



NICOLE NEWS

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

Volume 1 Number 2 February 1997

What have we got? What do we need?

Michel Jauzein reviews the first meeting of NICOLE Working Group 2

Many questions about the tools for risk assessment of industrially contaminated land were raised and discussed by 80 participants at the 1st workshop of NICOLE Working Group 2. - Contaminant Behaviour and Risk Assessment. The workshop took place in Nancy, France, on the 7 and 8 November 1996, and was jointly held with the CARACAS network.

First the contaminated land policy of different countries and the associated risk assessment methods were described by CARACAS members. The approaches of site owners to different aspects of risk assessment and their *in situ* experience from administrative, industrial and research points of view were considered in the second set of presentations. Linking the two networks during this first workshop was a splendid opportunity for both NICOLE and CARACAS to promote technical and scientific exchanges between policy makers, scientists and industrialists.

After these presentations we divided into 4 groups to work on the following specific themes:

- Toxicology and Ecotoxicology
- Fate and Transport
- Exposure Evaluation
- Risk Communication

Our main objective was to agree what is needed to reach a consensus on risk assessment of industrially contaminated land in Europe. We identified the ten top priorities for each theme and an overall top ten was selected by the industrial members and the Scientific Advisory Group and finally discussed in a plenary session.

The top ten research priorities

- study of natural attenuation
- validation of available models
- development of toxicological and ecotoxicological tools for risk assessment
- data collection for exposure assessment
- study of environmental significance of leaching tests
- development of sensitivity analysis for pathways and contaminants
- merging of networks for contaminated land issues
- fundamental study of fate and transport processes for exposure assessment
- development of adapted *in situ* monitoring techniques for the fate and transport of pollutants in the environment
- environmental significance of treatment residuals

Members interested in participating in specific working groups on each of the top ten topics were identified.

A full report of the meeting is available for attendees and NICOLE members from WG2 (see page 7).

Current status of the network

Paul Bardos

NICOLE continues to grow both in numbers and in enthusiasm. To date (February 1997) the network includes 23 companies, 62 research organisations and 11 planning/funding bodies all with full membership - and new members continue to come forward.

Companies from Belgium, Finland, France, the Netherlands, Norway and the UK have joined NICOLE, with interests ranging from port authorities to fine chemicals and petrochemicals, from power generation to technology development. Research organisations in NICOLE span 12 Member States - we have yet to welcome members from Luxembourg, Portugal, or Ireland. You do not need to be in the EU to join NICOLE. From outside the EU we welcome organisations from Norway, Switzerland and Poland.

NICOLE is most definitely open for business and prospering. If you have yet to join us we invite you to consider joining, and we have a number of 'easy pay' options as well (see '*NICOLE - New ways to subscribe*' on page 7).

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International initiatives, industry participation, VEGAS,
the Common Forum, CONCAWE.
Update on CARACAS
US EPA Technology Innovation Office

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Calendar of events	Date
Compiègne, France WG3 - Workshop 1 Control Methods; Remediation and Containment Professor Lebeault Fax: +33 3 44 23 19 80 3 rd Steering Group (SG) meeting 3 rd SAG meeting	17-18 April 1997
Brighton, UK WG 4 - Workshop 1 Measurement and Monitoring Professor Alloway Fax: +44 118 931 6666 3 rd Industry Subgroup meeting 4 th SAG meeting	28-30 May 1997
Amsterdam 2 nd NICOLE conference (organised with NOBIS) 4 th SG meeting	Autumn 1997
WG 2 - Workshop 2 Contaminant Behaviour and Risk Assessment Dr Jauzein Fax: +33 3 83 50 36 99 4 th Industry Subgroup meeting 5 th SAG meeting	November 1997
WG 1 - Workshop 2 Site Investigation and Characterisation Dr Leenaers Fax: +31 55 5493 390 5 th SG meeting 6 th SAG meeting	February 1998

The XII International Conference on 'Computational Methods in Water Resources' will be held in Crete, Greece on 15-19 June 1998. For further information contact **Professor Alkiviades Payatakes**, University of Patras.

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NICOLE News flashes

Mark your diaries now for ConSoil '98, the 6th International FZK/TNO conference on contaminated soil which will take place in Edinburgh 17-21 May 1998. Details available from Meeting Makers, Glasgow, UK

Ms Vicky Grant or Ms Lynn Samson

Fax: +44 141 552 0511

e-mail: lsamson@meetingmakers.co.uk

The European Geophysical Society is holding its 22nd general assembly in Vienna on 21-25 April 1997. It will include a session on 'Multiphase Flow and Transport in Soil/Aquifer Systems'. Any NICOLE members interested in attending contact **Professor Rae MacKay** at the University of Newcastle (UK) for more details:

Fax: +44 191 222 6563

e-mail: cluwrr@nel.ac.uk

The European Graduate School of Hydraulics (EGH) in Stuttgart (Germany) has announced its courses for 1997. EGH represents a network of continuing education short course at research institutions and universities across Europe. Courses of possible interest to NICOLE members include:

Numerical modelling of transport processes (3-7 March 1997, Stuttgart).

Concepts of geostatistics and stochastic modelling (10-13 March 1997, Stuttgart).

Contact **Dr Lensing** at the University of Stuttgart for more information.

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e-mail: Loerby@iws.uni-stuttgart.ole

The University of Wales at Cardiff (UK) is planning a conference on 'Contaminated Ground: Fate of contaminants and remediation', 16-18 September 1997. Contact **Cherrie Summers** for more details.

