

Beyond REACH – Chemical safety and sustainability concerns

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1. Overview

Concern over the potential health and environmental effects of chemical products has led to mounting pressure on producers to implement strategies to improve the safety and sustainability of their products. New European chemicals legislation on the registration, evaluation and authorisation of chemicals (REACH) and numerous international initiatives to address chemicals management, reflect widespread public concern over

chemicals in the environment and growing scientific evidence linking man-made chemicals to environmental and health risks.

The key findings of this briefing are as follows:

- Standards for chemicals management are gradually becoming more stringent around the world. This is particularly evident in Europe, although other regions may follow suit as global initiatives develop to harmonise the management of chemicals.
- Companies most vulnerable to concerns over chemical safety and sustainability appear to be intermediate and specialty chemical producers with substantial markets within Europe (where pressure on chemical firms and their downstream customers to produce safer and more environmentally friendly products is most apparent).
- While a few industry leaders have taken significant steps to address chemical safety and sustainability concerns, a number of firms are not yet far down this track despite growing regulatory and other pressure in that direction. Our assessment of several 'high

exposure' Companies (see section 5.3 below) suggests that only a relative few may be doing enough to mitigate their risks or address stakeholder concerns.

- Most of the seven Companies investigated in this briefing have taken some initial steps to address chemical product safety and sustainability concerns. For example, each of the seven Companies has made a commitment to apply product stewardship principles as well as to conduct risk assessments on their products. The majority (five out of seven) have also taken steps to incorporate chemical safety and sustainability concerns into their R&D work.
- However, only two of the seven Companies (Akzo Nobel and ICI) state a commitment to phase-out and/or substitute chemicals of concern where feasible, as well as to avoid chemicals of concern in the development of new products where possible. EIRIS considers both of these commitments to be essential if a company is to minimise its exposure to chemical safety and sustainability risks.

The findings suggest that while many chemical firms with exposure to these risks have taken some positive initial steps, the essential commitments and actions needed to phase out harmful chemicals are rarely in place. Most firms may thus not be doing enough to address the safety and sustainability concerns associated with their products.

2. Background

Growing awareness of the effects of synthetic chemicals and the gradual discovery of increasing concentrations of such chemicals in the environment and human beings (so-called 'body

burden') has fuelled public concern over the widespread use of chemicals in industrial and consumer products, and their potential environmental and health risks. Concern is greatest over use of chemicals that remain in the environment for many years and bio-accumulate in wildlife and humans. These include so-called persistent organic pollutants (POPs) such as dioxins, polychlorinated biphenyls (PCBs) and phthalates.

Numerous campaigns by NGOs such as the WWF, Greenpeace and Friends of the Earth, as well as a significant body of scientific research on the health and environmental risks posed by man-made chemicals have reinforced these concerns and helped bolster regulatory initiatives to improve the safety and sustainability of chemical products.

The concept of 'green' chemistry is now being advocated as an alternative approach to conventional chemical and process design in order to reduce or eliminate the harmful environmental impacts of chemical production and use. Some features generally associated with 'green' chemistry and 'green' chemicals include minimisation and prevention of waste; design and use of inherently safer chemical products and/or processes; utilisation of renewable raw material as inputs to production (rather than non-renewable petroleum-based feedstock); and increased utilisation of biodegradable chemical compounds. Chemical firms around the world are increasingly being asked to develop innovative new chemical products to supply a growing demand for 'green' chemicals. Nowhere are these trends more apparent than in Europe, with its growing public awareness and increasingly stringent regulations governing the production and use of chemicals.

2.1. European concern

The proposed European Chemicals Strategy (otherwise known as REACH) was first published in February 2001. Its aim is to improve the approach to chemical regulation and management by ensuring that risks to human health and the environment of widely used chemical products are better understood. The new strategy reflects growing scientific evidence linking certain chemicals to developmental defects in human beings and wildlife. In a report to the European Commission by its Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE) on the human and wildlife health effects of endocrine disrupting chemicals, it is noted that several expert working groups have highlighted possible linkages between adverse changes in human and wildlife reproductive health, and the increasing concentration of man-made chemicals in the environment, even though a causative role of these chemicals in diseases and abnormalities has not yet been verified¹. The CSTEE report notes that there has been a significant increase in the incidence of testicular cancer, prostate cancer and a declining proportion of male newborns in the last decades. It also highlights several examples of causal links that have been established between reproductive and developmental effects in wildlife and certain endocrine disrupting chemicals. The examples include masculinisation in female marine snails by tributyltin, a biocide used in anti-fouling paints; egg-shell thinning in birds induced by DDE, a metabolite of the organochlorine pesticide DDT; and reproduction and immune system impairment among Baltic grey and ringed seals induced by PCBs in the food chain².

