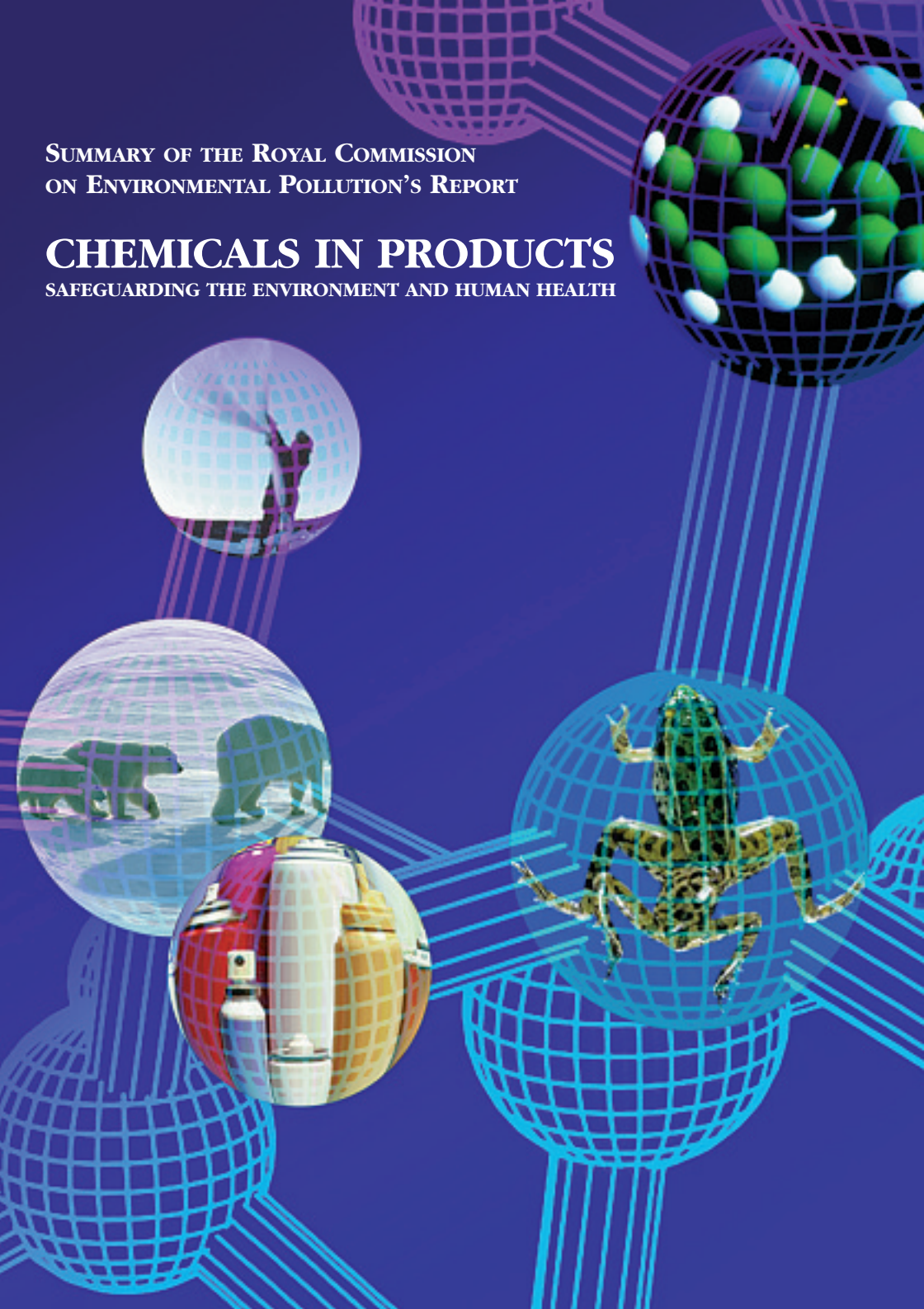


**SUMMARY OF THE ROYAL COMMISSION  
ON ENVIRONMENTAL POLLUTION'S REPORT**

# **CHEMICALS IN PRODUCTS**

**SAFEGUARDING THE ENVIRONMENT AND HUMAN HEALTH**



## About the Royal Commission's study of Chemicals in Products

In October 2000 the Royal Commission announced that it was to undertake a study of the long-term effects of chemicals on the natural environment and on humans exposed via environmental routes, and of how such impacts should be controlled.

