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geoLOGIC NEWS

A publication of Subsurface Consultants & Associates, LLC

Our Industry is Evolving

A message from our President, Hal Miller

The oil and gas industry has always responded to times of stress with remarkable resiliency. Survival mode lays the foundation for a healthier and more efficient industry moving forward. Today we are seeing seismic shifts in the composition of our workforce. Significant staff reductions in virtually every discipline have been disproportionately weighted on the high end of the experience spectrum. We have been anticipating this hand-off for years and now it is upon us, accelerated by the coincidence of this round of staff reductions with the retirement plans of the baby boomers.

At SCA, we hope to be a part of the generational hand-off by broadening our network of late-career geoscientists and engineers, and providing a vehicle for them to stay engaged through short to moderate term or part-time consulting and mentoring opportunities. This is a logical model that appeals to virtually every client that we speak with, although few companies are ready to bring in consultants so close on the heels of down-staffing. The market for consulting and mentoring will no doubt be driven by the eventual rejuvenation of major project work and the search for new venture opportunities.

On the training side, there is a very healthy evolution from conventional classroom style training to "blended learning." We have known for many years that a high percentage of skills learned in classroom-style courses are not retained unless immediately applied. Moving to a more interesting and challenging mix of instructor-led classroom, online, video and field presentations, combined with applied, multi-disciplined team exercises, provides a more effective training experience. Offering a modularized format allows training managers to customize content to the specific needs of their staff. Follow-on consulting or mentoring by the instructors and supplemental consultants can accelerate implementation of newly learned skills and enhance knowledge transfer.

As described in the following pages, SCA is working hard to introduce timely training options that utilize new and more effective techniques and are taught by highly experienced, industry-recognized experts. We appreciate the input received from many of our clients as we work to address the evolving needs of our industry.

Hal F. Miller

in this issue:

SCA
SUBSURFACE CONSULTANTS

Stay connected with SCA

Meet SCA's New Instructors

SCA proudly introduces new instructors and courses

Structural Geology & Tectonics as Applied to Upstream Problems

Taught by James Granath, PhD or Catalina Luneberg, PhD

A unique training program in which clients can design a customized, three- to five-day training course comprised of half-day, critical skill modules coupled with hands on consulting/mentoring. The content of each module reflects science or expertise related to an oil and gas work flow, topic, or problem, especially the integration of geological and seismic data into a valid and reasonable structural interpretation. In-house only.

Dr. James W. Granath

is a consulting structural geologist who has worked in minerals and petroleum exploration as well as academia. Jim spent 18 years at Conoco in research, international exploration, and new ventures. He is the author of numerous research papers and co-edited several multi-author compendia. His expertise lies in seismic interpretation and integration with structural analysis, fracture analysis, regional synthesis, and prospect and play evaluation.

Dr. Catalina Luneburg

is a recognized expert as a structural geologist in the validation of a variety of basins and petroleum systems worldwide, applying best practices and innovative structural modeling and restoration techniques. Her areas of expertise include geologic interpretation and validation, structural geology modeling, cross section balancing and 2D/3D time-step restorations as well as HC reserve estimates, 3D framework building and fracture prediction analyses.

Project Management Professional Exam Prep Course

Taught by Jill Almaguer, PE, MBA, PMP

This course is based on *A Guide to the Project Management Body of Knowledge*, published by the Project Management Institute (PMI), which is a recognized standard for the project management profession. The knowledge provided in this course includes recognized good practices of project management practitioners who contributed to standard development. In addition, the course defines key terms and identifies external environmental and internal organizational factors that surround or influence project success.

Project Management Exam Prep is being offered October 23-26, 2017

Jill Almaguer

is a certified Project Management Professional and Registered Professional Engineer in Texas. She provides leadership and project management to coordinate suppliers to deliver contract requirements on time and on budget while meeting or exceeding customer expectations for quality results. Professor Almaguer also provided project management and consulting services to clients such as BP Gulf of Mexico for a major ERP conversion project. She has presented at numerous national and regional conferences for Society of Women Engineers and Project Management Institute.

