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Guest author Sue Hall describes how environmental leaders come out ahead in the marketplace.



Pollution Prevention News

EPA AND INDUSTRY AWARDS RECOGNIZE INNOVATIONS IN SOURCE REDUCTION

EPA recently honored organizations in national and regional competitions for developing new industrial processes that reduce pollution. Meanwhile, a major chemical company and industry organization also made awards for innovative ideas and provided funding for further development.

GREEN CHEMISTRY CHALLENGE

A panel of experts convened by the American Chemical Society reviewed more than 70 nominations before EPA selected five recipients of the first Green Chemistry Challenge Awards. The Green Chemistry Challenge was established in 1995 to recognize and promote chemical methods that accomplish pollution prevention through source reduction and have broad applicability in industry.

Green chemistry encompasses all aspects and types of chemical processes—including synthesis, catalysis, analysis, monitoring, separations and reaction conditions—that reduce impacts on human health and the environment relative to the current state of the art. The Green Chemistry Challenge is part of the Clinton Administration's Reinventing Environmental Regulations initiative to promote pollution prevention and industrial ecology.

The first winners are: Monsanto Company, Dow Chemical Company, Rohm and Haas Corporation, Donlar Corporation, and Texas A&M University. They received a crystal award as well as certificates for key contributing individuals. (For details on projects, see page 9.)

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FIRST XL PROJECT APPROVED

CITRUS COMPANY SIGNS AGREEMENT; INTEL EXPECTS TO BE NEXT

Jack M. Berry, Inc., a citrus company located in LaBelle, FL, received EPA approval in July to proceed with plans to implement Project XL (Excellence and Leadership) in which Berry will get regulatory relief in exchange for innovative efforts to solve environmental problems.

Project XL is aimed at providing more environmental and public health protection at lower cost. Berry's was one of eight pilot projects announced in December 1995; up to 50 will be implemented in total. Under Project XL, regulated entities will test creative strategies intended to achieve cleaner, cheaper, smarter results than conventional regulatory approaches.

At the Berry facility, a comprehensive operating permit will be prepared by EPA and the company and made available for public comment. This new multi-media permit will encompass requirements previously included in several permits. It will not expire automatically and will consolidate federal, state, and local facility permits. In return, Berry promises to reinvest the cost savings in environmental enhancement efforts, such as use of process wastewaters for irrigation and use of non-hazardous pest controls.

The Berry company project was initiated by EPA in partnership with the

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NEWS & NOTES

GLOBAL STANDARDS ADDRESS ENVIRONMENTAL MANAGEMENT SYSTEMS

The International Organization for Standardization expects to publish final standards for environmental management systems this fall. The standards are intended to assist companies in adopting sound environmental management practices in all aspects of product development, including design, manufacture, marketing, raw materials, and gathering and communication of environmental data.

ISO 14000, a series of voluntary environmental management standards, was developed by a team of representatives from over 100 countries. About 300 U.S. companies participated as members of the U.S. Technical Advisory Group.

Following the publication of environmental management systems standards, standards for environmental auditing will also be published this fall with standards for environmental labeling, life cycle assessment, and environmental aspects of product standards to be published over the next year.

"In a global marketplace, standards provide a way of stimulating the quest for excellence, including environmental excellence," said Dr. Jack Gibbons,

Assistant to the President for Science and Technology. For copies of the standards, call 610-832-9585.

VIDEOCONFERENCE

The American Society for Testing & Materials (ASTM), the American National Standards Institute (ANSI), and the University of Missouri will sponsor an ISO 14000 satellite videoconference on **October 24, 12-3 p.m.**

EST. Conference speakers will include Joseph Cascio, head of the American delegation to the international committee that developed ISO 14000; Mary Saunders,

Assistant to the Director, National Institute of Standards and Technology; James Thomas, President of ASTM; Sergio Mazza, President of ANSI; and Mary McKiel, Director, U.S. EPA Voluntary Standards Network. For more information, call the University of Missouri, 800-358-9821.

CONFERENCE

International Standards Initiative, a non-profit organization that helps organizations implement ISO standards, will present a conference entitled "ISO Standards: Business Management for the 21st Century" on October 8-9 in Bellevue, WA. Speakers will include Chuck Clarke, Region 10 EPA Administrator, and Dorothy Bowers, a vice president of Merck and Co., Inc. For more information, call 206-392-7610, or access <http://www.isi-standards.org>.

MULTINATIONALS HOST WORKSHOP IN RUSSIA

The International Cooperative for Environmental Leadership (ICEL), a non-profit organization which encourages partnership among multinationals to promote innovative environmental solutions, recently sponsored a technology transfer workshop in St. Petersburg, Russia, to accelerate the international phaseout of ozone-depleting solvents. Speakers from Honeywell, Lockheed Martin, and Texas Instruments presented alternative technologies to replace CFCs in electronic, precision, and metal cleaning applications.

