



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*

Volume 3 Number 2 January 1999

NICOLE continues

Cees Buijs, NICOLE Chairman Designate

NICOLE is set to continue beyond the end of its funding support from the EC Environment and Climate Research and Development Programme at the end of January 1999. An important success for NICOLE has been the development a platform of mutual trust and understanding between a diverse range of members which is the basis for the open exchange of information and development of collaborative research, development and demonstration activities. NICOLE has an expanding portfolio of projects (see pages 6-10) and is actively involved in the stimulation and encouragement of proposals for the forthcoming EC Fifth Framework Programme. It is my pleasure to lead the transition team which has been developing the way forward for NICOLE in 1999, following the consultation exercise that was carried out over the Summer.

I think that the development of NICOLE has been a kind of organic evolution. There have been three broad stages in this evolution: recognition, effectiveness and continuation. After a lot of hard work I am confident that we have now reached the effectiveness stage, and the survey of options for the future indicated general support for a similar range of services and functions as now to be continued in the future.

We will have to reduce our activities somewhat now that we no longer have EC funding support, and this has been one of the major challenges for the transition team. Over the next three years we plan to:

- operate NICOLE as a self-funded network
- enhance its information exchange activities (through its web site and continued conferences)
- develop its effectiveness in stimulating new collaborative ventures.

I invite you to read more about our future plans on page 12.

Finally, I must acknowledge the tremendous help we have received from the European Commission, both through its financial support *via* the Environment and Climate programme, and also through the interest and enthusiasm of DGXII and ICI, and in particular Jürgen Büsing, Dale Laidler and Martin Bell. We fully intend to continue our good relationship with them, even although they no longer have to pay for us!

Inside includes

NICOLE project reports (pages 6 - 10)
EC Fifth Framework Programme (page 4)
CARACAS and CLARINET (page 3)

Martin Bell

I was going to start in the usual way by saying that it scarcely seems a moment since we attended the inaugural meeting of NICOLE in Hannover in May 1996, bright eyed and full of trepidation, but that would be wrong - looking back (always a dangerous thing to do) it seems a long road with a few bumpy patches and a steep climb. At the top of the climb we stopped and saw yet more hills to get up!

But that reflects where I think we all are - a good start has been made for which we all feel committed, we now have broader ownership of the aims of NICOLE, and we are beginning to achieve working relationships with important groups of people.

Many people ask me why ICI put so much effort into NICOLE - the answer is simple: we recognised that existing technologies were expensive and inadequate and that we needed to stimulate the development of new technologies and enable leveraged collaborations. This is not yet fully achieved so we shall remain active members of NICOLE for the future.

I have met many committed people bursting with ideas, and that has been a pleasure. However I would like to single out for a special mention the *NICOLE News* team, the NICOLE Secretariat, and the long suffering members of the Steering Committee.

Good luck!

Reflections on NICOLE

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| Calendar of events | Dates |
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| NICOLE Steering Group Meeting Cologne, Germany Marjan Euser Fax: +31 55 549 3231 e-mail: m.euser@mep.tno.nl | 1 Feb 1999 |
| NICOLE Industry Subgroup Meeting Ford, Cologne, Germany Lida Schelwald-van der Kley e-mail: schelwald.vd.kley@worldonline.nl | 2 Feb 1999 |
| NICOLE Network Meeting Bilbao, Spain Theme: Contamination by heavy metals (characterisation, remediation) Marjan Euser e-mail: m.euser@mep.tno.nl | 20-21 May 1999 |
| Risk Assessment - Special Session at the European Geophysical Society Annual Meeting, The Hague http://www.mpae.gwdg.de/EGS/index.html | April 1999 |
| International Workshop Recycling of Derelict Land Herne, North Rhine - Westphalia Karin Freier Fax: +49 30 8903 2103 e-mail: karin.freier@uba.de | 4-6 October 1999 |
| Soil Contamination Research in Australasia and the Pacific (SCRAP) 2 nd International Conference, New Delhi Rajendra Prasad e-mail: Rajendra.Prasad@BC-DELHI.BCINDIA.SPRINTSMX.ems.vsnl.net.in | 12-17 Dec 1999 |

NICOLE News

Paul Bardos

This will be the last issue of *NICOLE News* in its current format. In the future *NICOLE* will rely more on its web site and e-mail for information dissemination, although a simple "hard copy" newsletter may still be provided. Jacqui Marsh and I have enjoyed our time editing and producing *NICOLE News* and hope that you have found it useful. I am pleased to say feedback on *NICOLE News* has been generally complimentary, and that we have been able to react positively to the suggestions that have been made.

I would like to take this opportunity to thank Jacqui for all her hard work on the newsletter and joint statements. I wish her good fortune in the future. Jacqui previously worked with Colin Ferguson and Ammar Abbachi on the development of the 'Contaminated Land Exposure Assessment (CLEA)' model and will be continuing research in the Faculty of Construction and the Environment at the Nottingham Trent University. As for me, I am delighted to say that I shall continue my role in managing *NICOLE*'s information through its web site and e-mail. So you have not heard the last of me and I look forward to our continued contact.

