

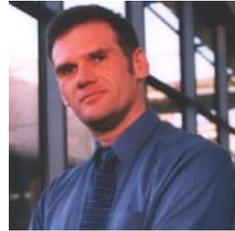


Latest on NICOLE projects, reports, meetings and working groups

Distributed free to all NICOLE members

October 2003

## A View from the Incoming Chairman Steve Wallace, Nicole Chairman, Secondsite Property Holdings Ltd



Firstly, I would like to start by thanking Karen and the other departing members of the Steering Group for all of the efforts that they have put in over the months and years. They are a hard act to follow!

### NICOLE at the Forefront

I have been involved in NICOLE from its outset and over that time, and in no small part due to the influence of the NICOLE members, I have seen contaminated land management evolve from something of a 'black-box' into a scientific subject in its own right. The NICOLE network has succeeded in bringing together contaminated land specialists from a wide range of countries and perspectives and, through its workshops, has developed a strong and positive dialogue with a range of stakeholders not directly represented in the Network. No serious discussion of contaminated land management in Europe would now be complete without reference to the NICOLE network.

### Developing and Sharing Best Practice

NICOLE has continued to be active through its ongoing series of workshops and we have sought to strike a balance of topics to cover specific technical issues as well as more strategic approaches. If the success of a workshop can be judged on the level of debate that it stimulates, then our workshops are of a very high standard.

The Budapest workshop focused on the financial aspects of site restoration and, as the location would suggest, emphasised the Central and Eastern European aspects. In fact, the Network is strengthened by the creation of such links and it is important that they are maintained and developed further as the European Union expands. In the Barcelona workshop we discussed the new direction for NICOLE within the framework of sustainability. This is discussed in more detail below.

Our next workshop will take place in Lille, France at the end of October and will

focus on the management of mega-sites. This is an important topic as it is often found that individual cases of contaminated land cannot be treated in isolation without consideration of other sources in the wider area. Management of mega-sites demands an understanding of the technical and the 'softer' issues and links back to many of the sustainability themes developed in Barcelona. I look forward to seeing you there for another stimulating discussion.

Another strength that NICOLE has is to help to assemble teams with a specific interest in order to facilitate projects where the costs are shared, or to develop significant research grant applications. NICOLE also directly funds a number of projects of common interest, particularly where such projects aid the wider dissemination and understanding of contaminated land issues. Plans are now being developed to hold a special NICOLE workshop devoted to disseminating the results of the various research projects currently underway.

### The Future of NICOLE

In a recent letter to our members, we discussed the future direction of NICOLE and emphasised the continued need for a multidisciplinary approach to contaminated land management. The Barcelona workshop developed the idea of using the theme of sustainability to link these approaches together. Having said that, the term 'sustainability' means different things to different people and we have to find a definition that matches the overall goals of the Network while building on the strengths and skills of our members. Too wide a definition would mean that we lose focus and could no longer claim to be experts in the area that we are representing (we must not forget that the 'C' in NICOLE stands for 'Contaminated'), too narrow and we would not cover the complex matrix that is contaminated land.

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## Chairman's View Continued

The theme of sustainability provides an ideal platform from which to do this as it neatly captures the range of challenges that we face. Contaminated land related legislation, guidance, best practice and technical knowledge is developing at a great pace and it is always useful to step back and consider what it is we are trying to achieve overall before drilling down into the detail.

There is an ever-increasing list of networks, associations, research groups, project consortiums, regulators, NGO's and other stakeholders with an interest in contaminated land management. We are working to prioritise these in order to focus our future efforts.

Completion of this exercise is only the first task. The effort will have been wasted, if we do not actively engage those stakeholder groups that we identify as critical to us. This means that we must proactively participate in the other organisations to deliver NICOLE's key

messages and to ensure that we bring external views and knowledge back into our network. Whilst a number of these organisations are already covered by the current activities of our members, NICOLE needs volunteers to fill some of the gaps. Can I therefore encourage you to respond with offers of assistance when the prioritised stakeholder list is circulated. Remember that the strength of our network is in its members. We only get out what we put in. In conclusion, I consider it to be an honour to be asked to chair such a well-respected and influential network. When Karen handed over to me, she said that the support of the secretariat, SG and members in general made the job easy.

I personally find that the more motivated the people, the more challenging is the Chairman's role (because I will have to keep up with you!). I therefore look forward to a very challenging but interesting and stimulating term of office!

# Lille Workshop

## The management of mega-sites

### Karen Cerneaz, Shell Global Solutions (UK)

At the last NICOLE workshop in Barcelona the NICOLE network started talking about the evolution of NICOLE 'towards a sustainable future'. This promoted much animated debate, challenging discussions, and thought-provoking outcomes. One of the most important questions to come out of the Barcelona workshop is "What does sustainable management of contaminated land really mean?"

The upcoming workshop, to be held 29-31 October in Lille, France, will provide input to discussions on the question: "What can we learn from the development of contaminated regions, Megasites, with respect to sustainable management of contaminated land?". A Megasite-approach goes beyond the individual site approach, involves many stakeholders and can help achieve sustainability.

