



# Pollution Prevention News

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## Clean Fuels Rules Proposed

### *Clean Air Act Spurs New Action for Non-Attainment Areas*

EPA has proposed two major fuels programs aimed at providing cleaner burning gasoline in cities with air pollution problems, for the first time regulating toxic emissions other than lead that are associated with gasoline use.

EPA Administrator William Reilly called the new fuels programs "the most promising measure available for reducing ozone forming compounds, toxic emissions, and carbon monoxide in urban centers that have not yet attained air quality standards."

One proposal requires a reformulated gasoline program covering almost 25% of the nation's gasoline use, starting in 1995 in nine areas with the worst ozone levels:

Baltimore, Chicago, Hartford, Houston, Los Angeles, Milwaukee, New York City,

Philadelphia, and San Diego. The proposal calls for a minimum of 2% oxygen, no more than 1% benzene, and no heavy metals in the reformulation. Other ozone non-attainment areas can request inclusion in the program. Rhode Island, for example, has already elected to do so.

EPA's second proposal outlines an oxygenated fuels program for the 41 areas of the country currently not meeting the air quality standard for carbon monoxide. The proposal features a marketable credits program within each control area, allowing refineries to earn credits from gasolines with higher oxygen content to offset fuels with lower oxygen content.

For more information, contact John Cabaniss at 202-382-2647.

## Editor's Corner

### State Roundtable Offers Forum for Program Exchange

Terry Foecke, Director  
Waste Reduction Institute (WRITAR)

Material conservation and the modification of uses, wastes and releases of toxic and hazardous substances ultimately involve many changes, large and small, at the local and personal level.

Programs operating at the state and local level are uniquely close to the implementation of pollution prevention through direct, proactive contact with facilities and individuals using or releasing toxic chemicals, or generating solid and hazardous wastes. With many states passing their own pollution prevention legislation, these programs

are finding their mandates expanding, allowing them to use direct technical assistance, innovation in permitting, and implementation grants to encourage waste generators to adopt pollution prevention techniques and technologies.

An important forum for the exchange of information and approaches among these programs is the National Roundtable of State Pollution Prevention Programs, an association of public sector programs at the state, county, and local levels. Summary proceedings from the Roundtable's Spring meeting are available on EPA's PIES network in the Roundtable's exchange.

*continued on page 2*



## Reports from EPA Offices

### Pilot NATO Project

EPA's Pollution Prevention Research Branch in ORD, the Office of Pollution Prevention, and the Office of International Activities have initiated a pilot project for NATO's Committee on the Challenges of Modern Society. The three-year pilot project, called Pollution Prevention Strategies for Sustainable Development, will provide a forum for the exchange of information on governmental and non-governmental programs and approaches to pollution prevention.

The first meeting was held in Washington, D.C. in early May and included representatives from NATO, Greece, Canada, Germany, the Netherlands, and the U.S., with U.S. attendees from EPA, USDA, U.S. Army, and the Department of the Interior. The pilot study will consist of workshops and other educational projects, focusing on the use of



NATO/CCMS participants tour the GR Grace Chemical Plant in Baltimore, MD, hosted by the Chemical Industry Council of Maryland. The Council reports that 40 chemical plants in the South Baltimore area have reduced their TRI emissions by over 70% since 1987.

clean technologies and the adoption of pollution prevention practices. Harry Freeman, head of ORD's Pollution Prevention Research Branch in Cincinnati, OH is the project manager for the study.

### Incentives for Solid Waste Reductions

Several new EPA publications offer assistance to solid waste officials in setting garbage collection rates so as to encourage source reduction and recycling. *Unit Pricing*, a 12-page brochure, explains how it works: if customers are charged for waste collection and disposal services based on the amount of trash they generate, they will take advantage of source reduction and recycling opportunities to reduce their trash, and their trash collection bill. Communities currently using unit pricing have reported decreases in overall waste generation of 10 percent or more. The leader in the field is Seattle, Washington, where households have reduced the average number of trash cans filled per week from 3.5 to just over 1 can.

