



NICOLE NEWS

Network for Industrially Contaminated Land in Europe

August 2008

Prevent... or Spend?

Anja Sinke
BP



Examples of preventative measures taken by the industry to minimise risk of soil contamination: a bund and floor in a tank area (left) and a fluid-tight pavement being installed in a petrol station during construction (right). Investment in such measures is preferable to clean-up costs.

INSIDE: Latest on NICOLE projects, reports, meetings and working groups

Soil protection is a core aspect of the draft EU Soil Framework Directive (SFD), which states that: *'Member States shall ensure that appropriate and proportionate measures are taken... to prevent the intentional and unintentional introduction of relevant dangerous substances on or in the soil by dumping, leaking or spilling'*. Although many parties gave their opinions on the draft SFD, resulting in over 500 recommended amendments, this particular phrase did not evoke much debate. Most of the readily available information on the prevention of soil contamination refers to either European or Governmental web pages and seldom makes reference directly to industry. At first sight this might suggest a lack of interest on the part of industry, although this is far from the case. In fact the notion of preventing contamination is considered an intrinsic part of operations and maintenance within industry and not as a stand-alone topic worthy of individual attention. Here we discuss some of the management approaches taken within industry to prevent contamination occurring, an approach that is far better than the expense incurred through clean-up operations.

Industry works to prevent soil contamination in many ways, ranging from practical measures to the more generic level of including environmental aspects in strategic decisions on the choice of locations, the installation of new facilities and plants and decommissioning of obsolete facilities. At

a practical day-to-day operational level, a distinction can be made between systems and operational processes. Clearly the exact means by which soil contamination is prevented will vary both between companies and between production processes. As an illustration, NICOLE has a wide range of members from the petroleum industry, chemical industry, steel and metal industries, electronics, logistics, major harbours and so on. All these activities differ in technical requirements and operations, although all of them will have at least some preventative measures in common. For example, the contamination prevention measures used in the petroleum industry are listed below.

Plant and systems:

- Physical barriers to prevent the spread of spillages such as bunding and lining (see illustration above),
- Use of double skinned tanks and flexible piping,
- Leak prevention and detection systems on tank bottoms,
- Cathodic protection of lines and tank bottoms,
- Automatic flow cut out systems,
- Overfill leak detection and alarm systems,
- Surface coverage (see illustration above),
- Collection of run-off water from plant surfaces,
- Use of proper design codes and the application of good engineering practice.



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If you would like to suggest an article for the next edition of NICOLE News please e-mail nicole@nicole.org

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NICOLE workshop October 2008

Environmental Decision Support Systems - Truth or Dare!

The next NICOLE workshop in **Madrid on 8-10 October 2008** will present a range of Environmental Decision Support Systems (DSS), discuss their capabilities and limitations and their acceptance in the decision making process. DSS have been developed for use in environmental management, linking environmental data with simulation or conceptual models in order to make site characterisation, monitoring, and cleanup decisions.

DSS facilitate the use of data and models and structure the decision-making process. The ideal DSS should integrate, analyse, and present information to project managers in order to select cost-effective cleanup strategies. The optimal system should balance the sophistication needed to address the wide range of site conditions with ease of use. It should not require data that is typically unknown and should have robust error checking (QA/QC) of problem definition through input. Care must be taken to match the DSS with the decision to be made.

Do we need *trust* in DSS or does it need *courage* to use and rely on the outcome of these systems? The workshop aims to provide a better understanding of the key-factors of Environmental DSS. Further information can be found at <http://www.nicole.org>

NICOLE gets a new look

You may have noticed the new look to this year's NICOLE newsletter; this is a part of a new 'corporate image' for NICOLE outputs that has been introduced recently.

As of now the website (bottom right), NICOLE presentations, reports and the newsletter will all be in the new orange and blue format. We hope that the strong cross-media style will heighten the image and presence of the NICOLE organisation across Europe. As many of you know we tried a range of different formats and asked for members' views and ideas on the new look. The NICOLE secretariat and information team wish to thank all NICOLE members who contributed their thoughts and ideas to this new look, and hope that you are as pleased with the end result as we are.

At the same time as the website has been updated visually, some new additions to the site structure have been incorporated. To support the continuing development and expansion of the **NICOLE Working Group initiative**, a series of Working Group pages have been incorporated into the NICOLE Groups section of the website (right).

Each group has a home page (top right) that gives access to information about the group, its activities (centre right) future meetings and resources. There are both open and restricted access areas, such as the working zone, where group members can work remotely on confidential documents. To find out more about the Working Group pages, log on to <http://www.nicole.org> and select NICOLE Groups from the left hand menu.



SuRF UK

Frank Evans, National Grid, UK
Nicola Harries, CL:AIRE, UK

ConSoil 2008: special sessions on technology development and market uptake

SuRF UK is the UK's Sustainable Remediation Forum – an initiative to improve understanding of sustainable remediation in the UK.

Sustainable remediation can be defined as the practice of demonstrating, in terms of environmental, economic and social indicators, that an acceptable balance exists between the effects of undertaking remediation activities and the benefits these activities will deliver.

A related concept is 'Green Remediation' defined by the US EPA as 'The practice of considering all environmental effects of remedy implementation... incorporating options to maximize net environmental benefit of cleanup actions'. Green remediation emphasises environmental aspects of sustainability such as use of natural resources and energy efficiently, reducing negative impacts on the environment, minimizing or eliminating pollution at its source, and reducing waste to the greatest extent possible.

SuRF UK's current working mission statement is as follows:

To develop a framework in order to embed balanced decision making in the selection of the remediation strategy to address land contamination as an integral part of sustainable development

The major deliverable of SuRF UK will be a framework, as opposed to a tool or model. In using the word 'balanced' the mission statement means a framework to consider social, environmental and economic factors. 'Strategy' is meant to include the design and implementation phase of a remediation project whilst 'Land contamination' covers related groundwater issues. 'Development' is meant in a wider context of sustainable development rather than a property development scheme.

The work plan aims to deliver a working framework by spring 2009 using a series of open forum meetings and smaller working groups to share and develop ideas for the framework.

To find out more about sustainable remediation, read the report of the NICOLE London workshop on Sustainable Remediation. A review can be found on page 4

Arthur de Groof, Grontmij, NL

Despite the fact that they may show considerable promise, market uptake of innovative soil and groundwater remediation technologies seems disappointingly low throughout Europe due to a lack of stakeholder confidence. At the ConSoil 2008 conference in Milan NICOLE and the EURODEMO+ network jointly presented an in-depth look into this important issue, with ample opportunity for discussion. Besides raising awareness, the main aim was to reach agreement on joint actions to move forward.