Established in 1989 to exchange information on the phaseout of ozone-depleting solvents, ICEL now addresses numerous environmental and pollution prevention issues through its member organizations. Members serve as project leaders on critical environmental technologies and work in partnership with government agencies and universities.

ICEL recently set up a new office, headed by Jane McGuire, managing director. For information on ICEL projects, call 202-986-5656, or access <http://www.icel.org>.

U.S. REACHES RECYCLING GOAL

EPA announced in June that the United States has achieved the national goal of recycling 25% of the municipal solid waste. In 1995, the U.S. recovered over 53 million tons of materials from the solid waste stream, up 120% from 1988. EPA is now setting its sights on a target of 35% recycling by 2005. To achieve this more ambitious target, EPA predicts that increases will be needed in recycling of durable woods, wood, yard trimmings, and food scraps, as well as in collection of paper, glass, metal, and plastics at multi-family dwellings.



BACK TO SCHOOL

P2 SAVES MONEY

School districts face constant budget pressure, but the Los Angeles Unified School District found a way to reduce compliance costs of meeting pollution control standards for about 300 school boilers. Working with the South Coast Air Quality Management District, school planners intend to install fuel flow meters to avoid retrofitting boilers, restrict fuel usage to limit emissions, and request free annual boiler tuneups from the gas company. Expected savings: \$8.4 million over five years.

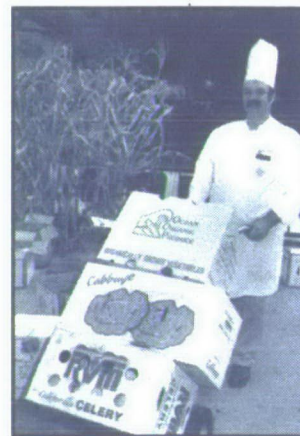
NEW TEACHING TOOLS

- ▶ **Free Energy Video (for High School Teachers Only!).** It's been 20 years since the energy crisis. What's happened since then? Find out the latest information on alternative energy sources and energy saving technologies in a video produced for the U.S. Department of Energy by the National Renewable Energy Laboratory. The video includes two programs: "Tomorrow's Energy Today" and "Tomorrow's Energy Today the Energy Efficiency Option." Appropriate for high school age and above, the video (VHS format) is available by calling the Energy Efficiency and Renewable Energy Clearinghouse (EREC) at 1-800-363-3732.
- ▶ **Laboratory Waste Minimization and Pollution Prevention.** A guide for teachers who supervise laboratory experiments, to minimize wastes and pollution. Developed by Battelle Pacific Northwest Laboratory and Battelle Seattle Research Center. Contact: Kate Lynch, 206-528-3218.
- ▶ **EE-Link.** Gopher and Web site created by the National Consortium for Environmental Education and Training intended for teachers, curriculum developers, and others. The Web site is: <http://nceet.snre.umich.edu/use.html>.
- ▶ **Overview of Environmental Problems.** An educational resource developed by the National Pollution Preven-

tion Center. The 125-page document presents a comprehensive view of environmental issues such as energy, climate change, resource depletion, waste, and air quality. \$19. For ordering information, call 313-764-1412.

LESSONS FROM CAMPUS

Ecodemia, subtitled "Lessons in Smart Management from Administrators, Staff, and Students," has been published by the National Wildlife Federation. The 222-page book (\$14.95) is illustrated, indexed, and abundantly annotated, with a bibliography at the end of each chapter. Written by Julian Keniry, National Coordinator of the Campus Ecology Program, *Ecodemia* covers the full range of pollution prevention opportunities available to colleges and universities—and most other institutions as well—including purchasing, landscaping, transportation, energy, food services, office equipment and printing, solid waste management and hazardous waste minimization. To order, call 1-800-432-6564 and ask for item # 79866.



Local, organic produce arrives at Bates College in Lewiston, ME

KIT EARNS AN "A"

Learning to be Water Wise and Energy Efficient, a program of the non-profit National Energy Foundation for grades 4 through 8, was featured in *P2 News* (Internet version) last fall. A water management consultant study for the City of Houston recently concluded that the City's \$200,000 investment in students' take-home water conservation kits was highly cost-beneficial, returning \$5.60 for every \$1 spent by saving 22.9 gallons of water, and a corresponding amount of wastewater, per household per day. To access the program's interactive Web site, go to <http://www.rof.net/yp/getwise>, or call 1-888-GETWISE.



Water Wise and Energy Efficient Kit



ELECTRIC VEHICLES

AUTOMAKERS BUILD THEM, BUT WILL ANYONE COME?

Later this year, major automobile manufacturers will introduce electric vehicles employing new technologies in batteries, sound systems, heating and air conditioning. Automakers say they are

prepared for continued growth in state requirements for emission-free cars and trucks, but also have enough production flexibility to cut back if consumers say “no thanks.”

