Green Chemistry and Commerce Council Innovators Roundtable: The Role of Standards, Policy and Retail in the Sustainable Management of Chemicals along Supply Chains

Nike World Headquarters
Tiger Woods Center
Beaverton, Oregon
July 9-11, 2008

Meeting Summary

Introduction

The roundtable was the third meeting of the Green Chemistry and Commerce Council, following successful meetings at the Darden School of Business, Charlottesville, VA in November 2005 and the University of Massachusetts, Lowell, MA in April 2007. Close to 80 representatives from industry, government (local, state and federal), NGOs and academia gathered at the Nike Headquarters in Beaverton, OR to discuss the sustainable management of chemicals along supply chains. The desired outcomes of the roundtable were to:

- Share information, experience and understanding among a diverse group of companies and other stakeholders on advancing implementation of green chemistry and design for environment (DfE).
- Discuss the role of standards in promoting green chemistry and DfE. Provide participants with an overview of the relevant certification systems and programs.
- Explore the chemicals policies of retailers and the role of the GC3 in supporting and influencing their progress.
- Discuss the current status and future directions of state and federal level chemicals policies in US and their impacts on green chemistry and DfE.
- Advance discussion and work products of GC3 working groups: Tools for Chemical Assessment, Advancing DfE and Green Chemistry in Government, and Drivers for Innovation and Marketing Safer Products.

July 9, 2008

Success Stories in Advancing Green Chemistry and Design for Environment

John Frazier; *Director of Considered Chemistry and Environment, Safety, and Health (ESH), Nike*

John reminded us of the many challenges we face in the world today. The world's population growth has been exponential since the plague. Global warming is a huge

issue across the globe. The US produces more CO_2 than China, India and Japan combined. Many countries face energy shortages. Three hundred of 640 major cities in

China face water shortages and 1.1 billion people in the world do not have access to safe water. Many areas of the globe are facing food scarcity e.g. wheat and corn prices doubled in the past year. We also have waste issues; the great pacific garbage patch is now the size of Texas. Now what?

Oregon has strong roots in caring for the environment. Nike also has strong roots in sustainability and environmental protection e.g. the first LEED certified building in Oregon is at Nike's Global HQ in Beaverton. Other sustainable projects Nike has been involved in include, the Reuse-a-Shoe program, using organic cotton in their apparel, use of water based adhesives in products, PVC elimination from products, and greenhouse gas reduction programs.

Nike's Considered design combines performance, innovation and premium design with environmental sustainability. There is an emphasis on the elimination of toxic materials from products due to their impact on consumers, workers and the environment. A considered product is defined as being:

- Less toxic
- Less waste produced
- More environmentally friendly materials used
- Sustainable product innovation

There are a number of different levels of considered product (gold, silver and bronze). A considered product receives a score out of 100 based on factors such as solvent use in manufacture, waste produced and the use of environmentally preferable materials. The company target is that all footwear and apparel will be at least at the bronze level by 2010 and 2015 respectively. There is no finish line.

Coastwide Laboratories

John Martilla; *Executive Vice President, Coastwide Laboratories*

Coastwide's Sustainable Earth cleaning product line consists of 16 general purpose cleaning products. They are business to business products and not available in consumer markets. The products are highly concentrated compared to other cleaners, down to a quarter oz per gallon dilution and they perform much better than many green cleaners. The products were first to be both Green Seal and DfE certified.

John outlined the path Coastwide took to develop the Sustainable Earth product line. He began by quoting the philosopher, Yogi Berra "You've got to be careful if you don't know where you are going, because you might not get there". Indeed, many people in the organization didn't know where they were going but one person in the company, Roger McFadden had the vision, focus and drive for the product line to make this a remarkable story. The path began in 1987 when high tech businesses started screening chemicals coming into their buildings creating a customer demand for safer cleaners. During the development process, Roger tried to find standards to work

towards. A suitable standard was not available at the time so he developed their own: SEGC-114 based on the Indiana relative chemical hazard score (numerical rating of hazard). In 2000, Coastwide came up with product prototypes based on the standard. Some of the lesson learned include, the early involvement of top management and customers, and avoiding tradeoffs on quality, price and service. John concluded by saying that green cleaning is the most exciting development in the last 30 years of cleaning products.

University of Oregon

Jim Hutchison; *Professor (Green Nanotechnology), University of Oregon*

Jim is an Oregon native who grew up in a logging community on the coast. His parents were environmentalists and were not happy when he said he wanted to be a chemist. Green chemistry has been a way to turn his life around. The approach to green chemistry at the University of Oregon has been to lead with education and the research has followed; it is usually the other way around. The many green chemistry successes at the university include a lab text for green organic chemistry. Current green chemistry research areas include materials, nano-materials and they are now moving into policy.

The green chemistry program at the University of Oregon did not have glamorous beginnings. The faculty wanted a safer environment to work in as many teaching labs had bad ventilation and they also wanted to inspire innovation in their curriculum. A new lab curriculum was developed which consisted of 30 organic chemistry experiments based on new reactions. Changing the curriculum resulted in the following benefits:

- Reduction in the number of fume hoods required from 22 down to 5 which resulted in a saving of $90,000 in energy costs
- Reduction of 33% in renovation costs
- Benefits seen in faculty and student recruiting; they now have 10 faculty involved in green chemistry
- Students are more engaged
- Faculty professional development, excitement, tenure, fellowships etc.

In 1997, there were just 3 academic groups involved in green chemistry (OR, AK and MA). To date, 8 green chemistry workshops for faculty have been held in OR every summer and over 160 faculty from across the country have attended. This has led to a great amplification of knowledge in the green chemistry field as these 160 professors teach many students. The GEMS (Greener Education Materials) network was established as an interactive way to share materials and disseminate Information.

As a result of undergraduate green chemistry labs, students at the University of Oregon wanted to do green chemistry research. The faculty had strong research interests in materials and is now working on nano-materials. Over 1000 papers on nano materials have been published, but there is still no consensus as to the hazards these materials pose. The reality is that we are still in the discovery stage for nano-materials with low yields, toxic reagents etc. The team at the University of Oregon is trying to bring green chemistry and nanotechnology science together. The approach is to partner with other universities and industry.

Columbia Forest Products

Elizabeth Whalen; *Director of Corporate Sustainability, Columbia Forest Products*

Elizabeth told the story of muscles, woods and green chemistry innovation at Columbia Forest Products. Columbia Forest Products manufactures wood products, primarily hardwood plywood and hardwood veneer. Their headquarters is in Portland and it is a 100% employee owned company. The hardwood plywood is an interior panel product used in kitchen cabinets and shelving both in homes and workplaces. Wood should smell like wood, but the traditional manufacturing process for hardwood plywood involves the use formaldehyde glues. The formaldehyde off-gases over time as has been observed in the FEMA trailers used post hurricane Katrina.

The path to formaldehyde free products began at a Forest Products Society meeting where Prof. Kaichang Li of Oregon State University told the story of a protein that marine mussels secrete to attach themselves to rocks and other hard surfaces. Columbia Forest Products worked with Dr. Li to create a formaldehyde free adhesive which mimicked this protein. The new adhesive was cost neutral and it allowed Columbia Forest Products to differentiate themselves from cheaper imported products with very high levels of formaldehyde.

On April 26th, 2007 California Air Resources Board announced a new regulation on formaldehyde in wood products. Columbia Forest products were the only company to support policy as this regulation would level the playing field and help to combat imports of products from China with high formaldehyde levels. Under this regulation any company that manufactures or ships manufactured wood products into California, will have to comply with these restricted formaldehyde emission limits. Columbia Forest products hardwood plywood already meets this standard.

July 10, 2008

GC3 Accomplishments and Future Direction

***Joel Tickner**; Project Director, Lowell Center for Sustainable Production*

Barbara Hanley from Hewlett Packard welcomed participants to her home state of Oregon citing many examples of local green chemistry innovation. Joel Tickner then spoke of the general accomplishments of the GC3 since the last meeting:

- GC3 website is up and running and the Lowell Center is updating it periodically
- Participant guidelines were established by the advisory committee
- GC3 mentioned in many press articles
- GC3 recognized by the EPA
- Growing participation and interest in the GC3
- Three working groups are now well established and actively working on specific projects *(1. Drivers for Innovation and Marketing Safer Products, 2. Advancing Design for Environment and Green Chemistry in Government and 3. Tools for Chemical Assessment and Safer Design)*

Joel discussed the increased attention to chemicals in products in the past year including, increased media interest in toxic chemicals, increased consumer concern particularly regarding imported products, phthalates, bisphenol–A and lead in toys. There has also been a lot happening in the policy area at the state level with new comprehensive chemical policies passed in Washington and Maine recently and a recommendation due in California in the very near future. Clean tech is also being recognized as an important field marrying economic development and environmental protection.

