

# Pressure Transient Analysis And Production Analysis For

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**Integrative Understanding of Shale Gas Reservoirs** - Kun Sang Lee 2016-02-03

This timely book begins with an overview of shale gas reservoir features such as natural fracture systems, multi-fractured horizontal wells, adsorption/desorption of methane, and non-linear flow within the reservoir. Geomechanical modelling, an aspect of importance in ultra-low permeability reservoirs, is also presented in detail. Taking these complex features of shale reservoirs into account, the authors develop a numerical model, which is verified with field data using the history matching technique. Based on this model, the pressure transient and production characteristics of a fractured horizontal well in a shale gas reservoir are analysed with respect to reservoir and fracture properties. Methods for the estimation of shale properties are also detailed. Minifrac tests, rate transient tests (RTA), and type curve matching are used to estimate the initial pressure, permeability, and fracture half-length. Lastly, future technologies such as the technique of injecting CO<sub>2</sub> into shale reservoirs are presented. The book will be of interest to industrial practitioners, as well as to academics and graduate students in the field of reservoir engineering.

**Modern Pressure Transient Analysis of Petroleum Reservoirs** - Tarek Al Arbi Omar Ganat 2023-06-03

This book covers well testing methods included the latest developments in the field. It explains classic topics in depth, in depth such as layered reservoirs, naturally fractured reservoirs, and wellbore effects, and also newer developments, such as well testing for horizontal wells. This book is perfect reference for junior and senior reservoir, production, and geology engineers, who want to improve their knowledge of well test analysis and current best practices. The book is a valuable addition to any reservoir and production engineer's library.

**Gas Well Testing Handbook** - Amanat Chaudhry 2003-08-07

"Gas Well Testing Handbook deals exclusively with the theory and practice of gas well testing, including pressure transient analysis technique, analytical methods required to interpret well behavior, evaluating reservoir quality, reservoir simulation, and production forecasts. A highly practical volume, this book is written for drilling engineers, well logging engineers, reservoir engineers, engineering students, geologists, and geophysicists."--BOOK JACKET

**Dynamic Well Testing in Petroleum Exploration and Development** - Huinong Zhuang 2020-05-12

Dynamic Well Testing in Petroleum Exploration and Development, Second Edition, describes the process of obtaining information about a reservoir through examining and analyzing the pressure-transient response caused by a change in production rate. The book provides the reader with modern petroleum exploration and well testing interpretation methods, including their basic theory and graph analysis. It emphasizes their applications to tested wells and reservoirs during the whole process of exploration and development under special geological and development conditions in oil and gas fields, taking reservoir research and performance analysis to a new level. This distinctive approach features extensive analysis and application of many pressure data plots acquired from well testing in China through advanced interpretation software that can be tailored to specific reservoir environments. Presents the latest research results of conventional and unconventional gas field dynamic well testing Focuses on advances in gas field dynamic well testing, including well testing

techniques, well test interpretation models and theoretical developments Includes more than 100 case studies and 250 illustrations—many in full color—that aid in the retention of key concepts

**Issues in Renewable Energy Technologies: 2011 Edition** - 2012-01-09

Issues in Renewable Energy Technologies / 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Renewable Energy Technologies. The editors have built Issues in Renewable Energy Technologies: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Renewable Energy Technologies in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Renewable Energy Technologies: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

**Proceedings of the International Field Exploration and Development Conference 2021** - Jia'en Lin 2022-09-07

This book focuses on reservoir surveillance and management, reservoir evaluation and dynamic description, reservoir production stimulation and EOR, ultra-tight reservoir, unconventional oil and gas resources technology, oil and gas well production testing, and geomechanics. This book is a compilation of selected papers from the 11th International Field Exploration and Development Conference (IFEDC 2021). The conference not only provides a platform to exchanges experience, but also promotes the development of scientific research in oil & gas exploration and production. The main audience for the work includes reservoir engineer, geological engineer, enterprise managers, senior engineers as well as professional students.

**Unconventional Reservoirs: Rate and Pressure Transient Analysis Techniques** - Amin Taghavinejad 2021-09-13

This book provides a succinct overview on the application of rate and pressure transient analysis in unconventional petroleum reservoirs. It begins by introducing unconventional reservoirs, including production challenges, and continues to explore the potential benefits of rate and pressure analysis methods. Rate transient analysis (RTA) and pressure transient analysis (PTA) are techniques for evaluating petroleum reservoir properties such as permeability, original hydrocarbon in-place, and hydrocarbon recovery using dynamic data. The brief introduces, describes and classifies both techniques, focusing on the application to shale and tight reservoirs. Authors have used illustrations, schematic views, and mathematical formulations and code programs to clearly explain application of RTA and PTA in complex petroleum systems. This brief is of an interest to academics, reservoir engineers and graduate students.

