



# NICOLE NEWS

Newsletter of the Network for Industrially Contaminated Land in Europe,  
a Concerted Action of the EC Environment and Climate Research and Development Programme

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## Project report: Beneficial re-use

*David Edwards describes an exciting NICOLE project*

One of the project "partnerships" that has developed through the NICOLE network is the "Beneficial re-use of materials from land reclamation". Its intention is that over the next 2 years BG plc Property Division, VHE plc, the Welsh Development Agency, TNO and British Steel plc will be demonstrating and evaluating, emerging and novel, re-use approaches applied to both materials and areas of land for reclamation and regeneration.

Our three general priority areas will be:

- restoration of post-industrial sites minimising reliance on landfill
- re-use of derelict sites for energy forestry in former coalfields
- rehabilitation of closed landfill sites through reduction, re-use and recycling.

In addressing these priorities, a range of approaches will be selected on the basis of their potential to deliver commercial, environmental and social value through waste minimisation, recovery of secondary materials, energy generation and more sustainable land reclamation and regeneration practices.

The initiative is to be known as "exSite" and the partners will concentrate their efforts and resources on enabling technologies, processes and strategies to be demonstrated and evaluated on-site and at field scale.

As an example, one contaminant that is found on post-industrial sites is coal tar, which can be encountered in diverse conditions; from viscous liquids with minimal solids content contained in below ground tanks to solid waste mixtures bound within viscous tar. Three factors drive the need for its recycling/re-use:

- disposal to landfill is an expensive and time consuming activity because handling and conditioning is difficult
- cost of disposal at landfill is likely to increase as a result of planning, licensing and regulatory controls
- European and UK environmental legislation may well, in time, preclude landfill (without pre-treatment) as an acceptable waste management option for tars.

However, tars exhibit certain attributes which present opportunities for sustainable recycling/re-use.

- If preconditioned, their high calorific value can be exploited to generate energy to drive mechanical or thermal decontamination processes, either on the site where the tar originated, or elsewhere.
- If engineered in combination with other (application specific) materials, their waterproof and flexible characteristics might be able to be employed e.g. as a lining medium for high-security landfills.

The overall aim of "exSite" is to generate sufficient field data to bridge the confidence gap which prevents widespread adoption of *ex situ* on-site methods of decontamination, restoration and rehabilitation.

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## NICOLE Web Site

**Paul Bardos**

NICOLE now has its own web site at

<http://www.nicole.org>

where you will find information not only about NICOLE but also, *via* links, other international initiatives, in Europe and elsewhere, concerning contaminated land management (*Full article on page 7*).

### Inside includes

Five more NICOLE project reports (pages 4 & 5)  
CARACAS, CLARINET up-dates (page 3)  
NICOLE (page 6).

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Calendar of events	Date
NICOLE Network Meeting Apeldoorn, The Netherlands Marjan Euser Fax: +31 55 5493410 e-mail: m.euser@mep.tno.nl	21-22 April 1998
European Geophysical Society Groundwater Topics, Nice, France Fax: +31 55 541 9837 e-mail: H.H.M.Rijnaarts@mep.tno.nl	20-24 April 1998
CARACAS Workshop on Risk Assessment Models and Risk Management. Berlin, Germany Fax: +49 30 890 32103 e-mail: Karin.Freier@uba.de	23-24 April 1998
ConSoil '98. Edinburgh, UK Mrs B Mathes Forschungszentrum Karlsruhe, PSA Fax: +49 7247 823949 e-mail: mathes@psa.fzk.de internet: http://w3.fzk.de/consoil98	17-21 May 1998
Advanced Study Course Soil Remediation - an overall approach to a complex subject Vienna, Austria Monika Schönerklee Fax: +43 2254/780 2652 e-mail: schoenerklee@arcs.ac.at	12-18 July 1998

#### NICOLE News

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# FZK/TNO conference

## Johan van Veen

The FZK/TNO Conference on Contaminated Soil, ConSoil '98, is to be held in May 1998 in Edinburgh, Scotland.

The conference series is now well established as an authoritative forum at which:

- scientists and engineers are able to present and exchange progress in technical innovation
- managers communicate about current and future technologies and business challenges for prevention of soil contamination and remediation of polluted sites
- policy makers discuss the shaping of national and international strategies and attempts to harmonise international legislation
- remediation companies, banking and insurance companies present and exchange news, knowledge and practices.

In preparing this 6<sup>th</sup> conference, the organisers have decided to continue the evolution which has become apparent from preceding conferences, but also to include new items such as risk management, technology transfer, communication, as well as legal, financial and insurance aspects of contaminated land. The generous grants and scientific contributions from Germany, the Netherlands and the United Kingdom, are also supplemented by support from national and regional governments of Finland, Spain and Switzerland.

The conference themes are:

- International
- Policies and strategies
- Investigation and characterisation
- Risk assessment
- Remediation and treatment technologies
- Land reuse, legal and financial management.

The conference will include lecture sessions, workshops, technical tours and an exhibition.

Contact details are given in the calendar of events opposite.

### Publication on clean-up technologies

A "Compendium of soil clean-up technologies and soil remediation companies" has been published recently by the United Nations Economic Commission for Europe (UN/ECE).

The publication has two parts. In Part I there are descriptions of 19 established commercial soil remediation technologies. Part II lists over 500 soil remediation companies in 19 countries.