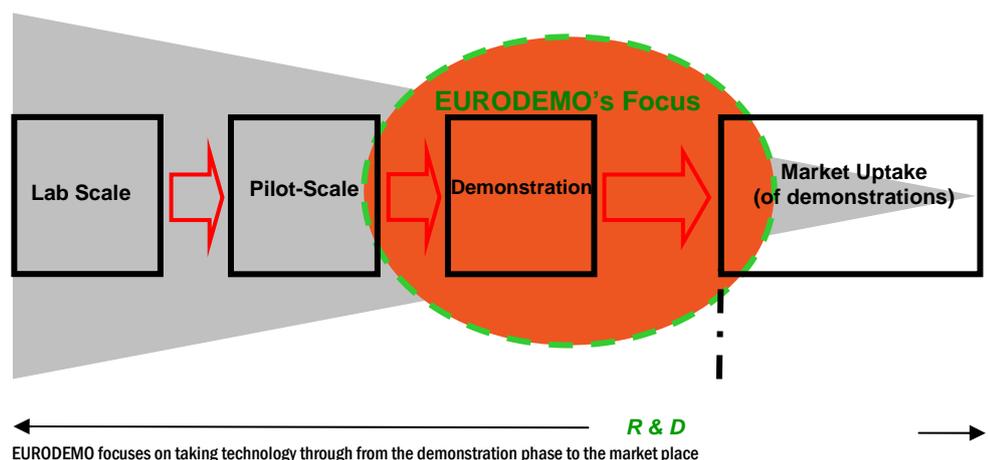
Three sessions were devoted to different aspects of technology development and market uptake. The first introduced the issue, the second examined the role of demonstration projects in the successful uptake of new technologies and the third looked at how industry can move towards a common position on new technology and its uptake. In the first session Markus Ackermann (NICOLE ISG) discussed the needs for future research and Jörg Frauenstein (SNOWMAN) announced a second SNOWMAN call for proposals. In the second session, Robert Hooley (NICOLE SPG) pointed out that a lot of data on successful demonstrations are available already and stressed the importance of better co-ordination between universities, engineers and technology vendors. Timo Heimovaara (representing the academics' perspective) gave an overview of issues arising from working on demonstration projects, emphasising the importance of clear targets and good reference measurements. Finally, Yvonne Spira (EURODEMO+) presented the results of the original EURODEMO programme and the ongoing funding effort being carried out in EURODEMO+.

In the third session Anja Sinke (NICOLE ISG) outlined the selection criteria applied to demonstration project proposals by the industry, and showed that aspects like chance of success, duration and potential revenue play an important role. Francesca Quercia (Common Forum) discussed the importance of sharing results, arguing against more formal formats, like a list of approved technologies, which could slow the acceptance of new techniques.

From the presentations and discussions the main concerns about demonstration projects were over-complex organisation, the investment needed in relation to the chances of success, the applicability of test results beyond the test site, the duration of the remediation produced and regulatory approval. The main conclusions of the combined sessions were as follows:

1. The results of research and demonstration projects can be of great use, especially for parties like the new EU Member States, and should therefore be accessible;
2. There is a need to investigate economic as well as technical aspects, e.g. whether the market is large enough;
3. Projects should aim for inexpensive, reliable, effective data, preferably in an informal format, such as a record of experiences, both good and bad.
4. No to more formal formats, like a list of EU-approved techniques, as these may discourage innovation.

EURODEMO+, supported by NICOLE and the Common Forum, agreed to take the joint action of composing a position paper on how best to move towards the creation of an experience database on a European scale.



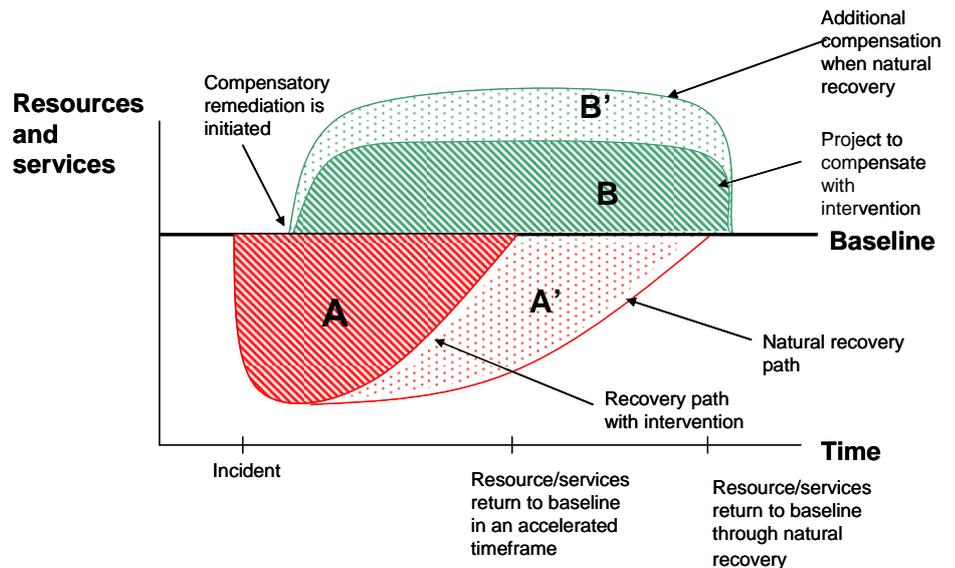
Using baselines in liability management

Brussels, Belgium, November 2007

Baselines are a useful tool in the liability management process. They are explicit in the Environmental Liability Directive (ELD) and Water Framework Directive (WFD) and feature in other European legislation. This workshop investigated what obligations current and upcoming legislation will place on site owners, buyers and sellers. Sessions dealt with regulatory and financial aspects as well as methodologies for dealing with the definition of baselines and designing risk management approaches to meet them. The definition of a baseline condition might represent the starting condition, the condition prior to contamination, or the condition to which a site has to be restored. Baselines are difficult to relate to contaminated land management, which typically relates to risks to human health and water, while ecological impacts may also be a consideration in the context of River Basin Management Plans. The ELD describes 'primary' remediation, where ecological services function under a baseline condition, with

two alternatives if this is not feasible: compensatory or complementary remediation, which provide equivalent ecological resources for those damaged. Primary remediation accelerates recovery processes on-site. Otherwise compensatory or complementary remediation is used to provide an enhancement in services. The baseline concept is attractive, but not necessarily practical, as it may refer to a time before which major ecological changes had already taken place and distinguishing new changes may be impossible. It may

be better to consider how to provide further ecological services during land remediation. An interactive case study demonstrated potential synergy between remediation and ecological restoration, where enhanced ecological services improve sustainability and cost savings. An ongoing action for NICOLE will be to initiate and maintain a debate on baselines and to collect case study information about both the use of baselines by members and their work on ecological restoration as a practical part of contaminated land management.



