



Bergvesenet

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Rapportarkivet

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Tittel
Gjersvik Project: Notes on Results to Date and Future Plans Arising from Joint Discussions at Joma23-24.01.91 Between A. Haugen, A. Reinsbakken and F.M.Vokes

Forfatter Vokes, F.M.	Dato År 25.01 1991	Bedrift (Oppdragsgiver og/eller oppdragstaker) Norsulfid Grong Gruber AS
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Kommune Røyrvik	Fylke Nord-Trøndelag	Bergdistrikt <input type="text"/>	1: 50 000 kartblad 19241	1: 250 000 kartblad Grong
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Fagområde Geologi Geofysikk Boring	Dokument type <input type="text"/>	Forekomster (forekomst, gruvefelt, undersøkelsesfelt) Gjersvik Grube Rørvatn Gjersvikklumpen Gjersvikfeltet
Råstoffgruppe Malm/metall	Råstofftype Cu,Zn	

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse
Gjennomgang av 1990-programmet med resultater.. behøver for beskrivelse av borkjernene i bH 4 ved Rørvatnet før 1991-sesongen.
Plan for feltarbeidet i 1991, med ymse tanker om prosjektet med hensyn til mineraliseringer, strukturer og stratigrafi.
Vedlagt skisser til tolkninger av struktuerene, geologisk tverrsnitt og forslag til hvordan mineraliseringen ved Rørvatnet kan tenkes opptre.

GJERSVIK PROJECT: GRONG GRUBER A/S - NTH, INST. FOR GEOLOGI OG BERGTEKNIKK
JOINT PROJECT.

Notes on results to date and future plans arising from joint discussions at
Joma 23.-24.01.91 between A. Haugen, A. Reinsbakken and F.M. Vokes.

Points covered.

1. 1990 Programme - results achieved, shortcomings.
2. Expected results of work to date.
Mapping, sample (specimen) treatment, specialized analyses.
3. Other necessary work.
Core logging Bh 4, geological-geophysical correlation, compilation of
existing mapping results.
4. Field work in 1991.
Areas to be covered, possible areal geological/geophysical
correlation, study of felsic magmatic rocks, personnel, budget,
reports required.
5. Various thoughts on the project.
Mineralizations
Structure
Stratigraphy.

1. 1990 Programme: achievements and shortcomings.

The summer's mapping in the area was carried out by Sun with considerable assistance from A.R. FMV spent a few days in the field with Sun at the beginning of the season. It was pointed out by GG's representative that the area covered was below expectations and the reasons for this were discussed.

In all two 1:5000 sheets were completed, from south of Gjersvikbukta to the vicinity of Rørvatn.

The work had mainly resulted in a detailing and filling-out of previous mapping results and had produced only slight modifications to the existing maps. More outcrops of a weakly mineralized (pyritic) zone to the east of the road (NE of Rørvatn) had been found. This is probably the outcrop of the zone on which geophysical anomalies had been previously measured, leading to the drilling of 4 drill holes.

A preliminary report on the work was submitted by Sun towards the end of 1990.

2. Expected results of work carried out to date.

a) Clean copies (redrawn) of the mapping carried out in the 1990 field season will be made available before spring. Ideally these should comprise a version showing all observations made, including extent of outcrops examined, and a version showing Sun's interpretation of the geology. A final report, including the results of the ongoing petrographical and geochemical work, should be submitted in good time before field season 1991.

b) Treatment of samples collected in 1990.

148 specimens of rocks and mineralization have been submitted for sectioning (PS, TS, PTS) and are now becoming available. Sun will start his microscopic examination in the near future, with assistance as necessary from FMV.

32 samples have been prepared by Sun (pressed and fused tablets) for chemical (XRF) analysis for main components and selected trace elements of importance for interpretation of rock types. Results are expected in next week or two and will be reported on following completion of the petrographical examination.

c) Consideration should be given to the purchase of more specialized (and more expensive) analyses of selected samples in order to solve specific problems. Foremost among these would seem to be REE analyses for interpretation of degrees of alteration, paleotectonic site of generation, etc.. REE analyses will have to be purchased, probably from abroad. FMV will ascertain prices from reliable laboratories.

AH and AR to assess budgetary situation in this respect.

AR reports he has a number of REE analyses of comparable Gjersvik terrane volcanites which should be assessed in order to judge usefulness of REE analyses on rocks in the Gjersvik area. AR to send these to FMV/Sun.

