1984 PUBLIC SHORT COURSE CATALOG

GEOLOGY

EXPLORATION

ECONOMICS

GEOPHYSICS

PRODUCTION

COMPUTERS

ENGINEERING

TRAINING

MANAGEMENT

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International Human Resources Development Corporation

International Human Resources Development Corporation (IHRDC) is a full-service training, publishing, and video programming company which offers a wide range of products and services for the international petroleum industry: public and private courses, institutes, books, manpower development services, special training and attachment programs, as well as video-based instructional materials.

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In 1984 IHRDC continues its tradition of providing practical and innovative short courses to meet the ongoing training needs of the international petroleum industry. In addition to our programs in petroleum geology, geophysics, engineering, and management, IHRDC's 1984 Public Short Course Series includes newly developed programs and formats to reflect the changing training needs in the petroleum industry. We are pleased to introduce shorter short courses, practical workshops, programs in state-of-the-art technology, petroleum economics, materials management and personal computers, as well as expanded international course locations.

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IHRDC is pleased to continue in 1984 to offer our clients effective answers to the petroleum industry's diverse training needs.

Exploration

Practical Seismic Interpretation: A Workshop Course

Dr. Michael E. Badley
Badley, Ashton & Associates Limited
England

New Orleans/March 12–16/$900
Denver/March 19–23/$900
Oslo/May 7–11/$900
London/July 9–13/$900
Jakarta/September 17–21/$900
Sydney/September 24–28/$900
Houston/October 22–26/$900
Calgary/October 29–November 2/$900

Designed in response to the need for a course that emphasizes the essential techniques used in the everyday work of the seismic interpreter, this five-day course centers around the actual interpretation of a grid of modern high quality seismic data made available by Merlin Geophysical. The course emphasizes the practical aspects of interpretation, and draws on many excellent examples present in the seismic data to illustrate each topic or technique. This program begins with a lecture on the techniques of everyday seismic interpretation, followed by a series of work sessions progressing through the interpretation step by step. Each session is introduced by a short talk outlining the topic or problem to be studied and recommended interpretation techniques. The work sessions are accompanied by questions both to help comprehension of the problem and to help guide the interpretation. Documented handouts are distributed at the end of each work session. The course is suitable both for those new to interpretation and also for those with some interpretation experience, as the work sessions and questions are designed to cater to differing levels of experience.

Contents

Seismic stratigraphy—relationship of seismic reflections to physical stratigraphy and geological time; classic seismic reflector relationships—onlap, truncation, clinoforms, mounds, etc. Interpreting depositional environments, deep sea facies, shallower-water prograding units; internal structure and seismic facies relationships, Interpretating sandstone, shale and carbonate-prone areas from reflection patterns and configurations. Tectonics—including rotational faulting; examples of rift, early post-rift and post-rift tectonics. Unconformity relationships to tectonics; paleosubmarine canyons, large scale slumps, igneous intrusions, etc. Interpretation techniques—data organization, starting the interpretation, understanding and implication of the section labels, evaluation of data quality; multiple recognition, selection of reflections, well-to-seismic tie, seismic stratigraphy in its broadest sense, subcrop mapping, character correlation, fault analysis, interpretation in less favourable data areas■

Seismic Data Processing for Interpreters

NEW

Ray L. Sengbush
Consultant
Houston, Texas

Calgary/March 28–30/$715
London/April 25–27/$775
Houston/June 4–6/$715
Oslo/September 19–21/$775

This three-day course presents the fundamentals of seismic data processing that are important to interpreters, so that they will better understand how processing enhances the data. Also it points out the deleterious effects of improper processing. Although assigned primarily for interpreters, a wide variety of personnel should benefit from the course, including geologists and managers, as well as acquisition and processing geophysicists.

Contents

Review of Mathematical Models of the Seismic Method:
- Wave Equation: Wave types; velocities and particle motions; reflection and transmission coefficients in layered media, reflectivity and transmissitivity in continuous media
- Geometric Model: Ray paths and wave fronts; Snell's law; critical angles; P-S converted waves
- Filter Theory: Acoustic impedance and reflectivity; seismic sources; minimum phase property

Review of Data Acquisition:
- Importance of good data to the processor; random noise and its suppression with multiplicity of elements; coherent noise and its suppression with patterns; examples of noise reduction; CDP methods; wide angle sources; sampling theory; aliasing

Digital Processing:
- Static corrections, automatic and manual; Normal moveout correction and velocity estimation;
- Stacking and f-k filtering to suppress multiples and improve signal-to-noise ratio;
- Deconvolution, spiking and predictive methods, minimum phase assumption and consequences of non-minimum phase data, signature deconvolution, wavelet processing;
- Migration, Hagedoorn, summation and wave equation methods, 3-d migration;
- Information-preserving processing, true amplitude and bandwidth preservation■

Introduction to Seismic Interpretation

Dr. Robert E. Sheriff
Professor of Geophysics
University of Houston

Calgary/January 23–25/$715
Houston/May 7–9/$715
London/June 11–13/$775
Denver/September 24–26/$715
Houston/November 12–14/$715

This three-day course provides a non-mathematical explanation of the methods whereby geological information is extracted from seismic data. As such it is recommended for geologists, geophysicists with less than a year of interpretation experience, processors, and geological geophysical technicians. While the emphasis of the course will be on the interpretation of geological structural features, some stratigraphic interpretation will also be included. Workshop exercises including interpretation of actual seismic sections and a simple mapping project will be utilized.

Contents

Relation of a seismic section to a geologic section; how to read a seismic record label and seismic section; relating well data to seismic data; deducing geological history from seismic evidences; influence of processing and displays; migrating data; use of structural style in interpretation; evidences of faulting, folding, unconformities, reefs, etc.; three-dimensional methods; velocity effects and velocity anomalies; pitfalls in interpretation; introduction to seismic stratigraphy, velocity significance, and resolution limitations■

Seismic Stratigraphy

Dr. Robert E. Sheriff
Professor of Geophysics
University of Houston

Calgary/January 25–27/$715
Houston/May 9–11/$715
London/June 13–15/$775
Denver/September 26–28/$715
Houston/November 14–16/$715

Stratigraphic concepts play an important role in tying various types of evidences together in a consistent, satisfactory interpretation. This three-day course is designed for geologists and geophysicists who wish to understand what kinds of stratigraphic information can be derived from seismic data, and the techniques for doing so. The applications of seismic stratigraphy will be illustrated by case histories.

Contents

Introduction:
- seismic features with stratigraphic implications; processing for stratigraphic interpretation; velocity significance and resolution limitations

Seismic sequence and facies analysis:
- time significance of reflections; techniques to identify depositional environment; clastic units; reefs

Reflection character analysis:
- stratigraphic modeling; use of synthetic seismograms and seismic logs (inversion); complex trace analysis; hydrocarbon indicators■

Enroll in Both Courses

Introduction to Seismic Interpretation and **Seismic Stratigraphy** are combined in a five-day presentation, the third day containing material that is common to both courses.

Calgary/January 23–27/$850
Houston/May 7–11/$850
London/June 11–15/$875
Denver/September 24–28/$850
Houston/November 12–16/$850

Exploration

Stratigraphic and Direct Detection Methods

Ray L. Sengbush
Consultant
Houston, Texas

Houston/February 15–17/$715

Calgary/April 2–4/$715

London/April 30–May 2/$775

Oslo/September 24–26/$775

This course is designed to develop the techniques for stratigraphic exploration and that significant subclass known as direct detection of hydrocarbons. Emphasis is placed on the role of the three types of mathematical models, wave equation, ray path and convolutional, in understanding the capabilities and limitations of the seismic method, and the comparison of models with real data to help in stratigraphic prediction and hydrocarbon content. The course is aimed at interpreters, geologists and managers, and is useful to acquisition and processing geophysicists.

Contents

Mathematical models:
- wave equation, ray path and convolutional

Data acquisition:
- requirement of best possible data, good instruments, good field procedures

Data processing:
- preservation of bandwidth and amplitude

Direct detection method:
- the diagnostics: bright spots, dim spots, flat events, diffractions and interference at the edge of reservoirs, absorption and time sag; theoretical velocity and density calculations; the pitfalls: low saturated reservoirs, thin reservoirs, hard streaks, salt and intrusive stringers; model studies, case histories

Stratigraphic traps:
- pinchouts, reefs, wedge outs

Special processing techniques:
- wavelet processing, signature deconvolution, inversion of seismic trace for impedance estimation■

3-D Seismics

Dr. Gerald H.F. Gardner
Co-Director
Allied Geophysical Laboratories
University of Houston

Dr. John A. McDonald
Co-Director
Allied Geophysical Laboratories
University of Houston

Calgary/April 25–27/$715

Oslo/October 24–26/$715

This three-day course presents the basic physical background for evaluating and using 3-D methods in practice. It is not heavy on theory, yet gives an adequate explanation of what is done and why. Classroom work sessions give the participants first-hand experience with the interpretation of 3-D surveys. It is anticipated that the audience may include geologists and managers, as well as geophysicists.

Contents

Overview of 3-D seismic methods:
- what it is and what it does; how costs are being reduced: acquisition; processing, interpretation; costs for some land and marine surveys; work sessions for practical experience

Forward modeling of 3-D effects:
- why use numerical and physical models; basic concepts in modeling; effect of density and velocity contrasts; wave-equation consistent methods; ray-path methods; modeling geologic features: gas caps, lithographic changes, abnormal fluid pressures, faults; computer programs to simulate profiles over 3-D geology; model examples: side-swipe, interference, statics, noise; sign-bit data

3-D processing:
- basic concepts; wave-equation consistent methods; ray-path methods; generating a CDP line free from side-swipe; generating a true vertical cross section; generating a true horizontal cross section; inverting a regular grid; first arrivals—refraction statics; measuring parameters: velocity, cross-dip angles, density; wide-line and crooked-line processing; displacing 3-D data: amplitude, phase, power, frequency, spectral ratios, pseudo-color images, 3-color images, contour maps, seis-crop movies, holography, interactive graphics; processing sign-bit data

Field procedures, interpretation, and case histories:
- pre-plots of proposed survey; field surveying; preliminary field tests; field parameters: spacing, orientation, area, group and source arrays, fold; recording methods and collecting sign-bit data; statics, multiples and deconvolution; land and marine case histories; objective, method, results and cost; new directions: shear waves, attenuation, interactive processing, event flattening, 3-D viewers■

Deconvolution

Dr. Anton Ziolkowski
Professor of Geophysics
Delft University of Technology
The Netherlands

London/June 11–13/$650

Los Angeles/August 6–8/$600

This intensive course is designed to present the processing and interpretation geophysicist with the physical concepts behind the mathematical process of deconvolution. Emphasis is placed on the relation between the assumptions which are made for mathematical convenience and the consequent limitations which must be placed on the interpretation of the data for lateral variations in lithology. The course is aimed at geophysicists with at least one year's experience in the processing of seismic data and who have a strong background in mathematics and physics. A good working knowledge of Fourier transforms and z-transforms is essential.

