Newsletter on Eco-labelling and Eco-friendly Products

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Hazardous Chemicals - (ii)

Contents

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Foreword

The importance of chemicals that affect human beings, animals and the environment can be seen from the fact that a number of UN (and other National Agencies in the world) are presently involved in reducing the hazards on the globe and regulate the same. Some of the important ones are UNEP (Chemicals), ILO (safework), IRPTC (International Register of Potentially Toxic Chemicals), Environmental Protection Agency, WHO, FAO, UNIDO, World Bank, etc. In fact, at the moment, these agencies are now focused on UNEP for the environmentally sound strategies on the issues concerning hazardous chemicals. While important aspects covering consumer products have been considered in these two issues of the CERC ENVIS Newsletter, one must note that a very large number of products are actually involved in chemicals related products and services and that due precautions would be necessary for consumers to find out for themselves the effects of chemicals on the daily life day-in and day-out.

The changes sweeping the developing world like ours have a much greater stake than developed world. This is so because of the lack of education and understanding on the part of ordinary consumers. A sustained effort will be needed to keep on educating people and keeping the latest information on chemical hazards fully up-dated, weaknesses in environmental education, product information and enforcement implementation for (chemical) hazardous wastes are all likely to affect the human beings, animals, vegetarian and the environment at large. The earlier all this gets realized, the better it will be.

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HOUSEHOLD CHEMICALS AND THEIR SUBSTITUTION

(Continued from last Issue)

Safe Substitutes for Laundry Products

Detergent is specially adapted to clean synthetic fabrics, and it has the added advantage of not leaving soil residues even in hard water. However, detergents are generally derived from petrochemicals, and people sensitive to these compounds may find it hard to tolerate detergents or the fragrances they are scented with. In addition, most detergents contain phosphates, which build up in streams and lakes and upset the natural balance in waterways, causing blooms of algae which deplete the dissolved oxygen fish need to live. Some detergent may even contain naphthalene or phenol, both hazardous substances.

An effective alternative to using detergents is to return to soap. Soap is an effective cleaner for natural fabrics, leaving such items as diapers softer than detergent can. For cotton and linen, use soap to soften water. A cup of vinegar added to the wash can help keep colors bright (but DO NOT use vinegar if you are using bleach -- the resulting fumes are hazardous). One-half to three-quarters of a cup of baking soda will leave clothes soft and fresh smelling. Silks and wools may be hand washed with mild soap or a protein shampoo, down or feathers with mild soap or baking soda.

For synthetic fabrics or blends (including most no-iron fabrics), there are biodegradable detergents on the market that do not contain phosphates, fragrances, or harsh chemicals. They are often imported from Europe and are available at health food stores or by mail order

Safe Substitutes for Personal Hygiene and Cosmetic Products

We use cosmetics and hygiene products for a fairly narrow range of reasons: to keep skin moist and supple; to clean hair without stripping it of natural oils; to eliminate unpleasant body or mouth orders; to prevent skin oiliness and clogged skin pores; and simply for the pleasure of relaxing and pampering ourselves with body-care or facial-care treatments. The following ingredients can help achieve these purposes without the use of toxic additives, synthetic fragrances, or artificial colorings:

Moisturizers and conditioners: egg yolk, milk, yogurt, safflower oil (for light moisturizing), olive oil (for dry skin or hair), water, oatmeal, jojoba oil.

Astringents/after shaves: witch hazel, diluted isopropyl alcohol.

Deodorants: baking soda, white clay, deodorant crystals.

Toothpastes: baking soda, salt.

Soaps cleansing agents: castle soap, olive-oil based soap.

Perfumes: essential oils provide nontoxic fragrances that can be used to scent shampoo, bath soaks, or even, in the case of peppermint, to flavor toothpaste.

Although it's easy to make healthful alternatives to many cosmetic and hygiene products, any natural-foods store has a fairly wide selection of shampoos, moisturizers, toothpastes, after shaves, soaps, and bath products that do not contain the harmful ingredients in many commercial preparations.

