CANADIAN WELL LOGGING SOCIETY

in site

CWLS Newsletter
APRIL 2003

Message from Dave Shorey

President, CWLS, 2003

It is indeed a privilege and honor to have been selected to lead such a special group as the CWLS. The CWLS has a long and valued history of contribution to the Canadian petroleum industry and I am proud to be a member and a part of such an organization.

Before I discuss the objectives for CWLS this year, I feel that it is very important to again recognize those who have volunteered their time and efforts in serving the CWLS.

I would like to thank the past executive for generously giving their time and commitment in serving our society. In particular, I would like to give special recognition to those members who have served for a number of years and will not be returning for the 2003-04 executive and whose service was invaluable to this organization. Max Howard, Jim Earley, Curtis MacFarlane, Mark Ducheck, and Andrew Logan, thank you for your commitment to the CWLS.

In addition to the past executive, the society exists only through the help of the persons who dedicate time and energy to give presentations, organize and contribute to our seminars and serve on our various committees. To all of you that have done so over this past year, thank you for your most valuable contribution.

The life-blood of any professional organization is the membership and its willingness to give its valuable time to serve the organization. Twelve candidates stepped up to the plate and ran for the CWLS executive for 2003-04. Each of these individuals, having won or lost, demonstrated the attitude and commitment to the society that will allow it to successfully grow and positively contribute to the petroleum industry of Canada and beyond. On behalf of the CWLS, I would like to thank each of you for your dedication.

As we look forward to this coming year, we have a strong executive team in place to take on the challenge of further improving our society. My two priorities for CWLS this year are, growing membership and increasing the society's contribution in the form of continuing education to its members and to the petroleum community at large.

As I stated previously, the life-blood of any professional organization is the membership. In particular, I would like to see the society grow its membership with young professionals from the oil, gas and service sectors. Toward this end, I would like to encourage each of you to invite our young geologists, petrophysicists, exploration managers, field engineers and field managers to join the society and encourage them to become actively involved. Another important segment that is under-represented is students in the geosciences disciplines. Efforts will be made, at least at the local level, to increase the awareness of the existence of the CWLS and what it has to offer, early on in their studies.

It is important that as we grow the society's membership, we strive to preserve the healthy balance that currently exists between all sectors. This society serves as a professional organization providing a forum for like-minded individuals; where an exchange of ideas and information can take place. It is not, nor will it be, a sales platform for the service sector.

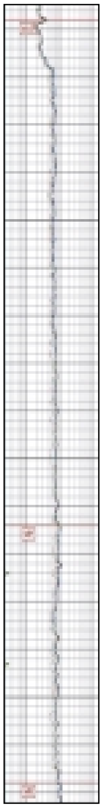
It is up to every CWLS member, everybody on the executive and me, to show our membership and Canadian petroleum industry as a whole, that this society can provide a lot of value at a little cost. I can justifiably confirm that CWLS venues are extremely cost-effective. As proof, our monthly luncheon meetings have been growing in attendance indicating that we are correctly identifying and discussing topics of importance to the industry.

As we move forward this year; IN-SITE magazine will play a more important role within the CWLS as a conduit for both communication and education. The CWLS Rw catalogue and special core database, the fall workshop on using the special core data base for improved volumetric analysis, and the spring resistivity seminar with Dave Herrick, are all organized and offered to the membership at very reasonable rates. Further, the CWLS membership fee itself is one of the lowest, if not the lowest in the industry.

To close, I would like to state that I am looking forward to serving as your president during this coming year and meeting the challenge I have outlined to grow and further increase the value provided by this great organization. I would like once again thank the membership for granting me the opportunity and privilege to serve.

I'm looking forward to seeing you all at our monthly luncheons and workshops.

Very best regards,
Dave Shorey, CWLS President



THE CANADIAN WELL LOGGING SOCIETY
Presents a Resistivity Workshop

ELECTRICAL EFFICIENCY: INTERPRETING THE RESISTIVITY OF RESERVOIR ROCKS

INSTRUCTOR: David C. Herrick, Ph.D.

