

**BERGVESENET**

MED BERGMESTEREN FOR SVALBARD

Postboks 3021, N-7441 Trondheim

# Rapportarkivet 2001

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Kommer fra arkiv	Ekstern rapport nr	Oversendt fra Tverrfjellet	Fortrolig pga	Fortrolig fra dato:
Tittel The Grinder gold project, Southeast Norway.				
Forfatter Flood, Boye		Dato    År <input type="text"/>	Bedrift ARCO Norway Inc. Geologiske Tjenester a.s.	
Kommune Grue Våler Åsnes	Fylke Hedmark Akershus	Bergdistrikt	1: 50 000 kartblad 20151 20162 20163	1: 250 000 kartblad
Fagområde Geologi Geokjemi Geofysikk	Dokument type Rapport	Forekomster Grinder		
Råstoffgruppe Malm/metall	Råstofftype Au			
Sammendrag / innholdsfortegnelse  I duplikat.				



## THE GRINDER GOLD PROJECT

### SOUTHEAST NORWAY

#### Location

The Grinder area is situated in southeast Norway, approximately 100 km NE of Oslo, see Kongsvinger fig. 1, and Grinder fig. 2.

The area is heavily forested with a relief from 150 to around 400 m.a.s.l. Till cover may in places reach 20 m thickness.

Good roads and a railway intersect the potential rock units, and all required infrastructure are within 10 km.

#### Grinder - why and how

The Grinder project is the result of ARCO's regional reconnaissance program Hedemark - Ostfold in 1984, see fig. 2 and Appendix 1. This resulted in the Kongsvinger project with three areas of interest: Kongsvinger, Grinder and Elverum, see fig. 2 and Appendix 2.

By completing the work on these areas Grinder by far returned the most interesting results. As ARCO Norway was closing down its mineral exploration program in 1985, titles (mutings) would be maintained only on high priority areas, hence Grinder is the only area kept by ARCO in southern Norway, see Appendix 2.

#### Previous work

Earlier work in this region has been carried out by The Norwegian Geological Survey (NGU) and has resulted in:

- Geological maps 1:250.000
- Aeromag maps 1: 50.000  
100-150 m altitude, 500 m linespaceing
- Regional stream sediment geochem, 1 sample/30km<sup>2</sup>

#### Work by ARCO

The actual Grinder area has by ARCO been subject to the following work:

- Geological mapping in scale 1:50.000, see fig. 3
- Geochemical<sub>2</sub> stream sediment sampling, approx.  
1 sample/km<sup>2</sup>

- Rock chipsampling across mineralized units, mainly pyritic and/or sericitic rocks
- IP orientation survey in the central part of area, see fig. 3

Geology and mineralization: The Grinder area is underlain by a Proterozoic rockpackage of at least 16-17 Ma, possibly as old as 19-20 Ma.

The package is dominated by granitic gneisses and banded gneisses of mixed composition, see fig. 3. Within the gneisses occur an extensive unit of metarhyolites, partly with primary textures well preserved partly as an augengneiss difficult to distinguish from some of the other gneisses. The rhyolites extend for an other 30 km to the northwest of fig.3.

On both side of the river Glåma the rhyolites are interbedded with greenstones and quartzites, the latter probably metamorphosed felsic tuffs. Particulary on the east side of Glåma at Grinder itself the rhyolites and quartzites are in places strongly altered, see Table 1. Elevated gold occur in samples from these alteration zones, see Table 2, sample 8402109 and 028.

The goldbearing samples here strongly resemble the hostrock at Mine Doyon, in Quebec. Work remain to be done before correlating the geological setting between the two areas, remembering that Mine Doyon is situated within an Archean greenstone belt.

On the west side of Glåma at Høgberget or Skurven there occur a block cluster of a pyritic quartzo-feldspatic rock within an area of 50 x 50 m. The blocks vary in size from around 10 x 10 cm to 50 x 50 cm and assay from 0.3 to 1.2 ppm Au, see Table 4, samples 8402043 and 101 - 103. One should notice the anomalous lead associated with the high gold values.

The block have most likely only been subject to short transport, icetransport has been from N to S.

Geochemistry: The results from the streamsediment sampling are shown in Table 3 clearly demonstrating the low background and contrast on the materiale. It is therefore interesting to note that four of the highest goldvalues occur around Grinder itself, and although no anomalous gold is found in the strams west of Glåma a number of lead anomalies occur in the vicinity of the goldbearing blocks at Høgberget.