The role of the baseline in contaminated land management, illustrating how baseline assessment determines the management of an incident on a site.

Sustainable Remediation

London, UK, March 2008

Achieving sustainable remediation in site management has become both a concern and a long term goal throughout Europe. Although there are now a range of regulations, design standards and guidance aimed towards achieving sustainable development in site remediation, there is still scope for further development of the field.

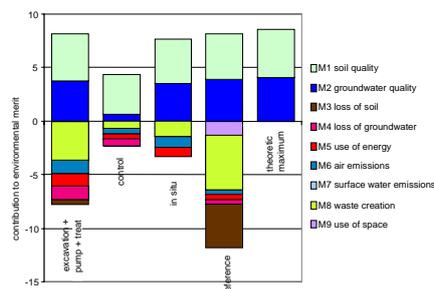
covered the definition of sustainable remediation and the implementation of sustainable development in remediation. Several papers provided overarching views, while case studies provided examples of implementation (see below for example).

Contaminated land management has a basis in risk assessment. However, the means of achieving risk management must in itself not place unreasonable demands on the environment, economy and society, the three key elements of sustainable development.

The definition and implementation of sustainable remediation were explored in syndicate sessions. These produced the following description of sustainable remediation: "A framework in order to embed balanced decision making in the selection of the strategy to address land and/or water contamination as an integral part of sustainable land use".

For implementation, some preferred a focus on measurable impacts, such as life-cycle based tools and cost benefit analysis, although such tools do not fully express sustainable development. It was discussed whether a separate appraisal of remediation should be undertaken when it is a component part of a larger redevelopment project. It was also suggested that sustainability might be considered at several levels, such as a particular site; a redevelopment project requiring risk management work; a municipality or other local area; regional, national and supranational policy. It was proposed that NICOLE should lead in establishing a sustainable remediation debate across Europe, and should link with the work being undertaken by CL:AIRE in the SuRF-UK initiative.

The workshop drew on a number of current themes, including benefits and costs issues, approaches to sustainable development in land remediation and the identification of knowledge gaps that might inhibit the achievement of sustainable remediation. It was run in collaboration with the Soil and Groundwater Technology Association (SAGTA) and sponsored by English Partnerships and CL:AIRE. Presentations



Comparison of Environmental Merit Components

Updates from the SG, SPG and ISG

Steering Group

Marjan Euser

In spring 2008 the NICOLE Steering Group had some open discussions with delegates from DG Environment about, among other things, the recasting of the Directive for Integrated Pollution Prevention and Control (IPPC) to an Industrial Emissions Directive.

The current draft proposal for this new Directive includes provisions to conduct baseline studies at the beginning and end of IPPC activities with interim monitoring every 7 years. The SG

explained to DG Environment that measuring incremental changes between baselines is very difficult. The amount of sampling would have to be so high that it would not be economically feasible. The proposal also includes a provision to improve the definition a baseline under a comitology procedure (in other words, specialists from the member state and the EC prepare guidance outside the regular EU parliamentary process). The Steering Group offered assistance to the EC in writing the draft comitology document and in providing NICOLE knowledge to the preparation of the resulting Best Available Technology Reference document (BREF). DG Environment will consider our suggestions and continue the dialogue

with NICOLE.

The COMMON FORUM on Contaminated land in the European Union organised several meetings this year to write new text for the Soil Framework Directive (see page eight for a more detailed summary of COMMON FORUM activities in this area). NICOLE was invited to be involved in this process of refinement and improvement of the legislation; Lucia Buvé of the NICOLE Steering Group has attended the meetings.

For meeting reports, visit <http://www.nicole.org> → NICOLE Groups → Steering Group. These reports are accessible for NICOLE members only.

Industry Subgroup

Lida Schelwald vd Kley

Since our last update in August 2007 the NICOLE Industry Subgroup (ISG) has convened three times. We had 'regular' meetings at Solvay's headquarters in Brussels and at Phillips in Eindhoven, and a joint meeting with our industrial UK counterpart, SAGTA, in London. During the same period we welcomed some new members: the Port of Antwerp and Petrom, as well as an 'old' member, Lyondell, who rejoined NICOLE.

Apparently concern over the contaminated land management issue is still very much 'alive', although it is viewed in a much broader context than

some years ago. A main challenge for the future is to ensure that management of contaminated land, like that for any of the other complex issues facing our society, fits into a framework of sustainability. This should not just be limited to making decisions at the remediation technology or approach level (e.g. source treatment versus boundary control). In fact sustainability could be considered one or two steps earlier by placing site remediation into the broader context of sustainable development or even by considering the targets themselves (sometimes 'doing nothing' and leaving the site as is would be the most sustainable solution).

Given the increasing importance of the subject, NICOLE is planning to set up a working group to help lead the European

debate on sustainability and remediation. The aims of the working group will be to provide a definition of sustainability as applied to remediation and to describe how sustainability thinking can be applied to remediation projects. The NICOLE London workshop has initiated these discussions and reached some preliminary conclusions (see p4 for more information). The working group shall continue the process. The ISG meeting held in June at Philips' headquarters in Eindhoven was followed by an excursion to the "Sanergy" project, a brownfield redevelopment based on a former Phillips site in Eindhoven. A novel feature of the development is an approach combining groundwater remediation with heat extraction, producing a sustainable combination of groundwater treatment and energy supply from the subsoil.

Service Provider's Group

Elze-Lia Visser Westerweele

The NICOLE Service Providers Group includes members from over 35 companies providing environmental consultancy and contracting services to the contaminated land industry. Membership is steadily growing and most EU Member States are now represented.

During 2007 and 2008 discussions within the group have largely dealt with the Soil Framework Directive and the transposition of the Environmental Liability Directive and its consequences for industry. These discussions provided a large part of the input for the NICOLE workshop on environmental liability in 2007 (see <http://www.nicole.org> for the workshop report). One of the most

important goals of such workshops is the exchange of knowledge between delegates and one of the most effective tools to achieve this has proved to be the site visits organised by one or more of the NICOLE SPG members. For example, at a site inspection in March 2007 we learned much about the successful redevelopment of a former shipyard site in Gothenburg in an area at risk of landslides. Close co-operation between the redeveloper, contractor and the city of Gothenburg proved to be a key to this success. Another example of a successful site visit was that held during the CONSOIL conference in June 2008 in connection with the SPG special session organised there. SPG members from Milan organised a very interesting visit to the large scale redevelopment site at Santa Giulia, described in more detail on page 9. Over 40 members from both the Service Providers and Industry Sub Groups attended the presentations and visited this impressive project.

