The Reservoir Engineering Aspects Of Waterflooding Spe Monograph Series Volume 3

Presents numerical methods for reservoir simulation, with efficient implementation and examples using widely-used online open-source code, for researchers, professionals and advanced students. This title is also available as Open Access on Cambridge Core.

Volume 1 of this book dealt with the techniques behind the acquisition, processing and interpretation of basic reservoir data. This second vol ume is devoted to the study, verification and prediction of reservoir behaviour, and methods of increasing productivity and oil recovery. I should like to bring a few points to the reader's attention. Firstly, the treatment of immiscible displacement by the method of characteristics. The advantage of this approach is that it brings into evidence the various physical aspects of the process, especially its dependence on the properties of the fluids concerned, and on the velocity of displacement. It was not until after the publication of the first, Italian, edition of this book (February 1990) that I discovered a similar treatment in the book Enhanced Oil Recovery, by Larry W. Lake, published in 1989. Another topic that I should like to bring to the reader's attention is the forecasting of reservoir behaviour by the method of identified models. This original contribution to reservoir engineering is based on systems theory - a science which should, in my opinion, find far wider applica tion, in view of the "black box" nature of reservoirs and their responses to production processes.

Many natural objects have been found to be fractal and fractal mathematics has been used to generate many beautiful ?nature? scenes. Fractal mathematics is used in image compression and for movies and is now becoming an engineering tool as well. This book describes the application of fractal mathematics to one engineering specialty ? reservoir engineering. This is the process of engineering the production of oil and gas. The reservoir engineer's job is to design and predict production from underground oil and gas reservoirs. The successful application of fractal mathematics to this engineering discipline should be of interest, not only to reservoir engineers, but to other engineers with their own potential applications as well. Geologists will find surprisingly good numerical descriptions of subsurface rock distributions. Physicists will be interested in the application of renormalization and percolation theory described in the book. Geophysicists will find the description of fluid flow scaling problems faced by the reservoir engineer similar to their problems of scaling the transport of acoustic signals.

Contents: 1. Introduction. 2. Production geology of fractured reservoirs. 3. Use of production data in fractured reservoirs. 4. Recovery mechanisms in fractured reservoirs. 5. Simulation of fractured reservoirs. 6. Application to the development and exploitation of fractured reservoirs. Appendices. Well logging in fractured reservoirs. Well performance and well tests in fractured reservoirs. Relationship between the fracture parameters. Compressibility of fractured reservoirs. Multiphase flow in fractured reservoirs. Mathematical simulation of fractured reservoirs. Bibliography. Index.

This revised edition of the bestselling Practice of Reservoir Engineering has been written for those in the oil industry requiring a working knowledge of how the complex subject of hydrocarbon reservoir engineering can be applied in the field in a practical manner. Containing additions and corrections to the first edition, the book is a simple statement of how to do the job and is particularly suitable for reservoir/production engineers as well as those associated with hydrocarbon recovery. This practical book approaches the basic limitations of reservoir engineering with the basic tenet of science: Occam's Razor, which applies to reservoir engineering to a greater extent than for most physical sciences - if there are two ways to account for a physical phenomenon, it is the simpler that is the more useful. Therefore, simplicity is the theme of this volume. Reservoir and production engineers, geoscientists, petrophysicists, and those involved in the management of oil and gas fields will want this edition.

The job of any reservoir engineer is to maximize production from a field to obtain the best economic return. To do this, the engineer must study the behavior and characteristics of a petroleum reservoir to determine the course of future development and production that will maximize the profit. Fluid flow, rock properties, water and gas coning, and relative permeability are only a few of the concepts that a reservoir engineer must understand to do the job right, and some of the tools of the trade are water influx calculations, lab tests of reservoir fluids, and oil and gas performance calculations.Two new chapters have been added to the first edition to make this book a complete resource for students and professionals in the petroleum industry: Principles of Waterflooding, Vapor-Liquid Phase Equilibria.