The Safe Home of the 21st Century

Because Americans spend approximately 90 percent of their time indoors, it is crucial to make the home environment as safe as possible. Indoor pollutants have proliferated in recent years, often either because modern construction techniques and furnishings manufacturers utilize hazardous materials or because consumers do not know enough about the products they buy to make informed choices.

But safe, nontoxic alternatives exist for nearly every real need around the home, and the search for them may help consumers distinguish between what they really do need, and what may be "luxuries" that could compromise their families' health.

COSMETICS AND PERSONAL CARE

Ref:
http://www.ecomail.com/greenshopping/nthouseholdproducts.htm

Cosmetics and personal care are extremely important areas that have direct consequences to the health of individuals in general and of women in particular. Knowledge about the toxic effects (that may include cancer) can help the consumers in reducing the risks involved in these areas of chemical usages. This information from USA & Europe is also applicable to most in the effluent society in our country as well.

Hazardous Chemicals in Cosmetics

Herbal Essences is now marketed largely to girls and young women, employing intense fragrances, bright packaging and shampoo and conditioner names like "none of your frizzness" and "drama clean."

With a name like "Herbal Essences" one might think that these products contain natural ingredients, but the brand uses fragrance, sodium laureth sulfate and other chemicals linked to cancer and reproductive problems in its body wash, shampoo and conditioner.

The Campaign for Safe Cosmetics recommends avoiding products with "fragrance" on the label whenever possible (go for unscented products or those perfumed with only essential oils). Companies are not required to list on product labels any of the chemicals in a fragrance mixture. That means that there could be hundreds of unlabeled neurotoxins, allergens and phthalates chemicals that have been linked to reproductive harm, early puberty in girls and testicular cancer in fragranced products like Herbal Essences.

Sodium laureth sulfate is another ingredient to watch out for because it's often contaminated with a carcinogen called 1,4-dioxane, and we did, in fact, find the chemical in a previous formulation of Herbal Essences.

Please tell P&G, makers of Herbal Essences, that

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ADVT.

Over 10,000 ingredients are used in personal care products. Some of these chemicals are linked to cancer, birth defects, developmental and reproductive harm, and other health problems that are on the rise. While the US FDA bans 9 ingredients from cosmetics the EU has banned over 1,000 due to health concerns. The table below shows a sample of ingredients contained in cosmetics sold in Massachusetts and associated health impacts.

Chemicals	Products	Health Impacts
Coal Tar Colors	Make-up and hair-dye	Some FD&C colors are carcinogenic or contain impurities that have been shown to cause cancer when applied to the skin. Allergies and irritants.
Diethanolamine (DEA)	Widely used in shampoo	A suspected carcinogen with nitrosamines shown to cause cancer in laboratory animals. [Suggestive animal evidence]
Formaldehyde and its releasers[1]	Eye shadow, mascara, nail polish, shampoo, blush, etc.	Carcinogen, reproductive toxin, shown to cause or exacerbate asthma and other respiratory ailments. [Strong animal and human evidence]
Glycol Ethers	Nail polish, deodorant, perfume	Hazardous to the reproductive system. Other effects include anemia and irritation of the skin, eyes, nose and throat. EGPE, EGME, EGEE, DEGBE, PGME, DPGME and others with "methyl" in their names. {Strong animal and human evidence]
Lead	Hair dyes (eg. Grecian formula) and in eye makeup (as preservative)	Lead damages the nervous system, leading to decreased learning ability and behavioral defects. Reproductive toxin. Carcinogen. [Strong animal, human and children evidence]
Mercury	Skin-lightening cream and in eye makeup (as a preservative).	Mercury is toxic to development, as well as to the nervous system and is suspected to have harmful effects on the respiratory system, the kidneys and gastrointestinal and reproductive systems. [Strong animal, human and children evidence]
Parabens	Deodorant, shampoo, cream, baby product, shaving cream, make-up, etc.	Methyl, propyl, butyl, isobutyl and other parabens, have shown hormonal activity. Themost common preservatives used in cosmetics. Recently found in tissue samples from human breast tumors. Propylparaben affects sperm production in juvenile rats. [Suggestive animal and human evidence]
Phenylenediamine (PPD)	Hair dyes (oxidation dyes, amino dyes para dyes, or peroxide dyes)	PPD is mutagenic and reasonably anticipated to be a human carcinogen. It has been banned in Europe. It is also linked with skin irritations and respiratory disorders. [Compelling animal evidence]
Phthalates	Fragrance, perfume, deodorants, nail polish, various hair products, cream and lotion, etc.	Liver and kidney lesions: reproductive abnormalities, including testicular atrophy, altered development of reproductive tissues and subtle effects on sperm production (maybe through endocrime disruption); cell line leukemia. These effects are generally quantitative though not qualitatively different between phthalates. The developing male reproductive system appears to be the sensitive organs. [Strong animal evidence; suggestive human evidence; some children through exposure via medical devices]

