

Quality Control for
Subsurface Maps (QLT's)

this issue

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MESSAGE FROM OUR PRESIDENT, HAL F. MILLER:



Let's Be Realistic...

I met recently with a Senior VP for a very large and successful privately owned wealth management firm, and during the course of our conversation I explained the importance of competent and unbiased technical analysis in the qualification of oil and gas investment opportunities. This seems inherently obvious, but in our experience many (not all) investment related entities tend to have very smart people who don't necessarily have sufficient knowledge of the oil business to understand some of the most important parameters; things like trap and seal risk, or the importance of proper reservoir characterization in the calculation of reserves and resources. They "don't know what they don't know."

Savvy investors understand financial risk factors and can build sophisticated economic models to test potential outcomes given varying cost and price assumptions. My pitch to the Senior VP was that even the best of these models are only as good as the technical assessment of the prospect. If one is relying on technical inputs presented by the seller like reserve size and production flow rates to populate the model, the wise investor really needs to have those inputs validated by an independent, unbiased third party. I went on to point out two enduring truths in our business;

1. When times are good and money is flowing, projects get funded that would not make the cut when times are lean.
2. Opportunity generators are likely to present an overly optimistic view of their prospects.

Neither of these is unique to our industry, nor is either an ethical issue - just human nature. When the money is available, either from eager investors wanting to capitalize on a successful industry, or within a major company with a big capital budget allocation to finding new reserves and resources, it should not be surprising that some higher risk, lower quality or back burner prospects will make their way into the portfolio. Sometimes this can be an opportunity to test new ideas, but historically it also impacts the overall success rate.

Oil finders are inherently optimistic and will naturally think in terms of how successful their prospects could be, and investors will typically want to know if the opportunity can be a "home run." Unfortunately, the most optimistic outcome is usually the one that goes into the prospect presentation with little note of the potential downside. Our industry learned years ago the need to take a pragmatic, unbiased look at risk, define the potential range of outcomes, and present the whole story (not just the high end of the range of potential outcomes) to the decision makers. We have an obligation to help non-industry investors understand that what we find in the subsurface is rarely exactly as predicted.

At SCA we are fortunate to work with many highly experienced consulting geoscientists and engineers who have found millions of barrels of oil and billions of cubic feet of gas for oil and gas companies all around the world...and probably drilled a few dry holes along the way as well. We and other consulting service providers like us can play an important role in making sure that non-industry investors have a realistic understanding of the inherent risks as well as the potential rewards of investing in this business.

RECOMMENDED COURSES RELATED TO HABIT 6

Applied Subsurface Geological Mapping (ASGM)

This is the most demanded subsurface mapping course in the world. From the newly graduated geoscientist or engineer to the seasoned professional, the course provides the applied, hands-on knowledge required to generate sound subsurface maps. Participants of this course will receive the Applied Subsurface Geological Mapping with Structural Methods 2nd Edition textbook (2003) and a lab manual with exercises. This course covers both fundamental and advanced methods of subsurface mapping that have been used by the most proficient exploration and development geoscientists in the industry, as well as an introduction to some of the more recent advances in interpretation.

July 14-18, 2014	Houston, TX
August 4-8, 2014	Dallas, TX
September 8-12, 2014	Houston, TX
October 6-10, 2014	Houston, TX
November 17-21, 2014	Kuala Lumpur
December 1-5, 2014	Houston, TX
December 1-5, 2014	Perth, Australia

Quality Control for Subsurface Maps (QLT's)

This unique 3-day course addresses the need for managers to obtain a systematic approach for quickly screening interpretations, maps, prospects and potential resources or reserves and identifying fundamental interpretation, mapping and estimating errors. The course begins with a review of examples of interpretation and mapping errors that led to poorly located wells that proved to be uneconomic or dry, as well as inaccurate reserves or resources estimates. The participants are challenged with a series of real exploration and development prospects and maps for their evaluation.

June 30-July 2, 2014	Houston, TX
November 3-5, 2014	Houston, TX

For a complete list of the 2014 public course schedule including course descriptions, target audience and dates available, please visit our website at:
www.scacompanies.com

EXPLORING THE TEN HABITS: HABIT 6 - *Successful oil finders know which methods, tools, and techniques are needed to define and understand the subsurface.* by Bob Shoup



There are many methods, tools and techniques available to the interpreter to help ensure that their interpretations are geologically and geometrically valid; far more than we have time to cover in this column. Many of these methods and techniques are taught in SCA's flagship course Applied Subsurface Geological Mapping.

