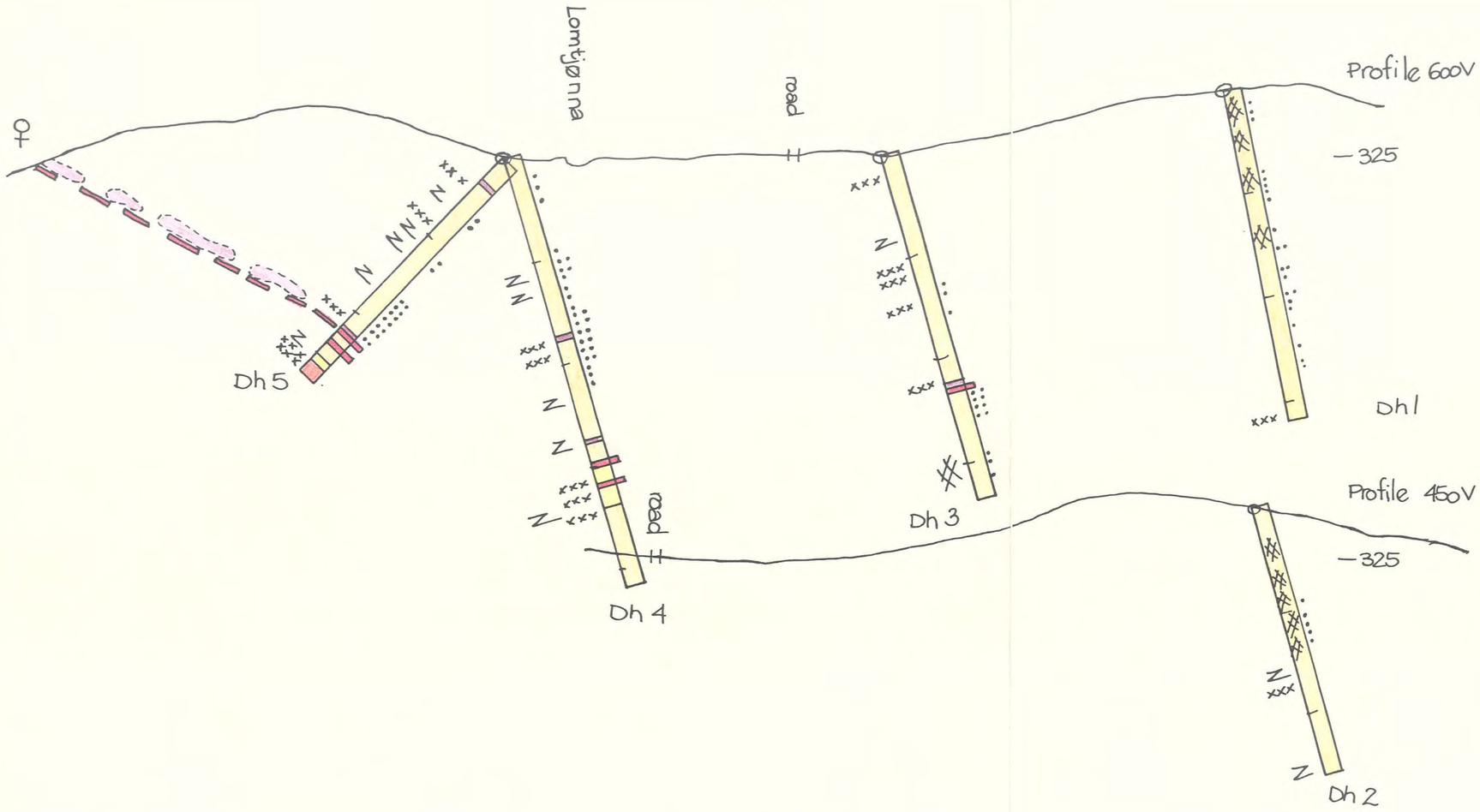
Gulf - Orkla Ventum



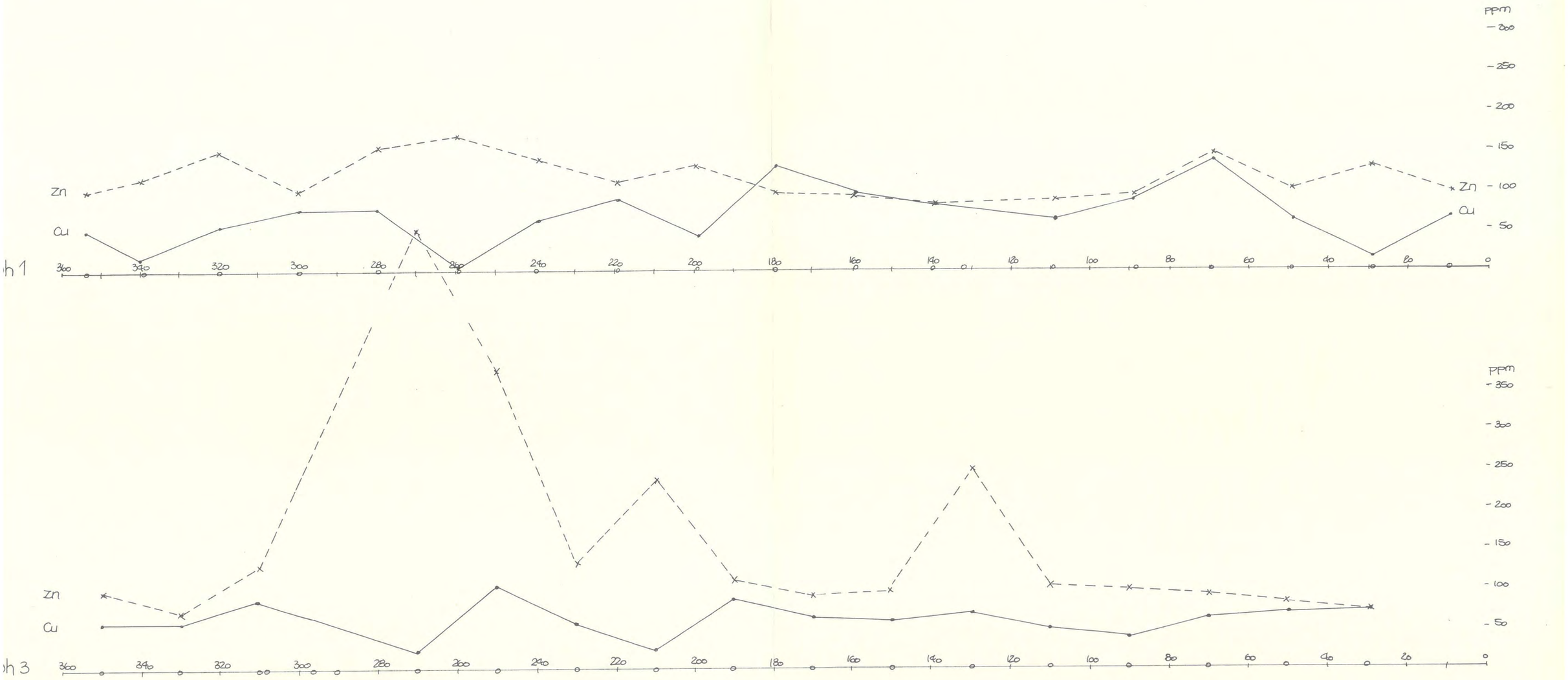
	Scale: 1:1000	Draw:	ÅB
		Trac:	AM

Orkla Industrier A.s
7332 LØKKEN VERK
Gulf - Orkla Venture

No:
Enclosure no: 2
Report no: LV 23
Date: dec. 82



SEGELVANN DIAMOND DRILLING VERTICAL PROFILES	Scale:	Draw:	ÅB
		Trac:	AM
	1:5.000	Date	dec. 83
Orkla Industrier A.s 7332 LØKKEN VERK	No: LVgl E3		
	Encl. no: 3		



