

FROM THE PRESIDENT
MICHAEL J. CAGNEY



In Indianapolis this past August there was a daylong landfill technical meeting sponsored by EREF and hosted by Republic Services, Inc.

Attending were waste industry engineering and technical staff from Republic Services, Waste Management, Golder, SCS, Weaver Boos, and Emcon, academics from Michigan State University and University of Central Florida, and environmental regulators from Indiana, Michigan, and the US EPA.

This meeting underscores EREFs capability as a bridge maker, bringing together diverse interests to discuss solid waste engineering and environmental issues of importance to all parties.

It is our intent to continue these kinds of meetings in the future as part of our mission to develop environmental solutions for the future. For further information I invite you to call Dr. Ed Repa, vice president of environmental programs at EREF, 703-299-5139.

*Landfill Technical Workshop
featured on pages 1 & 3*

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GIVING AND GLEE FOR GOLFERS AT HERON BAY TPC



Tournament champions Rob Fallon, Mitch Covington, Jim McKee and Jeff Haase.

The Environmental Research and Education Foundation teamed with host Republic Services, Inc. and a series of generous sponsors October 17th-18th to put on a wonderfully successful charitable golf tournament. The Fall Environmental Classic was enjoyed by over 100 good-spirited golfers, who gathered at the Heron Bay TPC course in Coral Springs, Fla. to raise over \$140,500 for the foundation. They were in-turn treated to perfect Florida weather (just beating the hurricane!), and goodies including shirts, golf shoes, and cigars.

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Landfill Technical Workshop

On August 2, 2005, the EREF held its first technical workshop that highlighted technical findings from its funded research. Completed and ongoing projects pertaining specifically to current landfill issues were presented. With waste industry professionals always striving to stay up-to-date on the latest research and regulations, the technical workshop offered a great gathering place to discuss current issues and ask questions about upcoming EREF work affecting regulations. The workshop brought together some 40 industry professionals, government regulators, and researchers to discuss landfill bioreactors, landfill gas quality pre- and post-combustion, and performance based post-closure care methods. The workshop was held at Republic Service, Inc.'s offices in Indianapolis, Indiana. Topics presented included:

- Recent developments in bioreactor landfills by Dr. Debra Reinhart, Chair, Civil and Environmental Engineering Department, University of Central Florida;

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COME ONE, COME ALL Be a part of EREF's 12th Annual Waste Equipment Auction

Our 2006 Auction at WasteExpo is :

- ✓ Fast-Approaching
- ✓ Again in Vegas
- ✓ A superb way to get added exposure at Expo while being part of a great cause!
- ✓ Beneficial and fun for everyone involved!



The support of the following companies and individuals made this tournament possible. Special thanks to:

Tournament Sponsor:
Republic Services, Inc.

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Sprint Nextel Corporation
Waste Corporation of America (WCA)
Weaver Boos Consultants

EREF would also like to thank those unable to attend who made contributions:
Steve Halmos
Vince Taormina

Golf *Continued from page 1*

This year's golf event brought together the largest number of golfers of any EREF tournament to-date. The festivities began in October 17th with a welcome reception, where players had a chance to eat, drink and be merry one last time before facing the course. Golfers were welcomed early the next morning by tournament host Jim O'Connor, Republic Services, Inc. just before their shotgun start. Though no team quite made the 12 under par being boasted of on the green, and the Corvette remained on the hill, players made a good showing. Congratulations to the Champion team: Mitch Covington, Rob Fallon, Jeff Haase and Jim McKee; and Second Place team: Carl Apicella, Randall Russell and Rick Cannon. Winners each received a crystal commemorative and framed team photo. The winners' names will also be immortalized on the traveling trophy—a beautiful, near-Super Bowl worthy piece that resides with the host company each year. Other prizes included Longest Drive (Sandee Cosman) and Closest to the Pin (Sean O'Brian). The 50/50 raffle raised over \$2200 - half of which was awarded to winner Junior Thompson, and half donated to the EREF. A heartfelt thanks to all who participated and made this such a wonderful event!



Second place team: Randall Russell, Rick Cannon, and Carl Apicella.



Rita Ugianskis awards Junior Thompson his nearly \$1200 cash award after drawing his ticket for the 50/50 raffle.