Fax: +44 1222 874420

e-mail: summersc@cardiff.ac.uk

NOBIS (the Netherlands) announce the availability of technology reports in English:

'Biosparging and Bioventing Expert Support System Phase 0' (Dfl 75), and

'Risk reduction, environmental merit and costs.

REC - Method Phase 1' (Dfl 80).

For more information contact **CUR/NOBIS**

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A bioremediation discussion group (Biogroup) on the Internet is being hosted by GZA GeoEnvironmental, Inc. (GZA). To join the mailing list visit their homepage at

<http://www.gzea.com> and scroll to 'Let's Talk'. Choose the 'Bioremediation Mailing List' and follow the directions.

Any questions about the BioGroup should be addressed to **I. Richard Schaffner, Jr**, BioGroup Manager

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CRBE announces that its MSc in Contaminated Land Management has received EPSRC-IGDS support for the next 5 years. For further details contact **Paul Nathanail**

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The Common Forum

by Ingrid Hasselsten of the Swedish Environmental Protection Agency

Common Forum is an informal group formed for co-operation between the EU-Member States, the European Commission and the European Environment Agency on contaminated land issues.

Inception and first meeting

In December 1994, the German "Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit" invited all EU Member States and the representatives of the European Commission (DGXI, DGXII) to an International Workshop on "Contaminated Sites in the European Union: Policies and Strategies" in Bonn, Germany. The main objectives of the meeting were:

- to facilitate the understanding of each Member State's approach to tackling the problem of contaminated land
- to identify with the European Commission thematic areas of transnational interest where an EU-wide co-operation would be beneficial
- to establish a common forum with delegates from EU Member States to discuss the results of the DGXI study "Survey of European Union Member States: Contaminated Land" and to develop recommendations to identify an EU-wide co-operation in the area of contaminated sites.

In the Bonn meeting Final Document, the delegates agreed that this co-operation should continue with regular meetings as a Common Forum.

Second meeting

The Environment Ministries of the Netherlands, Germany and Austria jointly organised the second meeting in Maastricht, the Netherlands, in October 1995. This meeting focused on international surveys of contaminated land, in particular on "Waste 92 Area IX: Survey of European Union Member States: Contaminated Land" initiated by DGXI. Another international survey concerning contaminated land, the Vienna Questionnaire, which had been initiated by the United Kingdom, was presented and discussed. Delegates also received information on the proposed European Soil Topic Centre and also the work of CARACAS.

Third meeting

On 23-24 September 1996 the third Common Forum meeting on Contaminated Land in the European Union was held in Stockholm. 27 delegates from 14 countries attended the meeting. Austria, Germany and Sweden were the joint organisers. The topics were:

- financing of remediation activities
- lessons learned from the management of remediation projects
- monitoring, control and after care of contaminated and remediated sites.

Malcolm Lowe, Department of the Environment, Contaminated Land and Liabilities Division, UK raised a lot of questions. These inspired a lively discussion on the subject, probably due to the fact that most of the countries have difficulties in financing remedial work! The Netherlands presented their concept, which is to make different industrial sectors take responsibility for

their own problems. They started with the oil industry which made an agreement, the SUBAT, on the remediation of gas (petrol/filling) stations. This has been followed by other sectors such as state railways, gasworks sites, laundries etc. So far this solution has worked very well and it avoids a lot of administration.

Kai Steffens, PROBIOTEC GmbH, Germany described all the things that can go wrong with a remediation project. These may include legal, financial, organisational, educational, technical and acceptance problems. However, most of the problems can be handled. Some of the main tasks are clear assignment of responsibilities within an organisation and for the particular project:

- establishment of a powerful quality assurance staff, emphasis on avoidance of errors instead of "repair" or toleration
- readiness to carry higher cost for quality to reduce risk of failure
- documentation that allows thorough reviewing in all project phases
- keeping and ensuring flexibility but eradicating unfocused work
- strengthening the "positive" human factor (innovation, creativity, care)
- combating the "negative" human factor (carelessness), control
- refinement of planning goals and solution of goal-conflicts, preparation and realisation of public information and participation.

Kees Hoppener from the Ministry of Housing, Spatial Planning and Environment Department of Soil Protection, the Netherlands discussed the factors influencing the choice in the Netherlands between encapsulation and containment, and a total clean-up. Previously the approach in the Netherlands was multifunctionality, nowadays their approach is more pragmatic.

Many countries are facing the problem of long-term care of these more temporary solutions such as containment. Who is taking the long-term responsibility for the control and after-care? How can the financing be secured? What will happen if the ownership is changed? Some countries such as Switzerland demand from the company a guaranteed sum for future remediation costs and there is also insurance which will cover future costs. In Belgium there is a provision on responsibility of aftercare for 30 years if encapsulation is chosen.

Another subject for the meeting was how we could combine the efforts of the Common Forum with other groups, including

- Ad Hoc group
- EEA
- Soil Topic Centre
- DGXI.

The next Common Forum meeting is proposed to be held in Amsterdam in conjunction with the Ad Hoc group in May 1997.

Round-up on SM&T activities

by Philippe Quevauviller

The objective of the Standards, Measurements and Testing programme (SM&T) is to improve the quality of measurements and consequently harmonise the results obtained within the European Union particularly in support of EC regulations (compliance with EC Directives), standardisation (e.g. pre-normative research) and means of calibration (transfer standards in metrology, CRMs in chemistry). Emphasis is given, in the current programme, to the support to Measurements for Quality European Products and Written Standards for Industry (Theme I), Research related to Written Standards and Technical Support of Trade (Theme II) and Measurements related to the Needs of Society (Theme III).

