

2000 ENVIRONMENTAL INNOVATOR AWARDS SHOWCASE INSIDE

EPA New England Environmental Technology Innovator Awards

This is the third year of EPA New England's Environmental Technology Innovator Award Program. This year, seven winners were selected from a pool of 27 applicants, as representing New England's most innovative companies. The selection process was administered by EPA's Regional Science Council. The council evaluated each application based on the following criteria: (1) the ability of the technology to address an environmental problem, (2) the ability of the claims to be verified, (3) field trial evaluations, and (4) innovativeness.

The awards were presented to the win-



2000 Award Winners seen here with EPA New England Regional Administrator Mindy Lubber (front row, center) and CEIT Director Maggie Theroux (back row, second from the left).

ners at the New England EnviroExpo 2000 held May 9 in Boston, Mass. The award recipients were:

- Andersen Technology Corp., Cotuit, Mass. (Headquartered in Palm Desert, Calif.)
- Cape Technologies, LLC, South Portland, Maine
- CASTion Corp., Ludlow, Mass.
- CF Technologies, Inc., Hyde Park, Mass.
- Couterpane, Inc., Stowe, Vt.
- SeptiTech, Inc., Gray, Maine
- SolmeteX, Inc., Billerica, Mass.

This issue of Technovation highlights the 2000 Environmental Technology Innovator Award winners.

The New Regional Administrator Addresses the Award Winners

The new Regional Administrator for EPA New England, Mindy Lubber, addressed the winners of

this year's Environmental Technology Innovator Awards. Mindy told those gathered that EPA New England undertakes this award presentation and other activities to promote environmental technologies because of their importance in making progress toward a clean environment. She recognized the major role that innovators, like the award winners,



EPA New England Regional Administrator Mindy Lubber addresses the award winners.

played in creating improvements in environmental performances that would have been impossible even 15 years ago.

She pointed to the fact that this progress needs to continue. We still have rivers that are too polluted to swim or fish in, toxic waste too near homes and families, and air that is unhealthy to breathe in the summers, trapping children and asthmatics indoors. She also highlighted the tremendous challenges we face in reducing the cost of

implementing the Clean Air, Clean Water and Safe Drinking Water Acts. We need to have smarter, cheaper, and better ways of dealing with our environmental problems. We need the inventors and entrepreneurs creating new solutions.

She ended by spotlighting other services offered by the EPA New England's Center for Environmental Industry and Technology (CEIT). Other CEIT activities are outlined in the "About CEIT" article in this issue.

We need the inventors and entrepreneurs creating new solutions.

CAPE Technologies, LLC Immunoassay Kits for Dioxin/Furan/PCB Analysis

CAPE Technologies of South Portland, Maine, has developed a simple, rapid, low-cost method to screen for dioxin and related compounds in a variety of sample types, including soil, sediment, ash and biological matrices. Conventional dioxin measurement technologies are extremely costly and time consuming. These methods typically require expensive dedicated laboratory space, sophisticated instrumentation and highly trained technicians. The combination of difficulty, time and cost of

conventional dioxin analysis often limits the number of analyses performed to a statistically unreliable level, undermining the overall quality of dioxin contamination data. In addition, timely decisions in monitoring or remediation actions are often impossible because conventional methods can not provide rapid analysis on site.

The CAPE Technologies method offers a solution to these difficult problems through new developments in immunoassay technology. Immunoassay methods are used extensively in clinical and veterinary diagnostics because of their low cost, ease of use, speed and reliability. In the environmental field, immunoassays have found wide application since the early 1990's, following the development of the 4000 series of solid

waste methods under SW-846. Now, this powerful technology has been successfully applied to the more demanding and complex analysis of dioxins and furans. CAPE Technologies has developed a complete system around its new immunoassay technology, which consists of immunoassay test kits, sample preparation

The low recurring costs and ease of use of the system encourage more analyses to be performed, resulting in a more complete and more detailed assessment of the scope of contamination.

kits and inexpensive supporting equipment. The low capital cost and simplicity of the system allows it to be used in temporary or mobile labs with very little set-up time. The low recurring costs and ease of use encourage more analyses to be performed, resulting in a more complete and more detailed assessment of the scope of contamination.