Petroleum Investment Analysis - Opportunity Evaluation, Risk Assessment, Economics, Strategies

Taught by Margaret Dalthorp, PhD

This two-day course encompasses a broad, applied and practical approach to assessing, risking, economically evaluating, and developing strategies for identifying and acquiring opportunities in the oil and gas industry. As the industry is a business of high risk and high reward, successful personnel need to know the tools that are critical to accurately and consistently evaluate income potential and associated risks.

Petroleum Investment Analysis is being offered June 19-20, 2017

Dr. Margaret Dalthorp

is a thirty-year oil industry veteran with a broad background of exploration, production, environmental, and management experience. Dr. Dalthorp has held positions as Exploration Manager at Murex Petroleum Corporation, the President and owner of an oil and gas consulting and natural resources planning company, a Geologist for Exxon Company USA in both the exploration and production departments, and an Operations Analyst for the Exxon Management Staff.

Characterization of Naturally Fractured Conventional and Unconventional Reservoirs

Taught by John C. Lorenz, PhD or Scott Cooper

Students will learn of the wide range of structures that fall under the basket term "fracture" and that they do not all have the same effect on hydrocarbon reservoirs. This hands-on class is anchored by a 50-piece teaching collection of natural and induced fractures in cores with which students will work during class exercises. Insight is provided into fracture mechanics and the origins of fractures, and then how to use those concepts in a very applied sense to understand natural fractures and their potential effects on reservoirs.

Characterization of Naturally Fractured Conventional and Unconventional Reservoirs is being offered April 24-28, 2017

Dr. John Lorenz

specializes in fractured reservoir characterization and effects. He has worked closely with the oil and gas industry on problems involving reservoir dimensions and in situ permeability, gaining extensive hands-on experience with core analysis and fieldwork. He has led field trips, presented core workshops, and taught short courses for the industry-oriented geological community in numerous places around the world.

Scott Cooper

has spent the last 19 years working projects related to outcrop and subsurface fracture studies, CO2 sequestration, and security related issues. Scott was a Senior Member of the Technical Staff at Sandia National Laboratories, a Department of Energy Research Laboratory, working on projects related to outcrop and subsurface fracture studies with applications to reservoir characterization, production and CO2 sequestration.

C. Susan Howes

is Vice President of Engineering at SCA. She has held a variety of engineering positions of increasing responsibility, starting her career at Anadarko. In 2007, she joined Chevron as Horizons Program Manager moving into the Reservoir Management function. Susan has coauthored several papers and articles on the topics of uncertainty management, risk management, and talent management for SPE conferences and publications. She is a 2016 recipient of the SPE DeGolyer Distinguished Service Medal.

Introduction to Risk and Uncertainty Management

Taught by Susan Howes, PE, PHR

This course is for members of multi-disciplinary project teams who need to identify key technical, mechanical, geological and commercial risks, and develop mitigation plans to address these risks. Members of multi-disciplinary technical teams will learn to plan how to resolve key uncertainties associated with their responsibilities for managing exploration portfolios, building regional exploitation strategies, managing capital projects and maintaining robust asset development plans.

Introduction to Risk & Uncertainty Mgmt is being offered August 15-16, 2017

Reservoir Characterization for Mudrock Reservoirs

Taught by Steve A. Sonnenberg, PhD

This course is an introduction to mudrock resource plays. A wide range of topics will be covered to familiarize the participant with the important nuances of both successful and unsuccessful mudrock plays. The petroleum system approach will be used. A key emphasis of this course will be to show the important elements and processes for continuous oil and gas accumulations. The participant will learn screening techniques which may help identify continuous types of accumulations.

Reservoir Characterization for Mudrock Reservoirs is being offered May 8-10, 2017

Unconventional Resource Plays

Taught by Steve A. Sonnenberg, PhD

Participants of this three-day workshop will learn the evaluation techniques used in choosing and developing unconventional resource new ventures. The workshop combines geology, reservoir engineering, reserve evaluation, economic forecasting, and the concepts of multi-variance analysis to develop skills for productivity prediction in oil/gas systems. Oil and gas plays in shale and stacked tight sands that have been developed with horizontal and vertical wells that have been completed and stimulated with necessary hydraulic fracturing are covered in this course.