In addition to concern over individual chemical substances, there are also emerging concerns over the health impacts of exposure to so-called

'chemical cocktails', i.e. the combination of chemical substances present in our everyday environment, and their potential to reinforce negative health and environmental effects. This is supported by recent studies such as the Avon Longitudinal Study of Parents and Children (ALSPAC) in Britain, which has found a strong association between the use of chemical products in the home and persistent wheezing in young children; a pre-cursor to asthma³.

2.2. International initiatives

Europe is not alone in its concern over the safety and sustainability of synthetic chemicals in our everyday environment. A number of international initiatives have emerged in recent years broadly aimed at creating institutions to enforce, support and encourage more sustainable chemicals management. Such initiatives have the potential to significantly transform the regulatory and market environments in which chemical producers operate worldwide.

The Montreal Protocol on Ozone Depleting Substances (ODSs), the Rotterdam Convention on Prior Informed Consent (PIC) and the Stockholm Convention on Persistent Organic Pollutants (POPs) are among the earliest and most successful examples of international initiatives to curb or eliminate the production and use of harmful chemicals. Since the Rio 'Earth Summit' of 1991, a number of other initiatives have developed to address or highlight the issue of chemical safety as a key priority for sustainable development. A key output of the Earth Summit was the Agenda 21 action plan which, among other things, set out principles for chemical safety and a number of objectives for the environmentally sound handling and use of chemicals (in its so-called 'Chapter 19'). This has provided an important basis for subsequent

international initiatives to coordinate the management of hazardous chemicals globally.

As part of the follow-on programme to promote, monitor, and harmonise the implementation of Chapter 19, the International Conference on Chemical Safety, organised by the United Nations Environment Program (UNEP), the International Labor Organization (ILO) and the World Health Organization (WHO), established the Intergovernmental Forum on Chemical Safety (IFCS) in April 1994. The IFCS has played an important role in improving communication among international stakeholders, developing recommendations to improve the POPs convention, and identifying the need for chemicals management capacity-building in developing countries and countries with economies in transition⁴.

In October 2000, the IFCS issued the Bahia Declaration on Chemical Safety, re-emphasising the essential role of sound management of chemicals in sustainable development and the protection of human health and the environment. The declaration also included a commitment on the part of IFCS participants to strengthen efforts and build partnerships to accomplish specific targets, including the implementation of a Globally Harmonised System (GHS) for the Classification and Labelling of Chemicals.

An implementation framework for the GHS was agreed at the 2002 World Summit for Sustainable Development (WSSD). The framework encompasses the development of universal classification criteria and labelling provisions for the physical and chemical, health-endangering, and environmentally harmful properties of chemical compounds. Its aim is to introduce globally standardised safety

data sheets and easily understood hazard symbols, which make clear the risks to humans and the environment resulting from the use of specific chemical substances, as well as to unify and supersede existing classification and labelling systems for dangerous goods and hazardous substances by 2008.

The Organisation for Economic Cooperation and Development (OECD), whose member countries represent over 80% of world chemical production, has also been heavily involved in harmonisation efforts (as well as a number of other relevant projects) within the scope of its Environment Health & Safety programme. These have included, among other things, international workshops promoting 'green' chemistry and the development of guidelines and standards for the regulatory assessment of chemicals internationally⁵.

The UN Environment Programme (UNEP) has also been prominent in this area, spear-heading the development of a strategic approach to international chemicals management (SAICM). The Governing Council of the UNEP initiated the development of the SAICM in February 2002, an initiative that was endorsed by the WSSD in Johannesburg in September of that year. The SAICM will recommend measures to help participating countries achieve safe and sustainable use of chemicals in a timely and efficient manner, in line with the goal, agreed at the WSSD, of minimising significant adverse impacts on the environment and human health by 2020. The SAICM was formally adopted at the International Conference on Chemicals Management (ICCM) in February 2006⁶.

2.3. Industry initiatives

The global chemical industry, through the International Council of Chemical Associations (ICCA), has taken initial steps to respond to this challenge. The ICCA, for example, launched its global initiative on High Production Volume (HPV) chemicals in 1998, as a first step towards producing harmonised data sets on the intrinsic hazards of approximately 1,000 HPV substances. This goal, which was originally set for 2004, has not yet been achieved but the ICCA expects to complete the assessments in another five to six years if the programme runs at full capacity. The ICCA's HPV Initiative builds on a partnership with the OECD and its member countries, but the prime responsibility for the initiative lies with the companies producing HPV chemicals. The cost of generating data and the work of drafting the assessments is borne by industry and shared, whenever possible, by companies in international consortia. Companies collate and generate data for each of the six basic data categories, which have been agreed by the member countries of the OECD to screen HPV chemicals for hazardous properties⁷.