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# CARACAS update

by *Harald Kasamas*

Some of the major outputs of CARACAS, which is now in its third and final phase, are:

- RTD database
- CARACAS web site
- CARACAS report on "State-of-the-Art on Risk Assessment for Contaminated Sites"
- "RTD needs" paper

The RTD database includes more than 600 on-going R&D projects on risk assessment of contaminated sites in Europe. To stimulate scientific co-operation in Europe this database will be made available to interested researchers.

The CARACAS web site has been launched. Its address is:

<http://www.caracas.at>

We aim to make this site a major information source on contaminated land risk assessment for scientists all over Europe.

The "State-of-the-Art on Risk Assessment for Contaminated Sites" report, which describes the current state of scientific knowledge and summarises national approaches in European countries, is in its final stage and will be published in March 1998.

Based on this report CARACAS scientists prepared a "RTD Needs" paper on contaminated land risk assessment. This paper aims to provide recommendations and guidance for the current development of a RTD work programme within EC Framework V. A copy of the paper may be obtained from the CARACAS office.

## Co-operation with NICOLE

At the 4<sup>th</sup> CARACAS meeting in Bilbao, representatives from NICOLE were invited to comment on the CARACAS State-of-the-Art draft report. The possibility of a joint NICOLE/CARACAS project on risk management was discussed but it has been recommended that this project should be launched within the Concerted Action CLARINET which is described in the adjacent column. A Joint CARACAS/NICOLE Statement on Contaminated Land Research Needs was prepared in October 1997. This document is available on the NICOLE web site. The German Umweltbundesamt (CARACAS leading organisation) will organise an international workshop on "Risk Assessment Models and Risk Management" in April in Berlin. NICOLE representatives have been invited to present an industrial view. A joint CARACAS/NICOLE workshop, where both networks will present and discuss their conclusions with a broader audience, has been scheduled at ConSoil'98 in Edinburgh. Representatives from both CARACAS and NICOLE will lecture at the Summer School to be held at the Austrian Research Center Seibersdorf in July (see pages 2 & 12).

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# CLARINET

by *Martin Schamann*

The Contaminated Land Rehabilitation Network for Environmental Technologies (CLARINET) is a new Concerted Action due to start in Spring 1998. The primary objective of the 3 year programme is to support the development of technical recommendations for sound decision making for the rehabilitation of contaminated sites based on current scientific knowledge.

CLARINET will also provide an interdisciplinary scientific network to stimulate international co-operation on priority research needs focused on the rehabilitation of contaminated sites, involving major interest groups on contaminated land issues such as scientists, authorities and industry.

Most of the EU Member States are developing strategies to tackle problems posed by contaminated sites but, with growing experience, it is clear that international co-operation and information exchange is highly beneficial.

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**CLARINET**  
**...rehabilitation of contaminated sites**  
**will benefit**  
**from**  
**this new Concerted Action**

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An international network will be established that includes scientists from different research disciplines, representatives from authorities, industry and international initiatives on contaminated land. This network will identify, compile and assess scientific approaches and R & D projects in relation to support the decision making for the rehabilitation of contaminated sites. Based on this synopsis, scientific priorities for future programmes and projects of DGXII and the EU Member States will be proposed and international co-operation on current and planned R & D projects stimulated.

The main focus will be on the selection of the most appropriate remediation option in the context of scientific, environmental and socio-economic issues.

CLARINET will integrate the results from other research actions relating to contaminated land, including CARACAS and NICOLE, and will reach conclusions on, and make technical recommendations for the rational management of contaminated sites.

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## Risk Communication

### Addie Weenk

The objective of this project is to develop a practical guideline for risk communication on contaminated land. The guideline will emphasise the role of a decision maker as manager of a multi-aspect and multi-actor process. The guideline will be supportive in predicting and recognising communication processes and in carrying out these processes. It will be based on existing knowledge on risk communication, case studies (positive and negative) and opinions and attitudes of relevant people (decision-makers, authorities, local communities, press) in risk communication.

### Rationale

Individual's perceptions of risks can put pressure on people involved in assessing and remediating a site. This pressure may affect the decision making process. Too many and too severe measures may have to be taken in order to reassure people and to regain their trust. This can have negative outcomes for problem owners, but also for society in general. Unnecessary public alarm should be avoided. Important activities to achieve this are informing, involving and communicating with the right parties at the right time in the right way: risk communication.

As was recognised at the NICOLE-meeting in Nancy (November 1996), the subject of risk communication is normally not covered by scientists or engineers involved in site assessment, risk assessment and remediation.

### Partners

The project, which is expected to start in March 1998, will be carried out by a project team formed by:

- TNO Institute of Environmental Sciences, Energy Research and Process Innovation
- Questor and the School of Psychology of The Queen's University of Belfast, Northern Ireland
- NOK Networking Organisation on Environmental Quality
- Schelwald-van der Kley Environmental Consultancy and Training

### Help from NICOLE readers

We would like to ask NICOLE readers to let us know about interesting cases of risk communication on contaminated land. These cases will play an important role in setting up the guideline. All information will be treated as confidential.