General Motors’ EV1 will be available this fall through Saturn retailers. The first to carry a GM designation, EV1 will be offered initially for

leasing in four markets: Los Angeles, San Diego, Phoenix, and Tucson. GM also plans to market an electric pickup truck, the Chevrolet S-10, for use in commercial fleets in 1997.

Chrysler, which began marketing the TEVan electric minivan in 1994, will replace it with the EPIC (Electric Powered Interurban Commuter) in 1997. Look for the Honda EV in spring 1997. Initially, 300 EVs will be leased to fleets and

consumers in California.

LISTENING TO CONSUMERS

The new models reflect manufacturers’ responses to criticisms that consumers voiced about earlier electric cars.

The major criticism was insufficient range—that is, the distance that can be travelled between battery recharges. This year’s models will have improved

batteries and lighter, more aerodynamic frames. Honda uses nickel-metal hydride batteries in place of lead acid batteries to increase driving range to 100-125 miles, up from 80 miles in earlier versions.

With an all-aluminum structure, the GM EV1 weighs 2,970 pounds and has a range of 70-90 miles.

Chrysler is using lead acid batteries in place of nickel cadmium in order to reduce the cost of its minivan. Lead acid batteries also make it unnecessary to fill the batteries with deionized water with every recharge. “Our customers told us it was an inconvenience,” said Doran Samples, program management executive with Chrysler.

Electric vehicles may face one unlikely hurdle in the marketplace: they’re so quiet that drivers think their engine has stopped, or they worry about ordinary mechanical noises they never heard before.

READY FOR ANYTHING

Although short-term demand is uncertain, manufacturers are gearing up for mass production of electric vehicles. At the Lansing Craft Center, where the EV1 is produced, GM can accommodate a wide range of production volumes. “We’ll produce as many as the market tells us to build,” said Dick Thompson, director of manufacturing for the EV1.

Demand is certain to increase in California over the next few years as requirements for Zero Emission Vehicles (ZEV) go into effect. The state’s Air Resources Board is developing a memorandum of understanding with the seven automobile manufacturers subject to ZEV requirements to place as many as 3,750 ZEVs in California beginning in 1998.

Ten percent of all new cars and light duty trucks sold in California in 2003 and beyond must have zero emissions. By 2010, these rules would translate into 800,000 ZEVs in California. Massachusetts and New York are developing similar guidelines.

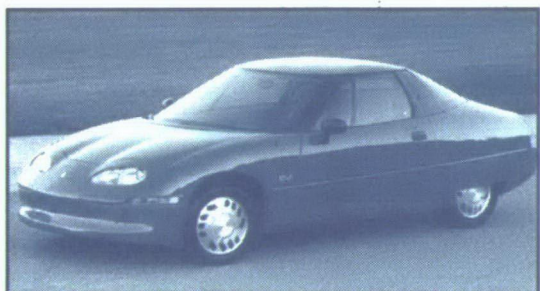
ZEVs sold in California will be equipped with advanced batteries to allow driving ranges of 125 miles between charges.

STRETCHING THE LIMITS

The feasibility of this range was amply demonstrated earlier this year, when a new electric vehicle range record of 373 miles on a single charge was set during the NESEA American Tour de Sol. The



Chrysler's EPIC



General Motors' EV1



Honda's EV



ELECTRIC VEHICLES, CONTINUED

New York-to-Washington competition was organized by the Northeast Sustainable Energy Association (NESEA).

Solectria built the range champion Sunrise, a pre-production prototype. Other Solectria vehicles also turned in record performances, including a fleet vehicle driven 244 miles before needing to be recharged and three standard sedans using lead acid batteries which tied for the range prize in their category after 132 miles.

In September, NESEA hosts its eighth annual symposium on sustainable transportation, solar and electric vehicles at Madison Square Garden, with an extensive trade show featuring road-ready electric and hybrid electric sedans, pickups, vans and buses.

VIRGINIA TECH WINS FUTURECAR CHALLENGE

College students dreaming of the perfect car of the future had a chance to test their dreams in reality in the 1996 FutureCar Challenge, billed as "the next generation of engineering design competitions." Sponsored by the Department of Energy and the U.S. Council for Automotive Research (USCAR), the FutureCar Challenge is a two-year student competition and showcase of industry, government and academic cooperation. Under USCAR, the three

domestic automakers—Chrysler, Ford, and GM—work together on shared technological and environmental concerns.

A team of engineering students from Virginia Tech earned the top spot, out of 12 competing engineering colleges. Students were challenged to design "super" fuel-efficient cars without sacrificing comfort, safety, affordability and consumer acceptability.

