Volve
15/9-F-11 B
Mærsk Inspirer
PLT logging
October 2015
Interpretation Report

Title:
Volve **15/9-F-11 B** **Mærsk Inspirer** **PLT logging** **October 2015** **Interpretation Report**

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1 Summary

Background

Volve well 15/9-F-11 B is a highly deviated producer in the Upper Hugin Fm. The well has an S-shaped well path that is building up to 90 deg in the upper part of the reservoir section before it is dropping off through the rest of the reservoir section. The well bore goes in and out of the Upper Hugin Fm. several times in the reservoir section. The production rate before PLT logging was around 1150 Sm3/d with a watercut of 55-60 %. The open hole log (CPI) for the well and well path is given in **Appendix A and Figure 1**.

The well was initially completed in July 2013 with a 7" cemented liner. The liner is perforated in 8 intervals in the three deepest Upper Hugin sections in the well. In the perforated part of the reservoir section, the well deviation is dropping from 80 to 50 deg. Well and completion schematics are given in **Appendix B and C**.

Objective

A combined Schlumberger PLT and RST-D logging run on Altus tractor was performed in the period 26-30 October 2015. Since Altus tractor was used, only up logging passes could be performed. The objective of the PLT logging was to find the production profile and zonal pressures and identify water producing zones for evaluation of straddling/plugging of water producing perforation intervals. The objective of the RST logging was to investigate the flooding status of un-perforated zones that were candidates for additional perforation.

Operational

The PLT/RST-D logging tool string is given in **Appendix D**. The logging was performed on 5/16" mono cable in shut-in well and at a flowing total rate at ca. 2700 Sm3/d with a watercut around 65 %. The first shut-in logging up pass @10 m/min was a combined PLT and RST-D Sigma mode pass from close to bottom of the perforation intervals and up to above the top of the reservoir section at ca. 3430 m MD. Afterwards two RST-D IC mode logging up passes at slow cable velocity (0.5 m/min) were performed in the same interval. The second PLT logging up pass at shut-in and the three logging up passes afterwards at flowing well was run only across the perforated section (from below the second deepest perforation interval and up above top perforation. More operational details are given in Chapter 2 and in Schlumberger sequence of events in **Appendix H.**

The RST-D results are reported in a separate report; *Volve-f11b-rstd no1-oct-2015.pdf.*

Interpretation / Evaluation

The main conclusions from the interpretation of the logging data by use of the Emeraude interpretation model are summarized below. The full overview of the results is given in **Figures 2 and 3** and **Tables 1 and 2**.

- The main production is coming from the upper two perforation intervals in the shallowest of the three perforated Upper Hugin sections in the well. In addition, there are some minor contributions from the two other perforated Upper Hugin sections deeper in the well.
- The upper perforation (Perf #1) is estimated to contribute to ca. 65 % of the total production and around 85 % of the oil production. Perf #2 is estimated to contribute to ca. 20 % of the total production, mainly water. However, it cannot be excluded that Perf #2 might have some higher oil content.

- The SIP analysis shows that the two perforation intervals (Perf #1 & Perf #2) in the shallowest perforated Upper Hugin section have ca. 4/5 of the total PI in the well.
- At shut-in some cross flow is interpreted from the two shallowest perforated Upper Hugin sections and down to the deepest Upper Hugin section (Perf #7-# 8).

Learnings / Experience

- The general data quality is relatively conclusive and can be used for interpretation.
- In flowing well all the 8 holdup probes gave un-correct measurements at the upper perforation (Perf #1) and above. This was corrected in the interpretation (see details in Chapter 4.2). The reason for the error measurements has not been clarified yet.
- Since most of the oil is being produced from the uppermost perforation interval, the most obvious place for water shut-off (plug or straddle) might have been just below these perforations. However, this is most probably an option at this time of the well lifetime since it can imply a risk of losing access to the rest of the well below this depth.

Actions after logging

After logging, two un-flooded zones higher up in the well were perforated based on the RST-D data. The result of this was an initial increase in oil rate of 350-400 Sm3/d.

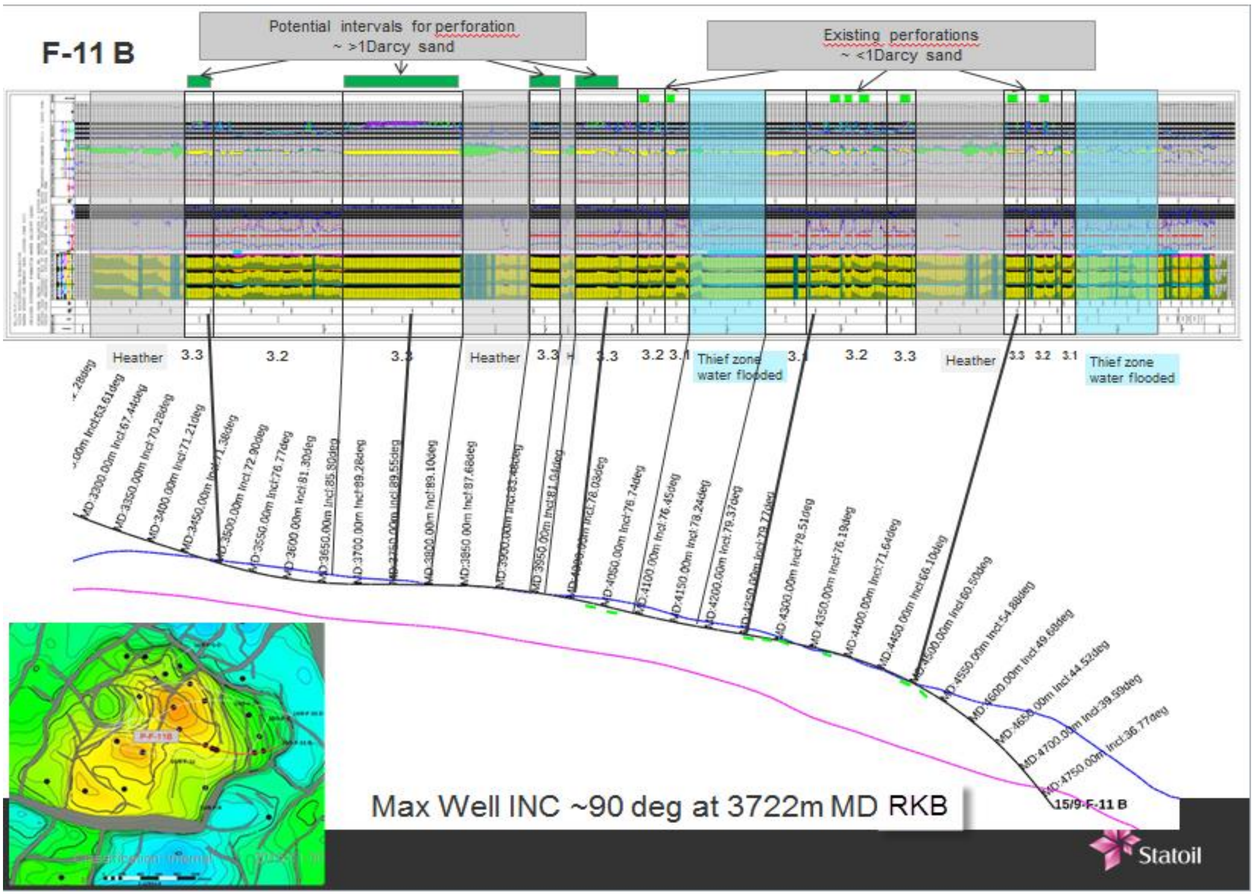


Figure 1: Well path and CPI

2 Operational sequences

More operational details are found in Schlumberger's sequence of events in **Appendix H.** The logging tool string schematic is shown in **Appendix D.**