**Challenges in Modelling and Simulation of Shale Gas Reservoirs** - Jebraeel Gholinezhad 2017-12-27

This book addresses the problems involved in the modelling and simulation of shale gas reservoirs, and details recent advances in the field. It discusses various modelling and simulation challenges, such as the complexity of fracture networks,

adsorption phenomena, non-Darcy flow, and natural fracture networks, presenting the latest findings in these areas. It also discusses the difficulties of developing shale gas models, and compares analytical modelling and numerical simulations of shale gas reservoirs with those of conventional reservoirs. Offering a comprehensive review of the state-of-the-art in developing shale gas models and simulators in the upstream oil industry, it allows readers to gain a better understanding of these reservoirs and encourages more systematic research on efficient exploitation of shale gas plays. It is a valuable resource for researchers interested in the modelling of unconventional reservoirs and graduate students studying reservoir engineering. It is also of interest to practising reservoir and production engineers.

**Modern Well Test Analysis** - Roland N. Horne 1995

**Pressure Transient Formation and Well Testing** - Fikri J. Kuchuk 2010-08-04

This reference presents a comprehensive description of flow through porous media and solutions to pressure diffusion problems in homogenous, layered, and heterogeneous reservoirs. It covers the fundamentals of interpretation techniques for formation tester pressure gradients, and pretests, multiprobe and packer pressure transient tests, including derivative, convolution, and pressure-rate and pressure-pressure deconvolution. Emphasis is placed on the maximum likelihood method that enables one to estimate error variances in pressure data along with the unknown formation parameters. Serves as a training manual for geologists, petrophysicists, and reservoir engineers on formation and pressure transient testing Offers interpretation techniques for immediate application in the field Provides detailed coverage of pretests, multiprobe and packer pressure transient tests, including derivative, convolution, and pressure-rate and pressure-pressure deconvolution

Energy Research Abstracts - 1986

Semiannual, with semiannual and annual indexes. References to all scientific and technical literature coming from DOE, its laboratories, energy centers, and contractors. Includes all works deriving from DOE, other related government-sponsored information, and foreign nonnuclear information. Arranged under 39 categories, e.g., Biomedical sciences, basic studies; Biomedical sciences, applied studies; Health and safety; and Fusion energy. Entry gives bibliographical information and abstract. Corporate, author, subject, report number indexes.

Unconventional Hydrocarbon Resources - Reza Barati 2020-11-05

A comprehensive textbook presenting techniques for the analysis and characterization of shale plays Significant reserves of hydrocarbons cannot be extracted using conventional methods. Improvements in techniques such as horizontal drilling and hydraulic fracturing have increased access to unconventional hydrocarbon resources, ushering in the "shale boom" and disrupting the energy sector. Unconventional Hydrocarbon Resources: Techniques for Reservoir Engineering Analysis covers the geochemistry, petrophysics, geomechanics, and economics of unconventional shale oil plays. The text uses a step-by-step approach to demonstrate industry-standard workflows for calculating resource volume and optimizing the extraction process. Volume highlights include: Methods for rock and fluid characterization of unconventional shale plays A workflow for analyzing wells with stimulated reservoir volume regions An unconventional approach to understanding of fluid flow through porous media A comprehensive summary of discoveries of massive shale resources worldwide Data from Eagle Ford, Woodford, Wolfcamp, and The Bakken shale plays Examples, homework assignments, projects, and access to supplementary online resources Hands-on teaching materials for use in petroleum engineering software applications The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity. Its publications disseminate scientific knowledge and provide resources for researchers, students, and professionals.

**Standard Handbook of Petroleum and Natural Gas Engineering: Volume 2** - William C. Lyons 1996-10-16

Volume 2 presents the industry standards and practices for reservoir engineering and production engineering. It also looks at all aspects of petroleum economics and shows how to estimate oil

and gas reserves.