The winning vehicle scored high in fuel economy (49.2 mpg city) and in emissions testing. It uses two power sources: a battery-powered electric motor combined with a propane-fueled, three-cylinder engine. Runner-up was Lawrence Technological University in Southfield, MI, and third place went to the University of Wisconsin at Madison.

In 1996-97, competitors will continue to improve the powertrain, incorporate an HVAC system and power electronics, and continue to develop a control strategy for the vehicle. Each team was given a Dodge Intrepid, Chevrolet Lumina or Ford Taurus on which to make whatever changes were necessary.



Chrysler's EPIC electric minivan uses an advanced lead acid battery which the manufacturer says approaches the performance of the advanced nickel cadmium used in the earlier TEVan but requires less maintenance and costs less.

XL PROJECTS

Continued from page 1

Florida Department of Environmental Protection and the South Florida Water Management District.

Final approval of Project XL plans for an Arizona facility of Intel Corp., the silicon chip manufacturer, is expected by the end of September. The Intel project is in the last stages of negotiations among EPA, Intel, and state and local government agencies and other stakeholders. XL planning for a 3M plant has stalled in Minnesota, where state officials accused EPA of not being sufficiently flexible.

EPA's Project XL has come under criticism by some in the environmental

community for being insufficiently protective of the environment. In Massachusetts, a state program similar to Project XL recently attracted public attention when 60% of the corporate participants were found to be violating regulations.

However, Jon Kessler, Director of the Emerging Sectors and Strategies Division in EPA's Office of Policy, Planning & Evaluation, was optimistic that EPA's program would be successful on both environmental and economic grounds. "Project XL allows EPA to do what it does best, which is to apply multi-media technical expertise to reduce pollution from a facility," said Kessler.

WATERSHEDS

EPA EXPLAINS HOW WATERSHED-BASED TRADING WORKS

A draft EPA framework issued in May explains how dischargers of pollutants into water sources can engage in trading related to watersheds. EPA is strongly promoting the use of environmental trading in response to President Clinton's regulatory reinvention initiative.

The framework, which supplements a policy statement issued by EPA in January, is expected to become final in April 1997. Informational meetings are being planned for this fall to discuss implementation issues.

The policy will allow a pollution source, such as an industrial discharger or sewage treatment plant, to sell or barter credits for pollution reduction to another source unable to reduce its own pollutants as cheaply. For example, selected publically-owned treatment works in North Carolina's Tar-Pamlico Basin pay into a state fund that supports implementation of best management practices on farms. Several categories of trades are possible:

- ▶ Trading among point and nonpoint sources. Point sources discharge pollutants directly into water. Nonpoint sources are more diffuse, conveying pollution via erosion, runoff, and snowmelt to surface waters or via infiltration to groundwater.
- ▶ Intra-plant trading. A point source will be allowed to allocate pollutant discharges among its outfalls in a cost-effective manner, provided that the combined permitted discharge with trading is no greater than the combined permitted discharge without trading. Also, discharge from each outfall must meet minimum standards.
- ▶ Pretreatment trading. An industrial source(s) that discharges to a publicly owned treatment works (POTW) will be allowed to arrange for greater-than-required reductions in pollution discharge by other so-called "indirect" sources in lieu of upgrading its own treatment beyond minimum standards.

"Regardless of who trades and how, the common goal of trading is achieving water quality objectives, including water quality standards, more cost effectively," EPA states in the draft framework. The Agency believes that trading will provide sources with greater flexibility to achieve pollution reductions at least cost; create economic incentives to go beyond minimum environmental requirements; encourage more widespread adoption of pollution prevention and innovative technologies; and address broader environmental goals within an ecosystem.

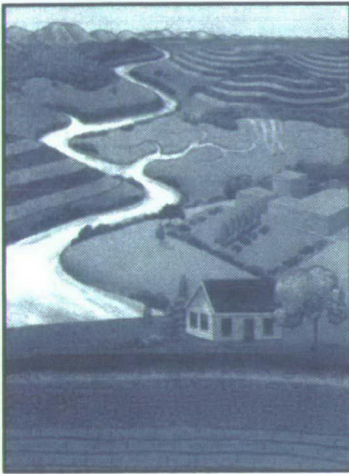
To order a copy of the draft framework, fax NCEPI at 513-569-7186, and request EPA 800R96001; specify hard copy or WordPerfect 6.1 diskette. Summary information and the complete framework are also accessible via the Internet at <http://www.epa.gov/ow/watershed>. For more information, call Theresa Tuano, 202-260-7059.

RESOURCES, RESOURCES EVERYWHERE

Know Your Watershed is a national effort to encourage the formation of local, voluntary partnerships to protect watersheds, and to help partnerships meet their goals. EPA and more than 70 other corporations, government agencies, and non-profit organizations sponsor the effort.