There are many challenges ahead; there are still marginal resources allocated at state and federal agencies to support DfE and green chemistry and the Green Chemistry Bill has still not passed in congress even through it is well supported. It is very difficult to distinguish “green” products in the marketplace and also to find the right tools for companies to move towards the use of safer materials. Another major challenge is ensuring good communication and dialog up and down supply chains and engaging retailers more effectively in this.

Moving forward, the GC3 needs to expand and include more participants from more sectors. The GC3 also needs to create a business plan; a set of priorities and an action plan to move the GC3 forward and provide deliverables that are value added to the participants. The GC3 needs to link to other organizations in order to avoid duplication of efforts. The GC3 efforts need to be focused on collectively influencing practice towards safer chemicals and products through government, industry and consumers.

The working groups have been busy and active over the past 14 months. Summaries of the activities of the three working groups and ideas for the future are outlined below.

Drivers for Innovation and Marketing Safer Products
***Jack Linard**; Unilever and **John Frazier**; Nike*
Jack summarized the activities of the Drivers group. Drivers are constantly moving targets which used to be the activities of government and NGOs, but this has now shifted to include consumer groups, retailers and industry CEOs. Many groups are getting involved in this activity. "Greenwashing" (a term used to describe the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service) has become a major issue as companies want to promote their product as "environmentally friendly" or "green". Jack stressed that no product is truly "green" or "environmentally friendly", just "greener" or "environmentally friendlier" than other products. All products have an environmental footprint and companies need to work on continuous improvement of their products.

The Drivers group is currently working on a number of projects including de-mystifying green claims and labels, and working to engage retailers around chemicals policy and standardization of green claims.

The Drivers group believes the RSL list developed by the GC3 Tools group could potentially be used to start a dialog with retailers. John Frazier from Nike spoke about the RSL approach taken by Nike and by the footwear and apparel sector through the Apparel and Footwear International RSL Management Working Group (AFIRM). John began his talk by citing an example from 1999/2000 where Nike spent over $5 million dealing with a jersey containing the heat stabilizer tributyltin in Germany. Tracking the various chemical legislations around the world is a difficult task and this led to the development of Nike's RSL. The Nike RSL is a combination of the most stringent worldwide legislation and substances Nike has voluntarily decided to restrict in their products. Nike's RSL can be found at http://www.nikeresponsibility.com/#environment-design/rsl. The use of RSLs can be used as a competitive advantage for Nike to promote their products.

Advancing Design for Environment and Green Chemistry in Government*Richard Cottrell; SYSCO and **Lauren Heine**; Clean Production Action***
Richard discussed the activities of the DfE group since the last meeting. In September, 2007 members of the group met with EPA personnel Jim Gulliford, Charlie Auer and Clive Davies in Washington, DC to express support for the EPA DfE program. The group also met with House and Senate staff to discuss the federal Green Chemistry Research Bill and EPA appropriations for DfE and green chemistry efforts. This was followed in October 2007 by a joint meeting of members of the GC3 DfE group and representatives from several States affiliated with the National Pollution Prevention Roundtable (NPPR) held in Chicago, IL to discuss incentives for businesses to promote and support green chemistry and DfE. Based on discussions during this meeting, the construction of a document that will provide States with a menu of incentive options and other information that can be used when promulgating legislation that promotes Green Chemistry and DfE type initiatives was initiated. Dialog was continued with NPPR state representatives in a meeting in May 2008. Work on the document is ongoing.

Lauren Heine gave a presentation entitled “Driving Innovation and Greener Chemical Choices: The CleanGredients Model” in which she highlighted the success of the DfE program and CleanGredients in the green cleaning sector. The EPA’s DfE program promotes the use of safer chemicals by substitution with safer alternatives. In the green cleaning sector, CleanGredients is used by formulators as a resource for finding safer chemicals to use in products. CleanGredients is an on-line membership based resource in which ingredients can be searched by use class to find the most sustainable option. Raw material suppliers list ingredients on CleanGredients through third party referral (currently NSF International is the certifier). Formulators can use the tool to find appropriate ingredients without testing and verification since this has already been performed through the third party validation.

CleanGredients has value as both a model for future development and as a tool. It was developed through a stakeholder process and is a low cost system. The subscription costs for formulators is $100 - $500 per year (exact cost varies on company size) and it costs $1000 - $3000 for raw materials manufacturers to list multiple products. There are currently over 300 subscribers and 264 formulators of surfactants using the system.

Tools for Chemical Assessment and Safer Design
***David Long**; Consultant and **Tom Osimitz**; Science Strategies*

Dave discussed the difficulty in finding the right tools for chemical assessment with different industries having very different requirements. The GC3 tools group has been working to identify and develop tools that are of value to participant companies. Some of the specific activities of the group since the last meeting are:

- Compiling and analyzing restricted substances lists (RSLs)
- Assessing commercially available software for chemical selection / evaluation
- Assessing chemical evaluation databases
- Understanding approaches different firms use to assess, prioritize and act on materials of concern

Restricted substances lists used in the RSL compilation were a combination of government and industry lists with a total of approximately 900 compounds. The RSL list and a draft version of the RSL analysis is on the GC3 website (Participants Only section). The list approach is one of the easiest ways to make a decision on chemicals, but there are many drawbacks to the approach.

The group also looked at commercially available software tools from Chemical Compliance Systems and Dolphin Software. Both companies started as MSDS management software providers and have now developed tools that contain chemical and toxicity data with the ability to rate the “greenness” of products.

Two databases for chemical evaluation were assessed; CleanGredients and the GreenScreen for Safer Chemicals. CleanGredients was created by Green Blue and provides environmental and safety data. Classes of compounds included are surfactants, solvents, chelants (soon) and fragrances. Green Screen for Safer

Chemicals from Clean Production Action provides environmental and safety assessment criteria.

Tom Osimitz from Science Strategies gave a short presentation to the group on the importance of exposure and risk factors when assessing chemicals. Tom is a trained toxicologist who has spent the past 20 years studying exposure. One of the primary concerns regarding hazard approaches is that animals are a good surrogate for people in toxicology studies, but not necessarily good models. Toxicology studies do not consider dose response and therefore do not tell everything. This may lead to costly reformulation to remove chemicals that pose no risk. The main drawbacks of risk assessment are that it is a complex, time consuming task and context specific. Risk assessment is a powerful tool, however, as it allows you to assess the greatest risk and work on those hazards. Tom is currently working with the automobile industry on this rapid chemical assessment approach.

The Role of Standards in Promoting Green Chemistry and DfE

*Moderator: **Ken Geiser**, Lowell Center for Sustainable Production*
*Panel: **Carolyn Cairns**; Consumers Union, **Christine Chase**; Green Seal, **Archie Beaton**; Chlorine Free Products, **Clive Davies**; US EPA, **Dorothy Atwood**; Zero Waste Alliance and **Clif McLellan**, NSF International*

Standards are often viewed as "soft" policy as they fall between government policy and voluntary measures. The primary purpose of a standard is to reduce subjectivity and create a common platform / norm. They also provide a means of defining a desired product and allow for product differentiation providing a competitive advantage to those meeting the standard. Standards are also a tool for customers to make informed choices and it encourages innovation.

Overview

***Carolyn Cairns**; Program Leader, Product Safety and Health Dept., Consumers Union*

Carolyn provided a broad overview of the role of standards. Over the past 50 years, we've seen many examples of product standards driving change in the marketplace. Sometimes a combination of mandatory minimum standards that raise the bar, along with voluntary standards that reward leaders in innovation, can be the most powerful influence on environmental sustainability e.g. energy efficient appliances through the Energy Star program. Carolyn showed an article from *Consumer Reports* magazine from 1936 citing lead hazards in toys. This is a good example of how without standards progress is not always made as we are still talking about lead in toys in 2008 (even though lead in paint has been banned since 1910s in Greece).

Another example of standards influencing progress is in the automobile industry. In the 1960s seatbelts had to be installed by consumers. No automobile company wanted to be the first to equip their vehicles with seatbelts as a standard. It wasn't until seatbelt use became mandatory that automakers started to compete on safety and make seatbelts standard. Another example in the auto industry is that of airbags.