If you are interested in investing in this project or would like further information please contact:

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## Good Survey Practice

### Joop Okx

Collecting soil pollution data is expensive, therefore, effective and efficient investigation strategies should be developed. Problem owners are primarily interested in the answer to the question "Is the contamination such that it requires costly action?" Thus, sample surveys or tests should be related to this question. NICOLE's "Good Survey Practice" project will provide (geo)statistical answers to questions such as:

- What is the chance that a contaminated spot exists although no contamination was found in the sampling survey?
- What are the uncertainties related to the estimated volumes of polluted soil?

In the project we will use the theoretical knowledge and practical experience available in the consortium to match industries' demands and researchers' offerings.

### Background

The project was born in the NICOLE meeting in Brussels where AKZO, Nobel, BNFL, Port of Rotterdam and Solvay gave moral support to the proposal. After the meeting we gradually developed the proposal into something acceptable to all. Although it would be possible for each of the developing parties to perform most of the work, we wanted the consortium to reflect NICOLE's European character. Therefore we formed a group to develop the project:

- Department of Soil Science, University of Reading
- Centre de Géostatistique, Ecole Nationale Supérieure des Mines de Paris
- Research and Development Department, Tauw Milieu

Just after the group's formation LABEIN gave us a pleasant surprise: their contribution and additional funding.

It is obvious that joining NICOLE brings profit: in this case the return of investment for the participating industry is 500% (a 50,000 ECU project for 10,000 ECU)! For the developers there are other rewards: they will be able to learn faster than usual by working in the group and the "Good Survey Practice" project can, and is intended to be, the starting point for something which might fit in one of the European RTD Programmes.

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# Natural Attenuation

## Anja Sinke

The decision on the application of Natural Attenuation as a management strategy depends on an array of scientific, economic and political criteria and should be based on the risk analysis of the specific site. To evaluate the potential applicability of Natural Attenuation as an environmentally sound solution, it is necessary to implement a technical protocol to confirm and quantify its efficacy.

The general objectives of our project "Natural Attenuation: Guidelines for Acceptance" are:

- to promote the acceptance of natural attenuation as a part of a cost effective and environmentally sound solution for contaminated sites
- to provide a technical basis for risk based application of Natural Attenuation.

### Approach

In the first phase of the project which will start in January 1998, the existing information on risk orientated protocols will be collected, schematised and summarised. All NICOLE members are invited to give their suggestions and complete the document that will be sent out in April.

In addition a glossary with commonly used terminology will be prepared because there often appears to be misunderstanding in discussions with regulators and public organisations. The lay-out of this glossary will receive special attention to make it user friendly so that it can help to enhance the acceptance of Natural Attenuation.

In the second phase a guideline to judge the applicability and efficacy of Natural Attenuation will be formulated and tested on ongoing pilot and field studies under NICOLE members. Finally the definitive form of this guideline will be presented to the NICOLE and CARACAS community.

### Partners

Dr Anja Sinke, TNO & Dr Isabelle le Hecho, CNRSP. Sponsored by: BP Oil Europe, Belgium; Elf Aquitaine, France, Ford Motors, Germany; Nestle Oy, Finland, Powergen, UK; Port of Rotterdam, The Netherlands; Solvay, Belgium.

Extra input of knowledge and expertise will be provided by Aspinwall, UK and ICI, UK.

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# Rapid Site Assessment

The Petroleum Environmental Research Forum (PERF) is beginning a new project that will focus on Rapid Site Assessment issues. The objective of the programme is to develop, apply, and transfer technology and information which will assist in rapid, cost-effective approaches to site characterisation. The project will be used as a forum for:

- exchanging information about new technologies and frameworks
- promoting a greater awareness and understanding of rapid site assessment approaches

# Comparison of Remedial Technologies

## Joop Okx

In this project we want to collect European views on the REC framework. REC (Risk reduction, Environmental Merit and Costs) is a 'Decision Support System' for the analysis and evaluation of alternative clean-up strategies for a polluted site. Its aim is to support the choice of the most effective and efficient strategy for soil remediation. REC will allow the user to assess the results of clean-up in terms of:

- Risk Reduction. The extent to which a clean-up option reduces the risks for humans, ecosystems and other targets on the site.
- Environmental Merit. The degree to which a remedial action achieves a positive environmental balance. Remedial operations prevent the spread of pollution and increase the stock of clean soil and groundwater. However, they also use up resources, such as energy, water or space, and may pollute other media, like air or water. Environmental Merit states the balance between environmental benefits and costs.
- Costs. The total costs necessary to clean-up the site. Costs include preparation, operation, maintenance and monitoring costs at all phases of the operations.

The framework has been developed in the Netherlands, but with the help of our partners – BNFL, British Steel, Ford, ICI, Port of Rotterdam, Solvay, Welsh Development Agency – we would like to find out whether internationalisation of the REC framework is something worth trying.

It is a small (7000 ECU) project, which should be considered as a starting point for something more substantial. Labein has showed their interest in developing a bigger project. We would like to know whether there are more parties interested in developing a proposal for a European RTD Programme and we would like to know whether you are aware of similar developments.

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- advancing regulatory acceptance to the approach. Currently, five petroleum companies have submitted proposed research contributions and several NICOLE members and government agencies have indicated an interest in participating. The work required to complete this project will be shared by programme participants; however, people who wish to make a monetary contribution may also participate.

