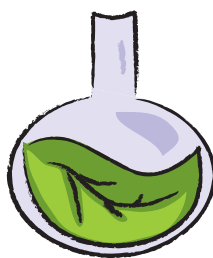
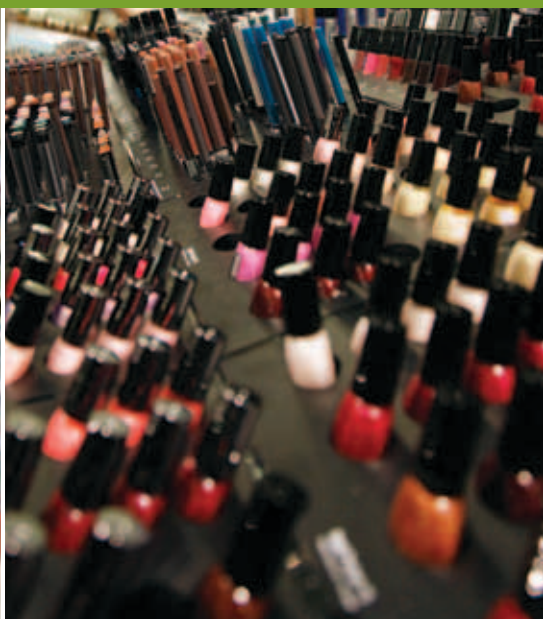


Best Practices in Product Chemicals Management in the Retail Industry

MOVING BUSINESS TOWARD SAFER ALTERNATIVES



GC³ Green Chemistry &
Commerce Council

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The Green Chemistry and Commerce Council (GC3) was formed in 2005 and provides an open forum for participants to discuss and share information and experiences related to advancing green chemistry and design for the environment as it pertains to sustainable supply chain management. The GC3 is a project of the Lowell Center for Sustainable Production at the University of Massachusetts Lowell.

The Lowell Center for Sustainable Production uses rigorous science, collaborative research, and innovative strategies to promote communities, workplaces, and products that are healthy, humane, and respectful of natural systems. The Center is composed of faculty, staff, and graduate students at the University of Massachusetts Lowell who work with citizen groups, workers, businesses, institutions, and government agencies to build healthy work environments, thriving communities, and viable businesses that support a more sustainable world.

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Executive Summary

FACED WITH GROWING DEMANDS TO IDENTIFY and disclose the potentially harmful chemical ingredients in the products they are selling and to substitute chemicals of concern, innovative retailers are incorporating product chemicals management systems into their corporate sustainability strategies. Developing and implementing such systems are not without challenges but retailers are discovering the benefits of such programs including an increase in consumer trust and cost savings.

This report examines the influences on today's retailers to encourage their adoption of chemicals management programs, the product chemicals management systems that seven innovative retailers have adopted in response to these influences, and the best practices identified in the development and implementation of these systems.

There are many influences on today's retailers that are driving them to understand more about the chemical ingredients in the products they sell and to find safer alternatives to chemicals of concern. These influences range from regulatory requirements to consumer and media pressure to sell safer or "green" products.

Innovative retailers are adopting product chemicals management systems to understand more about the chemical ingredients in the products they sell and to find

safer alternatives to chemicals of concern. These systems range from a reliance on restricted substance lists, to proprietary evaluation systems, to product design strategies. Each of these systems can be adopted at a company level, or collaboratively at a sector or retail industry level.

There are a number of "best practices" in product chemicals management in the retail industry that can be applied to other retailers that are beginning to develop their own systems. These practices are grouped into the following categories: securing leadership commitment, enhancing supplier chemicals management, engaging stakeholder partnerships, providing customer support, undertaking strong project management, and selecting the most appropriate product chemical management system for the organization.

As retailers are directly interacting with consumers who are raising concerns about product safety, they are in an important position to make significant changes in the supply chain. By working with suppliers to obtain adequate data about chemical ingredients in products and to find alternatives to toxic ingredients, they can develop product chemicals management systems that will benefit consumers, suppliers and retailers alike. Retailers command large purchasing and market power. While many retailers do not have chemical experts on staff they can nonetheless be advocates and leaders in the movement towards safer chemicals and products throughout supply chains.



Introduction

TODAY, RETAILERS ARE FINDING THEMSELVES in uncharted waters that require them to understand much more about the chemical ingredients of the products they sell than was required in the past. The growing regulatory trend of limiting the use of certain hazardous chemicals used in product manufacturing has many retailers scrambling to find ways to better manage their complex supply chains. They are also on the front line with consumers concerned about the safety of the products they sell. Changes in consumer preferences have accelerated the move to less hazardous ingredients in products such as personal care products, cleaning products, household goods, paints, toys and electronics. Retailers are also quickly learning that information about the chemical contents, let alone the toxicity of these products, is often lacking in detail or is non-existent, and that complex supply chains can hinder the collection of critical product content information.

The recent example of concern about bisphenol A (BPA) highlights some of the demands retailers are facing. BPA is a chemical invented nearly 120 years ago and is currently used in many products, including polycarbonate water bottles and epoxy linings of metal food cans. Some 20 years of studies have indicated that BPA is a ubiquitous pollutant. Some studies have shown it to be a developmental toxicant at very low doses, and others have found it to be safe at current levels of exposure. In the past several years, the number of studies and government actions on BPA has increased significantly. Canada became the first country to take actions to reduce exposures nationally¹, while a bill has been filed in the U.S. Congress to prohibit the use of BPA in certain products.² Two states, Minnesota and Connecticut, have restricted BPA for use in children's products and 22 other states have proposed legislation to restrict uses³.

The media has reported on these studies and legislative efforts, consumer concern has escalated, and demands for BPA-free

products have increased significantly. This has forced retailers to make decisions about products containing the chemical. Some retailers have chosen to phase out certain BPA-containing products and have put pressure on manufacturers to produce BPA-free alternatives. Even when retailers are carrying BPA-free products on their shelves, they often have little information regarding the health hazards of the alternatives. This example shows that in the absence of clear state or federal guidelines, retailers are often finding themselves in the role of quasi-regulators.

These influences on retailers require them to be proactive. According to Stern and Ander,⁴ consumers are looking for retailers and suppliers to act more responsibly, and consumers may even be prepared to pay more or switch their allegiances to companies that embrace green practices. Greentailing, which Stern and Ander define as conscientious retailing built on environmentally sustainable, socially responsible, and economically profitable business practices⁵, takes a pragmatic view of protecting market share and profits. They see it as a

potential platform for a fundamental shift in business practices; that environmentalism might enhance profits.

Greentailers are actively seeking to minimize their impacts on the environment, through their products, services, and operations. This is more than simply selling "green" products. It often involves substantial supply chain communication to meet green standards and to ensure that green products can be competitive with their conventional counterparts. Rather than simply reacting to regulations as they occur, greentailers are often proactively initiating changes in their business practices and those of their suppliers. Those that adopt proactive approaches to managing the chemical ingredients in their products may be able to enjoy the competitive advantages that come with staying ahead of changing regulatory, consumer, media, and supply chain pressures.





GC3 participant companies understand that the trend for more information about product chemical contents and safer materials will have an impact on the entire supply chain including chemical manufacturers, formulators and often several levels of suppliers.

The Green Chemistry and Commerce Council (GC3)⁶ also recognizes that retailers are increasingly becoming the focus of regulatory, consumer and supply chain demands and believe it is critical for them to develop new tools and collaborations to meet the challenges of sustainable product chemicals management. The GC3, a project of the Lowell Center for Sustainable Production at the University of Massachusetts Lowell, is a business-to-business forum of more than 80 companies. It is a forum for participants to discuss and share information and experiences related to advancing green chemistry⁷ and design for the environment⁸ as it pertains to sustainable supply chain management, as well as the challenges to and opportunities for a transition to safer alternatives.

GC3 participant companies understand that the trend for more information about product chemical contents and safer materials will have an impact on the entire supply chain including chemical manufacturers, formulators and often several levels of suppliers. They believe that retailers can be a key player in moving green chemistry and design for environment approaches through today's complex supply chains.

In authoring this report, the GC3 explores "best practices" in product chemicals management systems in the retail industry. The goal is to provide retailers with experiences and lessons from a range of retailers so they can inform and improve their own product chemicals management practices.

The report begins by exploring the influences that are advancing the retail industry's move towards safer materials: the changing landscapes in regulation, product labeling, greenwashing, and green purchasing support tools, as well as the roles that product disclosure, recalls, and consumer and media attention are playing. Seven retailers that have already developed or are developing product chemicals management systems in their retail operations are then presented as case examples: Apple, Boots, Green Depot, Patagonia, REI, Staples, and Walmart. An analysis follows that provides a summary of: common drivers, benefits and challenges; product chemical management system approaches; and best practices in developing a product chemicals management system. "Best practices" in this report are defined as key success factors and lessons that have been identified in the seven case examples. It is hoped that this report will encourage retailers to engage in discussions about safer chemicals and materials; gauge how their product chemicals management practices match up to those of other retailers; and provide them with best practices when embarking on, enhancing or changing their own systems.

Methodology

RESearchers at the University of Massachusetts Lowell reviewed public information about chemicals management/sustainability efforts, company literature, media articles and other publications. Although product chemicals management efforts are largely still in their infancy in the retail industry, a number of retailers were identified as potential case examples. The case examples chosen illustrate a variety of product chemicals management systems adopted by retailers of different sizes, in different sectors, and at different stages of development. It was not the intention of the report to include all retailers who have adopted such systems, but rather to illustrate a cross section of these efforts and the best practices that have resulted. It is hoped that this report will inspire other retailers who have or are adopting new product chemicals management systems or have discovered best practices not yet included in this report to share their work.

For the case examples chosen a number of questions were examined:

1. What were the key drivers to developing a product chemicals management system?
2. How was the system decided upon in the company?
3. What product chemicals management system was adopted and what are its elements?
4. What are the main challenges in implementing this system?
5. What are the main benefits in implementing this system?
6. How are you engaging and educating consumers about products?
9. What key lessons have been learned in developing / implementing this system that will benefit other retailers?

Interviews were conducted with six companies: Boots, Green Depot, Patagonia, REI, Staples, and Walmart. Additional information for the case examples was collected through online and web-based searches. The Apple case example was developed from publicly available information only.



Apple Computer



Influences On Today's Retail Industry

MANY INFLUENCES ON THE RETAIL INDUSTRY are requiring retailers to understand much more about the chemical ingredients of the products they sell and the toxicity of these ingredients. These influences include legislative and regulatory changes, the methods and criteria used to define a “green” product, product recalls, product ingredient disclosures, and consumer and media attention. These factors are outlined in more detail in this section.

Legislative and Regulatory Changes

Legislation in the U.S. and Europe that addresses chemicals in products is increasingly affecting retailers. A critical piece of legislation affecting companies making and selling electronic products has been the European Union's Restriction of Hazardous Substances (RoHS) Directive which came into effect in 2006.⁹ RoHS restricts the use of four toxic metals—lead, mercury, cadmium and hexavalent chromium—and two categories of brominated flame retardants—polybrominated biphenyls

(PBBs), and polybrominated diphenyl ethers (PBDEs)—in electronic and electrical equipment imported into Europe.

A second key piece of European legislation came into effect in 2007: Registration, Evaluation, Authorisation and Restriction of Chemical Substances (REACH).¹⁰ REACH overhauls the existing chemicals management structure in Europe by requiring that manufacturers or importers of chemicals to the European market provide detailed information on each chemical's uses and toxicity through a registration process. REACH operates on the “no data, no market” principle such that products containing chemicals that lack hazard data will not be able to be sold in the European market. Manufacturers will be required to seek authorization for continued use of chemicals of high concern, which may be critical components of products. This authorization may be denied in some cases. Thus, REACH has had global implications, forcing any company wanting access to the European Union (EU) market to both become aware of the chemicals used in their products and supply chains, and to ensure that chemical suppliers address gaps in hazard data or chemical safety that may prevent future use in a product.



While Europe has been steeped in debate over the details of its chemicals management system, little has changed in the United States at a federal level until recently, leaving states to advance legislation regulating products over the past several years. As described in a recent *Chemical Week* article,¹¹ retailers and states are shaping environmental policy by taking the lead on chemicals management initiatives. California's Safe Drinking Water and Toxic Enforcement Act of 1986, commonly referred to as Proposition 65, requires labeling of products containing substances that are known to cause cancer, mutagenic effects or reproductive health hazards.¹² Compliance with Prop 65 often requires significant testing of products to ensure they do not contain chemicals subject to labeling provisions. Legislation regulating specific chemicals (such as phthalates) in children's products has been introduced in 31 states and passed in 10. Twenty-three states have policies that restrict sales of mercury-containing products. Seven states have enacted policies that require state, county and city facilities to purchase and use environmentally preferable cleaning products. Additionally, in a movement toward more comprehensive chemicals policies, two states, Washington and Maine, require that manufacturers disclose information on

any chemicals in their products that are potentially harmful to children.¹³ As a result of these policies, retailers are being forced to consider the supply chain implications of actions restricting mercury, lead, BPA, phthalates, and flame retardants, among other chemicals.

