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Pesticides v. gators 5

A mechanistic link has been established between exposure to relic agricultural chemicals in Lake Apopka muck and substantial reductions in female alligator fertility.

BMPs on the farm 9

A study is underway to determine best management practices for a farm involved with vegetable production, forage production and calf production. Manure spreading and irrigation are being closely scrutinized to determine BMPs for maximizing forage production, conserving irrigation water and preventing leaching of nutrients into groundwater.

What's the number? 11

Funding for the state petroleum cleanup program has ranged from \$182 million to as low as \$90 million annually. Last year, the state Legislature approved \$128 million in funding. But the real number needed to provide for meaningful progress is a minimum of \$150 million for cleanups per year. Glenn MacGraw weighs in.

Chemicals dumped 12

DEP recently conducted an inspection of a West Melbourne property and found an estimated 3,500 containers of hazardous substances in seven covered trailers and two box trucks. The U.S. Environmental Protection Agency determined that an emergency response was warranted.

Departments

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Got a story lead?

Got an idea for a story? Like to submit a column for consideration? Fire away. And don't forget to fill us in on your organization's new people and programs, projects and technologies—anything of interest to environmental professionals in the state. Send to P.O. Box 2175, Goldenrod, FL 32733. Call us at (407) 671-7777; fax us at (407) 671-7757, or email us at info@enviro-net.com.

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Photo by George Hochmuth

UF researchers prepare groundwater leachate samples for chemical analysis as part of a collaborative research effort at Suwannee Farms. The goal of the study is to optimize nutrient and water use in agriculture while protecting groundwater resources. See story on Page 9.

New environmental resource permit rule expected to ensure statewide consistency

By PRAKASH GANDHI

One of Florida's major environmental regulatory programs is undergoing a major makeover. State environmental officials are working to consolidate, streamline and update the rules of the environmental resource permit program.

Florida Department of Environmental Protection officials said the changes will reduce regulatory burdens and provide a more consistent permitting process across the state.

The ERP program regulates activities involving the alteration of surface water flows, including new activities in uplands that generate stormwater runoff from upland construction, as well as dredging and filling in wetlands and other surface waters.

Industry and development groups have long complained about inconsistency in the program between the five regional water management districts. DEP plans to adopt a statewide rule that will be implemented by both the department, the districts and some local governments.

The department says the new rule will enable immediate and statewide sharing of rule drafts, questions and responses, thereby avoiding unnecessary delays in implementation.

"Our intent is to provide a higher level of service, expand access and engage more stakeholders to develop a better quality rule," said Doug Fry, environmental administrator with DEP and the lead coordinator on the rulemaking.

The rulemaking is required by Section 373.4131 of Florida Statutes. That section authorizes DEP, in coordination with the water management districts, to adopt a single, statewide ERP rule, relying mainly on the existing rules of the agencies.

To ensure consistent implementation and interpretation of the rule, DEP will be responsible for coordinating and overseeing regular assessment and training of agency staff.

DEP has been conducting workshops to obtain public input on the proposed rule. Fry said in August that based on the attendee numbers from the first two workshops, there has already been a major increase in participation as com-

Groups sue to protect Caloosahatchee flows

By DAN MILLOTT

The Conservancy of Southwest Florida, EarthJustice and the Florida Wildlife Federation filed suit against the U.S. Army Corps of Engineers in last July seeking restoration of normal water flow on the Caloosahatchee River.

Monica Reimer, a staff attorney in the Tallahassee office of EarthJustice, said the dams along the Caloosahatchee controlled by the corps are causing damage to the river and its estuaries.

The suit was filed in the U.S. District Court for the Northern District of Florida. Reimer and EarthJustice Attorney David Guest will present the case.

Reimer said the corps has 60 days to respond and does not expect the first

CALOOSAHATCHEE

Continued on Page 13

pared to other workshops for similar rule proposals.

Rule development workshops are a venue for DEP and the state's water management districts to solicit comments and obtain feedback from the public and other interested parties as part of drafting a proposed rule, said DEP Press Secretary Reena Bhardwaj.

In this case, the statewide ERP rulemaking is being conducted using a new, webinar-based format that allows people to view the rulemaking presentation and participate remotely, said Bhardwaj. This saves travel costs and time for all involved.

At the same time, the webinar is also being broadcast to seven regional locations where the public can meet directly

ERP

Continued on Page 16

Zephyrhills officials vote down brownfield designation

By PRAKASH GANDHI

Plans to develop a brownfield site in the West-Central Florida town of Zephyrhills have hit a major stumbling block. City officials there rejected plans to seek brownfield status for about 1,100 acres near the Zephyrhills Municipal Airport, siding with landowners worried about the stigma that such a designation could bring to the town.

The goal of the designation was to pave the way for current and future businesses to take advantage of special tax breaks and financial incentives, such as job creation rebates, said Melanie Kendrick, senior planner for economic development and brownfield coordina-

tor with Pasco County.

But some city commissioners were concerned about the stigma of the term brownfield, Kendrick said. "They don't want to portray the area as contaminated," she said.

The area in question is about 1,000 acres of which about 800 are owned by the city, and the balance by private land owners, Kendrick said. The sites include former training facilities for the military as well as manufacturing and lumber storage sites.

The Florida Department of Environmental Protection has offered the brownfield designation as a voluntary

ZEPHYRHILLS

Continued on Page 3



Painter

Correction

In last month's issue, I mistakenly referred to Pat Painter as "she" while editing our article about the NRC report on the Everglades. As you can see from the above photograph, Pat would be more correctly identified as a "he." My apologies to Pat and our writer Susan Telford for the error.

Editor

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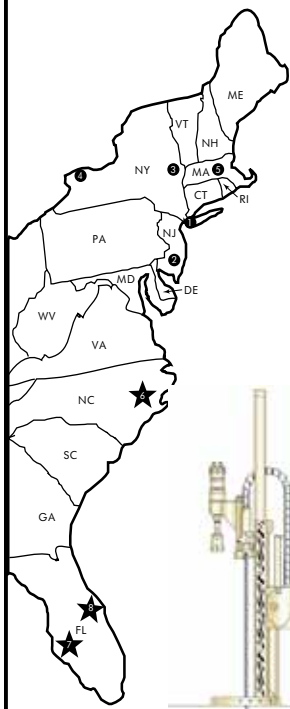
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EPA announces technical review for mercury, air toxics standards

Staff report

The U.S. Environmental Protection Agency announced that it will conduct a partial review of a recent rule, the Mercury and Air Toxics Standard. The agency will revisit its technical analysis associated with Section 112 of the rule passed in February, 2012.

An agency statement said that measurement techniques related to mercury and the data set to which the variability calculation was applied when establishing the new sources standards for particulate matter and hydrochloric acid will be re-examined.

In its announcement, the agency said that the review will not influence state-of-the-art pollution controls new power plants are expected to implement to reduce harmful pollution.

The EPA agreed to reconsider these specific aspects of the recently passed MATS rule following a petition from interested parties. The agency noted that the review specifically addresses requirements for new power plants in four states: Georgia, Kansas, Texas and Utah. Any changes resulting from the technical review will not influence standards for existing power plants.

The EPA noted that the Clean Air Act allows for reconsideration and that occurs routinely when new information becomes available after a rule is passed. The agency expects to conduct the review over the next three months. Any rule-making processes that might ensue will be completed by March, 2013.

The agency has issued a three-month stay of the regulations pending completion of its technical review.

More information is available at <http://www.epa.gov/mats/actions.html>.

Everglades cleanup may get share of BP fines. Some of the billions of dollars that BP may end up paying in punitive fines specified by the federal Oil Pollution Act following the Deepwater Horizon oil spill may find its way into Everglades restoration programs.

Congress set that possibility in motion in June when it passed the Restore Act requiring 80 percent of any fines collected from BP to be given to the five Gulf States.

The remaining 20 percent may be spent for any federal program.

Meanwhile, in 2011, the Florida Legislature passed a law specifying that 75 per-

cent of BP fines be spent in eight oil damaged counties in Northwest Florida.

U.S. Department of Interior Secretary Ken Salazar built expectations even higher when he told the South Florida Ecosystem Restoration Task Force that BP fines would provide money for conservation and vaguely suggested Everglades restoration work as an example.

According to media accounts, any new federal money from BP fines could be used to protect Southwest Florida's coast from future oil spills or to store and cleanse water now flowing to the Gulf of Mexico. Many of these projects are already planned.

Money received from BP fines would replace planned funding for them and, potentially, make that freed money available for projects elsewhere in South and Central Florida.

The amount of money that might be available is potentially huge. If BP is found guilty of simple negligence, the fines would be only \$1,300 per barrel. The fine increases to \$4,300 per barrel if BP is found guilty of gross negligence.

An investigation committee co-chaired by former U.S. Senator Bob Graham made a finding of gross negligence. The amount of oil spilled was about 5 million barrels, which translates into a gross negligence fine of over \$20 billion should that finding influence formal legal settlements between BP and the feds.

Any funds that become available will be distributed through a funding formula that includes at least five entities. Everglades restoration certainly will not be the only entity vying for a share. When all is said and done, funding augmentation from BP fines for Everglades restoration might be anywhere from zero to hundreds of millions of dollars.

Projects that might be funded are purely speculation at this point. Those that permanently protect Florida's coastline from future oil spills, or those that are shovel-ready are frequently mentioned as the ones most likely to receive a share of the BP fine bonanza.

Transportation opinion. A Dallas-based conservative think tank recently released a position paper claiming that automobile passenger transportation is more

FEDFILE
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Phone: (407) 671-7777
Fax: (407) 671-7757
info@enviro-net.com
www.enviro-net.com

MICHAEL R. EASTMAN
Publisher/Editor
mreast@enviro-net.com

Support services provided by
OSS
Orlando, FL

Contributing writers and columnists

PRAKASH GANDHI
Senior Environmental Correspondent
Orlando, FL

MELORA GRATTAN
Senior Environmental Correspondent
Newnan, GA

LAURA GIMPELSON, PE
President
LG Environmental Engineering
Orlando, FL

BLANCHE HARDY, PG
Environmental Correspondent
Sanford, FL

ROY LAUGHLIN
Environmental Correspondent
Rockledge, FL

LAURA LOCKETT
Partner
Carlton Fields PA
Tampa, FL

GLENN MacGRAW
Vice President
The FGS Group
Tallahassee, FL

DAN MILLOTT
Environmental Correspondent
Miami, FL

SUSAN TELFORD
Environmental Correspondent
Jupiter, FL

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DEP orders HRK to address deficiencies at Piney Point

Staff report

State environmental officials ordered HRK Holdings LLC to address eight deficiencies at its Piney Point facility ranging from high levels of ammonia in a drainage ditch to a watershed that is still contaminated with dredging sediment.

The company has not yet repaired the damage to structures near the gypsum stack liner tear that occurred last summer at the facility.

The warning by the Florida Department of Environmental Protection was issued in June before Tropical Storm Debby dumped almost 11 inches of rain in northern Manatee County.

Piney Point, a former phosphate facility, was purchased by HRK in 2006. The company intended to use the facility as a disposal site for Port Manatee's Berth 12 dredging project.

In May 2011, liners and pipes that housed the dredged material at Piney Point burst, releasing 2,700 gallons of water a minute into Bishop Harbor.

HRK filed for Chapter 11 bankruptcy protection in late June over the expenses related to the environmental fallout from the incident.

The DEP assumed responsibility for the property in 2001 after then-owner Mulberry Phosphates Inc. declared bankruptcy.

After a recent inspection, the DEP sent a letter to HRK that warns the company of violations in its maintenance agreement. The department wants HRK to reduce water inputs at the site by 153 gallons per minute to avoid exceeding the system's storage capacity.

Contaminated wells in Deland. More drinking water wells in the city of Deland have tested positive for dieldrin.

Officials with the U.S. Environmental Protection Agency said dieldrin was used as a pesticide and some of it spread to homes in the Country Club Estates community.

Agency experts initially tested 287 homes and almost half tested positive for the pesticide.

City leaders have agreed to transfer all the homes that tested positive to city water at no cost while giving homeowners whose wells tested negative a chance to make the change to city water at a reduced cost.

Dieldrin is an insecticide and a by-product of the pesticide Aldrin. From 1950 to 1974, it was widely used to control insects on cotton, corn and citrus crops. In addition,

ZEPHYRHILLS

From Page 1

program for those who want to come forward to be good stewards of the land. The incentives can go to properties that face a range of development challenges, even if they're not actually polluted.

