A Stevens Publication

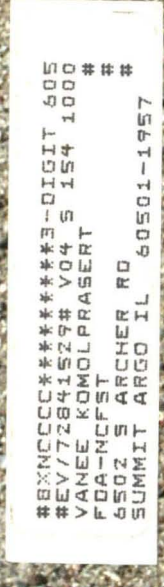
Environmental PROTECTION

Management and Problem-Solving for Environmental Professionals

JULY 1996

Don't Stop the Press For VOC Control

Wastewater Plant Cures Odors and Gets Big Surprise



Hitting Paydirt With Remediation

Clean Up Toxics With Cleaning Out Your Pocke

File Edit View Go Bookmarks Options Directory Window Help

Home | Custom Design | Custom Eng. | New Products | Calibration | Sales & Service | omega www | Tech Training | ISO 9001 Certified | Stop

Location: http://www.omega.com

Waterproof Conductivity, TDS, Resistivity, Salinity, and Temperature Meter

Compact pH/ORP Transmitter

ISO 9001 CERTIFIED CORPORATE QUALITY

Waterproof Dissolved Oxygen Meter

NEW™

Model PHTX-8710
$425

MADE IN USA

Circle No. 101 or Request Document #5142, OMEGAfax℠ Service

Circle No. 100 or Request Document #5136, OMEGAfax℠ Service

PHDG-70 Series
$800

Circle No. 102 or Request Document #5048, OMEGAfax℠ Service

Model CDH-420
$815

The OMEGA pH and Conductivity Handbook™

Waterproof Portable pH/mV Meter

NEW™

Circle No. 103 or Request Document #5118, OMEGAfax℠ Service

Model PHH-315
$460

NEW™ FREE!

To Request The Encyclopedia OMEGA®
Circle No. 104 Or Request Document #9989, OMEGAfax℠ Service, Dial 1-800-848-4271

OMEGAfax℠
OMEGA's 24-Hour-a-Day, On-Demand Publishing Service
DIAL 1-800-848-4271

OMEGAnet℠ ON-LINE SERVICE
See OMEGA on the World Wide Web! http://www.omega.com

For Sales and Service:
1-800-82-66342℠
1-800-TC-OMEGA

omega.com™
OMEGA®

http://www.omega.com

mail: info@omega.com

OMEGA ENGINEERING, INC., ONE OMEGA DRIVE, P.O. BOX 4047, STAMFORD, CT. 06907-0047

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1791 WACO, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Stevens Publishing

Environmental PROTECTION

Reader Service
Management Dept.
P.O. Box 2573
Waco, TX 76702-9910

FREE PRODUCT INFORMATION FOR ENVIRONMENTAL PROTECTION

July 1996

Card Expires September 1996

100	117	134	151	168	185	202	219	236	253	270	287	304	321	338	355	372	389
101	118	135	152	169	186	203	220	237	254	271	288	305	322	339	356	373	390
102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391
103	120	137	154	171	188	205	222	239	256	273	290	307	324	341	358	375	392
104	121	138	155	172	189	206	223	240	257	274	291	308	325	342	359	376	393
105	122	139	156	173	190	207	224	241	258	275	292	309	326	343	360	377	394
106	123	140	157	174	191	208	225	242	259	276	293	310	327	344	361	378	395
107	124	141	158	175	192	209	226	243	260	277	294	311	328	345	362	379	396
108	125	142	159	176	193	210	227	244	261	278	295	312	329	346	363	380	397
109	126	143	160	177	194	211	228	245	262	279	296	313	330	347	364	381	398
110	127	144	161	178	195	212	229	246	263	280	297	314	331	348	365	382	399
111	128	145	162	179	196	213	230	247	264	281	298	315	332	349	366	383	400
112	129	146	163	180	197	214	231	248	265	282	299	316	333	350	367	384	401
113	130	147	164	181	198	215	232	249	266	283	300	317	334	351	368	385	402
114	131	148	165	182	199	216	233	250	267	284	301	318	335	352	369	386	403
115	132	149	166	183	200	217	234	251	268	285	302	319	336	353	370	387	404
116	133	150	167	184	201	218	235	252	269	286	303	320	337	354	371	388	405

Interested because of: 95 ■ New Construction 96 ■ Adding Capacity 97 ■ Plant Upgrade 98 ■ Maintenance 99 ■ 1 for 1 Replacement

FREE SUBSCRIPTION INFORMATION **7/96**

❑ **Yes!** Send/Continue to send *Environmental Protection* free of charge.

❑ No, I'm not interested at this time.

Signature **(Required)**_____ Date_____

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip+4 _____ Phone _____

Fax _____ E-Mail _____

FOR FASTER SERVICE USE PEEL OFF LABEL

A. 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_____

rs137a

B. Type of Business (check only one):

A ❑ Manufacturing. If manufacturing, please check the appropriate SIC (check only one):

❑ (20) Food ❑ (30) Rubber/Plastic
❑ (21) Tobacco ❑ (31) Leather
❑ (22) Textile ❑ (32) Stone/Clay/Glass
❑ (23) Apparel ❑ (33) Primary Metal
❑ (24) Lumber & Wood ❑ (34) Fab Metal
❑ (25) Furniture ❑ (35) Mach., except Elect.
❑ (26) Paper ❑ (36) Elect. & Electron Mach
❑ (27) Print/Publish ❑ (37) Trans. Equip.
❑ (28) Chemicals ❑ (38) Instr./meas./analyze/controlling
❑ (29) Petrol. & Coal ❑ (39) Miscellaneous Mfg.

B ❑ Mining
C ❑ Agriculture
D ❑ Engineering & Contracting
F ❑ Govt. including municipal or district sanitary water or wastewater treatment sys. or plants
L ❑ Consulting
M ❑ Insurance
E ❑ Utilities, public, private & cooperative

Type of Govt:
G ❑ City
I ❑ State
H ❑ County
J ❑ Federal
K ❑ Transportation
N ❑ Labs
O ❑ Training
P ❑ Real Estate
Z ❑ Misc. Services _____

C. Approximate number of employees at this address (check only one):

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

D. 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 and control
E ❑ Services/Consulting
F ❑ None of the above_____

E. 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
H ❑ None of the above
_____

F. 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_____

G. Which of the following TANK AND PROCESS CONTROL products/services do you plan to purchase in the next 12 months? (Select all that apply)

A ❑ Aboveground Storage Tank
B ❑ Underground Storage Tank
C ❑ UST Tank Vault
D ❑ Level Controller/ Monitor
E ❑ Flow Meters
F ❑ Leak Detectors
G ❑ Cooling Towers
H ❑ Heat Exchanger
I ❑ Secondary Containment Systems
J ❑ Groundwater Monitor
K ❑ Lift Station Control
L ❑ Aeration System
M ❑ Recorders

H. What is your reason for purchasing the selected products/services? (Select one)

A ❑ New Construction
B ❑ Plant Upgrade
C ❑ Replacement/Maintenance

I. What is your projected budget for the selected products/services? (Select one)

A ❑ Over $200,000
B ❑ $100,001-$200,000
C ❑ $50,001-$100,000
D ❑ $10,001-$50,000
E ❑ $5,000-$10,000
F ❑ Under $5,000

J. How immediate is your need for the selected products/services? (Select one)

A ❑ 0-3 months
B ❑ 4-6 months
C ❑ 7-9 months
D ❑ 10-12 months
E ❑ over 12 months

Environmental PROTECTION

035709607060

FREE PRODUCT INFORMATION FOR ENVIRONMENTAL PROTECTION

July 1996

Card Expires September 1996

100	117	134	151	168	185	202	219	236	253	270	287	304	321	338	355	372	389
101	118	135	152	169	186	203	220	237	254	271	288	305	322	339	356	373	390
102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391
103	120	137	154	171	188	205	222	239	256	273	290	307	324	341	358	375	392
104	121	138	155	172	189	206	223	240	257	274	291	308	325	342	359	376	393
105	122	139	156	173	190	207	224	241	258	275	292	309	326	343	360	377	394
106	123	140	157	174	191	208	225	242	259	276	293	310	327	344	361	378	395
107	124	141	158	175	192	209	226	243	260	277	294	311	328	345	362	379	396
108	125	142	159	176	193	210	227	244	261	278	295	312	329	346	363	380	397
109	126	143	160	177	194	211	228	245	262	279	296	313	330	347	364	381	398
110	127	144	161	178	195	212	229	246	263	280	297	314	331	348	365	382	399
111	128	145	162	179	196	213	230	247	264	281	298	315	332	349	366	383	400
112	129	146	163	180	197	214	231	248	265	282	299	316	333	350	367	384	401
113	130	147	164	181	198	215	232	249	266	283	300	317	334	351	368	385	402
114	131	148	165	182	199	216	233	250	267	284	301	318	335	352	369	386	403
115	132	149	166	183	200	217	234	251	268	285	302	319	336	353	370	387	404
116	133	150	167	184	201	218	235	252	269	286	303	320	337	354	371	388	405

Interested because of: 95 ■ New Construction 96 ■ Adding Capacity 97 ■ Plant Upgrade 98 ■ Maintenance 99 ■ 1 for 1 Replacement

FREE SUBSCRIPTION INFORMATION 7/96

❑ **Yes!** Send/Continue to send *Environmental Protection* free of charge.

❑ No, I'm not interested at this time.

Signature **(Required)**_____ Date_____

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip+4 _____ Phone _____

Fax _____ E-Mail _____

FOR FASTER SERVICE USE PEEL OFF LABEL

A. 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_____

rs137a

B. Type of Business (check only one):

A ❑ Manufacturing. If manufacturing, please check the appropriate SIC (check only one):

❑ (20) Food
❑ (21) Tobacco
❑ (22) Textile
❑ (23) Apparel
❑ (24) Lumber & Wood
❑ (25) Furniture
❑ (26) Paper
❑ (27) Print/Publish
❑ (28) Chemicals
❑ (29) Petrol. & Coal
❑ (30) Rubber/Plastic
❑ (31) Leather
❑ (32) Stone/Clay/Glass
❑ (33) Primary Metal
❑ (34) Fab. Metal
❑ (35) Mach., except Elect.
❑ (36) Elect. & Electron Mach
❑ (37) Trans. Equip.
❑ (38) Instr./meas./analyze/controlling
❑ (39) Miscellaneous Mfg

B ❑ Mining
C ❑ Agriculture
D ❑ Engineering & Contracting
F ❑ Govt. including municipal or district sanitary water or wastewater treatment sys. or plants
L ❑ Consulting
M ❑ Insurance
E ❑ Utilities, public, private & cooperative

Type of Govt:
G ❑ City
H ❑ County
I ❑ State
J ❑ Federal

K ❑ Transportation
N ❑ Labs
O ❑ Training
P ❑ Real Estate
Z ❑ Misc. Services _____

C. Approximate number of employees at this address (check only one):

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

D. 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 and control
E ❑ Services/Consulting
F ❑ None of the above_____

E. 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
H ❑ None of the above

F. 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_____

G. Which of the following TANK AND PROCESS CONTROL products/services do you plan to purchase in the next 12 months? (Select all that apply)

A ❑ Aboveground Storage Tank
B ❑ Underground Storage Tank
C ❑ UST Tank Vault
D ❑ Level Controller/ Monitor
E ❑ Flow Meters
F ❑ Leak Detectors
G ❑ Cooling Towers
H ❑ Heat Exchanger
I ❑ Secondary Containment Systems
J ❑ Groundwater Monitor
K ❑ Lift Station Control
L ❑ Aeration System
M ❑ Recorders

H. What is your reason for purchasing the selected products/services? (Select one)

A ❑ New Construction
B ❑ Plant Upgrade
C ❑ Replacement/Maintenance

I. What is your projected budget for the selected products/services? (Select one)

A ❑ Over $200,000
B ❑ $100,001-$200,000
C ❑ $50,001-$100,000
D ❑ $10,001-$50,000
E ❑ $5,000-$10,000
F ❑ Under $5,000

J. How immediate is your need for the selected products/services? (Select one)

A ❑ 0-3 months
B ❑ 4-6 months
C ❑ 7-9 months
D ❑ 10-12 months
E ❑ over 12 months

Environmental PROTECTION

035709607060

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

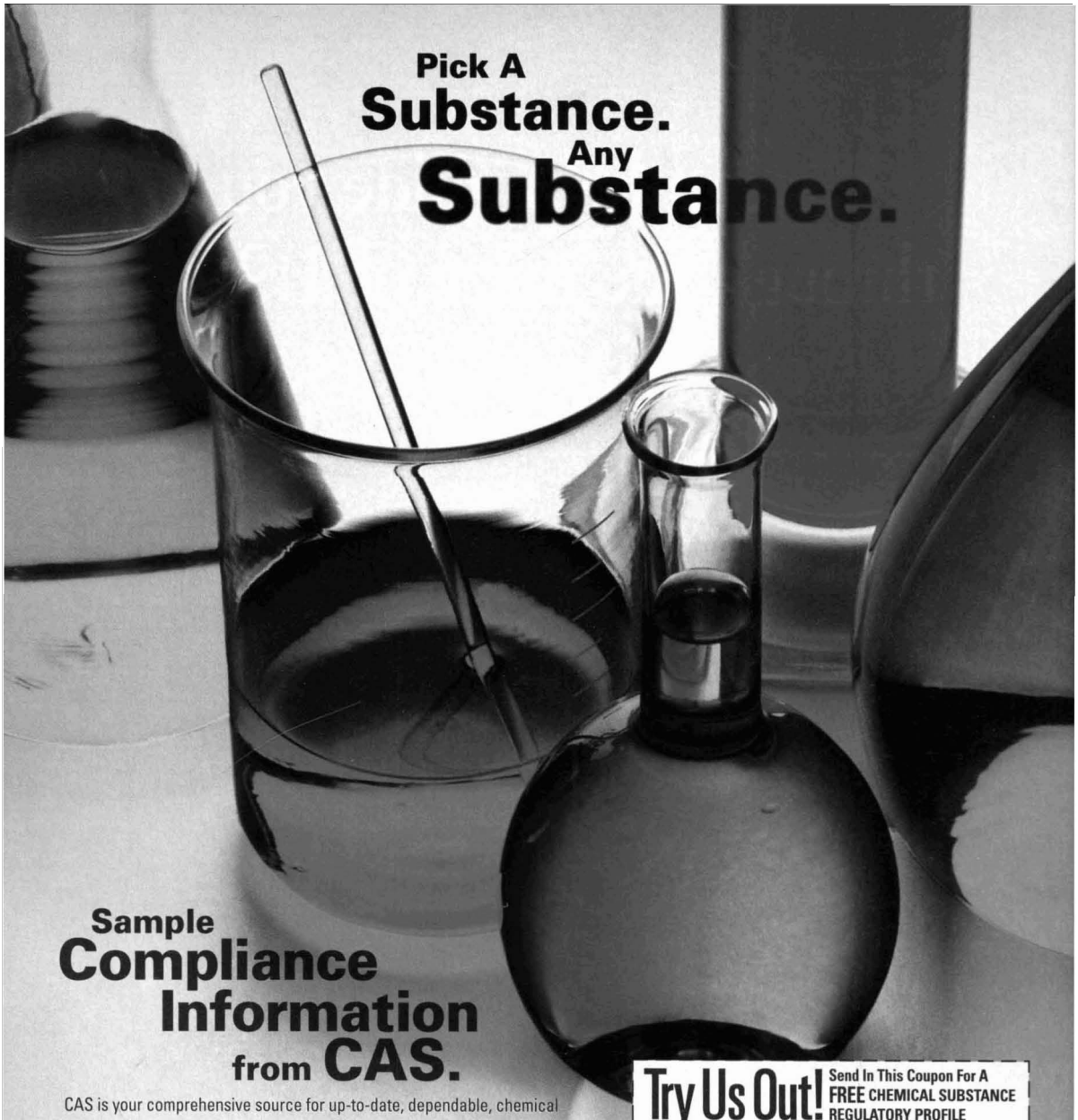
FIRST CLASS PERMIT NO. 1791 WACO, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Stevens Publishing

Environmental PROTECTION

Reader Service
Management Dept.
P.O. Box 2573
Waco, TX 76702-9910



Pick A Substance. Any Substance.

Sample Compliance Information from CAS.

CAS is your comprehensive source for up-to-date, dependable, chemical substance compliance information. And we'd like to show you. Just send in the coupon to the right, and we'll provide you with a FREE chemical substance regulatory profile. You'll receive the regulatory history of a given substance and the information you need for reporting purposes.

- **TSCA**
- **SARA**
- **PMN**
- **State Lists**
- **National Inventories**
- **CAS Registry Numbers**
- **CA Index Names**
- **Trade Names and Synonyms**

Nobody knows chemical substance information like CAS. For more information: **1-800-753-4227** or **614-447-3731**. Send e-mail to **help@cas.org** or visit our Web site at **http://www.cas.org**. Give us a try today and see for yourself.

CAS®

A division of the American Chemical Society®.

Try Us Out!

Send In This Coupon For A FREE CHEMICAL SUBSTANCE REGULATORY PROFILE

Chemical Name: _____

And/Or CAS Registry Number: _____

Name: _____

Title: _____

Company: _____

Address: _____

City: _____ State: ____ ZIP: _____

Country: _____

Mail: Chemical Abstracts Service
Marketing Dept. 9634
P.O. Box 3012
Columbus, OH 43210

Fax: (614) 447-3751
Attn: Customer Service

Offer valid through 12/31/96. Limit one (1) profile per customer.

Circle 106 on card.

About the cover:

Recently developed soil remediation techniques provide for quicker and less expensive cleanups and greater environmental safeguards.

Photo by
Stephen Marks/The Image Bank

contents

Environmental Protection • July 1996 • Volume 7, Number 7

features

page 24

departments

page 8

ENVIRONMENTAL PROTECTION (ISSN # 1057-4298, USPS #006-703) is published 12 times a year, **Vol. 7, No. 7.** © 1996 Stevens Publishing Corp., 3700 IH-35, Waco, TX 76706. Phone (817) 776-9000. periodicals postage paid at Waco, TX 76702-2573 and additional mailing offices. Subscription rate for Environmental Protection is $68 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 2573, Waco, TX 76702.** 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.

New Ways To Deal With Dirty Dirt

Innovative techniques for remediating contaminated soils are starting to hit pay dirt. New technologies, such as bioremediaton, are earning high marks for performance and cost containment. The rapid growth of the technologies is in response to the problems with past soil handling practices.

When the original Superfund law was passed and cleanups of major contaminated sites began, it soon became clear that moving contaminated soil offsite wasn't going to be dirt cheap. Besides the exorbitant costs involved, landfilling polluted soil didn't accomplish the goals of protecting the environment and ending legal exposure. Instead of permanently removing the contaminant, landfilling merely transferred it to a different location.

