

A Stevens Publication

Environmental

P R O T E C T I O N

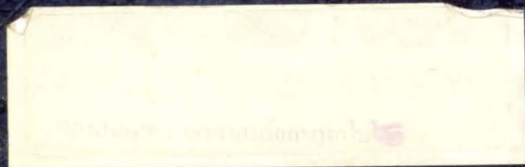
MANAGEMENT AND PROBLEM-SOLVING FOR ENVIRONMENTAL PROFESSIONALS

OCTOBER 1998

Landfills go high-tech

Get filled in on the latest advances

CAM Rule reality check:
Is your facility covered?



WASTEWATER CHEMICAL
COMPARISON GUIDE



**The Temperature Handbook™
21st Century™ Preview Edition**

Over 750 Full-Color Pages.
Your Source for the Latest Products in:

- Temperature • Pressure and Force
- Flow and Level • Data Acquisition
- pH and Conductivity
- Electric Heaters
- Environmental

Circle No. 118



**OMEGA® Transactions In
Measurement and Control**

Over 70 Full-Color Pages.
Includes:

- Volume II Data Acquisition
- Resolution and Aliasing
- Digital Inputs
- Analog Signal Types
- Dataloggers
- The OSI Network Model
- Fieldbus and Device Networks
- Selecting a System

Circle No. 119

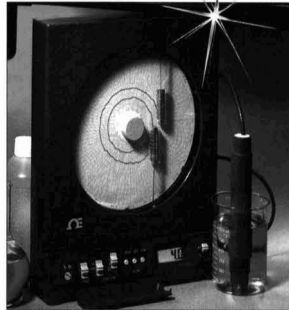


**NEW™
FREE!
Literature**

THE GREEN BOOK®

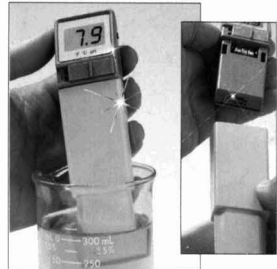
**Portable pH,
pH/Conductivity
and pH/ORP Meters**

PHH-60/80A
Series
\$199
Basic Model



**Microprocessor-Based pH and
Temperature Recorder With Large
200 mm (8") Diameter Chart**

Model CTPH
\$970



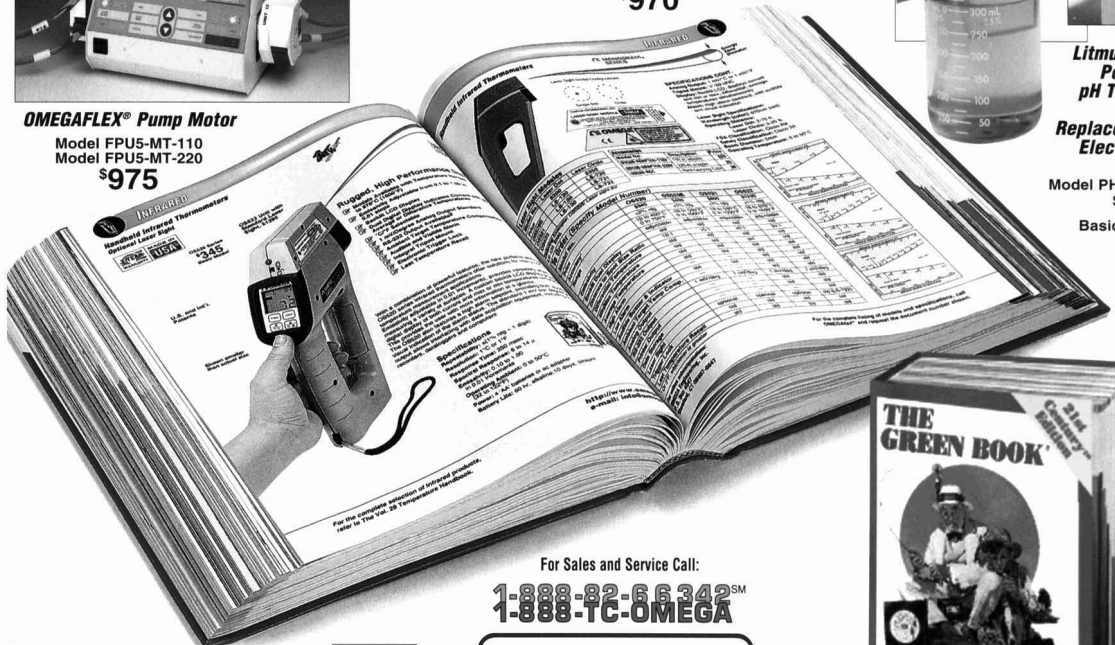
**Litmistik®
Pocket
pH Tester
with
Replaceable
Electrode**

Model PHH-3X
\$60
Basic Unit



OMEGAFLEX® Pump Motor

Model FPU5-MT-110
Model FPU5-MT-220
\$975



For Sales and Service Call:

1-888-82-OMEGA

omega.com®

Ω OMEGA®

OMEGA ENGINEERING, INC.
ONE OMEGA DRIVE, P.O. BOX 4047, STAMFORD, CT. 06907-0047
© COPYRIGHT 1998 OMEGA ENGINEERING, INC. ALL RIGHTS RESERVED.



Circle No. 1

OMEGAFax™

OMEGA's 24-Hour-a-Day,
On-Demand Publishing Service
DIAL 1-800-848-2271
and request document #9992

**ISO 9001
CERTIFIED
CORPORATE QUALITY**

http://www.omega.com e-mail: info@omega.com

FREE INFORMATION

Environmental PROTECTION

October 1998
Card expires December 1998
Reader Service Card
N9810F

FREE INFORMATION

For FREE information on products advertised in this issue, circle the Reader Service Number on the card below. Please type or print clearly and answer all the questions on the card.

PLEASE SEND ME FREE INFORMATION ON THE FOLLOWING ITEMS:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300

Follow these simple steps:

1

Answer all questions completely, sign and date your card.

2

Circle the number(s) on the attached card that correspond to the advertisement & items mentioned in this issue that you would like FREE information on.

3

Detach and mail your postage-paid card today!
For faster service, fax your card to:

(312) 922-3165

IT'S THAT EASY!

10/98 BUYING PLANS SURVEY REMEDIATION AND SPILL CLEANUP PRODUCTS/SERVICES

- | | | | |
|--|---|--|--|
| 1. Which of the following REMEDIATION & SPILL CLEANUP products/services do you plan to purchase in the next 12 months? (select all that apply) | 810 <input type="checkbox"/> Hazmat Drums/Overpack Drums | 824 <input type="checkbox"/> Geographic Information Systems | 831 <input type="checkbox"/> \$50,001-\$100,000 |
| 800 <input type="checkbox"/> Remediation Services | 811 <input type="checkbox"/> Drum Washers | 825 <input type="checkbox"/> Global Positioning Systems | 832 <input type="checkbox"/> \$10,001-\$50,000 |
| 801 <input type="checkbox"/> Spill Cleanup Services | 812 <input type="checkbox"/> Drum Crushers | | 833 <input type="checkbox"/> \$5,000-\$10,000 |
| 802 <input type="checkbox"/> Spill Sorbents | 813 <input type="checkbox"/> Portable Berms | 2. What is your reason for purchasing the selected products/services? (select one) | 834 <input type="checkbox"/> Under \$5,000 |
| 803 <input type="checkbox"/> Air Strippers | 814 <input type="checkbox"/> Bioremediation | 826 <input type="checkbox"/> New Construction | 4. How immediate is your need for the selected products/services? (select one) |
| 804 <input type="checkbox"/> Groundwater Treatment Systems | 815 <input type="checkbox"/> Soil Vapor Extraction | 827 <input type="checkbox"/> Plant Upgrade | 835 <input type="checkbox"/> 0-3 months |
| 805 <input type="checkbox"/> Oil/Water Separators | 816 <input type="checkbox"/> Asbestos Abatement | 828 <input type="checkbox"/> Replacement/Maintenance | 836 <input type="checkbox"/> 4-6 months |
| 806 <input type="checkbox"/> Portable Tanks | 817 <input type="checkbox"/> Lead Abatement | | 837 <input type="checkbox"/> 7-9 months |
| 807 <input type="checkbox"/> Soil Vapor Analyzers | 818 <input type="checkbox"/> Soil Treatment | 3. What is your projected budget for the selected products/services? (select one) | 838 <input type="checkbox"/> 10-12 months |
| 808 <input type="checkbox"/> Pond Lagoon Dredge | 819 <input type="checkbox"/> Groundwater Treatment | 829 <input type="checkbox"/> Over \$200,000 | 839 <input type="checkbox"/> Over 12 months |
| 809 <input type="checkbox"/> Decontamination Structures | 820 <input type="checkbox"/> VOC Removal | 830 <input type="checkbox"/> \$100,001-\$200,000 | |
| | 821 <input type="checkbox"/> Underground Storage Tank Removal | | |
| | 822 <input type="checkbox"/> Thermal Decontamination | | |
| | 823 <input type="checkbox"/> Vitrification | | |

SUBSCRIPTION INFORMATION

YES, I would like to receive/continue to receive *Environmental Protection*. No.

Signature _____ Date _____

Title _____

Business Phone (____) _____ FAX No. (____) _____

Please peel address label from cover and affix below. For faster service photocopy this side only and send to our FAX # (312) 922-3165.

NAME _____

COMPANY _____

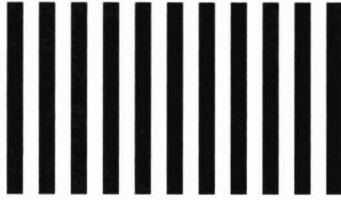
ADDRESS _____ Home Bus.

CITY _____ STATE _____ ZIP _____ ZIP+4 _____

- | | | | |
|--|---|---|--|
| A. Function which best describes your activity in Pollution Control (check only one):
A <input type="checkbox"/> Corporate responsibility for Pollution Control
B <input type="checkbox"/> Manage all Pollution Control Operations at this location
C <input type="checkbox"/> Supervise sub-group in Pollution Control Operations
D <input type="checkbox"/> Provide professional consulting service on Pollution Control
E <input type="checkbox"/> Provide staff environmental service on Pollution Control
Z <input type="checkbox"/> Other _____ | B <input type="checkbox"/> Mining
D <input type="checkbox"/> Engineering & Contracting
E <input type="checkbox"/> Utilities, public, private & cooperative
F <input type="checkbox"/> Govt. including municipal or district sanitary water or wastewater treatment sys. or plants
G <input type="checkbox"/> City
H <input type="checkbox"/> County
I <input type="checkbox"/> State
J <input type="checkbox"/> Federal
K <input type="checkbox"/> Transportation
L <input type="checkbox"/> Training
Z <input type="checkbox"/> Misc. Services _____ | C <input type="checkbox"/> Agriculture
L <input type="checkbox"/> Consulting
M <input type="checkbox"/> Insurance
N <input type="checkbox"/> Labs
P <input type="checkbox"/> Real Estate | E <input type="checkbox"/> Services/Consulting
F <input type="checkbox"/> None of the above
G <input type="checkbox"/> Other (please specify) _____ |
| B. Type of Business (check only one):
A <input type="checkbox"/> Manufacturing. If manufacturing, please check the appropriate SIC (check only one):
<input type="checkbox"/> (20) Food <input type="checkbox"/> (31) Leather
<input type="checkbox"/> (21) Tobacco <input type="checkbox"/> (32) Stone/Clay/Glass
<input type="checkbox"/> (22) Textile <input type="checkbox"/> (33) Primary Metal
<input type="checkbox"/> (23) Apparel <input type="checkbox"/> (34) Fab. Metal
<input type="checkbox"/> (24) Lumber & Wood <input type="checkbox"/> (35) Mach., except Elect.
<input type="checkbox"/> (25) Furniture <input type="checkbox"/> (36) Elect & Electron Mach
<input type="checkbox"/> (26) Paper <input type="checkbox"/> (37) Trans. Equip.
<input type="checkbox"/> (27) Print/Publish <input type="checkbox"/> (38) Trans. Equip.
<input type="checkbox"/> (28) Chemicals <input type="checkbox"/> (39) Miscellaneous Mfg.
<input type="checkbox"/> (29) Petrol. & Coal <input type="checkbox"/> (38) Instr./meas./analyze/controlling
<input type="checkbox"/> (30) Rubber/Plastic | C. Number employed at this location:
A <input type="checkbox"/> 1-19
D <input type="checkbox"/> 100-249
G <input type="checkbox"/> 1000-1499
B <input type="checkbox"/> 20-49
E <input type="checkbox"/> 250-499
H <input type="checkbox"/> 1500-2499
C <input type="checkbox"/> 50-99
F <input type="checkbox"/> 500-999
I <input type="checkbox"/> 2500 and up | D. In your job function do you recommend, specify or purchase? (check all that apply)
A <input type="checkbox"/> Pollution Control Equipment
B <input type="checkbox"/> Instrumentation
C <input type="checkbox"/> Chemicals
D <input type="checkbox"/> Parts & equipment for maintenance operation & control | E. What types of Pollution Control are you responsible for? (check all that apply)
A <input type="checkbox"/> Air
C <input type="checkbox"/> Noise
E <input type="checkbox"/> Industrial Hygiene
F <input type="checkbox"/> Toxic & Hazardous Material
G <input type="checkbox"/> Energy Control/Energy Conservation
I <input type="checkbox"/> Recycling
J <input type="checkbox"/> Other (please specify) _____
H <input type="checkbox"/> None of the above |
| F. Which of the following publications do you receive personally addressed to you? (check all that apply)
A <input type="checkbox"/> Pollution Engineering
B <input type="checkbox"/> Environment Today
C <input type="checkbox"/> Environmental Solutions
D <input type="checkbox"/> Pollution Equipment News
E <input type="checkbox"/> The National Environmental Journal
F <input type="checkbox"/> Water Environment & Technology
G <input type="checkbox"/> None of the above | | | |



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 1629 DALLAS, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Stevens Publishing

Environmental
P R O T E C T I O N

Creative Data
650 S. Clark St. Floor 6
Chicago IL 60605-9626





Global. Portable. Instant.

WEST GROUP'S ENVIRONMENTAL RESOURCES NOW AVAILABLE ON THE INTERNET.

ELR—*The Environmental Law Reporter*[®] is now available on the internet — via the all-new West Group Environmental E-Site. That means you can have on-demand access to federal and state environmental statutes and regulations, plus timely news and analysis available only on *ELR*. With the superior functionality of Folio[®] siteDirector[®], E-Site provides fast, effective solutions to your compliance needs. It's hassle-free research. Anytime. Anywhere. From any computer with an internet connection and web browser. West Group Environmental E-Site ... global, portable, instant — and the perfect companion to your *ELR* CD-ROM.

AVAILABLE ONLY FROM WEST GROUP AT 1-800-255-2549 OR VISIT US ON THE WEB AT: www.e-site.westgroup.com

NEWS & ANALYSIS

CASES

STATE INFOBASES

FEDERAL STATUTES

CFR

FEDERAL REGISTER

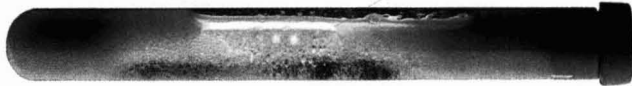


WEST GROUP

Bancroft-Whitney • Clark Boardman, Callaghan • Lawyers Cooperative Publishing • Westlaw • West Publishing

Circle 2 on card.

CONTRARY TO POPULAR BELIEF, OIL AND WATER DO MIX!

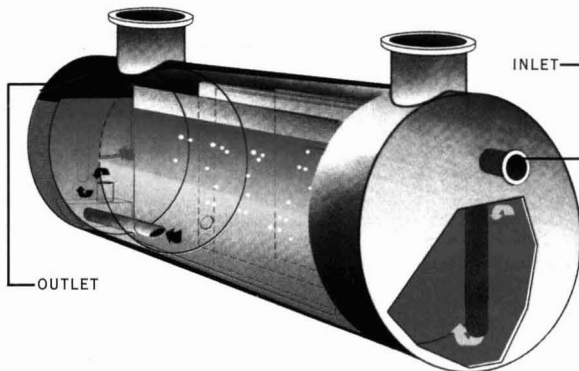


AND INDUSTRIES AROUND THE WORLD ARE REQUIRED TO FIND A WAY TO SEPARATE THEM. WITH THE PATENTED HYDRASEP® FLOW-THROUGH SEPARATOR THERE IS A WAY TO ECONOMICALLY MEET TODAY'S STRINGENT EFFLUENT DISCHARGE REGULATIONS AND RECLAIM OIL AS WELL. THE ADVANCED HYDRASEP® TECHNOLOGY EFFICIENTLY SEPARATES OIL, GASOLINE, JET FUEL, CRUDE, DIESEL FUEL, LUBE OIL, GREASE, VEGETABLE OIL, AND OILS HEAVIER THAN WATER (DNAPLs) FROM WATER IN CONCENTRATIONS UP TO 50% AND AT FLOW RATES FROM 20 TO OVER 20,000 GPM. THE HYDRASEP® TECHNOLOGY CREATES THE QUICKEST AND MOST EFFECTIVE METHOD OF SEPARATING CONTAMINATED OIL/WATER MIXTURES PROVIDING SEPARATION PERFORMANCE IN EXCESS OF 99.9%.

HYDRASEP

ADVANCED OIL WATER SEPARATOR

WHEN PERFORMANCE COUNTS



APPLICATIONS

- WASTE WATER TREATMENT
- REFINERY PROCESS FLUIDS
- LANDFILLS
- HAZARDOUS WASTE TREATMENT
- BULK-STORAGE TERMINALS
- INDUSTRIAL AND MANUFACTURING
- SHIP YARDS
- STORM WATER RUNOFF
- POWER PLANTS

HYDRASEP® FEATURES

- BUILT TO APPLICABLE A.S.M.E. SPECIFICATIONS
- SERPENTINE FLOW CONTROL TO MAXIMIZE RETENTION TIME AND FLOW DYNAMICS
- ACCUMULATOR FEATURE TO DAMPEN AND CONTROL SURGES
- FLOW MODULATOR TO REGULATE SEPARATOR SECTION EFFLUENT DISCHARGE
- SLUDGE RETENTION SECTION TO PREVENT SLUDGE MIGRATION
- NO COALESCING ELEMENTS TO SERVICE OR CHANGE
- MOBILE PILOT SEPARATOR PROGRAM

GNESYS, INC.

3259 Whitebrook Drive Suite D100
Memphis, TN 38118

Email: Hydrasep@aol.com

<http://members.aol.com/hydrasep/index.html>

PHONE: 901-794-2665

1-800-646-5439

FAX: 901-794-1960

DEALER AND REPRESENTATIVE OPPORTUNITIES AVAILABLE

Contents

ENVIRONMENTAL PROTECTION • OCTOBER 1998 • VOLUME 9, NUMBER 10

IN EVERY ISSUE

- 6 From the editor
- 8 In the lab
- 10 Newswire
- 12 Tech spotlight:
Odor control
- 56 New products
- 68 Classified advertising/
Professional directory
- 74 Protection
perspectives
- 74 Advertiser index

FEATURES

- 14 Gaining ground**
Major innovations in hazardous waste landfill technology are making strides in protecting the environment
By Marianna Buoni and David Nielsen
- 20 CAAA: EPA's gameplan for fighting air toxics**
This overview of the 1990 Clean Air Act Amendments spells out EPA's agenda for regulating air emissions
By John N. Driscoll, DCS
- 24 A common sense approach to cleanups**
An overview of how to use risk-based decision making to respond to chemical releases into the environment
By John A. Connor, PE, and Charles J. Newell, PhD, PE
- 28 Stalking a moving target**
Quantification of industrial and wastewater odors is a challenging, yet necessary first step in controlling this widespread problem
By Charles M. McGinley, PE, and Michael A. McGinley, MHS
- 32 The politics of protection**
Senatorial candidates in three high-profile races speak out on environmental issues
By Ingrid Truemper

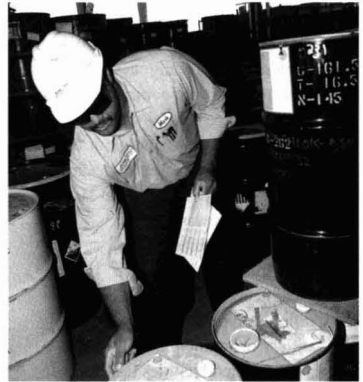
- 36 Once is not enough**
Business owners can reduce potential liability by switching from disposable wipes to reusable shop towels
By D.J. Smith, MS
- 42 CAM rule checkup**
Examine your facility's air emissions and determine if compliance assurance monitoring and periodic monitoring requirements apply
By Bernard Evans, PE

DEPARTMENTS

- 48 Wastewater chemical treatment comparison guide**
- 50 Legal watch**
Reaching a ceasefire
Alternative dispute resolution is increasingly being used to settle environmental disputes
By Jamie McLeroy, JD, and Howard S. Seitzman, JD

SPECIAL SUPPLEMENT

- 38 Product literature showcase**
This supplement contains a description of free literature from a variety of leading companies



Page 14



Page 28



Page 36



ABOUT THE COVER

This newly constructed landfill cell contains a rain protection cover placed over its liner. Sandbags are being used to hold down the temporary cover. This standard method is used to protect exposed landfill liners against the damage that could later cause leaks.

PHOTO COURTESY OF WESTFALL ECOIMAGES.
MARK HOWARD, PHOTOGRAPHER.

Landfills dump their old image

Open pits overflowing with discarded refuse, debris, insects and rats—from prehistoric times through the present, humans have picked certain sites to be the repositories of unwanted items and the results have often been eyesores.

Archaeologists will attest that dumping grounds reflect the societies that create them. Consequently, as our nation continues to evolve technologically at a rapid rate, it is not surprising that U.S. landfills are going high tech as well. Present-day landfill management now includes the planning, design, operation, monitoring for releases of contaminants, closure and postclosure control of landfills.

The driving force behind these practices is the concern about landfills' possible adverse impact on human health and natural resources like groundwater. The proper management of these sites is crucial given the ever mounting volume of waste created in our country. For example, each year industrial facilities generate and manage 7.6 billion tons of industrial nonhazardous waste (ISW).

To handle the wide variety of wastes generated in the United States, engineers have designed three different types of landfills. The sanitary or municipal landfills are engineered facilities used for the disposal of municipal solid waste that is determined to be nonhazardous under the standards set out in the Resource Conservation and Recovery Act (RCRA). Landfills for certain individual nonhazardous waste constituents such as asbestos and combustion ash are called monofills. Hazardous waste landfills are used for the disposal of waste classified as hazardous under RCRA.

All these landfills are now required to have certain legally mandated features. One example is the use of landfill liners, which are materials used to line the bottom areas and below grade sides of a landfill. These liners usually consist of alternating layers of compacted clay and geosynthetic materials designed to stop migration of any liquids that form at the bottom of the landfill.

To promote further improvements in landfills, EPA is developing a voluntary *Guide for Industrial Solid Waste Management* that is expected to be released for review in November. The guidance document is for owners of new land disposal facilities—landfills, surface impoundments, waste piles and land application locations—to follow when designing and operating these facilities. Among other things, the guide will include a computer program and risk-based model developed by EPA to use in selecting appropriate liners. For more information, contact EPA's Paul Cassidy at 703-308-7281.

Advances in hazardous waste landfills are the focus of our cover story "Gaining ground," which was written by Safety-Kleen's Marianna Buoni and David Nelson and starts on page 14. The article profiles innovations such as new liner systems and monitoring systems for groundwater, vadose zones and ambient air.

Burying waste in landfills is a fact of life for our society until we reach the point that all wastes either can be recycled for new uses or disposed of in other ways. In light of this current reality, ever improving landfill technology is making an important contribution in protecting human health and the environment.



PHOTO COURTESY OF SAFETY-KLEEN



Angela Neville

Angela Neville, JD, REM
Editor-in-Chief

Environmental PROTECTION

EDITORIAL

Publisher

Craig S. Stevens

Group Publisher

Dana Cornett

Associate Publisher

Randy Dye

Editor-in-Chief

Angela Neville, JD, REM, E-mail: aneville@cmpu.net

Managing Editor

Ashley E. Blyth, E-mail: ablyth@cmpu.net

Assistant Editors

Ingrid Truemper, E-mail: itruemper@cmpu.net
Kristie L. Guillotte, E-mail: kguillotte@cmpu.net

Contributing Editors

Marianna Buoni, John A. Conner, PE,
John N. Driscoll, DCS, Bernard Evans, PE,
Charles M. McGinley, PE, Michael A. McGinley, MHS,
Jamie McLeroy, JD, Charles J. Newell, PhD, PE,
David Nielson, Howard S. Seitzman, JD,
D.J. Smith, MS, Ingrid Truemper

PRODUCTION/MARKETING

Production Director

Alice Robinson

Production Manager

Sheila Jackson

Art Director

Kathleen Logan

Graphic Production

Greg Laklouf, Nathan Spoor, Helen Tuohy

Corporate Circulation Director

George Andrew

Circulation/Marketing Manager

Irene Fincher

ADVERTISING SALES

DISTRICT SALES MANAGERS

Central/Midwest

Buchanan Easley, (972) 687-6704

West & East Coasts

Devin Drelling, (972) 687-6702

Southeast & Central

The Miller Group, Kevin Miller and
Mark Guyther, (888) 311-7756
1709 E. Hillyer Robinson Pkwy., Oxford, AL 36203

National Classified Sales Manager

Stan Pruitt, (972) 687-6726

Classified Sales Representative

David Schwartz, (972) 687-6727

National List Sales Manager

Glenn Meserole, (972) 687-6714

ADMINISTRATION

President

Craig S. Stevens

Controller

David Martin

Business Manager

J. Gregory Nyström

ENVIRONMENTAL PROTECTION (ISSN # 1057-4298, USPS #006-703) is published 12 times a year, Vol. 9, No. 10, © 1998 Stevens Publishing Corp., 5151 Beltline Rd., Suite 1010, Dallas, TX 75240. Phone (972) 687-6700, periodicals postage paid at Dallas, TX 75240-2573 and additional mailing offices. Subscription rate for Environmental Protection is \$99 for 1 year. Subscriptions mailed to Canada please add \$25, to Mexico, please add \$25. For all other foreign countries, please add \$35. **POSTMASTER: Send address changes to ENVIRONMENTAL PROTECTION, P.O. Box 712, Mount Morris, IL 61054-0712.** For customer service call (815) 734-1208. Publication of signed articles does not constitute endorsement of personal views of authors. All rights reserved. Requests for back issues should be made within three months of publication. The publisher is not responsible for the contents of the articles herein, and any person following the advice or procedures in these articles does so at his or her own risk. Articles appearing in this journal are indexed in the Environmental Periodicals Bibliography. Authorization to photocopy items for internal or personal use is granted by Stevens Publishing Corp., provided that the base of U.S. \$0.50 per copy, plus U.S. \$0.03 per page is paid directly to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA (978) 750-8400.



GreenSuite

GreenSuite: a 100% Java™-based system integrating Environmental Management, Safety, Industrial Hygiene, and Occupational Medicine into a single enterprise business solution. The GreenSuite system is flexible enough to ensure that organizations retain their investment in legacy systems, and has created links to existing enterprise business systems. GreenSuite™ enables increased efficiency, reduced costs, decision support and shared data between organizations. GreenSuite has emerged as the global EH&S software standard now, for the year **2000 and beyond.**



**GREEN
SUITE**

TM

THE ENVIRONMENTAL SOLUTION

LFR Technologies

www.GreenSuite.com • 1-888-424-7336

225 South Cabrillo Hwy, Suite 102-D, Half Moon Bay, CA 94019

Fax: 650-712-7479 • e-mail: GreenSuite@LFR.com

Circle 4 on card.

Internet/Intranet-Based Environmental Data Management System

Compiled by Kristie L. Guillotte

Salt marsh aids understanding of global warming

An interdisciplinary team of Georgia scientists has found a surprisingly high rate of carbon and nutrient turnover by microbes in one of Georgia's coastal salt marshes, a highly productive ecosystem.

The team of researchers, associated with the Georgia Institute of Technology, is conducting a long-term study at Sapelo Island, Ga., to examine the marsh's biogeochemical processes—the exchange of biogeochemical elements such as carbon, phosphorus, nutrients and metals between living and non-living components of the environment. They are trying to find out how these processes relate to the productivity, faunal activity and hydrology of the marsh system. An understanding of these relationships is crucial to predicting the effects of global warming on the coastal environment.



"We observed some of the highest rates of organic matter decomposition ever measured in marine systems," said Dr. Joel Kostka, a Georgia Tech adjunct assistant professor and a researcher at the Skidaway Institute of Oceanography, a research unit of the University System of Georgia. One reason for the higher than expected results may have been the length of time the study was conducted. Very few studies have looked at decomposition rates by microorganisms over a 2-year period, as this ongoing study has done, Kostka added.

"If sea levels rise with global warming, we need to understand the stability of these environments and determine if we will lose them," said Dr. Philippe Van Cappellen, an associate professor in Georgia Tech's School of Earth and Atmospheric Sciences. "With an increased knowledge of the biogeochemical cycles at work, humans can better predict the future of these dynamic and important areas."

For more information contact Dr. Joel Kostka, Skidaway Institute of Oceanography, by phone at (912) 598-2395 or e-mail at joel@skio.peachnet.edu or Dr. Philippe Van Cappellen, Georgia Tech, by phone at (404) 894-3883 or e-mail at philippe.van-cappellen@eas.gastech.edu.

Spinach enzymes neutralize explosives

Researchers at the U.S. Department of Energy's Pacific Northwest National Laboratory have discovered that nitroreductase enzymes found in spinach and other natural compounds can eat, digest and transform explosives such as TNT. This emerging biotechnology is called the environmentally benign digestion process (EBDP). It reduces dangerous explosives to low toxicity byproducts that can be used by industry or reduced further to harmless products such as carbon dioxide and water.

This process can help the U.S. military eliminate, in a cost-effective and secure manner, its nearly 500,000 tons of explosives stockpiled around the country.

According to Dr. Manish M. Shah, the project's principal investigator, the digestion process would be safer than other alternatives. It would be conducted in a tank of water at atmospheric pressure, therefore reducing the risk of explosion or fire. There would be no alkaline solutions to dispose of because the process is done at a neutral pH.

Future research efforts will determine if the byproduct made by the enzymes is of lower toxicity. It may be possible to convert the byproduct for commercial use. Research to date suggests that the byproduct could be used in chemical processes that use free radical chemistry. For example, researchers have determined the enzymes convert nitrobenzene into p-aminophenol, which is used in the pharmaceutical industry to make drugs used to treat headaches.

The digested byproduct also could be reduced completely to a gaseous state, such as ammonia or carbon dioxide, through a second digestive process using microorganisms.

For additional information contact Staci West by phone at (509) 372-6313 or e-mail at staci.west@pnl.gov.

Environmental PROTECTION

ADVISORY BOARD

Randall Airst, JD, LLM
Brownfields Redevelopment Division,
American Land Recycling Corp.,
Exton, Pa.

Gregory G. Bond, PhD
Corporate Director of Product Responsibility,
The Dow Chemical Co.,
Midland, Mich.

Charles Calmbacher, PhD
President, Principal Scientist,
SEA Group Inc.,
Lawrenceville, Ga.

Ann N. Clarke, PhD, CET, REA
President,
ANC Associates Inc.,
Brentwood, Tenn.

Paul Farber, PE, DEE
Technical Director,
R.A. Kerley Ink Engineers Inc.,
Willowbrook, Ill.

Howard Gilberg, JD
Environmental Attorney & Shareholder,
Thompson & Knight, PC,
Dallas, Texas

Lawrence H. Keith, PhD
Vice President and Senior Corporate Fellow
Waste Policy Institute,
Blacksburg, Va.

Stephen Koenigsberg, PhD
Vice President for Research and Development,
Regenesis Bioremediation Products,
San Juan Capistrano, Calif.

Barbara J. Mickelson, PE
President,
Acton Mickelson Environmental,
El Dorado Hills, Calif.

Susan Moore
Vice President, Environmental Affairs,
Georgia-Pacific Corp.,
Washington, D.C.

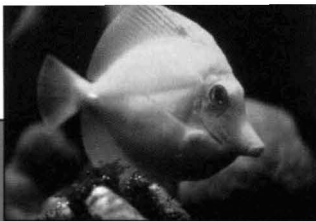
George W. Siple, QEP
Senior Air Quality Scientist,
Camp Dresser & McKee Inc.,
Cambridge, Mass.

Robert P. Smith, PhD, PE
Brown & Root, Environmental Services,
Dallas, Texas

ENVIRONMENTAL PROTECTION welcomes readers' letters; unsolicited manuscripts; suggestions for articles and photo shoots; protection perspectives submissions; and releases of news, products, services, literature, non-profit resources, business updates and meetings.
Editorial Offices: *Environmental Protection*, 5151 Beltline Rd., Suite 1010, Dallas, Texas 75240; phone (972) 687-6700, fax (972) 687-6770.

Stevens Publishing grants authorization to photocopy/ reproduce items for personal, internal, client, academic and educational use, provided that a base fee of \$.50/copy plus \$.03/page (fee code 0362-4064/95) is paid directly to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923; (978) 750-8400.





C L E A N

P U R E



S I M P L Y

REVOLUTIONARY

Imagine a revolutionary new chemistry and technology that removes mixed emulsions, aromatic hydrocarbons and crude oils from water in the blink of an eye.
It's here now.

