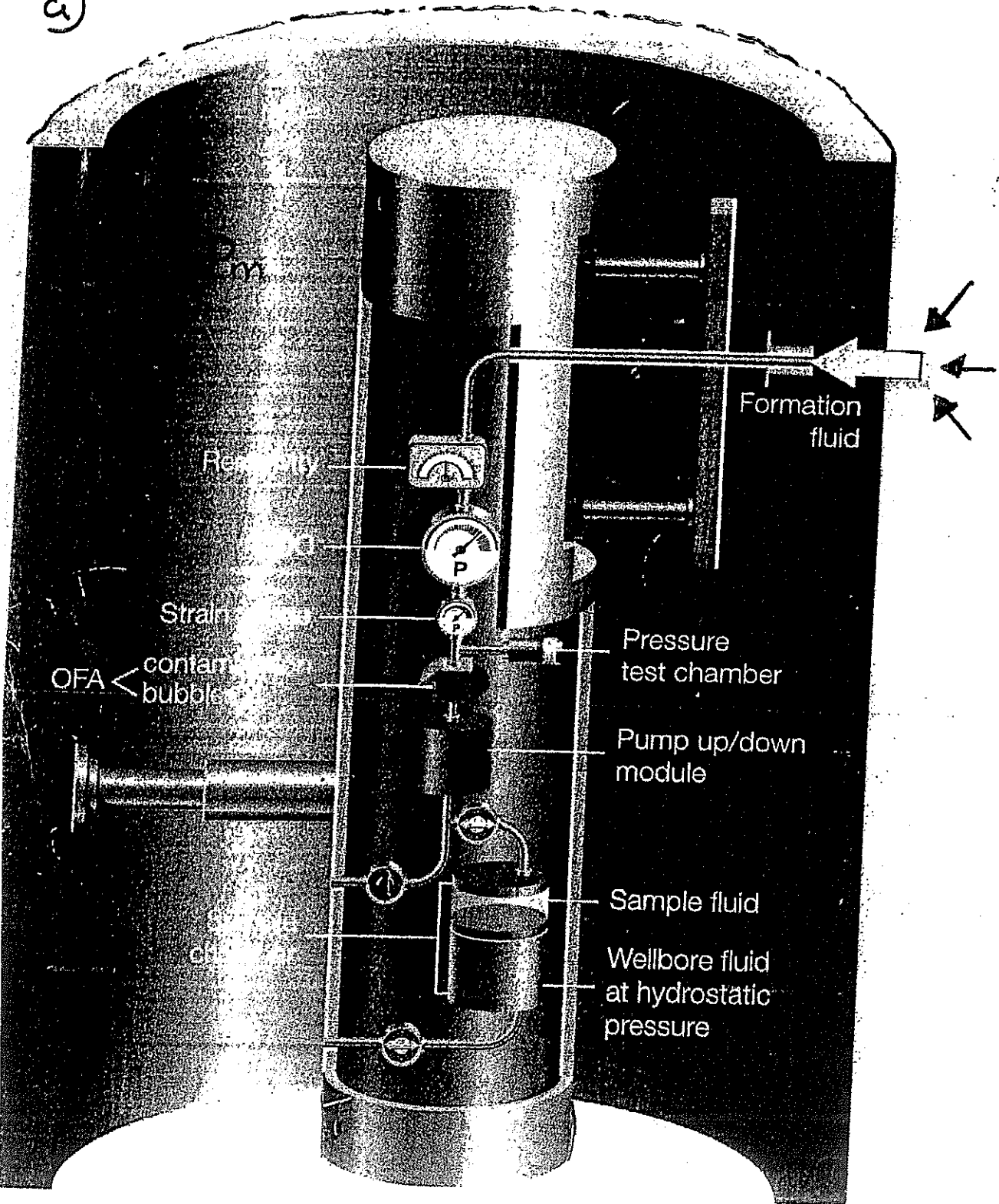


Oppgave 1

KABELTESTING

MDT

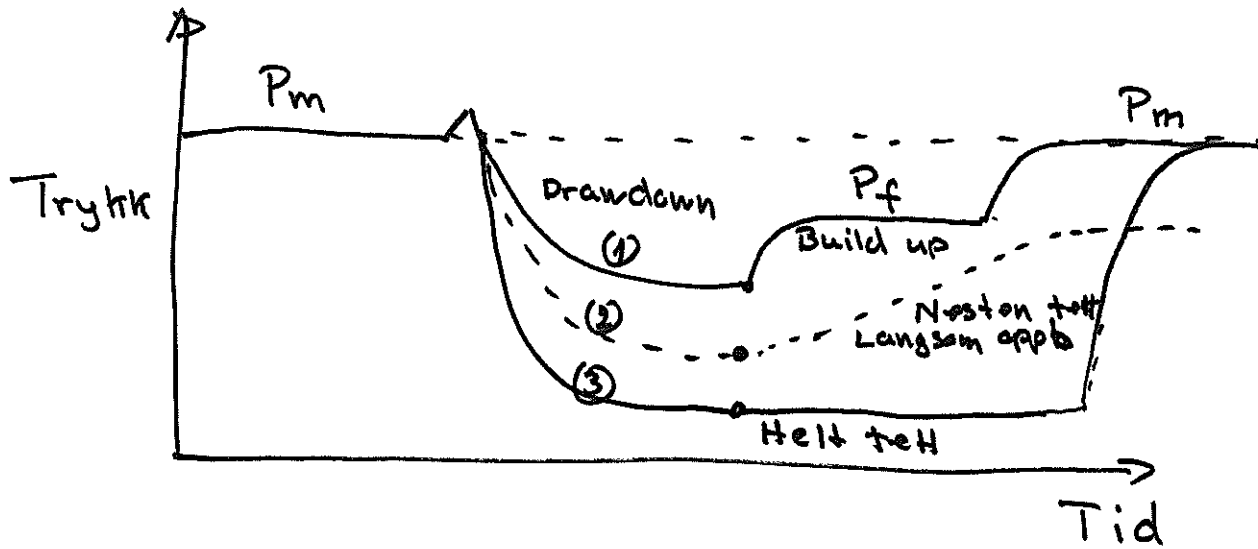
a)



pen valve
closed valve


Oppgave 1


b)



