
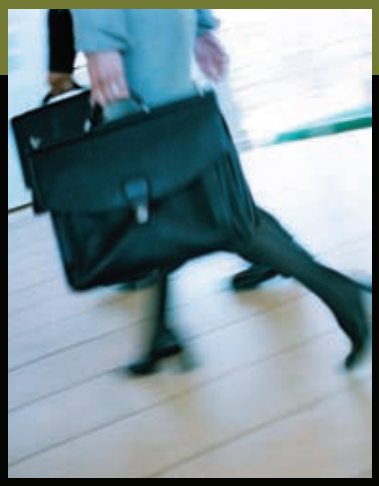

Healthy Business Strategies for Transforming the Toxic Chemical Economy

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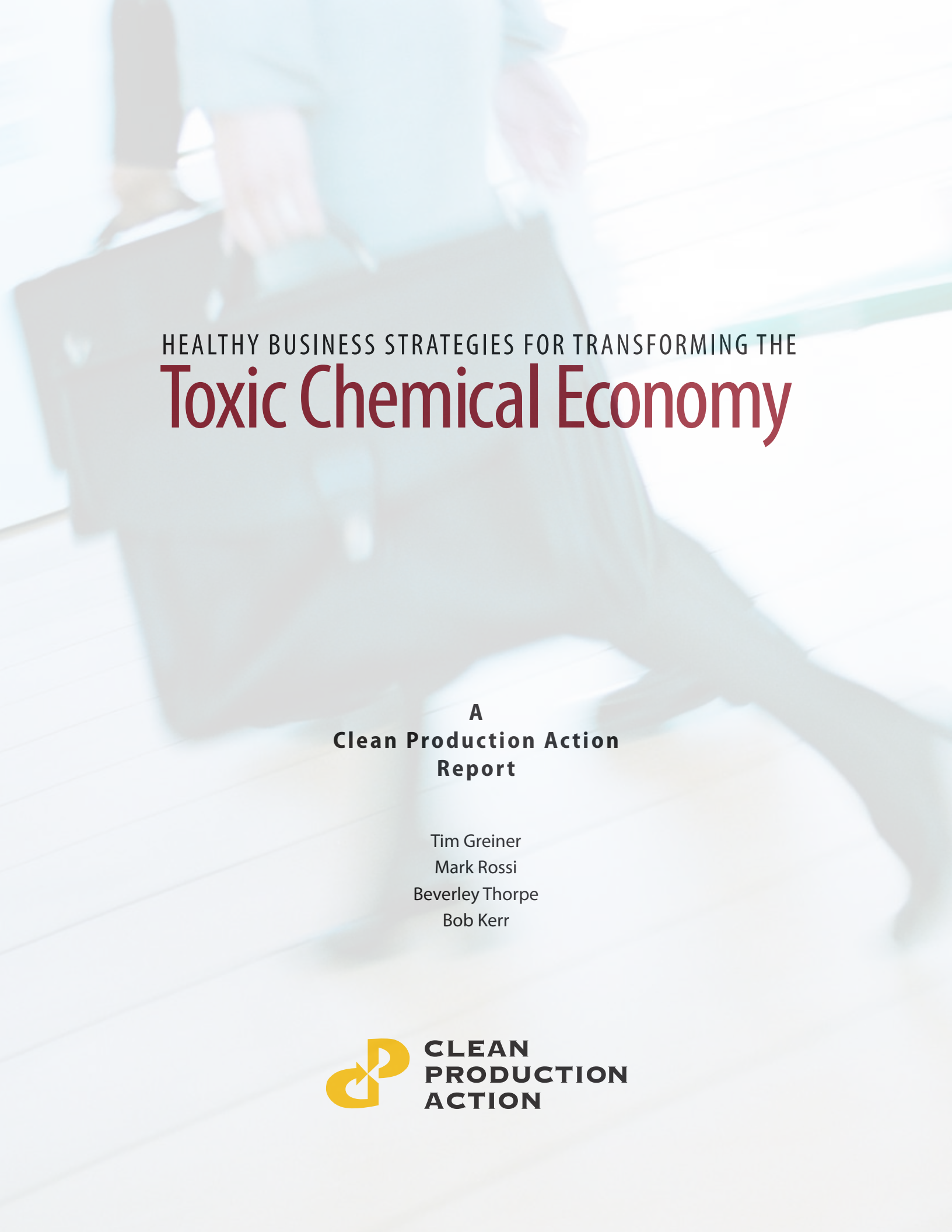