Unit pricing programs fall into two categories, depending on whether they are based on the volume or the weight of the trash. Volume-based programs may charge by the number of cans left at the curb by the consumer, or they may require customers to purchase "official" trash bags or tags to attach to their own trash bags. A weight-based rate system, where feasible, can produce even

greater incentives to reduce waste, since every item of trash makes a difference in the customer's garbage bill.

Although the collection costs for unit pricing systems may exceed those of a flat fee or tax-funded system, waste managers are finding that the switch to unit pricing usually results in net savings overall. Consumer reductions in waste result in less waste to collect and reduced "tipping fees" in disposing of the waste.

More detailed information on unit pricing systems is available from a two-volume handbook prepared by EPA's Office of Solid Waste in cooperation with the City of Seattle. *Variable Rates in Solid Waste: Handbook for Solid Waste Officials* explains how to assess the feasibility of unit pricing for a particular community, how to set rates, and other operational considerations. Another report, *The Effects of Weight- or Volume-Based Pricing on Solid Waste Management* describes unit pricing in detail and presents case studies from several communities where unit pricing has been implemented. For ordering information on all these publications, call the RCRA/Superfund Hotline at 800-424-9346.

### Second Round of Small Business Prevention Grants

EPA has announced the second round of funding in the "Pollution Prevention By and For Small Business" grant program. Grants of up to \$25,000 each will be awarded to small businesses to assist in demonstrating innovative approaches to pollution prevention. A total of \$40,000 will be awarded in this second year of the two-year program.

Projects must include a promising new concept, have a technical orientation capable of analysis, and be conducive to technology transfer. Applications are available now and are due on October 15, 1991. Winners will be announced in December. For more information or to obtain a grant application, contact EPA's Small Business Ombudsman (800-368-5888 or 703-557-1938) or the Center for Hazardous Materials Research at the University of Pittsburgh which is administering the program (800-334-CHMR or 412-826-5320).

### Roundtable from page 1

To keep readers informed about the efforts of state and local pollution prevention programs, WRITAR will be contributing a regular column to *Pollution Prevention News*. WRITAR is a non-profit training and research firm and executive director of the Roundtable. WRITAR also develops resources for state and local programs and performs applied research in an effort to facilitate the adoption of pollution prevention methods. For more information on the Roundtable and/or WRITAR's activities, please contact WRITAR at 612-379-5995.

Please Note: EPA's new newsletter, *Native American Network*, A RCRA Information Exchange, is published primarily to promote information exchange among Native Americans. EPA's Office of Solid Waste appreciates readers' interest in the newsletter, but it is not available for general circulation.



## Corporate News

### Soybean Oil Inks Gaining Market Acceptance

Printing ink made from soybean oil rather than petroleum is fast becoming a source reduction success story. First, soybean oil does not evaporate the way petroleum does, releasing harmful volatile organic compounds (VOCs) into the air and contributing to smog. In addition, industry publications are expressing enthusiasm over several commercial advantages of soybean inks:

- They can reduce ink and paper waste because the necessary balance between ink and water can be achieved more easily.
- Soybean oil ink colors are more vibrant, many printers say. At the same time, they can be easily matched to colors achieved using petroleum oil, a critical requirement among advertisers.
- Soybean oil inks are less likely to rub off on clothing and hands.

There may be other advantages, such as safer and faster cleanup of presses, but further study of wash-up solvents is needed.

One thing is certain: soybean oil inks have caught on fast in the newspaper industry. Their first commercial use in newspaper printing was in 1987, two years after the American Newspaper Publishers Association began sponsoring development of soy ink as a response to threatened shortages of imported petroleum. Since then, a third of all U.S. papers

have begun using soy-based inks, including three quarters of the nation's dailies.

