Exploration & Production

TRAINING COURSES 2014

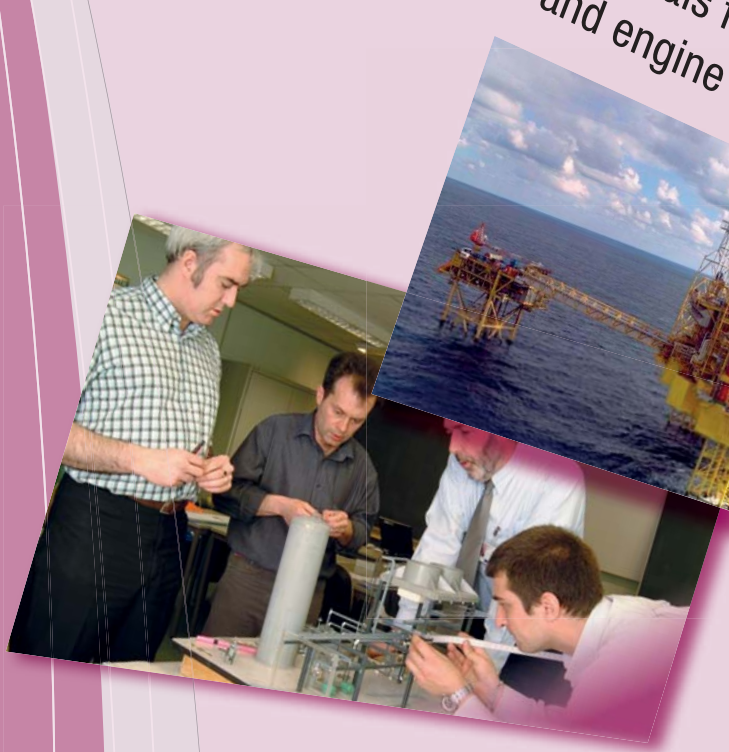
For the professionals from the oil, gas, petrochemicals and engine industries

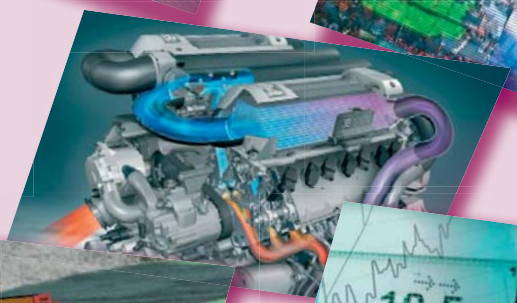
IFP Training

www.ifptraining.com

Technical expertise and know-how delivered by world trainers

Training professionals from the oil, gas, petrochemicals and engine industries





IFP Training

Editorial

For our clients in the oil and gas, petrochemicals and powertrain industries around the world, IFP Training is the trusted partner to build up the industrial expertise of their workforce. Their pursuit: an outstanding training in a long-term partnership to improve overall performance and operational safety. Our unique training solutions are customized to fit their specific objectives and delivered by trainers with a wide industrial experience.

Meeting vocational training needs, broadening knowledge, strengthening skills and reaching for the highest standards have been the guiding principles of IFP Training for almost 40 years now.

From short courses to long multidisciplinary training programs, including Master programs with IFP School, IFP Training blends lectures, simulations, hands-on workshops and on-the-job training to offer today more than 1 300 public and in-house training sessions around the world. The wide portfolio covers technical and economic topics all along the chain: from geosciences, drilling, surface facilities to refining, petrochemicals, and all the way to products and engines.

Our faculty of 95 permanent instructors with a wide technical expertise, along with a network of some 600 specialists, have the privilege to pass down their know-how and develop the competencies of some 15 000 trainees a year, from plant operators and technicians to engineers, managers and executives, from 80 countries. With its subsidiary RSI, world leader in dynamic simulation technology, IFP Training brings today to the oil and gas industry a global, high-quality solution for vocational training which blends, in a quite unique way, high-fidelity standard or customized simulators with associated training programs to improve operational staff performance, going all the way to job certification. Our goal is to bring your plant into the training room.

You are holding one of IFP Training's four catalogues which display the portfolios of our Divisions:

- Exploration & Production
- Refining & Chemicals
- IC Engines & Lubricants
- Economics & Management

We trust this will help you find the right training course for yourself, or the building blocks for a tailor-made training program which we would be delighted to design with the specific needs of your company in mind.

Looking forward to serving you.

Jean-Luc KARNIK
Chief Executive Officer

Contents

IFP Training

Technical expertise and know-how…
…delivered by world class trainers

Our mission

IFP Training accompanies the oil and gas, petrochemicals and powertrain industries in developing and maintaining the professional skills of their personnel to the highest industry standard.
Our unique, industry-focused, tailor-made training solutions, delivered worldwide with the technical expertise and know-how of our experienced trainers, help develop competent professionals and improve overall performance and operational safety.

An international training organization within the IFP Group

IFP Training was created in 1975 by IFP Energies nouvelles and IFP School to meet the training needs of professionals from the oil, gas, petrochemicals and engine industries.

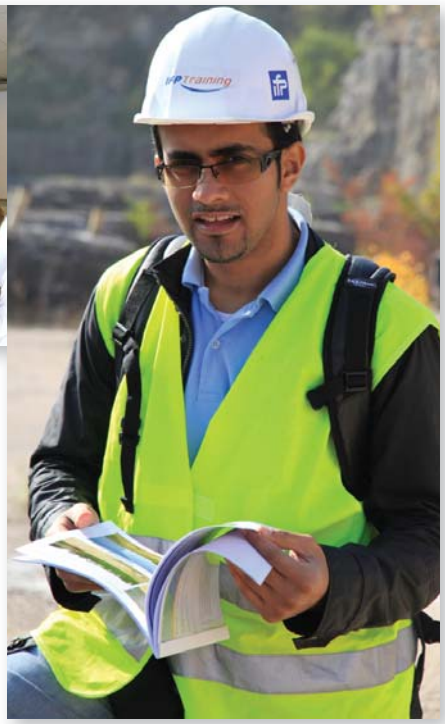
IFP Energies nouvelles is a public institution for research, industrial innovation and training in the fields of energy, transport and environment. Its aim is to provide public authorities and the industry with efficient, economic and clean technologies. The ultimate objective is to face tomorrow's challenges of climate change, energy diversification and water resources management.

For more than 90 years, **IFP School** has been delivering post-graduate programs to young engineers to further their knowledge with the practical issues that are of concern to the industry. With world-class programs and partnerships with companies and universities, IFP School attracts students from around the world. Every year, some 600 of them launch their career on the international stage with a Master degree from this renowned academic institution.

Our ambition: A trusted name in petroleum training and your trusted long-term partner for expertise development

IFP Training: We listen to your needs. We devise the right solution We provide you with a unique learning experience

- Learn from original, practical and tailor-made programs
- Choose from a complete spectrum of technical programs for the whole oil and gas chain
- Take short courses for competency enhancement
- Acquire a specific expertise through a long, multi-discipline, vocational training program
- Obtain a site-specific program for your operators, technicians, engineers and managers
- Experience your plant in the training room, all the way to job certification, through our special blend of high-fidelity customized simulators and associated training programs
- Participate in active learning experiences with customized case studies, simulations, hands-on workshops and OJT
- Learn from, make use of and build on the long industrial experience of our trainers



Our experience

- 1,200 customers
- 80 countries
- 15,000 trainees per year
- 1,300 sessions per year
- 550 training courses in the catalogue

95 permanent instructors and a network of 600 consultants, with world class industrial experience

IFP Training: our know-how

EXPLORATION & PRODUCTION

GEOSCIENCES AND RESERVOIR ENGINEERING
Geology
Geophysics
Logs and Petrophysics
Reservoir geology and Geophysics
Reservoir engineering

DRILLING, WELL
Drilling and Completion
Fluids
Well
Well control

FIELD OPERATIONS
Process engineering (Oil and Gas, water)
Operations (Oil and Gas)
Operator Certification
Safety, Health, Environment
Equipment
Integrity: maintenance and inspection

PROJECTS AND LOGISTICS
Development engineering
Construction
Projects
Logistics

MULTIDISCIPLINARY AND TRANSVERSAL TRAINING COURSES
Exploration-Production technical management
Design studies
Reservoir management
CO_2 capture and storage

REFINING & CHEMICALS

PRODUCTS, PROCESSES, CHEMICAL ENGINEERING
Multidisciplinary and transversal training courses
Processes, chemical engineering
Analysis - Products - Movements - Storage

MATERIALS, EQUIPMENT, MAINTENANCE, INSPECTION
Equipment, Materials, Corrosion, Inspection
Energy, Thermal equipment
Rotating machines
Maintenance and works

OPERATION, INSTRUMENTATION, REGULATION
Operator Certification
Technician training
Instrumentation and process control
Operational simulators

SAFETY, HEALTH, ENVIRONMENT
SHE Management
Safety in operations and works
Health and environment protection

CONSTRUCTION STUDIES AND PROJECTS
Construction engineering
Technical expertise
Project management

IC ENGINES & LUBRICANTS

ENGINE DESIGN
IC engines evolution
Spark ignited engines
Diesel engines
Hybrid powertrain
Transmission
Base engine design
Industrial processes
NVH
Reliability

ENGINE OPERATION
Combustion in spark ignited engine
Combustion in Diesel engine
Air supply
Supercharging
Pollutants emissions
Exhaust gases aftertreatment
Measurement on engine test bench
Engine management

IC ENGINES FOR AERONAUTICS
Reciprocating engines
Continuous flow
Hybridation

LUBRIFICATION
Lubricants physico-chemistry
Theory of lubrication
Lubrication of engines
Lubrication of industrial machines

POWERTRAIN PROJECTS MANAGEMENT
Engine project management
Lean management
System project management
Partnerships
Powertrain safety

ECONOMICS & MANAGEMENT

ENERGY ECONOMICS
Overview of Petroleum Economics
Overview of Natural Gas Economics
Liquefied Natural Gas Economics

UPSTREAM ECONOMICS
Upstream economics and management
Exploration-production contracts
Economic analysis of EP projects

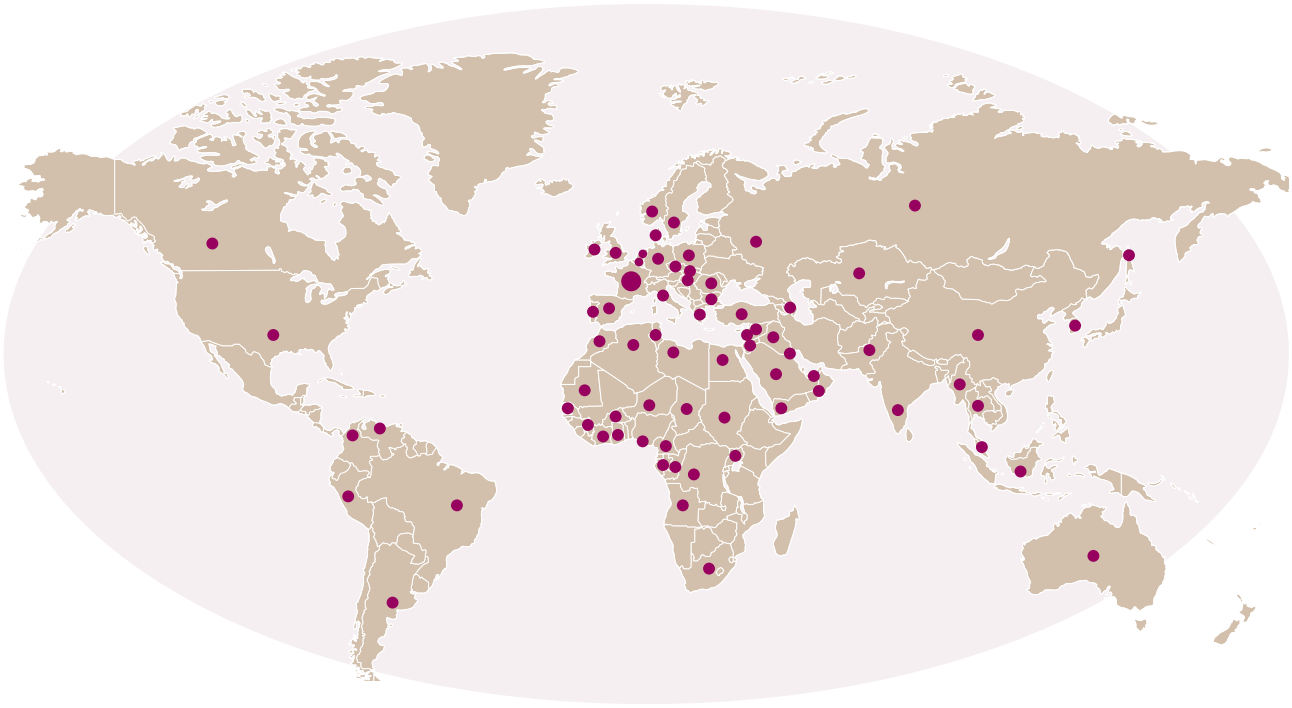
DOWNSTREAM ECONOMICS
Downstream economics and management
Refining economics
Marketing and sales
Retail marketing

TRADING AND SHIPPING
Oil Markets and Traiding
Gas Markets and Trading
Shipping: Charatering Contracts and Operations
Natural Gas and Electricity Trading

FINANCE AND MANAGEMENT
Financial management
Economic modeling and analysis
Strategic management
Price risk management

IFP Training, a worldwide presence

We deliver our tailor-made courses and proficient training programs around the world, in long-term partnerships with our clients to develop and sustain competency at the highest industry standards



5 training centers in France

Rueil-Malmaison, Lillebonne, Lyon-Solaize, Martigues, Pau

Subsidiary in France

RSI

Subsidiary in Bahrain

IFP Training & Consulting Middle-East

Subsidiary in the United States

RSI Simcon Inc., Houston

Representative in Nigeria

IFP Training,
solutions to develop your skills

IFP Training aspires to be there, with the best support, for all industry professionals; from operators, technicians and engineers to managers and executives, all along their career

> Information and induction
> Initial vocational training
> Advanced technical competency development
> Career evolution

IN-HOUSE COURSES

- All courses in our catalogues can be organized anywhere, at your convenience, as an in-house workshop tailored to address local operational concerns
- IFP Training is well known for its skillful training engineering of long, specific, multidisciplinary, proficiency programs envisioned from a thorough analysis of company's operational needs and articulated to build up the required technical expertise

PUBLIC COURSES

Our catalogues offer 550 programs, 400 of which are public courses scheduled for the development of your technical skills

QUALIFYING PROGRAMS WITH IFP SCHOOL

- Master programs delivered overseas
- Graduate diplomas for some proficiency programs

TRAINING FOR CERTIFICATION

- Accredited Operator Certification
- IWCF "Well control" Certification
- Production Superintendent Certification
- Maintenance Technician Training
- Welding Certification

DISTANCE LEARNING

- Blended Learning

BLOCK-RELEASE VOCATIONAL TRAINING

IFP Training has a strong experience of apprenticeship, with training alternating class sessions and OJT:

- Operators
- Maintenance and lab technicians

TRAINING FOR NEW INDUSTRIAL PROJECTS

- Job-specific foundation courses
- Advanced technical competency development
- Customized training to operate new facilities, using dynamic simulators

INTERNATIONAL CONFERENCES

In collaboration with Petrostrategies, two annual international conferences gather in Paris the leaders of the oil and gas industry:

- International Oil Summit
- International Gas & Electricity Summit

CONSULTING SERVICES AND TRAINING ENGINEERING

- Recruitment assistance
- Competency assessment
- Audit of training plans
- Training plan elaboration
- Training program engineering
- Design and management of training centers
- Conception of training manuals

BLENDED LEARNING

- Distance-learning method that combines self-training with teamwork and assistance from a tutor
- With an interactive tutoring, an individual coaching and a consistent competency assessment for the trainees

Simulator and Training

World-class global solution to meet the increasingly challenging business requirements in proficient training

We bring your Plant into the Training Room

RSI
create, evaluate, operate

40 years of experience in the conception of dynamic simulators (more than 2,000 models delivered)

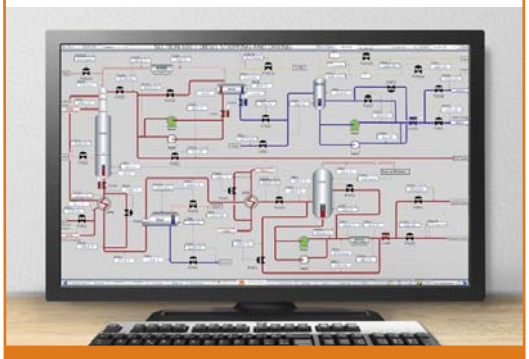
IFP Training

35 years of experience in training oil and gas professionals (more than 1,300 sessions per year)

IFP Training and its subsidiary RSI merge their skills and build on their experience to improve operational staff performance

A unique blended learning experience for the Oil and Gas Industry

DYNAMIC SIMULATOR



Design and implementation of high fidelity customized dynamic simulators

&

OPERATOR TRAINING

Design and delivery of associated training, with job certification processes

Our training centers in France…

Normandie
Immeuble Futura 1
Rue A. Desgenetais
76170 Lillebonne
GPS : 49.522027, 0.5306

Rueil-Malmaison
(headquarters)
232, av. Napoléon Bonaparte
92852 Rueil-Malmaison Cedex
GPS : 48.8771, 2.1726

Pau
Rue Paul et Henri Courteault
64000 Pau
GPS : 43.3096, 0.3602

Étang de Berre
Le Bâteau Blanc – Bât. C
Chemin de Paradis
13500 Martigues
GPS : 43.4066, 5.0459

Lyon-Solaize
Rond-point de l'Échangeur
de Solaize – BP3
69360 Solaize
GPS : 45.6431, 4.8274

…equipped for active learning and hands-on training

Dynamic Process Simulators

- Equipment
- Process units

Workbenches

- Instrumentation - Regulation
- Mechanics

Drilling Simulator / Workshops for hands-on operation and maintenance training programs

IFP Training: your contacts

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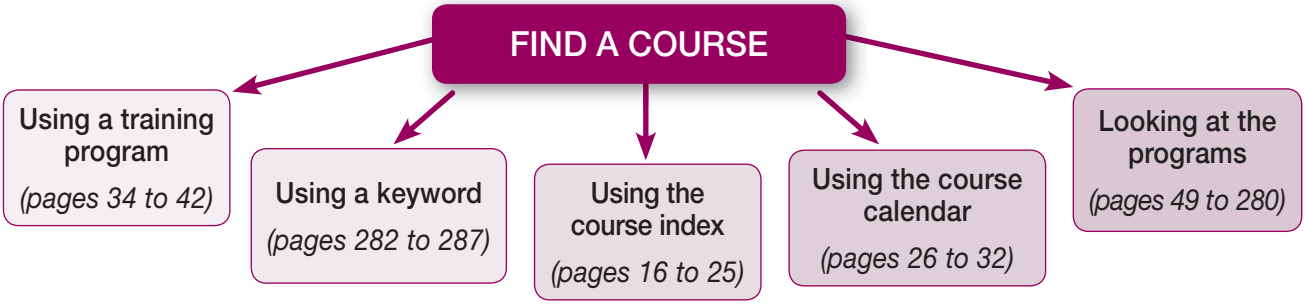
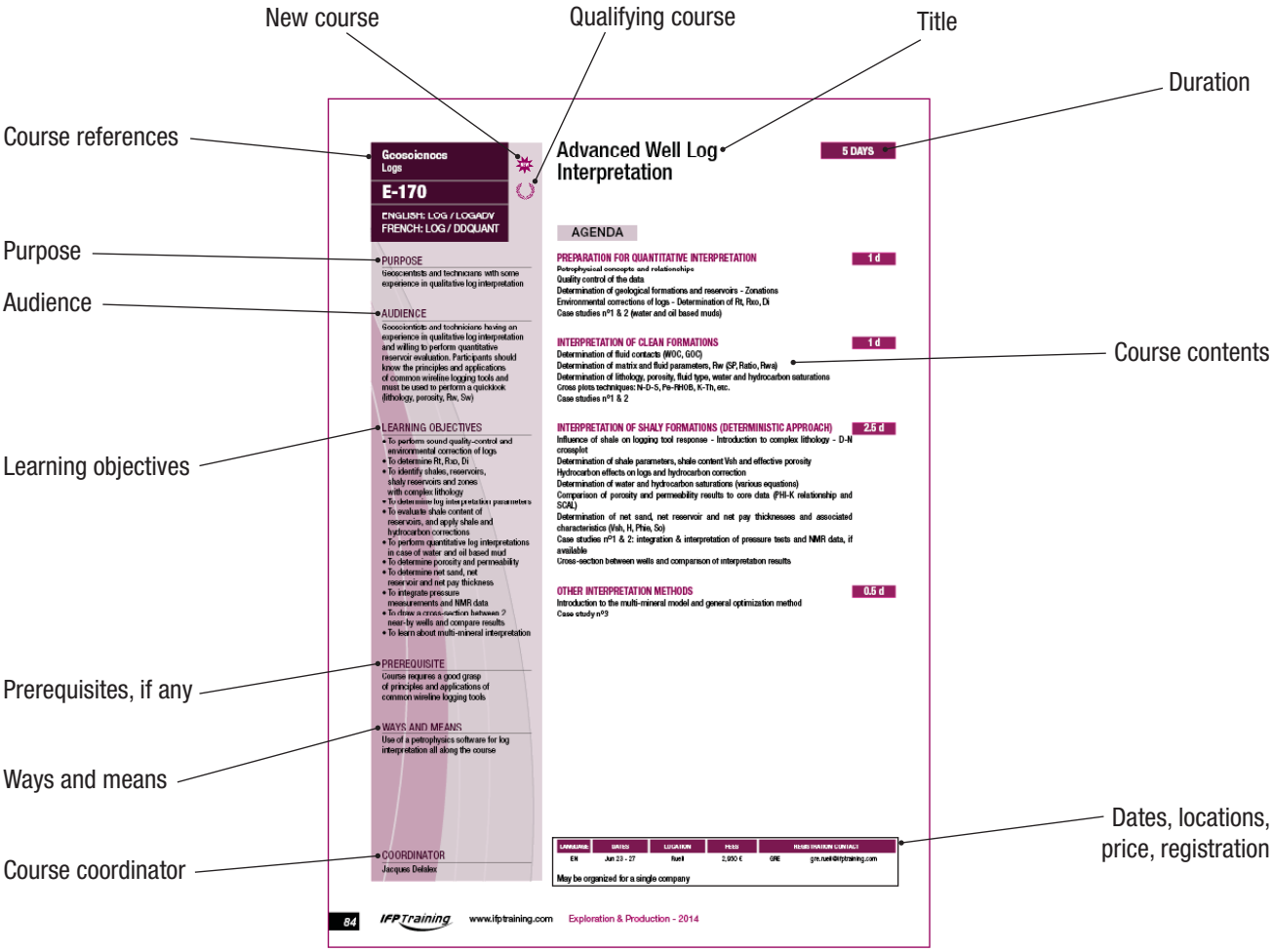
Guidelines



The courses are presented as per the technical display on page 45

The course program



To register

See page 302

Course index 2014

Tuition fee includes instruction, documentation; as well as meals and beverage breaks

	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Reference
GENERAL E&P TRAINING						
Management						
IRM - Integrated Reservoir Management	E-001	45	August 25 - October 29	Rueil / London	39,960 €	GEN / IRM
Energy Executive Session	E-004	10	June 23 - July 04	Paris	9,030 €	PEH / EES
International Oil Summit	E-006	1	April 11	Paris	1,300 €	PEH / IOS
International Gas & Electricity Summit	E-008	1,5	October 20 - 21	Paris	1,600 €	PEH / IGS
Overview of Petroleum Economics	E-010	4	December 02 - 05	Rueil	2,310 €	ENE / OPE
Overview of Natural Gas Economics	E-012	4	July 01 - 04	Rueil	2,450 €	ENE / ONE
Liquefied Natural Gas Economics	E-014	4	September 23 - 26	Rueil	2,900 €	ENE / LGE
Natural Gas and Electricity Trading	E-016	2	October 09 - 10	Rueil	1,660 €	TRT / GET
Oil Markets and Trading	E-018	3	June 04 - 06	Rueil	2,100 €	TRT / OMT
Shipping: General Features, Chartering Contracts and Operations	E-019	4	April 01 - 04	Rueil	2,690 €	TRT / CFS
General Information and Multidisciplinary Courses						
Major in Petroleum Engineering	E-030	90	In-house course			GEN / DIPPEN
Exploration & Production Overview	E-031	5	June 16 - 20 November 03 - 07	Rueil	2,960 €	GEN / DECOUVEP
Hunting for Oil: Exploration & Production Techniques	E-033	5	Upon request			GEO / HFO
Introduction to Petroleum Engineering	E-035	5	February 24 - 28 June 02 - 06 December 08 - 12	Rueil	3,070 €	COM / INFPGE
Upstream Economics						
Upstream Economics and Management	E-060	15	In-house course			EAM / UEM
Contractual Framework of Exploration-Production	E-062	4	April 08 - 11	Rueil	2,900 €	EAM / CFEP
Production Sharing and Joint Operating Agreements	E-064	4	February 25 - 28	Rueil	2,900 €	EAM / PSA
Exploration-Production Contracts and Negotiation NEW	E-066	5	September 08 - 12	Rueil	3,630 €	EAM / EPCN
Economic Framework of Exploration-Production	E-068	5	April 14 - 18	Rueil	3,300 €	EAM / EFEP
Economics and Risk Analysis of Upstream Projects	E-070	5	October 06 - 10	Rueil	3,360 €	EAM / ERA
Practice of Exploration-Production Contracts Economic Modeling	E-074	4	November 18 - 21	Rueil	2,900 €	EAM / PCM
Overview of the Oil & Gas Business	E-075	5	In-house course			GIP / SBA
Upstream contracts audit NEW	E-079	5	December 08 - 12	Rueil	3,220 €	GIP / UCA
Governance of an E&P Company NEW	E-080	5	November 24 - 28	Rueil	3,220 €	GIP / GEPC
Economic Evaluation of Carbon Capture, Transportation and Storage Projects	E-085	2	In-house course			GEN / CO2-2A

Course index 2014

Tuition fee includes instruction, documentation; as well as meals and beverage breaks

	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Reference
GEOSCIENCES						
Geophysics						
Seismic Reflection Fundamentals	E-100	5	May 12 - 16	Rueil	2,750 €	GEP / SEISREF
Signal Processing: a Tool for Acquisition and Processing of Geophysical Data	E-101	5	In-house course			GEP / SIGNAL
Petroleum Geophysics	E-103	10	November 24 - December 05	Rueil	5,500 €	GEP / GPHYSICS
Borehole Seismic	E-110	5	In-house course			GEP / BORESEIS
Seismic Interpretation Workshop NEW	E-131	10	October 13 - 24	Rueil	6,250 €	GEP / SISINTERP
Logs						
Wellsite Geology (Geological Logging) NEW	E-150	4	May 19 - 22	Rueil	2,200 €	LOG / WSGEOL
Well Log Interpretation	E-160	5	June 16 - 20	Rueil	2,750 €	LOG / LOGBASIC
Advanced Well Log Interpretation	E-170	5	June 23 - 27	Rueil	2,950 €	LOG / LOGADV
Well Log Interpretation on Computer	E-171	5	In-house course			LOG / LOGONPC
Cased-Hole Logging and Production Log Interpretation	E-180	5	In-house course			LOG / LOGPROD
Production Log Interpretation	E-181	5	In-house course			LOG / LPEMR
Well Logging & Basic Log Interpretation	E-190	8 weeks	Upon request at distance			LOG / BLWLI
Petroleum Basin & Exploration						
Fundamental Basin Exploration Workshop NEW	E-200	5	December 15 - 19	Rueil	2,750 €	GEO / INFO
Petroleum Exploration (Module 1) NEW	E-203	30	September 15 - October 24	Rueil / field trip(s)	19,100 €	GEO / PETEX
Exploration Concepts & Tools (Module 2) NEW	E-204	15	September 15 - October 03	Rueil / field trip(s)	10,860 €	GEO / PETEXMOD1
Basin Assessment & Prospect Definition NEW	E-205	15	October 06 - 24	Rueil	9,050 €	GEO / PETEXMOD2
Structural Analysis and Modeling	E-211	5	In-house course			GEO / STRUCT
Sedimentology & Sequence Stratigraphy	E-212	5	September 22 - 26	Rueil	2,900 €	GEO / STRATI
Petroleum Organic Geochemistry: from Kerogen to Reservoir	E-213	5	In-house course			GEO / GEOCHIM
Play Assessment & Prospect Evaluation	E-216	5	October 20 - 24	Rueil	3,050 €	GEO / PLAY
From Prospect to Development: an Integrated Approach	E-217	10	November 24 - December 05	Rueil	5,500 €	BAS / PROSPECT
Stratigraphic Modeling: Basin Architecture & Sediment Distribution NEW	E-218	4	In-house course			BAS / DIONISOS
Basin Modeling: Thermicity, Maturation & Migration NEW	E-219	5	In-house course			BAS / TEMIS
Seismic and Sequence Stratigraphy for Oil & Gas Exploration NEW	E-220	10	In-house course			BAS / STRATADV
Hydrocarbons in Unconventional Settings (the Geology Perspective) NEW	E-221	3	June 02 - 04	Rueil	1,950 €	BAS / UNCONV

Course index 2014

Tuition fee includes instruction, documentation; as well as meals and beverage breaks

	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Reference
Reservoir Geology						
RCM - Reservoir Characterization & Modeling	E-250	40	September 15 - November 07	Rueil / field trip(s)	25,600 €	RES / RCM
Reservoir Geology (Module 1)	E-252	20	September 15 - October 10	Rueil / field trip(s)	12,850 €	RES / RESGEOL
Advanced Reservoir Geology (Module 2) NEW	E-255	20	October 13 - November 07	Rueil / field trip(s)	14,100 €	RES / RESGEOLADV
Geological Modeling Workshop for Integrated Reservoir Studies	E-261	5	June 02 - 06	Rueil	3,100 €	RES / GEOMODEL
Introduction to Carbonate Reservoir Characterization NEW	E-262	5	May 12 - 16	Rueil	3,050 €	RES / INICARB
Advanced Carbonate Reservoir Characterization NEW	E-263	5	May 19 - 23	Rueil	3,200 €	RES / ADVCARB
Naturally Fractured Reservoirs: from Analysis and Modeling to Reservoir Simulation and Field Development NEW	E-264	5	June 16 - 20	Rueil	3,100 €	RES / NATFRAC
Petroleum Geostatistics	E-266	5	November 17 - 21	Rueil	2,950 €	RES / GEOSTAT
Petrophysical Properties: Core, Log and Test Data Integration for Reservoir Modeling	E-267	5	October 13 - 17	Rueil	2,950 €	RES / ROCKTYP
Reservoir Geophysics						
Seismic Analysis for Prospect Evaluation Workshop NEW	E-300	28	October 13 - November 21	Rueil	19,100 €	GEP / RESGPHY
Seismic Stratigraphy and Seismic Attributes Interpretation Workshop NEW	E-301	10	October 27 - November 07	Rueil	6,060 €	GEP / SEISINT
AVO and Seismic Inversion: Workshop Tools for Reservoir Characterization	E-330	5	June 02 - 06	Rueil	3,200 €	GEP / AVOINV
Microseismic: New Insights on Reservoirs	E-335	5	May 19 - 23	Rueil	2,900 €	GEP / MICROSEIS
SRC - Seismic Reservoir Characterization	E-340	6 weeks	Upon request at distance			GEP / BLSRC

Course index 2014

Tuition fee includes instruction, documentation; as well as meals and beverage breaks

	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Reference
RESERVOIR ENGINEERING						
Introduction to Reservoir Engineering	E-350	5	September 29 - October 03	Rueil	2,750 €	GIS / RESBAS
Reservoir Management	E-355	10	November 24 - December 05	Rueil	5,650 €	GIS / ARM
Reservoir Engineering	E-360	64	September 15 - December 12	Rueil / field trip(s)	32,350 €	GIS / RESENGIN
Reservoir Geology (Module 1)	E-252	20	September 15 - October 10	Rueil / field trip(s)	12,850 €	RES / RESGEOL
Fluid Studies - PVT (Module 2)	E-361	5	October 13 - 17	Rueil	2,750 €	GIS / PVT
Well Test Analysis (Module 3)	E-365	10	October 20 - 31	Rueil / field trip(s)	8,080 €	GIS / WELLTEST
Drive Mechanism - Enhanced Oil Recovery (Module 4)	E-370	9	November 03 - 14	Rueil	4,350 €	GIS / DRIVEOR
Drilling/Completion for Reservoir Studies (Module 5)	E-368	5	November 17 - 21	Rueil	2,750 €	GIS / RESPUIT
Development Project and Uncertainties (Module 6)	E-373	5	November 24 - 28	Rueil	2,900 €	GIS / DEVELOPROJ
Dynamic Reservoir Simulation (Module 7)	E-375	10	December 01 - 12	Rueil	5,850 €	GIS / RESSIMU
Core Analysis for Reservoir Characterization	E-363	5	April 14 - 18	Rueil	3,050 €	GIS / CONSCAL
PVT Modeling	E-385	5	November 17 - 21	Rueil	3,030 €	GIS / PVTMOD
Improved/Enhanced Oil Recovery (IOR/EOR)	E-386	5	October 13 - 17	Rueil	3,100 €	GIS / EOR
Advanced Well Test Analysis	E-388	5	In-house course			GIS / ADVWTA
Dynamic Reservoir Simulation: Best Practices	E-389	5	October 06 - 10	Rueil	3,350 €	GIS / ADVSIMU
Laboratory Determination of Relative Permeabilities	E-391	5	In-house course			GIS / CYDAR
Experimental Training for Core Analysis	E-392	5	In-house course			GIS / CARC
Reserves Evaluation - Risks and Uncertainties	E-393	5	June 02 - 06	Rueil	3,130 €	GIS / RISKUN
Gas Condensate Fields Development	E-394	5	May 19 - 23	Rueil	3,050 €	GIS / GAS
Unconventional Resources - Shale Gas Fundamentals	E-395	5	June 23 - 27	Rueil	3,650 €	GIS / UNCONV
Well Test Analysis	E-396	10 weeks	Upon request at distance			GIS / BLWTA
Material Balance and Production Mechanisms	E-398	7 weeks	Upon request at distance			GIS / BLMBAL
GEOSCIENCES FIELD TRIP						
Introduction to Petroleum System	E-900	5	In-house course			GEOT / PETBAS
Static Model Construction: Field Constraints and Integration with Subsurface Data NEW	E-910	5	June 02 - 06	Lorraine region	3,400 €	GEOT / CARBFT

Course index 2014

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	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Reference
DRILLING - COMPLETION - WELL CONTROL						
Drilling / Completion						
Drilling Fundamentals	E-410	5	September 15 - 19 November 24 - 28	Rueil	3,070 €	FOR / INFORE
Well Completion and Servicing	E-411	5	December 01 - 05	Rueil	3,070 €	PRO / INPFE
Drilling and Completion Engineering NEW	E-412	98	February 10 - June 27	Pau	38,700 €	FOR / FOFPE
Drilling Engineering NEW	E-413	83	February 10 - 28 & March 24 - June 27	Pau	32,280 €	FOR / FOFPFE
Completion Engineering NEW	E-414	63	February 10 - March 21 & May 05 - June 27	Pau	26,870 €	PRO / FOFPCE
Drilling						
Practical Aspects of Well Planning and Costing	E-415	10	June 16 - 27 November 17 - 28	Rueil	6,080 €	FOR / PAWPCE
Geological Field Trip for Drillers NEW	E-416	5	February 10 - 14	Pau	3,070 €	FOR / FTFPE
Fundamentals of Drilling and Completion	E-419	5	February 17 - 21	Pau	3,070 €	FOR / BACFPE
Well Architecture and Equipment	E-420	5	March 24 - 28	Pau	3,070 €	FOR / ARCHIE
Bit, Drill String and Fishing While Drilling	E-421	5	April 14 - 18	Pau	3,070 €	FOR / OUTGARNE
Rig, BOP's and Well Control Equipment	E-422	5	April 28 - May 02	Pau	3,070 €	FOR / BOPE
Data Aquisition during Drilling Operations	E-423	5	May 12 - 16	Pau	3,070 €	FOR / LOGFIE
HSE: Health - Safety - Environment	E-424	5	June 10 - 13	Pau	3,070 €	FOR / HSEE
Directional and Horizontal Drilling	E-425	5	April 22 - 25	Pau	3,070 €	FOR / FDTDHE
Geomechanics for Drilling Operations NEW	E-426	3	May 26 - 28	Pau	3,420 €	FOR / GEOME
Underbalanced and Managed Pressure Drilling: Applications, Design and Operations	E-427	5	March 17 - 21 December 08 - 12	Rueil	3,150 €	FOR / UBDE
Deepwater Drilling and Development	E-428	5	June 02 - 06	Pau	3,070 €	FOR / OFDWE
Wellhead and Blowout Preventers	E-429	3	In-house course			FOR / WHEADE
Stuck Pipe Prevention NEW	E-430	5	May 12 - 16 September 08 - 12	Pau	3,070 €	FOR / STUCKPIPE
Advanced Directional Drilling and BHA Design NEW	E-432	5	In-house course			FOR / FDTDH2E

Course index 2014

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	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Reference
Fluids						
Drilling Fluids	E-441	5	March 31 - April 04	Pau	3,070 €	FLU / FLUE
Designing a Mud Program	E-442	5	In-house course			FLU / FLUPGE
Cementing Practices	E-443	5	April 07 - 11	Pau	3,070 €	FLU / CIM1E
Advanced Cementing Practices	E-444	5	In-house course			FLU / CIM2E
Completion						
Well Productivity & Reservoir - Wellbore Interface	E-451	5	February 24 - 28	Pau	3,070 €	PRO / PPLCTE
Well Test Operation NEW	E-452	5	May 05 - 09	Pau	3,070 €	PRO / CEPE
Well-Completion Equipment and Procedures for Flowing Wells	E-453	5	March 03 - 07	Pau	3,070 €	PRO / EQTPEE
Tubing movement & forces	E-454	3	In-house course			PRO / TUBMFE
Wellbore Treatments	E-455	5	March 10 - 14	Pau	3,070 €	PRO / TRAITE
Matrix Acidizing	E-456	5	October 27 - 31	Rueil	3,070 €	PRO / ACIDIFE
Basic Hydraulic Fracturing	E-457	5	In-house course			PRO / HYDFRACE
Artificial Lift and Well Intervention Fundamentals	E-458	5	March 17 - 21	Pau	3,070 €	PRO / TAWOE
Artificial Lift: Gas Lift	E-459	5	In-house course			PRO / GLIFTE
Artificial Lift: Pumping	E-460	5	In-house course			PRO / APOMPE
Nitrogen & Coiled Tubing Operations in Completion and Workover	E-461	5	May 19 - 23 November 03 - 07	Rueil	3,070 €	PRO / CTAE
Well Servicing & Workover	E-462	5	In-house course			PRO / WSWOE
Well Performance	E-463	5	In-house course			PRO / WELLPERFE
Advanced Well Performance NEW	E-464	10	November 24 - December 05	Rueil	7,060 €	PRO / WELLPERF2E
Well Inflow & Outflow Performance	E-465	8 weeks	Upon request at distance			PRO / BLPROSPER
Well Production Integrity NEW	E-466	2	In-house course			PRO / WELINT
Well Integrity Management NEW	E-467	5	In-house course			PRO / WELINTMA
Well Control						
Well Control	E-471	5	May 19 - 23 July 07 - 11 September 08 - 12	Pau	2,490 €	WEL / FPESME
Well Intervention and Pressure Control	E-473	5	June 02 - 06 December 01 - 05	Pau	3,070 €	WEL / WELINE
Stripping	E-477	3	In-house course			WEL / STRIPE

Course index 2014

Tuition fee includes instruction, documentation; as well as meals and beverage breaks

	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Language	Reference
FIELD OPERATIONS							
Operation of Production Facilities							
Fundamentals of Production NEW	E-500	2	June 02 - 03 March 24 - 25 October 13 - 14	Rueil Pau Rueil	1,480 €	EN FR	PROD / PRODCHAIN PROD / CHAINPROD
Oil & Gas Field Processing	E-501	5	June 23 - 27 December 01 - 05 March 03 - 07 April 07 - 11 June 02 - 06	Rueil Pau Rueil Pau	2,970 €	EN FR	PROD / OGFP PROD / IPS
Field Processing and Surface Production Facilities	E-502	10	June 23 - July 04 December 01 - 12 June 02 - 13	Rueil Pau	5,630 €	EN FR	PROD / FPSPF PROD / PIPS
Advanced Oil & Gas Field Processing	E-503	15	February 10 - 28 September 15 - October 03 May 26 - June 13	Rueil	8,490 €	EN FR	PROD / ADVGB PROD / ADVFR
Module 1: Thermodynamics Applied to Well Effluent Processing	E-504	5	February 10 - 14 September 15 - 19 May 26 - 30	Rueil	2,970 €	EN FR	PROD / ADV1GB PROD / ADV1FR
Module 2: Oil and Water Treatment	E-505	5	February 17 - 21 September 22 - 26 June 02 - 06	Rueil	2,970 €	EN FR	PROD / ADV2GB PROD / ADV2FR
Module 3: Gas Processing and Conditioning	E-506	5	February 24 - 28 September 29 - October 03 June 09 - 13	Rueil	2,970 €	EN FR	PROD / ADV3GB PROD / ADV3FR
Natural Gas	E-510	5	June 30 - July 04 November 17 - 21 April 14 - 18 September 15 - 19	Rueil	2,970 €	EN FR	PROD / NATGAS PROD / GAZNAT
Liquefied Natural Gas (LNG)	E-511	5	March 10 - 14 November 24 - 28 June 23 - 27	Rueil	3,890 €	EN FR	PROD / LNG PROD / GNL
Gas Sweetening and Sulfur Recovery NEW	E-514	5	November 24 - 28 In-house course	Rueil	2,970 €	EN FR	PROD / ACIDGB PROD / ACIDFR
Natural Gas Storage	E-515	2	November 04 - 05 September 15 - 16	Rueil	1,480 €	EN FR	PROD / STOCKGB PROD / STOCKFR
Natural Gas Transport by Pipeline	E-516	2	November 06 - 07 September 17 - 18	Rueil	1,480 €	EN FR	PROD / TRANSGB PROD / TRANSFR
Production Accounting and Material Balance Sheet NEW	E-520	3	November 24 - 26 April 14 - 16	Rueil	2,180 €	EN FR	PROD / BALSH PROD / BILMAT
Introductory Course to Surface Production Operator Training	E-529	15	In-house course			EN FR	PROD / PC PROD / CP
Surface Production Operator Training (BOA)	E-530	35 weeks	In-house course			EN FR	PROD / BOAGB PROD / BOAFR
Production Panel Operator Training	E-531	35	May 12 - July 01 September 15 - October 31 In-house course	Rueil	30,900 €	EN FR	PROD / PANEL PROD / TABLEAU

Course index 2014

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	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Language	Reference
Surface Production Supervisor Training	E-532	35	In-house course			EN FR	PROD / PRODSUP PROD / SUPPROD
Surface Production Superintendent Training NEW	E-533	58	September 18 - December 10 April 09 - July 09	Pau, Martigues & Rueil	35,610 €	EN FR	PROD / PRODSI PROD / SIPROD
Production Engineer Training (ProdEng)	E-534	60	September 01 - November 21 May 12 - August 01	Rueil & Martigues	29,090 €	EN FR	PROD / PRODENG PROD / INGPROD
Laboratory Analysis Techniques for Oil & Gas Applications	E-535	5	December 08 - 12 June 30 - July 04	Rueil Pau	2,970 €	EN FR	PROD / LABOGB PROD / LABOFR
Safety in Laboratories and Pilot Plants NEW	E-537	4	December 15 - 18 In-house course	Rueil	2,630 €	EN FR	PROD / SAFELABGB PROD / SAFELABFR
Well Equipment and Operation for Production Engineers	E-546	5	September 08 - 12 May 19 - 23	Rueil	2,970 €	EN FR	PROD / WELLGB PROD / WELLFR
HSE - Health, Safety & Environment							
HSE in Surface Processing Operations	E-550	5	May 19 - 23 November 03 - 07 March 17 - 21 July 15 - 18	Pau Pau Rueil	2,970 €	EN FR	HSE / EXPSAFOP HSE / EXPSECOP
Safety Engineering - Module 1	E-560	5	March 03 - 07 November 17 - 21 June 16 - 20	Rueil	2,970 €	EN FR	HSE / SAFENG1GB HSE / SAFENG1FR
Safety Engineering - Module 2	E-561	5	November 24 - 28 June 23 - 27	Rueil	2,970 €	EN FR	HSE / SAFENG2GB HSE / SAFENG2FR
Safety Engineering Workshop - Hazard Identification and Risk Assessment Fundamentals	E-565	5	In-house course			EN FR	HSE / SEWGB HSE / SEWFR
HSE in Construction/Maintenance Works	E-570	4	November 17 - 20 June 16 - 19	Pau	2,630 €	EN FR	HSE / WORKGB HSE / WORKFR
Environmental & Societal Aspect Management	E-580	5	November 24 - 28 June 23 - 27	Rueil	2,970 €	EN FR	HSE / ENVGB HSE / ENVFR
HSE Superintendent Training NEW	E-590	58	September 18 - December 10 April 09 - July 09	Pau, Martigues & Rueil	35,610 €	EN FR	HSE / HSESI HSE / SIHSE
Equipment, Maintenance, Inspection							
Technology of Oil & Gas Processing Equipment	E-600	10	October 06 - 17 June 16 - 27	Rueil & Martigues	5,630 €	EN FR	MAT / EQUIP MAT / MAT
Module 1: Static Equipment	E-601	5	October 06 - 10 June 16 - 20	Rueil	2,970 €	EN FR	MAT / EQUIP1 MAT / MAT1
Module 2: Rotating Machinery	E-602	5	October 13 - 17 June 23 - 27	Martigues	2,970 €	EN FR	MAT / EQUIP2 MAT / MAT2
Process Control & Safety Instrumented Systems NEW	E-608	5	October 27 - 31 In-house course	Rueil	2,970 €	EN FR	I-R / INST1GB I-R / INST1FR
Advanced Instrumentation, Process Control & Automation NEW	E-609	5	In-house course			EN FR	I-R / INST2GB I-R / INST2FR
Metering and Allocation	E-615	5	November 03 - 07 June 02 - 06	Rueil	2,970 €	EN FR	I-R / METER I-R / COMPT
Electricity and Electrical Motors	E-617	3	October 27 - 29 June 16 - 18	Rueil	2,280 €	EN FR	I-R / ELECGB I-R / ELECFR
Centrifugal Pumps and Positive Displacement Pumps	E-620	5	In-house course November 17 - 21	Rueil	2,410 €	EN FR	MTE / PC-E MTE / PC

Course index 2014

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Centrifugal Compressor	E-625	5	In-house course			EN	MTE / ECC-E
			June 10 - 13 October 07 - 10	Lillebonne Martigues	1,890 €	FR	MTE / ECC
Gas Turbines	E-629	5	May 19 - 23 September 08 - 12	Rueil	2,690 € 2,600 €	EN FR	MTE / TAG-E MTE / TAG
Maintenance Superintendent Training NEW	E-640	58	September 18 - December 10 April 09 - July 09	Pau, Martigues & Rueil	35,610 €	EN FR	MAI / MAINSI MAI / SIMAIN
Operation, Maintenance and Inspection of Rotating Machinery	E-642	15	August 25 - September 12	Lyon	5,690 €	EN	MTM / OMIRM
Machinery Vibration Signature Analysis - A Practical Approach	E-643	5	In-house course			EN	MTM / PAVIB-E
			June 23 - 27	Martigues	2,440 €	FR	MTM / DIAVIB
Maintenance Management Equipment Availability Control	E-645	5	February 03 - 07	Rueil	2,600 €	EN	OMT / GEMA-E
			In-house course			FR	OMT / GEMA
Risk Based Inspection (RBI)	E-646	4	In-house course			EN	EIM / PLINS-E
			May 20 - 22	Lyon	1,470 €	FR	EIM / PLINS
Process & Layout Engineering							
Offshore Field Development - Pipelines & Flow Assurance	E-650	5	October 20 - 24 June 30 - July 04	Rueil	2,970 €	EN FR	DEV / OFFSHGB DEV / OFFSHFR
FPSO/FSO & Operation of Oil Terminals	E-660	5	November 24 - 28 May 19 - 23	Pau	2,970 €	EN FR	DEV / TERMGB DEV / TERMFR
Fluid Mechanics and Flow Assurance NEW	E-665	5	April 07 - 11	Rueil	2,970 €	EN	DEV / FLUFLOW
Pipeline Hydraulics and Multiphase Flow	E-670	5	September 22 - 26	Rueil	2,970 €	EN	DEV / HYDRGB
			In-house course			FR	DEV / HYDRFR
Corrosion and Corrosion Prevention	E-675	5	In-house course			EN	DEV / CORGB
			June 23 - 27	Rueil	2,970 €	FR	DEV / CORFR
Simulation of Oil & Gas Field Treatment Processes	E-680	5	December 15 - 19	Rueil	2,970 €	EN	DEV / SIMULGB
			In-house course			FR	DEV / SIMULFR
Schematization of Oil & Gas Processes	E-690	2	October 27 - 28 July 07 - 08	Rueil	1,480 €	EN FR	DEV / SCHEMGB DEV / SCHEMFR
Field Development Project NEW	E-695	20	November 24 - December 20 March 17 - April 11	Rueil	11,240 €	EN FR	DEV / FDEVGB DEV / FDEVFR

PROJECTS & LOGISTICS

Project Management	E-712	5	June 16 - 20 November 17 - 21 March 17 - 21 September 15 - 19	Rueil	2,970 €	EN FR	PL / PROJGB PL / PROJFR
PROMISE™ - Oil & Gas Project Management Interactive Simulator for Excellence	E-713	5	February 24 - 28 April 14 - 18 October 06 - 10 November 24 - 28	Rueil	3,740 €	EN	PL / PROMISE
Engineering Management	E-714	3	May 12 - 14 November 03 - 05	Rueil	1,960 €	EN	PL / EM
Mechanical Equipment Design and Manufacturing	E-715	2	May 19 - 20 November 06 - 07	Rueil	1,380 €	EN	PL / MECHEDM

Course index 2014

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	Scheet	Duration in days	Dates	Location	Tuition fee (€ H.T.)	Language	Reference
Social Environment of Oil & Gas Projects	E-716	3	In-house course			EN FR	PL / SEOGB PL / SEOFR
Project Control	E-718	10	April 07 - 18 October 13 - 24	Rueil	5,930 €	EN	PL / PC
Negotiation Skills NEW	E-719	5	October 27 - 31	Rueil	2,970 €	EN	PL / NEGOGB
Management of Medium Size and Revamping Projects	E-720	5	September 22 - 26 March 17 - 21 September 15 - 19	Rueil	2,710 € 2,500 €	EN FR	PL / MRSMPGB PL / MRSMPFR
Management of Small Projects	E-721	5	In-house course March 31 - April 04 June 02 - 06 December 08 - 12	Solaize Lillebonne Martigues	2,500 €	EN FR	PL / GESPPGB PL / GESPPFR
Quality & Risk Management in Projects	E-722	3	November 12 - 14 In-house course	Rueil	1,850 €	EN FR	PL / QAQCGB PL / QAQCFR
Estimation and Cost Control	E-723	5	September 29 - October 03 March 24 - 28	Rueil	2,970 €	EN FR	PL / COSTGB PL / COSTFR
Project Planning and Scheduling	E-725	5	June 16 - 20 November 24 - 28	Rueil	2,710 € 2,490 €	EN FR	PL / PSPCGB PL / PSPCFR
Contracts and Procurement	E-726	3	April 09 - 11 October 15 - 17 In-house course	Rueil	1,960 €	EN FR	PL / CP PL / CA
Technical Service Contracts for Operation Management	E-727	5	March 10 - 14	Rueil	2,970 €	EN	PL / TSC
Construction Management Training	E-730	25	June 10 - July 11	Rueil & Martigues	15,990 €	EN	PL / CONST
Construction Works Supervision	E-732	5	In-house course			EN FR	PL / CONSTSUPGB PL / CONSTSUPFR
Precommissioning, Commissioning and Start-up	E-735	5	June 02 - 06 May 19 - 23	Rueil	2,970 €	EN FR	PL / PRECOMGB PL / PRECOMFR
Metallurgy and Welding Technology	E-760	5	June 16 - 20	Rueil	2,970 €	EN	PL / MWT
Logistic Engineer Training	E-770	35	January 27 - March 14	Rueil	20,670 €	EN	PL / LET
Subsea Production Systems	E-780	5	May 19 - 23 In-house course	Rueil	2,970 €	EN FR	PL / SPSGB PL / SPSFR
Subsea Pipelines	E-785	5	June 02 - 06 In-house course	Rueil	2,970 €	EN FR	PL / PIPEGB PL / PIPEFR

BLENDED LEARNING

Well Logging & Basic Log Interpretation	E-190	8 weeks	Upon request at distance	EN	LOG / BLWLI
SRC - Seismic Reservoir Characterization	E-340	6 weeks	Upon request at distance	EN	GEP / BLSRC
Well Test Analysis	E-396	10 weeks	Upon request at distance	EN	GIS / BLWTA
Material Balance and Production Mechanisms	E-398	7 weeks	Upon request at distance	EN	GIS / BLMBAL
Well Inflow & Outflow Performance	E-465	8 weeks	Upon request at distance	EN	PRO / BLPROSPER

2014 course calendar

Page	Title of the course	Location	Duration	January	February	March	April	May	June	July	August	September	October	November	December
	INFORMATION AND MANAGEMENT														
	Management														
E-001	IRM Integrated Reservoir Management	Rueil / London	45 d								25	▶	29		
E-004	Energy Executive Session	Paris	10 d						23 ▶ 04						
E-006	International Oil Summit	Paris	1 d				11								
E-008	International Gas & Electricity Summit	Paris	1,5 d										20 ▶21		
E-010	Overview of Petroleum Economics ◐	Rueil	4 d												02 ▶05
E-012	Overview of Natural Gas Economics ◐	Rueil	4 d							01 ▶04					
E-014	Liquefied Natural Gas Economics ◐	Rueil	4 d									23 ▶26			
E-016	Natural Gas and Electricity Trading:	Rueil	2 d										09 ▶10		
E-018	Oil Markets and Trading ◐	Rueil	3 d						04 ▶06						
E-019	Shipping: General Features, Chatering, Contracts and Operations ◐	Rueil	4 d				01 ▶04								
	General Information and Multidisciplinary Courses														
E-031	Exploration & Production Overview ◐	Rueil	5 d						16 ▶20					03 ▶07	
E-035	Introduction to Petroleum Engineering ◐	Rueil	5 d		24 ▶28				02 ▶06						08 ▶12
	Upstream Economics														
E-062	Contractual Framework of Exploration-Production ◐	Rueil	4 d				08 ▶11								
E-064	Production Sharing and Joint Operating Agreements ◐	Rueil	4 d		25 ▶28										
✸ E-066	Exploration-Production Contracts and Negotiation ◐	Rueil	5 d									08 ▶12			
E-068	Economic Framework of Exploration-Production ◐	Rueil	5 d				14 ▶18								
E-070	Economics and Risk Analysis of Upstream Projects ◐	Rueil	5 d										06 ▶10		
E-074	Practice of Exploration-Production Contracts Economic Modeling ◐	Rueil	4 d											18 ▶21	
✸ E-079	Upstream contracts audit ◐	Rueil	5 d												08 ▶12
✸ E-080	Governance of an E&P Company ◐	Rueil	5 d											24 ▶28	

◐ Also proposed in French
✸ New course
Sessions in english
Sessions in french
Modular sessions in english
Modular sessions in french

2014 course calendar

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	GEOSCIENCES														
	Geophysics														
E-100	Seismic Reflection Fundamentals	Rueil	5 d					12 ▶16							
E-103	Petroleum Geophysics ◐	Rueil	10 d											24 ▶ 05	
✸ E-131	Seismic Interpretation Workshop ◐	Rueil	10 d										13 ▶24		
	Logs														
✸ E-150	Wellsite Geology (Geological Logging) ◐	Rueil	4 d					19 ▶22							
E-160	Well Log Interpretation ◐	Rueil	5 d						16 ▶20						
E-170	Advanced Well Log Interpretation ◐	Rueil	5 d						23 ▶27						
	Petroleum Basin & Exploration														
✸ E-200	Fundamental Basin Exploration Workshop	Rueil	5 d												15 ▶19
✸ E-203	Petroleum Exploration ◐	Rueil / field trip(s)	30 d									15 ▶ 24			
✸ E-204	Exploration Concepts & Tools ◐	Rueil / field trip(s)	15 d									15 ▶ 03			
✸ E-205	Basin Assessment & Prospect Definition ◐	Rueil	15 d										06 ▶24		
E-212	Sedimentology & Sequence Stratigraphy	Rueil	5 d									22 ▶26			
E-216	Play Assessment & Prospect Evaluation ◐	Rueil	5 d										20 ▶24		
E-217	From Prospect to Development: an Integrated Approach	Rueil	10 d											24 ▶ 05	
✸ E-221	Hydrocarbons in Unconventional Settings (the Geology Perspective)	Rueil	3 d						02 ▶04						
	Reservoir Geology														
E-250	RCM - Reservoir Characterization & Modeling	Rueil / field trip(s)	40 d									15 ▶		07	
E-252	Reservoir Geology	Rueil / field trip(s)	20 d									15 ▶ 10			
✸ E-255	Advanced Reservoir Geology	Rueil / field trip(s)	20 d										13 ▶ 07		
E-261	Geological Modeling Workshop for Integrated Reservoir Studies	Rueil	5 d						02 ▶06						
✸ E-262	Introduction to Carbonate Reservoir Characterization	Rueil	5 d					12 ▶16							
✸ E-263	Advanced Carbonate Reservoir Characterization	Rueil	5 d					19 ▶23							
✸ E-264	Naturally Fractured Reservoirs: from Analysis and Modeling to Reservoir Simulation and Field Development	Rueil	5 d						16 ▶20						
E-266	Petroleum Geostatistics	Rueil	5 d											17 ▶21	
E-267	Petrophysical Properties: Core, Log and Test Data Integration for Reservoir Modeling	Rueil	5 d										13 ▶17		
	Reservoir Geophysics														
✸ E-300	Seismic Analysis for Prospect Evaluation Workshop	Rueil	28 d										13 ▶ 21		
✸ E-301	Seismic Stratigraphy and Seismic Attributes Interpretation Workshop	Rueil	10 d										27 ▶ 07		
E-330	AVO and Seismic Inversion: Workshop Tools for Reservoir Characterization	Rueil	5 d						02 ▶06						
E-335	Microseismic: New Insights on Reservoirs	Rueil	5 d					19 ▶23							

◐ Also proposed in French
✸ New course
Sessions in english
Sessions in french
Modular sessions in english
Modular sessions in french

2014 course calendar

Page	Title of the course	Location	Duration	January	February	March	April	May	June	July	August	September	October	November	December
	RESERVOIR ENGINEERING														
E-350	Introduction to Reservoir Engineering ◐	Rueil	5 d									29 ▶ 03			
E-355	Reservoir Management	Rueil	10 d											24 ▶ 05	
E-360	Reservoir Engineering ◐	Rueil / field trip(s)	64 d									15		▶	12
E-361	Fluid Studies - PVT ◐	Rueil	5 d										13 ▶ 17		
E-363	Core Analysis for Reservoir Characterization	Rueil	5 d				14 ▶ 18								
E-365	Well Test Analysis	Rueil / field trip(s)	10 d										20 ▶ 31		
E-368	Drilling/Completion for Reservoir Studies ◐	Rueil	5 d											17 ▶ 21	
E-370	Drive Mechanism - Enhanced Oil Recovery ◐	Rueil	9 d											03 ▶ 14	
E-373	Development Project and Uncertainties ◐	Rueil	5 d											24 ▶ 28	
E-375	Dynamic Reservoir Simulation ◐	Rueil	10 d												01 ▶ 12
E-385	PVT Modeling	Rueil	5 d											17 ▶ 21	
E-386	Improved/Enhanced Oil Recovery (IOR/EOR)	Rueil	5 d										13 ▶ 17		
E-389	Dynamic Reservoir Simulation: Best Practices	Rueil	5 d										06 ▶ 10		
E-393	Reserves Evaluation - Risks and Uncertainties	Rueil	5 d						02 ▶ 06						
E-394	Gas Condensate Fields Development	Rueil	5 d					19 ▶ 23							
E-395	Unconventional Resources - Shale Gas Fundamentals	Rueil	5 d						23 ▶ 27						
	GEOSCIENCES FIELD TRIP														
✸ **E-910**	Static Model Construction: Field Constraints and Integration with Subsurface Data	Lorraine region	5 d						02 ▶ 06						

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	DRILLING - COMPLETION - WELL CONTROL														
	Drilling / Completion														
E-410	Drilling Fundamentals	Rueil	5 d									15 ▶19		24 ▶28	
E-411	Well Completion and Servicing	Rueil	5 d												01 ▶05
E-412	Drilling and Completion Engineering	Pau	98 d		10 ▶		▶		27						
E-413	Drilling Engineering	Pau	83 d		10 ▶28	24 ▶			27						
E-414	Completion Engineering	Pau	63 d		10 ▶ 21			05 ▶27							
	Drilling														
E-415	Practical Aspects of Well Planning and Costing	Rueil	10 d						16 ▶27					17 ▶28	
E-416	Geological Field Trip for Drillers	Pau	5 d		10 ▶14										
E-419	Fundamentals of Drilling and Completion	Pau	5 d		17 ▶21										
E-420	Well Architecture and Equipment	Pau	5 d			24 ▶28									
E-421	Bit, Drill String and Fishing while Drilling	Pau	5 d				14 ▶18								
E-422	Rig, BOP's and Well Control Equipment	Pau	5 d				28 ▶ 02								
E-423	Data Aquisition during Drilling Operations	Pau	5 d					12 ▶16							
E-424	HSE: Health - Safety - Environment	Pau	5 d						10 ▶13						
E-425	Directional and Horizontal Drilling	Pau	5 d				22 ▶25								
E-426	Geomechanics for Drilling Operations	Pau	3 d					26 ▶28							
E-427	Underbalanced and Managed Pressure Drilling: Applications, Design and Operations	Rueil	5 d			17 ▶21									08 ▶12
E-428	Deepwater Drilling and Development	Pau	5 d						02 ▶06						
E-430	Stuck Pipe Prevention	Pau	5 d					12 ▶16				08 ▶12			
	Fluids														
E-441	Drilling Fluids	Pau	5 d			31 ▶04									
E-443	Cementing Practices	Pau	5 d				07 ▶11								
	Completion														
E-451	Well Productivity & Reservoir - Wellbore Interface	Pau	5 d		24 ▶28										
E-452	Well Test Operation	Pau	5 d					05 ▶09							
E-453	Well-Completion Equipment and Procedures for Flowing Wells	Pau	5 d			03 ▶07									
E-455	Wellbore Treatments	Pau	5 d			10 ▶14									
E-456	Matrix Acidizing	Rueil	5 d										27 ▶31		
E-458	Artificial Lift & Well Intervention Fundamentals	Pau	5 d			17 ▶21									
E-461	Nitrogen and Coiled Tubing Operations in Completion and Workover	Rueil	5 d					19 ▶23						03 ▶07	
E-464	Advanced Well Performance	Rueil	10 d											24 ▶05	
	Well Control														
E-471	Well Control	Pau	5 d					19 ▶23		07 ▶11		08 ▶12			
E-473	Well Intervention and Pressure Control	Pau	5 d						02 ▶06						01 ▶05

- Also proposed in French
- Sessions in english
- Modular sessions in english
- New course
- Sessions in french
- Modular sessions in french

2014 course calendar

Page	Title of the course	Location	Duration	January	February	March	April	May	June	July	August	September	October	November	December
	FIELD OPERATIONS														
	Operation of Production Facilities														
E-500	Fundamentals of Production	Rueil Pau	2 d			24 ▶25			02 ▶03				13 ▶14		
E-501	Oil & Gas Field Processing	Rueil Pau	5 d			03 ▶07	07 ▶11		23 ▶27 02 ▶06						01 ▶05
E-502	Field Processing and Surface Production Facilities	Rueil Pau	10 d						23 ▶04 02 ▶13						01 ▶12
E-503	Advanced Oil & Gas Field Processing	Rueil	15 d		10 ▶28			26 ▶ 13				15 ▶ 03			
E-504	Module 1: Thermodynamics Applied to Well Effluent Processing	Rueil	5 d		10 ▶14			26 ▶30				15 ▶19			
E-505	Module 2: Oil and Water Treatment	Rueil	5 d		17 ▶21				02 ▶06			22 ▶26			
E-506	Module 3: Gas Processing and Conditioning	Rueil	5 d		24 ▶28				09 ▶13			29 ▶03			
E-510	Natural Gas	Rueil	5 d				14 ▶18		30 ▶ 04			15 ▶19		17 ▶21	
E-511	Liquefied Natural Gas (LNG)	Rueil	5 d			10 ▶14			23 ▶27					24 ▶28	
E-514	Gas Sweetening and Sulfur Recovery	Rueil	5 d											24 ▶28	
E-515	Natural Gas Storage	Rueil	2 d									15 ▶16		04 ▶05	
E-516	Natural Gas Transport by Pipeline	Rueil	2 d									17 ▶18		06 ▶07	
E-520	Production Accounting and Material Balance Sheet	Rueil	3 d				14 ▶16							24 ▶26	
E-531	Production Panel Operator Training	Rueil	35 d					12 ▶	01			15 ▶ 31			
E-533	Surface Production Superintendent Training	Pau, Martigues & Rueil	58 d				09 ▶		09			18		▶	10
E-534	Production Engineer Training (ProdEng)	Rueil & Martigues	60 d					12 ▶		01		01 ▶		21	
E-535	Laboratory Analysis Techniques for Oil & Gas Applications	Rueil Pau	5 d						30 ▶ 04						08 ▶12
E-537	Safety in Laboratories and Pilot Plants	Rueil	4 d												15 ▶18
E-546	Well Equipment and Operation for Production Engineers	Rueil	5 d					19 ▶23				08 ▶12			
	HSE - Health, Safety & Environment														
E-550	HSE in Surface Processing Operations	Rueil Pau	5 d			17 ▶21		19 ▶23		15 ▶18				03 ▶07	
E-560	Safety Engineering - Module 1	Rueil	5 d			03 ▶07			16 ▶20					17 ▶21	
E-561	Safety Engineering - Module 2	Rueil	5 d						23 ▶27					24 ▶28	
E-570	HSE in Construction / Maintenance Works	Pau	4 d						16 ▶19					17 ▶20	
E-580	Environmental & Societal Aspect Management	Rueil	5 d						23 ▶27					24 ▶28	
E-590	HSE Superintendent Training	Pau, Martigues & Rueil	58 d				09 ▶			09		18		▶	10

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2014 course calendar

Page	Title of the course	Location	Duration	January	February	March	April	May	June	July	August	September	October	November	December
	FIELD OPERATIONS														
	Equipment, Maintenance, Inspection														
E-600	Technology of Oil & Gas Processing Equipment	Rueil & Martigues	10 d						16 ▶27				06 ▶17		
E-601	Module 1: Static Equipment	Rueil	5 d						16 ▶20				06 ▶10		
E-602	Module 2: Rotating Machinery	Martigues	5 d						23 ▶27				13 ▶17		
E-608	Process Control & Safety Instrumented Systems	Rueil	5 d										27 ▶31		
E-615	Metering and Allocation	Rueil	5 d						02 ▶06					03 ▶07	
E-617	Electricity and Electrical Motors	Rueil	3 d						16 ▶18				27 ▶29		
E-620	Centrifugal Pumps and Positive Displacement Pumps	Rueil	5 d											17 ▶21	
E-625	Centrifugal Compressor	Lillebonne Martigues	5 d						10 ▶13				07 ▶10		
E-629	Gas Turbines	Rueil	5 d					19 ▶23				08 ▶12			
E-640	Maintenance Superintendent Training	Pau, Martigues & Rueil	58 d				09		▶	09		18		▶	10
E-642	Operation, Maintenance and Inspection of Rotating Machinery	Lyon	15 d								25	▶ 12			
E-643	Machinery Vibration Signature Analysis - A Practical Approach	Rueil	5 d						23 ▶27						
E-645	Maintenance Management Equipment Availability Control	Rueil	5 d		03 ▶07										
E-646	Risk Based Inspection (RBI)	Lyon	4 d					20 ▶22							
	Process & Layout Engineering														
E-650	Offshore Field Development - Pipelines & Flow Assurance	Rueil	5 d						30 ▶04				20 ▶24		
E-660	FPSO/FSO & Operation of Oil Terminals	Pau	5 d					19 ▶23						24 ▶28	
E-665	Fluid Mechanics and Flow Assurance	Rueil	5 d				07 ▶11								
E-670	Pipeline Hydraulics and Multiphase Flow	Rueil	5 d									22 ▶26			
E-675	Corrosion and Corrosion Prevention	Rueil	5 d						23 ▶27						
E-680	Simulation of Oil & Gas Field Treatment Processes	Rueil	5 d												15 ▶19
E-690	Schematization of Oil & Gas Processes	Rueil	2 d							07 ▶08			27 ▶28		
E-695	Field Development Project	Rueil	20 d			17 ▶11								24 ▶20	

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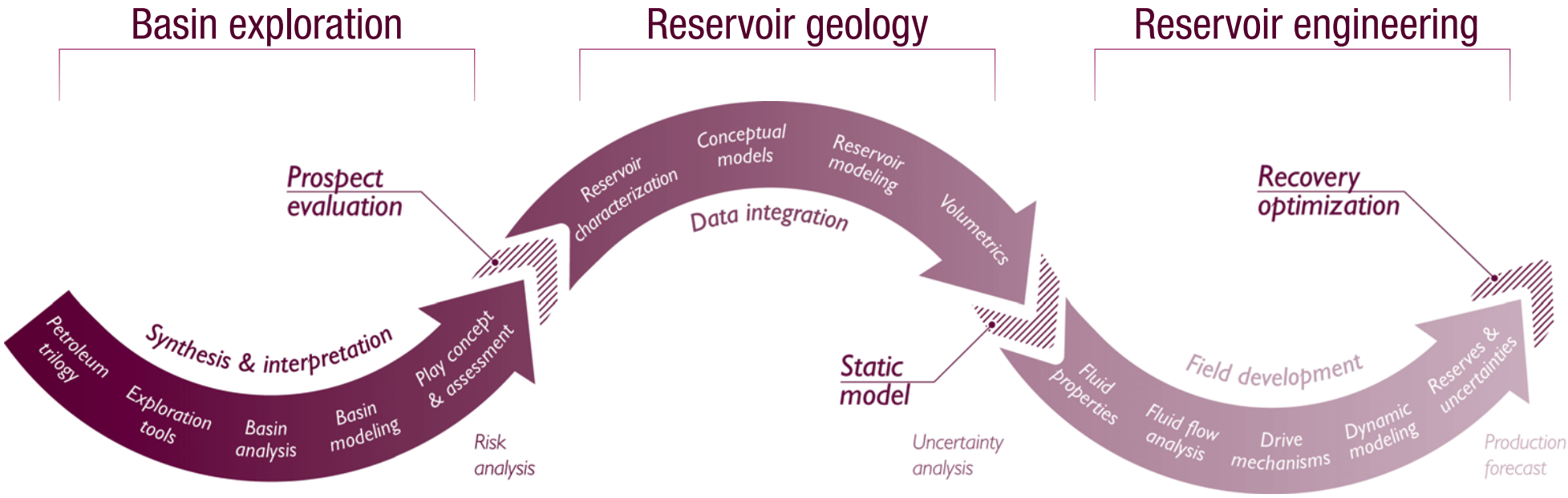
2014 course calendar

Page	Title of the course	Location	Duration	January	February	March	April	May	June	July	August	September	October	November	December
	PROJECTS & LOGISTICS														
E-712	Project Management ◐	Rueil	5 d			17 ▶21			16 ▶20			15 ▶19		17 ▶21	
E-713	PROMISE™ - Oil & Gas Project Management Interactive Simulator for Excellence	Rueil	5 d		24 ▶28		14 ▶18						06 ▶10	24 ▶28	
E-714	Engineering Management	Rueil	3 d					12 ▶14						03 ▶05	
E-715	Mechanical Equipment Design and Manufacturing	Rueil	2 d					19 ▶20						06 ▶07	
E-718	Project Control	Rueil	10 d				07 ▶18						13 ▶24		
✸ E-719	Negotiation Skills	Rueil	5 d										27 ▶31		
E-720	Management of Medium Size and Revamping Projects ◐	Rueil	5 d			17 ▶21						22 ▶26 15 ▶19			
E-721	Management of Small Projects ◐	Solaize Lillebonne Martigues	5 d			31 ▶04		02 ▶06							08 ▶12
E-722	Quality & Risk Management in Projects ◐	Rueil	3 d											12 ▶14	
E-723	Estimation and Cost Control ◐	Rueil	5 d			24 ▶28						29 ▶ 03			
E-725	Project Planning and Scheduling ◐	Rueil	3 d						16 ▶20					24 ▶28	
E-726	Contracts and Procurement ◐	Rueil	3 d				09 ▶11						15 ▶17		
E-727	Technical Service Contracts for Operation Management	Rueil	5 d			10 ▶14									
E-730	Construction Management Training	Rueil & Martigues	25 d						10 ▶11						
E-735	Precommissioning, Commissioning and Start-up ◐	Rueil	5 d					19 ▶23	02 ▶06						
E-760	Metallurgy and Welding Technology	Rueil	5 d						16 ▶20						
E-770	Logistic Engineer Training	Rueil	35 d	27	▶	14									
E-780	Subsea Production Systems ◐	Rueil	5 d					19 ▶23							
E-785	Subsea Pipelines ◐	Rueil	5 d						02 ▶06						

◐ Also proposed in French
✸ New course
■ Sessions in english
■ Sessions in french
■ Modular sessions in english
■ Modular sessions in french

E&P GEOSCIENCES INTEGRATED WORKFLOWS



- 3D seismic interpretation
- Structural modeling
- Sequence stratigraphy
- Well log analysis
- Well geophysics / Borehole seismic
- Geochemistry
- Petroleum systems

- Core description
- Well logs, electro-facies
- Core analysis, petrophysics
- Rock typing, rock properties
- Seismic facies
- Geostatistics
- Heterogeneities
- Fractured reservoirs

- PVT, fluid studies
- SCAL, petrophysics
- Well test analysis
- Dynamic reservoir simulation
- Optimized recovery EOR/IOR
- Development project and uncertainties

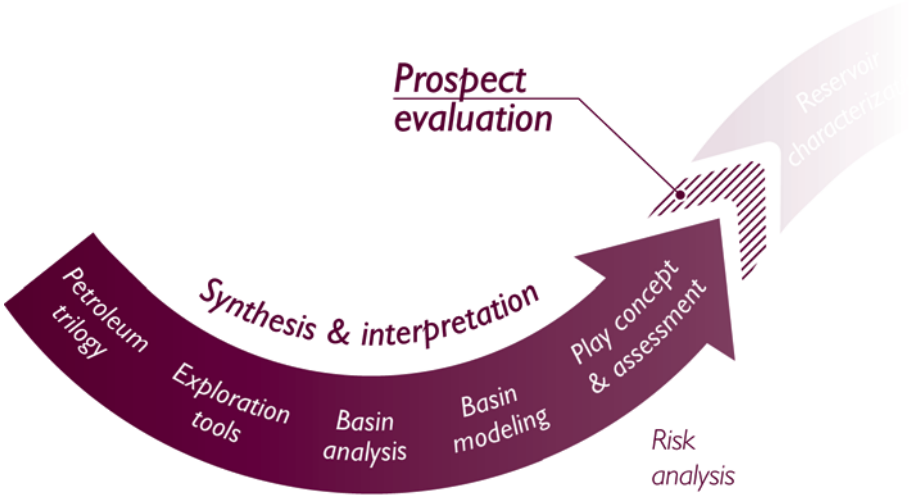
"Graduate Diploma Program" - GDP programs awarded by IFP School:

- Basin Analysis & Modeling
- Reservoir Characterization & Modeling
- Reservoir Engineering

} 12 weeks + internship

For a single company, in French or in English, with **minimum 10 participants** (brochure available on request)

Basin exploration syllabus
Prospect definition

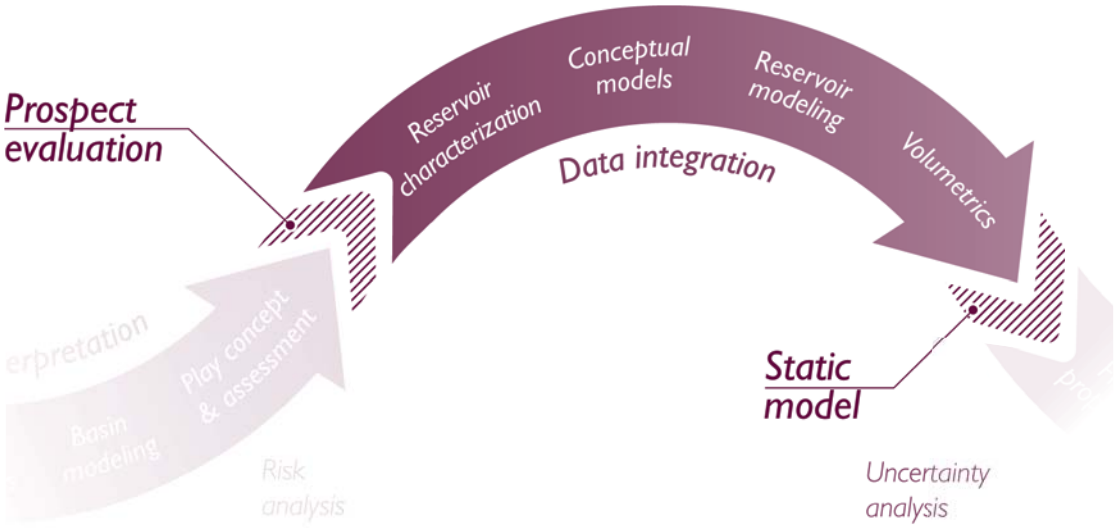


EXPLORATION *Prospect evaluation*					
	Sessions during this period		Duration	Reference	Course number
F	Fundamental Basin Exploration Workshop	✸	5 days	GEO / INFO	E-200
F	Field Trip: Introduction to Petroleum System		5 days	GEOT / PETBAS	E-900
I	Seismic Interpretation Workshop		10 days	GEP / SISINTERP	E-131
F	Well Log Interpretation		5 days	LOG / LOGBASIC	E-160
I	Sedimentology & Sequence Stratigraphy		5 days	GEO / STRATI	E-212
I	Basin Modeling		5 days	BAS / TEMIS	E-219
I	Play Assessment & Prospect Evaluation		5 days	GEO / PLAY	E-216
F	Hydrocarbons In Unconventional Settings	✸	3 days	BAS / UNCONV	E-221
INTEGRATED PROGRAM: PetEx					
Petroleum Exploration			30 days	GEO/PETEX	E-203