Thursday May 15, 2003

The Metropolitan Centre (Main Level)
333 – 4th Avenue S.W.

Time: 8:00 AM – 4:30 PM

The Course is currently over half full so please register ASAP if you want to attend

COST: MEMBERS $100.00; NON-MEMBERS: $150.00

REGISTRATION: Please register with the CWLS office or in person or by phone with VISA. The CWLS office is located at 2200, 700 – 2nd Street S.W., Calgary, Alberta T2P 2W1; Telephone: (403) 269-9366

COURSE DESCRIPTION: This course provides new insight into the meaning and interpretation of resistivity data from both logs and cores. Using the concepts developed in the course, analysts will be able to do more effective log and core data interpretation, pay determination and saturation evaluation. This course is designed for petrophysicists, reservoir engineers, geologists, researchers and others wanting a deeper understanding of the nature of resistivity data, enabling them to do a superior job of data interpretation.

COURSE OUTLINE

- Electrical Efficiency (E): Impact of pore (water) geometry on conductivity
- Archie's Equation
- Rocks with complex electrical properties
- Shaley sandstones

Message from the Editors

The publications position on the CWLS executive has a dual chairmanship so that the duties can be split and the carry-over from one executive to the next is assured. This year, the first IN-SITE has been my responsibility as the senior co-chair. Mike and I would like to welcome the new members to the CWLS, thank the membership for its continuing support and recognize our corporate members. In this IN-SITE our feature article is on log quality control, a subject dear-to-my-heart. Coming shortly (May 15) the CWLS is presenting a resistivity workshop given by Dave Herrick. Dave is an old friend who has always impressed me with his clear thinking and simple way of presenting his ideas. For your information I have attached a list of our luncheon talks and the dates. We are trying to keep the subjects of the talks current and relative to the wide interests of our membership. Also, do not miss the president's message.

This past year's annual general meeting was, for me and others that I talked with, informative and entertaining (YES!). Dave Rodney, our keynote speaker, was inspiring. How do you get the difficult tasks done? By placing one foot in front of the other, by relying on your co-workers, and by working as a team. He had my attention from his first sentence to the very end, which is something when you understand that I sleep through most talks longer than 15 minutes, a habit learned at University. I must admit I wondered what he was doing placing two chairs together, front to front, then standing on them and with hand to forehead looking to the horizon. Well, if you wondered how big the summit of Mt. Everest was, there you have it, about 0.5m by 1.5m. Thank you John Kovacs and Dave Shorey for an entertaining evening.

Just one more thing. The CWLS would like to publish a Journal this year. However, we cannot do this without papers. We are relying on you! I have agreed to submit a paper to the reviewers, won't you? The deadline for submissions is the end of September.

We hope that you enjoy this IN-SITE and please visit our new Website www.cwls.org

Steve Burnie, CWLS Publications Co-chairman
Mike Eddy, CWLS Publications Co-chairman

Log Quality

As a hydrogeologist I use logs routinely to determine porosity, water saturation and salinity. However, I seldom ask the question; "how good is the information on the log?" In Western Canada we are blessed with a high standard of wireline tools and logging operations and as a result, generally good quality log data. However, when the log data are unusual, or too good to be true, it is only then that I examine the log quality. Some would say that the log quality should be investigated regardless. So, here are a few helpful hints that will set your mind at ease that the 150 metres of pay in this low resistivity formation really are there!

My thanks to Mike Eddy (Wellsite Gas Detection Inc.) and Jim Earley (Encana Corporation) for taking the time to share their experience in this article.