Application of the proper methods and techniques is probably nowhere more important than in resource and reserve estimation. Your estimate of potential resources and reserves is the basis for almost all of your company's decisions. Moreover, should you systematically overestimate your reserves, you are likely to be subjected to an audit, and for US-traded companies, your corporate officers face potential fines and prison sentences under the provisions of Sarbanes-Oxley.

Let's begin our discussion of proper techniques for reserve estimation with a question. You are drilling a critical well. From your pre-drill evaluation, you know that to justify completion and further development, the well needs to have a minimum of 153' of net pay. The well is deviated with an azimuth of N80°E, and a well bore angle of 35°. The structure is dipping N80°W with a dip 42°. The well log shows 142' of net pay, with 116' of net pay on the TVD log. Do you complete this well and go forward with the development, or do you order the well to be plugged and abandoned?

If you elected to P&A the well, you have walked away from a commercial discovery. When the measured depth pay of 142' is converted to a true vertical thickness (TVT), we find we have encountered 185' of pay, well above the minimum 153' of pay needed to be commercial.

Why must we use TVT for making our net pay determinations? If you look at the rectangle of length of 500' and height of 100' shown in Figure 1, you will see that it has an area of 50,000 sqft.

However, if I were to rotate that rectangle to have a dip of 45° (Figure 2), the length, as measured on a map will be 354'. Calculating the area using the 100 feet of true stratigraphic thickness gives you an area of 35,400 sqft or ~70% of the correct area. Using the TVT thickness of 141.24', we calculate an area of 49,999 sqft.

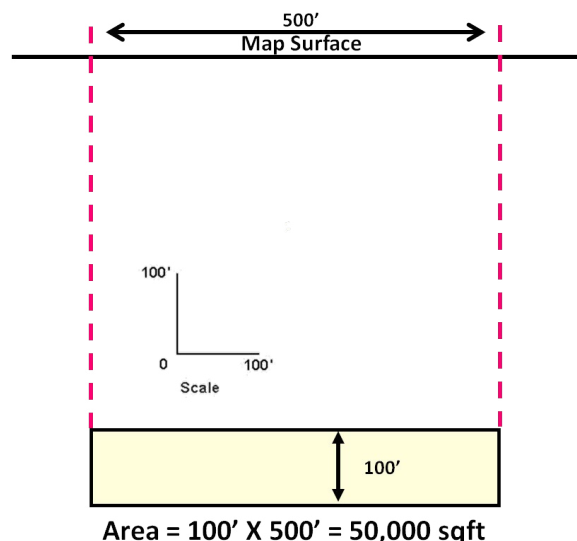


Figure 1: Area calculation for a rectangle of 500 feet by 100'

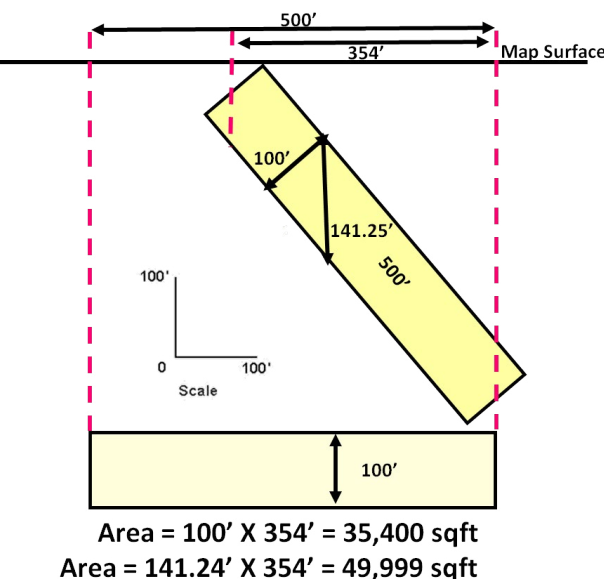


Figure 2: Area calculation for the same rectangle in Figure 1 rotated to have 45° of dip

Many companies base their net pay calculations on the TVD log. Depending on the orientation of the well to the horizon, they can significantly underestimate or overestimate the amount of net pay. Looking first at the case where a well is drilled in the same general direction as the bed dip (Figure 3, well on right). For a well with a deviation angle of 40° drilled into a bed dipping 35° the TVD

