



Pollution Prevention News

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33/50 Program Pledges on the Rise

Some companies already reporting reductions in emissions

Company participation in EPA's 33/50 Program to reduce emissions of key chemicals has increased more than three-fold since July 1991, according to the program's *Second Progress Report*. As of February 1992, 734 companies had written to EPA expressing commitments to voluntarily reduce their releases and transfers of chemicals covered by the program, up from 236 companies in July 1991. Actual reductions pledged have risen from 201 million pounds in July 1991 to 304 million pounds in February 1992.

A number of companies have already reported making drastic emissions reductions. From 1988 to 1990: AT&T reports that it has reduced its releases and transfers of

the 33/50 chemicals 66 percent, and BF Goodrich reports a 32 percent reduction. Dow Chemical reports that it has reduced releases of *all* chemicals included in the Toxic Release Inventory 30 percent, from 23.2 million to 16.2 million pounds.

Among smaller companies, Magee Carpet of Bloomsburg, PA, has stopped using trichloroethane, eliminating 340,000 pounds of releases of this chemical; and Pines Trailer Limited Partnership has reduced its use of xylene by 48 percent and its use of methyl isobutyl ketone by 37 percent.

The report includes breakdowns of how two companies plan to achieve their reduc-

(Continued on page 5)

Green Lights Reports on First Year Gains

Just over a year after EPA's Green Lights Program officially was launched, many of the participating institutions report that they are on their way toward implementing energy efficient lighting. According to *Green Lights Program: The First Year*, 181 buildings, covering 77 million square feet, were in the "upgrade pipeline" as of February 23, 1992. Forty-nine buildings have been fully upgraded, with a typical reduction in lighting electricity use of 40 to 70 percent. Of 40 companies reporting, kilowatt-hours avoided by the completed upgrades are 35.2 million, and pollution prevented per year includes 52.8 million pounds of CO₂, 449,692 pounds of SO₂ and 193,833 pounds of NO_x.

Officially launched Jan. 16, 1991, Green Lights aims to prevent pollution by encouraging major U.S. institutions to voluntarily

install energy-efficient lighting where it is profitable and where lighting quality is maintained or improved. According to Lodwick M. Cook, chairman and chief executive officer of ARCO, "By encouraging efficient use of lighting and reducing demand for electricity, the Green Lights program demonstrates how American creativity can lead to cost-effective and practical solutions to our complex environmental problems." B. Lum Lee, manager of energy and recycling programs at Xerox, says that "participation in Green Lights allows us to more clearly focus on not only the impact that lighting has on the environment, but also the impact that lighting has on our bottom line."

Participants in Green Lights have five

(Continued on page 7)

EPA News

Update on PPIC: Clearinghouse Offers 33/50 Mini-Exchange

EPA's Pollution Prevention Information Clearinghouse (PPIC) has entered its third year of information collection and dissemination. Over the past three months, the Clearinghouse has mailed 4,687 documents in response to requests. The number of users of the electronic computer network PIES (Pollution Prevention Information Exchange System) now exceeds 3500. Within the past year, a new mini-exchange for the 33/50 program has been established on PIES to allow participants in the program and interested parties to share information and receive updates on the progress of the 33/50 program.

Due to the wide array of users and varying needs, EPA is establishing an advisory panel for PPIC to assist the Agency in devising a five-year strategic

plan for the clearinghouse. The panel will also continue to monitor the progress of PPIC over the coming years. A planning meeting for the advisory panel is expected to take place prior to the 1992 National Roundtable spring conference in Raleigh, NC on April 21.

Recent publications available from the clearinghouse include the 1992 update to the training opportunities manual (see box) and industry-specific bibliographic reports that summarize processes, describe prevention and recycling alternatives, and contain lists of sources for more detailed information. Two



To access the Clearinghouse,

Call 703-821-4800

9:00 am - 5:00 pm EST

Monday through Friday.

