

Denne rapport
tilhører



LTEK DOK.SENTER

L. NR. *302 8502 0039*

KODE *Well 1/9-6 nr 42*

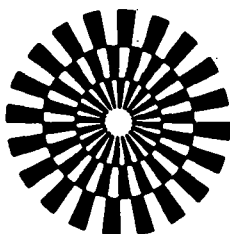
Returneres etter bruk

STATOIL A/S

SPECIAL CORE ANALYSIS

WELL: 1/9-6

MARCH 1984



GECO

**GEOPHYSICAL COMPANY
OF NORWAY A/S**



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COMMENTS

GENERAL: Special core analyses were requested by Statoil on 8 plug samples from well 1/9-6. The samples were cylindrical 1½" diameter. All samples were chalky limestone material.

PREPARATION: The plugs were cut to lengths of approximately seven cm. They were cleaned by extraction using first methanol, then toluene and finally with methanol. Prior to the analyses, the plugs were dried at 60°C and 40% relative humidity under controlled conditions.

MEASUREMENTS: POROSITY AND GRAIN DENSITY

Grain volume was measured by Bolyes law porosimeter using helium. Bulk volume was obtained by mercury, displacement. Knowing also the weight of the sample, porosity and grain density were calculated on all samples.

AIR PERMEABILITY

The same 8 samples were installed in a Hassler holder for air permeability measurements. The sleeve pressure used was 15 bar. Air permeability was measured using N₂ gas at three different pressures. These values were the basic for calculating the Klinkenberg corrected permeability. Both tabular and graphic compilations of data have been enclosed in this report.

IRREDUCIBLE WATER SATURATION

The 8 samples were completely saturated with the requested simulated formation water and subsequently placed in a porous plate for desaturation by water saturated air at a pressure of 14 bar. The pressure was acting for a period of 8 weeks. After this treatment the samples showed erroneous saturations of 95% to 100%. Due to the high irreducible water saturations, further measurements trapped gas and relative permeability was never initiated.



FLUID PROPERTIES

FORMATION WATER

The formation water was made from chlorides of Na, K, Mg and Ca according to this list:

| | | | |
|-----------------|-----------|--------|-------------------|
| Na ⁺ | : | 51 761 | ppm |
| K ⁺ | : | 718 | ppm |
| Mg ⁺ | : | 709 | ppm |
| Ca ⁺ | : | 11 859 | ppm |
| Density | (20 °C) : | = 1.12 | g/cm ³ |



POROSITY AND GRAIN DENSITY

| Sample no. | Depth (m) | Porosity (%) | Grain Density(g/cm ³) |
|------------|-----------|--------------|-----------------------------------|
| 1 | 3419.00 | 30.4 | 2.69 |
| 2 | 3424.20 | 35.1 | 2.68 |
| 3 | 3542.00 | 34.8 | 2.69 |
| 3A | 3543.58 | 28.5 | 2.69 |
| 4 | 3549.60 | 28.6 | 2.70 |
| 5 | 3553.48 | 31.6 | 2.69 |
| 6 | 3602.17 | 21.4 | 2.70 |
| 7 | 3610.47 | 20.2 | 2.70 |



KLINKENBERG CORRECTED AIR PERMEABILITY

| Sample no. | Depth (m) | (Mean Pressure) ⁻¹ (atm.abs.) ⁻¹ | Air permeability k _a (mD) | Klinkenberg corr. permeability k.e.l.(mD) |
|------------|--------------|---|---|---|
| 1 | 3419.00 | 0.528 0.419 0.347 | 0.535 0.483 0.448 | 0.281 |
| 2 | 3424.20 | 0.620 0.475 0.385 | 1.14 1.02 0.973 | 0.684 |
| 3 | 3542.00 | 0.526 0.418 0.346 | 4.92 4.61 4.49 | 3.62 |
| 3A | 3543.58 | 0.523 0.416 0.345 | 2.13 2.06 1.98 | 1.69 |
| 4 | 3549.60 | 0.519 0.413 0.343 | 2.16 2.04 1.96 | 1.56 |
| 5 | 3553.48 | 0.801 0.574 0.447 | 3.28 2.96 2.77 | 2.14 |
| 6 | 3602.17 | 0.510 0.407 0.339 | 0.111 0.099 0.093 | 0.055 |
| 7 | 3610.47 | 0.509 0.407 0.339 | 0.377 0.346 0.325 | 0.222 |