The SPG members form a large network and have a very large collective body of knowledge of value to the contaminated land remediation industry. In the open, informal and interactive atmosphere of the NICOLE network, in particular during site visits, this knowledge can be disseminated and translated, providing useful perspectives for NICOLE industrial members.

One of the products that has come from this interactive dissemination is a list of remediation and investigation techniques. The list was produced in close cooperation with ISG and SPG and provides an insight into the level of maturity of the techniques described (i.e. proven at full scale and accepted, pilot-scale or laboratory scale) as well as any personal experiences with them. The SPG is currently exploring research needs for the Industry and will try, in close cooperation with the ISG, to find answers to the issues raised in the coming years.

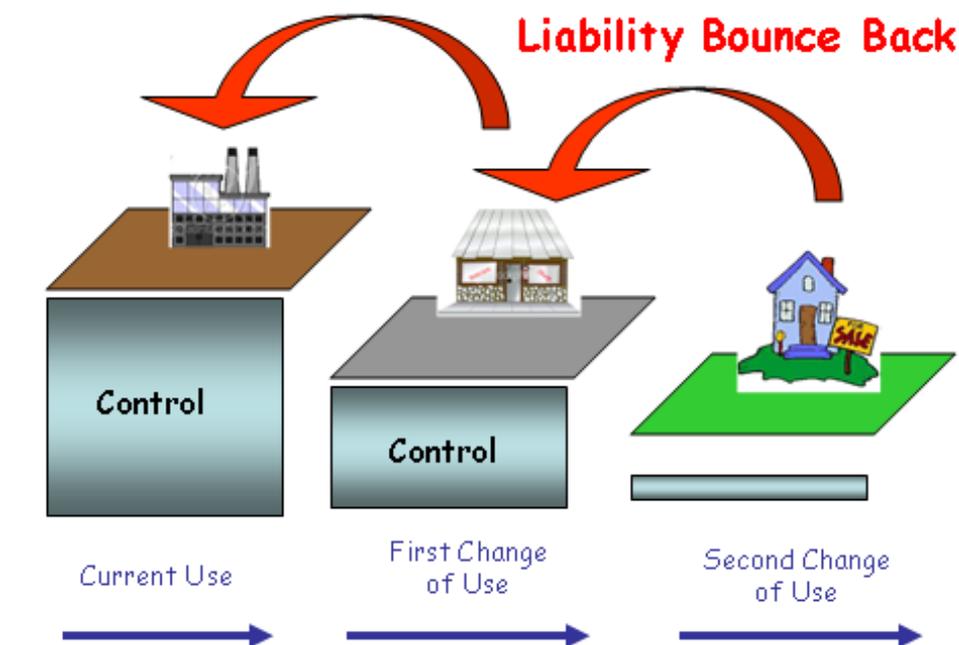
Brownfields

Ian Heasman, Taylor Wimpey, UK

The NICOLE workshop in Akersloot in June 2007 'The Redevelopment of Sites – The Industrial Perspective' highlighted the benefits of the reuse of brownfield land for economic, social and environmental regeneration (see <http://www.nicole.org> for the full report). From this meeting it became apparent that some land holding organisations are cautious about selling contaminated land for redevelopment, in particular for sensitive end uses such as housing. Landowners are sensitive to the possibility that, even with safeguards in place, it could be possible for a post-divestiture contamination problem to end up back with them. Unlike the sale of many assets there can be a continuing liability associated with the sale of land in line with the 'Polluter Pays' principle common in European environmental law. Landowners will therefore look to balance concerns over loss of control of legacy issues and risks of future problems against maximising the potential value of otherwise redundant land assets returning them to beneficial use for the good of society.

Brownfield Working Group Objectives

The Brownfield Working Group has the objective of developing a 'Framework Document' for brownfield divestment in Europe, designed to inform industrial land holders of options to secure as clean an exit from liability as possible,



An illustration of the principle of liability bounce back

and meet their liability management goals. It is recognised that the overall objective will be a complex and challenging task. Therefore a research proposal has been developed with the objective of producing a 'Road Map' detailing how the Framework Document for Brownfield Divestment could be structured and delivered. This will require a work on a number of fronts:

- Review existing Sources of Information including available research data
- Understand the definitions of 'Brownfield' and related terms, what status they have and how they are used in different European countries

- Review legislative, policy and market Drivers for brownfield regeneration in Europe, and how they are working in practice
- Identify and Review Environmental Liability Transfer Mechanisms in Europe, including statutory and contractual provisions and insurance
- Identify Country Specific Case Studies relating to Brownfield development and Environmental Liability Transfer to demonstrate how things work in practice
- Compile country-specific Information Sheets

You can contact any Working Group via <http://www.nicole.org> Navigate to the WG you are interested in and click on its contact form.

Monitored Natural Attenuation

Roger Jacquet, Solvay, Belgium

The MNA WG aims to build on the successful work of NICOLE and interest in MNA to move it further from theory towards practical implementation of MNA as a remediation strategy. The group also aims to document (anonymously) case studies of the use of MNA in Europe. It also keeps NICOLE members abreast of legal and technical developments in European countries. Recent activities included participation in a range of external meetings

- Sites pollués - Quelles avancées autour de l'atténuation naturelle? May 2007 in Bordeaux organized by the ADEME (Agency for the Environment and mastery of energy)

- KORA Status seminar, September 2007 in Stuttgart
- Participation in the organizing committee of the Dechema 3rd European conference on Natural Attenuation and in-situ Remediation.

Recently the WG launched an update of the potential for MNA implementation in Europe through a review of existing guidelines, protocols and soil legislation. We renew our call for new case studies (see above) as it has been difficult to find examples. This could be linked to slow implementation of MNA in Europe and because most cases submitted for MNA approval are likely to be recent.

Groundwater

Wouter Gevaerts, Arcadis, Belgium

The first round of guidelines on the Groundwater Daughter Directive was completed in 2007. NICOLE was involved in preparing the guidelines on 'Direct and Indirect Inputs', as reported in NICOLE News 2006. The new guidelines were started up in late 2007 and NICOLE will again be involved, this time on the guidelines on risk assessment. These guidelines will contain three main items: conceptual modelling, risk management and risk assessment. A first version of the guidelines is expected to be produced for autumn 2008. The intention is to have the final version completed in 2009. The Working Group will keep NICOLE members informed of progress

Site Characterisation and Monitoring

Derk van Ree, Deltares/Geodelft, NL

The new NICOLE Working Group on Site Characterisation and Monitoring was launched in June 2007 at Akersloot (NL). It held a second meeting at Solvay in Brussels in October. Its aim is to identify how to improve the prospects for successful implementation of innovative characterisation and monitoring techniques in the contaminated land sector. Meetings to date have allowed participants to exchange information on their activities in site characterisation and monitoring. There are many techniques that are currently underused in industrial applications for a variety of reasons: for example some are not accepted in all countries and some are very expensive. The WG intends to investigate and address the following issues in the coming year:

- What are the barriers preventing the implementation of new techniques?