On-going projects related to environmental risk assessment

A series of projects dealing with the improvement of analysis for environmental risk assessment (water, air, soil, waste) has been conducted within the Measurements and Testing programme (Third Framework programme). These projects were related to the production of reference materials certified for their contents of trace elements, trace organic compounds and chemical species, pre-normative research (e.g. harmonisation of leaching or extraction tests for soil and waste analysis) and development of new methods (e.g. on-line monitoring devices). Since 1995, the SM&T programme has opened two calls on Theme I and one call on Themes II and III. Most of the projects related to contaminated land were proposed in the frame of this latter call for which the proposals were selected and negotiated from April to September 1996. Examples of recently selected projects are:

- certification of extractable trace element and phosphate contents in sediments and soils (following standardisation of extraction protocols)
- technical work in support of the network on harmonisation of leaching/extraction tests for environmental risk assessment
- comparative evaluation of European methods for sampling of soils etc.

Information on the projects carried out within the Third Framework Programme may be obtained through the recently published synopsis of measurement and testing (M&T) projects. The projects, which started in 1996, were announced in the December issue of the M&T Newsletter (available free of charge).

A new call for proposals related to Theme II and III will be opened on 15 June 1997 (with a deadline in November 1997). An information package describing the areas covered by this call may be obtained free of charge from the SM&T Help Desk.

European Commission
Standards, Measurements and Testing Programme
200 rue de la Loi
B-1049 Brussels

For additional information about recent projects and information packs for proposals, please contact the SM&T Help Desk
Fax: +32 2 295 8072

VEGAS

Hans-Peter Koschitzky describes the research facility and programme framework

The research facility for subsurface remediation VEGAS at the Universität Stuttgart is funded by the German Federal Ministry of Education, Science, Research and Technology (BMBF) and the Ministry of the Environment of Baden-Württemberg. It is linked to the Institut für Wasserbau, Lehrstuhl für Hydraulik und Grundwasser (Inst. of Hydraulic Engineering, Chair of Hydraulics and Groundwater, Prof. Dr. h. c. H. Kobus). The facility includes several large scale experimental stainless steel tanks of various sizes with volumes up to 850m³. These are filled with partially contaminated soils and aquifer material thus simulating contaminated sites without the risk of uncontrolled spreading into the natural environment. This allows large-scale experiments on *in situ* groundwater and subsurface remediation techniques.

At present the programme framework for VEGAS has five main research topics:

- Optimisation and further development of hydraulic remediation techniques
- Non-aqueous phase liquids (NAPL) in the vadose zone
- Improvement of the remediation efficiency of soils contaminated with PAHs
- Contaminant transformation by reduction for *in situ* remediation of contaminated soils and aquifers
- Immobilisation, containment, and biochemical degradation techniques

VEGAS is always open to new project proposals in line with the objective of the facility.

The VEGAS laboratory is approximately 36m long, 18.5m wide and 17m high. The experimental hall is supplied with high-voltage current, compressed air, nitrogen and water outlets. A water treatment system has been installed to clean up contaminated water from the test set-ups. The system is standardised for the removal of chlorinated and non-chlorinated hydrocarbons from water. Extra space has been reserved for project-specific equipment or in case the system as a whole needs to be expanded. The waste air from the extraction fans in the chemistry laboratory and in the test set-ups will be led through a top-of-the line exhaust cleaning system.

Image not available

In addition to the experimental hall other laboratories and workrooms are available:

- climate control room with temperature regulation
- room with explosion shelter for experiments with highly combustible substances/explosive materials
- storage room for contaminated samples/materials
- state-of-the-art analytical laboratory
- measuring and electronic laboratories

The objective of VEGAS is to test and optimise existing techniques and to develop new ones for *in situ* remediation of contaminated aquifers and soils resulting from accidental spills, old waste deposits or abandoned industrial sites. VEGAS focuses on developing methods to determine the mobility of contaminants in the subsurface and for improving the assessment of contaminated sites. Methods for determining the overall mass and distribution of contaminants in the subsurface and techniques for identifying physical and chemical subsurface properties are to be developed and improved as well. Experiments on the behaviour of contaminants in the subsurface are carried out. Physical experiments are accompanied by numerical simulations in order to improve the quantitative understanding of the processes undergone by contaminants in the subsurface.

VEGAS links conventional small-scale laboratory experiments and field scale investigations. Experiments in VEGAS are conducted under controlled and reproducible conditions, therefore mass balances and remediation efficiencies can be specified. The large test containers allow investigations of realistic 3-D subsurface structures taking into consideration natural spatial variability. Combinations of field and

conventional laboratory investigations with VEGAS experiments are highly encouraged because this can contribute to bridging the gap between small-scale laboratory experiments and large-scale field investigations.

VEGAS offers research opportunities for industry, universities and research institutions throughout the country and for its co-operation partners abroad. Every project is responsible for its own funding. In general the experiments will be carried out by the researcher assisted by VEGAS personnel available. VEGAS provides the facility, the containers and the analytical laboratory for standard chemical analyses. The Institut für Wasserbau provides the basic operations for the test facility.

An advisory council (Beirat) regulates the criteria and priorities of VEGAS research and development work. It consists of representatives of science, research and industry. Regular workshop meetings are scheduled to include representatives of the various research partners of VEGAS and its co-operation partners as well as industry and administration.