Add your Link to our Web Site

As you probably already know, the *NICOLE* web site has a list of links for members, which is at:

<http://www.nicole.org/nicmemb.html>. This page is an opportunity for members and visitors to go straight from *NICOLE*'s site to members' own pages. Not all of you have taken advantage of this opportunity. We have therefore added a simple "request us to add a link" function to the list of members. If you are not on our list of links, please use it. We would like to have all members with a web site listed here.

Announcements

The proceedings of the CARACAS International Workshop "Risk Assessment and Risk Management for Contaminated Sites", held on 23-24 April 1998 in Berlin have now been published. Copies are available from Karin Freier (karin.freier@uba.de).

ConSoil 2000

The seventh International FZK/TNO Conference on Contaminated Soil, ConSoil 2000, is to be held on 18-22 September 2000 in Leipzig, Germany. The conference series is now well established as an authoritative forum for all those interested in the problems of contaminated soil.

For further information please contact Biserka Mathes, FZK Germany, e-mail: mathes@psa.fzk.de

NICOLE News

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CARACAS and CLARINET

Harald Kasamas

CARACAS final update

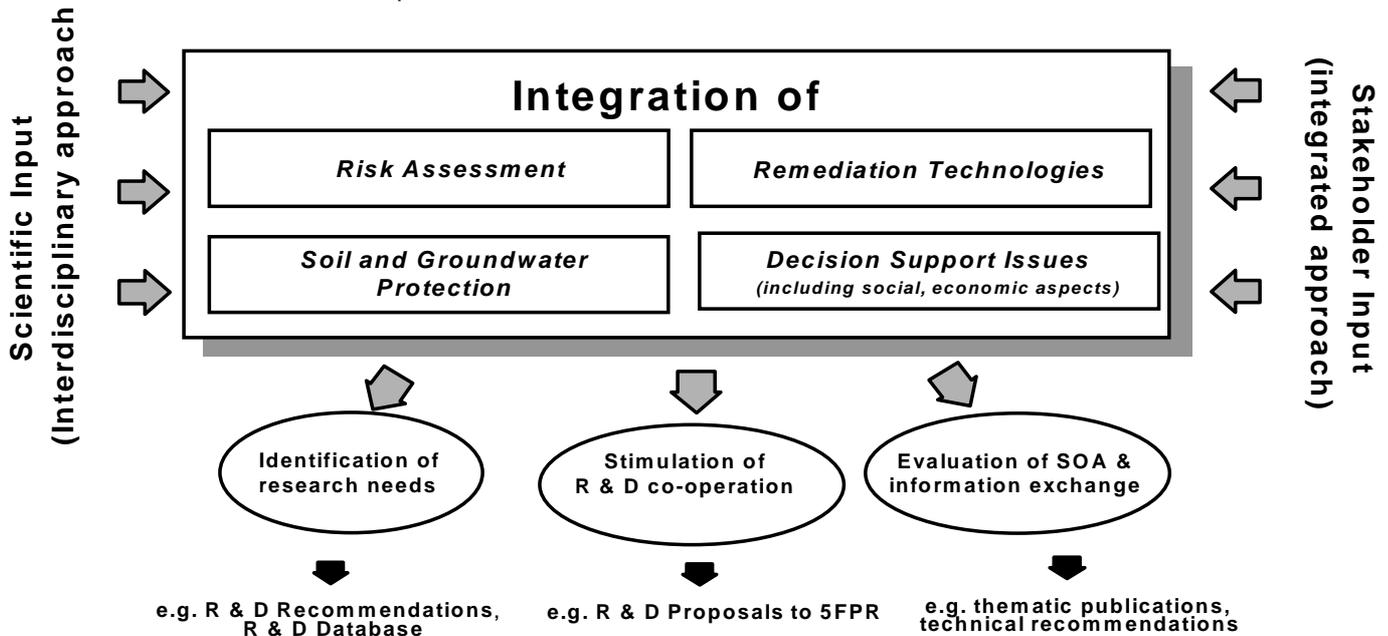
The CARACAS project officially finished at the end of October 1998. Despite the official end, CARACAS continues:

- it will provide a major input into the future Concerted Action CLARINET (see below)
- the CARACAS Website and the R & D Database will be continuously updated
- International CARACAS Workshops on Risk Assessment will be organised in the future.

