

# Unconventional Oil And Gas Resources Handbook Evaluation And Development

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<i>Unconventional Oil And Gas Resources Handbook Evaluation And Development</i>	<i>2023-12-13</i>
<b>WESTON GILLIAN</b>	
<u>Shale Gas and Tight Oil</u> University of Pittsburgh Press The Fossil Fuel Revolution: Shale Gas and Tight Oil describes the remarkable new energy resources being obtained from shale gas and tight oil through a combination of directional drilling and staged hydraulic fracturing, opening up substantial new energy reserves for the 21st Century. The book includes the history of shale gas development, the technology used to economically recover hydrocarbons, and descriptions of the ten primary shale gas resources of the United States. International shale resources, environmental concerns, and policy issues are also addressed. This book is intended as a reference on shale gas and tight oil for industry members, undergraduate and graduate students, engineers and geoscientists. Provides a cross-cutting view of shale gas and tight oil in the context of geology, petroleum engineering, and the practical aspects of production Includes a comprehensive description of productive and prospective shales in one book, allowing readers to compare and contrast production from different shale plays Addresses environmental and policy issues and compares alternative energy resources in terms of economics and sustainability Features an extensive resource list of peer-reviewed references, websites, and journals provided at the end of each chapter <i>Global Impact of Unconventional Energy Resources</i> BoD – Books on Demand New applications of horizontal drilling techniques and hydraulic fracturing, in which water, sand, and chemical additives are injected under high pressure to create and maintain fractures in underground formations, allow oil and natural gas from shale formations to be developed. As exploration and development of shale oil and gas have increased, including in areas of the country without a history of oil and natural gas development, questions have been raised about the estimates of the size of these resources, as well as the processes used to extract them. This book examines the environmental and public health requirements, risks, and size of shale resources of unconventional oil and gas development. <i>Shale Oil and Gas Handbook</i> John Wiley & Sons <i>Shale Oil and Gas Handbook: Theory, Technologies, and Challenges</i> provides users with information on how shale oil and gas exploration has revolutionized today’s energy industry. As activity has boomed and job growth continues to increase, training in this area for new and experienced engineers is essential. This book provides comprehensive information on both the engineering design and research aspects of this emerging industry. Covering the full spectrum of basic definitions, characteristics, drilling techniques, and processing and extraction technologies, the book is a great starting point to educate oil and gas personnel on today’s shale industry. Critical topics covered include characterization of shale gas, theory and methods, typical costs, and obstacles for exploration and drilling, R&D and technology development in shale production, EOR methods in shale oil reservoirs, and the current status and impending challenges for shale oil and gas, including the inevitable future prospects relating to worldwide development. Reveals all the basic information needed to quickly understand today’s shale oil and gas industry, including advantages and disadvantages, equipment and costs, flow diagrams, and processing stages Evenly distributes coverage between oil and gas into two parts, as well as upstream and downstream content Provides a practical handbook with real-world case studies and problem examples, including formulas and calculations <i>Environmental and Public Health Requirements, Risks and Size of Shale Resources</i> National Academies Press Unconventional Oil and Gas Resources HandbookEvaluation and DevelopmentGulf Professional Publishing <u>Deep Shale Oil and Gas</u> Springer Nature	

"An excellent objective explanation of the history, science, technology, politics, environmental concerns, and economics of the shale gas boom. The author clearly has great practical experience of the science and technology of shale gas development and shows a deep understanding of the environmental and economic issues." --Andrew Stone, Executive Director, American Ground Water Trust  
New technology has opened vast reserves of "unconventional" natural gas and oil from shales like the Marcellus in the Appalachian Basin, making the United States essentially energy independent for the first time in decades. Shale gas had its origins in the oil embargos and energy crises of the 1970s, which led to government research to increase domestic energy supplies. The first large-scale shale gas production was successful on the Barnett Shale in Texas in the late 1990s, followed a few years later by the Marcellus Shale in Pennsylvania. Shale gas has changed thinking about fossil energy supplies worldwide, but the development of these resources has been controversial. Activists have made claims that hydraulic fracturing may contribute to climate change, threaten groundwater resources, and pose risks to terrestrial and aquatic ecosystems, and human health. This volume explores the geology, history, technology, and potential environmental impacts of Marcellus Shale gas resources.