3. Other work necessary before 1991 field season.

a) Core logging, Bh 4. Consensus seems to be that this need not be carried out immediately, but should be done in good time prior to the start of field work, so that the results can eventually be used. Immediate post-Easter period seems a good compromise. FMV informs Sun, who will contact AR for go-ahead.

b) Coordination of exploration geophysics with geology in the area mapped last year. Refers specially to work carried out by Elvebakk for Grong Gruber. Results to be plotted together with geology. FMV to contact Elvebakk about this.

FMV
AR

c) Compilation of all existing (available) geological mapping results in the Gjersvik area should be completed prior to start of field season - should indeed be available in order to plan next season's field work.

AR to undertake this task. FMV available for assistance if desirable.

pu 1:20 000.

4. Field work 1991 - areas of activity.

a) Area NE of the area mapped 1990. This area (Gjeitberget) lies immediately south of the Gjersvik deposit and a knowledge of it is important in order to assess possible southwards continuation of the Gjersvik lithology. Need not necessarily be mapped in the same detail as the area already mapped.

b) N and NW of the area mapped in 1990. This constitutes the main "thrust" for 1991. The area around Bjørkvatnet seems to be a key area where various exhalite horizons can be followed from the south towards the area north of the river and road in order to link up with Annliffjell and other areas of interest.

* An E-W profile about the road or north of it.

It will be necessary to obtain new 1:5000 sheets (not yet produced) in this area if the mapping is to have the same basis as last year.

AR to investigate this matter.

Skal få 1:20 000 utgjort

The mapping of exhalite horizons in the Bjørkvatnet area will be important in order to solve (if possible) problems of structure and stratigraphy.

|| The relations between the more massive felsic intrusives and the volcanites south of Bjørkvatnet should be studied in detail.

c) (Speculative ?) Consideration should be given to an areal (? regional) combined geological-geophysical analysis (diplom-oppgave) in the area, of the type introduced at NGU by Oddleiv Olesen and colleagues in recent years. Much will depend on the quality (eveness) of geophysical helicopter coverage in the area and the availability of a suitable student, but the prospects for interesting/useful results from such a study are good enough that discussions should be initiated. FMV to take contact with Olesen/Skilbrei et al. på NGU. *

d) Due to close association of mineralization with felsic igneous rocks in the area, attention should be devoted to a better delineation of the various types of these rocks present - volcanic, shallow intrusive or deep intrusive. Can these be definitively distinguished by field relations, geochemistry, petrography, geophysics ?? ✓

Can we distinguish between felsic volcanites and "felsic" alteration types ?
Some of the rocks mapped as felsic igneous may in fact be hydrothermally altered other types. Can geochemistry help here ? *Yes look at Zr etc.*

What is the "ore-generating" potential of the felsic rocks ? Is their presence always (at all ?) essential for the presence of mineralization of possibly economic type ? Do the felsic rocks occupy any regular stratigraphical position w.r.t. the mineralized horizon ?

Have the coarse-grained deep magmatic rocks any ore potential ? (Cf. Fremstfjellet.)

e) Personnel.

Sun: A substantially longer field season than last year should be planned for, since this is his last field season. He will also presumably be more acquainted with the geology and field conditions than last year and better able to cover more ground. (?)

Length of field work will be partly determined by the date of his departure from Norway - i.e. whether his fellowship is extended to the end of the year or not.

Grong Gruber have been informed of the cost per month of extending his NTNF situation. NTNF will continue to administer his fellowship if the funding is available. *OK, seem to agree!*

1111

AR: will have more time available for the project than last year in his new capacity as head of GG's prospecting activities. AR to consider his availability, indicating potential absences such as holidays, *and other work*, *(2 weeks holid. end July)*

FMV: With reservations in case of knee operation/worsening condition, FMV will also be more available this field season. Details yet to be worked out but something of the order of 2 to 3 two-week periods should be achievable.

Coordination of field work periods between the above three coworkers should be achieved prior to field season.

Other possibilities:

"Diplomstudent": either in the geophysical/geological study (see pt. 4 d) or other capacity seems possible this year due to increased number of potential "diplomstudents" at NTH.

Field assistant: last years unfortunate experience with a field assistant for Sun probably shouldn't be repeated; especially as one or other of AR/FMV will probably also be in the area most of the time. *NO*

5. Budget.

Figures from GG ?

Field work: Sun, FMV.

Analyses.