KLINKENBERG CORRECTED AIR PERMEABILITY



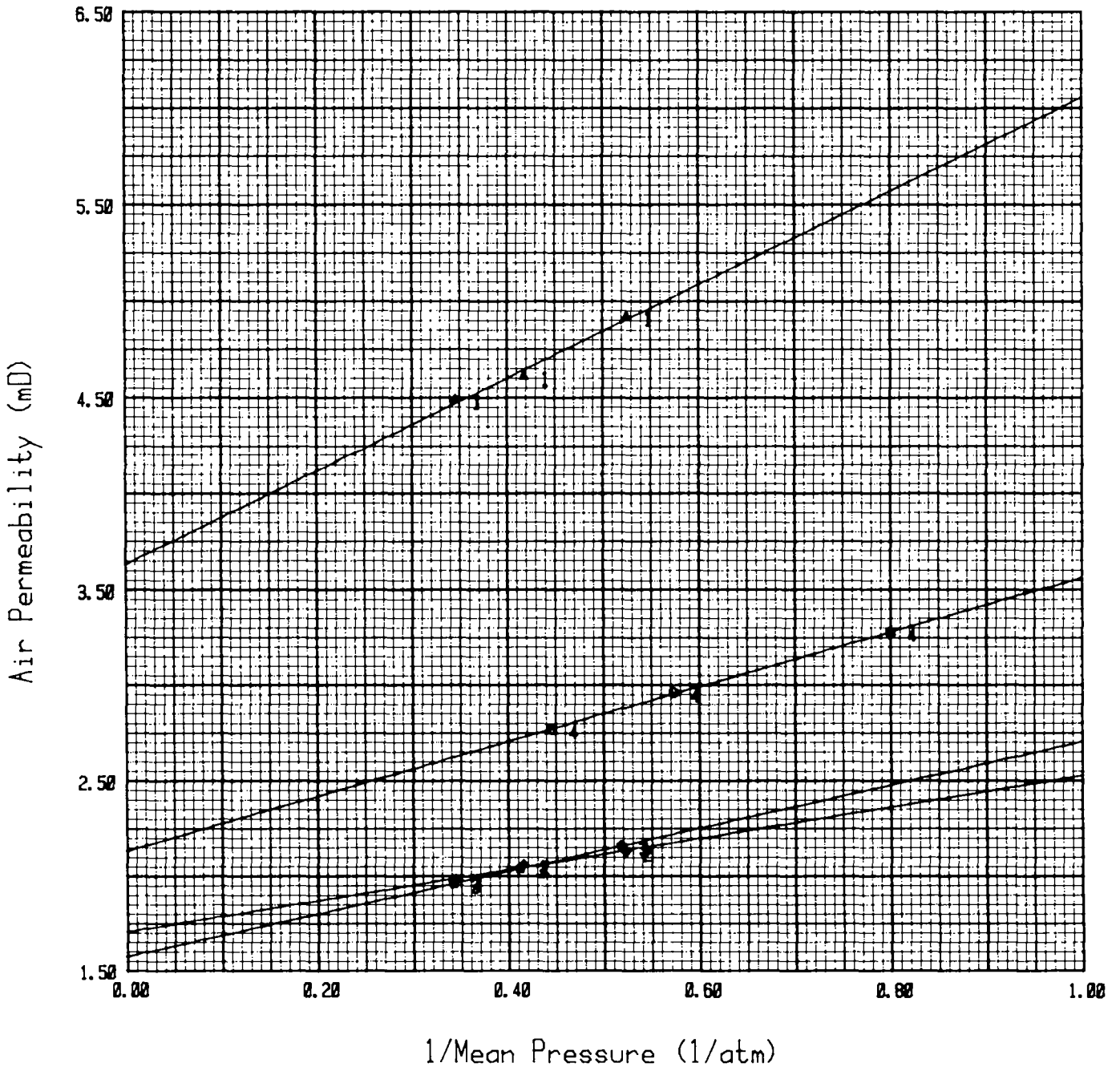
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Curve no 1 : Sample no : 3
Depth : 3542.00 m
Klink. perm.: 3.62 mD

Curve no 2 : Sample no : 3A
Depth : 3543.58 m
Klink. perm.: 1.69 mD

Curve no 3 : Sample no : 4
Depth : 3549.60 m
Klink. perm.: 1.56 mD

Curve no 4 : Sample no : 5
Depth : 3553.48 m
Klink. perm.: 2.14 mD



KLINKENBERG CORRECTED AIR PERMEABILITY



Curve no 1 : Sample no : 1
Depth : 3419.00 m
Klink. perm.: 0.281 mD

Curve no 2 : Sample no : 2
Depth : 3424.20 m
Klink. perm.: 0.684 mD

Curve no 3 : Sample no : 6
Depth : 3602.17 m
Klink. perm.: 0.055 mD

Curve no 4 : Sample no : 7
Depth : 3610.47 m
Klink. perm.: 0.222 mD

