



This session illustrates the workflow offered by Emeraude for Multiple Probes Tools (MPT) around a Flow Scan Imager™ (FSI) example.

The data is from a horizontal well logged with the FSI and PFCS tools. The flow is 3 phases and two surveys were conducted: a shut-in and a flowing survey. The shut-in passes will be used to calibrate the spinners. The flowing passes, after a data quality check, will be processed to obtain average values that will serve as inputs for the PL interpretation.


B08.1 • Shut in Data Quality Control

- We will start by opening the file called B08.ke2 which contains the GWD info and the shut-in passes corrected in depth.

Data quality control can be greatly facilitated by displaying the data in an appropriate way using view templates.


A view template is a model that allows creating one or several views (user views, image views, etc...) with predefined settings in a given order. The views resulting from a view template are created (or displayed if already existing) when the template is invoked. It is not part of this session to show how a view template can be created and we will use a set of predefined view templates dedicated to the Schlumberger tools to generate the displays of interest.

B08.1.1 • Spinner Data Quality Control

- Go to Settings – Default display – Templates tab.
- Use the file open button  to load the template file called 'SchlumbergerTemplates.kvt' located in the Emr260 folder.

A new folder is added to the list of available templates, below the local templates folder. If you open this folder, you will see several templates dedicated to a wide variety of SLB measurements.

The link with the SchlumbergerTemplates.kvt file will be saved with your Emeraude settings (unless the file is deleted or renamed). Among the templates, we will use the full layout templates.

- Close the window with OK.
- From the display toolbar, press the invoke template button .
- In the tree view, below the 'SchlumbergerTemplates.kvt' node, expand the Full layouts container and select 'FSI Spinner View' (see below).
- Ensure that the automatic binding is ticked and press OK (or double click on the template).
- A new window appears with a tab for each view included in this full layout template.

This window shows up because Emeraude has failed at automatically binding (at least) one of the view templates included in the full layout template. If you scroll the tabs, you will see that the 'TVD and DEVI' template is marked with a red spot, identifying it as a template not bound to any element. We will not give the template any binding, so this full layout template will be created without the 'TVD and DEVI' view.

- Accept all defaults and close with OK to display the FSI Spinner View template and create automatically the corresponding snapshot.

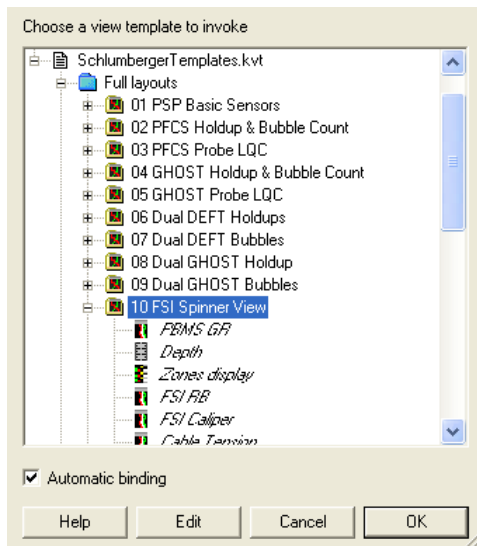


Fig. B08.1 • List of templates

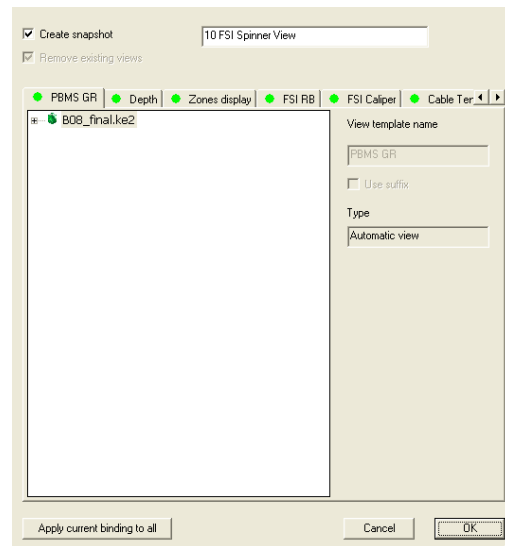




Fig. B08.2 • FSI template creation

The snapshot appears but the depth range is inadequate. This is because the shut-in passes were logged well above the reservoir, only for calibration purposes.

- Call the Depth scale dialog to set the depth range to [1440m,1530m]. Click on Apply. Note that you can save this depth range as the default for the zoom reset, by pressing on of the buttons  before exiting the dialog (the first one sets the default depth range to the current display depth range, the other one sets the default depth range to that specified in the dialog).
- Click on OK to quit the dialog.
- Add the SPIN and SCVL views and Update the snapshot using the 'store current screen' button .

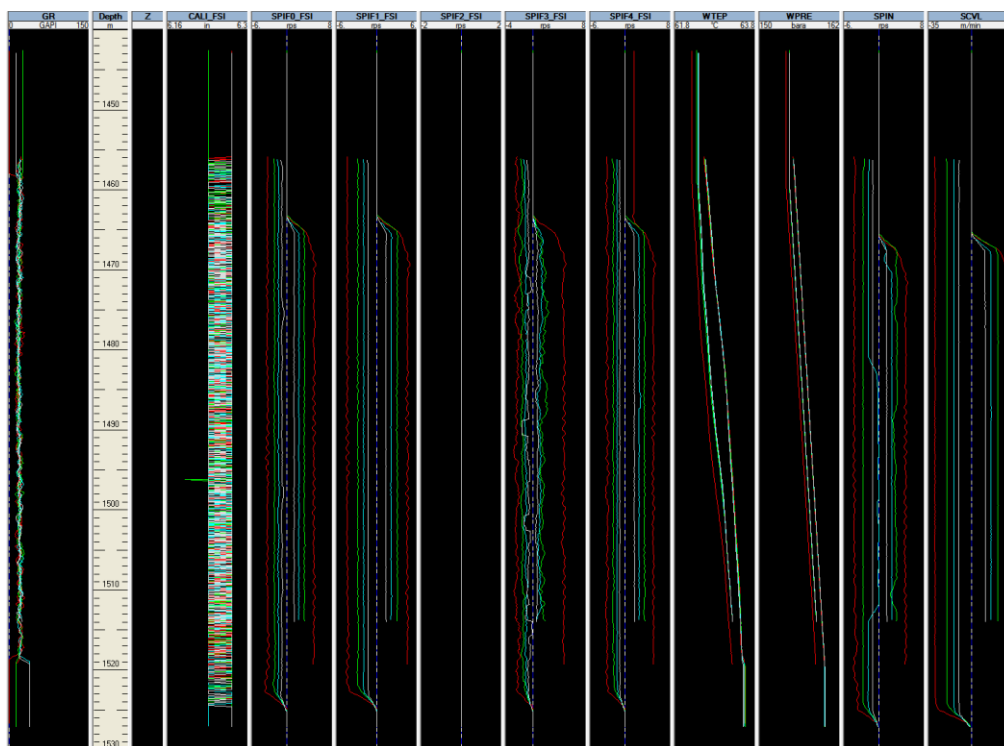


Fig. B08.3 • Snapshot with FSI spinners

It can be quickly seen that SPIF2 is dead.

B08.1.2 • Spinner Calibration

Different ways are offered to calibrate FSI spinners: either individually from in-situ measurements or using a constant value for the slope and thresholds all over the logged interval. Here, all spinners (FSI and conventional spinners) will be individually calibrated, based on the definition of spinner calibration zones:

- Go to the PL Interpretation panel and click on 'Information' to create a new interpretation.
- Accept the default name on the first dialog.
- Choose the cable speed SCVL and keep the default spinner calibration 'FSI individual'. Each FSI spinner is automatically selected for calibration and cannot be unselected.
- Tick SPIN in order to calibrate the central spinner as well and validate with OK.

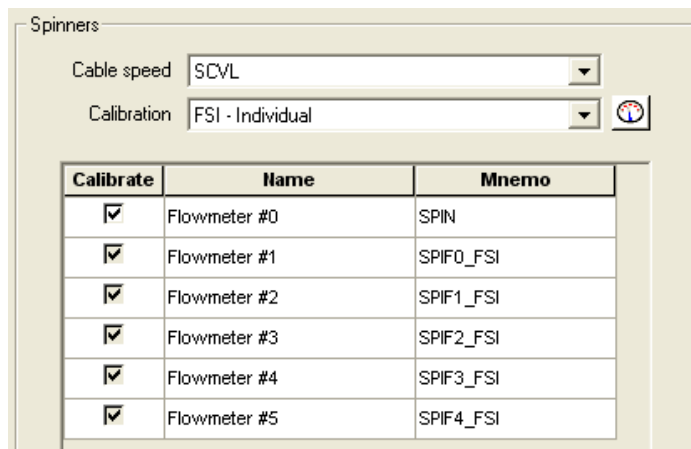



Fig. B08.4 • List of spinners available

In this mode, each FSI spinner will be calibrated the same way the conventional spinner is. We must therefore create the calibration zones. Considering the data, one zone is enough.

- Create a spinner calibration zone on the interval [1470m, 1480m].
- Go to the Calibrate option.
- Go through the spinners in turn (you can use the  arrows next the spinner drop list to do so).
 - SPIF0: slopes are OK, set the thresholds from the intercepts.
 - SPIF1: slopes are OK, set the thresholds from the intercepts.
 - SPIF2: dead.
 - SPIF3: disable the point for pass down 1, recalculate positive line, set the thresholds from the intercepts.
 - SPIF4: set the thresholds from the intercepts.
 - SPIN: set the thresholds from the intercepts.
- If you press 'All results', a window pops up showing the active spinner slope and threshold for the selected zone. If you select 'All spinners', the different spinners slopes and thresholds are displayed (see below) and can easily be adjusted.

	Spinner	Zone	Slope (+)	Int (+)	Slope (-)	Int (-)	Thresh(+)	Thresh(-)
			rps/m/min	m/min	rps/m/min	m/min	m/min	m/min
1	SPIF0_FSI	Zone 1	0.177	3.283828	0.19	-4.527247	3.280000	-4.530000
2	SPIF1_FSI	Zone 1	0.164	2.372929	0.163	-2.398005	2.370000	-2.400000
3	SPIF2_FSI	Zone 1	N/A	N/A	N/A	N/A	0.000000	0.000000
4	SPIF3_FSI	Zone 1	0.107	3.902743	0.099	-2.880916	3.900000	-2.880000
5	SPIF4_FSI	Zone 1	0.168	0.638056	0.148	-2.722460	0.000000	0.000000
6	SPIN	Zone 1	0.171	2.438361	0.165	-4.236041	2.440000	-4.240000

All spinners Order by spinners

Fig. B08.5 • Spinners results

- Quit this window and the calibration with OK.
- Generate the apparent velocities for all spinners with the defaults.