DEP offers incentives to businesses that locate in designated brownfield zones. Approved applicants receive tax refunds of up to \$2,500 for each job created and are eligible for multiple financing options through a voluntary cleanup program.

Currently, 279 brownfield areas have been designated statewide. In Pasco County, the Dade City Commerce Center has been designated as a brownfield.

Kendrick said she is an avid supporter of the program. "I am a big brownfields person," she said. "I have seen the development of brownfield areas work in other places. It's good to redevelop blighted areas and to help business people create jobs. I am going to do my best to push for it."

Kendrick said the proposed brownfields area in Zephyrhills is ripe for development with a CSX railroad, major highway arteries and the Port of Tampa in close proximity.

Developing the area as a brownfield district would provide a tool for officials to offer incentives for expanding or relocating businesses to the area.

Even though the city has rejected the brownfields proposal, the issue is not dead. "We're trying to get city officials to reconsider their decision," Kendrick said.

dieldrin was used to control locusts and mosquitoes, as a wood preserve and for termite control. It was banned in 1987 because it may cause cancer.

Work on expo shut down. Construction has come to a halt on a \$40-million renovation project on one of Brevard County's largest landmarks.

County officials pulled the plug on the Cocoa Expo project because some of the required permits had not been issued. In addition, there is concern that environmental laws may have been broken.

The new owners plan to revamp the baseball fields, demolish and rebuild a new gym and add other facilities.

Officials say renovation work on the expo started before the complete site plan was approved.

Ball park cleanup. Remediation may be needed on only the top six inches of contaminated soil at the proposed site for Little League ballfields at Blackstone Park in Palmetto.

The evaluation is based on preliminary

reports by DEP regarding the land, which was previously deemed unfavorable because residual pesticide was detected from previous farming activities.

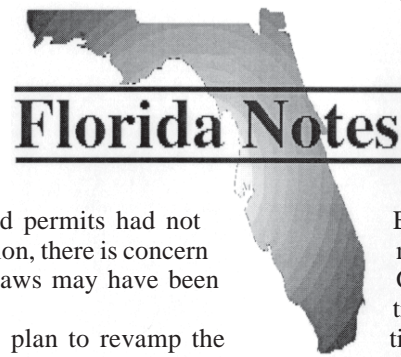
The county recommended halting construction plans for the site when environmental testing indicated that there was residual pesticide contamination.

Construction and remediation costs could reach about \$3.3 million and extend completion time to 2.5 years.

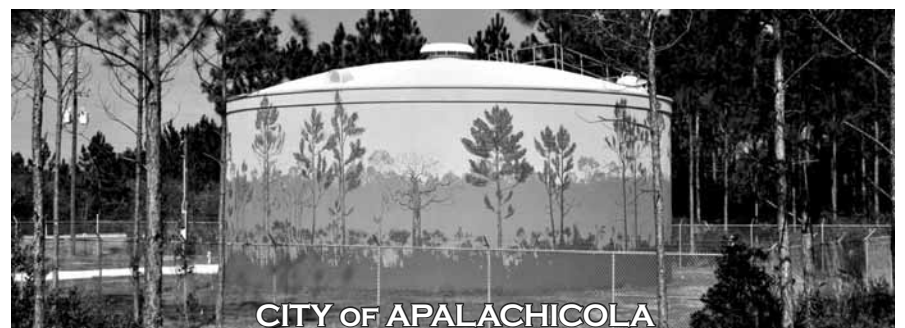
Company news. Clean Earth Inc. acquired Soil Remediation Inc. of Kingsland, GA, marking their ninth soil treatment and recycling location in the U.S. Clean Earth of Georgia is a thermal treatment facility processing non-hazardous petroleum-contaminated soils can now service remediation projects from Savannah, GA, to Gainesville, FL.

Progressions. Abby Still has joined HSA Engineers and Scientists in their Altamonte Springs office.

Deena Patsourkos has been promoted to business ambassador at Flowers Chemical Laboratories, also in Altamonte.



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Bradenton city council signs off on reclaim water system expansion

Staff report

The developer of Lakewood Ranch and owner of Braden River Utilities has won approval from the city of Bradenton to purchase reclaimed water from its system.

The agreement reached in July was made possible by a change in city policy. Up until 2010, the Manatee County comprehensive plan prohibited the sale of reclaimed water within the Braden River watershed. That restriction was terminated two years ago allowing the recent action

by the city.

Rex Jensen, CEO of Schroeder-Manatee Ranch Inc. and the developer of Lakewood Ranch, has been trying to make a deal with the city to use their reclaimed water. But due to comp plan restrictions, the city has been discharging its reclaimed water from the treatment plant into the bay.

Schroeder-Manatee also operates Braden River Utilities. Jensen said his company has been seeking ways to reduce its withdrawals of groundwater so the use of reclaimed water helps with that goal.

Under the agreement, BRU will pay 32 cents for every 1,000 gallons of reclaimed water they buy from the city. The utility will use a minimum of 2 million gallons and a maximum of 4 million per day.

BRU will build a pipeline from the Bradenton treatment facility to their delivery point. BRU must submit documentation within 60 days to the Florida Department of Environmental Protection to apply for the necessary permits.

JEA launches reservoir project. JEA has begun work on a \$20.6 million reservoir project in the Springfield area of Jacksonville.

The Haskell Construction Co. will replace a 30-year-old underground reservoir with a three-million gallon aboveground concrete storage tank. The contract also calls for installation of a nitrogen sulfate removal system and associated electrical, mechanical and site work.

According to the JEA, the tank will store water from the aquifer.

Other parts of the project include alterations of an existing building for ozone equipment, electrical gear, HVAC and some demolition and construction of a new one-story building to house electrical equipment.

The project is expected to be completed by the spring of 2013.

New reservoir, filter marsh for Cape Coral? A Cape Coral city councilman has proposed two new projects he hopes will eliminate the use of potable water in the city's reclaimed water system and stem the flow of nutrients into Matlacha Pass.

Councilman Kevin McGrail said he is looking into the feasibility of turning a patch of land along Gator Slough just east of Burnt Store Road into an open air reservoir and another across the street into a filter marsh.

The reservoir site is on 652 acres of land acquired by the city in April. It would be used to supplement Cape Coral's irrigation water supply. It could also be used to curtail salinity levels in the mangroves west of the proposed site.

The proposed filter marsh would stop excess nutrients from being deposited in the mangroves along the north spreader canal system.

The plan would be partially funded by selling the dirt removed to create the wa-

ter body to the nearby Pine Island Road and Burnt Store Road expansion projects, both scheduled in the next few years.

McGrail said engineering for the marsh could be funded by a mix of South Florida Water Management District and Lee County funds from the Conservation 20/20 program.

South Florida Water Management District spokesman Randy Smith said the district has established over 50,000 acres of marshes that have been very successful.

County Commissioner Frank Mann noted that the concept is a good one and is certainly consistent with what the county has looked at before.

More study needed on Lake O back-pumping. The governing board of the South Florida Water Management District took a look at a proposal to back-pump wa-

ter into Lake Okeechobee at an early August meeting, but has since asked staff for more research and science on the concept.

The proposal raised strong opposition from environmental advocacy groups including the Sanibel Captiva Conservation Federation. Their natural resource policy director, Rae Ann Wessel, has voiced concerns on the affects of back-pumping on the Caloosahatchee River and accompanying estuaries.

The practice of back-pumping water into the lake generated lawsuits a few years ago prompting the South Florida district to impose a ban on it in 2007. The idea of restoring the practice was an option that would help to maintain higher water levels in Lake Okeechobee.

According to the district, the idea under consideration would have permitted back-pumping, but at much lower levels than those outlawed in 2007.

Wessel said the issue goes to the heart of water allocations between natural systems and permitted users—an issue affecting the entire state.

She noted that the action was stopped when agricultural interests began using Lake Okeechobee as their reservoir—pumping water in and then withdrawing it as needed for irrigation. Those protesting such use of the lake contend they should build a reservoir on their own property and not use the lake.

Airport okays stormwater system. The Northwest Florida Beaches International Airport Board has approved a plan to finance a \$3.8 million stormwater improvement project at the two-year-old facility.

The package, approved in late July, also included paying a \$24,000 fine for violations and taking eight corrective actions to improve the stormwater system.

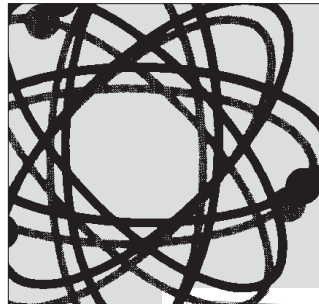
Executive Director John Wheat said he was hopeful that all remaining issues will be taken care of by early summer, 2013.

The improvement plan includes construction of a new pond to correct discharge water problems and restore a more natural flow to the system. The plan also calls for creating secondary treatment of all water on airport property to help clean up environmental problems.

The bulk of the funding, about \$2 million, would come from a yet-to-be-approved Federal Aviation Administration grant. The remaining funds would come from the airport's operating budget.

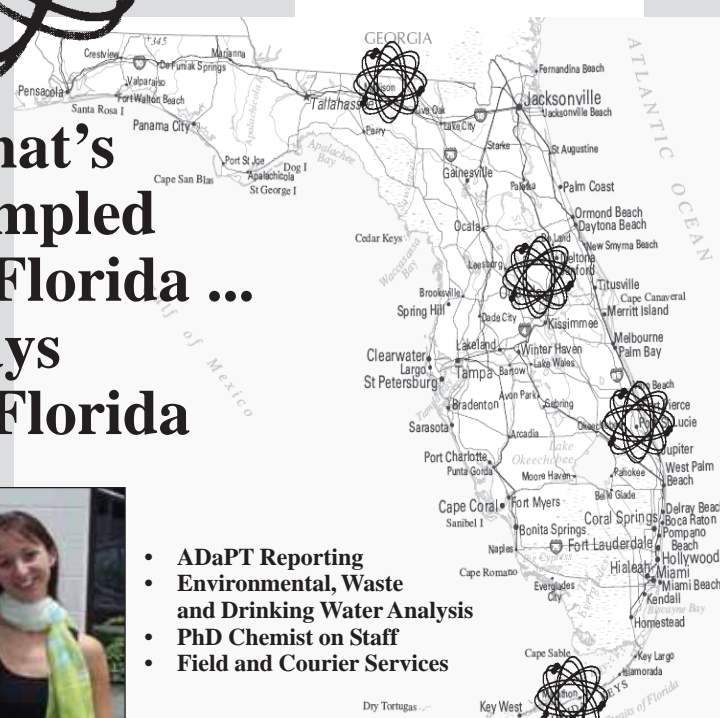
Wheat said that if the FAA grant does not come through, the project could be delayed for up to a year. The agency was scheduled to award a bid in early August with completion set for March, 2013.

Melbourne to demolish two water tanks. The city of Melbourne will demolish two elevated water tanks because they




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WATCH
Continued on Page 5

UF research: Pesticide residues impacting female alligator fertility

By ROY LAUGHLIN

A University of Florida researcher recently published his doctoral research showing a mechanistic link between exposure to relic agricultural chemicals in Lake Apopka muck and substantial reductions in female alligator fertility. Substantially reduced genetic expression to produce a critical enzyme in estrogen hormone synthesis is the mechanism of action.

WATCH

From Page 4

are no longer needed for the distribution of drinking water to customers.

The tanks located on Palm Avenue in Indian River and near Oak Street in Melbourne have been used for decades to provide storage and maintain pressure.

Ralph Reigelsperger, the city's public works and utilities director, said they have added ground storage tanks and booster pumps to enhance the water distribution system. As a result, he said, the elevated storage tanks are obsolete.

FGUA adds two systems. Two water and wastewater utilities in Land O'Lakes and Lutz have been purchased by Florida Governmental Utility Authority for \$14 million.

The two systems, Mad Hatter Utilities Inc. and Paradise Lakes LLC Systems, serve 3,500 customers.

Mad Hatter owners were originally asking \$35 million, but as negotiations moved slowly over the last four years, the lower figure was agreed to.

FGUA said they will begin several service projects immediately and will increase opportunities for customer involvement. An FGUA consumer ombudsman is already in place to address customer concerns.

According to FGUA, they plan \$3.4 million in system improvements over the next five years.

Carrabelle not buying. A proposal for the city of Carrabelle to purchase the water company serving St. George Island is all but dead after the city cancelled a public hearing set for late July.

The hearing would have been the first step toward Carrabelle applying for a \$15 million loan from the Florida Department of Environmental Protection to fund the purchase.

Water Management Services operates the water company on the island.

