



Society of Petroleum Engineers

SPE-198777-MS

In-Situ Burning As An Oil Spill Control Measure And Its Effect On The Environment

Abraham O. Ekperusi, Amarachi P. Onyena, Marvellous Y. Akpudo, Chibuike C. Peter, and Christiana O. Akpoduado, Department of Marine Environment & Pollution Control, Faculty of Marine Environmental Management, Nigeria Maritime University, Okerenkoko, Delta State, Nigeria; Omesiri H. Ekperusi, Ecoverse Integrated Limited, Warri, Delta State, Nigeria

Copyright 2019, Society of Petroleum Engineers

This paper was prepared for presentation at the Nigeria Annual International Conference and Exhibition held in Lagos, Nigeria, 5–7 August 2019.

This paper was selected for presentation by an SPE program committee following review of information contained in an abstract submitted by the author(s). Contents of the paper have not been reviewed by the Society of Petroleum Engineers and are subject to correction by the author(s). The material does not necessarily reflect any position of the Society of Petroleum Engineers, its officers, or members. Electronic reproduction, distribution, or storage of any part of this paper without the written consent of the Society of Petroleum Engineers is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of SPE copyright.

Abstract

In-situ burning (ISB) is a process of burning crude oil at the point of spill, as a containment measure for oil spill control. It is usually applied as one of the last resort to prevent spilled oil from reaching ecologically sensitive habitats and recreational activities in coastal areas. While booms, skimmers and dispersants may be very expensive and difficult to deploy, ISB is relatively inexpensive, making it attractive to oil spill responders. ISB can be applied in marine, coastal, freshwater, arctic and terrestrial environment. Factors affecting burn efficiency include water density, type of oil, slick thickness, degree of emulsification and weathering, flame coverage, wind speed and wave action. Although ISB has been very successful in removing spilled oil from polluted environment, there are great concerns about the transport and fate of emissions and residues from the burned oil, on the environment, biodiversity and public health. Potential air pollutants from oil burning include particulate matter, nitrogen oxide, sulphur dioxide, carbon monoxide, carbon dioxide, volatile organic compounds, and mixtures of various polycyclic aromatic hydrocarbons. Many developing nations lack the legal and regulatory frameworks, the contingency planning process and human resources to monitor the implementation of ISB in the oil and gas industry, making the practice very complicated and of imminent danger to society. There is also need to develop alternative measures to ISB in order to mitigate the effects on the environment and human population.

Keywords: in-situ burning, oil spill control, spill cleanup, environmental assessment, pollution control

Introduction

The global oil and gas industry is a high risk business. The exploration, production, transportation, refining and consumption of petroleum and its products come with a burden on the environment (Ekperusi and Aigbodion, 2015). Even with the best global practices on health and safety as a vital component of the corporate culture in the oil and gas industry in place, the occurrence of accident as a result of human error or mechanical failure in the operations surrounding the oil sector is almost inevitable. The fact that petroleum