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Atlantensanierung VEGAS
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Reports from the Working Group leaders

WG1 Site Assessment and Characterisation

Led by Dr Henk Leenaers, TNO-MEP,
The Netherlands
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The second workshop of NICOLE was held in the Netherlands on 22 and 23 January. Over 60 participants spent two days at the TNO-complex in the town of Apeldoorn to exchange information and ideas related to site assessment and characterisation.

A large number of research needs was identified and discussed during parallel work groups of scientists and members from industry. These ideas were then carefully prioritised during the Round Table Discussion of the Scientific Advisory Group and the Industry Subgroup for presentation in the final plenary session. Ultimately, the top 5 research items were selected and small groups were formed to take further action on each of those items. Industry members and scientific experts are now working together to produce joint research proposals. Progress reports will be presented within a few months.

Industry approaches

After Professor Wim Harder, the scientific director of TNO, had welcomed the participants to the Environmental Technology Valley, the morning session started off with a presentation by Rae Crawford from Esso. On behalf of the CONCAWE group he outlined their proposed approach to risk-based assessment of contaminated sites and summarised current status and future plans. He also shared with the NICOLE community their main concerns, that are in the process of communication and consultation. Mr Crawford invites members of NICOLE to present views on how best to achieve the aims of CONCAWE, particularly in relation to their individual situations.

Martin Bell from ICI Polymers and Chemicals Ltd., and chairman of the NICOLE Steering Group, presented his view on the site assessment process and the role of historical reviews. An essential part of a historical review is the so-called conceptual model, a flexible tool to inform the design of the site investigation.

The approach presented by Akzo Nobel differs from many other approaches because of the limited time available. Dick Kruisweg explained how he and his colleagues manage to assess the soil and groundwater quality at a site within a few weeks. Their site assessment is part of a Due Diligence Assessment and needs to give sufficient information to indicate remediation needs and costs.

A comprehensive overview of recent developments in field techniques was given by Martyn Lambson of BP International Ltd. The aim of this presentation was to summarise work done, noting practical application limitations and recognising areas where further development is warranted.

Scientific overviews

Michel Jauzein from IRH presented some of the output of the workshop in Nancy during his talk on data requirements for risk assessment. Data requirements also played a central role in the talk of Huub Rijnaarts from TNO. Using several maps from a case study, he demonstrated how data on redox conditions can be used to advantage when designing bioremediation strategies. Based on experiences in the NOBIS programme, he shared with the participants his ideas on which scientific innovations are required to further optimise this type of solution.

Frank Lame from TNO presented an overview of existing protocols and standards for site assessment and explained why and how these were developed in the Netherlands. Similar developments now take place in a European context and this is of particular interest to NICOLE. The draft version of an ISO standard for industrial sites was made available to all participants and was later discussed in more detail during the meeting of the Industry Subgroup, thus enabling a joint response from NICOLE.

A clear example of how information exchange between scientists and industry can be very beneficial!

Identifying and prioritising R & D needs

The objective of the work group sessions in the afternoon was to explore further the ideas and suggestions presented in the morning. In constructive discussions between scientists and members from industry research and development needs were identified around three themes: natural attenuation, data requirements and data collecting. The work groups were chaired by industry members who also gave short presentations of the output during the final plenary session, allowing everybody to learn and comment on the R & D needs identified by each of the groups. The final stage of this selection process was entered the next day, when the Scientific Advisory Group and the Industry Subgroup sat together at a Round Table to break down the long list of ideas to a well-balanced and fully supported top 5:

Top 5 Research Items on Site Assessment and Characterisation

- A 'good survey practice' framework (including optimisation of sampling strategies, review of geostatistical methods, relationship between cost and reliability)
- Rapid low cost techniques for preliminary characterisation
- Data on bio-availability and relationship with time and changes in the external environment
- Acceptable protocols for natural attenuation
- Cheaper alternatives to monitoring wells and the development of monitoring procedures

A laundry specialising in dry cleaning was visited on Thursday, 23 January. The company faces solvent contamination of the soil and groundwater and is seeking an acceptable solution for this problem. Natural attenuation is considered as a clean-up alternative, making use of a mineral oil contamination co-existing with the solvent contamination as a 'fuel' to detoxify the chlorinated solvents. It was very interesting to experience the activities in such a company and to get an idea about the way a serious contamination problem develops. During the closing session all participants were given the chance to participate in one of the groups that were formed, a chance that many of them took enthusiastically. Each of these groups will further explore one of the top 5 research items and produce a project outline before the next workshop in Brighton, in May. The next step will be to bring together the right partners and to start working on each of the research items that will help us find better ways of managing contaminated land.

A full report of the workshop is available to participants and members of NICOLE from Dr Leenaers.

WG2 Contaminant Behaviour and Risk Assessment

Led by Dr Michel Jauzein, IRH, France

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A brief account of the first Working Group 2 workshop appears on page 1 of this issue of *NICOLE News*. For a full report, which is available to NICOLE members and workshop participants, please contact Dr Michel Jauzein.

WG3 Control Methods (Remediation and Containment)

Led by Professor Jean-Michel Lebeault, University de Technologie de Compiègne, France

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Working Group 3 Control Methods (Remediation and Containment) will have its first meeting in Compiègne, France 17-18 April 1997.

The programme of the meeting will be as follows. A report of the previous two meetings on Containment Behaviour and Risk Assessment (WG2) and Site Assessment (WG1) will summarise the main issues.. Remediation technologies will be analysed in order to understand current practices and to identify their limitations and the possible alternatives.

Part of the workshop will be aimed at identifying difficulties and hence research needs for both 'intensive' and 'extensive' approaches to remediation.