The data - a Screening Information Data Set Dossier (SIDS Dossier), a SIDS Initial Assessment Report (SIAR) and a SIDS Initial Assessment Profile (SIAP) - are submitted to the OECD for international agreement. The ICCA expects this programme to help restore public confidence in chemicals and improve the reputation of the chemical industry globally, whilst producing a sound scientific basis for any subsequent voluntary industry action, global, regional and/or national risk assessment or legislation.

Another initiative in this area is the industry's Long-Range Research Initiative (LRI), launched in 1999, which funds independent research into

four focus areas in order to improve the risk assessment of chemicals in relation to public health. The focus areas are: environmental fate and effects of chemical substances; environmental and human exposure assessment; risk assessment methodologies; and endocrine disruption⁸. Both the HPV and LRI programmes are meant to complement the more long-standing Responsible Care initiative, which was developed in 1985 to address broad stakeholder concerns surrounding chemical production and improve the industry's reputation.

Responsible Care, a voluntary programme under which chemical companies commit to continuously improving their health, safety and environmental performance, and to communicating with stakeholders about their products and processes, has in recent years sought to place greater emphasis on product stewardship issues. In the US, for example, Responsible Care companies are now being encouraged, as part of their product safety commitment, to conduct systematic and rigorous evaluations of their products. These evaluations are meant to include characterisations of any risk associated with the use of the products and a determination of the risk management activities needed to address that risk. Companies are also encouraged to report on these activities in order to provide a greater understanding of how product safety and management decisions are made.

In Europe, similar efforts are being made by the European Chemical Industry Council (CEFIC) and the European Association of Chemical Distributors (FECC) as part of their Responsible Care initiative to draw up guidelines on the joint product responsibility of suppliers and distributors. The Japanese Chemical Industry Association's (JCIA)

Responsible Care programme's guiding principles also encourage member companies to incorporate environmental, safety, and health considerations in the design of new products.

Product stewardship will increasingly shape the direction of Responsible Care as the ICCA rolls-out its new Responsible Care Global Charter and Global Product Strategy (GPS). The Global Charter, which has been in development since 2004, is partly in response to UNEP's SAICM process and extends the commitments under Responsible Care to include commitments to promote sustainable development, effective management of chemicals along the value chain, greater industry transparency, and greater global harmonisation and consistency among the national Responsible Care programmes. The GPS, which aims to develop an improved approach to product stewardship throughout the chemical industry, includes amongst its key components guidelines for product stewardship based on industry best practice and a tiered process for completing risk characterisation and risk management actions for chemicals in commerce⁹.

Responsible Care is, however, a voluntary, self-regulated initiative, and its overall success in addressing demand for inherently safer and more sustainable chemicals will rest upon the commitment of individual member companies to strategic action in this area. Whether companies are currently doing enough to address these concerns and manage the risks associated with chemical safety and sustainability is discussed further in the following sections of this briefing paper.

3. Scope of EIRIS research

The chemicals industry may be classified into four broad product segments: commodity chemicals, specialty chemicals, pharmaceuticals, and consumer chemicals. Commodity chemicals include basic petrochemicals, industrial gases, inorganic compounds (e.g. certain metals and salts), and various intermediates used in the manufacture of polymers, solvents, fibres and other commodity products. These are produced in relatively large volumes, and are sold to other segments of the industry or other industries entirely. Specialty chemicals include fine and performance chemicals, pigments and inks, pharmaceutical intermediates, adhesives and other low-volume, high-value chemical compounds. Pharmaceuticals include both basic pharmaceutical products and pharmaceutical preparations; whilst consumer chemicals refer to products such as soaps/detergents, coatings and cosmetics.

EIRIS's research on firms' overall exposure to the regulatory and market challenges identified in this briefing focuses on companies that derive significant amounts of revenue from intermediate and specialty chemicals. EIRIS excludes revenue derived from pharmaceutical sales, since pharmaceuticals are currently not subject to the same concerns and face a distinct set of social, ethical and environmental challenges from those identified here. We also exclude basic commodity and consumer product sales since regulatory and consumer pressure in this area tend to be linked to specific intermediate and specialty chemical compounds, rather than the end products that they occur in per se or the base chemicals from which they are derived.

EIRIS assesses a subset of 'high exposure' companies in this area, evaluating their chemical management standards against our assessment criteria. The seven Companies assessed are all publicly listed and derive at least a third of their annual turnover or over GBP 2 billion from the sale of intermediate and specialty chemicals, and at least a third of their annual turnover from European chemicals sales. They are all among the top 50 chemicals firms globally by sales¹⁰ and include:

- Akzo Nobel (*NL*)
- Ciba Specialty Chemicals Holding (*CH*)
- Clariant (*CH*)
- Dainippon Ink & Chemicals (*JP*)
- Imperial Chemical Industries (*UK*)
- Lanxess (*DE*)
- Solvay (*BE*)

A snapshot of EIRIS's findings is captured below in section 6.1.