Commercial printers and magazines use far more ink than newspapers, but soy ink has been marketed for those purposes only since 1989. The American Soybean Association reports that a growing number of companies are manufacturing soy inks for the sheet-fed presses used by commercial printers and the heat-set presses used by magazine printers. The association has also found that over 50 companies have introduced at least one type of soybean oil printing ink and several more are considering such a move.

#### Ink Composition Evolving

Until now, soy inks have not been able to entirely replace the petroleum component in the ink. Particularly in heatset web-offset lithography, the type of printing done most commonly by magazine publishers, the drying time for pure soybean oil is unacceptably long. As a result, according to an article in *Magazine Design and Production*, most heatset-web soy-based inks contain between 20 and 25 percent soybean oil. However, the American Soybean Association reports that new technologies are starting to be commercialized that could eliminate all petroleum in soy inks used in newspaper publishing.

The function of oil in ink is to act as a transfer agent, dissolving the resins that



*Official SoySeal designed by the American Soybean Association.*

hold together the pigments — the colorants in the ink — and attaching the pigments to the paper. When petroleum is used, VOCs are released during the drying process as the petroleum evaporates. Pure soybean oil releases no VOCs because it does not evaporate. Inks with a substantial soybean content can reduce VOC content from 30 or 40 percent to less than 1 percent. Similar benefits can be achieved using inks made with other vegetable oils, such as nut and linseed oil, which are also becoming more widely used.

Metals continue to pose problems, however, for both soy inks and conventional inks. Lead chromate is used in some pigments, and certain other heavy metals are present in trace amounts. According to the National Association of Printing Ink Manufacturers, most ink manufacturers today are using mainly organic pigments, and several states have adopted regulations requiring gradual reductions in the metal content of inks used in packaging.

#### California Requirements

Printers in California have been especially motivated to seek out soy inks because of a state requirement to pay costly permit fees for use of inks with a VOC content higher than 1 percent. According to Jim Richards of the Printing Industries of Northern California, soybean oil inks can meet or surpass this standard for all but certain colors, such as purple, rhodamine red, fluorescents, and metallics.

"State environmental inspectors are not printers, and they don't know all the in's and out's of ink, but they do want to see that we are making a good faith effort," Jim Richards said. Many of his industry group's members have begun using soybean oil ink.

#### PPIC: Request for Comments

The Program Evaluation Division (PED) within EPA's Office of Policy, Planning and Evaluation is requesting comments on the effectiveness of the Pollution Prevention Information Clearinghouse (PPIC) in meeting the needs of its audience, and its relationship with other state and regional pollution prevention clearinghouses. Feedback is sought on user satisfaction with the quality of PPIC's:

- information (i.e., case studies, bibliographies, promotional material) and
- services, both electronic and non-electronic (i.e., PIES message center and databases, hotline response to information requests, PIES training).

Comments from non-users of PPIC regarding their specific needs for pollution prevention information and services are also welcome.

Please send comments by August 31, 1991 to Cord Jones or Gabriella Lombardi in PED via: a PIES message; tel: 202-382-5333; fax: 202-252-0513; or mail: PED (PM-223Z), U.S. EPA, Washington, D.C. 20460.