F Foundation
I Intermediate
A Advanced

✸ New Course

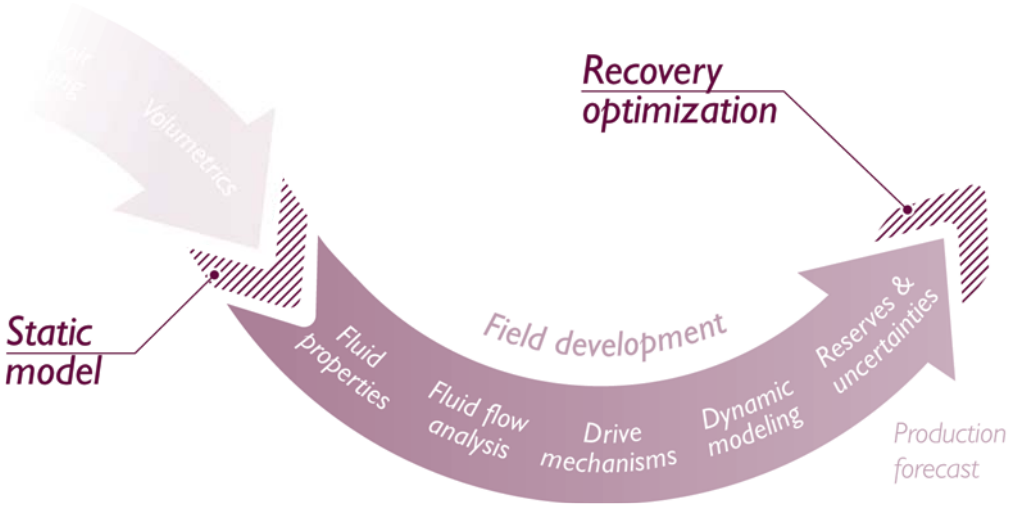
Reservoir geology syllabus
Static modeling



RESERVOIR *Characterization & modeling*				
	Sessions during this period	Duration	Reference	Course number
F	Reservoir Geology (RCM - Module 1)	20 days	RES / RESGEOL	E-252
F	Introduction to Carbonate Reservoir Characterization ✸	5 days	RES / INICARB	E-262
I	Geological Modeling for Integrated Reservoir Studies	5 days	RES / GEOMODEL	E-261
A	Naturally Fractured Reservoirs	5 days	RES / NATFRAC	E-264
A	Petroleum Geostatistics	5 days	RES / GEOSTAT	E-266
I	Field Trip: Static Model Construction: Field Constraints and Integration with Subsurface Data ✸	5 days	GEOT / CARBFT	E-910
INTEGRATED PROGRAM: RCM				
Reservoir Characterization & Modeling		40 days	RES / RCM	E-250

F Foundation
I Intermediate
A Advanced
✸ New Course

Reservoir engineering syllabus
Field development



RESERVOIR ENGINEERING *Reservoir development*					
	Sessions during this period		Duration	Reference	Course number
F	Introduction to Reservoir Engineering		5 days	GIS / RESBAS	E-350
F	Reservoir Management		10 days	GIS / ARM	E-355
I	Improved/Enhanced Oil Recovery		5 days	GIS / EOR	E-386
A	Dynamic Reservoir Simulation: Best Practices		5 days	GIS / ADVSIMU	E-389
I	Development Project and Uncertainties		5 days	GIS / DEVELOPROJ	E-373
I	Gas Condensate Fields Development	✸	5 days	GIS / GAS	E-394
I	Unconventional Resources - Shale Gas Fundamentals	✸	5 days	GIS / UNCONV	E-395
F	Reserves evaluation, risk & uncertainties		5 days	GIS / RISKUN	E-393
A	PVT Modeling		5 days	GIS / PVTMOD	E-385
INTEGRATED PROGRAM: ResEng					
Reservoir Engineering			64 days	GIS / RESENGIN	E-360

F Foundation
I Intermediate
A Advanced

✸ New Course

Courses for typical career development of drilling supervisor

JUNIOR

SENIOR

INITIAL TRAINING

Sessions during this period	Duration	Reference	Course number
• Introduction to Drilling Fundamentals	5 days	FOR / INFORE	E-410
ASSISTANT DRILLER		**estimated duration: 6 months**	
• Well Completion and servicing	5 days	PRO / INPFE	E-411
• Introduction to Rig HSE	5 days	Upon request	

ON AN ONSHORE RIG, AS A MEMBER OF A DRILLING CONTRACTOR TEAM

Sessions during this period	Duration		
ROUGHNECK FLOORMAN	**estimated duration: 4 months**		
• Derrickman Course	10 days	On request	
DERRICKMAN	**estimated duration: 4 months**		
• Assistant Driller Course	10 days	On request	
ASSISTANT DRILLER	**estimated duration: 6 months**		

TECHNICAL TRAINING DRILLING COMPLETION

Sessions during this period	Duration	Reference	Course number
• Geological Field Trip for Drillers	5 days	FOR / FTFPE	E-416
• **Drilling Completion Course** (including HSE module and IWCF certification)	**98 days**	FOR / FOFPE	E-412

ASSIGNMENT: JUNIOR SUPERVISOR

Sessions during this period	Duration	Reference	Course number
SAFETY			
• As needed	Variable		
ADVANCED TECHNIQUES (according to availability and needs)			
• Advanced Cementing Practices	5 days	FLU / CIM2E	E-444
• Underbalanced and Management Pressure Drilling	5 days	FOR / UBDE	E-427
• Well Test Operation	5 days	PRO / CEPE	E-452
• Matrix Acidizing	5 days	PRO / ACIDIFE	E-456
• Nitrogen & Coiled Tubing Operations in Completion and Workover	5 days	PRO / CTAE	E-461
• Well Intervention and Pressure Control (IWCF certification)	5 days	WEL / WELINE	E-473
• Introduction to Reservoir Engineering	5 days	GIS / RESBAS	E-350
• Advanced Well Performance	10 days	PRO / WELLPERF2E	E-464
• Artificial Lift: Gas Lift	5 days	PRO / GLIFTE	E-459
• Artificial Lift: Pumping	5 days	PRO / APOMPE	E-460

ASSIGNMENT: SENIOR SUPERVISOR

Sessions during this period	Duration	Reference	Course number
SAFETY			
• HSE Management	Variable		
ADVANCED TECHNIQUES (according to availability and needs)			
• Advanced Cementing Practices	5 days	FLU / CIM2E	E-444
• Well Test Operation	5 days	PRO / CEPE	E-452
• Well Intervention and Pressure Control (IWCF certification)	5 days	WEL / WELINE	E-473
• Introduction to Reservoir Engineering	5 days	GIS / RESBAS	E-350
• Advanced Well Performance	10 days	PRO / WELLPERF2E	E-464
• Practical Aspects of Well Planning and Costing	10 days	FOR / PAWPCE	E-415
MANAGEMENT			
• Rig Control	5 days	On request	
• Project Management	5 days	PL / PROJGB	E-712
• **Integrated Reservoir Management (IRM)**	**45 days**	GEN / IRM	E-001

JUNIOR

SENIOR

Courses for typical career development of drilling engineer

INITIAL TRAINING

Sessions during this period	Duration	Reference	Course number
• Drilling Fundamentals	5 days	FOR / INFORE	E-410
• Well Completion and Servicing	5 days	PRO / INPFE	E-411
• Introduction to Rig HSE	5 days	On request	

ON A RIG, with specific tasks and studies but no operational responsability

Sessions during this period	Duration
Mandatory courses as requested	
• Sea survival, fire fighting...	Variable

TECHNICAL TRAINING DRILLING COMPLETION

Sessions during this period	Duration	Reference	Course number
• Geological Field Trip for Drillers	5 days	FOR / FTFPE	E-416
• **Drilling Completion Course** (including HSE module and IWCF certification)	**98 days**	FOR / FOFPE	E-412

ASSIGNMENT: JUNIOR SUPERVISOR

Sessions during this period	Duration	Reference	Course number
SAFETY			
• As needed	Variable		
ADVANCED TECHNIQUES (according to availability and needs)			
• Advanced Cementing Practices	5 days	FLU / CIM2E	E-444
• Underbalanced and Management Pressure Drilling	5 days	FOR / UBDE	E-427
• Well Test Operation	5 days	PRO / CEPE	E-452
• Matrix Acidizing	5 days	PRO / ACIDIFE	E-456
• Nitrogen & Coiled Tubing Operations in Completion and Workover	5 days	PRO / CTAE	E-461
• Well Intervention and Pressure Control (IWCF certification)	5 days	WEL / WELINE	E-473
• Introduction to Reservoir Engineering	5 days	GIS / RESBAS	E-350
• Advanced Well Performance	10 days	PRO / WELLPERF2E	E-464
• Artificial Lift: Gas Lift	5 days	PRO / GLIFTE	E-459
• Artificial Lift: Pumping	5 days	PRO / APOMPE	E-460

ASSIGNMENT: OPERATION ENGINEER

Sessions during this period	Duration	Reference	Course number
SAFETY			
• HSE Management	Variable		
ADVANCED TECHNIQUES (according to availability and needs)			
• Advanced Cementing Practices	5 days	FLU / CIM2E	E-444
• Well Test Operation	5 days	PRO / CEPE	E-452
• Well Intervention and Pressure Control (IWCF certification)	5 days	WEL / WELINE	E-473
• Introduction to Reservoir Engineering	5 days	GIS / RESBAS	E-350
• Advanced Well Performance	10 days	PRO / WELLPERF2E	E-464
• Practical Aspects of Well Planning and Costing	10 days	FOR / PAWPCE	E-415
MANAGEMENT			
• Project Management	5 days	PL / PROJGB	E-712
• **Integrated Reservoir Management (IRM)**	**45 days**	GEN / IRM	E-001

SITE OPERATOR

PANEL OPERATOR

SUPERVISOR

SUPERINTENDANT

Courses for typical career development of production technician

OPERATOR

Sessions during this period	Duration	Reference	Course number
INITIAL COURSES			
• **Certifying Training for Production Operator**	**36 weeks**	PROD / BOAGB	E-530

PANEL OPERATOR

Sessions during this period	Duration	Reference	Course number
INITIAL COURSES			
• **Production Panel Operator Training**	**80 days**	PROD / PANEL	E-531
• Laboratory Analysis Techniques for Oil & Gas Applications	5 days	PROD / LABOGB	E-535
ADVANCED COURSES			
• HSE in Construction/Maintenance Works	4 days	HSE / WORKGB	E-570
• Metering and Allocation	4 days	I-R / METER	E-615
• Electricity and Electrical Motors	3 days	I-R / ELECGB	E-617
• Centrifugal Compressor	5 days	MTE / ECC-E	E-625
• Gas Turbines	5 days	MTE / TAG-E	E-629

PRODUCTION SUPERVISOR

Sessions during this period	Duration	Reference	Course number
INITIAL COURSES			
• **Surface Production Supervisor Training**	**35 days**	PROD / PRODSUP	E-532
ADVANCED COURSES			
• Environmental & Societal Aspect Management	5 days	HSE / ENVGB	E-580
• Metering and Allocation	4 days	I-R / METER	E-615
• Corrosion and Corrosion Prevention	5 days	DEV / CORGB	E-675
• FPSO/FSO & Operation of Oil Terminals	5 days	DEV / TERMGB	E-660
• Operation, Maintenance and Inspection of Rotating Machinery	15 days	MTM / OMIRM	E-642

PRODUCTION SUPERINTENDENT

Sessions during this period	Duration	Reference	Course number
INITIAL COURSES			
• **Surface Production Superintendant Training**	**57 days**	PROD / PRODSI	E-533
ADVANCED TECHNIQUES			
• Reservoir Engineering for Production Engineers	5 days	PROD / REGB	E-545
• Well Equipment and Operation for Production Engineers	5 days	PROD / WELLGB	E-546
• FPSO/ FSO & Operation of Oil Terminals	5 days	DEV / TERMGB	E-660
• Operation, Maintenance and Inspection of Rotating Machinery	15 days	MTM / OMIRM	E-642
• Risk Based Inspection (RBI)	4 days	EIM / PLINS-E	E-646
• Metering and Allocation	4 days	I-R / METER	E-615
• Corrosion and Corrosion Prevention	5 days	DEV / CORGB	E-675
MANAGEMENT			
• Advanced Well Performance	10 days	PRO / WELLPERF2E	E-463
• Advanced Oil & Gas Field Processing	15 days	PROD / ADVGB	E-503
• Liquefied Natural Gas (LNG)	5 days	PROD / LNG	E-511
• Offshore Fields Development - Pipelines & Flow Assurance	5 days	DEV / OFFSHGB	E-650
• Maintenance Management Equipment Availability Control	5 days	OMT / GEMA-E	E-645
• **Field Development Project**	**20 days**	DEV / FDEVGB	E-695
• Master of Sciences in Petroleum Engineering - IFP School		Consult us	

JUNIOR

SENIOR

Courses for typical career development of production engineer

PRODUCTION ENGINEER			
Sessions during this period	Duration	Reference	Course number
INITIAL COURSES			
• **Production Engineer Training**	**60 days**	PROD / PRODENG	E-534

TECHNICAL KNOWLEDGE DEVELOPMENT			
Sessions during this period	Duration	Reference	Course number
ADVANCED COURSES			
• Advanced Well Performance	10 days	PRO / WELLPERF2E	E-464
• Liquefied Natural Gas (LNG)	5 days	PROD / LNG	E-511
• FPSO/FSO & Operation of Oil Terminals	5 days	DEV / TERMGB	E-660
• Safety Engineering - Basis of Design for an Upstream Oil & Gas Facility	5 days	HSE / SAFENG1GB	E-560
• Safety Engineering - Advanced Course	5 days	HSE / SAFENG2GB	E-561
• Process Control & Safety Instrumented Systems	5 days	I-R / INST1GB	E-608
• Advanced Instrumentation, Process Control & Automation	5 days	I-R / INST2GB	E-609
• Metering and Allocation	5 days	I-R / METER	E-615
• Electricity and Electrical Motors	3 days	I-R / ELECGB	E-617
• Centrifugal Pumps and Positive Displacement Pumps	5 days	MTE / PC-E	E-620
• Centrifugal Compressor	5 days	MTE / ECC-E	E-625
• Gas Turbines	4 days	MTE / TAG-E	E-629
• Operation, Maintenance and Inspection of Rotating Machinery	15 days	MTM / OMIRM	E-642
• Machinery Vibration Signature Analysis - A Practical Approach	5 days	MTM / PAVIB-E	E-643
• Maintenance Management Equipment Availability Control	5 days	OMT / GEMA-E	E-645
• Risk Based Inspection (RBI)	4 days	EIM / PLINS-E	E-646
• Pipeline Hydraulics and Multiphase Flow	5 days	DEV / HYDRGB	E-670
• Corrosion and Corrosion Prevention	5 days	DEV / CORGB	E-675
MANAGEMENT			
• **Integrated Reservoir Management (IRM)**	**45 days**	GEN / IRM	E-001
• Production Sharing and Joint Operating Agreements	4 days	EAM / PSA	E-064
• Economics and Management in E&P	5 days	EAM / EFEP - EAM / ERA	E-068 / E-070
• **Project Management**	**20 days**	DEV / FDEVGB	E-695
• Estimation & Cost Control	5 days	PL / COSTGB	E-723
• Quality & Risk Management in Projects (QA/QC)	3 days	PL / QAQCGB	E-722

JUNIOR

SENIOR

Courses for typical career development of project engineer

PROJECT ENGINEER

Sessions during this period	Duration	Reference	Course number
INITIAL COURSES			
• Project Management	5 days	PL / PROJGB	E-712
• PROMISE™ - Oil & Gas Project Management Interactive Simulator	5 days	PL / PROMISE	E-713
• Quality & Risks Management in Projects	3 days	PL / QAQCGB	E-722

TECHNICAL KNOWLEDGE DEVELOPMENT

Sessions during this period	Duration	Reference	Course number
ADVANCED COURSES			
• Oil & Gas Field Processing	5 days	PROD / OGPF	E-501
• Field Processing and Surface Production Facilities	10 days	PROD / FPSPF	E-502
• Advanced Oil & Gas Field Processing	15 days	PROD / ADVGB	E-503
• Natural Gas	5 days	PROD / NATGAS	E-510
• Liquefied Natural Gas (LNG)	5 days	PROD / LNG	E-511
• Safety and Environment in Surface Processing Operations	5 days	HSE / EXPSAFOP	E-550
• Technology of Oil & Gas Processing Equipment	10 days	MAT / EQUIP	E-600
• Subsea Production Systems	5 days	PL / SPSGB	E-780
• Subsea Pipelines	5 days	PL / PIPEGB	E-785
• Metallurgy and Welding Technology	5 days	PL / MWT	E-760
• Corrosion and Corrosion Prevention	5 days	DEV / CORGB	E-675
• **Construction Management Training**	**25 days**	PL / CONST	E-730
• Precommissioning, Commissioning and Start-up	5 days	PL / PRECOMGB	E-735
MANAGEMENT			
• Project Control	10 days	PL / PC	E-718
• Project Planning and Scheduling	5 days	PL / PSPCGB	E-725
• Estimation and Cost Control	5 days	PL / COSTGB	E-723
• Contracts & Procurement	3 days	PL / CP	E-726
• Technical Service Contracts for Operation Management	5 days	PL / TSC	E-727
• Production Sharing and Joint Operating Agreements	4 days	EAM / PSA	E-064
• Economics and Management in E&P	5 days	EAM / EFEP - EAM / ERA	E-068 / E-070
• Engineering Management	3 days	PL / EM	E-714
• Managing Revamp, Small & Medium Size Projects	5 days	PL / MRSMP	E-720
• Management of Small Projects	5 days	PL / GESPPGB	E-721

Technical fields - Training courses

Trinitron
SIMView 3Dview <3>
File Animation Colormap Geometry Sections Wells
GridCase: pbr
Property: Vertical location
Run Command

General E&P Training

General E&P Training
Management

E-001

ENGLISH: GEN / IRM

IRM
Integrated Reservoir Management

45 DAYS

PURPOSE

To provide, through a multidisciplinary approach of paramount importance for the optimization of field development and operations, an in-depth understanding of key concepts and mechanisms of reservoir management
To find, through a unique training experience, what could be keys for success when one applies high-standard guiding principles in asset management, from exploration and field development to field operations and enhanced oil recovery

AUDIENCE

High-potential E&P professionals, future managers of E&P assets and activities, providers of integrated E&P services
Petroleum engineers, geoscientists, well engineers, project managers, business unit leaders

LEARNING OBJECTIVES

- To understand reservoir management techniques and best practices for oil and gas fields development and operation
- To learn how to apply those practical guiding concepts to manage the E&P value chain
- To maximize value creation through the technical and economic optimization of oil and gas assets and resources
- To comprehend various disciplines that take part in reservoir management
- To learn how to lead multidisciplinary teams in charge of field development and operations
- To learn about various types of reservoirs and field development conditions through hands-on sessions and case studies

PREREQUISITE

A degree in engineering or geosciences, with preferably a 5-year professional experience

WAYS AND MEANS

Highly interactive course with various application exercises and actual case studies
Use of a simulation game for the exploration process: Hunting for Oil (see E-033)
Four weeks of field trips for hands-on sessions

OBSERVATION

For the field trips to Montpellier and the Wessex basin, accommodation and transportation costs are not included in the course fees
A specific brochure for this program is available on request

COORDINATOR

Florent Prion

AGENDA

RESERVOIR ENGINEERING AND FIELD DEVELOPMENT FUNDAMENTALS (IFP TRAINING) — 23 d

Production geology, geophysics
Well logging, interpretation - Production logging
Petrophysics: rock properties (porosity, saturation, permeability) and their interactions with fluids
Fluid properties: PVT oil gas and water
Well testing: principles and interpretation
Production mechanisms: natural drive (primary recovery), immiscible fluid injection gas or water (secondary recovery), tertiary recovery (EOR: miscible, chemical or thermal process)
Field development methodology, data acquisition, reserves estimation
Drilling and completion
Project economics & contracts
Well performance optimization: inflow, outflow, formation damage remedial (acid stimulation, fracturing, sand control)
Assessment of reservoir risks and uncertainties
Unconventional hydrocarbons
Field trip to Montpellier area (2.5 days): well testing in an aquifer, interpretation and analysis of the results (production, draw-down, build-up), outcrop observation of a reservoir analogue to the one on which the test was performed, geological and dynamic modeling

CASE STUDIES (IMPERIAL COLLEGE LONDON) — 12 d

Development and application of a reservoir simulation model for reservoir management, including up scaling, history matching, and reservoir performance prediction, field development planning and simple economic analysis
UK field Development Project
Field trip to the Wessex basin
Group-based computer-aided exercise covering the development and monitoring of a large oil field
Data analysis, development of a reservoir simulation model, including upscaling and history matching
Application of model to identify an optimum field development plan with simple economic evaluation

CASE STUDIES (IFP TRAINING) — 10 d

Tertiary recovery in a mature oil field with lean gas injection
Reservoir management specificities for carbonate fractured reservoirs
Gas: gas properties and field case: development and monitoring of a gas field
Alwyn area: complex gas, condensate and oil field evaluation development and monitoring in the North Sea environment
Special case histories: deep water offshore, deep reservoir, heavy oils

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	25 Août - 29 Oct	Rueil / London	39 960 €	EPGEN	epgen.rueil@ifptraining.com

General E&P Training
Management

E-004

ENGLISH: PEH / EES

Energy Executive Session

10 DAYS

PURPOSE

Created in 1991, the **"Oil and Gas Management Executive Session"**, followed by the **"Short MBA for Executives on Energy Management"**, which were the former designation of **"Energy Executive Session"**, has attracted more than 400 participants from the major oil and gas companies in the world
Each session is the opportunity:

- to enhance the knowledge of delegates by an intensive review and interactive discussions on the recent developments in the world Energy and in the coming challenges
- to explore key technical, economic and financial issues relevant to areas of the oil and gas industries, such as exploration, development, production, trading, supply and refining
- to improve the understanding of the future environment in order to better anticipate decision making and investment policy
- to provide a privileged opportunity for exchanging experience with prestigious lecturers and a fruitful dialogue between participants from different countries and perspectives

AUDIENCE

Senior managers and executives in the oil, gas and petrochemical industries and related activities
The seminar is designed for professionals in either the private or public sector

COORDINATOR

Sylvie Saulnier

AGENDA

BUSINESS ENVIRONMENT, OIL AND GAS PERSPECTIVES

Energy resources and competition
Major challenges in the energy industry
International business environment
Oil markets and perspectives
Environmental issues
Oil companies' strategies
OPEC and consuming countries' strategies

MANAGEMENT OF OIL, GAS AND OTHER ENERGIES

Technology, economics, current situation, perspectives, policies and strategies in the field of

- Oil and gas exploration
- Oil and gas production and development
- Supply and trading
- Refining and oil processing
- Natural gas, LNG and unconventional gas
- Electricity
- Renewables
- Environmental issues

FINANCE AND ECONOMICS

Investment profitability and Capital budgeting
Financial management

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	23 Juin - 04 Juil	Paris	9 030 €	EM	eco.rueil@ifptraining.com

General E&P Training
Management

E-006

ENGLISH: PEH / IOS

International Oil Summit

1 DAY

Jointly organized with *IFP Énergies nouvelles and Petrostrategies*

PURPOSE

The **International Oil Summits**, held in Paris since 1999, have been recognized as large successes
Each conference brings together more than 200 participants, including ministers, prominent corporate leaders and journalists
The presentations of distinguished speakers open constructive discussions concerning a wide range of issues confronting the oil industry
In 2014, as in the previous summits, oil ministers and CEOs of leading national and international oil companies are invited to take part

AUDIENCE

Professionals in the oil business, consumers, government advisers, policy makers, academics, bankers, economists, lobbyists and consultants

AGENDA

FUTURE OF THE OIL INDUSTRY

The oil market. Competition between oil and other energy sources
The impact of technological advances on production and processing costs
Outlook for growth in oil supply in the current price climate
Demand in the 21st century and the share of oil in the global energy market in the face of competition and environmental constraints

PRODUCING COUNTRIES: MEETING THE NEW CHALLENGES OF THE OIL SECTOR

With the participation of ministers from the main oil producing countries

NOC - IOC: COMPETITION OR COOPERATION?

Oil industry developments (mergers and acquisitions) and their impact on costs
Possible cooperation strategies between producing countries and international companies
OPEC/non-OPEC relations and producer-consumer dialogue

SERVICE COMPANIES: HOW TO FACE THE NEW WAVE OF INVESTMENTS?

How improved technological progress, organization and management can contribute to the reduction of costs
Cooperation/competition between oil and oil services companies

CURRENT ISSUES

COORDINATOR

Sylvie Saulnier

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	11 Avr	Paris	1 300 €	EM	eco.rueil@ifptraining.com

General E&P Training
Management

E-008

ENGLISH: PEH / IGS

International Gas & Electricity Summit

1,5 DAYS

Jointly organized with *IFP Énergies nouvelles and Petrostrategies*

PURPOSE

The **International Gas Summits**, held in Paris since 1996, have recorded large successes
Each conference brings together more than 200 participants, including ministers, prominent corporate leaders and journalists
Wide issues facing the natural gas industry around the world are open for debate following presentations from distinguished speakers
In 2014, as in the previous summits, CEOs of leading gas companies such as GDF Suez, Gazprom, Shell, Sonatrach, Statoil, Total, QP… are invited to take part

AUDIENCE

Professionals in the Gas Business, Consumers, Buyers, Power Generators, Regulators and Government Advisers/ Policy Makers, Academics, Bankers, Economists, Lobbyists and Consultants

AGENDA

NATURAL GAS MARKET: TOWARDS NEW COMMERCIAL RELATIONSHIPS? POTENTIAL AND IMPACT OF NON-CONVENTIONAL GAS

Where will new supplies come from?
What shape will future ties with producing countries take?
Europe-Russia: what kind of partnership does the future hold?
Role of the Middle-East

THE FUTURE OF ELECTRICITY AND THE OPENING OF ELECTRICITY AND GAS MARKETS: SITUATION AND PERSPECTIVES

Opportunities and constraints of the convergence of gas and electricity
Could the increasing role of gas in power generation affect electricity prices?
Competition between electricity sources: coal, gas, nuclear
Will nuclear come back? Can we continue to use coal? The role of hydro
The role of exchanges on deregulated markets: reliability, liquidity, risk management, etc.

TODAY'S CHALLENGES OF THE LNG INDUSTRY: UNCONVENTIONAL GAS, JAPANESE DISASTER, EU SPOT PRICES, FLOATING LNG

What role will the spot market play in Europe? Impact on prices
World LNG supply and demand. Is LNG a factor in integrating markets?
The Atlantic basin - Asian market interface. What role will Gulf States play?
The impact of US demand on other LNG markets
Which LNG spot market for the Asia-Pacific area?
What is the need for new capacities?
Where will the investments come from?

COORDINATOR

Sylvie Saulnier

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	20 - 21 Oct	Paris	1 600 €	EM	eco.rueil@ifptraining.com

General E&P Training
Management

E-010

ENGLISH: ENE / OPE
FRENCH: ENE / EPE

Overview of Petroleum Economics

4 DAYS

PURPOSE

To have an overview of the petroleum sector, understand the oil operations and business from upstream to downstream and identify the economic challenges

AUDIENCE

People from energy and petroleum sectors, industrial partners, business men and financiers, as well as staff of the public administration

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to describe the different types of energy resources (conventional, unconventional, renewable, fossil)
- to interpret the evolution of the factors affecting the energy supply and demand (crude price, technology, reserves, geopolitics, geography, environment, etc.)
- to identify the actors of the energy scene and their strategic guidelines
- to describe the main steps of the upstream sector
- to distinguish the different types of oil contracts and to explain the main economic criteria to evaluate a project
- to summarize the operation of the physical and financial oil markets
- to explain the evolution of the refining sector and of the petroleum product markets

WAYS AND MEANS

Quiz and game on the fundamentals of the energy sector
Case study on the economic evaluation of an E&P project
Exercises on the transportation costs of a cargo, on hedging and on refining margins
Team games on factors affecting the crude price, on the upstream sector and on the oil trading

COORDINATOR

Mélissa Clodic

AGENDA

INTERNATIONAL ENERGY SCENE — 1 d

Energy resources: definition, characteristics, conversion factor
History of the oil industry
Strategies of actors: producer and consumer countries, national and international oil companies, international organizations (OPEC, IEA, etc.)
Energy demand, evolution factors and scenarios
Energy and oil production
Energy reserves
Technological challenge
Evolution of the oil prices, financial and political stakes
Geographical constraints
International environmental context

UPSTREAM — 1 d

Stages and technico-economic aspects of the Exploration-Production
Reserve evaluation
Economic criteria and evaluation method of an oil project
Oil contracts and principle of the oil rent sharing

MIDSTREAM — 1 d

Business practices and pricing
Physical markets (spot, forward): operation, reporting agencies
Introduction to incoterms
Pricing a cargo, freight rates
Financial markets (futures): operation, hedging

DOWNSTREAM — 1 d

Refining processes and units
Refining capacities, projects, strategies of actors
Economic aspects of the refining sector: investments, costs and margins
Environmental constraints, alternative fuels
Petroleum product markets and marketing

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 02 - 05	Rueil	2,310 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Management

E-012

ENGLISH: ENE / ONE
FRENCH: ENE / EGN

Overview of Natural Gas Economics

4 DAYS

PURPOSE

To provide participants with an overview of the economic and contractual aspects of the natural gas chain, all the way from production and transport to marketing

AUDIENCE

Professionals with experience in the oil industry who now need to widen their understanding and knowledge of the natural gas business
Those who are concerned about natural gas and work in other sectors such as banking or government where they need an understanding of the industry

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to evaluate the importance of natural gas in the world energy balance, and the strategies of the main actors of the industry
- to identify the main technical, economic and contractual features of the natural gas chain, from the production well to the final consumer
- to explain the framework of liberalization of natural gas markets and its impact on gas contracts and prices

WAYS AND MEANS

Quiz
Exercises on the costs of gas infrastructures
Examples of contracts - calculations on quantities
Statistical data

COORDINATOR

Sylvie Chemineau

AGENDA

GLOBAL GAS SCENE — 0.5 d

Importance of natural gas in the world energy balance
Reserves, production, consumption and trading around the world
International gas markets
Impact of unconventional gas on the world demand / supply and on gas prices

STRUCTURE AND COSTS OF THE NATURAL GAS CHAIN — 0.5 d

Description of the gas chain: from production to distribution
Costs of production, treatment and transport
Liquefied Natural Gas, Gas-To-Liquids
Storage costs and distribution costs
Examples of projects around the world
Biogas

DIFFERENT GAS MARKETS — 0.5 d

Main gas markets structures
The European Union and the liberalization process
The US market, the Japanese market
Emerging markets

LONG-TERM NATURAL GAS AND LNG CONTRACTS — 0.5 d

Contractual framework of Exploration-Production
Structure and principles of a long-term contract
Principles of take-or-pay, netback, indexation and gas price formulas
Main articles of long-term contracts

GAS MARKETING IN A LIBERALIZED MARKET — 1 d

Drivers and concepts of liberalization
Principles of the EU gas directive, progress in various countries, take-or-pay issues
Role of the regulator, network development, transport, tariffs, etc.
Contractual aspects between suppliers, transporters and distributors

SPOT, FORWARD AND FINANCIAL MARKETS — 0.5 d

Spot and forward natural gas markets
Why and how to access those markets?
Prices in the different markets
Financial contracts, hedging strategies and examples

CORPORATE STRATEGIES — 0.5 d

Organization and constraints of gas companies in monopolistic markets
Stakes and opportunities in the framework of liberalization
Role of oil and gas companies
Gas and power integration

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jul 01 - 04	Rueil	2,450 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Management

E-014

ENGLISH: ENE / LGE
FRENCH: ENE / EGL

Liquefied Natural Gas Economics

4 DAYS

PURPOSE

To provide participants with an overview of the economic and contractual aspects of the LNG (Liquefied Natural Gas) chain

AUDIENCE

Professionals from the oil, gas or power industries or from the bank/insurance/ consulting sectors who need to understand LNG activities and their economic stakes

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:
- to evaluate the economics of each part of the LNG chain
- to analyze the basic structure of LNG contracts
- to identify the main LNG markets and their evolution

WAYS AND MEANS

Quiz
Examples of contracts
Statistical data

COORDINATOR

Sylvie Chemineau

AGENDA

GLOBAL GAS SCENE AND ECONOMICS OF THE LNG CHAIN — 1 d

The Natural Gas chain
Gas delivery
Natural Gas uses, reserves, supply and demand
International gas trades and importance of the LNG
Unconventional gas and its impact on LNG markets
Evolution of the LNG trading and pricing
Main LNG markets: Japan, South Korea, Atlantic Basin, India and China
LNG marketing

TECHNICAL ASPECTS OF THE LNG CHAIN — 1.5 d

LNG: properties and specifications
Design of the different parts of the LNG chain
Principles, standards, usual practice and size
Liquefaction plants, LNG tankers, regasification terminals
Risks, danger, impact on design
Main projects of regasification in the World
Exploitation of regasification terminals
Capital expenditures and operating costs
Feedback from some international projects

LNG CONTRACTS — 1.5 d

Main features of LNG contracts
Important articles in long-term LNG sales agreements
LNG pricing: price formulae, indexation and net-back value
Impact of gas markets liberalization
Third-party access to regasification terminals
Example of terminals in France
Coexistence between long-term contracts and short-term contracts

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 23 - 26	Rueil	2,900 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Management

E-016

ENGLISH: TRT / GET

PURPOSE

To enable participants to gain a global and synthetic view on the risk management of the various trading activities of gas and electricity

AUDIENCE

All managers who need to learn the ways of managing risk in the market of natural gas and electricity

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to assess the risks associated with each phase of the gas trading and electricity
- to understand the different hedging tools of the financial markets and assess their efficiency and limits
- to put in place means of detecting, measuring and controlling the risks through a proper trading organization (procedures, segregation of duties)
- to implement control measures, including market risk and credit risk

WAYS AND MEANS

Case studies and examples

COORDINATOR

Lucien Guez

Natural Gas and Electricity Trading

2 DAYS

Market risks and their operational management

AGENDA

MARKETS — 0.25 d

Global overview of the oil market actors
Main features of gas and electricity markets

TRADING ROOM ORGANIZATION — 0.25 d

Front-office
Middle-office
Back-office

DIFFERENT TYPES OF RISKS — 1.25 d

Market risk
- Reminder of main hedging tools: futures, basis risk, swaps, options
- Peculiarities of gas contracts (swing, spark spread…)
- Contracts formula: management of constraints
- Monitoring of market risks: “greeks”, stress-tests, VaR, expected shortfall
- Credit risk (rating, limits…)

Other types of risk
- Operational risk and management of physical: regasification, storage, network access and transport
- Cash-flow risk
- Legal risk
- Reputational risk

CASE STUDIES — 0.25 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	09 - 10 Oct	Rueil	1 660 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Management

E-018

ENGLISH: TRT / OMT
FRENCH: TRT / MTP

Oil Markets and Trading

3 DAYS

PURPOSE

To provide a better understanding of the structure, the methods of operation, the uses and the impacts of physical, financial and paper markets for crude oil and petroleum products

AUDIENCE

All personnel in the petroleum or associated industries needing to improve their knowledge and understanding of crude oil and petroleum products trading and pricing mechanisms

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to analyze the parameters which influence prices of crude oil and petroleum products
- to review the different oil trading markets by type of transaction
- to understand the importance of maritime transport costs in oil supply economics
- to comprehend the hedging techniques available for protection against fluctuations in prices

WAYS AND MEANS

Syndicate works on case studies
Case studies

COORDINATOR

Lucien Guez

AGENDA

OIL SUPPLY AND DEMAND FUNDAMENTALS — 0.25 d

Oil vs other energy sources
Demand fundamentals
Oil producing countries, OPEC, consuming countries, international oil companies: constraints and strategies

CRUDE AND PETROLEUM PRODUCTS PHYSICAL TRADING — 1 d

"What is the value of a crude oil?": the refiner's point of view
Different types of contracts: Long term, spot and forward
Main oil markets and their features
Benchmark crudes. The role of reporting agencies
Links between trading and shipping
Products trading
Main provisions of a sale/purchase contract

EXCHANGES AND FUTURES TRADING — 1 d

The concept of volatility
Definition of a contract: the cases of WTI and Brent
Exchanges and their organization: the cases of NYMEX and ICE
Main futures markets
Hedging principles
Hedging imperfections. Basis risk
Market structure (contango, backwardation)
Case study

DERIVATIVES — 0.25 d

Options: principles, basics and characteristics
Interests and limits of options
Swaps: principles, basics and characteristics
Interests and limits of swaps

HEDGING STRATEGIES - VARIOUS CASE STUDIES ON HEDGING — 0.5 d

For a refiner
For a producer
For a marketer
For an industrial consumer

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 04 - 06	Rueil	2,100 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Management

E-019

ENGLISH: TRT / CFS
FRENCH: TRT / CES

Shipping: General Features, Chartering Contracts and Operations

4 DAYS

PURPOSE

To provide a better understanding of the main features of shipping, the basic concepts and the contractual relations

AUDIENCE

Professionals in the oil industry, involved in the supply, shipping, distribution activities and who need to improve their knowledge in operational and contractual aspects of shipping

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to assess the nautical capabilities and technical criteria of a particular ship for transportation of hydrocarbons
- to assess and better manage all the risks associated with maritime activities: boating, environment, politics…
- to integrate their thinking in the strategic choices necessary to the ship-owner or the carrier
- to understand the charter market and enter into negotiations in the best conditions

WAYS AND MEANS

Illustration of actual cases

COORDINATOR

Lucien Guez

AGENDA

VESSEL SPECIFICATIONS — 0.5 d

Physical characteristics: size, speed, propulsion, power generation…
Transportation capacities: tonnage, subdivision, transfer capabilities…
Usual Maritime Vocabulary
Goods transported (liquid bulk, dry bulk, containers, other…)
The vessels offering (types, sizes, age…)

THE SHIPPING CHAIN AND THE PORT COMMUNITY — 0.5 d

Reminders on INCOTERMS
The shipping agent and consignee of vessels: the representative of the owner/charterer and responsibilities
Its mission: organizing the call, cargo receiving and delivery
The ship in port: port authorities, pilotage, towing, mooring…
Nautical Safety of the ship: protecting the dock, sailing delays
Pollution prevention

THE SHIPPING: EXPLOITATION AND OPERATIONS, BASIC CONCEPTS OF MARITIME LAW — 0.75 d

Current state of the shipbuilding industry
The operating costs of vessels (crew, maintenance, insurance, financial charges…) variable costs related to travel (bunker calling costs…)
The "bunkering" market
Taxation of ship operation: national flags, flags of convenience…
Basic concepts of maritime laws: territorial waters, exclusive economic zone (EEZ), passage of the straits, transit in the channels
Sea routes: main stream, narrow waters and traffic separation

RISK CONTROL AND ENVIRONMENTAL PROTECTION — 0.75 d

The impact of maritime transport on the environment: emissions, energy consumption, pollution
International conventions related to risk protection and the environment (IMO, MARPOL, SOLAS, STCW…): overview
International Code for the Security of Ships and Port Facilities: ISPS
The procedures related to transportation of petroleum products: SHIP vetting, TERMINAL vetting, fleet management (TMSA)

THE PROFESSION OF MARITIME OPERATORS: STRATEGIC OPTIONS — 0.75 d

The fundamental aspects of maritime transport: goods transported, sizes and packaging, logistics integration
Constraints and risks: investment returns, costs (raw material, freight, logistics, storage…), security of supply, quality, nautical and environmental risks
The various strategic options: integrated ship-owners, owners-operators, oil majors, line or tramping operators…
Tradeoffs between carriage of cargo or "bunkers" fuels
The organization of the chartering market: the various stakeholders, their role and responsibility
Price fixing
The market tools: WORLDSCALE, FFA, BITR, PLATTS…

CHARTERING CONTRACTS AND CHARTER PARTIES — 0.75 d

The various chartering contracts: time charter, voyage charter, bare boat
The contract stakeholders and their respective responsibilities: financial, commercial, economic, nautical, political: the charter / the charterer / the broker
The conclusion of a charter contract: example
The "standard" or essential terms: lay time, NOR, demurrage, PFR, BCM…
The specific clauses or rider clauses: the options for length, volume, the buy-back, profit/loss sharing, indexing
Freight and/or cost, bunker…
Practice of using charter parties: Shellvoy, Astabank…
Dispute resolution: Maritime Arbitration, analysis of law cases (arbitration)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 01 - 04	Rueil	2,690 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
General Information and Multidisciplinary Courses

E-030

ENGLISH: GEN / DIPPEN

Major in Petroleum Engineering

90 DAYS

PURPOSE

To provide a very comprehensive, practical knowledge of world-class methods and techniques used in petroleum engineering, and develop competency needed to be fully operational and make very significant contributions in multidisciplinary project teams

AUDIENCE

E&P professionals, with an engineering degree, interested in an intensive training in petroleum engineering

LEARNING OBJECTIVES

- To gain insight into fundamentals of petroleum geology
- To understand the use of seismics in exploration and in reservoir studies
- To grasp the essence of reservoir characterization and modeling
- To learn about drilling and well completion
- To review well operations, well performance, and well test interpretation
- To grasp concepts and techniques of reservoir engineering
- To understand oil and gas processing operations and technology
- To assess some very important HSE challenges

PREREQUISITE

Required level of English: TOEIC 750

WAYS AND MEANS

Highly interactive training with various application exercises and actual case studies
Use of a simulation game for the exploration process: Hunting for Oil (see E-033)
Intensive English courses may be organized prior to the start of the training program
The training includes assessment of participants all along the program, and ends with a 4-month internship period
Each participant will have to spend this period working on a case study in his or her own company
This internship work will have to be validated by a technical report to be presented in front of a jury of experts
This is mandatory to obtain the Graduate Diploma
Upon successful completion of the program (exams passed and final jury consent), the participants are awarded the "Graduate Diploma of Petroleum Studies, Major in Petroleum Engineering" from IFP School

OBSERVATION

A specific brochure for this program is available on request
Number of seats in this course is limited to 19

COORDINATOR

Florent Prion

AGENDA

MODULE 1: HUNTING FOR OIL — 5 d

Exploration and Production Techniques
Competitive group exercise

MODULE 2: GEOSCIENCES AND RESERVOIR ENGINEERING — 30 d

Petroleum Geology and Geophysics for Reservoir Studies
Fluid properties and Petrophysics
Well Log Interpretation
Well Test Interpretation
Reservoir Engineering and Simulation

MODULE 3: DRILLING, WELL COMPLETION & SERVICING — 25 d
INFLOW AND OUTFLOW STUDY
ARTIFICIAL LIFT

Well Architecture and Equipment
Drilling Fluids and Cement
Well Completion (Reservoir - Wellbore Interface & Equipment of Naturally Flowing Wells) and Well Servicing
Well Control

MODULE 4: SURFACE PROCESSING — 25 d

Thermodynamics Applied to Well Effluent Processing
Oil & Gas Field Processing
Simulation of Oil & Gas Field Treatment Processes
Technology of Oil & Gas Processing Equipment
Offshore Technologies
Safety Environment in Field Operations

MODULE 5: WELL PERFORMANCE — 5 d

TOTAL DURATION OF TECHNICAL COURSES: 18 WEEKS

MODULE 6: PETROLEUM ENGINEERING INTERNSHIP (4 MONTHS)

In-house course. Contact: epgen.rueil@ifptraining.com

General E&P Training
General Information and Multidisciplinary Courses

E-031

ENGLISH: GEN / DECOUVEP
FRENCH: GEN / DECOUVERTE

PURPOSE

To provide a complete overview of the techniques, achievements and challenges of the Exploration-Production industry: Geosciences, Reservoir Engineering, Drilling and Well Completion, Surface Facilities, Onshore and Offshore Production

AUDIENCE

Professionals in commercial, legal, financial or human resources departments, within the petroleum industry or related sectors, who need of a general knowledge about the oil and gas upstream sector

LEARNING OBJECTIVES

- To understand the various phases of oil and gas exploration and production
- To understand the contribution of all experts and technologies involved in this sector
- To learn the vocabulary needed to attend E&P project technical meetings

WAYS AND MEANS

Use of several illustrations: videos, rock samples, tools, effluents…

COORDINATOR

Florent Prion

Exploration & Production Overview

5 DAYS

AGENDA

INTRODUCTION
Welcome, introduction to Exploration & Production

GEOSCIENCES — 1 d
Exploration Tools: Geology
- Structural geology - Rocks and sedimentary basins
- From hydrocarbons to reservoir, well logging

Exploration Tools: Geophysics
- Principles, Acquisition, Interpretation

Reservoir Engineering
- From physical interpretation to reservoir modeling
- Evaluation of the reserves, well test, drainage mechanisms
- Different types of effluent and their behavior

DRILLING AND WELL COMPLETION — 1 d
Drilling
- Well architecture, Drilling Rig functions, Drilling techniques and operation
- Offshore drilling rigs

Well Completion
- Reservoir / Wellbore interface, Artificial Lift techniques
- Well equipment and Well intervention

FIELD PROCESSING - SURFACE FACILITIES — 1 d
Field processing of well effluent
- Gathering network, effluent processing, metering and export

Offshore installations
- Fixed and floating production structures
- Deep offshore technology

FIELD DEVELOPMENT AND DECISION MAKING PROCESS — 1 d
Field development process - Oil & Gas project phases
Project profitability evaluation
Fundamentals of Oil & Gas Project Management

THE FUTURE — 1 d
The new challenges for the Oil & Gas industry
New energies
Environmental aspects

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 16 - 20	Rueil	2,960 €	EPGEN	epgen.rueil@ifptraining.com
EN	Nov 03 - 07	Rueil	2,960 €	EPGEN	epgen.rueil@ifptraining.com

May be organized for a single company

General E&P Training
General Information and Multidisciplinary Courses

E-033

ENGLISH: GEO / HFO

Hunting for Oil: Exploration & Production Techniques

Hunting For Oil™ (HFO™) is a unique training experience in which one slides over a practical overview of most common techniques used in the upstream oil and gas industry, from prospect exploration to field development and production. While doing so, one must also grasp exploration blocks; carry out exploration, drilling and production operations; and, at the same time, manage the financial situation of his or her oil company in a competitive virtual environment set up in a serious computer-game
The training starts with building several teams, each one representing a virtual oil company. These companies compete for oil resources in a new area and all have the same goal: discover and produce any economically viable volume of hydrocarbons
Participants learn how to select and acquire license blocks, interpret seismic data, plan drilling activities, develop oil fields, and manage their project, including timeline and budget
During the simulation, all teams analyze acquired information; and discuss internally all risks, uncertainties and actions to take all along the E&P value chain. Ultimately, each team defines and implements its own best strategy, while interacting with competitors and always striving to maximize value reflected in cash-flow and production figures

PURPOSE

To bring to life the following truth:
the success of an oil company comes from a sound strategy, with a proficient data interpretation and an effective teamwork

AUDIENCE

Geologists, geophysicists, reservoir engineers
Petroleum engineers, support staff, and non-technical staff
E&P professionals about to join multidisciplinary or asset teams
Government officials, executive managers, high-potential professionals in commercial, legal, financial or marketing departments

LEARNING OBJECTIVES

- To acquire a global vision of the upstream petroleum industry
- To evaluate reservoir characteristics and potential through geophysical and geological data interpretation
- To understand how uncertainties impact data interpretation
- To draw field development plans, considering development costs and production rates in order to maximize value

WAYS AND MEANS

This course is designed to stimulate the participants' interest in learning, and capture their attention with challenges, competition and collaboration.
This makes the learning experience enjoyable and fulfilling for all professionals
The course makes use of the software package DALLAS™, which is a dynamic training tool based on an innovative learning platform
Hands-on activities and exercises (maps, seismic sections, prognoses, logs, OWC, volumetrics, pitfalls, etc.) are carried out through sequential workshops to highlight key phases and illustrate lectures

OBSERVATION

The program hereunder is designed for a group of 15 to 18 participants, i.e. five or six 3-member teams

COORDINATOR

Arnaud Torres

AGENDA

INTRODUCTION - EXPLORATION GEOLOGY — 1 d

Introduction: Specific roles and objectives of Exploration, Development & Production in the petroleum industry
Lecture: Geological context of hydrocarbon prospecting. Reservoir characterization tools & techniques in E&P
Workshop: *Introduction to geoscientific exploration methods. Data-room / Call for tenders*

EXPLORATION GEOPHYSICS — 1 d

Lecture: Seismic reflection (fundamentals, data acquisition, processing & interpretation)
Workshop: *Seismic interpretation. Survey planning. Commitment and permitting*

HYDROCARBON TRAPS - OPERATIONS GEOLOGY — 1 d

Lecture: Hydrocarbon genesis, migration, entrapment & timing. Play assessment (concept and preservation)
Workshop: *Wellsite geology (mudlogging, wireline logging) and well monitoring. Well data interpretation*

WELL COMPLETION - RESERVOIR ENGINEERING - PRODUCTION MONITORING — 1 d

Lecture: Well design and completion. Enhanced recovery
Workshop: *Field appraisal strategy and development planning*

RESERVE EVALUATION - RESERVOIR MODELING - CONCLUSION — 1 d

Lecture: Understand the reservoir: sedimentological and structural modeling
Workshop: *Accumulation evaluation: mapping and volumetric calculation (OOIP). Production monitoring*
Conclusion: Presentation of teams' results. Feedback discussion. Wrap-up session

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

General E&P Training
General Information and Multidisciplinary Courses

E-035

ENGLISH: COM / INFPGE
FRENCH: COM / INFPGF

Introduction to Petroleum Engineering

5 DAYS

PURPOSE

To provide a complete overview of petroleum engineering covering primary issues of reservoir, drilling, completion, and surface treatment

AUDIENCE

Professionals in technical, commercial, legal, financial or human resources departments, within the petroleum industry or related sectors, who need of a general knowledge in petroleum engineering

LEARNING OBJECTIVES

- To learn about major issues in petroleum engineering
- To understand the various operations carried out during field development, from drilling to surface treatment
- To learn the vocabulary needed to communicate with E&P professionals

WAYS AND MEANS

All efforts are made to organize, during this course, visits to a drilling site and to a production site
Should a scheduled site visit have to be cancelled, for reasons beyond IFP Training's control, and no alternative can be found in time, an illustration will be discussed in class using videos

OBSERVATION

Kindly refer to the following complementary courses which might be of interest: "Introduction to Reservoir Engineering" (E-350); "Drilling Fundamentals" (E-410); "Well Completion and Servicing" (E-411); "Oil & Gas Field Processing" (E-501)

COORDINATOR

Gérald Gachet

AGENDA

RESERVOIR ENGINEERING — 1 d

Geologic traps
Rock and fluids properties
Logging and well-test evaluation
Drainage mechanisms
Improved oil recovery

WELL — 2.25 d

Drilling
- Oil and gas exploration organization
- Well design
- Drilling rig: functions hoisting, rotations, pumping, safety…
- Drilling operations: casing, cement job, fishing, D.S.T.

Downhole production / Completion
- Completion design
- Global approach of flow capacity
- Reservoir-wellbore interface
- Well stimulation
- Well equipment and maintenance
- Chronology of a completion operation

Offshore wells
- Selection of the rig type: jack-up, semi…
- Design and specific equipment

OIL AND GAS PROCESSING FACILITIES — 1.75 d

Different objectives of processing field plants
Gathering system, hydrate inhibition
Crude oil treatment: oil and gas separation, crude oil dehydration and desalting processes
Gas processing: dehydration, sweetening, NGL recovery processes
Offshore production: metering and shipment
Visit of a production site

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 24 - 28	Rueil	3,070 €	FP	fp.pau@ifptraining.com
EN	Jun 02 - 06	Rueil	3,070 €	FP	fp.pau@ifptraining.com
EN	Dec 08 - 12	Rueil	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-060

ENGLISH: EAM / UEM

Upstream Economics and Management

15 DAYS

PURPOSE

To provide the participants with a clear view of the contractual and economic framework of Exploration-Production in order to apprehend the tools for decision making, financial management and audit

AUDIENCE

Managers from the Exploration-Production sector who must acquire a complete picture of all the economic, financial and contractual aspects of the hydrocarbons exploration and production activities

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to evaluate all aspects of taxation and contracts used in the upstream sector
- to build advanced economic models for the economic evaluation of Exploration-Production projects
- to analyze the economic results and carry out sensitivity analysis
- to incorporate the geological risk and uncertainty in the economic evaluation of E&P projects
- to analyze the main corporate financial statements (Profit/Loss and Balance Sheet) issued by oil companies

WAYS AND MEANS

Case studies simulated on computers:
Development of an oil field (under concession and production sharing agreements)
Acceleration of production project with or without EOR (Enhanced Oil Recovery)
LNG plant project with specific financing
Gas pipeline project with specific financing
Impact of "ringfencing" and the state participation in the decision-making process
Valuation of a decision to acquire information (seismic or drilling)
Pricing of an exploration bloc
Analysis and construction of balance sheets, income statements and key financial statements of an oil & gas company

COORDINATOR

Mohamed Lyes Djenaoui

AGENDA

UPSTREAM ECONOMIC AND CONTRACTUAL FRAMEWORK — 5 d

Main physical and financial oil markets and their features
Definition of 1P, 2P and 3P reserves, different technical and economic criteria
Investments and risks in E&P, objectives of actors, role of national oil companies, stakes in E&P
Concession and Production-sharing contracts: principles, examples of tax regimes and case studies
Risk-service contracts, and technical assistance contracts
Objectives of a flexible and progressive tax system, flexible taxation terms
General structure of Exploration-Production contracts
Exploration phase: duration, commitments, surrender, data and information, etc.
Appraisal phase: work program, gas provisions, commerciality, etc.
Development phase: financing, State participation, budgets and development plans, unitization, etc.
Production phase: work conduct and supervision, audit and accounting, financing, taxation, transportation and marketing of production, hydrocarbon price determination, etc.
General terms & conditions: title transfer, force majeure, governing law and dispute resolution
Main legal provisions in a Joint Operating Agreement, and Farm in / Farm out agreement
Case studies: global oil tax regimes (North West Europe, North Africa, West Africa, Middle East, Asia-Pacific, etc.)

ECONOMIC ANALYSIS OF E&P PROJECTS — 4 d

Financing of oil and gas projects, cost of capital and discount rate
Economic criteria for project evaluation: net present value (NPV), internal rate of return (IRR), payback period, etc.
Global profitability analysis, the impact of taxation and inflation on economic indicators
Specific method to Exploration and Production: shadow interest
Equity profitability analysis
Case studies: development of an oil field under concession and production sharing contracts, acceleration of production with or without EOR, LNG plant project and pipeline project with specific financing

RISK ANALYSIS OF E&P PROJECTS — 1 d

Introduction to risk analysis and risk discount rate: sensitivity analysis, Spider and Tornado diagrams
Probability of success, economic risk analysis in oil exploration
Economic study of an exploration project using Min, Mode and Max scenarios
Impact of "ringfencing" and the state participation in the decision-making process
Case studies: valuation of a decision to acquire information (seismic or drilling) and pricing of an exploration bloc

UPSTREAM ACCOUNTING AND FINANCIAL MANAGEMENT — 5 d

Statements of accounts for an oil and gas company, upstream specificities
Exploration: full cost, successful efforts, FAS 19
Reserves accounting: rules, FAS 69, control
Consolidation and Joint Venture accounting
Contract accounting, social accounting, group accounting
Accounting for concessions and PSCs: reserves, inventories, commitments, revenues
Norms: asset amortization, asset retirement obligations, value impairment test, etc.
Reporting: purpose, obligations, financial communication
Analytical accounting. Cost management and control
Audit: general, fiscal, partners
Tax audit: recoverable costs, common costs, sole costs

In-house course. Contact: eco.rueil@ifptraining.com

General E&P Training
Upstream Economics

E-062

ENGLISH: EAM / CFEP
FRENCH: EAM / CCEP

Contractual Framework of Exploration-Production

4 DAYS

PURPOSE

To provide participants with an in-depth understanding of the shape and dynamics of oil and gas Exploration-Production contracts

AUDIENCE

Professionals from the E&P sector and lawyers who need a practical understanding of all the concepts, principles and rules of oil and gas patrimonial contracts between host countries and international oil companies

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:
- to discuss different tax systems and contractual frameworks
- to identify the key issues and constraints in the relationships between host countries, NOCs and IOCs
- to evaluate the management of partnerships in the upstream sector to find and produce hydrocarbons

WAYS AND MEANS

Case studies
Exercises on rent sharing
Examples of petroleum laws and tax systems

COORDINATOR

Sylvie Chemineau

AGENDA

ECONOMIC ENVIRONMENT — 0.25 d

World's oil and gas reserves, definition of 1P, 2P and 3P reserves
Comparison of different technical and economic criteria in major petroleum areas
Investments and risks in E&P, process of project evaluation and trends in E&P activities

LEGAL AND CONTRACTUAL FRAMEWORK — 1.75 d

Objectives of actors, role of national oil companies, stakes in E&P
Principles of rent sharing, property of hydrocarbons and State sovereignty
Procedure for contracts awarding, different regimes and petroleum laws in the world
Concessions contracts: principles, State's revenues, examples of tax regimes and case studies
Production-sharing contracts: principles, examples, of tax regimes and case studies
Risk-service contracts, and technical assistance contracts
Pseudo-tax and non-fiscal constraints
Sensitive economics clauses, flexible oil policy: why and how to design it?
Objectives of a flexible and progressive tax system
Flexible taxation terms and windfall tax approaches
Economic model of an oil project

MAIN ARTICLES OF E&P CONTRACTS — 1.5 d

General structure of patrimonial contracts
Exploration phase: duration, commitments, surrender, data and information, etc.
Appraisal phase: work program, gas provisions, commerciality, etc.
Development phase: financing, State participation, budgets and development plans, unitization, etc.
Production phase: work conduct and supervision, audit and accounting, financing, taxation, transportation and marketing of production, hydrocarbon price determination, etc.
General terms & conditions: title transfer, force majeure, governing law and dispute resolution
Comparison of fundamental features of Exploration-Production contracts
Major economic, financial and legal aspects for oil companies
Evolution and trends in oil taxation and patrimonial contracts

JOINT OPERATING AGREEMENTS — 0.5 d

Motivation for State participation and major types of participation
Main legal provisions in a Joint Operating Agreement, and Farm in / Farm out agreement
Obligations of State information

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 08 - 11	Rueil	2,900 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-064

ENGLISH: EAM / PSA
FRENCH: EAM / CPA

Production Sharing and Joint Operating Agreements

4 DAYS

PURPOSE

To provide participants with an in-depth understanding of the concepts and mechanisms of Production Sharing and Joint Operating Agreement

AUDIENCE

Exploration and production professionals, legal personnel entering the E&P scene, service companies managers and government employees

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to identify the main concepts, principles and rules of a Production Sharing Agreement which contractually binds petroleum companies with a ministry and/or a state oil company
- to evaluate the management of Petroleum Exploration and Production partnerships to successfully find and produce hydrocarbons
- to discuss the practical aspect of contracts: identifying key issues, understanding constraints and deadlines, getting familiar with the document

WAYS AND MEANS

Case studies
Exercises on Production Sharing Contracts
Analysis of Joint Operating Agreements
Examples of contracts

COORDINATOR

Sylvie Chemineau

AGENDA

PRODUCTION SHARING AGREEMENTS (PSA) — 2.5 d

Introduction
- Origins, concept and scope of the PSA
- Comparison of PSA to other contracts
- Contents and structure of a typical PSA

PSA mechanisms
- Cost oil, profit oil split, "Government Take"
- Bonuses, first tranche petroleum, tax holiday, cost recovery ceilings, uplifts, Investment credits, government "back-in"
- Typical PSA cash flow forecast chart

Examples: review of various clauses selected from different PSAs (steering committees and impact of voting, rights and duties, liabilities, sub-contracting…)

JOINT OPERATING AGREEMENTS (JOA) — 1.5 d

Introduction
- The purpose of the joint ventures and use of a JOA
- The relationship of the JOA to other oil industry contracts
- Structure of a JOA, definitions and terminologies

The operator: appointment, rights and duties, liabilities, responsibilities, resignation, removal
The partners: rights and duties, liabilities, responsibilities
The operating committee and sub committees: establishment, powers and duties, notices, voting procedures, impact of voting, pass-mark
Work program & budget: exploration, development and production budgets, service contracts tendering and awards, AFE procedure
The sole risk/non consent clause: procedure, responsibilities, consequences, penalties
Disposal of production: rights and obligations
Permit/concession/block: surrender, extensions, renewals, abandonment of wells
Legal matters and miscellaneous: applicable laws, pre-emption, dispute resolution, default, transfer of rights, insurances, withdrawal, confidentiality, conflict of interests, proprietary information
Accounting procedure: principles, Budgets, audits, operator's management & administrative overheads, parent company overheads, payments, inventories
AIPN model contract: review of main topics

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 25 - 28	Rueil	2,900 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-066

ENGLISH: EAM / EPCN
FRENCH: EAM / CNEP

Exploration-Production Contracts and Negotiation

5 DAYS

PURPOSE

To have an overview of the EP patrimonial contract negotiation and to develop or deepen a skill in negotiating, using rigorous and innovative approach and proven techniques

AUDIENCE

People who could participate in one or more stages of an EP contract negotiation: negotiators, project managers, explorers, engineers, lawyers, economists, advisors, financiers, managers from the public sector related to the energy sector and representatives of national companies

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to distinguish the characteristics of the patrimonial contracts (Concession, Production Sharing Agreement) and the contracts between oil companies (farm-in / farm-out, joint-bidding agreement, JOA)
- to describe the different ways to access acreage
- to use a rigorous and innovative approach, and proven techniques, for negotiating contracts
- to make an objective and comprehensive report to its hierarchy and to anticipate objections

WAYS AND MEANS

Simulation of a negotiation (role play where each stakeholder is played by a different team)

COORDINATOR

Mélissa Clodic

AGENDA

PATRIMONIAL CONTRACTS — 1.5 d

Concession, Production Sharing Agreement, Service Contracts
Analysis of the contents of a contract
Distribution of the different items into homogeneous “bundles”: clauses related to the exploration stage, clauses conducting operations, clauses related to economic and tax calculations, to pure legal issues, to financial terms, etc.
Important clauses of a contract to prepare a negotiation

OTHER E&P CONTRACTS — 1.5 d

Association contracts (Joint Operating Agreement - JOA): operator, operating committee, budget, default, Sole risk, accounting procedures, etc.
Joint studies and submission procedures (Joint Study and Bidding Agreement - JSBA): consortium, right to be a partner, best deals, restrictions to participate in another consortium, default, etc.
Unitization agreement
Farm-in and Farm-out: assignment, obligation of profit, default, arbitration, etc.

NEGOTIATION — 0.5 d

Negotiation principles: methodology and techniques
Preparation for negotiating: principles, economic reminders, technical reminders (reserves, etc.)

ROLE PLAY — 1.5 d

Case study preparation per team (Joint Venture (JV, State)
Preparation for the first round of negotiation (contact and consultation)
First simulation and debriefing, updating the negotiation plan
Preparation for the second round of negotiation (confrontation and early conciliation)
Second simulation and debriefing, updating the negotiation plan
Preparation for the third round of negotiation (construction of the agreement and conclusion)
Third simulation and debriefing
Preparation of the report to the management

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 08 - 12	Rueil	3,630 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-068

ENGLISH: EAM / EFEP
FRENCH: EAM / CEEP

Economic Framework of Exploration-Production

5 DAYS

PURPOSE

To provide a complete overview of the mechanisms of upstream projects and improve the understanding of the economics of Exploration and Production

AUDIENCE

Engineers and commercial staff who need to extend their understanding of the economic and business aspects of the upstream sector

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to explain the economic, technical and fiscal aspects of E&P activities
- to evaluate the economic profitability of an E&P project
- to analyze the main corporate financial statements (Profit/Loss and Balance Sheet) issued by oil companies

WAYS AND MEANS

Case studies simulated on computers:
Development of an oil field (under concession and production sharing agreements)
Acceleration of production project with or without EOR (Enhanced Oil Recovery)
Valuation of a decision to acquire information (seismic or drilling)
Pricing of an exploration bloc
Analysis and construction of balance sheets, income statements and key financial statements of an oil & gas company

COORDINATOR

Mohamed Lyes Djenaoui

AGENDA

UPSTREAM ECONOMIC ENVIRONMENT — 0.5 d

Economic development of the upstream sector
Various actors in Exploration-Production and their strategies. Oil markets and prices
Current exploration and production activities
Levels of investment
Examples of finding, development and production costs

CONTACTUAL AND FISCAL ENVIRONMENT — 0.5 d

General principles of oil tax systems
Legal framework: concessions agreements, production sharing contracts, service contracts
Impact of various contractual and technical parameters
Sharing of the economic rent between the State and Oil Companies. Economic flexibility
Legal aspects of joint ventures
Main legal provisions in a Joint Operating Agreement (JOA)

ECONOMIC EVALUATION OF E&P PROJECTS — 2 d

Cost of capital and discount rate, value creation
Economic criteria for project evaluation: net present value (NPV), internal rate of return (IRR), payback period, etc.
Global profitability analysis, the impact of taxation and inflation on economic indicators
Specific method to Exploration and Production: shadow interest
Case studies: development of an oil field (under concession and production sharing agreements)
Introduction to risk analysis and risk discount rate: sensitivity analysis, Spider and Tornado diagrams
Probability of success, economic risk analysis in oil exploration
Economic study of an exploration project using Min, Mode and Max scenarios
Case studies: valuation of a decision to acquire information (seismic or drilling) and pricing of an exploration bloc

MANAGEMENT OF THE E&P BUSINESS — 2 d

Financing of oil and gas projects. Basic aspects of accounting and financial analysis
Special mandatory reporting for oil companies
Accounting of exploration expenditures, full cost, successful efforts
Amortization and depreciation methods, special provisions (depletion allowance…), residual costs
Funds from operations, cash flows, financial equilibrium, working capital
Financial statement, return on capital employed, return on equity, financial leverage
Cost analysis and budgeting
Exploration costs, finding costs, development costs, replacement costs, production costs
Capital budgeting, authorizations for expenditure, planning and scheduling, budgeting exploration activities
Principles and methodology of cost control
Budget content and breakdown, selection of a cost control method
Standard costs, fixed and flexible budgets, analysis of variations
Budgets, principles of joint venture accounting, accounting procedures, cash calls, joint venture audit

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 14 - 18	Rueil	3,300 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-070

ENGLISH: EAM / ERA
FRENCH: EAM / EAR

Economics and Risk Analysis of Upstream Projects

5 DAYS

PURPOSE

To provide participants with an in-depth understanding of the tools used in economic analysis and decision making tools within the upstream industry

AUDIENCE

Engineers, economists and project managers who need to extend their understanding of the specific methods used to evaluate Exploration-Production projects

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to carry out investment profitability studies including all aspects of complex fiscal terms, inflation, and financing
- to analyze the economic results and carry out sensitivity analysis
- to incorporate the geological risk and uncertainty in the economic evaluation of Exploration-production projects
- to develop advanced computer models for the study of oil and gas development projects

WAYS AND MEANS

Case studies simulated on computers:
Development of an oil field (under concession and production sharing agreements)
Acceleration of production project with or without EOR (Enhanced Oil Recovery)
Impact of "ringfencing" and the state participation in the decision-making process
Valuation of a decision to acquire information (seismic or drilling)
Pricing of an exploration bloc

COORDINATOR

Mohamed Lyes Djenaoui

AGENDA

ECONOMIC AND CONTRACTUAL FRAMEWORK OF E&P — 0.5 d

Various phases of Exploration-Production
Technical cost, evolution of the economic environment
Petroleum Exploration and Production contracts
Concessions, production sharing contracts, service contracts
Sharing of the economic rent, economic flexibility in petroleum contracts
Economic clauses

INVESTMENT PROFITABILITY STUDIES — 2 d

Cost of capital and discount rate, value creation
Economic criteria for project evaluation: net present value (NPV), internal rate of return (IRR), payback period, etc.
Global profitability analysis, the impact of taxation and inflation on economic indicators
Specific method to Exploration and Production: shadow interest
Case studies: development of an oil field (under concession and production sharing agreements)
Introduction to risk analysis and risk discount rate: sensitivity analysis, Spider and Tornado diagrams
Impact of "ringfencing" and the state participation in the decision-making process

RISK ANALYSIS OF E&P PROJECTS — 1.5 d

Probability of success, analysis of economic risk in oil exploration
Evaluation of exploration projects and decision trees
Farm in/Farm out
Risked and unrisked economics
Case study: economic study of an oil project including Min, Mode and Max scenarios
Evaluation of development projects
Economic risk associated with a marginal development
Decision trees and subjective probabilities, decision theory

ASSET MANAGEMENT — 1 d

Components and determinants of asset valuation at various stages of maturity: exploration and appraisal, development, production
Review of methodologies and processes, probabilistic analysis
Asset aggregation and portfolio optimization, tools of choice for comparing expected results and budget efficiencies
Conclusions, what works and what doesn't
Contribution of risk analysis and management to successful exploration

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 06 - 10	Rueil	3,360 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-074

ENGLISH: EAM / PCM
FRENCH: EAM / PMC

Practice of Exploration-Production Contracts Economic Modeling

4 DAYS

PURPOSE

To provide a practical understanding of the economic modeling of oil and gas field development project as well as exploration projects
A number of computer case studies will be treated all along the course to apply the principles that are presented succinctly, which makes this course a very practical one

AUDIENCE

Managers and executives involved in Exploration-Production activities who need to acquire a deep understanding of fiscal modeling for project evaluation

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:
- to explain the critical aspects of taxation and upstream contracts
- to build advanced economic models for the economic evaluation of Exploration-Production projects
- to analyze the economic results and carry out sensitivity analysis
- to incorporate the geological risk and uncertainty in the economic evaluation of E&P projects

PREREQUISITE

Participants need to be comfortable with the use of Microsoft Excel

WAYS AND MEANS

Case studies simulated on computers

COORDINATOR

Mohamed Lyes Djenaoui

AGENDA

CONTRACTUAL AND FISCAL FRAMEWORK OF EXPLORATION-PRODUCTION — 0.5 d

Overview of E&P activities, exploration, development and production costs
General principles of oil taxation
Concession contracts, production sharing contracts and service contracts
Principles of rent sharing between States and oil companies
Case studies: examples of contracts

OIL CONTRACT MODELING — 2.5 d

Cost of capital and discount rate, value creation
Economic criteria for project evaluation: net present value (NPV), internal rate of return (IRR), payback period, etc.
Global profitability analysis, the impact of taxation and inflation on economic indicators
Specific method to Exploration and Production: shadow interest
Case studies: development of an oil field (under concession and production sharing agreements)
Equity profitability analysis
Case studies: LNG project and gas pipeline project with specific financing

RISK ANALYSIS OF EXPLORATION-PRODUCTION PROJECTS — 1 d

Introduction to risk analysis and risk discount rate: sensitivity analysis, Spider and Tornado diagrams
Probability of success, methodology of decision tree analysis
Analysis of economic risk in exploration
Typical problems with uncertainties
Impact of ringfencing and State participation on the exploration decision process
Farm in/Farm out, cost and value of information
Portfolio management for E&P projects

CASE STUDIES

Development of an oil field (under concession and production sharing agreements)
Acceleration of production project with or without EOR (Enhanced Oil Recovery)
LNG plant project with specific financing
Impact of "ringfencing" and the state participation in the decision-making process
Valuation of a decision to acquire information (seismic or drilling)
Pricing of an exploration bloc

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 18 - 21	Rueil	2,900 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-075

ENGLISH: GIP / SBA

Overview of the Oil & Gas Business

5 DAYS

PURPOSE

The training is entirely structured, throughout its duration, around a strategic management game simulated on computers in order to provide to the participants an overall understanding of the global oil and gas business

AUDIENCE

Professionals who need to get an overview of the petroleum industry with an understanding of the decision making process in the oil & gas business

LEARNING OBJECTIVES

Upon completion of the course, participants will have:

- seen the main economic, market, physical, environmental and political forces driving energy demand, supply, and prices
- connected the key links and terms of the oil and gas industry, from the exploration well to the final products
- understood the fundamental management tools and decision processes in an international oil and gas company
- applied practical decisions and experienced the risk of doing business in the oil and gas industry on a worldwide scale through a computer "strategic management game"

WAYS AND MEANS

This course is built on interactive presentations, exercises and team games
Working in competing teams, participants have to:
Evaluate and anticipate the driving factors of oil prices through the "Oil price game"
Rebuild the E&P chain of a specific project
Take a quiz on natural gas business
Price a cargo of crude oil
Calculate refining margins and the main operating indicators
Evaluate the economic profitability of an oil field development, gas pipeline & LNG projects
Implement business decisions & evaluate its impact through the use of an Excel simulator "Strategic Management Game"

COORDINATOR

Mohamed Lyes Djenaoui

AGENDA

INTERNATIONAL OIL ENVIRONMENT — 0.5 d

Energy demand and supply. Crude oil reserves and production
History of the petroleum industry. Role of main actors: OPEC, NOCs, IOCs, INOCs, IEA
Oil price evolution and long-term scenarios
Present and future constraints of the oil and gas industry (alternative energies, investments, etc.)

UPSTREAM ECONOMICS — 0.5 d

Fundamental steps of the upstream business
Economic aspects and costs, risks
Understanding the E&P Value chain
Legal and fiscal framework for exploration-production (concessions, production sharing contracts, service contracts)

NATURAL GAS ECONOMICS — 0.5 d

Natural gas reserves and production around the world
Main gas markets; their structures and constraints
Liquefied natural gas chain, economics and trade
Long-term sales and purchase gas contracts. Take-or-pay provisions and gas price formulas

TRANSPORT AND INTERNATIONAL OIL MARKETS — 0.5 d

International trade and shipping of crude and products
Various types of markets and contracts : long-term contracts, forward and spot markets
How to price a cargo of crude oil?