MYCELX

For more information call
Mother Environmental Systems, Inc.
888-306-6843

Circle 5 on card.

News at a glance

Compiled by Ingrid Truemper

GOP group plugs free-market environmentalism

WASHINGTON, D.C.—To help “green” their party’s image, Republican activists have formed a group to promote free-market solutions to environmental problems.

Coalition of Republican Environmental Advocates (CREA) co-chair Grover Norquist stated that the GOP is not opposed to environmental protection but

simply prefers different approaches to achieving conservation.

“What we want to do is have a clean environment. That does not necessarily mean command economic controls,” Norquist said, adding that Democrats have blocked Superfund cleanup initiatives at the behest of trial lawyers. “One of us wants to clean up the environment and the other one wants to make their friends rich. Which one do you want to play with?”

The CREA has sparked criticism from both moderate Republicans and traditional environmental advocates. Two-thirds of the senators on the committee have ratings of zero from the League of Conservation Voters, including Wayne Allard (R-Colo.), Dirk Kempthorne (R-Idaho) and Majority Leader Trent Lott (R-Miss.).

The group’s supporters, however, say they are deliberately rejecting traditional, federally based approaches to protecting the environment in favor of local and private-sector solutions.

“The Al Gore, left-wing environmental model is a centralized, bureaucratized, litigious, adversarial, anti-technology model,” said House Speaker Newt Gingrich (R-Ga.) at the coalition’s fund-raiser in June. “Let’s create a conservationist, common-sense, practical, high-tech environmental model.”

Sierra Club political director Daniel J. Weiss believes the group is a response to the issue advocacy his and other groups have begun running in closely contested races.

“This could be a meeting of ‘Polluters Anonymous,’” Weiss said. “Clearly this is an effort to ‘greenscam,’ to run ads that try to obscure these and other members’ environmental records.”

According to the *Washington Post*, this year the environment could be a key issue in several states where congressional seats could switch hands, including California, Idaho, Iowa, New Mexico and Washington. The new group is symbolic of the GOP’s determination to counter the barrage of negative publicity it has encountered on environmental issues—attacks many analysts think contributed to the party’s losing seats in the 1996 elections.

Online Chemical Scorecard puts pollution on display

NEW YORK—A new Internet service launched by the Environmental Defense Fund (EDF) allows anyone to enter a ZIP code and see a map highlighting local sources of pollution—and send inquiries straight to those sources.

During the scorecard’s first week online, it received more than two million hits.

“What could have taken hours, days or weeks to dig out of massive government and university databases can now be obtained with a few clicks of a mouse,”

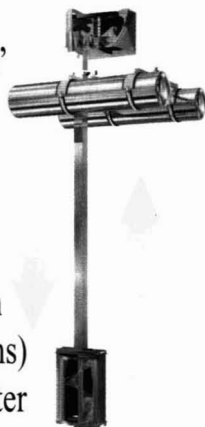
Meeting All WWT Applications FROM TOP TO BOTTOM



S&N AIROFLO IS “PURPOSE-BUILT”
To Maximize Both Oxygen Transfer And Mixing
While Minimizing Both O&M And Electrical Costs!

S&N AIROFLO’s
Series of ‘Low-Speed’
Aeration Equipment
Meets Both
Shallow and Deep
WWT Applications
(Lagoons • Oxidation
Ditches • Aerated Basins)
with Large Volume Water

Movement and
Unprecedented
Oxygen Transfer
Efficiency



S&N MAXFLO™ Mixer

The Only Mixer Providing
“3-in-1” Hydraulic Connections

- Top-to-Bottom
- Bottom-to-Top
- Horizontal

Adjustable to Operate
at Various Angles

PUMPING OVER +10,000GPM

S&N AIROFLO™
**CONTINUOUS-DUTY/
CORROSIVE-DUTY**
Hot-Dipped Galvanized
With Stainless Steel
And Bronze Components.
3HP, 5HP, 10HP, and
15HP Surface Piercing
Horizontal Rotor-Type
(SPHR) Floating
Aerators.

MORE SAVINGS\$

- Less HP Requirements
- Less Capitalization per HP
- Lower O&M Costs
- Lower Energy Costs

**MORE OXYGEN
MORE MIXING
LESS HP!**

S&N AIROFLO
P.O. Drawer 1994
Greenwood, MS 38935-1994
800.844.4524
800 / 761.4442 Fax
www.airoflo.com
etatum@airoflo.com



The Most Efficient Name In Aeration.

said EDF toxicologist Dr. William Pease, designer of the project. "All you need to know is your ZIP code."

The site contains full information on the health effects of thousands of polluting chemicals, as well as instant rankings based on pollution loads and health hazards for 17,000 manufacturing facilities across the country. It identifies the individual chemicals involved, highlights the top-ranked hazards and shows multi-year emission trends.

The Web site can be found at <http://www.scorecard.org> and is free to all users.

Study examines concerns and solutions regarding air pollution

NEW YORK—Sixty-three percent of consumers consider air pollution to be a significant problem, according to a study conducted by CDB Research & Consulting Inc.

The study reveals that women are more likely to consider air pollution a problem than other demographic groups. The affluent are the least concerned about air pollution. When asked to choose among several possible sources of air pollution in the United States, respondents cited automobiles and chemical industry plants most frequently.

According to the study's respondents, responsibility for the reduction of air pollution in the United States is shared among the government (33 percent), businesses (23 percent) and individuals (21 percent). Generation Xers are least likely to rely on corporate America for a solution to the problem, whereas baby boomers are least likely to rely on individuals to solve the problem.

"While the majority of Americans consider air pollution a significant problem, no one seems to be sure exactly how to address it," said Larry Chiagouris, managing director of CDB Research & Consulting Inc.

Nearly 80 percent of the respondents said they regularly recycle paper or aluminum, which is mandated by the government in many communities. Fifty-one percent said they regularly buy or use recycled materials, while only 18 percent participate in group clean-up activities and 16 percent participate in Earth Day activities. The affluent are least likely to participate in activities that reduce pollution, and baby boomers are the least likely to participate in Earth Day or group clean-up activities.

A SAMPLING PUMP FOR EVERY NEED.

Buy or Rent – You'll Save With Keck.



Model SPB



Model KRF

From our 12-volt, field-portable SPB Sampling Pump, to our SPR Sampling Pump (that ends the "purge and sample" blues), to our powerful KRF Grundfos® Redi-Flo2 Sampling Pump... there's one to meet every need and budget.

Call for complete information. **Make Keck your Sampling Pump source.**



Model SPR

KECK

INSTRUMENTS, INC.

1099 W. Grand River • Williamston, MI 48895-9499
Phone: 1-800-295-KECK or (517) 655-5616
FAX: (517) 655-1157

Web Site: <http://www.keckinc.com>
e-mail: water@keckinc.com



Grundfos and Redi-Flo2 are Trademarks of Grundfos Pumps Corporation

TO BUY OR RENT, CALL
KECK.
1-800-295-KECK

Circle 7 on card.

A PRODUCT OF:

odor management inc.

18-4 East Dundee Road, Suite 200
Barrington, IL 60010
(847) 304-9111 Fax (847) 304-0989
e-mail: ecosorb@goldengate.net

Natural Organic Odor Neutralizer

The dawn of a new day in odor control

Ecosorb Natural Organic Odor Neutralizer has been proven to actually break down and eliminate potentially toxic and malodorous gases such as hydrogen sulfide. It is a powerful, cost-effective, broad spectrum odor neutralizer that can be used in a variety of settings. Ecosorb systems are simple and economical and can often replace expensive scrubbers and other more elaborate odor control equipment. Where scrubbers are used, Ecosorb can often be used in place of potentially hazardous scrubber solutions.

Call for a demonstration of the power of Ecosorb!



Odor control

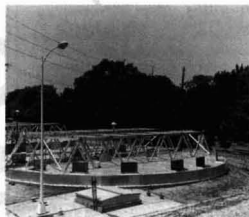
Compiled by Ingrid Truemper

◀ Odor neutralizer

Epoleon odor neutralizers offer a non-toxic alternative for controlling odors from landfill, recycling, sludge, wastewater, scrubbers and other similar operations. The neutralizers chemically convert odor-causing gases into odorless, non-toxic compounds upon contact, rather than simply covering up odors. *Epoleon Corp. of America.*

Circle 88 on card.

Tank covers and domes ▼

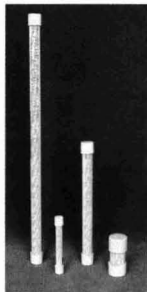


Temcor's permanent, maintenance-free aluminum covers and domes for circular and non-circular tanks of all kinds can be clear-span or column-supported, depending on economics and function. Applications include odor control, water, wastewater, petroleum, petrochemical and bulk storage tanks and more. *Temcor.*

Circle 90 on card.

Odor eliminator ▼

The De-Odor Rod™ is designed to eliminate biological odor and gases such as ammonia and hydrogen sulfides from lift station wet wells, vents, scum hoppers, utility vehicles and more. The unit pulls the positive molecules that hold the odor by negative attraction, absorbing gaseous odor at the source. *Environmental Care Center Inc.*

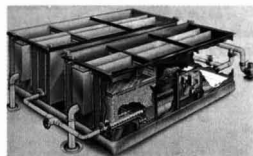


Circle 91 on card.

Reservoir breathers ▶

The TriCeptor series of reservoir breathers removes moisture, solid particulate and odors or vapors before they harm a system or the environment. The breathers use a three-step filtration process. Features include particulate filter, activated carbon, hygroscopic agent, peel strip air intakes and mounting adapters. *Parker Filtration.*

Circle 89 on card.



◀ Water treatment

The trident water treatment system is ideal for potable water, process water, tertiary wastewater treatment and other municipal and industrial applications. The system removes turbidity, suspended solids, color, iron, manganese, odor and taste. Trident produces finished drinking water with turbidity of 0.1 to 0.3 NTU. *U.S. Filter.*

Circle 92 on card.

Other municipal and industrial applications. The system removes turbidity, suspended solids, color, iron, manganese, odor and taste. Trident produces finished drinking water with turbidity of 0.1 to 0.3 NTU. *U.S. Filter.*

Scrubbing systems ▶

The Mystaire® point of use scrubbing system is ideal for laboratory scrubbing applications including digestion, wet ashing procedures and source capture of corrosive and odorous compounds. Due to their small size they can be mounted next to the source of pollutants for total capture of pollutants at the source. *Misonix Inc.*

Circle 93 on card.

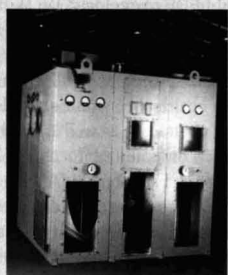


◀ Odor containment

Vapor Guard® structural fabric covers eliminate odor problems at wastewater treatment facilities.

The flat profile minimizes emission equipment costs and leaves catwalks open to maximize space entry. The sealed surface ensures complete odor and VOC containment. *ILC Dover Inc.*

Circle 95 on card.



Charbroiler catalyst

The CharCat™ 900 controls smoke and odors with little maintenance. It runs on broiler exhaust heat to release hydrocarbons during the cooking process in the form of smoke and gas. Removal efficiency is over 95 percent for gases and over 90 percent for particulates. *Engelhard.*

Circle 94 on card.

Thermal oxidizers

Smith regenerative thermal oxidizers are engineered VOC emissions control systems ideal for low solvent concentrations and high process exhaust flow rates. Applications include converting, metal decorating, plastics and odor control. *Smith Engineering & Environmental Corp.*

Circle 96 on card.

Biofilter system

The Bioton® Biological Oxidation System is designed for the control of odors and VOCs. Features include long-life, low-compaction Bioton media, enclosed design and automatic moisture addition system. The system comes as a pre-designed, shop-fabricated unit or can be customized in concrete or sandwich panel construction. *Monsanto Enviro-Chem Systems.*

Circle 97 on card.

CD-ROM streamlines tank specification projects

Snyder's CD-ROM, SPECSOURCE, gives you quick access to the broadest selection of polyethylene tanks in the industry. SPECSOURCE is arranged so you can quickly select the style, capacity, material (HDLPE or XLPE polyethylene) and accessories to match your requirements. **Circle 10 on card.**

Extended warranty for sodium hypochlorite storage

Warranties on four different tank systems designed to store sodium hypochlorite have been extended. These warranties cover outdoor and indoor storage for up to five years. **Circle 11 on card.**

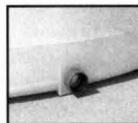


A safer way to store sulfuric acid

Get a full three-year warranty on Snyder's newest, 1.9 specific gravity HDLPE tanks. Resistant to sulfuric acid concentrations of up to 98 percent, these tanks comply with ASTM D1998. **Circle 12 on card.**

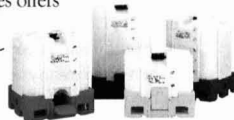
Patented SUMO® outlet maximizes tank drainage

The Snyder Unitized Molded Outlet (SUMO®) maximizes drainage on vertical tanks. The fully encapsulated, threaded insert is now available in 316SS, Hastelloy or titanium in 2", 3", 4" and 6" ANSI pipe sizes for storing a broad range of chemicals. **Circle 13 on card.**

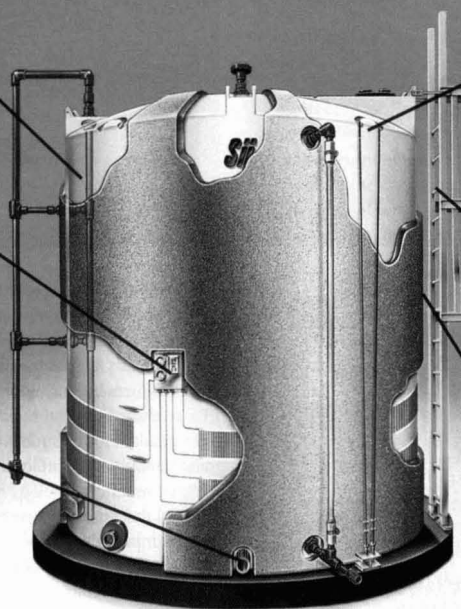


U.N.- and D.O.T.- approved plastic IBCs for hazardous materials

Snyder Industries offers the largest selection of reusable polyethylene intermediate bulk containers (IBCs), for the continuous shipment of hazardous materials. The unique all-polyethylene construction offers superior corrosion and chemical resistance, as well as greater impact strength and long-term durability. **Circle 14 on card.**



Snyder Tank Systems



Internal or external downpipe assemblies.

State-of-the-art, low-wattage heat system.

Snyder Unitized Molded Outlet (SUMO®).

Integrally molded in tie-down lugs meet UBC seismic zone 4.

OSHA-approved ladder assembly.

Urethane foam insulation with mastic coating.

Rotationally molded, one-piece, stress-free polyethylene tanks. In sizes from 8 to 22,000 gallons. All with custom engineered accessories to match your specifications for storage and handling efficiency. Call or write for our FREE product catalog.



SNI SNYDER INDUSTRIES, INC.
SOLUTIONS IN BULK HANDLING

P.O. Box 4583 • Lincoln, Nebraska 68504 • 402-467-5221 • FAX: 402-467-6493 • Internet: <http://www.snydernet.com>
Other manufacturing locations: Marked Tree, Arkansas • Roanoke, Alabama

Circle 9 on card.

Gaining ground

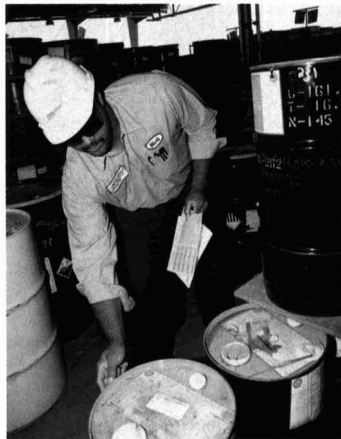
Major innovations in hazardous waste landfill technology are making strides in protecting the environment

Over the last 12 years, a lot has changed in the hazardous waste landfill industry. Business, market, technological, environmental and health and safety changes have occurred. In the early 1980s, more than 30 operating hazardous waste landfills existed in the United States, most of which were not fully permitted. Most did not have liner systems or systems that monitored the groundwater, the vadose zone (the unsaturated zone between the ground surface and the watertable) and the ambient air. Most of these landfills did not have waste analysis plans, nor did the waste that came into the facilities have to be profiled or tested. Hazardous waste manifests were not uniform—if they were used at all. For the most part, the local communities in which the facilities were located had no input in the location or permitting of the facility.

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA) and then significantly amended the statute with the passage of the Hazardous and Solid Waste Amendments of 1984 (HSWA). RCRA authorized the U.S. Environmental Protection Agency to review permit applications and issue hazardous waste facility permits. With the passing and implementation of RCRA and HSWA and the issuance of hazardous waste facility permits, the hazardous waste landfill industry began to change rapidly in the mid and late 1980s.

The 1980s also brought about the existence of hazardous waste liner technology, development of groundwater monitoring and the beginning of statistical analysis of

the analytical data—a science that would grow and develop in the 1990s. Vadose zone monitoring was studied and implemented in states such as California. Ambient air monitoring regulations were developed, and implementation dates set in some of the states in which hazardous waste landfills operated. Waste analysis plans were not just a requirement of a RCRA Part B permit application, but were a requirement of the operating facility. Most importantly, community participa-

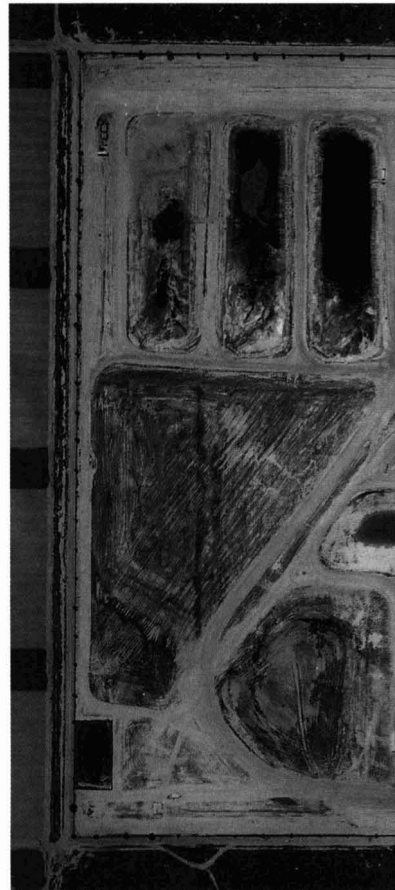


Labeling drums for treatment.

tion in all aspects of hazardous waste permitting became the norm.

Breakthroughs in leak-proof liners

Prior to 1982, most hazardous waste landfills in operation were unlined units. Many



were built in areas around the country that were thought to have appropriate geology such as thick clay deposits underlying the landfill units. Composite liner systems were not a requirement until the early '80s when EPA published its minimum technology liner standard for hazardous waste disposal units (landfills and surface impoundments). EPA's minimum technology liner standards required that hazardous waste landfills and surface impoundments be lined with a double composite liner system with leachate collection and removal systems. The composite liner system consists of one clay liner, generally 2 to 3 feet thick with a permeability of 1 by 10⁻⁷ centimeters per second (cm/sec), and a 40 mil synthetic liner. At that time, the synthetic liner materials available were high density polyethylene (HDPE) and polyvinyl chloride liner. Liner material used in the liner system depended on the landfill operations and the types of waste to be landfilled. In the mid 1980s, most landfills began to use HDPE liners. Sophisticated composite liner systems were developed to meet the minimum technology standards.



In the Safety-Kleen (formerly Laidlaw Environmental Services) hazardous waste management system, landfill liner designs vary depending on the geology of the landfill location and the depth and quality of groundwater. In general, a hazardous waste landfill liner system consists of the following from bottom to top: clay liner, HDPE liner, leachate collection and removal system drainage layer, a second clay liner, HDPE liner, leachate collection and removal system, and soil cover for an operations layer. Safety-Kleen has eight hazardous waste landfills in its network. All the landfills are fully permitted RCRA treatment, storage and disposal facilities (TSDFs).

Advances in groundwater monitoring

Since the early 1980s, EPA has promulgated land disposal restriction (LDR) regulations. The LDRs were promulgated in phases, and preclude certain types of waste from being disposed in a landfill. This includes the disposal of wastes containing free liquids. In addition, EPA has

promulgated strict groundwater monitoring regulations while several states have promulgated vadose zone monitoring and ambient air monitoring.

Prior to 1984, very little groundwater monitoring was performed at TSDFs. As such, groundwater monitoring regulations were adopted. The regulations were complex, but general in nature to accommodate all types of geologic and hydrologic groundwater regimes. Subsequent to the development of the groundwater monitoring regulations, EPA clarified the regulations through the publication of groundwater monitoring guidance manuals.

In general, groundwater monitoring systems consist of a series of groundwater wells that monitor waste management units (WMUs) on a unit-by-unit basis or on a site-wide basis. This depends on the nature of the geology and location of the WMU relative to groundwater. Most land disposal facilities have more than 50 groundwater monitoring wells.

Groundwater monitoring samples are generally collected quarterly and analyzed for general chemistry parameters

An aerial view of a hazardous waste management system.

such as pH; chloride; sulfate; cyanide; alkalinity; bicarbonate; heavy metals such as arsenic, lead and chromium; and volatile organic compounds (VOCs) such as acetone, benzene and trichloroethylene. Periodically, additional analysis may be specified in the facility's permit. Additional testing may include semi-volatile organic compounds, pesticides, PCBs and dioxins.

The analytical results are compared to statistical results that are calculated based on previous data. If the current analytical result is within specified limits, the facility continues with routine groundwater monitoring. If the result is above the specified statistical limits or background, then the well(s) must be re-sampled to determine if something other than a release may have caused the elevated result. If the re-sampling confirms the previous results, then the facility must sample all the wells and analyze the samples for Appendix IX chemicals—a

list of about 400 chemicals—to verify that there are no other chemicals in the groundwater.

After this has been completed, the facility must evaluate the results and make a determination as to whether there is groundwater contamination from a regulated unit. If the facility does not believe that the contamination is from a regulated unit, then the facility can perform a demonstration to show that a source other than a regulated unit caused the elevated chemical concentrations. If the regulatory agencies accept the facility's demonstration, then the facility would continue with routine detection monitoring; otherwise a groundwater clean-up program must be designed, permitted and implemented.

Vadose zone vigilance

A technical report is prepared quarterly and submitted to the regulatory agencies for review. The groundwater report must include water level data from each monitoring well, groundwater contour maps, copies of field notes, laboratory analytical data and interpretation and discussion of the results of the monitoring. The

regulations were written to require the hazardous and non-hazardous landfill facilities to periodically obtain soil pore liquid samples. Thus, the only device available for soil pore liquid monitoring was a suction lysimeter, which consists of a porous ceramic cup mounted on the end of a PVC tube with a rubber stopper and vacuum/sampling tube protruding through the stopper. When a vacuum is applied to the vacuum/sampling tube, water flows through the porous cup, enters into the vacuum/sampling tube and travels to the surface for collection in bottles. If a soil pore liquid sample could not be obtained, then the landfill facility had to suggest an alternate way of monitoring the vadose zone. Due to California's geologic conditions and arid conditions, the depth to groundwater and the zone of saturation are well below the operational limits of suction lysimeters.

The hazardous waste landfill industry was the first industry to be regulated by these rules. As such, the hazardous waste landfills in California had to suggest another method for monitoring the vadose zone. California has the most stringent environ-

mentality that leachate from the landfill may be migrating downward and outward.

Neutron probe moisture detection systems consist of a neutron probe moisture detection gauge and a steel pipe beneath the landfill. The steel pipe is generally installed during the excavation of the cell or, in the case of existing landfill, installed

Sophisticated liner systems and monitoring systems for groundwater, vadose zone and ambient air systems are now required and in place.

by slant drilling from the ground surface to beneath the bottom of the landfill in areas likely to detect leachate. Moisture content readings of the native soil beneath the landfill are taken to calibrate the probe to

the soil's existing moisture content and determine the background soil's moisture content. Once a background and a baseline soil moisture content level has been determined, monitoring is usually performed on a monthly or quarterly basis with a neutron probe. If an increase in moisture content of greater than 4 to 6 percent is detected above background, the facility must notify the regulatory agencies within 7 days and investigate the source of the fluid. The vadose zone monitoring system acts as an early warning system against a possible release and groundwater contamination.



Waste sampling is necessary to stay in compliance.

reports must be signed by a registered geologist or engineer.

In 1984, the state of California modified its regulation to include vadose zone monitoring. Vadose zone monitoring was intended to act as an early warning system for possible future groundwater contamina-

tion. The regulations regarding permitting and ground water/vadose zone monitoring in the nation. Several studies were performed by different companies, and it was concluded that neutron probe moisture detection devices were a viable option to meet the intent of the regulations. Neutron probes are used to detect the moisture content of soil. If an increase in soil moisture content is detected, then there is a possibil-

On the lookout for air toxics

California requires industries that emit specific air pollutants to obtain air permits from the local air pollution control districts. Depending on the type of industry and the nature of the emissions, you may need to perform a health risk assessment. If a health risk assessment is performed and it is concluded that the risk is within



CARHARTT EXTREMES.
IT'S WHAT A PROFESSIONAL WORKER WEARS ...
IN COLD, WET ENVIRONMENTS.

Extreme work conditions in cold and wet environments are the *norm* for some professionals. Water repellency, warmth, comfort and freedom of movement become essential requirements for their workwear. That's why Carhartt Extremes were created. With its water repellent 1000 denier DuPont Cordura® Plus nylon shell and Carhartt arctic-weight lining, Carhartt Extremes delivers superior durability and protection from the elements. It sets a new standard in rough weather workwear ... which is exactly what professionals expect ... from Carhartt.

For your nearest Carhartt retailer, call 1-800-358-3825.



www.Carhartt.com

Carhartt
EXTREMES™



Circle 15 on card.

acceptable limits, the air districts will want you to perform ambient air monitoring to validate the results of the emission calculations and the risk assessment.

Ambient air monitoring programs consist of upwind and downwind air monitoring stations and continuous meteorological monitoring for wind speed, wind direction, temperature and barometric pressure. Ambient air samples are collected on a specified frequency, typically every 12 days in conjunction with the California Air Resources Board statewide air toxics monitoring program. The air samples are analyzed by a laboratory for the pollutants of interest—typically determined from the risk assessment. After a quarter's worth of data has been collected, an upwind and downwind comparison of the chemical concentrations is performed. If it is determined that there is a statistically significant increase above the background concentration, then intensive re-sampling is performed. Intensive re-sampling consists of collecting ambient air samples for a 24-hour period of time, every other day for 12 days. After this data has been analyzed, a comparison is again performed to determine if there is a continuing significant release of the air toxic compound in question. If the intensive sampling data confirms the increase, then a mini-risk assessment is performed to determine if the concentration of the air contaminant is above the pre-deter-



Checking leachate in vadose zone monitoring.

ty's waste analysis plan, are the backbone of facility operations. The type of waste accepted drives the waste placement in the landfill or the type of treatment required. Almost all hazardous waste landfills in existence in the United States have at least one type of treatment technology associated with the landfill. In many cases the treatment technology is stabilization treatment, which typically consists of the addition of pozzolonic reagents via a mixing system, that chemically changes the

has questions, comments or concerns about what the facility will do and how it will operate. The public has the right to come to meetings and bring up any questions or concerns.

In California, any facility permitting activity that deals with the management of hazardous waste requires that the lead agency form a Local Assessment Committee (LAC). California's public participation regulations pertaining to hazardous waste operations provide and require public participation over and above other states. The LAC consists of seven community members. The purpose of the LAC is to negotiate terms and conditions of approval with the applicant. The process is cumbersome; however, it provides the arena for anyone to discuss their concerns with the applicant, the lead agency and others involved in the waste handling operations. Public involvement can provide for changes in any and all facility operations. Many states have public participation requirements that exceed the federal requirements.

The evolution of modern landfills

Hazardous waste landfill changes and innovations have occurred in all areas. The business has consolidated such that there are not as many landfill operators as there were in the 1980s. Sophisticated liner systems and monitoring systems for groundwater, vadose zone and ambient air systems are now required and in place. The results of most monitoring systems are statistically analyzed so that accurate determinations can be made. All facilities today have waste analysis plans that provide a base knowledge of the waste prior to actual waste receipt for treatment or disposal. Almost all hazardous waste landfills have treatment processes. Public participation is an integral part of all hazardous waste permitting processes. Public participation allows for everyone to know what operations will be ongoing as well as allowing the public to express their concerns.

Hazardous waste landfill operations were once thought to be simplistic operations. However, today—from permitting to monitoring to operating the facility—the business of operating a hazardous waste landfill is far from simple and in some areas extremely complex. **EP**

Marianna Buoni is general manager and David Nielsen is operations manager of Safety-Kleen's Buttonwillow, Calif., facility.

For more information, circle 98 on card.

In general, a hazardous waste landfill liner system consists of the following from bottom to top: clay liner, HDPE liner, leachate collection and removal system drainage layer, a second clay liner, HDPE liner, leachate collection and removal system, and soil cover for an operations layer.

mined risk threshold value typically determined when the risk assessment was performed. If the risk is above this level, then an investigation must be performed to determine the emissions unit or operation creating the elevated air contaminant levels. Once the source has been determined, the company must notify the local air district, cease the operations causing the elevated air contaminant levels and request a permit modification.

Planning and seeking public input

Waste acceptance programs, which are typically the implementation of the facili-

ty's waste analysis plan, are the backbone of facility operations. The type of waste accepted drives the waste placement in the landfill or the type of treatment required. Almost all hazardous waste landfills in existence in the United States have at least one type of treatment technology associated with the landfill. In many cases the treatment technology is stabilization treatment, which typically consists of the addition of pozzolonic reagents via a mixing system, that chemically changes the

valance states of the metals requiring treatment such that they do not or are unable to leach back into the environment. In addition to driving landfill and treatment operations, the facility's waste analysis plan also drives what occurs in the laboratory. Most waste analysis plans specify the analysis to perform prior to a facility making the determination of waste acceptance. Public participation in the permitting of hazardous waste treatment, storage and disposal facilities has become very active. The federal regulations require public participation during the permitting process. Public participation consists of community groups, neighbors or any person who

**FEDERAL
DEADLINE
AHEAD**

UNDERGROUND TANK DEADLINES ARE "JUST AROUND THE BEND"!

**The 10-year USEPA
Compliance Schedule
ends on December 22,
1998 and this could
affect you!**

It's the Law...

Federal USEPA 40 CFR 280

Technical Standards and
Corrective Action Requirements
for Owners and Operators
of Underground Storage
Tanks (UST)

Penalty signs ahead

There's no turning back! If you want to avoid fines, your regulated tank systems must meet standards. First, they must be corrosion-resistant (single wall for petroleum -- secondary containment for hazardous substances). They must also have spill and overflow prevention equipment and release detection. All installations must also be certified.

You have options

1) You can upgrade your existing systems to meet the new standards. 2) Replace

potential trouble makers with new underground or aboveground tank systems. Or, if you don't need the storage, 3) close your tanks.

What's the best route?

Call Lexicon. We're storage tank experts. Our experience with fleets helps us to spot danger signs and map out alternative routes to avoid tolls.

If your tanks are already in compliance, we'll help you manage to keep them that way. Environmental compliance may not be a free ride, but it's the highway to the future!

**LAST EXIT
BEFORE TOLL**



LEXICON

Environmental Associates, Inc.

790 East Market Street, Suite 270 West Chester, PA 19382-4806

(610) 344-3380 FAX: (610) 344-3388

email: LexiconEn@aol.com

Circle 16 on card.

Regional Offices in Metro-New York and New England

Tips on Tanks:
Let us help you stay on top of your tanks. Call or Fax today to receive our **free** LexiConcepts Bulletins.



CAAA

EPA's gameplan for fighting air toxics

This overview of the 1990 Clean Air Act Amendments spells out EPA's agenda for regulating air emissions

First passed in 1970, the Clean Air Act (CAA)—intended to regulate air emissions from both mobile and stationary sources—delegated to the U.S. Environmental Protection Agency the authority to establish National Air Quality Standards. In order to provide the individual states with more time for compliance, the CAA was amended in 1977. Until 1990, EPA worked on a chemical-by-chemical basis, listing and regulating only seven chemicals known to be risks to health—*asbestos, benzene, beryllium, arsenic, mercury, radionuclides and vinyl chloride*. This approach was ineffective in emissions reductions. The 1990 Clean Air Act Amendments (CAAA) involved a new approach: regulation by industry rather than by chemical, thereby re-focusing the program to one that is technology and performance based. The U.S. Congress generated a list of 189 hazardous air pollutants (HAPs) as a focused guideline to reducing emissions of HAPs from major sources of air pollution.

U.S. world environmental leadership slips but returns with CAAA

During the 1970s through the mid 1980s, the United States was clearly the world leader in pollutant reduction from mobile sources through the use of catalytic converters, reduction of carbon monoxide and hydrocarbons, on automobiles and the removal of lead from gasoline. The health effects of lead removal were obvious in the United States by the late 1980s and early 1990s.

However, in Europe in 1990, it was still difficult to find unleaded gasoline for sale. During the late 1980s, northern European countries moved ahead of the United States in passing legislation controlling stationary sources.

