



COURSE OVERVIEW DE0793 Gas Reservoir Management

Course Title

Gas Reservoir Management

Course Date/Venue

August 31-September 04, 2026/Al Ain Boardroom,
Le Royal Méridien Abu Dhabi, Abu Dhabi, UAE

Course Reference

DE0793

Course Duration/Credits

Five days/2.75 CEUs/27.5 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



This course is designed to provide participants with a detailed and up-to-date overview of Gas Field Reservoir Management. It covers the gas-fluid classification and phase behavior, fundamental PVT properties and PVT sampling of gas condensate; the PVT laboratory reports and gas flow and well testing; the gas-well deliverability, non-darcy flow and applied closure and fractured wells; the horizontal wells, gas condensate, volumetric OGIP and material balance; the alternative graphic techniques and types curves, fetkovich and RTA fundamentals; the exponential, hyperbolic and harmonic decline; and the glow flow in wellbores and pipelines.



During this interactive course, participants will learn the system and nodal analysis, production restrictions and forecasting fundamentals; the decline analysis, coupled material balance, reservoir simulation and history matching; the uncertainty and scenarios, method comparison, well spacing and infill drilling; the gas reservoirs with water drive including gas condensate; and the coalbed methane, adsorption and desorption, langmuir isotherm, matrix diffusion, initial water production and stress-dependent permeability.



Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain in-depth knowledge on gas field reservoir management
- Discuss the gas-fluid classification and phase behavior, fundamental PVT properties and PVT sampling of gas condensate
- Explain the PVT laboratory reports and carryout gas flow and well testing
- Recognize gas-well deliverability, non-darcy flow and applied closure and fractured wells
- Identify horizontal wells, gas condensate, volumetric OGIP and material balance
- Employ alternative graphic techniques and identify types curves, fetkovich and RTA fundamentals
- Discuss exponential, hyperbolic and harmonic decline including glow flow in wellbores and pipelines
- Carryout integrated system and nodal analysis and identify production restrictions and forecasting fundamentals
- Apply decline analysis, coupled material balance, reservoir simulation and history matching
- Determine uncertainty and scenarios, method comparison, well spacing and infill drilling
- Explain gas reservoirs with water drive including gas condensate
- Identify coalbed methane, adsorption and desorption, langmuir isotherm, matrix diffusion, initial water production and stress-dependent permeability

Exclusive Smart Training Kit - H-STK®



*Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of gas field reservoir management for reservoir engineers actively involved with the operation and management of gas reservoirs and geoscientists working with gas reservoirs in field development.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.



Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations:

-  British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

-  The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **2.75 CEUs** (Continuing Education Units) or **27.5 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.



Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. George Basta, MSc, BSc, is a **Senior Reservoir Engineer** with extensive experience within the **Oil & Gas, Refinery and Petrochemical** industries. His wide expertise covers in the areas of **Gas Reservoir Management**, Advanced **Gas Reservoir Engineering**, **Gas Reservoir Characterization & Modelling**, **Gas Reservoir Performance & Surveillance**, **Gas Reservoir Simulation & Performance Prediction**, **Reserve Calculation**, **Reservoir Engineering**, **Petroleum Engineering & Reservoir Management**, **Sandstone & Fractured Carbonate Reservoir**, **Reservoir Productivity**, Enhanced Oil Recovery (EOR), Thermal Enhanced Oil Recovery (TEOR), **Reservoir Pressure Maintenance (Water Flooding)**, **Reservoir Modelling**, **Reservoir Surveillance**, **Steam Flood Reservoir Management**, Integrated **Carbonate Reservoir Characterization**, Applied **Reservoir Engineering & Management**, **Reservoir Surveillance & Management**, Applied **Production Logging & Reservoir Monitoring**, **Reservoir Management**, **Reservoir Geomechanics**, **Reservoir Engineering**, **Reservoir Characterization**, **Reservoir Characterization**, **Reservoir Fluid Characterization & Management**, **Fractured Carbonate Reservoir**, **Reservoir Geophysics**, **SCAL**, **Rocks & Fluids Properties**, **Production & Injection**, **Heavy Oil Recovery**, **Well Production Engineering**, **Well Modelling**, **Nodal Analysis**, **Well Data Results Interpretation**, **Well Tests**, Enhancing **Well Productivity**, **Injection Logging**, Original Hydrocarbon in Place (OHIP), **Reserve Estimation**, **Reserve Evaluation**, **Steam Injection**, **Polymer Injection**, **Steam Pulsing Injection (SPI)**, Cyclic Group Steaming of Wells (CGSW), Quality Management System, **Volumetric Analysis**, **Monte Carlo Techniques**, **Material Balance** and **Decline Curve Analysis (DCA)**. He is also well-versed in **PVTi**, **PVTP**, **PVTsim**, **PETREL Software**, **MBAL Software**, **Prosper Software**, **CMG**, **OFM**, **Saphir/Ecrin**, **Advanced Excel**, **EORgui**, **IMEX**, **Thermal STARS**, **EXOTHERM**, **Eclipse**, **KAPPA Software** and **PETEX**.