Fax 703-821-4775

industrial category reports are currently available: wood furniture manufacturing (SIC code 25); and metal fabrication (SIC 34-38).

PPIC continues to add case studies from states, regional inspection programs, enforcement cases, grants, international and other sources. PPIC also continues to request information that can be added to the case study, program summary, calendar, and other PIES reference databases. PPIC is also interested in networking with other pollution prevention information sources. To request documents or submit information to PPIC, call 703-821-4800.

EPA Grant Programs Announced

EPA's Office of Pollution Prevention and Toxics has announced the availability of approximately \$3 million in FY 1992 grant and cooperative agreement funds in the fourth round of Pollution Prevention Incentives for States. The goals of the grant program include: supporting state and locally-based multimedia programs, building state pollution prevention capabilities, and initiating demonstration projects that test innovative pollution prevention approaches and methodologies.

Pre-proposals are due by **April 20, 1992**. Only U.S. states and territories, state agencies (including state universities), and Native American tribes are eligible to apply. For guidance on submitting a pre-proposal, contact Lena Hann at 202-260-2237.

NICE³ — Round 2

EPA's Pollution Prevention Division has also announced the second round of

the NICE³ (National Industrial Competitiveness through Efficiency: Energy, Environment, Economics) grant program. Jointly funded by EPA, the Department of Energy and the Department of Commerce, the program is designed to demonstrate new technologies to prevent pollution, improve energy efficiency, and overcome barriers to industrial pollution prevention initiatives.

State agencies from California, Illinois, Louisiana, New York, New Jersey, Ohio, and Texas are eligible to apply for the \$1.4 million in grant funds available in 1992. Awards will be made through state agencies working with industry to develop and assess projects. A 50 percent matching share is required, using any combination of state and industrial funding. Proposals must be received by **April 30** to be considered, and awards will be announced in September. For more information, contact Brian Symmes at 202-260-3590.

Available From PPIC:

Pollution Prevention Resources and Training Opportunities in 1992. A popular annual EPA guide to documents, videos, state and university programs, EPA headquarters and regional offices, courses, workshops, conferences, and a multi-year calendar of events. 115 pages. Free. Order through PIES, or contact: PPIC, 7600-A Leesburg Pike, Falls Church, VA 22043. tel: 703-821-4800.

EPA's Settlement Process: Power Tool for Pollution Prevention

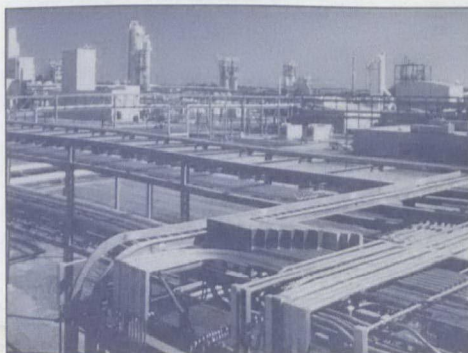
EPA's Office of Pesticides and Toxic Substances (OPTS) is pioneering the use of pollution prevention requirements in its settlement agreements with statutory violators. The settlements quickly have become a powerful tool in encouraging violators to put money into capital improvements that will make possible long-term reductions in pollution.

In a recently released report, *Pollution Prevention Through Compliance and Enforcement*, OPTS's Office of Compliance Monitoring highlights 66 cases involving settlements with environmental benefits that go beyond federal, state and local environmental requirements. Most of the cases involve enforcement under the Emergency Planning and Community Right-to-Know Act and other statutes such as the Toxic Substances Control Act.

In the past, if a member of the regulated community committed a statutory violation, such as failing to report as required its emissions of acetone or freon-113, EPA simply assessed a fine. Often this proved not to be incentive enough for violators to take steps to modify their noncompliance before future fines were assessed. Under the new pollution prevention emphasis in the settlement process, the fines may be reduced after defendants agree to redress the original violation, or agree to conduct

other projects that reduce environmental risk.