Effectively Apply Modern Fracturing Methods in Horizontal Wells Improve productivity and maximize natural gas extraction using the practical information contained in this comprehensive guide. Written by world-renowned experts, Fracturing Horizontal Wells features complete details on the latest fracking tools and technologies. Illustrations, tables, and real-world examples are found throughout. Discover how to handle site selection and testing, build accurate simulations, and efficiently extract energy from horizontal sources, including shale formations. Environmental standards, regulatory compliance, and safety protocols are also included. Fracturing Horizontal Wells covers: • Fracture Stimulation of Horizontal Wells • Transitioning from Vertical to Horizontal Wellbores • Reservoir Engineering Aspects of Horizontal Wells • Reservoir Engineering Aspects of Fractured Horizontal Wells • Fracturing Horizontal Wells: Rock Mechanics Overview • Drilling of Horizontal Wells • Proppant and Proppant Transport • Fracture Diagnostic Testing • Interval Isolation • Horizontal Completion Fracturing Methods and Techniques • Use of Well Logging Measurements and Analysis for Fracturing Design • Fracture Treatment Diagnostics • Environmental Stewardship

"This book is fast becoming the standard text in its field", wrote a reviewer in the Journal of Canadian Petroleum Technology soon after the first appearance of Dake's book. This prediction quickly came true: it has become the standard text and has been reprinted many times. The author's aim - to provide students and teachers with a coherent account of the basic physics of reservoir engineering - has been most successfully achieved. No prior knowledge of reservoir engineering is necessary. The material is dealt with in a concise, unified and applied manner, and only the simplest and most straightforward mathematical techniques are used. This low-priced paperback edition will continue to be an invaluable teaching aid for years to come.

The current state of development of the Tongonan and Puhagan geothermal fields in the Philippines is presented and the nature of the reservoirs is described. In the latter part of the paper, reservoir engineering techniques which have been found to be particularly valuable are discussed and some aspects which give rise to problems are identified.

This timely book explores the lessons learned in and potentials of injecting supercritical CO_2 into depleted oil and gas reservoirs, in order to maximize both hydrocarbon recovery and the

storage capacities of injected CO_2. The author provides a detailed discussion of key engineering parameters of simultaneous CO_2 enhanced oil recovery and CO_2 storage in depleted hydrocarbon reservoirs. These include candidate site selection, CO_2 oil miscibility, maximizing CO_2-storage capacity in enhanced oil recovery operations, well configurations, and cap and reservoir rock integrity. The book will help practicing professionals devise strategies to curb greenhouse gas emissions from the use of fossil fuels for energy production via geologic CO_2 storage, while developing CO_2 injection as an economically viable and environmentally sensible business model for hydrocarbon exploration and production in a low carbon economy. Geothermal Reservoir Engineering offers a comprehensive account of geothermal reservoir engineering and a guide to the state-of-the-art technology, with emphasis on practicality. Topics covered include well completion and warm-up, flow testing, and field monitoring and management. A case study of a geothermal well in New Zealand is also presented. Comprised of 10 chapters, this book opens with an overview of geothermal reservoirs and the development of geothermal reservoir engineering as a discipline. The following chapters focus on conceptual models of geothermal fields; simple models that illustrate some of the processes taking place in geothermal reservoirs under exploitation; measurements in a well from spudding-in up to first discharge; and flow measurement. The next chapter provides a case history of one well in the Broadlands Geothermal Field in New Zealand, with particular reference to its drilling, measurement, discharge, and data analysis/interpretation. The changes that have occurred in exploited geothermal fields are also reviewed. The final chapter considers three major problems of geothermal reservoir engineering: rapid entry of external cooler water, or return of reinjected water, in fractured reservoirs; the effects of exploitation on natural discharges; and subsidence. This monograph serves as both a text for students and a manual for working professionals in the field of geothermal reservoir engineering. It will also be of interest to engineers and scientists of other disciplines.

Chapter 1. Fundamentals of Well Testing -- Chapter 2. Decline and Type-Curves Analysis -- Chapter 3. Water Influx -- Chapter 4. Unconventional Gas Reservoirs -- Chapter 5. Performance of Oil Reservoirs -- Chapter 6. Predicting Oil Reservoir Performance -- Chapter 7. Fundamentals of Enhanced Oil Recovery -- Chapter 8. Economic Analysis -- Chapter 9. Analysis of Fixed Capital Investments -- Chapter 10. Advanced Evaluation Approaches -- Chapter 11. Professionalism and Ethics.