The idea of the Carrabelle purchase raised concerns from some St. George Island residents.

WMS is a privately operated company so the rates they charge are regulated by the Public Service Commission. If Carrabelle operated their water system, the PSC would have no power to regulate rates.

Had the plan to seek funds from the DEP moved forward, both the Franklin County Commission and island residents were prepared to ask the DEP to temporarily suspend the application.

In recent months, WMS had requested a rate increase of over 54 percent, but PSC staff returned a recommendation on July 20 for a two-step rate increase of 10.18 percent in the first phase and 24.1 percent in the second.

NFWFMD monitoring to continue. The Northwest Florida Water Management District's Governing Board voted to continue to fund its Integrated Water Resources Monitoring Program.

The board took the action to maintain the program that has operated since the 1980s. District scientists monitor water quality in the 16 counties of the Northwest Florida WMD checking on conditions in the aquifers, streams, rivers, ponds and lakes.

Guy Gowens, director of the Division of Resource Management, said scientists have established ground and surface water sites across the district that have produced a significant water quality assessment tool.

District Executive Director Jon Stever-

Professor Brandon Moore showed that female alligator hatchlings from eggs collected at Lake Apopka showed substantially less response to the follicle-stimulating hormone FSH than did alligator hatchlings collected from a control lake, Lake Woodruff, near Gainesville.

This research is a significant advance because it has a molecular endpoint to characterize effects of contaminants. FSH acts by initiating biosynthesis of the enzyme aromatase, which converts androgens to

estrogens. This is the normal metabolic conversion pathway important for orchestrating female fertility in all vertebrates.

Withlacoochee water authority has new director. Richard Owen, a former official with the Southwest Florida Water Management District, has been named executive director of the Withlacoochee Regional Water Supply Authority.

Owen was named to the position on July 1 replacing Jack Sullivan who retired after directing the authority for 30 years.

The Withlacoochee Authority serves water needs in Citrus, Hernando, Marion and Sumter counties.

Edgar named division director at NFWFMD. Michael Edgar, a Tallahassee business executive and environmental scientist with over 30 years of experience, has been named division director of resource regulation for the Northwest Florida Water Management District.

Edgar is experienced in water resource permitting and regulatory compliance, water supply and wastewater treatment, ecosystem restoration and contaminated site remediation.

He also brings award-winning expertise in design, permitting and construction of industrial water supply and wastewater treatment systems.

He replaces Guy Gowens who has moved to director of the district's Division of Resource Management.

Stormwater award. The city of Pensacola's Admiral Mason Park, which opened last fall, won a Florida Stormwater Association project excellence award for 2012.

The park underwent a \$1.5-million renovation involving the addition of a 2.35-acre pond, two fountains, walkways and benches, plus landscaping additions of live oak trees, magnolias, crepe myrtles and sable palms.

The pond serves as a stormwater treatment facility for about 31 acres in downtown Pensacola.

estrogens. This is the normal metabolic conversion pathway important for orchestrating female fertility in all vertebrates.

Moore described the effect of FSH as "revving up" the metabolism of the female alligators towards producing eggs through the direct influence of estrogens. For Lake Apopka hatchlings, the system is broken.

Female hatchlings from Lake Apopka do not respond to FSH by increasing estrogen biosynthesis, a lack that directly translates to lower fertility. Research observations and their interpretation seems to go a long way toward explaining why alligators in Lake Apopka show such drastic fertility declines compared to alligators in less contaminated habitats.

Moore and his colleagues have focused on steroid hormones because "the same signaling hormones exist in all vertebrates." Enzyme-mediated metabolic pathways that produce androgenic and estrogenic steroids are very similar if not largely identical in all vertebrates, he said.

In the case of alligators, the enzyme aromatase displays much lower activity in Lake Apopka alligators compared to those from Lake Woodruff. Absent stimulation by endogenous estrogens, alligator egg production declines.

Moore said that it's not practical to study adult alligators in experiments like

these. But hatchling alligators have characteristics that make them very useful. Female gators' ovarian follicles go through a differentiation within the first five months after hatching, unlike those of many mammals including humans, which go through that portion of development in utero.

The experiments done with alligators involving FSH induction occurred just at the completion of follicle differentiation but before other environmental influences might have had a chance to further modify their response to FSH.

This research is part of the growing field of epigenetics: the study of how environmental and other influences affect gene function. In alligators, agricultural chemical exposure specifically reduced the activity of an enzyme, leading to a persistent if not permanent fertility reduction due to lowered genetic capability to initiate biosynthesis of a specific enzyme.

The researchers also noted a phenomenon seen in other early life history studies: alligator hatchlings from Lake Apopka were much smaller than those from Lake Woodruff, the control site. Nevertheless, Lake Apopka animals made up for slower growth during embryonic development, by growing faster as hatchlings. This phenomenon, hormesis, is often observed in early life history exposures to xenobiotics.

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2012 Conference Agenda



Thursday, October 11, 2012

9:00 **Keynote Address from the Conference Chair**
Nick Albergo, PE, DEE, President/CEO
HSA Engineers & Scientists, Tampa

9:30 **Session 1A: Enhancing Anaerobic Bioremediation of Chlorinated Ethenes in Low-pH Aquifers**
Brad Elkins, MS, Technical Support Manager, EOS Remediation LLC, Raleigh, NC
Aquifer pH has an enormous impact on enhanced reductive dechlorination of chlorinated ethenes, cVOCs. Dechlorinating bacteria that reduce parent cVOCs, such as PCE and TCE, to ethene are sensitive to pH, exhibiting significantly reduced degradation rates at pH less than 6. At many field sites, however, aquifer pH is naturally acidic and base addition is required to generate optimal pH conditions for cVOC dechlorination. Increasing aquifer pH for in-situ bioremediation can be a challenging task. Commonly used strong bases, including NaOH and KOH, can result in excessively high pH if not closely controlled. Weaker, easier-to-use bases, such as Na₂CO₃ and NaHCO₃, offer relatively low alkalinity/pound, necessitating large quantities to overcome the natural soil acidity while adding large amounts of sodium to the aquifer. Alternatively, Mg(OH)₂ is safe to work with, provides greater alkalinity/pound, and serves as a long-term buffer since it is less soluble and slowly dissolves over time. Despite these benefits, distribution of an aqueous Mg(OH)₂ suspension in-situ can be complicated by attractive forces between the positively-charged Mg(OH)₂ particles and the negatively-charged aquifer sediments. A recently developed colloidal Mg(OH)₂ formulation, CoBupH-Mg, has a negative surface charge designed to increase distribution. Laboratory column tests demonstrated excellent transport of CoBupH-Mg through aquifer sand. After three pore volumes, only 18 percent of the injected Mg(OH)₂ was retained within the column and no significant permeability loss was observed, suggesting that large volumes of this suspension can be distributed away from an injection point without clogging the aquifer. This presentation will illustrate the effectiveness of Mg(OH)₂ in adjusting aquifer pH, the laboratory results from CoBupH-Mg column experiments, and geochemical modeling demonstrating its potential for extended longevity.

10:00 **Session 1B: Alternatives for Successful Bioremediation at Low pH**
Jeff Roberts, MS, Laboratory Manager, SiREM, Guelph, Ontario, Canada
Bioremediation of chlorinated compounds is optimal in the neutral pH range of 6.8 to 7.5. Below pH 6.0 complete biodegradation of chlorinated ethenes to ethene can be difficult to achieve. Many sites in the Southeast U.S., including Florida, Georgia, South Carolina and North Carolina, have natural groundwater pH commonly below 6.0. This, combined with acid generation from reductive dechlorination and fermentation of many electron donors, can make bioremediation challenging at some sites in the Southeast. In recent years, modifying aquifer pH using buffering agents such as sodium bicarbonate and commercial buffer formulations has become increasingly common at low pH sites. Aquifer pH modification has been met with varying degrees of success depending on application method, site geology and geochemistry, but is generally considered challenging. Effective alternatives would be welcome. In certain cases, especially where pH is near or slightly below 6.0, the use of bioaugmentation cultures acclimated to lower pH could reduce the need for aquifer neutralization. There is increasing evidence that complete dechlorination to ethene is possible below pH 6.0 with pH tolerant bioaugmentation cultures, including a low pH acclimated version of KB-1®. The challenges associated with pH modification and the use of low pH acclimated cultures will be highlighted using case studies from sites in Florida and around the Southeast.

10:30 **Break**

11:00 **Session 2A: DNAPL Identification, Characterization and Mapping Techniques**
Cal Butler, PG, Senior Geologist, Black & Veatch Special Projects Corp., Tampa
Historically, DNAPL source regions have gone undelineated for a couple of reasons. First, the bulk of borings/wells on any particular site were installed downgradient to identify and contour the low-level leading MCL edge of the dissolved fraction of the plume. Consequently, only a handful of borings/wells were advanced in or near the source zone, frequently missing the "mother lode" altogether. Second was the valid fear that drilling through the source zone would cause more damage than good because of vertical migration of the plume. Currently, regulators and other stakeholders understand the importance of source area delineation, and careful drilling techniques with experienced field personnel limit the probability of conduit formation and contaminant drag-down. The identification, delineation and characterization of DNAPL on sites impacted by SVOCs or VOCs are essential for the accurate portrayal of the conceptual site model. The degree of DNAPL contamination can be subdivided into zones of either residual or mobile NAPL depending on whether there is enough liquid in the pore space to coalesce/coagulate to promote further migration. Movement or pooling of NAPL relies heavily on the geotechnical properties of soil, and the physical properties of the NAPL. In this presentation, four creosote and coal tar DNAPL sites in Florida are examined with field tests and observations that assist in the recognition of soil horizons of residual versus pooled NAPL. Downhole High Resolution Site Characterization techniques including laser-induced fluorescence and geophysical plume mapping are also discussed as invaluable tools for preliminary NAPL delineation.

11:20 **Session 2B: Using the MiHPT to Characterize a Solvent Plume**
Brad Carlson, Manager, Direct Sensing, ZEBRA Environmental Corp. Tampa
The MiHPT system utilizes the dynamic sampling approach of real-time field measurements to determine a range of contaminant concentrations, the degree of heterogeneity and spatial correlation for contaminant distributions and movement. Real-time screening does not replace laboratory analysis with its high degree of certainty. Rather, combining real-time field measurements and laboratory analysis supports risk characterization, risk-based cleanup negotiation, remedy selection and protective site reuse strategies. One benefit of the MiHPT system is to expeditiously reduce site characterization uncertainty to promote effective remedial solutions. Real time field measurement using the Membrane Interface Probe includes three screening sensors; however, chemical speciation and actual concentrations are not achieved by these detectors. Selected confirmation sampling is necessary at critical locations to determine contaminant nature and extent with a high degree of certainty. MiHPT results can be evaluated daily to optimize and reduce laboratory-analyzed sample collection needed to identify the spatial contaminant distribution. Therefore, utilizing MiHPT in a dynamic sampling strategy, a critical element of MiHPT system, combined with the proper placement of confirmatory samples can significantly reduce the overall project cost and expedite site remediation. The objective of this presentation is to demonstrate the use of the MiHPT System to streamline and optimize remedial decision making.

11:40 **Session 2C: Application of High Resolution Characterization and Three-Dimensional Imagery to Develop an Effective Conceptual Site Model**
Jill Johnson, PG, Senior Hydrogeologist
Geosyntec Consultants, Pensacola
A case study from work performed at a Kennedy Space Center site highlights how high-resolution sampling techniques for source characterization combined with three-dimensional modeling is critical to the development of an effective conceptual site model that will ultimately affect site cleanup costs and timeframes. At this NASA KSC site, a RCRA facility investigation conducted by a previous consultant delineated a CVOC plume to meet regulatory requirements. A limited CVOC plume was identified on-site, consisting primarily of cis-1,2-dichloroethene and vinyl chloride. Parent compounds were not identified or were detected at very low levels, and the assessment was concluded without identification of a source area. In 2008, Geosyntec recommended supplemental assessment due to consistently elevated concentrations of cDCE in a long-term monitoring well at the site. Supplemental assessment activities included high frequency, discrete interval direct push technology groundwater sampling and a membrane interface probe investigation. During these activities, a source area with TCE concentrations up to 160,000 µg/L and dissolved plumes extending off-site were identified. In the source area, DPT locations were as close as 10 to 15 feet apart and in some areas, the TCE source area is less than 20 feet wide. The high resolution dataset was used for detailed 3-D modeling to develop an effective CSM to support follow-up remediation. This case study demonstrates that while meeting regulatory requirements and understanding the distribution of a dissolved plume is important, remedial success and cost ultimately hinge on understanding the location and architecture of the source area.