Many successful settlements have involved pollution prevention projects such as changing industrial processes to reduce use of pollutants or to establish closed loop processes, the report says. The settlements also may involve efforts to reduce pollution, which include projects that reduce the discharge of pollutants through more effective end-of-pipe or stack removal technologies or through improved operation and maintenance. Environmental restoration, environmental auditing and enforcement-related environmental public awareness projects all are pollution



General Electric Co. has agreed to install a number of pollution prevention systems at its Burkville, AL, facility, including a system that would recover wastewater and channel it back into the manufacturing process for reuse.

reduction strategies that have been used successfully by OPTS.

For a copy of the report, call 202-554-1404.

Turning Violations into Environmental Benefits

Markham Corp. of Keene, N.H., is one company set to become a pollution preventer through participating in a settlement with EPA's Office of Pesticides and Toxic Substances compliance program. EPA originally filed a complaint against Markham alleging an unauthorized use of a PCB transformer and failure to maintain adequate records. EPA proposed a penalty of \$76,000. After settlement, Markham paid a final penalty of \$33,000 and agreed to undertake a series of pollution prevention and reduction projects, including instituting a cleaning solvent recovery system and eliminating the use of heavy metals in the ink the company used to label components it manufactures. The projects will reduce the company's yearly use of methyl ethyl ketone by 75 percent and will cost an estimated \$175,000.

Another participant in the OPTS settlement process is **EIMCO Process Equipment Co. Inc.** of the Great Salt Lake Region. EPA had proposed a penalty of \$85,000 against the company for failing to report as required under the Emergency Planning and Community Right-to-Know Act. The company agreed to pay \$51,000 and to undertake a pollution prevention project that will cost \$52,000. Through the project, EIMCO will purchase equipment that will reduce the need for volatile solvents in painting operations. By removing a wet paint spray booth and replacing it with a dry paint spray booth, amounts of toluene, xylene and other paint related solvents will be reduced significantly.

50 Percent of Wisconsin Generators Report Waste Reduction

Wisconsin's Department of Natural Resources has released preliminary results of a 1991 survey of 850 large and small quantity hazardous waste generators in the state. Some 50% of the firms responding reported reducing the volume of waste generated in 1990 compared with the volume generated in 1985. Twenty percent of the firms had totally eliminated one or more waste stream.

Eighty percent of the firms contacted completed the 34-page questionnaire. Firms reporting waste reduction

or changes in hazardous waste management practices were motivated by a desire to comply with state regulations, avoid liability, and protect worker health and safety. According to respondents, barriers to further waste reduction include unavailability of substitutes, potential declines in product quality, and insufficient information about how to reduce waste.

For more information, contact Elizabeth David, 202-260-5732.

In the States: Iowa

Water Quality Concerns Lead to Reduced Fertilizer Use in Iowa Farms

Water quality concerns are changing the way farmers are using nitrogen fertilizers. One Corn Belt state, Iowa, began acting on its water quality concerns a decade ago. With assistance from EPA and other federal agencies, in 1989 and 1990 Iowa state programs helped farmers cut fertilizer use by more than 400 million pounds. In addition, Iowa farmers saved the equivalent of about 130 million gallons of diesel fuel over the two year period, according to George Hallberg, agriculture-water quality project director with the Iowa Department of Natural Resources.

The result has been big dividends to Iowa agriculture — reduced nitrogen fertilizer use saved the state's farmers \$80 million in 1989 and 1990. Meanwhile their average corn yields have remained consistent with those in the other Corn Belt states. Nitrogen fertilizer use in five other Corn Belt states has remained steady or increased since 1985.

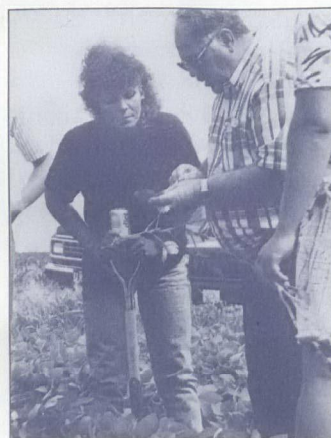
According to Linda Monroe, an Iowa farmer who participated in the effort, "Fertilizer bills haven't been a problem like they used to be. And it's mostly because we're using a lot less nitrogen."