1) RIH with PLT and RST-D logging tool string and performed spinner calibration logging passes @ 10, 20 and 30 m/min down and up across the interval 2700-2750 m MD RKB.
2) Continued running in hole. Started tractor at 2800 m MD RKB and run down to ca. 4530 m MD RKB.
3) Logged a combined PLT and RST sigma mode pass @ 10 m/min in the interval 4530-3430 m MD RKB.
4) Ran down again on tractor and performed first RST IC mode pass @ 0.5 m/min in the interval 4254-3470 m MD RKB. Increased the cable speed in some parts of the logging interval which were not of interest for RST logging.
5) Ran down again on tractor and performed second RST IC mode pass @ 0.5 m/min in the interval 4254-3470 m MD RKB. Increased the cable speed in some parts of the logging interval which were not of interest for RST logging.
6) Ran down again on tractor and performed a PLT pass @ 20 m/min in the interval 4530-4000 m MD RKB
7) Positioned the tool string at 4000 m MD RKB, started station logging and opened the well for production.
8) When the well had stabilised on total rate of ca. 2700 Sm3/d, started running down on tractor to 4530 m MD RKB.
9) Logged three PLT pass @ 10, 20 and 30 m/min in the interval 4530-4000 m MD RKB.
10) Performed station logging above top perforation. The holdup probes had shown only oil in all the three flowing passes above the top perforation interval. However, while performing the station logging above top perforation all the probes suddenly started to show ca. 62 % water instead of only oil. Due to this it was decided to run down again on tractor to 4530 m MD RKB and perform one more logging pass. However, due to problems with the tractor this was cancelled. Starting to POOH.
11) After the logging two un-flooded intervals were perforated higher up in the well based on the RST-D logging data. This resulted in an initial increase in oil rate of 350-400 Sm3/d.

3 Results from PLT interpretation

- The interpreted production profiles for flowing and shut-in well are given in **Figures 2 and 3**. Production contributions at flowing and shut-in well are given in **Table 1** below. *All perforations are in Upper Hugin Fm.*

Table 1: Estimated production contribution pr. perforation zone

Perforation zones	Depth	Fowing**			Shut-in**	
		Oil rate	Oil rate	Water rate	Total rate	Total rate
	(m MD RKB)	(Sm3/d)	(Rm3/d)	(Sm3/d)	(Sm3/d)	(Rm3/d)
Perf #1	**4031-4043**	830	1195	905	0	0
Perf #2	**4065-4075**	35	50	475	105	180
Perf #3-#6*	**4268-4367***	0	0	230	60	100
Perf #7-#8*	**4488-4539***	85	120	140	-165	-280
Totalt		**950**	**1365**	**1750**	**0**	**0**

**) The perforations are treated as one production zone (see also in the CPI in Appendix A).*
***) The uncertainty in oil/water split and also in the total contribution is much higher in the three zones with lower production than in the high producing zone in the top. Eg it cannot be excluded that Perf #2 and/or Perf #3-#6 can have some higher oil content than given in the table.*

- Zonal PI and pressure (corrected to top upper perforation @4031 m MD RKB = 2898 m TVD MSL) based on SIP analysis are given in **Table 2** below (see also **Figure 4**):

Table 2: Estimated zonal pressure and PI based on SIP analysis

Perforation zones	Depth	Zonal pressure** *@top of each perf interval*	Zonal pressure** *@4031 m MD RKB*	PI @res.cond
	(m MD RKB)	(bar)	(bar)	(Rm3/d/bar)
Perf #1	**4031-4043**	318 (+/-5)	318 (+/-5)	30
Perf #2	**4065-4075**	335 (+/-10)	334 (+/-10)	6
Perf #3-#6*	**4268-4367***	345 (+/-15)	340 (+/-15)	1.5
Perf #7-#8*	**4488-4539***	310 (+/-10)	299 (+/-10)	5
Total				**42.5**

) The perforations are treated as one production zone (see also in the CPI in **Appendix A).*
***) The uncertainty in pressure is higher in zones with low rate/PI. Especially the pressure in the zone covered by Perf #3-#6 is highly uncertain, and has been scaled down somewhat compared to the pressure output from the SIP analysis in Emeraude.*

- Average well pressure and temperature in flowing and shut-in well at top perforation @4031 m MD RKB = 2898 m TVD MSL, are given in **Table 3:**

	Wellbore pressure	Wellbore temperature
	(bar)	(deg C)
Flowing	246	105.9
Shut-in*	318	106.8

**) The shut-in pressure and temperature is from the second shut-in pass after the RST IC mode passes.*

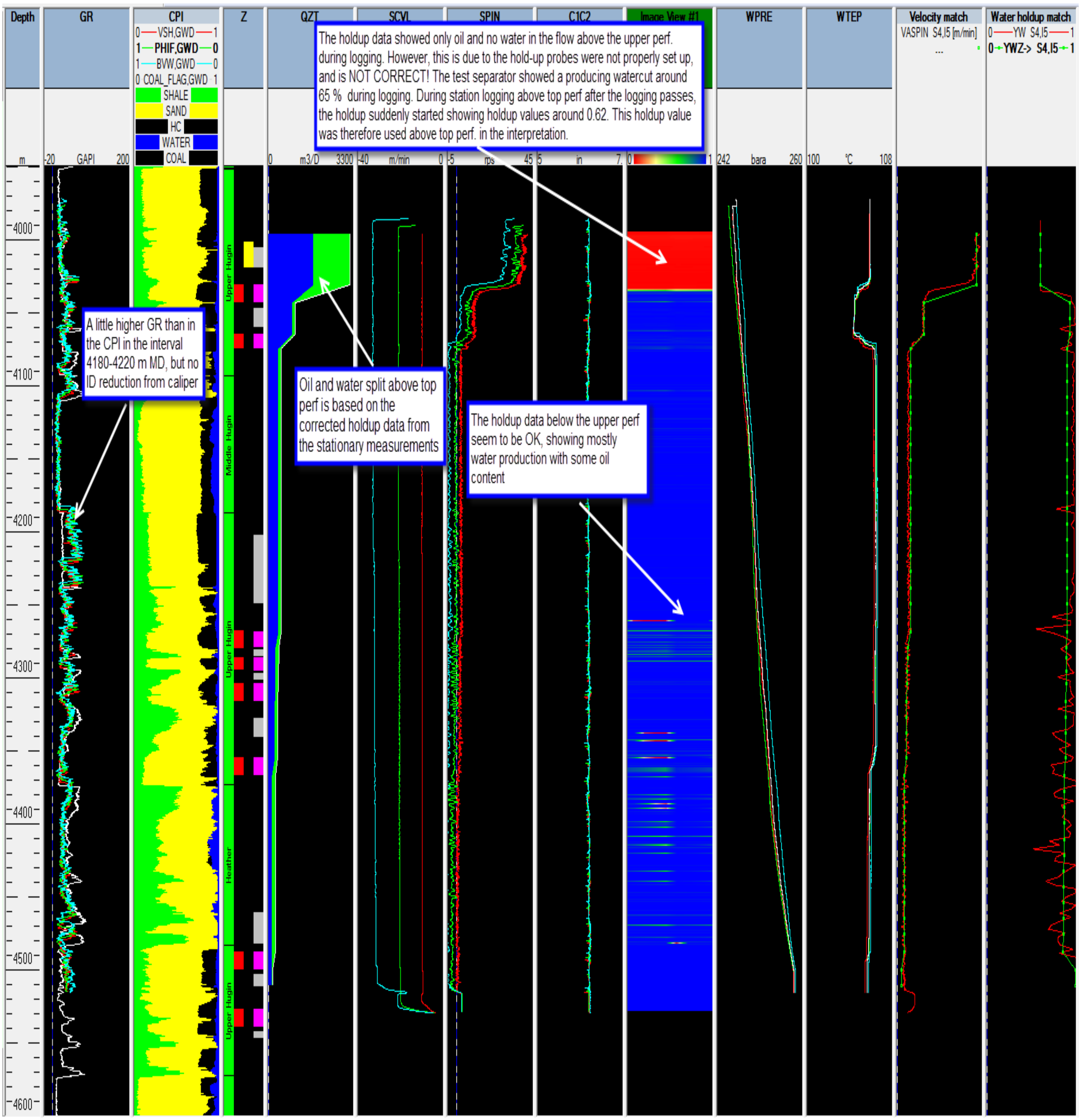


Figure 2: Interpreted production profile [Rm3/d] at flowing well *(the perforation intervals is in red colour)***.**