In 1990, the CAAA was amended to include new needs such as ozone depletion, acid rain, HAPs or air tox-

The 25 MACT standards when fully implemented will reduce the emission of more than 100 air toxics by more than 1 million tons per year, which is nearly ten times greater than that achieved with the pre 1990 legislation.

ics—the 189 listed chemicals that cause serious health and environmental hazards. The implementation of this legislation will put the U.S. back in the forefront of air pollution reduction. The CAAA has a 10-year window to complete the standards for various industrial and commercial sources.

Once the categories of sources are listed, EPA will issue regulations, including technology, to reduce pollutants, but wherever possible companies

will have flexibility to choose how they meet requirements. Sources are to use Maximum Available Control Technology (MACT) to reduce pollutant releases. EPA must issue regulations for large or major sources first, and must then issue regulations to reduce pollution from small or area sources, setting priorities for small sources, based on health and environmental hazards, as well as production volume and batch variability.

If a company wishes to increase the amount of air toxics released from an operating plant, the company may choose to offset the increases so that total number of hazardous air pollutant emissions from the plant do not go up. Otherwise, they may choose to install pollution controls to keep pollutants at the required level. If a company reduces its releases of a hazardous air pollutant by about 90 percent before EPA regulates the chemical, the company will get extra time to finish cleaning up the remaining 10 percent. This early reduction program is expected to result in a rapid reduction of the levels of several critical hazardous air pollutants.

The Bhopal tragedy that involved the release of a toxic chemical that killed 4,000 people and injured an additional 200,000 in India in 1984, motivated the CAAA initiative that businesses develop plans to prevent accidental releases of highly toxic chemicals. The CAA established The Chemical Safety Board (CSB) to investigate accidental releases of hazardous air pollutants. CSB will operate in a similar manner to the National Transportation Safety Board (NTSB).

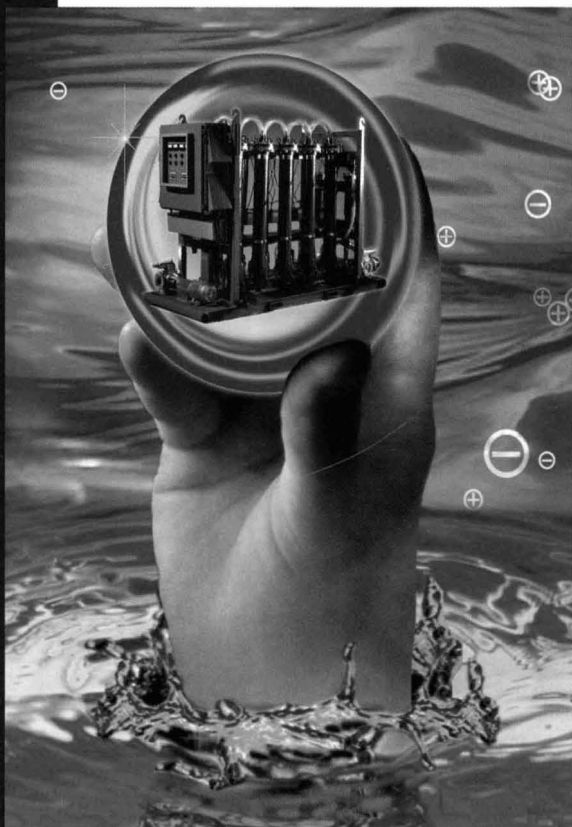
By John N. Driscoll, DCS

Improve your BOTTOM LINE

with Ecoloquip's JOULE™ EC System

If your current wastewater treatment technology is not meeting discharge limits, replace it with the Joule™ EC System from Ecoloquip. This proven system removes most contaminants found in today's industrial waste water streams. Consider the installed cost, the operational cost and the quality of wastewater treated with the Joule™ EC System and you will discover it is something you can't afford to be without.

- Destroys organic compounds
- Eliminates pathogens
- Separates dissolved and suspended solids
- Reduces or eliminates odor
- Reduces chrome, nickel, zinc, cadmium and other metals
- Breaks oil emulsions
- Requires no chemicals
- Small footprint
- Less expensive to operate than traditional systems
- Simple to operate and maintain
- Buy or lease systems that exceed EPA standards through 2004
- 10, 25, 50 and 100 GPM units in stock



Call now for bottom line savings
(888) 568-5332

1657 Oak Tree Drive ● Houston, TX 77080 ● Voice (713) 827-9355 ● Fax (713) 827-9396
E-mail: ecoloquip@ecoloquip.com ● www.ecoloquip.com

See us at WEFTEC, Booth #3288 • Circle 18 on card.

Title I progresses rapidly

From 1990 to 1994, the Title I portion of the CAAA progressed quickly; continuous emission monitoring systems (CEMS) for sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO) and particulate emissions monitors were installed in most large power plants. Title II involved monitoring programs for ozone, CO and other similar pollutants. Ambient air programs have been implemented and many states report the historical monitoring data, such as Louisiana, or daily monitoring data, such as Texas, on their Web sites. Within the European Community, most countries have started to monitor air toxics such as benzene, toluene, xylene and, recently, 1,3 butadiene, on a continuous basis in their upgraded air monitoring networks.

Title III moves at a slower pace

The Title III portion of the CAAA, HAPs or air toxics appears to have been moving at a much slower pace since we are already more than 8 years into the program and regulations have been promulgated for less than one third of the industries. As of January 1998, MACT air toxics final standards have been issued for only 23 industries under Section 112 of the CAAA. These standards affect 48 categories of major industrial sources and eight categories of the smaller sources. Note that many industries have multiple sources such as elastomer production, chrome plating and anodizing, plastics and polymers. The time frame for finishing this process is November 15, 2000. As of January 1998, EPA has also proposed rules covering 22 additional source categories. The implementation schedule of the standards for the remaining industries can be found on the Web at www.epa.gov/tnn/uatw/7_10yrst.html. Note that dates are assigned along with a contact name and an e-mail address for each industry or chemical to be regulated. There is a considerable amount of ground to cover in the next one and a half years. The rate will have to increase considerably, however, to keep up with the proposed schedule.

Strategy starts with source identification

To reduce air toxics pollution, EPA must first identify the toxic pollutants whose release should be reduced. On the basis of potential health and environmental hazard; EPA must regulate these listed air toxics. The 1990 Act allows EPA to add or remove chemicals to the list as necessary. In fact, the 189 chemicals has recently been reduced to 188. Caprolactam apparently should not have been included in the

TABLE I
Final Air Toxics MACT Rules under Section 112 of the CAAA list of industries regulated as of January, 1998

INDUSTRY	Final rule publish date	Federal Register reference subpart ()	Number of source categories
Aerospace manufacturing and rework industry*	9/1/95	60FR45948 (GG)	1
Basic liquid epoxy resins and non nylon polyamide resins manufacture	3/8/95	60FR1267 (W)	2
Chromium electroplating and anodizing operations*	1/25/95	60FR49848 (N)	6
Coke oven batteries at steel plants*	10/27/93	58FR57898 (L)	1
Commercial sterilization and fumigation*	12/6/94	59FR62585 (O)	2
Dry cleaners*	9/22/93	58FR64382 (M)	5
Elastomer production	9/5/96	61FR46906 (U)	9
Gasoline distribution facilities	12/14/94	59FR64303 (R)	1
Halogenated solvent cleaning machines	12/2/94	59FR61801 (T)	2
Industrial process cooling towers	9/8/94	59FR46339 (Q)	1
Magnetic tape manufacturing	12/15/94	59FR64580 (EE)	1
Marine tank vessel loading operations	9/19/95	60FR48388 (Y)	1
Off-site waste operations	7/1/96	61FR34139 (DD)	1
Organic chemical production plants	4/22/94	59FR19402 (F,G,H,I)	1
Petroleum refining industry	8/18/95	60FR4344 (CC)	1
Polyethylene terephthalate polymer and styrene-based thermoplastic polymers production	9/12/96	61FR48208 (JJJ)	6
Primary aluminum reduction industry	10/7/97	62FR52407	1
Printing and publishing operations	5/30/96	61FR27132 (KK)	1
Secondary lead smelting industry*	3/8/95	60FR32587 (X)	1
Shipbuilding and ship repair industry	12/15/95	60FR64330 (II)	1
Wood furniture manufacturing	12/7/95	60FR62930 (JJ)	1
major sources			40
* small sources			8

first place and was removed in 1996.

The CAAA of 1990 deals primarily with major large sources, which is greater than 10 tons annually for a single compound or 25 tons annually for mixed HAPs, but small sources will also be controlled as additional regulations are passed. The air toxics producers are to be identified as major or area sources. The CAAA directed EPA to set standards based on all major sources of HAPs, plus sources of particular concern, to reduce significantly the emissions of air toxics. An emissions inventory in 1993 showed that mobile sources

accounted for 41 percent of emissions of air toxics, area or small sources accounted for 35 percent and major sources accounted for 24 percent of emissions.

Cars, trucks, buses and other mobile sources release large amounts of hazardous air pollutants such as formaldehyde and benzene. Cleaner fuels such as reformulated gasoline, more efficient engines and proper maintenance of pollution control devices should reduce hazardous air pollutants from mobile sources. In the Netherlands, many of the fuel stations sell both gasoline and liquid

propane gas (LPG). The Dutch government has tax incentive programs for dual fuel vehicles which pays for the additional cost of LPG over a 5-year period.

Monitoring considerations

Large stationary sources, such as chemical plants, plastics manufacturing, sterilization and incinerators, release hazardous air pollutants. The 1990 CAAA deals more strictly with large sources than small ones, but EPA must regulate small area sources of hazardous air pollutants as well. As of January 1998, 48 industries were covered by regulation. EPA indicated that there is a considerable public health concern with the effect of large sources on the health of the population downwind. In Alberta and Edmonton, the local Canadian environmental authorities require large chemical producers to monitor fence lines with continuous analyzers. Most of the fence line monitoring programs for CAAA Title III involve the use of grab samples including SUMMA canisters for collection in the field, followed by laboratory analysis. With the final implementation of the CAAA, this will change. The use of continuous monitors for fence line monitoring occurs in the United States when a significant release or leak occurs from a major source or when there is considerable public pressure or concern on the part of local environmental authorities. This is also the situation in many Third World countries where there is little environmental legislation and political pressure on the mayor or other public authorities required to establish monitoring programs. Recent EPA legislation, the Compliance Assurance Monitoring (CAM) Rule provides industry with a program to ensure the local regulators or neighbors that it is operating within its permit.

Small sources are also regulated

Air toxics are released from small area stationary sources, such as dry cleaners and electroplating. Under the 1990 CAAA, EPA is required to study means to reduce hazardous air pollutants from small neighborhood polluters such as auto paint shops, print shops and more. The agency will also have to evaluate air toxics pollution after the first round of regulations to determine whether the remaining health hazards require additional regulatory action. However, legislation for eight small sources such as chrome plating, printing and chlorinated solvents are included within the 48 source categories already regulated as of January 1998.

A list of the 23 industries regulated under Section 112 of the CAAA is given in

Table 1 along with the date of the final rules and a reference to the *Federal Register* (FR) that is available in many large libraries, on-line, from EPA or state department of environmental protection offices. The information can also be downloaded from the Web under national emission standard for hazardous air pollutants (NESHAP) summaries. The *Federal Register* pertaining to aerospace manufacturing is found in the September 1, 1995 60 FR 45948, subpart GG. In addition to the standards issued under Section 112, EPA issued two standards under Section 129 of the CAAA covering municipal waste combustors and medical waste incinerators.


Time frame

The average time between the proposed or initial and the final publication of the rules in the *Federal Register* for the air toxics MACT standards in Table 1 was 13 months. The shortest time was 9 months

Useful Web sites

- EPA homepage: epa.gov
- EPA Office of Air & Radiation (OAR) home page: epa.gov/oar/
- EPA Office of Mobile Sources (OMS) home page: epa.gov/omswww
- Unified Air Toxics Web site: epa.gov/tnn/uatw/
- State Environmental Goals and Indicator Project (SEGI) home page: fsu.edu/~cpm/segip.html
- State of Louisiana Web site: deq.state.la.us/oarp/air.htm
- State of Texas Web site: tnrcc.state.tx.us/air/monops/ambmon.html

and the longest time was 21 months.

What will be accomplished when these standards go into effect? The 25 MACT standards discussed above when fully implemented will reduce the emission of more than 100 air toxics by more than 1 million tons per year, which is nearly ten times greater than that achieved with the pre 1990 legislation. Between 1988 and 1993, the reporting to the Toxic Release Inventory (TRI) indicates that the ten air toxics with the largest releases have shown a decline of 30 percent or 443.7 tons. The TRI is the main source of comprehensive information on HAPs and the new (1996) TRI has just been published on EPA's Web site at www.epa.gov/tris_sta.htm. 

John N. Driscoll, DSC, is president of HNU Systems Inc., Newton Highlands, Mass.

For more information, circle 99 on card.



SmartLine Analyzers

- ▲ Infrared
- ▲ Ultraviolet
- ▲ Oxygen
- ▲ Chemiluminescent



Model AR-1000 Analyzer

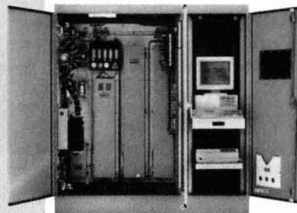
19 inch rack-mount SmartLine Analyzer for single and multiple emissions and trace gas measurement.

The analyzer that can stand alone as a mini-system.

CEM Systems

- ▲ Probe to Printout
- ▲ Turnkey Installations
- ▲ Single Source Supplier

The UniCEM is your first choice in emissions monitoring.



System Enclosure with Data Acquisition

Anarad provides the complete CEMS project: design, data acquisition system, manufacture, installation, start-up, training, and system certification

Anarad, Inc.

534 E. Ortega

Santa Barbara, CA 93103

Phone: 805-963-6583

Fax: 805-962-4627

email: anaradusa@anarad.com

A common sense approach to cleanups

An overview of how to use risk-based decision making to respond to chemical releases into the environment

By John A. Connor, PE, and Charles J. Newell, PhD, PE

There has been an increasing discussion of risk assessments, risk-based corrective action (RBCA, sometimes referred to as "Rebecca"), risk-based decision making and other risk-based terms in the environmental cleanup industry in recent years. For example, over 40 states are considering the adoption of RBCA procedures for management of corrective action at underground storage tanks (USTs) based on an American Society of Testing and Materials (ASTM) standard issued in 1995. Currently, there is an ASTM effort to develop a RBCA program for other types of chemical release sites, such as Superfund sites, Resource Conservation and Recovery Act (RCRA) sites and other waste site cleanup programs. Generally, these risk-based programs are designed to manage the long-term risks from releases of chemicals to the environment, as opposed to responding to the effects of catastrophic releases, such as oil spills regulated under the Oil Pollution Act.

Overall, the new focus on risk-based approaches is a positive development. A risk-based approach allows environmental cleanups to be conducted in a rational manner based on the actual risk that the site poses to society; it also allows for a flexible approach to managing those risks. Movement towards risk-based approaches does raise a concern that they will impose greater complexity on site evaluation processes, with significant variability among states. However, these

programs all share the common principles of risk management, which, in essence, are both simple and rational. Keep in mind these simple principles, which are the basic tools needed to pursue a risk-based strategy on any cleanup project.

Risk management objectives

In the environmental field, risk management is essentially a two-step process—

action processes while incorporating key risk management processes.

Environmental release: concerns and response actions

An environmental release of a hazardous chemical can pose a variety of concerns, depending on the location, magnitude and nature of the release. The following are key areas of concern:

- Human health and ecological hazards, or

A risk-based approach allows environmental cleanups to be conducted in a rational manner based on the actual risk that the site poses to society; it also allows for a flexible approach to managing those risks.

prevent releases and manage soil and groundwater impacts when releases occur (see Figure 1).

Because preventing releases is more cost-effective than managing releases after they occur, many of our state and federal regulations are directed toward ensuring that accidental spills and leaks do not occur. However, when hazardous chemicals are released to the environment, we need to respond as necessary to prevent impacts to public health and the environment. Recent initiatives such as RBCA represent efforts to streamline the corrective

hazards posed by the toxicity of chemicals to human or ecological receptors;

- Non-biological resource impacts, or destruction of a natural resource, such as water resources belonging to the state;
- Aesthetic impacts, which are impacts causing a non-hazardous but unsightly or nuisance problem; and
- Subsurface utility impacts, or impacts from dangerous conditions caused by having contaminants in subsurface utilities, such as explosive gases.

The goal of the risk-based site evaluation is to assess these concerns and define

appropriate response actions on a site-specific basis. This evaluation may involve an initial qualitative assessment of site conditions, followed, if necessary, by a quantitative analysis of contaminant transport and exposure. Either way, the exercise of reviewing an inventory of relevant hazards and targeting appropriate response actions toward key risk factors constitutes risk management. Under many regulatory programs, response actions may be required if chemical concentrations in environmental media are likely to result in a human or ecological exposure in excess of safe levels; usable water resources could be damaged by continued exposure of the contaminant zone; the contaminants pose explosive conditions; or the contaminants may cause physical damage to subgrade structures.

Human health concerns

Human health concerns are the central focus of many of our state and federal corrective action rules. Under a risk-based approach, an exposure assessment is conducted to determine whether the chemical release could result in human exposure in excess of safe levels. For this proposal, the environmental engineer or scientist must address various exposure scenarios, hypothetical mechanisms whereby chemicals on affected soil or groundwater could move to a point of human intake. Typical soil and groundwater exposure scenarios identified on many state or federal risk-based regulatory programs are listed on Table 1.

Again, the exposure assessment may be relatively simple or relatively complex, depending on the specific needs of the state. For example, if historical data show an affected groundwater plume to be stable or shrinking, then it is impossible for this plume to impact a water well located outside the existing plume area, and the potential risk to that well user is zero. No models or calculations are needed.

Alternatively, in the case of an expanding groundwater plume, a model could be employed to predict long-term plume management patterns. In some cases, such modeling may support a more timely risk management decision than could be developed based on monitoring data.

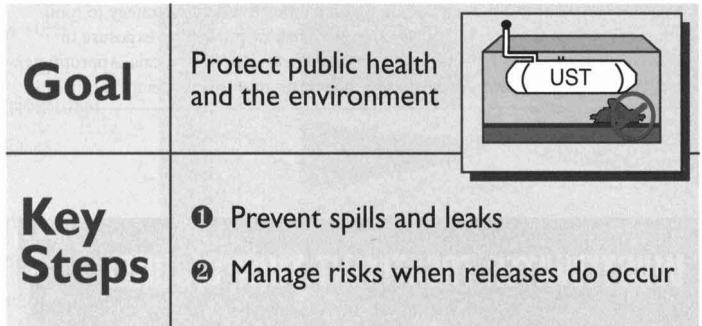
The basic steps of risk assessment and response

The risk-based site evaluation process can be distilled to four basic steps shared by almost all risk-based regulatory programs.

The first step is site assessment. Collect site information to characterize soil and groundwater impacts and identify potential receptors. Key data needs include site soil and groundwater conditions, location of actual and potential receptors, and concentrations of chemicals of concern in various media, such as soil and groundwater.

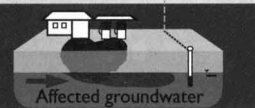
Step two is exposure assessment. Conduct exposure pathway screening analysis to identify those exposure conditions that could apply to the site—commonly based on the presence or absence of source media or receptors and the presence or

FIGURE 1



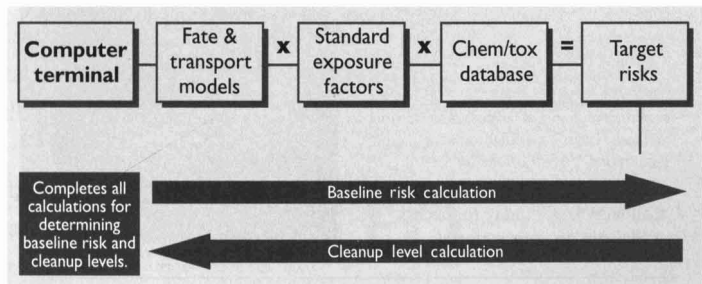
Two Key Steps for Risk Management

TABLE 1

CONCERN		RESPONSE
Human health and eco hazard	➔	Prevent exposure to unsafe levels of contaminants
Non-biological resource impacts	➔	Prevent loss of useable groundwater
Aesthetic impacts	➔	Prevent odor or nuisance
Subsurface utility impacts	➔	Prevent explosive conditions
KEY POINT: Define the concerns and necessary response actions for each site.		

Environmental releases: Concerns and response actions

FIGURE 2



Calculation flowchart for risk-based corrective action (RBCA) software (from GSI RBCA Tool Kit)

absence of chemicals above the threshold screening level. For each applicable pathway, evaluate potential exposure levels.

The third step is protective standards. Compare potential exposure conditions to protective criteria. Identify those affected media zones and chemicals that pose potentially harmful conditions or exceed the protective criteria established for each area of concern. The calculations can either be performed in a forward mode, where you compare the actual risk at the site to protective criteria defined by regulatory agencies, or a backward mode, where cleanup standards at the receptor are used to generate cleanup standards at the source. Software is available to make these

calculations easier by combining fate and transport models, standard risk assessment exposure factors, chemical/toxicological databases, and regulatory agency-mandated target risks in one integrated package (see Figure 2).

These tools allow users to calculate easily the risks associated with a particular site (the forward calculation) and calculate cleanup standards for the source zone at a site that will be protective of human health and the environment. The fourth step is the response action. Develop a corrective action strategy to minimize risk by preventing exposure to harmful levels of chemicals. Appropriate measures may involve removal or treat-

ment of affected media; containment measures to prevent exposure to soil or groundwater left in place; or institutional controls to limit future uses of the property as needed to prevent unsafe exposure conditions, such as deed recordation or limiting the use of a property to commercial or industrial uses with no groundwater extraction. Each of these measures may successfully achieve the risk protection criteria. Consequently, the choice among these options is not a risk-based decision but a function of technical and economic considerations as well as land use plans. The final response action should achieve the applicable protective standards while preserving the active and productive use of the property.

Summary

Risk-based management is becoming a more acceptable method under many regulatory programs for responding to chemi-

WASTEWATER TREATMENT THAT WORKS!

Whitewater

TSS TDS

BOD COD Color

Plant Effluent

V-SEP®

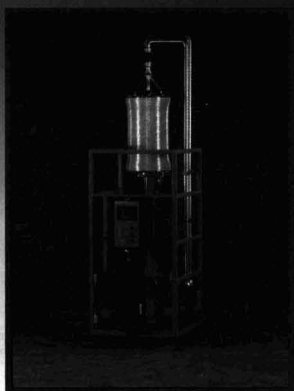
CLEAN WATER TECHNOLOGY.

The V-SEP® filtration system takes an untreated Wastewater Stream and turns it into clean, reusable water.

Finally, filtration is an option for tough Wastewater Streams where until now engineers have had to settle for Flocculation, Evaporation, Centrifugation, or Sedimentation.

V-SEP® is smaller, faster and more economical than old fashioned separation methods. From molecular to micron sized separations, V-SEP® works!

Call New Logic today to discuss a trial run on your material.



The V-SEP Series 1 system can process from 5 to 5,000 gallons per minute in a single pass.

The exercise of reviewing an inventory of relevant hazards and targeting appropriate response actions toward key risk factors constitutes risk management.

cal releases to the environment. Although on the surface these risk-based approaches appear to be highly complex and difficult to perform, all of the various risk-based regulatory programs are based on relatively simple principles. Computer software packages help make the calculation of risk and appropriate cleanup standards easier and more straightforward. At sites where excess risk is predicted to occur, risk-based management approaches allow more flexibility in response actions by allowing containment and institutional controls in addition to standard removal and treatment alternatives. **EP**

John Connor, PE, and Charles Newell, PhD, PE, are president and vice president of Groundwater Services, Inc., Houston. Both are ASTM certified nationwide risk-based corrective action trainers.

For more information, circle 100 on card.



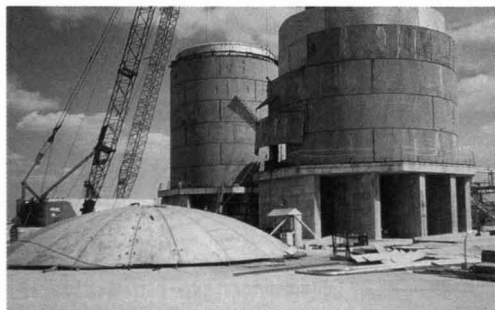
NEW LOGIC INTERNATIONAL

1295 67th Street, Emeryville, CA 94608 Tel: (510) 655-7305 x388
Fax (510) 655-7307 E-Mail: info@vsep.com web:http://www.vsep.com

Providing Answers to Industrial Storage Systems Needs

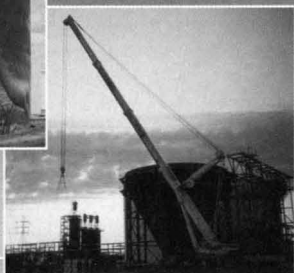
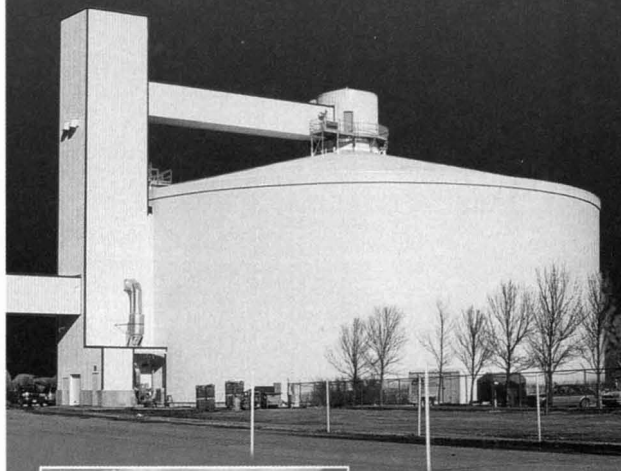
ITEQ's **Field Erect Division** is a full range designer, fabricator and field erector of steel structures for the storage of petrochemical products, water, waste-water, wine, agricultural products, chemicals, and a variety of gases, including methane and nitrogen.

As innovator in materials, equipment and design methods, ITEQ has set the standards in field construction. With over 200 years of combined experience and technical expertise in steel fabrication and corrosion protection, ITEQ's experienced staff of engineers and designers can provide the mechanical design to meet your specifications.



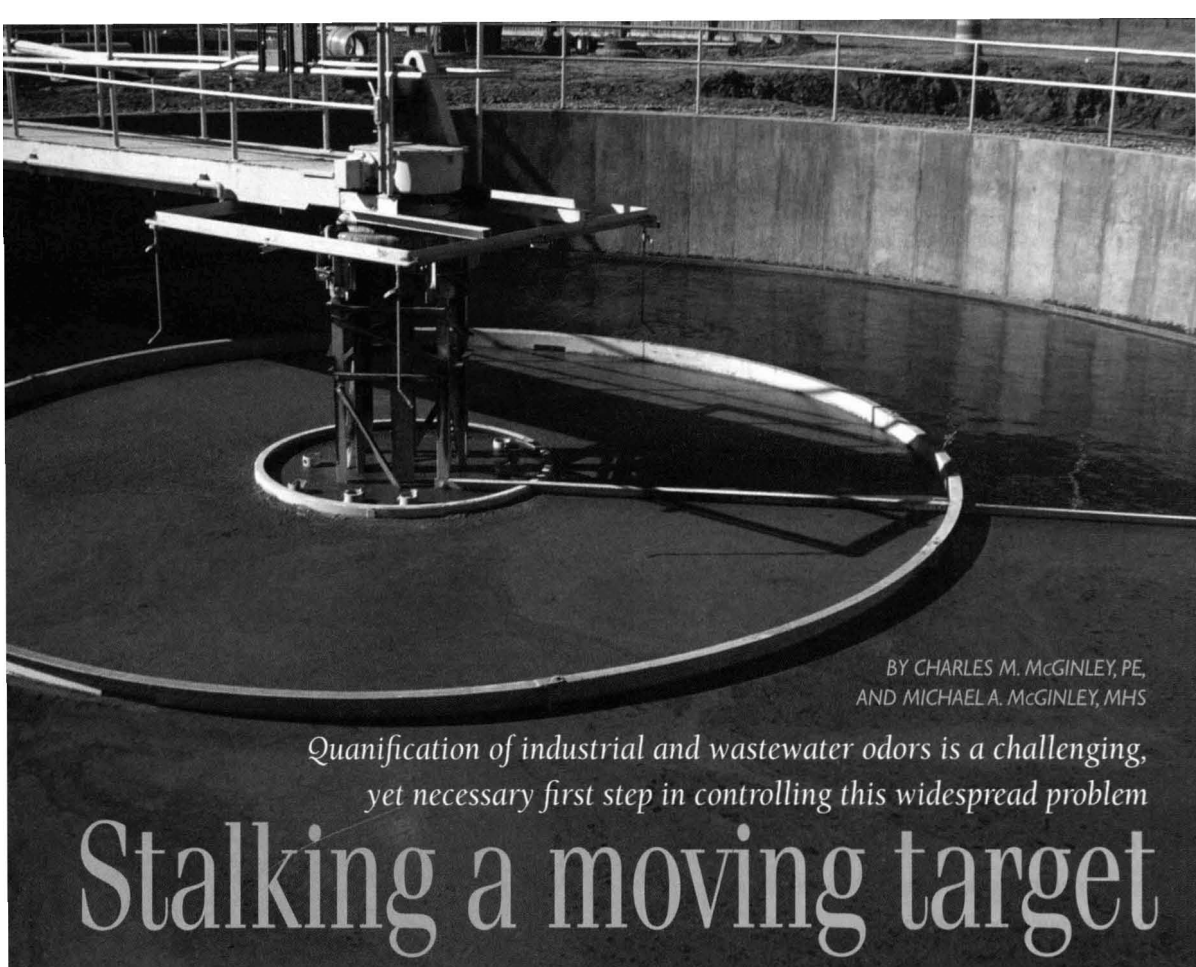
The Field Erect Division product line has a full range of storage tanks, including API-650, 12F, and 620 tanks, cryogenics, water storage, process tanks, waste and environmental products, stacks, bins and silos. We also offer full repair and retrofit services.

The Field Erect Division is part of the **ITEQ Storage Systems Group**, the leader in engineering, fabrication, construction and maintenance of steel structures for a variety of industries around the world.



ITEQ
 STORAGE SYSTEMS
 FIELD ERECT DIVISION

4422 FM 1960 W., Suite 350
 Houston, Texas 77068
 Tel: 281/893-9150
 Fax: 281/893-6014



BY CHARLES M. MCGINLEY, PE,
AND MICHAEL A. MCGINLEY, MHS

*Quantification of industrial and wastewater odors is a challenging,
yet necessary first step in controlling this widespread problem*

Stalking a moving target

With today's increasing levels of development, odor nuisance has become a major environmental issue in communities. Citizen complaints about odors have created a chain reaction through all levels of government as officials search for a sufficient odor regulation or ordinance that will effectively but fairly satisfy the community and industry. The question is whether odors can be quantified for regulatory and operational purposes.

Elusive emission sources

Communities and regulators readily know that tracking down the cause of objectional odors may be difficult because industrial operations yield odorous emissions in varying degrees from many potential sources that may include trucks, process equipment, fugitive sources, wastewater collection and treatment systems, associated activities and adjacent activities and businesses. Odors vary considerably in the following ways:

- Emission type, such as surface or point source;
- Emission rate as odor units per second;

- Odor strength, which is the concentration and intensity;
- Odor persistence, or the dose-response relationship;
- Odor character, such as descriptors and Hedonic Tone, which is one's personal like or dislike of an odor;
- Frequency of occurrence—random or repeating;
- Duration of emission, as in an episode or activity related; and
- Circumstances, such as a temporary condition, emergency release or construction.

Why quantify odors?

The effort to quantify odors may be required for the following:

- Compliance monitoring and compliance assurance;
- Determination of compliance for permit renewal;
- Determination of status using base line data for expansion planning;
- Determination of specific odor sources based upon investigation of complaints;
- Verification of complaints after notice of violation;
- Monitoring daily operations and man-

agement performance evaluation;

- Comparison of operating practices while evaluating alternatives;
- Monitoring specific events or episodes—defensible credible evidence;
- Determination of an odor control efficacy based upon scientific testing;
- Determination of an odor control system cost effectiveness and cost minimization;
- Comparison of odor control methods and cost accountability; and
- Verification of odor dispersion modeling or model calibration.

Each of these purposes dictates a need for dependable and reproducible methods and practices for odor quantification. The trend in the United States and internationally is toward an acknowledgment that odor is a legitimate air pollutant and that it can be controlled. Therefore, regulators and operators of industrial facilities are faced with the practical needs for odor quantification, whether the purpose is solely for complaint investigation, public relations, permit renewal or facility survival.

Site-specific conditions often place significant limitations on the ability of regu-



The Ultimate in ODOR Containment

The Structural-Fabric Cover



■ TOTAL ODOR CONTAINMENT

- Heat-Sealed Seams
- Sealed Cover/Tank Interfaces
- Fully Gasketed Access Doors
- Leak-Tight Panel Interfaces

■ MINIMUM EMISSION CONTROL COSTS

- Low Profile
- Integrates With or Under Catwalks

■ LIMITED OPERATIONAL IMPACT

- Large, Lightweight Access Doors
- Integrated Rigid Walkways
- Open Catwalks & Walkways
- Large, Removable Panels

■ DURABILITY & LONG LIFE

- Snow Loads in Excess of 60 psf
- Wind Speeds up to 155 mph
- Localized Live Loads of 500 psf



ILC DOVER INC

PROTECTING MAN & HIS ENVIRONMENT
One Moonwalker Rd., Frederica, DE 19946-2080
(800)631-9567 • (302)335-1320 fax
www.ilcdover.com/vg/vg.htm
e-mail: vginfo@ilcdover.usa.com
patent pending • made in USA

ISO 9001 CERTIFIED

lators and/or operators to implement a program of odor quantification. Local terrain and local meteorology are common constraints that challenge method development and sometimes limit the choices of odor quantification practices.