When too much nitrogen, which is considered an essential nutrient for plants, is put on the soil, it can leach into the subsoil and into the aquifers that fill wells, and it washes into the rivers that larger cities tap for drinking water. Eighteen to 20 percent of Iowa's rural, private water supplies, and the water supplies of cities such as Des Moines and Iowa City have exceeded acceptable nitrate levels in recent years. High levels of nitrogen can cause oxygen deprivation and Blue Baby Syndrome.

The Iowa programs included extensive one-on-one contact, field days, public meetings and marketing campaigns to promote effective ways to use nitrogen, other crop nutrients, pesticides and animal manure. Through the Big Spring Basin Demonstration Project, for example, educational and demonstration efforts helped more than 200 area

farmers cut nitrogen use 21 percent from 1981 to 1989—with no loss in yield and annual savings of \$200,000.

In many cases, the projects found, Iowa farmers simply were applying more nitrogen than their corn crops



Kay Connelly from ISU Extension trains a group of field scouts for the Sioux County Model Farms Demonstration Project.

needed. Nitrate soil tests conducted in 1989 and 1990 indicated that at least 32 percent of the soils sampled did not need additional nitrogen for optimal yields. Only half of the farmers questioned had been crediting the nutrients from manure applied to their row crops, yet surveys indicate that 20 percent of Iowa farmers could supply about half of the needed nitrogen from livestock manure. One study showed that there is no yield advantage by adding nitrogen to corn the first year following a good stand of alfalfa. Also, surveys found that 25 percent of farmers were overestimating their yield goals, causing them to use more nitrogen than needed.

The Iowa programs have not come cheap—the state spent about \$11 million on the programs from 1980 to 1990. Yet every dollar spent for education saved farmers \$8 in fertilizer costs. However, much of the funding for the programs expires in 1992. "We need this momentum to continue because there is still more work to be done," says Dale Cochran, Iowa Secretary of Agriculture.

Resources

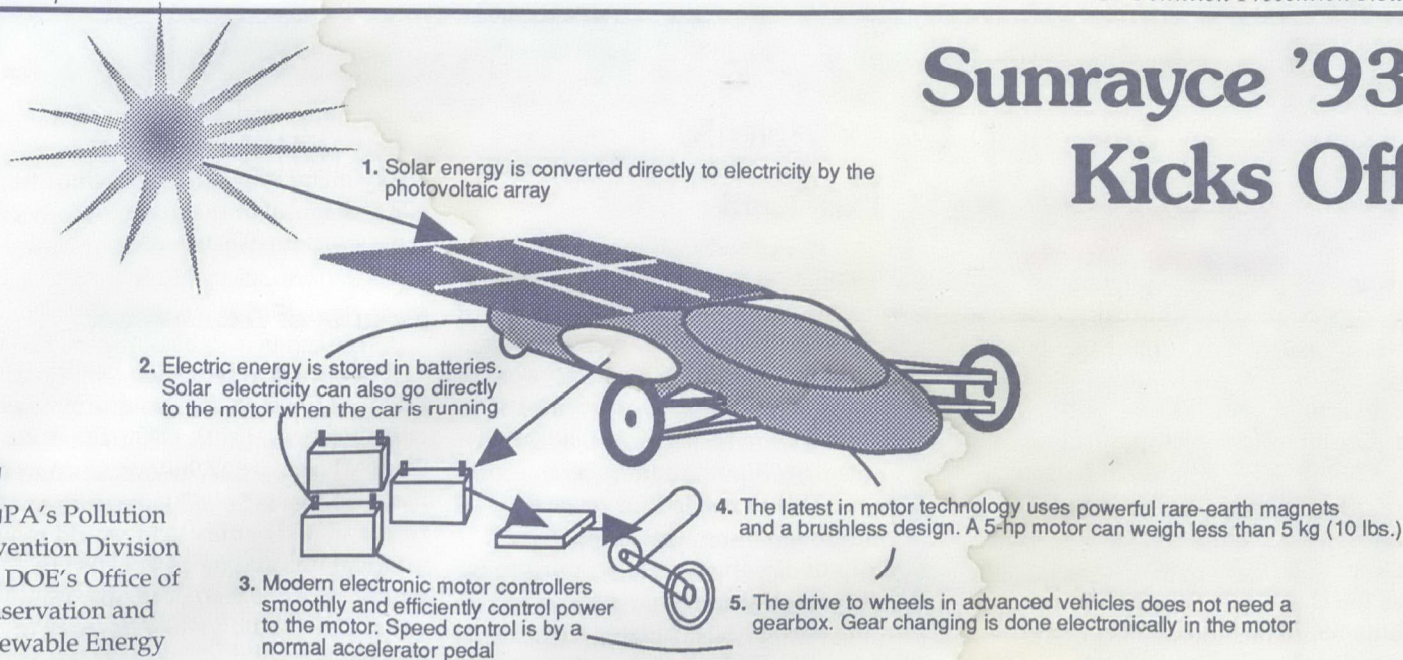
People Making a Difference: The Big Spring Basin Demonstration Project is a 20 minute video available on loan from **Iowa's Extension Offices**. Local agency representatives and farmers talk about how they have worked together to change farming practices to improve groundwater quality in Iowa's Big Spring Basin. Contact Media Resources Center, Iowa State University, 515-294-1540.

