

**Data report on molecular and stable isotope
composition of gasbag samples from
Well 31/4-11**



**Applied Petroleum Technology AS
P. O. Box 123
2027 Kjeller
Norway**



Address: Applied Petroleum Technology AS
P.O.Box 123
2027 Kjeller
Telephone: +47 63 80 60 00
Telefax: +47 63 81 55 53

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Authors

Harald Johansen
Sylviane Siegle

	Name	Date	Signature
Reviewed by	Björg Andresen	2001-07-05	<i>Björg Andresen</i>
Approved by	Nigel Mills	2001-07-05	<i>N. Mills</i>

1 Introduction

1 gas sample from 31/4-11, labelled Ex BH5 2546EA + 1592-EA, is analysed for gas and isotopic composition.

On the sample $C_1 - C_5$ and CO_2 are quantified. The $\delta^{13}C$ value is measured on methane, ethane, propane, the butanes and CO_2 , and the $\delta^{18}O$ value is measured on CO_2 . In addition the δD value is measured on methane.

2 Analytical procedures

Aliquots of 0.2 ml are sampled with a syringe for analysis on a Porabond Q column connected with flame ionisation (FID) and thermal conductivity (TCD) detectors. The detection limit for the hydrocarbon gas components is 0.001 $\mu l/ml$, for CO_2 0.05 $\mu l/ml$.

For the isotope analysis 5-10 ml of the gas is sampled with a syringe and then separated into the different gas components by a Carlo Erba 4200 gas chromatograph. The hydrocarbon gas components are oxidised in separate CuO-ovens in order to prevent cross contamination. The combustion products CO_2 and H_2O are frozen into collection vessels and separated.

The combustion water is reduced with zinc metal in sealed quartz tubes to prepare hydrogen for isotopic analysis. The isotopic measurements are performed on a Finnigan MAT 251 and a Finnigan Delta mass spectrometer.

IFEs value on NBS 22 is $-29.77 \pm .06\%$ PDB.

The analytical procedures are tested with a laboratory gas standard mixture. Based on repeated analysis of the gas standard, the reproducibility in the $\delta^{13}C$ value is better than 0.5% PDB for all components. The reproducibility in the δD value is likewise better than 10%.

3 Results

The normalised volume composition of the gas sample is shown in Table 1. The stable isotope composition is shown in Table 2.

The molecular composition related to the carbon isotope variations in methane from the sample is plotted in Figure 1 (Schoell, 1983), the carbon and hydrogen variations in methane are plotted in Figure 2 (Schoell, 1983) and the carbon isotope variation in ethane related to the carbon isotope variations in methane in Figure 3 (Schoell, 1983).

Table 1 Volume composition of a gas sample (normalised values) from well 31/4-11

Sample	IFE no	C ₁ %	C ₂ %	C ₃ %	iC ₄ %	nC ₄ %	iC ₅ %	nC ₅ %	CO ₂ %	Sum C ₁ -C ₅	Wetness	iC ₄ /nC ₄
31/4-11	20010120	83.7	9.1	4.5	0.6	1.1	0.25	0.24	0.4	99.6	0.16	0.54

Table 2 Isotopic composition of a gas sample from well 31/4-11

Sample	IFE no	C ₁ $\delta^{13}\text{C}$	C ₁ δD	C ₂ $\delta^{13}\text{C}$	C ₃ $\delta^{13}\text{C}$	iC ₄ $\delta^{13}\text{C}$	nC ₄ $\delta^{13}\text{C}$	CO ₂ $\delta^{13}\text{C}$	CO ₂ $\delta^{18}\text{O}$
31/4-11	20010120	-45.0	-211	-30.0	-27.7	-26.3	-27.6	-15.1	-11.1

4 Literature

Schoell, M. (1983). Genetic characterisation of natural gases. *The American Association of Petroleum Geologists Bulletin*, **67**,2225-2238.