The most notable federal legislative initiative regarding chemicals in consumer products in recent years has been The Consumer Product Safety Improvement Act (CPSIA) of August 2008. The stated purpose of this bill was to establish consumer product safety standards and other safety requirements specific to children's products, and to reauthorize and modernize the Consumer Product Safety Commission.¹⁴ The CPSIA requires that all products intended for children under 12 are tested and certified to meet strict lead limits. Phthalates are restricted, with testing required for toys intended for children under 12 or "child care articles" for children under three. The legislation also makes the previously voluntary toy standard mandatory. These changes and the testing requirements accompanying them have posed great challenges for many retailers.

In September 2009, the Environmental Protection Agency's (EPA) administrator, Lisa Jackson, announced core principles that outline the Obama Administration's goals for legislative reform of the 1976 Toxic Substances Control Act (TSCA).¹⁵ Additionally, the administrator outlined plans for a major initiative to strengthen EPA's current chemicals management program under TSCA to increase the pace of the agency's efforts to address chemicals that pose a risk to the public.

The impacts of these legislative changes and other efforts led the Environmental Protection Agency (EPA) to launch a web portal¹⁶ in May 2009 providing retailers with a central clearinghouse of information on the many programs and resources available to help prevent and resolve environmental issues at retail establishments. This portal helps retailers meet regulatory and compliance obligations, and also helps them go beyond these to more sustainable practices.

Criteria and Methods Used to Define a "Green" Product

Consumers are increasingly demanding "green" or safer products. In fact, according to the Shelton Group's 2009 Eco Pulse Study, 60% of American consumers say they're seeking out green products, and 66% say they haven't curtailed their green spending in this economy.¹⁷ The results of the study also show consumers are searching for green products in a variety of sectors: 75% in home cleaning products; 65% in food and beverage,

55% in personal care products, 47% in appliances and 46% in home improvement products. However, the study goes on to show that consumers are confused about available product information and don't know whom to turn to for honest answers. They end up relying on manufacturers about whose claims they are skeptical.¹⁸ There is a proliferation of green claims that make it difficult for consumers to know what products are truly environmentally preferable.



Labeling

As green marketing has grown, so has the number of eco-labels.¹⁹ According to the website www.ecolabelling.org, there are more than 300 labels for everything from cosmetics to seafood. Some require independent verification of a product manufacturer's claims and apply rigorous standards. Others do not.

There are three types of eco-labels that have been identified by standardization bodies: Type 1 labels are from independent third parties who award eco labels; Type 2 labels are self-declared by manufacturers to make environmental claims about their products; and Type 3 labels serve as a report card providing information on the possible environmental impact of a product, leaving it to the consumer to decide which product is best.²⁰

The US Federal Trade Commission (FTC) strives to establish baseline environmental marketing criteria with its "Guides for the Use of Environmental Marketing Claims," known as the "Green Guides," which were first issued in 1992 and updated in 1998. A 2009 update has yet to be released. The FTC can take action against unfair or deceptive marketing practices though such actions are rarely taken.

In 2008, legislation establishing a federal "eco-label" program was proposed in the US Senate.²¹ Such an accredited national eco-label program would recognize consumer products that are environmentally preferable throughout their lifecycle. However, in the absence of more uniform standards for eco-labeling, there is increasing confusion about the truthfulness of green marketing promises and it is difficult for consumers to know if "green" purchases generate any environmental benefits.



Greenwashing

“Goods making some kind of environmental claim are the fastest growing segments of every product category we look at,” says Dara O’Rourke, an associate professor of environmental and labor policy at the University of California Berkeley. “The concern is that some bad actors out there could leave consumers disillusioned and undermine the whole market for environmentally preferable products.”²² Lacking an effective federal definition or regulatory mechanism for controlling what is labeled as environmentally preferable, companies make many claims about their products’ environmental attributes. This has led to an abundance of greenwashing, the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service. According to their April 2009 report, *The Seven Sins of Greenwashing*,²³ TerraChoice found in a survey of 2,219 consumer products with green marketing claims that for 98% of the products, companies could not supply proof to verify environmental marketing claims, had made irrelevant or meaningless claims, or had based their claims on their manufacturer’s own environmental criteria. Based on this study, Terra Choice identified the seven sins of greenwashing as:

1. **the sin of the hidden trade-off** — suggesting a product is “green” based on an unreasonably narrow set of attributes
2. **the sin of no proof** — suggesting a product is “green” without any easily accessible supporting evidence;
3. **the sin of vagueness** — suggesting a product is “green” by using vague, broad and poorly defined terms that many consumers understand to mean “green”;

Lacking an effective federal definition or regulatory mechanism for controlling what is labeled as environmentally preferable, companies make many claims about their products’ environmental attributes. This has led to an abundance of greenwashing, the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service.

4. **the sin of irrelevance** — suggesting a product is “green” by providing information that may sound good but is irrelevant to determining a product’s “green” attributes;
5. **the sin of lesser of two evils** — suggesting a product is “green” by distracting consumers from larger environmental impacts of the whole product category;
6. **the sin of fibbing** — suggesting a product is “green” by making environmental claims that are simply false; and
7. **the sin of worshipping false labels** — suggesting a product is “green” by giving the impression through words or images that the product is endorsed by a third party when it actually isn’t.

Because some marketers are exploiting consumers’ demand for third-party certification by creating in-house labels that suggest third-party endorsement that does not exist, retailers need to consider this in developing strategies to move towards safer products.

Green Purchasing Support Tools

As a result of the confusing landscape for consumers wanting to purchase safer or “green” products, some independent organizations have developed tools to assist consumers in making greener choices, such as *Green Guide*, Consumer Report’s *Green Choices* and *GoodGuide*.

Originating as a newsletter in 1994, and expanding into a web site²⁴ in 2002, *Green Guide* was acquired by the National Geographic Society in March 2007 as “the green living source for today’s conscious consumer.” *Green Guide* reviews the science, the manufacturer’s detailed product information, claims, and third party certifications to develop product recommendations and shopping suggestions which are available in book, magazine and online formats.

*Greener Choices*²⁵ was launched on Earth Day 2005 by Consumers Union to address the lack of credible, in-depth information on green products, services, and lifestyles. It offers an accessible source of online information on buying “greener” products that have lesser environmental impact.

*Good Guide*²⁶ reviews the environmental and social impacts of products and companies. To date, over 70,000 foods, toys, and personal care and household products have been evaluated “using the best science and technology available.” The information is available as a downloadable application for the iPhone; it rates products, compares them to competitor products, summarizes their impacts in a single score on a 10-point scale, and lets the user know what the preferred choices are.

Product Recalls

Throughout 2007, consumers were inundated with news coverage of a series of toys and other children’s products being recalled due to excessive levels of lead. More than 17 million toys were recalled in 2007 because of excessive lead levels.²⁷ Researchers found that these recalls cost the toy industry 25% of their holiday sales. The recalls affected products that were not recalled or associated with recalled brands.²⁸

Product Ingredient Disclosures

In fall 2008, the Consumer Specialty Products Association (CSPA), Canadian Consumer Specialty Products Association (CCSPA), and the Soap and Detergent Association (SDA) developed an ingredient communication initiative as a way to provide consumers with information about the ingredients in products in four major categories: air care, automotive care, cleaning, and polishes and floor maintenance products. This voluntary program will take effect in January 2010.²⁹

Some companies have already announced that they will disclose the ingredients in their products. SC Johnson, Clorox, and Seventh Generation, for example, have all made an effort to list product ingredients on their corporate websites.³⁰ SC Johnson allows consumers to search for chemical ingredients by product brand, by type of product, and by specific ingredient.³¹ Clorox’s website³² provides consumers with information on ingredients in their products listed in descending order of concentration. Unlike SC Johnson, Clorox does not provide a description of the function each ingredient provides, only that it can be found in the product. Seventh Generation³³ allows consumers to see a full listing of product ingredients, including those found in trace amounts.

Consumer and Media Attention

There has been an increase in scientific knowledge and media attention to the buildup of chemicals in the environment and the potential health effects of exposures. Advocates, who see the power of the retail industry to change product markets, have also used the media to educate the public about the health hazards of chemicals in products. Consumer awareness is evolving and priorities are shifting. Not only are 60% of consumers demanding “green” or safer products but they are also willing to take action if they are being lied to. The Shelton Group’s 2009 Eco Pulse Study³⁴ shows that 41% of consumers would stop buying their favorite brand of a “green” product if the manufacturer received a government fine for environmental pollution. An additional 36% would encourage their friends to stop buying it as well.

The increase in scientific knowledge, media and advocacy attention, and recalls has raised awareness and consumer concern about toxic substances such as flame retardants, phthalates, lead, mercury and BPA in everyday products and their presence in air, water, house dust, and the human body.³⁵

According to Stern and Ander³⁶ additional factors that are leading to green-influenced retail include the release of *An Inconvenient Truth*, a film which dramatically increased awareness of global warming, and the price of gas, which has drawn attention to hybrid cars. The online video *The Story of Stuff*,³⁷ which shows the connections between the products we buy and a number of environmental and social issues, has also served to raise awareness.

Case Examples

THE INFLUENCES ON RETAILERS AT THIS POINT in time are placing higher demands on them than ever before to identify and disclose the potentially harmful chemical ingredients in the products they are selling and to substitute chemicals of concern. For this reason, some retailers are opting to develop product chemicals management systems, allowing them to understand much more about the products they are selling and to transition towards safer products.

Apple

According to company publications, Apple³⁸ is committed to offering consumers the best personal computing, portable digital music and mobile communication experience through its innovative hardware, software, peripherals, services, and internet offerings. The company's business strategy leverages its unique ability to design and develop its own operating system, hardware and application software.



Apple Computer

Apple's revenue in 2008 exceeded \$32 billion. Forty-five percent of its business is in the Americas with another 23% in the European Union. Apple employs 36,000 and routinely invests more than 3% of revenues on research and development.

Apple is primarily a technology company but it has also built its own dedicated retail stores, as well as an active online purchasing outlet and numerous other sales channels including business-to-business and educational sales.

Drivers of change

Apple's drive is for product design excellence, and its environmental strategy, including product chemicals management, is embedded in every aspect of product design. In fact, Apple sees environmental excellence as being the result of product design excellence. It measures its corporate environmental footprint in terms of the environmental performance of the millions of products it sells each year.³⁹ It calculates, for example, that products made up 97% of the company's carbon footprint, whereas energy used in buildings account for just 3%.⁴⁰ Apple has made the environment a focus of its products since the

1990s, but in October 2008, it began a new era of commitment by announcing a new line of MacBook notebook computers as the "greenest family of notebook computers ever made."⁴¹

In addition to environmental performance, product design excellence is at the core of Steve Jobs' leadership, and every Apple employee is encouraged to adopt this part of Apple's culture. The company controls both the hardware and software used in its products and recruits the most talented hardware and software engineers.⁴² This ensures that the drive for product excellence comes from the bottom up as well as the top down.⁴³

Innovation and introducing new technologies to mainstream applications like phones, portables and desktops is not without risk. Apple has a long history of taking on engineering challenges. Examples include the multi-touch display of the iPhone, and the notebook's aluminum unibody.⁴⁴

In the same way, Apple has approached its environmental goals with a spirit of innovation. In 2006 Apple became the first company in the computer industry to completely eliminate cathode-ray-tubes (CRT) displays.⁴⁵ A typical CRT contains approximately 1,360 grams of lead. Apple's CRT-based iMac contained 484 grams of lead; the current-generation liquid crystal display (LCD)-based iMac contains less than 1 gram of lead.



Another example is Apple's transition to mercury-free light emitting diode (LED) displays in 2008. Conventional large flat panel television displays contain between 12 and 20 cold compact fluorescent bulbs (CCFL) that can each contain on average 3.5 mg of mercury. In contrast, mercury free LED displays are a more expensive technology than CCFL backlighting systems, but they offer better definition, a higher contrast ratio and improved color uniformity. More importantly, LED technology eliminates mercury all together.

Because of its high visibility and dedicated young customer base, Apple has been the target of environmental advocacy groups wanting the company to change the chemical and material contents of its products. In 2006, Greenpeace advocated that Apple and the rest of the computer industry set targets to eliminate brominated flame-retardants (BFRs) and polyvinyl chloride (PVC) from all products. Apple's famously secretive culture made it difficult for the public to understand that the company had already begun work on these targets, and by 2006 was close to not only eliminating BFRs and PVC across all products, but also to eliminating other substances as well, including mercury and arsenic. In 2008 Apple became the first in the industry to produce an entire line of products without BFRs, mercury and arsenic.⁴⁶

Apple's product chemicals management system

Apple has implemented a product design strategy, product design excellence, which is used in the design and manufacture of all Apple products. Apple's pursuit of product design excellence includes minimizing the environmental impact of its products. It strives to be a leader in its field and that leadership includes the elimination of hazardous chemicals and the substitution of safer alternatives. All Apple products sold worldwide comply with the RoHS Directive (Restriction of Hazardous Substances)⁴⁷ adopted by the European Union in February 2003. RoHS restricts heavy metals (lead, mercury, hexavalent chromium and cadmium) and certain flame retardants (polybrominated biphenyls and polybrominated diphenyl ethers). Its products met both the spirit and letter of the RoHS restrictions years before RoHS went into effect.