Through Know Your Watershed, individuals and organizations interested in forming partnerships can tap into a wealth of resources, including:

- ▶ "What is a Watershed Partnership?" a short introductory brochure.
- ▶ Guides entitled "Getting to Know Your Local Watershed," "Building Local Partnerships," "Leading and Communicating," "Managing Conflict," "Putting Together a Watershed Management Plan," and "Reflecting on Lakes" (\$2 each).
- ▶ A starter video entitled "Partnerships for Watersheds" (\$7).
- ▶ Watershed Management Kit in a Box,



WATERSHEDS, CONTINUED

which includes all of the above for \$15.

- ▶ National Watershed Exchange, a database which describes nearly 1,000 brochures, videos, guides, manuals, proceedings, technical materials, workshop materials, slide shows, annual reports, and newsletters.
- ▶ National Watershed Network, a database of more than 1,000 watershed groups which enables watershed partners to locate partnerships that faced similar challenges. Both databases are available on Windows compatible disk (\$12.50) and the World Wide Web.
- ▶ *Focus*, a monthly newsletter for watershed groups.

Know Your Watershed is coordinated by the Conservation Technology Information Center (CTIC), a non-profit public/private partnership which provides information about agricultural and natural resource management systems, practices, and technologies. For more information, contact CTIC at 1220 Potter Drive, Room 170, W Lafayette, IN 47906, phone 317-494-9555, fax 317-494-5969, Internet location <http://www.ctic.purdue.edu/kyw/kyw.html>, or e-mail kyw@ctic.purdue.edu.

WATERSHED INFORMATION RESOURCE SYSTEM (WIRS)

WIRS is a resource center for bibliographic information maintained by the Terrene Institute. Formerly known as the Clean Lakes Clearinghouse, it contains information on technical reports, conference proceedings, government documents, journal articles, and other publications.

WIRS abstracts and indexes approximately 5,000 watershed-related documents, more than a quarter of them less than 5 years old. The database is updated annually and is available on the World Wide Web at <http://www.terrene.org> under Terrene's Nonpoint Source Projects Database.

For more information, contact the Terrene Institute at 4 Herbert Street, Alexandria, VA 22305. Tel: 800-726-LAKE.

NEW AND NOTEWORTHY

- ▶ "A Watershed Approach to Urban Runoff: Handbook for Decisionmakers," a

new publication from the Terrine Institute developed in conjunction with EPA Region 5 (\$20.95). Call CTIC at 317-494-9555.

- ▶ "Nonpoint Pointers," a new fact sheet series developed for non-technical audiences by EPA's Office of Water. Contact Kristen Martin at 202-260-7108 or martin,kristen@epamail.epa.gov. View or download them from <http://www.epa.gov/OWOW/NPS/facts/>.

- ▶ "Wild on Watersheds" planning kit for developing a watershed tour. Call Julie Spezia at the California Association of Resource Conservation Districts, 916-447-7237.

- ▶ New publications from the U.S. Geological Survey's National Water-Quality Assessment Program: "Occurrence of Gasoline Additive MTBE in Shallow Ground Water in Urban & Agricultural Areas," "Pesticides in Ground Water," "Pesticides in the Atmosphere," and "USGS Tracks Acid Rain." Call USGS, 800-426-9000.

- ▶ "BMPs to Reduce Runoff of Pesticides into Surface Water: A Review and Analysis of Supporting Research," developed by researchers and EPA Region 5 (\$2.50). Call 317-494-9555.

INFORMATION UPDATE

The e-mail newsletter about environmental sites on the Internet that was listed in the June-July issue has ceased publication. However, information about free environmental information resources can be obtained through Mark Couhig of Environmental Compliance Reporter, Inc., tel: 505-377-1225, or mcouhig@ix.netcom.com.

'A River Reborn'

Excerpt from a speech by the Hon. Bruce Babbitt, Secretary of the Interior, at Watershed '96, sponsored in June by the Water Environment Federation and 14 federal agencies:

"One spring day, I thought what I'll do is go to Cleveland and see if I can find the exact place where the river burned in 1969—the burning Cuyahoga River... What I saw before my eyes was really extraordinary. I saw a river reborn. I saw businesses, restaurants, walks along the river, fishing boats. A blue heron flew down out of the sky, looking for its breakfast. And I subsequently went out to Lake Erie, and I saw a lake—pronounced dead in the 1960s—reborn. I began listening to the people in that community explaining how it had happened. And I began to see that as the waters were restored, the waters were restoring the community. Cleveland was again moving back to the waterfront that it had abandoned at the beginning of the Industrial Revolution ... the public places were being re-created. As I progressed up the Cuyahoga River, I began meeting citizen groups who were explaining to me, it's not just enough to clean up Lake Erie, and it's not enough to have an effort at the mouth of the Cuyahoga River. This is a watershed."



AWARDS, CONTINUED

EPA GRANTS ENCOURAGE REDUCTION IN PESTICIDE USE, RISK

EPA has awarded grants totaling almost \$740,000 to encourage the development and implementation of strategies for reducing the use and risk of pesticides.