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12:00 Day One Luncheon

Shale Gas Initiatives in the U.S.

Chuck Whisman, PE, Chief Technical Officer
Groundwater & Environmental Services Inc.
Exton, PA

U.S. shale gas production has grown rapidly in recent years as the natural gas industry has improved drilling and extraction methods, creating significant opportunities for many business sectors across the country and reshaping our nation's energy outlook. U.S shale gas production is projected to increase from 23 percent of total U.S. gas production in 2010 to 49 percent by 2035. Total output from shale formations in the continental U.S. averaged 25.58 billion cubic feet a day in May 2012, an increase of 24 percent from May 2011. In addition to the environmental benefits associated with increased natural gas usage, the economic benefits of this development are resonating throughout the nation through more affordable energy resources, low natural gas and NGL prices, significant job creation, large transportation and infrastructure projects—pipeline, storage, shipping, rail and more—and significant growth in the petrochemical industry including providing lower-cost feedstock to the Gulf region. According to a recent economic analysis, the natural gas industry invested more than \$12 billion in Pennsylvania alone in 2011 while supporting more than 200,000 jobs across the region through the develop of the Marcellus Shale. Other U.S. states are feeling a similar natural gas and NGL exploration and production boom, including Texas, Oklahoma, North Dakota, South Dakota, Wyoming, Ohio, Colorado and West Virginia. This discussion will provide an overview of the shale gas boom in the U.S. and how it will increasingly impact businesses and the economy throughout the country for many years to come.

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1:30 Session 3A: Surfactant-Enhanced Groundwater Extraction for Expedited Remediation

David Sheehan, PE, Senior Engineer, and Lydia Ross, EIT, Engineering Supervisor
Groundwater & Environmental Services, Inc., Ft. Lauderdale

A surfactant-enhanced groundwater extraction event was performed to address persistent residual BTEX concentrations above GCTLs and benzene concentrations above NADCs in groundwater in the area of an active tank field at a retail gasoline station in Miami. No discernible decrease in concentrations was observed during several years of natural attenuation monitoring. Given the relatively low amount of residual mass at the site and the proximity of an active tank system, a one-time surfactant-enhanced groundwater extraction event was proposed as a more sustainable and shorter-duration remedy than a traditional system installation. A non-ionic, biodegradable, non-toxic surfactant was selected for this application. A product submittal application was submitted to the Miami-Dade County Department of Environmental Resource Management and an underground injection control permit was applied for and received prior to application. Approximately 5,000 gallons of groundwater were pumped out of the tank field and replaced with 5,000 gallons of surfactant solution that was left in the ground overnight. On the following day, 5,000 gallons of surfactant solution and groundwater were recovered. Groundwater samples were collected from surrounding monitoring wells before and after the event to confirm the recovery of the surfactant solution. Due to detailed, specific sampling parameters required, including all contaminants, chemical components and possible by-products, three separate laboratories in three different states were contracted to perform the analyses. The surfactant-enhanced groundwater extraction event was performed in August 2010. As of February 2012, all BTEX compounds were below GCTLs and residual octylphenols, a surfactant by-product, continue to decrease to pre-injection baseline levels.

2:00 Session 3B: Coupling Polymer Flooding with Bioremediation for Enhancing the Distribution of Biological Amendments and Microorganisms

Sean Davenport, Environmental Research Chemist
Carus Remediation Technologies, LaSalle, IL

In-situ bioremediation has been successfully used to remediate a variety of organic contaminants worldwide. The application of organic substrates and/or microorganisms for the detoxification of emerging and recalcitrant compounds shows great promise for ensuring successful and complete remediation of contaminated sites. The coupling of shear-thinning polymer floods, such as xanthan polymer, with traditional in-situ remediation technologies has shown great promise in improving the distribution of amendments in heterogeneous subsurface systems. Several microcosm experiments were performed to elucidate the timing and extent of xanthan polymer degradation in subsurface soils. During the course of the experiment, changes in solution properties, including viscosity and reducing sugar concentrations, were used to determine the rate of polymer degradation in two different aquifer soil samples. Additionally, the potential for degradation of the xanthan polymer to provide a source of carbon to facilitate reductive dechlorination was examined. Finally, the coupling of shear-thinning polymers with bioaugmentation shows promise for enhancing microbial transport and distribution in heterogeneous aquifers. Dual-permeability, 2-D tanks were used to demonstrate the transport of dehalococoides cultures using both polymer and artificial groundwater as a carrier solution. The results of the microcosm and 2-D tank experiments will be presented.

2:30 Break

3:00 Session 4A: Laboratory and Field Evaluation of a Novel Liquid Amendment Containing Lecithin and Ferrous Iron

Patrick Hicks, Technical Sales Manager, SE Territory, FMC Environmental Solutions, Philadelphia, PA

This presentation focuses on the results of long-term laboratory evaluation of a recently developed reagent for anaerobic remediation of chlorinated hydrocarbons and redox-reactive metals. The reagent is a buffered micro-emulsion of slow-release, food-grade carbon lecithin, ferrous iron and a redox buffer. Results from the initial bench-scale evaluation shows how the product formula was developed and what the role of each component is with respect to microbial and abiotic pathways of reductive dechlorination. Subsequent product testing was designed to evaluate long-term effectiveness using contaminated site groundwater. In addition, an overview of the status of ongoing field pilot evaluations will be provided. Flow-through column tests were used for all laboratory evaluations. The procedure included packing the columns with site aquifer material that was either unamended or amended with the evaluated reagents. The flow rate corresponded to a residence time of five days within column beds. All columns received site groundwater containing TCE and cDCE. The columns were evaluated under natural conditions and after bioaugmentation using a commercial dehalococoides inoculum. The columns have been operated for 14 months and monitored data included concentrations of TCE and its breakdown products, TOC, pH, ORP and inorganic parameters. Average TCE and cDCE concentrations in the influent were at about 5,000 and 600 µg/L, respectively over the test period. No TCE breakthrough was observed in the amended column from the initial sampling event at 14 days after initiation. A cDCE concentration increase to a value of ca. 5,000 µg/L was observed in the amended column effluent after about 40 days of flow. This intermittent cDCE peak corresponded to a direct conversion of TCE to cDCE. Complete treatment of cDCE was observed after about 75 days of flow, which was accompanied by VC generation at values ranging from about 500 to 1,600 µg/L. The amount of VC generated in the amended column corresponded to molar conversion of between 20 percent and 60 percent of influent TCE plus cDCE. After about 175 days of flow, the amended column was bioaugmented by an inoculum. Subsequently, complete degradation of the influent chlorinated ethenes was observed in the effluent of the amended column. Dissolved organic carbon was generated within the amended column from carbon fermentation, as expressed by a substantial increase in total organic carbon in the column effluent. TOC concentrations of about 950 mg/L were observed in the amended column effluent within the initial 30 days of flow. Subsequently, the TOC levels decreased to a steady-state concentration of about 10 mg/L above the influent value after about 120 days of flow. This TOC level was maintained in the remainder of the test period. Comparing the amount of carbon in the amendment added to the column to that cumulatively released as TOC over the test period, about 30 percent of the added carbon mass was retained within the column bed after about 400 days of flow. Since complete degradation was observed in the amended column in the latter part of the test when the effluent TOC levels were relatively low, it appears that the slow release components of the amendment retained within the column bed were sufficient to sustain microbial and abiotic processes that provided complete treatment of influent TCE and cDCE.

3:30 Session 4B: Biogeochemical Iron Reduction for Dechlorination of Chlorinated Solvent Plumes- Status of Practice Shift from Biotic to Abiotic Degradation Pathways

James Studer, MS, PE, Managing Principal, InfraSUR LLC, Albuquerque, NM

With respect to the remediation of subsurface plumes containing chlorinated aliphatic hydrocarbons such as PCE, TCE and TCA, a popular approach to in-situ treatment is biological reductive dehalogenation. However, abiotic reductive dehalogenation, is gaining ground with variations based on zero-valent iron or hybrids with biotic pathways being perhaps the most popular at this time. A ferrous monosulfide-based approach has been under development for the last decade and is now set to enter the remediation professionals practice as a highly attractive technology option. This new approach is referred to as biogeochemical reductive dechlorination, or BiRD. It has been shown in multiple government-sponsored demonstrations to achieve desirable technology and economic performance metrics relative to biological and ZVI approaches. BiRD is currently being tested and implemented at commercial scale in Florida. BiRD is an engineering process based on amplification of naturally

occurring biogeochemical and geochemical reactions where solid-phase iron sulfide minerals are generated in-situ and en masse as a permeable reactive barrier. Discriminating benefits of BiRD include: rapid degradation of a wide range of chlorinated compounds; no production of undesirable transformation products cis-1, 2 DCE and vinyl chloride and therefore avoidance of accumulation of these products; and greatly reduced conversion of carbon to methane. BiRD is a highly robust process that can be reliably implemented using low-cost treatment materials and trench-based or direct injection tactics. The presentation will describe the salient features of the spectrum of treatment technologies ranging from biological to biological-abiotic, a ZVI-based hybrid, to strict abiotic and will introduce the BiRD technology. A case study involving the side-by-side demonstration of biological dehalogenation and BiRD will be presented to illustrate the differences and similarities between the technologies and the features and benefits of BiRD.

4:00 Session 4C: Evaluating Organic Substrates as Soluble DVI Transport Mechanisms

Donovan Smith, PE, President, JRW Bioremediation LLC, Lenexa, KS

In-situ biologically enhanced reductive dechlorination and chemical reduction have developed as parallel technologies for the remediation of chlorinated solvents for more than a decade. More recent advances in remedial design have attempted to take advantage of the benefits of both processes by combining organics with

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either zero valent iron, ZVI, or dual valent iron, DVI, in order to promote both abiotic and biotic contaminant degradation. These systems benefit from a positive interaction between the abiotic and biotic components. Benefits include maximizing abiotic degradation rates by keeping the iron surfaces reduced by providing electrons as a result of substrate fermentation, soluble iron reduction and direct iron reducing bacterial activity. Most of these combinations have relied on suspending the iron particles in solution or as part of an emulsion system to increase distribution. Because the approach has been centered on the suspension of solid ZVI and DVI particles, distribution through low permeability systems remains problematic. The problem may potentially be solved by broadly dispersing a mixture of soluble DVI within an organic to promote distribution throughout the aquifer. To evaluate the performance of soluble DVI compounds in various highly mobile organic substrates, JRW performed a series of microcosm studies to demonstrate the viability of the process and identify the possible biotic and abiotic mechanisms. The study was conducted by introducing mixtures of various DVI compounds and organic substrates into biologically active systems containing trichloroethene and then monitoring the changes over time. This presentation presents the results and discusses field application implications.

4:30 Session 4D: **In-Situ Chemical Reduction of Removal of Kepone and Other Pesticides**
Jim Mueller, PhD, FMC Environmental Solutions, Freeport, IL
The global use of organochlorine pesticides, such as Lindane, DDT, Dieldrin, Kepone, Chlordane and Toxaphene has resulted in long-term soil impacts at many sites. Given the potential risks to human health and the environment, some OCP-impacted sites require treatment. One example is the use of the insecticide Kepone on banana plantations until the late nineties in the French West Indies, which has resulted in the contamination of drinking water supplies; bans on vegetables, fish and sea food consumption and commercialization; and

increased occurrence of prostate cancer. As in many other cases, the dig-and-dump approach is not practical here due to the magnitude of the problem, access issues and resource constraints. Alternatively, bioremediation may potentially be used to treat the soils on site, often at lower costs and certainly in a more sustainable manner. Unfortunately, most OCPs, notably kepone, are not amenable to conventional bioremediation technologies. In-situ chemical reduction entails the combined effects of stimulated biological oxygen consumption and direct chemical reduction with reduced metals, leading to enhanced decomposition reactions that are realized at the lowered redox conditions. To facilitate ISCR conditions, DARAMEND® amendments combine controlled release carbon with a reduced metal, such as zero-valent iron or zinc, to stimulate the degradation of persistent organic compounds without accumulation of catabolic intermediates. Most soils can be effectively treated in a reasonable time frame using standard agricultural machinery at a price typically less than U.S. \$20 per tonne of soil treated. In the present work, ISCR with Daramend was applied on the three major soil types of the French West Indies in studies under controlled conditions and with detailed physicochemical and microbiological monitoring. The presentation will summarize the ISCR approach followed by results from technology validation tests for remediation of kepone impacted soils from banana fields. Mesocosm studies conducted with site soils demonstrated a 90 percent decrease in kepone concentration for the nitisoi, 88 percent for the ferralsol and 47 percent for the andosol, with significant fluctuations over time in the control and treated soils. Unexpected buffering capacity of the redox potential was observed in the tropical soils, particularly in the andosol. Dechlorinated transformation products were observed and subsequently identified, and significant changes in the structure and activities of the bacterial communities of the three soils were also observed. A tentative degradation pathway for Kepone can therefore be suggested. Additional data will be presented on ecotoxicity and bioaccumulation studies.

