
Preface

The increasing energy demand over the past decades has resulted in a corresponding growth and expansion in the refining and processing of crude petroleum, natural gas, and many other chemical industries. The proliferation of refineries and chemical plants, combined with the increasingly stringent quality requirements for effluents discharged from these facilities, has underscored the need for perfecting existing pollution control technology and developing improved approaches for minimizing the pollution potential in this sector.

Exploration and production of natural gas and oil are rapidly expanding across the world due to technological developments that have made extraction of previously untapped unconventional resources, such as shale gas, economically feasible. In part due to expansion of operations to locations where the industry has never been active, emissions of air pollutants, along with other potential environmental and public health impacts, have come under increasing scrutiny.

Industries and municipalities account for the largest portion of waste discharges that occur. Industries discharge an enormous variety of materials which include the largest volume of waste and the most toxic of pollutants. Environmental control is a very complex science. The trend is to move in the direction of pollution avoidance rather than control.

This will add a tremendous cost to industrial budget. The public has tolerated pollution until recently, but the condition has increased to the point that many may suffer or even die because of it especially in developing countries.

In this book monitoring of wastewater control, equipment, and engineering techniques will be discussed. This book specification is intended to cover the safety and environmental control aspects as the essential requirements for water pollution control in oil, gas and chemical plants. The scope is accomplished under following titles:

- Refinery, gas processing industries, petrochemical plants, and oil terminal water pollution control.
- Chemical industries, water pollution sources and control.
- Organic chemical manufacturing.
- Monitoring.

Cleaning up hydrocarbon-based liquids and refined products release from pipelines, oil production units, pumping station, tank farms, and drilling operation in upstream part and other pollutants from oil and petrochemical refineries and above ground/underground storage tanks in downstream part of both petroleum and chemical industries, typically involves using several corrective actions and strategies. Short-term emergency measures may involve imminent actions to control acute safety and health hazards such as potential explosion and toxication. After the imminent danger has been eliminated, longer term corrective actions involve cleaning up pollutants that have entered the surface and subsurface environment.

In this book the following matter of *Soil Pollution Control* is discussed:

- To provide authorities concerned on how to assess site conditions in the unsaturated zone and where a petroleum product release has occurred, information needed to localize where in the unsaturated zone petroleum product is located, and also the removal of petroleum products from the unsaturated zone at a given site.
- To assess on the technologies designed specifically for clean-up of the saturated zone.
- To provide a structural methodology for evaluation and potential consequences of a leak in a pipeline. The methodology that is intended to assist pipeline operators in assessing the need to install pipeline leak detection facilities, and an overview of available pipeline leak detection techniques.

Petroleum products in the subsurface may be trapped between soil particles in the unsaturated zone, floating on the water table or dissolved in ground water in the saturated zone. The focus of this book is on long-term strategies for cleaning up petroleum products in unsaturated or saturated zones. When the spill occurs some kind of soil clean-up is typically necessary.

Air pollution is waste remaining from the many ways as production of goods, process of hydrocarbon and petrochemicals, use of transport, and generation of energy to heat and light. The major cause of all air pollution is combustion. When perfect or theoretical combustion occurs, the hydrogen and carbon in the fuel combine with oxygen from the air to produce heat, light, carbon dioxide, and water vapor. Impurities in the fuel, poor fuel-to-air ratio, or too high or too low combustion temperatures cause the formation of such side products as carbon monoxide, sulfur oxides, nitrogen oxides, fly ash, and unburned hydrocarbons. In this book, methods of reducing air pollution and means to decrease the pollution of the environment is discussed.

This book represents the essential requirements for air pollution control and covers the following main topics:

- Pollution sources
- Types of emission
- Measurement of air pollution
- Consideration in the selection of the pollution control equipment

- Process control
- Threshold limit values (TLV).

The effects of air pollution on human health, on plants and animals are well known. To ensure that all important methods of emission reduction have been considered, this book is prepared to provide information which will be of values to all concerned with measurements of general pollution of the air and involved in reducing to a realistic minimum the emission from industrial processes. It is an advantage that there are accepted methods for the measurement so that a sound comparison of all results could be made.

Due to the various adverse impacts of noise on humans and environment, noise should be controlled. The technique or the combination of techniques to be employed for noise control depend upon the extent of the noise reduction required, nature of the equipment used, and the economy aspects of the available techniques.

This book provides new insights and information with regard to reduction in the noise exposure time or isolation of species from the noise sources. It covers noise pollution control techniques besides providing personal ear protection, engineered control for noise reduction at source, and/or diversion in the trajectory of sound waves.

Last but not least I would like to sincerely thank the Springer Editorial Team, Michael Luby and Merry Stuber, for their editorial assistance, advices and support during working on this book project.

Pollution Control in Oil, Gas and Chemical Plants

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2014, XVII, 318 p. 64 illus., 39 illus. in color., Hardcover

ISBN: 978-3-319-01233-9