A pilot educational module targeting agricultural and rural groundwater pollution has been developed by **EPA Region V. FARM*A*SYST** consists of activity-oriented lessons revolving around groundwater and contamination movement; types of underground contaminants; soil, geologic, and hydrologic site conductions; and contamination prevention or reduction strategies. Contact: Susan Boldt, 312-353-3565.

The **Regional Groundwater Center** at the University of Michigan Biological Station has developed an educational handbook to inform citizens about groundwater and explain the usefulness of a Geographic Information System (GIS). The handbook is based on data from Charlevoix County, Michigan, but can be used as a reference for other communities interested in GIS for resource planning and protection. Contact: the Regional Groundwater Center, 616-539-8789.

EPA, in conjunction with USDA's Soil Conservation Service and Winrock International, has produced a new video titled *Sustaining America's Agriculture: High Tech and Horse Sense*. The video highlights thriving farms that reduce or eliminate the impact of fertilizers and pesticides on groundwater. Narrated by Raymond Burr and produced by David Wann of EPA Region VIII, the video is available through: Nat'l Assn. of Conservation Districts, 800-825-5547.

Sunrayce '93 Kicks Off



EPA's Pollution Prevention Division and DOE's Office of Conservation and Renewable Energy recently kicked off

Sunrayce '93 with seed money for 36 North American university teams to participate in the biennial intercollegiate competition for solar-powered cars. The race will be held June 20-26, 1993, on a 1,000-mile course stretching from Dallas, TX to Minneapolis, MN. University teams will compete with vehicles of their own design and construction powered only by sunlight. Most of the cars will operate on less energy than is required to operate a standard hair dryer.

One purpose of Sunrayce is to

showcase clean technologies for automotive propulsion. Although the cars are highly specialized, the technologies employed will push the frontiers of applied mathematics, physics, and materials science. The event is designed to involve hundreds of science, mathematics, and engineering students across North America. Sunrayce '93 symbolizes a recognition by DOE and EPA of the importance of "hands on" education and cooperation in promoting a cleaner future. Support for Sunrayce '93 will be

provided by General Motors, DOE/OCRE, DOE's National Renewable Energy Laboratory, and the Society of Automotive Engineers, and possibly by Energy, Mines, and Resources Canada.

