Deep Horizontal Well drilled

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Approximately 85 horizontal wells have been drilled to date in Chevron's Gulf Of Thailand (GOT) oil operations, the objective being to maximize oil rate and ultimate reserves recovery. Most of the horizontal wells are targeting shallow reservoirs, generally less than 8,000 ft TVDSS, however Chevron recently drilled a deep horizontal well to improve recovery in a low porosity sandstone reservoir. This was the deepest and highest temperature horizontal well in Chevron Thailand's history, and possibly in the entire GOT.

Horizontal well "A" was drilled in block B8/32. Since this particular area is mainly a gas producing area, horizontal wells had not been drilled in the past. A total of 1,500 ft of 14-17% porosity rock was drilled at -8620 TVDSS and completed open hole in November 2010. While in conventional wells, many zones at equivalent depths and porosity have produced significant gas reserves, oil zones have traditionally been tight or very poor producers.

This well is noteworthy not only because of its depth, which resulted in higher drilling risks than previous wells, it also represented an excellent opportunity to better understand production performance, possibly opening up additional opportunites for Chevron and other operators. By drilling all the planned traditional "high and tight" locations in the fault block, carefully managing their completions, and a comprehensive surveillance program it was possible to properly compare production performance between horizontal and conventional wells in deep low porosity rock.

The map below illustrates the location of the horizontal well relative to the other conventional wells (28, 09, 08, 07, 06, and 05) drilled as part of the primary development drilling campaign. RFT data confirmed the connectivity of the sand from 28 in the North to 06 in the South, proving an oil column of approximately 200 ft.

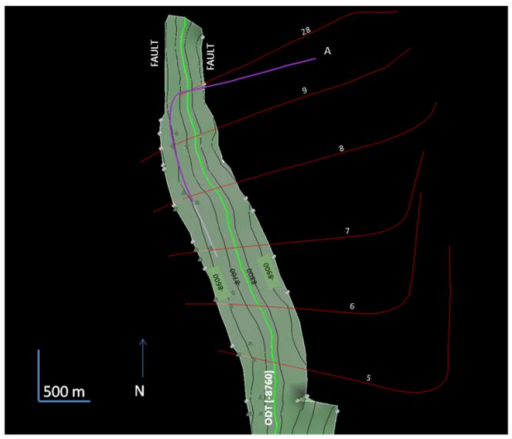

Figure 1: Map illustrates the location of the horizontal well

The seismic and log correlations helping confirm reservoir connectivity are shown in Figure 3.

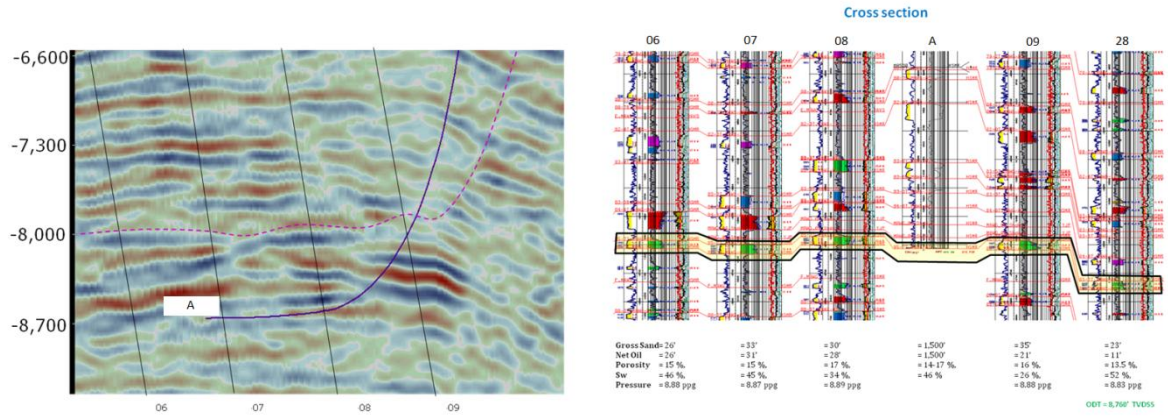

Figure 3: Seismic and log cross sections illustrate discontinuity of sand bodies which is commonly found in fluvial depositional environment.

Figure 4 represents the actual drilled well path, with the heel of the well landing close to the 08 well and the toe of the horizontal just south of the 07 well. The lateral section was drilled with an inclination angle ranging from 87 to 90 degrees, thus terminating slightly deeper in the toe than heel. A 1500' continuous sand was observed in the logs.

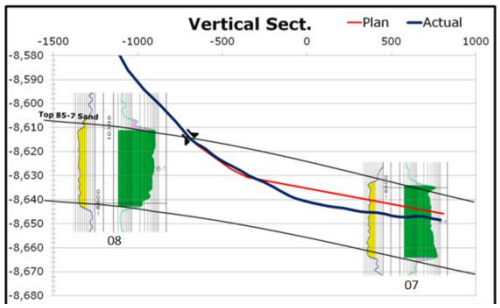

Figure 4: Actual well path showing the heel of the well landing close to the 08 well and terminating at the toe, just past the 07 well.