HEALTHY BUSINESS STRATEGIES FOR TRANSFORMING THE

Toxic Chemical Economy

A
Clean Production Action
Report

Tim Greiner
Mark Rossi
Beverley Thorpe
Bob Kerr

CLEAN
PRODUCTION
ACTION

Clean Production Action
Mark Rossi, Beverley Thorpe
Clean Production Action promotes the use of products that are safer and cleaner across their life cycle for consumers, workers and communities. Our mission is to advance Clean Production which we define as the design of products and manufacturing processes in harmony with natural ecological cycles, the elimination of toxic waste and inputs and the use of renewable energy and materials.

Pure Strategies, Inc.
Tim Greiner, Bob Kerr
Pure Strategies helps companies improve their environmental and social performance using clean production tools, sustainable materials, strong community relationships and transparent measures of progress.

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Interface Fabric: Benign by Design

Terratex PLA represents Interface's latest innovation on the company's journey towards sustainability. Launched in 2004 as the first commercial interior fabric made from 100 percent renewable biopolymers, Terratex PLA is used in window treatments and office cubicle paneling. Over the past eight years, Interface's product development team worked to introduce this new fiber, developing one of the most comprehensive approaches to selecting green chemistry in the textile industry.

What is Terratex PLA?

Terratex uses 100 percent polylactic acid (PLA) from NatureWorks LLC. Terratex PLA fibers originate from corn that is processed via fermentation to produce a 100 percent bio-based polymer. Lifecycle studies show that PLA polymer consumes less fossil fuels, uses less water, and emits fewer greenhouse gases, compared to most conventional petrochemical-based polymers. Terratex PLA also offers performance benefits comparable to and even exceeding petrochemical polymers. For example, it is naturally stain-resistant, exhibits superior fire-retardant properties and does not retain odors.

When Interface developed Terratex PLA technology, the company wanted to ensure that its bio-fiber would not be contaminated with the environmentally destructive chemistry commonly used in the industry such as heavy metals or alkylphenol ethoxylates. To ensure that only benign dye and finish chemicals were used, Interface Fabric created a screening protocol that goes far beyond government requirements for protecting the environment and human health. Furthermore,

Interface FABRIC™

INTERFACE FABRIC

Interface Fabric is a leading producer of interior fabrics and upholstery products.

- **Founded as part of Interface, Inc. in 1973**
- **Headquartered in Atlanta, GA**
- **1,380 employees worldwide**
- **$350 million annual revenue**
- **Manufacturing in four U.S. states**

the protocol made it clear that any fabric coatings or finishings could not interfere with the ability to recycle, reuse or compost the material.

The Interface Fabric Dye and Chemistry Protocol

Initial attempts at Interface Fabric to develop a chemistry screening protocol were difficult and challenging. The first iteration used a handful of regulatory lists to screen out bad-actor chemicals[1]. For every chemical on each list, the company developed a usage policy. Some chemicals were prohibited altogether from all company operations, while others were prohibited from products but could be used on plant and equipment.

The paper filing system was resource intensive to maintain and required frequent faxing and photocopying of information to multiple manufacturing locations. But more important, the system depended on suppliers to file accurate Material Safety Data Sheets (MSDS) for their chemicals. While a few suppliers provided accurate MSDSs, most did not. Perhaps the system's greatest flaw was its reliance on regulatory lists, which are notoriously out of date and lag years behind the newest scientific information on chemical hazards. Finally, while this system screened out bad chemicals, it did nothing to highlight good ones.

Going into the first efforts to develop the protocol, Interface assumed that its vendors were formulating textile chemistry mindful of environmental and human safety. But contrary to their expectations, Interface soon found out its vendors actually knew very little, and were instead relying on their vendors and even their vendors' vendors. Simply stated, there was little chemical consciousness, let alone shared assumptions, in the supply chain when it came to green chemistry.