Unconventional Resource Plays is being offered July 10-12, 2017

Elements of Petroleum Geology

Taught by Steve A. Sonnenberg PhD

This course provides a comprehensive understanding of petroleum geology by describing petroleum system elements (source, reservoir, seal, and overburden rocks) and processes (generation, migration, entrapment, and preservation) in detail. Participants will become familiar with petrophysics (log analysis), source rock evaluation, capillary pressure analysis, subsurface pressure analysis (including hydrodynamics), DST analysis, subsurface water analysis, and subsurface mapping and correlation techniques.

Elements of Petroleum Geology is being offered August 7-9, 2017

Dr. Steve Sonnenberg specializes in unconventional reservoirs, sequence stratigraphy, tectonic influence on sedimentation, and petroleum geology with over twenty-five years of experience in the industry. He is a professor and holds the Charles Boettcher Distinguished Chair in Petroleum Geology at the Colorado School of Mines. Steve has served as President of several organizations including the AAPG, RMAG and Colorado Scientific Society. He was recently awarded the Halbouty Medal from AAPG.

Dr. Rajan N. Chokshi has over 30 years of work experience in the petroleum and software industries. His roles have included petroleum engineer, research engineer, software developer, project manager, trainer, senior consultant, and senior business leader. He has worked on many petroleum and software projects globally in the areas of multi-phase flow, artificial lift, production optimization, well performance improvement and real-time production monitoring. Dr. Chokshi has taught many courses and conducted workshops for practicing professionals around the globe in public and private forums.

Artificial Lift and Real-Time Optimization for Unconventional Assets

Taught by Dr. Rajan N. Chokshi

This three-day course is designed to give participants an overview of artificial lift and related issues that are applicable to unconventional and tight oil/gas wells. Production optimization is also discussed, particularly real-time measurements and optimization techniques that are required to understand and manage the dynamic production scenarios. Specific production and lift challenges related to unconventional wells are focused on too.

Artificial Lift is being offered October 30 - November 1, 2017

Well Stimulation: Practical and Applied

Taught by Leo Roodhart and Gerrit Nitters

This course is designed for those involved in all aspects of inflow performance and well completion/outflow design with emphasis on well stimulation. Time will be spent discussing candidate selection strategies, the effect on inflow performance and consequently stimulation design. Also included: acidizing and fracturing design, quality control, conducting the treatment, and analyzing pressures and other critical parameters during and after the treatment. The course has a strong interactive format as participants are encouraged to bring their own cases.

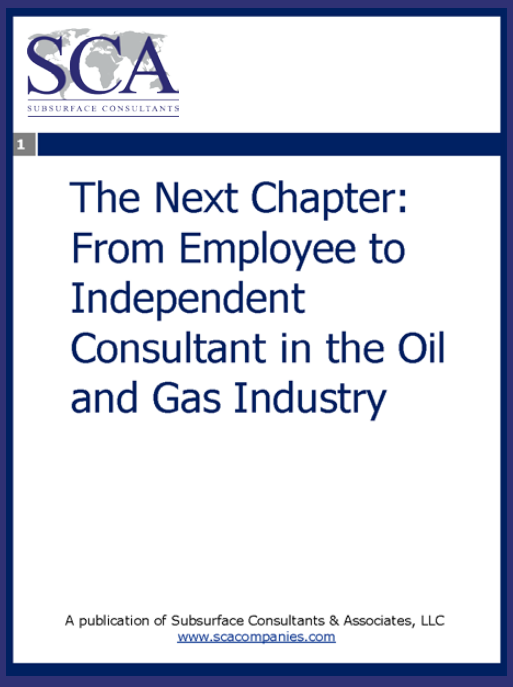
Well Stimulation: Practical and Applied is being offered October 16-20, 2017

Gerrit Nitters is a specialist in well stimulation operations with 40 years of experience in the oil industry. During his career with Shell he became their global well stimulation coordinator and Principal Technical Expert on well stimulation. Gerrit authored and co-authored many SPE papers on the subject of well stimulation and was SPE's Distinguished Lecturer on Well Stimulation in 2005. After his career with Shell, he has been consulting as a lecturer and providing detailed support on acid and fracturing treatments for a range of oil companies.