P_m - mud trykk Trykket i brønnen

P_f - formasjonstrykket Trykket vi skal måle

Drawdown innstrømming i pretestkammeret 

Build up  pretestkammeret fylt opp trykket stiger

- (1) Normal til høy permeabilitet
- (2) Nesten tett, trykket bygger seg Langsamt opp
- (3) Helt tett, trykket holder seg lavt etter drawdown

g)

Dual packer module

The dual packer module, schematically shown in Fig. 4-24, provides two inflatable packer elements to isolate a borehole interval for testing and/or sampling. The pumpout module uses borehole fluid to inflate the packer elements to about 1000 psi above hydrostatic pressure. Spacing between the packer elements varies with hole size, but the minimum distance is about 3 ft [92 cm]. The entire borehole wall is open to the formation, so the fluid flow area is several thousand times larger than with conventional probes. The dual packer module can be used as an alternative to conventional probes.

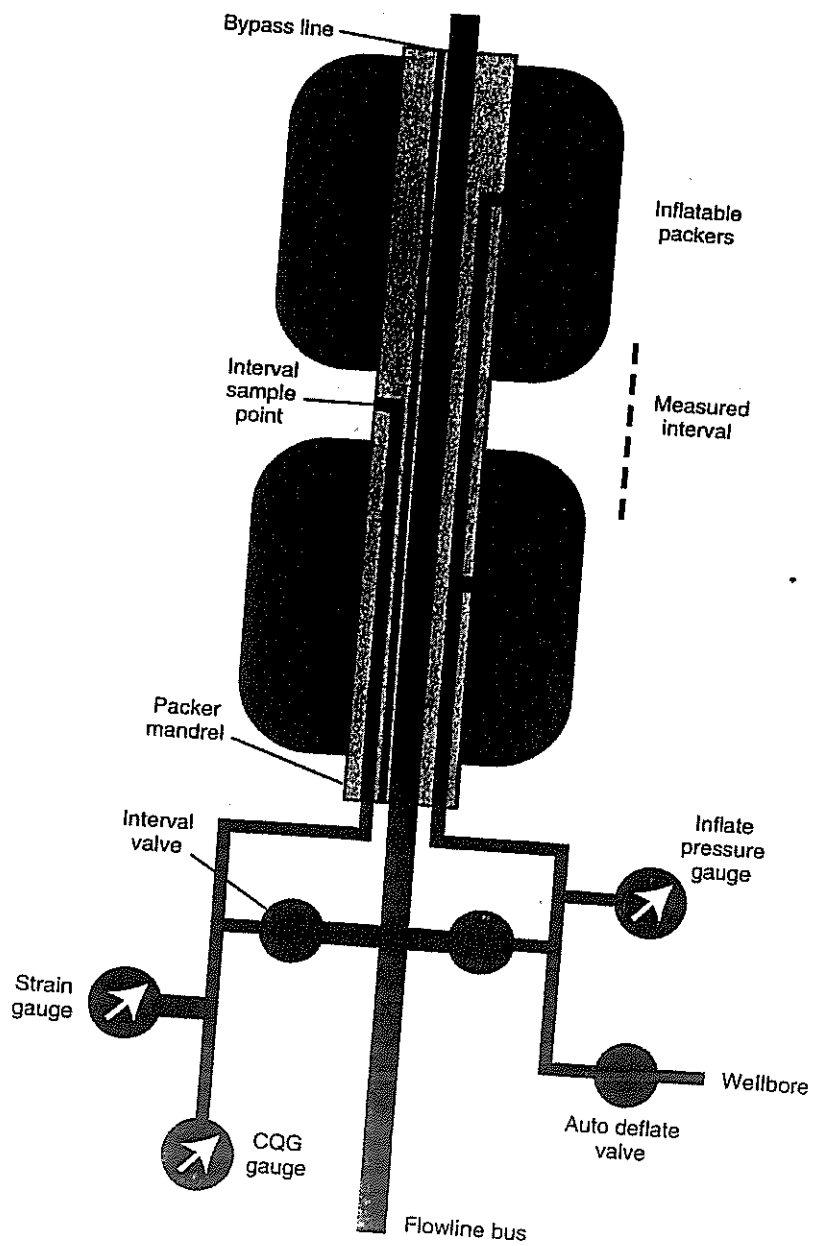


Figure 4-24. Dual packer module used to isolate an interval for testing and/or sampling.

dy) OFA
Optical Fluid
Analysis

① P&visning av
Gass
Optisk refleksjon

② Absorpsjons
Spektroskopi
Analyse av væske

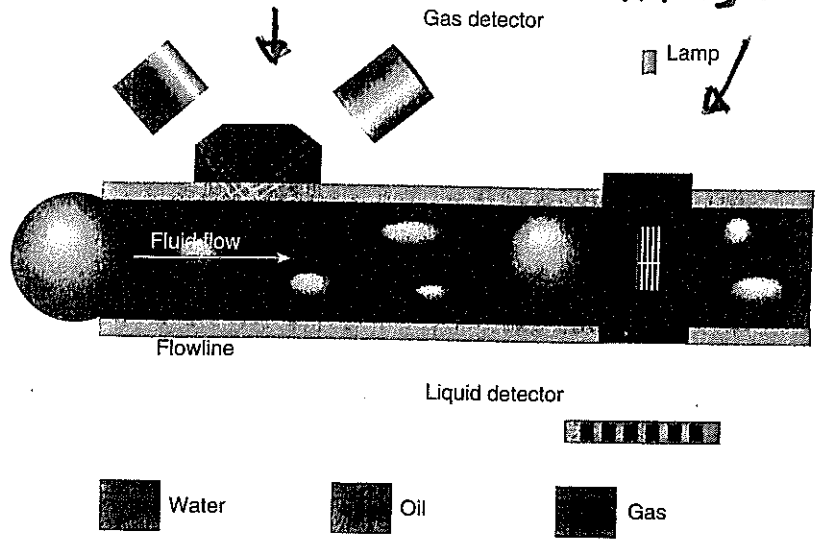


Figure 4-35. The OFA module with its two sensor systems: one for liquid detection and analysis and the other for gas detection.

