



Pollution Prevention News

Highlights

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NEW RULES PROPOSED FOR SOOT, SMOG

AIR QUALITY TREND DATA SHOW PROGRESS, BUT PARTICULATES LAG BEHIND

EPA proposed new national standards for particulate matter (soot) and ground-level ozone (smog) on November 27, 1996, based on studies showing that current standards are not doing enough to prevent serious health problems.

Because of the proposal's significance, a new toll-free telephone number and electronic mail addresses have been set up to receive public comments. (See page 7).

Most particulate matter (PM) comes from combustion in installations such as power plants, large incinerators, and cars and trucks. Ozone is the haze of chemicals from car exhaust and smokestack emissions that shrouds many cities on hot summer days. The proposed standards, along with clean air programs already planned, are expected to reduce premature deaths by 40,000 per year and reduce serious respiratory problems in children by 250,000 cases per year.

In addition, implementation of the standards is expected to spur a host of pollution prevention efforts. Specific measures to limit ozone and PM pollution that cities and states will need to take in order to meet the new standards will be proposed in June 1998. Many areas are expected to achieve attainment through

regional utility efforts, national low emission vehicle programs currently in development, and sulfur dioxide reductions from power plants. Some cities (e.g., Houston, Philadelphia, Baltimore-Washington) are likely to need additional steps to meet the new standard, such as the installation of low NOx burners or economic incentive programs. Finally, a few cities, such as greater Los Angeles and New York, will likely need more innovative efforts to reduce traffic and introduce cleaner vehicles. In the meantime, an interim implementation policy of "no backsliding" is in effect until state implementation plans are developed, and approved by EPA.

The proposal is computer-accessible through the Internet at <http://www.epa.gov/airlinks>. For technical information, contact Jeff Clark at 919-541-5557.

In December, EPA released its annual report on air quality trends, which shows a brighter side of the overall picture. Over the past 25 years, major air pollutants have decreased nationally by almost 30 percent.

Air quality improved for all six criteria pollutants during the 1990s, compared to the 1980s. The six are: carbon monoxide,

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GRANTS COMPETITIONS

Three pollution prevention grants competitions are underway:

P2 Network — a national network of pollution prevention information centers.

Deadline: April 21, 1997. Contact: Beth Anderson, 202-260-2602 or

Anderson.Beth@epamail.epa.gov.

FY97 Pollution Prevention Incentives for States (PPIS) grants:

Deadline: April 25, 1997. Contact: Regional Pollution Prevention Coordinators.

Environmental Justice/Pollution Prevention grants for minority and low-income communities. Deadline: April 15, 1997. Contact: 703-841-0483.

NEWS & NOTES

WASTEWI\$E PARTNERS REPORT RECORD SAVINGS

More than 200 companies participating in EPA's program WasteWi\$e report that voluntary waste reduction in 1995 was four times as large as in 1994. The companies estimate that they avoided generating 344,000 tons of waste material through prevention and recycled an additional 4.2 million tons.

WasteWi\$e partners, a third of whom are Fortune 500 manufacturing and service companies, also managed to save approximately \$59 million in 1995 as a result of efforts to reduce transport packaging, a key cost-cutting measure for many companies.

EPA's "Second-Year Progress Report" contains more information about achievements of WasteWi\$e partners, including examples of strategies to reduce both waste and cost. For a copy, call the RCRA/Superfund Hotline at 1-800-424-9346 or 703-412-9810.



EPA SPEEDS UP BIOLOGICAL PESTICIDE APPROVAL

Regulatory reinvention measures by EPA are expected to accelerate the registration of new, safer insect pheromone (biological) pesticides. Pheromones are naturally occurring compounds used by insects to communicate and mate. Their use can control pests by interfering with normal insect behavior and preventing reproduction. Pheromones pose far fewer risks to human health and environmental pollution than traditional chemical pesticides. Their effectiveness at low dosages and compatibility with integrated pest management programs reduce the need for conventional, more toxic insecticides.

The time and cost of bringing pheromone pesticides to the market have been considerably reduced by EPA's new common sense measures, a series of rules published between 1993 and 1996. A record number of safer products have entered the market, most used in moth and caterpillar control. Specific measures

include exempting most pheromone pesticides from restrictions regarding maximum permissible levels for residues in food, as no harmful residues result from pheromone use. EPA has also increased the acreage of testing ground allowed for most pheromone products. Because pheromone pesticide testing requires a larger area than conventional pesticides, the increase saves both EPA and pheromone developers time and money. Many of the producers of pheromone pesticides are small companies with limited resources, and the savings and exemptions accorded by EPA will allow them to free up capital for product development.