In the late 1990s, Interface began questioning whether this approach was adequate for understanding if its dye and finishing chemistry was benign. The company was inter-

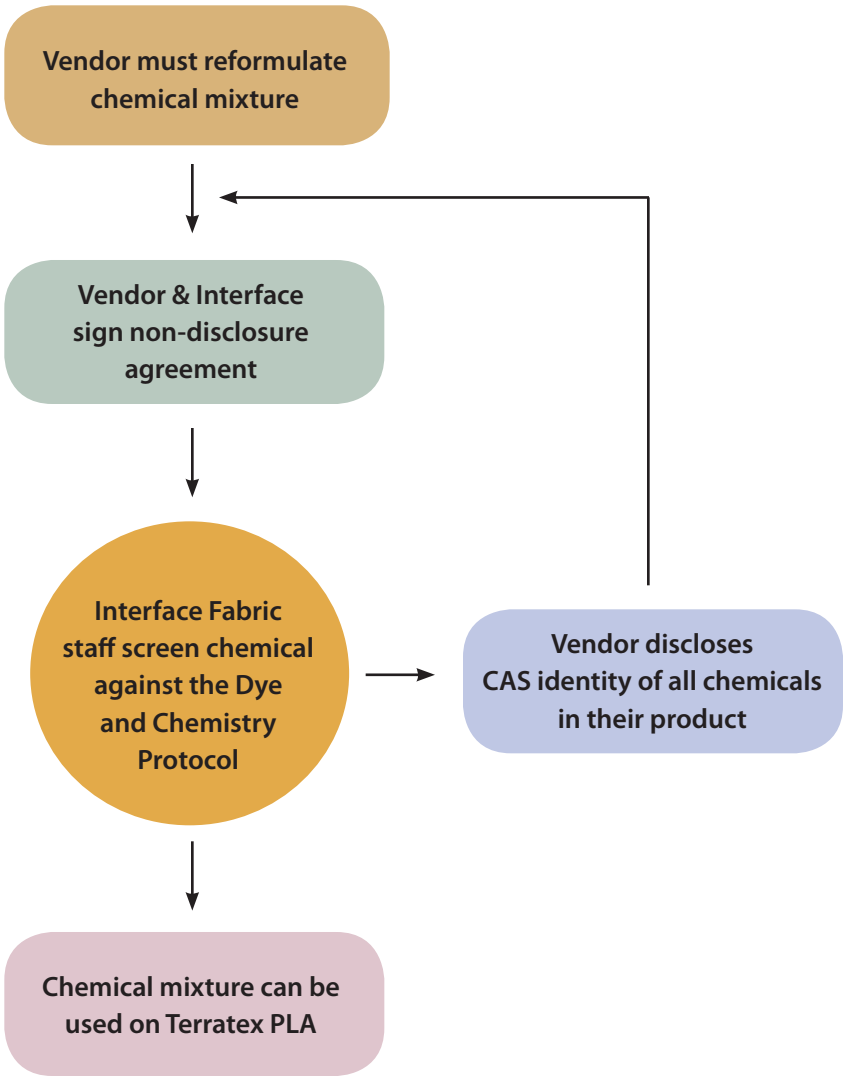
1 Lists included in the screening process were regulatory based and included Superfund Amendments and Reauthorization Act (SARA) 313, Occupational Safety and Health Act (OSHA) carcinogens, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulated chemicals, SARA Extremely Hazardous Substances, Clean Air Act Hazardous Air Pollutants, State of Michigan critical pollutants, Maine Toxics Use Reduction Act (TURA) chemicals and Massachusetts TURA.

ested in developing a system that could choose good chemicals using the most current science; leaving behind an antiquated paper system based on outdated regulatory lists and inaccurate supplier MSDSs.

Interface Fabric spent the next two years developing a more organized system using a proprietary chemical screening protocol developed by a third party. The system had many advantages: it evaluated against the most recent science, was not based on regulatory lists and identified benign chemistries. But despite a sizable investment of time and money, the effort failed. Interface had difficulty getting its suppliers to reveal their chemical formulations since they feared sharing such information might compromise confidential business information. Furthermore, Interface found that the third-party protocol provided too little feedback on why chemicals passed or failed the screen. Interface chemists and environmental managers could not examine the protocol's assumptions to determine if they were acceptable and therefore, would not fully understand why some chemicals were environmentally preferred and others were not.