Optisk refleksjon

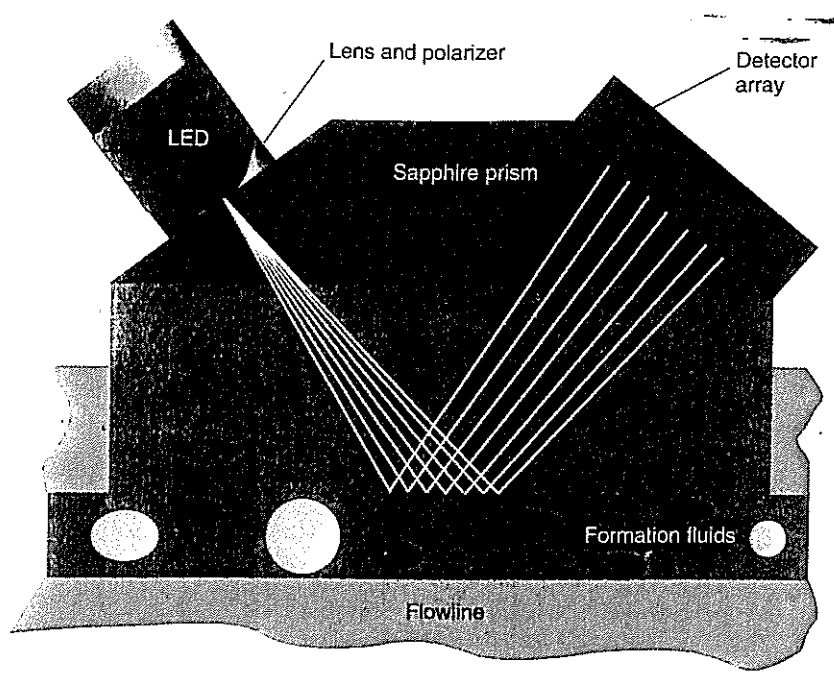
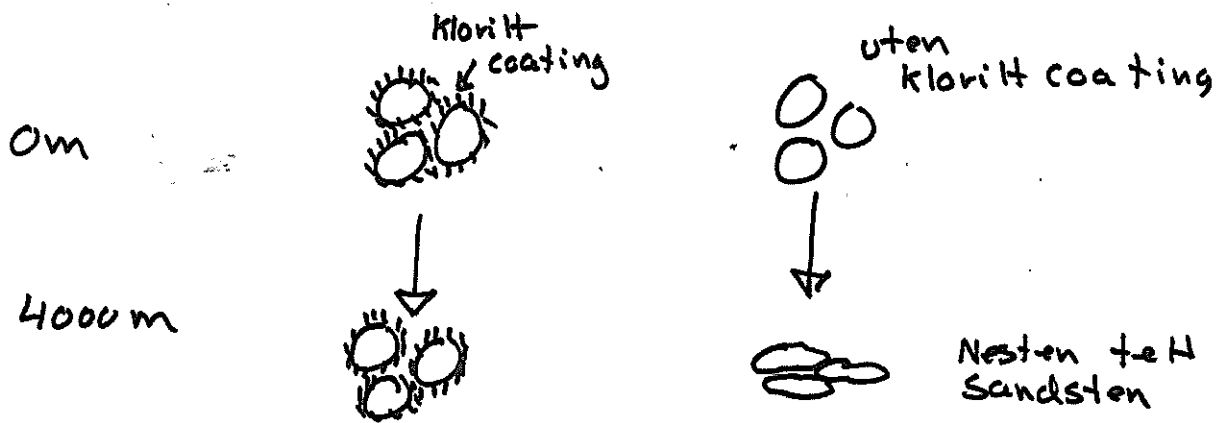


Figure 10-8. Basic gas detector design.

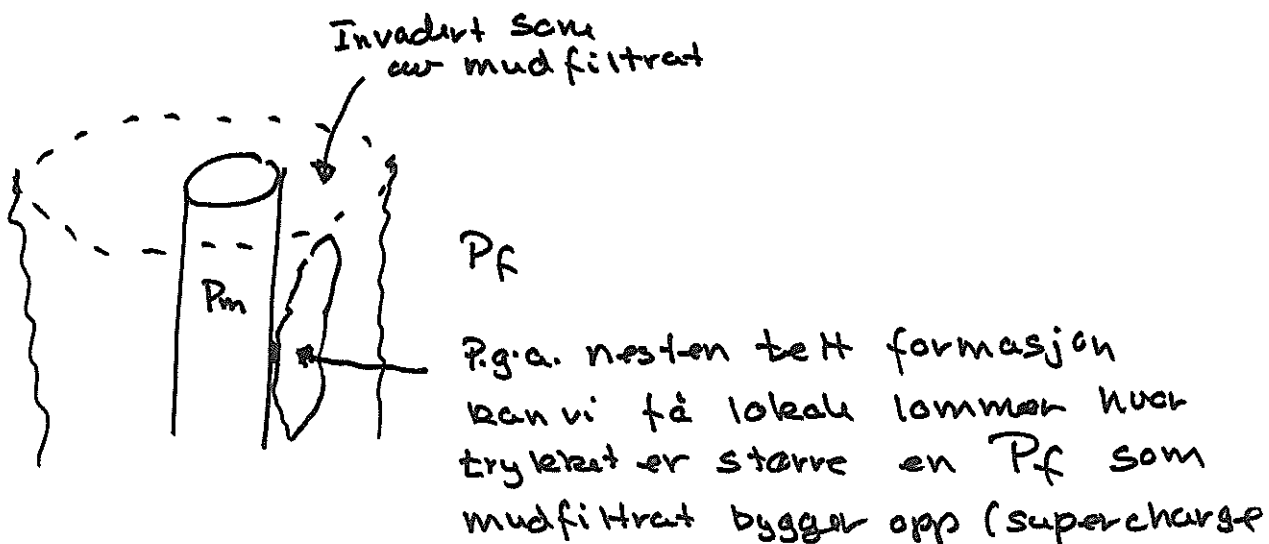
At present, water holdup is calculated directly from the calibrated responses of the detectors tuned to the two water peaks relative to those tuned to wavelengths at which water has very little absorbance. Subtraction from unity then gives hydrocarbon holdup. In addition, the log presents an oil indicator by shading the separation between the output of the detector tuned to the oil peak and the output of the detector tuned to a wavelength between the oil peak and the 1450-nm water peak. The magnitude of the

e) Gode reservoar egenskaper med store dyp
 3800 - 4400 m, $\phi = 0.25$ og $k > 1000$ mD

