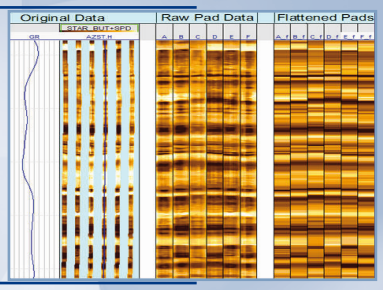
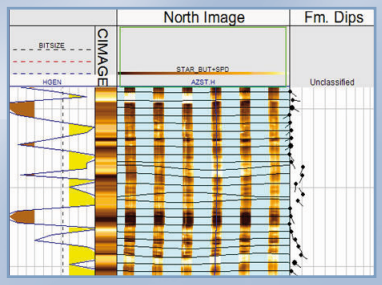
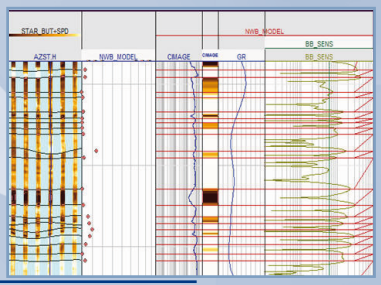
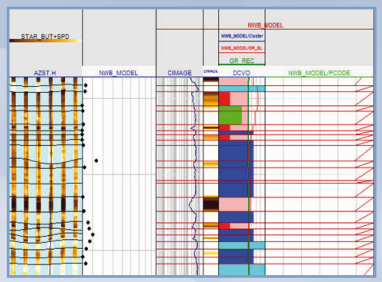
Near Wellbore Modelling









Thin-bedded reservoirs are extremely difficult to analyze using log data at conventional resolution. Standard petrophysical analysis tends to overestimate clay and underestimate net sand, porosity and hydrocarbon volume.

Near Wellbore Modelling uses high-resolution image data to create a 3-d model of the near wellbore environment. This forms the framework used to identify the component lithotypes and forward model the wireline log response.

The near wellbore model can be built from all image types where trace configuration and tool orientation are known. The processing uses progressive data reduction to generate a single curve, the "centreline" curve, representing the mean trace value (e.g. resistivity, conductivity etc.), dip and azimuth at every level in the well.

The activity of the centreline curve and other data are used to identify bed boundaries. Next, the wireline data are integrated to generate electro-facies. The program uses advanced statistical techniques and forward modelling to identify geometric bed-types with similar wireline signatures. Both standard and advanced logs (for example, NMR) can be used.

Forward modelling is performed to validate the model. A successful forward model provides an accurate estimation of net-to-gross ratio, as well as petrophysical properties of beds below the resolution of most logging tools.

LOGICOM E&P

Logicom E&P Limited
Westcott Farm House, Westcott, Aylesbury, HP18 ONX, United Kingdom
Tel: +44 (0) 1296 655511, Fax: +44 (0) 1296 301860
Email: support@logicomep.com, Web: www.logicomep.com

Image Analysis

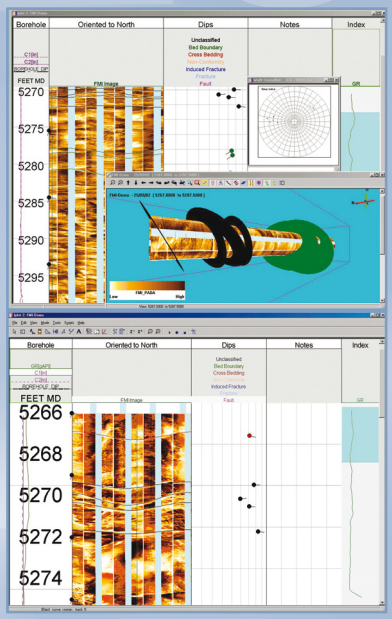


Image logs are an integral part of most modern suites, and LogIC allows the display and manipulation of all the common tools. On top of all the standard image log processing, integration of these high-resolution data with conventional logs adds terrific value to a standard analysis.

Image log data pre-processing includes speed correction, filtering and re-processing of the contractor's data with user-defined parameters.

For display, comprehensive facilities include a number of industry-standard and user defined colour maps, and several normalization options with user definable windows.

Depending on the log, a range of analysis tools is available. Common to all is the ability to pick dips manually by clicking on the observed features, or matching templates. Dips so picked are immediately displayed as sine waves on the image, and as tadpoles in a separate log track. Dips can be classified and coloured by class.

2D-Breakout plots (based on multi-sample caliper tools) can be drawn in a dedicated track at regular intervals or drawn 'on-the-fly' as the pointer moves down the plot, creating a 'movie' effect.

The image log data can be viewed in a 3D window along with the interpreted dip planes. The image can be rotated/zoomed in a variety of ways to highlight features of interest. The viewpoint can be set inside the wellbore to help see breakout in relation to the image data and the casing as you 'fly' down the well.

Live linkage between all the plots means that, for example, re-classifying a dip in the logplot automatically refreshes the other open stereonet/3D displays.

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