

CONTAMINATED SOIL '88

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Contaminated Soil '88

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Preface

W.A. de Jong
President of TNO

Until some decades ago man supposed that the resilience of the environment was unlimited. He thought he could draw heavily on nature with impunity and that he could infinitely dump his waste into the environment. We have come to know better now: virtually everyone is well aware that one cannot just go on burdening the environment of man, animal and plant to such an extent.

TNO, the Netherlands Organization for Applied Scientific Research, is among those research institutions that are working on economically feasible solutions for pollution problems resulting from human activities. Soil contamination and remediation feature as important topics in TNO's environmental research programme. In view of the international scope of the problem, TNO organized an international conference on this subject in Utrecht, the Netherlands, in November 1985, which met with a worldwide response from the scientific community as well as from governments and industry.

The international interest taken in soil contamination is underlined by the fact that the Second International Conference on Contaminated Soil takes place in a country where remedial action is being given high political priority. We are very honoured that the Federal Ministry of Research and Technology, BMFT, which plays an important role in this respect, has decided to consider this event a "BMFT-Statusseminar" and to act as major sponsor. We are also grateful to the other institutions that are involved in the preparations of the scientific and social programmes, namely: the Free and Hanseatic City of Hamburg, the Federal Environmental Agency (UBA), the Technical University Hamburg-Harburg, and the Netherlands Ministry of Housing, Physical Planning and the Environment (VROM).

This Second International TNO/BMFT Conference will no doubt reveal that much progress has been made since 1985 in developing methods and techniques for remedying the problems associated with soil contamination. Its primary objective is to offer representatives from science, governments and industry an international platform. I am convinced that it will promote the exchange of views and know-how and thus mean another step towards a cleaner and healthier environment.

PREFACE

H. Riesenhuber
Federal Minister for Research and Technology

Following the discovery, in some spectacular cases, of the serious damage caused mostly by old landfills with mixed disposal of hazardous wastes and household wastes, and in view of the large number of such landfills now believed to exist, the problem of contaminated soil has, since the early 80s, become one of the most important topics of environmental policy in the Federal Republic of Germany and elsewhere. The elimination or reduction of the environmental damage dating back to earlier periods of industrial activity and the prevention of future similar soil contamination therefore constitutes a major challenge for environmental policy-makers.

The problem of contaminated soil is by no means limited to the Federal Republic of Germany. One hundred and fifty years of industrial activity has had its adverse effects in the industrialized nations. In nearly all the European countries, but also in the US and in Japan, similar damage has been discovered. The international exchange of relevant information can foster goal-oriented discussion of these problems and help identify new approaches.

The Federal Government supports the federal states' curative measures for the treatment of contaminated soil by funding R&D work. Such research, the need for which has been set out in the Federal Government's concept for soil protection, is being carried out as one of the priority issues under its environmental research and technology programme. An amount of more than DM 50 million has been awarded to date for the identification and development of assessment criteria and of low-cost containment techniques and curative treatment methods.

Within the framework of these support measures I have always been anxious to inform the general public as early as possible on the latest research results by promoting scientific events and status seminars at regular intervals. It is, therefore, a great pleasure and a particular honour for me to participate in the organization of the first international scientific event in this field in the Federal Republic of Germany.

I should like to thank all those who have helped to organize this conference. Let me finally express my best wishes to the speakers, guests and participants from this country and from abroad.

Introduction

F.J. Colon

Chairman of the Scientific Committee,
TNO-Division of Technology for Society, Apeldoorn,
The Netherlands

K. Wolf

Deputy Chairman of the Scientific Committee,
State Ministry for the Environment of the Free and Hanseatic
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Republic of Germany

More than a hundred years ago, people began to treat sewage in order to keep groundwater and surface water clean. A few decades ago, a start was made on cleaning exhaust gases to keep air pollution in check.

Large areas of the Earth's surface and subsoil have already been contaminated with poisons and other pollutants. This is the result of too careless a handling of chemicals and waste, a thing which endangers groundwater in particular. Nevertheless, soil conservation and soil rehabilitation measures are worldwide still in the initial stages of development.

Few fields of activity in environmental protection are as interdisciplinary as soil rehabilitation. The fields involved are characterized by a wide range of unresolved questions and thus by a high degree of uncertainty on how to proceed. This applies to the following in particular:

- Site investigation and analysis
- Toxicological and health issues
- Risk assessment
- Behaviour of contaminants
- Planning of measures
- Remedial action methods
- Occupational health and safety
- Programmatic government plans for soil protection and soil rehabilitation
- Legal issues

All of these topics were discussed in depth at the Second International TNO/BMFT-Conference on Contaminated Soil in Hamburg, with a view to exchanging and making accessible the increasing knowledge and experience in this field, on an international level and in the most interdisciplinary and comprehensive manner possible. Particular emphasis was placed on rehabilitation techniques as over the last few years there have been developments in this field that are definitely interesting. This is also the scope within which the Dutch environmental industry's special lectures are given.

Another special theme, not entirely unrelated to soil rehabilitation in some respects, is that of problems relating to dredged materials. It was included, as this issue affects both Hamburg and the Netherlands.

The conference was prepared and organized by the Netherlands Organization for Applied Scientific Research, TNO, and the State Ministry for the Environment of the Free and Hanseatic City of Hamburg. It was supported by the Hamburg-Harburg Technical University and the Federal Environmental Agency in Berlin. It would not have been possible to hold the conference without the sponsorship of the Federal Ministry of Research and Technology, the Dutch Ministry of Housing, Physical Planning and the Environment, and the Free and Hanseatic City of Hamburg, all of whom the organizers would like to thank.

These proceedings contain all the posters and papers presented at the Conference that were submitted on time. Unfortunately, it has not been possible to translate the text in all the graphics, due to time constraints. The editors would like to thank K. Marg (Hamburg) and J.W. Assink (Apeldoorn) for their help in compiling these proceedings.

If this book is as widely read and well received as the Conference proceedings on the First International TNO Conference on Contaminated Soil, held in Utrecht in November 1985, then it will have made an important contribution to the further development of soil rehabilitation work around the world.