During Mr. George's career life, he has gained his thorough and practical experience through his various positions as the **Reservoir Surveillance Engineer**, **QA/QC Engineer**, **Field Engineer**, **Reservoir Surveillance Petroleum Consultant Engineer** and **Senior Instructor/Lecturer** for various companies like OPEC (Offshore Protection Engineering Company), Scimitar Production Egypt Ltd and the Business Development in Africa and MENA Regions.

Mr. George has a **Master** and **Bachelor** degrees in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer**, an active member of the Society of Petroleum Engineer (**SPE**) and Canadian Society of Petroleum Geologists (**CSPG**). Moreover, he published various books and scientific journals and has delivered numerous trainings, courses, seminars, conferences and workshops globally.

Course Fee

US\$ 8,000 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.



Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: **Monday, 31st of August 2026**

0800 – 0830	Registration & Coffee
0830 – 0845	Welcome & Introduction
0845 – 0900	PRE-TEST
0900 – 0930	Gas-Fluid Classification & Phase Behavior Gas-Fluid Classification • Dry Gas: Behavior & Implications • Wet Gas: Liquid Production at Surface • Gas Condensate: Key Concept • Pressure-Temperature Diagram • Critical Point, Dew-Point Curve & Cricondentherm • Retrograde Condensation • Relationship Between Dew-Point Pressure & Productivity • Application to the Field Under Study
1000 – 1015	Break
1015 – 1100	Fundamental PVT Properties Why Real Gas Does Not Behave as an Ideal Gas • Compressibility Factor Z • Calculation & Interpretation of Bg • Gas Density • Gas Viscosity • Gas Compressibility • Property Variation with Pressure • Pseudopressure: Physical Intuition • Pseudopressure: Equation & Variables • Pseudotime: When to Use it • Integrated Numerical Example of PVT Properties
1100 – 1130	PVT Sampling of Gas Condensate Why Sampling Controls the Entire Analysis • Bottomhole Sampling • Separator Sampling • Recombination Sampling • Sample Representativeness • Contamination & Fractionation • Sampling Quality Control • Sample Evaluation for the Field Under Study • Common Errors in PVT Sampling
1130 – 1200	PVT Laboratory Reports How to Critically Read a PVT Report • Constant Composition Expansion – CCE • Constant Volume Depletion – CVD • Separator Tests • Dew-Point Pressure Validation • Consistency among CCE, CVD & Separator Tests • Checklist to Accept or Challenge the PVT
1200 – 1215	Gas Flow & Well Testing Gas Flow in Porous Media • Wellbore Storage • Damage or Skin • Radial Flow • Drawdown Test • Buildup Test • Practical Interpretation of Flow Regimes
1215 – 1230	Break
1230 – 1330	Gas-Well Deliverability Deliverability Concept • Backpressure Test • Isochronal Test • Modified Isochronal • Deliverability Equation • Absolute Open Flow – AOF
1330 – 1350	Non-Darcy Flow & Applied Closure Non-Darcy Flow & Turbulence Coefficient • Guided Exercise: Deliverability & AOF Fit • Guided Exercise: AOF Calculation • Final Summary & Practical Activity
1350 – 1400	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1400	Lunch & End of Day One