In many cases we've seen standards start as voluntary initiatives and eventually transition to mandatory standards once innovations are proven feasible. Sometimes standards result from innovative companies – Volvo pioneered the seat belt, which eventually became standard, just like air bags – hard to imagine driving cars without them today. Other times standards drive the innovation: appliance efficiency standards, and VOC limits in paint emerged when companies and governments, often under pressure from consumers, set a higher bar that companies had to meet to stay in business.

It is difficult for consumers to distinguish a meaningful standard and Consumers Union has come up with 5 criteria to evaluate eco-standards:

- Free from conflicts of interest
- Meaningful and verifiable
- Consistent and clear
- Transparent
- Open to public comment

Ultimately, the test of a standards or certification program to reduce chemical hazards is the kind of net environmental and health benefits it generates in the marketplace.

Green Seal

Christine Chase*; Green Seal*

The mission of Green Seal is "to safeguard the environment and transform the marketplace by promoting the manufacture, purchase and use of environmentally responsible products and services". The company is involved in both the development of standards and the certification of products. Their approach is science based with a focus on products, services, purchasing and operations. The standards are based on third party certification which provides validity for companies to verify their environmental claims.

The Green Seal process is open, transparent and based on life-cycle evaluation. The standards are developed by consensus if possible, monitored/enforced and periodically revised. Revisions are available on-line. The goal of the standards is to move the marketplace and push it towards a better place. The bar is not set so low that everyone can meet the standard and focuses on continuous improvement.

ISO 14020 and 14024 standard processes are followed in the development of Green Seal standards. They are members of the Global Ecolabelling Network. They also meet EPA guidelines for third-party certifiers and Consumers Union criteria for "what makes a good eco-label?"

Standards are developed with stakeholder and public involvement which helps to strengthen the standard. The standards help to advance green chemistry by providing a good starting point and a goal to work towards. Green Seal standards help to eliminate potentially harmful chemicals from the marketplace and provide differentiation and recognition in the marketplace. Some of the current challenges include rapidly changing technologies, greenwashing, and the education of consumers and purchasers.

EcoLogo

Archie Beaton, *Executive Director, Chlorine Free Products*

Archie presented on behalf of TerraChoice due to a recent partnership between them and Chlorine Free Products. The EcoLogo program is an eco label based on sound science using life-cycled based techniques. The standard is multi-attribute, developed through a multi-stakeholder process and is transparent and accessible. There is a third party auditing process providing independent verification and ongoing certification. The standard criteria are regularly reviewed and updated. EcoLogo is also a member of the Global Ecolabelling Network.

There are 13 different EcoLogo categories e.g. pulp & paper products category, cleaning & janitorial products category. The following key environmental issues are addressed in the EcoLogo standards:

- Efficacy
- Packaging / Labeling
- Physical properties
- Prohibited and restricted components
- Toxicity
- Biodegradability and bioaccumulation

Archie then spoke about using eco-labels effectively and addressed the question; can someone tell me what's green? Many companies are claiming to be green and it is a topic of much media coverage at the moment. Consumers need to be aware of "greenwashing." According to the FTC claims such as the following are not verifiable: eco-safe, environmentally friendly, earth friendly. The following 6 sins of greenwashing were outlined:

- Sin of Fibbing – Misleading customers about the actual environmental performance of their products.
- Sin of No Proof – Also known as the sin of "just trust us," some manufacturers are unable to provide proof of their environmental claims
- Sin of the Hidden Trade-Off – Focusing on one or two environmental facts, but ignoring other significantly more important environmental concerns
- Sin of Irrelevance – Factually correct, but irrelevant (e.g., "CFC-free")
- Sin of Vagueness – Broad, poorly defined environmental claims (e.g., "100 percent natural")
- Sin of Lesser of Two Evils – The most environmentally preferable product in its class, but still an inappropriate choice (e.g., "organic cigarettes")

Design for Environment

Clive Davies*; Chief, Design for Environment Branch, US EPA*

The focus of the DfE program is on green chemistry and informed substitution of hazardous chemicals. This helps to move from one chemical to another while avoiding unintended consequences. The program makes use of OPPT technical tools and expertise. DfE is based on industry involvement and stakeholder participation. The program works closely with businesses towards the use of safer chemicals; industry partners reduced about 160 million pounds of chemicals of concern last year.

Clive used the Furniture Flame Retardants Partnership's alternatives assessment as an example of the success of DfE program. Flame retardants are added to furniture for safety. The predominant flame retardant (pentaBDE) was being found increasingly in human tissue, breast milk and the environment and was phased out in 2004. Through the DfE program 14 alternative flame retardants were proposed by industry. The alternatives were rated based on human health, ecotoxicity and environmental hazard concerns.

The DfE program focuses on looking at all chemicals in a formulation and finding the safest possible chemicals for functional use. Endpoints of concern and continuous improvement are built into the process. There are 3 basic steps involved:

- Review every ingredient by functional use class
- Review formulation as a whole
- Performance testing

Clive mentioned some of the issues encountered in the program:

- Access - some GC3 participants have complained that there is not adequate access to the program. The EPA is addressing this by using 3rd parties to bring timeframes down.
- Transparency – the process may be written up in the form of a standard in the future.

The Safer Detergents Stewardship Initiative was instigated by the EPA Office of Water and DfE has produced a screen for surfactants. The desired result is safer surfactants which degrade quickly to low toxicity degradates. DfE has also been working with Wal-Mart and their suppliers towards the use of safer chemicals.

ISO 14001

Dorothy Atwood*; Environmental Management Systems Project Manager Zero Waste Alliance*

Dorothy's presentation focused on the use of ISO14001 and how it relates to the use of safer chemicals. ISO14001 is a management system, not a descriptive standard. It does not provide goals, rather a framework for continual environmental improvement using the Plan-Do-Check-Act management system cycle. Combining an environmental management system with long term sustainability goals is very powerful and will change organization and involve everyone in it. Other standards can be used to support this effort.

A full ISO 14001 EMS with a green chemistry focus can be developed for use as a checklist to good chemical management and to meet specific green chemistry goals. It can also be used to design toxic chemicals out of products or processes and to reduce the total number of chemical products, reduce overall toxicity and eliminate specific 'harm' classes (i.e. carcinogens).

Dorothy used a case study from Portland General Electric (PGE) to illustrate the implementation of ISO14001. PGE used the system to reduce toxicity and better manage chemical inventory in their coal fired power plant. They used 500 chemicals on-site and the system helped them to achieve their goal of reducing the amount of chemicals used by 10%. With the system in place the staff had a better understanding of chemicals and toxicity e.g. they used a lot of lead solder and before the system was in place many staff did not think of lead as a chemical.

ANSI Standards

***Clif McLellan**; Director of Toxicology Services, NSF International*

NSF International is a recognized world leader in standards development, product testing, certification and risk assessment, and has developed more than 72 national consensus standards (ANSI, EU, USDA and sports based MLB and NFL standards). They are a service provider to over 12,000 companies in 100 countries and have certified more than 225,000 products around the globe.

All standards developed by American National Standards Institute (ANSI) are done by consensus; regulators, manufacturers and users are involved in the process of writing the standard and any changes and updates made to the standard. "Consensus" means substantial agreement has been reached by directly and materially affected interest categories. The advantage of using consensus standards is that it will be a single standard within the US which increases the credibility of the standard, involves all stakeholders and ensures that the standard is revised every 5 years. ANSI is also the ISO member body for the United States.

Clif outlined the challenges of the ANSI standards process as it relates to green chemistry as follows:

- Establishing a leadership standard may be difficult.
- Criteria associated with how a mark is used is typically not part of the standard but is included in the certification policies of the certifier.
- Certification is the decision of the third party certifier and it would be difficult for DfE to maintain oversight of reviewers.
- Equity does not always exist between certifiers. Expertise is not a requirement within an ANSI Standard.

Questions and Discussion

Do we need a green chemistry standard? Can you see changes in services and products as a result of standards?

- The main impact may be seen over time; a standard is important as it often becomes mandatory.
- There is a huge shift in our midst with bio alternatives and nanomaterials. How do you deal with these new materials within standards?
- There are opportunities with new emerging technologies and products, but it is very difficult to develop a standard with a rapidly moving target. In the case of Green Seal, the standard is for end use products. The 12 Principals of Green Chemistry are not just focused on product, but also include process.