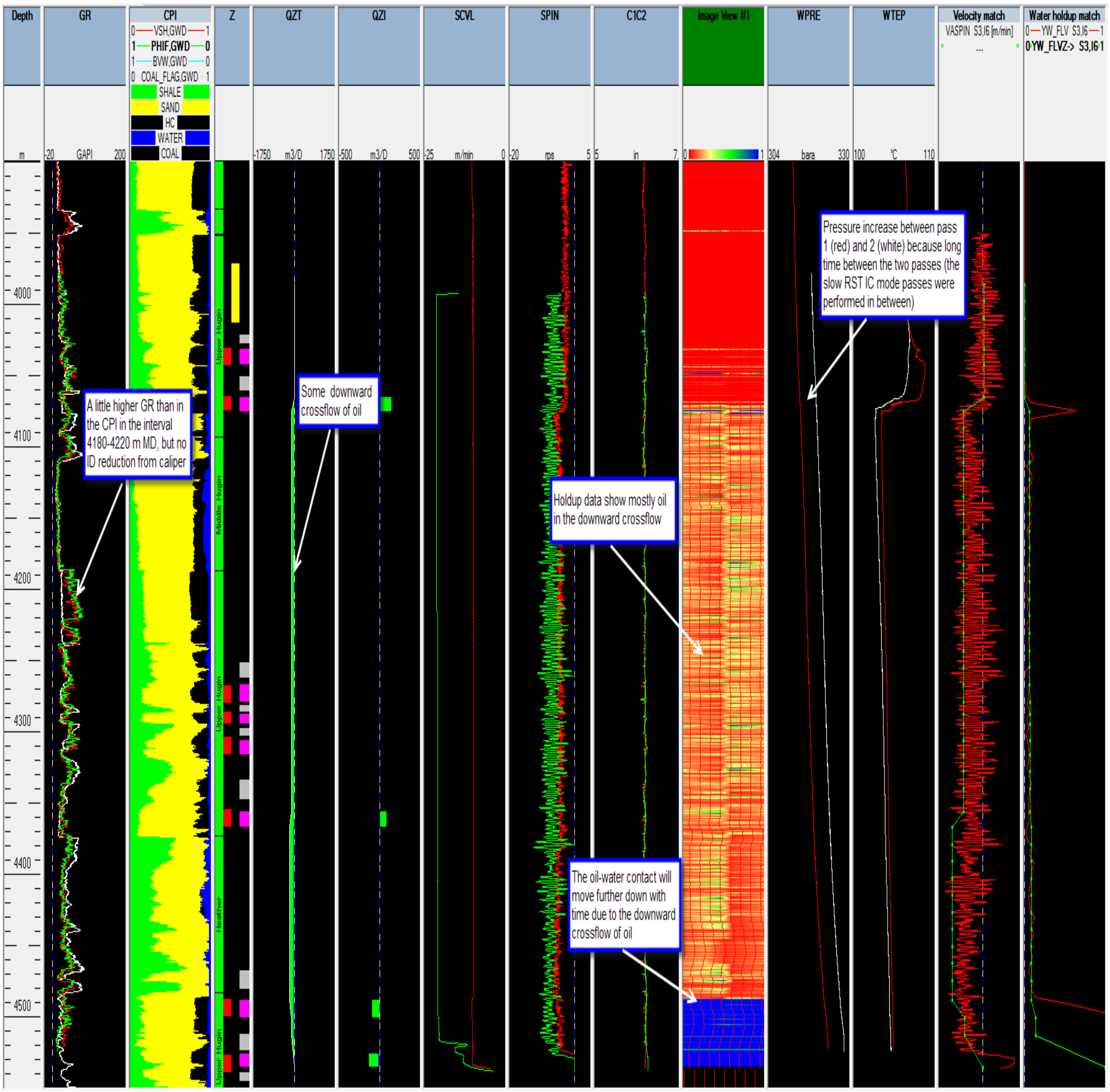


Figure 3: Interpreted cross flow profile [Rm3/d] in shut-in well *(the perforation intervals is in red colour)*.

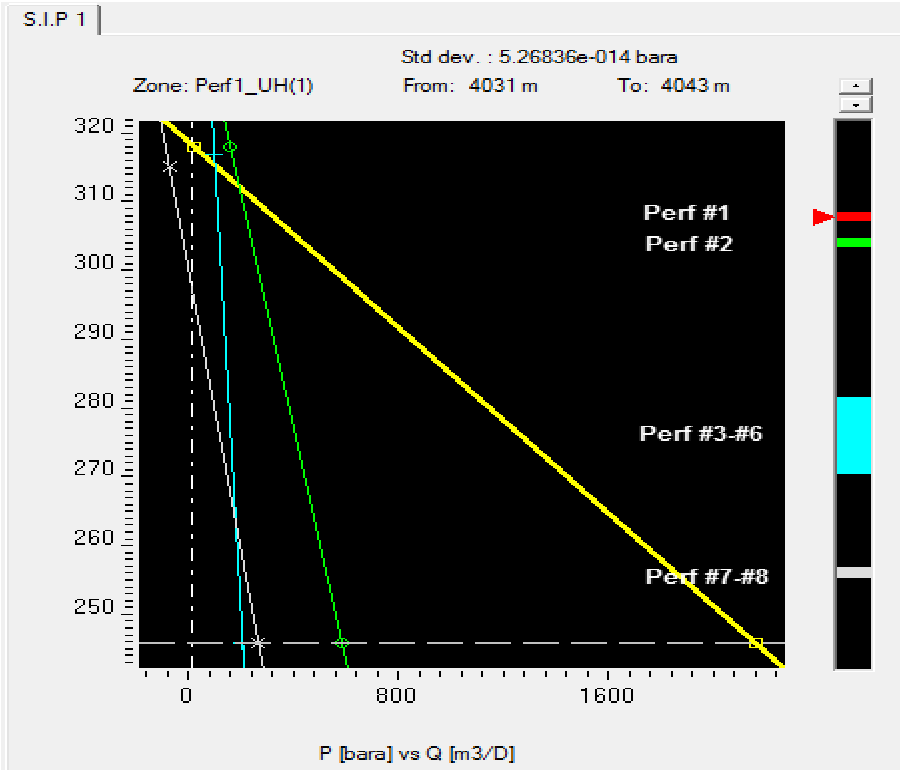


Figure 4: SIP analysis plot from Emeraude

4 Discussion

4.1 Data quality

The PLT logging was performed at shut-in (before and after the RST IC mode passes) and in flowing well. Apart from the hold-up data above top perforation in flowing well (see Chapter 4.2) the data quality is good and can be used for interpretation by use of the Emeraude interpretation model.

4.2 PLT evaluation

Spinner Data
Spinner calibrations slopes and thresholds from the four logging sequences are shown in **Appendix E.1 and E.2.** The calibration is based on all passes (only up passes since logging on Altus tractor.

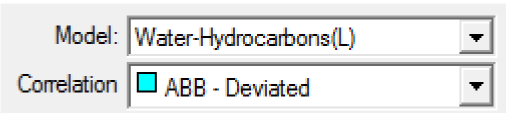
Water holdup measurements
The water holdup measurements from the dual DEFT seem OK in shut-in well and below the upper perforation interval in flowing well. However, at the upper perforation interval (Perf #1) in flowing well the holdup data from all 8 probes in all the three logging passes suddenly changed from showing mainly water with some oil content in the well stream coming from the perforations below Perf #1, to 100 % oil (and no water) in the well stream above Perf #1. This is obviously not correct; all the water from deeper in the well cannot cross flow into the upper perforation interval simultaneously as a high oil rate is flowing out of the same interval. In addition, at the same time the test separator showed a stable production rate with a watercut around 65 %.