*Reservoir Formation Damage* - Faruk Civan 2015-09-20

*Reservoir Formation Damage*, Third Edition, provides the latest information on the economic problems that can occur during various phases of oil and gas recovery from subsurface reservoirs, including production, drilling, hydraulic fracturing, and workover operations. The text helps readers better understand the processes causing formation damage and the factors that can lead to reduced flow efficiency in near-wellbore formation during the various phases of oil and gas production. The third edition in the series provides the most all-encompassing volume to date, adding new material on conformance and water control, hydraulic fracturing, special procedures for unconventional reservoirs, field applications design, and cost assessment for damage control measures and strategies. Understand relevant formation damage processes by laboratory and field testing Develop theories and mathematical expressions for description of the fundamental mechanisms and processes Predict and simulate the consequences and scenarios of the various types of formation damage processes encountered in petroleum reservoirs Develop methodologies and optimal strategies for formation damage control and remediation

**Unconventional Reservoir Rate-Transient Analysis** - Clarkson C.R. 2021-06-15

Unconventional Reservoir Rate-Transient Analysis provides petroleum engineers and geoscientists with the first comprehensive review of rate-transient analysis (RTA) methods as applied to unconventional reservoirs. Volume One—Fundamentals, Analysis Methods, and Workflow is comprised of five chapters which address key concepts and analysis methods used in RTA. This volume overviews the fundamentals of RTA, as applied to low-permeability oil and gas reservoirs exhibiting simple reservoir and fluid characteristics. Volume Two—Application to Complex Reservoirs, Exploration and Development is comprised of four chapters that demonstrate how RTA can be applied to coalbed methane reservoirs, shale gas reservoirs, and low-permeability/shale reservoirs exhibiting complex behavior such as multiphase flow. Use of RTA to assist exploration and development programs in unconventional reservoirs is also demonstrated. This book will serve as a critical guide for students, academics, and industry professionals interested in applying RTA methods to unconventional reservoirs. Gain a comprehensive review of key concepts and analysis methods used in modern rate-transient analysis (RTA) as applied to low-permeability ("tight") oil and gas reservoirs Improve your RTA methods by providing reservoir/hydraulic fracture properties and hydrocarbon-in-place estimates for unconventional gas and light oil reservoirs exhibiting complex reservoir behaviors Understand the provision of a workflow for confident application of RTA to unconventional reservoirs

**Petroleum Production Engineering** - Boyun Guo, 2017-02-10

*Petroleum Production Engineering*, Second Edition, updates both the new and veteran engineer on how to employ day-to-day production fundamentals to solve real-world challenges with modern technology. Enhanced to include equations and references with today's more complex systems, such as working with horizontal wells, workovers, and an entire new section of chapters dedicated to flow assurance, this go-to reference remains the most all-inclusive source for answering all upstream and midstream production issues. Completely updated with five sections covering the entire production spectrum, including well productivity, equipment and facilities, well stimulation and workover, artificial lift methods, and flow assurance, this updated edition continues to deliver the most practical applied production techniques, answers, and methods for today's production engineer and manager. In addition, updated Excel spreadsheets that cover the most critical production equations from the book are included for download. Updated to cover today's critical production challenges, such as flow assurance, horizontal and multi-lateral wells, and workovers Guides users from theory to practical application with the help of over 50 online Excel spreadsheets that contain basic production equations, such as gas lift potential, multilateral gas well deliverability, and production forecasting Delivers an all-inclusive product with real-world answers for training or quick look up solutions for the entire

petroleum production spectrum

**Shared Earth Modeling** - John R. Fanchi, PhD 2002-08-25

Shared Earth Modeling introduces the reader to the processes and concepts needed to develop shared earth models. Shared earth modeling is a cutting-edge methodology that offers a synthesis of modeling paradigms to the geoscientist and petroleum engineer to increase reservoir output and profitability and decrease guesswork. Topics range from geology, petrophysics, and geophysics to reservoir engineering, reservoir simulation, and reservoir management. Shared Earth Modeling is a technique for combining the efforts of reservoir engineers, geophysicists, and petroleum geologists to create a simulation of a reservoir. Reservoir engineers, geophysicists, and petroleum geologists can create separate simulations of a reservoir that vary depending on the technology each scientist is using. Shared earth modeling allows these scientists to consolidate their findings and create an integrated simulation. This gives a more realistic picture of what the reservoir actually looks like, and thus can drastically cut the costs of drilling and time spent mapping the reservoir. First comprehensive publication about Shared Earth Modeling Details cutting edge methodology that provides integrated reservoir simulations

**A Well Performance Study of Eagle Ford Shale Gas Wells Integrating Empirical Time-Rate and Analytical Time-Rate-Pressure Analysis** - Avery Sutton Davis 2015