4. Potential social, environmental & other ethical risks & opportunities

Growing environmental consciousness amongst consumers and more stringent environmental regulation are gradually increasing demand for safer and more ecologically sound chemical products. The key developments in this regard and the associated challenges facing the chemical industry include:

- a) REACH, the new EU chemicals strategy, which will require chemical producers and suppliers to proactively identify and mitigate the health and environmental risks associated with their products;
- b) Other relevant EU product legislation (e.g. RoHS and WEEE), which will require a number of downstream industries to improve the environmental attributes of their products, thereby increasing the

demand for more sustainable chemical products; and,

- c) The 'greening' of consumer product supply chains amongst manufacturers and retailers in response to stakeholder pressure, resulting in the substitution of certain harmful chemical substances in their own products.

4.1. REACH

REACH (which stands for Registration, Evaluation and Authorisation of Chemicals) is the European chemical regulatory framework designed to improve regulatory information on chemical products in the EU market and replace over 40 existing European chemicals legislation governing production, imports and use of chemicals in Europe.

Under REACH, producers or importers of chemicals in volumes greater than or equal to 1 tonne per year will be required to register those substances by providing a dossier outlining the properties, uses and safe handling of the substances in question. Around 30,000 substances currently on the European market are expected to be registered in this way. The producers and importers will also have to pass on any safety information related to these substances to their downstream users (i.e. manufacturers that use these chemicals in their production processes) in order to improve the management of chemicals along the product value chain. A number of these registered substances will undergo an evaluation process by Member States followed by an authorisation process for substances with properties that give rise to 'very high concern', i.e. substances considered to be persistent, bio-accumulative and toxic (PBT), very persistent and very bio-accumulative (vPvB) or carcinogens, mutagens and reproductive toxins (CMRs)¹¹. A new

European Chemicals Agency will have responsibility for managing the entire process one year after REACH comes into force.

The REACH proposal, although not yet finalised, will require manufacturers and importers of authorisable substances to demonstrate that for a particular use, the risks to human health and the environment posed by a particular substance are adequately controlled, or that the socio-economic benefits of the product outweighed the potential costs to society. Both the European Council and the European Parliament appear set to move the proposal towards mandatory substitution of hazardous substances, which would require all authorisable substances to be substituted where feasible, even if the risks of using such a substance could be shown to be adequately controlled. Authorisation and substitution are expected to be the main points of debate in the Council's and Parliament's second reading of the proposal at the end of 2006. REACH is expected to come into force in 2007.

Estimates of the cost of REACH to industry vary widely. The direct cost of registration and testing (which is to be borne by industry) is generally expected to be small relative to the value of annual chemical sales¹². Notwithstanding, a number of high risk chemical substances may be phased out or severely restricted by this legislation, and it is unclear what indirect costs the new system will have on downstream industries. Waste and food items or additives will be fully exempted from REACH. Ores, ore concentrates, minerals will also be exempted (unless chemically modified), as well as cellulose pulp and possibly cement clinker, LPG, crude oil, coke, coal (unless chemically modified), oxygen, a number of oils, iron, noble gases, methane and ethanol.

4.2. Other relevant EU product legislation

Several other new pieces of European product legislation are also being enacted with the aim of reducing the environmental burden and health effects of manufactured goods throughout their life cycle. A number of these will indirectly affect the chemical industry by increasing the demand for safer and more sustainable chemicals in downstream markets. The main ones include¹³:

- The Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive, which requires member states to restrict the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers, in electrical and electronic products placed on the market from July 2006.
- The Waste Electrical and Electronic Equipment (WEEE) Directive, which will make producers of electrical and electronic products responsible for the collection, treatment, recovery and disposal of all waste electrical and electronic equipment. From December 2006, producers will also be required to meet recycling and recovery targets. This is expected to encourage the use of less hazardous and more easily recyclable materials in consumer electronics and electrical equipment.
- The End of Life Vehicle (ELV) Directive which requires that at least 85% by weight of all vehicles be recoverable (by recycling or incineration with energy recovery) from 1 January 2006, and 95% by 2015. Automobile manufacturers are thus likely to avoid chemical substances which are difficult or expensive to recover.

- The Biocidal Products Directive, which requires that testing be done on all biocidal products on the EU market by 2010, to ensure their acceptability and that no less harmful alternative exists. Approved biocides will be placed on a positive list of products that manufacturers may use as active ingredients. Active ingredients not listed will be banned from use. The Directive applies to all chemical preparations designed to control harmful organisms by chemical or biological means.

These and other new pieces of EU legislation currently being discussed demonstrate the bloc's sustained commitment to enacting regulations to protect the environment and human health. These are all likely to drive improvements in product specification and formulation in favour of safer and more sustainable chemicals.