Geophysical orientation survey: Two orientation profiles were run across the pyritic units at Grinder using moveable IP, VLF and Mag.

Based on these results IP is indicated as a method to deliniate the pyritic potential units under cover. The VLF results were inconclusive while Mag can be used as a general mapping tool in these terrains.

Table 1. The Grinder alteration system

Rock-type	calc. sliren	py- rite	qtz	seri- cite
Sericite schist & qtz veins Greenstone absent		***	**	**
Sericite-quartzite Greenstone	*	*** *	**	**
Siliceous meta-rhyolite Greenstone	** *	** *	*	*
Meta-rhyolite w/calcite sliren & py Greenstone	* *	* *		
Meta-rhyolite Greenstone				

Number of \* indicate qualitative amount of listed mineral.

Rock type/ sample	Au ppm	As ppm	Pb ppm	Zn ppm	Cu ppm
Sericitic quartzite, 3% py. Grinder. 8402013.	.009	-10	1849	218	858
Sericite schist, 5% pyrite. Grinder, chip 12m. 8402109.	.115	-10	-10	-10	33
Chlorite-pyrite filling in ½m brec. Grinder, open pit. 8402028.	.439	-10	26	42	60
Quartzite with 5% pyrite, boulders, W of Grinder (Skurven). 8402043.	1.282	-10	208	27	20
Do., resamples:					
8402101	.360	-10	138	14	55
8402102	.579	-10	81	11	29
8402103	1.181	-10	109	18	12
Blue quartzite, trace py, Flisknappen. 8402079.	.036	-10	12	47	-10

Table 2: List of the best rock-samples collected this year.  
Note that higher Au-values coincide with higher  
Pb-values. As was not detected in any of the samples,  
the Zn and Cu values are generally low.

Table 3. Global Statistics Stream Sediment Survey  
Elverum - Grinder Subareas. n = 259

	Mean	>90%ile	>95%ile	Highest	Lowest
Cu ppm	-	>12	>13	956	2
Pb ppm	22	>26	>33	540	2
Zn ppm	30	>49	>61	134	2
As ppm	-	>16	>21	122	2
Au ppb	-	> 9	>12	77	1

### Conclusion

Norway is an underprospected country in general and regarding gold in particular.

It has been shown that a road reconnaissance in the scale of Hedmark-Østfold, see Appendix 1 can bring forward a Grinder gold project. No economic grades or volumes have been proven so far, but only a minor regional program has been completed and the area has never been explored before.

Although of Proterozoic age the area and observed mineralization display features resembling those occurring in well known Archean goldbearing districts (Mine Doyon, Quebec).

Due to the general thick glacial cover the area is proposed explored by a combination of block tracing, detailed geological mapping, deep soil sampling and combined IP and Mag.

It is our strong belief that further exploration in this area is warranted.

Boye Flood  
Chief Geologist  
Geologiske Tjenester a.s.

BF/akj

RPTF/25

APPENDIX 1

AREA:

HEDMARK-ØSTFOLD 15000 KM<sup>2</sup>  
RECONNAISSANCE

ROCK PACKAGE:

PROTEROZOIC ROCKS  
FROM 900-1800 M.Y. WHICH INCLUDES:  
CONGLOMERATE AND SANDSTONES  
IGNIMBRITES  
GRANITES AND GABBROIC ROCKS  
GNEISS-COMPLEX  
METASEDIMENTS - METARHYOLITES  
AND GREENSTONES

KNOWN  
MINERALIZATION:

NI GABBRO ASSOCIATION  
MO, CU, BI GRANITE ASSOCIATED  
W IN GNEISSES  
CU, PB, ZN IN VARIOUS SETTINGS  
FE PARTLY IN HYPERITES  
AU IN QUARTZ VEINS

EXTENSIVE SERICITE-QUARTZITE WITH  
KYANITE-PYRITE, MAINLY KNOWN ON  
SWEDISH SIDE OF BORDER

CA. 2 WEEKS  
PROGRAM INCLUDING:

CAR RECONNAISSANCE  
MAPPING: 1:50000 MAPPING AND  
CONTROL OF AN AREA 1800 KM<sup>2</sup>. SEE  
FIG. 2.