Further, Apple has eliminated asbestos, cadmium, hexavalent chromium, lead (above and beyond RoHS requirements), organic tin, polybrominated biphenyls, polybrominated diphenyl ethers, polychlorinated biphenyls, polychlorinated dibenzodioxins, polychlorinated naphthalene, polychlorinated terphenyls, red phosphorus and short-chain chlorinated paraffins from its products. Some of Apple's more recent product level sub-

stance restrictions include arsenic in display glass, all brominated compounds (including tetrabromobiphenyl-A (TBBP-A)), all chlorinated compounds (including polyvinyl chloride (PVC)), phthalates (including Bis(2-ethylhexyl)phthalate (DEHP), Dibutyl phthalate (DBP), Benzyl butyl phthalate (BBP), and Di-isononyl phthalate (DINP)), and mercury.

Apple is the only company in the industry to produce all its products as Energy Star compliant. It is also the only major IT company to have achieved the Gold level with the Electronic Product Environmental Assessment Tool (EPEAT),⁴⁸ (an EPA-endorsed environmental performance standard, covering energy efficiency, recyclability and toxic-free design) across all its computer products.⁴⁹

Challenges encountered

Apple's biggest challenges have come as it has developed new materials. Any new material that is introduced produces technical challenges: the failure rate of the material needs to be minimized and inspections need to be performed to make sure suppliers are meeting environmental and technical specifications.

One such challenge arose with the elimination of PVC and BFRs from Apple products. To replace PVC used in wire and cables for example, alternative resins had to be developed that met safety standards that in some instances were only written to specify PVC resins. Further complicating the situation, safety standards vary geographically, forcing companies to use and get approval for multiple alternatives that comply with the different regional standards.⁵⁰

Benefits discovered

In the past, Apple's environmental message was part of its corporate story but recently it created an environmental report for each product demonstrating that environmental performance is becoming a stand-alone message for each of its products.

Apple's product design approach, which includes the environmental impact of its products, has pushed its supply chain to develop alternatives to hazardous materials, effectively implementing green engineering throughout its supply chain. Suppliers are therefore now in a position to respond to requests for alternative materials from other corporate customers such as Dell and Hewlett-Packard. The environmental significance of this is in the permanence and completeness of these changes. For example, once suppliers completed the switch from mercury-containing displays to mercury-free LED technologies, there

was a complete elimination of a toxic compound rather than a gradual reduction over time. These changes are creating a positive impact within the electronics supply chain and electronics sector in general.

Apple has also been able to redefine the concept of chemical restrictions in their products and supply chains. Previously, suppliers would restrict substances at a compound level. However, Apple's research showed that elimination of only specific compounds, for example TBBPA, would be more difficult from a validation perspective since many BFRs are difficult to detect. In contrast, the methods for detecting bromine and chlorine were well-established and relatively inexpensive to carry out.⁵¹ By restricting nearly all materials containing brominated and chlorinated compounds Apple could encourage testing at the elemental level, instructing suppliers to look for elemental bromine rather than brominated compounds like deca-BDE and TBBPA. This approach dramatically reduced the cost of verification, thereby ensuring that empirical verification took place at a homogenous material level for every part.⁵²

Thinking ahead

Apple has made a concerted effort to be transparent about its environmental efforts and it will continue to do so. It has endeavored to create a brand that will stimulate customers to question and innovate. By challenging its customers to find out about the environmental attributes of its products rather than seek third-party green certification or labeling, Apple hopes that over time, these customers will demand the same environmental attributes in products made by other companies. Demanding environmental responsibility and sustainability in any product is how they see real change happening.

Consumers

Apple's customers are extremely loyal. They expect and demand that Apple use the most innovative and progressive technologies, and can be critical and unforgiving when these innovations don't work.

In recent months Apple has been educating its customers through TV and web communications about the environmental features of its products by creating an environmental report for each product. On the marketing page for each product, consumers can download a dedicated environmental report,⁵³ as well as video files on specific environmental performance attributes.⁵⁴

Lessons learned

Suppliers are given clear and well-developed specifications for

the design and manufacture of Apple products. Apple has found that these are more effective than guidelines, as suppliers are given precise engineering thresholds that help them verify the environmental performance of the materials and components they are supplying.

Apple had to work with suppliers to change the composition of hundreds of parts, including printed circuit boards, connectors, fan impellers, cable insulators, adhesives, films, inks, dyes, flexible printed circuits, and enclosures. To implement its restrictions, Apple required its suppliers to establish strict compliance management programs, which included using certified laboratory testing to demonstrate that they were complying with the new requirements. Apple monitored its suppliers' compliance via internal audits. A transparent compliance program, which allows for quick and inexpensive material testing, enabled Apple to identify problems early on and take corrective action. An extensive auditing program in a supply chain is critical to increasing compliance and ensuring full implementation of new material specifications, particularly during the early stages of the transition.⁵⁵

Boots

Founded in 1849 by John Boot as an herbalist store, Boots, UK Ltd⁵⁶ developed a reputation for



providing affordable medicines to the poor. The company quickly became synonymous with quality, value and service in healthcare and beauty products, as well as with favorable environmental practice, staff welfare, and corporate responsibility. In 2006 Boots Group merged with Alliance UniChem to form Alliance Boots plc, an international pharmacy-led health and beauty group. Today, Alliance Boots operate more than 3,200⁵⁷ health and beauty retail outlets of which just under 3,000⁵⁸ have a pharmacy. In Europe it is the clear pharmacy market leader with outlets in the UK, Norway, Republic of Ireland, The Netherlands, Italy and Russia. It also has pharmacies in Thailand. The group has over 115,000⁵⁹ employees, and has an annual revenue of £20.5 billion.⁶⁰ Boots is unique in the UK as it manufactures and retails its own products through its extensive retail outlets.

Drivers of change

Boots has always maintained a scientific approach to its businesses, with a strong technical staff. For many years there was "behind the scenes" discussion of product chemicals management as Boots personnel recognized that the health risks of chemicals used in its products were not fully understood.



Consumers and stakeholders began asking more questions about the safety of Boots' products, driving the company to become a leader in ingredient disclosure 10 years ago. The decision to become a leader did not come without controversy; some in the company questioned the risks of being out front, but in the end, Boots decided it wanted to be seen as the health and beauty experts and the most trusted brand in the industry. Being proactive about potential hazards posed by chemical ingredients was a decision anchored by the company's core commitments: innovate in a trusted manner, educate consumers, and encourage the development of sustainable principles.

Boots' product chemicals management system

Boots recognized that the company needed to have a strategic approach to chemicals management and build wide ranging support to establish leadership in the health and beauty sector. The company decided on a high risk strategy: in 2001 and 2002 it sought input from a series of independently hosted stakeholder forums with government, consumers, and non-governmental organizations (NGOs). These sessions resulted in a report published in 2003 by Boots Chemicals Working Group,⁶¹ outlining the path forward in product chemicals management. The strategy commits to taking a precautionary approach to the use of chemicals, by considering the inherent hazards of the chemical rather than risk based on potential exposure, to

ensure that the only chemicals used in Boots brand products have a history of safe use. It commits to a systematic review of all products carrying the Boots label (55-60% of its annual revenue). The working group was charged with maintaining a database of chemicals and providing Boots with expert, impartial advice on the use of chemicals.⁶²

As part of this strategy, Boots created a Priority Substances List (PSL), updated and published annually, which outlines chemical ingredients of concern (and their uses), as well as any regulatory actions that have been taken to restrict their use. When developing the list, around 60 chemicals were highlighted as potential issues. The majority of these appeared on various published government or NGO lists (OSPAR,⁶³ CIR,⁶⁴ SCC,⁶⁵ KEMI,⁶⁶ and ChemSec's⁶⁷ SIN list to name a few) which Boots monitors regularly. This data is also underpinned by Boots' own internal expertise as well as additional supplier data to provide an overall assessment for a chemical. This list was developed to promote substitution of chemicals of high concern, a required practice under REACH⁶⁸ (Registration, Evaluation, Authorisation and Restriction of Chemicals), the European Union's recently enacted chemicals policy legislation. Boots works with suppliers to restrict specific chemicals (14 currently) and to encourage the use of safer alternatives. In assessing the continued or future use of a particular chemical, the Chemicals Working Group gives close consideration to a number of factors: immediate health hazard and longer term threats to health (bio-accumulation etc); environmental (cradle-to-cradle) impacts; product efficacy; availability and cost of alternatives; regulatory constraints; and customer concerns. The PSL highlights the high impact, high profile chemicals, but Boots also works on phasing out many more chemicals that would not make it onto the PSL as they are not seen as high profile.

The process is applicable for all Boots brand products whether they are manufactured by Boots or manufactured by third parties for Boots. For non-Boots products (proprietary products), Boots requires that suppliers comply with minimal safety requirements and with current laws including REACH.

Challenges encountered

Boots has found that managing chemicals data is its biggest challenge. Large amounts of data must be analyzed and significant amounts of time and resources must be spent tracking and monitoring chemicals policy around the world. Even though Boots is primarily a UK-based retailer, the company monitors activities in other countries to stay ahead of any relevant approaching regulation. The company will consider

restricting a chemical from use in its products if it is restricted by a government, even if Boots does not have a retail presence in that jurisdiction.

Although laws and restrictions differ by country, Boots sells the same product formulations everywhere in the world. Boots products may be disadvantaged in this way, as they are competing with products that have not conformed to either Boots' or the EU's specifications and regulations. However, Boots is committed to its product quality; this is part of the company's ethos. Maintaining this system requires a significant commitment to the program by management.

Benefits discovered

Consumer trust in the quality and safety of Boots brand products provides the company with a stable market. It is no surprise then that maintaining the Boots brand image is a critical corporate priority. Being proactive in chemicals management ensures that Boots can maintain this credibility with its customers and stakeholders.

Boots has also discovered an additional economic benefit that other businesses overlook. By monitoring and responding to chemical regulations around the world, the company is proactive and avoids the high cost of rapid formulation changes and marketing campaigns experienced by competitors forced to make ingredient changes reactively.

The company's proactive approach is also beneficial from a marketing perspective. When customers learn why Boots has decided to remove a particular chemical from its product line, they are assured that their safety is the company's first priority. Boots has also discovered the benefits of collaboration with other retailers and with environmental advocates. Through one such collaboration with other mid-level retailers in the UK (Marks and Spencer, and B&Q building products), Boots has been able to share resources and experiences that have enhanced its image as a sustainable company while simultaneously reducing the financial and political costs of transitioning to safer products. Similarly, through collaborations with advocates, Boots has been able to develop an understanding of both the chemical and the social hazards of selling products containing substances of concern. For Boots, consumer and advocacy input is critical to the firm's ability to think ahead of regulation. Finally, Boots has been a strong advocate for chemicals policy that provides information on chemicals in products and enhances product safety, including REACH.

Thinking ahead

In the same way that they were leaders in developing a product chemicals management system for their products, Boots would like to be seen as a leader in the area of environmental assessments. There is currently very little data on the environmental impacts of many chemicals in products, so Boots has partnered with The University of York to develop a system to predict the environmental impacts of chemicals in its products on both surface water and soil. Data used in the assessment includes type of chemical, global usage, and Boots usage which is put into a set of unique predictive screening algorithms to assess the environmental impact. The system ranks chemicals as high, medium, and low risk. If a chemical shows a high risk, Boots investigates opportunities to reduce the risk either by phasing the chemical out or by limiting the usage across its portfolio. Boots has assessed all the chemicals (approximately 350) used in its own brand manufactured products. Its goal is that by the end of 2009, this environmental impact assessment work will be published and publicly available.

Boots expects green chemistry to be increasingly used. It is continually working to improve performance in this area and is committed to further developing its expertise in green chemistry while exploring how green and sustainable chemistry solutions can be used in consumer products.

Boots is in partnership with the Green Chemistry Centre, the Green Chemistry Network⁶⁹, and Glasgow Science Centre to develop an outreach activity: The Discover and Explore Green Consumer Products project.⁷⁰ This project is aimed at engaging the general public, increasing awareness of the role of green chemistry in improving the sustainability of consumer products, and exploring the positive impacts of green chemistry for consumers. It has developed an interactive touch screen display that consumers can use to explore a number of everyday products, the science behind them and the steps that can be taken to improve their sustainability through the application of green chemistry. The interactive display has been piloted in science centers. The ultimate goal is to have interactive screens available in stores.

Boots is also working with Plymouth Marine Laboratory to build a photobioreactor that will grow algae at its head office. The photobioreactor will use waste CO₂ and heat from Boots' own power station to grow the algae. The algae will then be processed to extract high-value raw materials to be used in Boots' products. This project will hopefully deliver a green route for raw materials.

Consumers

A survey of Boots customers in April 2008 found that toxic chemicals were not high in consumers' concerns. Although toxics issues were of high concern five years ago, climate change is now the main focus of consumer attention along with labor rights and ethical trade. Consumers don't seem to want to know the chemical ingredients in products but they want assurance that products are safe. Because of legal obligations, the majority of Boots products have their ingredients listed.

Boots does not use third party labels to verify the safety of products but instead promotes the Boots brand as the trusted mark. The company maintains an extensive consumer products website at www.boots-uk.com which outlines actions and policies concerning specific chemicals, position statements on non-restricted chemicals and links to relevant external resources.