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US ENERGY INDEPENDENCE AND “FRACING”, AS IT AFFECTS THE US ENVIRONMENT, ECONOMY, AND ENERGY SUPPLIES

by: Dr. Kirk Boatright

as previously published in the Tahlequah Daily Press and other newspapers

The US, particularly North America, with proper government cooperation and involvement, has the potential to be energy self-sufficient in a relatively short time. It was recently announced that the US has the highest production of hydrocarbon liquids in the world, including crude oil, condensate, and natural gas liquids. That lead is projected to hold for at least 20 years. The US is currently producing just over eight million barrels of oil per day, and consuming approximately 18.8 million barrels of oil per day. US imports, which were 60% of consumption just two years ago, have now dropped to 36%. Much of that decrease can be attributed to the “tight” gas and “tight” oil shales. Up until ten years ago, it was thought that these were not viable energy resources, in that it was not expected that they could be produced within the foreseeable future. The technology was not available. However, beginning ten years ago, because of new technologies, gas from those “tight” reservoirs could now be produced, and, beginning five years ago, oil and condensates (liquids) from those reservoirs could also now be produced. Those technologies are Measurement While Drilling (MWD) and Reservoir Fracture Technology (“fracing” – journalistically transformed to “fracking”). In the 1960s, as a research reservoir engineer for Exxon in Tulsa, George Paff and I obtained, and I personally played back the first MWD in the history of the industry. If “fracing” should be terminated by Government action, 4.5 million barrels per day of the seven million barrels per day we now produce would be eliminated from availability, and we would see a dramatic adverse effect on the US economy, employment, and our lifestyles.

Due to these new technologies, there has been a tremendous increase in production, and gas prices have dropped to an average of just over four dollars per thousand cubic ft of gas. Historically, in order for it to be economic for companies to develop those reservoirs, the price must be in the range of six dollars per thousand cubic ft. Consequently, many gas producing companies are now concentrating more on liquid production than on gas production. It takes an average of six thousand cubic ft of gas to be energy equivalent to one barrel of oil. Consequently, at four dollars per thousand cubic ft, the same amount of energy can be produced for 24 dollars, using gas, in contrast to essentially 104 dollars per barrel for oil. Consequently, the energy from this gas is now available at a cost of 25% of equivalent oil cost.

In my opinion, five years from now, every automobile and 18-wheeler in the US should be manufactured to run on compressed natural gas (CNG). The cost to operate our automobiles and trucks will drop to one-third of the current cost, based on per-gallon cost of gasoline, and carbon dioxide generation will also drop by two-thirds.

As a result of dramatic increases in gas consumption since “fracing” justified production, US atmosphere carbon dioxide has dropped to 1995 levels. Increased gas consumption will continue to reduce the carbon dioxide presence in our atmosphere.

Electricity in the US in 2010 was generated from: coal 45%, gas 34%, nuclear 20%, wind energy 2%, solar 0%. I am a strong supporter of reasonable development of our renewable energy resources. However, in the next 20 years, renewable resource generation for the US will surely not even reach 5%. It is projected that, in 2030, 35% of our energy will be provided by oil.

The oil and gas industry is basically a clean industry. There is no knowledge of even one incident where fresh water reservoirs were contaminated due to “fracing”. Wells are completed in such a fashion that the natural geologic seal of the reservoirs are not disturbed. The oil and gas we produce by drilling has a natural geologic seal. Fracturing technology does not break that seal.

In a recent report, it has been determined that the Middle East region has 2.6 trillion barrels of oil equivalent energy resources, including coal, crude oil, and natural gas, whereas North America, including the US, Canada, and Mexico has 13.6 trillion barrels of oil equivalent energy resources. North America can become energy independent very quickly if we utilize our energy within North America.

Please explain to me how we can run our automobiles on wind or solar. If we talk about electric cars, keep in mind that that electricity was generated by coal, oil, or gas. Consequently, there has already been a 52% loss of energy availability, since most of those generating stations operate at 48% efficiency. The electric automobile is not the solution to our energy problems.

A primary source of carbon dioxide generation and atmospheric contamination is automobile traffic in the major cities. I was in Houston in November, and it is a 24-hour per day parking lot. We must make a major change in how we provide transportation in the major cities. The problem is already intolerable. If we want to improve our environment, we must make dramatic changes in transportation systems. If we can send men to the moon, solutions to this problem are relatively simple. The US has an opportunity to improve our atmosphere, and also our economy, if we just take advantage of that opportunity and be knowledgeable when we make decisions.