This led to the need for alternative treatment technologies. The Superfund Amendments and Reauthorization Act of 1986 (SARA) authorized the U.S. Environmental Protection Agency to promote research on alternative treatment technologies. Because of SARA, the EPA created the Superfund Innovative Technology Evaluation (SITE) program to encourage new cleanup technology development.

Depending on the processes, soil remediation technologies can be divided into three categories. One group, which includes thermal destruction and bioremediation, uses chemical or biochemical means to change the pollutants into nonhazardous products of different chemical composition.

Another category consists of mass transfer technologies that use physical or chemical means to take the contaminants out of the soil and then treat or destroy them in another process step. Soil washing, steam stripping, soil vapor extraction, low-temperature thermal desorption and solvent extraction are examples of these technologies.

The third category is comprised of technologies that bind contaminants into a solid matrix so the contaminants leached into the environment are reduced to levels below those regulated by governmental agencies. Such technologies include cement or lime stabilization, vitrification and other macro- or microencapsulation techniques.

Two of this issue's articles focus on the use of bioremediation—one of the most popular new technologies—to clean up soil and groundwater. The case study on page 24 describes how bioremediation took off at a JFK Airport cleanup and successfully removed jet fuel hydrocarbons. In another article on page 28, William Weinstein details how an Oregon consulting firm concocted a unique "cocktail" of four separate bacteria strains to bioremediate sites contaminated with creosote and other polycyclic aromatic hydrocarbons.

Angela Neville

Angela Neville, JD, REM
Editor, *Environmental Protection*

Environmental PROTECTION

EDITORIAL

Publisher: Craig S. Stevens
Associate Publisher: L. Alan Stevens
Editor: Angela Neville, JD, REM
Managing Editor: Vicky Boyd
Assistant Editor: Marion Petty
Contributing Editors: Janet Boulter, Joseph P. Draves, Bruce Frumer, Randall E. Hobbs, Barry Lucas, Nicholas Pressly, Robert Roth, Daniel S. Schleck, William Weinstein

PRODUCTION/MARKETING

Advertising Production Manager: Wayne Lowe
Graphic Layout Supervisor: Wes Jordan
Art Director: Sandra Danna
Graphic Production: John Ciaburri, Regina Kubelka, Christopher Lang, Jim Reeves, Helen Tuohy
Circulation/Marketing Manager: Margaret Perry

ADVERTISING SALES

National Sales Manager: George Stevens (847) 304-4822
District Sales Managers East Coast: Devin Dreiling (214) 687-6702
Midwest: Paul Burkett (817) 662-7054
Southeast/South Central: Ray Karlyn (904) 241-9336
West Coast: Mark Rosas (817) 662-7006
Classified Sales Manager: Jon Meador (817) 662-7101
National List Manager: Connie Reineke (817) 662-7088

ADMINISTRATION

President: Craig S. Stevens
Controller: David Martin
Vice President, Operations: John Anzelmo

Environmental Protection welcomes readers' letters; unsolicited manuscripts; suggestions for articles and photo shoots; and releases of news, products, services, literature, non-profit resources, business updates and meetings. Editorial Offices: *Environmental Protection*, 3700 IH-35, Waco, Texas 76706; or phone (817) 776-9000.

ONE SOURCE MANY SOLUTIONS

Ashland can help you keep the delicate balance between chemical waste management and efficient operation.

More than ever, sound and cost-effective management of chemical waste has become a matter for experts. As the leader in distribution of chemicals and chemical products, Ashland offers one of the most comprehensive chemical waste management programs across North America.

We provide access to a complete network of environmental services: collection, treatment, disposal, recycling, recovery or other services, based on expert evaluation of your operation and needs. We also bring the resources and expertise to lead you safely through the maze of regulations, licensing, and other environmental requirements you face—important, since by law you never really relinquish responsibility for your chemical waste.

Every phase of your personalized chemical waste management program is correctly and legally handled...from initial Waste Profile prepared just for your company, through regular scheduled collection, handling and/or disposal, to professional assistance with the complex paperwork involved.

And, because we know the chemical and process industries, we're well suited to help you get the sound waste management you need, keeping your operation efficient and cost effective. Call us your safety net. For information, contact your Ashland Chemical representative, or call our Environmental Services hot line today: 1-800-637-7922. Or write: Ashland Chemical Company, Dept. 466, P.O. Box 2219, Columbus, OH 43216. Fax: 614-790-3426.

HOW DIVERSIFIED ARE WE? ASHLAND CHEMICAL IS CHEMICALS, SPECIALTIES, RESINS AND PLASTICS FOR...ADHESIVES • AUTOMOTIVE & TRANSPORTATION • BOAT BUILDING • CHEMICAL PROCESS INDUSTRIES • CHEMICAL WASTE MANAGEMENT • COMPOSITES • COSMETICS • ELECTRONICS • FOODS • FOUNDRY • HOUSEHOLD & INSTITUTIONAL FORMULATING • MERCHANT MARINE • METAL WORKING • PAINTS & COATINGS • PETROCHEMICAL PRODUCTS • PHARMACEUTICALS • PLASTICS PROCESSING • SEMICONDUCTOR PRODUCTION • WATER TREATMENT **SPECIALIZED SERVICES AND SYSTEMS FOR...** CHEMICAL WASTE MANAGEMENT, RECOVERY & RECYCLING • COOLING, BOILER AND PROCESS WATER TREATMENT • FUEL TREATMENT • SHIPBOARD AND OFFSHORE SERVICES—ASK FOR THE DETAILS.

A Responsible Care® Company

Circle 107 on card.

Ashland Chemical

Ashland Chemical Company
Division of Ashland Inc.

Visit Ashland on the World Wide Web at http://www.ashchem.com

Waste-To-Energy Plant Revenue Continues Growth

U.S. waste-to-energy plant revenue will grow at a 5-percent compound annual rate between 1994 and the year 2001, according to a recently released study by the Mountain View, Calif., research firm, Frost & Sullivan. In 1994, the industry generated revenue of $2.14 billion and handled about 32.8 million tons of waste, according to the report.

By the year 2001, waste-to-energy plants are expected to generate $2.94 billion in revenue and handle more than 45 million tons of waste. Despite the growth, overall revenue has failed to meet expectations as planned facilities were scaled back because of tight financing, the relatively lower costs of landfills and environmental concerns. Obtaining financing will become an even greater problem, and new capital investment will decline.

Mass burn plants, which accounted for 70 percent of market revenues in 1994, are expected to experience the largest part of future growth, according to the report. They are considered the simplest, most widely accepted method offering the safest approach in the near future.

Group Cites Six Cities For Lax Crypto Testing

Six cities are taking little action to prevent waterborne *Cryptosporidium* protozoal pathogens from sickening residents, according to a survey of 31 of the nation's biggest water departments.

Conducted by the National Association of People with AIDS, the survey examined how often the municipalities tested water and how quickly they alerted the public to *Cryptosporidium* contamination.

The group cited six cities for taking the least action: Atlanta, Ga.; Minneapolis, Minn.; St. Petersburg, Fla.; Newark, N.J.; Dallas, Texas; and Washington, D.C. The Minnesota Health Department doesn't recommend testing for *Cryptosporidium* because the test is not reliable. Tests results vary, catching *Cryptosporidium* between 30 percent and 60 percent of the time, according to NAPWA.

Nevertheless, the U.S. Environmental Protection Agency is considering a rule to require all water systems that serve more than 100,000 people to test.

Farmers' Pesticide Use On The Rise

The people who raise meat, milk, fruits and vegetables are using more pesticides than ever before, according to an environmental group. But the health risks of the increase are difficult to measure.

According to unpublished government data, agriculture used 1.25 billion pounds of herbicides, insecticides and fungicides in 1995. Farmers used 1.23 billion pounds in 1994, up 100 million pounds from 1993 and reversing a downward trend.

Farming industry groups say the increase reflects increased acreage under cultivation and weather-related pest problems, such as a beet armyworm plague in cotton. They also point out that farmers are using more environmentally friendly chemicals, such as sulfur. But the compounds also require as much as 10 times the number of applications per acre as synthetics.

The U.S. Environmental Protection Agency confirmed the findings of the Natural Resource Defense Council and the U.S. Public Interest Research Group. Among the products showing increases were methyl bromide, sulfur, petroleum oil and glyphosate, sold under the brand name Roundup.

Los Angeles Targets Smoking Lawn Mowers

First, the Los Angeles, Calif., region went after clunker cars that belched blue smoke, offering car owners money for retiring the vehicles.

Now, the South Coast Air Quality Management District is going after older gas-powered lawnmowers and lawn equipment and plans to give businesses emission reduction credits (ERCs) if they take the notorious machines out of action.

In Southern California, an estimated 1.73 million commercial and residential mowers, leaf blowers and other tools emit 22 tons per day of volatile organic compounds. That's more VOCs than are discharged by all aircraft in the region, according to the AQMD.

An older, gas-powered lawn mower operating for 20 hours a year produces the same VOCs as a 1996 car driven 26,000 miles, according to the AQMD.

Under the program, businesses can earn ERCs by offering rebates, discounts or other incentives for homeowners to trade in old lawnmowers, edger-trimmers, leaf blowers, chainsaws or other garden power equipment. In addition, businesses will earn ERCs if they replace their old equipment with new models meeting or exceeding the California Air Resources Board's current emission standards.

Some Environmental Firms Still Prosper

Publicly traded environmental firms, except for the hazardous-waste management sector, showed strong revenue growth and increased operating margins in 1995, according to a state-of-the-industry report issued by a Washington, D.C., management consulting firm. In the report, Joan B. Berkowitz of Farkas Berkowitz & Company said the increased growth was due to continuing mergers and acquisitions.

"Operating margins also improved for all sectors except hazardous waste, and we attribute this good performance to strong management," Berkowitz said.

The U.S. market for environmental consulting and remediation services climbed 5 percent to $12.5 billion in 1995, said Alan L. Farkas of Farkas Berkowitz & Company. "Nearly all of

the growth in this sector can be accounted for by remediation construction," he said.

Of the $12.5 billion market, 10 firms continued to command 20 percent of the total share in 1995. To be among the top 10 in 1996, firms will have to generate more than $170 million in net revenue from U.S. projects. Among the candidates are Bechtel, Camp Dresser & McKee, CH2M Hill, International Technology, ICF Kaiser, Montgomery Watson, Morrison-Knudsen, OHM, Roy F. Weston and Rust International.

Colorado Wants EPA To Relax Ozone Regs For Industries, Businesses

Metropolitan Denver, Colo., has done such a good job cleaning up ozone that state environmental officials are asking the federal government to relax ozone regulations for industries. The U.S. Environmental Protection Agency is taking a cautious look at the proposal,

Texas Wants More Time To Comply

Unable to meet a Nov. 15 deadline, Texas' top environmental official asked the federal government for more time to clean up its air. Barry McBee, chairman of the Texas Natural Resource Conservation Commission, said the Environmental Protection Agency should give the state additional time to see if its current air-pollution control program works.

Dallas-Fort Worth ozone levels exceed federal standards and last year were the dirtiest in a decade. Under the 1990 Clean Air Act, Dallas-Fort Worth is classified as a moderate ozone violator.

EPA Regional Administrator Jane Saginaw said she would not extend the deadline without proof the area was making progress. She said the state knew about the deadline six years ago and had plenty of time to plan.

Of the 33 U.S. urban areas classified as moderate violators, Dallas-Fort Worth is one of only nine that hasn't cleaned up its area.

because it could set a precedent for other states to bypass federal oversight.

Denver has not violated federal ozone standards since 1987.

The Colorado Association of Commerce and Industry is proposing a new air-pollution regulation that would give state environmental officials flexibility to allow businesses to emit excess pollutants that create ozone.

The state also is asking for less stringent pollution controls on new industrial plants in the metro area.

Plan supporters say the exemptions would not increase ozone pollution because they could total no more than 5 tons of ozone-causing volatile organic compounds—about 1.5 percent of the total VOC emissions in the Denver area. But it comes as the state plans to reduce ozone in the Denver area by 6 percent by 2010, largely by taking advantage of cleaner running vehicles.

EPA officials said they doubt they would approve the proposal as part of Colorado's proposed ozone-control plan.

Columbia River Not As Dirty As Thought

The Columbia River received a good bill of health compared to other major rivers, but it is still plagued by DDT and other pollutants in its lower 146 miles, according to a six-year study. The report on the 1,200-mile river—which drains parts of seven states and British Columbia—was compiled by the Lower Columbia River Bi-State Program, a joint effort of Oregon and Washington.

The study found that the Willamette River, a tributary to the Columbia, delivers a disproportionate load of metals, pesticides and organic pollutants.

Researchers measured chemicals in water, sediment and fish; funded studies of mink and otter; assessed the impact of pollutants on bald eagles; and weighed the risk to people who eat contaminated fish. Five contaminants found in the river posed a threat to human health—polychlorinated biphenyls, dioxins and furans, DDT, arsenic and mercury.

Theories Differ On Lake Apopka, Fla., Pollution Sources

A 1947 hurricane, and not nitrate-rich farm runoff, polluted Lake Apopka north of Orlando, Fla., according to a recent University of Florida study. But state and federal officials continue to blame fertilizer-laced farm runoff for turning the massive lake into a 31,000-acre pea-green sea of algae that has already cost $60 million in restoration projects.

The new theory contends the lake was already experiencing problems when surrounding muck farms started to discharge fertilizer in the 1940s. A hurricane scoured the lake bottom, killing most of the grasses and plants, according to the UF study by Daniel Canfield and Roger Bachmann.

"There are a number of lakes where (fertilizer-based) nutrients aren't the issue," Canfield said. "Lake Apopka is one of them."

Canfield and Bachmann suggest a massive lake drawdown, or draining, to allow plants to take root and kill the ever-present algae that blocks to sunlight needed for plants, grasses and sport fish.

Lake managers criticized the theory, arguing that most scientific research fails to support it. EP

BECAUSE ACCIDENTS COST MORE THAN MONEY...

Keeping your employees safe, healthy -- and productive -- is more important now than ever before. Occupational Health & Safety News is the twice monthly newsletter that helps you **CUT YOUR RISK and STAY INFORMED** with the latest and most significant state and federal regulatory, compliance and legislative updates.

In a quick-read format, Occupational Health & Safety News helps you take the guesswork out of OSHA Compliance with the latest information on:

AVOID BECOMING AN OSHA STATISTIC...

Litigation - Court rulings, civil and criminal actions.

Legislation - Federal, state and local laws affecting workplace safety and health.

Regulation - Important court decisions, key legislation coming from the states.

Enforcement - Follow the trends toward stiffer penalties and heftier fines.

Innovations - New ideas and discoveries affecting worker safety and health.

Worker safety - Standards, hazards training and health risks.

Liability - Lawsuits, legal actions and insurance.

Subscribe To Occupational Health & Safety News Today!

CALL (817) 662-1134

Stevens Publishing Corporation • 3700 IH-35 • Waco, TX 76706

Circle 110 on card.

typ928

Group Wants EPA To Warn Before Searches

The Washington Legal Foundation, a nonprofit public interest law and policy center based in Washington, D.C., has petitioned the EPA for a rulemaking. The rule would require the agency to provide a written Miranda-style warnings, similar to what police officers must give to arrested persons, to regulated entities before inspectors are given access to premises to conduct searches for environmental violations.

- Entities may insist that a search warrant be issued before any EPA inspection.
- They have the right to accompany and videotape inspectors, as well as the right to obtain split portions of any samples taken by the inspectors.
- They have the right to obtain legal counsel.

The foundation also wants the EPA to provide similar instructions to company employees and other witnesses before they are interviewed by agency representatives.

EPA Proposes New Guidelines To Assess Cancer Risks

To protect public health, the U.S. Environmental Protection Agency recently proposed new guidelines to assess the cancer risk posed by environmental pollutants and chemicals. The guidelines will modernize the methods used to determine cancer risk by incorporating a broad range of evidence, including microbiological testing and genetic data.

In addition, the guidelines will focus on cancer-causing environmental contaminants to which people are most likely susceptible and identify parts of the population that may be more susceptible. The guidelines will also identify agents that are not likely to have effects at environmental levels because they only cause cancer in laboratory animals at excessively high doses.

HWIR: Keep Delisting Hazardous Waste Flexible

The U.S. Environmental Protection Agency plans to set constituent-specific levels for "delisting" low-risk solid wastes designated as dangerous because they are listed as hazardous wastes in the EPA regulations or because they have been mixed with, derived from or contain "listed" hazardous wastes.

Under the proposed guidelines, if a solid waste contains hazardous constituents in concentrations less than or equal to the specified levels, the waste will be eligible to be delisted and to "exit" out of the hazardous-waste management system required under the Resource Conservation and Recovery Act (RCRA).

Once a solid waste is delisted, it is regulated as nonhazardous solid waste and subjected to less burdensome regulation under RCRA, resulting in reduced costs for waste management.

All the listed hazardous constituents are in the proposed new Appendix X of 40 CFR 261. To be delisted and reclassified as nonhazardous, a waste must also meet the applicable land disposal restriction requirements in 40 CFR 268.

The proposal, referred to as the Hazardous-Waste Identification Rule (HWIR), sets a risk-based floor to hazardous-waste listings. Many of the "exit levels" that allow the wastes to be delisted and redesignated as nonhazardous were established using an innovative risk-assessment that evaluates potential exposure pathways.

The assessment focused on both human and environmental receptors potentially affected by the wastes.

EPA To Unveil Air Emissions Strategy For Electric Utilities

The U.S. Environmental Protection Agency expects to release this month an initial proposal for a comprehensive strategy to regulate air emissions generated by electric utilities. The EPA's utility strategy, known as the "Clean Air Power Initiative," will concentrate on three pollutants—sulfur oxides, nitrogen oxides and mercury.

According to the EPA, a regulatory approach that incorporates a "cap and trade" emission trading scheme would be appropriate for controlling sulfur dioxide, NO_x and mercury. Such an approach was established by Clean Air Act for regulation of SO_2 emissions under the EPA's acid-rain program.

It involves setting a cap on overall emissions from the industry and allocation of those emissions to different utilities in the form of allowances. Under the acid-rain program, utilities can release one ton of SO_2 for each allowance they hold and can buy or sell allowances as necessary.

EPA To Implement Water Pollution Credit Trading

The EPA is in the process of instituting its first trading policy for water pollution sources in watersheds. Sewage treatment plants and other entities that are able to achieve more pollutant reductions than required will be able to sell or barter credits to other sources.

The agency strongly supports effluent trading within watersheds to achieve water-quality standards. The EPA asserts that the trading creates economic incentives that go beyond minimum compliance requirements.

EPA Amends Policy On Canceled Pesticide Stocks

The U.S. Environmental Protection Agency recently decided to provide a public comment period before amending its 1991 policy on existing stocks of canceled pesticides. The EPA's current policy distinguishes between pesticides that pose significant risks and those that do not.

The EPA will not allow continued sales, distribution or use of canceled pesticides that pose significant risks to public health or the environment unless the benefits associated with the use exceed the risk. On the other hand, the EPA will generally allow unlimited sale by persons other than the registrant and unlimited use of existing stocks of canceled pesticides that do not pose a significant risk.