Winner, Closest to the Pin: Sean O'Brian



Winner, Longest Drive: Sandee Cosman

Would you like be part of our next golf event? For sponsorship details or to be put on our invitation list, please contact Michael Cagney at 703-299-5139.



LANDFILL

continued from page 1

- Management of nitrogen at bioreactor landfills by Nicole Berge, EREF's Francois Fiessinger Scholar, Civil and Environmental Engineering Department, University of Central Florida;
- Granular blankets for leachate recirculation at bioreactors by Dr. Milind Khire, Civil and Environmental Engineering Department, Michigan State University;
- A performance-based system for post-closure care at municipal solid waste landfills by Dr. Jeremy Morris, Senior Staff Engineer, GeoSyntec Consultants; and
- Characterization of landfill gas emissions and control technology by Susan Thorneloe, Office of Research and Development, U.S. Environmental Protection Agency.

WASTEC Executives Detained by U.S. Coast Guard!

It was a break in meetings on August 22nd that gave WASTEC members the opportunity to take an afternoon boating excursion on the Potomac River. And while it was a perfect summer afternoon on the river that did not deter the U.S. Coast Guard from stopping and boarding Lion's Rule. Perhaps it was because we were a surly looking group of old dudes, or perhaps there was so much cigar smoke coming from the boat that it appeared we were on fire, or perhaps it was that a "friend" of Michael Cagney's sent the Coasties in pursuit telling them that on Lion's Rule there was a serious quantity of refreshments being consumed?

Regardless it all ended quite well as you can see, another perfect day on the water.



Taking a break from meetings to enjoy "Talking Trash."



The coasties are coming!

SOMEONE IS GOING TO BRING THIS BABY HOME WHY NOT YOU?

EREF proudly presents its 2006 raffle car, a **1968 Camaro RS Sport Coupe** Buy your ticket today—it could be the winner!

Details: modified 327/325hp with a mild cam and Holley four-barrel carb, Turbo 400 automatic transmission, mirror finish Tripoli Turquoise paint with white stripes and cowl induction hood, original factory blue bucket interior with factory console and horseshoe shifter, original blue carpet, correct gauges, rally wheels with white letter radials, great sounding dual exhaust, power steering, great driver or for show.

VIN 124378N443753

Casting Number 3914678

Index # V0527ME/18N443753 (built in Flint, MI on May 27, 1968)

Only 600 tickets will be sold—just \$100 each!

Limit 10 tickets per person.

Drawing

Thursday, April 6, 2005

WasteExpo - EREF Exhibit Space

Las Vegas Convention Center

Las Vegas, Nevada

Drawing Follows Waste Equipment Auction (starts 5:00 p.m.)

Winner need not to be present to win.



FROM THE CHAIRMAN ROBERT P. STEARNS, P.E., DEE



I am completing my two-year stint as the Chairman of the foundation in 2005. It has been my pleasure to work with Michael Cagney, other foundation staff mem-

bers, and the Board members in that role. I look forward to continuing my participation in foundation activities as Past Chairman in the coming year.

A number of important projects were completed or nearing completion in 2005. These included: the development of a performance-based system for post-closure care at MSW landfills, the field test of granular blankets for leachate recirculation, and the development of bioreactor landfill training course. Our annual equipment auction at WasteExpo was among the most successful to date, and I want to specifically acknowledge the participating equipment suppliers for their contributions to the success of the foundation.

The foundation also transitioned to a new office location this year. We were able to capitalize on the "hot" real estate market in Virginia by selling our previous location, netting in excess of \$250,000 for the foundation in the process. These funds will be available to support future projects that improve solid waste management.

The foundation is also poised to kick off a significant new capital campaign in 2006. This campaign has as a goal to enable the foundation to support up to \$1 million in new projects and scholarships annually within the next 5 years.

Thanks to all of you who have contributed to the success of the foundation.

FROM THE CHAIRMAN OF THE NOMINATING COMMITTEE LONNIE C. POOLE, JR.



The EREF's mission to develop environmental solutions for the future through research and education, is best perpetuated by those who believe in it. As a board of directors committed to this mission, we look for member additions who will further the foundation's progress through dedication to both industry and public good.

We are pleased to announce the election of Michael Jobe, President, Heil Environmental (Tennessee) to Director, with a term to expire in 2008.