FEATURED INSTRUCTOR: Dr. Kirk Boatright



President, CEO, and 1980 Founder of **Engineering Consultants International and Training Consultants International**. Since founding his companies, Kirk has been consulting for the international oil and gas industry and developing and presenting training programs, with over 14,000 participants completing his training courses.

Dr. Boatright has a B.S. Mechanical Engineering (Petroleum) and an M.S. Mechanical Engineering, both from Oklahoma State University, and a Ph.D. Engineering Science (Mechanical and Civil Engineering) from the University of Arkansas. He is a registered Professional Engineer and member of Society of Petroleum Engineers (SPE).

Kirk was a Roustabout for Occidental Petroleum in West Texas, and a Petroleum Engineer for Amoco, involved in the design, fabrication and development of the first air hammer drilling system.

As an Exxon Drilling Research and Reservoir Research Engineer in an assigned project, Dr. Boatright studied the dynamics of a rotary drill bit while actually drilling a well at a depth of several thousand feet. Since this had not been done before, the first bottomhole recorder was developed, leading to the first MWD obtained in the industry. Dr. Boatright personally played back the first MWD data and was the author of multiple priority internal papers and reports on the project.

Dr. Boatright has served as Dean, College of Arts & Sciences, Chairman, Division of Natural Science & Mathematics, and developed the Engineering Physics degree program at Northeastern State University, Tahlequah, Oklahoma. He was the recipient of the “Outstanding Faculty Member, Northeastern State University” in the first campus-wide vote of students and faculty. He developed a course to prepare engineers to take the Engineering Registration Examinations. This course came to be highly recognized by the State Boards of Registration in Oklahoma, Texas, and Colorado.

HABIT 6 (continued from page 2)

thickness will be 242' whereas the TVT thickness is 100'. Using the TVD log to determine the net pay would have resulted in a 242% overestimation of the resource, eventually leading to a major reserve write down.

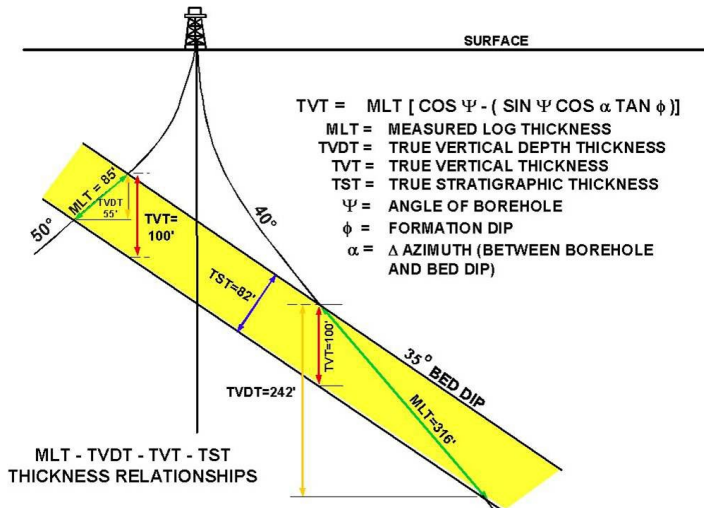


Figure 3: Comparison of thickness measurements in vertical and deviated wells drilled into a dipping bed

Now let's examine the case where a well is drilled in a generally opposite direction to the bed dip (Figure 3, well on left). For a well with a deviation angle of 50° drilled into a bed dipping 35°, the TVD thickness will be 55' whereas the TVT thickness is 100'. Using the TVD log to determine the net pay would have resulted in underestimating the resource by 55%, potentially causing your company to walk away from a commercial development.

So when estimating net pay, the proper method is to correct the measured log thickness (MLT) to the true vertical thickness using Setchell's equation shown in Figure 3. Once the proper value of net pay has been calculated, the net pay map needs to be constructed using the Wharton method of net pay isochore mapping.

To construct a net pay isochore map for an edge water reservoir using the Wharton method, one must first construct a structure map for the top and the base of the reservoir and a net sand isochore map. The oil or gas contact from the top of reservoir map determines the zero net pay contour on the net pay isochore map (Figure 4 - next column).

The oil or gas contact from the base of reservoir map determines the Inner Limit of Water (ILW) on the net pay isochore map (Figure 4). The portion of the net pay isochore map between the 0' net pay contour and the ILW is the oil over water wedge. The area updip of the ILW is that portion of the structure where wells will encounter pay to base of sand. Therefore, for the map updip of the ILW, the net pay is equal to the net sand (Figure 5).

