

GEIE
Route de Soultz
F-67250 Kutzenhausen

Production GPK3 09.10.2006

HEX-B correction

Technical Note

26.09.2006
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S W I S S
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1. Aims

The purpose of this technical note is to calculate productivity index from a production test realised in well GPK3 on 09.10.2006

2. Well model used for Hex-B calculations

The well model used in this technical note are the same one used for interpretation of the circulation test of summer 2005 (see technical note 017-16). Table 1 shows properties of the well GPK3 model used.

Table 1: Borehole/rock model in HEX-B for GPK3 production well

Bore hole parameters						Rock mass parameters	
Nr	Depth section MD [m]		Inner radius [m]	Flow rate [% of injection rate]	Average wall roughness [mm]	Thermal conductivity [W/m K]	Specific heat capacity [J/m ³ K]
	from:	to:					
1	0	1700.	0.110	100	0.15	3.0	2.2 10 ⁶
2	1700	2200	0.110	100	0.15	15.00	2.2 10 ⁶
3	2200	3800	0.110	100	0.15	3.00	2.2 10 ⁶
4	3800	4556	0.110	100	0.15	4.00	2.2 10 ⁶
5	4556	4768	0.108	100	0.15	4.00	2.2 10 ⁶

3. Results

Origin is taken on 06.10.2006 at 16:11.

As shown on figure 1, wellhead pressure is equal to 3.3MPa at the beginning of the test. It is decreasing because the reservoir has been lightly pressurized by flow log test on october 5th.

This value of 3.3MPa is assumed to correspond to a 0.8MPa downhole overpressure, according to the fact that equilibrium pressure at the wellhead is generally equal to 2.5MPa.

The well temperature is supposed to be nearly equilibrium, but not completely, taking in account the flowlog test realised on october 5th (see figure 2). As the density of produced fluid is very slowly changing during production (this effect may be due to previous injection tests released in GPK3), a new version of Hex-B, Hex-B 82 was developed in order to take in account measured fluid density during production as a model input variable.

Downhole pressure at equilibrium is assumed to be equal to 44.5MPa.