Odor protocols

Ten methods or protocols are commonly used by facility operators and regulators. The following protocols are presented in brief exemplary form as a guide.

Point source sampling: A facility may include buildings or processes that have a specific point emission source—stack, roof exhaust or building side vent. The sampling of the potentially odorous point sources involves the collection of the air from the point source in a Tedlar gas sample bag using a vacuum chamber, sometimes called a sampling lung. The odorous air sample is express shipped to an odor laboratory for evaluation of the odor parameters, such as odor concentration and descriptors, using

odors throughout the day. Monitoring on site can also involve odor observations from selected predetermined locations. Sample locations might be at and around the building and the property line.

Complaint response: The use of odor complaint hot lines is a common method used by industry and communities. A hot line system provides citizens with direct access to register a complaint and other relevant information. A complaint response plan, with designated on-call inspectors, produces opportunities for observing odor episodes and for tracking odors to the contributing sources.

Random monitoring: A frequently used method for odor monitoring is the random or unannounced inspection approach. The random monitoring method leads to a compilation of data that can be correlated with meteorological information and on-site activities. Regulators often find that random monitoring is the only cost-effective method available for compliance determination.

keeping, that represents real conditions in the residential community. The citizens recruited would be trained to measure odors using an intensity scale and to assign standard odor descriptors. The citizen monitors can assist in determining prevalent times that odors occur and prevalent weather conditions of odor episodes. Citizen monitors also help in understanding the odor intensity level at which an odor first becomes a nuisance.

Citizen advisory panel: Occasionally a citizen "jury" is impaneled to evaluate odors associated with a facility. A typical citizen advisory panel would be gathered to observe odors at specific locations and asked to respond to the following question with a "yes" or "no": In your opinion, do the odors witnessed at this location on this day and at this time have the intensity and character which would interfere with the normal conduct of business or cause material, physical discomfort to a person?

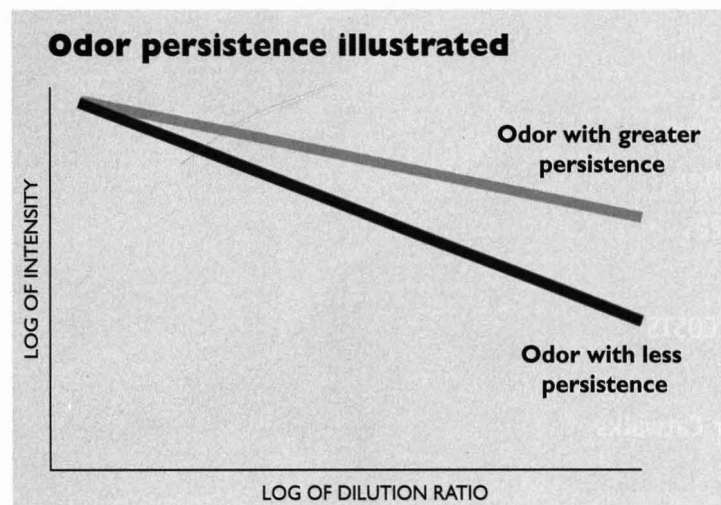
Intensive odor survey: An in-depth evaluation of on-site odor generation and off-site odor impact might be needed for a facility in preparation for a permit review or facility expansion. Extensive data collection of odors, related meteorological conditions and process operations will identify sources and operations that cause odors and ones that do not cause odors. All potential odor sources can be ranked and their relative odor contributions determined. Trials of odor control methods also may require an intensive period of data collection using odor monitoring practices.

Plume profiling: Odor dispersion monitoring can be supplemented with odor plume profiling. Several inspectors placed cross wind and down wind from the odor source can be assigned to measure odor intensity. Multiple plume profiles, during differing wind conditions, can be used to calibrate a dispersion model or verify model predictions.

Measuring odor parameters

The five standard practices directly applicable for quantification of odors are: characterization by descriptors, word scale odor intensity, suprathreshold odor intensity, odor threshold concentration and odor persistence.

The character of an odor is reported by an observer using standard odor descriptors. Numerous standard odor descriptor lists are available to use as referencing nomenclature. One standard published by the International Association on Water Pollution Research and Control (IAWPRC) is a flavor wheel for natural waters. A standard list of odor descriptors provides odor inspectors, monitors, operators and citi-



standard American Society for Testing and Materials (ASTM) practices.

Surface sampling: A facility may contain a number of surfaces that have the potential to emit odorous gases, such as wastewater treatment lagoons. The collection of odors from surfaces requires the use of a device called a flux hood. A simple flux hood is a bowl inverted on to the surface that is to be sampled. Odor-free air is supplied to the flux hood during sampling from the flux hood. Several methods of surface sampling have been used by investigators and the choice will be dictated by the site specific conditions and the data requirement needs.

On-site monitoring: Operators have the unique ability in the facility to monitor

Scheduled monitoring: Well-planned scheduled monitoring can be limited to a daily drive around the facility site or a daily visit to several predetermined monitoring locations. The data from scheduled monitoring can be used to correlate the many parameters that potentially influence odor episodes. Meteorological conditions and on-site operating activities need to be recorded during the monitoring. The use of a versatile database will facilitate the analysis of the data.

Citizen monitoring: The implementation of citizen monitoring can be part of an interactive community outreach program for an industry. The primary function of citizen monitoring is to obtain information, through accurate record

zens with a common vocabulary for evaluation, reporting, comparing, contrasting and communicating.

Odor intensity is a measure of the relative strength of an odor above the threshold. Odor intensity can be assigned a word descriptor or a number on a 5 or 10 scale. A common word scale is:

- 0 No odor
- 1 Very faint
- 2 Faint
- 3 Noticeable
- 4 Strong
- 5 Very strong

Intensity word scales are also used with only end point word descriptors. The citizen odor monitor typically finds the word intensity scale easy to understand and use.

Odor intensity quantification can be accomplished using an odor intensity referencing scale (OIRS). Odor intensity referencing compares the odor in the ambient air to the odor intensity of a series of concentrations of a reference odorant, such as n-butanol. The inspector, investigator, monitor or operator observes the odor in the ambient air and compares it to the OIRS. The person making the observation must use a carbon filtered mask to refresh their olfactory sense between sniffing observations. Without the use of a carbon-filtered mask the observer's olfactory sense would become fatigued or would adapt to the odors in the surrounding ambient air. Using the OIRS, the intensity is expressed in parts per million of n-butanol.

The odor concentration is a number derived from a laboratory dilution of a sample odor from a Tedlar sample bag. Dilution of the odor is the physical process that occurs in the atmosphere down wind of the odor generating source. The dilution ratio is an estimate of the number of dilutions needed to make the odor non-detectable. Odor panelists in the laboratory observe the sample using an instrument called an olfactometer. The testing procedure produces threshold values that are called detection threshold and recognition threshold.

In addition to the determination of odor thresholds, an odor laboratory can conduct evaluations for the following odor parameters: intensity, character descriptors, Hedonic Tone and persistency.

Persistency is a term used in conjunction with intensity. The perceived intensity of an odor will change in relation to its concentration. However, the rate of change in intensity verses concentration is not the same for all odors. This rate of change is termed the persistency of the odor.


The persistency of an odor can be measured in an odor laboratory as a dose-

response function. The dose-response function is determined from the intensity of an odor at full strength and at several dilution levels above the threshold level. The plotted values as logarithms of the intensity and dilution ratios make up the dose-response function. As illustrated in Figure 1, the odor with the flatter slope would have a greater persistency, or hang time, in the ambient air.

What, when, where ...

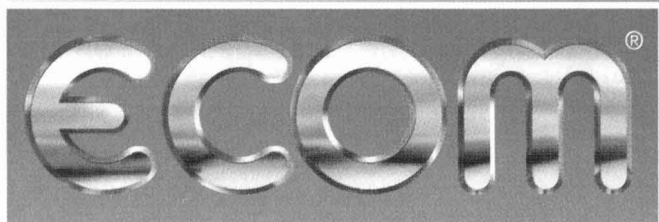
Odor data collection and analysis address four basic questions:

- What are the odors?
- When are the odors?
- Where are the odors?
- What does or does not cause the odors?

Industries have the opportunity to embrace standard protocols and practices of odor quantification for purposes of self improvement, survival and growth. Proactive odor management strategies with ongoing monitoring and aggressive odor control will provide assurances of favorable public acceptance, regulatory compliance and informed management decision making. 

Charles M. McGinley, PE, is technical director of St. Croix Sensory Inc., Stillwater, Minn., and Michael A. McGinley, MHS, is an engineer/industrial hygienist, at McGinley Associates, PA, Stillwater, Minn.

For more information, circle 102 on card.



The Leader in Portable Emission Analyzers



- O₂, CO, NO, NO₂, SO₂, CxHy measurements
- Easy to Use
- Reliable Accurate
- Built for tough environments
- Optional Sample Conditioning
- Meets State & Federal Regulations

ECOM America offers a wide range of instruments for the measurement of emissions from Boiler, Burner and Engine Applications.

Call for Free Literature or a Demonstration Today!

ECOM America Ltd.

3075 Breckinridge Blvd. #420 • Duluth, GA 30096

Phone (770) 806-0220 • Fax (770) 806-0120

Visit our Web Site at www.ecomusa.com

By Ingrid Truemper

The politics of protection

Senatorial candidates in three high-profile races speak out on environmental issues

Environmental issues will play a factor in at least 10 of the 34 U.S. Senate races occurring in 1998, according to an analysis by the *National Journal's Greenwire*, a nonpartisan environmental news daily. Three of the races, in California, Wisconsin and New York, involve important environmental topics.

In California, incumbent U.S. Sen. Barbara Boxer (D) and State Treasurer Matt Fong (R) will battle it out in what is likely to be a close, high-profile race. Barbara Boxer is one of 18 senators in the 105th Congress to receive a score of 100 percent from the League of Conservation Voters (LCV), a bipartisan watchdog organization dedicated to educating citizens about the environmental voting records of members of Congress (see [Online resources](#)).

U.S. Sen. Russell Feingold (D) is running against U.S. Rep. Mark Neumann (R) in Wisconsin. Feingold has also garnered a 100 percent rating from the LCV, and he is known for his support of legislation on pollution prevention and Great Lakes protection as a state senator. Neumann was targeted by environmentalists during his 1996 House re-election campaign, and his environmental record is expected to be raised again. His pledge to "wage war" against environmental protection programs, along with a voting record that shows him voting for clean water and clean air initiatives only 29 percent of the time, has landed him on the "Dirty Dozen" roster put together each year by the LCV.



In New York, U.S. Sen. Alfonse D'Amato (R) faces leading Democratic candidate Geraldine Ferraro, a former U.S. representative and vice presidential nominee. In 1997, D'Amato received a 29 percent rating from the LCV, the lowest number of any senator in the Northeast, Republican or Democrat. This rating nevertheless represented an enormous improvement over previous years—in 1995 and 1996 he received scores of seven and zero. However, D'Amato's attempt to brush up his environmental image in the last year has been criticized by Ferraro as a re-election maneuver.

Environmental Protection asked each candidate to provide his or her comments on two environmental issues vital to his or her home state. Where a candidate has declined to respond, previously published statements of his position on the relevant issues are included.

California

Sen. Barbara Boxer (D)

Water scarcity: Our challenge is to make sure that we have an

adequate water supply for future economic growth and agricultural requirements while ensuring that future generations can enjoy clean rivers and streams and fish and wildlife.

The Calfed Bay-Delta Restoration Program brings together farmers, environmental advocates and urban water consumers to ensure a clean and reliable water supply based on sound science. As a member of the Environment and Public Works Committee and Appropriations Committee, I have won mil-

We made **SCADA** simple

Control Microsystems has what you need for water and wastewater SCADA. Our TeleSAFE and SCADAPack PLC/RTUs are famous for their durability, ease of use, and low cost. Our operator workstation software is renowned for its simplicity and high performance. And almost two decades of SCADA experience means that Control Microsystems has the know-how and track record to make your SCADA system work.

Your new SCADA system can be easily assembled with a personal computer in the control room, and SCADAPack

PLCs in the treatment plant, pumping stations, valve chambers and well heads. Your operators will be able to view pressures and flow rates throughout the system. They'll be able to change setpoints, open and close valves, start and stop pumps and ensure your system is working to peak potential.

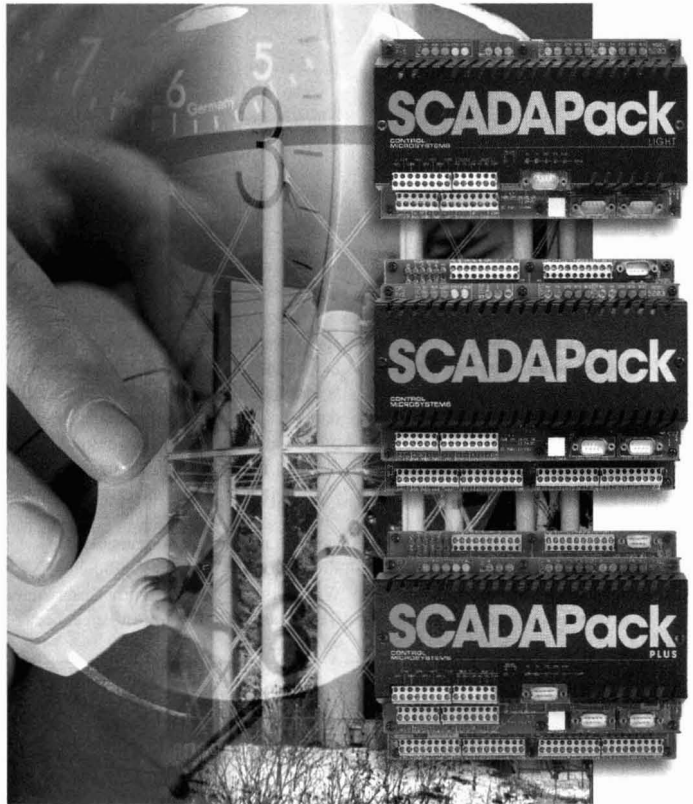
Best of all, your new SCADA system won't be 'rocket science'. It'll be well within your capability to support, expand and improve upon. Our training courses guarantee it.

For more information on how Control Microsystems can help you implement a new SCADA system, please call our toll-free number shown below, or contact us through our web-site.

Sales 1-888 267-2232
www.controlmicrosystems.com

**CONTROL
MICROSYSTEMS**
SCADA products...
for the distance

Canada & International: 28 Steacie Drive, Kanata, Ontario, Canada K2K 2A9 ■ Telephone: 613.591.1943 ■ Fax: 613.591.1022
USA: 200 Southern Star, Slidell, LA 70458 ■ Fax: (504) 643-5450 ■ Phone (504) 643-1777



lions of dollars in federal funding for the Calfed program.

I support legislation to modify Folsom Dam and strengthen levees along the lower American River to provide effective flood control. I do not support an Auburn



Sen. Barbara Boxer

Dam, based on safety, cost and environmental concerns.

Air quality: Clean air is necessary for economic growth and a healthy quality of life. In 1997, I supported the president's decision to back

EPA's tougher clean air standards. The new standards toughen emission limits on ozone and particulate matter and will help reduce respiratory problems that greatly affect children and other vulnerable populations.

I have strongly supported research and development of clean fuel vehicles. I successfully fought to repeal the luxury tax on electric cars and to increase tax incentives to use liquefied natural gas. I won federal funding for electric vehicles at military installations and for local government alternative fuel fleets.

State Treasurer Matt Fong (R)

(Fong declined to comment on the above issues. The following are excerpts from a May 1998 speech.)

Water scarcity: There is one simple truth

to be faced: California will be chronically short of water by the year 2010 if steps are not taken to improve both our storage and delivery systems. The two major components, the Bay-Delta and Colorado River delivery systems, are broken and must be fixed to meet our state's future needs.

It is high time that someone other than Barbara Boxer ... speak for California on water and environmental issues in Washington. Common sense solutions can be found to balance the needs of the environment, cities and agriculture. Stewardship is too important to delegate to Washington bureaucrats. We must protect our environment and at the same time refrain from excessive regulation of people and jobs.

We need more water storage capacity, both on-stream and off-stream, and there is no time to lose, considering how much time it takes to plan and build a new facility. For on-stream storage, we should build the multipurpose Auburn Dam—for flood control, irrigation and recreation—and we should modify or replace the Shasta Dam, which is now nearly 50 years old. Off-stream, the Los Angeles Metropolitan Water District and the Contra Costa Water District are building large off-stream reservoirs, but more are needed.

Water is clearly our most important commodity—but it is also much more. Water is an essential property right that helps to define us as a free people.

Wisconsin

Sen. Russell Feingold (D)

Nuclear waste disposal: I recently

opposed a bill that did not go far enough to ensure safe and secure shipments of nuclear materials from sites in Wisconsin to storage outside of the state. I would like to see nuclear waste moved to a permanent site outside our state, but I also want to ensure that waste is not needlessly transported around in search of a final disposal site. When waste leaves Wisconsin, it should do so permanently.

I will not accept legislation that is a quick fix and does not ensure that nuclear waste



Sen. Russell Feingold

disposal is safe, secure and fiscally responsible.

Wetlands protection: I support responsible, common sense protection of wetlands. Wetlands prevent flooding by absorbing runoff from rainwater

before it reaches rivers and streams, sustain the sport fishing industry, filter pollutants out of the water before they reach our drinking water and support several endangered species in Wisconsin, as well as the bald eagle. That is why I fought provisions supported by my opponent in the 1996 Clean Water Act that threatened the classification and protection of over 60 percent of Wisconsin wetlands.

(Feingold's opponent, Rep. Mark Neumann (R), declined to comment on the above issues.)

New York

Sen. Alfonse D'Amato (R)

(D'Amato declined to respond to specific issues. The following is the senator's official position on the environment.)

When the Cuyahoga River in Cleveland, Ohio, literally caught fire nearly 30 years ago, many of us finally woke up to the



Sen. Alfonse D'Amato

realities of what pollution was doing to our planet. Since then, great strides have been made in the fight to combat pollution. Landmark pieces of legislation have been passed, including the Clean Air Act

Amendments, the Safe Drinking Water Act, the Clean Water Act and Superfund.

Through the implementation of these laws, Americans now enjoy a cleaner environment and have become more conscious of how their actions affect the earth. Recycling, which was almost unheard-of 20

Online resources

League of Conservation Voters (LCV) <http://www.lcv.org>

The LCV has published a National Environmental Scorecard every Congress since 1970, the year it was founded by leaders of the environmental movement following the first Earth Day. Its mission is "to protect the environment through political action by holding members of Congress accountable for their environmental votes and helping to elect pro-conservation candidates to Congress."

According to the LCV, the annual Scorecard represents the consensus of experts from 27 respected environmental groups who selected the key votes on which members of Congress should be graded. The LCV scores votes on what these experts consider to be the most important issues of environmental health and safety protections, resource conservation and spending for environmental programs.

U.S. Sen. Barbara Boxer (D-Calif.) <http://www.boxer98.org>

State Treasurer Matthew Fong (R-Calif.) <http://www.fong98.org>

U.S. Sen. Russell Feingold (D-Wis.) <http://www.feingold98.org>

U.S. Rep. Mark Neumann (R-Wis.) <http://www.neumann98.org>

U.S. Sen. Alfonse D'Amato (R-N.Y.) <http://www.damato.org>

Geraldine Ferraro (D-N.Y.) <http://www.ferraro98.org>

Democratic National Committee <http://www.democrats.org>

Republican National Committee <http://www.rnc.org>

years ago, has become more widely accepted. Restrictions on disposing of hazardous waste are tighter. Factories have dramatically decreased the amount of pollutants released into the atmosphere. All in all, great strides have been taken toward a cleaner planet.

However, there have been recent concerns about Congress living up to its expectations and commitments with respect to protecting our nation's environment.

The American people have overwhelmingly indicated that they do not wish to see the environmental achievements of nearly three decades wiped out. I believe Congress has received that message loud and clear. We have done a lot to protect our environment, but we can still do more. Support for the necessary funding that will allow federal environmental protection programs to continue.

Geraldine Ferraro (D)

Her opponent: The greatest obstacle to solving New York's top environmental problems has been having Al D'Amato as a senator for 18 years—a senator who runs ads calling himself the environmental senator, while receiving a zero percent rating on the


League of Conservation Voters Scorecard in 1996.

D'Amato has spent his career representing corporate polluters, who have poured hundreds of thousands of dollars in his campaign coffers, at the



Geraldine Ferraro

expense of clean air, clean water and the public's right-to-know.

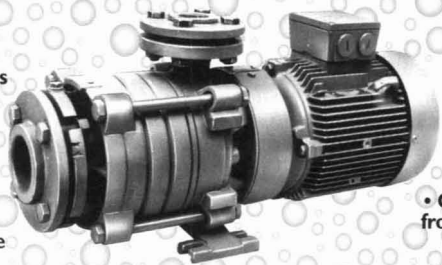
The Hudson River cleanup: I will play a leadership role in cleaning up polychlorinated biphenyls (PCBs) from the Hudson River. The Hudson River is one of the worst PCB pollution sites in the world, having more than a million pounds of the chemicals released from two General Electric factories during a 30-year period, which ended in 1977. Interior Secretary Bruce Babbitt said, "The sickness of the river today is directly traceable to the General Electric Co." I will urge EPA to make a decision on whether G.E. should be required to clean up the Hudson River as part of the Superfund program. I believe that each of us should be a "riverkeeper." 

Ingrid Truemper is an assistant editor of Environmental Protection magazine.

For more information, contact the author at itruemper@cmpu.net

Introducing A New Age In DAF Pump Technology

- Handles Up to 35% Entrained Air and Gas
- Flows to 300 GPM
- Pressures to 400 PSI
- 30 Micron Bubble Size



- Compact Design
- Cast Iron and Stainless Steel
- Guaranteed from 93-100% Solubility

We have taken DAF technology to a new level of performance with the EDUR Multiphase Centrifugal Pumps. The EDUR line is the ideal pump for all your Dissolved Air Flotation applications and liquid-gas enrichment processing. These high efficiency, specialty pumps eliminate the need for compressors, pressure tanks, and extensive controls required in other system designs. EDUR pumps are wear resistant from contaminated media, providing long, reliable operation, and offering excellent media mixing capabilities.

For the latest in DAF pump technology, call one of our factory-trained technical sales engineers at 847-439-9200, or your local EDUR/Shanley distributor.

EDUR

Shanley Pump & Equipment, Inc.
2525 South Clearbrook Drive
Arlington Heights, Illinois 60005
Fax: 847-439-9388

Visit our Website at:
<http://www.shanleypump.com>

Circle 24 on card.

WATER LEVEL LOGGER

- High Accuracy:
0.2% 12-bit resolution

- Reliable & Rugged
fully submersible sensor

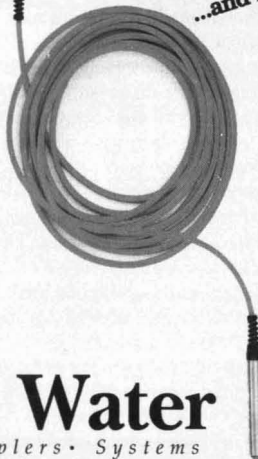
- Records 6000 Readings

- EZ PC Software
spreadsheet format

- \$795
Including 25' Cable



- for:
- Groundwater
- Surface Water
- Stormwater
- Sewers
- ...and more



Global Water

Sensors • Samplers • Systems
11257 Coloma Rd. Gold River, CA 95670 USA
1-800-876-1172 (916) 638-3429 fax (916) 638-3270

Visit our web site at: globalw.com

All industries with wiping towel applications have one basic decision to make: reusable cotton shop towels or disposable wipes? The most important environmental factor to consider is the management of the used absorbents.

Single-use wipes and rags are a waste that is usually sent for costly disposal. Unfortunately, the disposables may also be thrown in the trash, exposing the user to potential liability. Generators of disposables should perform a hazardous waste determination before selecting a proper waste disposal method. However, some generators of disposables have minimized their hazardous waste generation and liability by changing from disposables to reusable shop towels.

The printing, aircraft, automotive, circuit board, coatings and adhesives, furniture and food processing industries use millions of shop towels each day. These shop towels

to be a waste, they are subject to full Resource Conservation and Recovery Act (RCRA) regulation. Most laundries are not permitted to transport, treat, store or dispose of hazardous waste, but many still legally process towels contaminated with listed solvents. The U.S. Environmental Protection Agency's regional offices and each state's environmental regulatory agency provides guidance for handling these towels. These agencies do not require all reusable shop towels to be managed as hazardous waste.

The federal EPA decided to defer any policy making decisions on reusable textiles to the EPA regions and states. EPA has also given the EPA regional offices and states considerable latitude in determining what the local regulatory status of the absorbents should be.

Michael Shapiro, director of EPA's Office of Solid Waste, outlined this policy in a

shop towels containing listed solvents from regulation. The reusable towel exemption applies when the towels do not contain any free liquids as determined by a paint filter liquids test. New Jersey also requires that the towels are managed on-site as hazardous waste until sent off-site for laundering.

In a May 16, 1996, letter to the Uniform and Textile Services Association (UTSA), the state of Colorado informed UTSA that the information contained in a fact sheet is their guidance on the regulatory status of reusable shop towels. The fact sheet states, "Reusable absorbent materials cleaned by such contractual/closed loop cleaning services would not have to be managed as hazardous waste" Colorado added that the exemption does not apply to absorbents "saturated with free liquid."

Companies that change from a disposable to a reusable shop towel service have realized other benefits from the reusable

Once is **NOT** enough

By D.J. Smith, MS

Business owners can reduce potential liability by switching from disposable wipes to reusable shop towels

come in contact with all kinds of chemicals including inks, cleaning solvents, furniture lacquers, paint thinners, mineral oils and aqueous cutting fluids. Many of these chemicals, due to their chemical characteristics, present difficult challenges, especially where waste disposal is considered.

The reusable regulatory framework

Quality and cost issues aside, different environmental regulatory frameworks guide the management of the two absorbent programs, especially where solvents that are listed as hazardous wastes are involved. The regulatory differences also exist when the reusable shop towels or disposable wipes exhibit one or more characteristics of a hazardous waste after use. It is important to note the differences between the absorbent programs where the reusables or disposables are contaminated with listed or characteristic solvents.

Since disposable towels are considered

February 14, 1994, memorandum to EPA's regional waste management directors. In this memorandum Shapiro writes, "Any determinations or interpretations regarding this diverse and variable waste stream should be made by the regulatory agency [i.e., EPA region or state] implementing the RCRA program for a particular state. This has been our long-standing policy."

Forty-six of 50 states have either exempted or limited the scope of RCRA regulation where reusable shop towels are contaminated with listed or characteristically hazardous solvent(s). However, all states and EPA Regions granting exemptions require that specific reusable shop towels management criteria be followed. These criteria vary from state to state. Two rules usually apply. First, the laundry must be in compliance with its wastewater discharge permit. Second, the reusable shop towels must not contain any free liquids.

For example, New Jersey, in an August 3, 1994, position paper, exempts the soiled

shop towel guidance. A furniture manufacturing company in New York state won the Governor's Award for Pollution Prevention. The company changed its wipers from hazardous waste disposables to reusable shop towels. The guidance provided in New York state's January 2, 1992, Technical and Administrative Guidance Memorandum (TAGM) paved the way for the change. Besides the waste management benefits of the service, the reusable towel also exceeded the tough performance requirements for the company's finishing applications.

RCRA and CERCLA

Customer liability problems can arise from many federal environmental laws. Of particular concern are RCRA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund.

We have already established that the EPA regions and state environmental agen-

cies have exempted the laundering of shop towels from full RCRA regulation. Also, disposable wipes and rags are solid waste and some of that solid waste is a hazardous waste. The disposable wipe and rag user sends the waste to a disposal facility. If the disposables are a hazardous waste, then a hazardous waste manifest will accompany the shipment to the disposal facility. The hazardous waste manifest clearly establishes the customer as a hazardous waste generator.

Now, consider a laundry that manages a reusable shop towel program. Laundries separate the contaminants from the reusable shop towels. Waste generated by the separation process is a solid waste and, sometimes, a hazardous waste. If the waste is a hazardous waste, then a hazardous waste manifest will accompany the shipment to the disposal facility. However, in this case, the laundry is clearly identified as the hazardous waste generator.

Therefore, a customer using the shop towel program has reduced its potential RCRA liability. A layer of protection—the laundry—has been added in the waste ownership chain. In addition, the customer has not been identified as a generator of hazardous waste.

CERCLA has some extremely broad liability provisions. A customer faces potential liability under CERCLA by using either reusable shop towels or disposable wipes. This is because of the chemicals that get on the absorbent products. One way a customer can limit its potential CERCLA liability is to reduce the volume of waste sent to off-site disposal facilities.

Laundries separate the chemical contaminants from the reusable shop towels. Therefore, only the separated waste is sent for disposal. The shop towels are cleaned and returned to the customer. A disposable wiper program will generate a substantially larger volume of waste when compared with a reusable shop towel program used in equivalent wiping applications. Typically more than one disposable wiper is used when compared with the same application using a shop towel.

CAA

No differences in air emissions exist between reusables and disposables at the customer's facility. Both products are used in the same way. There have not been any documented instances of a customer changing to a less volatile cleaning solvent because a switch was made from one absorbent program to the other. Liability

Continued on page 46

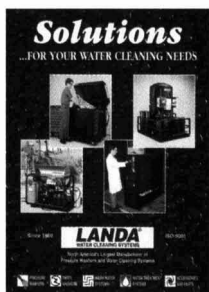


PHOTOS COURTESY OF CORNELL TEXTILE SERVICES

Product literature

This department contains a description of products from a variety of leading companies.

To receive FREE literature, simply circle the numbers on the reader service card that correspond to the number beneath the products that interest you.



Circle 30 on card.

Industrial wastewater treatment systems

Landa offers a full range of high-quality solutions, including: the world's largest line of pressure washers; automatic parts washers featuring a water-propelled spray bar; wash-water recycling systems; and a variety of industrial treatment systems, such as evaporation, clay and bioremediation. Contact us for a free brochure.

Landa Water Cleaning Systems
4275 N.W. Pacific Rim Blvd.
Camas, Washington
Phone: (800) 547-8672, (360) 833-9100
Fax: (800) 535-9164, (360) 833-9200
E-mail: landa@landa-inc.com
Web site: www.landa-inc.com



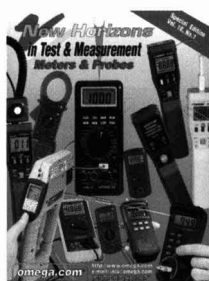
Nordberg – Making you more profitable...

Whether you're recycling, excavating or sizing aggregates, a Nordberg mobile screening plant can turn the materials on your job site into profits.

Experience the Nordberg Difference – where quality, performance and superior customer service separate Nordberg mobile screening plants from all the rest. Call us for more information and your free copy of the Nordberg Screening video.

Nordberg
Phone: (800) 992-0145

Circle 31 on card.

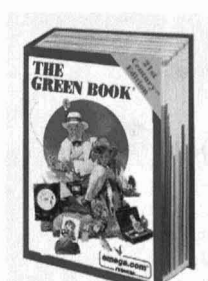


Circle 28 on card.

New from OMEGA

New Horizons in Test & Measurement: Meter and Probes is the newest literature from OMEGA Engineering Inc. Inside you will find the latest information on OMEGA's newest thermometers, multimeters, pyrometers and thermocouple probes and connectors. In addition, there is information about our legendary handbook series, including the *Transactions* series.

OMEGA Engineering Inc.
One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047
Phone: (203) 359-1660
Fax: (293) 359-7700
E-mail: info@omega.com
Web site: www.omega.com



Circle 32 on card.

The Green Book®

The Green Book® has over 200 full-color pages featuring hundreds of devices for lab and industrial monitoring and control of various environmental parameters.

Including:

- Water/wastewater sampling
- Air flow and sampling
- Gas monitors and alarms
- Test kits
- Leak detectors
- pH and conductivity devices

OMEGA Engineering Inc.
Phone: (203) 359-1660
Fax: (293) 359-7700
E-mail: info@omega.com
Web site: www.omega.com

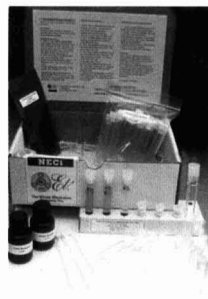


Circle 29 on card.

Belt skimmers

Belt skimmers are the most cost-effective way to remove oil and grease from water. Benefit from over 30 years experience with the world's leading industrial oil skimmers. Versatile, rugged belt skimmers remove oil/grease from wastewater for recycle or reuse. Wide range available with removal rates from 1-200 gph. Portable units for coolant tanks and parts washers; well skimmers and complete systems for groundwater remediation; heavy-duty units solve serious oil contamination problems.