## **An Overview of Unconventional Oil and Natural Gas** CreateSpace

In this report, RAND researchers assess the potential future production levels, production costs, greenhouse gases, and other environmental implications of synthetic crude oil from oil sands and fuels produced via coal liquefaction relative to conventional petroleum-based transportation fuels. The findings indicate the potential cost-competitiveness of these alternative fuels and potential economic-environmental trade-offs from their deployment.

## **Evaluation and Development** AAPG

This book addresses the need for deeper understanding of regulatory and policy regimes around the world in relation to the use of water for the production of ‘unconventional’ hydrocarbons, including shale gas, coal bed methane and tight oil, through hydraulic fracturing. Legal, policy, political and regulatory issues surrounding the use of water for hydraulic fracturing are present at every stage of operations. Operators and regulators must understand the legal, political and hydrological contexts of their surroundings, procure water for use in the fracturing and extraction processes, gain community cooperation or confront social resistance around water, collect flow back and produced water, and dispose of these wastewaters safely. By analysing and comparing different approaches to these issues from around the globe, this volume gleans insights into how policy, best practices and regulation may be developed to advance the interests of all stakeholders. While it is not always possible to easily transfer ‘good practice’ from one place to another, there is value in examining and understanding the components of different legal and regulatory regimes, as these may assist in the development of better regulatory law and policy for the rapidly growing unconventional energy sector. The book takes an interdisciplinary approach and includes chapters looking at water-energy nexus security in general, along with issue-focused and geographically-focused case studies written by scholars from around the world. Chapter topics, organized in conjunction with the stage of the shale gas production process upon which they touch, include the implications of hydraulic fracturing for agriculture, municipalities, and other stakeholders competing for water supplies; public opinion regarding use of water for hydraulic fracturing; potential conflicts between hydraulic fracturing and water as a human right; prevention of induced seismic activity, and the disposal or recycling of produced water. Several chapters also discuss implications of unconventional energy production for indigenous communities, particularly as regards sustainable water management. This volume will be of interest to scholars and students of energy and water, regulators and policymakers and operators interested in ensuring that they align with emergent best global practice.

## **The Fossil Fuel Revolution** Gulf Professional Publishing

Unconventional Oil and Gas Resources Handbook: Evaluation and Development is a must-have, helpful handbook that brings a wealth of information to engineers and geoscientists. Bridging

between subsurface and production, the handbook provides engineers and geoscientists with effective methodology to better define resources and reservoirs. Better reservoir knowledge and innovative technologies are making unconventional resources economically possible, and multidisciplinary approaches in evaluating these resources are critical to successful development. Unconventional Oil and Gas Resources Handbook takes this approach, covering a wide range of topics for developing these resources including exploration, evaluation, drilling, completion, and production. Topics include theory, methodology, and case histories and will help to improve the understanding,integrated evaluation, and effective development of unconventional resources. Presents methods for a full development cycle of unconventional resources, from exploration through production Explores multidisciplinary integrations for evaluation and development of unconventional resources and covers a broad range of reservoir characterization methods and development scenarios Delivers balanced information with multiple contributors from both academia and industry Provides case histories involving geological analysis, geomechanical analysis, reservoir modeling, hydraulic fracturing treatment, microseismic monitoring, well performance and refracturing for development of unconventional reservoirs  
Unconventional Oil and Gas Development Geological Society of America  
Unconventional Oil and Gas Resources Handbook: Evaluation and Development is a must-have, helpful handbook that brings a wealth of information to engineers and geoscientists. Bridging between subsurface and production, the handbook provides engineers and geoscientists with effective methodology to better define resources and reservoirs. Better reservoir knowledge and innovative technologies are making unconventional resources economically possible, and multidisciplinary approaches in evaluating these resources are critical to successful development. Unconventional Oil and Gas Resources Handbook takes this approach, covering a wide range of topics for developing these resources including exploration, evaluation, drilling, completion, and production. Topics include theory, methodology, and case histories and will help to improve the understanding,integrated evaluation, and effective development of unconventional resources. Presents methods for a full development cycle of unconventional resources, from exploration through production Explores multidisciplinary integrations for evaluation and development of unconventional resources and covers a broad range of reservoir characterization methods and development scenarios Delivers balanced information with multiple contributors from both academia and industry Provides case histories involving geological analysis, geomechanical analysis, reservoir modeling, hydraulic fracturing treatment, microseismic monitoring, well performance and refracturing for development of unconventional reservoirs  
*Shale Reservoirs* Lulu.com