Extension of Sun's fellowship.

Diplomstudent ?

Other ?

6. Reports required 1991.

It is expected that Sun will deliver clean copies of his map sheets (see 2a) and a written report on the geology, petrography, geochemistry of the area covered before leaving Norway late in 1991.

(See remarks concerning extension of fellowship in section 4f above.)

On the basis of the above report and of own observations and knowledge, FMV, with the advice and help of AR will prepare a final project report on results achieved, with proposals for further work, prospecting actions etc..

(Please add more or modify!)

Prospect potential

7. Some (undigested) thoughts.

Mineralizations. It is of course very important to be able to determine the 'type' and significance of sulphidic and other 'mineralizations' occurring in the area; to be able to distinguish for example, between stratiform/exhalative and feeder-zone types of deposition. Exhalites are bound to definite horizons and can be used to solve stratigraphical/structural problems. Feeder-zone mineralizations can in favourable cases be traced across stratigraphy to possibly ore-bearing horizons.

This question arises, e.g. in the interpretation of sulphide mineralization in Bh 4. AR is of opinion that this is of feeder-zone type and that the eventual stratiform zone indicated by the geophysics has not yet been reached (see sketch Fig. 3). If this interpretation is correct one must consider deepening Bh 4 in order to investigate the stratiform zone.

The economic potential of the different types is also of interest. Evidence so far suggests that potentially economic objectives are confined to the stratiform types (sea floor sulphides), e.g. Gjersvik. However, one must not lose sight of the fact that in other areas, feeder-zone sulphides have proved to be economically viable in themselves.

The area has many outcrops of silica-magnetite+sulphide exhalites - in themselves of no economic importance. Consensus seems to be that these are distal exhalites on an horizon of mineralization, somewhere along which there could be an accumulation of proximal, possibly economic, sulphides. If this is so then they could possibly be used as "guides to ore" as well as key horizons for the solution of structural/stratigraphical problems.

Such possibilities should be given consideration in the coming year.

Structure. AR considers that regional structure is dominated by major, shallow-dipping (westerly) shear/thrust zones, between which the volcanite stratigraphy is folded and overturned (see sketch, Fig. 1). If this is the correct picture, then it will be no simple matter to follow stratigraphy (or structure) in the mapping.

One should, however, give some thought to the possibility of mapping directly the shear/thrust zones of the area. They are easy to see at the base of coarse-grained granodiorite massif north of Rørvatn (Søterlifjellet) where there is a clear contact between schistose metabasalts of unit 1 and overlying massive granodiorite (cf. Sun's photographs from 1990 field season).

However, within the metabasalts it is a different matter, especially in areas with high degree of cover.

Lutro's maps (1:20 000 unpublished and preliminary map sheets) mark a 'skjærsone' running NE from the river west of Gjersvikbukta, past Langtjern, Kroktjern, Ansvatn, to Saksvatn. Its significance is not easy to assess, or its "uniqueness" (are there others that are not quite so obvious?). Southwards it would skirt the eastern contact of the Søterlifjellet granodiorite - may even be the above-mentioned tectonic contact of the massif.

Does this thrust zone represent a major structural break in the Gjersvik terrane rocks in the area? Are these significantly different on each side of the zone? At a superficial glance, this could possibly be the case.

This is one of the points to be considered during 1991 field season.

The brittle deformation - faulting - in the area should be assessed more thoroughly. E.g. the major fault (?) lineament trending NE through Gjeitberget. Have we any means of assessing throw, sense of movement, etc.?

Stratigraphy. Are we able to establish a volcanite stratigraphy in the area now? AR has presented what he considers to be the general stratigraphical column for the Gjersvik-Skorovass area (see Fig. 2).

We must now try to fit the results of Sun's 1990 mapping (and of subsequent mapping) into his model to test if it applies to the area under consideration. Sun is distinguishing between dark, chloritic (in places stilpnomelane- or biotite-bearing) volcanites - possibly AR's unit 1 - and pale-green Mg-rich volcanites which possibly overlie the latter. In this case those Mg-rich volcanites would correspond to AR's unit 2 volcanites. These are not particularly Mg-rich (cf. unit 3 over) but there could be local Mg-rich flows within unit 2 which Sun has found (?)