In the last decade, immunoassays for industrial wastes such as polychlorinated biphenyls (PCBs) have been integrated into the site assessment and remediation process, dramatically changing the way contaminated sites are managed. CAPE Technologies has now opened the door for the same improvement in management of dioxin sites. Same day analysis on site is possible for soils and sediments at high pico gram per gram (pg/g) levels using a rapid extraction and one step cleanup. Same day or next day analysis is possible on site for biological samples at low pg/g levels using a proprietary sample cleanup device. CAPE Technolo-

gies reports that successful laboratory and field demonstrations of the dioxin/furan immunoassay system have now been completed and data are being compiled for distribution. A prototype kit is also available for analysis of dioxin-like PCBs. Dioxin-like PCBs are expected to be re-defined as "dioxins" in the EPA's dioxin reassessment, which will soon be released.

The CAPE Technologies methods can provide analysts and site managers with a unique tool that is a valuable complement to conventional methods. These methods encourage applications for detection of dioxins, furans and dioxin-like PCBs in health-related situations where screening by the conventional methods is prohibitively costly and non-responsive to time concerns.

For more information contact:

Robert O. Harrison, Ph.D.

CAPE Technologies, LLC

3 Adams Street

South Portland, ME 04106

207-741-2995

e-mail: cape-tech@ceemaine.org

web site: www.cape-tech.com

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Andersen Technology Corporation Lime Slurry Treatment Process

Lime is a preferred reagent for controlling pH in public water supplies. The lime provides a buffering action which stabilizes the pH. It is also a low cost material which is safer to handle than the sodium or potassium hydroxides frequently used. Water suppliers, however, are reluctant to use lime because of the operating and maintenance problems associated with handling and feeding of solid material, excessive lime scaling of equipment and lime dust.

Andersen Technology Corporation, a Massachusetts company, developed a lime slurry process which is reported to eliminate the problems encountered in conventional dry lime feeding systems. The process design incorporates a computer-controlled means for establishing equilibrium conditions in slurry preparation and slurry dilution which completely eliminates lime scale formation. Manual handling of 50 pound lime bags is eliminated by an automated lime slurry preparation using 1200 Super Sacks. Lime dust release is eliminated by use of a venturi scrubber mounted on the slurry preparation tank which returns the dust

scrubbed out to the slurry being prepared.

This patented process is particularly suited to water systems with multiple pump stations. As shown in the figure below, an 18% lime slurry is prepared at a central location and is transported to each of the mounted tanks. At each of the stations the 18% slurry is diluted automatically to 1% as needed and the 1% slurry is injected into the water main. Computerized control maintains the pH in the water mains at the set-point plus or minus 0.2 of a pH unit. Anderson Technology Corporation has built four independent safeguards into the process to avoid over addition of lime.

The process was piloted in 1992 for pH control at the Cotuit Water Department in Cotuit, Massachusetts. In 1994, the entire water system, comprising four pump stations, was converted to lime slurry treatment. In 1998, a fifth pump station was added to the system. Capital costs for the installation were low because the injection systems were installed in the existing pump stations without any structural modifications.

According to Anderson Technology Corporation, in the eight years of operation at Cotuit Water, no lime scaling has been encountered and none of the tanks, piping, valves or metering pumps have required cleaning. Low equipment maintenance and the integration of the process into the normal operating routine allowed the Water Department to initiate pH control without any changes in the operation and maintenance staffing. The Cotuit water system is run on Supervisory Control and Data Acquisition (SCADA) control 24 hours per day with operators on duty eight hours per day from Monday to Friday.

For more information contact:

John N. Andersen

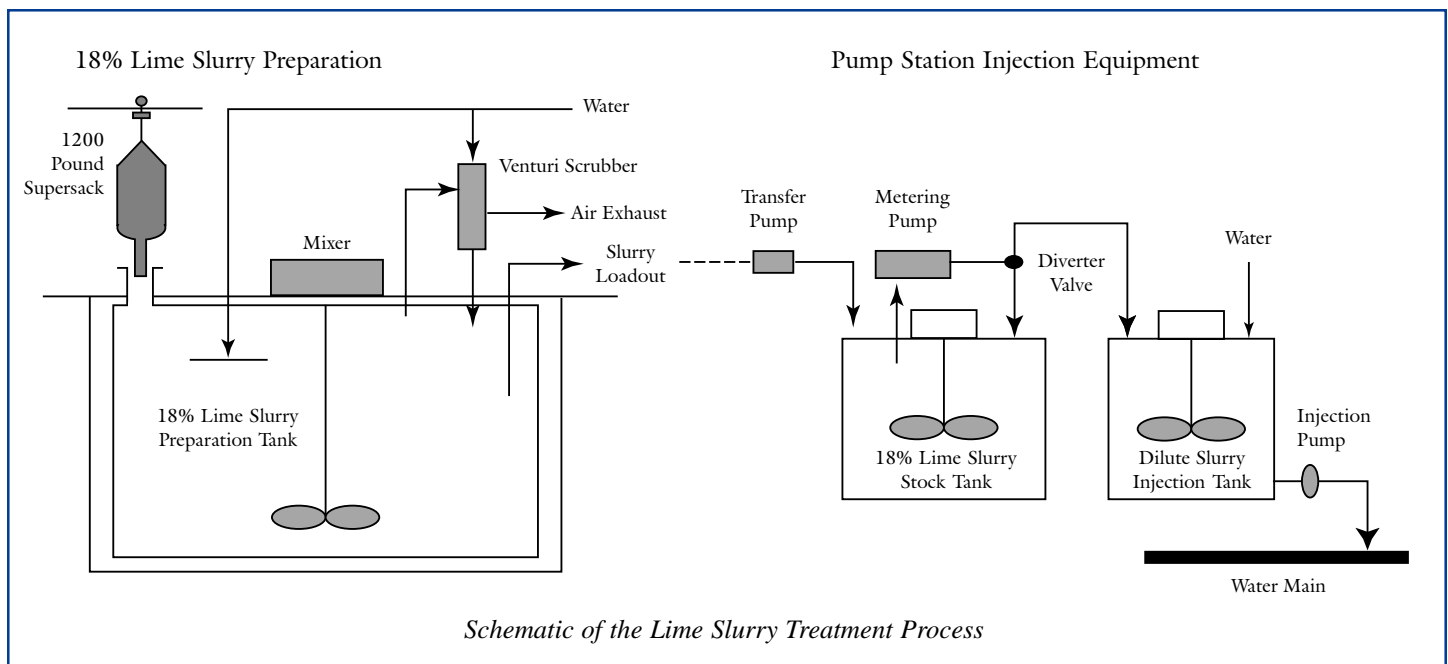
Andersen Technology Corp.

39271 Gainsborough Circle

Palm Desert, CA 92211

760-360-3044

e-mail: jnsparky@aol.com



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Counterpane, Inc. Polyester Fiber Reclamation

An estimated 500 million voluminous pounds of non-biodegradable, polyester fabric remnants are dumped in landfills annually by U.S. textile, clothing and home furnishing manufacturers. Counterpane, Inc. of Stowe, Vermont, a woman-owned small business, has developed a patented, sustainable, low energy process to mechanically reprocess pre-consumer polyester textile remnants into open, blendable, spinable fiber. The company reports that this fiber is reclaimed using 90% less energy than conventional thermal technology and is projected to cost 45% less than other recycled fiber made from poly ethylene terephthalate (PET) bottles. By-products of the reprocessing are non-woven textiles exhibiting distinctive softness and drape.



Loading the "card" with recycled polyester fleece fiber and wool.

Judith Wallick, President of Counterpane, Inc., began researching textile recycling while working for the Turtle Fur Company in Morrisville, Vermont, manufacturers of cold weather apparel. Subsequent research has been supported by the Vermont Agency of Natural Resources, Vermont EPSCoR (Experimental Program to Stimulate Competitive Research), Vermont Public Service Department, EPA, U.S. Department of Agriculture, Malden Mills Industries, Patagonia Clothing Company and the American

Plastics Council.

The company is currently in the final phase of industrial trials of textile samples that showed promise in the laboratory. In collaboration with the Institute of Materials Science at the University of Connecticut, Counterpane is continuing fiber fusion research to optimize their "green," supple textiles. Color assorted, non-woven textiles for the U.S. outerwear apparel and bed blanket markets are planned as the initial commercial products.



Needle punched non-woven textile emerging from the loom and rolling onto the bolt.