5:00 **FRC Reception at Caribe**

7:00 **SWS Environmental Services / Specifier Night at City Walk**



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Day 2
Friday, October 12, 2012

9:00 Session 5A: **Oxidation or Reduction – Some Thoughts on the Big Picture**
Jim Mueller, PhD, FMC Environmental Solutions, Freeport, IL
Many compounds can be degraded via oxidative or reductive processes. Various in-situ chemical oxidation technologies using oxidizing agents such as hydrogen peroxide, permanganate, ozone and activated persulfate have been used to remediate impacted environments. Each of these oxidants and their activators offer unique features, and they can be very effective on a broad range of more oxidized/chlorinated hydrocarbons to more reduced/petroleum hydrocarbons. ISCR approaches using a combination of zero-valent iron and controlled release carbon generate environmental conditions that can facilitate the chemical reduction of oxidized/chlorinated hydrocarbons and other contaminants. Many factors may need to be considered when making a selection between an ISCO and an ISCR approach for a specific site. These may include the following, which will be discussed as part of this presentation: targeted treatment area; source removal, plume control or both; contaminant characteristics, concentrations and goals; presence of free product or product residuals; desired clean-up time; aquifer geochemistry - aerobic to anaerobic; soil oxidant demand; hydrogeology and groundwater flow velocity; application method: soil blending, direct injection, injection through wells, etc.

9:30 Session 5B: **The Evolution of Innovative Technologies for Soil and Groundwater Remediation**
John Haselow, PhD, PE, President
Redox Tech LLC, Cary, NC
Over the past 17 years, Redox Tech has implemented over 900 turn-key in-situ soil and groundwater remediation projects mainly using chemical oxidation and reduction, as well as aerobic and anaerobic bioremediation. During the period, a number of technologies have evolved and matured in the marketplace. A large number of technologies were never accepted by the marketplace for varying reasons. In its early stages, chemical oxidation mainly involved high strength hydrogen peroxide, ozone or permanganate. Hydrogen peroxide chemistry and its implementation have improved dramatically over the past years. Ozone remains relatively the same with the exception of improvements in the ozone generation systems. Permanganate has remained relatively unchanged with the exception with some new delivery techniques. More recently, persulfate emerged as another viable peroxygen for remediation. Both anaerobic and aerobic bioremediation have matured and the chemicals that are used for their implementation have essentially become commodities. The combination of zero-valent iron with anaerobic bioremediation has allowed reductive technologies to compete with oxidation technologies in terms of timeframes for remediation. For Redox Tech, this has meant that chemical reduction combined with anaerobic bioremediation has largely supplanted chemical oxidation for chlorinated alkene remediation. Also, anaerobic oxidation via sulfate reduction is being more commonly applied for petroleum hydrocarbon remediation versus other electron acceptors. This presentation will provide a perspective on the evolution of these technologies based upon field implementation experience. Also, a brief overview of some emerging technologies for soil and groundwater remediation will be presented.

10:00 *Break*

10:30 Session 6A: **Ozone and Hydrogen Peroxide Injection for Dissolved-Phase PAH and Creosote DNAPL Impacts**
Ernest Mott-Smith, PE, Remedial Practice Leader, Federal Services, Black & Veatch Special Projects Corp., Tampa and Tracy Deal, PE, Principal Engineer, Groundwater & Environmental Services Inc. Exton, PA
This presentation discusses in-situ chemical oxidation remediation implemented at U.S. EPA Region 4's Brunswick Wood Preserving site in Brunswick, GA. The site is a former wood preserving facility where creosote, pentachlorophenol and copper chromium arsenate were used. The subsurface is impacted with both dense non-aqueous phase liquid and dissolved-phase and adsorbed-phase constituents of concern. Primary COCs consist of PAHs such as naphthalene, PCP and semi-volatile organic compounds. ISCO bench testing was conducted to determine the proper dosing of ozone and hydrogen peroxide to treat the COCs located within the extended plume. A field pilot test was subsequently performed at the site which consisted of GES' patented HypeAir-EX chemical oxidation system that utilizes ozone, oxygen, atmospheric air and hydrogen. Based on the success of the field pilot study, ISCO via ozone and hydrogen peroxide injection was selected to address the extended dissolved-phase plume beyond the subsurface barrier walls. The HypeAir-EX ISCO system includes an 80 pound/day ozone unit, hydrogen peroxide injection system and an injection well network that includes 74 injection wells covering target aquifer zones ranging between 10 to 55 feet below ground surface. The ISCO system began operation in late July 2011. The presentation will cover the ISCO system design, operation and overall effectiveness of the remediation over 12 months of Hype-Air-EX system operation. Key design considerations for system installation will also be discussed, considering the vast injection well network in the vicinity of numerous underground utility structures and site encumbrances.



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11:00 Session 6B: **In-Situ Soil Blending with Activated Persulfate**
Barry Rudd, President
EXO TECH Inc., Monroe, GA
EXO TECH recently performed an innovative in-situ soil blending treatment at a brownfield site developed by the city of Cullman, GA. The site was formerly used by a drum manufacturer and contained a mixture of chlorinated solvent VOCs and petroleum VOCs in the vadose zone soils and shallow groundwater. EXO TECH worked with Jymalyn Redmond of Goodwyn, Mills, & Cawood, nationally known for her advances in phyto-remediation. GMC performed an assessment which identified a 4,500-square-foot source area contaminated from approximately two to 12 feet with a maximum of 180 parts per million of trichloroethene, 6.6 ppm of cis-1,2-dichloroethene and lesser concentrations of vinyl chloride, tetrachloroethene, xylenes, ethylbenzene and related VOCs. Impacted soils were identified as silty-clay loam underlain by clay and weathered shale bedrock. Dissolved TCE and DCE were identified above the shallow shale bedrock at concentrations of 49,000 parts per billion and 17,000 ppb, respectively. In December 2011 and January 2012, EXO TECH treated approximately 1,500 tons of impacted soils in-place. Due to the high clay content in the soil matrix, additional lime was utilized for soil conditioning prior to oxidant blending. The results of confirmatory sampling indicate VOC concentrations were reduced to non-detect levels above and below the water table. No Further Action is pending regulatory review.

11:30 Session 6C: **Disinfection, Pharmaceutical, VOC and PFC Removal with Coated Nanobubble Ozone**
William Kerfoot, President
Kerfoot Technologies Inc. Mashpee, MA
The creation of peroxide-coated, low-micron to nanobubble size ozone increases the effectiveness of disinfection, pharmaceutical, and volatile organic compound removal over traditional dissolved ozone

FRC
Continued on Page 15

Partnership study looks into integrated agricultural techniques

By ROY LAUGHLIN

Migration of agricultural operations from areas south of Interstate 4 to areas further north is one of the most significant changes in Florida land use during the last 15 years.

It may not be on the radar of most Floridians, but officials with the Suwannee River Water Management District have not missed the increase in agricultural activity within their district. Most of the district's rural lands were once forested. Now, crop and cattle production are on the rise.

Cattle activities include both dairy and beef production, but in either case, concentrated animal feeding operations are now a part of the agricultural landscape. Many cattle farms are highly integrated, producing crops and forage to feed the cattle.

One integrated operation, Suwannee Farms, has been the subject of a three-year study to determine best management practices for a farm involved with winter vegetable production, forage production and calf production. In addition to winter vegetables, Suwannee Farms produces much of its own forage for calf production, primarily grain and soy.

In the current study, manure spreading and irrigation are being closely scrutinized to determine best management practices for maximizing forage production, conserving irrigation water and preventing leaching of nutrients into groundwater.

Manure treatment begins with a large fermenter that produces methane that is fed directly into generators on the farm to produce electricity.

SRWMD's Suwannee Partnership Coordinator Hugh Thomas said that simply spreading biosolids on land as a nutrient source has its limits because aluminum sulfate is used to stabilize biosolids during treatment.

"The stabilization treatment with alum will skew pH. You have to be careful and continually check soil pH," said Thomas.

Fermentation reduces the amount of organic carbon in the fermenter output, but leaves both nitrogen and phosphorus. At the end of the process, a manageable

amount of effluent is applied to fields as an organic fertilizer that does not make the soil too alkaline.

The study also focuses on the nutrient dynamics of nitrogen and phosphorus applied to the forage crop in any form, including chemical fertilizers, some of which still must be applied even if biosolids are also spread.

Thomas noted that in South Florida, nutrient loss from agricultural land is surface-flow driven. When land floods, then drains, nutrients flow with the runoff. Whereas in North Florida, nutrient flux is groundwater driven, he said.

Thomas explained that in the Suwannee River Basin, if you don't get movement of soil, phosphorus binds and remains for crops to take up. In groundwater flow systems, nitrates that leach through sandy surface soils to groundwater are the biggest problem, in contrast to phosphorus in surface waters in South Florida.

The study is showing that organic nitrogen from treated biosolids is retained for the long term and is available to crops. "There is little or no leaching from applying organic nutrients," he said.

Suwannee Farms is managed by Kenneth Hall and his son, one of the three partners in this research collaboration. Hall said the research effort has provided insights to better manage resources.

"It's an opportunity to utilize a waste stream with sustainable methods," he said.

Hall said the final results would characterize the extent to which practices used on his farm could be generalized to a set of best management practices useful to other farms in the area.

Prof. George Hockmuth, Urban and Agricultural Environmental Sciences, Soil and Water Science Department, University of Florida, is the third player in the team involved in the effort. He is particularly interested in the role that water plays in leaching nitrates from the root zone of crop and forage plants.

"Nitrogen can be leached and moves readily in sandy soils," he said. "The big factor is the water management. We are actually quantifying the amount of nitrogen that is leached below the root zone that ends up in the groundwater and springs. If you can manage the water you can manage the nitrogen flux."

Hockmuth stressed that the simple answer for farmers is not always so simple. In this case, adding organic nutrients in the form of feedlot effluent certainly makes a contribution to crop nutrition, and that has an economic incentive for the farmer.

But optimizing that practice involves more than an understanding of soil chemistry. On the Hall Farm, measurements of

nitrate in petiole sap gives an insight into plant physiology like a blood test may give for humans.

Nitrate concentration in plant sap tells farmers when plants have sufficient access to nitrate, or are nitrate deficient, and when fertilizer application would provide the most benefit. When plants need fertilizer, they take it up quickly, reducing the potential for leaching into groundwater.

At the end of the project, Hockmuth says he also hopes to have a nutrient budget for crops, one that focuses particularly on leaching losses from the root zone.

"So far, the management practices that

Suwannee Farms is using on crops are very good," he noted.

When the study is complete, farmers will likely have substantial new insights into managing animal waste on their farms in such a way as to control costs, perhaps increase profits and better comply with environmental protection goals.

The water management district will have insights rather than beliefs and hunches on which to formulate best management practices.

And University of Florida researchers will have essential data defining a critical problem in northern Florida.

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Group working to boost green technologies

Staff report

Major strides are being made to boost clean technology in Florida. The Florida Cleantech Acceleration Network is speeding up the development of green technology in the Sunshine State.

The network catalogues advanced clean technologies in Florida and helps entrepreneurs get into the commercial marketplace more quickly.

The network is funded federally and operated by the University of Central Florida in Orlando, the Technological Research and Development Authority in Melbourne and the statewide Florida Energy Systems Consortium.

It has collaborated with NASA's Kennedy Space Center and several Florida universities to create a list of more than 450 intellectual properties and 60 laboratories capable of supporting clean technology efforts.

Research areas include solar power, energy efficiency, nanoscience, biofuels and fuel cells, among others.

The network links Florida-based universities, incubation networks, investors and industry resources together to test and commercialize clean technology research, support the formation of new companies and help existing firms acquire and license additional technology.

Services available for entrepreneurs and clean-tech companies include a lab network catalog—a statewide network of laboratory facilities that are available to mature promising research into commercial prototypes.

There is also a service provider catalog that lists external service providers for those in need of clean-tech development services within Florida.