Simplified Drinking Water Rules For Lead, Copper

The U.S. Environmental Protection Agency recently resolved to make several minor changes to the national primary drinking water regulations for lead and copper to improve the rules' implementation. The EPA's intent is to eliminate unnecessary requirements, streamline and reduce reporting burdens and promote consistent national implementation.

The changes proposed in this action do not affect the lead or copper maximum contaminant level goals or the basic regulatory requirements. EP

Northwestern Uses Cells For Toxicity Testing

Northwestern University researchers have developed a promising new system for testing toxicity without live animals. The test involves growing a thin layer of cells on a membrane and monitoring the electrical resistance of the cells as they are exposed to chemicals.

The fully automated system measures the electrical resistance of the cell layer, called the "transepithelial electrical resistance" (TER), which decreases as the cells are damaged by a toxic chemical. The TER reduction can be followed continuously.

Currently, the U.S. Food and Drug Administration only accepts tests on live animals, called the Draize test.

Testing the toxicity of new chemicals used to involve exposing the eyes of live animals to potentially toxic chemicals. The procedures were expensive, time consuming and sometimes drew the ire of consumers and animal rights groups.

The tests are required for new cosmetics, industrial chemicals, solvents and household products.

Pacific Northwest Lab Develops Plasma Process

A new waste conversion technology for treating solid wastes could provide major economic and environmental benefits. The technology, known as the controlled plasma glassification process, will soon be available commercially and differs significantly from other plasma technologies on the market.

The CPG process uses electrically conductive gas, or plasma, to vitrify or heat waste until it becomes molten. The resulting material, a solid glass or metal, prevents contaminants from leaching into the environment. The technology is well suited to tackle most solid waste streams, including hazardous, medical, radioactive, mixed industrial and municipal solid waste.

The CPG process handles large amounts of waste in a small unit, while reducing environmental impacts. It produces fewer hazardous emissions than alternative technologies such as incineration. The new process was developed by Pacific Northwest Laboratory and two independant consultants.

Savannah River Resolves Problem With Hydrides

A scientist at Savannah River Technology Center has developed a solution to the plugging problems metal hydrides pose. He has devoloped a dimensionally stable metal hydride composition in the form of granules or pellets.

The pellets absorb and desorb hydrogen rapidly and remain stable through thousands of cycles. They are also more durable by a factor of 1,000 than metal hydride itself. Operations have successfully implemented hydride applications from hydrogen storage to hydrogen separation. Their potential industrial applications are being explored.

Metal hydrides—a special group of metals that absorb, store and release hydrogen—play a major role in Savannah River Site defense operations. In commercial hydrogen processing and hydrogen energy fields, the materials offer many applications.

After several absorption/desorption cycles, metal hydrides break down into a fine powder that can create serious problems. EP

the grapevine

For the latest scoop on the comings and goings in the environmental field.

The Water and Wastewater Equipment Manufacturers Association Inc., Washington, D.C., selected Susan Helling as vice president.

Scientific Technologies Inc., a manufacturer of factory automation applications, including safety light curtains, industrial sensors and optical profiling scanners, consolidated its operations into a new custom-designed facility in Hayward, Calif.

Grady W. Williams, P.E., joined **CDM Federal Programs Corp.** as manager of its new office in Frankfurt, Germany.

The Portland Cement Association, Skokie, Ill., named Charles M. Wilk waste management program manager.

Robert A. Brunson was named director of environmental and regulatory affairs for **Quantum Chemical Co.**, Cincinnati, Ohio.

James McNulty was elected chief executive officer of **The Parsons Corp.**, an engineering, construction, and research and development firm based in Pasadena, Calif.

Bruce Berndaro was appointed national sales manager of **ALAR Engineering Corp.**, Mokena, Ill.

Robert J. Fungaroli (B.J.) was promoted to manager of **AAA Environmental's** Raleigh/Durham, N.C., office.

Northern Environmental Technologies, an environmental engineering and hydrogeology firm, opened a new office in Brainerd, Minn.

Kleinfelder Inc., a California-based engineering consulting firm, opened offices in Denver, Golden and Colorado Springs, Colo. Heading the Denver office is Russell Erbes; Golden, Jeffrey Meyers; and Colorado Springs, Ron Turner.

George Harlow is the new senior advisor on environmental issues for **Marine Shale Processors Inc.**, based in Morgan City, La.

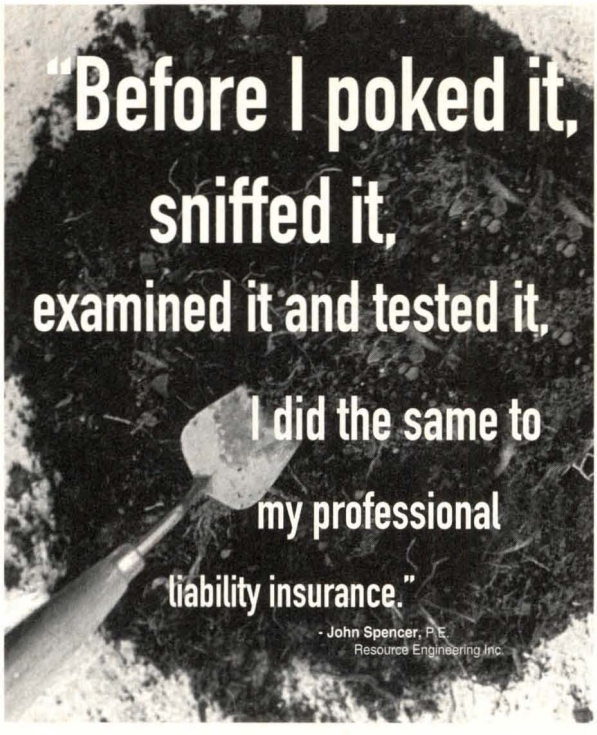
HDR Engineering Inc. named Eric L. Keen department manager of its Irvine, Calif., office.

Barbara Johnson joined U.S. Safety, Lenexa, Kan., as an account executive for Texas and the western United States.

The Industrial Safety Equipment Association, Arlington, Va., appointed Janice C. Bradley, CSP, technical director.

John Chahbandour was named project manager at **Water Management Consultants,** Denver, Colo.

John C. Johnston was elected president and chief operating officer of **Farr**



Leaving no stone unturned is something environmental consultants like John Spencer know all about. Which is why we've developed a professional liability insurance program that can withstand the same degree of digging.

Perhaps it's because a board of practicing environmental consultants works to ensure our program meets your unique needs. Or maybe it's our network of independent agents who specialize in loss prevention and insurance for your profession. Of course, it could also be our ability to leap into action long before a dispute becomes an actual claim.

And if that's not enough, we also have more loss prevention programs than anyone else. Programs that will not only help you reduce risk, but also lower your annual premium. By as much as 35%.

But that's only the beginning. We have the kind of coverage you'd expect from a company with our reputation for innovation. A reputation built on 25 years of experience.

Of course, don't just take our word for it. Nose around in our competitors' programs and see for yourself. Then give us a call.

DIFFERENT BY DESIGN FOR TWENTY - FIVE YEARS

The Professional Liability Specialist of the Orion Capital Companies

DPIC Companies, Inc.
2959 Monterey-Salinas Highway
Monterey, CA 93940
800.227.4284
info@dpic.com
http://www.dpic.com

In Canada:
Security Insurance Company of Hartford
800.565.6038
info@tor.dpic.com

Design Professionals Insurance Company
Security Insurance Company of Hartford
The Connecticut Indemnity Company
A.M. Best Rating: A (Excellent)

Circle 113 on card.

Co., a Los Angeles, Calif., manufacturer of particulate, liquid and gaseous filtration systems.

Adirondack Environmental Services Inc., Albany, N.Y., hired Paul D. Watson, a certified industrial hygienist and certified environmental trainer.

Jay Davis is the new manager of sales for the Engineered Systems Division of **Kinetico**, Newbury, Ohio.

William J. Goodwin was appointed vice president and director of marketing for **Berryman & Henigar's** western regional operations in Santa Ana, Calif.

Mansour Ghiasi joined **Brownfield Development Corp.**, Arlington Heights, Ill., as vice president of operations.

U.S. Filter Corp., Rockford, Ill., acquired **Zimpro Environmental Inc.**, Rothschild, Wis.

The U.S. Department of Interior's Minerals Management Service honored **Exxon Co. U.S.A.**, Houston, Texas, with the 1995 National Safety Award for Excellence for its commitment to safety and environmental protection while operating on the outer Continental Shelf.

Scott Evans has been appointed aboveground storage tank products manager for **Tracer Research Corp.'s** aboveground fuel tank and pipeline services group in Houston, Texas.

Joan M. Tanaka joined **HDR Engineering Inc.** as an environmental engineer in the company's Chicago, Ill., office.

Michael L. Foreman was appointed vice president of the field services divison at **Berryman & Heniugar** and is based in the firm's San Diego, Calif., headquarters.

Robert C. Renner is the new deputy executive director of **The American Water Works Association**, Denver, Colo.

Christopher Matthews joined **HDR Engineering Inc.** as an environmental scientist in the company's Charlotte, N.C., office.

Safety-Kleen Corp., Elgin, Ill., received this year's Governor's Award for Excellence in Hazardous Waste Reduction in the state of Wisconsin.

Todd W. King, P.E., joined **Camp Dresser and McKee Inc.'s** Detroit, Mich., office.

SCS Engineers, Long Beach, Calif., opened its first Texas office in Austin, with Steve Hamilton as its manager.

Walter L. Scruggs was appointed vice president and general manager of **Electrocatalytic Inc.'s** U.S. operations, based in Warren, N.J.

William J. Conlon, P.E., DEE, joined **Rust Environment & Infrastructure** as vice president and will lead the company's Midwestern water services business.

David Burstein was named executive vice president of **Parsons Infrastructure & Technology Group**, a global business unit of The Parsons Corp., Pasadena, Calif.

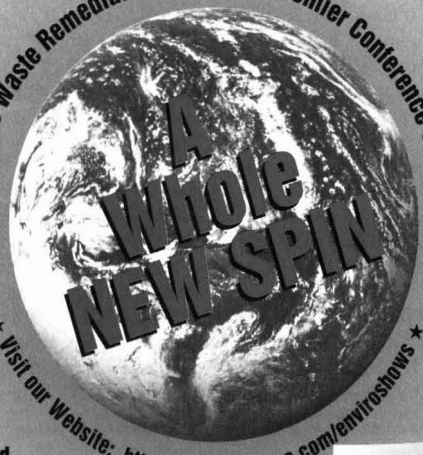
Robert Welch joined **Adatek Inc.**, Sandpoint, Idaho, as national sales manager. EP

HAZWASTE WORLD

SUPERFUND XVII

Oct. 15-17, 1996 WASHINGTON, D.C. CONVENTION CENTER

The Hazardous Waste Remediation Industry's Premier Conference & Exhibition



★ Visit our Website: http://www.ejkrause.com/enviroshows ★

HIGHLIGHTS FOR 1996!

- Training Sessions included within the conference
- Dept. of Energy, Dept. of Defense & U.S. EPA conference sessions
- Featuring Transportation & Emergency Response Issues
- Over 500 hazardous & solid waste exhibits

Sponsored By:

E.J. Krause & Associates

Environmental Industry Associations

Supported By:

EPA

W.A.S.T.E. '96
The Waste Industry's Approach to Solid Waste Technologies and Equipment joins HAZWASTE WORLD adding a solid waste conference and exposition to this world class event.

W.A.S.T.E. '96 CONFERENCE: OCT. 14-16, 1996

To receive more information please complete this form and fax to:

E.J. Krause & Associates, Inc.
7315 Wisconsin Ave., Suite 450N
Bethesda, Maryland 20814
Attn: Susan Newman
Fax (301) 986-4538
Any questions call (301) 986-7800

CONTACT INFORMATION

I'M INTERESTED IN ❑ ATTENDING EXHIBITS ❑ CONFERENCE ❑ EXHIBITING

COMPANY

ADDRESS

CITY STATE ZIP

CONTACT TITLE

TELEPHONE FAX

Circle 115 on card.

on the cutting edge

New Thermal Conductivity Analyzer

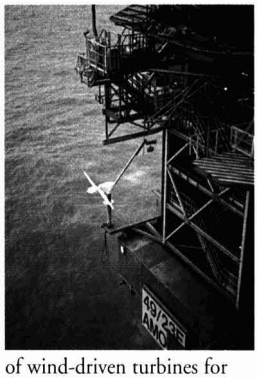
Teledyne's new Model 2000A Thermal Conductivity Analyzer is a versatile microprocessor-based instrument for measuring binary mixtures of gases. The analyzer combats nonlinearly with a linearizing circuit that automatically corrects the signal output and meter readout. **Teledyne Analytical Instruments.**
Circle 140 on card.

New Filter Press Technology

DryVac Environmental announces the development of a new dewatering technology that will revolutionize the filter press industry. The technology is built around a filter press plate that incoporates both a new design and new materials, resulting in a system where sludges and other products can be dried to 100 percent solid in conventional presses without any follow-on equipment. This reduces solid volumes and weights by 50 percent to 80 percent of those achieved by conventional processes. **DryVac International.**
Circle 141 on card.

First Wind-Driven Generator for Offshore Platforms

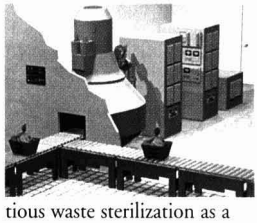
The French turbine manufacturer VERGNET, one of the world's leading producers



of wind-driven turbines for more than 25 years, has produced and installed the first wind-driven generators on an offshore platform. A world first, the use of wind turbines to power remote platforms provides sufficient energy to operate the platforms through battery storage, cutting refueling and maintenance costs in half. **VERGNET.**
Circle 142 on card.

Infectious Waste Sterilization Now Easier On Site

BioSterile Technology announces electron beam infec-

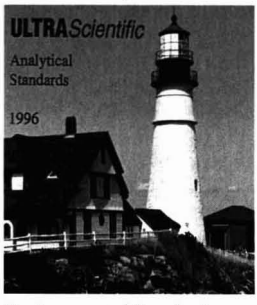


tious waste sterilization as a cost-effective method of sterilizing infectious waste. Although the technology has been used for 20 years, the size of the equipment and the cost have always prohibited on site use by hospitals. BIOSIRIS™ is the first compact, self-contained E-beam treatment system that renders 100 percent of infectious waste non hazardous. **BioSterile Technology Inc.**
Circle 143 on card.

in print *Compiled by Marion Petty*

Here's just a taste of the many catalogs, brochures, books and reports currently available to help you.

THE NEW 1996-1997 ULTRA Scientific Analytical and



Environmental Standards Catalog contains more than 5,000 inorganic and organic standards and more than 1,000 new products. New products include DRO/GRO fuel standards, international standards, explosive

ONE OF AMERICA'S LEADING PUBLISHERS OF safety and regulatory compliance products, J.J. Keller & Associates Inc. has introduced its HazMat Catalog for 1996.

The 64-page, full-color catalog is a vast array of regulatory publications, placards, labels, forms, training materials and services. Some of the new products featured in the HazMat Compliance Catalog are the *Hazardous Compliance Manual,* the *Hazardous Materials Compliance Pocketbook,* the *Hazardous Materials Regulations Handbook* and the *1996 Emergency Response Guidebook.*

Two new features contained in the catalog are bound in: Business Reply Cards for Keller's On-site Safety Consulting & Training Services and Keller's Customized Safety and Compliance Solutions. Both cards provide readers a fast and easy way to find out more about the wide range of services offered, as well as Keller's customizing capabilities done for many of America's Fortune 500 companies.

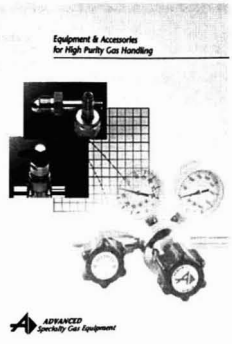
Keller offers more than 2,000 products, such as regulatory guides, compliance manuals, employee handbooks, user-friendly software, newsletters and video-based training kits. The company also conducts seminars and workshops across America. **J.J. Keller & Associates Inc.** *Circle 201 on card.*

standards, state standards and new ULTRA DATAdisks™. **ULTRA Scientific.**
Circle 144 on card.

WHESSOE HAS PUBLISHED THE first issue of a newsletter called "Instrumenting Solutions," which reviews advances in instrumentation technology—with a particular focus on applications in the oil, gas and chemical process industries. **Whessoe.**
Circle 145 on card.

A NEW FREE BROCHURE, "Water Solutions," features information on more than 30 water treatment products for both municipal and industrial applications.
Smith & Loveless Inc.
Circle 146 on card.

A SECOND EDITION OF A catalog of high purity gas



handling equipment and related accessories is available and has been expanded to 150 pages. It contains hundreds of items essential for safe and efficient handling of specialty gases. **Advanced Specialty Gas Equipment.**
Circle 147 on card.

A new four-page brochure describes Hydro Group's environmental subsurface

remediation services, technologies and its manufactured remediation equipment. Services include Phase I and Phase II site assessments, remedial investigation/feasibility and treatability studies and solid-waste services. **Hydro Group Inc.**
Circle 148 on card.

IN PRINT SINCE 1985 WITH periodic updates, Elson's "Engineering and Specifications Manual" is recognized as the thermoplastic piping industry's most comprehensive technical reference. It contains updated product information on Eslon's full line of PVC and Corzan™ CPVC thermoplastic piping products. **Eslon Thermoplastics.**
Circle 149 on card

A CURRENT AWARENESS AND Guide to Understanding the United States Environmental Regulations" is a new guide designed for those not in the mainstream of environmental regulation awareness, who need a resource guide to determine whether they are in compliance, and if they have questions, where to go for help. **DPNA International.**
Circle 150 on card.

EPA Issues New Audit Policy

The EPA hopes a new incentive program will promote industry's environmental compliance and encourage self-policing.

THE U. S. ENVIRONMENTAL PROTECTION AGENCY has finally addressed the concerns of corporate America by issuing its final environmental auditing policy.

The purpose of the EPA's audit policy is to encourage voluntary self-policing and encourage voluntary compliance with federal environmental laws. A party making disclosures to the EPA must do so on a voluntary basis to become eligible for treatment under the new policy. If a party's disclosure is voluntary and meets other conditions, the EPA will seek reductions in penalties and will not refer the matter for criminal enforcement.

While providing some protection for environmental audits, the EPA continues to withhold evidentiary privilege for disclosure of voluntary environmental audit information. Evidentiary privilege is a two-part legal term. Evidentiary is the use of facts given by one party during a court proceeding to help prove that party's position. Privilege is a legal mechanism that allows a party to a lawsuit to protect information from disclosure to the court or the opposition.