Abanaki Corp.
(800) 358-7546, Fax: (440) 543-7404
Web site: <http://www.abanaki.com>

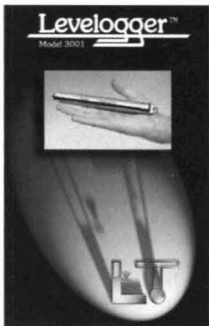


Circle 33 on card.

Something new in nitrate analysis

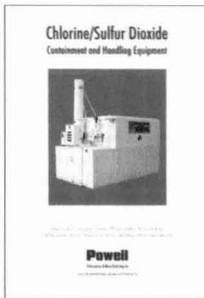
Enzyme-based nitrate testing is accurate, economical, and environmentally benign. NECi's Lab kits provide quantitative data. NECi's Field Kits require no equipment. Interference-free in virtually any sample - soil, wastewater, groundwater, etc. Whatever your application, we've got a Nitrate Test Kit that's right for you.

NECi, The Nitrate Elimination Co., Inc.
334 Hecla St., Lake Linden, MI 49945
Toll-free: (888) NITRATE
Web site: www.nitrate.com
Fax: (906) 296-8003
Phone: (906) 296-1115



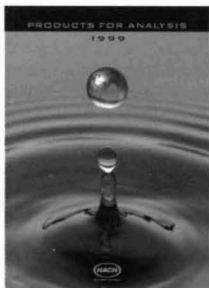
Circle 34 on card.

Records water level and temp!
 Solinst LT Levelogger™ includes a factory sealed temperature sensor, a pressure transducer, datalogger and power source all in one 1/2" dia. x 9" probe. Automatically records level and temperature. Level measurements are temperature compensated for increases accuracy. Tamper restraint; no regular servicing; 8 to 10 year battery life; Windows 95 or DOS; recording intervals from 0.5 sec to 99 hours; 2 x 24,000 measurements per session.
 Solinst Canada Ltd., 35 Todd Road, Georgetown, Ontario L7G4R8
 Phone: (800) 661-2023, (905) 873-2255
 Fax: (905) 873-1992
 E-mail: instruments@solinst.com
 Web site: www.solinst.com



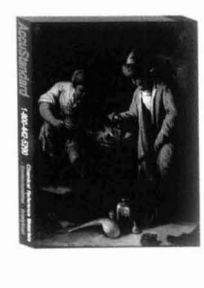
Circle 38 on card.

Chlorine scrubbers
 Chlorine containment and handling equipment including the POWELL Sentry 2000 Chlorine/Sulfur Dioxide Scrubber System, the most advanced scrubber available today. The Sentry 2000 uses patented horizontal packed bed technology and is the only scrubber tested at full scale 3,000 ACFM air flow rate with 2,000 pound releases of chlorine and sulfur dioxide.
 Powell Fabrication and Manufacturing Inc.
 740 East Monroe Road
 St. Louis, MI 48880
 Phone: (517) 681-2158
 Fax: (517) 681-5013
 Web site: www.powellfab.com
 E-mail: info@powellfab.com



Circle 35 on card.

Products for Analysis 1999 introduces new testing platforms
 This year, Hach offers some exciting new platforms for portable testing, which are showcased in the latest catalog, *Products for Analysis 1999*. AccuVer™ Test Kits, available in 10 key parameters, utilize an unbreakable color comparator for trouble-free and affordable on-site testing. In addition, Hach's new Water Quality Test Strip offers an inexpensive means of performing semi-quantitative spot checks. Just dip the strip, wait for color to develop and compare against the chart on the container.
 Hach Company
 Phone: (800) 227-4224, request literature number 3228.



Circle 39 on card.

1998 Organic Chemical Reference Materials Catalog
 The 1998 Organic catalog has been redesigned for ease of use, provides significant technical information and includes new analytical standards for use in environmental, petrochemical, industrial or research applications. Copies of the 1998 Organic Standards Catalog are available upon request.
 AccuStandard Inc.
 Marketing/Sales Department
 25 Science Park, Box 1
 New Haven, CT 06511
 Phone: (800) 442-5290
 Fax: (203) 786-5287
 E-mail: usa@accustandard.com



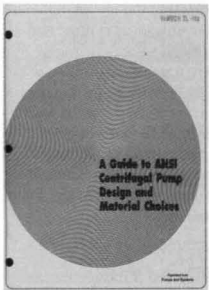
Circle 36 on card.

MSDS software
 MSDSFILE™ software organizes and quickly scans MSDSs. It has easy-to-use engines, on-the-fly help and MSDS archiving capabilities. Data tables can be imported directly into ACCESS. SARA Tier II and 313 Fort R listings can be printed. An integrated chemical database of 4,500 chemicals cross references MSDSs to 25 federal and state regulations. Single user and LAN/networks are available for Win 95 and NT.
 HazMat Control Systems, Inc.
 5595 E. 7th St. #654
 Long Beach, CA 90804
 Phone: (562) 597-7994
 Fax: (562) 985-0645;
 E-mail: hazmat@ix.netcom.com
 Website: www.hmcs.net.



Circle 40 on card.

MSDS management and environmental compliance software
 MIRS for Windows offers software modules that can be integrated for environmental and safety compliance. The MIRS MSDS management modules provide expanded MSDS tracking and maintenance options for inbound or outbound MSDSs, text or scanned image format, and inhouse or customer distribution.
 The MIRS environmental compliance modules cover SARA Title II, EPA-approved Form R, OSHA Hazcom, Clean Air Act, Water, Waste and Inventory management.
 AV Systems Inc.
 Phone: (313) 973-3000



Circle 37 on card.

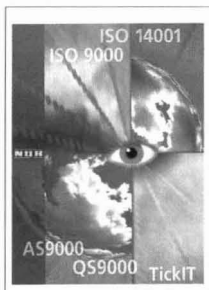
Guide to ANSI Pump Design and Material Choices
 This technical guide compares design variations and material choices available for those specifying, purchasing or using ANSI centrifugal pumps for handling corrosive, abrasive and ultrapure fluids. It directly compares design features, cost factors, maintenance considerations and applications related to physical properties and service characteristics of various metallic, thermoset and thermoplastic materials.
 Vanton Pump & Equipment Corp.
 201 Sweetland Ave., Hillside, NJ 07205
 Phone: (908) 688-4216
 Fax: (908) 686-9314
 E-mail: mkt@vanton.com



Circle 41 on card.

ADD-A-PHASE®
 The ADD-A-PHASE® phase converter, first introduced in 1952, can operate three-phase pump or blower motors from single-phase power when three-phase power is either unavailable or prohibitively expensive to install. Manufactured by RONK Electrical Industries Inc. of Nokomis, IL, this autotransformer-capacitor type converter is very efficient and is the ideal converter for operating automated, constant load applications.
 RONK Electrical Industries Inc.
 P.O. Box 160, Nokomis, IL 62075
 Phone: (800) 221-RONK
 Fax: (217) 563-8336

Product literature



Circle 42 on card.

NQA, USA – ISO 9000 & ISO 14001 registrars

National Quality Assurance, USA has registered 12,000 clients worldwide to ISO 9000, ISO 14001, QS-9000 and AS9000. Clients benefit from having quality and environmental systems audited by NQA, USA's specialized and knowledgeable auditors. Our partnering approach, non-bureaucratic process and innovative techniques enhance clients' management systems while "keeping an eye" on the bottom lines.

Toll-free: (800) 649-5289
Web site: www.nqa-usa.com.



Circle 46 on card.

Introducing Keller's News & Information Service

Keller's News & Information Service provides a timesaving weekly fax of regulatory news. Subscribers can choose from an environmental, workplace safety and/or transportation news focus, to best fit their needs. Each fax contains approximately 10 news briefs and a BONUS PAGE covering general business operational news. Keller's News & Information Service is available with a choice of one regulatory focus area bonus page for \$199, two focus areas plus bonus page for \$249 or three plus bonus page for \$299.

Toll-free: (800) 327-6868

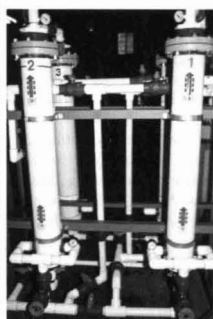


Circle 43 on card.

Intermountain Specialty Gases

Intermountain Specialty Gases, an established manufacturer of calibration gases in disposable cylinders, has a large selection of zeroing and calibration gas standards available. They range from ppm to percentage concentrations. Mixtures include Bump Test Gas™, chlorine, ammonia, sulfur dioxide, hydrogen sulfide, carbon monoxide, isobutylene, hexane, pentane, methane and propane. Accessories are also available.

Intermountain Specialty Gases
520 N. Kings Road, Nampa, ID 83687
Phone: (800) 552-5003
Fax: (208) 466-9143
Web site: www.internetoutlet.net/isg

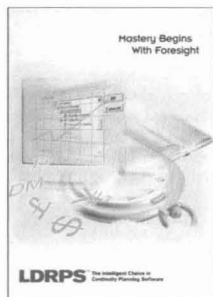


Circle 47 on card.

DYNAPERM®

DYNAPERM® is a filtration system capable of flux rates fifty fold higher than conventional cross flow filtration systems with improved effluent quality. It enables near complete removal of suspended particles down to the micron size. This filtration system utilizes rugged microporous tubes of controlled pore sizes that are chemically and biologically inert. Enhanced performance is due to combining features of cyclone separation, flow interruption and cross-flow filtration.

DYNAFLOW Inc.
Phone: (888) DYNAFLOW
E-mail: info@dynaflo-inc.com
Web site: www.dynaflo-inc.com



Circle 44 on card.

LDRPS™ Free Demonstration Disk: The intelligent choice in continuity planning software

LDRPS is powerful, secure, flexible and easy-to-use business continuity planning software. By automating crisis management, emergency response and business resumption plans, LDRPS gives you access to the information you need when you need it. Call today.

Strohl Systems
500 North Gulph Road
King of Prussia, PA 19406
Phone: (800) 634-2016
Web site: www.strohlsystems.com



Circle 48 on card.

Thermal and catalytic solutions

Whether you need a direct-fired, recuperative or regenerative thermal oxidizer, Smith Environmental Corporation (SEC) can design the system to meet your individual requirements. Destruction of volatile organics, hazardous air pollutants and odors can be achieved either thermally or catalytically. SMITH systems are provided on an equipment-only or turnkey basis and can be designed for tight spaces, high destruction efficiencies and/or corrosive applications.

Smith Environmental Corporation (SEC)
2837 E. Cedar St., Ontario, CA 91761
Phone: (800) 959-5732
Fax: (909) 947-2006



Circle 45 on card.

Floating suction/skimers

- Pump from top levels in tanks of jet fuel—cleanest fuel is at top.
- Pump lighter specific gravity products off top of heavier products.
- Separate petroleum products from water.
- Separate heavy/light chemical solutions.

Sizes from 2 inches to 24 inches, Model 301B shown. Materials: aluminum, stainless steel or carbon steel.

GNV Equipment, LLC
71 East Industry Court
Deer Park, New York 11729
Phone: (516) 667-1010
Fax: (516) 242-3444



Circle 49 on card.

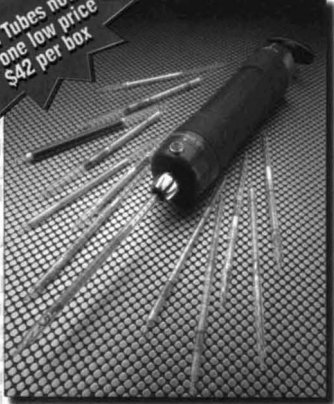
Recycling first

Some consider unwanted compressed gas cylinders to be hazardous waste. At MG Industries, a premier supplier of industrial and specialty gases, we consider these cylinders to be potential assets. Our Cylinder Remediation Program is designed to place unwanted cylinders back into productive service. Contact our Remediation Product Manager for more information.

MG Industries
Earlene Shillingford, Product Manager
Phone: (215) 736-5212
Fax: (215) 736-5237
E-mail: earlene_shillingford@mgind.com

GASTEC™ GAS DETECTION & WATER ANALYSIS TUBES

All Tubes now at one low price \$42 per box



Sulfide Ion Tubes for On-the-Spot Sulfide Analysis in Water Samples



NEW Extra Low Range

- Single-Stroke Operation
- Direct-Reading Tubes
- Ergonomically Designed Pump
- Fail-Safe Handle Lock
- Lifetime Pump Warranty

- Direct Reading / Length of Stain
- Single Step Ease of Use
- Instantaneous Results
- No Expensive Lab Costs
- Works by Capillary Action
- Portable, Field-Proven Reliability
- Fail Safe Operation
- Four Ranges Available

Direct reading detector tubes are available for over 300 airborne gases and vapors

SENSALERT™ GAS MONITORING SYSTEMS

- Detects a Wide Variety of Gases
- Non-Intrusive Calibration
- Auto Sensor Recognition
- User Selectable Alarm Levels
- Easy-to-Read Displays
- Intrinsically Safe
- Password Protected



See us at WEFTEC Booth 4359

SENSIDYNE

Sensidyne, Inc. • 16333 Bay Vista Drive • Clearwater, FL 33760
800-451-9444 • 813-530-3602 • Fax 813-539-0550 • www.sensidyne.com

CAM rule checkup

Examine your facility's air emissions and determine if compliance assurance monitoring and periodic monitoring requirements apply

By Bernard Evans, PE

IN *Environmental Protection's* February issue, *Living with the CE and CAM Rules* discusses the Credible Evidence (CE) rule, *Federal Register*, February 24, 1997; Vol. 62 No. 36; pages 8313 to 8328, and the Compliance Assurance Monitoring (CAM) rule (*Federal Register*, Oct. 22, 1997; Vol. 62 No. 204; pages 54899 to 54947). The article states that these rules require owners and operators of facilities to rethink how their systems should be operated and how their permits need to be written. You should also consider a methodology to conduct a CAM and periodic monitoring assessment of your facility to determine CAM and periodic monitoring applicability. Knowing if and when these requirements will apply provides insight into planning for equipment and resources in your budgeting efforts.

Background on the CAM rule

The CAM rule is a response by the U.S. Environmental Protection Agency to the mandates of the 1990 Clean Air Act Amendments. It is intended to assure air pollution control agencies that properly

designed control measures are installed, that these measures can achieve applicable requirements, and that the controls are operated and maintained in a fashion so that the affected emission units remain in compliance. Emission units covered by the CAM rule will need to develop a plan that will identify performance indicators that provide some reasonable assurance of compliance with emission limits. The CAM plan will specify to regulatory agencies what the operating ranges for these performance parameters will be, the basis of the choice and how compliance will be tracked.

Periodic monitoring is designed to fill in gaps such as monitoring that is required as part of the Title V permit process for state implementation plan (SIP)-approved federally enforceable rules that do not contain sufficient monitoring requirements to assure compliance with emission limits.

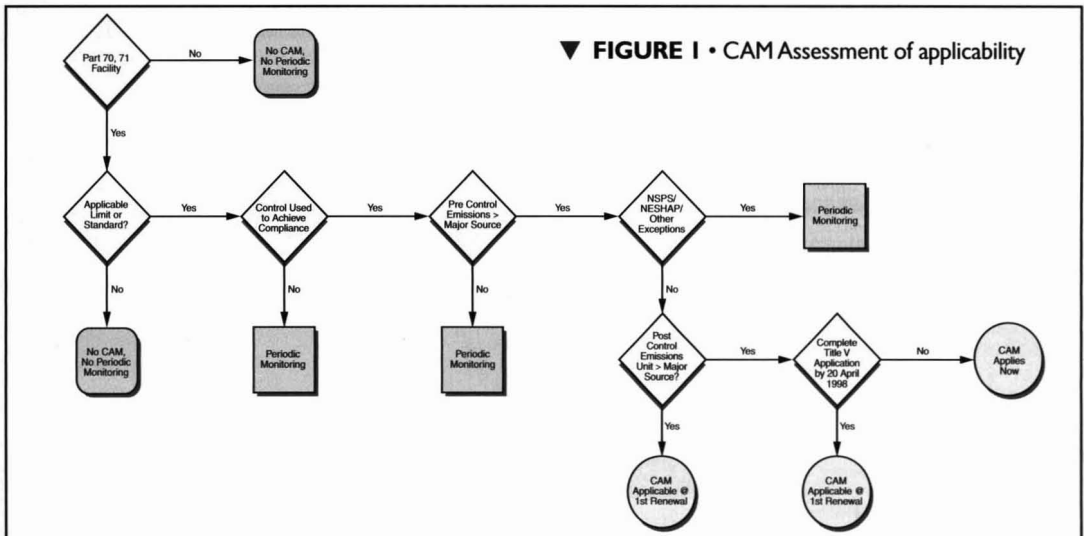
The CAM rule subjects a large number of industrial sources to additional monitoring in a phased in approach. In addition, periodic monitoring may also subject industrial facilities to increased monitoring. To obtain a preliminary indication of

the impact of these two monitoring programs on an industrial facility, a CAM and periodic monitoring assessment is recommended. The purpose of the assessment is to identify those emission units and associated emission species that may be subject to CAM or periodic monitoring and the timing of applicability.

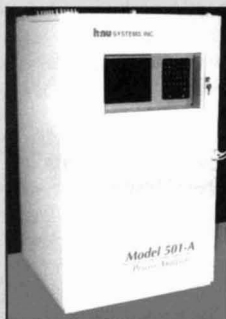
The information may then be used to project additional fiscal expenditures and personnel requirements to address CAM and periodic monitoring regulatory requirements. This way, an environmental manager or professional might use the assessment to proactively determine the need for additional monitoring devices, personnel, maintenance and source testing to comply with the new monitoring programs. To conduct the assessment, you must determine the applicability of these two monitoring requirements to your facility, each emission unit and the associated emission species. The overall process is described in Figure 1.

Permitting applicability

The first step in the applicability assessment procedure is to determine if your



501-A Process GC



- Area (20 pt) to process monitoring—ppb to % gas or liquid streams
- Sampling systems available/turnkey installations
- Detectors include: FID, PID, TCD, FPD, ECD & FUV
- NEMA 4 enclosure, X or Z purged

For more information, circle 113

201 Total VOC Monitor



- Available with PID or FID
- Fast response for ppm to %
- Carbon bed monitoring
- Area monitoring—multipoint available
- Stack gas monitoring—EPA Method 21

For more information, circle 116

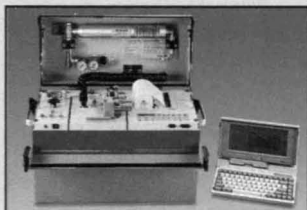
301-A Air Toxics Monitor



- 19" rack, bench or wall mounted automatic GC
- Specific monitor for fence-line to stack monitoring
- ppt to ppm with speciation
- Six detectors available

For more information, circle 117

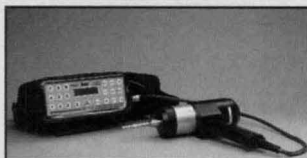
GC 311 Portable GC



- Monitor indoor pollutants, fence-lines, factory floors, industrial plants & stack gases
- ppt (optional concentrator) to ppm levels
- Gas or liquid samples
- Five detectors available

For more information, circle 114

DL-101 VOC Leak Detector



- PID first brought to the industry in 1973 by HNU
- PID based analyzer with auto zero & wide range
- Detect low levels in flanges, fittings and valves
- Datalogging by site—up to 256 site points
- Industrial Hygiene surveys

For more information, circle 115

Applications include:

Hydrocarbons (BTX, 1,3 butadiene, formaldehyde), fixed gases (N₂, O₂, CO, CO₂), sulfur compounds (H₂S, mercaptans), nitrogen compounds (NH₃, amines), chlorinated compounds (SF₆, freons, methylene chloride, tetrachloroethylene, chlorophenols) and inorganics (AsH₃, PH₃)

Need to Monitor VOC's in Air, Water or Process Streams?

Monitor aromatic or chlorinated hydrocarbons, total or speciated, to:

- Measure to sub ppb levels
- Control/contain spills
- Provide the operator with accurate and timely data
- Comply with government regulations and eliminate costly fines
- Control, process or wastewater operations

See us at WEFTEC, Booth #4513
For more information, circle 51

Call HNU

FOR ADDITIONAL INFORMATION:
1-800-724-5600



Model 650 Sparger with FID

1973-1998
TWENTY-FIVE YEARS
PIONEERS IN PHOTOIONIZATION AND
X-RAY FLUORESCENCE

hnu

facility itself is subject to the CAM rule. To be governed by the CAM rule, the facility must be subject to Part 70 or 71 permitting requirements—any facility required to obtain a Title V operating permit under the Clean Air Act as amended.

Now determine if your facility is a major source of emissions. Generally, this means that a facility as a whole has the potential to emit more than 100 tons per year (tpy) of any criteria pollutant, more than 10 tpy of a hazardous air pollutant (HAP) or 25 tpy of any combination of HAPs. These major source thresholds are lower in geographic areas that are classified as not meeting the National Ambient Air Quality Standards for criteria pollutant. For instance, the threshold for volatile organic compounds (VOCs) would be 50 tons per year in the Northeast Ozone Transport Region, 25 tpy in Houston and 10 tpy in Los Angeles.

This step is important to make a distinction between Part 70 or 71 applicability and major source (emissions above thresholds) as some states have Title V programs that include facilities that are not major sources. These facilities are not subject to CAM; however, they may be subject to periodic monitoring requirements.

The remaining steps in the applicability assessment deal with individual emission units and associated emission species.

Applicable federal emission limits and standards

Identify if there are one or more federal applicable emission limits or standards associated with each emission unit and associated emission species at your facility. An emission limit or standard means any applicable requirement that constitutes an emissions limitation, emission standard, standard of performance or means of emission limitation as defined under the act. Emission limits and standards include but are not limited to new source performance standards (NSPS), national emission standards for hazardous air pollutants (NESHAP), lowest achievable emission rates (LAER), best available control technology (BACT), reasonably available control technology (RACT) requirements by emission unit and pollutant, federally enforceable limits associated with prevention of significant deterioration (PSD) permit, or those taken to avoid PSD.

Control device usage

For each emissions unit and its associated emission species, identify those that use control devices to achieve reduced emissions. Control devices are types of equipment, other than inherent process equipment, that are used to destroy or remove

air pollutants prior to discharge to the atmosphere. Typical control devices include gas absorbers, electrostatic precipitators, baghouses, incinerators and flares. Passive control devices such as low-solvent inks, lids, seals and covers on tanks that are used to limit VOC emissions are not considered control devices. There are complexities over the classification of low NO_x burners as passive controls. If burners have over-fire air, or adjustable burners, then they are not classified as passive controls, and CAM may be applicable to them.

Potential pre-control emissions

Identify those emission units and their associated emission species that, prior to the control device, have emissions greater than the applicable major source threshold. Federally enforceable operating hour and throughput restrictions limit the emissions rates and should be taken into account in this calculation. It is important to remember that an emission unit is the activity that generates the emissions. These emissions may then be routed to a control device. For example, a flare header may have more than 100 tpy of VOCs that are controlled by the flare, but the individual contribution from each emission unit linked to that header may be less than 100 tpy. The potential to emit is based on a per unit calculation basis, and in this example, CAM would not apply.

It is also important that the appropriate major source threshold be used in determining applicability. You may find that your potential emissions of VOCs from an emissions unit are below a nonattainment area threshold for ozone (i.e. 50 tpy), but an individual HAP emission may be greater than an applicable NESHAP (i.e. 10 tpy).

Rule exemptions

For those emission units and their associated emission species still remaining in the assessment, determine if there are any units that are exempted by the CAM rule.

Exempted units and their associated emissions include those subject to the following:

- NSPS and NESHAPs promulgated after November 15, 1990;
- Stratospheric ozone protection requirements;
- Acid rain requirements;
- Requirements due to an approved emissions trading program;
- Emissions cap requirements created under Title V; and
- Certain municipality-owned back-up utility power units.

EPA's logic for exempting units subject to the above requirements is that there are adequate monitoring procedures built into

these requirements. Note that sources subject to an exemption for one emission species still have to examine applicability of CAM to other species. Do not quickly dismiss CAM applicability due to these exemptions—such as NESHAPs—and overlook the fact that the source may require CAM for other pollutants emitted by the unit.

Timing applicability

Once those unit emission species subject to CAM have been identified, the next step is to determine their applicability timing. Applicability timing is based on the post-control potential to emit (PTE) rate. Units with post-control PTE rates greater than the applicable major source threshold are classified as large units. Units with post-control PTE rates less than the applicable major source threshold are classified as small units.

For the majority of large units, CAM submittals must be included with the Title V renewal application. For large units in those states with late Title V programs, the CAM requirements must be addressed within the application if the Title V application has not been submitted or not determined to be complete by April 20, 1998. In addition, beginning April 20, 1998, significant permit revision applications must also include a CAM plan for each affected emission unit species or Pollutant Specific Emission Unit (PSEU).

For small units, CAM applicability initiates at the time of the first Title V renewal application. In either case, permits reopened for cause by the permitting authority may require CAM information submittal as part of the reopening process.

Conclusions

Understanding all of the emissions units that are affected by the CAM and periodic monitoring rules will be of benefit to Title V facilities and will avoid over-committing to periodic monitoring programs during your Title V permitting efforts. Early determinations of CAM and periodic monitoring applicability will allow you to negotiate "smart" permit conditions and to better plan for the implications of CAM and periodic monitoring, including the need for additional equipment, personnel and contractor support. Through planning, environmental compliance is preserved consistent with corporate environmental policies, operating permit conditions and state and federal regulations. **EP**

Bernard Evans, PE, is an air practice leader with Environmental Resources Management, (ERM), Exton, Pa.

For more information, circle 104 on card.

*Puzzled about fitting state compliance obligations
into the federal picture?*

**BNA's got it
mapped out
for you.**

BNA'S ENVIRONMENTAL COMPLIANCE SERIES ON CD

Air, water, and waste compliance. When federal and state obligations differ, our expert editors compare the two and highlight the differences for you — in plain English. That makes it easier for you to maintain compliance programs and develop new ones.

It's the complete, practical, and affordable information resource for the hands-on professional.

Try *BNA's Environmental Compliance Series on CD* in your office for 30 days. FREE. There's no obligation and no invoice will follow. Call 1-800-372-1033.

Or send your request along with your complete name, address and phone number to RISKFREE@bna.com and reference the priority code at the bottom of this advertisement.



BNA

THE BUREAU OF NATIONAL AFFAIRS, INC. Employee owned since 1947

1-800-372-1033

Visit our website at <http://www.bna.com/>

Circle 52 on card.

CSCD582B9

Continued from page 37

for air emissions generated by the disposal or laundering of absorbents is the responsibility of the disposal facility or laundry. A customer's liability under the Clean Air Act is the same for shop towels as it is for disposable wipes.

CWA

Neither reusable shop towels nor disposable wipes contribute to wastewater contamination at the customer's location. Potential discharges with contamination from absorbents may occur at the landfill, disposal facility or laundry. However, these receiving facilities are responsible for the wastewater discharges, not the customer.

The customer's liability is negligible under the Clean Water Act.

All laundries are connected to the local sewer system. The local regulatory agency responsible for controlling industrial discharges to the sewer system monitors the wastewater effluent from the laundries. Wastewater pollutant restrictions are outlined in the local sewer ordinance or the laundry's wastewater discharge permit. These documents contain conditions that provide for the discharge of laundry wastewater to the sewer system. Laundries specializing in shop towel processing have invested millions of dollars in wastewater treatment equipment and chemicals to ensure compliance with discharge limitations.

Laundry logistics


The laundry is responsible for cleaning the soiled wipers and managing the disposal of the material captured from the reusable shop towel. Shop towel customers should audit the laundry supplying the reusable shop towel service. The audit should consist of a review of towel management prac-

Since disposable towels are considered to be a waste, they are subject to full Resource Conservation and Recovery Act (RCRA) regulation.



tices, compliance with applicable permits and a review of all off-site disposal facilities used by the laundry.

The laundry is responsible for supplying the customer with an inventory of wiping cloths at predetermined intervals—usually every week. Ownership of the reusable shop towels remains with the laundry. The customer rents the towels, thereby eliminating the customer's need to purchase and manage its own inventory of wiping products.


For more information on the specific reusable shop towel requirements in your region, contact your state environmental agency's solid waste management division. 

D. J. Smith, MS, is the corporate environmental engineer for Coyne Textile Services, Syracuse, N.Y.


For more information, circle 103 on card.

ISO 9000 • CE MARKING • ISO 14000

ISO 14000 • QS-9000 • CE MARKING • ISO 9000



This dove is a symbol of peace.




Our dove is a symbol of peace of mind.

The Green Dove Award is a universally recognized symbol of accredited registration to ISO 14001. It provides employees, customers, regulators, the community and society with confidence that an organization is not only managing its environmental obligations effectively, but it's also committed to continual improvement.

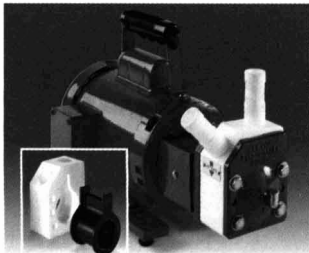
Independent verification leading to ISO 14001 registration and the Green Dove Award is available worldwide, but only through SGS International Certification Services. Since 1878, as the world's largest organization in the field of inspection and verification, SGS Group has provided its clients with a comprehensive range of environmental and quality management system assurance services.

If your organization is a responsible corporate citizen and can demonstrate an effective environmental management system, shouldn't you also be giving the world a little peace of mind?

For more information about our ISO 14001 registration and training services, please call 800-747-9047 or 201-935-1500.


SGS International Certification Services, Inc.
Raising Industry Standards

ISO 14000 • CE MARKING • QS-9000



**Transfer corrosives, volatiles,
and abrasives to 40 gpm**

Flex-i-liner® sealless, self-priming peristaltic pumps eliminate the wear, leakage and maintenance inherent with pumps having shaft seals, packing glands, gaskets, and valves. Only two parts contact fluid: a rugged polyethylene, polypropylene, or teflon body block; and a heavy-wall flexible liner available in a wide range of interchangeable elastomeric materials—all immune to your most aggressive chemicals and abrasive slurries, yet gentle to latex emulsions and other shear-sensitive liquids.

Circle 57 on card.

Why the wet end of your next ANSI pump should be PVC, PP, PVDF, or ECTFE

(instead of stainless, alloys, or FRP)

ZERO CORROSION

(unlike stainless and alloys)

ZERO CHEMICAL ABSORPTION OR WICKING

(unlike FRP)

ZERO TEARING, CRACKING, OR PEELING

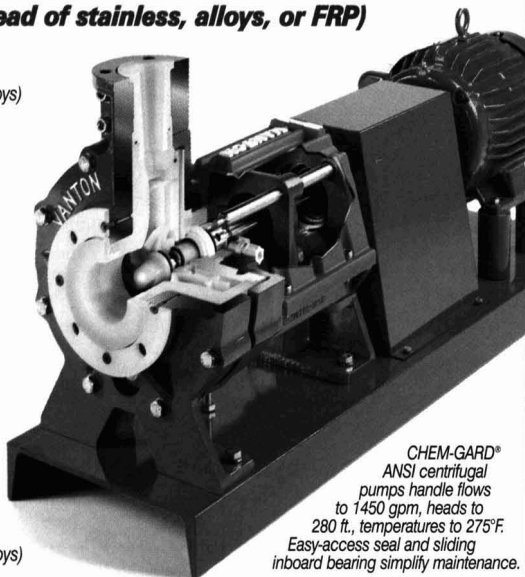
(unlike plastic linings)

ZERO OR NEAR-ZERO ABRASION

*(unlike stainless,
alloys, and FRP)*

ZERO PRODUCT CONTAMINATION

(unlike stainless and alloys)



CHEM-GARD®
ANSI centrifugal
pumps handle flows
to 1450 gpm, heads to
280 ft., temperatures to 275°F.
Easy-access seal and sliding
inboard bearing simplify maintenance.

Why battle corrosion and abrasion when you can eliminate it

Acids, caustics, salts, solvents, chlorides, halogens, and other aggressive, abrasive chemicals can destroy stainless steel, high alloys, plastic linings, and FRP—and the pumps comprised of them.

But they cannot harm a Vantone CHEM-GARD® pump.

Because the entire wet end is made of solid, chemically-inert, abrasion-resistant thermoplastic.

So you eliminate corrosion and the product contamination it can cause, while you reduce abrasion to near zero. And for all these advantages, you give up nothing; Vantone CHEM-GARD® ANSI pumps are fully interchangeable with all ANSI B73.1 pumps, and feature armored casings and flanges to handle the same nozzle loadings as metal pumps.

For a detailed selection guide and index of technical articles on pumping your specific chemicals contact:



VANTONE PUMP AND EQUIPMENT CORP.

201 Sweetland Avenue, Hillside, NJ 07205

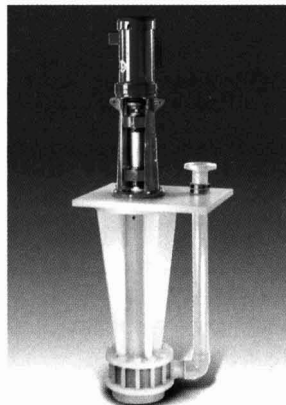
Tel: 908-688-4216 • Fax: 908-686-9314

E-mail: mkt@vantone.com

Web: www.vantone.com

VANTONE

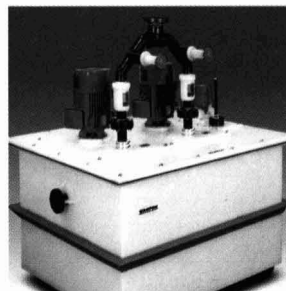
See us at WEFTEC, Booth #3642 • Circle 54 on card.