The resulting channels appear in the browser in a 'Calculated Log Data' sub-folder of the interpretation node.

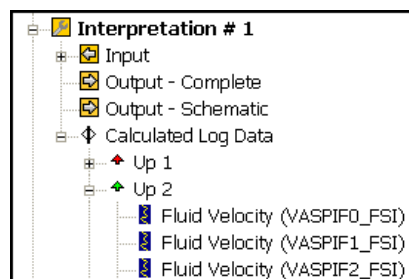


Fig. B08.6 • Spinner apparent velocities

- Use the Show/Hide view dialog to set up the screen with VASPIFx views.
- You can create a snapshot called 'Vapps' for this layout.

If the above steps were followed you should see that below 1455 m, and except for VASPIF3 in pass D1 and up passes for VASPIF4, all FSI velocities are spot on (at 0).

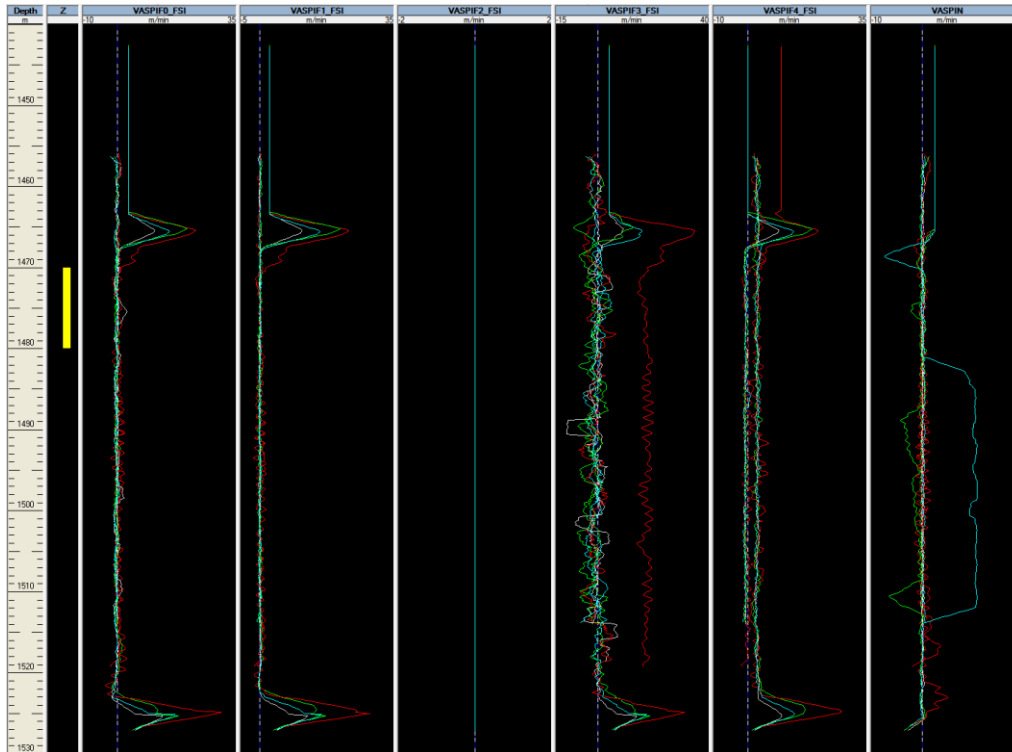


Fig. B08.7 • Display of spinner apparent velocities

This is the spinner calibration that we will use to interpret the data in the flowing survey.

B08.2 • Flowing Survey: Handling Data

- Create a new Survey called 'Flowing' with short name 'FI'. Enter the surface rates [Qw=10m³/D, Qo=1600m³/D, Qg=465000 m³/D].
- Load both Up files B08Up1.las and B08Up2.las (set the pass type to Up).
- If needed, define the mnemonic 'ACCE' as 'Always filtered'.
- Import (some Gas holdup data are empty and therefore, not loaded).
- Set the depth range to [3300m, 4000m]. You can set it as the default depth range.
- Go to Survey-Tool info, and ensure that the blade diameter for SPIN is 0.064 m. Press OK.

In the flowing passes, some sensors were giving erratic measures: the corresponding data have been removed from the LAS files to avoid tedious cleaning procedure for the user (note that the 'Hide parts' or 'Delete parts' options offer an easy way of doing it as shown next).

Again, in order to perform a quality control of the various tool readings, we will use the view templates option.

- In the Schlumberger templates, full layouts, call the following in turn (snapshots are created).

B08.2.1 • PSP basic sensors

- Invoke templates with .
- In Full layouts, choose PSP Basic Sensors template (keep all defaults).

All sensor readings seem OK, except for spikes on PFC1 and PFC2: they can be cleaned with the 'Hide parts' or 'Delete parts' options in the browser.

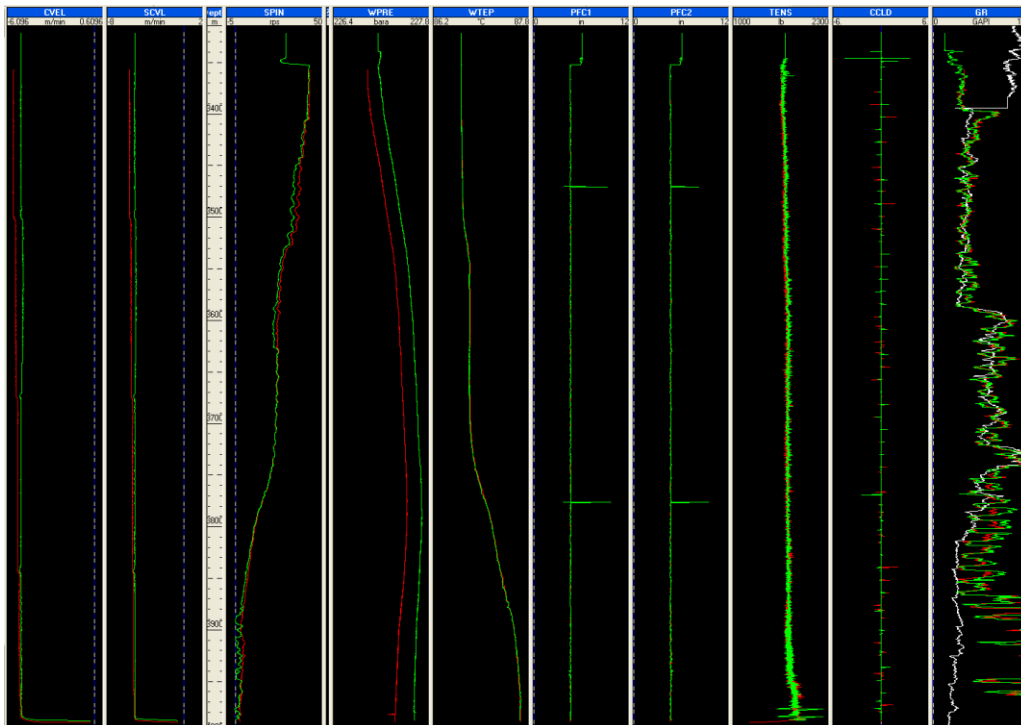



Fig. B08.8 • PSP basic sensors display

- Click twice on the PFC1 track header to expand the view.
- Use the 'Nearest curve' button  and click close to pass Up2.
- The browser opens with the curve highlighted. Select 'Hide parts'.
- Click and drag in the PFC1 track with the left mouse button in order to select the area of the curve to hide: from 3460 m to the very bottom depth.

When the mouse button is released, the following window pops up.

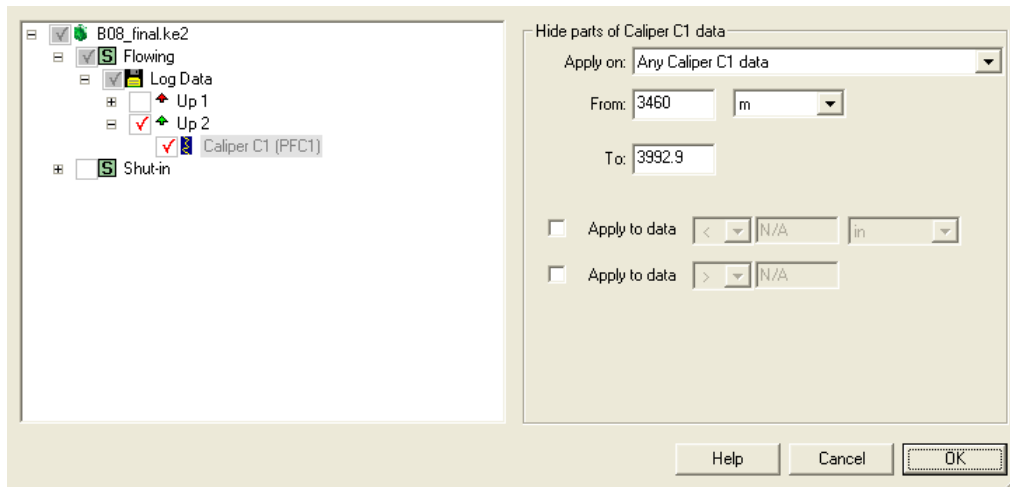


Fig. B08.9 • Hide parts dialog

The user is offered the possibility to hide parts of the selected pass on the depth interval just defined with the mouse, above or below a certain value. The choices can be applied to other passes too and/or to any other type of data.

- Check the box 'Apply to data >' and enter 0.14 m.
- Validate with OK.
- Redo the same procedure for PFC2.

In the PFC1 and PFC2 tracks below, the hidden spikes appear in gray.