Skyldes kloritten som legger seg rundt sandkornene når de blir avsatt og hindrer diagenese



f) Supercharge, Nesten tett formasjonen



På trykkplottet vil det vises som 2-5 bar høyere trykk enn de andre punktene

Brønn 6, 7 og 8 viser supercharge

89

$\rightarrow P_g \frac{40 \text{ bar}}{100 \text{ m}} \approx 0.4 \text{ g/cc}$

Trykk verdier - i le sandsonen

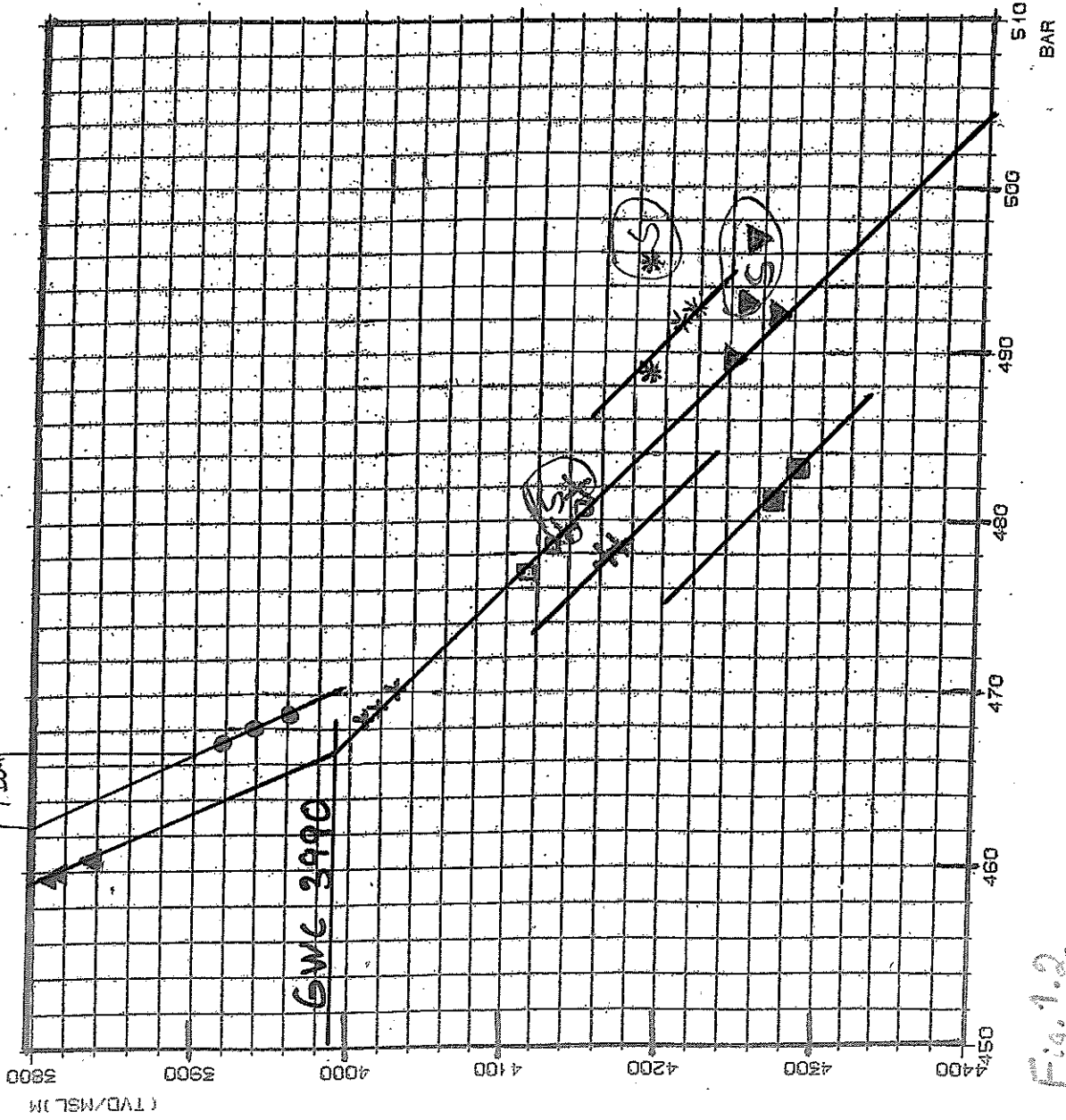


Fig. 1.2

$\frac{1 \text{ bar}}{10 \text{ m}} \approx 1 \text{ g/cc}$

n)