The study was initiated with a seminar 'Fresh Approaches to Chemical Use and Control' in London, in July 2001. Speakers included representatives from government departments, regulators, environmental groups, the chemicals industry and academics. The seminar sought to address some of the larger questions for the Chemicals Study, such as the effectiveness of the risk assessment paradigm, the role of various stakeholders in the process, and more generally how society could gain from the benefits of chemicals while reassuring itself that the associated hazards to the environment were adequately identified and controlled.

Fifty-one responses, from a wide range of interested parties, were received to the invitation to submit written evidence on key issues for the Chemicals Study. This invitation, issued in October 2001, sought evidence on the guiding principles for the control of chemicals, risk assessment and current chemicals policy, and roles and responsibilities in chemicals controls. The written evidence submitted for this study is on the Commission's website at <http://www.rcep.org.uk/chemicals.html>.

In the course of the study the Commission took oral evidence from representatives of 18 organisations and four studies were commissioned on particular issues. These consultants' reports are also available on the Commission's website.

Members of the Commission and its Secretariat made a series of visits to the USA, Sweden, the Netherlands and Japan. To obtain further information for the study, visits were also made to UNEP (United Nations Environment Programme) in Geneva, the OECD (Organisation for Economic Co-operation and Development) in Paris and the European Commission in Brussels. A chemicals production facility in Scotland and a chemicals testing laboratory in England were also visited.

A full text of the Commission's Report is published by The Stationary Office (Cm 5827, £27.20) and is on the Commission's website.

## About this summary

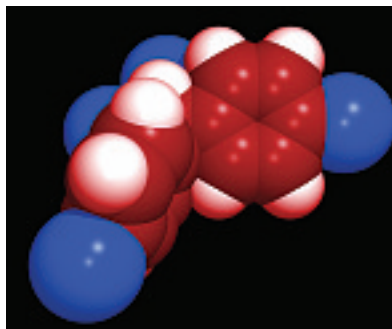
The Royal Commission's Twenty-fourth Report, *Chemicals in Products – Safeguarding the Environment and Human Health*, was published on 26 June 2003. We summarise here the reasons why the Chemicals Study was undertaken and our proposed solution to the problem of dealing with the large number of chemicals currently on the market for which there are few or no data available to assess whether they present a hazard in the longer term.

# Chemicals in Products: Safeguarding the Environment and Human Health

The development of chemical products over the past hundred years has made important contributions to the quality of life and the economy. But the manufacture and use of chemicals has created risks to the natural environment and human health, many of which are poorly characterised. There is a long history of serious environmental concerns associated with chemicals that were originally thought to be beneficial: for example, organochlorine pesticides, such as DDT, industrial chemicals, such as PCBs, and now a wide range of suspected endocrine disruptors. Public confidence in the chemicals industry is low, due to concerns over its environmental impacts and particularly over the long-term effects of exposure to synthetic chemicals.

Despite efforts over the years by the UK and other governments to manage these risks, major doubts persist about the effectiveness of present policies in protecting the health of ecosystems and humans from unintended long-term effects. The UK government's recent chemicals strategy<sup>1</sup> and the European Commission's White Paper<sup>2</sup> on chemicals are reflections of these concerns.

In this Report, we examine scientific understanding of the fate and effects of chemicals in the environment, and the degree of uncertainty associated with that understanding. We investigate the way that regulatory systems across the world attempt to manage the risks from chemicals, how they deal with this uncertainty, and how they address public concerns about the process. We identify shortcomings and recommend ways in which they might be addressed.



Our study deals with synthetic chemicals – by which we mean chemicals that are manufactured by industry, regardless of whether or not they also occur in nature – as well as naturally occurring chemicals that have been extracted and concentrated by industry. The regulatory regime that controls emissions from chemical processes is reasonably well established, and we have focused our attention on the regulation of chemicals which are traded, or incorporated into products, or are

substances that derive from such activities. Chemicals that are released into the environment during the use or disposal of products create more diffuse sources of pollution than those released accidentally during the production process. Their effects are thus more pervasive and more difficult to detect and correlate with changes in the environment and human health.

## The nature of the problem



All chemicals have the potential to be harmful, and some have properties and patterns of use that allow them to reach compartments of the environment that are vulnerable. For many years it has been widely recognised that some societal mechanism is needed to ensure that the harm caused by such chemicals is contained within acceptable limits. But substantial problems face those who wish to manage the risks from chemicals.