Steve Burnie , CWLS Publications Co-Chairman

Some Thoughts on Log Quality

Log Compilation and Heading (All Logs)

The first thing I do when presented with a set of logs (new or old) is check out the heading information, then flip through each log to get a feel for how the log data is compiled and presented. Here I'm looking for small scale, large scale, high resolution passes and repeat passes. At this point I'm not looking for "zones of interest" since I feel that it's pointless to evaluate a zone of interest with potentially erroneous log data. Refer to the "Remarks" section of the heading for information from the logging engineer, which may explain any anomalies on the log or other important information. I consider these comments to be the logging engineer's "day in court" and any items pertaining to the running of the log should be entered here. If the logs are fresh in from the field, I pay particular attention to the heading information, i.e. company name, well name, dates, elevation data, mud data, etc. If I notice errors or omissions I find it much easier to contact the logging engineer at the location as soon as possible to have these problems cleaned up immediately rather than waiting for the job to be done and the truck to leave the location. Having the problems repaired "after the fact" may take days, weeks or they may not be fixed at all. I'd like to be able to say that I study the calibration trailer information in great detail, but with the volumes of calibration data, all presented differently and uniquely by each service company, it would not be good use of my time to look for problems in this area. A couple of sets of offset logs provide far more assistance to me than any calibration trailer information.

Resistivity Logs

As stated above, I like to quickly flip though the entire log. Here I'm looking for evidence of problematic data as a result of mud type, and also any other anomalous readings, such as gaps in the data, straight-line portions (which may indicate intervals where the tool pulled tight or quit working) or wild curve swings from one side of the track to the other. I physically cut the repeat section off the bottom of the log and on a light table lay the main pass over the repeat pass. A resistivity log, apart from the Gamma Ray (which is statistical) and the SP (which may be linearly shifted) should pretty much repeat identically. Incidentally, if you don't have a light table, then improvise by holding the log up to the window, over a lamp or up to a blank white TV screen.

A couple of sets of offsetting logs are invaluable at this point to compare the resistivity magnitude of the thick shale zones in the well. These thick shale zones generally help to determine if the low-end resistivity is reading properly. At the same time, scan the log for high-end resistivity and compare to offsets to determine if the log is reading as high as it should in the proper zones. If a problem is found, the best course of action is to have the logging service company comment on the problem and possibly repair the log. If you're dealing with older log data, then the problem data must be repaired or modified on the fly. This modification process may become complicated and is beyond the scope of this article.

One of the most important considerations when checking log quality on a resistivity log is the mud type and filtrate resistivity of the mud. In general, a salt-based mud such as Potassium Chloride (KCL) or Potassium Sulfate (K2SO4) would best be logged with a Laterolog device. A fresh mud, on the other hand, would best be logged with an Induction device. If the well is currently being drilled, the mud type information can usually be obtained from the drilling engineer. If, however, there is some confusion as to mud type and filtrate resistivity, then it is best to have both a Laterolog and Induction log on the wellsite. When the logging service company arrives on site, they can measure the filtrate resistivity of the circulated mud sample, and combining this data with other data such as anticipated porosity, formation water resistivity (Rw) and anticipated Rt of the zone of interest, service company charts may be used to determine the proper logging device to use.

An induction log run in a salt mud environment, usually exhibits curves which may swing wildly from high to low resistivity, particularly in a more washed out borehole and more so on the shallow depth of investigation curves.

Neutron - Litho Density Logs

I follow the same procedures as with the Resistivity logs. When comparing main pass to repeat, one would not expect the Gamma Ray, Pe, CNL, Density or Density Correction to repeat identically, due to their radioactive statistical nature, however all these curves should be quite close and similar in shape, provided the logging tool came up the same side of the borehole on both the repeat and main pass. If, as evidenced by the calipers, the borehole is elliptical in nature, then the Density and Density Correction may be vastly different from the repeat to the main pass. In this case, decide which data are better and use that data.

On the topic of elliptical boreholes, if the Density logging tool skid rides up the long axis of the borehole (which may generally be more rugose) then the Density and Density Correction data may be quite erroneous. Each logging service company has its own standards, but as a rule of thumb, I begin to question the validity of the Density data when the Density Correction exceeds approximately 100 kg/m3. Incidentally, to overcome the problem of invalid Density data in elliptical boreholes, several logging service companies now run two Density tools offset 90 degrees to each other. Then when one Density tool is in the long axis, the other is in the short axis, thereby providing at least one good Density at any given time. This at first may seem like a ploy by the service company to charge double for the Density information, but personally I regard it as a "pay me now or pay me later" situation. Generally the Density data is invaluable in any interpretation and since the borehole interval is usually logged only once, then invalid data can haunt us for a long time.

