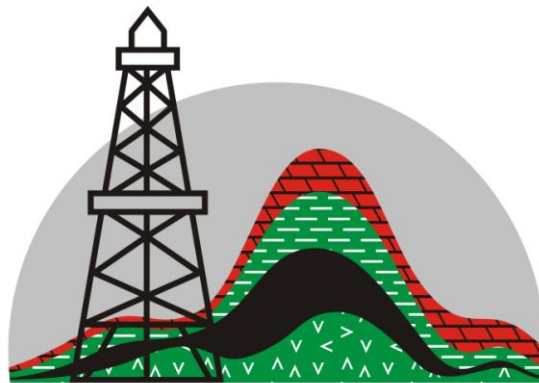


PROCEEDINGS
OF
2nd SPWLA – INDIA SYMPOSIUM

Innovations in Petrophysical Evaluation of Unconventional Reservoirs



SPWLA
INDIA

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PAPER A – U

Presented at
Grand Hyatt, Mumbai, India
November 19 – 20, 2009

Symposium Sponsors



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Society of Petrophysicists and Well Log Analysts – India

(A Chapter of SPWLA, USA)

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2nd SPWLA - India Symposium

Innovations in Petrophysical Evaluation of Unconventional Reservoirs

Grand Hyatt, Mumbai (November 19-20, 2009)

Respected Shri R S Sharma, Chairman and Managing Director, ONGC & ONGC Group of Companies, Dr. A K Balyan, Director (HR), Mr. U N Bose Director (T&FS), Mr. D K Sarraf Director (Finance), Mr. Sudhir Vasudeva Director (Offshore), ONGC, Distinguished Invitees, Authors, Delegates, Fellow members of SPWLA, Ladies and gentlemen.

It gives me immense pleasure to welcome you all to this 2nd SPWLA-INDIA symposium. We had organized First symposium on "Value Addition through Lateral Evaluation" in 2007. It was appreciated internationally. In recognition, our Chapter was adjudged the best Chapter by SPWLA in 2008. The success of that symposium gave us a great impetus to organize this symposium. The theme of this symposium is "Innovations in Petrophysical Evaluation of Unconventional Reservoirs"

It is befitting that the symposium is being held in Mumbai which enjoys the dual distinction of being commercial capital of India as well as the major hub of Hydrocarbon Exploration and production activities.

I have been personally associated with SPWLA since its inception in ONGC since 1987. It gives me great satisfaction that SPWLA-India activities have increased manifold. It is giving platform for the advancement of the science of petrophysics and formation evaluation by regularly organizing technical presentations and symposium.

The theme of this symposium has been selected keeping the Indian scenario in mind. With the present scenario of growing demand for energy we have to focus our attention in assessing and tapping unconventional reservoirs in more concerted way. The assessment of potential of these reservoir is fraught with serious evaluation challenges. Fast technological development in the field of data acquisition in recent past has been to facilitate the evaluation of such reservoirs. High R&D efforts are being put to generate techniques for petrophysical evaluation of such reservoirs. This symposium would provide an opportunity for convergence of industry brain to mull over these issues and provide further lead in this direction.

The main stress would be given on Shale Gas , Tight Gas Reservoirs, Basement, thin bed Reservoirs, fresh water reservoir Coal Bed Methane, Gas Hydrates.

Gas Hydrates, being highly unconventional today but very promising future energy source, has been included in this symposium.

21 oral presentations spread over 6 technical sessions are planned for today and tomorrow.

In India, Bhuvanagiri Formation and Mandapeta Sandstone in the Cauvery and Krishna-Godavari Basins, Mukta and Bassein formations in in the wedge out area of Mumbai Offshore Basin, Wadu pay of Cambay Basin are areas where commercial production is established in tight reservoirs. Significant gas reserves seem to be locked up in the tight reservoirs in the Vindhyan Basin. The Jabera well flowed gas @2000m³/d but reservoirs were found tight because of silica fillings and quartz overgrowth. Many other instances of tight reservoirs in other basins have also been identified holding considerable gas potential.

Successful characterisation of these reservoirs must address petrophysical, geo-mechanical and geochemical aspects of rock properties. The use of technologies in an integrated manner; which include resistivity, density, neutron, cross dipole acoustic, magnetic resonance, acoustic and resistivity imaging, mineral spectroscopy, spectral gamma ray and core analyses will lead to the answers we are striving to get.

Shale gas is going to the thrust area of exploration and exploitation in India.

In the first three sessions, scheduled for today, covering shale gas, tight gas reservoirs, coal bed methane and tar oil, we will get a flavor of international and national effort in form of 10 oral presentations.

Four international presentations on shale gas and tight gas reservoirs will enlighten us on the hottest plays in US.