Firstly, there is the large number of chemicals. Depending on the definition used, there are between 30,000 and 100,000 chemicals on the market in some shape or form in greater than laboratory scale quantities – with several hundred new substances added every year. Of these, less than 5% fall into categories that are approved for specific uses such as food additives, pesticides, biocides or pharmaceuticals. The rest can be used unless specifically regulated against. Chemicals are used in a multitude of ways: many are the building block chemicals of other products; others are incorporated into formulations or products that are then used in industries or sold to the public. They may consist of pure individual chemicals, or more commonly as complex mixtures. The supply chain between the manufacturer and public end-use can be long and complicated, and the flow of information along the supply chain is convoluted.

A second problem is the distinct lack of reliable data for the vast majority of these chemicals. Extensive national, EU and international legislation and agreements prescribe requirements for testing and assessing chemicals for their potential to cause harm in the environment, but only a small proportion of chemicals on the market have been the subject of risk assessment. A number of national initiatives and the European Commission's White Paper on chemicals have put forward proposals to deal with the backlog of chemicals waiting to be assessed. The proposals will no doubt increase the data available for assessing chemicals, albeit at huge costs in terms of both money and animals used for testing. But we remain far from convinced that the proposed solutions (essentially, more of the same) are either practical or adequate.

Thirdly, major problems arise from limitations and uncertainties in the hazard evaluation procedures and risk assessment process itself, and the continuing debate on costs and benefits of individual risk management proposals. In our Twenty-first Report, *Setting Environmental Standards*,<sup>3</sup> we proposed a conceptual framework for environmental policy that involves several complementary and inter-related components, including scientific evidence, risk assessment and economic appraisal. We recognised that all components would be characterised by uncertainty or indeterminacy and might be influenced by different interests and beliefs. We pointed out that it was essential for uncertainties and

different premises to be explicit in the policy process, and a key recommendation of the Twenty-first Report was that people's values should be integrated into each critical stage of decision-making, including framing the problem under consideration. Much of the evidence that the Commission received for the Chemicals Study indicated areas of ignorance and uncertainty in data reliability, the validity of risk assessment assumptions and basic understanding of environmental processes and effects. Mechanisms for incorporating people's values into the resolution of these uncertainties were rarely to be found.

## A fragmented approach

We were struck by how fragmented and differentiated the assessment and regulation of chemicals had become. Many government departments and agencies are involved, and differing regulatory regimes apply, depending on the use to which the chemical is put or the effects that it might have. Linkages between environmental monitoring programmes and environmental risk assessments are rare. Initiatives to reduce industry's reliance on particularly hazardous chemicals are beginning to emerge, but they are quite separate from the overall control and management of chemicals in products.

In seeking solutions to these shortcomings, the Commission was aware that this area, in common with many others in the environmental field, was one where most decisions affecting the UK were taken at a European, rather than a national level. Because of the global nature of the chemicals industry and the importance of trade in chemicals many decisions are taken at a supranational level – through the machinery of OECD or UNEP. Solutions to the failure of the regulatory system to deliver chemicals safety and to the challenge of restoring public confidence must, therefore, be ones which can be implemented swiftly and effectively within the UK, but then promulgated through the EU and beyond. Our objective in carrying out this study was to find such solutions.



## Reducing the hazard

Given the inherent uncertainties about the way chemicals interact with the environment, it makes sense to assume that the continuing use of large numbers of synthetic chemicals will lead to serious effects, which we cannot predict on the basis of our current or foreseeable understanding of these processes. A sensible approach to this uncertainty would be one of precaution - to reduce the hazard wherever we have an opportunity to do so.

The substitution of hazardous chemicals with ones of lower hazard or a non-chemical alternative, underpins many of the recommendations in this Report. We recognise that substitution cannot be achieved systematically through prescription, but will need to be progressively achieved through a range of measures. Our Report therefore recommends that the government adopt substitution as a core goal of its chemicals policy, and many of our recommendations will help government drive towards such a goal. They include: better provision of information about chemicals that are on the market and their hazards; the use of assessment and monitoring programmes to inform substitution decisions; a much improved flow of hazard information along the supply chain, underpinned by legislation such as that being prepared in the Netherlands; and a government-sponsored programme of testing chemical products, such as that undertaken in Sweden.



We believe that economic instruments could also play an important role in driving substitution. Our proposed testing regime for chemicals will provide the information necessary to design and implement a charge for chemicals of concern which will encourage industry to move away from more hazardous chemicals whenever opportunities present themselves, and at the same time avoid perverse effects through a hazard banding system. Complementary to a charge, we recommend a greater emphasis on current initiatives to facilitate the move towards less hazardous products and processes through the development and promotion of green chemistry and chemical management services.