The Gamma ray and CNL may be affected by washed out borehole as well. In fact in boreholes washed out to extremes, i.e. all calipers off the page, the Gamma ray may begin to exhibit clean, "false" sand anomalies. The CNL seems to remain more stable than the Density log out to higher caliper readings. The CNL response is difficult to predict in a washed out hole and I have observed it to read anywhere from too low to much too high under bad hole conditions.

Heavy muds, usually weighted with barite, may cause the Pe measurement to read too high, especially in washed out portions of the borehole. I begin watching for this effect when mud weights exceed approximately 1100 kg/m3. Some logging service companies have software which provides a "barite correction", and if high mud weights are anticipated, this correction should be requested.

Sonic Logs

As I flip through the sonic log, I'm again looking for straight-line sections or zones of cycle skipping. Regarding the repeatability, the Delta -T curve should repeat almost identically. It's always a good idea to have the service company present the individual Transit Time curves alongside the Delta -T curve. I find them useful for identifying subtle cycle skips and once identified, the Transit Time curves can be used to correct the cycle skips. Using the individual Transit Time curves along with the Transmitter / Receiver spacing information for the Sonic tool, should allow you to rebuild the Delta-T curve where necessary. Note, however, that cycle skips may be indicative of fractures, so before eliminating all cycle skips, make note of their depths for future interpretation.

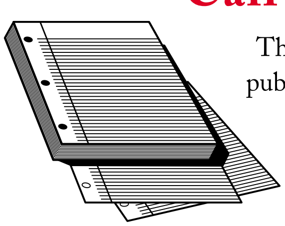
It's also a good idea to continue logging the sonic log up through casing as this provides a calibration check of the tool and may also help to identify a cement top behind casing. In free pipe, with no cement sheath, the Delta -T should read approximately 187 uS/m. Another calibration point for the sonic may be in a reasonably thick (2-3 meters) anhydrite, where the Delta -T should read approximately 164 uS/m.

Sonic logs usually perform well even in badly rugose boreholes and as such are very useful for porosity estimation in intervals where the Density log is invalid due to borehole washout.

Please forward any questions, comments or concerns to jim.earley@encana.com. They will be followed up as well as possible, as time permits.

Jim Earley, P.Eng.,
Petrophysicist, Encana Corporation

Call for Papers



The CWLS is always seeking materials for publication. We are seeking both full papers for the Journal and short articles for the Newsletter. Please share your knowledge and observations with the rest of the geoscience community. Please contact publications co-chairs, Steve Burnie Sr. (steve@rpcl.com) at 264-4466 or Mike Eddy (meddy@wellsitegas.com) at 230-0603.

You provide the material and we will provide the soap box!

Quality Checking Wireline Pressure Data

My experience with wireline pressures has been almost solely with data from the Modular Formation Dynamics Tester (MDT*) and Repeat Formation Tester (RFT*) logs. My apologies to the other logging companies (Baker Atlas, Halliburton, Computalog etc) that also run wireline pressure logs, but I have no recent experience with their tools. However, the guidelines that I am going to present for quality checks on the Schlumberger MDT and RFT logs, I believe apply equally as well to the others.

Pressure Gauge Verification

Gauge choice is important. Choose a gauge with a low risk of plugging such as the Schlumberger CQG-G, which is a re-design of the CQG quartz gauge. If such a gauge is not available, run-in with two probe modules, one of these acting as a back-up should one or the other gauges plug.

The Schlumberger probe module contains a quartz gauge and a strain gauge and the performance of the module and both gauges should be verified at the wellsite. I recommend requesting the loggers to measure the hydrostatic pressure at three or four check points set at 25m apart above the base of the casing. Running the gauge check in the casing has virtually no risk for sticking the tool and the quartz gauge and strain gauge can be validated for pressure stability, stabilization time, and to some degree, accuracy. The packer can be seated in the casing and a small (5 cm^3 to 10 cm^3) short pretest drawdown run to check probe function and packer integrity.