Contributions from local, regional and Europe-wide experts will lead us into the debate on tools for sustainable land management.

What can we learn from them? By continuing the dialogue we will make

progress in understanding the concept of sustainable land management.

Workshop themes, to be illustrated with case studies, include: legal aspects: who can be held liable for contamination on megasites?, economy: how to find the money for (re)development of contaminated regions, social and health aspects: how to communicate risks of contamination with respect to health and restrictions for use, integrated management: how to manage contaminated megasites now and in the future. There will also be dedicated time for corner discussions.

The workshop is hosted and organised in co-operation with Région Nord Pas de Calais and is co-sponsored by Gaz de France.



## www.nicole.org

### Paul Bardos

As many of you know the NICOLE web site is being upgraded. A new web site is currently being "beta-tested", with final touches in terms of text content being made. The new web site will include a gallery of pictures, both of techniques and members! It will also include a library where NICOLE members can have technical papers posted for the benefit of the network overall. It will also have an upgraded news and conference service, and its web links will be upgraded and re-organised. A November launch is expected.



# NICOLE Workshop in Budapest

Budapest 6 - 7 November 2002

Paul Bardos, r<sup>3</sup> environmental technology limited (UK)

Windrow based bio-remediation in Hungary The 2002 NICOLE workshop in Budapest focused on the financial aspects of site restoration, with an emphasis on Central and Eastern Europe (CEE).

Technical issues are usually a dominant element of dealing with contaminated sites and NICOLE workshops have to date focussed on this aspect of the problem. In practice, problem-holders also have financial or commercial decisions to make. NICOLE, as a Network, is always looking to expand the range of topics related to contaminated land as well as to enlarge its geographic reach across Europe.

The first day highlighted speakers from Central and Eastern Europe, including law firms, service providers and banks working in CEE countries in land remediation and redevelopment. The second day focused on financial aspects, including venture capital and other approaches to buying and redeveloping contaminated land for profit.

Other talks discussed the industry and service provider views on the way contracts are now written, the way indemnities and insurance are applied, the effect new accounting standard will have on setting aside environmental provisions, and how real estate value and due diligence are factored into transactions.

CEE countries are faced with an enormous legacy in terms of contaminated land. It was felt that, although a lot of advice is available,

there is little hard investment in brownfield remediation. There are significant opportunities, because in CEE countries there is a larger proportion of former industrial derelict land in city centres or close to major conurbation, but many companies moving to CEE countries prefer greenfield sites. The scarcity of money and the rapidly changing contaminated land policies in CEE countries, often shifting responsibility for State-owned polluting industries to new site owners and local authorities, is creating uncertainty with regard to financial risks, making all but the most lucrative projects seem too high risk.

## Financial Tools

It was felt that NICOLE offer much of potential use to CEE countries, and also that CEE countries presented new opportunities, but that these were constrained by the uncertainties in contaminated land regulation, liabilities and contract law in general in these countries.

Risk transfer mechanisms, for example via insurance or re-insurance, are not yet widely available in CEE countries because of uncertainties in contractual law. Stabilising contaminated land regulations and policy regarding liabilities is likely to be a significant step in CEE countries in creating the conditions favourable for risk transfer and inward investment.

Some service providers felt that innovative approaches to financial risk transfer mechanisms, such



Windrow based bio-remediation in Hungary

as insurance, standardising service packages and market consolidation could provide the necessary adaptation, but not all industry delegates had confidence in risk transfer mechanisms as a means of controlling future liabilities.

## Would It Work?

Questions remain, for example about mechanisms if the original site owners became bankrupt. Possible solutions included joint Environmental Liability Impairment policies that would include the original site owner or setting aside money in an escrow account to deal with possible future liabilities.

Most of the discussion about brownfields redevelopment was about dealing with liabilities, and investing in sites with a net present value (NPV) of more than zero, rather than those with zero or negative NPV. However there are many sites in CEE countries with NPV less than zero,

EU competition policy has limited what can be offered by way of redevelopment incentives for such areas.

A number of other problem areas were identified. Contaminated land inventories and regular environmental/emissions monitoring are often lacking.

Many CEE countries are reliant on groundwater resources, which are under severe threat by industrial and agricultural emissions. Many areas have an extensive transborder network of rivers and lakes and there has been little development of water policy.

Risk based decision making is rare in CEE, partly due to lack of awareness in the regulatory sector and a desire to keep decision making processes simple, often depending on limit values.

The full meeting report is available via the publications list or News Service on [www.nicole.org](http://www.nicole.org) as a PDF file. The download is free.

# NICOLE Workshop in Barcelona

Barcelona 12-14 March 2003

Paul Bardos, r<sup>3</sup> environmental technology limited (UK)

The subject of the 2003 NICOLE workshop in Barcelona was Management of contaminated land towards a sustainable future: opportunities, challenges and barriers for the sustainable management of contaminated land in Europe.

## Sustainable Land Management

Management of contaminated land is an important issue throughout Europe involving many stakeholders: governments, regulatory bodies, the community, industry and the wide range of researchers and service providers who support the process.