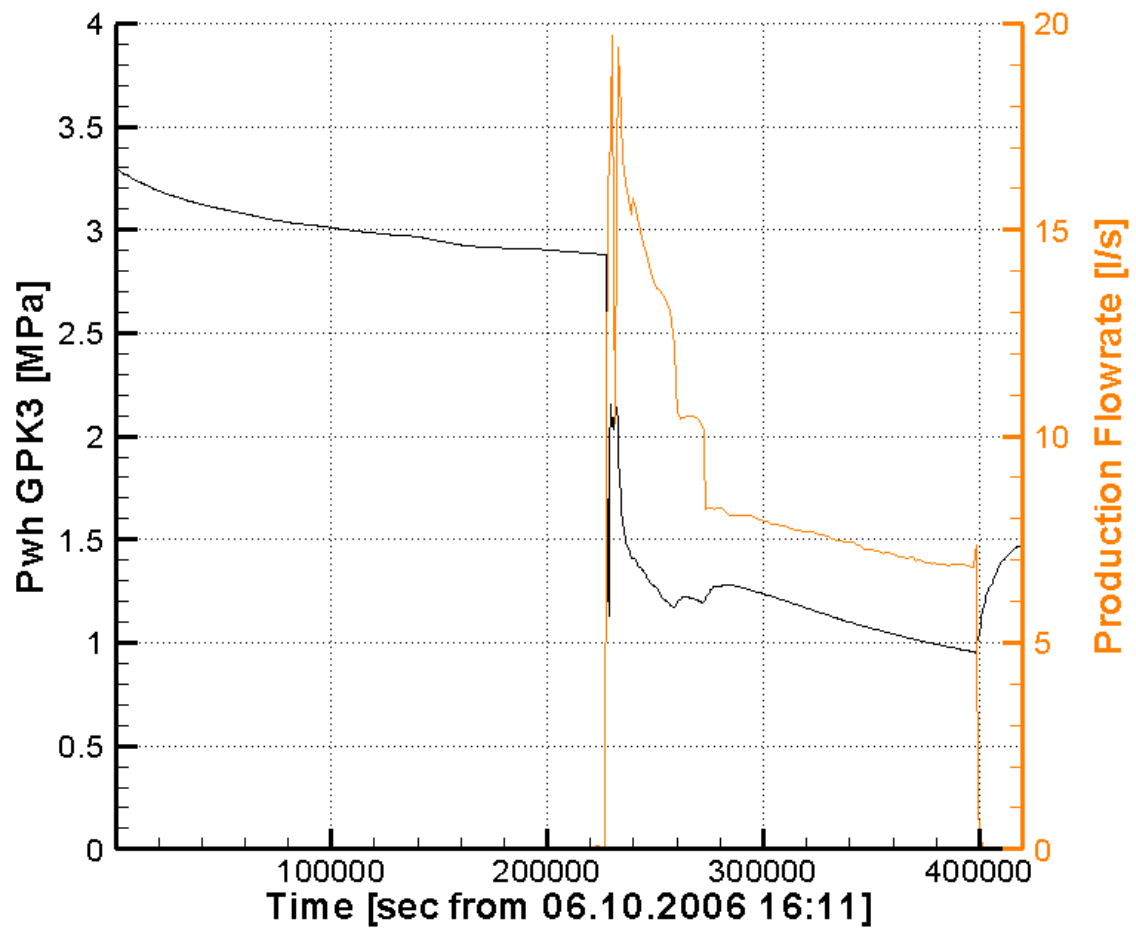


Figure 1: Wellhead pressure and production flowrate in GPK3 during production test