# The Economics of a Sustainable Planet

## Decision-Makers Are Offered Theories and Practical Solutions

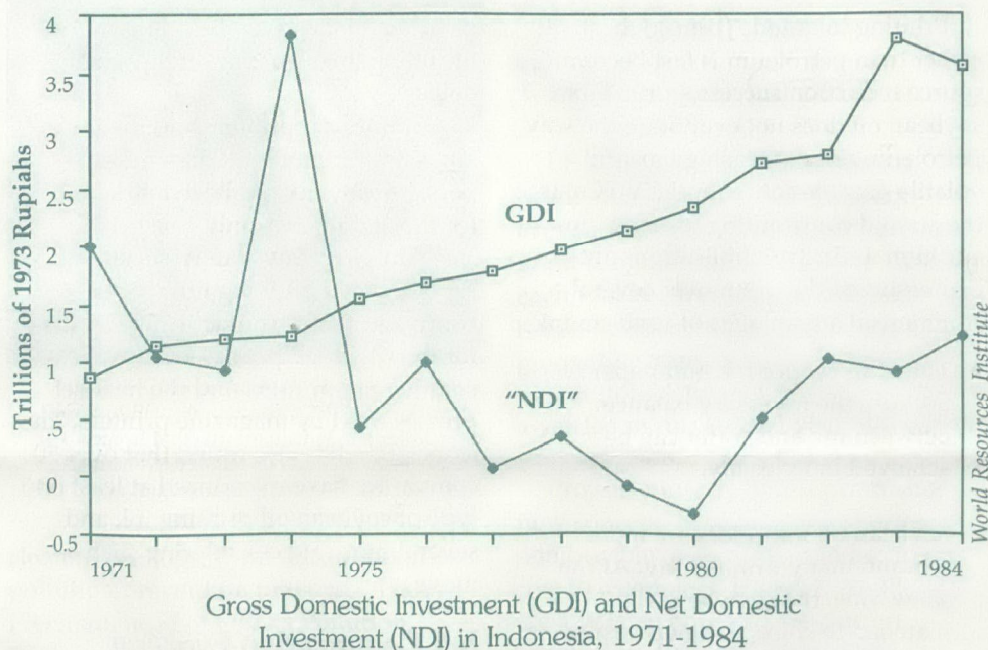
**N**ational governments and international organizations such as the World Bank are coming under increasing pressure to recognize the environmental implications of major economic decisions. To provide the tools for making more ecologically aware decisions, economists are at work on conceptual frameworks that take environmental impacts explicitly into account.

Summarized below are some of the major approaches currently being taken by environmental economists. Examples are provided to show what the new environmental economics could mean in practical programmatic terms.

### Bringing Externalities Home

Environmental considerations have been integrated extensively in microeconomics, the study of how individuals and firms behave in markets, and, in particular, how prices are set. Environmental problems are among the set of adverse consequences to society or "externalities" that can be created through the actions of firms. Many economists have pondered how market forces can be used to make responsible parties feel the full burden of the externalities that they create.

Writing in the March/April 1991 issue of *World Watch*, the magazine of the Worldwatch Institute, Sandra Postel



identified three separate ways in which firms can be made to internalize environmental externalities:

- *Eliminate government subsidies for destructive practices.* Examples of subsidies include: utility regulations biased against conservation; underpriced irrigation water; tax exemptions and discounted prices for pesticides in Third World countries; and fiscal incentives in both rich and poor countries that result in deforestation.
- *Shift part of the burden from income taxes to "green taxes."* Governments can

require polluters to pay more of the costs of removing pollutants from emissions, thereby internalizing the social costs resulting from their activities. An OECD (Organization for Economic Cooperation and Development) survey of 23 industrialized countries found that 14 countries had instituted taxes on air and water pollution, waste, noise, and potentially harmful products such as fertilizers. In an analysis of options for the United States, *World Watch* concluded that

*continued on following page*

### "Needed: A New Vision"

By Herman E. Daly

"The vision of modern economics in general, and especially of macroeconomics, is the familiar circular flow diagram. The macroeconomy is seen as an isolated system (i.e. no exchanges of matter or energy with its environment) in which exchange value circulates between firms and households in a closed loop.... Since an isolated system of abstract exchange value flowing in a circle has no dependence on an environment, there can be no problem of natural resource depletion, nor environmental pollution, nor any dependence of the macroeconomy

on natural services, or indeed on anything at all outside itself....

"It is as if the preanalytic vision that biologists had of animals recognized only the circulatory system, and abstracted completely from the digestive tract. A biology textbook's index would then contain no entry under 'assimilation' or 'liver.' The dependence of the animal on its environment would not be evident. It would appear as a perpetual motion machine.