For more information, call Al Heier, 202-260-4374.

SOLVENT GUIDE PREPARED FOR METAL CLEANERS

"Aqueous and Semi-Aqueous Solvent Chemicals: Environmentally Preferable Choices" is a new guide from EPA's Office of Pollution Prevention and Toxics. It was developed to help companies make responsible environmental choices for chemicals used in metal cleaning.

The guide includes a wall chart which rates chemicals by toxicity and persistence in the environment. The toxicity rating indicates potential harm to aquatic organisms, such as fish and algae. The persistence rating indicates how long the chemical will remain in the water before it degrades into stable components and, at that point, becomes less likely to pose environmental problems.

Also included are lists of additional resources that can be used in selecting solvents.

EPA has sent the guide to about 1,000 companies, including 600 metal finishers. An Internet version will be available soon.

To order the guide, call the TSCA Hotline, 202-554-1404.



MARKET SOLUTIONS

TOP PERFORMING ENVIRONMENTAL COMPANIES FIND PROFITS IN POLLUTION PREVENTION

An annual ranking of the financial performance of environmental service firms finds a number of companies with pollution prevention orientation in the top listings. The *Environmental Benchmark*, a Colorado business that follows environmental service companies, released its list of the top 20 firms in 1996 based on a weighted average of return on sales and return on equity.

Heading up the list is Millipore Corporation, with a 43% return on equity and a 15% return on sales. Millipore provides a broad array of laboratory support and purification services for the environmental analysis, pharmaceuticals, and microelectronics markets.

Many of the other top performers are from the water quality services (Nalco Chemical, Osmonics) and instrumentation (Dionex, Thermo Instrument) sectors of the industry. Several of the firms which made the Top 10 are "reflective of the rapid growth in businesses which promote and facilitate pollution prevention, waste reclamation and re-utilization, or the extension of infrastructure or product life," according to Steve Maxwell, Managing Editor of the *Environmental Benchmark*. For example:

► **Bandag** is an internationally diversified tire retreader and recycler, extending the useful life of automotive and heavy equipment tires, and helping to mitigate the problem of tire disposal. Operating through more than 1350 franchised, independent dealers throughout the world, Bandag has consistently grown at well above industry rates while maintaining high profitability.

► **Giant Cement Holdings**, a southeastern cement company, has pioneered resource recovery techniques

for use in the manufacture of cement, and is one of the country's largest users of waste-derived fuels in the cement industry. The firm gathers and blends a wide range of toxic wastes and organic chemical by-products into an energy source to fuel its cement production kilns.

► **Thermo Fibertek**, a subsidiary company of Thermo Electron Corporation, has achieved rapid growth and financial success by concentrating its efforts in the manufacture of innovative paper recycling equipment. With systems that incorporate the most advanced de-inking and cleaning equipment, Fibertek is one of the leading suppliers to the international recycling industry.

► **Insituform Technologies** is a provider of trenchless solutions to piping systems. The company provides an automated system for rehabilitation of underground water delivery and sewage piping systems. By extruding rubber-based liners through pipelines to seal cracks and prevent leakage, Insituform allows a municipality to avoid costly disruptions of laying new lines, and minimizes the water losses or sewage contamination problems that often result from leaking older cement lines.

Firms that have concentrated in the areas of recycling, resource recovery and pollution or waste prevention have enjoyed greater growth and financial success in recent years. But despite the good performance of these stars, in today's dynamic market conditions diversification in industries outside of the environmental marketplace continues to be a key factor in maintaining strong financial performance.

For more information, contact the *Environmental Benchmark*, 104 Pine Tree Lane, Boulder CO 80304. Tel: 303-442-4800, Fax: 303-442-9004.

INDOOR AIR POLLUTION

IN SEARCH OF PRODUCTS TO LET US BREATHE MORE EASILY

With Americans spending nearly 90 percent of our time indoors, the quality of the air we breathe is an increasing concern. Traditional approaches

EPA is seeking to characterize indoor air emissions from selected types of office equipment and evaluate equipment modifications that may result in lower emissions.

to mitigating pollution have focused on ventilation and air cleaning, techniques to transfer pollution rather than prevent or reduce it at the source. Pollution prevention projects currently underway within EPA's Air Pollution Prevention and Control

Division focus on the many sources of indoor air pollution, including office equipment, aerosol consumer products, textile products, engineered wood products, conversion varnishes, and biocontaminants.