Under EPA's Pesticide Environmental Stewardship Program (PESP), a voluntary public-private partnership and EPA's major pollution prevention initiative for pesticides, eight awards totalling \$240,000 were made to organizations that use pesticides or represent pesticide users. Another \$500,000 was awarded to 14 organizations, including several universities, in the form of EPA Regional Pollution Prevention Initiative Grants.

Many of the grant projects emphasize Integrated Pest Management, the carefully managed use of a variety of pest control methods such as use of natural pest enemies, crop rotation, and judicious pesticide use, to achieve the best results with the least harm to the environment and public health.

AWARDS

Continued from page 1

EVERGREEN AWARD

EPA unveiled a new regional award recognizing corporate achievements in pollution prevention in the Pacific Northwest. The first winner of the Evergreen Award was

Wacker Siltronic Corporation, a state-of-the-art silicon wafer production facility near Portland, OR, which has achieved an 86% reduction in Toxics Release Inventory emissions since 1990.

The company completely eliminated the use of trichloroethylene (TCE) and ozone-depleting chlorofluorocarbons (CFCs) from its production process. It was formerly Oregon's second largest user of TCE and third largest user of CFCs. Overall hazardous waste generation was reduced by 99%, air pollution by 89%, and solid waste by 30%.

Wacker Siltronic designed alternative processes to eliminate TCE and CFCs,

replacing its solvent-based cleaning system with water-based cleaning. Another major component of the company's hazardous waste stream was chromic acid, which now is used in smaller quantities than in 1985, when the reduction program began, and is made safer through improved waste treatment procedures.

"The Evergreen Award showcases companies that are demonstrating how to build an environmentally sustainable economy in the Northwest," said Chuck Clarke, EPA Regional Administrator in Seattle.

"Few firms have better demonstrated how environmental protection and economic prosperity can go hand in hand," said Clarke. "We hope to find many more companies like Wacker. We're looking for companies that deserve credit for going beyond simply complying with the law. And we know they're out there."

For nomination information, call Carolyn Gangmark at EPA Regional Headquarters in Seattle at 206-553-4072 or via e-mail at gangmark.carolyn@epamail.epa.gov.

\$1 MILLION CHALLENGE

SRI International was named the winner of **Monsanto's Second \$1 Million Challenge** in July for a proposed waste recovery technology.

SRI proposed to recover high-purity amino acids and phosphoric and phosphorous acids from certain waste streams, leaving behind clean sodium chloride. SRI will receive \$500,000 to develop and demonstrate its technology in a laboratory setting. If the work indicates successful commercial application, SRI will receive another \$500,000.

The winner was selected by a panel assembled by the Center for Waste Reduction Technologies, an affiliate of the American Institute of Chemical Engineers. Earlier this year, AIChE announced plans to fund a research proposal that was a finalist in last year's \$1 Million Challenge. The proposal is to separate and recover ammonia from a complex mixed aqueous wastestream containing various organic chemicals and inorganic salts.

"Few firms have better demonstrated how environmental protection and economic prosperity can go hand in hand."



AWARDS, CONTINUED

INNOVATIONS IN GREEN CHEMISTRY

The five winners in EPA's Green Chemistry Challenge made a variety of contributions to source reduction:

Monsanto Company created a new process for manufacturing a key intermediate in the popular herbicide Roundup.® The new, "zero-waste" process relies on the copper-catalyzed dehydrogenation of diethanolamine. The basic process has been known since 1945. However, it was only applied commercially when Monsanto developed proprietary catalysts that make the chemistry economically feasible.

Monsanto's older process uses extremely hazardous substances including formaldehyde, ammonia and cyanide-based chemicals.

Dow Chemical Company found a replacement for chlorofluorocarbons and other volatile organic compounds used in the manufacture of foam products. Dow now uses 100% carbon dioxide, which does not deplete the ozone layer or contribute to ground level smog since it comes from existing by-product commercial and natural sources. Dow has made the technology available to other companies through a commercial license.

Rohm and Haas Corporation designed a marine antifoulant called Sea-Nine™ to prevent the accumulation of marine life on boats and ship hulls with much less risk to humans and the environment than previous antifoulants. The main compounds used worldwide to control fouling are the organotin antifoulants, which cause widespread environmental problems due to their persistence in the environment, including acute toxicity, bioaccumulation, decreased reproductive viability, and increased shell thickness in shellfish.

The Organotin Antifoulant Paint Control Act of 1988 mandated restrictions on the use of tin in the U.S. Sea-Nine™, which is based on a compound from the 3-isothiazolone class, is the first new EPA registration of an antifoulant in over a decade.

