Entrac Petroleum Ltd

Training Courses 2024

Excellence in Petroleum Learning

EPL runs both public and in-house courses.

For in-house courses, please e-mail or fax us with name of course, number of delegates and suggested date.

For a complete list of petroleum engineering courses, please look at the miscellaneous page at back of this document.

Entrac Petroleum Ltd.

Baghdad Centre: Tel:+964 773 485 5848

e-mail: epldrilling@btinternet.com

e-mail: info@entrac-petroum.com

1. Well Control (IWCF: Levels 2,3 and 4), IADC (Wellsharp)

Course Duration: 5 days for levels 3 and 4 including practicals

4 or 5 days for level 2,depending on candidate background. No practicals.

Certificate Duration: Levels 3 and 4:2 years

Level 2: 5 years

Course Overview

The Well Control course addresses the principles and the theory of well control along with the most commonly used well control techniques.

Designed For

Designed for Drillers, Assistant Drillers and Drilling Engineers and personnel involved in the drilling process, both onshore/ offshore and who are preparing to attend the certified IWCF course-Level 2, and/ or those who want a thorough knowledge of well control techniques.

Course Objectives

This is a theoretical and practical course for surface installation. The course is designed to enhance the understanding of the fundamentals of well control that can be applied at most well control operations, and to prepare candidates for IWCF testing. In addition, delegates will be able to understand the followings:

Surface Principles & Procedures

- Overview
- Introduction to Well Control
- Barrier Concept
- Risk Management
- Causes of kicks
- Kill Warning Signs
- Kick Indicators
- Top Hole Drilling & Shallow Gas
- Circulating Systems
- Fracture Pressure and Maximum Surface pressure
- Influx Characteristics and Behaviour
- Shut in Procedures
- Well Control Methods
- Kill Sheets
- Well Control during Casing and Cementing Operations.

Surface Equipment

- Blowout Preventers
- Associated Well Control Equipment
- Choke Manifold and Chokes
- Auxiliary Equipment
- Barriers
- BOP Testing

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info@entrac-petroleum.com
Tel:+964 773 485 5848

- BOP Control Systems

Practicals for levels 3 &4 only.

2. Advanced Well Control

Instructors: Dr. H Rabia

Course Duration: One week plus a project.

Conditions: A candidate must be sponsored by an operator or a service company and must have a Wellsharp certificate or IWCF Level 4 certificate.

Who Should Attend:

Drilling Engineers, Drilling Supervisors, Rig Managers and Toolpushers.

Objectives:

To learn detailed well control procedures including volumetric and stripping methods and bull-heading. Learn to produce annular pressure profiles and deal with equipment failure.Other topics include: horizontal well control, correcting kick graphs, HPHT wells considerations, well control during casing and cementing and well barriers.

Delegates are strongly advised to bring a laptop loaded with Excel in order to solve the many exercises given in this intensive course.

Content:

- Well barriers
- Leak off and FIT tests and proper interpretation
- Kick tolerance
- Review of primary well control methods
- Influx characteristics
- Primary and secondary build-up interpretations: choosing proper SIDPP and SICP
- Gas solubility and effects of Z factors
- Annular pressure profiles: Drillers and W& W Methods: Detailed example
- HPHT Well considerations: Comparing surface and downhole kicks
- Horizontal well control
- Correcting kick line graphs
- Single and distributed kicks: surface signs
- Volumetric method: details and actual worked example
- Stripping method:
- Worked example
- Well control when running casing and cementing
- Bullheading
- Dynamic and momentum kill methods
- Trapped annulus pressure
- Dealing with MAASP and its effect on shoe fracture pressure
- Shallow gas

epldrilling@btinternet.com
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- Underground blowouts
- Hydrates: Determining the onset of hydrates
- Relief well design considerations
- Degassers design considerations: determining optimum kill rate
- Tertiary well control methods
- Risk management

Exam preparation.

3. Well Intervention (IWCF: Levels 2,3 & 4) IADC: WellSharp

Course Objectives

This programme is aimed at people who are in critical well control positions during well intervention operations. Candidates will complete an accredited training course, taught according to IWCF syllabus, in order to prepare them for assessment.

At the end of the course delegates should be able to understand of well control methods relating to well intervention operation.

- Identify completion types, equipment functions and industry practices
- Identify barrier systems and know the terminology
- Identify well control methods
- Identify solutions to various well control problems
- Determine if well control equipment is fit for purpose
- Design a well kill plan for a production well and generate a kill graph
- Discuss production well kill problems and recommend appropriate solutions

The course is delivered through lectures supported by videos and animations, self-study exercises, and group discussions. The course concludes with two closed-book examinations leading to the required certificate of competence in well intervention.

Course Duration: 5 days

Certification Type: Wireline or Coiled Tubing

(Note: candidates can take both exams)

Certificate Duration: 2 years

Course Components

Coiled Tubing Operations

- Coiled Tubing Equipment
- CT BOPs
- Rigging Up
- CT Testing
- CT Barrier Principles
- Contingency Procedures
- Shut in Procedures

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info@entrac-petroleum.com
Tel:+964 773 485 5848

Well Control Procedures

- Overview
- Introduction to Well Control
- Introduction to Barriers
- Risk Management
- Causes of Unplanned Well Inflow
- Circulating System
- Well Integrity Testing
- Influx Characteristics and Behaviour
- Shut in Procedures
- Well Control Methods
- Contingency Planning

Completion Equipment

- Blowout Preventers (BOP)
- Wellheads
- Xmas Trees
- Completion Tubing
- SSSVs
- Completion accessories including: Landing Nipples, SSD's, Side Pocket Mandrels, Blast joints, Seal Assemblies and WLENG
- Packers and Setting Procedures
- Perforating
- Barriers
- Completion Equipment Testing
- Completing the Well
- Annulus Pressure Monitoring
- Trouble Shooting & Contingency Planning

Wireline Operations

- Pressure Control Equipment
- Rigging Up
- Testing
- Barrier Principles
- Managing a Leak or Malfunction on Surface
- Contingency Procedures
- Critical Operating Procedures
-

Well Control Procedures

- Overview
- Introduction to Well Control
- Introduction to Barriers
- Risk Management
- Causes of Unplanned Well Inflow
- Circulating System

- Well Integrity Testing
- Influx Characteristics and Behaviour
- Shut in Procedures
- Well Control Methods
- Contingency Planning

Completion Equipment

- Blowout Preventers (BOP)
- Wellheads
- Xmas Trees
- Completion Tubing
- SSSVs
- Completion accessories including: Landing Nipples, SSD's, Side Pocket Mandrels, Blast joints, Seal Assemblies and WLENG
- Packers and Setting Procedures
- Perforating
- Barriers
- Completion Equipment Testing
- Completing the Well
- Annulus Pressure Monitoring
- Trouble Shooting & Contingency Planning

Exam on 5th day.