Pump aggressive chemicals and wastes from sumps to 50 feet deep

Every wetted component in a Vantone SUMP-GARD® vertical pump, including the heavy-wall shaft sleeve, is machined or molded of solid, chemically inert PVC, CPVC, PP, PVDF, or ECTFE thermoplastics. This eliminates corrosion and minimizes abrasion, resulting in lower maintenance, longer pump life, and contamination-free products. SG Series pumps are configured for sumps 18 inches to 50 feet deep, and handle flows to 1450 gpm, heads to 245 ft., and temperatures to 275°F. Bearingless, dry-running, cantilevered models are available for sump depths to 6 feet; Vortex recessed-impeller models for pumping stringy or solid materials to 3 inch diameters.

Circle 55 on card.



Eliminate corrosion, contamination with inert tank/pump systems

Vantone integrates tanks, pumps, instrumentation, and controls in standard and custom configurations to handle your most aggressive, hazardous, and ultrapure products with guaranteed results and single source responsibility. Every wetted pump component is made of inert thermoplastics, so there is nothing your chemicals can harm, or be harmed by. Cylindrical, square, and rectangular tanks from 50 to 5000 gallon capacities in both stationary and mobile configurations are fabricated of thermoplastics or fiberglass. For higher pressure applications, steel construction with thermoplastic linings is available.

Circle 56 on card.

Wastewater chemical treatment comparison guide

COMPANY	PRODUCT NAME	DESCRIPTION
Chemical Lime Co. P.O. Box 985004, Fort Worth, TX 76185 (817) 732-8164 Circle 105 on card.	Quicklime calcium oxide	Lime and lime-based products for water, wastewater, remediation, neutralization and flue gas desulfurization.
Martin Marietta Magnesia Specialties Inc. P.O. Box 15470, Baltimore, MD 21220-0470 (800) 648-7400 Circle 106 on card.	Magnesium Oxide Slurry FloMag® H FloMag HUS MagneClear® 58	Suspensions of magnesium hydroxide solids in water at approximately a 60 percent solids concentration. A non-hazardous, non-corrosive chemical.
Nalco Chemical Co. One Nalco Center, Naperville, IL 60563 Circle 107 on card.	NALMET® ULTIMER®	Metals removal program designed to improve environmental performance by keeping your facility in compliance while conserving and recovering previous resources. Patented water continuous, oil-free dispersion polymers for raw water clarification and oil water separation and sludge dewatering in all industries.
Osprey Biotechnics Inc. 2530 Trailmate Dr., Sarasota, FL 34243 (800) 553-7785 Circle 108 on card.	MUNOX® PW-N MUNOX® PW-S MUNOX® XL Plus-DN MUNOX® XL Plus-I MUNOX® XL Plus-6	Patented, environmentally friendly wastewater inoculants for improved biological removal of ammonia, nitrite and nitrate from poultry wastewater treatment plants. Patented, environmentally friendly wastewater inoculants for improved biological removal of oil and grease, excessive BOD/COD from poultry wastewater treatment plants. Patented, environmentally friendly wastewater inoculants for improved biological removal of ammonia, nitrite and nitrate of industrial and municipal wastewater treatment plants and contaminated groundwater. Patented, environmentally friendly wastewater inoculants for improved biological removal of fats, oil or grease, petroleum hydrocarbons and chemical solvents from industrial and municipal wastewater treatment plants. Patented, environmentally friendly inoculants for improved biological removal of dry-cleaning solvents from industrial wastewater treatment plants.
Probiotic Solutions 201 S. Roosevelt Ave., Chandler, AZ 85226 (602) 961-1220 Circle 109 on card.	Bio Energizer	Converts solids to carbon dioxide, increases dissolved oxygen levels, lowers BOD and COD levels and reduces offensive odors. Designed for sludge reduction in industrial and municipal wastewater treatment plants and lagoons.
Sybron Chemicals Biochemical Division P.O. Box 66, Birmingham, NJ 08011 (800) 678-0020 Circle 110 on card.	BI-CHEM® 1000 Series BI-CHEM 2000 Series	Bacterial products for wastewater applications.
U.S. Filter/Davis Process 2650 Tallevast Rd., Sarasota, FL 34243 (800) 345-3982 Circle 111 on card.	Bioxide®, Bioxide-AQ™ Hydrogen Peroxide Odophos®	Solution for natural, biochemical control of hydrogen sulfide and other sulfur compounds in wastewater. Oxidizer for control of sulfides and other odorous compounds in wastewater. Iron salt solution for control of hydrogen sulfide in wastewater.

LIQUID	SOLID	PACKAGING	SPECIAL FEATURES
•	•	Bulk or bag	
•		Bulk tank truck or railcar. Also available in drums and totes through repackaging.	A weak base that delivers excellent buffering performance. Biological wastewater systems achieve very uniform pH and alkalinity levels when magnesium hydroxide slurry is utilized as the alkaline reagent.
•		Drums, porta-feeds or bulk	Achieves ppb levels and total metals management with product, automated feed and sludge management. Removes soluble mixed metals and chelated metals.
•		Drums, porta-feeds or bulk	No VOCs and lower BOD than oil containing polymers.
•		2.5-gallon container or 55-gallon drums	Specially formulated for ammonia+organic nitrogen (TKN) removal from poultry waste. Effective in reducing nitrite/nitrate toxicity problems.
•		2.5-gallon container or 55-gallon drums	Reduces BOD/COD and prevents excessive sludge generation.
•		2.5-gallon container or 55-gallon drums	Consistent ammonia removal even under cold weather. Reduced nitrite/nitrate toxicity problems. Fast cleanup of nitrate contamination from groundwater.
•		2.5-gallon container or 55-gallon drums	Cost-effective treatment of high strength wastewater.
•		2.5-gallon container or 55-gallon drums	Fast and complete PCE and TCE removal. No accumulation of toxic intermediates like vinyl chloride.
•		5-gallon jugs, 55-gallon drums or 275-gallon pallet tank	
•	•	Dry: 25- and 50-pound containers; ½-pound Sol-U-Pak; BIO-SOCK® Liquid: 55-gallon drums; 250-gallon totes	Live bacterial cultures.
•		Bulk	Natural process; non-hazardous product.
•		Bulk or totes	
•		Bulk	Manufactured product; quality control.

Reaching a ceasefire

Alternative dispute resolution is increasingly being used to settle environmental disputes

By Jamie McLeroy, JD,
and Howard S. Seitzman, JD

"The worst quarrels only arise when both sides are equally in the right and in the wrong."—Winston Churchill

Churchill was no stranger to controversy and though he didn't know it at the time, he was giving an apt description of a modern-day environmental dispute. Often, everyone in these cases is right about what the problem is: a mess threatens the environment. But there is so much to disagree about, "Who caused it, how do we fix it, and at what cost?" Such details can take years and millions of dollars to resolve. This is why litigants are increasingly using mediation to resolve these cases.

This article is the first in a series that discusses the use of alternative dispute resolution (ADR) in environmental disputes. Part I of the series focuses on mediation and explains some of the ways that technical experts, such as chemists, engineers and geologists, may be useful in the process. Later articles will address more specific aspects of dispute resolution in the environmental field.

Why mediate?

Mediation is a form of ADR that is being used increasingly by parties as a way out of traditional litigation. In litigation, the parties submit their disputes to a judge or jury. Most cases eventually settle, but the negotiations are controlled by the lawyers, who are aggressive advocates for their clients. Traditional litigation is a lengthy and costly process that angers and frustrates many clients who often do not achieve the results they want in or out of court.

Mediation is a method of bringing the participants in a lawsuit together for intensive sessions where settlement discussions can take place in a setting that is less formal and adversarial. Generally, the parties have more input and are able to solve problems in a way that a judge or jury cannot. Although it is hard to gauge the true rate of settlement in mediated cases, most studies report very high rates of satisfaction by participants in the process. Most lawyers now recognize the effectiveness of

mediation and are incorporating it into their practices. Judges love the effect on their case loads, and in many large cities, such as Dallas, mediation is mandatory in most complex cases.

Role of mediator

Mediation is an informal settlement conference that is presided over by a neutral third party who facilitates communication between the parties. The role of the mediator differs from that of a judge or arbitrator in one crucial way: the mediator has no power to make a ruling that affects the

Environmental professionals will no doubt have a greater future role as consulting expert witnesses and as technical neutrals in the preliminary stage of preparing for a mediation, and in the long-term administration of complex settlements.

case. Mediators are usually experienced trial lawyers who are skilled in the art of negotiation and trained in the special techniques of mediation.

Sometimes, two mediators work together on the same case. This is called co-mediation, and it works especially well when there are multiple parties demanding the mediators' time. It is ideal when the co-mediators have backgrounds that are complementary; for example, one may have a lot of courtroom experience and another may have a science background.

Role of technical expert

Clients retain technical experts, whether in-house or outside consultants, to objectively analyze the status of a site or to evaluate a situation and to assist the client in devising a set of possible solutions. Technical experts are knowledgeable about such issues as the nature and extent of the contamination, migration pathways, cleanup levels, risk reduction standards and remedy options. While experts retained by clients are not generally perceived as neutral, their knowledge can provide invaluable assistance resolving disputes if they are actively included in the mediation process. For example, parties frequently disagree on the cost of remediation because they do not agree on the type and extent of the remedy. A mediator-controlled discussion between technical experts allows the parties to devise a realistic range of expected costs. Narrow the expected cost range and the parties can re-evaluate settlement options.

This "north to south and east to west" technical evaluation approach has proven successful at mediation involving a wide variety of constituents including petroleum products, metals, solvents, herbicides and pesticides. In one mediation, this process allowed the parties to reach a satisfactory resolution in part because one party's very able expert was able to evaluate the other party's future business plan and existing physical plant design and assist that party in restructuring both during the mediation process. In another successful mediation, after meeting, the experts jointly approached the regulatory agency, obtained feedback on several matters and further refined the remedy cost estimate.

Role of technical neutral

In environmental cases, the parties also may rely on the services of a "technical neutral." This is a person employed by both sides, loyal to none, who provides assistance in identifying the nature of the problem and the possible remedies and their costs.

Another role for a technical neutral is to act as a decision maker on technical matters entrusted to the technical neutral by the parties. In one case involving allegations of toxic torts and property value diminution, the parties agreed as a critical component of

SELF-CLEANING UV



TROJAN... the revolutionary System UV4000™ will change the way you think about wastewater disinfection

Trojan System UV4000™ incorporates high intensity UV lamps in a controlled geometry, variable UV lamp output precisely matched to wastewater UV demand, modular open channel lamp configurations and our innovative self-cleaning system. The use of high intensity UV lamps dramatically reduces the total number of lamps required, resulting in reduced space requirements.

System UV4000™ is engineered to meet the most demanding performance requirements, whether the application be primary or secondary effluents, combined sewer overflows, stormwater or high level disinfection.



For reliable UV solutions, go with the leader.

Trojan Technologies Inc.

Trojan... the brightest ideas in UV technology

Head Office: 3020 Gore Road, London, Ontario, Canada N5V 4T7 Tel: (519) 457-3400 Fax: (519) 457-3030

Internet: <http://www.trojanuv.com>

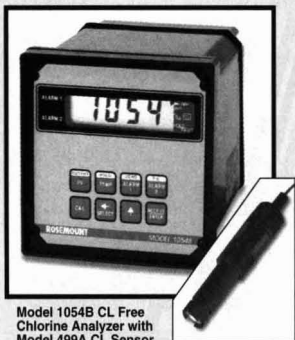
European Office: Laan van Vredestein, 160, 2552 DZ, The Hague, Netherlands Tel: 31-70-391-3020 Fax: 31-70-391-3330

California Office: 690 E. Tabor Ave., Suite I, Fairfield, CA, USA 94533-4006 Tel: (707) 425-1639 Fax: (707) 426-3599

Circle 58 on card.

Clean Deal

No Hassle Chlorine Measurement



Model 1054B CL Free Chlorine Analyzer with Model 499A CL Sensor

Sampling Systems are expensive and break down. Replacing reagents costs time and money. You don't want to deal with them and we don't think you should. Rosemount Analytical, Uniloc Division offers an inexpensive on-line analyzer for automatic measurement and control of free chlorine. This means you can get a continuous record of your chlorine residual and control disinfection both easily and economically.

The **Model 1054B CL** Analyzer has been extensively field tested in applications just like the ones you have. It uses an easy to maintain, Model 499A amperometric sensor that installs directly in a process line or in a low-flow assembly. Startup can be as simple as connecting the sensor cable and entering the numerical value on the sensor tag into the analyzer. Later calibration using DPD or other titrations are also supported.

The **Model 1054B CL** offers many features:

- Automatic temperature compensation
- Automatic pH compensation
- .001 ppm resolution display and
- User selectable filtering for low noise or rapid response.

Save yourself time and money, eliminate those unnecessary reagents and get a continuous reading instead!

ROSEMOUNT ANALYTICAL

FISHER-ROSEMOUNT Managing The Process Better.

Rosemount Analytical Inc., Uniloc Division
2400 Barranca Parkway, Irvine, CA 92606 USA
Tel: (714) 863-1181 <http://www.RAuniloc.com>

the settlement to jointly select a technical neutral to evaluate the known data concerning the site and to determine what, if any, additional data was required to determine whether the site's closure plan components were operating and effective. While the technical neutral's authority was broad, it was limited by the parameters agreed upon by the parties, and disputes involving the technical neutral's decisions were subject to an expedited, binding arbitration process.

Confidentiality of proceeding

One of the hallmarks of mediation is the strict confidentiality of the proceedings. In litigation, information disclosed in pre-trial hearings and in the discovery process in depositions and written interrogatories is normally part of the public record. Information exchanged between the parties in mediation, however, is private. The participants cannot be subpoenaed to give testimony about anything that happened in the mediation. Settlement offers cannot be used as admissions against any side in court.

The mediator holds separate meetings with the parties in which they share information they do not want to reveal to the other side. This allows each party to feel comfortable engaging in a frank talk with the mediators about the weaknesses of its own position. The mediator uses this sensi-

tive information to help each side evaluate the actual risk of not reaching a settlement.

Alternative remedies

The confidential setting and the informal nature of the mediation proceeding allow the parties to let their hair down in a way that lawyer-driven negotiations do not. A skillful mediator leads the parties in brainstorming sessions about settlement possibilities. She may act as a sounding board for settlement proposals and may offer suggestions of her own.

One of the beauties of a mediated settlement is that the parties have the power to agree on a host of remedies that a court cannot impose. This gives the mediator great latitude in helping the parties solve the underlying problem that led to the dispute. A good mediator spends a lot of time getting the parties to focus on their mutual interests. She also encourages disputing parties to recognize what they really need to get the deal done, as opposed to unrealistic demands, in order to get them moving past entrenched positions.

An example of allowing both parties to achieve a positive result is one penalty enforcement case brought by a regulatory agency. A number of first impression legal issues separated the parties and the two were facing a 3-week trial. By listening carefully to the parties and floating various

How would you solve this problem?

The owner of a parcel of land, Company A, leased the property over a long period of time to a reclaimer of batteries and metals. The site is located in a major metropolitan area and is adjacent to a river that serves as a source of drinking water. Metals, including lead, acids and solvents, are present in the soil and the shallow groundwater. There is no evidence that the constituents have migrated to the river or its alluvium.

Company A, a highly regulated utility, has sued the reclamation company and some 25 companies that shipped materials to the site for reclaiming. The 25 companies can be categorized as automotive parts manufacturers, technology companies and other manufacturers engaged in highly competitive and relatively unregulated business lines.

Assume the 25 companies have set aside their internal disputes regarding allocation and are working collectively to minimize the sum they will pay as a group to partially the ultimate remedy. It becomes apparent to the mediator that despite the good faith efforts of Company A and the 25 companies, the settlement negotiations are stalling because the risk analysis and risk tolerance of the two sides varies greatly. Company A is risk adverse and demands a significant monetary premium for accepting the risk that the remedy might come in over cost. Company A does not trust the remedy cost estimate provided by the group of 25 and likes to exercise a high degree of control in projects. Conversely, the group of 25 believes that Company A's remedy estimate is inflated because of the large contingency amounts Company A has allotted for unknowns and cost overruns. They also doubt that Company A can effectively manage a remediation project and that Company A will overengineer the project, resulting in inflated costs. They will not pay a large premium to shift the risk of cost overruns. All parties generally agree on the need to remediate the site and of the general nature of the remedy components.

You have been retained to assist the mediator on technical issues. As the technical neutral, your task now is to bring the risk evaluation and risk valuation differences to the attention of the parties and to offer possible solutions to the parties for their consideration. How will you accomplish your task and what solutions will you offer? Forward your responses to aneville@cmpu.net.

Information resource

EPA lists its Alternate Dispute Resolution Fact Sheet on its web site at <http://es.epa.gov/oeca/osre/950500-2.html>.

settlement options, the mediator assisted the parties in structuring a settlement that allowed the regulatory agency to send a message to other similarly situated manufacturers. The parties finally resolved all matters associated with this particular operation at a cost and over a time period that facilitated the company's ongoing manufacturing operations. Although the dispute between the parties had largely focused on their differing interpretations of the law and the facts surrounding the specific operation, the settlement focused on pragmatic goals.

The hearing was scheduled to take 3 weeks, and there was the threat of a lengthy appeal. But the case was fully settled in mediation in 2 days. Why? Because the mediator got the parties to shift the focus from who was liable for what in the past to what it would take to solve the problem both parties helped create. The administrative law judge had the power to impose some of the fines—possibly more than the state settled for—but the judge could not have ordered the defendants to cooperate in such a way.

Dealing with difficult people

Mediators are experts in dealing with difficult people under pressure—and we're not just talking about lawyers. Personality conflicts often get in the way of effective negotiating. By talking with the parties and their lawyers and observing their negotiating styles, the mediator can usually identify the obstacles to communication and help people work around them. Sometimes he must address tense relations between attorneys and their own clients.

A mediator uses various techniques to defuse personal conflict. He tries from the get-go to establish a rapport with the key players in the negotiations so they trust the mediators even if they do not trust each other. He counsels each side about the best strategy to use in negotiating with the blockhead on the other side. He separates parties when necessary, and carries messages back and forth, acting like a human shield when the parties vent their anger about their adversaries. An experienced mediator can stand toe-to-toe with someone with a bulldozer personality whose tactics may jeopardize the success of the negotiations.

Corporations also have personalities that influence the negotiations. A big company with layers of bureaucracy makes decisions

differently than a mom-and-pop business. In the environmental field, some businesses operate in highly regulated areas and are more risk-averse. They make decisions in a way that may confound a company with an unfettered entrepreneurial spirit. Mediators that appreciate these differences can help one company understand the world view of the other and come to terms with what the other side needs in order to compromise.

Conclusion

Mediation is more popular than ever as a tool to resolve environmental conflicts in every arena. Environmental professionals will no doubt have a greater role in the future as consulting expert witnesses and as technical

neutrals in the preliminary stage of preparing for a mediation, and in the long-term administration of complex settlements. **EP**

Jamie McLeroy, an attorney-mediator practicing for 17 years in Austin, Texas, is the author of several publications advising businesses on various legal topics including Business Insurance Guide: How to Purchase the Best and Most Affordable Coverage, published by Summers Press, Ft. Worth, Texas. Howard S. Seitzman is an attorney-mediator and arbitrator in Austin, Texas, who specializes in the practice of environmental and administrative law.

For more information, circle 112 on card.

A NEW DAY IS DAWNING INDUSTRIAL HYGIENE

ANDERSEN INSTRUMENTS INC.

ANDERSEN ONE STAGE VIABLE SAMPLER

ANDERSEN TWO STAGE VIABLE SAMPLER

ANDERSEN SIX STAGE VIABLE SAMPLER

INTERGRITY S700 PC BASED SPIROMETER SERIES

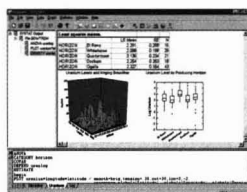
Visit us at www.anderseninstruments.com

ISO 9001

500 TECHNOLOGY COURT • SMYRNA, GA 30082 USA
770.319.9999 • FAX 770.319.0336
E-MAIL: ANDERSEN@GRASEBY.COM • WWW.GRASEBY.COM
800-241-6898

Compiled by Kristie L. Guillotte and Ingrid Truemper

Software



SYSTAT 8.0 is the latest version of statistics and graphics software. New features include additional spatial statistics, a revamped user interface, an output organizer, a data editor, more graph editing, 32-bit architecture and more. SPSS Inc. **Circle 120 on card.**

Disposable filters



In-line disposable filters are designed for the preparation of groundwater samples for dissolved metals analysis. The high-capacity filters give 700 cm² of effective filtration area using a 0.45µm membrane. They fit 1/2-inch-by-1/2-inch tubing and barbs adapt to 1/8-inch-by-1/8-inch tubing. Solinst Canada Ltd. **Circle 121 on card.**

Chlorophyll a standards

Turner Designs Inc. now offers solid secondary standards for use in the fluorometric analysis of extracted chlorophyll a. These

standards provide the user with quick and affordable means to assess instrument drift or to recalibrate the instrument. They are not temperature sensitive or photosensitive. Turner Designs. **Circle 122 on card.**

Wastewater treatment



The RFS OBTEK machine is designed to treat many different types of wastewater generated by various industries. It is easy to operate and requires very little maintenance. Simply fill the process tank with wastewater and turn the machine on. Immediately, clean water than can be reused or discharged is produced. Redondo Filtration Systems. **Circle 123 on card.**

Drive unit

The Model DHL-60-20-2 drive unit includes a high-capacity, precision-bearing integral with a

highlight

End connectors

Metal union end connectors that work with Eslon PVC and Corzan™ CPVC unions can be used with all Eslon unions as well as Esloclean™ unions and ball valves, to make transitions between metallic and thermoplastic or dissimilar plastic piping systems.

Eslon Thermoplastics. **Circle 124 on card.**



Get to the source the first time!



with Horizontal Remediation Wells

Some of the benefits:

- No business interruption during installation
- Maximum exposure to contaminants
- Cost efficient
- Reduced maintenance, equipment, and operations cost.
- Rapid site closure

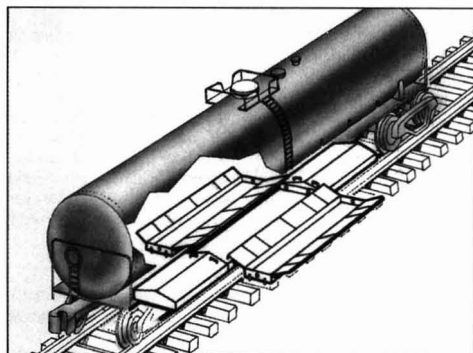
And a few of the applications are:

- Air sparging
- Soil vapor extraction
- Bio-remediation
- Groundwater extraction
- Leachate collection
- Dual phase extraction and many more...

Directional Technologies, Inc.
Horizontal Drilling Services
North Haven, CT

203.248.9599

Railroad Track Spill Containment



The Ounce of Prevention to Preclude a Ton of Headaches!

Unique, Relocatable Spill Containment Pans with Rolling Raincovers. Opens When You Need It and Closed and Locked When Not Needed.

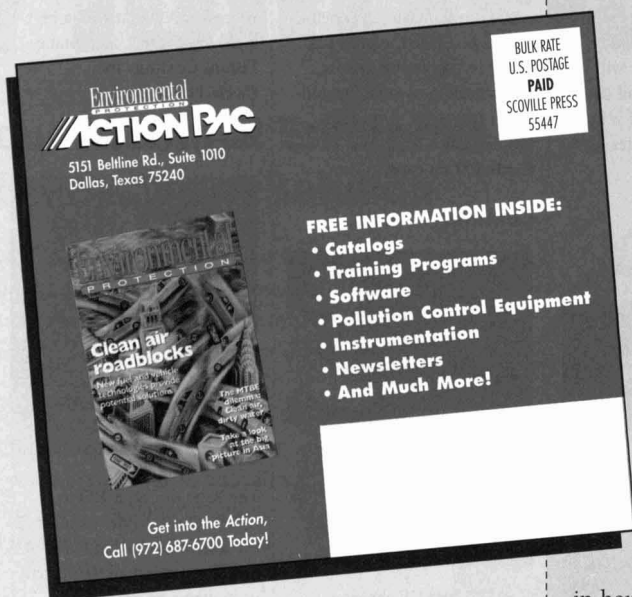
Avoid Collecting Snow, Rainwater and Debris!

Lower Your Environmental Liability!

TRANS ENVIRONMENTAL SYSTEMS, Inc.

P.O. Box 40163 Cleveland, Ohio 44140 **800-220-2466** **440-871-3214** **FAX 440-871-3414**
www.transenvsys.com

Are you Serious?



If you are serious about significantly increasing sales and generating more leads in the most cost-effective manner, you need to reach us!

Environmental Protection ActionPac card deck, from the publishers of Environmental Protection magazine, reaches over 90,000 buyers and specifiers in every major buying influence. These are the decision makers with buying power your advertising message, product or service needs to target to generate more ad inquiries, prospects and new customers! It's time to get serious about taking your business to new levels and gaining the competitive edge. Call an Environmental Protection ActionPac card deck specialist today for results with impact and get serious!

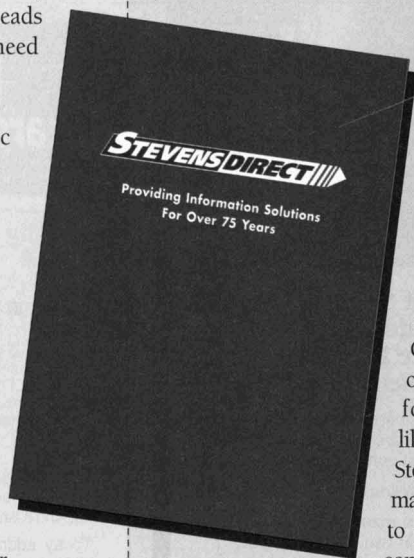
**CENTRAL & WEST COAST,
DONNA RHOADES
(972) 687-6725**

**EAST COAST, TONI BROCK
(972) 687-6726**

**Need Information Solutions
for these Professions?
Occupational Health & Safety
Environmental
Healthcare
Security
Rental
Human Resources**

THEN LOOK NO FURTHER THAN STEVENS DIRECT

For over 75 years Stevens Direct has been providing information solutions for the Occupational Health & Safety, Environmental, and Healthcare professions. As a recognized leader in these industries, Stevens Direct offers key executives, decision makers, and prospects for your marketing needs. Stevens' in-house List Managers, with years of experience in direct Marketing, can pinpoint the right targets for your direct mail and telemarketing campaigns.



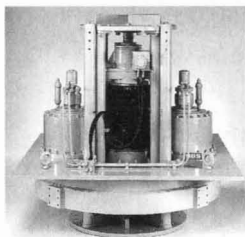
Today's rising postage and printing costs make list selection increasingly important in achieving maximum profitability for your marketing efforts. Careful use of demographics like Job Function, Purchasing Responsibility, Company Size, and Type of Business, enable you to focus on prospects most likely respond to your offer. Stevens Direct's expertise in matching the right audience to your offer, combined with continuously updated lists that

have a proven response record, helps guarantee success for your marketing projects.

**OVER 85% OF OUR CLIENTS BECOME
REPEAT CUSTOMERS.
CALL TODAY**

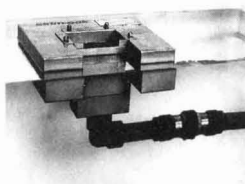
(972) 687-6714

FAX YOUR REQUEST TO (972) 687-6722



forged alloy steel gear enclosed in a durable fabricated steel housing. All reducers that make up the drive unit are directly coupled. The primary reducer is hydraulically driven to ensure load balancing between the pinion drive gearboxes. DBS Mfg. **Circle 125 on card.**

Oil skimmers

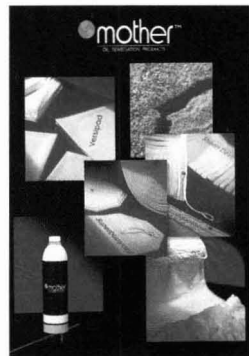


Skim-pak fixed weir skimmers from Douglas Engineering remove pure oil from separation tanks and sumps.

Designed to work either with gravity flow or controlled pumping, the skimmer will automatically remove oil concentrations in excess of 1/2 inch with no underlying water.

Douglas Engineering. **Circle 126 on card.**

Oil remediation products brochure



Mother™ Oil Remediation Products is a four-page color brochure listing patented chemistry that will instantly render oils hydrophobic and viscoelastic. Oil bonds to the products instantly, preventing sinking, emulsification, weathering and sheen and tarball formation.

Mother Oil. **Circle 127 on card.**

Coatings

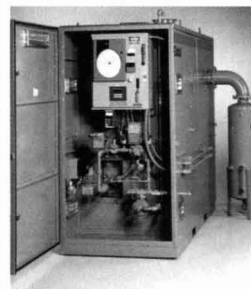


FUTURA-THANE abrasion-resistant coatings have better abrasion resistance than steel,

according to the manufacturer. This improved, spray-applied product line allows contractors to quickly protect steel or iron process equipment with a high-build, elastomeric membrane.

Futura Coatings Inc. **Circle 128 on card.**

Catalytic oxidizer



The Remedi-Cat, a 100 to 2,000 scfm catalytic oxidizer, is capable of destroying VOCs at an efficiency rate of 97 percent or higher. Custom sizes, options and system configurations are available for Global

A better degree



Master of Science in Hazardous and Waste Materials Management

An SMU graduate degree will give you a competitive advantage in the new millennium.

- Developed in consultation with the EPA.
- Emphasis on management and technical issues in treatment, elimination, handling, regulation, and compliance of waste materials.
- Available nationwide through videotape distance education.



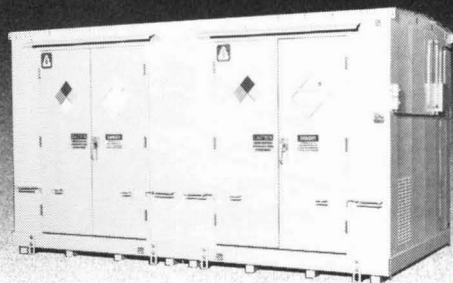
SMU ENGINEERING
SCHOOL OF ENGINEERING
AND APPLIED SCIENCE

SOUTHERN METHODIST UNIVERSITY

www.seas.smu.edu • 1-800-601-4040

SMU does not discriminate on the basis of race, color, national or ethnic origin, sex, age, or disability.

Meet the Pros in Hazardous Material Storage.



Increasingly, the handling and storage of hazardous materials in an environmentally safe, secure manner is an issue you must deal with. And it isn't something you want to leave to guesswork.

Today, addressing this problem is as easy as calling on the pros of EPI. Our E.P. Containment Systems answer with the most advanced, relocatable, Factory Mutual approved buildings available. Our complete line of building sizes and designs can be custom-fitted with a wide range of options to perfectly meet your requirements.

Put the best available technology to work for you where cost-effective hazardous material storage is demanded. Call today for complete information on our professional solution — The E.P. Containment System.



Environmental Products, Inc.™

Division of BENKO PRODUCTS INC.
5350 Evergreen Pkwy • Sheffield Village, Oh 44054
Ph. (440) 934-2180 Fax (440) 934-4052
www.benkoproducts.com



PlantWare32[®]

Your Essential Enterprise-Wide EHS Software Solution

Environmental, Health and Safety information management is business information management. It is *essential* not only for regulatory compliance but also to your bottom line — even your ability to continue business operations.

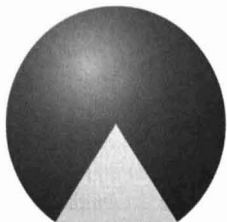
PlantWare32 is a comprehensive, thoroughly integrated environmental management information system that lets you unify and streamline information processes at every level of your operations — saving time and money every step of the way.

Select only the capabilities you need to manage:

**Air • Waste • Water • Inventory •
MSDS • Health & Safety**

Find out how PlantWare32 can help you assure regulatory compliance, cut daily costs, and reduce risks while boosting productivity and profitability.