In the last months, national workshops have been

organised in some European Countries (e.g. London, Rome, Berlin) to inform academics, scientists and problem holders about the conclusions reached by CARACAS and to discuss possible ways of implementing them into national research programmes. The conclusions and recommendations of the Concerted Action CARACAS are summarised in two books: Volume 1 explains the scientific basis and the perceived research needs of Contaminated Land Risk Assessment in Europe and Volume 2 describes the policy frameworks in which risk assessment and management is carried out in the European countries. These books can be ordered from Land Quality Press, e-mail: jane.burroughs@nottingham.ac.uk.

owners and technology developers from 16 European countries. It will develop technical recommendations for sound decision making concerning various contaminated land related problems, such as redevelopment of brownfield sites and urban areas, protection and rehabilitation of groundwater resources, etc. CLARINET will identify and assess current approaches on scientific, environmental and socio-economic topics, and aims to co-ordinate future research activities in this field, at both national and European levels. Additionally, CLARINET aims to stimulate collaboration and co-ordination



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CLARINET - a new Concerted Action has started

CLARINET is a new Concerted Action within the Environment & Climate Programme of the European Commission DG XII, which is co-ordinated by the Austrian Environment Agency. The project started on 1 July 1998 and will continue for 3 years. CLARINET will integrate and combine knowledge of academics, government experts, consultants, industrial land

between various R & D programmes in Europe on contaminated land issues.

At the first CLARINET meeting in Athens at the beginning of October 1998, the working structure was established. The selected themes for further work will address ways to solve priority problems faced with contaminated land. Furthermore the Concerted Action CLARINET will co-ordinate "clusters" of R & D proposals for further submission to the EC Fifth Framework Programme key-actions "The City of Tomorrow" and "Sustainable Management and Quality of Water".

CLARINET and NICOLE

NICOLE is represented on the CLARINET Steering Group and *vice versa*. NICOLE members will be actively involved in this new partnership. The first outcome of this involvement was the publication of the CLARINET and NICOLE Joint Statement "Better Decision Making Now", which addresses the use of risk assessment and risk management for tackling the problems of contaminated land.

Further information from:

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EC Fifth Framework

Paul Bardos

Specific opportunities for problem driven contaminated land research, development and demonstration proposals have been included in the Fifth Framework Programme for Research and Technological Development (1999-2002).

The key actions of interest to NICOLE members are likely to be:

- "Sustainable Management and Quality of Water", with regard to the protection and rehabilitation of groundwater resources; and
- "The City of Tomorrow", with regard to the stimulation of the redevelopment of brownfield sites.

These specific opportunities exist within the thematic programme "Energy, Environment and Sustainable Development". Other possible opportunities include the development of new biotechnological approaches within the Key Action "The Cell Factory". In addition, horizontal programmes offer specific support for small and medium sized enterprises and for supplementing R & D efforts through fellowships and other professional exchange programmes.

A key feature of the Fifth Framework, compared to the Fourth Framework, is to use a problem-solving approach including, where appropriate, clusters of integrated proposals to address particular issues and so maximise synergy.

Last Autumn NICOLE and its sister organisation CLARINET were asked by DGXII to support this cluster approach and have since provided substantial support.

Soils Science Cluster

Michel Jauzein

As part of current research and development initiatives within the Environment and Climate EU programme, a 'cluster' called SCORE (Soil Contamination Research) has been initiated for all on-going projects in the field of soils science. Following the workshop on Environmental Technologies '98 organised in Darmstadt, 16-19 June, where several newly launched projects were presented in this field (see *NICOLE News V3N1 p10*), the co-ordinators of seven projects discussed the possibility of clustering their activities. Clustering of projects helps to promote scientific and technical exchanges between on-going projects complementary to periodic EU workshops. A similar cluster has been initiated for waste water analytical research (WWC: the Waste Water Cluster, co-ordinated by Damia Barcelo from CSIC in Spain). At present time, three main topics have been suggested by the workshop delegates for the projects involved. They can be summarised as pairs of basic knowledge and applied science areas:

- soils-plants systems and phytoremediation
- pollutant transfer or transformation in soils and natural attenuation
- ecotoxicology and risk assessment.

The first meeting of SCORE was in Nancy 17-18 November 1998 at the same time as project meetings. We believe that soil science, as part of a multi-disciplinary approach, will be an important facet of the key actions: The City of Tomorrow and Sustainable Management and Quality of Water, included in the programme preserving the ecosystem of 5FPR, and presented at the last workshop on Environmental Technologies '98 organised in Nancy on 7-10 October 1998. When new projects dealing with soils science are launched, they will join the cluster SCORE for further actions.

Help for Your Fifth Framework Programme Idea How can we help you?

NICOLE and CLARINET are concerned with the co-ordination of relevant proposals to Fifth Framework Programme for contaminated land R & D. Both networks have been pro-active in seeking to establish consortia. If you are not already in contact with one of these consortia then we offer the following:

- Contact us if you would like to be put in touch with one of the NICOLE project clusters (only by e-mail)
- Take advantage of free access to the research needs documents and joint statements that we have already written to guide you (available from the web: <http://www.nicole.org> and <http://www.caracas.at>)
- Take advantage of the links from our web sites to further information, for example direct from the EU, and to other networks, information sources and national agencies and initiatives.
- Use CLARINET and NICOLE research directories for partner finding through the network secretariats.