Michael's leadership style in business will be an asset to his service on the EREF board. He believes in trying to understand the customer's true needs, and feels this must be done while also addressing the dynamic changes, needs and regulatory requirements for each industry being served. Michael's fondness of a popular quote by Wayne Gretzky emphasizes his ability to look to the future. Of Heil Michael said, the company does "not skate to where the puck is...but where the puck will be." The EREF board and those we serve welcome Michael as a valuable new member, looking forward to his contribution and insight.

MICHAEL JOBE PRESIDENT HEIL ENVIRONMENTAL



Michael Jobe has served as president of Heil Environmental since January 2003. As president, Michael oversees the company's Refuse Equipment Group, Truck Equipment Group, Parts Central, Bayne Premium Lift Systems and Heil Europe. He is responsible for all aspects of the company's operations worldwide, including facilities in Chattanooga, Tenn., Fort Payne, Ala., Tishomingo, Miss., Greenville, S.C., and Hillend, Scotland. He is charged with developing and implementing Heil's overall strategic direction.

Michael earned a bachelor's degree in management from Sam Houston State University and was well-prepared to take on the challenges at Heil as a result of his extensive 17-year career at Rotary Lift, the world leader in vehicle service lift systems. Rotary and Heil are both operating companies of Dover Corporation. Through the ensuing years, Michael took on increasingly responsible positions at Rotary, moving through various key roles before being named president in 2000. As Rotary's president, Michael was especially proud of focusing the company further on its customers' needs, while positioning it with a clear direction and process to achieve sustainable long-term growth.

At Heil, Michael's focus on the customer remains key to his goals. He believes that the company must thoroughly understand each customer's true needs.

Michael likes to spend his free time in family-related activities with his wife and two sons.

PROJECT UPDATES

BE SAFE, BE PROUD – AT TRANSFER STATIONS

On July 26, 2005, the U.S. Occupational Safety and Health Administration granted EREF an additional \$56,260 under the Susan Harwood Training Grant Program to develop a safety training video for workers at transfer stations and other solid waste industry operations. This is the third contract awarded to the Foundation for development of safety-training videos for the solid waste industry. The first two safety training videos covered solid waste collection workers and landfill workers.

The approximately 20-minute video on preventing injuries and fatalities at transfer station will be developed by EREF's contractor the National Solid Wastes Management Association (NSWMA). The video should be completed by April 2006 where it will be debuted at Waste Expo '06 (<http://wasteexpo.com/index.html>).

The two previous training videos are available in VHS and DVD format by contacting NSWMA's publication department at 800-424-2869. Proceeds from the sale of the videos are used to develop further health and safety information.

Field-Scale Thermal Properties of Bioreactor Landfills

On September 1, 2005, EREF's Board of Directors approved a grant to Michigan State University (MSU) to develop an estimation of the field-scale thermal properties of a bioreactor landfill to maintain optimal biological activity. The work will be done at the McGill Landfill in Jackson, Michigan by MSU researchers that had been previously awarded a contract to design, instrument, and monitor field-scale leachate recirculation blankets including geo-composite, chipped tires, and crushed glass drainage layers.

The new project activities include:

- Conducting additional leachate recirculation trials at various leachate temperatures during all seasons and monitoring temperature changes in the blankets and adjoining waste mass;
- Carrying out limited lab-scale tests on surrogate waste to measure thermal properties and comparing these properties to the field-scale data;
- Conducting numerical modeling to simulate heat flow between leachate and waste and estimating thermal properties of the waste; and
- Preparing design and operational guidelines for landfill operators to achieve an optimum target temperature in the landfill.

The project will be carried out over a two-year period. Results of the project will allow provide operators of bioreactors with operational strategies to inject liquids and air into bioreactor landfills to achieve optimum temperature distribution that will maintain accelerated biological activity through various seasons.

Update of Landfill Gas Testing Program

Back in 2001, EREF and U.S. Environmental Protection Agency (EPA) entered into a Cooperative Research and Development Agreement (CRADA) to characterize landfill gas emissions and control technologies. The goal of the project was to collect pre- and post-combustion (i.e., flares, internal combustion engines, turbines, boilers) gases and analyze these samples for a wide range of pollutants including hazardous air pollutants (HAPs), volatile organic compounds (VOCs), methane, carbon dioxide and combustion by-products. The project results are expected to assist EPA in updating the existing AP-42 emission data that are considered non-representative of modern municipal solid waste landfills.