Day 2: Tuesday, 01st of September 2026

0800 – 0900	Fractured Wells Fractured Well: Why the Response Changes • Fracture Conductivity • Flow Regimes in a Fractured Well • Guided Exercise: Fractured-Well Test • Derivative Interpretation
0900 – 0930	Horizontal Wells Horizontal Well: Effective Length • Anisotropy & Flow • Heel-Toe Effect & Distributed Damage • Boundaries & Compartmentalization • Mini Case: Vertical, Horizontal & Fractured Wells • Vertical Well • Horizontal Well • Fractured Well • Which is the Best Well? Vertical, Horizontal or Fractured?
0930 – 0945	Break
1015 – 1115	Gas Condensate Gas Condensate: Physical Intuition • Phase Envelope • Condensate Banking • Drawdown & Rate • Black-Oil versus Compositional • Risk Exercise: $P_{Average}$, P_{WF} & P_{Dew}
1115 – 1215	Volumetric OGIP OGIP: Volumetric Approach • Critical OGIP Variables • Averages & Scale • Probabilistic OGIP • Guided Exercise: Volumetric Calculation • Minimum, Base & Maximum Cases • Simple Monte Carlo • Tornado Analysis
1215 – 1230	Break
1230 – 1315	Material Balance Material Balance: Physical Intuition • P/ Zplot • Pressure Quality • P/Z Deviations • Aquifer Scenarios • Volumetric Case without Aquifer • Weak Aquifer • Strong Aquifer
1315 – 1350	Case & Closing Volumetric versus Dynamic OGIP Comparison • Final Technical Product
1350 – 1400	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1400	Lunch & End of Day Two

Day 3: Wednesday, 02nd of September 2026

0800 – 0930	Alternative Graphic Techniques From Data to Diagnosis • Alternative Graphical Techniques • Rate Versus Time • Rate Versus Cumulative Production • Pressure Versus Cumulative Production • Log-Log Plots • Rate Normalized Pressure • Material Balance Time • Operational Events
0930 – 0945	Break
1015 – 1115	Types Curves, Fetkovich & RTA Fundamentals Type Curves: Concept • Fetkovich Type Curves • Transient Region versus BDF • Rate & Rate Integral • Type-Curve Limitations
1115 – 1215	Exponential, Hyperbolic & Harmonic Decline Decline: Purpose & Risk • Exponential Decline • Hyperbolic Decline • Harmonic Decline • Comparison of Fits
1215 – 1230	Break
1230 – 1315	Glow Flow in Wellbores & Pipelines Gas Flow in Tubing • Pressure Losses • Multiphase Flow & Holdup • Liquid Loading • Integrated Production System



1315 – 1350	Integrated System & Nodal Analysis IPR: Reservoir Capacity • VLP/TPR: Transport Capacity • Nodal Analysis • System Sensitivities • IPR Construction • VLP Construction • Nodal Analysis
1350 – 1400	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1400	Lunch & End of Day Three

Day 4: Thursday, 03rd of September 2026

0800 – 0900	Production Restrictions What Really Limits Production? • Reservoir Restrictions • Near-Wellbore Restrictions • Completion & Tubing Restrictions • Choke, Flowline & Separation • Compression & Delivery Pressure • Simultaneous Restrictions • Restriction Diagnosis Matrix • Activity: Identify the Bottleneck • Exercise: Identify the Bottleneck
0900 – 0930	Forecasting Fundamentals What is a Defensible Forecast? • Rate Profile & Cumulative Production • Technical, Operating & Economic Limits • Abandonment Pressure • Exercise: Abandonment Pressure • EUR: Estimated Ultimate Recovery • Exercise: Estimated Ultimate Recovery • Scenarios versus Sensitivities • Typical Forecasting Errors
0930 – 0945	Break
0945 – 1030	Decline Analysis Decline Analysis: Physical Intuition • Exponential, Harmonic & Hyperbolic Models • Arps Variables • Selecting the Fitting Interval • Regime Changes • Decline Under Restrictions • Extrapolation & Terminal Limits • Production Plot Guide • Guided Decline Exercise • Interpreting the Decline Forecast
1030 – 1100	Coupled Material Balance Material Balance: Physical Intuition • Cumulative Production–Pressure Relationship • Use of P/Z in Gas • Updating PVT Properties • Well Deliverability • Pressure–Rate Coupling • System Restrictions • Time-Step Solution • Effect of Compression & New Wells • Exercise: Effect of Compression & New Wells
1100 – 1130	Reservoir Simulation Why Simulate? • Contents of a Simulation .DAT File • A Simulator Does Not Replace Judgment • Conceptual Model • Simulator Type: Black-Oil versus Compositional • Grid, Regions & Properties • PVT & Relative Permeability • Contacts, Aquifer & Initial Conditions • Wells, Completions & Restrictions • Initialization & Volume Balance • Model Quality Control
1130 – 1215	History Matching What is History Matching? • Historical Data Validation • Global, Regional & Local Matching • What to Modify & When • Non-Uniqueness of History Matching • Cross-Validation & Predictive Capability
1215 – 1230	Break
1230 – 1315	Uncertainty & Scenarios Static & Dynamic Uncertainty • Controllable & Non-Controllable Variables • Screening & Sensitivity • Low, Base & High Models • Communicating P10, P50 & P90



