AAPG

2016 EDUCATION PROGRAM

Take a glance inside and choose your favorites now!

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A QUICK LOOK INTO THE AAPG 2016 ULTIMATE CAREER ADVANCEMENT RESOURCE GUIDE

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FIELD SEMINARS

AAPG GRADUATE STUDENT ASSISTANT PROGRAM

Want to attend an AAPG School or Short Course but don't have the funds to register? By participating in AAPG's Grad Student Assistant Program, you'll be doing us a favor, and in return, you'll be able to attend one or two courses at no charge. This Program is open to anyone currently enrolled in graduate school, studying for either a Master's degree or Ph.D. in a geoscience or related field.

Here's how it works:

- You look over the schedule of AAPG Short Course offerings and choose one or two that you would like to attend.
- Contact us, and we'll let you know if we still need an assistant for that course – there is one slot available for most courses, and it is filled on a first-come, first-served basis.
- As grad student assistant, your duties include operating the projection equipment, sound and light controls, and assisting the speaker and the AAPG representative in making the course run smoothly.
- In return for these responsibilities, you attend the course free of charge, receive all of the course materials, and receive $25 per day to help defray expenses.
- Travel and lodging expenses not included.

Please contact Amy Mahan in the AAPG Education Department at 918-560-9431 (fax 918-560-2678; e-mail amahan@aapg.org) if you are interested in participating in this program. This program does not apply to field seminars or field courses.

FULL-TIME STUDENT MEMBERS OF AAPG RECEIVE REDUCED TUITION

- Current full-time AAPG student members who want to attend an AAPG Course - Tuition $115.00.
- AAPG members of an AAPG Student Chapter – Tuition $75.00.
- Three spaces are allotted for each Short Course and students will be accepted in the order of receipt of their paid registrations.
- Tuition reduction does not apply to Field Seminars.
- Attendance is required to receive course material.
- Student rate at Education Conferences is $125 for the week, five spaces available.

Spaces are limited, so online registration for student member and/or Student Chapter slots is not available. You must contact the AAPG Education Department directly to apply for available slots.

EARLY BIRD DISCOUNTS IN EFFECT FOR 2016 AAPG COURSES

Sign up early for AAPG short courses and field seminars and save $200. That's right. Those registering prior to the individual course deadline will pay the discounted rate shown. After that deadline all registrants will pay an additional $200 for tuition.

CONTINUING EDUCATION UNITS (CEUs)

AAPG awards Continuing Education Units (CEUs) for its training functions. Included in this program are short courses, schools, field seminars, online courses and e-symposia. The CEU content is noted on each offering included in this catalog. This is a nationally recognized unit of achievement that is based on 10 contact hours being equivalent to one CEU. The CEUs are customarily awarded by organizations that have a continuing education program under responsible sponsorship, capable direction and with qualified instruction. AAPG meets these requirements.

For AAPG members, CEU records have been kept since January 1, 1989, for all AAPG courses taken. The release of CEU information will only be granted by authorization of the member. These records provide evidence of personal and vocational growth and adjustment to meet changing career demands. They also demonstrate a conscious, persistent and voluntary effort toward personal development and growth. This record is available to any member upon request.

If you are interested in adding CEU credits awarded by other organizations to your AAPG member record, please send your course certificate or other documentation of earned CEUs to the AAPG Education Department.

ONLINE COURSES

CAN'T GET AWAY FROM THE OFFICE TO TAKE A SHORT COURSE? IS THERE NO CLASS IN THE SUBJECT YOU WANT OFFERED IN YOUR AREA? AAPG OFFERS THE SOLUTION WITH A GREAT SELECTION OF ONLINE HELP. THE ONLINE COURSES OUTLINED HERE RANGE FROM SHORT MODULES, TO HELP YOU BRUSH UP ON YOUR SKILLS, TO MONTH-LONG COURSES WITH WRITTEN ASSIGNMENTS EACH WEEK. WE ALSO HAVE OUTSTANDING COURSES IN THE MAKING, SO KEEP YOUR EYES OPEN FOR FUTURE ANNOUNCEMENTS.

E-SYMPOSIA

AAPG's exciting e-symposia program consists of monthly live 1-hour webinars on up-to-date topics of interest to most geoscientists. Extended independent study packages for CEU credit are also available with each e-symposia. CEUs are available if you attend the e-symposium, read the independent study materials, and return a questionnaire. Once registered, you will be contacted by our technical support facilitator with FTP information. After the initial live webinar, most e-symposia are archived and still available in recorded form.

We have over 60 titles now and the list is still growing. Please check our website at **www.aapg.org/career/training/online/e-symposia** for all of our archived and upcoming webinars.

ONLINE CERTIFICATE COURSES

These courses are offered at the beginning of every month. You may sign up for them at any time, and your course will begin the first day of the upcoming month. These courses are designed to be equivalent to a 3 credit-hour graduate-level seminar. They are 4-week online courses which consist of 4 one-week units that involve readings, multimedia, guiding questions, and assignments for you to do and to email to your instructor. You will receive feedback from your instructor, and upon successful completion of the course, you will receive a certificate. Required Work: for each unit, one research project and a short paper that builds on results of the research project, for a total of four brief research projects and four papers.

PETROLEUM GEOLOGY FUNDAMENTALS

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $595 • Nonmember: $695 • Student members: $300. Introductory Price: $295 (until January 31, 2016)*
Limit: *200*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This course is designed for petroleum geologists just beginning a career in the oil industry, or for students in their final phases of work. The course is also useful for petroleum engineers and geophysicists, geochemists, and scientists interested in learning the fundamentals of petroleum geology.

Learning Objectives

Upon successful completion of the course, the learner will be able to identify different types of reservoirs, explain the basics of petroleum geochemistry, discuss exploration methods, evaluate different technologies used in exploration, and describe how petroleum is produced.

Content Description

This course provides an overview of petroleum geology, from exploration to development. It provides foundational information required to work in the current industry environment, with content that ranges from a historical overview to methods of exploration, new technologies, subsurface geology, petroleum generation, reservoirs, traps, seals, petroleum systems, unconventional reservoirs, shale plays, geophysics, geochemistry, and more.

Key Topics

- History of Petroleum Geology
- Physical and Chemical Properties
- Exploration Methods
- Subsurface: Waters, Temperatures, Pressures, Fluid Dynamics
- Generation of Petroleum
- Reservoirs, Traps, Seals
- Sedimentary Basins and Petroleum Systems
- Unconventionals, including Shale Plays
- The Role of Technology

Course Structure

This is a self-paced, self-guided course, with interaction with an instructor. It consists of 8 units, and is designed to be completed in 4 weeks. All materials are online.

SILICICLASTIC PETROGRAPHY FUNDAMENTALS

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $595 • Nonmember: $695 • Student members: $300. Introductory Price: $295 (until January 31, 2016)*
Limit: *200*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This course is designed for petroleum geologists who are working in siliciclastic environments. The course is also useful for geochemists, and scientists interested in learning the fundamentals of siliciclastic petrography.

Learning Objectives

Upon successful completion of the course, students will be able to identify textures, classify siliciclastics, describe their textures, discuss mineralogy, explain diagenetic processes, and analyze factors affecting porosity and permeability.

Content Description

This course provides an overview the petrography of siliciclastic rocks, including sandstones, siltstones, shales, and associated rocks (including mudrocks). The course covers the mineralogy, grains, texture and classification, diagenesis, and other topics.

Key Topics

- Grains
- Minerals
- Texture and Classification
- Sand and sandstone textures
- Siltstones, mudstones, claystones, and shales
- Diagenesis
- Compaction
- Cementation
- Dissolution
- Replacement and recrystallization
- Porosity
- Paragenesis
- Emerging technologies and techniques

Course Structure

This is a self-paced, self-guided course, with interaction with an instructor. It consists of 8 units, and is designed to be completed in 4 weeks. The text is AAPG's Memoir 109: A Color Guide to the Petrography of Sandstones, Siltstones, Shales and Associated Rocks, (must be purchased separately from the AAPG Store) and online materials.

NOTE: Course textbook is AAPG's Memoir 109: A Color Guide to the Petrography of Sandstones, Siltstones, Shales and Associated Rocks. This book is NOT included in the course price, and must be purchased separately from the AAPG Store.

RENEWABLE ENERGY CERTIFICATE COURSES

As part of our five-course Certificate in Renewable Energy program, if you complete all five courses in this series, you will receive 5 course certificates and a program certificate.

GEOTHERMAL ENERGY BASICS: A RENEWABLE ENERGY CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00. Please note: There is a discount of $100 off this course if you sign up for all 5 courses in the AAPG Renewable Energy Certificate Course Program.*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Mike Sullivan, Groundwater Services International, Harrisburg, PA*

Who Should Attend

This course is ideal for individuals who want to learn about geothermal energy, current trends, technologies and applications, particularly as integrated with oil and gas.

Objectives

By the end of the course, participants should be able to:

- Define key aspects of the growing geothermal industry, including different locations and scales of production.
- Describe the current use of geothermal energy.
- Identify and list past and current incentives for using and producing geothermal energy.
- Recognize companies developing and investing in geothermal energy, as well as estimate the business benefits of such investments.
- Identify the scientific fundamentals of the exploration, development, and distribution of geothermal power.
- Describe the scientific, technological, and business components of geothermal energy, e.g., land-based versus ocean sources, drilling techniques, and current storage/distribution of geothermal energy.
- Cite current applications of geothermal power in the energy industry.
- Discuss and analyze case studies involving the integration of geothermal power and non-renewable sources of energy.
- Devise methods for the integration of geothermal power in order to anticipate future changes in the energy market.

Content

Geothermal Energy Basics is an online course that enables participants to review, analyze, and evaluate opportunities in the rapidly expanding market for geothermal energy. In addition to gaining a working knowledge of the scientific, technological, and business aspects of geothermal energy, participants will also learn techniques for the integration of geothermal energy and existing non-renewable resources on a variety of levels,

from small-scale use in commercial structures to large-scale distribution. The course blends theory and practice, and culminates with a project requiring the learner to develop a step-by-step plan for a geothermal energy installation.

With direct contact with your professor, who will answer questions and review your work via e-mail, you will have a chance to learn about geothermal energy in a personalized setting. You may also have an opportunity to interact with other professionals in the field who will be available for your questions. A discussion board will be available for interaction with peers.

This course is part of a 5-course series: Certificate in Renewable Energy. The goal of the series of courses, and the Renewable Energy program is to equip earth scientists with knowledge to enable them to take the lead in integrated energy projects and programs. An earth scientist's unique training and understanding of the big picture — the global picture — provides unmatched abilities to design, oversee, and promote integrated energy solutions which require bringing together fossil energy, geothermal, solar, biomass, and others.

- Unit 1 (Week 1): Scientific and Technology
- Unit 2 (Week 2): Exploration and Development
- Unit 3 (Week 3): Investment Models and Benefits
- Unit 4 (Week 4): Integration Techniques

WIND ENERGY BASICS: A RENEWABLE ENERGY CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00 Please note: There is a discount of $100 off this course if you sign up for all 5 courses in the AAPG Renewable Energy Certificate Course Program.*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Mike Sullivan, Groundwater Services International, Harrisburg, PA*

Who Should Attend

This course is ideal for all energy professionals who have an interest in wind energy operations, ranging from small use-specific operations to large contributors to the regional grid. Individuals and companies interested in integrating energy generation from multiple sources (wind, oil and gas, etc.) will find the information very useful for adding revenue sources and increasing efficiency.

Objectives

By the end of the course, participants should be able to:

- Define key aspects of the growing wind industry, including different locations and scales of production.
- Describe the current use of wind energy.
- Identify and list past and current incentives for using and producing wind energy.
- Recognize companies developing and investing in wind energy, as well as estimate the business benefits of such investments.
- Identify the scientific fundamentals of the exploration, development, and distribution of wind power.
- Describe the scientific, technological, and business components of wind energy, e.g., turbine manufacturing and installation, wind farm management, purchasing and distribution of wind energy.
- Cite current applications of wind power in the energy industry.
- Discuss and analyze case studies involving the integration of wind power and non-renewable sources of energy.
- Devise methods for the integration of wind power in order to anticipate future changes in the energy market.

Content

Wind Energy Basics is an online course that enables participants to review, analyze, and evaluate opportunities in the rapidly expanding market for wind energy. In addition to gaining a working knowledge of the scientific, technological, and business aspects of wind energy, participants will also learn techniques for the integration of wind energy and existing non-renewable resources on both a large-scale production level and smaller-scale use in commercial and public structures. The course blends theory and practice, and culminates with a project requiring the learner to develop a step-by-step plan for a wind energy installation.

With direct contact with your professor, who will answer questions and review your work via e-mail, you will have a chance to learn about wind energy in a personalized setting. Resources will include texts, articles, podcasts, presentations, and video. You may also have an opportunity to interact with other professionals in the field who will be available for your questions. A discussion board will be available for interaction with peers.

This course is part of a 5-course series: Certificate in Renewable Energy. The goal of the series of courses, and the Renewable Energy program is to equip earth scientists with knowledge to enable them to take the lead in integrated energy projects and programs. An earth scientist's unique training and understanding of the big picture — the global picture — provides unmatched abilities to design, oversee, and promote integrated energy solutions which require bringing together fossil energy, geothermal, solar, wind, biomass, and others.

- Unit 1 (Week 1): Scientific and Technology
- Unit 2 (Week 2): Exploration and Development
- Unit 3 (Week 3): Investment Models and Benefits
- Unit 4 (Week 4): Integration Techniques

SOLAR ENERGY BASICS: A RENEWABLE ENERGY CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00 Please note: There is a discount of $100 off this course if you sign up for all 5 courses in the AAPG Renewable Energy Certificate Course Program.*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This online course is ideal for individuals who want to learn about renewable energy, current trends, technologies and applications.

Objectives

By the end of the course, participants should be able to:

- Define key aspects of the growing solar industry, including different locations and scales of production.
- Describe the current use of solar energy.
- Identify and list past and current incentives for using and producing solar energy.
- Recognize companies developing and investing in solar energy, as well as estimate the business benefits of such investments.
- Identify the scientific fundamentals of the exploration, development, and distribution of solar power.
- Describe the scientific, technological, and business components of solar energy, e.g., turbine manufacturing and installation, solar farm management, purchasing and distribution of solar energy.
- Cite current applications of solar power in the energy industry.
- Discuss and analyze case studies involving the integration of solar power and non-renewable sources of energy.
- Devise methods for the integration of solar power in order to anticipate future changes in the energy market.

Content

Solar Energy Basics is an online course that enables participants to review, analyze, and evaluate opportunities in the rapidly expanding market for solar energy. In addition to gaining a working knowledge of the scientific, technological, and business aspects of solar energy, participants will also learn techniques for the integration of solar energy and existing non-renewable resources. Both large-scale solar farm structures and small-scale use in commercial and public structures will be addressed. The final project will involved developing a plan for a solar energy installation.

With direct contact with your professor, who will answer questions and review your work via e-mail, you will have a chance to learn about solar energy in a personalized setting. You may also have an opportunity to interact with other professionals in the field who will be available for your questions. A discussion board will be available for interaction with peers.

This course is part of a 5-course series: Certificate in Renewable Energy. The goal of the series of courses, and the Renewable Energy program is to equip earth scientists with knowledge to enable them to take the lead in integrated energy projects and programs. An earth scientist's unique training and understanding of the big picture — the global picture — provides unmatched abilities to design, oversee, and promote integrated energy solutions which require bringing together fossil energy, geothermal, solar, solar, biomass, and others.

- Unit 1 (Week 1): Scientific and Technology
- Unit 2 (Week 2): Exploration and Development
- Unit 3 (Week 3): Investment Models and Benefits
- Unit 4 (Week 4): Integration Techniques

BIOMASS ENERGY BASICS: A RENEWABLE ENERGY CERTIFICATE COURSE

Dates: Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.
Tuition: Member: $695.00 • Nonmember $795.00 Please note: There is a discount of $100 off this course if you sign up for all 5 courses in the AAPG Renewable Energy Certificate Course Program.
Limit: 100
Content: 4.8 CEU
Instructor: Susan Nash, AAPG Education Director, Tulsa, OK

Who Should Attend

Ideal for individuals who want to learn about renewable energy, current trends, technologies and applications.

Objectives

By the end of the course, participants should be able to:

- Define key aspects of the growing biopower and biofuel industry, including different locations and scales of production.
- Describe the current use of biomass-generated energy.
- Identify and list past and current incentives for using and producing biomass energy.
- Recognize companies developing and investing in biomass energy, as well as estimate the business benefits of such investments.
- Identify the scientific fundamentals of the exploration, development, and distribution of biopower and biofuel.
- Describe the scientific, technological, and business components of energy from biomass sources, e.g., the six types of biopower systems (direct-fired, cofiring, gasification, anaerobic digestion, pyrolysis, and small, modular) and sources of biofuel, e.g. ethanol, biodiesel, and methanol.
- Cite current applications of biopower and biofuels in the energy industry.
- Discuss and analyze case studies involving the integration of biopower/biofuel and non-renewable sources of fuel and energy.
- Devise methods for the integration of biopower/biofuel and non-renewables in order to anticipate future changes in the energy market.

Content

Biomass Energy Basics is an online course that enables participants to review, analyze, and evaluate opportunities in the rapidly expanding market for biopower and biofuel. In addition to gaining a working knowledge of the scientific, technological, and business aspects of biomass energy/fuel, participants will also learn techniques for integration with existing non-renewable resources, including using bioenergy and fuel to heat and/or power commercial structures, private

homes, and public buildings. You will have a chance to plan a biomass operation for your final project.

With direct contact with your professor, who will answer questions and review your work via e-mail, you will have a chance to learn about renewable energy in a personalized setting. You may also have an opportunity to interact with other professionals in the field who will be available for your questions. A discussion board will be available for interaction with peers.

This course is part of a 5-course series: Certificate in Renewable Energy. The goal of the series of courses, and the Renewable Energy program is to equip earth scientists with knowledge to enable them to take the lead in integrated energy projects and programs. An earth scientist's unique training and understanding of the big picture — the global picture — provides unmatched abilities to design, oversee, and promote integrated energy solutions which require bringing together fossil energy, geothermal, solar, wind, biomass, and others.

- Unit 1 (Week 1): Scientific and Technology
- Unit 2 (Week 2): Exploration and Development
- Unit 3 (Week 3): Investment Models and Benefits
- Unit 4 (Week 4): Integration Techniques

RENEWABLE & NON-RENEWABLE RESOURCES - OVERVIEW & INTEGRATION : A RENEWABLE ENERGY CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00 Please note: There is a discount of $100 off this course if you sign up for all 5 courses in the AAPG Renewable Energy Certificate Course Program.*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This online course is ideal for individuals who want to learn about renewable energy, current trends, technologies and applications.

Objectives

By the end of the course, participants should be able to:

- Define key aspects of the growing renewable resource industry, including different types of energy sources and locations.
- Describe the current use of wind, geothermal, solar, and biomass energy.
- Identify and list past and current incentives for using renewable energy, including tax credits, grants, cost savings, and more.
- Recognize companies developing and investing in renewable energy, as well as estimate the business benefits of such investments.
- Identify the scientific fundamentals of the exploration, development, and distribution of different sources.
- Describe the technological components of different sources, e.g., commercial and small-scale wind turbines, photovoltaics and CSP, and biomass.
- Cite current applications of renewable resource technologies within the energy industry.
- Compare and contrast the scientific, technological, and business components of renewable and non-renewable energy sources.
- Discuss and analyze case studies involving the integration of renewable and non-renewable energy.
- Devise methods for the integration of renewable and non-renewable sources in order to anticipate future changes in the energy market.

Content

Renewable & Non-Renewable Resources is an online course that enables participants to review, analyze, and evaluate opportunities in the rapidly expanding market for renewable energy. In addition to gaining a working knowledge of the scientific, technological, and business aspects of sources of renewable energy, participants will also learn techniques for integration with existing non-renewable resources, both on a large production scale and a smaller scale for use in commercial, public, and private structures. The final project involves planning an installation requiring renewable and non-renewable energy integration.

With direct contact with your professor, who will answer questions and review your work via e-mail, you will have a chance to learn about renewable energy in a personalized setting. You may also have an opportunity to interact with other professionals in the field who will be available for your questions. A discussion board will be available for interaction with peers.

This course is part of a 5-course series: Certificate in Renewable Energy. The goal of the series of courses, and the Renewable Energy program is to equip earth scientists with knowledge to enable them to take the lead in integrated energy projects and programs. An earth scientist's unique training and understanding of the big picture — the global picture — provides unmatched abilities to design, oversee, and promote integrated energy solutions which require bringing together fossil energy, geothermal, solar, wind, biomass, and others.

- Unit 1 (Week 1): Scientific and Technology
- Unit 2 (Week 2): Exploration and Development
- Unit 3 (Week 3): Investment Models and Benefits
- Unit 4 (Week 4): Integration Techniques

5-COURSE SET - ONLINE RENEWABLE ENERGY CERTIFICATE COURSES

Tuition: *Member: $2,975.00 • Nonmember $3,475.00*
Limit: *100*
Content: *24.CEU*
Instructors: *various - see individual course descriptions*

Who Should Attend

Ideal for individuals who want to learn about renewable energy, current trends, technologies and applications.

Content

Courses included are (See individual courses for complete descriptions):

- Geothermal Energy Basics - Launch: September 1, 2009

- Wind Energy Basics - Launch November 1, 2009
- Solar Energy Basics - Launch February 1, 2010
- Biomass Energy Basics - Launch April 1, 2010
- Renewable Energy Integration - Launch June 1, 2010

These courses are being offered at the beginning of every month. Sign up for these 5 courses as a package at any time, and the courses will begin the first day of the upcoming month. Length for each course is 4 weeks and each course is designed to be equivalent to a 3 credit-hour graduate level seminar.

GIANT OIL AND GAS FIELDS CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This course is ideal for geologists, geophysicists, engineers, and other energy professionals who want to learn about giant and super-giant fields, their reservoirs, and production history.

Objectives

Upon successful completion of this course, you will be able to analyze, compare, and contrast giant petroleum fields of the world. You will be able to describe the fields, the reservoirs, and their production history.

Key Concepts:

- Giant petroleum fields
- Tectonic settings of giant fields
- Giant field trends
- Deepwater discoveries
- Stratigraphic controlled giant fields
- Salt domes
- Deltaic reservoirs
- Carbonate reservoirs
- Deep Marine clastics reservoirs
- Basin modeling
- Unconventional resources
- Fractured reservoirs
- Hydraulic fracturing
- CO_2 enhanced oil recovery
- Reservoir characterization and 3D seismic
- Seismic imaging and reservoir/stratigraphic definition
- Offshore seismic data acquisition techniques

Content

There are approximately 1,000 oil and gas fields in the world that have been classified as "giant," containing more than 500 million barrels of recoverable oil and/or 3 trillion cubic feet of gas. Giant Oil and Gas Fields is an online course that enables participants to study the structure, stratigraphy, and production history of the fields and an analysis of effective exploration, production, and enhanced oil recovery methods.

With direct contact with your professor, who will answer questions and review your work via e-mail, you will have a chance to learn about giant oil fields in a personalized setting. You may also have an opportunity to interact with other professionals in the field who will be available for your questions. A discussion board will be available for interaction with peers.