Additionally, we feel that a more rigorous approach towards substitution might be adopted by the chemicals industry if there were clearer rights of redress, through civil liability, for those who can demonstrate that they have been harmed by chemicals, and we recommend changes to UK and European law to this end.

## Dealing with the backlog

We propose a chemicals assessment and monitoring programme that will help the government to tackle the large backlog of untested chemicals on the market. It is unacceptable that after more than a century of chemicals production, and decades of legislation attempting to deliver environmental safety from these chemicals, we still do not have a good understanding of their fate and effects in the environment; nor do we even have much information upon which such an understanding might be derived. We have little faith that either the present regulatory system or the proposals coming forward to improve them will provide better answers in the future. We believe that only a substantial paradigm shift will begin to rectify this situation and we believe that such a shift needs to be made now.

There are two main reasons for the current high levels of uncertainty about the environmental effects of chemicals. The first is fundamental: our understanding of environmental processes and the way that chemicals interact with the physical and biological environment is far from complete. Furthermore, because of the complex and fluctuating nature of the environments into which chemicals are released, providing descriptions of behaviour that will encompass all relevant vulnerable situations is extremely problematic. It is likely that over coming decades a concerted research effort will gradually improve this understanding and reduce this sort of uncertainty, though it is unlikely ever to be eliminated. For now it has to be regarded as inherent to the process and not rectifiable, and hence we recommend in our Report a precautionary approach based on substitution of hazardous chemicals with ones of lower hazard or a non-chemical alternative.

The second reason certainly is rectifiable. The lack of adequate information about the hazards presented by most of the chemicals currently on the market is a serious failure, which must be addressed as a matter of urgency. The European Commission's White Paper proposes a process called REACH (registration, evaluation and authorisation of chemicals) for the assessment and management of the risks from chemicals, which we believe will be cumbersome and time consuming.



The infeasibility of carrying on with traditional approaches for hazard and risk assessment and not exploiting fully new technologies and advances in computational assessment techniques are serious failings. However, we applaud the goal in REACH of examining all chemicals on the market and selecting a few for further attention, and we believe that authorisation for use is the right way of regulating chemicals in products. Where REACH fails is that it has been insufficiently radical in its approach to the actual process of assessing the hazards and risks from chemicals.

## A new approach

The alternative process we recommend falls into four interlinked steps – listing, sorting, evaluation and action. Two features span the whole process: the integration of environmental monitoring and the incorporation of public values. Figure 1 illustrates this process.

In the present system, the links between environmental monitoring and risk assessment are rudimentary, and proposals such as REACH appear to do little to put that right. We recommend that monitoring must be an integral part of the whole process of assessing both the potential and actual environmental impacts of chemicals that are on the market. We have advocated the adoption of a reconnaissance monitoring approach, through tighter integration of chemical and biological surveillance, the intelligent use of new sophisticated techniques to provide the data needed for detecting unexpected adverse effects, and the use of opportunities for less formal monitoring that already exist through voluntary schemes and the activities of amateur observers. Those responsible for overseeing the regulatory control of chemicals must have clearly defined routes through which they can influence environmental and monitoring programmes to deliver the required information, and that information must be integrated into the assessment process at all stages.