Goals for improving indoor air quality and preventing pollution include:

- ▶ Encouraging the development of low emitting materials, products, and equipment;
- ▶ Evaluating existing data to identify low emitting materials;
- ▶ Developing appropriate test methods for use by industry to promote pollution prevention, such as a test method to measure office equipment emissions.

TESTING OFFICE EQUIPMENT

Adverse health effects linked to office equipment emissions, as reported by test subjects, include headache; mucous membrane irritation; eye, nose and throat dryness; and dry and tight facial skin. Through cooperative research with Research Triangle Institute, EPA is seeking to characterize indoor air emissions from selected types of office equipment and evaluate equipment modifications that may result in lower emissions.

Because no standard test method exists at present, EPA is also seeking to develop a test applicable to all types of office equipment. Such a method would make it

possible to compare results among different machines and manufacturers and encourage the development of lower emitting equipment.

Equipment emissions include ozone, volatile organic compounds (VOCs), inorganic gases, and particulates. Emissions generally result from one of the following:

- ▶ **Equipment operation.** Both the supplies used, such as toner and paper, and the operation of electronic equipment contribute to emissions. Emissions may either remain fairly constant or increase between routine maintenance as the equipment ages.
- ▶ **Component off-gassing.** Residual organics can off-gas from any type of office equipment. Sources include construction materials (e.g., plastic casings), components (e.g., cards used for circuit boards), or solvents used in manufacturing or cleaning the equipment. Off-gassing emissions decrease over time but increase at higher temperatures.
- ▶ **Catastrophic failure.** Failure of a unit can cause episodic releases of organics due to venting of capacitors and/or charring of components.

In order to validate the newly-developed test method, EPA tested dry-process copy machines, which make up a majority of the photocopier market, and found that the copiers can produce emissions of ozone and VOC that can potentially have a significant impact on indoor air quality. Different machines produced different combinations of individual compounds, probably due to the different toner formulations. Potential solutions to reduce office equipment pollution include a charged roller system to reduce ozone emissions; improved transfer efficiency to minimize toner emissions (perhaps with a replaceable cartridge system); reduced temperature of fusing operation, improved equipment maintenance, and reformulation of supplies such as toner. Ozone filters, commonly used on copiers and laser



INDOOR AIR POLLUTION, CONTINUED

printers, catalytically convert the ozone to oxygen. They are not 100 percent effective, however, and must be replaced or cleaned periodically. A final report on the project will be available in late 1997.

AEROSOL CONSUMER PRODUCTS

The prevalence of aerosol consumer products in the indoor environment has prompted EPA to develop an improved understanding of personal exposures to these products as well as pollution prevention techniques to reduce exposures.

Cooperative research with Georgia Tech and the University of Illinois is focusing on developing measurement methods and models for manufacturers to use to develop a better understanding of aerosol behavior. Georgia Tech is developing a mass spectrometer system which will chemically characterize aerosol products. Researchers there are also measuring particle sizes of various spray patterns. The system eliminates the need for collection and concentration techniques and is well suited for real-time, direct analysis of aerosol consumer products. At the University of Illinois, researchers are developing techniques and instrumentation, as well as a model, to measure aerosol transport and distribution in rooms. By analyzing spray patterns of representative aerosol products using particle image velocimetry techniques, they are determining particle concentrations at various distances from the spray nozzle. The research will help in predicting emissions and personal exposure from using aerosol products indoors.

At Purdue University, an innovative spray nozzle design is under development for use with precharged aerosol containers. The new dispenser design allows manufacturers of selected products (e.g., personal care, hair care, degreasers, and hard surface cleaners) to replace VOC solvents and hydrocarbon propellants with water and air while maintaining acceptable product delivery characteristics. Final reports on these projects will be available in late 1997, including the design guidelines for the spray nozzle.

IN ANY COLOR, THIS COPIER PAPER IS GREEN

Washington-based Green Seal's Environmental Partners Program published its annual top-10 list of copier papers on the market with the least adverse impact on the environment. Listed in Green Seal's September *Choose Green Report*, the comparison is based on post-consumer recycled content and bleaching processes that do not use chlorine or its derivatives.

The top three "Green Buys" were led by Arbokem's Downtown Paper #3, with 43 percent post-consumer recycled content, 45 percent tree-free fiber content, and a totally chlorine-free bleaching process. Next were International Paper's Springhill Incentive 100DP paper and James River's Eureka!100.