Formulas and Calculations for Petroleum Engineering unlocks the capability for any petroleum engineering individual, experienced or not, to solve problems and locate quick answers, eliminating non-productive time spent searching for that right calculation. Enhanced with lab data experiments, practice examples, and a complimentary online software toolbox, the book presents the most convenient and practical reference for all oil and gas phases of a given project. Covering the full spectrum, this reference gives single-point reference to all critical modules, including drilling, production, reservoir engineering, well testing, well logging, enhanced oil recovery, well completion, fracturing, fluid flow, and even petroleum economics. Presents single-point access to all petroleum engineering equations, including calculation of modules covering drilling, completion and fracturing Helps readers understand petroleum economics by including formulas on depreciation rate, cashflow analysis, and the optimum number of development wells

The first edition of The Reservoir Engineering Aspects of Waterflooding was published in 1970 and written by Forrest F. Craig, Jr. At the time of publication, much of the theory of oil displacement by water had been developed and many laboratory studies completed; however, the ability to perform computer modeling of 3D fluid flow in reservoirs with complex geologic depositions was in its infancy. In addition, several of the earliest, large-scale field applications of pattern waterflooding had begun, but long-term performance results were not yet known and various infill drilling programs had y.

Working Guide to Reservoir Engineering provides an introduction to the fundamental concepts of reservoir engineering. The book begins by discussing basic concepts such as types of reservoir fluids, the properties of fluid containing rocks, and the properties of rocks containing multiple fluids. It then describes formation evaluation methods, including coring and core analysis, drill stem tests, logging, and initial estimation of reserves. The book explains the enhanced oil recovery process, which includes methods such as chemical flooding, gas injection, thermal recovery, technical screening, and laboratory design for enhanced recovery. Also included is a discussion of fluid movement in waterflooded reservoirs. Predict local variations within the reservoir Explain past reservoir performance Predict future reservoir performance of field Analyze economic optimization of each property Formulate a plan for the development of the field throughout its life Convert data from one discipline to another Extrapolate data from a few discrete points to the entire reservoir

Well Test Analysis for Multilayered Reservoirs with Formation Crossflow introduces the fundamentals of well test analysis of a multilayered reservoir with formation crossflow. The effects of reservoir parameters on wellbore pressure and flow rate are examined, as is a proper method that has been established to analyze well test data that leads to better determinations on the reservoir parameters for each layer of the reservoir. Focusing on multilayer models for data analysis, this reference explains the reasons for the existence of single-phase crossflow in multilayer reservoirs, exploring methods to establish them and presenting practical applications to utilize and implement for today's more complex reservoirs. Aiding in better well testing operations and models, this book is a one-stop solution for today's reservoir and production engineer, helping them understand every layer of their reservoir. Includes real-world examples of well testing through multilayered reservoirs, whether with crossflow or with formation crossflow Provides strong guidance and criteria of research on reservoir dynamic performance, such as physical models and mathematical models Includes a new unsteady crossflow model for vertical interference testing in low-permeability zones Describes interpretation methods for different cases in multilayer reservoirs, including a new model called semipermeable walls for stratified reservoirs, drawdown test procedures and layer-by-layer test procedures that are useful for shales between layers

Once a natural gas or oil well is drilled, and it has been verified that commercially viable, it must be "completed" to allow for the flow of petroleum or natural gas out of the formation and up to the surface. This process includes: casing, pressure and temperature evaluation, and the proper instillation of equipment to ensure an efficient flow out of the well. In recent years, these processes have been greatly enhanced by new technologies. Advanced Well Completion Engineering summarizes and explains these advances while

providing expert advice for deploying these new breakthrough engineering systems. The book has two themes: one, the idea of preventing damage, and preventing formation from drilling into an oil formation to putting the well introduction stage; and two, the utilization of nodal system analysis method, which optimizes the pressure distribution from reservoir to well head, and plays the sensitivity analysis to design the tubing diameters first and then the production casing size, so as to achieve whole system optimization. With this book, drilling and production engineers should be able to improve operational efficiency by applying the latest state of the art technology in all facets of well completion during development drilling-completion and work over operations. One of the only books devoted to the key technologies for all major aspects of advanced well completion activities. Unique coverage of all aspects of well completion activities based on 25 years in the exploration, production and completion industry. Matchless in-depth technical advice for achieving operational excellence with advance solutions.

