

NICOLE WORKING GROUP REPORT: WG 2, NOVEMBER 1996

NICOLE Workshop "Contaminant Behaviour and Risk Assessment", 7-8 November 1996

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The first workshop of NICOLE on Contaminant Behaviour and Risk Assessment was organised by Working Group 2 and took place in Nancy, France, on 7-8th November 1996. The general theme of the workshop was the "needs and existing tools for the risk assessment of industrially contaminated land" and it was attended by about eighty participants drawn from research organisations, companies and regulating bodies. The main aim of the workshop was to identify areas where future research and development was required in order that risk assessment-based approaches to contaminated land management might be founded on sound scientific approaches. The workshop took the form of a series of presentations on different aspects of risk assessment followed by discussion groups tackling four different themes and producing "ideas for future action" which were then consolidated by consensus into a list of topics for follow-up actions.

The first session of the workshop was devoted to presentations of the contaminated land policies of different European countries and their associated risk assessment methods. These presentations were mainly representative of the work being carried out in CARACAS, which is a "sister" concerted action to NICOLE that has the aim of producing guidelines and recommendations for assessing risk posed by contaminated land based on secure scientific knowledge. The session provided a useful opportunity to promote scientific and technical exchanges between policy makers, scientists and industrialists.

A second set of presentations focussed on the points of view of different problem owners. Their approaches to the different aspects of risk assessment and their experience was discussed from administrative, industrial and research points of view.

Risk assessment is generally performed through conceptual procedures where the risk characterization integrates interdependent data on the hazard identification, the exposure assessment and the receptor characterization. These three key stages of the risk assessment are dealing respectively with the sources, fate, and potential effect of pollutants that can be generated by contaminated land areas.

These basic elements were used to focus the discussions of four separate working groups, which tackled different aspects of risk assessment. Each workgroup generated a list of topics which the participants agreed merited better understanding and further work:

- Toxicological & Ecotoxicological Aspects:

This theme is linked mainly to hazard identification but is also the basis for receptor characterisation. The development and use of biological testing, the study of dose-response

relationships and the knowledge of toxicological hazards associated with specific chemicals were identified as some of the key issues. The following topics were highlighted as requiring further developments:

- requirements concerning toxicological and ecotoxicological data and their quality as metrologic means for decision making.
- development of common data bases on toxicological studies (epidemiological studies, ...) and on reference criteria used in different countries for contaminated land management.
- improvement of the critical debate of toxicology and ecotoxicology issues for risk assessment.
- establishment of more relevant toxicological and ecotoxicological data for contaminated land systems.
- development of common metrics (standards or protocols) for comparing contaminated sites.
- fundamental study of the consequences of mixtures on the expression of the toxicological or ecotoxicological hazards of chemicals.
- development of protocols and associated screening ecotoxicological methods for the definition of ecotoxicity risk based remediation strategies.
- development of better tools for collecting information concerning ecosystems and human health impacts of contaminated land problems.
- Fate & Transport Aspects:

This theme is linked to the exposition assessment but is also the basis for the potentially exposed receptors before their characterization. The understanding of pollution generation from contaminated sources, the understanding and modelling of the fate and transport of pollutants in environmental media, the specific study of the mobility and persistence of chemicals in the environment were some of the issues discussed and the following topics were highlighted for further attention:

- modelling of fate and transport mechanisms for inorganic and organic compounds.
- fundamental understanding and applied modelling of transport processes through soil, air and water environmental media.
- study of natural attenuation phenomena for its better integration in exposition assessment.
- fundamental study of chemical, physico-chemical and biological processes to be taken into account for the modelling of pollutant fate and transport.
- study of the ultimate fate of chemicals during exposure and especially the final uptake by the ecosystem elements and the specific end products.
- development of flexible modelling tools for exposure assessment.
- validation exercises for available modelling tools (laboratory and field)
- study of the applicability of available models and development of a strategy for their combined use for risk assessment.
- fundamental improvements of leaching tests and study of speciation and solubility effects on these specific behaviour tests for a better understanding of their applicability.
- development of adapted monitoring methods concerning in situ fate and transport of pollutants.
- specific development of stochastic modelling approaches and discussion of their applicability.