SVINSÅS
Geochemistry
drillholes 1 and 3 , Zn and Cu

Scale: 1:1000

Draw	ÅB
Trac	AM
Date	1984

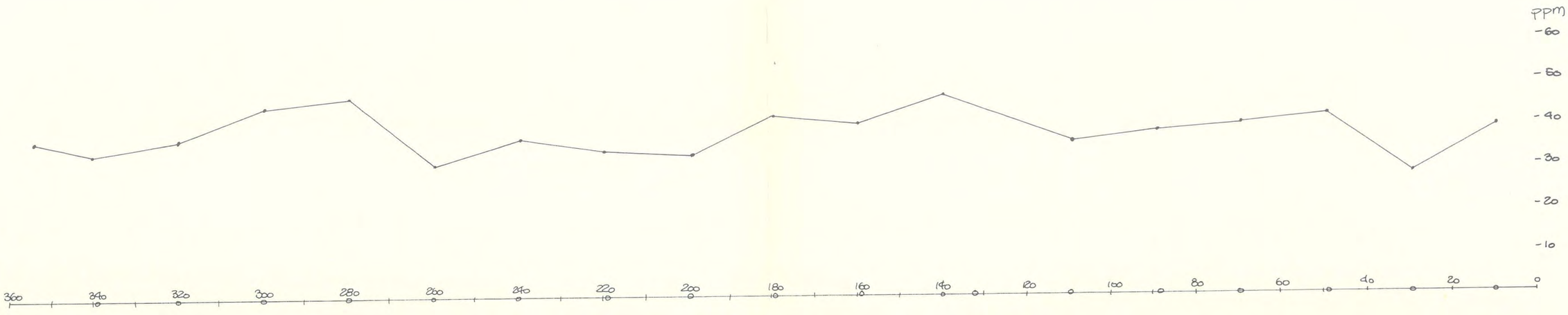
Orkla Industrier As
7032 LØKKEN VERK

Gulf-Orkla Venture

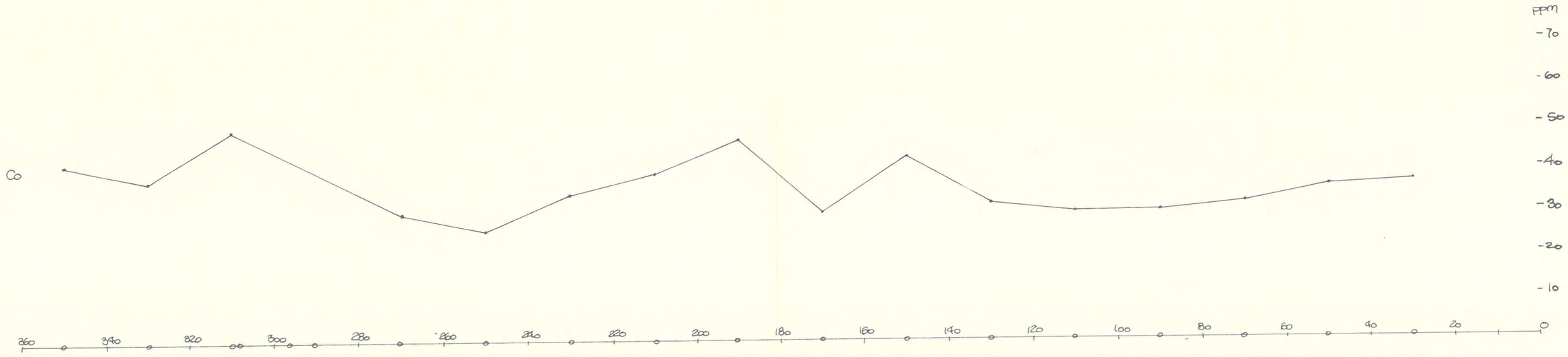
No:

Encl. no: 4A

Report no: 28



h1



73

SVINSÅS
Geochemistry
drillholes 1 and 3 , Co

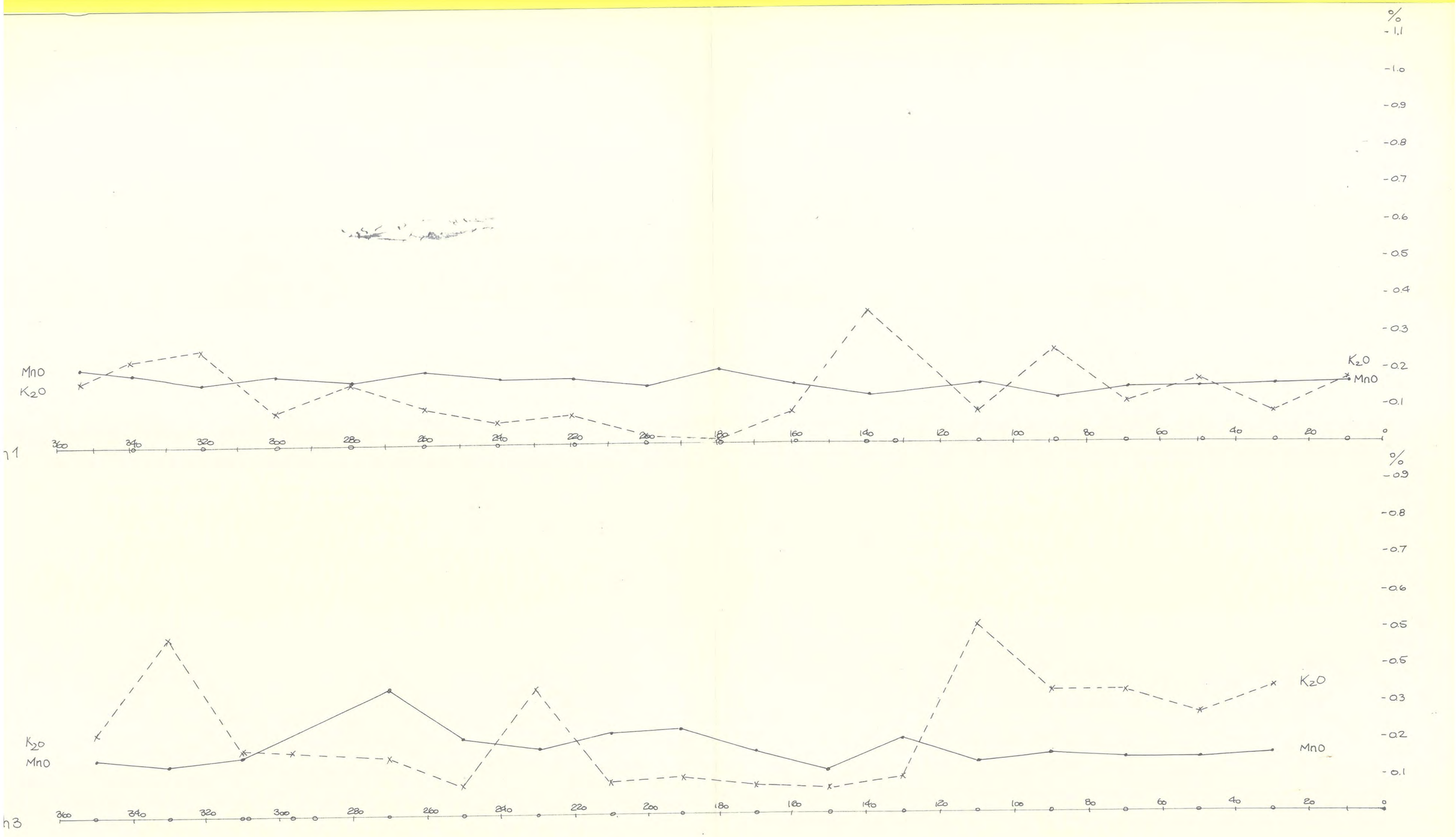
Scale: 1:1000

Draw ÅB
Trac AM
Date 1984

No:

Orkla Industrier As
7332 LØKKEN VERK

Enclosure no: 48



SVINSÅS Geochemistry drillholes 1 and 3 , K_2O and MnO	Scale : 1:1000	Draw	ÅB
		Trac	AM
		Date	1984
Orkla Industrier AS 7332 LØKKEN VERK Gulf-Orkla Venture	No:		
	Encl. no: 4c		