REFINING ECONOMICS & PETROCHEMICALS — 0.5 d

Basic technical aspects. Development in refining capacity
Refining margins and costs
Evolution of products specifications and structure of demand
Inter-relationship between refining and petrochemicals
Main petrochemical sectors; environmental and economic trends
Coping with economic cycles

PROJECT ECONOMICS & DECISION ANALYSIS TOOLS — 1.5 d

Economic criteria for investment project evaluations
Global profitability analysis. Economic cost analysis
Introduction to risk analysis
Risk management, financial and cost management

STRATEGIC MANAGEMENT GAME — 0.5 d

Introduction to strategy & financial management
Introduction to the strategic game : participants are introduced to the use of strategic tools
Communication workshop: participants analyze their respective situation (SWOT analysis) in each of the businesses

COMMUNICATION & EVALUATION — 0.5 d

The participants have to implement their decisions & evaluate its impact through the use of an Excel simulator
- Upstream sector
- Refining sector
- Marketing sector
- Petrochemical sector

The results of each company will be evaluated within the "real" economic environment
The companies are ranked and rewarded according to their results

In-house course. Contact: eco.rueil@ifptraining.com

General E&P Training
Upstream Economics

E-079

ENGLISH: GIP / UCA
FRENCH: GIP / ACEP

NEW

Upstream Contracts Audit

5 DAYS

PURPOSE

To provide participants with a detailed understanding of the principles and methods of upstream contracts audit

AUDIENCE

For upstream personnel who will conduct joint-venture audits, or will be audited by partners in a joint-venture, for State auditors in charge of auditing oil & gas contracts (production-sharing and service contracts), for executives who look for a comprehensive understanding of issues linked to contractual audit

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:
- to prepare and lead a contractual audit
- to identify the risks related to accounting in oil industry
- to put in place an audit structure

WAYS AND MEANS

Industrial experience of the lecturer
Case studies and exercises based on recent industrial cases

COORDINATOR

Mélissa Clodic

AGENDA

CONTRACTUAL ACCOUNTING — 1 d

Joint Operating Agreements and accounting annex
Upstream tax issues
PSC and accounting procedures
Common costs and recoverable costs
At cost principle and implementation
Bases of operator's cost accounting

SPECIFICITIES OF JOINT VENTURE AUDIT — 1.5 d

Audit rights
Organization of the audit: partners, operator
Auditing respect of at cost principle
Exercises

SPECIFICITIES OF STATE AUDIT — 1.5 d

Audit rights
Organisation of the State audit, auditors qualification
Articulation between joint-venture audit and State audit
Key elements of contract and accounting procedure
Case study

CONDUCTING A CONTRACT AUDIT — 1 d

Audit preparation
During the audit
Conclusion of the audit
Audit supervisor role
Audit report and follow-up

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 08 - 12	Rueil	3,220 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-080

ENGLISH: GIP / GEPC
FRENCH: GIP / GCEP

Governance of an E&P Company

5 DAYS

PURPOSE

To present the most recent elements and reflections on companies governance and some issues specific to the oil & gas upstream companies, except contracts audit which are treated in a separate course

AUDIENCE

Professionals in charge of implementing internal control and procedures, to managers and independent board members wanting to know the best practices, to technical staff called to move to the internal audit of their company

LEARNING OBJECTIVES

Upon completion of the course, participants will be able:

- to obtain a global understanding of the problems attached to company's governance
- to know the most recent solutions developed and implemented in internal control of companies
- to analyze the human and financial resources needed to ensure the financial safety of the company
- to lead or supervise the creation of an internal audit

WAYS AND MEANS

Industrial experience of the lecturer
Discussions on key issues

COORDINATOR

Mélissa Clodic

AGENDA

GOVERNANCE OF COMPANIES — 1.5 d

Internal control: where and when
Principles of financial safety
Definition of audit, norms and standards
Internal control: definition, modalities
Internal audit, external audit
Audit committee, CPAs and external auditors

METHODOLOGY OF FINANCIAL AUDIT — 0.5 d

Audit techniques
System of proofs
Audit process
Documentation

AUDITORS QUALIFICATIONS — 0.5 d

Audit standards
Auditors initial and continuing education
Behavior rules

CONDUCT OF AN AUDIT — 1 d

Preparation of the audit
During the audit
Conclusion of the audit
Supervisor's role
Audit report and follow-up

OIL & GAS UPSTREAM SPECIFIC ISSUES — 0.5 d

FCPA compliance
New reporting requirements for listed companies: Reserves, payments to States, emission certificates

CONCLUSIONS: BEST PRACTICES — 1 d

Errors, creative accounting and aggressive accounting: assessment of the risks
Institutional answers in the USA and in the European Union
Company's organization
Developing an internal culture of financial safety

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - 28	Rueil	3,220 €	EM	eco.rueil@ifptraining.com

May be organized for a single company

General E&P Training
Upstream Economics

E-085

ENGLISH: GEN / CO2-2A

Economic Evaluation of Carbon Capture, Transportation and Storage Projects

2 DAYS

PURPOSE

To provide an introduction to the methods and tools used in the economic evaluation of CCS projects

AUDIENCE

Decision makers, managers, engineers, supervisors and operators involved in CCS projects and studies

LEARNING OBJECTIVES

- To understand technical and economic guiding principles for optimizing the implementation of a CCS chain
- To learn about some major regulations that could constrain a CCS project
- To understand major financing mechanisms available to CCS projects
- To grasp key dimensioning factors of a CCS chain's economics
- To identify important economic and financial risks with regard to the evaluation of a CCS chain
- To learn about issues involved in the economic modeling of a CCS project

COORDINATOR

Florent Prion

AGENDA

INTRODUCTION AND TECHNICAL DESIGN OF A CCS CHAIN — 0.25 d

Main Capture, Transportation and Storage technologies
Efficiencies (costs, energy consumptions), risk management, development perspectives
Technical development options
Surrounding storage capacities and captured CO_2 valuation options

INTERACTION BETWEEN ECONOMY / PROJECT DEVELOPMENT REGULATION FRAMEWORK / LIFE CYCLE ANALYSIS — 0.25 d

Regulations: constraints and uncertainties
LCA objectives and purpose
Interaction between LCA and economical analysis

PROJECT ECONOMICAL ASSESSMENT — 0.5 d

Investments and operating costs key parameters
Strategy comparison between business as usual projects and CCS projects
Sensitivity to parameters
Utilities (CO_2, fossil fuel…) price modeling
Identification of constraints from

RISK AND KEY DEVELOPMENT FACTORS FOR CCS CHAIN — 0.25 d

Matrix risk identification (SWOT analysis) in order to underline key CCS chain development parameters

IDENTIFICATION OF DECISIONAL FACTORS THROUGH A CASE STUDY — 0.5 d

Analysis of an industrial pool including urea production unit, steam boiler, waste incinerator and biodiesel refinery with potential storage in a nearby deep aquifer
Identification of project key points and risks
- Study perimeter and analysis strategy
- Technical options to be screened
- Best designs from an economical standpoint as a function of various contexts through Excel analysis (Excel datasheet will be provided partly completed)

SUMMARY AND CONCLUSIONS — 0.25 d

Key points to be studied during technico-economical analysis of CCS chain projects
Position of the technico-economical analysis within global CCS chain project analysis and decision process
CCS chain development perspectives: Who and When?

In-house course. Contact: epgen.rueil@ifptraining.com

Geosciences

Geosciences
Geophysics

E-100

ENGLISH: GEP / SEISREF

Seismic Reflection Fundamentals

5 DAYS

PURPOSE

To provide a thorough understanding of seismic reflection and its use in obtaining an image of earth subsurface which needs to be interpreted to deduce structural and geological information for a prospect

AUDIENCE

E&P geoscientists with no or weak experience in seismic

LEARNING OBJECTIVES

- To understand basics of acoustic wave propagation with relation to petro-physical properties of earth subsurface
- To grasp methodology of surface and borehole seismic acquisition and interpretation
- To review theoretical concepts of acoustic seismic wave propagation
- To assess main steps of seismic reflection workflow, from acquisition to interpretation
- To select the appropriate seismic technique to use for reservoir analysis
- To assess limitations and uncertainties of seismic reflection methodology with regard to prospect evaluation

WAYS AND MEANS

Interactive presentations, exercises, document analysis, videos…

COORDINATOR

Eric Fagot

AGENDA

WELCOME - INTRODUCTION TO PETROLEUM GEOPHYSICS — 0.25 d

SEISMIC WAVES PROPAGATION — 0.5 d

Seismic waves, rock velocities and densities, Snell-Descartes laws
Reflection coefficients, acoustic impedance
Seismic shot gathers
Multiples, refractions, diffractions, converted waves…

FUNDAMENTALS OF SIGNAL PROCESSING — 0.25 d

Seismic signal versus seismic noises
Time domain versus frequency domain
Spatial and time sampling

SEISMIC ACQUISITION — 0.75 d

2D and 3D seismic, land, marine, sea bottom seismic
Seismic sources (explosive, vibroseis, air guns…)
Seismic receivers (geophones, MEMS, Hydrophones…)
Streamer, OBC, shallow water, transition zone…

BOREHOLE SEISMIC — 0.5 d

Theory and principles, Vertical Seismic Profile (VSP)
Offset Seismic Profile (OSP), walkaway, Seismic While Drilling (SWD)
Examples and applications

SEISMIC PROCESSING AND IMAGING — 0.75 d

Seismic processing workflows, post-stack versus pre-stack
Enhance signal versus noise
Static corrections, dynamic corrections, velocity analysis
Stack, post-stack migrations, pre-stack migrations (PSDM)

SEISMIC REFLECTION INTERPRETATION — 1 d

Principles and methodology
Synthetic seismogram and well tying
2D seismic interpretation practice (on paper)
Seismic interpretation pitfalls

SEISMIC FOR RESERVOIR ANALYSIS — 0.75 d

Seismic amplitudes analysis, Direct Hydrocarbon Indicators (DHI), seismic attributes analysis
HR – HQ – HD – Broadband seismic, 4D Seismic
Multi-component seismic, P waves versus S waves
AVO-AVA processing and analysis, seismic inversion

CONCLUSION AND SYNTHESIS — 0.25 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 12 - 16	Rueil	2,750 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Geophysics

E-101

ENGLISH: GEP / SIGNAL

PURPOSE

To provide a thorough introduction to basic concepts and mathematical tools of signal processing used in seismic surveys

AUDIENCE

Geoscientists

LEARNING OBJECTIVES

- To understand fundamentals of signal processing algorithms (Fourier, etc.), and their application in geophysics
- To understand how properties of sinusoidal data can be analyzed to improve processing and interpretation
- To use appropriate sampling and filtering techniques, with correlation and deconvolution processes to improve geophysical data
- To assess application constraints and limits of the methods

WAYS AND MEANS

Signal processing applications used during the course provided in electronic form

OBSERVATION

Number of seats is limited to 14

COORDINATOR

Eric Fagot

Signal Processing: a Tool for Acquisition and Processing of Geophysical Data

5 DAYS

To familiarize geologists and geophysicists with the basic concepts of signal processing used in seismic surveys

AGENDA

QUICK OVERVIEW ON THE SEISMIC ACQUISITION AND PROCESSING — 0.25 d

THE FOURIER TRANSFORM — 0.75 d

The Fourier transform is a mathematical transform which changes between the time domain *t* (or distances *x*) and the frequency domain f (or similarly wavenumbers *k*)
The transformation of the product of the convolution is characterized by linearity and reversibility, and is also essential to analyze the processes and the linear systems
Analysis of field record in (x,t) and (f, k) domains

COMMON FUNCTIONS IN SPECTRAL ANALYSIS — 0.5 d

The common functions are the basis tools used in signal processing. Here, we study the behavior of the most useful functions in the spatial domain (time or distance) or in the spectral domain (frequency or wavenumber)
The base functions are

- The Dirac (the distribution is considered as a function)
- The boxcar function
- The Hanning function
- The exponential decay function
- The signals composed of carriers and envelopes
- The Dirac comb, used to sample a continuous function or make a signal periodic
- Approximation of a dirac comb by the sum of cosines
- Periodicities in time
- Multiplication by a Dirac comb

SAMPLING — 1 d

Mathematical representation of time sampling
Conservation of the spectrum H(f). Shannon theorem
Sampling the Fourier transform. The Discrete Fourier Transform (DFT)
From the continuous transform to the discrete transform. Time-shifting by one sample
Sampling the Dirac function. Under-sampling. Spectral wrap-around (Aliasing)
Over-sampling. Multiplexing. Spatial sampling
Application to 2D and 3D spread designs

CORRELATION — 0.5 d

Analog and digital definitions. Interpreting the correlation. Properties of the correlation
Autocorrelation of various functions. Measuring delays, phase and periods
Noise attenuation by using cross correlations

FILTERS — 0.5 d

Properties. The Z-transform (ZT). Some examples of filters. Reject filters. Non-linear filters
Spectral density: Raw cross-power spectrum. Smoothing
Averages, methods of estimating energy levels
Random signals, white noise. Applications
The Hilbert transform and its applications: definition of the Hilbert transform and use (instantaneous frequency, phase, amplitude)

WAVE SEPARATION — 1 d

Description of separation methods with examples
Different separation methods are described: F-K, SVD, SMF, Wiener, Polarization
Application for wave separation on field records (body waves, surface waves, multiples…)

DECONVOLUTION AND FILTER ESTIMATION — 0.5 d

Minimum and maximum phase causal and anti-causal signals. Deconvolution
Application: increasing of vertical resolution, multiple attenuation, stratigraphic deconvolution, Wiener filter and monitoring

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Geophysics

E-103

ENGLISH: GEP / GPHYSICS
FRENCH: GEP / GEOPHY

Petroleum Geophysics

10 DAYS

PURPOSE

To provide a comprehensive and practical understanding of techniques used to investigate the structure as well as the geological and petrophysical characteristics of a reservoir

AUDIENCE

E&P professionals, with little or no experience in petroleum geophysics

LEARNING OBJECTIVES

- To gain an insight into fundamentals of petroleum geophysics: acoustic wave propagation; seismic reflection acquisition, processing and interpretation; well seismic, and reservoir geophysics
- To select the appropriate geophysical method to use in various phases of petroleum exploration
- To understand concepts of wave propagation in seismic reflection
- To comprehend the link between seismic waves and petrophysical properties of a reservoir
- To gain an insight into the methodology of seismic acquisition and interpretation
- To acquire a clear overview of seismic reservoir characterization
- To appreciate the importance of a multidisciplinary approach in seeking a coherent interpretation

WAYS AND MEANS

Interactive presentations, exercises, document analysis, videos…

COORDINATOR

Eric Fagot

AGENDA

SEISMIC WAVES PROPAGATION — 0.5 d

Seismic waves, rock velocities and densities, Snell-Descartes laws
Reflection coefficients, acoustic impedance
Seismic shot gathers
Multiples, refractions, diffractions, converted waves…

SEISMIC ACQUISITION — 2.5 d

2D and 3D seismics, land, marine, sea bottom seismics
Seismic sources (explosive, vibroseis, airguns…)
Seismic receivers (geophones, MEMS, Hydrophones…)
Streamer, OBC, shallow water, transition zone…

SEISMIC PROCESSING AND IMAGING — 3 d

Seismic processing workflows, post-stack versus pre-stack
Enhance signal versus noise
Static corrections, dynamic corrections, velocity analysis
Stack, post-stack migrations, pre-stack migrations (PSDM)
Seismic Processing W Workshop on PC

BOREHOLE SEISMIC — 0.75 d

Theory and principles, synthetic seismogram and well tie, Vertical Seismic Profile (VSP)
Offset Seismic Profile (OSP), walkaway, Seismic While Drilling (SWD)
Examples and applications

SEISMIC INTERPRETATION: THEORY AND PRACTICE — 2 d

Principles and methodology, seismic interpretation pitfalls
2D seismic interpretation practice (on paper)
3D seismic interpretation workshop on PC

SEISMIC FOR RESERVOIR ANALYSIS — 1 d

Seismic amplitudes analysis, Direct Hydrocarbon Indicators (DHI), seismic attributes analysis
HR – HQ – HD – Broadband seismic, 4D Seismic
Multi-component seismic, P waves versus S waves
AVO-AVA processing and analysis, seismic inversion

GRAVIMETRY, MAGNETISM AND ELECTRO-MAGNETIC — 0.25 d

Gravimetry: theory and principles, acquisition, processing, interpretation
Examples and applications
Magnetism: theory and principles, acquisition, processing, interpretation
Examples and applications
Electro-Magnetism: theory and principles, acquisition, processing, interpretation

CONCLUSION AND SYNTHESIS

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - Dec 05	Rueil	5,500 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Geophysics

E-110

ENGLISH: GEP / BORESEIS

Borehole Seismic

5 DAYS

PURPOSE

To provide a comprehensive understanding of borehole seismic which builds the bridge between borehole and surface data, and ultimately improve knowledge of reservoir characteristics

AUDIENCE

E&P geoscientists with no or weak experience in borehole seismic

LEARNING OBJECTIVES

- To understand fundamental concepts of borehole seismic
- To comprehend different borehole seismic technologies
- To follow or supervise design and operations of standard borehole seismic jobs
- To follow or supervise standard borehole seismic processing
- To ensure that optimized high-quality borehole seismic results are delivered

PREREQUISITE

It is highly recommended to have a good knowledge of fundamentals in seismic wave propagation, acquisition and processing, as well as in structural geology

WAYS AND MEANS

Interactive presentations, exercises, document analysis, videos…

COORDINATOR

Eric Fagot

AGENDA

INTRODUCTION TO BOREHOLE SEISMIC — 1 d

Role of Borehole Seismic
Fundamentals: seismic, rock physics and wave propagation
Borehole seismic and surface seismic

BOREHOLE SEISMIC ACQUISITION — 1 d

Equipment
Typical borehole seismic acquisition techniques
Preparation & supervision
Case studies and exercises

BOREHOLE SEISMIC PROCESSING — 1 d

Surface seismic calibration: time vs. depth relationship
Synthetic seismogram
VSP processing principles: up & down wavefield separation, up wavefield demultiplying, corridor stack
Case studies and exercises

BOREHOLE SEISMIC 2D AND 3D IMAGING — 0.5 d

2D & 3D processing: wavefield separation, demultiplying up wavefield, imaging
Case studies and exercises

BOREHOLE SEISMIC APPLICATIONS AND INTERPRETATION — 1 d

Surface seismic calibration, imaging and prediction
Reservoir characterization
Monitoring
Case studies and exercises

ADVANCED FEATURES — 0.5 d

Cross-well seismic, permanent sensors, permanent sources
4C / 3D / 4D surveys, microseismicity, SWD: Seismic while drilling
Resolution enhancement
Discussion and conclusions

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Geophysics

E-131

ENGLISH: GEP / SISINTERP
FRENCH: GEP / INTERPSIS

NEW

Seismic Interpretation Workshop

Structural model and traps analysis

10 DAYS

PURPOSE

To provide a practical understanding of 3D-seismic structural modeling used for the delineation of a reservoir, relying on wells and seismic data interpretation, and depth modeling

AUDIENCE

Experienced geologists and geophysicists

LEARNING OBJECTIVES

- To grasp the workflow of a seismic structural interpretation
- To analyze and QC the seismic data set to be used for interpretation
- To identify main uncertainties in the interpretation process
- To perform a seismic to well tying
- To identify key horizons for the construction of a depth model and for reservoir delineation
- To prepare the velocity model and perform a time-to-depth conversion
- To perform seismic reservoir interpretation and build a geophysical structural model
- To identify potential trapping areas
- To assess uncertainties associated with the structural interpretation
- To provide recommendations

PREREQUISITE

Course requires a good grasp of fundamentals in the following fields: wave propagation, seismic acquisition and processing

WAYS AND MEANS

Interactive presentations, exercises, document analysis, videos…
90% of the training duration is devoted to computer-based work on an actual case

OBSERVATION

Number of seats is limited to 14 participants
Tuition fees do not include the cost of the software license

COORDINATOR

Eric Fagot

AGENDA

INTRODUCTION

Team work on North Sea 3D-case study

STRUCTURAL INTERPRETATION OF PROSPECTS GEOMETRY — 9.5 d

Surveys presentation of the North Sea 3D seismic Block and workshop objectives

Geology and petroleum system overview - Geophysical context
Prospect objectives

Data preparation and QC

Seismic data preparation and analysis

- Seismic display and overview choosing parameters for displays, vertical sections or time slices, intersections, random sections, display combinations
- Seismic data analysis → how to evidence and identify noise and multiples, emphasize areas of frequency or energy modification, areas of good S/N ratio
- Seismic data preparation → remove noise and acquisition foot prints (filtering)

Well-to-seismic tying and horizons identification

- Well logs display (maps and plates) and QC
- Well data editing and calibration: Well velocity calculation and layer velocity contrasts identification - Main reservoir layers identification
- Synthetic seismogram calculation (impedance, Reflectivity, wavelet extraction and SS calculation)

Defining traps

Well to seismic tying and seismic key horizons identification
Key horizons Time structural interpretation (interfaces between velocity contrast layers + top and base of reservoir) → fault and horizon picking, correlation and mapping
QC of picking and uncertainties assessment
Velocity model building (layer stripping approach) and Time-to-depth conversion

- Selection of layers for depth model building (velocity contrasts)
- Seismic Interval velocity VI calculation for selected layers → VI editing and smoothing, Seismic VI to well VI correction
- Layer stripping velocity model building: Depth migration of seismic data with flooded velocity of layer 1 - Picking of base of layer 1 and velocity model update - Iterative update for next layers → final velocity model
- Time to depth final conversion → depth seismic bloc

Structural prospect analysis

- Entrapment, reservoir extension
- Comparison between time and depth structures
- Uncertainties assessment
- Recommendations

SYNTHESIS AND CONCLUSIONS — 0.5 d

Wrap-up session

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 13 - 24	Rueil	6,250 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Logs

E-150

ENGLISH: LOG / WSGEOL
FRENCH: LOG / DIAGFOR

Wellsite Geology (Geological Logging)

4 DAYS

PURPOSE

To provide a comprehensive understanding of how to monitor and use geological data acquired while drilling in order to characterize geological formations and reservoirs

AUDIENCE

Geologists, technicians involved with geological well-site control and/or supervision
Geoscientists using well geological reports

LEARNING OBJECTIVES

- To understand the role of a well site geologist
- To grasp various techniques applied in wellsite geology and coring operations
- To learn about various aspects of geological logging

WAYS AND MEANS

Interactive presentations, applications on case studies, team work

COORDINATOR

Jacques Delalex

AGENDA

DRILLING PARAMETERS — 3 d

Quick review of mechanical parameters (WOH, WOB, RPM, ROP) & hydraulic parameters (SPP, MFR, MPL, MWin & out, etc.)

GEOLOGICAL PARAMETERS

Cuttings: sampling, cleaning, analysis, description, calcimetry, lagtime, XRD, fluorescence
Quality and representativeness of cuttings
Hints on how to fill in the cutting description sheet; Main minerals and accessory minerals
Paleontological observations

HYDROCARBON GASES

Physics and chemistry of gases
Detection & evaluation of gas shows while drilling - Chromatography - Type of dissolved gases in the mud
Importance of gas control on quality of measurements - Gas while drilling

GEOLOGICAL LOGGING

Role of well site geologist: analysis and decision
Depth control: depth, deviation surveys, (MD, TVD, TVDSS) and stratigraphic column
Gathering geological and drilling information
Geological log: header and track presentation; main software programs
Drilling parameters for a geological log
Calcimetry, gas, gain and losses
Composite log: Interpretation of geological observations and descriptions for the lithology
Integration of other data: well tests results and logging information
Supervision and quality control of logging operations
Coring operations: core recovery, cleaning, splicing, description, fracture identification, sampling, photos
Final report
Case studies

WORKSHOP SESSION: CASE STUDY — 1 d

Quality control
Quality control of mud logs in clastics and carbonate environments
Practical session
Realization of a mud log from analysis and description of cuttings

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 22	Rueil	2,200 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Logs

E-160

ENGLISH: LOG / LOGBASIC
FRENCH: LOG / DDBASES

Well Log Interpretation

5 DAYS

PURPOSE

To provide an overview of main logging tools, and an insight into fundamentals of well log interpretation for reservoir identification and characterization

AUDIENCE

Geoscientists and other E&P professionals interested in log acquisition and interpretation

LEARNING OBJECTIVES

- To acquire concepts of log interpretation (Archie formula, invasion)
- To review coring, mud logging, and wireline logging
- To perform a quick-look interpretation to characterize reservoirs: fluid contacts, lithology, porosity, saturation
- To grasp sampling techniques and interpret pressure measurements
- To gain an insight into Nuclear Magnetic Resonance and Borehole Imaging

COORDINATOR

Jacques Delalex

AGENDA

BASIC INTERPRETATION CONCEPTS — 1 d

Definition of main reservoir petrophysical and fluid properties (lithology, porosity, resistivity, saturation)
Environment of measurement (borehole, invasion profile)
Fundamental equations (Archie formula) for log interpretation in clean formations

REVIEW OF LOG MEASUREMENTS AND APPLICATIONS — 1.25 d

Mud logging and coring techniques - Mud logs and use in log interpretation
Wireline logging operations and wireline logs
The log: header, calibrations, parameters, repeat section, main log
Wireline logging tools: principle and applications, limitation, calibration, log correction and quality control
Caliper, Gamma Ray and GR spectrometry, Spontaneous Potential
Resistivity (induction, laterolog) and Micro-resistivity measurements
Porosity & lithology measurements: nuclear (Litho-Density, Neutron) and acoustic logging (Sonic, Dipôle sonic)
Case studies n°1 & 2

LOG INTERPRETATION — 2 d

Qualitative and semi-quantitative interpretation
- Log responses in most common geological formations
- Identification of reservoirs and fluid contacts (overlay technique: water and oil based mud cases)
- Hydrocarbon effect on density & neutron logs
- Determination of water resistivity Rw (SP, Ratio, Rwa) and formation resistivity (Rt, Rxo)
- Determination of lithology, porosity, water and hydrocarbon saturations
- Shale effects on logs: introduction to shaly and complex lithology formations

Cross-plot techniques with density, neutron, sonic and other logs (Pe, K, Th, etc.)
Case studies n°1, 2 & 3 (water & oil based muds, clastics & carbonates)

PRESSURE MEASUREMENTS, NMR, DIPMETER AND BOREHOLE IMAGING TECHNIQUES — 0.5 d

Pressure measurements and fluid sampling: operation and applications
Determination of fluid contacts, fluid gradients and fluid densities
Nuclear Magnetic Resonance: principle and applications
Dipmeter and Borehole imaging tools: principle and applications

NMR, DIPMETER AND BOREHOLE IMAGING TECHNIQUES — 0.25 d

Nuclear Magnetic Resonance: principle and applications
Dipmeter and Borehole imaging tools: principle and applications

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 16 - 20	Rueil	2,750 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Logs

E-170

ENGLISH: LOG / LOGADV
FRENCH: LOG / DDQUANT

PURPOSE

Geoscientists and technicians with some experience in qualitative log interpretation

AUDIENCE

Geoscientists and technicians having an experience in qualitative log interpretation and willing to perform quantitative reservoir evaluation. Participants should know the principles and applications of common wireline logging tools and must be used to perform a quicklook (lithology, porosity, Rw, Sw)

LEARNING OBJECTIVES

- To perform sound quality-control and environmental correction of logs
- To determine Rt, Rxo, Di
- To identify shales, reservoirs, shaly reservoirs and zones with complex lithology
- To determine log interpretation parameters
- To evaluate shale content of reservoirs, and apply shale and hydrocarbon corrections
- To perform quantitative log interpretations in case of water and oil based mud
- To determine porosity and permeability
- To determine net sand, net reservoir and net pay thickness
- To integrate pressure measurements and NMR data
- To draw a cross-section between 2 near-by wells and compare results
- To learn about multi-mineral interpretation

PREREQUISITE

Course requires a good grasp of principles and applications of common wireline logging tools

WAYS AND MEANS

Use of a petrophysics software for log interpretation all along the course

COORDINATOR

Jacques Delalex

Advanced Well Log Interpretation

5 DAYS

AGENDA

PREPARATION FOR QUANTITATIVE INTERPRETATION — 1 d

Petrophysical concepts and relationships
Quality control of the data
Determination of geological formations and reservoirs - Zonations
Environmental corrections of logs - Determination of Rt, Rxo, Di
Case studies n°1 & 2 (water and oil based muds)

INTERPRETATION OF CLEAN FORMATIONS — 1 d

Determination of fluid contacts (WOC, GOC)
Determination of matrix and fluid parameters, Rw (SP, Ratio, Rwa)
Determination of lithology, porosity, fluid type, water and hydrocarbon saturations
Cross plots techniques: N-D-S, Pe-RHOB, K-Th, etc.
Case studies n°1 & 2

INTERPRETATION OF SHALY FORMATIONS (DETERMINISTIC APPROACH) — 2.5 d

Influence of shale on logging tool response - Introduction to complex lithology - D-N crossplot
Determination of shale parameters, shale content Vsh and effective porosity
Hydrocarbon effects on logs and hydrocarbon correction
Determination of water and hydrocarbon saturations (various equations)
Comparison of porosity and permeability results to core data (PHI-K relationship and SCAL)
Determination of net sand, net reservoir and net pay thicknesses and associated characteristics (Vsh, H, Phie, So)
Case studies n°1 & 2: integration & interpretation of pressure tests and NMR data, if available
Cross-section between wells and comparison of interpretation results

OTHER INTERPRETATION METHODS — 0.5 d

Introduction to the multi-mineral model and general optimization method
Case study n°3

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 23 - 27	Rueil	2,950 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Logs

E-171

ENGLISH: LOG / LOGONPC

Well Log Interpretation on Computer

Clastics or Carbonate Case Studies

5 DAYS

PURPOSE

To provide a thorough and practical understanding of methods applied to identify and characterize reservoirs in clastics or carbonate environment, using petrophysical analysis software

AUDIENCE

Geoscientists and technicians interested in using a petrophysical interpretation software for reservoir evaluation

LEARNING OBJECTIVES

- To perform log quality control and environmental correction, with the determination of Rt, Rxo, Di
- To identify shales, reservoirs, shaly reservoirs and zones with complex lithology
- To determine log interpretation parameters, evaluate the shale content of reservoirs, apply shale and hydrocarbon corrections
- To perform quantitative log interpretations for clastics or carbonates environments
- To determine and compare effective and core porosities and permeabilities
- To integrate pressure measurements and NMR data when available
- To perform reservoir summations: determine net sand, net reservoir and net pay thickness and associated parameters
- To draw a cross-section between 2 or more near-by wells
- To learn about multi-mineral interpretation

WAYS AND MEANS

Course can be focused on interpretation in one environment solely, either clastics or carbonate, with the use of either Geolog of Paradigm Geophysical or Interactive Petrophysics IP of Senergy

COORDINATOR

Jacques Delalex

AGENDA

WELL LOG INTERPRETATION IN CLASTICS OR CARBONATE ENVIRONMENT (DETERMINISTIC APPROACH)

Petrophysical concepts and relationships

Distribution of clays in the rock and influence of clay on logging tool response

Logs of two near-by wells, vertical and deviated, recorded in water and oil based mud

PROCESSING (similar to clastics and carbonate environments)

Quality control of the data - Log editing, log depth matching and SP baseline shift

Pre-computations and environmental corrections of logs - Determination of Rt, Rxo, Di

Determination of reservoir intervals and fluid contacts (WOC, GOC)

Determination of lithology, matrix and fluid parameters, Rw (SP, Ratio, Rwa, Pickett)

Cross-plots techniques and interaction with logs: N-D-S, Pe-RHOB, K-Th, etc.

Determination of shale parameters and shale content Vsh

Hydrocarbon effects on logs and hydrocarbon correction

Determination of effective porosity, water and hydrocarbon saturations (various equations - complex lithology)

Comparison of effective porosity and permeability to core data (PHI-K and SCAL) and NMR data, when available

Integration of rock types and facies analysis results

Facies variations and facies analysis on near-by wells - K-Phi law per facies type – Pc vs. Sw

Integration and interpretation of pressure measurements

Reservoir summations: cut-offs, determination of net sand, net reservoir, net pay thickness and associated characteristics

Cross-section between the 2 wells and comparison of results (Vsh, H, Phie, So, HPhiSo)

Introduction to multimineral approach

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Logs

E-180

ENGLISH: LOG / LOGPROD
FRENCH: LOG / DDPROD

PURPOSE

To provide a comprehensive knowledge of cased-hole logging techniques and production log interpretation, along with the industry's best practices and procedures

AUDIENCE

Production engineers and supervisors, drilling and workover engineers and supervisors, wellsite geologists and witnesses

LEARNING OBJECTIVES

- To acquire an insight into well cementation control and saturation monitoring
- To learn about sources and assessment of corrosion
- To determine characteristics of formations behind the casing
- To carry out a quick interpretation of production logs

COORDINATOR

Jacques Delalex

Cased-Hole Logging and Production Log Interpretation

5 DAYS

AGENDA

CEMENT EVALUATION — 1.25 d

Acoustic measurements (CBL - VDL)
Ultrasonic measurements (USIT - CASTV)
Other logs (temperature, isolation scanner)
Case studies, log examples

CORROSION EVALUATION — 0.25 d

Origins of the corrosion process in the wells
Corrosion evaluation
- Multi-finger Caliper
- Electromagnetic and potential measurements
- Ultrasonic logging

FORMATION EVALUATION IN CASED HOLE (SATURATION) — 0.75 d

Logging tools for cased hole formation evaluation: spectral GR, sonic, resistivity, pressure & fluid sampling, density
Pulsed Neutron capture logs
- Thermal decay time log
- Thermal absorption log
- Reservoir Saturation Tool

Interpretation: Time lapse technique - Gas detection
Determination of oil holdup and oil saturation
Reservoir performance monitor: gas view, fluid view - Case study

PRODUCTION LOGGING — 2.75 d

Tools for acquisition of main parameters: caliper, flowmeter, gradiomanometer, manometer, temperature, holdup meter
Main characteristics (PVT) of the reservoir fluids (water, oil and gas)
Production log record (case study)
Determination of the fluid velocities and the fluid densities in the well
Pressure and temperature measurements
Flow characterization and modeling (Flow Scan Imager)
Production log interpretation: interpretation of a set of production logs by hand and also with the EMERAUDE™ software (Kappa Engineering)

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Logs

E-181

ENGLISH: LOG / LPEMR

Production Log Interpretation

5 DAYS

Using Emeraude™ Software

PURPOSE

To provide a practical understanding of production log interpretation in vertical, deviated or horizontal wells using a dedicated software

AUDIENCE

Production, reservoir or workover engineers, field production managers, and supervisors

LEARNING OBJECTIVES

- To carry out a basic interpretation of PLT data using the software program Emeraude™
- To practice regular log quality control
- To learn the interpretation technique for horizontal wells
- To understand software models and correlations used in Emeraude™
- To practice on multi-probe analysis with data gathered from Multi Array Production sondes and Flow Scan Imager

PREREQUISITE

Knowledge of PLT calibrations, holdups measurements and flow-rates calculations is recommended

WAYS AND MEANS

Hands-on sessions with the use of the production log interpretation software Emeraude™ of KAPPA Engineering

COORDINATOR

Jacques Delalex

AGENDA

BASIC FEATURES AND SOFTWARE PRACTICE — 1 d

Basic features applied to a 2-phase gas oil well example
Software presentation: well data, well sketch, features and layouts
Zones definitions: reservoirs, perforations, calibrations, inflow, calculations of rates

PL INTERPRETATION OF DIPHASIC FLOWS — 1 d

Handle diphasic flow in deviated well, with shut-in and production surveys
Practice on spinner reversals
Integrate PVT data and determine production rates per zone & cumulative rate
Apply all previous practices on field example with 3-phase flow

HORIZONTAL WELLS — 1 d

Handle data from horizontal wells logged with Flow Scan Imager & Probe Flow Caliper Sonde with 3-phase flow and shut-in & production surveys
Obtain average values of velocity & holdups through process of passes from flowing survey
Perform full PL interpretation with previous inputs

PL INTERPRETATION WITH MULTIPLE PROBES TOOLS — 1.5 d

Interpret data set from multiple probe tools in case of deviated well, with Emeraude™ software, with logs acquired with spinner array, capacitance array, resistivity arrays tools in a 3 phase flow well
Quality control of data

SINGLE PHASE GAS WELL — 0.5 d

Interpretation of temperature log with Emeraude™ segmented and energy equation models
Case of apparent downflow & selected inflow performance

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Logs

E-190

ENGLISH: LOG / BLWLI

PURPOSE

To provide a practical understanding of basic concepts and methodology of well log acquisition and interpretation for subsurface or reservoir studies

AUDIENCE

Geologists, geophysicists, reservoir engineers interested in well log interpretation

LEARNING OBJECTIVES

- To understand well log acquisition techniques
- To grasp fundamental physics of log measurements
- To perform well-log quality control
- To understand log data from shale and other geological formations
- To perform basic log interpretation to identify and characterize reservoirs

WAYS AND MEANS

Before training starts, 2 hours are dedicated to introduce the training agenda, methods and tools
The exact needs and expectations of each participant are also assessed and discussed (MCQ and phone interview with the tutor)

OBSERVATION

Total duration of the training is 32 hours, spread over an 8-week period

COORDINATOR

Jacques Delalex
Catherine Ulrich (Blended Learning)

Well Logging & Basic Log Interpretation

8 WEEKS

E-learning with personal coaching

Well log acquisition and basic interpretation of clean formations

AGENDA

BASIC INTERPRETATION CONCEPTS — 8 h

Seals and reservoirs
Definition of main reservoir petrophysical and fluid properties (lithology, porosity, resistivity, saturation)
Fundamental equations for log interpretation in clean formations
Environment of measurement (drilling, borehole, invasion process)

MEASUREMENTS AND APPLICATIONS — 12 h

Mud logging and coring operations
Wireline logging operations
The log: header, calibrations, parameters, repeat section, main log
Logging tool principle, limitation, application, quality control
Caliper, gamma ray and GR spectrometry, spontaneous potential
Resistivity (induction, laterolog) and microresistivity measurements
Porosity and lithology measurements: nuclear (litho-density, neutron) and acoustic logging

BASIC LOG INTERPRETATION — 12 h

Wireline log interpretation in clean formations:
- Identification of shales, common geological formations and reservoirs
- Cross-plot technique with density and neutron
- Identification of fluid contacts
- Hydrocarbon effects on logs
- Determination of lithology and porosity
- Determination of Rw (SP, Ratio, Rwa)
- Determination of water and hydrocarbon saturations
- Case of oil based mud
- Estimation of h.Phi.So

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

Geosciences
Petroleum Basin & Exploration

E-200

ENGLISH: GEO / INFO

Fundamental Basin Exploration Workshop

5 DAYS

PURPOSE

To provide a practical knowledge of petroleum exploration and develop competency needed to participate actively in multidisciplinary project teams

AUDIENCE

Geologists, geophysicists, young professionals interested in petroleum exploration techniques

LEARNING OBJECTIVES

- To review most common exploration techniques, via an integrated multidisciplinary approach
- To understand standard workflows used in exploration to integrate multidisciplinary teams
- To acquire skills in basin structural and sedimentary analysis
- To carry out fundamental well log analysis
- To acquire know-how in assessing a basin hydrocarbon potential and prospects

WAYS AND MEANS

Short daily lectures followed by hands-on sessions
The workshop includes individual work (exercises) and team work (case studies)

COORDINATOR

Arnaud Torres

AGENDA

BASIN ANALYSIS — 1 d

Sedimentary basins types, geodynamics and deformation
Hands-on
- Arabian plate borders
- Tectonic inversion backstripping

PETROLEUM SYSTEMS — 1 d

The petroleum trilogy, traps, migration, timing
Hands-on
- Campos basin (Brazil): hydrocarbon potential
- Paris basin: TOC, OM maturity (link w/ unconventional)

SEISMIC INTERPRETATION — 1 d

Structural analysis, Sequence stratigraphy
Hands-on
- North Sea

WELL LOG ANALYSIS — 1 d

Quick look qualitative interpretation
Hands-on
- Well correlation
- Electro-facies determination
- Logs vs. reservoir properties

BASIN POTENTIAL EVALUATION — 1 d

Risk analysis, hydrocarbon potential assessment, prospect definition (ID sheet)
Hands-on
- Backstripping, petroleum system analysis + explo well positioning
- Paris basin: events chart

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 15 - 19	Rueil	2,750 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

E-203

ENGLISH: GEO / PETEX
FRENCH: GEO / FEP

Petroleum Exploration

30 DAYS

PURPOSE

To provide a comprehensive, practical knowledge of petroleum exploration and develop competency needed to contribute actively to petroleum exploration studies in multidisciplinary project teams

AUDIENCE

Geologists, geophysicists, young professionals interested in an intensive training in petroleum exploration

LEARNING OBJECTIVES

- To review exploration workflow and techniques, via an integrated multidisciplinary approach
- To acquire skills in basin assessment and prospect definition

WAYS AND MEANS

Interactive lectures, workshops, and two field trips
The training program is made up of two parts:
- Module 1: Concepts & Tools (cf. E-204)
- Module 2: Basin Assessment & Prospect Definition (cf. E-205)

Kindly refer to these two programs for detailed course content

OBSERVATION

Tuition fees include transport and accommodation costs for field trips

COORDINATOR

Arnaud Torres

AGENDA

MODULE 1: EXPLORATION CONCEPTS & TOOLS (DETAILED PROGRAM: SEE E-204)

INTRODUCTION TO PETROLEUM SYSTEM (FIELD TRIP)	5 d
SEDIMENTOLOGY AND SEQUENCE STRATIGRAPHY (cf. E-212)	5 d
GEOLOGICAL INTERPRETATION OF WELL DATA (FIELD TRIP)	5 d

MODULE 2: BASIN ASSESSMENT & PROSPECT DEFINITION (DETAILED PROGRAM: SEE E-205)

SEISMIC INTERPRETATION WORKSHOP	5 d
PETROLEUM ORGANIC GEOCHEMISTRY AND BASIN MODELING	5 d
PLAY ASSESSMENT & PROSPECT EVALUATION (cf. E-216)	5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 15 - Oct 24	Rueil / 2 field trips	19,100 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

NEW

E-204

ENGLISH: GEO / PETEXMOD1
FRENCH: GEO / FIOUTIPET

PURPOSE

To provide a comprehensive, multidisciplinary knowledge of exploration concepts and tools, and develop a transverse competence in integrated seismic and well log interpretation

AUDIENCE

Geologists, geophysicists, young professionals interested in an intensive training on petroleum exploration techniques

LEARNING OBJECTIVES

- To understand workflows used in exploration to integrate multidisciplinary teams
- To analyze and interpret the structural and sedimentary history of a basin
- To practice use of sequence stratigraphy techniques
- To carry out well log interpretations

WAYS AND MEANS

Hands-on sessions on real case studies
Two field trips

OBSERVATION

This course is included in the 2-part training program "Petroleum Exploration" (E-203)
Kindly refer to the second part which provides a very thorough training in "Basin Assessment and Prospect Definition" (E-205)
Training starts on a Monday in Pau, south-west of France (details will be provided to trainees in due time)
Tuition fees include transport and accommodation costs for field trips

COORDINATOR

Arnaud Torres

Petroleum Exploration - Module 1

15 DAYS

Exploration Concepts & Tools

AGENDA

INTRODUCTION TO PETROLEUM SYSTEM — 5 d

Field trip to south-west of France
Introduction to petroleum exploration
- Introduction to plate tectonics and sedimentary basins
- Basin infilling: a sedimentary rocks review
- Petroleum systems: source, reservoir & seals rocks
- Migration & entrapment processes
- Field analogs with known basins
- Logs and seismic applications

SEDIMENTOLOGY AND SEQUENCE STRATIGRAPHY (cf. E-212) — 5 d

Sedimentology overview: facies analysis and depositional environments
- Main depositional environments
- Clastic rocks (composition, classification, main environments and features)
- Carbonate rocks (composition, classification, main environments and features)

Seismic stratigraphy and Sequence stratigraphy analysis (concepts & case studies)
- Introduction to modern stratigraphy (depositional sequences, system tracks)
- Sequence stratigraphy at basin scale: Impact of sea level variations - Facies distribution
- High-resolution sequence stratigraphy at reservoir scale: Genetic vs. stratigraphic sequences - Sequence analysis of both continental and marine deposits (shallow & deep) - Cross correlation between wells

Stratigraphic modeling of a sedimentary basin

GEOLOGICAL INTERPRETATION OF WELL DATA — 5 d

Fundamentals of log interpretation and concepts
- Review of logging tools, measurements and applications
- Lithological interpretation (Quick Look, X-plots) - Fluids

Structural analysis of well data
- Introduction to borehole imaging and dipmeter data analysis

Sedimentological and stratigraphic analysis of well data
- Basin scale (depositional sequences, well correlations, petroleum systems identification)
- Reservoir scale (facies & stacking pattern analysis, reservoir geometry and quality)

Field trip to Burgundy (3 days)
- This field trip will present stratigraphic sequences and carbonate facies
- This outcrop will be an excellent analogue to the data used during the carbonate workshop, for facies correlation at basin scale and reservoir scale lateral variation
- Logs facies and sequences will be directly observed on outcrops

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 15 - Oct 03	Rueil / field trip	10,860 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

NEW

E-205

ENGLISH: GEO / PETEXMOD2
FRENCH: GEO / EVALBAS

PURPOSE

To develop a transverse competence in integrated basin assessment and prospect definition studies

AUDIENCE

Geologists, geophysicists, young professionals interested in an intensive training basin assessment

LEARNING OBJECTIVES

- To understand workflows used in exploration by multidisciplinary teams
- To integrate concepts and techniques efficiently in the process of assessing the potential of a basin
- To determine exploration targets using basin modeling techniques
- To define prospects with related risks and uncertainties

OBSERVATION

This course is included in the 2-part training program "Petroleum Exploration" (E-203) Kindly refer to the first part which provides a very thorough training on "Exploration Concepts & Tools" (E-204)

COORDINATOR

Arnaud Torres

Petroleum Exploration - Module 2

15 DAYS

Basin Assessment & Prospect Definition

AGENDA

WORKSHOP ON FUNDAMENTALS OF SEISMIC INTERPRETATION — 5 d

Presentation of the geological and geophysical framework (case studies)

Structural interpretation workshop

Well-to-seismic calibration, synthetic seismogram generation and reservoir horizons identification
Reservoir geometry interpretation (fault and horizon picking, correlation and mapping)
QC and uncertainties assessment
Time-to-depth conversion and/or imaging with velocity model building
T/D QC and comparison
Structural prospect analysis (trapping, reservoir extension, uncertainties and risk assessment)

Stratigraphic interpretation workshop

Interpretation of sedimentary features, unconformities, sequence identification and picking
Amplitude and seismic attributes analysis (DHI, gas shadows, neural network and reservoir properties analysis)
Seismic facies analysis
Inversion, porosity analysis and interpretation
Channels delineations and interpretation – Geological features (salt dome, chalk & karstic effects)
Sedimentary prospect analysis

Synthesis and conclusions

Wrap-up session

PETROLEUM ORGANIC GEOCHEMISTRY AND BASIN MODELING — 5 d

Geochemistry

Applications of geochemical analysis to basin evaluation
- Hydrocarbon formation and occurrences (composition and origin)
- Geochemical and optical analysis of kerogens (RockEval analysis)
- Kinetics of hydrocarbons formation (modeling parameters)
- Reservoir geochemistry

Basin modeling

Data synthesis and modeling parameter selection
- Parameter sensitiveness and related uncertainty
- Geometry and links with sedimentary basins geodynamics
- Basin thermal history - Pressure and overpressure modeling
- Maturation and expulsion - Migration of hydrocarbons and uncertainty analysis

PLAY ASSESSMENT & PROSPECT EVALUATION (cf. E-216) — 5 d

Play assessment

Basin potential assessment
Regional context - Petroleum trilogy, Entrapment
Relative timing of events

Prospect analysis and evaluation

Source rock potential
Cross correlation & integration with seismic data
Structural history & Timing of HC expulsion and Migration
OHIP calculation parameters - Estimation of uncertainties
Uses of prospect evaluation - Transition to dynamics and economics

Risk analysis

Definition of risks and uncertainties
Probability of success - Consequences for economics

Basics in economy of exploration

Definitions and notions
Economic studies during exploration stage - Probability of success

Exploration prospect conversion in potential reservoir

Well potential productivity assessment
Potential Field Development Plan
Anticipated production profiles

Summary, general conclusion and wrap-up

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 06 - 24	Rueil	9,050 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

E-211

ENGLISH: GEO / STRUCT

Structural Analysis and Modeling

5 DAYS

PURPOSE

To provide an in-depth knowledge of key elements that characterize the structural style of a sedimentary basin

AUDIENCE

Petroleum exploration geoscientists, multidisciplinary-team managers

LEARNING OBJECTIVES

- To identify the structural style of a petroleum area
- To grasp issues of tectonic evolution versus petroleum system

COORDINATOR

Arnaud Torres

AGENDA

PLATE TECTONICS AND COEVAL STRUCTURAL STYLES — 1 d

Earth structure and global dynamics
Extensional regimes: from continental breakup to oceanic accretion
Compressional regime at plate boundaries: accretionary prisms and foreland fold-and-thrust belts
Oblique convergence and strain partitioning

EXTENSIONAL AND COMPRESSIONAL DEFORMATIONS AND COEVAL STRUCTURAL TRAPS — 1 d

Rifting and development of extensional traps (field - seismic examples and analog modeling)
Foreland inversion features and related traps (field - seismic examples and analog modeling)
Salt tectonics and related traps: geometries and case studies (seismic data and analog modeling)
Wrench faulting and related traps
Mobile belt: quantitative analysis of uplifts and erosions and dynamics of thrust propagation
Regional case studies and relations with petroleum system

RELATIONSHIP BETWEEN GEOLOGICAL STRUCTURE AND SEDIMENTARY PROCESSES — 1 d

Geodynamic controls on sedimentation
Synrift sedimentation and its tectonic-paleo-environmental controls
Passive margin development and its eustatic-geodynamic controls
Synflexural sedimentation in foreland-foredeep areas
Syntectonic (syn-kinematic) sedimentation in foothills areas
Fore-arc and back-arc volcano-clastic sedimentation

EXPLORATION AND DEVELOPMENT PROBLEMS ASSOCIATED WITH STRUCTURAL STYLES — 1 d

Overall distribution of fractures as a result of paleo-stress and present-day direction of principal stress
Folding mechanisms and styles, impact on fractures distribution
Faults acting as conducts or seals
Drainage areas, migration pathways and timing of petroleum systems
Seal efficiency and time of residence of hydrocarbons in structural traps

STRUCTURAL MODELING — 1 d

Section balancing, back-stripping: objectives and principles
Structural modeling: presentation and dedicated software
Forward structural modeling: presentation and application with various software packages
Geomechanical modeling: application to fractured reservoirs. Software presentation

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Petroleum Basin & Exploration

E-212

ENGLISH: GEO / STRATI
FRENCH: GEO / STRATSEQ

Sedimentology & Sequence Stratigraphy

5 DAYS

PURPOSE

To provide a practical, comprehensive understanding of new concepts and methods applied in stratigraphy, sedimentology and sequence stratigraphy analysis

AUDIENCE

Geoscientists, multidisciplinary-team managers

LEARNING OBJECTIVES

- To grasp fundamentals of main depositional environments
- To understand and use sequence stratigraphy concepts and methods
- To identify sequences on seismic lines
- To interpret cores and log data with regard to sequence stratigraphy

PREREQUISITE

Course requires a good grasp of fundamentals in stratigraphy and in sedimentology

WAYS AND MEANS

Lectures, exercises, hands-on sessions on real case studies

COORDINATOR

Arnaud Torres
Claude Bacchiana (former Exxon Mobil)

AGENDA

STRATIGRAPHY - SEDIMENTOLOGY - MAIN DEPOSITIONAL ENVIRONMENTS — 1 d

Review of basic concepts in stratigraphy and sedimentology
Alluvial, fluvial, deltaic, shallow & deep marine facies models
Facies classification and related petrophysical characteristics

SEISMIC SEQUENCE STRATIGRAPHY AT BASIN SCALE — 2.5 d

Historical concept of depositional sequences and system tracts
Interpretation methodology both for clastics and carbonate facies
Prediction of potential source rocks & reservoirs location
Application to seismic interpretation
State-of-art overview of sequence stratigraphy

HIGH-RESOLUTION SEQUENCE STRATIGRAPHY AT RESERVOIR SCALE — 1 d

Identification of genetic sequences
Correlation by analysis of stacking patterns
Interpretation: exercises based on outcrop analogues and field studies

OVERVIEW OF TRATIGRAPHIC MODELING — 0.5 d

Interactive demo on Dionisos™ modeling software

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 22 - 26	Rueil	2,900 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

E-213

ENGLISH: GEO / GEOCHIM

Petroleum Organic Geochemistry: from Kerogen to Reservoir

5 DAYS

PURPOSE

To provide an understanding of various geochemical techniques, leading to the evaluation of sedimentary basin hydrocarbon potential and identification of hydrocarbon migration pathways

AUDIENCE

Geologists, geophysicists or geochemists involved in petroleum potential evaluation or in reservoir management

LEARNING OBJECTIVES

- To review in depth analytical and modeling methods
- To interpret geochemical data gathered with today's techniques
- To assess correctly the value of geochemical data
- To evaluate the potential and maturity of a source rock

WAYS AND MEANS

Several exercises and case studies

COORDINATOR

Arnaud Torres

AGENDA

PETROLEUM FORMATION AND OCCURRENCES — 1 d

Petroleum system definition
Nature and origin of fossil hydrocarbons
Source rocks
Oil and gas generation
Expulsion and migration

GEOCHEMICAL AND OPTICAL ANALYSIS OF KEROGENS — 1 d

Rock Eval analysis
Significance and interpretation of Rock Eval parameters
Application to basin analysis and to oil and gas exploration
Optical analysis of kerogens: methodology and applications
Regional case studies

KINETICS OF HYDROCARBON FORMATIONS — 1 d

Kinetic models and parameters
Introduction to a software for quantification of hydrocarbon generation and expulsion in a basin
Benefits for petroleum exploration

APPLICATIONS OF GEOCHEMICAL ANALYSIS TO BASIN EVALUATION — 1 d

Current procedures for oil analysis
Oil / source-rock correlations, Bio-markers
Prospect assessment
Regional case studies (geochemical risk)

RESERVOIR GEOCHEMISTRY — 0.5 d

Parameters controlling the fluid composition
Distribution and degradation of oils
Characterization of heavy oils and tar mats
Regional case studies

UNCONVENTIONAL HYDROCARBONS — 0.5 d

Shale gas, shale oil
Coal Bed Methane (CBM)
Tight gas, tight oil
Other non-conventional resources

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Petroleum Basin & Exploration

E-216

ENGLISH: GEO / PLAY
FRENCH: GEO / PROSP

PURPOSE

To provide a practical, comprehensive understanding of that part of the E&P value chain that deals with the technical evaluation of an exploration asset

AUDIENCE

Geoscientists, technical or non-technical managers interested in prospect assessment

LEARNING OBJECTIVES

- To understand the workflow used to define a prospect
- To estimate and manage OHIP parameters
- To understand risks and uncertainties
- To master method of OHIP calculation
- To make use of results deduced from HCIP calculation
- To review fundamental concepts of portfolio management
- To understand exploration strategies

COORDINATOR

Arnaud Torres

Play Assessment & Prospect Evaluation

5 DAYS

AGENDA

EXPLORATION PROSPECT CONVERSION IN POTENTIAL RESERVOIR — 1 d

Well potential productivity assessment
Potential Field Development Plan
Anticipated production profiles

PLAY ASSESSMENT — 1 d

Data collecting
Basin potential assessment
Regional context - Petroleum trilogy
Trapping
Relative timings of events

PROSPECT ANALYSIS & EVALUATION — 2 d

Source rock estimation
Seismic and well data interpretation
Cross correlation & integration with seismic data
Structural history & Timing of HC expulsion and Migration
Exploration maturity status significance
OHIP calculation parameters - Evaluation of uncertainties
Assessment consistency
OHIP determinist and stochastic assessment
“Prospect sheet” generation
Uses of the prospect evaluation
Transition to dynamics and economics

RISK ANALYSIS — 1 d

Definition of risk and uncertainties
Geological risks (reservoir, trap, HC conservation)
Fluid content risks (source rock, maturation, migration, timings)
Probability of success - Consequences for economics

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 20 - 24	Rueil	3,050 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

E-217

ENGLISH: BAS / PROSPECT

From Prospect to Development: an Integrated Approach

10 DAYS

PURPOSE

To provide the knowledge and skills required to assess and move forward with field studies; from discovery, through appraisal, and on to development, always looking for the best scenario of all

AUDIENCE

Geologists, geophysicists, reservoir engineers

LEARNING OBJECTIVES

- To acquire knowledge on methodology for defining a prospect
- To apply exploration workflow leading to a prospect definition
- To assess probability of success
- To understand the link between the exploration phase leading to the discovery well and the field development phase
- To learn how to evaluate a field at each step of appraisal and final development
- To acquire practical knowledge of both appraisal and development workflows using a real case study

COORDINATOR

Arnaud Torres

AGENDA

WEEK 1: BASIN ANALYSIS TO PROSPECT EVALUATION - FROM PLAY TO PROSPECT

INTRODUCTION TO PETROLEUM SYSTEM & BASIN ANALYSIS — 5 d

The participants are going to complete a mini-project on a real case study
From a seismic line, the participants carry out a short basin analysis using log data
They will have to elaborate the “plays” existing in this basin and then proceed to the prospect analysis
Basin potential assessment
Regional context - Petroleum trilogy
Play definition

RISK ANALYSIS

Geological risk (reservoir, trap, HC conservation) Fluid content risk (Source rock, maturation, migration, timings)
Probability of success - Consequences for economics

BASIN ASSESSMENT AND PROSPECT EVALUATION

Assessing the potential of basin
- Petroleum trilogy
- Traps

Timing of migration versus trapping
- Seismic interpretation
- Well data interpretation
- Cross correlation & integration with seismic data

Prospect definition
- OHIP calculation
- Uncertainties

WEEK 2: OIL FIELD DEVELOPMENT - FROM DISCOVERY TO PRODUCTION START

INTRODUCTION TO E&P WORKFLOW — 5 d

General presentation of the different steps of an oil field development project
Reminder of concepts, tools, methods, necessary data to work with and how to reduce inherent subsurface uncertainties
Illustration through a case history (onshore field, light oil)

DISCOVERY

Geological and tectonic context of the field
Seismic interpretation issues
Evaluation of the discovery well. Uncertainties
Proposals for location and program of the first appraisal well

APPRAISAL PHASE

Evolution of subsurface uncertainties (structural maps, OHIP estimations, etc.) with new data from appraisal wells
Updating of the issues after each appraisal well
Definition of data acquisition programs for each well
Date synthesis at the end of the appraisal phase and OHIP estimations

ENGINEERING STUDIES

Estimations of reserves, production profiles through simplified methods and a full field simulation
Estimations of CAPEX, OPEX, technical costs of different development scenarios
Comparison of production forecasts with actual field production history

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - Dec 05	Rueil	5,500 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Petroleum Basin & Exploration

E-218

ENGLISH: BAS / DIONISOS

Stratigraphic Modeling: Basin Architecture & Sediment Distribution

4 DAYS

PURPOSE

To provide an in-depth and practical understanding of stratigraphic modeling in a comprehensive workflow

AUDIENCE

Junior exploration geoscientists, multidisciplinary-team managers

LEARNING OBJECTIVES

- To grasp methodology of sequence stratigraphy
- To understand concepts of stratigraphic evolution
- To understand how allogenic parameters impact basin architecture and sediment distribution
- To evaluate reservoir quality and possible hydrocarbon migration pathways
- To model stratigraphic evolution of a basin using the software program Dionisos™
- To predict reservoir distribution and geometry
- To learn about interpretation of all types of geological data
- To assess efficiently the stratigraphic architecture of a sedimentary basin

WAYS AND MEANS

Hands-on training sessions on workstation
Use of the software program DIONISOS™
Exercises and reports to launch questions and discussions at the end of the course

COORDINATOR

Arnaud Torres

AGENDA

SEQUENCE STRATIGRAPHY ANALYSIS — 0.5 d

Depositional system concepts
Walther's law
Well log date
Seismic data
Sequence stratigraphy analysis workflow

STRATIGRAPHIC PARAMETERS — 0.5 d

Presentation of allogenic parameters through the use of Dionisos™ software
Sensitivity analysis exercises with Dionisos™

ACCOMMODATION AND SHORELINE SHIFTS — 1 d

Accommodation concept
Shoreline trajectories
Subsidence
Sediment supply
Demo and exercises with Dionisos™

SEISMIC AND WELLS ANALYSIS — 1 d

Stratigraphic surfaces
Systems tracts
Demo and exercises with Dionisos™

MODELING LOOP — 1 d

Links between stratigraphic modeling and basin modeling
Questions and discussion
Exercises with Dionisos™

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Petroleum Basin & Exploration

E-219

ENGLISH: BAS / TEMIS

Basin Modeling: Thermicity, Maturation & Migration

5 DAYS

PURPOSE

To provide an in-depth and practical understanding of thermal basin modeling in a comprehensive workflow; including modeling of oil maturation and hydrocarbon migration, and leading to the assessment of hydrocarbon potential of an exploration block or a prospect

AUDIENCE

Junior petroleum exploration geoscientists, multidisciplinary-team managers

LEARNING OBJECTIVES

- To understand source rock maturation and hydrocarbons generation
- To assess most significant basin modeling parameters
- To construct a regional basin model with TEMIS1D™
- To understand hydrocarbon migration processes with TEMIS2D™
- To evaluate the hydrocarbon potential of a given area

WAYS AND MEANS

Afternoon sessions are devoted to case studies based on non-proprietary data provided by IFP
Use of the software programs TEMIS1D™ and TEMIS2D™, maximum 2 participants per workstation
By the end of each afternoon, participants generate short reports which are assessed the following day
Participants have the alternative of using their own data
Upon request, the course can make use of a company's regional dataset, provided the latter is made available in advance

COORDINATOR

Arnaud Torres

AGENDA

SEDIMENTARY BASIN MODELING THROUGH OUT TIME — 1 d

AM: lectures
Basin types (rift, margin, foreland, etc.)
Subsidence versus time
Compaction, back stripping
PM: exercises, introduction to Temis1D™, subsidence curve calculation

THERMAL HISTORY — 1 d

AM: lectures
Modes of heat propagation: conduction, convection and advection
Transient thermal regimes and blanketing effects of sedimentary covers
Calibration of heat flow for present and past thermal state
PM: exercises in Temis1D™, influence of the heat flow, surface temperature, conductivity

MATURATION AND EXPULSION — 1 d

AM: lectures
Source rock (type, rock-eval data…)
Kerogen cracking, kinetic parameter determination
Secondary cracking
Paleo-thermometers (organic, fission track, fluid inclusions…)
PM: exercises in Temis1D™, influence of the kinetic parameters

HYDROCARBONS MIGRATION — 2 d

AM: lectures
Migration principles
Definition of lithologies in basin modeling
Archimedes force, capillary pressure
PM: introduction to Temis2D™, exercises in Temis2D™, influence of the parameters
AM: lectures
Oil and gas
PVT and chemical composition
Velocity of hydrocarbon migration
PM: exercises in Temis2D™, influence of parameters

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Petroleum Basin & Exploration

E-220

ENGLISH: BAS / STRATADV

Seismic and Sequence Stratigraphy for Oil & Gas Exploration

10 DAYS

PURPOSE

To provide, through daily practical exercises and an integrated project, a thorough and very practical understanding of seismic and sequence stratigraphy for oil and gas exploration

AUDIENCE

Geologists, geophysicists, production managers and engineers involved in exploration or reservoir characterization

LEARNING OBJECTIVES

- To grasp structure of workflows
- To understand the use of sequence stratigraphy as a tool in basin exploration
- To ensure accurate stratigraphic breakdown of well data
- To make use of a full set of data including well logs, biostrat information, and 2D lines in an integrated project

WAYS AND MEANS

The most important elements to be considered in this process are: accurate stratigraphic breakdown of well database and stratigraphic data loading both into the well and the seismic databases

COORDINATOR

Arnaud Torres

AGENDA

SEQUENCE STRATIGRAPHY CONCEPTS AND METHOD — 1 d

Shelfal accommodation space. Tectonic, eustatic and sediment control on the stratal and facies stacking pattern of depositional sequences
Practical palaeontology
- Establishment of a chronostratigraphic framework to support well and seismic correlation
- Precise definitions of palaeoenvironments and water depths in order to predict reservoir facies

WELL LOG AND SEISMIC RESPONSES OF LOWSTAND SYSTEMS TRACTS — 1 d

LST sequence boundaries, slope fans, basin floor fans and prograding complexes
TST & HST basin starvation, source rock and reservoir seal
Biostratigraphic signature of lowstand versus transgressive / highstand systems tracts
Hierarchy of stratigraphic cycles

WELL LOG/SEISMIC RESPONSES OF NERITIC SYSTEMS TRACTS — 1 d

LST sequence boundaries, incised valley and lowstand prograding complex
TST & HST stratal and facies stacking pattern
HST alluvial, deltaic, shoreline complexes and shelf sands
Biostratigraphic signature of transgressive and highstand systems tracts
Relationship of stratigraphic patterns to changes in subsidence rates as driven by regional and earth scale tectonic processes

WELL LOG/SEISMIC RESPONSES OF NERITIC SYSTEMS TRACTS (ALLUVIAL PLAIN TO DELTA FRONT) — 1 d

LST sequence boundaries, incised valleys, major unconformities and prograding complexes
TST incised valley fill, shelfal aggradation
HST alluvial, deltaic, shoreline complexes
Stratal and facies stacking pattern in the alluvial plain
Forestepping sequences and major unconformities as driven by regional and earth scale tectonic processes

WELL LOG/SEISMIC RESPONSES OF NERITIC SYSTEMS TRACTS (SILICICLASTIC SHELF) — 1 d

LST sequence boundaries, incised valleys, major unconformities and prograding complexes
TST in shelfal environment (log-to-core scale)
HST in shelfal environment (log-to-core scale)
Stratal and facies stacking pattern in a siliciclastic shelfal system
Biostratigraphic signature
Hierarchy of stratigraphic cycles
Exploration & production consequences and related strategies

DATA INTEGRATION — 5 d

Interpretation of a set of wire line logs covering the Mesozoic-Cenozoic succession to tie
Transgressive / regressive facies cycles and unconformity surfaces. A quantitative paleontological datasets is used to aid in determining maximum flooding surfaces, peak transgression and unconformities
Interpretation of a regional basin-scale seismic lines tied to the wells. Mapping of various potential reservoir intervals
Data integration: Exploration & Production consequences and related strategies

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences
Petroleum Basin & Exploration

E-221

ENGLISH: BAS / UNCONV

Hydrocarbons in Unconventional Settings (the Geology Perspective)

3 DAYS

PURPOSE

To provide, through a "petroleum system" approach, a general introduction to various non-conventional hydrocarbons, focused solely on a consistent geological rationale to the different potentially producing objectives

AUDIENCE

Geologists, geophysicists, engineers, managers, E&P professionals in charge of basin exploration and prospect evaluation
E&P professionals involved in production of unconventional hydrocarbons

LEARNING OBJECTIVES

- To understand the geological rationale of unconventional resources as an extension of the petroleum system concept
- To acquire a general knowledge of all unconventional resources

AGENDA

PETROLEUM SYSTEM CONCEPT (A REMINDER) — 0.5 d

UNCONVENTIONAL RESOURCES (PART I) — 1 d

Oil shales
Heavy oils, extra heavy oils, tar sands
Geological biogenic gases (ex-early diagenesis, ex-oil biodegradation)
Gas hydrates
"Clean Coal" (coal bed methane, coal mine methane, underground coal gasification)

UNCONVENTIONAL RESOURCES (PART II) — 1 d

Shale plays (shale gas, shale oil)
Tight gas in basin centered gas system

UNCONVENTIONAL RESOURCES FROM AN EXTENDED PETROLEUM PERSPECTIVE — 0.5 d

Burial & thermal history - Source rock maturation
Kinetic parameter determination, kerogen expulsion and cracking
Migration of hydrocarbons & pressure regime

COORDINATOR

Arnaud Torres

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	02 - 04 Juin	Rueil	1 950 €	GRE	gre.rueil@ifptraining.com

Geosciences
Reservoir Geology

E-250

ENGLISH: RES / RCM

RCM
Reservoir Characterization & Modeling

40 DAYS

PURPOSE

To develop advanced skills in reservoir characterization and modeling through an intensive, practical learning experience, focused on building the bridge between geological characterization and dynamic behavior, and delivered by means of hands-on training with teamwork and fieldtrips

AUDIENCE

Geologists involved in reservoir characterization and modeling studies

LEARNING OBJECTIVES

- To build a reliable geological model in which all heterogeneities that can affect production are integrated
- To model clastic, carbonate and fractured reservoirs

WAYS AND MEANS

Important part of the intensive training is dedicated to teamwork, case studies, fieldtrips, and hands-on workshops
Use of dedicated softwares

OBSERVATION

A specific brochure for this program is available on request
Course fees include all accommodation and transportation during field trips (including travel between Paris and field-trip locations)

COORDINATOR

Raphaël Lalou

AGENDA

RESERVOIR CHARACTERIZATION STUDIES: OVERVIEW — 20 d

Sequence of courses/exercises which review principles and stages leading to the construction of a geological model

- Geophysics: interpretation of horizons, fault network and seismic attributes
- Petrophysics: logs interpretation (porosity, saturation and lithology) and rock-typing
- Stratigraphic sequences
- Fractured reservoirs
- Heterogeneities and fluid-flow
- Geostatistics

Dynamics data (Well test interpretation, up-scaling & history matching)
Specific emphasis will be given to the integration of data from different sources and different scales (e.g. geology, seismic, well logs, cores, PVT, production history) in order to integrate at the end reservoir heterogeneities on reservoir models

RESERVOIR MODELING: TEAM WORK & CASE STUDIES — 10 d

Team-work on two case-studies
Integration of data analysis, structural modeling, rock-typing, geostatistics
Static models construction, sedimentary facies models, petrophysical models, using both deterministic and stochastic methods; integration of seismic and dynamic constraints
Identification of key heterogeneities and quantification of uncertainties
Up-scaling of petrophysical models for fluid flow modeling and reservoir simulation
Two field cases will be used all along the program to highlight stakes of geological reservoir modeling

Clastic environment: A geological model on clastic environment will be built using dedicated software (Petrel™), after field trip on clastic environment.
Carbonate environment: A geological model on carbonate environment will be built using dedicated software (Petrel™), after field trip on carbonate environment

FIELD TRIPS — 10 d

Three field trips with outcrop observations related to reservoir unit in sub-surface conditions (analogs)

- **Clastic environment:** The first field trip will be carried out in the South of France, in the Lodève basin. Participants will carry out exercises using data from cores and outcrops. The topic "reservoir in petroleum basin context" will be also investigated. After the fieldtrip, a geological model on clastic environment will be built on computer
- **Carbonate environment:** During the second field trip, in the Burgundy region, stratigraphic sequence and carbonate facies changes will be presented. Participants will have an opportunity to look at a carbonate reservoir which is an analog of the reservoir of a producing field located in the Paris basin. This field will be used as a "field case study" during the geomodeling exercise on workstation
- **Dynamic/static relationship:** The third field trip will be conducted on a site equipped with aquifer drilling (Poitiers region). Participants will observe dynamic interferences, with the aim to study the dynamic behavior of a reservoir

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	15 Sept - 07 Nov	Rueil / 3 field trips	25 600 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-252

ENGLISH: RES / RESGEOL

RCM / Reservoir Engineering - Module 1

20 DAYS

Reservoir Geology

PURPOSE

To provide a very comprehensive understanding of reservoir characterization and geological model building-process, linking all along geological characterization and dynamic behavior

AUDIENCE

Geophysicists, geologists and reservoir engineers involved in integrated reservoir studies

LEARNING OBJECTIVES

- To assess and use required data for reservoir characterization
- To understand objectives of integrated reservoir studies
- To grasp various constraints of the reservoir model
- To master different stages in the building of a geological model
- To assess sedimentary and tectonic reservoir heterogeneities
- To determine whether to take into account some heterogeneities in the model
- To evaluate the hydrocarbons in place from a reservoir model

WAYS AND MEANS

Field trip to Lodève
Practical case studies
Use of dedicated softwares

OBSERVATION

Course fees include round trip (by train) between Paris and Lodève, as well as accommodation and transportation in and around Lodève

COORDINATOR

Raphaël Lalou

AGENDA

BASIC PRINCIPLES AND RESERVOIR CHARACTERIZATION WORKFLOW — 1 d

Introduction and objectives

GEOPHYSICS AND RESERVOIR GEOPHYSICS — 3 d

Structural seismic interpretation
Principles of seismic attributes interpretation
Reservoir geophysics
Hands-on workshop on seismic interpretation with dedicated software

PETROPHYSICS — 2 d

Core data, porosity, permeability, saturation, wettability
Capillary pressure
Data consistency
Laboratory procedures and measurements

WELL LOGGING AND LOG INTERPRETATION — 3 d

Basic log interpretation concepts
Principle and limitation of logging tools
Qualitative log interpretation (lithology, Vsh, porosity, saturation)
Petrophysical quality control, uncertainties, cut offs
Pressure measurement applications

RESERVOIR CHARACTERIZATION — 4 d

Static and dynamic approaches
Reservoir architecture
Stratigraphy and sequence stratigraphy
Rock-typing
Geostatistics
Heterogeneities

FIELD TRIP ON CLASTIC RESERVOIR — 4 d

Field trip in the South of France, in the Lodève basin
Sequence stratigraphy concepts (courses/exercises)
Petroleum system
Clastic environment
Tectonics and sedimentary heterogeneities
After the fieldtrip, a geological model on clastic environment will be built using dedicated software (Petrel™)

GEOLOGICAL MODELING AND CALCULATION O.H.I.P — 3 d

Geomodeling with dedicated software
OHIP estimation. Uncertainties

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 15 - Oct 10	Rueil / field trip	12,850 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-255

ENGLISH: RES / RESGEOLADV

RCM - Module 2

Advanced Reservoir Geology

20 DAYS

PURPOSE

To provide an intensive, practical learning experience in advanced reservoir geology and geological modeling

AUDIENCE

Geophysicists, geologists and reservoir engineers involved in integrated reservoir studies

LEARNING OBJECTIVES

- To understand all stages of the characterization of a field in preparation for modeling
- To learn about electro-facies analysis technics
- To understand specificities of complex reservoirs
- To assess impact of reservoir complexity on dynamic behavior and on modeling
- To build digital geomodels
- To acquire a thorough understanding of dynamic modeling, simulation, history matching and well testing
- To practice dynamic modeling

PREREQUISITE

RCM Module 1 or several years of experience as geologist in the petroleum industry

WAYS AND MEANS

Field trips to Dijon and Poitiers
Practical case studies
Use of dedicated softwares

OBSERVATION

Course fees include travel (by train) between Paris, Dijon, and Poitiers, as well as accommodation and transportation in and around Dijon, and Poitiers

COORDINATOR

Raphaël Lalou

AGENDA

FRACTURED RESERVOIR — 3.5 d

Workflow for fractured reservoirs characterization and modeling
Fractured reservoir modeling using dedicated software (Fraca Flow™)

WORKSHOP – RESERVOIR CHARACTERIZATION AND MODELING — 6.5 d

Electro-facies, rock-typing
Conceptual models: sedimentological, stratigraphic, diagenetic and fracture
Reservoir geophysics
Well correlations
Geostatistics
Facies modeling
Petrophysical characteristics and modeling
Hydrocarbon volume calculation
During this workshop, dedicated software will be used

PETROPHYSICS — 1 d

Core data, Porosity, Permeability, Saturation, Wettability, Capillary pressure
Data consistency
Laboratory measurements and procedures

RESERVOIR STUDIES ON OUTCROPS - FIELD TRIP — 5 d

Two field trips

Carbonate platform – Sedimentology, stratigraphy, diagenesis and fractures. This field is located in the Burgundy region. Participants will have an opportunity to look at a carbonate reservoir as an analog of the reservoir of a producing field located in the Paris basin. This field will be used as a "field case study" during the geomodeling exercise on workstation

Dynamic/static relationship: this field trip will be conducted on a site equipped with aquifer drilling (Poitiers region). Participants will to observe dynamic interferences, with the aim to study the dynamic behavior of a reservoir

DYNAMICS — 2 d

Introduction to simulation
History matching
Well tests

UNCERTAINTIES — 1.5 d

Quantify uncertainties using dedicated software

CONCLUSIONS — 0.5 d

Wrap-up session on RCM Training

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 13 - Nov 07	Rueil / 2 field trips	14,100 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-261

ENGLISH: RES / GEOMODEL

Geological Modeling Workshop for Integrated Reservoir Studies

5 DAYS

PURPOSE

To provide the knowledge and develop the skills needed in geological modeling for integrated reservoir studies

AUDIENCE

Geophysicists, geologists and reservoir engineers involved in integrated reservoir studies

LEARNING OBJECTIVES

- To understand the objectives of integrated reservoir studies
- To review all stages in the construction of a geological model
- To use a geomodeling software
- To understand geostatistical methods used for the static model
- To cross-check modeling results
- To learn about methods for assessing hydrocarbons in place in reservoirs

WAYS AND MEANS

Workshop on case study using dedicated modeling softwares

COORDINATOR

Raphaël Lalou

AGENDA

BASIC PRINCIPLES AND RESERVOIR CHARACTERIZATION WORKFLOW — 0.5 d

Introduction and objectives
Case study: field presentation

PROJECT ORGANIZATION — 0.5 d

Define project
Data QC and synthetic table
Data management
Loading general well data
Manipulate scripts and Excel™ macro

STRUCTURAL MODELING — 1.5 d

Structural context
Well correlation and stratigraphic data analysis
Constraining static model with dynamic data
Surface generation
Horizon picking and seismic fault network
Layering
Structural modeling
Mapping reservoir structures
Checking results

ROCK-TYPING AND MODELING — 1.5 d

Log upscaling and comparison with rock-typing
Facies modeling
Petrophysical modeling
Mapping gross thickness, NTG maps and reservoir properties for QC results

VOLUME COMPUTATION AND UNCERTAINTIES — 1 d

Calculate a volumetric accumulation for a selection of parameters
Sensitivity of different parameters
Determine key parameters for risk assessment

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 02 - 06	Rueil	3,100 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-262

ENGLISH: RES / INICARB

Introduction to Carbonate Reservoir Characterization

5 DAYS

Organized in collaboration with Cambridge Carbonate Ltd

PURPOSE

To provide essential information on how one can describe carbonates from cores/ outcrop analogues, logs, and seismic; and, ultimately, integrate data for reservoir characterization and static modeling

AUDIENCE

Geologists, geophysicists, petrophysicists, reservoir engineers

LEARNING OBJECTIVES

- To review steps one must follow to characterize carbonate reservoirs and build a static geological and petrophysical model
- To understand carbonate sedimentology and sequence stratigraphy
- To understand carbonate diagenesis and its significant impact on pore-space
- To review Phi-K properties of carbonates (dual or triple pore systems) and ways of acquiring the data
- To learn about rock-typing processes integrating sedimentology and petrophysics data

WAYS AND MEANS

Several practical exercises and workshops with core photos, thin section photos, log data, Phi/K data, seismic data

COORDINATOR

Raphael Lalou
Benoît Vincent (Cambridge Carbonate Ltd)

AGENDA

INTRODUCTION TO CARBONATES — 0.25 d
Exploration history, key concepts, carbonates vs. clastics

DESCRIPTION OF CARBONATE SYSTEMS — 1 d
Carbonate and evaporites mineralogy and components
Classifications
Carbonate platforms: types, controls on depositions, depositional environments

CARBONATE FACIES ANALYSIS — 0.75 d
Typical workflow
Applications

SEQUENCE STRATIGRAPHY — 1.25 d
Principles
High resolution sequence stratigraphy in carbonates
Typical workflow
Applications

DIAGENESIS — 1.25 d
Introduction and definitions
Diagenetic potential
Pore-space
Diagenetic processes, products and realms
Dolomite
Methods of study
Applications

SEISMIC EXPRESSION OF CARBONATES
MATRIX RESERVOIR PROPERTIES - ROCK-TYPING
DUAL POROSITY RESERVOIRS — 0.5 d

REAL INTEGRATED CASE STUDY: ILLUSTRATION OF A COMPLETE WORKFLOW

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 12 - 16	Rueil	3,050 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-263

ENGLISH: RES / ADVCARB

Advanced Carbonate Reservoir Characterization

5 DAYS

Organized in collaboration with Cambridge Carbonate Ltd

PURPOSE

To deepen understanding of ways and means for describing carbonates from cores/outcrop analogues, logs, and seismics; and, ultimately, integrating data efficiently for reservoir characterization and static modeling

AUDIENCE

Experienced geologists, geophysicists, petrophysicists, reservoir engineers

LEARNING OBJECTIVES

- To assess steps followed to characterize carbonate reservoirs and build a static geological and petrophysical model
- To appreciate the contribution of carbonate sedimentology and sequence stratigraphy to the model
- To assess the significant impact of carbonate diagenesis on pore-space
- To understand the complexity of carbonates' Phi-K properties and link geological observations and petrophysics
- To review about rock-typing processes integrating sedimentology and petrophysics data
- To develop skills in building efficient workflows for carbonates reservoir characterization

