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NATIONAL CENTER FOR MANUFACTURING SCIENCES

ENVIRONMENTALLY CONSCIOUS MANUFACTURING

Clare Vinton

The purpose of this presentation is to share the results and some of the thinking of the **Environmentally Conscious Manufacturing - Strategic Initiative Group (ECM-SIG)** at the **National Center for Manufacturing Sciences (NCMS).** NCMS is a consortium of more than 185 North American Manufacturing organizations comprised of about 75% for profit manufacturing companies and about 25% nonprofit organizations that support manufacturing activities. NCMS conducts collaborative R&D programs designed to improve global competitiveness of its members and other North American manufacturers to address common issues that are important to manufacturing industries. NCMS is an industry driven organization whose agenda is established by industry with input from appropriate government agencies.

The technology programs at NCMS are established in Strategic Initiative Groups (SIGs). Each of the SIGs has a Planning Committee that is responsible for the agenda, programs and projects for their respective SIG.

The 6 SIGs are:

Manufacturing Processes and Materials
Production Equipment and Systems
Computer Integrated Operations
Management Practices
Environmentally Conscious Manufacturing
Electronic Manufacturing

The planning committee for the ECM-SIG is comprised of the following people:

- Mike Leake, Texas Instruments Incorporated, Chair
- Angelo Decrisantis, United Technologies Corporation
- Jan Sekutowski, AT&T
- Abdul Abdul, General Motors Corporation
- Jim Anderson, Ford Motor Company
- Paul Arbesman, Allied Signal
- Phil Brown Eastman Kodak
- Karen Salveta, Digital Equipment Corporation
- Vic Schaefer, Cincinnati Milicron
- Dave Sordi, Torrington
- Ralph Worden, Kingsbury Corporation
- Dale Denny, National Defense Center for Environmental Excellence
- Steve Lingle, Environmental Protection Agency
- Pete Ritzcovan, Department of Energy
- Gary Vest, Department of Defense

The programs that the ECM Planning Committee have established and prioritized are:

1. Life Cycle Design for Environmental Compatibility
2. Manufacturing Solvents and Their Substitutes
3. Hazardous Materials Emissions (33/50 List)
4. Environmentally Conscious Manufacturing Packaging Initiatives
5. Emissions from Surface Finishing Operations
6. Sensors for Environmentally Conscious Manufacturing Processes
7. Environmental Practices
8. Remediation of Industrial Wastes
9. Waste Minimization/Energy Conservation Practices
10. Handling and disposal of Metal Working Fluids

In the past industry has tended to focus environmental activities on compliance related issues. Industry needs to become more proactive in the regulatory process to ensure that regulations are based on sound science and not just on emotion and political expediency. The 70s were the decade that focused on treatment technology by scrutinizing a company's gaseous, liquid and solid emissions . The 80s were the decade that included the manufacturing process itself by scrutinizing a company's products especially for recycability. We are now adding the incoming feedstocks and including the scrutiny of a company's raw materials and energy consumption that are used in the manufacturing processes. There are some who think it is not enough to eliminate the emissions of chemicals that have been officially classified as hazardous, we must also eliminate the use of those chemicals.

Pollution Prevention has the support of the majority of environmentalists, government officials, and industry officials and all seem to be committed to the concept. Life Cycle Analysis (LCA) is a way of addressing pollution prevention. LCA addresses environmental implications for all of the phases in the life of a product, during maintenance, use and disposal as well as during manufacture of the product. It is important to include full cost accounting in LCA. We need to be sure that we include all of the environmental costs into the pricing structure so we are making economic decisions not environmental decisions. We should prevent pollution by making it cost more for to do the things that are bad and cost less to do things that are good. During the 19th century, kids were often poisoned from chewing phosphorus matches. When less toxic sulfur matches were invented, they cost more and people did not buy them. Congress showed wisdom, they taxed phosphorus matches so they cost more than sulfur matches and guess what, people stopped buying phosphorus matches and kids ceased to be poisoned as a result of chewing them!

The increasing human population has caused changes to earth's environment, the industrial revolution has accelerated those changes during the last 2 or 3 centuries. Sustainable development can be achieved by establishing a "Closed Industrial Ecology". This Closed Industrial Ecology must learn to use by-products from every industrial process for feedstock for other industrial processes. We must find a use for these precious resources and stop disposing of them as waste. These conservation activities must include energy conservation along with the conservation of other natural resources. We must strive in our Pollution Prevention activities toward the implementation of technologies that maintain an ecological balance, raise the standard of living in developing countries and maintain the quality of life in developed countries. Populution is a human activity that must be addressed.