In this work, our purpose is to create a "performance-based reservoir characterization" using production data (measured rates and pressures) from a selected gas condensate region within the Eagle Ford Shale (S. Texas). We use modern time-rate ("decline curve") analysis and time-rate-pressure ("model-based") analysis methods to analyze/interpret/diagnose gas condensate well production data. We estimate reservoir and completion properties - specifically: formation permeability, fracture-face skin effect, fracture half-length, and fracture conductivity. We correlate these results with known completion variables - specifically: completed lateral length, total proppant, total water used, and type of hydraulic fracturing fluid. We use the time-rate and time-rate-pressure analyses to forecast future production and to estimate ultimate recovery. Finally, we apply pressure transient analysis methods to those cases where the production history contains shut-in periods of sufficient duration to provide resolution in the pressure build-up data to identify reservoir features and qualitatively validate completion effectiveness. It is noted that ONLY surface pressures are available for the wells considered in this study. We utilize industry-standard software to perform single well rate-time "decline curve" analyses. The traditional "modified-hyperbolic" time-rate model was used as the "basis" relation and the "power-law exponential" time-rate model was used as a check/validation (the power-law exponential model tends to be a more conservative relation for generating forecasts and estimating ultimate recovery). We also utilize industry-standard software to perform single well time-rate-pressure "model-based" analyses --- this methodology is also known as Rate Transient Analysis (RTA). In this work we used the full analytical model for the performance of a Multi-Fracture Horizontal Well (as opposed to a proxy or numerical model). We use Microsoft Excel and a commercial statistical software package to correlate the production analysis results with the measured completion parameters to create "design" relations for well completions - specifically correlations of estimated ultimate recovery with completion variables (completed lateral length, total proppant, total water used, and type of hydraulic fracturing fluid). Finally, we utilize industry-standard software to perform pressure transient analysis on the cases where the quality and relevance of the shut-in pressure data warranted such analyses. In this work, we "cross-validate" the estimated ultimate recovery results by comparison of the time-rate and time-rate-pressure analysis results. The correlation of EUR with completion variables, we propose, is shown to be statistically relevant for almost all combinations of variables, and the correlation relation should be applicable for creating completion designs. The analysis of surface-derived pressure transient data is successfully demonstrated for several cases taken from the gas condensate region of the Eagle Ford Shale (S. Texas). The work we perform in this thesis clearly demonstrates the validity of using empirical

(time-rate) and analytical (time-rate-pressure) analysis methods for the purpose of characterizing well performance for wells in the gas condensate region of the Eagle Ford Shale (S. Texas). The electronic version of this dissertation is accessible from <http://hdl.handle.net/1969.1/155432>

**Fundamental And Applied Pressure Analysis** - Daltaban Tayyar Sezgin 1998-08-08

The analysis of well tests constitutes one of the most powerful tools for the effective description of a petroleum reservoir and its subsequent management. This requires that the well test be placed in the proper context of related disciplines, especially geoscience, production and reservoir engineering. Modern methods of automated data processing can conceal mathematical limitations and overlook the need for realistic physical and geologic models. This book emphasizes the plausible physical contexts and mathematical models and limitations, and also the importance of realistic geologic models in analysis. Although the book is clearly targeted at petroleum engineers, the approach taken by the authors will no doubt find favour with practitioners in other areas of fluid flow in porous media, such as hydrology and the flow of pollutants. Scattered throughout the book are worked examples of the use of the methods described in the text. It also contains extensive appendices on permeability, application of Laplace transforms to flow equations valid for single and multi-layered systems, convolution and deconvolution, dimensionless parameters and P-theorems, and physical and thermodynamic properties of gases. This book should appeal to students as well as practitioners in industry; many in the latter group may have benefited before from formal exposure to the underlying theory and its limitations in real reservoir environments.

**Advanced Production Decline Analysis and Application** - Hedong Sun 2015-02-12

In recent years, production decline-curve analysis has become the most widely used tool in the industry for oil and gas reservoir production analysis. However, most curve analysis is done by computer today, promoting a "black-box" approach to engineering and leaving engineers with little background in the fundamentals of decline analysis. Advanced Production Decline Analysis and Application starts from the basic concept of advanced production decline analysis, and thoroughly discusses several decline methods, such as Arps, Fetkovich, Blasingame, Agarwal-Gardner, NPI, transient, long linear flow, and FMB. A practical systematic introduction to each method helps the reservoir engineer understand the physical and mathematical models, solve the type curves and match up analysis, analyze the processes and examples, and reconstruct all the examples by hand, giving way to master the fundamentals behind the software. An appendix explains the nomenclature and major equations, and as an added bonus, online computer programs are available for download. Understand the most comprehensive and current list of decline methods, including Arps, Fetkovich, Blasingame, and Agarwal-Gardner Gain expert knowledge with principles, processes, real-world cases and field examples Includes online downloadable computer programs on Blasingame decline type curves and normalized pseudo-pressure of gas wells