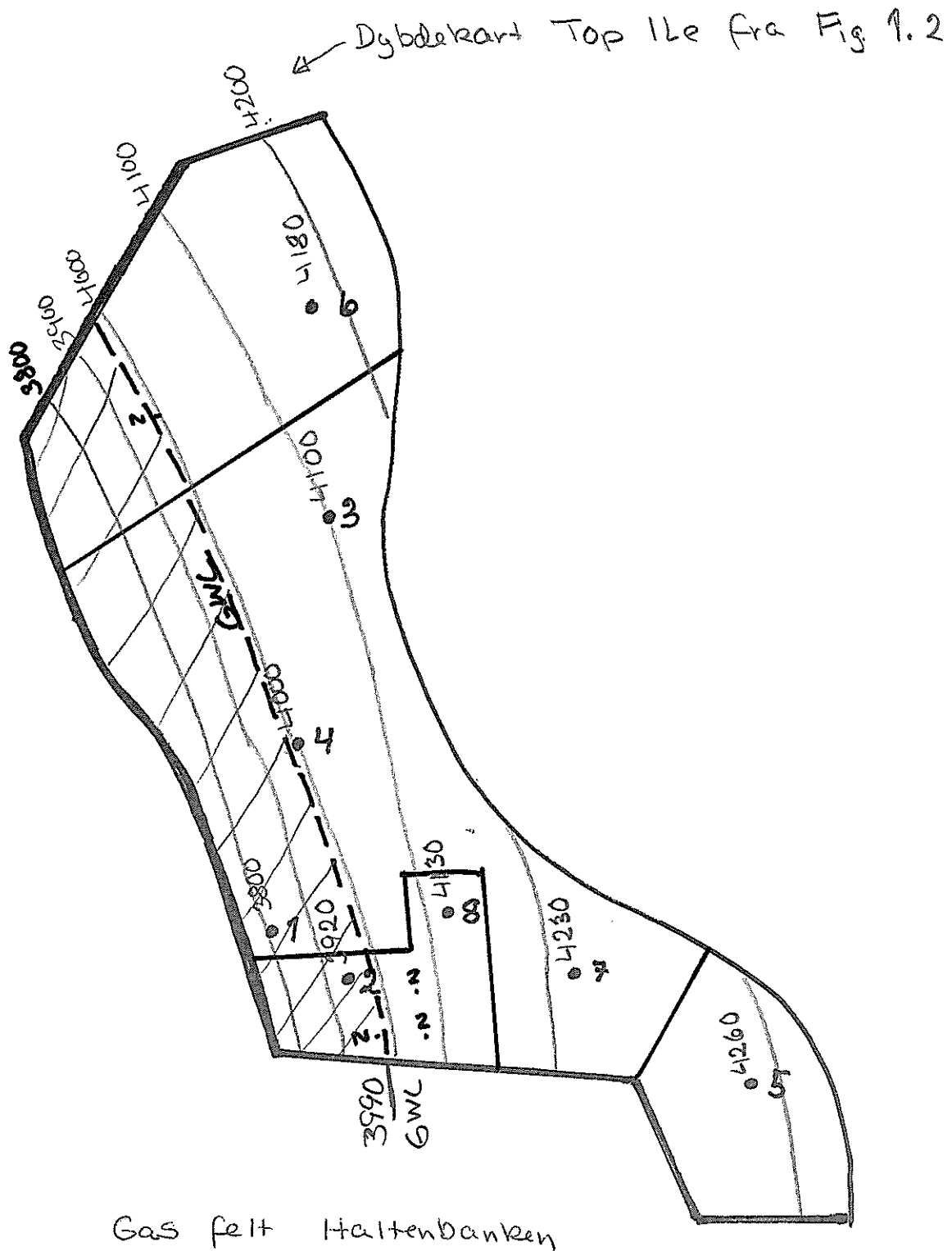


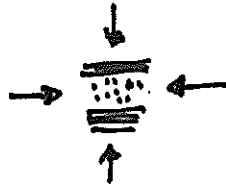
Fig. 1.1

i) se trykplotet på
foregående side

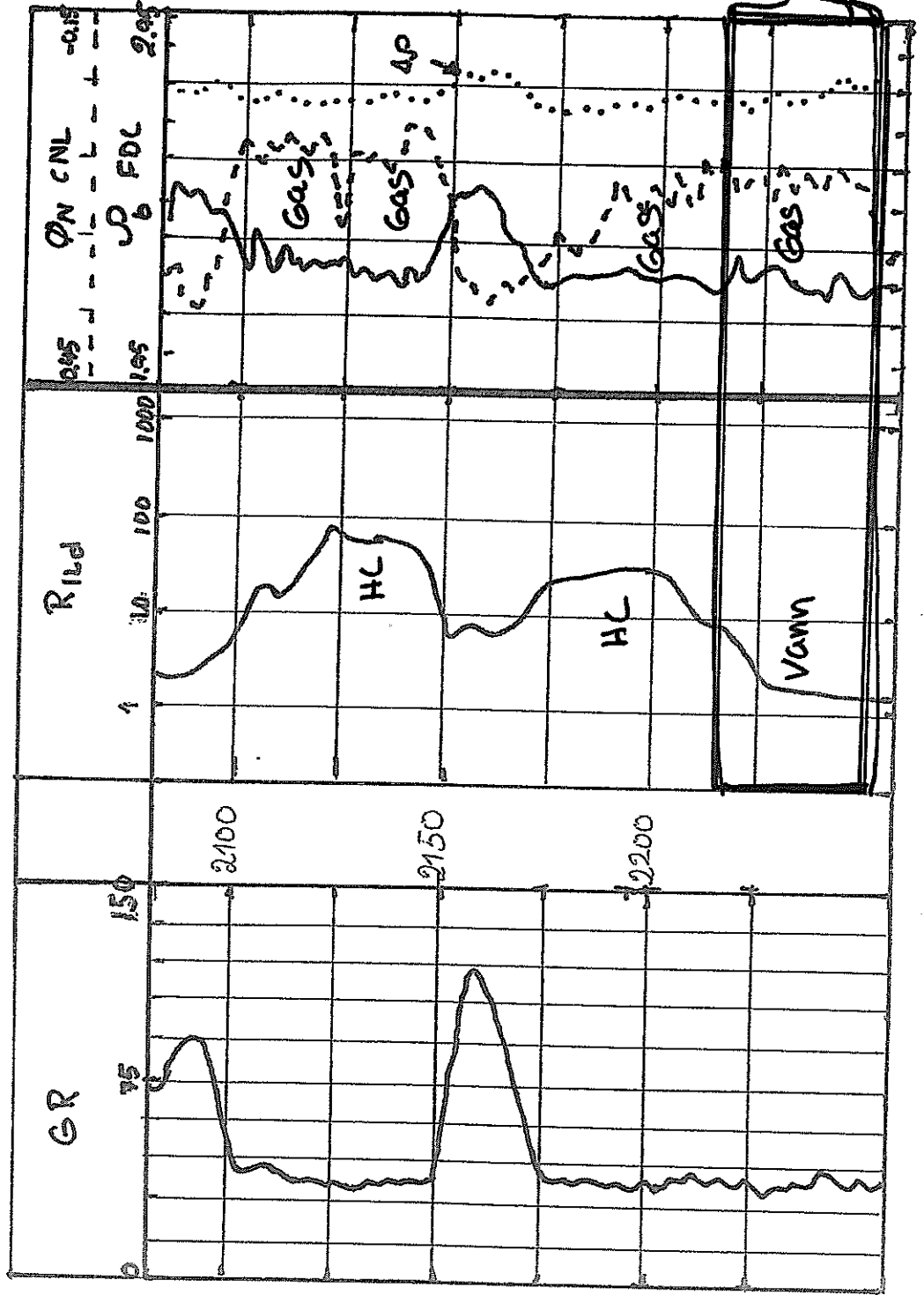
Oppgave 2

a) Hastighetslogg

- 1) ϕ \uparrow \rightarrow Δt \uparrow
- 2) Dybden \uparrow \rightarrow Δt \downarrow
- 3) Vannsom til vannsom med noe gass \rightarrow Δt \uparrow noe
- 4) Vannsom med noe gass til vannsom med mye gass \rightarrow Δt konstant
- 5) P \uparrow \rightarrow Δt \uparrow
- 5) OB \uparrow \rightarrow Δt \downarrow
- 7) Sprekk \rightarrow Δt konstant
- 8) Sek. ϕ \rightarrow Δt konstant
- 9) Anisotropi



Forskjellig Δt i
horisontal og vertikal
retning



Rild viser vann
 P_b - q_h viser Gas ser

Rild eller
 P_b - q_h må
 være gal

Fig 2.1
 Oppg. 2b

9

Lithologisk tolkning basert på alle 5 loggene.
Tegn lithologien direkte inn i dybdesporet