Fe_2O_3

CaO

Fe_2O_3

CaO

- 11
- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

360 340 320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0

h1

Fe_2O_3

CaO

Fe_2O_3

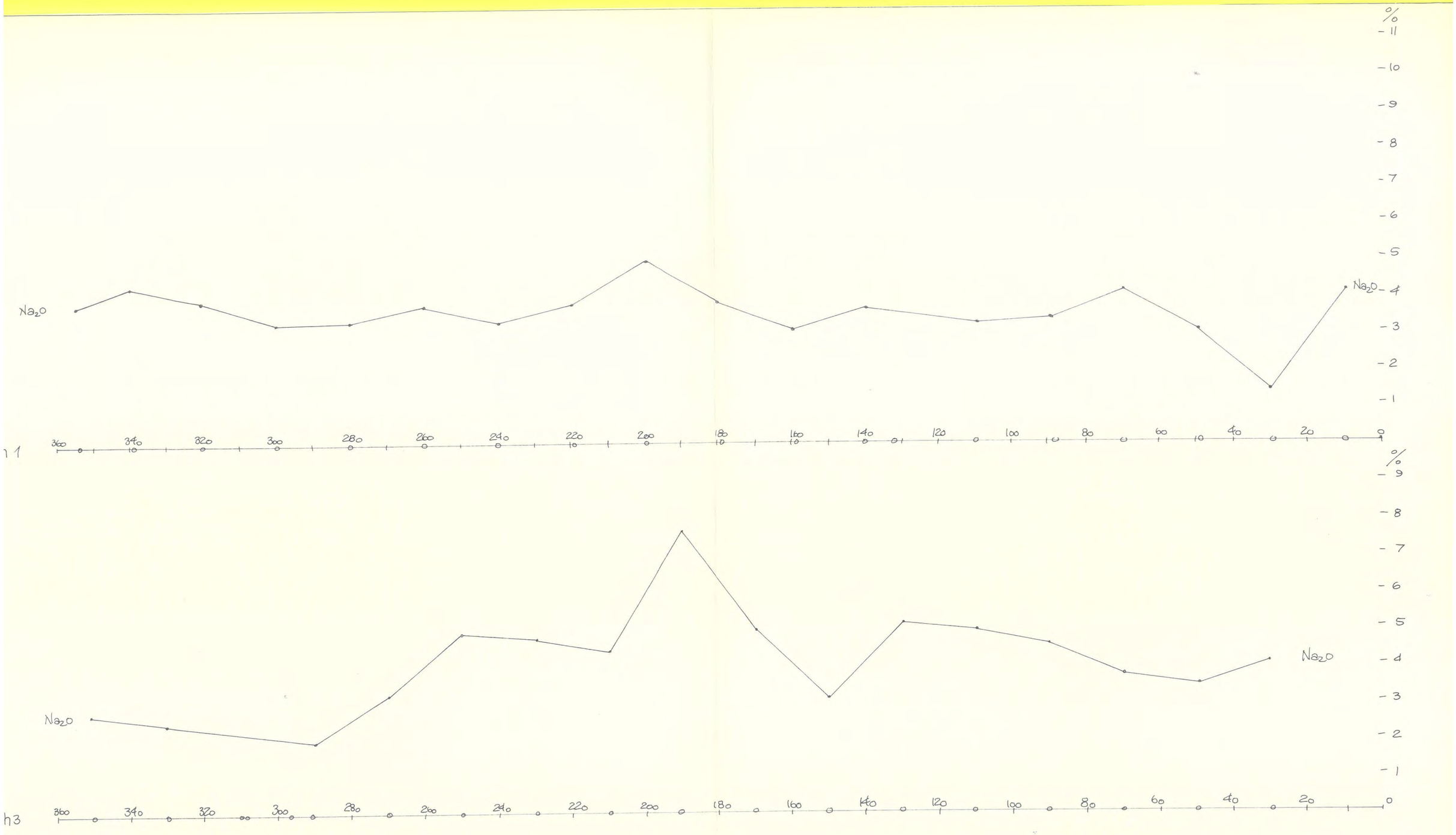
CaO

- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

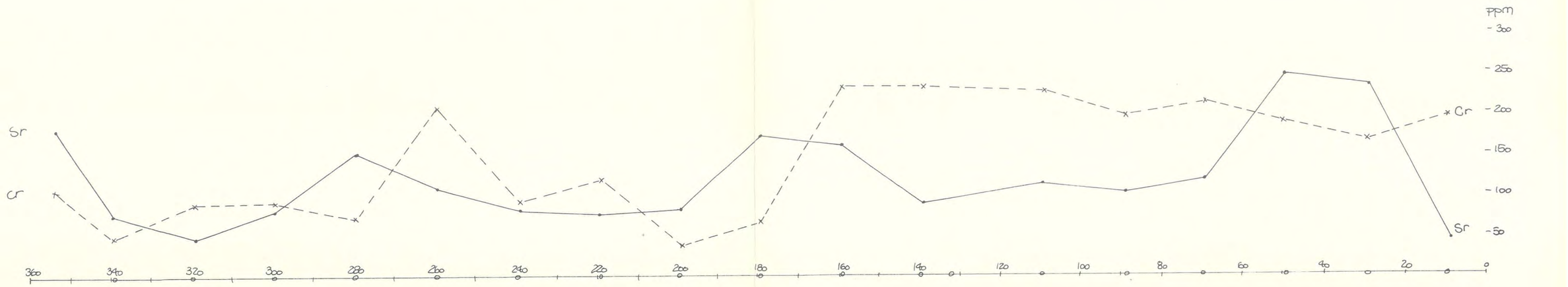