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DEP streamlines processes for implementing restrictive covenants required for cleanup closure with conditions

By LAUREL LOCKETT, ESQ

In June 2012, the Florida Department of Environmental Protection released a revision to its Institution Controls Guidance Procedures document that substantially streamlined the approval process associated with implementation of restrictive covenants required to be recorded before a site rehabilitation completion order is issued for a contaminated site that is closed “with conditions” under the DEP’s various risk-based corrective action rules.

The revision will substantially reduce the time and expense involved by eliminating, except in limited circumstances, the need for a property owner to obtain third party written approvals (primarily from lenders and easement holders) of a restrictive covenant before the DEP issues the SRCO. The revisions were the result of a collaborative effort between the DEP and the Florida Brownfield Association to improve the process for completing cleanup at brownfields and other sites closed under risk-based corrective actions.

Under prior policy, the department required a lender holding a mortgage on a property to be closed with conditions to execute a recordable subordination of the mortgage, confirming that the lender would not wipe out the RC in foreclosure in the event that the owner defaulted. However, practical experience during the recent economic downturn has shown it to be very unlikely that a lender would ever choose to extinguish a RC through foreclosure—an action that would render the property out of compliance, subject to rescission of the SRCO, and unmarketable, particularly when the lender could proceed with foreclosure, leaving the RC in place, or simply sell the note, mortgage and pending foreclosure action to a third party.

Similarly, with recorded easements, the DEP historically required a recordable consent and joinder from the holders of recorded easements, confirming their agreement to comply with the terms of the RC. This has proved extremely difficult, expensive and time consuming to obtain, requiring formal action by local governments that held platted or other utility easement rights, and prolonged attempts to contact and coordinate with private utilities not equipped to handle such requests.

Under the new guidance, rather than having to obtain a recordable subordination or consent and joinder, the owner must now provide written notice to the party of the intent to enter into the RC with the DEP and provide proof of that notice to the department. This notice can be provided on or after the time the owner publishes notice of the department’s intent to enter in the RC in the local newspaper, a requirement under existing policy. The form of the notice to the lender or easement holder is similar to the form of notice the owner is required to publish.

There remain very limited and well-defined situations where a lender or easement holder will still be required to execute a recordable subordination of mortgage or consent and joinder. For a lender, those are limited to situations where site closure is dependent on an engineering control with an active control system that involves a substantial recurring expense or where the failure to maintain the control system could result in an imminent hazard (within a few days or weeks). This would include, for example, the operation of an active gas collection system that removes ignitable, corrosive, reactive or toxic vapors or maintenance of active holding tanks or ponds containing substantial volumes and control mechanisms requiring daily or weekly attention.

In addition, subordination will be required if the mortgage specifically limits use of the property in a way that directly conflicts with the RC. For the easement holder, consent and joinder will be required only when an active control meeting the criteria is located in the easement area, or an engineering control, such as a cap, is located in the easement area, and the easement holder has a right to interfere with the control. Finally, consent and joinder can

be required where the easement holder has rights to disturb the soil or groundwater in connection with potential installation of utilities, but has not yet done so, unless the owner demonstrates that the risks posed are small based on the nature and extent of existing contamination in the easement area.

As is the case with the published notice, the lender or easement holder will have 30 days from the date of receipt to provide comments to the department. In addition, those third parties may exercise any rights they have under the mortgage or easement if the RC is in violation of the terms of the instrument, and retain the right of any substantially interested party to object to the issuance of the SRCO based on the RC.

Fundamentally, the policy revisions place the right and responsibility for interpreting and enforcing private party contract rights with the appropriate parties—the parties to that agreement and not the department—while ensuring that those parties have been provided with adequate

\$150 million annually needed for meaningful progress in the state petroleum cleanup program

By GLENN MacGRAW

“What’s the number?” is a question we hear all the time about many things. Usually, it’s a measurement of something. In this instance, the question refers to what dollar amount will be appropriated by the Florida Legislature next year from the “dedicated” Inland Protection Trust Fund for the state’s petroleum cleanup program?

I use the word “dedicated” loosely. The IPTF was established in 1986 by the Legislature to exclusively fund petroleum product cleanups throughout Florida. Lawmakers recognized that if they were going to establish multiple state-funded eligibility programs to pay for the cleanup of over 17,000 sites, they needed a dedicated funding source. But since Jeb Bush was in office, each governor and Legislature has chosen to redistribute dedicated IPTF dollars away from cleanups and into other programs.

The annual diversion of IPTF dollars to other purposes has created a number of issues for both site owners and our environment. Many site owners have had their sites on a cleanup list for over twenty years with a real possibility (at the current cleanup funding level) to still be awaiting cleanup many years from now. Some sites may have to wait for cleanups for over 50 years from the time the discharge was first reported.

There has been much discussion concerning biodegradation and natural attenuation. But if anyone thinks a 50-year-old release biodegrades, it would be sobering to see how many of those old releases are not only still in need of cleanup but today pose an even greater threat to our drinking water today.

Florida, where 92 percent of our residents drink groundwater, is already facing groundwater shortages, drought and even the onslaught of more water wars. It is inconceivable that each year, the Legislature forsakes this

notice and multiple points of entry to the process. In addition, DEP staff is not put in the position of evaluating the contract rights or intentions of parties to existing recorded instruments, which has proved to be inefficient, time consuming and subject to differing interpretation.

These changes have also allowed the department to eliminate the requirement that their technical staff review title work before sending draft RCs to Tallahassee for review, further streamlining the RC review process.

The department is expected to formally roll out the revisions to the regulated community through a webinar later this year.

Laurel Lockett is a partner at Carlton Fields PA in Tampa and co-chair of the Technical Committee of the Florida Brownfields Association. She is past chair of the Environmental and Land Use Group of the Real Property and Trust Section of the American Bar Association, and currently serves as liaison from the section to the ABA’s Task Force on Environmental Policy and Coordination.

resource, where—without water—life does not exist.

What it boils down to is that petroleum cleanup of subsurface soil and groundwater contamination is an expensive proposition. The average cost of a site cleanup is around \$400,000 and rising.

Without performing assessment and remediation, each day existing contamination spreads and thus drives cleanup costs even higher. At current estimates, between \$3 - \$6 billion in cleanup funding is needed on the sites that have already been reported.

The bottom line is that not allowing appropriate IPTF funding dollars for cleanups kills everything that recovery (both financial and environmental) is all about. Coupling the lack of cleanup funding with the billions of dollars that site owners have had to spend to meet the toughest storage tank rules in the country, translates to a very challenging and frustrating situation as their properties sit environmentally impaired, hurting both the real estate market and corresponding tax revenue, thus stalling Florida’s economic recovery.

So then, what is the number? Funding for the program has ranged from \$182 million to as low as \$90 million (a bond) annually. Last year, the Legislature exceeded the DEP request of \$120 million by \$8 million, approving \$128 million in funding. There have been staff cuts as directed by the governor, but the real number needed to provide for meaningful progress is a minimum of \$150 million for cleanups per year.

The DEP and their local program site managers can handle their site management load with this increase in funding, and more work—especially cleanup work—can be performed.

IPTF
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Improvements made to innovative assessment and remediation processes

By LAURA J. GIMPELSON

Technology innovation does not stop once a firm has received acceptance from the Florida Department of Environmental Protection. Many of these providers continue improving their processes and developing new ones.

One area that is improving is the collection of field data during assessment and post-injection phases. Various interface probes collect data as the drill rig bores through the soil and groundwater but biological plate count is rarely tracked. Not only was a lab needed for this but the test had to start within six hours of sample collection.

Now soil and groundwater bacteria can be quantified during a sampling event or maintenance visit using a field sampling kit and purge water. The kit, developed by CL Solutions, can quickly identify and quantify hydrocarbon-degrading microbes.

A single kit provides 10 Petri dishes to pipette a sample of groundwater or soil rinseate onto the test medium. After the dishes are sealed, they are placed on a window seal, shelf or other flat surface for two days. Then, dye-enhanced colonies on the growth media in the Petri dishes are counted to quantify the number of colonies present in the subsurface.

This number can be used to refine remedial action plans and operations.

Preparing a remedial action plan for in-situ chemical

oxidation involves different assumptions and calculations when compared to air sparge/soil vapor extraction systems. Vironex is developing a program that calculates the radius of influence for each injection point.

Members of the Groundwater Remediation Search and Destroy Methodologies Group on LinkedIn are beta testing the software and posting their results on the group’s discussion page. Other discussions cover expected temperature rise and destroying absorbed contaminants in the soil matrix.

Another source of innovation is research being conducted at various universities throughout the world. For example, the University of California at Berkeley has been conducting research on improving the generation of free radicals when using hydrogen peroxide alone or as a catalyzed. Results of the research are videotaped and posted on various social media such as YouTube.

A new YouTube video discusses the impact of using silicon dioxide and permanganate to encourage the generation of hydroxyl radicals over oxygen-free radicals. Other videos discuss theories to improve assessment activities and modeling hydraulics and mass flow.

In addition, there are over 2,000 entries related to groundwater contamination with many posted by Asian universities and institutes.

Laura J. Gimpelson, PE, Fellow, AIChE and SWE, is the president of LG Environmental Engineering in Orlando. She can be reached at gimpelsonl@bellsouth.net.

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Michael R. Eastman
Publisher/Editor
Goldenrod, FL
mreast@enviro-net.com

The Florida Specifier welcomes columns, articles and letters to the editor on any subject or issue pertinent to the environmental, regulatory and technical areas the newspaper covers. We reserve the right to edit all submissions for newspaper style and publish submissions on a space-available basis.

Calendar

September

SEPT. 5-6—Course: Microbiology of Activated Sludge, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 7-15—Course: Backflow Prevention Assembly Tester Training and Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 9-12—Symposium: 27th Annual Water Reuse Symposium, Hollywood, FL. Presented by the Water Reuse Association and cosponsored by the American Water Works Association and Water Environment Federation. Visit www.watereuse.org/symposium27.

SEPT. 10—Course: Asbestos Refresher: Project Design, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 10-14—Course: Backflow Prevention Assembly Tester Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 11—Course: Asbestos Refresher: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 11—Course: Asbestos Refresher: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 12—Course: Asbestos Refresher: Contractor/Supervisor, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 12-13—Course: Water Reclamation & Treatment Processes, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 13—Expo: 5th Annual South Florida Water & Wastewater Expo, Fort Myers. Presented by Region V of the Florida Section of the American Water Works Association. Call (239) 278-7966 or visit www.fsawwa.org.

SEPT. 14—Meeting: Bi-monthly Meeting of the Florida Section of the American Water Resources Association, Cedar Key. Contact Cathy Vogel at (238) 565-1429 or visit www.awraflorida.org.

SEPT. 15—Course: Backflow Prevention Recertification Exam, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 17—Course: 4-Hour Refresher Course for Spotters at Landfills, C&D Sites and Transfer Stations, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 17—Course: 8-Hour Training Course for Spotters at Landfills, C&D Sites and Transfer Sta-

tions, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 17-18—Course: Initial Training Course for Transfer Station Operators and Material Recovery Facilities - 16 Hour, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 17-19—Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 18—Course: Understanding Hazardous Waste Regulations in Solid Waste Operations and Recycling, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 18—Course: Lead: Renovation, Repair & Painting, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 19-20—Course: Sequencing Batch Reactor Operation, Make it Work for You, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 21—Course: Spotter Training for Solid Waste Facilities, Ft. Lauderdale, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 21—Conference: FAEP Annual Conference, Pensacola, FL. Presented by the Florida Association of Environmental Professionals. Call (813) 240-4298 or visit www.faep-fl.org.

SEPT. 21—Course: Backflow Prevention Recertification Review, Fort Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 22—Course: Backflow Prevention Recertification Exam, Ft. Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 24—Course: The Business of Consulting Engineering, Orlando. Presented by the Florida Engineering Society. Call (850) 224-7121 or visit www.fleng.org.

SEPT. 24-26—Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 25-27—Course: Respiratory Protection, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 13—Expo: SCADA Technology Overview, Orlando. Presented by the Florida Section of the American Water Works Association. Call (407) 957-8448 or visit www.fsawwa.org.

SEPT. 27—Course: Backflow Prevention Recertification Review, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 27-28—Course: LEED-AP BD&C Overview & Exam Preparation, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 28—Course: Backflow Prevention Recertification Exam, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 28-29—Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

SEPT. 29- OCT. 7—Course: Backflow Prevention Assembly Tester Training and Certification, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

October

OCT. 1-5—Course: Backflow Prevention Assembly Tester Training and Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

OCT. 5-13—Course: Backflow Prevention Assembly Tester Training and Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeco.ufl.edu.