- Consumer demand is increasing for labeled products and retailers are demonstrating leadership and helping the public to make good choices regarding consumer products. In the case of nanotechnology, tools need to be developed in order to understand impact and exposure. The EPA is looking at this and it may be of benefit to look at lifecycles until all toxicity data is available.
- The impact of standards varies depending on the organization e.g. the goal at Fort Lewis is to eliminate all toxics on base by 2025. They are using ISO to help accomplish this goal. Other companies are reducing toxics at a much lower level e.g. 0.5% a year even though they are also ISO certified.

Standards are valuable at different positions in the supply chain. At what positions in the supply chain would a standard have the most benefit?

- Standards should be incorporated from start to finish; "cradle- to – cradle" approach.
- Standards are most important the closer you get to the people who care, often the consumer.
- The product design phase is very important as you need to track where chemicals are used and what exposures are generated.

Consensus based standards may lead to the bar being set too low; how can this be avoided?

- The International Council on Nanotechnology is addressing this by avoiding dependence on 100% consensus and staying focused on the end goal.
- Leadership standards are necessary and all pertinent issues should be brought to the table and addressed. A standard should be able to move forward with some opposition if there are leadership opportunities.
- People involved in standard development need to decide what they want in the standard; a dumbed-down standard does not serve any purpose and would not be used.

There are many elements to green chemistry; where does the definition for a standard come from?

- Standards based on specific applications may be more useful than a general green chemistry standard.

There are currently multiple standards and multiple certifications and they are time consuming and costly for companies. Is there a need to harmonize standards?

- There are many current and new standards; the Global Ecolabelling Network are trying to standardize across the globe with a mutual recognition program. Green Seal are looking at ways to collaborate as they do not want to create a burden and are looking at ways to bring programs together where the intention is the same.
- This is a very important goal. We also need to think about bringing technical expertise from one area to another. It is not always easy to get consensus and you also want to avoid a monopoly situation.

One of the barriers that exist is that industries are already meeting regulatory standards. How do you drive improvement beyond this?

- Mandatory standards eventually get stricter and companies who are early adopters of voluntary standards stay ahead of their competitors.
- If you hit the wall it can be very costly. Standards with continuous improvement keep you ahead of regulation and also provide economic and marketing benefits.
- As more voluntary standards are adopted, those who don't meet the standard are at a disadvantage in the market.

Standards: A Look Back, A Look Forward
***Bob Peoples**; Director, ACS Green Chemistry Institute*
There is a vast sea of information on the web regarding sustainability e.g. > 125 million hits for "sustainability" in a Google search. Sustainability was defined by the Brundtland Commission in1987 as "meeting the needs of today without compromising the ability of future generations to meet their needs". This is a good working definition, but does not address how progress is measured. The concept of standards has been around for hundreds of years e.g. weights and measures were used for gold, silver and iron ore. There are many reasons why we need regulation, but just because something is highly regulated and certified does not make it foolproof e.g. financial industry.

The early solution to pollution was dilution, but our thinking had modified over time and we are now using a systems approach. Pathways in a system are all connected, many in ways we do not initially realize. Sustainability requires systems thinking as products are only one element. Use can be a big impact, but this depends on the nature of the product. Life cycle analysis tools can help to answer questions. Sustainability efforts must also provide financial return on investment and the pertinent information in the hands of company decision makers.

NSF 140: Sustainable Carpet Certification is the first ANSI approved, multi-attribute standard for environmentally preferable building materials. The standard was built on the LEED model and there are 3 levels of certification; silver, gold and platinum. The standard took more than 5 years to develop and is consensus based. There are 5 categories in which points are awarded towards certification:
- Public health and environment
- Energy and energy efficiency
- Materials
- Manufacturing
- End of Life

<u>Retailers Chemicals Policies:</u>
*Moderator: **Yve Torrie**; Lowell Center for Sustainable Production*
*Panel: **Stephen Johnson**; Boots UK Ltd, **Zachary Freeze**; Wal-Mart Stores, Inc. and **Colleen Kohlsaat**; Levi Strauss & Co.*
Hazardous chemicals in consumer products have been the focus of much media attention, particularly in the past few months e.g. Bisphenol-A in baby bottles, PVC in toys. Retailers are the first point of contact for the consumer and are increasingly having to respond to these issues. Due to the lack of guidance from the federal government, the response of some retailers has been to come up with their own

chemicals policy. These policies generally follow sector lines and take the lead from influential companies e.g. restricted substances lists common in footwear and apparel industries, single chemical restrictions common in big box stores and take back programs are common in the electronics sector.

Boots UK Ltd.

***Stephen Johnson**; Sustainable Development Manager, Boots UK Ltd*

Many of the challenges faced by retailers in the US are the same as those in the EU. Boots is the leading pharmaceutical retailer in Europe. Boots is atypical as they also manufacture their own products. Boots has a very strong ethical background from its inception 150 years ago to provide “affordable medicines for the poor” of Nottingham. Boots boasts a legacy of environmental good practice e.g. in 1914 they were using electric vehicles and were recycling glass in the 1930s. This tradition is still evident today and Boots has become the most trusted brand on the high street in the UK. Alliance Boots received a gold rating in the business community "Companies that Count 2008" corporate responsibility index.

Product development at Boots is based on sustainable development principles. Boots differs from their competitors in that they follow a product journey rather than product destination approach. Boots is a large user of chemicals and components and their products are applied to the skin or ingested. They were the first retailer to publish a strategy on the use of chemicals that commits them to take a precautionary approach. They developed environmental sustainability criteria for use of all the chemicals they use and are currently reviewing their impact. They have succeeded in reducing the number of chemicals used in their products from 800 down to 400 and aim to exceed mandatory regulations. They are committed to constructive external NGO dialogue and have close relationships with academia to develop and introduce green chemistry initiatives.

Boots believes that their approach to chemicals has many business benefits including the following:

- Encourages use of products safer for human health and the environment
- Encourages innovation to produce long term sustainable products
- Prevents costly reformulation of products
- Business is prepared for legislative changes e.g. REACH
- Continued trust in Boots brand

Steve discussed the following current and future projects at Boots:

- Growing algae in bioreactors using heat, CO_2 and NO_x generated by the Boots power station. The algae will be used to provide components to be used in Boots cosmetics and toiletry products.
- Looking at the environmental impact of materials used in Boots products in conjunction with the Central Science laboratory (CSL) in York, UK.
- Developing a website to help consumers understand green chemistry.

Steve thinks that REACH will be the first piece of global legislation on chemicals. NGOs also have an important role to play in pushing industry to be more responsible. There will be an increasing demand from consumers for greener products and information on where they are available. There is also a need for the media to provide more good news stories rather than the current negative focus on chemicals.

Wal-Mart Stores, Inc.

Zachary Freeze, *Environmental Compliance, Wal-Mart Stores, Inc.*

Wal-Mart is making efforts to become a better and more sustainable company, but is still just at the beginning of their journey and has a long way to go before they would qualify themselves as "green." Their goal is to become an environmental leader and they are working towards being supplied by 100% renewable energy, creating zero waste and selling environmentally friendly products. They would like to achieve these without passing on the cost to their customers. Ninety two percent of Wal-Mart's environmental impact is tied indirectly to the products they sell. They are currently working to improve their own environmental footprint, and are also encouraging their suppliers to provide more sustainable products.

Wal-Mart has developed a Chemical Intensive Products Sustainable Value Network (SVN). Suppliers provide information such as MSDS (material safety data sheet), safety summary sheets, transportation information, waste handling and regulatory information for compliance to a third party (WERCS process). All new products must go through this process.

The original approach at Wal-Mart was to eliminate hazardous chemicals on a chemical-by chemical approach e.g. permethrin, propoxur, and nonylphenol ethoxylates were phased out/eliminated from products. Going forward they are focusing on continuous improvement versus 100% elimination of hazardous chemicals. They are working with suppliers to reformulate products to make them less hazardous while keeping cost of goods, lifecycle costs, and efficacy in mind. In order to achieve this they are working on a tool for buyers to be able to distinguish products in the same category based on environmental and health hazards. The tool will be used to identify products which are fully assessed and that have low hazard and lifecycle benefits and to work with suppliers to improve their products and "aim for the top". It will not be used to ban products from the shelves, rather focus on continuous improvement.