For more information contact:

Judith Leslie Wallick
Counterpane, Inc.
P.O. Box 1522
Stowe, VT 05672-1522
e-mail: jwallick@together.net

SolmeteX, Inc. Dental Solution

Mercury is characterized as extremely toxic to humans and the environment. It is readily taken up in the food chain and will bioaccumulate and bio-magnify in aquatic life. Most of the remedial attention has been concentrated on incinerators, electric power utilities, chloro-alkali facilities and the health care industry. However, studies have shown that as much as 25%-35% of the mercury found at sewage treatment facilities can be attributed to the discharge of dental waste (specifically dental amalgams).

SolmeteX, Inc. of Billerica, Massachusetts, applied its patent pending tech-



SolmeteX, Inc.'s Keyle:X® cup for treating flows from standard dental facilities

nology, Keyle:X®, to the dental waste problem. The company developed two systems for the treatment of dental waste streams. The Keyle: X® cup, which combines mechanical and chemical filtration, treats flows from standard dental facilities—those with less than fifteen chairs—removing both particulate mercury and dissolved mercury. The Amalgam Effluent Management System (AEMS) treats

flows from large dental facilities—large practices and clinic central systems.

The technology of the Keyle:X® resin allows SolmeteX to design and package small compact systems that are simple to use and maintain. Keyle:X® is reportedly able to remove mercury at speeds that are 30 times faster than typical resins, allowing SolmeteX to design a small system that does a big job. The product also has high holding capacity. This combination means that the system is much smaller and less expensive.

In December of 1998, SolmeteX installed a dental amalgam removal system

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SeptiTech, Inc. High Surface Area Biological Trickling Filtration



SeptiTech's tank being winched up a cliff on Fox Island, off the coast of Maine.

SeptiTech, Inc. of Gray, Maine, combined the patent pending technology of the SeptiTech waste water treatment system with an innovative, high intensity, ultraviolet disinfection system and low impact surface drip irrigation technology to provide a solution to the waste water problems of seasonal residents of MacMahan Island located off the coast of Maine.

MacMahan Island, a small island only

one quarter mile wide and about one mile long, needed a safe and acceptable alternative to subsurface leach fields. Its soils are rocky, thin, non-absorbent and shallow to bedrock and its fresh water aquifer typically dries up by August. Conventional leach fields would do serious harm to the fragile island ecosystem because they would require preparatory road construction and tree cutting, and barging and deposition of 18,000 yards of fill (two foot

ball fields, six feet deep) to the island.

The system implemented by SeptiTech involves a marriage of several technologies, which begins with proprietary, advanced pre-treatment by SeptiTech, coupled with the high intensity ultraviolet disinfection and the final discharge of the treatment effluent via drip hose. The SeptiTech processor is a patent pending tertiary level biological trickling filter

plant. It receives household waste water from a standard septic tank and reportedly treats the water to tertiary levels – 97-98% removal of Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS). Treatment water is disinfected using high intensity ultraviolet light and is discharged in small, frequent, uniform doses, throughout the day and night, to a drip hose that is covered with two inches of organic duff. The hose “leaks” along its entire length, dispersing the treated water into the environment at the ground surface for rapid root absorption and transepiration.

For more information contact:

James R. Gray
SeptiTech, Inc.
220 Lewiston Road
Gray, ME 04039
207-657-5252
e-mail: info@septitech.com
web site: www.septitech.com

SolmeteX, Inc. Dental Solution



SolmeteX, Inc.'s Amalgam Effluent Management System for treating flows from large dental facilities.

at the U.S. Great Lakes Naval Dental Research Institute in Great Lakes, Illinois. The Naval Dental Research Institute has a dental facility with 35 chairs and is aggressively trying to reduce the amount of mercury discharged to the sewer. The U.S. Navy issued the following statement, “These data indicate the

SolmeteX system is effective in reducing mercury levels to less than 0.2 ug/l, which is the detection limit for method 245.1.”

