Book Review

by **LUCIA MacISAAC**

Environmental Impact of the Offshore Oil and Gas Industry

BY: STANISLAV PATIN

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Environmental Impact of the Offshore Oil and Gas Industry is a comprehensive, multidisciplinary compendium that provides a solid scientific review of current, accurate data covering the period of 1972 to 1998 that attempts to establish the actual effect of petroleum exploration and production on the marine environment. This unique text is written by Stanislav Patin, a respected Russian scientist with over forty years experience in marine ecology, biogeochemistry and environmental management. The author has over 200 publications to his credit and his literary experience is evident in this extremely well written and accurate manuscript. A tremendous collection of data from virtually all regions of the globe is enhanced by insightful conclusions and references on this important topic. Practically all geographic areas involved in offshore oil and gas exploration have been examined including the Russian Shelf, the Barents Sea, the United Kingdom North Sea, the Dutch Sector North Sea, the Gulf of Mexico, the Alaska Prince William Sound, the Atlantic Region, the Persian Gulf and the Irish Sea.

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Patin presents a thorough understanding of the full cycle of offshore hydrocarbon exploration, production, transportation and abandonment and determines the potential environmental impacts that could occur at each stage. He has segmented the text into a logical developmental format that allows the reader to examine individual or cumulative effects from oil and gas related activities. Initially, the sources and nature of pollutants are categorized and then their hazardous properties are examined. He assists the reader in developing an understanding of the chemical, biological, and physical forces at play in the complex world of the marine environment. For readers with an average scientific background this book provides a comprehensive documentation of the issues with a logical layout, descriptive index, and in-depth tables of research data.

Specific information included in this text is relevant to many individuals involved in different aspects of offshore oil and gas development. Regulators will be interested in the specific regulated discharges for various marine environments; producers may use this reference to select alternative monitoring programs for gas or liquid hydrocarbon releases; fisheries specialists may better understand the effects of specific contaminants on the marine environment and chemists may utilize some of this research to evaluate the toxicological effects of pollutants in different regions.

The author compiles relevant and valid researched references from worldwide organizations but the real value of this book is in the understandable, accurate and scientific explanation contained within the text. If further in-depth analysis is required on a specific topic, this book identifies the leading researchers from around the world that have published papers on the topic of interest. If an organization has a role to play in the offshore oil and gas industry, they should examine the contents of this text and determine the appropriate sections and their references.

Although the text is well referenced and contains recent research, there have been advances in technology and process that are not reported. For example, there are numerous references to the disposal of drilling muds and cuttings offshore. Some regions have instituted a zero discharge policy that does not allow any disposal at sea and requires the operators to have completely closed loop systems. Positive operational changes in some frontier areas are minimized in the text, and readers must understand that this compilation only reflects operations in specific marine areas over specific timeframes.

The author reports on chemical data and its impact on marine environments but does not thoroughly consider potential sources of the components other than the oil and gas industry. For instance shipping traffic releases hydrocarbons into the marine or atmospheric environments but is not associated with petroleum production in the region. It is also important for the reader to take notice of the author's statement that "Many experts agree that on a global scale, the main anthropogenic flows of oil hydrocarbons into the marine environment come from land-based sources (refineries, municipal wastes, river runoff, and so on) and transportation activity (tanker oil transportation and shipping). Enough evidence exists to agree with this opinion."

Environmental Impact of the Offshore Oil and Gas Industry contains eight chapters, over 75 sections and sub-sections, over 150 tables and illustrations and more than 700 references. Each of the chapters contains a concise list of conclusions that enables the reader to quickly access the applicable sections. The author has disassembled the development stages of an offshore oil and gas project and examined the individual effects each stage has on the environment. He has also managed to piece the project back together by examining the cumulative environmental effects of an offshore petroleum project from cradle to grave.

Readers with backgrounds in fisheries, marine coastal management, maritime offshore regulations, along with oil and gas producers will be interested in models the author brings forward to address risk analysis, risk assessment and ecological monitoring. Some of this information dates back to 1994 but the model can be used as a framework for a region with applicable guidelines being overlaid to represent current ecological information about the particular coastal area.

The author draws upon scientific evidence from around the world to establish limits on components in discharge streams resulting from offshore oil and gas exploration and production. References are made to mathematical models that can create a set of indices identifying estimates of biomass, stock and catch for species in a certain region. Through continuous improvement techniques and establishment of best practices identified from other marine regions, the opportunity exists for producers, regulators and fishery and environment interest groups to establish practical guidelines that will ensure protection of ecological zones. The author establishes a foundation by which regulations and monitoring can effectively protect the marine environment from damage resulting from activity associated with offshore oil and gas development.

Stanislav Patin states "The issues of critical importance include assessing the environmental hazard of different impact factors, estimating the fisheries losses due to oil production operations, and establishing permissible limits of ecological changes." As we in North America search for energy sources from our marine areas, information contained in this text can be utilized to establish guidelines that will allow co-existence between fisheries and offshore oil and gas development.