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# NICOLE's 11 priority projects on track

by Patricia De Bruycker and Pierre Coërs

During the coming year short-term, well-focused objectives will be pursued. These were decided during our Topic Development Meeting at SOLVAY (one of the founding members of NICOLE) in September 1997, and are significant outputs of NICOLE.

Ambitious targets for NICOLE were set at the inaugural meeting (*NICOLE News*, V1 N1 p1), these included launching "NICOLE inspired" research and action to develop workable solutions for contaminated land.

The key questions at our meeting were:

- Which of the 26 preliminary proposals that were presented deserved priority?
- How can they be tackled in practice?

Eleven out of the 26 proposals were selected for immediate attention.

This meant identifying sources of funding either from private companies or other funding schemes, and identifying NICOLE members willing to participate and progress the work.

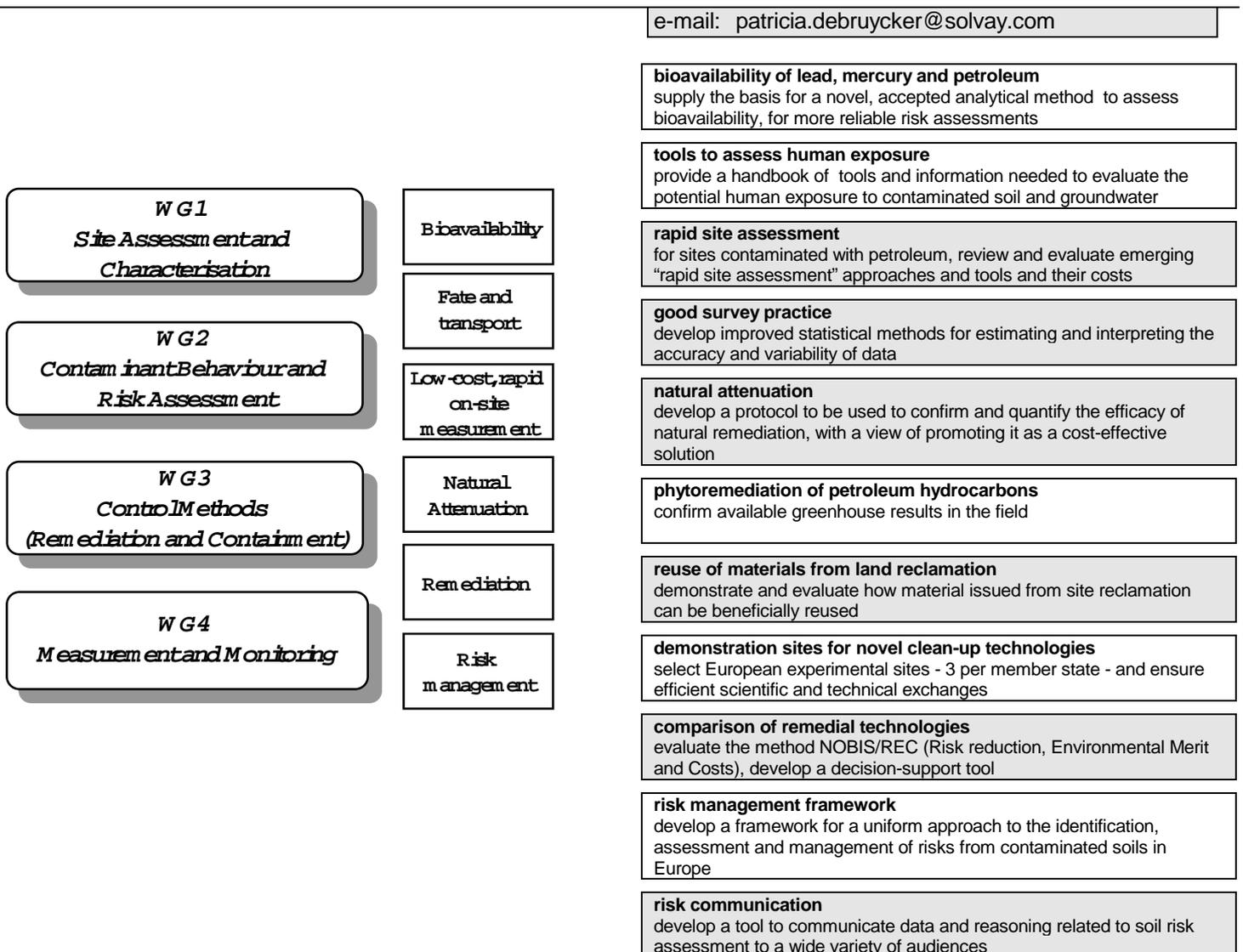
Eleven priority projects were selected. All the selected topics will be carried out jointly by members from public research and private companies. This combination of academe and industry should lead to useful outputs within a reasonable timescale. We feel that this step-by-step approach is the right way for the further development of NICOLE.

The topics on which progress can be expected in the near future are listed below. The six 'shaded' projects are discussed in more detail in this issue (*pages 1, 4 and 5*).