The news from DGXII is that they are not looking for a series of unrelated proposals, and that clusters of related and synergistic proposals will be preferred. They have also emphasised that they want proposals to be informed by the work that has already gone on in identifying research needs, and will waste little time on proposals written by consultants in 'Eurospeak' but without addressing these real needs.

Hard copies of the NICOLE/CLARINET Joint Statement 'Better Decision Making Now', October 1998 can be obtained from the CLARINET office (contact details on page 3) or the NICOLE Secretariat (contact details on page 5).

NICOLE and CLARINET collaborate to stimulate proposals to Fifth Framework

Harald Kasamas and Dale Laidler

Meetings in Rome and Athens result in new initiatives

At the inaugural meeting of CLARINET in October 1998 in Athens and the last NICOLE meeting the networks learnt of the ambitions of the Fifth Framework Programme (5FPR) from 1999-2002. The Fifth Framework Programme has a markedly different concerted and problem orientated approach compared with its predecessor.

5FPR is problem driven, using research and development (R & D) to help solve major social demands and needs, as opposed to being science and technology driven. This is a major challenge to the scientific community in that

- 1) proposals will need to be problem and not discipline orientated
- 2) proposals will have to take account of broader contexts such as sustainability
- 3) teams will need to be multi-disciplinary incorporating not just the "hard" sciences but also "soft" sciences such as economics and social sciences.

It seems likely that the conventional narrow focus scientific R & D proposal will not meet this challenge, and that clusters of synergistic proposals will be the way forward to combine both detailed problem-related technical studies and considerations of wider costs and benefits.

5FPR also demands another level of collaboration. A past weakness of R & D projects has typically been in the implementation of their findings. 5FPR seeks to address this weakness directly, by requiring proposals to include stakeholders for implementing solutions. For contaminated land this might mean including problem holders, consultancies and contractors, development agencies, regulators and other service providers, so that there is a clear progression from problem solving to implementation.

5FPR has set itself a tough aim to address complex societal-driven problems. This means that the structure of the programme is different. There are a reduced number of themes and these relate to "key actions" and "Research, Development and Technology (RDT) activities of a generic nature". 5FPR intends to support only projects which are of substantive regional, European and global significance.

NICOLE, CARACAS and now CLARINET have been influential in setting the agenda for contaminated land research, development and technology needs and it is therefore incumbent on them to help stimulate and encourage appropriate clusters of projects. CLARINET and NICOLE have therefore decided to co-operate in encouraging two or three project clusters for 5FPR.

The clusters are:

- Brownfield Redevelopment**, considering measures to reduce the cost and disturbance associated with reclaiming brownfield sites with a strong emphasis on
- a) on site re-use of materials
 - b) ensuring integration of specific redevelopments with surrounding areas, and
 - c) resolving issues related to safety, security and environmental impact.

This addresses the key action "The City of Tomorrow".

Water Protection and Contaminated Sites, considering issues such as reduction of water pollution through the remediation of contaminated sites, sediments and groundwater bodies - *in situ* and permeable treatment wall technologies may well be of use in this regard -, paying particular heed to the problems of cities and arid / semi-arid areas; monitoring and early warning techniques; diffuse pollution; determining ecological impact; assessment of chronic effects.

This addresses the key action "Sustainable Management and Quality of Water".

At the Rome meeting of NICOLE thirteen specific outline proposals were suggested and have been used as a basis to begin these clusters, which will also link with CLARINET working groups on brownfield redevelopment (WG1) and water (WG3). Information on the specific proposals (as well as a further 21 ideas presented on posters) is available from the NICOLE secretariat.

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CLARINET also has a working group on "risk management and decision support systems". This aligns with one of the research and technological development activities of a generic nature specified within the draft EU Specific Programme on Preserving the Ecosystem: socio-economic aspects of environmental change within the perspective of sustainable development. A number of NICOLE members have also joined this WG which is also considering a project cluster. Its project cluster would be closely linked to both the brownfield and water project clusters and seek to provide an integrated platform across brownfield and water protection, for examining broad costs and benefits such as environmental merit, legacy, broad economic impact and societal issues such as neighbourhood impacts.

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NICOLE project reports

Exposure assessment tools for use in risk based decision making at contaminated sites

William Hafker

The aim of this project is to produce a user friendly handbook of appropriate (Europe/country-specific) default exposure factors for use in risk based decision making at contaminated sites. The handbook will also describe a process for when to deviate from the defaults. Recommendations for single point estimates and distributions for European criteria will be provided with an initial focus on ensuring that all UK data is included. The rationale for recommendations that are made will include the quality of the data used. It is expected that the handbook will be useful for all types of exposure and risk analysis not just exposure from contaminated sites.

The major activities involved in developing the Exposure Factors Sourcebook for European sites are:

- review literature and critique available European data for each parameter.
- summarise relevant data along with a discussion of the quality of the studies and the adequacy of the "database". The presentation of results will include, as far as possible, tabular and graphical summaries.
- provide recommendations and the rationale for the choice of single point values and the form of the probability distribution functions for each parameter.
- provide for a critical review of the draft product by the appropriate internal and external peer reviewers.