BEDROCK SAMPLING: 31 SAMPLES  
(OUTSIDE FOLLOW-UP AREAS)

## APPENDIX 2

### KONGSVINGER

#### THREE AREAS OF INVESTIGATION:

KONGSVINGER, GRINDER AND ELVERUM

#### TARGETS:

AU IN QUARTZ VEINS (EIDSVOLL)

AU AND/OR POLYMETALLICS ASSOCIATED WITH  
PRECAMBRIAN MIXED VOLCANO-SEDIM. PACKAGES  
CONTAINING QUARTZ-SERICITE-KYANITE-PYRITE  
SCHISTS.

• RECON. ASSAYS: 1.282 PPM AU

#### 8 WEEKS PROGRAM COMPLETED:

MAPPING: 1:50,000 OF THREE AREAS  
TOTTALLING AROUND 400 KM<sup>2</sup>, SEE FIG. 2.

SS SAMPLING: 439 SAMPLES

BEDROCK SAMPLING: 85 SAMPLES

MUTING APPLICATIONS: 32 a)  
(8 KM<sup>2</sup> IN TWO  
BLOCKS AT GRINDER  
AND ELVERUM)

a) Later the Elverum block has been relinquished  
and more mutings have been applied for at  
Grinder where ARCO to day holds 77 mutings  
in 4 blocks totalling 19,25 km<sup>2</sup>