Evidentiary privilege is based on the idea that society is best served by not forcing disclosure of certain information, because ensuring the information's confidentiality prompts the party to do the "right thing."

When environmental audit information is protected, it can be used to begin corrective measures to solve environmental problems. Several important definitions are set out in the EPA's audit policy. The definitions are critical because they set the boundaries for material covered by the policy and identify federal protections available to companies that complete environmental self-evaluations.

- Environmental audit is defined as a "systematic, documented, periodic and objective review" of practices related to meeting environmental requirements.
- Due diligence is defined as a company's efforts to prevent, detect and correct environmental violations.
- Gravity-based penalties are defined as that portion of a penalty levied above and beyond the recoupment of the benefits the company has gained by the violation.

An entity can become eligible for the benefits of voluntary disclosure after meeting certain conditions, including:

- The discovery of violations must come as part of a systematic program designed to identify and correct environmental issues.
- The disclosure must be voluntary and not result from an agency-mandated monitoring program.
- Prompt disclosure to the EPA, and disclosure must not result from a federal or state investigation.
- Violations and any resulting harm must be corrected within 60 days, or longer if the EPA agrees.
- The violation cannot be part of a pattern of environmental violations of the same type.
- The entity must have measures in place to prevent the recurrence of the violation.

If a party's disclosure is voluntary and meets other conditions, the EPA will seek reduction in penalties and will not refer the matter for criminal enforcement.

After Conditions Are Met

Once an entity meets the conditions, the EPA will reduce its pursuit of enforcement sanctions. An entity will be eligible for a 75-percent reduction in gravity-based penalties if it meets all of the conditions, except for a systematic environmental auditing approach. The approach differs from the EPA's interim policy that granted a 75-percent reduction in gravity-based penalties for simply meeting "most" of the conditions.

For entities that satisfy all of the requirements, the EPA will not seek gravity-based penalties or refer issues to the U.S. Department of Justice for criminal enforcement. The EPA will not routinely request environmental audit reports for the purpose of initiating enforcement action unless it has independent knowledge of environmental violations.

The EPA's audit policy places some strict requirements on entities that wish to receive protection through the use of self-evaluation. Although some companies believe environmental self-policing is burdensome, protections, including reductions in gravity-based fines and criminal enforcement, provide a strong incentive to participate. However, the EPA has not gone far enough, because the current policy does not provide any evidentiary privilege protection in court. Evidentiary privilege is needed to truly convince industry that the EPA supports self-auditing. Until this privilege is established, it is hard to predict the impact of the policy. EP

Daniel S. Schleck, *P.E., CHMM, is an attorney in Minneapolis, Minn.*

Handling Environmental Claims

Unless your company is prepared, you might be overwhelmed by the myriad of hoops to be jumped through to clean up a contaminated site.

AN ARTICLE LAST YEAR IN THE *WALL STREET JOURNAL* broadcasted the story of $15.2 million spent in attorney's fees and more than $50 million spent in remedial expenses by Motorola Inc. for one of its facilities in Phoenix, Ariz. Eye-catching because of the dollars involved and perhaps surprising that it involved a major corporation expert at controlling costs, this dilemma is being faced by more corporations every day. All companies, regardless of size, must be wary of the costs of environmental claims.

Unlike traditional contract or tort claims, environmental losses do not always involve clearly defined issues of liability and damages.

Unlike traditional contract or tort claims, environmental losses do not always involve clearly defined issues of liability and damages. As in the Motorola claim, there is a significant need for technical or scientific support in researching, evaluating and defending these claims. The nature and extent of the pollution conditions, the development and selection of short- and long-term remedial and disposal alternatives must be considered, regardless of any third-party claimants. Once third-party claims begin to develop, new issues must be considered.

Choosing the Best Contractor

While prompt notice of a loss is important in any situation, it is of paramount concern for an environmental claim. Contamination from a spill only increases and costs escalate by delay.

Once notice is given, the loss must be assessed from the perspective of selecting the correct contractor. The environmental business has grown dramatically in the past 15 years, and as a consequence, the types of companies are diverse. Firms can be simply consultants offering investigative, design and oversight services, or contractors, who own and operate the equipment to implement the remedial plan, or a combination of both. All companies have limitations, whether geographic, technical or in equipment and labor. Many have particular areas of specialization, such as hydrogeology, bioremediation and mobile incineration.

The first thing to determine is a contractors' qualifications. Have they performed this work before? Are they familiar with your company's business? Do they have the manpower and equipment to perform the work in a timely and efficient manner?

Next, what is the contractors' reputation? How long have they been in business and particulary, in this type of business? References should be obtained from both private clients as well as federal, state or local agencies.

Price lists for both hourly rates and equipment and materials should be compared.

Important Contractual Considerations

Once a contractor has been selected, a formal written contract should be executed. In an emergency, it may be impossible to sign a contract until after the work has begun. A contract, nonetheless, should clearly set forth parties' intentions, including the scope of work and associated cost estimates. As in any contract for services rendered, the terms should be clearly reviewed, and, in particular, the client should review the indemnification provisions, as well as the limitation of liability provisions.

The contract also should clearly spell out insurance coverage that the contractor will maintain. For environmental services, a contractor should not only have general liability, business auto and workers' compensation coverage, but also maintain professional liability and pollution legal liability coverage.

With a contractor selected and a contract in place, work can begin. Clients should ensure they have a contact person, as well as a backup. Depending on the size of the project, clients should receive daily verbal and weekly written status reports.

Remedial Methods

All appropriate federal, state and local agencies should be notified of the loss and should approve the remedial action plan. If a lead agency isn't determined from the beginning, the client may begin a remedial plan working with one agency only to finish the plan and find that another agency has authority over the incident and will not approve the previously agreed upon cleanup criteria.

The choice of an appropriate remedial method is key to managing environmental claims in which remedial action is necessary. In addition to traditional approaches used to determine the most cost-effective

continued on page 39

Randall E. Hobbs, *JD, is vice president of Environmental Claims Administrators Inc. (ECA) in Exton, Pa.*

Conducting a harmonious biosolids management program doesn't have to be difficult.

Orchestrating an effective biosolids program can be frustrating if your staff, consultants, and contractors aren't performing in sync. That's why municipalities across North America call on Bio Gro to create solutions that are both seamless and flexible enough to meet the industry's ever-changing demands. Bio Gro can assume total responsibility for your biosolids program, from processing to product marketing, all with full regulatory compliance. And we have the proven ability to work effectively with you, your consultants, and all your biosolids players.

If an integrated, cost-effective biosolids management program from a single, reliable source sounds like music to your ears, start on the right note. Call Bio Gro about a solution designed around your needs.

Bio Gro offers the full spectrum of services for effective biosolids management.

- ▲ Design
- ▲ Construction
- ▲ Operations
- ▲ Privatization

Your one source for the industry's widest range of state-of-the-art technologies.

- ▲ Land Application
- ▲ Pelletizing
- ▲ Alkaline Stabilization
- ▲ Composting
- ▲ Dewatering
- ▲ Product Marketing

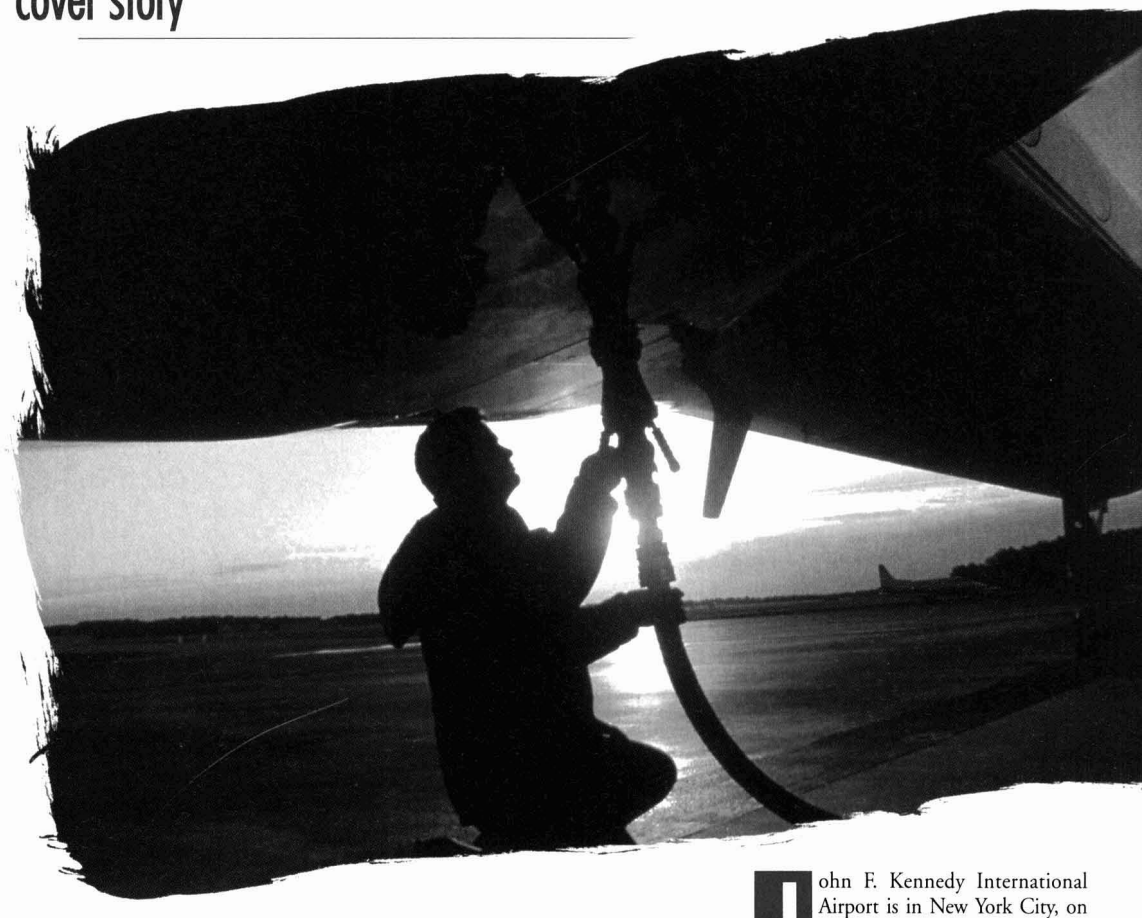
Wheelabrator Water Technologies Inc.

BIO GRO

A WMX Technologies Company
180 Admiral Cochrane Drive, Suite 305
Annapolis, Maryland 21401

Phone 800.234.2524

Circle 129 on card.



Airport Cleanup Rises Above Problems

Engineers used a treatment combination to improve the in-situ bioremediation system's efficiency in removing underground fuel leaks at JFK Airport.

By Nicholas Pressly, Barry Lucas, Bruce Frumer and Robert Roth

John F. Kennedy International Airport is in New York City, on Jamaica Bay, about 15 miles from midtown Manhattan. JFK has an above-ground storage capacity of about 32 million gallons of jet fuel, which flows through about 50 miles of high-pressure underground pipe to the central terminal area. Each terminal's fuel hydrant system was the major source of subsurface contamination at the site.

The site is covered by 1 to 1.5 feet of reinforced concrete pavement. Liquid phase jet fuel (free product) was measured on the water table with true thickness ranging from less than 1 inch to 1 foot. After analysis of core samples, contamination was found adsorbed to the soil with maximum levels at the water table.

The system is designed to dewater the contaminated area and remove groundwater and free product under enhancement by a separate vacuum on the well head. Most of the free product lens is smeared across the dewatered soil to optimize the surface area for biodegradation and volatilization of hydrocarbons by the air movement caused

by the applied vacuum to the well head. Air injection wells located between the extraction wells supply air for biodegradation as well as for traditional air sparging when the water table was allowed to return to near-static levels.

The groundwater extraction and treatment system included a centralized groundwater recovery system (CGRS) using a recirculation tank and ejector pumps, oil-water separation, oxidation of dissolved iron using diffused aeration, suspended solids removal using an inclined plate clarifier (IPC), air stripping to remove dissolved volatiles, and liquid phase granular activated carbon (LPGAC) for further dissolved hydrocarbon removal before discharge to a storm sewer.

The vapor extraction system included a vacuum extraction blower, air/water separator, and vapor phase granular activated carbon (VPGAC).

The concentration of volatile organic compounds (VOCs) within extracted vapors ranged from 30 to 419 parts per million. The VOC mass removal rate was determined using the average flow rate and VOC concentration obtained from each new sampling and the previous one.

The cumulative hydrocarbon removal via the liquid phase was 27,740 pounds. This was determined by the amount of jet fuel separated by the oil/water separator, contaminated sludge collected by the clarifier, and dissolved hydrocarbons removed by the groundwater treatment system.

About 100,004 pounds of petroleum hydrocarbons were biologically oxidized from startup to October 1995. On Dec. 13, 1995, water samples were collected from six wells within Area 3 for VOC and semi-volatile organic compound (SVOC) analyses according to U.S. Environmental Protection Agency method 8020 and 8270. The results for total benzene, toluene, ethylbenzene and xylene (BTEX) and SVOCs ranged from nondetectable to 10.5 ppb and from nondetectable to 49 ppb, respectively.

Microbial Conditions During System Operation

In November 1993, soil samples were collected from nine locations at depths ranging between 4 to 10 feet below grade within future remediation areas at Terminal 1. In August 1995, six soil samples were collected from two locations within Area 3.

November 1993 results indicated a total heterotrophic population in the pre-remediated area ranging from 105 to 106 colony forming units per gram (cfu/g) dry weight. PHC results from the same date indicated a petroleum hydrocarbon degrading population ranging between 104 to 106 cfu/g. In all the above samples, the heterotrophic plate count (HPC) counts were greater than the petroleum hydrocarbon (PHC) counts.

In contrast, HPC and PHC results were nearly identical midway though the Area 3 operation and ranged from 108 to 1,010 cfu/g. Simultaneously, with the growth of the microbial population, the dissolved oxygen (DO) level in the total groundwater extraction system influent was 8 mg/L at system startup (showing the efficiency of the air injection system). During subsequent months, the DO level within the influent declined and was at its lowest level (4.3 mg/L) during the August 1995 sampling.

Based on population increase, the mass of petroleum hydrocarbons biologically oxidized in the unsaturated and saturated zones was about 91,400 pounds and 5,000 pounds, respectively. Based on the amount of CO_2 generated above background levels during the same period, about 63,000 pounds of petroleum hydrocarbons were degraded.

Above-Ground Treatment Faced Challenges

The dual-phase remediation method employed at JFK used a series of separation processes to removed separate and dissolved phase jet fuel from groundwater. Shortly after system start-up, the separation processes became ineffective at removing separate phase fuel, which caused fouling of active adsorption sites and high consumption of liquid phase granular activated carbon (LPGAC) that treated the discharge water.

- **Free Product Emulsification:** Emulsification occurred when the fuel and water mixture drawn from the well was jetted into the high-velocity flow of the venturi. Jetting liquid extracted from the well into the circulated water suspended and entrained microglobules of recovered fuel in the circulated water. Microglobules of jet fuel less than 10 microgram in diameter had insufficient buoyancy to coalesce but formed a floating layer during the two-hour residence time.

The formation of an effectively buoyant emulsion and a float cake that impeded removal of separate phase fuel in the oil/water separator caused suspended fuel and cake to foul downstream processes such as the air stripper, sand and bag filters, and LPGAC. Microglobules of product, bacterial cells and suspended ferric oxides, which passed the final filter, a 10 microgram bag filter, adsorbed onto the surface of the carbon, effectively blinding sorption sites that should have attracted dissolved phase fuel compounds. Excessive weekly carbon adsorber changes were necessary to prevent breakthrough of contaminant to the discharge waters.

A second factor believed to have contributed to the emulsification of free product were biosurfactants. Biosurfactants produced by petroleum-degrading microorganisms are typically glycolipids or phospholipids with properties resulting from polar and apolar groups on a single molecule.

- **Presence of Biomass:** The presence of floating and suspended sludge, identified primarily as biomass in combination with emulsified free product, reduced treatment system efficiency. The tendency to float could have resulted from entrained gas bubbles from the respiration of bacteria, adherence of bacteria to the low density oil globules, or fibrous material (fungi), which decreased the settling velocity of the material—resulting in the observed floating scum.

Initially, up to 6 inches of floating sludge was manually skimmed from the oil/water separator and the clarifier per day. The suspended particles, adsorbed with hydrocarbons, reduced the efficiency of the LPGAC by up to 75 percent by occupying and blocking most of the adsorption sites in a relatively short time period.

The adsorbed hydrocarbon component of the suspended biomass was detected by the analysis of filtered and nonfiltered samples. Nonfiltered water

samples had up to a 100 times greater hydrocarbon concentration.

Evaluation of Enhancements

• **Dissolved Air Flotation:** Since the clarifier solids were suspended and not settling effectively, dissolved air flotation (DAF) was considered as a solution. The objective of DAF is to remove buoyant suspended solids by causing them to first agglomerate with the aid of coagulants and then flocculate into larger particles in a slow-mix tank. The floc floats to the tank surface by adsorbing to air bubbles.

The additional costs in changing the existing system to DAF, along with the coagulant costs, did not make the conversion feasible.

• **Coagulation and Flocculation:** Coagulation involves solidifying or destabilizing finely divided suspended particles. Coagulation can be either adsorptive coagulation or sweep coagulation, depending on the relative level of turbidity and coagulant dosage. Adsorptive coagulation occurs at high turbidity and low coagulant dosage; whereas sweep coagulation occurs at low turbidity and high coagulant dosage. Flocculation occurs at slow mixing rates to form aggregates or flocs from finely divided particles to increase the removal rate of suspended solids. The flocculation process is a function of time.

Jar tests were conducted using ferric chloride, polymer, and other coagulants and flocculants. A variety of coagulants and flocculants were jar tested to find a solution to the sedimentation problems in the remediation system.

• **Retention Time Adjustments:** As a result of the free product emulsification and biomass problems, the bacteria, silt, and jet fuel froth at the surface of the oil/water separator, iron oxidation tank, inclined plate clarifier, and CGRS tank did not settle in solution without large dosages of polymers and other additives.

To reduce the pass through of hydrocarbons and suspended solids to the LPGAC units, a 20,000-gallon holding tank was installed before air stripping and the LPGAC units. The 20,000-gallon portable tank with level controls afforded a one-day cycle per discharge event. The froth and fuel was collected from the tank only when significant accumulation was present.

Conclusions

The data suggest that the mechanism with the greatest potential for remediating the soil and groundwater appeared to be biodegradation. The bioactivity was supported by the concentration of CO_2 above background levels, decreased DO in the groundwater treatment system influent, and increased microbial population in the saturated and unsaturated zones. The decrease in bioactivity in October 1995 may be the result of:

• The hydrocarbons used by the subsurface microorganisms as a substrate might be limiting.

• The moisture content in the soil might have been reduced by the groundwater/soil vapor extraction to levels that are inhibitory to microbial growth.