When the gauge is at a temperature close to the ambient run depth value, the pressure gauges should read a stable mud pressure within 10 to 12 minutes of stopping at a check depth. Gauges in need of service usually take longer than this. The quartz gauge may or may not reach stability before the strain gauge. The quartz and strain gauge should read the same reservoir pressure to within the gauge accuracy specifications, which for the quartz gauge is ±(14 kPa+0.01 % of gauge capacity) and ± 0.001 % of gauge capacity for the strain gauge. If not, one or the other or both gauges need to be recalibrated. The three or four mud pressures measured with the two gauges should be plotted on a pressure versus true vertical depth (TVD) graph and the statistics of the two regression lines (pressure - Y on TVD - X) assessed. The square of the correlation coefficient (r^2) should be 1 or very close to it. The standard error of the regression should be less than 10 kPa and preferably less than 5 kPa. The last gauge field check I saw had a standard error for the strain and quartz gauge casing mud pressure regression lines of less than 0.1 kPa and a r^2 of 1.000. The slopes of the strain gauge and quartz gauge regression lines should be the same within the error calculated for the slopes or if different, not by an amount deemed to be important. For example, in one recent gauge check, the casing mud pressure gradients for the strain and quartz gauges were -11.523 ± 0.002 kPa/m and 11.543 ± 0.001. In this case the mud column was exceptionally stable and the regression slopes were different by an amount greater than the slope error. However, the difference between the pressure gradient measured by the quartz and strain gauges, 0.02 kPa/m was not, in my opinion, important. The errors were so low, that the gauge performance was deemed to be excellent. The pressure intercepts for the regression lines will differ by the specifications for the gauge accuracy and the calculated errors.

The three values for pressure divided by TDV for the casing check points and the slope of the regression line should be in the same ballpark, but need not be the same. This is the result of the settling of the mud column since the last circulation. For the same reason, the Pressure/TVD ratio and the regression slopes will not be the same as the mud gradient determined from the mud weight reported by the mud man from the last circulation. These values should however be in the same ballpark.

Formation Pressure Quality

Once the gauge performance has been verified, the quality of the individual formation pressure measurements can be assessed from the pretest drawdown pressures and the formation mobility numbers. The chief source of formation pressure error/data scattering is supercharging. Supercharging is a dynamic condition whereby the pressure from the mud column moves into the formation as mud filtrate passes through the filter cake into the reservoir. Where formation permeability is low, the reservoir cannot effectively bleed-off the injection pressure from the invading mud filtrate and the pressure at the sandface is elevated or supercharged. The pressure measured by the probe is therefore higher than the formation pressure. Pressures lower than formation pressure can be recorded in low permeability reservoirs when buildup times are too short.

In general lower quality reservoirs which have a mobility (permeability divided by viscosity) less than about 7 mD/mPa.s are prone to supercharging. Reservoir quality can also be assessed by calculating the drawdown factor (DDF). This factor can be used to supplement mobility data or when mobility has not been calculated, as is the case for most RFT logs, it can be used to effectively QC the pressure data. The drawdown factor is a percentage determined by subtracting the minimum pressure of the pretest drawdown from the last read buildup pressure and dividing this by the last read buildup pressure, then multiplying by 100. The last read buildup pressure is assumed to be a reasonable estimate of the formation pressure. The best quality pressures have very low (less than 10%) DDFs. Pressures with higher DDFS are more prone to supercharging than pressures with lower DDFs. In general formation pressures with DDFs of 70% or higher are the most prone to supercharging.

The best quality pressure data should be used to make the interpretation of the reservoir. However, when only lower quality pressure data are available, the data should be plotted qualifying them with the mobility or DDF quality code values. Regression lines should be determined and the standard error checked. Data should be rejected on the basis of the quality code values until the standard error of the regression line is less than 16 kPa and preferably under 10 kPa. Data rejection based on quality coding should not be treated as a black box procedure, as judgment is also required. Lower quality data are only prone to supercharging and some low quality pressures are quite good. It is also true that some of the best quality pressures can be supercharged, though by and large they are not.