4. Basic Petroleum Geology/Geoscience

Instructor: Several Instructors

Objectives

This course provides an introduction to petroleum geology and operational and wellsite geological procedures. Delegates will be instructed in the physical and chemical properties of the major sedimentary rocks and will be able to examine hand specimens and drill cuttings of all the major rock types. The origin, migration and trapping of hydrocarbons is covered together with a review of key sedimentary and geological features such as folding and faulting. The effect of geology on key drilling practices such as mud systems, bit selection and performance and directional drilling is also discussed. The course is highly practical, includes a comprehensive manual and is presented in an informal style to promote maximum participation and discussion.

Audience

Drilling and Petroleum Engineers, Directional Drillers, Mud Engineers, Bit Design and Application Engineers, Office Support Staff, Secretaries, Foremen and Lab technicians

Course Content

- Introduction to Geology
- Structure and Composition of the Earth
- The Time Scale
- Stratigraphy and Fossils

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- Igneous and metamorphic rocks
- Geological Processes
- Basic Rock Types and Classifications
- Folding and Faulting
- Sedimentary Rocks
- Classification Schemes
- Clastics
- Carbonates

Mud Rocks

- Textures
- Colours
- Mineralogy
- Environments
- Clastic Rocks
- Grain Texture
- Components
- Cements
- Colour
- Porosity and Permeability
- Environments
- Carbonates
- Components
- Grains
- Cement/Matrix
- Diagenesis
- Environments
- Dunham Classification

Chemical Rocks

- Surface Processes
- Environments of Deposition
- Depositional Features
- Sedimentary Structures
- Petroleum Geology
- Origin of Hydrocarbons
- Migration and Traps
- Sedimentary
- Petrology
- Others
- Wellsite Description and Analysis
- Sample Collection & Processing
- Drill Cuttings /Oil Show Evaluation
- Lithological Evaluation
- Oil Show Evaluation/ Reservoir Plays
- Coring Operations
- Conventional Coring
- Sidewall Cores

- Sedimentary Structures
- Petroleum Systems
- Formation Pressures
- Earth Stresses
- Rock Properties
- Wellbore Failure

5. High Pressure & High Temperature Technology

Instructor: Dr. H. Rabia

Objectives

To explore the challenges of drilling and evaluating HPHT wells. Students will learn about well planning processes, the drilling and geological challenges presented by HPHT wells and pore pressure detection processes, rock fracture pressure and ECD requirements and well control procedures. Rig types and casing design methods will be explored.

Audience

Geologists, Geophysicists, Petroleum and Drilling Engineers. Some wellsite or operations experience and a basic knowledge of geology are beneficial for this course.

Course Content

- HP/HT Drilling: Definitions
- HPHT profiles and history: temperature and pressure
- HPHT incident statistics
- Drilling window/ECD
- Formation pressure evaluation
- FIT consideration
- Casing seat selection
- Hydrocarbon phase behaviour
- Gas solubility
- Gas behaviour under HPHT conditions
- Kick Tolerance
- Casing design for HPHT wells
- Sour gas consideration, special casing grades
- Casing wear consideration
- Well control equipment
- General rig equipment layout
- Down-hole equipment
- Degassers
- Mud types

- Effects of P/T on mud properties
- Effects of gel strength
- Breathing and ballooning
- Swab and surge pressure profiles
- ECD against depth
- Barite sag
- Tripping procedures
- Actual examples from North Sea wells
- Cementing consideration
- Well testing consideration
- Well completions
- Exercises

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info@entrac-petroleum.com
Tel:+964 773 485 5848

6. Practical Drilling Technology

Instructors: Dr. Hussain Rabia

Audience: - This course is suitable for Drilling Engineers, Drilling Supervisors, Completion Engineers, Geologists, Reservoir Engineers, Asset Team Members and Project Management Members wishing to understand the basic processes involved in the drilling of oil and gas wells.

Objectives

On completion of this course participants will be able to identify rig components, types and functions of casings, basic casing design calculations drill bit types, mud types and functions, cementing, how to select Drillstring components, hoisting calculations, rig selection fracture gradient and basic hole problems.

Course Content

- Basic Petroleum Geology
- Rig types: onshore and offshore
- Rig Components
- Hoisting Operations: tripping in and out, ropes, ton-miles, derrick capacity, calculations
- Drillstring: grades and types drillpipe, drillcollars, HWDP, selection, API design method
- Drilling Muds : functions and types
- Fracture Gradient and Casing Seat Selection: example
- Basic Casing Design Calculations: collapse, burst and tension. Triaxial method
- Cementing
- Directional and Straight Hole Drilling
- Hydraulics
- Drilling Bits (Three cone and PDC)
- Hole Problems: stuck pipe and fishing

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info@entrac-petroleum.com
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7. Horizontal & Multilateral Wells

Instructors: Dr. H. Rabia

Objectives

At end of course, participants will be able to identify candidates wells for horizontal drilling, design horizontal and multilateral well profiles, understand single and double build curve, calculate torque and drag, understand kick off methods, compile a drilling and completion programme and estimate wellbore stability mud weights

Course content

- Geology and reservoir considerations
- How to select and screen horizontal wells
- Target Considerations: Dimensions, Azimuth, target area, markers
- Profile design and well path calculations: Example from Oman
- Drill string design: Torque, drag, buckling calculations
- Mud systems
- Kick off techniques
- Drillbits and coring
- Rock Mechanics and Wellbore stability: Actual Example from North Sea
- Hole Cleaning
- New drilling Methods: ERD, UBD, CT, Intelligent MWD systems
- Logging and perforating horizontal wells
- Completion methods: zonal isolation, multilateral considerations
- Formation damage and cleaning
- Workover considerations
- A Complete Well Design Exercise and presentation

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

8. Stuck Pipe Prevention

Instructor: Dr. S Saleh, or Dr. H. Rabia

Audience

Drilling, completion engineers, supervisors and service company personnel.

Objectives

At end of course participants will be able to identify major hole problems. They will be able to diagnose differential and mechanical sticking, find solutions and improve drilling programmes.