Schlumberger have suggested that the error in holdup measurements might be due to flowing velocity higher than the spec velocity of 2 m/s for the holdup probes, in the upper part of the logging interval. However, this is in our opinion not a very likely explanation. Firstly; the velocity in this part of the well is not extremely high, around 2.2-2.3 m/s, and it is unlikely that the velocity limit is so absolute. Secondly; the fact that all 8 probes suddenly and simultaneously changed from showing a lot of water to only oil makes it difficult to think that this is due to too high velocity. If the velocity was the reason for this, a little more gradually development in the error readings for the different probes should be expected since the velocity would not be the same on the high side as on the low side of the well.

Besides this, when performing station logging above the top perforation after the flowing passes the holdup measurements suddenly changed from zero (i.e. no water) to around 0.62 (i.e. ca. 62 % water) with no change in top side rate before or after this happened, see time log in **Appendix F.** The first time it happened it lasted for ca ½ hour before it suddenly changed back to no water again. Then 20 minutes later it suddenly jumped up to ca. 0.62 once more and stayed at this level for the rest of the station logging period (many hours). Due to this strange behavior it was decided to go down and perform a new logging pass in flowing well, but this had to be cancelled due to problems with the tractor. It was therefore decided to end the logging operation and pull out of hole. But anyway, this showed that the flowing velocity was not too high for the holdup probes. The Schlumberger engineer's explanation to what happened was slugging in the well. However, the well was producing at stable rate and watercut during the entire logging period, and the changes in holdup measurements were much too sudden and lasted far too long to be related to any slugging in the well.

It has per date not been concluded what have caused the errors in the holdup measurements above the upper perforation interval during the flowing passes. It might be related to the setup of the probes in the data processing system. However, based on the holdup data from the station logging in the periods when the holdup suddenly started to show reasonable values of ca. 0.62 (which compared very well with the rate measurements on the test separator), *it was decided to use this holdup value in the evaluation. This has given water and oil rates that compare very well with the test separator rates at standard conditions.*

Rate Calculations
The following flow model and correlation was applied for interpreting the zone rates in Emeraude, using the PVT-data given in **Appendix G**:



Despite the error in holdup measurements at the top perforation interval, the upper perforation interval undoubtedly is the main oil producing interval in the well. In addition this interval also produces quite a lot of water; oil/water split is ca 55/45 at reservoir condition. For the other perforations in the well, the rates and oil/water splits are more uncertain than for the upper perforation interval due to much lower total rate.

The following passes were used for the different parameters in the rate calculations, see **Table 5**:

Table 5: Parameters and passes used in the rate calculations

	Temperature	Pressure	Fluid velocity	Water holdup
Flowing	WTEP: U1, U2, U3	WPRE: U1, U2, U3	VASPIN from SPIN: U1, U2, U3	YW_FLV: U1, U2, U3 Corrected to 0.62 above 4035 m MD New curve name: **YW**
Shut-in	WTEP: U2	WPRE: U2	VASPIN from SPIN: U1, U2	YW_FLV: U1, U2 (Corrected holdup for lowest two perfs. by use of “Contributions”)

U1, U2, U3 = Up pass 10, 20, 30 m/min.
VASPIN = Apparent velocity from spinner data
SPIN = Turbine spinner data
YW_FLV = Water holdup from MPT processing

The following tool/model was used in the MPT processing:

- Tool type: PFCS-DEFT (DFHx)
- 2D model: MapFlo Holdups
- Average: Areal

Key output curves were applied as input for computing the schematic (QZT) and continuous (Q) flow rate profiles according to the list in **Table 6**.

Table 6: Input reference channels for generating of the rate profiles (QZT and Q).

☑	Temperature	Define	WTEP	
☑	Pressure	Define	WPRE	
☑	Fluid Velocity	Define	VASPIN	
☑	Water holdup	Define	YW	
☐	Density	Define		

The output zone rate schemes were calculated utilizing

- Flow model: Water_Hydrocarbons(L)
- Correlation: ABB - Deviated

SIP Analysis

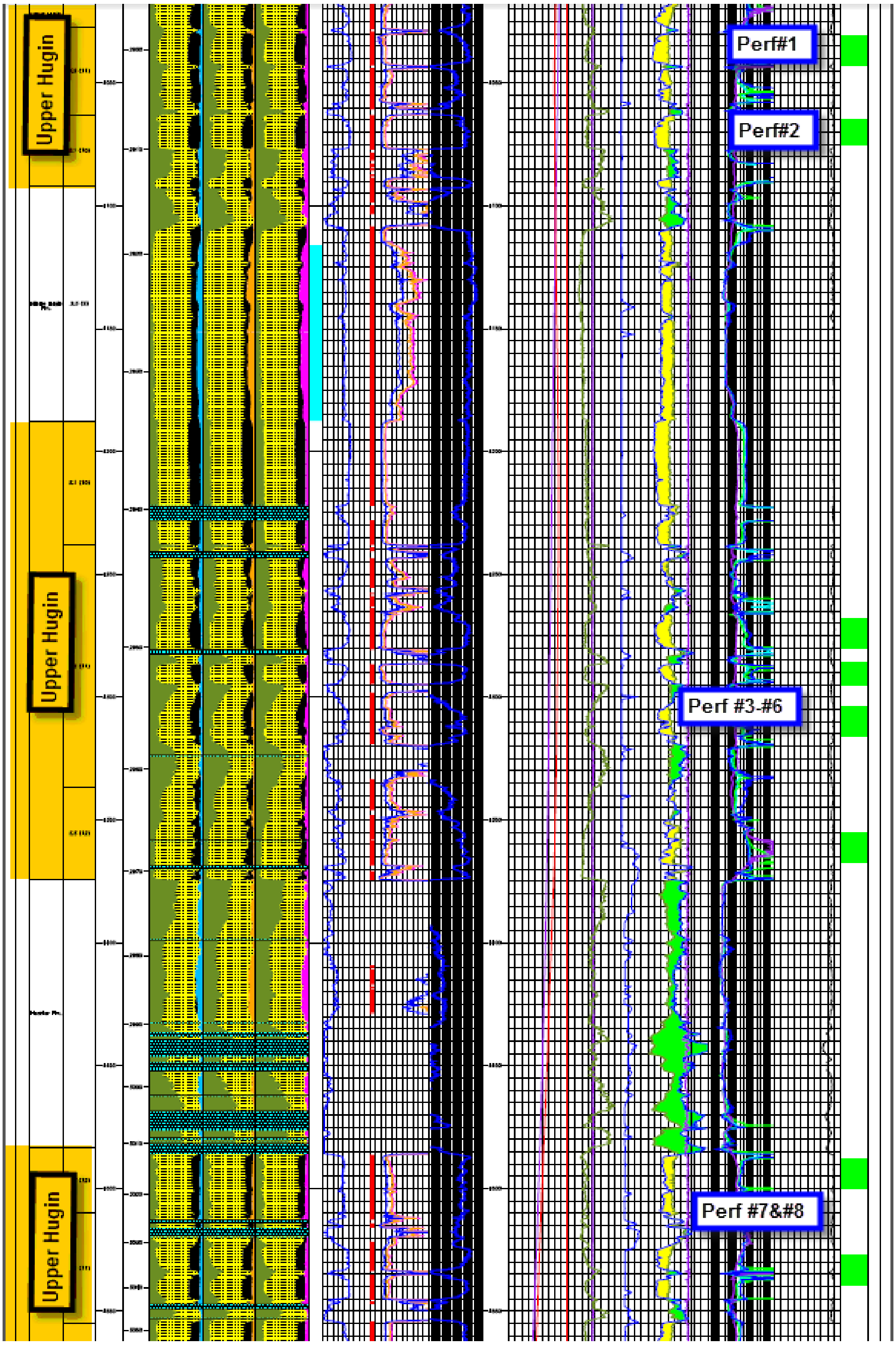
In the SIP analysis in Emeraude the eight perforation intervals were regarded as four production “zones” in the Upper Hugin Fm; Perf #1, Perf #2, Perf #3-#6 and Perf #7-#8.
All perforations are in the Upper Hugin Fm. See the CPI with perforations in **Appendix A**.