For more information contact:

Owen E. Boyd
SolmeteX, Inc.
29 Cook Street
Billerica, MA 01821
978-262-9890
e-mail: oboyd@solmetex.com
web site: www.solmetex.com

CASTion Corporation Controlled Atmosphere Separation Technology

CASTion Corporation of Ludlow, Massachusetts, designs, manufactures and markets the Controlled Atmosphere Separation Technology (CAST®) systems. The CAST® systems are designed for recovering clean reusable water and valuable reusable chemistries from hazardous aqueous metal finishing processes in the electronics, automotive, aerospace, machinery/hardware and decorative/jewelry industries. Specific applications include electroplating, chromating, galvanizing, pickling or etching, anodizing, phosphating and alkaline parts washing. These processes all generate a large volume of hazardous waste containing heavy metals such as cad-

mium, copper, chrome, nickel, gold, silver, platinum and zinc, and chemical anions such as chlorides, sulfates and cyanides.

CAST® systems are a proprietary combination of vacuum flash distillation and patented liquid/vapor separation system. The CAST® system is a refinement of existing applications of distillation technology though the use of CASTion's patented liquid/vapor separation system, forced circulation flash distillation configuration, design and construction. As with other distillation systems, the CAST® system design allows for recovery of chemical solutions which cannot be recovered using conventional atmospheric evaporator designs alone.

The CAST® system is a zero-discharge mode of operation with purified wastewater recycled internally and with the concentrated hazardous chemistry recycled, reclaimed or sent to a RCRA licensed hazardous waste management company. There is no discharge of wastewater to the sewer or the atmosphere. CAST® is a zero-discharge alternative to traditional wastewater treatment by chemical precipitation prior to sewer discharge. It is also a wastewater recovery alternative to atmospheric evaporation.

CAST® systems have undergone successful evaluation under the Massachusetts Strategic Enviro Technology Partnership (STEP). CASTion Corporation reports that their systems have achieved significant performance improvement over

competing vacuum distillation in the form of much higher purity of recovered distilled water (typically 99.99+% rejection on contaminant metals and chemicals). CAST® systems also achieve lower operating cost (4-5 cents per gallon of wastewater processed, as documented by the Massachusetts STEP evaluation). The

CAST® is a zero-discharge alternative to traditional wastewater treatment by chemical precipitation prior to sewer discharge. It is also a wastewater recovery alternative to atmospheric evaporation.

CAST® systems achieve much higher production reliability due to the use of venturi to draw system vacuum instead of a vacuum pump and the use of commercially available plate and frame external heat exchangers to replace a refrigeration system to achieve distillate condensation.

CAST® systems have been successfully installed at such leading global customers as British Oxygen/Edwards Vacuum, Handy & Harman, Litton Industries/Winchester Electronics, Swarovski Jewelry and Teradyne, Inc.

For more information contact:

Stephen Brown
CASTion Corporation
290 Moody Street
Ludlow, MA 01056
413-589-1601
e-mail: sbrown@castion.com



CASTion Corporation's Controlled Atmospheric Separation (CAST®) technology.

CF Technologies, Inc. Critical Fluid Processing

CF Technologies, Inc. (CF TECH), a Massachusetts company, develops critical fluid processing technology for industrial applications. CF TECH has developed a technology for recycling spent oil absorbents and is assisting its client, CRI Recycling Services, Inc. (CRI), in commercializing the process as a service business.

An estimated 120 million gallons of oil are spilled on the floors of U.S. manufacturing and maintenance facilities each year. This oil is typically cleaned up with granular absorbent materials, polypropylene mats and pads, cellulose and/or rags, generating about 8 million drums of spent oil absorbents with 15 gallons of waste oil per drum on average. Approximately 95% of these oil-soaked absorbents end up in landfills, 5% are incinerated, and recycling is just beginning. Most of the waste oil is contaminated with lead or other heavy metals. Real estate development of waste oil contaminated brownfields and environmental concerns with disposal methods prompted the development of CF TECH's recycling technology.

CF TECH's patent pending technology uses liquefied gases as solvents to extract the oil from the absorbent to be

recycled and reused. The recovered oil is recycled either as a fuel oil in waste fired boilers, or rerefined to lube oil feedstocks. CF TECH reports that testing has shown



Flow chart of spent oil absorbent recycling process using CF Technologies, Inc.'s Critical Fluid Processing.

that the recycled absorbents have absorbent properties similar to that of the virgin materials and that the properties do not diminish as the material is reused multiple times.