- Is the innovative technique replacing an accepted 'standard' technique, or is it an additional technique that could be offered as an alternative?
- Why are some techniques acceptable in one country and not in others? How can such discrepancies be addressed?
- How can techniques be compared?
- Creating opportunities to share experiences of using novel techniques

There are many ongoing projects of interest and sharing information will help to fulfil the aims of the Working Group. It is intended to make use of the internal work-area (see p2) to share data between members. Limited progress has been made on this to date. A screening methods standard is being considered in ISO/TC190 on Soil Quality. The chair and co-chair are following progress via the Dutch Standardization institute.

Soil

John Waters, ERM, UK

The Soil WG has more than 20 members drawn from industry, academia and consultancy; it addresses the Soil Framework Directive and co-ordinates NICOLE's response to it. Until recently soil was one of the few, if not the only environmental media without specific legislation at EU level. Following the release of the draft Soil Directive public consultation late in 2006 and NICOLE's response in January 2007 a huge number of amendments (594) were reviewed and compromise amendments were issued in October 2007. These were laid before the EU Parliament Environment Committee and a summary report was published in October 2007. In November 2007, the draft Soil Protection Directive was adopted by the EU Parliament. However it was blocked in the Council of Ministers in December 2007. Five countries voted against its adoption, including France, Germany and the UK. Austria, the Netherlands and Germany voted against as they feel soil is not a cross boundary medium. France and the UK voted against for reasons of proportionality and cost, rather than on a matter of principle. Nonetheless twenty two Member States voted for the Directive, including all the newer members. While the vote was a blow to the Commission, significant effort is now going on behind the scenes to revive the SFD. Ironically the key mover in this is France, who has just taken over the EU Presidency and is keen to see progress on a revised text within the next

six months. Two important issues that NICOLE will be looking at when the revised text is available are inventories of contaminated land and liability transfers. NICOLE is concerned that automatic placement on an inventory discourages voluntary remediation by owners, thus slowing the pace of remediation, particularly of brownfield sites. If an inventory is unavoidable, NICOLE supports an amendment to exclude remediated sites once remediation activity has been completed.

NICOLE supports the 'polluter pays' principle. However, more clarification in the text is required about the obligations and liability of owners, operators and polluters. For example, who would be considered as the polluter if the original owner of the land (and operator of the 'polluting' process) sold it to a buyer with full information, at a discount to allow the purchaser to deal with the pollution, who exposed humans to the chemicals of concern by redeveloping the site? It would seem inequitable for responsibility to remain with the original owner.

The Soil WG is also currently tracking the Commission's proposed consolidation and revision of the IPPC and six associated Directives. We met with Commission officials in May 2008 to discuss their proposals and some associated challenges. See <http://www.nicole.org> -> NICOLE Groups -> Steering Group -> Documents for any updates.

Waste

Ian Heasman, Taylor Wimpey, UK

Since the last edition of NICOLE News the Waste Working group met once in Brussels last November. Here the group confirmed its primary goals as:

- Following the progress of the Waste Framework Directive (WFD); and subsequently
- Looking at the practicality/consistency of transposition and adoption.

Of the 120 amendments proposed by the European Parliament in its first reading, the Commission has accepted 48 in full, in part or in principle. This still leaves territory for discussion, which may be why the second reading, scheduled for early 2008, did not take place until 17th June 2008, when it was approved. The NICOLE position paper of May 2007 (see <http://www.nicole.org>) focussed on the best outcomes for soils. In particular it looked at exclusions from the Directive, ways in which materials could be considered as by-products rather than waste, and when waste ceases to be waste. A more detailed discussion of the revised Directive and its implications for NICOLE Members can be found on page 9. The Waste WG will continue to monitor progress in the Directive.

ERA

Bertil Grundfelt, Kemakta, Sweden

The Ecological Risk Assessment (ERA) WG aims to produce a proposal, a position statement or an action plan on ERA. It focuses on the Environmental Liability Directive (ELD) and procedures used for ERA in EU Member States. The group recently met in Akersloot and Brussels. It was concluded that as the implementation of the ELD is being covered elsewhere, the WG should focus on an inventory of ERA procedures used in different countries. This reviews what procedures are laid out in legislation, what reference or screening values are used and if widely used methods or legal obligations for ecological tests of soil and groundwater exist. In 2007 the JRC co-ordinated HERACLES project reported on methods used to derive soil screening values across Europe: its aims were:

- to describe the state of the art of SV derivation methods and their application in Europe,
- to assess commonalities and main differences among national methods,
- to assess reasons for differences,
- to assess harmonization opportunities.

There is clear need for the ERA WG and HERACLES to cooperate in the future.

Snowman funds five research projects

Arnd Wieland, UBA, Germany

SNOWMAN, an ERA-Net on soil and groundwater, began in 2004 under the EC 6th Framework Programme for Research and Technological Development. **SNOWMAN** is funding five transnational one year research projects that started in autumn 2007.

Organisations from two countries form the smallest of these projects, while the largest project consists of 13 organisations from eight countries. This article briefly describes ERA-Net, **SNOWMAN** and the five projects.

The ERA-Net (European Research Area Network) scheme was introduced in Framework Programme 6 for Research and Technological Development. ERA-Networks are intended to create an internal European market for research, restructure the European research area and develop European research policy. They were created to support the cooperation and co-ordination of research programmes in the EU at the trans-national level. **SNOWMAN** is one of over 70 ERA-Net projects, fifteen of which belong to the Environment topic. **SNOWMAN** perceives itself as the platform for soil and groundwater research bridging the gap between knowledge demand and supply. The network consists of seven partner organisations from seven European Member States. **SNOWMAN** has developed a mechanism for trans-national cooperation in research funding between the project's partner countries, resulting in a co-ordinated call for research worth almost €700.000 in total, which was published in December 2006. When it closed, **SNOWMAN** had received 23 project proposals that went into a two-stage evaluation process including an international peer review. Funding was awarded to five one-year long research projects that began at the end of 2007. **SNOWMAN** is the only ERA-Net dealing with the soil topic. The results are expected in early 2009. The five projects are described below:

MUSA (France (coordination), and the Netherlands) This project aims at building an efficient decision support

tool integrating Environmental Risk Assessment (EcoRA) and Life Cycle Assessment (LCA) for contaminated soil management. It will provide guidelines for the use of EcoRA and LCA at the same time to assess impacts of organic or inorganic contaminants at different scales in contaminated site management.

