



Remediation Of Petroleum Contaminated Soils

Rainer Stegmann



Remediation Of Petroleum Contaminated Soils:

Remediation of Petroleum-contaminated Soils David J. Friend, 1996 This synthesis will be of interest to state transportation personnel involved with project planning and location administrative and regulatory personnel design staff general civil geotechnical and environmental engineers and project managers construction and maintenance engineers and staff It will also be of interest to federal and state environmental agencies and to environmental consultants and contractors as well as to trainers in the field of petroleum contaminated soil remediation This synthesis describes the remedial technologies that may be available to transportation agencies faced with the regulatory responsibility to clean or remediate petroleum contaminated soils in the vadose zone unsaturated soils above the groundwater table at a particular site as well as the state of the practice within the agencies This report of the Transportation Research Board describes the applicability and cost effectiveness of alternate technologies to remediate petroleum contaminated soil Practices currently being used by state transportation agencies to remediate petroleum contaminated soils both on site and off site are also described This summary of transportation agency practice complements the limited telephone survey of soil remediation techniques that was performed in preparing NCHRP Report 351 Hazardous Wastes in Highway Rights of Way

Remediation of Petroleum Contaminated Soils Eve Riser-Roberts, 2020-11-25 This book combines the results of current research with essential background material to provide complete in depth coverage of every aspect of in situ and ex situ bioremediation as well as an extensive overview of the physical and chemical processes currently available for treating petroleum contaminated soils Critical information has been collected and assembled under one cover to provide a convenient reference for anyone who must contend with this worldwide problem Remediation of Petroleum Contaminated Soils Biological Physical and Chemical Processes describes how to optimize the biodegradation of petroleum hydrocarbons in soil water systems It reports on the susceptibility of various petroleum components to biodegradation by microorganisms and considers all groups of microorganisms for their potential contributions The book also deals with problem areas such as the transport of organisms oxygen or nutrients throughout the subsurface as well as biodegradation of polynuclear aromatic hydrocarbons PAHs and nonaqueous phase liquids NAPLs In addition the book presents a variety of methods for monitoring bioremediation This reference discusses current soil remediation processes and includes many innovative approaches It also investigates means of controlling volatile organic compounds VOCs and leachate and addresses methods for collecting and treating these secondary waste streams The expansive coverage of this book will furnish readers with a wide range of options for developing treatment strategies and for customizing procedures for specific requirements

Assessment and Remediation of Petroleum Contaminated Sites G. Mattney Cole, 1994-03-24 Federal regulations have required thousands of underground storage tanks USTs to be dug up and removed or replaced The contamination of soil and ground water from leaking USTs has become widespread and has produced an overwhelming number of sites that require remediation

Assessment and Remediation of Petroleum Contaminated Sites presents the broad scope of the remedial process from initial site assessment to closure in an integrated understandable format The book guides you effortlessly through regulatory requirements site assessments and sampling and remediation methods RCRA and CERCLA federal regulations are addressed The chemistry and toxicology of petroleum hydrocarbons in the remediation process are explained and factors affecting soil remediation are discussed Environmental assessments site characterizations remediation planning and remediation methods are all covered in detail The book is an essential guide for environmental consultants regulatory agency personnel engineers and environmental attorneys

Petroleum Contaminated Soils, Volume I Paul T. Kostecki, 2021-04-19 These three volumes provide valuable information to help bring rational and scientifically feasible solutions to petroleum contaminated soils State of the art information on both technical and regulatory issues is covered including environmental fate health effects risk assessment and remedial alternatives They show why petroleum contaminated soils are a problem and propose solutions for that problem These books are an excellent reference for regulatory personnel and environmental consultants at all levels

Petroleum Contaminated Soils Paul T. Kostecki, 1988-11-30 These three volumes provide valuable information to help bring rational and scientifically feasible solutions to petroleum contaminated soils State of the art information on both technical and regulatory issues is covered including environmental fate health effects risk assessment and remedial alternatives They show why petroleum contaminated soils are a problem and propose solutions for that problem These books are an excellent reference for regulatory personnel and environmental consultants at all levels

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Remediation of Petroleum Contaminated Soils Biological Physical and Chemical Processes describes how to optimize the biodegradation of petroleum hydrocarbons in soil water systems It reports on the susceptibility of various petroleum components to biodegradation by microorganisms and considers all groups of microorganisms for their potential contributions The book also deals with problem areas such as the transport of organisms oxygen or nutrients throughout the subsurface as well as biodegradation of polynuclear aromatic hydrocarbons PAHs and nonaqueous phase liquids NAPLs In addition the book presents a variety of methods for monitoring bioremediation This reference discusses current soil remediation processes and includes many innovative approaches It also investigates means of controlling volatile organic compounds VOCs and leachate and addresses methods for collecting and treating these secondary waste streams The expansive coverage of this book will furnish readers with a wide range of options for developing treatment strategies and for customizing procedures for specific requirements

