

# Florida Specifier



Practical Information For Environmental Professionals

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### Note to our valued readers...

We will not be publishing an issue in January, 2018. Look for your next issue of the paper in early February, 2018.

Happy Holidays, One and All!

### Surface water toxics rule 10

The Third District Court of Appeal recently reversed a Florida Division of Administrative Hearings' decision. The reversal grants plaintiffs a chance to challenge DEP's Human Health Toxics Criteria Rule.

### Arsenic in water wells 11

The USGS recently published a study concluding that close to two million Americans drink well water contaminated with arsenic concentrations above EPA's human health standard.

### BP oil spill worker study 12

A study by the National Institutes of Health indicates that some workers that helped clean up the 2010 Deepwater Horizon oil spill in the Gulf of Mexico developed health symptoms well after the spill and may still be experiencing the symptoms today.

### FPL to customers: Pony up 15

FPL petitioned the state Public Service Commission to recover the approximately \$200 million from customers that it needs for cleaning up groundwater contamination at its Turkey Point nuclear power plant. The request was not welcomed by many.

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### Got a story lead?

Got an idea for a story? Like to submit a column for consideration? Fire when ready. 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 Florida. Send to P.O. Box 2175, Goldenrod, FL 32733. Call us at (407) 671-7777; fax us at (407) 671-7757, or email mreast@enviro-net.com.

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Photo courtesy of FAU Harbor Branch Oceanographic Institute

Dr. Brian Lapointe examines Gracilaria in the Indian River Lagoon. Gracilaria is a type of red macroalgae that can form blooms in nitrogen-rich environments and choke out beneficial seagrasses and disrupt natural food webs. See story below.

## Florida's natural enemy: Algae

By DR. BRIAN E. LAPOINTE

Florida is booming. By most measures, the state is doing great. Unemployment is down, real estate values are up and the population is growing...fast.

Florida's population, now at 21 million, is the fastest growing among states with ten million or more people. Since 2000, the sunshine state's population has grown at twice the national rate (30 vs. 15 percent).

Growth often brings prosperity, and Florida's economy is strong. But growth can also create problems. Many formerly small, rural communities have exploded in size, especially those along the lakes, rivers, estuaries and coasts.

For some of them, the growth came more quickly than the necessary municipal infrastructure, specifically wastewater collection and treatment.

Too many homes relying on septic tanks have created a big problem for the state's valuable—and fragile—aquatic ecosystems.

Septic tank systems have been used widely to support rapid growth in Florida for many decades. Septic tanks require sufficient acreage for a drainfield system, where pollutants are naturally treated and attenuated by per-

colation through aerobic, dry soils.

But, with so many homes in high-density neighborhoods in close proximity to sensitive surface waters, nutrient and fecal pollution can occur.

This problem is exacerbated by seasonally high water tables, which can be

**LAPOINTE**  
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**BRIGHTLINE**  
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## FRC 2017: A rich mix of tradition, new perspectives

By ROY LAUGHLIN

The 2017 Florida Remediation Conference in Orlando will provide environmental professionals with a mixture of technology innovations, perspectives on new technological challenges and strategies to negotiate the sometimes-jagged intersection of public-private partnerships that comprise a good portion of Florida's soil and groundwater cleanup industry.

### Kick-off session

Michael Annable, PhD, PE, a professor at the University of Florida's Engineering School of Sustainable Infra-

structure and Environment in Gainesville, will kick off the 2017 conference with a technical presentation on contaminant flux in porous media.

Following Annable, Michael Goldstein, managing partner for The Goldstein Environmental Law Firm in Coral Gables, will describe the

increasingly sophisticated legal framework around brownfield site rehabilitation.

Often, legalities simultaneously influence both cleanup and development

**FRC**  
Continued on Page 9

## AAF rail project overcomes another legal challenge

By PRAKASH GANDHI

Local government officials along the east coast of Florida lost another round in their battle to block a major rail project when water managers signed off on an environmental resource permit for All Aboard Florida's Brightline project.

The company can now proceed with the second phase of its project to connect West Palm Beach to Orlando.

An administrative law judge recommended that the South Florida Water Management District approve a permit modification that allows for the construction and operation of a stormwater management system for the project.

The news was a setback for officials in Martin and St. Lucie counties that have been aggressively fighting the high speed rail project.

Officials from the two counties had challenged Brightline's permit request because they said it would negatively impact water quality in the area.

But Administrative Law Judge Bram D. E. Canter ruled that the project would not result in "unacceptable cumulative impacts to wetlands and other surface waters."

Under the permit change, the company can now make culvert and bridge modifications and can implement other improvements at 23 roadway crossings between West Palm Beach and the northern border of St. Lucie County.

After an earlier challenge was denied in September, the counties filed 17 exceptions that they claimed should be added to the permit and requested the opportunity to present an oral argument.

Treasure Coast leaders attempted to block the project's expansion through their communities since its inception.

Officials from both counties did not return calls for comment.

Ali Soule, director of public affairs at Brightline, said that all exceptions were dismissed and the request for an oral argument was denied. The district then issued the final order approving the permit.

Myles Tobin, general counsel for Brightline, said in a statement that the



# Survey: PFAS firefighting chemicals common in groundwater at military bases

## Staff report

In April, 2017, the U.S. Department of Defense announced that it would begin testing groundwater at up to 400 of its military bases and outposts where polyfluorinated alkyl substances are known or suspected to be present.

After only six months, while the sur-

veys are still ongoing, the news is that PFAS are being found—and sometimes in high concentrations.

The military's primary use for PFAS is in aqueous firefighting film mixtures. PFAS are notably prevalent around airfields and aircraft facilities. The U.S. Navy also uses them aboard ships to fight fires.

The DoD's survey initiated in March

is up for refunding if it is to continue. The U.S. House of Representatives included funding for it in its draft budget this year.

In the Senate, Sen. Maria Cardwell (D-WA) and two others formed a bipartisan sponsoring trio. They had \$62 million inserted into the 2018 National Defense Authorization Act to continue the planned five-year PFAS occurrence assessment and health study initiated in 2017.

The Senate approved the funding inclusion by a wide margin.

After Senate passage, NDAA went to a House-Senate joint committee to resolve differences in the versions passed by each chamber.

Bill passage was originally expected by the end of October but final action was delayed and the vote was not yet rescheduled as of the first week in November.

**Threatened, endangered species update.** Over the past year, the U.S. Department of Interior has worked through a list of 62 species nominated for designation as "threatened" or "endangered."

To date, DOI has listed just six species. Six decisions on listing are delayed and 29 have been rejected. That leaves 21 more

decisions pending.

Noah Greenwald, a spokesperson for the Center for Biological Diversity that requested many of the listings, noted that a number of the denied species were endangered by climate change.

These include the Florida Keys mole skink, a lizard that lives on beaches and coastal forests that is disappearing because of rising sea levels. A large portion of the lizards' habitat was recently flooded by Hurricane Irma.

In its rejection, the U.S. Fish and Wildlife Service said that the lizard population would not be endangered even if its habitat decreased by 44 percent by 2060. The case of more frequent storm flooding was not addressed.

Greenwald noted that two species of plants with small ranges—one in Texas and the other in Hawaii—that did not threaten industrial operations were approved for listing.

He concluded that, overall, DOI is substantially curtailing species listings, especially for those whose listing occurs because of climate change effects.

A DOI spokesman countered Greenwald's comments, noting that wildlife scientists write the reports and make the decisions, even though they are reviewed by political appointees in the agency.

As of early November, President Trump had not yet nominated a director for the FWS. That appointment will influence endangered and threatened species listings in the future, and probably not in a way that environmental advocates will welcome.

Meanwhile, the House Natural Resources Committee passed five bills amending the Endangered Species Act. Most of the bills will substantially weaken the ESA's ability to protect species.

Republicans responsible for these bills said that states should take care of endangered species regulation within their borders, something the bills endorse to varying degrees.

**Guidance for animal waste air emission reporting.** In late October, the U.S. Environmental Protection Agency released guidance to assist farmers in reporting air releases of hazardous substances emanating from animal waste at farms.

The goal is to help farmers prepare for the reporting deadline for farms with continuous releases. Ammonia and hydrogen sulfide are the two substances subject to the rule.

If farms release less than 100 pounds daily from animal wastes, the rule does not require reporting. If the air emissions equal or exceed 100 pounds per day, then reporting is required.

The rule exempts the reporting of ammonia or hydrogen sulfide applied as fertilizer.

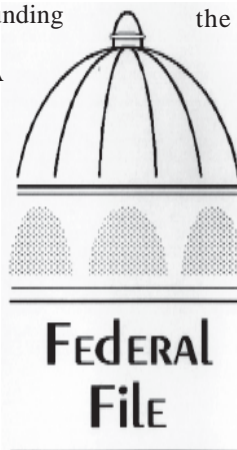
Farms and animal facilities that continuously emit more than 100 pounds of ammonia or hydrogen sulfide can use a streamlined reporting method but they must report their initial continuous releases by Nov. 15, 2017, to comply with the rule.

The reason for the release of EPA guidelines arises from a rule passed in December, 2008, under the authority of the Comprehensive Environmental Response, Compensation and Liability Act and the Emergency Planning and Community Right-to-Know Act.

The 2008 rule exempted farmers from reporting.

But opponents of the exemption filed suit and the DC Circuit Court of Appeal vacated the exemption in April this year, later extending it until Nov. 15, 2017, to give farmers a reasonable amount of time for compliance.