The report also includes ideas on ways to reduce paper consumption in the office. To obtain a copy, contact Green Seal at 202-331-7337, ext. 31. On the Internet, go to <http://www.greenaseal.org>.

OTHER PROJECTS

Other research projects underway include:

Textile Products: EPA and NC State/College of Textiles have combined their efforts to focus on manufacturing alternatives to reduce latent volatile chemical emissions in textile products and development of low emitting thermoplastic composite panels.

Fabric and Finish: A low emitting prototype alternative to plywood and particleboard has been developed.

Engineered Wood Products: Project includes identification of low emitting coatings and fibers.

Conversion Varnishes: Clear varnishes often used as coatings on wood cabinets and furniture can produce emissions of formaldehyde and other VOCs.

Biocontaminants: EPA intends to establish engineering guidelines for the prevention, mitigation, and control of biocontaminants.

For more information, contact the Indoor Air Quality Information Clearinghouse (IAQ Info) for information on specific pollutants, health effects, testing, measuring and controlling pollutants, minimizing indoor air pollution, and standards of IAQ. Call 1-800-438-4318 or fax 202-484-1510. To receive Inside IAQ, published twice a year, write to kleovic@engineer.aerl.epa.gov or fax to 919-541-2157.

P2 IN CONSTRUCTION

Technologies used in construction, renovation, and demolition are advancing rapidly to meet clients' demands for structures that generate less construction waste and are more environmentally benign during their useful lives. Here are a few of the diverse applications.

GREEN LIGHTS, CLEAN AIR ARE SPECS FOR EPA HQ

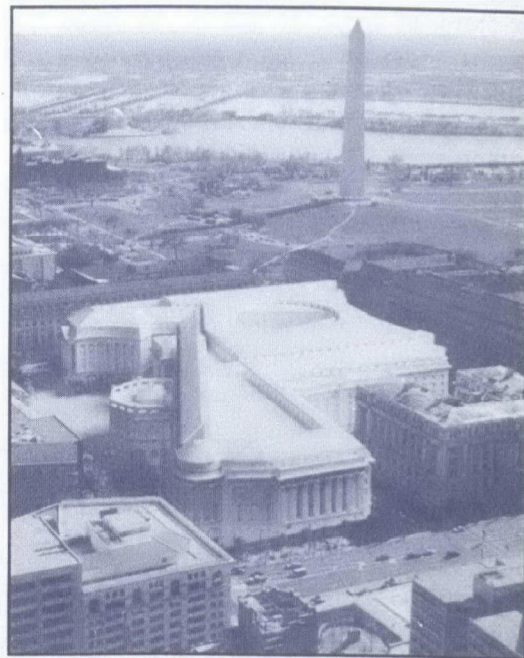
The new EPA headquarters offices in Washington, D.C. incorporate state-of-the-art technologies for assuring clean indoor air, energy conservation, and materials reuse. The agency currently occupies the southern half of the Ariel Rios Federal Office Building, which the General Services Administration (GSA) renovated with EPA's participation during the design phase. In summer 1997, some EPA offices will move into a portion of the new Ronald Reagan Federal Building, which is Washington's second largest federal building, exceeded in size only by the Pentagon.

Indoor air quality is a high priority in both projects. For the new building, EPA's planning team developed furniture selection criteria to ensure minimal volatile organic compounds (VOC) off-gassing. The planning team used as a model a Washington State furniture procurement in which four elements were identified for testing: formaldehyde, total aldehydes, total VOCs, and particulates. GSA awarded the contract to Haworth Inc. of Holland, MI. This represents the first time the government has used target emissions and environmental assessment for a major procurement, instead of relying solely on technical and price considerations. As a result of this acquisition, GSA plans to make a similar process available for other federal agencies.

In the Ariel Rios renovation, pollution prevention measures included:

- ▶ Carpet tile free of the chemical 4-PC and low in VOCs;
- ▶ Walls painted with low-VOC paint or finished with low-VOC vinyl or fabric wall covering; and
- ▶ Removal of old window air conditioning units so that windows could be refurbished and made operable.

EPA's 200,000 square feet in the Reagan building will reflect the Green Lights program, using energy-saving luminaires



EPA's new headquarters offices are located in the Ronald Reagan Federal Building (white) and the Ariel Rios Federal Office Building to its left. In this photograph of the model, the view is southwest toward the Washington Monument and the Jefferson Memorial.

and electronic ballasts, along with task lighting at each workstation. Pendant lighting will be used to illuminate ceilings.