For further information contact:

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## 4 Working Groups proposed 26 projects under 6 topic headings... 11 selected for action



# Industry Subgroup

## *Lida Schelwald-van der Kley*

The NICOLE Industry subgroup met twice in the second half of 1997. On both occasions, hosted by SOLVAY and ICI respectively, the attendance was high (over 20 industrial representatives were present). Credit must be given to our former Chairman, Cees Buijs, for bringing the Industry Subgroup this far. The role of chairman has now been taken on by Bill Hafker from Exxon. Fixed items on the agenda that were discussed included the exchange of information with ISO/CEN and with sister networks such as CARACAS, the American RTDF and the Dutch programme on *in situ* bioremediation (NOBIS). One of the accomplishments of the successful co-operation between CARACAS and NICOLE was the issue, in October 1997, of a joint statement on the research needs for risk assessment and management in Europe. The 2 Concerted Actions approach the problem from different perspectives (NICOLE's focus is primarily on industrial sites, whereas CARACAS has the broader perspective of governments who have decisions within a national contaminated land policy and planning framework). However, both reached a consensus on the definition of research needs.

Another accomplishment was the joint NICOLE/NOBIS conference held in Amsterdam in October 1997. The R & D progress on topics is another returning item on the agenda. At the Workshop in Brussels on 11 September 1997 11 topics were successful in attracting financial or other support of participants. Progress on these projects is discussed at regular intervals.

In early spring 1998 the Industry Subgroup will meet again, this time in the Netherlands. An ISO/CEN representative from the Technical Committee on Contaminated land has been invited to attend this meeting to discuss the involvement of NICOLE in standardisation.

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## NOBIS/NICOLE

### *Joint meeting described by Harry Vermeulen*

A highlight of 1997 was the annual NOBIS conference, combined on this occasion with NICOLE, held in Amsterdam in October. The opening speech of Mr Bemmer, Director General of the Dutch Ministry of Economic Affairs, made it clear that the new soil remediation policy in the Netherlands is based on risk assessment related to the use of the ground. Standard allowable maximum concentration levels are no longer the main targets for soil remediation. This new policy is more in line with the soil remediation policies in several other European countries. This makes co-operation between Dutch and other European researchers and consultants more relevant and promising than before.

For this reason we are even more pleased that, as a result of the combined conference, NICOLE and NOBIS made plans for close co-operation in several areas. The exchange of information will be intensified via NICOLE News and Internet. NOBIS will make an official agreement with the RTDF concerning exchanging know-how from the R & D projects carried out by both organisations. It was also agreed that in 1999 NICOLE and NOBIS will organise a second combined NICOLE/NOBIS conference (see page 10 for information on NOBIS R & D programme).

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## NICOLE web site

(continued from page 1)

### *Paul Bardos*

The NICOLE web site contains:

- a review of NICOLE's activities, history and organisational structure
- the latest announcements from NICOLE
- a listing of NICOLE's past and forthcoming conferences
- e-mail and web form contact information
- members' links to put you directly in touch with fellow members
- membership information and requirements
- NICOLE News, past and current issues on-line
- the latest and information and links for NICOLE's projects
- a publications listing for NICOLE's documents, which are mostly available on-line.
- information and contact details for the NICOLE Research Directory
- a review of NICOLE's research themes and the NICOLE research opinion.

Links to national agencies and initiatives and links to selected information providers are also provided.

The NICOLE web site is only at a prototype stage and we would welcome your suggestions about how it could be improved and how it might be best used.

I would also point out that the prototype is still being built! For example, not all of NICOLE's projects have provided information yet. If you believe you have some information to add - e-mail it over!

I would like to see lots more suggestions for links to other national initiatives and agencies and I would like each NICOLE member to e-mail me their own URL so that I can complete the list of members' links. Ultimately I rely on your help to make this web site a success. I look forward to hearing from you.

Paul Bardos  
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# Soil Topic Centre

## **Gundula Prokop, Austrian Federal Environment Agency**

The European Topic Centre on Soil (ETC/S) was established in October 1996 and operates under contract to the European Environment Agency, for a period of three years. The ETC/S is a consortium of 8 expert institutions in 8 EEA Member States. The topic "Contaminated Sites" is one of the major tasks of the ETC/S and is dealt with by the Austrian Federal Environment Agency in co-operation with the Geological Survey of Denmark and Greenland. The major objective of work carried out by the ETC/S on behalf of the EEA is to promote the harmonisation of terminology and to develop a common methodology for setting up national inventories by providing the Member States with a common framework.

### **Activities**

Firstly, data on the management of contaminated sites in the EU and EFTA Member States were collected, reviewed and compared. The following categories were used to structure the information:

1. legal aspects
2. existence of inventories or registers
3. data on potentially and definitely contaminated sites
4. site identification methodologies
5. funding systems
6. estimates of the scale of the problem.

Secondly, currently applied site identification methodologies and their comparability were thoroughly examined. This was done by finding out which countries/regions have published guidelines on the issue of identification of contaminated sites, and by comparing basic principles of the procedures described, such as basic data-sets and sampling protocols.

The results of the above activities have been published in a Draft Report which is currently under the review by the European Environment Agency.

### **Selected Results**

The existence and availability of data on contaminated sites has been investigated in the 1<sup>st</sup> year's programmes of this Task Group. In line with the expectations the obtained data are very heterogeneous.

About two thirds of the Member States apply systematic identification schemes, which are hardly comparable though. Together some 300,000 potentially contaminated sites have been identified and at least twice as many are estimated to exist.