WAYS AND MEANS

Several practical exercises and workshops with core photos, thin section photos, log data, Phi/K data, seismic data

COORDINATOR

Raphael Lalou
Benoît Vincent (Cambridge Carbonate Ltd)

AGENDA

INTRODUCTION TO CARBONATES — 0.25 d
Exploration history, key concepts, carbonates vs. clastics

DESCRIPTION OF CARBONATE SYSTEMS — 0.75 d
Carbonate and evaporites mineralogy and components
Classifications
Carbonate shelves: types, controls on depositions, depositional environments

CARBONATE FACIES ANALYSIS — 0.5 d
Typical workflow
Applications

SEQUENCE STRATIGRAPHY — 1 d
Principles
High resolution sequence stratigraphy in carbonates
Typical workflow
Applications

DIAGENESIS — 1.25 d
Introduction and definitions
Diagenetic potential
Pore-space
Diagenetic processes, products and realms
Dolomite
Methods of study
Applications

SEISMIC EXPRESSION OF CARBONATES — 1.25 d
MATRIX RESERVOIR PROPERTIES - ROCK-TYPING
DUAL POROSITY RESERVOIRS
FLUID FLOW UNITS

REAL INTEGRATED CASE STUDY: ILLUSTRATION OF A COMPLETE WORKFLOW

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 23	Rueil	3,200 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-264

ENGLISH: RES / NATFRAC

Naturally Fractured Reservoirs: from Analysis and Modeling to Reservoir Simulation and Field Development

5 DAYS

PURPOSE

To provide a practical understanding of methods used to characterize integrated static and dynamic data from naturally fractured fields and build fracture models
Developed over the past 20 years in some 100 studies, these methods have been applied by IFP's experts for different types of reservoir around the world

AUDIENCE

Reservoir engineers and geoscientists involved in development or management of naturally fractured reservoirs

LEARNING OBJECTIVES

- To characterize an oil field fractured network using various data sources (cores, logs, seismic, drilling, well tests)
- To define fracture types
- To sum up fracture analyses, and conceive a conceptual model
- To build a Discrete Fracture Network integrating small- and large-scale components (joints, fault-related fractures and fracture swarms)
- To calibrate a 3D fracture model through flowmeter and transient well test simulations
- To select the most appropriate porosity formulation: single or dual
- To simulate a full field model
- To learn about oil recovery mechanisms and ways to simulate them

WAYS AND MEANS

Hands-on sessions, case studies, videos
Training content and delivery entrusted to one reservoir engineer and one reservoir geologist; two experts from the IFP Group with an extensive experience in fractured reservoir characterization and modeling

COORDINATOR

Raphaël Lalou

AGENDA

FRACTURED RESERVOIRS: IDENTIFICATION AND SPECIFICITY — 1 d

Objectives for dynamic model
Workflow for characterization using both static and dynamic data
Definition and scales of natural fractures
Parameters for fracture network description
Static characterization at borehole scale (logs, cores, borehole images)
Hands-on: exercises & case studies

FRACTURED RESERVOIRS STATIC CHARACTERIZATION — 1 d

Fracture analysis from borehole scale data
Fracture analysis from interwell scale data (outcrop, geomechanical model, seismic data)
Fault and subseismic fault networks
Data synthesis on a summary document
Conceptual models
Hands-on: exercises & case studies

FRACTURE MODELING — 0.5 d

Discrete fracture network building (DFN - 3D Model) integrating both large-scale (fault-related fractures and fracture swarms) and small-scale fractures (joints)
Principles to determine fracture length and hydraulic conductivity (dynamic calibration) from dynamic data (flowmeters and well test simulation)
Hands-on: exercises & case studies

FRACTURED RESERVOIR DYNAMIC CHARACTERIZATION — 1 d

Introduction
- Main types of fractured reservoirs
- Influence of fractures on field behavior
- Examples of field recovery

Dynamic parameters
Fracture characterization using dynamic data
Impact of fractures on flow behavior
Fracture network hydraulic characterization
DFN model calibration
Flow mechanisms in a fractured reservoir
Recovery mechanisms and simulation
Hands-on: exercises & case studies

FRACTURED RESERVOIR DYNAMIC SIMULATION — 1.5 d

Specificity of both large- and small-scale fracture for modeling
Which model for which use?
Dual porosity: the Warren & Root approach
Different kinds of simulation models for fractured reservoirs
Development of fractured reservoirs fields
Hands-on: exercises & case studies
Conclusions / Summary / Wrap-up

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 16 - 20	Rueil	3,100 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-266

ENGLISH: RES / GEOSTAT

Petroleum Geostatistics

5 DAYS

Organized in collaboration with Geovariances

PURPOSE

To provide a comprehensive and practical knowledge of reservoir characterization and modeling, focusing on geostatistical methods and tools

AUDIENCE

Reservoir engineers, geologists, geophysicists, professionals involved in data interpretation and management

LEARNING OBJECTIVES

- To use basic geostatistical tools and methods (variogram, kriging, cokriging, external drift)
- To use vertical proportion curves (e.g. layering, well gridding, statistics, vertical proportion curves building)
- To select the adequate geostatistical simulation method: facies (pixel and object methods); petrophysics (gaussian methods)
- To constrain geostatistical distribution using additional information (e.g. geology, seismic and dynamic data)
- To use a professional geostatistics software
- To practice each step of a reservoir geological model workflow using geostatistics

WAYS AND MEANS

Practical examples and workshops, lab exercises carried out with Isatis™ software

COORDINATOR

Raphaël Lalou

AGENDA

FUNDAMENTALS — 1 d

Basic statistics for data analysis
Introduction to geostatistics
Quantification of spatial variability: variogram

KRIGING AND VARIATIONS — 1 d

Introduction to kriging
Data integration: cokriging, collocated cokriging, external drift kriging
Applications to time-to-depth conversion and property mapping
Dealing with non-stationary cases (trends)

GEOSTATISTICAL SIMULATIONS — 1.5 d

Why simulations: limitations of kriging
Simulation methods for continuous parameters (as Phi and K)
Simulation methods for categorical variables (lithology)
Applications

GEOSTATISTICS FOR INTEGRATED RESERVOIR STUDIES — 0.5 d

Geostatistics as an integration tool
Heterogeneities, scales, upscaling
Integration of seismic-derived data in 3D static models
Applications

RISK MANAGEMENT - QUANTIFICATION OF UNCERTAINTY — 0.5 d

Confidence intervals - Iterative methods
Beyond the Monte-Carlo approach - Simulation optimization
Risk assessment optimization
Applications

FINAL DISCUSSION BASED ON A MODELING EXAMPLE — 0.5 d

Wrap-up session

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 17 - 21	Rueil	2,950 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geology

E-267

ENGLISH: RES / ROCKTYP

Petrophysical Properties: Core, Log and Test Data Integration for Reservoir Modeling

5 DAYS

PURPOSE

To deepen understanding of methods used to measure reservoir petrophysical properties from cores, logs and well tests data; and, ultimately, correlate and integrate results for reservoir characterization and modeling

AUDIENCE

Experienced petrophysicists, reservoir engineers, geologists, geophysicists

LEARNING OBJECTIVES

- To learn about lab core measurements
- To deduce reservoir properties from log interpretation and compare results to core measurements
- To define rock-types, determine electrofacies and derive K-Phi relationship
- To integrate cores, logs and well tests data for reservoir modeling

WAYS AND MEANS

Real case study with cores, logs and well tests data

COORDINATOR

Jacques Delalex

AGENDA

RESERVOIR PROPERTIES FROM CONVENTIONAL AND SPECIAL CORE ANALYSIS — 1 d

Porosity, permeability, saturation, grain density
Wettability, relative permeability and capillary pressures
Electrical properties (m and n exponents)

RESERVOIR PROPERTIES FROM LOG EVALUATION — 1.5 d

Determination of reservoir properties from log interpretation: lithology, porosity and water saturation (case study)
Core - Log correlation and comparison of petrophysical results
Permeability estimation from logs and core data
Reservoir simulation results (cut-offs, Net to Gross ratio, average values, h.Phi.So)

ROCK-TYPING — 0.5 d

Rock-typing and facies identification from core description and logs

WELL TESTING — 0.5 d

Well test analysis and integration with petrophysics

DATA INTEGRATION FOR RESERVOIR MODELING — 1.5 d

Introduction to reservoir modeling
Reservoir petrophysical and geological synthesis
Upscaling
Uncertainties management

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 13 - 17	Rueil	2,950 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geophysics

E-300

ENGLISH: GEP / RESGPHY

NEW

Seismic Analysis for Prospect Evaluation Workshop

28 DAYS

Prospect definition in fluvio-deltaic systems

PURPOSE

To provide a comprehensive and practical understanding of seismic analysis and interpretation undertaken to define a prospect in a fluvio-deltaic system

AUDIENCE

Experienced geologists and geophysicists

LEARNING OBJECTIVES

- To learn how to carry on through seismic data analysis, structural modeling and prospect analysis
- To perform structural interpretations and build geophysical models
- To perform structural and stratigraphic interpretations on a real case in a fluvio-deltaic environment
- To identify building blocks of, and main uncertainties in an interpretation process
- To identify traps and seismic characters, analyze seismic attributes, and characterize potential reservoirs
- To assess uncertainties in the model build for a potential reservoir

PREREQUISITE

Course requires a good grasp of fundamentals in the following fields
- Geology in sedimentary process
- Seismic wave propagation and rock physics
- Seismic acquisition and processing
- Seismic reservoir characterization

WAYS AND MEANS

Interactive presentations, exercises, document analysis…
Workshop on case studies using dedicated seismic interpretation software

OBSERVATION

Number of seats is limited to 14
Tuition fees do not include software additional costs

COORDINATOR

Eric Fagot

AGENDA

MODULE 0: E-LEARNING COURSE TO REVIEW PREREQUISITES (OPTIONAL) — 60 h

Reservoir studies and geophysics
Introduction to reservoir studies
Geophysical methods and geophysical data acquisitions
Geophysical tools and data preparation
Seismic methods and data process
- Why process data, tools and process, cleaning the data: signal and noise identification and cleaning
- Enhance the signal → seismic data true amplitude recovery, binning and coverage, velocity and dynamic corrections, statics problems, putting the seismic image in its right place: migrating data and imaging
- Improving the seismic image: P/S conversion waves, anisotropy, broadband and wide azimuth techniques

Seismic processing and reservoir characterization
- Data QC and preparation for RC - Well to seismic calibration
- AVO, Inversion processing
- Interpretation and classification techniques, prediction methods overview

Sequence stratigraphy
Sedimentary sequence identification - Sequence stratigraphy analysis
Accommodation and shoreline shifts - Wells and seismic analysis

MODULE 1: SEISMIC INTERPRETATION WORKSHOP (cf. E-131) — 10 d

Structural Model and Traps Analysis

MODULE 2: SEISMIC STRATIGRAPHY AND ATTRIBUTES WORKSHOP (cf. E-301) — 10 d

Sedimentary Bodies and Seismic Attributes Interpretation

MODULE 3: ADVANCED INTERPRETATION ANALYSIS — 7 d

Seismic Reservoir characterization (advanced methods)
Well data QC and feasibility study
Statistical methods approach - Context and practice
Data segmentation and classification
- Attributes extraction (in the reservoir complex)
- Statistical approach for mapping → Facies and probability maps for supervised and non-supervised techniques – Analyze and comparison
- Neural network and Seismic facies analysis
- Interpreting results

Prediction techniques application: single regression approach (linear transform → Porosity / Vclay)

Interpreting stratigraphic sequence
Seismic stratigraphy
- Defining and picking a chrono-stratigraphic sequence → Define limits and horizon cube creation
- Studying depositional development → Wheeler transform and data preparation for SSIS

Systems tracts interpretation & stratigraphic modeling

SYNTHESIS AND CONCLUSIONS — 1 d

Wrap-up session

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 13 - Nov 21	Rueil	19,100 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geophysics

E-301

ENGLISH: GEP / SEISINT

Seismic Stratigraphy and Seismic Attributes Interpretation Workshop

10 DAYS

PURPOSE

To provide a comprehensive and practical knowledge in interpretation of sedimentary structures and seismic attributes

AUDIENCE

Experienced geologists and geophysicists

LEARNING OBJECTIVES

- To perform a complete seismic stratigraphy interpretation
- To perform seismic interpretation in a fluvio-deltaic prograding sequence
- To identify and pick associated sedimentary figures
- To identify traps and seismic characters, analyze seismic attributes, and characterize potential reservoirs

PREREQUISITE

Course requires a good grasp of fundamentals in the following fields
- Geology in sedimentary process
- Seismic wave propagation and rock physics
- Seismic acquisition and processing
- Seismic reservoir characterization

WAYS AND MEANS

Interactive presentations, exercises, document analysis…
Workshop on case study using dedicated seismic interpretation software

OBSERVATION

Tuition fees do not include the cost of the software license
Number of seats for this course is limited to 14

COORDINATOR

Eric Fagot

AGENDA

INTRODUCTION

Team work on North Sea 3D case study

INTERPRETATION OF SEDIMENTARY STRUCTURES AND SEISMIC ATTRIBUTES ANALYSIS — 9.5 d

Surveys presentation of the North Sea 3D seismic Block and workshop objectives
Geology and petroleum system overview - Geophysical context
Prospect objectives

Interpretation of sedimentary bodies
Unconformities, angularity, techniques of sequence identification and picking
- Top and base picking of the sedimentary sequence in the tertiary group
- Interpretation of prograding sub sequences using seismic facies analyses (amplitude, energy, phase, etc.)

Other structures evidence through structural attributes analysis
- Channels delineation and interpretation using structural attributes
- Other structural elements

Seismic structural model building of the sedimentary sequence (Time model)

Seismic evidence of a reservoir – Detection and analysis
Amplitude and seismic attributes anomalies analysis at the top of the sequence (DHI, gas shadows, etc.)
Analysis of seismic character modification in the vicinity of the reservoir (reflectivity, phase or frequency changes, multiples enhancement, structural anomalies, etc.)

Seismic attributes analysis and characterization
Analysis of seismic Inversion and porosity attributes in the potential trapped reservoirs
Attributes comparison in the potential trapped areas, seismic facies analysis and characterization

SYNTHESIS AND CONCLUSIONS — 0.5 d

Wrap-up session

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 27 - Nov 07	Rueil	6,060 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geophysics

E-330

ENGLISH: GEP / AVOINV

AVO and Seismic Inversion: Workshop Tools for Reservoir Characterization

5 DAYS

PURPOSE

To provide an in-depth and practical understanding of the methods AVO and INVERSION used in reservoir characterization

AUDIENCE

Senior geoscientists

LEARNING OBJECTIVES

- To understand concepts, methodologies and techniques of AVO-AVA and Seismic Inversion
- To review prerequisites, workflows and objectives of AVO-AVA and Inversion studies
- To understand the link between petrophysics and geophysics
- To understand the various steps in a feasibility study
- To gain insight into data processing and interpretation
- To organize, plan and supervise AVO-AVA studies and 2D or 3D seismic inversion projects

PREREQUISITE

Course requires a good grasp of fundamentals in the following fields: wave propagation, seismic acquisition and processing

WAYS AND MEANS

Interactive presentations, exercises, document analysis…
Workshop on case study using dedicated modeling and inversion softwares

OBSERVATION

Number of seats is limited to 14

COORDINATOR

Eric Fagot

AGENDA

INTRODUCTION AND OBJECTIVES — 1 d

Introduction: AVO and inversion workflows and objectives
Wave propagation theory and concepts
Data pre-requisites and rock-physics
Rock-physics and petro-elastic modeling
Well data conditioning for seismic characterization
Seismic data pre-requisites

WELL-TO-SEISMIC CALIBRATION — 0.5 d

Objectives and workflows
Preparing well data for inversion
Signal and noise estimation
Wavelet extraction from seismic and log data

AVO INTERPRETATION — 0.5 d

AVO attributes and AVO behavior
AVO benefits and limitations
From AVO to seismic inversion

SEISMIC INVERSION — 2 d

Inversion workflows: description of inversion algorithms, parameters and benefits
Model-based inversion: definition and objective
Role of initial or low frequency model
Inversion parameter sensitivity testing
Deliverables of seismic inversion: QC
Examples: clastics and carbonates

RESERVOIR CHARACTERIZATION — 1 d

Interpretation of inversion
Results: objectives and workflows
Refining seismic interpretation: noise, signal, phase and resolution issues
Seismic facies analysis: supervised vs. non-supervised analysis
Quantitative reservoir property prediction
Uncertainty analysis
Extended inversion workflows for fractured reservoir characterization

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 02 - 06	Rueil	3,200 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geophysics

E-335

ENGLISH: GEP / MICROSEIS

Microseismic: New Insights on Reservoirs

5 DAYS

PURPOSE

To provide an understanding of microseismic data acquisition and processing, with an overview of applications to reservoir monitoring

AUDIENCE

Geologists and geophysicists involved in reservoir characterization

LEARNING OBJECTIVES

- To understand fundamental concepts of microseismics used in reservoir monitoring
- To follow or supervise design and operations of passive monitoring
- To ensure data and results reliability
- To interpret and integrate microseismic data with conventional seismic data, geological and reservoir data, etc.
- To learn about microseismic monitoring applied to reservoir stimulation, particularly with regard to fracturing

PREREQUISITE

Course requires a good grasp of fundamentals in the following fields: wave propagation, seismic acquisition and processing

WAYS AND MEANS

Interactive presentations, exercises, document analysis…

COORDINATOR

Eric Fagot

AGENDA

FUNDAMENTALS — 1.5 d

Introduction - Origin and principle of microseismicity
- Terminology and basic principles
- Recall on mechanics and rock physics

Natural source - Features
- Natural seismic sources
- Seismic moment tensor
- Time of rupture and seismic moments

Propagation of microseismic waves
- Equation of propagation & Green function
- Propagation of seismic waves induced by failures
- Complex medium

ACQUISITION AND PROCESSING — 2 d

Radiation pattern and focal mechanism
- Radiation pattern of faulting source - Radiation pattern and Fourier transform
- Focal mechanism - Graphical representation
- Focal mechanism of typical natural seismic sources

Acquisition and data processing
- Acquisition - Equipment - Typical receiver deployment techniques
- Preparation & supervision
- Processing – Microseismic event localization
- P and S-wave picking
- P and S-wave picking
- Methods of locating by back propagation

APPLICATION AND INTERPRETATION — 1.5 d

Access to parameters associated with fractures
- Quantification of the seismic moment tensor
- Moment tensor inversion process
- Synthetic and field study

Application and interpretation
- Passive monitoring
- Fluid injection - Hydrofracturation

Discussion and conclusions

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 23	Rueil	2,900 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Geosciences
Reservoir Geophysics

E-340

ENGLISH: GEP / BLSRC

SRC
Seismic Reservoir Characterization

6 WEEKS

E-learning with personal coaching

PURPOSE

To provide a comprehensive and practical understanding of how seismic data is used to characterize, model, and classify reservoirs

AUDIENCE

Geologists, geophysicists and reservoir engineers

LEARNING OBJECTIVES

- To understand the relationship between physical properties of rocks and geophysics
- To master the main steps of well to seismic calibration
- To grasp the workflow of seismic reservoir characterization
- To perform QC of an AVO-AVA study
- To assess data to be interpreted and related uncertainties
- To interpret major results of petroelastic analysis and modeling, AVO-AVA and Inversion studies
- To understand methodological issues in seismic inversion, attributes classification and reservoir properties prediction

WAYS AND MEANS

Before training starts, 2 hours are dedicated to introduce the training agenda, methods and tools
The exact needs and expectations of each participant are also assessed and discussed (MCQ and phone interview with the tutor)

OBSERVATION

Total duration of the training is 24 hours, spread over a 6-week period

COORDINATOR

Jacques Negron
Catherine Ulrich (Blended Learning)

AGENDA

SEISMIC RESERVOIR CHARACTERIZATION — 1 h
How is it integrated?
Methods used and scale issues

ROCK PHYSICS THEORY — 2.5 h
Basic rock physics
Main parameters having an influence on rock-elastic answer
Saturation effect modeling (Gassmann)
Rock physics model and parameters taken into account
Differences between Gassmann and petroelastic modeling

PHYSICS AND AVO PRINCIPLES — 5 h
Why AVO?
Wave propagation
Data prerequisites, seismic attributes

WELL TO SEISMICS CALIBRATION — 2 h
Objectives, methods
Recommended wavelet extraction techniques
Real case example: Multi-well calibration
Wavelet deconvolution

INTERPRETATION OF AVO ATTRIBUTES — 3 h
Crossplot principles
AVO seismofacies
AVO class
AVO facies volume

INVERSION OF SEISMIC DATA — 4 h
Inversion methodology: fundamentals
Post-stack and pre-stack inversion
Validating and interpreting inversion results

PREDICTION OF RESERVOIR PROPERTIES — 4.5 h
Attribute classification
Techniques of prediction
Validation of characterization results

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

Reservoir Engineering

p. 119 to 139

Reservoir Engineering

E-350

ENGLISH: GIS / RESBAS
FRENCH: GIS / INFOGIS

PURPOSE

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

AUDIENCE

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

LEARNING OBJECTIVES

- To learn the language used by reservoir engineers with all those involved in multidisciplinary teams set up for field development and monitoring studies
- To grasp the main reservoir engineering concepts of petrophysics, fluid characterization, formation evaluation, and drive mechanisms

COORDINATOR

Gérard Glotin

Introduction to Reservoir Engineering

5 DAYS

Reservoir engineering techniques for a better communication in multidisciplinary teams

AGENDA

BASICS OF RESERVOIR CHARACTERIZATION — 3 d

Production geology (basic concepts): reservoirs, traps, heterogeneities, etc.
Petrophysics: rock properties
Reservoir fluid properties (gas, oil, formation water)
Logging evaluation
Volumetric evaluation of oil and gas in place
Exercises

FIELD DEVELOPMENT — 1.5 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 — 0.5 d

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

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 29 - Oct 03	Rueil	2,750 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-355

ENGLISH: GIS / ARM

PURPOSE

To provide a comprehensive overview of techniques used in the management of an asset, throughout its lifetime, from the discovery of a reservoir till the end of production

AUDIENCE

Geoscience and petroleum engineers actively involved in production engineering related activities
Managers and would-be managers in various E&P disciplines involved with interface activities
Field development engineers who need to broaden their technical experience

LEARNING OBJECTIVES

- To grasp the fundamentals of reservoir management, from geology to hydrocarbons recovery
- To implement best techniques and practices in oil and gas fields development
- To ensure optimal use of the company's resources and maximize value creation
- To lead multidisciplinary teams in reservoir development, operations and planning
- To acquire some know-how through a number of case studies which provide an exposure to a range of reservoir conditions

WAYS AND MEANS

Numerous hands-on case studies and extensive use of Microsoft Excel

OBSERVATION

This course has a significant practical content and is therefore recommended for those who already have an industrial experience and a scientific background

COORDINATOR

Gérard Glotin

Reservoir Management

10 DAYS

Field development, monitoring, reserves, risks and uncertainties

AGENDA

INTRODUCTION TO RESERVOIR MANAGEMENT — 0.25 d
Objectives of reservoir management
Field development projects: an integrated effort

RESERVOIR MONITORING: INTRODUCTION — 0.25 d
Definitions and Planning (reservoir management plans, new and mature fields)

RESERVOIR GEOLOGICAL CHARACTERIZATION — 1 d
Geomodels
Well data interpretation (Rock properties from cores and logs, exercises)
Geological and petrophysical modeling
Dynamic data integration

FLUID CHARACTERIZATION AND SAMPLING — 0.5 d
Fluid properties
Sampling
Exercises

WELL TESTING — 1 d
Theory
Practical exercise

DRAINAGE MECHANISMS — 2 d
Primary recovery
Secondary recovery
Tertiary recovery / EOR, exercises

MONITORING: DATA ACQUISITION — 1 d
Planning & costs
Cased Hole Logging: Cement Bond, Saturation Monitoring and Flow Profiles, plus exercises

WELL PERFORMANCE — 0.5 d
Well productivity
Complex wells

DECISION PROCESSES & BUSINESS ASPECTS — 0.5 d
Development decision process & project economics
Various approaches of international companies & JV

FIELD CASES — 1 d
North Sea Field Development case & workshops exercises

RESERVES — 0.5 d
Oil and Gas reserves and resources definitions and classification
Volumetrics, exercise

RISKS & UNCERTAINTIES — 1.5 d
Introduction to R&U
Notions of Probabilities, exercises
Statistical description of data & common distributions
Monte Carlo simulation & parametric method, exercises
Notions of geostatistics and geostochastic modeling, exercises
Static uncertainties
Dynamic uncertainties, exercises

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - Dec 05	Rueil	5,650 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-360

ENGLISH: GIS / RESENGIN
FRENCH: GIS / FORMGIS

PURPOSE

To provide a comprehensive and practical understanding of reservoir engineering concepts used in oil and gas fields development projects, with the necessary skills to participate, along with reservoir engineers and other professionals, in multidisciplinary teams set up for field development and monitoring studies

AUDIENCE

Reservoir engineers, geologists and production engineers

LEARNING OBJECTIVES

- To characterize a reservoir, validate data, calculate hydrocarbons in place, and evaluate uncertainties
- To understand reservoir fluid behavior, identify drive mechanisms, and use appropriate methods to improve recovery
- To grasp the importance of rock properties used in a reservoir simulation model
- To recommend a well test design
- To learn about the various models applicable to well test interpretation
- To perform well test interpretation using a software program
- To prepare data sets for reservoir simulation and carry out a standard reservoir simulation study
- To derive qualitative conclusions from sensitivity analysis ranking risk factors in terms of impact on production forecast
- To derive quantitative conclusions from computation of probabilistic production forecasts
- To optimize a production scheme taking into account most significant uncertainties
- To follow up impact of uncertainty, from static modeling and dynamic fluid-flow simulation up to field economic evaluation

OBSERVATION

Course fees include accommodation and transport during field trips

COORDINATOR

Gérard Glotin

Reservoir Engineering

64 DAYS

Geology - PVT - Well test - Simulation - Field development

AGENDA

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

MODULE 4 - DRIVE MECHANISM - ENHANCED OIL RECOVERY (cf. E-368) — 9 d

Multiphase Flow
Drive Mechanism
EOR

MODULE 5 - DRILLING/COMPLETION FOR RESERVOIR STUDIES (cf. E-370) — 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	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 15 - Dec 12	Rueil / field trip	32,350 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-361

ENGLISH: GIS / PVT
FRENCH: GIS / FLUIDS

PURPOSE

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

AUDIENCE

Geoscientists and petroleum engineers with a short industrial experience; young scientists moving into reservoir engineering

LEARNING OBJECTIVES

- To grasp oil and gas reservoir fluids behavior and PVT experiments in relation to fluid type
- To analyze and validate pressure, volume and temperature data in PVT reports, with attention to correlations and equations of state
- To understand the structure and the building process of a PVT model for reservoir simulation
- To input available data in a reservoir simulator using a black oil or a compositional model
- To acquire a practical experience of using experimental data to build PVT models

WAYS AND MEANS

Numerous practical examples with use of a PVT package

COORDINATOR

Gérard Glotin

Reservoir Engineering - Module 2

5 DAYS

Fluid Studies - PVT

Reservoir fluids properties - Oil - Gas

To acquire the knowledge of thermodynamics applied to reservoir engineering for studies and modeling

AGENDA

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

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 13 - 17	Rueil	2,750 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-363

ENGLISH: GIS / CONSCAL

Core Analysis for Reservoir Characterization

5 DAYS

PURPOSE

To provide a comprehensive information on core analysis and the importance of rock properties for reservoir description and fluid-flow dynamics

AUDIENCE

Geoscientists and petroleum engineers with a short industrial experience; engineers involved in reservoir studies and simulations

LEARNING OBJECTIVES

- To grasp a thorough understanding of rock properties used in reservoir simulation models
- To interpret and validate a SCAL report
- To review the quality control process for main parameters (porosity, permeability, wettability)
- To interpret a two-phase flow experiment, and use results for future reservoir engineering calculations
- To design a SCAL program with regard to given objectives

WAYS AND MEANS

For all measurements, a description of laboratory equipment, data acquisition and data interpretation processes is presented Impact of petrophysical properties on various production mechanisms is also discussed, along with concepts of error, uncertainty and confidence intervals

COORDINATOR

Gérard Glotin

AGENDA

INTRODUCTION — 0.5 d

Reservoir characterization: seismic, core analysis, well testing, logs, cuttings, PVT… Role of core analysis

CORING

Method for coring - Core preservation, cleaning and analysis - Conventional and special core analysis (CCA and SCAL)

GENERALITIES ON TWO-PHASE FLOW PROPERTIES — 1 d

Darcy's law for two-phase flows in reservoir simulations and core analysis
Relative permeabilities - Capillarity, Capillary pressure - Wettability
Effect of petrophysical properties on fluid displacements, importance of wettability in water flooding
Modeling miscible displacements

CONVENTIONAL CORE ANALYSIS — 1 d

Porosity: definition and measurements - Pore size distribution by NMR and Mercury Injection
Use of mercury to determine reservoir initial saturation and transition zones
Permeability: definition, measurements, indirect estimations, limits
Porosity/permeability correlations - Use of Core Analysis for Rock Typing

DESIGN OF SCAL PROGRAM

SCAL program to obtain dynamic properties for reservoir simulations
Plug selection and preparation (Rock typing, CT scan, plugging…) - Additional measurements on trimends (Mercury, XRD, Thin section)
Choice of a method for placing oil into the plug (Swi state) - Choice of a wettability restoration procedure
Choice of operating conditions for relative permeabilities, reservoir conditions, live oil, dead oil, calculation or confining pressure

MEASUREMENTS OF SCAL PROPERTIES — 1.5 d

Dispersion tests to quantify plug heterogeneities - Measurement of wettability: Amott index, USBM, use of NMR
Relative permeabilities: steady-state, unsteady-state, in-situ saturation monitoring, interpretations
Capillary pressures: porous plates, centrifuge, semi-dynamic method - Formation factor and Resistivity index RI

QUALITY CONTROL OF AVAILABLE DATA — 0.5 d

Old and new data, contents of reports
Porosity, comparisons with logs when available (effective and total porosity)
Permeability, various methods, liquid and gas permeability, Klinkenberg corrections, effect of confining pressure
Wettability: Amott compared to USBM, effect of wettability on Pc, Kr and RI, check consistency of the results
Validity of Kr measurements, existence of wettability restoration, interpretation with capillary pressure
Validity of centrifuge interpretation, existence of calculation of local saturation
Final verification of the plug selection in the various rock types (mineralogy, porosity/permeability correlation, pore size distribution, Kr, Pc, RI)

AVERAGING PETROPHYSICAL PROPERTIES — 0.5 d

Need for averaging rock types for reservoir simulations
Effect of heterogeneities, description of heterogeneities
Averaging for grid block properties - Averaging porosities and permeabilities - Averaging capillary pressures
Static averaging of end-points Kr
Dynamic averaging of Kr: pseudoization (Kyte and Berry)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 14 - 18	Rueil	3,050 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-365

ENGLISH: GIS / WELLTEST

PURPOSE

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

AUDIENCE

Reservoir engineers with some practical knowledge of well testing operations and basic interpretation theory

LEARNING OBJECTIVES

- To perform a well test interpretation using an up-to-date software package
- To grasp the theory of well testing interpretation (Flowregimes, Models, Methodology)
- To devise or recommend a well test design

WAYS AND MEANS

Numerous case studies, with use of a well-test analysis software package

OBSERVATION

Course fees include accommodation and transport during field trip

COORDINATOR

Gérard Glotin

Reservoir Engineering - Module 3

10 DAYS

Well Test Analysis

Well testing for better design and interpretation

AGENDA

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	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 20 - 31	Rueil / field trip	8,080 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-368

ENGLISH: GIS / RESPUIT
FRENCH: 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

Geoscientists and reservoir engineers; experienced technicians

LEARNING OBJECTIVES

- To grasp the essence of various drilling and completion techniques
- To learn about what happens in the reservoir and the well
- To learn about well design, and drilling equipment and operations
- To understand well completion design, wellbore treatments, artificial lift and well intervention
- To interpret production logs and optimize well productivity

COORDINATOR

Gérard Glotin

Reservoir Engineering - Module 5

5 DAYS

Drilling/Completion for Reservoir Studies

AGENDA

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

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 17 - 21	Rueil	2,750 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-370

ENGLISH: GIS / DRIVEOR
FRENCH: GIS / MECAFLO

PURPOSE

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

AUDIENCE

Geoscientists and reservoir engineers; experienced technicians

LEARNING OBJECTIVES

- To understand the mechanism of reservoir fluids natural drive
- To improve recovery through water or non-miscible gas injection
- To learn about non-conventional techniques for enhanced oil recovery
- To learn how to monitor reservoirs while implementing enhanced oil recovery techniques
- To understand the drive mechanism in a fractured reservoir

COORDINATOR

Gérard Glotin

Reservoir Engineering - Module 4

9 DAYS

Drive Mechanism - Enhanced Oil Recovery

Multiphase flow and of primary and secondary recovery
Enhanced Oil Recovery methods, screening criteria and expected additional recovery

AGENDA

MULTIPHASE FLOW — 2 d

Relative permeabilities and reservoir production
Non-miscible diphasic flow: fluid mobility and mobility ratio
Theory of frontal displacement

DRIVE MECHANISM — 3 d

Primary drainage: undersaturated oil, gas gap drive, oil reservoir with natural water influx, gas field
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
Capillary imbibition
Gravity forces

ENHANCED OIL RECOVERY — 1 d

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

MATERIAL BALANCE — 1 d

Exercises on PVT matching, History matching, Production forecast with a dedicated software

FRACTURED RESERVOIRS — 2 d

Fractures definition, classification, characterization, modeling
Dynamic parameters, flow mechanism in a fractured reservoir, simulation

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 03 - 14	Rueil	4,350 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-373

ENGLISH: GIS / DEVELOPROJ
FRENCH: 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

Geoscientists and reservoir engineers; experienced technicians

LEARNING OBJECTIVES

- To implement best techniques and practices in oil and gas fields development
- To ensure optimal use of the company's resources and maximize value creation
- To lead multidisciplinary teams in reservoir development, operations and planning
- To acquire some know-how through a number of case studies which provide an exposure to a range of reservoir conditions
- To carry out reservoir engineering studies incorporating uncertainties in the simulation workflow
- To derive qualitative conclusions from sensitivity analysis ranking risk factors in terms of impact on production forecast
- To derive quantitative conclusions from computation of probabilistic production forecasts
- To optimize a production scheme taking into account most significant uncertainties

WAYS AND MEANS

Lectures on statistical methods
Hands-on practice with a software program
Real-field case studies

COORDINATOR

Gérard Glotin

Reservoir Engineering - Module 6

5 DAYS

Development Project and Uncertainties

Methodology of field development, taking into account the economics and uncertainties

AGENDA

PROJECT: FIELD DEVELOPMENT — 3 d

From discovery to development: geological context, evaluation of reservoir properties, OOIP, reserves
Field evaluation at each step of the appraisal phase
Development phase: several scenarios are established depending on drive mechanisms
Field monitoring
Economic calculation: 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 RISKS AND UNCERTAINTIES — 1 d

Why quantifying uncertainties in reservoir studies?
Overview of the experimental design approach
How to identify the most influential geological and dynamic parameters on field evaluation and production forecasts

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - 28	Rueil	2,900 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-375

ENGLISH: GIS / RESSIMU
FRENCH: 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

LEARNING OBJECTIVES

- To grasp the fundamental concepts of Dynamic Reservoir Simulation
- To learn about the building blocks of a simulation study
- To use the software ECLIPSE™ and prepare data sets for reservoir simulation
- To carry out reservoir simulation studies and learn about data input, history matching and production forecast with a black oil model
- To exchange with professionals in various disciplines (geology, geophysics, drilling, production, asset management) to validate results

OBSERVATION

Tuition fees do not include software additional costs

COORDINATOR

Gérard Glotin

Reservoir Engineering - Module 7

10 DAYS

Dynamic Reservoir Simulation

Black oil reservoir simulation including all reservoir properties (geological, petrophysical, PVT, well data, production history)

AGENDA

INTRODUCTION TO SIMULATION — 1 d

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 ECLIPSE™ — 2 d

Eclipse™ presentation
Practical exercise (Building a model from A to Z)

SPACE & TIME DISCRETIZATION — 1 d

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 ECLIPSE™

PETROPHYSICS — 0.5 d

Data Review & Petrophysical upscaling
Practical exercise using ECLIPSE™

FLUIDS — 0.5 d

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 ECLIPSE™

INITIAL STATE — 0.5 d

Data Review & Formalisms used by the simulator (equilibration regions)
Identification of fluids in place per region
Practical exercise using ECLIPSE™

FLOW REPRESENTATION — 0.5 d

Formalisms used by the simulator (transmissivity multipliers, end point scaling of capillary pressures & relative permeability)
Identification of production mechanisms & material balance analysis
Practical exercise using ECLIPSE™

AQUIFERS REPRESENTATION — 0.5 d

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 ECLIPSE™

WELLS REPRESENTATION — 0.5 d

Formalisms used by the simulator (Inflow Performance & Numerical PI, outflow performance & VFP tables)
Practical exercise using ECLIPSE™

HISTORY MATCHING — 2 d

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 ECLIPSE™

PRODUCTION FORECAST — 1 d

Integration of well representation & production constraints
Estimation of future productions linked to different scenarios and identification of remaining uncertainties
Practical exercise using ECLIPSE™

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 01 - 12	Rueil	5,850 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-385

ENGLISH: GIS / PVTMOD

PVT Modeling

5 DAYS

Thermodynamics application to reservoir fluids modeling

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 (with a few years of industrial experience in reservoir engineering)
Basic PVT knowledge (basic characteristics, measurement techniques, chromatography, classical correlation) is a prerequisite

LEARNING OBJECTIVES

- To build a PVT model in order to represent the fluid behavior with respect to the available and validated PVT data
- To have the understanding of the properties needed to build their model and the properties used to fit it to the experiments

PREREQUISITE

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

WAYS AND MEANS

Extensive use of the PVT modeling software “BEST”™ in a number of practical case studies
Links between compositional or black oil PVT models clearly identified
PVT experiments presented in the reports are fully discussed with regard to lab issues and fluid behavior in the reservoir
Particular attention given to relation between types of fluids (heavy or light crude oils, gas condensates, dry gas…)

COORDINATOR

Gérard Glotin

AGENDA

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

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	17 - 21 Nov	Rueil	3 030 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-386

ENGLISH: GIS / EOR

Improved/Enhanced Oil Recovery (IOR/EOR)

5 DAYS

EOR - Screening Criteria - Field Cases

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 grasp the concepts and limitations of the different methods used for enhancing oil and gas recovery
- To select the best methods provided reservoir properties and oil characteristics

COORDINATOR

Gérard Glotin

AGENDA

INTRODUCTION — 0.25 d

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 — 0.25 d

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

OIL RECOVERY BY PRESSURE MAINTENANCE — 1 d

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 — 0.5 d

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

ENHANCED OIL RECOVERY — 1.5 d

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 — 0.25 d

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

FIELD CASES — 1 d

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

WRAP-UP SESSION — 0.25 d

Course assessment, wrap-up and conclusions

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	13 - 17 Oct	Rueil	3 100 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-388

ENGLISH: GIS / ADVWTA

Advanced Well Test Analysis

5 DAYS

PURPOSE

To provide an extensive and practical knowledge for designing and analyzing complex well tests in an efficient way

AUDIENCE

Geoscientists and reservoir engineers involved with integrating dynamic data in reservoir modeling studies

LEARNING OBJECTIVES

- To devise or recommend a well test design
- To learn about the various well test interpretation models
- To perform a well test interpretation using an up-to-date software package
- To integrate well tests results into the overall reservoir modeling process

PREREQUISITE

Some practical knowledge of well testing operations and basic interpretation theory are recommended

WAYS AND MEANS

Use of the software programs SAPHIR™ and WELGEM™
Case studies with real-field data

COORDINATOR

Gérard Glotin

AGENDA

WELL TESTING: OBJECTIVES AND HARDWARE REVIEW — 0.25 d

Purpose of well testing types of tests, well testing equipment, metrology

BASIC EQUATIONS AND METHODS — 0.25 d

Darcy's law - Superpositions (Time, space), multi-rate testing, boundaries
Matching derivative
Exercises

WELLBORE CONDITIONS — 0.5 d

Constant / Changing Wellbore Storage - Vertical fracture (Finite, Infinite) - Horizontal well
Skin(s) factors and families
Analysis using software package

RESERVOIR MODELS — 0.5 d

IARF: infinite acting radial flow - Double porosity reservoirs - Two-layer reservoir - Radial composite
Analysis using software package

BOUNDARY MODELS — 0.5 d

One sealing fault - Two parallel sealing faults - Two intersecting sealing faults - Leaky Fault
Closed system, reservoir limit testing and depletion effects - Constant pressure boundary
Analysis using software package

TEST DESIGN - PRACTICAL SESSION — 0.5 d

Rate history definition - Multi wells models - Time and pressure error
Pressure gauge drift & noise
Phase segregation - Procedures for Interpretations validations and Results Consistencies - Reporting

GAS WELLS: THEORETICAL REVIEW AND APPLICATIONS — 0.5 d

AOFP, Pseudo Skin, Pseudo Pressures, Gas Material Balance, Pseudo Time or Changing WBS

NUMERICAL SIMULATION OF WELL TESTS USING RESERVOIR SIMULATION PROGRAMS — 1 d

Fluid flow in porous media and reservoir heterogeneities
Numerical simulation of well tests with a grid block model: problems and solutions
Advanced interpretation of the simulation results
The "objective function". Matching the petrophysical properties of the reservoir model and the well characteristics:
- The inversion process applied to the evaluation of the reservoir characteristics
- Introduction to the WELGEM™ Software. Field applications

The step forward. Matching the geological properties of the reservoir model:
- Geostatistical modeling constrained by well tests

WORKSHOP — 1 d

Introduction to the simulation of well tests with a numerical simulation program
Practical inversion of several well tests: test of a channel, test of a model made of several reservoir facies, etc.
Presentation of a simultaneous interpretation of several well tests

R&D RECENT DEVELOPMENTS

Latest R&D developments in the domain of integration of well tests in reservoir modeling

In-house course. Contact: gre.rueil@ifptraining.com

Reservoir Engineering

E-389

ENGLISH: GIS / ADVSIMU

PURPOSE

To enhance practical experience and skills in reservoir simulation through an experiential, hands-on simulation based on a real-field case study

AUDIENCE

Reservoir engineers

LEARNING OBJECTIVES

- To deepen understanding of main issues in reservoir simulation
- To practice extensively with a black oil reservoir simulator
- To acquire best practices through hands-on experience
- To review main data related to reservoir simulation
- To perform a production history matching, and set up a methodology
- To generate production forecasts

PREREQUISITE

Some basic knowledge in dynamic reservoir simulation is recommended

WAYS AND MEANS

Use of the software program ECLIPSE 100™

COORDINATOR

Gérard Glotin

Dynamic Reservoir Simulation: Best Practices

5 DAYS

Real-field case study with data review, history matching, and production forecast

AGENDA

INTRODUCTION — 0.25 d

Basic reminders in reservoir simulation
Field presentation

RESERVOIR MODEL DATA REVIEW — 1 d

Reservoir geometry, geological layering & grid definition
Porosity & permeability distributions
Fluid properties & SCAL functions
Volumes originally in place
Aquifer modeling

HISTORY MATCH OBJECTIVES & METHODOLOGY — 0.75 d

Review of production / Injection data per well; Identification of data to match
Production mechanisms & material balance analysis
Identification of matching parameters & uncertainty ranges attached to these parameters

HISTORY MATCH FOR PRESSURE — 0.75 d

Sensitivity analysis using matching parameters linked to pressure
Field Pressure History match
Well Pressures History match (including RFT pressures and static pressures)

HISTORY MATCH FOR SATURATION — 1.25 d

Sensitivity analysis using matching parameters linked to saturations
Field water-cut and GOR history match
Wells water-cut and GOR history match (including PLT results)

PRODUCTION FORECAST OBJECTIVES & METHODOLOGY — 0.25 d

Integration of production constraints & well performance
Launching the do nothing case & checking the continuity between history and forecast

PRODUCTION FORECAST ("DO NOTHING" CASE) — 0.25 d

Optimization of production guidelines
Identification of remaining oil at end of the forecast

PRODUCTION FORECAST (NEW INVESTMENTS) — 0.5 d

Identification of possible scenarios
Implementing corresponding runs and calculation of incremental productions attached to each scenario
Identification of remaining uncertainties
Identification of recommended scenario and conclusions

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	06 - 10 Oct	Rueil	3 350 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-391

ENGLISH: GIS / CYDAR

Laboratory Determination of Relative Permeabilities

5 DAYS

PURPOSE

To enhance skills for designing and interpreting lab experiments that will provide relative permeability to input in reservoir engineering studies

AUDIENCE

Engineers interested in measuring relative permeability

LEARNING OBJECTIVES

- To understand the theory underlying the methods for assessing relative permeability in a lab
- To learn how to select the most appropriate method
- To acquire hands-on experience through a real lab experiment carried out during the training
- To use a software program for experiment design and interpretation

WAYS AND MEANS

Exercises and case studies using the software program CYDAR™
Real experiment is prepared, performed and interpreted

COORDINATOR

Gérard Glotin

AGENDA

BASICS ON TWO-PHASE FLOW IN POROUS MEDIA — 0.5 d

Two-Phase flow equations: definitions and notion of relative permeability
Notion of capillarity, pore level mechanisms and core-scale modeling
Capillary pressure curves, hysteresis, wettability

PRINCIPLE OF KR DETERMINATION — 0.5 d

Unsteady-state and steady-state methods
Semi-dynamic method and Kr from centrifuge
Analytic and numerical interpretations
Laboratory versus reservoir conditions

UNSTEADY STATE — 2 d

Principle and exercises using analytical solutions (JBN, Welge, Jones-Roszelle methods)
Principle of numerical simulations necessary to take into account the capillary pressure.
Direct simulations and automatic history matching. Hands-on with CYDAR™
Multistep experiments for simultaneous determination of the capillary pressure

STEADY STATE — 1 d

Advantages and drawbacks - Analytical and numerical Kr determinations
Hands-on practice with CYDAR™

CENTRIFUGE — 0.5 d

Relative permeabilities from centrifuge experiments: Analytical calculation (Hagoort), interpretation of single and multispeed speed experiments

EXPERIMENTAL CONSIDERATIONS — 0.5 d

Use of dispersion to quantify sample heterogeneities, principle of Kr upscaling
Saturation measurements, mass balance, Karl Fisher
Principle and advantages of in-situ measurements
Problems using crude oil: filtration, gas nucleation, asphaltenes flocculation
Dead volumes corrections

In-house course. Contact: gre.rueil@ifptraining.com

Reservoir Engineering

E-392

ENGLISH: GIS / CARC

Experimental Training for Core Analysis

5 DAYS

Laboratory experiments - Two-phase flow - Interpretation

Water/Oil displacement experiments

PURPOSE

To provide a comprehensive and practical knowledge of how to carry out and interpret SCAL lab experiments

AUDIENCE

Engineers and technicians involved in core analysis

LEARNING OBJECTIVES

- To deepen knowledge of lab experiments
- To select methods for conventional and special core analysis
- To understand the physical mechanisms and experimental conditions

WAYS AND MEANS

Exercises and case studies using the software program CYDAR™

COORDINATOR

Gérard Glotin

AGENDA

INTRODUCTION - THEORY — 1 d

Darcy's law, porosity, permeability
Theory of multiphase flow (Capillary Pressure, relative Permeability)
Description and preparation of the experiments that will be performed (principles, operating methodology)

EXPERIMENTS — 2 d

Experiments will be performed by participants in a services company laboratory
- Porosity (Helium porosity, liquid saturation)
- Permeability: steady-state with liquid, pulse-decay with gas
- Tracer test to characterize the heterogeneities
- Formation Factor
- Relative permeability Kr: steady state and unsteady state method (water / oil)

PRACTICAL HAND-ON EXPERIMENTS — 2 d

Discussion and analysis of the experiments
Generalities on data acquisition and data processing
Notion of experimental errors and uncertainties
Interpretation of Kr experiments by an analytical and numerical method with CYDAR™ software

In-house course. Contact: gre.rueil@ifptraining.com

Reservoir Engineering

E-393

ENGLISH: GIS / RISKUN

Reserves Evaluation - Risks and Uncertainties

5 DAYS

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 definitions of hydrocarbons reserves
- To grasp fundamentals of reserves evaluation
- To learn the various methods for evaluating oil and gas reserves
- To learn the probabilistic methods of uncertainty and risk assessment
- To grasp issues related to static and dynamic uncertainty, geostochastic modeling, expected values…

WAYS AND MEANS

Exercises using the software program Microsoft Excel

AGENDA

BASICS OF RESERVOIR CHARACTERIZATION — 1 d

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 — 0.5 d

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

RESERVES ESTIMATIONS AND PRODUCTION PROFILES — 1 d

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

RISKS AND UNCERTAINTIES — 1.75 d

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 — 0.75 d

EOR and Unconventional reserves
Notions of economics, contracts. Exercises

COORDINATOR

Gérard Glotin

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	02 - 06 Juin	Rueil	3 130 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-394

ENGLISH: GIS / GAS

Gas Condensate Fields Development

5 DAYS

PURPOSE

To provide a comprehensive and practical understanding of gas condensate reservoirs behavior; from gas PVT properties to gas flow

AUDIENCE

Geoscientists and petroleum engineers with a short industrial experience

LEARNING OBJECTIVES

- To characterize gas condensates using PVT properties
- To evaluate productivity and gas-flow dynamic properties
- To grasp main concepts of gas condensate fields development
- To learn about the main issues with regard to surface facilities design and operation

WAYS AND MEANS

Numerous practical examples and field cases
Experiential gas fields development methodology is presented

COORDINATOR

Gérard Glotin

AGENDA

PROPERTIES OF NATURAL GASES: DRY GAS AND GAS CONDENSATE — 0.5 d

Phase equilibrium: single and multi-component systems
Classification of petroleum Hydrocarbon system
Gas PVT behavior - Gas Compressibility Factor - Gas density and Formation volume factor - Gas viscosity
Darcy law for gas: deviation to the Darcy's law
Klinkenberg effect
Real gas potential (pseudo pressure)

WELL PERFORMANCE — 0.5 d

Basic equation, skin and non Darcy flow
Transient flow - Pressure transient testing - Deliverability testing
Condensate banking

RESERVOIR PERFORMANCE — 1 d

Drive mechanism
Determination of IGIP by volumetrics
Material balance: exercises, reserves determination
Gas cycling

UNCERTAINTIES IN FIELD DEVELOPMENT - CASE STUDY — 2 d

Dry gas and gas condensate fields development
Concept and exercises - Field case: reservoir flow, tubing flow, well spacing
Decision tree

SURFACE FACILITIES - INFRASTRUCTURE — 0.5 d

Onshore, offshore, deep offshore
Specific gas condensate process issues

TIGHT AND SHALE GAS RESERVOIR PERFORMANCE — 0.5 d

Well productivity and field case

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	19 - 23 Mai	Rueil	3 050 €	GRE	gre.rueil@ifptraining.com

May be organized for a single company

Reservoir Engineering

E-395

ENGLISH: GIS / UNCONV

Unconventional Resources - Shale Gas Fundamentals

5 DAYS

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 grasp fundamentals of gas shale formation evaluation (cores, logs and resources)
- To learn about well stimulation and completion
- To learn about productivity assessment and improvement
- To go over field development projects
- To address economic and environmental issues

WAYS AND MEANS

Exercises using the software program Microsoft Excel
Illustration with a number of videos

COORDINATOR

Gérard Glotin

AGENDA

HYDROCARBONS IN UNCONVENTIONAL SETTINGS — 1 d

Introduction, definitions, world data resources
Exploration aspects: geology and geochemistry

SHALE GAS STIMULATION — 1.5 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

Market share, drastic changes of markets for shale gas and LNG
Price formulae, oil indexation, future for gas as a commodity, notions of economics, contracts

PRODUCTION COSTS — 0.25 d

Discussion around a controversial issue
Costs versus gas selling price

ENVIRONMENTAL IMPACT — 0.25 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	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	23 - 27 Juin	Rueil	3 650 €	GRE	gre.rueil@ifptraining.com

Reservoir Engineering

E-396

ENGLISH: GIS / BLWTA

Well Test Analysis

10 WEEKS

E-learning with personal coaching

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 performance supervision and well test design and interpretation
Reservoir geologists interested by well-test-generated dynamic information for use in geological models

LEARNING OBJECTIVES

- To comprehend the full extent of oil and gas well tests, within the framework of set objectives
- To understand, recognize and analyze pressure behavior linked to a given flow regime
- To apply conventional and advanced methods for setting up a well/reservoir model and deriving results
- To obtain well bore conditions using the derivative approach
- To describe a double-porosity reservoir model
- To assess boundary response within the derivative approach
- To use a software program to interpret well tests in simple reservoirs
- To set up the appropriate gas well test and analyze results

WAYS AND MEANS

Practical applications and exercises using the software programs PIE™ and SAPHIR™

OBSERVATION

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

COORDINATOR

Gérard Glotin
May also contact Catherine Ulrich, in charge of Blended Learning

AGENDA

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 at distance. Contact: gre.rueil@ifptraining.com

Reservoir Engineering

E-398

ENGLISH: GIS / BLMBAL

Material Balance and Production Mechanisms

7 WEEKS

E-learning with personal coaching

PURPOSE

To enhance practical experience and skills in setting up material balance (oil, gas and condensate gas reservoirs) through an experiential, hands-on training experience, using the software program MBAL™

AUDIENCE

Reservoir engineers, engineers and technicians involved in well performance

LEARNING OBJECTIVES

- To characterize reservoir fluids
- To input main reservoir characteristics, tank and well data in the software program MBAL™
- To adjust reservoir parameters in order to match historical data as well as possible
- To calculate inflow performance for oil and gas reservoirs
- To match fractional flow and forecast field production using MBAL™

OBSERVATION

28 hours over 7 weeks
MBAL™ software license not provided

COORDINATOR

Gérard Glotin
May also contact Catherine Ulrich, in charge of Blended Learning

AGENDA

CHARACTERIZATION OF RESERVOIR FLUIDS — 4 h
Goal & applications of PVT studies, fluid basic characteristics and definitions, main oil and gas properties, correlations, Oil and Gas behavior between the reservoir and the surface

LABORATORY PVT STUDIES — 2 h
Constant composition expansion & constant volume depletion, equation of state

USE OF PVT WITH MBAL™ — 3 h
Introduction, PVT Module, PVT controlled miscibility and water viscosity, PVT validation

PRODUCTION MECHANISMS — 4 h
Material Balance equation, aquifer water influx, oil plus dissolved gas expansion, gas cap Expansion, linear expression of the MBE (Havlena & Odeh), water entry calculation

APPLICATIONS WITH MBAL™ SOFTWARE — 4 h
Tank parameters, aquifer characteristics & relative permeabilities, production history by well or by tank, history matching

FRACTIONAL FLOW — 2 h
Frontal unidirectional displacement, Buckley-Leverett model & welge tangent method
Fractional flow matching

GAS RESERVOIRS — 2 h
No water influx, dry gas, gas inflow performance

WELL DEFINITION — 1 h
Inflow for oil

PREDICTION MODULE — 2 h
Productivity index, MBAL™ productivity prediction module

VOLATILE OIL AND CONDENSATE GAS RESERVOIRS — 1 h
General material balance equation, material balance applications

SINGLE-TANK OR MULTI-TANK — 3 h
Case study

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

Geosciences Field Trip

p. 143 to 144

Geosciences Field Trip

E-900

ENGLISH: GEOT / PETBAS

Introduction to Petroleum System

5 DAYS

PURPOSE

To provide a comprehensive overview of petroleum geology processes (emphasizing basin geometry, deposition, hydrocarbons' origin, migration, and accumulation) with an introduction to the ways and means of oil and gas exploration

AUDIENCE

Oil and gas professionals, with little or no knowledge in geology

LEARNING OBJECTIVES

- To acquire some practical knowledge of basic petroleum geology through examples (seismic, logs, etc.)
- To understand the factors required for the existence of an accumulation of hydrocarbons
- To grasp the methodology used to assess the hydrocarbons potential of sedimentary basins
- To learn about some exploration methods and tools, such as geophysics and well logging

WAYS AND MEANS

Field trip to Dorset (UK)

OBSERVATION

Course fees include accommodation and transportation during the field trip

COORDINATOR

Laurence Bove

AGENDA

INTRODUCTION — 1 d

General introduction to petroleum geology
Place of exploration in the petroleum industry
Concepts and techniques used in petroleum exploration
Mechanisms of sedimentary basins formation
Infilling and deformation of sedimentary basins
Geophysical, geological, geochemical and wire line logging methods

FIELD TRIP — 3 d

The field trip unfolds along the scenic cliffs of the south coast of Devon and Dorset
The two most important topics are:
Basin analysis (Weld and Channel Basin) from Permian and Tertiary times and building
Petroleum system of the neighboring Wytch Farm oil field:
Continental deposits (Permian): horst, graben and faults
Dawlish: alluvian fan and dunes deposition
Landram bay: braided rivers - Sherwood sandstones
Bridport sands: shallow marine environment and diagenesis
Langton Herring: limestones
Osmigton Mills: oil seepages

CONCLUSION — 1 d

The last day of the course is a synthesis of observations made and an introduction to reservoir characterization, using geological and geophysical methods

In-house course. Contact: gre.rueil@ifptraining.com

Geosciences Field Trip

E-910

ENGLISH: GEOT / CARBFT

Static Model Construction: Field Constraints and Integration with Subsurface Data

5 DAYS

Organized in collaboration with Cambridge Carbonate Ltd

PURPOSE

The Jurassic outcrops of Eastern Paris Basin are exceptional quality analogues for several producing oil fields, especially regarding sequence stratigraphy features and typical carbonate platforms architecture. Recent diagenetic and petrophysical investigation performed on selected outcrops and in equivalent subsurface provide a unique opportunity of proposing an updated, complete and integrated overview of shallow marine carbonates This 5-day field course proposes an excellent review of the constraints to the static model in the field and the integration of outcrop observation with subsurface data: sedimentary architectures, and distribution and evolution of petrophysical properties through diagenesis

AUDIENCE

Geologists, geophysicists, petrophysicists or reservoir engineers

LEARNING OBJECTIVES

Recent works carried out on Andra's request (French National Agency for Radioactive Waste Management) allowed a deep geological reappraisal of the Jurassic of the Eastern Paris Basin, and brought new insights about the Jurassic petroleum system. A geological and petrophysical static model was performed over a large area centered on the main zone of interest, along an extended stratigraphic interval (Bajocian to Kimmeridgian) The aim of this field trip is to follow, through the entire stratigraphic interval, the evolution of the various depositional environments, sedimentary facies and geometries in a constrained sequence-stratigraphic framework, which represents the geological model skeleton. This approach involves several outcrop studies and calls for a constant comparison with related subsurface data (cores, logs, seismic). The evolution of carbonate platform morphology and associated stratigraphic architectures are interpreted to define the sedimentary-inherited heterogeneity in the model In the present case study, a limited number of RCA data (<300) were available and an innovative workflow was developed to incorporate a large set of NMR logs (Nuclear Magnetic Resonance) to populate the petrophysical model. In parallel with the sedimentological and stratigraphic outcrop study, a review of the diagenesis which affected the carbonates is proposed so as to understand porosity and permeability distributions. All the key steps for robust static model construction are reviewed during the trip, always tying back geology and petrophysics A brief training/reminder on core and outcrop sketch logging in carbonates is scheduled during the trip

PREREQUISITE

Fundamentals of carbonate sedimentology may be a useful prerequisite, but a quick reminder can be organized in the field

WAYS AND MEANS

Outcrop sections (quarries), cores, well logs, thin section photographs, RCA data, NMR logs

OBSERVATION

Field trip: Lorraine region (North-Eastern France) along the main outcrops of Middle and Late Jurassic carbonates

COORDINATOR

Laurence Bove
Benoît Vincent (Cambridge Carbonate Ltd)

AGENDA

DAY 1

AM: Travel from Paris to Lorraine
PM: Presentation of the stratigraphic succession and of the aims of the trip
Early Bajocian platform: 1 quarry (2 quarries possibly) with illustration of coral bioconstructions, and inter-bioherms sedimentation. Integration with 3D seismic observations. Quick reminder of basics of carbonate sedimentology on site if required

DAY 2

AM: Late Bajocian flooding (flooding of the Early Bajocian carbonate platform), and subsequent establishment of Bathonian platform; discussion about forcing parameters on carbonate platform growths and demises. One type section in a quarry
PM: Bathonian platform outcrops (3) in distal (offshore), shoal (ooid shoal), and proximal environments; introduction to the local petrophysics (porosity, permeability, NMR, MICP…) and reservoir problematic. First integration and discussion of the 3D geological and reservoir model (input, controls on facies and poro-perm distribution in the Middle Jurassic carbonates)

DAY 3

Visit of the Andra Underground Research Laboratory (to be confirmed) + core store with examples of subsurface equivalent of what has been and will be observed on outcrops AND/OR outcrops illustrating the return of carbonate sedimentation after the Callovian-Oxfordian marls, and the establishment of the Oxfordian platform; discussion about forcing parameters on carbonate platform growths and demises

DAY 4

Visit of quarries (2 or /3) to illustrating the evolution of the Oxfordian/Kimmeridgian platform evolution; discussion about the evolution of the architecture of the platform, and of distribution of depositional environments distribution
Introduction to the local petrophysics (porosity, permeability, NMR, MICP…) and reservoir problematic. Second integration and discussion of the 3D geological and reservoir model (input, controls on facies and poro-perm distribution in the Upper Jurassic carbonates)

DAY 5

AM: Optional quarry AND/OR local gastronomy specialties
PM: Travel back to Paris

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	02 - 06 Juin	Lorraine region	3 400 €	GRE	gre.rueil@ifptraining.com

Two possible sessions can be scheduled on request in spring (April-June) or autumn (September-October)

Schlumberger
HYDRO TEST
09-08-03
MAWP 30 P.S.I

Drilling - Completion - Well Control

Drilling - Completion - Well Control
Drilling / Completion

E-410

ENGLISH: FOR / INFORE
FRENCH: FOR / INFORF

Drilling Fundamentals

5 DAYS

PURPOSE

To provide a comprehensive overview of drilling techniques and operations

AUDIENCE

Engineers and technicians interested but not involved in drilling: geologists; geophysicists; reservoir engineers; completion, production and process staff; platform designers; economists, etc.

LEARNING OBJECTIVES

- To acquire the vocabulary specific to drilling
- To review drilling operations and equipment
- To learn about roles and responsibilities of different professionals involved in drilling

WAYS AND MEANS

Visit to a drilling site (when the course is delivered in Rueil, practical illustration is provided by a video)

OBSERVATION

Kindly refer to the following complementary courses which might be of interest: "Introduction to Reservoir" (cf. E-350), "Well Completion and Servicing" (cf. E-411), "Oil & Gas Field Processing" (cf. E-501)

COORDINATOR

Jean Beaume

AGENDA

ORGANIZATION OF DRILLING OPERATIONS — 0.5 d

Drilling principle
Cost, duration of a drilling job
Different people involved, types of contracts
Safety

WELL ARCHITECTURE — 0.5 d

Reservoir notions
Functions of different casings
Parameters to be taken into account to determine well architecture
Examples of architectures

DRILLING PRINCIPLES - EQUIPMENT — 1.5 d

Different types of bits
Drilling string
Drilling rig
- Hoisting function and equipment
- Pumping function and equipment
- Rotating function and equipment
- Power function

Mud and solid treatment
BOP

SPECIAL OPERATIONS — 1.25 d

Cementing operations
Wellhead
Directional drilling
Well control
Fishing jobs
Wireline logging, well test (DST)

DRILLING ON A SIMULATOR (PAU) — 0.25 d

Use of a well control simulator to show the drilling operations (tripping, drilling, running of casings)

OFFSHORE DRILLING OPERATIONS — 0.25 d

Different types of rigs
Problems related to their use

WELL COMPLETION — 0.25 d

Reservoir-wellbore interface
Equipment for flowing wells
Well intervention

VISIT OF A DRILLING SITE — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 15 - 19	Rueil	3,070 €	FP	fp.pau@ifptraining.com
EN	Nov 24 - 28	Rueil	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling / Completion

E-411

ENGLISH: PRO / INPFE
FRENCH: PRO / INPFF

Well Completion and Servicing — 5 DAYS

PURPOSE

To provide a comprehensive overview of completion and well intervention operations

AUDIENCE

Engineers and technicians, from operating or service companies, interested but not involved in well completion or servicing: geologists, geophysicists, reservoir engineers, drillers, production and process staff, platform designers, economists, etc.

LEARNING OBJECTIVES

- To understand the connections between reservoir and completion
- To understand main configurations and techniques of completion
- To review advantages and issues of various techniques
- To acquire the language to communicate efficiently with oil and gas service companies and equipment suppliers

WAYS AND MEANS

Well control on a simulator
Equipment and cutaway tools display
Exercises, role-playing sessions, project and case studies
Summary notes prepared and presented by the participants
Upon successful completion of a knowledge test, the IWCF "Well Control" Certificate is delivered

OBSERVATION

Kindly refer to the following complementary courses which might be of interest: "Introduction to Reservoir Engineering" (cf. E-350), "Drilling Fundamentals" (cf. E-410), "Oil & Gas Field Processing" (cf. E-501)

COORDINATOR

Denis Perrin

AGENDA

NECESSARY FUNDAMENTALS OF RESERVOIR ENGINEERING FOR COMPLETION — 0.75 d

Introduction: area concerned by completion, main steps
Geological trap, rock properties
Fluid behavior
Reservoir characterization, well testing
Recovery mechanisms

NECESSARY FUNDAMENTALS OF DRILLING FOR COMPLETION — 0.25 d

Drilling and casing program, casing cementing
Wellhead and safety equipment (BOP)

INTRODUCTION TO COMPLETION — 0.5 d

Concerned area, main steps (for memory)
Main factors influencing completion design
Completion configurations: requirement, main configurations

WELL PRODUCTIVITY & RESERVOIR-WELLBORE INTERFACE (PART 1) — 0.75 d

Overall approach of the well flow capacity:
- Inflow and outflow performance
- Need for artificial lift

Drilling (and casing) of the pay zone: specific aspects
Problems linked to restoring the cement job
Perforating: principle, main methods

EQUIPMENT OF NATURALLY FLOWING WELLS — 1 d

Functions to be carried out and corresponding pieces of equipment, main configurations of production string(s)
Technology and handling of main pieces of equipment: production well head, tubing, packer, downhole devices, subsurface safety valve
Running in hole procedure
Present trends: fullbore, (…), intelligent completion

RESERVOIR-WELLBORE INTERFACE (PART 2) — 0.75 d

Stimulation: acidizing, hydraulic fracturing
Sand control
Horizontal drain specificity: interest, reservoir-wellbore interface

ARTIFICIAL LIFT — 0.5 d

Sucker rod pumping and electrical submersible pumping: principle, main components, factor to consider for design, operating problems
Continuous gas lift: principle, factor to consider for design, unloading, operating problems
Field of application

WELL SERVICING AND WORKOVER — 0.5 d

Main jobs: measurement, maintenance, workover
Operations on live wells: wireline, coiled tubing, snubbing
Operations on killed wells: workover

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 01 - 05	Rueil	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling / Completion

E-412

ENGLISH: FOR / FOFPE
FRENCH: FOR / FOFPF

Drilling and Completion Engineering

98 DAYS

PURPOSE

To provide an in-depth, practical understanding of drilling and completion techniques, operations, equipment and procedures

AUDIENCE

Young engineers involved in drilling and completion, supervisors, tool pushers

LEARNING OBJECTIVES

- To assist in drilling/completions operations on site; and, with some experience, manage those operations
- To define a drilling/completion program; and, with some on-site experience, design and implement such a program
- To pass the IWCF "Combined Surface/ Subsurface BOP Stack" Test

WAYS AND MEANS

Drilling simulator
Well control on a simulator
Equipment and cutaway tools display
Exercises, role-playing sessions, and case studies
Summary notes prepared and presented by the participants
10-day drilling / completion project, ending with a presentation to a jury
Site visits
Knowledge assessment on a weekly basis

OBSERVATION

This training program is made up of two complementary training programs: "Drilling Engineering" (cf. E-413) and "Completion Engineering" (cf. E-414)
The training includes several modules; each one can be attended independently

COORDINATOR

Rémi Ferrière
Denis Perrin

AGENDA

MODULE 1 - GEOLOGICAL FIELD TRIP FOR DRILLERS (cf. E-416)	**5 d**
MODULE 2 - COMMON FUNDAMENTALS FOR DRILLING AND COMPLETION (cf. E-419)	**5 d**
MODULE 3 - WELL PRODUCTIVITY & RESERVOIR - WELLBORE INTERFACE (cf. E-451)	**5 d**
MODULE 4 - WELL COMPLETION EQUIPMENT AND PROCEDURES (FOR FLOWING WELLS) (cf. E-453)	**5 d**
MODULE 5 - WELLBORE TREATMENTS (cf. E-455)	**5 d**
MODULE 6 - ARTIFICIAL LIFT & WELL INTERVENTION FUNDAMENTALS (cf. E-458)	**5 d**
MODULE 7 - WELL ARCHITECTURE AND EQUIPMENT (cf. E-420)	**5 d**
MODULE 8 - DRILLING FLUIDS (cf. E-441)	**5 d**
MODULE 9 - CEMENTING PRACTICES (cf. E-443)	**5 d**
MODULE 10 - BIT, DRILLING STRING AND FISHING WHILE DRILLING (cf. E-421)	**5 d**
MODULE 11 - DIRECTIONAL AND HORIZONTAL DRILLING (cf. E-425)	**5 d**
MODULE 12 - RIG & BOP'S AND WELL CONTROL EQUIPMENT (cf. E-422)	**5 d**
MODULE 13 - WELL TEST OPERATION (cf. E-452)	**5 d**
MODULE 14 - DRILLING DATA AQUISITION (cf. E-423)	**5 d**
MODULE 15 - WELL CONTROL (cf. E-471)	**5 d**
MODULE 16 - GEOMECHANICS FOR DRILLING OPERATIONS (cf. E-426)	**3 d**
MODULE 17 - DEEPWATER DRILLING AND DEVELOPMENT (cf. E-428)	**5 d**
MODULE 18 - HSE: HEALTH - SAFETY - ENVIRONMENT (cf. E-424)	**5 d**
MODULE 19 - DRILLING AND COMPLETION PROJECT Well architecture Completion design Casing and tubing calculations Fluids and cementing design Chronology of operations Presentation to a jury	**10 d**

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 10 - Jun 27	Pau	38,700 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling / Completion

E-413

ENGLISH: FOR / FOFPFE
FRENCH: FOR / FOFPFF

Drilling Engineering

83 DAYS

PURPOSE

To provide an in-depth, practical understanding of drilling techniques, operations, equipment and procedures

AUDIENCE

Young engineers involved in drilling and completion, supervisors, tool pushers

LEARNING OBJECTIVES

- To assist in drilling operations on site; and, with some experience, manage those operations
- To define a drilling program; and, with some on-site experience, design and implement such a program
- To pass the IWCF "Combined Surface/ Subsurface BOP Stack" Test

WAYS AND MEANS

Drilling simulator
Well control on a simulator
Equipment and cutaway tools display
Exercises, role-playing sessions, and case studies
Summary notes prepared and presented by the participants
10-day drilling project, ending with a presentation to a jury
Site visits
Knowledge assessment on a weekly basis
Upon successful completion of a knowledge test, the IWCF "Well Control" Certificate is delivered

COORDINATOR

Rémi Ferrière

AGENDA

MODULE 1 - GEOLOGICAL FIELD TRIP FOR DRILLERS (cf. E-416)	**5 d**
MODULE 2 - COMMON FUNDAMENTALS FOR DRILLING AND COMPLETION (cf. E-419)	**5 d**
MODULE 3 - WELL PRODUCTIVITY & RESERVOIR - WELLBORE INTERFACE (cf. E-451)	**5 d**
MODULE 7 - WELL ARCHITECTURE AND EQUIPMENT (cf. E-420)	**5 d**
MODULE 8 - DRILLING FLUIDS (cf. E-441)	**5 d**
MODULE 9 - CEMENTING PRACTICES (cf. E-443)	**5 d**
MODULE 10 - BIT, DRILL STRING AND FISHING WHILE DRILLING (cf. E-421)	**5 d**
MODULE 11 - DIRECTIONAL AND HORIZONTAL DRILLING (cf. E-425)	**5 d**
MODULE 12 - RIG & BOP'S AND WELL CONTROL EQUIPMENT (cf. E-422)	**5 d**
MODULE 13 - WELL TEST OPERATION (cf. E-452)	**5 d**
MODULE 14 - DRILLING DATA AQUISITION	**5 d**
MODULE 15 - WELL CONTROL (cf. E-471)	**5 d**
MODULE 16 - GEOMECHANICS FOR DRILLING OPERATIONS (cf. E-426)	**3 d**
MODULE 17 - DEEPWATER DRILLING AND DEVELOPMENT (cf. E-428)	**5 d**
MODULE 18 - HSE: HEALTH - SAFETY - ENVIRONMENT (cf. E-424)	**5 d**
MODULE 19 - DRILLING PROGRAM	**10 d**

Well architecture
Casing calculations
Fluids and cementing design
Chronology of operations
Presentation to a jury

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 10 - 28 & Mar 24 - Jun 27	Pau	32,280 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling / Completion

E-414

ENGLISH: PRO / FOFPCE
FRENCH: PRO / FOFPCF

Completion Engineering

63 DAYS

PURPOSE

To provide an in-depth, practical understanding of completion techniques, operations, equipment and procedures

AUDIENCE

Young engineers involved in drilling and completion, supervisors, tool pushers

LEARNING OBJECTIVES

- To assist in completion operations on site; and, with some experience, manage those operations
- To define a completion program; and, with some on-site experience, design and implement such a program
- To pass the IWCF "Combined Surface/ Subsurface BOP Stack" Test

WAYS AND MEANS

Well control on a simulator
Equipment and cutaway tools display
Exercises, role-playing sessions, and case studies
Summary notes prepared and presented by the participants
10-day completion project, ending with a presentation to a jury
Knowledge assessment on a weekly basis
Upon successful completion of a knowledge test, the IWCF "Well Control" Certificate is delivered

COORDINATOR

Denis Perrin

AGENDA

MODULE 1 - GEOLOGICAL FIELD TRIP FOR DRILLERS (cf. E-416) — 5 d

MODULE 2 - COMMON FUNDAMENTALS FOR DRILLING AND COMPLETION (cf. E-419) — 5 d

MODULE 3 - WELL PRODUCTIVITY & RESERVOIR - WELLBORE INTERFACE (cf. E-451) — 5 d

MODULE 4 - WELL COMPLETION EQUIPMENT AND PROCEDURES (FOR FLOWING WELLS) (cf. E-453) — 5 d

MODULE 5 - WELLBORE TREATMENTS (cf. E-455) — 5 d

MODULE 6 - ARTIFICIAL LIFT & WELL INTERVENTION FUNDAMENTALS (cf. E-458) — 5 d

MODULE 13 - WELL TEST OPERATION (cf. E-452) — 5 d

MODULE 15 - WELL CONTROL (cf. E-471) — 5 d

MODULE 16 - GEOMECHANICS FOR DRILLING OPERATIONS (cf. E-426) — 3 d

MODULE 17 - DEEPWATER DRILLING AND DEVELOPMENT (cf. E-428) — 5 d

MODULE 18 - HSE: HEALTH - SAFETY - ENVIRONMENT (cf. E-424) — 5 d

MODULE 19 - PROJECT ON COMPLETION PROGRAM — 10 d
Completion design
Tubing calculations
Fluids design
Chronology of operations
Presentation to a jury

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 10 - Mar 21 & May 05 - Jun 27	Pau	26,870 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-415

ENGLISH: FOR / PAWPCE

Practical Aspects of Well Planning and Costing

10 DAYS

PURPOSE

To provide a comprehensive overview of all steps one should take to properly plan and budget oil and gas exploration or development wells, from pre-planning with geoscientists all the way to delivery

AUDIENCE

Young engineers, drilling and completion superintendents already, or about to be involved in well design and planning

LEARNING OBJECTIVES

- To review the different parameters involved in oil or gas well planning
- To identify major concerns and plan for dealing with them
- To understand procedures and methods for designing oil or gas wells and preparing drilling programs
- To learn how to estimate drilling time and costs, along with corresponding margins of error
- To grasp importance of effective well engineering and planning
- To follow efficiently well planning and costing sequences

WAYS AND MEANS

Interactive course with case studies and practical exercises
A well case history will be used to build an AFE and a time drilling curve as a model for each section of this course

COORDINATOR

Mohamed Benzeghiba

AGENDA

WELL OBJECTIVES AND INPUTS TO THE DRILLING PROGRAM — 1 d
Typical objectives and inputs to an exploration or/and a development well program
Geological prognosis, geological evaluation program
Testing considerations, completion considerations
Practical examples of well design and program
Risks analysis: applied to the case study

CASING DESIGN: SHOE POSITIONING — 0.5 d
Pore pressure and fracture gradients, drilling hazards
Swab and surge considerations, kick tolerance
Selection of mud weights and casing seats, additional constraints
Practical examples

CASING DESIGN: CASING SELECTION — 1 d
Physical and mechanical properties of casings and casing connections
Use of the drilling data handbook
Casing string calculation, selection, criteria and practical examples
Casing running equipment

WELLHEAD DESIGN AND SELECTION — 0.5 d
Different wellheads in onshore and offshore environments, wellhead and BOP program

BITS PROGRAM — 0.5 d
Different types of bits, bit selection: bit records, cost per foot, bit hydraulics

DRILL STRING, COMPONENTS AND SELECTION — 1 d
BHA components and design criteria; drill string design criteria
Torque and drag modeling, hydraulic and pumping requirements