"What is needed is... a new vision. The necessary change in vision is to picture the macroeconomy as an open subsystem of

the finite natural ecosystem (environment). . . . Once the macroeconomy is viewed as an open subsystem, rather than an isolated system, then the issue of its relation to its parent system (the environment) cannot be avoided. And the most obvious question is how big should the subsystem be relative to the overall system?"

— Excerpt from "Towards an Environmental Macroeconomics," a paper presented at a World Bank conference in April 1990.



# Sustainable Planet

from page 4

green tax revenues could go as high as 25 to 35 percent of current government revenue from personal income taxes.

- *Establish incentive programs to encourage environmentally sound decisions.* An example of incentives is giving electric power utilities the opportunity to profit more from investing in conservation than from selling additional electricity. Programs have been established in California, New York, Oregon, and five New England states to achieve this goal.

## Is There an Optimal Scale?

Taking a broader perspective, some economists are beginning to wonder whether human economic activity as a whole might not be pushing at the outer limits of sustainability. These economists are concerned with issues of scale, or the carrying capacity of the planet.

As pointed out by Herman E. Daly of the World Bank (see box on previous page), issues of scale have not traditionally been a part of macroeconomics, which is the study of economies at an

aggregate level. Yet some economists now speculate that there may be an optimal scale, beyond which human activity cannot grow without diminishing the quality of life.

If scale were to be factored into macroeconomic analysis, the results could have major implications for national policy-making. A key step in this direction would be to revise current practices in macroeconomic measurement to have national income accounting reflect natural resource depletion. Some economists argue that failure to do so can grossly distort perceptions of a country's "progress."

Robert Repetto and other economists at the World Resources Institute (WRI) are leading proponents of this view. In their 1989 study "Wasting Assets: Natural Resources in the National Income Accounts," they use a case study of natural resource depletion (petroleum, forestry, and soil) in Indonesia to illustrate the consequences of omitting natural resources from national income accounting.

The chart on the previous page taken from the WRI study shows gross domestic investment (GDI) rising in

constant monetary units each year from 1971 through 1983. By calculating the depreciation of natural resource capital and subtracting this number from GDI, the authors determined "net domestic investment" ("NDI"). As shown, in most years the depreciation of natural resources cancels out much of gross domestic investment.

In years when depletion of natural resources exceeds gross investment, NDI falls below zero. The implication is that natural resources are being depleted to finance current consumption expenditures.

An alternative approach to assigning a monetary value to natural resource capital is offered by World Bank economist Salah El Serafy. He proposes a "user fee" approach whereby part of the sale proceeds from depletable resources would be invested in order to produce an undiminished perpetual stream of future income.

Few approaches this specific have been adopted by national governments or international organizations to date. But new trends in economic theory may exert subtle pressures on the shape of environmental decision-making in the future.

## World Bank Strengthens Environmental Requirements for Major Project Funding

Since 1989 the World Bank has required that countries seeking funds for major development projects conduct environmental assessments in order to anticipate the project's impacts on local populations and ecology. Beginning this year, the Bank will also require that prospective borrowers consult affected groups and make the results of the assessments available to them.

To support these activities, the World Bank has assembled an environmental staff of over 100 persons. Among their duties are to help the operations staff look at the environmental implications of proposed projects and to monitor projects once they are under way to make sure that any terms and conditions designed to protect the environment are being respected. In addition, the staff

conduct what they refer to as a "policy dialogue" with government officials in developing countries to focus attention on environmental concerns.

Looking back over the two years since environmental assessments were first required, the World Bank finds the results encouraging. Many project proposals now incorporate environmental protection in the engineering phase rather than as an afterthought. Anticipating the need for an environmental assessment, some prospective borrowers are working their way around problem areas. Floodways have been redesigned to avoid disruption of a lagoon for example, and the carrying capacity of rangelands has been estimated before augmenting cattle herds. Some projects that would raise major environmental issues are being scaled

down or dropped altogether.