Interface ultimately abandoned this effort with little to show for its investment, but the company did not abandon the idea of a chemical screening protocol. In early 2001, Interface Fabric assembled a team to begin thinking deeply about what "benign by design" really meant when it came to chemical-intensive textile dying and finishing. As Wendy Porter, Director of Environmental Management, recounts, "My boss liked what we were doing, but was bothered by the dialogue in our industry and the unwillingness to share information. He told me, 'I don't want to waste any more time and money, but I also don't want to sell PLA fabric without a good dye and chemistry protocol.'"

DYE AND CHEMISTRY PROTOCOL



Third Time Is a Charm

Interface Fabric decided to develop its own protocol — one that would incorporate the company's values and use the latest human and environmental scientific information. The protocol would need to give greater assurance to suppliers that confidential information would be protected. Staff drew up a

TERRATEX PLA AND DYE AND CHEMISTRY TIMELINE

1995
First efforts to develop a regulatory-list-based chemical screening system

1998
Began development work on polylactic acid (PLA) as the base material for Terratex® fabric

2001
PLA yarn spinning and dyeing processes developed

January 2002
Development of the Dye and Chemistry Protocol

December 2002
First weaving of Terratex PLA® fabric

January 2004
Approval of sufficient chemistry under the Dye and Chemistry Protocol to support PLA color development

May 2004
Official launch of two proprietary lines of Terratex PLA® at NeoCon® World's Trade Fair (Chicago)

May 2005
Dye and Chemistry Protocol implemented in all new Terratex polyester and wool fabrics

July 2005
Official launch of Guilford of Maine open-line of Terratex PLA®

August 2005
Completed a chemical screening study and pilot-scale composting project of Terratex PLA® fabric in a commercial composting facility

December 2005
Selected as one of the 2005 BuildingGreen Top-10 products

December 2006
Terratex PLA fabrics constitute ~ 2.5 percent of Interface Fabric sales

Future
Introduce Dye and Chemistry Protocol into other brands and product lines in the Interface family including carpet. Independently review and verify the Dye and Chemistry Protocol

draft protocol and successfully tested it on several dyes and chemicals the company hoped to use on its new line of PLA-based fabrics. With these promising results under its belt, Interface Fabric engaged its chemical suppliers as partners in this new effort. Interface held two meetings with its vendors in 2002. Chemical suppliers were told the company planned to cull its vendors from as many as 28 per chemical to three. Fewer vendors meant larger contracts for the firms selected by Interface. But to participate, chemical suppliers had to agree to supply the identity of every chemical sold to Interface.

Interface Fabric formulated a non-disclosure agreement that assigned significant penalties if the company compromised the vendor's confidential business information (CBI). Only two individuals in the company were permitted to handle CBI and were prohibited from sharing it with anyone else in the company. While several vendors chose not to participate in the program, most did. Vendors submitted Chemical Abstract Service (CAS) numbers and names under the agreement to Interface Fabric. Interface Fabric then screened the chemicals using the protocol. Although the exact mechanics of the protocol remain confidential, it uses a series of screens (see box on p. 21) to approve chemical ingredients. The protocol screens out lead, mercury, perfluorinated alkyl surfactants, polychlorinated or polybrominated biphenyls, and other persistent, bioaccumulative and toxic substances commonly found in fabrics.

If a chemical fails, Interface Fabric refrains from suggesting alternatives to its vendors. The company wants to avoid getting involved in its vendor's product development efforts. And more importantly, Interface Fabric wants its vendors to develop their own capabilities to determine whether a chemical is safe.

Since developing the protocol the company has screened 151 products comprised of roughly 280 chemicals, of which only 30 have been approved for use in Terratex PLA. Many of these products required vendors to reformulate and remove undesirable ingredients. The company spent nearly six years developing new chemistries and processes to process PLA so that it would hold its shape, retain color and meet abrasion and wearability specifications. According to Porter, "the first time we dyed it, it dissolved!" PLA fabric dyed and handled so differently from traditional fibers that the company had to throw out its conventional dye chemistry and start from scratch.