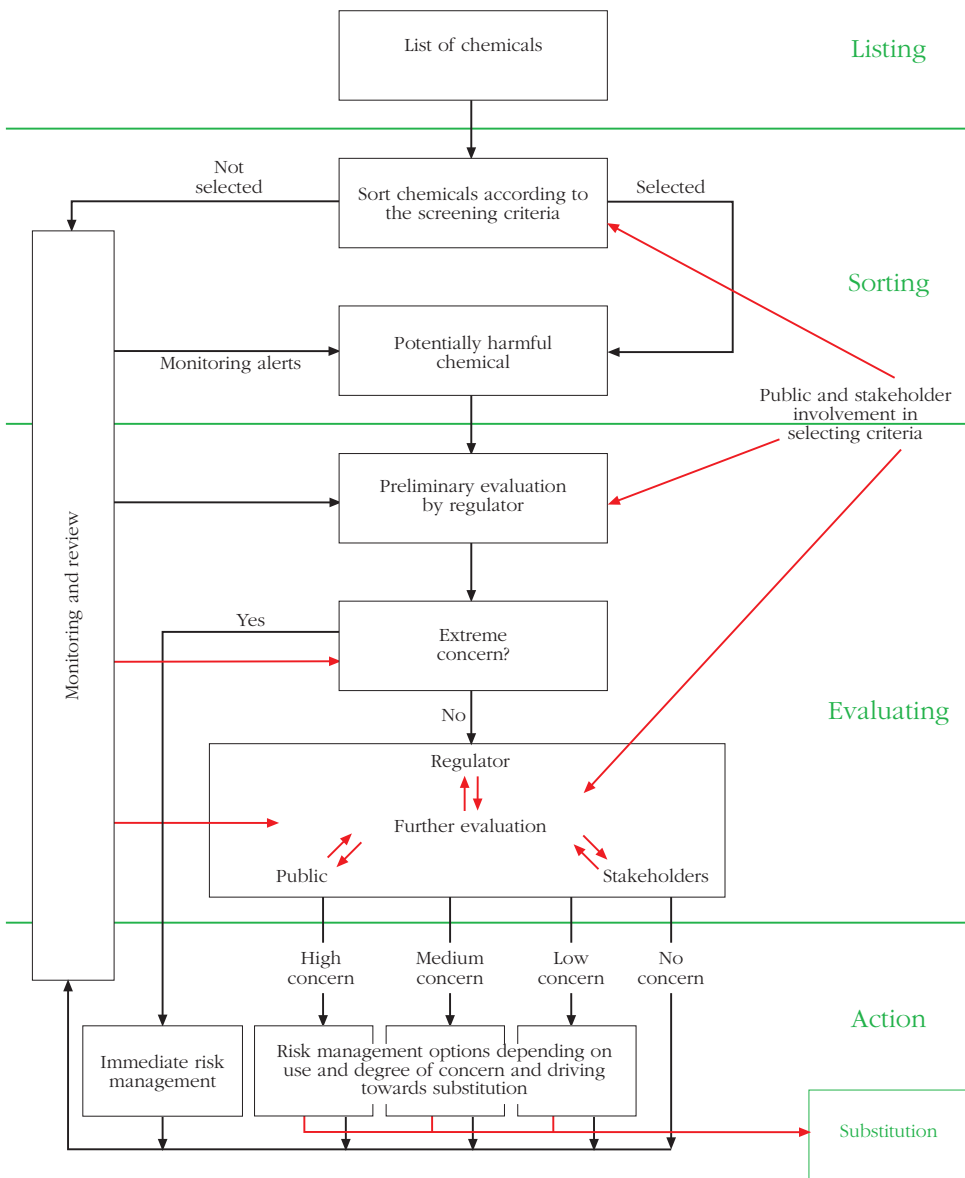
The second linking feature is the incorporation of a broad range of opinion into the key stages of design and implementation of the chemicals assessment and monitoring programme. This is important to ensure that the assessment processes properly address public concerns, and do not overlook the importance of incorporating a range of different perspectives into the design of the process and its subsequent implementation. This will require a fully transparent process, with information about chemicals being placed routinely in the public domain, and machinery in place to obtain the views of a broad range of people. We make recommendations on how this might be achieved.

### Step 1: a list of marketed chemicals

We see no reason why all the chemicals currently on the UK market should not be identified by a suitable regulatory agency and listed on the Internet. The existence of such a list is an essential pre-requisite to efficient enforcement of chemicals legislation. Open public access to the list would be an important first stage in improving transparency of the process, and the list would be a factor in the design or re-alignment of environmental monitoring programmes.

As information is gathered about chemicals that are on the list, and the decisions taken about whether or not to restrict the chemical to certain approved uses, the information and the decisions should be added to the list. A simple Internet-based database is all that is required. It could be readily augmented with links to other Internet sites with more information about the chemicals listed on the site, in a similar fashion to the Environment Agency's Pollution Inventory.

**Figure 1 RCEP proposals for managing the risks from existing chemicals in products**



→ Chemicals

→ Influence

## Step 2: sorting to select chemicals of concern

It is not realistic to expect a comprehensive risk assessment to be carried out on all of the tens of thousands of chemicals currently on the market. This would involve detailed analyses of the pathways and fates of chemicals once released into the environment, as well as comprehensive and expensive testing of the effects on living organisms and the environment. We recommend a quite different approach.

A system that identifies chemicals of concern for further investigation is essential. It should be based on simple criteria that reflect both exposure and hazard, and that can be applied quickly to all these chemicals. Two such criteria in wide use that reflect exposure are persistence (the resistance of a chemical to degradation by environmental processes) and bioaccumulation (its tendency to concentrate in the fatty tissues of organisms).