The World Bank is also involved in a special environmental program to support projects in developing countries that benefit the global environment and that developing countries could not fund on their own. The program, called the Global Environment Facility (GEF), is a joint venture among national governments, the World Bank, the United Nations Development Programme, and the United Nations Environment Programme. The GEF is funded with \$1.5 billion, earmarked for projects to reduce and limit greenhouse gas emissions, preserve biological diversity and maintain natural habitats, control pollution of international waters, and protect the ozone layer from further depletion.



## In the States

### New Jersey Prepares to Launch Comprehensive Permit Process

New Jersey is on the verge of becoming the first state to establish a facility-wide emissions permit process based on pollution prevention. As this issue went to press, New Jersey's state legislature just passed a bill making it a statewide policy goal to cut hazardous waste emissions in half over the next five years. The requirement for pollution prevention planning would apply to the 800 facilities that report emissions in New Jersey under EPA's Toxic Release Inventory.

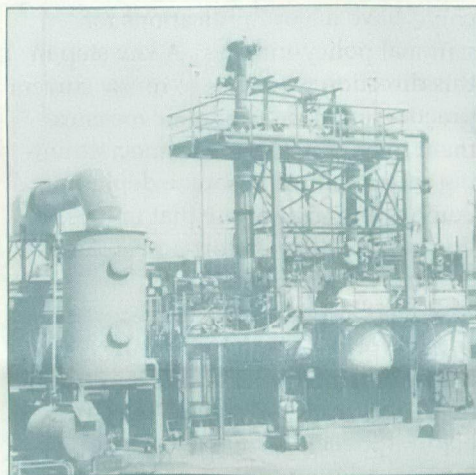
In addition to planning requirements, the new program represents a holistic approach to regulation, says Shelley Hearne, acting director of New Jersey's Office of Pollution Prevention (OPP). In the past, emissions to air, water and land have been regulated separately, which in some cases encourages companies to transfer toxic substances from one medium to another, rather than to reduce overall emissions. However, the new, comprehensive permits will integrate air, water and land releases, with companies' pollution prevention plans. "Hopefully, not only is this going to be better for the environment, but it's common sense in permitting," says Hearne.

Hearne explained that companies' 1987 emissions levels will be used as a baseline in calculating their progress toward the goal. "You can't penalize the good guys," i.e., companies that have already made major strides in source reduction, she said.

#### Pre-Pilot Study

Three companies have volunteered to serve as test cases in a "pre-pilot" study for the new program: Schering-Plough's pharmaceuticals facility in Kenilworth; Fisher Scientific's chemicals plant in Fairlawn, and Sybron Chemical's plant in Birmingham. The OPP will work closely with these companies and begin drafting regulations for the new program based on their experiences.

"I think that we as a company offer a lot of challenges to this program," said Frank Poliferno, Fisher's director of



*Distillation equipment at Fisher Scientific*

safety and environmental affairs. The company buys a wide range of industrial-grade chemicals, then purifies them to meet the rigorous standards of scientific research. "We already had a very active waste minimization program," Poliferno said; for example, the company has found alternative markets for the portion of its output that is not pure enough for scientific use. But now, "we'll be going through our processes and seeing where we can reduce the use of hazardous materials" or improve yields, he explained.

All three of the companies have submitted basic descriptions of their processes to OPP and are working out a memorandum of understanding as to

how the program will be conducted.

Under the new legislation, called the Pollution Prevention Act, another 10 to 15 facilities will be chosen for facility-wide permitting after the pre-pilot study. Three years down the road, the legislature will review the results and consider making facility-wide permitting the norm.

In the meantime, under the law, pollution prevention plans will be required by mid-1993 from about 400 of the state's largest toxics users, and by mid-1995 from the 400 next largest. The plans will be updated yearly for 5 years, with summaries submitted to OPP. The goal of reducing emissions to 50 percent of 1987 levels will apply to statewide averages, not to individual facilities.