Over the last decade good progress has been made in developing and enhancing contaminated land management tools for site investigation, risk assessment, modelling and remedial techniques. The challenge for the future is to ensure that management of contaminated land, like that for any of the other complex issues which our societies face, sits within a framework of sustainability.

The workshop included a broad range of papers on how sustainable development and the remediation of contaminated land are linked and included some detailed case studies. The papers set a platform for a debate within NICOLE to set priorities for its activities over the next few years.

The meeting began with an overview of sustainable development, followed by a series of perspectives on

what that meant in terms of “sustainable land management” from industry, regulators and nongovernmental organisations (NGOs).

The first day of the meeting considered what the barriers, challenges, opportunities related to sustainable land management might be, in particular regarding waste issues and brownfields. It concluding with discussions to identify the most pressing issues affecting the implementation of sustainable development principles to contaminated land management across Europe. The second (half) day used syndicate groups to further explore these issues, prioritise them and provide suggestions for activities that NICOLE could engage in to facilitate sustainable land management across Europe.

## A Common Definition?

The meanings ascribed to terms such as “sustainable” or “sustainable development” vary widely. There is clearly not (yet) a common language for discussing contaminated land management in the context of sustainable development. It would be both a major challenge, and also a major achievement, for NICOLE to catalyse the development of a common framework, widely used across Europe in the same way that risk based decision making has become used.

Distinguishing land that is still being actively used for processes from land that has moved to a post-industrial phase may be useful because the funding,



An example of natural regeneration of land

stakeholders, beneficiaries will all to some extent be different. Discriminating between the phases also eliminates confusion about who will/should provide funding for managing the land, what sustainable management means and who should be the problem holders and problem solvers.

Without clear definitions everybody can claim that they are taking sustainable action when sometimes perhaps they are not. There were some differences in point of view between NGOs and businesses, with NGO delegates tending to equate sustainable development less strongly with sustainable business management.

## What NICOLE Must Do

The most important single outcome was the acceptance that NICOLE needs in its discussions and to engage with a wider audience.

In particular a strong synergy was seen between NICOLE’s interests and spatial planning.

This broader view, in conjunction with some degree of clarity on the phases of land under consideration, should move the agenda forward for sustainable land management, for land which is still in commercial use or is to be returned to commercial use, and for post-industrial land such as that in the former mining region of Nord pas de Calais.

NICOLE’s next steps are to establish the concrete needs of stakeholders for sustainable contaminated land management, perhaps using case studies to facilitate this process.

Sustainable land management has now become a key theme which NICOLE wants to develop and apply.

The full meeting report is available via the publications list or News Service on [www.nicole.org](http://www.nicole.org) as a PDF file. The download is free.

# Monitored Natural Attenuation

## Demonstration project

Anja Sinke, TNO-MEP (NL) and Roger Jacquet, Solvay (BE)

In August the NICOLE steering group decided to fund the Monitored Natural Attenuation project (MNA) with 15,000 EUROS to produce a consolidated report summarising individual company studies on MNA.

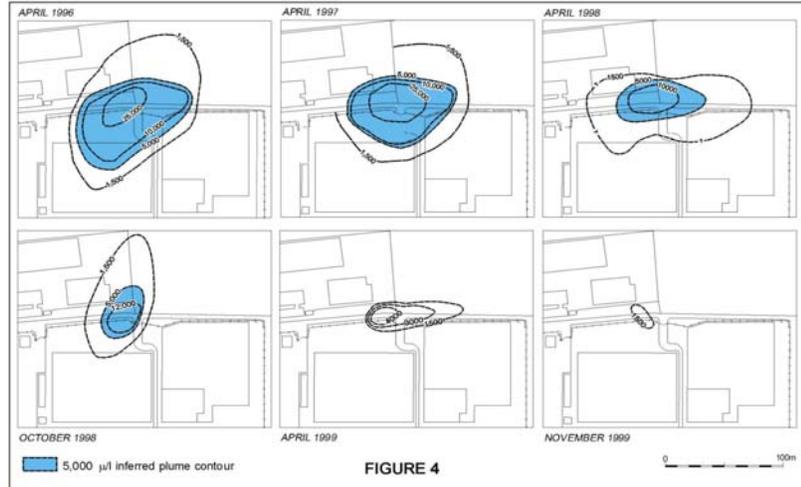
In this project 10 industrial parties co-operate to investigate and research the possibility of MNA at their specific sites. In total approximately 2 million € will be invested during the 3 years of the project.

The consortium partners have agreed to investigate their sites to compare strategies for assessing the feasibility of MNA. The MNA group expects that investigating MNA at several demonstration sites, and reporting it in a uniform structured way, will contribute to the acceptance of MNA in Europe as a remedial strategy.

## The sites

The 10 project sites represent a range of geologies, for example fractured bedrock and unconsolidated deposits, and contaminants such as hydrocarbons, chlorinated hydrocarbons, phenols, and contaminant mixtures

It is not expected that MNA will work as a primary remedy at all sites. In some cases MNA may work in conjunction with methods such as pump and treat, but MNA will not be the appropriate method where conditions at the site are unfavourable.