In its announcement, the EPA raised the faint prospect that the court may grant another compliance extension.



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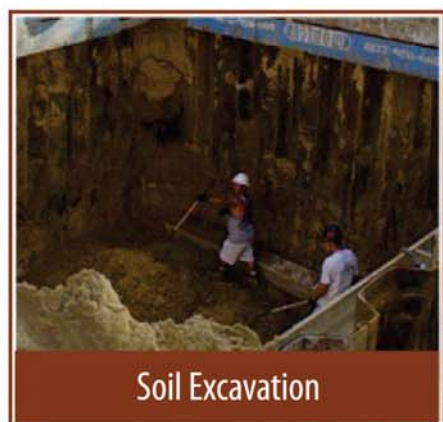
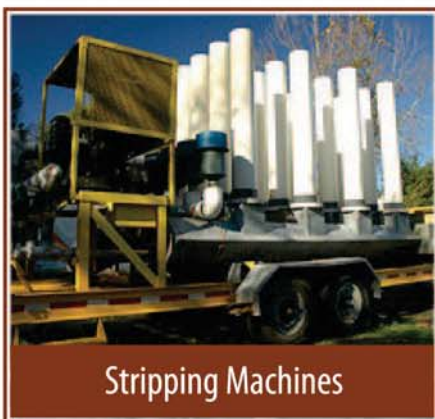
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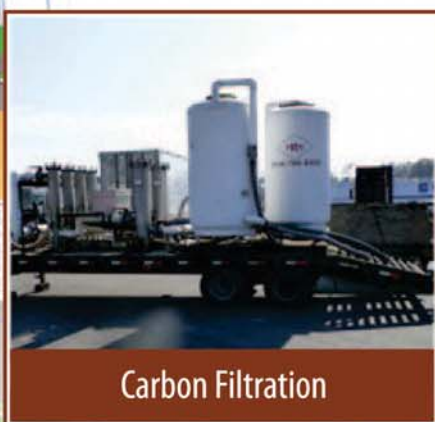
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## Mosaic Fertilizer to shut down Plant City facility

### Staff report

Mosaic Fertilizer will close its Plant City facility at the end of the year. The plant employs 430 people.

The company said it is offering 200 voluntary retirement incentive packages to its Florida employees and has created about 100 more open positions through a hiring freeze over the past few months.

The company hopes to offer the laid off employees jobs at the company's other facilities.

The Plant City facility opened in 1965 and has the capacity to produce two million tons of fertilizer a year.

Meanwhile, state environmental officials said there is no danger to the public from a small tear found in the liner of a process water retention pond at the plant.

The 17-inch long, 4-inch wide tear is reportedly just below a retention pond's water line.

Mosaic also discovered a small submerged section of liner that was emitting bubbles at a liner seam.

The Florida Department of Environmental Protection sent investigators to inspect the gypsum stack and recovery well system. A DEP statement said a preliminary investigation found that the recovery system was operating properly.

Independent samplings of on-site monitoring wells were conducted to ensure the process water is being self-contained.

DEP officials said they do not believe there is any threat to public health or safety. Officials plan to review the incident to determine if any enforcement action is needed.

**Continued drilling in Big Cypress.** A Texas company was given the go-ahead to continue its search for oil in the Big Cypress National Preserve.

Environmental activists wanted the Florida Department of Environmental Protection to refuse the request by Texas-based Burnett Oil Co. to resume the work.

Groups opposed to the drilling include the Natural Resources Defense Council, the Conservancy of Southwest Florida, the National Parks Conservancy Association and the Center for Biological Diversity.

The groups filed a 2016 lawsuit to stop the exploration work. But a federal judge sided with the drillers.

The National Park Service found that Burnett's work would cause only minor impacts to species like the Florida panther.

The new DEP permit includes requirements that any environmental damage be repaired.

The permit adds a requirement that Burnett use smaller and lighter trucks, and requires buffer zones around wading bird colonies.

**Tallahassee, clean and renewable.** City of Tallahassee officials are working on a plan to adopt 100 percent renewable energy by 2035.

Almost 40 cities have agreed to transition from fossil fuels towards 100 percent clean and renewable energy.

Tallahassee has reached capacity in its customer participation program for its new 120-acre, 20-megawatt solar farm being built at the Tallahassee International Airport.

City staff will come back with a recommendation to county commissioners for a plan to hit the 100 percent renewable goal by 2035.

**Duke solar.** Duke Energy Florida was given the go-ahead to build about 175 megawatts of solar generation each year through 2021.

Despite strong opposition, the Florida Public Service Commission approved the utility's plan for utility-scale solar construction over the next four years.

In exchange, the utility has agreed to stop construction of a nuclear plant in Levy County.

The agreement limits the utility's annual base-rate increases to between one and three percent from 2019 to 2021. The

utility cannot ask for additional base rate increases until at least 2021.

The Solar Energy Industries Association strongly opposed the agreement. The association said the current plan would raise consumer costs instead of lowering them.

**AUVSI Space Coast Chapter.** Highlighting the proliferation of the Space Coast's flourishing tech scene, the Association for Unmanned Vehicle Systems International announced the launch of a local chapter focused on unmanned and robotic vehicle systems, such as drones, driverless cars and unmanned boats and submarines.

The Space Coast Satellite Chapter, part of AUVSI's long-established Florida Peninsula Chapter, will focus on building awareness and dialogue about unmanned systems among the region's defense, civil, commercial, academic and government sectors.

Todd Hillhouse will lead the new Space Coast Satellite Chapter.

Hillhouse, who will serve as interim director, will engage with local and regional companies, entrepreneurs, government agencies and academic institutions to capitalize on the momentum for unmanned sys-

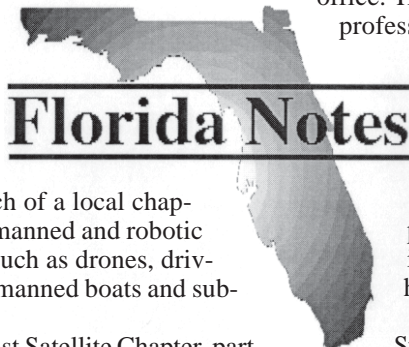
tems that is already building throughout the region.

For more information, visit [www.AUVSIspacecoast.org](http://www.AUVSIspacecoast.org).

**People news.** Neil Eppig joined the professional infrastructure and environmental services firm Cardno Inc. as a senior project manager for subsurface utility engineering operations in their Tampa office. He has more than 43 years of professional experience. Eppig was previously a director of subsurface utility engineering services for a private consultant, where he supported federal, state and municipal clients with planning and technical skills, including GPS technology and hydrographic surveys.

Matt Armstrong joined Stantec as a project manager in their Land Use Planning Group in Tampa. He has almost two decades of experience providing urban planning, land-use policy development and architectural design services.

Most recently, he served as the executive planner for Pasco County Planning and Development where he managed the county's long range planning efforts. He earned his master of science in urban and regional planning from Florida State University and his bachelor of science in architecture from Arizona State University.



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# SWFWMD adopts SWIM plan for Homosassa, Chassahowitzka rivers

Staff report

In October, the Southwest Florida Water Management District Governing Board adopted Surface Water Improvement and Management plans for the Homosassa and Chassahowitzka rivers.

In 2014, the district designated these two rivers as SWIM priority waterbodies.

The recently approved plans were drafted under the oversight of the inter-agency Springs Coast Steering Committee.

The committee focused on nitrate contamination, changing salinity levels, maintaining historical flows, the presence of invasive aquatic vegetation and stormwater runoff. Stormwater runoff may be the biggest threat because of its influence on the others.

"Now the work begins with implementation of the SWIM plans," said Susanna Martinez Tarokh, a SWFWMD spokesperson. "But the SWIM plans are not just district plans—they include a partnership of stakeholders through the Springs Coast Steering Committee structure."

The committee is developing a list of projects to be submitted for funding. It conducted public meetings in November and plans several more in December to obtain public input.

The committee will finalize its project list in December, submit it to the district board in January for approval, and then to DEP in January. The improvement projects are slated to begin in 2018.

**Supreme Court takes up FL v. GA dispute.** The Supreme Court agreed to hear arguments in the long-standing dispute between Georgia and Florida over Apalachicola River water flow.

In a lawsuit initiated in 2015 and concluding in February, 2017, Florida charged that Georgia withdraws too much water from the Flint and Chattahoochee rivers, primarily for the Atlanta area's drinking water supply, leaving Florida without an adequate flow to the Apalachicola River.

Georgia argued that restricting water withdrawals according to Florida's request would unreasonably limit Atlanta's future population growth as well as agricultural operations in Southwest Georgia.

Special Master Ralph Lancaster, appointed by the Supreme Court for the hearing concluded earlier this year, found that

Florida had not made a convincing case that water use in Georgia was causing harm to Apalachicola Bay's seafood industry in Franklin County.

Florida lawyers then asked the Supreme Court to reject the special master's decision and return the case for more deliberation. Georgia endorsed the special master's decision and asked the Supreme Court to do the same.

The U.S. Army Corps of Engineers controls water flow through the three rivers by managing a series of dams and reservoirs, but was not

directly involved in the lawsuit.

In a brief filed this summer, Georgia officials accepted the possibility that the court might set water quotas or a similar sharing plan without requiring the corps to modify policies for dam and reservoir management in the Apalachicola-Chattahoochee-Flint River system.