360 340 320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0

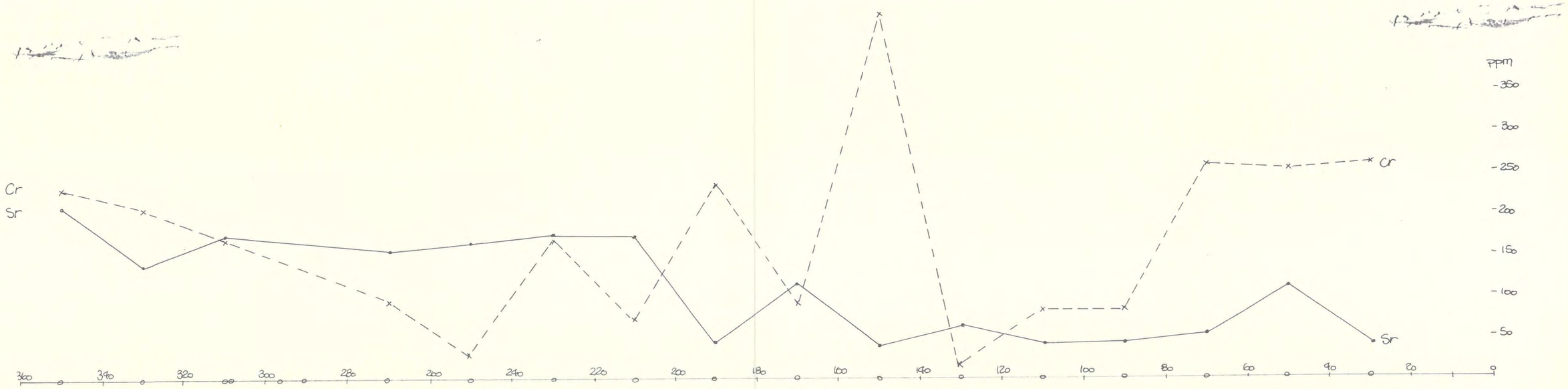
h3

SVINSÅS Geochemistry drillholes 1 and 3, Fe_2O_3 and CaO	Scale: 1:1000	Draw	ÅB
		Trac	AH
		Date	1984
Orkla Industrier AS 7332 LØKKEN VERK Gulf-Orkla Venture	No:		
	Encl. no: 4D		
	Report no: 23		