Contents

The one-dimensional convolutional models:
- the plane wave model; the point source model; the problem of reconciling well-logs with seismograms; source and receiver arrays and their constraints on the validity of the models; spherical divergence and distortion of the wavelet

The minimum-phase wavelet in relation to:
- its z-transform; the causality of its inverse; its phase spectrum; its energy distribution; its Wiener inverse

The Wiener prediction filter and prediction-error filter:
- their relation to the concept of minimum-phase.

Deconvolution of multiples, bubble-pulses (and primaries); the problems of estimating and interpreting the auto-correlation function

Signature Deconvolution before stack and after stack; zero-phase versus minimum-phase; the distortion introduced by the normal moveout correction

Extraction of the signature from the data:
- a critical appraisal of some commonly-used methods

Frequency-domain deconvolution; extension of the method to 2 and 3 dimensions; geological constraints on the validity of the 2-D and 3-D convolutional models

The problem of phase error in the interpretation of lithology■

Vertical Seismic Profiling

Dr. Alfred H. Balch
Senior Research Associate
Mobil Research and Development
Dallas, Texas

Dallas/February 27–29/$715

London/September 10–12/$775

Vertical seismic profiling (VSP) is an important geophysical technique that has significant new applications in petroleum exploration and development. This three-day course covers the areas of acquisition, processing and applications of the method to specific subsurface geologic problems. As such, it is designed to be of interest to both explorationists and production personnel.

Contents

VSP method:
- description; advantages; limitations; cost; future development and applications

VSP field procedures:
- seismic sources and their adaptations to VSP; field configurations; instruments; operational problems

Borehole seismology:
- casing; coupling; sources; tube waves; kinematics; three-component data; borehole orientation; domain consideration

Processing of VSP data

Interpretation of vertical seismic profiles

VSP applications and case histories■

Exploration

Seismic Data Acquisition for the Practicing Explorationist

Dr. Nabil A. Morgan
Area Geophysicist
Geophysical Service International
Bedford, England

London/April 30–May 2/$775

This three-day comprehensive course is designed to acquaint explorationists with major aspects of seismic field activities. Although intended for data acquisition explorationists who wish to improve their understanding in their own field, the course is of special interest and is strongly recommended to explorationists who will process the acquired data, the interpreters who analyze the processed data and the managers responsible for the overall control of the seismic exploration program.

Contents

The seismic wave:
radiation; transmission and attenuation; a review
The seismic wave generators:
land and marine
The seismic recording equipment:
receiver and cables; recording instruments
Field parameter estimation:
multiple receiver concept; noise analysis; optimum field parameters
Field techniques:
refraction shooting; well shooting; two-and-three-dimensional reflection shooting
Misconceptions in seismic data acquisition
The future■

The Seismic Source

NEW

Dr. Anton Ziolkowski
Professor of Geophysics
Delft University of Technology
The Netherlands

London/June 13–15/$650

Los Angeles/August 8–10/$600

Modern seismic sources such as Vibroseis®, air guns, water guns and steam guns generate complicated seismic wavefields which must be accurately known if maximum resolution is to be obtained from the data in processing. Determination of the full source wavefield is sometimes possible, but current methods of source control are usually inadequate to permit the source wavefield to be determined accurately. Also current methods of data processing are unable to take account of the full source wavefield. To obtain maximum resolution, therefore, both source control and current methods of data processing must be improved. This intensive course is designed to bridge a gap between the practicing acquisition and processing geophysicist, by providing a sound physical understanding of the processes by which seismic sources generate sound waves.

Contents

Basic physical concepts
The linear acoustic wave equation; relationship between the pressure and particle velocity fields; source directivity as a function of source size and bandwidth; point sources and arrays; the "near field" and "far field" of a source
The single point source
the problem of nonlinearity in the vicinity of the source; the behavior of the oscillating bubble of an air gun; extension of the principles to dynamite, water guns, steam guns and Vibroseis®; measurement of the wavefield
Source arrays
design of arrays (a) for signal-to-noise bandwidth and (b) to minimize shot-generated noise; effect of source ghost; measurement of the wavefield; the problems posed by (a) shallow water and (b) interaction between elements of a source array
The full wavefield of a marine seismic source array—3 solutions
(1) Solution of the interaction problem via pressure measurements in the linear near field; (2) elimination of interaction by temporal and spatial separation of source elements; determination of wavefield directly from pressure measurements in the linear near field; (3) alternate firing of 2 scaled arrays■

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New Technologies in Exploration Geophysics

H. Roice Nelson, Jr.
Sr. Vice President of Operations
Landmark Graphics Corp.
Houston

Houston/March 21–23/$715

Calgary/May 2–4/$715

London/June 25–27/$775

Denver/September 5–7/$715

New technologies used in exploration seismology are examined in this three-day course. Today, the search for oil and gas requires explorationists to look for smaller and more complex fields. The most modern techniques and tools are required to find these small plays. Often new discoveries are structurally or stratigraphically separated from previous finds already in production. The course is specifically designed for exploration managers who want to remain aware of the expanding technologies in exploration seismology. The new developments are mostly based on new computer and graphics technology. For example, new computer developments are described ranging from micros to supercomputers. Sections of the course will describe how technology evolution is influencing seismic data acquisition and processing, as well as non-seismic techniques. However, the main emphasis is on how these developments are changing seismic interpretation. New geophysicists or experienced explorationists that have felt isolated from new technologies will find the course provides a comprehensive overview of the developments most expected to affect their careers over the next decade.

Contents

Trends in multi-channel seismic recording systems; three-dimensional seismic techniques; vector computers in seismic data processing; seismic modeling techniques; computer graphics for display of geophysical data; true three-dimensional display devices; interactive interpretation techniques in seismology; satellite transmission and data base management; hands-on training of explorationists in these new technologies■

Seismic Noise: Its Recognition, Detection, Evaluation and Elimination

NEW

Dr. John A. McDonald
Co-Director
Allied Geophysical Laboratories
University of Houston

Houston/February 8–10/$715

Calgary/March 14–16/$715

London/July 18–20/$775

The seismic reflection method represents the quintessential geophysical means of searching for hydrocarbons. Modern developments such as areal or three-dimensional methods have added another dimension to this technique. But there is little appreciation of the unwanted portions of the seismic signal—noise. Noise is here defined as anything that distorts the wanted part of the seismic trace, the seismic wavelet. In this course we will illustrate the effect that noise has on all aspects of the seismic reflections, namely, acquisition, processing and interpretation. We will show how an appreciation of the deleterious effects of noise can be used to improve the seismic image. The course is aimed at the practicing professional and not at the post-graduate theoretician. Those with some appreciation of the problems caused would benefit most. This includes seismic crew party chiefs, processing geophysicists, interpreters, those involved in designing seismic data acquisition and processing schemes, etc.

Contents

Basic math; basic geology; rays and waves; positioning of sampling; seismic method; CDP; areal; source problems; land; marine; transmission problems; receiver problems; land; marine; instrument problems; noise reduction: @ source, @ receiver; arrays; transducer coupling; processing; filtering; deconvolution; workshops■

Exploration

Introduction to Petroleum Geology

Dr. Richard C. Selley
Consulting Geologist
London

Houston/March 12–14/$715

London/September 3–5/$775

This three-day course, designed for geophysicists and petroleum engineers, gives a concise outline of the factors which control the generation, migration, and entrapment of oil and gas and discusses geological methods of hydrocarbon exploration.

Contents

Introduction and objectives:
- the physical and chemical properties of hydrocarbons, their distribution in the earth's crust; basic requirements for generation

Hydrocarbon source rocks:
- clays and their contained organic matter; the generation, migration, and maturation of hydrocarbons; paleothermometers

Introduction to geophysical well logs:
- electric, acoustic, and radioactive logs; their uses in porosity and rock identification, fluid determination and correlation

Reservoir rocks:
- porosity and permeability and their relationship to rock texture; composition, deposition, and diagenesis of sandstone and carbonate reservoirs

Hydrocarbon traps:
- a review of the basic types of structural, stratigraphic, hydrodynamic, diagenetic, and combination traps with case histories

Sedimentary basins:
- their genesis and classification in the light of plate tectonics theory; the hydrocarbon potential of different basin types■

NEW

Practical Prospect Generation and Analysis: A Workshop Course

David C. Morrill
Partner, Donohue Anstey & Morrill
Boston

New Orleans/November 5–9/$850

This course, primarily in the form of workshop exercises, covers the practical aspects of prospect generation and as such is designed for junior geologists and geophysicists. It is also of interest to individuals who seek an understanding of updated exploration techniques as well as the cooperative effort now required between geologists and geophysicists in the search for the subtle trap. The half-day long review of fundamentals has been included for geophysicists who may require an update in petroleum geology.

Contents

Review of petroleum geology fundamentals:
- the subsurface environment: heat, pressure, and fluids; physical and chemical properties of petroleum; generation and migration of petroleum; reservoir rocks: porosity, permeability, and effects of diagenesis; the trap

Prospect generation in frontier areas:
- sedimentary basins: origin, classification, and hydrocarbon potential; exploration tools, their application and interpretation; planning and executing programs; determination of petroleum geology and estimation of hydrocarbon potential; recognizing potential prospects from the obvious structure to the subtle trap; use of analogs; application of seismic stratigraphy; appraising nontechnical factors; reserve estimation and economic analysis; examples of recent ventures

Workshop:
- Students are asked to generate a variety of prospects using data from an actual frontier area. The exercise centers on a grid of modern high resolution seismic data and emphasizes the search for less obvious traps, such as stratigraphic and unconformity related accumulations.

Prospect generation in mature producing areas:
- identification of defined ploys within geological trends; exploration tools: geological, geophysical, and geochemical; recognition of anomalies and search for the subtle trap; reserve estimation and economic analysis; examples of recent ventures

Workshop:
- Students are asked to generate prospects using data, primarily well logs, from a variety of geological habitats within mature regions. Actual prospects have been generated from this data, most of which have subsequently been drilled. Results of this actual drilling will be analyzed■

NEW

The Exploration and Development of Sandstone Reservoirs

Dr. Robert M. Sneider
President, Robert M. Sneider Exploration, Inc.
Houston, Texas

Singapore/March 12–16/$900

Calgary/April 30–May 4/$825

London/August 27–31/$875

Houston/September 10–14/$825

This five-day course is designed for explorationists and development geologists involved in the exploration for and development of hydrocarbons in sandstone deposits. The course will synthesize concepts, techniques, and knowledge from studies of modern and ancient systems and case histories of plays and fields to illustrate methodologies useful to locate, delineate and develop hydrocarbon accumulations. Practical exercises and problem-solving are emphasized throughout the course. Seismic stratigraphy and mappability of sand bodies and the value of integrated geological-geophysical-engineering studies are reviewed.