For definitely contaminated sites only about a half of the countries surveyed can provide figures. Up to now less than 10,000 sites have been verified as definitely contaminated and posing a significant risk to human health and the environment. However, much more site surveying has to be done, which is expected to bring about a sharp increase in the number of sites.

Attempts to estimate the size of the problem have been made by several countries, representing about two thirds of the surveyed area. The provided figures are again too heterogeneous to allow an aggregation. It is estimated that total clean-up costs on a European scale are somewhere in the order of 100,000 million ECU.

### **On-going and future activities**

Results from the first survey will be reviewed and completed. A test study in co-operation with selected European regions will be conducted aimed at defining indicators of contaminated sites to better quantify the problems posed by contaminated sites.

Most emphasis will be put on:

1. comparability of sites
2. comparison of clean-up costs
3. comparison of information levels used to identify potentially contaminated sites.

The participation of further volunteering regions will be stimulated as a long term objective.

### **Expected Results**

The development of contaminated sites indicators will allow better estimation and quantification of the risks and costs posed by contaminated sites in regions where the availability of data is very poor.

The investigation of currently applied systems and their data availability shall allow to set up a design for a common framework on contaminated sites management at the European level.

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<http://homepage.tinet.ie/~jcastle/etc>

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# SM&T workshop

## **Philippe Quevauviller reports**

A workshop on Standards, Measurements and Testing for Solid Waste Management, organised by the SM&T programme of the European Commission was held in Pau, France on 5 - 7 May 1997. (for background information on SM&T see NICOLE News V1 N2 p4).

New regulations related to industrial waste management have the ambitious objective of stopping the direct release of wastes in 2002. This implies that wastes from different origins should be treated for possible recycling. The effect of different waste treatment processes needs to be accurately determined to ensure correct waste management. The quality of treatment processes and of final (recycled) products relies on the availability of standards (such as those prepared by CEN or ISO) and testing methods (e.g. chemical analysis for assessment of environmental risks or landfill use). Clearly, there is a need for developing and validating methods of measurement. The workshop aimed to stimulate partnership between industry and research.

The following topics were discussed:

- Field measurements and screening tests
- Rapid techniques for physico-chemical characterisation
- Elaborated measurement techniques
- Modelling, expert systems and data-bases
- Standards, reference materials and quality control

Written standards for sampling and sample pre-treatment exist for soil analysis (ISO) and waste (draft CEN standard). Participants stressed that it is not possible to produce standards which would be applicable to all cases but rather guidance documents based on previous experience.

Rapid techniques for physico-chemical characterisation - the term "rapid" has different meanings for different organisations. Three levels of assessment were identified:

- characterisation, e.g. first step to identify major problems or to complete main analysis by screening on field
- short procedures (maximum 2-4 days)
- *in situ* verification (less than one hour, cheap and simple tests).

Participants recognised that one test is generally insufficient and recommended a combination of several short tests.

The different types of modelling were considered:

- geochemical modelling (equilibrium condition)
- water transport modelling
- release modelling (dynamic and local equilibrium)
- chemical interaction/transport modelling.

General concern was expressed that models can become too complex. Validation and recognition of the limits of modelling are a vital issue.

For further information on the workshop contact:

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# NATO/CCMS

## **Steve James, US EPA**

The NATO/CCMS Pilot Study: Evaluation of Demonstrated and Emerging Technologies for the Treatment of Contaminated Land and Groundwater (Phase III) will meet in Vienna, Austria from 23-27 February 1998, to discuss common issues and problems associated with the management of contaminated land. At this meeting, a special session will address treatment walls for the control of contaminated groundwater. The session, lead by Germany, will include presentations from several European and North American countries.

### **Phase III - focus and output**

Building a knowledge base for innovative and emerging technologies is the impetus for this pilot study. The focus of Phase III will be the technical approaches for addressing the treatment of contaminated land and groundwater. This phase will draw on the information presented under the previous studies and the expertise of the participants from all countries.

The output will be summary documents addressing

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**Developing nations  
are especially  
encouraged to participate.**

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clean-up problems and the array of currently available and newly emerging technical solutions. Issues of sustainability, environmental merit, and cost-effectiveness will be enthusiastically addressed.

- Principles of sustainability address the use of our natural resources.
- Site remediation addresses the management of our land and water resources.
- Sustainable development addresses the re-use of contaminated land instead of the utilisation of new land.

These appeal to a wide range of interests because they combines economic development and environmental protection into a single system.

The objectives of the study are:

- to evaluate technologies critically
- to promote the appropriate use of technologies
- to use information technology systems to disseminate the products
- to foster innovative thinking in the area of contaminated land.

The pilot study is open to both NATO and non-NATO countries. Developing nations are especially encouraged to participate.

For further information on the pilot study contact:

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# NOBIS

## Jos Verheul

At the beginning of a new year NOBIS looked back at a successful second full year of operation (a description of NOBIS appeared in NICOLE News V1 N1 p9).

### Research programme

NICOLE members have formulated their main research and development topics. A number of these topics are also being developed as NOBIS projects. Probably the extensive discussions at the European level have led to this remarkable overlap. The development of risk assessment and management tools is one major topic in common. Within NOBIS, the REC project (Risk reduction, Environmental Merit and Costs) deals with the development of such a decision support tool. The second phase of this project was recently finalised. An operational version of this assessment tool is now available and will be implemented and tested in practice (see page 5 of this issue of NICOLE News). Another NOBIS topic, Restrisk (assessment of remaining risks after groundwater remediation), has led to the development, implementation and testing of a tool as a basis to decide whether to stop the remediation activities for assessing the risk of contaminant migration.