Course Content

- Stuck Pipe Diagnosis
- Differential sticking mechanisms
- Freeing differentially stuck pipe
- Pipe freeing agents
- Reduction of mud hydrostatic pressure
- Dealing with kicks while freeing stuck pipe
- The U-tube method
- Mechanically stuck pipe mechanisms
- Shale problems (brittle, reactive and hard shales)
- Settled cuttings
- Ledges and doglegs
- Key seating
- Fractured formations
- Decision trees: Which pipe sticking mechanism is in my hole?
- Economics
- Calculations

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info@entrac-petroleum.com
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9. Fishing Operations

Instructor: Dr. H. Rabia

Audience

Drilling, completion engineers, supervisors and service company personnel.

Objectives

At end of course participants will be able to identify major fishing equipment. They will be able to diagnose the fishing operation and choose the appropriate fishing tools for the job.

Course Content

- Casing strength and tool strength specification
- Milling tools and assembly
- Hole cleaning and swarf removal
- Window milling
- Milling junk
- Standard fishing tools
- Fishing operations
- Fishing economics
- Free point indicator
- Explosive charges
- Torque calculations
- When to give up

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info@entrac-petroleum.com
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10. Cementing Technology

Duration: one week or two days

Director: Industry guests

Learning Outcome

To be able to plan, engineer and trouble shoot cement jobs. Carry out cement calculations and interpret cement quality logs (CBL/VDL/USIT)

Course Content

- Cement Chemistry: manufacture, lab testing methods, sampling
- Cement Additives: types & formulations
- Casing & Cementing Hardware/ Liners: liner jewellery, liner laps
- Mud Removal: Chemical and mechanical means
- Cement Calculations: cement yield, single, two stage, liner, differential pressure
- Stage Cementing
- Floating/ Large casing
- Hydraulics: annular pressures and Frac considerations
- Salt problems
- CBL/VDL & USIT Log: interpretation
- Remedial Cementing & Calculations: squeeze cementing
- Cement plugs
- Gas Migration: causes and cure
- Horizontal Cementing
- Casing Buckling: minimum cement height calculations
- Well abandonment

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11. Basic Petroleum Engineering

Instructor: Dr. H. Rabia plus others

Audience

This course is suitable for Petroleum Engineers, Production Engineers, Reservoir Geologists, Drilling Engineers, Drilling Supervisors, Asset Team Members and Project Management Members.

Objectives

Participants at the end of this course will be able to have a well rounded knowledge of the petroleum industry from geology, drilling, reservoir engineering to production. They will be able to under reservoir rock properties, drive mechanisms, methods of depletion, well testing and well completion methods.

Course Content

- Petroleum geology: Introduction, the earth and its structure sedimentary rocks, hydrocarbons, classification of oil and gas traps, exploration techniques.
- Petroleum Reservoirs: Reservoir rock properties
- Reservoir drive mechanisms
- Drilling Operations: basic rig components, drilling fluids, drilling problems, downhole motors, directional drilling
- Casing programs, cementing operations
- Well completion: types of well completions, perforating, well stimulation.
- Reservoir Fluid Properties: Introduction, composition and structure of petroleum, physical properties of hydrocarbons
- PVT analysis of reservoir fluids, properties of natural gases, phase behaviour of hydrocarbon systems.
- Recovery methods: Primary recovery, enhanced oil recovery, recovery efficiencies, reservoir estimates.
- Production of Oil and Gas: Flowing wells, artificial lift systems, comparisons, applications.
- Processing of produced Fluids: Surface processing systems, surface equipment, fluid separation, gas dehydration, flowline sizing, and oil and gas measurement, net oil computers.
- Offshore Operations: Historical development, weather, environmental forces, platform and facilities design and construction, special problems, storage and transportation, other equipment and special problems on production platforms, new developments

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info@entrac-petroleum.com
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12. Mud Technology & Solids Control

Instructor: Dr. Saad Saleh plus others

Target Group**:** Drilling Engineers and Operations

Objectives

Participants will discover how critical is the control and disposal of solids and liquids in drilling, workover and completion operation. The course starts with the source of the problem: drilling and mud. Then each mud type will explained in details: water-base and oil-based. If oil based mud is used the disposal and removal of drillcuttings will be vital. Participants will obtain answers here that address the current problems associated with these solids and disposal of oily cuttings.

Course Content

1. Definition and Functions of Drilling Fluids
2. Drilling Fluid Chemistry and Rheology
    - Chemical Analysis
    - Mud Weight
    - Viscosity
    - Yield Point
    - Gel Strength
    - Fluid Loss
    - Solid Content
3. Drilling Fluid Design for Carbonates and Shales
4. Formation Damage Concerns
5. Benefits of Light Weight Fluids
6. Functions of Drilling Fluid Additives and Chemicals
7. Clay Structure and Shale Problems
8. Loss Control Material for Complete Loss Circulation
9. Types of Mud Systems and their Characteristics
    - Inhibitive Mud
    - Oil-Based Mud
    - Low Solids Non-Dispersed Mud
    - Dispersed Mud
10. Separation equipment:
    - shale shakers
    - hydrocyclones
    - mud cleaners
    - centrifuges

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info@entrac-petroleum.com
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13. Advanced Casing Design

Instructor: Dr. H. Rabia or Dr. Saad Saleh

Objectives

This course offers a practical approach to casing design methods and buckling analysis. The course is based on numerous wells drilled successfully in many parts of the world including the UK, Vietnam, Pakistan, Bulgaria, Tunisia, Egypt, Abu Dhabi, Russia, Indonesia, and Yemen. The course will cover conventional, horizontal and high pressure/ high temperature wells.

Participants will be able to design casings for any well: onshore, offshore, high pressure and high temperature wells, horizontal and multilateral wells.

Course Details

- Steel properties and API casing strength
- CRA Material
- Casing seat selection
- Casing design criteria
- Casing loadings and safety factors
- Casing design methods for:
- Design considerations for Exploration, Development,
- Horizontal wells
- HPHT wells
- Triaxial Stress Ellipse
- Kick profiles
- Kick Tolerance
- Temperature effects and trapped annular pressures
- Buckling analysis
- Sour gas consideration
- Cementing practices
- Cementing tools
- Cementing Calculations
- Remedial cementing
- Well suspension and abandonment
- Casing wear
- Complete well design

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info@entrac-petroleum.com
Tel:+964 773 485 5848

14. Wellbore Stability and Rock Mechanics

Instructor: H. Rabia or Dr. Saad Saleh

Objectives

This is the only course available in the industry which discusses borehole stability using modern rock Mechanics techniques.

To understand hole stability during drilling and production. Understand why wells collapse and how to prevent that.