Proposed Exposure Parameters

Based on the anticipated activities under given land use scenarios, e.g., residential, commercial, industrial, residential, agricultural, summary descriptions of critical exposure parameters will be developed. The descriptions will discriminate, as far as possible, among receptors in these settings (i.e., child versus adult, adult in a residential exposure scenario versus occupational exposure). The following list of parameters will be updated based on feedback from participants.

The parameters that will be described include (but are not limited to):

- *Physiological* - data on body weight and skin surface area
- *Contact rate* - data on breathing rates, water consumption rates, soil ingestion rates, fraction of skin exposed, consumption of home-grown fruits and vegetables, consumption of fish and shellfish, consumption of beef.
- *Time activity pattern* - data for exposure duration, exposure frequency, time spent indoors/outdoors, hours at home/away, weekly hours at work, working tenure, shower duration

The aim is to produce the final document by the end of September 1999. The current participants in the project are Shell, ICI and Esso. Participation by other companies is welcome.

For further information contact:

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EBSI
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Rapid Site Assessment

This project offers a unique opportunity for NICOLE and the Petroleum Environmental Research Forum (PERF) to work on a collaborative effort, "Rapid Site Assessment Field Study", that should be mutually beneficial, by allowing the groups to share information and resources.

On-site analytical tools will be evaluated at a site in the Port of Rotterdam. Evaluation of the Geoprobe MIP tool will be the focus of the field work. The group would like to evaluate the Geoprobe MIP tool at other sites in Europe, between one and four depending on the amount of funding available. One advantage of the second generation Geoprobe MIP tool is its ability to provide speciation, through the use of a mass spectrometer. However, there are number of unresolved issues concerning the technique, such as quantitation, which will be addressed in the field study. The performance of the Geoprobe MIP tool will be compared with the results of standard analytical procedures. Several sites have been identified and the field study effort is described in greater detail in a draft proposals by Terry Walden, BP and Derk van Ree, Delft Geotechnics.

Currently, Exxon, Amoco, Chevron, British Petroleum, Elf Aquitaine, Unocal, Phillips Petroleum Co., Akzo Nobel, the Port of Rotterdam and Delft Geotechnics are planning to participate. Other companies are encouraged to join the project. Cost is \$20,000 US. PERF group members will also be providing shared R&D and field experiences to the project. The PERF contributions are at least \$50,000 US in value.

For further information contact:

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Bioavailability of mercury and lead

Brian Alloway

An in-depth literature review on the bioavailability of mercury and lead in industrially contaminated soils and sediments has been undertaken by the Department of Soil Science at the University of Reading.

The project, which is nearing completion, has been sponsored by ICI plc and SOLVAY SA. Almost all of the work has been done on mercury and the remaining tasks are the final collation and writing up of the review on lead. One of the main objectives of the project was to identify major gaps in knowledge and to highlight these for future research possibly within the Fifth Framework Programme of the EU which will commence funding new projects during 1999.

The important gaps in knowledge and requirements for further research, with regard to mercury, include:

- The need for standard methods for assessing the bioavailable concentrations of mercury in soils (this is essential for any Risk Assessment procedure and is the most important of all the gaps in knowledge/research requirements identified.)
- Methods for collecting representative samples of soils from heavily contaminated sites where liquid-phase mercury (Hg⁰) can occur.
- Movement of liquid-phase mercury through pores and fissures in soils, concrete and other buried materials to groundwater and the mobility of other mercury species.
- The timespans over which the relatively inert form of mercury (HgS cinnabar) can be transformed to more mobile and bioavailable forms (including methyl mercury) and the conditions most likely to facilitate this (and the persistence of all forms of mercury in soils and made land).
- Possible synergistic/antagonistic effects of other contaminant metals and organic chemicals also present in the contaminated soils with the mercury.
- The dynamics of the sorption/desorption of mercury by humic substances and soil minerals.

The review of lead has shown marked differences in the toxicology and soil/environmental chemical behaviour between mercury and lead. Both of these metals are commonly encountered soil contaminants on industrial sites and a full understanding of their respective behaviour is necessary for assessing and managing the risks associated with contaminated land, especially in the case of 'brownfield sites' intended for redevelopment for urban/residential purposes.

For further information contact:

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Good Practice for Surveys

Joop Okx

In the "Good Practice for Surveys" project a general set-up for surveys for soil pollution problems is described. The set-up can be used for laboratory or pilot experiments. There are several principal steps that define an investigation strategy.

Step1: First we need an unambiguous definition of our objective. Without such an objective surveys should not be carried out. The objectives of a survey can be quite diverse, for example:

- we may want to determine the possible presence of chromium VI (Cr-VI) hot spots, that is those locations where the concentration exceeds some pre-set threshold.
- we may want to estimate the average mineral oil concentration of a well-defined area as precisely as possible in order to check whether defined thresholds are exceeded.
- we may want to estimate the volume of polluted soil on our site above defined thresholds.