Preliminary results of the study indicate that about 60 percent of the HAPs tested for in the raw landfill gas were 1 to 3 orders of magnitude less than those listed in AP-42. In fact, three HAPs were not detected during sampling including one that EPA listed landfills as the largest source.

HONORARIUMS AND MEMORIALS

Herbert White

(husband of Auline White)
(father of Bonita Cagney)

Michael J. Cagney

Sandra Roth

(wife of David Rolston)

Michael J. Cagney

Richard W. Eldredge

"An industry pioneer"

Robert Stearns

Catherine Kaiser

(great aunt of Elizabeth Leith)

Michael J. Cagney

Amparo Comacho

(sister of Carlos A. Munoz)

Michael J. Cagney

Major Gerald M. Bloomfield

(son-in-law of Denny Gill)

Michael J. Cagney

**The due date for mention
of your honorariums or
memorials in our spring
issue is April 1, 2006.**

**Call 703-299-5139 x10 for a
donor form or download at
www.erefnd.org/donor.pdf**

EREF CALENDAR

April 5 - 6

Silent Auction at WasteExpo

April 6

Equipment Auction at
WasteExpo

April 1

Grant proposals due

July 1

Scholarship applications due
2006 Golf Tournament TBD

Results of the study will be finalized and presented by EPA at Waste Tech 2006 (www.landfillconference.com) in Phoenix, Arizona on February 27 and 28. These findings are important to landfill owners when determining compliance with air permitting requirements.

2005 EREF SCHOLARSHIP WINNERS

The EREF is pleased this year to award three students funding to further their studies and research. Monica Nicole Danon-Schaffer, a Ph.D. student enrolled at the University of British Columbia; Shahzeen Zahid Attari, a Ph.D. student enrolled at Carnegie Mellon University; and Solenne Grellier, a recent Ph.D. graduate doing post-doctoral work at University of Illinois at Chicago were each awarded \$8,000 per year for up to three years.



Ms. Danon-Schaffer's research will be a mass balance evaluation of poly-brominated diphenyl ethers (PBDEs) - system models and upstream source characterization. These are a class of brominated flame retardants (BFRs) that are bioaccumulative, persistent, lipophilic, and are considered a new type of persistent organic pollutant. She hopes the findings of this research will assist in evaluating the extent of contribution of landfills as sources of contamination to groundwater and surface water bodies, as well as the migration of PBDEs in soil and the capability of clay liners to contain PBDEs.



Ms. Attari's research will focus on the excess of packaging in the United States, and how to empower consumers to make effective social and environmentally sustainable choices. She plans to study the relationship between manufacturers, government policy makers, engineers and consumers to construct mental models and administer risk communication to all stakeholders. She hopes in addressing overpackaging, to provide a unique interdisciplinary approach with implications for waste minimization, environmental justice and social equity.



Ms. Grellier's research aims to address both the dynamic water balance and geotechnical stability of bioreactor landfills. The objectives of the proposed research are to quantify the dynamic water balance concurrently with the engineering properties of the waste during bioreactor operations, and to develop a field validated coupled flow-mechanical model suitable to assess the performance of bioreactor landfills. She will employ a unique partnership between academia and industry for the successful completion of the proposed research.

UPDATE EREF SCHOLARS

Brian Staley

North Carolina State University
(2004 Fiessinger Scholarship Winner)

Mr. Staley has begun his second year as a Fiessinger scholar at N. C. State University. He recently completed a project to measure the production of non-methane organic compounds (NMOCs) from municipal solid waste



(MSW) and individual refuse components (yard waste, food, paper). His results showed that gas sparging was

a significant NMOC release mechanism and suggested that significant biodegradation of gas phase NMOCs was occurring during refuse decomposition. The relatively high production of NMOCs in aerobic systems relative to anaerobic systems implicates yard waste composting facilities as a potentially major source of NMOCs. Finally, the research results suggest that the

default values given in AP-42 are leading to over estimates of NMOC emissions. This has significant implications for air permitting activities in the landfill industry. A paper on this research was submitted for publication in August 2005.