• Available inorganic nutrients, especially phosphorous, could have been depleted. EP

Nicholas Pressly *is an environmental engineer,* **Barry Lucas** *is a staff services engineer. and* **Bruce Frumer** *is a construction engineer with the Port Authority of New York and New Jersey, New York, N.Y.* **Robert Roth,** *PE, Ph.D., is the operations manager of the Mid-Atlantic office of Terravac Inc., Trenton, N.J.*

Tired of sifting through streams of compliance regs, searching for a few nuggets of information?

***BNA's Environment & Safety SmartCite™* leads you straight to what you're looking for.**

Introducing a new, Windows®-based CD-ROM tool from BNA. By asking you a series of plain-English questions, *SmartCite* helps you find the specific rules that apply to your plant.

The result is an individualized regulatory compliance profile for each of your facilities. And your profile can be easily updated whenever regulations change. Because BNA sends a new disc each month.

It's like having your own personal consultant, working with you in these key areas of regulation: solid and hazardous waste, air quality, PCB management, spill prevention, hazardous materials transportation, water quality, storage tanks, TSCA, and EPCRA.

SmartCite also lets you access easy-to-understand capsule definitions of regulatory requirements. It's the perfect tool to help you manage your compliance program. Develop comprehensive checklists. And train your plant and headquarters personnel.

When it comes to helping you save time, *SmartCite* is as good as gold. Try it in your office for 60 days at no cost.

BNA'S ENVIRONMENT AND SAFETY
SmartCite™

ESSC566EP

Windows is a registered trademark of Microsoft Corporation.

Call 1-800-372-1033 to try BNA's *SmartCite* for 60 days — FREE!

The Bureau of National Affairs, Inc., 1231 25th Street, NW, Washington, DC 20037
Visit our Internet Web Site at http://www.bna.com/

Circle 121 on card.

Mixing Up a Microbial Cocktail

Using cultures of microbes isolated from a Siberian oil spill, an Oregon company has sped up the time it takes to bioremediate hydrocarbon-contaminated sites.

By William Weinstein

ETEC, based in Troutdale, Ore., recently completed tests on a Superfund site to prove that applied remediation could clean sites contaminated with creosote and other polycyclic aromatic hydrocarbons (PAHs). The tests were conducted for the Oregon Department of Environmental Quality (ODEQ) and the U.S. Environmental Protection Agency Region 10 at the McCormick and Baxter Creosoting Site. The EPA placed the site on the Superfund National Priorities List May 31, 1994.

McCormick & Baxter operated a wood-treatment plant at the site from 1944 until 1991. Wood-treatment processes used at the site included creosote in oil and pentachlorophenol (PCP). For years, waste oil containing creosote was reportedly applied to site soil.

In August 1995, ETEC received some of the impacted soil from the McCormick & Baxter site. Initial concentration of PAH compounds (by EPA 8310 analysis) was 1,862 parts per million. Sixteen different PAH constituents were analyzed. The stated cleanup goal is 100 ppm total for these contaminants.

Due to the high concentration of toxic compounds, one of ETEC's bioremedial products—a biosurfactant compound—was applied first. The application's main goal was to reduce the total system toxicity and make possible a further application of the main bioremedial product—a multi-enzyme complex. Due to the specific chemical structure of PAH compounds, PAH constituents will affect the three-dimensional structure of enzyme molecules as well as simply killing bacteria through toxic shock.

Bioremediation

Bioremediation can break down 95 percent of two-, three- or four-ring polyaromatic hydrocarbons, but only 60 percent of five- and six-ring compounds. And it takes at least two to three years to attain these degradation levels. During 72 days of treatment using the biosurfactant and multi-enzyme complex products, PAHs were reduced 55.8 percent. Although these results are somewhat impressive, most of the degradation occurred in the two- through four-ring PAHs.

> Acknowledged as one of the most difficult compounds to bioremediate, benzo(a)Pyrene dropped nearly 90 percent in only 16 days.

The bacterial cultures are the product of a search that sent the company's founders to the former Soviet Union, where they discovered Russian scientists with extensive backgrounds in microbiology and biochemistry. Their research included isolating and culturing natural microbes for use in bioremediation. Among the organisms was a bacteria strain isolated from an old Siberian oil spill.

Co-metabolism

At the time, the company's researchers completed development of a new product that uses a process referred to as "co-metabolism." The product includes four separate strains of bacteria. Two strains work together to begin the process of breaking down the ring structure. The third and fourth step are added to complete the breakdown.

Alone, this would achieve the desired results. However, the combination of strains seems to have a synergistic or catalytic effect, so that the sum of the break-

down process is greater than its parts.

In processes involving bioremediation using biological components, the first step in the breakdown of hydrocarbons involves molecular oxygen (O_2) as a reactant in which one of the oxygen atoms is incorporated into the oxidized hydrocarbon. The reaction is carried out by enzymes called oxygenesses, which activate oxygen and convert it to a form in which the oxygen atom can be incorporated directly into a biochemical compound. This process, repeated, quickly breaks down the hydrocarbon to the corresponding alcohol, aldehyde and finally to the monobasic fatty acids.

Metabolism of both aliphatic and aromatic hydrocarbons have the same important and difficult fatty-acid-formation stage. The critical step of oxidation requires specific enzymes, which are produced by a few microorganisms known as hydrocarbon oxidizers. As the hydrocarbons are transformed after contacting the fatty acid stage, they become "easy" hydrocarbons and can readily be assimilated by the indigenous bacterial population.

The enzyme process accounts for about 90 percent of remedial breakdown.

During the 16 days following application of the new product, dramatic degradation occurred. Total PAH levels dropped from 823 to 146. Most dramatic was the drop in the five- and six-ring compounds. Acknowledged as one of the most difficult compounds to bioremediate, benzo(a)Pyrene dropped nearly 90 percent in only 16 days. The remaining is PAH constituents degraded to between 90 percent and 100 percent. Subsequent to this treatability study, two additional strains of bacteria have been isolated, cultured and added to the "cocktail," making it more efficient.

Using co-metabolism at the beginning of the process would produce similar results in a fraction of the time.

ETEC has completed the next step of its research and development program, which separates the enzymatic compounds from the bacterial strains, as the firm currently does for its hydrocarbon degrading products. EP

William Weinstein *is co-founder and a principal in ETEC L.L.C., Troutdale, Ore.*

For more information on ETEC, circle 151 on card.

Questions or comments? E-mail us at angela@texnet.net.

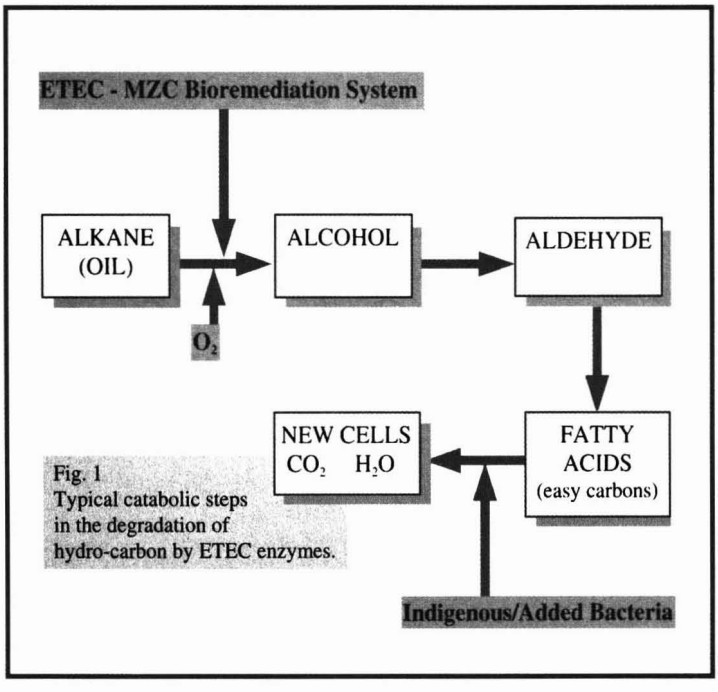


Fig. 1
Typical catabolic steps in the degradation of hydro-carbon by ETEC enzymes.

Photo courtesy of ETEC L.L.C.

Too Close To Call

EP survey respondents said they plan to buy several sludge drying and disposal products, but no product stood out as a clear winner.

If *Environmental Protection* magazine's recent buying intention survey on sludge drying and disposal products were a car race, it would be too close to call. No product or service was a clear winner, and most fell in the middle of a tight pack.

The poll, conducted in the April *EP*, asked readers about their buying intentions for sludge drying and disposal products for the coming year. Those voting circled the appropriate categories on the magazine's readers service card. Unlike some of the past buyers' surveys where there were clear trends, this survey yielded none.

When asked which sludge disposal and drying services or products they intended to buy within the next 12 months, 16 percent of participants said they would buy screw presses. On the other end of the spectrum, 3 percent of survey participants said they intended to purchase land-application vehicles, fluid-bed incinerators or wet-air oxidation systems. The remaining products fell between the two points.

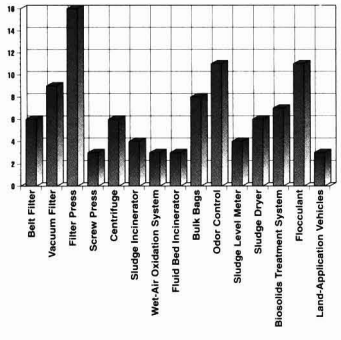
The lack of a trend also was evident when participants were asked why they were purchasing the services or products. Replacement and maintenance was the main reason, receiving 41 percent of the votes. But plant upgrade, with 31 percent, and new construction, with 28 percent, weren't far behind.

Respondents planned to spend varying amounts of money on the products or services, ranging from 24 percent who said less than $5,000 to 19 percent who said more than $200,000.

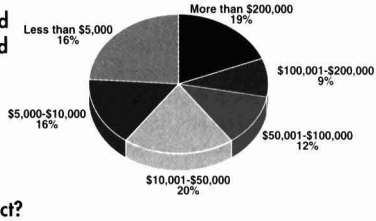
More than half the participants said they planned to purchase the services or products within the next six months.

If you would like to participate in the July buying intentions survey, simply answer the appropriate questions on the reader service card and mail it to *Environmental Protection*. Watch for the results in future issues.

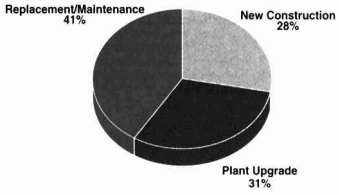
Which of the following sludge drying and disposal product(s)/service(s) do you plan to purchase in the next 12 months?



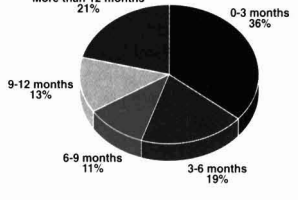
What is your projected budget for the selected products/services?



What is your reason for purchasing the selected product?



How immediate is your need for the selected products/services?



Handling the Media During a HazMat Emergency

Advance preparation is critical to successfully dealing with reporters when an incident occurs involving hazardous materials.

By Janet Boulter

You are prepared to respond to an emergency involving a dangerous chemical release at your facility, but are you ready to communicate to the media and the public during the event?

The only way to be prepared is to have a communication plan that outlines employee responsibilities. An emergency is not the time to develop new media communication strategies.

The following is a list of suggestions for effectively dealing with the media and the public:

1 Always plan as if an emergency could happen. Your company should have pre-prepared information to distribute to the media. The company spokesperson should be the only person who talks with the media as a representative of the company.

In an emergency, the most senior person on-site should brief the media until your spokesperson arrives. Once your spokesperson arrives and gathers the necessary information, set a time when the media can expect a response. Always have your legal counsel review the pre-prepared information that will be released.

2 Remember, the media has a job to do—report on your emergency. The public is concerned about the potential impact the emergency may have on the community. Try to understand and address their perspective and concerns. Always cooperate—provide as much information as possible. Provide fact sheets, including maps and charts, on the project and the company. The information should be current and in an easy to understand format.

3 Speak slowly and always repeat important information. If time allows, fax or e-mail quotes, names and titles, acronyms, etc. The written word is less likely to be misquoted.

> At a minimum, you should provide information outlining your company's role on the project, company history and your environmental policies.

4 Educate your employees on your company's policies. Only trained staff should speak as representatives of the company. You cannot prevent your employees from expressing their opinion, but it is important that both your employees and the media understand the employees are not speaking as representatives of the company.

5 Respond immediately—reporters are on a deadline and will use their own information if yours is not provided in a timely manner. At a minimum, you should provide information outlining your company's role on the project, company history and your environmental policies.

Both your company spokesperson and representatives from management should be at your press conference to answer questions. Resist the temptation to have your legal counsel present, unless absolutely necessary.

6 Gather your composure. Before being interviewed or photographed, always remove your hardhat, sunglasses or safety glasses. Since the media will only be allowed in a safe area, consider removing any protective clothing as your appearance could create additional concerns with the public.

7 Provide names and phone numbers (including after-hour numbers) of people to be contacted for more information after the initial media briefing.

Obtain a list of media contact names and fax numbers so you can forward regular project updates, as the situation unfolds.

8 Never use "no comment." If you are not prepared to present your side of the story, say so. When you say "no comment," it implies guilt or some level of wrongdoing.

Do not say anything "off the record." If you say it, expect it to become part of the news story.

9 Do not provide information on a subject of which you are not knowledgeable. Either defer to someone more familiar with the project or offer to provide more information at a later date —and then do it.

10 Avoid using acronyms not familiar to the public. If you have to, explain what they mean as you use them.

11 Do not use contractions. Example: use "do not" instead of "don't." You are less likely to be misquoted.

12 Never discuss the situation with other employees, assuming no one is listening. What you say could end up in print.

13 Do not waiver—always stand your ground and repeat your company's position as often as necessary. Be prepared, so you will not succumb to the pressure of intense questioning.

14 Never ignore the media and the public. They will find the information they need, along with information you may not want included in the story.

15 An emergency is not the time to learn how to deal with the media and the public. In order to have your company represented as accurately as possible, it takes planning and practice.

Consult your local professional directories for lists of consultants who provide the necessary communications training.

16 In addition to providing formal media training for your company spokesperson(s), take time to talk to your employees about your company's communications plan and policies.

Planning ahead and being prepared will make communicating with both the media and the public a positive and successful experience.

Janet Boulter *is a principal and founder of Glacial Communications, Denver, Colo.*

For more information on Glacial Communications, circle 152 on card.

Questions or comments? E-mail us at angela@texnet.net.

What Do You Think?

Please indicate your level of interest in this article by circling the appropriate number on the Reader Service Card.

High 153 Medium 154 Low 155

The Autobahn of Environmental Databases

When you're racing against time to prepare environmental reports, a new on-line database gets the checkered flag.

Regardless of the cause, the need to tap into environmental regulatory records information during nonbusiness hours is an obstacle most environmental professionals have encountered.

A major consumer food manufacturer contacted Rockville, Md.-based Apex Environmental Inc. with an urgent request. Apex is a full-service environmental consulting firm that conducts both environmental investigations and remediations.

The manufacturer was interested in purchasing 52 properties across the nation to use for additional production, storage and distribution facilities. After reviewing the seller's property disclosure statements, the manufacturer called Apex and requested a customized regulatory government records report verifying the registration or presence of underground storage tanks (USTs) on the sites.

The buyer also requested Comprehensive Environmental Response, Compensation and Liability Act Information System (CERCLIS) and Resource Conservation and Recovery Act Information System (RECRIS) reports on two sites. Apex's only problem was the buyer requested the information at 5:45 p.m. and needed it by 8 a.m. the next day.

"We normally expect a job of this size and nature to take at least two to three days before getting information back from a database service provider," said Apex project hydrogeologist Kelly Kinkaid. "I knew ERIIS (Environmental Risk Information and Imaging Services) was the only company that could possibly help us."

Millions of Records

With a database containing more than 7 million federal, state and county environmental records, Herndon, Virg.-based ERIIS is the nation's largest publisher of environmental property reports.

The firm recently developed ERIISnet, the first nationwide online, interactive environmental information service. The service provides instant online access to the firm's full database of environmental records information for any U.S. commercial, industrial or residential property.

Apex's Reading, Pa., office didn't have access to the new online service at the time. Instead of downloading 52 complete American Society of Testing and Materials reports, which weren't needed, the firm worked with Apex during the evening to tailor the request and specifically order only the UST, CERCLIS and RECRIS databases.

> The database revealed several UST sites not mentioned in the seller's original property disclosure statements.

Apex gave the site locations, and the firm's representative entered each one into the on-line system using a laptop computer from home. Within minutes, the customized UST, CERCLIS and RECRIS information databases were geocoded and available.

Quick Turnaround

Although the consulting firm worked all night, the report was on the client's desk before the 8 a.m. deadline. The database revealed several UST sites not mentioned in the seller's original property disclosure statements. After reviewing the reports, the client requested additional Phase I environmental site assessments at several sites.

If Apex had the online database service in its office at the time, it could have simply entered each property's address into the network to get a complete environmental database report for the site. The firm could tailor the search to obtain all, some or any single environmental database needed, 24 hours a day, 365 days a year.

Apex could select information about a specific property or information about all

properties within defined radius ranges or zip codes. When used this way, the firm would save time and money by screening a list of sites for the presence of one or two critical hazards and separating those properties for further investigation.

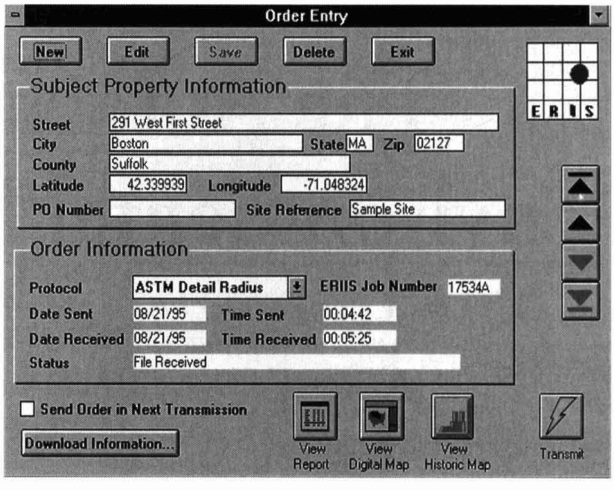
Environmental consultants often need quick turnaround of pre-Phase I government records to get the jump on competition. Sometimes, deadlines are pushed forward by clients to meet unforeseen budget constraints.

Until now, however, they could not be overcome since the database reports required some manual processing by the supplier companies.

That is no longer the case, as technology has caught up with demand for instant environmental regulatory records information, available now for the first time online. EP

For more information about ERIIS, circle 156 on card.

Questions or comments? E-mail us at angela@texnet.net.



ERIIS' user-friendly computer screen makes gathering data easy.

Circle 124 on card.