PERSPEC (Austria, Sweden (coordination), UK) **PERSPEC** aims to compile current knowledge on how atmospheric and hydrological processes influence the mobilisation of contaminants to, within and from soils. By including both metals and organic contaminants in the same research framework, differences as well as similarities in their environmental fate and response to climate factors will become apparent and different scenarios may be explored.

IOPSIM (Austria (coordination), Germany, and the Netherlands) This project examines prevention and the risk-based management of organic pollutants in the soil and groundwater system. It focuses on mobilization and immobilization processes influenced by land use and climate change in relation to the long-term stability of organic pollutants.

SUMATECS (Austria (coordination), Czech Republic, Flanders (Belgium), France, Germany, Italy, Sweden, UK) The project aims to make a literature and project-based review to identify the current status of research and application of phytoextraction, phytostabilization and immobilization in Europe, to derive decision support tools and remediation scenarios and define future research.

ENACT (Flanders (Belgium), Germany, and the Netherlands (coordination)) The objective of the project is to optimize the use of a new analytical technique called "compound specific stable isotope analysis (CSIA) for chlorine and to demonstrate the use of combined carbon and chlorine isotope analysis as tool for demonstrating natural attenuation of chlorinated solvents.

Further information about **SNOWMAN** and the research projects is available from the **SNOWMAN** homepage (<http://snowman-era.net>).

Common Forum and the Soil Framework Directive

Joop Vegter, COMMON FORUM

The **COMMON FORUM** on Contaminated Land is a network of contaminated land policy makers and advisors from national ministries in EU Member States and EFTA countries. It has been involved in the discussions about the EU thematic strategy for the protection of soil, especially in the Technical Working Group on contamination, where it promoted Risk Based Land management with support from **NICOLE**.

The proposal for a Framework Directive on soil protection by the EC contained a detailed chapter on contaminated sites and the need for remediation. This led to an intense debate between the EU Member States, the EC and the European Parliament. **COMMON FORUM** contributed to this discussion with four discussion papers and by acting as a platform for consultation for the parties involved. At the end of 2007 the Portuguese EU Presidency was not able to reach a political agreement on the proposed Directive between Member States. The current French presidency will continue the discussions and is preparing a changed proposal. A small working group of **COMMON FORUM** members is supporting this French initiative. There is no uniform **COMMON FORUM** position concerning the Soil Framework Directive, since Member States disagree on a number of issues. However, the discussions in several **COMMON FORUM** meetings and on other occasions such as **CONSOIL 2008** have led to a better mutual understanding of national positions. These discussions highlighted the advantages of a Directive, but also the main difficulties in implementing certain articles referring to contaminated sites. As most **COMMON FORUM** members need to advise their Ministers in the Soil Framework Directive debate, an exchange of arguments in favour of and against the Directive is very informative even if it leads to different national conclusions.

COMMON FORUM intends to continue this "mutual professional support" in the next meeting in Toulouse (October 16 and 17). The meeting will be managed by the new secretary, Dominique Darmendrail (BRGM, France), who will replace the current secretary Joop Vegter.



An Update on the Waste Directive

On June 17th a revised version of the Waste Framework Directive, adopting amendments proposed following the first reading, was approved by the European Parliament and Council of Ministers at second reading stage. It streamlines waste management legislation by replacing three existing Directives: the current Waste Framework Directive (2006/12/EC), The Hazardous Waste Directive (91/689/EEC) and the Waste Oils Directive (75/439/EEC).

The New Directive contains targets for re-use of recycling of waste to be achieved by 2020, an addition to the original proposal. As well as a 50% target for recycling household waste, at least 70% of non-hazardous construction and demolition waste should be recycled by the same date. These targets were the result of a compromise needed to move the proposed Directive through the European Parliament. The targets outlined are not binding; rather Member States 'shall take the necessary measures' to achieve them. A proposal for a recycling target for manufacturing and industrial waste was not included; nor is there a commitment to stabilising waste generation at 2009 levels, as desired by some Member States, featured. Instead, Member States will be obliged to produce waste management plans and waste prevention programmes with specific waste prevention objectives within five years of the Directive entering into force. Prevention of waste rather than its subsequent treatment is a key aspect of the Directive, which is reflected in the greater status afforded to the waste hierarchy of reduce-reuse-restore-recycle/compost-recover-dispose. Member States should now treat the hierarchy as a priority action rather than a guiding principle. A proposal to set targets to decouple economic growth from waste generation may be incorporated into the directive by 2014.

A particular goal of the Directive is to reduce the amount of landfill and incineration taking place across the EU. However, there is an incentive for incinerator operators that incineration can qualify as a recovery process rather than disposal provided it meets certain standards of energy efficiency. However, these levels of efficiency are very high, an Energy Efficiency factor of 60 being required for facilities in operation before 2009 and 65 from the start of 2009 in order to qualify.

The Directive also clarifies several

previously grey areas within waste management by providing definitions of (non waste) by-products and end-of-waste status, whereby by products are sufficiently recovered through treatment processes to be defined as a new product in their own right. By-products produced by some form of industrial process (i.e. not necessarily a waste management process) may be classified as not being waste provided that further use of the substance or object is certain without requiring additional processing, that the original production of the substance or object is an integral part of the industrial process and that the onward use is legal. Some wastes can now be clearly defined as non-waste and used as a raw material or a product where they have undergone a recovery process, provided they fulfil the following criteria:

- The substance or object is commonly used for a specific purpose
- A genuine market exists for the object or substance
- The substance can fulfil the technical requirements required
- The use of the material will not cause adverse effects to the environment or human health

These criteria can include limit values for specific pollutants where necessary to protect the environment and human health, taking into account the potential impacts of the relevant substance.

Many of the issues with which NICOLE is concerned are satisfactory in the revised Directive. NICOLE's interest in waste relates to soils, soil treatment and materials generated by brownfield regeneration. In particular, the exclusion of unexcavated contaminated soil and excavated uncontaminated soil from the list of wastes and the definition of by-products, recovery, protection and the end of waste are positive aspects of the Directive. Thus at this stage the wording of the Directive in these aspects looks like it will support the principles of suitability for use and risk-based land management central to the NICOLE mission. However, this is not the end of the regulatory process and the text now needs to go back to the Council and the Commission, although the Directive looks likely to be finalised before the end of this year.

