



NEWSLETTER May 2009

Message from the LPS President:

April saw a very well attended LPS Evening Meeting at Burlington House, where Tim Whittle of BG talked on "The Determination Of Minimum Tested Volume And Future Well Production From The Deconvolution Of Well Test Pressure Transients." It was particularly good to see a number of younger LPS members present, and we even attracted a number of reservoir engineers who might normally attend SPE meetings in preference to LPS/SPWLA. I hope we made them feel very welcome as wireline and LWD formation testing and well testing is an obvious area of overlap between the subsurface technical disciplines and it is always good to identify topics that have as wide an attraction as possible to boost attendance. I will be challenging the committee to identify other such topics for possible presentation in the future. Watch this space!

In recognition of younger LPS members, May's talks will be from the LPS sponsored students. Please have a look at the abstracts later in the newsletter and support our younger membership by attending. It should be a great opportunity to experience presenting in an external forum for our sponsored students, so be gentle with them but ask probing questions! I'm sure they will appreciate them.

Plans are also nearing completion for our summer seminar on petrophysical aspects of nuclear magnetic resonance (NMR). The seminar is scheduled for Monday 8th June at Burlington House. VP Technology Derek Thomas has worked hard in putting together a high quality agenda of talks on another technology that is becoming more and more commonplace in the industry as the years go by, but is still one that many people (including myself) struggle to understand fully! We have a good mix of contractor and oil company talks scheduled, but could do with one or two more, particularly case studies from the operators. Please therefore contact Derek via his e-mail (Address in the committee section on the website: <http://www.lps.org.uk/committee.html>) if there is anything you would like to present on the day.

Regards

Jonathan Lean – LPS President

Dates for Your Diary

Monday 11th May, LPS Monthly Evening Meeting, 6pm, Geological Society, London, Piccadilly – Two short talks by the LPS sponsored MSc students, Paul Stockwell – “Log and Formation Testing Programs on Well Study” and Russell Edge – “Multi-well Correlation to Map Sand Bodies.”

Monday 8th June, LPS One Day Seminar, Geological Society, London, Piccadilly – “T-Time and Relaxation – The Principles and Application of NMR Logging”.



Formation Evaluation of Thinly Laminated Formations; Comparison of the Thomas-Stieber Method to Conventional Approaches

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Thinly bedded formations are problematic when it comes to petrophysical interpretation. This is partly because the individual formation properties are below the level of resolution by most logging tools, but also because the properties of the individual beds and how these should be considered as mixtures are poorly constrained with considerable uncertainties and possible errors. Careful definition of rock types can aid in building a more representative reservoir model but requisite lithofacies parameters historically are based on hand specimen scale structure and lithology rather than pore scale properties and clay characteristics.

A further approach to thinly bedded formations is to use the Thomas Stieber method. In this technique, Thomas and Stieber assume the porosity of the sand layers is only a function of the amount of dispersed, structural and laminated clay. The clay content is considered primarily detrital and has the same provenance as the sand, and hence the clay properties can be derived from a nearby 100% shale. This approach can work but has considerable assumptions, not least the prospect of authigenic clays and quartz overgrowths – both of which are seen widely in this dataset.

In this project, a new approach to rock type definition based on clay structure and composition is trialled. The reservoir potential of the host rock is a function of depositional and post-depositional (compaction, diagenesis and cementation) features hence careful study and modeling of these rock types could have a profound effect on the evaluation of logging tool response and accurately estimating porosity, permeability and saturation. These are determined based on textural characteristics, authigenic clay content, clay structure and associated effects on pore system dynamics. We define 4 lithofacies from extensive analysis of thin-section, scanning electron microscope and x-ray diffraction data of 27 SCAL plugs. Facies 1 is a clean silt – fine sandstone with negligible detrital or authigenic clays, facies 2 is an arenitic siltstone with significant dispersed authigenic clays, facies 3 is an arenitic siltstone with clear clay laminae and facies 4 is a lithic greywacke with dominant mudstone clasts. Petrophysical parameters are modeled for each lithofacies and collated to form a representative reservoir model. This is tested by capillary pressure and saturation height function analysis and comparisons made to core data with notable correlation enhancement compared to previous work.

The conventional reservoir evaluation is complemented by an investigation of the Thomas-Stieber approach to thinly bedded Formations, appraising the work by Thomas and Stieber, 1975 and Heslop, 1978 towards identifying a number of best practice recommendations with implications for the broader characterisation of shaly-sand reservoirs.



The development of the Sedimentary Steering concept, using advanced well correlation and log pattern recognition to find the key variables in real-time application

Russell Edge¹, Stephen Morris², Jez Lofts², Mike Lovell¹ & Terry Quinn²

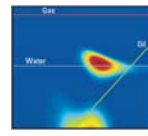
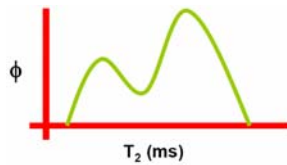
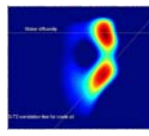
1. University of Leicester

2. Baker Hughes

We use a dataset of closely-spaced test wells drilled with a high-resolution LWD electrical imaging tool to test the application of sedimentary steering. This is the concept of using real-time sedimentary information, geological models, stochastic reservoir data and human expertise to make timely decisions on well-path changes in response to an improved understanding of local reservoir geometry-properties. The data allow the confident correlation of sedimentary features within a sequence of reservoirs that comprise a variety of sedimentary environments.