Your interpretation of formation quality, fluid contents and formation pressure, based on the wireline pressure data, should be supported by the other logs, chip sample information, mud log response and any core results. This is particularly important when lower quality pressures are needed to make a reasonable interpretation.

For reservoirs without depletion, the wireline log pressures should define regression lines with a slope that represents a reasonable fluid gradient and with a low standard error (<16 kPa and preferably <10 kPa). If not, then some or all of the data are probably not good formation pressures. High standard regression errors can also occur when the data quality is quite acceptable, but data from different populations are mixed. Such a case occurs when water pressures from two different aquifers are mixed, or hydrocarbon and water data are treated as one population.

S. W. Burnie, P. Geol

New Members and their Affiliates:

Steve Ahloy - Baker Atlas
Coriine Bagdan - Husky Energy
Jim Barclay - Springtide Energy Ltd
Irene Bodnar - Husky Energy
Rob Burly - Global Link
Sorin Buyor - BP
Scott Carter - Husky Energy
Greg Cave - Samson Canada
Eric Clarke - Encana Resources
Michael Croft - Continental Labs
Steve Dixon - Dominion
Mike Dobberthien - Husky Energy
Andrew Etele - Anadarco
Jillian Garnett - HEF Petrophysical
Sandy Greene - Petro-Canada
David Heughan - International Data Share
Richard Johnson - OPUS Petroleum Engineering Ltd
Joseph Khoury - Schlumberger
Duane Kohut - Lario Oil and gas
Cooper (Zengjun) Li - SAIT
Douglas Mackenzie - Zargon Oil and Gas
Donna Mallmes - Husky Energy
Ryan Marshall - Computalog
Chris Pan - CoreLab
Noel Pancy - Olympia Energy
Chris Podetz - Advanced Geotechnology
Bill Prescott - Prespective Consultants
Douglas Rae - ExxonMobil Canada
Bruce Redies - Schlumberger
Angela Ricci - Husky Energy
Als Salsman - Schlumberger
Mike Seifert - RECON Petrotechnologies
Joe Sobachan - Crescent Point energy
Michael Tanouye - CNRL
Jeff Taylor - Encana Resources
Kevin Trickett - GJL
Judy Turner - Anadarko Canada Corp
Riley Waite - MRW Engineering
Ulrich Zimmer - Advanced Geotechnology Inc

Basic Interpretation and Quality Control of Mud Logging/Total Gas Data

Gas readings recorded while drilling are dependent on many chemical, physical and mechanical processes. When interpreting gas log data it is vital to be aware of all the factors that ultimately produce a recorded value on a mud log and weigh each of these carefully before determining the course of action on a given well.

A significant gas response, referred to as a gas show, is an increase in the amount or composition over the background gas. This can be produced by geological factors such as drilling through a gas charged reservoir, or by physical factors such as a change in the rate of penetration (ROP), change in drilling fluid densities, fluctuating pump rates and level changes in the shaker box where the gas extractor (gas trap) is located. You must be able to identify the gas shows resulting from the geological factors as this may have economic significance.

A background gas can be defined as a response from the gas detector during normal drilling. Background gas is determined by gas entrained in the mud system that is re-circulated over time or is continually being produced into the well bore from some point down hole. Usually there is some consistency in the level of background gas if the rate of penetration, drilling fluid and surface conditions are constant. Trends can be established, through straight line or mean mathematical analysis, that will indicate if there are hydrocarbons being produced into the well bore (increasing background) or if there is an overbalanced situation that is holding back gas in the formation.

Depending on drilling and hole conditions a slight gas response above background may be just as important to formation evaluation as a large one. Normally, there is a direct relationship between a gas show and an increase in ROP that can be associated to a change in lithology or formation. Heavy drilling fluid densities, referred to as mud weights can cause gas responses to be lower than normal and not as prominent. Fluctuating pump rates can increase or decrease drilling fluid levels in the shaker box causing the same increase or decrease in the gas trap resulting in fluctuating gas readings.

Other factors that affect the gas detector response are gases produced in the well bore when the pumps are off for a given amount of time. Such gases include connection gases, survey gases, trip gases and recycled gases.