OCT. 6—Course: Backflow Prevention Recertifica-

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A minimum of \$150 million still allows for some diversion of funds to other uses but, within program restraints, allows for more cleanups to be performed, which would be welcomed by all involved.

If this number was a target for subsequent state budgets, it would provide for more cleanups, better resource planning on both the public and private sides of the equation, and a better estimate of how long it will take to complete the cleanup of all the sites—a piece of the puzzle that needs to be defined.

Legislative time is coming, budgets are being prepared and it is important that all companies in our industry get involved.

Meet with your local legislators and make sure they know what is important to you. They all need education on such a significant issue.

The Florida Petroleum Marketers Association, the Florida Groundwater Association and the Florida Association of Professional Geologists are all active and in need of additional members to join the effort to get these sites cleaned up.

In a world that seems to always be focused on the numbers, the number for the cleanup budget is a minimum of \$150 million annually!

Glenn MacGraw, PG, is a vice president for The FGS Group in Tallahassee. He can be reached at gmacgraw@thefgs.com or (850) 504-1300.

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EPA investigates contamination from truckloads of chemicals in West Melbourne

By MELORA GRATTAN

Rumors of leaking chemicals led state environmental officials to search a vacant piece of property off South John Rodes Boulevard in West Melbourne, but the reality had them calling in a federal emergency response team to lock down the site and start mitigating the damages.

In July, the Florida Department of Environmental Protection conducted an inspection of the property, finding an esti-

mated 3,500 containers of hazardous substances in seven covered trailers and two box trucks. Due to the volume and condition of the materials, DEP officials notified the U.S. Environmental Protection Agency, which determined that an emergency response was warranted.

Many of the containers were deteriorated and actively leaking substances onto the ground. The property is located near a drainage canal and residential neighbor-

hoods.

These factors led EPA officials to initiate an emergency response removal action, according to a memo from federal to state environmental officials two days after the chemicals were found.

"The chemicals were in various sizes from a pint up to 55-gallon drums," said Dawn Harris-Young, a spokesperson for EPA Region 4.

The agency has spent \$26,000 securing the site with an eight-foot fence and barbed wire, and is taking samples to determine the extent of contamination to the soil and groundwater.

Before any cleanup can start, results of the samples will be examined, which could take another six weeks, Harris-Young said. It's too early to speculate on what types of remedial methods will be used or how the materials will be disposed of, she said.

An initial inventory of the materials included Flexform coating compound, polyamide, lube oil, resin, potassium hydroxide, corrosion prevention cleaner and part A and B epoxy adhesive.

The variety of chemicals present is still being investigated, according to Janine Kraemer, a solid/hazardous waste manager with DEP. However, state officials are cer-

tain they are some of the same chemicals initially discovered in 2010 on a different piece of property, but moved before action could be taken.

In 2012, a complaint was called in about a tenant using property on Dike Road for storage after he had refused to clean the site and continue paying rent. A contractor hired by the owner to clean up materials such as waste tires and scrap metal found tractor trailers containing leaking materials that melted the soles of his shoes, according to an investigation report.

However, investigators were unable to seize the chemicals when they disappeared from the site.

"We closed the case, but we heard rumors they had been moved to John Rodes. We observed the same trailers there at this property," Kraemer said.

Wayne Dickinson, the tenant from the 2010 complaint, told officials he moved the chemicals and could not afford to pay to have them properly disposed of. Dickinson bought the chemicals from the Defense Reutilization and Marketing Offices of the U.S. Defense Logistics Agency to resell.

"These were chemicals he hadn't been able to sell but still owned," said Kraemer.

DEP is pursuing a civil investigation regarding waste violations, while EPA handles the cleanup of the Dickinson site.

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Fort Myers' Powell Creek filter marsh nearing completion

BY DAN MILLOTT

The Powell Creek filter marsh project in North Fort Myers is scheduled to be completed in late September, the latest of Lee County's Conservation 20/20 projects to come on-line.

Conservation 20/20 was pioneered by Lee County in 1996 when environmentalists and county leaders realized that many acres of land were quickly being gobbled up by development.

A measure was carved out by citizens with varying interests and placed on the ballot. The idea called for a half-mill tax to be imposed on property owners—50 cents on every \$1,000 in property value.

Since 1996, the program has successfully purchased 116 pieces of property, 44 of which are now preserves, totaling 24,827 acres. Only 10 percent of the tax money raised by 20/20 can be used for managing the acquired lands.

Laura Greeno, Lee County's land stewardship coordinator, said the pioneering land acquisition program has been a model for several other counties, including Collier County next door to the south.

Greeno has been coordinating the

Powell Creek project that began in the spring of 2012.

The Powell Creek area is 77.2 acres surrounded by residential development. In size, the Powell Creek site is small compared to other properties acquired under 20/20.

The project will divert water from both Powell Creek and the Powell Creek Canal into the filter marsh. The water will flow through wetlands allowing sediment to settle and excess nutrients to be absorbed by wetland plants. The cleansed water will then flow back into Powell Creek.

"(The area) had a creek running through it, but because of channelization and other things going on, it was not getting water year round. By putting a filter marsh in, that not only met a mandate from the state on natural resources, it cleaned up water going into the (Caloosahatchee) river."

The project is the third filter marsh effort she has supervised. The other two were Pop Ash Preserve and Billy Creek Preserve.

Greeno said future projects like Powell Creek and the earlier two depend on securing grant money in the future. Money for future projects might come from federal sources, she said.

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New report provides recommendations for achieving sustainable management of waste streams

By BLANCHE HARDY, PG

Washington, DC-based strategic consulting firm MDB Inc. recently released "Sustainable Materials Management: A New Materials Hierarchy, Solutions to Barriers, and Recommendations for a Path Forward" on behalf of the Sustainable Materials Management Coalition.

The report exemplifies the famous Frederick Talbot quote highlighted: "Waste is merely raw material in the wrong place."

The coalition report was solicited by Waste Management. They asked MDB to assemble a group of industry, government, academic and environmental advocacy groups to produce recommendations on how to put sustainable materials management principles into more effective practice, particularly for waste streams that would generate municipal solid or non-hazardous wastes.

"I believe that this report and its recommendations will result in a greater focus and higher priority being given to sustainable materials management in the U.S.," said Timothy Fields Jr., the coalition's chairman, former EPA assistant administrator for solid waste and emergency response and current MDB senior vice president.

Fields pointed out that a diverse group of stakeholders agrees that sustainable materials management is the future of waste management.

In addition to Waste Management and MDB, the coalition report contains input from some of the nation's largest corporations including Wal-Mart, Dow Chemical and DuPont, as well as representatives from national and international government management associations, the Environmental Defense Fund, universities and federal, state and territorial representatives.

The coalition's year-long effort resulted in guidance on returning materials typically discarded as waste back into productive use before they enter the waste stream, including recommending an improved materials hierarchy, solutions to address barriers to sustainable material management and creation of new life-cycle based performance metrics to evaluate materials management

As a solution, the conservancy and other environmental interests advocate "a flow regimen for the river that mimics the natural flow that existed before it was dammed."

Conflicts regarding the river's flow as well as water levels in Lake Okeechobee are essentially conflicts between agricultural and environmental interests. McElwain says the balance between agricultural use of water and use of water for natural resources is "all out of whack."

"The ag interests are now saying they will give us more water, but it won't be fresh water; it will be reuse water that they pump back into the lake containing fertilizers and pesticides," he said.

He said that sugar interests are using Lake Okeechobee as their personal reservoir as well as their toilet.

There are three dams on the Caloosahatchee—one at Moore Haven, one at Franklin Locks and one at Alva. McElwain said the area around the Franklin Locks dam is the most troublesome.

"When the lake is high, they dump the water down to us. When it's low, they cut us off altogether creating a very unstable situation in which neither species that rely on fresh water or salt water can survive," he said.

The origin of the lawsuit dates back 18 months when the conservancy went before the governing board of the SFWMD and asked them to set a minimum water flow for the Caloosahatchee. The measure failed when the board deadlocked 3-3.

processes.

The report's target audience is "people in the business of managing materials who need further guidance and direction on how to more sustainably use those materials instead of landfilling them—federal, state and local officials and regulators who institute policies and create incentives for recycling and reuse that divert materials from landfills to more sustainable uses," said Fields, adding that the public will also play a big part in the process.

The most current data from the U.S. Environmental Protection Agency shows that Americans recycled or composted almost 85 million tons of municipal solid waste in 2010.

As solid waste generation increased from 3.7 to 4.4 pounds per person per day over the last thirty years, the MSW recycling rate increased from less than 10 percent in 1980 to about 34 percent in 2010, while disposal to landfills decreased from 89 to 54 percent over the same period.

EPA began turning to a life-cycle material management approach with the publication of their 2009 report "Sustainable Materials Management: The Road Ahead."

As the benefits of sustainable materi-

als management became more apparent, so did the practice's popularity as reflected by increasing public focus on energy efficiency, resource conservation and greenhouse gas emissions.

The shift is also apparent in EPA's language. Rather than tons in and tons out, we now hear equivalencies such as, "recycling and composting more than 85 million tons of MSW saved more than 1.3 quadrillion BTUs of energy, the equivalent of over 229 million barrels of oil."

Among recommendations made in the report are that EPA sponsor a regular multi-stakeholder dialogue on sustainable materials management and assign a subgroup to design and develop the concept of life-cycle based performance factors that could be used to evaluate the environmental and public health performance of individual processes as a complement to the materials hierarchy.

As the coalition continues to refine its principles, they are in the process of developing life-cycle based performance factors, or metrics, that can be used to evaluate or compare particular processes to manage materials from an environmental and public health perspective.

They hope to have this and associated tasks completed by the end of 2012.

CALOOSAHATCHEE

From Page 1

hearings in court to come before October.

Andrew McElwaine, president and CEO of the Conservancy of Southwest Florida, said the Caloosahatchee "has been the step-child of the Army Corps of Engineers when it comes to managing the flow of fresh water from Lake Okeechobee."

McElwaine noted that when the weather is abnormally dry, the river is completely cutoff from fresh water flows. "At times conditions are so severe, the river actually begins to flow backwards," he said.

In legal terms, Reimer said the corps is violating the Clean Water Act, which requires federal facilities to comply with state-mandated laws and clean water standards that control water pollution.

Though they are not being sued, the Florida Department of Environmental Protection and the South Florida Water Management District are listed as "interested parties."

Corps spokesman John Campbell would not comment on the lawsuit, but did say decisions on water flow are dependent on the availability of fresh water.

McElwaine said curtailment of fresh water flow on the Caloosahatchee creates multiplying problems.

"A highly unstable ecological situation produces toxic blooms," he said. "The blooms have become so severe that they have forced the temporary closing of the Olga Water Treatment plant that serves 30,000 people."

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Seaweed causing stir along Broward, Palm Beach county beaches

By SUSAN TELFORD

Large piles of seaweed are washing up on the beaches in Broward and northern Palm Beach counties causing more than a stinky situation along the coast from Boca Raton to Ft. Lauderdale—it's creating environmental issues that both clean up crews and regulators are forced to address.

There has been a roughly three-fold increase of seaweed washing up along Ft. Lauderdale beaches since last January, while Boca beaches had twice the amount from the year before. The combined amount is more than 1,000 tons.

According to environmental and marine

biologists in Broward County, there are different reasons for the large increase in seaweed over the past year. But they don't expect it to be a trend.

The seaweed is coming from the Gulfstream and it's most likely being washed ashore as a result of prevailing winds.

Seaweed is a general term used for all sea grass species that wash ashore, but the predominate species on beaches in Broward County is sargassum, a free-floating seaweed found offshore in mats throughout the South Atlantic region.

"The presence of sea grass and the affect on the sea turtles is quantity dependent," said Dr. Charles Manire, director of

research and rehabilitation at the Loggerhead Marinelife Center in Juno Beach.

"Having large mounds of seaweed may affect hatchlings as they emerge from the nest. If they are blocked, they have a harder time reaching the water. The seaweed could also generate more heat, which could affect the nests, but there's lots of heat out there already this time of year."

Beach Raker, a beach cleaning service contracted in Broward County, has been handling a substantial number of calls regarding the growing seaweed situation and has been trying to appease municipalities, environmentalists, the Florida Fish and Wildlife Conservation Commission, sea turtles and beachgoers alike.

"It's impossible to simply haul it away due to limited access for trucks. And burying it like we always have is no longer allowed by the FWC," said Ray Thompson, operating manager of Beach Raker. "We

were told to stop burying the seaweed because it could hurt the sea turtle nests, but we have always been careful about nests and sea turtle protection. We've been burying the seaweed for the past 30 years plus."