In 1990, 32 North American teams raced from Orlando, FL to Warren MI in the GM Sunrayce USA 1990, which attracted an estimated 60,000 spectators over the course of the 11-day event, plus widespread television coverage. The winning vehicle in that race was the University of Michigan's Sunrunner.

33/50 Marks Progress

(Continued from page 1)

tion goals. LTV Steel's 80 percent reduction pledge includes 100 percent reductions of the solvents methylene chloride, tetrachloroethylene and 1,1,1-trichloroethane. Honda of America's plan includes replacing solvent-borne coatings with waterborne technology, at an estimated cost to the company of \$75-200 million.

According to the report, companies have joined the program for a variety of reasons. Some are pursuing reduction efforts and welcome the opportunity for public recognition of their efforts; others say they believe pollution prevention can best be promoted through a voluntary program such as the 33/50 Program. Companies' reasons for not joining the program include the difficulty of making predictions about future waste generation, and a concern about

potential conflicts between the 33/50 Program and goals under other state and federal environmental programs.

The drug and pharmaceutical manufacturers have the highest industry sector participation in the program, at 37.70 percent. Next highest are the agricultural chemicals sector, at 34.62 percent, and the tobacco sector at 33.33 percent, according to the report.

The 33/50 Program seeks to reduce the generation of 17 high-priority toxic chemicals 50 percent by 1995; with an interim goal of 33 percent reduction by 1992. In 1988, the baseline year

for the program, 1.4 billion pounds of the 33/50 chemicals were either released to the environment or transferred off-site to waste management facilities; the aim is to reduce this figure to 700 million pounds by 1995.

Has your company volunteered for 33/50?

For information on the 33/50 Program, contact the TSCA Hotline:

Call: 202-554-1404

Fax: 202-554-5603

Case Studies from the Pollution Prevention Research Branch

Pollution Prevention Opportunity Assessment: Fort Riley, Kansas

The Risk Reduction Engineering Laboratory of EPA's Office of Research and Development is supporting the Waste Reduction Evaluations at Federal Sites program which focuses on waste minimization research opportunities and technical assessments at federal facilities. One site chosen for performance of a pollution prevention opportunity assessment under the program was the U.S. Army Forces Command maintenance facilities at Fort Riley, Kansas.

Results of the Fort Riley assessment identified two waste reduction opportunities in a multi-purpose building (Building 8100) used for automotive subassembly rebuilding, and lead acid battery repair, as well as a number of other Army maintenance operations.

Waste Battery Acid

Battery acid (32-37 percent sulfuric acid) containing trace concentrations of lead and cadmium is currently drained from both dead batteries and batteries requiring repairs and shipped in 15-gallon drums to the storage facility at

the installation for ultimate disposal as a hazardous waste. The assessment proposed instead that the waste acid be gathered in a holding tank, filtered to remove any particulates, and adjusted in concentration to 37 percent sulfuric acid (using 60 Baume commercial sulfuric acid) as needed for reuse in reconditioned or new batteries. The buildup of dissolved metal impurities in this recycling system is prevented by purging part of the acid from the system. The acid being purged is neutralized and treated for trace heavy metal removal to allow on-site disposal as nonhazardous waste.

Automotive Parts Washer Wastewater

Dirty aqueous alkaline detergent solution from automotive parts cleaning, which contains trace concentrations of lead, chromium and cadmium at a pH >12 as well as the oil, grease and dirt removed from the automotive parts, is currently drained to an on-site nonhazardous waste evaporation pond. This waste, heretofore regarded as nonhazardous, is currently being reclassified as a RCRA hazardous waste due to its characteristics (D007, D008) and will have to be disposed of as a hazardous waste.