The corps, however, advised that if modifying dam and reservoir management were required, there could be a complicated interaction with other legal requirements for water storage and water projects within the river basins.

As of Nov. 2, a hearing date before the Supreme Court was not yet scheduled. The hearing is likely to occur after the first of the year.

**Early start on EAA reservoir.** In late October, the South Florida Water Management District committed to expeditious progress towards completion of a Florida Legislature-approved stormwater storage reservoir south of Lake Okeechobee in the Everglades Agricultural Area that will deliver water to Everglades National Park.

Three years is the usual planning interval for a project of this size, which aims to build a reservoir to hold back up to 100 billion gallons of water from Lake Okeechobee.

Matt Morrison, head of federal policy and coordination at the district, said that SFWMD intended to have accelerated planning completed in about a year.

The Legislature expects basic design plans to be submitted by the beginning of its 2018 session. To meet that requirement, Morrison said that, in November, the district should choose some alternative locations for the reservoir's subcomponents.

In December, SFWMD would begin assembling the results of modeling, and its cost and budget estimates.

The U.S. Army Corps of Engineers an-



nounced in October that it would partner with Florida to construct the reservoir. That commitment brings with it half of the expected \$1.6 billion project price tag.

The corps' share is expected to be approved by the end of 2019.

When the reservoir is complete, water currently being drained through the St. Lucie and Chattahoochee rivers following high rainfall events will be delivered to the Everglades rather than being released through the Caloosahatchee and St. Lucie rivers to tide waters.

**State funds Polk water cooperative.** The Florida Department of Environmental Protection's Clean Water Revolving Fund recently awarded the Polk Regional Water Cooperative \$11.5 million.

The money is slated to fund a Lower Floridan Aquifer wellfield, and the preliminary design of a water treatment plant to desalinate brackish water from the wellfield. It will also cover potable water distribution lines.

Strategic water storage areas and aquifer recharge sites will also be identified using the funds.

The PRWC was formally established earlier this year with the expressed purpose of assisting residents of Polk County and its 13 municipalities with developing a county-wide water utility using alternative water sources, and to secure funding for it.

The funding is a notable first year success for PRWC.

PRWC's award was one of 45 clean water and drinking water projects that DEP announced. The awards totaled nearly \$200 million, with \$138 million coming from the Clean Water State Revolving Fund and \$52 million coming from the Drinking Water State Revolving Fund.

The two funds still have about \$100 million that can be awarded later this fiscal year. About \$39 million of this may be provided as loans that require no repayment from financially disadvantaged communities.

A public meeting, the first step to securing future loans, was held on Nov. 8 and others will be held in 2018.

**Three finalists named for Barley prize.** The Everglades Foundation announced three finalists for Stage 2 of its \$10 million competition for the Barley Water Prize.

They are listed in first through third places as Wetsus NaFRad, Green Water Solution Inc., and the U.S. Geological Survey Leetown Science Center.

The winners were awarded \$50,000, \$20,000 and \$10,000 and represent teams from the Netherlands, Canada and the U.S., respectively.

The Barley prize's goal is to develop an environmentally harmless phosphorus removal technology for surface waters such as stormwater runoff from agricultural fields.

Such a phosphorus removal process would protect freshwater ecosystems from eutrophication and its ensuing undesirable ecosystem effects.

The prize document describes the desired process as "adaptable, reliable, green, and cheap." It must be able to remove phosphorus without negatively impacting the environment.

The selection process proceeds through four stages of competition.

The next one, the pilot stage, will include the three winners named above plus 10 additional competitors who will build pilot-scale plants in Canada to demonstrate phosphorus removal under cool conditions.

Four winners in the pilot test competition will each receive \$200,000, to be awarded in September, 2018.

The prizes are jointly administered through the George Barley Water Prize, the Everglades Foundation and the Scott's MiracleGro Foundation.

**WATCH**  
Continued on Page 5

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# Cross Key exploring costs, requirements for centralized sewer connections

By ROY LAUGHLIN

The community of Cross Key at mile marker 112 in the Florida Keys faces a dilemma with meeting its mandated sewer requirements.

In the early days of sewerage in the Keys, the 18-mile-long community with just 45 dwellings was considered too small and isolated—and therefore too expensive—for connection to the Key Largo Wastewater Treatment District plant.

Cross Key missed its decade-old Dec. 31, 2015, compliance date for sewerage in the community. Property owners there now face fines from the Florida Department of Health and Monroe County for failure to have an advanced wastewater treatment

system in place.

Local news sources report that an enforcement action was imminent even before Hurricane Irma passed over the Keys.

But a solution for Cross Key residents may be in the works.

The Florida Keys Aqueduct Authority has a U.S. Environmental Protection Agency grant that could substantially underwrite Cross Key residents' costs for connecting to a centralized system.

Different parts of the solution for the Cross Key connection began to coalesce earlier this year when FKAA's board of directors authorized staff to work with the district to provide services to Cross Key.

The action was a general authorization "to work with the Key Largo Wastewater

Treatment District to assist in seeking options to provide the services."

The current plan is to transfer EPA funding from FKAA to KLWTD to pay for the project, after a project description and budget has been prepared.

At an FKAA meeting in early August, preliminary discussions with KLWTD officials resulted in a plan to spend up to \$1.25 million to install an on-site vacuum sewer system serving Cross Key residents.

The EPA grant would cover up to \$750,000, perhaps as much as 75 percent, of total estimated project costs to connect the 45-dwelling community to KLWTD's treatment plant.

The KLWTD tasked one of its staff en-

gineers to develop cost estimates and a budget, working with FKAA counterparts, to be submitted to EPA for approval.

Left undecided was whether FKAA should undertake the construction project itself or provide the money to KLWTD for the work.

While the wastewater collection system will not be in place by the end of 2017, a firm plan with funding and scheduling may be sufficient to delay FDOH and county enforcement action.

Communities in the Florida Keys have been working since the late 1990s to reduce nutrient inputs and bacteria loading in waters around the Keys.

Residential septic tanks and cesspools were identified early as a primary source of those contaminants.

Collectively, communities in the Keys have spent hundreds of millions of dollars installing advanced wastewater treatment plants and sewer collection systems throughout the island chain.

The remaining effort involves connecting small, isolated communities to wastewater treatment facilities, achieving a 20-year-old goal to eliminate septage as a source of water contamination in the Keys.

Water quality data in several regions of the Keys is demonstrating an improvement in water quality in both canals and adjacent near-island waters after sewerage occurs, so the effort is worthwhile.

*Editor's note: This story was completed before Hurricane Irma visited the Keys. We will provide an update on their plans in a future issue.*

## Tampa-based firm completes zero waste course for SWANA

Staff report

The Solid Waste Association of North America and the California Resource Recovery Association launched their new Zero Waste Principles & Practices certification course this summer.

Tampa-based Kessler Consulting Inc. developed the innovative course for SWANA and the CRRA. The first offering was conducted in August and the course is now available through SWANA's suite of training programs.

The zero waste philosophy promotes the rethinking of a resource's life cycle. The goal is to have all products and components of the resource reused so nothing is sent to a landfill or incinerator. Zero

waste's emphasis is on waste prevention.

SWANA is the leading association in the solid waste management field representing more than 9,000 public and private sector professionals. The association conducts technical conferences, provides training, issues professional certifications and produces publications.

CRRA is California's statewide recycling association. It is the oldest and one of the largest non-profit recycling organizations in the country.

The new course will promote the integration of zero waste principles into existing management systems, practices and policies to move local systems toward de-

veloping and achieving community-specific zero waste goals.

Mitch Kessler, president of KCI, said that the course was a natural fit for them because of their focus on resource conservation and sustainable management of waste.

"The collaborative effort between SWANA, CRRA and the KCI project team reflects a wide array of interests, expertise and passion for this topic and that carries through in the materials," Kessler said.

The three-day course is designed to assist communities with implementing innovative strategies and best practices as they work to reach their zero waste goals.

WATCH  
From Page 4

**Altamonte receives reuse award.** Altamonte Spring's PureALTA project won the 2017 WaterReuse Innovative Project of the Year award at the Annual WaterReuse Symposium in Phoenix, AZ.

The award recognizes notable water reuse and recycling projects that are models for the water reclamation industry.

Altamonte Spring's pureALTA project treats reclaimed water to drinking water quality standards without the use of reverse osmosis.

The project's process train includes ozonation and biological activated carbon filtration, ultrafiltration, granular activated carbon filtration and a final treatment with ultraviolet light with advanced oxidation processes.

The pilot plant treats 28,000 gallons per day of water that is currently used for landscape irrigation.

Altamonte Springs intends to scale up the system to produce 300,000-500,000 gallons per day, about five percent of the city's demand for irrigation water.

The St. Johns River Water Management District partnered in supporting the pilot scale project.

**Tampa Bay Water nabs utility excellence award.** Tampa Bay Water, Hillsborough County's regional wholesale water supplier, received the Association of Metropolitan Water Agencies' Platinum Award for Utility Excellence for implementing the Attributes of Effective Utility Management Process.

The award recognizes utilities that show progress towards attaining the 10 Attributes of Utility Management and Keys to Management Success.

TBW is the largest water utility in the Southeast U.S. The accomplishments for which it received the award include its long-term master water plan, the asset management plan for its \$1 billion infrastructure, its continual improvement plan, its energy management program based on international standards, and innovative revenue management and bond refinancing that has kept its water rates holding steady for seven consecutive years.