- specific development of multicomponent, multiphasic transport models and discussion of the applicability to contaminated environmental systems.
- establishment of a specific terminology for communication within and outside NICOLE network.
- Exposure Evaluation Aspects:

This theme is linked to the receptor characterization and must be the final stage of the exposure assessment exercise. The identification, understanding and modelling of dose-response relationships for living organisms, populations, communities and ecosystems is one of the more problematic areas for research and development in support to risk assessment. In addition the methodology to be used for deriving risk of damage from predicted exposition to pollutants has to be discussed on a sound scientific and technical basis before application to contaminated land problems. Topics for identified further development were:

- data collection for target identification and quantification.
- data collection for dose-response relationships (pollutant transfer, speciation effects, response quantification).
- establishment of better tools for predicting bioconcentration factors.
- discussion on the use of default or site specific assumption for exposure modelling depending on risk assessment objectives.
- development of benchmarking for available models.
- information exchange using standardization of methods, common experimentation on site, and developing a common intervention value database.
- development of probabilistic exposure assessment.
- discussion on the use of harmonized or site specific reference values calculation protocols for exposure assessment.
- development of sensitivity analysis of pathways and contaminants
- selection of specific field for enhancing information exchange.
- Risk Communication Aspects :

This theme was identified as a key issue for problem holders as they must communicate data and reasoning for their risk assessments to a wide range of diverse audiences including regulators, investors and the general public. It is important to achieve effective communication at different levels and by use of "language" that is most appropriate for the recipient community. Topics identified for further exploration included:

- explain and define « risk » assessment.
- tailoring communication.
- testing solutions iteratively.
- development of large communication strategy.
- establishment of consensual basis for the attitude towards public concerning risk assessment.
- merging networks (CARACAS-NICOLE-CCMS-...).
- why and what and to whom to communicate.

- demonstration project for better communication.
- definition of tasks for each actors of communication strategies.

Following the separate discussions by the four workgroups and the presentation of their discussions to a plenary session, three further topics for possible future action were identified:

- better ways of evaluating dermal transport from "site-specific" contaminants (from soil, water, air)
- environmental significance of leaching tests
- environmental significance of treatment residuals

All of the identified topics were subsequently reviewed by a round table comprising the industrial members and the Scientific Advisory Group of NICOLE. The output of the round table was a listing of ten topics which gained the highest levels of support by a process of voting and consensus. In a final plenary session these topics were presented and organisations and researchers signalled their interest i being associated with others in developing ideas for tackling the topci following the workshp. The topic and interested parties are listed blow, together with the identification of the person who agreed to assume "leadership "role in developing the topic further.

TOPIC	INTERESTED PARTIES	LEAD PERSON
1. Risk communication	Akzo, ICI, TNO, TAUW, Port of Rotterdam, CARACAS	Shell (Tom Mitchell) phone: +44 151 3735034
2. Data Collection concerning Exposure assessment	EUL?	IRH (M. Jauzein) phone: +33 383 503651
3. Sensitivity Analysis for Pathways & Contaminants	(EUL?) , BP (BP to circulate papers)	Ford (J. Troiano) phone: +49 221 901 7643
4. Development of mere relevant toxicological & ecotoxicological data	ICI, AKZO Nobel, British Gas, Inst. Ecology of Industrial Areas	IRH (M. Jauzein) phone: +33 383 503651
5. Natural Attenuation in Saturated & Unsaturated Zones	ICI, Port of Rotterdam, Shell, Repsol, BGS, TNO, Univ. Reading, Neste, Delft Geotechnics, ICEHT Institute	BP (T. Walden) phone: +32 2 774 3280
6. Validation of NA Models	TNO, Nottingham Trent Univ. Delft Geotechnics, IRH, (ICI?), (Shell?) (VEGAS to provide info)	BP (T. Walden) with TNO phone: +32 2 774 3280
7. Fundamental Study of Fate & Transport Processes	Reading Univ. Nat. Techn. Univ. Athens, BGS, British Stell, British Gas, VEGAS, KUL	TNO (J. Kooijman) phone: +31 15 269 6821
8. Leaching Tests	IRH, Nottingham Trent Univ. TNO, Nat. Techn. Univ. Athens, BGS, VHE, British Steel, ICEHT Institute, KUL	British Gas (with Nat. Techn. Univ. Athens) name /phone person.....

9. Treatment of Residuals	TAUW, TNO, British Gas, Port of Rotterdam, Shell, EUL, ITE, IRH	Nottingham Trent Univ. (with TAUW) name/phone person ...
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The workshop concluded with the agreement that the topic leaders would develop their topics and report progress at the next NICOLE meeting.