Designing an efficient drilling program is a key step for the development of an oil and/or gas field. Variations in reservoir pressure, saturation and temperature, induced by reservoir production or CO2 injection, involve various coupled physical and chemical processes. Geomechanics, which consider all thermohydromechanical phenomena involved in rock behavior, play an important role in every operation involved in the exploitation of hydrocarbons, from drilling to production, and in CO2 geological storage operations as well. Pressure changes in the reservoir modify the in situ stresses and induce strains, not only within the reservoir itself, but also in the entire sedimentary column. In turn, these stress variations and associated strains modify the fluids flow in the reservoir and change the wellbore stability parameters. This book offers a large overview on applications of Geomechanics to petroleum industry. It presents the fundamentals of rock mechanics, describes the methods used to characterise rocks in the laboratory and the modelling of their mechanical behaviour; it gives elements of numerical geomechanical modelling at the site scale. It also demonstrates the role of Geomechanics in the optimisation of drilling and production: it encompasses drillability, wellbore stability, sand production and hydraulic fracturing; it provides the basic attainments to deal with the environmental aspects of heave or subsidence of the surface layers, CO2 sequestration and well abandonment; and it shows how seismic monitoring and geomechanical modelling of reservoirs can help to optimise production or check cap rock integrity. This book will be of interest to all engineers involved in oil field development and petroleum engineering students, whether drillers or producers. It aims also at providing a large range of potential users with a simple approach of a broad field of knowledge.

This is the first book in the petroleum sector that sheds light on the real obstacles to sustainable development and provides solutions to each problem encountered. Each solution is complete with an economic analysis that clarifies why petroleum operations can continue with even greater profit than before while ensuring that the negative environmental impact is diminished. The new screening tools and models proposed in this book will provide one with proper guidelines to achieve true sustainability in both technology development and management of the petroleum sector.
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 JewelSuiteTM 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.

This book investigates sand production problems in the development of unconsolidated sand reservoirs and suggests novel technical solutions and improvements to sand management issues. This book is divided into six chapters: (1) geologic characteristics of unconsolidated sand heavy oil reservoirs and concept of sand management technology; (2) sand production mechanisms and its effect on reservoir petrophysical quality; (3) sand production quantity prediction and well productivity evaluation methods, especially for fluid-solid coupling prediction model; (4) completion technology for sand management; (5) sand flow in well bore and surface processing; (6) the application of sand management technology in China’s Bohai heavy oil field. Readership: Petroleum reservoir engineers and production managers worldwide.

Since the 1990s five books on Applications of Computational Mechanics in Geotechnical Engineering have been published. Innovative Numerical Modelling in Geomechanics is the 6th and final book in this series, and contains papers written by leading experts on computational mechanics. The book treats highly relevant topics in the field of geotechnic
tensão que ocorrem, considerando as tensões in situ, a perfuração e a produção de fluidos. Foi desenvolvido um programa experimental de ensaios mecânicos que inclui testes uniaxiais, triaxiais convencionais e hidrostático, além de carregamentos seguindo a trajetória de pconstante. Estes ensaios serviram para obtenção dos parâmetros do modelo de Lade, bem como para caracterizar o comportamento geomecânico dos arenitos. Deve-se mencionar que os corpos de prova estavam totalmente saturados com água e com óleo. Usou-se um algoritmo de otimização para identificação dos parâmetros do modelo. Por fim, avaliou-se a capacidade do modelo elastoplástico de Lade & Kim para descrever o comportamento tensão deformação dos arenitos estudados.

This periodical edition includes peer-reviewed papers based on results of scientific research and engineering solutions in different areas of modern engineering science.

This book gathers the proceedings of the 4th International Conference on Mechanical Engineering and Applied Composite Materials (MEACM), held in Beijing, China on October 24-25, 2020. The conference brought together researchers from several countries and covered all major areas of mechanical engineering and applied composite materials, new applications and current trends. The topics covered include: structure and design, mechanical manufacturing and automation, robotics and mechatronics, mechanical behavior of nanomaterials, nanocomposites, and composite mechanics. Given its scope, the book offers a source of information and inspiration for researchers seeking to improve their work and gather new ideas for future developments.

The 31st European Symposium on Computer Aided Process Engineering: ESCAPE-31, Volume 50 contains the papers presented at the 31st European Symposium of Computer Aided Process Engineering (ESCAPE) event held in Istanbul, Turkey. It is a valuable resource for chemical engineers, chemical process engineers, researchers in industry and academia, students and consultants in the chemical industries. Presents findings and discussions from the 31st European Symposium of Computer Aided Process Engineering (ESCAPE) event.

Issues in Engineering Research and Application: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Noise Control Engineering. The editors have built Issues in Engineering Research and Application: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Noise Control Engineering in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Engineering Research and Application: 2013 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/.

Monthly. Papers presented at recent meeting held all over the world by scientific, technical, engineering and medical groups. Sources are meeting programs and abstract publications, as well as questionnaires. Arranged under 17 subject sections, 7 of direct interest to the life scientist. Full programs of meetings listed under sections. Entry gives citation number, paper title, name, mailing address, and any ordering number assigned. Quarterly and annual indexes to subjects, authors, and programs (not available in monthly issues).

During the last two decades rock mechanics in Europe has been undergoing some major transformation. The reduction of mining activities in Europe affects heavily on rock mechanics teaching and research at universities and institutes. At the same time, new emerging activities, notably, underground infrastructure construction, geothermal energy develop

Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.
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.

To provide technical support for sand control decision-making, it is necessary to predict the production condition at which sand production occurs. Sanding onset prediction involves simulating the stress state on the surface of an oil/gas producing cavity (e.g. borehole, perforation tunnel) and applying appropriate sand production criterion to predict the fluid pressure or pressure gradient at which sand production occurs. In this work, we present numerical and analytical poroelastoplastic stress models describing stress around producing cavity and verify those models against each other. Using those models, we evaluate the stress state on the cavity surface and derive sanding onset prediction models in terms of fluid pressure or pressure gradient based on the given sand production criterion. We then run field case studies and validate the sanding onset prediction models. Rock strength criterion plays important roles in sanding onset prediction. We investigate how the sanding onset prediction results vary with the selection of one or another rock strength criterion. In this work, we present four commonly used rock strength criteria in sanding onset prediction and wellbore stability studies: Mohr-Coulomb, Hoek-Brown, Drucker-Prager, and Modified Lade criteria. In each of the criterion, there are two or more parameters involved. In the literature, a two-step procedure is applied to determine the parameters in the rock strength criterion. First, the Mohr-Coulomb parameters like cohesion So and internal friction angle ff are regressed from the laboratory test data. Then, the parameters in other criteria are calculated using the regressed Mohr-Coulomb parameters. We propose that the best way to evaluate the parameters in a specific rock strength criterion is to perform direct regression of the laboratory test data using that criterion. Using this methodology, we demonstrate that the effect of various rock strength criteria on sanding onset prediction is less dramatic than using the commonly used method. With this methodology, the uncertainties of the effect of rock strength criterion on sanding onset prediction are also reduced.

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