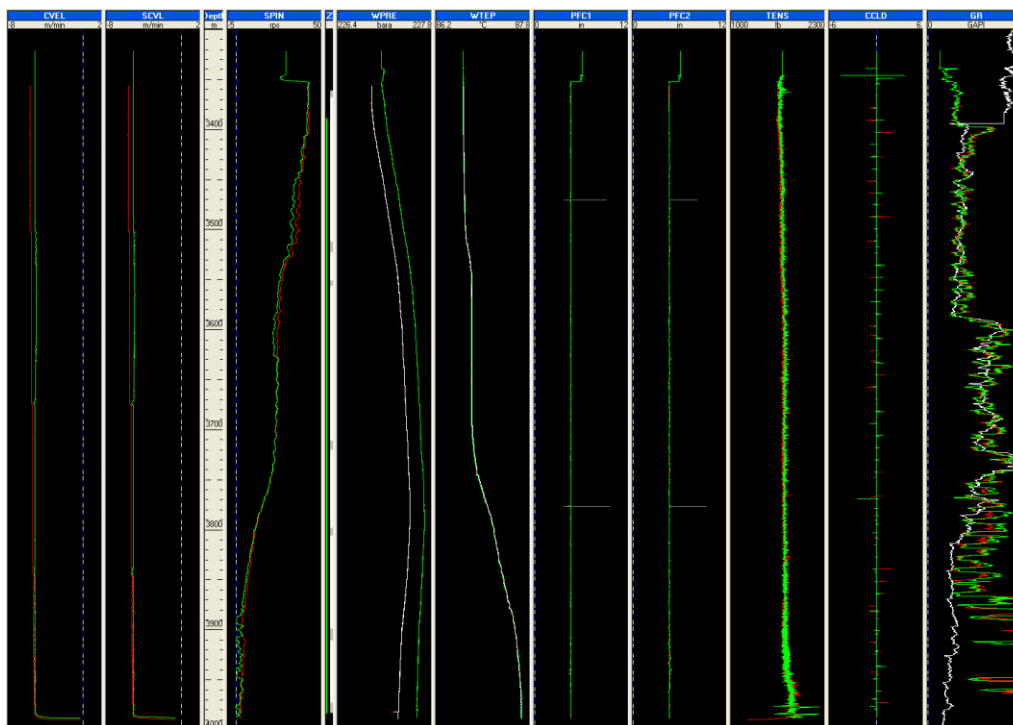


Fig. B08.10 • Display with caliper hidden parts

B08.2.2 • PFCS holdups and bubble counts

- Invoke templates with .
- Call PFCS Holdup and Bubble Count template (keep all defaults).

The PFCS probes are all very suspiciously flat: we will not consider this tool when interpreting the data.

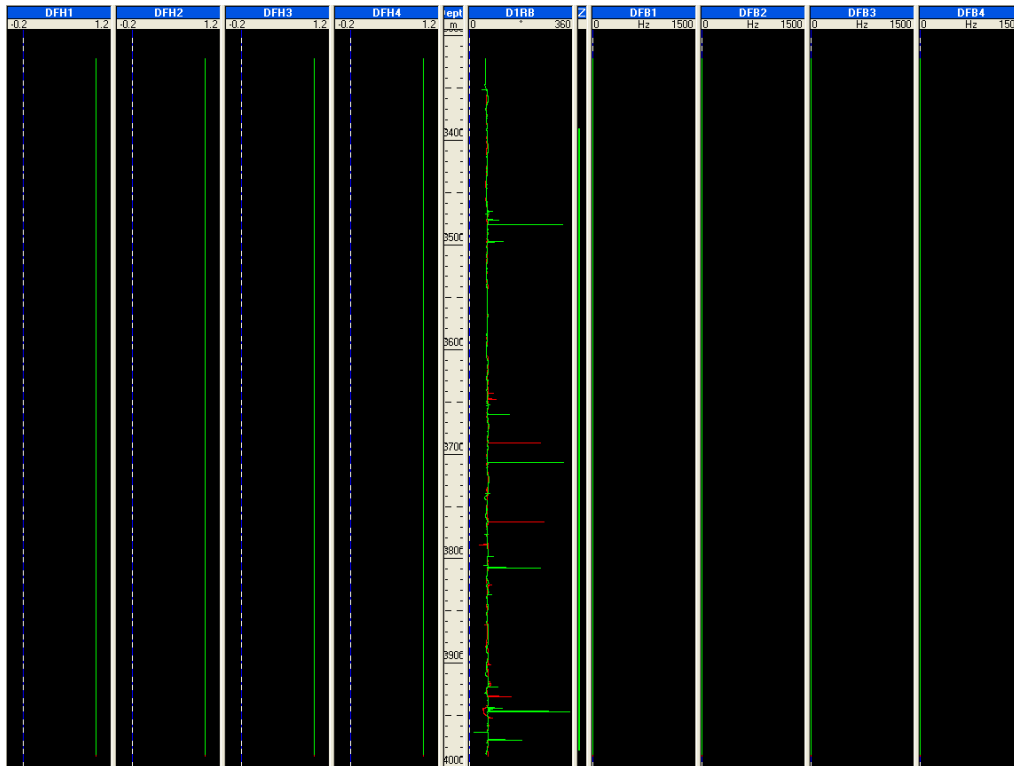


Fig. B08.11 • PFCS and bubble counts display

B08.2.3 • FSI spinner view

- Invoke templates with .
- Call FSI Spinner View template (keep all defaults).

The following picture shows the original data of the FSI spinners. The hidden parts of SPIF0_FSI appear in gray. As it was looking suspicious in Up1 and Up2, it was cleaned using 'Hide parts' on some sections. SPIF2 is dead and will then be ignored in the calculations.

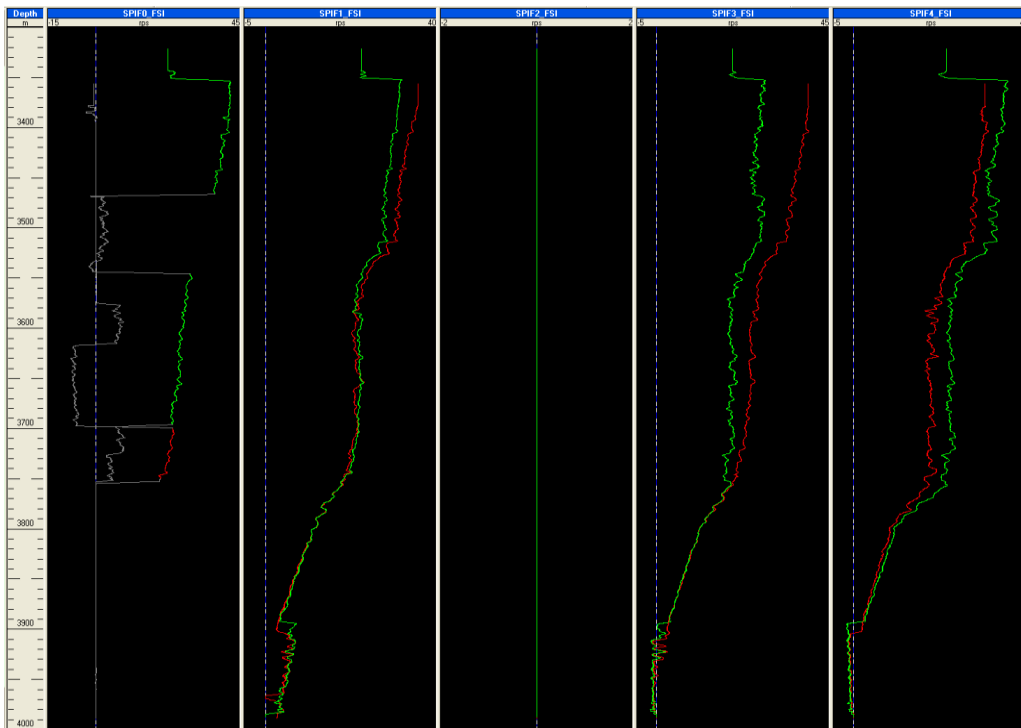


Fig. B08.12 • FSI spinners display after cleaning

This snapshot shows the data cleaned, and corresponds to the data loaded in the survey.

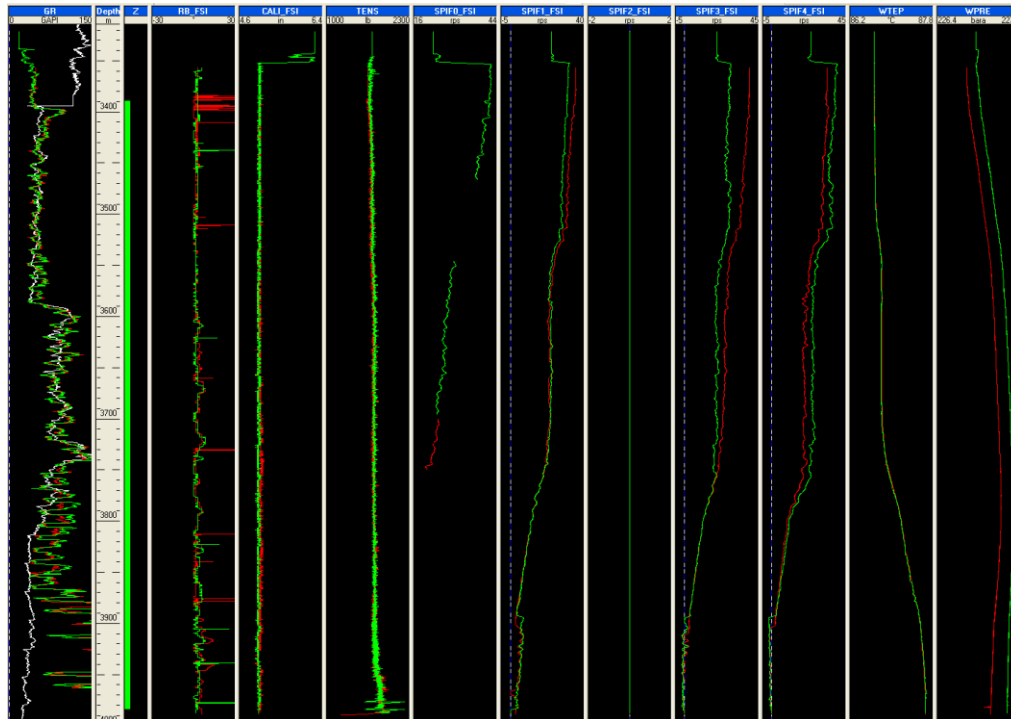


Fig. B08. 13 • Conventional sensors after data cleaned

B08.2.4 • FSI electrical probe view

- Invoke templates with .
- Call FSI Electrical Probe View template (keep all defaults).

There seems to be water traces on DFHF0. Some 'blips' on the others.