Donlar Corporation, a small business in Bedford Park, IL, invented two processes to manufacture a class of polymer products that can be used in fertilizer and other applications as substitutes for more toxic chemicals. The

alternative, thermal polyaspartate (TPA), is derived from naturally occurring aspartic acid and is biodegradable.

TPA increases the efficiency of nutrient uptake of plants and, therefore, benefits the ecology of the land while increasing crop yields. It is also a candidate for use in water treatment and detergent manufacturing and as a scale and corrosion inhibitor in oil and gas production.

Texas A&M University's Professor Mark Holtzapple, in the Department of Chemical Engineering, developed a family of technologies that converts waste biomass into animal feed, industrial chemicals, and fuels. Waste biomass includes such resources as municipal solid waste, sewage sludge, manure, and agricultural residues.

Lime-treated agricultural residues can be used as ruminant animal feeds, or can be converted to chemical and fuels. Producing chemicals and fuels from biomass conserves nonrenewable resources such as petroleum and natural gas. Fuels derived from biomass are also cleaner burning and do not add net carbon dioxide to the environment.

NOMINATIONS FOR 1997 AWARDS

Nominations for the 1997 Green Chemistry Challenge Awards must exemplify one or more of the following three focus areas: the use of alternative synthetic pathways for green chemistry; the use of alternative reaction conditions for green chemistry; or the design of chemicals that are, for example, less toxic than current alternatives, or inherently safer with regard to accident potential. Deadline for entries is **November 30**.

To order a nomination package, call the Toxic Substance Control Act Assistance Information Service at 202-554-1404 or 202-554-0551 (TDD); or EPA's Pollution Prevention Information Clearinghouse at 202-260-1023; or EPA's Industrial Chemistry Branch at 202-260-2659. Additional information is available on the Internet at <http://www.epa.gov/docs/gcc> or through EPA's homepage <http://www.epa.gov>; select "Offices," then "Prevention, Pesticides, and Toxic Substances," then "Toxic Substances," then "OPPT Programs and Initiatives," and then "Design for the Environment (DfE)."



P2 IN THE MARKETPLACE

SUSTAINABLE PRACTICES GIVE CHANGE LEADERS A COMPETITIVE EDGE

by Sue Hall

In a growing number of industries, innovators are gaining a competitive business advantage from becoming what I call environmental “change leaders” — companies that are adding shareholder value as they make the transition to more sustainable practices in ways that transcend regulatory compliance.

While many businesses pursue pollution prevention for its cost savings, change leaders are redesigning entire products and services to achieve greater sustainability. Some have even changed their industry's rules of the game, forcing competitors to adopt similarly sustainable practices.

“Change leaders often take their cues from stakeholders whose interests in environmentally sound practices converge with the firm's business interests.”

THE PAYOFF: MARKET SHARE... AND MORE

Innovators in sustainable business practices often reap rewards in the form of increased market share. In addition, many find their investments in sustainable practices yield higher margins. Beyond market share and higher overall profitability, this kind of leadership is being found to add value on every line of the profit and loss statement.

For example, as lead was phased out of gasoline, sales of tetraethyl lead declined to virtually zero by the early 1990s. When Arco first noticed the likely shift towards lead-free gasoline, it moved early into MTBE (methyl tertiary butyl ether), ending up with the largest worldwide share of this expanding market. Arco led the industry again with a decision, in August 1991, to replace all of its leaded gasoline sales in California with a new reformulated product, EC¹. EC¹ is a substitute designed to run on pre-1975 cars, which accounted for only 15 percent of gasoline sales but 30 percent of the California auto pollution problem. Arco's share of the unleaded market rose dra-

matically from under 17 percent to over 25 percent in just nine months.

In the plastics industry, Wellman, Inc. of Shrewsbury, NJ, preceded its competitors by almost a decade when it began creating a market for the recycled plastic PET in the 1980s. Wellman, the world's largest plastics recycler, teamed up with a set of non-traditional allies, including Coke and Pepsi bottlers who were recovering their used PET bottles from bottle-bill states. This leadership helped PET become one of the most heavily recycled plastics—which in turn enabled PET to gain market share over rival resins, further enhancing Wellman's sales. Wellman went on to sustain a 40 percent growth rate and 21 percent return on equity over a period of six years.

As competitors began to invade Wellman's niche, it expanded its recycled product range downstream into the fibers business, helping to catalyze yet another high-value recycled materials market by selling Coke and Pepsi bottles to the clothing company Patagonia to manufacture a new line of “recycled” fleecy outdoor clothing. The polymer used to make some of the fleecy jackets is derived from used bottles and converted to pellets, which are then extruded into fibers.

LEARNING FROM STAKEHOLDERS

Change leaders often take their cues from stakeholders whose interests in environmentally sound practices converge with the firm's business interests. Shaman Pharmaceuticals was formed six years ago to develop pharmaceutical drugs by learning from traditional indigenous healers which plants they use to treat various diseases. When these plants are tested for effectiveness in treating those diseases, half the plants test positive—a hit rate over 50 times that of most drug companies.