The proposed waste reduction option for this waste stream would involve the use of equipment external to the automotive parts washer. The proposed process would include emulsion breaking to cause emulsified oils to float, removal of demulsified oils and other tramp oils and grease by skimming, filtration to remove particulates in an in-line cartridge filter, and addition of fresh alkaline detergent as necessary, followed by recirculation of the cleaned washwater to the automotive parts cleaner. Buildup of impurities in the recycled washwater is prevented by purging 25 percent of the used alkaline detergent and recycling 75 percent. The material being purged is neutralized

with an appropriate amount of waste battery acid and precipitated trace heavy metal impurities are removed to allow disposal of the purge stream as a nonhazardous waste.

Results of Assessment

The battery repair shop generates 7,200 gal/yr of RCRA hazardous waste (classifications-D002, D006, D008) at a disposal cost of \$27,900/yr. Current raw material cost is \$11,530. Recycling of the reformulated battery acid would require a capital investment of \$15,200 but would save \$36,000/yr in operating costs. This would yield a payback of 0.42 years.

Automotive parts washing generates 29,000 gal/yr of RCRA hazardous waste (classifications-D007, D008). This waste is currently drained to an on-site evaporation pond. Current raw material cost is less than \$100/yr. Recycling of purified alkaline detergent solution would require a capital investment of \$19,800. If it were disposed of as a RCRA hazardous waste at the same cost per gallon as the waste battery acid, the disposal cost would be \$112,000/yr. This option would save \$107,100/yr in operating costs, leading to a payback period of 0.18 years.

Recommendations

In light of the short payback periods of the two waste reduction options identified, successful implementation of these options at Fort Riley would create the potential for application of similar options in at least 10 other U.S. Army Forces Command installations.

The EPA Project Officer for this study is James S. Bridges. The project summary entitled: "Waste Minimization Opportunity Assessment: Fort Riley, Kansas" (EPA/600/S2-90/031) is available from U.S. EPA/RREL, Pollution Prevention Research Branch (MS-466), 26 W. Martin Luther King Drive, Cincinnati, OH 45268.

The summary can also be obtained from the Pollution Prevention Information Clearinghouse (PPIC) by calling 703-821-4800.

Technology Development Hotline: 800-48-NETAC

A new toll-free hotline service is available from the National Environmental Technology Applications Corporation (NETAC) at the University of Pittsburgh to assist in the commercialization of environmental technologies. Funded by EPA, the hotline offers information about: the environmental technology commercialization process; public and private financing sources; and government programs supporting technology development and commercialization. The hotline will be staffed Monday through Friday, 9 a.m. to 5 p.m. EST.

Corporate Notes

Less Toxic Batteries Available in 1992

Batteries without toxic heavy metals such as mercury and cadmium will be available this year, according to a number of manufacturers and suppliers. Public concern has been rising about the environmental impacts of disposing of household batteries in the post-consumer waste stream. Among the companies announcing new products:

- **Harding Energy Systems** has introduced Green Battery, a nickel hydride rechargeable battery that does not contain cadmium and has twice the capacity and cycle life of a conventional nickel cadmium (NiCad) battery, according to the company. The battery includes a technology developed by the **Ovonic Battery Co.** that uses metal-alloy hydride instead of cadmium.
- **Battery Technologies Inc.** has developed a reusable alkaline battery that will contain no mercury. The company has signed licenses with six companies in five countries, including Rayovac in the United States, for the use of its reusable alkaline manganese technology, which uses metallic and organic inhibitors to perform the function formerly performed by mercury. The first generation of the RAM technology, which will be available in 1992, will compete with disposable batteries and NiCad rechargeables.
- **Matsushita Battery Industrial Co.** and licensee **Rayovac** have signed a technology agreement that will enable Rayovac to produce a no-mercury added alkaline battery. Matsushita's **Panasonic** brand also has announced a line of alkaline, heavy-duty and general purpose cells that are 99.999 percent mercury free. (The company says that because traces of mercury exist naturally in other elements in the battery, no battery is entirely free of mercury.)

Mercury has been added to batteries to chemically counter reactions that

could ultimately destroy the cell. For example, alkaline manganese batteries use zinc powder as the negative electrode. Ordinarily, without a small amount of mercury added, the powder would react with other battery components, causing internal corrosion and leakage.