Real-world reservoirs are layered, heterogeneous and anisotropic, exposed to water and gas drives, faults, barriers and fractures. They are produced by systems of vertical, deviated, horizontal and multilateral wells whose locations, sizes, shapes and topologies are dictated "on the fly, at random"by petroleum engineers and drillers at well sites. Wells may be pressure or rate-constrained, with these roles re-assigned during simulation with older laterals shut-in, newer wells drilled and brought on stream, and so on. And all are subject to steady and transient production, each satisfying different physical and mathematical laws, making reservoir simulation an art difficult to master and introducing numerous barriers to entry. All of these important processes can now be simulated in any order using rapid, stable and accurate computational models developed over two decades. And what if it were further possible to sketch complicated geologies and lithologies, plus equally complex systems of general wells, layer-by-layer using Windows Notepad? And with no prior reservoir simulation experience and only passing exposure to reservoir engineering principles? Have the user press "Simulate," and literally, within minutes, produce complicated field-wide results, production forecasts, and detailed three-dimensional color pressure plots from integrated graphics algorithms? Developed over years of research, this possibility has become reality. The author, an M.I.T. trained scientist who has authored fifteen original research books, over a hundred papers and forty patents, winner of a prestigious British Petroleum Chairman's Innovation Award in reservoir engineering and a record five awards from the United States Department of Energy, has delivered just such a product, making real-time planning at the well-site simple and practical. Workflows developed from experience as a practicing reservoir engineer are incorporated into "intelligent menus" that make in-depth understanding of simulation principles and readings of user manuals unnecessary. This volume describes new technology for down-to-earth problems using numerous examples performed with our state-of-the-art simulator, one that is available separately at affordable cost and requiring only simple Intel Core i5 computers without specialized graphics boards. The new methods are rigorous, validated and well-documented and are now available for broad petroleum industry application.

Advanced Reservoir Engineering offers the practicing engineer and engineering student a full description, with worked examples, of all of the kinds of reservoir engineering topics that the engineer will use in day-to-day activities. In an industry where there is often a lack of information, this timely volume gives a comprehensive account of the physics of reservoir engineering, a thorough knowledge of which is essential in the petroleum industry for the efficient recovery of hydrocarbons. Chapter one deals exclusively with the theory and practice of transient flow analysis and offers a brief but thorough hands-on guide to gas and oil well testing. Chapter two documents water influx models and their practical applications in conducting comprehensive field studies, widely used throughout the industry. Later chapters include unconventional gas reservoirs and the classical adaptations of the material balance equation. * An essential tool for the petroleum and reservoir engineer, offering information not available anywhere else * Introduces the reader to cutting-edge new developments in Type-Curve Analysis, unconventional gas reservoirs, and gas hydrates * Written by two of the industry's best-known and respected reservoir engineers

The Practice of Reservoir Engineering has been written for those in the oil industry requiring a working knowledge of how the complex subject of hydrocarbon reservoir engineering can be applied in the field in a practical manner. The book is a simple statement of how to do the job and is particularly suitable for reservoir/production engineers and is illustrated with 27 examples and exercises based mainly on actual field developments. It will also be useful for those associated with the subject of hydrocarbon recovery. Geoscientists, petrophysicists and those involved in the management of oil and gas fields will also find it particularly relevant. The new http://www.elsevier.nl/locate/isbn/0444506705 Practice of Reservoir Engineering Revised Edition will be available soon.

Horizontal drilling and multi-stage hydraulic fracturing have made the commercial development of nano-darcy shale resources a success. The Shublik shale, a major source rock for hydrocarbon accumulations on the North Slope of Alaska, has huge potential for oil and gas production, with an estimated 463 million barrels of technically recoverable oil. This thesis presents a workflow for proper modeling of flow simulation in shale wells by incorporating results from hydraulic fracturing software into hydraulic fracture flow modeling. The proposed approach allows us to simulate fracture propagation and leak-off of fracturing fluid during hydraulic fracturing. This process honors the real proppant distribution, horizontal and vertical variable fracture conductivity, and presence of fracturing fluid in the fractures and surrounding matrix. Data from the Eagle Ford Shale in Texas was used for this modeling which is believed to be analogous to Alaska's Shublik shale. The performance of a single hydraulic fracture using a black oil model was simulated. Simulation results showed that for the hydraulically fractured zone, the oil recovery factor is 5.8% over thirty years of production, to an assumed economic rate of 200 STB/day. It was found that ignoring flowback overestimated oil recovery by about 17%. Assuming a constant permeability in the hydraulic fracture plane resulted in overestimation of oil

recovery by almost 25%. The conductivity of the unpropped zone affected the recovery factor predictions by as much as 10%. For the case investigated, about 25% of the fracturing fluid was recovered during the first 2 months of production; in total, 44% of it was recovered over thirty years. Permeability anisotropy was found to have a significant effect on the results. These results suggest that assuming a constant conductivity for the fractures and ignoring the presence of water in the fractures and the surrounding matrix leads to overestimation of initial production rates and final recovery factors. In addition, the modified workflow developed here more accurately and seamlessly integrates the modeled induced fracture characteristics in the reservoir simulation of shale resource plays.