- Unit 1 (Week 1): Definition of Giant Oil and Gas Fields
- Unit 2 (Week 2): The First Giant Oil and Gas Fields
- Unit 3 (Week 3): Expanding Onshore and Offshore
- Unit 4 (Week 4): New Technologies, New Giants

INTRODUCTION TO SHALE GAS CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This course is ideal for geologists, geophysicists, engineers, and other energy professionals who want to learn about the basics of shale gas plays, and ongoing exploration in such plays as the Barnett, Marcellus and Woodford basins.

Objectives

Upon successful completion of this course, participants will be able to define shale gas, explain theories relating to its origin, discuss the attributes of major and emerging plays, describe challenges in horizontal drilling, and discuss geological considerations in hydraulic fracturing.

Content

This course covers the fundamentals of shale plays, from the origins and geochemistry of shale gas, to profiles of shale gas exploration and production, including the Barnett, Fayetteville, Marcellus, Woodford, and Antrim. Reservoir considerations such as natural fracturing are covered, as well as completion issues involving hydraulic fracturing processes and procedures. Course includes interaction with your instructor, a log of the articles and reports provided for the course, responses to discussion questions and problem sets, and case study analyses.

INTRODUCTION TO UNCONVENTIONAL RESOURCES CERTIFICATE COURSE

Dates: *Ongoing, course is offered at the beginning of every month. You may sign up for it at any time, and your course will begin the first day of the upcoming month.*
Tuition: *Member: $695.00 • Nonmember $795.00*
Limit: *100*
Content: *4.8 CEU*
Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This course is ideal for geologists, geophysicists, engineers, and other energy professionals who want to learn about the basics of various unconventional resources, such as coalbed methane, shale gas, shale oil and tar sands.

Objectives

Upon successful completion of this course, participants will be able to define unconventional resources, explain theories relating to their origin, discuss the attributes of major and emerging plays, describe challenges in exploring for and developing the resources, and discuss technologies that are helping make unconventional plays economic.

Content

This course covers the fundamentals of unconventional resources, including coalbed methane, shale gas, shale oil, and tar sands. The course presents the key defining characteristics of the different unconventional resources, and it discusses methods for exploring for and producing them. Examples of the main plays will be profiled, including coalbed methane in Wyoming, the Bakken formation, the Eagle Ford, and tar sands in Alberta. Emerging plays and technologies that make the resource plays economic will also be covered. Course includes interaction with your instructor, a log of the articles and reports provided for the course, responses to discussion questions and problem sets, and case study analyses.

ONLINE COURSES – TRADITIONAL FORMAT

STRATEGIC DECISION-MAKING: CURRENT ISSUES IN THE OIL INDUSTRY

Dates: *Begins the first of each month. Includes Online resources, course website, videos, packet of independent study reading materials. Materials will also sent by e-mail. You may start the course at any time and work at your own pace. This course is designed to be completed within 4 weeks. You will have one year from the date you register to complete the course.*

Tuition: *$395.00AAPG members, $495.00 for non-members*

Content: *4.0 CEU*

Instructor: *Susan Nash, AAPG Education Director, Tulsa, OK*

Who Should Attend

This course will help energy professionals, investors, geoscientists, engineers, business owners, managers, and service providers a clear view of many of the issues that accompany the rapid expansion of oil and gas supplies. It will place them within a strategic context that will help identify specific opportunities, and also places where changes can be made.

Learning Goals

Upon successful completion of this course, the student will be able to list current issues that can impact growth and sustainability of oil and gas ventures. They will also be able to explain the reasons for the potential problems, and evaluate possible solutions.

Overview

The future of oil and gas ventures is complex due to a number of challenges facing the industry. Although demand for oil and gas remains high, especially in the new giants, India and China, complications have emerged, particularly in the U.S., where the "shale revolution" has resulted in an oversupply of natural gas, and plunging natural gas prices. In the meantime, lack of infrastructure in some of the major plays (the Bakken in North Dakota, the Eagle Ford in south Texas), has made it necessary to employ expensive methods of transporting liquids-rich petroleum such as hauling via truck and rail, vs. pipelines. Further, the lack of natural gas processing and transportation infrastructure (gathering systems, pipelines, compressors, conditioning) has made it difficult to get natural gas to market. Water management remains a challenge as well, particularly in times of drought and public sensitivity to environmental issues.

At the same time, enormous opportunities abound, primarily due to the emergence of transformational technologies, which have allowed previously unproductive and unproducible resources to be exploited. Further, new technologies are making it possible to return to mature fields and to recover oil and gas that has been left behind.

In order to make strategic decisions in all industries, it is very important to have an understanding of the issues facing the energy sector.

Background and Contexts

Technological breakthroughs which have enabled companies to recover oil and gas that was previously unrecoverable have transformed the U.S. energy industry, and have helped lower dependence on imported oil. Some economists have predicted energy independence by 2020 (Citigroup, 2013, Energy 2020: North America, the New Middle East?). We can already see a change: in 2005, the U.S. imported 60% of its oil, while in 2012, only 40% was imported (U.S. Energy Information Administration, August 2013).

Understanding the opportunities and gaining knowledge of the multiple challenges that accompany the goal of sustainable expansion of oil and gas supplies (via exploration, production, transportation) and the appropriate / effective use of new technologies are vital.

Course Units (Issues):

Participants will select four issues from the list below and be given access to those readings and course materials. They then read the materials and respond to the Guiding Questions by writing responses, supporting their ideas with information from the readings and also by conducting their own research using reliable sources.

1. Current oil and gas exploration / production efforts hampered by insufficient cash / undercapitalization.
2. Skyrocketing costs in energy technology.
3. Environmental challenges.
4. Shortages of qualified personnel.
5. Bubble Economies and Carbon Economies / Fire sales and "vulturing".

6. Alternative Energies: Easy-to-find, cheap-to-produce oil no longer exists.
7. Health and safety issues are increasingly complicated.
8. "Green" energy must combine with oil and gas.
9. Geopolitical power shuffles.
10. Non-renewables are "dirty" and difficult;
11. Renewables are expensive.
12. Global outlook: Sustained, worldwide growth.

TECHNICAL WRITING

Dates: Begins the 2nd of every month, 10-week course (can be accelerated). Exercises and Exams administered by instructor via email.
Tuition: $300 (includes textbook)
Content: 5.4 CEU
Instructor: Susan Nash, AAPG Education Director, Tulsa, OK

Who Should Attend

This course is ideal for scientists, managers, and professionals for whom English is a second language, with personalized grammar and vocabulary review. This course is highly recommended for scientists and technical professionals seeking to develop a mastery of the communication skills required in an increasingly digital age.

Objectives and Content

In addition to providing a solid foundation with templates and flowcharts for reports, technical documents, summaries, recommendations, annual reports, and more, the course provides one-on-one mentoring in collaborative work, presentations, emails, discussion board postings, web logs, website analysis and design, and more. Also, the course looks at ethical issues in digital and print communication, and provides support and effective techniques for collaborative and individual revision activities. This course is newly revised (2005), and gives users access to Dr. Nash's Writing Survival Guide. This course is particularly useful for professionals involved in writing research papers, proposals, dissertations, theses, and technical monographs.

- Abstracts / Technical Papers
- Grammar / Style / Revision
- Proposals
- Technical correspondence
- Reports

PROFESSIONAL ENGLISH

Dates: Variable, completely self-paced online. Exercises and Exams administered by instructor via email.
Tuition: $300 (includes textbook)
Content: 5.4 CEU
Instructor: Susan Nash, AAPG Education Director, Tulsa, OK

Who Should Attend

This course is ideal for individuals seeking to develop highly effective documents for their companies, personal businesses, and associations.

Objectives and Content

Upon completion of this course, students will have gained an ability to develop and organize documents both printed and on the Internet which are read by individuals outside their company. If you are responsible for creating or maintaining any of the following, this course will be beneficial for you:

- Memoranda, PowerPoint Presentations, Meeting Documents
- Quarterly and Annual Reports
- Reports and Presentations to Investors, Shareholders, Stakeholders
- Websites, Promotional Items
- Resumes
- Directories of Services, Virtual Information Libraries

LEADERSHIP AND STRATEGIC THINKING IN THE OIL AND GAS INDUSTRY

Dates: Begins the first of each month. Includes course materials and direct interaction with the instructor via e-mail. You may start the course at any time and work at your own pace. This is a four-module course designed to be completed within 4 weeks.
Tuition: $395.00 AAPG members, $495.00 for non-members
Instructor: Susan Nash, AAPG Education Director, Tulsa, OK

Who Should Attend

Geoscientists, engineers and all decision-makers involved in the energy industry, with emphasis on oil and gas.

Objectives and Content

Times of rapid technological innovation, financial turmoil, new plays and markets, distributed teams and workforces, difficult-to-control social media, shortages of technical expertise, and time pressures involved in achieving operational objectives have come together to create new challenges and opportunities for leadership. How the issues relate to the oil and gas business (exploration, development, oilfield services, support services, financial sector) constitutes the core of this course, along with ways to transform challenges into opportunities, and to develop effective strategic thinking.

Key Topics Covered in the Course

- Leadership theories: profiles, comparisons, applications.
- Management theories and application to oil and gas industry.
- Creative problem-solving: internal, external, public presence.
- Dealing with rapid change.
- Impact of technological innovation.
- Dealing with rapidly changing regulatory environment.
- Environmental issues: operations, procedures, perception and reality.
- Social network power & potential pitfalls.
- Impact of social networking on organizational structure and integrity.
- Diversity in the global context / distributed workplace.
- Team-building across disciplines.

- Dealing with "game-changers" (resource plays, new ways of structuring deals, capital from national oil companies, international partnerships).
- Key articles / thinkers / emergent ideas.

MBA in Energy Leadership: This course can be taken alone, or in conjunction with the AAPG's partnerships in Energy Leadership. If you are considering applying for the Texas A&M Texarkana MBA in Energy Leadership, this course is required.

This is a four-module course designed to be completed within 4 weeks. You may start the course at any time and work at your own pace. You will have direct interaction with the instructor via email and will receive materials through a course website. For each unit, you will be required to complete a brief report.

PETROLEUM EXPLORATION & PRODUCTION: AN ONLINE OVERVIEW

A joint course with AAPG and The University of Tulsa Continuing Engineering and Science Education Department

Please note - if paying with a check, please make check payable to University of Tulsa, CESE (applies to this course only)

Dates: *Variable, completely self-paced online.*
Tuition: *$795.00/person. Upon registration, each student will receive a login and password, good for 30 days of anytime, anywhere access. Your computer will need to have Internet access and be able to run QuickTime, Flash and Java Runtime. Certificate of Completion, a geological time card and a reference handbook are also included.*
Instructor: *Norman J. Hyne, The University of Tulsa, Tulsa, OK*

Who Should Attend

This course is for anyone needing an overall perspective of petroleum exploration, drilling, and production in order to become more knowledgeable and productive in your job. This will include, but not be limited to: new employees, Administrative Assistants, Landmen, Accountants, Managers, Marketing/Sales Personnel, Attorneys, Finance Personnel, Geotechs, etc.

Objectives

This online course provides an overview of the petroleum industry from what is natural gas and crude oil to how to explore, drill, and produce oil and gas. It is a technical program presented on a non-technical level, through audio visuals, graphics, texts and examples. No previous technical training is necessary to take this course.

This program offers a perspective that leads to increased job productivity. It is designed for anyone who works directly or indirectly with the petroleum industry and who is not a petroleum geologist or petroleum engineer.

The course is provides individuals and companies with an easily accessible training tool to educate interns and employees on the language and processes of the oil and gas industry. In addition, we want to provide participants with an interactive, flexible and exciting way to learn.

Content

1. The Nature of Oil & Gas
2. The Earth's Crust — Where We Find Oil and Gas
3. Generation, Migration and Accumulation of Petroleum
4. Deformation of Sedimentary Rocks
5. Petroleum Traps
6. Petroleum Exploration; Seismic Exploration
7. Drilling Preliminaries; Drilling a Well; Drilling Problems and Techniques
8. Testing a Well; Completing a Well
9. Offshore Exploration and Production
10. Petroleum Production

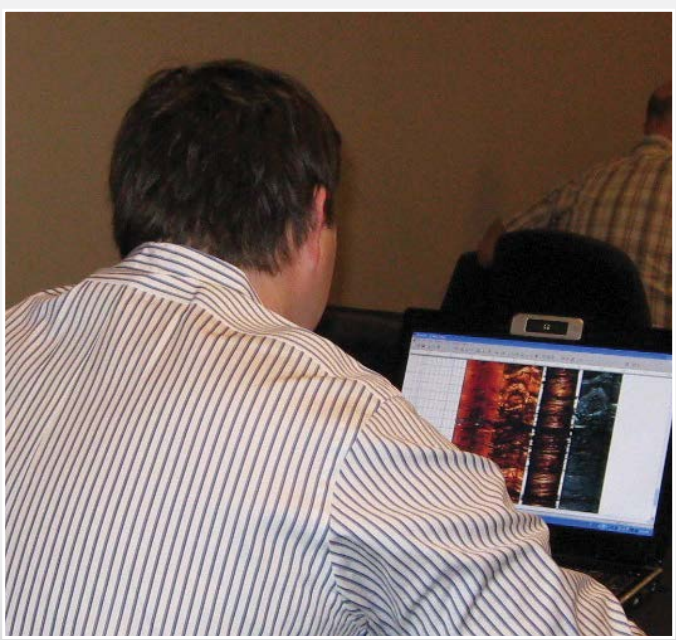
Course Highlights

1. Narrated by Norm Hyne - his enthusiasm of this topic will keep your interest!
2. Animated illustrations
3. Easy to navigate your way thru the course
4. Designed in short segments making it easy to stop after each section. Or you can finish the course all at once. You make the decision based on your schedule.
5. Turn the audio on or off any time throughout the course.
6. Highly interactive
7. Immediate feedback exercises
8. Glossary of terms provided with the click of a mouse
9. Links to additional information on the web
10. Picture gallery of various subjects

Technical Requirements

Your computer will need to have the following:

1. Internet access (Internet Explorer or Firefox)
2. QuickTime: www.quicktime.com
3. Flash: www.adobe.com/shockwave/download/
4. Java Runtime: www.java.com



THE WORLD-CLASS EDUCATION CONFERENCE

ENJOY FIVE GREAT DAYS OF THE FINEST GEOSCIENCE TRAINING, INCLUDING SOME OF THE BEST SHORT COURSES THE AAPG HAS TO OFFER.

Schedule for AAPG World-class Education Conference » 2016 Houston				
Monday - 2/29	**Tuesday - 3/1**	**Wednesday - 3/2**	**Thursday - 3/3**	**Friday - 3/4**
Deepwater Reservoir Connectivity - Lesli Wood		Fluvial Sedimentology & Geomorphology - John Holbrook	Applied Seismic Geomorphology and Seismic Stratigraphy - Henry Posamentier	
Carbonate Reservoir Geology: Understanding Depositional and Diagenetic Factors Controlling Porosity - Peter & Dana Scholle		Carbonate Depositional Systems - Art Saller	Applying Ideas of Carbonate Sedimentology, Stratigraphy and Depositional Systems to Petroleum Exploration - Brad Macurda	
Extracting Geology from Seismic Wiggles: An Intro to Seismic Interpretation for Non-Geophysicists - Fred Schroeder		Integrating Data from Nano- to Macro-Scale: Improving Characterizations of Unconventional Plays - Christina Calvin, Allison Cornett, Rick Lewis	Essentials of Production Geology - Terngu Utim	
Shale Gas Geomechanics - Hamed Soroush		Applications of Stable Isotope Geochemistry in the Petroleum Geosciences - Christopher Laughrey	Log Analysis of Shaly Sand Reservoirs - George Asquith	Log Analysis of Hydrocarbon-Bearing "Shale" Reservoirs - George Asquith
Small bookstore open during breaks each day				

AAPG WORLD-CLASS EDUCATION CONFERENCE

Dates: February 29-March 4, 2016
Location: Houston, TX
Tuition: $1895, AAPG members, $2195, non-members (increases to $2095/$2395 respectively on 2/01/2016.) Registration is for entire week, and badge is transferable. Includes refreshments and buffet lunch each day in addition to digital course notes and printed exercises. Courses also priced individually at $550/course day (increases to $600/course day on 2/01/2016.) No refunds for cancellations after 2/01/2016.

DEEPWATER RESERVOIR CONNECTIVITY

Dates: February 29-March 1, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructor: Lesli Wood, Colorado School of Mines, Golden, CO
Content: 1.5 CEU
Limit: 40 people

Who Should Attend

This course is for engineers, geologists and geophysicists who are responsible for economically positive exploration and development of deep-marine reservoirs. In addition, any individuals who might be evaluating prospects or proposals from other individuals dealing with deepwater assets or developments will benefit. It is particularly appropriate for geologist-engineer teams who are responsible for building reservoir development models in these complex systems.

Objectives

By the end of the course, participants should be able to accomplish the following:

- Recognize the major architectural elements of the deepwater reservoir systems, how to interpret them, their geometries, petrophysics, and stratigraphic relationships (connectivity) between each other and with surrounding elements
- The ability to assess sand presence in deepwater reservoir elements
- Differences in connectivity due to changes in net:gross of a system
- Recognize, interpret and understand the impact of debrites and other forms of mass failures on your reservoirs and their performance
- Be aware of previous successes and failures of connectivity and production planning in deepwater reservoir systems.

Content

Connectivity in deepwater deposited reservoirs is often times something you don't know for certainty until you have a well down and flowing. However, with careful understanding of the architecture of the reservoir section (i.e., facies distributions, element sizes and distributions, shale thicknesses and lengths, erosional events versus depositional events, etc.) we can reach toward reducing uncertainty in our production projections. This course will discuss predicting sands in seismic analysis of deepwater intervals, connectivity in various types of deepwater reservoir systems, and production case histories, both successful and less so. We will do some seismic, outcrop and subsurface based exercises and discuss the implications of various correlation and interpretation scenarios. Finally we will finish with a look at building training images and reservoir models in deepwater systems.

CARBONATE RESERVOIR GEOLOGY: UNDERSTANDING DEPOSITIONAL AND DIAGENETIC FACTORS CONTROLLING POROSITY

Dates: February 29-March 1, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructors: Peter Scholle and Dana Ulmer Scholle, Scholle Petrographic, LLC, Magdalena, NM
Content: 1.5 CEU
Limit: 40 people

Who Should Attend

Exploration and development geologists working on carbonate reservoirs; petroleum engineers and geophysicists with some carbonate geology background and an interest in understanding the causes and patterns of reservoir heterogeneity.

Objectives

By the end of this course, participants should understand the major factors of importance in controlling porosity in carbonate rocks along with:

- sedimentary facies and sediment textures through time;
- primary mineralogy variations and their influence on porosity preservation or development;
- early diagenetic history of cementation and/or exposure-related porosity development; and
- burial diagenesis from early to late stages including brine reflux, hydrothermal water movement, timing of hydrocarbon entry and others.

Participants should also be able, at the end of the course:

- to understand porosity evolution and the techniques available to evaluate reservoirs, especially petrographic and geochemical methods – both their advantages and limitations; and
- to independently evaluate their own samples based on an understanding of the geologic and diagenetic histories of their units. Carbonate petrography may seem overwhelming at first, but if it is focused on rocks of a specific age and a specific region, the task is well within the achievable skill set of any geoscientist.

Content

The course consists of a series of PowerPoint presentations. We will start with predictable patterns of carbonate deposition as a function of geologic time and move on to an examination of selected modern depositional settings that serve as excellent analogs for ancient sediments (focusing mostly on the less commonly presented, but very important analogs from the Persian Gulf and Australia). Moving on to diagenesis, we will discuss patterns of alteration in marine, subaerial exposure/meteoric environments, and deeper burial settings, integrating core, petrographic and geochemical observations. We will then examine a series of case histories of reservoirs from Paleozoic and Mesozoic basins, especially those in the southwestern US. We will also cover unconventional carbonates with a discussion of chalk reservoirs and their porosity patterns.

EXTRACTING GEOLOGY FROM SEISMIC WIGGLES: BASIC SEISMIC INTERPRETATION FOR NON-GEOPHYSICISTS

Date: February 29-March 1, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructor: Fred Schroeder, Consultant, Tomball, TX
Content: 1.5 CEU
Limit: 40 people

Who Should Attend

Geologists, engineers, technicians and all others who need a working knowledge of seismic interpretation methods and products without getting overpowered with advanced geophysics. This would include people who are getting started with seismic interpretation assignment but do not have a good understanding of how seismic data can be used to answer business questions. The course emphasizes the exploration stage, but what you will learn can be applied through the life cycle of an asset.

Objectives

By the end of the course, participants should be able to accomplish the following:

- Explain what in the subsurface generates the seismic reflections.
- Describe what happens before you begin your seismic interpretation.
- Relate your well-based geology to a seismic section through the well by using a synthetic (modeled) seismic trace.
- Develop a geologic framework for your study area:
- Recognize and map faults on seismic data,
- Identify and map sequence boundaries on seismic data,
- Predict depositional environments and infer sedimentary facies,
- Use seismic attributes to enhance your predictions,
- Apply the concept of system tracts to identify drill locations.

Content

This course provides a two-day introduction to seismic interpretation. Participants should have a good understanding of geology, but they do not need to have much training in geophysics. The targeted audience is young professionals who have or will soon start a seismic interpretation project. It will also be of value to people who interact with seismic interpreters and need to understand what they do and the products they generate.

The course has two main components. The first six hours covers the most basic fundamentals of seismic data and its display. It is geophysics-lite – just enough to understand how the "wiggles" are formed and how we can use them. The second component is on extracting geological data from the geophysical measurements. You will learn to generate a stratigraphic framework by identifying and mapping major faults and sequence boundaries. Several techniques to analyze key intervals (e.g., a reservoir sequence) will be explained and you will practice these techniques by completing exercises.

This is a learn-by-doing course where lectures are less than ½ the time. You will work paper-based exercises either individually or in teams of two to put into practice the skills that are taught.

SHALE GAS GEOMECHANICS

Date: February 29-March 1, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructor: Hamed Soroush, Dong Energy, Gentofte, Denmark
Content: 1.5 CEU
Limit: 40 people

Who Should Attend

Drilling, completion, reservoir and production engineers, geologists, geophysicists, geoscientists and petrophysicists with some basic knowledge of petroleum geomechanics.

Objectives

Due to low permeability of shale gas reservoirs, production at commercial level requires horizontal drilling and effective hydraulic fracturing. Therefore, successful production from such complex reservoirs is heavily dependent on the knowledge of in-situ stresses and fracture mechanics and requires advanced geomechanical studies. Geomechanics of shale is to some extend different from conventional reservoirs due to intricacy imposed by inelastic matrix behavior, stress sensitivity, existence of natural fractures, rock rheology, and different pressure-temperature environments.

Upon completion of this course, participants will:

- Understand the importance of geomechanics in development of shale gas resources.
- Learn the theory of rock mechanics (e.g. theories of stress, deformation and failure etc.

- Understand the differences between geomechanical analysis for conventional and unconventional rocks.
- Learn the data requirement for shale geomechanical modeling.
- Be able to design rock mechanics testing program for shale and QC the results.
- Be able to build geomechanical models using Excel sheet (including stresses and rock properties calculations for anisotropic formation) and calibrate it.
- Understand the concept of safe operating mud weight window and the safest well trajectory to drill in anisotropic shale.
- Be able to determine feasibility for UBD.
- Understand the influence of stress regime and rock property on orientation and extension of hydraulic fractures.
- Be able to recognize the conductive natural fractures and optimize well trajectory for maximum production.
- Understand reservoir compaction and subsidence subsidence.information techniques to improve your workflow and assessment

Content

This course discusses the geomechanical aspects of shale gas and how it adds value to the development of this type of reservoirs. It is an interactive course presenting in two modules: "Geomechanical Modeling" and "Geomechanics Applications for Shale Gas". In the first part, the importance of geomechanics in development of shale gas resources will be discussed. It includes constructing 1D to 4D geomechanical models using available data from off-set wells and how to calibrate the model using measurements and field observations.