Course Content

- Rock behaviour
- Stresses due to drilling a well
- Stress transformations for horizontal and multi-lateral wells
- Mohr envelope
- Failure criteria
- Triaxial rock testing
- Borehole rupture mechanics
- Hole collapse mechanisms
- Safe mud envelope
- Stuck pipe problems
- Designing a perfect well with the earth stresses

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info@entrac-petroleum.com
Tel:+964 773 485 5848

15. Well Completions

Instructor: Various

Audience

This practical seminar is directed at exploration, engineering and drilling personnel concerned with drilling, well engineering, completion, reservoir management, and workover and rig formen. They should all benefit from attending this course.

Course Content

- Completion Relationships
- Economic Life of a Field
- Field Development Plan
- Drilling Sequence
- Reservoir Characteristics
- Geology and Geophysics, Petrophysics, Drive Mechanisms, Fluid Flow, Formation Damage, Stimulation, Multiple Zones, GOR/Watercut Development
- Well Design
- Target, Casing and Cement, Hole Size, Deviation, Drill-in Fluids, Multiple Boreholes
- Completion Components: Tubing, packers, Nipples and Locks, Regulating Devices, Side Pocket Mandrels, Sliding Sleeves, Tubing to Packer Joints, Tubing to Packer Joints, Pumping Devices, Instruments, Retrievable Control
- Completion Concepts
- Simple Completions, Monobore Completions, Commingled Flow, Dual Completions,
- Artificial Lift
- Sand Control
- Intelligent Completions
- Permanent vs. Retrievable
- Production Problems
- Formation Fines, Gas/Emulsion Blocking, Scale, Wax/Asphaltenes/Hydrates, Pressure Loss, Pressure Loss, Crossflow, Equipment Failure, Ignorance
- Light intervention
- Slickline, Electric Line, Monitoring, Perforating, Hole Cleaning, Flow Controls, Inflatables and Expandables, Stimulation, TFL
- Heavy Intervention
- Coiled Tubing, Snubbing, Workover

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info@entrac-petroleum.com
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16. Practical DST Interpretation for Engineers and Geologists

Instructor: Various

Audience

This practical seminar is directed at exploration, engineering and drilling personnel concerned with making operation decisions based on DST results of who use DST data in general exploration/exploitation work. It is also for regional geologists who use show maps and pressures in correlation work those looking for missed pay (bypassed pay) in old wells.

This seminar emphasizes practical application rather than theoretical derivations of computations. The comprehensive course manual contains DST charts from over 60 field examples which can be used for troubleshooting problem DST's later. Participants are encouraged to bring examples from their own work experience.Course is taught with visual aids keyed to the course manual.All material covered in exact order presented in the manual *(slowly, clearly,* and thoroughly!).This eliminates need for note taking allowing students to concentrate on lectures and discussions.

Course Outline

- Equipment fundamentals and pretest planning
- Basic pressure chart interpretation (qualitative) to identify permeability types - How to recognize depletion
- of a limited volume reservoir -Differentiation of depletion from 'supercharge'
- Recognizing mechanical problems, e.g. tool plugging. packer and valve leaks, etc.
- Pressure gauge and clock malfunctions
- Quantitative reservoir analysis for Kh, skin, PI, stable AOF, reservoir geometry understanding conflicts
- between DST and core/log data
- Missed pay (bypassed production) by identifying formation damage and 'deep' damage
- Closed chamber tests for deep overpressure or sour gas or tight gas
- Significance of recoveries of 'oil cut mud' and gas rates of 'tstm' to exploration
- Making a decision to complete or abandon a wildcat with only marginal DST results
- Interpreting poorly run old DST's where Horner Analysis & derivative type curves will not yield answers

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info@entrac-petroleum.com
Tel:+964 773 485 5848

17. Basic Petroleum Economics

Instructor: Various

Audience

Managers, Engineers, Explorationists, field and accounting supervisors, and other personnel who need to develop or improve their skill and understanding of basic economic analysis and profitability of petroleum exploration and production.

Objectives

Upon completion of this course, participants will be able to:

Develop or improve their skill and understanding of basic economic analysis and the profitability of the petroleum exploration and production.

Course Content

- forecasting: oil production using decline equations; understanding; what a 'reserve' is; operating expenses and capital expenditures, inflation; what determines the price of oil and gas.
- Cash Flow: techniques, principles, construction of spreadsheets; examples of various projects.
- Economic criteria: interest and hurdle rate; time value of money; selection and raking criteria.
- Risk and uncertainty: definitions, type of risk; mathematical techniques including risk and uncertainty in economic analysis; financing and ownership in the oil and gas industry: business arrangements between operators and between mineral owner and producer; typical oil company capital structure cost of capital.
- Accounting vs. cash flow: Accounting principles and definitions, difference between accounting and cash numbers; depreciation depletion and amortization.
- Budgeting: Types and process; selection of projects for the budget.
- Economic Analysis Operations: Examples of economic evaluations; and economic analysis techniques.

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info@entrac-petroleum.com
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18. Advanced Directional Drilling

Instructors: Guests or Dr. H. Rabia

Objectives

Attendees will learn UTM and grid coordinates, how to design directional wells, horizontal and multilateral wells, understand BHA's, MWD, surveying equipment, survey calculations and error quantification.

Course Content

- Reasons for directional wells
- Declination And Convergence
- UTM & Grid coordinates
- Factors Affecting Hole Deviation Including Formation And Drillstring Factors.
- Bottomhole assemblies. Placement of stabilisers.
- Survey Reference Points
- Calculations And Wellpath Plotting
- Surveying Tools And Accuracy
- Types Of Directional Wells: types 1,2 and three and calculations.
- Kick Off Points, Build Up And Drop Off Rates
- MWD And LWD
- Drillstring design
- Directional Drilling Techniques: Wellpath Design Calculations, Course Corrections, Tools
- Designing horizontal wells: kick off points, tangent and landing sections
- Long-, Medium-, & Short-Radius Wells; Extended Reach Wells, S-Bend Wells. Multi lateral designs. Joints integrity.
- Complete Well Planning Exercises
- Cluster Wells
- Collision Analysis
- Survey Errors, Quantification Of Error Sources
- Ellipsoid Descriptive Equations
- Spider plots & travelling cylinder
- Drillstring Design: Drill Pipe Selection, Drill Collar Selection
- Buoyancy Factor Method: Procedure For Selecting Drillcollars
- Heavy-Walled Drillpipe (HWDP), Stabilisers, Drilling Jars, Shock Subs
- Drillstring Design Criteria, Dogleg Severity Analysis