At the end of the meeting Working Group 3 will be set up more formally in accordance with its initial aims taking into account the conclusions of the different meetings.

WG4 Measurement and Monitoring

Led by Professor Brian Alloway
University of Reading, UK

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Our workshop will be held in Brighton, UK, 28-30 May 1997. We have an interesting programme planned with speakers from Belgium, Denmark, Italy, the Netherlands and the UK. Prior to the meeting a questionnaire will be sent to all NICOLE members by the organisers of Working Group 4 to provide information on the main problems and requirements for both monitoring and analytical techniques. The results will be announced in the Brighton meeting and will help to form the basis for the topics for the discussion group sessions.

The provisional programme for the meeting includes a review of aims and progress of NICOLE by Martin Bell, ICI. Dr T Vulpius, DTI, Denmark will give an overview of the analysis of organic contaminants followed by a complementary paper on the analysis of inorganic contaminants from Dr C Davidson, Strathclyde University, UK.

Dr P Demeulemeester, Solvay, Belgium will consider analysis from industry's viewpoint. Contributors from the UK, Italy and the Netherlands will discuss recent developments in various aspects of monitoring. The final paper on 'Problems of uncertainty of analytical data near to the limit of detection' will be followed by group discussion sessions.

The plenary session of the workshop will be held on Friday, 30 May, morning. Meetings of the Scientific Advisory Group and the Industry Subgroup are scheduled for the final afternoon.

NICOLE - new ways to subscribe

NICOLE's Steering Group has decided to extend the range of options for subscribing to NICOLE and its activities for new business and industry members. The intention is to be more flexible:

- You may join for just one year (for example on a trial basis) - cost 5,000 ECU;
- We have an 'easy pay' option for membership of NICOLE over 3 years - cost 3,500 ECU per year;
- We have a 'workshop only' option for those who do not wish to subscribe to NICOLE but wish to take part in one of its workshops - cost 1,000 ECU per workshop.
- The standard subscription remains, however, the best value option cost 10,000 ECU for 3 years.

Of course we hope that if you attend just one workshop, or take a one year membership, you will quickly appreciate the value of NICOLE, and take up full membership. If you do make this choice your initial payment would be taken into account in calculating your yearly or three yearly payment regime. Please contact me for further information on membership applications.

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Polluted site studies - French National Centre

Public institutions and private companies in partnership

On 29 May 1996 a collaboration contract was signed by twelve partners, founding the National Research Centre for Polluted Sites and Soils (CNRSSP).

Founding partners - May 1996

Private companies	Universities and School of Engineering	Public Institutions
Charbonnage de France Compagnie Générale des Eaux Rhône-Poulenc Usinor-Sacilor	Université du Littoral Université de l'Artois Institut Supérieur d'Agriculture de Lille Ecoles des Mines de Douai, Paris et Saint Etienne	BRGM CEA INERIS Institut Pasteur de Lille

The Centre, which will be located in Douai in the north of France, brings together private companies, universities and schools of engineering, and public institutions. Gaz de France will also participate as an associate member. Facing problems of remediation of polluted soils and sites, the founders have defined 3 levels of investigation:

- study and pollution diagnosis of polluted soils
- risk assessment
- knowledge of mechanisms and remediation efficiency

Our aims

Based on these topics, the CNRSSP will develop its specific aims, in order to:

- define, co-ordinate and carry out applied research programmes concerning polluted sites and soils
- link research and applications on full scale
- participate in national and international research programmes
- advise authorities and managing organisations, from a scientific point of view, on questions about polluted sites and soils, especially concerning standardisation.

The future aim of solving problems linked to polluted sites and soils in France - and particularly in the industrialised Northern region - required scientific research to be brought together in a single institute. This project is in the phase of implementation as researchers, already working at Douai, are preparing the scientific strategy of the Centre and starting the research programmes at the beginning of 1997.

Foundation

The French Environment Minister, Mrs Lepage, laid the foundation stone of the Centre in March 1996. The Centre will contain laboratories, offices and a pilot hall. Before 1998, the CNRSSP will comprise a team of 30 specialists in complementary fields of research, from the different founders who will share investments, knowledge and results.

For further information about the CNRSSP contact:

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CARACAS update

from Harald Kasamas

The primary aim of CARACAS is to improve the scientific knowledge on the assessment of risk posed by contaminated land (*NICOLE News V1 N1 p3*). In the first phase of the project CARACAS identified and compiled information on relevant RTD projects and scientific approaches for risk assessment developed in the EU Member States. We have disseminated information by our Newsletter, publications in scientific journals and Internet sites (*see page 11*)

A questionnaire has been distributed to all interested scientists in Europe.

First results

- approximately 1,200 scientists world-wide expressed their interest in CARACAS and are now on our mailing list;
- over 400 RTD relevant projects have been reported
- scientific information from these in on a CARACAS database;
- scientific co-operation with major international initiatives (e.g. EEA/Soil Topic Centre, NICOLE, RACE, NATO/CCMS Pilot Studies, WHO, ISO TC 190/SC 7, CONCAWE);
- research priorities have been recommended to DG XII and EU Member States for consideration in future research programmes.

Prospects

In the 2nd phase, information compiled will be assessed by CARACAS scientists to evaluate the state-of-the-art of risk assessment. This will provide scientific recommendations to on-going R & D projects and programmes in the EU, and stimulate scientific co-operation between the Member States in future. Data collection will be continued and possibly extended to relevant R & D projects in the United States and Canada.