The SIP analysis for the zones with low rate is more uncertain than for the zones with high rate. This is reflected in the uncertainty range for the zonal pressures given in **Table 2**. For the low PI zone Perf #3-#6, the pressure has in addition been scaled down compared to the output from the SIP analysis in Emeraude because the estimated pressure was unrealistic high (over 375 bar).

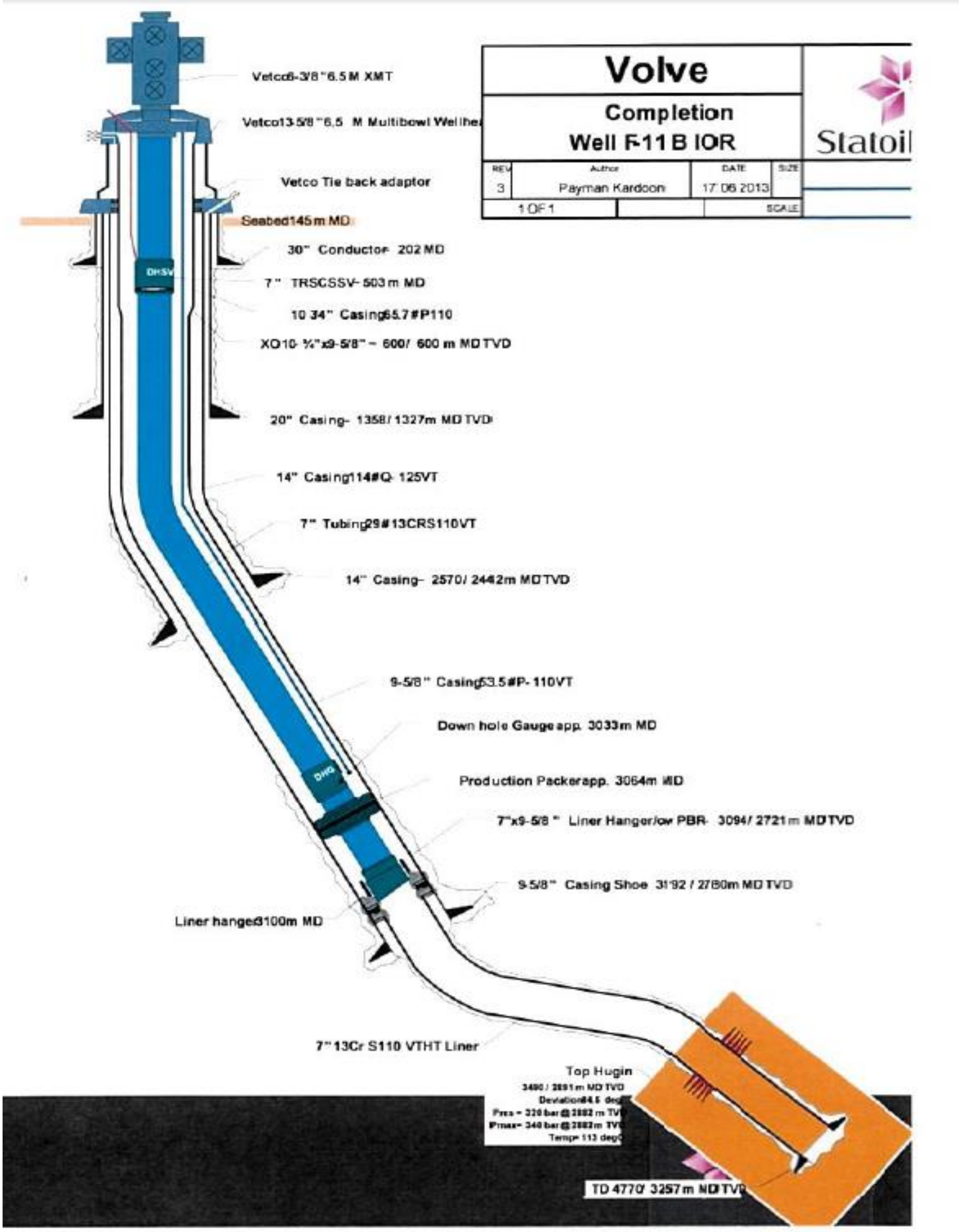
GR measurements

The GR measurements showed very good agreement with the open hole GR, except for in a short interval (4180-4220 m MD RKB) where PLT data showed slightly higher values. However, the caliper did not show any ID reduction in this interval.

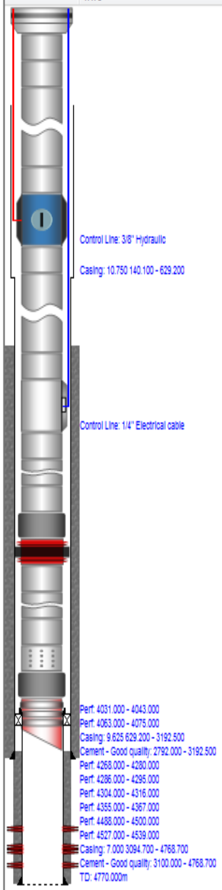
App A 15/9-F-11 B – CPI of the perforated part of the reservoir section