A comprehensive guide to the technology, science, safety, and environmental assessment and cleanup related to hydraulic fracturing for oil and gas resources Fracking: Environmental Protection and Development of Unconventional Oil and Gas Resources focuses on hydraulic fracturing related to oil and gas drilling, spills and leaks, and environmental impacts, and the side-effects or unintended consequences of resource extraction. The book starts with the history of oil and gas drilling associated with hydraulic fracturing and explains the geologic and technical issues of fracking of tight formation. This practical guide also describes the geology of petroleum hydrocarbon resources, as well as the methods of verification for environmentally safe resource extraction. Numerous case studies from the U.S. EPA and other agencies and universities are featured, showing safe and appropriate resource extraction, as well as verified case studies where water resources have been impacted by drilling and production activities. This important and timely book concludes with a variety of background soil, vapor, and groundwater sampling methods to minimize impacts and provide data to lower the chances of future environmental damage and litigation. Monitoring and sampling programs during and after drilling and production activities are explained, and cost recovery methods are described for when environmental damages occur. Provides a better understanding of the controversy related to hydraulic fracturing

Covers hydraulic fracturing technologies, and the geology and chemistry of tight shale and sandstone resources Features numerous case studies by the U.S. EPA and other agencies Evaluates planning and sampling methods of minimizing environmental impacts Explains remediation methods if environmental impacts are confirmed Includes cost recovery techniques and data requirements for impacts from hydraulic fracturing

*Fracking* BiblioGov

The United States has seen a resurgence in petroleum production, mainly driven by technology improvements (hydraulic fracturing and directional drilling) developed for natural gas production from shale formations. Application of both of these technologies enabled natural gas to be economically produced from shale and other unconventional formations, and contributed to the United States becoming the world's largest natural gas producer in 2009. Use of these technologies has also contributed to the rise in U.S. oil production over the last few years. In 2009, annual oil production increased over 2008, the first annual rise since 1991, and has continued to increase each year since then. Between 2008 and 2012, U.S. annual crude oil production rose by 1.5 million barrels per day, with about 92% of the increase coming from shale and related tight oil formations in Texas and North Dakota. Overall petroleum liquids grew by 2.1 million barrels per day, with much of the increase in natural gas liquids coming from shale gas plays. Other tight oil plays are also being developed, and helped raise the prospect of energy independence, particularly for North America. The rapid expansion of oil and gas extraction using hydraulic fracturing, both in rural and more densely populated areas, has raised concerns about its potential environmental and health impacts. These concerns have focused primarily on potential impacts to groundwater and surface water quality, public and private water supplies, and air quality. This book focuses on the growth in U.S. oil and natural gas production driven primarily by tight oil formations and shale gas formations. It also reviews selected federal environmental regulatory and research initiatives related to unconventional oil and gas extraction, including the Bureau of Land Management (BLM) proposed hydraulic fracturing rule.