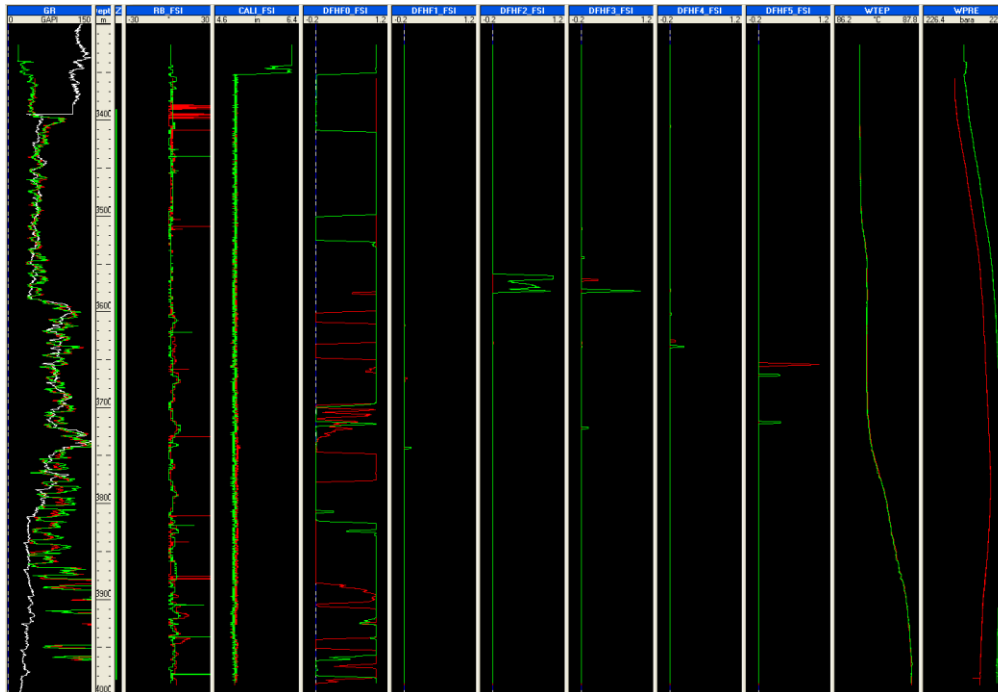



Fig. B08.14 • Electrical probes display

The surface rates indicate that there is almost no water produced and the electrical probes are seeing only little water: we will then not consider water when analyzing the well, by ignoring the electrical probes in the calculations.

B08.2.5 • FSI optical probe view

- Invoke templates with .
- Call FSI Optical Probe View template (keep all defaults).

As shown next, it seems that GHHF1 is not responding and therefore it will be ignored in the processing. The other probes were giving erratic measures. They have been cleaned using 'Hide parts'.

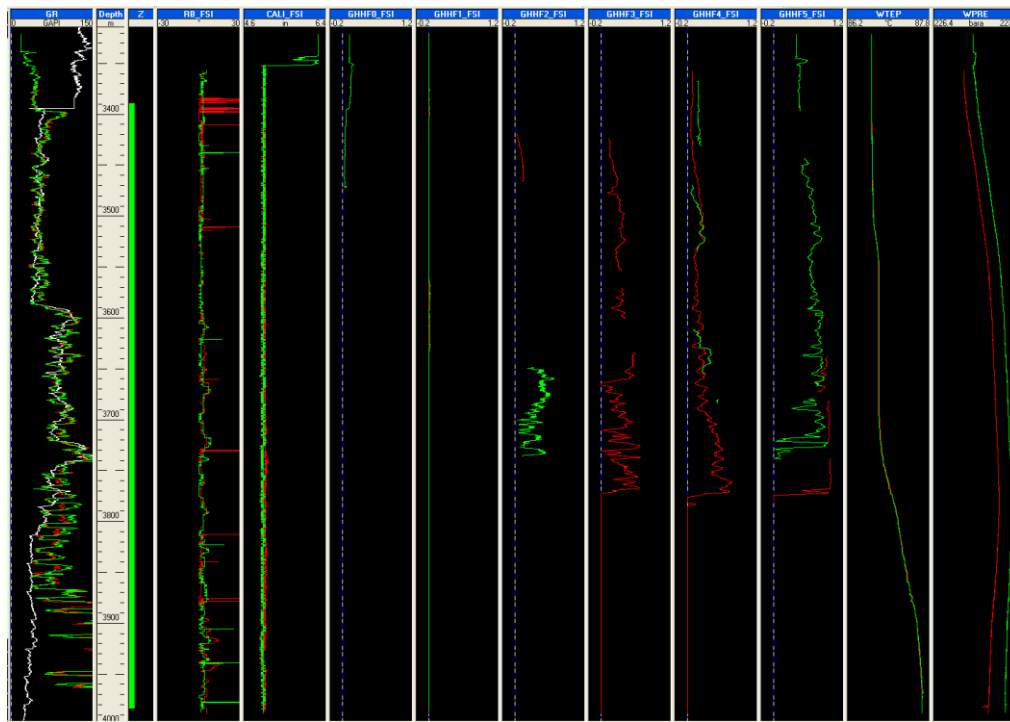


Fig. B08.15 • Cleaned optical probes display

Below is a snapshot of the original probe measurements, showing all erratic readings, before the cleaning procedure.

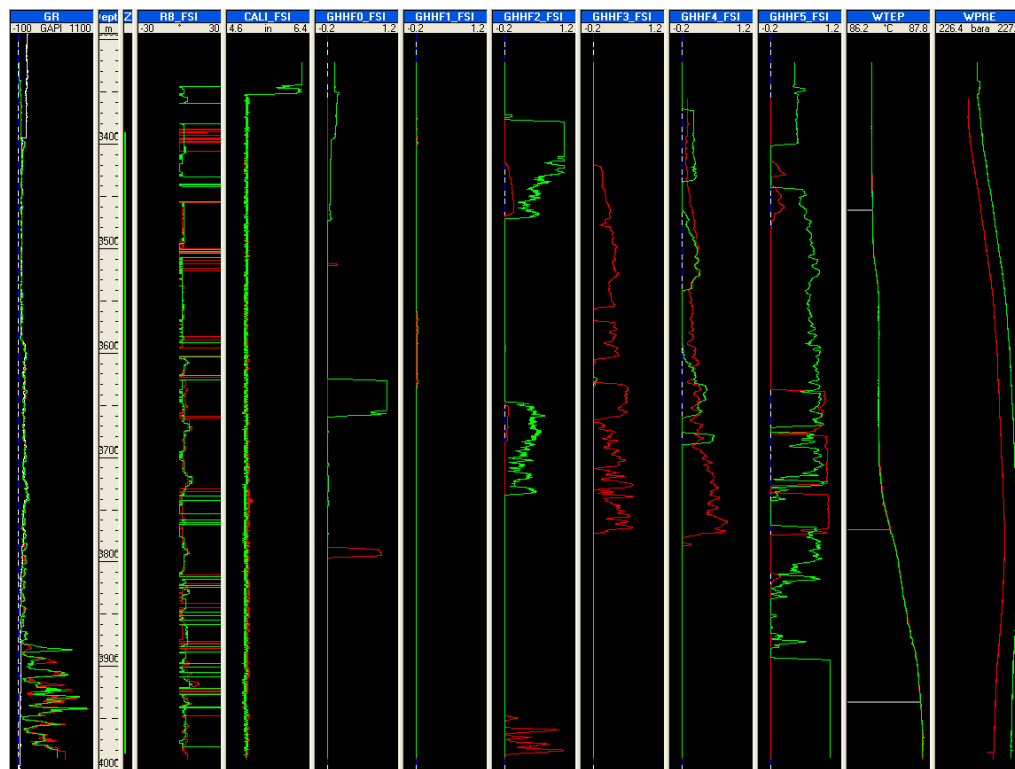



Fig. B08.16 • Original optical probes display

Instability everywhere reveals an intermittent flow structure, linked possibly to the horizontal well trajectory. This is exemplified on image views.

We can add two holdup image views for both passes to help understanding the probe readings. An easy way to achieve this and provide for the future is to add a view template:

- Settings – Default display – Templates: add in the Local templates a new image view template using  button. Call it 'FSI - Holdup' and set the 'Tool' to FSI.

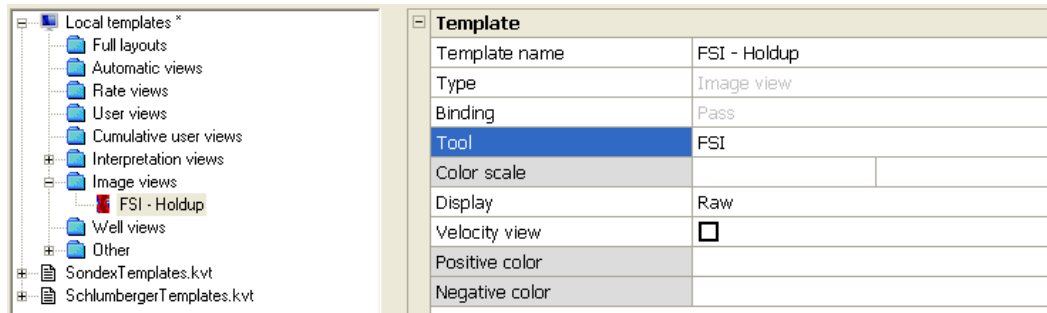



Fig. B08.17 • creation of an image view template

- Validate on OK, and in the display toolbar, Invoke the template with .
- Select the 'FSI – Holdup' template we just created and OK.
- In the next dialog, expand the nodes and tick both Up1 and Up2 of the Flowing survey, change the view title to 'Holdups', tick 'Use suffix' (the short name of the survey will be added to the view title, followed by pass type and index) and ensure that the tool to is set to 'FSI'.

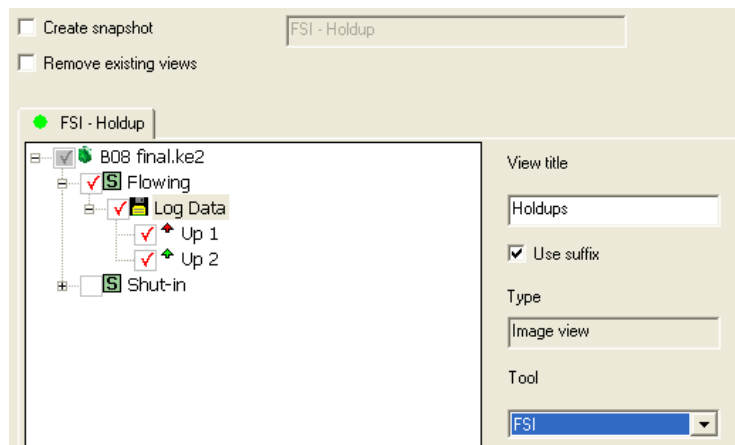


Fig. B08.18 • Image view dialog

A snapshot of both images could be created by selecting the 'Create snapshot' option, but we will rather add these views to an existing snapshot.

- Press OK to create the views.
- Recall the 'FSI Optical probe View' snapshot and add both images to the display. Update the snapshot.