The second part includes different applications of geomechanics related to shale plays. Mechanical and chemical wellbore instability, hydraulic fracturing design and optimization, maximizing production from natural fractures, reservoir compaction and surface subsidence are applications which will be covered in this module. The differences between geomechanical analysis in conventional and unconventional reservoirs will be explained and special attention will be paid to rock anisotropy.

FLUVIAL SEDIMENTOLOGY AND GEOMORPHOLOGY

Dates: March 2, 2016
Times: 8:00 a.m. to 5:00 p.m.
Tuition: $550, if purchased separately (increases to $600 on 2/01/2016)
Instructor: John Holbrook, Texas Christian University, Ft. Worth, TX
Content: 0.75 CEU
Limit: 40 people

Who Should Attend

Geologists, geophysicists, and engineers seeking an improved understanding of fluvial depositional processes in order to better predict fluvial reservoir characteristics. This course will aid in recognition and evaluation of patterns and scaled relationships that will help in subsurface mapping and more accurate prediction of lithology/porosity distribution within fluvial reservoir intervals that are depicted in seismic, borehole, and outcrop data sets. Concepts are taught from base principles so no prerequisites are required. An entry-level understanding of Geology is helpful.

Objectives

Upon completion of the course, participants will gain an overview of the river sedimentary processes that generate strata, as well as the primary geomorphologic controls on these sedimentary processes. Participants will attain the following skills.

- Relate surficial river processes to specific reservoir facies.
- Evaluate fluvial preservation in a "river-to-rock" context to better relate modern river deposition to subsequent fluvial stratigraphy
- Quickly recognize fluvial lithofacies in core and outcrop
- Recognize and evaluate best modern candidates for fluvial reservoir analogs
- Estimate sediment discharge of an ancient river system from parameters (i.e. grain size and channel fill thickness) measureable in common subsurface data sets
- Relate and predict fluvial reservoir facies architecture to the range of basin tectonic styles and accommodation states.

Content

The course will explore a wide range of topics on geomorphologic controls of river systems and the related depositional processes that generate and preserve fluvial sediment. The course will concentrate on modern river processes but in the context of how these processes eventually generate preserved fluvial strata. The course is intended for practitioners and theorists who wish to gain a more clear understanding of how fluvial rocks are generated in order to make more informed maps, interpretations, and predictions for fluvial reservoirs. The course is divided into six segments: channel hydrology and sediment dynamics; source-to-sink systems; bars and bedforms; fluvial facies; fluvial preservation and accommodation; and basin-scale processes. Channel hydrology and sediment dynamics will focus on factors controlling water and sediment discharge in river channels. This segment will address the drainage processes that dictate water volumes and channel dimensions, the processes of sediment entrainment and transport, and the channel morphodynamics that relate these water and sediment components. The source-to-sink segment will detail methods used to quantify and qualify the sediment mass transported from the hinterland to the depocenter and the storage sites in route. This segment will train in the "fulcrum" approach for quantitatively approximating the sediment budget for ancient source-to-sink systems. The bars and bedforms segment will detail the controlling processes that dictate the nature of bedload migration, bar development, and larger-scale channel pattern. Fluvial facies will pull learnings from the prior sections together to capture the core

range of deposit types that typify fluvial strata. This section will train in quickly recognizing and interpreting facies for the range of depositional environments that characterize most fluvial systems. Fluvial preservation will detail the processes that connect modern surficial geomorphic and sedimentary processes to the deposits they eventually leave as stratigraphy. This section will elaborate on the base-level processes that control fluvial accommodation and will dig into the basic processes that determine the relationship between the more complete deposits generated at the modern surface and the more fragmentary preservation in the rock strata. Understanding gained of this stratigraphic filter will lend valuable guidance on best practice in the use of modern analogs for reservoir interpretation. Basin-scale processes will discuss river avulsion and bifurcation process with respect to basin tectonic conditions. This section will offer predictive relationships for fluvial architecture at the belt and floodplain scale under various states of accommodation and differing sediment supply.

CARBONATE DEPOSITIONAL SYSTEMS

Dates: March 2, 2016
Times: 8:00 a.m. to 5:00 p.m.
Tuition: $550, if purchased separately (increases to $600 on 2/01/2016)
Instructor: Art Saller, Cobalt International Energy, Houston, TX
Content: .75 CEU
Limit: 40 people

Who Should Attend

This course is for earth scientists and engineers involved in exploration or production from carbonate rocks. This is an introductory course that assumes no pre-existing knowledge. It moves from basic principles to advanced ideas and case studies that will also help experienced geoscientists with practical aspects of carbonate depositional systems.

Objectives

This course will give participants a working knowledge of carbonate depositional systems. By the end of the course, participants will able to:

- Describe carbonate rocks according to depositional texture and grain types
- Interpret carbonate depositional environment from core descriptions and other data
- Know the characteristics of modern and ancient carbonate depositional environments
- Understand the relationship between depositional environments and carbonate grain types and textures
- Use depositional environments and facies data to understand variations in subsurface reservoir properties like porosity and permeability
- Predict the spatial distribution of different depositional environments in the context of reservoir development
- Understand different types of carbonate depositional systems (ramps, shelves, isolated platforms, and buildups), and their implications to reservoir development
- Predict changes in depositional systems and facies during basin evolution and sea level fluctuations, including differences between "greenhouse" (small amplitude sea-level fluctuations) and "ice-house" (high amplitude sea-level fluctuations) times

Content

This course will alternate between lectures and practical exercises involving cores, logs and seismic data.

The course starts with an introductory lecture that summarizes key differences between carbonate and siliciclastic depositional systems, followed by a review of the Dunham classification of carbonate rocks and grain types. An exercise involving outcrop samples will allow participants to describe samples and relate them to depositional environments.

The second lecture is on carbonate depositional environments, and it will systematically examine modern environments, outcrop equivalents, and subsurface reservoir examples of each environment. An exercise involving cores and logs will illustrate ramp depositional environments and their effect on reservoir architecture during "greenhouse" times.

Carbonate sequence stratigraphy will be discussed in theory and practice. A core-log-seismic exercise will show how predictable variations in reservoir development occur during ice-house cycles on a shelf and isolated platform.

This course will conclude with a discussion summarizing prediction of depositional facies, stratigraphy and reservoir development in a variety of different settings.

CANCELLED

INTEGRATING DATA FROM NANO- TO MACRO-SCALE: IMPROVING CHARACTERIZATIONS OF UNCONVENTIONAL PLAYS

Dates: March 2, 2016
Times: 8:00 a.m. to 5:00 p.m.
Tuition: $550, if purchased separately (increases to $600 on 2/01/2016)
Instructors: Christina Calvin (Schlumberger, Houston, TX), Allison Cornett (Schlumberger, Salt Lake City, UT), Rick Lewis (Schlumberger, Denver, CO)
Content: .75 CEU
Limit: 40 people

Who Should Attend

Geologists, geophysicists, petrophysicists and reservoir engineers looking for a detailed overview of data integration in analysis of organic shale reservoirs. This course exposes attendees to data from multiple disciplines using examples and case studies to demonstrate the importance of reservoir quality and completion quality measurements in the successful exploration and exploitation of mudstone reservoirs.

Objectives

By the end of the course the attendees will have

accomplished the following:

- An analysis of different scales of reservoir measurements (pore-core-log) and what these measurements reveal about the shale play both for reservoir and completion quality.
- Developed definitions and drivers of reservoir quality and completion quality. Reviewed case studies that integrate various data sets to develop a better understanding of their influence for basin evaluations and production targets.
- Developed knowledge of the role of core analysis within both gas and liquid-rich shale plays and how to integrate core data with log measurements.
- Learned how to integrate core photos and borehole images to provide additional information for petrophysical and stress evaluations.
- Exposed to recommended workflows for core and log acquisition for end member shale plays. These workflows would address both exploration and exploitation phases.

Content

A key to optimizing the exploration and development of unconventional plays is the integration of various data types into a meaningful analysis of reservoir and completion quality. This course will evaluate data from the nano- to macro-scale in order to show how different types of data can be integrated in the evaluation of organic shale reservoirs. By the end of the course attendees with have developed an insight into how core data and petrophysical evaluations can be utilized to build a more complete understanding of a play.

APPLICATIONS OF STABLE ISOTOPE GEOCHEMISTRY IN THE PETROLEUM GEOSCIENCES

Date: March 2, 2016
Times: 8:00 a.m. to 5:00 p.m.
Tuition: $550, if purchased separately (increases to $600 on 2/01/2016)
Instructor: Christopher D. Laughrey, Dolan Integration Group (DIG), Boulder, CO
Content: .75 CEU
Limit: 40 people

Who Should Attend

This workshop is designed for geologists, geophysicists, engineers, and environmental professionals interested in gaining a basic knowledge of the applications of isotope geochemistry in petroleum geoscience, especially with regard to exploration, development, production, and environmental problems commonly encountered by the oil and gas industry in its search for energy resources.

Objectives

By the end of the course, participants should be able to accomplish the following:

- Describe the role of geochemistry in petroleum systems analysis;
- Understand the basic terminology utilized by scientists when discussing natural gas geochemistry;
- Understand the natural geologic processes involved in stable isotope fractionation;
- Apply noble gas geochemistry to geological problems;
- Understand the genetic origins of both hydrocarbon and non-hydrocarbon natural gases;
- Estimate risk with non-hydrocarbon production gases (CO_2, N_2, and H_2S);
- Know how to determine the thermal maturity of hydrocarbon gases utilizing stable carbon isotopes and ancillary geochemical/geologic data;
- Understand how to correlate natural gases with their source rocks and each other, and how to interpret reservoir continuity and compartmentalization using stable isotopes;
- Apply production gas stable isotope geochemistry to predicting reservoir fluid types in liquids-rich unconventional systems (GOR considerations);
- Understand the use of stable isotope geochemistry in correlating whole oils, bitumens, and kerogens, and in determining marine versus terrigenous organic input in depositional environment reconstruction;
- Utilize established stable isotope applications in stratigraphy;
- Understand the applications and limitations of stable gas isotope analyses in mitigating stray gas migration

incidents.

Content

The purpose of this workshop is to acquaint petroleum industry and environmental professionals with the tools, methods, terminology, and interpretive techniques of stable isotope geochemistry used to understand the origin and fate of hydrocarbons and associated compounds in the earth's subsurface. Since, in practice, stable isotope geochemical data must be constrained by equally important geological, hydrological, and engineering data, a large portion of the workshop will be dedicated to interpreting isotope data in conjunction with other earth science information. The workshop will provide a general overview of first principals concerning stable isotope geochemistry in the earth sciences, followed by in-depth discussions and exercises about natural gas and liquid hydrocarbon geochemistry, and stray gas investigation and mitigation.

APPLIED SEISMIC GEOMORPHOLOGY AND SEISMIC STRATIGRAPHY – EXTRACTING GEOLOGIC INSIGHTS FROM 2D AND 3D SEISMIC DATA

Dates: March 3-4, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructor: Henry Posamentier, Consultant, The Woodlands, TX
Content: 1.5 CEU
Limit: 40 people

Who Should Attend

Geologists and geophysicists who utilize seismic data to predict the distribution of depositional systems and associated lithologies in the subsurface. Although the emphasis will be on the use of 3D seismic data, geoscientists using 2D seismic data will benefit as well from this course as well.

Objectives

This course is designed to enhance interpretation skill sets with regard to geologic interpretation of seismic data. The overall objective is to present methods for reducing risk with regard to prediction of lithology, reservoir compartmentalization, and stratigraphic trapping potential in exploration and production. Specifically, the participant will be shown:

- techniques for 2D and 3D seismic geomorphologic/stratigraphic analyses
- workflows designed to facilitate extraction of stratigraphic insights from 3D seismic data
- numerous examples of various depositional systems in various depositional settings
- By the end of this course, participants will be able to:
- recognize geologically significant stratigraphic and geomorphologic patterns
- predict lithological distribution based on seismic patterns
- build a stronger case for the acquisition of seismic data for exploration and field development
- gain new insights with regard to geologic process in numerous depositional settings, including deep-water, shelf and marginal marine, fluvial systems, and carbonate systems
- apply new and novel workflows to facilitate and accelerate seismic interpretation for lithologic prediction.

Content

The application of seismic geomorphology and seismic stratigraphy to exploration and field development is a natural consequence of the advent of high-quality and increasingly more affordable and widespread 3D seismic data currently available. Integrating analyses of plan view (geomorphologic) and section view (stratigraphic) images can significantly enhance predictions of the spatial and temporal distribution of subsurface lithology (reservoir, source, and seal), compartmentalization, and stratigraphic trapping capabilities, as well as enhanced understanding of process sedimentology and sequence stratigraphy.

Participants in the course will be exposed to seismic geomorphologic/stratigraphic workflows, which involve 1) initial reconnaissance through 3D volumes with various slicing techniques using a variety of different seismic attribute volumes including full stack reflection amplitudes, near and far stacked amplitude volumes, and coherence volumes, as well as opacity rendering, 2) focus on features of geologic interest and further investigate through a combination of detailed slicing, interval attributes, horizon picking and amplitude extraction, horizon illumination, etc., and 3) comprehensive integration of seismic geomorphologic analyses with seismic stratigraphic analyses, whereby the plan view is integrated with the section view to ensure a consistent interpretation.

Course lectures will involve both PowerPoint presentations as well as interactive interpretation of 3D seismic data. A wide variety of depositional settings will be shown, ranging from non-marine to marginal marine, shelf and deep water, and will include both clastic as well as carbonate depositional environments. Concepts as well as applications pertaining to seismic-based analyses of depositional systems will be covered in detail.

APPLYING IDEAS OF CARBONATE SEDIMENTOLOGY, STRATIGRAPHY AND DEPOSITIONAL ENVIRONMENTS TO PETROLEUM EXPLORATION AND PRODUCTION

Dates: March 3-4, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructor: D. Bradford Macurda, Jr., Consultant, Spring, TX
Content: 1.5 CEU
Limit: 40 people

Who Should Attend

Geoscientists and engineers whose professional activities involve finding new carbonate reservoirs and/or enhancing the production from existing fields. Interdisciplinary thinking is a requisite to fully understand the potential of carbonate

reservoirs.

Objectives

By the end of the course, participants should be able to:

- Understand the varied inputs resulting from different carbonate producers as microbial, molluscan, and algal biotas.
- Be familiar with the modern carbonate disciplinary environments as tropical and cool water settings.
- Work with the paradigms of carbonate sequence stratigraphy which are different than those of siliciclastics.
- Have an overview of the principle carbonate reservoirs globally and the interplay of primary and diagenetic environments therein.
- Synthesize current thinking in ways to enhance production from carbonate reservoirs.

Content

The first part of the course will set the stage for comparing the paradigms of carbonate versus siliciclastic sequence stratigraphy. Controlling physical and biological parameters will be examined. A global overview of modern carbonate environments follows.

Since carbonates are primarily of biochemical origin, a survey of the principle contributors of the Phanerozoic will be presented. These include microbial, molluscan, algal, echinodermal, and poriferal inputs. Varied contributions during different geologic periods will be contrasted.

Carbonate environments vary from raps to rimmed and unrimmed platforms to carbonate slopes and debris flows. Models of these will be illustrated and some regional seismic examples shown to contrast their geometries.

Next we will examine some of the great carbonate producing provinces such as the Permian Basin, Western Canadian Basin, Gulf of Mexico, Caspian, and the Middle East. We will examine the principle producing horizons and the primary and diagenetic factors. We will look closely at the key concepts used to develop and maximize production in these areas.

Finally, we will look at the role of carbonates in the Bakken, Three Forks, Eagle Ford in the U.S. and the Santos Basin in Brazil.

ESSENTIALS OF PRODUCTION GEOLOGY

Dates: March 3-4, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Tuition: $1100, if purchased separately (increases to $1200 on 2/01/2016)
Instructor: Terngu Utim, Nexen Petroleum, Houston, TX
Content: 1.5 CEU
Limit: 40 peopleX

Who Should Attend

This course is intended for anyone working in an oil production group primarily geologists, but also petrophysicists, geophysicists, reservoir engineers and team leaders who manage a producing field or are involved in evaluating a producing field.

Objectives

By the end of the course, participants should be able to accomplish the following:

- Recognize the evolving role of the production geologist through the life of a field.
- Establish and update the geological scheme for a field.
- know how to create and apply basic and special maps in production geology
- Predict reservoir flow geology by combining rock property and production data.
- Demonstrate how to identify compartments in producing reservoirs
- Demonstrate how to locate remaining hydrocarbons using qualitative and quantitative methods.
- Set up and maintain an opportunity inventory for a producing field
- Know where hydrocarbons can be left behind in a reservoir
- Construct and update reservoir surveillance atlases.

Content

This course is an overview of the roles and responsibilities of a production geologist; it highlights methodologies for using rock property data to build a 'geological scheme' and how to incorporate production data to build a 'flow geology scheme'. Characterization of the flow geology identifies compartments and reveals the likely location of any remaining hydrocarbons. The course will also demonstrate how to setup and manage a producing field's 'opportunity inventory' and how to de-risk using a reservoir surveillance atlas. The course text is AAPG Memoir 91.

While the course is an overview, it is designed to provide participants with information, tools and resources not normally available in many geology courses and is designed to impart a mix of interdisciplinary skills gained by the instructor in over 16 years of experience across several basins.

LOG ANALYSIS OF SHALY SAND RESERVOIRS, Plus A Gas-Bearing Shale Case Study

Date: March 3, 2016
Times: 8:00 a.m. to 5:00 p.m.
Tuition: $550, if purchased separately (increases to $600 on 2/01/2016)
Instructor: George B. Asquith, Texas Tech University, Lubbock, TX
Content: .75 CEU
Limit: 40 people

Who Should Attend

The course is designed to be of benefit to geologist, engineers and technical support people who are involved in oil and gas exploration and production in shaly sandstone reservoirs. As the title states this is a guide that concentrates on methods used to analyze shaly sandstones reservoirs. It is an advanced course and assumes the course participants are already well informed about basic well logging principles.

Objectives

At the conclusion of the one day course the participants should be able to do the following:

- Scan a well log to determine zones that potentially could

be hydrocarbon productive.
- Be able to examine pre-processed and calculated well log data and be able to answer the following questions.
  - Is the sandstone a shaly sandstone?
  - Is the reservoir water-wet or oil-wet?
  - Is the reservoir potentially hydrocarbon productive?

Once the above questions are answered the participants should be able to determine a strategy to improve the calculations of the reservoir's effective porosity (Φe) and effective water saturation (Swe).

Content

The course begins with a short review of the basic principles of well logging. Next are a series of lectures on the calculation of volume of clay/shale (Vcl), using the Vcl to correct the reservoir's total porosity (Φtotal) to effective porosity (Φe). Then we'll discuss the ability to apply a shaly sandstone producibility plot (Q-PLOT) to determine if the shaly sandstone is a reservoir. The next step is to determine using log data if the reservoir has effective or non-effective clay present and what shaly sandstone model can be used to convert total water saturation (Swtotal) to effective water saturation (Swe). Several models will be presented for determining Swe. A flow chart is provided that will aid the participants in understanding the sequence that I use in analyzing sandstone and shaly sandstones. At conclusion, ten examples will be presented that will be analyzed by the participants. The course will end with a case study of log analysis gas-bearing Woodford shale.

LOG ANALYSIS OF HYDROCARBON-BEARING "SHALE" RESERVOIRS

Date: March 4, 2016
Times: 8:00 a.m. to 5:00 p.m.
Tuition: $550, if purchased separately (increases to $600 on 2/01/2016)
Instructor: George B. Asquith, Texas Tech University, Lubbock, TX
Content: .75 CEU
Limit: 40 people

Who Should Attend

The course is designed to be of benefit to geologist, engineers and technical support people who are involved in oil and gas exploration and production in hydrocarbon-bearing shale reservoirs. As the title states this is a guide that concentrates on methods used to analyze potential "shale" reservoirs. It is an advanced course and assumes the course participants are already well informed about basic well logging principles.

Objectives

At the conclusion of the one day course the course participants should be able to do the following:
- Apply numerous QUICK-LOOK Methods to evaluate and map potential "shale" reservoirs.
- Be able to determine thermal maturity from well log data.
- Determine total organic carbon (TOC) by several methods including Schmoker, Passey, etc.
- Determine volume of clay (Vcl), total porosity (Φtotal), effective porosity (Φe), water saturation (Sw), permeability (ka) in a "shale" reservoir using both a standard logging suite and with GEOCHEM logs.
- Be able to calculate OGIPscf and OOIPstb utilizing both a standard well logging suite and using GEOCHEM log data.
- Determine formation water resistivity (Rw) in a shale.

Content

This one day course will include background material on hydrocarbon-bearing shales, methods of evaluation, and case studies of both gas and oil bearing shales. The course begins with a quick review of general information about hydrocarbon-bearing shales that will include: 1) areal distribution, 2) classification, 3) hydrocarbon resources, 4) key geological and engineering parameters, 5) a comparison of the mineralogy of an average shale to a hydrocarbon-bearing shale, 6) shale porosity and permeability, and 7) an expected shale production model. Next the log parameters [Rt, GR, ρb, ΦNls, and Pe] used for a quick log scan evaluation are presented along with the standard quick-look methods [Ro, Rwa, and Φw]. All of these quick methods are designed so that the geologist or engineering can evaluate the potential shale to determine if a more detailed log analysis is required. The parameters included in a more detailed log analysis include the determination of: 1) total organic carbon (TOCwt%), 2) effective porosity (Φe), 3) effective water saturation (Swe), 4) hydrocarbon-filled porosity (Φgas or Φoil), and 5) permeability (k in nannodarcies). There also a section that reviews the methods that can be used to determine formation water resistivity (Rw) in shales.

The methods for determining the thermal maturity of organic shales will include: 1) vitrinite refection (Ro), 2) coloration of spores and conodonts, and 3) determination of thermal maturity from log data [Maturity Index (MI; Zhao & others, 2007). The determination of thermal maturity is an important step in the analysis of an organic shale, because the level of maturity (i.e. oil or gas) determines how the log data will be analyzed. The next step is the determination of TOC(wt%) from log data. The methods outlined are Passey & others (1990), the Schmoker Equation, and uranium content from spectral gamma ray logs.

If the potential shale is a gas reservoir the next step is the determination of the adsorbed gas content (gc in SCF/ton). The two methods for determining adsorbed gas content that will be outlined are the Langmuir Isotherm and the TOC versus gc (SCF/ton) methods. A flow chart is provided to guide the geologist/engineer through the analysis. For example if the TOC(wt%) is greater than 2% the analysis should proceed to the next step the determination of: 1) volume of kerogen (Vke), 2) Volume of clay (Vcl), 3) volume of quartz (Vqtz), and total porosity (Φtotal) using the simultaneous equation method developed by Rick Lewis w/ Schlumberger.
Using the results from the simultaneous equations the total porosity (Φtotal) in corrected to effective porosity (Φe) using the volume of clay (Vcl) and the porosity of the clay (Φclay), and the effective water saturation (Swe) is calculated.