One product that has proven to be a success not only in terms of packaging, but also on a larger environmental level is concentrated laundry detergent. While these bottles are smaller, they contain the same amount of detergent and can wash the same number of loads as the larger bottles. Last September at the Clinton Global Initiative, Wal-Mart pledged to transition all of the liquid laundry detergent on the shelves to these "compact" versions by May 2008. They project that this change will save more than 125 million pounds of cardboard, 95 million pounds of plastic resin and 400 million gallons of water.

Levis Strauss & Co.

Colleen Kohlsaat, *Environmental Affairs Manager, Levi Strauss & Co.*

The business model at Levis has shifted from manufacturing towards retail in the last 10 years. They had a chemical approval process in place pre-2000 but are now working more with suppliers and have moved to an RSL/chemical policy approach. Levis now uses the most stringent worldwide legislation as a basis for their approach.

The scope of their list of chemical substances includes all direct suppliers, licensees, agents and is applied to all branded products, sundries, accessories, and packaging. Chemicals on the list are either prohibited from use, allowed in limited concentration in the end product or due for phase-out (2008 version). The RSL is updated every 2 years e.g. in 2008 updates included extension of list scope to include packaging, phthalates prohibited for children's products and the provision of a chemical phase out list.

The chemical phase out list supports the company's new environmental vision. They use persistence, bioaccumulation and persistence checks / analysis as well as expert opinion to compile the list. They are currently working with suppliers to find alternatives to chemicals on the list.

The RSL has had a positive impact on worker and consumer safety as well as ecosystem health. It also enhances supplier capacity building to understand chemical concerns, evaluate processes for restricted substances and seek out safer alternatives.

Questions and Discussion

How do you manage chemicals that are not well studied e.g. nanomaterials?

- This is a very difficult task. At Boots they have a toxicologist on staff and also work with groups outside the company to get the required information e.g. TiO_2 in sunscreen.
- At Levis the situation is similar; new chemicals trigger testing and they also work with experts.

What can manufacturers do that would help retailers?

- Manufacturers need to come forward with ideas and the retailers can help them bring new innovative products to market.
- Wal-Mart is trying to let suppliers know they want to sell better products.
- Communication with suppliers is very important, especially in today's global economy.

Are you looking at take-back programs?

- Take-back programs are a logistical nightmare for companies. Boots currently takes back pharmaceuticals in the UK.
- Wal-Mart also has take-back programs e.g. plastic bags and motor oil. They also think it is very difficult logistically and want to avoid safety risks for their associates.

Does an MSDS provide adequate information for retailers?

- MSDSs provide minimal information! Boots have their own form they have filled out by suppliers.
- Since 2006, Wal-Mart has been collecting additional formulation information from suppliers through a third party.
- Levis have a similar program and now asks for the chemical inventory of all suppliers.

Are proactive suppliers being rewarded by retailers?

- Wal-Mart is trying to educate their buyers who are strongly encouraged to seek out and stock green products.
- Retailers are starting to see through "greenwashing." We will need many changes in the next 2 – 5 years.

July 11, 2008

Breakfast Discussion on GC3/EPA Collaboration to Advance Green Chemistry and Design for Environment

As a follow on to the September 2007 GC3/EPA discussion and two conference calls in May 2008 on strengthening the DfE program and the role of the new CHAMP Program in supporting Green Chemistry and Design for Environment, a breakfast meeting was held to explore three particular areas:

1. Can DfE Recognition be expanded and become a standard?
2. Communicating DfE as an Approach
3. Enhancing DfE as an implementer of Green Chemistry

Specific points of discussion include:

1. DfE expansion
    - The DfE approach is well respected and can be applied to any chemical product formulation. It may be more challenging to apply to complex products so it may make sense to start with a DfE leadership standard in cleaning products.
    - Standards should be seen as the minimum that companies should achieve for products to be sustainable.
    - DfE has a very positive image – credibility associated with it.
    - Standards offer consumer great ability to know that the product is the safest available. For cities and local governments, certification is an easy way for them to make choices in competitive bids so any program should ensure ease of use in procurement.
    - The DfE program offers a way to bring companies together towards innovation. There should not be a competition with ecolabels. DfE should be complementary.
    - A consensus standard may be important in the long run, but in the short run, such an approach could dummy down a standard as compromise is an objective to get consensus.
    - Any approach should combine the process with criteria/fine lines that raise the bar on reducing environmental impacts.
    - The goal should be to define a strong standard that can then be generalized to other products. The question is how broad a net to cast.
    - A goal should be to have a process that can EPA can have strong say over and then do certification through third parties on the basis of MOUs.
    - Can carbon footprint be built into DfE at some point?
    - Harmonization of standards at the international level may be important. Such harmonization should go towards the highest standard globally.

2. Communicating DfE
    - EPA needs to do a better job communicating the DfE program as a model.
    - The Energy Star Program, which has substantial staffing, should be seen as a model for how DfE could more effectively communicate (e.g., through PSAs).

- It is important to carry the DfE message to broader forums, including: trade groups and international audiences.
- It would make sense for GC3 to think about expansion into Canada and Mexico to broaden its range of companies but also its ability to spread the word on DfE/Green Chemistry. The Sound Management of Chemicals group of the Commission on Environmental Cooperation offers one such venue for such internationalization. Also, the Strategic Approach to International Chemicals Management is another forum where a strong DfE/Green Chemistry message would be important. The International Conference on Chemicals Management in May 2009 may provide a venue for a side event hosted by GC3.

3. Enhancing DfE as an implementer of Green Chemistry
   - There is a need for funding proposals for green chemistry challenges to academic organizations. The Pharmaceutical Green Chemistry Roundtable provides such a model where research is proposed with a right to patent so that it can be shared broadly.
   - There is a need for better tapping into academic resources to ensure green chemistry needs are fulfilled. Linking industry to academic resources ensures the research has application value.
   - There are models like Innocentive that should be explored for such links.
   - The GC3 could provide a good venue to identify Green Chemistry research needs that could then be undertaken through challenges and other mechanisms.

Strengthening the GC3 and its Impact in 2008-2009

The GC3 advisory committee has recommended the creation of a business plan to define key GC3 priorities and deliverables. The GC3 needs to determine what current projects they want to take on that would be of benefit to companies and society as a whole. This session was a brainstorming of specific ideas on how the GC3 should move forward in the coming year(s). The following is a summary of the suggestions:

- Get behind the Federal Green Chemistry Bill and make sure it is passed as soon as possible.
- Accelerate R & D for replacements for hazardous chemicals by working with academic institutions. GC3 identifies universities and administers projects. Pharmaceutical Roundtable is doing something similar and could be used as a model.
- Bring retailers into the supply chain dialog and engage them in chemicals policy discussions.
- Harmonize retailers, states, EU and Canadian RSL lists.
- Have a communications group to help disseminate the work of the GC3 and relevant work of GC3 participant companies.
- Focus on communications of correct information to combat greenwashing and other practices that are misinforming the public. This will include helping to define what things are and are not.

- Continue work on standards – how to use them to our most effectively and help define them.
- Focus on effective communication of goals and needs across the supply chain e.g. participating companies bring members of their supply chain to next GC3 meeting.
- Produce case studies on challenges / successes of greening supply chains. Lowell Center could provide template and companies could do the case studies.
- MSDSs are a big issue as they do not supply enough information. Suppliers need to be educated and pushed to provide a minimum dataset. Also, OSHA should be encouraged to implement the ANSI standard for MSDSs. EU MSDSs provide better information and will be updated again for REACH.

  The following task list of what we would like to achieve in the next year was compiled based on the group discussion (identifying the Working Group designated to develop a plan for its implementation):

Task	Assigned Working Group
Communications	Drivers
Standards	DfE
Supply Chains / Case Studies	Tools
Green Chemistry Bill	DfE
Collaborative Research Network	DfE
Expansion of GC3 / international	All Groups
MSDS/ Min. Dataset for chemical assessment	Tools
Host Retailers Discussion	Drivers

Working Group Breakout Sessions

Drivers for Innovation and Marketing Safer Products

Working Group Leaders: (**Mark Buczek,** absent), **Lauren Heine**; Clean Production Action; and **Yve Torrie**; Lowell Center for Sustainable Production.