*Unconventional Fossil-Based Fuels* Lexington Books

The stimulation of unconventional hydrocarbon reservoirs is proven to improve their productivity to an extent that has rendered them economically viable. Generally, the stimulation design is a complex process dependent on intertwining factors such as the history of the formation, rock and reservoir fluid type, lithology and structural layout of the formation, cost, time, etc. A holistic grasp of these can be daunting, especially for people without sufficient experience and/or expertise in the exploitation of unconventional hydrocarbon reserves. This book presents the key facets integral to producing unconventional resources, and how the different components, if pieced together, can be used to create an integrated stimulation design. Areas covered are as follows: • stimulation methods, • fracturing fluids, • mixing and behavior of reservoir fluids, • assessment of reservoir performance, • integration of surface drilling data, • estimation of geomechanical properties and hydrocarbon saturation, and • health and safety. *Exploitation of Unconventional Oil and Gas Resources: Hydraulic Fracturing and Other Recovery and Assessment Techniques* is an excellent introduction to the subject area of unconventional oil and gas reservoirs, but it also complements existing information in the same discipline. It is an essential text for higher education students and professionals in academia, research, and the industry.

**Theory, Technologies, and Challenges** Elsevier

Natural gas and crude oil production from hydrocarbon rich deep shale formations is one of the most quickly expanding trends in domestic oil and gas exploration. Vast new natural gas and oil resources are being discovered every year across North America and one of those new resources comes from the development of deep shale formations, typically located many thousands of feet below the surface of the Earth in tight, low permeability formations. *Deep Shale Oil and Gas* provides an introduction to shale gas resources as well as offer a basic understanding of the geomechanical properties of shale, the need for hydraulic fracturing, and an indication of shale gas processing. The book also examines the issues regarding the nature of shale gas development, the potential environmental impacts, and the ability of the current regulatory structure to deal with these issues. *Deep Shale Oil and Gas* delivers a useful reference that today's petroleum and natural gas engineer can use to make informed decisions about meeting and managing the

challenges they may face in the development of these resources. Clarifies all the basic information needed to quickly understand today's deeper shale oil and gas industry, horizontal drilling, fracture fluids chemicals needed, and completions Addresses critical coverage on water treatment in shale, and important and evolving technology Practical handbook with real-world case shale plays discussed, especially the up-and-coming deeper areas of shale development

*Fracking: Environmental Protection and Development of Unconventional Oil and Gas Resources*

*Unconventional Oil and Gas Resources Handbook* Evaluation and Development

Oil and gas well completion and stimulation technologies to develop unconventional hydrocarbon resources in the United States have evolved over the past several decades, particularly in relation to the development of shale oil and shale gas. Shale oil and shale gas resources and the technology associated with their production are often termed "unconventional" because the oil and gas trapped inside the shale or other low-permeability rock formation cannot be extracted using conventional technologies. Since about 2005, the application of these technologies to fields in the U.S. have helped produce natural gas and oil in volumes that allowed the country to reduce its crude oil imports by more than 50% and to become a net natural gas exporter. The regional and national economic and energy advances gained through production and use of these resources have been accompanied, however, by rapid expansion of the infrastructure associated with the development of these fields and public concern over the impacts to surface- and groundwater, air, land, and communities where the resources are extracted. The intent of the first day of the workshop of the National Academies of Sciences, Engineering, and Medicine's Roundtable on Unconventional Hydrocarbon Development was to discuss onshore unconventional hydrocarbon development in the context of potential environmental impacts and the ways in which the risks of these kinds of impacts can be managed. Specifically, the workshop sought to examine the lifecycle development of these fields, including decommissioning and reclamation of wells and related surface and pipeline infrastructure, and the approaches from industry practice, scientific research, and regulation that could help to ensure management of the operations in ways that minimize impacts to the environment throughout their active lifetimes and after operations have ceased. This publication summarizes the presentations and discussions from the workshop.