1315 – 1350	Method Comparison <i>Comparison: Decline versus MBE versus Simulation • Recommended Method by Field Maturity • Summary: Cross-Cutting Case Integration.</i>
1350 – 1400	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1400	<i>Lunch & End of Day Four</i>

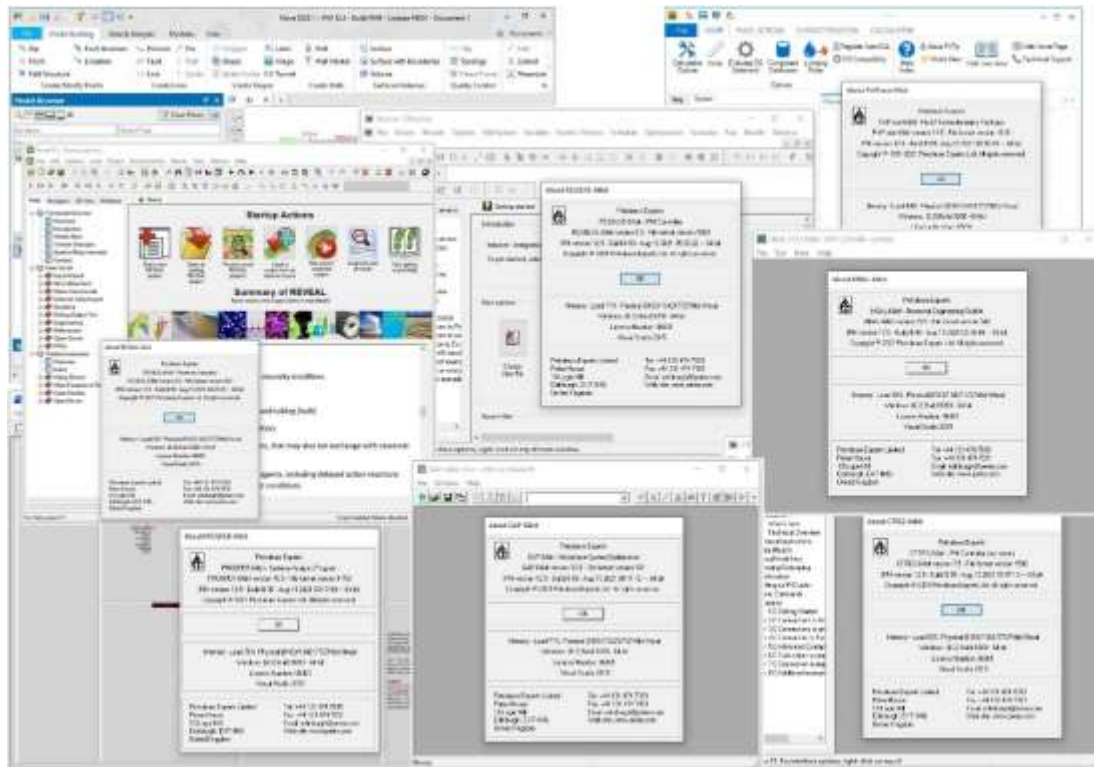
Day 5: Friday, 04th of September 2026

0800 – 0900	Well Spacing & Infill Drilling <i>Why Does Spacing Matter? • Drainage Area & Equivalent Radius • Radius of Investigation & Interference • Connectivity & Compartmentalization • Heterogeneity & Redundant Wells • Acceleration versus Incremental Recovery • Technical Criteria for Infill Drilling • Infill Risks • Visual Example: Drainage Map • Guided Spacing Exercise • Block Conclusion</i>
0900 – 0930	Gas Reservoirs with Water Drive <i>Water Drive: Benefit & Risk • Types of Aquifers • Water Influx & Pressure Behavior • Diagnosis with P/Z • Gas-Water Contact Advance • Water Breakthrough • Coning, Channeling & Heterogeneity • Relative Permeability, Hysteresis & Residual Gas • Exercise: Aquifer Diagnosis • Management & Abandonment Criteria</i>
0930 – 0945	<i>Break</i>
1015 – 1100	Gas Condensate <i>What Makes Gas Condensate Special? • Phase Envelope • Condensate Banking • Drawdown & Apparent Skin • Natural Depletion • Gas Cycling & Gas Injection • Black-Oil versus Compositional Simulation • Strategy Comparison • Conceptual Exercise</i>
1000 – 1145	Coalbed Methane <i>Coalbed Methane: An Unconventional Reservoir • Adsorption & Desorption • Langmuir Isotherm • Matrix Diffusion & Flow in Cleats • Initial Water Production • Stress-Dependent Permeability • Basic Langmuir Exercise • Key Differences from Conventional Reservoirs</i>
1145 – 1215	Integrated Case: Comparison of Alternatives <i>Alternatives in the Cross-Cutting Case • Comparison Criteria • Technical Decision Matrix • Simplified Economic Integration • Critical Sensitivities • Conditional Recommendation</i>
1215 – 1230	<i>Break</i>
1230 – 1315	Surveillance & Data Plan <i>Why Monitor? • Surveillance Plan • Action Limits</i>
1315 – 1330	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1330 – 1345	POST-TEST
1345 – 1400	<i>Presentation of Course Certificates</i>
1400	<i>Lunch & End of Course</i>



Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the “PETEX IPM Suite”, “PROSPER”, “MBAL” and “GAP” software.



