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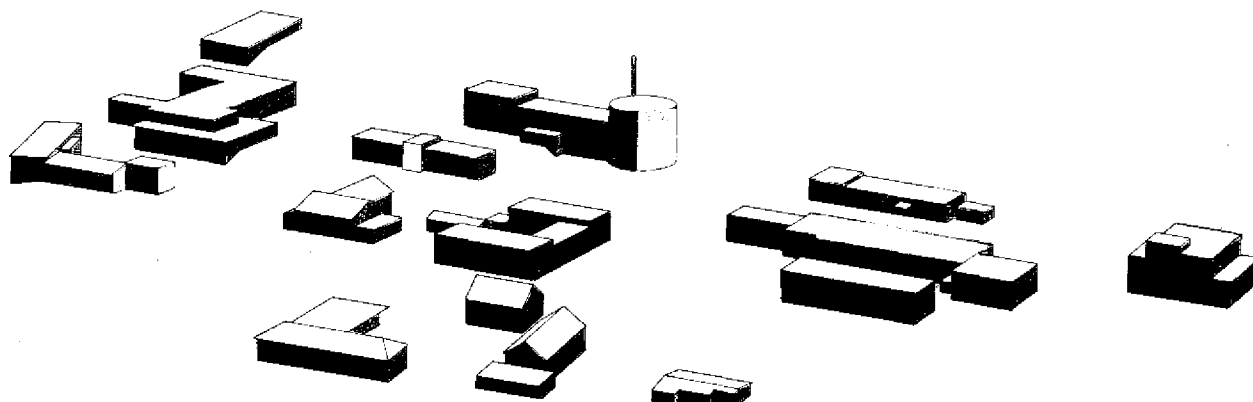
REPORT TITLE

PRELIMINARY REPORT ON THE CARBON
ISOTOPIC DISTRIBUTION OF A NATURAL
GAS FROM WELL 6407/1-2

CLIENT

STATOIL

Den norske stats oljeselskap a.s.





Institute for energy technology

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SUMMARY		DISTRIBUTION	
The gas components CH ₄ , C ₂ H ₆ , C ₃ H ₈ , i-C ₄ H ₁₀ , n-C ₄ H ₁₀ and CO ₂ have been separated from the natural gas of well 6407/1-2, and the $\delta^{13}\text{C}$ -values of these components have been measured.		B. Andresen	
The data indicate a low maturity source LOM of about 7, eq. to a vitrinite reflectance of about .5 for the gas.		E. Brevik	
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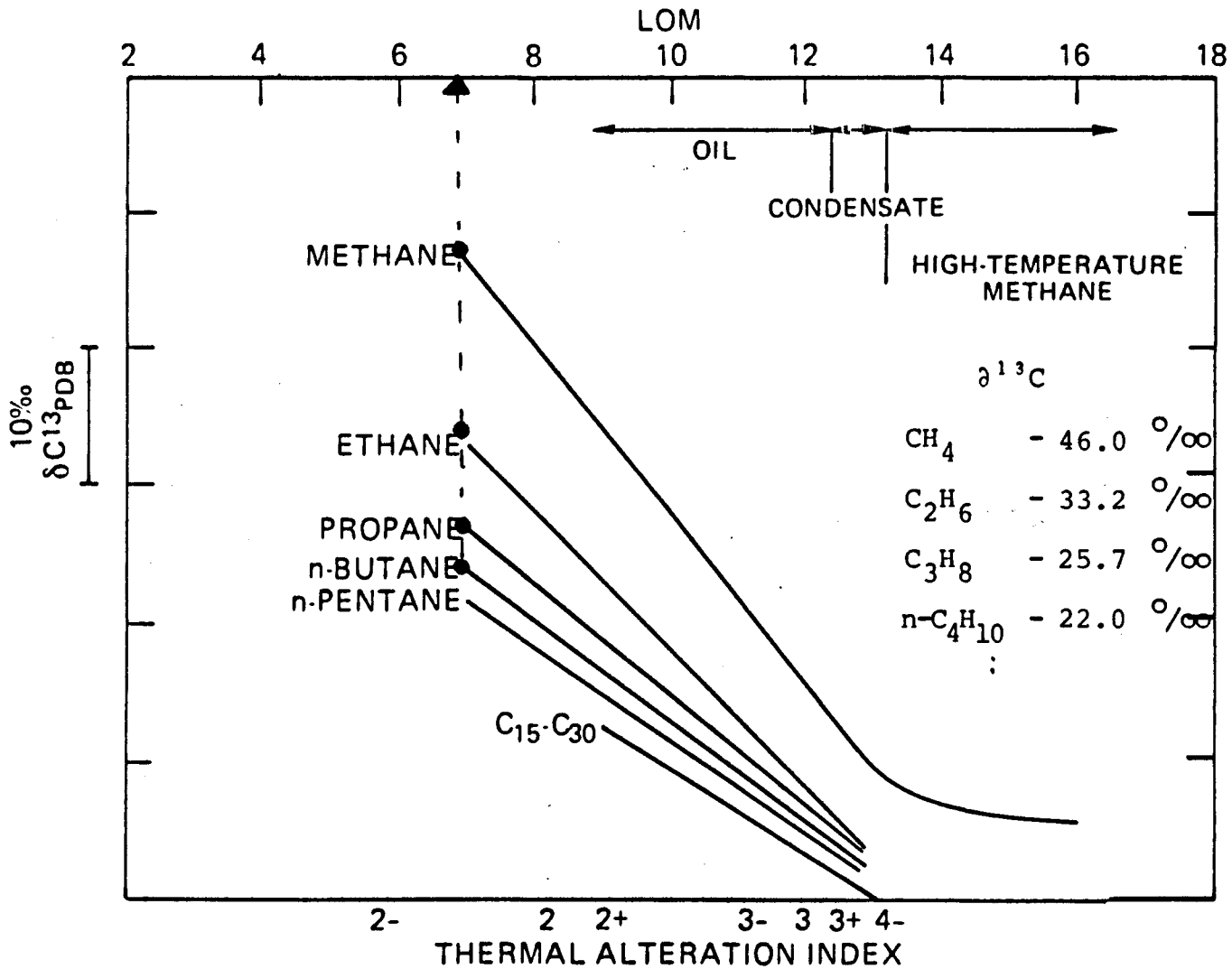
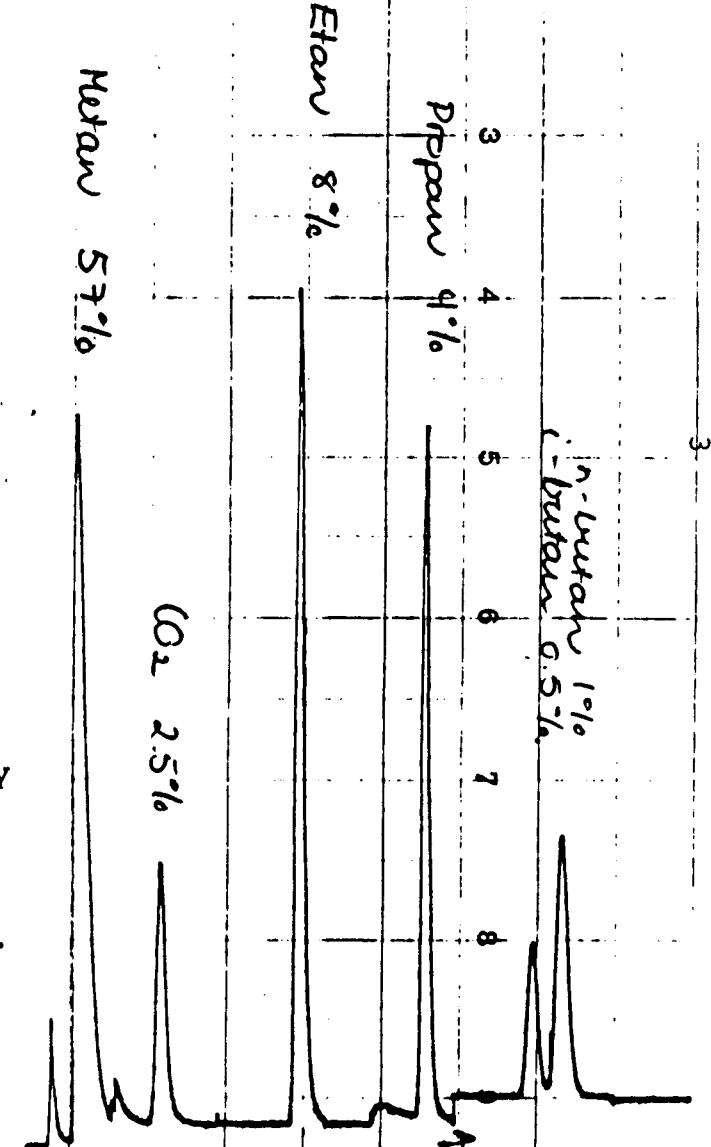