Building on this project, Mr. Staley's research is now focused on the manipulation of landfill management practices to direct microbial community dynamics towards the enhancement of refuse decomposition. The overall goal of this research is to degrade waste more completely and at a faster rate relative to traditional landfill practices by controlling or directing landfill microbiology. To do this, the identity and number of individual microorganisms that make up existing microbial communities must be known. The first step in this research is to adapt newly developed techniques from molecular microbiology to the study of refuse decomposition. These techniques will then be used to evaluate landfill operating practices.

Mr. Staley is taking advantage of the rapid development of molecular techniques to study microorganisms in the environment. These techniques are based on the extraction of RNA and DNA (nucleic acids) from landfill samples. Mr. Staley has been developing and optimizing a method to maximize both the quantity and quality of nucleic acids extracted from MSW. He has evaluated 8 different pre-treatment techniques prior to DNA and RNA extraction from MSW. Current results indicate that the DNA extraction technique employed has a significant effect on the quantity of DNA harvested, while reducing variability intrinsic to the heterogeneity of MSW. Further work in late 2005 will assess the efficiency of the best pre-treatment technique by spiking MSW with known quantities of DNA and determining the fraction of the added DNA recovered using real-time polymerase chain reaction (PCR). Subsequent analyses will address bias by assessing microbial diversity via a technique called terminal restriction fragment length polymorphism, or T-RFLP, in which fluorescently labeled oligonucleotides are used in concert with restriction enzymes to

'fingerprint' the microbial community. The pre-treatment technique selected will attempt to minimize community bias while maximizing nucleic acid yield from solid waste.

Research over the coming 2 years will employ the optimized method Mr. Staley has developed for nucleic acid extraction, as well as stable isotope probing to better understand how microbial populations develop just prior to the onset of methane production. Once this process is understood, he plans to evaluate alternate landfill operating strategies for their effects on the initiation and rate of refuse decomposition and methane production. Specifically, the manner in which microbial communities are affected by landfill operating strategies, such as leachate recirculation and the leachate dosing regime must be understood. This information can be used to enrich for microbial community members with higher metabolic rates which, subsequently, will result in more efficient and rapid degradation. Ideally, this research will prepare the landfill industry for the next generation of techniques to optimize gas production and airspace recovery.

Mira Stone Olsen, Ph.D.

University of Virginia
(2002 Fiessinger Scholar)

I have recently completed the third and final year of my EREF Fiessinger scholarship. I graduated with a Ph.D. in environmental engineering from the University of Virginia in May, 2005, and following an appointment as a post-doctoral research associate in the department of Environmental Sciences, I will begin a faculty position in environmental engineering at Drexel University, beginning January, 2006. I am tremendously grateful to the EREF for allowing me the opportunity to enhance my graduate education, and to continue further studies of my Ph.D. research after I completed my dissertation.

My Ph.D. research focused on studying how chemotaxis affects the transport of bacteria through porous media. Chemotaxis refers to the ability of bacteria to sense chemical concentration gradients and swim toward regions of



optimal contaminant concentration. I ran several sets of experiments analyzing bacterial transport through packed columns and studied the effect of an imposed chemical gradient on bacterial transport. I found that bacteria migrate preferentially to regions containing low concentrations of trichloroethylene (TCE). This result suggests that chemotactic bacteria may be extremely useful in degrading residual ground-water contamination. With the support from my Fiessinger scholarship, I was able to continue modeling studies of bacterial transport through heterogeneous porous media to determine the extent to which chemotaxis affects bacterial transport in larger-scale systems. My scholarship from EREF also helped support a research trip I took to the University of Edinburgh, Scotland, in the summer of 2003, in which I had the opportunity to expand my skills from bench-scale laboratory skills to broader field applications. I am extremely appreciative for the flexibility that the Fiessinger scholarship allowed me in shaping my graduate education and my future career in environmental research.

WasteExpo is just around the corner!

Make the most of it by participating in the EREF Annual Equipment Auction. Exposure on the registration level of WasteExpo, mention in all marketing materials, and that feel-good feeling are included. Join the ranks of those giving back to the industry by committing equipment or services to raise funds for MSW scientific research. Visit our website for more information or call Sarah Stancliff at 703-299-5139 x10.

Donors Who Have Made Substantial Financial Commitments as of June 1, 2005

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(donations of \$250,000.00 or more)

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