THERE'S A
CHANGE IN
THE AIR

The sign of change in the world of process emission control

Focused clean-air solutions for industry

The world over, legislation is tightening on atmospheric emissions from industrial processes. The issue is urgent. The consequences of non-compliance could be critical to your business. But the challenge of compliance can be complex, and no two manufacturing processes present quite the same set of problems.

The time is right for a new kind of emission systems supplier. One with an in-depth understanding of your process. One with not just one family of solutions, but a complete spectrum. One with the skills, the experience and the global infrastructure to support your compliance strategy worldwide.

Introducing **ENGELHARD PROCESS EMISSION SYSTEMS.** An emission systems and solutions partner for today, but with a track record spanning many years.

Engelhard Process Emission Systems, formerly Salem Engelhard, offers the widest range of stationary source emission abatement options available anywhere. It supplies technologies, based on both catalytic and thermal oxidation principles, to treat volatile organic compounds, nitrogen oxides and ozone.

What's more, our engineering teams possess the experience and process knowledge to ensure that your solution represents a simple, cost-effective and low-maintenance route to long-term compliance.

Make contact with your new partner in process emission control. Call us now to arrange an initial consultation without obligation.

Engelhard Process Emission Systems
101 Wood Avenue
Iselin, New Jersey, USA 08830-0770
Telephone: +(908) 205-6829
Fax: +(908) 205-6146

ENGELHARD
PROCESS EMISSION SYSTEMS

Circle 125 on card.

case study

Destroying VOCs and Looking to the Future

An Illinois printer met state emission standards by installing a catalytic oxidizer.

By Joseph P. Draves

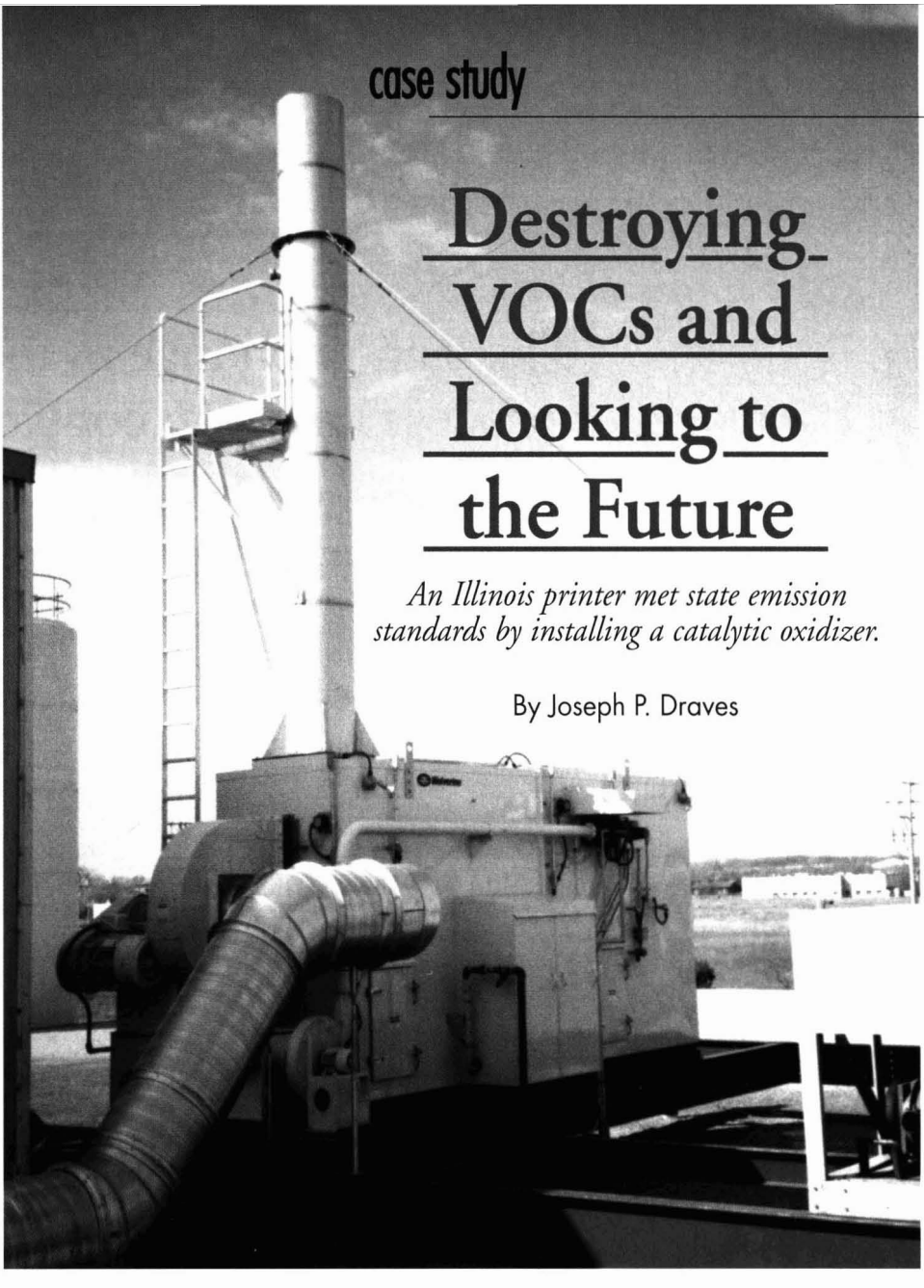


Photo courtesy of Wolverine (Massachusetts) Corp.

In January, Multifilm Packaging Corp. of Elgin, Ill., completed the installation of an 8,000-standard-cubic feet-per-minute catalytic oxidizer. The oxidizer was installed to control volatile organic compound (VOC) emissions from its flexographic printing presses. Installation of the oxidizer allowed Multifilm to meet the Illinois Environmental Protection Agency air-quality regulations in the Chicago, Ill., area and also provided the company additional capacity for future production expansion.

Reviewing the Problem

Before making the decision to purchase the catalytic oxidizer, the printer was planning to convert entirely to water-based inks to reduce VOC emissions. However, it recognized that with its expected growth, it would have to increase the production speed of its printing presses.

"After reviewing water-based inks, we didn't think they were as good now as solvent-based ink systems, and we didn't want to expend the time and money on the learning curve to get them up to the quality we needed." said Tom Jakubauskus, the printer's plant manager.

"Going with water-based inks would have cost us several customers who require the quick response Multifilm presently provides."

The printer's decision to install a Wolverine catalytic oxidizer was based on several factors. Foremost, catalytic oxidization is a highly proven and accepted VOC-control technology used in the flexographic printing industry.

Also important to Multifilm was consideration for its expected future growth. By choosing Wolverine's Model C-8000 oxidizer, the printer has the flexibility to expand future production. The firm expects to add a new printing press in the coming year.

Another important factor was the oxidizer manufacturer's ability to provide a complete turnkey system installation, offering the printer a single point of contact for the entire project. Wolverine's turnkey installation package included mounting the oxidizer above the roof on structural steel supports, installing the interlock and control wiring, and designing and installing all required collection ductwork from the printing presses to the catalytic oxidizer.

The oxidizer manufacturer also provided the engineering and installation of recirculation ductwork on all the press dryers. Recirculating the dryer exhaust provides the printer even greater capacity at the oxidizer, since it reduces the process exhaust volume being treated.

How It Works

The catalytic system operates on the oxidation principle. When the VOC emissions from the printing press exhaust stream are mixed with oxygen at elevated temperatures within the oxidizer, the VOCs chemically break down to form carbon dioxide and water. With the use of a precious metal catalyst, the reaction occurs at much lower temperatures than otherwise possible for a noncatalytic oxidizer (650 degrees Fahrenheit vs. a range of 1,400 degrees F to 1,500 degrees F).

To reduce operating costs, the oxidizer is equipped with a 70-percent effective primary heat recovery unit. The integrated heat exchanger uses the higher temperature exhaust air to preheat the incoming process air before oxidation. Following the heat exchanger, a natural gas-fired burner and automated fuel control system regulates the temperature required to achieve the high level of VOC destruction.

Most important to the printer, the oxidizer offers a guaranteed 95-plus percent VOC destruction efficiency. Based on results of preliminary testing, the oxidizer is achieving 98.6-percent destruction efficiency. Within the next few months, the printer will complete a certified compliance test as required by the Illinois EPA.

Typically, installation of an oxidizer has no financial payback. Tom Jakubauskus looks at it differently. Comparing the printer's

current operating capability with the reduced speed, lower production and loss of customers associated with conversion to water-based inks, the catalytic oxidizer has an estimated payback of 18 to 24 months.

"Installing the Wolverine catalytic oxidizer assured us that we would reduce our printing press emissions to acceptable levels and maintain compliance with both state and federal clean air regulations," Jakubauskus said. EP

Joseph P. Draves *is an applications engineer for Wolverine (Massachusetts) Corp.'s Pollution Control Division, De Pere, Wisc.*

For more information on the Wolverine (Massachusetts) Corp. catalytic oxidizer, circle 157 on card.

Questions or comments? E-mail us at angela@texnet.net.

What Do You Think?

Please indicate your level of interest in this article by circling the appropriate number on the Reader Service Card.

High 158 Medium 159 Low 160

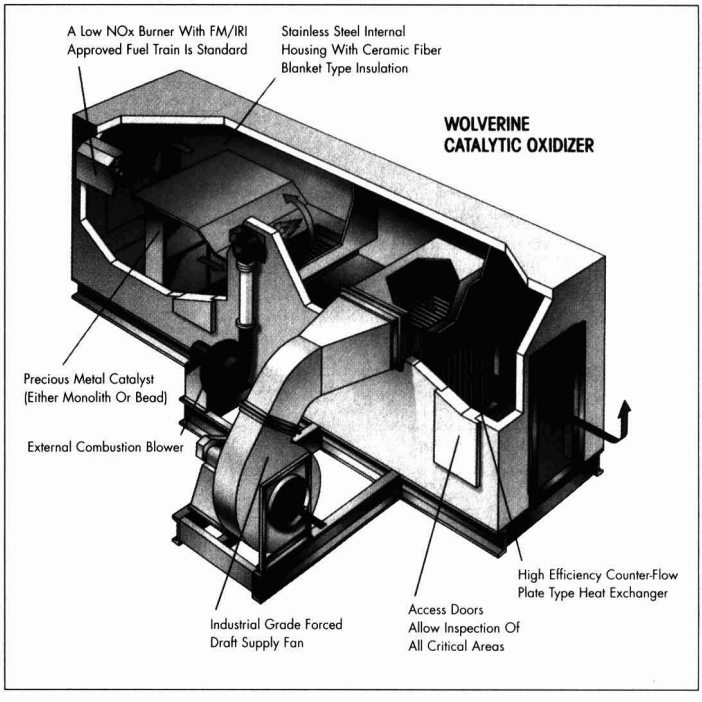


Photo courtesy of Wolverine (Massachusetts) Corp.

continued from page 22

method on owned sites, other elements are added when developing a remediation plan on a neighboring claimant's property.

Choosing a remedial technology involves identifying cost-effective technologies and evaluating them for their consistency with your internal objectives (and regulatory agency objectives) for the site. When performing this excercise on a neighboring site, the owner's objectives for the site must also be evaluated. The property owner can, in effect, act as an additional regulatory hurdle. The relationship with a neighboring property owner has the potential to be far more adversarial than with the regulatory agencies.

Issues, such as arrangements for site access and the claimant's current and intended uses of the property, may force the project manager to choose quicker, yet more capital-intensive, technologies such as excavation and disposal over more cost-effective technologies requiring a greater duration of site access.

For example, a neighboring property with petroleum-contaminated soils may be a prime site for in-situ bioremediation. However, site-access constraints set by the property owner, as well as the potential for litigation resulting from the interruption of the neighbor's use of the site, can make excavation and disposal advantageous to the responsible party.

In addition, the agreement upon remedial objectives for a site, and the verification of the results of remediation, can influence the choice of remedial technologies on a neighboring property owner's site. A property owner may have unreasonable expectations that the property can be returned to its pristine "nondetect" state that allegedly existed before the incident.

The cleanup requirements placed by a property owner can, at first, exceed those required by the state and federal governments. At this point, it may be useful to involve property owners in the discussions with the regulatory agencies to expose them to what the numbers actually represent in terms of risk.

Disposal of Site's Wastes

If disposal of hazardous or nonhazardous waste is required, an appropriate balance of long-term risk and overall cost must be evaluated. Though more expensive disposal options may offer greater freedom from long-term liabilities associated with the waste, these options can often amount to "overkill" in the management of many types of waste. Available disposal options are typically limited by regulations, but a full review of possible disposal options is important to ensure the most cost-effective methods are explored.

The other facets of an environmental claim no doubt distinguish it from other types of claims.

Outside of the remediation itself, regulatory issues, such as public utility commission hearings, fines and penalties for alleged storage violations, may exist.

Dealing With The Media

The incident may have the attention of the media. Multiple spokespersons providing limited or conflicting statements or even worse, the absence of any comments whatsoever, could lead to adverse publicity. A spokesperson should provide the press with an open, clear, concise and consistent description of the loss, the remedial steps and health risks. If there are citizens' groups or neighborhood associations in the area, open communication, as in the case of the press, should be established.

Seeking Legal Counsel

The likelihood of litigation arising out of an environmental claim is just as great, if not greater, than a normal loss situation. However, the attendant cost associated with litigating an environmental claim vs. a normal loss are far greater because of both the massive amount of documentation as well as technical experts required.

The same due diligence employed in investigating and retaining an environmental contractor should also be used in seeking counsel. Depending on the type of claim, counsel should be consulted well in advance of litigation. The same criteria used in choosing a remediation contractor should be used. Though it is impossible to predict the outcome of litigation and in preparing the scope of work for the remediation contractor, it is important to look at the overall litigation process from the beginning.

Is there liability for a loss, and if so, should the cases be settled quickly? If there is not liability for a loss, how much is the company prepared to litigate the claims, not only in terms of dollar amount but also in terms of actual time, potential adverse publicity and countless hours of in-house time? One may not be able to act as judge and jury with a complaint in hand; the impact that litigation can have on a company's balance sheet should be considered from the beginning.

As demonstrated in the Motorola case, a company need not be primarily involved in an environmental field to face the possibility of a massive environmental loss. Any company that stores or transports even small amounts of materials with the potential to pollute must be aware of its potential exposure. EP

For more information on Environmental Claims Administrators Inc., circle 161 on card.

Questions or comments? E-mail us at angela@texnet.net.

What Do You Think?

Please indicate your level of interest in this article by circling the appropriate number on the Reader Service Card.

High 162 Medium 163 Low 164

Cooking up a Winning Recipe

Faced with an odor problem, a Texas wastewater treatment plant found a way to solve the dilemma while creating a valuable sludge-based product.

By Vicky Boyd

Only Mother Nature can make soil, but a central Texas wastewater treatment facility is doing a pretty good imitation with a mixture of treated biosolids and quicklime. Not only does the artificial soil meet the Environmental Protection Agency's requirements for "exceptional quality" sludge, but it also has a myriad of uses, including capping a landfill.

Producing artificial soil wasn't the Trinity River Authority of Texas' original intent, however, said Wayne K. Hunter, assistant regional manager for the authority's northern region. Instead, the authority was looking for a way to control odors from stockpiled sludge. "It simply took off from an emergency," Hunter said.

The Authority

Originally established by the Texas Legislature to aid river navigation, the Trinity River Authority currently provides water and wastewater treatment—among other services—to entities within an 18,000-square-mile region of northeastern Texas.

Of the six wastewater facilities the authority operates, the Central Regional Wastewater Treatment Facility is by far the largest, providing wastewater treatment under contract to 21 entities between Dallas and Fort Worth, Texas.

With a rated capacity of 135 million gallons per day, the facility produces the equivalent of 100 dry tons of treated biosolids daily.

Urbanization Spells Growth

Urbanization and accompanying demand for wastewater treatment spurred the authority to expand the plant in the 1980s to handle 100 mgd and convert it from a two-stage trickling filter to a single-stage activated sludge plant. Before expansion, the plant, built in 1959, handled about 30 mgd.

The plant expansion included adding large plate and frame presses that produce biosolids cake with 35 percent to 40 percent solids. The authority quit using a sludge lagoon, converting it to a monofill for biosolids. As the authority removes soil, it replaces it with biosolids.

Wet Weather Woes

What the authority didn't count on was unusually wet weather during 1990 and 1991, which hampered equipment moving biosolids from the plant to the landfill. As the stockpiles of biosolids awaiting transport grew, nearby residents complained about the odors.

"The complaints caused us to pull together a group of odor-control experts, and the panel developed recommendations," Hunter said. After testing the recommendations on seven sludge piles, the authority decided to add 10 percent quicklime by weight to the biosolids.

The authority already adds ferric chloride and 440 pounds of lime per ton of dry solids to condition the sludge before it goes through the plate presses. The sludge's pH is 10.0 or higher.

The additional 10 percent lime raised the pile's pH to 12.0 or higher and caused pile temperatures to rise to more than 70 degrees Celsius for 30 minutes or longer in most cases. Even after the pile was stored for six months, odor levels never exceeded an acceptable level.

Comparing it to pasteurization, Hunter said holding the temperature at 70 degrees C for more than 30 minutes also met the EPA's criteria for a process to further reduce pathogens. The result was Class A sludge, which meets the EPA's 40 Code of Federal Regulations 503 requirements for pathogen control and vector attraction reduction.

But the pile tests were just the beginning. The authority contracted with the University of Texas, Arlington, to conduct extensive tests on the artificial product's soil characteristics. What the authority wanted to know in particular was the proper ratio of soil-fill material to artificial soil at the monofill and the product's compaction strength. The authority had been using 1 part sludge to 1 1/2 parts clay soil by volume.

UTA recommended that the authority use 1/2 part soil with 1 part amended

sludge. The ratio change, which was approved by the Texas Natural Resource Conservation Commission, extended the life of the monofill to 27 years.

Hunter said the authority was leery of jumping into an alternate sludge disposal program before the EPA released its 40 CFR 503 regulations—which govern sludge use and disposal—in 1993. "Until then, it was our thinking there was some latent risk associated with such disposal methods and land applications without the benefits of the regulations," Hunter said. "When the regulations came out, with the quicklime addition, our sludge met Class A. Without the quicklime, we met Class B effectively off of our present filter press operation."

Class A sludge must meet tougher pathogen-reduction requirements than Class B sludge. It also has fewer handling and application restrictions than Class B material.