Contents:

Fundamentals:
- composition, texture, sedimentary structures; initial pore space, pore fluid distribution; clays and their effect on well logs, fluid-flow and completions

Tools, techniques and measurements useful for exploration and development:
- cores, samples, and cuttings; paleo; wireline log response; DST and production tests; seismic geometry and stratigraphy; hydrocarbon geochemistry

Concepts and methodology:
- basin analysis, mapping consideration, differential compaction, genetic stratigraphy, diagenesis

Depositional systems, patterns, and trends:
- lateral and vertical facies and vertical sequences of reservoirs in alluvial fans and channels, aeolian, coastal beach-barrier, marine bars and sheets, deltas, transgressive, deep-water fan and turbidite deposits

Trap types and geometries:

Sandstone plays, fairways and fields:
- examples and case histories from frontier and mature basins illustrating trap styles; prediction of reservoir, seal, source rock distribution; trend and play recognition and prediction; reservoir delineation and characterization

Exploration and development strategies:
- fairway and prospect delineation; primary development; supplemental recovery and reservoir description; fluid-flow barriers; the value of integrated geological-geophysical-engineering studies■

NEW

The Exploration and Development of Carbonate Reservoirs

Dr. Robert M. Sneider
President, Robert M. Sneider Exploration, Inc.
Houston, Texas

Dr. Harry H. Roberts
Louisiana State University
Baton Rouge, LA

Houston/April 9–13/$825

This five-day course combines concepts and knowledge from modern and ancient carbonates that are useful in locating, defining and developing hydrocarbon accumulations within limestone and dolomite deposits. The course is designed for exploration and development geologists and geophysicists, and emphasizes practical problem-solving and field case histories to illustrate trap styles and exploration and development techniques. Seismic mappability and the value of integrated geological-geophysical-engineering studies are reviewed.

Contents:

Carbonate sediments and rocks:
- classification and terminology; source of sediments; early diagenesis

Tools, techniques and measurements useful for exploration and development:
- cores, samples, and cuttings; paleo; wireline log response; DST and production tests; seismic geometry and stratigraphy

Carbonate rocks as reservoirs, seals and hydrocarbon sources:
- pore space; capillary and petrophysical properties; pore-fluid distribution; hydrocarbon geochemistry

Carbonate depositional patterns and trends:
- lateral and vertical facies; vertical cycles and cyclic sedimentation; shoreline, ramp, shelf margin, buildups, deep ocean basin

Diagenetic modifications and patterns:
- early and late processes; pore space enhancement by leaching, dolomitization, and fracturing; pore space reduction by cementation and compaction

Carbonate plays, fairways and fields:
- tidal flats, high-energy shoreline and shoals, patch and pinnacle reefs, platform, shelf margins, turbidites, chalks, fractured rocks

Exploration and development strategies:
- fairway and prospect delineation; primary development; supplemental recovery and reservoir description; fluid-flow barriers; the value of integrated geological-geophysical-engineering studies■

Exploration

Subsurface Facies Analysis

Dr. Richard C. Selley
Consulting Geologist
London

Houston/March 5–9/$825

London/July 9–13/$875

This five-day course is designed to show how subsurface facies analysis may be used to find oil and gas fields and to aid their development drilling. Lectures, discussions, and workshop sessions cover the analysis and interpretation of well logs and other data. This course is directed primarily towards exploration and production geologists and is also recommended to petroleum engineers and geophysicists who have geological backgrounds.

Contents

Introduction:
- concepts of environments, facies and sedimentary models; methods of subsurface facies analysis; the uses of cuttings, cores, and wireline log (including the dipmeter); integration with seismic stratigraphy

Continental deposits:
- fluvial (braided and meander channel) and eolian systems; processes and modern examples; ancient case histories; subsurface diagnosis; significance to petroleum exploration and development

Deltas:
- processes and modern examples; ancient case histories and subsurface diagnosis; petroleum geology of deltas

Barrier island and shelf deposits:
- both carbonate (including reefs) and terrigenous; processes and modern examples; ancient case histories; subsurface facies analysis; petroleum geology

Deep water deposits:
- submarine channels and fans; processes; modern examples; ancient case histories; subsurface diagnosis and petroleum geology■

Practical Subsurface Geological Analysis Using Well Logs

David C. Morrill
Partner
Donohue Anstey & Morrill
Boston

Hans J. Meyer
Training Manager
Festo

London/October 8–12/$875

This five-day course goes beyond the traditional use of well logs for such purposes as correlation and formation evaluation by discussing their equally valuable use as direct indicators of structure, sedimentary processes, lithology, mineralogy, grain size, fracture porosity and pore pressure. As such, the course is designed primarily for beginning geologists or for more experienced geologists who have had limited experience in the analysis of well logs. The course is also recommended for geophysicists and petroleum engineers who have had some previous geological training.

Contents

Use of the dipmeter as a structural mapping tool:
- principles of the continuous dipmeter; modern dipmeter computation programs; interpreting dipmeter data; exercises—using dipmeter data and base maps, participants will make structural interpretations and predict locations for optimum drilling sites

Interpretation of subsurface clastic depositional environments from wireline logs:
- review of clastic depositional environments; use of SP and gamma ray logs and of the continuous dipmeter in subsurface facies analysis; important clastic reservoir deposits—their characteristic SP/gamma ray profile and dipmeter patterns; principle of electrofacies; exercises—using logs, base maps, and sections across common environmental facies to make facies identifications, draw lateral extensions and relationships between wells, and predict sandstone depositional trends

Use of wireline logs in analysis of lithology and mineralogy:
- review of the principle of logs as modern lithological tools; the use of crossplots in lithology and mineral determination; exercises—participants will be given log data and asked to determine correct lithologies.

Detection of abnormally high subsurface pressures:
- cause of abnormally high pressures; wireline log methods

Detection of fracture porosity:
- review of geological aspects of fracture porosity—nature and causes, direct detection techniques, exploration methods; well log detection of fracture porosity—general considerations, logging methods

Applications and examples

Exercises■

NEW

Organic Geochemistry for Petroleum Explorationists

Dr. Douglas W. Waples
Geochemical Consultant
Dallas, Texas

Jakarta/March 26–30/$875

San Antonio/May 14–18/$825

London/June 4–8/$875

Calgary/September 10–14/$825

Houston/October 29–November 2/$825

Organic geochemistry is an effective means for high-grading areas deserving of intense hydrocarbon exploration. This course is designed to introduce petroleum geologists, geophysicists, exploration managers, and research geologists to organic geochemistry as it is applied in exploration settings. No previous knowledge of organic chemistry is assumed. Participants will learn the factors which promote deposition of good source beds, the techniques used to analyze source rocks and oils, interpretation of analytical data, and methods for predicting organic maturity and source-rock distribution in untested areas. Case studies illustrating the successful application of organic geochemistry in solving exploration problems will be presented. Hands-on exercises and an exploration game form an integral part of the course.

Contents

Origin of fossil fuels; factors influencing source-rock deposition; kerogen: formation, composition, and conversion to hydrocarbons; thermal models for hydrocarbon formation, including practice exercises; bitumen and petroleum: formation, composition, and transformations; migration of hydrocarbons; analytical techniques for kerogen, bitumen, petroleum, and natural gas; source rock evaluation and data interpretation, including practice exercises; correlation techniques: oil/oil and oil/source rock, including practice exercises and case studies; hydrocarbon exploration game, a group exercise occurring concurrently with the class, and emphasizing application in an exploration context of the principles introduced throughout the course■

NEW

Carbonates and Evaporites

Dr. John K. Warren
Assistant Professor
University of Texas at Austin

Bahrain/May 14–18/$875

London/June 18–22/$875

Houston/October 1–5/$825

Adelaide/December 10–14/$900

This course covers both modern and ancient carbonate and evaporite depositional systems. It is intended to give geologists and geophysicists a better understanding of the importance of carbonates and evaporates in terms of their hydrocarbon source potential as well as their ability to form major reservoirs. Among other topics the course will give information on how to predict porosity trends in ancient depositional systems, a presentation of the latest developments in dolomitization, and a discussion on how to distinguish between subaerial and subaqueous evaporites in ancient sequences.

Contents

Introduction:
- the economic importance of carbonates and evaporites

Reefs—modern and ancient:
- coral reefs; ancient reefs; is there a general model for ancient reefs?

Linear clastic shorelines:
- modern; ancient

Shelf environments:
- general model; modern; ancient

Deeper water carbonates:
- general model; modern; ancient

Tidal flat deposition (humid):
- general model; modern; ancient

Dolomites and dolomitization:
- general model; modern; ancient

The significance of caliche and unconformities in carbonate environments

Summary—models of carbonate deposition and their economic potential■

Exploration

NEW

Applied Sedimentology for Hydrocarbon Exploration

Dr. Charles T. Siemers
President, Sedimentology, Inc.
Boulder, CO

Oslo/April 9–13/$875

Denver/October 15–19/$825

This five-day course has been designed to provide comprehensive, integrated presentations on the genetic, process-oriented approach to sedimentology, stratigraphy and basin analysis. Emphasis is on the Process-Approach to Sedimentology, with recognition and utilization of small-scale genetic units within vertical and lateral sequence, and Process Stratigraphy, with discussions on basin-filling sedimentary sequences (mainly terrigenous clastics) as controlled by tectonic, climatic and eustatic processes. Basic aspects of primary sedimentary rock composition, textures and structures (physical and biogenic) and secondary (diagenetic) features are reviewed and discussed in terms of petrophysical analysis utilizing a variety of well-logs. A wide spectrum of depositional systems are discussed with emphasis on recognition in the subsurface using cores, well-logs and seismic sections and development of predictive models of reservoir distribution and character. The handling and interpretation of whole-diameter core sequences is discussed in considerable detail with the presentation of numerous core and associated well-log sequences. The course is directed primarily towards exploration and production geologists but also recommended to petroleum engineers and geophysicists who have geological backgrounds.

Contents

Concepts of sedimentary geology:
- concepts of the genetic process-oriented approach to stratigraphy, process sedimentology and the wholistic approach to genetic basin analysis; basins and basin-filling process and products with discussion of seismic stratigraphy and sea-level cycles

Structures, textures and compositions:
- basics of sedimentary rock primary structures (physical and biogenic) textures and compositions and affects of diagenesis as related to well-log responses and reservoir properties; physical, chemical and biogenic sedimentary processes and recognition of their products in the rock record are emphasized

Well logs:
- logs are reviewed in terms of response to petrophysical characteristics of sedimentary sequences and use in developing predictive models of subsurface depositional sequences and contained reservoir units

Depositional systems:
- continental (e.g., alluvial fan, meandering and braided stream, aeolian), shoreline (deltaic and non-deltaic), shelf, slope and basinal (including submarine fans) deposits discussed in detail with numerous examples of modern and ancient deposits and subsurface, petroleum-bearing sequences

Cores:
- detailed discussion of proper handling procedures (to prevent information loss) and approaches to effective analysis using associated subsurface data■

Tectonic Guidelines to Oil and Gas Exploration: A Geologist's View

Dr. Thomas L. Thompson
Consulting Geologist
Boulder, CO

Los Angeles/June 18–22/$825

London/August 6–10/$875

This five-day course, intended for all explorationists, examines tectonic settings with oil and gas potential in the context of time and place associations of structural style and associated traps, temperature history, and sedimentation. This course emphasizes the study of present continental margins not only as frontier regions, but also to gain insight into the origin of ancient continental margins that now form part of the land, including many productive provinces.