Example: Primary line of evidence on a BTEX case

## Acceptance and implementation

For the acceptance of MNA at industrial sites in Europe it is important that the project is carried out thoroughly and reported and promoted to a wider public.

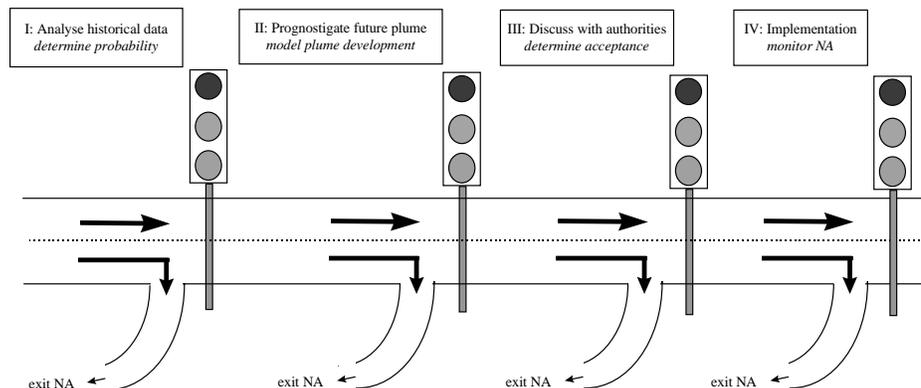
Representatives of academia and authorities will be invited to give their opinion on the research that has been carried out at the sites

They will be asked to give their opinion on the quality of the work and the reliability and interpretation of the results. Also, they will be asked if the information provided is sufficient for the implementation of MNA at a specific site.

## Partners in the consortium

- BP, ChevronTexaco,
- Dow Benelux,
- Eni Ambiente,
- ExxonMobil,
- Ford Werke AG,
- Port of Rotterdam,
- Shell Global Solutions,
- Solvay (chair),
- TNO (final report),
- TotalFinaElf.

## Steps in Monitored Natural attenuation Projects



# MULTIBARRIER Project

## Multifunctional permeable barriers carrying well-performing microbial biofilms for treatment of mixed pollutant plumes

Leen Bastiens and Ludo Diels, Vito (BE)

In order to remediate contaminated groundwater, many techniques have been developed and applied. However, although groundwater is often polluted with complex mixtures of different chemicals, most remediation techniques only deal with one or a few pollutant types.

Sanitation of groundwater polluted with mixtures of hazardous compounds has received less attention and remains a problem. A combination of different existing technologies may be a solution, but one should consider (i) the impact of one remediation technique on another and (ii) the influence of co-contaminants on the removal efficiency of the processes.

In 2001 the EU-project MULTIBARRIER was started with 8 European partners (Vito-Belgium, LFU-Austria, UW-The Netherlands, TUM-Germany, IBA-Germany, Biotech-Germany, UP-Czech Republic, DEC-Belgium).

The study focuses on MULTIBARRIERS, i.e. permeable reactive barriers in which different pollutant removal processes (biological and physicochemical processes) are combined to treat *in situ* groundwater containing mixed pollutants.

Different MULTIBARRIER concepts to treat groundwater were designed, evaluated and compared. One of the objectives of the study was to answer the question whether the removal processes should be

applied one after the other (sequential MULTIBARRIER), or whether a combination of different processes in one zone (mixed MULTIBARRIER) is also possible. The latter may require more optimisation but the installation is expected to be less complex and less expensive. Another important question concerns the choice of the terminal electron acceptors (TEA) for the biological process.

### Some results

In a first stage of this work, lab-scale batch and column tests were set-up to evaluate several sequential and mixed MULTIBARRIERS. A model pollutant mixture was defined consisting of (i) the heavy metals zinc (5 mg/l) and arsenate (0.2 mg/l), (ii) the chlorinated ethenes PCE (2 mg/l) and TCE (5 mg/l), and (iii) the aromatic hydrocarbons benzene, toluene and *m*-xylene (BTX, 2 mg/l each). The investigated pollutant removal processes were reductive dehalogenation of the chlorinated aromatic hydrocarbons (CAHs) with zero valent iron, sorption/reduction of the metals and biodegradation of BTmX and also some CAHs.

In the biobarrier oxygen, nitrate, sulphate as well as iron were tested as terminal electron acceptor (TEA). As oxygen and nitrate are known to have a negative influence on the performance of zerovalent iron, only sequential MULTIBARRIERS (Fe<sup>0</sup> + BIO) were tested with these TEAs



Continuous flow-through columns mimicking barrier systems

In all concepts, the sorption was installed in a container part was considered mainly as a polishing step. In one column set-up the anion-generated during corrosion of the zerovalent iron was present as only TEA.

Both mixed and sequential MULTIBARRIER configuration showed to be suitable for sanitation of mixed groundwater pollution. There were indications for improved removal in mixed systems. In all tested MULTIBARRIER concepts chlorinated ethenes and heavy metal removal was observed when zerovalent iron was present, except in the columns where Fe(III)EDTA was added as TEA. Biodegradation of BTmX was observed under aerobic, denitrifying and iron reducing conditions, but to a much lesser extent when sulphate was present as TEA.