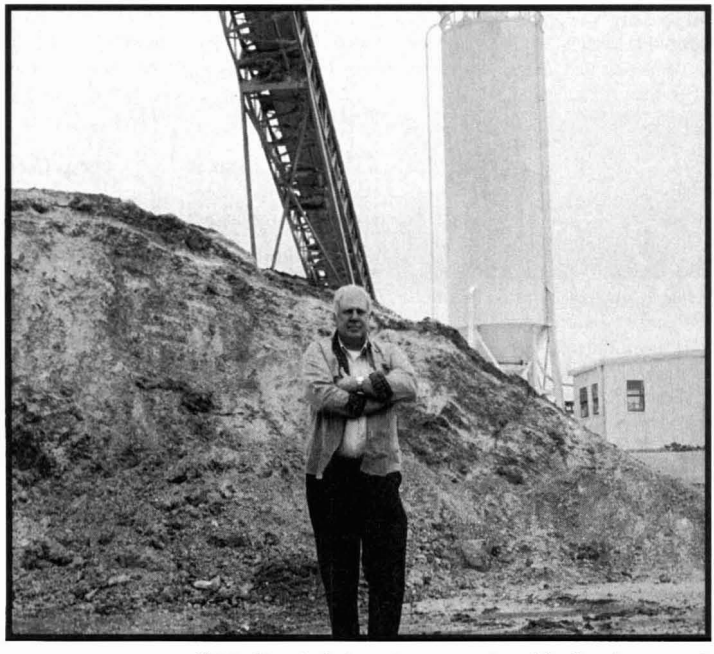
Recipe For Soil

Based on the test results, the authority purchased clay working machinery in 1993 from J.C. Steele & Sons of North Carolina to pulverize the biosolids cakes. The company has been making equipment to handle clays for the brick and tile industry for 107 years. Rick Steele of J.C. Steele said Trinity's use of the machinery to handle sludge is pioneering. "It's used to handle clay filter cakes that are sticky as peanut butter and tough as belt leather," Steele said.

The equipment purchase coincided with plant expansion that increased capacity to 135 mgd. The secret behind getting even heat distribution within the piles is having good particle-to-particle contact between the biosolids and the lime, and the equipment provided it, Hunter said.

The biosolid cakes—some several square feet in area—come off the presses and drop into trucks waiting to haul them to a sludge hopper at a mixing pad. A chopper feeder breaks the cakes into pieces about 4 square inches.

The smaller blocks move via conveyor to a disintegrator designed to shred tough clays containing rocks. The product exiting the disintegrator is 1/2 inch or less and moves on another conveyor to a mixer, where lime is added. The material, which has been transformed from charcoal-gray slabs to fine-textured light gray artificial soil, is then piled on a cement pad.



Trinity River Authority maintenance engineer John Greer is an expert in sludge mixing and artifical soil production

Within minutes, the pile begins to cook, and temperatures increase to at least 70 degrees C. Probes placed at four corners of the pile document the temperature changes over time to ensure the material meets Class A requirements.

Landfill Cap

Although Hunter said alkaline stabilization helped address many of the treatment plant's problems, the authority decided nonetheless to draft a plan to look at land application of biosolids elsewhere. "We wanted to introduce to the contracting parties the value of making that 27 years forever by beginning to export biosolids," Hunter said, referring to the life of the monofill.

The plan calls for increasing the amount of biosolids exported by 20 percent annually. By the fifth year, the authority theoretically should be exporting all of its biosolids, Hunter said.

After meeting with three customer cities, only Arlington expressed interest in using biosolids to cap its municipal solid waste landfill. The authority ships 20 percent of its daily production—about 20 dry tons of artificial soil— to the landfill.

"The landfill has to import soil for use in meeting vector-control requirements," Hunter said.

A handful of other treatment facilities in Texas also export biosolids for landfill capping, and all do so under conditional permits issued by TNRCC.

When the authority initially sought a permit, Hunter said TNRCC was not too receptive.

"TNRCC was initially reluctant (to issue a permit) partly because of the precedent it might establish," Hunter said. "They were concerned about the consistency and water content of the sludge. But we invited them to the plant and showed them." EP

Vicky Boyd *is managing editor of* Environmental Protection *magazine.*

Questions or comments? E-mail us at angela@texnet.net.

What Do You Think?

Please indicate your level of interest in this article by circling the appropriate number on the Reader Service Card.

High 165 Medium 166 Low 167

Disposable Medical Coupling Inserts

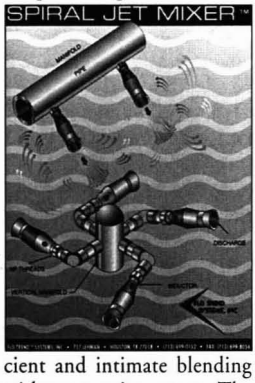
A new patented integral seal is the key to cost saving with

Nu-Seal coupling inserts. The low-density polyethlyene inserts are inexpensive enough for disposable medical tube set applications. They are easy to use when wearing gloves and consist of a push-pull coupling, eliminating the awkward twisting required with luer connectors. **Colder Products Co.**

Circle 168 on card.

Spiral Jet Mixer

The Spiral Jet Mixer is a unique mixing device for effi-



cient and intimate blending without moving parts. The pressurized flow creates all the energy to mix, suspending solid particulates in a liquid phase. It can also be used to emulsify one liquid with another. **Flo Trend Systems Inc.**

Circle 169 on card.

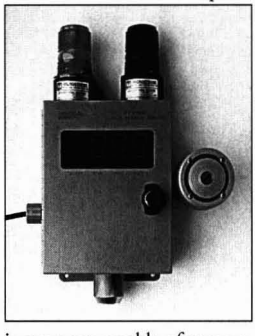
Gas Concentrations Software

The new SuperVizion software program uses a computer screen to display real-time gas concentrations at remote points. It monitors remote detectors to check levels of toxic, explosive or oxygen-depleting gases. It can include alarms when a level becomes dangerous. **Sensor Electronics.**

Circle 170 on card.

Carbon Monoxide Monitor

The RS5100 Carbon Monoxide monitor is a fixed-point



instrument capable of measuring carbon monoxide from 0 to 1,999 ppm. It is designed to mount in any environment where carbon monoxide gas may accumulate. **Industrial Scientific Corp.**

Circle 171 on card.

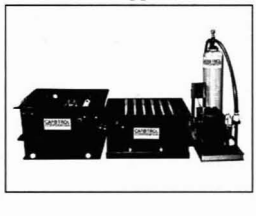
High Flow Air Sampling

The AirPro 6000DH will sample up to 4 liters at constant pressure through multiple particulate filters or sorbent tube media, or filters combined with sorbent tubes. Programming flexibility allows multiple hazard or redundant sampling of respirable particulates, total particulates and VOCs. **BIOS International.**

Circle 172 on card.

Heavy Metal Removal

CARBTROL's package treatment systems remove heavy metals from industrial wastewaters. Applications in-

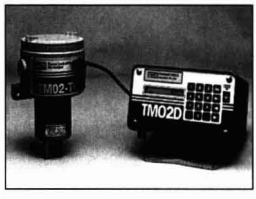


clude metal finishing, equipment maintenance, parts manufacturing, cooling waters and chemical production. **CARBTROL.**

Circle 173 on card.

Binary Gas Analyzer

The Panametrics TMO2-TC measures the concentra-

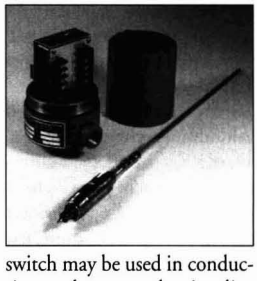


tion of hydrogen, carbon dioxide, methane, helium and other gases in binary and pseudo-binary gas mixtures by measuring the thermal conductivity of the sample gas and comparing it to the thermal conductivity of a reference. **Panametrics.**

Circle 174 on card.

Single Point Level Switch

The Series 200 RD Capacitance single-point level

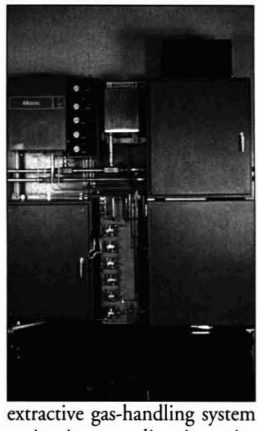


switch may be used in conductive and nonconductive liquids, granular material, foams, pastes and slurries. The low-cost device features high quality construction and is ideal for most tip-sensitive switch applications. **Magne-Sonic Corp.**

Circle 175 on card.

Continuous Gas Analyzer

The Enviro-FTIR is designed for continuous monitoring of stack emissions and provides simultaneous measurement of gases. The heated



extractive gas-handling system maintains sampling integrity necessary for monitoring highly water-soluble components. **Applied Automation.**

Circle 176 on card.

Environmental Management Software

LINDEN™ Environmental Management System Version 3.0 is an application software that can be used on a standalone PC. It includes all previous hazardous materials, MSDS, emissions, and waste management features, and adds expanded reporting capabilities and new MSDS image viewing capabilities. **Modern Technologies.**

Circle 177 on card.

Membrane Air Dryer

The new Balston® Membrane Air Dryer provides pure, dry, compressed air and offers an alternative to pressure swing and refrigerant dryer technologies. It dries compressed air to dewpoints as low as minus 40 degrees Fahrenheit at flow rates of up to 40 scfm. **Whatman Inc.**

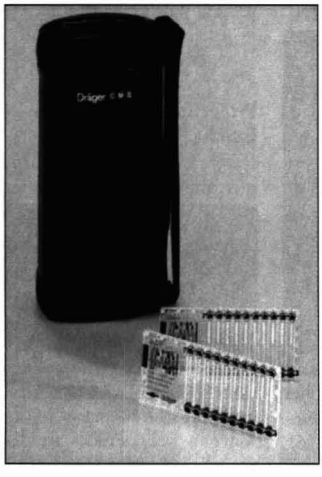
Circle 178 on card.

High Speed A/D and Oscilloscope Board

OMEGA features the COMP-1012, a high speed A/D and oscilloscope board, capable of ultra-high speed sampling of 20 MSPS at 12-

product exclusive

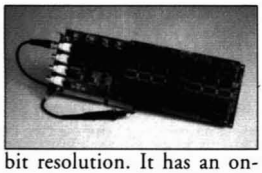
Revolutionary Gas Detection Product



National Draeger, a manufacturer of portable gas detection instruments and fixed gas detection systems, has released a revolutionary new product—the Dräger CMS. The Dräger CMS (Chip Measurement System) consists of a handheld analyzer and chip. It's ergonomically designed, rugged and shock resistant. Each chip contains 10 measurement capillaries filled with a substance-specific reagent. The two elements combine electronics, optics, new chemical reagents, and a special internal pump system to provide one of the most accurate and simple-to-use spot gas measurement systems ever developed. **National Draeger Inc.**

Circle 179 on card.

new products



bit resolution. It has an onboard memory for 512K samples of data storage that can be transferred to the PC memory for post processing. **Omega Engineering.**

Circle 180 on card.

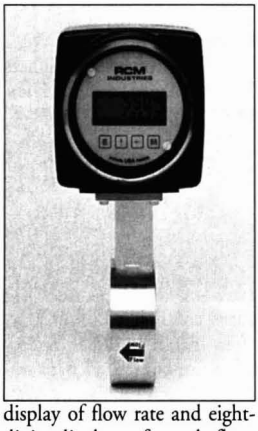
Total Hydrocarbon Analyzer

The J.U.M. model 3-200 is designed to continuously measure concentrations of a variety of hydrocarbons in gaseous mixtures and ambient air. It features solenoid valves for sample, zero gas, span gas and internal sample filter backpurge. **J.U.M. Engineering of North America.**

Circle 181 on card.

Flow Transmitter

Differential pressure flow transmitter provides 4-20 mA dc and scaled pulse output combined with local 4½-digit

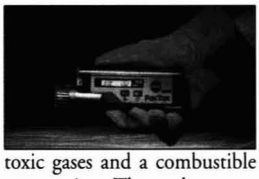


display of flow rate and eight-digit display of total flow. Display of slow and total is in selected engineering units. Can measure water, groundwater with entrained sand, chemicals and hydraulic fluids, as well as compressed air and other gases. **RCM Industries Inc.**

Circle 182 on card.

Personal Single Gas Monitors

The Foxboro Co. announces its new FoxTox series of single gas monitors for personal monitoring. The series includes three models: oxygen,



toxic gases and a combustible gas monitor. The analyzers are designed for rugged use with simple calibration, large digital display and programmable alarms. **The Foxboro Co.**

Circle 183 on card.

Water Intake Screens

Excerpts from the "Cook Book" on Intake Screen systems are available in an eight-page brochure that provides tables for gathering design information, sizing and selection, and sample specifications for the screens and air burst screen cleaning systems. **Lee Cook Intake Screen Co.**

Circle 184 on card.

Breathing Air Systems

A new line of Grade "D" breathing air systems with capacities ranging from 25-1,000 cfm is available. All units are intrinsically safe, and monitor

for high carbon monoxide levels, low air pressure, high air temperature, low humidity, high hydrocarbons and low oxygen levels. **Breathing Air Products Co.**

Circle 185 on card.

Portable Colorimeter

The new Model 975MP portable colorimeter, the Analyst, is factory precalibrated for more than 90 water/wastewater tests. It comes with a 120-page procedure manual and many other accessories. **Orbeco-Hellige.**

Circle 186 on card.

new products

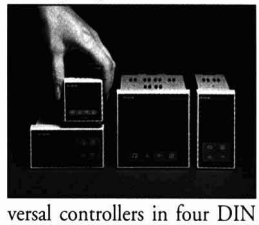
Vacuum Pump Exhaust Filters

Protect the workplace and the environment with oil-capturing vacuum pump exhaust filters. The 400 Series of filter assemblies are offered in anodized aluminum and 316L stainless steel for corrosive applications. **Headline North America Inc.**

Circle 187 on card.

Process Controllers

Athena Controls announces a family of panel-mounted universal controllers in four DIN sizes. Each model is microprocessor-controlled with on-demand auto tuning and complete on/off through full photoionization detection functionality. **Athena Controls.**



Circle 188 on card.

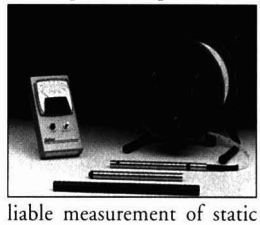
Microbial Products

International Biochemicals (InterBio) is the world's largest leader in applied environmental biotechnology and manufactures and distributes formulated microbial products for industrial/municipal wastewater treatment, bioremediation and institutional applications. Through the Microbe Masters division, the company provides products and services to wastewater facilities in the pulp and paper, chemical, refinery, food processing and textile industries. **InterBio.**

Circle 189 on card.

Water Level Meter/ Conductivity Profiler

Long-lasting water level indicator provides repeatable, reliable measurement of static water in wells. Probes are designed not to give false signals in cascading water. Lengths are from 50 to 3,000 feet. **Solinst Canada Ltd.**



Circle 190 on card.

Poly-Overpack

The ECONOPOP Poly-Overpack is a cost-efficient solution to spill kit assembly, in-plant drum storage, and transportation and storage of hazardous solids. Its 100-percent polyethylene construction provides chemical and corrosion resistance. **ENPAC Corp.**

Circle 191 on card.

Groundwater Pump System

Fultz Pumps Inc. manufactures a groundwater pump system for purging and sampling

new products

2-inch and larger monitoring wells. The positive displacement pump features quality construction of stainless steel and Teflon to emphasize sample integrity. **Fultz Pumps Inc.**

Circle 192 on card.

Air Quality White Paper

A four-page worksite air quality report was developed to give facility managers insight into in-plant air quality control. The AirManager™ simplifies the task of understanding application-specific governmental standards for allowable levels of air pollutants. **Aercology.**

Circle 193 on card.

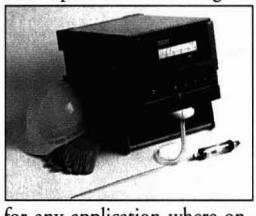
Low-Flow, High-Head Pumping

The Magnatex® MP/MPL Series pumps provide cost-effective and efficient handling of low-flow, high-head applications. They feature rare earth Neodymium magnets for synchronous drive with no slipping and less internal heat than other mag-drive pumps. **Magnatex Pumps Inc.**

Circle 194 on card.

Portable Mass Spectrometer

The MG2100 portable Mass Spectrometer is designed for any application where on-site, real time, multiple compound monitoring is required. Immediate applications include environmental testing, process control, product analysis, industrial hygiene, safety and investigative analysis. **Industrial Scientific Corp.**



Circle 195 on card.

Non-Toxic Cleanup

Superall #38 has been proven in both pilot tests and actual hydrocarbon soil remediation projects to dramatically reduce TPH and BTEX in less time than competing models. It is comprised of several organic compounds and contains no products listed on the RCRA hazardous materials list, or any bacteria cultures. **SuperAll Marketing Services Inc.**

Circle 196 on card.

product literature

Levelogger™
The new Solinst Levelogger is a 7/8-inch diameter self-contained datalogger/pressure transducer for automatically recording water levels in wells. Infrared data transfer eliminates the need for electrical cable, reduces costs and avoids electrical interference. The Levelogger stores 16,000 measurements, allows direct start or "future start." No data is over-written. Range is from 15 feet (5m) to 30 feet (10m).
Solinst Canada Ltd.
35 Todd Road
Georgetown, Ontario L7G 4R8
905-873-2255; 1-800-661-2023
Fax: 905-873-1992

Circle 197 on card.

Free, New Environmental Product Guide
A new bulletin outlines proven applications where Dwyer Controls and Gauges solve problems like soil remediation, vapor/groundwater recovery, air stripping and more. Low cost, diverse solutions include controls, gauges and switches for pressure, flow, level and temperature plus flowmeters, temperature process controllers, pitot tubes and manometers.
Dwyer Instruments Inc.
P.O. Box 373
Michigan City, IN 46361
219-879-8000; Fax: 219-872-9057

Circle 199 on card.

Pentek's Dustless Decontamination Systems
Pentek has brochures on new additions to its Dustless Decontamination vacuum/waste collection unit that can operate 10 tools more than 200 feet away, eliminating containment and respirators. Pentek's new ROTO-PEEN Scaler is an evacuated, shrouded tool that removes hazardous coatings from steel and concrete at 40-50 feet²/hr.
Pentek Inc.
412-262-0725
Fax: 412-262-0731
E-mail: pentekusa@aol.com

Circle 198 on card.

Earthprobe 200
This self-contained all hydraulic rig meets the growing demand for direct push/probe technology for taking soil, water or vapor samples. The Earthprobe 200 is rugged and can be mounted in any suitably sized pickup truck. Advanced hydraulics allow precise control over the feed and hammering functions. The mast tilts for angle probing. The optional rotary head provides limited auger drilling capability.
SIMCO
800-338-9925

Circle 200 on card.

classifieds

recruitment

OPPORTUNITIES

Positions available for Industrial Hygienists, Safety/ Environmental & Toxicology Professionals. Please send resume including current/desired salary & geo. preferences to:

Greg Downs
Executive Recruiters Agency, Inc.
P.O. Box 21810, Little Rock, AR 72221-1810
(501) 224-7000; FAX: (501) 224-8534

SUNBELT OPPORTUNITIES
$28,000 to $78,000

Immediate openings nationwide in virtually all Environmental/Safety & Health related disciplines.
Contact: **Kimberly Cranford, C.P.C.,**
PROFESSIONAL PERSONNEL ASSOCIATES, INC.
7520 E. Independence Blvd., #160 - Charlotte, N.C. 28227
(704) 532-2599 (704) 536-8192 FAX

for sale

AIR
SOIL
WATER

Paradigm Equipment Corporation
[p] 312.832.9680 [f] 312.832.9681
USED instrumentation and remediation equipment

software

TANK MANAGER SOFTWARE
ABOVEGROUND STORAGE TANKS (AST)
UNDERGROUND STORAGE TANKS (UST)

- **REGULATORY COMPLIANCE**
  Perform Inspections on time. Review & analyze permanent records of inspection histories.
- **INVENTORY MANAGEMENT**
  Track product and inventory levels, location, model, serial number, construction type, etc., for every tank.
- **PREDICTIVE MAINTENANCE**
  Engineering tests, thickness readings, settlement information, corrosion and deterioration rates.
  Prevent unexpected and expensive failures!