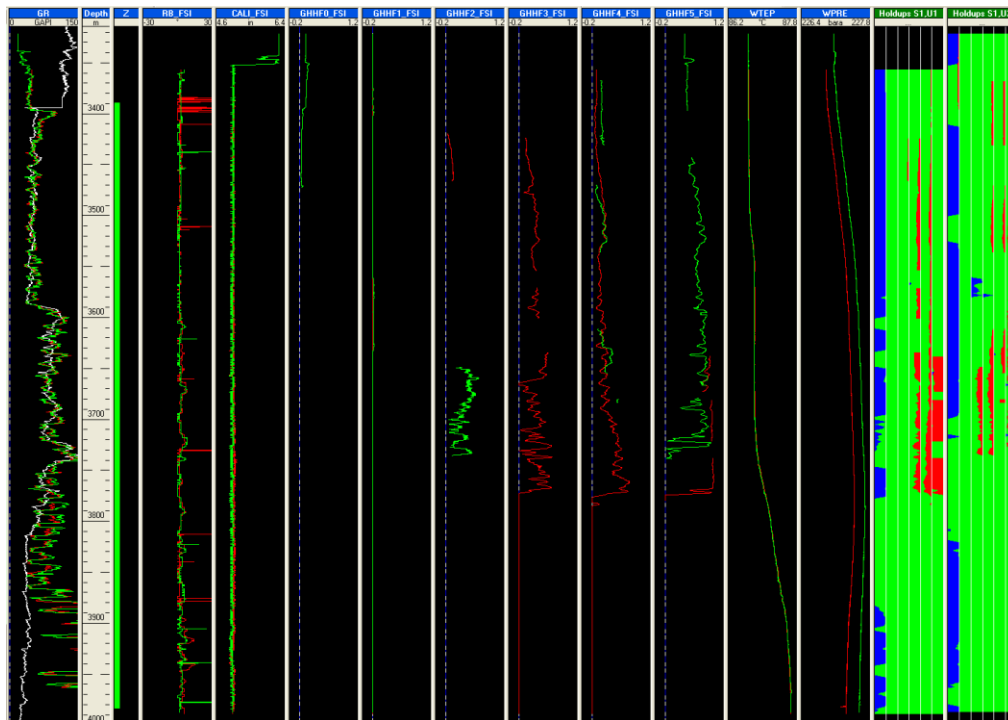


Fig. B08.19 • Optical probes display with image views

Note that velocity views are also possible but we will see that later in this document.

As decided earlier, we will now ignore the probe GHFH1 and spinner SPIF2.

- Go to Survey – Tool Info, 'Multiple probe' tab.
- Select the FSI in the tool list.
- Set SPIF2 and GHFH1 to ignore.

Note that, since the beginning, snapshots have been created although there was no existing interpretation. Such snapshots are labeled with the survey short name preceding their name (e.g. '[FI] PSP Basic Sensors'). They will be available for any interpretation created later. If such a snapshot is modified by adding a view created under an interpretation or containing interpretation dependent data, the snapshot name will change with the short name of the interpretation replacing the short name of the survey (e.g. '[I1] PSP Basic Sensors'). Such a snapshot will then only be available when Interpretation I1 is active.

B08.3 • Flowing Survey: Data Interpretation

The review of the sensor measurements done above helped us deciding which data will be used: spinner and optical probes for the FSI, none from the PFCS and possibly all conventional tools. The data from the FSI must now be processed to generate averages, according to criteria chosen by the user. These average outputs will then be used as inputs for the interpretation and the interpretation done as for conventional tools.

- Create a new PL interpretation.

- Choose to initialize from the Shut-in interpretation in order to retrieve the 'Spinner Calibration (zones and lines)'. This is the default choice. Click on OK.
- In the 'Interpretation Settings' dialog, it can be checked that the calibration type has been correctly carried on from the Shut-in survey interpretation. Click OK.
- Select PVT and define a saturated oil + water; Salinity = 26000 ppm; bubble point = 236.6 Bar @ 85°C; match this constraint and accept to change the GOR.
- Accept default PVT for Gas.

B08.3.1 • Apparent velocities

When creating the interpretation, the spinner calibration was copied from the shut-in survey and done on a zone not covered by the flowing data. If you go to 'Calibrate', you will see the slopes and thresholds of every spinner but no data.

- Click on 'V apparent' and accept all defaults to generate the apparent velocities.
- Create a layout with the Vapp views and RB_FSI (see below).
- Add the corresponding snapshot 'Vapps'.

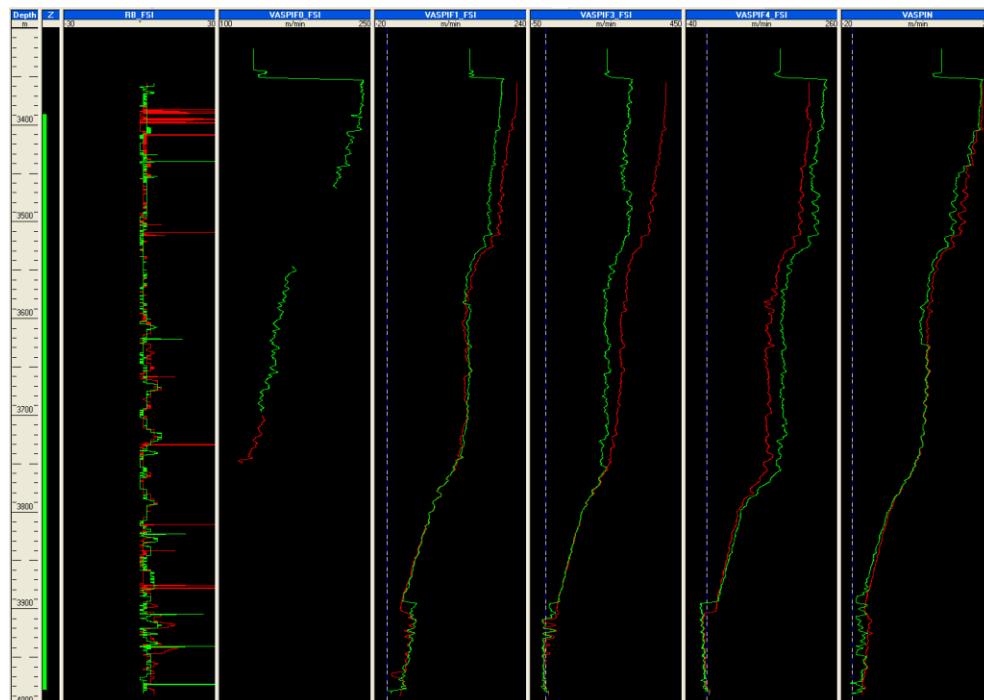


Fig. B08.20 • Apparent velocities and relative bearing

Some data parts are missing in both passes for VASPIF0_FSI as erratic data was removed from the files. VASPIF2 is not generated as the probe is ignored at the tool level.


B08.3.2 • MPT Processing

The MPT processing allows calculating, at any depth, one centered value from distributed measurements. This possibility is offered by reconstructing the probe measurements on the basis of a 2D representation of the holdups and the velocity, with the possibility of adding external

constraints. The 2D model parameters are evaluated by matching the reconstructed data on the raw data, using a non linear regression.

Once obtained, the reconstructed values for the holdups and the velocities are combined to calculate the local phase velocities. By integrating this information over the cross-section at every depth, the average phase rates and holdups are produced, waving the need for slippage models. These averages are then be used to feed a conventional PL interpretation.

Three 2D models are available for the FSI tool (linear, Mapflo and Prandtl) and as indicated before, physical constraints can be added to the non linear regression: phase absence, vertical segregation (e.g. water holdup decreasing from bottom to top), conventional tool measurements (density, capacitance, spinner).

- Click on 'MPT processing' (this interpretation option is enabled whenever MPT data have been identified as such among the Survey log data).
- Next to 'Tool type', click on the icon  to select the FSI measurements to be included in the processing. Untick 'Water holdups' as it was decided to ignore the electrical probes.

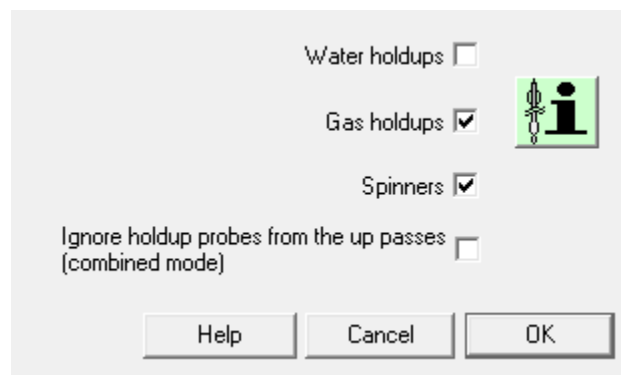



Fig. B08.21 • Holdups selection

- Select the 2DModel 'Linear Velocity – MapFlo Holdups'. The  button on the same line allows selecting the velocity extrapolation mode. Ensure that '0 at the pipe walls' is selected, so the fluid velocity profile will consider a null velocity at the pipe wall. The Mapflo 2D model forces an areal average.
- In Range, choose to process at 'Interval' with a value of 1m. This interval value also governs the depth spacing for the averages.
- In 'Phase constraints' impose the constraint 'Yw =0' as water production is negligible.
- Choose to simulate VASPIN. A reconstructed VASPIN channel will be output to check for consistency.
- Select passes Up1 and Up2 in 'Combined pass' mode.

In combined mode, the readings of the selected passes are all matched simultaneously at each depth, using the same 2D model: this mode behaves as if there was a FSI tool with twice the number of probes. This can be of great interest when some probes failed in one pass but not in another. Bear in mind that this mode is valid only if the flow conditions have not changed or are very similar between the passes.

- Choose to generate 'Error channels', 'Average of the outputs' and 'Phase rates'.

Error channels are the relative errors between the raw and the reconstructed data. 'Average of the outputs' generates the MPT process averages for the interpretation input. 'Phase rates' will produce the reconstructed rates of the phases.