Using this dataset we constructed detailed correlation panels through a deltaic and a fluvial reservoir encountered by all of the test wells at different subsurface depths. The correlation of sandbody boundaries, internal event surfaces and key sedimentary layers recognized in each well from log responses (e.g. gamma log profile) and in image facies allow us to understand position in the reservoir with certainty. Following this, the thicknesses of reservoir, intra-reservoir zones and sandbody properties are mapped and contoured in plan view to allow understanding of spatial geometry. Thus pinch-out of intervening mudrocks can be viewed and, for the first time, evaluated in terms of the impact on well position. In addition, we use several mathematical techniques to derive useful information to aid reservoir positioning, these include automated log pattern recognition between wells and well-to-well petrofacies correlation using forced log and depth/event surface normalization. We then test the framework established using various correlation techniques against independent geological information from dips such as facies convergence directions and paleocurrent directions/sandbody extent derived from internal geometry, and stochastic reservoir geometry models.

Taking the results from a closely-packed group of sub-vertical wells, we then look at the information that would be available in real-time from one or more, sparsely-located offset wells and the data derived from the present, probably highly inclined, steered well. Our final goal is the evaluation and establishment of the key geological variables that will need to be monitored in real-time. This will lead to improvements in wellbore positioning based on the sedimentological information available while-drilling and into which we want to better position the wellbore. Our results demonstrate considerable success for the potential of using this approach to create a geological framework within which we can use mathematical and statistical techniques to geosteer in real-time.



'T-time and Relaxation'

The London Petrophysical Society announces a one day seminar on:

The Principles and Application of NMR Logging

Monday 8th June 2009 at the Geological Society, London

Abstract:

Introduction, review and panel discussion by acknowledged industry experts, with talks by service companies describing their NMR tool capabilities and further interpretation case studies presented by oil companies.

Who Should Attend?

Petrophysicists, geologists, reservoir engineers, technical assistants, and support staff: all those who work with NMR logs, contribute to logging programmes or use their outputs for reservoir characterisation.

Why?

NMR is a powerful tool in subsurface formation evaluation, and can help to answer many of the important questions posed of a reservoir, such as the rock texture, porosity, pore size distribution, fluid saturation and fluid movability. This seminar aims to cut through the reputation of complexity that surrounds this tool and make NMR logging more accessible to the geoscientists tasked with addressing tricky formation evaluation problems...

The technical program includes:

An introduction to NMR logging concepts; presentations by NMR logging providers; wisdom on the pitfalls and merits from specialists in NMR interpretation; case-studies from oil companies to demonstrate NMR success stories; and a panel discussion to summarise the day.

Presentations by:

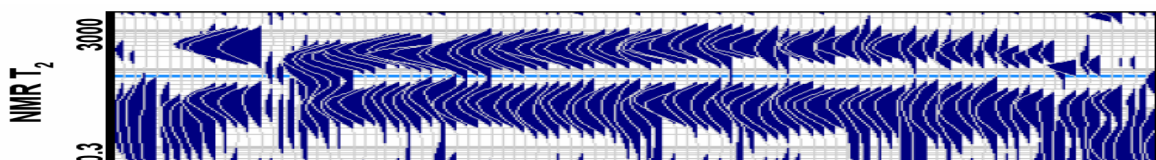
Baker-Hughes, BG-Group, Hess, Logicom, RPS Energy, Schlumberger, Statoil, Weatherford and others from the consultant, service company and oil company communities.

Registration Cost:

£150 for LPS/PESGB/AFES/SPE Members

£175 for Non-members (LPS is not VAT registered).

For more info or to register for this event please visit: <http://www.lps.org.uk> or email Robert.Webber@bg-group.com or Derek Thomas : thomasdh@hotmail.com



PESGB FIELD TRIP TO SVALBARD, 13-21 JULY 2009

DON'T MISS THIS ONCE IN A LIFE TIME OPPORTUNITY

The PESGB Council is running a field trip to review the petroleum geology of the Svalbard region. The field trip leader is Erling Siggerund of SGS, who has led a number of successful field trips to the area, most recently for Total.

Erling states "the Geological exposure is spectacular, and we would be spending at least five days in the field, reviewing everything from Carboniferous rift basins to Cretaceous shallow marine and Eocene turbiditic deposits. The geology, of course, has direct relevance to the petroleum systems of the arctic basins in the immediate vicinity."

Due to the remote nature of the region, participants will be based on a chartered vessel, leaving it each day to visit chosen localities. The boat sleeps 24 lucky geologists.

The cost for the trip is £5,500 per person plus travel.

If you would like to take advantage of this unique opportunity please contact:
fieldtrips@pesgb.org.uk tel: +44 (0)20 7408 2000; fax: +44 (0)20 7408 2000