This book is intended to be a reservoir engineering book for college students, but it is not the usual college textbook. It is a modern and very practical guide offering reservoir engineering fundamentals, advanced reservoir related topics, reservoir simulation fundamentals, and problems and case studies from around the world. It offers all this information with guidelines on how to assist these processes with the use of simulation software (software not included). It is designed to aid students and professionals alike in their active and important roles throughout the reservoir life cycle (discovery, delineation, development, production, and abandonment), and in the various phases of the reservoir management process (setting strategy, developing plan, implementing, monitoring, evaluating, and completing).

What makes this book so different and valuable to the engineer is the accompanying software, used by reservoir engineers all over the world every day. The new software, IFLO (replacing WINB4D, in previous editions), is a simulator that the engineer can easily install in a Windows operating environment. IFLO generates simulations of how the well can be tapped and feeds this to the engineer in dynamic 3D perspective. This completely new software is much more functional, with better graphics and more scenarios from which the engineer can generate simulations. BENEFIT TO THE READER: This book and software helps the reservoir engineer do his or her job on a daily basis, better, more economically, and more efficiently. Without simulations, the reservoir engineer would not be able to do his or her job at all, and the technology available in this product is far superior to most companies internal simulation software.-

Practical Reservoir Characterization expertly explains key technologies, concepts, methods, and terminology in a way that allows readers in varying roles to appreciate the resulting interpretations and contribute to building reservoir characterization models that improve resource definition and recovery even in the most complex depositional environments. It is the perfect reference for senior reservoir engineers who want to increase their awareness of the latest in best practices, but is also ideal for team members who need to better understand their role in the characterization process. The text focuses on only the most critical areas, including modeling the reservoir unit, predicting well behavior, understanding past reservoir performance, and forecasting future reservoir performance. The text begins with an overview of the methods required for analyzing, characterizing, and developing real reservoirs, then explains the different methodologies and the types and sources of data required to characterize, forecast, and simulate a reservoir. Thoroughly explains the data gathering methods required to characterize, forecast, and simulate a reservoir Provides the fundamental background required to analyze, characterize, and develop real reservoirs in the most complex depositional environments Presents a step-by-step approach for building a one, two, or three-dimensional representation of all reservoir types

When Fertl's first book, Abnormal Formation Pressures, was published by Elsevier in 1976, the topic was relatively new in book form. In the years that followed, his book became the standard work for petroleum engineers and drillers. The list of major petroleum provinces with abnormally high pore pressures has grown steadily over the years, and with it has grown our knowledge and experience. There have also been technological advances. A new book was required, but no longer could the topic be covered adequately by one person. The problems of abnormally high formation pressures encountered in the subsurface while drilling for petroleum are very diverse, involving geologists, geophysicists, reservoir engineers, drilling engineers, and borehole logging engineers. The acute anticipation of such pressures before drilling has become possible with modern technology. This book treats these developments and covers the following topics: world occurrences, the geology of abnormal pore pressures and the background theory, reservoir engineering aspects of abnormally pressured reservoirs, detection of abnormal pressures by geophysical methods before drilling and during drilling, and their evaluation after drilling. It examines the special problems of shallow hazards from shallow abnormal pressures, and relief-well engineering to control blowouts. It also examines the generation of abnormal pressures from hydrocarbon generation in the Rocky Mountains, and the distribution of abnormal pressures in south Louisiana, USA. The topics are examined from a practical point of view with a theoretical background. There is a glossary of terms, and a relevant practical conversion table. Both SI units and the conventional US oil industry units are used.