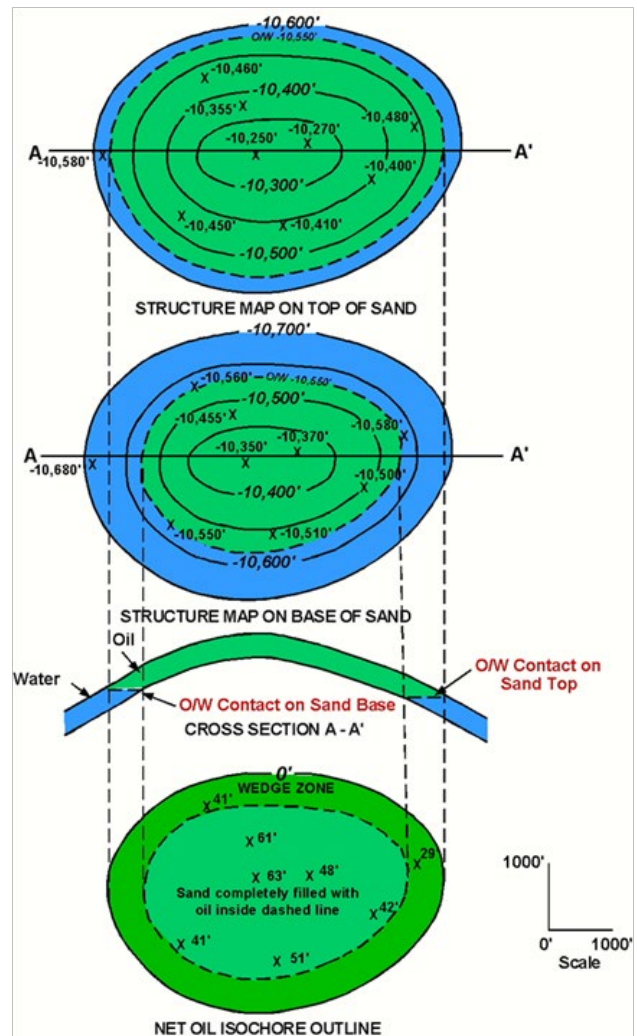


Figure 4: Net Pay Isochore construction for a basic edge water reservoir

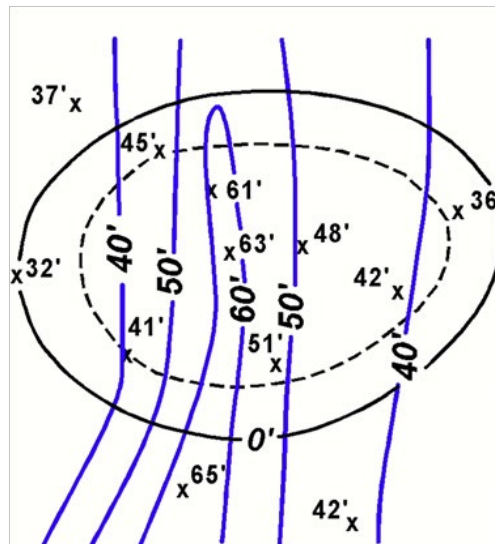


Figure 5: Net Sand Isochore overlain onto the Net Pay Isochore. Net Sand = Net Pay updip of the ILW

Introducing “COMPUTER MAPPING PRINCIPLES”

Instructor: Alan Cherry

A new five-day
course offered by:

Subsurface Consultants
& Associates, LLC



Subsurface Consultants & Associates, LLC, (SCA) is offering an unparalleled new course entitled “*Computer Mapping Principles*” which integrates fundamental geologic mapping principles with computer mapping software tools. **The next public session of SCA’s Computer Mapping Principles course is scheduled for October 20-24, 2014 at SCA’s Houston training facility (seating limited!).** This 5-day course bridges the gap between the “tried and true” geologic principles taught in traditional pencil and paper mapping courses and the reality of today’s workplaces that are heavily centered on workstation technology.

Designed in response to client and participant feedback, Computer Mapping Principles is a next generation follow-up to SCA’s popular flagship course, Applied Subsurface Geological Mapping. (To ensure adequate preparation, it is strongly advised that participants attend Applied Subsurface Geological Mapping prior to attending Computer Mapping Principles, although it is not a formal pre-requisite.)