Contents

Introduction:
- structure of the earth; general concepts of tectonics; rudiments of oil and gas formation and accumulation

Rifts and divergent continental margins:
- evolution of rifts and continental margins (Atlantic type) with examples from productive areas including the Gulf of Suez, North Sea, equatorial Atlantic, and the Gulf of Mexico

Convergent margins and collisions (Pacific and Northeast Indian type):
- variable tectonics and sedimentation aspects of subduction and collisions involving two island arcs, island arc and continent, and two continents; wrench tectonics and traps for oil and gas

North American basin analysis by analogy of ancient continental margins of interior basins with present continental margins of the world■

NEW

Sedimentological Analysis of Whole-Diameter Cores: A Workshop Course

Dr. Charles T. Siemers
President, Sedimentology, Inc.
Boulder, CO

Denver/March 1–2/$500

Dallas/September 13–14/$500

Houston/November 8–9/$500

This two-day workshop has been designed to provide participants with an opportunity to examine cores from a variety of terrigeneous clastic depositional environments and to learn the finer details of geological core analysis. Process-oriented concepts of sedimentology, stratigraphy and basin analysis are reviewed along with detailed aspects of sedimentary rock textures, compositions and structures as related to vertical genetic sequences. Proper core handling procedures are strongly emphasized. Procedures are presented for detailed lithologic description, genetic-unit analysis, and calibration of core sequences with associated wireline logs. Depositional systems are reviewed and discussed with respect to recognition using cores and wireline logs in the vertical sequence. The course has been designed for exploration and production geologists and for petroleum engineers with experience in utilizing core data for reservoir analyses.

Contents

Sedimentological concepts:
- review of process sedimentology, process stratigraphy and genetic basin analysis; emphasis on wholistic approach, basics and calibration

Structures, textures and compositions:
- primary physical and biogenic sedimentary textures, compositions, and structures and their use in recognizing genetic units in the vertical sequence

Core handling and information loss:
- presentation of proper core handling procedures for geologists and engineers

Description and interpretation of core sequences:
- basic procedures for description of lithologic sequences and recognition of genetic units; sedimentological analysis and calibration of wireline logs

Depositional systems:
- review of continental, shoreline, deltaic, shelf, slope and basinal depositional systems and their recognition in vertical sequences

Examination of core sequences:
- numerous examples available for detailed examination within a discussion-oriented workshop atmosphere■

Exploration

Contributions of Geology, Geophysics, and Engineering in the Development of the Petroleum Reservoir

Dr. Richard C. Selley
Consulting Geologist
London

Dr. Robert E. Sheriff
Professor of Geophysics
University of Houston

Dr. David A.T. Donohue
President, IHRDC
Boston, MA

Houston/February 27–March 2/$850

The nature of petroleum reservoirs is evident in different ways to the geologist, the geophysicist, and the reservoir engineer. This five-day course summarizes the contribution from each discipline, develops the interrelationship between them, and proceeds to a practical integration. As such, the course is intended for members of all three disciplines.

Contents

Introduction:
- source rocks, migration, reservoir rocks, seals; porosity/permeability; common reservoir rocks

Factors defining reservoir type:
- lithology; depositional settings for sandstones and carbonates; post-depositional history; compaction, cementation, chemical change and fracture; the tectonic component; the pressure component; the hydrodynamic component

Important reservoir features:
- area; thickness profile; vertical and lateral variations of porosity and permeability due to depositional circumstances; the same variations due to subsequent happenings; structural relief; faults and other abrupt permeability barriers; potential for leakage; characteristics of saturant; water saturation

Measurements from samples and logs:
- microscopic evaluation (with alternative illuminations); chemical and paleo evaluation; significance of particular inorganic and organic constituents; significance of grain size, sorting and maturity; significance marks, orientation and cross-bedding; summary of logging tools, their measurements and their inferred measurements; important log signatures and their variants; dipmeter measurements; borehole pressure and temperature measurements

Measurements from surface seismics:
- the elements of seismic stratigraphy: seismic sequences, determination of relative sea level and depositional setting, identification of the habitat of sandstone reservoirs and carbonate reservoirs; velocity as a distinction between sandstone and carbonate reservoirs; seismic measurements of structure in time and in depth; seismic measurements of porosity and thickness in gas sands; developments aimed at identifying reservoir barriers; synthetic seismograms; modelling

Measurements from borehole seismics:
- the vertical seismic profile; combined vertical and horizontal profiling; delineation of the lateral limits of a reservoir; determination of thickness and porosity variations over the extent of the reservoir; adaptations appropriate to thin reservoir beds

Basic reservoir engineering data:
- reservoir fluids; compressibility; porosity; permeability, absolute and relative; capillary pressure; wettability; pressure-volume relationships; fluid phase distribution

Reservoir characterization:
- more on the inferences from logging and coring the impression packer; drillstem tests; pressure buildup and back-pressure testing; pulse testing; tracer studies

Reservoir fluid flow concepts:
- pressure-saturation transients; gravity and capillary forces; water and gas coning; well completion, stimulation and damage; duel porosity systems; well spacing

Mechanisms for petroleum recovery:
- natural drive mechanisms; water/gas injection; chemical flooding; micellar flooding; thermal recovery methods

Reservoir management:
- reserves estimation, static and dynamic; reservoir simulation; planning for optimum recovery; examples of good and bad management

Economic evaluation:
- net cash flow stream; discounting for cash-flow timing; measures of investment return; reserves recognition accounting

Synthesis:
- technical assessments and decisions to be made between prospect generation and payout; parallel economic assessments and decisions; simultaneous relevance of all three disciplines to many of these decisions; interrelations of technical and economic decisions for optimum return; identification and assessment of risk; conclusions■

Engineering

NEW

Reservoir Geology of Sandstones for Engineers

Dr. Robert M. Sneider
President, Robert M. Sneider Exploration, Inc.
Houston, TX

Denver/February 21–24/$775

Essen/June 4–7/$800

Stavanger/August 13–16/$800

New Orleans/October 15–18/$775

This four-day course is designed to provide petroleum engineers and managers with geologic concepts and knowledge on the distribution of pore space and fluid flow barriers in typical sandstone reservoirs. The course combines lectures and practical application exercises and workshops to give the participants guides to reservoir description and evaluation, and an appreciation of how to optimize recovery from sandstone reservoirs. The benefits of applying the team concept of joint geological-geophysical-engineering evaluation are discussed.

Contents

Depositional processes and environments:
- vertical and lateral sequences of potential reservoir rocks and impermeable barriers to fluid-flow; value of texture, sedimentary structures and paleo to predict potential reservoir-nonreservoir rocks

Development of pore space:
- effect of depositional processes on texture, initial porosity, permeability and pore-size distribution; modification of initial pore space during burial by leaching, fracturing, cementation, and compaction; prediction of porosity-permeability trends; importance of clay minerals

Rock-log calibration and responses:
- inferences about geological and petrophysical properties of reservoir and impermeable rocks from wireline logs (gamma-ray, SP, resistivity, sonic, neutron, density logs)

Spatial distribution of pore space and fluid-flow barriers within common sandstone reservoir systems:
- alluvial fans and channels, aeolian, coastal beach and barrier, marine bars and sheets, deltas, deep-water fans and turbidite deposits

Case histories, examples, exercises, and workshops:
- demonstrations and practical experience in reservoir description and evaluation; aquifer description and delineation; realistic geologic reservoir models to aid in reservoir simulation to optimize primary and supplemental recovery; joint integrated geological-geophysical-engineering studies for reservoir management and reserve estimates■

Petroleum Production Engineering

T.E.W. Nind
Petroleum Engineer Consultant
Professor of Mathematics
Trent University
Peterborough, Ontario
Canada

London/July 2–6/$875

New Orleans/November 5–9/$825

This course is designed for those associated with field production operations, whether as engineers, field personnel, or managers. It is intended to give an overview of the design and operation of the producing well during both natural and artificial lift. The emphasis is on the well, which is regarded as one element of a system that embraces the formation, the well itself, and the surface facilities.

Contents

Introduction

Well inflow performance:
- relative permeability curves; PI and IPR; Vogel; Fetkovich; log-log; Jones-Blount; GLR and WOR behavior; interflow

Flowing well performance:
- flow regimes, vertical lift performance; THP curve; tubing performance curve; comparisons gradient curves; choke performance; stability of flow; pressure-rate-depth grid; behavior of flowing well system; formation to storage tank; flowing well history; equation for gradient curves

Continuous gas lift:
- general discussion; gas lift valves and string design

Intermittent gas lift:
- closed and semi-closed system; accumulation chamber; plunger lift; GLR

Beam pumping:
- nature of annulus fluid; gas separation; echometer; dynamometer; determination of down hole pressure

Electric submersible centrifugal pumps:
- pump efficiency and performance; effects of operating conditions; gas separation; analysis via illustrative problem

Review of other pumping systems:
- hydraulic pumping; jet pumping; long-stroke pumping (chain and cam)

Overview of producing methods■

Engineering

NEW

Reservoir Appraisal & Development

L.P. Dake
Petroleum Consultant
Scotland

Bahrain/March 26–30/$875

London/April 30–May 4/$875

Oslo/June 25–29/$875

Houston/October 15–19/$825

Calgary/October 22–26/$825

This is a five day course covering the broad spectrum of reservoir engineering activity during the appraisal and development of oil and gas fields. Particular emphasis is placed on the role of reservoir engineers in planning, monitoring and controlling offshore developments and the majority of illustrative course material relates to North Sea projects. The aim of the course is to teach both the simple, analytical techniques and numerical simulation methods required for reservoir evaluation. The course is primarily aimed at practicing field reservoir engineers. Because it is more descriptive than mathematical, however, it can also be fully appreciated by many disciplines associated in the development of oil and gas fields.

Contents

Introduction:
- the role of the modern reservoir engineer; distinction between the practice of reservoir engineering for onshore and offshore projects

Appraisal—general:
- collection of fluid samples; specification of PVT analysis requirements; understanding PVT analysis reports and application of results in reservoir studies; the use of PVT correlations; fluid pressure regimes; use of the RFT during field appraisal; overpressured reservoirs; estimation of hydrocarbons in place; the concept of field unitization; reservoir engineering aspects of equity determination

Development—general:
- the significance of material balance; depletion of oil and gas fields; Darcy's Law

Appraisal—oilwell testing:
- the purpose of appraisal well testing; basic theory of well test analysis; examination of the assumptions implicit in analysing tests; critical review of testing methods; the uniqueness and reliability of pressure buildup testing; traditional versus modern methods of testing and analysis

Appraisal—gas well testing:
- differences between oil and gas well testing; rationalization of oil and gas well analysis techniques; pressure buildup versus multi-rate testing

Appraisal—general:
- interference and pulse testing; use of the RFT in vertical and lateral pulse testing

Development—waterdrive:
- the significance of waterdrive as a recovery method; design concepts for onshore and offshore waterdrive projects; the basic mechanics of waterdrive in one dimension; the "mystique" in the use of relative permeability functions; scaling waterdrive to two dimensions; generation and use of pseudo relative permeabilities; comparison between analytically derived pseudos and those generated by detailed cross-sectional simulation

Development—waterdrive/gasdrive:
- a critical review of analytical methods for describing waterdrive; simple methods for developing production profiles for complex waterdrive fields; planning and construction of a 3D numerical simulation study; essentials of history matching waterdrive simulation studies; efficiency of gas drive versus waterdrive; monitoring waterdrive performance

Development—general:
- water and gas coning; the development of gas and gas condensate fields; example of the appraisal and initial development planning for a major oilfield—illustrating and exercising the techniques presented during the week

Lectures on each topic are illustrated by field examples drawn from a wide variety of reservoir environments from all over the world. In addition exercises are provided to demonstrate the application of the techniques presented■

NEW

Reservoir Engineering: Theory and Practice of Secondary Recovery

L.P. Dake
Petroleum Consultant
Scotland

London/July 9–13/$875

Essen/September 10–14/$875

Jakarta/November 26–30/$900

This five day course aims at giving guidance on the responsibilities of the reservoir engineer throughout the planning and implementation of secondary recovery schemes, contrasting the difference in decision making between the onshore and offshore environments. Only when a secondary recovery scheme can be successfully monitored and controlled can there be any expectation of gaining additional recovery by more complex and expensive EOR flooding. Emphasis is placed throughout the course on simple analytical techniques for the description of flood performance. This approach is intended to give the engineer greater confidence and understanding of the reservoir performance which will aid in the construction and running of more sophisticated numerical simulation models and in many cases prove very cost effective.