A second common field of interest between NICOLE and NOBIS is the development of extensive bioremediation techniques and natural attenuation. Several NOBIS projects are focused on these topics. For example, the Rademarkt project in Groningen and the VECOM project in Maassluis. In Groningen the natural anaerobic biological breakdown of chlorinated hydrocarbons is being studied. In the second phase of

zone. In Maassluis the completely anaerobic degradation of chlorinated hydrocarbons is stimulated by the addition of compost extract, a very active co-substrate for dehalogenating bacteria.

The emphasis on physical, chemical and biological processes in the soil in extensive, longer lasting remediation activities, increase the demand for reliable and cost effective monitoring and measuring instruments, preferably also *in situ*. In the NOBIS programme, in co-operation with NOVEM (Netherlands Agency for Energy and the Environment) 4 new monitoring instruments are being developed for *in situ* monitoring of oxygen, mineral oil, BTEX and chlorinated hydrocarbons. The last 2 are based on fibre optic technology.

In the table below an overview is given of the research items formulated by NICOLE members and NOBIS projects that deal with these subjects. This overview shows how results of the NOBIS projects can be made available for the NICOLE projects and how experiences of the NICOLE and NOBIS projects can be exchanged to get maximum benefit out of investment in research.

NOBIS is very willing to work out ways of exchanging experience with participants of NICOLE.

For further information contact:

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NICOLE research topics	NOBIS R & D projects
<b>Risk based land management</b> Communication of results of risk management Integrated comparison of remediation technology Cost effectiveness of extensive remediation	REC, Restrisk, Intelligence of soil REC REC, phase 3
<b>Site characterisation</b> Robust, rapid, low cost techniques Accuracy and variability	Oxygen-, Oil-, BTEX and CHC probes
<b>Bioavailability</b> Bioavailability and chemical structure/uptake mechanisms Parameters determining bioavailability Cost effective determination methods Determination of bioavailability fraction of contaminants Biosensors for risk levels	Bioassays, Nematodes as a test organism, Extensive landfarming and ecological restoration
<b>Natural attenuation</b> Protocol for natural attenuation Soil parameters determining natural attenuation Degradation potentials of soils Monitoring of plume development Monitoring <i>in situ</i> remediation	Natural attenuation Rademarkt Groningen, Textile cleaning pollution Flexible emission monitoring <i>In situ</i> monitoring
<b>Fate and transport</b> Human toxicological risk models Eco-toxicological risk models Assessment of contamination migration	Restrisk
<b>Remediation</b> Long term behaviour or residual contamination Predictive test for long term behaviour Treatment of residuals Demonstration sites for novel techniques Photo- and rhizo-remediation Monitoring <i>in situ</i> remediation	<i>In situ</i> monitoring

the project (a pilot study) this degradation will be stimulated locally by the application of a bioreactive

# Contaminated Land and Insurance

## Simon Johnson

Environmental and financial risks for buyers, sellers and lenders are major concerns for any property deal, which must be of interest to NICOLE members. Buyers are concerned about acquiring environmental risks that have not been quantified. Sellers are anxious about the retention of liability after they sell the site. Lenders worry about the credit risk presented by borrowers and about the value of their security.

For example in the UK, to allay worries about environmental liability, people with a financial interest often try to rely on complex warranties and indemnities. The uncertainties and complexities in drafting such documents make this generally unsatisfactory. Also, warranties are only as good as the credit worthiness of the people giving them.

### The needs from insurance

Insurance works best where many adverse events could happen but only a few do. The insurer compensates those who suffer from the events that happen and the cost is spread across everyone exposed to the potential events through the premium. If the premium is too high then the insurance will not sell. Conversely, if the premium is too low to cover the risk then the insurer will go out of business and cover will not be available to anyone.

Buyers, sellers and lenders require environmental insurance for their different needs which include the following features:

- **Acceptance of Risk.** To date the UK's environmental insurers have been prepared to insure only clean or low risk sites. Indeed, insurance has often been dependent on the people seeking insurance for a site having it audited exhaustively at their own expense by one of the insurers' chosen consultants.
- **Broad Cover.** Insurance that provides cover for on-site and off-site risks, bodily injury, economic loss, full civil liability protection and clean-up costs (both mandatory and voluntary) is needed. Policy wording must be comprehensible and must not contain extensive exclusions or a cancellation clause (which enables the insurer to withdraw cover unilaterally).
- **Long Duration.** Some UK prospective buyers of insurance (landowners, property developers and institutional investors) require environmental cover for 20 years or more (to match the duration of leases or loan agreements).
- **Cost Effective.** Insurance is often reluctantly purchased. However, environmental insurance has the potential to speed up property transactions and it can make the difference between a transaction going ahead or failing.

Businesses want solutions that are specifically designed to help them to manage land contamination risks for the long term, enhance the value of suspect land and protect against potential liabilities.