SCREENING CHEMICALS AT INTERFACE FABRIC

Interface Fabric screens chemicals using a proprietary screening protocol that asks questions such as:

- **Is there sufficient carcinogenicity, skin sensitivity, aquatic toxicity, mutagenicity, bioaccumulation and persistence information available on the chemical to make a decision?**
- **Is the chemical free of these hazards?**
- **Is the chemical structure similar to other chemicals of concern?**
- **Are other chemical hazards generated during chemical synthesis or during use, recycling or disposal?**

Given the complexity of screening chemicals, it seems reasonable to expect increased chemical costs after implementing the protocol. Instead, Interface saw recurring annual savings of around $300,000 per year. The savings came from consolidation of its chemicals supplier base, since vendors with larger accounts could offer discounted, volume-based pricing. According to Porter, the company has had a ripple effect in the supply chain as vendors have gotten smarter about proposing chemistry to the company. Rather than simply reacting to a customer approving or rejecting a particular chemical, Interface Fabric finds its suppliers proactively developing more benign chemistry for the entire market.

Closing the Material Loop and Saving Energy

In the highly competitive office interiors market, where green design carries significant weight, Interface Fabric stands out as a leader in designing environmentally conscious fabrics. According to Porter, "Our unique knowledge gives our sales person an edge over the competition. We even get inquiries from our competitors who want to know if certain chemicals are okay to use." Currently, Interface uses the protocol to screen all Terratex PLA product and all new Terratex polyester and wool products.

Further, in the company's quest to continually improve, Interface is finding enhanced capabilities to upgrade its analyses protocols using Life Cycle Analyses (LCA) and states that "these robust techniques are becoming a critical part of our product development and raw material selection processes." For internal guidance, LCAs are very descriptive of where environmental and health effects are impacted when a material substitution or a process change is being evaluated. For example, Interface found that the benefits of using recycled polyester (PET) for their Terratex brand fabrics and carpet face fiber versus virgin synthetic PET was quite dramatic. Similarly, the LCA benefits of closing-the-loop on PVC backed carpet tiles by recycling post consumer product is a key part of Interface's vision of a more environmentally friendly future. To date, Interface has recycled over 80 million pounds of post

consumer carpet retaining the PVC backing in the commercial cycle and out of landfills or incinerators. As part of Interface's long term challenge to eliminate the use of all virgin synthetic materials, the carpet business has invested heavily in new process technologies to further reduce the energy footprint of its recycling efforts and also to expand its technical capability to produce new carpet backing systems made from other thermoplastic post consumer waste streams. "One more step," as Interface says, "in reducing our dependence on non renewable fossil fuels for energy and synthetic raw materials."

Terratex PLA is not significantly more expensive than comparable recycled or virgin PET products. Interface did not develop Terratex PLA as a niche product, but one that could compete with comparable products on price. When Interface and office furniture manufacturer Herman Miller introduced Terratex PLA at the National Exposition of Contract Furnishings (NeoCon) 2004 in Herman Miller's Kira panel fabrics, the product won the Best of NeoCon Gold award in the Textiles Panel category.

In 2005, DesignTex, another customer of Interface Fabric, received a Silver Noun award for its 100 percent Terratex PLA panel. Interface designed the product so that customers in the architecture and design community need no longer sacrifice style, quality and durability when choosing an environmentally friendly product.

In addition to using biopolymers to make Terratex PLA and passing them through the dye and chemistry screening protocol, Interface Fabric manufactures the product at ISO 14001 certified facilities with 100 percent offset of carbon emissions (associated with manufacturing) and has instituted a reclamation program (known as ReSKU™) to recover product at the end of its useful life. When it's recovered, the fabric is compostable and biodegradable in commercial composting facilities. The compost material can then be used as a nutrient for agricultural crops, such as corn.

Healthy Business Strategies
for Transforming the Toxic Chemical Economy

Business leaders are creating value by embedding concerns for human health and the environment into their products. Healthy business strategies differentiate a company's brand from its competitors — lowering costs, enhancing consumer and employee loyalty and increasing market share by creating healthier products for people and nature. For these leading companies, using environmentally preferred chemicals and materials is a core value, not a secondary assignment relegated to the periphery of the company.

This report profiles six companies that are crafting healthy strategies for using chemicals and materials in their products. While their individual actions to address toxic chemicals vary, their best practices, when gathered together define the terrain of healthy chemical strategies:

- Identify all chemicals in products.
- Eliminate high hazardous chemicals.
- Strive to use only green chemicals.
- Commit to product re-design.
- Take responsibility for products from cradle-to-cradle.
- Adopt internal chemical policies, including the precautionary principle.
- Work collaboratively with environmental advocates.
- Publicly support government reform of chemical policies.

These strategies exemplify the approaches companies must take if they are serious about creating a healthy chemical economy.

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