Lessons learned

Boots found developing a product chemicals management system to be a resource intensive process and as such found the success of such a system to be dependent on it becoming a backbone of the company. Managing the system can be difficult, so it is important not to overcommit a company's resources, as over promising and under delivering is bad for business. Developing a product chemicals management system takes time and it is important to develop this in achievable steps.

Boots has also found working with NGOs to be invaluable. In treating all stakeholders with respect, they have discovered that individual agendas are more closely aligned than they initially thought.

Green Depot

Founded in November 2005, Green Depot⁷¹ is a one-stop shop for green building materials, products and services. Its primary goal is to facilitate green living and building in communities so that it is accessible, affordable and gratifying. Green Depot has a consumer living store in New York City, and building locations in New York City, Long Island, and Albany, NY, Newark, NJ, Philadelphia, PA, Boston, MA, Chicago, IL, and Newark, DE. Additionally, Green Depot has built an active e-commerce website.



Drivers of change

Sarah Beatty was pregnant with her first child when she founded Green Depot. She was looking for environmentally friendly products to use in renovating her apartment, especially those with reduced toxins and volatile organic compounds (VOCs). She became frustrated by the lack of available green paints, finishes, and furnishings in the Northeast, recognized the growth in the area of green buildings, and decided to turn her personal commitment to providing a greater choice of safer products in the market into a retail business opportunity. In 2005, Green Depot was born. The company began as a "construction trade" business and quickly evolved to individual consumers as well.

Fast growth of the green building sector, widespread greenwashing and an awareness of changing industry standards, convinced Sarah Beatty it was important to invest in developing an internal chemicals management system. She saw it as vital to the company to understand first hand what chemicals were in products being sold. A key driver was the belief that an internal system would help clarify the company's standards, train employees, and ensure quality control. The screening process would establish a consistent assessment of proposed products during a time of rapid corporate expansion.

Green Depot's product chemicals management system

A small team of internal environmental experts and consultants was formed to determine criteria for product evaluation. The team developed a system called the Green Depot Green

Filter which identified five environmental categories, the critical end points for each category, and a means of communicating the system to consumers. Icons for each category are used to identify products that meet the criteria in each category. Icons can be awarded as half tones or full tones. A half tone icon is awarded if a product performs better than most conventional products yet there is room for improvement; a full tone icon is awarded if it truly meets or exceeds Green Depot's standards. The ratings are displayed prominently next to the products in the store, and on the company's website. The environmental categories are summed up by the acronym "CLEAR":

- **Conservation:** A product is awarded a Conservation icon if it: contains a high percentage of rapidly renewable materials or post-consumer or post-industrial recycled content; is designed to last longer than mainstream alternatives; or carries a third-party certification that verifies responsible sourcing, such as the Forest Stewardship Council.
- **Local:** A product is awarded a Local icon if it was manufactured or assembled within 500 miles of Green Depot's Brooklyn headquarters. A half-tone local icon is awarded if the product was manufactured within 1,000 miles of the Brooklyn headquarters—this is a move to encourage American manufacturing.
- **Energy Efficiency:** A product is awarded an Energy Efficiency icon if it helps save energy. This includes items such as insulation, energy-saving doors and windows, passive solar devices, daylighting systems, and attic fans in homes. Energy icons are also awarded for products with an Energy Star label, and for those using less energy than conventional products.
- **Air Quality (which includes toxics):** A product is awarded an Air Quality icon if it: contains low or no VOCs; is formulated for highly allergic or other sensitive populations; helps customers identify toxic pollutants, mold or other allergens in homes; or efficiently filters pollutants from indoor air.
- **Responsibility:** A product is awarded a Responsibility icon if credible documentation regarding the manufacturer's corporate responsibility efforts is available.

The Green Filter review process begins with requiring product manufacturers to fill out an in-depth vendor questionnaire and to provide all relevant product specifications and material safety data sheets (MSDS's). Where applicable, Green Depot also considers third party certifications and test results from independent laboratories to verify manufacturer claims such as

lead levels in children's furniture, formaldehyde levels in flooring, or organic status for cotton textiles. These data are then compared to internal standards and thresholds Green Depot has established. The Green Filter applies a restricted substances list of about 2,000 chemicals, the Red Flag Chemical List, to restrict certain chemicals outright. This list is based on toxic chemicals lists published by the US government and reputable nonprofit organizations, and includes other criteria (such as persistence and bioaccumulation) that restrict additional chemicals such as decabromodiphenyl ether and bisphenol A. When needed, Green Depot interviews suppliers for further information. If a supplier refuses to disclose information to verify product claims, Green Depot may not approve its products. If a chemical of concern is a suspected rather than a known toxicant, and is present at a very low concentration, Green Depot will try to get the supplier to replace it with a safer alternative or in certain cases, may accept the product but may choose not to award it an icon.

Challenges encountered

As a start-up company, Green Depot has invested a significant amount of resources in developing the Green Filter. It has struggled with the limited chemical composition information available from suppliers, and the frequent treatment of this information as proprietary. Obtaining information from uncooperative suppliers as well as research of possible restricted chemicals or other environmental attributes, put a strain on company resources.

In the process of developing the Green Filter, the company has had to educate its staff, individual consumers, and commercial contractors—its primary consumers. However, many commercial contractors are not yet interested in or educated about green products.

Educating consumers has been a challenge in today's marketplace because of a lack of definition of "green" products. Green Depot has endeavored to be as transparent as possible with consumers by explaining and displaying product ratings to try to help dispel some of the confusion created by greenwashing.

Benefits discovered

In developing the Green Depot Filter, the Green Depot team has developed an understanding of how to navigate the product assessment process. This knowledge is being used to educate employees and customers alike. It is also helping Green Depot gain recognition as a trusted supplier in the green sector.



Green Depot has been acknowledged by many community leaders as a change agent, specifically for its role in spurring the green economy through job creation, education, retail and industry supply. For example, in 2007, Greenmaker Supply (now Green Depot) was recognized by Chicago Mayor Richard Daley’s GreenWorks Awards for green products.⁷² In 2008, Green Depot was invited to help lead the Green Future Summit in Newark, New Jersey, an initiative focusing on green collar jobs.⁷³ And in 2009, Green Depot was the winner of the “Business Leader of the Year,” awarded by Earth Day New York and the Natural Resources Defense Council (NRDC).

The company is also discovering tremendous benefits from using local sources, such as cost savings with smaller supply runs, quicker turnaround times, credits awarded under the

Green Building’s Rating System—the Leadership in Energy and Environmental Design (LEED)—and the ability to support local infrastructure and businesses. Perhaps the biggest benefit of doing business locally is the increased control over all the elements of production including the supply chain.

Green Depot has seen steady revenue growth from both the building trades trying to meet green building specifications, and from educated consumers looking to remodel their homes with the latest green materials. This has spurred the development of new services such as the “Flip It Green” program. This program starts with a set of architectural drawings and specs and identifies the green, greener and greenest building material alternatives. It is designed to give architects and consumers opportunities to achieve the green goals of any building project.

Thinking ahead

Green Depot recognizes that the process of greening the supply chain is an ongoing learning effort, and one that requires continuous development, refinement of definitions and internal criteria. They have committed to re-evaluate their products every two years and will re-evaluate a product immediately if a customer voices concerns about its environmental attributes. Green Depot is committed to building on its successes to date. For example, the Green Filter team recently amended the Red Flag Chemical List to screen out suspected as well as recognized toxicants.

Green Depot is also focusing on leveraging local business clusters of suppliers to come up with ideas and solutions for green products, and is spurring local green business networks. It does this by working closely with local industry trade groups, governmental small business support agencies and non-profit organizations.

It also believes that when the general public understands the health impacts of chemicals in products and built environments, they will change their behavior, bringing increasing pressure to change public policy regarding product manufacturing and ingredient disclosure.

Consumers

In the development of the Green Filter, the team recognized that there would be a need to educate the consumer and to do so in a simplified manner. They recognized that consumers would choose which green criteria were most important to them. Green Depot’s flagship retail space is therefore an educational lab in its construction, design and merchandising, and

includes educational materials in large displays that clearly explain the CLEAR icon system, and show how some of the building materials and other products are used. For those customers who are interested in more detail, Green Depot's e-commerce product profiles offer more information, including product brochures, usage information, a listing of third party certifications the products have received, and downloadable Material Safety Data Sheets (MSDS) and specification sheets.

In an effort to ensure that the green products and services it provides are high quality, effective and relevant, Green Depot shares customer feedback both internally and with vendors and local business partners.

Lessons learned

According to Green Depot, retailers just entering the green marketplace who are interested in developing their own product chemicals management system have a lot of work to do. Green Depot found it important to start with a clear mission and goals. When developing the product chemicals management plan they developed the steps and metrics to be accountable to that plan and conducted cost/benefit and productivity analyses in order to see what they could expect to derive from this effort. They recommend this initial work and these kinds of decisions are made internally, rather than outsourced, as retailers will be empowered by the internal process.

Green Depot also learned that in order to solve problems, there needs to be cross-pollination across sectors so efficiencies can be found, standards can be agreed on, and mutual support can result. For example, Green Depot worked with a furniture manufacturer whose products had been off-gassing to provide examples of alternative finishes that could be used to green their products. They were also able to convince a cleaning products manufacturer to remove a toxic ingredient from a detergent and replace it with a safer alternative. These lines of communication across sectors need to be open for change to occur.

Patagonia **patagonia**[®]

Since its founding by environmentalist Yvon Chouinard in 1973, Patagonia⁷⁴ has grown from a small group of climbers and surfers making climbing tools to a respected retailer of specialty clothing, sport and technical gear. Patagonia products are sold within its own stores, by other retailers, and in online marketplaces. The company is a small, privately held retailer with revenues approaching \$500 million. Patagonia's corporate values reflect

the minimalist style of its founders and demonstrate participation in the fight to protect wilderness from development.⁷⁵

Drivers of change

Patagonia's corporate culture is marked by a curiosity about the world. Not surprisingly, when the company developed a product chemicals management system, it was driven by a need to understand the environmental impacts of the chemicals used in its products. To do this it began to research the materials used in its products, and to find ways to reduce the use of any problematic chemicals. Although it knew this could involve substitute materials, Patagonia's first priority was to maintain the performance of its products, so any substitute had to perform as well or better than the one it was replacing. Protecting the integrity of the brand was fundamental.

External factors also influenced the development of the management system. Patagonia's customers are well-informed and hold strong views on environmental issues. Their questions about the environmental attributes of Patagonia products, for example the safety of bisphenol A in plastic water bottles, were an important driver for the company. An increased legislative focus on the chemical content of consumer products was also an influence: the implementation of REACH in the European Union; the Consumer Product Safety Improvement Act in the US; and the legislative actions of several US states.

Patagonia's product chemicals management system

Patagonia's sustainability agenda initially facilitated its switching from conventional to organic cotton in 1996. In the early 1990s, founder Yvon Chouinard became aware of the environmental destruction of conventional cotton farming, and in 1994 made the decision to switch the entire Patagonia product line to the use of organic cotton. Patagonia's "Beneficial Ts" brand of t-shirts was born. Few companies at the time used organic cotton and Patagonia wanted to increase its demand to force a greater supply. When Beneficial Ts was in business, it not only produced Patagonia brand t-shirts, but also sold wholesale quantities of organic cotton t-shirts to other retailers. Within three years, Beneficial Ts became one of the biggest buyers of organic cotton in the United States.

Following from these efforts, Patagonia thought to base its product chemicals management system on testing protocols and restricted substance lists. However, it quickly realized that as a smaller retailer, its ambitions exceeded its resources. Patagonia had worked with individual suppliers over the years



to enhance transparency and to facilitate communication within the supply chain, but it did not have the size and scale to completely drive the changes it was looking for. Patagonia wanted a solution for its suppliers that would not be seen as a “Patagonia Program,” but one which suppliers would embrace as better for their own individual long term business interests.

This led Patagonia to bluesign,⁷⁶ an independent environmental standard for the textile industry that provides certification to suppliers. Bluesign now plays a significant role in Patagonia’s product chemicals management system: Patagonia encourages its suppliers to become bluesign certified.

The bluesign standard for environmental health and safety was developed by bluesign Technologies AG based in Switzerland. The declared objective of the standard is that benefits are seen along the entire textile supply chain. Raw material and component suppliers who manufacture yarns, dyes and additives, and textile manufacturers, maximize resource productivity. Retailers and brand-name companies enhance safety and profitability, and consumers are protected against substances which are potentially hazardous.

The bluesign certification starts with a supplier signing an agreement with bluesign Technologies which includes a secrecy clause. A short on-site audit of the supplier’s operation is then conducted verifying that chemical and environmental health and safety (EHS) practices meet the guidelines set by bluesign. A software tool, “the bluetool”, is provided containing the information needed to assess chemical components and processes. The objective is to classify each chemical component based on its ecological and toxicological impact. The bluesign standard includes Restricted Substance Lists (RSLs) of leading textile companies, as well as relevant REACH requirements.

In principle, the bluesign standard divides raw materials, chemical components and production processes into two categories,

grey and blue, based on five assessment levels: resource productivity; consumer safety and protection; air emission; water emissions; and occupational health and safety. Raw materials or chemical components that contain substances that are banned are prohibited from the production process. Raw materials or chemicals components that lead to a textile product that meets the bluesign standard in all aspects, are classified as blue. All other raw materials are labeled grey. The “grey” classification means that there are restrictions on how a substance can be used in processing and a precise evaluation of the impacts is required. Subject to certain safety conditions, the grey chemical component is allowed if a substitute can’t be found that will provide comparable functionality, quality or design.