Contents

Review of the physical principles of primary recovery; difficulties in quantifying field performance under depletion drive conditions; data collection and interpretation required for planning a secondary recovery scheme; choice of secondary recovery method: water versus gas flooding; planning a secondary recovery scheme for both onshore and offshore environments; laboratory flooding experiments and their relevance to the description of fluid displacement on a macroscopic scale; basic mechanics of water and gas drive; calculation of displacement efficiencies in the vertical cross-section; field-wide description of water/gas flooding performance; critical review of the analytical methods for the description of secondary recovery processes; planning and execution of a field-wide numerical simulation study; secondary recovery in gas-condensate fields, dry gas recycling and waterdrive; study of field case histories; data collection and field monitoring required for flood control and planning subsequent EOR schemes; exercises■

NEW

Oil and Gas Measurement

M.J. Sergesketter
Consultant
Houston, Texas

New Orleans/May 21–25/$825

Bahrain/November 26–30/$875

This five-day course covers design, installation, and operation of liquid and gas metering installations, and methods of calculating corrected flow volumes from meter data. The course is designed for engineers and senior field technicians. Accounting personnel responsible for measurement calculations will also benefit from this course. Practical exercises in sizing and specifying equipment and performing flow calculations are included.

Contents

Introduction:
- the physical and chemical properties of hydrocarbons; pressure; temperature; perfect gas law; fluid compressibility

Orifice meters:
- orifice plate; orifice plate holder; meter tube; flow recorder; electronic instruments; calibration

Positive displacement and turbine meters:
- operating principles; compensators; electronic instruments; meter provers

Sampling:
- continuous and spot sampling; sample containers; sample connections

Fluid quality instruments:
- gas gravitometer; gas calorimeter; densitometer; BS&W monitor; net oil computer

Data processing:
- chart processing; orifice flow calculations; gas volume corrections; liquid volume corrections; stream composition calculations■

Petroleum Management

NEW

Economic Evaluation of Petroleum Exploration & Development Projects

Norman W. Miller
President, EPI Resources Ltd.
Calgary, Canada

Houston/March 26–30/$875

London/October 22–26/$875

This five-day course is aimed at providing an overview of the economics of exploring for oil and gas in a wide variety of geological, operating and financial environments. The importance of the subject is discussed and the analytical techniques used in determining results are reviewed. The course takes a practical approach to the subject and attempts to embrace a wide range of considerations in a realistic and manageable manner. It is recommended for geologists, geophysicists, engineers, economists and management personnel, from junior through senior levels. While the emphasis of the course will be on condensing the broad subject matter to a useful, decision making format, some specific examples and problems are also included to illustrate the techniques used and the results attainable.

Contents

Introduction
Contract area terms:
- areal extent; permit term; work obligations; relinquishments; working interests; operatorship/partners; carried interests; net profits interest; gross overriding royalty

Estimation of potential reserves & production:
- regional geology; source rocks; reservoir rocks; migration; trapping; chance of hydrocarbon accumulation; gas or oil?; prospect identification and definition; depth of objective; area of closure; thickness of potential reservoirs; lithology, porosity and permeability; prospect interdependence

Operating environment considerations:
- onshore/offshore; terrain/access; water depth; wind wave conditions

Exploration program costs, timing and uncertainty:
- seismic program: extent, timing, costs, interpretation; drilling: location, number of wells, type of rig, support services, cost (day rate), well depth, evaluation

Delineation or appraisal drilling: costs, timing:
- locations; number of wells; evaluation; costs; timing

Field development: costs, timing & uncertainty:
- drilling and surface facilities: initial well productivities, number of development wells, fluid characteristics, expected recoveries, production profile, facilities (platforms, processing, treatment, compression, water/gas injection, artificial lift), capital and operating costs, timing, cost escalation

Storage and transportation:
- tankage; pipelines/tankers; loading facilities; capital and operating costs

Estimating oil and/or gas prices:
- quality; location; bench mark price references; escalation (inflationary, real)

Fiscal terms (government take):
- tax/royalty regimes; production sharing regimes; risk contracts; other

Risk of uncertainty:
- dry hole risk; probability distributions; sensitivity analysis; Monte-Carlo simulations

Other important project considerations:
- technological factors; national goods and services; access to crude supplies; financing of development expenditures (cost of capital; project financing; debt/equity ratios); management perspectives■

NEW

Decision Methods for Petroleum Investment

Dr. Robert C. MacDonald
President, Intera Petroleum Consultants Inc.
Austin, Texas

Oslo/April 11–13/$775

Houston/October 22–24/$715

The purpose of this course is to acquaint petroleum industry professionals with risk analysis techniques and their application to oil and gas exploration and exploitation project evaluation. The practical aspects of risk and uncertainty concepts are emphasized by examples and exercises. The participants are assumed to have some technical background in the petroleum industry.

Contents

Introduction:
- assessing uncertainty in decision making; applications in exploration and exploitation

Profitability criteria:
- review time value of money concepts: interest rate versus inflation, equal payment series interest formulae; profitability measures: payout, rate-of-return, net present value—present value profit, growth rate-of-return, sinking fund method, book yield

Economic projections:
- cash flow model; production profiles and reserves estimation: volumetric techniques, material balance calculations, statistical methods, performance data analysis, modeling; revenue and cost projection: oil and gas prices, drilling costs, inflation considerations; taxation and production payments: royalties and production payments, excise taxes, income taxes; summary of cash flow projection

Probability and statistics:
- review of concepts: frequency distributions, mean, mode and median, standard deviation; probability distributions: binomial distribution, normal distribution, log-normal distribution, other distributions, sampling

Uncertainty and risk:
- expected monetary value; decision tree analysis; preference theory; simulation methods—Monte Carlo; venture appraisal: maximum cost relative to risk, determination of fractional participation, appraisals limited by risk, gambler's ruin

Summary■

NEW

Using the Personal Computer: A Workshop Course

Charles Tutt, Jr.
Vice President
Intera Petroleum
Consultants Inc.
Austin, Texas

Anne Huston
Consultant
Byrne Computer Center
Wellesley, MA

Boston/May 31–June 1/$500

Houston/September 17–18/$500

Denver/October 18–19/$500

This two-day program is the ideal short course for those individuals who want to understand what personal computers can do and to learn how to use them to solve practical problems. Developed around lectures and hands-on, practical applications, participants will learn why microcomputers are becoming so important, who the principal manufacturers of hardware and software are, what the magic "chips" do, what operating systems are available, and what common peripheral devices may be purchased. Major emphasis is given to the types of software that are available and in *learning to use them during the sessions*. The core of the course and its principle objective is to have the participant, whether a manager, technologist, administrator or secretary, leave the program confident that he/she can use the personal computer to meet daily needs. Participants are encouraged to bring along examples of their specific applications. Personal computers and a number of software packages will be available in the classroom for the use of the participants. The course ends with a look at the future of the personal computer and at what considerations go into buying one. If you have a "need to know" how to use the personal computer in your daily affairs, this course is for you. (Note: This is not a course where you will learn to write software; but you will learn to use existing software.)

Contents

Why microcomputers? The advantages and disadvantages; Who are the hardware players? (and why are there so many?); Who are the software players?; The underlying "chips"; Operating systems; How to select and buy a personal computer; Some common peripheral devices: printers, plotters, digitizers, "mice", modems, disks, tape drives; Classes of common software: editors, word processors, accounting packages, spreadsheets, data bases, languages, communications; Some editors: character oriented, line oriented, screen oriented, programmable; Some word processors and their features: Wordstar, Peach Text, Powerwriter, Volkswriter; Some accounting packages: Peachtree, BPI; Spreadsheets: Visicalc, Context MBA, Lotus 1-2-3, Perfectcalc, Logicalc; Data bases: Dbase II, spreadsheet integrated data bases; Languages—interpreters and compilers; communications; The future: networking, data bases, multi-tasking, ATT and IBM, ergonomics, robotics, education, applications software, languages■

Petroleum Management

NEW

Economics of Materials Management

Dr. William B. Lee
Partner
Touche Ross & Co.
Houston, Texas

Dr. Earle Steinberg
Partner
Touche Ross & Co.
Houston, Texas

London/May 14–18/$875

Denver/October 27–November 2/$825

This five-day course is designed to demonstrate the use of analytical techniques in the solution of materials management problems, to examine the economic factors which affect procurement strategy, to improve understanding of financial reports to enable participants to evaluate suppliers' financial status and performance, and to enhance negotiating skills.

Contents

Business economics
- Cost/profit structure of manufacturing industries and its relation to price: selling price split into profit and cost components (material, labor, energy, administration, capital, and tax); the use of this analysis in price forecasting, planning for negotiation, and review of escalation formulas
- Key determinants of price: the effect on price of labor cost and productivity changes; capacity utilization and the influence of productivity on unit labor costs and consequent effect on prices
- Economic cycles: supply and demand imbalance and effect on prices; government attempts at control and cartel operations
- Review of current economic forecasts for major industrial countries

Economic analysis techniques
- Components of an economic analysis: setting up a cash flow structure; the use of profitability criteria in decision making (payout, present value, earning power)
- Present value criteria for comparing alternatives: the practical application to procurement problems by use of exercises

Application of techniques to actual materials problems
- Lease versus purchase: structure of present value solution; financing considerations; operational and practical aspects
- Inventory control: cost components of an inventory; individual item inventory decisions; aggregate effects of individual decisions
- Payment terms: analysis of cost/benefits of cash discounts in payment terms and of costs in relation to progress payments
- Delayed payment—export credits: the use and availability of supplier's or buyer's export credits
- Bid comparisons: analysis of quotations to ensure that the full cost of each bid is properly evaluated
- Currency exchange rate risk: the risk of changes in currency exchange rates; forward currency markets and currency exchange cover; factors in forecasting exchange rates
- Price escalation formulas: the use of indices; evaluation of escalation formulas
- Evaluation of supplier's financial performance: understanding balance sheets, profit and loss, and cash flow statements; the impact of inflation; evaluation of profitability and risk factors

Negotiating skills
- The negotiating process; planning for negotiation; strategy and tactics; supporting practical exercises■

Introduction to Petroleum Technology

Dr. David A.T. Donohue
President
IHRDC
Boston

David C. Morrill
Partner, Donohue Anstey & Morrill
Boston

Bahrain/May 8–11/$750

Boston/July 16–19/$700

This 3½-day course is designed for individuals involved in oil and gas or related activities who seek an understanding of petroleum exploration, drilling, field development, and production technology. It assumes no prior knowledge of the subject and has proven particularly effective for individuals working in law, accounting, banking, government, and other oil and gas related fields. The course is a combination of lectures, case studies, and exercise sessions. To gain a working knowledge of the tools used by geologists, geophysicists, log analysts, and drilling and production engineers, participants will draw contour maps, plan the drilling of wells, and make realistic exploration decisions.

