

The Denver Well Logging Society

Chapter of the Society of Professional Well Log Analysts

Chapter News

October 1999, Volume 12 Number 2

Using Petrophysics To Improve Recovery: Whitney Canyon-Carter Creek Field, Western Wyoming Thrust Belt, USA

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Charles R. Smart, and Mike A.
Miller, BPAmoco

ABSTRACT

Whitney-Canyon Carter Creek, is a significant North American gas field discovered in 1978 which has produced 1.3 TCF of gas to date of the approximately 4.0 TCF of gas in-place. It produces from the Madison Group, a complex carbonate. This case study highlights how probabilistic formation evaluation techniques along with an integrated three-stage petrophysical process were applied to examine the significant differences in well performance and provide recommendations to increase recovery.

Stage 1 defines petrophysical rock types for the Madison carbonates by relating geologic framework, lithofacies and petrology to porosity, permeability and capillarity.

Stage 2 for the Madison carbonate produces petrophysical models of pay and flow behavior. Probabilistic formation evaluation techniques were extended to develop petrophysical rock types models. Using nuclear modeling was a key step in understanding a complex gas correction and the effects of boron on porosity.

Followed by applying the Modified Leverett J Method to identify the free-water level and confirm the wireline calculations in this highly resistive reservoir system. Applying this integrated approach was important in recognizing additional upside potential

Stage 3 integrated the reservoir description from the previous stages with actual well production. Pressure transient analysis was used to evaluate fluid sensitivity and formation damage mechanisms. Reservoir simulation analyzed the impact of flow units on ultimate economic recovery. Recommendations on possible remedial actions were a crucial product of this integrated field study.

In summary the Petrophysics Integrated Process Model (PIPM) was successfully applied to characterize the reservoir and the drivers of reservoir performance.

Biography:

Pam Logan earned her B.S. in Petroleum Engineering from the University of Tulsa. For the past nine years she has worked for Amoco as Wyoming Operations, Project, and Reservoir Engineer and as Acquisition/Divestment Technical Evaluator. She had the unique opportunity to participate in Amoco's year long Reservoir Management/Petrophysics Training Program at Amoco's Research Center.

Meeting Information

First Meeting of the Season

When

Tuesday, October 19, 1999
11:30 A.M. - 1:30 P.M.

Where

Wynkoop Brewing Company
1634 18th St. (18th & Wynkoop)
Mercantile Room

Cost

\$15 per person

Reservations

Reservations must be made by
noon, Monday, October 18.

Call Elice Wickham @
(303) 573-2781



President's Message

Phil Nelson

This column continues to highlight the services and materials available to the Denver well logging community. These profiles concentrate upon, but are not be limited to the DWLS membership. For this issue, we feature two companies which offer both software and consulting services, and one individual consultant.

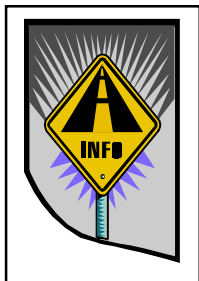
Digital Formation

Digital Formation offers both consulting services and well log analysis and display software. The synergy of services and software is underpinned by the company structure. Log analyst Michael Holmes heads the company with sons and software engineers Antony and Dominic Holmes serving as vice presidents. Rounding out the consulting staff are Donald Burch and Kjersti Breirem. Scott Wickstrom, Ron Strong and Janet Holmes provide sales and staff support.

Although small, the company takes pride in their mix of skills. If problems arise in reading an obscure data format, code can be

The **DWLS Chapter News** is the newsletter of the Denver Well Logging Society and is published nine times per year, excluding June, July and August. Subscriptions are included with membership. Annual dues are \$5 for SPWLA members and \$10 for nonmembers. Advertising is welcome, as are articles and items of interest from the membership. Contact the Editor for information or address corrections.

written to take care of the problem. The staff is quick to apply statistical techniques to odd mixes of borehole data. Project sizes range from single well to field studies.



Digital Formation has also done equity determinations, representing the U.S. Department of Energy at Elk Hills Field California. In order to stand up to legal scrutiny, equity work requires an extra layer of documentation of procedures and software. They also provide expert witness support for well logging issues in legal conflicts.

Their mainline software products are LESA, for log analysis, and RIS-Info, a display formatting and plotting package for all types of well data, including logs. Both packages are designed for a PC running under Microsoft Windows. Other software packages include a viewer for examining LAS files and another for examining Windows-based metafiles.

[Reminder: you can view past and present DWLS newsletters on the Digital Formation web site.]