PETEX IPM Suite



PROSPER

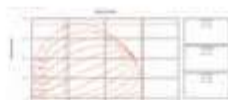


MULTIPHASE WELL AND PIPELINE NODAL ANALYSIS

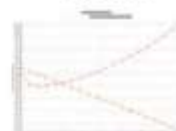
WELL AND PIPELINE MODELS



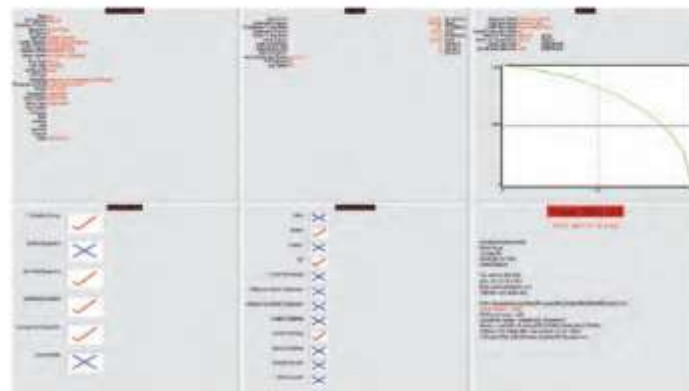
FULLY COMPOSITIONAL



INFLOW/OUTFLOW RESPONSE



STEAM WELLS



OUTFLOW (VLPs) MODELS



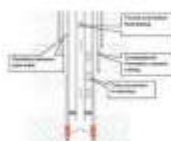
FLOW ASSURANCE



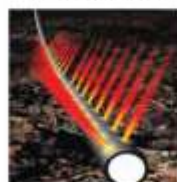
ARTIFICIAL LIFT SYSTEMS



THERMAL MODELLING



PERFORATION DESIGN AND PERFORMANCE



MULTILATERAL COMPLETIONS



INFLOW (IPRs) MODELS





PETROLEUM ENGINEERING SOFTWARE

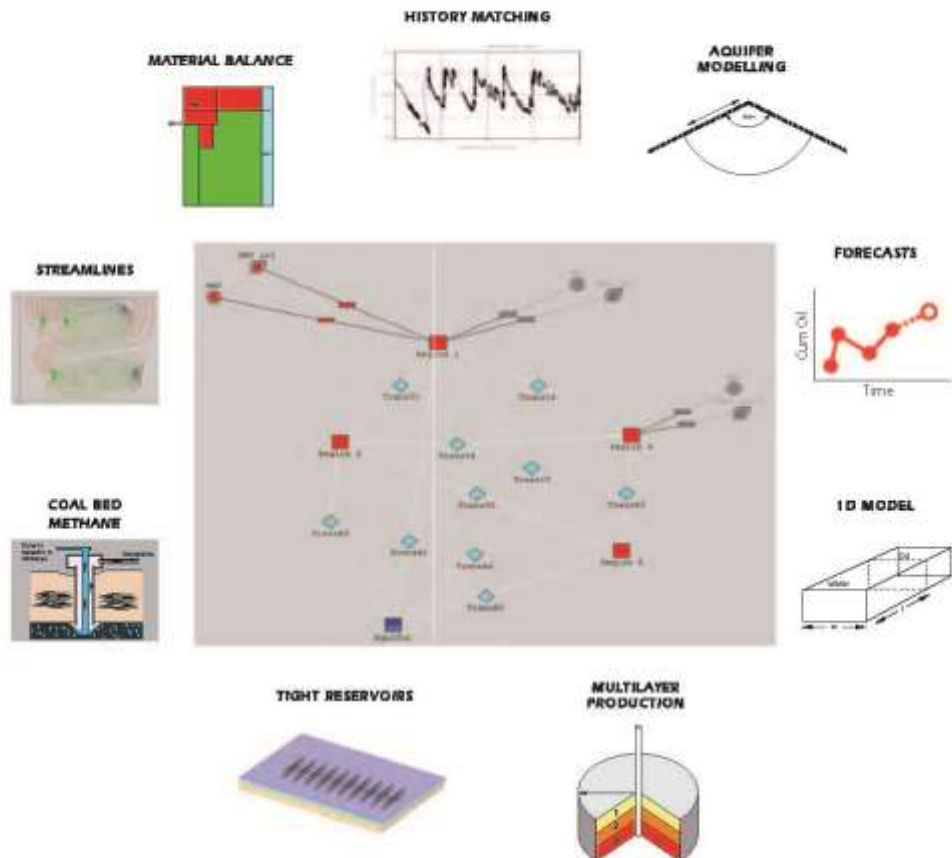
IPM SUITE



MBAL



ANALYTICAL RESERVOIR ENGINEERING TOOLKIT