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CHEMICAL HAZARDS PUT WORKERS, ENVIRONMENT AT RISK

Written by Michelle Morra
Wednesday, 06 February 2008

Ross Armstrong doesn't pretend to be a chemical expert. The safety supervisor at Boart Longyear Canada has developed a keen eye for spotting important health data on a material safety data sheet (MSDS) over the years, and the workers come to him when they have concerns about chemicals used at the plant. Still, he's no chemist.

"Some of those chemical names are longer than your arm," says Armstrong. "It's still very intimidating to me, but if we don't know what something is, I have no problem finding out."

Handling chemicals

You can work safely with chemicals by following the right steps. Health and safety experts agree on some of the basics.

If you're using a product that's hazardous eliminate it. If you can't eliminate it or replace it with a safer product, minimize exposure by implementing engineering controls such as ventilation, or putting the hazardous product in an enclosed area. Consider administrative controls, such as scheduling shifts in a way that minimizes worker exposure. If there is still potential for exposure once these measures are in place, use personal protective equipment.

Since WHMIS (Work place Hazardous Materials Information System, Canada) was enacted in 1988, employers have been required to provide training on chemical hazards. WHMIS also standardized how we classify and label chemical products. Each controlled product must have the appropriate WHMIS label and be accompanied by an up-to-date MSDS. WHMIS also spells out exactly what information the MSDS must contain, such as first aid measures, and the product's flammability, reactivity and toxicity. These mandatory practices have become the norm, helping companies do much better managing its chemicals.

No system, however, is flawless. As companies try to keep up with an ongoing stream of new chemicals on the market, workers still sometimes get sick or injured from chemical-related respiratory exposure, skin exposure, spills, fire or explosion. We've identified some problem areas:

Gaps and risks for chemical safety

Small companies: The law doesn't require a Joint Health and Safety Committee for companies of less than 20 employees. So the owner of a small company might not know the requirements, and might not have a safety professional on staff who can show others how to work safely with chemicals. If there's high turnover, one person might learn about safety from the departing employee, who might have learned from someone with terrible habits. Small employers have additional cause for concern because they might not be as aware of Bill C-45, a law that can hold them criminally responsible if a worker gets hurt or killed on the job.

Inconsistent MSDSs: They come from various chemical manufacturers and suppliers, so "the sections on an MSDS are not always lined up the same way, which sometimes makes them hard to understand," says Jamie Hansen, National Health and Safety Coordinator for the Canadian Auto Workers Union (CAW). Some larger organizations, he says, address the issue by reformatting MSDSs in their own standardized template. "It's really good for training purposes, to be able to tell someone, 'Look at Section 1 for this, Section 2 for that, and here's where to find the toxicological information and exposure levels.'"