MUD AND CEMENT PROGRAM — 1 d
Drilling fluid types and characteristics, mechanical treatment equipment
Selection of mud program according to the well construction criteria
Cementing technology and procedures, cement and slurry design
Cementing program, cementing quality control

FORMATION EVALUATION PROGRAM — 0.5 d
Mud logging and cutting sampling, electrical logging, logging services requirements
Coring tools, procedures and coring program

DEVIATED WELLS DESIGN: DIRECTIONAL DRILLING METHODS AND TECHNOLOGY — 1 d
Surveying tools and technology, basic behavior of rotary assemblies
Directional drilling tools and technology, directional program
Surveying methods, trajectory calculation methods, uncertainty evaluation
Surveying tools and technology, basic behavior of rotary assemblies
Directional drilling tools and technology, directional program

RIG SELECTION — 1 d
Main drilling rig functions
Types of rigs, rig selection criteria
Rig contract and bidding process, logistics support of drilling operations
Well contract model

TIME ESTIMATE AND PROVISIONAL PROGRESS CURVE — 1 d
Typical rig times required for the different operations, drilling and tripping time, contingencies
Analysis of time curve plan for the case study

COST ESTIMATE AND AFE — 0.5 d
Drilling, formation evaluation and logistics contracts
Intangible costs, tangible costs, and contingencies
Establishing the well budget and AFE for case study well

CASE STUDY, PRACTICAL EXAMPLE OF WELL PLANNING AND COSTING — 0.5 d
The participants will be review the well planning and costing exercise used from a real case study

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 16 - 27	Rueil	6,080 €	FP	fp.pau@ifptraining.com
EN	Nov 17 - 28	Rueil	6,080 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-416

ENGLISH: FOR / FTFPE
FRENCH: FOR / FTFPF

Geological Field Trip for Drillers

5 DAYS

Classroom course with theoretical exercises and field trip observations in the Lacq gas province (Pau, South-West of France)

PURPOSE

To provide a practical understanding of petroleum systems that is useful for integrating geological constraints and rock properties in drilling strategies which ultimately improve drilling models and reduce risk

AUDIENCE

Non-geologists and drilling professionals with no experience in petroleum geology

LEARNING OBJECTIVES

- To review main components of a petroleum system
- To learn about most common facies rocks and their physical properties
- To grasp the scope and fundamentals of the petroleum trilogy
- To analyze deformations and constraints, and identify potential traps
- To deduce implications for drilling campaigns

WAYS AND MEANS

Training includes exercises and field trip observations in the Lacq gas province (Pau, South-West of France)

COORDINATOR

Jacques Negron

AGENDA

INTRODUCTION TO PETROLEUM GEOLOGY — 2 d

Basin and sedimentary rocks - Petroleum system

Sedimentary basin - Definitions, structure and terminology

Sedimentary rocks - Description and main facies - Comparison clastic versus carbonates - Sedimentary process

Petroleum system - Source rock, reservoir rock and seal rock - Trapping and migration process

Exercises: Interpretation of geological cross section, identification of the petroleum components, petroleum system building - Identification of potential prospects and implementation of 2 exploration wells - Analysis of limitations and drilling constrains

FIELD TRIP IN THE PYRENEAN LACQ FIELD (ACTIVE MARGIN BASIN) — 3 d

Presentation of the Lacq Basin - Relations with the Pyrenean structure

Structural overview of the Pyrenean chain - Geomorphology and structural context

Lacq: a petroleum system in the Jurassic - Lower cretaceous carbonate domain - Source, reservoir and seal rock

Structure of the reservoir, trapping and potential hydrocarbon migration

Sedimentary study of the upper cretaceous clastic formation

The turbidites of St Jean de Luz

- Detail of the sedimentary complex - Observation of the clastic deposits - Analysis of the deposit unit in a turbidite system (Bouma sequence) observation and comparison with carbonate series of the Lacq field
- Analysis of the turbidites' structure in St Jean de Luz - Syn and post sedimentary structures - Observation of "chair folding" - Dissymmetry of the folding - Notions of pressure / Stretching (laminated flanks) and under compacted zones
- Comparison with turbidites facies of Gan (South of Pau) - Notion of lateral facies variation - Conclusion

Synthesis and conclusions

Structural context of the Lacq gas field: An example of active margin basin in foothills domain

Elements of the Petroleum system of the Lacq gas field: an example of petroleum system in carbonate domain

The upper cretaceous turbidites system: interest of this facies analysis for understanding of the Pyrenean structure

Field observation of the turbidite series structure: interest and consequences for drilling purpose

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 10 - 14	Pau	3,070 €	FP	fp.pau@ifptraining.com

Drilling - Completion - Well Control
Drilling

E-419

ENGLISH: FOR / BACFPE
FRENCH: FOR / BACFPF

PURPOSE

To provide an overview of fundamental knowledge in drilling and completion (with a review of geology, formations and well pressure) as an introduction to the intensive training program "Drilling and Completion Engineering"

AUDIENCE

Young engineers involved in drilling and completion, supervisors, tool pushers

LEARNING OBJECTIVES

- To learn about different types of rock
- To understand the process of hydrocarbon formation and trapping
- To carry out well pressure calculations
- To assess uncertainties with regard to pressure measured while drilling

WAYS AND MEANS

Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Jean Beaume

Fundamentals of Drilling and Completion

5 DAYS

AGENDA

PETROLEUM GEOLOGY — 1.5 d

Earth structure, main rock components
Sedimentary rocks: origin, structure, classification
Sedimentation, tectonics and stratigraphy
Hydrocarbons: origin, formation, migration, traps

OVERBUDEN PRESSURE, PORE PRESSURE, FRAC PRESSURE — 1 d

Definitions
Causes of abnormal pore pressure
Detection of abnormal pore pressure
Determination of pore pressure: Eaton's method, equivalent depth method, ratio method
Determination of frac pressure, LOT

DRILLING FUNDAMENTALS — 1 d

Principle of drilling, functions of the drilling fluid, well architecture
Casing cementing
Wellhead and safety

HYDRODYNAMICS APPLIED TO WELL — 1 d

Hydrostatic pressure, pressure losses
Relation between static and circulating well pressures

KNOWLEDGE ASSESSMENT — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 17 - 21	Pau	3,070 €	FP	fp.pau@ifptraining.com

Drilling - Completion - Well Control
Drilling

E-420

ENGLISH: FOR / ARCHIE
FRENCH: FOR / ARCHIF

Well Architecture and Equipment

5 DAYS

PURPOSE

To provide a thorough and practical understanding of the methodology for designing a casing program

AUDIENCE

Young engineers, tool pushers, supervisors, other professionals involved or interested in well architecture

LEARNING OBJECTIVES

- To calculate different casing strings using the Drilling Data Handbook
- To select the right position of casing shoes
- To select the casings as per the constraints encountered while drilling
- To choose the right wellhead with regard to the casings used

WAYS AND MEANS

Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Didier Brigant

AGENDA

DRILLING AND CASING PROGRAM — 0.5 d

Role of casings
Parameters to be considered to determine well architecture
- Well type
- Pore and frac pressures
- Completion, lithology

Different types of casings
- Surface
- Intermediate
- Production

CHARACTERISTICS OF CASINGS — 0.5 d

Geometric, physical and mechanical properties of the pipes, the connections
Use of Drilling Data Handbook

SHOE POSITIONING — 0.75 d

Hypotheses to be considered, casing point - kick tolerance
Casing point - Kick tolerance
Examples and exercises

CASING STRING CALCULATION — 1 d

Principles and assumptions to remember for the different strings
Stress cases study
- Collapse
- Burst
- Tension
- Triaxial study
- Safety factors

Casing selection: examples and exercises

CALCULATION EXAMPLES — 1.75 d

Case studies

WELLHEAD — 0.5 d

Different elements
Wellhead assembly sequences

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 24 - 28	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-421

ENGLISH: FOR / OUTGARNE
FRENCH: FOR / OUTGARNF

PURPOSE

To provide an in-depth, practical knowledge of bit, drill string, and fishing techniques and equipment

AUDIENCE

Young engineers and supervisors, toolpushers with some experience in drilling

LEARNING OBJECTIVES

- To acquire the basic knowledge on the bit and the drill stem
- To carry out basic calculations on the drill stem
- To choose a drill stem
- To use the different elements of the drill stem
- To learn about main techniques and equipment used to solve a fishing problem while drilling

WAYS AND MEANS

Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Fabien Manuel

Bit, Drill String and Fishing While Drilling

5 DAYS

AGENDA

BIT — 1.5 d

Bit different types and classification
Bit use and drilling parameters
Dull grading
Bit nozzle selection
Bit selection
Visit of a Varel manufacturing unit

DRILL STRING — 1.75 d

Distribution of stresses in the drill stem, neutral point
Drill pipes: characteristics, limits of use, combination of stresses, buckling
Drill collars: characteristics, profile, threading, choice of diameter
Auxiliary equipment: kelly, heavy weight drill pipes, stabilizers
Drill string selection: first approach
Margin of overpull, equiresistant drill string, necessary length of DC
Visit of a Vam Drilling manufacturing unit

FISHING WHILE DRILLING — 1.5 d

Different problems found during drilling
Causes for sticking
Principles of the solutions to sticking
Fishing equipment lost in the well, main tools used
Avoiding sticking and losses of equipment in the wells

KNOWLEDGE ASSESSMENT — 0.25 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 14 - 18	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

E-422

ENGLISH: FOR / BOPE
FRENCH: FOR / BOPF

Rig, BOP's and Well Control Equipment

5 DAYS

PURPOSE

To provide a thorough, practical knowledge of rigs, BOP's and well control equipment

AUDIENCE

Young engineers and supervisors, toolpushers with some experience in drilling

LEARNING OBJECTIVES

- To acquire a good knowledge of drilling rigs and BOPs
- To learn about the use and limits of different pieces of equipment
- To select capacities and types of rig equipment
- To select BOPs, hydraulic units and auxiliary equipment

WAYS AND MEANS

Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Jean Beaume

AGENDA

RIG — 3 d

Description of the main functions
- Hoisting
- Pumping
- Rotating
- Power

Limits of use
Equipment selection through exercises:
- Choosing the drawworks, the drilling line, drilling line work
- Choosing the pumps as per the drilling program

BOPS AND WELL CONTROL EQUIPMENT — 2 d

BOP
- Functions
- Different types: ram BOP, annular BOP, inside BOP
- Technical field characteristics

Auxiliary equipment
- Accumulation and closing unit
- Choke manifold, chokes
- Mud gas separator

Equipment working test and pressure test
API rules
Exercises on BOP closing unit sizing

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 28 - May 02	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-423

ENGLISH: FOR / LOGFIE
FRENCH: FOR / LOGFIF

Data Aquisition during Drilling Operations

5 DAYS

PURPOSE

To provide a thorough, practical knowledge of openhole logging, mud logging and fishing while drilling

AUDIENCE

Young engineers and supervisors, toolpushers with some experience in drilling

LEARNING OBJECTIVES

- To understand, assess and interpret measurements made while drilling
- To learn about techniques and equipment used for coring during drilling operations
- To understand how to prevent kicks and drilling problems with mud logging data analysis
- To understand wireline and LWD technology with regard to log data analysis
- To appreciate the geoscientists' work in a quick-look log analysis at the rig site

WAYS AND MEANS

Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Jean Beaume

AGENDA

MUD LOGGING PARAMETERS — 2 d

Tasks of various professionals at the drilling site
Main documents carried out
Physical principles sensors used on well site
Mechanical parameters (WOH, WOB, RPM, ROP) & hydraulic parameters
Cuttings (sampling, cleaning & analysis)
Detection & evaluation of Oil & Gas shows while drilling
Carry out a section of geological log
Case study

CORING OPERATIONS — 0.5 d

Data collected with coring
Conventional coring operation
Cores bits and drilling strings for coring operations
Advanced coring technics: turbo-coring; soft formations coring; gel coring
Side wall coring with wire line
Oriented coring system
Storage and handling process for cores during surface recovery: cores cutting; preliminary well site analysis; storaging of cores

WELL LOGGING AND LOGGING WHILE DRILLING — 2 d

Definition of basic concepts used in log interpretation
Wireline logging
- Well site setup and log records operation
- Main logging tools and applications (caliper, GR, SP, resistivity, nuclear, acoustic)
- Quick-look interpretation: reservoir identification and characterization (lithology, porosity, fluid types, saturation)
- Case study

Logging While Drilling
- Main LWD sensors and measurements (directional, resistivity, nuclear, acoustic, pressure…)
- Applications for directional drilling, geosteering, formation evaluation, predictive pressure

Pressure measurement concepts
Different technics for sampling with wireline and LWD tools
Prevention actions to handle sampling operations

KNOWLEDGE ASSESSMENT — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 12 - 16	Pau	3,070 €	FP	fp.pau@ifptraining.com

Drilling - Completion - Well Control
Drilling

E-424

ENGLISH: FOR / HSEE
FRENCH: FOR / HSEF

HSE
Health - Safety - Environment

5 DAYS

PURPOSE

To provide a thorough understanding of drilling/completion risks, along with the methodical approach to risk analysis for mitigating the impact of those industrial risks

AUDIENCE

Young engineers and technicians involved or interested in drilling and completion operations

LEARNING OBJECTIVES

- To analyze risks related to products and equipment
- To understand risks related to operations and maintenance works
- To master typical safety management practices (preventive measures, protection)
- To analyze drilling/completion risks
- To prepare a mitigation plan
- To ensure high-level HSE standards during operations

WAYS AND MEANS

Simulation exercise
Role-playing sessions on a simulator in Pau
Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Didier Brigant

AGENDA

PROFESSIONAL ACTIVITY AND SAFETY — 0.25 d

List of the risks and the hazards of oil and gas activities
- Product-related risks
- Equipment-related risks
- Human factor-related risks

Consequences
- Accidents, human mistake
- Impact on the environment, occupational disease…

Industrial risk management

MAIN RISKS — 0.75 d

Flammability
- Explosive atmospheres (ATEX): flammable products, explosive limits and flash point
- Ignition sources: flame, self-ignition temperature, sparks and static electricity, pyrophoric products…
- Preventive measures and precautions against the ignition risks

Fluid behavior-related risks
- Vessel pressure and consequences of temperature variation
- Avoidance of risks through the correct use of equipment - Safety equipment

Risks for personnel
- Chemical risks
- Physical risks
- Preventive measures and protection - Personal Protective Equipment (PPE)

Risks when handling loads, assembling and disassembling a rig

RISK ANALYSIS IN DRILLING / COMPLETION OPERATIONS — 0.5 d

List of the risks during maintenance work
Hazards related to the use of equipment. Radioactive sources
Maintenance work on electrical equipment
Work permits

SAFETY MANAGEMENT - RESPONSIBILITIES — 0.5 d

Simultaneous operations management (SIMOPS)
Human factors in risk management - Responsibilities
Bridging document concept

ENVIRONMENTAL ASPECTS OF OIL AND GAS UPSTREAM — 0.5 d

RISK ANALYSIS - SAFETY ENGINEERING FUNDAMENTALS — 1.5 d

Introduction to risk assessment, identification of the major risks
Optimizing the layouts - Safety systems

HSE TRAINING PLAN ON A DRILLING RIG — 0.5 d

Basic HSE recap and training
Training exercises: well control, fire drill, rig evacuation

KNOWLEDGE ASSESSMENT — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 10 - 13	Pau	3,070 €*	FP	fp.pau@ifptraining.com

* Training plan for 5 days scheduled in 4 days for public holidays

Drilling - Completion - Well Control
Drilling

E-425

ENGLISH: FOR / FDTDHE
FRENCH: FOR / FDTDHF

PURPOSE

To provide a comprehensive knowledge on how to prepare efficiently and succeed in drilling a directional well

AUDIENCE

Drilling engineers, supervisors, tool pushers

LEARNING OBJECTIVES

- To learn about the equipment needed for directional drilling
- To design a directional well
- To calculate the trajectory of a deviated well in 2D
- To design the drill stem, with regard to a well's profile, in order to reach a target

PREREQUISITE

Course E-420 "Well Architecture and Equipment", or equivalent practical experience, is highly recommended

WAYS AND MEANS

Exercises
Application to a real case (project) for participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Fabien Manuel

Directional and Horizontal Drilling

5 DAYS

Successful preparation and drilling of a directional well

AGENDA

GENERALITIES — 0.75 d

Applications, terms and definitions
Well profiles, coordinates system
Trajectory control
Uncertainty calculation, anti-collision

DIRECTIONAL DRILLING EQUIPMENT — 0.75 d

Specific drilling equipment: downhole motors, rotary steerable system
Measuring equipment: MWD

DRILLING ENGINEERING — 2 d

Well planning
Limits of use of a drill string: buckling
Drill string design
Torque and drag calculation
Drilling fluids and cementing program
Logging
Well control

HORIZONTAL AND ERD — 1 d

ERD, multilateral and short radius

CASE STUDIES — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 22 - 25	Pau	3,070 €*	FP	fp.pau@ifptraining.com

* Training plan for 5 days scheduled in 4 days for public holidays

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-426

ENGLISH: FOR / GEOME

Geomechanics for Drilling Operations

3 DAYS

PURPOSE

To provide an understanding of Geomechanics solutions for mitigating and solving drilling problems

AUDIENCE

Engineers and supervisors involved in drilling and completion operations

LEARNING OBJECTIVES

- To acquire some knowledge on Geomechanics applied to drilling and completion operations
- To grasp through case studies some important drilling and wellbore issues with regard to Geomechanics

AGENDA

INTRODUCTION TO GEOMECHANICS — 0.25 d
What is Geomechanics?
Why Geomechanics?
Geomechanics Applications
How to apply Geomechanics?
Geomechanics application examples
The value of Geomechanics

BASIC ROCK MECHANICS PRINCIPLE — 0.25 d
Introduction in to Geomechanics
Elasticity, plasticity, poro-elasticity
Stress and strain
Rock failure criteria

ROCK MECHANICAL PROPERTY CHARACTERIZATION — 0.5 d
Laboratory tests in core sample
Empirical relationship
Log-derived mechanical properties

MUD WINDOW PREDICTION — 0.5 d
Why pore pressure prediction is important
Basic of pore pressure
Pore pressure determination methods

IN-SITU STRESS ANALYSIS — 0.5 d
Introduction to subsurface stresses
Overduben stress calculation
In-situ stress determination techniques
Summary

CASE STUDIES — 0.5 d
Anisotropy stress effect on wellbore
Thermal effect on wellbore stability
Breakout analysis
Wellbore collapse

FINAL TEST — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 26 - 28	Pau	3,420 €	FP	fp.pau@ifptraining.com

May be organized for a single company

COORDINATOR

Mohamed Benzeghiba

Drilling - Completion - Well Control
Drilling

E-427

ENGLISH: FOR / UBDE

Underbalanced and Managed Pressure Drilling: Applications, Design and Operations

5 DAYS

Drilling with non conventional method to enhance drilling performance and oil recovery

PURPOSE

To provide a comprehensive and practical knowledge of non-conventional techniques used in advanced drilling and completion processes to enhance drilling performance and oil recovery

AUDIENCE

Drilling and mud engineers, superintendents and supervisors, and all professionals involved in well planning and operation

LEARNING OBJECTIVES

- To deal with issues of narrow pore/fracture pressure gradient windows, lost circulation, abnormal pressures, kick/loss situations
- To drill wells in depleted reservoirs
- To acquire basic concepts of managed and underbalanced pressure drilling
- To review various managed pressure drilling methods and equipment
- To identify typical situations calling for managed pressure drilling and assess potential benefit
- To review typical applications, equipment and operation of underbalanced drilling

WAYS AND MEANS

Several case studies and examples are discussed

COORDINATOR

Mohamed Benzeghiba

AGENDA

BASIC PRINCIPLES OF MANAGED PRESSURE DRILLING — 1 d

History, objectives and definitions
Occurrence and implications of narrow pore and fracture pressures windows on well design and well control
Dynamic factors affecting bottom hole pressure
Mathematics and examples

MUD CAP DRILLING — 0.5 d

History of mud cap drilling
Pressurized and floating mud cap
Mud cap operation

MANAGED PRESSURE DRILLING EQUIPMENT — 0.5 d

Rotating control devices
Chokes
Drill pipe non return valves and down-hole annular valves
ECD reduction tools
Coriolis flow-meter, friction pump

MANAGED PRESSURE DRILLING USING PRESSURE AS PRIMARY CONTROL — 1 d

Introduction, open and closed back pressure systems
Automated back pressure system technology
Continuous circulating system technology

MANAGED PRESSURE DRILLING USING FLOW AS PRIMARY CONTROL — 1 d

Process description
Equipment and technology
Applications

UNDERBALANCED DRILLING — 0.5 d

Underbalanced drilling objectives and applications
Underbalanced drilling equipment and operations

CONCLUSION — 0.5 d

Advantages of managed and underbalanced drilling
Potential and limitations
Typical applications

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 17 - 21	Rueil	3,150 €	FP	fp.pau@ifptraining.com
EN	Dec 08 - 12	Rueil	3,150 €	FP	fp.pau@ifptraining.com

Drilling - Completion - Well Control
Drilling

E-428

ENGLISH: FOR / OFDWE
FRENCH: FOR / OFDWF

Deepwater Drilling and Development

5 DAYS

PURPOSE

To provide an in-depth, practical understanding of offshore drilling techniques, operations, equipment and procedures

AUDIENCE

Young engineers and supervisors, toolpushers with some experience in drilling

LEARNING OBJECTIVES

- To learn about different offshore rigs
- To learn about equipment specific to offshore drilling operations
- To understand the process of a subsea development

WAYS AND MEANS

Videos, animations
Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Jean Beaume

AGENDA

OFFSHORE SPECIFICITIES — 3 d

Offshore rig description: jack up, anchored and dynamic positioning floating platforms
Limits of use of the rigs
Specific equipment for floating platforms
Mud line suspension
Subsea well head and equipment
BOP, BOP closing unit, risers, positioning
Subsea Xmas tree and equipment
- General overview
- Different types: vertical, horizontal
- Comparison
- Running procedures
- Examples

SUBSEA FIELD DEVELOPMENT — 2 d

Typical subsea development schematic
- Tie back
- Deepwater stand-alone development
- Subsea field layout
- Production control system

Well architecture for deepwater well
- Typical drilling
- Casing programs

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 02 - 06	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-429

ENGLISH: FOR / WHEADE
FRENCH: FOR / WHEADF

Wellhead and Blowout Preventers

3 DAYS

PURPOSE

To provide thorough information on wellhead, BOP stack characteristics and well control equipment

AUDIENCE

Engineers, technicians interested in well control

LEARNING OBJECTIVES

- To choose the equipment (wellhead, BOP, ancillary equipment) to design a well
- To detect operating problems
- To check the equipment used

WAYS AND MEANS

Videos and animations showing how equipment works

COORDINATOR

Didier Brigant

AGENDA

ONSHORE WELLHEAD AND BLOWOUT PREVENTERS — 1.5 d

Onshore wellhead
- Functions, principles and technology
- Setting procedure
- Evolution of the wellhead according to drilling phase

Blowout preventers
- Function and different types
- Characteristics and technology

AUXILIARY EQUIPMENT — 1 d

Closing and accumulation hydraulic unit
Choke manifold, chokes, valves…
Mud gas separator

SUBSEA EQUIPMENT — 0.5 d

Wellhead, BOPs
Risers
Subsea BOP closing system
API rules
Exercises on subsea BOP closing system sizing

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Drilling

E-430

ENGLISH: FOR / STUCKPIPE

Stuck Pipe Prevention

5 DAYS

Utilize preventive measures to avoid getting stuck and identify warning signs of impending problems

PURPOSE

To provide a practical understanding of the preventive measures to implement while drilling to avoid having a pipe stuck

AUDIENCE

Young engineers and supervisors, toolpushers with some experience in drilling

LEARNING OBJECTIVES

- To identify warning signals of potential stuck pipe incidents or hole problems
- To understand the problems that can lead to a pipe getting stuck
- To identify and interpret efficiently any signal received while drilling
- To learn how to take evasive actions and implement preventive measures
- To learn how to deal effectively with stuck pipes
- To assess importance of teamwork, communication and accurate reporting in avoiding NPT

COORDINATOR

Xavier Gueyraud

AGENDA

INTRODUCTION, GEOLOGY AND ROCK MECHANIC REMINDER — 0.75 d

Statistics about NPT
Rock structure, mineralogy, main characteristics of sedimentary rock
Rock mechanic: stress in the ground, stress effect on hole stability
Rock mechanic and hole stability exercises

DRILL STRING LIMITS, MUD AND HOLE CLEANING REMINDER — 0.5 d

Drill string characteristics, overpull margin, buckling
Mud and hole cleaning: rheology and hole trajectory influence on hole cleaning
Methods to assess the quality of the hole cleaning
Methods to improve the hole cleaning

CAUSES OF STUCK PIPE — 0.5 d

Differential sticking
Differential sticking exercises: calculation of the force to apply to free the pipe
Mechanical sticking due to equipment and to the formation

WARNING SIGNS OF STUCK PIPE OCCURRENCE — 0.5 d

Example for case study: determination and analysis of causes of stuck pipe

METHODS TO FREE THE DRILL STRING — 1.5 d

Determination of the stuck point, exercises
Jarring: hydraulic and mechanical jar
Exercises on mechanical jar adjustment
Differential pressure reduction, exercises
Use of lubricant pills
Back off, exercises

PROCEDURE FOR A FISHING JOB — 0.5 d

Description, function and utilization of different fishing equipment

PREVENTIVE MEASURES — 0.75 d

How to avoid stuck pipe and prevent drill string rupture while drilling and stripping
Choices in planning fishing operation

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 12 - 16	Pau	3,070 €	FP	fp.pau@ifptraining.com
EN	Sep 08 - 12	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Drilling

E-432

ENGLISH: FOR / FDTDH2E

Advanced Directional Drilling and BHA Design

5 DAYS

PURPOSE

To deepen understanding of and develop practical skills in directional drilling and BHA design

AUDIENCE

Experienced engineers and drilling supervisors, with some basic knowledge in directional drilling and BHA design

LEARNING OBJECTIVES

- To anticipate and analyze the behavior of directional BHA (Rotary / Steerable Motor / RSS) and that of the drill bit coupling
- To evaluate, and take appropriate decisions about, directional drilling proposals
- To understand the technical challenges one faces when considering directional drilling
- To assess why drillstring mechanics analyses are complex; and particularly so with deviated wells, ERD and HPHT
- To learn about issues of pipe dynamics

COORDINATOR

Fabien Manuel

AGENDA

GENERALITIES — 1 d

Introduction to directional drilling
Directional theoretical background
Data management and introduction to drillscan software
Description of RSS and steerable Motor BHAs

BHA MANAGEMENT — 1 d

BHA design (simplified BHA design, automatic simplified BHA design)
BHA pre-analysis (detailed BHA designs - PDM, RSS, underreamer, MWD…)
Directional sensitivity analysis (motor & RSS directional case studies)
Introduction to directional post-analysis

DIRECTIONAL POST-ANALYSIS AND SAG MANAGEMENT — 1 d

Directional post-analysis (motor BHA case study)
Directional post-analysis (RSS directional case study)
SAG management (theoretical background)
SAG management case studies (pre-analysis, SAG correction)

DRILLING ENGINEERING — 1 d

Torque & drag models (soft-string & stiff-string models)
Torque & drag & buckling theoretical background (tripping/drilling phases, critical buckling loads, distribution of stresses along the drill string)
Torque & drag & buckling calculations (case study 1)
Torque & drag & buckling calculations (case study 2)

DYNAMICS — 0.75 d

Dynamic modal analysis (theoretical background)
Dynamic case studies (single depth & multiple depths)
Evaluations
Corrections and questions

KNOWLEDGE TEST — 0.25 d

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Fluids

E-441

ENGLISH: FLU / FLUE
FRENCH: FLU / FLUF

Drilling Fluids

5 DAYS

PURPOSE

To provide a comprehensive understanding of drilling fluids characteristics

AUDIENCE

Drilling and completion professionals involved in drilling and engineering

LEARNING OBJECTIVES

- To acquire a thorough knowledge of drilling fluids and rheology
- To learn how to choose the right equipment for solid removal
- To learn how to communicate efficiently with a drilling fluid specialist

WAYS AND MEANS

Exercises
Application to a real case (project) for participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Gérald Gachet

AGENDA

FUNCTIONS OF DRILLING FLUIDS — 0.5 d

PHYSICAL AND CHEMICAL CHARACTERISTICS — 1.5 d

Specific gravity
Rheology
Filtration
Alkalinity
Chloride
Hardness

TYPES OF FLUIDS — 1 d

Water base mud
Oil base mud

SHALE INHIBITION — 0.5 d

Types of shale
Chemical and physical inhibition

MECHANICAL AND WASTE TREATMENT — 0.75 d

Function
Selection of equipment and layout
Separation ranges
Overall efficiency
Waste treatment
- Solidification
- Reinjection
- Desorption

TROUBLESHOOTING — 0.75 d

Losses
- Detection
- Analysis and decision chart
- Treatment

Hole cleaning
- Vertical well
- Deviated and horizontal wells

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 31 - Apr 04	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Fluids

E-442

ENGLISH: FLU / FLUPGE
FRENCH: FLU / FLUPGF

Designing a Mud Program

5 DAYS

PURPOSE

To provide the knowledge and skills needed to design a mud program

AUDIENCE

Drilling professionals designing or using mud programs

LEARNING OBJECTIVES

- To acquire the basic rules to design a mud program
- To understand the importance of drilling fluids when drilling a well
- To select a drilling fluid adapted to local constraints
- To learn how to find the information needed
- To organize the technical data within a program

WAYS AND MEANS

Trainees practice by designing and presenting a mud program

COORDINATOR

Gérald Gachet

AGENDA

DRILLING FLUIDS — 1 d

Function of drilling fluids
Different types of fluids
- Water base mud
- Oil base mud
- Completion fluids

Characteristics of drilling fluids
- Physical
- Chemical
- Controls

Mechanical treatment equipment
- Type
- Functions
- Efficiencies

CONSTRAINTS, SELECTION — 1 d

Geological, legal, environmental constraints
Location, accessibility
Selection of drilling fluids
Economic criteria
Potential problems (losses, kick…)
Selection of characteristics: physical, chemical
Selection of mechanical treatment equipment and overall efficiency

DESIGNING A PROGRAM — 3 d

Program analysis
Exercises on a given lithology, casing shoes and drilling phases known
Three phases
- Surface
- Intermediate
- Production

Selection of a drilling fluid
- Type
- Characteristics
- Volumes
- Logistics

Presentation and result analysis

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Fluids

E-443

ENGLISH: FLU / CIM1E
FRENCH: FLU / CIM1F

Cementing Practices

5 DAYS

PURPOSE

To provide the knowledge and skills needed to design a cementing program

AUDIENCE

Engineers, supervisors, and lab professionals involved or interested in cementing programs

LEARNING OBJECTIVES

- To master the vocabulary specific to cementing
- To understand and use primary cementing techniques and procedures
- To select cement and necessary additives
- To calculate major parameters in a cementing operation
- To assess the quality of a cementing job

WAYS AND MEANS

Exercises, videos
Application to a real case
Visit of a laboratory
Application to a real case (project) for participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Rémi Ferrière

AGENDA

TECHNIQUES AND JOB PROCEDURES — 1 d

Primary cementing
Cement job design
Job planning and preparation
Casing running
Cementing job
Cementing calculations

CEMENT AND SLURRIES — 1 d

Cement special slurries and additives
Formulation and laboratory tests
Rheology of mud and slurries

SPECIAL CASES — 1 d

Multistage cement job
Liner
Cement plugs

CEMENTING EQUIPMENT — 1 d

Pumps
Mixers
Cementing head

EVALUATION OF THE CEMENTING JOB — 1 d

Principles and interpretation of the cement logs
- Thermometry
- Sonic (CBL -VDL)
- Ultrasonic (USIT)

Log analysis on a real case

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 07 - 11	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Fluids

E-444

ENGLISH: FLU / CIM2E
FRENCH: FLU / CIM2F

Advanced Cementing Practices — 5 DAYS

PURPOSE

To deepen the understanding and develop the skills needed to design efficiently a cementing program

AUDIENCE

Engineers, supervisors involved in cementing programs

LEARNING OBJECTIVES

- To acquire a detailed knowledge of the different cementing techniques
- To address special cases: liner, highly deviated wells, gas zones
- To design a full cementing program for a real typical case
- To assess the quality of a cementing job

PREREQUISITE

Course E-443 “Cementing Practices”, or equivalent practical experience, is highly recommended

WAYS AND MEANS

Exercises
Teamwork on a project

COORDINATOR

Rémi Ferrière

AGENDA

TECHNIQUES AND JOB PROCEDURES — 1.5 d

Cementing program
Job planning and preparation
- Casing running
- Selection of the fluids and flows
- Cementing calculations
- Primary, surface, multistage, liner cementing
- Cement plugs

CEMENT AND SLURRIES — 1 d

Cement chemistry
Special slurries and additives
Formulation and laboratory tests
Rheology
Displacement in eccentered annulus
Salt zone and temperature problems

SPECIAL CASES — 0.5 d

Gas zone cementing
Deviated and horizontal wells cementing
Remedial techniques

CEMENTING PROJECT — 1 d

Design of a whole well cementing job

EVALUATION OF THE CEMENTING JOB — 1 d

Principles and interpretation of the cement logs
- Thermometry
- Sonic (CBL - VDL)
- Ultrasonic (USIT)

Logs analysis on a real case

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-451

ENGLISH: PRO / PPLCTE
FRENCH: PRO / PPLCTF

PURPOSE

To provide the knowledge and skills needed to optimize the reservoir-wellbore interface and well productivity

AUDIENCE

Young engineers involved in drilling/ completion, supervisors in charge of drilling pay zone, and production professionals concerned with well productivity

LEARNING OBJECTIVES

- To choose a reservoir-wellbore interface adapted to the conditions encountered in the reservoir
- To detect problems holding down productivity and select adequate solutions

WAYS AND MEANS

Numerous exercises on the influence of key parameters
Summary notes prepared and presented by the participants
Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Denis Perrin

Well Productivity & Reservoir - Wellbore Interface

5 DAYS

AGENDA

NECESSARY FUNDAMENTALS OF RESERVOIR ENGINEERING FOR COMPLETION — 1 d

Main parameters about the rock-fluid couple: porosity, permeability, saturation
Means of reservoir knowledge: core, logging, well test
PVT study: PV diagram, PT diagram, terminology (bubble point, dew point, R_s, B_o, B_g, GOR, WOR…)
Drainage mechanisms: primary, secondary and enhanced recovery

COMPLETION FUNDAMENTALS — 0.5 d

Completion: operations involved, main phases
Main factors influencing completion design
Completion configurations: fundamental requirements, main configurations

WELL PRODUCTIVITY (PART 1) — 1 d

Fundamentals: overall approach of the well flow capacity
- Inflow (study of the bottomhole pressure from the upstream side): main parameters, Productivity Index (PI), global skin and flow efficiency
- Outflow (study of the bottomhole pressure from the downstream side): case of oil wells and case of gas wells
- Analysis of inflow and outflow performance curves, need for artificial lift

RESERVOIR WELLBORE INTERFACE IMPLEMENTATION (EXCLUDING "WELLBORE TREATMENTS") — 1 d

Specific aspects linked to drilling and cementing the pay zone
Perforating: main techniques, key parameters for productivity
Specific case of horizontal drains

WELL PRODUCTIVITY (PART 2) — 1 d

Additional information about PI
- Productivity index and flow regime
- Inflow performance below bubble point pressure (IPR)

Additional information about skin
- Components of completion skin
- Damage skin estimation

SUMMARY NOTE — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 24 - 28	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Completion

E-452

ENGLISH: PRO / CEPE

Well Test Operation

5 DAYS

PURPOSE

To provide the required comprehensive knowledge and skills for implementing well tests

AUDIENCE

Drilling and production engineers, supervisors involved in well test operation; reservoir engineers

LEARNING OBJECTIVES

- To write an operational well test program with regard to the reservoir engineer's requirements
- To select the required well test equipment
- To supervise the well test operation

WAYS AND MEANS

Several practical examples and case studies

OBSERVATION

This course can be delivered in French, with documentation in English
Kindly refer to the complementary course which might be of interest: "Well Test Analysis" (cf. E-365)

COORDINATOR

Denis Perrin

AGENDA

WELL TESTING FUNDAMENTALS — 0.5 d

Principle and objectives of well testing
Basic data for predevelopment studies
Fundamentals of fluid flow in porous media

DRILL STEM TEST, PERFORATION AND WELL TESTING EQUIPMENT REVIEW — 2 d

Principle of DST operation
Principle of perforation operation
- Perforation methodology
- Equipment selection versus well configuration and objectives
- Perforation tools demo (movie)

DST string versus rig types
- Principle of DST String versus well testing objectives
- Composition of different DST strings

Principle of DST String
- DST String type composition review
- DST tools demo (movie)

Well testing operation and surface set up
- Surface equipment and set up
- Well testing sequences of operation
- Surface well testing equipment
- Well testing HSE concept
- Data acquisition
- Sampling
- Well testing calculations

PROGRAM IMPLEMENTATION, ORGANIZATION AND RESPONSIBILITIES, WELL ABANDONMENT, DST IN SUBSEA ENVIRONMENT — 2.5 d

DST operations and well test program implementation
- Standard procedures reviews versus DST string type
- Running in hole the DST string
- Brine selection and weight
- Selection of the ΔP on the formation
- Operation instructions review
- Sampling
- Cases studies

Organization on board of the rig, roles and responsibility
- Safety instructions
- Contingency plan

Well abandonment after DST operation
- Well killing operation
- Well abandonment and safety concerns

Principle of DST operation in subsea environment
- Deep water DST operations subsea equipment
- Deep water DST operations
- Deep water environment operation impact: wax deposition, paraffin, hydrates
- Deep water operations contingency plan
- DST tools demo (movie)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 05 - 09	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Completion

E-453

ENGLISH: PRO / EQTPEE
FRENCH: PRO / EQTPEF

Well-Completion Equipment and Procedures for Flowing Wells

5 DAYS

PURPOSE

To provide the knowledge and skills needed to choose and operate completion equipment for flowing wells

AUDIENCE

Drilling or production engineers, supervisors involved in completion

LEARNING OBJECTIVES

- To assess which equipment is required in a conventional case
- To design the corresponding completion procedure
- To acquire know-how needed to work on complex completion issues with specialists

WAYS AND MEANS

Equipment and cutaway tools display in Pau
For in-house courses held elsewhere, inasmuch as a completion shop is made available, a visit will be organized to the said shop
Summary notes prepared and presented by the participants
Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

COORDINATOR

Denis Perrin

AGENDA

WELL-COMPLETION EQUIPMENT — 1.5 d

Functions to be carried out and corresponding equipment
Production string(s) configurations (conventional or tubing less, single or multi-zones)
Production wellhead: tubing head spool and Christmas tree (components, design)
Tubing & connections (main characteristics, criteria of choice)
Packers and accessories (drillable or permanent, retrievable)
Bottom hole devices (landing nipples, circulating devices…) and relevant wire line equipment
Subsurface safety valve (subsurface controlled, surface controlled)

FUNDAMENTALS OF TUBING MOVEMENT & FORCES — 1 d

Point to be verified
Packer permitting free motion (tubing movement, tension on the tubing hanger)
Packer permitting no motion (packer to tubing force, tension on the tubing hanger)

WELL-COMPLETION PREPARATION & IMPLEMENTATION — 1.5 d

Preparing for operations
Safety recommendations during completion operations
Standard running-in and start-up steps
  Case of a packer set directly with the tubing string
  Case of a packer set prior to the running-in of the tubing string
Operating recommendations

ADVANCED COMPLETION — 1 d

Tubing less completion
Intelligent completion
Multilateral completion
Deep water completion
Single trip multizones gravelpack system

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 03 - 07	Pau	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Completion

E-454

ENGLISH: PRO / TUBMFE
FRENCH: PRO / TUBMFF

PURPOSE

To provide a thorough understanding of tubing movement and forces

AUDIENCE

Completion engineers or technicians

LEARNING OBJECTIVES

- To analyze data and decide which element(s) or parameter(s) of a completion equipment must be modified to solve problems related to tubing movement
- To write a completion program taking tubing behavior into account
- To analyze correctly a tubing behavior-related problem encountered during operation and provide an adequate solution

WAYS AND MEANS

Exercises and a large case study

COORDINATOR

Denis Perrin

Tubing movement & forces

3 DAYS

AGENDA

GENERAL PRINCIPLES — 0.5 d

Presentation of the problem
Parameters to be verified (worst place and case) and possible cures
Reference state and present states of the well, various conventions
Calculation principle
Computation of temperature and pressure changes

CASE OF A DOWNHOLE BINDING DEVICE PERMITTING FREE TUBING MOVEMENT — 1 d

Temperature effect
Ballooning effect
Piston effects (not including buckling)
Effect of the friction resulting from the fluid flow
Buckling effect
- Awareness to the key parameters
- Buckling criteria
- Location of the neutral point and determination of the movement resulting from buckling

Global effect: movement of the sliding binding device, tension force at the wellhead….

CASE OF A DOWNHOLE BINDING DEVICE PERMITTING NO TUBING MOVEMENT — 0.5 d

Calculation principle
Estimation of f_{link}
Determination of f_{link} taking buckling into account

CASE STUDY — 1 d

In-house course. Contact : fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-455

ENGLISH: PRO / TRAITE
FRENCH: PRO / TRAITF

PURPOSE

To provide knowledge and skills needed to examine well damage issues and take appropriate actions

AUDIENCE

Drilling or completion engineers, supervisors, lab or production professionals, non-specialists in wellbore treatment

LEARNING OBJECTIVES

- To identify the nature and the origins of well damage
- To choose the adequate stimulation method
- To learn how to deal with sand production and water coning

WAYS AND MEANS

Animations - Exercises
Visit of a rock mechanics and reservoir-wellbore interface laboratory
Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

OBSERVATION

Kindly refer to the following complementary courses which might be of interest:
"Matrix Acidizing" (cf.E-456) and "Basic Hydraulic Fracturing"(cf. E-457)

COORDINATOR

Rémi Ferrière

Wellbore Treatments

5 DAYS

AGENDA

INTRODUCTION TO WELLBORE TREATMENTS — 1 d

Fundamental reminders on productivity index (PI), the skin effect and flow efficiency, the different components of the skin
Productivity issues: cause of low productivity, nature and origins of well damage, location of problems and possible solutions
Damage due to fluids: mechanisms, prevention

MATRIX TREATMENT: ACIDIZING… — 1 d

Aims; how it works
Carbonate rocks and sandstones; inner characteristics, reactivity to injected fluids
Choosing the acids and the additives
Choosing the wells to be treated
Design: preparation, checks and guidelines during the operation, after the acidizing (flow back…), possible cause of failure, coiled tubing…

HYDRAULIC FRACTURING — 1 d

Aims and principles; candidate wells
Frac fluids and fracture propping
Calculation models and frac impact on PI
Design; program, frac evaluation
Other cases: pre-frac, minifrac, acid frac

SAND CONTROL — 1 d

Basics: consequences of sand, prediction of sand, sand analysis
Sand control techniques; case of mechanical processes (determining the gravel and the screens…)
Design: cased hole gravel packing, openhole gravel packing, preparing the gravel pack, various methods, guidelines

WATER OR GAS SHUT-OFF AND DEPOSITS — 0.5 d

Origin of the problems
Remedial

SUMMARY NOTE — 0.5 d

Debate around several examples
Case study

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 10 - 14	Pau	3,070 €	FP	fp.pau@ifptraining.com

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-456

ENGLISH: PRO / ACIDIFE
FRENCH: PRO / ACIDIFF

PURPOSE

To provide knowledge and skills needed to identify well damage issues in sandstone and carbonate reservoirs, and design acidizing programs

AUDIENCE

Drilling or completion engineers, supervisors, lab or production professionals, non-specialists in wellbore treatment

LEARNING OBJECTIVES

- To identify the nature and the origins of well damage
- To design an acidizing program
- To select the additives needed
- To set up the acid treatment program

WAYS AND MEANS

Exercises - Teamwork
Visit of a reservoir-wellbore interface laboratory

OBSERVATION

Kindly refer to the following complementary course which might be of interest: "Welbore Treatments" (cf. E-455)

COORDINATOR

Rémi Ferrière

Matrix Acidizing

5 DAYS

AGENDA

INTRODUCTION TO RESERVOIR TREATMENTS — 0.5 d

Fundamental reminders on the productivity index (PI), the skin effect and flow efficiency, the different components of the skin

FORMATION DAMAGE — 1 d

Productivity issues
- Cause of low productivity, nature and origins of the damage, location of the problems and possible solutions

Scale deposition
- Scale control and prevention

MATRIX TREATMENT: ACIDIZING CARBONATES — 1 d

Aims; how it works
Sandstones: inner characteristics, reactivity to injected fluids
Laboratory studies
Exercises

MATRIX TREATMENT: ACIDIZING SANDSTONES — 1 d

Aims; how it works
Sandstones: inner characteristics, reactivity to injected fluids
Choosing the acids

ACIDIZING ADDITIVES — 0.5 d

Review of the different additives (corrosion inhibitor, iron complexing agents, surfactants, solvents, etc.)
Selection of the additives

MATRIX TREATMENT DESIGN — 0.5 d

Candidate selection
Matrix design methodology
Diversion
Treatment evaluation

SUMMARY NOTE — 0.5 d

Other associated processes (water shut-off…)
Causes of failure in matrix acidizing
Case study

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 27 - 31	Rueil	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Completion

E-457

ENGLISH: PRO / HYDFRACE

Basic Hydraulic Fracturing

5 DAYS

PURPOSE

To provide a comprehensive overview of hydraulic fracturing operations

AUDIENCE

Drilling, completion or production engineers, supervisors, laboratory staff, not specialized in wellbore treatment

LEARNING OBJECTIVES

- To identify the impact of fracturing parameters on well productivity
- To grasp the essence of hydraulic fracturing
- To learn about materials, equipment and procedures used for fracturing
- To design hydraulic fracturing operations
- To measure the success of these operations

WAYS AND MEANS

Movie
Exercises

OBSERVATION

See also the course "Wellbore Treatments" (cf. E-455)

COORDINATOR

Rémi Ferrière

AGENDA

INTRODUCTION TO HYDRAULIC FRACTURING — 0.5 d

Productivity index, skin effect, flow efficiency
Damage in the formation and in the pack
Candidate selection

DESCRIPTION OF THE PROCESS — 0.5 d

In situ stress, fracture orientation and fracture propagation
Different types of pressures: net pressure, tortuosity, friction
Fluid leak-off, slurry efficiency, dimensionless fracture conductivity

FRACTURING FLUIDS, PROPPANTS AND FRACTURE CONDUCTIVITY — 1 d

Types of fracturing fluids
Types of proppants
Fluid and proppant selection

INPUT AND FRACTURE DESIGN — 1 d

Requirement for fracture design
Fracture growth analysis
Hydraulic fracturing models

EQUIPMENT AND PLACEMENT TECHNIQUES — 1 d

Surface pumping equipment
Placement techniques in vertical and horizontal wells
Planning and executing operation

FLOW BACK, FRACTURE MAPPING AND POST-JOB ANALYSIS — 0.5 d

Flow back techniques: wellhead isolation tool, frac valve
Mapping: well test, tracer and micro-seismic
Post-job evaluation

QUIZ, ASSESSMENT AND FEEDBACK — 0.5 d

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-458

ENGLISH: PRO / TAWOE
FRENCH: PRO / TAWOF

Artificial Lift and Well Intervention Fundamentals

5 DAYS

PURPOSE

To provide a comprehensive knowledge of artificial lift, workover implementation and killing procedures for a producing well

AUDIENCE

Participants attending the training program "Drilling and Completion Engineering" (cf. E-412)

LEARNING OBJECTIVES

- To choose the adequate artificial lift method with regard to some specific operational problems
- To choose the adequate well intervention method with regard to some specific operational problems
- To define a well killing program (pumping diagram)

WAYS AND MEANS

Exercises on key parameters of artificial lift
Design of a pumping diagram for killing a well
Case study for a workover program with an interactive game
Application to a real case (project) for the participants in the "Drilling and Completion Engineering" training course (cf. E-412)

OBSERVATION

Kindly refer to the following complementary courses which might be of interest: "Artificial Lift: Gas Lift" (cf. E-459), "Artificial Lift: Pumping" (cf. E-460) and "Well Servicing and Workover" (cf. E-462)

COORDINATOR

Denis Perrin

AGENDA

ARTIFICIAL LIFT BY CONTINUOUS GAS LIFT — 1 d

Continuous gas lift: principle, well unloading, operating procedure and troubleshooting, field of application

ARTIFICIAL LIFT BY PUMPING — 1 d

Sucker rod pumping, Electrical Submersible centrifugal Pumping (ESP): principle, specific completion equipment, operating procedure and troubleshooting, field of application

TYPES AND MEANS OF INTERVENTION ON PRODUCING WELLS — 1 d

Mains types of intervention: measurement, maintenance, workover
Main means (wire line unit, coiled tubing unit, snubbing unit, workover rig): principles, area of application

GENERAL PROCEDURE OF A WORKOVER — 0.5 d

Main operation steps: chronology, more tricky operations from a safety point of view, main operations
Case of depleted reservoirs: losses and formation damage, kick-off after the workover

WELL KILLING PROCEDURE FOR A PRODUCING WELL — 1 d

Killing the well by circulation: area of application, basis procedures (direct or reverse circulation), elaboration of the forward-looking pumping diagram
Killing by squeeze: area of application, basis procedure, elaboration of the operating program, case where the injectivity test is unsatisfactory, squeeze and bleed-off method
Final killing phase: observing the well, operations to run after packer "unsetting"

CASE STUDY: WORKOVER PROGRAM — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 17 - 21	Pau	3,070 €	FP	fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-459

ENGLISH: PRO / GLIFTE
FRENCH: PRO / GLIFTF

Artificial Lift: Gas Lift

5 DAYS

PURPOSE

To provide a comprehensive, practical knowledge of gas lift concepts, operations, equipment, and potential problems

AUDIENCE

E&P professionals involved in operating wells using gas lift

LEARNING OBJECTIVES

- To analyze gas lift operating conditions
- To improve well performance

WAYS AND MEANS

Practical exercises to grasp physical phenomena

OBSERVATION

Kindly refer to the following complementary course which might be of interest:
"Artificial Lift: Pumping" (cf. E-460)

COORDINATOR

Denis Perrin

AGENDA

FLOWING GRADIENTS - TUBING PERFORMANCE CURVES — 1 d

Well representation and nodal analysis
Inflow: Productivity Index (PI) and Inflow Performance Relationship (IPR) techniques
Outflow: vertical flowing pressure gradient curves in diphasic flow and Tubing Performance Curve (TPC)

INTRODUCING GAS LIFT SYSTEMS — 1 d

Principle and active parameters
Characteristics and advantages
Operating parameters determination: gas injection depth, pressure and rate
Determination of the absolute maximum flow rate versus GLR (gas-liquid ratio).
Optimization with time

GAS LIFT DOWN HOLE EQUIPMENT — 0.5 d

Valve mechanics and characteristics
IPO / Casing-operated gas-lift valves
PPO / Tubing-operated gas-lift valves
Conventional and Side Pocket Mandrel (SPM)
Miscellaneous valves and equipment

CONTINUOUS GAS LIFT DOWN HOLE EQUIPMENT DESIGN — 1.25 d

Side pocket mandrel spacing and valve selection
Manual (graphical) design
Standard completion designs and other possibilities (dual completion, macaroni / coiled tubing)

CONTINUOUS GAS LIFT OPERATION — 1 d

Well surface equipment
Unloading procedure
Operating recommendations
Surveillance and troubleshooting

INTRODUCTION TO PROSPER™ — 0.25 d

Overview of well performance software tool and methods
PROSPER™ methodology for gas-lift design and troubleshooting, manual application

In house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-460

ENGLISH: PRO / APOMPE
FRENCH: PRO / APOMPF

Artificial Lift: Pumping

5 DAYS

PURPOSE

To provide a comprehensive, practical knowledge of rod and centrifugal pumping concepts, design, operations, and potential problems

AUDIENCE

E&P professionals involved in operating wells using rod or centrifugal pumping

LEARNING OBJECTIVES

- To choose the most-suited pumping method
- To analyze operating conditions
- To improve well performance and manage equipment lifetime

WAYS AND MEANS

Exercises on equipment calculation

OBSERVATION

Kindly refer to the following complementary course which might be of interest:
"Artificial Lift: Gas Lift" (cf. E-459)

COORDINATOR

Denis Perrin

AGENDA

WHY ARTIFICIAL LIFT? — 0.5 d

Main parameters relative to reservoir and well performance curve: inflow and outflow
Need for artificial lift

SUCKER ROD PUMPING — 1.5 d

Principle, field of application, crucial parameters
Main specific equipment: surface Pumping Units (PU), downhole pumps, rodstring
Operating procedures and troubleshooting
Example of rodstring load calculation

ELECTRICAL SUBMERSIBLE CENTRIFUGAL PUMPING (ESP) — 2.5 d

Principle, field of application
Main specific pieces of equipment: pump, seal section/protector, electric motor selection, Variable Speed Drive (VSD) interaction
Operating procedures and troubleshooting (including PROSPER™ methodology)
Example of design
- Base case: oil "without problems"
- Specific cases: gassy oil well, ESP with VSD

OTHER METHODS AND PROCESS SELECTION — 0.5 d

Overview of other methods (hydraulic pumps, jet pumps, Progressive Cavity Pumps [PCP]): principle, fields of operation
Artificial lift methods comparison, benefits and limitations

In house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-461

ENGLISH: PRO / CTAE
FRENCH: PRO / CTAF

PURPOSE

To provide a comprehensive, practical knowledge of coiled tubing equipment and operations on a producing well

AUDIENCE

Engineers, supervisors, technicians from operating or service companies, involved in completion, workover and stimulation

LEARNING OBJECTIVES

- To learn about coiled tubing applications in completion and workover
- To design coiled tubing programs (wellbore treatment, logging, cementing, lifting and drilling)

WAYS AND MEANS

Exercises - Animations

COORDINATOR

Rémi Ferrière

Nitrogen & Coiled Tubing Operations in Completion and Workover

5 DAYS

AGENDA

BASIC DATA — 0.25 d

Importance of nitrogen in stimulation and workover
Importance of coiled tubing in completion and workover

NITROGEN - NITRIFIED ACID - FOAMED ACID — 1 d

Nitrogen (properties, basic formula for design)
Specifications for nitrogen storage and pumping equipment
Two-phase fluids and foams (properties, chart and tables for design, difference between foam and two phase fluids), diverting effect of foamed fluid
Stimulation methodology, flow back procedure

COILED TUBING EQUIPMENT (TECHNOLOGY, DIMENSION, WEIGHT) — 0.75 d

Main components: reel, injector, BOP, and related equipment
Auxiliary equipment: crane, pumping equipment, etc.
Down hole tools: connectors, safety equipment, circulating tools, down hole motor, fishing tools, inflatable packers, etc.
Guide for safe equipment rig-up

PIPE CHARACTERISTICS AND BEHAVIOR — 0.5 d

Geometric and mechanical properties: geometry, metallurgy, performance, characteristic curve
Tubing behavior (at surface, in hole): fatigue, buckling, tension and pressure limits (tubing force analysis, model for operation design)
Measuring and recording of operating parameters

COILED TUBING APPLICATIONS — 2 d

Kick off with nitrogen, underbalance perforating
Well clean out (fill removal, wax and hydrate removal)
Sand control
Matrix treatment: acid, solvent
Other applications: CT assisted DST, conveyed tool operations in high deviated well, use as producing, gas-lift or chemical injection string, fishing, underreaming, drilling
Statistics, economy, areas for future development

CEMENTING OPERATIONS WITH NITROGEN OR COILED TUBING — 0.5 d

Foamed cement: definition, use (primary cementing, squeeze)
Cementing through coiled tubing: cement plug, squeeze (squeeze slurry characteristics, job design, key-points)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 23	Rueil	3,070 €	FP	fp.pau@ifptraining.com
EN	Nov 03 - 07	Rueil	3,070 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Completion

E-462

ENGLISH: PRO / WSWOE

Well Servicing & Workover

5 DAYS

PURPOSE

To provide the required comprehensive knowledge and skills for well servicing and workover

AUDIENCE

Completion, well servicing or workover engineers and supervisors, with client or service companies, familiar with well control operations

LEARNING OBJECTIVES

- To select the right means for well intervention
- To write well servicing or workover programs
- To supervise well servicing or workover operations

WAYS AND MEANS

Two case studies are worked out: one for well servicing, and the other for workover

OBSERVATION

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

COORDINATOR

Denis Perrin

AGENDA

REASONS AND WELL INTERVENTION MEANS ON PRODUCTION WELL — 1 d

Intervention means classification
Well intervention main reasons
- Measurement
- Maintenance
- Well remedial and workover

Main intervention means: wireline, coiled tubing, snubbing, workover rig

REVIEW OF COMPLETION, WELLHEAD & BOP STACK SET UP — 0.5 d

Review of completion installation and equipment technology
- Standard completion
- Intelligent completion
- Multi-zone gravel pack completion
- Deep water completion fitted with sand control equipment

Review of wellhead set up
Review of BOP stack set up versus company rules

WELL SERVICING — 1.5 d

Safety issue during well servicing operations
Intervention equipment set up
Study of different well servicing cases
- Standard completion
- Tubing less completion
- Intelligent completion
- Multi zone gravel pack completion
- Deep water completion fitted with sand control equipment

Light intervention case study

WORKOVER — 2 d

Safety issue during workover operations
Main operations
- Well neutralization and means
- Xmas-tree removal
- Workover rig and BOP stack installation
- Workover operation
- Fishing operation
- Operation risk evaluation versus well operation cost and budget

Depleted reservoirs
- Losses and potential reservoir damage
- Well kick-off after well intervention

Study of different well workover cases
- Standard completion
- Tubing less completion
- Smart completion
- Multi zone gravel pack completion
- Deep water completion fitted with sand control equipment

Workover case study

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-463

ENGLISH: PRO / WELLPERFE

Well Performance

5 DAYS

PURPOSE

To provide a comprehensive understanding of well lift optimization

AUDIENCE

E&P technical staff involved in well operations
Reservoir engineers involved in field studies with productivity and artificial lift issues
Development engineers involved in conceptual design with well architecture and artificial lift

LEARNING OBJECTIVES

- To understand fundamentals of reservoir characteristics and fluid properties
- To understand main artificial lift concepts and methods
- To discover the relationship between these phenomena and well performance
- To analyze the impact of well completion and equipment on well performance
- To understand the crucial parameters in well performance

OBSERVATION

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

COORDINATOR

Denis Perrin

AGENDA

PVT AND RESERVOIR FUNDAMENTALS — 0.5 d

Oil and Gas PVT properties: bubble point, B_o, R_s, GOR, solids…
Reservoir rock & fluids: porosity, permeability, saturation, relative permeability, scales, corrosion
Reservoir behavior types

RESERVOIR-WELLBORE INTERFACE FUNDAMENTALS — 0.25 d

Pay zone drilling, completion (open hole, cased hole), perforating
Wellbore treatment: sand control, stimulations (acidizing, hydraulic fracturing)

INFLOW PERFORMANCE — 0.75 d

Flow in the reservoir: Productivity Index (PI), empirical Inflow Performance Relationship (IPR), horizontal wells
Back pressure equation for gas wells
Global skin: formation damage, perforation, partial penetration, deviation
Applications - Exercises

OUTFLOW PERFORMANCE — 0.75 d

Flow in the wellbore: pressure gradient and Vertical Lift Performance (VLP) curves
GLR, tubinghead pressure, tubing ID impact
Monophasic vs. polyphasic flow: minimum flowrate / well loading
Applications - Exercises

WELL PERFORMANCE — 1 d

Well deliverability nodal analysis: inflow x outflow
Well performance modeling, prediction and analysis vs. reservoir pressure, PI, GLR, BSW, tubing ID
Applications - Exercises

ARTIFICIAL LIFT — 1.5 d

Gas lift: fundamentals, unloading procedure, surveillance and troubleshooting
Electrical Submersible Pump (ESP): components, design, problems
Rod pumping and jet pumps fundamentals
Comparison of the artificial lift methods

INTRODUCTION TO PROSPER™ — 0.25 d

Overview of well performance software tool and methods
PROSPER™ methodology for gas-lift design and troubleshooting, manual application
PROSPER™ methodology for ESP troubleshooting

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-464

ENGLISH: PRO / WELLPERF2E

Advanced Well Performance

10 DAYS

PURPOSE

To provide the practical, comprehensive understanding and skills needed to master well performance and make significant contributions to field productivity studies and well performance monitoring

AUDIENCE

Reservoir, well performance or production engineers and technicians

LEARNING OBJECTIVES

- To acquire a practical understanding of reservoir, fluid properties, near-wellbore zone, well completion and facilities
- To understand main remediation/ stimulation and artificial lift methods
- To model, forecast, assess, troubleshoot and optimize well performance

WAYS AND MEANS

Use of the software program PROSPER™ (training license provided for the duration of the course)
Short lectures alternating with hands-on sessions
Course ends with a 2-day integrated case study

COORDINATOR

Denis Perrin

AGENDA

WEEK 1

INTRODUCTION TO PRODUCTION SYSTEM — 0.5 d

Introduction to well performance nodal analysis: inflow x outflow
Overview of PROSPER™ software workflow
PROSPER™: building initial well system file

PVT DATA / PVT MODELING — 0.5 d

Oil & Gas PVT properties: bubble point, B_o, R_s, GOR, solids…
PROSPER™: building PVT model

RESERVOIR PROPERTIES & RESERVOIR-WELLBORE INTERFACE — 0.5 d

Reservoir rock & fluids: porosity, permeability, saturation, relative permeability, scales, corrosion
Reservoir behavior type
Pay zone drilling, completion (open hole, cased hole), perforating
Wellbore treatment: sand control, stimulations (acidizing, hydraulic fracturing)

INFLOW PERFORMANCE / IPR MODELING — 1.5 d

Flow in the reservoir: Productivity Index (PI), empirical Inflow Performance Relationship (IPR)
Back pressure equation for gas wells
Global skin: formation damage, perforation, partial penetration, deviation
PROSPER™: IPR modeling exercise
Horizontal drains
PROSPER™: horizontal drain modeling

WELLBORE FLOW, OUTFLOW PERFORMANCE / VLP MODELING — 1 d

Flow in the wellbore: pressure gradient and Vertical Lift Performance (VLP) curves
GLR, tubinghead pressure, tubing ID impacts
Monophasic vs. polyphasic flow: minimum flow rate / well loading
PROSPER™: tubing correlations, VLP modeling
Flow in a choke

WELL PERFORMANCE — 1 d

Well deliverability nodal analysis: inflow x outflow
PROSPER™: IPR + VLP natural flow well performance modeling, prediction and analysis vs. reservoir pressure, PI, GLR, BSW, tubing ID

WEEK 2

ARTIFICIAL LIFT — 3 d

Gas lift: fundamentals, unloading procedure, surveillance and troubleshooting
PROSPER™: gas-lift design, prediction, analysis and diagnosis
Electrical Submersible Pump (ESP): components, design, problems
PROSPER™: ESP design, prediction, analysis and diagnosis
Rod pumping and jet pumps fundamentals
Comparison of the artificial lift methods

PROSPER™ CASE STUDY — 2 d

Application of PROSPER™ to one comprehensive case study, from PVT modeling and matching, IPR + VLP building and matching, to natural flow performance and gas-lift design / performance prediction

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - Dec 05	Rueil	7,060 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Completion

E-465

ENGLISH: PRO / BLPROSPER

Well Inflow & Outflow Performance

E-learning with personal coaching

8 WEEKS

PURPOSE

To deepen knowledge of well lift optimization and master use of the software program Prosper

AUDIENCE

Reservoir or well performance engineers and technicians

LEARNING OBJECTIVES

- To build a PVT model which will be used in a well performance study
- To analyze the link between reservoir characteristics and production
- To understand how wells can produce naturally
- To understand the main artificial lift methods and their use
- To model and understand crucial parameters of well performance
- To identify reasons for poor well performance

WAYS AND MEANS

Multimedia online learning with personal coaching
Before training starts, 2 hours are dedicated to introduce the training agenda, methods and tools
The exact needs and expectations of each participant are also assessed and discussed (MCQ and phone interview with the tutor)
During the training, individual phone contact with the tutor and web conferences with other participants
Use of the software program PROSPER™ (license not provided)

OBSERVATION

Total duration of the training is 32 hours, spread over an 8-week period

COORDINATOR

Denis Perrin
Catherine Ulrich (Blended Learning)

AGENDA

INTRODUCTION — 2.5 h
Well production optimization
PROSPER™ software

CHARACTERIZATION OF RESERVOIR FLUIDS - PVT — 2 h
Goal and application of PVT studies
Main oil and gas properties
PROSPER™ software PVT module

INFLOW PERFORMANCE RELATIONSHIP — 6.5 h
Modeling of flows in a porous medium
Modeling of the reservoir-wellbore interface
IPR calculation in the case of oil and gas reservoirs
Specific case of horizontal and deviated wells

NATURAL FLOWING WELLS — 7 h
Introduction to the specificities of multiphase flows
Choice of the adequate correlation
Modeling outflow performance
Nodal analysis of a reservoir well system

ARTIFICIAL LIFTED WELLS — 4.5 h
Introduction - Using the nodal analysis
Gas Lift system: description and design
Electrical Submersible Pump (ESP): presentation and design
Overview of other artificial lift methods

WELL PERFORMANCE DIAGNOSIS — 2.5 h
Production rate analysis of well flowing naturally
Production rate analysis of well activated with GL or ESP

CONCLUSION / CASE STUDY — 7 h

Upon request at distance. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-466

ENGLISH: PRO / WELINT

Well Production Integrity

2 DAYS

PURPOSE

To provide an introduction to well integrity concepts: "how to keep hydrocarbons in the pipe" by designing, operating and maintaining well equipment to ensure safe containment of all wellbore fluids over the lifetime of a well

AUDIENCE

Drilling, completion and production engineers and technicians

LEARNING OBJECTIVES

- To understand the importance and the concepts of well integrity
- To assess the link between well integrity and other key strategic efforts
- To review the key focus areas for well integrity assurance
- To appreciate the role of the production technician with regard to well integrity

WAYS AND MEANS

Videos and animations showing how equipment works
Practical exercises and knowledge assessment

COORDINATOR

Denis Perrin

AGENDA

WELL INTEGRITY DESIGN — 0.25 d

Well Construction/Completion: casing, tubing, cement, produced fluids
Wellhead and Tree Equipment: valves, seals, accessories
Safety valves: downhole, surface

WELL INTEGRITY OPERATIONS — 0.5 d

Monitoring and managing pressure
Flow assurance: corrosion, sand
Testing and maintenance: valves, accessories

OPERATIONS: YOUR ROLE — 0.25 d

Monitor well equipment tests
Perform well equipment tests
Ensure safety equipment is operational
Remember you are the first line of defense against Well Integrity failures

WELL INTEGRITY MAINTENANCE — 0.25 d

All Well Equipment
- Valves
- Safety Equipment
- Seals

Preparation and reinstatement

MAINTENANCE: YOUR ROLE — 0.25 d

Perform maintenance tasks as assigned by location
Prepare the well for maintenance and well intervention activities
Reinstate the well after maintenance and well intervention activities

INTEGRITY MANAGEMENT — 0.25 d

Operations owns the Wellstock
Develop a more complete understanding of the well below the surface
Understand the independence of all well components

TODAY'S SUCCESSFUL PRODUCTION TECHNICIAN — 0.25 d

HSE goals
Design decisions made for the well and the relevance of those decisions to their operations
Ways that all surface and subsurface well components work together
Instruments: how the downhole conditions are reflected in the surface
Handovers: strict adherence to site-specific procedures and/or practices
Risks: daily tasks that bring increased risks to Well Integrity and proactive mitigation of those risks
Problems: deeper knowledge of the well to anticipate problems turn into large scale Well Integrity incidents

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Completion

E-467

ENGLISH: PRO / WELINTMA

Well Integrity Management

5 DAYS

PURPOSE

To deepen knowledge of well integrity management, and develop the skills for designing, operating, and maintaining well equipment with the ultimate objective of ensuring a permanent, safe containment of all wellbore fluids

AUDIENCE

Drilling, completion and production engineers and supervisors

LEARNING OBJECTIVES

- To understand the importance of well integrity
- To grasp the process of well integrity management
- To view well integrity within the framework of all key strategic efforts
- To focus attention on key areas of well integrity assurance
- To understand the Production supervisor's duties with regard to well integrity

COORDINATOR

Denis Perrin

AGENDA

WELL INTEGRITY MANAGEMENT SYSTEM FRAMEWORKS — 0.5 d

Introduction
Assets
Organization and people
WI Direction

WELL INTEGRITY STANDARDS — 2 d

QA/QC Standard
Well suspension and abandonment standard
Well construction standard
Well integrity assessment
Well operation standard
Well re-entry and workover

WELL INTEGRITY MANAGEMENT — 1.5 d

Introduction, concepts and definitions
WIM key activities
Minimum integrity requirements vs. well life cycles phases
Annulus pressure management
Data management
Well integrity review
WI performance management

WELLHEAD PREVENTIVE MAINTENANCE (OPTIONAL) — 0.75 d

Objectives
General safety guidelines
Routine preventive maintenance
Activity based preventive maintenance
Field testing procedures
Wellhead seal integrity test (all well types)
Xmas tree nitrogen testing (gas well)
Wellhead failure report
Wellhead preventive maintenance report
Gas producer 6 and 12 months preventive maintenance
SC-SSSV preventive maintenance plan

KNOWLEDGE TEST — 0.25 d

In-house course. Contact: fp.pau@ifptraining.com

Drilling - Completion - Well Control
Well Control

E-471

ENGLISH: WEL / FPESME
FRENCH: WEL / FPESMF

Well Control

5 DAYS

IWCF "Combined Surface/Subsea BOP" Certification
IWCF certified training center

PURPOSE
To provide an understanding of kicks and well control methods

AUDIENCE
Drilling engineers, supervisors, tool pushers, drillers, assistant drillers

LEARNING OBJECTIVES
- To understand and identify what causes kicks
- To learn about methods and equipment used to secure a well after the occurrence of a kick
- To learn about well control methods when circulating the well
- To detect incidents during well control and take appropriate actions
- To practice on a simulator
- To pass the IWCF "Surface BOP Stack" or "Combined Surface/ Subsea BOP Stack" Test

WAYS AND MEANS
Application exercises, exercises on a simulator with the assistance of two trainers

COORDINATOR
Didier Brigant

AGENDA

INITIAL ASSESSMENT ON HYDROSTATICS AND DYNAMICS — 0.25 d

PRESSURE ANALYSIS AND KICK CONTROL — 0.75 d
Reminders on hydrostatics and pressure losses
Relations between pressures in the well
Reminder on gas law
Pore pressure: causes and signs indicating abnormal pore pressure
Frac pressure: definition, determination, MAASP
Causes and signs of a kick, influence of the drilling mud type
Precautions to be taken to avoid kicks

WELL CONTROL — 1.75 d
Procedures to follow in case of a possible kick during drilling or tripping
Well shut-in methods: hard and soft methods
Observation and evolution of pressures when shutting in the well
Determining stabilized pressures
Preliminary calculations
Different methods used to control a kick
- Driller's method
- Wait and Weight method

Comparison of the methods

PARTICULAR CASES — 0.25 d
Incidents when circulating a well
Case of shallow gas
Volumetric methods

REMINDERS ON THE EQUIPMENT — 0.5 d
BOP: types, tests
Koomey unit
Ancillary circuit: choke, manifold, mud-gas separator
Equipment testing

EXERCISES — 0.25 d
Practice on a simulator, training for the IWCF certificate
Exercises on theory, kill sheet and equipment (exercises done by a group of participants while another one is training on the simulator)

SUBSEA SPECIFITIES — 0.25 d
Friction losses in the choke line
Consequences on well control: start, gas in the choke line, end of circulation
Specific equipment
In the meantime, participants in the surface BOP course will do exercises

IWCF CERTIFICATION — 1 d
Principles & procedures test and equipment test
Assessment on a simulator

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 23	Pau	2,490 €	FP	fp.pau@ifptraining.com
EN	Jul 07 - 11	Pau	2,490 €	FP	fp.pau@ifptraining.com
EN	Sep 08 - 12	Pau	2,490 €	FP	fp.pau@ifptraining.com

May be organized for a single company

Drilling - Completion - Well Control
Well Control

E-473

ENGLISH: WEL / WELINE
FRENCH: WEL / WELINF

Well Intervention and Pressure Control

5 DAYS

IWCF "Well Intervention" Certification
IWCF certified training center

PURPOSE

To provide an understanding of well intervention and pressure control techniques, with the skills to plan, supervise and carry out well intervention

AUDIENCE

Engineers and technicians, who have to plan, supervise or carry out well intervention

LEARNING OBJECTIVES

- To understand the behavior of a producing well
- To learn about the equipment used in wire line, coiled tubing and snubbing
- To grasp safety barrier principles
- To learn about the equipment, and acquire the methods used to control well pressure
- To pass the IWCF "Well Intervention" Test

OBSERVATION

Course content can be expanded to 2 weeks for a tailor-made program

COORDINATOR

Fabien Manuel

AGENDA

BASIC PRINCIPLES AND WELL FUNDAMENTALS — 0.5 d

Physics applied to the well
- Hydrostatic pressures
- Specific gravities
- Densities
- Pressure gradient
- Pore pressure
- Over/underbalance
- …

COMPLETION EQUIPMENT — 0.5 d

Different types of completion
Specific equipment as
- Packers
- SCSSV
- Side pocket mandrels
- Casing, tubing
- Tubing hanger
- Xmas tree
- …

DIFFERENT TYPES OF INTERVENTION WITH THEIR RESPECTIVE EQUIPMENT — 1.5 d

Wire line intervention
- Slick line
  - BOP
  - Lubricator
  - Stuffing box
  - Tool trap
  - …
- Braided line, e-line
  - Double BOP
  - Grease injection system
  - Tool trap, tool catcher
  - …

Coiled tubing
- Different types of BOP, strippers
- Problem during the interventions, interpretation and decision

Snubbing
- BOP, types and stacks
- Specific constraints
- Problem during the interventions, interpretation and decision

PRESSURE CONTROL APPLIED TO COMPLETION AND WELL INTERVENTION — 2 d

Barriers, pressure tests
Well calculation (pressure, volume, kill fluid, pumping time, balancing the pressure at the circulating device…)
Shut in procedures
Kill methods (direct or reverse circulation, bull heading, lubricate and bleed…)
Specific problems linked to producing wells (thief zones, losses, plugging, migration, hydrates…)
Responsibilities, decision making

IWCF CERTIFICATION — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 02 - 06	Pau	3,070 €	FP	fp.pau@ifptraining.com
EN	Dec 01 - 05	Pau	3,070 €	FP	fp.pau@ifptraining.com

Drilling - Completion - Well Control
Well Control

E-477

ENGLISH: WEL / STRIPE
FRENCH: WEL / STRIPF

PURPOSE

To provide the practical knowledge and skills required for stripping operations

AUDIENCE

Drilling and completion engineers, supervisors, and experienced tool pushers

LEARNING OBJECTIVES

To carry out stripping operations in real conditions through annular preventer alone or rams to rams

PREREQUISITE

To have a valid well control certificate and to correctly know the basics on well control equipment

WAYS AND MEANS

Exercises either on a real rig or on a simulator

COORDINATOR

Jean Beaume

Stripping

3 DAYS

AGENDA

REMINDERS ON WELL CONTROL — 0.75 d

Causes, signs of a kick
Procedures in case of a sign of a kick
Well shut-in procedures
Control methods: driller's method, wait and weight method
Reminders on the equipment: BOP, closing unit, choke manifold, tests of equipment
Equipment

STRIPPING — 2.25 d

Principle of the volumetric method, of the lubricating method
Application of the volumetric method to a general case: change in annular capacity, deviated well, drill collar safety
Stripping principle
Additional equipment required for a stripping job
Stripping through the annular preventer while running in on a training well or simulator
How teams are organized on the rig site to carry out the job
Stripping through ram BOP while running in on a training well or simulator
Stripping procedure when pulling out of hole

In-house course. Contact: fp.pau@ifptraining.com

Field Operations

Field Operations
Operation of Production Facilities

E-500

ENGLISH: PROD / PRODCHAIN
FRENCH: PROD / CHAINPROD

Fundamentals of Production

2 DAYS

Introduction to oil and gas field production

PURPOSE

To provide an introduction to oil and gas production, along with a glossary of terms, covering fundamentals of technology, chain structure from well to export terminal, skills and job positions involved in operating production facilities

AUDIENCE

Non-technical staff or technical professionals not directly involved in hydrocarbons production (managers, executives, technicians, staff of human resources, finance of projects departments…)

LEARNING OBJECTIVES

- To learn about the different phases of the oil and gas production process
- To grasp the specific issues of offshore oil and gas production
- To understand organizations, skills and job positions involved in operating production facilities
- To acquire a complete view of the oil and gas production chain, stretching over technical, business and economic issues

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Fouzia Baïri

AGENDA

THE OIL AND GAS CHAIN: PRODUCTION POSITION? — 0.5 d

Positioning of the production in the value E&P chain
World Primary production
Issues and technical constraints
- Conventional resources
- Unconventional resources

Job descriptions and skills for production activities

ONSHORE & OFFSHORE PRODUCTION — 0.5 d

Technical specifications, operating modes
Operating patterns and mapping fields
Technical architectures
Organization (remote site, extreme condition, manning, shift…)
Case studies: FPSO, wet gas field (onshore), oil fields operated with reinjection, remote control room, early production facilities…

FROM WELL TO EXPORT POINT — 1 d

From reservoir to wellhead: hydrocarbons and well effluent behavior
Well techniques, production techniques and well servicing
Surface facilities & treatment operations
Metering and expedition
Health Safety & Environment, sustainability
Budgets (CAPEX, OPEX) during the life cycle of a production field

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 24 - 25	Pau	1,480 €	EXP Pau	exp.pau@ifptraining.com
EN	Jun 02 - 03	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Oct 13 - 14	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-501