Four papers from International service companies and E&P companies in India will showcase the innovations made in Characterizing Tight gas reservoirs , Electrical Imaging Applications and Early Detection of Tar to plan recovery procedures.

Two papers from ONGC on identification and estimation of these unconventional reservoirs in context Indian Basins will provide lead for the future and conclude the day.

Tomorrow's session will cover Thin Bed reservoirs, Fresh Water reservoirs, Basement reservoirs and Gas Hydrates.

Formation water salinity and bed thickness with respect to tool resolution, are important parameters for quantitative evaluation. Assessment of hydrocarbon potential in Fresh Water and Thin Bed reservoirs has been a grey area for Log Analyst. I am quite

hopeful that the advances made in these areas by new technology and out of the box thinking will be amply illustrated by the live examples of Indian fields .

The petrophysical characterization of Basement reservoir from the perspective of a log analyst is highly subjective. Image log , production log, mechanical properties of basement rock and its stress strain relationship helps in estimating net pay and reservoir quality of the Basement. Collective assessment by Petrophysicist, geologist, reservoir and production engineer would enable the comprehensive evaluation . In this context our national effort will be highlighted by presentations mostly from ONGC.

Presentation on Gas Hydrates will highlight the Development in this area from three different perspectives: International, National Oil Company and private player in the E & P operating in India.

I hope yesterday's Ice Breaker must have given a breather from the jet leg to our guests from other parts of the globe. It has been our endeavor to make your stay comfortable and enjoyable.

With this, I welcome you all again to participate in this Symposium with scientific curiosity and wish you a very fruitful stay in Mumbai.

Dinesh Chandra

President, SPWLA-India Chapter

TECHNICAL PROGRAM TIME TABLE**Thursday, November 19, 2009**

Technical Session – I Shale Gas		
11:15 – 13:00	Petrophysical Analysis of Shale Gas Reservoirs	A
	Application of An Integrated Petrophysical Evaluation Approach to North American Shale Gas Reservoir	B
	Estimation of Hydrocarbon Producing Shale	C
Technical Session – II Tight Gas Reservoirs		
13:45 – 16:00	Characterizing Tight gas sands in an Oil Based Mud Environment utilizing Dipole Sonic and 2D NMR T1 -T2 data	D
	Formation Resistivity Evaluation in Tight gas Sands in China	E
	Formation Evaluation of HPHT Tight Gas Reservoirs by Integration of NMR and Elemental Capture Spectroscopy logs	F
	Detection of shallow and shaly gas reserves using Pulsed Neutron Neutron Logging in the Eagle Formation, Montana (USA)	G
Technical Session – III Coal Bed Methane & Tar Sand		
16:15 – 18:00	Extended Range Micro-Imager (XRMI) TM - Applications in Coal Environment	H
	Identification and Evaluation of Hydrocarbon Accumulation in Unconventional Reservoir – A Case Study from Cambay Basin in India	I
	Early Detection of Tar using Real time data from advanced LWD tools to plan recovery procedures.	J

Friday, November 20, 2009

Technical Session – IV Gas Hydrate & Fresh Water Reservoirs		
09:00 – 11:15	Developments in Gas hydrate formation evaluation	K
	Russian Integrated approach to Gas Bearing Shaly Sand Stone Log Interpretation	L
	Petrophysical Characterisation of Gas Hydrates	M
	An Integrated Approach to Solve Reverse Resistivity Contrast Problem in Fresh Water Shaly Sand Reservoir of Changmaigaon Field, Assam, India – A case Study.	N
Technical Session – V Basement Reservoirs		
11:30 – 13:45	Understanding the Basement Rock Heterogeneity in Western Offshore Basin, India: An Integrated Approach	O
	Fractured Basement Oil: A significant untapped hydrocarbon play in Western offshore Basin, India	P
	Evaluating Hydrocarbon Potential of Deccan Trap (Basaltic Reservoirs) in Padra Field of Cambay Basin for Its Effective Development Through Logging, Geological and Geophysical Techniques	Q
	Reservoir nature and evaluation of Deccan basaltic basement, Cambay Basin, India	R
Technical Session – VI Thin Bed Reservoirs		
14:30 - 16:15	Challenges in the Reservoir Characterisation of a Laminated Sand Shale Sequence	S
	Improved Formation Evaluation in Thin Beds Using Hi Tech Logs	T
	Strategy for identifying the Hydrocarbon prospects in tight /Shaly Silty reservoirs-An integrated approach a case study	U

STANDBY		
	NMR Applications in Fresh Water Reservoirs	V
	Sub-Surface Characterization of the Gas Hydrate Bearing Volcanic Ash Sediments with Wireline Logs in Andaman Deep Waters, India.	W