Based on the discussion in the larger GC3 group meeting, the projects that were assigned to the drivers group were:

1. Engaging Retailers in our supply chain dialog/hosting a retailer discussion: Retailers are the first point of contact for consumers who want to know what are in the products they are buying and why. Aggregated information needs to be bought up and down the supply chain to retailers so they can buy products based on their own chemicals policy and inform retailers about their products. What are initial ways we, as the GC3, can start to engage retailers in this dialog about supply chain issues?
    a. Retail Industry Leaders Association (RILA) is a newly established group of retail and consumer product companies, many big box retailers, who are looking to advance the retail industry through educational forums and public policy advocacy. Their first retail conference devoted to issues of environmental sustainability and compliance will be held on September 22-24 in Dallas, Texas. We agreed that this event would be a good place for the

GC3 to be represented. Zach Freeze of Wal-Mart, a member of RILA, agreed to make introductions of the GC3 to RILA. We will try to get on the agenda of this conference or attend at the very least.

b. Marilyn Johnson, IHS/ Dolphin, gave us an introduction to The Global Data Synchronization Network (GDSN). The GDSN is an international Internet-based initiative that includes leading retailers, manufacturers and industry groups, that will enable trading partners to quickly and efficiently exchange supply chain data between each other. The data is entered once and accessed by companies given permission to access it, decreasing time and resources required in supplying companies up and down your supply chain. Marilyn Johnson who is currently involved in the development of the system, agreed to keep us abreast of it's development and Lauren Heine agreed to participate as a GC3 representative. Ultimately, we would like to see if the GC3 can support this initiative. We thought a first step may be to give a presentation about the GDSN to the whole GC3.

c. A third initiative we would like to look into but didn't get time to discuss is a retailers' chemicals policies project: conducting a study of retailers' chemicals polices as a good way to engage retailers in dialog. Mark Buczek, who has taken the lead on this project, was unable to attend so we will pick this project up on our next call.

2. Communications:
   a. In the absence of clear consumer labels and a definition of green, manufacturers, retailers and consumers are looking for guidance of marketing terms to use and not to use. Increasingly this verification of "green" is being sought. The Drivers group began developing a glossary of "green" marketing terms a year or so ago to define some of these terms used on products e.g. natural, green, sustainable, biodegradable, etc. Some words are defined by the Federal Trade Commission, but others have a variety of definitions, some misused. All in the group; manufacturers; retailers; and consumers said this project would be very helpful to them. The Lowell Center will send around the glossary to date and then we will decide on the scope of the glossary of commonly used environmental terms; agree upon a set of terms that should and shouldn't be used, get sign off from the GC3, and get a document out as soon as possible. This may help with the FTC dialogs. We will have communicated about this by September 15.

   b. Education of suppliers, retailers and consumers about Green Chemistry and Design for Environment. Participants in the wider discussion wanted a central point of communications for the GC3 to disseminate information about Green Chemistry and DfE to relevant parties and to unify the messaging around the GC3: a GC3 quasi peer review approach for articles; e.g. in trade publications. The Advancing DfE and Green Chemistry working group for example is currently working on a brochure about DfE and Green Chemistry that will need to be disseminated. We didn't have time to discuss this project in any detail and will pick it up on our next call.

Action Items:

- Zach Freeze of Wal-Mart, a member of RILA, will make introductions of the GC3 to RILA. We will try to get on the agenda of this RILA's conference and / or attend.
- Marilyn Johnson, HIS/Dolphin will keep us up to date on the progress of GDSN and Lauren Heine will represent the GC3 on their monthly calls. They will advise on any collaborative opportunities with the GC3. A GDSN presentation will be offered to the whole GC3.
- We will dedicate further discussion to the retailers' chemicals policies project on our September call.
- The Lowell Center will send around the work done to date on a glossary of "green" environmental/marketing terms and the group will have looked at the glossary and be ready to speak about next steps for it on our September call.
- We will discuss our role as education communicator on our September call.

Advancing Design for Environment and Green Chemistry in Government
Working Group Leaders: ***Roger McFadden****; Corporate Express and* ***Richard Cottrell****; SYSCO*

1. Review of Existing Working Group Activities:
    a. One of the projects the DfE/Green Chemistry working group has been involved in since the 2007 Innovators Roundtable is a brochure summarizing options for advancing DfE and green chemistry programs at the state level. The brochure emerged as a work product following a meeting last year between participants in this working group and the National Pollution Prevention Roundtable (NPPR) and emphasizes 4 tools:

        - Incentives. Paul Richards and the NPPR have material for this section.
        - Information tools. This section will be largely written by this working group and will draw on CleanGredients as an important component.
        - Recognition and certification. The leading 3 certification programs will be featured.
        - Regulation. The Toxic Use Reduction Act (Massachusetts) and Europe's RoHS and WEEE are examples.

        The Lowell Center will add information about educational assistance and examples of green chemistry initiatives. Ken Zarker and Richard Cottrell will send this outline to the group in time for a review by September 30th. A final version will be distributed before the end of the year in time for the next legislative session.

    b. Another Working Group project has been support of the federal Green Chemistry Bill which would support green chemistry research in academia as well as innovations in small businesses. The first version of the bill would have reallocated funding from other federal agencies and saw significant opposition as a result. Currently approved by the House but stalled in the Senate, the bill now draws from new funding sources and will

likely to be voted on next year. We will push for the bill's passing before the Congressional break in August, but if not possible, the time before the next legislative session should be used to build support for the bill. Staying in touch with Olympia Snowe (sponsor) and scientific organizations such as ACS will allow us to stay current with the bill's status. Ray Guarant, ACS Office of Legal and Government Affairs, can help the GC3 determine how to be most helpful. The Environmental Council of the States and the NPPR may be willing to sign a formal letter of support for the bill, as would ISSA (the Worldwide Cleaning Industry Association), academic institutions and small business associations.

2. Discussion of New Working Group Activities:
   a. In response to the option of some who feel that the DfE program is not on a par with other eco-logo systems because it does not have an inherent standard, the working group will take the next steps in developing this continuous improvement standard in tandem with EPA, and an equal balance of industry, government, and NGO stakeholders. Roger McFadden (Corporate Express/Coastwide), Jack Daley (Daley International), Clive Davies (EPA), Scott Mobley (Clorox), and Richard Cottrell (SYSCO) volunteered to draft a proposal for a subset of cleaning products by October 1st. When this group meets in October it should be well publicized and include Green Seal and Terra Choice in particular. This new DFE standard will be introduced at the 2009 GC3 Innovators Roundtable.
   b. This working group will begin work with students and academics to create a research network focused on filling green chemistry data gaps. The International Council on Nanotechnology website may be a good model for a portal to key papers, background documents, interviews with leading researchers, and blogs which foster dialogue, accelerate consensus, identify research needs, and build resources for collective benefit. Green chemistry pioneer John Warner has launched a new journal, Green Chemistry Letters and Reviews, which could be a publication vehicle for outlining supply chain needs for green chemistry solutions. NPPR, ICON, and suppliers should also be involved. Buzz Cue (Pfizer, retired), Roger McFadden (Corporate Express/Coastwide), Barbara Hanley (HP), and Dave Long (ESS consulting) will discuss this further before September 1st with a probable focus area of cleaning products.
   c. A third new area for the working group is to help expand the GC3 network beyond the US and into Canada and Mexico, as well as other countries. The Commission on Environmental Cooperation (CEC) may provide funding to broaden the scope of the GC3 to include all of North America. Better understanding of how European companies are using green chemistry and involvement by Asian suppliers would be very helpful to participating companies. The CEC is holding a summit January 21-22, 2009 in Florida, to which a representative from the GC3 should attend and discuss the group's

accomplishments. Archie Beaton is on the steering committee for this meeting and is willing to submit a draft proposal for these ideas in September.

Action Items:

- Draft a letter of support for the federal Green Chemistry bill and send to potential supporters.
- Send a copy of the current version of the Green Chemistry bill and update from the Green Chemistry Conference in June to the working group.
- Develop a proposal for a DfE standard by October 1.
- Coordinate a meeting with the standard drafting committee, Terra Choice, and Green Seal by October 1.
- Send a scoping email around to green chemistry research institutions and students to gauge their interest in creating a research network.
- Add links to GCEdNet, Innocentive, and OECD to the GC3 website.
- Draft a proposal to broaden the GC3 to include Canada and Mexican companies, but also European and Asian firms as well, to submit to the CEC in September, 2008.

Tools for Chemical Assessment and Safer Design

Working Group Leaders: ***Dave Long****; Consultant and* ***John Frazier****; Nike*

The tools working group outlined four topics for discussion. Two of the topics are already projects of the tools group; analysis of Restricted Substances Lists (RSLs) and the development of a hazard database. The other two topics for discussion were items that came up during the larger group discussion and were assigned to the tools group; case studies illustrating the "greening" of supply chains and establishing a minimum dataset for MSDSs.