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19. Advanced Reservoir Geology

Instructor: Various

Course Content

- Objectives, need for quantification, references,
- What does the reservoir geologist have to work with?
- What is the reservoir Geologist's role?
- Concept of different reservoir models (depositional, layer and flow unit) and their uses
- Interpretation of Well Data
- Drilling cuttings, types of cores
- Core cutting, handling, description and analysis
- Role of reservoir geologist in core sampling – problems of bias and true representation of reservoir porosity and permeability
- Wireline logs in reservoir description
  - NMR logs and what they measure
  - Dipmeter and Image logs (introduction
  - Dipmeter & Image log theory, processing and interpretation using examples of both micro-resistivity logs (FMI etc) and sonic-based logs (UBI etc)
  - Dipmeter & Image log theory, processing and interpretation using examples of both micro-resistivity logs (FMI etc) and sonic-based logs (UBI etc) (continued)
  - Structural and stratigraphic interpretation exercises
  - Wireline logs in facies interpretation; uses and pitfalls
- Wireline logs in Correlation
  - Why are we trying to correlate?
  - What are we trying to correlate?
  - Introduction to seismic and sequence stratigraphy and the use of sequence stratigraphy in correlation Introduction to seismic and sequence stratigraphy and the use of sequence stratigraphy in correlation (continued)
  - Exercises in correlation and mapping Exercises in correlation and mapping (continued)
  - Examples of commercially successful applications of these concepts
- Construction and Application of Reservoir Models
  - Concepts, terminology, definitions and challenges
  - Integrated approach – value of 3D and 4D seismic
  - Reservoir classification (layer cake, jigsaw puzzle, labyrinth)
  - Construction and Application of Reservoir Models
  - Scales of reservoir heterogeneity and its impact of reservoir sweep efficiency
  - Identifying heterogeneity
  - Case studies of underestimating heterogeneity
- Overview of reservoir simulation:
  - Application of analogue models

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info@entrac-petroleum.com
Tel:+964 773 485 5848

20. Sand Production Management

INSTRUCTORS: Various

Who Should Attend

Engineers, technologists and field personnel with a technical or operational interest in wells that produce sand.

Summary:

This five-day course will address production problems resulting from excessive sand production and will present completion and workover techniques designed to either minimize or deal with sand production. The course will include heavy oil applications as well as sand production problems often associated with conventional oil, gas and water wells in international operations. The participant may expect to apply sand management methods learned to practical field operations.

Course Outline:

1) Sand Production Theory, Effects, and Costs
2) Identification and Quantification of Sand Production
3) Mitigation of Sand Production
   a) Mechanical Methods - screening devices, gravel packs
   b) Chemical Methods
4) Adaptation to Sand Production
   a) Equipment to artificially lift and handle Sand Production
   b) Disposal Methods and Regulations
5) Case Histories

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

21. Formation Damage

INSTRUCTOR: Various

Who Should Attend

This course is a must for engineers, geologists, supervisors and managers who are involved with drilling, completion, workover and evaluation of oil and gas reservoirs.

Summary

The costly phenomenon of formation damage will be discussed from the perspectives of types, causes, identification, remedies and prevention. Both laboratory and field methods will be discussed. The participant can expect to have a much better understanding of Formation Damage and how to be able to apply this knowledge easily and simply in the conduct of daily operations, including important considerations for horizontal wells and other under-balanced situations. A detailed discussion of matrix acidizing is designed to help participants get better results from damage removal treatments. A number of class workshop problems have been included in the course. The course is very practical. A course manual written in textbook style with a large bibliography is included.

Course Outline

1) Significance of Formation Damage
2) Types of Formation Damage
3) Causes of Formation Damage
4) Prevention of Formation Damage
5) Identification of Formation Damage
6) Damage Remediation Treatments

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

22. Introduction to Reservoir Engineering

Instructors: Dr. Rabia, plus other experts

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

Course Content

- Introduction
- Outline course content and objectives; why these 'engineering' topics are highly relevant to geoscientists
- Subsurface Pressures
  - Why understanding pressures is so important
  - Fundamentals of normally pressured, overpressured and underpressured formations
  - Overpressures and how to detect them
  - Overpressures due to hydrocarbons
- Drilling Technology
  - Introduction to recent advances
  - Development of a drilling program
  - Casing design
  - New technology (horizontal drilling, multilaterals)
  - Logging whilst drilling (LWD)
  - Drilling performance (cost-effectiveness)
- Reservoir Rock Properties
  - Porosity
  - Permeability (absolute, Kv, Kh, problems of averaging,)
  - Capillary Pressure
  - Effective and relative permeability
  - Mobility ratio & the concept of immiscible displacement
- Well Testing
  - RFT & MDT - mechanics, theory, application and interpretation in exploration and development
  - RFT & MDT -mechanics, theory, application and interpretation (continued)
  - DST - mechanics, theory, application and interpretation (introduction)
  - DST – productivity testing, introduction to transient flow testing, flow regime concept
  - Quantitative radial flow analysis for reservoir properties, skin
  - Quantitative radial flow analysis for reservoir properties, skin (continued)
  - Recognising reservoir boundaries and depletion, well testing quiz
- Reservoir Fluid properties
  - Sampling of reservoir fluids
  - Petroleum types and properties
  - Fluid behaviour in the reservoir (bubble point, dew point, etc) and its implications for field development

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- Concepts in field appraisal and development
  - Overview of objectives in appraisal and development programs
- Reservoir Drive mechanisms (primary and secondary recovery)
  - One phase and two phase expansion, gravity drainage, water drive, rock compressibility, etc.
  - Concept of depletion
  - Pressure support mechanisms (water injection, gas reinjection etc)
- Recovery factors
  - Factors that control them and ways to estimate them (analytical techniques, reservoir simulation)
  - Overview of displacement theory, effect of reservoir heterogeneity
- Enhanced Oil Recovery
  - Major methods, basic theory, their specific applications and typical costs
- Artificial Lift & Reservoir Stimulation
  - Basic theory of lift performance
  - Major types of artificial lift and their application
  - Types of reservoir stimulation

23. HAZOP Analysis

Instructor: Various

Objectives: Hazard and Operability (HAZOP) Study is a formal review of a process, its equipment and operation in order to identify potential hazards and operational problems. The HAZOP study assists in reducing the hazards at a facility and reduces the likelihood of commissioning delay or malfunctioning of the facility.