Once chemical components are certified, they receive the bluesign approved label.

Patagonia is also a member of the Outdoor Industry Association’s Eco Working Group (OIA EWG),⁷⁷ formed in 2007 to explore product environmental sustainability as it relates to the outdoor industry. It has open membership and encourages



participation from all companies throughout the supply chain. Currently, it consists of over 60 outdoor businesses collaborating to develop the industry's first environmental assessment tool or "Eco Index." The index will be life-cycle based and contain:

- **environmental guidelines**—qualitative principles and/or best management practices to be used as an educational tool, promoting continuous improvement for companies and suppliers;
- **environmental performance metrics**—an industry-wide common methodology of calculating the metric to be used to assess environmental impact and measure improvement; and
- **a comparative scoring system**—performance measures that will be used to inform product design so that environmental impacts can be considered in addition to performance, costs, etc.

The index is based upon a complete life cycle which includes feedstocks, manufacture and processing; product manufacturing; packaging; transportation; use and service; and end of life. Chemicals (or toxics) are just two of the lenses (human and ecotoxicity) which are being applied within each of these lifecycle stages. Once developed, the Eco Index will be used by companies to incorporate environmental considerations into product design and to manage their supply chains in a way that supports their environmental goals. It is also intended that the index will enhance transparency within the supply chain and facilitate communication with suppliers.

OIA EWG initiatives aid small companies like Patagonia who have fewer resources as they benefit from access to work performed by companies who have greater resources. However, companies with greater resources also benefit as industry wide actions have far greater impact than actions by a few. In all cases, there is a greater awareness placed on environmental challenges within supply chains.

Challenges encountered

The biggest challenge Patagonia has faced has been finding a way to get all its suppliers to embrace the bluesign program. When all suppliers have been certified, Patagonia will have effectively outsourced its product chemicals management system which will not only benefit it economically, but will guarantee product consistency. Patagonia has had to convince its supply chain that the benefits of bluesign are worth the financial commitment. The cost of certification for suppliers varies

according to the kind of facility being certified and the complexity of the operation. A knitting mill, for example, will incur a different cost than a dyeing company. The time needed for a return on investment has been encouraging for bluesign certifiers, ranging from one week to 10 months.

Another challenge with the bluesign process has been unwillingness on the part of suppliers to release information about their formulations. Bluesign's non-disclosure confidentiality agreements have largely removed this obstacle because formulation information is kept from retailers. Over time suppliers have become more willing to disclose this information to bluesign.

Bluesign and Patagonia have achieved a mutually beneficial relationship where bluesign becomes a more successful program and retailers' product chemical management initiatives become easier as more suppliers become certified. Patagonia has had to educate not just its own suppliers but other retailers as well, working to encourage other retailers to understand and consider adopting the bluesign program for their supply chains.

Benefits discovered

Patagonia has benefited from bluesign by allowing the company to be part of a system with knowledge and technical capacity far exceeding its own. It has also benefited financially from outsourcing its product chemicals management system, and by reducing the costs involved in developing restricted substance lists, assessing chemical toxicity, and testing products. As suppliers begin to see returns on their investments it has become easier to encourage more suppliers to become certified.

A greater number of bluesign certified suppliers has allowed Patagonia to communicate the impact of specific Patagonia products to its customers from its design through its delivery. The Footprint Chronicles,⁷⁸ accessible on its website, documents the environmental and social impacts of specific Patagonia products and allows the company to highlight success stories. One such success story is that of a Patagonia polyurethane coatings mill which was fitted with a solvent collection and distillation recovery system that allowed it to recover 98% of material previously sent to waste streams. This is the kind of success that Patagonia believes its customers expect.

Thinking ahead

Patagonia has set a target of 100% bluesign certification for all of its products. It is also working to educate other retailers in the outdoor apparel sector about bluesign so they will en-



courage their suppliers to adopt the program. Many outdoor industry retailers use the same suppliers so the more retailers seeking bluesign certified products, the more pressure is put on suppliers to become certified. It also provides a bigger business reward for suppliers, opening them up to new markets.

Consumers

Patagonia has a well informed consumer base committed to environmental issues and one that provides a lot of feedback to Patagonia through email, blogs, calls, and in store inquiries.

Instead of developing a corporate social responsibility report, Patagonia decided instead to utilize its storytelling past and recently launched the Footprint Chronicles. It tracks the impact of specific Patagonia products from design through delivery, documenting environmental and social impacts of every link in the supply chain. In May 2007 Patagonia's founder challenged a group of ten employees to track five products from the design studio to the raw-materials stage to Patagonia's Nevada distribution center. They canvassed the globe, observing yarn spinners in Thailand, visiting a 50,000-employee footwear factory in China, and touring a fiber-manufacturing facility in North Carolina.⁷⁹ These efforts, the Footprint Chronicles, can be found at www.patagonia.com, featuring short videos and detailed information of a product's positive sustainability attributes, as well as those that need improving.

Lessons learned

Patagonia has had to learn to be patient in two important areas. First, it has had to be patient with its suppliers, allowing them to begin the bluesign certification process when they are

able to see that it will benefit their company. This has taken time as its efforts to incentivize suppliers to do this did not work. Second, it has had to be patient with its own sustainability agenda and learn that moving forward, even slowly, is better than over-committing and not being able to meet expectations

The company has also learned through the Footprint Chronicles, that the benefits of openness or transparency outweigh the costs, because it spurs other retailers to action. By documenting and sharing information about the environmental effects of each link in its supply chain with customers, the bar has been raised for its competitors as well.

Recreational Equipment Inc.



www.rei.com

REI[®] is a leading retailer of gear and apparel for activities such as bicycling, camping, climbing, snow sports, and paddling. The company's primary focus is providing products and services high in performance and quality. REI is a consumer cooperative, founded by 23 climbers in 1938. Today the company has more than 3 million active members and annual revenue of approximately \$1.5 billion. It sells most of its products through its retail outlets throughout the US but also has a robust direct sales business. About 80% of the company's sales volume is in internationally recognized branded products such as North Face, Patagonia, Merrell, and Cannondale, while the remaining 20% is the private brands of REI and Novara (cycling). These private brands have been the focus of most of REI's product chemicals management policy.

Drivers of change

REI answers to its more than 3 million active members rather than to shareholders or to a quarterly bottom line. It therefore must stay true to its members' love of the outdoors and health of the planet. This motivates the company to adopt policies that protect consumers even when it is not mandated to do so. For example, REI was one of the leading suppliers of water bottles made with BPA. Because the company does not have chemists on staff, it relied on information provided by university and industry sources to make decisions on the safety of these bottles. REI was unclear about the risks that BPA posed to consumers when it leached into water bottles, but due to consumer and media attention to the issue, it opted to remove BPA from any of its products intended to come into contact with food or drink.

REI's product chemicals management system

REI manages chemicals in products in a variety of ways. It has developed its own Restricted Substance List (RSL)⁸¹ for use with the products sold under its own brands, but is simultaneously encouraging its suppliers to become certified under the textile standard, bluesign.⁸² For the remaining products REI sells, it endeavors to work collaboratively with other brands to raise the industry's overall compliance through working groups such as the Apparel and Footwear International RSL Management Working Group (AFIRM)⁸³ and the Outdoor Industry Association's (OIA) Eco Working Group.⁸⁴

REI's Restricted Substances List (RSL) consists of three parts. The first part is the Primary Restricted Substances List. Substances on this list are based on global legislation, have been used in textile processing and have been found in finished products. Substances listed are restricted in products according to the limits and test methods that REI provides. This includes: azo dyes; disperse dyes; flame retardants; formaldehyde; metals (cadmium, chromium VI, lead, and nickel); organotin compounds; phenols; and phthalates.

Part Two of the RSL is the Supplementary List. Substances that appear on this list are based on global legislation and are restricted, but are not commonly found in finished products. This includes: arsenic and its compounds; asbestos; dioxins and furans; persistent organic pollutants; some pesticides; and some solvents.

The third part of REI's RSL is the List of Concern. Substances that appear on this list are not currently restricted in apparel products but may be in the future, based on potential legislation or voluntary restrictions by some companies. This

list includes: the flame retardant decabromodiphenyl ether (DECA); some organotin compounds; diisobutyl phthalate (DIBP); polyvinyl chloride (PVC) in toys and products intended to be mouthed; triclosan; perfluorooctanoic acid (PFOA); alkylphenol ethoxylates; and bisphenol A.

In 2007, REI also introduced its ecoSensitive label with more than 40 branded apparel styles, identifying select items that have improved environmental performance compared to their conventional counterparts. This started with an emphasis on materials with a high percentage of renewable, recycled, and/or organic fibers: organic cotton, bamboo, hemp, organic wool, post-industrial recycled polyester, recycled polyethylene terephthalate (PET) plastic, and polylactic acid (PLA).

In the last year, REI became a member of bluesign, an independent environmental standard for the textile industry (see above description of bluesign in Patagonia's case example—page 25). It has been encouraging textile suppliers to become certified under bluesign. The approach is being taken by brands such as Patagonia, Mountain Equipment Co-op, The North Face, Helly Hansen, Haglofs and Vaude; material suppliers such as Everest Textile, Eschler, Formosa Taffeta, Schoeller and Kingwhale; and chemical suppliers such as Clariant, Dye-star and Huntsman.

REI engages in discussions about non-REI brand supplier's chemicals policies but does not currently actively test for compliance. Some of these brands, such as Nike, have already created their own product chemicals management systems; however many other suppliers have yet to do so. Other brands are only required to be compliant with regulations in the continental United States where REI distributes and sells its products.

The AFIRM working group includes companies such as Adidas, Ann Taylor, C&A, Gap, H&M, Levis Strauss, New Balance, Nike, S. Oliver, Puma, Tesco, Timberland, and other companies that are interested in advancing global management of restricted substances in apparel and footwear, communicating information about RSL to the supply chain, discussing concerns, and exchanging ideas for improving RSL management. Ultimately the group seeks to elevate consumer and supply chain chemical safety. AFIRM participants agree that chemical product safety can only be achieved through partnerships among retailers, suppliers and manufacturers and they endeavor to develop solutions that continually improve their current practices.

REI is also actively involved in The Outdoor Industry Association Eco Working Group (OIA EWG—see above description in Patagonia's case example—page 26) which they co-founded in 2007.

Challenges encountered

Supply chain transparency and information accessibility are the biggest challenges REI has faced in implementing its product chemicals management program. The availability of accurate chemical toxicity data is a major hurdle as the company does not employ chemical experts on staff and therefore lacks the necessary expertise to assess the merits or risks of using a contentious chemical, as was seen with BPA. Rather than conduct an internal evaluation of BPA, REI instead had to rely on the input of third parties and discern a best path forward when confronted with conflicting data from a range of sources. REI ultimately made its decision to discontinue the use of BPA based on market forces rather than chemistry.

A second challenge REI faces is a lack of reliable metrics for environmental impacts. From chemical use, to water and energy consumption, to end-of-life impacts, it is difficult to gather data needed to share this information along the supply chain. It is equally difficult to communicate effectively with co-op members and customers about the complexity of product impacts.

Lastly, REI has run into challenges when sourcing products and materials to meet their evolving ecoSensitive standard.

Benefits discovered

REI's CEO, Sally Jewell, sees sustainability as a team effort and believes in the power of collaboration. There are currently several challenges in defining "green" and "sustainable" products, but REI sees a tremendous opportunity to increase innovation while simultaneously driving down the cost of sustainable products. Industry-wide efforts will allow companies to compete on the design of products rather than the definition of sustainable. If many companies are making bicycles for example, let the competition be on the performance of the bicycle rather than the packaging for the bicycle. If everyone uses the same reduced environmental footprint packaging, all benefit and the competition then focuses on product design and performance.

Thinking ahead

REI believes in the power of collaboration. Like many in the outdoor industry it has begun to develop in-house tools for a product chemicals management system. However, for each company to undertake this endeavor individually will not only take a significant economic investment, but will also result in a lack of harmonization, the development of disparate tools

and a variety of non comparable measurements that become commonplace in the industry. This is why it is an active participant in OIA EWG and will continue to be so.

The company firmly encourages all of its suppliers to become bluesign certified as this system holds the best promise for proactive chemicals management through identification of acceptable chemicals and the processes that use them.

REI will continue to invest in its private label ecoSensitive program based on continually tightening standards. Currently, ecoSensitive products can contain no substances on the RSL and no substances or materials of concern such as PVC. In the future, bluesign certified materials will be a requirement.

Consumers

REI's customers have expressed strong interest in sustainable products but most of all they want the company to be transparent and honest about what it knows about its products and how assessments are made. Its consumer base tends to be more environmentally aware than the average consumer and the company seeks to share as much information as it can about its products. REI's RSL, for example, is publicly available online, as is an assessment of the pros and cons of each material it uses in its ecoSensitive program.