Reservoir Engineering focuses on the fundamental concepts related to the development of conventional and unconventional reservoirs and how these concepts are applied in the oil and gas industry to meet both economic and technical challenges. Written in easy to understand language, the book provides valuable information regarding present-day tools, techniques, and technologies and explains best practices on reservoir management and recovery approaches. Various reservoir workflow diagrams presented in the book provide a clear direction to meet the challenges of the profession. As most reservoir engineering decisions are based on reservoir simulation, a chapter is devoted to introduce the topic in lucid fashion. The addition of practical field case studies make Reservoir Engineering a valuable resource for reservoir engineers and other professionals in helping them implement a comprehensive plan to produce oil and gas based on reservoir modeling and economic analysis, execute a development plan, conduct reservoir surveillance on a continuous basis, evaluate reservoir performance, and apply corrective actions as necessary. Connects key reservoir fundamentals to modern engineering applications

Bridges the conventional methods to the unconventional, showing the differences between the two processes Offers field case studies and workflow diagrams to help the reservoir professional and student develop and sharpen management skills for both conventional and unconventional reservoirs

This book provides a clear and basic understanding of the concept of reservoir engineering to professionals and students in the oil and gas industry. The content contains detailed explanations of key theoretic and mathematical concepts and provides readers with the logical ability to approach the various challenges encountered in daily reservoir/field operations for effective reservoir management. Chapters are fully illustrated and contain numerous calculations involving the estimation of hydrocarbon volume in-place, current and abandonment reserves, aquifer models and properties for a particular reservoir/field, the type of energy in the system and evaluation of the strength of the aquifer if present. The book is written in oil field units with detailed solved examples and exercises to enhance practical application. It is useful as a professional reference and for students who are taking applied and advanced reservoir engineering courses in reservoir simulation, enhanced oil recovery and well test analysis.

Quantitative Methods in Reservoir Engineering, Second Edition, brings together the critical aspects of the industry to create more accurate models and better financial forecasts for oil and gas assets. Updated to cover more practical applications related to intelligent infill drilling, optimized well pattern arrangement, water flooding with modern wells, and multiphase flow, this new edition helps reservoir engineers better lay the mathematical foundations for analytical or semi-analytical methods in today's more difficult reservoir engineering applications. Authored by a worldwide expert on computational flow modeling, this reference integrates current mathematical methods to aid in understanding more complex well systems and ultimately guides the engineer to choose the most profitable well path. The book delivers a valuable tool that will keep reservoir engineers up-to-speed in this fast-paced sector of the oil and gas market. Stay competitive with new content on unconventional reservoir simulation Get updated with new material on formation testing and flow simulation for complex well systems and paths Apply methods derived from real-world case studies and calculation examples

Fundamentals of Applied Reservoir Engineering introduces early career reservoir engineers and those in other oil and gas disciplines to the fundamentals of reservoir engineering. Given that modern reservoir engineering is largely centered on numerical computer simulation and that reservoir engineers in the industry will likely spend much of their professional career building and running such simulators, the book aims to encourage the use of simulated models in an appropriate way and exercising good engineering judgment to start the process for any field by using all available methods, both modern simulators and simple numerical models, to gain an understanding of the basic 'dynamics' of the reservoir –namely what are the major factors that will determine its performance. With the valuable addition of questions and exercises, including online spreadsheets to utilize day-to-day application and bring together the basics of reservoir engineering, coupled with petroleum economics and appraisal and development optimization, Fundamentals of Applied Reservoir Engineering will be an invaluable reference to the industry professional who wishes to understand how reservoirs fundamentally work and to how a reservoir engineer starts the performance process. Covers reservoir appraisal, economics, development planning, and optimization to assist reservoir engineers in their decision-making. Provides appendices on enhanced oil recovery, gas well testing, basic fluid thermodynamics, and mathematical operators to enhance comprehension of the book's main topics. Offers online spreadsheets covering well test analysis, material balance, field aggregation and economic indicators to help today's engineer apply reservoir concepts to practical field data applications. Includes coverage on unconventional resources and heavy oil making it relevant for today's worldwide reservoir activity.

This book covers different aspects of gas injection, from the classic pressure maintenance operation to enhanced oil recovery (EOR), underground gas storage (UGS), and carbon capture and storage (CCS). The authors detail the unique characteristics and specific criteria of each application, including: material balance equations phase behaviour reservoir engineering well design operating aspects surface facilities environmental issues Examples, data, and simulation codes are provided to enable the reader to gain an in-depth understanding of these applications. Fundamentals and Practical Aspects of Gas Injection will be of use to practising engineers in the fields of reservoir engineering, and enhanced oil recovery. It will also be of interest to researchers, academics, and graduate students working in the field of petroleum engineering.

The cost-effective recovery of oil and gas depends on an understanding of both reservoir and petroleum engineering, yet these are, increasingly, becoming self-contained fields. Hydrocarbon Reservoir and Well Performance brings the two subjects together for the first time and, by explaining both fundamental concepts and actual practice, helps in understanding their interrelation.