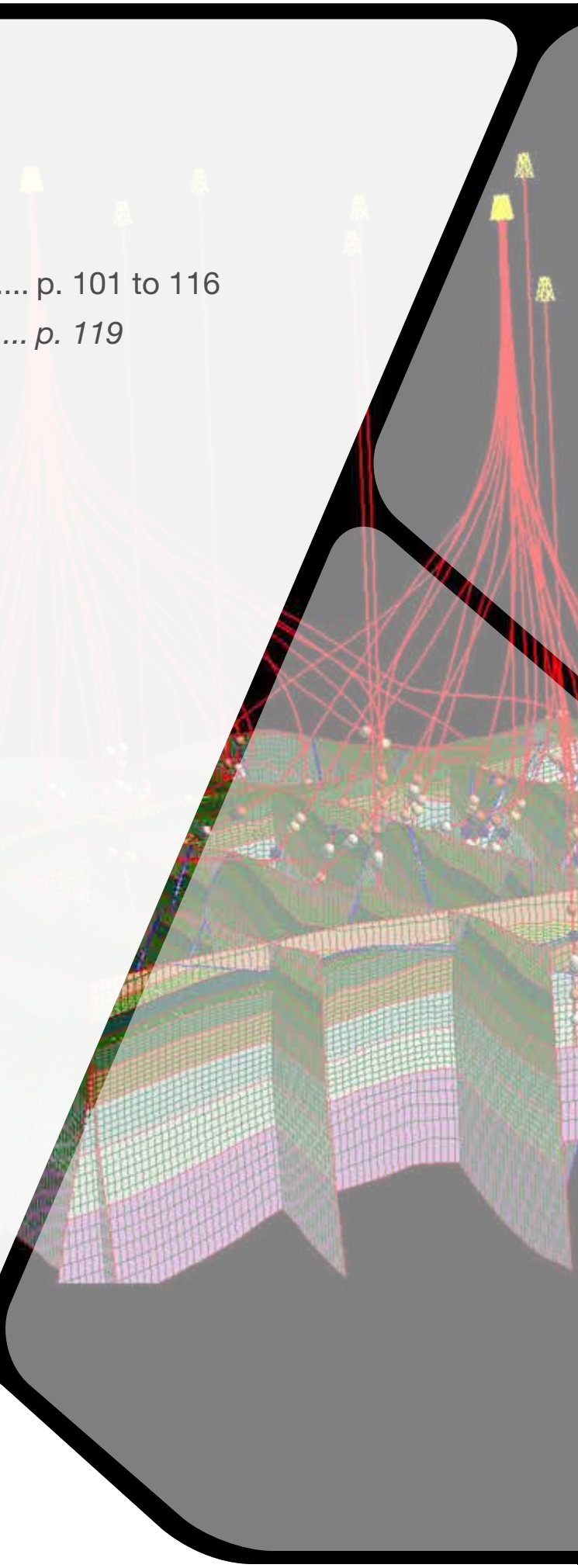
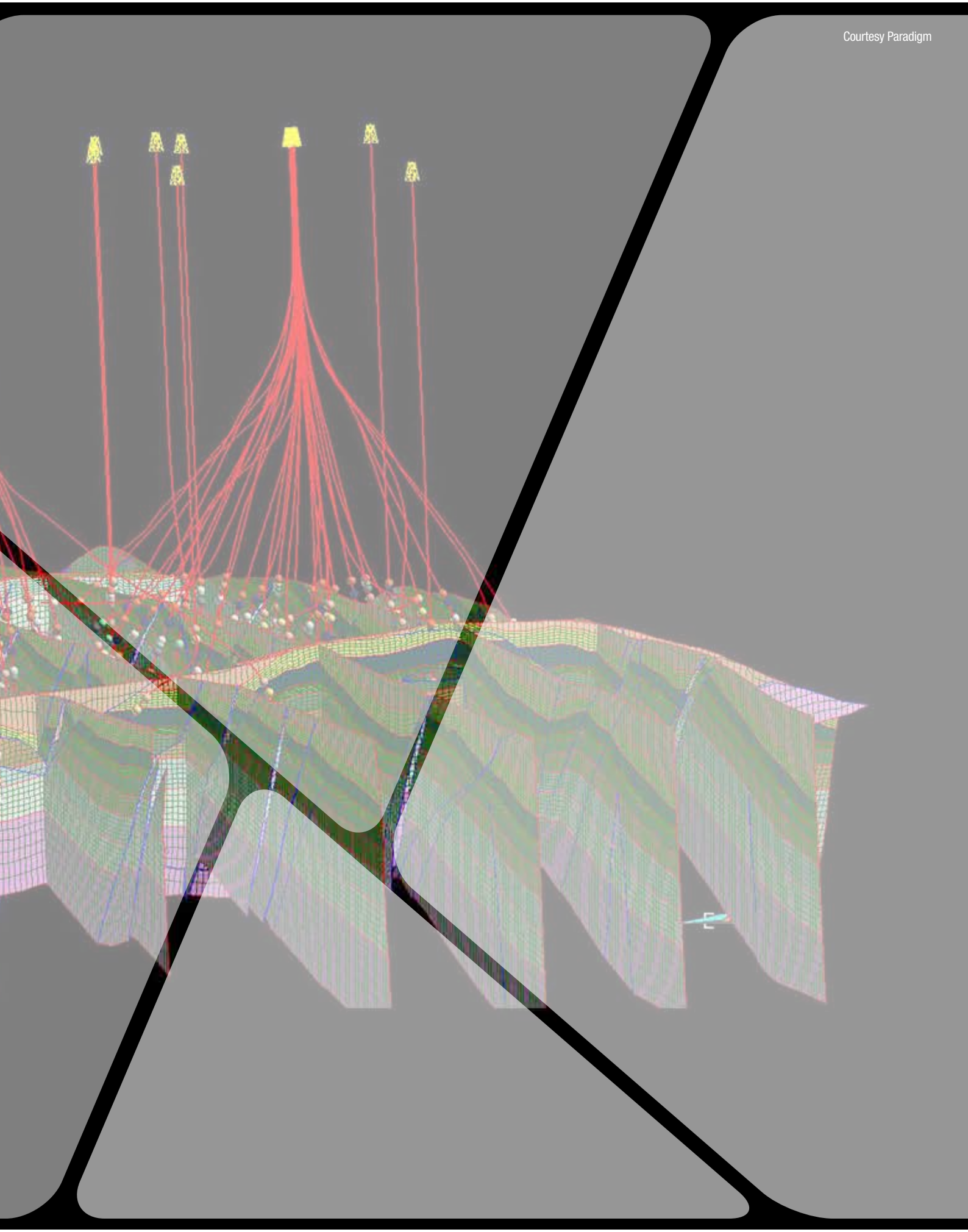
Reservoir Engineering