The course is unique in the upstream training industry in that it does not promote or rely upon any particular workstation software package. Instead, participants are provided with the fundamental knowledge and techniques needed to make more accurate and geologically correct maps through proper data management and establishing an iterative process between seismic interpretation and mapping.

The instructor illustrates the various workflows presented in the course, offering interactive exploration and dynamic visualization of the data. Participants will also have the opportunity to manipulate data in order to solidify their understanding of the principles being taught, and will leave the course with the ability to apply core knowledge to whatever software their company uses.

Computer Mapping Principles was designed by SCA Senior Geologist and Training Instructor, Alan Cherry. Alan, who is also the course instructor, has a strong integrated skill set including 2D and 3D geophysical interpretation, field development, reservoir engineering, formation evaluation, economic assessment, reserves evaluation, drilling, completion, and production operations. He is experienced and exceptionally effective in exploration prospect generation and screening. Alan has conducted numerous integrated field studies and is highly proficient in the use of multiple geologic and seismic interpretation tools.

**Private, in-house sessions of
Computer Mapping Principles may be
scheduled according to instructor availability.
Visit our website for the full [course description](#).**

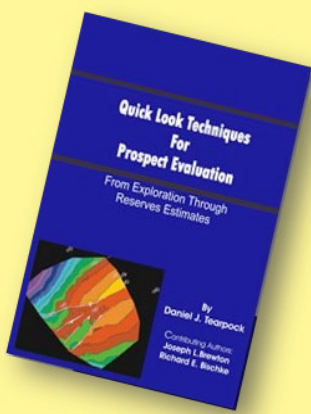
**For more information, please contact SCA’s Training Department
at 713.789.2444, or email training@scacompanies.com.**



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HABIT 6 (continued from page 4)

The final step, in constructing the net pay isochore map, is to contour the oil over water wedge, that portion of the map between the 0' net pay contour and the inner limit of water (Figure 6). Note that the contours take a sharp turn in the direction of the higher sand values at the inner limit of water.

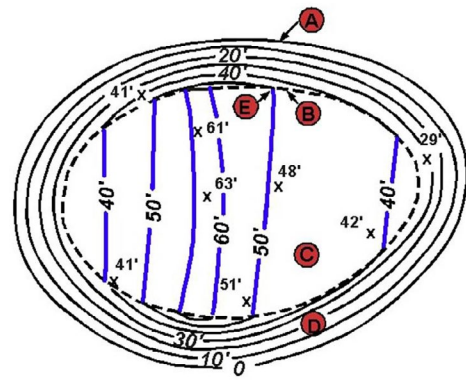


Figure 6: Properly contoured Net Pay Isochore with the contours showing a sharp turn at the ILW

In a properly constructed net pay isochore map, the zero contour will correspond to the contact as observed on the top of the reservoir map (A, Figure 6). The Inner Limit of Water (ILW) will correspond to the contact as observed on the base of the reservoir map (B, Figure 6). The contours updip of the ILW will be the same as the Net Sand Contours (C, Figure 6) and the area between the 0' contour and the ILW is the oil over water wedge (D, Figure 6). The contours should exhibit a sharp turn toward the higher net pay values at the ILW (E, Figure 6).

For prospects where there are no development wells to use to construct a net pay isochore map, it is still important to take into account the oil over water wedge. Without accounting for the oil wedge, the prospect seen in Figure 7 has an estimated volume of 5.65 million barrels (top map, Figure 7).

When the water wedge is accounted for, the prospect has an estimated volume of 3.52 million barrels (lower map, Figure 7), 62% of the volume estimated without accounting for the water wedge.

Many companies now use probabilistic methodologies to determine resources and reserves in their developed fields. As such, many interpreters no longer construct net pay isochore maps. We consider this to be a poor practice, as you are now making resource estimates without using all of the data. Calculating reserves in a developed field using a probabilistic method and a performance-based method (i.e. decline curve analysis) and by constructing a net pay isochore is an excellent technique to help validate your

interpretation and resource estimates. Although doing all three methods may be time consuming, considering the many millions of dollars at stake, it is time well invested.