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e-mail: edinburgh@petex.com

www.petroleumexperts.com

PETROLEUM ENGINEERING SOFTWARE
IPM SUITE



GAP



MULTIPHASE NETWORK MODELLING AND OPTIMISATION

INTEGRATED PRODUCTION AND INJECTION NETWORKS



EQUATIONS BASED SOLVER

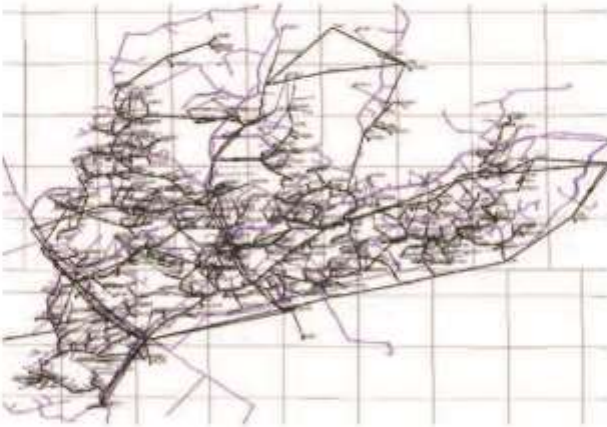
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NON-LINEAR OPTIMISATION



UNCONVENTIONALS





RULE BASED CONSTRAINTS



FLOW ASSURANCE



WELL PERFORMANCE



SURFACE EQUIPMENT MODELLING



ADVANCED PVT HANDLING



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e-mail: edinburgh@petex.com
www.petroleumexperts.com

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org