SHORT COURSES

SHORT COURSES ARE THE BEST WAY TO LEARN ABOUT THE INDUSTRY AND ARE PACKED WITH INFORMATION. VALUABLE MATERIALS, HANDS-ON EXERCISES AND DIRECT INTERACTION WITH INSTRUCTORS AND FELLOW ATTENDEES – THERE'S NO BETTER WAY TO LEARN! WITH SO MANY TO CHOOSE FROM, THERE'S SOMETHING FOR EVERYONE.

STAND-ALONE SHORT COURSES

BASIC PETROLEUM GEOLOGY FOR THE NON-GEOLOGIST

A joint course with AAPG and University of Tulsa Continuing Engineering and Science Education Department

Dates and Locations:
March 29-31, 2016 in Houston, TX
June 7-9, 2016 in Denver, CO
Aug. 23-25, 2016 in Houston, TX
Dec. 6-8, 2016 in Houston, TX

Tuition: *$1,995.00 (increases to $2295 one month prior to course date), includes the textbook "Nontechnical Guide to Petroleum Geology, Exploration, Drilling and Production", course notes, a common rock and mineral kit, a petroleum glossary, a wallet card listing geological times and various map symbols, and four large colored wall charts: 1) Petroleum Basin Map of the United States, 2) Drilling Rig Component Diagram, 3) Well Log Response Chart and 4) Oil and Gas Field Classifier. Daily morning and afternoon refreshments are provided. Please Note - if paying with a check, please make check payable to University of Tulsa, CESE (applies to this course only.) Special pricing if sending 3 or more persons from the same company - ask for details!*

Limit: *50 people*

Content: *2.1 CEU*

Instructor: *Norman J. Hyne, University of Tulsa, Oklahoma*

Who Should Attend

Train your staff! This course is for anyone who could benefit by an overall perspective of petroleum geology, exploration, drilling and production to be more productive in their job. It is a non-technical course, anyone can take this course. There are over 25,000 past participants that have included information technology personnel, managers, accountants, landmen, draftsmen, attorneys, secretaries, clerks, geological and geophysical technicians, investors, petroleum service personnel, petroleum banking and financial ventures personnel, business administrators and executives, human resources personnel, geophysicists without geological training, land personnel, economists and engineers.

Objectives and Content

In just three days, you will learn the fundamentals and language of petroleum geology, exploration, drilling and production. This understanding will enable you to communicate more efficiently and perform your job more effectively. The course introduces the tools and techniques that geologists and geophysicists use to locate gas and oil, that drillers use to drill the wells and that petroleum engineers use to test and complete the wells and produce the gas and oil. Exercises throughout the course provide practical experience in well log correlation, contouring, interpretation of surface and subsurface, contoured maps, seismic interpretation, well log interpretation, and decline curve analysis. You will learn how to identify the most common rocks and minerals.

In taking this course, you will learn:

- How to identify the most common rocks and minerals.
- The different types of crude oils and natural gasses and their measurements.
- The basic processes in the formation and deformation of sedimentary rocks.
- The formation of natural gas and crude oil.
- The occurrence and distribution of crude oil and natural gas.
- The characteristics of petroleum traps.
- The use of geological and seismic data in petroleum exploration.
- How to drill a well, the language, technique and equipment.
- How to test a well and qualitatively interpret well logs.
- How to complete a well, the language, techniques and equipment.
- The challenge of offshore exploration, drilling and production.
- How to produce crude oil and natural gas, calculate reserves, stimulate wells and improve oil recovery.

This course is extremely well illustrated with PowerPoint presentations and hands-on samples such as a drill bit, Landsat pictures, microfossils and crude oil specimens. Every student that completes this course will receive a certificate with the continuing education units on it. This course is approved continuing education units for landmen and accountants and for attorneys in most states.

Please Note: Online Registration not available for this course through AAPG. Please contact AAPG Education Department directly at (918) 560-2650 or educate@aapg.org for registration instructions.

BASIC WELL LOG ANALYSIS

Dates: *April 25-29; July 11-15, 2016*

Times: *8:00 a.m. to 5:00 p.m. each day*

Location: *Austin, TX (April); Golden, CO (July)*

Tuition: *$1795, AAPG members, $1995, non-members (increases to $1995/$2195 on 3/28/2016 for April course, and on 6/13/2016 for July course), includes digital course notes, printed exercises, refreshments, and a copy of Basic Well Log Analysis by George Asquith and Daniel Krygowski, with Neil Hurley and Steve Henderson. No refunds for cancellations after 3/28/2016 for the April course, or 6/13/2016 for the July course.*

Instructors: *George Asquith, Texas Tech University, Lubbock, TX; Daniel A. Krygowski, The Discovery Group, Denver, CO; Richard E. Lewis, Schlumberger, Denver, CO*

Content: *3.75 CEU*

Limit: *50 people*

Who Should Attend

Geologists, engineers and technicians who work with openhole logs and who want to understand the fundamentals of what the measurements are, what affects them, and how they are used to estimate the properties of interest in the

subsurface. This basic course will be useful to new personnel in the oil and gas industry as well as to more experienced professionals that want a review.

Objectives

By the end of the course, participants should be able to:

- Describe the acquisition process for both wireline and LWD measurements.
- Scan a well log to determine zones that potentially could be hydrocarbon productive, and to check for log quality.
- Convert formation and drilling fluid properties for temperature, and make other basic well log environmental corrections.
- Determine porosity using one or more logs;
- Infer lithology from the logs, and know how the logs are affected by lithologic changes.
- Understand how the Archie parameters are obtained, so that together with log data, water saturation and hydrocarbon saturation can be derived.
- Understand how pattern recognition and graphical techniques can be used to determine computation parameters as well as properties of interest.
- Understand how to judge the reservoir and completion qualities of shale gas reservoirs using basic logging techniques and more advanced measurements, as well as the value of other measurement types in an integrated interpretation.y.

Content

The course assumes no logging knowledge and seeks to establish an understanding of basic petrophysical measurements and interpretation techniques which can be applied to routine tasks, and upon which more complex and advanced information and interpretive techniques can be built.

The course:

- Uses a "hands-on" approach to basic openhole well log analysis and interpretation, where common sets of logs are used in ongoing exercises and final problems to illustrate complete and coherent interpretations.
- Focuses on the traditional interpretation targets of lithology, porosity, and fluid saturation, but also touches on other applications of the measurements.
- Introduces a variety of interpretation techniques: numerical to visual (pattern recognition), and the use of some older techniques in the context of the availability of newer, more extensive, data.
- Introduces the participants to the evaluation of shale gas reservoirs through the concepts of reservoir and completion quality, using common logging suites and more advanced measurements.

The course strives to provide a strong and coherent foundation for the understanding of other, specialized interpretation techniques involving well log data, which are not covered here.

HOW TO FIND BYPASSED PAY IN OLD WELLS USING DST DATA (find low risk oil cheaply!)

Dates: April 26-28, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Location: Austin, TX
Tuition: $1295, AAPG members, $1495, non-members (increases to $1495/$1695 on 3/28/2016; includes digital course notes, printed exercises and refreshments. No refunds for cancellations after 3/28/2016.
Instructor: Hugh W. Reid, Hugh W. Reid & Associates, Calgary, AB, Canada
Content: 2.25 CEU
Limit: 50 people

Who Should Attend

Geologists, engineers & technicians who encounter or utilize DST results and reports in their exploration & production decisions. In fact any professional who needs to make more sense of the numerous old DSTs which are present in so many wells, often with confusing results. Particularly appropriate for those prospecting for bypassed pay using logs and geology, who may wish to verify their conclusions from the DST or for regional geologists using show maps of DST results..

Objectives

By the end of the course participants should be able to accomplish the following:

- Understand DST pressure charts to identify obvious formation damage & depletion (small reservoir) and mechanical problems (eg. tool plugging).
- Recognize high vs. low permeability tests.
- Understand why data from cores and logs often conflict with DST data.
- "Make more sense" of DST results printed in IHS well cards and field reports where no chart is available and even estimate approximate permeability & damage in some cases.
- Identify presence of poorly connected natural fractures, which can be accessed with horizontal wells.
- Appreciate where recoveries of "oil cut mud" and "gas cut mud" may be significant from an exploration standpoint for horiz wells and multi-stage fracs.
- Determine when a gas test is co-producing water.
- Identify gas presence even where no gas was reported in certain tests.
- Identify potential oil zones from DSTs which recovered no oil (from the chart shape and air blow description).
- Estimate the approximate gas rate in DSTs of "GTS TSTM" by knowing the time gas took to reach the surface and the air volume of the test string.
- Make a decision as to whether old DSTs can be recompleted as commercial wells today from limited information.
- Assess DSTs of water zones for potential water disposal wells or source of water for frac's.

Content

This course is a non numerical introduction to understanding DSTs & DST pressure charts focusing on pattern recognition and practical "quick look" techniques. Numerous field examples & case histories are utilized and theory is kept to a minimum. Course manual contains numerous DST charts which can be used for trouble shooting problem DSTs later. It is a permanent reference source. To avoid problem of attendees forgetting procedures taught at the course, all techniques are given in cookbook format 'fill in the blanks'.

A key emphasis of the course is to show how to identify missed (damaged) pay in competitor's 'dry' wells & additional pay in your own producing wells. This is an important skill to complement log skills!

In summary, the course is designed to provide participants with information not normally encountered in routine service company training seminars and to impart some interpretive skills gained by the instructor in over 30 years of experience.

Course Focus For Today's Low Priced Oil Environment

This year a major focus of the course will be how to identify tight oil sand from DSTs to use as candidates for horizontal wells with multi-stage frac's. However we also identify better permeability zones which are damaged and can be simply re-entered and re-perfed in a cheaper vertical well. "No need for an expensive horizontal well where a simple vertical well will do the trick". We also cover using water DSTs to find zones for water disposal wells pertinent today.

PETROLEUM GEOLOGY FOR ENGINEERS

Date: May 6, 2016
Location: Houston, TX, with OTC meeting
Tuition: USD $895, professionals (increases to $1095 on 4/08/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 4/08/2016.
Instructor: J. David Lazor, J.D. Lazor Enterprises, Inc., Carbonado, WA, USA
Limit: 50 people
Content: .75 CEU

Who Should Attend

This course is intended for engineers who need a better understanding of the geology and geological concepts used in exploration and production decisions, including petroleum engineers, drilling and completion engineers and others who may need a basic petroleum geology refresher. It will also be valuable for GeoTechs, Landmen, Bankers, Office staff and others who work with geologists and need a basic knowledge of geology and geologic terminology and processes.

Objectives

By the end of the course participants should be able to:

- Understand the principles of geology as applied to petroleum exploration and production.
- Explain how geology is used to explore for and produce oil and gas
- Know the exploration tools, techniques & strategies used in locating viable oil & gas prospects
- Understand prospect evaluation, petroleum economics & risk analysis
- Understand the connections between engineering data and geological data and how they complement each other for more successful prospects

Content

This course is an introduction to petroleum geology and how a petroleum geologist uses the science to explore for oil and gas. Most engineers have a scientific education and background, but may not be familiar with some of the specific terms, processes and strategies unique to geology, and how they can work together with engineering data to evaluate prospects and plays for greater drilling success.

Topics to be covered include:

- Definition of a Petroleum Geologist
- Duties of a Petroleum Geologist
- Related components:
  - Stratigraphy & deposition
  - Structural geology
  - Geophysics
  - Geochemistry
  - Petroleum engineering
  - Well log interpretation
- Rock cycle, weathering & plate tectonics
- Depositional environments & stratigraphy
- Geology structures: definition and causes
  - Strike & dip
  - Stream patterns & underlying structure
- Unconformities & geologic history
- Petroleum requirements
  - Porosity, permeability, source, reservoir, trap
- Exploration tools
  - Mud logging, wireline (electric) logs, and cores
  - Seismic, geochemistry, gravity, magnetics
  - Maps: geologic (structure), isopach, facies
- Net pay, fracture orientation
- Exploration strategy
  - Structural analysis & trap definition
  - Reservoir depositional environment
  - Seismic attributes
  - Geochemistry
  - Micro-magnetism
- How to scrutinize an oil & gas prospect
- Risk Management
- Drilling
- Shale plays in North America
- Athabaska Oil Sands; North Slope
- Review & Questions

BASIC SEISMIC INTERPRETATION

Dates: May 17-18, 2016
Times: 8:00 a.m. to 5:00 p.m. each day
Location: Tulsa, OK
Tuition: $1095, AAPG members, $1295, non-members (increases to $1295/$1495 on 4/19/2016); includes digital course notes and refreshments. No refunds for cancellations after 4/19/2016.
Instructors: Donald A. Herron and Robert C. Wegner, Consultants, Houston, TX
Content: 1.5 CEU
Limit: 50 people

Who Should Attend

New hires, experienced geologists, and geoscience technicians who work with seismic data and wish to learn and develop basic seismic interpretation skills.

Objectives

Upon completion of this course, participants will:

- Understand basic concepts and practices of seismic interpretation.
- Be able to interpret seismic data and recognize interpretation problems.
- Understand the importance of seismic interpretation in a business context.

Content

The course consists of lectures on fundamental topics including basics of petroleum geology, seismic response, velocity, resolution, seismic migration, seismic correlation and mapping techniques, and quantified interpretation. Lectures are supported by hands-on exercises, and the second day of the course includes two practical correlation and mapping projects. Each participant receives a copy of SEG Geophysical Monograph Series #16, First Steps in Seismic Interpretation, by Donald A. Herron.

Outline

Day One

- Introduction to Petroleum
- Petroleum Geology
- What is Seismic Exploration
- Introduction to Seismic Interpretation
- Seismic response
- Velocity
- Resolution
- Seismic migration

Day Two

- Fault interpretation
- Horizon interpretation
- Correlation and mapping exercise (3D seismic grid)
- Quantified interpretation
- Bright Spot Interpretation
- Course summary

"OLD" (PRE-1958) ELECTRIC LOGS: A QUICK REVIEW

Date: May 19, 2016
Times: 8:00 a.m. to 5:00 p.m.
Location: Tulsa, OK
Tuition: $895, AAPG members, $1095, non-members (increases to $1095/$1295 on 4/19/2016); includes digital course notes and refreshments. No refunds for cancellations after 4/19/2016.
Instructor: George Asquith, Texas Tech University, Lubbock, TX
Content: 0.75 CEU
Limit: 50 people

Who should attend

The course is designed to be of benefit to geologists, engineers and technical support people who are involved in oil and gas exploration and production working in areas with a large number of "Old" well logs. As the title states, this is a quick review of the unique methods used in the analysis of older well logs. The course will be a useful to new personnel in the oil and gas industry as well as more experienced professionals who need a review.

Objectives

At the conclusion of the one day course, participants should be able to do the following:

- Scan a well log to determine zones that potentially could be hydrocarbon productive.
- Determine formation temperature and correct both drilling fluids and formation water resistivities to formation temperature. Also be able to make basic bore hole and thin bed corrections to the resistivity logs.
- Determine formation water resistivity using well logging methods.
- Determine porosity from resistivity logs using numerous well logs and methods.
- Normalize old gamma ray log to API units and normalize old neutron logs to determine porosity.
- Make invasion corrections of resistivity logs to true formation resistivity.
- Understand how the Archie parameters are obtained, so that together with log data, water saturation and hydrocarbon saturation can be derived.

The participants will also be exposed to additional methods including cross plots to help in the determination of the productive potential of the zone being analyzed.

Content

The course consists of lectures on the different "old" well logs, what they measure and how they are used in the analysis of a potentially hydrocarbon productive zone. The importance and how to make bore hole and thin bed corrections to the non-focused resistivity logs will be outlined in detail. The different rules used to analyze the old resistivity log will be presented with examples. The different unique problems presented to the log analyst when working with older well logs will be outlined and discussed in detail.

At conclusion, twelve problems will be presented, eight of

which will be analyzed by the participants. Questions will be asked about each of the eight problems including what they believe is the hydrocarbon productive potential of the zone.

QUICK GUIDE TO CARBONATE WELL LOG ANALYSIS

Date: May 20, 2016
Times: 8:00 a.m. to 5:00 p.m.
Location: Tulsa, OK
Tuition: $895, AAPG members, $1095, non-members (increases to $1095/$1295 on 4/19/2016); includes digital course notes and refreshments. No refunds for cancellations after 4/19/2016.
Instructor: George Asquith, Texas Tech University, Lubbock, TX
Content: 0.75 CEU
Limit: 50 people

Who should attend

The course is designed to be of benefit to geologists, engineers and technical support people who are involved in oil and gas exploration and production in carbonate reservoirs. As the title states, this is a quick guide that concentrates on methods used to analyze carbonate reservoirs. It is an advanced course and assumes the course participants are already well informed about basic well logging principles.

Objectives

At the conclusion of the course, participants should be able to do the following:

- Scan a well log to determine zones that potentially could be hydrocarbon productive.
- Examine pre-processed and calculated well log data and be able to answer the following questions.
  - What is the carbonate pore type or types?
  - Is the reservoir water-wet or oil-wet?
  - Is the reservoir hydrocarbon productive?
  - If hydrocarbon productive will the production be oil or gas? Do you expect a water-cut?
- Use a cross plot method to help verify the answers to the four questions.
- Once the above four questions are answered the participants should be able to determine a strategy to improve the calculations of the reservoir's water and hydrocarbon saturations.

Content

The course begins with a short review of the basic principles of carbonate well logging. Next are a series of lectures on the different carbonate pore types and the logging methods used to differentiate the various pore types and to determine their hydrocarbon productive potential. A flow chart is provided that will aid the participants' understanding of the sequence used in analyzing carbonate reservoirs. At conclusion, seventeen problems will be presented that will be analyzed by the participants. In six of the problems, they will be required to do some of the calculations. They will then answer the four questions outlined above for each of the seventeen problems. Next, they use a cross plot to help

verify their pore type, wettability, and hydrocarbon productive potential conclusions determined in the seventeen problems.

INTRODUCTION TO OIL SANDS THIN SECTION ANALYSIS

Date: Saturday, June 18, 2016
Time: 8:00 am to 5:00 pm
Location: Calgary, AB, Canada, with AAPG 2016 Annual Convention & Exhibition
Tuition: USD $895, professionals (increases to $1095 on 5/20/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 5/20/2016.
Instructor: Julie Dee Bell, Consultant, Oakville, ON, Canada
Content: 0.75 CEU
Limit: 50 people

Who should attend

This course is designed for the beginner through to seasoned professional who would like a review of unconsolidated oil sands reservoir petrology. This includes geologists, petrologists, asset teams, R&D teams, and petroleum engineers.

Objectives

Upon completion of the course, participants should be able to have a basic understanding of important concepts of oil sands on the micro scale including:

- Unconsolidated oil sands/sandstone reservoir petrology
- Interpretation and application of thin section data into reservoir management
- Theory of oil sands fabric analysis – qualitative (descriptive) analysis

- Texture and fabric analysis for reservoir management
- Introduction to quantitative analysis (image analysis)
- Obtaining reservoir properties from thin sections
- Microscopes and thin sections
- Making thin sections and common artefacts
- How/Where thin section analysis data can be used (ie. Geomodels/Sand Production)

Content

As is often the case, new discoveries can lead to re-evaluation of important concepts thought to be outdated. This course offers a unique opportunity to have a retrospective look at the reservoir characteristics of oil sands. This course will be taught from 'Guide to Oil Sands Fabric Analysis for Reservoir Characterization', written by the instructor, in e-book format. In a combination of course lectures and exercises using microscopes, this course will cover such topics as:

- Unconsolidated oil sands reservoir petrology (how it differs from rock reservoirs)
- Reservoir characterization studies using thin sections
- The different scales within oil sands reservoirs (macro, meso and micro)
- Microscopes and thin sections
  - Theory of microscopes
  - The petrographic microscope
  - Going from 2D to 3D in microscope observation
  - Microscope techniques
  - Making thin sections
  - Common artefacts
  - Staining and spot tests
- The Theory of oil sands fabric analysis
  - Reservoir constituents
  - Concept of fabric
  - Coarse to fine c/f limits
  - Elements of fabric
  - Fabric unit
  - Partial fabric
  - Integrated fabric

Identifying elements of oil sands fabric and texture

Coarse components

- Type coarse components
- Elements of fabric

Fine Components

- Type fine components
- Elements of fabric

Voids

- Types of voids
- Morphology
  - Size
  - Shape

Qualitative analysis

- Why carry out and importance of using the same language
- How to carry out description qualitative analysis
- Representative elementary area
- Determination of the degree of sorting using visual comparators

Short discussion on Quantitative analysis

- How to carry out description quantitative analysis
- Obtaining reservoir characteristics and properties in thin section

Application of the data obtained from quantitative and qualitative analysis

Practical applications of the material include:

- Application of findings to reservoir management
- Observe the oil sands in thin sections as an unconsolidated to very friable sandstone.
- Introduction to a working language specific for non-crystalline rock reservoirs.
- Introduction to a systematic method for using thin sections to compare different depositional environments through reservoir characteristic
- Sourcing of grains so that depositional environments can be confirmed.
- Various applications for data obtained from oil sands thin section analysis.
- Different ways that reservoir properties can be obtained.
- Where micro scale data fits into Geomodels.

ADVANCED GEOCHEMICAL TECHNOLOGIES: METHODS THAT REVEAL THE REST OF YOUR PETROLEUM SYSTEM

Date: Sunday, June 19, 2016
Time: 8:00 am to 5:00 pm
Location: Calgary, AB, Canada, with AAPG 2016 Annual Convention & Exhibition
Tuition: USD $895, professionals (increases to $1095 on 5/20/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 5/20/2016.
Instructor: J.M. (Mike) Moldowan, Biomarker Technologies, Inc., Rohnert Park, CA, USA
Content: 0.75 CEU
Limit: 50 people

Who Should Attend

The course is geared toward exploration/development geologists, especially those engaged in basin modeling and/or geochemical applications. Although several new technologies and methods will be presented in this course, no particular knowledge or experience is required to understand them and benefit (i.e., beginners will benefit). However, for those who do have experience, even for seasoned experts in geochemistry, the technology and methods to be presented will add enormously to their problem-solving abilities (i.e., advanced participants will also benefit).

Objectives

The technologies and methods to be presented in this course have been underutilized compared to the wealth of new understanding they can bring forth when applied to petroleum system analysis and modeling. Participants will learn:

- new skills for identifying where deep sources occur
- methods for determining their provenance from analysis of liquids,
- technology for determining co-sourced oil mixtures,
- and the latest techniques for constraining the age of an oil source from analysis of an oil sample (age-related biomarkers).

These are techniques that can be applied in both conventional and unconventional exploration and production. In the unconventional realm maturity assessment by quantitative diamondoid analysis has become particularly useful when vitrinite reflectance or programmed pyrolysis fail to produce confident results and/or to determine when fluid migration might have occurred.

Course Content

The course content will cover three selected topics in advanced geochemical technologies:

Topics to be covered include:

1. Diamondoids. The uses of quantitative diamondoid analysis (QDA), how it is performed and advantages and pitfalls of the method will be discussed. QDA is used for determining maturity of post-mature fluids (> 1.0 % Ro) in both conventional and unconventional applications. Diamondoid correlation methods for recognizing co-sourced oil mixtures and correlating liquids of any maturity (e.g., black oil to white oil) and even those liquids affected by severe biodegradation, are now routinely applied.