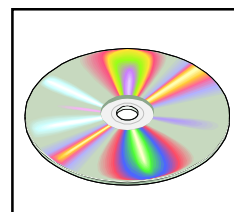
Web site:
www.digitalformation.com; Email:
Info@digitalformation.com;
Telephone: (303) 770-4235, Fax,
(303) 770-0432. Location: 6000
E. Evans Ave, Denver

Bowler Petrophysics, Inc.

Bowler Petrophysics, Inc. provides MacLog log analysis software for Mac OS users around the world. As you might guess, Jack furnishes one of the few software packages aimed at Mac-based log analysts. Jack also provides log analysis consulting services to Denver-based independents. Since opening shop in Denver in 1988 much of his consulting work has been in carbonates, often evaluating bypassed hydrocarbon-bearing rocks.

Recently, Jack has been busy encoding MacLog lite using Java. The new software has been under development during the past year and is about ready for testing.

MacLog lite has been checked on Windows 95 and 98, NT 4.0 and Mac OS and surprisingly runs as advertised without having to code for specific operating systems.



It should also run on UNIX, Sun and OS/2. MacLog lite is a 1

Up Coming Events

New Officers

Congratulations to Steve Richards and Kim Bunning, new Secretary Treasurer and Editor.

Attendance Incentive!!

Attendees at the October luncheon will be rewarded by a free cdrom-of-the-month, selected by Phil Nelson.

lightweight log analysis program that imports LAS and ASCII files and solves most log analysis evaluation problems that confront the small explorer and consultant. If you are interested in beta testing MacLog lite please send an e-mail to Jack.

Email: maclog@diac.com; Web: http://www.maclog.com; phone and fax: 303 860 1641; Location: 243 E. 19th Ave., Suite 204, Denver 80203

Hoyer Petrophysics, Inc.

Darrell Hoyer has relocated back to the Rocky Mountain area after 16 years in Houston. After graduating from South Dakota School of Mines and Technology in 1973 with a B.S. in Geological Engineering, Darrell worked for Dresser Atlas as a logging engineer throughout the Rocky Mountain States. In 1983 he accepted a position with Marathon International in Houston and in 1986 began working for Union Texas Petroleum. Recently he retired (early) from Union Texas Petroleum and started Hoyer Petrophysics, Inc. Darrell has worked on a wide variety of international and domestic conventional oil and gas projects as well as coalbed methane recovery projects. He has authored and presented papers that are published in symposium transactions and industry magazines.

Using "state of the art" petrophysical software, Darrell

offers deterministic as well as statistical petrophysical analysis for worldwide exploration and development projects, with special attention to log reconstruction and fluid substitution. Reconstructed logs over rugose boreholes or in wells where logs are missing improve the quality of the geological, geophysical and engineering aspects of a project. Sonic logs used for synthetic seismograms are improved by the substitution of hydrocarbon fluid properties. Hoyer Petrophysics

also uses well logs to calculate rock mechanical properties on wells where sonic shear information is not available.

Email: dlhoyer@earthlink.net; Telephone: 970-472-9588; Cell: 281-773-6121; Location: Fort Collins, Colorado

Note: If you would like to have your company/organization profiled in this column, send a short writeup to Phil at pnelson@usgs.gov.



**Wanted: Stereo
Microscope
Will consider units
needing repair.
Contact: Bart Torbert
(303) 595-7550 x2337
bart.torbert@ihsenergy.com



The Denver Well Logging Society

Chapter of the Society of Professional Well Log Analysts

1999 - 2000 Application for Membership

_____ New Member

_____ Renewal

Member Name: _____

Job Title: _____

Mailing Address:

Street: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Email Address: _____

Are you a National SPWLA member?

Yes: _____ Dues are \$5.00 (Dual Membership)

No: _____ Dues are \$10.00 (Local Member only)

Make cheque payable to the **Denver Well Logging Society** and send to:

DWLS

Attn: Steve Richards

c/o Schlumberger Oilfield Services

6090 Greenwood Plaza Blvd.


Englewood, CO 80111

Do you have any suggestions for lunch topics?

Schlumberger

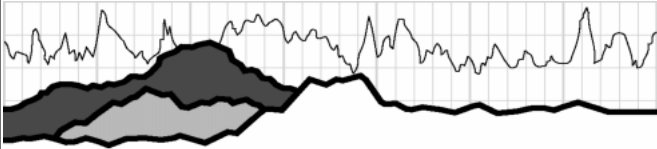
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Teamwork & innovation to create value



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