The purpose of this course is to provide the required knowledge for carrying out HAZOP study for an industrial facility at any phase of the life cycle of the facility; and how to reduce or eliminate the identified risks concluded by the study.

Duration: Five days

Contents
First Day:

- Introductions and definition of HAZOP Study
- Why risk assessment is required for a facility at design stage(s), for an operating one, and for the same prior to any upgrading or modification?
- What are the concepts, objectives and goals of a HAZOP study?
- Who does and/or participate in the study, and under what organization?
- Who are the leader and members of the study team, and how are they selected?
- Who decides that a HAZOP study is required and when?
- What are the requirements to initiate a HAZOP study, and who does that?
- What is meant by a HAZOP Session, and how it is organized and whose is the responsible for each function?

Second Day:Methodology

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- What are the requirements to undertake a HAZOP study? These are to be manifested and defined.
- Overall review of the process and steps of conducting a HAZOP study and sessions will be thoroughly surveyed.
- Defining of the guide words and how they are used to identify possible risks.
- What are the common types of HAZOP studies?
- What are the documents and drawings that are required to conduct the study, and the basis of selecting them?
- What dose "Node" mean? On what basis and how nodes are selected?
- What are the sequences of examination of each node?
- How the guide words are used to identify the possible risk and identify the deviation?
- For the defined deviation, what are the reasons and consequences? And what is the available safeguarding, if any?
- What are the required action(s), to be taken, to eliminate or reduce the identified risks?
- Whose is/are the responsible person to implement the decided upon action?
- How the study findings are analysed and listed? What is the work sheet and what does it contain and list?
- What are the actions arising from the HAZOP session?
- What is an Action Sheet? What does it contain and how to fill and distribute?
- What are the contents of the HAZOP Study report? How it is written? Who writes the report?
- How the Action Sheets are issued and distributed? Who does the following up and confirm the completion of the agreed-upon action?
- What is a Response Sheet? Who fills this sheet? To whom it should be delivered?
- What is a close out of a HAZOP action? Who decide the action has been closed?
- What does a HAZOP close out report include, and who writes this report?

Fourth and Fifth Days:HAZOP Sessions

- During these two days P&ID's of different type of facilities and at different phase of the project/facility will be considered to practice a HAZOP study on them.
- This study will implement all the steps taken in such a study, staring from definition of the objectives, verification of suitability of the documents, defining of nodes and guide words, brain storming of the participants to realize the hazards, possible failures, their causes and consequences.
- Then suggest, discuss and select remediation actions and determine the responsibility of implementing the action.
- Writing a work sheet, from which action are highlighted and action sheets will be filled.
- Conducting a debate within the class to select and determine what to include in the HAZOP Report.

24. Upstream Processes and Equipment Course

Instructor: Various

Duration: 5 Days

Objectives:

Oil and gas leaving the wellhead have to be treated prior to transporting or exporting to the consuming or refining facilities. The main objectives of this treatment are to adjust the pressure of the fluid, to remove impurities that lead to corrosion and/or erosion of the downstream export pipe lines and equipment, and impurities that when sticking around will reduce the sale price of the fluid. When gas/oil ratio is high in a crude oil, gas is separated from oil and each is exported individually to allow accurate metering and avoid fluctuating two phase flow.
The treatment process of oil or gas on the surface of the well is known as "Upstream Processing" and the employed equipment as "Upstream Equipment" or "Surface Equipment".

The purpose of this course is to define the main characteristics of produced crude oil and produced gas and illustrate the basis of selection of the upstream processes for treatment of oil and those for treatment of gas. Typical process flow diagrams and important features of piping and instrumentation diagram will be discussed. Upstream equipment used for each objective of the treatment process will be described and the basis of their selection will be defined. Calculations and sizing of the essential equipment will be presented.

Content

First Day: Crude Oil Upstream Processing

1. Properties and Characteristics of Crude Oil.
   a. Crude oil constituents and spectrum of hydrocarbons in the crude.
   b. Crude oil assays, specifications and common tests.
   c. Crucial properties; specific gravity, pour point, vapour pressure, water and sediment content.
2. Oil Production Facility.
   a. Objectives and types
   b. Constituents: test, production, second stage and third stage separators, and desalter.
   c. Basic configuration
3. Process Selection
   a. Generation of PFD.
   b. Evolving a representative P&ID.
4. Metering of Crude Oil.
   a. Lease Automatic Custody Transfer (LACT).
   b. Positive displacement meters.
   c. Turbine or propeller type meters
   d. Ultrasonic meters
   e. Electromagnetic meters.

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Second Day: Gas Upstream Handling

1. Properties and Characteristics of Natural Gas (NG).
   a. Natural gas constituents and spectrum of hydrocarbons in the NG.
   b. Natural gas compositions, common methods of analysis and sampling.
   c. Crucial properties; heating value sulfur and water content.
   d. Phase behaviour of natural gas.
   e. Water-hydrocarbon phase behaviour.
2. Natural Gas Handling Facility.
   a. Objectives
   b. Constituents: heat exchangers, scrubbers, compressors, gas treatment and flaring.
   c. Basic processing schemes.
   d. Prevention of hydrate formation.
3. Process Selection
   a. Generation of PFD.
   b. Evolving a representative P&ID.

Third Day:

Morning Session:Additional Gas Processing

1. Gas sweetening.
2. Gas dehydration.
3. Natural gas compression.
4. Metering of natural gas.

Afternoon Session:Treatment of Produced Water

1. Objectives of treatment and required water properties.
2. Methods of treatment and their applications.
3. Typical PFDs of treatment process.
4. Comparison between different methods and equipment.

Fourth Day: Essential Equipment and their Features

1. Chock valves.
2. Phase separators.
3. Knock-out drums.
4. Dehydrator – desalter.
5. Crude stabilization and sweetening equipment.
6. Pressure relief and flaring.

Fifth Day:Sizing of Main Equipment

1. Relief valves.
2. Two phase separators.
3. Three phase separators.
4. Knock-out drums.
5. Sizing consideration of crude dehydrator and desalter.