Contents

Basic geological concepts; petroleum formation and accumulation; petroleum reservoirs; geological procedures; geophysical methods; the exploration decision; case studies; obtaining the legal right to explore, drill and produce; drilling technology—equipment and procedures; well completion technology—equipment and procedures; field developments—planning and design; production operations; reservoir engineering and reservoir management; preparing the economic feasibility study; regulations; case studies■

Introduction to Manpower Planning

John J. Connor
Project Manager
Consulting Services
IHRDC
Boston

Jakarta/February 13–17/$775

Bahrain/April 14–18/$775

Houston/June 11–15/$725

Jakarta/October 1–5/$775

This five-day course presents a systematic program devoted to developing long-range plans for manpower development. It is intended for training and manpower development professionals worldwide, for those working in or with a developing country, and for those concerned with the human issues of energy development. Each participant will work a series of interrelated exercises that will give practice in each of the elements of the manpower planning and development system. Most of these exercises will require the student to use real information from his or her own work environment.

Contents

Strategic planning:
- elements; mission statements; strategic planning exercise

Organizational design:
- factors influencing design; objectives; organization charts

Manpower planning:
- forecast; inventory; plan; system

Job descriptions and qualification profiles:
- purpose; format

Task-and-skill analysis (TASA) and training objectives:
- role of TASA; TASA interview; TASA format; performance-oriented training objectives

Training:
- an element of the system; job-related; classroom; ship/simulator; on-the-job; task certification

Recruitment and selection:
- to support the manpower system; aptitude profile; qualifying education program

Performance appraisal and organizational reward:
- development appraisal; intrinsic vs. extrinsic rewards to support the manpower system

Succession planning:
- candidates; schedule and program; job ladder; formats■

Petroleum Management

Management and Supervision

John J. Connor
Project Manager
Consulting Services
IHRDC
Boston

Bahrain/April 7–11/$775

Jakarta/November 5–9/$775

This course is designed for first-line supervisors and managers, whatever their formal areas of study and training. The primary emphasis is on organization, planning, and scheduling as they apply to the new manager. Special consideration is given to the problems of the international manager: communication, interpersonal and cultural relations. Practical examples and case studies from diverse technical fields are used as models for discussion and analysis.

Contents

Basic management skills:
- planning; organization; decision-making; problem-solving; time management

Interpersonal relations:
- leadership; delegation; motivation; communications

Daily supervisory activities:
- introduction of change; discipline and morale; evaluation; training and development

Cultural considerations:
- overseasmanship; learning from experience

Case studies and class discussions■

On-The-Job Training

John J. Connor
Project Manager
Consulting Services
IHRDC
Boston

Jakarta/February 20–24/$775

Bahrain/April 21–25/$775

Houston/June 18–22/$725

Jakarta/October 8–12/$775

Sydney/November 12–16/$775

This five-day course is designed for technical training specialists and others responsible for the design and/or conduct of training programs that contain—or should contain—an on-the-job training element. The course stresses the need to plan and to follow a systematic approach. It outlines a method for analyzing both the job and the trainee and uses this data to economize the training effort by designing realistic, trainee-centered, job-related programs. Each participant will work a series of interrelated exercises that will give practice in each of the elements of this systematic approach to developing on-the-job training. Most of these exercises will require the student to use real information from his or her own work environment.

Contents

A structured approach:
- based on task-and-skill analysis; performance-oriented; work environment; supplement by other methods; proficiency certified

Task-and-skill analysis:
- for existing jobs; for new jobs; methods; format

Task information sheet:
- task numbering; subtasks; selecting tasks for training; conditions and standards

Training objectives:
- performance-oriented; elements; realism

The training program:
- qualifying education; on-the-job elements; role of the supervisor; supplemental training methods

Training literature:
- on-the-job references; job aids; supplemental references; administrative materials

Evaluation and certification:
- testing; certification procedures; quality control of program■

IHRDC's Public Short Course Instructional Team

Dr. Michael E. Badley is consultant with the U.K.-based firm, Badley, Ashton & Associates Limited, and specializes in the areas of petroleum geology, seismic interpretation, and computer applications to oil exploration. His broad petroleum industry experience includes work as a consultant with Exploration Consultants Ltd., assignment to seismic interpretation and training projects for Norsk Hydro and geological services to the Barbados Government; geologist with Deminex (West Germany), dealing with all aspects of exploration with emphasis on U.K., Norway, and Ireland offshore activities; Burmah Oil Company's London office as a geologist working on subsurface geology, seismic interpretation and offshore wellsite geology; and Texaco (UK) as a geologist. Dr. Badley holds Bs.C. and Ph.D. degrees in Geology.

Dr. Alfred H. Balch, is Senior Research Associate for Mobil Research Development Corporation. Prior to holding this position he was geophysicist and Program Chief of the United States Geological Survey's Branch of Oil and Gas Resources in Denver, Colorado, where he worked on the application of vertical seismic profiles. Dr. Balch's past industry experience includes positions as Adjunct Professor at Colorado School of Mines, manager of the Denver seismic processing branch of Geocom, Inc. (Houston), and Advanced Research Geophysicist with Marathon Oil Company (Denver), as well as earlier associations with Phillips Petroleum Company. Dr. Balch was a member of the U.S. Geological Delegation to the U.S.S.R. in 1971, and was a Fulbright Hays lecturer in geophysical exploration at Moscow State University in 1976. Dr. Balch, who has a B.S. in Geology from Stanford University and Sc.D. in Geophysical Engineering from the Colorado School of Mines, has written many technical papers and holds a number of U.S. and foreign patents.

John J. Connor, who is currently Project Manager in IHRDC's Consulting Services Department, provides consulting services to international clients in such areas as manpower planning, training systems design, and on-the-job training. He joined IHRDC in 1977 as an instructor of professional development, manpower, and training courses. Formerly with the U.S. Army Corps of Engineers, he was Project Engineer of a multi-million-dollar construction program in the Marshall Islands, and taught geology while on the faculty of the U.S. Army Engineer School. From July 1980 to May 1981, Mr. Connor was assigned to the Petronas Training and Manpower Development Department as Consultant on Technical Manpower Planning and Development. He has taught numerous management and training courses, both public and private, and has authored two books in his field: *On-The-Job Training* and *Manpower Planning and Development: The Developing World* (with William M. Carson). Mr. Connor has a B.S. degree in geology from Boston College.

L.P. Dake is currently a consultant based in Scotland. During a period of nineteen years divided between Shell International, the British National Oil Corporation and now as a consultant, he has been involved in appraisal and development planning decision making in more than 50 oil and gas fields worldwide. He gained his experience in lecturing in reservoir engineering during a four year period in Shell's Training division in the Hague and has more recently given courses in Europe concentrating on the theme of the contribution required of reservoir engineers in the planning of major offshore projects. Author of the popular textbook—Fundamentals of Reservoir Engineering (Elsevier 1978)—he has also lectured at universities in the UK and Norway and is honorary professor at the Petroleum Engineering Department of Heriot Watt University, Edinburgh.

Dr. David A.T. Donohue is the founder and President of IHRDC. He began his teaching career at the Pennsylvania State University and has lectured widely in the IHRDC short course format in such areas as reservoir mechanics, computer technology, and the legal, accounting, and business areas of the petroleum industry. He has worked in various phases of engineering and research for both Exxon and Gulf Oil Companies. His other credits include: President and one of the developers of the Honeoye Storage Corporation, an underground gas storage firm in New York State; President, Arlington Exploration Company, Boston; Director, Energy Resources Consultants Ltd., London. He is also principle in the consulting firm of Donohue Anstey & Morrill, Boston. Dr. Donohue has advanced degrees in both Petroleum Engineering and Law and is a past recipient of the Cedric Ferguson Award of the Society of Petroleum Engineers.

Dr. G.H.F. Gardner is Co-Director of the Allied Geophysical Laboratories and Professor of Electrical Engineering at the University of Houston. He has served as Senior Scientist with Gulf Research and Development Company in Pittsburgh, PA. During his 20 years with Gulf, in production and exploration, Dr. Gardner developed 3-D methods and put them into practice. In addition, he has considerable experience in measuring the acoustic properties of rock and in making use of these properties for the direct detection of hydrocarbons and the identification of lithologies. Dr. Gardner was chosen as Distinguished Lecturer by the Society of Exploration Geophysicists in 1980. He is currently Editor of Geophysics magazine.

Anne Huston is currently working as a computer consultant for Byrne Computer in Wellesley, Massachusetts. Her experience includes selling and training clients on microcomputers. Other credits include the training of business applications on microcomputers for General Binding Corporation and long term familiarity with word processing at Damon Corporation and Harvard Medical School.

Dr. William B. Lee is a Partner in Touche Ross & Co. in Houston. Prior to this Dr. Lee was Senior Partner with SOM Associates, a Houston-based international consulting firm. He has also worked with Martin Marietta Corporation, where he was concerned with engineering/manufacturing coordination and logistical support to products in field locations around the world, and with Rockwell Manufacturing Company, as project leader for systems analysis during the development and installation of two of the first computerized materials requirements planning systems in the country. He has been associated for several years in a consulting and professional development program role with companies such as ARAMCO, PETROVEN, Shell Oil Company, Pullman-Kellog, Fluor, McEvoy Oilfield Equipment Company, National Supply Company, and others. Dr. Lee has served as an Associate Professor of Operations Management and Chairman of the Department Systems and Operations Management at the University of Houston. He is a fellow of the American Production and Inventory Control Society and has written numerous articles in his area. Dr. Lee holds a Bachelor of Engineering degree from Vanderbilt University, an M.B.A. with concentration in Engineering from Rollins College and a Ph.D. in Business Education with concentration in Production and Operations Management from the University of North Carolina in Chapel Hill.

Dr. Robert C. MacDonald, President of Intera Petroleum Consultant, Inc., graduated from the University of Michigan in 1963 with Bachelor of Science degrees in Chemical and Metallurgical Engineering. After five years as a Reservoir Engineer in the gas storage activity of Michigan Consolidated Gas Company, he entered the graduate studies program at The University of Texas at Austin. He obtained an M.S. degree in Petroleum Engineering in 1970 and a Ph.D. degree in 1972. For three years he worked for Intercomp, and in 1975 became Vice-President and General Manager of their European Operations at The Hague. From 1978 until the formation of Intera Petroleum Consultants, Inc. in 1981, he served on the Petroleum Engineering Faculty of the University of Texas at Austin. He is a registered professional engineer in both Michigan and Texas and a member of the Society of Petroleum Engineers of AIME, AAPG, AICE, NSPE, and the AGA.