4.3. Greening of supply chains

Pressure from environmental NGOs and more responsible purchasing by consumers is also contributing to an increasing demand for safer and more sustainable products from consumer product manufacturers.

A number of major consumer brands such as Puma, Nokia, Adidas, Unilever and Chicco have recently announced the phasing out of certain chemicals or chemical groups considered to be of particular concern from their own-brand products. These include chemicals such as synthetic musks, phthalates, alkylphenols, brominated flame retardants, and organotin compounds¹⁴. Samsung Electronics has also recently announced the phase out of PVC, organotins and all brominated flame retardants from its electrical and electronic products, and Philips and Sony have announced similar plans to

remove brominated flame retardants from their own products in the near future. Other major UK brands such as Marks & Spencer and Boots have already taken steps to phase out a number of chemicals of concern from their supply chains, whilst endorsing the need for chemical manufacturers and importers to supply more data on hazardous substances and to substitute potentially harmful chemicals for safer ones. Marks & Spencer has its own range of "natural" cleaning products in which chemicals such as phthalates, triclosan, parabens and biocides, all on M&S's list of 14 groups of chemicals of concern, have been replaced by natural alternatives¹⁵.

Consumer brands continue to face both regulatory and consumer pressure to incorporate sustainability considerations into product formulation and procurement decisions. These pressures will in turn be passed on to their intermediate and specialty chemical suppliers as more information on product safety and sustainability is required.

5. Exposure factors

5.1. Manufacture of intermediate and specialty chemicals

The risks associated with chemical safety and sustainability concerns are likely to be most significant for manufacturers of intermediate and specialty chemicals, especially those used in consumer product manufacturing. Consumer concern over product safety and sustainability, as well as more stringent product regulations, are likely to result in greater requirements being placed on specialty chemicals suppliers to provide acceptable alternatives to certain chemicals of concern. A number of existing intermediate and specialty

chemicals may also become subject to various market restrictions as a result of the REACH process, thereby affecting the revenue and growth prospects of the suppliers involved.

5.2. Significant revenue derived from European sales

The regulatory and consumer pressures identified above are to a large extent specific to the European marketplace. Chemical firms with significant European sales will be most directly affected by REACH and other product legislation being enacted in the EU, as well as growing consumer awareness of product safety and sustainability issues (which is already very high in Europe).

5.3. Exposure classification

The exposure of chemical firms to product safety and sustainability concerns will depend on the degree to which the factors outlined above are relevant to its business activity. This will vary according to specific product portfolios and the nature of the downstream customer base. Large firms with well-known brands may also face significant reputation or litigation risks, even if the business or product linked to chemical safety and sustainability concerns accounts for a relatively small proportion of their overall turnover.

EIRIS has used the proportion of overall turnover derived from European chemical sales and intermediate and specialty chemicals as the basis for assessing companies' exposure to the SEE risks identified above. EIRIS considers companies that derive at least a third of their annual turnover or over GBP 2 billion from the sale of intermediate and specialty chemicals, and at least 15% of their annual turnover from European chemicals sales, as having a 'high exposure' with

respect to the risks posed by chemical safety and sustainability concerns. Lower proportions of revenue from intermediate and specialty chemicals sales or European chemicals sales, would correspond to lower exposure levels as outlined in Table 1 below.

Companies that derive less than 5% of their annual turnover or less than GBP 500 million from the supply of intermediate and specialty chemicals, or less than 5% of their annual turnover from European sales, are assessed as having little or no risk exposure in this area.

Table 1: EIRIS exposure classification*

Exposure Factor	5-15% turnover from Europe	15-33% turnover from Europe	> 33% turnover from Europe
5-15% or £0.5b -£1b turnover from intermediates & specialties	L		
15-33% or £1b - £2b turnover from intermediates & specialties	L	M	
>33% or >£2b turnover from intermediates & specialties	M	H	H

*H = High exposure; M = Medium exposure; L = Low exposure

6. Managing the risks

Managing the risks associated with harmful chemicals applies on two levels; identification and management of risks to a company's core business posed by the various SEE issues identified above, and identification and management of risks posed to human health and the environment by a company's products.

The position of the European chemicals market as the world's leading exporter and importer of chemicals (accounting for approximately 65% of world exports and 53% of world imports in 2004)¹⁶, as well as the gradual harmonisation of global standards governing hazardous chemicals, suggest that simple evasive action by manufacturers (e.g. relocation) may not be a sensible long-term strategy. Chemical producers will need to modify their existing product lines and/or develop new products that are compatible with long term trends towards greater product safety and sustainability.

As markets continue to internalise the health and environmental effects of chemical use, 'green' alternatives and substitutes will become increasingly attractive. Companies that adapt quickly to these trends are likely to benefit most from the new market opportunities they provide. Those that lag behind run the risk of losing access to valuable markets and alienating downstream customers, as safety and environmental standards tighten across all sectors.