Dr. Leo Roodhart has worked in the areas of Production Engineering, Production Optimization and Water Management, Strategic Innovation, Scenario Planning, and New Business Development. He was a Distinguished Lecturer for the SPE in 2008 and became President of SPE in 2009. As global well stimulation expert, he designed and supervised fracturing treatments in Shell's operating units across the globe. He has written and presented numerous papers in the areas of production optimization, hydraulic fracturing and acidizing, and water management.

For more course information and instructor biography details: ***www.scacompanies.com***

The Next Chapter: From Employee to Independent Consultant in the Oil and Gas Industry



Whether you've recently transitioned out of a full-time position or have chosen to retire and want to stay professionally engaged, a career in consulting can offer greater flexibility, diverse project opportunities, and attractive compensation.

Our eBrochure provides a comprehensive look at what it means to be an independent consultant in the oil and gas industry and how to be successful doing so. The information covered in the following chapters is meant to serve as a guiding tool for reference throughout the process:

Chapter 1: Why Become a Consultant?
Chapter 2: Self-Managing
Chapter 3: Understanding Independent Contractor Status
Chapter 4: Financial Planning, Taxes, and Legal Considerations
Chapter 5: Navigating the Path to Consulting
Chapter 6: Strategies for Success on the Job
Chapter 7: Advantages of Working with a Consulting Company

Click this link to access the full document from SCA's website.

Style Over Substance

by Bob Shoup, SCA Chief Geologist

Managers, if you like drilling dry holes, you can skip this column.

Society is increasingly favoring style over substance, a viewpoint that values looks more importantly than content. According to *Changing Minds*[1], the differences between style and substance can be characterized as follows:

Style

In the style approach, we are less concerned with what is done, being more concerned with appearance. This can include visual appearance but is more focused on the impressions other people gain, including what they think and feel.

Substance

In the substance approach, we are less concerned with appearances as we assume that actions will speak louder than words, and achievements will always trump ineffective action.

This trend is, at least in part, an outgrowth of social media. It is hard to be substantive with instantaneous communication, especially when that communication is limited to 140 characters.

But the trend is more pervasive and deeper than just social media. To illustrate how pervasive the phenomenon of style over substance is, let's look at golf.

Golf

Last October, thanks to a very long flight delay caused by an errant bolt of lightning, I had the opportunity and pleasure to get to know professional golfer, Phil Blackmar. He was en route to Kuala Lumpur to contribute to a broadcast of a golf tournament for NBC Sports. I learned from Phil that golf has changed significantly since the years when he was on the pro circuit. In his day, each golf shot was a problem to be solved. You had to consider tangible options (club choice, swing mechanics, ball position), and intangible options (situational awareness, concentration, breathing, visualization). By mastering problem solving skills, a good golfer could have a great game.

With the technologically advanced clubs available to golfers today, few golfers undertake a rigorously thoughtful approach to their shot. Rather than using problem solving skills to plan their shot, players today often stick to a rigid approach that relies more on technology, each shot being treated more or less the same. In doing so, they neglect to adapt and fail to take full advantage of their skill and talent. In Phil's words, it is no longer a thinking-person's sport. Put another way, today's golfers are long on style, short on substance.

By mastering problem solving skills, a good golfer can play a great game.

Oil

The same problem can be seen in our industry. Few interpreters undertake a rigorously thoughtful approach to their evaluation of the subsurface, relying on technology to make their interpretations and maps. In many ways, this is no longer a thinking-person's industry. It is important for interpreters not to fall into the trap of being long on style, short on substance.

Managers

Managers, are you willing to make a multi-million dollar decision to drill a well based on a technical evaluation that is more style than substance? Are you aware that almost every map generated by the workstation is incorrect, sometimes so much so as to be geologically impossible? Wells drilled on these type of maps are dry holes in the making. Can you be sure that the map your team has generated for your decision is valid?

Unless you like drilling dry holes, you need a strategy to return substance to your team's evaluations. One way that you can restore substance to your team's work is to conduct

(1) Straker, David. "Style vs. Substance." *Changing Minds*. David Straker, 18 January 2015. Web. December 2016. <http://changingminds.org/explanations/preferences/style_substance.htm>.

periodic technical reviews. In those reviews, hold your team accountable for understanding the subsurface. Make sure that the interpreters are familiar with all of the data and that they have used that data correctly. Then, make sure the interpreters understand their map and what it portrays. Finally, follow the contours on their map to ensure that they are valid.