The AMWA also awarded the Peace River Manasota Regional Water Supply Authority a platinum award in the same category.

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# FLORIDA REMEDICATION CONFERENCE

# The Premier Soil and Groundwater Cleanup Conference of the Year

Dec. 7-8, 2017, Rosen Centre Hotel, Orlando

## Technical Agenda

### Day One,

Thursday, Dec. 7, 2017



### Opening Session

9:00: **A Word from the Chair**  
Jim Langenbach, PE, BCEE, Senior Principal, Geosyntec Consultants, Titusville

**Kickoff Address:** Michael Annable, PhD, PE, Professor, University of Florida, Gainesville

9:30: **Environmental Consulting at Brownfield Sites is (Much, Much) More than Just Contamination Assessment and Remediation: Strategies for Limiting Professional Liability, Increasing Client Profitability and Improving Redevelopment Outcomes**

Michael Goldstein, Esq., Managing Partner, Goldstein Environmental Law Firm PA, Miami

In a brownfields context, consider the typical contamination discovery-reporting-assessment-remediation-NFA model historically marketed by environmental consultants to responsible parties fully disrupted. Clients taking on these types of sites for redevelopment are now demanding a more non-linear suite of services that emphasize evaluating incremental construction costs associated with properly managing contaminated media, obtaining regulatory agency approvals to properly manage contaminated media during construction, and actually managing contaminated media properly during construction to maintain pre-acquisition defenses to state and federal liability on the one hand while simultaneously limiting exposure to third-party liability claims from neighbors and adjacent property owners on the other. These services can also encompass tapping into federal and state redevelopment and rehabilitation incentive programs to subsidize incremental construction costs and create even greater insulation from legal liability. This presentation will suggest a "unified

theory" of environmental redevelopment consulting with the intent of providing those in attendance with the knowledge, tools and resources necessary to offer a more robust and relevant suite of services to an ever-expanding pool of potential clients in the brownfields marketplace. At the same time, the presentation will highlight emerging topics of professional malpractice and strategies for improving the quality and efficacy of consultant interactions with state and local regulatory agency officials. Areas of focus in this regard will include the relationship between stormwater system design and contaminated media, the plans and reports that regulators are now requiring to allow for on-site grading of affected soils and relocation and processing of solid waste materials, non-statutory environmental criteria applicable to construction dewatering effluent, monitoring and management of airborne contaminants, proper selection of engineering control options and early-stage planning for environmental deed restrictions. In addition, a concise and detailed summary of federal and state financial incentives available to subsidize rehabilitation and redevelopment activities will be presented with recommendations regarding how to timely and efficiently coordinate with other client-retained development professionals to maximize economic subsidy opportunities.

10:00 30-Minute Break

### Session 2: Innovative Assessment and Remediation Strategies

10:30 **Using a Bottom-Up Approach to Develop a Sustainable Remediation Technology: Theory and Practice**

Paul Favara, PE, Global Practice Dir., Liability and Remediation, CH2M, Gainesville

In the ramp-up to integrating sustainability into remediation, a key industry focus area has been to reduce the environmental footprint of treatment processes. In-situ treatment processes involving injection of treatment reagents for chlorinated organics and fuel-related contaminants are considered inherently sustainable since they typically don't require continuous use of energy to provide effective treatment. However, a closer inspection of the burdens related to some remediation reagents shows there is room for improvement. For example, embedded energy and water used in some remediation reagents can be significant. By understanding these environmental burdens and using a bottom-up approach for using sustainable thinking to improve remediation technology, it is possible to improve sustainability profile of the technology while decreasing life-cycle costs. A solar/wind-powered subgrade biogeochemical reactor is a unique in-situ technology for treatment of contaminant source areas and groundwater plume hot spots. SBGRs have been used to treat chlorinated volatile organic compounds and fuel-related contaminants in soil and groundwater; and treatment of other contaminants continues to be evaluated. SBGRs consist of the following common elements: 1) excavation of contaminated source area soils, 2) backfill of the excavation with gravel and SBGR amendments tailored to the contaminant(s) of concern, and 3) installation of a solar- or wind-powered pumping system to recirculate groundwater through the SBGR for treatment. For enhanced reductive dechlorination approaches at CVOC sites, SBGR treatment media have contained various types of organic mulch, new or recycled vegetable oil, iron pyrite or magnetite sands. For fuel-related sites, SBGR treatment media have included recycled gypsum products for sulfate-enhanced degradation. Use of locally sourced farm and tree byproducts, reclaimed construction materials, along with off-grid groundwater pumping, creates a low-cost, low-maintenance and sustainable remediation solution. This presentation will provide an overview of the theory behind SBGR, discuss the sustainability attributes of the technology and provide examples of how this flexible remediation technology can be applied to address different site challenges.

10:50 **The Application of Engineered Phytotechnology for Remedial System Optimization and Ultimate Site Closure of a Complex 1,4-Dioxane Site in Sarasota**

P. James Linton, Principal, Geosyntec, Clearwater

Groundwater at a former manufacturing facility was contaminated with chlorinated volatile organic compounds, the emerging contaminant 1,4-dioxane and arsenic resulting from historic activities. Complex conditions making site cleanup challenging included a complex lithology, a residual source area, and coalescing, on- and off-site dissolved-phase plumes. An ineffective pump-and-treat system was operated by others for 12 years, and an additional 25 additional years of costly O&M was anticipated to obtain closure. Geosyntec planned and conducted high-resolution site investigation activities to refine the conceptual site model and prepared a focused feasibility study for remedial optimization. Investigation tools included vertical lithology and groundwater profiling, pump testing and groundwater flow modeling. The results indicated that the shallow surficial aquifer, the upper 15 feet, was characterized by sands, silty sand/sandy silt with layers of shells and lithified zones, and clay comparable to coastal Central Florida. A 1,4-dioxane/CVOC source area was identified within the fine-grained soils that was slowly back-diffusing into the permeable zones of the SA, resulting in an approximately three-acre dissolved-phase plume in the shallow. The FFS was finalized as a remedial action plan that met the requirements of Chapter 62-780, F.A.C. The final remedy included an impermeable barrier to isolate the 1,4-dioxane source area; innovative, engineered phytotechnology using native species for COC reduction and hydraulic containment; and long-term monitoring for the dissolved plumes. The RAP was implemented and by the second growing season, results demonstrated that the phytotechnology system had captured groundwater flow through hydraulic containment, and groundwater concentrations had decreased by two orders of magnitude. Geosyntec obtained DEP approval to shut down and decommission the P&T system and implement an optimized groundwater monitoring program specific to the phytoremediation design. By the fourth growing season, Geosyntec demonstrated that 1,4-dioxane within the isolation area had decreased to concentrations slightly above the GCTL and that the other plumes were stable and/or shrinking. Based on these results, Geosyntec successfully negotiated DEP approval for no further action with conditions.

11:10 **Demonstrating Plume Stability to Support Risk-Based Closure**

Ed Meyers, PG, Environmental Manager, UCPM Environmental LLC, Orlando

In 1997, Universal City Property Management purchased approximately 2,000 acres of property in the Orlando I-Drive tourist district area. Due to historical operations at the site, 46 solid waste management units and areas of concern were identified at the facility. Soil and groundwater contamination was identified at 17 SWMU/AOCs. UCPM has implemented corrective measures at each of the impacted SWMUs. All impacted soils have been removed from the facility. Groundwater treatment technologies have included excavation, air sparge, chemical oxidation and bioremediation. Eight sites have been closed without conditions and five sites have been closed with conditions. To date, over 800 acres of the facility have been redeveloped including the expansion of the Orange County Convention Center, and construction of two hotels, a golf course, shopping center and two apartment/condominium complexes. To support redevelopment of the impacted property and adjacent land parcels, UCPM performed a preliminary facility-wide risk assessment to evaluate future land use based on current and predicted groundwater contaminant concentrations. Risk assessment activities included development of alternative cleanup target levels associated with several possible development scenarios including commercial and residential use, onsite utility workers, short and long-term construction projects and vapor intrusion thresholds. Following contaminant reduction to acceptable levels, UCPM completed post active remediation monitoring to confirm that contaminant concentrations remain below cleanup target level criteria and remnant groundwater plumes remain stable. UCPM used several techniques to demonstrate that remnant groundwater plumes are stable and contained onsite. These techniques included analysis of groundwater contamination plume maps, groundwater contaminant trend analysis, Bichlor modeling, analysis of stable isotope data, and MAROS and Mann Kendal statistical analysis. This presentation will provide a summary of how UCPM has evaluated plume stability to support site closure

11:30 **Mapping our Way with Drones at Environmental Sites**

Frank McInturff, PE, Principal, EnSafe Inc., Jacksonville

Brent Klavon, Director of Commercial Drones, Aviation Systems Eng. Co., Jacksonville

Although much of the technology evolution behind small unmanned aerial systems, or drones, has been driven by the U.S. Department of Defense's strategic defense initiatives, it is the emerging commercial applications of drones that has driven new regulations and business use cases for

## A Quick Look at FRC 2017 Highlights

### We welcome Michael D. Annable, PhD, PE, to FRC 2017 as our featured FRC 2017 Kickoff Speaker

Dr. Michael Annable is a professor in the Department of Environmental Engineering Sciences at the University of Florida. He joined the UF faculty in 1992 after receiving his Ph.D. from Michigan State University where he worked on soil vapor extraction of multi-component non-aqueous phase liquids. His current interests are in physical-chemical processes related to field scale application of innovative technologies for subsurface remediation.