Step 2: We need a clear and unambiguous definition of the population, which must allow the decision to be made during a survey whether a particular location belongs to the population or not. Common populations are: an industrial complex of 6ha, the surface of a 1ha residential area, or simply the volume of soil to be excavated or to be treated.

Step 3: To avoid unnecessary costs, all sampled environmental variables must be relevant to the objective of the survey, but no relevant variables must be omitted. The selection of variables will not be discussed in this report.

Step 4: An essential element of statistical decision support is the precision needed in terms of the objective. A distinction can be made between spatial uncertainty and non-spatial uncertainty. Spatial uncertainty is caused by the necessarily limited number of observations and it can be reduced by taking more samples. Non-spatial uncertainty, such as measurement error, can be reduced by repeating the number of experiments or by improved measurement devices.

Step 5: Measuring instruments need to be specified in relation to the objectives of the survey. Commonly arrangements have to be made with contractors to have these available at the right time.

Step 6: Strategies rely upon an effective sampling scheme indicating how many observations have to be taken and at which locations. Two main strategies are distinguished. The first strategy aims at estimating how much of a contaminant is present, leading to classical or design-based sampling. The second strategy aims at predicting, as accurately as possible, where the contaminant is present, leading to geostatistical or model-based sampling.

(continued on page 9)

Field approach - experimental sites for research, development and technology demonstrations in Europe

Michel Jauzein, NICOLE Steering Group

Of the 23 topics identified at the half-way point of NICOLE, one was entitled Demonstration sites for novel clean-up technologies within the theme Remediation (see *NICOLE News V2N1 p6, August 1997*) and this has been selected as one of the eleven priority projects (see *NICOLE News V2N2 p6, February 1998*).

The significant role of large-scale experiments (field scale and/or industrial scale) for soils, sub-soils and groundwater characterisation, risk assessment, natural attenuation and remediation research is the major justification of this project. Its main aim is to bridge the gap between laboratory investigations and field or industrial reality. Also, experimental sites are ideal to bring together the various disciplines involved.

Individuals from many disciplines can address soil contamination from different viewpoints to attempt to obtain one coherent and interdisciplinary picture of the system.

The objectives of this project are:

- to provide a **network of local platforms for research and development** in the field of industrially contaminated land, with the aim of demonstration for existing or emerging scientific approaches and technologies in Europe.
- to provide **an environment where scientists from different disciplines can work together** to solve contaminated land problems with industrial problem owners, national and local authorities, and consultancy groups.

To reach these objectives, there is a need for specific locations and infrastructures which can be promoted for concerted experimental actions. In some countries (e.g. United Kingdom, France, Germany, the Netherlands), sites have been selected for comparative studies or specific research and development programmes. Thus, a practical objective is **to combine the effort of individual countries in a single European Concerted Action** through a network of local organisations in charge of experimental sites used for national research and development programmes. In addition, it will be necessary:

- **to promote complementary programmes** on existing sites, and efficient scientific and technical exchange within the network and with the international scientific and technical community,
- **to focus the financial effort requested from the European Community** on a limited number of organisations to derive a more detailed knowledge of each site and a higher quality of site equipment.

The network will be organised in close collaboration with on-going concerted actions like NICOLE and CLARINET around the participation in workshops which could be located on one site or the other. The communication of results, the preparation of new projects and the optimisation of efforts will be managed through the network for greater impact. Depending on selected priorities, financial support will be requested from the EU through the on-going calls for proposals.

Three organisations per member state is about the maximum number desired. Prior to their participation in the network, **national financial support must be obtained for their specific activities**. Some of them have expressed an interest in the networking process (e.g. VEGAS, NOBIS, CLAIRE, CNRSSP, CEFI) but I would like to hear from more potential participants from other countries. I request more specific information from interested organisations in prepare a first description of the proposed network structure. I would like to receive confirmation of interest and additional information from different organisations (e.g. comments, questions, possible contribution).

My contact details are:

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Good Practice for Surveys

(continued from page 8)

Design-based sampling yields unbiased estimation of the frequency distribution of the contaminants. Model-based sampling yields a description of spatial dependence and optimal interpolation at sites not visited. To these two we add the objective of identifying the presence of hot spots.

Step 7: Once the results are collected a clear presentation and illustration of the results is required. Geographical information systems can play a central role here. They show the extent of the environmental problem in its real context; they allow a link to be made with hydrological models, and show possible alternative strategies. For making the proper statistically based decision, the amount of error and uncertainty in the objective function can be presented as well.

The "Good Practice for Surveys" project is intended to give a description of each of the steps. The project should be finished early in 1999.