App B 15/9-F-11 B - Well path schematic

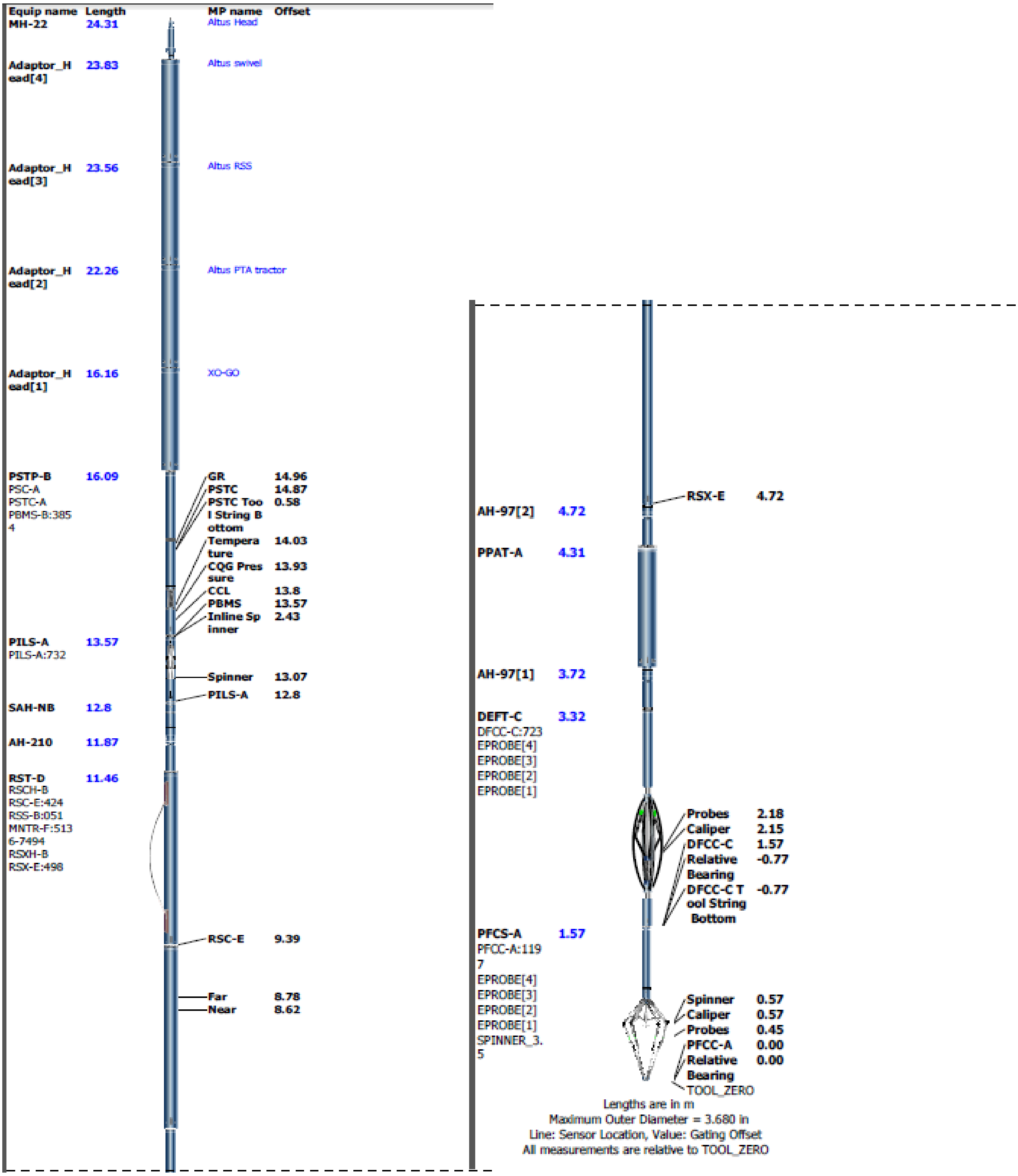


App C 15/9-F-11 B - Completion schematic



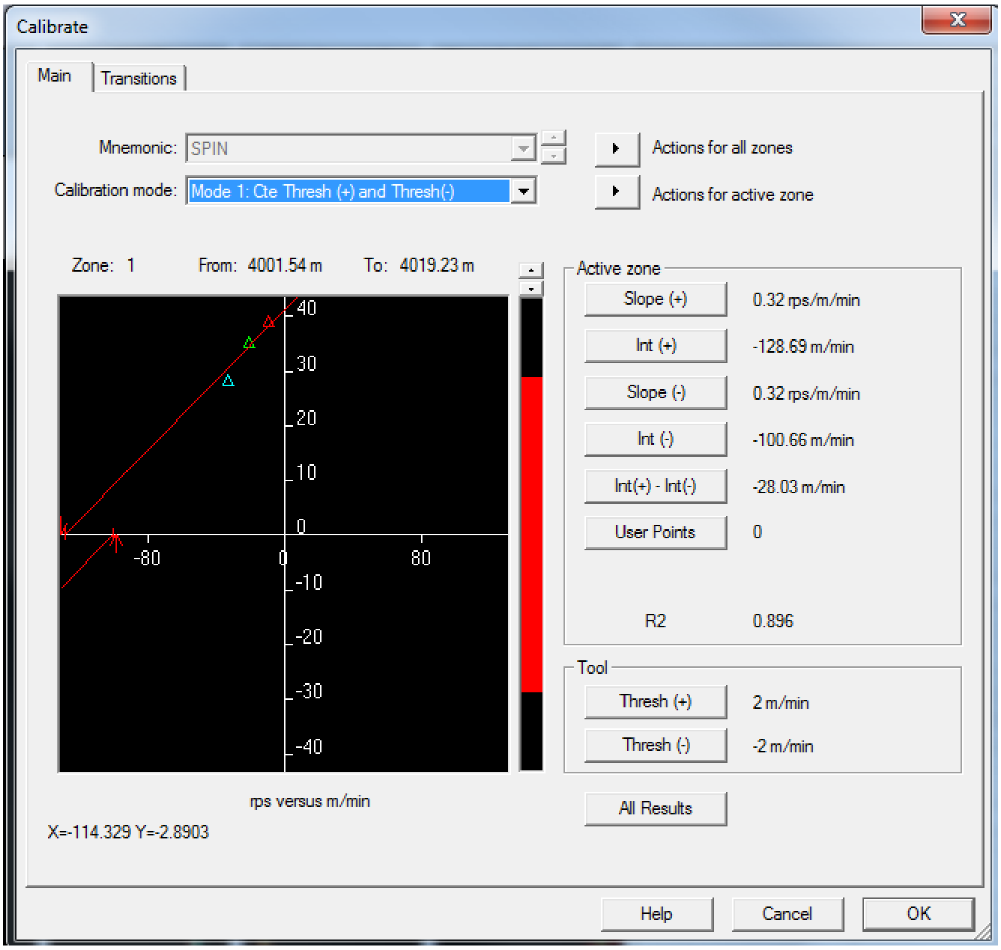
MD [RKB] Top [m]	Min ID [inch]	TVD [RKB] Top [m]	Length [m]	Max OD [inch]	Nom. weight [lb/ft]	Description	Angle [Deg]	Assei	Matl. spec.	Comments
20.552	6.084	20.552	1.460	13.500	32.00	7" Tubing hanger Vetco Gray Volve		ssy .46	-- Not Selected --	w/ Pup Joint.
22.012	6.184	22.012	6.093	7.680	29.00	7" 29# Pup Joint Vam Top B x P			13 Cr S-110	
28.105	6.184	28.105	0.984	7.680	29.00	7" 29# Pup Joint Vam Top B x P			13 Cr S-110	
29.089	6.184	29.089	471.122	7.644	29.00	7" 29# Tubing Vam Top B x P			13 Cr S-110	
500.211	6.184	500.118	3.058	7.680	29.00	X-Over - 7" 29# Pup Joint Vam Top B x VTHC P	2.1		13 Cr S-110	
503.269	5.812	503.174	2.775	9.500	29.00	Baker Mod: ONYX-7.5" TRSV Sz.: 5.812"	2.1	Assy 5 7.886	S-13 Cr 110-Ksi	Note: Max OD is 9.460" in assy dwg. (Volve 12954571)
506.044	6.184	505.947	2.053	7.690	29.00	X-Over - 7" 29# Pup Joint VTHC B x Vam Top P	2.1		13 Cr S-110	
508.097	6.184	507.998	2522.052	7.644	29.00	7" 29# Tubing Vam Top B x P	2.1		13 Cr S-110	
3030.149	6.184	2704.778	3.050	7.680	29.00	7" 29# Pup Joint Vam Top B x P	61.9		S13Cr P110	Assy dwg not found.
3033.199	5.900	2706.215	2.200	8.311	32.00	7" Single Gauge Mandrel for single NPQG-BA Tubing P/T Gauge	61.9	Assy 4 7.300	13 Cr S-110	Assy dwg not found.
3035.399	6.184	2707.252	2.050	7.680	29.00	7" 29# Pup Joint Vam Top B x P	61.9		S13Cr P110	Assy dwg not found.
3037.449	6.184	2708.218	23.209	7.644	29.00	7" 29# Tubing Vam Top B x P	61.9		13 Cr S-110	
3060.658	6.184	2719.154	3.010	7.760	29.00	X-Over - 7" 29# Pup Joint Vam Top B x VTHC P	61.9		13 Cr S-110	
3063.668	6.184	2720.570	0.334	8.320	32.00	7" 29# Collar	62.0	Assy 3 6.532	13 Cr S-110	Note: IDs not specified.
3064.002	6.000	2720.727	1.180	8.320	32.00	9 5/8" x 7" Granite Packer Sz. 831 x 600	62.0		13 Cr S-110	(Statoil 12828087)
3065.182	6.184	2721.281	2.008	7.690	29.00	X-Over - 7" 29# Pup Joint VTHC B x Vam Top P	62.0		13 Cr S-110	
3067.190	6.184	2722.225	11.909	7.644	29.00	7" 29# Tubing Vam Top B x P	62.0		13 Cr S-110	
3079.099	6.184	2727.814	12.000	7.644	29.00	7" 29# Tubing Vam Top B x P	62.0	ssy 2.0(	13 Cr S-110	
3091.099	6.184	2733.435	2.054	7.680	29.00	7" 29# Perforated Pup Joint Vam Top B x VTHC P	62.1		13 Cr-80	w/ 4 ea. 20 mm hole.
3093.153	6.184	2734.397	0.295	7.680	29.00	7" 29# Collar	62.1	Assy 1 6.649	13 Cr S-110	
3093.448	6.184	2734.535	4.300	7.070	29.00	7" 29# 13 Cr Locator Stem w/ Cut Half Muleshoe	62.1		13 Cr	