*Exploitation of Unconventional Oil and Gas Resources - Hydraulic Fracturing and Other Recovery and Assessment Techniques* Elsevier

*Fluid Phase Behavior for Conventional and Unconventional Oil and Gas Reservoirs* delivers information on the role of PVT (pressure-volume-temperature) tests/data in various aspects, in particular reserve estimation, reservoir modeling, flow assurance, and enhanced oil recovery for both conventional and unconventional reservoirs. This must-have reference also prepares engineers on the importance of PVT tests, how to evaluate the data, develop an effective management plan for flow assurance, and gain perspective of flow characterization, with a particular focus on shale oil, shale gas, gas hydrates, and tight oil making. This book is a critical resource for today's reservoir engineer, helping them effectively manage and maximize a company's oil and gas reservoir assets. Provides tactics on reservoir phase behavior and dynamics with new information on shale oil and gas hydrates Helps readers Improve on the effect of salt concentration and application to CO<sub>2</sub>-Acid Gas Disposal with content on water-hydrocarbon systems Provides practical experience with PVT and tuning of EOS with additional online excel spreadsheet examples

*Geology and Assessment of Unconventional Oil and Gas Resources of Northeastern Mexico*

Cambridge University Press

*Well Production Performance Analysis for Shale Gas Reservoirs* is urgently needed by the petroleum community for unconventional oil and gas resources development and production. Features an in-depth analysis of shale gas horizontal fractured wells and how they differ from their conventional counterparts Includes detailed information about the testing of fractured horizontal wells before and after fracturing Offers in-depth analysis of numerical simulation and the importance of this tool for the development of shale gas reservoirs

*Offshore Well Completion and Stimulation* Nova Science Pub Incorporated

While the public is generally aware of the use of hydraulic fracturing for unconventional resource

development onshore, it is less familiar with the well completion and stimulation technologies used in offshore operations, including hydraulic fracturing, gravel packs, "fracpacks," and acid stimulation. Just as onshore technologies have improved, these well completion and stimulation technologies for offshore hydrocarbon resource development have progressed over many decades. To increase public understanding of these technologies, the National Academies of Sciences, Engineering, and Medicine established a planning committee to organize and convene a workshop on Offshore Well Completion and Stimulation: Using Hydraulic Fracturing and Other Technologies on October 2-3, 2017, in Washington, DC. This workshop examined the unique features about operating in the U.S. offshore environment, including well completion and stimulation technologies, environmental considerations and concerns, and health and safety management. Participants from across government, industry, academia, and nonprofit sectors shared their perspectives on operational and regulatory approaches to mitigating risks to the environment and to humans in the development of offshore resources. This publication summarizes the presentations and discussions from the workshop.

*Unconventional Oil and Natural Gas* CRC Press

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.

*Unconventional Oil and Gas Development* National Academies Press

Over the last decade, the oil and gas industry has garnered a lot of support from the United States federal and state governments in the name of energy independence and economic prosperity. More specifically, hydraulic fracturing or fracking is said to not only make the production of affordable energy possible but also reduce emissions of carbon dioxide by substituting coal with natural gas in the utility sector. Behind the façade of many socio-economic and political benefits, the process of fracking causes serious environmental concerns. Dismissing the negative externalities of fracking simply raises the question, to what extent have communities close to fracking sites been adversely impacted by it? In this book, Sarmistha R. Majumdar studies four communities close to fracking well sites in Texas to help illustrate to what extent fracking regulations have been developed in Texas and how effective these regulations have been in safeguarding the interests of individuals in local communities amidst the lure of economic gains from the extraction of oil and natural gas from shale formations. Majumdar has developed a model to show stage by stage community actions to regain their quality of life and the consequences of their actions, if any, on state and local regulations and ordinances, and the oil and gas industry. This book will be an important resource for scholars of environmental and natural resource politics and policy in the United States.

**Oil Shale and Tar Sands** Gulf Professional Publishing

Fracking - hydraulic fracturing of porous rock to enhance the extraction of fossil fuels - was first attempted in the mid-20th century, but has only recently been adopted as a viable source of hydrocarbons. This volume in the Issues series examines the technology, and its potential environmental implications.