Principles and Practices

for Petroleum Contaminated Soils Paul T. Kostecki, 2019-07-16 Principles and Practices for Petroleum Contaminated Soils includes some of the best research and practical work done by top researchers in the field both in industry and academia It covers fundamental and advanced topics such as analysis and site assessment techniques e g vacuum extraction asphalt incorporation and case studies The book will interest anyone working with contaminated soils ground water and underground storage tanks It will also be a valuable reference for regulatory personnel and environmental consultants at all levels Guidelines for Assessment and Remediation of Petroleum Contaminated Soils Florida. Division of Waste Management, 1992 Guidance for Remediation of Petroleum Contaminated Soils Washington (State). Toxics Cleanup Program, 1994 This document is for owners of contaminated sites who wish to remediate their sites using the independent process Cf p 1 **Remediation of Petroleum-contaminated Soils**, 1996 *Petroleum Contaminated Soils* Paul T. Kostecki, 1989-09-30 These three volumes provide valuable information to help bring rational and scientifically feasible solutions to petroleum contaminated soils State of the art information on both technical and regulatory issues is covered including environmental fate health effects risk assessment and remedial alternatives They show why petroleum contaminated soils are a problem and propose solutions for that problem These books are an excellent reference for regulatory personnel and environmental consultants at all levels Treatment of Contaminated Soil Rainer Stegmann, 2001-05-22 The treatment of contaminated soil is a permanently relevant subject for ensuring the quality of the environment A wide variety of soils contaminated with a broad range of harmful chemical compounds all around the world call for many different treatment strategies Research activities focus on affordable methods offering the greatest possible effect whilst limiting the potential side effects This book sums up the research activities of Research Centre 188 which has cooperated with the Technical University of Hamburg Harburg the University of Hamburg and GKSS in Geesthacht over the last 12 years thus greatly advancing our knowledge in this field **Hydrocarbon Contaminated Soils and Groundwater** Paul T. Kostecki, Edward J. Calabrese, 2023-01-06 Proceedings of the February 19 22 1990 conference held at Newport Beach California Conference Directors PAUL T KOSTECKI EDWARD J CALABRESE and CHARLES E BELL Advisory Committee RICHARD BOZEK EEI TERRY BRAZEL SWRCB MARK COUSINEAU AG SETH DAUGHERTY Orange County RALPH De La PARRA SCE JERRY HAGGY Shell JOHN HANBY HAL JOHN HILL ICF JOHN HILLS City of Anaheim DOROTHY KEECH Chevron BILL KUCHARSKI WC DAVID LEU Mittel Hauser MARY McLEARN EPRI PHIL OLWIN Texaco DENNIS PAUSTENBACH MC ART POPE ARCO LYNNE PRESLO Weston DON ROTHENBAUM KA KIM SAVAGE EPA OUST CARL SHUBERT IT WENDELL SUYAMA Lockheed MICHAEL WANG WSPA JOHN WILLIAMS TT and WILLIAM WINTERS AEM **Petroleum Contaminated Soils - Volume 2 : Remediation Techniques, Environmental Fate, Risk Assessment, Analytical Methodologies , Proceedings of the Third National Conference on Petroleum Contaminated Soils, Amherst, MA, September 19 - 21 1988** Calabrese EJ Ed, 1989 Environmental regulations place new