Courtesy Paradigm

Foundation

Can be organized for a single company

E-350 Introduction to Reservoir Engineering

5 Days

Reference GIS / RESBAS
GIS / INFOGIS

PURPOSE

To provide an overview of main reservoir engineering concepts used in oil and gas fields development projects

AUDIENCE

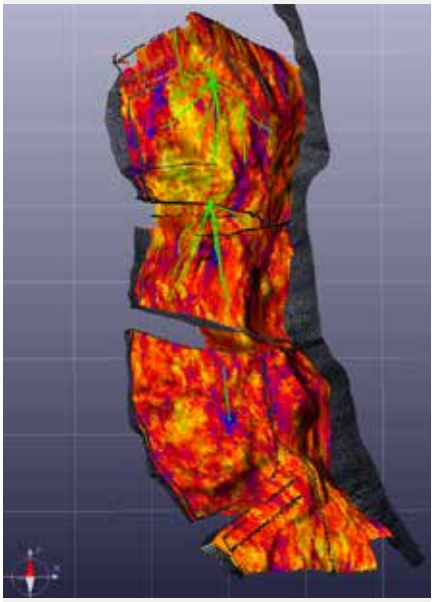
Engineers and experienced technicians facing day-to-day reservoir engineering concerns although not directly involved (personnel from fields such as geology, geophysics, drilling, completion, production, processing, economics, etc.)

LEARNING OBJECTIVES

- To know the reservoir engineering workflow
- To know and understand fundamental concepts of reservoir characterization and reservoir engineering in petrophysics, fluid characterization, formation evaluation and drive mechanisms
- To understand how these concepts are used within multidisciplinary teamwork

WAYS & MEANS

Reservoir engineering workflow interactive presentation
Interactive lectures, exercises and short movies
Field case study quick-look



Coordinator: Jean-Pascal Dejean

RESERVOIR ENGINEERING WORKFLOW — 0.25 d

Introduction to Reservoir Engineering workflow through interactive group work

BASICS OF RESERVOIR CHARACTERIZATION — 1.75 d

Production geology (basic concepts): reservoirs, traps, heterogeneities, etc.
Well logging interpretation
Petrophysics: rock properties
Reservoir fluid properties (gas, oil, formation water)
Exercises

FIELD DEVELOPMENT — 2.5 d

Well test interpretation
Multiphase flow
Drainage mechanisms
Primary drainage: undersaturated oil reservoir, solution gas drive, gas cap drive, oil reservoir with natural water influx, gas field
Secondary recovery: water flood, gas injection
Enhanced Oil Recovery: EOR
Basics of reservoir simulation
Field developments
Exercises

CASE STUDY: FIELD DEVELOPMENTS — 0.5 d

Application to an oil field evaluation and development
Recovery and drainage mechanism evaluation
Reserves estimation
Development schedule

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Dubai	Feb 28 - Mar 03	€3,060	GIS / RESBAS	gre.rueil@ifptraining.com
	Rueil	Sep 05 - 09	€2,860	GIS / RESBAS	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

E-360

Reservoir Engineering

Geology - PVT - Well test - Simulation - Field development

62 Days

Reference
GIS / RESENGIN
GIS / FORMGIS

PURPOSE

To provide a comprehensive and practical understanding of reservoir engineering concepts and the necessary skills in order for the attendees to quickly integrate multidisciplinary teams set up for oil and gas fields development and monitoring projects