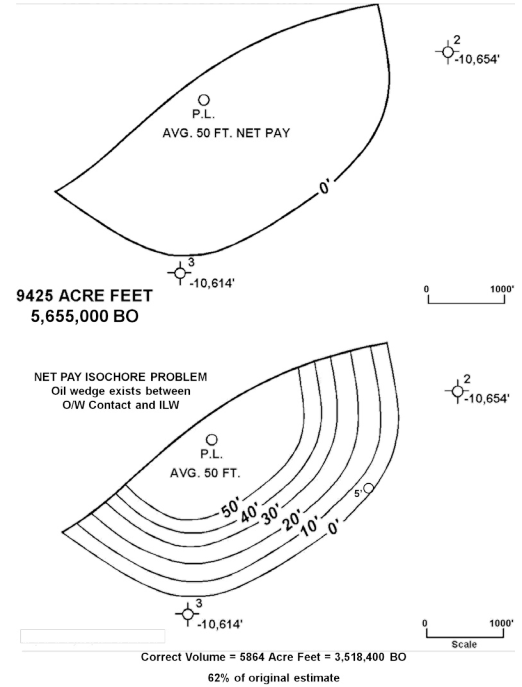


Figure 7: Prospect evaluated with and without accounting for the water wedge

Editor's Note: To learn more about net pay mapping and other tools, methods, and techniques to help ensure accurate subsurface maps, register for SCA's signature course Applied Subsurface Geologic Mapping (LINK). Visit www.scacompanies.com to learn more about SCA's training Program and other services, or to read more of the 10 Habits of Highly Successful Oil Finders.

Follow SCA on:



NETWORK FOR JOB HUNTING SUCCESS

by: Mark Connor, Sr. Upstream Recruiter



After interviewing a good number of job seekers every week for the past few years, I am yet to speak with one person who has been able to successfully control their job searching activities solely through online job applications. Invariably, people describe the online application process as a black hole, where they receive a dry automated response thanking them for their application, or they receive nothing at all. Everyone seems aware that online applications are something of a crap shoot, but as the world continues down the path of becoming more “online”, there are limited options for many professionals when it comes to making an application to their potential employer of choice.

At SCA, we make new connections with highly qualified and experienced technical professionals on a daily basis. It never fails to amaze us that these individuals seem to “fall through the cracks” because the online resume gathering systems simply don’t seem to have the computing power to make the required connections between the right candidate and the right job.

There is a lot of truth in the old adage “it’s not what you know, it’s who you know”, especially when it comes to landing a job or a consulting assignment.

People feel far more comfortable hiring people they know, or at the very least going off a recommendation from someone they trust, which leaves the hopeful internet applicant at a huge disadvantage. It is difficult for an unknown quantity to compete against a referral from a trusted source within a hiring manager’s carefully cultivated professional network.

As a consulting company, we try to bridge that gap for those not fortunate enough to have a wide reaching professional network. The most desirable candidates are often those with a more limited network, professionals who have worked loyally and successfully for the same company for long periods of time, concentrating more on a technical product rather than expanding their list of contacts. Since 1988, SCA has been diligently building relationships, making high level business connections, and, as a result, we can offer top quality professionals the benefit of our industry wide network to aid in their job search. No internet applications, no networking calls, just straight access to the decision makers who are crying out for the best people to join their teams. Even for those candidates and consultants with extensive contacts, we can help to highlight other positions and opportunities that we have become aware of through our networking calls and meetings, and help facilitate the right resume to land on the right desk. Feel free to contact me at mconnor@scacompanies.com

Please visit our website for current industry openings:
<http://scacompanies.com/sca-careers/external-industry-employment-postings/>



2014 Upcoming Training Courses

JULY

- 06/30-07/02/14 - Quality Control for Subsurface Maps (QLTs) - Houston, Texas
- 07/14-18/14 - Applied Subsurface Geological Mapping - Houston, Texas
- 07/21-25/14 - Basic Petroleum Geology - Houston, Texas
- 07/28-08/01/14 - Principles of Integrated Petroleum Geoscience - Houston, Texas

AUGUST

- 08/04-08/14 - Applied Subsurface Geological Mapping - Dallas, Texas
- 08/11-10/31/14 - **THE DANIEL J. TEARPOCK GEOSCIENCE CERTIFICATION PROGRAM** - Houston, TX
- 08/11/14 - Basics of the Petroleum Industry - Houston, Texas
- 08/12-15/14 - Structural Styles in Petroleum Exploration and Production - Houston, Texas
- 08/16-17/14 - Structural and Sequence Stratigraphy Field Course - Texas Hill Country
- 08/18-22/14 - Cased Hole and Production Log Evaluation - Houston, Texas
- 08/18-22/14 - Practical Interpretation of Open Hole Logs - Houston, Texas
- 08/25-26/14 - Economic Evaluation of Petroleum Opportunities - Houston, Texas
- 08/25-29/14 - Practical Seismic Exploration and Development - Houston, Texas

