An Evaluation of Bioremediation as a Potential Tool for Marine Oil Spill Response in South Africa

U.S. Arctic waters north of the Bering Strait and west of the Canadian border encompass a vast area that is usually ice covered for much of the year, but is increasingly experiencing longer period and larger areas of open water due to climate change. Sparsely populated with a wide variety of ecosystems found nowhere else, this region is vulnerable to damage from human activities. As oil and gas, shipping, and tourism activities increase, the possibilities of an oil spill also increase. New approaches to respond to such an event in this challenging environment? Responding to Oil Spills in the U.S. Arctic Marine Environment reviews the current state of the science regarding oil spill response and environmental assessment in the Arctic region north of the Bering Strait, with emphasis on the potential impacts to the environment. This report describes the unique ecosystems and environment of the Arctic and makes recommendations to provide an effective response effort in these challenging conditions. According to Responding to Oil Spills in the U.S. Arctic Marine Environment, a full range of proven oil spill response technologies is needed in order to minimize the impacts on people and sensitive ecosystems. This report identifies key oil spill research priorities, critical data and monitoring needs, mitigation strategies, and important operational and logistical issues. The Arctic acts as an integrating, regulating, and mediating component of the physical, atmospheric and cryospheric systems that govern life on Earth. Not only does the Arctic serve as regulator of many of the Earth’s large-scale systems and processes, but it is also an area where changes made have substantial impact on life and ecosystems on planet Earth. This report’s recommendations will assist environmentalists, industry, state and local policymakers, and anyone interested in the future of this special region to preserve and protect it from damaging oil spills.

Observations of an Oil Spill Bioremediation Activity in Galveston Bay, Texas

Using Oil Spill Dispersants on the Sea

Workshop on the Use of Bioremediation for Oil Spill Response in the Great Barrier Reef Region

Biodegradation and Bioremediation

Responding to Oil Spills in the U.S. Arctic Marine Environment

Response to Marine Oil Pollution

This book presents new insights into the development of different aspects of petroleum science and engineering. The book contains 19 chapters divided into two main sections: (i) Exploration and Production and (ii) Environmental Solutions. There are 11 chapters in the first section, and the focus is on the topics related to exploration and production of oil and gas, such as drilling, production, characterization of reservoir fluids, and enhanced oil recovery. In the second section, the special emphasis is on waste technologies and environmental cleanup in the downstream sector. The book is written by numerous prominent experts, including oil and gas industry leaders. The book addresses the second area of the multidisciplinary approach to sustainable development in the petroleum industry and stresses the most updated topics such as EOR and environmental cleanup of fossil fuel waste.

Bioremediation in Marine Oil Spills

Bioremediation in the Field

With oil spills occurring worldwide, much media and practical attention has been given in recent years to the rapidly maturing field of hydrocarbon bioremediation, particularly with application to marine spills. Hydrocarbon contamination of soil and groundwater, although less visible, is even more widespread and has provided the background for the numerous studies presented in this book, in addition to those devoted to shoreline spills. Chapters address a wide variety of theory and practice and cover important subjects such as biofiltration, natural attenuation, surfactants, and the use of in situ biostimulating compared to soil venting. This unique book represents the collective global experience of practitioners and researchers in North America, Europe, Africa, and Asia. It describes experiences in top laboratory studies to field applications. No one else anywhere in hydrocarbon bioremediation find more up-to-date, relevant information on field experience using the various techniques and combinations of techniques in remediating hydrocarbons by biological means.

Bioremediation For Marine Oil Spills

This book provides a clear and concise overview of the present level of knowledge and expertise in the field of oil spill response. It covers the behaviour and fate of different types of oil when spilled and the effects on marine and coastal resources. Guidance is given on aerial surveillance, the at-sea measure of containment and recovery, and the use of chemical dispersants, and there are new chapters on in situ burning and bioremediation measures. Other chapters cover shoreline cleaning strategies, waste management and disposal. Guidance is provided on training, exercises and equipment maintenance and storage, and information is also given on liability, compensation and cost accounting.

Oil Spill Dispersants

A state-of-the-art presentation of the specific microbes that inhabit oil reservoirs, with an emphasis on the ecological significance of anaerobic microorganisms. • Provides fundamental and applied biological approaches, and serves as an invaluable reference source for petroleum engineers, remediation professionals, and field researchers.

Bioremediation for marine oil spills.

Oil Spill Environmental Forensics provides a complete view of the various forensic techniques used to identify the source of an oil spill into the environment. The forensic approach used in this book allows for the determination of the source of oil spills from the field and from within laboratories throughout the world. The authors explore which analytical and interpretative techniques are best suited for a particular oil spill project. This handy reference also includes the use of these techniques in actual environmental oil spills. Famous incidents discussed include the Surfside Oil Incident and the Exxon Valdez Oil Spill. The authors chronicle both the successes and failures of the techniques used for each of these events. Dr. Shendel Wang is a senior research scientist and Head of Oil Spill Research of Environment Canada, working in the oil and toxic chemical spill research field. He has authored over 270 academic publications and won a number of national and international scientific honors and awards. Dr. Wang is a member of the American Chemical Society (ACS), the Canadian Society for Chemistry (CSC), and the International Society of Environmental Forensics (ISEF). International experts show readers the forensic techniques used in oil spill investigations provides the theoretical basis and practical applications for investigative techniques Contains numerous case studies demonstrating proven techniques