responsibilities on property owners Providing environmental impairment liability insurance coverage Issues affecting contaminated soils management the railroad industry perspective Implications of dealing with real estate based cleanup statutes Current issues in management of motor fuel contaminated soils EPRI sponsored research on underground storage tanks Health effects research initiatives at the Agency for Toxic Substances and Disease Registry applicability to contaminated soils Underground storage tanks releases in Arizona causes extent and remediation State of research and regulatory approach of state agencies for cleanup of petroleum contaminated soils Analysis of petroleum contaminated soil and water an overview Field screening techniques quick and effective tools for optimizing hazardous waste site investigations Onsite analytical screening of gasoline contaminated media using a jar headspace procedure Problems associated with analysis of petroleum derived materials in the environment Three common misconceptions concerning the fate and cleanup of petroleum products in soil and groundwater The effect of water soluble organic material on the transport of phenanthrene in soil Stabilized petroleum waste interaction with silty clay subgrade Enhanced bioremediation techniques for in situ and onsite treatment of petroleum contaminated soils and groundwater Biodegradation of dissolved aromatic hydrocarbons in gasoline contaminated groundwaters using denitrification Bioremediation of petroleum contaminated soils using a microbial consortia as inoculum Cutoff walls to contain petroleum contaminated soils Thermal desorption of hazardous and toxic organic compounds from soil matrices Hot mix asphalt technology and the cleaning of contaminated soil Removing petroleum products from soils with ozone ultraviolet ultrasonics and ultrapure water Cleanup of a gasoline contaminated site using vacuum extraction technology Using soil vapor contaminant assessment at hydrocarbon contaminated sites Application of quantitative risk assessment evaluation of underground storage tanks to insurance banking and real estate transactions Assessment and remediation of residential properties contaminated with home heating oil case studies Overview Risk assessment risk management Creative approaches in the study of complex mixtures evaluating comparative potencies How much soil do young children ingest an epidemiologic study Percutaneous absorption of Benzo a pyrene from soils with and without petroleum crude contamination An overview and suggested methodology to determine the adequacy of cleanup of contaminated soils Toward economically efficient management of underground storage tanks a risk based approach The California leaking underground fuel tank field manual a guidance document for assessment of underground fuel leaks Letting the sleeping dog lie a case study in the no action remediation alternative for petroleum contaminated soils Council for Health and Environmental Safety of Soils CHESS a coalition to standardize soil contamination problems

Assessments And Remediation Of Oil Contaminated Soils Paul Kostecki, 1999 Paul T Kostecki Associate Director Northeast Regional Environment Public Health Center School Of Public Health University Of Massachusetts At Amherst Received His Ph D From The School Of Natural Resources At The University Of Michigan In 1980 He Has Been Involved With Human And Ecological Risk Assessment And Risk Management Research For The Last 12 Years Dr Kostecki Has Co Authored And Co Edited Over

50 Articles And 16 Books On Environmental Assessment And Cleanup Including Remedial Technologies For Leaking Underground Storage Tanks Soils Contaminated By Petroleum Products Petroleum Contaminated Soils Vols 1 To 3 Hydrocarbon Contaminated Soils And Groundwater Vols 1 To 4 Hydrocarbon Contaminated Soils Vols 1 To 5 Principles And Practices For Diesel Contaminated Soils Vols 1 To 5 Sesoil In Environmental Fate And Risk Modeling Contaminated Soils Vol 1 And Risk Assessment And Environmental Fate Methodologies Dr Kostecki Also Serves As Associate Editor For The Journal Of Soil Contamination Chairman Of The Scientific Advisory Board For Soil And Groundwater Cleanup Magazine As Well As An Editorial Board Member For The Journal Of Human And Ecological Risk Assessment In A Addition Dr Kostecki Serves As Executive Director For The Association For The Environmental Health Of Soils AeHS And Was The Scientific Advisor For The Workshop On Assessment And Remediation Of Oil Contaminated Soils Held In Kuwait 18 22 March 1995 Dr Manaf Behbehani Obtained His B S In Biology From The University Of Akron Usa 1969 And M S In Zoology From The Same University 1972 He Continued His Graduate Studies At The University Of New Hampshire Receiving Ph D In Marine Ecology And Invertebrates In 1978 Since Then He Has Been Teaching Ecology And Marine Biology Courses At The Faculty Of Science Kuwait University From 1 982 1987 He Held The Post Of Marine Scientist At The Regional Organisation For The Protection Of The Marine Environment Ropme In Kuwait Dr Behbehani Has Worked On A Number Of Pioneering Research Projects Namely To Study The Zooplankton Of Kuwaiti Waters And The Western Section Of The Arabian Gulf And To Study The Distribution Abundance And Taxonomy Of Marine Invertebrates Living In The Intertidal Zones Of Kuwait He Has Published Several Scientific Articles And Has Served As External Examiner For Several Masters Thesis From 1991 1995 Dr Behbehani Was Vice Dean For Planning And Laboratories At The Faculty Of Science Kuwait University And Is Presently Chairman Of The National Biodiversity Committee State Of Kuwait He Was The Chairman Of The Scientific Committee For The Workshop On Assessment And Remediation Of Oil Contaminated Soils The Proceedings Of Which Are Published In This Book