The drilling west of the road in the mapped area was collared in unit 1 rocks (stratigraphy overturned) and drilled downwards, up stratigraphy, towards an EW leader possibly on the border between units 1 and 2. (See sketch, Fig.3.) (This horizon would, on AR's model, be the "Gjersvik horizon".) His vertical section (Fig. 3) implies that Bh 4 has only penetrated a possible feeder zone (in unit 1 rocks) and has not yet reached the putative Gjersvik horizon, the cause of the geophysical anomaly.

This horizon may, however, not be a simple sulphide layer; it may be highly deformed, imbricated, by the general thrusting in the area into a series of bodies as suggested on Fig. 3.

It seems reasonable that Bh 4 should be deepened to try to intersect the Gjersvik horizon. This would require that the detailed logging of the existing core from this hole should be carried out in advance of the field (drilling) season.

Joma and Trondheim 24.-25.01.91

F.M. VOKES

Fig 1.
Arnes interpretation of
stratigraphy

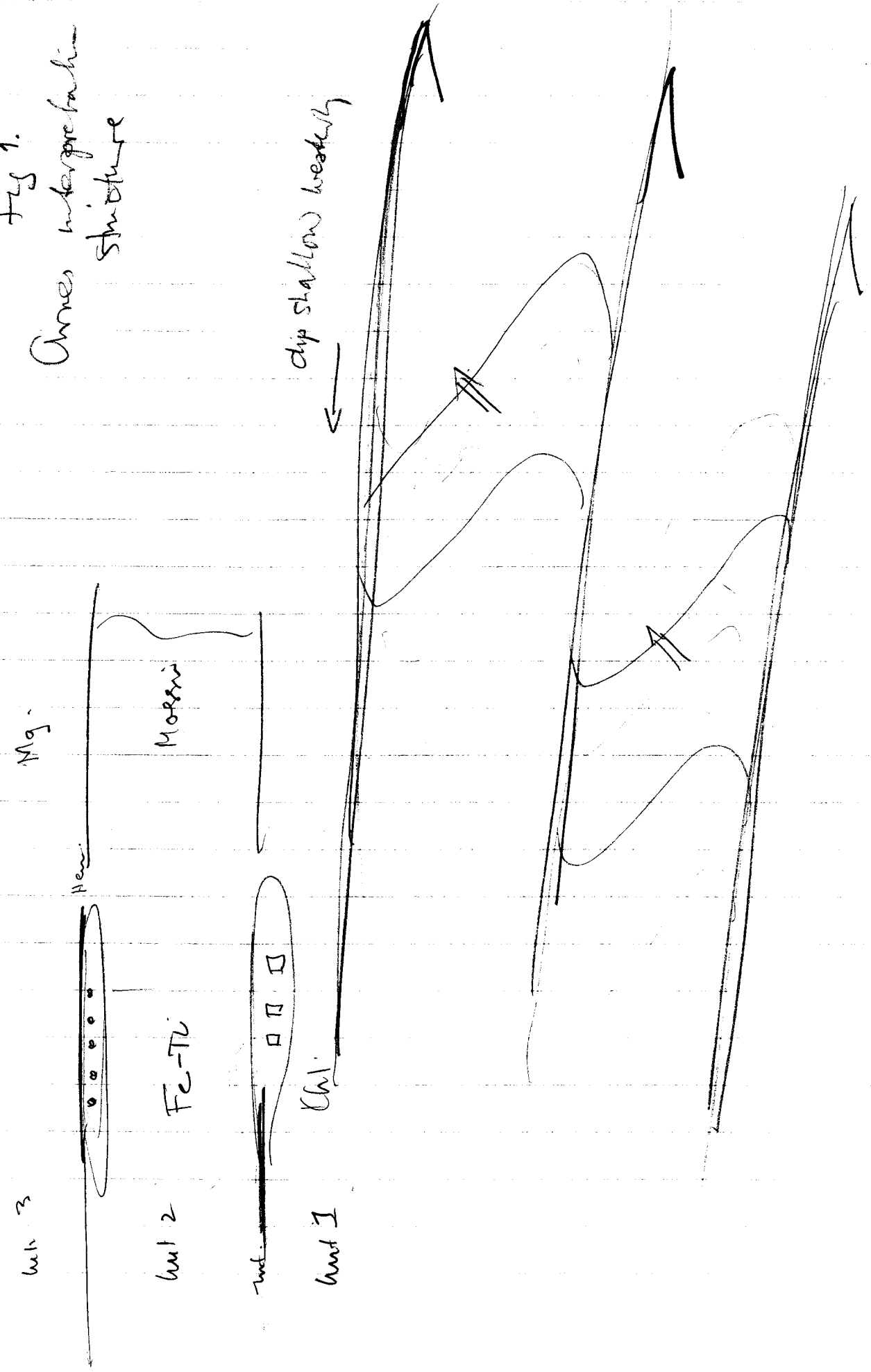


Fig 2.
Generalized Section A-R 10

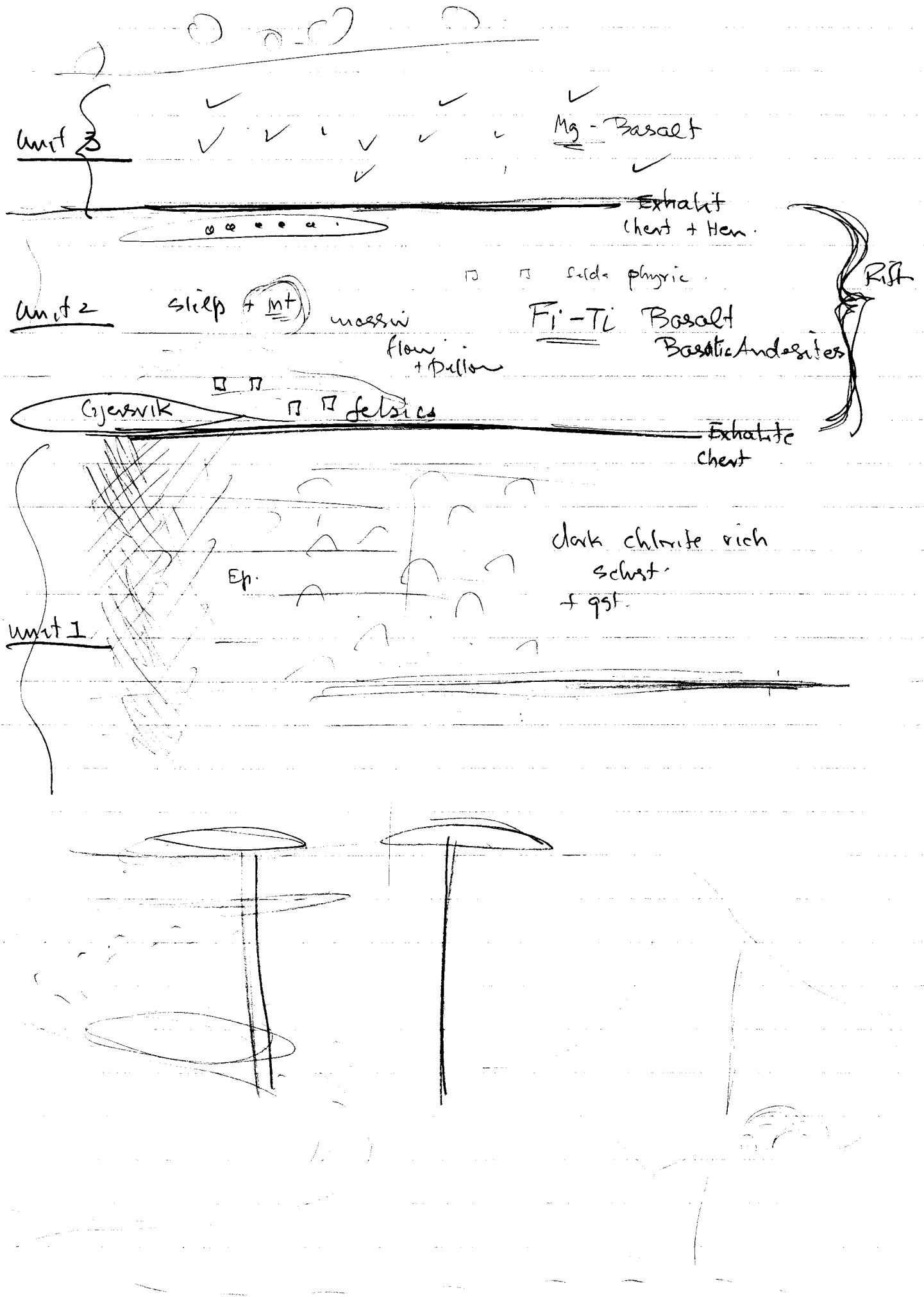


Fig 3. Section through D44

W thrust outcrops
base of granoblastic

UNIT
metabasalts.

D44