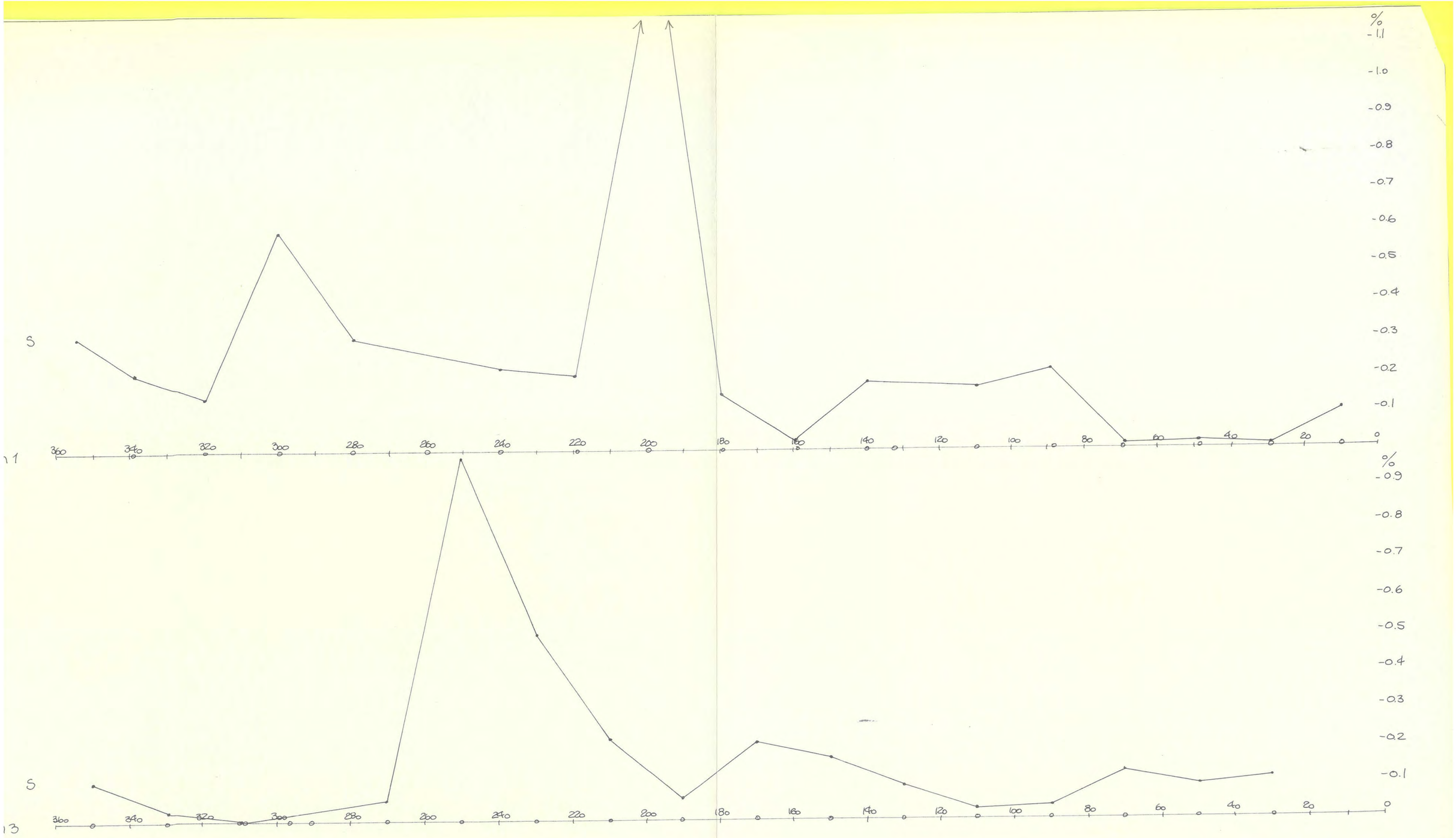


SVINSÅS Geochemistry drillholes 1 and 3 , Na_2O	Scale: 1:1000	Draw	ÅB
		Trac	AM
		Date	1984
	No:		
Orkla Industrier As 7332 LØKKEN VERK	Encl. no: 4E		
Gulf-Orkla Venture			