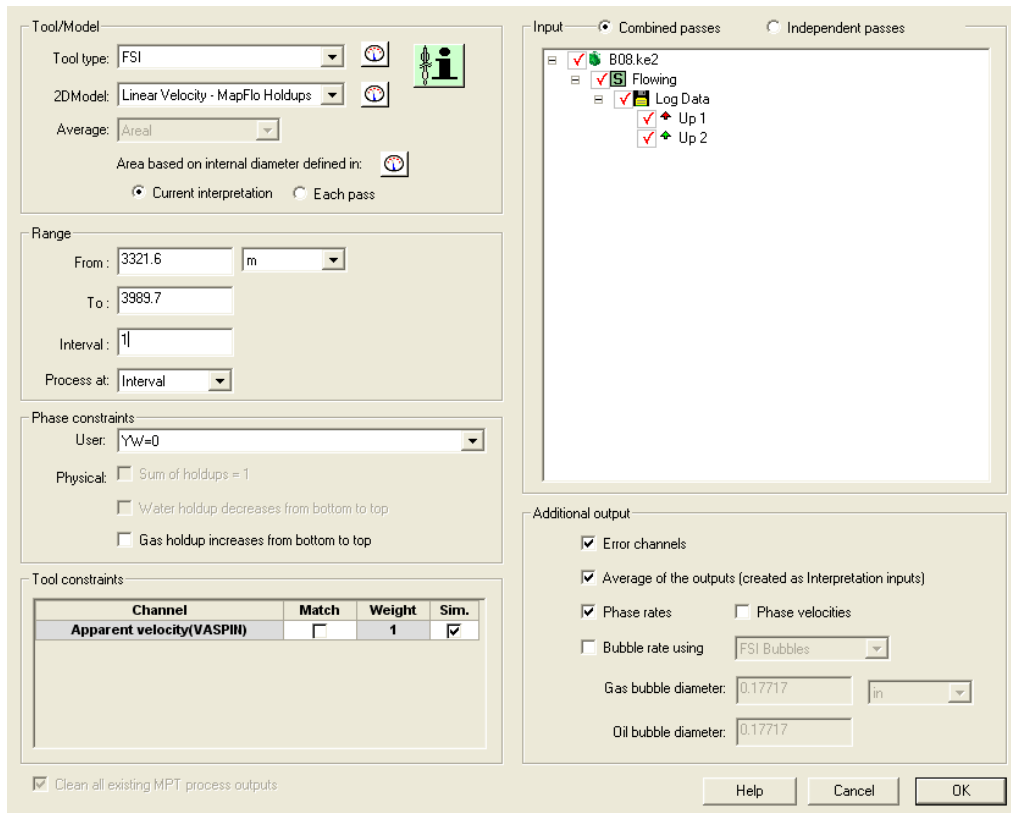
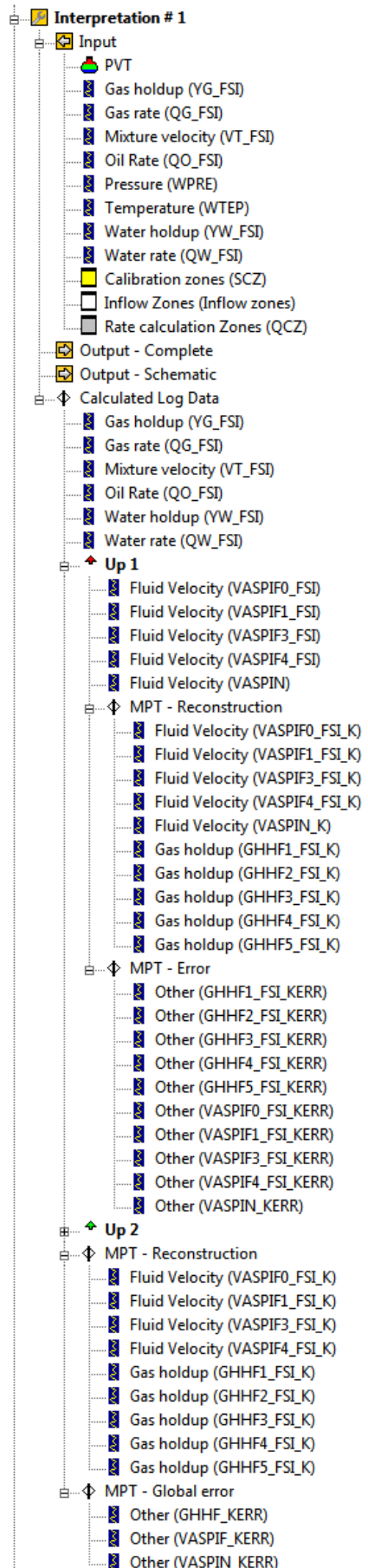


Fig. B08.22 • MPT processing dialog

- When OK is given, Emerald indicates that the process will generate more points than a maximum, defined in 'Settings – Interpretation – Misc'. The interval will be changed automatically (to 3.xx m) to honor this condition. Accept with OK.

At the end of the process, a number of new channels have been created under the 'Calculated Log Data' folder in the browser (under Interpretation #1 folder). The next figure gives the details. Beware that those additional channels will obviously take some space; this is why the generation of errors is optional. The combined process averages of the holdups, rates and mixture velocity have been copied to the Interpretation input, as requested.



 Averages out of the MPT processing

 Pass average values (holdups, velocities, rates)
 from combined processing

 Vapparent (generated previously)

 Reconstructed channels with `_K` suffix

 Errors with `_KERR` suffix

 These reconstructed channels are the 2Dmodel
 prediction for a FSI tool vertical and centered (no
 bearing). These channels are used for the FSI
 holdup image views in Combined passes mode

 Overall errors on reconstructed tools. Arithmetic
 averages of the pass errors on the different
 probe groups (optical probes and spinners)

A number of new views have been created, some appearing automatically in the layout up to the usual limit. Automatic views are created for the averages, and a global error view called 'MPT Errors' + Interpretation short name is create to display the overall errors on reconstructed tools.

- Use the hide/show view dialog to organize the layout with:
[Depth – Z – MPT errors I1 – QO_FSI – QG_FSI – VT_FSI – YG_FSI]
- Add the corresponding snapshot 'Processing'.

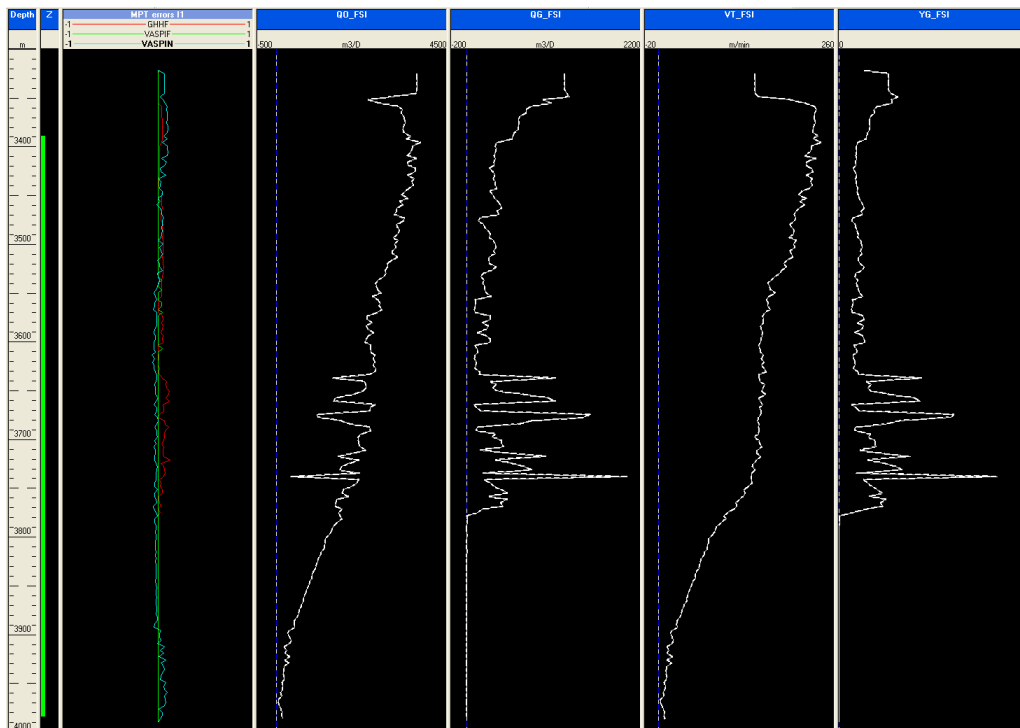


Fig. B08.23 • 'Processing' snapshot


The error view shows that:

- The VASPIF curve is close or equal to 0 over the entire log interval: the FSI spinner velocities are almost matched with no error, except at depths where a spinner is at the same position in both passes, but reads a different value. The combined process then sets the model to the average value. Otherwise, no difference is found between raw and reconstructed, because of the linear model with no central spinner constraint.
- The GHHF are further - more on this later.
- VASPIN, the error on the central spinner measurement is not far. Note that the reconstructed value is an average of the 2D model on the disk of radius spinner blades diameter.

The other views are displaying MPT averages (dashed lines from calculated log data node) and Interpretation inputs (continuous line). Curves are identical because of the combined process. The results obtained are erratic (spikes) due to few valid measures and the instable flow in the well.

We take a further look at the results. The newly generated channels (reconstructed, errors) can also be seen on the automatic views.

Be sure that you saved the Processing snapshot.

- Recall the snapshot 'Optical probe view'.
- In the display toolbar, you can display raw vs reconstructed channels, or the errors, using the display options . Select the error display option.

Below is the view of the errors for the GHHF probes.

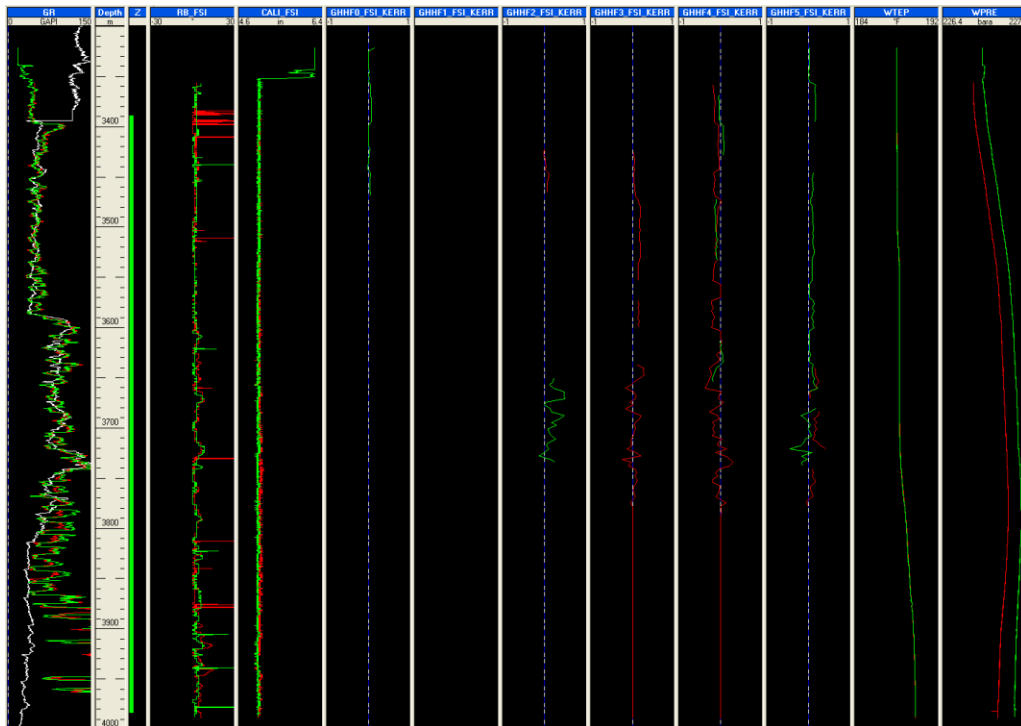


Fig. B08.24 • Optical probes errors display

The GHHF1_FSI_KERR track is empty as the probe was ignored, therefore the error between raw and reconstructed could not be calculated. There is a slight error on the other probes as already noticed on the global error view, also visible on raw vs reconstructed display mode.