Overlooking the "reactivity" section of an MSDS: "People zone in on the health hazard information but often overlook the reactivity section," says Lorraine Davison, manager of Chemical Services at the Canadian Centre for Occupational Health and Safety (CCOHS). "Reactivity is often under-recognized and poorly

understood." She gives the example of a workplace where a hydrosulphide spill was flushed into a process sewer and reacted with the acidic contents of the sewer. This created a deadly mix of hydrogen sulphide, killing two workers and injuring eight others. "Reactivity is more difficult to deal with than fire or health," says Davison. "You have to become quite knowledgeable on the chemical you're dealing with."

WHMIS training that's too generic: The CAW's Hansen stresses the importance of learning about the chemicals specific to the workplace. He recommends on-site training whereby the instructor trains a worker to train other workers. "Workers will hear it from someone they work with, which is important," he says. "And worker-instructing-worker is probably the most feasible, too, because you only pay for the instructor's time and maybe $10 for a manual."

Wearing the wrong personal protective equipment (PPE): "A lot of people don't read the labels right, and they think respirators or rubber gloves are always a safe bet," says Hansen. "Different gases, vapours, dusts and fumes require different types of respirator cartridges, depending on the size of the airborne particle. You can't use a dust mask if you're dealing with gas, or it'll go right through it."

The same goes for safety gloves, which are made of different materials and designed for very specific kinds of hazards. Hansen has presented workers with several choices of gloves, to test their knowledge, "and some would choose a pair of gloves just because the colour matched their shirt Because of these and other issues, no one should attempt to handle chemical safety without expert help.

Tap into expert sources

Employers should have an accurate inventory of the chemicals on the job site, and a management system to track those chemicals and their MSDSs. Boart Longyear Canada decided a few years ago to outsource its MSDS management to 3E, a global provider of chemical, regulatory and compliance information services. The company took all of its paper MSDSs and scanned them into a digital format for all staff to access online. In the past, Armstrong was responsible for making sure all MSDSs were up-to-date, an onerous task that involved flipping through binders to find the expiry date on each data sheet. 3E now takes care of that for them.

Besides managing your MSDS collection and keeping it up-to-date, a company such as 3E can alert you to chemicals on site that are subject to legislative changes.

"Regulations might relate to a chemical, and our customers might not necessarily know what chemicals are in a product," says Jeffrey Starr, vice president of marketing at 3E. "We have the data about the chemicals, regulations, and products, so part of our application is to look at our chemical inventory and compare it to our regulatory database. We can see very quickly where in your enterprise a change of regulation impacts your operation."

3E operates 24/7 and also has a "Mission Control Call Centre" that people can call at any time if they urgently need an MSDS faxed to them.

Online databases can help

Outsourcing your MSDS management can make sense especially for downstream users, people who use the chemicals but don't know as much about them as the experts who create or package them. CCOHS, too, manages MSDSs and has its own extensive database, which is available by subscription online or on CD-ROM. CCOHS

works closely with Health Canada, the Ministry in charge of WHMIS, and has become such a household name that even health and safety regulators subscribe to CCOHS' chemical information products.

Its primary mandate is to protect workers, however, so besides its databases of chemical profiles, CCOHS publishes easy-to-read booklets and reference guides, answers frequently asked health and safety questions on its OSH Answers website, (***www.ccohs.ca***) and has an Inquiries Service that anyone in Canada can access free of charge.

Because chemical safety involves so much more than reading a label or an MSDS, no one can handle the job alone. If you transport or dispose of chemicals, you're subject to a myriad of requirements, forms, reports, and permits. Experts like 3E and CCOHS can help with compliance in these areas.

"And we strongly recommend you have an emergency response strategy and structure," says Starr. "If you have a medical concern, spill, or exposure, you need access to the professionals who can help you through that. The MSDS is a core document but not the total solution."

Besides relying on expert help, the seasoned safety professional must also rely on his or her own instincts. "Never make assumptions about chemicals," says Ross Armstrong. "Don't smell something if you don't know what it is, or you could burn your nostrils. Don't taste it or stick your hand in it, either. Even if the salesperson is saying, 'It's safe', I think, *Sure it is. You drink it. You stick your hand in it*."