In a second stage of this work a pilot-scale, partially mixed MULTIBARRIER

was installed in a container system (5m x 2.4 m x 2.4 m) in which an aquifer is simulated. The tested MULTIBARRIER consists of a mixed Fe<sup>0</sup>+BIO zone followed by an anaerobic BIO-zone and a sorption zone. Iron (III) originating from the corrosion of the zerovalent iron was selected as TEA. Besides monitoring of the chemical composition of the groundwater and the field parameters, *in situ* mesocosm socks and molecular techniques like PCR-DGGE are being used to monitor changes in the microbial population in the different zones.

In the future MULTIBARRIER concepts for treating complex mixed pollution, such as groundwater polluted with leachate, will be developed and tested.

### For more information:

Please visit the project website:  
<http://www.multibarrier.vito.be>

# Industry Subgroup (ISG)

## Lida Schelwald, Port of Rotterdam (NL) and Terry Walden, BP (UK)

The last NICOLE Industry Subgroup meeting of 2003 took place in Barcelona, following the network meeting on sustainable contaminated land management. A special topic in this meeting was EC policy developments

The European Commission (EC) is working on new soil and (ground)water Directives. Although their scope is often wider than contaminated land they may have direct implications for industry. Examples are the EU liability white paper, the Landfill Directive and the EU Water Framework Directive, with the daughter Groundwater Directive, and

the developing soil protection strategy.

The EC has launched an external consultation exercise with five working groups of interest to NICOLE, such as contamination and research. The NICOLE ISG has been invited to take part. This participation is a technical contribution, as NICOLE is not a lobbying group.

NICOLE has also decided to become more proactive in general in its relationships with other groups with similar interests. One means of achieving this will be direct participation by ISG and SPG members, e.g.:

- taking part in recent Common Forum meetings
- a joint meeting between the ISG and SedNet (European Sediment Research Network) in Venice

A prioritised list of other organisations and networks of interest to NICOLE is currently being drawn up.

For more information about the Industry Subgroup see our pages at the NICOLE web site or contact:

Lida Schelwald, Secretary to the NICOLE ISG, e-mail: [LSvdK@schelwald.nl](mailto:LSvdK@schelwald.nl)



# Service Providers Subgroup (SPG)

## Thierry Imbert, Tauw (France) and Elze-Lia Visser-Westerweele (NL)

From its start four years ago, the SPG has grown to be a real partner to the ISG, through the efforts of its members under the guidance of the last chairman, Wouter Gevaerts. As the new chairman, I shall try to do as well as the former one!

The keyword within the SPG is knowledge exchange and we collaborate well with the ISG in organising NICOLE workshops, and planning for the network's future. There are other collaborations with ISG members and academic members, resulting in larger Europe-wide projects such as JOINT and Bridging Gaps and initiatives such as MONIPOL. SPG members also play a role in the various EC level consultations, e.g.: Wouter Gevaerts

represents NICOLE in a Groundwater Directive Working Group and Johan De Fraye represents NICOLE in a Soil Directive Working Group.

The number of SPG members is growing. But we need new input, and one of the aims for the next two years is to increase membership from countries from South and Eastern Europe. NICOLE has a new challenge for the next two years. At the Barcelona workshop NICOLE discussed the evolution of NICOLE towards a sustainable future and raised the question "What does sustainable management of contaminated land really mean?" This question needs to be answered. NICOLE needs to take a broader view in its discussions

and to engage with a wider audience.

The next step is to define the needs of stakeholders for sustainable contaminated land management.

I am convinced that the SPG input to the network will be important. Service providers are usually at the interface between stakeholders and have a broad view on environmental aspects. So feel welcome to join us and to contribute to the future of NICOLE into a sustainable network.

For more information about the Service Providers Subgroup see our pages at the NICOLE web site or contact: Elze-Lia Visser-Westerweele, Secretary to the NICOLE SPG, e-mail: [visser.vwma@planet.nl](mailto:visser.vwma@planet.nl)



# CONSOIL 2003

## Evaluations and conclusions

**Johan van Veen, TNO-MEP (NL)**

Current legislation considering soil and soil protection is fractured, sometimes works but is definitely not sustainable. It will be a major challenge to frame appropriate protection policies for this “*subsurface*”, integrating soil and water protection and considering spatial planning. Solutions to problems must address fitness for use, protection of the environment and long term care, and managing contaminated and non-contaminated land in a common harmonised structure.

Public awareness of the relevance of the “*subsurface*” is rudimentary; communication focusing on themes, such as soil quality and the benefits of cleaning it up, is essential to improve awareness.

More countries are adopting risk assessment for managing contaminated land. Some speakers addressed the need for a better evaluation of exposure parameters, major pathways and uncertainties.

In a case study session the Netherlands Centre for Soil Quality Management and Knowledge Transfer (SKB) review team provided commentary on the results of a comparison of risk assessment models; a project sponsored by NICOLE. The SKB team recommended building a toolbox with the best elements of certain European risk models, standardising elements where

**Role Play: Flemish Country Session at ConSoil→**

Significant efforts have been dedicated to better understand the mechanisms and kinetics of Natural Attenuation as a tool for effectively managing risk. Some speakers welcomed new developments in processes such as funnel and gate; precipitation; oxidation; bio-augmentation, but more validation of these techniques is needed.