Low-flow plumbing devices are specified in tenant spaces. Recyclable and reusable materials were specified during construction—for example, in temporary construction barriers and packing materials—as well as in permanent materials, such as recycled flyash in concrete, metal wall framing, gypsum board, and linoleum flooring.

EPA staff are planning to move into Ariel Rios-North and the neighboring Customs and ICC buildings by the year 2000.

STEEL DRIVIN' MEN DRIVE LESS STEEL

The recent upgrade of the Dartmouth Bridge across the Mississippi River, on Interstate 94 in Minneapolis, MN, was a sign of the times. Today's lighter, stronger steels and new design technologies made it possible to use nearly 20% less steel per square foot of road surface than when the original structure was built about 30 years ago.

P2 IN CONSTRUCTION, CONTINUED

WETLANDS MADE TO ORDER FOR COORS FIELD

Wetlands are nature's treatment plants. Marshes, swamps and bogs filter and absorb sediments, nutrients, and chemicals that can pollute other bodies of water further downstream.

Taking a cue from nature, HOK Sports Facilities Group, a division of Hellmuth, Chata + Kassabaum, Inc., the nation's largest architectural firm, designed Coors Field in Denver with a vegetated submerged wetlands to treat water from the stadium and parking lots. Home of the Colorado Rockies baseball team, Coors Field is believed to be the only stadium with this design feature. Here is how HOK Sport describes it:

"The wetlands emulate natural ecosystems and the physical, chemical, and biological processes that purify water. At Coors Field, the symbiotic relationship between the microbes and vegetation provides the compact treatment required in the constricted site in lower downtown Denver.

"As a ballpark that seats 50,000 people, Coors Field generates contaminants such as beer, peanut shells, hot dog pieces, cleansers, and paper. To treat this stadium wash water and turf irrigation water, which is filtered as it percolates through the field's sand bed, (HOK Sport) designed a 48,000 square foot underground vault that has two cells. Water enters the vault through a system of baffles that remove larger floatables and sediments. The water containing dissolved pollutants is held for 40 hours in a sedimentation cell before being pumped to the constructed wetlands. Fresh water ... enters the other cell, where it is pumped to the storm sewer system. Water from the surface parking lots and storm-water runoff flows directly to the subsurface wetlands.

"Six sequential ponds of varying sizes and different planting sequences treat the water. A submerged gravel pack filters wastewater through the gravel while

maintaining a flow beneath the media. Wastewater flows through the root systems of plants—no water appears above the gravel pack. This prevents exposed areas of standing water which can become anaerobic, creating odors and attracting undesirable insects such as mosquitoes."

The project team predicts that the system will reduce operational costs associated with traditional water quality systems and will require little maintenance.

NEW RULES FOR SOOT AND SMOG

Continued from page 1

lead, nitrogen dioxide, smog, soot, and sulfur dioxide. Despite the progress, the report also shows that 80 million people, or three in 10, still breathe air that does not meet existing health standards.

HOW TO COMMENT ON PROPOSED AIR QUALITY STANDARDS

The toll-free phone number is 1-888-TELL EPA (1-888-835-5372), and it will receive comments 24 hours a day, seven days a week.

Five e-mail boxes are organized by subject:

General comments: general.comments@epamail.epa.gov

Ozone national ambient air quality standards only:
o3naaqs.comments@epamail.epa.gov

Particulate matter national ambient air quality standards only:
pmnaaqs.comments@epamail.epa.gov

Interim implementation policy only: iip.comments@epamail.epa.gov

Particulate matter monitoring regulations only:
monitors.comments@epamail.epa.gov

Comments can also be mailed to: U.S. Environmental Protection Agency
Air Docket (6102)
Attn: Docket # (See below)
Waterside Mall
401 M Street, SW
Washington, DC 20460

Docket numbers: ozone NAAQS proposal A-95-58; particulate matter NAAQS proposal A-95-54; interim implementation policy A-95-38; particulate matter monitoring proposal A-96-51.

For further information, contact Jan Kleeman at 919-541-3450 or Tom Curman at 919-541-5559 for e-mail information. For the 1-888 telephone number contact Pat Vaughan at 919-541-4912. The comment period closes Feb. 18, 1997.

DEMANUFACTURING

END-OF-LIFE STRATEGIES FOR ELECTRONICS

How ironic it is that the computer technology we love for its ability to reduce paper consumption and cut down on car travel now poses an environmental threat all its own.

Think about it. What do you do with an obsolete computer? Put it out with the trash? Take it to the landfill? Dismantle it and dispose of it a piece at a time?