AUDIENCE

Reservoir engineers and experienced technicians willing to deepen their knowledge in reservoir engineering; young scientists, geoscientists and production engineers moving towards reservoir engineering

LEARNING OBJECTIVES

- To know and understand fundamental concepts of Reservoir Characterization and relationships with Reservoir Engineering
- To know and understand fundamental concepts of Reservoir Engineering, especially drive mechanisms and reservoir modeling
- To know and understand fundamental concepts of Field Development Plan, particularly reserves evaluation and production scheme optimization taking into account static and dynamic uncertainties

WAYS & MEANS

Interactive lectures and exercises
Hands-on practices using various dedicated and state-of-the-art software tools
Case study
Field trips

NOTE

Course fees include accommodation and transport during field trips

Coordinator: Jean-Pascal Dejean

Module 1 - RESERVOIR GEOLOGY (cf. E-252) — 20 d

Petroleum system & reservoir
Geophysics & reservoir geophysics
Petrophysics
  Core data, Porosity, Saturation, Wettability, Capillary pressure
Well logging interpretation
Reservoir characterization
  Reservoir architecture - Static and dynamic approach - Heterogeneities
Field trip on clastic and carbonate reservoirs
Geological modeling (deterministic & stochastic) and OHIP computation

Module 2 - FLUIDS STUDIES (cf. E-361) — 5 d

Chemical composition of petroleum fluids
Basic properties and thermodynamics of reservoirs fluids
PVT studies

Module 3 - WELL TEST ANALYSIS (cf. E-365) — 10 d

Basic equations and methods of interpretation
Test design - Practical session
Gas well theoretical review and applications
Field trip: well test in an aquifer

Module 5 - DRIVE MECHANISM - ENHANCED OIL RECOVERY (cf. E-370) — 7 d

Multiphase Flow
Drive Mechanism
EOR
Material balance
Naturally fractured reservoir

Module 4 - DRILLING/COMPLETION FOR RESERVOIR STUDIES (cf. E-368) — 5 d

Drilling
Well completion
Cased hole logging
Well performance
Horizontal and complex wells

Module 6 - DEVELOPMENT PROJECT AND UNCERTAINTIES (cf. E-373) — 5 d

Reservoir geological characterization
Well performance - Monitoring and data acquisition
Decision process and business aspects
Field cases
Introduction to risks and uncertainties
Qualitative diagnostic through sensitivity studies
Quantitative diagnostic through uncertainty analysis

Module 7 - DYNAMIC RESERVOIR SIMULATION (cf. E-375) — 10 d

From geology to dynamic reservoir model
Petrophysics - PVT data - Production and well data
Reservoir simulation methodology
Practice on a multipurpose software package (Eclipse™)
Development scheme

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil / field trip	Sep 12 - Dec 09	€34,400	GIS / RESENGIN	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

Reservoir Engineering - Module 2

E-361

Fluid Studies - PVT

Reservoir fluids properties - Oil - Gas

5 Days

Reference
GIS / PVT
GIS / FLUIDS

PURPOSE

To provide a comprehensive and practical understanding of oil and gas reservoir fluids behavior

AUDIENCE

Reservoir engineers and experienced technicians willing to deepen their knowledge in reservoir fluid properties; young scientists, geoscientists and production engineers moving towards reservoir engineering

LEARNING OBJECTIVES

- To know and understand main principles of thermodynamics applied to Reservoir Engineering studies
- To know and understand the building process of a PVT model for reservoir simulation
- To acquire practical experience of using experimental data to build PVT models

WAYS & MEANS

Interactive lectures and exercises
Analyzing real PVT report
Hands-on practices using state-of-the-art EOS package for PVT matching

THERMODYNAMICS: REMINDERS — 1.5 d

Petroleum genesis
Chemical composition of petroleum fluids
- Hydrocarbon families
- Compositional presentation of reservoir fluids

Thermodynamics of petroleum fluids
- Pure component, binary mixture, multi-component systems - Phase behavior
- Hydrocarbon fluids: under saturated oil, saturated oil, dry gas, wet gas, retrograde gas

Measurements
- Sampling: bottom hole and surface sampling - Representativity and validity of sampling
- Analysis
- PVT studies: oil - gas condensate

PHYSICAL PROPERTIES - HYDROCARBON FLUIDS — 2.5 d

Thermodynamics: mixture equilibrium, fluids classification
Liquid vapor equilibrium
- Real equilibrium, thermodynamics potential, fugacity
- Bubble point pressure, formation volume factor, density compressibility, viscosity

Equation of state
- Peng-Robinson, Soave-Redlich-Kwong
- Liquid-vapor calculation

Analytical representation: properties of light and heavy cuts
Fluid modeling: PVT matching
Fluid synthesis: gravity segregation, field cases, miscibility
Downstream data: data for reservoir simulator and process

PVT EXERCISES — 1 d

Matching with a PVT EOS package

Coordinator: Jean-Pascal Dejean

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Oct 10 - 14	€2,960	GIS / PVT	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

E-365

Reservoir Engineering - Module 3
Well Test Analysis

10 Days

Reference GIS / WELLTEST

PURPOSE

To provide a comprehensive knowledge of how to set up, design and interpret well tests