Dr. John A. McDonald is a Professor of Geophysics and Co-Director, Allied Geophysical Laboratories at the University of Houston. He has held positions in the past with Gulf Research & Development Company, Teledyne-Geotech, and U.K. Atomic Energy Authority. Dr. McDonald has authored numerous papers on 3D seismology, high-resolution seismology, physical modeling, seismic detection, air-to-ground interactions. He holds a degree from Southend College of Technology and a Ph.D. from Southern Methodist. He is a Fellow of the Institute of Physics, London.

Hans J. Meyer is Training Manager for Festo in Esslinger, West Germany. Prior to joining Festo he was coordinator of technical training activities with Deminex in Essen, West Germany, and served 11 years with Schlumberger in Europe and the Middle East as Field Engineer, Field Manager, Training Officer, and Training Manager. Mr. Meyer received his M.S. in Electronic Engineering from the Technical University of Braunschweig.

Norman W. Miller has spent most of his 17 year career in frontier related exploration and development activities, commencing with his participation in Shell's west and east coast activities where he was responsible for the engineering evaluation of the wells drilled in these programs. He then spent three years in Ottawa supervising the reservoir engineering and economics group at the Resource Management Branch before undertaking a 2 year staff engineering assignment pertaining to offshore planning and development in the Java Sea, Indonesia. Following his return to Canada in 1976, he spent three years in Petro-Canada's Planning Department where he held a number of positions, the last being the Manager of Business Development. He left Petro-Canada in 1979 to set up a consulting firm specializing in planning and engineering economics, eventually merging that company with Cooke Offshore to form E.P.I. Resources Ltd. He is currently president of E.P.I. Resources Ltd.

Dr. Nabil A. Morgan is currently Area Geophysicist for Europe and the Middle East with Geophysical Service International in Bedford, England and was formerly with GSI's Special Projects Group in Dallas. He has had extensive experience in exploration geophysics and seismic research. His professional experience with GSI includes signal analysis research, technical supervision and support for seismic data acquisition, data processing, and data interpretation crews. Prior to joining GSI, he was an explorationist for Huntec Ltd. in Toronto and a consultant with the United Nations in Burma. Dr. Morgan has a Ph.D. in Geophysics from the University of Toronto and an M.B.A. in International Management from the University of Dallas.

David C. Morrill is a partner in Donohue Anstey & Morrill, a Boston-based oil and gas consulting firm, and Senior Vice President of Arlington Exploration Company, Boston. He has over 20 years of extensive domestic and international exploration experience. He served 11 years with Standard Oil of California and affiliates in the U.S. Gulf Coast, North Sea, Northern Europe, and Nigeria. He later became Staff Geologist and Manager of Oil and Gas Operations for a U.S. independent oil company with worldwide oil and gas producing interests. Mr. Morrill, who has taught courses worldwide for IHRDC, holds an M.S. degree in Geology from the University of Illinois.

H. Roice Nelson, Jr. is Senior Vice-President of Operations at Landmark Graphics Corp. in Houston. Prior to this position, he served as General Manager of the Allied Geophysical Laboratories and as Senior Researcher with the Seismic Acoustics Laboratory at the University of Houston. He has held various geophysical positions in Mobil Exploration and Producing Services, Inc. in Dallas, and has worked with Amoco Production Co. Mr. Nelson received a B.S. from the University of Utah and an M.B.A. from Southern Methodist University and is currently serving as a member of the SEG research committee.

T.E.W. Nind is an industry consultant specializing in the area of petroleum production engineering, and is Professor of Mathematics at Trent University in Peterborough, Ontario, Canada. He worked for eight years with the Royal Dutch Shell Group in Venezuela, Brunei, and Holland, concentrating in reservoir and production engineering. He served for six years as a member of the Oil and Gas Conservation Board, Province of Saskatchewan, Canada, was for several years a member of the Hydrology Subcommittee of the Canadian National Research Council, and has been a Visiting Professor at the Universidad Autonoma de Mexico. He is the author of The Principles of Oil Well Production and has written numerous technical papers. Professor Nind is a graduate of Cambridge University and past President and Vice Chancellor of Trent University.

Dr. Harry H. Roberts is a professor at the Coastal Studies Institute and Department of Marine Sciences, Louisiana State University in Baton Rouge. Since 1968 Dr. Roberts has been formulating and conducting field-oriented research projects in both carbonate and terrigenous settings related to a wide variety of coastal and shelf problems including sedimentation, physical processes, geomorphology, and ecology. He has conducted field investigations in the Mississippi River delta, South Florida, Bahama Islands, British West Indies (Cayman Islands), Barbados, Dominican Republic, Nicaragua, Nile River delta, Straits of Hormuz (Oman), Red Sea Coast and many other areas. Dr. Roberts has published numerous articles and technical reports on both basic and applied coastal geoscience. He is a member of Sigma Xi, SEPM, GSA, and IAS and received a Ph.D. in Geology from Louisiana State University.

Dr. Richard C. Selley is a consulting geologist in London, England, and has worked as a geologist, mainly for oil companies in Northwest Europe, the Mediterranean, North Africa, and the Middle East, specializing in the applications of sedimentology to exploration and development of hydrocarbons. Dr. Selley has lectured worldwide and has written two textbooks and over thirty papers on sedimentology and petroleum geology. In 1975 he received the Murchison Fund Award of the Geological Society of London. He was also the 1978 Distinguished Lecturer of the Petroleum Exploration Society of Australia. He received his Ph.D. in Geology from London University.

Ray L. Sengbush, formerly Vice President, Geophysics, of Integrated Energy, Inc., based in Houston, Texas, has over 35 years experience in geophysics involved in the search for oil and gas. He has worked primarily at Magnolia Petroleum and its parent company, Mobil Oil. More recently he founded, with Norris Harris, Pexcon International, Inc. His degrees are from the University of Wisconsin, Madison, and Southern Methodist University.

M.J. Sergesketter is a consulting engineer in Houston, Texas, specializing in flow measurement and process control applications. His over quarter century of industry experience includes facilities engineering with Shell Oil Company and sales and application engineering with Daniel Industries and ITT Barton. He holds a Bachelor of Science degree in Electrical Engineering from Purdue University and is a graduate of the U.S. Army Command and General Staff College. Mr. Sergesketter is a registered professional engineer in Texas and Louisiana, a senior member of the Instrument Society of America (ISA), a member of the Institute of Electrical and Electronic Engineers (IEEE), and a member of numerous industry organizations, including past director of the Gulf Coast Gas Measurement Society. He is active in the Gulf Coast Measurement Short Course and has presented numerous technical papers there and at the International School of Hydrocarbon Measurement. He teaches regularly at API and GPA sponsored schools presented by the University of Texas Petroleum Extension Service and for several major oil companies.

Dr. Robert E. Sheriff, who is Professor of Geophysics at the University of Houston, is one of the industry leaders in the application of technology to petroleum exploration. He formerly served as Senior Vice President of Seiscom Delta, Inc. in Houston, and was a Senior Geophysicist for Chevron Oil Company where he was responsible for geophysical activities as well as the development and teaching of exploration courses. Dr. Sheriff, a past recipient of the SEG's Kauffman Gold Medal, was a First Vice President of the SEG, Associate Editor of SEG's Geophysics magazine and Program Chairman of its 1976 International Meeting. He has published widely in the exploration literature field and has presented his many petroleum exploration courses worldwide. Dr. Sheriff holds a Ph.D. degree in Physics from Ohio State University.

Dr. Charles T. Siemers is president and senior scientist of Sedimentology, Inc., Boulder, Colorado and has extensive research and exploration experi-ence on the genesis and hydrocarbon-bearing poten-tial of a wide variety of depositional systems throughout North and South America. In addition to authority over 25 scientific publications, he has lectured in numerous short courses and has received several awards for scientific contributions, including the A.I. Levorsen Award. Dr. Siemers received his Ph.D. from Indiana University and has been a professor of geology at Indiana University, the University of New Mexico and the University of Wyoming, as well as Senior Research Geologist for 5 years with Cities Service Company.

Dr. Robert M. Sneider is President of his own Houston-based exploration-consulting company. He is engaged in hydrocarbon exploration and development of sandstone and carbonate reservoirs in the Gulf Coast and Western U.S. He consults on geological and engineering problems in basins throughout North America and in Australia. He has more than 26 years of experience in exploration, production, research, training, and management including over 7 years with Shell Oil and Shell Development and 17 years with Sneider and Meckel Associates. Dr. Sneider is recognized in the industry as a leader in successfully applying the team concept of joint geologic-engineering studies for exploration and exploitation. He has taught and lectured worldwide to geologists, engineers, geophysicists and managers. He was a distinguished lecturer for the Society of Petroleum Engineers. Dr. Sneider received his Ph.D. in Geology and Mining Engineering from the University of Wisconsin.

Dr. Earle Steinberg is a Partner in Touche Ross & Co. in Houston. Prior to this Dr. Steinberg was Senior Partner with SOM Associates, a Houston-based international consulting firm. His industrial experience includes several years in Distribution and Manufacturing as well as Logistics Management in the United States Army. As an active consultant, Dr. Steinberg has worked with PEMEX, PETROVEN, ARAMCO, NASA, U.S. Air Force, U.S. Navy, Weatherford International, Ramteck Industries, Hydril, Ameraflex Rubber & Gasket Co., Milchem, FMC, McEvoy Oilfield Equipment Co., National Supply, Digicon, Inc. and others. He is a national vice president of the American Institute for Decision Sciences and past President of the Houston Chapter of the American Production and Inventory Control Society. For the past several years, Dr. Steinberg has also been an Associate Professor of Operations Management at the University of Houston. He has written numerous papers in his area. Dr. Steinberg holds a B.A. degree in Psychology from Boston University, an M.Sc. degree in Quantitative Analysis, an M.B.A. in Management and a Ph.D. in Business Administration with a concentration in Production and Operations Management from Georgia State University in Atlanta.

Dr. Thomas L. Thompson is President of Thompson Geological Explorations, Inc. (Boulder). Prior to this he served as Exploration Manager for Fain Porter Production Co. in Oklahoma City. His varied work experience includes: field mapping in the Rocky Mountains, military geology of the Alaskan north slope, mineral exploration in British Columbia and uranium exploration in Colorado, mapping the geology of underground nuclear explosions in Nevada, oil and gas exploration in the U.S. midcontinent and Rocky Mountains, field supervision of mineral exploration in Alaska and western U.S. and liaison to oceanographic research institutes. He taught petroleum geology and the geology of continental margins at the University of Oklahoma and was honored as Distinguished Lecturer for AAPG. In 1976 Dr. Thompson participated as scientist on board the Glomar Challenger for Leg 48 of the Deep Sea Drilling Project offshore Bay of Biscay (France) and Rockall Plateau (U.K.) He received his Ph.D. in Geology from Stanford University.

Charles Tutt, Jr., Vice President of Intera Petroleum Consultants, Inc., obtained a B.S.E degree in 1972 and an M.S.E. degree in 1974, both from The University of Michigan. His engineering experience began with the American Natural Resources Company where he worked on reserves estimation, gas storage field design, and specification of related computer software. Later he joined Intercomp as a consulting engineer and performed reservoir simulation studies of oil and gas reservoirs, both domestic and international. More recently he assumed responsibilities as Product Manager for Intercomp's black oil reservoir simulation model. Mr. Tutt is a registered engineer in Michigan and Texas, and a member of SPE, ACM, IEEE, and SIAM.