**Well Test Analysis for Wells Produced at a Constant Pressure** - Christine Anna Ehlig-Economides 1979

**Formation Testing** - Wilson Chin 2014-03-17

The only book available for the reservoir or petroleum engineer covering formation testing—with algorithms for wireline and LWD reservoir analysis developed for transient pressure, contamination modeling, permeability, and pore pressure prediction. Traditional well logging methods, such as resistivity, acoustic, nuclear, and NMR, provide indirect information relating to fluid and formation properties. However, the "formation tester" offered in wireline and MWD/LWD operations is different. It collects actual downhole fluid samples for surface analysis, and through pressure transient analysis, provides direct measurements for pore pressure, mobility, permeability, and anisotropy. These are vital to real-time drilling safety, geosteering, hydraulic fracturing, and economic analysis. Methods for formation testing analysis, while commercially important and accounting for a substantial part of service company profits, are shrouded in secrecy. Many are poorly

constructed, and because details are not available, industry researchers are not able to improve on them. Formation Testing explains conventional models and develops new, more powerful algorithms for early-time analysis. More importantly, it addresses a critical area in sampling related to "time required to pump clean samples," using rigorous multiphase flow techniques. All of the methods are explained in complete detail. Equations are offered for users to incorporate in their own models, but, for those needing immediate answers, convenient, easy-to-use software is available. The lead author is a well-known petrophysicist with hands-on experience at Schlumberger, Halliburton, BP Exploration, and other companies. His work is used commercially at major oil service companies, and important extensions to his formation testing models have been supported by prestigious grants from the U.S. Department of Energy. His latest collaboration with China National Offshore Oil Corporation marks an important turning point, where advanced simulation models and hardware are evolving side-by-side, defining a new generation of formation testing logging instruments. Providing more than formulations and solutions, this book offers a close look at "behind the scenes" formation tester development, as the China National Offshore Oil Corporation opens up its research, engineering, and manufacturing facilities through a collection of never-before-seen photographs, showing how formation testing tools are developed from start to finish.

Fossil Energy Update - 1977

**Proceedings** - 1976

"Rapporteurs' summaries": pages [xxx]-cxxxii.

Numerical Simulation of Pressure Transient Analysis in Tight Formation and Field Data Categorization and Typical Well Production Data Analysis - Yue Zhu 2015

*1987 Annual Report* - 1988

Sustainable Natural Gas Reservoir and Production Engineering - David A. Wood 2021-10-30

Sustainable Natural Gas Reservoir and Production Engineering, the latest release in The Fundamentals and Sustainable Advances in Natural Gas Science and Engineering series, delivers many of the scientific fundamentals needed in the natural gas industry, including improving gas recovery, simulation processes for fracturing methods, and methods for optimizing production strategies. Advanced research covered includes machine learning applications, gas fracturing mechanics aimed at reducing environmental impact, and enhanced oil recovery technologies aimed at capturing carbon dioxide. Supported by corporate and academic contributors along with two well-distinguished editors, this book provides today's natural gas engineers the fundamentals and advances in a convenient resource. Helps readers advance from basic equations used in conventional gas reservoirs. Presents structured case studies to illustrate how new principles can be applied in practical situations. Covers advanced topics, including machine learning applications to optimize predictions, controls and improve knowledge-based applications. Helps accelerate emission reductions by teaching gas fracturing mechanics with an aim of reducing environmental impacts and developing enhanced oil recovery technologies that capture carbon dioxide.