AUDIENCE

Reservoir engineers an experienced technicians willing to deepen their knowledge in well test analysis; young scientists, production geoscientists and production engineers moving towards reservoir engineering

LEARNING OBJECTIVES

- To know and understand the theory of well testing interpretation (flow regimes, models)
- To know how to perform a well test interpretation
- To know how to devise or recommend a well test design

WAYS & MEANS

Interactive lectures and exercises
Hands-on practices using state-of-the-art software for well test interpretation
Field practical application on an aquifer

NOTE

Course fees include accommodation and transport during field trip

Coordinator: Jean-Pascal Dejean

INTRODUCTION TO WELL TESTING — 0.5 d

Purpose of well testing
Well and reservoir performance and the need for testing
Practical well test operations: types of tests, equipment, safety and environmental issues
Definitions & typical regimes: wellbore storage, radial flow regime, skin effect, fractured well, well in partial penetration
Fractured reservoirs, limited reservoirs and closed reservoirs
Productivity index, radius of investigation

BASIC EQUATIONS AND METHODS — 2 d

Darcy's law, the diffusivity equation
The time superposition, multirate testing
The space superposition, boundary effect
Pressure curves analyses and pressure derivative
Exercise

WELLBORE CONDITIONS — 1 d

Well with wellbore storage and skin
Infinite and finite conductivity vertical fracture
Well in partial penetration
Horizontal well
The different skin factors, geometrical skin and well deliverability

BOUNDARY MODELS — 1 d

One sealing fault
Two parallel sealing faults
Two intersecting sealing faults
Closed system, reservoir limit testing and depletion effects
Constant pressure boundary

TEST DESIGN - PRACTICAL SESSION — 1.25 d

Rate history definition
Time and pressure error
Pressure gauge drift & noise
Changing wellbore storage
Phase segregation
Interpretation procedure
From the initial diagnosis to the final consistency check of the results
Reporting and presentation of results, examples of test response

GAS WELLS: THEORETICAL REVIEW AND APPLICATIONS — 0.25 d

WELL TESTING: EQUIPMENT AND OPERATIONAL PROCEDURES — 1 d

Clean up, surface equipment, down hole equipment, perforating, sampling

FIELD TRIP: WELL TEST IN AN AQUIFER — 3 d

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil / field trip	Oct 17 - 28	€8,460	GIS / WELLTEST	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Foundation

Can be organized for a single company

E-368

Reservoir Engineering - Module 4

Drilling & Completion for Reservoir Studies

5 Days

Reference
GIS / RESPUIT
GIS / PUITRES

PURPOSE

To provide a technical overview of well operation
Drilling: the different well design, the drilling equipment, the different operations to reach the reservoirs
Completion: wellbore treatments, artificial lift and well intervention

AUDIENCE

Reservoir engineers and experienced technicians willing to deepen their knowledge in drilling and completion; young scientists, geoscientists and production engineers moving towards reservoir engineering

LEARNING OBJECTIVES

- To know and understand fundamentals of drilling and completions techniques
- To know and understand main concepts of production logs and well productivity optimization
- To know fundamentals about horizontal and complex wells

WAYS & MEANS

Interactive lectures and exercises

DRILLING — 1 d

Well design - Casing program
Drilling equipment and techniques
Directional drilling
Drilling fluids (mud)
Different types of rigs - Specific offshore problems

WELL COMPLETION — 1 d

Wellhead and safety equipment (BOP)
Basic completion configurations
Well servicing and workover
Operations on live wells: wireline, coiled tubing, snubbing

CASED-HOLE LOGGING — 1 d

Cementation logs: CET, CBL, VDL
Production logs
Saturation Monitoring (PNC)
Flow profiles (PLT)

WELL PERFORMANCE — 1 d

Inflow, outflow
Nodal analysis
Well deliverability & productivity

HORIZONTAL AND COMPLEX WELLS — 1 d

New applications - Feasibility, productivity
Coning, risks and other issues

Coordinator: Jean-Pascal Dejean

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Nov 14 - 18	€2,860	GIS / RESPUIT	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

E-370

Reservoir Engineering - Module 5
Drive Mechanism - Enhanced Oil Recovery

7 Days

Reference
GIS / DRIVEOR
GIS / MECAFLO

PURPOSE

To provide a thorough understanding of drive mechanisms and ways to optimize recovery, reserves and field development

AUDIENCE

Reservoir engineers and experienced technicians willing to deepen their knowledge in drive mechanism and EOR; young scientists, geoscientists and production engineers moving towards reservoir engineering

LEARNING OBJECTIVES

- To know and understand the natural mechanisms of production of a field
- To know and understand the mechanisms of improved oil recovery through water and non-miscible gas injection
- To know and understand the main concepts of Enhanced Oil Recovery

WAYS & MEANS

Interactive lectures and exercises Hands-on practices using state-of-the-art software for PVT matching, History Matching and Production Forecast

Coordinator: Jean-Pascal Dejean

WEEK 1 — 3 d

MULTIPHASE FLOW

Flow characteristics at pore scale
Relative permeabilities and reservoir production
Non-miscible diphasic flow: fluid mobility and mobility ratio
Theory of frontal displacement