PVC : A MAJOR ENVIRONMENTAL HEALTH DISASTER

PVC (Polyvinyl Chloride), known generally as `PVC' or `Vinyl' is one of the most common synthetic materials. It is a versatile resin and appears in a large number of formulations and in different configurations. Among plastics, PVC is second to only Polyethylene as far as its usage is concerned. PVC is the worst plastic from an environmental health point of view, posing major hazards in its manufacture, product life cycle and disposal.

Toxic By Products : Dioxin (the most potential carcinogen known to science), Hydrochloric Acid and Vinyl Chloride are unavoidably created in production of PVC and can cause severe health problems to workers, fence-line communities and ultimately to us. Following are the major hazards :

Cancer, Neurological damage, Endometrosis, Damage to immune system, respiratory problems, liver and kidney failure, birth defects, etc.

The toxic impact of pollution from the PVC factories on the workers and communities near-by is creating problems all around the world.

Lethal Additives : PVC production involves a number of toxic chemical stabilizers such as lead and cadmium and pthalate plasticizers. These chemicals leach, flake or outgas from the PVC over time, raising risks from asthma to lead poisoning to cancer.

Global Impact : Dioxin's impact doesn't stop there. As a persistent bio-accumulative toxin, it does not breakdown rapidly and travels around the globe, accumulating in fatty tissues and concentrating as it goes up the food chain. Dioxins from one manufacturing plant migrate on the winds and concentrate in another place far away affecting the tissues there. Most poignantly, dioxins concentrate in breast milk damaging human infants.

Fire Hazard : PVC poses a great risk in waste incineration and building fires as it releases deadly gases such as Hydrogen Chloride long before it ignites. As it burns, it leaves behind toxic dioxin waste.

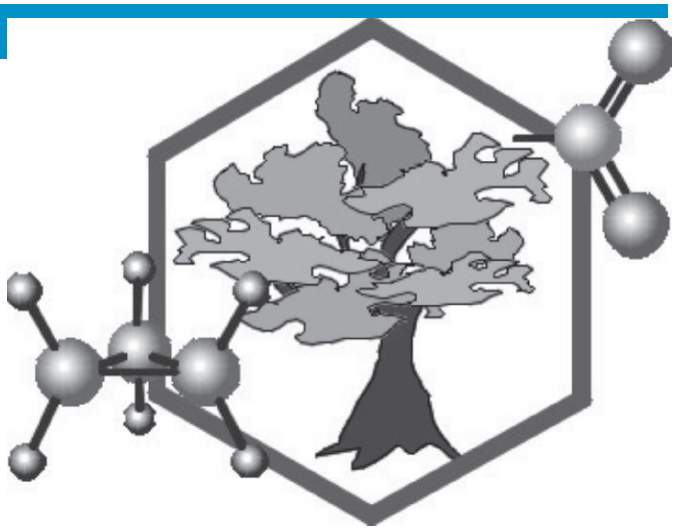
Can't be recycled :The magnitude of additives required to make PVC make recycling nearly impossible (interfering with the recycling of other plastics).

Alternative to PVC : Major share of PVC products is in construction industry. Many cost-effective alternatives have been now available that can avoid health and environmental hazards of PVC. Following are some of the places where alternatives to PVC can be profitably used.

- Piping (cast iron, vitrified clay, HDPE)
- Siding (Fiber-cement board, PP and acrylic)
- Roofing, etc. (Thermoplastic Polyolefin, EPDM)
- Flooring carpet (bamboo, ceramic tiles, natural linoleum, special wood)
- Wall covering and furniture (natural fibres, polyethylene, etc.)
- Electrical insulation (LLDPE, XLPE, etc.)
- Windows and doors (recycled wood, fiberglass, aluminium)

Conclusion : The many problems associated with PVC far outweigh the minimal benefits. Fortunately now there are much safer, cost-effective and environmentally better applications available in the marketplace especially in the construction industry.