Information about persistence, bioaccumulation and toxicity is available for many chemicals and these data should be first brought together, exploiting advanced methods of searching available literature and databases. This should be augmented by a system based on advanced computational techniques, pioneered in the pharmaceutical industry, to identify molecules with particular physiological properties. It is not unusual in the pharmaceutical industry to screen a hundred thousand chemicals in one pass. To some extent these techniques are already used by the United States Environmental Protection Agency for the pre-manufacture assessment of new chemicals. Information about hazard, reflecting the way a chemical interacts with organisms (various aspects of its toxicity), is also relevant, but is more difficult to assess using conventional approaches.



Securing full European acceptance of the regulatory application of computational methods may not be straightforward. It is for the UK to take a lead and to demonstrate that by using such fast and efficient techniques very large numbers of chemicals can be screened very quickly. Adoption of such an approach would turn the daunting task of assessing the 30,000 or so chemicals on the UK market into a rather straightforward operation. Exposure analysis in risk assessments already involves an element of computer-based modelling, and a sorting process that is both fast and comprehensive is feasible.

Such an approach will not resolve the fundamental uncertainties referred to above. It would, however, mean that very soon every chemical on the market would have been looked at, systematically, at least once. Some of these chemicals would be selected, against carefully chosen criteria, for further evaluation. Those not selected would continue in use but remain

under review – that is, they would be re-evaluated in the light of any information arising either from the environmental monitoring that we have recommended, from improvements in the screening technology, or from new insights into the properties and behaviour.

### **Step 3: evaluation of selected chemicals**

The sorting process will identify a number of chemicals for further evaluation. The Report makes recommendations about the testing and assessment approaches used during this evaluation.

Firstly, there should be rapid identification of any chemicals that look so dangerous, on the basis of the sorting data, that immediate action is required without further investigation. We recommend the way that criteria might be selected to identify such chemicals, and give examples. We emphasise again that the selection of such criteria should be made in the light of open debate; this is not a decision to be made solely by experts.

It is likely that, for most of the chemicals requiring further evaluation, it will be necessary to gather further information on properties of the chemical and the uses to which it will be put. Determining its properties might require further testing, although we advocate the use of computational techniques wherever available, and the development of new computational techniques where they do not yet exist. In the absence of such an approach, testing regimes should be designed to avoid, wherever possible, the use of animals. To this end we have recommended that all practicable steps should be taken to avoid the use of higher animals as test organisms, and decisions to move to such tests should be on a case-by-case basis following transparent deliberation.

The evaluation stage should result either in the assignment of a chemical to one of three categories, high, medium or low concern, or in a decision that the chemical is not, after all, of immediate concern. A key benefit of this categorisation process is that it will usefully inform the development of a chemicals charge.

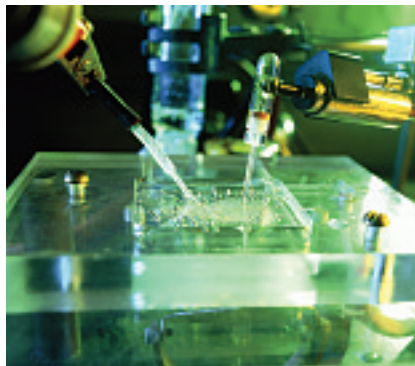
### **Step 4: risk management action**

One of the main criticisms that we have heard about the present regulatory regime for chemicals is the length of time taken, from the first indication that a chemical is harmful, to action to curtail that harm – typically several years. This must be improved, but regulatory change will be needed. REACH, when it comes into force, will introduce approval for use for chemicals identified as hazardous; this seems to us to be the correct way forward, but it needs to be introduced more quickly than is planned for REACH.

We envisage that chemicals placed in the category of high concern will face severe restrictions on their use, including a total ban on the production or importation of the chemical in some cases. They will also attract the highest level of the chemicals charge. Medium

concern chemicals will be restricted to certain uses and attract a lower charge. Those in the low concern category might not need to be restricted, but will still attract a charge.

Information about the category to which a chemical has been assigned must be made available throughout the supply chain, including to the public, so that customers can take it into account in making purchasing decisions and assessing their potential liabilities if they choose to use chemicals with a particular hazard rating. Thus, the chemicals assessment and management process will provide both regulatory control over the chemicals of particular concern and a driver for the process of substitution that we have recommended. This should become the central goal of the government's chemicals policy.



## Regulation and administration

We have argued that a policy of substitution is not best driven solely by regulation, and we have, therefore, recommended a package of measures that are predominantly non-regulatory. However, some regulatory change will be necessary, and the chemicals assessment and management programme that we have recommended will not work effectively without a considerable degree of regulatory underpinning.