DRIVE MECHANISM

Primary drainage
- Undersaturated oil expansion, solution gas drive, gas gap drive
- Oil reservoir with natural water influx
- Gas fields

Secondary drainage
- Water or immiscible gas injection
- Water flooding: sources of injected water, well injectivity, flood pattern water flood performance
- Gas injection: flood mechanism and well injectivity
- Displacement or microscopic efficiency, areal sweep efficiency, vertical sweep efficiency, global sweep efficiency

Exercises

WEEK 2 — 4 d

ENHANCED OIL RECOVERY

Miscible gas method
Thermal methods: steam injection, SAGD, in situ combustion
Chemical methods: surfactant, polymer
Application - Field cases

MATERIAL BALANCE

Practical exercises on PVT matching, History matching, Production forecast with MBAL™ software

FRACTURED RESERVOIRS

Fractures definition, classification
Types of fractured reservoir: characterization, modeling
Dynamic parameters; gravity and capillarity as a production mechanism
Flow mechanism in a fractured reservoir, simulation

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Nov 02 - 10	€3,850	GIS / DRIVEOR	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

E-373

Reservoir Engineering - Module 6
Field Development Project & Uncertainties

5 Days

Reference
GIS / DEVELOPROJ
GIS / PROJ

PURPOSE

To provide an understanding of reservoir management fundamentals, techniques and best practices, from geology to hydrocarbons recovery, with a special attention to the risk induced by the project's uncertainties

AUDIENCE

Reservoir engineers and experienced technicians willing to deepen their knowledge in development project and uncertainties management; young scientists, geoscientists and production engineers moving into reservoir engineering

LEARNING OBJECTIVES

- To know and understand about best practices of oil & gas fields development projects
- To know and understand main concepts of risks and uncertainties assessment
- To get a practical quick-look experience about risks and uncertainties management within field developments

WAYS & MEANS

Interactive lectures and exercises
Hands-on practices using state-of-the-art softwares
Field case studies

PROJECT: FIELD DEVELOPMENT — 2.5 d

From discovery to development of an oil field: methodology from a real field case
Discovery phase: geological context, evaluation of reservoir properties, OOIP, reserves
Appraisal phase: field evaluation after each appraisal well
Development phase: several scenarios established from drive mechanisms definition and simulations
Production profiles
Surface/subsurface integration
Field monitoring
Economical evaluation of scenarios: CAPEX, OPEX

ECONOMIC EVALUATION OF A PROJECT — 1 d

Development decision making process
Projects economics: methods and criteria
Oil tax legislation - Net Present Value
Types of petroleum contracts

INTRODUCTION TO UNCERTAINTIES — 1.5 d

Why quantifying uncertainties in reservoir studies?
Overview of the response surface methodology and experimental design approach
Identification of the most influential static and dynamic parameters – Consequences on field evaluation and production forecasts

Coordinator: Jean-Pascal Dejean

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Nov 21 - 25	€3,110	GIS / DEVELOPROJ	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

E-375

Reservoir Engineering - Module 7
Dynamic Reservoir Simulation

10 Days

Reference
GIS / RESSIMU
GIS / SIMURES

PURPOSE

To provide a thorough understanding of dynamic reservoir simulation; covering principles as well as data reviewing and formatting

AUDIENCE

Reservoir engineers, geologists, geophysicists, development project engineers and managers willing to deepen their knowledge in black-oil dynamic reservoir simulation; young scientists, geoscientists and production engineers moving towards reservoir engineering

LEARNING OBJECTIVES

- To know and understand fundamental concepts of Dynamic Reservoir Simulation
- To learn about the building of a reservoir simulation model (data gathering, data QC)
- To learn about carrying out a simple reservoir simulation study (data input, history matching and production forecast with a black-oil model)

WAYS & MEANS

Interactive course and exercises
Hands-on practices using state-of-the-art software packages: Eclipse™, Petrel-RE or PumaFlow reservoir simulator
Black oil reservoir simulation including the manipulation of all kind of reservoir data (geological, petrophysical, PVT, well data, production history)

Coordinator: Jean-Pascal Dejean

WEEK 1 — 5 d

INTRODUCTION TO SIMULATION
Physical aspects & basic laws
Mathematical & Numerical aspects (diffusivity, transport & general equations)
Types of reservoir simulation models: black oil, compositional, thermal, chemical and double porosity model

INTRODUCTION TO THE SIMULATOR
Simulation software presentation
Practical exercise (Building a model from A to Z)

SPACE & TIME DISCRETIZATION
Grid properties (Cartesian grid, Radial grid, corner point grid, etc.) & key elements to take into account
Time Step Management & main events to take into account
Practical exercise using the Simulation software

PETROPHYSICS
Data Review & Petrophysical upscaling
Practical exercise using the Simulation software

FLUIDS
Data Review & Formalisms used by the simulator
Use of black oil data set & integration of lab experiments (constant composition expansion, constant volume depletion)
Practical exercise using the Simulation software

WEEK 2 — 5 d

INITIAL STATE
Data Review & Formalisms used by the simulator (equilibration regions)
Identification of fluids in place per region
Practical exercise using the Simulation software