App D Logging tool string

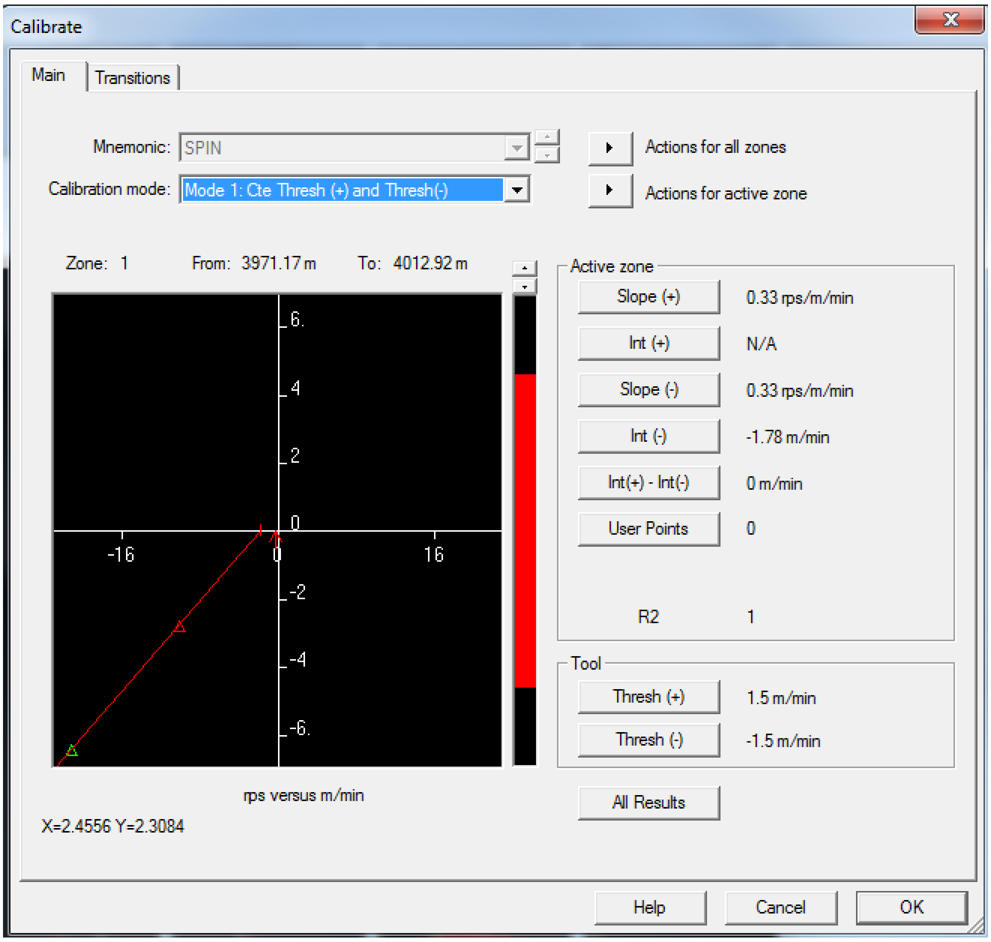


App E Spinner calibration

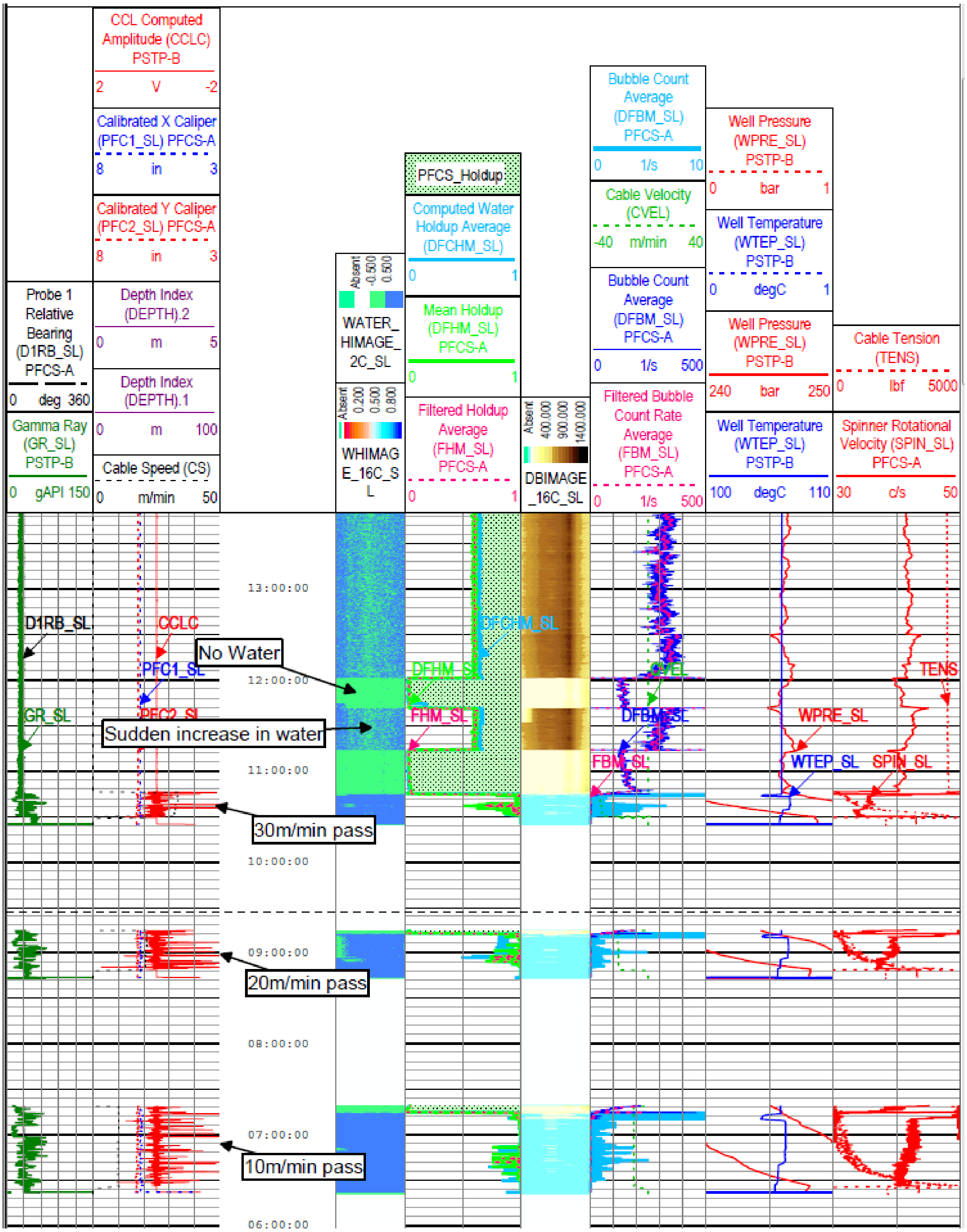
E.1 Spinner calibration used in the flowing evaluation