**Well Test Analysis for Fractured Reservoir Evaluation** - G. Da Prat 1990-11-19

The main purpose of this book is to provide the reader with a basic understanding of the behaviour of fractured reservoirs, using evaluation techniques based on processing pressure and flow-rate data resulting from production testing. It covers the fundamental reservoir engineering principles involved in the analysis of fluid flow through fractured reservoirs, the application of existing models to field cases, and the evaluation and description of reservoirs, based on processed data from pressure and production tests. The author also discusses production decline analysis, the understanding of which is a key factor influencing completion or abandonment of a well or even a field. The theoretical concepts are presented as clearly and simply as possible in order to aid comprehension. The book is thus suitable for training and educational purposes, and will help the reader

who is unfamiliar with the subject acquire the necessary skills for successful interpretation and analysis of field data. One of the most important features of the book is that it fills the gap between field operations and research, in regard to proper management of reservoirs. The book also contains a computer program (FORTRAN language) which can be incorporated in existing software designed for reservoir evaluation; type curves generation, test design and interpretation, can be achieved by using this program. Petroleum engineers, reservoir engineers, petroleum geologists, research engineers and students in these fields, will be interested in this book as a reference source. It can also be used as a text book for training production and reservoir engineering professionals. It should be available in university and oil company libraries.

**Dynamic Description Technology of Fractured Vuggy Carbonate Gas Reservoirs** - Hedong Sun 2019-04-12

Dynamic Description Technology of Fractured Vuggy Carbonate Gas Reservoirs delivers a critical reference to reservoir and production engineers on the basic characteristics of fractured vuggy gas reservoirs, combining both static and dynamic data to improve reservoir characterization accuracy and development. Based on the full lifecycle of well testing and advanced production decline analysis, this reference also details how to apply reservoir dynamic evaluation and reserve estimation and performance forecasting. Offering one collective location for the latest research on fractured gas reservoirs, this reference also covers physical models, analysis examples, and processes, 3D numerical well test technology, and deconvolution technology of production decline analysis. Packed with many calculation examples and more than 100 case studies, this book gives engineers a strong tool to further exploit these complex assets. Presents advanced knowledge in well test and production decline analysis, along with performance forecasting that is specific to fractured vuggy carbonate gas reservoirs. Helps readers understand the characteristics, advantages, disadvantages and current limitations in technology of fractured vuggy carbonate gas reservoirs. Provides a bridge from theory to practice by combining static and dynamic data to form more accurate real-world analysis and modeling.

*Pressure Transient Analysis and Production Analysis for New Albany Shale Gas Wells* - Bo Song 2010

Shale gas has become increasingly important to United States energy supply. During recent decades, the mechanisms of shale gas storage and transport were gradually recognized. Gas desorption was also realized and quantitatively described. Models and approaches special for estimating rate decline and recovery of shale gas wells were developed. As the strategy of the horizontal well with multiple transverse fractures (MTFHW) was discovered and its significance to economic shale gas production was understood, rate decline and pressure transient analysis models for this type of well were developed to reveal the well behavior. In this thesis, we considered a  $\sigma$ Triple-porosity/Dual-permeability $\sigma$ + model and performed sensitivity studies to understand long term pressure drawdown behavior of MTFHWs. A key observation from this study is that the early linear flow regime before interfracture interference gives a relationship between summed fracture half-length and permeability, from which we can estimate either when the other is known. We studied the impact of gas desorption on the time when the pressure perturbation caused by production from adjacent transference fractures (fracture interference time) and programmed an empirical method to calculate a time shift that can be used to qualify the gas desorption impact on long term production behavior. We focused on the field case Well A in New Albany Shale. We estimated the EUR for 33 wells, including Well A, using an existing analysis approach. We applied a unified BU-RNP method to process the one-year production/pressure transient data and performed PTA to the resulting virtual constant-rate pressure drawdown. Production analysis was performed meanwhile. Diagnosis plots for PTA and RNP analysis revealed that only the early linear flow regime was visible in the data, and permeability was estimated both from a model match and from the relationship between fracture half-length and permeability. Considering gas desorption, the fracture interference will occur only after several centuries. Based on this

result, we recommend a well design strategy to increase the gas recovery factor by decreasing the fracture spacing. The higher EUR of Well A compared to the vertical wells encourages drilling more MTFHWs in New Albany Shale.

*Shale Oil and Shale Gas Resources* - José A. Torres 2020-05-23

This multidisciplinary book covers a wide range of topics addressing critical challenges for advancing the understanding and management of shale oil and shale gas resources. Both fundamental and practical issues are considered. By covering a variety of technical topics, we aim to contribute to building a more integrated perspective to meet major challenges faced by shale resources. Combining complementary techniques and examining multiple sources of data serve to advance our current knowledge about these unconventional reservoirs. The book is a result of interdisciplinary and collaborative work. The content includes contributions authored by active scientists with ample expertise in their fields. Each article was carefully peer-reviewed by researchers, and the editorial process was performed by an experienced team of Senior Editors, Guest Editors, Topic Editors, and Editorial Board Members. The first part is devoted to fundamental topics, mostly investigated on the laboratory scale. The second part elaborates on larger scales (at near-wellbore and field scales). Finally, two related technologies, which could be relevant for shale plays applications, are presented. With this Special Issue, we provide a channel for sharing information and lessons learned collected from different plays and from different disciplines.