FLOW REPRESENTATION
Formalisms used by the simulator (gridded or analytical aquifers)
Review of different possibilities (bottom, edge, transient, steady state, semi steady state) & “Hurst & Van Everdingen” tables
Practical exercise using the Simulation software

AQUIFERS REPRESENTATION
Formalisms used by the simulator (gridded or analytical aquifers)
Review of different possibilities (bottom, edge, transient, steady state, semi steady state) & “Hurst & Van Everdingen” tables
Practical exercise using the Simulation software

WELLS REPRESENTATION
Formalisms used by the simulator (Inflow Performance & Numerical PI, outflow performance & VFP tables)
Practical exercise using the Simulation software

HISTORY MATCHING
Production data & identification of data to match
Production mechanisms & identification of matching parameters
History matching strategies (pressure, saturation, early & late times) & uncertainty reduction
Practical exercise using the Simulation software

PRODUCTION FORECAST
Integration of well representation & production constraints
Estimation of future productions linked to different scenarios and identification of remaining uncertainties
Practical exercise using the Simulation software

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Nov 28 - Dec 09	€6,270	GIS / RESSIMU	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Advanced

Can be organized for a single company

E-385 PVT Modeling

5 Days

Reference GIS / PVTMOD

PURPOSE

To provide an extensive and practical knowledge for analyzing PVT reports, handling data, and defining PVT models for use in compositional and black oil simulations

AUDIENCE

Reservoir engineers and very experienced technicians with a few years of industrial experience willing to acquire advanced knowledge about PVT modeling

LEARNING OBJECTIVES

- To acquire extensive and practical knowledge for analyzing PVT reports and handling PVT data
- To know how to build a PVT model in order to represent fluid behavior with respect to available and validated PVT data
- To know how to perform a PVT match

PREREQUISITE

Basic PVT knowledge (characteristics, measurement techniques, chromatography, classical correlation) is recommended

WAYS & MEANS

Interactive courses and exercises Hands-on practices using state-of-the-art PVT modeling software BEST Discussion on PVT experiments and Performing a mini-project

THEORETICAL COURSE — 2 d

Fluid properties
- PVT properties of pure components and mixtures
- Functions and variables
- Properties of reservoir fluids
- Introduction to the PVT modeling software
- Applied exercises

Thermodynamic models and equilibrium
- Functions and variables
- EOS and algorithms
- Component properties and lumping
- Liquid/Vapor thermodynamic equilibrium
- Applied exercises

RESERVOIR FIELD CASES — 3 d

Segregation modeling
Miscibility
MDT pressure evaluation
Review of sampling conditions and PVT data
PVT modeling
Gradient modeling
Fluid sampling
Advanced PVT modeling
Mini project, Discussion and Conclusions

Coordinator: Jean-Pascal Dejean

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Nov 14 - 18	€3,160	GIS / PVTMOD	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

With the ADVANCED CERTIFICATE in Fundamentals of Enhanced Oil Recovery

Build your skills in:

- Understanding secondary recovery & the need for EOR
- Understanding concepts of EOR methods: gas injection, chemicals & thermal
- Selecting the best EOR method with a comprehensive approach
- Applying methods in real field case studies

Key benefits:

- An international recognition of your competencies
- An Advanced Certificate is obtained
- A confirmed expertise in EOR
- Ready-to-use skills

For more information visit **www.ifptraining.com/certifications**
or call **+33 1 41 39 12 12**

Advanced Certificate

Can be organized for a single company

CERTIFICATION

E-386C

Fundamentals of EOR Certification

EOR - Screening Criteria - Field Cases

5 Days

Reference GIS / EOR

PURPOSE

To provide a comprehensive knowledge of improved/ enhanced oil recovery methods

AUDIENCE

Engineers, managers and staff interested or involved in IOR/EOR projects

LEARNING OBJECTIVES

- To know and understand main concepts of EOR
- To know and understand advantages and limitations of the various EOR techniques
- To know and understand how to select best EOR methods provided reservoir and oil characteristics

WAYS & MEANS

Interactive courses and exercises
Hands-on practices on various field case studies

NOTE

This course can be delivered in French, with documentation in English

INTRODUCTION

Definitions of IOR/EOR, world energy data, EOR status and on-going projects
Reservoir Management: from initial development to EOR. Reserves evaluation

SPECIAL CORE ANALYSES

Relative permeabilities, capillary pressures, wettability, smart water
Practical exercise

OIL RECOVERY BY PRESSURE MAINTENANCE

Oil recovery by water and/or gas injection
Factors impacting on recovery: reservoir and fluid characteristics, injection characteristics (volumes of injected fluids, type of fluids, flood pattern)
Displacement or microscopic efficiency, areal sweep efficiency, vertical sweep efficiency and global sweep efficiency
Buckley-Leverett frontal advance theory. Production forecasts. *Practical exercises*
Water flooding: sources and treatment of injected water, well injectivity, water flooding implementation, flood pattern
Immiscible Gas injection: injected gas sources, flood mechanisms

FIELD DEVELOPMENT CASE

Field development *exercise*: water injection case followed by miscible gas injection