Companies in New Jersey also can take advantage of a technical assistance program (NJTAP), a non-regulatory organization that provides free, confidential information and technical assistance such as on-site audits.

NJTAP has just received a grant from EPA Region 2 to develop a program for integrating pollution prevention training into vocational school curricula. Many workers in trades such as auto repair and printing are trained in vocational schools.

For more information on New Jersey's pollution prevention efforts, contact OPP at (609) 777-0518 or NJTAP at (201) 596-5864.

**Globe '92** is the second conference in the biennial GLOBE series of conferences and trade fairs sponsored by the Canadian Government with a focus on sustainable development. Globe '92 will be held in Vancouver, March 16-20, 1992. Participants are expected from over 80 countries. For information, contact Karon Brashares, U.S. coordinator for Globe '92 at 202-333-3711, or call Globe '92 directly at 604-666-8020.

#### In Living Color: Painting Challenges for the 90's

A five hour teleconference on painting techniques that reduce waste generation will be held on November 6, 1991 under the auspices of the University of Tennessee's Center for Industrial Services. Alternate painting technologies and material substitutions will be covered. For information on license agreements and site locations, contact Bill Wiley at 615-242-4816.



## In the States

### Connecticut: TAPping Into Ways to Save Waste and Money

A Connecticut manufacturer is reducing its hazardous waste generation and water consumption by 90 percent, and using the money it saves to tackle the remaining 10 percent, thanks to the assistance of ConnTAP, the Connecticut Technical Assistance Program, part of the Connecticut Hazardous Waste Management Service.

ConnTAP offers companies Matching Challenge Grants of up to \$5,000 to study waste minimization and pollution prevention. It was under this program that Action Circuits of Danbury, a printed circuit board manufacturer, conducted a feasibility study and discovered ways that it could reduce production of metal hydroxide sludge, its primary waste source, and its water consumption by 90 percent at a fraction of the cost of waste treatment systems available on the market.

#### Dramatic Results

Now, with the help of a \$50,000 Pilot Project Demonstration grant of EPA funds to the Hazardous Waste Management Service, Action Circuits has begun carrying out its plan, and is expected to finish later this summer. The company will save more than 17,000 gallons of hazardous waste per year by applying ion exchange, electrowinning, and point source reduction technologies, and will save 3.5 million gallons of water annually using in-process recycling and new rinsing techniques.

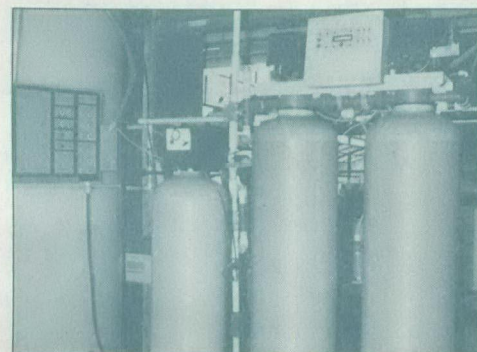
"It looks like they will achieve their goal," said Rita Lomasney, manager for ConnTAP. "They're on schedule for the different milestones that they had hoped to achieve."

"We expect the collective result of this activity to be so dramatic that it will provide us with the resources to address the final 10 percent of metal hydroxide sludge and process effluent. Ultimately, Action Circuits plans to close the loop on water consumption. This final phase will require the introduction of leading edge technology," wrote company president Randall Klein in a letter to the

Hazardous Waste Management Service.

Another ConnTAP Matching Challenge Grant resulted in the preparation of a Waste Minimization/Pollution Prevention Self-Audit Manual for metal finishers, prepared by Peter Gallerani of Integrated Technologies, Inc. of Bethany, Conn. The manual offers clear language and worksheets that can help companies use in-house personnel to gather data, reduce purchases of chemicals, reduce waste treatment and disposal costs, and limit hazardous waste liability.