E.2 Spinner calibration used in the shut-in evaluation



App F Time Log from flowing well



App G PVT Data

FLUID TYPE	Water - Oil+Gas
GAS	
Specific gravity	0.856
N2 %	0.82
CO2 %	2.81
H2S %	1
Z	Beggs and Brill
Mug	Lee et al.
OIL	
Gravity	0.7334 sp. gr.
GOR	135 m3/m3
Pb	Standing
Rs	Standing
Bo	Standing
co	Vasquez and Beggs
Muo	Beggs and Robinson
WATER	
Salinity, ppm	45000.
Rsw	Katz
cw	Dodson and Standing
Muw	Van-Wingen+Frick

App H Schlumberger detailed sequence of events

Client : Statoil
Rig : Mærsk Inspirer
Field : Volve
Well : 15/9 F 11 B

Engineers: Anders Mølgård (D)
Rune Salte (N)

Operators: Knut Gunnarsen (D)
Morten Revheim (N)

===========
23-Oct-2015
===========

... Crew onboard. No equipment onboard

===========
24-Oct-2015
===========

23:00 Boat with equipment arrive

===========
25-Oct-2015
===========

--:-- Rig up equipment

===========
26-Oct-2015
===========

04:00 Altus start to build tractor
06:00 Start with toolcheck
Problem with inline spinner

===========

27-Oct-2015
===========

03:10 Toolbox meeting on drillfloor
03:30 Start to rig up
03:25 TOOL STRING CONNECTED
08:00 Equalize and open well
08:45 RIH
09:30 Test minitron at 550m
--:-- Continue RIH
11:40 Spinner calibration @ 2750m File 3-10
Some displacement of liquid/gas taking place, calibration ok
12:30 Continue RIH
Tool stopped @ 2800m, take pickup
Try again, stop at same depth
12:45 Start tractor from 2800m
17:30 Power up minitron @ 4530m
17:40 Start sigma pass 10m/m
Depth offset +1.5ish at bottom
20:35 Finished 10m/m sigma
20:40 Handed over to tractor
correlated to peak at 3811.8m
ADD +0.6 M TO log 13
21:30 Tractor at 4270m
22:00 Start to log up IC pass1 log #15
24:00 Tool at 4200m

===========
28-Oct-2015
===========

00:30 Finished 4254-4188
increased speed to 4045m
00:50 Continue with 30m/hr
05:20 Finished 4045-3895
05:30 Continue from 3827 30m/hr
06:00 IC Pass 1 - Tool at 3815m
12:00 IC Pass 1 - Tool at 3500m
12:30 Winch speed unstable, trying to get 30m/h
13:10 Completed first IC pass at 3470m
--:-- Tractor down to 4270m
14:55 Tools at 4270m, switch to logging and power up tool string
15:05 Start IC pass 2

19:00 Tool at 4020m
22:45 Finished 4045-3895 section
increased speed
22:55 Continue 30m/hr from 3827m
24:00 Tool at 3780m

===========
29-Oct-2015
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03:40 Finished pass 3827m-3660m
Increased speed
04:10 Continue from 3522m 30m/hr
05:55 Second IC pass completed
06:00 Handed over line to tractor
06:05 Tractoring down
08:15 Stopped at 4530m, switch to logging and power up
08:20 Shut in pass 20m/m
DO = +1.3 vs Sigma at 4397m pup
08:55 Pass uploaded to interact, waiting for confirmation of next step
--:-- Standby for access to test separator
14:20 Equalize wing valve, start station log
15:10 Opening well

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30-Oct-2015
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05:00 Stopped station log
05:05 Start to tractor down to 4530m
06:20 Tractor at 4530m
06:25 Start to log up 10m/min
07:20 Power down tools for tractoring
08:40 Stopped at 4530m, power up tool string
08:45 Log up 20m/min
09:15 Power down tools for tractoring
10:25 Tractor at 4530m
10:30 Log up 30m/min
11:00 Data uploaded to InterAct, standby for Statoil decision
11:15 *Downhole flow changed, response on holdup, spinner and pressure****

****) This is the Schlumberger engineer's explanation to why the holdup measurements during station logging above top perforation after the flowing passes suddenly changed from zero (i.e. NO water) to 0.62 (ca. 62 % water). He trusted the holdup measurements and thought that the reason for the sudden and very big change* *in holdup measurements was slugging in the well. As explained in Chapter 4 this is <u>NOT CORRECT!</u> (Magne Grotle).*

14:50 Start tractor down to 4530m
--:-- Problem with tractor
16:30 Decide to POOH, try to power tools, not possible
16:45 Tractor working again, still POOH
17:05 Close well, log station
17:30 POOH while logging
19:51 Stopped log
19:55 Tool in catcher
20:05 Swab closed
21:15 Toolbox meeting on rig floor
21:30 Start to rig down tool string
22:55 All tools rigged down
prepare Perfo hardware
23:45 Ready for check of tool string

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31-Oct-2015
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00:45 Aker tractor problem
05:55 Start with tractor check
07:15 Power down for handling of explosives
08:15 TBT on rig floor
09:30 Rig up guns and tractor
10:30 Rigged up, stab on
10:40 Zero with tool in catcher(-14.4+8.8) -5.6m on CCL
11:45 RIH
12:20 Power up 70m below seabed
12:25 Inventory and CCL, ok
12:30 Tractor com ok
--:-- Start log down for RIH
14:16 Start tractor at 2800m
17:00 Tractoring at ~3m/m
18:30 Stopped at 4030m, switch to logging
Gun check, ok
18:40 Start first pass up
18:50 Switch to tractor
Change depth +4m
20:10 Stopped at 4334m
20:20 Switch to logging

Gun check ok
20:25 Start second correlation run
20:40 Switch over to tractor
21:25 Tool at 4035m
21:30 Switch to logging
Gun check ok
21:35 log up correlation run 3(Log 4) on depth over shooting interval
21:43 Switch to tractor
21:47 Tractor started
22:20 Tractor stopped at 4000m
22:25 Switch to logging
Check gun
Log up corr 4 Log #5 add 0.9m
22:35 Switch to tractor
23:10 Tractor stopped at 4020
23:15 Switch to Logging
Check gun
23:20 Log up on depth
23:31 Start tractor3935m

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01-Nov-2015
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00:05 Switch from tractor
00:10 Log up to shoot log 7
00:20 Fired gun at 3960 top shot
00:25 Log up after shooting
00:30 POOH
04:25 Shut down unit for explosives operation
05:20 TBT for rigging down
05:40 Lift lub
07:20 Tool string rigged down, lift tools to pipe deck
07:45 Prepare Altus tractor for new run
10:15 Final tractor perfo checklist
Change electronics in tractor
11:30 Power down for explosives
11:35 TBT for rigging
Arm firing head
12:45 Rigged up
13:40 Power up 12V and zero in catcher -5.6m (CCL)
14:00 RIH
14:20 Power up surface equipment at 300m

Gun inventor and CCL ok
Tractor com ok
14:25 Start log down for RIH
16:15 Switch to tractor at 2800m
--:-- Problems with tractor communication
17:40 Start tractoring
21:35 Stop tractor
checked gun
Log up 10m/min Run5 Log# 2 On depth at shooting
21:50 Switch to tractor
22:40 Tractor stopped
checked gun
Log up 10m/min Run5 Log# 3
23:03 Switch to tractor

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02-Nov-2015
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00:05 Tractor stopped
checked gun
Log up 10m/min Run5 Log# 4
12:24 Switch to tractor
01:15 Log up

01:40 Start tractor
02:00 Log up
Checked gun
02:11 Switch to tractor
02:31 Stop tractor
02:33 Switch to logging
02:42 Tool in shooting position
02:44 Gun fired at 3910m top shot CCL depth 3906.2m
02:45 Problem to log switch over to tractor mode and back
Tractor unable to switch back to logging mode
No contact with VPM
03:00 POOH
04:55 Shut down system
05:30 Tool in Catch, close swab
07:15 TBT for rigging
08:45 Guns rigged down