Regulation flowing from chemicals policy usually needs to be accepted and endorsed at EU level, and this has been a major obstacle to the adoption of new regulatory policies in individual Member States, including the UK. We believe that the length of time that it will take for REACH to have any effect, and the widespread criticisms of its efficiency and effectiveness, mean that it is inappropriate for the government simply to wait for the new EU regime to come into force. There is now a good opportunity for the UK, jointly with like-minded Member States, to come forward with coherent proposals for new legislation, possibly interim legislation pending further development of the REACH proposals, within the EU.

The Report also recommends new administrative arrangements to provide a much more coherent framework for the assessment and management of chemical risks. The new body, which we have called a *chemicals safety co-ordination unit*, should have a specific remit to oversee the implementation of a new programme for the assessment and management of chemical risks in the way that we have described above. Responsibilities of this new body would include (*inter alia*): putting in place and co-ordinating the assessment and management scheme we have recommended, including publication of the list of chemicals; preliminary sorting using available information and computational techniques; securing

information from industry and assessment of the hazards posed by those chemicals selected for further evaluation; overseeing reconnaissance monitoring; and ensuring appropriate enforcement of restrictions on the use of chemicals products.

The chemicals safety co-ordination unit would also be responsible for sponsoring the research that we see as necessary to take forward longer-term improvements in our understanding of the fate and effects of chemicals and new techniques for assessing chemicals. A key function will be to drive forward progress towards the goal of substitution. This would be achieved by imposing restriction on use where necessary, securing appropriate levels of a charge on chemical products, providing information, encouraging innovation in the chemicals industry and sponsoring business-related initiatives such as green chemistry.

The provision of a unit of this sort is unlikely to be fiscally neutral, but we observe that:

- resources for the unit will be drawn from the existing government departments and agencies with chemicals responsibilities;
- our proposals for integrating environmental monitoring into the process do not necessarily imply a large increase in monitoring effort. However, to the extent that it does require some increase, this will be offset, at least partially, by a reduced need for full risk assessments; and
- any residual increased costs of administration or monitoring should be paid for by industry through fees for the assessment of their chemicals, and further offset by the revenue raised through the chemicals charge that we have proposed.

The Report foresees a continuing role for the Chemicals Stakeholder Forum, reconstituted as a statutory advisory committee to the unit, mandated to seek the broadest possible range of opinion in formulating its advice and renamed the 'Chemicals Standards Forum'.

## Our vision for the future

As a consequence of our recommendations, we expect to see considerable changes over the next ten years in the way that chemicals are assessed, managed, monitored and used. This includes the early formation of a chemicals safety co-ordination unit to provide a coherent framework and leadership for the implementation of chemicals policy, including a clear strategic drive towards substitution.

All chemicals currently on the UK market should be examined by 2006, using the sorting process that we have recommended. All the chemicals selected by that process as being potentially harmful should be fully evaluated by 2009. A government strategy should be in place within the next two or three years to achieve a steady, measurable reduction in the use of hazardous chemicals. A comprehensive programme of research should be promoted

jointly by industry and government to expand the new approaches to chemicals assessment that we have identified. The aim of these proposals is to ensure that within a few years all chemicals in use in society have been listed and screened for their hazardous potential, and that the risks that they pose are being systematically reduced.



## Key recommendations

The Report makes a total of 54 recommendations, proposing a new approach for assessing and managing risks of synthetic chemicals, ways of encouraging the substitution of hazardous chemicals with less hazardous ones, and improvements to administrative arrangements. Some of the key recommendations are summarised here.<sup>4</sup>

### Chemicals assessment and monitoring programme

*Current approaches to assessing and managing risks of chemicals in the environment are cumbersome, unsound and rely heavily on animal testing. A new paradigm is needed.*

*We recommend a system comprising four steps: listing of marketed chemicals; sorting to select chemicals of concern; evaluation of selected chemicals; and risk management action. Thus in step 3, following public deliberation, chemicals would be assigned to one of three categories of concern (high/medium/low) or a 'no concern' category (whereby the chemical continues in use without further testing but is kept under review). In step 4 the appropriate risk management regime would be applied to those chemicals of concern.*

The government should compile and publish a list of all chemicals currently marketed in the UK.

The government should put in place now sorting procedures based extensively on computational approaches to hazard assessments, and sort listed chemicals within three years.

Where synthetic chemicals are found in elevated concentrations in biological fluids such as breast milk, they should be removed from the market immediately.

Chemicals selected by the sorting process or identified through environmental monitoring to be of concern should be evaluated to categorise them according to their degree of potential risk.

All new chemicals should be considered as potentially harmful and be evaluated with chemicals of concern. 90% of the selected chemicals should be evaluated and categorised within three years.