Call ESS at 800-289-6116 for FREE Catalog.

SITE-ASSESSMENT Software ™
http://www.macneillj.com

ESA Phase I reports in minutes using our *newly improved* expert text!

Assemble reports by picking sections of *ASTM-compatible* text from pop-up lists.

Our checklists guide your process.

Customize our text, import yours, & edit reports in *your own* word-processor.

Box 3846 Indialantic, FL 32903
(800) 365-3962

continuing education

UNIVERSITY DEGREES!

Economical home study for Bachelor's, Master's, Doctorate, licensed by the California State Council for Private Postsecondary and Vocational Education. Prestigious faculty counsels for independent, individualized, at-a-distance education.Free information: Richard Crews, M.D. (Harvard). President, ***Columbia Pacific University***, Dept. 3H98 1415 Third St., San Rafael, CA 94901: 800-552-5522 or 415-459-1650.

NEW ENVIRONMENT, INC.

40-HOUR HAZWOPER TRAINING

Train your employees in-house using our Train-The-Trainer Program!
800•732•3073
Call for information

maps

Map EXPRESS, Inc.
800-627-0039
24 HR. FAX 303-969-8195
USGS MAPS & PRODUCTS
Entire US coverage: Topographic, Geologic, Aerial Photos, State & US Maps.
Overnight / 2-3 days!

products and services

FREE
SAMPLE CASE OF DISPOSABLE BAILERS*

Factory Direct Prices

- Innovative product design.
- Patented cone bottom design eliminates well hang-ups and speeds up sinking time.
- Weighted or non-weighted.
- Outer diameter sizes: from .410" to 3" OD.
- Custom lengths available!

EnviroLine
1-800-554-0123
*Available in Teflon or Polyethylene

Call Today!

SALVAGE CHEMICALS BOUGHT

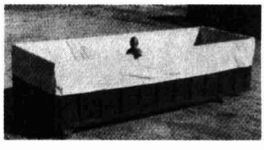
Chemicals, Freons, Resins, Solvents, Plastics, Exotic Metals, Borates, Ions, Genesolves, Oils, Dyes, Spool Ends, Oxides. Also: Advanced Composites (Kevlar, Nextel, Fiberglass, Carbon Fibers, Yarns)
KEMSTAR CORP.
West: (310) 390-0180 East: (914) 681-0126
FAX: (310) 391-8143 Fax: (310) 391-8143

Hydrocarbon Environmental Recovery Systems

- Microbial Products
- Custom & Portable Spill Kits
- Spill response Products
- Soil & Water Treatment
- Dealerships & Distributorships

For more information call:
(210) 497-8980 Fax: (210) 497-4227
See our WEB Page @
http://www.bizpro.com/hers
P.O. Box 701275, San Antonio, Tx 78270

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

CFCs HCFCs HFCs
REFRIGERANT OR SOLVENT

RETURNED TO VIRGIN SPECS
EPA APPROVED
USED PRODUCT PURCHASED
(DEPENDING ON TYPE, CONTAMINANTS & QUANTITY)

TECHNISYS
(214) 342-8700
FAX (214) 342-8580

SURPLUS CHEMICALS BOUGHT
Chemicals, Acids, Surfactants, Solvents, Cleaners.

TRIPLE-S CHEMICAL
Tel: 213-261-7301 • Fax: 213-261-5567

Classifieds Get Results!

professional directory

advertiser index

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1791 WACO, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Stevens Publishing

Environmental PROTECTION

Reader Service
Management Dept.
P.O. Box 2573
Waco, TX 76702-9910

FREE PRODUCT INFORMATION FOR ENVIRONMENTAL PROTECTION

July 1996

Card Expires September 1996

100	117	134	151	168	185	202	219	236	253	270	287	304	321	338	355	372	389
101	118	135	152	169	186	203	220	237	254	271	288	305	322	339	356	373	390
102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391
103	120	137	154	171	188	205	222	239	256	273	290	307	324	341	358	375	392
104	121	138	155	172	189	206	223	240	257	274	291	308	325	342	359	376	393
105	122	139	156	173	190	207	224	241	258	275	292	309	326	343	360	377	394
106	123	140	157	174	191	208	225	242	259	276	293	310	327	344	361	378	395
107	124	141	158	175	192	209	226	243	260	277	294	311	328	345	362	379	396
108	125	142	159	176	193	210	227	244	261	278	295	312	329	346	363	380	397
109	126	143	160	177	194	211	228	245	262	279	296	313	330	347	364	381	398
110	127	144	161	178	195	212	229	246	263	280	297	314	331	348	365	382	399
111	128	145	162	179	196	213	230	247	264	281	298	315	332	349	366	383	400
112	129	146	163	180	197	214	231	248	265	282	299	316	333	350	367	384	401
113	130	147	164	181	198	215	232	249	266	283	300	317	334	351	368	385	402
114	131	148	165	182	199	216	233	250	267	284	301	318	335	352	369	386	403
115	132	149	166	183	200	217	234	251	268	285	302	319	336	353	370	387	404
116	133	150	167	184	201	218	235	252	269	286	303	320	337	354	371	388	405

Interested because of: 95 ■ New Construction 96 ■ Adding Capacity 97 ■ Plant Upgrade 98 ■ Maintenance 99 ■ 1 for 1 Replacement

FREE SUBSCRIPTION INFORMATION 7/96

❑ **Yes!** Send/Continue to send *Environmental Protection* free of charge.

❑ No, I'm not interested at this time.

Signature **(Required)**_____ Date_____

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip+4 _____ Phone _____

Fax _____ E-Mail _____

FOR FASTER SERVICE USE PEEL OFF LABEL

A. 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_____

rs137a

B. Type of Business (check only one):

A ❑ Manufacturing. If manufacturing, please check the appropriate SIC (check only one):

❑ (20) Food
❑ (21) Tobacco
❑ (22) Textile
❑ (23) Apparel
❑ (24) Lumber & Wood
❑ (25) Furniture
❑ (26) Paper
❑ (27) Print/Publish
❑ (28) Chemicals
❑ (29) Petrol. & Coal
❑ (30) Rubber/Plastic
❑ (31) Leather
❑ (32) Stone/Clay/Glass
❑ (33) Primary Metal
❑ (34) Fab. Metal
❑ (35) Mach., except Elect.
❑ (36) Elect. & Electron Mach
❑ (37) Trans. Equip.
❑ (38) Instr./meas./analyze/controlling
❑ (39) Miscellaneous Mfg.

B ❑ Mining
C ❑ Agriculture
D ❑ Engineering & Contracting
E ❑ Utilities, public, private & cooperative
F ❑ Govt. including municipal or district sanitary water or wastewater treatment sys. or plants
L ❑ Consulting
M ❑ Insurance

Type of Govt:
G ❑ City
H ❑ County
I ❑ State
J ❑ Federal
K ❑ Transportation
N ❑ Labs
O ❑ Training
P ❑ Real Estate
Z ❑ Misc. Services _____

C. Approximate number of employees at this address (check only one):

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

D. 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 and control
E ❑ Services/Consulting
F ❑ None of the above_____

E. 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
H ❑ None of the above
_____

F. 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_____

G. Which of the following TANK AND PROCESS CONTROL products/services do you plan to purchase in the next 12 months? (Select all that apply)

A ❑ Aboveground Storage Tank
B ❑ Underground Storage Tank
C ❑ UST Tank Vault
D ❑ Level Controller/ Monitor
E ❑ Flow Meters
F ❑ Leak Detectors
G ❑ Cooling Towers
H ❑ Heat Exchanger
I ❑ Secondary Containment Systems
J ❑ Groundwater Monitor
K ❑ Lift Station Control
L ❑ Aeration System
M ❑ Recorders

H. What is your reason for purchasing the selected products/services? (Select one)

A ❑ New Construction
B ❑ Plant Upgrade
C ❑ Replacement/Maintenance

I. What is your projected budget for the selected products/services? (Select one)

A ❑ Over $200,000
B ❑ $100,001-$200,000
C ❑ $50,001-$100,000
D ❑ $10,001-$50,000
E ❑ $5,000-$10,000
F ❑ Under $5,000

J. How immediate is your need for the selected products/services? (Select one)

A ❑ 0-3 months
B ❑ 4-6 months
C ❑ 7-9 months
D ❑ 10-12 months
E ❑ over 12 months

Environmental PROTECTION

035709607070

FREE PRODUCT INFORMATION FOR ENVIRONMENTAL PROTECTION

July 1996

Card Expires September 1996

100	117	134	151	168	185	202	219	236	253	270	287	304	321	338	355	372	389
101	118	135	152	169	186	203	220	237	254	271	288	305	322	339	356	373	390
102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391
103	120	137	154	171	188	205	222	239	256	273	290	307	324	341	358	375	392
104	121	138	155	172	189	206	223	240	257	274	291	308	325	342	359	376	393
105	122	139	156	173	190	207	224	241	258	275	292	309	326	343	360	377	394
106	123	140	157	174	191	208	225	242	259	276	293	310	327	344	361	378	395
107	124	141	158	175	192	209	226	243	260	277	294	311	328	345	362	379	396
108	125	142	159	176	193	210	227	244	261	278	295	312	329	346	363	380	397
109	126	143	160	177	194	211	228	245	262	279	296	313	330	347	364	381	398
110	127	144	161	178	195	212	229	246	263	280	297	314	331	348	365	382	399
111	128	145	162	179	196	213	230	247	264	281	298	315	332	349	366	383	400
112	129	146	163	180	197	214	231	248	265	282	299	316	333	350	367	384	401
113	130	147	164	181	198	215	232	249	266	283	300	317	334	351	368	385	402
114	131	148	165	182	199	216	233	250	267	284	301	318	335	352	369	386	403
115	132	149	166	183	200	217	234	251	268	285	302	319	336	353	370	387	404
116	133	150	167	184	201	218	235	252	269	286	303	320	337	354	371	388	405

Interested because of: 95 ■ New Construction 96 ■ Adding Capacity 97 ■ Plant Upgrade 98 ■ Maintenance 99 ■ 1 for 1 Replacement

FREE SUBSCRIPTION INFORMATION 7/96

❑ **Yes!** Send/Continue to send *Environmental Protection* free of charge.

❑ No, I'm not interested at this time.

Signature **(Required)**_____ Date_____

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip+4 _____ Phone _____

Fax _____ E-Mail _____

FOR FASTER SERVICE USE PEEL OFF LABEL

A. 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_____

rs137a

B. Type of Business (check only one):

A ❑ Manufacturing. If manufacturing, please check the appropriate SIC (check only one):

❑ (20)	Food	❑ (30)	Rubber/Plastic
❑ (21)	Tobacco	❑ (31)	Leather
❑ (22)	Textile	❑ (32)	Stone/Clay/Glass
❑ (23)	Apparel	❑ (33)	Primary Metal
❑ (24)	Lumber & Wood	❑ (34)	Fab. Metal
❑ (25)	Furniture	❑ (35)	Mach., except Elect.
❑ (26)	Paper	❑ (36)	Elect. & Electron Mach
❑ (27)	Print/Publish	❑ (37)	Trans. Equip.
❑ (28)	Chemicals	❑ (38)	Instr./meas./analyze/controlling
❑ (29)	Petrol. & Coal	❑ (39)	Miscellaneous Mfg.

B ❑ Mining
C ❑ Agriculture
D ❑ Engineering & Contracting
F ❑ Govt. including municipal or district sanitary water or wastewater treatment sys. or plants
L ❑ Consulting
M ❑ Insurance
E ❑ Utilities, public, private & cooperative

Type of Govt:
G ❑ City
H ❑ County
I ❑ State
J ❑ Federal
K ❑ Transportation
N ❑ Labs
O ❑ Training
P ❑ Real Estate
Z ❑ Misc. Services _____

C. Approximate number of employees at this address (check only one):
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

D. 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 and control
E ❑ Services/Consulting
F ❑ None of the above_____

E. 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
H ❑ None of the above
_____

F. 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_____

G. Which of the following TANK AND PROCESS CONTROL products/services do you plan to purchase in the next 12 months? (Select all that apply)
A ❑ Aboveground Storage Tank
B ❑ Underground Storage Tank
C ❑ UST Tank Vault
D ❑ Level Controller/ Monitor
E ❑ Flow Meters
F ❑ Leak Detectors
G ❑ Cooling Towers
H ❑ Heat Exchanger
I ❑ Secondary Containment Systems
J ❑ Groundwater Monitor
K ❑ Lift Station Control
L ❑ Aeration System
M ❑ Recorders

H. What is your reason for purchasing the selected products/services? (Select one)
A ❑ New Construction
B ❑ Plant Upgrade
C ❑ Replacement/Maintenance

I. What is your projected budget for the selected products/services? (Select one)
A ❑ Over $200,000
B ❑ $100,001-$200,000
C ❑ $50,001-$100,000
D ❑ $10,001-$50,000
E ❑ $5,000-$10,000
F ❑ Under $5,000

J. How immediate is your need for the selected products/services? (Select one)
A ❑ 0-3 months
B ❑ 4-6 months
C ❑ 7-9 months
D ❑ 10-12 months
E ❑ over 12 months

Environmental PROTECTION

035709607070

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

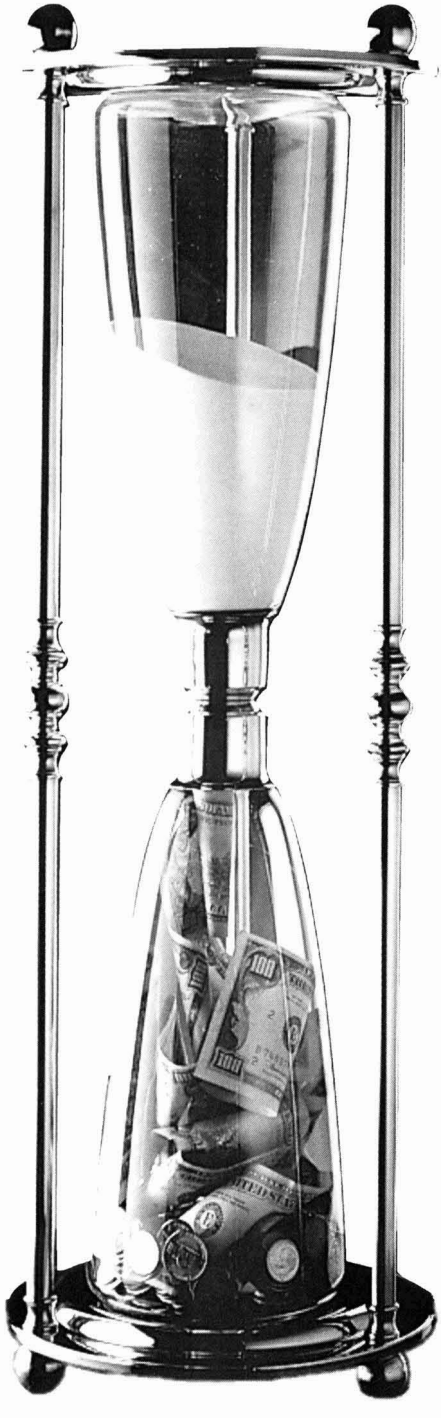
FIRST CLASS PERMIT NO. 1791 WACO, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Stevens Publishing

Environmental PROTECTION

Reader Service
Management Dept.
P.O. Box 2573
Waco, TX 76702-9910



Groundwater Remediation In Less Than 30 Days, For A Fraction Of The Cost, At A Fixed Fee.

They Said It Couldn't Be Done. But We Do It Repeatedly.

QUICK-PURGE® is the fastest and most cost-effective solution for groundwater and soil remediation.

The revolutionary **IES QUICK-PURGE®** technology uses a geological approach to remediation. It removes contaminants from the subsurface without removing soil and groundwater. Not only is **QUICK-PURGE®** much faster than traditional methods–it takes just weeks instead of years – but it also does a more thorough job and costs up to fifty percent less. All at a unique fixed-fee contractual rate.

IES developed the **QUICK-PURGE®** technique to achieve remediation QUICKLY. And to parts-per-billion levels.

They said it couldn't be done. But IES did it. And we can do it for you. For information, call us today.

IES

INTEGRATED ENVIRONMENTAL SOLUTIONS, INC.

An *Inc.* 500 Company

3787 Old Middleburg Road, Suite 3
Jacksonville, FL 32210
(904) 778-1188 FAX (904) 778-0201

• Soil & Groundwater Remediation • Contamination Assessment • Phase I & II Environment Assessment
• Environmental Consulting • Government/Regulation Liaison

Circle 132 on card.

THE FIRST GC/MS DESIGNED FOR SITE SEEING.

Introducing HAPSITE™, the first portable GC/MS that lets you see the answers before you leave the site.

VOHAPs analysis just got easier, and quicker, and less expensive, and less time consuming, and more reliable.

No, it's not too good to be true. It's what the industry has been waiting for—the first truly field-portable instrument to provide on-site analysis of VOHAPs.

HAPSITE literally changes the way VOHAPs analysis is done. Battery-powered, lightweight and weatherproof, this new instrument will accurately speciate and quantify VOC emissions right on the spot, giving you the certainty that your field crew will only have to test once.

And it's easy to use. HAPSITE doesn't require any special knowledge of mass spectrometry, because an internal processor interprets and displays the results. It's self-tuning, too, so the field operator doesn't tune or calibrate the GC/MS. Using built-in internal standards, HAPSITE ensures accurate calibration for greater confidence in test results.

HAPSITE also offers total flexibility for multiple applications. It can be used in a survey mode (MS only) for fast screening, or in a GC/MS mode when confirmatory results are required. In either mode, it has full scan or SIM capability.

And it's *only* available from Inficon, a world leader in the design and manufacture of analytical instruments.

If you're involved in VOHAPs analysis, now you can spend a lot less time site seeing.

Call 1-800-223-0633 for more information.

REGISTERED ISO 9001 MAY 1993

OPENING THE FIELD TO NEW IDEAS™ **INFICON®**

See us at EnvirACS, Booth #216 Circle 133 on card.