A better understanding of natural processes and impacts of contamination in ‘subsurface’ functions is needed to support the EU and national policy development with respect to protection and management of this complex system under various environmental and geographical conditions.

The next ConSoil conference will be held in France in 2005. A substantial part of the programme and the plenary Case session will be dedicated to European developments such as “*subsurface*” Management, EU soil policy papers and New EU member states.

## Evaluation of European Risk Assessment Models

**Lawrence Houlden, Arcadis (DE)**

A NICOLE-sponsored study to evaluate the risk assessment models currently in use throughout Europe was completed this summer. Eleven industrial members of NICOLE plus the NICOLE organization itself sponsored the effort, which was undertaken by Arcadis Geraghty and Miller. The Netherlands-based SKB organization critically reviewed the work.

Recently the philosophy of using a risk-based approach for addressing contaminated sites has found widespread acceptance throughout Europe. However, individual countries within the EU have developed ‘national models’ for environmental risk assessment which vary with legislative requirements and are at different levels of development.

Since risk-based clean-up targets will vary with each model, the credibility of risk assessment could be undermined if there is a lack of understanding on why the results differ. The aim of this study is to benchmark and compare the different models, clearly explain the

reasons behind any disparities, and generally show that the fate and transport components of most models are conservative when compared against actual field data. It was not the intention to rank the models or show one to be superior to another.

The evaluation involved running ten models for a generic (hypothetical) data set and five case studies where ground truth data, such as offsite monitoring wells or onsite vapour probes, were available. Results for receptor point concentrations, dose and risk levels were compared and sensitivity to key input parameters identified. The key results of the study are as follows: (i) when input data is standardised, models with soil ingestion, vegetable uptake and groundwater migration pathways give generally similar receptor point concentrations and doses; (ii) a variation of two orders of magnitude is found in dermal contact doses and three orders of magnitude in indoor air concentrations, with standardised inputs; (iii) default chemical and exposure factors can result in high variability between models for all pathways (although the reasons for this are now understood).

Results of this study will be published this autumn and will be posted on the NICOLE website. The work was sponsored by NICOLE, Akzo Nobel, BNFL, BP, Fortum, ICI, JM Bostad, Powergen, Shell, Second-Site, Solvay and Total



# WELCOME

## Risk Based Management for Megasites

Huub Rijnaarts, TNO-MEP (NL)

WELCOME stands for: Water, Environment, Landscape management at Contaminated Megasites

Large scale contaminated sites (megasites), with considerable groundwater damage and soil contamination, exist all over the EU and in accession states posing risks for surrounding surface water and groundwater systems. It is estimated that megasites involve 30 - 50 % of all costs associated with the remediation of contaminated soils and groundwater in Europe; totalling some 100 – 1.000 billion € in the next decade.

Since complete Megasite clean-up is generally not possible, the only alternative possible but including flexible elements to accommodate different national approaches is a risk based

management approach. This has been foreseen in the Water Framework Directive, which accommodates risk based approaches via exception articles and the Groundwater Directive. Future EU “integrated soil and water quality” policies are likely to take into account risk-based approaches.

Defining and establishing risk-based management approaches at megasites is difficult. The WELCOME project, funded by the FP5 key action programme “sustainable management of water resources in Europe”, aims to develop and provide a helpful tool for establishing risk-based management approaches at megasites in Europe.

The WELCOME project focuses on the management of complex, large scale

groundwater damage, which cannot be remediated within a reasonable timeframe, either due to the lack of technical means or because it can only be achieved through disproportionately expensive measures.

Three megasite cases are included in the project, namely: the industrial harbour regions of Rotterdam (the Netherlands) and Antwerp (Belgium), the former chemical production area of Bitterfeld (Germany) and the Tarnowski Gori mining area/chemical plant in Katowice (Poland).

A thorough methodology for the evaluation and the derivation of remediation strategies for groundwater damage at megasites is being developed. This tool is the WELCOME-IMS; an intelligent guideline for establishing Integrated

Management Systems at contaminated megasites. The IMS is a guideline, in the form of a manual, enabling the user to go through the procedures to design risk management strategies, including risk-reducing remediation measures for megasites. Several specific tools and examples from megasites included in the WELCOME project are provided to assist completion of each step. The IMS-development is currently half way and the final product will become available through internet and on CD-ROM at the second half of 2004

For more information visit: <http://www.EUwelcome.nl>, or contact the project co-ordinator: Huub. Rijnaarts:

H.H.M.Rijnaarts@mep.tno.nl

# WELCOME

### What is a Megasite?

*A megasite is an area with multiple contaminant sources related to (former) industrial activities, with a considerable impact on the environment, through groundwater, surface water and / or air migration.*

*Owing to its complexity related to soil and groundwater contaminant conditions, organization and / or considerable costs, an integral risk based management approach is recommended to manage the risks for the receptors*