He is also investigating innovative techniques for measuring groundwater flow and contaminant flux in aquifers. He has published more than 60 journal articles and currently serves as an associate editor for the *Journal of Contaminant Hydrology*.

Mike will kick off the 2017 FRC conference with a discussion of "Advances in Characterization of Water and Contaminant Flux in Porous Media." Don't miss this talk.

And just after that, the ever popular and always intriguing Michael Goldstein, managing partner with The Goldstein Environmental Law Firm PA in Miami, returns to FRC. Michael will provide his take on "Environmental Consulting at Brownfield Sites." He knows better than anyone that brownfields consulting is much more than contamination assessment and remediation. He will discuss strategies for limiting your professional liability, increasing your client's profitability and improving redevelopment outcomes.

In addition, FRC 2017 features two unusual sessions sure to please:

### Our first ever Young Professionals Session

Several years ago, we noted that there were not a lot of young professionals in our audience. Since then, we have taken steps to encourage the participation of the 35-and-under crowd.

This year, we introduce a special session specifically designed for these young guns to take the podium and share their unique perspectives on a range of technical and management issues. Can we learn something from them? You bet.

### Back again for 2017, our fast-paced Speed Talk Session

Many moons ago, we tried a crazy idea: we presented short five-minute talks from several speakers during lunch. Of course, the fact that it was done during lunch ensured it's failure. After all, who wants to listen to short technical presentations while you're finishing dessert and coffee, deep into conversation with your round table colleagues?

FRC Chair Jim Langenbach had a better idea last year: give the speed talks a session of their own during the conference when folks are not distracted. Plan it for the end of the day's talks to allow for follow-up questions at the FRC Reception. What a concept! Last year, it went so well that we have expanded the idea. Expect 10 rapid-fire talks chock fulla good stuff on topics from green remediation to ISM.

Add to that, our usual broad selection of topical and relevant subject matter presented by some of the industry's most knowledgeable and recognized experts, stir well and, voila, FRC 2017 is ready to serve.

### 2017 technical session menu items include:

- Innovative Assessment and Remediation Strategies
- Emerging Contaminants of Concern: PFAS
- Applications of In-Situ Assessment and Remedial Strategies
- Petroleum Remediation: Case Studies
- Thermal Technologies and Complex Strategies
- Enhanced In-Situ Remediation Applications
- Conceptual Site Models to Facilitate Successful Remedy Applications
- Our popular annual Regulatory Panel Discussion with DEP representatives

And don't forget our **8th Annual FRC Charity Golf Tournament** at the nearby Shingle Creek Golf Club. The course was recently redesigned and will present some new challenges to even the most seasoned golfers. Proceeds this year go to the Special Operations Warrior Foundation. Join us on the links for a great cause!

**Two words best describe what we have put together this year at FRC: "More" and "Better." Do not miss FRC 2017.**



imagery collection, data analysis, visualization and management. Learn how we charted the path for the first commercial drone use on U.S. Navy installations for the Navy Facilities Engineering Command Southeast's environmental cleanup sites. This project included the use of multiple drone aircraft, optical and LiDAR imagery collection, ground control, various post data analysis/visualizations and development of an ESRI ArcGIS Portal web application. The project included the data acquisition of high resolution imagery, real-world topographic mapping, stock pile volume analysis, and conceptual site model development with 3D views.

12:00 **Day One Luncheon** Sponsored by **Advanced Environmental Laboratories Inc.**

### Session 3: Emerging Contaminants of Concern: PFAS

1:00 **Chemical Properties, Uses and Sources, and Risks Associated with PFAS**  
Brian Moore, PE, Principal, GHD Services Inc., Tampa

Perfluoroalkyl and polyfluoroalkyl substances are a family of manufactured chemicals that do not occur naturally in the environment. Perfluorooctane sulfonate and perfluorooctanoic acid are two of the most well-known and are contaminants of emerging concern. They have been identified in the environment at several known and suspected contaminated sites. These chemicals are not traditional industrial pollutants and they are not commonly monitored or measured. They have the potential to enter the environment and cause known or suspected adverse ecological and human health effects. PFAS have hydrophobic and hydrophilic ends, and repel oil and water. This presentation will provide background information on the chemical properties, uses and sources, and risks associated with PFAS. The presentation will also detail existing environmental quality guidelines and some of the challenges associated with assessment and remediation of PFAS in the environment. PFAS analysis can be complicated because of cross contamination, analytical limitations and inconsistencies in methodologies. Similarly, PFAS are extremely recalcitrant to degradation or destruction, which complicates the remediation process. The presentation will also provide examples of remedial approaches for PFAS cleanup.

1:30 **Perfluoroalkyl and Polyfluoroalkyl Substances: Treatment Options for Soil and Groundwater**  
Gary Birk, PE, Managing Partner, Tersus Environmental, Wake Forest, NC

Perfluoroalkyl and polyfluoroalkyl substances are surfactants, polymers and other substances that are widely distributed across the higher trophic levels and are found in air, soil and groundwater at sites across the U.S. For decades, they have been used in hundreds of industrial applications and consumer products such as carpeting, apparels, upholstery, food paper wrappings and metal plating. Surfactant applications used heavily in the military include aqueous film-forming foams used to extinguish fires involving highly flammable liquids. The toxicity, mobility and bioaccumulation potential of PFAS pose potential adverse effects for the environment and human health. PFAS have been found at very low levels both in the environment and in the blood samples of the general U.S. population. To provide a margin of protection from a lifetime of exposure to perfluorooctanoic acid and perfluorooctyl sulfonate from drinking water, EPA established the health advisory levels at 70 parts per trillion. PFAS are fluorinated organic compounds in which the hydrogen atoms of the hydrocarbon skeleton are substituted fully or partially by fluorine atoms. In view of the strong covalent bond between the fluorine and the carbon atoms, these compounds are considered non-degradable and they persist in the environment. Practitioners have difficulty remediating these compounds at a reasonable cost because PFAS are extremely resistant to thermal, chemical and biological degradation processes. The current state of the practice for addressing highly concentrated source zones, mitigate mass flux of impacts to aquifers or PFAS in extracted water includes the use of granular activated carbon. Unfortunately, GAC is only a temporary solution as it is effective at removing only a portion of PFAS from groundwater. This is due to GAC's low binding capacity for PFOS as compared to nonpolar organic hydrocarbons and the low effective removal of shorter chain perfluoroalkyl acids, the daughter products resulting from biotransformation of polyfluorinated precursor compounds. As the PFAS family of compounds includes anions, cations and zwitterions, new sorbent media are being developed to remove both long and short chain PFAS that combine hydrophobic interactions with electrostatic interactions. Liquid surface-active reagents are also being developed for use as an initial pretreatment. In the pretreatment phase, dissolved PFAS are precipitated as micro-flocs by metering the liquid active compound into a stirring tank. With removal efficiencies of 96 to 98 percent, the precipitants can be concentrated to a very high degree, the life of sorbent media is significantly extended. This constitutes a considerably more sustainable approach. The presentation will include results and lessons learned from the latest laboratory and field implementation for the treatment of PFAS-impacted soil and groundwater. The presentation will also provide an update on advances in point-of-entry systems.

2:00 **Pilot Testing of Removal of Perfluoroalkyl and Polyfluoroalkyl Substances from Fire Training Site Soils**  
William Kerfoot, PhD, Principal, Kerfoot Technologies Inc., Mashpee, MA

Perfluoroalkyl compounds have been used with fire-fighting foams and are found adsorbed in soils from the sites. Rainwater leaches the compounds downward when porous, sandy soils dominate resulting in vadose zone and saturated soil contamination. The soils also contain the remnants of the fuels which were ignited and subjected to elevated temperatures. A series of tests were conducted on example contaminated soils with different delivery methods using peroxide-activated nanobubble ozone slurries. Formation of the slurry above ground, followed by injection through slotted screens into the contaminated soil, showed PFOS and PFOA removal of 98.5 and 92.3%, respectively, within a two-day long exposure. Fluorotelomer sulfonates of two isotopes, 6:2 and 8:2, showed removal efficiencies over 98% when monitoring aqueous fractions. Formation of the slurry in ground from special nanoporous stainless-steel laminar Spargepoints® appeared to increase the rate of removal from adsorbed soil fractions. A rise in fluoride concentration, proportional with the decomposition of 85% of PFOS, the most abundant PFAS, was graphed during 72 hours of injection. Acidity rise, often observed due to formation of dilute hydrofluoric and carbonic acids, was controlled by use of slightly alkaline peroxide, yielding final pHs between 6.4 and 7.4. Different from chloride, residual fluoride concentrations, ranging up to .75 mg/L, gradually disappeared from groundwater solution.