Dr. Douglas W. Waples is a geochemical consultant to the oil industry based in Dallas, Texas. He has worked for Chevron and Mobil in both research and exploration, and taught at the Colorado School of Mines. He also held research and teaching fellowships in West Germany and Chile. Dr. Waples was organic geochemist on two legs of the Deep Sea Drilling Project. He has authored papers on a variety of subjects in organic geochemistry, one of which won the 1982 J.C. Sproule award from the AAPG, and a textbook, Organic Geochemistry for Exploration Geologists. Dr. Waples has a Ph.D. in chemistry from Stanford University, but deep in his heart he has always been a geologist.

Dr. John K. Warren is an assistant professor at the University of Texas at Austin. Prior to this he served as an assistant professor at the University of Texas at Dallas, as a consulting geologist for Esso Minerals Australia and as a geologist for South Australian Dept. of Mines and Energy. Dr. Warren has a B.S. degree in Geology and Paleontology from the University of Adelaide and a Doctor of Philosophy from Flinders University of South Australia. He is active in many international professional societies and has written numerous publications.

Dr. Anton Ziolkowski is Professor of Geophysics at Delft University of Technology in the Netherlands. Most recently he served as Research Consultant to British National Oil Corporation specializing in the areas of deconvolution and air guns. Dr. Ziolkowski has also worked as Chief Geophysicist for the National Coal Board of England, where he was responsible for the technical control, development, and administration of a high resolution seismic exploration program. Prior to this assignment he was a member of Massachusetts Institute of Technology's Seismic Discrimination Group of Lincoln Laboratory in Cambridge, where he concentrated on the development of techniques for discriminating between earthquakes and underground nuclear explosions by analysis of their seismic radiation. Dr. Ziolkowski received the 1982 EAEG Conrad Schlumberger Award for his work on seismic sources. He has a Ph.D. in Geophysics from Trinity Hall, Cambridge, England, and an M.Sc. in Economics from the London School of Economics.

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Petroleum companies worldwide are looking for innovative and cost-effective ways to meet ongoing training needs. The presentation of private, in-house course offerings, carefully targeted and tailored to an organization's specific requirements has proven to be one effective solution.

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IHRDC has over 100 technical and management programs which can be offered at your facilities on-site, on time, and within budget. These courses can be presented to as few as ten, or as many as fifty individuals. Our programs in petroleum engineering, geology, geophysics, and management include courses suitable for training all levels: new hires, intermediate personnel, as well as advanced technical specialists. IHRDC offers full tailoring and redesign capabilities for any of our existing programs and, in addition, will custom-design a specific program for a client.

The following partial list of programs can be incorporated into your internal on-site training efforts. In the event that your organization does not have a large enough group to justify sponsorship of an in-house program, IHRDC can organize a group of companies in your area for co-sponsorship of a particular course.

For a specific proposal or further information on IHRDC's in-house training programs, please contact:

C.K. Locke, Manager of Instructional Programs,
IHRDC, 137 Newbury Street, Boston, MA 02116 USA
Tel: (617) 536-0202, Telex: 940557

Introduction to Seismic Interpretation (3 days)
Dr. Robert E. Sheriff

Seismic Stratigraphy (3 days)
Dr. Robert E. Sheriff

Structural Interpretation of Seismic Data (including Migration) (5 days)
Dr. Robert E. Sheriff

Advances in Seismic Prospecting (2 days)
Dr. Nabil A. Morgan

Seismic Data Acquisition for the Practicing Explorationist (3 days)
Dr. Nabil A. Morgan

The New Seismic Explorationist: Field, Processing, and Interpretation Methods (5 days)
Dr. Nabil A. Morgan

Seismic Processing for the Practicing Explorationist (2 days)
Dr. Nabil A. Morgan

Vibroseis (3 days)
Maurice G. Barbier

Geophysics Today: An Overview for Exploration Management (3 days)
Dr. Robert E. Sheriff

Practical Seismic Interpretation: A Workshop Course (5 days)
Dr. Michael E. Badley

Vertical Seismic Profiling (3 days)
Alfred H. Balch

New Technologies in Exploration Geophysics (3 days)
H. Roice Nelson, Jr.

Deconvolution (2½ days)
Dr. Anton Ziolkowski

The Seismic Source (2½ days)
Dr. Anton Ziolkowski

Seismic Data Processing for Interpreters (3 days)
Ray L. Sengbush

Stratigraphic and Direct Detection Methods (3 days)
Ray L. Sengbush

3-D Seismics (3 days)
Dr. Gerald H.F. Gardner, Dr. John A. McDonald

Seismic Noise: Its Recognition, Detection, Evaluation, and Elimination (3 days)
Dr. John A. McDonald

Gravity and Magnetics (2 days)
Dr. Richard Geyer

Subsurface Facies Analysis (5 days)
Dr. Richard C. Selley

Petroleum Exploration Fundamentals (5 days)
David C. Morrill

Organic Geochemistry for Petroleum Explorationists (5 days)
Douglas W. Waples

Application of Kerogen Maturation Models to Petroleum Exploration (3 days)
Douglas W. Waples

The State of the Art of Computerized Logging (2 days)
Art Schmidt

Sandstone Depositional Systems (2 days)
Dr. George deVries Klein

Well Log Interpretation (5 days)
Donald J. Timko, John T. Dewan

Introduction to Petroleum Geology (3 days)
Dr. Richard C. Selley

Carbonates and Evaporites (5 days)
Dr. John K. Warren

Tectonic Guidelines to Oil and Gas Exploration: A Geologist's View (5 days)
Dr. Thomas L. Thompson

The Exploration and Development of Sandstone Reservoirs (5 days)
Dr. Robert M. Sneider

The Exploration and Development of Carbonate Reservoirs (5 days)
Dr. Robert M. Sneider, Dr. Harry H. Roberts

Practical Prospect Generation and Analysis: A Workshop Course (5 days)
David C. Morrill

Practical Subsurface Geological Analysis Using Well Logs (5 days)
David C. Morrill, Hans-Jurgen Meyer

Applied Sedimentology for Hydrocarbon Exploration (5 days)
Dr. Charles T. Siemers

Sedimentological Analysis of Whole-Diameter Cores: A Workshop (2 days)
Dr. Charles T. Siemers

Contributions of Geology, Geophysics, and Engineering in the Development of the Petroleum Reservoir (5 days)
Dr. Robert E. Sheriff, Dr. Richard C. Selley, Dr. David A.T. Donohue

Reservoir Geology of Sandstones for Engineers (4 days)
Dr. Robert M. Sneider

Petroleum Engineering for Exploration Personnel (3 days)
Frank O. Reudelhuber

Reservoir Appraisal and Development (5 days)
L.P. Dake

Reservoir Engineering: Theory and Practice of Secondary Recovery (5 days)
L.P. Dake

Well Completion Design (5 days)
Michael Golan

Natural Gas Production and Field Processing Technology (5 days)
Frank O. Reudelhuber

Natural Gas Production, Transmission and Processing (5 days)
Dr. Mark Klins

Well Completions and Operations (5 days)
James R. Eickmeier

Artificial Lift Systems (5 days)
James R. Eickmeier

Drilling and Well Completion Technology (10 days)
Dr. Chi Ikoku

Drilling Engineering with Offshore Considerations (5 days)
Ellis H. Austin

Petroleum Production Engineering (5 or 10 days)
T.E.W. Nind

Fundamentals of Reservoir Engineering: Oil Reserve Estimates, Reservoir Mechanics, Well Testing and Enhanced Recovery (5 days)
Dr. Turgay Ertekin

Surface Facilities Design: A Practical Workshop (5 days)
Dr. Said Arrata

Drilling Techniques (3-5 days)
Peter J. Mills

Advanced Reservoir Modeling (5 days)
Dr. Turgay Ertekin

Hydrogen Sulfide in Drilling and Production Activities (2 days)
G. Russell Goodwin

Firefighting and Safety Programs (5 days)
G. Russell Goodwin

Blowout Prevention: Theory and Practice (3-5 days)
Peter J. Mills

Oil & Gas Measurement (5 days)
M.J. Sergesketter

Emergency First Responder Course for Oil and Gas Drilling and Production Personnel (3 days)
G. Russell Goodwin

Fundamentals of the Refining and Petrochemical Industry: Technical and Commercial Aspects (5 days)
Dr. Musa R. Kamal

LNG Development Projects from Wellhead to Market (5 days)
Richard A. Norman

Decision Methods for Petroleum Investment (3 days)
Dr. Robert C. MacDonald

Economic Evaluation of Petroleum Exploration and Development Projects (5 days)
Norman W. Miller

Project Management and Cost Control (10 days)
Dr. Albert A. Einseidel, J. Nicholas Kattchee

Introduction to Management and Supervision (5 days)
John J. Connor

Introduction to Manpower Planning (5 days)
John J. Connor

Effective Communication (3 days)
John J. Connor

On-The-Job Training (5 days)
John J. Connor

Economics of Materials Management (5 days)
Touche Ross & Co.

Using the Personal Computer: A Workshop Course (2 days)
Charles Tutt, Jr., Anne Huston

For details ask for IHRDC's Catalog of In-house Courses

General Information

Fees
All fees are listed in U.S. dollars. Payments should be made in U.S. funds drawn on a U.S. bank and are due before the commencement of the course.

Cancellations
A fee of $300 will be charged to enrollees who cancel their enrollment after the closing date of the course. IHRDC reserves the right to cancel any program when enrollment is not sufficient to ensure effective sessions. In such instances, enrollment fees will be returned in full.

Schedule
Course times usually run from 9:00 AM to 12:00 noon and from 1:00 PM to 4:30 PM with both morning and afternoon coffee breaks.

Hotel Reservations
IHRDC blocks a limited number of rooms at each conference hotel. Reservations for these rooms run as follows:
U.S. and Canada—arrival on day before course/departure on last day of course.
Others—arrival on day before course/departure on day after course.
Enrollees needing hotel accommodations should call the assigned conference hotel directly, mentioning IHRDC. The hotel will hold the block of rooms until the course closing date. Contact IHRDC Registrar for hotel location.

Course Closing Date
U.S. and Canada—two weeks prior to first day of course.
Others—four weeks prior to first day of course.

For further information contact:

Cherry C.K. Locke
Manager, Instructional Programs
IHRDC
137 Newbury Street
Boston, MA 02116 USA
Telephone: (617) 536-0202
Telex: 94-0557

Enrollment Form

Enrollment can be made by completing and mailing the enrollment form below, by telephone, or by telex to:

IHRDC Registrar
Ms. Marilyn Larkin
137 Newbury Street
Boston, MA 02116 USA
Telephone: (617) 536-0202
Telex: 94-0557
Cable: HUMDEVCO BOSTON

It is desirable that enrollment procedures be completed as early as possible and no later than two weeks prior to the beginning of the course. Enrollments will be handled on a first-come-first-served basis.

Please reserve space for me in:

Course(s) _____

_____

Location _____

☐ fee enclosed ☐ please invoice

Please respond to:

Name _____

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Address _____

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