EIRIS has identified 12 indicators for assessing companies' management response. These fall into three broad categories and are as follows:

Strategy & responsibility

- Processes to identify business risks posed by chemical safety and sustainability concerns at senior management level
- Commitment to apply product stewardship principles to new and existing chemical products
- Commitment to conduct risk assessments on all chemical products
- Commitment to phase-out and/or substitute chemicals of concern where feasible

- Commitment to avoid chemicals of concern in the development of new products where possible
- Business-to-business partnerships to develop 'green' alternatives or substitutes

Research & development

- R&D linked to 'green' chemicals innovation
- Use of life cycle analysis (LCA) in the design and development of chemical products

Reporting & dialogue

- Public reporting of chemicals of concern produced and/or used
- Disclosure of business risks posed by chemical safety and sustainability concerns in Annual Report & Accounts
- Stakeholder engagement and dialogue on chemicals
- Systems to communicate chemical product risks along the product value chain

6.1. Snapshot of EIRIS findings

Assessed against the indicators described above, the chemicals management response of the seven selected 'high exposure' Companies indicates that most of these Companies have only taken 'limited' or 'intermediate' steps towards managing their chemical safety and sustainability risks.

Only two of the Companies assessed demonstrate a 'good' or an 'advanced' approach towards chemical safety and sustainability management. This would suggest that many chemical firms, with significant exposure to the issues identified above, may not be doing enough to mitigate their risks or address stakeholder concerns. As described earlier in section 3, the seven 'high exposure' chemical

producing Companies which were selected for this assessment are:

- Akzo Nobel (*NL*)
- Ciba Specialty Chemicals Holding (*CH*)
- Clariant (*CH*)
- Dainippon Ink & Chemicals (*JP*)
- Imperial Chemical Industries (*UK*)
- Lanxess (*DE*)
- Solvay (*BE*)

The indicators required to meet the different assessment grades are outlined in section 9 and specific Company assessments are captured in section 8.

Our research found that each of the seven Companies had publicly expressed a commitment to apply product stewardship principles and/or is engaged in some form of product risk assessment. The majority (four out of seven) had also established formal processes for identifying the business risks posed by chemical safety and sustainability concerns. In addition, five out of seven incorporated chemical safety and sustainability concerns in their R&D work, either by engaging in R&D linked to 'green' chemicals innovation (four out of seven) or utilising LCA in the design and development of chemical products (five out of seven). Most of the Companies reviewed (five out of seven) also engaged in stakeholder dialogue on chemicals management issues and have systems in place to communicate chemical product risks along the product value chain.

However, only two of the seven Companies (Akzo Nobel and ICI) state a commitment to phase-out and/or substitute chemicals of concern where feasible, and to avoid chemicals of concern in the development of new products where possible. EIRIS considers these commitments to be essential to a company's efforts to

minimise exposure to chemical safety and sustainability risks.

Only one of the Companies assessed (Akzo Nobel) publicly disclosed specific chemicals of concern produced and/or used in its processes. EIRIS considers such disclosure best practice and important to encouraging transparency and dialogue between companies and their stakeholders on the risks associated with chemicals.

Overall, these findings suggest that while a few industry leaders have taken significant steps to address chemical safety and sustainability concerns, much more needs to be done to respond to growing regulatory and other pressure.

To better understand how chemical safety and sustainability concerns relate to a company's business model, the following additional questions may be considered.

Questions for analysts

Who are the company's major customers and what kind of products do they manufacture?

What is the likely business impact of customer demand for 'green' chemicals on the company's major product lines and/or markets?

What is the Company's exposure to chemicals covered by REACH?

What proportion of the company's R&D budget is spent on 'green' chemicals innovation?

7. Good practice examples

There are a number of examples of businesses that have taken steps to address chemical safety and sustainability concerns by applying one or more of the chemicals management practices identified above. Some of the examples highlighted here are taken from companies that are not specifically assessed in this paper, but are useful illustrations nonetheless.

Hydro Polymers, a subsidiary of Norsk Hydro and one of Europe's largest manufacturers of PVC, has for example been working since the late 1990s with The Natural Step, an international sustainable development charity, on a number of projects to address the sustainability challenges facing the PVC industry. Among these challenges are the elimination of persistent organic pollutant (POP) releases to the environment and the use of more sustainable additives in its products. The company is engaged in a research project to evaluate and report on a newly constructed chlorine plant that is geared towards producing less dioxin emissions. Hydro Polymers has also set itself a target to phase out the use of lead stabilisers by the end of 2007 and is a partner in a UK government funded project to improve the sustainability of PVC through the use of novel materials, processes and life cycle methodologies¹⁷.