The full text of the revised Directive can be found online at:

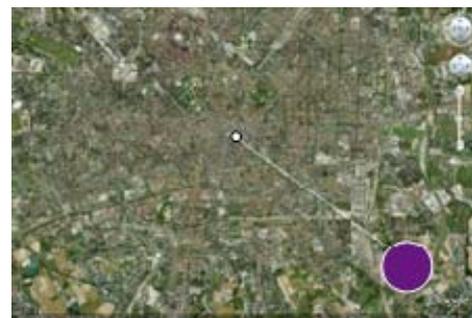
<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0282+0+DOC+XML+V0//EN>

SPG site visit to Milan

As part of a special session at CONSOIL 2008, the SPG organised a site visit to the Santa Giulia brownfield site redevelopment on the outskirts of Milan (see below). The 120ha site was previously occupied by a steel mill, a chemical plant and cultivated land (bottom). The plan is to rehabilitate the area and create a 'city within a city', including housing, tertiary industry, shops, parks and other facilities. The project budget is €100 million. The project is almost completed, having been ongoing in various phases since 1993.

Contamination on the site is varied, a reflection of the different past uses of the site: typical contaminants include heavy metals, PAHs, pesticides and chlorinated solvents. Remediation has included a variety of techniques, including soil venting, air sparging, soil sieving and stabilisation and disposal of material both on- and off-site. The on-site landfill sites have been capped and are being landscaped to form parkland within the redevelopment site. Reuse of treated materials on site has been undertaken where practicable, while a sustainable remediation approach has been undertaken throughout the project.

The site visit and a presentation describing the site and the work were organised by the NICOLE SPG. It allowed SPG and ISG members the opportunity to see the remediation work at close hand. The visit was both informative and impressive, highlighting the value of such tours during NICOLE meetings.



The location of the Santa Giulia redevelopment (purple) in relation to the centre of Milan (White). Picture courtesy of TAUW Italia



This aerial view shows the spatial extent of the Santa Giulia site, outlined in purple. Picture courtesy of TAUW Italia

An introduction to two new EU projects: ModelPROBE and SoilCAM

Matthias Kästner
Helmholtz Centre for Environmental
Research, Leipzig, Germany

This year will see the launch of several new FP7 projects of relevance to NICOLE members. On this page Matthias Kästner describes ModelPROBE and SoilCAM, while on the facing page, NICOLE News editor **Tony Chapman** gives a brief description of some of the other newcomers and an update from IWRM-net.

ModelPROBE

Model driven Soil Probing, Site Assessment and Evaluation



Conventional techniques for site characterization are time consuming, cost intensive, and often do not effectively support decision making with regard to sustainable remediation. Therefore, new techniques for step by step site characterization strategy with smart feed back loops are necessary and have to be developed.

ModelPROBE is a new small to medium scale collaborative EU FP7 project in the theme of Development of technologies and tools for soil contamination, assessment and site characterisation. The coordinator is the Helmholtz Centre for Environmental Research in Germany. The 46 month project started in June 2008 and includes 17 partners from nine countries. ModelPROBE will work closely with another FP7 project. SoilCAM (Soil contamination: advanced integrated characterisation and time lapse monitoring) is a 42 month long project led by the Norwegian Institute for Agricultural and Environmental Research with ten partners from eight countries. It aims to improve current methods for monitoring contaminant distribution and biodegradation in the subsurface.

Current invasive methods of sampling of soil, soil water and soil air are seriously affected by their accuracy and resolution. In SoilCAM, geophysical time-lapse measurements combined with ground-truthing methods will be developed to improve the accuracy of measurements

of the heterogeneity of subterranean contamination. The work will combine controlled experiments using lysimeters and tests at two field sites. ModelPROBE will develop common techniques with SoilCAM to use alongside new types of vegetation analysis. Based on these non-invasive surveys, soil heterogeneity and the source and extent of contamination levels (THP, BTEX, PAH, CHC, explosives, and heavy metals) will be located. Hot spots will then be investigated by new direct push probe systems integrated with geophysical & hydrogeological methods and combined with chemical & isotopic contaminant analysis for source location and identification. An assessment of the biological processes occurring on-site, such as contaminant degradation or mobilization, will be undertaken using biosensors, *in situ* microcosms, and stable isotope and biomarker analysis. New techniques and tools will be compared with best practice using conventional methods.

ModelPROBE gives the opportunity to test, optimize and demonstrate the proposed approach at fully equipped and characterized European brownfield reference sites in Germany, Italy, Norway and the Czech Republic. Integrated statistical analysis and modelling at different stages will result in an improved view of soil and subsurface contamination and will provide a sound basis for risk assessment and decision in the choice of the most appropriate sustainable remediation strategy.



The ModelPROBE approach will combine site investigation using portable geophysical characterisation equipment (right) with new types of vegetation analysis

Other new projects beginning in 2008

DIGISOIL: an integrated system of data collection technologies for mapping soil properties

High resolution, accurate maps of soil properties are valuable tools to assess and prevent soil degradation and to derive sustainable benefits from the many functions of good quality soil. The core objective of the project is to explore and exploit new capabilities of advanced geophysical technologies for answering this societal demand. The multidisciplinary DIGISOIL consortium will integrate and improve in situ and proximal measurement technologies for the assessment of soil properties and soil degradation indicators, spanning fieldwork, the integration of information and its presentation in the form of digital soil mapping (DSM). DIGISOIL addresses four issues covering technological, soil science and economic aspects: (i) validation of geophysical (*in situ*, proximal and airborne) technologies and integrated pedo-geophysical inversion techniques (mechanistic data fusion) (ii) relationships between geophysical parameters and soil properties, (iii) integration of the derived soil properties

for mapping soil functions and soil threats, (iv) the evaluation, standardisation and sub-industrialization of the proposed methodologies, including technical and economic studies. With respect to these issues, the milestones of the DIGISOIL project are: (i) to develop, test and validate the most relevant geophysical technologies for mapping soil properties (ii) to establish correlations between the measured geophysical measurements and threats to soil (erosion, compaction, organic matter decline, salinisation and shallow landslides) by using innovative data processing and correlation protocols (iii) to evaluate the societal impact of the developed techniques by investigating their relevance relative to end-user needs, technical feasibility and cost effectiveness; (iv) to produce an exploitation plan including the standardization of the processes and the technical specifications of the developed methodologies. The project is being led by BRGM of France and will last for 36 months; it will involve ten partners from seven countries.

iSOIL

To improve understanding and quantification of the pan-European issue of soil degradation, high-resolution soil property maps are required. Such maps will assist the specific protection of soil functions and the restoration of degraded soils as well as contribute towards sustainable land use, water and environmental management. The iSOIL project aims to provide fast and reliable mapping of soil properties, soil functions and degradation threats. This will involve improving and combining geophysical and spectroscopic measurement techniques together with advanced soil sampling approaches. The overall project approach will be to integrate three aspects of the work: High resolution, non-destructive geophysical and spectroscopic mapping methods; Digital Soil Mapping (DSM); optimized soil sampling. The results will be implemented in national and European soil databases.

