

**Roundtable Purpose and Goals**  
**Sustainable Business and Safer Chemistry Through the Supply Chain:**  
**An Innovator's Roundtable**  
**November 14-16, 2005**

The purpose of the Innovators Roundtable is to bring together a group of forward-looking companies and individuals active in transitioning the private sector to more sustainable practices through the application of Green Chemistry design concepts and safer chemicals selection. Our goal is to have fruitful discussions on how cleaner materials and processes can be more effectively integrated into product supply chains and lifecycles. We will focus on drivers of innovation, participant companies' accomplishments, future opportunities, key barriers, and needs. How one generates and supports more innovation among firms going forward is also a central question. We encourage participants to raise topics of importance that are not included on the agenda or are not raised in the early sessions.

The objectives of the Roundtable are to:

- Discuss and recommend innovative practices and approaches to improve supply chain management of chemicals toward safer alternatives (and therefore safer products and less hazardous waste);
- Explore the ways companies currently manage chemical use within their supply chain, and the opportunities and barriers to the development and application of Green Chemistry and safer chemicals management throughout supply chains;
- Discuss and understand the forthcoming EU REACH regulation and the new Globally Harmonized System for classification and labeling of chemicals, and the impacts they are likely to have, particularly as incentives for innovation;
- Identify opportunities and needs created by new chemical policies (state and country) and other core market drivers.

Many drivers are at work encouraging industry to transition to more benign materials and processes. Commonly identified are cost savings opportunities, strategic differentiation, risk reduction, stockholder petitions, market campaigns, new markets, and customer retention. We will discuss the roles these drivers play in firms. Another major driver is, of course, regulation. While regulations are proliferating at multiple levels, for many companies the European Commission's REACH directive represents the most significant influence on present and future chemical selection. Because REACH will have broad global impact we will discuss this regulation, with particular attention to its role as an innovation driver. We also will discuss a variety of chemical selection screens and standards designed for firms – that can assist firms in selecting safer materials. Some are already available, others are still under development. Panels, advance materials, and brief presentations will be part of the Roundtable process. However the emphasis is on discussions, not presentations

**See reverse side for Green Chemistry principles**

## The Twelve Principles of Green Chemistry\*

### **1. Prevention**

It is better to prevent waste than to treat or clean up waste after it has been created.

### **2. Atom Economy**

Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.

### **3. Less Hazardous Chemical Syntheses**

Wherever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.

### **4. Designing Safer Chemicals**

Chemical products should be designed to effect their desired function while minimizing their toxicity.

### **5. Safer Solvents and Auxiliaries**

The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.

### **6. Design for Energy Efficiency**

Energy requirements of chemical processes should be recognized for their environmental and economic impacts and should be minimized. If possible, synthetic methods should be conducted at ambient temperature and pressure.

### **7. Use of Renewable Feedstocks**

A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.

### **8. Reduce Derivatives**

Unnecessary derivatization (use of blocking groups, protection/deprotection, temporary modification of physical/chemical processes) should be minimized or avoided if possible, because such steps require additional reagents and can generate waste.

### **9. Catalysis**

Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.

### **10. Design for Degradation**

Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.

### **11. Real-time analysis for Pollution Prevention**

Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.

### **12. Inherently Safer Chemistry for Accident Prevention**

Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

\*Anastas, P. T.; Warner, J. C. *Green Chemistry: Theory and Practice*, Oxford University Press: New York, 1998, p.30.  
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