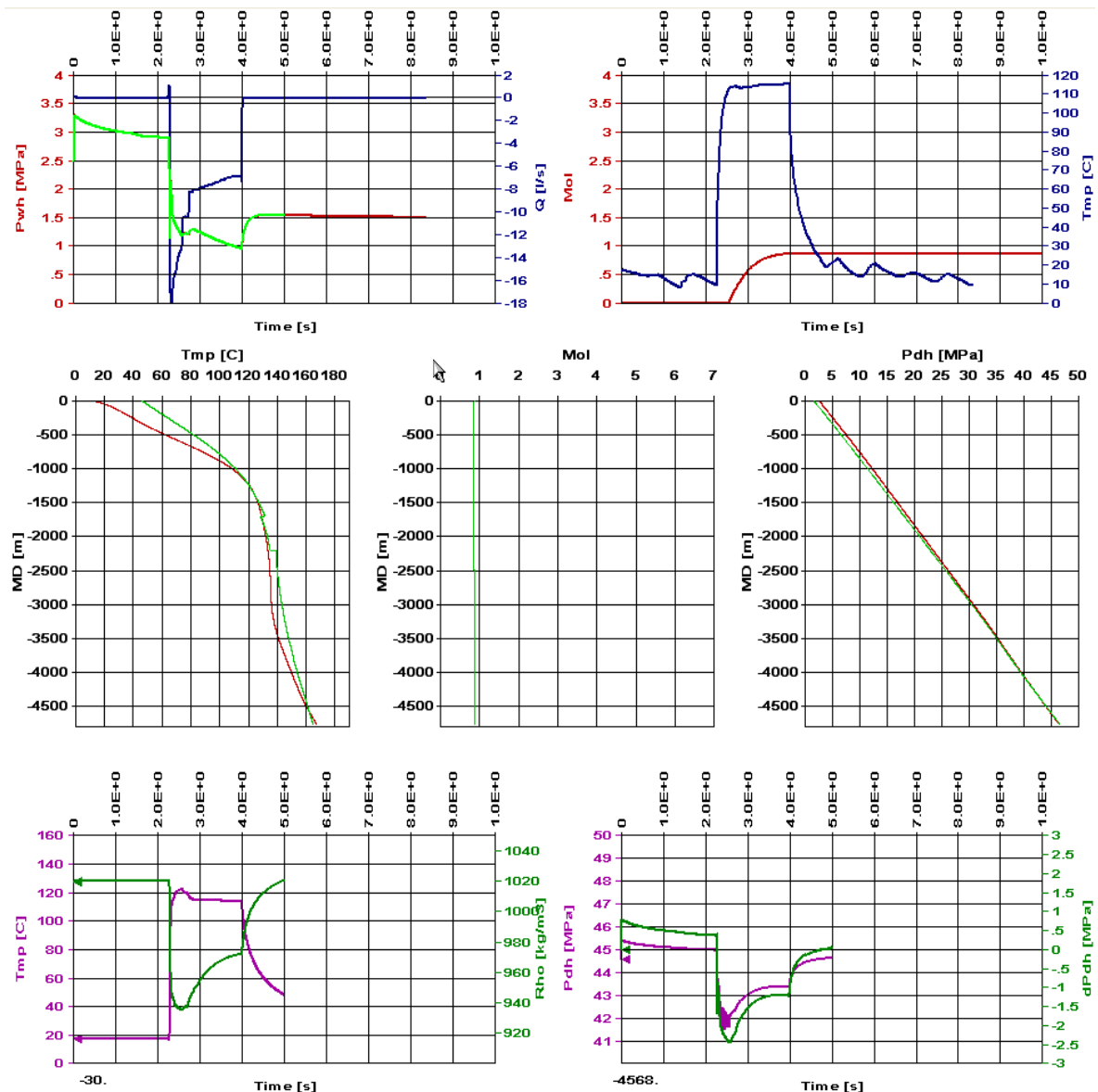


Figure 2: Hex-B capture screen. On top left, measured wellhead pressure and flowrate; on top right, measured molality and temperature of produced fluid; on middle, estimated temperature, molality and pressure in borehole (red=beginning of simulation, green=end of stimulation); on bottom left, calculated temperature and density of fluid at wellhead; on bottom right, calculated downhole pressure and over pressure at 4500mTVD.

One can observe on this figure that calculated wellhead temperature and measured production temperature show very good agreement.

Under these conditions, calculated downhole overpressure in GPK3 and calculated productivity index are shown on figure 3.

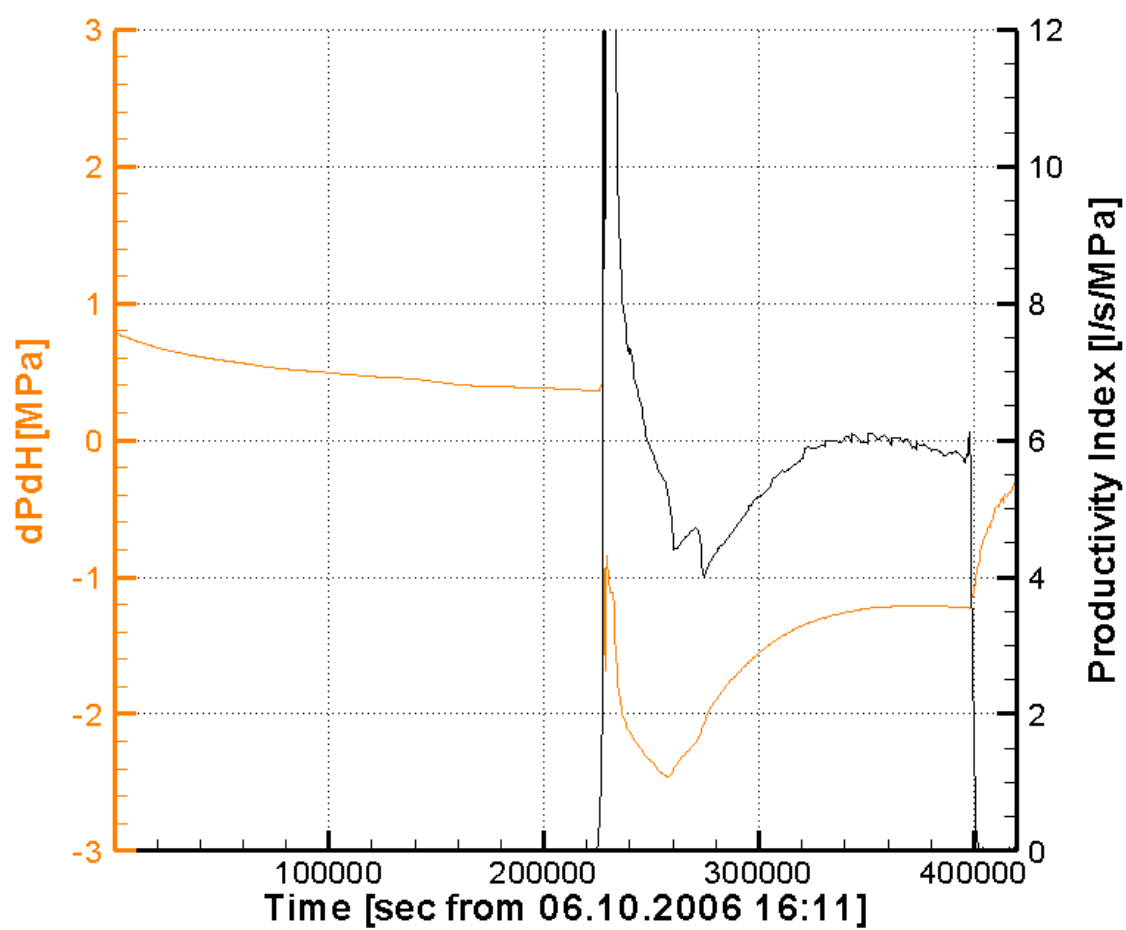


Figure 3: Calculated downhole overpressure and productivity index in GPK3 during production test.