ENGLISH: PROD / OGFP
FRENCH: PROD / IPS

PURPOSE

To provide a comprehensive overview of oil and gas field processing technology

AUDIENCE

Engineers and technicians interested, although not directly involved in day-to-day oil and gas field processing operations: reservoir engineers, drilling and completion personnel, platform designers, petroleum architects, equipment suppliers, economists…

LEARNING OBJECTIVES

- To learn about oil and gas well effluents' characteristics
- To assess various problems that can be induced by unwanted elements and compounds
- To understand the treatment processes needed to remove those components from oil and gas streams
- To grasp fundamentals of oil and gas field processing operations and related operating conditions
- To ascertain the treatment processes necessary for production water and injection water

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

Oil & Gas Field Processing

5 DAYS

Field treatments of Oil & Gas well effluent

Overview of field processing operations

AGENDA

FUNDAMENTALS OF RESERVOIR, DRILLING AND COMPLETION — 0.5 d

Reservoirs: types, exploration techniques
Drilling principle – Case of offshore drilling
Main completion equipment – Principle of artificial lift by pumping, Gas Lift…
Enhanced Oil Recovery (EOR): aim and principle of the main techniques

WELL EFFLUENT BEHAVIOR - NEED FOR EFFLUENT FIELD PROCESSING — 0.5 d

Different types of well effluent - Main characterization parameters
Liquid/Vapor equilibrium of pure substances and mixtures – Vapor pressure curves and phase envelopes
Constituents that pose problems for storage, transport, or commercialization/utilization of crude oils and natural gases
Main specifications to be respected and required treatments

CRUDE OIL TREATMENT — 1 d

Crude stabilization (gas removal) by Multi Stage Separation (MSS) - Foaming problems and main available solutions
Crude dehydration (water removal) and desalting - Emulsion problems and main treatments available
Crude sweetening (H_2S removal)
Examples of oil treatment and associated gas recompression process schemes

PRODUCTION AND INJECTION WATER TREATMENT — 1 d

Quality requirements for rejected water - Environment related constraints
Main necessary treatments: oil skimmers (API tanks, plate separators), floating oil separators, hydrocyclones…
Reasons for water injection
Quality requirements and necessary treatments: chlorination, filtration, oxygen removal, sterilization
Examples of process schemes for production and injection water treatment

GAS PROCESSING AND CONDITIONING — 2 d

Gas dehydration (drying): TEG units, desiccants - Hydrate formation inhibition: injection of MeOH, MEG, DEG, LDHI…
Gas sweetening - Acid components (H_2S and CO_2) removal: amine units, molecular sieves, membranes
Natural Gas Liquids (NGL) extraction: use of cryogenic refrigeration, Joule-Thompson expansion, or Turbo-expander
Fundamentals of Liquefied Natural Gas (LNG) chain

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 03 - 07	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com
FR	Apr 07 - 11	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Jun 02 - 06	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com
EN	Jun 23 - 27	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Dec 01 - 05	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-502

ENGLISH: PROD / FPSPF
FRENCH: PROD / PIPS

Field Processing and Surface Production Facilities

10 DAYS

Effluent treatment and equipment technology

PURPOSE

To provide a comprehensive understanding of onshore and offshore oil and gas field processing techniques, along with a knowledge of technology and operating principles of surface production facilities equipment

AUDIENCE

Engineers and technicians interested in onshore and offshore oil and gas field processing technology and equipment

LEARNING OBJECTIVES

- To grasp fundamentals of oil and gas production techniques
- To understand operating principles and conditions of oil, water and gas treatment
- To learn about specificities of offshore production techniques
- To learn about the technology of main equipment used in oil and gas processing facilities
- To ascertain fundamentals of process control
- To draw a typical safety system layout
- To understand main metering techniques
- To comprehend issues of corrosion prevention and monitoring

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

AGENDA

FUNDAMENTALS OF RESERVOIR, DRILLING AND COMPLETION — 0.5 d

Reservoirs: types, exploration techniques
Drilling principle – Case of offshore drilling
Main completion equipment – Principle of artificial lift by pumping, Gas Lift…
Enhanced Oil Recovery (EOR): aim and principle of the main techniques

WELL EFFLUENTS BEHAVIOR - NEED FOR EFFLUENT FIELD PROCESSING — 0.5 d

Different types of well effluent - Main characterization parameters
Liquid/Vapor equilibrium of pure substances and mixtures – Effluent behavior
Constituents that pose problems for storage, transport, or commercialization
Main specifications to conform with and required treatments

CRUDE OIL TREATMENT — 1 d

Crude stabilization (gas removal) by Multi Stage Separation (MSS) - Foaming problems
Crude dehydration (water removal) and desalting - Emulsion problems
Crude sweetening (H_2S removal)
Examples of oil treatment and associated gas compression process schemes

PRODUCTION AND INJECTION WATER TREATMENT — 1 d

Rejected water: environmental constraints and required treatments
Injection water: aim, quality requirements and required treatments
Examples of process schemes for production and injection water treatment

GAS PROCESSING AND CONDITIONNING — 2 d

Gas dehydration (drying): TEG units, desiccants - Hydrate formation inhibition: injection of MeOH, MEG, DEG, LDHI…
Gas sweetening - Acid components (H_2S and CO_2) removal: amine units…
Natural Gas Liquids (NGL) extraction: use of cryogenic refrigeration, Joule-Thomson expansion, or Turbo-expander
Fundamentals of Liquefied Natural Gas (LNG) chain

CASE OF OFFSHORE DEVELOPMENTS - FLOW ASSURANCE — 1 d

Offshore production structures: jacket, semi-submersible, Spar, TLP, FPSO…
Storage and offloading vessels (FSO, FPSO, FPU, buoy…)
Deep offshore developments - Examples of subsea architecture
Flow Assurance: problems of slug, erosion, hydrate formation, deposits (paraffins, asphaltenes, naphtenates, carbonates, sulfates, salts…) - Main preservation techniques and pigging solutions

ROTATING MACHINERY — 1 d

Pumps, Compressors, turbo-expanders and gas turbines: types, operation, technology
Examples of application

THERMAL EQUIPMENT — 0.5 d

Heat exchangers, Air coolers, Furnaces, Heaters, fire tubes: types, operation, technology

FUNDAMENTALS OF CORROSION — 0.5 d

Different types of corrosion, prevention and monitoring

INSTRUMENTATION & PROCESS CONTROL - SAFETY SYSTEMS — 1 d

Elements constituting a simple process control loop - Cascade and split-range loops - DCS
Technology and working principle of sensors, transmitters and control valves
Safety Systems: HIPS, ESD, EDP, F&G, USS

METERING AND ALLOCATION — 1 d

Metering of liquids, metering of gases, multi-phase metering (MPM)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 02 - 13	Pau	5,630 €	EXP Pau	exp.pau@ifptraining.com
EN	Jun 23 - Jul 04	Rueil	5,630 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Dec 01 - 12	Rueil	5,630 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-503

ENGLISH: PROD / ADVGB
FRENCH: PROD / ADVFR

PURPOSE

To deepen understanding of oil and gas field processing techniques

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

- To understand main thermodynamic transformations involved in oil and gas processing
- To grasp a comprehensive picture of oil and gas processing facilities
- To simulate main oil and gas facilities
- To master operating variables and conditions of processing facilities

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)
Several simulations using the software program Proll

OBSERVATION

The course is a combination of three separate modules. It is highly recommended to attend Module 1 first
Refer to next pages for detailed content

COORDINATOR

Christian Foussard

Advanced Oil & Gas Field Processing

15 DAYS

Sizing - Simulation - Operation

Proficiency in oil and gas field processing techniques

AGENDA

MODULE 1: EFFLUENT PROCESSING (cf. E-504) — 5 d

Well effluent
Ideal and real fluid behavior
Gas compression and expansion
- Isentropic and polytropic compression
- Applications

Liquid-Vapor equilibrium of pure substances
- Vapor pressure curves
- Enthalpy diagrams
- Proll simulation exercises

Liquid-Vapor equilibrium of mixtures - Mixture separation
- Phase envelopes
- Flash, Distillation, Absorption, Stripping
- Proll simulation exercises

MODULE 2: OIL AND WATER TREATMENT (cf. E-505) — 5 d

Need for field processing of oil - Quality requirements
Crude oil treatment
- Crude stabilization
- Crude dehydration
- Acid crude sweetening
- Proll simulation exercises

Production water treatment
- Regulation for disposal
- Main treatments

Injection water treatment
- Quality requirements
- Main treatments

MODULE 3: GAS PROCESSING AND CONDITIONING (cf. E-506) — 5 d

Need for field processing of gas - Quality requirements
Gas processing
- Gas dehydration
- Gas sweetening
- NGL extraction
- Proll simulation exercises

Liquefied Natural Gas (LNG)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 10 - 28	Rueil	8,490 €	EXP Rueil	exp.rueil@ifptraining.com
FR	May 26 - Jun 13	Rueil	8,490 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 15 - Oct 03	Rueil	8,490 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-504

ENGLISH: PROD / ADV1GB
FRENCH: PROD / ADV1FR

PURPOSE

To provide a thorough understanding of thermodynamics principles underlying operation and design of oil and gas processing facilities

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

- To learn about oil and gas well effluents composition, properties and characteristics
- To grasp ideal gas law and real fluid behavior and characterization methods
- To comprehend liquid-vapor equilibrium of pure substances and mixtures
- To master the operating principle and performance of mixture separation
- To understand gas compression and gas expansion laws
- To perform Proll simulations and master the fundamentals of Equations Of State

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)
Several simulations using the software program Proll

COORDINATOR

Christian Foussard

Advanced Oil & Gas Field Processing

5 DAYS

Module 1: Thermodynamics Applied to Well Effluent Processing

Fluid behavior - Mixture separation - Gas compression

AGENDA

WELL EFFLUENT — 0.5 d

Constitution and physical states of matter
Constituents of well effluents: hydrocarbons, impurities, water, sediments…
Different types of effluents: black oil, light oil, volatile oil, condensate gas, dry gas…
Characterization parameters: GOR, CGR, BSW, WOR, Water Cut, Bo, Bg, B'g…
Examples of compositions of crude oil and natural gas effluent

IDEAL GAS AND REAL FLUID BEHAVIOR — 0.5 d

Ideal gas behavior
Behavior of real fluids: compressibility factor, Amagat's law, law of corresponding state with two and three parameters
Equations Of State (EOS): conception, uses, examples, selection

GAS COMPRESSION AND EXPANSION — 1 d

Isentropic and polytropic compression of ideal gases - Case of real fluids
Practical gas compression and expansion laws
Exercise: Compression of propane
Proll simulation: Propane compressor

LIQUID-VAPOR EQUILIBRIUM OF PURE SUBSTANCES — 1 d

Vapor pressure curves: saturated and subcooled liquids, saturated and superheated gases, critical point, vapor pressure, boiling point… - Volatility classification
Overall phase diagram of a pure substance (three dimensions: P, T and V)
Enthalpy diagrams of pure substances
Exercises: Vapor pressure and boiling points of pure components - Vapor pressure and boiling point - Case of a column
Proll simulation: Propane Cryogenic Loop

LIQUID-VAPOR EQUILIBRIUM OF MIXTURES - MIXTURE SEPARATION — 2 d

Phase envelopes: saturated and subcooled liquids, saturated and superheated gases, critical point, bubble curve, dew curve, cricondenbar, cricondentherm… - Retrograde condensation phenomena
Well effluents behavior from pay zone to surface processing facilities
Techniques applied to mixture separation: flash process, distillation process
Absorption and stripping phenomena
Exercises: Equilibrium coefficients (K values) and relative volatility - Vapor pressure of a mixture of hydrocarbons - LPG recovery by physical absorption
Proll simulation: Mixture Separation by distillation - LPG splitter

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 10 - 14	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
FR[1]	May 26 - 30	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 15 - 19	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-505

ENGLISH: PROD / ADV2GB
FRENCH: PROD / ADV2FR

PURPOSE

To provide a comprehensive understanding of oil and water treatment processes, operation and troubleshooting

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

- To assess various problems that can be induced by unwanted elements and compounds in crude oil streams
- To master oil and water treatment processes, operations and related operating conditions
- To design main equipment used for oil processing
- To ascertain main operating problems encountered in oil and water processing and related solutions
- To simulate crude oil treatment processes using the software program Proll

PREREQUISITE

Module 1 (cf. E-504)

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)
Several simulations using the software program Proll

COORDINATOR

Christian Foussard

Advanced Oil & Gas Field Processing — **5 DAYS**

Module 2: Oil and Water Treatment

Sizing - Simulation - Operation

AGENDA

NEED FOR OIL FIELD PROCESSING - QUALITY REQUIREMENTS — 0.25 d

Constituents that pose problems for storage, transport, or commercialization/utilization
Different specifications and quality requirements of crude oils
Necessary treatments to reach these specifications
Examples of compositions of commercialized crude oils

CRUDE OIL TREATMENT — 2.75 d

Crude stabilization (gas removal) by Multi Stage Separation (MSS)
- Process principle
- Operating parameters: number of separation stages, pressures, heating and cooling needs… - Influence on the quantity and quality (API grade) of the produced oil
- Foaming problems and main available solutions
- Associated gas recompression - Typical associated gas compression schemes
- *Applications: practice of separator summary design methods*
- *Proll simulation: study of the influence of separation stage number on the performances of a MSS process*

Crude dehydration (water removal) and desalting
- Emulsion problems
- Main dehydration processes
- Crude oil desalting
- *Applications: practice of desalter summary design methods*

Acid crude sweetening (H_2S removal)
- Cold stripping: origin of stripping gas, need for sweetening of stripping gas
- Hot stripping
- *Applications: practice of stripping column summary design methods*
- *Proll simulation: simulation of a crude oil stripping units case study*

Case study: Simulation of a whole crude oil field treatment plant - Study of an offshore crude oil field treatment unit, based on a Multiple Stage Separation (MSS) process scheme - Optimization of the operating parameters

PRODUCTION WATER TREATMENT — 1 d

Regulations for disposal
Main treatments - Operating principle and required performances
Comparison of the different available techniques - Selection criteria
Examples of production water treatment block flow diagrams

INJECTION WATER TREATMENT — 1 d

Reasons for water injection
Quality requirements and necessary treatments
Main operating conditions of each treatment and required performances
Examples of injection water treatment block flow diagrams

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 17 - 21	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Jun 02 - 06	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 22 - 26	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-506

ENGLISH: PROD / ADV3GB
FRENCH: PROD / ADV3FR

PURPOSE

To provide a comprehensive understanding of gas treatment processes, operation and troubleshooting

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

- To assess various problems that can be induced by unwanted elements and compounds in natural gas streams
- To master gas treatment and liquefaction processes, operations and related operating conditions
- To perform hand calculations for summary design of main gas processing equipment
- To ascertain main operating problems encountered in gas processing and conditioning and related solutions
- To simulate natural gas treatment processes using the software program Proll

PREREQUISITE

Module 1 (cf. E-504)

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)
Several simulations using the software program Proll

COORDINATOR

Christian Foussard

Advanced Oil & Gas Field Processing

5 DAYS

Module 3: Gas Processing and Conditioning

Sizing - Simulation - Operation

AGENDA

NEED FOR GAS FIELD PROCESSING - QUALITY REQUIREMENTS — 0.25 d

Constituents posing problems for storage, transport, or end use of natural gas
Different specifications and quality requirements for natural gas
Necessary treatments to conform these specifications
Examples of compositions of commercialized natural gases

GAS PROCESSING — 3.75 d

Gas dehydration (drying) and Hydrate formation inhibition
- System behavior - Moisture content of a saturated gas
- Applications: moisture content of different gases of various compositions
- Hydrate formation inhibition by injection of inhibitors: MeOH, MEG, DEG, LDHI…
- Gas dehydration: TEG units, Molecular Sieves…
- *Application: summary design of TEG unit*
- *Proll simulation: simulation of TEG unit*

Gas sweetening: removal of acid components (H_2S and/or CO_2)
- Different techniques applicable for gas sweetening
  - Chemical solvent processes - Amine units (MEA, DEA, DGA, MDEA…)
  - Physical solvent processes
  - Hybrid (physico-chemical) solvent processes
  - Overview of other techniques
- Conversion of H_2S: sulfur production (CLAUS process) and tail gas processing
- *Application: summary design of an amine unit*

Natural Gas Liquids (NGL) extraction (removal of heavy components)
- External refrigeration loop
- Joule-Thomson expansion
- Turbo-Expander
- *Application: calculation of cryogenic loop used for extraction*
- *Proll simulation: simulation of NGL extraction unit - Process selection*

Case study: Simulation of a whole natural gas field processing plant - Study of a natural gas dehydration, NGL extraction and compression unit - Optimization of the operating parameters - Analysis of hydrate formation risks

LIQUEFIED NATURAL GAS (LNG) — 1 d

Liquefaction processes: operating principle, typical operating conditions, technology of specific equipment (plate fin heat exchangers, spiral-wound heat exchanges, refrigeration loop compressors…), power consumption…
LNG storage and transport: storage tanks, LNG carriers, jetty, loading arms…
Safety considerations specific to natural gas liquefaction plants
Industrial examples of natural gas liquefaction units

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 24 - 28	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Jun 09 - 13	Rueil	2,970 €*	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 29 - Oct 03	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-510

ENGLISH: PROD / NATGAS
FRENCH: PROD / GAZNAT

PURPOSE

To provide a comprehensive review of the techniques involved in natural gas production, processing and transport; complemented with a picture of natural gas valorization channels

AUDIENCE

Professionals from all sectors, involved or interested in the natural gas industry

LEARNING OBJECTIVES

- To learn about fundamentals of natural gas composition, production and field processing
- To comprehend technical issues and specific constraints of natural gas transport and storage
- To review the various end-user markets available for valorizing natural gas
- To grasp key natural gas chain economic issues

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

Natural Gas

5 DAYS

Production - Treatments - Transport - End Uses

AGENDA

NATURAL GAS: TYPES AND PRODUCTION TECHNIQUES — 0.75 d

Types and characteristics of natural gas fields - Production techniques
Different types of natural gases (condensate, wet or dry gas) and characterization parameters
Constitution of natural gas well effluent, properties and specific hazards
Case of associated gases: recovery techniques, characteristics, composition…

END USES OF NATURAL GAS - MAIN QUALITY REQUIREMENTS — 0.25 d

End uses of natural gases: fuel (domestic and industrial uses), conversion into other energy types (electricity production and cogeneration), automotive fuel (Natural Gas for Vehicles - NGV and conversion into liquid automotive fuels GTL), chemical valorization…
Quality requirements for commercial natural gases and associated products (ethane, LPG, condensates) - Examples of quality standards

NATURAL GAS PROCESSING — 2 d

Gas dehydration (drying) and Hydrate formation inhibition
- System behavior - Moisture content of a saturated gas
- Applications: moisture content of different gases of various compositions
- Hydrate formation inhibition by injection of inhibitors: MeOH, MEG, DEG, LDHI…
- Gas dehydration: TEG units, Molecular Sieves…
- *Application: summary design of TEG unit*

Gas sweetening: removal of acid components (H_2S and/or CO_2)
- Different techniques applicable for gas sweetening:
  - Chemical solvent processes - Amine units (MEA, DEA, DGA, MDEA…)
  - Physical solvent processes
  - Hybrid (physico-chemical) solvent processes
  - Overview of other techniques
- Conversion of H_2S: sulfur production (CLAUS process) and tail gas processing
- *Application: summary design of an amine unit*

Natural Gas Liquids (NGL) extraction (removal of heavy components)
- External refrigeration loop
- Joule-Thomson expansion
- Turbo-Expander
- *Application: calculation of cryogenic loop used for NGL extraction*

Examples of gas field development schemes
- Gas fields development options: onshore or offshore processing, single-phase or multiphase export pipes (sea lines), "Wet" or "Dry" development
- *Other treatments: mercury removal, conversion or adsorption of mercaptans (RSH)…*

TRANSPORT OF NATURAL GAS IN LIQUID PHASE - LNG OPTION — 1 d

Liquefaction processes: principle, typical operating conditions, technology
LNG tanks: Single or Double or Full Containment (self standing, membrane) - Hazards
LNG transport: LNG carriers (MOSS spheres, Membrane…), export and receiving terminals
LNG regasification at the receiving terminals, options for refrigeration duty recovery

TRANSPORT AND STORAGE OF NATURAL GAS IN GAS PHASE — 0.5 d

Gas pipes: technology, capacities, equipment, recompression units, operating conditions…
Underground storage (old reservoirs, aquifers, salt domes…) - Required treatments at outlet

NATURAL GAS ECONOMICS — 0.5 d

Resources, production and markets
Natural Gas marketing: competition of other energy sources and consequences on gas contracts (prices and duration), cost of transport and its impact on the structure of the gas chain
Future of the Natural Gas

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Apr 14 - 18	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Jun 30 - Jul 04	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Sep 15 - 19	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 17 - 21	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-511

ENGLISH: PROD / LNG
FRENCH: PROD / GNL

PURPOSE

To provide a comprehensive technical and economic review of the Liquefied Natural Gas industry

AUDIENCE

Professionals involved or interested in the LNG industry: technical and managerial staff in the LNG industry, equipment providers, personnel from engineering companies…

LEARNING OBJECTIVES

- To review the structure of an LNG chain and look over the world map of LNG plants
- To understand main LNG physical properties and specificities
- To assess LNG facilities' hazards and HSE issues, along with risk mitigation and prevention techniques
- To grasp main liquefaction processes' operating principles, conditions and constraints
- To glance at the technology of equipment used in the LNG industry
- To grasp the essence of LNG markets and contracts

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

Liquefied Natural Gas (LNG)

5 DAYS

Hazards - Technology - Operation - Economics

AGENDA

THE LNG WORLD — 0.5 d

The LNG Chain - Order of magnitude and trends - Location of main plants worldwide
Base load LNG plants - Peak shaving LNG plants - Small LNG plants for LNG fueled vehicles
Receiving terminals - Regasification techniques - Satellite regasification techniques

LNG SPECIFIC PROPERTIES AND ASSOCIATED HAZARDS — 0.5 d

Physical properties: Liquid-Vapor equilibrium, density, ratio of vapor methane / LNG, heat of vaporization, heat of combustion…
Safety aspects: Flash Point, Fire Point, Auto-ignition Point, Minimum Spark Energy, Flammability Limits, Deflagration, LNG Vaporization, Rapid Phase Transition (RPT), Radiation levels, Stratification / Roll-over, Sloshing, LNG clouds ignition, Asphyxiation risks, Cryogenic liquids jets, Piping behavior

LNG HAZARD PREVENTION AND MITIGATION MEASURES — 0.5 d

LNG spillage control at Design stage and in Operation
LNG clouds control in operation
LNG fires control at Design stage and in Operation

LIQUEFACTION AND REGASIFICATION PROCESSES — 0.75 d

Feed pretreatment: sweetening, dehydration, NGL extraction, Hg and aromatics removal
Different liquefaction processes: Pure Component Refrigerants, Pure component(s) and Mixed Refrigerant(s), Mixed Refrigerants
Peak Shaving simplified scheme
Regasification process

LNG STORAGE, LOADING / OFFLOADING AND TRANSPORT — 0.75 d

LNG tanks: Single or Double or Full Containment (self standing, membrane) - Hazards
Jetty head, Jetty trestle, harbor
LNG Carriers: common features, technology, cargo operations, safety systems

TECHNOLOGY OF LNG SPECIFIC EQUIPMENT — 1 d

LNG cryogenic heat exchangers: Spiral Wound Heat Exchangers, Aluminum Brazed Heat Exchangers
Technology of the Cryogenic Compressors and their drivers (Gas Turbines)
LNG Vaporizers: Open Rack Vaporizers (ORV), Submerged Combustion Vaporizers (SCV)… - Safety and Environmental aspects
Submerged LNG pumps: in-tank retractable pumps, cargo pumps, HP canned send out pumps…
Liquid cryogenic turbo-expanders, Cryogenic valves
Cryogenic personnel protection items

LNG PLANT OPERATION — 0.25 d

Day to day activities in an LNG plant - Experience of some plants

LNG TRENDS - RESEARCH AND NEW DEVELOPMENTS — 0.25 d

LNG trends since the 70's - Equipment and concept development - Future…

LNG ECONOMIC ASPECTS — 0.5 d

Gas markets: natural gas reserves and production, worldwide gas demands distribution, international natural gas trade
LNG contracts: specificities of LNG contracts, pricing, shipping contracts
LNG markets trends

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 10 - 14	Rueil	3,890 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Jun 23 - 27	Rueil	3,890 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 24 - 28	Rueil	3,890 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-514

ENGLISH: PROD / ACIDGB
FRENCH: PROD / ACIDFR

NEW

Gas Sweetening and Sulfur Recovery

5 DAYS

PURPOSE

To provide a comprehensive technical review of sour gas treatment, sulfur recovery, conditioning processes and storage facilities, including operating and troubleshooting issues

AUDIENCE

Professionals interested in sour gas: engineers involved in oil and gas field facilities operation or design, managerial staff in gas processing facilities, equipment providers, personnel from engineering companies

LEARNING OBJECTIVES

- To comprehend all concerns linked to sour gas treatment and sulfur recovery
- To review sulfur and acid pollutants main physical properties, specificities, and induced hazards
- To understand operating principles and conditions of gas sweetening and sulfur recovery / handling processes
- To grasp main operating problems encountered in sour gas processing and sulfur recovery and handling

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

AGENDA

GAS SWEETENING - OVERVIEW OF GAS SWEETENING — 0.25 d

Nature, origins and compositions of the streams to be treated
- Refineries
- Natural Gases

The properties of sulfur compounds and CO_2
Reasons for removing acid gases, usual specifications
Cost impact of gas sweetening and stakes
Acid gas management, impact on the sweetening unit
- Sulfur recovery
- Acid gas re-injection

The different types of gas sweetening processes

GAS SWEETENING - AMINE SWEETENING PROCESSES — 1.5 d

General principles
Generic processes and proprietary processes
Typical process flow scheme
Amine unit design: key design parameters
Specific process arrangements
Equipment review, process control
Operational issues and troubleshooting
The specificities of amine units in refineries
Elgin-Franklin, an example of a versatile MDEA sweetening unit
An example of successive revampings of an amine unit
Acid Gas Enrichment

OTHER GAS SWEETENING PROCESSES — 0.75 d

Scavengers
Solid Bed processes
Redox processes
Other solvent processes: hot carbonate, physical solvents, hybrid solvents
Permeation membranes
Cryogenic distillation processes
LPG sweetening
Guidelines for process selection

RECOVERING SULFUR FROM ACID GASES — 0.25 d

Architecture of the sulfur recovery facilities
Sulfur properties
The sulfur market (sulfur uses)

SULFUR RECOVERY UNITS (CLAUS) — 1.25 d

Chemical mechanisms & general process flow diagram
Key parameters of the Claus process
The thermal stage
The catalytic stages
Adapting the process to the acid gas quality
- Rich acid gases
- Lean acid gases

Operational issues

TAIL GAS TREATMENT — 0.75 d

Types of TGT processes
Direct oxidation processes
Sub-dewpoint processes
Wet sub-dewpoint process
H_2S absorption processes

SULFUR CONDITIONING & STORAGE — 0.25 d

Liquid sulfur degassing
Sulfur forming
Sulfur storage

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 24 - 28	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-515

ENGLISH: PROD / STOCKGB
FRENCH: PROD / STOCKFR

PURPOSE

To provide an overview of technical issues of various natural gas storage facilities

AUDIENCE

Professionals interested in natural gas storage

LEARNING OBJECTIVES

- To review features and operating conditions of natural gas storage facilities
- To learn about gas storage equipment specificities: wells, manifolds, compression, auxiliary equipment, etc.
- To understand gas treatment techniques applied upon extraction from storage in order to conform to specifications
- To grasp fundamental issues of natural gas storage economics and third-party access

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

Natural Gas Storage

2 DAYS

Types - Technology - Operation - Economics

AGENDA

NATURAL GAS AS A STORABLE ENERGY — 0.25 d

Why to store natural gas? Needs expressed by suppliers, administration and network operators
How? Summary presentation of the different storage systems: depleted reservoirs, aquifers, salt domes, LNG storage tanks…
Where? History of underground gas storage, Storage sites in Europe and worldwide. Maps and tables by types of storage, per country and stored volumes
Gas storage and his environment: noise, exhaust, surface footprints, landscape integration, local taxes, workforce

STORAGE TYPES — 0.5 d

Fluid flow in porous media. Reservoir modeling
Depleted reservoirs, Aquifers, Salt domes, LNG storage tanks
For each type of storage, presentation of development conditions, geological and structural characteristics and their specificities, the inherent hazards, the operational constraint, the repartition of sites throughout the world…

STORAGE EQUIPMENT — 0.25 d

Wells: drilling specificities, downhole and surface equipment
Gathering network
Gas compression: why, when and how?
Extracted gas treatment: dehydration, sweetening, odorization
Auxiliary equipment: manifolds, instrumentation and control system, safety, treatment of effluents
Metering: primary meter, correctors, data processing

COMPRESSION — 0.25 d

Characteristics of compressors specific to natural gas storage sites: compression ratio, runtime frequency, environment related issues (exhaust gases, noise…), power types
Types of compressor units: driver type (engine, electrical motor, gas turbine…), reciprocating or centrifugal compressor…
Comparison between gas turbine and motor drivers, fuel gas and electricity power…

GAS TREATMENT — 0.25 d

At the wellhead: hydrate prevention by heating or methanol injection
In the station: dehydration, sweetening, odorization
For each treatment, presentation of the target, the risks, the regulation aspects, treatment techniques, common processes used for gas treatment and product regeneration, effluent treatment

ECONOMICAL ASPECT OF GAS STORAGE — 0.5 d

Life cycle for a gas storage site
Estimated values for CAPEX and OPEX for each storage type
Pricing of access of third parties to storage facilities in France: analysis of the price breakdown, taking into account constraints and specificities of the storage
Simulation of cost price per kWh, stored or delivered, for common site configurations

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Sep 15 - 16	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 04 - 05	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-516

ENGLISH: PROD / TRANSGB
FRENCH: PROD / TRANSFR

PURPOSE

To provide an overview of technical and economic issues of natural gas transport by pipeline

AUDIENCE

Professionals interested in natural gas transport by pipeline, including equipment and services suppliers to gas transport companies

LEARNING OBJECTIVES

- To look over the world map of natural gas pipeline networks
- To review marketed gas pipeline design: route, sizing, material, compression stations positioning and design…
- To assess pipe laying organization, management, constraints, planning, and techniques
- To understand gas transportation network maintenance and daily operations within the framework of regulations
- To grasp fundamental issues of natural gas transport economics and third-party access

WAYS AND MEANS

Several applications and illustrations (videos, samples, equipment…)

COORDINATOR

Christian Foussard

Natural Gas Transport by Pipeline

2 DAYS

Technology - Operation - Economics

AGENDA

INTRODUCTION TO NATURAL GAS — 0.25 d

From reservoir to end user
Chemical composition and properties of natural gas. Comparison to other combustible gases
World reserves
Panorama of offer, demand and movements

TRANSPORT NETWORK — 0.25 d

Overview of networks worldwide, in Europe and particularly in France
Perspectives of the development of European network
Interaction with the other blocks of the natural gas chain: storage, LNG terminals, compression stations, network interconnections, delivery to the client
Economical and technical comparison between transport by pipeline and LNG carriers

DESIGN AND CONSTRUCTION OF A GAS PIPE — 0.5 d

Design standards: pressure, length, volume, diameter
Fundamentals of metallurgy welding techniques, and coating materials
Pipe laying
- Different steps of pipe laying operations
- Cost and duration of pipe laying, and compression station construction

COMPRESSION — 0.25 d

Characteristics of compressors: compression ratio, run-time frequency, environment related issues (exhaust gases, noise…), power types
Types of compressor units: driver type (engine, electrical motor, gas turbine…), reciprocating or centrifugal compressor
Comparison between gas turbine and motor drivers, fuel gas and electricity power

OPERATION OF A NETWORK — 0.5 d

Maintenance, monitoring and technical management, risk prevention, safety regulations (law of August 4, 2006), cathodic protection, equipment maintenance, monitoring and controls, metering
Network operation management: planning, execution, allocations and accounts

ECONOMICAL ASPECTS OF GAS TRANSPORT BY PIPELINE — 0.25 d

Investment costs (CAPEX)
Life time of a gas pipe
Operation costs (OPEX)
Pricing for access of third parties to the gas transport network in France: analysis of the price breakdown
Simulations of cost price per kWh delivered, for some typical cases

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Sep 17 - 18	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 06 - 07	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-520

ENGLISH: PROD / BALSH
FRENCH: PROD / BILMAT

NEW

Production Accounting and Material Balance Sheet

3 DAYS

Liquid & gas balances - Measures & metering - Production reporting

PURPOSE

To provide the fundamental knowledge for understanding production balance, linking relevant operations and production figures which impact issues such as transfer fee, exchange between fields, field use…

AUDIENCE

Managers, engineers, non-technical staff involved in production reporting or material-balance handling (assessing fee, value created, etc.)

LEARNING OBJECTIVES

- To set up production balance from basic data (well tests, process measurements, fiscal data)
- To grasp performance monitoring and production reporting tools
- To assess impact of different operations on the material balance
- To learn about accounting and back allocation rules

WAYS AND MEANS

Several applications and illustrations (videos, samples, case studies…)

COORDINATOR

Fouzia Baïri

AGENDA

THE PRODUCTION CHAIN FROM THE RESERVOIR TO THE SHIPPING POINT — 0.5 d

Field operations mapping
Surface facilities
PFD studies

MEASURES AND METERING SYSTEMS ALONG THE CHAIN — 0.5 d

Well measurements and production tests
Locations of metering systems
Technology, precision calibration
"Filter" concept of a metering system
Process metering
Transactional metering
Gauging

LIQUID BALANCES — 0.5 d

Production accounting rules
Oil balance
Condensate balance
LPG balance
Water balance
Application: oil and condensate balance of an oil field study

GAS BALANCE — 0.5 d

Accounting rules
Dry gas field case
Wet gas field case
Application: Reconstruction of a natural gas balance and associated gas (oil field and gas cap)

PERFORMANCE MONITORING AND REPORTING PRODUCTION — 0.5 d

CASE STUDY & REPLENISHMENT ASSESSMENTS PRODUCTION BACK ALLOCATION, SATELLITE FIELDS, THE MAIN PRODUCTION CENTERS — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Apr 14 - 16	Rueil	2,180 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 24 - 26	Rueil	2,180 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-529

ENGLISH: PROD / PC
FRENCH: PROD / CP

PURPOSE

To consolidate mathematics, physics, chemistry and mechanics fundamentals required to attend IFP Training's qualifying training program "Surface Production Operator (BOA)"

AUDIENCE

Newly-hired personnel who need to strengthen their academic fundamentals before attending the training program "Surface Production Operator Training (BOA)". Upon successful completion of the latter, they will be qualified to hold the position of field operator in oil and gas production facilities or terminals

LEARNING OBJECTIVES

- To reach the prerequisite academic level in mathematics, physics, chemistry and mechanics
- To make full use of this background knowledge in future skills development programs for a Surface Production Operator job position

WAYS AND MEANS

Several applications and exercises based on issues encountered in the oil and gas industry

COORDINATOR

Benoît Rabaud

Introductory Course to Surface Production Operator Training

25 DAYS

Academic fundamentals for would-be field operators

AGENDA

PC1: MATHEMATICS — 5 d

Numerical calculations
Operations on numbers
Powers and roots
Solving first degree equations, straight line in a plan referential, first degree inequalities
Functional relations
Numerical equalities and inequalities
This course is illustrated with various application related to production facilities operation

PC2: PHYSICS — 7 d

Units and physical parameters
Movement, speed, acceleration
Specific gravity, density
Force, force moment, torque, work and mechanical power
Direct current and direct voltage
Electric dipole
Alternating current and applications to motors
This course is illustrated with various application related to production facilities operation

PC3: CHEMISTRY — 5 d

Atoms and molecules structure
Chemical notation and formulas
Physical states
Chemical reaction equation and balance
This course is illustrated with various application related to production facilities operation

PC4: MECHANICS AND INDUSTRIAL DRAWING — 8 d

Metallic and non-metallic materials – Steel, cast iron, brass
Notions of metallurgy and material strength
Heat treatment and mechanical characteristics of steel
Industrial drawings, dimensions and standards
This course is illustrated with numerous applications related to production facilities operation

In-house course. Contact: exp.rueil@ifptraining.com

Field Operations
Operation of Production Facilities

E-530

ENGLISH: PROD / BOAGB
FRENCH: PROD / BOAFR

Surface Production Operator Training (BOA)

35 WEEKS

Certifying Training Course

PURPOSE

To provide, through a comprehensive training and assessment system, the required technical knowledge and skills for qualifying to hold the position of field operator and contribute to safe and efficient operations in upstream oil and gas facilities

AUDIENCE

Newly-hired personnel who are called on to hold position of field operators in oil and gas production facilities or terminals
Active surface production operators in need of knowledge enhancement and skills development

LEARNING OBJECTIVES

- To acquire relevant technical knowledge, know-how and mindset for a field operator position
- To perform routine facilities equipment monitoring
- To take the required actions to ensure equipment safety and products quality
- To carry out daily operations safely and efficiently
- To identify and react to plant shortfalls

PREREQUISITE

Training requires academic scientific knowledge equivalent to British O levels. If needed, trainees can attend a 5-week introductory course (E-529) to acquire or review the fundamentals required to attend this qualifying training course

WAYS AND MEANS

Training includes alternating classroom sessions and on-site, hands-on periods

OBSERVATION

This qualifying training program "Surface Production Operator (BOA)" requires an academic level equivalent to British O levels. If need be, IFP Training can provide a 3-week introductory course to consolidate mathematics, physics, chemistry and mechanics fundamentals
This 35-week program stretches over a period of 12 months, including agenda herein, rotation leave and vacations
Upon successful completion, trainees are granted a Professional Certificate which is registered (by decree published in the Official Journal of the French Republic of August 10, 2011) in the National Directory of Professional Certification or RNCP at level IV

COORDINATOR

Benoît Rabaud

AGENDA

1st phase: OPERATIONS FUNDAMENTAL TRAINING — 24 w

The classroom training (conventional teaching, exercises, team work, practical exercises, equipment demonstrations…) is split into several short modules (typically 2 to 3 weeks each) and alternates with On the Job Orientation (OJO) periods (typically of 2 weeks each) during which participants are assigned to an operational site for a better efficiency of the learning process

Fundamental Professional training (1 week)
- Physics applied to operations
- Hydrodynamics, heat exchange, liquid-vapor equilibrium
- Notions of industrial chemistry, chemical reactions

Equipment and Operations Training (7 weeks)
- Schematization, piping and associated equipment, valves, vessels
- Technology and operation of rotating machinery and drivers (pumps, compressors, electrical motors, gas turbines…)
- Technology and operation of heat exchanger equipment (heat exchangers, air coolers, fired heaters, boilers…)
- Instrumentation and process control, introduction to DCS, safety systems
- Electrical generation, electrical equipment and safety
- Operations tutorials (equipment routine monitoring, operation and troubleshooting, shut-down and start-up, incidents analysis and case studies…)
- Practical Exercises (PE): 1-day on-site exercises aiming at identifying and studying specific equipment for immediate application of classroom training modules

Products and Process training (6 weeks)
- Products: composition, specifications, toxicity, controls, sampling
- Notions of down-hole production: reservoir, exploration, drilling, completion, wells, artificial lift, well effluents
- Surface processing: analysis of flow diagrams and operating conditions. Processes operating principle, plant operation and monitoring
- Utilities, Products Storage, FPSO/ FSO, Oil Terminals, Subsea developments
- Process related operation tutorials and Practical Exercises (PE)

Safety in operation (2 weeks)
- Hazards due to fluid behavior, flammability risks and chemical hazards. PPE. Hazards related to maintenance works. Procedures in operation: isolations, Permit to Work, SIMOPS, downgraded situations. Risks prevention and mitigation means. Incident/accident reporting. Human factor. Environment protection
- Operation tutorials: PtW preparation. Equipment shutdown and preparation for handover to maintenance. Vessel entry. Equipment re-commissioning. Works supervision…

On the Job Orientation (OJO) periods alternating with classroom training modules: on-site practice
- Identification and study of equipment: routine surveillance and associated operating procedures
- Operation follow-up, production team organization, identification of the different tasks and responsibilities held by the various members of the operational team

Continuous assessment of the work based learning process: Oral presentations and reports of the OJO periods assignments

2nd phase: ON THE JOB TRAINING (OJT) — 10 w

On-site training, aiming at providing the specific knowledge required for assuming the function of operator: process, circuits, plant equipment, instrumentation and process control, operating conditions, risks specific to facilities and safe operating procedures
Achievement of various tasks as defined in the field operator job description, under the supervision of a mentor and the shift team

3rd phase: FINAL ASSESSMENT & JURY — 1 w

Final oral examinations aiming at assessing the knowledge of the area of OJT assignment (hazards, details of the installations, operating conditions, equipment characteristics, site specificities…) as well as the capability to assume the field operator duties (routine monitoring, execution of routine and non-routine tasks, knowledge of HSE rules and behavior in the event of accident…)
Preparation of a final OJT report, as a support for the final oral examinations

In-house course. Contact: exp.rueil@ifptraining.com

Field Operations
Operation of Production Facilities

E-531

ENGLISH: PROD / PANEL
FRENCH: PROD / TABLEAU

PURPOSE

To provide the required skills and comprehensive knowledge to hold the position of a panel operator with the appropriate attitude towards plant operation safety issues

AUDIENCE

Experienced field operators called on to hold a panel operator position in oil and gas production facilities

LEARNING OBJECTIVES

- To comprehend the responsibilities and day-to-day activities of a panel operator who fulfills all duties with a strict enforcement of safety measures
- To communicate efficiently with field personnel and carry through shift handovers very properly
- To grasp the role of various DCS and ESD systems components
- To make full use of the Human Machine Interface (HMI) main functionalities
- To operate and monitor process control loops, safety loops and automated sequences
- To operate production facilities in steady and transient conditions
- To monitor operating parameters all along the production chain
- To implement proactive plant operation in order to anticipate plant behavior and stabilize deviations
- To analyze and react methodically to anomalies, incidents and emergency situations
- To implement crisis management procedures

WAYS AND MEANS

Very practical training program with numerous case studies
Half of the training dedicated to intensive hands-on practice on world-class generic dynamic simulator

COORDINATOR

Benoît Rabaud

Production Panel Operator Training

35 DAYS

AGENDA

PANEL OPERATOR ROLE AND DUTIES — 0.5 d

Control room organization and panel operator role

BASIC PROFESSIONAL TRAINING — 2.5 d

Fluid mechanics: pressure, fluid flow. Heat exchange mechanisms
Liquid-vapor equilibrium of pure substances and mixtures / Flash separation
Standalone simulator: temperature profile in a heat exchanger; flash drum separation

PROCESS CONTROL & AUTOMATION — 5 d

Process control
- Control loop & associated symbolization. Instruments technology
- Controllers operating principles & parameters. Control loops structures
- *Standalone simulator: Simple loop controller tuning and impact of P,I,D actions – Case of a 3-phase separator; Typical transmitters faults*

Distributed Control System (DCS)
- ICSS architecture and system components. Human-machine interface (HMI)
- HMI Functions: trends, alarms… Automated sequences and Safety Instrumented Systems: PSS, ESD, HIPPS, EDP
- *Integrated plant simulator: DCS views and functionalities browsing; Reading safety logics; Package sequence analysis*

WELL AND SURFACE EQUIPMENT OPERATION — 11 d

Reservoir conditions and production modes. Production principles and physics applied to well
Well and production lines operation
- Surface wells and subsea wells: equipment; architectures, operating procedures
- Common well interventions. Production and injection wells monitoring – Common troubles
- Safety and prevention/protection barriers
- *Integrated plant simulator: Well – Production lines section parameters analysis – FPSO case*

Rotating machinery
- Operating parameters and mechanical conditions monitoring, protection systems and operation of centrifugal pump, reciprocating compressor, centrifugal compressor
- *Standalone simulators: Reciprocating and centrifugal compressors, LPG pump*

Products and processing
- Well effluents. Introduction to flow assurance: hydrates prevention, deposits
- Surface processing: main operating parameters of common processes
- Crude oil and sales gas custody transfer and export
- *Standalone simulators: Crude oil processing, gas processing, metering and export – FPSO case*

INTEGRATED PLANT SAFE OPERATION — 5.5 d

Panel operator duties and control room activities
- Panel operator reporting and handover duties. Plant documentation in control room
- Radio-communication

Integrated plant operation
- Alertness, proactive plant operation. Trends usage as an anticipation tool
- Alarms management: alarm types and classification, decision making
- Steady state runs: routine checks, post-handover checks, global performances checking
- Operating in transient conditions: Production planned shutdown; Production restart
- *Integrated plant simulator: Practice of integrated plant operation in steady and transient conditions – Case of a FPSO*

SAFETY IN OPERATION — 8 d

Routine operations: Permit to Work, work orders, isolations, inhibitions management
Downgraded situations. Special operations: SIMOPS, black start
Process upsets: reacting and acting in a structured manner
SIS: Process and emergency shutdown levels - Related panel operator role and duties
Emergency shutdown procedures and crisis management: stress management and making decision
Integrated plant simulator: Operating in downgraded situations; Emergency shutdown monitoring – Managing process upsets through exercises of progressive difficulty; Emergency shutdown procedures implementation

ASSESSMENT — 2.5 d

Continuous assessment (incl. practical exercises on simulators)
Simulation exercises based on actual industry cases

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 12 - Jul 01	Rueil	30,900 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 15 - Oct 31	Rueil	30,900 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-532

ENGLISH: PROD / PRODSUP
FRENCH: PROD / SUPPROD

Surface Production Supervisor Training

35 DAYS

Equipment - Treatments - Operations - HSE

PURPOSE

To provide the required skills and comprehensive knowledge to hold the position of production supervisor and ensure safe and efficient operations in upstream oil and gas facilities, within the framework of environmental regulations

AUDIENCE

Production supervisors in oil and gas production, transport or storage facilities

LEARNING OBJECTIVES

- To grasp technical details and operating issues of completion and artificial lift
- To understand fundamental concepts underlying oil, water and gas processing
- To assess typical operating conditions and impact of various operating parameters
- To learn about technology and operation of static equipment and rotating machinery used in production facilities
- To comprehend hazards linked to various products and equipment
- To review main safety rules for works or day-to-day operations
- To detect anomalous operating conditions and launch appropriate actions

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Workshops for practical, hands-on sessions with equipment

OBSERVATION

2 weeks in Martigues (south of France)

COORDINATOR

Patrick Elhorga

AGENDA

FUNDAMENTALS — 5 d

Fundamentals of chemistry: atoms, molecules, atomic weight, molecular weight
Hydrocarbons types and main characteristics
Applied physics: force, work and energy, temperature, thermal energy and heat transfer, pressure, hydrostatics, hydrodynamics and friction losses
Well effluent: composition, types and characterization parameters
Liquid-Vapor equilibrium of pure components and mixtures
Well effluents behavior - Need for effluents field processing - Specifications

DOWNHOLE PRODUCTION — 5 d

Fundamentals of reservoir engineering
Information on drilling techniques
Completion techniques and equipment - Wellhead equipment
Artificial lift by Gas Lift (GL), Electrical Submersible Pumps (ESP), Sucker Rod Pumps (SRP), Progressing Cavity Pumps (PCP): principle, operation, selection criteria

EFFLUENT PROCESSING TECHNIQUES — 10 d

Crude oil treatment
- Stabilization (degassing): principle, process parameters, foaming problems
- Dehydration (water removal): principle, process parameters, emulsion problems
- Sweetening (H_2S removal): different techniques, process parameters

Production and injection water treatment
Gas treatment
- Gas dehydration and hydrate formation inhibition
- Gas sweetening
- NGL extraction/recovery
- Fundamentals of LNG

Oil and gas metering
Terminals, FSO/FPSO, Offshore development, Electricity

STATIC EQUIPMENT: TECHNOLOGY AND OPERATION (in Martigues) — 5 d

Piping and valves - Metallurgy and corrosion
Storage equipment
Thermal equipment
Instrumentation, process control - Distributed Control System (DCS)
Safety System: HIPS, ESD, EDP, F&G, USS

ROTATING MACHINERY: TECHNOLOGY AND OPERATION (in Martigues) — 5 d

Pumps: centrifugal and positive displacement
Compressors: centrifugal and reciprocating
Turbo-expanders
Gas turbines

SAFETY AND ENVIRONMENT IN OPERATION AND WORKS — 5 d

Main HSE risks
Hazards for personnel
HSE in production operations
HSE in construction and repair works
Risks inherent to Simultaneous Operations (SIMOPS)
HSE management - Responsibilities
Risk analysis - Safety Engineering concepts

In-house course. Contact: exp.rueil@ifptraining.com

Field Operations
Operation of Production Facilities

E-533

ENGLISH: PROD / PRODSI
FRENCH: PROD / SIPROD

Surface Production Superintendent Training

58 DAYS

Certifying Training

PURPOSE

To provide the in-depth technical knowledge of oil and gas processing operations, along with the managerial and communication skills, for qualifying to hold the position of production superintendents
The required high-level knowledge stretches over a wide range of issues in relation to reservoir, corrosion, inspection, maintenance, well performance, flow assurance…

AUDIENCE

Professionals with a significant experience in oil and gas surface production who are called on to hold position of production superintendents

LEARNING OBJECTIVES

- To master all issues of the overall production process, from reservoir to offloading facilities
- To assess available tools and techniques for well performance enhancement and production optimization
- To anticipate maintenance constraints and impact on production
- To learn about state-of-the-art oil and gas production techniques
- To learn about on-site HSE management rules and individual responsibilities
- To acquire world class work methods and communication skills
- To anticipate anomalous events and react effectively to avoid production loss
- To propose well-argued plans to improve operations

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Intensive teamwork
Use of dynamic training simulations
Practical sessions with equipment in a workshop

OBSERVATION

1 week in Martigues (south of France), 1 week in Rueil

COORDINATOR

Jacques Parpant

AGENDA

DOWNHOLE PRODUCTION - WELL PERFORMANCE — 6.5 d

Units - Dimensions
Fundamentals of Reservoir Engineering - Well testing
Fundamentals of Drilling, Completion and Well Servicing
Artificial Lift (Pumping, Gas Lift…) and Well Performance

OIL, WATER AND GAS PROCESSING — 10 d

Effluent behavior - Fundamentals of thermodynamics - Specifications
Oil processing
Production and Injection water treatment
Gas processing
Work on Study cases to detail processes and concerns

HSE IN PRODUCTION OPERATIONS, CONSTRUCTION & MAINTENANCE WORKS - HSE MANAGEMENT AND SAFETY ENGINEERING — 17.5 d

HSE risks, flammability, overpressure systems: PSV, flare and flare network, closed and open drains…
Safety in operation: use of utilities, degassing/inerting, confined space entry, start-up & shutdown
Safety during construction & maintenance works: lifting & rigging, work at height, electrical safety…
Work permit system - SIMultaneous OPerations (SIMOPS) management…
HSE management systems - Management of change - Downgraded situations - HSE referential & responsibilities
Safety engineering: HAZID, HAZOP, layout optimization and identification of major accidents - Risks matrix…
Safety systems: HIPS, ESD, EDP, F&G, USS - Safety logic diagrams
Human factors - Opersafe: philosophy and methodology
Incident analysis and reporting - Root cause analysis

INSTRUMENTATION & PROCESS CONTROL - ELECTRICITY — 2.5 d

Instrumentation & Process Control - Distributed Control System (DCS)

ROTATING MACHINERY — 5 d

Rotating machinery: pumps, compressors, turbo-expanders, and gas turbines

CORROSION, INSPECTION & INTEGRITY — 3 d

Metallurgy – Corrosion – Inspection – Facility integrity management

MULTIDISCIPLINARY CONFERENCES — 3.5 d

Terminal and FSO / FPSO
Deep offshore: development challenges and specific operating constraints
Flow assurance - Chemicals injection monitoring - Deposit prevention and monitoring
Field Operations Initiative (FOI): objectives and methodology

DYNAMIC TRAINING SIMULATOR (in Lacq) — 5 d

Unit troubleshooting - Practice on Dynamic Training Simulator
Team work management

WORK METHODS AND COMMUNICATION — 2 d

Work methods and team management
Written and oral communication

REVISIONS - ORAL ASSESSMENT — 3 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Apr 09 - Jul 09	Pau, Martigues & Rueil	35,610 €	EXP Pau	exp.pau@ifptraining.com
EN	Sep 18 - Dec 10	Pau, Martigues & Rueil	35,610 €	EXP Pau	exp.pau@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-534

ENGLISH: PROD / PRODENG
FRENCH: PROD / INGPROD

Production Engineer Training (ProdEng)

60 DAYS

Design - Simulation - Operations - Troubleshooting

PURPOSE

To provide the in-depth technical knowledge of oil and gas production facilities design and operation necessary to hold rapidly, and very effectively, the position of field engineer, or design engineer, or project engineer

AUDIENCE

Engineers (particularly young field, design or project engineers) interested in a specialization in oil and gas surface production

LEARNING OBJECTIVES

- To grasp fundamentals of reservoir engineering, drilling, well completion and servicing, and artificial lift
- To comprehend the laws of thermodynamics involved in oil and gas processing
- To understand in detail operating conditions and basic design of oil, water and gas treatment
- To review operating rules and technology of static equipment and rotating machinery used in production facilities
- To learn about offshore development techniques and flow assurance issues
- To grasp the importance of hazards in oil and gas production facilities and assess main HSE rules
- To work through the dynamics of field development projects

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Several simulations using the software program Proll
Intensive teamwork.
Use of dynamic simulations
Several tutorials with equipment in a workshop. Site/field visits

OBSERVATION

1 week in Martigues (south of France)

COORDINATOR

Christian Foussard

AGENDA

FUNDAMENTALS OF GEOSCIENCES AND RESERVOIR ENGINEERING — 5 d

Petroleum geology and geophysics
Reservoir fluids - Petrophysics
Well log interpretation
Well testing - Reservoir engineering and simulation

FUNDAMENTALS OF DRILLING, WELL COMPLETION AND SERVICING — 5 d

Fundamentals of drilling - Well completion
Artificial Lift: Pumping (PCP, ESP, SRP), Gas Lift
Well Servicing and Workover

ADVANCED OIL & GAS FIELD PROCESSING — 15 d

Module I: THERMODYNAMICS APPLIED TO WELL EFFLUENT PROCESSING
- Well effluent - Ideal gas and real fluid behavior
- Gas compression and expansion
- Liquid vapor equilibrium of pure components and mixtures - Mixture separation

Module II: OIL & WATER TREATMENT
- Crude oil treatment: Stabilization, Dehydration, Sweetening
- Reject and injection water treatment

Module III: GAS PROCESSING AND CONDITIONING
- Gas processing: Dehydration, Sweetening, NGL recovery
- Fundamentals of Liquefied Natural Gas (LNG) Chain

TECHNOLOGY OF OIL & GAS PROCESSING EQUIPMENT — 10 d

Module I: STATIC EQUIPMENT
- Piping & Valves - Storage equipment
- Metallurgy - Corrosion - Fundamentals of Inspection
- Thermal Equipment - Fundamentals of Electricity
- Instrumentation & Process Control - Safety System

Module II: ROTATING MACHINERY (in Martigues)
- Centrifugal and positive displacement pumps
- Compressors and Turbo-Expanders - Gas Turbines

SCHEMATIZATION OF OIL & GAS PROCESSES — 2 d

Drawing of a Block Flow Diagram
Drawing of a Process Flow Diagrams (PFD)
Study and analysis of a Piping & Instrumentation Diagrams (P&ID)
Drawing of isometrics

PETROLEUM ECONOMICS — 3 d

Fundamentals of contracts
Project profitability evaluation - Risk analysis of Exploration & Production projects
Project cost estimation and cost control

OFFSHORE FIELD DEVELOPMENT - PIPING & FLOW ASSURANCE — 5 d

Context of offshore developments - Fixed and floating production structures
Construction and installation of platforms
Pipelines: technology, laying and operation
Deep offshore developments - FPSO/FSO technology - Operation of Terminals
Flow Assurance & Multi-phase flow

SAFETY & ENVIRONMENT IN SURFACE PROCESSING OPERATIONS — 5 d

Product and equipment related risk - Hazards for personnel
Safety in production operations and during construction or repair works
Safety management and responsibilities
Introduction to fundamentals of safety engineering

FIELD DEVELOPMENT PROJECT - JURY — 10 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	May 12 - Aug 01	Rueil & Martigues	29,090 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 01 - Nov 21	Rueil & Martigues	29,090 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-535

ENGLISH: PROD / LABOGB
FRENCH: PROD / LABOFR

Laboratory Analysis Techniques for Oil & Gas Applications

5 DAYS

Methodology - Result analysis - HSE

PURPOSE

To provide a comprehensive knowledge of and develop practical skills in conducting reliable and safe laboratory analyses for the oil and gas industry

AUDIENCE

Laboratory personnel, operational staff and other professionals interested in lab analysis dedicated to oil and gas operations

LEARNING OBJECTIVES

- To grasp the physical and chemical concepts involved in various analyses
- To comprehend issues requiring special attention in various analyses
- To assess the results of an analysis and decide whether to carry out the analysis over again
- To review main Occupational Health and Safety rules within the framework of lab activities

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Lab visit

COORDINATOR

Christian Foussard

AGENDA

ROLE AND RESPONSIBILITIES OF LABORATORY STAFF — 0.5 d

Member of Production Staff - Equipment yields controls/monitoring
Final product quality controls/monitoring - Recommendations to improve treatments

ANALYSIS SPECIFIC TO CRUDE OIL — 1 d

Specific gravity or Density
Vapor Pressure (Reid VP)
Water content: Basic Sediment & Water (BSW), Dean Stark distillation
Salt content: Chlorides content, Conductimetry
Acid components content
- H_2S content (Methylene Blue)
- H_2S & Mercaptans by Potentiometry
- Total Acid Number (TAN) of liquid Hydrocarbons

Fluid rheology: Pour point, Kinematic viscosity, Wax content

ANALYSIS SPECIFIC TO GAS — 0.5 d

Gas characterization analysis
- Dew Point (HC & Water)
- Gas composition by Gas Phase Chromatography (GPC)
- Gas Specific Gravity estimate from composition

Acid components content
- H_2S content (Dräger), H_2S & Mercaptans content (Potentiometry, Iodometry)
- CO_2 content (Dräger & Acidimetry)

ANALYSIS FOR THE FOLLOW-UP OF EFFLUENT TREATMENT OPERATIONS — 1 d

Demulsifiers evaluation & selection (Bottle Tests, Field Tests)
Quality controls/monitoring of poor and rich Triethyleneglycol (TEG)
- Water content, pH
- Hydrocarbon content

Follow-up of equipment performances: Water content, Residual emulsion

LABORATORY VISIT — 1 d

Equipment visualization
Discussions on practices, difficulties…

ANALYSIS DONE TO OPTIMIZE ANTI-CORROSION TREATMENTS — 0.5 d

Deposits and scale analyses
Chemical corrosion and bacterial corrosion appraisal
Recommendations for chemical additives and treatments

HSE IN LABORATORY ACTIVITIES — 0.5 d

Laboratory facilities design and implementation
Chemicals management (storage, use…)
Occupational Health and Safety behavior

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 30 - Jul 04	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com
EN	Dec 08 - 12	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-537

ENGLISH: PROD / SAFELABGB
FRENCH: PROD / SAFELABFR

NEW

Safety in Laboratories and Pilot Plants

4 DAYS

PURPOSE

To improve awareness regarding risks in laboratories and pilot plants and develop the right skills to mitigate those risks

AUDIENCE

Technicians with responsibilities in various laboratories (control, R&D, application), pilot plant technicians, security guards

LEARNING OBJECTIVES

- To assess the risks linked to products, testing material and industrial environment
- To mitigate risks by adopting appropriate prevention policies
- To become fully involved in safety matters
- To adopt the best industry practices

COORDINATOR

Christian Foussard

AGENDA

RISKS RELATED TO PRODUCTS — 1.5 d

Inflammability
Explosive atmospheres (ATEX): flammable gases, oxidizers, ignition sources.
Preventions and precautions against ignition hazards: electrical equipment approved for explosive atmospheres classified areas, grounding, venting, inerting
Detection equipment (explosimeters portable and stationary, analysis) and extinction
Dangerous chemical reactions
Incompatibility between products, decomposition and thermal runaway, precautions during storage, use and disposal
Hazards behavior of fluids
Pressure in capacity, thermal expansion, vaporization, put under vacuum, icing
Operating precautions: filling limits…

HAZARDS TO HUMANS — 0.75 d

Chemical risks
Hazard Identification: harmful, toxic, corrosive, carcinogenic, teratogenic, inert gas, thermal burns
Main forms of intoxication, entry into the body and metabolism
Prevention, collective and individual protection
Radiative risks
Non-ionizing radiation and ionizing units used effects on the body - Precautions for the use of laboratory analysis equipment
Electrical hazards
Effects and severity of electrotraumatisme action to be taken in case of accident - Logging
Hearing risks
Area of audibility thresholds of pain sensation, effects and dangers of noise on the body
Measuring the level of exposure, individual and collective protection

HAZARD MATERIALS — 0.5 d

Operating limits of the equipment: pressure, temperature, corrosion, regulations, and precautions during installation and use - Protective equipment pressure vessels
Utilities networks: check valves, hoses, identification, isolation, flow restrictor
Small equipment: glassware, hand tools, rotary tools
Materials for XRF analysis, chromatography, NMR, size, laser…
Machines implemented finished products and equipment testing application

DESIGN AND DEVELOPMENT LABORATORY MANAGEMENT PRODUCTS — 1 d

Laboratory: classification, ventilation, bench, fume…
Specific local: shop, gas storage, chiller, vacuum unit, laundry…
Product management: storage, labeling, marking, book products, expired products
Segregation and disposal of waste recycling, neutralization, sewers, landfills…

INDIVIDUAL BEHAVIOR — 0.25 d

Behavior in the business: risk behavior, exemplary
Prevention of unsafe acts: observation techniques, communication, reaction to unsafe acts
Daily risk management: risk prevention, risks associated with laboratory work

BEHAVIOR HEALTH AND SAFETY

Personal hygiene - Medical supervision
Personal responsibility
Analysis and compliance procedures - Individual behavior - Danger habits
Available tools
Procedures - Analysis tasks - Procedures - MSDS
Service documentation and toxicology - Security service - HSC - Audits
Newsletter, reporting of accidents…

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 15 - 18	Rueil	2,630 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Operation of Production Facilities

E-546

ENGLISH: PROD / WELLGB
FRENCH: PROD / WELLFR

PURPOSE

To provide a comprehensive knowledge of well operations; from drilling, completion, and artificial lift techniques and equipment to well intervention operations

AUDIENCE

Production engineers and other professionals interested in well operations

LEARNING OBJECTIVES

- To grasp fundamentals of drilling techniques
- To draw the architecture of a typical well completion and explain the technology of the equipment used
- To understand operating principle and technology of artificial lift pumps
- To understand operating principle, monitoring and technology of gas lift systems
- To review main well servicing and workover operations (objectives, principles, equipment…)

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)

COORDINATOR

Christian Foussard

Well Equipment and Operation duction Engineers — 5 DAYS

Drilling - Completion - Artificial Lift - Well Interventions

AGENDA

FUNDAMENTALS OF DRILLING — 1 d

Drilling and casing program: function of the different casings, how to determine the drilling and casing program
Principle of drilling: different types of bits, drilling string, hoisting and pumping functions and material, mud and solid treatments, wellheads
Drilling methods and special operations: drilling parameters, turbo drilling, coring and logging, casing and cementing operations, directional drilling, well control, fishing jobs
Offshore drilling operations: different types of rigs, specific offshore problems

FUNDAMENTALS OF COMPLETION OF NORMALLY FLOWING WELLS — 1 d

Operations involved in well completion
Main factors influencing a completion design
Connecting the pay-zone to the borehole: open hole and cased hole, drilling and casing of the pay zone, evaluating and restoring the cement job, perforating
Equipment of naturally flowing wells: functions to be carried out and corresponding pieces of equipment, technology and handling of the main pieces of equipment (production wellhead, tubing, packer, downhole services, subsurface safety valve)

WELL PRODUCTIVITY - NEED FOR ARTIFICIAL LIFT — 0.25 d

Overall approach of the well flow capacity: inflow and outflow performances
Need for artificial Lift
Main artificial lift techniques

ARTIFICIAL LIFT BY PUMPING — 0.75 d

Techniques to be covered:
- Sucker Rod Pumps
- Electrical Submersible Pumps (ESP)
- Progressing Cavity Pumps (PCP)…
- Jet pumps

For each of these techniques, the following points will be highlighted: Principle, Technology of the involved pieces of equipment, Operating procedure and troubleshooting, Installation design, Applications, Advantages and drawbacks. How to improve performances and run-life duration?

ARTIFICIAL LIFT BY CONTINUOUS GAS LIFT — 1 d

Operating principle
Specific completion equipment
Factors to consider for design
Unloading, operating problems, and selection criteria

WELL SERVICING AND WORKOVER - WELL INTERVENTION — 1 d

Main jobs: measurement, maintenance, stimulation, Workover
Operations on killed wells (workover)
Operations on live wells (well intervention): wireline, coiled tubing, snubbing

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	May 19 - 23	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Sep 08 - 12	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
HSE - Health, Safety & Environment

E-550

ENGLISH: HSE / EXPSAFOP
FRENCH: HSE / EXPSECOP

HSE in Surface Processing Operations

5 DAYS

Hazards - Engineering - Operations - Works - Management

PURPOSE

To provide a thorough understanding of risks and safety measures related to products, equipment, and different operations in oil and gas processing facilities

AUDIENCE

Engineers and staff involved in operating oil and gas field processing facilities

LEARNING OBJECTIVES

- To deepen knowledge of hazards involved in routine operations, SIMOPS and shutdown/start-up operations
- To assess risks involved in different operations and adopt best industry practices
- To adopt the most appropriate safety measures in routine oil and gas processing operations and when faced with unforeseen events
- To understand key safety management rules to reach for the highest HSE standards

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Several case studies and teamwork sessions

COORDINATOR

Christian Foussard

AGENDA

OPERATIONS AND SAFETY — 0.25 d

Hazards and risks incurred - Consequences: accidents, health problems and environment related damage
Risk management means: equipment, organizational and human aspects

MAIN RISKS — 0.75 d

Flammability
- Explosive atmospheres (ATEX): flammable products, flash point, explosive limits - Ignition sources: flames, self-ignition, sparks and static electricity, pyrophoric products - Preventive measures and precautions: during normal conditions, during draining and sampling operations, in the event of leaks, with regard to storage tanks, during loading and offloading - Boiling Liquid Expanding Vapor Explosion (B.L.E.V.E.) phenomena

Fluid behavior and related hazards
- Vessel pressure, consequences of temperature variation: thermal expansion, vaporization, collapse freezing due to pressure relief - Avoidance of risks through the correct use of common place equipment: safety valves, rupture discs

Hazards for personnel
- Chemical risks: toxic, corrosive, cancerous
- Physical risks: lack of oxygen, thermal burn, radioactivity, electricity
- Protection and prevention means - Personal Protection Equipment (PPE)

SAFETY IN PRODUCTION OPERATIONS — 1 d

Use of utilities: inert gases, liquid water, steam, air, gas oil, fuel gas
Blow-down and drainage toward: flare, slops, tanks, oily water
Mechanical lock-out - Electrical lock-out
Degassing-inerting: steam, nitrogen, water, vacuum, work permits…
Entry into vessels - Ventilation and atmosphere analysis: oxygen content explosivity, toxicity
Start-up: checks, accessibility and cleanliness, line up, deaeration, seal tests, oil in

SAFETY IN MAINTENANCE & CONSTRUCTION WORKS — 0.5 d

Inventory of risks in works
- Lifting and rigging
- Working in confined space
- Works at height: ladders, scaffolding, mobile elevated working platforms…
- Use of tools: sand blasting, grinding, HP cleaning
- Radioactive sources - Working on electrical equipment
- Work Permits: various types, responsibilities

SAFETY MANAGEMENT - RESPONSIBILITIES — 0.5 d

SIMultaneous OPerations (SIMOPS) management
Management of modifications
Learning from incidents and accidents: Near Misses, Reporting and Cause Tree Analysis
Human factors in risk management, safe and unsafe habits, motivation, exemplarity, difficulties in improving safety results
Responsibilities

ENVIRONMENTAL CONSIDERATIONS IN E&P — 0.5 d

HAZARD ANALYSIS - FUNDAMENTALS OF SAFETY ENGINEERING — 1.5 d

Introduction to Risk Evaluation, Identification of Major Hazards - HAZID - HAZOP
Optimization of Layouts. Safety Instrumented Systems

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 17 - 21	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com
EN	May 19 - 23	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com
FR	Jul 15 - 18	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 03 - 07	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com

May be organized for a single company

Field Operations
HSE - Health, Safety & Environment

E-560

ENGLISH: HSE / SAFENG1GB
FRENCH: HSE / SAFENG1FR

PURPOSE

To provide the knowledge necessary to assess and mitigate risks, and apply industry-required safety codes and practices when designing, constructing and operating oil and gas processing facilities

AUDIENCE

Engineers, technicians, and staff, not familiar with the concepts of safety engineering, involved in operating oil and gas field processing facilities or in designing oil and gas projects architecture

LEARNING OBJECTIVES

- To learn about HSE standards and the deterministic methods of safety engineering in oil and gas processing
- To grasp different methods of risk assessment and key safety management rules
- To learn about the contents of standard hazard studies
- To define, forecast and measure possible outcomes and effects

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Several case studies and teamwork sessions

COORDINATOR

Christian Foussard

Safety Engineering - Module 1 — 5 DAYS

Hazid/Hazop - Risk identification, reduction and mitigation of risks

AGENDA

INTRODUCTION — 0.25 d
Aims of Safety Engineering
Important Terms & Definitions
Safety Engineering throughout the life of a project and during operations

FUNDAMENTALS OF SAFETY ENGINEERING — 0.25 d
Main issues, orders of magnitude
Probabilistic and deterministic methods
Safety engineering practices

"PRELIMINARY HAZARD ANALYSIS" - HAZID — 0.5 d
Objectives of Preliminary Hazard Identification during Conceptual / Feasibility studies
Hazards Related to typical Oil & Gas Process
Methodology for carrying out a HAZID
HAZID application

"HAZARD AND OPERABILITY" - HAZOP — 0.75 d
Methodology to be used
HAZOP exercise

PLOT PLAN REVIEW — 0.75 d
Examples
Safety Engineering approach to plant layout
Plant Layout exercise: optimization of an offshore plant layout

CONSEQUENCE ANALYSIS METHODOLOGY — 0.5 d
Examples of types of scenarios to be considered
Consequence modeling e.g. Blast overpressure, Dispersion modeling etc.
Criteria for Impact assessment
Exercise

REDUCTION OF IGNITION SOURCES — 0.5 d
Hazardous area classifications methodology and examples
Electrical Equipment and suitability with regard to hazardous area classification
Ventilation: types and functional analysis

MINIMIZE THE INVENTORY OF HYDROCARBON RELEASE — 0.5 d
Safety System : Instrumented Safety Systems (incl. HIPS case study), Shutdown System, Blow-down System
Overpressure protection and gaseous HC disposal: PSV's and mechanical systems
Flares / vents and flare network systems
Liquid Drainage: Open / Closed drains, Surface drainage

MITIGATING THE CONSEQUENCES OF A HYDROCARBON RELEASE — 0.5 d
Fire and Gas Detection Systems
Passive Fire & Blast Protection
Active Firefighting systems
Alarm / Evacuation, Escape & Rescue

CASE STUDIES — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Mar 03 - 07	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
FR	Jun 16 - 20	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 17 - 21	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
HSE - Health, Safety & Environment

E-561

ENGLISH: HSE / SAFENG2GB
FRENCH: HSE / SAFENG2FR

PURPOSE

To provide the knowledge and tools for coordinating HSE studies, for the different stages of an onshore or offshore, oil and gas, grass-roots or major revamping project

AUDIENCE

Safety engineers, other engineers and managers (environment, project, process, instrument, and operations) involved in operating or designing and implementing major projects

LEARNING OBJECTIVES

- To acquire the probabilistic methods of safety engineering and typical safety systems design
- To design safety systems including firewater, fire and gas detection, and over-pressure relief
- To ensure safe operation of oil and gas facilities
- To take part in risk assessment and project evaluation
- To contribute to a corporate, experience-based, safety culture

PREREQUISITE

Fundamental knowledge of statistical analysis and hazard identification techniques is highly recommended

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Several case studies and teamwork sessions

COORDINATOR

Christian Foussard

Safety Engineering - Module 2 — 5 DAYS

Major hazard assessment, quantitative risk assessment, fire and gas detection systems design, safety instrumented systems design

AGENDA

DIGEST OF MODULE 1 — 0.5 d
Fundamentals of Safety Engineering-milestones reminder
Review of Historical events leading to significant incidents through consequences analysis

INHERENTLY SAFER PLANT DESIGN — 0.5 d
Possible options for the removal or elimination of a hazard
Provision or addition of means to control
Limitation of inventories of hazardous products

MAJOR HAZARD ASSESSMENT — 0.75 d
Examples of Accident scenarios
Risk Matrices and ALARP principle
Safety critical measures / elements

QUANTITATIVE RISK ASSESSMENT — 0.75 d
Methodology to be used
Systematic QRA approach (step by step)
Assessment and improvement
Case studies and application

DESIGN OF FIRE AND GAS DETECTION SYSTEMS — 0.5 d
Selection of Fire & Gas detector types
Positioning of Fire & Gas detectors
Logic associated with the activation of the F&G detectors
Worked example

ACTIVE AND PASSIVE FIRE PROTECTION - FIRE PROTECTION OF PROCESS PLANT — 0.5 d
Design of firewater network, calculations for firewater demand
Fire protection using water, foam, dry chemicals and inert gas
Firewater systems, pump types and selection guidance
Practical exercise

SAFETY INSTRUMENTED SYSTEMS — 0.5 d
Examples of safety instrumented systems & performance targets
Typical architecture
Safety Instrumented Function (SIF) and Safety Integrity Level (SIL)
Design of ESD systems, Hierarchy of ESD & Actions, Cause & Effects
Example of HIPS

"EMERGENCY ESCAPE AND RESCUE" — 0.5 d
Methodology for Emergency Escape & Rescue Analysis (EERA) & Fire & Explosion Risk Analysis (FERA) studies
On and off site emergency planning
Methodology, data input, assumptions and output
Case study

HUMAN FACTORS AND HUMAN ERRORS — 0.25 d
Human factors in process control, Alarm systems, Human error in process plants, Downgraded situations
Emergency situations

"SAFETY DOSSIER" — 0.25 d
Objectives and contents

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 23 - 27	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 24 - 28	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
HSE - Health, Safety & Environment

E-565

ENGLISH: HSE / SEWGB
FRENCH: HSE / SEWFR

Safety Engineering Workshop Hazard Identification and Risk Assessment Fundamentals

5 DAYS

Hazard identification - Hazid/Hazop - Major hazard assessment - QRA - Layout - Consequences analysis - Fire and gas detection systems - Evacuation - Emergency response

PURPOSE

To provide the knowledge necessary to assess and mitigate risks involved in designing, constructing and operating oil and gas processing facilities

AUDIENCE

Engineers, technicians, and staff (environment, project, process, instrument, and operations) involved in operating oil and gas field processing facilities or in designing oil and gas projects architecture

LEARNING OBJECTIVES

- To learn about HSE standards, process hazards analysis methods, and key safety management rules
- To learn about the contents of standard hazard studies
- To define, forecast and measure possible outcomes and effects
- To select safety systems including firewater, fire and gas detection, and over-pressure relief
- To ensure safe operation of oil and gas facilities
- To take part in risk assessment and project evaluation for offshore and onshore facilities

WAYS AND MEANS

Very interactive and participative delivery method
Workshop sessions with a number of exercises, applications, real case studies, illustrations (videos and pictures), PID
Brainstorming sessions in small groups, with reporting
Plenary sessions:

- to consolidate fundamental knowledge of participants with different backgrounds (process-engineers, HSE, project-engineers, supervisors…)
- to discuss results of workshop sessions, case studies and applications

COORDINATOR

Christian Foussard

AGENDA

DAY ONE

PLENARY SESSION (0.25 day)
HSE Fundamentals: definitions, Hazard studies, risk assessment, environmental issues
Risk analysis methodology: definitions, vocabulary, deterministic and probabilistic methods, preliminary Hazard analysis
WORKSHOP (0.50 day)
HAZID exercise
Hazard and operability (HAZOP) application
PLENARY SESSION (0.25 day)
Workshop results, Day 1 debriefing, questions-answers

DAY TWO

PLENARY SESSION (0.25 day)
Plot plan review: Safety Engineering approach to plant layout
WORKSHOP (0.50 day)
Plant Layout (safety optimization), Plant Layout exercise & case study
PLENARY SESSION (0.25 day)
Workshop results, Day 2 debriefing, questions-answers

DAY THREE

PLENARY SESSION (0.25 day)
Major hazard assessment on process plants
WORKSHOP (0.50 day)
Quantitative Risk Assessment: Systematic QRA approach (step by step), Assessment and improvement, applications
PLENARY SESSION (0.25 day)
Workshop results, Day 3 debriefing, questions-answers

DAY FOUR

PLENARY SESSION (0.25 day)
Consequences analysis methodology, case studies
WORKSHOP (0.50 day)
Risk quantification
Consequences analysis: Dispersions, explosions (VCE, BLEVE), boilover, jet fire, etc. - Criteria for Impact assessment
PLENARY SESSION (0.25 day)
Workshop results, Day 4 debriefing, questions-answers

DAY FIVE

PLENARY SESSION (0.50 day)
Fire and gas detection systems, protection of process plant
Safety systems
Evacuation - *Emergency response*, on & off site emergency planning
WORKSHOP (0.25 day)
Emergency escape and rescue case study
Historical accident analysis
PLENARY SESSION (0.25 day)
Workshop results, Day 5 debriefing, questions-answers

In-house course. Contact: exp.rueil@ifptraining.com

Field Operations
HSE - Health, Safety & Environment

E-570

ENGLISH: HSE / WORKGB
FRENCH: HSE / WORKFR

PURPOSE

To provide a thorough understanding of risks related to products, equipment, and different operations, involved in the execution of construction/ maintenance works

AUDIENCE

Engineers and staff involved in the supervision of construction and maintenance of oil and gas field processing facilities

LEARNING OBJECTIVES

- To gain a deeper insight into hazard analyses during the preparation of construction/maintenance works
- To assess risks linked to various activities, and adopt best industry practices
- To grasp typical HSE management rules for prevention and protection
- To lead a team carrying out a safety audit of construction/maintenance works

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Several case studies and teamwork sessions

COORDINATOR

Christian Foussard

HSE in Construction/ Maintenance Works

4 DAYS

Hazards - Works - SIMOPS - Management - Audits

AGENDA

INTRODUCTION — 0.25 d

Hazards and risks - Consequences: accidents, health problems and environment related damage
Risk management means: equipment, organizational and human aspects

PRODUCT RELATED HAZARDS — 0.25 d

Hazards incurred by flammable products: flash point, explosive limits…
Ignition sources: flames, self-ignition temperature, sparks and static electricity, pyrophoric products
Presence of oxygen - Hazards incurred by air inlet
Hazards related to the use of utilities: inert gases, liquid water, steam, air, gas oil, fuel gas
Preventive measures and precautions

OCCUPATIONAL HEALTH HAZARDS — 0.25 d

Chemical risks: toxic, corrosive, cancerous
Physical risks: lack of oxygen, thermal burn, radioactivity, electricity
Protection and prevention means - Individual Protection Equipment

HAZARDS RELATIVE TO CONSTRUCTION AND MAINTENANCE WORKS — 1.5 d

Lifting: manual and mechanical
Work at Height / Over water / Diving
Use of tools: sand blasting, lifting, chemical and HP cleaning, hydraulic tests, flexible pipes, welding tools, milling…
Radioactive sources: hazards, markers, use
Electrical equipment: electrical classes, hazards, habilitation, consignation, personnel protection
Confined space works: ventilation, gas detection, oxygen content of air, penetration, evolution of hazard during works, supervision
Hydrostatic testing
Welding / Grinding / Cutting

HAZARDS RELATED TO SIMULTANEOUS OPERATIONS — 0.25 d

SIMOPS Simultaneous Operations (Construction & Operation) and control of inherent risks
Downgraded Situations

SAFETY MANAGEMENT IN CONSTRUCTION ACTIVITIES — 0.5 d

Responsibilities
Work Permit System
Risk Assessment for construction activities
Reporting; anomalies, Near Miss, Lost Time Incident (LTI), etc.
Accident / Incident Investigation
Learning from Incidents & Accidents - Fault Tree analysis
Competence & Training

AUDITS - MEANS OF IMPROVING THE SAFETY PERFORMANCE — 1 d

Objectives of an Audit
Pre-audit preparations: Audit boundaries, Expectations, Audit checklists, Audit plans
Audit: findings versus expectations
Post Audit: feedback (Report, findings vs. targets, recommendations and action plan), Audit action plan follow-up
Participants will have the opportunity to practice the preparation, execution and follow-up of an audit related to construction activities

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 16 - 19	Pau	2,630 €	EXP Pau	exp.pau@ifptraining.com
EN	Nov 17 - 20	Pau	2,630 €	EXP Pau	exp.pau@ifptraining.com

May be organized for a single company in 5 days

Field Operations
HSE - Health, Safety & Environment

E-580

ENGLISH: HSE / ENVGB
FRENCH: HSE / ENVFR

PURPOSE

To provide a thorough and applied knowledge of best industry standards and practices for appraising environmental and social matters that need to be handled cautiously throughout the life cycle of an upstream project, from design to construction and operation of oil and gas processing facilities

AUDIENCE

Managers, advisors, engineers, and operations staff involved in oversight or management of environmental and social issues all along the lifetime of an upstream project

LEARNING OBJECTIVES

- To understand the global prevailing context for the oil and gas industry
- To grasp legal requirements and standards with respect to impact on local environment and populations
- To understand techniques and contents of environmental and social impact assessments
- To identify mitigation measures, perform stakeholders' mapping and build Public Consultation and Disclosure Plans
- To select key performance indicators, and set up monitoring with environmental and social management plans
- To learn about minimum requirements for restoration of operational sites after abandonment

WAYS AND MEANS

Several applications and illustrations
Several case studies and teamwork sessions

COORDINATOR

Christian Foussard

Environmental & Societal Aspect Management

5 DAYS

Project Phase and Production Period Issues

AGENDA

ENVIRONMENTAL ISSUES RELATED TO E&P ACTIVITIES — 0.25 d

Historical overview of impact awareness, management
Definitions: Environmental impact, significance, accidental vs. operational discharges, discharge and pollution

THE STAKES — 0.75 d

Environmental issues: local, regional, global
Air, water (availability, pollution), biodiversity, wastes
Kyoto Protocol, carbon dioxide accounting, cap and trade, Clean Development Mechanisms
Toxicity, ecotoxicity

ENVIRONMENTAL RISK ASSESSMENT (ERA), LEGAL REQUIREMENTS/ LEGAL STANDARDS: NATIONAL, REGIONAL, INTERNATIONAL — 0.25 d

Environmental Risk Assessment (ERA)
Legal standards: definition, standard determination, Best Available Technology, Best Environmental Practices
Environmental Quality Standards (EQS), discharge standards - Regional, international, conventions

ENVIRONMENTAL IMPACT ASSESSMENT – PROJECTS — 0.5 d

Environmental impact assessment activities throughout the life cycle of a field, tools used for impact prediction
The EIA process, Scoping an EIA, ENVID (Environmental Hazard Identification) Environmental Management Plan – Case study

ENVIRONMENTAL RISK MANAGEMENT – PRODUCTION ACTIVITIES — 0.5 d

HSE MS – EMS (ISO 14001), continuous improvement processes
Key environmental procedures: wastes management, chemical management, monitoring
Oil Spill Contingency Planning

MONITORING & REPORTING — 0.5 d

Key performance indicators, Industry performance – Trends
Environmental monitoring & surveillance
Green House Gases estimation and reporting

ENVIRONMENTAL RISK MANAGEMENT – ABANDONMENT — 0.25 d

SOCIAL ISSUES RELATED TO E&P ACTIVITIES: THE RISKS, THE STAKES AND THE STRATEGIES — 0.5 d

The risks and the stakes - Some high profile cases (human rights, NGOs activism, etc.)
Documentary viewing and discussion on social risks in E&P activities
How to change practices and image?