Akzo Nobel, one of Europe's largest specialty chemical firms, is also making steady progress in their management of hazardous substances. The Company has incorporated processes into its management systems that regularly review the use of substances considered to be hazardous in order to better manage their life cycle impact. In new products, the Company commits to avoid where at all possible substances that are known to be

dangerous carcinogens, mutagens and reproductive toxins¹⁸.

The Imperial Chemical Industries (ICI) Group has similar product stewardship guidelines which require its businesses to carry out hazard and risk assessments on all raw materials, intermediates and products. This forms the basis of the Company's risk management and communication processes. ICI's Uniqema business is also participating in the US Environmental Protection Agency's Sustainable Futures initiative, designed to help industry develop new chemicals that are economically and environmentally sustainable¹⁹.

Several major chemical producers have also begun providing chemical management services (CMS) to a number of their key downstream customers in order to reduce cost, improve the efficiency of chemicals use and promote better chemical life cycle management. CMS, also known as Total Chemical Management (TCM), refers to a business model in which a customer engages with a service provider to form a strategic, long-term contract in which the service provider supplies and manages the customer's chemicals and related services. In a CMS model, supplier profits are based not on the volume of chemicals sold but on the quality of service provided. The US is leading the way in this area, but there are also CMS programmes in Canada, Europe, South America and Asia, particularly amongst firms that supply the automotive, steel manufacturing and semiconductor industries. Customers enjoy not only significant cost savings, but also significant environmental benefits from reduced chemical volume, reduced emissions, reduced risk, and better data for reporting²⁰.

These are only a few examples of steps chemical manufacturers can take to address the SEE risks associated with their products. In EIRIS's view, 'good' chemicals management will involve a combination of such initiatives, from corporate strategy and R&D through to stakeholder engagement and dialogue (as outlined in our assessment methodology – section 9). The greater a firm's exposure to safety and sustainability risks, the greater the expectation, by investors and society at large, that the business in question demonstrate leadership and strategic competence in managing the risks involved. EIRIS will continue to monitor trends in this area and provide our clients with comprehensive analysis of how companies are managing their SEE risks and addressing relevant stakeholder concerns.

Notes

- ¹ *Opinion on Human and Wildlife Health Effects of Endocrine Disrupting Chemicals, with Emphasis on Wildlife and on Ecotoxicology Test Methods*. Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE). EU, Brussels.
- ² Ibid.
- ³ *Asthma researchers point finger at household chemicals*. ENDS Report, January 2005, Issue 360, p. 10.
- ⁴ Schlottmann, U., Gartner, S. and Kullmer, J. (2003). *Chemical Safety in a Vulnerable World*. Angewandte Chemie, International Edition, vol. 42, pp. 4456-4469.
- ⁵ OECD Environment Directorate: Chemicals Safety website (www.oecd.org/ehs) (13/01/2006).
- ⁶ IISD (2005). *Summary of the Third Session of the Preparatory Committee for the Development of Strategic Approach to International Chemicals Management: 19-24 September 2005*. Earth Negotiations Bulletin, vol. 15, no. 124.
- ⁷ ICCA HPV Chemicals Initiative website (<http://www.cefic.be/activities/hse/mgt/hpv/hpvinit.htm>) (13/01/2006).
- ⁸ *Long Range Research Initiative: Global Research Strategy*. International Council of Chemical Associations.

- ⁹ *Responsible Care Global Charter*. International Council of Chemical Associations (ICCA). January 2005.
- ¹⁰ *Global Top 50*. Chemical & Engineering News, vol. 83, no. 29, pp. 20-23.
- ¹¹ *Strategy for a Future Chemicals Policy. White Paper*. Commission of the European Communities, February 2001.
- ¹² Ackerman, F. and Massey, R. (2004). *The True Costs of REACH*. A study performed for the Nordic Council of Ministers. Global Development and Environment Institute, Tufts University.
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- ¹⁵ *Retailers seek tougher measures for chemicals in products*. ENDS Report, February 2005, Issue 361, p. 30.
- ¹⁶ *Facts and Figures: The European chemical industry in a worldwide perspective*. European Chemical Industry Council (Cefic), January 2005.
- ¹⁷ Hydro Environmental News, no. 5, October 2005.
- ¹⁸ Akzo Nobel website (www.akzonobel.com) (30/11/2005).
- ¹⁹ ICI Sustainability Review 2004.
- ²⁰ *Chemical Management Services Industry Report 2004: Creating Value Through Service*. Chemical Strategies Partnership.

The purpose of the paper is to present the methodology and situation at the time of publication. Updated information on the Companies in this briefing and others will be available from clients@eiris.org.