2:30 **In-Situ Containment of PFAS Using Colloidal Activated Carbon**

Chad Northington, PE, SE District Technical Manager., Regenesis, Tallahassee

With the increasing awareness to the widespread contamination associated with PFOA, PFOS and other PFAS compounds, there is an established need for new and lower cost treatment options that can address the large dilute plumes that these contaminants commonly form. At the present time, the accepted remediation method is to use pump and treat systems equipped with activated carbon. The costs associated with running these systems and replacing the carbon can be quite high. For that reason, the ability to implement an in-situ barrier of activated carbon that can cutoff and contain these plumes for many years with a single application affords a beneficial means to decrease or avoid the operating and maintenance costs in the existing aboveground systems. This presentation examines the use of a colloidal activated carbon that readily distributes within the subsurface, providing a method for injecting an in-situ barrier of activated carbon for PFAS treatment. Laboratory batch studies were conducted to measure the relative adsorption of PFOS, PFOA, PFHpA and PFBS with a distributable form of colloidal activated carbon. Results of these studies demonstrated that a field relevant dose of the colloidal activated carbon could reduce 100 mg/L of each PFAS compound tested by at least 99.9% and the relative adsorption followed in the order: PFOS > PFOA > PFHpA > PFBS, as has been observed with other activated carbons. In these experiments PFOS and PFOA were reduced to below the 2016 revised EPA health advisory limits of 70 ng/L.

3:00 30-Minute Break

#### Concurrent Sessions

3:30 **Session 4A: Speed Talks**

- Green Remediation Alternative**  
Nesmar Mora, Environmental Engineer, Royal Consulting Services, Longwood
- Post Remediation Performance and Aquifer pH**  
Brad Elkins, MS, PG, Tech. Sales & Support, EOS Remediation LLC, Raleigh, NC
- Horizontal Well Used for Coal Ash Basin Dewatering**  
David Bardsley, PG, Geologist, Directed Technologies Drilling Inc., Bellefonte, PA
- Sustainable and Cost-Effective Destruction of Chlorinated Alkane-Alkene Contaminants via Biostimulation and Enhanced Reductive Dechlorination**  
Kent Armstrong, President, TerraStryke Products LLC, Andover, NH
- Tools for Monitoring Contaminant Biodegradation when Combined with Colloidal Activated Carbon**  
Chad Northington, PE, SE District Technical Manager, Regenesis, Tallahassee

- Filing Data Gaps with Horizontal Wells**  
Lance Robinson, PE, Chief Technology Officer, EN Rx Inc., Parrish
- Successful Large-Scale Remediation Projects Using a Variety of Emplacement of Amendments Techniques and Operational Procedures**  
Robert Kelley, PhD, Client Solution Mgr-East, Cascade Tech. Services, Midland, NC
- Klozur One: A Built-In Soluble Activator with Klozur SP**  
Patrick Hicks, PhD, SE Regional Technical Sales Manager, PeroxyChem, Philadelphia, PA
- Time-Tested Advantages of Horizontal Wells**  
Kyle Carlton, PG, Senior Geologist, Directional Technologies Inc., Miramar Beach
- ISM to Delineate Soil for a Solid Waste Landfill Cell Expansion**  
John Meade, Senior Account Executive, TestAmerica, Pensacola

### Session 4B: Applications of In-Situ Assessment and Remedial Strategies

3:30 **Unusual Dichloroethylene Isomer Ratios and External Nitrate Input Help Decipher In-Situ Pilot Test Outcomes**  
Jim Studer, PE, Principal Consultant, InfraSUR LL, Albuquerque NM

This case study represents an interesting example where outcomes from a field pilot test of an in-situ groundwater treatment technology strayed significantly from expectations. Careful review of pilot test performance assessment data, leveraged by insights obtained from a bench-scale treatability study, led to identification of subsurface features the awareness of which avoided a misleading summary conclusion that the treatment technology was incompatible with the remedial goal. The pilot test involved a shallow injection zone and a deeper injection zone within a variably weathered limestone harbouring a TCE and DCE groundwater plume. Natural biodegradation was slowly degrading the TCE to DCE but mineralization was not apparent. The pilot goal was to test biogeochemical reductive dechlorination, or BiRD, to accelerate remediation. A bench treatability study demonstrated in-situ biogenic ferrous sulphide production and TCE and DCE transformation without VC production. A reagent formulation identified from the bench study was the basis for 7,425 liters of reagent solution pressure injected into each zone. The central monitoring well in the shallow zone did not respond to injection—even after nine months. The central monitoring well in the deep zone did not immediately respond but eventually injectate components were detected due primarily to diffusion and TCE and DCE concentrations declined without VC production. This

Continued on Page 16



#### Current List of FRC 2017 Exhibitors and Sponsors

- |                                 |                                    |
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| ASEC Drones                     | Huss Drilling                      |
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| FRx Inc.                        | Vapor Pin Enterprises              |
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| Geo-Solutions                   | Waste Connections - JED Landfill   |
| Geoprobe Systems                | Waste Management                   |

The exhibit hall will be open from 8:00 am until 7:00 pm on Thursday, Dec. 7, and from 8:00 am until 12:00 noon on Friday, Dec. 8. The fee to access to the largest assemblage of soil and groundwater technology and service providers in the Southeast is \$50. Call (407) 671-7777 or e-mail [mreast@enviro-net.com](mailto:mreast@enviro-net.com) for more information.



## LAPOINTE

From Page 1

above or just below ground level and can undermine the proper functioning of septic systems.

Our research with human tracers, including stable nitrogen isotopes, sucralose, acetaminophen and other human-sourced nutrients and compounds has demonstrated the couplings between septic systems and the pollution of rivers, canals, estuaries and coastal waters.

A significant amount of poorly-treated sewage enters Florida's surface waters where it supports harmful algal blooms, including toxic species such as the blue-green alga *Microcystis*.

Poorly treated septic tank effluent is nitrogen-rich and, in combination with our famous Florida sunshine and warm temperatures, creates the perfect environment for algal blooms.

Algae come in many different forms and species. Initially, macroalgae, commonly known as seaweeds, are the first to bloom on the bottoms of springs and shallow coastal waters, smothering seagrasses, sponges and other biota critical for the normal functioning of aquatic food webs.

In sub-tropical and tropical coastal waters, macroalgae can also smother corals and eventually kill them. Some macroalgae float and bloom on the water surface, cutting off sunlight and impeding wildlife,

anglers and boaters.

Over time, microscopic algae in the water column, called phytoplankton, also begin to bloom and can eventually reach high densities where sunlight reaching the bottom becomes greatly reduced.

This situation leads to discolored water—red, green or brown, depending on the algal species—as well as reduced light penetration, and loss of corals and seagrasses, as well as the habitat they provide.

Without corals and seagrasses and their associated biodiversity, fish and larger marine life either move out or die off.

Some species of macroalgae and phytoplankton can produce toxins, posing direct harm to wildlife and humans that come in contact with the bloom or its toxins.

When the algae die following a bloom, bacteria consume oxygen to break down the decaying organic matter, resulting in low oxygen conditions that become “dead zones” that no longer provide a functional habitat for fisheries.

As the waters become polluted and marine habitat is lost, real estate values can decline. Tourists and fishermen go elsewhere. We are now at a point in parts of Florida where fishing guides are already seeing their futures threatened. Businesses suffer and jobs vanish.

Unless Floridians recognize the significance of the problem and act soon, much of what makes our state beautiful and unique will be lost, perhaps forever.

“There are probably as many economic considerations as there are environmental,” said Charles Pattison, policy director for 1000 Friends of Florida. “I see real estate people now coming forward as it affects their ability to sell real estate. It affects a homeowner's property value. This may be as important in moving forward with this idea for septic tank replacements as anything we've got going.”

### Keys to victory

Biologists and fishermen in the Florida Keys were among the first to recognize the problem back in the 1980s and 1990s. In 1996, Governor Lawton Chiles and his cabinet mandated that communities in the Keys develop a central sewage collection system with advanced wastewater treatment (nutrient removal) facilities. Initially, they were given a deadline of 2010 to comply.

“I moved to the Keys in 1978,” said Don DeMaria, a commercial fisherman. “Back then the waters were blue and clear and the coral was healthy. Over time, the water became green and the coral was covered with algae.”

Sadly, the Florida Keys reef system has lost a tremendous amount of living coral, which has decreased from over 70 percent cover in the 1970s to about five percent or less today.

The Florida Reef Tract, which provides habitat for thousands of species of marine life, is one of the largest in the world, extending 221 miles along the Keys. In addition to the problem of algal blooms, corals in the Keys were also being killed by a pathogen found in human sewage, the fecal bacterium *Serratia marcescens*, which can cause white pox disease.

“We found a strain that comes from human sewage and from the reef that causes white pox disease in just five days,” said Dr. Kathryn Sutherland, associate professor in the Department of Biology at Rollins College who first identified the pathogen. “So we had definitive evidence that the *Serratia marcescens* found on the reef and found in human sewage is a cause of white pox disease.”

Today, most of the Florida Keys is on central sewage collection and advanced wastewater treatment. Improving water quality in nearshore waters has been apparent.

“Marathon ended up becoming the focus of a pilot program to see how well this centralized sewage system we were building was going to work,” said George Garrett, deputy city manager with the city of Marathon. “We began to see specifically definable improvements in water quality. Secondly, as you began to look at the nearshore, up to 500 feet from the canal system, you actually began to see improve-

ments in the seagrass beds.”

This echoes what other residents and fishers have observed.

“You go the housing developments where they have a central sewer system and the canals are nice again,” said DeMaria. “I think what we are doing here in the Keys is an example to other areas of what can be done.”

### Other algae battles

The Keys are not the only place where algal blooms are threatening Florida's waterways. Sarasota County public works officials began to study septic system pollution in the mid-1980s. Likewise for Charlotte County.

Crystal River, famous for its manatees, was cited for nitrogen impairment in the early 2000s. Algal blooms became so severe in the Indian River Lagoon between 2011 and 2014 that they were linked to massive seagrass die-off and the deaths of hundreds of manatees and pelicans as well as dozens of bottlenose dolphins.