PARTICIPATIVE SOCIAL IMPACT ASSESSMENT AS A RISK MANAGEMENT TOOL — 0.5 d

Participative social impact assessment: definition, business case and standards, process
Social management Plans and monitoring - Focus on special topics: involuntary resettlement, local communities, business in conflict zones

STAKEHOLDER ENGAGEMENT — 0.5 d

Stakeholder engagement: definition and business case
Public Consultation and Disclosure Plan (steps and techniques)
Stakeholder Mapping
Stakeholder engagement: Misguiding assumptions and key success drivers

CASE STUDY: SOCIAL SCREENING OF AN OIL AND GAS PROJECT — 0.5 d

Based on a group work, participants should prepare a:
- Stakeholder mapping
- Social impacts identification and mitigation plan

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 23 - 27	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 24 - 28	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
HSE - Health, Safety & Environment

E-590

ENGLISH: HSE / HSESI
FRENCH: HSE / SIHSE

HSE Superintendent Training

58 DAYS

PURPOSE

To develop managerial and communication skills while providing an in-depth technical knowledge stretching over a wide range of issues and advanced topics in relation to oil and gas production and processing equipment, integrity, HSE, deep offshore, flow assurance, etc.; necessary to hold the position of HSE superintendent

AUDIENCE

Professionals with a significant experience in oil and gas surface production and/or HSE, called on to hold the position of HSE Superintendent

LEARNING OBJECTIVES

- To learn about state-of-the-art oil and gas production techniques and equipment technology
- To understand all details of HSE issues linked to production, as well as to construction and maintenance works
- To learn about HSE management rules and individual responsibilities
- To acquire world class work methods and communication skills

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Several teamwork sessions
Practical sessions on firefighting and oil spill response

OBSERVATION

3 weeks in Martigues, 2 weeks in Rueil

COORDINATOR

Jacques Parpant

AGENDA

DOWNHOLE PRODUCTION - WELL PERFORMANCE — 4 d

Units - Dimensions
Fundamentals of Reservoir Engineering - Well testing
Fundamentals of Drilling, Completion
Well Servicing, Artificial Lift and Well Performance

OIL, WATER AND GAS PROCESSING — 5 d

Effluent behavior - Fundamentals of thermodynamics - Specifications
Oil processing
Production and Injection water treatment
Gas processing

HSE IN PRODUCTION OPERATIONS, CONSTRUCTION & MAINTENANCE WORKS — 17.5 d

HSE MANAGEMENT AND SAFETY ENGINEERING

HSE risks, flammability, overpressure systems: PSV, flare and flare network, closed and open drains…
Safety in operation: use of utilities, degassing/inerting, confined space entry, start-up & shutdown
Safety during construction & maintenance works: lifting & rigging, work at height, electrical safety…
Work permit system; SIMultaneous OPerations (SIMOPS) management…
HSE management systems - Management of change - Downgraded situations - HSE referential & responsibilities
Safety engineering: HAZID, HAZOP, layout optimization and identification of major accidents - Risks matrix…
Safety systems: HIPS, ESD, EDP, F&G, USS - Safety logic diagrams
Human factors - Opersafe: philosophy and methodology
Incident analysis and reporting – Root cause analysis

INSTRUMENTATION & PROCESS CONTROL - ELECTRICITY — 5 d

Instrumentation & process control - Distributed Control System (DCS)
Electricity, electrical motors and power generators, electrical power distribution network

ROTATING MACHINERY — 5 d

Rotating machinery: pumps, compressors, turbo-expanders, and gas turbines

CORROSION, INSPECTION & INTEGRITY — 3 d

Metallurgy - Corrosion - Inspection - Facility integrity management

MULTIDISCIPLINARY CONFERENCES — 3.5 d

Terminal and FSO / FPSO
Deep offshore: Development challenges and specific operating constraints
Flow assurance - Chemicals injection monitoring - Deposit prevention and monitoring
Field Operations Initiative (FOI): objectives and methodology

FIRE-FIGHTING & OIL SPILL RESPONSE (GESIP OR EQUIVALENT) — 5 d

Emergency plans - Equipment involved in fire-fighting
Fire-fighting and OSR practice onsite - GESIP or equivalent

ENVIRONMENTAL & SOCIETAL ASPECT MANAGEMENT — 5 d

Environmental legal
Environmental Impact Assessment (EIA) – Management Plan EMP
Societal issues related to E&P activities

WORK METHODS AND COMMUNICATION — 2 d

Work methods and team management
Written and oral communication

REVISIONS – ORAL ASSESSMENT — 3 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Apr 09 - Jul 09	Pau, Martigues & Rueil	35,610 €	EXP Pau	exp.pau@ifptraining.com
EN	Sep 18 - Dec 10	Pau, Martigues & Rueil	35,610 €	EXP Pau	exp.pau@ifptraining.com

Field Operations
Equipment, Maintenance, Inspection

E-600

ENGLISH: MAT / EQUIP
FRENCH: MAT / MAT

PURPOSE

To provide a comprehensive knowledge of static equipment and rotating machinery used in oil and gas processing facilities

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

To comprehend all issues of operating principles, technology, selection criteria, and maintenance of oil and gas processing equipment

WAYS AND MEANS

Several applications and illustrations (movies, samples, tools…)
Use of dynamic simulations
Field/site visit
Several tutorials on equipment in a workshop

OBSERVATION

The training combines the two independent courses E-601 and E-602, the detailed content of which is given in the following two pages

COORDINATOR

Christian Foussard

Technology of Oil & Gas Processing Equipment

10 DAYS

Static equipment - Rotating machinery

Learn the operating principle, the technology, the operation and maintenance of the main equipment used in Oil & Gas installations

AGENDA

MODULE 1: STATIC EQUIPMENT (cf. E-601) — 5 d

Piping and valves
Storage equipment
Metallurgy - Corrosion - Fundamentals of Inspection
Thermal equipment
- Fundamentals of heat transfer
- Heat exchangers, air coolers
- Furnaces, Fire Tubes

Fundamentals of electricity
Instrumentation and Process Control
- Constitution of a control loop - Types
- Sensors and transmitters
- Control valves
- Distributed Control System (DCS)
- Practice of dynamic simulation for process control

Instrument Safety System (ISS)
Oil & Gas metering - Multiphase metering

MODULE 2: ROTATING MACHINERY (cf. E-602) — 5 d

Pumps
- Centrifugal pumps
- Positive displacement pumps

Fundamentals of gas compression and expansion
Compressors and expanders
- Reciprocating compressors
- Centrifugal compressors
- Turbo-expanders

Gas turbines
- Operating principle
- Technology
- Auxiliaries

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 16 - 27	Rueil & Martigues	5,630 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Oct 06 - 17	Rueil & Martigues	5,630 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-601

ENGLISH: MAT / EQUIP1
FRENCH: MAT / MAT1

PURPOSE

To provide a comprehensive knowledge of technology and operating principles of static equipment used in oil and gas processing facilities

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

- To understand technology, operating principles, and maintenance of static equipment (piping, vessels, thermal equipment, storage, instrumentation, process control)
- To learn about main selection criteria in regard to equipment operating conditions and safety considerations
- To grasp fundamentals of metallurgy, corrosion and corrosion prevention
- To review important origins of equipment failures

WAYS AND MEANS

Several applications and illustrations (movies, samples, tools…)
Use of dynamic simulations
Field/site visit

COORDINATOR

Christian Foussard

Technology of Oil & Gas Processing Equipment — **5 DAYS**

Module 1: Static Equipment

Piping - Metallurgy - Thermal equipment - E&I - ISS

Learn the technology, the operation and maintenance of the main static equipment used in Oil & Gas installations

AGENDA

PIPING & VALVES — 0.5 d

Pipes, flanges and gaskets: types, standards
Valves: globe valves, gate valves, other valve types (butterfly, membrane, piston…), check valves
Pig types, Pig valves, pig launcher and receiver
Miscellaneous: filters, flame arrestors, steam traps
Pressure relief equipment: pressure safety valves, thermal expansion valves, rupture disks
Different Codes and standards

STORAGE EQUIPMENT — 0.5 d

Different storage equipment: atmospherics tanks, spheres, cigars, refrigerated and cryogenic storage
Miscellaneous equipment
Case of floating storage vessels (FSO, FPSO)

METALLURGY - CORROSION - FUNDAMENTALS OF INSPECTION — 1 d

Different material types
Main corrosion types
Different materials resistance to corrosion
Corrosion protection and prevention

THERMAL EQUIPMENT — 0.5 d

Fundamentals of heat transfer
Technology of heat exchangers and air coolers
Technology of furnaces and fire tubes
Examples of thermal equipment applications

FUNDAMENTALS OF ELECTRICITY — 0.5 d

Electrical Architecture in Onshore / Offshore installations: Power distribution network, Main components
Electrical Safety - Equipment for Explosive atmospheres
Example of Electrical balance for an offshore installation - Power generation capabilities selection / redundancy, etc.

INSTRUMENTATION & PROCESS CONTROL — 1.25 d

Constitution of a control loop: sensor, transmitter, controller, recorder, control valve, signals (pneumatic, electrical, digital) and signal converters -Tags and symbols
Different types of pressure, temperature, flow rate and level sensors
Transmitters types
Technology of control valves: simple and double seat plug valves, cage valves, “Camflex” type valves, three-way valves
Different types of control loops: simple loop, cascade, split-range
Distributed Control System (DCS): network architecture and constitution - Examples
Practice of Dynamic Simulation for process control

INSTRUMENTED SAFETY SYSTEMS (ISS) — 0.25 d

High Integrity Protection System (HIPS)
Emergency Shut-down System (ESD)
Fire & Gas (F&G)
Ultimate Safety System (USS)

OIL & GAS METERING - MULTIPHASE METERING — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 16 - 20	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Oct 06 - 10	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-602

ENGLISH: MAT / EQUIP2
FRENCH: MAT / MAT2

PURPOSE

To provide a comprehensive knowledge of technology, operating principles and performance of rotating machinery used in oil and gas processing facilities

AUDIENCE

Engineers involved in operating or designing oil and gas field processing facilities

LEARNING OBJECTIVES

- To learn about the practical use of different types of rotating machineries
- To understand operating principles and performance
- To master technology, operating constraints and maintenance of rotating machinery

WAYS AND MEANS

Several applications and illustrations (movies, samples, tools…)
Use of dynamic simulations
Field/site visit
Several tutorials on equipment in a workshop

COORDINATOR

Christian Foussard

Technology of Oil & Gas Processing Equipment — **5 DAYS**

Module 2: Rotating Machinery

Pumps - Compressors - Expanders - Gas turbines

Learn the technology, the operation and maintenance of the main rotating equipment used in Oil & Gas installations

AGENDA

PUMPS — 2 d

Main types of pumps and classification - Selection criteria
Centrifugal pumps
- Types of centrifugal pumps: single or multiple stage, radial of horizontal split, high speed, in line, vertical barrel, pit suction, magnetic drive, canned motor, Electric Submersible (ESP)
- Typical centrifugal pump installation in a circuit: block valves, filter, check valve, manometers, vent and drain
- Technology of the centrifugal pumps: impellers, seals, couplings, bearings, driving machine…
- Auxiliaries: flushing and quench, lubrication, cooling
- Centrifugal pumps performances: characteristic curves, pump-circuit coupling, problems encountered (cavitation and NPSH, adaptation to operating conditions)

Positive displacement pumps
- Rotating positive displacement pumps: Progressing Cavity Pumps (PCP)
- Reciprocating positive displacement pumps (piston or plunger type)
- Technology of the positive displacement pumps and main applications

HSE related to pumps operation

FUNDAMENTALS OF GAS COMPRESSION AND EXPANSION — 0.25 d

Isentropic and polytropic gas compression - Practical gas compression laws
Case of gas expansion

COMPRESSORS AND EXPANDERS — 1.75 d

Main types of compressors and classification - Selection criteria
Reciprocating compressors
- Technology of reciprocating compressors: frame, cylinders, piston and rings, piston rod and crank head, crankshaft and connecting rods, bearings, compartment distance piece, specific emphasis on valves
- Auxiliaries: pulsation dampeners, crank mechanism and cylinder lubrication systems, cooling system, safety devices

Centrifugal compressors
- Technology of centrifugal compressors: rotor and stator, journal and thrust bearings, internal and shaft seals, balance disc
- Auxiliaries: lubrication, sealing (liquid or gas) and cooling systems

Turbo-expanders: technology and main uses
HSE related to compressors and expanders operation

GAS TURBINES — 0.5 d

Operating principle: compression, combustion and expansion - Typical cycles and performances
Technology of gas turbines: compressor part, combustion chamber, turbines part, internal cooling, lubrication
Auxiliaries: fuel supply and filtering, exhaust gas, fire-fighting system

SITE VISIT (SUBJECT TO APPROVAL OF COMPANY) — 0.5 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 23 - 27	Martigues	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Oct 13 - 17	Martigues	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-608

ENGLISH: I-R / INST1GB
FRENCH: I-R / INST1FR

NEW

Process Control & Safety Instrumented Systems

5 DAYS

Instrumentation - Distributed Control System - Dynamic simulation

PURPOSE

To provide a comprehensive knowledge of process control and safety systems

AUDIENCE

Engineers and technicians involved in designing, constructing, commissioning or operating oil and gas surface production facilities

LEARNING OBJECTIVES

- To understand control loops and safety loops, as well as ICSS and associated equipment technologies
- To comprehend technology and operating principles of instruments most commonly used in the oil and gas industry
- To understand impact of PID controllers parameters on process control
- To grasp main process control structures encountered in oil and gas surface processing
- To draw the outline of a typical DCS architecture
- To learn the functions of safety instrumented systems

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Use of dynamic simulations

COORDINATOR

Christian Foussard

AGENDA

PROCESS CONTROL OVERVIEW — 0.5 d

Controlling and controlled system
Controlled variable, manipulated variable, disturbance variable, actuators, set point…
Control topology
Functional analysis, functional locks, symbolization
Pneumatic, electric and digital control loops
Pneumatic and electric power supply, signal transmission… and conversion

MEASURING ELEMENT - SENSORS — 0.5 d

Operating parameters measurement – Measurement errors
Temperature, pressure, flow-rate, level measurement
Operating principle, technology, measurement unit, local reading/ transmission
Safety instruments: limit switches, position sensors, temperature, pressure, flow-rate level detectors…

SIGNAL TRANSMISSION - TRANSMITTERS — 0.5 d

Pneumatic transmitters: transformation of force into a pneumatic signal and amplification, technology and transmitter tuning - Operation of the sensor-transmitter combination
Electric and electronic transmitters: operating principle
Digital and programmable transmitters

ACTUATORS – CONTROL VALVES — 0.5 d

Linear displacement valves: technology, different plug types, characteristic curves, safety position: AO, AC, FC, FO…
Positioners: operating principle, types (pneumatic, electro pneumatic…)
Other types of control valves: simple and double seat valves, cage valves, "Camflex" type valves, three-way valves
Contactors: position sensors, electro-valves
ON/OFF valves: types, simple and double actuators

CONTROLLERS – CONTROL STRUCTURES — 0.5 d

Controllers: Role, operating principle, direct or inverted action, operating modes
Behavior of PID type controllers: operating point, gain, interactions
Control loops: Simple, cascade, and split-range
Ratio control, elaborated variable control, feed-forward control systems

DISTRIBUTED CONTROL SYSTEM — 0.5 d

Plant control philosophy, workstation, glossary
Architecture
- Functional organization, equipment organization
- Data allocation, communication network
- Safety/ redundancy

Interfaces (sensors - actuators - network - PLC - others)
Plant control: hardware, software, types and organization of views
Alarms, historian

PID CONTROLLERS — 1 d

PID tuning: process and control loop response
Robustness, rapidity, accuracy
Regulation (fixed set point) and closed-loop control (variable set point)
Proportional, Integral, Derivative controller characteristic
Applications on dynamic simulator

SAFETY INSTRUMENTED SYSTEMS (SIS) — 1 d

Safety loop
Safety function, Safety Integrity Level
High Integrity Protection Systems (HIPS), Emergency ShutDown (ESD), Emergency Depressurization (EDP), Fire and gas (F&G), Ultimate Safety System (USS)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Oct 27 - 31	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-609

ENGLISH: I-R / INST2GB
FRENCH: I-R / INST2FR

NEW

Advanced Instrumentation, Process Control & Automation

5 DAYS

Acquire advanced knowledge and know-how in process control, safety systems and associated hardware design and implementation

PURPOSE

To provide a comprehensive and practical knowledge of process control and safety systems, necessary for designing and implementing instrumented systems

AUDIENCE

Engineers and technicians involved in designing, setting-up and commissioning instrumented systems for oil and gas surface production facilities

LEARNING OBJECTIVES

- To understand and analyze field instruments design
- To implement Safety Integrated Levels (SIL) on instruments loops
- To anticipate the impact of PID controllers parameters and structures on process control
- To analyze main control structures and perform basic tuning of controllers
- To learn about ICSS equipment architecture
- To understand man-machine interface functionalities
- To comprehend ICSS design and oversight of implementation projects

WAYS AND MEANS

Practical training with real-life case studies
Use of dynamic simulations

COORDINATOR

Christian Foussard

AGENDA

PROCESS INSTRUMENTATION — 1.25 d

Field instrumentation refresher: 4-20 mA standard and HART instruments, digital instruments
Instruments scales and calibration methods
Introduction to control valves calculation
Calibrated orifice calculation according to ISO 5167 standard, approach for measurement error calculation
Flow-rate calculation corrected for pressure and temperature
Instrument cables and junction boxes definition
Introduction to on-site industrial analyzers

PROCESS CONTROL — 1 d

Oil & gas surface processes identification
PID controllers study: series, parallel and mix structures – Impact of controller parameters on process control – Controllers tuning
Study and adjustment of control loops: simple closed loop, cascade, split-range, ratio
Applications on dynamic simulator: case of a {well – separator} process section

SAFETY INSTRUMENTED SYSTEMS (SIS) — 1 d

Refresher on safety instrumented systems (SIS): PSS, ESD, HIPPS, EDP
Impact on HAZID and HAZOP studies on design
Definition and implementation of Safety Integrated Levels (SIL) on instruments loops: oil and gas companies approach to IEC 61508 and 61511 standards – application exercises
Applications on dynamic simulator: Implementation of PSS and ESD systems – Case of a {well – separator} process section

AUTOMATION (ICSS/ PLC) — 1.75 d

Distributed control system (DCS) architecture
- Equipment architecture: controller, input/output cards, software architecture
- Man – machine interface: views management (mimics, alarms, historian, trends), plant control strategy (overview, tree structure) and functionalities of the various types of views
- Alarm management: alarm types, hierarchy, processing
- DCS simulator: Man – Machine interface analysis – Case study

DCS and PLC implementation projects
- Approach to quantification and allocation of system input/output
- Notion of system life cycle and integrity (IEC 61508) / implementation of SIL
- Study of e DCS or PLC implementation project: Engineering documents (functional analysis) and project phases: Factory Acceptance Test (FAT), Site Acceptance Test (SAT) and commissioning

In-house course. Contact: exp.rueil@ifptraining.com

Field Operations
Equipment, Maintenance, Inspection

E-615

ENGLISH: I-R / METER
FRENCH: I-R / COMPT

Metering and Allocation

5 DAYS

Single-phase - Multi-phase - Transactional - Fiscal

PURPOSE

To provide a comprehensive knowledge of metering equipment and applications in the oil and gas industry

AUDIENCE

Operational staff of oil and gas field treatment plants and terminals, instrumentation specialists, petroleum architects, project engineers, reservoir engineers, well performance specialists, completion specialists, personnel from engineering companies, and all professionals interested in metering methods and equipment used in the petroleum industry

LEARNING OBJECTIVES

- To review different kinds of metering and allocation methods, and assess importance of accuracy
- To grasp technology and operating principles of single-phase metering equipment
- To understand standards of liquids and gases transactional metering
- To assess operation, maintenance and calibration techniques of metering installations
- To review multiphase metering advantages, technology and operating principles

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Site visits

COORDINATOR

Christian Foussard

AGENDA

DIFFERENT TYPES OF METERING - IMPORTANCE OF METERING — 0.25 d

Types of metering: technical, transactional, allocation, fiscal
Importance of metering accuracy

DATA TREATMENT — 0.25 d

Technical material balances, data reconciliation, data architecture, architecture of DCS, data recording

IMPLEMENTATION OF A METERING INSTALLATION - INFLUENCE ON PROCESS — 0.25 d

Friction losses, introduction of a cold spot, intrusivity, leakage risks…

SINGLE-PHASE METERING: OPERATING PRINCIPLE AND EQUIPMENT — 0.75 d

Fluids dynamics (laminar and turbulent flow)
Different types of single-phase meters
- Meters based on kinetic energy (Rho.V²): orifice plate meters, Pitot tubes, Rotameters
- Meters based on velocity: direct meters (turbines, volumetric meters) or Indirect meters (Ultrasounds, Electromagnetic, Vortex, thermal, Turbines)
- Derived meters: use of centrifugal pump characteristic curve, use of rotation speed of a positive displacement pump…
- Tracers: chemical, radioactive, inter-correlation

TRANSACTIONAL METERING OF LIQUIDS — 0.5 d

Static transactional metering or Pseudo-transactional metering (tank being filled up…)
Metering bench; turbines, volumetric, ultrasounds
Calibration of metering installations on test bench in manufacturing facilities or on site
Operation of metering installations: maintenance, calibration
Calculators: corrections, conversion into standard volumes
Sampling, online analysis and lab analysis

TRANSACTIONAL METERING OF GASES — 0.5 d

Metering bench; turbines, volumetric, ultrasounds
Calibration of metering installations on test bench in manufacturing facilities or on site
Operation of metering installations: maintenance, calibration
Calculators: corrections, conversion into standard volumes
Sampling, online analysis and lab analysis

MULTI-PHASE METERING: OPERATING PRINCIPLE AND EQUIPMENT — 1 d

Advantages of multiphase metering
Fluids: flow modes, composition
Principle of multiphase measurement: gamma-metric measurement, volume measurement, passive noise analysis use of dielectric, of Venturi, of Inter-correlation
Use of Optic Fibers: inter-correlation, sound velocity
Description of some equipment available for multi-phase measurement: 3D, Roxar, Agar, Haimo, MPM, Weatherford
Installation of multi-phase measurement - Impact on process: fluid conditioning, intrusiveness
Subsea and downhole multiphase meters
Calibration at manufacturer facilities
Operation and maintenance of multi-phase meters

ALTERNATIVES TO THE USE OF MULTI-PHASE METERS — 0.5 d

4D seismic. Use of natural or introduced tracers
Estimation of the contribution of each reservoir (allocation)

SITE VISIT(S) — 1 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 02 - 06	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 03 - 07	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-617

ENGLISH: I-R / ELECGB
FRENCH: I-R / ELECFR

PURPOSE

To provide a thorough understanding of electrical network architecture and operation, as well as a knowledge of electrical equipment technology

AUDIENCE

Engineers and technicians interested in electrical installations and equipment used in the oil and gas industry

LEARNING OBJECTIVES

- To draw the structure of a typical electrical network
- To understand equipment operating principles within a typical electrical network

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)

COORDINATOR

Christian Foussard

Electricity and Electrical Motors

3 DAYS

Distribution network - Back-up supply - Consumers

AGENDA

OVERALL ARCHITECTURE OF ELECTRICAL POWER DISTRIBUTION NETWORK — 0.75 d

Constraints to be considered for the design of an electrical power network
Typical architecture of electrical power network
Voltage levels
Priority classification
Back-up management
Neutral choice and influence on network operation
Different connection modes to public network

DESCRIPTION AND OPERATING PRINCIPLE OF ELECTRICAL EQUIPMENT — 0.75 d

Transformers
Electrical cables
Electrical panels
Control and protection equipment
Equipment used for back-up power supply: diesel/fuel generators, power accumulators, redresser - Role and uses

SYNCHRONIC AND ASYNCHRONIC ELECTRICAL MOTORS - POWER GENERATORS — 0.75 d

Operating principle
Characteristics: current intensity, torque, efficiency depending on rotational speed or load
Different start-up modes, depending on driven machine and/or network possibilities
Electrical and thermal protection/switches of motors
Speed variation

VIABILITY AND SAFETY OF INSTALLATIONS — 0.75 d

Selectivity of protections: different techniques
Isolation checking
Equipment for Explosive Atmospheres: standards and maintenance constraints
Rules for equipment Isolation/Consignation prior to and after maintenance

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 16 - 18	Rueil	2,280 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Oct 27 - 29	Rueil	2,280 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-620

ENGLISH: MTE / PC-E
FRENCH: MTE / PC

Centrifugal Pumps and Positive Displacement Pumps

5 DAYS

PURPOSE

To provide a better understanding of centrifugal and positive displacement pumps technology and operating principle

AUDIENCE

Engineers and technical staff involved in centrifugal and positive displacement pump operation, maintenance or engineering

LEARNING OBJECTIVES

- To describe the behavior and the operation of pumps
- To analyze the technical solutions applied in their units
- To establish a diagnosis of the incidents, and participate in the troubleshooting meetings
- To identify essential elements in pump selection

WAYS AND MEANS

Actual examples from the refining, petrochemical and chemical industry
Trainee participation is continuously encouraged through case studies selected by the lecturer or proposed by the participants themselves

COORDINATOR

Christian Castelnau

AGENDA

HYDRODYNAMICS APPLIED TO A PUMPING SYSTEM — 2 d

Pump performance
- Flow in a pump, velocities triangle, internal flow and energy losses
- Theoretical and practical head: characteristic curve
- Other characteristics: efficiency, power, NPSH required
- Changes in characteristics vs. rotation, viscosity, impeller shape, cavitation

Pipe system
- Liquid flows in pipes: friction losses
- System curve, resistance of flow and throttling control
- Operating point: normal and maximum capacities, change in fluid characteristics and incidence on operating conditions

***Case study**: study of a reflux line and its pump*

CENTRIFUGAL PUMP TECHNOLOGY AND SELECTION — 2 d

Centrifugal pump
- Construction and technology: API 610 specifications
- Internal forces and mechanical criteria: balancing, wear ring clearances
- Specific numbers, impeller and pump shape, suction conditions

Mechanical seal
- Selection according API 382 standard, materials, type
- Friction face heating
- Safety and environment: typical arrangements (single, dual, dry seal)
- Specific solutions: canned motor pump, magnetic drive pump

Installation
- Suction and discharge pipe design
- NPSH available; base plate and grouting
- Ancillary lines and equipment
- Coupling and driven machines
- Safety and environment

POSITIVE DISPLACEMENT PUMP TECHNOLOGY AND PERFORMANCE — 0.5 d

Technology
- Different types of pumps: rotary and reciprocating pumps
- Operating principle and utilization of the different types of pumps

Performance
- Influence of clearance, internal leaks, nature of product on flow rate and pressure.
- Flow rate control
- Installation guidelines: position of tanks, line diameters, metering drums, pulsation dampeners, pressure valves

PUMP OPERATION — 0.5 d

Preparation: filling, draining; spare pumps: heating, ancillaries
Start-up / Shutdown: priming, remote/local controls, hammer shock, risks for process and pump
Survey: parameters (vibration levels, noises, bearing housing temperature, motor intensity, pressures); process incidences (discharge pressure, viscosity, specific gravity, capacity); hazards
Parallel and series operations: risks, dysfunction
Reliability: types and source of damage (wear, ruptures, cavitation, leakages); improvement methods
Safety conditions

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Nov 17 - 21	Rueil	2,410 €	RRU	rc.rueil@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-625

ENGLISH: MTE / ECC-E
FRENCH: MTE / ECC

Centrifugal Compressor

5 DAYS

PURPOSE

To provide a broader understanding of the technology, performance and operation of centrifugal compressors

AUDIENCE

Operation and technical department staff involved in the operation of centrifugal compressors and maintenance technicians

LEARNING OBJECTIVES

- To describe the technology of centrifugal compressors
- To select the adequate operating conditions
- To explain the main operating problems
- To be involved in a troubleshooting process

WAYS AND MEANS

Study of actual cases based on industrial situations
Various illustrations of actual systems
Use of a dynamic simulator

COORDINATOR

Christophe Large

AGENDA

TECHNOLOGY — 1.25 d

Different types of centrifugal compressors
Component parts and architecture of a centrifugal compressor
Technology of the essential components: stator, rotor, bearings, thrust bearing, seals
Vibrations, critical speed, dynamic balancing
Auxiliary equipment: lubrication system, buffer gas, balancing line…
Safety devices: axial displacement, vibrations, bearing and thrust bearing temperatures, oil pressure…

PERFORMANCE — 1.75 d

Changes in gas velocity and pressure in a centrifugal compressor
Mass and volume flow rate as a function of pressure, temperature and the nature of the gas
Discharge temperature, power absorbed as a function of the nature of the gas and the operating conditions
Compressor performance: influence of process parameters, impeller velocity and geometry
Characteristic curves of the circuit and the compressor. Influence of the operating conditions: intake pressure and temperature, nature of the gas, rotation speed

OPERATION — 0.5 d

Flow rate regulation. Adaptation to service conditions
Surge and antisurge devices. Conventional control
Startup and shutdown
Monitoring the compressor and auxiliary equipment under normal operating conditions
Troubleshooting

DYNAMIC SIMULATOR (INDISS+ BY RSI) APPLICATIONS — 1.5 d

Topics

Compressor/driver performance vs. operating parameters
Use of an antisurge device
Start-up/shutdown procedures

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	June 10 - 13	Martigues	1,890 €	RMA	rc.martigues@ifptraining.com
FR	Oct 07 - 10	Lillebonne	1,890 €	RNO	rc.lillebonne@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-629

ENGLISH: MTE / TAG-E
FRENCH: MTE / TAG

Gas Turbines

5 DAYS

PURPOSE

To deepen knowledge about gas turbine technology and enhance competency in the selection, operation and maintenance of gas turbines

AUDIENCE

Engineers and managers involved in gas turbine operation, maintenance, engineering and purchasing

LEARNING OBJECTIVES

- To understand gas turbine operation
- To understand selection criteria based on process and on-site conditions
- To participate in gas turbine troubleshooting
- To know how to create a gas turbine maintenance schedule

WAYS AND MEANS

Study of actual cases based on industrial situations
Various illustrations of actual systems

COORDINATOR

Christophe Large

AGENDA

GAS TURBINE EQUIPMENT — 2 d

Classification: typical cycles, heavy duty and aeroderivative designs, applications
Presentation: main components. Typical machines available on the market
Construction and design: compression, combustion, expansion. Rotor dynamics, coupling
Ancillary equipment
Internal cooling, lubrication, control system, safety devices
External ancillaries: filtering, exhaust stack
This part might be illustrated by a manufacturing workshop or a turbine in operation

PERFORMANCE — 1.5 d

Thermodynamics: ideal and actual gas, behavior during compression and expansion, isentropic and polytropic processes
Centrifugal and axial compression. Performance, stability and other limits.
Combustion: types of combustors, combustion operation. Influence of fuel type. Afterburning for cogeneration purposes. Low NOx designs
Expansion: single or double shaft design operation
Performance influence of atmospheric conditions, fuel selection. API charts
Available load characteristics: rotation speed, T_3 firing temperature, IGV influences. Open cycle, combined cycle examples
***Case studies**: actual performance vs. basic design; troubleshooting*

SELECTION — 0.5 d

Selection criteria according to availability, operational and maintenance requirements
Bidding: significant information for data sheet definition

OPERATION — 1 d

Start-up and shutdown operation: sequences and trips
Air filtering, lubrication and fuel systems operation
Performance monitoring and mechanical operation
Maintenance during operation: compressor cleaning devices
Maintenance objectives and scheduling: operation, load, fuel influences; inspection schedules
Factors related to available load: rotation speed, T_3, IGV. Typical approaches related to Brayton cycle, cogeneration (combined cycle)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 23	Rueil	2,690 €	RRU	rc.rueil@ifptraining.com
FR	Sept 08 - 12	Rueil	2,600 €	RRU	rc.rueil@ifptraining.com

Field Operations
Equipment, Maintenance, Inspection

E-640

ENGLISH: MAI / MAINSI
FRENCH: MAI / SIMAIN

Maintenance Superintendent Training

58 DAYS

Certifying Training

PURPOSE

To provide, through a comprehensive training and assessment system, the required technical knowledge and skills for qualifying to hold the position of Maintenance Superintendent.
The program develops managerial and communication skills while providing an in-depth technical knowledge stretching over a wide range of issues and advanced topics in relation to effluent processing, oil and gas treatment operations, HSE, equipment maintenance management…

AUDIENCE

Professionals with a significant experience in maintenance of oil and gas production facilities, called on to hold the position of Maintenance Superintendent

LEARNING OBJECTIVES

- To understand technology and maintenance operations of main equipment in oil and gas facilities
- To acquire a complete view of the oil and gas production chain, from reservoir to offloading facilities
- To anticipate production constraints and their consequences on maintenance
- To learn about state-of-the-art oil and gas production techniques
- To learn about on-site HSE management rules and individual responsibilities
- To acquire world class work methods and communication skills
- To prepare and manage effectively a global maintenance plan

WAYS AND MEANS

Several applications and illustrations (movies, samples, tools…)
Several teamwork sessions
Several tutorials with equipment in a workshop

OBSERVATION

3 weeks in Martigues, 1 week in Rueil

COORDINATOR

Jacques Parpant

AGENDA

DOWNHOLE PRODUCTION - WELL PERFORMANCE — 4 d

Units - Dimensions
Fundamentals of Reservoir Engineering - Well testing
Fundamentals of Drilling, Completion, Well Servicing, Artificial Lift and Well Performance

OIL, WATER AND GAS PROCESSING — 5 d

Effluent behavior - Fundamentals of thermodynamics - Specifications
Oil processing
Production and injection water treatment
Gas processing

HSE IN PRODUCTION OPERATIONS, CONSTRUCTION & MAINTENANCE WORKS — 17.5 d

HSE MANAGEMENT AND SAFETY ENGINEERING

HSE risks, flammability, overpressure systems: PSV, flare and flare network, closed and open drains…
Safety in operation: use of utilities, degassing/inerting, confined space entry, start-up & shutdown
Safety during construction & maintenance works: lifting & rigging, work at height, electrical safety…
Work permit system - SIMultaneous OPerations (SIMOPS) management …
HSE management systems - Management of change - Downgraded situations - HSE referential & responsibilities
Safety engineering: HAZID, HAZOP, layout optimization and identification of major accidents - Risks matrix…
Safety systems: HIPS, ESD, EDP, F&G, USS - Safety logic diagrams
Human factors - Opersafe: philosophy and methodology
Incident analysis and reporting – Root cause analysis

INSTRUMENTATION & PROCESS CONTROL - ELECTRICITY — 5 d

Instrumentation & Process Control - Distributed Control System (DCS)
Electricity, Electrical Motors and Power Generators, Electrical power distribution network

OPERATION, MAINTENANCE & INSPECTION OF ROTATING MACHINERY — 10 d

Rotating machinery: pumps, compressors, turbo-expanders, and gas turbines
Technology and operation of rotating machinery
- Machine technology: main parts, auxiliaries, maintenance
- Operation and performance: Operation aspect, Mechanical aspect
- Typical troubles: internal leakages, unbalancing, wear and ruptures

Technology and maintenance of machine components
- Lubrication, bearings, coupling and alignment, sealing devices for pumps and compressors, rotors and shafts
- Forecasting breakdowns

CORROSION, INSPECTION & INTEGRITY — 3 d

Metallurgy - Corrosion - Inspection - Facility integrity management

MULTIDISCIPLINARY CONFERENCES — 3.5 d

Terminal and FSO / FPSO
Deep offshore: development challenges and specific operating constraints
Flow assurance - Chemicals injection monitoring - Deposit prevention and monitoring
Field Operations Initiative (FOI): objectives and methodology

MAINTENANCE MANAGEMENT - EQUIPMENT AVAILABILITY CONTROL — 5 d

Maintenance policy and objectives
Reliability process implementation and follow-up - Reliability analysis and improvement
Maintenance costs & failure costs
Subcontracting, shutdown management, progress plans

WORK METHODS AND COMMUNICATION — 2 d

Work methods and team management
Oral and written communication

REVIEW - ORAL ASSESSMENT — 3 d

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Apr 09 - Jul 09	Pau, Martigues & Rueil	35,610 €	EXP Pau	exp.pau@ifptraining.com
EN	Sep 18 - Dec 10	Pau, Martigues & Rueil	35,610 €	EXP Pau	exp.pau@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-642

ENGLISH: MTM / OMIRM

Operation, Maintenance and Inspection of Rotating Machinery

15 DAYS

PURPOSE

To grasp an understanding of how machines work, the mechanical aspects, wear and tear, lubrication, and troubleshooting by vibration analysis and other techniques

AUDIENCE

Young engineers, supervisors and technical staff involved in rotating machinery maintenance and inspection

LEARNING OBJECTIVES

- To explain how the machines and their components work
- To list the mechanical effects of a change in operating conditions
- To describe the failure modes of each component
- To participate to the machinery reliability improvement process

WAYS AND MEANS

Pumps, compressors and turbines manufacturing site visits
Workshop practical exercises
Case studies based on industry feedback

COORDINATOR

Christian Castelnau

AGENDA

TECHNOLOGY AND OPERATION OF MAIN ROTATING MACHINES (PUMPS, COMPRESSORS, TURBINES, ELECTRIC MOTORS) — 5 d

General aspects of machine technology (2 days)
Main parts of the machines: casing, rotor, bearing, coupling
Ancillaries: flushing, heating and cooling, lubrication systems
Maintenance: assembly and dismantling procedures, inspection, clearance, adjustment, roughness

Operation and performance (2.5 days)
Process aspects
- Operational parameters; head, flow, rpm, efficiency
- Characteristic curves. Regulation. Start-up, routine monitoring
- Effect of internal wear

Mechanical aspect
- Stresses in machines. Influence on lifespan, on damage
- Failure prevention; monitoring, repair quality

Frequent problems (0.5 day)
Internal leakages. Unbalancing. Wear and ruptures

Practical exercises *(time included in above items)*
Recording and plotting pressure or head versus flow applied to a centrifugal pump

Plant visits*: centrifugal pumps manufacturer; centrifugal compressors and steam turbines manufacturer, if available*

TECHNOLOGY AND MAINTENANCE OF MACHINE COMPONENTS — 5 d

Lubrication (0.5 day)
Purpose, different types of oil and grease. Practical aspect

Bearings (1.25 days)
Antifriction bearings: types, lifespan, mounting, applications, related problems
Plain and pad bearings, thrust bearings: operation, maintenance, incidents

Coupling and alignment (1.25 days)
Different types of couplings, related problems
Different methods of alignment using comparators, tolerances, practical aspects

Sealing devices for pumps and compressors (1.25 days)
Mechanical pump seals, types, operation, related problems
Installation, geometrical checks
Other seals for positive displacement pumps and reciprocating compressors

Rotors and shafts (0.75 day)
Balancing: eccentricity, tolerances. Assembling on shaft: effect on balancing
Geometrical shaft controls

Practical exercises *(time included in above items)*
Bearing mounting and overhaul. Geometrical shaft control. Shaft alignment
Mechanical seal mounting

Plant visit*: machine component manufacturer, if available*

FORECASTING BREAKDOWNS — 5 d

Study of ruptures, wear and other failures (2.5 days)
Typical damage to machines: onset of problems and causes of failures, influences of metallurgy and surface treatments
Fatigue, wear and tear. Rupture face analysis
Case studies*: rupture and wear examinations of typical machine parts, analysis of some process centrifugal pump complex breakdowns*

Use of vibration analysis in forecasting (2 days)
Different types of measurements and sensors
Monitoring of turbomachines rotor behavior
Spectrum analysis applied to pumps, fans
Examples of diagnosis

Management of machinery reliability (0.5 day)
Reliability centered maintenance
Detection of **Bad Actors**.
Improving reliability through failure analysis and diagnosis
Monitoring the maintenance activity performance

Practical exercises *(time included in above items)*
Measurement and analysis of vibrations
Machinery component failures, analysis on examples

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Aug 25 - Sep 12	Lyon	5,690 €	RSO	rc.solaize@ifptraining.com

Field Operations
Equipment, Maintenance, Inspection

E-643

ENGLISH: MTM / PAVIB-E
FRENCH: MTM / DIAVIB

Machinery Vibration Signature Analysis - A Practical Approach

5 DAYS

PURPOSE

To provide the tools for the evaluation of the machinery operating problems
To give the necessary knowledge and methods for the organization and implementation of an **efficient predictive maintenance program**

AUDIENCE

Supervisors and technical staff involved in inspection and maintenance of rotating equipment

LEARNING OBJECTIVES

- To know the capacity and **limitations of different types of measurement devices**: sensors, analyzers, software…
- To recognize **typical signatures** of the most common mechanical defects
- To decide **the kind of signal treatments** to apply in order to give evidence of a specific defect and evaluate its severity
- To know how to implement a **maintenance schedule for each machine**, based on the type of machine and its importance in the production process

WAYS AND MEANS

Study of actual cases based on industrial situations
Various illustrations of actual systems
Use of professional measurement software and/or (when available) test benches
The practical approach makes the course suitable for fulltime vibration specialists

COORDINATOR

Christophe Large

AGENDA

BASIC DEFINITIONS - OVERALL MEASUREMENTS — 0.75 d

Frequency and amplitude
Displacement, velocity, acceleration
Different types of vibration: periodic, random, shocks
Overall measurements: their limitations, severity charts, high frequency techniques for anti-friction bearings, practical recommendations

RESONANCE — 0.5 d

Simple system behavior: amplitude and phase
Actual rotor and bearings systems
Critical speeds
Using phase to study resonance
Identifying and solving problems

TOOLS FOR DIAGNOSIS — 0.5 d

FFT analyzers: Fourier transforms and actual plots
Accelerometers, fixation methods
Selecting analysis parameters: scales, units, windows
Using special functions: zoom, cepstrum, envelope detection
Using non-contacting probes for monitoring large machinery running on plain or tilt-pad bearings

MACHINERY DEFECTS AND VIBRATION SIGNATURE — 3 d

Unbalance
Shaft and coupling misalignment
Antifriction bearings - Typical defaults
Plain or tilt pad bearings instabilities
Mechanical looseness, cracks, friction between rotor and stationary parts
Gears defaults
Electromagnetic defects of induction electric motors
Drive belt vibration

PRACTICAL MACHINERY VIBRATION MONITORING — 0.25 d

Vibration control policy: machinery improvement program
Different policies according to the type of machinery and its criticity “Ordinary machine” monitoring (motor-pump assemblies, fans, blowers…). Guidelines
Developing an effective program: cooperation between specialists, mechanics and operators

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	June 23 - 27	Martigues	2,440 €	RMA	rc.martigues@ifptraining.com

May be organized for a single company

Field Operations
Equipment, Maintenance, Inspection

E-645

ENGLISH: OMT / GEMA-E
FRENCH: OMT / GEMA

Maintenance Management Equipment Availability Control

5 DAYS

PURPOSE

To provide knowledge on how to select and implement a customized maintenance policy
To provide the practical tools for implementing reliability engineering processes

AUDIENCE

Engineers, supervisors and staff involved in maintenance in equipment availability control or in charge of maintenance costs

LEARNING OBJECTIVES

- To see whether current trends in **maintenance policy** (TPM, RCM…) are applicable to a given case
- To set goals in terms of both **overall corporate efficiency**
- To understand **reliability analysis and improvement techniques**
- To set-up conditions for successful management of unit turnarounds
- To implement **a subcontracting policy**

WAYS AND MEANS

Numerous workshops and case studies illustrating the techniques studied and the topics discussed
The delivery method is interactive and based on participants' own experience

COORDINATOR

Olivier Silaire

AGENDA

MAINTENANCE POLICY AND OBJECTIVES — 0.5 d

Maintenance policy and plant policy. Financial, technical and workforce organization, goals
Current trends: criticality analysis TPM, RCM… How they fit a given situation
Condition-based, preventive and corrective maintenance methods and their respective importance
Maintenance work management: criticality of equipment, priorities, spare parts inventory management

RELIABILITY PROCESS IMPLEMENTATION AND FOLLOW-UP — 0.75 d

Descriptive statistics: reliability and reliability indicators, equipment performance monitoring in terms of availability and maintainability. MTBF, MTTR…
Statistical functions and their applications to preventive maintenance, equipment redundancy studies, standby equipment policy
Pareto law, identification of bad actors

RELIABILITY ANALYSIS AND IMPROVEMENT METHODS — 1 d

FMECA (Failure Modes, Effects and their Criticality Analysis). Areas of application, basic techniques, probability estimation, common methodological errors
Failure trees. Purpose of the method. Practical calculation methods
Reliability centered maintenance. Use of decision logic. Detection and elimination of hidden failures
Application of RCM to SIS (Safety Instrumented Systems) management

MAINTENANCE COSTS AND FAILURE COSTS — 1 d

Maintenance cost vs. overall failure cost. Cost factors. Overall effectiveness index, efficiency concept, adaptation to the petroleum and petrochemical industries
Life cycle cost. Definition and application to the choice of investments. Possible use in estimation of optimum life duration
Spare part management. Cost of inventory. Unsuitability of some conventional calculations. Potential solutions. Decision-making methods

CONTRACTING — 0.5 d

Purpose, conditions for efficiency. Why outsourcing, how to maintain, how to keep control
Different types of contract. Which type to use

SHUTDOWN MANAGEMENT — 0.5 d

Detailed preparation. Permanent cost control. Planning. Identification of critical operations
Work management. Site organization. Safety goals
Commissioning and preliminary start-up. Quality management and safety. Procedures
Reports and updates

IMPROVEMENT PLANS — 0.75 d

From failure management to equipment management
Lowering the tolerance threshold for minor defects. Operators involvement
Maintenance programs per equipment item and per equipment type
Progress plans, key performance indicators. Maintenance audits. Self-rating

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Feb 03 - 07	Rueil	2,600 €	RRU	rc.rueil@ifptraining.com
FR	Nov 17 - 21	Rueil	2,320 €	RRU	rc.rueil@ifptraining.com

Field Operations
Equipment, Maintenance, Inspection

E-646

ENGLISH: EIM / PLINS-E
FRENCH: EIM / PLINS

PURPOSE

To give the necessary background to set up RBI for fixed equipment

AUDIENCE

Managers, engineers and staff involved in inspection, maintenance and operation in the petroleum, petrochemical and chemical industries

LEARNING OBJECTIVES

- To describe the RBI method for a petrochemical or a chemical unit
- To identify the degradation mechanism for a corrosion loop
- To identify the probability and consequence of failure
- To set-up appropriate inspection plan

WAYS AND MEANS

The course is interactive and based on actual case studies

COORDINATOR

Patrick Couturier

Risk Based Inspection (RBI)

4 DAYS

AGENDA

OWNER - USER INSPECTION ORGANIZATION — 0.25 d

Responsibilities of an owner-user of pressure equipment

DIFFERENT TECHNIQUES FOR RISK ANALYSIS — 0.25 d

Definitions, applications, comparison of different methods: RBI, HAZOP, What-If, AMDEC (FMEA), Check-lists, PSM, QRA, Fault Tree Analysis

HOW TO DESIGN A RATIONAL METHOD OF INSPECTION — 0.5 d

Review of RBI based on API 581

QUANTITATIVE AND SEMI-QUANTITATIVE RISK BASED INSPECTION APPROACH — 1 d

Comparison of the qualitative and quantitative RBI-API 581 approaches
Damage and inspection "manuals" (API 571)
Inspection plan preparation and/or revision. Keys for a successful inspection plan
Advantages of the risk-based approach. Other professional documents
Inspection "Quality loop"

EXAMPLES OF APPLICATION OF THE RBI METHOD — 2 d

Technical expertise
Risk-based inspection analysis presentation
Corrosion survey and diagnosis tools
Use of inspection results and technical experts
Documentation related to damage types (corrosion, metallurgical or mechanical damages) and prevention strategies
Case studies of process plant inspection plan

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	May 20 - 22	Lyon	1,470 €	RSO	rc.solaize@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-650

ENGLISH: DEV / OFFSHGB
FRENCH: DEV / OFFSHFR

Offshore Field Development - Pipelines & Flow Assurance

5 DAYS

Technology - Construction - Installation - Operation

PURPOSE

To provide an understanding of offshore technology and techniques, with a particular emphasis on issues of flow assurance

AUDIENCE

Engineers and technicians involved in designing, constructing or operating oil and gas offshore production facilities

LEARNING OBJECTIVES

- To understand technology and design of offshore production facilities
- To grasp the architecture of offshore field developments, from shallow waters to deep offshore
- To understand pipelines technology, laying techniques and main operational problems
- To learn the techniques used to prevent main problems of flow assurance

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)

COORDINATOR

Christian Foussard

AGENDA

OVERVIEW OF OFFSHORE DEVELOPMENTS — 0.25 d

Constraints specific to offshore production
Present performances and future perspectives - Technological barriers

FIXED AND FLOATING PRODUCTION STRUCTURES — 0.25 d

Offshore production structures: jacket, semi-submersible, SPAR, TLP, FPSO…
Selection criteria - Limitations
Terminology: shallow water, deep offshore, ultra deep offshore

CONSTRUCTION AND INSTALLATION OF PLATFORMS — 0.5 d

Platform technology - Platform installation techniques
Examples of shallow water developments

DEEP OFFSHORE DEVELOPMENTS — 0.5 d

Typical subsea architecture: subsea wellheads, well jumpers, production manifolds, production lines, production risers, preservation lines, umbilicals
Role and technology of each piece of equipment
Examples of deep offshore developments

FPSO/FSO TECHNOLOGY — 0.5 d

Technology of Floating (Production) Storage and Offloading vessels
Ballast tanks - Atmosphere control
Oil, methanol… storage tanks - Blanketing system
Storage tanks start-up procedures - Incidents
Technology and operation of FPSO/FSO offloading (tanker loading) buoy

OPERATION OF TERMINALS — 0.25 d

Technology of tankers and Loading/Offloading equipment
Marine operations of reception and exports
Terminal constraints: storage capacity, scheduling

NEW DEEPWATER TECHNOLOGIES — 0.25 d

Overview of new DEEPWATER technologies that are in R&D or pilot stages

FLOW ASSURANCE 1/2: PREVENTION OF DEPOSITS IN FLOWLINES — 0.5 d

Main Flow Assurance problems: hydrates, paraffins, sulfates, sand, salt, naphtenates…
Main technical solutions and preservation operations - Intervention techniques

FLOW ASSURANCE 2/2: MONITORING OF MULTI-PHASE FLOW THROUGH FLOWLINES — 1 d

Multi-phase flow patterns - Application to Oil & Gas upstream activities
Gas dominated systems: dry versus Wet scheme, flowline and slug catcher design
Oil dominated systems: hydrodynamic slug flow, examples

PIPELINES: TECHNOLOGY, LAYING AND OPERATION — 1 d

Technology of pipelines: standards, material grades, insulation techniques
Pipeline laying techniques (offshore and shore approach) - Illustrations
Pipeline operation and maintenance:
- Main flow assurance problems - Main available technical solutions
- Pipe corrosion monitoring and prevention - Cathodic protection
- Pipeline maintenance / Maintenance management

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 30 - Jul 04	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Oct 20 - 24	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-660

ENGLISH: DEV / TERMGB
FRENCH: DEV / TERMFR

PURPOSE

To provide a comprehensive knowledge of technology and operation of oil terminals in general; and of FPSO/FSO in particular

AUDIENCE

Managers, staff, and technicians whose activities are related to oil terminals (production, marine maintenance, operation, design, manufacturing, trading, control, regulations…)

LEARNING OBJECTIVES

- To review all loading/unloading operations on oil terminals, FPSO's and FSO's
- To understand technical characteristics of on-land or floating storage facilities
- To understand metering and sampling techniques used to measure volume of marketed oil
- To grasp technology of oil tanker loading facilities (jetty, loading buoy, tandem point…)
- To learn about mooring crew activities, pilotage, port regulations
- To assess oil terminals HSE hazards and operational constraints

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)

COORDINATOR

Christian Foussard

FPSO/FSO & Operation of Oil Terminals

5 DAYS

Technology - Construction - Operation - Regulation

AGENDA

OVERVIEW OF OIL TERMINALS — 0.5 d

Functions of oil terminals: reception, oil processing, storage, export…
Different actors of an oil terminal
Crude oil treatment, Water treatment…
Evaluation of terminal storage capacity, tanker loading planning…

ONSHORE STORAGE TANKS — 0.5 d

Different types of storage tank (fixed roof, floating roof) - Selection criteria
Fixed roof tank: shell, roof, bottom, foundation, retention basins, and various equipments
Floating roof tank and various equipments
Fire fighting facilities: water deluge, foam, gas extinguisher…
Safety risks on storage tanks: H_2S, dangers of ignition, explosion risk, collapse, static electricity…
Incidents and equipment failures on storage tanks
Fire types on storage tanks

METERING OF OIL QUANTITIES: RECEIVED, STORED AND EXPORTED — 1 d

Metering and sampling on onshore tank (level, reference temperature scales)
Determination of amounts standard issued
Counting dynamic transactional, sampling and calibration - Calculation of standard volume and weight
Maintenance of metering unit and calibration loop and meter calibration
Presentation of oil exported commercial documents

FLOATING STORAGE FACILITIES (FSO/FPSO) — 1 d

Presentation of the main functions of a FPSO
Anchoring the FPSO - FSO
Technology of floating storage tanks
Storage tanks of crude oil, methanol ballast. Tanks atmosphere control - Inerting system
Procedures for storage tanks entry - Incidents
Safety on-board storage of FSO / FPSO

EXPORT AND MARINE OPERATIONS — 1 d

Tanker approach operations and mooring at: jetty, loading buoy, tandem point…
Tanker loading operations, tanker loading planning, preparations before loading, monitoring during the loading operations and procedures after loading
International Ship and Port Facility Security (ISPS) Code: principle, actors, responsibilities, practical difficulties
Mooring crew operations
Safety Port Regulations - Pilot activities
Commercial contracts, demurrage, commercial claims

TANKERS TECHNOLOGY AND TANKER LOADING INSTALLATIONS — 1 d

Ships transport of crude oil (tankers): different sizes of vessels, equipment related to the handling of products (cargo circuit, pump room), ballasting and deballasting, inert gas generation, tank washing
Different mode of loading tankers: jetty, tandem, and buoy. Advantages / disadvantages
Safety Checklist (IMO)
Description of tandem loading point and loading buoy

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	May 19 - 23	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com
EN	Nov 24 - 28	Pau	2,970 €	EXP Pau	exp.pau@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-665

ENGLISH: DEV / FLUFLOW

NEW

Fluid Mechanics and Flow Assurance

5 DAYS

Flow in a line, hydrodynamics, friction losses, flow assurance

PURPOSE

To provide a thorough understanding of pipeline hydraulics and pipe friction loss calculations

AUDIENCE

Engineers involved in operating or constructing oil and gas production facilities

LEARNING OBJECTIVES

- To learn fundamentals of fluid mechanics applied to flow lines and pumps
- To assess friction losses in a pipeline and fittings for a single-phase flow
- To understand multiphase flow patterns and main perturbing factors
- To grasp multiphase flow hydrodynamics for wet gas streams and crude oil streams
- To deal with pipeline flow assurance issues

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)

COORDINATOR

Christian Foussard

AGENDA

FUNDAMENTALS OF FLUID MECHANICS — 2 d

Fundamentals
- Fluid at rest, surface tension, fluid in motion, rheology, similitude

Laws of conservation
- Conservation of mass - Conservation of energy: Bernoulli's equation - Conservation of Momentum: Euler's equations

Pressure drop
- Single phase pressure drops, pressure drops on singularities, viscous flow, compressible flow

Flow regimes
- Laminar and turbulent flows - Reynolds number
- Calculation of friction loss through pipes & fittings: Moody chart, AFTP charts (Lefevre)
- Case of compressible fluids (gas) - Main empirical equations

Several exercises

MULTI-PHASE FLOW IN OIL & GAS PRODUCTION — 1 d

Incentives and stakes
Definition of multi-phase flow
Main terminology
Basic understanding of different modeling approaches
Historical methods to study steady-state two-phase flow
Future with multi-phase flow modeling

FLOW ASSURANCE — 1 d

Main flow assurance issues
Flow stability: flow pattern (horizontal and vertical) - Slugging
Erosion constraints, wax, hydrates
Heat transfer: main heat transfer phenomenon, OHTC, cold spot issue
Phase envelope, hydrate dissociation curve, emulsion, viscosity

WET GAS STREAMS — 0.5 d

Natural gas field development
- "Dry" scheme versus "Wet" scheme
- Main Flow Assurance issues (hydrates, TLC, surge liquid volume handling)

Exercises

CRUDE OIL STREAMS — 0.5 d

Crude oil field development
Deep water constraints
Typical Field Preservation
Classical loops versus alternative development architectures
Subsea processing

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 07 - 11	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-670

ENGLISH: DEV / HYDRGB
FRENCH: DEV / HYDRFR

Pipeline Hydraulics and Multi-phase Flow

5 DAYS

Simulation using OLGA™ & PVTsim

PURPOSE

To provide a practical understanding of pipeline hydraulics, flow simulation, and pipe friction loss calculations

AUDIENCE

Engineers involved in designing, constructing or operating oil and gas production facilities

LEARNING OBJECTIVES

- To assess friction losses in a pipeline and fittings for a single-phase flow
- To understand multiphase flow patterns and main perturbing factors
- To grasp multiphase flow hydrodynamics for wet gas streams and crude oil streams
- To understand operational constraints of single- and multi-phase flow lines
- To deal with pipeline flow assurance issues
- To simulate a pipeline using the software program OLGA™

WAYS AND MEANS

Several applications and illustrations (videos, samples, tools…)
Use of simulation software programs OLGA™ and PVTsim

COORDINATOR

Christian Foussard

AGENDA

FRICTION LOSSES FOR SINGLE-PHASE FLOW — 1.5 d

Total energy of a fluid - Bernoulli law
Real fluid flow: viscosity, friction coefficient
Flow regimes: laminar and turbulent (eddy) flows - Reynolds number
Calculation of friction loss through pipes: Moody chart, AFTP charts (Lefevre)
Calculation of friction loss through fittings
  Method 1: resistance coefficient
  Method 2: equivalent straight pipe length
Case of compressible fluids (gas) - Main empirical equations
Several exercises

MULTI-PHASE FLOW IN OIL & GAS PRODUCTION — 0.5 d

Incentives and stakes
Definition of multi-phase flow
Main terminology
Basic understanding of different modeling approaches
Historical methods to study steady-state two-phase flow
Example of multi-phase dynamic flow simulator OLGA™
Future with multi-phase flow modeling

FLOW ASSURANCE — 1 d

Main flow assurance issues
Flow stability: Flow pattern (horizontal and vertical) - Slugging
Erosion constraints, Wax, Hydrates
Heat transfer: main heat transfer phenomenon, OHTC, cold spot issue
Fluid modeling (example with PVTSim)
Phase envelope, hydrate dissociation curve, emulsion, viscosity

WEL GAS STREAMS — 1 d

Natural gas field development
  "Dry" scheme versus "Wet" scheme
  Main Flow Assurance issues (hydrates, TLC, surge liquid volume handling)
"Wet" scheme Simulations
Operating envelope
Geometry impacts
Example of Slugcatcher design

CRUDE OIL STREAMS — 1 d

Crude oil field development
  Deep water constraints
  Typical Field Preservation
  Classical loops versus alternative development architectures
  Subsea processing
Crude oil stream
  Severe slugging
  Hydrodynamic slug flow - Slug-catcher design
  Thermal constraints during production / transient (cool down)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Sep 22 - 26	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-675

ENGLISH: DEV / CORGB
FRENCH: DEV / CORFR

Corrosion and Corrosion Prevention

5 DAYS

Application to Oil & Gas Upstream Activities

To understand the corrosion phenomena specific to Oil & Gas Upstream installations, and the main corrosion prevention techniques

PURPOSE

To improve participants' knowledge of corrosion of metal elements integrated in Oil & Gas equipment

AUDIENCE

Engineers and technicians working for the Design, Construction, Operation, Inspection or Maintenance of Oil & Gas upstream production facilities

LEARNING OBJECTIVES

- To list the main characteristics and types of corrosion of metallic materials used in the Oil & Gas industries
- To describe the means of protection against each type of corrosion
- To select the most appropriated material for a given Oil & Gas application
- To explain the available ways of monitoring the state of corrosion of a metallic equipment

WAYS AND MEANS

Interactive teaching by experienced lecturers
Several applications and illustrations (videos, samples, tools…)

COORDINATOR

Christian Foussard

AGENDA

DEFINITION AND MECHANISMS OF CORROSION — 1 d

Ferrous and non-ferrous metals: structure, composition, mechanical properties
Definitions: wet corrosion, dry corrosion
Cost of corrosion: financial and human
Basics: electrochemical mechanisms, polarization, passivity, diffusion

COMMON TYPES OF CORROSION — 1 d

Analysis of the origin and development process of each form of corrosion and possible methods of prevention
Forms of corrosion studied: uniform, galvanic, pitting, crevice, inter-granular, selective, corrosion-erosion and cavitation, stress corrosion, contact corrosion

TYPES OF CORROSION ENCOUNTERED IN THE OIL & GAS INDUSTRY — 1 d

Each type of corrosion is studied together with possible remedial treatment:
- Corrosion by hydrogen sulfide
- Corrosion by carbon dioxide
- Corrosion due to Naphthenic acid and Polythionic acid
- Caustic soda corrosion
- Corrosion in an aqueous environment
- Atmospheric corrosion or corrosion by sea water
- Corrosion by oxidation
- Corrosion of reinforced concrete

Case studies of corrosion observed in Oil & Gas installations: identification of the types of corrosion and suggested remedial treatment

CORROSION PREVENTION — 1 d

Design of equipment aimed at avoiding certain types of corrosion
Choice of the materials best suited to the environment
Corrosion inhibitors, filming, passivating, neutralizing, absorbing the oxygen
Anti-corrosion coatings and systems
Cathodic protection with sacrificial anodes or imposed current
Methodology and control of processes. Control of process and environmental parameters
Analysis of the means of prevention implemented in the units

CORROSION MONITORING - FUNDAMENTALS OF INSPECTION — 1 d

Corrosion coupons and probes
Non-destructive testing of the state of walls
Corrosion monitoring plan
Fundamentals of inspection

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jun 23 - 27	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-680

ENGLISH: DEV / SIMULGB
FRENCH: DEV / SIMULFR

PURPOSE

To provide a comprehensive knowledge of all field operations, and develop practical skills in simulation of oil and gas treatment processes using the software programs HYSYS and Proll

AUDIENCE

Professionals involved or interested in oil and gas field treatment processes: operation or process personnel, engineering staff, R&D engineers…

LEARNING OBJECTIVES

- To understand different oil and gas processing operations: flash separation, compression, expansion, heating or cooling, mixing, pumping, etc.
- To grasp most common oil and gas processing schemes and operating parameters
- To build a new Process Flow Diagram (PFD) and optimize existing processing schemes
- To simulate an industrial unit at different operating stages
- To extract thermodynamics data from the simulation software database (phase envelope, critical point parameters, hydrate formation risk area, different physical properties…)

WAYS AND MEANS

Several simulation case studies, addressing most of oil and gas field processes

COORDINATOR

Christian Foussard

Simulation of Oil & Gas Field Treatment Processes

5 DAYS

Simulation using HYSYS and Proll

AGENDA

SOFTWARE PRESENTATION — 0.25 d

Presentation of the different pieces of equipment: pumps, compressors, heat exchangers, turbines, turbo expanders, separators, valves, pipes
Choice of the thermodynamic model: PR, SRK…
Definition of components, pseudo-components, heavy-cuts

SIMULATION OF A PROPANE CRYOGENIC LOOP — 0.75 d

Study of a simple loop
Improvement of loop performances by addition of an intermediate expansion
Use of propane enthalpy diagram to validate the software results
Influence of propane purity and consequences of air ingress

SIMULATION OF A CRUDE OIL FIELD TREATMENT UNIT — 1 d

Main field treatments for crude oils: stabilization, sweetening, desalting and dehydration, associated gas compression and treatment
Study of an offshore crude oil field treatment unit, based on Multiple Stage Separation (MSS)
Influence of the number of separators on the quality (API…) and quantity of stabilized oil
Optimization of the operating parameters: pressures and temperatures of separators, suction and discharge condition of compressors, pumping needs for export by pipe
Identification and adjustment of the controlling parameters

SIMULATION OF A NATURAL GAS FIELD TREATMENT UNIT — 1 d

Main field treatments for natural gases: dehydration, sweetening, NGL extraction/ recovery, compression and export…
Study of an offshore natural gas dehydration, liquids extraction and compression unit
Optimization of the operating parameters: primary separator operating conditions, dehydration parameters, cooling temperature for a sufficient liquid extraction, compression needs upstream the export pipe
Identification and adjustment of the controlling parameters
Analysis of hydrate formation risks

SIMULATION OF A GAS DEHYDRATION UNIT BY PHYSICAL ABSORPTION (TEG) — 0.75 d

Simulation of the glycol loop: contactor, flash separator, regenerator (still), circulation pumps, glycol/glycol exchanger
Adjustment of controlling parameters: dry gas residual moisture content versus purity of lean TEG, moisture flow to be removed versus TEG circulation flow

SIMULATION OF A NATURAL GAS LIQUIDS (NGL) EXTRACTION / RECOVERY UNIT — 0.75 d

Progressive build up of the PFD of a Natural Gas Liquids (NGL) extraction unit
Three processes are studied:
- External refrigeration loop (cryogenic loop)
- Joule Thomson expansion valve
- Turbo Expander

Illustration of the results on phase envelope diagram

SIMULATION OF NATURAL GAS LIQUID FRACTIONATION UNIT - DISTILLATION PROCESS — 0.5 d

Principle of separation by distillation process and main operating parameters
Simulation of a NGL fractionation unit using distillation columns
Characteristics and operating conditions of the main equipment Specific constraints

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Dec 15 - 19	Rueil	2,970 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-690

ENGLISH: DEV / SCHEMGB
FRENCH: DEV / SCHEMFR

Schematization of Oil & Gas Processes

2 DAYS

Block flow diagrams, PFD, PID, Plot Plans and Isometrics

PURPOSE

To provide a thorough and practical understanding of oil and gas processes schematization techniques

AUDIENCE

Engineers and technicians interested in oil and gas processing schemes; treatment facilities equipment suppliers; process, design, and construction staff

LEARNING OBJECTIVES

- To assess the essence of different diagrams used in the oil and gas industry
- To read and analyze all types of oil and gas process schemes
- To learn where in all available diagrams to look for some particular information if need be
- To take part efficiently in technical project meetings involving professionals from various disciplines

WAYS AND MEANS

Several case studies, based on most common oil and gas processing facilities

COORDINATOR

Christian Foussard

AGENDA

DIFFERENT DIAGRAMS USED IN OIL AND GAS PROCESSING — 0.25 d

Different types of diagrams used in the Oil and Gas industry:
- Block Flow Diagrams
- Process Flow Diagrams (PFD)
- Piping & Instrumentation Diagram (P&ID)
- Plot Plan onshore and offshore
- Isometrics

Symbolization: representation of the different pieces of equipment, the instrumentation
Illustration by examples of schemes corresponding to the same process unit

DRAWING OF A BLOCK FLOW DIAGRAM — 0.25 d

Drawing of the Block Flow Diagram
Identification of the different connections between the blocks
Analysis of the working principle of the whole process

DRAWING OF A PROCESS FLOW DIAGRAM — 0.5 d

Reminder of the working principle of the main equipment: valves, separators, desalter, pumps, compressors, heat exchangers
Drawing of a PFD starting from an illustration and a written description of a crude oil stabilization plant, including associated gases compression unit, crude oil storage and export pumps
Emphasis on the schematization pitfalls to avoid: inlet and outlet connections of each piece of equipment, tube side and shell side of heat exchangers, suction and discharge lines of rotating machinery, typical arrangement of compressors (gas cooler, scrubber, anti-surge line)
Implementation of the different control loops on the previous schematic, starting from a written description
Emphasis on the instrumentation pitfalls to avoid: connection of sensors, positioning of control valves (inlet or outlet of capacities, suction or discharge or rotating machinery, inlet or outlet of heat exchangers)

STUDY AND ANALYSIS OF P&ID'S — 0.5 d

Team work exercises
Analysis of a set of Process and Instrumentation Diagrams, symbols, line numbering, safety systems, etc.
Identification of the different circuits: hydrocarbon, water, utilities
Analysis of the instrumentation and process control
Drawing of the process flow diagrams corresponding to the studied P&ID
Presentation of the results of each team to the other groups

DRAWING OF ISOMETRICS — 0.5 d

Use of isometrics
Exercises of isometric drawing

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Jul 07 - 08	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Oct 27 - 28	Rueil	1,480 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Field Operations
Process & Layout Engineering

E-695

ENGLISH: DEV / FDEVGB
FRENCH: DEV / FDEVFR

Field Development Project

20 DAYS

Scheme selection - Design - Schedule - Project profitability

PURPOSE

To provide the knowledge, methodology and tools to orchestrate work and integrate contributions of engineers from all disciplines working in a project team with the purpose of devising field development schemes

AUDIENCE

Engineers from all upstream oil and gas disciplines: reservoir, drilling and well completion, treatment facilities, cost estimation, design…

LEARNING OBJECTIVES

- To consolidate the fundamentals to lead a field development study
- To acquire world class methodology in oil and gas field development
- To assess and assemble contributions of all technical disciplines involved in mapping out a field development scheme
- To outline the design of flow-lines, processing facilities, and export facilities
- To make an efficient contribution to field development multidisciplinary project teams

WAYS AND MEANS

Intensive 10-day work on a full field development project, with deliverables presented to a jury in a plenary session
Coaching throughout the training by industry experts for a highly interactive learning experience
Several teamwork sessions with practical exercises
Use of several professional software programs for designing facilities and sizing equipment

COORDINATOR

Christian Foussard

AGENDA

FUNDAMENTALS OF RESERVOIR, DRILLING AND COMPLETION	**1 d**
WELL EFFLUENTS BEHAVIOR - NEED FOR EFFLUENT FIELD PROCESSING	**1 d**
CRUDE OIL TREATMENT	**1 d**
PRODUCTION AND INJECTION WATER TREATMENT	**1 d**
GAS PROCESSING AND CONDITIONNING	**1 d**
SIMULATION OF OIL & GAS FIELD TREATMENT	**2 d**
CASE OF OFFSHORE DEVELOPMENTS - FLOW ASSURANCE	**0.5 d**
SAFETY AND ENVIRONMENT	**0.5 d**
PROJECT MANAGEMENT	**1 d**
PETROLEUM ECONOMICS	**1 d**
PROJECT REALISATION	**10 d**

Deliverables

Data collection and analysis – Identification of the technically feasible scenarios - Selection of the optimum scenario
Design of flow-lines and study of Flow Assurance issues
Design of Surface Processing Facilities: Process Flow Diagram PFD, operating conditions, main control loops…
Design of export pipelines and estimation of floating storage capacities
Estimation of Power requirements and consequently the Fuel Gas balance
Topside layout, minimizing hazards
Tentative schedule for the project - Cost estimation and Project Profitability analysis
Contracting policy – Local Content policy

Jury: presentation of the results and comments with members of the Jury

PEDAGOGICAL METHODOLOGY

Team work exercise, in order to promote an efficient collaborative work
Continuous coaching by industry experts of the diverse subjects studied, for a highly interactive learning
Use of several industry-proven software for the design of the installations and the sizing of the equipment

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 17 - Apr 11	Rueil	11,240 €	EXP Rueil	exp.rueil@ifptraining.com
EN	Nov 24 - Dec 20	Rueil	11,240 €	EXP Rueil	exp.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

p. 253 to 273

Projects & Logistics

E-712

ENGLISH: PL / PROJGB
FRENCH: PL / PROJFR

Project Management

5 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide a comprehensive and practical knowledge of what it takes to manage successfully large exploration and production projects: "What to do, When to do it, and How to do it?"