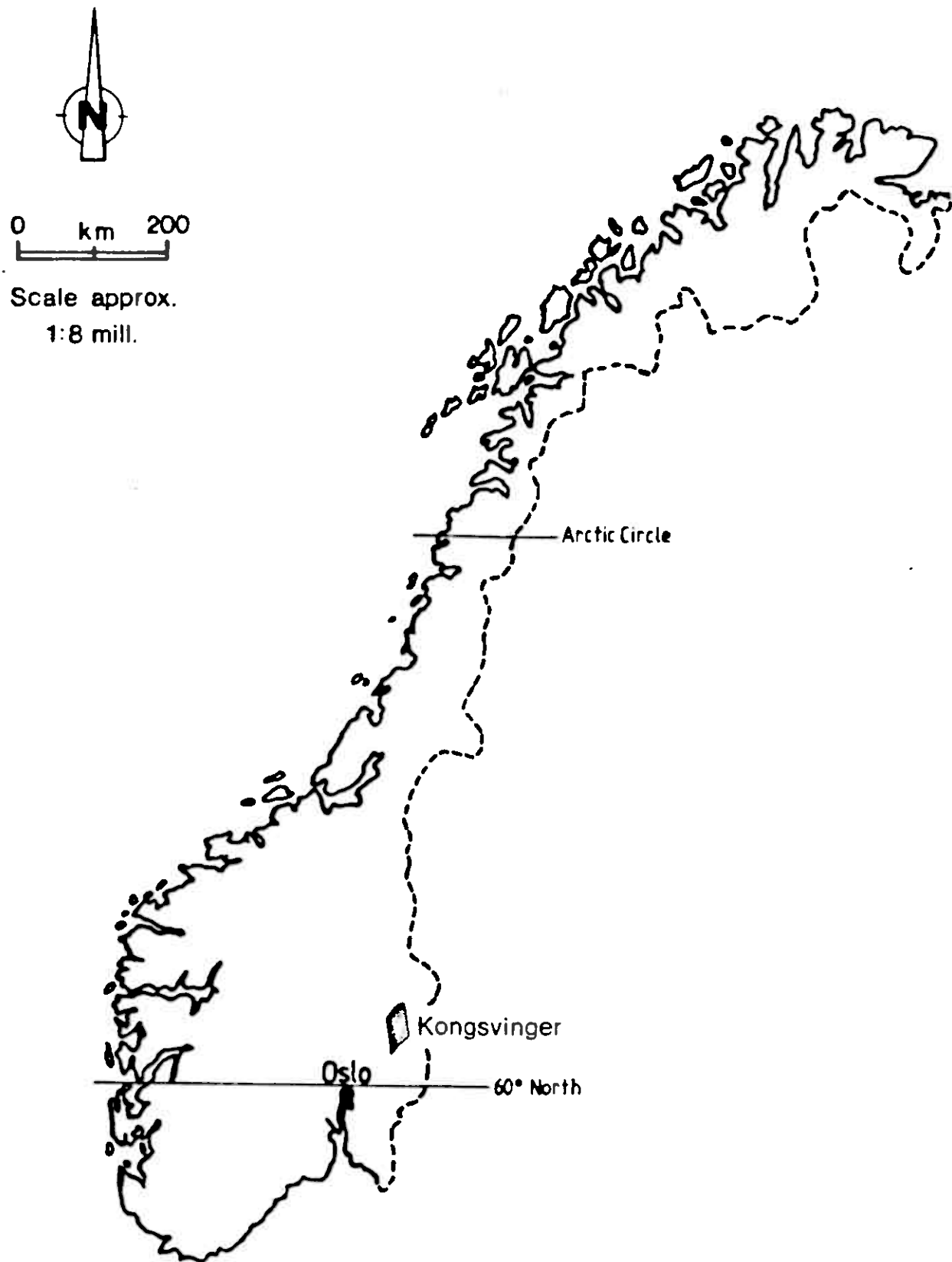


Fig. 1

**NORWAY**

**Location Map**



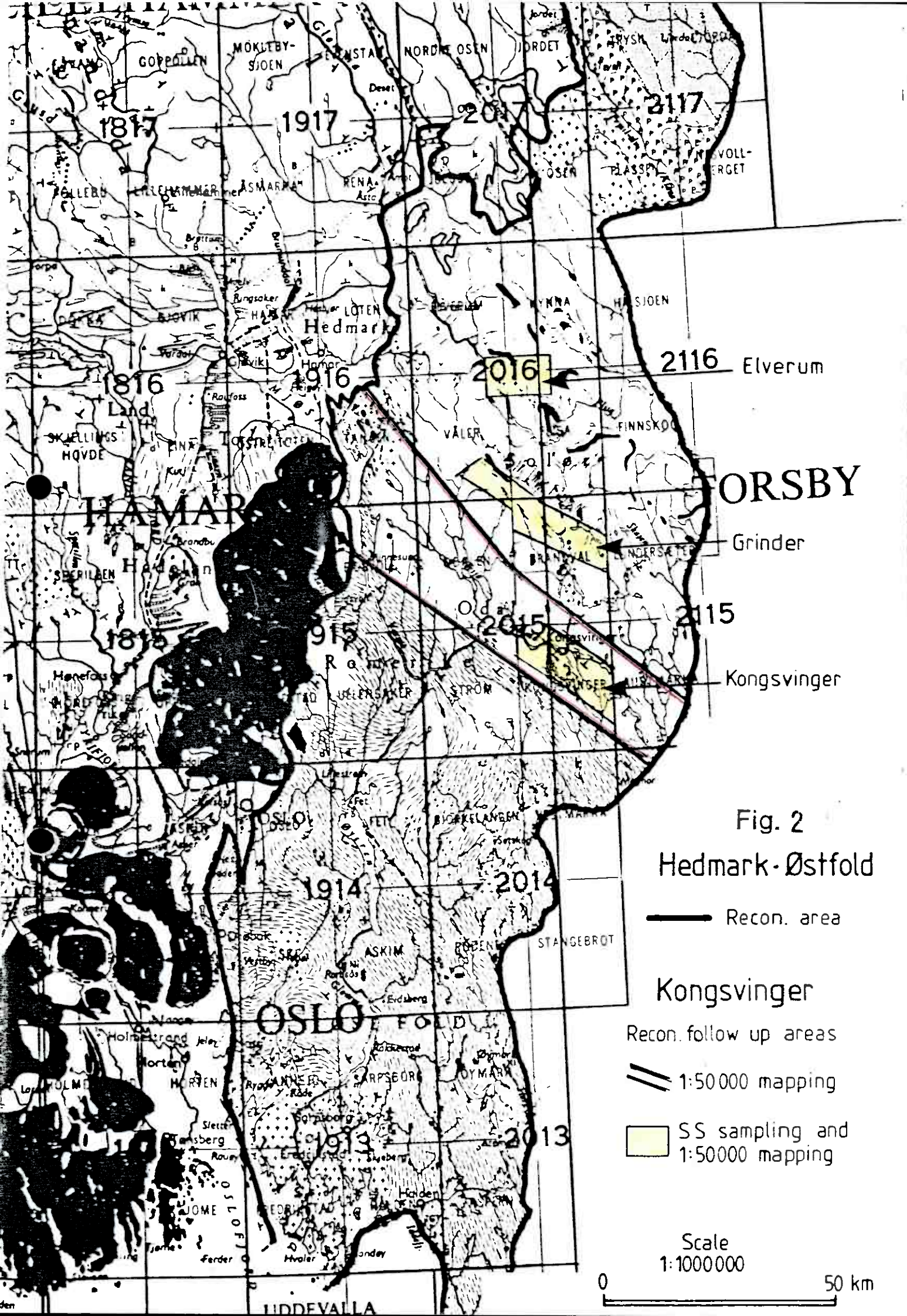


Fig. 2  
Hedmark-Østfold

Recon. area

Kongsvinger

Recon. follow up areas

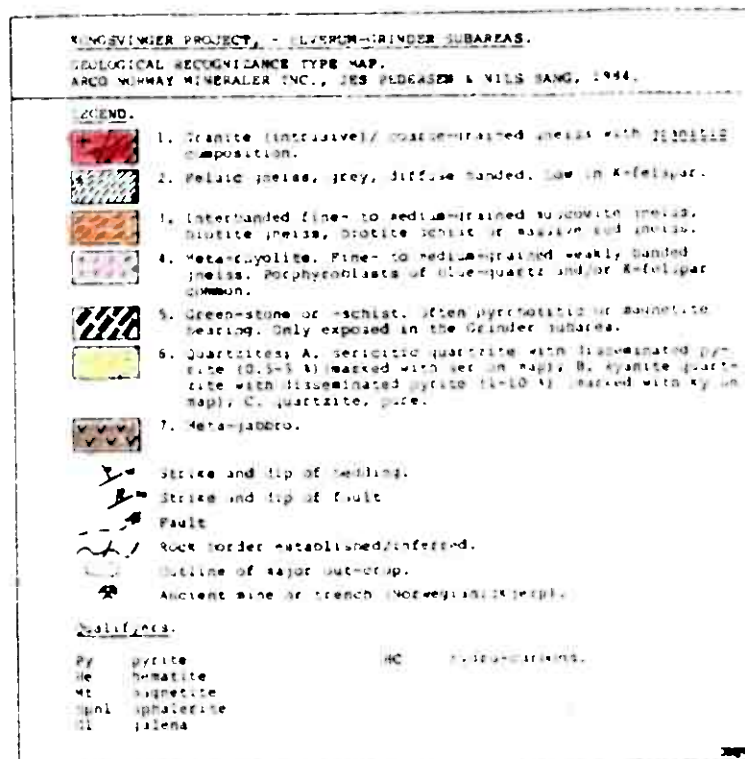
1:50 000 mapping

SS sampling and  
1:50 000 mapping

Scale  
1:1 000 000

0 50 km





ARCO Norway Inc.  
Hard Minerals Section

## KONGSVINGER AREA

Elverum - Grinder subareas

Geological recon type map

Drawn/traced: JPB/	Date: Feb 95	Centre: Oslo
Report No: 85-27-46	Project No: 27	Drawing No: Map Sheet: Scale: 1:100 000

A  
A'