ENHANCED OIL RECOVERY

Water injection versus gas injection
Gas injection: gravity displacement by lean gas, miscible displacement by lean and rich gas. Miscible flooding parameters (phase behavior, MMP). Water Alternating Gas (WAG)
Videos examples
Chemical injection: polymers to improve the volumetric sweep efficiency, surfactants to improve the microscopic sweep efficiency
Practical exercises
Thermal methods: steam and air injection. Extra heavy oil cases
EOR selection criteria and limitations. EOR project planning, pilots, design, surveillance

COMPLEX WELLS

Use of complex and intelligent wells to improve oil recovery. *Videos examples*

FIELD CASES

Various field cases: miscible displacement and gas gravity displacement
Middle East Case: EOR screening exercise

WRAP-UP SESSION

Course assessment, wrap-up and conclusions

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Dubai	Jan 30 - Feb 03	€3,060	GIS / EOR	gre.rueil@ifptraining.com
	Rueil	Oct 24 - 28	€3,060	GIS / EOR	gre.rueil@ifptraining.com

Coordinator: Jean-Pascal Dejean

For additional courses, please see the In-House Training section on page 226

With the ADVANCED CERTIFICATE in Reserves Evaluation – Risks & Uncertainties

Build your skills in:

- Static reservoir characterization & accumulation estimates
- Dynamic reservoir modeling & estimating reserves
- Understanding risks & uncertainties in G&G workflow
- Economics

Key benefits:

- An international recognition of your competencies
- An Advanced Certificate is obtained
- A confirmed expertise in Evaluating Reserves
- Ready-to-use skills

Advanced Certificate

Can be organized for a single company

CERTIFICATION

E-393C

Reserves Evaluation - Risks & Uncertainties Certification

5 Days

Reference GIS / RISKUN

PURPOSE

To provide a comprehensive and practical understanding of all methods and issues involved in the evaluation of hydrocarbons reserves

AUDIENCE

Geologists, geophysicists, reservoir engineers, asset managers, economists, government representatives interested or involved in reserves estimation and reporting

LEARNING OBJECTIVES

- To review principles of reservoir characterization and reserves evaluation
- To learn about main concepts of risks and uncertainties management
- To learn about integrating risks and uncertainties into reserves evaluation – static uncertainties, dynamic uncertainties, geostochastic modeling, etc.

WAYS & MEANS

Interactive courses and exercises
Hands-on practice using state-of-the-art softwares

NOTE

This course can be delivered in French, with documentation in English

BASICS OF RESERVOIR CHARACTERIZATION

Introduction to Field Development Projects
Reminder on rock and fluid properties
Geomodeling
Volumetric Evaluation of OIIP and GIIP. Exercises
Summary of recovery factors versus drive mechanisms

RESERVES DEFINITIONS

Oil & gas reserve/resource definitions
SPE definitions and principles
SEC definitions and guidelines
Other definitions

RESERVES ESTIMATIONS AND PRODUCTION PROFILES

Volumetrics
Performance analysis (material balance, decline curves)
Simulation models
Exercises

RISKS AND UNCERTAINTIES

Introduction to Risks and Uncertainties
Notions of probability and decision trees (exercises)
Statistical description of data (exercises)
Common distributions
Probabilistic methods: Monte-Carlo and Parametric (exercises)
Notions of geostatistics and stochastic modeling (exercises)
Structural, geological and dynamic uncertainties (exercises)

ADDITIONAL RESERVES AND ECONOMICS

EOR and Unconventional reserves
Notions of economics, contracts. Exercises

Coordinator: Jean-Pascal Dejean

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Jun 13 - 17	€3,250	GIS / RISKUN	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Proficiency

Can be organized for a single company

E-395

Unconventional Resources - Shale Gas Fundamentals

5 Days

Reference GIS / UNCONV

PURPOSE

To provide an overview of unconventional hydrocarbons resources, highlighting main technical, economic and environmental issues of shale gas exploration and production

AUDIENCE

Geoscientists, reservoir engineers, development project engineers and managers interested in shale gas resources

LEARNING OBJECTIVES

- To know fundamentals of gas shale formation evaluation
- To learn about productivity assessment and improvement
- To go over field development projects addressing economic and environmental issues

WAYS & MEANS

Interactive courses and exercises
Videos
Hands-on practice using dedicated software
Course taught by experts

NOTE

Kindly refer also to complementary courses which might be of interest: “Hydrocarbons in Unconventional Settings” (E-221), “Unconventional Reservoirs Completion and Stimulation” (E-468) and “Unconventional Resources Production Overview” (E-040)

Coordinator: Jean-Pascal Dejean

WORLD ENERGY DEMAND AND SHALE GAS — 0.5 d

Introduction, definitions, world data resources

HYDROCARBONS IN UNCONVENTIONAL SETTINGS — 1 d

Exploration aspects: geology and geochemistry

SHALE GAS STIMULATION — 1 d

Hydraulic fracturing, micro-seismicity interpretation, stress and mapping of fractures
Status on fracturing technologies
Completion design, well orientation, spacing, re-fracturing, fracture load recovery, tracers

SHALE GAS PETROPHYSICS — 0.5 d

Status of petrophysical evaluation, some exercises

SHALE GAS RESOURCES — 0.5 d

Evaluation of resources (in place and technically recoverable)
Methodology
Exercises