1. Supply Chain / Case Studies

This was the topic the tools group focused on for most of the breakout session. The following is a summary of the group discussion points and conclusions made on the production of case studies by GC3 tools group participants:

- The case studies should focus on lessons learned both positive and negative i.e. focus should be not only on success stories, but difficulties encountered.
- The topics covered by the study should include green chemistry, greenhouse gas emission reduction, renewable energy, REACH etc, but, the consensus was that the focus should be on green chemistry with other benefits also highlighted. The 12 principles of green chemistry should be incorporated and used for guidance.
- The group also discussed the importance of creating a "safe space" to tell stories of things that did not work. Some participants were in favor of producing anonymous case studies, but a final consensus was not reached. The issue of confidentiality was also raised, but no conclusions reached.
- All agreed that a template for the case studies should be created. There was some discussion on how the case studies should be created i.e. by the company or a 3rd

party and if follow up to the case study should be permitted. No consensus was reached on either of these.

- A review process should be set up and followed once a draft case study has been produced.
- The group thought the case studies could be of benefit as a GC3 recruiting tool.
- It was agreed that the case studies should be posted on the GC3 website and also published e.g. in trade journals.
- The case studies should eventually reside on the GC3 website and be searchable, sorted by industry etc. *(WHO: David Livingood/DEQ, Melissa Coffin/UMass Lowell)*
- A goal of the tools group is to have 1 case study per GC3 industry sector by the 2009 GC3 Meeting
- Potential companies were identified for case studies (those without question marks and names assigned volunteered to find out if their companies would participate)
    1. Steelcase *(Mary Ellen Mika)*
    2. Nike *(John Frazier)*
    3. SC Johnson *(Dave Long)*
    4. Columbia Forest Products *(?)*
    5. DSM *(?)*
    6. Levi Strauss *(Colleen Kohlsaat)*
    7. Wal-Mart *(?)*
    8. Boots *(?)*
    9. DuPont *(?)*

2. RSLs

The DRAFT document comparing RSLs produced by the Lowell Center needs to go out for review. The discussion around the idea of a harmonized RSL should be the topic of a future Tools group call.

3. Hazard Database – Searchable

The group did not get to this topic, due to time limitations

4. MSDS Minimum Dataset

The discussion on the topic was very limited, also due to time limitations. The group plans to look at a minimum dataset needed to make MSDSs meaningful.

Action Items:

1. Template for Supply Chain Case Studies - *Maria Peeler /WA DOE, Mary Ellen Mika/Steel Case, Jason Pearson Green/Blue – by Aug 30*
2. *Draft of Supply Chain Case Studies – by March 1, 2009*
3. Comments on RSL report – by October 1, final by December.
4. Discussion of Hazard Database and MSDS minimum dataset – by October 1

Trends in Chemicals Policies at the State and Federal Level:

*Moderator: **Joel Tickner**, Lowell Center for Sustainable Production*

Panel: ***Sarah Doll****; State Alliance for Federal Reform of Chemicals Policy (SAFER),* ***Ken Zarker****; Washington State,* ***Charlie Auer****; US EPA and* ***Chris Pearce****; SC Johnson & Son, Inc*

NGO Perspective

Sarah Doll; *State Alliance for Federal Reform of Chemicals Policy (SAFER)*

SAFER is composed of coalitions of advocates in eight states including California, Connecticut, Maine, Massachusetts, Michigan, Minnesota, New York, and Washington, in addition to many other strategic partners. It is a multi-stakeholder effort to reshape chemicals federal policy in the US to safeguard human health and the environment. The focus is at the state level, using states as laboratories to try out policy and use this as a basis for federal chemical policy reform. There is currently huge opportunity in this area e.g. $2.9 billion was invested in clean technologies in 2007. There are market, consumer and political pressures to shift away from environment versus economy, towards sustainable practices.

Much of the rest of the world are ahead of the US in terms of sustainability. We need policy to identify and characterize chemicals, to fill the current data gap and move away from hazardous chemicals. We need to give those in supply chains the information on chemical hazards they need. Businesses need to move towards disclosure of product constituents so that chemicals can be managed based on hazard.

Within the US we need to create incentives for safer alternatives research. The advocacy community would like not only to see regulatory strategy, but market strategy, government procurement programs and executive strategies (e.g. California Green Chemistry Initiative). Economic development dollars need to be directed to support business moving towards safer alternatives. Support and resources is also needed for academic green chemistry organizations.

Currently, states are working to move federal level reform of chemicals policy e.g. 30 states have mercury policies and many states are introducing BPA legislation. The federal Green Chemistry Bill is pending. It is hoped that this will begin the conversation for reform. Business has an important role to help shape t policy in the future.

State Government Perspective

Ken Zarker*; Pollution Prevention and Regulatory Assistance Section, Washington State*

Ken spoke about state action and leadership with respect to chemicals policy. A state chemicals policy framework is emerging. States are moving away from a “chemical by chemical” approach and collaborating/focusing on high priority chemicals; seeking safer chemical alternatives. It is envisaged that these policies will drive green chemistry innovation and economic opportunity. Some of the specific state policies are as follows:

- MI: Michigan Green Chemistry Executive Directive
- CA: California Green Chemistry Initiative
- WA: Washington Children's Safe Products Act
- ME: Maine “Act To Protect Children's Health and the Environment from Toxic Chemicals in Toys and Children's Products”

- CT: Connecticut Child Product Safety Act

The states of Washington and Maine are currently combining resources and working together as the children's safety bills have many similarities. These states are also leading the development of an Interstate Chemicals Clearinghouse, which will perform the following functions:

- Classification of chemicals based on concern
- Organize and manage available data on chemicals
- Produce and inventory information on safer alternatives for specific uses of chemicals and model policies and programs related to such alternatives
- Provide technical assistance to businesses and consumers relating to safer chemicals

Federal Government Perspective

Charlie Auer, *Director, Office of Pollution Prevention and Toxics, US EPA*

Charlie spoke about two efforts at the EPA on chemicals management, namely the ChAMP (Chemical Assessment and Management Program) and DfE (Design for the Environment) programs. The ChAMP program is an international collaboration formed under the Security and Prosperity Partnership (SPP). The US, Canada, and Mexico will work together to ensure the safe manufacture and use of industrial chemicals. The DfE program allows for the differentiation of safer products and conducts alternatives assessments to inform substitution to safer chemicals.

For the first time in Charlie's 32 year tenure at the US EPA, the heads of state of USA, Canada and Mexico got together to talk about chemicals in 2007. This meeting resulted in both national and regional commitments:

- U.S.: Assess and initiate needed action on 6,750 mid-production volume chemicals
- Canada: Realize its chemical management plan
- Mexico: Establish a chemical inventory

The US EPA has named its commitment to SPP the ChAMP program and is enhancing their existing chemical program which includes an HPV Challenge type of program for HPV inorganic chemicals and possibly resetting the TSCA Inventory. There is a large amount of work underway including many opportunities to work with Canada e.g. PFCs. There is a need to coordinate, share and do work in a mutually reinforcing manner. The US EPA and Environment Canada / Health Canada are also working with the EU to align timing of SPP activities with those of REACH in the EU.

The goal of the DfE program is to work to realize informed substitution approaches. We need to work with the best available information so that effective choices can be made and unintended consequences avoided. Alternatives should be preferable in terms of health and environment, technically feasible and the same or better in terms of cost and performance. Charlie cited three successful examples of the DfE program:

- Alternatives to PBDE flame retardants in furniture
- New safer chemical products; Green Works product line from Clorox

- Safer Detergents Stewardship Initiative; an environmental stewardship program to encourage the use of safer surfactants. This program now has more than 60 applications.

ChAMP and DfE are mutually enforcing programs within the EPA. There is a need to evaluate the full array of chemicals in commerce. DfE may be a solution to some of the chemical issues identified in the ChAMP Program, highlighting where green chemistry can provide solutions to hazardous chemicals.

Industry Perspective

***Chris Pearce**; Government Relations Manager, SC Johnson & Son, Inc*

SC Johnson considers themselves a leader in environmental stewardship and to be ahead of legislation. They developed the "Green List" to rate chemicals used in their products and are very proud of their accomplishments.