- Finally we can recall the Vapps snapshot.
- Display the reconstructed vs raw.

The reconstructed channels appear in dashed lines (see below). As noticed earlier, there is no difference.

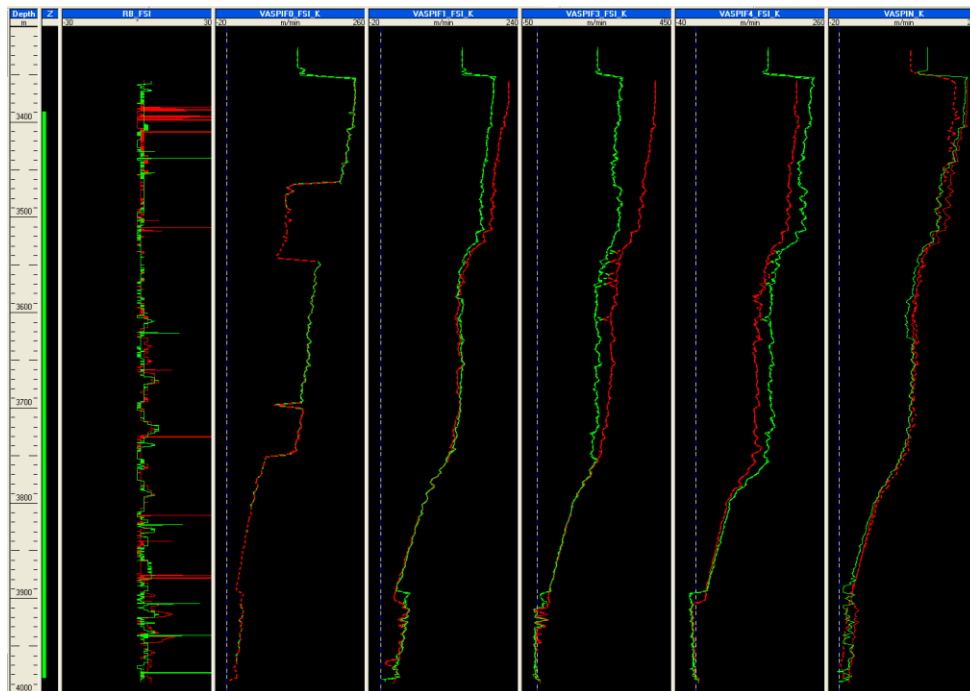


Fig. B08.25 • Apparent velocities: reconstructed vs raw

Another thing we can do is to build image views for reconstructed channels and compare those with the raw ones.

- Empty the screen (keep only the depth track).
- Recall the Holdup image view for pass Up1 ('Holdups FI, U1').
- Select the browser option to create a new Image view. As a Combined passes MPT processing was run for the FSI tool in current interpretation, the property dialog offers by default Combined passes and 'Reconstructed'. Call it 'Holdup FI, K' and press OK.

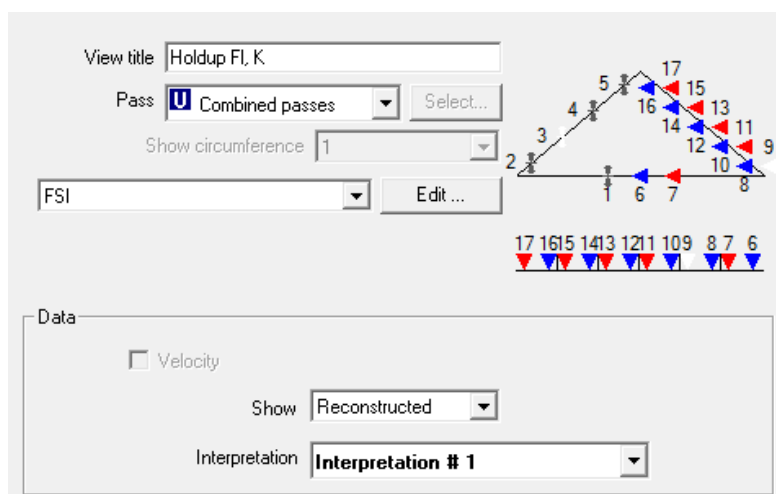


Fig. B08.26 • Image view dialog

As noticed earlier, the image view displays the holdups predicted by the 2Dmodel for a FSI tool vertically centered in the pipe (e.g with no bearing). These data are visible in the reconstructed

probes automatic views, with a white dash line aspect by default (for instance, you would see those by calling the FSI optical probe view snapshot, and asking for the display of the MPT processed channels).

- You can also create a velocity view to display the reconstructed data: select the New image view option in the browser, check the 'Velocity' box in the Image views properties dialog, select 'Reconstructed' and 'Combined passes', and change the view title to 'Velocity FI, K'.
- You can create a snapshot called 'Holdups'.

We clearly see on the holdup views the result of the model application: $Y_w=0$ and the influence of the stratification imposed by Mapflo model on the gas holdup (although not forced to honor gravity segregation).

It can also be noticed from the velocity view that, although the raw and the reconstructed velocities are almost identical over the entire log depth (linear model with no central spinner constraint), the reconstructed velocity profile is different from the raw velocity profile (you can create a raw velocity view for pass Up1 to see the difference). The Combined processing option is responsible for this difference, and it is actually recommended to use the Prandtl velocity model when a Combined processing is run on the FSI tool. This generally ends up with more admissible profiles in a physical sense, although phase disappearance or tool rotation may sometimes be responsible for a clearly erroneous profile (generally clearly identifiable).

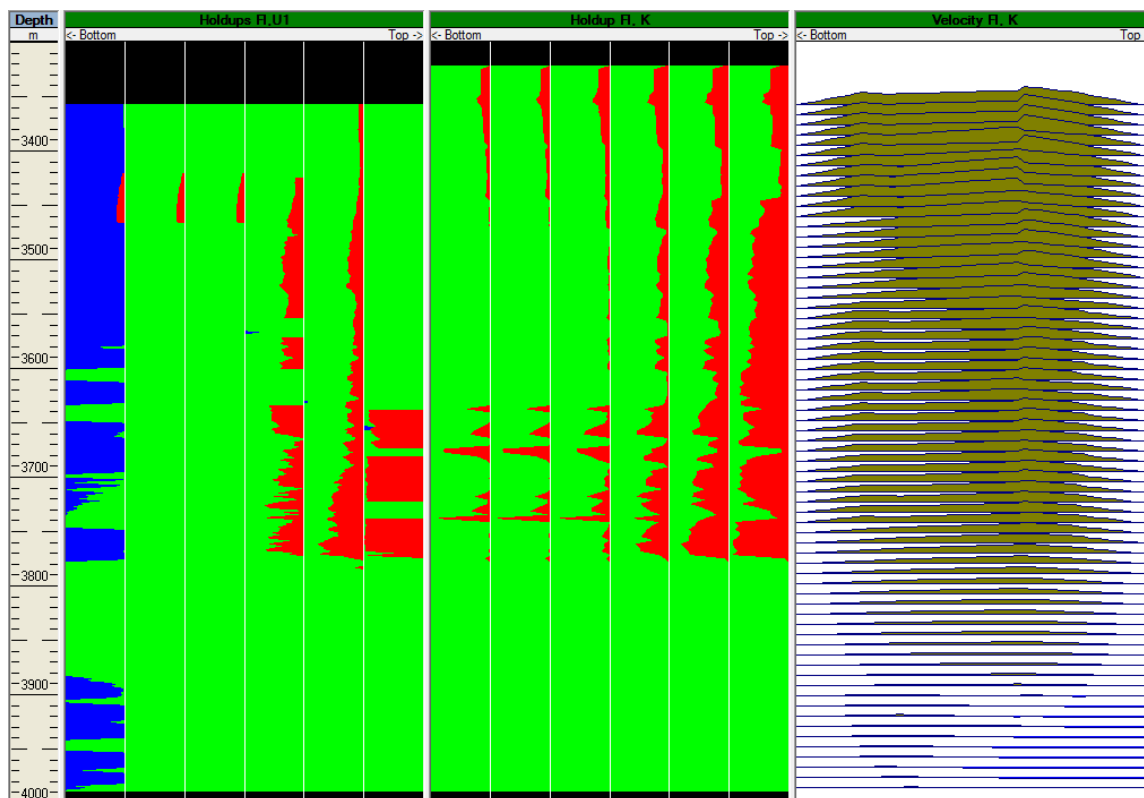


Fig. B08.27 • Holdup image views: raw and reconstructed with a velocity view

Let us call the cross-section of the reconstructed holdup view using the combined passes.

- Right click on the image view 'Holdup FI, K' and select Cross-section. The following window pops up. The cross-section depth changes when pressing shift and moving the mouse on top of the image view.

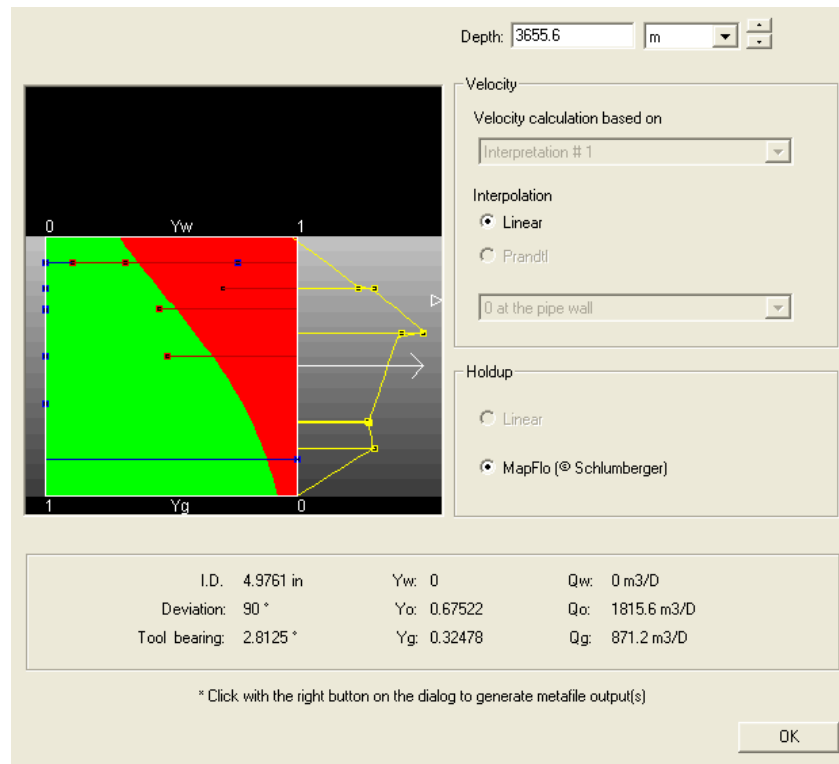


Fig. B08.28 • Image view cross-section

The different options are locked on the MPT model. The blue squares represent the electrical probe raw measurements (DFHF mnemonics - water holdups). The red squares represent the optical probe raw measurements (GHFH mnemonics - gas holdups). The red area represents the gas holdup given by the Mapflo model from bottom to top, the green area the oil holdup. The yellow squares represent the raw spinner apparent velocities, and the yellow line represents the velocity profile from the MPT model.