When all the data was used, the interpreters understand the geology and the maps, and the contours are correct, then you will have the substantive evaluation you can base a decision on.

> *"Managers, one way that you can restore substance to your team's work is to conduct periodic technical reviews. In those reviews, hold your team accountable for understanding the subsurface."*

Providing your team with the skill sets they need to give you substantive evaluations requires training. Most of the methods and techniques needed to make high quality interpretations and maps are not taught in school. Industry used to rely on mentors to pass these methods and techniques on to the next generation interpreter. However, we are in the midst of the "Great Crew Change", so mentors are not available for most of today's younger staff. As such, training is more important than ever.

By mastering interpretation and mapping skills, a good geoscientist can be a great geoscientist, an oil-finder rather than a dry hole generator.

Training

Training itself must be substantive to help your team master interpretation and mapping skills. It is commonly assumed, and at least partly true, that millennials have shorter attention spans and want more animated classes. As a result, many training providers have been replacing substantive material with stylistic material; more "ooh and ah" than "hmmm".

Just as you need a strategy to return substance to your team's evaluations, you need a strategy to maximize the value of your training budget. Select courses such as SCA's signature course Applied Subsurface Geological Mapping provide substance, particularly substance that teaches your interpreters the methods and techniques they need to make substantive interpretations and maps.

To be sure, a class needs to have style to hold the student's attention and focus. The most substantive class in the world is worthless if the students are sound asleep by lunch. However, a good class puts substance over style. It needs to provide your students the methods and techniques they need to provide you with an interpretation you can base a multi-million dollar decision on.

Upcoming Training Courses

APR	04/24-28/17	Characterization of Naturally Fractured Conventional and Unconventional Reservoirs NEW
MAY	05/04-05/17	Refrac Candidate Selection, Execution, & Performance Evaluation
	05/08-10/17	Reservoir Characterization for Mudrock Reservoirs NEW
	05/15-19/17	Applied Subsurface Geological Mapping
	05/22-26/17	Reservoir Characterization of Clastic (Sandstone) Reservoirs
	05/22-26/17	Applied Subsurface Geological Mapping (Tulsa)
JUN	06/05-09/17	Integration of Rock, Logs, Test and Seismic Data
	06/12-13/17	Petroleum Geomechanics
	06/12-16/17	AVO, Inversion and Attributes: Principles and Applications
	06/14-15/17	Injection Geomechanics
	06/19-20/17	Petroleum Investment Analysis - Opportunity Evaluation, Risk Assessment, Economics, Strategies NEW
	06/26-30/17	Applied Sequence Stratigraphy of Clastic Depositional Systems

All courses are located in Houston unless noted otherwise.

These SCA textbooks are foundation works for accepted practice in oil & gas exploration and development. Taught and sold around the world!

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Reserve your seat today! For full course listings, visit: ***www.scacompanies.com***

About SCA

Subsurface Consultants & Associates, LLC provides upstream consultancy and training to professionals in the oil and gas industry. Founded in 1988 by Daniel J. Tearpock, SCA's four primary services are 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. SCA's staff has found and/or developed over 6 billion barrels of oil equivalent around the world for our clients.

AUTHORIZED IACET PROVIDER

We have been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET), authorizing SCA to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard. Professionals who are required to maintain their state, federal or society licensing, registration or certification can fulfill their requirements by attending SCA training courses.

The People & Activities of SCA

Candlelighters' "Adopt A Family"

To celebrate the Christmas Holiday, SCA was pleased to participate in Candlelighters' "Adopt A Family" program. By becoming a Bundle of Joy Sponsor, SCA provided gifts to help a family that was unprepared for the holiday season.

Networking Effectively to Build Beneficial Relationships

SCA's VP of Engineering, Susan Howes, delivered a presentation entitled "Networking Effectively to Build Beneficial Relationships: SPE Soft Skills Workshop" to a classroom of engineering students at the University of Texas. She led the students through exercises to practice variations of their "elevator speech", learn tips for conversation starters, map their network, and draft a vision statement.

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