Research revealed that septic tanks were a significant part of the problem in all of these communities.

Typically, rapid population growth occurred without sewer collection and treatment systems in place. Septic systems, as well as stormwater runoff from agricultural and urban areas, overloaded the nearby bodies of water with nitrogen and phosphorus.

Over many decades, the waters became dangerously polluted and algal blooms expanded in both frequency and extent.

All of these communities responded by installing modern central sewage collection systems and treatment facilities. In each case, the local waters have begun to improve.

Furthermore, public works officials are extremely pleased with the ease of maintenance and durability of the new vacuum and low-pressure sewers. While each of these communities are turning the tide, other areas are just now addressing the septic system issue.

“Septic tanks are not designed to keep pollutants out of pristine bodies of water like the Indian River Lagoon,” said Clay Henderson, executive director of Stetson University's Institute for Water and Environmental Resilience. “We need to identify the areas where septic tanks are causing pollution to the lagoon and focus our efforts on converting those areas to advanced wastewater treatment.”

The problem in many communities is two-fold: a lack of understanding of what causes the problem and a reluctance to implement funding measures to pay for conversion to sewage collection and treatment.

Installing sewer lines and building treatment facilities costs money—but it pays off sooner than most taxpayers realize.

“Thanks to our septic-to-sewer program and our new wastewater treatment plant, we've had consistently improving water quality trends throughout the bay and the seagrass is coming back,” said Mark Alderson, executive director of the Sarasota Bay National Estuary Program.

The environment and wildlife are essential infrastructure to Florida's economic future. More than 100 million visitors come to our state each year to enjoy the sun and water, but if the water is polluted, the tourists and snowbirds will go elsewhere. Our economy will suffer.

As Tampa Bay Estuary Program Director Holly Greening recent noted, “Helping the environment is not in opposition to helping the economy.”

In fact, they are directly connected.

### Awareness and inertia

The biggest challenges for concerned Floridians are awareness and inertia. Every resident with a septic tank needs to be aware that his sewage may be contributing to the algae onslaught that is damaging our water and wildlife.

Likewise, they also must be motivated to act. Many people choose to be idle on environmental issues unless they are di-

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**FRC**  
From Page 1  
plans.

Goldstein will discuss the subtle interplay of simultaneously conducting cleanup work, controlling exposure risk to during and after the work, and developing institutional controls or site closure conditions that can often be more challenging than the remediation project itself.

After the kickoff session and a break, the remainder of the morning includes discussions on innovative assessment and remediation strategies.

#### Innovation at work

Paul Favara, global practice director at CH2M in Gainesville, leads off Session 2 with a discussion of using a solar/wind-powered subgrade biogeochemical reactor to provide sustainable and effective chlorinated solvent destruction in contaminated groundwater.

Next, James Linton, principal environmental scientist at Geosyntec Consultants Inc. in Clearwater, will describe a different approach to groundwater plume bioremediation.

He will focus on the use of phytoremediation at a site where complex soil stratification and back diffusion from silty soils caused the failure of the initial attempt to close a site contaminated with 1, 4-dioxane.

Ed Meyers, PG, environmental manager at UCPM Environmental LLC in Orlando and an FRC veteran, will describe a multi-decade-long effort to remove chlorinated solvents from 2,000 acres that were once owned by a defense contractor.

Meyers will review 20 years of remediation work that is now approaching its conclusion. To date, more than 800 acres at the site have been cleaned up and parceled for sale.

Of the 1,200 remaining acres, the number of contaminated sites has been reduced from 46 on the original acreage to just four today.

In an interview, Meyers noted that contaminated plumes are now affecting only about 30 acres. He will give details of the complex remediation work completed at the Central Florida site.

Frank McInturff, PE, principal with EnSafe Inc., and Brent Klavon, director of commercial drones at Aviation Systems Engineering Co., both in Jacksonville, will discuss how commercial drones can assist in site cleanups.

Drone usage is developing a growing cadre of recreational and professional users and is expanding into the cleanup arena.

#### Young professionals

One of the Day Two concurrent sessions on Friday morning features young environmental professionals, a new session format for 2017. In the first talk, three environmental specialists from the Florida Department of Health - Polk County will provide their viewpoints and offer advice for successfully integrating millennials into what is an increasingly aging environmental professional workforce.

"We're going to provide some insight for hiring managers about what millennials can bring to the team," said Jilian Drenning, environmental specialist II. "And we will offer some advice to millennials who may have some practical experience but no true professional experience."

Included in their talk will be a discussion of the value of internship and collegiate leadership experience, which will be directed at hiring managers in attendance.

#### Case studies: Petroleum

Contaminated petroleum site cleanup case studies will be featured during another Day Two concurrent session on Friday morning.

Three talks will discuss the use of multiple reagents to accomplish hydrocarbon degradation under challenging site conditions.

A fourth will discuss using ozone sparging at a corrective action site in Dixie County where aboveground storage tanks and a constantly changing water table below them produced unusual treatment circumstances.

Rounding out that session, Jeff Roberts, a senior manager at SiREM in Guelph,

Ontario, Canada, will discuss the appropriate selection and use of recently isolated bacteria with enhanced benzene degrading capability to degrade benzene and related compounds under anaerobic conditions.

#### New for 2017: Varied talk lengths

An important note for attendees this year is that the duration of technical presentations ranges from nine minutes for "speed talks" and 15 minutes for the Young Professionals Session, to talks up to the traditional 30 minutes in length.

Jim Langenbach, FRC 2017 chair and senior principal and Florida branch manager for Geosyntec Consultants in Titusville, said the change was adopted to provide a maximum number of speaking opportunities at the two-day event.

The presentation lengths in concurrent technical sessions differ. Attendees intending to hear presentations across the two concurrent sessions should note the use of variable presentation time spans.

Speed Talks return this year to FRC with ten, nine-minute-long presentations. The session was scheduled just before the FRC Reception to allow for one-on-one questions over a cold beverage.

Langenbach instituted speed talks last year and the session was successfully orchestrated and well received.

#### Regulatory panel discussion

Friday afternoon's annual Regulatory Panel Discussion features three Florida

Department of Environmental Protection professionals new to FRC and one long-time FRC participant.

Teresa Boeshaghi, Austin Hofmeister and Lynn Walker, PE, will join the panel from DEP in Tallahassee and Wilbur Mayorga, PE, will represent Miami-Dade County as only he can.

Boeshaghi is the program administrator for the Florida Department of Environmental Protection's Waste Cleanup Program. She will provide an update on the state's Drycleaning Solvent Cleanup Program and some statistics on the number of program sites, site assessments, remedial summary and the new DCSP Advanced Site Assessment Program.

Hofmeister is the program administrator for the state's Petroleum Restoration Program. He will provide an update on the PRP including performance metrics, goals, recent changes to the DEP website, changes to active score, the Advanced Redevelopment Program, and the recent formula modification for site assignments.

Walker is a professional engineer in the DEP Waste Management Division's Office of District and Business Support. She will update attendees on regulatory and technical support issues, including the DEP/EPA MOA for PCBs, DBSP review of closure reports including restrictive covenant packages and SRCRs, and a summary of recent Contaminated Media Forum activities and initiatives.

Mayorga is chief of Miami-Dade's RER/DERM's Environmental Monitoring and Restoration Division. He will provide an overview and summary of developments at contaminated former landfill sites in the county.

The regulatory panel has consistently been FRC's best attended session. This year promises to be no different.

#### Networking opportunities

All work and no play makes environmental professionals almost as dull as a Starbucks full of the poorly socialized.


In addition to well-timed breaks between sessions, the luncheons will provide opportunities to sit and share war stories over rubber chicken.

Advanced Environmental Laboratories Inc. is sponsoring Thursday's luncheon (the chicken will actually be good) and CH2M is sponsoring Friday's luncheon.

The FRC Reception follows the talks on Day One and is sponsored this year by Pace Analytical Services LLC.

This year, a record 90+ companies will be on hand to exhibit, including drillers, reagent providers, equipment vendors, analytical labs and almost any other service, material or equipment needed for soil and groundwater cleanup work.