For further information contact:

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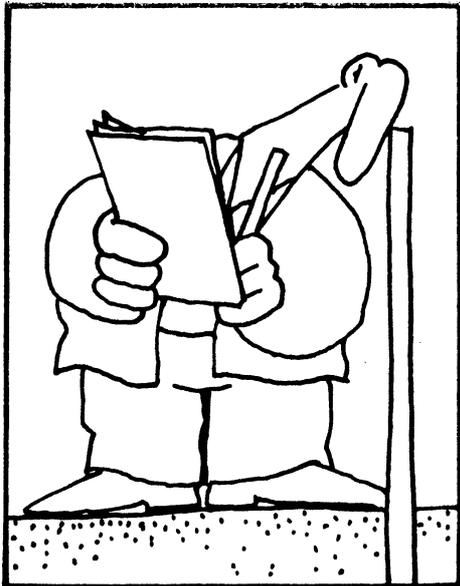
Natural attenuation: guidelines for acceptance

**Anja Sinke (TNO, NL) and
Isabelle le Hecho (CNRS-SP, France)**

The first phase of the NICOLE project "Natural attenuation: guidelines for acceptance" is almost completed. At the last NICOLE meeting in Rome at 21-22 October 1998, a preliminary draft of the report was been discussed with the consortium. The report summarises existing protocols on the evaluation and application of monitored natural attenuation for chlorinated solvents and petroleum hydrocarbons. Also background information is given on the microbial processes and on the possibilities for degradation of pollutants.

The report comes up with suggestions for a European guideline to evaluate monitored natural attenuation as a remediation strategy. These suggestions still have to be discussed further within NICOLE. Also CLARINET has been asked to give their comments and input. The guideline will be formulated in a general way with sub-routines for the different classes of specific contaminants. A final version of the report is expected to appear at the beginning 1999. The report will include glossaries (English, French, Dutch and possibly German) to explain the terms that are generally used when discussing monitored natural attenuation.

To explain in a simplified way what natural attenuation is and how it occurs, a book illustrated with cartoons is being produced, this is also scheduled to appear at the beginning of next year.



*Monitored natural attenuation
has to be evaluated carefully*
(© Sinke and van Moll, in press)

In the second phase of the project the industrial partners within NICOLE (and outside) will be invited to test the developed guideline at their sites. This implies that they collect field data at a specific site according to the guideline. The results of these test cases can than be used to evaluate and adapt the guideline.

Our goal is to come up with a guideline to evaluate monitored natural attenuation that takes into account both industrial and regulatory requirements (NICOLE and CLARINET) and that has been validated at multiple sites.

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Beneficial re-use

David Edwards

In the final year of the NICOLE Concerted Action programme, four members of the Industry Subgroup co-operated to create a vehicle for demonstrating innovation in land reclamation.

BG plc Property Division, VHE Holdings plc, the Welsh Development Agency and British Steel plc had the vision to anticipate that ideas that NICOLE would generate needed a means of translation into field-scale action. They joined forces to create a company, exSite Research Limited, with the specific intention of enabling such translation to be not only enabled, but also encouraged. exSite's three priority areas are restoration of post-industrial sites minimising reliance on landfill, re-use of derelict sites for energy forestry in former coalfields, and rehabilitation of closed landfill sites through reduction, re-use and recycling (see *NICOLE News V2N2 p1* - this issue is available for viewing on the NICOLE web site at <http://www.nicole.org>).

exSite has assembled a team that can do this. On the one hand, several of exSite's members can provide a site for demonstrations to take place, others can carry out the work and develop the necessary tools. Other members address science, technology, waste, engineering and sustainability issues

With this facility in place, science and technology providers are able to take advantage of a 'gateway' to sites and potential users of the results of their efforts.

Currently, exSite has active projects ranging from establishing protocols for establishing which decontamination process may be appropriate for a candidate site, through to creating a highway from reused materials recovered from a landfill site.

exSite welcomes new ideas and would be very pleased to hear from anyone who needs an opportunity to demonstrate a process, technology or strategic approach in the field. If you have such ideas, please contact me.

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Network on Natural Attenuation in Groundwater and Soils (NNAGS)

Steve Thornton

An important recent development in the field of natural attenuation research is the creation of a UK Network on Natural Attenuation in Groundwater and Soils (NNAGS). The network, funded by the UK Engineering and Physical Sciences Research Council (EPSRC), was commissioned on 1 October 1998 and is designed to provide a platform for stimulating interdisciplinary collaboration between researchers interested in natural attenuation of organic contaminants in the subsurface.

The underlying rationale for NNAGS is to address knowledge gaps in scientific natural attenuation as a cost-effective remediation technology for contaminated sites. There are many situations where natural attenuation could be a viable option for site clean-up. However, this approach is often rejected in favour of more expensive remedial strategies, because of difficulties in robustly characterising the *in situ* potential for natural attenuation of contaminants at sites. The approach demands practical tools for site assessment and monitoring of natural attenuation processes. Appropriate methods are also required to scale-up these processes to provide an accurate description of the environmental fate and effects of organic contaminants *via* mathematical models. The present state of the art is deficient in many of these areas but mainly in an adequate quantitative description of the microbiological processes and the spatial heterogeneity that exists in many real field situations. Natural attenuation is therefore exploited in a pragmatic manner that currently limits its general acceptability.