Connection gas is observed as an increase or decrease in gas readings depending on the hole conditions, mud weights and formation pressures. Generally connection gases generate a positive response on gas detectors due to slightly underbalanced conditions down hole. A connection gas is a show resulting from a momentary underbalance due to pump shut down, and/or pipe movement. Connection gases can be seen and identified by correlating them to rig operations using lag times. Often connection gases will dissipate over time as the initial penetration of the formation equilibrates with the wellbore pressure. From time to time a negative connection gas may occur and is seen as a drop in gas values correlated to rig operations by the lag time. Connection gases can also be generated from an uphole event, which can again be correlated by using lag times. Connection gases are important to note because they are a good indication of gas production into the wellbore. An increase in connection gas over time should be noted on the gas log. It is important to notify rig personnel when an increase in connection gas is occurring as it could be an indication that the hole is becoming under balanced.

Survey gas and trip gas are similar to connection gas in that they are produced by mud-pump downtime, which can allow formation gas to enter the well bore.

Recycled gas is due to the inability of the hydrocarbons to be completely released from the mud at surface and is recirculated through the mud system. This type of gas can encourage gas-bearing formations to release hydrocarbons to the mud stream creating a lazy almost cyclic gas response curve. Liberated gas is gas that is continually released through the process of the bit drilling through reservoir and non-reservoir rock. It contributes to the background gas of the formation being drilled but cannot necessarily be used as a means to determine producible gas.

Some gas will be entrained in the chip samples depending on the porosity and permeability of the cuttings and may not give a good significant gas response. Also, lighter gases that are more soluble in water will not be easily released and therefore may have only a slight response at the surface detector.

It is important to evaluate all factors that contribute to changing gas readings when interpreting mud logging data. Gas readings are relative to the physical and chemical properties encountered while drilling and may be the result of lithology or drilling processes. The gas readings are qualitative and therefore the information is relative to itself. When used in conjunction with wireline logs, logging while drilling (LWD) data, and the wellsite geologist's striplog, mud logging or total gas data provides additional information from which conclusions can be drawn.

Mike Eddy, Wellsite Gas Detection Inc.

Topics in Advanced Reservoir Characterization: Identification and Characterization of Low Resistivity Pay

A course offered by the CWLS on May 29-30, 2003, in conjunction with the CSPG-CSEG Convention.

According to a recent paper published in the AAPG Bulletin, about thirty percent of the world's reserves are contained in laminated, low-resistivity or low contrast shaley-sand formations.

The identification and petrophysical characterization of low-resistivity pay has historically been one of our most serious formation evaluation challenges. Apparent high water saturation values, typically computed across low-resistivity pay zones, can obscure their true hydrocarbon potential and result in commercially viable productive intervals being bypassed. Recent advances in borehole petrophysics can significantly improve our ability to identify and evaluate these low-resistivity reservoirs.

In this course typical geological settings in which these types of reservoirs can occur will be examined and Canadian examples will be presented. Next, new technologies such as: imaging, NMR, vector resistivity, and sampling/testing data will be discussed to show how more robust water saturations and more complete reservoir descriptions can be provided and the accuracy of reserve estimates and productivity predictions, improved while minimizing the possibility of bypassing pay.

A number (5-6) of international petrophysical experts will be lecturing on the cause of low resistivity pay and on the various technologies available to help identify and quantify hydrocabons in this challenging environment.

UPCOMING EVENTS:

CWLS Luncheons

May 14, 2003 Relationships between Pore Geometry, Conductivity & Permeability, David Herrick

June 18, 2003 Topics in Advanced Reservoir Characterization, Ted Griffin

CWLS Sponsored Courses

May 15, 2003 2003 CWLS Resistivity Workshop (see page 2 of In-Site)

May 29-30, 2003 Topics in Advanced Reservoir Characterization: Identification and Characterization of Low Resistivity Pay (see above)

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For information on advertisement in In-Site and the Journal. Please contact either of the publications co-chairs, Steve Burnie Sr. (steve@rpcl.com) at 264-4466 or Mike Eddy (meddy@wellsitegas.com) at 230-0603.
Discounts on business card advertisement for members.

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