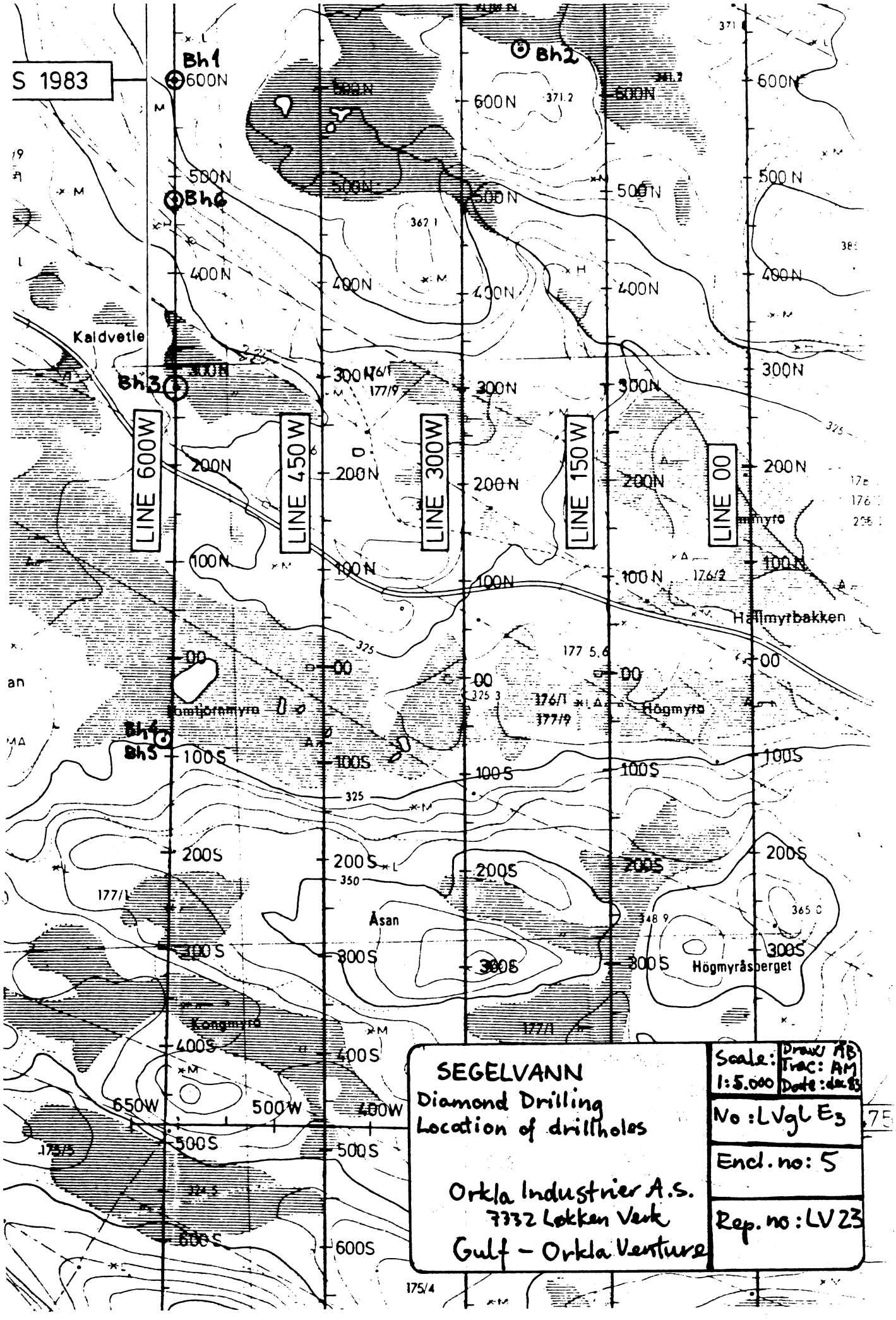




SVINSÅS Geochemistry drillholes 1 and 3, Cr and Sr	Scale: 1:1000	Draw	ÅB
		Trac	AM
		Date	1984
Orkla Industrier As 7332 LØKKEN VERK	No:		
	End. no: 4F		
Gulf-Orkla Venture			



SVINSÅS Geochemistry drillholes land 3, S	Scale 1:1000	Draw	ÅB
		Trac	AM
		Date	1984
Orkla Industries AS 7332 LØKKEN VERK	No:		
	Encl. no: 4G		
Gulf Orkla Venture			


S 1983
Bh1
Bh2
Bh3
Bh4
Bh5
Bh6
LINE 600W
LINE 450W
LINE 300W
LINE 150W
LINE 00
600N
500N
400N
300N
200N
100N
00
100S
200S
300S
400S
500S
600S
650W
500W
400W
Kaldvetle
Hällmyrbakken
Högmyra
Högmyråsberget
Åsan
Kongmyra
SEGELVANN
Diamond Drilling
Location of drillholes
Orkla Industrier A.S.
7332 Lokken Verk
Gulf - Orkla Venture
Scale: 1:5.000
Drawn: AB
Trac: AM
Date: dec 83
No: LVgl E3
Encl. no: 5
Rep. no: LV23