$$\Delta t = 70$$

$$\phi_s = \frac{70 - 56}{189 - 56} = 0.10$$

Δt er meget lav, kan derfor ikke være sand + gass

med
høy ϕ
↓
Salt

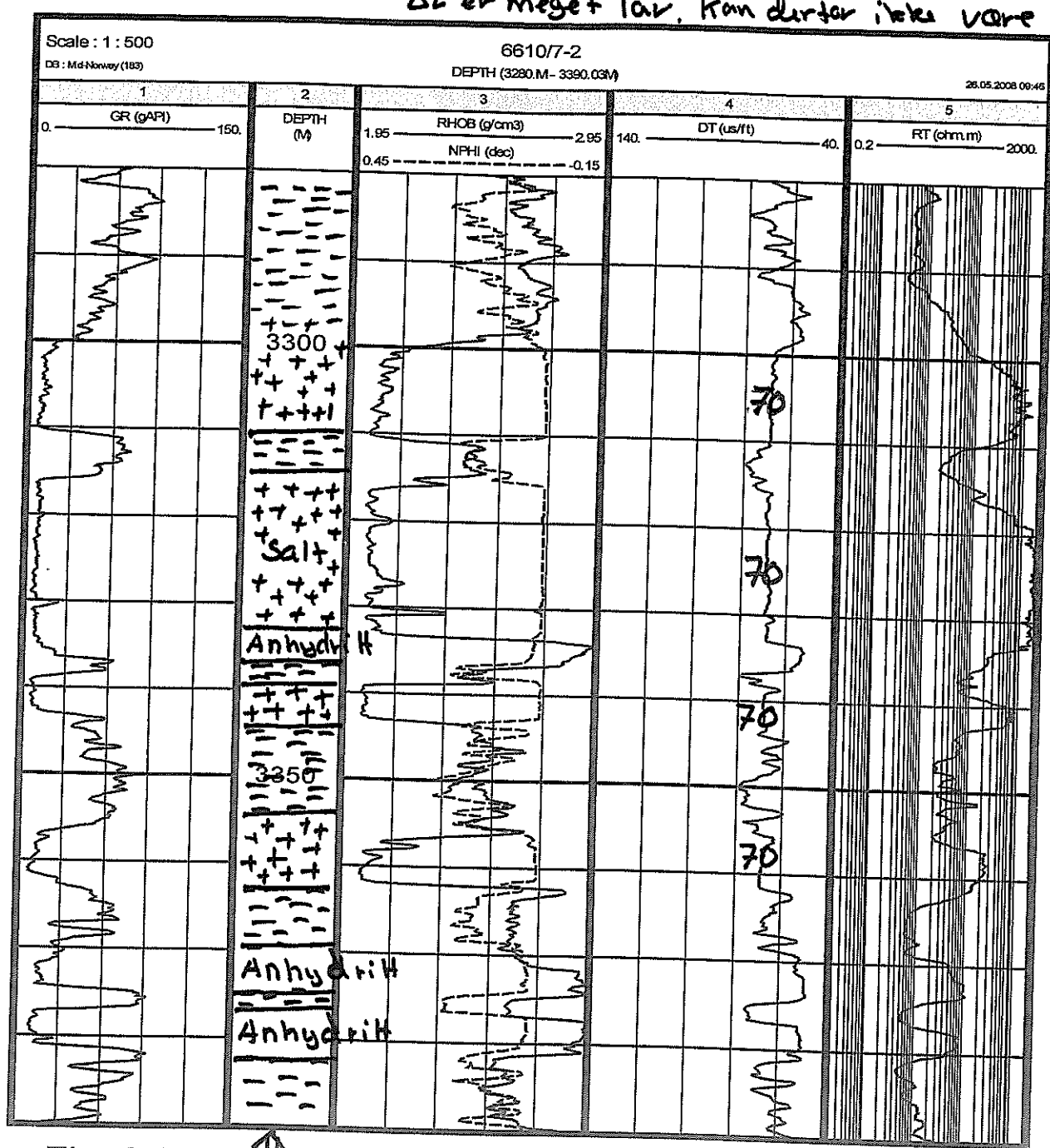
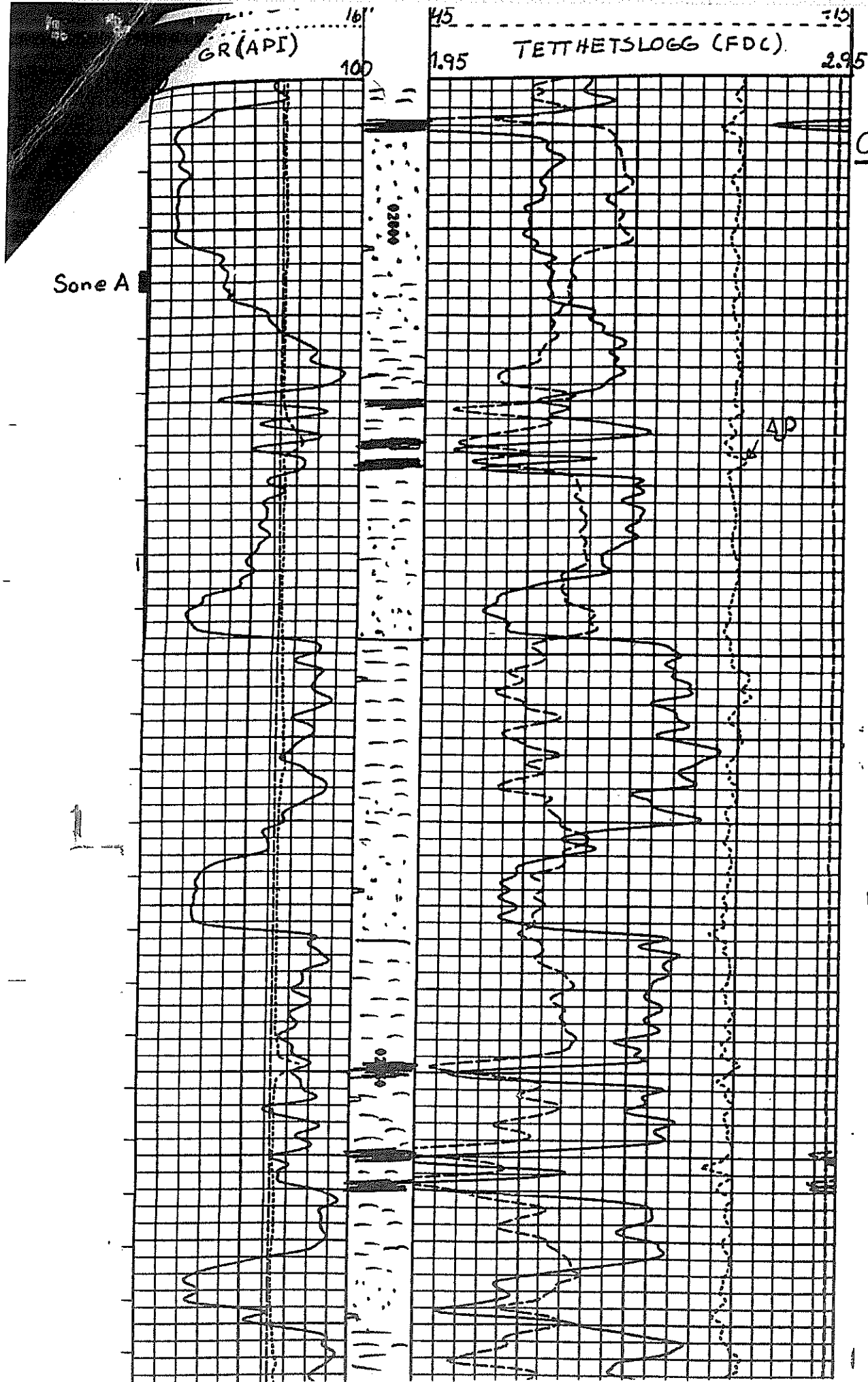


Fig. 2.2
 ↑
 |||| Skifer
 +++ Salt
 Anhydrit Evaporitter



Oppg. 3

a) Lithologi

Vannsoner
Lev R

↑
Lithologi

CALIPER

GR(API)

0.2

RILD (Ωm)