Lessons learned

REI understands that today's retail industry is in a difficult position: on the front line with the consumer, expected to disclose product ingredients, but frequently unable to reliably obtain this vital information from suppliers. REI believes that development of a product chemicals management system as a single retailer is difficult, if not impossible to do correctly. Rather, collaborative relationships with others struggling with the same issues is seen as the key to successfully navigating product chemicals management issues. Industry-wide systems are vital for improving the effectiveness of chemicals management practices.

REI has learned to be wary of managing its own RSL program as it is time and resource intensive, and is complex to test for compliance and manage. It sees more promise in an approach such as the bluesign approach with which its suppliers will become certified.

Staples

Since incorporating in 1985, Staples⁸⁵ has become the largest office supply provider



in the world with operations in 27 countries on five continents throughout North and South America, Europe, Asia, and Australia. Headquartered in Framingham, Massachusetts, the company boasts annual revenues in excess of \$27 billion, and employs some 90,000 worldwide. In August 2008, Staples acquired Corporate Express,⁸⁶ a European owned business-to-business office product provider with a long history of sustainability initiatives. The fastest-growing line of business within Corporate Express was the facility supplies business which included facility supplies, janitorial supplies and cleaning products.

Corporate Express itself had acquired a large regional janitorial supply company, Coastwide Laboratories, in 2006. It brought its experience in chemicals management and design for environment initiatives to Staples following its integration into the company. While this case example primarily presents the chemicals management framework developed at Corporate Express, it also explores the role of corporate mergers in integrating chemicals management efforts, despite differences in approach or stage of development.

Drivers of change

In the mid-90's Coastwide Laboratories began receiving inquiries from major customers (INTEL, IBM, Tektronics) who had initiated screening of chemicals being used in their facilities to avoid damaging products. These companies were asking for full disclosure of the chemicals in Coastwide's products. Coastwide recognized early on that although full disclosure was risky, the first companies to do so would be rewarded with a larger share of the market. In choosing full disclosure, the company aligned its commercial interests with its health and safety goals. Coastwide developed its first chemicals policy, winning an early success with Intel before replicating this model with other customers. This approach proved to be an effective sales tool with other customers.

Staples' product chemicals management system

One of Staples sustainable design strategies is to eliminate the hazards of chemicals of concern from its own cleaning products' supply chains and replace them with safer alternatives. When acquiring Corporate Express in 2008, Staples adopted its chemicals policy: The Sustainable Product Design Standard⁸⁷ (SPDS). Staples implemented it into its own brand

product design policies, using it as the foundation for chemical management policies for cleaning products with a long-range objective of using it as the framework for designing its other brand products.⁸⁸

The Sustainable Product Design Standard provides specifications for the design of environmentally preferable and sustainable institutional and industrial cleaning products. It provides a definition for these products, establishes requirements for human and environmental health and safety attributes and encourages social equity throughout the cleaning product cradle-to-cradle supply chain. SPDS is voluntary, based on life cycle assessment principles, and establishes benchmarks for continuous innovation and improvement. It also provides a method for evaluating any cleaning product through a three-part framework.

Part One establishes nine mandatory human health screening endpoints of a Sustainable Environmentally Preferable Green Cleaning Products Scoring System, such as carcinogens, mutagens and reproductive toxins, endocrine disruptors, and volatile organic compounds. A product must comply (unless exempted) with all of the attributes and criteria listed to be considered for approval as a green cleaning product.

Part Two establishes 22 environmental, health and safety attributes which are desirable but not mandatory for compliance under this standard. Scores are assigned to each attribute; a lower total score indicates a more favorable product. Products containing petroleum distillates, for example, would receive a higher score than those without these ingredients because



petroleum distillates are not readily renewable resources. All attributes are evaluated, scored and recorded by a third-party certifier. Any product accumulating a total score exceeding 250 points is disqualified as a sustainable green cleaning product as defined by this standard.

Part Three encourages innovation and continuous improvement through a numerical assessment of the cleaning product chemical mixture. The Indiana Relative Chemical Hazard Score (IRCHS) is derived by assigning a point value for each ingredient of the product based upon its percentage by weight in the formula. The weighted IRCHS for each ingredient is added together and becomes the product's IRCHS value. The product must have an accumulative IRCHS of 4.00 or less to meet this standard (the lower the value the more favorable the rating). Medals are then assigned based on this IRCHS rating: bronze for products complying with Part 1 and Part 2; silver or gold for products with certain scores under the IRCHS system.

A product is considered sustainable and environmentally preferable when it complies with the requirements as indicated in Parts One and Two of this standard. Part Three of the standard is optional and can be used by organizations to determine the level of green proficiency.

Coastwide Laboratories (Corporate Express) also sought help in identifying safer alternatives by partnering with the Design for the Environment (DfE) Formulator Program at the Office of Pollution Prevention and Toxics of the Environmental Protection Agency.⁸⁹ This program provides independent validation of chemical product ingredients. The EPA DfE Formulator Program uses the Agency's chemical assessment tools and expertise to provide information to partnering companies on substitution for chemicals of concern and safer alternative chemistries. It encouraged Coastwide Laboratories (Corporate Express) to reformulate its products to be simultaneously safer for the environment, cost competitive, and effective.

By providing such services, the EPA DfE Formulator Partnerships have become respected and sought after among firms making cleaning products. The EPA has recently developed a detergent ingredients partnership following the same principles.

In addition to complying with SPDS and EPA DfE, Coastwide Laboratories (Corporate Express) also submitted its products to Green Seal for independent, third-party certification that it meets Green Seal cleaning product standards. This multi-certification approach provides a broad range of certifications to meet consumer expectations.

Challenges encountered

In the development of the Sustainable Product Design Standard, Coastwide Laboratories (Corporate Express) worked closely with suppliers to inventory the chemicals used in their products, and to explain their motivation for developing a standard. Coastwide Laboratories found that many suppliers were unaware of the concerns of chemicals in their products, and many of them thought they were already producing sustainable products, or didn't want to share their intellectual property. The company also found that there were frequently data gaps or data of poor quality, and limited access to credible environmental, health and safety information about the chemicals being used. At the time, suppliers believed that green products were expensive, were less effective than their conventional counterparts, and lacked a market of consumers willing to pay a price premium for environmental protection. Coastwide Laboratories worked with each of these challenges; they asked their suppliers to make safer alternatives for problematic ingredients and promised they would use them. The company identified 25 initial chemicals of concern which would not be used in Coastwide Laboratories products and set a timeline for this transition. Suppliers were invited to be part of the substitution process, and all but a few continue to supply the company with the ingredients it requires.

Benefits discovered

The primary benefit of implementing the SPDS was its promotion of suppliers as critical partners in disclosing vital information about product ingredients, eliminating restricted chemicals, and minimizing concerns for customers and suppliers. This relationship attracted innovative suppliers as well as Corporate Express employees interested in working for a company committed to a healthy workplace and environment. Exposure to chemicals of concern has been minimized for users of these products and the amount of these chemicals released to the environment has been reduced.

For Staples, one of the benefits of the Corporate Express acquisition was acquiring a new brand to add to the Staples® brand group family – Sustainable Earth.⁹⁰ For years, this brand has represented a line of high-quality, environmentally preferable cleaners for institutions and the office and now it is bringing recognition to Staples. In November 2008 for example, the Environmental Protection Agency recognized Staples Corporate Express as a champion in producing safer detergents for the environment.⁹¹ “Champion” is the highest level of recognition offered under the EPA's DfE SDSI (Safer Detergents Stewardship Initiative). In 2008 Staples also won the 2008 ISSA (The Worldwide Cleaning Industry Association) Innovation

Award⁹² and most Innovative Green Product Award for its Sustainable Earth line of products.

Thinking ahead

The SPDS Standard is currently focused on Staples brand product designs, specifically Sustainable Earth cleaning products. Now Staples is expanding the Sustainable Earth brand and recently added Sustainable Earth remanufactured toners. Like all Sustainable Earth brands, the new line had to meet strict standards to demonstrate they are more environmentally preferable than competing products in their class including: meeting independent third-party certifications that cover multiple product attributes (e.g., raw materials, energy use, chemicals of concern, etc.); using high levels of post-consumer recycled content, and/or incorporating other features, such as reduced materials use, reduced packaging, etc.; and screening of the expected life-cycle impacts of the product (from raw material extraction to end of life) to ensure there are no significant trade-offs in environmental impacts.

The company wants to encourage and influence product designers in other product lines at Staples to apply the SPDS life cycle approach in the design of products. Its overarching goal is to drive product chemicals management within the company by incorporating it at deeper levels of the corporate structure and expanding its reach beyond cleaning products to other product lines.

The long-range objectives for Staples are to work with and teach suppliers of national brands to conform to the SPDS standard. Currently the primary influence the company has with national brands is through its purchasing power. Staples is working towards creating a chemicals policy that will be presented to suppliers with the objective of advancing green chemistry and encouraging suppliers to offer products that have been made with safer alternatives without sacrificing performance or price.

Consumers

Customer satisfaction is one of Staples' highest priorities and customer satisfaction surveys enable them to continually improve service and product offerings. Based on these surveys, Staples offers hundreds of eco-preferable Staples® brand products to help meet their sustainable purchasing goals. These are cost-competitive alternative products ranging from notebooks and writing pads made from recycled sugar cane fiber to remanufactured ink & toner, Forest Stewardship Council-certified copy paper and recycled content mailing supplies. In 2007 Staples expanded its commitment to sustainability with

the introduction of Staples EcoEasy, which is focused on three key areas: operating the Staples business in a manner that sustains the environment for customers, associates, suppliers, and the global community; providing office products that make a difference for the environment; and, offering services that make it easy to be environmentally responsible.

Lessons learned

Staples has found that resistance to change is to be expected. It needs to be planned for and its inevitability needs to be accepted, but it can't stop the development process. Leveraging champions within and outside organizations can help respond to this resistance and can help guide change. In order to incorporate the changes a product chemicals management system brings, Staples has found that a company has to have the resources available, be tenacious and resolved to finish what it has started.

The acquisition of Coastwide by Corporate Express in 2006 followed by the acquisition of Corporate Express by Staples in 2008 provide great lessons of how smaller companies can positively influence and accelerate chemical policy changes in larger enterprises. In both cases these changes were the result of demonstrating that implementing product design chemical policies can lead to significant competitive advantage and economic benefits.

Walmart Walmart

Walmart⁹³ is the world's largest retailer with over 7,900 retail operations in 15 countries. With fiscal year 2009 sales of \$410 billion, Walmart employs more than 2.1 million associates worldwide, and serves more than 200 million customers and Sam's Club members each week. Sustainability 360 is the framework being used to achieve Walmart's long-term sustainability goals that focus on: using 100 percent renewable energy; creating zero waste; and selling products that sustain resources and the environment.

Drivers of change

Walmart initially started down the path to developing a product chemicals management system by looking for a way to provide accurate regulatory information throughout its logistics system. With its thousands of stores and hundreds of thousands of SKU's, it needed a way to be sure that associates in the stores as well as shipping personnel had the adequate information to handle hazardous materials. Walmart needed a way to identify regulated items and handle them in accordance with



hazardous waste regulations. For Walmart, the sheer size and complexity of its operations required a formalized system.

In 2004 Walmart initiated a system in its stores and clubs that would help associates identify hazardous materials. Walmart used a third party to evaluate Material Safety Data Sheets (MSDS), Department of Transportation (DOT) classifications and fire code classifications, among other things, and help get information so store associates could handle hazardous materials safely. The information had to be readily available to a workforce that was unlikely to include experts in health and safety and, as with most retail, has a high turnover. However, on numerous occasions, Walmart had to go back to the supplier as information on the MSDS sheets was inadequate.

Walmart's product chemicals management system

An element of Walmart's Sustainability 360 has been to reduce the hazardous chemicals from its products. In discussion with a variety of stakeholders, including suppliers and non governmental organizations, in late 2006 Walmart launched its Chemical Intensive Product Initiative.⁹⁴ This initiative identified a list of 20 chemicals of concern, announcing three as priorities: propoxur and permethrin, both used in household insect control products; and nonyl phenol ethoxylates (NPE), an ingredient in some cleaning products. Walmart then worked

with suppliers to develop a timeline for elimination of these three chemicals and their replacement with less harmful alternatives.

In 2008, Walmart announced a change in its approach. It would no longer identify specific chemicals of concern, but would give preference to chemical products that score well in the GreenWERCS screening process. This screening process was developed by The Weracs,⁹⁵ an independent company that specializes in Material Safety Data Sheets (MSDS) and regulatory compliance systems.

A coalition of suppliers and non government organizations worked with Walmart and The Weracs to develop software called the GreenWERCS Chemical Screening Tool.⁹⁶ The system conducts chemical assessment on chemical products based on ingredient information provided by suppliers plus MSDS.⁹⁷ In order to create new chemicals in a supplier's item file (a file of their products and services), a supplier must submit all intentionally added chemical ingredients in their product plus current MSDSs. The product chemicals are screened and classified as PBTs (persistent, bioaccumulative and toxic), CMR's (carcinogens, mutagens and reproductive toxicants) or endocrine disruptors based on published and authoritative lists of chemicals of concern. The tool currently uses 30 separate

transparent lists that contain information on about 2,400 chemicals. GreenWERCS generates a score for a finished product based on the properties and the levels of the individual chemicals in the final composition. Every chemical, with the exception of endocrine disruptors, currently has the same weighting in this score. Endocrine disruptors have a lesser score.