**Call (800) 999-5009 or visit our Web site
at www.essentech.com today!**



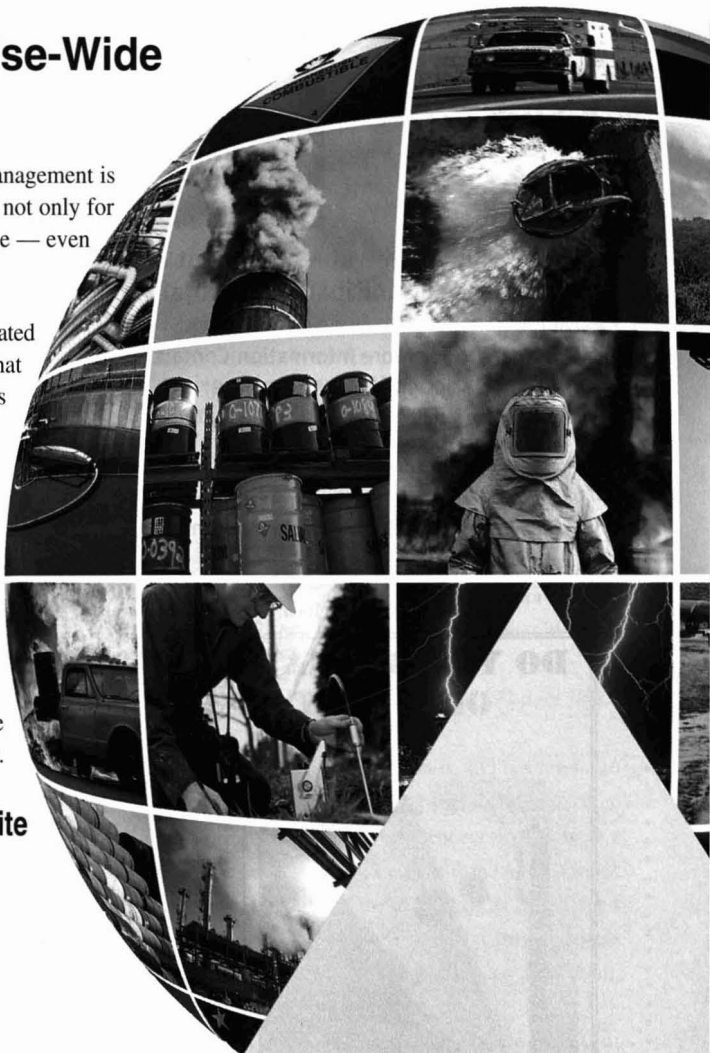
Essential

TECHNOLOGIES™
INCORPORATED

1401 Rockville Pike, Suite 500, Rockville, MD 20852
Telephone: (301) 284-3000; FAX (301) 284-3001

PLWAE1098

Circle 66 on card.





SBR Wastewater Treatment Plants for Domestic, Municipal & Industrial Applications

For More Information Contact:

Babcock Water Engineering, L.P.

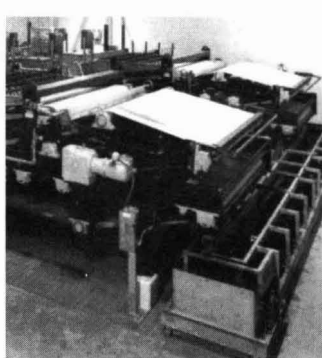
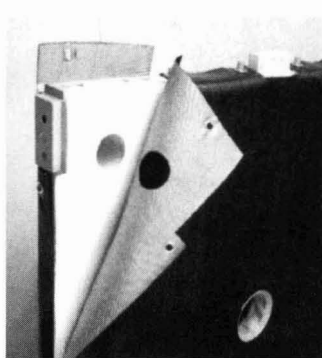
15707 Rockfield Blvd., Suite 333
Irvine, CA 92618

Phone: 714-472-9110 ♦ Fax: 714-472-9210

E-Mail: wastewater@sbrccass.com
<http://www.sbrccass.com>

See us at WEFTEC, Booth #2135 • Circle 67 on card.

DO YOU OPERATE A FILTER PRESS OR A BELT FILTER PRESS?



WE CAN PROVIDE PRESS CLOTHS OR BELTS
WITH THE BEST DELIVERY TIMES AT THE
LOWEST PRICES WITH ISO-9001 QUALITY!

SCAPA FILTRATION

4563 JORDAN ROAD - P.O. BOX 238
SKANEATELES FALLS, NY 13153-0238
PHONE: 1-800-637-6206 ~ FAX: 1-315-685-5574

scrubber modules, oxidizers, vacuum extraction modules, integrated units and vapor liquid separator modules. Global Technologies.

Circle 129 on card.

Chlorinating system



The PPG system consists of a 3-inch calcium hypochlorite tablet with 65 percent available chlorine and the PPG Series 3000 chlorinator, allowing operators to chlorinate water consistently and accurately. It is an alternative to chlorine gas cylinders and sodium hypochlorite for sanitizing water systems. PPG Industries Inc.


Circle 130 on card.

Filter element



JET Pleat™ is a multi-pleated filter element designed for the Wheelabrator family of pulse jet collectors. It can enhance the performance of existing pulse jet dust collectors, allowing greater gas flow and more than four times the surface filtration area of standard bags. Wheelabrator Air Pollution Control Inc.

Circle 131 on card.

The next person who says
"I DIDN'T KNOW EQ DOES THAT"
is gonna get it. 

We hear it a lot.


When you're one of the largest and most diversified environmental management companies in the country, it's tough letting everyone know *everything* you do.

Most folks, for example, know about our Wayne Disposal RCRA/TSCA landfill, and EQ's Michigan Disposal Waste Treatment Plant - North America's largest treatment facility by volume. A lot of people have used our chemical recovery and recycling. And our lab analysis services are pretty well known.

But tell them that EQ can manage transportation, or remediate contaminated sites, or treat waste water, or recycle oil and spent deicing fluids for airports, and it's the same old thing:

"I didn't know EQ does *that*."

The fact is, EQ has grown to provide a comprehensive package of environmental management services all from a single vendor. That's because some of the largest corporations in the world trust us to handle their varying needs. As those needs have grown, so has our ability to meet them.

So please. Take just a moment to call EQ at 1-800-KWALITY (592-5489) or visit our website at www.eqonline.com. We'll send you an informative package that will tell you more about us than you probably know. 



THE ENVIRONMENTAL QUALITY COMPANY

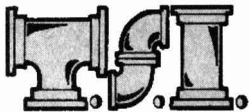
36255 MICHIGAN AVENUE ■ WAYNE, MICHIGAN 48184
734-329-8000 FAX: 734-329-8140 SALES: 800-592-5489
www.eqonline.com

Circle 69 on card.

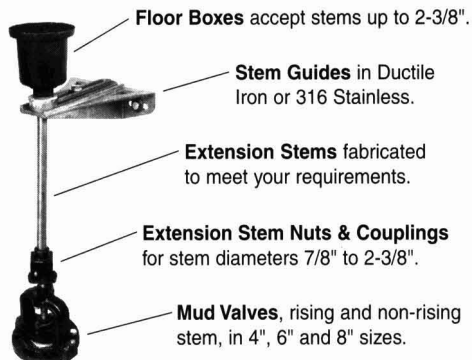
A FREE COPY

of our 16-page brochure
on the environmental
management services of

EQ. Simply call
1-800-592-5489



TRUMBULL INDUSTRIES



Hydrostatic Tank Pressure Relief Valves in 4" and 6" sizes, wall or floor types.



See us at WEFTEC 98 in ORLANDO, Booth #2575 for other products related to the Waterworks industry

Circle 71 on card.

CO tester



The ECOM-EM CO tester is a small, handheld unit designed to meet the MSHA regulation requiring testing of CO emissions from diesel engines used in underground coal mines. Features include CO measurement to 4,000 ppm, exhaust and vacuum pressure testing, internal pump, backlit LCD display and more. ECOM America Ltd.

Circle 132 on card.

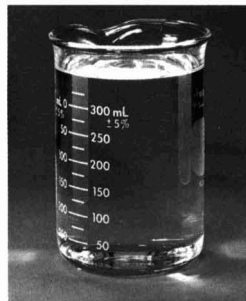
Water conservation project

New Logic International Inc. installed their VSEP® system at Hospital Central Services Associ-

ation in Seattle. The system will be used for wastewater treatment and water recycling at this laundry facility. The system is able to recycle up to 80 percent of the water used. New Logic International.

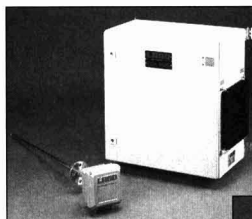
Circle 133 on card.

Dust suppressant



EnviroKleen® is non-toxic, environmentally friendly, oil-sheen free, colorless, odorless and safe for human, animal and plant life. It provides control efficiency in locations such as construction sites, indoor warehouses,

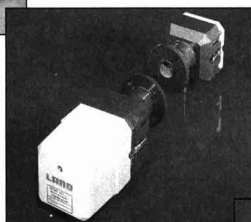
flue gas emissions monitoring



FGA Series Emissions Monitors

Model 4500MKII Opacity and Dust Monitor

Land Combustion is at the forefront of flue gas emissions monitoring technology with reliable, proven solutions. A wide range of products, combined with over 50 years of experience in the field, ensure all customer compliance requirements are met.



LANCOM Series II Portable Flue Gas Analyzer



a range of compliance monitors

**CO
O₂
NO_x
Dust
Opacity**

**LAND
combustion**

Division of Land Instruments International
Inc. 2525B Pearl Buck Road Bristol,
PA 19007, USA
Telephone: 215 781-0810
Facsimile: 215 781-0798
Toll Free: (in USA) 800 922 9679
E-Mail: sales@land-combustion.com
URL: <http://www.landinst.com/comb/>

intermodal operations, landfills, mining haul roads, steel mills and more. **Midwest Industrial Supply Inc.**

Circle 134 on card.

Asbestos software



ADAM is a Windows-based asbestos management, regulatory compliance and document preparation software system. It provides consultants, building owners and government agencies with a method to manage their asbestos information. It also generates survey reports and notification, material locations, abatement information and OSHA records. **EcoLogic Systems.**

Circle 135 on card.

Sampling probe



The Super Probe is designed with standard components plus a 2-inch outer sheath. The sheath is designed for efficient replacement of pitot, stack thermocouple and probe liners.

Geometric calibration of pitot is included. Wind tunnel calibration is available upon request.

Andersen Instruments Inc.

Circle 136 on card.



Lawsuit.

(magnified 20,000x)

It's legal action waiting to happen. Fact is, abatement site air clearance samples can contain plenty of asbestos that won't be seen with PCM. At McCall & Spero Environmental, Inc. you'll benefit from several Philips TEMs, unquestionably the most accurate and sensitive method for analysis of asbestos in air and water. MSE is a NVLAP certified lab, backed by a highly qualified staff of M.S. and B.S. scientists that specialize in asbestos analysis. You can have your results in as little as two hours and at a competitive price.

For more detailed information on our facilities or services, just call 1-800-841-0180.



13005 Middletown Industrial Blvd.
Suite H, Louisville, KY 40223
502-244-7135 • 800-841-0180
Fax: 502-244-7136

Circle 73 on card.

**YOU WOULDN'T BUY A CHEAP PARACHUTE.
YOU WOULDN'T DESIGN A CHEAP PACEMAKER.
YOU WOULDN'T MAKE A CHEAP CRASH HELMET.**

LET'S DISCUSS FUEL STORAGE SYSTEMS.

There are some things in business that are simply too important to cut corners. And yet every day, people do exactly that when choosing the one piece of equipment that must provide them protection from significant liabilities and exposure - their fuel storage system. Despite clear evidence to the contrary, many people still believe a quick-fix steel tank is an adequate answer. Fortunately, this attitude has never been fashionable at ConVault, which is why in every category that the government has set standards ConVault systems not only meet them, but in many cases exceed them. In areas where there are no standards, we have created our own benchmarks. ConVault also backs up its systems with a simple, unconditional, no-small-print warranty. Make the comparisons.

Is there a less expensive way to build tanks? To be sure. Ultimately, the question you must ask yourself is not whether you can afford to buy a tank built as well as a ConVault. The question is whether you can afford not to.

If we can assist you or your clients in solving your fuel storage problems in any way, please call 1-800-222-7099 for a confidential, no cost, no obligation assessment. ConVault can help.

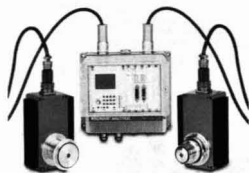


Call today for more information
and be sure to visit us at:

www.convault.com

1-800-222-7099

Refractometer



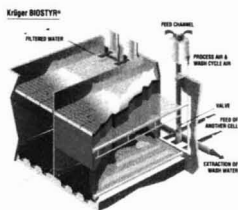
The Model REFRAC DS refractometer includes continuous measurement that is temperature-compensated and a super-

sensitive light detector that boosts resolution. It is free of signal drift, and not affected by color, turbidity, clouding, suspended solids or flow rate.

Rosemount Analytical.
Circle 138 on card.

Filtration process

The BIOSTYR® process provides tertiary treatment in less than 15 percent of the space required by conventional processes, according to the manufacturer. It pro-



vides solids removal to less than 15 milligrams per liter without clarifiers. It combines a biological reactor to degrade pollution and a phase separator to remove

the matter transformed by the purification. Krüger.
Circle 139 on card.

Alarm accessory



Gas Tech's new vibrating alarm accessory is designed for use with the 95 Series personal portable instrument. It has an integral clip that fits on a belt or shirt pocket. The vibrating alarm is lightweight and the size of a pager. It is powered by two AA alkaline batteries. Gas Tech Inc.
Circle 140 on card.

Water quality checker



The Model U-10 water quality checker measures pH, temperature, dissolved oxygen, conductivity and more. Twenty samples of data on six parameters can be stored in memory for recall, display and printout. User can select either a 2- or 10-meter interconnection cable between the electronics and the sensors. Horiba.
Circle 141 on card.

Sewer pipe

H₂SewerSafe™, a new line of sewer pipe and fittings, is designed for use in corrosive areas of the wastewater infrastructure. It features a fused calcium aluminate mortar lining called SewerCoat® that has exceptional resistance to hydrogen sulfide gas. Griffin Pipe Products Co.
Circle 137 on card.

Turbidimeter

The Micro 100 laboratory turbidimeter meets performance criteria specified by U.S. EPA method 180.1 for NTU mea-

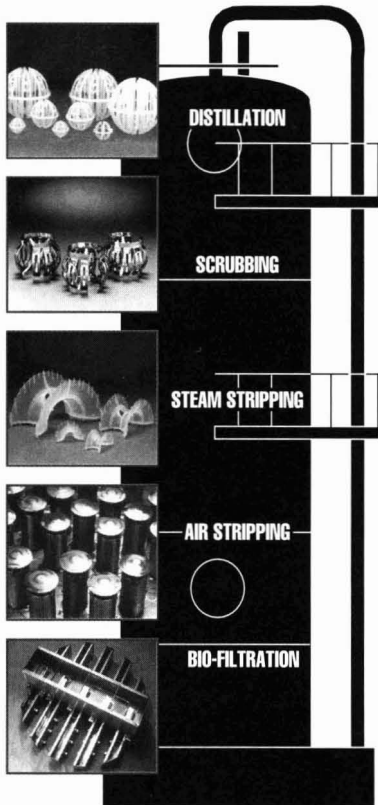
Optimize Your Packed Tower with Jaeger Internals

Get the most effective column packing and internals for air stripping and scrubbing towers.

Jaeger has supplied hundreds of air stripping and scrubbing towers with packing and internals from Maine to Hawaii.

- Jaeger Tri-Packs®, the Standard of the Industry in Random Plastic Packings
- Complete Line of Tower Internals
- Extensive Experience in Environmental and Process Applications
- NSF® Certified Products Available
- Quality Engineering Services
- The Largest Number of Successful Applications
- Responsive Service Attitudes to OEMs, Consultants, and End Users.

Put our years of experience and our computerized applications technology to work for you.



JAEGER

Superior performance by design™

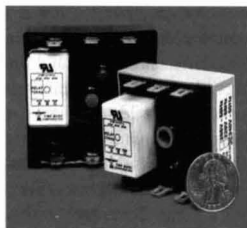
1611 Peachleaf • Houston, TX 77039 • Tel: (281) 449-9500 • Fax: (281) 449-9400
www.jaeger.com • (800) 678-0345



surement, and will accurately measure turbidity from 0 to 1,000 NTU and display the results to a resolution of 0.01. It features a simple menu structure, an RS-232 serial port and more. **HF Scientific Inc.**

Circle 142 on card.

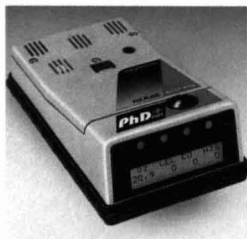
Phase monitor



The Model 2581 three-phase monitor protects any three-phase motor from loss of phase, low voltage and phase reversal. The voltage and phase-angle sensing circuit allows lost phases to be detected on a loaded motor, even when regenerated voltage is present. **Time Mark Corp.**

Circle 143 on card.

Gas detector



The PhD Plus confined space gas detector measures oxygen, combustible gas and up to two additional toxic gases. It is housed in a rugged, compact case designed for demanding environments. Snap-in NiCad or alkaline battery packs provide up to 12 hours continuous operation. **Biosystems Inc.**

Circle 144 on card.

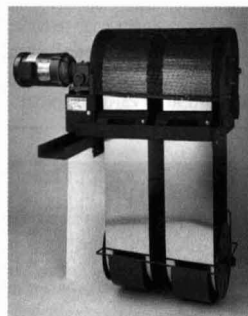
Draft cooling tower



Delta's newest draft cooling tower expands seamless corrosion proof plastic towers to larger capacities. The tower is available in seven different models, which range from the capability to handle 250 cooling tons to 500 cooling tons. The towers are designed to handle everything from routine applications to extremely corrosive. **Delta Cooling Towers Inc.**

Circle 145 on card.

Oil skimmer



The Multi-Belt Oil Grabber can reduce oil content to less than 5 ppm in water. It saves coolants by removing tramp oil and conserves parts wash water by removing oily contamination. It can be used in tanks with depths as shallow as 1 foot or as deep as 100 feet. **Abanaki Corp.**

Circle 146 on card.

Hydrocarbon analyzer



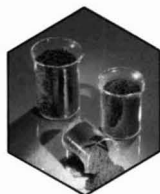
The Model 55C hydrocarbon analyzer is designed to measure directly both methane and non-

Discover the

POWER OF CARBON

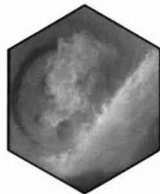
FROM ENVIROTROL

FULL SERVICE ACTIVATED CARBON SUPPLY:



ACTIVATED CARBONS

Envirotrol provides granular, pelletized, and powdered products for nearly all liquid and vapor phase applications.



REACTIVATION SERVICE

Custom reactivation recycles your carbon for a fraction of the cost of virgin carbon and eliminates the expense and liability of spent carbon disposal.

ADSORPTION SYSTEMS

Standard and custom designed adsorption systems from drum size to the industries' largest configurations may be purchased or leased.



Serving:

- Waste & Groundwater
- Solvent Recovery
- V.O.C. Control
- Food & Pharmaceutical
- General Air Filtration
- Chemical Process

(412) 741-2030 ● FAX (412) 741-2670



ENVIROTROL, INC.

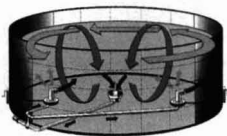
432 Green Street, P.O. Box 61
Sewickley, PA, U.S.A. 15143-0061
www.envirotrol.com

methane hydrocarbons. Its back-flushed gas chromatography system allows reliable measurements of non-methane hydrocarbons at sub-ppm concentrations. The Model 55Cs menu-driven software allows users to establish operating parameters and to control calibration and measurements.

Thermo Environmental Instruments Inc.

Circle 147 on card.

Mixing system



The JetMix™ Vortex Mixing System is engineered to take advantage of a tank's natural hydraulic characteristics to achieve optimum mixing of solids. It is capable of operation on an as-needed basis due to its ability to quickly

and completely resuspend solids.

Liquid Dynamics Corp.

Circle 148 on card.

VOC monitor



The new 301-A VOC monitor is ideal for monitoring hazardous air pollutants at the fence line or in the process. When it is coupled with the new Model 650 sparging system, ppb levels of a variety of VOCs in water can be measured. This instrument is capable of performing spot-checking for waste treatment, municipal treatment and industrial effluents. **HNU Systems Inc.**

Circle 149 on card.

Grinder maintenance



The new top stack tightening feature on the Muffin Monster grinder allows maintenance to be taken care of in three steps—remove the back plate, tighten the cutter stack and reattach the plate. This feature allows users to perform stack tightening within minutes and the unit does not have to be removed from its channel.

JWC Environmental.

Circle 150 on card.

Mini gas conditioner

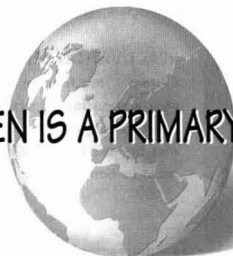


The new mini gas conditioner is designed to be used with Testo's entire product line of combustion flue gas analyzers. It is an active moisture removal system that increases accuracy and protects the analyzer. The mini-gas conditioner is ideal for low range measurements, cooling the sample gas, long-term measurements and high moisture gas streams. **Testo Inc.**

Circle 151 on card.

AICHe Publications...Because, in the CPI,

GREEN IS A PRIMARY COLOR



Designing and running processes that reduce wastes and emissions is not only the right thing to do, it's also the smart thing...as good for the bottom line as it is for your community and the planet. AICHe publications can help, with titles like:

- *Environmental Progress*—a quarterly magazine that covers all aspects of pollution control, including air, water, and solid and liquid wastes.
- Environmental titles from *DECHEMA*, the German chemical engineering society, addressing such issues as industrial wastewater, and bioassays for soils.
- *The Environment: Air, Water, & Soil and Environmental Management and Pollution Prevention*—PEP Series books which compile the best articles from AICHe literature on critical industry issues.

For more information on AICHe environmental products, call 1-800-242-4363 and request a copy of our *Publications Catalog*.

Circle 76 on card.

On-line Analysis for Oil in Water



The TD-4100 Continuous On-Line Monitor

Detect leaks of petroleum products in non-contact cooling water, boiler feed water, effluent water, and process water. The TD-4100 features a non-fouling flow cell to significantly reduce maintenance, and detects from ppm to ppb! Supports NPDES discharge permits and correlates to standard methods.



TURNER DESIGNS

845 W. Maude Avenue • Sunnyvale, CA 94086
(408) 749-0994 • FAX (408) 749-0998 • <http://www.turnerdesigns.com>

See us at WEFTEC, Booth #4011 • **Circle 77 on card.**

October 1998

Steam recovery system



Dedert's low-pressure steam recovery system enables industrial plants with steam pressure as low as 15 psig to reduce the utility, fuel and steam costs of carbon adsorption solvent recovery. It recycles heat from carbon-bed regenerative steam, cutting fresh steam consumption by as much as 50 percent.

Dedert Corp.
Circle 152 on card.

Oxygen analyzer



The Series 1200 oxygen analyzers provide accurate monitoring of excess air and combustion efficiency under any conditions. The series has three major components—the probe, the control or display unit and the optional gas calibration flow control unit.

Land Combustion.
Circle 153 on card.

Biofiltration system

The MicroBiotic™ carbon biofiltration systems employ microorganisms to degrade and destroy up to 99 percent of VOCs. Carbon media at 6 to 10 millimeters

Your BIGGEST environmental problem could have a microscopic SOLUTION.



Industrial customers around the world have discovered the benefits of bioaugmentation for tackling a wide range of waste treatment problems. Sybron, a leader in applied environmental microbiology, offers the products, training and support to help you apply microbial solutions for:

- Compliance with organic limits
- Shock load resistance
- Degradation of specific organics
- Nitrification
- Rapid upset recovery
- Cold weather operations
- Effluent toxicity
- Pretreatment
- Grease management
- Collection system maintenance
- Solid and liquid waste odors

SYBRON CHEMICALS INC.

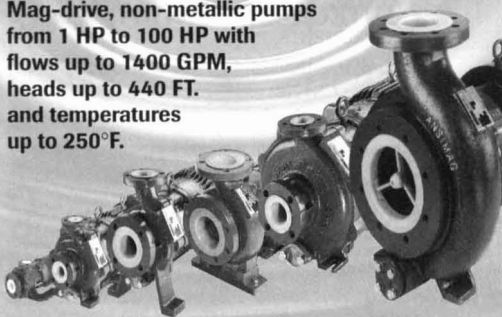
For More Information Contact
Maryland Biochemical
P: 800-771-7252 • F: 410-734-9102

or Sybron Chemicals Inc.
P: 800-678-0020 • F: 609-894-8641
(Call 609-893-1100 in NJ)

Circle 80 on card.

LARGE Or small ALL THE SIZES YOU NEED

Mag-drive, non-metallic pumps
from 1 HP to 100 HP with
flows up to 1400 GPM,
heads up to 440 FT.
and temperatures
up to 250°F.



Unparalleled NEVER LEAK™ performance with corrosive liquids such as sulfuric acid, hydrochloric acid, bleach, caustic soda and many other solvents.

Made in the USA

ANSI MAG®

Simple By Design™

ANSIMAG, INC. • 1090 Pratt Blvd. Elk Grove Village, IL 60007, U.S.A.
(847) 290-0482 • FAX: (847) 290-0481 • Internet: <http://www.ansimag.com>
A part of Sundstrand Fluid Handling

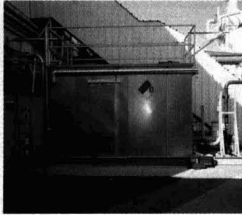
MAKE THE RIGHT REMEDICATION CALL

It's up to you to make the right call on remediation equipment for soil and groundwater cleanup. You'll want the professionals at NEPCCO on your team to design an integrated system to meet your site's unique requirements. With over 900 system installations since 1981, nobody matches the proven knowledge, experience and engineering support of NEPCCO's remediation experts. The fast, reliable and cost-effective solutions to your environmental remediation challenges are just a call away. 800-277-3279 / www.nepcco.com



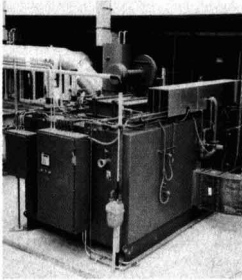
NEPCCO

ENVIRONMENTAL SYSTEMS & TECHNOLOGIES



provides long-term media guarantee on compaction and degradation, low operational and maintenance costs and no natural gas consumption. Geoenergy International Corp.
Circle 154 on card.

Thermal oxidizer



The Millennium™ is a regenerative thermal oxidation system designed for low air flow applications. It is engineered to achieve VOC destruction rates up to 99 percent with 95 percent nominal thermal efficiency, and handles process air flows as low as 2,000 scfm.

MEGTEC Systems.
Circle 155 on card.

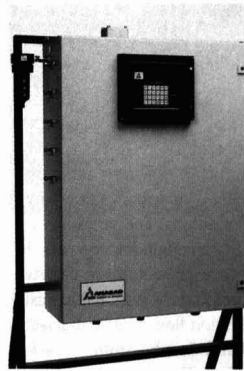
Computer enclosures



Industrial Guardian enclosures are designed to protect personal computers and other sensitive electronic equipment in hostile environments. Available in stand-alone, table-top, or pedestal

mounted versions, the enclosures are crafted from heavy gauge steel with a durable powder coat finish. BR Metal Technology.
Circle 156 on card.

Emissions monitoring



The MicroCem is a field-proven continuous emissions monitoring package aimed at the smaller size boiler, furnace, incinerator, combustion turbine, engine and process plant market. Gas sensing is provided by an advanced

microprocessor controlled multiple sensor package. Anarad.
Circle 157 on card.

Emissions analyzers



The ENERAC™ 3000 series portable emissions analyzers include advanced SEM™ sensors. Automatic features ensure accurate and reproducible compliance level data that can aid in reducing both operational and compliance risks. The 3000 series is capable of monitoring oxygen, carbon, carbon dioxide, nitrogen,

SUBMERSIBLE PRESSURE TRANSMITTER FOR LIFT STATIONS



- All welded titanium construction
- 5 year corrosion warranty
- Elastomeric flush diaphragm to prevent buildup of grease and biosolids
- UL/FM/CSA Intrinsically Safe Class I, Div 1, Groups A, B, C and D
- Vented polyurethane cable



Druck Incorporated
 4 Dunham Drive, New Fairfield, CT 06812
 (203) 746-0400 Fax: (203) 746-2494
<http://www.druckinc.com>
 email: sales@druckinc.com
 Druck Group Companies: Druck • Ruska Instrument • Pressurements • Unomat

THE UNIVERSAL TECHNOLOGY for VOC's in Air

Just Got Smaller

ENTECH
 INSTRUMENTS, INC.

introduces the MiniCan and the CS1200 passive flow controller for:



Landfill Gas Analysis



Stack Gas Analysis



Indoor Air Quality



Emergency Response

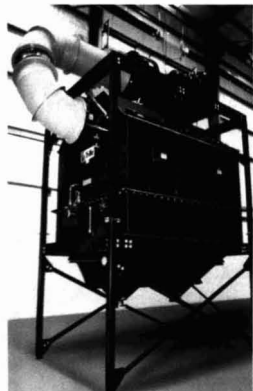


Industrial Hygiene

2265-A Ward Ave, Simi Valley, CA 93065 (800) 555-8034 <http://www.entechinst.com/entech/home.htm>

nitrogen oxide and sulfur. Energy Efficiency Systems Inc. **Circle 158 on card.**

Wet dust collector



The Whirl-Wet-AG is an all-polypropylene, zero corrosion collector of high loadings of dust. The unit is continuously self-cleaning and will capture 99.5 percent of all dust 2 microns and larger. It operates at a very low noise level, has no

internal moving parts and uses very little water. Tri-Mer Corp. **Circle 159 on card.**

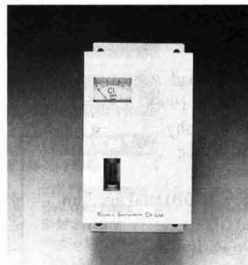
Mixer



The Chemineer® Fixed-Mount JT Series Mixer is designed for rapid and uniform blending of moderately viscous fluids in volumes up to 10,000 gallons. Features include a double-reduction, helical gear design for in-line speed production; a power range from ¼ to 5 horsepower;

and standard speeds of 310 and 170 rpm. Chemineer Inc. **Circle 160 on card.**

Gas detectors



The Bionics SH-1003HT and SH-1007HT are "smart" instruments designed for the continuous detection and measurement of toxic gases in installations where access to the sensor system is restricted. They are extractive, electrochemical detection systems capable of sampling areas up to 30 feet away. PureAire Monitoring Systems Inc. **Circle 161 on card.**

Training kit



Stormwater Best Management Practices (BMP) training kit version 2.0 and Spill Prevention and Response (SPCC) training kit include 18- to 20-minute videos designed to help train employees and contractors on how to comply with applicable regulations. The kits also include trainer's manuals and quizzes to evaluate employees' understanding of subject matter. EXCAL Visual Communications. **Circle 162 on card.**

If you're not reading Stevens' newsletters ... you should be.

If you need to keep on top of the latest environmental news coming out of Washington, D.C., you should be reading Stevens' newsletters. We track legislation and provide timely, comprehensive and objective reporting on areas that concern you most: Environmental Protection, Air Quality, Hazardous Materials, Water Management and Water Pollution.

We understand that you need the most current information possible. That's what we're here for.

Stay informed. You can't afford not to. Call today.

(972) 687-6700

Environmental PROTECTION NEWS

HOT SPOTS

User Guide to DRUM HANDLING EQUIPMENT



PUMPS, FAUCETS, MIXERS

CARRIER/ROTATORS

CRUSHERS

DUMPERS

COVERS

DOLLIES

JACKS

CALL FOR YOUR COPY TODAY



VESTIL MANUFACTURING COMPANY
P.O. Box 507, Angola, IN 46703
Ph. (219)665-7586 Fax (219)665-1339
E-mail: vestil@dmci.net Website: www.vestil.com

Circle 83 on card.

HOT SPOTS

Western Research Institute

announces the U.S. DOE Spill Test Data Base

Data repository for mitigation and dispersion tests conducted at the
U.S. Department of Energy's HAZMAT Spill Center

Files available for download

- All available data since 1990
- Spill research bibliography
- Spill research mailing list

www.westernresearch.org/projects/STFDBDataPage.htm

1200 - 9600 BAUD

8 data / 1 stop / No Parity

• For more information •

Phone (307) 721-2011

Fax (307) 721-3455

WRI WESTERN RESEARCH INSTITUTE
Leadership in Energy and Environmental Technology

Circle 165 on card.

FREE
CATALOG!

YOU CAN SAVE THOUSANDS

Perform Hazardous Waste Operations and Emergency Response

HAZWOPER

Training in-house using New Environment, Inc.'s Train-The-Trainer Curriculum!

Call Today For A FREE Catalog

1-800-732-3073

Circle 166 on card.

Classifieds

Recruitment



SALT LAKE
COMMUNITY COLLEGE

Faculty Position in Environmental Technology

(#98039) - Teach Environmental, Health and Safety, and Hazardous Material classes to college-level students. Prepare, teach, and update technical material for use in classroom and laboratory settings. M.S. degree in a related field and three years of full-time related, paid work experience in the field of Health and Safety and Hazardous Material required. Teaching experience and professional certification and/or licensing preferred. Demonstrated knowledge and experience with OSHA, EPA, and DOT regulations. This position closes November 2, 1998. For complete requirements see position announcement (hard copy, web site or job line 801-957-4133). To be considered for employment, please submit an official Salt Lake Community College employment application, resume/vitae, cover letter, and transcripts to:

Salt Lake Community College

Human Resources

4600 So. Redwood Road

P.O. Box 30808

Salt Lake City, Utah 84130

Phone: (801) 957-4210

TTY: (801) 957-4692

Fax: (801) 957-4721

www.slcc.edu/hr/hr.htm

AA/EO Employer



Opportunities For All Environmental Professionals

- Profit Center Management
 - Senior Technical Positions
 - Project Management
 - Consulting and Industry
- Air Quality • Water/Wastewater • Solid Waste • Hazardous Waste
Groundwater • Remediation • Engineering Design • Transportation

REPRESENTATIVE CLIENTS:

OHM • Dames & Moore • Foster Wheeler • ICF Kaiser • ESE
BNTB • Bristol Meyers • Metcalf & Eddy • Brown & Root • ASI
Amoco • Exxon Chemical • Brown & Caldwell • Earth Tech
Harding Lawson • EMCOR • Rust • Kodak • Shering-Plough
CH2M Hill • CDM • Archer Daniels • Hoechst Celanese • Merck

Coast to Coast Contacts and Network Second to None!!