Contaminated Soils Edward J. Calabrese, Paul T. Kostecki, 1992-05-12 Contaminated Soils offers state of the art technologies for detection and remediation of diesel contaminated soils that can be used by environmental professionals to maximize the practical application of theory The book covers all aspects of assessment of soils contaminated by diesel fuel and discusses the most successful remediation techniques currently available These techniques include the use of hydrocarbon analyses for environmental assessment and remediation physical and biological treatments and vent walls for enhancing biodegradation of contaminated soils The development of a monoclonal antibody immunoassay for detecting gasoline and diesel fuel in the environment and a comparison of the purge and trap procedure versus the extraction procedure for detecting kerosene and diesel fuel No 2 are examined as well The book concludes with a chapter discussing human health based soil cleanup guidelines for diesel fuel No 2 Contaminated Soils is a must for professionals concerned with the quality of groundwater and hazardous waste cleanup regulators oil company officials and libraries Features

Remediation of Petroleum Contaminated Soils and Groundwater Using High Carbon Content Fly Ash ,2008

Petroleum Contaminated Soils Paul T. Kostecki,1990-09-19 These three volumes provide valuable information to help bring rational and scientifically feasible solutions to petroleum contaminated soils State of the art information on both technical and regulatory issues is covered including environmental fate health effects risk assessment and remedial alternatives They show why petroleum contaminated soils are a problem and propose solutions for that problem These books are an excellent reference for regulatory personnel and environmental consultants at all levels

Remediation Manual for Petroleum Contaminated Sites David L. Russell,1992-11-23 Based on proven investigation into cleanup techniques the material in this manual gives engineers a working knowledge of the field and a basis for making key decisions during the cleanup process It is easy to get petroleum into the ground but hard to get it back out again The problem does not exist in the groundwater or the soil alone but in a dynamic balance between the soil water and air in the soil Gasoline and any of its volatile components can and do move between the soil air and water and they cost billions of dollars every year in contamination cleanup This new book provides the information needed for cost and time effective petroleum contaminated site cleanup Originally developed as an oil company s training aid this book discusses the hows and whys of site cleanup geology data gathering cleanup alternatives remediation costs and management of consultants contractors Plus the book contains a critical examination of the benefits and limitations of each type of remediation technology There is never only one way to clean up a particular site The choice of the method of cleanup is one of the greatest factors affecting the cost Another important cost factor is the level of cleanup required to satisfy the regulatory cleanup community This new book will not only provide a fundamental understanding of site remediation techniques but also the knowledge to make cost effective environmentally sound choices during the remediation process Copies of this handy manual are available for immediate delivery An order form follows the detailed table of contents on the reverse

Applying Ozone to Accelerate Remediation of Petroleum-contaminated Soils Tengfei Chen,2018 Petroleum contamination is ubiquitous during extraction transportation refining and storage Contamination damages the soil s ecosystem function reduces its aesthetics and poses a potential threat to human beings The overall goals of this dissertation are to advance understanding of the mechanisms behind ozonation of petroleum contaminated soil and to configure an effective integrated bioremediation and ozonation remedial strategy to remove the overall organic carbon Using a soil column I conducted batch ozonation experiments for different soils and at different moisture levels I measured multiple parameters e g total petroleum hydrocarbons TPH and dissolved organic carbon DOC to build a full understanding of the data that led to the solid conclusions I first demonstrated the feasibility of using ozone to attack heavy petroleum hydrocarbons in soil settings I identified the physical and chemical hurdles e g moisture mass transfer pH needed to be overcome to make the integration of chemical oxidation and biodegradation more efficient and defines the mechanisms behind the experimental observations

Next I completed a total carbon balance which revealed that multiple components including soil organic matter SOM and non TPH petroleum competed for ozone although TPH was relatively more reactive Further experiments showed that poor soil mixing and high soil moisture content hindered mass transfer of ozone to react with the TPH Finally I pursued the theme of optimizing the integration of ozonation and biodegradation through a multi stage strategy I conducted multi stages of ozonation and bioremediation for two benchmark soils with distinctly different oils to test if and how much ozonation enhanced biodegradation and vice versa With pH and moisture optimized for each step pre ozonation versus post ozonation was assessed for TPH removal and mineralization Multi cycle treatment was able to achieve the TPH regulatory standard when biodegradation alone could not Ozonation did not directly enhance the biodegradation rate of TPH instead ozone converted TPH into DOC that was biodegraded and mineralized The major take home lesson from my studies is that multi stage ozonation and biodegradation is a useful remediation tool for petroleum contamination in soil

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