GREEN CHEMISTRY



Now that the entire world is getting concerned about chemical hazards and the pollution in environment, steps are being taken by many organizations and companies to bring about changes through the use of green chemicals. Principles of such a system are outlined in this brief article.

Green chemistry, also called sustainable chemistry, is a chemical philosophy encouraging the design of products and processes that reduce or eliminate the use and generation of hazardous substances. Whereas environmental chemistry is the chemistry of the natural environment, and of pollutant chemicals in nature, green chemistry seeks to reduce and prevent pollution at its source. In 1990 the Pollution Prevention Act was passed in the United States. This act helped create a *modus operandi* for dealing with pollution in an original and innovative way. It aims to avoid problems before they happen.

As a chemical philosophy, green chemistry derives from organic chemistry, inorganic chemistry, biochemistry, analytical chemistry, and even physical chemistry. However, the philosophy of green chemistry tends to focus on industrial applications. Click chemistry is often cited as a style of chemical synthesis that is consistent with the goals of green chemistry. The focus is on minimizing the hazard and maximizing the efficiency of any chemical choice. It is distinct from environmental chemistry which focuses on chemical phenomena in the environment.

In 2005 Ryoji Noyori identified three key developments in green chemistry: use of supercritical carbon dioxide as green solvent, aqueous hydrogen peroxide for clean oxidations and the use of hydrogen in asymmetric synthesis. Examples of applied green chemistry are supercritical water oxidation, on water reactions and dry media reactions.

Bioengineering is also seen as a promising technique for achieving green chemistry goals. A number of important process chemicals can be synthesized in engineered organisms, such as shikimate, a Tamiflu precursor which is fermented by Roche in bacteria.

Principles

Paul Anastas with graduate student Rachid Skouta at a green chemistry workshop

Paul Anastas, then of the United States Environmental Protection Agency, and John C. Warner developed 12 principles of green chemistry, which help to explain what the definition means in practice. The principles cover such concepts as:

the design of processes to maximize the amount of raw material that ends up in the product;

the use of safe, environment-benign substances, including solvents, whenever possible;

the design of energy efficient processes;

the best form of waste disposal: do not create it in the first place.

The 12 principles are:

1. *Prevent waste:* Design chemical syntheses to prevent waste, leaving no waste to treat or clean up.

2. *Design safer chemicals and products:* Design chemical products to be fully effective, yet have little or no toxicity.
3. *Design less hazardous chemical syntheses:* Design syntheses to use and generate substances with little or no toxicity to humans and the environment.
4. *Use renewable feedstock:* Use raw materials and feedstock that are renewable rather than depleting. Renewable feedstock are often made from agricultural products or are the wastes of other processes; depleting feedstock are made from fossil fuels (petroleum, natural gas, or coal) or are mined.
5. *Use catalysts, not stoichiometric reagents:* Minimize waste by using catalytic reactions. Catalysts are used in small amounts and can carry out a single reaction many times. They are preferable to stoichiometric reagents, which are used in excess and work only once.
6. *Avoid chemical derivatives:* Avoid using blocking or protecting groups or any temporary modifications if possible. Derivatives use additional reagents and generate waste.
7. *Maximize atom economy:* Design syntheses so that the final product contains the maximum proportion of the starting materials. There should be few, if any, wasted atoms.
8. *Use safer solvents and reaction conditions:* Avoid using solvents, separation agents, or other auxiliary chemicals. If these chemicals are necessary, use innocuous chemicals. If a solvent is necessary, water is a good medium as well as certain eco-friendly solvents that do not contribute to smog formation or destroy the ozone.
9. *Increase energy efficiency:* Run chemical reactions at ambient temperature and pressure whenever possible.
10. *Design chemicals and products to degrade after use:* Design chemical products to break down to innocuous substances after use so that they do not accumulate in the environment.
11. *Analyze in real time to prevent pollution:* Include in-process real-time monitoring and control during syntheses to minimize or eliminate the formation of byproducts.
12. *Minimize the potential for accidents:* Design chemicals and their forms (solid, liquid, or gas) to minimize the potential for chemical accidents including explosions, fires, and releases to the environment.