The amount of mercury used in household batteries has been declining steadily in the United States, decreasing 92 percent between 1984 and 1989, according to U.S. Bureau of Mines data. Recently, states have begun setting standards for mercury levels. The first state to set mercury levels, Minnesota, required household batteries to have no more

than 250 parts per million by January 1992. Industry experts expect legislation on mercury standards will become more stringent once this newest round of products is on the market.



Officials of Battery Technologies Inc. in front of automatic RAM battery cycling stations.

Green Lights Makes Gains

(Continued from page 1)
years to complete their lighting upgrades. The typical plan for most companies has been to use the first year or two to survey buildings, develop expertise, train staff and acquire budgets. The first two years also include, in most cases, some lighting upgrades to help with the training process and to allow staff to develop procedures for budgeting, procurement, installation, contracting and reporting. Years three and four will be used for major upgrades.

According to the report, Green Lights

goals for 1992 include recruiting an additional 3 to 5 percent of the nation's square footage and to have every Green Lights participant complete one major lighting upgrade. The program also plans to begin outreach toward the residential sector.

Green Lights is EPA's first voluntary energy-efficiency program; by the end of 1992, the Agency hopes to offer a Green Building program and/or a Green Energy Corporation program to further the nation's goal of preventing pollution.



New Jersey became the first state to have all its electric utilities join the Green Lights program. Constantine Sidamon-Eristoff, EPA Region 2 Administrator (far r.) hosted a signing ceremony in January with vice presidents (l to r) James J. Lees, Atlantic Electric Co., Eugene J. McCarthy, Jersey Central Power & Light Co., Thomas M. Crimmins, Public Service Electric & Gas Co., and Victor A. Roque, Orange & Rockland Utilities, Inc.

Calendar

Title	Sponsor	Date/Location	Contact
Clean Air Marketplace: New Business Opportunities	U.S. EPA, Air & Waste Management Assn.	April 22-23 Tysons Corner, VA	703-934-3747
Groundwater Education Summit	Groundwater Education in Mich., Great Lakes Commission	May 11-12 Chicago, IL	Carol Misseldine 517-355-0224
Solid Waste Management: Turning Trash into Dollars	Univ. of Missouri/Columbia College of Engineering	May 21 Kansas City, MO	Eng. Extension 800-776-1044
Northwest Citizens' Conf. on Right-to-Know	Northwest Policy Center, Sierra Club, Wash. Toxics Coalition, etc.	May 30-31 Mt. Ranier, WA	Freddie Merrell 206-543-7900
8th Annual Woods Hole Meeting	U.S. EPA	June 1-3 Woods Hole, MA	Dana Duxbury 508-470-3044
Managing Now for a Sustainable Future: Env. Mngmnt. Inst.	Tufts University Center for Environmental Management	June 1-26 Medford, MA	Colleen Singer 617-627-3531
Environmental Leadership Conference	Renew America, Smithsonian, EPA, Council on Env. Quality	June 3-5 Washington, DC	Renew America 202-232-2252
SARA Title III and OSHA Right-to-Know	Environmental Resource Center	June 11 Dallas, TX	Tel: 800-537-2372 Fax: 919-822-0449
National IPM Forum	U.S. EPA, USDA	June 17-19 Arlington, VA	ARI 301-530-7122
85th Annual Meeting & Exhibition	Air & Waste Management Association	June 22-26 Kansas City, MO	Debbie Reichert 412-232-3444
Urban and Agricultural Water Reuse	Water Environment Federation	June 28-July 1 Orlando, FL	Nancy Blatt 703-684-2400
1992 National Solid Waste Forum	ASTSWMO	July 20-22 Portland, OR	Tel: 202-624-5828 Fax: 202-624-7875
30th Annual Solid Waste Exposition	Solid Waste Association of North America	August 3-6 Tampa, FL	301-585-2898

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