### Approaches to insurance

**Public Liability Policy** The Association of British Insurers addressed the issue of providing cover for historic or gradual contamination within public liability insurance by introducing the following in 1991: *'This policy excludes all liability in respect of pollution or contamination other than caused by a sudden identifiable unintended and unexpected incident which takes place in its entirety at a specific time and place during the Period of Insurance.'*

### Consultant's Professional Indemnity Insurance

Many owners and occupiers rely on the professional indemnity insurance of the environmental consultant/engineer to cover the emergence of contamination related issues.

**Collateral Warranties** Collateral warranties are used to enable the recommendations in consultant's reports to be relied upon by third parties.

### Specialist Insurance products

There are several insurance products on the market that seek to address contamination issues. Although hundreds of these generic Environmental Impairment Liability (EIL) types of policy have been issued in the USA, relatively few have been recorded as being sold in the UK since their introduction in the early 1980's.

From this understanding of residual risk, insurance solutions have been developed which give:

- Land Contamination Insurance (for up to 25 years) covering historic contamination
- Remediation Stop Loss to prevent the escalation of clean-up costs
- Secured Loan to provide lenders with an alternative to going into possession of environmentally suspect or contaminated land which it has taken for security
- An insurance alternative for businesses which would otherwise hold reserves against potential environmental liabilities
- Portfolio options for more than one site
- Risk Transfer and Risk Financing against future liabilities and remedial action costs, where insufficient information is available to provide immediate and full risk transfer
- Operational risk for on-going processes which could give rise to contamination in the future.

Certa is a new company offering all the above insurance solutions through a process of technical audit, legal and financial review. This 'certification' approach includes an independent audit of the client's consultants' reports on the environmental condition of the site, judged against a consistent good practice standard.

We would be very interested to hear from NICOLE members about their views on the insurance solutions available in their own countries.

For further information contact:

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# Letter Box

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Dear Editor,

As chairman of NICOLE I felt bound to reply to the letter from Dr Bramley published in the last issue of *NICOLE News*. I note Dr Bramley's desire to avoid another R&D talking shop. It was never NICOLE's intention to be all talk and no action. Indeed NICOLE speaks through its actions, for example

- the publication of the NICOLE Research Opinion, August 1997 (used to guide the joint statement on research with CARACAS in October 1997)
- a first suite of NICOLE projects
- a web site to facilitate co-operation between NICOLE members.

Yes it has taken some time for these actions to take place. I think that this entirely natural. NICOLE is a network representing different countries and including members with very different backgrounds and interests. It takes time for members to build confidence in each other. Discussion, sharing ideas and information, is a key part in this confidence building - so talking has been an important part of NICOLE. We believe that researchers, industry and regulators should talk to each other, so we do not excuse it we applaud it, and the fruits of this new confidence to collaborate are beginning to emerge.

On the specific issue of the content of *NICOLE News*, this newsletter is not intended to be a detailed "scientific journal" it is intended to be a forum for the network. It fulfils its agreed objectives and its style is deliberately informal. Space is always limited in a newsletter and NICOLE's detailed views are published separately. However, we do agree that it is important that those interested in NICOLE to have ready access to its work in detail and we have therefore established a web site (<http://www.nicole.org>) to supply this.

Finally, I and my NICOLE colleagues fully agree with the need to discuss best practice, hence the articles from various NICOLE members in *NICOLE News* in the past. We are not in the position to develop prescriptive best practice guidance alone. We believe that this should be a joint process involving CARACAS and CLARINET among others as well.

**Martin Bell, Chairman, NICOLE**

Dear NICOLE members,

We would like to draw your attention to an advanced study course 'Soil remediation - an overall approach to a complex subject' that will be run in 12-18 July 1998, in Vienna by the Austrian Research Centers as part of the EC DG XII-D Science Research and Development Environment and Climate Programme. The main goal of the course is to promote the exchange of ideas and practical needs between representatives of academia and industry. Special emphasis will be put on innovative technologies and developments in risk assessment and remediation. Young scientists, experienced senior scientists, representatives of industry, problem holders and regulators will be able to come together in multi-disciplinary workshops. The topics covered will include site investigation, risk assessment, contaminant behaviour, transport of pollutants, measuring and monitoring, and remediation (needs, technologies and applications).

The deadline for applications is 1 April 1998. As the number of participants is limited a selection will be made by a Scientific Panel together with the European Commission Services. Full details of the programme, its cost and an application form can be obtained from us or downloaded directly from our web site ([http://www.arcs.ac.at/fzs/bereiche/\\_v/asc.htm](http://www.arcs.ac.at/fzs/bereiche/_v/asc.htm))

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Dear NICOLE members,

There is now a solution to heavy metal contamination called 'Molecular Bonding System'. It can be carried out on site and either *ex situ* or *in situ*. The technology has the full backing of the Environmental Protection Agency in the USA and a mobile waste management licence in the UK. It is extremely cost effective, removing the need to transport contaminated soil to landfill and allowing remediated soil to be left on site. It is an environmentally friendly solution that removes the ability of the heavy metals to leach. MBS works by converting the heavy metals from their reactive leachable state into non-leaching insoluble sulphides. Tests have indicated that the stabilisation is long term (1000 years). If you would like to know more or would like to discuss MBS please contact me.

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*NICOLE News* is intended to serve as a platform for debate in the network. Your ideas, articles and letters are very welcome! Please send them to the editor or deputy editor. The deadline for publication is 1 June and 1 December each year.

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