PRODUCTIVITY AND FIELD DEVELOPMENT — 0.5 d

Well productivity assessment
Field Development (Case Study and exercises)
- Establish well pattern
- Establish the plateau rate and duration
- Build Field Development spread-sheet

ECONOMICS — 0.5 d

Field development economics
Production costs

ENVIRONMENTAL IMPACT — 0.5 d

Discussions around controversial issues
- Handling of important volumes of water for frac and treatment
- Impact on aquifers by drilling and fracturing
- High number of drilling sites
- Use of chemicals

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	Jun 20 - 24	€3,810	GIS / UNCONV	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Foundation

Can be organized for a single company

E-396 Environmental Management of Unconventional Development Projects: Shale & Tight Gas & Oil

3 Days

Reference GIS / ENVGB

PURPOSE

To perceive and assess the stakes of a "shale gas project", including the controversial perception of public.
To learn about key regulations on shale gas and therefore the contents of a dedicated Environmental Impact Assessment
To provide a thorough and applied knowledge of regulatory requests with the Best Available Techniques, recent industry standards and practices for Air Pollution control and treatment, waste water control and remediation techniques and equipment. Lessons learnt from case studies in the US and Europe

AUDIENCE

Managers, advisors, engineers, and operations staff involved in the management of environmental issues all along the lifetime of a unconventional shale gas & oil or tight gas & oil development: from exploration to production

LEARNING OBJECTIVES

- To understand the global prevailing context for the shale and tight gas & oil development for Environmental Management at worldwide level
- To identify key issues and impacts of specific shale gas activities (exploration, fracking, production)
- To learn about technical requirements and regulation in USA and Europe
- To understand specific contents of a shale gas environmental impact assessment, mitigations (treatments), and how to develop communication (Public Participation)
- To know lessons learnt from case studies (strategy, technologies, public acceptability, etc.)

WAYS & MEANS

**Highly interactive training by an industry-specialist lecturer involved in shale gas project
Numerous case studies, applications and illustrations, and teamwork sessions - key Internet references - videos**

Coordinator: Jean-Pascal Dejean

THE STAKES: PUBLIC PERCEPTION – A CONTROVERSIAL ENERGY

THE INDUSTRY POINT OF VIEW

TECHNOLOGIES: KEY ISSUES FOR THE ENVIRONMENT

Fracking and water
Air emissions
Wastewater & waste treatment

SOCIO-ECONOMIC IMPACT & SUSTAINABLE DEVELOPMENT

ENVIRONMENTAL REGULATORY OVERVIEW

CONTENTS OF AN ENVIRONMENTAL IMPACT ASSESSMENT & CASE STUDIES – MITIGATION AND EMISSIONS TREATMENT

LANGUAGE	LOCATION	DATE	FEES	REFERENCE	REGISTRATION CONTACT
	Rueil	May 25 - 27	€2,020	GIS / ENVGB	gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Foundation

Can be organized for a single company

E-397

Well Test Analysis

E-learning with remote personal coaching

40 Hours over 10 Weeks

Reference GIS / BLWTA

PURPOSE

To enhance practical experience and skills in well test design and interpretation through an experiential, hands-on training experience

AUDIENCE

Reservoir engineers, engineers and technicians interested or involved in well test design and interpretation
Reservoir geologists interested by well-test-generated dynamic information for use in geological models

LEARNING OBJECTIVES

- To know and understand the theory of well testing interpretation (flow regimes, models)
- To be able to perform a well test interpretation
- To be able to design a well test

WAYS & MEANS

Interactive lectures and practical exercises
Hands-on practices using state-of-the-art software for well test interpretation

NOTE

40 hours over 10 weeks
PIE™ or SAPHIR™ software licenses not provided

Coordinator: Jean-Pascal Dejean
Catherine Ulrich (Blended Learning)

WELL TEST PRINCIPLES AND OBJECTIVES — 8 h

Definitions, objectives, surface tools, downhole tools, metrology
Data input, data results, test sequence, gas tests, diffusivity, methodology, flow regimes, special plots, skin, investigation, productivity

WELL TEST ANALYSIS: METHOD — 8 h

The log scale, conventional method, DD type curve match, BU T/C match, MDH, horner
Multirate time, superposition, the derivative (T/C, match, signature catalog)

WELL TEST ANALYSIS: APPLICATIONS — 8 h

Theory review, no flow boundaries classes, closed system, average pressure and productivity index, software presentation and exercises

WELL BORE & RESERVOIR CONDITIONS — 4 h

Well bore conditions, reservoir conditions (homogeneous, 2 Phi), software, exercises

LIMITS AND BOUNDARIES — 4 h

Limits, boundaries, closed system, software, partial penetration, horizontal well, exercises

GAS AND INTERFERENCE TESTS — 4 h

Gas tests, interference tests, software, exercises

TEST DESIGN — 4 h

Test design, complicating factors, reporting, interpretation procedure, test history simulation

Upon request. Contact: gre.rueil@ifptraining.com

For additional courses, please see the In-House Training section on page 226

Our In-House Training

Reservoir Engineering