25. Waste Water Treatment

Instructor: Mr. Sean Moran

Course Duration: 5 Days

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

Course Content

Wastewater Engineering

- Sludge Treatment
- Water Disposal and Reuse
- Wastewater Characteristics
- Wastewater Flows
- Wastewater Composition

Wastewater Treatment Considerations

- Objectives
- Classification of Methods
- Applicability and Selection of Methods
- Overview: Wastewater Treatment Plant Design
- Flowrate and Mass Loading
- Selection of Design Flowrates
- Selection of Design Mass Loadings
- Process Selection
- Conceptual Process Design
- Physical Processes
- Flow Measurement
- Screening
- Flow Equalisation
- Mixing
- Sedimentation
- Accelerated Gravity Separation
- Flotation
- Filtration
- Gas Transfer
- Stripping
- Chemical Processes
- Precipitation
- Adsorbtion
    - Disinfection
    - Dechlorination
    - Other Chemical Processes

Biological Processes

- Overview: Biological Processes
- Microbial Metabolism
- Important Microorganisms
- Bacterial Growth
- Biological Treatment Processes
- Aerobic Attached Growth Processes
- Aerobic Suspended Growth Processes
- Anaerobic Attached Growth Processes
- Anaerobic Suspended Growth Processes
- Biological Nutrient Removal
- Pond Treatment

Conventional Treatment Plant Design:

Overview

- Primary Treatment Plant Design
- Racks and Screens
- Comminution
- Grit Removal
- Flow Equalisation
- Other Preliminary Treatments
- Primary Sedimentation

Conventional Treatment Plant Design:

Overview

- Primary Treatment Plant Design
- Racks and Screens
- Comminution
- Grit Removal
- Flow Equalisation
- Other Preliminary Treatments
- Primary Sedimentation
- Chemical Precipitation
- Disinfection
- Post Aeration
- VOC and Odour Control
- Secondary Treatment Plant Design
- Activated Sludge: The Process
- Activated Sludge Physical Facility Design and Selection
- Activated Sludge Process Design
- Aerated Lagoons
- Trickling Filters
- RBCs
- Combined Aerobic Treatment Processes
- Stabilisation Ponds
- Tertiary Treatment Plant Design
- The Need for Tertiary Treatment
- Treatment Technologies
- Screens and Filters for Residual Suspended Solids Removal
- Biological Nitrogen Removal
- Chemical/ Physical Nitrogen Removal
- Biological Phosphorus Removal
- Chemical/Physical Phosphorus Removal
- Biological Combined Nitrogen and Phosphorus Removal
- Removal of Toxic and Refractory Compounds
- Removal of Dissolved Inorganics

Natural Treatment

- Bio-Augmentation
- Deep Shaft Process
- Pure or Enhanced Oxygen Processes
- Biological Aerated Flooded Filters
- Sequencing Batch Reactors
- Membrane Bioreactors
- Upflow Anaerobic Sludge Blanket Process
- Anaerobic Filter Process
- Expanded Bed Reactor

Sludge Treatment Plant Design

- Sludge Yield
- Sludge Characteristics
- Sludge and Scum Pumping
- Preliminary Operations
- Thickening
- Stabilisation
- Anaerobic Sludge Digestion
- Aerobic Sludge Digestion
- Composting
- Conditioning
- Disinfection
- Dewatering
- Thermal Drying
- Overview: Industrial Effluent Treatment
- Oil / Water Separators
- Granular Activated Carbon Treatment
- Neutralisation
- Reduction
- Physical/Chemical treatments
- Problems of Industrial Effluent Treatment
- Batching
- Toxic Shocks
- Nutrient Balance
- Sludge Consistency
- Changes in Main Process
- Overview: Newer Physical Treatment Processes
- Ultrasonic Sludge Conditioning

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

26. Petroleum Refinery (Processing & Operations)

Course Director: Various

Duration: 5 days

Who should attend

This programme is designed for new recruits to the oil industry, or those who want to convert to the science of crude oil processes, new managers, energy personnel and petroleum engineers.

Objectives: In this course you will learn about:

Crude Oil, types, properties and peculiarities, Refining different crude oil types.The refining processes, materials, pressures and temperatures, Linking all aspects of production.Product range including dealing with waste materials.Health & Safety in refinery.Energy saving and Environmental issues.

Course Outline

Day 1

Crude Oil

- Generic composition
- Variations from around the world
- Practical limitations
- Practical considerations
- Its introduction and initial testing at the refinery

Day 2

Introduction to the basic refining processes of crude oil.

- Review of Day One
- The basic refining processes – a study in process technology
- Materials, pressures and temperatures
- Health and Safety aspects of the operation

Day 3

Variations in crude oil

- Transporting and storage of crude oil at the refinery
- A detailed look at refining processes specific to particular crude oil types Products, By- products and added value processes
- Refined LPG Technology
- NGL Processes and handling techniques

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info@entrac-petroleum.com
Tel:+964 773 485 5848

Day 4

Tying it all together

- Purpose and limitations of linking processes
- Energy saving through linked processes
- Maintenance with respect to Health and Safety
- Product testing and quality

Day 5

Health & Safety in Refinery

- How to manage waste
- Hazards in oil refinery

27. Waste Management

Duration: 4 Days
Audience:
All personnel from the oil industry and allied chemical and process industries

Objectives

The main outcomes of this course are to enable the trainees to have a clear understanding and more awareness of the importance of waste minimisation and waste management.

DAY 1

- Environmental Threats
- How population and economic (industrialisation) growth has led to current problems
- Governments Responses
- Rising level of legislation (e.g. EPA/IPC, IPPC, Env.Act, Packaging Regs, Landfill Tax, Climate Tax)
- General waste strategy (hierarchy)

DAY 2

- Waste Minimisation I
- Awareness of true cost of waste Inefficiency = Pollution
- Video – Pollution Prevention Pays

DAY 3

- Waste Minimisation II
- Simple site mass balance
- Possible areas for savings
- Energy Savings, Techniques, Methods and Calculations
- Case Studies

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info@entrac-petroleum.com
Tel:+964 773 485 5848

DAY 4

- Where Next
- Move from awareness to action
- Remedy and Prevention of Pollution
- Site assessment
- Method of analysis
- Remedy Processes
- Case studies
- Assessments & Certifications

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info@entrac-petroleum.com
Tel:+964 773 485 5848

28. Miscellaneous Courses & Consultancy

Details on the following courses are available on request

- **Various safety courses**
- **Petroleum Engineering for Non PE's**
- **Technical English**
- **Technical maths for the oil industry**
- **Management courses**
- **Introduction to the Oil Industry (1 day)**
- **Advanced Drillstring Design**
- **Technical writing (2 days)**
- **Consultancy**
- **Trouble shooting**
- **Manuals writing**
- **Long term courses 3-12 months are also available on request**

Tel:+964 773 485 5848
epldrilling@btinternet.com
info@entrac-petroleum.com

29. Booking Form

Course Title:
Number Of Participants:
Name:
Address:
Phone:
Fax:
E-mail:
PO Order Number:
Method of Payment:

Orders will NOT be accepted by phone, only by e-mail.