ConnTAP is participating in EPA's WRITE (Waste Reduction Innovative Technology Evaluation) program for technical and economic assessments of waste reduction technologies. In addition, ConnTAP operates an information clearinghouse and a library,



*Action Circuit's new closed-loop treatment system for inorganic waste streams and non-contact cooling waters. The system incorporates ion exchange technology and enables the company to reduce its water consumption.*

publishes a quarterly newsletter, and conducts workshops and seminars promoting pollution prevention and technology transfer. To contact ConnTAP, call (203) 241-0777.

### Michigan's GEM of a Program for Groundwater

To help safeguard Michigan's groundwater resources, the W.K. Kellogg Foundation is collaborating with Michigan State University's Institute of Water Research to fund community-level groundwater protection projects.

The program, called Groundwater Education in Michigan (GEM), focuses on empowering community-level groups to initiate innovative groundwater protection and education projects, developing a network of such groups, and disseminating the lessons they learn. Over half the residents of Michigan depend on groundwater for their drinking water.

More than 29 groups in the state have launched projects through GEM. They include the East Michigan Environmental Action Council, which has established groundwater leadership teams of citizen volunteers who are working to address the threats posed by hazardous household products. Michigan's League of

Women Voters is running a GEM project that helps the League's local chapters organize, educate, and train groups of "water watchers" to lead their communities in monitoring local government decisions that affect their groundwater.

The GEM program helps local groups identify potential funding sources and collaborators. To encourage information sharing, the program has hosted interactive conferences and workshops, developed a computer communications system and a bibliographic database, and published newsletters.

The GEM program has been so successful that the Kellogg Foundation has decided to expand its groundwater programming into the eight states and two Canadian provinces of the Great Lakes Basin. For more information on GEM, contact Linda Helstowski, at 517-353-3742.



# Calendar

Title	Sponsor	Date/Location	Contact
2nd Topical Conference on Pollution Prevention for the 1990s	AIChE Center for Waste Reduction Technologies	Aug 20-21 Pittsburgh, PA	Steve Smith 212-705-7660
Prevention, Management, Compliance for Haz. Wastes	AIChE (Short Courses)	Aug. 21-23/Pittsburgh, PA Nov. 20-22/Los Angeles	Registrar 212-705-7526
3rd Annual Waste Equipment Recycling Conf./Expo	Tower Conference Management	Sept. 9-12 Detroit, MI	Bill Harrington 708-469-3373
Waste Reduction Technical Assistance Training Program	Univ. of Tennessee Center for Industrial Services	Sept. 15 Murfreesboro, TN	Cam Metcalf 615-242-4816
2nd Annual Central Gulf States Recycling Marketing Conference	EPA Regions 4 & 6, Gulf States, MISSTAP/MSSWRAP, others	Sept. 19-20 Biloxi, MS	Patricia Lindig 601-325-8067
NE Conference on Recycling/Composting	BioCycle Magazine	Sept. 23-25 Burlington, VT	Celeste Madtes 215-967-4135
Pollution Prevention: A New Direction	Ohio Alliance for the Environment, Ohio EPA	Sept. 24 Columbus, OH	Irene Probasco 614-421-7819
Environmental Shopping and Labeling	EPA Region 3, Penn. Resources Council	Sept. 30-Oct. 2 Baltimore, MD	Ruth Becker 215-565-9131
Pollution Prevention in Photoprocessing	National Association of Photographic Manufacturers	Oct. 16-19 Cincinnati, OH	NAPM 914-698-7603
Southeast Regional Solid Waste Symposium	Solid Waste Assn. of North America	Nov. 5-7 Orlando, FL	Brad Roberge 301-585-2898
Pollution Prevention: Making It Happen	Engineering Foundation	Jan. 26-31, 1992 Santa Barbara, CA	Eng. Fdn. 212-705-7835

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