SEPTEMBER

- 09/02-05/14 - Mapping and Interpreting Clastic Reservoirs - Houston, Texas
- 09/08-12/14 - Applied Subsurface Geological Mapping - Houston, Texas
- 09/15-17/14 - Seismic Interpretation Workshop - Houston, Texas
- 09/18-19/14 - Basic Petroleum Engineering for Non-Engineers - Houston, Texas
- 09/20/14 - Modern Coastal Systems of Texas Field Course - Galveston, Texas
- 09/22-26/14 - Basic Petroleum Engineering Practices
- 09/22-26/14 - Evaluation of Unconventional Resource Plays
- 09/29-10/02/14 - Drilling Basics for the Geoscientist

OCTOBER

- 10/06-10/14 - Applied Subsurface Geological Mapping - Houston, Texas
- 10/13-17/14 - Petroleum Geology of Deepwater (Turbidite) Depositional Systems - Houston, Texas
- 10/20-24/14 - Computer Mapping Principles - Houston, Texas

Reserve Your Seat Today!
www.scacompanies.com

REGISTRATION should be made at least one month prior to the start of a course. Paid registrations will be accepted until the day before the course. Registrants will receive a confirmation e-mail within 48 hours of registration and will receive complete venue information two weeks prior to the first day of class. Registration is confirmed upon receipt of payment.





INDUSTRY EVENTS

URTEC	August 25-27, 2014	Denver, CO
AAPG ICE	September 14-17, 2014	Istanbul, Turkey
GCAGS	October 5-8, 2014	Lafayette, LA
SPE	October 27-29, 2014	Amsterdam, Netherlands

About SCA

Subsurface Consultants & Associates, LLC (SCA) provides upstream consultancy and training to stakeholders in the oil and gas industry. Founded in 1988 by Daniel J. Tearpock, SCA's four primary services include geoscience and engineering consulting upstream projects and studies training services, and direct hire recruitment.

**SCA HAS TRAINED OVER 26,000 GEOSCIENTISTS AND ENGINEERS
AND HAS EVALUATED OVER 5,000 PROSPECTS
WORLDWIDE IN OVER 50 COUNTRIES**



THE PEOPLE & ACTIVITIES OF SCA



"MAKING STRIDES AGAINST BREAST CANCER" -

On May 10, 2014 'Team SCA' participated in *Making Strides Against Breast Cancer 5K walk* at Reliant Park. Making Strides Houston is an annual fundraising event sponsored by the American Cancer Association who reported that over

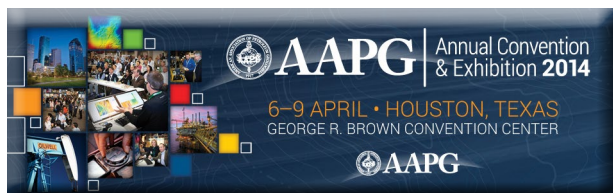
7,000 individuals walked and over \$500,000 was raised. Team SCA raised over \$650 for this worthy cause in honor of our own survivors, **Cathy Jankovic** and **Mary Wells**, the mother of Martha Hester. It was a great time for a great cause. We hope to do it again next year. Please visit www.makingstrideswalk.org for information on how you can donate or participate in a local event.

SCA WELCOMES TROY JEFFREY

Sr. Upstream Recruiter

March 2014 - Troy began his Upstream Recruiting career at Houston based Seis-Strat Services in 2008. He has experience recruiting for both contract and direct hire positions as well as recruiting multi-discipline teams for a variety of clients. Troy has built an extensive Geological, Geophysical and Petroleum Engineering candidate base over the last 5 years.

We are pleased to have Troy Jeffrey as part of our recruiting staff and SCA family.



SCA was well represented with most of our staff in attendance at the **2014 AAPG Annual Convention at the George R. Brown Convention Center in Houston, Texas**. We were again proud to participate in the *Explore the Floor* promotion where the winner received a Kawasaki Mule 610 4x4. Thank you to everyone who stopped by our booth. SCA was also honored to sponsor the Amoco Alumni event on Monday night where there were plenty of happy reunions and stories from back in the days of Amoco.