2. Compound specific isotope analysis (CSIA). CSIA is applied to different compound classes including diamondoids, alkanes, and biomarkers such as steranes, hopanes, isoprenoids and tricyclic terpanes, to determine source and depositional environment. CSIA of biomarkers, together with various diamondoid analyses, is particularly useful for unraveling co-sourced oil mixtures.

3. Age-related biomarkers. Selected taxon-specific biomarkers useful for constraining the geologic age of an oil source from the analysis of a derived oil sample will be discussed, including the techniques necessary for such analyses and examples of applications and the pitfalls encountered during those applications.

INTEGRATION OF PETROLEUM GEOCHEMISTRY AND RESERVOIR PVT ANALYSES FOR EVALUATION OF HYDROCARBON RESOURCE PLAYS

Date: *Sunday, June 19, 2016*
Time: *8:00 am to 5:00 pm*
Location: *Calgary, AB, Canada, with AAPG 2016 Annual Convention & Exhibition*
Tuition: *USD $895, professionals (increases to $1095 on 5/20/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 5/20/2016.*
Instructors: *John B. Curtis, Colorado School of Mines, Golden, CO; Andy Mort, Geological Survey of Canada, Calgary, AB; John Zumberge, Geomark, Houston, TX*
Content: *.75 CEU*
Limit: *40 people*

Who Should Attend

The content is designed for novice to intermediate level geoscientists or as a refresher for advanced students. Managers with a financial background have also benefitted from this course. Course applications include exploration, completion, and field development.

Objectives

Upon completion of this course, participants will:

- know how to integrate data from source rock, mud gas, produced oil & gas, and reservoir engineering to better understand and exploit 3D details of petroleum systems.
- understand how source rock, stable carbon isotope and biomarker geochemistry can be used to determine quantity and type of generated hydrocarbons and migration distance and direction within source rock and tight oil plays.
- discover a greater understanding of the nature and productivity of resource plays and co-located conventional reservoirs through the integration of hydrocarbon phase behavior (using PVT analyses) and these geochemical data.

Description

This course will address integration of source rock, produced oil and gas, mud gas and reservoir engineering data to better understand and exploit 3-dimensional details of petroleum systems. Source rock, carbon isotope and oil biomarker geochemistry will be stressed as a way to determine quantity and type of generated hydrocarbons and migration distance and direction within source rock and tight oil plays. The integration of hydrocarbon phase behavior, as determined through PVT analyses, with these geochemical data allows an improved understanding of the nature and productivity of resource plays and co-located conventional reservoirs. Participants will finish the course with a better idea of how to use another tool – petroleum geochemistry integrated with reservoir engineering – to answer their E&P questions and guide their efforts in both resource and conventional plays.

The course will focus on resource and co-located conventional plays, with exercises and examples from the Montney, Doig, Charlie Lake, Halfway, Duvernay, and Cardium of the WCSB and the Eagle Ford, Mowry, Niobrara, Lodgepole and Red River of the U.S. portion of North America.

Topics to be covered include:

- Source Rock Evaluation - Quantity, quality & thermal maturity of organic matter to predict hydrocarbon type(s) & yield; Sampling considerations, and TOC/Rock-EvalTM/ vitrinite reflectance measurements will be reviewed and practical aspects of data evaluation demonstrated and practiced in exercises.
- Crude Oil Geochemistry & Correlation - Stable carbon isotope and oil biomarker geochemistry will be highlighted, with examples of cluster analysis/principal components analysis to identify petroleum systems, and oil families. Determination of oil vitrinite reflectance equivalent (VRE) values and source-migration-reservoir relationships will be emphasized.
- Natural Gas Geochemistry - Use of produced and drilling gas molecular and isotopic data, with an emphasis on Mud Gas Isotope Analysis (MGIA) to identify source maturity, organofacies, and potential reservoir compartments and completion intervals.
- Production Engineering (PVT) - Basic concepts will be introduced: phase equilibria, bubble point, dew point, multi-phase flow in reservoirs. The use of petroleum geochemistry to derive and GIS map PVT relationships across a region, prediction of phase behavior and determination of Degree of Undersaturation for reservoir management considerations will be discussed and illustrated.
- Integration of Rock, Oil and Gas Geochemical and Engineering Data - Geochemical and reservoir engineering parameters required for successful resource plays, detailed examples and participant exercises.

SOURCE-ROCK KINETICS: NEW METHODS OF DETERMINING THEM, AND NOVEL APPLICATIONS TO HYDROCARBON EXPLORATION

Date: Saturday, July 30, 2016
Time: 8:00 am to 5:00 pm
Location: San Antonio, TX, with 2016 URTeC Meeting
Tuition: USD $895, professionals (increases to $1095 on 7/1/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 7/1/2016.
Instructor: Douglas Waples, Sirius Exploration Geochemistry, Evergreen, CO
Content: .75 CEU
Limit: 50 people

Who Should Attend

This course will be entirely comprehensible and useful for any exploration geologist who is interested in maturity or other aspects of source rocks. It will also be useful for managers who will want to understand all the tools they could have in their toolbox. It is intended for all exploration geologists, regardless of experience with kinetics, and is a fairly comprehensive treatment of the topic, particularly the applications to exploration

Objectives

Upon completion of this course, participants will understand:

- How source-rock kinetics control the rate, timing, and temperature of hydrocarbon generation;
- The difference between "bulk hydrocarbon kinetics" and "separate kinetics for oil and gas generation";
- How kinetic parameters are derived from pyrolysis data;
- The differences in determination of "one-run" kinetics and "multirun" kinetics;
- The assumptions involved in and thus the weaknesses of both those kinetic methods;
- The importance of using appropriate combinations of A factor and activation energy for source rocks in basin modeling;
- How source-rock kinetics can be used to distinguish different organofacies and link that knowledge to other geologic phenomena and data; and
- How to use the Mean Ea value from source-rock kinetics as a valuable thermal indicator that can be used to calibrate basin models and predict the level of hydrocarbon generation (Transformation Ratio).

Description

Although source-rock kinetics have been widely used in basin modeling for more than 25 years, recent technical developments have greatly increased the utility of kinetics data. Source-rock kinetics can now be used for a variety of purposes not imagined only a few years ago. These new applications are extremely valuable in both conventional and unconventional exploration.

Traditional methods of measuring kinetics were slow and expensive. A new method increases the speed of laboratory analysis by a factor of approximately 20, resulting in major reductions in cost and in acquisition time. In addition, kinetics can now be determined at even lower cost for samples for which appropriate archived Rock-Eval or Source-Rock-Analyzer data are available. Studies can even be carried out using a combination of archived and newly generated pyrolysis data. The use of archived data can greatly relieve the burden of acquiring samples where acquisition is expensive, difficult, or impossible. Finally, the kinetics obtained by the new method are more reliable and have less chance of being significantly in error than kinetics determined by the traditional method.

Kinetic data include the mean activation energy (Mean Ea) and the shape of the activation-energy distribution, but can also include a split of the hydrocarbons into liquid and gas products. Mean Ea values are conceptually similar to Tmax values, in that they are both derived from the Rock-Eval S2 peak, but are superior in that they take into account the entire S2 curve rather than simply the maximum. Kinetic data are normally used in conjunction with TOC and Rock-Eval data,

as well as with other types of geochemical data, such as biomarkers. Kinetic data can also be integrated into sequence-stratigraphic interpretations.

The lower cost of kinetics data strongly encourages acquisition of large data bases of kinetics. These data bases can then be used not only to provide more-reliable kinetics for basin modeling (the traditional application), but also to identify distinct organofacies within a single source layer, and as a direct indicator of the progress of hydrocarbon generation. Source-rock kinetics can be easily linked to Transformation Ratio and vitrinite reflectance (Ro) values via relationships that are uniquely calibrated for each kerogen.

Exploration applications include (1) defining distinct organofacies within a single source layer, showing both vertical and horizontal variation, and thus permitting high-grading of a kitchen area according to kerogen quality; (2) mapping Ro values calculated from the kinetic data to aid in calibrating thermal history in basin models; and (3) mapping Transformation Ratios to indicate the actual progress of hydrocarbon generation across an area of interest. Kinetic data can supplement Ro data where Ro data are available and confident, or they can replace Ro data where vitrinite is absent or where Ro measurements are unreliable (e.g., Ro suppression, Lower Paleozoic rocks where vitrinite is absent, carbonates where vitrinite is scarce or absent).

Specific applications to conventional exploration include defining source-rock facies and the hydrocarbon kitchen, with a view to later integrating this information with a migration scenario. Applications in unconventional exploration are somewhat different: since little or no migration is anticipated, one must know precisely where the kitchen is. Mean Ea is extremely valuable in precisely identifying kitchens. Criteria for defining a kitchen can be adjusted to meet specific exploration needs, such as the requirement of having oil with high GOR and high API gravity.

INTEGRATING DATA FROM NANO- TO MACRO-SCALE: IMPROVING CHARACTERIZATIONS OF UNCONVENTIONAL PLAYS

Date: Saturday, July 30, 2016
Time: 8:00 a.m. to 5:00 p.m.
Location: San Antonio, TX, with URTeC meeting
Tuition: USD $895, professionals (increases to $1095 on 7/1/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 7/1/2016.
Instructors: Allison Cornett (Schlumberger, Salt Lake City), Rick Lewis (Schlumberger, Denver, CO), Stacy Lynn Reeder (Schlumberger, Boston, MA)
Content: .75 CEU
Limit: 40 people

Who should attend

Geologists, geophysicists, petrophysicists and reservoir engineers looking for a detailed overview of data integration in analysis of organic shale reservoirs. This course exposes attendees to data from multiple disciplines using examples and case studies to demonstrate the importance of reservoir quality and completion quality measurements in the successful exploration and exploitation of mudstone reservoirs.

Objectives

By the end of the course the attendees will have accomplished the following:

- An analysis of different scales of reservoir measurements (pore-core-log) and what these measurements reveal about the shale play both for reservoir and completion quality.
- Developed definitions and drivers of reservoir quality and completion quality. Reviewed case studies that integrate various data sets to develop a better understanding of their influence for basin evaluations and production targets.
- Developed knowledge of the role of core analysis within both gas and liquid-rich shale plays and how to integrate core data with log measurements.
- Learned how to integrate core photos and borehole images to provide additional information for petrophysical and stress evaluations.
- Exposed to recommended workflows for core and log acquisition for end member shale plays. These workflows would address both exploration and exploitation phases.

Content

A key to optimizing the exploration and development of unconventional plays is the integration of various data types into a meaningful analysis of reservoir and completion quality. This course will evaluate data from the nano- to macro-scale in order to show how different types of data can be integrated in the evaluation of organic shale reservoirs. By the end of the course attendees with have developed an insight into how core data and petrophysical evaluations can be utilized to build a more complete understanding of a play.

UNCONVENTIONAL RESERVOIR ASSESSMENT – AN INTEGRATED APPROACH

Date: Sunday, July 31, 2016
Time: 8:00 am to 5:00 pm
Location: San Antonio, TX, with 2016 URTeC Meeting
Tuition: USD $895, professionals (increases to $1095 on 7/1/2016); $115, students (limited number); includes digital course notes and refreshments. No refunds for cancellations after 7/1/2016.
Instructor: Chad Hartman, Weatherford Labs, Golden, CO
Content: .75 CEU
Limit: 50 people

Who Should Attend

Geologists, geophysicists, engineers, and laboratory technicians who need to become acquainted with the various disciplines that must be integrated for successful unconventional reservoir exploration and production. These disciplines include well site engineering, sedimentology,

stratigraphy, petrology, structural geology, geophysics, geochemistry, petroleum engineering, and geomechanics. The class is particularly appropriate for professionals who are new to unconventional reservoirs and for specialists in one area who want to acquire general knowledge of other aspects of unconventional reservoir science and technology.

Objectives

By the end of the course, participants should be able to:

- apply the principals of petroleum systems analysis to the exploration phase of unconventional gas and liquid-rich reservoir prospect evaluation.
- plan and execute a unconventional reservoir core acquisition and analytical program.
- understand and interpret mud gas, headspace gas, and canister gas content, composition, and stable isotope data.
- use x-ray diffraction and various optical and SEM petrology data to interpret shale pore geometry and distributions.
- apply fundamental petroleum geochemistry principals and techniques to measuring the amount, quality, and thermal maturity of organic matter in unconventional reservoir systems.
- understand the methods of petrophysical characterization of unconventional reservoirs.
- utilize adsorption isotherm data for unconventional reservoir analysis.
- make gas content and gas storage capacity comparisons.
- develop core data relationships and core-to-log interpretations.
- calculate gas-in-place and oil-in-place estimates.
- understand well testing and geomechanical applications in unconventional reservoir studies.
- appreciate various reservoir simulation applications and the use of cluster analysis in unconventional reservoir analysis.

Content

This course is a practical and applied introduction to laboratory techniques routinely employed in unconventional reservoir assessment and their relationship to some of the other tools used in the industry. Class emphasis is on explaining which analytical techniques can best address specific questions, what caveats must be kept in mind when employing these tools, what are the strengths and limitations of laboratory analyses in unconventional reservoir assessment, and how to interpret conflicting data from different analyses. Theory is kept to a minimum and selected practical exercises help participants learn to review laboratory data, recognize problems with the data, and to cultivate a feel for interpreting laboratory data and integrating these interpretations with other geological and engineering information.

FRACTURED RESERVOIRS: FROM GEOLOGIC CONCEPTS TO RESERVOIR MODELS – COURSE PLUS FIELD TRIP

Dates: August 22-26, 2016
Times: 8:00 a.m. to 5:00 p.m. each classroom day; 7:00 a.m. to 6:00 p.m. on field trip day
Location: Casper, WY
Tuition: $2195, AAPG members, $2395, non-members (increases to $2395/$2595 on 7/25/2016), includes digital course notes, printed exercises, lunch and refreshments each day, box lunches and transportation on field trip day. No refunds for cancellations after 7/25/2016.
Instructors: John Lorenz, Scott Cooper, FractureStudies LLC, Edgewood, NM; Ahmed Ouenes, FracGeo, The Woodlands, TX
Content: 3.4 CEU
Limit: 40 people

Who Should Attend

Geologists, geophysicists, reservoir engineers, and geomodellers who deal with fractured reservoirs and who need to develop them using all types of available data. The course will be very useful to all geoscientists involved in clastics, carbonates and shale plays where fractures play a major role.

Objectives & Description

This course provides a unique opportunity to learn all the aspects related to the understanding and modeling of fractured reservoirs. The unique feature of this course is the ability to take the geologic concepts and use them in reservoir modeling. Hands-on sessions are devoted to the examination of outcrop, core and log data and using that information and a software to create 3D fractured reservoir models. The first part of the workshop covers the geologic aspects which allow the geoscientist to recognize different types of fractures from outcrop, cores and boreholes. Once the fractures are recognized, their impact on the reservoir and its performance is examined. Six case studies are used to illustrate all the geologic concepts. The second part of the workshop covers all the aspects of modeling fractured reservoirs. Using modeling software and actual data from Teapot Dome, (WY), the geoscientist will be able to construct fracture models that integrate geology, geophysics and reservoir engineering. Emphasis will be given to the critical use of seismic attributes derived from inversion, volumetric curvature and spectral imaging. Using actual Teapot Dome field data from the Tensleep and Niobrara Shale formations and a hands-on approach, the workshop allows the geoscientist to identify fractures and to construct predictive 3D fracture models that can be used to identify productive zones, plan wells and to create fracture porosity and permeability models for reservoir simulation.

Prior to starting the modeling exercises, a field trip to the Tensleep outcrop around Casper (WY) will provide to the students the unique opportunity to see the large scale features related to fractures.

The student can take the concepts learned in this class and use them to solve his own fractured reservoirs problems

Content

Part 1: Geologic Aspects of Fractured Reservoirs
- A. Introduction: Fracture Types and Variability
- B. Fractures in Core: Natural Fractures
- C. Fractures in Core: Induced Fractures, Types and Uses
- D. Fracture Mechanics
- E. Fractures on Anticlines
- F. Fracture Spacings
- G. Fracture Effects on Reservoirs
- H. Case Histories

Part 2: Field Trip to Tensleep outcrops

Part 3: Modeling Fractured Reservoirs
- A. Introduction
- B. Factors Affecting Fracturing
- C. Methodologies to Characterize Fractured Reservoirs
- D. The Use of Seismic to Improve the Fracture Modeling
- E. Integrated Workflow Applied to Fractured Reservoirs
- F. Hands-on Application: 2 Different Datasets from the Teapot Dome (WY)

SALT TECTONICS OF THE GULF OF MEXICO

Dates: September 10-11, 2016
Time: 8:00 a.m. to 5:00 p.m. each day
Location: Cancun, Mexico, with AAPG/SEG ICE meeting
Tuition: $1095, AAPG members, $1295, non-members (increases to $1295/$1495 respectively after July 29, 2016); includes digital course notes, printed exercises and refreshments. No refund for cancellations after 7/29/2016.
Limit: 40 people
Content: 1.5 CEU
Instructor: Mark Rowan, Rowan Consulting, Boulder, CO

Who Should Attend

This course is intended for geoscientists, engineers, and managers who need an introduction to salt tectonics or an update in this constantly evolving field. It is appropriate for those working in any salt basin globally and assumes a basic familiarity with structural geology concepts and terminology.

Objectives

Participants completing this course should be able to:
- understand the original spatial and thickness distribution of the Louann/Campeche salt and its relationship to crustal rifting and oceanic spreading,
- assess the presalt potential of the nothern and southern GoM,
- describe the mechanics of salt flow and its influence on the deformation of Upper Jurassic to Recent strata,
- understand the drives and processes of gravitational failure of the conjugate margins,
- explain how salt flow and diapirism are triggered by extension, contraction, or differential loading,
- identify the regional and temporal distribution of extensional, translational, and contractional provinces and resulting structural styles in both the northern and southern GoM,
- explain how and why allochthonous salt sheets form, advance, and evolve,
- describe the distribution of salt canopies in time and space and their role in gravitational failure of both margins,
- interpret complex allochthonous salt geometries and subsalt structure,
- assess the influence of salt on trap, reservoir presence and distribution, hydrocarbon maturation and migration, and seal.

Content

This two-day short course will provide an overview of salt tectonics in the Gulf of Mexico (GoM), including both the US and Mexican portions of the basin. It will cover a range of topics ranging from the fundamental mechanics of salt-related deformation to the regional distribution of different structural styles, including relevant aspects of extensional, contractional, vertical, and allochthonous salt tectonics. It is intended for geoscientists with different levels of expertise, from those new to the GoM or salt tectonics to those with years of experience in exploring in this complex basin.

The topics will be addressed from the bottom up, with examples from both the northern and southern areas: 1) the crustal architecture and its relationship to evaporite deposition; 2) gravity-driven deformation at the autochthonous salt level, from proximal extension to distal contraction, and the associated primary diapir and minibasin styles; and 3) the formation and evolution of allochthonous salt canopies and consequent shallow deformation. Finally, the influence of salt on various aspects of the petroleum system (trap, reservoir, hydrocarbon maturation and migration, seal) will be summarized.

The course will consist primarily of lectures, using a combination of seismic examples, outcrop relationships, and conceptual and experimental models. There will also be several seismic-interpretation exercises using data from the basin.

PRACTICAL SALT TECTONICS

Dates: November 29-December 2, 2016
Times: 8:00 a.m. to 4:30 p.m. each day
Location: Houston, TX
Tuition: $1495, AAPG members, $1695, non-members (increases to $1695/$1895 on 11/01/2016), includes digital course notes, printed exercises and refreshments. No refund for cancellations after 11/01/2016.
Instructor: Mark Rowan, Rowan Consulting, Boulder, CO
Content: 3.0 CEU
Limit: 40 people

Who Should Attend

This course is intended for geoscientists, engineers, and managers who need an introduction to salt tectonics or an update in this constantly evolving field. It is appropriate for those working in any salt basin globally and assumes a basic

familiarity with structural geology concepts and terminology.

Objectives

Participants completing this course should be able to:

- understand the depositional setting of layered evaporites and the control on later deformation,
- describe the mechanics of salt flow and identify the loading, extensional, and contractional triggers for salt movement,
- interpret salt and stratal geometries associated with diapirs, salt welds, and minibasins,
- illustrate the processes and geometries resulting from extensional or contraction reactivation of diapirs,
- explain how diapir rise influences stratal geometries, faulting, and reservoir distribution in diapir-flank traps,
- demonstrate how allochthonous salt is emplaced and how it subsequently evolves,
- understand the role of salt in rift basins, passive margins, and convergent-margin fold-and-thrust belts,
- determine the effect of salt on sediment transport and deposition,
- appraise the influence of salt bodies and welds on hydrocarbon maturation, migration, and entrapment
- assess more accurately the risks in the exploration of salt basins.

Content

This course is designed to give participants the basic working tools to explore and develop hydrocarbons in salt basins. Because no two basins are alike, the focus is on understanding the processes and styles of salt-related deformation using a combination of seismic data, outcrop examples, and experimental models.

The course will initially address layered-evaporite basins and what drives salt mobility. We will then shift to discussing, first, how salt flow, diapirism, and minibasin formation are triggered by early differential loading, extension, contraction, or strike-slip deformation, and second, how diapirs and minibasins evolve over time and can be reactivated during episodes of extension or shortening. Focusing in on the details around diapirs, we will examine how diapiric growth impacts folding, faulting, and reservoir distribution. Because salt often moves more laterally than vertically, we will explain how and why allochthonous canopies form and evolve, and what can be expected just below salt sheets.

Salt is found in a variety of tectonic settings. We will look at its role in facilitating and responding to deformation in rift basins, passive margins dominated by gravity-driven deformation, and convergent-margin fold-and-thrust belts, using examples for various salt basins around the world. Finally, because salt provides the framework for other aspects of the petroleum systems in these basins, we will examine the influence of salt bodies and salt welds on sediment transport and deposition, hydrocarbon maturation and migration, and seal of hydrocarbons.

The course will consist primarily of lectures but will be supplemented by exercises focused mainly on interpretation of both 2-D and 3-D, time- and depth-migrated seismic data.

AAPG FUNDAMENTALS EDUCATION CONFERENCE

Dates: *October 3-7, 2016*
Location: *Houston, TX*
Tuition: *$1895, AAPG members, $2195, non-members (increases to $2095/$2395 respectively on 9/05/2016.) Registration is for entire week, and badge is transferable. Includes refreshments and buffet lunch each day in addition to digital course notes and printed exercises. Courses also priced individually at $550/course day (increases to $600/course day on 9/05/2016.) No refunds for cancellations after 9/05/2016.*

Check the website soon for the list of courses included in this event!

FIELD SEMINARS

SIXTEEN UNIQUE AND ENGAGING WAYS TO LEARN MORE ABOUT THE INDUSTRY. PLUS EACH AND EVERY ONE PROMISES TO BE AN EXPERIENCE YOU'LL NEVER FORGET.

2016 FIELD SEMINARS

PLEASE NOTE: Registrants in AAPG Field Seminars must complete and sign the Release and Indemnity Form on the bottom of the Registration Form. Your registration will not be complete until we have your signed form in our files.