The commercial process is operated in a batch mode. Spent absorbent materials are placed into pressurized vessels (ex-

tractors) and are "washed" with liquefied gas solvent in a closed loop process. The extraction removes 98+% of oil and grease, and the absorptive capacity of the recycled absorbent ranges from 80% to 100% of the original material. The system has a nominal capacity of six 55-gallon drums of absorbent per hour. When operating at full capacity, each plant will be recycling more than 500,000 gallons of oil and 10,000,000 pounds of absorbents annually.

The CRI service includes picking up the oily absorbent; dropping off empty drums and new or recycled absorbent; and providing a "Certificate of Recycling." The service is currently offered in Minnesota, Wisconsin and California and is now being introduced in New England.

For more information contact:

John Markiewicz
John Moses
CF Technologies, Inc.
One Westinghouse Plaza
Suite 200
Hyde Park, MA 02136-2059
617-364-2500
e-mail: jmosescft@aol.com

NEWMOA Technology Review Committee

In March 1998, the six New England States, EPA New England, the Northeast Waste Management Officials' Association (NEWMOA) and the New England Governors' Conference signed a Memorandum of Agreement to promote interstate regulatory cooperation for waste site assessment and cleanup technologies.

NEWMOA subsequently established a Technologies Review Committee (TRC) to actively review technologies and communicate both public and public sector use of innovative technologies. The TRC is made up of one or more staff members from each of the New England

States and New York, who coordinate state review, issue advisory opinions and disseminate information on the use of innovative technologies.

Advisory Opinion on Immunoassay Field Analysis

On May 24, 1999, the TRC issued an advisory opinion on Immunoassay Field Analysis. As an overview, the Advisory Opinion states that the primary advantage of immunoassay analysis is that analytical results can be generated in real-time. This allows decision-making in the field regarding the need for additional sampling or further remediation (pro-

vided that proper data validation procedures are followed). It strongly urges potential users of immunoassay to consult EPA New England's *Immunoassay Guidelines for Planning Environmental Projects* (October 1996) and with kit vendors prior to planning the field effort. The guidelines can be obtained at <http://www.epa.gov/region01/measure/ia/iaguide.html>. The Advisory Opinion also includes ten (10) recommendations for improving or insuring product performance. The Advisory Opinion can be viewed at <http://www.epa.gov/region01/steward/ceit>.

ABOUT CEIT

EPA's Center for Environmental Industry and Technology (CEIT) is moving forward with our mission to promote New England's environmental technologies. We have embarked on numerous programs and projects designed to sustain the strength of the environmental industry, make it easier to commercialize new technologies, provide more flexibility for environmental technology buyers and reduce costs for the regulated community. The CEIT acts as a point of contact for the environmental industry, technology developers and other interested stakeholders, providing an ombudsman service for those seeking assistance on the development of new technologies.

The following are highlights of our services:

- **Golden Opportunity Series**

Through this series, participants learn about technology transfer; assistance and verification opportunities; and, financing opportunities.

- **Technology Trade Shows**

Technology Trade Shows showcase new and innovative technologies. Upcoming trade shows include monitoring technologies and stormwater technologies.

- **Technovation**

CEIT's technical bulletin highlights promising technologies developed by New England companies.

- **Ombudsman Hotline**

The CEIT offers assistance, information, and referrals on a wide range of federal and state programs to the industry through its Ombudsman Hotline: **1-800-575-CEIT**.

- **CEIT HomePage**

A visit to our Home page at www.epa.gov/region01/steward/ceit will give you up-to-date information on business opportunities, upcoming events, and links to other web sites of interest to the envirotech industry.

- **EnvirotechNews**

CEIT's monthly listserv, Envirotech News, contains information on upcoming events, business opportunities and technology opportunities.

To subscribe, send an e-mail to listserv@unixmail.rtpnc.epa.gov with a blank subject line; the body of the message must be: subscribe envirotechnews [your first name] [your lastname].

- **Innovative Technology Inventory (ITI)**

The ITI is a web based inventory of commercially-available innovative environmental technologies. The inventory provides technology description, application, performance and cost.

If you would like to know more about CEIT services or events, please contact:

Maggie Theroux,
Carol Kilbride or
Junette Peters
of CEIT at 1-800-575-CEIT (2348)
or 617-918-1783.

Visit our web site at www.epa.gov/region01/steward/ceit



EPA New England
1 Congress Street Suite 1100 (SPI)
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