Brian MacLinnac, C.P.C., President / Angela Swope, V.P. Administration
21514 Gulfstar Court Cornelius, NC 28031
■ Phone: 704-896-3336 ■ Fax: 704-896-3337

**TO ADVERTISE
IN THE CLASSIFIEDS
CALL David Schwartz
TODAY at
(972) 687-6727.**

When you use our ManageIT™
software, your hazardous waste
compliance will seem like child's play.

Features

- Suite of nine integrated software applications
- Up-to-date, interactive MaxChem database of over 10,000 cross-indexed chemical materials
- Easiest manifest and label preparation and print capability
- Generates sophisticated graphing and customized reports in a variety of formats
- Patented "SmartWaste" electronic decision making

For more information and a free set of demo discs:

Call: 1-800-463-4241, or

Email: dhenderson@itcrp.com or fax to 925-227-0307.

Saves time, saves money,
reduces compliance
concerns!



IT INTERNATIONAL
TECHNOLOGY
CORPORATION

www.itcorporation.com

Circle 168 on card.

Classifieds

Onion Enterprises

Specializing in Thermal and Biological Oxidation



Home of the Regenerative Oxidizer the Envirocot

Call Toll Free
877-566-7007

Circle 167 on card.

Equipment rental

INTEK/RENT-ALYZER

ANALYZER RENTALS

for

- ENVIRONMENTAL
- IH/Safety • WATER
- FUGITIVE EMISSIONS
- IAQ • CEMS

Celebrating 8 years of Rental Service

1-800-323-6527

RENTALS

To place a classified ad, contact David Schwartz today at:
(972) 687-6727.

Maps/aerials

Carolina Global Maps "The Professionals' MapStore"SM

- ★ USGS Topographic Maps
 - National Coverage
 - Overnight Delivery Available

- ★ Aerial Photography
 - Extensive Archives
 - Custom Flown

- ★ Digital Topos & Photography
 - Vector & Raster Topos
 - Custom Digitizing, Vector or Raster

800-248-6277 919-757-2511
Fax 800-321-6277 919-757-0959
www.LBAGroup.com Email: CGMaps@LBAGroup.com

Circle 169 on card.

WANT TO GET NOTICED!
CALL David Schwartz
(972) 687-6727.

Products and services

DEWATERING EQUIPMENT



Belt Filter Presses
Belt Thickeners
Skid Systems
Mobile Systems
Free Lab Testing

FRONTIER TECHNOLOGY, INC. fax: 616-673-9629

Circle 171 on card.

SAFETY CLIPART

Each of the following disks contain 140 images:

MSDS INFO

CONSTRUCTION

CONFINED SPACE

DOT/FLEET

ERGONOMICS

FALL PROTECTION

FIRE SAFETY

GENERAL SAFETY

HAZARD COMMUNICATION

LOCKOUT/TAGOUT

MATERIAL HANDLING

MEDICAL PPE

SAFETY FIRST

\$39.00 PER 3.5" DISK

CD ROM 2000+ IMAGES \$299

NEW PRODUCT: SAFETY SCREENSAVERS

FREE CATALOG!! PURCHASE ORDERS ACCEPTED
By mail or internet www.flash.net/~sstx
Safety Services of Texas
PO Box 160932 Austin, TX 78716
1-800-767-8003/ 512-280-1929(FAX)

Circle 170 on card.

Software

Visit our redesigned web site at
www.eaglecmmms.com
and check out our ProTeus Maintenance Management Software...designed to fit your needs!

- Year 2000 compliant
- Audit Trail for ISO 9000 certification
- MS Office™, Binder File™ integration
- Interface to Johnson Controls' Metaeys® Control System
- Internet/Intranet and E-mail connectivity
- User-friendly, flexible, full-featured system
- Many other systems to fit your company's needs

Eagle Technology Mequon, WI 53092 USA
Ph: (414) 241-3845 Fax: (414) 241-5246
Toll Free: (800) 388-3266 E-Mail: eagle@execpc.com

Circle 172 on card.

Locks

EP **PadLocks**

Master Lock
Wilson Bohannon, Sesamee

• Fast Quotes • Best Prices
• Quick Ship • Free Info

LockMasters

1-800-461-0620 • Fax 850-914-9754

Brass Steel Keyed Alike Master Keyed Any Size Anywhere

RMP View™

Risk Management Plan (RMP) - 112(r)

- Offsite Consequence Analysis
- Interfaces with SLAB View
- Report Ready Output
- Electronic Submission

FREE EPA codes and demos from our Website:
www.lakes-environmental.com

Lakes Environmental

Tel: (519) 746-6157 • Fax: (519) 746-0793
e-mail: info@lakes-environmental.com

Circle 173 on card.

Training & consulting

Catch the Wave!

Web Based 8-Hour
HAZWOPER

Training

Only \$69 - or train eight or more for \$560

What a value!

www.natlenvtrainers.com
or call 423-693-9880

PROFESSIONAL ENVIRONMENTAL MANAGEMENT

Water Quality Air Abatement Corrective Action

Pollution Control Equipment

OSHA Training

Compliance Specialists

Atlanta, GA 888-793-6266

Circle 174 on card.

SAFETY IS NO ACCIDENT. GET OUR HEALTH/SAFETY TRAINING BROCHURE.

Maple Woods Community College
Call 800/841-7158
Surf www.btcenter.com

THE METROPOLITAN COMMUNITY COLLEGES
BUSINESS & TECHNOLOGY CENTER

OSHA Authorized Training Center.
KC, MO.

October 1998

Environmental Protection

69

Professional directory



KANOMAX

Your Market Leader in
Fine Measure Instruments

- ◆ FLUID
- ◆ AEROSOL
- ◆ SYSTEM
- ◆ ENVIRONMENTAL



Call Today

Kanomax USA, Inc.

212-489-3755 FX: 212-489-4104
250 W. 57th St • Suite 816 • New York 10107

CONTAINER BAG LINERS



Leak Protection for Roll-Offs
Dump Trailers and Railroad Cars
PACKAGING RESEARCH & DESIGN CORP.
P. O. Box 678, Madison, Mississippi 39130-0678
TOLL FREE 1-800-833-9364

TO ADVERTISE
CALL David Schwartz TODAY:
(972) 687-6727.



ASBESTOS ANALYSIS LEAD ANALYSIS

SINCE 1981

NY • NJ • CA • GA • MI • TX • NC • WA
(800) 220-EMSL



OCT
Operator
CERTIFICATION
Training, Inc.

PO Box 332, Gladstone, OR 97027 • (503) 650-9735 • FAX (503) 650-9329

English to Spanish Translations

Water / wastewater industry translations of letters, documents, O & M manuals, etc. OCT, Inc., Educational Consultants, P.O. Box 332, Gladstone, Oregon 97027. For more details and pricing, contact Sharon Gilbert at (503) 650-7606.

Off Campus Degree Programs

EARN YOUR B.S. or M.S.
Through Distance Learning

Degree Programs:

- Environmental Engineering
- Occupational Safety & Health
- Business Administration
- Computer Science
- Criminal Justice
- Health Administration
- Human Resource Mgmt.

Certification Programs:

- Certified Environmental Compliance Manager
- Certified Ergonomics Compliance Director
- Certified Pharmacy Technician

- Licensed and Accredited
- Credit For Life Experience Awarded
- No on Campus Requirements
- Study at Your Own Pace
- Affordable Tuition Plans Available

Call For Free Catalogue

1-800-977-8449 ext. 517

**Columbia
Southern
University**

Orange Beach, AL 36561

or visit us at:
www.cofsouth.edu



One Stop Bioremediation

- BIO PRODUCTS - Bio-stimulators & nutrients
 - BIO EQUIPMENT - Bio-Chisel™ aerates & injects
 - BIO SOFTWARE - Project management software
 - BIO SCHOOL - Classroom and field training
 - SUBCONTRACTING - Extensive field experience
- For a complete Bioremediation Guide, call us at (830)426-3011 or FAX (830)426-2288.



Medina Bioremediation Division, Hondo, TX

ENVIRONMENTAL & SAFETY SERVICES, INC.

ENVIRONMENTAL HEALTH & SAFETY MANAGER
CERTIFICATE COURSE
Independent Study Format

- Hazardous Materials • Air Pollution Control
- CERCLA/SARA • Water Pollution Control
- Ergonomics • Plans & Programs
- Recordkeeping • Hazwoper • Hazcom • Confined Space Entry • Lockout/Tagout • Bloodborne Pathogens • Personal Protective Equipment
- RCRA/HSWA • Civil & Criminal Liability • Hazardous Waste • Medical Surveillance
- Assessments/Audits

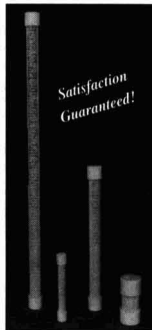
Accredited by the National Registry of Environmental Professionals for Registered Environmental Manager (REM) and recognized by the Institute of Hazardous Materials

Management for Certified Hazardous Material Manager (CHMM). Also GEUs from UNC system.

PRICE: \$595.00 (all materials included)
CALL OR WRITE FOR DETAILS 800-447-6742
Box 3394 Wilmington, NC 28406

DE-ODOR ROD™

THE NEW REVOLUTION IN ODOR CONTROL!



- Slot-Ventured Intake Design
- U.S. Patent Approved
- Solar Rechargeable
- Low Maintenance
- Naturally Attracts & Absorbs Ammonia & Hydrogen Sulfides

DE-ODOR ROD™

contains natural-selected ionic minerals which are uniquely effective in attracting and absorbing Ammonia and Hydrogen Sulfides that cause ODORS in: Lift Stations Wet Wells, Vents, Scum Hoppers, Utility Vehicles, Offices, Restrooms, Etc. (Also can be effective in aiding against toxic run off.)

ENVIRONMENTAL CARE CENTER, INC.

10214 Old Ocean City Boulevard • Berlin, Maryland 21811

1-800-322-1988 • Fax: 410-641-2139

VISA, MASTERCARD, C.O.D. ACCEPTED

Circle 175 on card.



Critical Filtered Vacuum Systems

Completely self-contained, critical filtered vacuum systems capable of conveying asbestos fibers and contaminated solids, slurries and liquids. Available filtration includes HEPA, nuclear waste, carbon, or product specific.

www.vector-vacuums.com
VECTOR TECHNOLOGIES LTD..

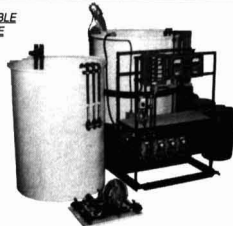
Milwaukee, WI 53209

414-247-7100 • 800-832-4010

Circle 176 on card.

BATCH TREATMENT

AFFORDABLE
EFFECTIVE



STANDARDIZED METHODS • DOZENS OF APPLICATIONS

IPEC GLOBAL

TEL: (909) 930-0999
FAX: (909) 930-0900

www.ipecglobal.com

Professional directory

REPAIRS

SAMPLING PUMPS REPAIRED BATTERY PACKS REBUILT

Personal Pumps & Hi Vol Pumps-

Most makes and models repaired
PARP'S Repaired - Batteries Rebuilt
Fast Turnaround - Warranty Given



Save 40% - 50% on
repairs and batteries
The Perm-O-Fix
Acetone Vaporizer sold

Quality Service Since 1987

Atlanta Lab Systems
115 Cedar Trace, Roswell, GA 30075
(770) 993-7850

Circle 177 on card.



DAMES & MOORE

A DAMES & MOORE GROUP COMPANY

- Design
- Engineering
- Environmental Programs
- Construction Services

Tel: 213 996 2200 E-mail: exo@dames.com

FULL SERVICE • WORLDWIDE

AQUATROL?

Supervisory Control and Data Acquisition (SCADA)
PLC Telemetry/Computer/System Integration
DLC Controls 25 Years Experience

Aquatrol Additions & Repair

System Control Services Corp

366 N. Prior Ave., Ste. 206, St. Paul, MN 55104

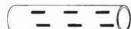
PH (612) 647-9955, Ext. 2 FAX (612) 647-9977

Circle 178 on card.

ATLANTIC SCREEN & MFG., INC.

Products for:

- Water Wells
- Petroleum Inspection Wells
- Groundwater Monitoring
- Zone Sampling Equipment
- Dewatering
- Landfill & Construction
- Pumps



118 Broadkill Rd. • Milton, DE 19968

302-684-3197 FAX 302-684-0643

Professional Certification Earned At Home



Orange Beach, AL 36561

Columbia Southern University

CERTIFIED ENVIRONMENTAL COMPLIANCE MANAGER
CERTIFIED ERGONOMICS COMPLIANCE DIRECTOR

Call For Information
1-800-977-8449
ext. 914

Continuing Education is Essential

RENTAL

- Aerosol Monitors
- Air Sample Pumps
- Breathing Apparatus
- Confined Space Entry Equipment
- EMF Meters
- Interface Probes
- Gas Detectors (CO, H₂S, LEL, CO₂, O₂, Hg, ...)
- IAQ (CO, CO₂, TEMP, RH, ...)
- Noise Monitors
- VOC Detectors (PID/FID)
- Velocity Meters
- H₂O Quality Checkers (PH, DO, COND, TURB, ...)



ASC Professionals

CALL TODAY FOR FREE CATALOG 1-800-327-4260

WWW.ASCPRO.COM

LOOK FOR US ON THE WEB!

Circle 179 on card.

Hazardous Waste Drums Specializing in Overpaks U.N. APPROVED DRUMS

New and Reconditioned Steel • Plastic • Fiber
5 to 110 Gallons

Cubic Yard Boxes UN (x rated) with Poly Liners
One Drum to Truck Loads Shipped Anywhere Prices Depend on Quantity

If we do not stock a special drum, we will get it for you.

JAMES T. WARRING SONS, INC.

4545 "S" Street, Capital Heights, MD 20743

(301) 322-5400 — (301) 925-8874 FAX

BIOLOGICALLY ELIMINATE

- AMMONIA
- NITRATE
- NITRITE



MUNOX®

WASTEWATER INOCULANT



1-800-553-7785

UET

UNIVERSAL ENVIRONMENTAL TECHNOLOGIES, INC.

COMPLETE SITE REMEDIATION SERVICES AND SYSTEMS

- REMEDIAL DESIGN SERVICES
- 2" WELL PRODUCT RECOVERY
- HEAVY/VISCOUS OIL ("HORSE") RECOVERY
- DIESEL/#2 OIL/GASOLINE PRODUCT RECOVERY
- CHLORINATED SOLVENTS SYSTEMS
- SOLAR POWERED SYSTEMS
- SOIL VACUUM/SPARGING SYSTEMS
- VAPOR/GROUNDWATER TREATMENT SYSTEMS
- CUSTOM DESIGNED SYSTEMS

CALL 1-800-858-7736 OR FAX 1-888-838-7736
OR EMAIL TO: UETM@AOL.COM

END BIRD POLLUTION!

BIRD-X



BIRD CONTROL SPECIALISTS

800-662-5021 www.bird-x.com

Circle 180 on card.



AMERICAN AQUATIC TESTING, INC.

- NPDES Compliance Biomonitoring
 - Consulting Services
 - Customized Studies
 - NJ Certified Lab #77682
- 1111 Union Blvd.
Allentown, PA 18103
(610) 434-9015
(610) 434-2510 fax

Circle 181 on card.

SPEEDI-BERM

Secondary Containment Systems

ONE PIECE! FULLY COLLAPSIBLE AND PORTABLE

- INSTANT SET-UP; JUST UNFOLD
- SAFELY COLLECTS LEAKS AND SPILLS
- RESISTS MOST FUELS AND CHEMICALS
- USED BY U.S. ARMY, NAVY, MARINES ETC.

THE ESSENTIAL HAZMAT TOOL
IN STOCK FOR FAST EMERGENCY SERVICE

AATL 1-800-526-5330

Aero Tec Laboratories Inc.
Ramsey, NJ 07446-1251 USA
Tel: 201-825-1400 Fax: 201-825-1962
e-Mail: aertec@cybernex.net

Circle 182 on card.

Hydrocarbon Environmental Recovery Systems

- Microbes
 - Spill Kits
 - Soil & Water Trmt
 - Dealerships
- (210) 497-8980 Fax: (210) 497-4227
See our WEB Page @
http://www.adwizards.com/hers
P.O. Box 701275, San Antonio, TX 78270

Professional directory

Automate Site Monitoring

VadoScan[®] Systems

- Choose palm-size loggers or multi-channel systems
- Sensors for oxygen, temperature, pressure, water level, hydrocarbons
- Simple to operate
- Field proven, long sensor life
- Low cost, from \$438/monitoring point

Call for details: BioRenewal Division,
Microbac Laboratories, Inc.
(888) 276-8908, e-mail at: info@biorenewal.com
http://www.biorenewal.com

Circle 183 on card.



Some environmental companies
require a closer look.

- Site Remediation Services
- Environmental Claims Administration
- Pollution Prevention
- Air Monitoring & Permitting

14K World's Fair Drive
Somerset, NJ 08873
1-888-556-6545 Phone: 732-356-0560
Fax: 732-356-6440

The latest in cubic yard boxes

For haz & non-haz solid waste

Environmental Container
Call 1-800-278-3626

Circle 184 on card.

LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Ground-Water and Environmental Engineering Services

Water Supply • Contamination • Modeling
Dewatering Permitting



Trumbull, CT
(203) 452-3100
Offices Nationwide
EST. 1944

ENVIRONMENTAL AND INDUSTRIAL
SAFETY INSTRUMENTS

RENTAL



At MSR, we measure our success by your
level of satisfaction. That's why we carry a wide
selection of instruments for all your needs.

FDS • Confined Space Monitors
Dust Monitors • CO₂ Analyzers
Water Quality Meters • PIDs
Site Well Purge Pumps
Air Sampling Pumps
Toxic Gas Monitors

800-775-1738
MILCO SAFETY RENTAL, INC.

IATL

International Asbestos Testing Laboratories

ASBESTOS AND LEAD LABORATORY SERVICES

AIHA - NLLAP - NVLAP
NY State ELAP Accredited

QUALITY ANALYTICAL
SERVICES SINCE 1987

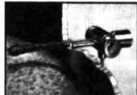
(609)-231-9449

16000 Horizon Way, Unit 100
Mt Laurel, NJ 08054

Dynatrot[®]

Level Detection

DUST COLLECTORS



Automation Products, Inc.,
3030 Maxroy Street, Houston, Texas 77006-6294 USA
Fax 713-869-7332 Phone 800-231-2062 J540-CL111

Circle 185 on card.

Earn a Bachelors, Masters, or Ph.D.

Take courses using texts/phone/mail/email

No classes. Low costs.

COLUMBIA PACIFIC UNIVERSITY

105 Digital Drive, Novato, CA 94949

800-552-5522 www.cpuniv.edu

Portable Sludge Dewatering Services

- Pressure Filtration • Belt Filter Press • Centrifuge
- Sludge Dryer • Dredging • Equipment Rentals



PHILIP SERVICES
INDUSTRIAL SERVICES GROUP
Formerly J.D. MEAGHER/ALLWASTE, INC.
P.O. Box 752 • Westboro, MA 01581 • 800-272-7338 PH • 888-491-7400 FAX

NEED DRUMS TOMORROW? CALL TOLL-FREE TODAY! 1-800-366-7044

- STAINLESS STEEL DRUMS
- STEEL DRUMS
- POLYETHYLENE DRUMS
- SALVAGE & OVERPACK DRUMS
- PAILS AND CANS
- FIBER DRUMS
- HAZARDOUS WASTE DRUMS
- DRUM ACCESSORIES



54 Veronica Ave • P.O. Box 6140
Somerset, New Jersey 08875-6140
TEL: 732/435-0020 • FAX: 732/435-0040

OUR REPUTATION IS STAINLESS.

Disposable Bailers

SSI Bailer Prices
Are Coming Down to Earth!!!



DISPOSABLE BAILERS

AS LOW AS

\$49.50 CASE

Distributorships Available

SUPERIOR QUALITY

Call today for FAST delivery
at TERRIFIC PRICES!

Sampling Specialties, Inc.

Call for Complete Catalog

800-256-8345

Circle 186 on card.

Environmental Education Leading to a Professional Environmental Designation

Short one and two day courses
offered in 20 cities nationwide.
Hands-on Site Assessment and
Screening courses lead to Envi-
ronmental Assessment Consult-
ant (EAC) designation. Call
1-800-531-5333 for free catalog.

Lincoln
Graduate
Center

303 W. Cypress
San Antonio, TX
78212

No 97496



TO ADVERTISE, CALL
David Schwartz
TODAY AT

(972) 687-6727

Professional directory

Flowmeter Rentals & Services

PSC offers short term rental & technical services using precision portable non-intrusive flow or energy flowmeters for Water & Energy Conservation Surveys or to verify compliance to EPA requirements, as well as:

- Leak Detection
- Balancing
- Calibration

Performance Survey Corporation

155 Plant Ave., Hauppauge, NY 11788
1-800-275-8478 Fax (516) 231-3334

AIR DISPERSION MODELING COURSES.

Practical, "how to" courses customized to your local area, including state permitting. Advanced Modeling for Permits and 112(r) RMP Modeling courses also conducted.

Austin, TX - 9/14-16
Asheville, NC - 11/9-13
Tampa, FL - 1/26-28

Chicago, IL - 3/22-24
Asheville, NC - 5/17-21

BEE-LINE

TRAINING
www.beeline-software.com
e-mail: info@beeline-software.com



828/258-1895 Fax 828/258-1821

**TO ADVERTISE IN THE
CLASSIFIEDS, CALL
David Schwartz
TODAY AT
(972) 687-6727**

Referral directory

Air dispersion modeling software

Bee-Line Software - P O Box 7348, Asheville, NC 28802. (704) 258-1895, FAX: (704) 258-1821.
E-Mail: beest@beeline-software.com,
Internet Address: www.beeline-software.com.

Leaders in air dispersion modeling software and training.

See our ad in Classifieds

Asbestos analysis

Precision Analysis Inc. - 22 Avieto Court, Florissant, MO 63031, PH/FAX: (314) 838-5052.

Bailers - Water Sampling

Sampling Specialties, Inc. - 6834 Flintlock St., Houston, TX 77040. (713) 466-4940.

Manufacturers of quality, competitively priced water sampling bailers. "SSI bailer prices are Down to Earth"

See our ad in Classifieds

Bioremediation

Medina Agriculture Products Co. Inc. - PO Box 309, Hondo, TX 78861. (210) 426-2288.
Full line of products for bioremediation and Environmental cleanup.

See our ad in Classifieds

Consultants

Leggette, Brashears & Graham Inc. - 126 Monrow Turnpike, Trumbull, CT 06611. (203) 452-3100, FAX: (203) 452-3122.

Professional groundwater and environmental engineering services.

See our ad in Classifieds

SSG Incorporated - 14K World's Fair Drive, Somerset, NJ 08873.
(732) 356-0560, FAX: (732) 356-6440.
E-Mail: pstrauss@ssgcorp.com

Cost-effective solutions to environmental problems.

See our ad in Classifieds

Consulting/training

Excel Partnership Inc. - 75 Glen Road, Sandy Hook, CT 06482. (800) 374-3818, FAX: (203) 426-7811.
Internet Address: www.xpl.com.

Innovative solutions to help you implement an Environmental Management System (EMS), understand the requirements of ISO 14001 and add value

to your business.

Drums - Containers

General Container Corp - 54 Veronica Avenue, P O Box 6140, Somerset, NJ 08875-6140.
(908) 435-0020, FAX: (908) 435-0040.
E-Mail: www.generalcontainer.com.

Your source for steel, polyethylene and stainless steel drums.

See our ad in Classifieds

Dust collectors

Automation Products - 3030 Maxroy, Houston, TX 77008, (713) 869-0361, FAX: (713) 869-7332.
See our ad in Classifieds

Education

Columbia Southern University - 24847 Commercial Ave., Orange Beach, AL 36561.
(800) 977-8449, FAX: (334) 981-3815.

Earn your BS, MS, Ph.D. through the freedom of distance education.

See our ad in Classifieds

Engineering & environmental services

Dames & Moore Group - 911 Wilshire Blvd., Suite 700, Los Angeles, CA 90034.
(213) 683-1560, FAX: (213) 628-0015.
E-Mail: LAXHK@DAMES.com.

Engineering, environmental, construction management, litigation support services.

See our ad in Classifieds

Laboratory - Asbestos/lead

International Asbestos Testing Laboratories (IATL) - 16000 Horizon Way, Unit 100, Mt. Laurel, NJ 08054.
(609) 231-9449, FAX: (609) 231-9818.

Asbestos and lead analytical services. NVLAP, AIHA, and NY-ELAP accredited.

See our ad in Classifieds

Liners - Truck

Packaging Research & Design - P O Box 678, Madison, MS 39130.
(800) 833-9364, FAX: (601) 853-1202.
Disposable bag liners for roll-offs, dump

trailers & railroad gondolas.

See our ad in Classifieds

Rental equipment

ASC Professionals - 15075 E. Eleven Mile Rd., Roseville, MI 48066. (800) 372-4260, FAX: (810) 771-0098.

Safety equipment rental & repair.

See our ad in Classifieds

Safety training & consulting

Environmental & Safety Systems Inc. - PO Box 3394, Wilmington, NC, 28406
(910) 763-6999, FAX: (910) 763-8709.

Full service company specializing in OSHA and EPA training and consulting.

See our ad in Classifieds

Sludge dewatering services

J.D. Meagher/Allwaste Inc. - PO Box 752, Westborough, MA 01581. (508) 366-6606, FAX: (508) 366-6662.

See our ad in Classifieds

Training manuals - Wholesale

Network Environmental Systems Inc. - 10933 Trade Center Drive #108, Rancho Cordova, CA 95870. (800) 637-2384, FAX: (818) 853-8526.

Internet Address: www.nes.hazmat.com.

OSHA - EPA - DOT training manuals for sale.

See our ad in Classifieds

Waste Water Treatment

IPEC Global, Inc. - 1047 E. Acacia St., Ontario, CA 91761. (909) 930-0995, FAX: (909) 930-0900.

Internet Address: www.ipecglobal.com

Complete line of affordable waste water systems, modules, and components featured on the internet.

See our ad in Classifieds

Water monitoring

Scientific Instruments Inc. - 518 W. Cherry St. Milwaukee, WI 53212. (414) 263-1600, FAX: (414) 263-5506, E-Mail: siis18@aol.com.

Stream gauging/water monitoring.

See our ad in Classifieds

FREE INFORMATION

Follow these simple steps:

1

Answer all questions completely, sign and date your card.

2

Circle the number(s) on the attached card that correspond to the advertisement & items mentioned in this issue that you would like FREE information on.

3

Detach and mail your postage-paid card today! For faster service, fax your card to:

(312) 922-3165

IT'S THAT EASY!

Environmental PROTECTION

FREE INFORMATION

For FREE information on products advertised in this issue, circle the Reader Service Number on the card below. Please type or print clearly and answer all the questions on the card.

PLEASE SEND ME FREE INFORMATION ON THE FOLLOWING ITEMS:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300

10/98 BUYING PLANS SURVEY REMIEDIATION AND SPILL CLEANUP PRODUCTS/SERVICES

- Which of the following REMEDIATION & SPILL CLEANUP products/services do you plan to purchase in the next 12 months? (select all that apply)
 - 800 Remediation Services
 - 801 Spill Cleanup Services
 - 802 Spill Sorbents
 - 803 Air Strippers
 - 804 Groundwater Treatment Systems
 - 805 Oil/Water Separators
 - 806 Portable Tanks
 - 807 Soil Vapor Analyzers
 - 808 Pond Lagoon Dredge
 - 809 Decontamination Structures
 - 810 Hazmat Drums/Overpack Drums
 - 811 Drum Washers
 - 812 Drum Crushers
 - 813 Portable Berms
 - 814 Bioremediation
 - 815 Soil Vapor Extraction
 - 816 Asbestos Abatement
 - 817 Lead Abatement
 - 818 Soil Treatment
 - 819 Groundwater Treatment
 - 820 VOC Removal
 - 821 Underground Storage Tank Removal
 - 822 Thermal Decontamination
 - 823 Vitrification
 - 824 Geographic Information Systems
 - 825 Global Positioning Systems
- What is your reason for purchasing the selected products/services? (select one)
 - 826 New Construction
 - 827 Plant Upgrade
 - 828 Replacement/Maintenance
- What is your projected budget for the selected products/services? (select one)
 - 829 Over \$200,000
 - 830 \$100,001-\$200,000
- How immediate is your need for the selected products/services? (select one)
 - 831 \$50,001-\$100,000
 - 832 \$10,001-\$50,000
 - 833 \$5,000-\$10,000
 - 834 Under \$5,000
 - 835 0-3 months
 - 836 4-6 months
 - 837 7-9 months
 - 838 10-12 months
 - 839 Over 12 months

SUBSCRIPTION INFORMATION

YES, I would like to receive/continue to receive *Environmental Protection*. No.

Signature _____ Date _____

Title _____

Business Phone (____) _____ FAX No. (____) _____

Please peel address label from cover and affix below. For faster service photocopy this side only and send to our FAX # (312) 922-3165.

NAME _____

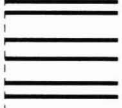
COMPANY _____

ADDRESS _____ Home Bus.

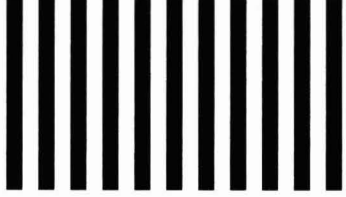
CITY _____ STATE _____ ZIP _____ ZIP+4 _____

- Function which best describes your activity in Pollution Control (check only one):
 - A Corporate responsibility for Pollution Control
 - B Manage all Pollution Control Operations at this location
 - C Supervise sub-group in Pollution Control Operations
 - D Provide professional consulting service on Pollution Control
 - E Provide staff environmental service on Pollution Control
 - Z Other _____
- Type of Business (check only one):
 - A Manufacturing. If manufacturing, please check the appropriate SIC (check only one):
 - (20) Food (31) Leather
 - (21) Tobacco (32) Stone/Clay/Glass
 - (22) Textile (33) Primary Metal
 - (23) Apparel (34) Fab. Metal
 - (24) Lumber & Wood (35) Mach., except Elect.
 - (25) Furniture (36) Elect. & Electron Mach.
 - (26) Paper (37) Trans. Equip.
 - (27) Print/Publish (38) Miscellaneous Mfg.
 - (28) Chemicals (39) Instr./meas./
 - (29) Petrol. & Coal (38) Instr./meas./
 - (30) Rubber/Plastic analyze/controlling
 - B Mining
 - C Agriculture
 - D Engineering & Contracting
 - L Consulting
 - M Insurance
 - E Utilities, public, private & cooperative
 - F Govt. including municipal or district sanitary water or wastewater treatment sys. or plants
 - G City State Federal
 - H County District Federal
 - K Transportation
 - N Labs
 - O Training
 - P Real Estate
 - Z Misc. Services _____
- Number employed at this location:
 - A 1-19
 - B 20-49
 - C 50-99
 - D 100-249
 - E 250-499
 - F 500-999
 - G 1000-1499
 - H 1500-2499
 - I 2500 and up
- In your job function do you recommend, specify or purchase? (check all that apply)
 - A Pollution Control Equipment
 - B Instrumentation
 - C Chemicals
 - D Parts & equipment for maintenance operation & control
 - E Services/Consulting
 - F None of the above
 - G Other (please specify) _____
- What types of Pollution Control are you responsible for? (check all that apply)
 - A Air
 - B Water
 - C Noise
 - D Solid Waste Disposal
 - E Industrial Hygiene
 - F Toxic & Hazardous Material
 - G Energy Control/Energy Conservation
 - I Recycling
 - J Other (please specify) _____
 - H None of the above
- Which of the following publications do you receive personally addressed to you? (check all that apply)
 - A Pollution Engineering
 - B Environment Today
 - C Environmental Solutions
 - D Pollution Equipment News
 - E The National Environmental Journal
 - F Water Environment & Technology
 - G None of the above

October 1998
Card expires December 1998
Reader Service Card
N9810F



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 1629 DALLAS, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Stevens Publishing

Environmental
PROTECTION

Creative Data
650 S. Clark St. Floor 6
Chicago IL 60605-9626



PRAXAIR: Keeping You Environmentally Correct

Remaining environmentally correct is critical, especially when complex challenges cloud air, soil and water monitoring efforts.

Praxair's comprehensive line of pure gases, calibration mixtures, and related equipment and services take us far beyond the role of traditional supplier.

As North America's largest industrial gases manufacturer, Praxair also offers the reliable supply, technical support and worldwide coverage to meet your toughest regulatory, service and delivery requirements.

Call 1-800-299-7977 today for Praxair's Environmental Monitoring Solutions brochure plus our reference catalog detailing the full line of Praxair specialty gases and equipment.

Internet: www.praxair.com
e-mail: info@praxair.com

EPA Protocol Gases

NIST-Traceable
Calibration Standards

CEM Zero Gases

VOC Mixtures

And Much More

 **PRAXAIR**

See us at ISA, Booth #3254 • Circle 86 on card.



a n e w

company

a c o n t i n u i n g

commitment



safety-kleen®

888/477-0729

To review what the new Safety-Kleen has to offer you,
call or write for our capabilities brochure.

Circle 87 on card.