

PETROPHYSICS VOLVE 15/9-F-15 A

1 Modell

Well 15/9-F-15 A is evaluated accordingly to the Model reported in : Sleipner Øst and Volve Model 2006, Hugin and Skagerak Formation , Petrophysical Evaluation, Dokument 3781-06, 2006-11-10, Authors: E. Solfjell, K.A. Lehne

1.1 Porosity

The porosity is derived from the density log which is calibrated to overburden corrected core porosity for wells drilled with OBM and WBM.. The neutron log has been used to correct for mud filtrate invasion. The equation in use is:

$$\text{Phif} = \text{Phid} + A * (\text{Nphi} - \text{Phid}) + B$$

Here A and B are regression konstants. Phid is the density porosity.

$$\text{Phid} = (\text{Rhoma} - \text{Rhob}) / (\text{Rhoma} - \text{Rhofl}).$$

1.2 Clay Volume

The Clay volume is entirely derived from the gamma ray log GR. The function used is the linear realationshi :

$$\text{VSH} = (\text{GRmax} - \text{GR}) / (\text{GRmax} - \text{GRmin}) \quad (\text{API units})$$

Grmax : Gamma ray Claystone . Grmin : Gamma ray clean Sandstone.

1.3 Water Saturation

The water saturation is evaluated with the Archie formula :

$$S_w = (a \cdot R_w / R_t \cdot \text{Phif}^m)^{1/n}$$

Here S_w = Water saturation, a = Archies lithology konst., R_w = Formation Water Resistivity,
 R_t = True Resistivity, Phif = porosity, m = cementation exponent, n = saturation exponent.

1.4 Permeability

Permeability is based on multivariable regression analysis between log porosity and shale volume against overburden corrected core permeability., The following functions are being used on the Volve Field :

$K_{logh} = 10^{(8 \cdot \text{Phif} - 9 \cdot V_{sh} + 2)}$	Hugin
$K_{logh} = 10^{(32 \cdot \text{Phif} - 2 \cdot V_{sh} - 3)}$	Sleipner
$K_{logh} = 10^{(17.4 \cdot \text{Phif} - 3 \cdot V_{sh} - 1.85)}$	Skagerak*

* Not in this well

1.5 Evaluation parameters

The different evaluation parameter are seen in table 1.

Tab 1.

Evaluation Parameters 15/9-F-15 A				
Parameter	Draupne		Hugin	Sleipner
Rhoma	2.66		2.65	2.65
Rhofl	1		0.9	0.9
A	0		0.4	0.4
B	0		0.01	0.01
Grmin	4		4	4
Grmax	160		110	110
a	1		1	1
n	2		2.45	2.45
m	2		*	*
* $m = 1.865 \cdot (K_{logh}^{**} - 0.0083)$				
Rw = 0.07 ohmm at 20 °C, Temp Gradient : 2.6 °C				
Reservoir Temperature : 111 °C at 2800m TVDSS.				

2 Results

2.1 Pressure tests StethoScope (LWD)

Depth	Tvd-msl	Pressure (Bar)	Mob. (Md/cp)
3802.00	2946.73	318.74	3841
3811.00	2952.42	319.37	285
3831.00	2965.38	320.83	50
3849.00	2977.12	321.90	2335
3860.00	2984.54	322.70	412
3882.00	2999.40	324.40	21
3963.50	3057.03	359.07	0.9
3977.00	3067.05	347.75	4.1
3981.00	3070.03	347.19	3

Tests plotted columns 7 and 8 .

2.2 Petrophysical Parameters from Log Evaluation 15/9-F-15 A

Petrophysical Parameters						
Formation	NetGros	Phif	Sw.	Klogh_A *	Klogh_H	Klogh-G
Hugin	0.828	0.229	0.919	296	1.4	46
Sleipner	0.516	0.186	0.796	2459	3.7	135

*A: Aritmetic , H: Harmonic , G: Geometric

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2.3 CPI