Millions have wondered the same thing—yes, millions. According to a study conducted in 1991 at Carnegie Mellon University, the number of personal computers discarded globally by the end of 1995 was estimated at 25 million. By the year 2001, the Carnegie Mellon researchers projected disposal of 150 million personal computers in total.

So are monitors packed in alongside disposable diapers in landfills around the world? No, because approximately 75 percent of all personal computers that consumers have ceased to use have gone

THE DAWN OF DEMANUFACTURING

Demanufacturing is the new term coined to describe the process of dismantling and reusing or disposing of manufactured products, primarily electronics. When it comes to addressing electronics waste, European countries have taken the lead. European governments are pressuring industry to adopt “take back” policies for electronic and computer products. The European Union (EU) is considering a broad framework to identify who is responsible for collection, recycling, and disposal of discarded computers, set pollution prevention targets, and address cross-border shipments to specialized treatment facilities.

In the U.S., most of the electronic equipment used in business is already part of recycling programs maintained as a service to customers by manufacturers such as IBM, Digital Equipment Corporation, Hewlett-Packard, and Unisys. It is the consumer electronics sector that poses the problem, since a manufacturer’s involvement with the customer ends with the point of sale and there has been no incentive to provide recycling—until now. Increasingly, U.S. companies are contemplating voluntary programs in hopes of averting government regulation.

Digital has one of the most well-established recycling and reuse programs. It consists of:

- ▶ Resale of whole units through brokers, repair houses, or directly to end-users, in the U.S. and developing countries;
- ▶ Demanufacturing, or dismantling of the product in order to reuse parts, such as hard drives or circuit boards, or failing that, to recover and sell materials such as steel, aluminum, copper wires, and precious metals.

WHAT’S INSIDE, EXACTLY?

Television and computer screens are known, technically, as cathode ray tubes (CRTs). They have a useful life of around 12 years, far longer than most computers. Typically, it costs \$80 to refurbish a CRT. A 17-inch CRT contains about 18 pounds of

NATIONAL CONFERENCE PLANNED IN FEBRUARY

EPA is co-sponsoring an Electronic Product Recovery & Recycling Conference in Washington, D.C., February 25-26. The conference is being planned by the Environmental Health Center, a division of the National Safety Council, with the goal of developing an environmentally and economically sound strategy for recovering and recycling electronic equipment. It is intended for a diverse audience from industry, environmental groups, government, academia and elsewhere. Other sponsors are *Business and the Environment* newsletter, Hewlett Packard, Unisys Corporation, Techneglas, BDI and Envirocycle, Inc. Space is extremely limited. For information, contact the Environmental Health Center at 202-293-2270, ext. 469.

the way of those *National Geographic* back issues. According to industry consultants, they’re stored in the attic... or in the basement, or the garage, or somewhere. They’re on hold. Waiting. Until one day, someone or something will come along and give them the dignified retirement that they deserve.

The day is at hand.



DEMANUFACTURING, CONTINUED

glass, which is recyclable, as well as some lead. Low market demand for recycled glass has placed limits on the interest in recycling CRTs. However, a growing number of small firms in the U.S. and abroad feel the market potential is large enough to justify the risks.

One such firm is Envirocycle, of Hallstead, PA, which processed glass from 250,000 CRTs in 1995. While CRTs are the company's specialty, it also processes circuit boards and resells the lead, silver, gold, and platinum. Circuit boards are typically the most valuable parts that can be extracted from computers, although their value may drop as newer computers use smaller quantities of precious metals. The market for used parts is volatile in other ways. An example is the past year's drop in the cost of memory chips from \$100 to \$10, which destroyed profits for many chip recyclers.

ON THE CUTTING EDGE

Two county governments are blazing trails in computer demanufacturing. Hennepin County, MN, collects and disassembles 200 tons of consumer electronics each year, at a cost of \$190,000. In 1995, better than half of the 9700-plus units collected were televisions and computer monitors, reflecting the county's focus on high lead-content CRTs. The program also accepts camcorders, computers, radios, sewing machines, stereos, tape players, telephones, typewriters, VCRs, and vacuums.

Whatever can be reused, is. The rest is disassembled, and metals are sold in existing markets.

In Union County, NJ, a contractor disassembles televisions, microcomputers, monitors, printers, keyboards, computer peripherals, copiers, faxmachines, audio/stereos, VCR/video cams, microwaves, and telephones. The program got under way in October with a \$200,000 state grant, and hopes to offset costs through sales of parts.