Figure 1. Carbon isotopic separations of 6407/1-2 - gas plotted on the maturity diagram (after James, 1983). A source LOM of about 7 is indicated for the gas.

The calculated carbon isotopic separations between gas component are plotted on the vertical axis using a sliding scale that is simply the algebraic difference, in parts per mil, between the isotopic compositions of the natural gas components. The scale does not possess a fixed origin, but is oriented with the more depleted $\delta^{13}\text{C}$ values at the upper end. Use of this sliding scale allows the maturity of a gas to be assessed without prior knowledge of the isotopic composition of the gas's source.

Gas chromatogram
of natural gas
6407/I-2



CONCLUSION

A low maturity source LOM of about 7, eq. to a vitrinite reflectance of about .5 is indicated for the gas. This immature gas is possibly formed at a very early stage of an oil generation.

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ANALYTICAL PROCEDURE

The natural gas has been separated into the different gas components by a Carlo-Erba 4200 instrument. The hydrocarbon gas components were oxydized in separate CuO-ovens, which enables us to collect several times when the concentration of a gas component is low. The combustion products CO₂ and H₂O were frozen into collection vessles and separated. The isotopic measurements were performed on a Finnigan Mat 251 mass spectrometer. Our $\delta^{13}\text{C}$ -value on NBS-22 is - 29.77 \pm .06 ‰.

RESULTS

The results are given in the following table ;

	Methane	Ethane	Propane	i-Butane	n-Butane	CO ₂
$\delta^{13}\text{C}$ ‰ *	- 46.0	- 33.2	- 25.7	- 19.4	- 22.0	- 8.5

The $\delta^{13}\text{C}$ -values for methane, ethane, propane and n-butane have been plotted on the maturation diagram by James (1983)**

A good fit is found for the methane - ethane - propane - n-butane - separasjons. A source LOM of about 7, eq. to a vitrinite reflectance of about .5 is indicated for the gas.

* Our uncertainty on the $\delta^{13}\text{C}$ -values is estimated to be \pm .3 ‰ and includes all the different analyses steps.

** James, Alan T. (1983) : Correlation of natural Gas by Use of Carbon Isotopic Distribution Between Hydrocarbon Components, A.A.P.G. Vol. 67, No. 7, July, 1983.