The supplier sees a score for its product along with other products in its category. These ratings are on a scale that is color coded as red/yellow/green. A feature called a “sandbox” allows suppliers to experiment with product ingredients to see what alternative ingredients would reduce their environmental impact. This encourages suppliers to make changes in product formulations so they can gain a better score in the GreenWERCS system.

There is a fee to suppliers for each product submitted for chemical assessment and the chemical assessment is conducted within 48 hours. Walmart and other retailers can download data from this third party process with permission from the supplier. Retailers thereby receive information that will assist in legal compliance at the federal, state, and local levels. The information includes a chemical assessment, DOT hazardous material classifications, VOC percentage, chemical inventory status, pesticide registration, etc., and a North American MSDS. The exact ingredient percentages are confidential but are retained by GreenWERCS in an encrypted secure format.

For large company suppliers, the data to be supplied to GreenWERCS is usually available. For smaller suppliers who may not have all the necessary data or MSDSs, Walmart has set up a support network of independent experts that suppliers can access to help them provide the necessary data. Walmart has also set up a Retail Link for its suppliers to communicate about the chemical assessment process. In addition, The Wercs provides independent webinars on the system’s operation.

Walmart recognized that it would be requiring its suppliers to provide more information than they might have on chemical product ingredients, that the collection and expert interpretation of this chemical data is important to the entire retail sector, and that there could be significant economies of scale to a system if eventually it could be used by other retailers trying to accomplish the same goals. Although Walmart initially contracted with GreenWERCS and has participated in the initial design of the system, the goal has been to allow additional qualified third party companies to participate in the process.

This cooperative concept has ensured that Walmart has been very involved in the development of a worldwide initiative, the Global Data Synchronization Network (GDSN).⁹⁸ The GDSN facilitates the synchronization of item (product and service) information between GDSN trading partners: suppliers/manufacturers and retailers. If a product changes or a new product is introduced, that new information needs to be communicated across the supply chain to all affected parties to ensure that all partners are trading with the same information. Communicating changes of this information to all affected parties can be a daunting task in complex supply chains with hundreds of partners. The GDSN responds to these information needs by ensuring consistent, quality information among trading partners.⁹⁹

The GDSN system would allow for tracking of information that may be relevant for future regulations, sustainability and/or purchasing initiatives. As new chemical concerns or restrictions arise, retailers can add them to their specifications. Advantages include safer shipping, handling, storage, and disposal; accurate data in a consistent format; improved regulatory compliance; and cost reductions and efficiency improvements.

Challenges encountered

Regulations as they pertain to the retailer industry need to be understood by both buyers and suppliers. Initially, Walmart tried to make buyers and suppliers experts in these regulations but as they change constantly, this was difficult. They found the GreenWERCS system, which relies on ingredient information, to be a better solution. Walmart communicated with suppliers and asked for input in developing this system and communicated what their expectations were. This was done over a phase-in period to allow suppliers to adjust to the chemical product assessment process.

GreenWERCS relies on data accuracy. Suppliers provide this data and The WERCS evaluate and provide an independent assessment on the data submitted. Product testing is not done to verify the accuracy of the information provided by the suppliers.

Benefits discovered

The main benefit to Walmart in developing its product chemicals management system is that stores can now properly handle chemicals in storage, in the distribution system, in transportation to stores and in stores themselves. Walmart

can better manage compliance with federal, state and local regulations. And suppliers have this information to assist them with product design.

Walmart expects to see a cost savings based on reduced hazardous waste; because the system is new, there has not been time to measure the impacts. Immediate cost savings will come from efficiencies in identifying and safely handling hazardous materials.

With GreenWERCS, Walmart has a tool that will help its suppliers understand how they rate against their industry average score and how they can improve their products. Ultimately suppliers will be competitively challenged to produce more sustainable products.

Thinking ahead

Walmart is still in the early stages of implementing the GreenWERCS Chemical Screening Tool, as it went live in May 2009. As new regulations and lists of chemicals of concern are put into place, the system will incorporate these and suppliers will be notified of the change. In this way, the impact on the supply chain will be minimized.

The initial phase of GreenWERCS focuses on regulated chemicals. This will have the effect of “bringing up the bottom.” The plans though are to encourage the practice of informed substitution and eventually identify preferred chemicals by functionality.

Walmart also hopes that GDSN will gain broad acceptance and be seen as a way to ease the burden on suppliers who now have to supply information separately to each retailer. In a letter to its suppliers in October 2009, Walmart announced its goal to synchronize product data with all of its trading partners via GDSN by January 31, 2010. Monthly web seminars with suppliers will provide updates on the status of Walmart’s GDSN rollout, future direction, and expectations of its supplier community.¹⁰⁰

Consumers

Walmart customers vote everyday by what they purchase. Items are tracked and monitored by a computer system and product and sales information is shared with suppliers so they can adjust their manufacturing and distribution to remain in stock. These tools allow Walmart’s marketing group to identify and monitor future trends, which are also shared with suppliers.

The Marketing department at Walmart conducts significant market research, particularly with women. Women make the majority of purchases in a family so Walmart wants to understand what is important to women and how they can fulfill those needs. Based on sales information from 2008, Walmart found that customers think environmental issues are very important and are supportive of green products but they do not want to spend a lot more money for them.

Walmart provides information to buyers to help them make informed decisions, and expects that this information will be assimilated by consumers in time. Walmart provides some information to consumers: shelf talkers (brochures that provide information about a product that are located directly beneath it) are available on some products; product specifications are available at www.walmart.com, and copies of a product’s MSDS can be obtained online. However, it currently sees suppliers taking the lead on consumer education.

Lessons learned

Walmart has found that success of a product’s chemicals management system depends on it being incorporated into day-to-day business operations; it must become routine and an essential element that suppliers and buyers alike adhere to.

It has also found it to be important to understand the capabilities of suppliers and to initially ask them for information that they already have or that they can develop easily. Suppliers’ concerns about confidential business information have been eased by the help of a credible third party. Although initially producing this information can be burdensome to suppliers, they have discovered benefits as well. It is often difficult for example, for many suppliers to keep track of changing regulatory and compliance issues state by state. A third party system such as GreenWERCS tracks this information and makes it available to both suppliers and retailers.

Analysis of Case Examples

THIS SECTION PROVIDES AN ANALYSIS AND SUMMARY of the information obtained from the seven case examples. The information was analyzed to identify commonalities and lessons learned in implementing a product chemical management system. This includes the identification of drivers, challenges, benefits, and key success factors in implementing such a system. In general, the objective of implementing the product chemical management system was to enable the retailer to identify, evaluate, and make decisions regarding the chemicals used in the products they sell.

Common Drivers, Benefits, and Challenges for Implementing a Product Chemicals Management System

There were several drivers for retailers to implement a product chemical management system. For some retailers, there was a desire to build or enhance a brand image based on trust and integrity. These retailers clearly recognize that consumer trust in their brand name is a key to their longer-term commercial success. For those retailers handling hazardous products or products that contain hazardous materials, implementing product chemical management systems is driven by cost saving efforts such as reducing costs for hazardous waste handling of returned products, or reducing transportation costs by using less hazardous materials. Also, some retailers are responding to inquiries from customers that are requesting chemical specific information for their products, or to media coverage of new scientific findings on certain chemicals raising concerns about their safety.

The benefits achieved by the retailers after implementing a product chemical management system are significant. Many of them are similar to the drivers. Building the trust of the consumer in the company brand has translated into commercial success. For retailers handling hazardous products or products that contain hazardous materials cost savings have been recognized in the storage, handling, disposal, and transportation of products that use less hazardous chemicals. Also, there is protection from unwanted liability and better assurance of compliance with local, state, federal and international regulations. In addition, the workplace is now safer for employees. These companies believe that they can now better attract and retain talented employees who want to work for a

company that is both environmentally and safety conscious. These retailers believe that as awareness of hazardous chemicals in products grows, better tools and data will become available to make the process of identifying safer alternatives easier and more efficient.

The benefits achieved after implementing a product chemical management system are significant. The workplace is now safer for employees. These companies believe that they can now better attract and retain talented employees who want to work for a company that is both environmentally and safety conscious.

Some of the common challenges these retailers encountered in implementing a product chemicals management system were related to the lack of readily available information throughout the supply chain, as well as the resources required to implement and manage the system. Each company encountered issues with their suppliers' lack of data on specific chemicals, or with a supplier's reluctance to provide data due to concerns about the proprietary nature of their formulations. The retailers were also challenged with educating their suppliers and customers about the implementation of the product chemical management system. Educating consumers about "green" or safer products presented another challenge for retailers who found it difficult to introduce these products without calling other products they sell into question. Products are continuously improving as safer alternatives to toxic chemical ingredients are discovered but this is a difficult concept to convey to consumers.

Product Chemicals Management System Approaches

In the cases studied, there was not a universal approach for implementing a product chemical management system. Instead, there were three different approaches identified in the seven examples: restricted substance lists, chemical evaluation systems, and product design strategies. Each of these approaches can be pursued at the company level, or in a more

collaborative fashion at the sector level or retail industry level. These approaches are described below.

Restricted Substance List: This approach entails developing a list of chemicals restricted in products the retailer sells. The list can be developed internally by identifying chemicals based upon some selection criteria, or it can be based upon external sources such as regulations, or consolidation of existing restricted substance lists worldwide.

Company level: Boots developed a restricted substance list based upon toxic chemical lists generated by OSPAR,¹⁰¹ CIR,¹⁰² SCC,¹⁰³ KEMI,¹⁰⁴ and ChemSec's¹⁰⁵ SIN list to name a few.

Sector level: The Apparel and Footwear International RSL Management Working Group (AFIRM) worked collaboratively with companies to develop a restricted substance list for the apparel and footwear sector, primarily based on worldwide regulatory restrictions.

Retail industry level: No retail industry level approach has been identified.

Chemical Evaluation System: This approach includes the use of a chemical evaluation system that tracks and evaluates the risk of chemicals used in products that are sold by the retailer. The evaluation can be conducted either internally by the retailer, or externally by a third party.

Company level: Green Depot has developed the Green Filter process to compare chemical usage by suppliers to internal standards and thresholds that the company has established.

Sector level: Bluesign is an organization that provides environmental health and safety certification for suppliers in the textile products sector. Patagonia and REI are retailers in the textiles sector that have collaborated with bluesign to provide these certification services for their suppliers.

Retail industry level: Walmart has collaborated with The WerCS to develop a system called the GreenWERCS Chemical Screening Tool for conducting chemical assessments on products. The intent is that the system will gain broad acceptance across the retail industry, and consequently ease the information burden on suppliers who now have to supply chemical information separately to each retailer.

Product Design Strategy: The objective of this approach is to implement a product design strategy that incorporates reducing the environmental impact of products by reducing or eliminating the use of harmful substances at the design stage. Many retailers include this approach with their private label and exclusive distribution products but have not adopted it as an approach for all products.

Company level: Apple has implemented a product design strategy, product design excellence, which is used in the design and manufacture of all Apple products.

Sector level: No sector level approach has been identified.

Retail industry level: No retail industry level approach has been identified.

A summary of the product chemicals management system approaches selected by the seven companies is shown below.

Table 1. Product Chemicals Management System Approaches by Level

Approach	Company Level	Sector Level	Retail Industry Level
Restricted Substance List	Boots, Green Depot, REI	Apparel & Footwear: Apparel and Footwear International RSL Management Working Group (Patagonia & REI)	None yet identified
Chemical Evaluation System	Boots, Green Depot, Staples	Textiles: Bluesign (Patagonia, REI) Outdoor: Outdoor Industry Association Eco Working Group (Patagonia & REI) Cleaning: EPA Design for Environment (Staples)	GreenWERCS (Walmart) Global Data Synchronization Network (Walmart)
Product Design Strategy	Apple, Boots, Green Depot, Staples	None yet identified	None yet identified

Retailers selected either a single approach or a combination of approaches for their product chemical management system. For example, Patagonia has selected a chemical evaluation system approach with bluesign, while REI has chosen a chemical evaluation system approach with bluesign in conjunction with a restricted substance list approach for REI branded products. Other retailers also selected different approaches

for different product categories (i.e. their own label and different product brands). This strategy was undertaken by Boots, REI, and Staples. The following table provides an overview of the product chemical management system approaches pursued by the seven retailers included in the case examples. A check mark and a brief description are provided for each system that has been adopted by the retailer.