A CARACAS Internet site will be established. Our database will be published at this site, and will include a questionnaire for reporting RTD project data

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CONCAWE

Eric Martin, CONCAWE

CONCAWE (Conservation of Clean Air and Water in Europe), the oil companies' European organisation for health, safety and the environment, was established in 1963 in the Hague. In 1990 its Secretariat was moved to Brussels. CONCAWE has been developing a rational approach, based on risk assessment, to the clean-up of contaminated sites. In recent years, the principles of risk-based corrective action have been applied in a number of countries in Europe and in North America where the American Society for Testing Materials (ASTM) has been involved in the development of standardised protocols.

Many CONCAWE member companies have been involved with this American activity but realised that there are a number of differences with Europe and even within the two continents. CONCAWE's wish has been to develop similar protocols for Europe. A task force has been set up to carry out this work. A guideline setting out a protocol which could be adapted to the situations prevailing in the various European countries is being developed and is now nearing completion. It describes a three-tiered approach to corrective action decision making.

The CONCAWE guideline is built on the premise that one begins with relatively little site data (e.g. using conservative generic assumptions) and progresses towards more site-specific knowledge and less conservatism through additional investigation and analysis. The result is an equal level of protection of human health and the environment throughout each tier.

The three tiered approach is summarised schematically in Figure 1. It starts with an initial assessment of the site. This gathers general data including potential sources of contaminants, obvious evidence of contamination, land-use, presence of potable groundwater, etc. The pathways by which contaminants could reach populations and environmental compartments at risk are also identified. This initial assessment is followed by Tier 1, in which chemical data on the degree of contamination of the site is collected and compared with Risk-Based Screening Levels (RBSL) and other relevant criteria. The RBSLs comprise a set of trigger concentrations for contaminated soil and groundwater. These figures are not intended to be soil standards or clean-up targets. If exceeded, they are simply an indication that further study is required. RBSLs are

derived using conservative assumptions and contaminant migration models and, as such, are based on a generalised risk assessment. If the observed values are below these levels, then the risk will be regarded as insignificant.

In Tiers 2 and 3, the assessment involves refinements of the study to take into account more site-specific considerations, with the possible collection of additional data. The actual environmental compartments and populations at risk are identified, along with the possible pathways. These pathways are modelled to prepare quantitative risk estimates which can be

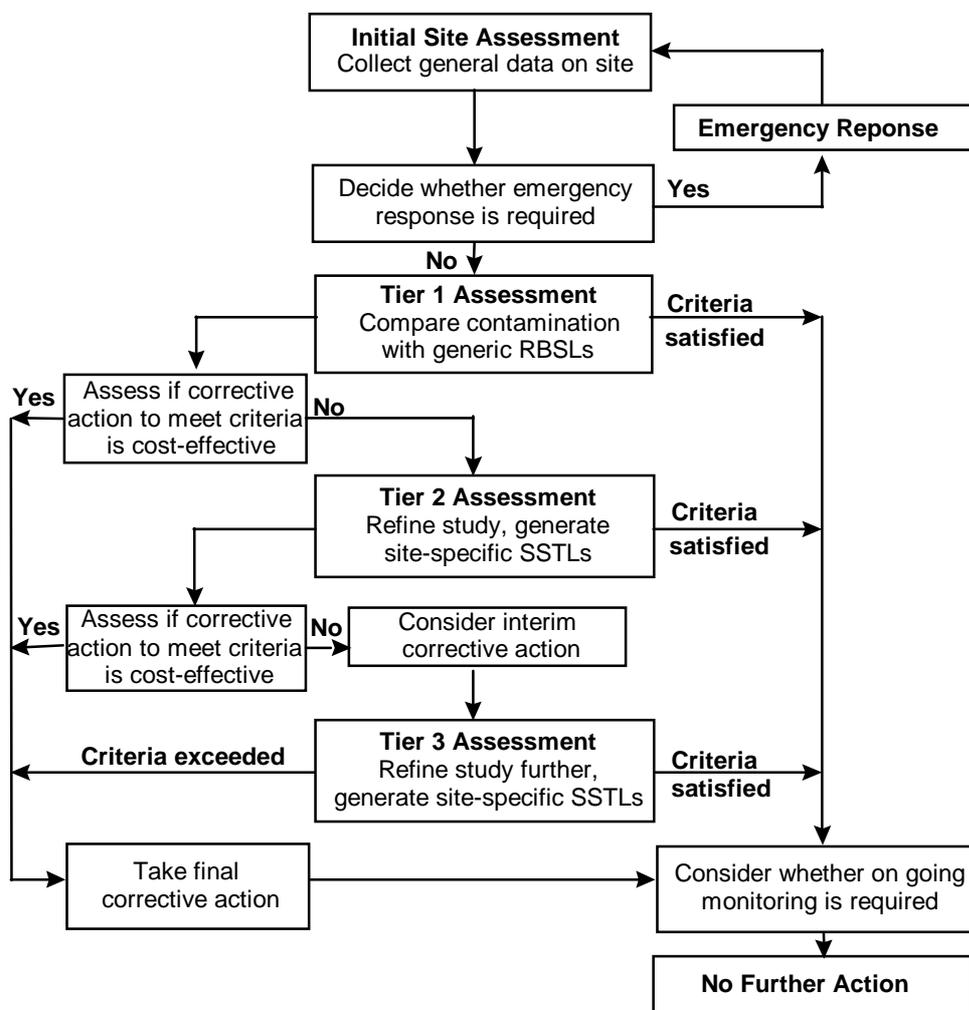


Figure 1. The three tier approach

compared with acceptability criteria. There is an option at the end of each of these tiers to develop a corrective action programme based on remediation to Site Specific Target Levels (SSTL). Corrective Actions could include taking no action or instituting a long-term monitoring programme.