Prior to drilling the "A" horizontal well, the greatest operational concern was the forecasted high formation temperatures. Based on the data obtained from the conventional wells, circulating temperature was expected to range between 150 and 160 degrees Celsius, close to the upper range of mud motors, a critical component in the BHA. This risk was mitigated by careful attention to drilling rate and mud circulation volumes resulting in actual circulating temperature below 140 degrees Celsius.

Since a critical objective in the program was to better understand the relative performance of a conventional well vs that of the horizontal well, 06, 07, and 28 were completed as single zone completions in the same reservoir that the horizontal well was drilled.

- "A" horizontal was the first well to be put on production with an initial production of 1500 bbl/d (+/- 390 psi drawdown).
- 06 and 07 were put on production with the initial rate of about 1000 bbl/d with much higher drawdown (> 1000 psi drawdown).
- 28, did not produce due to poor reservoir properties.

Due to the depth and temperature of the reservoir, the bubble point pressure is above 3000 psi and although the wells did not penetrate a gas cap, the simulation history match suggests the presence of one at initial conditions (Pinit = 3043 psia @ datum). 07 and 06 had quick gas break through within a month of production. Extensive welltesting with the use of downhole BHP has been done in 06, 07 and "A" resulting in the reservoir characteristics as shown below. Noted that horizontal well's PI is 5-8 times higher than the conventional wells.

Table 1: Results from welltest on 06, 07 and A

Well	PI (bbl/d/psi)	k (md)	Skin
06	0.5	7	-2
07	0.8	17	-2
A	3.8	30	4

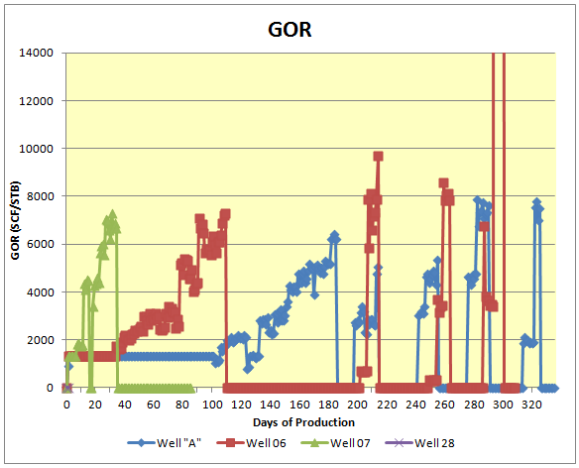

Figure 5: GOR of each producing well. Noted that horizontal well "A" took 100 days before the gas break through while 06 and 07 took less than 35 days

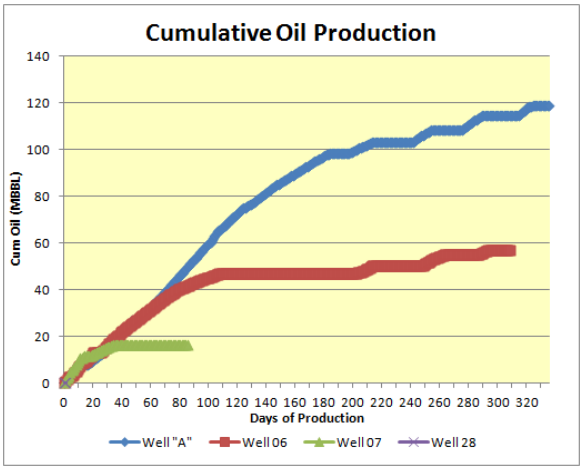

Figure 6: Cumulative oil production of each producing well to date. Noted that horizontal well "A" has produced two times more oil than 06 and six times more than 07 under the controlled GOR at 8000 SCF/STB.

Total production from this reservoir to date is 192 MBBL of oil and 386 MMSCF of gas. 06 and "A" are producing cyclically from this reservoir, periodically being shut in to control the GOR. As a result of the rapid rise in the wells' GOR, and subsequent shut in BHP data, it became apparent that this reservoir would benefit from pressure maintenance. Several pressure measurements over time confirmed that 28 is connected to "A" so the B 8/32 asset team is now planning to waterflood this reservoir using SWIMS (**S**ea **W**ater **I**njection **M**obile **S**ystem) unit and 28 as the injector. A trial carried out in mid 2011 confirmed that adequate injection rates can be achieved using the high injection pressure from the portable SWIMS unit. If successful, it is believed that this will then be the deepest waterflood in the GOT.

This deep horizontal well has been a very successful economic project, but more importantly has proven that such wells can be executed, highlighting that more opportunities exist to pursue deep target reservoirs. The relatively trouble-free drilling operations were a result of multifunctional team work, intelligent risk taking and a desire continuously improve our GOT operations.