NNAGS has been set up to address these concerns by bringing together multidisciplinary centres of excellence in the field with consultants/contractors, regulatory agencies and end-users/customers for this technology. Some key aims of the network are to:

- bring together national and international expertise on natural attenuation issues in workshops and conferences
- develop a research portfolio to advance the understanding and exploitation of natural attenuation concepts
- become the main focus of natural attenuation research in the UK.

The network will achieve these objectives with the following activities over the next three years:

- annual short courses for industry and postgraduate students in January each year
- annual research conference in June 1999 and 2000, which will include keynote speakers, conventional presentations and technical workshops
- International conference in June 2001
- an electronic newsletter with details of new members, listings of projects and publications, information on funding opportunities, discussion

- forum on application issues for natural attenuation, and more
- web site <http://www.sheffield.ac.uk/~nnags> which includes the newsletter, details of NNAGS and natural attenuation activities, membership database and links to other useful sites.

The network is organised by the Groundwater Protection and Restoration Group at the University of Sheffield, and is intended to be a community resource for all researchers with an interest in natural attenuation, so please use it! To join NNAGS, access our home page and complete the entry form, supplying details of your contact address and summary of interests. This information is circulated to members, posted on the web page and is used to include you in the circulation list for receipt of 'NNAGS News', the network newsletter, which is distributed electronically.

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CLAIRE (Contaminated Land: Applications in Real Environments) Jacqui Marsh

CLAIRE is a network for demonstrating remediation technologies for contaminated land in the UK. It began with a feasibility study over 1996/97 carried out by A & S Associates, Parkman Environment and r³ Environmental Technology Ltd.

The Soil and Groundwater Technology Association (SAGTA), whose members include major companies, with the support of public organisations will establish a network of sites representative of industrial contamination *via* CLAIRE. Thirty two contaminated sites in the UK have been proposed, as well as 16 existing projects which could form part of the CLAIRE network. Detailed information on these sites and projects is currently being collected and analysed.

Remediation companies and research groups will be able to use these sites for research and demonstration projects for at least 3 years. CLAIRE will lower the barriers to on-site remediation projects and improve the dissemination of results.

For a prospectus and further information contact:

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Moving Ahead

Cees Buijs

I am pleased that this last issue of *NICOLE News* has been able to report such good progress in NICOLE, with a broad range of new and emerging projects. Our publications, web site and meetings have made us a major force in the contaminated land debate in Europe, and we have been able to distil this work into a series of documents, including joint statements with CARACAS and CLARINET and the NICOLE Research Opinion.

My challenge with the rest of the transition team has been to develop a strategy for the next three years of NICOLE to improve its efficiency and usefulness further, whilst at the same time keeping strict control over costs. When the network was conceived we underestimated how difficult the recognition stage would be and had a vision of it being fairly short, six months to a year. It has taken longer, and there are still some countries, for example Germany and Austria, that we would like to see better represented in NICOLE.

We are also keen to open our resources to the EU Accession States and to increase our links and collaboration with other international initiatives across Europe and in other parts of the world, for example the Remedial Technology Development Forum (USA). We also want to broaden our membership to include a greater number of service providers and also financiers and developers involved with brownfield remediation projects.

We intend to increase our special interest subgroups, adding a "Service Providers Subgroup" to join the "Industry Subgroup", and to develop a special relationship with CLARINET with representation on each other's steering groups.

We have sharpened NICOLE's objectives and proposed a minimum package of activities.

- to provide a European forum for dissemination and exchange of scientific knowledge and ideas relating to all aspects of industrially contaminated land

- to stimulate co-ordinated, interdisciplinary, collaborative research and technology and knowledge transfer that addresses identified research needs and enables European commerce and industry to identify, assess, manage and redevelop contaminated sites more efficiently and cost effectively
- to strengthen the relationships between NICOLE and other networks within and outside Europe and to extend the network to involve other stakeholders (e.g. land developers, local and regional authorities and the insurance and investment communities).

NICOLE will at the least provide members with:

- 3 industry subgroup meetings per year
- service provider subgroup meetings as demanded
- academic/researchers subgroup meetings as demanded
- a newsletter and/or web site
- opportunity for joint research activities
- a window to CLARINET
- a NICOLE brochure
- one network meeting per year

Without EU support we need to reduce our activities within NICOLE somewhat and so we intend to streamline its organisation and management; its information management and its provision of meetings. As a result of this process we have been able to peg membership costs for companies at existing levels: 3,500 EURO per year.

And if a company member brings new paying industrial members to the network, its own fee is reduced by 25% per new member for one year. We are introducing a charge of 150 EURO per year for universities, technology institutes and non-profit organisations. If academic members bring new paying industrial members to the network they receive 500 EURO per new member. However, all members will now enjoy free access to NICOLE meetings, and will of course have free access to web site discussions and NICOLE mailings.

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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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