AUDIENCE

Professionals involved in oil and gas projects or production, interested in the discipline of project management applied to large exploration and production projects

LEARNING OBJECTIVES

- To conduct preliminary stages: concept, feasibility, economics, risk assessment, FEED
- To appraise project planning: schedule, costs, economics, risk, execution plan
- To strengthen HSE in project Design and Construction
- To choose between various types of service contracts
- To manage pre-construction phases: basics, calls for tenders, etc.
- To manage EPC phases: engineering, procurement, construction and commissioning

WAYS AND MEANS

Numerous examples from actual Exploration & Production projects
Participants work on one case study that illustrates, throughout the course, all stages involved in the management of a project

COORDINATOR

Yves Bonnefoy

AGENDA

INTRODUCTION AND PRELIMINARY STUDIES — 0.5 d

Introduction: global project context (field development and oil and gas treatment projects types, project steps)
Preliminary studies: field development project evaluation process, examples of field development project, oil & gas project evaluation process, examples of gas treatment projects, conceptual studies, pre-FEED, project economics, technical deliverables, preliminary project planning (global project schedule, CAPEX estimate, risks management plan, project execution strategy)

FEED OR BASIC ENGINEERING — 0.5 d

Technical package and project planning, project team organization, feed management, execution sequence, deliverables, process licensors packages, EPC phase schedule, CAPEX estimate, project execution strategy, project execution plan update. Feed or basic contracts types

CONTRACTING — 0.5 d

Contracting strategy (project breakdown into contracts), EPC phase contracts types and comparison, endorsement of company items, of Feed and other contracts, EPC tendering process, contractors EPC bids preparation, tenders evaluation

EPC PROJECT ORGANIZATION AND EXECUTION — 0.25 d

Organization charts, role of project manager, EPC phase objectives & project execution plan

HSE AND QUALITY MANAGEMENT — 1 d

HSE management: tools & techniques for safety & environment design, project reviews, safety concept & safety dossier, HSE during construction phase, HSE reporting for projects
Quality management: quality management, quality control, quality surveillance
Risk management: types of risk, evaluation of cost and schedule risks, contingencies, risk management tools

SCHEDULING AND PROGRESS CONTROL — 0.5 d

Project control process, planning elaboration, progress curves, critical path, planning software, progress control, recovery plan

COST CONTROL, REPORTING, DOCUMENTATION CONTROL SYSTEMS — 0.5 d

Cost control principles, initial budget elaboration, final cost estimation, invoicing, project reporting, documentation control systems

DETAIL ENGINEERING AND PROCUREMENT — 0.5 d

Detail engineering management: management process, packages management, main deliverables, project reviews, engineering systems (doc. control…)
Modification management
Procurement management: procurement strategy, procurement of LLIs (Long Lead Items) & other "company items", procurement management organization & execution (purchasing, expediting, inspection, shipping), material control systems, other procurement systems

CONSTRUCTION — 0.5 d

Construction/Fabrication challenges, contractors & resources, (sub) contracts types, construction & fabrication strategy. Construction at site: construction execution plan and management, HSE management, schedule, progress control, quality management. Construction methods (TCF, pre-fabrication, modularization, delivery/erection), interface with commissioning. Modularized projects. Fabrication at yards, load-out, transport & installation (offshore facilities and onshore modular plants). Construction methods offshore

COMMISSIONING AND START-UP — 0.25 d

Completion activities definition, methodology, sequence and completion dossiers, commissioning systems, contractual aspects and organization, hand-over and acceptance of facilities

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 17 - 21	Rueil	2,970 €	PL	pl.rueil@ifptraining.com
EN	Jun 16 - 20	Rueil	2,970 €	PL	pl.rueil@ifptraining.com
FR	Sep 15 - 19	Rueil	2,970 €	PL	pl.rueil@ifptraining.com
EN	Nov 17 - 21	Rueil	2,970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-713

ENGLISH: PL / PROMISE

PURPOSE

To provide, through the serious game PROMISE™, an interesting and lively experience to develop hard skills as well as soft skills in the discipline of project management, blending real-life situations with the techniques most-largely used in the oil and gas industry

AUDIENCE

Professionals involved or interested in the management of oil and gas projects

LEARNING OBJECTIVES

- To play various roles in a project management team such as: Project Manager, Planning Manager, Cost Control Manager, Construction Manager…
- To organize a project in various working environments such as Head Office, worksite, etc.
- To manage various types of events: contractual issues, delays and/or non-conformities, HSE incidents, until project close out
- To use various project control tools: progress control, cost control, contracting strategies
- To see decisions monitored by KPI's (Key Performance Indicators)

WAYS AND MEANS

All events include an introduction and a debriefing session
Selection of events may be decided depending on the expectations of the group
Trainees will be evaluated in each aspect of Project Management (Schedule, Cost, HSE, Quality and Team management) through Key Performance Indicators

COORDINATOR

Pascal Ricroch

PROMISE™ Oil & Gas Project Management Interactive Simulator for Excellence

5 DAYS

An advanced training, based on a Serious Game specifically developed by IFP Training

This serious game will allow a complete immersion in the execution of an Oil & Gas project

AGENDA

INTRODUCTION

Overview of Project Management applied to the Oil & Gas industry
Pre-requisites to use the simulator throughout the week

PROJECT PREPARATION

EPC Tenders Evaluation
Postponement of EPC award date

PROJECT MOBILIZATION

Project staffing
Project Offices organization (Company, Contractor)

PROJECT IMPLEMENTATION WITH TYPICAL EVENTS

Schedule review
Look ahead schedule preparation
Engineering strategy
Purchasing strategy
Construction contracting strategy
Risks Management plan
Engineering disciplines manhours
Initial budget issues
Preparation of Monthly progress report 30%
Vendor selection for main equipment
Construction contractors selection (mechanical)
Preparation of Monthly progress report 50%
Increase in piping quantities
Delay in Civil work
TEG Skid delivery delay
Company comments on Civil works
Preparation of Monthly progress report 80%
Delay in isometrics issues
HSE LTI
Claim Mechanical Contractor
Repair of major equipment following damage
Hand over

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	24 - 28 Févr	Rueil	3 740 €	PL	pl.rueil@ifptraining.com
EN	14 - 18 Avr	Rueil	3 740 €	PL	pl.rueil@ifptraining.com
EN	06 - 10 Oct	Rueil	3 740 €	PL	pl.rueil@ifptraining.com
EN	24 - 28 Nov	Rueil	3 740 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-714

ENGLISH: PL / EM

Engineering Management

3 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide an overview of Oil & Gas projects Engineering studies, from conceptual design and all the way to detailed drawings

AUDIENCE

Project Engineers, managers, staff involved or interested in engineering activities performed by Engineering Contractors

LEARNING OBJECTIVES

- To grasp all issues of engineering activities, deliverables, work sequence and interfaces
- To understand the main risks (schedule, vendors, interfaces, quality) and how to mitigate them
- To control engineering execution: what is critical and what controls/ KPIs should be in place?
- To learn the best practices, including management of change, progress control, etc.

WAYS AND MEANS

Half of the training is devoted to hand-on exercises on Engineering discipline and management tasks
Quiz at the end of each section to test assess knowledge acquisition
A 200 page guide is provided for future reference material

COORDINATOR

Camilo Arias-Rivera

AGENDA

UNDERSTANDING ENGINEERING — 0.5 d

The organization and role of engineering in a project: the parties involved, scope and sub-contracting

ENGINEERING DISCIPLINE OVERVIEW — 1.5 d

The design basis & criteria
The engineering activities and deliverables
Input, output, content and constraints, sequence
In the various disciplines: Process; Equipment/Mechanical; Plant layout; Health, Safety & Environment (HSE); Civil engineering; Material & Corrosion; Piping; Plant model; Instrumentation and control; Electrical; Field engineering

KEYS TO A SUCCESSFUL ENGINEERING EXECUTION — 1 d

Understanding the schedule requirements: typical critical path of an Oil & Gas Project, consequences for engineering, matching the procurement and construction schedule
The internal constraints of the Engineering schedule: interfaces between disciplines, Vendor input, best practices
Interface management: challenge and best practice
Implementation of changes: challenge and best practice
How to meet the main challenge of delivering on schedule
The EPC execution model & the resulting key Milestones for engineering + benchmarks
What to put in place to control a contractor: how to effectively monitor progress, factors that could impact progress, meaningful KPI, requirements for progress reports

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	12 - 14 Mai	Rueil	1 960 €	PL	pl.rueil@ifptraining.com
EN	03 - 05 Nov	Rueil	1 960 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-715

ENGLISH: PL / MECHEDM

Mechanical Equipment Design and Manufacturing

2 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide an overview of the fundamental aspects of mechanical equipment design and manufacturing

AUDIENCE

Professionals involved in oil and gas projects, concerned with issues of design, fabrication, construction and quality control of mechanical equipment (pressure vessels, heat exchangers, etc.)

LEARNING OBJECTIVES

- To learn about all design and fabrication activities of mechanical equipment
- To understand the potential difficulties during the procurement phase
- To learn which terms and conditions should be specified when ordering equipment
- To perceive fundamentals of manufacturing techniques, welding and NDE
- To grasp all the critical aspects involved in material selection and sourcing, quality standards and quality control

WAYS AND MEANS

Along with a highly interactive session in class, the course includes a visit of an equipment supplier's facilities
Live demonstration of manufacturing activities, welding, NDE
Several practical exercises featuring equipment sizing, material selection, thickness calculation, etc.
All issues discussed are illustrated with real examples taken from the oil and gas industry

COORDINATOR

Camilo Arias-Rivera

AGENDA

ENGINEERING — 1 d

Process design: sizing, material selection, design conditions
Hand on exercise: sizing of a production separator
Activities of the Mechanical Equipment specialist:
- The design codes
- Material selection
- Design & Calculations
- Softwares used
- Deliverables produces: data sheet, specification, material requisition
- Design interfaces
- Vendor documents

Hands on: calculate the wall thickness of a pressure vessel, wind & seismic loads
Procurement: process, sourcing, cost estimate

MANUFACTURING – AT THE VENDOR'S PREMISES — 1 d

Design office activities
Material sourcing
Quality control & documentation
Welding procedures and qualifications
Non-destructive testing and inspection
Manufacturing operations, welding, NDE – Workshop demonstration
The Manufacturing Record Book

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	19 - 20 Mai	Rueil	1 380 €	PL	pl.rueil@ifptraining.com
EN	06 - 07 Nov	Rueil	1 380 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-716

ENGLISH: PL / SEOGB
FRENCH: PL / SEOFR

Social Environment of Oil & Gas Projects

3 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide a comprehensive analysis of sustainable development projects that are concerned with health, education and maintenance issues raised by the imperatives of social, economic and local development

AUDIENCE

Sustainable development managers, managers and staff involved in oil and gas projects, concerned with social and local content issues that might be part of a sustainable development program linked to their project

LEARNING OBJECTIVES

- To grasp basics of sustainable development projects, and corresponding social and local content management plans, required in the approval phase as well as during the execution of an oil and gas project
- To deepen knowledge about social development methodology, procedures and challenges
- To understand the issues, objectives and active role of all stakeholders in social development
- To learn about best practices in social engineering, and the ways and means to ensure local content issues and sound social programs are accounted for in oil and gas projects

WAYS AND MEANS

Participants' active involvement in teamwork and discussions on social issues Case studies. Actors: NGO's, Institutions, field program coordinators

COORDINATOR

Camilo Arias-Rivera

AGENDA

OIL AND GAS COMPANIES POSITIONING — 0.25 d
Presentation of Industry practices. Interactive session on goals and risks

SOCIAL IMPACT ASSESSMENT (SIA) AND MANAGEMENT PLAN — 0.5 d
Risk assessment, Stakeholders engagement and monitoring, social impact management, value creation: local content development and local communities support

STAKEHOLDER COMMITMENT — 0.5 d
Learn how to state requirements. Consultation and participation process. Know how to formalize expectations. Learn consultation and participation methods and tools

TOOLS AND TECHNIQUES — 0.75 d
Identification and development of Projects
Local Content of Oil gas projects: measurement, challenges and implementation strategy
Promotion and development of the local industrial network
Local manpower training and professional skills enhancement
Social development contribution-Projects development and Management
Partnership development

SOCIAL ENVIRONMENT STRATEGY AND ACTION PLAN — 0.25 d
Risk and opportunity assessment for Oil & Gas Companies. Management plan build-up taking into account stakeholders interests

CONTRIBUTION AND RESPONSIBILITIES OF THE VARIOUS OIL AND GAS PROJECT STAKEHOLDERS — 0.75 d
Case studies, simulations

In-house course. Contact: pl.rueil@ifptraining.com

Projects & Logistics

E-718

ENGLISH: PL / PC

Project Control

Application to Oil & Gas Upstream Projects

10 DAYS

PURPOSE

To further knowledge about project control constraints, challenges and methods that are part of today's large upstream oil & gas projects

AUDIENCE

Project engineers, project managers, project control specialists moving on to the position of project control manager, and staff concerned with the increasingly complex techniques and challenges of project control within the framework of the upstream oil and gas industry

LEARNING OBJECTIVES

- To comprehend all issues and tools in the area of project control involved in the development of a large oil and gas field
- To acquire a sound knowledge of all non-technical keys for success in oil and gas projects

WAYS AND MEANS

Numerous examples taken from actual Exploration & Production projects

OBSERVATION

Participants who do not wish to attend the whole course may request to register for some of the modules only

COORDINATOR

Camilo Arias-Rivera

AGENDA

GENERAL PROJECT ORGANIZATION AND CONTROL — 2 d
Overall framework, background, stakeholders and objectives
Industry Players: Engineering, Construction, Main Suppliers
Project Organization
Human resources: mobilization, job descriptions, outsourcing
Delegation of Authorities, Ethical issues
Local content and permitting
Reporting

CONTRACTS AND PROCUREMENT (cf. E-726) — 3 d
Contracting strategy
EPC Contract content and core articles, exhibits
Call for tender procedures
Contract administration
Management of change orders, of claims
Procurement, Expediting, Stock Management, Transportation, Customs
Legal issues
Insurance issues

PLANNING AND SCHEDULE CONTROL — 1 d
Methods and Tools
Baseline project planning
Progress measurement and reviews
Recovery plan

ESTIMATION AND COST CONTROL — 1 d
Cost estimating, initial budget
Budget (WBS, Commitments, Forecasts, AFE, currency hedging, etc.)
Accounting (Invoicing, cash calls, SAP/Salsa, etc.)

COMMON PRACTICES — 0.5 d
Market intelligence
Project financing

RISK MANAGEMENT — 0.5 d
Method and tools
Risk management plan, study cases

QUALITY ASSURANCE, QUALITY CONTROL — 0.5 d
QA, Project quality plan
Audits and reviews
Quality control

INFORMATION MANAGEMENT — 1 d
Document control, Circulation and comments of Engineering documents
Specifications, derogations, queries
Interface Management
Management of change
IT issues

PROJECT CONTROL FROM CONTRACTOR'S STAND POINT — 0.5 d
Schedule revision
Progress control

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	07 - 18 Avr	Rueil	5 930 €	PL	pl.rueil@ifptraining.com
EN	13 - 24 Oct	Rueil	5 930 €	PL	pl.rueil@ifptraining.com

Projects & Logistics

E-719

ENGLISH: PL / NEGOGB

NEW

Negotiation Skills

Application to Oil & Gas Upstream Projects

5 DAYS

PURPOSE

To assess all the constraints, challenges and methods involved in large oil and gas projects

AUDIENCE

Project managers, project engineers, future project control managers, and all professionals interested in upstream oil and gas technical contracts

LEARNING OBJECTIVES

- To negotiate contracts during a large Oil & Gas Project
- To apply methodology, tools and advices negotiating contracts

WAYS AND MEANS

All events include an introduction and a debriefing session
Selection of events in line with the participants' expectations
Trainees make use of a software program during the case studies

COORDINATOR

Pascal Ricroch

AGENDA

GENERALITIES – PRINCIPLES AND METHODOLOGY — 1 d

Methodology - Generalities
- Principles
- Preparation and discussions wheels
- Performance evaluation

Case study A: ordering piping for an Oil & Gas Project (under development)

METHODOLOGY – PROJECT SPECIFIC — 0.5 d

Methodology - Application to Projects
- Principles
- Preparation and discussions wheels
- Performance evaluation

Case study B (under development)

SIMULATION 1 — 0.5 d

Case study: resolution of a dispute linked with problems occurred during transportation of equipment

ARGUMENTS, SEARCH FOR COMPROMISE — 0.5 d

The 3 "Ego states"
Arguments and objections
Looking for a compromise - Reciprocity
Tools and tactics

SIMULATION 2 — 0.5 d

Case study: negotiation of a bank loan

CLAIM MANAGEMENT — 0.5 d

Methodology - Application to Projects
Case study C (under development)

SIMULATION 3 — 0.5 d

Case study: Collaboration Agreement (with a particular care about compromises to be generated)

INFLUENCE GAMES AND GROUP DYNAMICS — 0.5 d

Decode the games of influence
How to identify and manage them?
Group dynamics
- How to build a team
- Legitimacy & credibility
- Your Group dynamic and the one of the other party

Case study final (compilation of cases A, B and C)

SIMULATION 4 — 0.5 d

Case study: global agreement by using the tactics of pressure

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	27 - 31 Oct	Rueil	2 970 €	PL	pl.rueil@ifptraining.com

Projects & Logistics

E-720

ENGLISH: PL / MRSMPGB
FRENCH: PL / MRSMPFR

PURPOSE

To deepen understanding of the specific features of medium size and revamping projects implemented in operating facilities

AUDIENCE

Managers, engineers, supervisors and contractor staff (engineering, EPC, subcontractors) in charge of medium size and revamping projects, in existing onshore or offshore fields, plants and facilities

LEARNING OBJECTIVES

- To understand the preliminary stages: concept, feasibility, economics, risk assessment, FEED
- To appraise project planning: schedule, costs, economics, risk assessment, execution plan
- To grasp the HSE dimension in project design and construction
- To learn about the various types of EPC contracts
- To get an overview of the EPC chain: engineering, procurement, construction and commissioning
- To manage critical interfaces with the operational staff, at each stage of the project

WAYS AND MEANS

Numerous examples from actual Exploration & Production projects
Case study used throughout, at all stages of the project management process

COORDINATOR

Yves Bonnefoy

Management of Medium Size and Revamping Projects

5 DAYS

Application to Oil & Gas Upstream Projects

AGENDA

INTRODUCTION AND PRELIMINARY STUDIES — 0.5 d

Introduction: global project context (overview of plants and projects types, of plant management organization), why a project, project phases and gates), specific aspects of projects within existing facilities (impacts, risks, schedule, work during operation and shut-downs), availability of resources for project execution (company and contractors)
Preliminary studies: technical studies (comparison of alternatives, concept selection, value engineering and cold eye reviews), project team organization for the phase, concept study technical deliverables, preliminary project planning (global project schedule, CAPEX estimate, project economics, risks management plan, project execution plan)

FEED OR BASIC ENGINEERING — 0.5 d

When to perform Basic Engineering? Project team organization company & contractor, Feed management, execution sequence, deliverables, process licensors packages, EPC phase schedule, CAPEX estimate, project execution strategy, project execution plan update. Feed or basic contracts types

CONTRACTING — 0.5 d

Contracting strategy (project breakdown into contracts), EPC phase contracts types and comparison, endorsement of company items, of Feed and other contracts, EPC tendering process, contractors EPC bids preparation, tenders evaluation

EPC PROJECT ORGANIZATION & EXECUTION, ENGINEERING & PROCUREMENT — 0.5 d

Organization & execution management: organization of company & of EPC contractor, project management skills, EPC phase objectives & project execution plan update
Detail engineering management: management process, packages management, main deliverables, project reviews, company control of detail engineering, interfaces management, engineering systems
Procurement management: procurement strategy, specific aspects for projects in existing facilities, procurement of LLIs (Long Lead Items) & other “company items”, procurement management organization & execution (purchasing, expediting, inspection, shipping), company control of procurement, material control systems, other procurement systems

HSE, QUALITY AND RISK MANAGEMENT — 1 d

HSE management: tools & techniques for safety & environment design, project reviews, safety concept & safety dossier,
HSE during construction phase, HSE reporting for projects
Quality management: quality management, quality control, quality surveillance
Risk management: HSE risk mitigation, cost and schedule risk, available software tools, risk management plan approval

PROJECT CONTROL (COST/SCHEDULE, COST AND PROGRESS CONTROL) — 1 d

Project control process. Schedule elaboration, progress curves, critical path, softwares. Progress control. Recovery plan
Specific aspects of Revamping projects (shutdown considerations, scheduling of shutdown works, job cars schedule)
Cost estimate and control principles, initial budget elaboration, preliminary and final cost estimation techniques, invoicing, project reporting, documentation control systems. Contingency plans

CONSTRUCTION, COMMISSIONING AND STARTUP — 1 d

Construction/Fabrication challenges, contractors & resources, (sub) contracts types, construction & fabrication strategy. Construction at site: construction execution plan and management, HSE management, schedule, progress control, quality management. Construction methods: TCF, pre-fabrication, modularization, delivery/erection), interface with commissioning. Modularized projects. Fabrication at yards, load-out, transport & installation (offshore facilities and onshore modular plants). Specifics for revamping projects: construction challenges, construction work safety control (SIMOPS, PTW, method statements, site HSE plan, job cards), shut-downs time minimization, pre-shutdown and shut-down works preparation & control
Completion activities definition, methodology, sequence and completion dossiers
Commissioning systems, contractual organization, hand-over and acceptance of facilities, specifics for revamping projects

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 17 - 21	Rueil	2,500 €	PL	pl.rueil@ifptraining.com
FR	Sep 15 - 19	Rueil	2,500 €	PL	pl.rueil@ifptraining.com
EN	Sep 22 - 26	Rueil	2,710 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-721

ENGLISH: PL / GESPPGB
FRENCH: PL / GESPPFR

PURPOSE

To deepen understanding of the specific features of implementing small projects in operating facilities

AUDIENCE

Managers, engineers, plant supervisory staff (projects, maintenance, operations) and contractor staff (engineering contractors and subcontractors) in charge of implementing small projects within existing facilities

LEARNING OBJECTIVES

- To apply efficiently proven project management practices to plant projects
- To optimize project organization and execution plan for specific plant conditions
- To identify critical interfaces with operational and maintenance staff, at each stage of the project
- To grasp safety, health and environmental challenges during design, execution and start-up

WAYS AND MEANS

Numerous examples from actual Exploration/Production projects
Case study used throughout, at all stages of the project management process
A small game used to deepen understanding of key features

COORDINATOR

Yves Bonnefoy

Management of Small Projects — 5 DAYS

Within existing facilities
Application to Oil & Gas Upstream Projects

AGENDA

SPECIFIC FEATURES OF SMALL PROJECTS WITHIN EXISTING FACILITIES — 1 d

Plant projects overview: specific constraints of plant projects (availability of resources, organization, project definition, estimation, schedule, management of multiple projects, implementation in operating facilities and/or during shutdown); specific risks associated with revamp projects
Stage-gate process
- Various stages from conceptual design to start-up. Roles and responsibilities of the Project Manager
- Integrated team, roles of each team member. Project Execution Plan: organization chart, objectives, priorities, milestones, constraints
- Management of interfaces with the site operational staff

ENGINEERING — 1.5 d

Engineering studies: conceptual design, basic engineering, detailed engineering. List of deliverables, document control. Technical pitfalls
Scheduling, schedule optimization, progress control
- Relationship between planning and scheduling. Available scheduling techniques and tools, job cards, advantages and limitations
- Scheduling of subcontracted works. Interface with Owner, schedule optimization, management of constraints
- Measurement of progress, progress control at each stage. Recovery plans
- Specific considerations related to revamped areas. Shutdown works schedule

Cost estimates, cost optimization and control
- Various cost estimate techniques, accuracy and degree of confidence of estimates
- Value Engineering: involvement of Owner and team members
- Contingencies, design allowance. Management of cost trends
- Cost control objectives, methods, tools, forecasting, reporting requirements

PROCUREMENT — 0.5 d

Contracting strategy
- Various contract types for Engineering, Procurement and Construction: lump sum, reimbursable (hourly rates, cost plus fixed fee), unit rate, other
- Advantages and drawbacks. Most common practice. Umbrella contracts

Procurement: procurement of equipment: specifications, purchasing, expediting, inspection, transportation. Quality Control Plan

CONSTRUCTION/STARTUP — 1 d

Construction execution: construction strategy (use of maintenance or other construction contractors). Construction management and methods. Subcontractor field supervision and control. Safety, Health and Environment Management. Change Management. Quality control
Commissioning and start-up
- Precommissioning. Mechanical acceptance, management of punch-list items
- Commissioning and start-up responsibilities, involvement of the project team. Methodology
- Post-startup activities, technical and financial closure, Final acceptance, guarantees

HSE RISK MANAGEMENT — 0.5 d

Identification of risks related to design, equipment and material, construction and operation. Risk Management worksheets
The Process Hazard Review (HAZOP, HAZID, What-if, Check-list). Permitting issues
Change Management risk evaluation

CRITICAL SUCCESS FACTORS — 0.5 d

Clear objectives, importance of front end engineering design
Communication, organization, team spirit, procedures

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 31 - Apr 04	Solaize	2,500 €	PL	pl.rueil@ifptraining.com
FR	Jun 02 - 06	Lillebonne	2,500 €	PL	pl.rueil@ifptraining.com
FR	Dec 08 - 12	Martigues	2,500 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-722

ENGLISH: PL / QAQCGB
FRENCH: PL / QAQCFR

PURPOSE

To comprehend how the quality dimension in project management is used to continuously improve project practices

AUDIENCE

Professionals involved in the management of industrial projects; and in particular, oil and gas projects

LEARNING OBJECTIVES

- To learn about the quality dimension in project management, the stakes involved, and the benefits of feedback
- To apply quality assurance and control; and use quality tools and resources during the execution of projects
- To improve continuously on the methods used to develop a project in order to create more value

WAYS AND MEANS

Numerous examples from actual Exploration & Production projects
Practical exercises for the participants (project objectives, surveillance plan, experience feedback, risk analysis)
Reference book provided at the end of the course

COORDINATOR

Camilo Arias-Rivera

Quality & Risk Management in Projects

3 DAYS

Application to Oil & Gas Upstream Projects

AGENDA

QUALITY MANAGEMENT SYSTEM — 0.5 d

Management of and by quality. Quality improvement cycle. ISO-9001 standard. Application too projects
Integrated Management Systems (Quality, Safety and Health, Environmental, Security, Social, Societal)
The project reference standard. Internal and external customer satisfaction. Management commitment
Project objectives, key performance indicators, role of the project team

QUALITY PROCESS AND ORGANIZATION — 0.5 d

The ISO-10006 standard: common points and differences vs. ISO-9001. Constituents
Links between management and project process - Identification and cartography of the project processes
Project organization and quality responsibilities - Involvement of the management and quality independence v/s organization efficiency
Key documents: Execution Plan, Quality Plan, Procurement Plan, EHS Plan
The Project Quality Plan – The associated list of Project management procedures
Related processes: Interfaces management – Documentation management – Modifications management – Risk management

QUALITY CONTROL DURING EXECUTION — 0.5 d

External and Internal Quality Audits>
Surveillance plan: key principles, definition of the surveillance levels and tasks, document control, meetings, management of non-conformances, records management
Surveillance during Procurement and Construction: Organization, Methods, Tools and Resources needed for Quality Control at supplier's premises (presentation by a professional external Surveillance Company)

QUALITY FEEDBACK - CONTINUOUS IMPROVEMENT — 0.5 d

Continuous improvement of processes
Key Performance Indicators. Periodical surveillance meetings and actions follow-up
Feedback: gathering, use for improvement, Benchmarking
Principle of supplier documents review – Documents approvals and updates
Use of project non-conformances for improvement purposes
Quality records. Project as-built documentation

RISK MANAGEMENT SYSTEM — 1 d

Definition of risk, gravity, probability, criticality
Risk identification methods, qualification, prioritization
Risk Register: organization, owners, meetings and stakeholders
Tools to monitor and update the Risk Register
Tools to put in place a Risk Mitigation system
Methods to follow-up progress and results

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Nov 12 - 14	Rueil	1,850 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-723

ENGLISH: PL / COSTGB
FRENCH: PL / COSTFR

Estimation and Cost Control

5 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide a structured and comprehensive approach to project cost estimation and control

AUDIENCE

Project engineers, R&D engineers, petroleum architects, project managers and all professionals interested in the methods for estimating capital expenditures in an upstream oil and gas project

LEARNING OBJECTIVES

- To improve upon the technical definition of a project to allow for a comprehensive cost estimate
- To gain a working knowledge of different methods and tools used in cost estimation
- To master main cost control techniques used throughout the execution of a project

WAYS AND MEANS

Each cost estimation method illustrated with case studies from actual upstream projects
Netbooks, with pre-installed spreadsheets, used to perform project estimates from basic design parameters

COORDINATOR

Camilo Arias-Rivera

AGENDA

COST ESTIMATION CONTEXT — 0.5 d

Introduction to development projects
- Asset life cycle
- Decision process
- Project execution phases, organization, contracting strategy

Technical fundamentals
- Production facilities
- Structures and pipelines

PROJECT COST ESTIMATION — 2 d

Estimation framework
- Scope and exclusions
- Cost management process
- Estimate classes
- CAPEX structure

Software available on the market

Cost evaluation during project evaluation phases
- Order of magnitude estimate
- Factored/modular estimate

Cost evaluation during basic engineering and contracting phases
- Semi detailed estimate
- Detailed estimate

From historical data to present time cost evaluation
- Cost escalation, cost indexes, inflation
- Location factor

Additional cost elements
- Risks and uncertainties
- Provisions
- Expenditure schedule

COST ESTIMATING CASE STUDIES — 1.5 d

Onshore Project
- Cost estimate of well clusters, CPF, flow lines, trunk lines and infrastructures using diverse documents (historical data, curves, etc.)
- Integration of all obtained results into a composite overall estimate of the whole project

Offshore Project
- Cost estimate of a satellite field development. To do so, two development schemes will be studied: the one featuring a “dry” export pipeline and the other a “wet” one. Economics for both cases are evaluated and the best scheme is selected by the trainees to obtain a reliable estimate of the whole project

Deep Offshore Project
- Cost estimate of the three main packages: the Floating Production Storage and Offloading (FPSO) unit; the Umbilicals, Flowlines and Risers (UFR) and the Subsea Production Systems (SPS)

COST CONTROL — 1 d

Overall view
- Definition, concepts and principles
- Main actors and their responsibilities
- Budget and estimated final cost

Cost control methods
- Commitment cost process
- Example of reporting reporting templates

Change management
- Deviation requests and engineering queries
- Change order requests and instructions

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	Mar 24 - 28	Rueil	2,970 €	PL	pl.rueil@ifptraining.com
EN	Sep 29 - Oct 03	Rueil	2,970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-725

ENGLISH: PL / PSPCGB
FRENCH: PL / PSPCFR

PURPOSE

To comprehend the dimensions of a project involved in the schedule formulation, optimization and control

AUDIENCE

Project engineers responsible for building, optimizing and controlling the schedule of capital projects implemented in oil and gas operating facilities

LEARNING OBJECTIVES

- To learn about a schedule formulation process at various stages in a project
- To understand the advantages and drawbacks of various scheduling software programs
- To formulate the schedule of a project using one of these programs (Microsoft Project, Primavera)

WAYS AND MEANS

Examples from actual E&P projects (Onshore/Offshore)
Demos and teamwork during practical sessions
Software programs used intensively, with the help of professional users

COORDINATOR

Camilo Arias-Rivera

Project Planning and Scheduling

5 DAYS

Application to Oil & Gas Upstream Project

AGENDA

PROJECT STATE GATE PROCESS — 0.5 d

Feasibility studies, detailed engineering, procurement, construction and start-up
Engineering Contractor involvement depending on project size and contract type
Project planning: Execution Plan, roles and responsibilities of actors involved
Importance of schedule in various project types, depending on the stage

BUILDING / OPTIMIZING THE SCHEDULE — 0.5 d

Planning of activities, structure (WBS) and definition of terms. Constraints to meet
Preliminary Engineering: bar chart. Evaluation of the duration of each activity
Logical links between activities. Critical path. Margins. Critical Path Method, Precedence Diagram
Resource management. Optimization of the duration of an activity

ONSHORE CASE STUDY USING MS PROJECT — 1 d

Presentation of a fictitious **revamping onshore** project (which entails a plant shutdown) to be used as case study
Demonstration of software functions. Critical path visualization
Input and coding of activities, tasks and resources. Reporting levels
Physical progress update for reporting purposes

OFFSHORE CASE STUDY USING PRIMAVERA — 3 d

Presentation of a fictitious **deep offshore** project to be used as case study
Demonstration of software functions
Definition of the list of project activities to be carried out according to the project scope of works
Input and coding of activities, tasks and resources necessary to project execution
Sequence of the activities and estimation of their duration. Probabilistic approach in scheduling
Critical path visualization
Various types of progress (physical, cost, hours). Follow-up methods
Relationship between cost progress and schedule

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 16 - 20	Rueil	2,710 €	PL	pl.rueil@ifptraining.com
FR	Nov 24 - 28	Rueil	2,490 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-726

ENGLISH: PL / CP
FRENCH: PL / CA

PURPOSE

To provide a comprehensive understanding of project contract and procurement issues as seen by an oil company and a contractor

AUDIENCE

Project managers, project engineers, project control specialists involved in contractual issues of large upstream oil and gas projects

LEARNING OBJECTIVES

- To grasp the increasingly challenging contractual relations involved in an oil and gas project
- To apply proven methods to solve the issues and put successfully a project in the right contractual framework

WAYS AND MEANS

Numerous examples from actual Exploration & Production projects

COORDINATOR

Camilo Arias-Rivera

Contracts and Procurement

3 DAYS

Application to Oil & Gas Upstream Projects

AGENDA

CONTRACTING STRATEGY — 0.25 d

Different types of contracts
Assignment of main equipment
Endorsement of the Design Dossier
Interfaces between contracts
Contractors
Local content

EPC CONTRACT CONTENT AND CORE ARTICLES, EXHIBITS — 0.5 d

Agreement (Articles and Annexes)
Exhibits
Examples of Main articles

CALL FOR TENDER PROCEDURES — 0.25 d

Tendering phase
Prequalification
Instructions to tenderers
Tender schedule
Tender evaluation procedure
Inflation and currency hedging
Final selection and contract award
Single source contract
Contractor bid preparation

CONTRACT ADMINISTRATION — 1 d

Contract review and operation
Management of change orders and claims
Use of standard clauses through case studies

PROCUREMENT, EXPEDITING, STOCK MANAGEMENT, TRANSPORTATION, CUSTOMS — 0.5 d

Procurement Strategy
Procurement Management Process
Long Lead Items & Critical Equipment
Procurement Management organization; Projects in partnership
Company Control of Procurement; inspections
Procurement Systems
Material control – Vendors Documents Management
Logistics – Incoterms

LEGAL ISSUES — 0.25 d

Interfaces between Patrimonial Agreements and Operations Contracts
Legal issues and contract negotiation/administration

INSURANCE ISSUES — 0.25 d

Insurance Basis
Risk Management Process
Risk Assessment and Reduction
Claim Control for Projects

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Apr 09 - 11	Rueil	1,960 €	PL	pl.rueil@ifptraining.com
EN	Oct 15 - 17	Rueil	1,960 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-727

ENGLISH: PL / TSC

PURPOSE

To provide a comprehensive understanding of oil and gas operational issues and associated business and contractual challenges

AUDIENCE

Oil companies' and service companies' operation and business managers, E&P professionals, and government employees interested in technical service contracts of upstream oil and gas projects

LEARNING OBJECTIVES

- To understand how E&P joint-ventures are managed in order to succeed in finding and producing hydrocarbons
- To grasp the structure of upstream technical service contracts
- To master the practical aspect of contracts: key issues, constraints and deadlines

WAYS AND MEANS

Unique and integrated vision of the E&P contractual challenges
Main topics discussed through the analysis of an actual Joint-Operating Agreement

COORDINATOR

Camilo Arias-Rivera

Technical Service Contracts for Operation Management

5 DAYS

Application to Oil & Gas Upstream Projects

AGENDA

INTRODUCTION TO OPERATION MANAGEMENT — 1 d

Main elements of Oil & Gas operations: Exploration, Production, Drilling and Well interventions, Maintenance Management, Logistics aspects, Inspection, Integrity Management, Projects and Construction

EXPLORATION-PRODUCTION PATRIMONIAL CONTRACTS — 0.5 d

Different types of contracts and analysis of table of contents of upstream contracts
Clauses of exploration-production contracts: work commitments provisions, financial and tax provisions, legal dispute provisions, etc.
Workshop for each bundle of clauses and establishing a concluding statement
Establishing a structure for scenario negotiation

JOINT-OPERATING AGREEMENTS (JOA) — 0.5 d

Presentation of different types of contracts
Farm-in / Farm-out: assignment, earning obligation, default, JOA, arbitration…
Joint Study and Bidding Agreement: the consortium, right to be a partner, right to opt out, best offer, restriction to participate to another consortium, default…
Joint Operating Agreement: operator, operating committee, budget, default, sole risk and non-consent, accounting procedure…
Negotiation of a farm-out

TECHNICAL SERVICE CONTRACTS AND OTHER AGREEMENTS — 3 d

Different types of contracts and contracting strategies: Seismic contracts, Drilling contracts, Maintenance contracts, Logistic contracts, Front End Engineering and Design contracts, Engineering Procurement Construction contracts, Fixed price incentive fee contract, Firm fixed price contract, Cost plus incentive fee contract, Cost plus fixed fee contract
Gas contracts
Lifting agreements for crude oil
Transportation and tie-in agreements for oil and gas production
Various types of insurance contracts used in the petroleum industry

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	10 - 14 Mars	Rueil	2 970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-730

ENGLISH: PL / CONST

Construction Management Training

25 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide a comprehensive understanding of construction activities up to pre-commissioning, along with the associated management challenges and control tools

AUDIENCE

Young field engineers and supervisors responsible for managing construction activities at site

LEARNING OBJECTIVES

- To broaden knowledge of the various construction activities
- To evaluate HSE issues and assess security risks at the construction site
- To develop skills in construction management
- To monitor and control quality/schedule/costs during construction activities

WAYS AND MEANS

Case study used throughout, for all stages of the construction program
Numerous examples from actual oil and gas construction activities

OBSERVATION

The sixth module of the program below is optional. Participants who do not wish to attend the whole course may request to do so and receive details

COORDINATOR

Pascal Ricroch

AGENDA

MODULE 1: CONSTRUCTION TECHNIQUES — 3 d

Lifting & handling (special tools and methods), cranes
Work at height
Equipment erection on site. Scaffolding
Civil works, structural steel, equipment layout and foundations
Piping connection (welding and weld controls), and installation (erection, pipe-racks, supports)
Electrical and Instrumentation. Basics for installation on site
Installation of power and instrument cables
Painting, insulation works
Precommissioning activities
Specifics of revamping projects

MODULE 2: SITE VISIT IN MARTIGUES (FRANCE) — 2 d

MODULE 3: TEAM MANAGEMENT — 5 d

Construction planning, field work organization, roles and responsibilities, organization charts
Coordination of site supervisors
Communication: purpose and management of periodic meetings, information tools, team-building
Management of site access cards, night shifts, back-to-back rotation, shift handover reports
Vendors mobilization/demobilization depending on contracts types. Contract reviews
Management of individual performance
Relationship with Contractors and subcontractors: contracts (lump sum, reimbursable, change-orders), conflicting situations
Relationship with Field operations
Reporting: how to prepare synthetic reports

MODULE 4: SITE CONTROL SCHEDULE / QUALITY / COSTS — 5 d

Schedule: main field constraints, optimization of detailed construction schedule, validation with subcontractors
Contractual progress measurement and reporting. Recovery plan in case of delays
Quality control: interfaces between prefabrication and construction/installation activities. Quality control of work on site, Non conformity reports, technical queries, site instructions
Material control: organization of warehouse, storage areas, receipt/control of main equipment and bulk material (quality/quantity)
ISO-9001 requirements (non-conformances, deviations to construction standards, As-Built documentation…)
Cost control: reporting, challenging of change requests, subcontractor productivity control (when appropriate)
Ready for Commissioning (mechanical completion): discipline checklists, categorization and management of punch-list items
Construction all risk insurances (CAR)

MODULE 5: SAFETY RISK MANAGEMENT ON THE FIELD - HSE — 5 d

HSE Prevention Plan: definition and evaluation of risk, subcontractor organization and training. Preventive action plan
HSE Incident Management: Root Cause Analysis of incidents, including Consequence Analysis. Immediate actions
Corrective and Preventive actions. Reporting. Communication and crisis management. Experience feedback. Emergency Response Plan
Surveillance: surveillance plan, field HSE audits, Safety tour, behavioral observations, Subcontractor HSE evaluation
Monitoring of SIMOPS activities
Identification and analysis of construction risks: root analysis, electrical risks, wrong gestures and postures, work at height, radio protection, use of gas, lifting and handling, fire, work in confined spaces, defensive driving
Security Management: definition, site management with regards to external events (Robbery, kidnapping, data)
Security control and technologies

MODULE 6: OFFSHORE INSTALLATION (OPTIONAL) — 5 d

Preparation of offshore operations, load-out, quay fitting, dredging
Load out methods: lifting, skidding, rolling
Marine warranty surveys, sea fastening
Transportation barges
Installation operations: offshore, deep offshore. Anchoring, positioning
Construction vessels: surveys, diving, ROV, multi-purpose support vessels, heavy lift, pipe lay, tugs, supply boats, Flotels
Hook-up, precommissioning
Offshore organization: stakeholders, organization chart, POB (Personnel On Board) control

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	10 Juin - 11 Juil	Rueil & Martigues	15 990 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-732

ENGLISH: PL / CONSTSUPGB
FRENCH: PL / CONSTSUPFR

PURPOSE

To provide transverse ways and means in terms of experience, know-how and soft skills that are essential to construction supervision

AUDIENCE

Managers, engineers, plant supervisory staff (construction, maintenance, operation) and contractor staff (engineering contractors and constructors) in charge of revamping, small, medium-size or large oil and gas projects

LEARNING OBJECTIVES

- To learn about proven practices in actual operations involved during construction
- To optimize project organization and execution plan for specific plant conditions
- To manage critical interfaces with operational staff, at each step of the project implementation
- To identify and manage HSE issues during project design and execution

WAYS AND MEANS

Quiz used throughout to challenge trainees and assess knowledge acquired
Use of photos and videos

COORDINATOR

Pascal Ricroch

Construction Works Supervision

5 DAYS

AGENDA

WORKS SUPERVISION — 1 d

Roles and responsibilities of stakeholders in an Oil & Gas project
Different stages of an Oil & Gas project
Importance of preliminary stages
Field modification works: responsibilities, constraints and challenges
Working on operating facilities
Roles and constraints of Field Operators
Site organization, typical site construction manual
Construction Contractor organization and relationship with it

HSE — 1 d

Typical construction risk analysis
Organization of operations on the facilities
Works supervision procedure
Simultaneous operations (SIMOPS)
Work permits (instructions, procedure, audit)

WORK INSTRUCTIONS AND QUALITY ISSUES — 1 d

Procedures to be enforced, their objectives, base principles and validation process
Learning how to read the plans
How to supervise quality of prefabricated and site works
Quality Control at supplier's premises
Visiting a Construction Contractor
Visit reports

CONSTRUCTION SUPERVISION — 1 d

Preparation and organization of successful meetings with the contractor
Basic notions of welding (principles and used techniques)
Follow-up of works for each discipline (piping, E&I and mechanical)
Pre-Commissioning and Commissioning
Planning, cost and schedule control

RELATIONSHIPS AND TEAM WORK — 1 d

Roles and responsibilities of team leaders (leadership and relationships with the other stakeholders)
Qualification, knowledge and aptitude
Reflexes, rules and obligations
Non-conflictual interpersonal relationships
Ethics
Feedback and lessons learned
Proper communication
Use of emails

In-house course. Contact: pl.rueil@ifptraining.com

Projects & Logistics

E-735

ENGLISH: PL / PRECOMGB
FRENCH: PL / PRECOMFR

Precommissioning, Commissioning and Start-up

5 DAYS

Application to Oil & Gas Upstream Projects

PURPOSE

To provide a comprehensive and practical knowledge of all issues involved in the long procedure leading to a successful start-up of oil and gas processing facilities

AUDIENCE

Supervisors, engineers and technicians in E&P (production, process, maintenance and projects), and professionals responsible for commissioning, start-up, acceptance and operation of new processing facilities or revamping projects

LEARNING OBJECTIVES

- To plan and organize the start-up and acceptance of processing units
- To learn about the specific constraints of these activities
- To anticipate the problems related to financial, technical, operational and organizational aspects
- To learn how to avoid most common errors or eventually reduce their impact
- To take into account the distinct objectives of, and the communication channels between, all stakeholders (contractor, oil company's project team and operating group)

WAYS AND MEANS

Use of participants' experience
Start-ups and incident analysis from real situations related to trainees' background

COORDINATOR

Pascal Ricroch

AGENDA

PROJECT PRESENTATION (WITH EMPHASIS ON INPUT OF PRECOMMISSIONING/COMMISSIONING START-UP ACTIVITIES) — 1 d

Main phases of a project: pre-FEED, FEED (basic engineering), detailed engineering, construction, precommissioning, commissioning, start-up
Categories of Engineering, Procurement, Construction (EPC) Contracts: EPC, EPCC, EPCC/ Start-up
Reimbursable versus long sum types of EPC contracts

PRECOMMISSIONING: MECHANICAL COMPLETION — 1 d

Definition and responsibilities
Operations to be performed
Ready for commissioning
Hand over to commissioning team
Typical precommissioning dossier
Case studies

COMMISSIONING ACTIVITIES — 1.5 d

Definition and responsibilities
System and subsystem approach, Packages
Commissioning preparation: organization and man-power (including vendors and future operators), planning, budget, documentation/commissioning spare parts
Case studies
Operations to be performed in each discipline: mechanical, electrical, instrumentation, OTP's
Hand over
Safety during commissioning (SIMOPS…)
Commissioning costs

START-UP — 1.5 d

Preparation: Manpower (operators; vendors…), training, spare parts, planning, procedures / operating manual
Safety
Performances tests
Start-up costs
Case studies

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
FR	May 19 - 23	Rueil	2,970 €	PL	pl.rueil@ifptraining.com
EN	Jun 02 - 06	Rueil	2,970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-760

ENGLISH: PL / MWT

Metallurgy and Welding Technology

5 DAYS

Organized in collaboration with Institut de Soudure

PURPOSE

To grasp fundamentals of metal welding techniques for a better understanding of all constraints and specificities

AUDIENCE

Professionals interested in metal welding techniques: inspectors, construction engineers, construction site supervisors, maintenance team, engineering personnel, operating team, etc.

LEARNING OBJECTIVES

- To understand the working principle of main metal welding techniques used in the oil and gas industry
- To learn about main welding parameters and understand selection criteria
- To identify the range of application, appropriate preparation and potential problems to be solved
- To interpret a material certificate and the results of basic mechanical tests
- To grasp effects of heat treatments on mechanical characteristics
- To perceive effects of the welding operation on the metallurgical characteristics of the assemblies
- To assess metallurgical risks associated with welding non/low alloy steels, high alloy stainless steels, dissimilar steels…

WAYS AND MEANS

Numerous examples from the welding industry
Lecturers are professional welders / inspectors from Institut de Soudure Industries

COORDINATOR

Camilo Arias-Rivera

AGENDA

BASICS OF GENERAL METALLURGY — 1 d

Elaboration and designation of steels
Types of rupture
Structure and mechanical properties of metals
Study of Fe-C alloys
Introduction to heat treatments

INTRODUCTION TO METALLURGY AND WELDABILITY OF NON-FERROUS METALS — 0.5 d

Aluminum and its alloys
Copper and its alloys
Nickel and its alloys
Titanium and its alloys

FUNDAMENTALS OF RESISTANCE OF MATERIALS — 0.5 d

Thickness calculation
Calculation conditions

FUNDAMENTALS OF NON-DESTRUCTIVE QUALITY CONTROL TECHNIQUES — 1 d

Welding imperfections: classification
Review of NDT methods: VT, PT, MT, RT, UT
Notions of other NDT methods (eddy current, acoustic emission, thermography)

INTRODUCTION TO WELDING PROCESSES — 0.75 d

Shielded metal arc welding (SMAW)
TIG welding (GTAW)
MIG-MAG welding (GMAW)
Short introduction to submerged arc welding (SAW), plasma welding

BASICS OF WELDING METALLURGY — 0.25 d

Thermal aspect of welding
Welding cycle and thermal distribution, factors of influence
Study of the HAZ, elaboration of the FZ

WELDABILITY OF NON AND LOW ALLOY STEELS — 0.5 d

Cold cracks, lamellar tearing
Origins and means of prevention

WELDABILITY OF HIGH ALLOY STEELS — 0.5 d

Categories of stainless steels
Weldability of each category of steels
Case of dissimilar assemblies

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	16 - 20 Juin	Rueil	2 970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-770

ENGLISH: PL / LET

Logistic Engineer Training

Application to Oil & Gas Upstream Projects

35 DAYS

PURPOSE

To provide an overview of the various aspects handled by E&P logistic specialists who are responsible for a strategic component of exploration, development and decommissioning operations

AUDIENCE

Logistic engineers, technicians called on to hold positions in an E&P logistics organization: logistic manager, base managers, etc.

LEARNING OBJECTIVES

- To grasp the whole spectrum of issues and stakes in relation with an oil and gas exploration and production project
- To comprehend the specific challenges of road, sea and air transport in an oil and gas project
- To address all angles of HSE challenges within the framework of an upstream oil and gas project
- To penetrate the working of a logistic base and clearly identify the different jobs carried out by all professionals involved

WAYS AND MEANS

Trainees work in teams on a logistic project which is presented to a jury
Numerous videos and animations used throughout the training
Visit of a logistic base

COORDINATOR

Pascal Ricroch

AGENDA

INTRODUCTION TO E&P CONTEXT — 5 d
Basic knowledge of oil & gas E&P
Introduction to E&P logistics in new affiliates
Risk and human factors

LOGISTIC BASE — 5 d
Logistic base management
Introduction to softwares (SAP-PTS-KPI…) and tasks
Introduction to civil works
Visit

HEALTH SAFETY AND ENVIRONMENT (HSE) CHALLENGES — 5 d
Respect the Environment
Lifting & handling operations
Transport of dangerous goods (summary)
Defensive driving
Work on Project-Questions-Answers

TRANSPORTATION ISSUES — 8 d
Sea Transport-Techniques and methods
Meteorology for air, road and sea transport
Road transportation
Air transport-techniques and methods

PROCUREMENT AND STOCK MANAGEMENT — 8 d
Tubular in Logistics activities
Cost Control (budget, OPEX, etc.)
Contracts and Purchasing for buyers
Stock Management: techniques and methods

MANAGEMENT ISSUES — 4 d
Management of HSE & action plan
Quality, referentials and standards
Management of Human Resources
Intercultural issues and communication
Presentation of Projects to the Jury

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	27 Jan - 14 Mars	Rueil	20 670 €	PL	pl.rueil@ifptraining.com

Projects & Logistics

E-780

ENGLISH: PL / SPSGB
FRENCH: PL / SPSFR

PURPOSE

To provide an in-depth technical knowledge of oil and gas subsea production systems

AUDIENCE

Engineers and technicians involved in the design, construction or operation of oil and gas subsea production systems

LEARNING OBJECTIVES

- To use the right criteria for selecting the appropriate technology of an equipment that is part of a subsea production system
- To comprehend thoroughly the intricate problems of typical subsea architectures; particularly in the deep offshore
- To proceed with and control installation techniques (with ROV, etc.)
- To deal with main flow assurance problems, and use prevention techniques

WAYS AND MEANS

Numerous examples from actual projects
Trainers are specialized engineers, presently involved in deep-offshore projects

COORDINATOR

Camilo Arias-Rivera

Subsea Production Systems

5 DAYS

Organized in collaboration with STAT Marine SAS

AGENDA

SUBSEA COMPONENTS & FIELD ARCHITECTURE — 0.5 d

Typical field architectures: loop, single line, hybrid loop, separation…
Surface production and storage technologies: FPSO, TLP…
Subsea production systems: XT, jumper, manifold, production lines, risers, umbilicals
Umbilical networks: electrical, hydraulic, chemicals…
Flowlines, risers and export systems
Examples of deep offshore developments

PIPELINES AND RISERS — 0.5 d

Pipeline and riser concept
Pipeline design
Materials (steel, corrosion resistant alloys, anti-corrosion coatings, thermal insulation…)

SUBSEA CONSTRUCTION & INTERVENTION — 1 d

Construction and multi-purpose support vessels
Surface and subsea positioning
ROV / diving operations
Description of main subsea interventions methods

INSPECTION, MAINTENANCE AND REPAIR — 1 d

Anomalies: physical/structural integrity issues; functional non-conformities integrity issues
External and internal inspection, monitoring
Maintenance: subsea interventions; operational pigging
Clamps and spool repairs

OPERATIONAL CHALLENGES — 1 d

Constraints specific to deepwater offshore production
Environmental constraints (temperature, sea, seabed, access…)
Reservoir characteristics
Flow assurance issues: pressure, temperature, hydrates, wax, flow stability, deposits…
Typical preservation sequence
Restart

OPERATION FROM PRODUCTION PLATFORMS — 0.5 d

General description (subsea control devices, valve actuation process…)
Description of typical operations
Description of specific operations

NEW TECHNOLOGIES — 0.5 d

Main technologies under development (subsea separation, subsea processing, subsea pumping, subsea compression, heating, surface support…)

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	May 19 - 23	Rueil	2,970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Projects & Logistics

E-785

ENGLISH: PL / PIPEGB
FRENCH: PL / PIPEFR

PURPOSE

To provide an in-depth technical knowledge of oil and gas subsea pipelines

AUDIENCE

Engineers and technicians involved in the design, construction or operation of oil and gas subsea pipelines and risers

LEARNING OBJECTIVES

- To grasp the fundamental concepts for designing subsea pipelines
- To comprehend thoroughly the construction methods and laying techniques, including subsea tie-in and shore approach
- To manage pipeline integrity, inspection and repairs

WAYS AND MEANS

Numerous examples from actual projects
Trainers are specialized engineers, presently involved in deep-offshore projects

COORDINATOR

Camilo Arias-Rivera

Subsea Pipelines

5 DAYS

Organized in collaboration with STAT Marine SAS

AGENDA

INTRODUCTION — 0.25 d
Definitions - Architecture of oil & gas production facilities
Pipeline concepts
Riser concepts
Fabrication of carbon steel line pipe

PIPELINE OPERATION: MAIN CONSTRAINTS — 0.75 d
Constraints associated to subsea environment
Flow regimes and instabilities
Maintaining the flow in pipelines: management of deposits
Preservation during shutdown, restart
Production monitoring and control from surface
Impact of operational constraints on architecture and design

DESIGN OF RIGID PIPELINES & RISERS — 1 d
Overview of pipeline design phases
Survey techniques and route selection
Thermal performance design
Mechanical design
Internal & external corrosion
Materials
Stability
Spans
Expansion and buckling
Risers design specificities
Limit state design

FLEXIBLE PIPELINES DESIGN — 0.25 d
Specificities of flexible pipeline design

OFFSHORE PIPELINE CONSTRUCTION — 0.5 d
Pipe lay methods (S, J, reel, tow)
Initiation / abandonment, installation of in-line structures
Pipe lay vessels & equipment
Welding and NDT
Comparison of installation methods

SHORE APPROACH CONSTRUCTION — 0.25 d
Shore approach construction and horizontal drilling

TRENCHING & PROTECTION — 0.25 d
Requirements for pipeline protection
Soil classification
Overview of protection methods

SUBSEA TIE-IN METHODS — 0.25 d
Conventional tie-ins incl. hyperbaric welding
Deepwater tie-ins
Thermal insulation of tie-ins

PRE-COMMISSIONING & PIGGING — 0.25 d
Introduction to pipeline pigging
Pipeline pre-commissioning
Operational pigging
Intelligent pigging

PIPELINE INTEGRITY — 0.75 d
Pipeline failures
Management of integrity
Inspection and maintenance
Assessment of pipelines with defects - Requalification
Repair

WORKSHOP — 0.5 d
Worked example covering the main topics of the training

LANGUAGE	DATES	LOCATION	FEES	REGISTRATION CONTACT	
EN	Jun 02 - 06	Rueil	2,970 €	PL	pl.rueil@ifptraining.com

May be organized for a single company

Blended Learning Courses at IFP Training

E-learning with personal coaching

Blended learning at IFP Training refers to distance learning with a close and structured follow up of each trainee by an expert coach, including one to one exchange through internet and/or the phone

EXCELLENCE OF KNOWLEDGE TRANSFER

High quality interactive training materials including quizzes and animations
Structured and guided learning path
Individual coaching using a dedicated training platform giving access to self training resources, forums and one to one exchanges
Simultaneous collaborative work using internet and phone through a web conference tool

OPTIMIZED TRAINING TIME

Trainee stays in his job location
4 hours a week learning work on average for the trainee
Course duration 6 to 12 weeks depending on subject
One hour per week personal guidance by the coach

CONTINUOUS ASSESSMENT FEEDBACK

Weekly progress reporting
Trainee dashboard
Individual and global pedagogical synthesis of the course

Blended Learning

p. 277 to 281

Blended Learning

E-190

ENGLISH: LOG / BLWLI

Well Logging & Basic Log Interpretation

8 WEEKS

E-learning with personal coaching

Well log acquisition and basic interpretation of clean formations

PURPOSE

To provide a practical understanding of basic concepts and methodology of well log acquisition and interpretation for subsurface or reservoir studies

AUDIENCE

Geologists, geophysicists, reservoir engineers interested in well log interpretation

LEARNING OBJECTIVES

- To understand well log acquisition techniques
- To grasp fundamental physics of log measurements
- To perform well-log quality control
- To understand log data from shale and other geological formations
- To perform basic log interpretation to identify and characterize reservoirs

WAYS AND MEANS

Before training starts, 2 hours are dedicated to introduce the training agenda, methods and tools
The exact needs and expectations of each participant are also assessed and discussed (MCQ and phone interview with the tutor)

OBSERVATION

Total duration of the training is 32 hours, spread over an 8-week period

COORDINATOR

Jacques Delalex
Catherine Ulrich (Blended Learning)

AGENDA

BASIC INTERPRETATION CONCEPTS — 8 h

Seals and reservoirs
Definition of main reservoir petrophysical and fluid properties (lithology, porosity, resistivity, saturation)
Fundamental equations for log interpretation in clean formations
Environment of measurement (drilling, borehole, invasion process)

MEASUREMENTS AND APPLICATIONS — 12 h

Mud logging and coring operations
Wireline logging operations
The log: header, calibrations, parameters, repeat section, main log
Logging tool principle, limitation, application, quality control
Caliper, gamma ray and GR spectrometry, spontaneous potential
Resistivity (induction, laterolog) and microresistivity measurements
Porosity and lithology measurements: nuclear (litho-density, neutron) and acoustic logging

BASIC LOG INTERPRETATION — 12 h

Wireline log interpretation in clean formations:
- Identification of shales, common geological formations and reservoirs
- Cross-plot technique with density and neutron
- Identification of fluid contacts
- Hydrocarbon effects on logs
- Determination of lithology and porosity
- Determination of Rw (SP, Ratio, Rwa)
- Determination of water and hydrocarbon saturations
- Case of oil based mud
- Estimation of h.Phi.So

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

Blended Learning

E-340

ENGLISH: GEP / BLSRC

SRC
Seismic Reservoir Characterization

6 WEEKS

E-learning with personal coaching

PURPOSE

To provide a comprehensive and practical understanding of how seismic data is used to characterize, model, and classify reservoirs

AUDIENCE

Geologists, geophysicists and reservoir engineers

LEARNING OBJECTIVES

- To understand the relationship between physical properties of rocks and geophysics
- To master the main steps of well to seismic calibration
- To grasp the workflow of seismic reservoir characterization
- To perform QC of an AVO-AVA study
- To assess data to be interpreted and related uncertainties
- To interpret major results of petroelastic analysis and modeling, AVO-AVA and Inversion studies
- To understand methodological issues in seismic inversion, attributes classification and reservoir properties prediction

WAYS AND MEANS

Before training starts, 2 hours are dedicated to introduce the training agenda, methods and tools
The exact needs and expectations of each participant are also assessed and discussed (MCQ and phone interview with the tutor)

OBSERVATION

Total duration of the training is 24 hours, spread over a 6-week period

COORDINATOR

Jacques Negron
Catherine Ulrich (Blended Learning)

AGENDA

SEISMIC RESERVOIR CHARACTERIZATION — 1 h
How is it integrated?
Methods used and scale issues

ROCK PHYSICS THEORY — 2.5 h
Basic rock physics
Main parameters having an influence on rock-elastic answer
Saturation effect modeling (Gassmann)
Rock physics model and parameters taken into account
Differences between Gassmann and petroelastic modeling

PHYSICS AND AVO PRINCIPLES — 5 h
Why AVO?
Wave propagation
Data prerequisites, seismic attributes

WELL TO SEISMICS CALIBRATION — 2 h
Objectives, methods
Recommended wavelet extraction techniques
Real case example: Multi-well calibration
Wavelet deconvolution

INTERPRETATION OF AVO ATTRIBUTES — 3 h
Crossplot principles
AVO seismofacies
AVO class
AVO facies volume

INVERSION OF SEISMIC DATA — 4 h
Inversion methodology: fundamentals
Post-stack and pre-stack inversion
Validating and interpreting inversion results

PREDICTION OF RESERVOIR PROPERTIES — 4.5 h
Attribute classification
Techniques of prediction
Validation of characterization results

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

Blended Learning

E-396

ENGLISH: GIS / BLWTA

Well Test Analysis

10 WEEKS

E-learning with personal coaching

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 performance supervision and well test design and interpretation
Reservoir geologists interested by well-test-generated dynamic information for use in geological models

LEARNING OBJECTIVES

- To comprehend the full extent of oil and gas well tests, within the framework of set objectives
- To understand, recognize and analyze pressure behavior linked to a given flow regime
- To apply conventional and advanced methods for setting up a well/reservoir model and deriving results
- To obtain well bore conditions using the derivative approach
- To describe a double-porosity reservoir model
- To assess boundary response within the derivative approach
- To use a software program to interpret well tests in simple reservoirs
- To set up the appropriate gas well test and analyze results

WAYS AND MEANS

Practical applications and exercises using the software programs PIE™ and SAPHIR™

OBSERVATION

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

COORDINATOR

Gérard Glotin
May also contact Catherine Ulrich, in charge of Blended Learning

AGENDA

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 at distance. Contact: gre.rueil@ifptraining.com

Blended Learning

E-398

ENGLISH: GIS / BLMBAL

Material Balance and Production Mechanisms

7 WEEKS

E-learning with personal coaching

PURPOSE

To enhance practical experience and skills in setting up material balance (oil, gas and condensate gas reservoirs) through an experiential, hands-on training experience, using the software program MBAL™

AUDIENCE

Reservoir engineers, engineers and technicians involved in well performance

LEARNING OBJECTIVES

- To characterize reservoir fluids
- To input main reservoir characteristics, tank and well data in the software program MBAL™
- To adjust reservoir parameters in order to match historical data as well as possible
- To calculate inflow performance for oil and gas reservoirs
- To match fractional flow and forecast field production using MBAL™

OBSERVATION

28 hours over 7 weeks
MBAL™ software license not provided

COORDINATOR

Gérard Glotin
May also contact Catherine Ulrich, in charge of Blended Learning

AGENDA

CHARACTERIZATION OF RESERVOIR FLUIDS — 4 h
Goal & applications of PVT studies, fluid basic characteristics and definitions, main oil and gas properties, correlations, Oil and Gas behavior between the reservoir and the surface

LABORATORY PVT STUDIES — 2 h
Constant composition expansion & constant volume depletion, equation of state

USE OF PVT WITH MBAL™ — 3 h
Introduction, PVT Module, PVT controlled miscibility and water viscosity, PVT validation

PRODUCTION MECHANISMS — 4 h
Material Balance equation, aquifer water influx, oil plus dissolved gas expansion, gas cap Expansion, linear expression of the MBE (Havlena & Odeh), water entry calculation

APPLICATIONS WITH MBAL™ SOFTWARE — 4 h
Tank parameters, aquifer characteristics & relative permeabilities, production history by well or by tank, history matching

FRACTIONAL FLOW — 2 h
Frontal unidirectional displacement, Buckley-Leverett model & welge tangent method Fractional flow matching

GAS RESERVOIRS — 2 h
No water influx, dry gas, gas inflow performance

WELL DEFINITION — 1 h
Inflow for oil

PREDICTION MODULE — 2 h
Productivity index, MBAL™ productivity prediction module

VOLATILE OIL AND CONDENSATE GAS RESERVOIRS — 1 h
General material balance equation, material balance applications

SINGLE-TANK OR MULTI-TANK — 3 h
Case study

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

Blended Learning

E-465

ENGLISH: PRO / BLPROSPER

Well Inflow & Outflow Performance

E-learning with personal coaching

32 HOURS

PURPOSE

To deepen knowledge of well lift optimization and master use of the software program Prosper

AUDIENCE

Reservoir or well performance engineers and technicians

LEARNING OBJECTIVES

- To build a PVT model which will be used in a well performance study
- To analyze the link between reservoir characteristics and production
- To understand how wells can produce naturally
- To understand the main artificial lift methods and their use
- To model and understand crucial parameters of well performance
- To identify reasons for poor well performance

WAYS AND MEANS

Multimedia online learning with personal coaching
Before training starts, 2 hours are dedicated to introduce the training agenda, methods and tools
The exact needs and expectations of each participant are also assessed and discussed (MCQ and phone interview with the tutor)
During the training, individual phone contact with the tutor and web conferences with other participants
Use of the software program PROSPER™ (license not provided)

OBSERVATION

Total duration of the training is 32 hours, spread over an 8-week period

COORDINATOR

Denis Perrin
Catherine Ulrich (Blended Learning)

AGENDA

INTRODUCTION — 2.5 h
Well production optimization
PROSPER™ software

CHARACTERIZATION OF RESERVOIR FLUIDS - PVT — 2 h
Goal and application of PVT studies
Main oil and gas properties
PROSPER™ software PVT module

INFLOW PERFORMANCE RELATIONSHIP — 6.5 h
Modeling of flows in a porous medium
Modeling of the reservoir-wellbore interface
IPR calculation in the case of oil and gas reservoirs
Specific case of horizontal and deviated wells

NATURAL FLOWING WELLS — 7 h
Introduction to the specificities of multiphase flows
Choice of the adequate correlation
Modeling outflow performance
Nodal analysis of a reservoir well system

ARTIFICIAL LIFTED WELLS — 4.5 h
Introduction - Using the nodal analysis
Gas Lift system: description and design
Electrical Submersible Pump (ESP): presentation and design
Overview of other artificial lift methods

WELL PERFORMANCE DIAGNOSIS — 2.5 h
Production rate analysis of well flowing naturally
Production rate analysis of well activated with GL or ESP

CONCLUSION / CASE STUDY — 7 h

Upon request at distance. Contact: fp.pau@ifptraining.com

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Registration

Identify on the course programme the course reference, the price, the location and the date you are interested in; as well as the contact name for registration.

So that your registration is done in the best conditions, please follow the procedure below:

3 weeks minimum before the beginning of the course ➔ Please send the completed **registration form**

2 weeks minimum before the beginning of the course ➔ Please make the **full payment**

- By check payable to IFP Training, 232 avenue Napoléon Bonaparte – 92852 RUEIL MALMAISON CEDEX
- By bank transfer to IFP Training
  NATIXIS n° 30007 99999 04165583000 12
  IBAN: FR76 3000 7999 9904 1655 8300 012 – BIC: NATXFRPPXXX
- Should a sponsoring organization (like OPCA in France) pay for the course, please specify this on the registration form.

Do not hesitate to contact us for a late registration.

Tuition fee includes instruction, documentation; as well as meals and beverage breaks.

IFP Training will send to the authorized person indicated on the registration form:

- a written confirmation by mail
- one or several invitations for the participants
- useful information about the training course (access to the training center, training hours, etc.)

To whom should you send your registration form?

You can find the registration form on page 99. It can be sent

- by mail
- by email
- by fax

You must send it to the entity that will organize the course you have chosen. This entity appears at the bottom of the course program.
You need then to turn to the next page to find the corresponding address and phone number.

Any registration means the acknowledgement and the acceptance of IFP Training General Sales Conditions (page 96).

Contacts

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General Sales Conditions
Public Courses

1 - PURPOSE AND SCOPE

The purpose of these General Sales Conditions (GSC) is to define the general conditions for taking part in public training sessions organized by IFP Training.

All customer enrolments are considered as accepted orders as soon as the enrolment confirmation issued by IFP Training has been received and implies their full commitment to these conditions which prevail over all other Customer documents, including general purchasing conditions.

2 - ENROLMENT AND ORDER PROCEDURES

All inscriptions to training sessions shall be carried out 3 weeks prior to the session start date. IFP Training reserves the possibility of accepting late enrolment.

The number of participants per session is limited.

Enrolment will be confirmed once the organizing centre receives a filled in enrolment form via email, fax or mail. Incomplete enrolment forms will not be accepted.

Enrolment will be final once payment has been received in full, or once an acceptance certificate from a certified organization has been received.

3 - ENROLMENT CONFIRMATION – INVITATION OF PARTICIPANTS

If the entire cost of the session is not paid 2 weeks before the training begins, IFP Training reserves the right to free up the places booked by the Customer after informing them. IFP Training will, at least 2 weeks prior to the start of the session, send a letter to the Customer designated on the form, confirming their enrolment. A personal invitation for the Participant is attached to the letter and provides all practical information on the session (schedule, directions, etc.) and any other specifications.

4 - PRICE - INVOICING AND PAYMENT

PRICE: Enrolment fees cover training (teaching, practical activities, simulators and other IT tools, documentation, suppliers) as well as break-times (refreshments) and lunch and do not include transport or accommodation. The price on the order form is given in Euros excluding tax. VAT at the current rate shall be added to this, plus any other tax deducted at source. All training sessions once started are to be paid in full. On request, IFP Training may decide to apply reduced enrolment fees for job seekers.

PAYMENT: The training session will only be accessible once payment has been made in full:

- by check to: IFP Training - 232 avenue Napoléon Bonaparte F-92852 Rueil-Malmaison Cedex.
- via bank transfer to the IFP Training beneficiary:

NATIXIS account no. 30007 99999 04165583000 12

IBAN: FR76 3000 7999 9904 1655 8300 012 – BIC: NATXFRPPXXX.

INVOICING: The paid invoice is sent to the Customer at the end of the training session, in duplicate if specified on the enrolment form.

LATE FEES: If IFP Training exceptionally agrees on payment after the session, any amounts not paid in time will give rise to late fees set at three (3) times the legal interest rate. These late fees can be requested by right until full payment has been made.

5 - PAYMENT BY A SPONSORING ORGANISM

If the Customer wishes to pay using a sponsoring organism (for example, OPCA as defined under French Law) , the following procedure shall be followed:

- before the start of the session, a request for direct billing shall be issued and accepted;
- this shall be indicated explicitly on the enrolment form;
- the Customer ensures payment has been completed by the designated organization.

IFP Training will provide the Customer with all necessary documents for making sponsoring organism requests.

If the sponsoring organism only bears part of the cost of the training, the remaining sum will be invoiced to the Customer.

Only payment by sponsoring organism before the 1st day of training will ensure enrolment and access to the training.

If, for whatever reason, the sponsoring organism will not pay, the Customer will be invoiced for the total price of the training.

At the end of the session, IFP Training will send the sponsoring organism an invoice along with a copy of the certificate of attendance signed by the Participant.

6 - CANCELLATION AND POSTPONEMENT - SUBSTITUTION

By the Customer: Cancellations by the Customer shall be sent in writing to IFP Training.

In case of cancellation, even due to force majeure, less than 14 calendar days before the beginning of the session, 50% of the enrolment fees will be invoiced by IFP Training, except if a participant from the same business takes the place, which must be confirmed by sending a new enrolment form. In case of non-cancelled enrolments (including absenteeism or dropout), 100% of the enrolment fees will be invoiced by IFP Training.

In case of an unforeseen departure justified by the Customer, the Participant may be authorized to take part in a later session with the prior consent of IFP Training.

By IFP Training: IFP Training reserves the right to cancel or postpone a session, especially if there is an insufficient number of participants. The Customer will be informed by telephone, at least 2 weeks before the session was due to begin. The cancellation will be confirmed in writing. The payments received will be fully refunded. No compensation will be given to the Customer due to postponing or cancellation on behalf of IFP Training.

7 - DATA PROTECTION

Personal information sent by the customer to IFP Training for the session may be given to IFP Training's contractual partners for the needs of the said Training session. In accordance with the provisions of law no. 78-17dated 6 January 1978 on data protection, the Customer may at any time use their right of access, right to object and right to correction in the IFP Training file.

8 - CONFIDENTIALITY AND PROPERTY RIGHTS OF TRAINING DOCUMENTS

The Customer is subjected to a confidentiality obligation concerning all documents and information specified as being confidential communicated during the session, irrespective of their medium. The Customer shall ensure that all their staff and more generally speaking all people in contact with IFP Training comply with this obligation.

More specifically, IFP Training may provide participants with training documents on all media (e.g. paper, audio, audiovisual, IT or multimedia). Any direct or indirect reproduction, adaptation, alteration, representation or distribution by the Customer, irrespective of the form, of all or part of the training documents created by IFP Training and/or the information contained in them, for its staff not taking part in training sessions or for third parties, will be subjected to IFP Training's prior written agreement. The Customer must not to make any copies, in any shape or form, with the aim to sell, organize or conduct training sessions.

9 - CONCEALED WORK - SUBCONTRACTING

Based on Law no. 91-1406 dated December 31 1991 supplemented by the Decree dated June 11 1992, IFP Training guarantees that all workers are employed legally in terms of the provisions stated in the French labor code. IFP Training guarantee compliance with all fiscal and social obligations in terms of training staff as well as legal and regulatory obligations in terms of concealed work and the employment of foreign labor.

IFP Training may consult qualified partners to carry out part of the service, who will be subjected to the same obligations as mentioned in this document, as well as the obligation of confidentiality. In no case does subcontracting relieve IFP Training of its obligations and responsibilities with regard to these General Sales Conditions.

10 - FORCE MAJEURE

The Party prevented from carrying out its obligations due to Force Majeure as defined by the French Civil code, shall inform the other party in written form via registered post with acknowledgement of receipt providing all relevant justification, and will do its utmost to reduce any damage caused by this situation. This excludes exclusively internal strikes and payment capacities or methods of each Party.

The obligations of a Party affected by a Force Majeure are interrupted, without penalties, until the effects of this cause disappear. Each Party will bear the cost of all fees incumbent upon them resulting from the force majeure.

In case of a force majeure lasting over thirty (30) days in a row, the Party which the force majeure is opposed to may terminate the order immediately and by right without compensation.

11 - TERMINATION

In case the Customer does not comply with the obligations stated in these General Sales Conditions, IFP Training will send a letter of formal notice via registered post with acknowledgement of receipt, demanding compliance within thirty (30) days. Once this deadline has been exceeded, if the Customer has not met the requests of the formal notice, IFP Training may terminate the order, and may request compensation.

12 - INSURANCE - RESPONSIBILITY

The Customer will take out and maintain all insurance policies at his own cost and for the entire duration of the session, for covering risks, responsibilities, direct or indirect damage and any illness contracted by the Participant(s), with prime insurance companies. The Customer will compensate IFP Training for any loss, damage or harm caused by its Participants to IFP Training, its trainers or partners.

IFP Training will take out and maintain insurance required for covering risks which may arise during training sessions.

Each Party remains liable for damages made to its property and for personal injuries suffered by its employees, regardless of the cause or the reason of that damage, during the performance of the training session, except gross negligence or willful misconduct by this aforementioned Party, or one of its employees.

In any case, IFP Training shall not be liable for any indirect or consequential loss such as but not limited to financial, commercial or any other type of prejudice, caused directly or indirectly by the use of the information broadcast within the framework of its training sessions.

13 - MISCELLANEOUS PROVISIONS - DISPUTES

The Customer is aware of all documents which constitute the order, including these General Sales Conditions.

After the training session and/or in case of termination, the provisions of articles 8, 11, 12 and 13 will remain valid.

These General Sales Conditions are subjected to French law. Any dispute which is not solved amicably within one (1) month and which concerns the validity, the execution or the interpretation of these General Sales Conditions will be subjected to the jurisdiction of the Commercial Court of Nanterre.

NOTES:

Registration form (to be sent to the training center concerned)

COURSE TITLE: .....

Course reference: ____ / _____ **Program code:**

Date of session: ..... **Location:** .....

PARTICIPANT

Mr ☐ Ms ☐ First name: ..... Family name: .....

Position: ..... Nationality: .....

Company: .....

Address: .....

Zip code: ..... City: ..... Country: .....

Phone: ..... Fax: ..... E-mail: .....

CONFIRMATION OF REGISTRATION

Mr ☐ Ms ☐ First name: ..... Family name: .....

Position: ..... Nationality: .....

Company: .....

Address: .....

Zip code: ..... City: ..... Country: .....

Phone: ..... Fax: ..... E-mail: .....

INVOICE

Mr ☐ Ms ☐ First name: ..... Family name: .....

Position: ..... Nationality: .....

Company: .....

Address: .....

Zip code: ..... City: ..... Country: .....

Phone: ..... Fax: ..... E-mail: .....

VAT number: .....

References to be mentioned on the invoice: .....

☐ I aknowledge receipt of IFP Training general sales conditions for public courses and I accept them

To be sent with the invoice:

☐ Attendance sheet

☐ Course assessment by the participant

☐ Duplicate of the invoice

☐ Others (please state): .....

Stamp and Signature

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