SEE risk briefing series

Other issues in the series include Access to medicines in the Developing World; Mobile phone health concerns; and Obesity concerns in the food and beverage industry:

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8. Company assessments

	Akzo Nobel	ICI	Dainippon Ink & Chemicals	Lanxess	Solvay	Ciba Specialty Chemicals Holding	Clariant
Strategy and responsibility							
Processes to identify business risks posed by chemical safety and sustainability concerns at senior management level	•	•		•	•		
Commitment to apply product stewardship principles to new and existing chemical products	•	•	•	•	•	•	•
Commitment to conduct risk assessments on all chemical products	•	•	•	•	•	•	•
Commitment to phase-out and/or substitute chemicals of concern where feasible	•	•					
Commitment to avoid chemicals of concern in the development of new products where possible	•	•					
Business-to-business partnerships with downstream users to develop 'green' alternatives or substitutes	•	•	•		•		
Research & development							
R&D linked to 'green' chemicals innovation	•	•	•		•		
Use of life cycle analysis (LCA) in the design and development of chemical products	•	•			•	•	•
Reporting & dialogue							
Public reporting of chemicals of concern produced and/or used	•						
Disclosure of business risks posed by chemical safety and sustainability concerns in Annual Report & Accounts	•	•		•			
Stakeholder engagement and dialogue on the management of chemicals	•	•	•	•	•		
Systems to communicate chemical product risks along the product value chain	•	•	•	•	•		
Assessment	A	G	I	I	I	L	L

NE – no evidence; L – limited; I – intermediate; G – good; A – advanced

Detailed grading methodology is provided in section 9

NB Assessments apply to companies and any subsidiaries and associates over 20% owned.

Data analysis February 2006

9. Assessment methodology

	No evidence	Limited	Intermediate	Good	Advanced
Requirements	No indicators	Any one indicator	All marked indicators plus any three from other sub-areas	All marked indicators	All marked indicators
Strategy & responsibility					
Processes to identify business risks posed by chemical safety and sustainability concerns at senior management level				•	•
Commitment to apply product stewardship principles to new and existing chemical products			•	•	•
Commitment to conduct risk assessments on all chemical products			•	•	•
Commitment to phase-out and/or substitute chemicals of concern where feasible				•	•
Commitment to avoid chemicals of concern in the development of new products where possible				•	•
Business-to-business partnerships with downstream users to develop 'green' alternatives or substitutes					•
Research & development					
R&D linked to 'green' chemicals innovation				•	•
Use of life cycle analysis (LCA) in the design and development of chemical products					•
Reporting & dialogue					
Public reporting of chemicals of concern produced and/or used					•
Disclosure of business risks posed by chemical safety and sustainability concerns in Annual Report & Accounts				•	•
Stakeholder engagement and dialogue on the management of chemicals				•	•
Systems to communicate chemical product risks along the product value chain				•	•

9.1 Indicator definitions

Chemicals of concern: substances considered to be persistent, bio-accumulative and toxic in nature (including carcinogens, mutagens and chemicals toxic to reproduction), e.g. chemicals identified by the Stockholm Convention on the Persistent Organic Pollutants (POPs); chemicals targeted under the Convention for the Protection of the Marine Environment of the North East Atlantic (the OSPAR Convention) for cessation of discharges, emissions and losses; or other chemicals of concern such as Triclosan, Bisphenol A, Parabens, Creosote, Chromium VI compounds and Perfluorooctanyl sulfonate (PFOS).

Disclosure of business risks posed by chemical safety and sustainability concerns: potential consequences to the business (financial, reputational or operational) identified by the Company as a result of chemical safety and sustainability concerns, based on regular business risk assessments conducted at senior level. Credit may be given to a Company that provides evidence of conducting regular business risk assessments covering this issue, but which indicate that the business risks posed by chemical safety and sustainability concerns are not material or among the Company's main risks.

'Green' alternatives or substitutes: environmental benign alternatives to chemicals of concern or substitute chemicals that pose no significant risks to human health or the environment

Life cycle analysis: a process of evaluating the effects that a product has on the environment over the entire period of its life in order to increase resource-use efficiency and decrease product liabilities.

Product stewardship: an approach to environmental protection which involves reducing the environmental impacts of products over their entire life cycle (also referred to as extended producer responsibility).

Public reporting of chemicals of concern produced and/or used: a publicly available list of priority substances to be assessed and/or substituted by the Company on the basis of safety and/or sustainability concerns.

Risk assessment: a scientific process that estimates the type and magnitude of toxicological risks posed by exposure to chemical substances.

Stakeholder engagement and dialogue: interaction between the Company and its external stakeholders which is characterised by mutual information exchange, deliberation and collaboration on chemicals management.

Systems to communicate chemical product risks along the product value chain: systems to enhance downstream chemicals management by providing customers with information on the health and environmental risks associated with a particular product, as well as best practice guidelines for the safe handling, use and disposal of these products in order to mitigate the associated risks.

See also section 6 – Managing the risk

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