2000

0.2

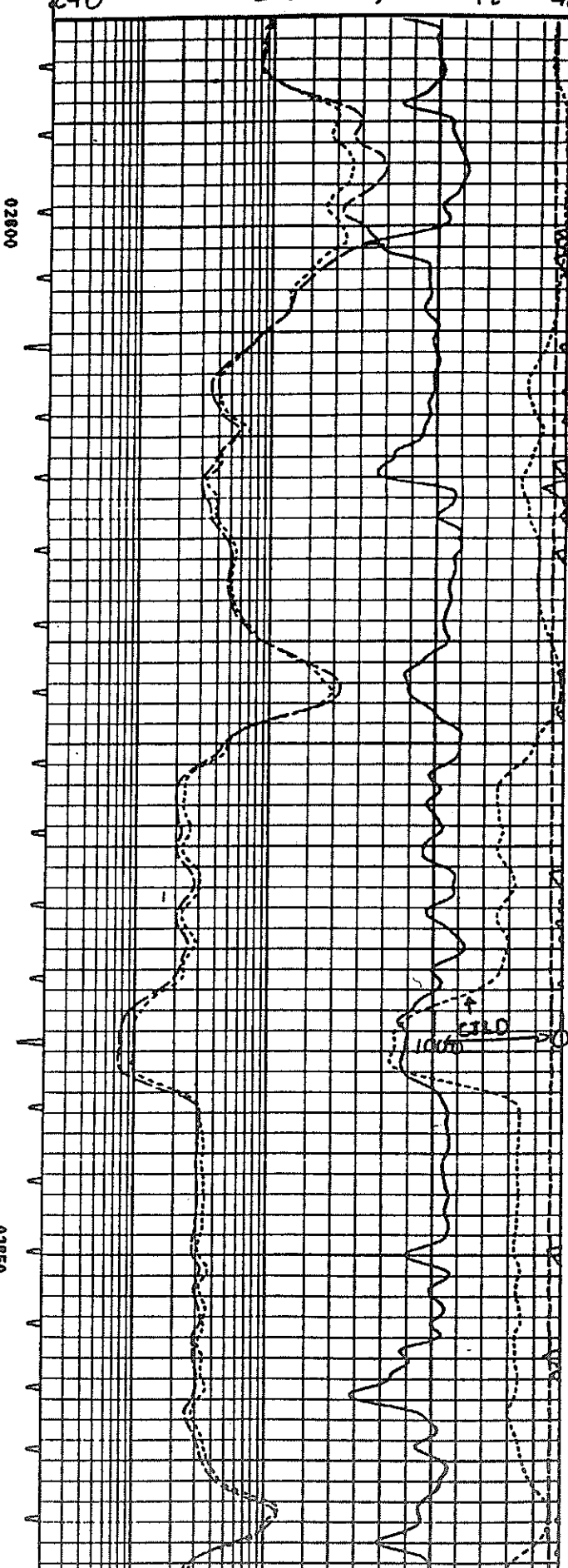
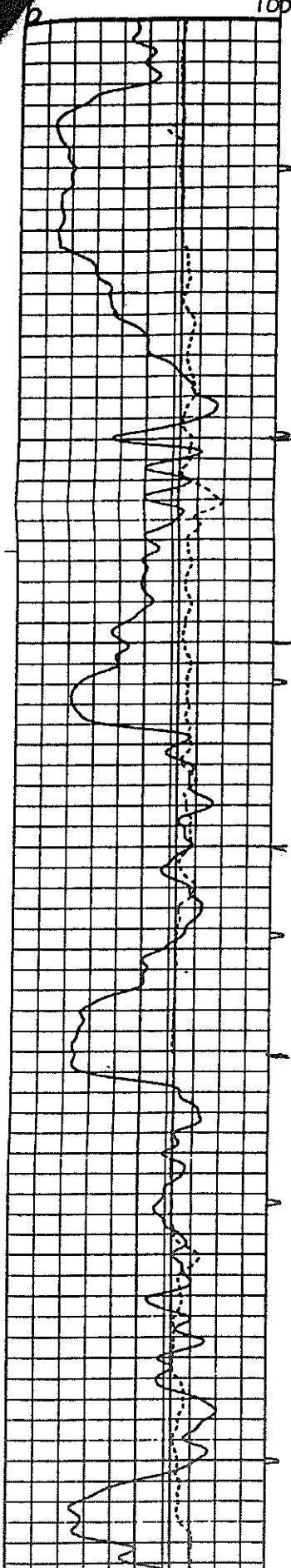
RILM (Ωm)

2000

240

t (Sonic) $\mu sec/ft$

40



olje
soner

olje
soner

1

Vannsoner
lav R

olje
soner

Oppg. 3

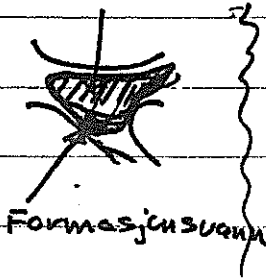
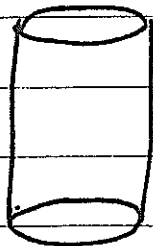
a)

RILD
1000

b)

oljeslam

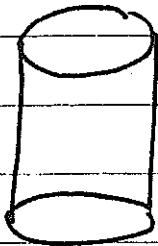
oljefiltrat



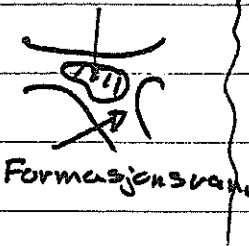
Anta: $S_{oljefiltrat} = 0.8$
 $S_w = 0.2$

oljesone

Anta: $S_{oljefiltrat} = 0.5$
 $S_w = 0.5$



oljefiltrat



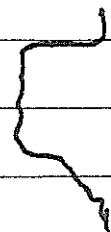
vannsoner

c) De tre nedste soner er typisk
kanalavsetning (meandrerende elver, NESS)
(sylindrisk nedst og oppfining over)

1



Den øvre sandsonen ~~setts~~ er en oppgravingssølevers.



med mindre avsetningsenergi oppover.

d) Oljeslam \Rightarrow kun Ind. loggen kan læses

Ingen SP-logs p.g.a. oljeslam

GR blir læst sammen både med FDC-CML og IL-BHC for bl.a. dybdekorrigering

e) $\rho_b = 2.25$ Kvarts, kaolinit, glimmer

$$\rho_b = \frac{\rho_{ma} - \rho_b}{\rho_{ma} - \rho_f}$$

$$\rho_f = 0.8 \times 0.75 + 0.2 \times 1.03 = 0.806$$

Kvarts Glimmer kaolinit

$$\rho_{ma} = 2.65 \times 0.6 + 2.82 \times 0.3 + 2.41 \times 0.1 = 2.677$$

↑ ↑
Disse verdier står
bakerst i kartboks

$$\rho_b = \frac{2.677 - 2.25}{2.677 - 0.806} = 0.23 \quad \rho_f = 0.8 \times 0.75 + 0.2 \times 1.03$$

f)

$$S_w = \frac{F \cdot R_w}{R_f} = \frac{15.16 \times 0.066}{15} = 0.26$$

0.1'

VANNSONE
Sanden som
er vannfylt

$$R_w = \frac{R_o}{F} = \frac{0.7}{\frac{1}{0.28} \cdot 1.85} = 0.06$$

$$\rho_b = \frac{2.65 - 2.15}{2.65 - 0.89} = 0.28$$

$$\rho_f = 0.5 \times 0.75 + 0.5 \times 1.03 = 0.89$$

Olefilterat Form. vann