IP orientation profile

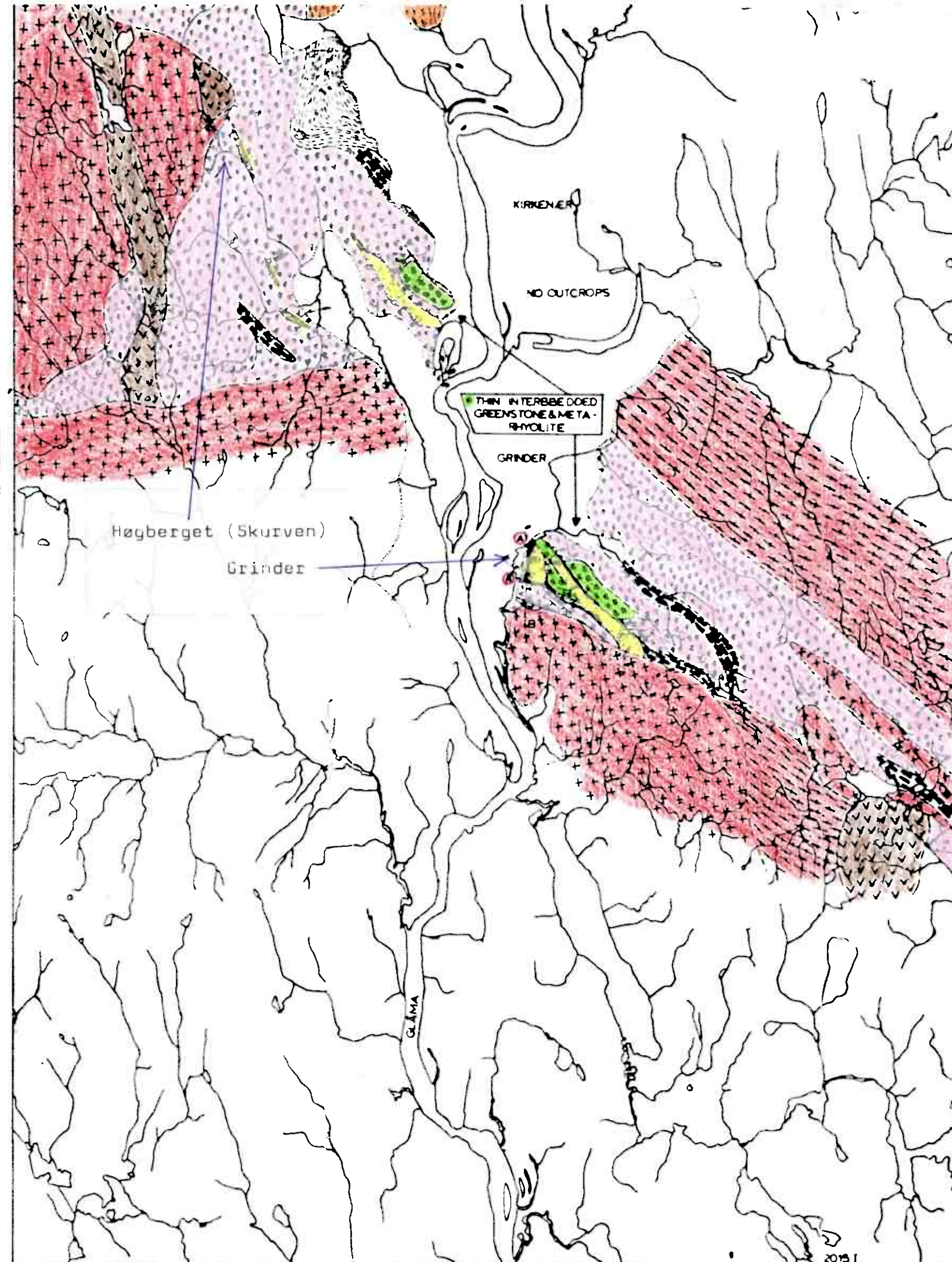


Fig. 3

## Grinder Gullprosjekt

Fastfjellprøver langs en vegskjæring ved Grinder nord for Kongsvinger:

Profilstart på østsiden av veien ved en merke som fører følgende oppskrift:

R 3-03 - 9km , her er det tatt prøve nr. 1.

1 -

2 11m lenger mot nord

3 13m " " "

4 11m " " "

5 10m " " "

6 03m " " " grønnstein

7 03m " " " gul "S" utvittring

8 10m " " "

9 10m " " "

10 07m " " "

11 08m " " "

12 09m " " "

13 10m " " "

14 10m " " "

15 10m " " "

16 10m " " "

17 10m " " "

18 10m " " "

19 10m " " "

20 10m " " "

21 10m " " "

22 10m " " "

23 10m " " "

24 10m " " "

De neste metrene lengere mot nord er overdekket (myr med lite bekkefar)

neste prøvepunkt ligger 65m lengere mot N og har betegnelsen "25"

25 -

26 10m lenger mot nord

27 10m " " "

28 10m " " "

29 10m " " "

31 13m " " " (ingen prøve under nr.30)

32 10m " " "

33 10m " " "

34 10m " " "

36 11m " " " (ingen prøve under nr.35)

37 15m " " "

Følgende prøver er tatt syd for veimerle: R 3-03 - 9km. Profilstart ligger syd for parkeringsplassen med Turistinformasjonstable ca. 80m syd for den nevnte veimerken.

38 der hvor blottningene begynner.

39 10m lengere syd

40 10m " "

41 10m " "

42 13m " "

43 13m " "

44 ved veisjæringens ende

hele det "sydlige"veiprofilet er sterkt sulfidimpregnert.