This procedure is expected to provide a consistent framework for decision making. The outcome should be cost-effective but still result in the clean-up of those sites where it is necessary to protect man and the environment.

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US EPA

Walter W Kovalick

Director of Technology Innovation Office invites you to his web site

US legislation requiring the remediation of contaminated soil and groundwater at private party sites and clean-up programmes on Federal government lands has been a major driver for remediation technology development in the USA since the early 1980s. The US Environmental Protection Agency's Office of Solid Waste and Emergency Response created the Technology Innovation Office (TIO) in 1990 to act as an advocate for new technologies. TIO's mission is to increase the applications of innovative treatment and field analytical characterisation technologies to contaminated sites, soils and groundwater. TIO has worked with partners in other US agencies and in the private sector to improve the collective understanding of remediation and characterisation technology development and reduce the impediments to their widespread use. Within EPA, TIO works with other offices to: effect policy changes, assist technology demonstrations, analyse trends in technology development and use, identify the supply of technologies and vendors to the marketplace, chart the future demand for technologies, chart the cost and performance parameters, and improve the diffusion of technology-related information. Outside the Agency, TIO works with states, other agencies, professional associations and private companies to create a marketplace with a rich diversity of cost effective solutions. The goal of these partnerships is to create an information-rich and practical network for all public and private decision-makers who affect the applications of clean-up technologies.

Nearly all the information generated by TIO is available electronically from our Clean-Up Information (CLU-IN) world wide web homepage at

<http://clu-in.com>

The web site is intended as a forum for all stakeholders in waste remediation and contains information on policies, programmes, organisations, publications and databases useful to regulators, consulting engineers, technology developers, researchers, remediation contractors. The site contains technology descriptions and reports as well as current news on business aspects of waste site remediation. The following section describes some of the information available for downloading from the web site.

Supply and Demand for Technologies

TIO has published recently three reports that analyse the future demand for remediation services for all major US clean-up programmes. *Cleaning Up the Nation's Waste Sites: Markets and Technology Trends* focuses on the national perspective. The other two describe market opportunities in the Mid-Atlantic and Southeast regions of the United States. TIO has produced two pc-based systems that identify

technologies and vendors for remediation and field analytical screening technologies. The *Vendor Information System for Innovative Treatment Technologies* (VISITT 5.0) provides data on 346 innovative treatment technologies (75% of which are commercially available) provided by 210 vendors. The *Vendor Field Analytical and Characterization Technologies System* (Vendor FACTS 2.0) provides vendor supplied information on 129 field portable technologies supplied by 85 vendors for measuring and monitoring contaminated soil and groundwater.

Partnerships and Consortia

TIO has worked with many partners in recent years to develop new technologies, demonstrate and evaluate technology performance and verify vendor performance claims. Under our Public-Private Partnership programme, TIO is working with Fortune 500 technology users, other federal agencies, and regulators to demonstrate and evaluate full-scale technologies on problems of mutual concern at federal facilities. The purpose of this effort is to allow potential technology users to help define the parameters of the demonstration to produce information the companies need to evaluate the potential applicability of the technology to their own sites and problems.

The Remediation Technologies Development

Forum (RTDF) encourages collaboration among companies, states and federal agencies in defining, prioritising and funding new, untried concepts for clean-up technologies. By consulting at the earliest stages of technology development, the RTDF seeks to combine the financial and intellectual resources to promote research co-ordination on problems of mutual interest.

The Consortium for Site Characterisation

Technologies (CSCT) is composed of EPA, the Departments of Defense and Energy, other Federal agencies, state regulators, technology evaluation and verification entities, and potential end users of these technologies to facilitate independent and expert verification of site characterisation technology performance. The Consortium was created to increase the use of new site characterisation, monitoring, and measuring technologies at clean-up sites.

Benchmarking Technology Development and Use

On a regular basis, TIO produces reports and data systems that track the development of emerging technologies and application of full-scale applications of technologies at sites. One such report, in its seventh edition, is the *Innovative Treatment Technologies: Annual Status Report*, which tracks the application of new remediation technologies at over 300 sites. This year TIO added a searchable database to the hard copy report to allow easy analysis of the status of planned, ongoing or completed applications of innovative treatment technologies. The database contains site-specific information on 397 innovative projects at sites across the nation. Released in

September, 1996, *Completed North American Demonstration Projects* summarises over 260 innovative technology field demonstrations sponsored by government agencies in North America. Both of these reports provide information such as site type, technology used, contaminants, project status and points of contact. In an effort to track the progress of bioremediation, EPA has developed the *Bioremediation in the Field Search System* (BFSS). BFSS is a pc-based system of information on over 400 waste sites across the US where bioremediation is being tested or implemented. BFSS allows users to search the database, view data on specific site types and print reports of selected information.

Despite the progress in using new technologies, two areas stand out where new methods are needed. The first is treatment of metals in soil and the other is the *in situ* remediation of groundwater. TIO has two reports that identify emerging technologies for metals treatment and groundwater remediation. *Emerging Abiotic In Situ Remediation Technologies for Groundwater and Soil* describes 96 field demonstrations or full-scale applications of technologies for non-aqueous phase liquids and groundwater treatment. Six technology specific reports are available on surfactant enhancements, treatment walls, co-solvents, electrokinetics, thermal enhancements, and hydraulic/pneumatic enhancements. *Recent Developments for In Situ Treatment of Metal Contaminated Soils* provides hazardous waste professionals with information on four emerging technologies: electrokinetics, phytoremediation, soil flushing, and solidification/stabilisation.