*Well Test Analysis* - Dominique Bourdet 2002-08-21

This book on well test analysis, and the use of advanced interpretation models is volume 3 in the series Handbook of Petroleum Exploration and Production. The chapters in the book are: Principles of Transient Testing, Analysis Methods, Wellbore Conditions, Effect of Reservoir Heterogeneities on Well Responses, Effect of Reservoir Boundaries on Well Responses, Multiple Well Testing, Application to Gas Reservoirs, Application to Multiphase Reservoirs, Special Tests, Practical Aspects of Well Test Interpretation.

**Unconventional Oil and Gas Resources** - Usman Ahmed 2016-04-05

As the shale revolution continues in North America, unconventional resource markets are emerging on every continent. In the next eight to ten years, more than 100,000 wells and one- to two-million hydraulic fracturing stages could be executed, resulting in close to one trillion dollars in industry spending. This growth has prompted professionals experienced in conventional oil and gas exploitation and development to acquire practical knowledge of the unconventional realm. *Unconventional Oil and Gas Resources: Exploitation and Development* provides a comprehensive understanding of the latest advances in the exploitation and development of unconventional resources. With an emphasis on shale, this book: Addresses all aspects of the exploitation and development process, from data mining and accounting to drilling, completion, stimulation, production, and environmental issues Offers in-depth coverage of sub-surface measurements (geological, geophysical, petrophysical, geochemical, and geomechanical) and their interpretation Discusses the use of microseismic, fiber optic, and tracer reservoir monitoring technologies and JewelSuite™ reservoir modeling software Presents the viewpoints of internationally respected experts and researchers from leading exploration and production (E&P) companies and academic institutions Explores future trends in reservoir technologies for unconventional resources development *Unconventional Oil and Gas Resources: Exploitation and Development* aids geologists, geophysicists, petrophysicists, geomechanic specialists, and drilling, completion, stimulation, production, and reservoir engineers in the environmentally safe exploitation and development of unconventional resources like shale.

**Standard Handbook of Petroleum and Natural Gas Engineering** - William Lyons 2015-12-08

*Standard Handbook of Petroleum and Natural Gas Engineering, Third Edition*, provides you with the best, state-of-the-art coverage for every aspect of petroleum and natural gas engineering. With thousands of illustrations and 1,600 information-packed pages, this handbook is a handy and valuable

reference. Written by dozens of leading industry experts and academics, the book provides the best, most comprehensive source of petroleum engineering information available. Now in an easy-to-use single volume format, this classic is one of the true "must haves" in any petroleum or natural gas engineer's library. A classic for over 65 years, this book is the most comprehensive source for the newest developments, advances, and procedures in the oil and gas industry. New to this edition are materials covering everything from drilling and production to the economics of the oil patch. Updated sections include: underbalanced drilling; integrated reservoir management; and environmental health and safety. The sections on natural gas have been updated with new sections on natural gas liquefaction processing, natural gas distribution, and transport. Additionally there are updated and new sections on offshore equipment and operations, subsea connection systems, production control systems, and subsea control systems. *Standard Handbook of Petroleum and Natural Gas Engineering, Third Edition*, is a one-stop training tool for any new petroleum engineer or veteran looking for a daily practical reference. Presents new and updated sections in drilling and production Covers all calculations, tables, and equations for every day petroleum engineers Features new sections on today's unconventional resources and reservoirs *Applied Well Test Interpretation* - John Paul Spivey 2013 Well test interpretation, which is the process of obtaining information about a reservoir by analyzing the pressure transient response caused by a change in production rate, plays a very important part in making overall reservoir-management decisions. From the authors of *Pressure Transient Testing and Well Testing*, Spivey and Lee introduce the readers of *Applied Well Test Interpretation* to the fundamentals of this critical piece of decision-making by focusing on the most basic well testing scenario; a single-well test on a well producing a single-phase fluid, from a single-layer, homogeneous re.