Two Shaman drugs now in phase II and beginning phase III testing may complete their FDA trials within 7-8 years of their initial plant screening, compared to an average of 10-12 years for conventional



P2 IN THE MARKETPLACE, CONTINUED

drug companies. Since FDA grants patent protection—and thus exclusive “monopoly” profits—to drug companies for up to 17 years after initial screening, this could provide Shaman with up to 4 years’ additional protected revenues and profits.

Outstanding leadership can be found even in products as humble as baking soda. Members of two Canadian environmental groups were the ones who first knocked on Bryan Thomlison’s door at Arm & Hammer to ask why the company was not educating consumers about baking soda’s use as an alternative, non-toxic cleaner. Thirty-six months later, baking soda sales had risen 30 percent—in an industry in which sales had been stagnant for decades.

Thomlison began to deepen his relationships with other environmental stakeholders—environmental groups, educators, the media, regulators, and beyond. Further innovations followed. One of the founders of Earth Day USA asked if baking soda had ever been used to clean printed circuit boards, where traditional solvent cleaners were creating major CFC and VOC problems. Thomlison put them in touch with the head of Arm & Hammer’s Research and Development department. Several weeks later a prototype product was developed, which now forms the basis for a full line of patented industrial cleaners.

SECRETS OF SUCCESS

What do successful companies do right? They:

- ▶ Make a clear up-front commitment to become a part of the solution;
- ▶ Learn how to predict and lead their markets as they restructure towards more sustainable products and services by developing a stakeholder learning process;
- ▶ Explicitly invest in long-term, learning-oriented relationships with environmental stakeholders to envision and discover new solutions.

On the last “secret of success,” we recently



An ethnobotanist and a medical doctor from Shaman Pharmaceuticals, Inc. listen as a traditional healer of Igbo culture in southeast Nigeria (center) describes how an indigenous plant species is used to treat type II diabetes.

measured how much incremental value the stakeholder approach created for Arm & Hammer. While 15 percent of company revenues are derived from the “green” market, the company’s stakeholder approach alone contributes an incremental 5 percent. Furthermore, Arm & Hammer has found that its stakeholder strategy is twice as cost-effective as traditional marketing approaches, generating \$10 for every \$1 invested, compared to \$4 for the company’s traditional marketing approach.

Sue Hall founded Strategic Environmental Associates (SEA) in 1992 to assist companies and other stakeholders in creating business-based solutions to environmental problems. She is currently also Executive Director of the Institute for Sustainable Technology. You can reach Sue at SEA, 4 Chenoweth Road, Underwood, WA 98651, tel: 509-538-2500, fax: 509-538-2550, or via e-mail suehsea@aol.com.

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CALENDAR

DATE	EVENT	SITE	SPONSOR	CONTACT
Oct. 5-9	WEFTEC '96: Annual Conference and Exposition	Dallas, TX	The Water Environment Federation	Tel: 800-666-0206
Oct. 8	Reducing Wastes and Preventing Pollution in Marinas and Boatyards Satellite Broadcast	University of Wisconsin	College of Engineering and Hazardous Waste Education Center	Prof. C. Allen Wortley Tel: 608-262-0577 Fax: 608-263-3160 wortley@engr.wisc.edu
Oct. 8-9, Oct. 22-23, Nov. 13-14	Pollution Prevention Workshops	Austin, TX Dallas, TX Houston, TX	Texas Natural Resource Conservation Commission	Bridget Wenzel Tel: 512-239-3152
Oct. 16	Annual Conference Fertilizer Research and Education Program	Modesto, CA	California Department of Food and Agriculture	Tel: 916-653-5340
Oct. 19	ISO 14000: Achieving Implementation and Alternatives to Certification	Chicago, IL	International Business Communications	Tel: 508-481-6400 Fax: 508-481-7911
Oct. 23-24	Food Scrap Composting Workshop	Syracuse, NY	Cornell Waste Management Institute	Lauri Wellin Tel: 607-255-1187
Oct. 26	Eighth International Seminar on Battery Waste Management	Deerfield Beach, FL	Educational Seminars	Tel: 407-338-8727
Nov. 1-3 and 15-17	Microscale Chemistry Workshops for High School Teachers	Merrimack College, No. Andover, MA	National Microscale Chemistry Center	Tel: 508-837-5137
Nov. 2-4	Roundtable Fall National Meeting	Minneapolis, MN	Office of Environmental Assistance	Laurie Hutchinson Tel: 612-643-3551
Nov. 5-7	HazMat West '96	Long Beach, CA	Advanstar Expositions	Tel: 800-331-5706
Nov. 13-15	Chemical Emergency Preparedness and Prevention Conference	Charleston, WV	EPA	Tel: 800-642-7409

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