MODERN TERRIGENOUS CLASTIC DEPOSITIONAL SYSTEMS

Leader: Walter J. Sexton, Athena Technologies, Inc., Columbia, SC
Dates: May 31-June 7 and September 11-18, 2016
Location: Begins in Columbia and ends in Charleston, South Carolina
Tuition: $3100 (increases to $3,300 on 3/4/2016 for the April trip, and on 8/12/2016 for the September trip); includes ground transportation to Charleston, water transportation, guidebook, modern core workshop, lunch on the fluvial day, and CD-ROM. No refunds for cancellations after 3/4/2016 (for April course) or after 8/12/2016 (for September course.)
Limit: 24
Content: 5.6 CEU

Who Should Attend

Petroleum geologists and engineers who desire to further their understanding of modern sedimentary processes, stratigraphy, and sedimentology. Geoscientists working in fluvial and shallow marine environments. Both exploration and development geoscientists, log analysts (petrophysics) and managers will benefit from viewing the complexity of the facies architecture and scale.

Objectives

Upon completion of this field seminar, participants will be able to:

- Depict the facies architecture, heterogeneity and 3D geometry of modern clastic depositional environments deposited in alluvial, deltaic, estuarine, barrier island and tidal channel settings.
- Improve modeling skills by evaluating facies trends in the subsurface that will allow the potential to predict facies and reservoir trends.
- Identify potential mesotidal shoreline trap types.
- Express the impact of the hydrodynamic regime (i.e. waves and tides) on the geomorphology, lithology, and stratigraphy of clastic sediments.
- Comprehend the sedimentological processes responsible for the deposition of sedimentary rocks in the subsurface.

Content

The seminar study area is located on the trailing edge of the North American plate, the coastal plain of South Carolina. The study area is thoroughly documented and offers an excellent opportunity for the students to walk on a variety of modern terrigenous clastic depositional systems while observing sedimentary processes, modern sedimentary structures, and numerous trenches illuminating the three-dimensional architecture of each area. Genetically related depositional environments and their stratigraphic correlation are stressed during the seminar from the standpoint of subsurface interpretation for prospect evaluation and reservoir development. The emphasis of the trip will be on sediments deposited within the past 4,000 years. Field observations will

be supported and expanded on by short and focused lectures each morning, a detailed guidebook, and numerous figures and diagrams (posters) used during each field day. In addition, a modern core workshop will be held where the cores will be logged and discussed by the students during class.

The focus of the seminar will be on the three-dimensional characteristics of modern depositional environments and their regional relationship with other depositional environments in the area. This focus will be used to demonstrate how these characteristics and relationships can be used to recognize and delineate similar depositional environments in ancient sedimentary rocks. Additionally, the evolution of Quaternary strata is presented in a chronostratigraphic context. Subsurface data provide lithologic interpretations for progradational (barrier island, deltaic) retrogradational (barrier island, estuarine), and aggradational (valley fill, barrier island) depositional styles. Lateral facies-association and lithofacies changes are discussed from the basin scale (exploration fairways) to the reservoir scale (permeability controls).

The six-day trip is carefully planned to maximize time in the field and participants will be encouraged to discuss the depositional settings encountered on each day. The first day in the field is devoted to examination of the modern aggraded fill in the alluvial valley formed during the most recent sea level cycle of the Congaree River during the Pleistocene/Holocene. The second day will be spent examining a mixed energy delta (Santee/Pee Dee) by boat, moving from the fluvial upper reaches of the delta system to the marine delta front. The third day will focus on mesotidal progradational/regressive barrier island/shoreface complexes, and tidal inlet deposition. This will include observing trenches and an explanation of the processes active in the system's sub-environments. The fourth day will be spent at Cape Romain focusing on retrogradational/transgressive shorelines, lagoons/bays, inlet formation and closure, and wave-dominated deposition. The fifth day will be spent in Charleston with morning lectures followed by a half-day modern core workshop. During the workshop, groups of students will be assigned modern core samples to log followed by discussion on the environment of deposition, potential reservoir characteristics and exploration strategies. The sixth and final day will be spent in St. Helena Sound, the largest estuary on the southeastern coastline of the United States. The sub-environments of deposition to be visited in the incised valley fill will include: peat swamp, point bar, marsh, fine grained tidal flat, sand flat, barrier island, and linear sand ridge. This field day will demonstrate changes in deposition in the estuary from freshwater dominance to open marine conditions.

FIELD SAFETY COURSE FOR FIELD TRIP LEADERS

Instructors: Kevin Bohacs, Dave Story, Pam Collins, ExxonMobil, Houston, TX; Robert Clarke, Consultant, Irving, TX
Dates: Wednesday and Thursday, April 6-7, 2016, 8:00 a.m. to 5:30 p.m. each day
Location: Houston, Texas
Tuition: $500 (increases to $550 on 3/9/2016); includes course notes, AAPG publication Field Safety in Uncontrolled Environments, other printed material, and classroom first aid supplies. No refunds for cancellations after 3/9/2016.
Limit: 24 Persons
Content: 1.5 CEU

NOTE: This 2-day course will be offered in early-April, well before the AAPG Annual Convention (June 19-22, 2016), so that field trip leaders and other interested persons may attend the course prior to other 2016 field trips/field seminars.

Who Should Attend

This course is designed for anyone who leads or coordinates field activities such as Field Trips, Field Seminars, Field Camps, or general field work, for companies or student groups. Participants will acquire and practice strategies to prepare for and conduct safe and effective field activities.

Objectives

Upon completion of this seminar, participants will:

- be better prepared to assess their safety responsibilities as leaders in preparing for, planning, and conducting a safe and effective field trip.
- understand the value of having protocols and specific actions to execute a plan for responding to an emergency in the field.
- be more aware of field hazards and means to assess what conditions to consider (topography, steep slopes, cliff faces, etc.), and what weather conditions might make a field stop a "no-go".
- see the value of conducting a short safety briefing before going to the field each day, allowing trip attendees to give feedback about their safety concerns from the previous field day, and understand the value of keeping an up-to-date daily Safety Logbook during the field trip.

Content

Field activities are normally safe, but accidents do happen with potentially serious consequences, so measures should be taken to reduce the risks. This field safety program is straightforward, widely applicable, and scaleable to a wide range of field activities, from short roadside stops to long, backcountry expeditions. This course provides classroom

activities on Day 1 with instructor talks, group problem solving, and hands-on basic first aid scenarios. Day 2 is a trip to a field location where, during 4 field stops, participants will practice many of the field-safety concepts discussed in the classroom. This course provides scenarios for implementing a valuable field safety processes and a template for creating programs tailored to the needs of individual field trip leaders. We encourage all AAPG 2016 field trip/field seminar leaders to register for this course.

NOTE: Participant's experience with this course may be enhanced if they have previously taken a Basic First Aid or and/or Wilderness and Remote First Aid, which are both available from the American Red Cross.

CARBONATE RESERVOIR ANALOGUES: PLAY CONCEPTS AND CONTROLS ON POROSITY

Leaders: *Evan K. Franseen, Robert H. Goldstein, University of Kansas, Lawrence, KS; Mateu Esteban, Consultant, REPSOL-YPF, Mallorca, Spain*
Date: *April 7-12, 2016, following SEG/AAPG ICE in Barcelona, Spain*
Location: *Almeria Region, SE Spain, begins and ends in Almeria Airport, Spain. Fly from London/Barcelona/Madrid*
Tuition: *$3,500 (increases to $3700 on 2/22/2016); includes field transportation, all meals and lodging during trip, guidebook. No refunds for cancellations after 2/22/2016.*
Limit: *15*
Content: *4.8 CEU*

Who Should Attend

Petroleum geologists, engineers, and geophysicists who are involved in interpreting carbonate systems; geoscientists needing introduction or refresher course on carbonate sedimentology, stratigraphy, or diagenesis.

Objectives

The objectives of this field seminar are to provide educational opportunities on the following:

- Depositional and diagenetic models for carbonates that are good analogs to highly productive reservoirs in the Middle East, including Cretaceous and Tertiary carbonates from the Gulf (Iran, Iraq, U.A.E., Qatar, Oman), carbonates from SE Asia, including Indonesia, and potentially to offshore plays from Brazil.
- Lessons on carbonate systems that can be applied to carbonate reservoirs throughout the geologic record.
- Additions to sequence stratigraphy concepts through development of substrate paleoslope and climate controls on depositional sequence characteristics; a sequence stratigraphy approach that involves the innovative "pinning point" technique.
- Coverage of cool-water as well as warm-water carbonate facies models.
- Controls of paleotopography on shallow-water and deep-water carbonate reservoir systems.
- New and emerging carbonate reservoir play types.

Includes outcrop exposure of play models related to meteoric, acid and hydrothermal karst, unconformities, deepwater carbonates, reef and forereef slope, sequence stratigraphic controls, dolomitization, moldic porosity, cool-water carbonates, oolite, bioclastic sand, and microbialite.

Content

During this seminar, leaders and participants together will:

- Examine a wide variety of carbonate facies types: coral reef platforms with continuous progradational talus slopes grading into basinal deposits; temperate-water carbonate systems; evaporites, microbial buildups (thrombolites, stromatolites) and oolitic shoals.
- Study and discuss various types of unconformities and associated paleokarst; evolution and distribution of porosity associated with meteoric, acid, and hydrothermal karst processes.
- Examine and discuss relationships and interaction with evaporites, volcanoes and volcaniclastics.
- Discuss large-to small-scale predictability of depositional facies and porosity trends important for estimating reservoir parameters.
- Compare and discuss methods, approaches, and results in using outcrops to build 3-D cellular reservoir-analog models.
- Relate field seminar topics and stops to play concepts in carbonates throughout the geologic record.

This field seminar is held in an area in which compressional, shear-zone and extensional tectonism created highly variable basement paleotopography and differing basin

morphologies prior to Upper Miocene-Pliocene carbonate deposition. Superb 3-D exposures of Upper Miocene - Pliocene carbonates in SE Spain offer an unrivaled opportunity to learn from undisturbed depositional geometries. The area is a natural classroom for illustrating basic and advanced concepts of carbonate sequence stratigraphy, and evaluating the interaction of sea-level fluctuations, paleotopography, paleoclimate, and various diagenetic processes on reservoir character of a variety of carbonate systems. Outcrops in the region reveal evolution from heterozoan (temperate/cool water) carbonate systems to photozoan systems (coral reef-rimmed platforms) to an oolitic and microbialite (thrombolite, stromatolite) cyclic system.

The field seminar develops and evaluates the sequence stratigraphic framework and controls on location and reservoir character of Upper Miocene-Pliocene carbonate sequences from a variety of carbonate systems within the context of the regional paleogeography. Facies architecture of Upper Miocene carbonate complexes will be explored using sequence stratigraphy stacking patterns, controls of relative sea level, basement paleotopography, basin morphology, paleovalley systems, and climate. Diagenetic processes (including those related to karst and dolomitization) that affected the rocks are integrated to evaluate the controls on porosity distribution. Various forms of primary and secondary porosity exist in the outcrop. Particular emphasis is placed on applying principles from the field seminar and utilization of the excellent outcrops as analogs to a wide range of subsurface reservoir equivalents.

RESERVOIR ANALOGUES FROM MODERN AND ANCIENT TURBIDITE SYSTEMS, TABERNAS BASIN, SPAIN

Leaders: *C. Hans Nelson (University of Leeds, UK) and Peter Haughton (University College Dublin, Ireland)*
Date: *April 7-10, 2016, following SEG/AAPG ICE in Barcelona, Spain*
Location: *Begins and ends in Granada, Spain, with a 3 night stay at Hotel El Dorado Carboneras in the Tabernas Basin area. Participants will need to provide their own transportation to and from Granada.*
Tuition: *$2200 (increases to $2400 after 2/22/2016); lodging, transportation during the seminar, all meals at Carmen Victoria in Granada for day 1, course lecture notes, field trip guidebook and lunches No refunds for cancellations after 2/22/2016.*
Limits: *Minimum – 10 people; Maximum – 20 people*
Content: *2.8 CEU*

Who Should Attend

This trip is for exploration and development geologists, geophysicists, log analysts, engineers, and managers working with deep-water reservoir systems in exploration and production settings. The course also is applicable for professors, students and government earth scientists who study modern marine geology and ancient turbidite systems. The field seminar will benefit all audiences, from experts to those unfamiliar with deep-water systems.

Objectives

Upon completion of this field seminar, participants will be able to:

- Understand all aspects of deepwater systems, their morphologic variations, architectural geometry, stratigraphy, seismic facies, lithofacies, and sedimentary processes, based on comparison of modern turbidite systems in a wide variety of depositional settings
- Recognize the spectrum of deep-water siliciclastic facies developed across the full range of deep-water environments, from upper slope to basin plain
- Understand the processes by which deep-water siliciclastic reservoirs are formed, and how to recognize them in core and in the field
- Appreciate the origins, controlling factors and heterogeneity in deep-water reservoir facies
- Use deep-water facies in a predictive manner, while recognizing pitfalls and limitations

Content

This seminar will begin with an up-to-date review of modern turbidite systems as analogues for deepwater sandstone reservoirs and then continue for three days visiting Tabernas Basin outcrops.

The lectures will compare morphology, geometry, stratigraphy, facies, dispersal patterns, and depositional processes in small-scale (kms) to large-scale (100's km) modern turbidite systems. From these comparisons we will define criteria for the recognition of basic turbidite system elements of canyons, base of slope aprons, proximal fan channels, distal fan lobes, basin plains, and of associated elements such as crevasse splays and axial channels. Variations of turbidite system patterns dependent upon tectonic setting, sediment supply, and oceanographic controls (sea level change, bottom currents) will be discussed to avoid pitfalls of model-driven approaches.

After a day 1 morning introduction to the Tabernas field area, turbidite systems and processes, the group will proceed from Granada to the field area. Each morning prior to heading to outcrops, a relevant modern turbidite system case study will be presented. These will include Gulf of Mexico mini-basins, Corsica base of slope aprons plus megabeds, and mass transport deposits. For these case studies, the data bases include seismic profiles, swath bathymetric plus sidescan images, and core transects. The seismic facies and morphologies of the modern turbidite systems and their feeder systems, channels and lobes will be outlined so that width, relief, gradients, and stacking patterns of channels and lobes can be compared with the many emerging data sets of 3D seismic geomorphology.

The field trip to the interconnected Tabernas and Sorbas basins in SE Spain (Fig. 1) includes important late Miocene deep-water successions. These are particularly well exposed because of the modern hyper-arid climate, recent uplift and subsequent erosional dissection. A wide range of different turbidite systems and mass-transport complexes can be viewed in large and accessible exposures. The basins include structurally-confined

fans, slope channel systems, coarse-grained aprons, and ponded sheet systems. Subsidence was controlled by a combination of strike-slip faulting and regional amplification of folds that also uplifted sediment source areas. Faults and folds propagated to the palaeoseafloor forcing depocentres to migrate and creating local depressions analogous to slope minibasins on passive margins with salt and shale diapirism. Several of the turbidite systems show evidence for onlap onto active structures.

The three-day field portion will focus on (1) sediment gravity flow behavior in confined basins; (2) turbidite reservoir architecture and heterogeneity – channels, sheets and lobes (3) structure and impact of mass transport deposits, and (4) tectonic controls on sea floor gradients, basin development and later inversion.

Participants should bring: Stout field boots with ankle support; Climbing helmet/hard hat (the trip will not involve rock climbing – the helmet is to protect against potential rock fall from loose cliffs); Sun protection; Hand lens and field notebook; Binoculars. Participants will receive a 500-page set of short course notes (PDF) and a 100-page field guide with maps and illustrations.

THRUST BELT STRUCTURE AND FORELAND BASIN EVOLUTION IN THE SOUTHERN PYRENEES (ARAGON, SPAIN)

Leaders: *Antonio Teixell, Universitat Autònoma de Barcelona, Spain*
Antonio Barnolas, independent consultant, Madrid, Spain
Date: *April 7-10, 2016, following SEG/AAPG ICE meeting in Barcelona*
Location: *Begins and ends in Barcelona, Spain; Lodging during the trip (3 nights) in Jaca, Spain*
Tuition: *$2,100 USD (increases to $2,300 on 2/22/2016); includes guidebook and course materials, internal and roundtrip transportation from Barcelona, lodging, and all meals. No refunds for cancellations after 2/22/2016.*
Limit: *22*
Content: *2.75 CEU*

Who Should Attend

Exploration and development geologists and geophysicists interested in fold and thrust structures and tectonics-sedimentation interactions in compressional belts and foreland basins.

Objectives

In this field trip, participants will examine:

- Thrust structures and fault-related folds formed in diverse habitats, from deep basinal settings to the earth's surface.
- Patterns of growth strata in areas with syn-sedimentary folding
- The basic principles of the architecture and kinematics of foreland basins, including deep-water turbidite systems and proximal alluvial fans.

Content

The Spanish Pyrenees provide world-class models for thrust tectonics and syn-orogenic sedimentation. During the field seminar we will examine illustrative outcrops of thrusts, fault-related folds, stratal architectures and facies of depositional systems affected by growing structures, which are good analogues for hydrocarbon reservoirs. The seminar will cover a transect of the southern Pyrenees in Spain, where thrust-fold geometries are well exposed and suitable for conceptual discussion. Syn-orogenic sediments range from deep-water turbidites to shallow marine and terrestrial molasse. Turbidites include debris sheets ("megaturbidites") that have produced gas. Molasse sediments are perturbed by growth anticlines and exhibit intraformational unconformities related to observable thrust faults.

The first day comprises the travel from Barcelona to Jaca and a general presentation to the trip after the arrival, including the geology of the Pyrenees and an introduction to the concepts to be studied. In the next day, the field work is initiated in the scenic Aragüés valley, studying thrust-fold geometries and deformed syn-orogenic turbidites. The classic turbidite and breccia deposits of the Hecho group of the Jaca basin, which produced gas, will be analyzed. The third day will be devoted to recognize the relationships between deep-water turdidites and shallow-water carbonates of the basin margin, and to examine the evolution from the turbidites to the deltaic and alluvial systems of the final molassic infill of the basin. In the afternoon we will study growth strata and related unconformities at the internationally known example of the Pico del Aguila anticline. The last day involves a reconnaissance of the south Pyrenean mountain front at Riglos (Gallego gorge), analyzing interactions between growing thrust structures and proximal alluvial fan conglomerates, and concludes with the return to Barcelona in the evening.

The field trip takes place in beautiful mountain scenery, which is a plus to the geology. During the days of the trip, lodging will be in a comfortable hotel in the touristic/historic town of Jaca, a famous center for winter and summer leisure activities. Accompanying guests may enjoy visits to the XI century Romanesque cathedral and the XVI century fortress. Field work involves some walking in mountain terrain, always along safe and well-marked trails.In addition to warm clothes and a raincoat, we recommend hiking boots, sun protection cream, and a hat.

FRACTURED CARBONATE RESERVOIRS OUTCROPS: OBSERVING FAULTS, FRACTURES AND KARSTS PERMEABILITY NETWORKS IN DIFFERENT CARBONATE DEPOSITIONAL SETTINGS

Leaders: Raffaele Di Cuia, G.E. Plan Consulting, Ferrara, Italy; Davide Casabianca, TOTAL, Aberdeen, UK
Date: April 7-9, 2016, following SEG/AAPG ICE in Barcelona, Spain
Location: Begins and ends at Bari Airport (Italy)
Tuition: $1,800 (increases to $2,000 on 2/22/2016); includes guidebooks, transportation expenses during the field seminar, all meals during the course. Does not include lodging. No refunds for cancellations after 2/22/2016.
Limit: 15
Content: 2.1 CEU

Who Should Attend

This field-based course is designed for exploration and production geoscientists working on carbonate rocks and sequences for hydrocarbon exploration and production projects. Ideally the components of a subsurface team would greatly benefit from participating together.

Objectives

The field seminar aims to demonstrate how to adequately describe facies distribution and faults and fractures characteristics, within the relevant depositional and tectonic context. Outcrop data gathering will help participants to focus on the important aspects to consider when characterizing and modelling carbonate reservoirs. Uncertainty will be a central theme and scenario modelling will be advocated as a way of managing it.

By using the outcrops of the Apulian Carbonate Platform, data from equivalent reservoirs in the subsurface of southern Italy, and from carbonate reservoirs elsewhere, participants in this field seminar will be able to:

- observe the structural organisation of the Southern Apennines geological units and infer the evolution of the thrust belt;
- recognise facies types in the Apulian Rudist Carbonate platform and in the deeper water deposits resedimented into the adjacent basin areas;
- understand the 3D organisation of sedimentary bodies from regional to reservoir scale;
- understand the hierarchy, distribution and organisation of the fault and fracture networks and their consistency with the tectonic evolution of the region;
- verify the relationships between sedimentary facies and fracture distribution ;
- identify the main diagenetic processes that affected the platform and understand their impact on reservoir quality;
- identify, describe and distribute reservoir porosity and permeability ensuing from sedimentary, diagenetic and tectonic processes;
- understand the relationships between outcrop evidence (facies and structural analysis) and subsurface datasets (seismic, core, open hole logs, image logs, production logs and well tests) and discuss how to integrate both for reservoir description;
- learn and compare methods for the description of reservoir uncertainty ranges and understand the value of additional data acquisition for reducing these uncertainties in order to inform reservoir development and management decisions.

Description

Fractured Carbonate reservoirs are liable to display large variability in their characteristics which can affect their performance and economic viability. Primary facies distribution and properties, sequence stratigraphic framework, diagenesis and fracturing are amongst the main factors that exert important controls on reservoir properties.

In these reservoirs the interaction between matrix characteristics (facies, layering, poro-permeability, wettability) and fractures characteristics (timing, style, sizes, distribution, orientation) invariably control fluid flow by enhancing or imparting primary reservoir properties. As a result the understanding of fracture distribution and in particular the relationship between fractures and sedimentary facies is fundamental for an adequate description of fractured carbonate reservoirs. Understanding these relationships is key to correctly model matrix storativity and fracture connectivity and identify potentially highly productive intervals.

This field trip gives participants a chance to look at different carbonate depositional settings ranging from internal platform/lagoon to platform margin and to slope and basinal. In these different depositional settings different types of carbonate sediments were accumulated with different textural and petrophysical characteristics and different depositional geometries. In each setting it is possible to observe how fault and fracture developed and what are the main controlling factors at different scales.

The sequence that will be observed belongs to the Apulian Carbonates, and spans in age from Cretaceous to Pliocene.

SEQUENCE STRATIGRAPHY, FACIES ARCHITECTURE AND RESERVOIR CHARACTERISTICS OF FLUVIAL, DELTAIC AND STRAND-PLAIN DEPOSITS

Leader: Edmund R. "Gus" Gustason, Enerplus Resources (USA) Corp., Denver, CO
Date: April 30-May 7, 2016
Location: Begins and ends in Salt Lake City, Utah
Tuition: $2,200 (increases to $2,400 on 4/01/2016); includes field transportation, lunches and beverages in the field, guidebook. No refund for cancellations after 4/01/2016.
Limit: 12
Content: 5.0 CEU

Who Should Attend

This seminar is designed for geologists and engineers who explore for and/or develop oil and gas resources in fluvial, deltaic, and strand-plain deposits. The course will benefit participants by providing an opportunity to examine, describe, and better understand sequence stratigraphy, facies

associations, and the 3-dimensional spatial distribution of reservoir flow units and heterogeneities in fluvial, deltaic, and strand-plain reservoirs. Although there are no prerequisites, a basic understanding of fluvial, deltaic and strand-plain (shoreface) sedimentology and stratigraphy is helpful. Engineers will find the experience complimentary to current surveillance and modeling challenges.