Please send the above completed form to:

Entrac Petroleum Ltd.

E-mail: info@entrac-petroleum.com

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epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

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info@entrac-petroleum.com
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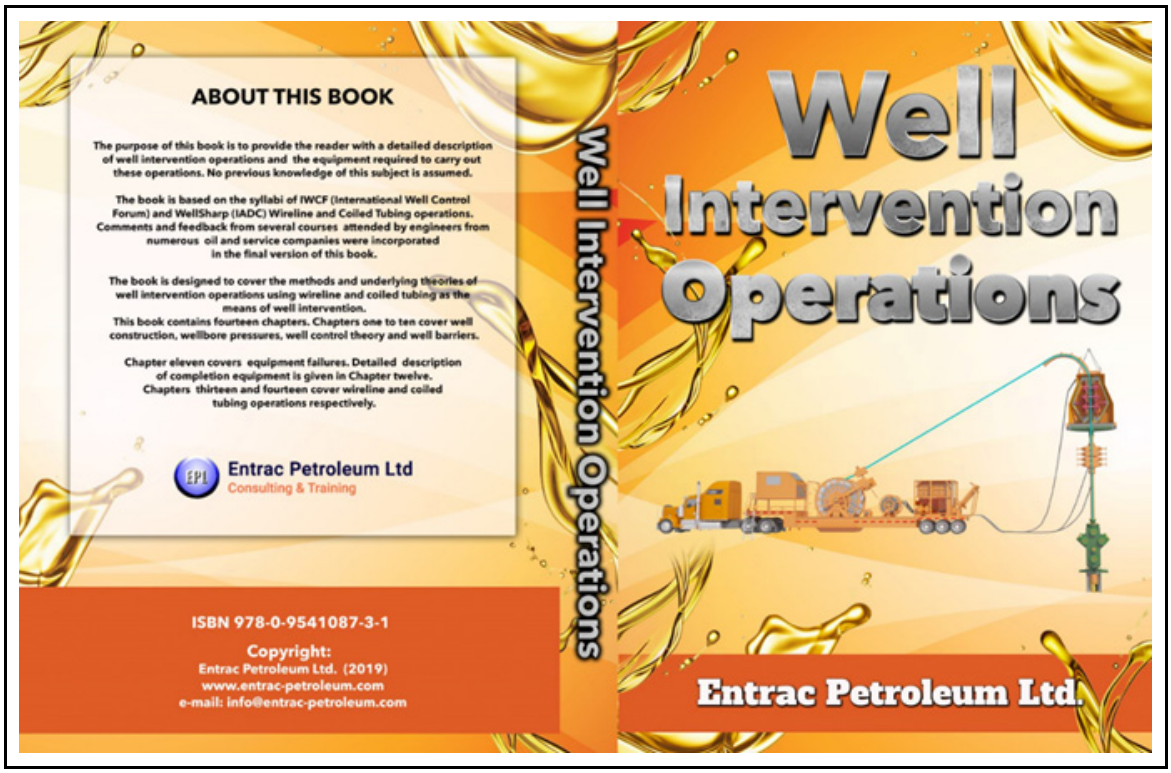

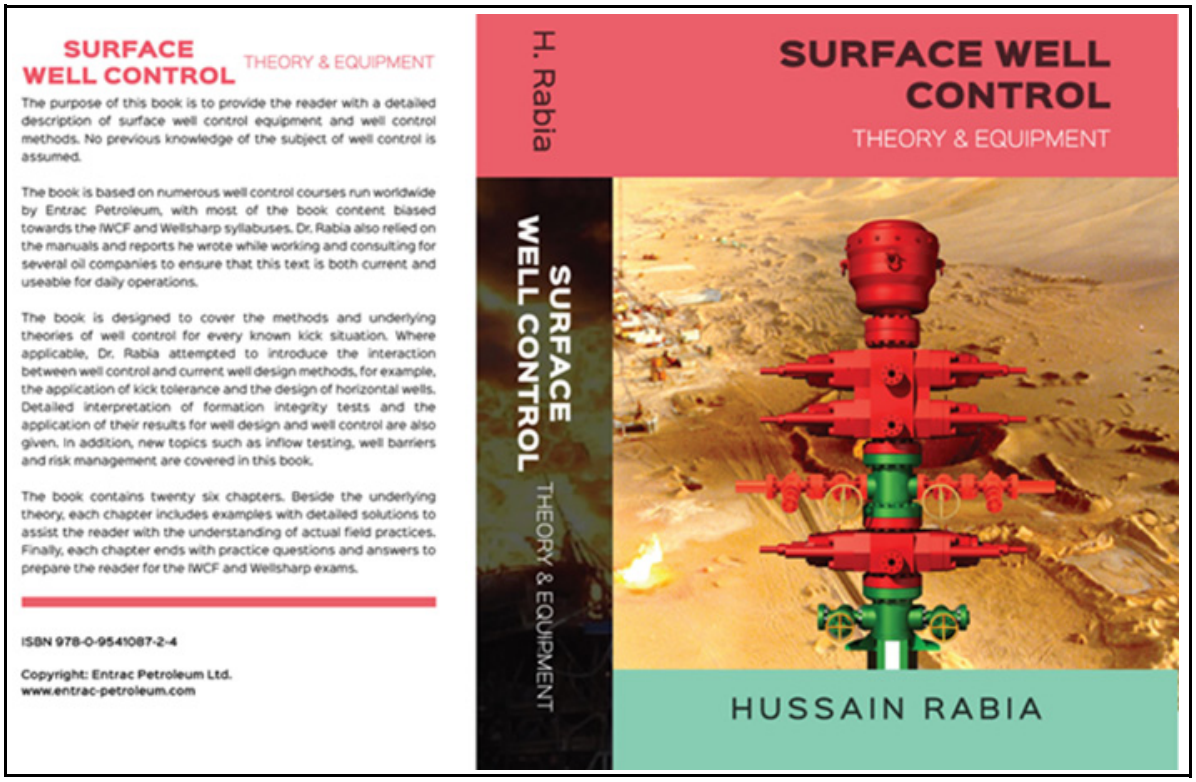

Tel:+964 773 485 5848
epldrilling@btinternet.com
info@entrac-petroleum.com

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

epldrilling@btinternet.com
info@entrac-petroleum.com
Tel:+964 773 485 5848

At Aramco

Tel:+964 773 485 5848
epldrilling@btinternet.com
info@entrac-petroleum.com

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