There is a lot going on at the state level at the moment. SC Johnson is very supportive of the California Green Chemistry Initiative, moving away from a chemical-by-chemical approach and the need for waste cleanup towards a more proactive system. They are also very pleased with the opportunity for stakeholder input in the CA Green Chemistry Initiative. California is also moving towards ingredient disclosure. It is important to find meaningful ways to let consumers know what is in products without compromising company confidential information. Environmentally Preferable procurement programs have been set up in 21 states; activities are generally aimed at green cleaning products for schools, hospitals etc.

At the federal level there is some activity, but an absence of broad reform. Many are asking if TSCA is adequate and if it is time for a change in chemical policy. In the absence of a broader bill we will likely see restrictions on individual chemicals. SC Johnson is happy to promote the Green Chemistry R & D proposal. The federal government needs to be an active partner in green chemistry and the hope is that the bill will be passed later this year. The DfE program is supported by SC Johnson and they would like to see it expanded.

At an industry level, we need robust science to drive regulation. Policy should not hinder innovation. Transparency and stakeholder involvement is very important in the regulation process. Ahead, the change in government may lead to robust debate in congress on chemical policy. We need increased resources for the EPA, TSCA reform and green chemistry legislation.

Questions and Discussion

Toxicity was mentioned as a primary reason for substitution, how important are other factors e.g. safety of glass baby bottle versus plastic?

- When looking at safer alternatives you need to examine all consequences and conduct a broad analysis.

Will the Washington state list of chemicals of high concern be harmonized with the REACH list?

- States are struggling with many lists and are in favor of harmonization. The formation of the Interstate Chemicals Clearinghouse should help the consolidation efforts.

More than 20 states have preferable purchasing policies which specify Green Seal certified cleaning products. This excludes many good products which are DfE recognized. Comments?

- Transparency is an issue, the states would like to move forward and use other standards / certifications for such programs

How can GC3 help more sustainability efforts at the state level?

- Participating companies can lead by example and talk about green chemistry projects they are involved in.
- The GC3 can be a force for change. Individual companies working together can influence change in more constructive ways than trade organizations.
- Informed feedback from GC3 participants to EPA is very helpful. EPA may be able to help provide solutions to chemicals of concern through the DfE program.

Additional Presentations

California Green Chemistry Initiative

***Maureen Gorsen**; Director, California Department of Toxic Substances Control*

The past 40 years of environmental laws were based on the cradle-to-grave system. We are spending a lot of money on this un-sustainable system and need to do something different. Public storage is currently a growth industry; people keep buying stuff they don't need, use or have room for!. Other people around the world want as much "stuff' as we have in the US. The people of the world are not going to stop consuming so we need to think about how we make things i.e. focus on the sustainable design of items we consume everyday.

California legislation has required studies examining the chemical body burden of the average Californian. The drumbeat will get louder when these findings are released in the next few years. California currently has a new law banning the sale of the following toxic products:

- Ban on lead in jewelry
- Ban on toxics in packaging
- Ban on mercury in certain devices
- RoHS ban on covered electronics

Currently compliance is being tested by buying goods in stores. Fines are not being given at this time, but once re-checks are started, there will be a $25,000 fine per product in store for non-compliance violations. Ban bills are very popular in CA; plastic shopping bags will be banned in 2 years time.

We think the answer to toxic waste is green chemistry and a cradle – to – cradle approach. The economic potential is enormous; $16 trillion global market for green materials. The California Green Chemistry Initiative is taking ideas and putting them into a policy framework. The governor of CA has a big vision and wants CA to be a global leader in this area. Phase 1 of this project, the Options Report, is already completed. The report is a summary of everything learned / all options. Phase 2 is currently underway; this task is much harder as it involves defining which options meet the goal of changing global production. The goal of phase 2 is to evaluate policy alternatives and recommend a framework for California. This phase involves the recommendations of the Science Advisory Panel, a group of leading PhD level scientists from around the country. Currently the "key elements" are being formulated based on the > 800,000 comments received from a vast array of Stakeholders in phase One. Several key elements have been identified that represent all comments received:

- The big vision is a cradle-to-cradle based economy by 2050.
- Public investment is required to build green chemistry capacity.
- There is a need to focus on safer alternatives to problem chemistries.
- There is a need for right to know and disclosure to ensure informed decision-making on chemicals.

Mountains and Molecules

***Arlene Blum**; Visiting Scholar, Chemistry, University of California, Berkeley*

Arlene received her undergraduate degree in chemistry and was introduced to climbing in the state. While carrying out her PhD research at the University of California, Berkley, Arlene organized and achieved the first all-women ascent of Denali (Alaska) in 1970. She also went on to climb Mt. Everest in 1976.

On completion of her PhD, Arlene challenged the use of brominated tris flame retardant in children's sleepwear. As a result of her efforts, the US Consumer Product Safety Commission banned tris-treated children's garments in 1977. Her next challenge was to lead an all-women expedition of Annapurna I in Nepal in 1978. She has also raised a daughter and is the author of two books: *Annapurna: A Woman's Place* and *Breaking Trail: A Climbing Life.*

Arlene resumed her work on flame retardants two years ago when her daughter left for university. California is the only US state to have a furniture flammability standard. This has lead to the addition of PentaBDE to furniture foam in amounts up to 10% from 1980 to 2004. PBDEs are showing up everywhere on the planet from creatures 1 mile beneath the surface of the ocean to Tasmanian Devils. In 2003 two PBDEs were banned in CA and the Great Lakes Chemical Co. agreed to voluntarily cease Penta-PBDE production. However, the PBDE alternative, Firemaster 550 contains 4 problematic ingredients:

- Triphenyl Phosphate (highly eco-toxic)
- Triaryl phosphate isopropylated (probable reproductive toxin)
- Bis(2-ethylhexyl) tetrabromophthalate
- 2-ethyl hexyl 2,3, 4, 5-tetrabromobenzoate

The other replacement, chlorinated tris is a cancer risk. Even though PBDEs have been banned in CA, they are still found in 60% of furniture in homes (20% of furniture outside CA). It is slowly ‘‘bleeding’’ into the outdoor environment. The task of identifying PBDEs in furniture and getting them out of people’s homes is a difficult one. There is some evidence that high PBDE body burdens may result in health effects, including thyroid problems in cats.
Arlene detailed her latest work opposing the International IEC Electronics Standard 62368. The standard would lead to the use of 1.7 billion pounds of fire retardant chemicals annually to protect electronics against candle fires (which are not a risk in US households). In addition, plastics treated with flame retardants cannot be recycled and incineration of these materials leads to the formation of furans and dioxins. When Arlene took on the challenge of opposing the flammability standard in late 2007, she was told the process was too far along to stop it from passing. Arlene got a group of 90 NGOs, 50 noted scientists and firefighters together to oppose the standard. She also produced a 40 page paper outlining the scientific basis for opposing the standard. Victory came in May and June of this year with four of the candle standards defeated. Arlene is continuing her work through the Initiative for Green Science Policy (GSP) at the UC Berkeley and Stanford.

Next Steps for GC3

In addition to the action items from the working groups above, the following plans were outlined for the GC3 in the coming year:

- Meeting Report – A report on the meeting will be produced before the end of August.
- Business Plan – A draft of the GC3 business plan will be produced by September. The business plan will outline GC3 goals, deliverables and timelines for projects.
- Resources –
    - Funding: Currently, the GC3 is being funded by meeting sponsorship on registration fees. The issue of funding will be addressed by the advisory committee at their next meeting.
    - Time commitment: There is a resource issue within the GC3 and we need to make sure progress is made without relying on the Lowell Center. Participants need to be aware that projects will only happen with their input.
    - Pool resources to solve common problems by collaborating with other groups working on similar issues. It is important to identify other groups/coalitions undertaking similar efforts to combine resources.
- Advisory Committee – There are currently no timelines for serving on the advisory committee. An election / nomination system will be outlined in the business plan.
- Expansion – The GC3 should be expanded to include sectors currently missing e.g. automotive, end-of-life industries, academics. Partnering with a School of Business was also suggested. All GC3 participants should actively recruit, particularly from within their supply chain.

- Scope of GC3 – It was agreed that the GC3 should remain a business – to – business forum with invited people from NGOs and government. The goal should be maintaining a majority business representatives at future meeting.
- Next Meeting – The next meeting may be hosted by Corporate Express / Staples in MA or CO. Many people would like to have the meeting earlier in the year (April – May timeframe, at least a few weeks before / after the GCI meeting)