The CLU-IN Home page contains a wealth of other information on US environmental technology policy, regulations, remediation technology business opportunities, and other technology related topics. CLU-IN is also a gateway to other remediation technology and business related home pages. You are invited to visit the site and we hope that it serves your remediation and field analytical characterisation technology information needs.

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Web sites

NICOLE News may be accessed via TIO's homepage. The address is <http://clu-in.com> and the newsletter is in the "International Updates" area on the web site. Another route is via CRBE's pages on The Nottingham Trent University site. The address for this site is: <http://groupius.ntu.ac.uk/cbe/nicol.htm>
Innovation Relay Centre Help Forward (<http://www.irc.forth.gr>) will be hosting information on both NICOLE and CARACAS. Information about CARACAS can also be accessed via CLU-IN (<http://www.clu-in.com/intup.htm#International>) as well as the European Commission CORDIS site: <http://www.cordis.lu>

Industry Subgroup

Chairman's report

Industrial members have used the NICOLE network as an initiative to organise themselves into an 'Industry Subgroup', that meets on a regular basis. By operating as a pro-active forum we hope to directly steer and provide input to our counterpart within NICOLE - the Scientific Advisory Group.

The first meeting, attended by some 20 industrial representatives, took place in September 1996. One of the first items on the agenda was to determine a common goal for the industrial members of the NICOLE Network. After some discussion the following aim was finally agreed upon:

"To pro-actively develop, enhance and communicate concepts/strategies and technologies for the responsible management of soil and groundwater problems, which enable a balance amongst risk reduction, environmental merit, costs and time."

Two Industry Subgroup meetings have been held to date, the most recent took place in January this year in Apeldoorn, the Netherlands. During the meetings both internal (NICOLE) and external issues are focused upon.

At each meeting, previous NICOLE workshops are evaluated and the topics for future workshops are discussed. This ensures that the NICOLE workshops meet the aims and mission of the NICOLE network. The meetings also provide room for an exchange of experiences between industry representatives. Participants are encouraged to present innovative ideas or share experiences related to soil contamination with their colleagues from industry.

Presentations were given on a method for Risk-Based Corrective Action (RBCA) for contaminated site assessment and on an innovative *in situ* measurement technology involving fibre optic sensors. Several industry members present expressed their interest and willingness to participate as end-users in one form or the other. The meetings therefore also act as a forum for co-financed R & D. Networking in itself is seen as a direct and major benefit of participating in the Industry Subgroup meetings.

Finally the NICOLE Industry Subgroup intends to be a market demand platform which contributes to the research agenda in Europe. Our aim is to identify the research needs from an industry's point of view.

Mr Ir Cees Buijs, Chairman, Industry Subgroup Mrs drs A J M Schelwald-van der Kley

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The Editor **NICOLE NEWS**
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Dear NICOLE members

Compost from recycled waste materials is a powerful tool for remediating contaminated soils, particularly for extensive sites with denuded soils. The Organic Reclamation and Composting Association (ORCA) is the European trade and scientific organisation for compost producers, users and researchers, in many ways akin to NICOLE. ORCA is keen to develop links with NICOLE to explore the potential for use of composts and composting techniques in land remediation. We invite both the NICOLE Steering Group and individual members to contact us for more detailed discussion. Contaminated land remediation has not been widely recognised by compost producers as a direct market for their products, which have historically been used in agriculture, viticulture, forestry, horticulture and domestic markets. Because of this focus, data on the use of composts in land remediation are not widely available. Such use of composts needs to be understood in a risk management and life cycle context. We believe that an open forum with NICOLE would help develop the potential for compost and composting in land remediation to be fully exploited, as well as develop best practice guidance and identify problem areas for further research and development.

Please contact me to see how we can develop collaboration further.

Bert Lemmes,

Managing Director, ORCA

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Dear NICOLE members,

We would like to ask members of NICOLE about their interest in using the Internet to disseminate information about contaminated land across Europe. We suggest NICOLE and its sister network CARACAS should consider how they might collaborate to determine the feasibility of establishing a central gateway for contaminated land information on the Internet, linking existing information sources and developing new ones. The Internet could also be used to enhance the networking NICOLE and CARACAS have already begun

and allow a much wider community to take part in or be informed of their activities.

If you are interested please contact us. We have a draft discussion paper that we can send to anyone interested.

Yours

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Alkiviades Payatakes, IRC, Greece

Harald Kasamas, CARACAS (Austria/Germany)

Paul Bardos, R³, UK

For further information contact Addie Weenk

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Dear NICOLE members

In October 1993 a Norwegian network for contaminated land (Miljøringen) was established.

This network, which has similar objectives to NICOLE, is for everyone in Norway who owns and deals with contaminated land. It is a meeting place for the industry which is responsible for and owner of contaminated land, research institutes and consultants who are working with solving these problems, companies who are delivering technology for such purposes and the authorities who are responsible for defining and requiring remediation work. Today the network has 40-50 members of different sizes and interests. Our network is also a member of NICOLE.

One of the aims of Miljøringen is to contribute to the development of technology and knowledge about contaminated land, so that remediation work is done in a cost-effective and environmentally appropriate way.

Through our network and our connection with NICOLE we want our members to have the opportunity to find partners for research projects and other projects. Some of you may have complementary expertise which is of interest to our members and *vice versa*.

Any one who would like to establish contacts with Norwegian organisations working with contaminated land problems do not hesitate to contact us.

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

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