EPA TESTS THE MARKET

As part of the Common Sense Initiative to find cleaner, cheaper, smarter solutions to

environmental problems, EPA Region I has funded the Northeast Resource Recovery Association to conduct four pilot projects in Binghamton, NY, and Somerville, MA. Consumer electronics are collected at dropoff points, for a charge of \$1 in New York and for free in Massachusetts. In November, when the first pilots took place, the New York site got 140 responses and the Massachusetts site got 180. For more information, get in touch with Chris Beling, 617-565-3241, or beling.christine@epamail.epa.gov.

In Rhode Island, EPA and the state's Department of Environmental Management are in the process of awarding an economic development grant to an electronic demanufacturing firm. There were five bidders, ranging from a small local company to Digital. The firm selected is German and will be making its first entry into the U.S. market. It will open its doors by fall 1997.

STARTING EARLY

Digital, AT&T, and other manufacturers are seeking to facilitate eventual demanufacturing by simplifying and standardizing components in the earliest stages of the design process. For example, new products are being designed using materials that are already recycled, or that can be recycled easily. Some hazardous materials and difficult to recycle materials can be easily separated or snapped off.

"In new product evaluation, we do a mock disassembly of the product," explained Bob Butler, account manager for Digital's computer asset recovery business. This helps designers determine, among other things, how to reduce the number of different types of plastics and fasteners used.



Part of the disassembly line at Electronic Processing Associates, Inc. in Lowell, MA.

DEMANUFACTURING, CONTINUED

AT LEAST THE PACKAGING IS BIODEGRADABLE

Scientists at the National Starch and Chemical Research Center, while working on projects to increase cereal tolerance to milk, stumbled on a new material considered to be a breakthrough in the packaging industry. Known as Eco-Foam® loose fill, this environmentally safe packaging material is being used by an increasing number of companies.

Made almost entirely of starch, Eco-Foam looks and feels like polystyrene, which makes up most of today's loose fill, but offers more disposal options than reusing, recycling, or dumping in a landfill.

Eco-Foam is produced in an extruder, the same machine producing many breakfast cereals in an environmentally safe process.

The annually renewable source of corn starch used in Eco-Foam is a special hybrid grown in the Midwest mainly for industrial uses.

As concern over the solid waste problem increases, Eco-Foam provides another solution in addition to reduction and recycling. Loose fill is difficult to collect for reuse and recycling due to its wide distribution and low weight. A natural product that breaks down won't end up in a landfill or littering land and sea.

Eco-Foam, because it is naturally based, can be:

- ▶ Reused;
- ▶ Composted, where the naturally occurring bacteria will break it down into carbon dioxide and water;



- ▶ Flushed down the toilet;
- ▶ Washed down the sink;
- ▶ Washed away by the rain; or
- ▶ Watered into the lawn, where it will break down naturally. Although it does not have any value as a fertilizer, it also appears to pose no risk to humans, animals, the lawn, or even the water table.

More information about Eco-Foam and how to replace existing loose fill with an environmentally safer alternative can be obtained by contacting American Excelsior Company at 817-649-7816 or 1-800-ECO-FOAM.

CRUNCHING THE NUMBERS

The demanufacturing trend is likely to continue, according to the Microelectronics and Computer Technology Corporation (MCC), a research and development consortium in Austin, TX, that has prepared several studies of environmental issues in the electronics industry. An "Environmental Roadmap" published this year notes that planning for and managing end-of-life disposition of electronic products is becoming increasingly important because of regulatory pressure and the increasing costs of traditional disposal alternatives. In the report, MCC recommends continuing to treat end-of-life products as products, not

as waste, and explores alternatives to releasing them into the waste stream.

MCC and the University of Texas, with funding from the Texas State Energy Conservation Office, are studying the technological and economic viability of an integrated recycling center in Austin that would conduct triage on electronic products ("Is it still working? Can it be refurbished? Is it recyclable?") and separate recyclables into metals, plastic, and glass for their respective markets. For more information on the study, which will be completed in early 1997, contact Colleen Mizuki at 512-338-3391.