B08.4 PL • Interpretation

As mentioned earlier, having checked 'Average of the outputs' in the MPT processing window, Emeraude has generated copies of the MPT process averages for the interpretation inputs.

- Go to the PL Interpretation Information – Reference channels: the MPT process averages are visible.
- Define the reference Temperature and Pressure from pass Up1.

As opposed to the usual zoned approach where the residual calculations are made at the calculation zones only, a continuous approach, offered as an alternative, considers all schematic points when calculating the objective function and allows the holdups to slightly depart from the slip model predictions.

- Select the Interpretation method to 'Continuous' and validate with OK.
- Define the calculation zones in stable regions: use the manual definition Zones and enter:

3361.000	3368.000
3512.000	3523.000
3551.000	3557.000
3711.000	3720.000
3798.000	3806.000
3899.000	3911.000
3973.000	3983.000

Fig. B08.29 • Calculation zones

- Setup the screen for interpretation with the layout:
[Depth – Z – Gas holdup match – Mixture velocity match – Oil rate match - Gas rate match]

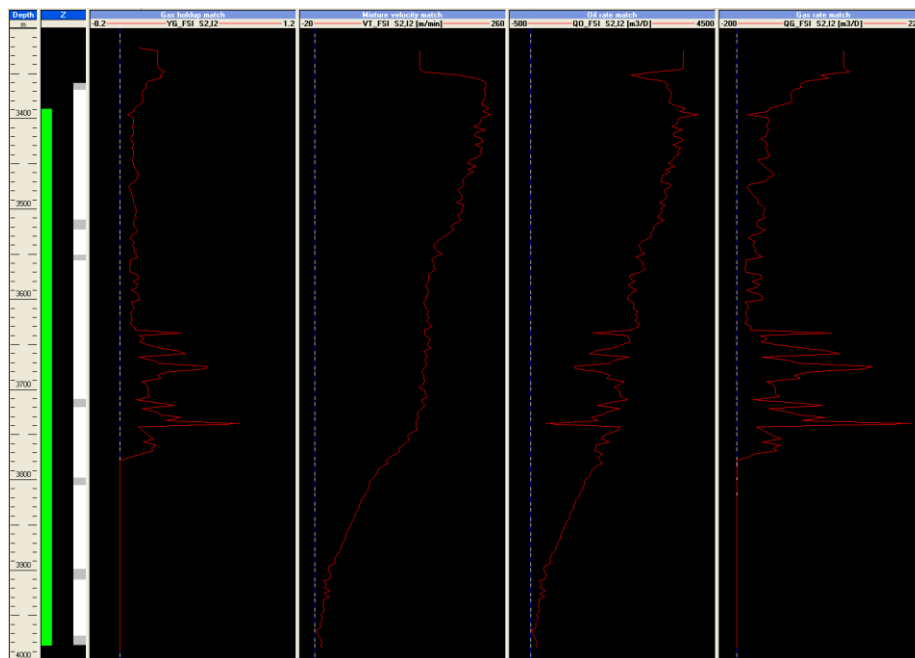


Fig. B08.30 • Data display for interpretation

- Go to Inflow Rates. The selected model is 3 Phase L-G. The selection of correlations is irrelevant as they will be by-passed in this case: more explanations below.
- Click on OK. You are taken to the Contributions screen (see below).
- Click left mouse button down on the Contribution cell for the Bottom zone, and set it to No Flow by selecting 'Closed zone'.
- Set all other contributions to Positive.
- Tick 'Match surface conditions'.
- Uncheck 'Constrain slippage sign' and press 'Global Improve'.

After the first iteration the schematic logs appear on the screen and the successive changes are visible on all the tracks (you may have to move the Zone rates dialog to see the changes).

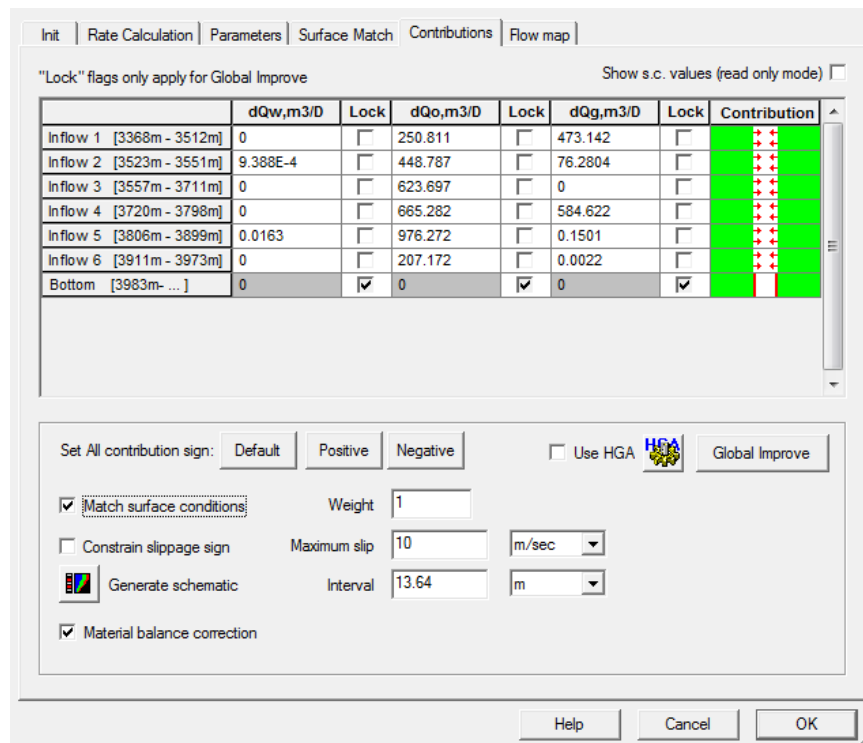


Fig. B08.31 • Contributions

- Once the process is completed, exit the dialog with OK.
- Make a snapshot and call it 'Interpretation'.

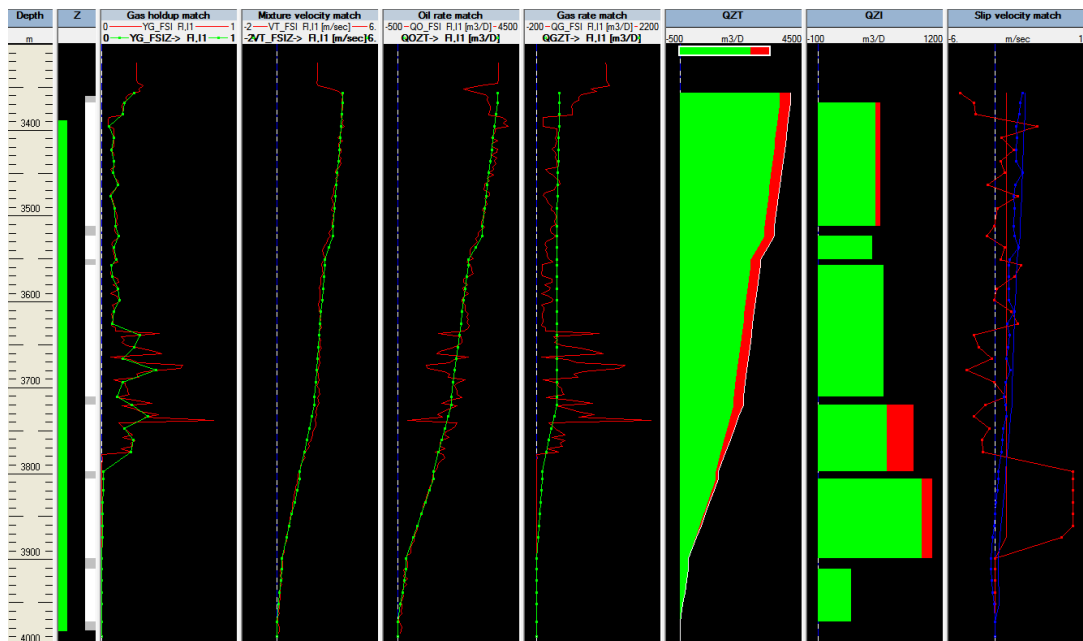


Fig. B08.32 • Interpretation display

Before going further on the solution, it can be noticed that a 'Slip velocity match' view has appeared. This view is meant to show the difference, when interpreting data in Continuous' mode, between the slippage calculated by the regression process, and that calculated by the

selected slip model(s). The blue curves are for the slippage between water and oil, and the red curves is for the slippage between gas and liquid. In both cases, the dots are on the slippage given by the regression.

Overall, the match between the raw data (in red) and Emeraude solution (in green) is good, even in zones with numerous spikes. And thanks to the Slippage velocity view, it can be noticed that this match was achieved by only a slight departure from the slip models predictions.

However, when creating the survey, we have entered surface rates [$Q_w=10\text{m}^3/\text{D}$, $Q_o=1600\text{m}^3/\text{D}$, $Q_g=465000\text{ m}^3/\text{D}$]. We can now compare them with the simulated rates given by Emeraude.

- Go to 'Inflow rates' and select the 'Surface Match' tab.

Surface conditions and rates			
Apply	Temperature:	15.555556	°C
	Pressure:	1.0135	bara
	Qw	10.0000	m ³ /D
	Qo	1600	m ³ /D
	Qg	465000	m ³ /D
Simulated rates			
Surface:	0	2223.2	5.4164E+5

Fig. B08.33 • Surface match dialog

Obviously, the simulated results give too much oil and gas. A reason for this can be that the water production, although small, was ignored: the oil content was then overestimated in the MPT process because the electrical probes were not considered.

However, entered surface rates are also questionable and several reasons can explain the difference with the interpretation results:

- Poor quality PLT measurements
- Well unstable while logging
- Surface metering equipment inaccurate
- Surface measurements made at a different drawdown
- Surface measurements made at a different time

This concludes Guided Interpretation#8.