The project began on 1st June 2008 and will run for 42 months: it is being coordinated by the Helmholtz Centre for Environmental Research in Leipzig, Germany and will involve 19 partners from nine different countries. For more information see <http://www.isoil.ufz.de/>

HydroNet

New technologies are needed to assess the chemical and ecological status of water bodies and to improve water quality and quantity. Recent progress in micro-electronics and micro-fabrication has led to the creation of miniature sensors and devices capable of improved accuracy in water monitoring. The HydroNet proposal (Floating Sensorised Networked Robots for Water Monitoring) aims to design, develop and test a new technological platform for improving the monitoring of water bodies based on a network of autonomous, floating and sensorised mini-robots, embedded in an Ambient Intelligence infrastructure. Chemo- and bio-sensors, embedded in the mobile robots will be developed and used for real-time monitoring of physical parameters and pollutants in water bodies. Enhanced mathematical models will be developed for simulating pollutant transport and processes in rivers, lakes and seas. Feedback on the processed data will be sent back to human actors (supervisors, decision makers, industrial people, etc.) and/or artificial actuators, in order to perform actions.

IWRM-NET News

The Integrated Water Resources Management Network (IWRM-NET) is a five-year ERA-net project that aims to provide national and regional funding for projects related to Water Resources Management in general and the Water Framework Directive in particular. It currently involves 18 European partners and runs from 2006-2010.

The first IWRM-NET funding call was completed earlier this year and the first round of funding is now in the process of being awarded. A complete list and description of the selected projects will be published soon. It is anticipated that the projects will begin in Autumn 2008. For more information see: <http://www.iwrm-net.eu/>

isoSoil

isoSoil is a 36 month project including eleven partners from six countries. Its objective is to establish concentration-independent contaminant-specific isotope analysis (CSIA) as a novel, user-friendly tool for degradation monitoring and source fingerprinting of organic contaminants in soil.

Regular remediation monitoring is often inconclusive due to its inability to distinguish between several mixed contaminant sources, degradation, dispersion and other redistribution processes. The isoSoil consortium will apply multiple CSIA systems to improve site-specific characterization and monitoring of microbial and abiotic degradation and the source apportionment of regional diffuse and locally mixed contamination scenarios. It will also develop web-based commercial software to allow users to sample and interpret CSIA results.

Elze-Lia Visser-Westerweele, SKB, NL

In March 2008 delegates from the SNOWMAN consortium discussed their work with members of the NICOLE Steering Group. The aim of the meeting was to inform NICOLE about the project and its goals and to identify opportunities for NICOLE to become involved.

The ambition of SNOWMAN is to be the research funding platform for soil and groundwater in Europe, during and beyond the life of the project. In order to achieve this aim the project has formulated several actions, the first of which has been the launch of a transnational funding call. Details of the first projects funded through this route are provided on page eight of this Newsletter. In parallel the project is developing a SNOWMAN research programme and a strategy for the dissemination of existing knowledge. The research programme focuses on strategic scientific research with a mid-term to long-term perspective.

The formulation of the research programme has been a stepwise process. Based on visionary discussions four themes have been recognised, all focusing on the sustainable use of soil and groundwater with respect to:

- Energy and climate change,
- Water management,
- Agriculture,
- Urbanisation.

The next step will be the formulation of knowledge questions based on demands from stakeholders and their translation into research questions. NICOLE members are a prime example of a stakeholder group that could make use of the knowledge generated in SNOWMAN projects. As such they are invited to provide input into the discussion of the knowledge that is required in funded projects. Such input will be a valuable tool to accurately match knowledge demand and supply on contemporary and future issues related to the sustainable use of soil and

groundwater. Based on the specified research questions it is anticipated that further transnational calls will be launched.

As NICOLE members make use of technical knowledge to provide practical solutions for contemporary and future issues, they are best situated to assess how they would make use of available knowledge and what they need to be able to use it effectively. Understanding these demands and implementing them as part of the SNOWMAN dissemination strategy will help to improve access to and uptake of results from current and future SNOWMAN projects, as well as other sources.

The SNOWMAN consortium is dedicated to providing useful and accessible research results. It invites NICOLE and its members to:

- Become involved in the definition of knowledge questions for the SNOWMAN Research Programme;
- Provide input on the needs for knowledge dissemination;
- Become involved in the SNOWMAN funded projects;
- Join SNOWMAN in the dissemination of existing knowledge.

A first interactive meeting between NICOLE and SNOWMAN has already taken place at CONSOIL in June 2008 which was attended by two NICOLE Steering Group members. This could be the first of many if NICOLE and SNOWMAN can develop an effective working relationship. For more information on SNOWMAN the current projects and any future developments, please visit:

<http://www.snowman-era.net>

**If you would like to join NICOLE, find out more about the network or make a contribution to NICOLE News, please contact the NICOLE Secretariat:
marjan.euser@tno.nl**

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Organisational processes:

- Maintenance programmes for all aspects of the plant, including sewage systems,
- Keeping track of any spills and near-misses, noting the quantity of liquid spilled, location of the spill and the type of products, noting the lessons learned and possibilities for improvement,
- A 24-hour emergency spill response service,
- Training of employees and contractors
 - to make sure (potential) spill incidents are reported,
 - to alert them to potential spill conditions,
 - to train them on 'preventative' behaviour

This combination of measures should be sufficient to minimise the likelihood and impacts of any potential spills, and so meet the requirements of the SFD.

Despite the fact that most Industrial members of NICOLE have a HSSE (Health, Safety, Security and Environment) or similar department that monitors the environmental performance indicators (EPIs) of the company, prevention is not considered in isolation. A more holistic approach is usual and, depending on the industry, prevention is captured under 'life cycle management', 'sustainable operation', or 'environmental stewardship'. As part of this approach, industry is constantly looking at its operations to find ways to prevent spills and leaks from happening in the first place. For most NICOLE industry members, remediation is not their core business and instead of creating net income, it is seen as an out-of-pocket cost that should be avoided if possible.

Luckily, prevention pays off: recovering a barrel of oil from a contaminated site can be up to 50 times more expensive than recovering a barrel from an oilfield. In most cases the choice between 'prevent or spend' is a clear one.

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