### ↓The Four Main Steps of the Welcome IMS

### Members of the Welcome Team ↑

#### 1 Defining the mega-site

*The goal of this step is the definition and the description of the megasite. Basis for this decision is the identification of a groundwater damage, or soil contamination exposing extensive long term risks to surface or groundwater systems, which do not allow for a complete remediation within a reasonable timeframe and by proportionate means. Furthermore, the megasite is systematically described.*

#### 2 Risk assessment

*This step is the systematic identification and description of risks, originating from the megasite and particularly regarding groundwater.*

#### 3 Management scenarios

*In this step, the iterative derivation of possible and feasible remediation strategies for the megasite is executed. As a result, the potential remediation options are presented as the base for the final decision of the stakeholders*

#### 4 Implementation, monitoring and review

*Here, the necessary instruments for the controlling and monitoring of the installed system are derived. This step includes the controlling and optimisation of the measure and their reporting.*

# Bridging GAPS

## between sensor developers and users in a pragmatic approach

**Derk van Ree, Geodelft (NL)**

Within the NICOLE network site characterisation and monitoring is seen as an important topic and has been subject of a separate workshop in Pisa 2002. Identifying suitable sensors and instruments for contaminated soil and groundwater and implementing these is costly, time consuming and hampered by the lack of expertise necessary to redesign/adjust instrument to the specific needs of practitioners.

However there exists a large specialist community involved in sensor development for a wide range of environmentally relevant parameters. Through the networks Biosensors for Environmental Monitoring

& Environmental Technology (BIOSET) and its successor Sensors for Monitoring Water Pollution from Contaminated Land, Landfills and Sediments (SENSPOL) a wide range of prototype sensors are available. For the SENSPOL community identifying enduser needs in the development of new sensors is an important and challenging task. The implementation step, once a prototype sensor is ready for testing in the field, requires strong relationships with end users.

A project (acronym Bridging GAPS) has been set up to share expertise and identify available sensors and instruments that have a potential to be applied in site

characterisation and monitoring of contaminated land.

An inventory study for sensors and instruments has been completed. One of the information sources is the response to questionnaires that have been sent out. Field applications are needed as well to test the usefulness for specific categories

of contaminated land problems. As part of this project a trial is planned for mercury and chlorinated hydrocarbon related contaminated land problems. Relevant sensors identified in the inventory study will be evaluated at an industrial site.

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ree@geodelft.nl



Example: Biosoil semiconductor Based VOC Detector (see 2002 Pisa meeting report on [www.nicole.org](http://www.nicole.org))

## Photo Gallery: – Some NICOLE Personalities!



## Fifth Framework Accompanying Measures

## Denise Lambkin, r<sup>3</sup> (UK)

The four 5<sup>th</sup> Framework projects: EUGRIS, IMAGE-TRAIN, JOINT and SOWA, collaborate and co-ordinate their activities to provide the highest benefit to the end users: the EC, members of international and national policies, authorities, industries and researchers. The on-going work of the projects is interlinked through a common interest in soil and groundwater protection, and each project has its own special focus.

**EUGRIS** (European sustainable land and groundwater management information system) aims to consolidate the diverse information available on the sustainable management of water and land for groundwater protection and restoration, and disseminate it via a user-friendly, web-based gateway, to all stakeholders with an interest in the subject.

The work has three components: (i) information system design, (ii) software development and implementation, (iii) population of the system with information. Information will be managed via national gateways with identical structures based on well-defined templates so that EUGRIS can grow as a flexible and open structure.

The first objective is to develop a 'pilot' version, based on information provided by 'Pilot countries', pilot projects (like SOWA), Concerted Actions and other international activities. This is a pre-commercial stage. The eventual aim is to develop a detailed management / business plan for the future maintenance and expansion of EUGRIS.

For further information contact: Jörg Frauenstein, joerg.frauenstein@uba.de

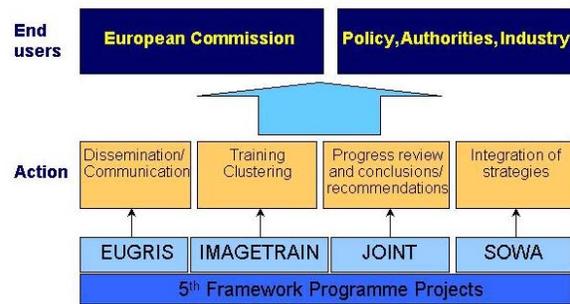
**IMAGE-TRAIN:** (Innovative management of groundwater resources in Europe – Training and RTD co-ordination project) aims to improve co-operation and interaction between ongoing research projects in the field of soils and groundwater contamination through improved knowledge transfer (training and communication) and better integration of research activities by including EU Accession countries and establishing research clusters.

IMAGE-TRAIN operates at two levels: (i) Cluster Meetings for established researchers of ongoing research projects are being organised aimed at establishing topic links between RTD projects dealing with contaminated land and groundwater and to promote their practical application. Practical case studies with selected experts are being organised to run short studies on emerging groundwater and soil issues; (ii) Advanced Study Courses for junior scientists are being organised aiming to quickly transfer existing and emerging knowledge to young European academics.