Table 2. Product Chemicals Management System Approaches by Retailer

Company	Product Categories	Restricted Substance List	Chemical Evaluation System	Product Design Strategy
Apple	Products designed & manufactured by Apple			✓ Product Design Excellence
Boots	Boots brand; manufactured by Boots or a third party (55% of total)	✓ OSPAR, CIR, SCC, KEMI, ChemSec	✓ EH&S assessments	✓ Green Chemistry Strategy
Boots	Non-Boots brand (45% of total) comply with minimal safety requirements & current laws including REACH			
Green Depot	Green Depot and non-Green Depot brands	✓ Based on U.S. Government & NGOs	✓ Green Filter	✓ Safer Ingredients
Patagonia	Patagonia brands		✓ bluesign OIA Eco Working Group	
REI	REI brand (20% of total)	✓ Based on global legislation AFIRM	✓ bluesign OIA Eco Working Group	
REI	Non REI brand (80% of total)	AFIRM	OIA Eco Working Group	
Staples	Cleaning products	✓ Used for screening	✓ SPDS, and review by Green Seal & EPA DfE	✓ Green Chemistry Strategy
Staples	Non-cleaning products		✓ SPDS standards under development, and EPA DfE	
Walmart	All chemical product brands and categories		✓ GreenWERCS GDSN	

Several factors may influence a company's selection of an approach for product chemical management. First, the type of organization is a key factor. Companies that design, manufacture, and sell most or all of its products (i.e. Apple) have direct control on product design activities and therefore are well positioned to determine an overall product design strategy. Companies that do not design or manufacture any products and are purely a retail operation would not select the product design strategy and would be more likely to choose another approach. Many companies are a hybrid of manufacturing and retailing for their various product categories (e.g., Boots) and may select from the three different approaches. Some retailers have direct manufacturing operations while others, like Green Depot, manufacture their branded products through an OEM operation.

Another factor is company size. Smaller companies with limited resources may be more inclined to rely on work already undertaken by external organizations and to adopt either a Restricted Substance List or a collaborative sector-level ap-

proach in which a system developed by another organization is adopted. Large companies have more resources to leverage and have greater influence within the overall supply chain. These companies are better positioned to effectively develop a proprietary product chemical management system or a collaborative sector level approach in which they are the driver of the system. For example, Walmart has worked with The WERCS to develop an independent third party system for supplier chemical data and chemical screening that can be accessed by other retailers. Walmart initiated the development of this system to ease the burden on suppliers that have to supply information separately to each retailer. Also, this approach will help to keep track of regulatory and compliance issues on a state-by-state basis.

The table (below) illustrates some of the benefits and challenges of the particular approaches that were reported by the retailers in the case examples as a result of implementing their product chemical management systems.

Table 3. Benefits and Challenges of Product Chemicals Management Systems

Approach	Benefits	Challenges
Restricted Substance List	A proprietary restricted substances list enhances the speed of product evaluation, and enables the retailer to pass feedback about chemicals of concern up the supply chain. (Green Depot)	With the lack of internal chemical expertise, there is a reliance on external information sources which are often conflicting. (REI)
Proprietary Evaluation System	<p>Company level: The economic benefit of being proactive with product chemicals management is that there is no need to rush changes to formulations or marketing which can be costly. (Boots)</p> <p>Sector level: A retail operation doesn't have to pay for developing restricted chemical lists, assessing chemical toxicity, or testing products. (Patagonia)</p>	<p>Company level: Extensive resources are needed to track and monitor what's happening around the world, as well as managing and assessing the data gathered. (Boots)</p> <p>Sector level: Convincing suppliers to pay the costs of certification by bluesign takes time and resources. (Patagonia)</p>
Product Design Strategy	A retailer is able to redefine how chemicals are restricted within the supply chain. For example, restricting substances at the elemental level instead of the compound level. (Apple)	The greatest challenges occurred with the introduction of new materials. This included adoption by suppliers and certification by testing agencies. (Apple)

Best Practices for Implementing a Product Chemicals Management System

Several common success factors for implementing a product chemicals management system were identified in this analysis. Best practices are defined in this report as key success factors in implementing product chemicals management systems that have been identified in the seven case examples. The best practices are grouped into the following categories: ensuring leadership commitment, enhancing supplier chemicals management, engaging stakeholder partnerships, providing customer support, undertaking strong project management, and selecting the most appropriate product chemical management system for the organization.

Leadership Commitment

Senior management is responsible for providing the strategy, policies, organization, and resources necessary for the success of major initiatives. As such, their commitment to the development and continuous improvement of a product chemicals management system is essential. The following best practice was identified:

- Retailers should secure a commitment from leaders in the organization to pursue a product chemicals management system. This is necessary because it is a resource intensive and complex undertaking that may require participation of internal resources from across the organization, as well as participation by members of the supply chain. For example, when consumers and stakeholders began asking more questions about the safety of Boots' products, Boots made the decision to become a leader in safer chemicals in the healthcare and beauty products industry. Some in the company questioned the risks of being out front, but in the end, Boots leadership decided it wanted to be seen as the most trusted brand in the industry. Being proactive about potential hazards posed by chemical ingredients was a decision anchored by the company's core commitments.

Supplier Chemicals Management

Retailers and their direct suppliers share the same consumer. Both have the desire to enhance brand image and build consumer trust, so collaboration is essential. Suppliers are there-

fore critical participants in implementing a product chemicals management system. The following best practices were identified:

- Retailers should communicate clearly with suppliers about new chemical reporting protocols and requirements, and explain why a new product chemicals management system has been developed. For example, REI has communicated with its suppliers about the benefits of using bluesign, including the cost savings potential and the quick return on investment.
- Collaboration with suppliers is important as they work to conform to the new protocols and requirements of a product chemicals management system. For example, for small suppliers Walmart set up a support network of independent experts that suppliers can access to help them provide the necessary chemical data.
- Retailers should recognize and protect the reasonable confidentiality needs of suppliers for their proprietary information. For example, bluesign addressed this by using non-disclosure agreements to protect confidential information.

Stakeholder Partnerships

In addition to supplier collaboration, collaborative opportunities and partnerships can be found within and outside the supply chain. For example, traditionally, retailers have viewed the role of advocacy organizations as reactionary and adversarial. Including multiple stakeholders in the initial stages and throughout the development of a product chemicals management system enhances its likelihood of success. The following best practices were identified:

- Retailers should proactively engage advocates and other stakeholders in the development of their product chemicals management system, and in helping guide their strategies and program efforts in general. For example, Walmart worked with a variety of stakeholders, including non-governmental organizations, when it launched its Chemical Intensive Product Initiative in 2006, and again in 2008 when it developed the GreenWERCS Chemical Screening Tool.

- It is important that retailers are involved in sector-wide and industry-wide discussions with others struggling to successfully navigate product chemicals management challenges. These discussions are seen as vital for improving the effectiveness of product chemicals management practices. For example, REI and Patagonia are involved in the Outdoor Industry Associations Eco-Working Group to develop the industry's first environmental assessment tool or Eco Index. Once developed, it will be used to incorporate environmental considerations into product design and to manage their supply chains in a way that supports their environmental goals.
- The chemicals management system should be started on a reasonable and flexible timeline to allow for adjustments that may be needed for both suppliers and retailers. For example, the GreenWERCS system has taken a year for buyers and suppliers to develop. Walmart communicated with suppliers about its expectations and asked for input in developing this system. This was done with enough time to allow suppliers to adjust to the chemical product assessment process.
- It is important to understand that any product chemical management system will require continuous improvement and retailers should be prepared to develop the necessary skills and provide the resources this requires. For example, Boots is expanding its product chemical management system to include environmental impacts in addition to health and safety impacts for the chemicals used in the products that they sell.

Customer Support

Retailers must provide adequate customer support during the implementation phases of their product chemical management system. Otherwise consumers may become confused or frustrated with the information provided. The following best practices were identified:

- The goal of the retailer should be to make the purchase of safer and greener products easy for their customers. For example, Green Depot tries to educate its customers by including educational materials in large displays that clearly explain the CLEAR icon system.
- Retailers should communicate clearly with consumers by providing safety and chemical information that customers may require about their products. For example, this was accomplished by Apple through the use of emails, television commercials, and an environmental report for each product.

Project Management

In addition to leadership commitment, the implementation of a product chemicals management system must be thoughtfully and effectively managed. This will ensure success of the system. The following best practices were identified:

- Retailers should first establish a baseline of information about toxic ingredients in their products by evaluating existing products being sold, how much environmental, health and safety information is available, and any relevant supplier information. For example, the GreenWERCS Chemical Screening Tool conducts chemical assessment on products based on ingredient information provided by suppliers plus MSDS.

Product Chemical Management System Selection

There are many different approaches for a retailer to implement a product chemical management system. Three different approaches were identified in this study. The following best practices were identified:

- It is important for retailers to determine which approach may be the best “fit” for their particular retail operation. Retailers should first evaluate potential chemicals management systems adopted by other retailers, as well as determine if there are potential areas of collaboration with external partners either within or across sectors. The chemicals management system approach selected should develop useful criteria to evaluate, compare and rate products. For example, in the GreenWERCS Chemical Screening Tool suppliers see a score for their products along with other products in that category. The “sandbox” feature allows them to experiment with product ingredients to see what alternative ingredients would reduce their environmental impact, resulting in a better score.
- The chemicals management system approach selected should be easy for retailers and suppliers to use. For example, Green Depot developed its chemical evaluation system as a part of its Green Filter. This dovetails with its CLEAR icon system, which was intended to be simple to understand.

Conclusion

WITH THE EXCEPTION OF A SMALL NUMBER of retailers, to date product chemicals management has not been a focus of retailers' sustainability efforts. Such efforts have been focused on improving energy efficiency, alternative energy, carbon reduction and packaging. As retailers find themselves faced with increasing demands to understand more about the chemical ingredients and toxicity of the products they sell, and to identify safer alternatives, product chemicals management is coming to the forefront.

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These demands are coming from changes in product legislation in Europe and other parts of the world, and from states within the United States. U.S. federal changes to product legislation have been limited to date but this may change if reform of the federal Toxic Substances Control Act and other legislation that affect products come to fruition. Further demands are coming from consumers who are increasingly interested in buying "green" or safer products as news of product recalls and new science highlighting the hazards of toxic ingredients in products becomes available. Although the number of eco-labels is increasing with the number of "green" products, without regulation it is still very difficult for consumers to know the difference between a product that is "green" and greenwashing. Some companies are responding by disclosing the ingredients in the products they sell and some independent bodies are offering green purchasing support tools. Even the EPA has recognized the current demands on retailers by launching a web portal which acts as a central clearinghouse of information to help them to implement more sustainable practices.

This report was written to explore the increasing demands that retailers face with regards to chemical safety and to in-

form retailers about various product chemicals management approaches being developed and applied. It is relevant to retailers who have not yet embarked on a product chemicals management system, those who are currently in the process of developing or selecting a system, and those who have developed a system.

Although there is no one industry approach to developing a product chemicals management system, the best practices from these seven case examples offer useful guidelines to retailers moving forward. These include:

1. Securing a commitment from leaders in the organization to pursue a product chemicals management system;
2. Establishing a baseline of existing products, ingredients, and toxicity information available;
3. Determining which product chemicals management approach may be the best fit for the retail operation;
4. Selecting a system that is simple for retailers and suppliers to use;
5. Engaging suppliers, advocates and other stakeholders in the development of the product chemicals management system;
6. Communicating clearly with suppliers about the new chemical reporting protocols and requirements that come with a new system and collaborating with them as they work to conform to these;
7. Protecting the confidentiality of suppliers' proprietary information;
8. Understanding that any product chemical management system will require continuous improvement;
9. Participating in sector-wide and industry wide discussions with others struggling to successfully navigate product chemicals management issues;
10. Making the purchase of safer products easy for customers; and
11. Providing customers with the safety and chemical information they request about the products they are purchasing.

A transformation in the way chemicals are regulated and managed is occurring as new understandings of the health implications of chemical exposures, limitations of current policy systems, and knowledge of safer alternatives arise. It is likely that retailers are going to face more regulations, more consumer and advocacy pressure, and more challenges to understand chemicals used in products and to implement alternatives. Under these circumstances, retailers can respond by reacting to challenges or by working together with forward-looking manufacturers and retailers to develop systems that ensure good information on product formulations and chemical toxicity, and to promote the design of safer products.

The opportunity is ripe for the retail industry to be a key innovator in the field of product chemicals management and to

help transform the marketplace towards safer products. Some retailers are already engaged. Although many retailers start with developing their own product chemicals management systems, there are growing opportunities for collaboration sector-wide and industry-wide. Industry-wide systems like the Global Data Synchronization Network may offer the largest potential for impact as they can include all suppliers and all retailers. No matter what system is developed, or whether that system is company, sector or industry-wide, as more suppliers and retailers become involved, it will be easier for all retailers.

Retailers play a key role in leading the movement towards supply chain initiatives and policies that ensure that data on chemicals in products are available and that the products sold use the safest chemicals and materials.



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Best Practices in Product Chemicals Management in the Retail Industry

Faced with growing demands to identify and disclose the potentially harmful chemical ingredients in the products they are selling and to substitute chemicals of concern, innovative retailers are incorporating product chemicals management systems into their corporate sustainability strategies. Developing and implementing such systems are not without challenges but retailers are discovering the benefits of such programs including an increase in consumer trust and cost savings. This report examines the influences on today's retailers to encourage their adoption of chemicals management programs, the product chemicals management systems that seven innovative retailers have adopted in response to these influences, and the best practices identified in the development and implementation of these systems.



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Chemicals, alone or in combination, are the platform upon which key elements of the global economy have been built, and have been incorporated into millions of products used every day. Many chemicals may have inherently harmful characteristics that can impact ecological and human systems as they are used throughout supply chains. A growing number of companies are discovering that the approaches of green chemistry and Design for Environment (DfE) allow for a transition to safer alternatives. The Green Chemistry and Commerce Council provides open conversation about the challenges to and opportunities for this successful transition. The GC3 is a project of the Lowell Center for Sustainable Production at the University of Massachusetts Lowell.