FWC directed Beach Raker to stop burying the seaweed because the large amounts of decomposing vegetation could generate toxic concentrations of bacteria and fungi in the sand causing the buried sea turtle eggs to rot.

"We were able to haul away close to 10 cubic yards and have it composted off site to see if we can find another use for it," Thompson said.

"We're having a lab check it for salt and phosphate content to see if maybe we can find another use for it. It's not too different from the disposal issues that the equestrian community has to deal with," he said. "These are issues that we need to start thinking about."

Randal O'Toole, was published by the National Center for Policy Analysis, headquartered in Dallas, TX. It is available at <http://www.ncpa.org>.

EPA, USDA issue microbial risk assessment guidance. The EPA and U.S. Department of Agriculture released their first ever Microbial Risk Assessment Guideline document in late July. The agencies' goal is to improve the quality of the data collected by public health scientists charged with protecting Americans from pathogen-related risks in food and water.

This risk assessment builds on many of the classical risk assessment protocols originally pioneered in the late 1970s and early 1980s by EPA scientists and contractors. But as the executive summary notes, "while some federal agencies have an established record of conducting and advancing chemical risk assessments ... Microbial risk assessment has not received as much attention or support." Consequently, microbial risk assessment has depended on various approaches developed since 1996.

According to the report, the difference between classical chemical risk assessment protocols and those for microbes arise because microbial resistance depends on the physiological status of the target organism, including resistance capability of its immune system, transmission opportunities (as opposed to exposure routes), propagation of microbes in both in the environment, and regrowth of pathogens after treatment and apparent end of infection in hosts.

Sanitation control measures in food and especially water are undoubtedly one of humanity's most effective and beneficial public health achievements. The greatest progress occurred in the prior century.

The microbial health assessment addresses, in a quantitative way, identification and characterization of the hazard, and estimates the extent of the possible pathogenic disease outbreak and the relationship between the pathogenicity of the organism and the severity of a host response.

"Microbial Risk Assessment Guideline Pathogenic Microorganisms with Focus on Food and Water" is available at <http://www.epa.gov/raf/microbial.htm>.

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energy efficient per passenger mile and less costly than urban rail and bus systems. The report based its conclusion on federal government research lab reports for U.S. transportation statistics and European Union transportation studies. It uses broad averages of energy use and cost for passenger automobiles, light trucks, buses and urban passenger rail systems.

The report cites data showing that per passenger mile, a passenger car uses about 3500 BTUs while an urban bus uses more than 4200 BTUs. Passenger rail systems in Baltimore, Cleveland, Miami and Pittsburgh all use more BTUs than cars, some significantly more. Ironically, the report excludes comparisons with New York City's mass transit system, arguably one of the most extensively patronized and efficiently run in the world.

The report also has a focus on economics of passenger auto versus mass transit. According to the report, mass transit fares across the country equal approximately \$12.2 billion. The price of mass transit per mile is on par with those of driving a private passenger auto. The report notes, however, that in 2010, mass transit subsidies were nearly \$40 million, increasing total mass transit costs by an additional \$.75 per passenger mile, and showing it to be grossly more costly than passenger autos.

The report includes discussion of the convenience of private auto driving as a primary factor of its value. Part of the discussion compares the U.S. to the European experience with its far greater mass transit infrastructure. The report says that in Europe, in spite of the availability of passenger trains and buses, the average European travels about half as many miles per year as the average American.

The report writers conclude that attempts to replace auto travel with other forms of travel only end up suppressing mobility and claim that there is no economic or environmental justification for increased federal subsidies for transit infrastructure.

The report, "Which Is Better for the Environment: Transit or Roads," authored by

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To register for the conference, complete and return the registration form on the next page with payment in full to: NTCC Inc., P.O. Box 2175, Goldenrod, FL 32733, or fax your completed registration form with credit card information to (407) 671-7757. This is a secure fax number. (Purchase order numbers are accepted for government employees.)

We encourage you to register early. Conference registration is limited to avoid overcrowding. Please note: Payment in full is required to confirm your registration. Cancellations received before Sept. 11, 2012, will be refunded, less a \$75 service charge. No refunds will be made for cancellations received after that date. However, paid no-shows will receive a copy of the presentation materials upon request. Substitutions will be accepted at any time, preferably with advance notice.

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FRC

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and conventional advanced oxidation procedures. A reverse venturi system composed of a laminar Spargepoint® insert receiving peroxide and ozone positioned after a high pressure pump boosts the rate of removal of trichloroethene to over four times that expected by air stripping. Within pipe systems, gas does not escape, but partitioning proceeds. Kinetics of bench-scale and field tests show that the rate of decomposition is directly proportional to induced pressure change. Each bubble maintains a negative charge which maintains nanobubble separation during fluid transport. Adjustment of the thickness of coating allows control of oxidation/reduction potential of the receiving water to avoid pipe corrosion. The opposing inward partitioning of VOCs appears to collide with outwards dissolution of the concentrated gaseous ozone fraction from surface to volume ratio transfer to create a highly dynamic reactive film region of predominantly hydroxyl radical reaction. The rate of decomposition is greater than that found previously by Glaze and Bowman for AOPs involving dissolved ozone and peroxide. The difficult perfluorohydrocarbon bond also appears to be cleaved, indicating an increase in oxidation potential to the 3.0 volt range. The additional energy may be derived from the energy of collapse of the bubble, adding to the presence of a spherical hydroxyl radical film zone.

12:00 Day Two Luncheon

1:30 Session 7A: **Regulatory Panel**
Moderated by Glenn MacGraw, PG, Vice President, The FGS Group, Tallahassee
Jorge Caspary, PG, Director, DEP Division of Waste Management, Tallahassee
Robert Brown, PE, Chief, Bureau of Petroleum Storage Systems, DEP, Tallahassee
Robert Cowdery, PE, Professional Engineer III, DEP, Tallahassee
John Wright, PE, Environmental Engineer, DEP Bureau of Petroleum Storage Systems, Tallahassee

3:00 Break

3:30 Session 8A: **ITRC, SuRF and ASTM: A Review of Recent Sustainability Initiatives**
Buddy Bealer, Shell Regional Manager, Nazareth, PA
Green and Sustainable Remediation is a relatively new concept and an evolution in how site remediation is performed. Several organizations, including the Interstate Technology & Regulatory Council, the Sustainable Remediation Forum and ASTM International, have recently completed, or are in the process of completing, framework guidance documents on how to perform GSR. This presentation will provide an overview and update on some of the key components of GSR and will review the similarities and differences between the different frameworks. The ITRC framework is one of the most well developed and will be presented in a summary format to demonstrate how a GSR framework is being incorporated into a regulatory program and used by responsible parties and consultants.

4:00 Session 8B: **Incorporating Sustainability into Remediation**
Lydia Ross, EIT, Engineering Supervisor and Michael Spievack, PE, Project Manager
Groundwater & Environmental Services Inc., Ft. Lauderdale
"Sustainability" and "green remediation" are the current buzzwords in the remediation industry, but how can they be implemented during each step of the remedial process? By considering sustainability in terms of its three major metrics—environmental, social and economic—it is easy to identify small changes that can make big differences. This presentation will demonstrate several examples of changes that have been made in various steps of the remedial design and implementation process to show how each supports one or more of the three metrics. The environmental benefit involves methods to reduce the environmental footprint during the remediation process. The social benefit is consideration and support of neighbors and the local community. The economic benefit focuses on reducing costs associated with remedial implementation and operation and maintenance activities. This presentation discusses how sustainability can become a routine part of a remediation system design by incorporating both technical and non-technical measures.

4:30 Session 8C: **Using Recycled Glass in Flowable Fill for a Large Petroleum Contaminated Source Removal Project**
Angela Finney, Senior Geologist/Project Manager, AMEC Environment & Infrastructure, Tallahassee
The concept of sustainability should now be part of the discussion when developing site remediation plans. AMEC completed an LSRAP for the remediation of petroleum contaminated soil at Tharp's Grocery in Cypress, FL, proposing to cleanup contaminated soil using excavation via large diameter augers. As part of our internal sustainability program, opportunities to implement sustainable remediation practices were also explored. A local fluorescent light recycling facility generates 20 tons of recycled glass per week that is currently being landfilled. The proposed site remediation process included backfilling boreholes with a flowable fill mixture which included sand. AMEC met with Robert Brown, PE, chief of the DEP's Division of Waste Management's Bureau of Petroleum Storage Systems, to discuss the prospect of using the recycled glass in lieu of sand as a small percent of the flowable fill mixture. The concept was also discussed with Johanna Poston with DEP's Greening Florida Government program, regarding the benefits of reusing the recycled glass to promote the sustainability concept of reducing, reusing and recycling and contributing to DEP's recycling goal of 75 percent. Authorization was given to proceed based on the successful results of laboratory analysis and material testing. During a four-week period, approximately 80 tons of recycled glass were diverted from the landfill and successfully incorporated into the site remediation project. The opportunity to expand this practice to other site remediation projects across the state appears to be viable.

Contaminated Miami drycleaning site under investigation by EPA

By MELORA GRATIAN

Although spanning less than an acre, a piece of land in the Liberty City neighborhood of Miami has large enough issues with soil and groundwater contamination that state and federal environmental officials felt the need to add it to the U.S. Environmental Protection Agency's National Priorities List earlier this year. They are now in the midst of studying the extent of contamination there.

In addition to possibly being used as a gas station or repair shop, the property at

the corner of NW 62nd Street and NW 8th Avenue was utilized for laundry and dry-cleaning operations for nearly 40 years until 2005.

Numerous studies since the 90s have documented elevated levels of tetrachloroethylene in groundwater, as well as even higher amounts of its breakdown products, trichloroethylene and cis-1,2-dichloroethene, in both the groundwater and soil.

"The levels exceed maximum contaminant levels, but we don't know the extent," said Dawn Harris-Young, a spokesperson for EPA Region 4 in Atlanta.

The agency is currently conducting the

first phase of a remedial investigation.

Known as the Continental Cleaners site, the property includes a 2,400-square-foot building used as a facility to drop-off and pick-up dry cleaning conducted off site.

Secured with a fence and a locked gate, the site is surrounded by commercial, residential and community properties including a community center across the street.

Officials are concerned about the possibility of the contamination migrating off site and into to the groundwater table.

According to the NPL site narrative for Continental Cleaners, the aquifer beneath the site is the sole source of municipal drinking water for southeastern Florida.

However, there is no immediate threat to people that live and work in the area since their drinking water comes from the public water distribution system versus any nearby wells, Harris-Young said.

Officials emphasized the absence of danger during a public meeting held at the community center that shared the results of a 2011 soil-gas study. The study concluded that vapor intrusion into nearby

buildings is not a threat, according to NPL site summary documents.

These documents also noted that state environmental officials helped EPA evaluate the site for the federal Superfund program after determining that it was not eligible for the Florida Drycleaning Solvent Cleanup Program due to gross negligence at the site.

After EPA finishes up with the remedial investigation to determine the amount and possible off-site migration of contamination, it will propose a plan for cleaning it up to the community.

The agency will have a better idea of what action to take after the investigation is complete and will provide details at another public meeting in a few months, Harris-Young said.

Since the site's potentially responsible party is unable to pay for any of the work, EPA is using federal funds to investigate and cleanup the site.

The agency may be able to recoup some of these costs later by placing a Superfund cost recovery lien on the property.

The final hearing on the rulemaking will take place on Oct. 17. DEP officials say the final rule will be adopted by Nov. 28 and they hope it will become effective by Jan. 31, 2013.

ERP

From Page 1

with staff to provide comments and ask questions.

"This process has provided a unique way to distribute information and obtain feedback on the rule as quickly as possible," said Fry.

"So far, we have received many favorable responses from those who have participated. This forum in particular is a transparent way for a question or comment to be posted by one individual, as well as any responses to that post to be immediately be shared and considered by others, statewide and beyond," he said. "This has never before been available to our rulemaking process."

Industry groups said they back DEP's efforts. Associated Industries of Florida was a key supporter of legislation creating a statewide environmental resource permit, said Jose Gonzalez, vice president of government affairs for the organization.

Under DEP's current leadership, the agency has made significant strides in working with employers and becoming more consumer friendly, said Gonzalez.

"The department's efforts to streamline the ERP process and make it more efficient are evidence of their commitment to work together with industry for the betterment of our state," he said.

"AIF and our members look forward to having one rule that ensures consistency in the ERP process and creates cost savings while still protecting our environment."



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