**Pressure Transient Testing** - John Lee 2003

*Pressure Transient Testing* presents the fundamentals of pressure-transient test analysis and design in clear, simple language and explains the theoretical bases of commercial well-test-analysis software. Test-analysis techniques are illustrated with complete and clearly written examples. Additional exercises for classroom or individual practice are provided. With its focus on physical processes and mathematical interpretation, this book appeals to all levels of engineers who want to understand how modern approaches work. Pressure transient test analysis is a mature technology in petroleum engineering; even so, it continues to evolve. Because of the developments in this technology since the last SPE textbook devoted to transient testing was published, we concluded that students could benefit from a textbook approach to the subject that includes a representative sampling of the more important fundamentals and applications. We deliberately distinguish between a textbook approach, which stresses understanding through numerous examples and exercises dealing with selected fundamentals and applications, and a monograph approach, which attempts to summarize the state-of-the-art in the technology. Computational methods that transient test analysts use have gone through a revolution since most existing texts on the subject were written. Most calculations are now done with commercial software or by spreadsheets or proprietary software developed by users to meet personal needs and objectives. These advances in software have greatly increased productivity in this technology, but they also have contributed to a "black box" approach to test analysis. In this text, we attempt to explain what's in the box, and we do not include a number of the modern tools that enhance individual engineer productivity. We hope, instead, to provide understanding so that the student can use the commercial software with greater appreciation and so that the student can read monographs and papers on transient testing with greater appreciation for the context of the subject. Accordingly, this text is but an introduction to the vast field of pressure transient test analysis.

*Geothermal Well Test Analysis* - Sadiq J. Zarrouk 2019-04-30

*Geothermal Well Test Analysis: Fundamentals, Applications and Advanced Techniques* provides a comprehensive review of the geothermal pressure transient analysis methodology and its

similarities and differences with petroleum and groundwater well test analysis. Also discussed are the different tests undertaken in geothermal wells during completion testing, output/production testing, and the interpretation of data. In addition, the book focuses on pressure transient analysis by numerical simulation and inverse methods, also covering the familiar pressure derivative plot. Finally, non-standard geothermal pressure transient behaviors are analyzed and interpreted by numerical techniques for cases beyond the limit of existing analytical techniques. Provides a guide on the analysis of well test data in geothermal wells, including pressure transient analysis, completion testing and output testing Presents practical information on how to avoid common issues with data collection in geothermal wells Uses SI units, converting existing equations and models found in literature to this unit system instead of oilfield units

Improving Long-term Production Data Analysis Using Analogs to Pressure Transient Analysis Techniques - Damola Sulaiman Okunola 2010

In practice today, pressure transient analysis (PTA) and production data analysis (PDA) are done separately and differently by different interpreters in different companies using different analysis techniques, different interpreter-dependent inputs, on pressure and production rate data from the same well, with different software packages. This has led to different analyses outputs and characterizations of the same reservoir. To avoid inconsistent results from different interpretations, this study presents a new way to integrate PTA and PDA on a single diagnostic plot to account for and see the early time and mid-time responses (from the transient tests) and late time (boundary affected/PSS) responses achievable with production analysis, on the same plot; thereby unifying short and long-term analyses and improving the reservoir characterization. The rate normalized

pressure (RNP) technique was combined with conventional pressure buildup PTA technique. Data processing algorithms were formulated to improve plot presentation and a stepwise analysis procedure is presented to apply the new technique. The new technique is simple to use and the same conventional interpretation techniques as PTA apply. We have applied the technique to a simulated well case and two field cases. Finally, this new technique represents improvements over previous PDA methods and can help give a long term dynamic description of the well's drainage area.

#### **Novel, Integrated and Revolutionary Well Test**

**Interpretation and Analysis** - Freddy Escobar 2019-01-30

The TDS technique is a practical, easy, and powerful tool for well test interpretation. It uses characteristic features and points found on the pressure derivative versus time plot, so that reservoir parameters can be easily calculated by using several analytic expressions. Most calculations can be verified more than once and applied to systems where the conventional straight-line method has no applications. This book deals with well tests run in elongated systems, partially completed/penetrated wells, multirate tests, hydraulically fractured wells, interference tests, and naturally fractured reservoirs. This technique is used in all commercial well-testing software. Its use is the panacea for well test interpretation and can also be extended to rate-transient analysis, although not shown here.

**Gas Engineering** - James G. Speight 2021-09-20

Volume 1 deals with the origins of process gases and describes recovery, properties and composition. It covers as well the shale gas, the production from hydrocarbon rich deep shale formations, being one of the most quickly expanding trends in onshore domestic gas exploration. Vol. 2: Composition and Processing of Gas Streams. Vol. 3: Uses of Gas and Effects.