Objectives

The objectives of this field seminar are to provide geologists and engineers with a better understanding of the sequence stratigraphy, facies architecture and reservoir characteristics of fluvial, deltaic and strand-plain deposits and show how the integration of information from outcrop, cores, and wireline logs can add confidence and reduce the amount of uncertainty associated with correlation and prediction of the spatial distribution of reservoir elements, their bounding surfaces, and internal heterogeneities at interwell, reservoir, and basin scales.

Upon completion of this course you will be able to:

- Distinguish a wide variety of fluvial, deltaic, and strand-plain facies and facies associations in outcrop.
- Recognize and characterize important reservoir flow units and heterogeneities that influence the behavior of fluids in fluvial, deltaic and strand-plain deposits.
- Recognize discontinuities that constitute flooding surfaces in shallow- and marginal-marine settings, as well as their landward expression in alluvial-plain environments.
- Define parasequences and parasequence sets based on their vertical facies successions and stacking patterns.

- Predict the spatial arrangement (stratigraphic or facies architecture) of fluvial channel deposits and predict whether shoreline parasequence sets will be strongly progradational, aggradational or retrogradational based on what part of the base level transit they were deposited. For example, particpants will observe that channel sandstone body density is low (low net-to-gross) where shoreline parasequence sets are retrogradational or aggradational and channel sandstone body density is high (high net-to-gross) where parasequence sets are strongly progradational.

April 29 or 30 are the recommended travel days for participants - they need to arrive in Salt Lake City by noon on Saturday, April 30. A brief presentation on safety and an introduction to the course will be held that evening. Field work begins on May 1. The course ends in Salt Lake City early afternoon on Saturday, May 7.

Content

Much of the world's conventional and unconventional oil and gas production is from fluvial, deltaic and shallow marine clastic deposits that accumulated within foreland basin settings. The ability to accurately describe and predict the stratigraphic architecture that controls the behavior of fluids within these reservoirs greatly reduces risk in exploration and development decisions. This field seminar focuses on relevant, topical geological and engineering issues as expressed in world-class outcrop exposures of these reservoir types throughout Utah. The emphasis in this 7-day field seminar is on recognizing and learning how to predict facies and facies architecture (the geometry and spatial arrangement of sedimentary bodies) within a high-resolution, sequence stratigraphic framework. Participants will examine numerous outcrops along a proximal (west) to distal (east) transect that represent a variety of depositional environments deposited during low stand, transgressive, highstand, and late highstand (falling stage) phases of two third-order Cretaceous sequences: the Cenomanian-Turonian Greenhorn Sequence and the Turonian-Santonian Niobrara Sequence.

Participants will:

- examine and describe the facies and facies associations of gravelly braided river, meandering river, tidal channel, ebb-tidal delta, tidal flat, salt marsh, bay, estuarine, swamp, wave-modified shoreface, wave-modified delta front, fluvial-dominated delta front, distibutary channel and mouth bar, offshore marine and prodelta deposits.
- examine and describe the important surfaces that bound these facies, facies associations and facies assemblages.
- define the criteria that can be used to recognize specific facies associations on wireline logs and in cores.
- examine, describe, and understand the factors controlling stratigraphic architecture.
- examine and describe the reservoir characteristics (flow units and heterogeneities) of these deposits.
- develop depositional models that can be used to predict these variations in the subsurface.

- examine core photos from wells drilled adjacent to the outcrop and analogous oil and gas fields, conduct core-to-log calibration and correlation exercises, and review techniques for integrating available data into a geological model, and discuss the uncertainties associated with building models.

This field seminar is a perfect follow-up course to the AAPG Modern Terrigenous Clastic Depositional Systems course. A remarkable comparison can be demonstrated between the modern South Carolina coastal plain and mid-Cretaceous sediments of southern and central Utah.

Outcrops visited are along the margins of the Kaiparowits, Paunsaugunt, Markagunt, Fish Lake, and Wasatch Plateaus, the Circle Cliffs Uplift, Waterpocket Fold, East Kaibab Monocline, and the Henry Mountains. The field seminar travels through spectacular natural scenery of the Colorado Plateau, including Zion, Bryce, and Capitol Reef National Parks, Grand Staircase-Escalante National Monument, and Glen Canyon National Recreational Area (Lake Powell).

Class size is kept small for mobility and to promote group and individual discussions with the instructor on the outcrop. A considerable amount of hiking is involved. Participants should be in good physical condition.

THE LODGEPOLE-BAKKEN-THREE FORKS PETROLEUM SYSTEM: A FIELD SEMINAR FOR GEOLOGISTS, ENGINEERS, AND OPERATORS IN WESTERN MONTANA

Leaders: *George W. Grader and P. Ted Doughty, PRISEM Geoscience Consulting, Spokane, WA*
Date: *May 23-25, 2016*
Location: *Begins and ends in Three Forks, MT*
Tuition: *$1,900 (increases to $2,100 on 4/25/2016); includes field trip guidebook, field transportation, lodging, field lunches and refreshments. Participants will pay for their breakfasts and dinners. No refund for cancellations after 4/25/2016.*
Limit: *15*
Content: *2.4 CEU*

Who Should Attend

Oil and gas professionals who wish to learn about the geology, reservoir engineering, or operation aspects of the Lodgepole-Bakken-Three Forks Petroleum System.

Location

Begins and ends in Three Forks, MT. Plan to arrive/depart from Bozeman, MT

Objectives

The attendee will gain a working knowledge of the following in the Lodgepole-Bakken-Three Forks Petroleum System:

- Bakken and Three Forks reservoir sedimentology and facies
- Sequence stratigraphy and basin architecture of the Bakken-Sappington and Three Forks
- Characteristics of key sequence boundaries
- Geology and engineering aspects of Bakken-Three Forks reservoirs

- Geochemistry and depositional environments of Bakken source rocks and seals
- Lateral facies changes and reservoir changes along horizontal transects
- Late Devonian-Mississippian tectonics and basin histories of western North America
- Regional geology of western Montana
- Stratigraphy and petroleum geology of the lower Lodgepole (incl Scallion).

Content

The course begins with a ½ day introduction to Late Devonian-Mississippian basins and strata (Bakken-Sappington-Exshaw) in the northwestern U.S. and southern Canada. Day one concludes with a short visit to a Sappington-Three Forks section near Three Forks, MT.

Day two starts with a field exercise describing a section and finishes with a hands-on lab using a Bakken-Three Forks core. Day three is spent examining sections of the Sappington and Three Forks with facies identical to those of the Bakken/Three Forks. Access is via car, foot, and weather permitting, horseback.

The field part of the course is organized so that each outcrop, is examined and discussed in terms of its correlation with the Bakken and Three Forks Formations in the subsurface. Local well logs, outcrop gamma ray logs, detailed measured sections, and geochemical data are used at each section to support the field lectures and regional correlations.

The laboratory part of the course includes a 270' Bakken/Three Forks core with a comprehensive core analysis dataset.

Excellent outcrops illustrate how facies, reservoir properties and rock properties, can vary along a lateral

well bore. Engineers, geologists, and operators will find this especially interesting.

The course is located just north of Yellowstone National Park in an area of world-famous geysers, wildlife, scenery, and fishing. The Three Forks-Bozeman area of Montana also is the classic type section for the Three Forks and Sappington Formations.

DEEP-WATER SILICICLASTIC RESERVOIRS, CALIFORNIA

Leaders: *Stephan Graham and Donald R. Lowe, Stanford University, Stanford, CA*
Date: *June 13-18, 2016 (prior to the AAPG annual convention)*
Location: *Begins in Palo Alto and ends at the airport in San Francisco, California*
Tuition: *$3,000 (increases to $3,200 on 5/16/2016); includes lodging, transportation during the seminar, lunches, guidebook and group dinner (1 night). No refunds for cancellations after 5/16/2016.*
Limit: *20*
Content: *5.5 CEU*

Who Should Attend

Exploration and development geologists, geophysicists, log analysts, engineers, and managers working with deep-water reservoir systems in exploration and production settings. The field seminar will benefit all audiences, from experts to those unfamiliar with deep-water systems.

Objectives

Upon completion of this field seminar, participants will be able to:

- Recognize the spectrum of deep-water siliciclastic facies developed across the full range of deep-water environments, from upper slope to basin plain
- Understand the processes by which deep-water siliciclastic reservoirs are formed, and how to recognize them in core and in the field
- Appreciate the origins and nature of heterogeneity in deep-water reservoir facies
- Use deep-water facies in a predictive manner, while recognizing pitfalls and limitations

Content

This six-day field seminar is designed to provide participants with an appreciation of the broad range of deep-water reservoir facies, the mechanisms by which they were deposited, their predictive attributes, their reservoir heterogeneity and their stratigraphic architecture. The field school emulates a voyage downslope in a deep-water sedimentary system, from submarine canyon head to mouth, to submarine fan valley, to outer fan, to basin plain, using many of the most outstanding deep-water facies outcrops California has to offer. The field seminar formed the basis for the AAPG Hedberg Conference in 2000.

The field seminar is designed to give participants an understanding of deep-water sedimentary processes and products, as well as a powerful visual impression of the scale and architecture of the full spectrum of deep-water deposits. After gathering on the first evening in Palo Alto, California for a welcome dinner, the second day of the trip brings participants to a common level of understanding of the bed-scale building blocks of deep-water systems through lectures and a core workshop held on the Stanford University campus, with the day ending in Half Moon Bay, California. The morning of the third day reinforces the second day's lectures by viewing a range of turbidite facies in coastal exposures of San Mateo County. The trip moves south in the afternoon to the Monterey-Carmel area to view the most proximal of deep-water deposits: upper submarine canyon fill exposed in sea-cliff outcrops in Point Lobos State Preserve. The night is spent in Monterey. The morning of the fourth day entails examination (and a field exercise) of a mid-submarine canyon channel-fill exposure at Wagon Caves Rock in the Santa Lucia Range west of King City. In the afternoon, the trip moves east from the Salinas basin, across the San Andreas Fault, to a dramatic mountainside cross sectional exposure of a submarine fan channel/levee complex at Juniper Ridge, near Coalinga in the San Joaquin basin. The Juniper Ridge field exercise affords participants an opportunity to understand channel-levee facies relations. After a night in the Coalinga area, the fifth day entails a drive north to see the outcrop sequence represented by the second day's core exercise in submarine fan-valley fill exposed at Monticello Dam, Lake Berryessa. The final night is spent in Davis, California. The sixth day consists of examination of outer fan and basin plain deposits along Cache Creek, in the Coast Ranges northwest of Davis. The group returns to San Francisco International Airport in the mid-late afternoon.

SEISMIC INTERPRETATION IN FOLD-AND-THRUST BELTS: FIELD TRIP TO THE SOUTHERN CANADIAN ROCKY MOUNTAIN FORELAND

Leaders: *John H. Shaw, Harvard University, Cambridge, MA, & Frank Bilotti, Chevron, Houston, TX*
Date: *June 23-29, 2016 (immediately after the AAPG annual convention)*
Location: *Begins and ends in Calgary, AB, Canada*
Tuition: *$3,000 (increases to $3,200 on 5/26/2016); includes lodging in a field station (double occupancy), most meals (exception of 2 dinners), local transportation, boat and gondola fees, guidebooks, and supplies. No refunds for cancellations after 5/26/2016.*
Limit: *16*
Content: *4.2 CEU*

Who Should Attend

This course is intended to assist geologists and geophysicists involved in the interpretation of seismic reflection data for trap delineation and reservoir characterization in both orogenic and passive margin fold-and-thrust belts. The course should also be a useful for supervisors who evaluate structural interpretations to assign and reduce drilling risks.

Objectives

Upon completion of this field seminar, participants will be able to:

- Recognize common types of structures in fold-and-thrust belts based on their expressions in outcrop and seismic data.
- Apply fault-related folding concepts to interpret these structures, characterizing fault and fold geometries and fault displacements.
- Identify petroleum traps and their major structural risk elements.
- Recognize similarities between styles of trap and reservoir-scale deformation.

Content

This structural field course in the Front Ranges of the Canadian Rockies focuses on relating outcrop to seismic expressions of compressive structural styles that are common in fold-and-thrust belts and deepwater passive margins (toe thrust belts) worldwide. Course topics include seismic interpretation of thrust and reverse faults, detachment surfaces, fault-bend folds, fault-propagation folds, detachment folds, growth structures, wedge structures, and imbricate structures. The course offers an extensive "atlas-style" guidebook with seismic examples from petroleum basin throughout the world, as well as instructional materials and exercises on quantitative structural interpretation of seismic data. Each day will be spent visiting three to five field locations, where new concepts will be introduced and applied in seismic interpretation projects.

Participants stay at the University of Calgary Kananaskis Field Station, in Kananaskis Country, Alberta, Canada, about an hour drive from Banff and two hours' drive from Calgary. The geology is extraordinary, and the scenery and wildlife are tremendous.

All participants are responsible for making their own travel arrangements to Calgary (you will be provided with arrival and departure details at least 30 days prior to the start of the trip).

CANCELLED

INTERPRETATION OF THRUST BELTS AND FORELAND BASINS: MODELS FROM THE SPANISH PYRENEES

Leaders: *Antonio Teixell, Universitat Autònoma de Barcelona, Spain, and Antonio Barnolas, Instituto Geológico y Minero de España, Madrid, Spain*
Date: *September 5-9, 2016*
Location: *Begins and ends in Barcelona, Spain*
Tuition: *$2,600 USD (increases to $2,800 on 7/25/2016); includes guidebook and course materials, internal and roundtrip transportation from Barcelona, lodging, and all meals. No refunds for cancellations after 7/25/2016.*
Limit: *22*
Content: *3.5 CEU*

Who Should Attend

Exploration and development geologists and geophysicists interested in fold and thrust structures and tectonics-sedimentation interactions in compressional belts and foreland basins.

Objectives

As a result of taking this field seminar, participants should be able to:

- Interpret complex thrust structures and fault-related folds formed in diverse habitats, from deep basinal settings to the earth's surface.
- Identify and understand strain and fracture systems in fold-thrust belts
- Analyze patterns of growth strata in areas with synsedimentary folding
- Apply the basic principles of the architecture and kinematics of foreland basins
- Discuss and predict the basin-scale geometry and evolution of deep-water turbidite systems and proximal alluvial fans in relation with the active tectonic development

Content

The Spanish Pyrenees provide world-class models for thrust tectonics and synorogenic sedimentation. During the field seminar we will examine illustrative outcrops of thrusts, fault-related folds, stratal architectures and facies of depositional systems affected by growing structures, which are good analogues for hydrocarbon reservoirs. The seminar will cover a transect of the southern Pyrenees, a Cenozoic belt where thrust-fold geometries are well exposed and suitable for conceptual discussion. Synorogenic sediments range from deep-water turbidites to shallow marine and terrestrial molasse. Turbidites include debris sheets ("megaturbidites") that have produced gas. Molasse sediments are perturbed by growth anticlines and exhibit intraformational unconformities related to observable thrust faults.

The field trip takes place in beautiful mountain scenery, which is a plus to the geology. During the days of the trip, lodging will be in a comfortable hotel in the touristic/historic town of Jaca, a famous center for winter and summer leisure activities. Accompanying guests may enjoy visits to the XI century Romanesque cathedral and the XVI century fortress.

The first day comprises the travel from Barcelona to Jaca and a general presentation to the seminar after the arrival, including the geology of the Pyrenees and an introduction to the concepts to be studied. In the next day, the field work is initiated in the Roncal valley, where we will study the internal thrust sheets of the Pyrenees that illustrate the process of inversion of the pre-orogenic extensional margin of the Iberian plate. Patterns of fractures and other minor structures related to thrusting will be discussed. The third day is centered on an itinerary on the scenic Aragüés valley, studying in detail thrust-fold geometries and examining deformed synorogenic turbidites. The fourth day is devoted to the classic turbidite and breccia deposits of the Hecho group in the Jaca basin, and to the analysis of growth strata and related unconformities at the internationally known example of the Pico del Aguila anticline. The last day involves a reconnaissance of the south Pyrenean mountain front at Riglos (Gallego gorge), analyzing interactions between growing thrust structures and proximal alluvial fan conglomerates, and concludes with the return to Barcelona in the evening.

The field work involves some walking in mountain terrain, always along safe and well-marked trails. On the third day we walk up a difference in elevation of 450 m. Good exposures of thrust faults and folds make the hike worth! The trail is well marked, and return to a hut or to the vans is always accessible. We recommend hiking boots, sun protection cream, and a hat.

THE ZIMAPÁN AREA: GEOLOGY OF THE SOUTHERN PART OF THE VALLES - SAN LUIS POTOSÍ PLATFORM, STATES OF HIDALGO AND QUERÉTARO, MÉXICO

Leader: *Ricardo J. Padilla y Sanchez, Universidad Nacional Autonoma de Mexico, Mexico City, Mexico*
Date: *September 7-10, 2016 (with AAPG/SEG ICE 2016 meeting in Cancun)*
Location: *Begins and ends in Mexico City airport. Participants will need to provide their own transportation to Cancun.*
Tuition: *USD$1110 (increases to USD$1310 after7/27/2016); includes lodging (3 nights), transportation during the seminar, 3 breakfasts & dinners, 2 box lunches, water & snacks in the field and field trip guidebook. No refunds for cancellations after 7/27/2016.*
Limits: *Minimum – 10 people; Maximum – 15 people*
Content: *2.0 CEU*

Who Should Attend

This trip is for exploration and development geologists, geophysicists, and managers interested in Mexican Geology.

Location

Begins and ends at Mexico City international airport, with transportation to Zimapán, and a 3 night hotel stay in the Zimapán area.

Objectives

Upon completion of this field seminar, participants will be able to:

- Recognize the Cretaceous stratigraphy of the Sierra Madre Oriental and the paleogeography of the southern edge of the Valles - San Luis Potosí Platform.
- Understand the tectonic processes that originated the folded and thrusted Sierra Madre Oriental by the Early Neogene Laramide Orogeny.

Content

This four-day fieldtrip is designed to provide participants an understanding of the geology of the Sierra Madre Oriental at the southern edge of the Valles - San Luis Potosí Platform, through direct observation of outcrops of shallow-water to deep-water rocks from Upper Jurassic to Upper Cretaceous age. Also, the main faults and folds of the area will be visited.

The first afternoon, we will travel by bus from the Mexico City Benito Juarez International airport to Zimapán. The fieldtrip starts in the morning of the second day with a visit to the Zimapán Dam, located at the confluence of the rivers San Juan and Tula, where the Moctezuma – Pánuco River is born and flows to the Gulf of Mexico at the city of Tampico. At the crest of the dam a spectacular view of El Doctor Limestone will

be seen with canyon walls of near 800 m high. The dam covers now the most remarkable outcrop of the "El Doctor Thrust" in the area, however, another outcrops will be visited later that first day. Four stops will be done this first day: one to observe El Doctor reef, another one to discuss El Doctor Thrust, a third one to walk along the El Dedhó Anticline, and the last to review the angular unconformity among El Morro Cgl. and the Soyatal Fm. On the third day, the group will continue to visit more outcrops on the NE part of Zimapán. Four stops will be done today: the first to recognize the volcanic rocks of Las Espinas Fm., where the group will measure some families of strike slip faults which indicate the last compressive event in the area; the second one to visit the type locality of the Upper Jurassic – Lower Cretaceous "Las Trancas Formation"; the third to review El Cobrecito Graven; and the last one to visit the outcrops of the Jiliapan Thust, on the eastern edge of the Valles San Luis Potosí Platform. The morning of the 4th day, we will travel back from Zimapán to Mexico City where participants can then travel on to Cancun for the ICE meeting.

Participants should bring: Stout field boots with ankle support; hat and sun protection; Hand lens, rock hammer and field notebook; Binoculars, Brunton compass and GPS. Participants will receive a 15-page field guide with maps and illustrations, and will be provided with reflective safety vests.

FRACTURES, FOLDS, AND FAULTS IN THRUSTED TERRAINS: SAWTOOTH RANGE, MONTANA

Leaders: *William B. Hansen, Jireh Consulting Services, Great Falls, MT; Steve Boyer, Consultant, Tacoma, WA; Jim Sears, University of Montana, Missoula, MT*
Date: *September 12-17, 2016*
Location: *Begins and ends in Great Falls, Montana*
Tuition: *$2,900 (increases to $3,100 on 8/15/2016); includes lunches, transportation, guidebooks, admission to Glacier National Park, and some additional meals. No refunds for cancellations after 8/15/2016.*
Limit: *20*
Content: *4.2 CEU*

Who Should Attend

Exploration and development geologists, geophysicists, log analysts, engineers, and managers working in structural geology and/or fractures who want a thorough understanding of the geology and geophysics utilized in E&P in thrust belts.

Objectives

Upon completion of this field seminar, participants will be able to:

- Identify natural fractures and discuss analogs
- Differentiate natural vs. induced fractures
- Make connections between structure & fractures & prolific oil fields in the region and new discovery potential
- Have a greater understanding source rock petroleum systems of a thrust belt, and its influence on adjacent forebulge resource oil plays
- Develop completion programs where fractures and structure play a major role in the reservoir

Content

During this seminar, leaders and attendees together will:

- Examine the mechanics of fracturing, folding, and faulting in thrust belt terrains.
- Identify and discuss new ideas regarding the geometry and kinematics of the development of thrust belts with examples from the spectacular Sawtooth Range of northwest Montana.
- Compare seismic interpretation with outcrop examples and review drilling practices in a "frontier" (Montana) exploration thrust belt province.
- Analyze stratigraphic concepts which are essential in the exploration of thrust belt targets.

This field seminar is unique in that it offers the participant the opportunity to interact with a number of instructors who have several decades of experience working in thrust belts of the world. It focuses on the practical issues of exploration and production of hydrocarbons in thrust belts, with the Montana Thrust Belt as the backdrop. It will explain how these concepts can be applied worldwide, where overthrust terrains are increasingly important exploration targets.

The course will integrate concepts of exploration, including a review of fractured reservoir models, structural geology, stratigraphy, and hydrocarbon assessment. The spectacular geology of the Montana Sawtooth Range (an exhumed duplex) will serve as the backdrop for this field seminar. Time in the field will be bolstered by periodic classroom sessions on structural geology concepts, fractured reservoirs, and other issues the explorationist can expect to encounter in thrust belt exploration.

The seminar will utilize traverses to examine multiple thrust sheets exposed in Sun River Canyon, the famous Teton Anticline, and an outstanding example of an exposed fractured reservoir along a fault-propagated fold in Mississippian carbonates as Swift Reservoir. Discussions will involve new ideas on the geometry and kinematics of thrust sheets and how they might influence exploration strategies in those settings.

Participants will discuss the Bakken/Exshaw petroleum system of the Montana Disturbed Belt, and its influence on the emerging resource oil play on the adjacent Sweetgrass Arch. The seminar will continue northward to Glacier National Park, with a cross-section view of the Lewis Thrust, the Chief Mountain klippe, discussions of horizontal Bakken oil drilling on the nearby Blackfeet Indian Reservation and the historical giant gas field production across the border in Alberta, and conclude with a geologic transect along the scenic Going-to-the-Sun Highway of Glacier National Park.