In evaluating chemicals, all practicable steps should be taken to avoid the use of higher animals as test organisms, through better use of non-animal assessment methods. Decisions to use animal tests should be made on a case-by-case basis following transparent discussion.

## **Regulation and administration**

*Current administrative arrangements for chemicals safety are complex and fragmented.*

*We propose the establishment of a chemicals safety co-ordination unit to be placed in the Environment Agency. The unit would be charged with co-ordinating a national chemicals management programme, including responsibility for the new assessment scheme and monitoring activities we recommend. It would be formed from experts in chemicals policy, regulation and science already in government departments, thus minimising any additional costs.*

The government should seek EU legislation to underpin a satisfactory assessment and management programme for chemicals.

The government should establish a chemicals safety co-ordination unit, by transferring resources from existing organisations dealing with chemicals safety to the Environment Agency.

The Chemicals Standards Forum should be mandated to provide advice to the unit on any topic within the unit's remit.

## **Environmental monitoring**

*Some of the most severe problems caused by chemicals in the environment have been detected by observation rather than assessment techniques.*

*For this reason and as a key part of the review process, the new approach we advocate would integrate an expanded and better organised monitoring programme with the assessment procedures.*

Monitoring activity related to the fate and effects of chemicals in the environment should be co-ordinated by the proposed chemicals safety co-ordination unit.

Environmental epidemiological studies of human and animal populations should be used by the chemicals safety co-ordination unit to identify chemicals for further evaluation.

## **Towards environmentally sustainable products**

*Substitution of hazardous substances with others of lower hazard should be a central objective of chemicals policy.*

*This can be achieved by design, manufacture and use of environmentally benign chemical products and processes ('green chemistry') or by indirect approaches such as replacing processes which use chemicals with processes which achieve similar effects without the involvement of chemicals. Implementing substitution policies requires reliable information on product composition, use patterns and comparative properties together with surveillance regimes.*

The government should adopt substitution as a central objective of chemicals policy.

All companies trading in chemicals should ensure that they receive all available safety information about any chemical substance or preparation when they obtain it, and pass on the information about it when they sell it.

Random tests should be carried out on the composition of chemical products, including imported products.

The government together with the chemical industry should continue to promote programmes for the development and promotion of green chemistry but with a new emphasis on its application to product design and use.

### **Driving change**

*To effect the changes we advocate will require a suite of strong 'drivers'.*

*These should include a charging scheme to encourage substitution of chemicals in categories of high concern; greater product liability and extended producer liability; enhanced labelling and information for consumers; together with voluntary initiatives. Given that much chemical business and regulation is international, the UK government should work closely with other like-minded administrations, particularly in the EU, to achieve the goals identified in this Report.*

The government should introduce a charging scheme to stimulate greater substitution. Categories of concern from our proposed testing regime for chemicals should be used to differentiate the levels of the charge.

Wholesalers and retailers, as well as the manufacturer, should be jointly and severally liable under the Consumer Protection Act.

The government should fund a joint scientific/legal study in order to anticipate the challenges to traditional civil liability concepts posed by increasing knowledge of genetic susceptibilities to specific chemicals.

The government should sponsor research with consumers to determine the most effective means of information transfer and the level of detail required on the hazardous substance content of finished articles.

The government should review the role of commercial confidentiality and statutory protection of relevant intellectual property rights.

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2. *Commission White Paper of 27 February 2001 on the strategy for a future chemicals policy*. COM(2001)88.
3. Royal Commission on Environmental Pollution, Twenty-first Report, *Setting Environmental Standards*, October 1998. TSO, ISBN 0-10-140532-4.
4. For brevity, some recommendations have been paraphrased. Refer to the main Report for the full text and context of the recommendations (Twenty-fourth Report, *Chemicals in Products - Safeguarding the Environment and Human Health*, June 2003. TSO, ISBN 0-10-158272-2).

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*\* Professor Macrory leaves the Commission on completion of the Chemicals Study.*

*# Mrs Miller left the Commission in April 2003.*

**Secretary to the Commission**

**Dr Peter Hinchcliffe**

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The Royal Commission on Environmental Pollution is an independent body, appointed by the Queen and funded by the government, which publishes in-depth reports on what it identifies as the crucial environmental issues facing the UK and the world.

The Royal Commission's full report (*Chemicals in Products - Safeguarding the Environment and Human Health*) is available from The Stationary Office (Cm 5827; ISBN 0-10-158272-2). Alternatively the full report and this summary are available on the Royal Commission's website (<http://www.rcep.org.uk>).

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