Public access to announcements, proceedings from Cluster Meetings and review reports from Advanced Study Courses can be directly downloaded from the project website: <http://www.image-train.net/>

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**JOINT** (Joint technical approach for soil and groundwater quality management) organises workshops to review the current state-of-the-art and the progress and results of individual



Research Technology & Development (RTD) activities to arrive at conclusions and recommendations for future research needs, tailored to individual stakeholder groups.

Through a series of workshops JOINT will focus on diffusion of current R&D results; updating and connecting existing technical approaches; stimulate co-operation for applied research; and support of the implementation of Water Framework Directive and upcoming Soil Policy.

The workshops will focus on the topics of investigation, risk assessment, remediation and integrated management of the soil-water-system.

For further information contact: Dr. Thomas Ertel, thomas.ertel@uw-d.de

**SOWA** (Integrated soil and water protection: Risks from diffuse pollution) aims to integrate soil and water protection measures in Europe by bringing together all disciplines involved in environmental research and policy making.

SOWA provides a forum for the identification of research needs and strategies for integrated soil and water protection identified in five thematic working groups, which focus on the different

aspects of integrated soil and water protection.

The results and progress of the working groups will be presented in two reports and will be discussed and disseminated at two workshops. The first (March 21, 2003, Tübingen, Germany) focused on the protection of soil as the most active resource in the hydro- and biosphere. The second (June 2004) will focus on "Research strategies for integrated soil and water protection."

For further information contact: Prof. Dr. Peter Grathwohl [grathwohl@uni-tuebingen.de](mailto:grathwohl@uni-tuebingen.de), or Dr. Dietrich Halm, [dietrich.halm@uni-tuebingen.de](mailto:dietrich.halm@uni-tuebingen.de)

Or visit the SOWA homepage: <http://www.uni-tuebingen.de/sowa>

JOINT, IMAGE-TRAIN, SOWA and EUGRIS are holding their first joint workshop in Orleans, France 26-28 November 2003. The workshop "The Functioning and Management of the Water-Soil-System at River-Basin Scale: Diffuse Pollution and Point Sources", will sum up the activities from the 5th European Framework Programme and address future needs within the 6th Framework Programme (see Page 12).

# Announcement of the EU-Workshop

## The Functioning and management of the Water-Soil-System at River-Basin Scale: Diffuse Pollution and Point Sources

Orléans, France 26th – 28th November 2003

The 5th Framework Programme for Research, Technology Development and Demonstration started in 1998 with a duration of 5 years. The projects belonging to the action line “Prevention of Pollution” within the key action “Management and Quality of Water” are just before finishing or recently completed. The 6th Framework Programme for the period 2002 – 2006 with its sub-priority “Global Change and Ecosystems” covers under the issue “The Water Cycle and Soil-related Aspects” numerous aspects for which the findings and results of FP5 projects might be of highest relevance.

The main objectives of the workshop are:

- to review the progress of projects funded under 1.4 Pollution Prevention of the Water Key Action of the Environment and Sustainable Development Programme (FP5)

- to build the bridge between FP5 and FP6

- to inform about the new instruments of FP6 and to discuss both their scientific and project management aspects

- to identify future short-, medium- and long-term priority research tasks.

The workshop will present a seamless account of all the above mentioned FP5 projects. Those projects that are not covered in detail during the oral presentations are invited to participate in the poster sessions. A compilation of all projects including an exhaustive contact list will be part of the workshop proceedings.

All contributions as well as the summed-up results of the workshop discussions will be edited for the workshop proceedings and compiled to provide direct input to the “European Sustainable Land and Groundwater Management Information System” EUGRIS.

This EU-workshop is jointly co-organised by the accompanying measures JOINT and IMAGE-TRAIN, hosted by the BRGM, France, and funded by the European Commission within FP5.

The following projects are actively involved in the workshop: ABACUS, AG-RIBMPWATER, CO-RONA, DESPRAL, DIM-DESMOTOM, EUGRIS, GRACOS, IMSIS, IMAGE-TRAIN, INCORE, LIBERATION, MAROC, METALBIOREDUCTION, ORGONATE, PEGASE, PEREBAR, PhytoDec, PIRAMID, PROWATER, PURE, SEDNET, SENSPOL, SOWA, TRACe-Fracture, WATCH, WELCOME

The Workshop Organising committee is: Thomas Ertel, Dominique Darmendrail, Jürgen Büsing, Gundula Prokop, Damia Barcelò, Astrid Groegler.

The workshop is hosted by BRGM – Bureau de Recherches Géologiques et Minières.

The workshop is being held at the Scientific and Technical Centre, BRGM, 3 avenue Claude Guillemin - BP 6009, 45060 Orléans Cedex 2 – France

Tel. : +33 (0)2 38 64 34 34  
Fax : +33 (0)2 38 64 35 18

Early registration is highly recommended.

Registration fee is 80,- EURO incl. VAT for each participant and includes handouts and lunch / refreshments. (Please note that any registrations that are cancelled or altered are subject to a 20 % fee).

For further information please contact:

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Information is also available in the news section of [www.eugris.org](http://www.eugris.org).

**All registered EUGRIS users can post news items. Registration is free.**

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