RESOURCES

NPPC Resource Lists On-line. The National Pollution Prevention Center for Higher Education is now making the full text of its Resource Lists available through the NPPC's homepage. The Resource Lists include citations to articles, books, reports, case studies, problem sets, and multimedia resources for classroom use. Currently, the Lists cover pollution prevention in accounting, business law, chemical engineering, chemistry, environmental studies, industrial ecology, and industrial engineering and operations management. Go to <http://www.umich.edu/~nppcpub/> and click on Resource Lists. Printed listings can also be obtained from the Center at NPPC, University of Michigan, 430 E. University, Ann Arbor, MI 48109-1115. 313-764-1412. nppc@umich.edu

Water-wise Gardener Program and Handbook focuses on proper landscape management as a way to reduce homeowner contributions to nonpoint source pollution. The Extension program is a valuable model for those who work in public education. The 52-page handbook covers planning, implementation, data evaluation, and reporting as well as examples of surveys, impact sheets and marketing materials that have been successfully used in public education. Contact: The Water-Wise Gardener, Office of Consumer Horticulture, 407 Saunders Hall, Blacksburg, VA 24061-0327, tel. 540-231-6254.

EPA's Stratospheric Protection Division is releasing a book in January summarizing voluntary industry efforts in eliminating the use of ozone depleting substances. Contact Steve Andersen, Office of Stratospheric Protection, 202-233-9069.

ICOLP (1990-1995): A New Spirit of Industry and Government Cooperation. The International Cooperation for

Ozone Layer Protection, a non-governmental organization of multinational companies and affiliate members whose goal is the resolution of environmental problems through the exchange of technical information, has been reorganized as the International Cooperative for Environmental Leadership (ICEL). A five-year review of ICOLP and its success as an industry and government partnership is now available free of charge. Contact: ICEL at 202-986-5656.

Pollution Prevention for Process Engineers. This group of 34 papers from the American Institute of Chemical Engineers (AIChE) 1995 winter conference focuses on the integration of the best conventional and emerging waste reduction and pollution prevention technologies for minerals recovery processing. Topics include acid mine drainage, water treatment, recycling, and pollution prevention technologies in energy minerals, precious metal minerals, and fertilizer minerals processing. Contact: AIChExpress Service Center at 1-800-AIChemE (1-800-242-4363). Outside the US and Canada, 212-705-8100; or fax 212-705-8400.

Greening Your Property helps hotels and motels make their operations more environmentally responsible. Released by Green Seal, the guide lists environmentally preferable products and advises hotels on ways to reduce waste, save energy, and encourage recycling. Worksheets and audit forms are included to help hotels estimate the costs and savings associated with implementing the environmentally friendly changes. Contact: Educational Institute of the American Hotel and Motel Association at 517-353-5500.

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CALENDAR

DATE/SITE	EVENT	SPONSOR	CONTACT	E-MAIL/WWW
March 3-5 Houston, TX	De Lange Woodlands Conference on Sustainable Development	Energy and Environmental Systems Institute at Rice University, Center for Global Studies, National Academy of Sciences, and the James A. Baker III Institute for Public Policy	Judy Howell Tel: 713-737-5674 Fax: 713-285-5948	jimhowell@rice.edu
March 12-15 Cromwell, CT	Building Energy 1997—Insuring a Sustainable Future	Northeast Sustainable Energy Association	Tel: 413-774-6051 Fax: 413-774-6053	nesea@nesea.org http://solstice.crest.org/nesea
April 10-11 Lexington, VA	Environment Virginia 97: Public and Private Partnership for Environmental Progress Conference	Virginia Department of Environmental Quality and VMI Research Laboratories, Inc.	Fax: 540-464-7618	
May 4-6 East Rutherford, NJ	Workshop: "Pollution Prevention: Tools to Make It Really Happen"	American Institute of Chemical Engineers and Center for Waste Reduction	Dr. Joseph J. Cramer Tel: 212-705-7950 Fax: 212-752-3297	
May 17-24 Waterbury, CT to Portland, ME	American Tour de Sol: U.S. Electric Vehicle Road Rally Championship	Northeast Sustainable Energy Association	Tel: 413-774-6051 Fax: 413-774-6053	nesea@nesea.org http://solstice.crest.org/nesea
June 8-13 Toronto, Ontario	Science and Technology: the International Language	Air & Waste Management Association	Maureen Brown Tel: 412-232-3444 x3122	mbrown@awma.org http://www.awma.org/
July 8-11 Saratoga Springs, NY	Summer Study on Energy Efficiency in Industry	American Council for an Energy- Efficient Economy, NY State Energy Research and Development Authority	Tel: 202-429-8873 Fax: 202-429-2248	ace3-conf@ccmail.pnl.gov http://crest.org/aceee
Sept.-Oct Hyannis, MA	Sustainable Transportation & S/EV97 Symposium and Trade Show	Northeast Sustainable Energy Association	Tel: 413-774-6051 Fax: 413-774-6053	nesea@nesea.org http://solstice.crest.org/nesea

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