LACUSTRINE BASIN EXPLORATION

Leaders: *Alan Carroll, University of Wisconsin, Madison, WI; Meredith Rhodes Carson, Geofuels LLC, Madison, WI*
Dates: *September 18-25, 2016*
Location: *Begins and ends in Salt Lake City, Utah*
Tuition: *$3,400 (increases to $3,600 on 8/19/2016); includes transportation, course materials, and lunches. Lodging NOT included in tuition. No refunds for cancellations after 8/19/2016.*
Limit: *20*
Content: *3.6 CEU*

Who Should Attend

Geologists, geophysicists, reservoir engineers, managers and anyone working with lacustrine petroleum source rocks, oil shale, lacustrine or fluvial reservoirs, and non-marine basin stratigraphy.

Objectives

Lake basins contain some of the most prolific hydrocarbon resources in the world, including super-giant fields in the South Atlantic, Caspian Sea, and in China and SE Asia. Even larger resources are associated with oil shale deposits in the western U.S. Despite their growing importance, the petroleum geology of lake basins has received far less attention than marine basins. This course therefore aims at developing an understanding of the unique aspects of lacustrine source rocks, reservoirs, and basin evolution that will aid future exploration and development efforts. We will do so using the world-famous record of Quaternary Lake Bonneville to gain insight on controls on lacustrine deposition, and the similarly famous Eocene Green River Formation to examine the preserved deposits of a well-exposed ancient lake basin.

Specific topics to be emphasized in this field seminar include:

- Genetic controls on lake basin evolution
- Recognition of the three principal lacustrine facies associations, based on surface, subsurface, or geochemical data.
- Source rock characteristics associated with the three facies associations

- Carbonate reservoir characteristics in lacustrine basins
- Clastic reservoir (fluvial and deltaic) characteristics in lacustrine basins.
- Lacustrine stratal geometries and distribution patterns of source rock and reservoir facies.

Content

This 6-day Lacustrine Basin Exploration field seminar has been developed on a number of classic field localities in Utah and Wyoming. Localities outside of Salt Lake City, UT will be used to illustrate key geomorphic and stratigraphic features of pluvial lake Bonneville (Gilbert deltas and other shoreline features) and modern Great Salt Lake (playa-lake environments). These "actualistic" observations will help provide context for understanding the deposits of Eocene Lake Gosiute in Wyoming, where recent radioisotopic work has established a chronostratigraphic framework of unprecedented resolution. There we will focus on basin margin to basin center transects of the Bridger and Washakie basins, based on excellent exposures of fine-grained lacustrine carbonate mudstone facies and alluvial to deltaic sandstone facies. Participants will build two basin-scale cross sections of Lake Gosiute strata by recording their own guided outcrop observations on the chronostratigraphic framework provided.

At the outcrop scale, we will examine the heterogeneous reservoir architecture of alluvial, deltaic, and lake-marginal carbonate deposits associated with overfilled, balanced-fill, and underfilled lacustrine basins. These deposits range in style from classic Gilbert deltas to more "dryland" fluvial facies that are dominated by upper flow regime deposition, to mounded carbonate strata. Laterally equivalent mudstone facies are similarly heterogeneous, ranging from laminated oil shale with abundant fish fossils to pedogenically modified playa facies associated with nonmarine evaporites. Distinctive biological marker compounds

(biomarkers) are associated with each of these facies, and can be used to help determine paleoenvironmental setting.

In addition to field studies, several classroom lectures will be used to illustrate the main course concepts and to provide geologic background information on the field areas. Because fine-grained rocks can appear rather different in core than in outcrop, we will also conduct a half-day core workshop based on representative examples of the major facies associations. We will spend some time developing criteria for subsurface recognition using wire-line logs, seismic, and organic geochemistry.

SEDIMENTOLOGY AND SEQUENCE STRATIGRAPHIC RESPONSE OF PARALIC DEPOSITS TO CHANGES IN ACCOMMODATION: PREDICTING RESERVOIR ARCHITECTURE, BOOK CLIFFS, UTAH

Leaders: *Keith W. Shanley, Anadarko, Denver, CO; J. Michael Boyles, Shell Canada, Calgary, AB, Canada*
Date: *September 28-October 5, 2016*
Location: *Begins and ends in Grand Junction, Colorado*
Tuition: *$2,900 (increases to $3,100 on 8/31/2016); includes ground transportation, lunches, and guidebook. No refunds for cancellations after 8/31/2016.*
Limit: *20*
Content: *5.6 CEU*

Who Should Attend

Geologists, geophysicists and reservoir engineers working marginal marine reservoir systems in exploration and production settings. Lectures cover all the concepts necessary for non-geologists to benefit greatly from the course. Geologists often wish that their reservoir engineer had also attended.

Objectives

Upon completion of this workshop, participants will:

- Be able to understand detailed facies analysis within fluvial, estuarine, shoreface, and shallow marine deposits.
- Be able to use parasequence stacking patterns to predict reservoir sand body occurrences.
- Be exposed to a consistent subsurface methodology to recognize sequence boundary unconformities, marine flooding surfaces, parasequence stacking patterns, and reservoir distribution within a sequence stratigraphic framework, resulting in a more robust subsurface stratigraphy.
- Be familiar with sequence stratigraphic concepts and be able to apply those concepts to their exploration and production assignments.

Content

World class exposures of Upper Cretaceous strata in the Book Cliffs of east-central Utah provide outcrops that demonstrate the 3D reservoir architecture of marginal marine strata. These strata were deposited by a variety of depositional settings ranging from fluvial to incised valley to shoreface and deltaic. For those more comfortable with systems tracts, we observe features common to highstand shorelines and contemporaneous alluvial deposits, late highstand and

lowstand shorelines, and incised valleys. We illustrate through the use of spectacular outcrops, subsurface datasets, and stratigraphic modeling how these systems tracts and key surfaces (flooding surfaces and sequence boundaries) may be recognized. The outcrops have almost complete exposure of over 500 m of strata in both depositional strike and dip sections that extend for over 200 km. Well logs and cores from the nearby oil and gas wells provide the opportunity to learn how to recognize outcrop relationships in more traditional subsurface datasets. This field seminar demonstrates how well log and core data can be used to predict reservoir geometries at both the exploration and production scales.

During the seminar, a practical approach of using sequence stratigraphic concepts is developed through the use of lectures, computer modeling, outcrop exposures and is reinforced through subsurface exercises. Field observations and data sets drawn from a variety of subsurface examples are used to develop understanding of vertical facies relationships that can be used to predict subsurface reservoir architecture in a variety of basin settings. At the end of the course, participants will have an understanding of deltaic and fluvial facies and the nature of larger scale stratigraphic variations within these deposits. Participants will be able to use these facies relationships to understand stratal stacking patterns that can be used to estimate lateral extent of reservoir facies. Participants will learn a process of how to use subsurface data to gain an understanding of depositional systems and key sequence stratigraphic surfaces to assist in either exploration or production.

The field trip begins by looking at the sedimentological and stratigraphic aspects of the Panther Tongue and lower Blackhawk Formation exposures in the vicinity of Price, Utah. In this relatively high-accommodation setting, sequence boundary unconformities are not developed and marginal marine facies tracts are more fully preserved. The high-accommodation stratigraphy in the vicinity of Price is contrasted with observations from the stratigraphically younger Desert Member of the Blackhawk Formation and the Castlegate Sandstone in the vicinity of Green River, Utah. In these deposits, subsidence rates are diminished relative to those found near Price; resulting in progradation during

relative sea level fall which generated well developed sequence boundary unconformities. The stratal architecture of these deposits is dramatically different from the architecture associated with the more high-accommodation deposits near Price, Utah.

COMPLEX CARBONATE RESERVOIRS: SEDIMENTATION AND TECTONIC PROCESSES. THE IMPACT OF FACIES AND FRACTURES ON RESERVOIR PERFORMANCE

Leaders: *Raffaele Di Cuia, G.E. Plan Consulting, Ferrara, Italy; Davide Casabianca, TOTAL E&P UK Ltd., Aberdeen, UK*
Date: *October 1-7, 2016 (begins the early afternoon of Oct. 1 and finishes the late afternoon of October 7.)*
Location: *Begins in Naples and ends at Rome International Airport (Italy)*
Tuition: *$3,200 (increases to $3,400 on 8/19/2016); includes guidebooks, transportation expenses during the field seminar, all meals during the course. Does not include lodging. No refunds for cancellations after 8/19/2016.*
Limit: *15*
Content: *4.2 CEU*

Who Should Attend

Petroleum geologists, reservoir engineers and geophysicists working for the exploration, appraisal and development of carbonate reservoirs. Ideally the components of a subsurface team would greatly benefit from participating together.

Objectives

The field seminar aims to demonstrate how to adequately describe facies distribution and faults and fractures characteristics, within the relevant depositional and tectonic context. Outcrop data gathering will help participants to focus on the important aspects to consider when characterizing and modelling carbonate reservoirs. Uncertainty will be a central theme and scenario modelling will be advocated as a way of managing it.

By using the outcrops of the Apulian Carbonate Platform, data from equivalent reservoirs in the subsurface of southern Italy, and from carbonate reservoirs elsewhere, participants in this field seminar will be able to:

- Observe the structural organisation of the Southern Apennines geological units and infer the evolution of the thrust belt;
- Recognise facies types in the Apulian Rudist Carbonate platform and in the deeper water deposits resedimented into the adjacent basin areas;
- Understand the 3D organisation of sedimentary bodies from regional to reservoir scale;
- Understand the hierarchy, distribution and organisation of the fault and fracture networks and their consistency with the tectonic evolution of the region;
- Verify the relationships between sedimentary facies and fracture distribution ;
- Identify the main diagenetic processes that affected the platform and understand their impact on reservoir quality;
- Identify, describe and distribute reservoir porosity and permeability ensuing from sedimentary, diagenetic and tectonic processes;
- Understand the relationships between outcrop evidence (facies and structural analysis) and subsurface datasets (seismic, core, open hole logs, image logs, production logs and well tests) and discuss how to integrate both for reservoir description;
- Learn and compare methods for the description of reservoir uncertainty and understand the value of additional data acquisition for reducing these uncertainties in order to inform reservoir development and management decisions.

Content

This seminar will be like following the trajectory of a well drilled through the thrust belt to target a fractured carbonate reservoir. At the beginning, we will focus on the Allochthonous thrust sheets of the fold and thrust belt, in order to understand the regional geological and structural framework. We will then reach and observe the reservoir represented by the Cretaceous Apulian Platform Carbonates, which are currently being produced in the sub-surface of Southern Italy. The main part of the field seminar will focus on the description of the fractured carbonates and the extrapolation from the outcrop observations to the subsurface for building geologically plausible reservoir models.

The main advantage of using the example of the Southern Apennines is that we can run through the drilling trajectory of the hypothetical well, not o nly vertically (using subsurface data) but also horizontally by moving from west coast outcrops (Naples area) to the east coast outcrops (Apulia area). The final part of the field seminar, will be spent studying an exhumed anticline (in the Abruzzi region) where there are extensive outcrops of Apulian Carbonates equivalent to some of the major oil reservoirs exploited in Italy.

REGISTRATION FORM

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All credit card charges will be processed in U.S. dollars only. All checks must be made PAYABLE TO AAPG IN U.S. DOLLARS AND DRAWN ON A U.S. BANK. Checks made to the Education Department should be written to the AAPG EDUCATION DEPARTMENT.

Registration Policy for Schools, Short Courses and Field Seminars

Mail completed form with full tuition, or $50 deposit to cover processing fee, to the AAPG Education Department. Full tuition is due 4 weeks prior to commencement of course. Full tuition is due 6 weeks prior to all international courses.

Cancellation Policy for Schools, Short Courses and Field Seminars

AAPG will refund the tuition, less the processing fee of $50, if request is received no later than 4 weeks prior to the course. Cancellations for international courses must be received no later than 6 weeks prior to the course. Cancellation must be made in writing; the registrar will accept cancellation notices by telephone, telex or fax, but all such notices must be followed up by mail. No refund will be made for cancellations received less than 4 weeks (6 weeks on international courses) prior to a course being given. Nonpayment of tuition does not constitute automatic cancellation. If no cancellation notice is received by 4 weeks prior (6 weeks on international courses) to course, participant is liable for full tuition. AAPG reserves the right to cancel a course if enrollment is insufficient to ensure proper effectiveness; in such cases, full refunds will be given. Substitutions for individuals can be made at any time. A paid enrollment may be transferred one time to a future course if the request is received prior to the 4 or 6 week cut-off period.

Complete and return the form with tuition to:
AAPG Education Department, P.O. Box 979,
Tulsa, Oklahoma 74101-0979 | Phone 918-560-9430
Fax 918-560-2678 | Email: educate@aapg.org

Release and Indemnity Agreement

I, _____, in consideration of the receipt by me of permission from the American Association of Petroleum Geologists ("AAPG") to participate in a Field Seminar entitled _____to be conducted on _____, 2016, and sponsored by AAPG, the receipt of such permission being hereby acknowledged, and being fully aware that the Field Seminar may involve hazardous and/or dangerous activities, and/or being in and/or around other hazardous and dangerous conditions, and recognizing and accepting the risks, known and unknown, involved in a Field Seminar, hereby release and will indemnify, defend and hold harmless AAPG, the agents, officers, servants, and employees of AAPG, and the leader or leaders of the Field Seminar (collectively "indemnitees") of and from any and all liabilities, claims, demands, actions, and causes of action whatsoever arising out of or relating to any loss, damage, or injury, including death, as may be sustained by me, and to any loss, damage, or injury to any property of mine, while involved in any way with the Field Seminar, including without limitation traveling to and from the site or sites of the Field Seminar (whether by air, water, or land transportation) and at and during all stops and layovers during the Field Seminar. This release and indemnity includes without limitation liabilities, claims, demands, actions, and causes of action to or by third parties as well as to or by me. This release and indemnity includes without limitation liabilities, claims, demand, actions, and causes of action arising out of or relating to any loss, damage, or injury caused in any way by the concurrent or contributory negligence of any indemnitee.

This release and indemnity includes without limitation liabilities, claims, demands, actions, and causes of action arising out of or relating to any loss, damage, or injury caused in any way by the sole negligence of any indemnitee. Having made all inquiries deemed by me to be appropriate, I hereby voluntarily assume all risks of loss, damage, or injury, including death, as may be sustained by me or any property of mine while involved in any way the Field Seminar.

In the event the release by me of any indemnitee of any liability, claim, demand, action, or cause of action described herein is determined to be invalid or unenforceable, I agree that my total recovery of damages from the indemnitees, or any of them, both actual and punitive, shall be limited to $100.00 or the cost of admission to the Field Seminar, whichever is less.

In the event any provision of this Release and Indemnity Agreement is determined to be invalid or unenforceable, all other provision hereof shall continue to be enforceable and shall be interpreted as though said invalid provision had never been contained herein.

This release shall be binding upon my distributes, heirs, next of kin, executors, administrators, and personal representatives.

IN SIGNING THIS RELEASE AND INDEMNITY AGREEMENT, I HEREBY ACKNOWLEDGE AND REPRESENT THAT I HAVE READ THE FOREGOING RELEASE AND INDEMNITY AGREEMENT, UNDERSTAND IT, AND I HAVE SIGNED IT VOLUNTARILY. I UNDERSTAND AND AGREE THAT I WOULD NOT BE ALLOWED TO PARTICIPATE IN THE FIELD SEMINAR IF THIS RELEASE AND INDEMNITY AGREEMENT WERE NOT SIGNED AND AGREED TO BY ME, AND THAT THE AGREEMENT BY ME TO THE TERMS AND CONDITIONS OF THIS RELEASE AND INDEMNITY AGREEMENT IS AN ESSENTIAL PART OF THE CONSIDERATION FROM ME FOR ME TO BE ALLOWED TO PARTICIPATE IN THE FIELD SEMINAR.

_____
Signature Date

_____
Name Printed

REGISTRATION AND CANCELLATION POLICIES

Registration Policy

For Schools, Short Courses, and Field Seminars: Mail completed form with full tuition, or $50 deposit to cover processing fee, to the AAPG Education department. Full tuition is due 4 weeks prior to commencement of course. Full tuition is due 6 weeks prior to all international courses. No photographing or recording of sessions will be permitted. Unless otherwise noted, tuitions are shown in U.S. dollars.

Canada

Canadian Government regulations require that participants who attend AAPG courses in Canada pay 7% Goods and Service Tax (GST). This has been included in the tuitions.

Cancellation Policy

AAPG will refund the tuition, less the processing fee of $50, if request is received no later than 4 weeks prior to the course. Cancellation requests for international courses must be made no later than 6 weeks prior to the course. Cancellation must be made in writing; the registrar will accept cancellation notices by telephone, or fax, but all such notices must be followed up by mail. No refund will be made for cancellations received less than 4 weeks (or 6 weeks on international courses) prior to a course being given. Nonpayment of tuition does not constitute cancellation. If no cancellation notice is received by 4 weeks (or 6 weeks on international courses) prior to course, participant is liable for full tuition. AAPG reserves the right to cancel a course if enrollment is insufficient to ensure proper effectiveness; in such cases, full refunds will be given. Substitutions for individuals can be made at any time. A paid enrollment may be transferred one time to a future course if the request is received prior to the 4 or 6 week cut-off period.

U.S. Tax Deduction

The general rule is that a taxpayer can deduct, as ordinary and necessary business expenses, expenses of education undertaken for the purpose of:

1. Maintaining or improving skills required in his employment or other trade or business,

or

2. Meeting the express requirements of his employer, or the requirement of applicable law or regulations imposed as a condition to the retention

by the taxpayer of an established employment relationship, status, or rate of compensation.

Check with your tax advisor for further information.

Please register early, as some classes fill up quickly. Please check with the AAPG Education Department for availability of openings if less than 30 days prior to the start of the course in which you're interested. Positions in the course cannot be guaranteed until the $50 deposit has been received.

The American Association of Petroleum Geologists (AAPG) does not endorse or recommend any products or services that may be cited, used or discussed in AAPG publications or in presentations at events associated with AAPG.

Please Note: Registrants in AAPG Field Seminars must complete and sign the Release and Indemnity Form included on the Registration Form. Your registration will not be complete until we have your signed form in our files.

JOIN TODAY

Save hundreds of dollars on many short courses with an AAPG member discount. For more information, visit our website at www.aapg.org

Join the AAPG and receive discounts on many of the courses, trips, books, publications, and products featured in this catalog. Just call 1-800-364-AAPG or 918-584-2555 and ask for an easy to complete form. Associate memberships are hassle-free to our friends at SEG and SPE. Membership forms can also be found on the AAPG website.

BENEFITS

- The largest circulation journal in earth sciences, AAPG Bulletin (in print or online & CD).
- FREE member access to complete AAPG Bulletin archives (1917 to present).***
- Receive news you can really use each and every month — the AAPG Explorer.
- Participate in AAPG education forums & mentoring programs.
- Use AAPG Foundation Energy Resources Library and AAPG Foundation Grants-in-Aid Program.
- Save on registration at conferences, exhibitions, courses and our world-renowned field trips.
- Take advantage of AAPG GeoCare Insurance.

MEMBERSHIP

MEMBER	**$105.00***
ASSOCIATE	**$105.00***
STUDENT	**$10.00****

* Add $20 if you live outside North America
** Add $10 if you live outside North America
*** Student members receive online access to the past 3 years of Bulletins.

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LOOKING TO THE FUTURE

AAPG EDUCATION WILL BE ADDING SEVERAL MORE PROGRAMS IN 2016 AND BEYOND!

Hedberg Conferences
- The Future of Basin and Petroleum Systems Modeling

Online courses
- More Certificate Courses
- More live E-Symposia

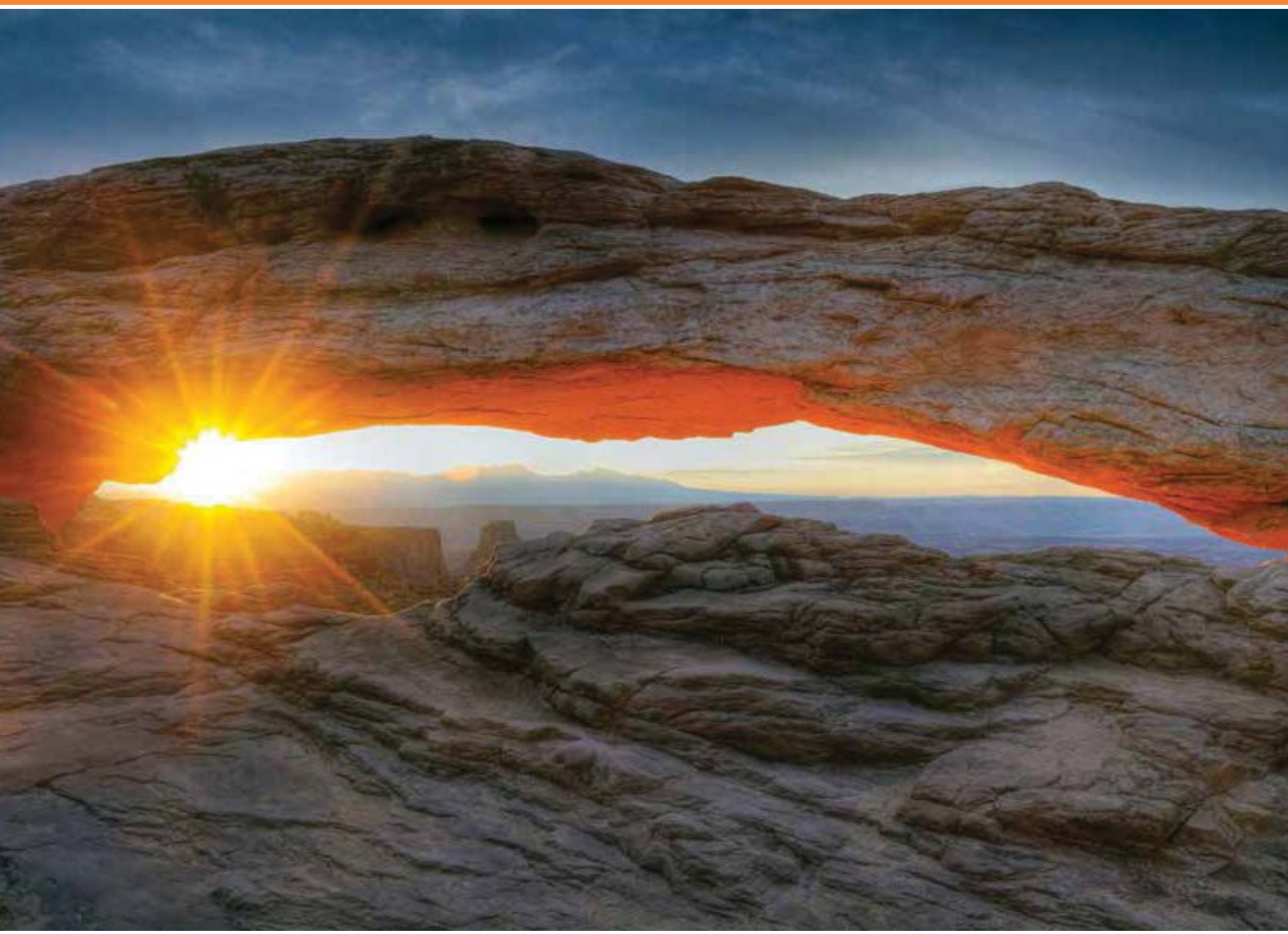
Geosciences Technology Workshops
- Deepwater and Shelf Reservoirs
- Revitalizing Reservoirs
- More to come

Forums
- Playmaker
- More to come

Stay tuned and keep checking the AAPG website for updates.

www.aapg.org/career/training

www.AAPG.ORG/CAREER/TRAINING



AAPG

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