Psychrophiles: From Biodiversity to Biotechnology

Opportunities for Environmental Applications of Marine Biotechnology

Approximately 3 million gallons of oil or refined petroleum products are spilled into U.S. waters every year. Oil dispersants (chemical agents such as surfactants, solvents, and emulsifiers that are used to reduce the effectiveness of oil spills by changing the chemical and physical properties of the oil) by enhancing the amount of oil that physically mixes into the water, dispersants can reduce the potential that a surface slick will contaminate shoreline habitats. Although called for in the Oil Pollution Act of 1990 as a tool for minimizing the impact of oil spills, the use of chemical dispersants has long been controversial. This book reviews the adequacy of existing information and ongoing research regarding the effectiveness of dispersants as an oil spill response technique, as well as the effect of dispersed oil on marine and coastal resources. Oil Spill Dispersants also includes recommended steps for policy makers faced with making hard choices regarding the use of dispersants as part of spill contingency planning efforts or during actual spills.

Bioremediation of hazardous wastes : research, development, and field evaluations

This 2-day workshop is the culmination of a study of the status and future of marine biotechnology. The overall goal of this workshop is to examine what was initially called “Opportunities For Marine Biotechnology in the United States,” to consider where we are now in this field of “Environmental Marine Biotechnology,” to envision the field in the future, and to discuss and recommend that might be encountered along the way. Opportunities for Environmental Applications of Marine Biotechnology: Proceedings of the October 5-6, 1999, Workshop addresses the question of where the federal government should invest its limited funds and what future initiatives should be planned.

Bioremediation for Marine Oil Spills

The book discusses ways to overcome the side effects of using hydrocarbon-based products as energy sources. Hydrocarbons produce raw crude oil waste of around 600,000 metric tons per annum, with a range of uncertainty of 200,000 metric tons per year. The various chapters in this book focus on approaches to reduce these wastes through the application of potential microorganisms, in a process called bioremediation. The book is a one-stop reference resource on the methods, mechanisms and application of the biocompounds, in the laboratory and field. Focusing on realizing a very pressing environmental issue, it not only provides details of existing challenges, but also offers deeper insights into the possibility of solving problems using hydrocarbon bioremediation.

Petroleum Microbiology

Introduction to Petroleum Biotechnology introduces the petroleum engineer to biotechnology, bringing together the various biotechnology methods that are applied to recovery, refining and remediation in the uses of petroleum and petroleum products. A significant amount of petroleum is undiscoverable in reservoirs today using conventional and secondary methods. This reference explains how microbial and oil spill recovery is aiding to produce more economical and environmentally-friendly
metabolic events that lead to improved oil recovery. Meanwhile, in the downstream side of the industry, petroleum refining operators are facing the highest levels of environmental regulations while struggling to process more of the heavier crude oils since conventional physical and chemical refining techniques may not be applicable to heavier crudes. This reference proposes to the engineer and refining manager the concepts of bio-refining applications: not only render heavier crudes as lighter crudes through microbial degradation, but also through biodenitrogenation, biodemetallization and biodesulfurization, making more petroleum derivatives purified and upgraded without the release of more pollutants. Equipped for both upstream and downstream oil and gas operations, provides the latest technology in reservoir recovery using microbial enhanced oil recovery methods. Helps readers gain insight into the current and future application of using biotechnology as a refining and fuel blending method for heavy oil and tar sands.

Bioremediation of Unresolved Complex Mixtures in Marine Oil Spills

While major oil spills are rare, oil slicks can have disastrous environmental and economic consequences. This book summarizes research on the use of chemical dispersants: their effectiveness and limitations and the results of using them in different spill situations. Based on laboratory and field research as well as on actual case histories, this book contains a clear set of recommendations for action, planning, and research. Of special interest is the chapter on the biological effects of oil itself and of oil treated with chemical dispersants.

Manual on Oil Pollution

Introduction to Petroleum Biotechnology

Hydrocarbon Pollution and its Effect on the Environment

What light does nearly 25 years of scientific study of the Exxon Valdez oil spill shed on the fate and effects of a spill? How can the results help in assessing future spills? How can ecological risks be assessed and quantified? In this, the first book on the effects of Exxon Valdez in 15 years, scientists directly involved in studying the spill provide a comprehensive perspective on, and synthesis of, scientific information on long-term spill effects. The coverage is multidisciplinary, with chapters discussing a range of issues including effects on biota, successes and failures of post-spill studies and techniques, and areas of continued disagreement. An even-handed and critical examination of more than two decades of scientific study, this is an invaluable guide for studying future oil spills and, more broadly, for unraveling the consequences of any large environmental disruption. For access to a full bibliography of related publications, follow the Resources link at www.cambridge.org/9781107070717.

Microbial Action on Hydrocarbons

This book covers hydrocarbon pollution, measurement techniques for hydrocarbons, risk assessment, and environmental impact. This comprehensive book is an expert on the subject and integrates a wide variety of approaches. This book attempts to address the needs of graduate and postgraduate students and other professionals or readers interested in food, soil, water, and air pollution. The aim of this book is to explain and clarify important studies, and compare and develop the new and groundbreaking measurement techniques. Written by leading experts in their respective areas, the book is highly recommended to professionals interested in environmental and human health because it provides specific and comprehensive examples.