Reducing market barriers to Green Chemistry

In March 2006, the University of California published a landmark report by Dr. Michael P. Wilson and colleagues, Daniel A. Chia and Bryan C. Ehlers, on green chemistry and chemicals policy for the California Legislature entitled, Green Chemistry in California: A Framework for Leadership in Chemicals Policy and Innovation (http://coeh.berkeley.edu/news/06_wilson_policy.htm). The report finds that long-standing weaknesses in the U.S. chemical management program, notably the Toxic Substances Control Act (TSCA) of 1976, have produced a chemicals market in the U.S. that discounts the hazardous properties of chemicals relative to their function, price, and performance. The report concludes that these market conditions represent a key barrier to the scientific, technical, and commercial success of green chemistry in the U.S., and that fundamental policy changes are needed to correct these weaknesses.

The report describes three primary U.S. policy weaknesses: (1) The Data Gap: TSCA does not

require chemical testing prior to placing them on the market. However, any test results on the properties or hazards of the chemical that are in the possession of the submitter must be submitted to the U.S. Environmental Protection Agency. Even if test results are submitted, they may be claimed as confidential and cannot be disclosed. As a consequence, industrial buyers, workers, and consumers may not have the information they need to make informed decision about the chemicals they use. This data gap allows potentially hazardous chemicals to remain competitive in the market, and may undermine the commercial success of less hazardous products; (2) The Safety Gap: Public agencies are overly constrained in their capacity to assess chemical risks and control those of greatest concern to public and environmental health; and (3) The Technology Gap: Together, the Data and Safety Gap have produced market conditions in the U.S. that have damped the motivation of the private sector to invest in green chemistry at a level commensurate with the pace and scale of chemical production; green chemistry therefore operates at the margins of the industrial system.

The UC report calls for a modern, comprehensive chemicals policy to motivate new investment in green chemistry by improving transparency and accountability in the chemicals market. The report argues that these changes are needed soon, given the growing body of scientific information on the health and environmental effects of many chemicals, and the expected doubling of global chemical production over the next 25 years. Recommendations include (1) regulations to improve the generation and flow of information on the health and environmental effects of chemicals; (2) enhancing the capacity of public agencies to assess chemical risks and control those of greatest concern; and (3) increasing public investments in green chemistry research, education, and technology diffusion. The report argues that by taking these steps, California can position itself to become a global leader in green chemistry innovation, and that doing so will address a growing set of health and environmental problems related to chemicals and will open new possibilities for investment, employment, and productive capacity in California in green chemistry.

In January 2008, the University of California at Berkeley and Los Angeles produced a second report, Green Chemistry: Cornerstone to a Sustainable California (http://coeh.berkeley.edu/greenchemistry/briefing/). Commissioned by California EPA and endorsed by 127 UC faculty members from seven UC campuses and the UC national labs, the Cornerstone Report builds on the findings of the 2006 UC report to the California Legislature (noted above) and presents new cost estimates of the health and environmental consequences of existing chemical and product management approaches. The Cornerstone Report proposes policy strategies to stimulate investment in green chemistry by steadily closing the data, safety and technology gaps. California EPA Secretary Linda Adams released a statement noting that "the University of California's green chemistry report supports and reinforces the significance of the state's new environmental protection initiative on green chemistry. The University of California is an important partner in our efforts to establish a first-of-its-kind comprehensive policy for managing toxic chemicals in products." (http://www.calepa.ca.gov/PressRoom/Releases/2008/PR1-011708.pdf)

Ref: http://en.wikipedia.org/wiki/Green_chemistry

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