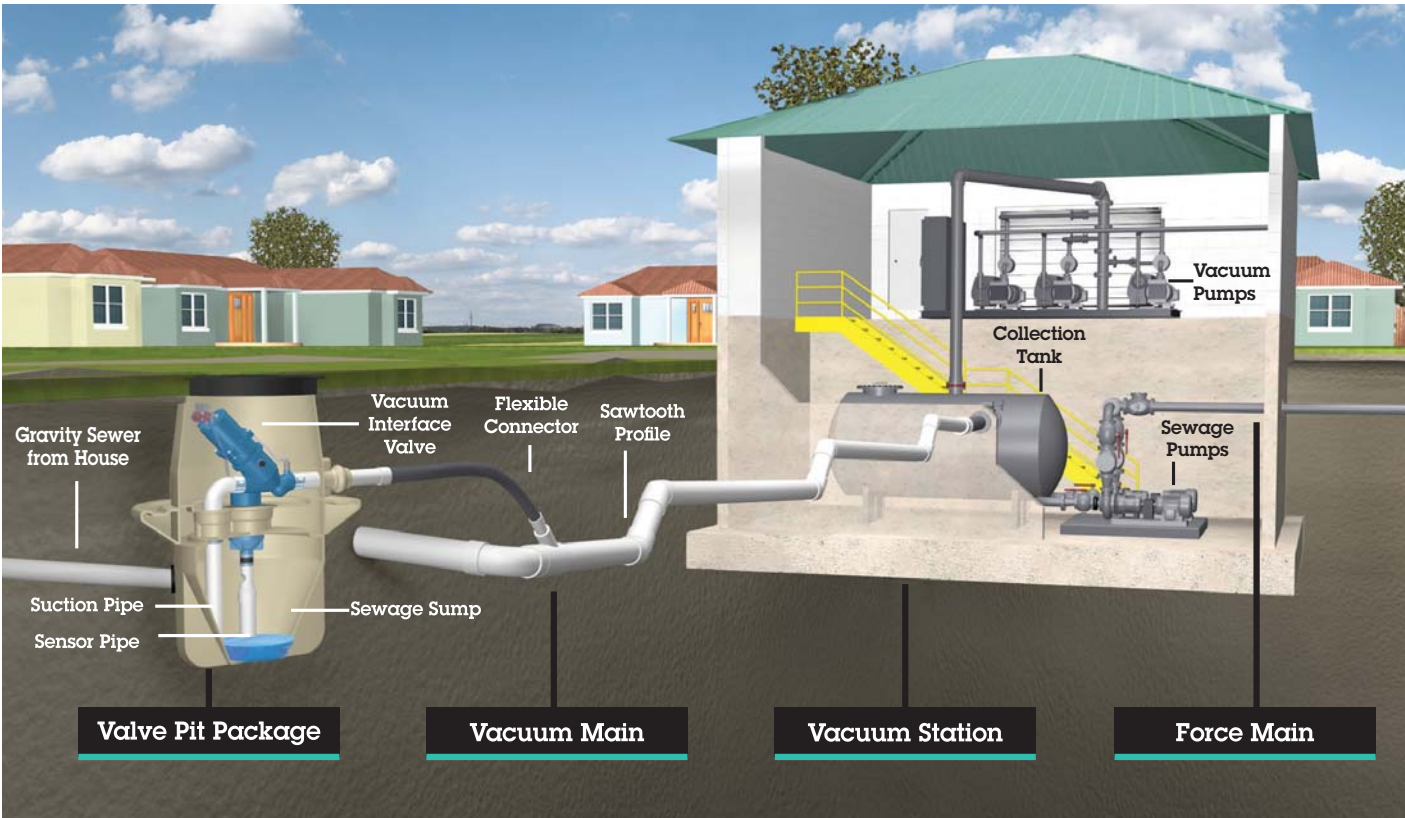
FRC 2017, set for Dec. 7-8 at the Rosen Centre in Orlando, is part of the holiday season again and an event that is circled annually on the calendars of many environmental professionals in the Southeast.



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# Court of Appeal decision reopens DEP toxics criteria rule challenge

By ROY LAUGHLIN

The city of Miami and the Seminole Tribe of Florida now have a second shot at challenging the Florida Department of Environmental Protection's Human Health Toxics Criteria Rule.

In October, the Third District Court of Appeal in Miami reversed a Florida Division of Administrative Hearings' dismissal of the suit on technical grounds.

In August, 2016, four petitioners filed suit against the new standards. In addition to the Seminole Tribe and Miami, Martin County and the Florida Pulp and Paper Association Environmental Affairs Inc.

filed petitions.

The first three challengers claimed that at least some of the standards were too lax. FPPA challenged the new standards as too strict.

The Florida Department of Administrative Hearings dismissed all four petitions as "untimely filed pursuant to section 120.56 (2)(a), Florida Statutes (2016)," legalese for not getting the paperwork filed before the published deadline.

Subsequent to DOAH's dismissal, FPPA filed an appeal in the First District Court of Appeal in Tallahassee. In July this year, that court issued an opinion revers-

ing the dismissal, sending the case back to DOAH for consideration.

"We agree with and adopt our sister court's well-reasoned opinion, which is applicable to the consolidated appeals before this Court, and therefore, we reverse the corrected order of dismissal as to the Seminole Tribe and the City (of Miami) and remand for further proceedings," wrote the Third District Court of Appeal judges in their opinion.

The case now reverts to DOAH for a hearing based on its merits.

The new standards for toxins released to surface waters in the state have been controversial.

DEP scientists used probabilistic risk assessment, a method relatively new to the department, for determining threshold standards for the rule.

The method is controversial because it makes a number of assumptions, for example, what the exposure level would be for a given chemical under population-wide typical consumption of seafood.

The resulting standard is critically dependent on what the modelers assumed was typical consumption where consumption is the primary uptake route.

In 2016, DEP concluded its updating exercise for toxic substances released to surface water. The exercise increased the acceptable contaminant levels for more than 24 substances and decreased the levels for 13.

In the case of benzene, the standard increased about three parts per billion. Many experts believe this standard should have been tightened, not relaxed.

The rule also added new standards for 39 chemicals that had not previously been regulated.

The plaintiffs challenged the new standards from two different perspectives.

The Seminole Tribe based its challenge on the fact that tribal members consume significantly more fish and aquatic organ-

isms than the risk assessment model's consumption assumed.

Tribal members' high level of consumption exposes them to a much greater health risk from benzene, in particular, and perhaps other water contaminants with new standards calculated using the probability model of risk.

If that is the case, some standards may require recalculation.

The city of Miami's challenge was based on similar grounds, but more generally found the updated standards unacceptable.

Miami officials do not favor relaxing the standards for surface water toxins. According to their plea, DEP's decision is without justification of the risk of the levels of toxins and the increased human health risks that city officials allege will ensue.

Martin County officials argued in their submittal to DOAH that the new standards endanger public health and safety. They are not satisfied that, in setting the standards, DEP followed its own rules.

DEP established the new standards under the requirements of the Clean Water Act. The department was several years tardy in completing its risk assessment and proposing the new standards.

DEP scientists and regulators have consistently argued that exposure assumptions for the model are accurate for Florida populations and therefore provide sufficient protection.

The case now heads back to Administrative Law Judge Bram D. E. Canter. As of the second week of November, the hearing had not been rescheduled.

DEP's Human Health Toxics Criteria Rule will not be effective until all judicial appeals end, and the rule is submitted to and approved by the U.S. Environmental Protection Agency.

It appears that approval will be delayed until 2018.

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## EPA recognizes excellence, innovation in clean water infrastructure

Staff report

This fall, the U.S. Environmental Protection Agency recognized 28 clean water infrastructure projects around the country for excellence and innovation within the Clean Water State Revolving Fund program.

Projects included large wastewater infrastructure projects to small decentralized and agriculture projects.

The agency's Performance and Inno-

vation in the SRF Creating Environmental Success, or PISCES, program celebrates innovation demonstrated by CWSRF programs and assistance recipients.

The CWSRF is a federal-state partnership that provides communities with a permanent, independent source of low-cost financing for a wide range of water quality infrastructure projects.

Over the past 30 years, CWSRF programs have provided more than \$125 billion in financing for water quality infrastructure.

"For decades, the Clean Water State Revolving Fund has supported critical water infrastructure projects that help grow the American economy and support our way of life," said Mike Shapiro, acting assistant administrator in EPA's Office of Water.

"These projects are a testament to the power of the Clean Water State Revolving Fund in leveraging investment to meet the country's diverse clean water needs," he said.

Twenty-eight projects by state or local governments, public utilities and private entities were recognized by the 2017 PISCES program.

Four projects in Region 4 were recognized including a biosolids improvement project for energy recovery in the city of Albertville, AL; a stormwater retention project in the city of Hinesville, GA; an ocean outfall project in the city of Myrtle Beach, SC; and a digester project in the city of Graceville, FL.

The Graceville project improved the energy and process efficiencies of the city's wastewater treatment aerobic digester.

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# USGS study: Millions of domestic well water users consume high levels of arsenic

By ROY LAUGHLIN

A recently published U.S. Geological Survey study estimated that 2.1 million Americans drink well water contaminated with arsenic concentrations above 10 micrograms per liter, the U.S. Environmental Protection Agency's human health standard for arsenic.

Consumption of drinking water with arsenic concentrations slightly greater than the limit can cause birth defects as well as preterm births. At higher arsenic concentrations, cancer and other illnesses can occur.

The study, "Estimating the High Arsenic Domestic Well Population in the Conterminous United States," had two primary goals.

The first was to develop a multifactorial statistical model for predicting arsenic concentrations in well water across the conterminous U.S., even where sampling and analysis has not occurred.

The second was to estimate the number and spatial distribution of the U.S. population exposed to arsenic above the 10 microgram standard threshold.

To construct its geographical prediction model of arsenic in groundwater, the research team began with arsenic data for 20,450 potable water wells.

However, data from water wells is not consistently available across the country.

"Although areas of the U.S. were under-represented with arsenic data, predictive variables available in national data sets were used to estimate high arsenic in unsampled areas," the researchers wrote.

"Additionally, by predicting for all of the conterminous U.S., we identified areas of high and low potential exposure in areas of limited arsenic data."

The idea of using an algorithm to interpolate geographical distribution of substances is not new. But the specific sophisticated USGS geographic information system model for arsenic presented in the

study is new.

A significant component of model development was to select and statistically test more than 321 additional geological and descriptive variables to estimate arsenic concentrations where well water analysis data were sparse or lacking.

Across most of the country, the model showed that domestic well water does not contain arsenic over the 10 micrograms per liter threshold.

Arsenic occurrence above that standard is evident in parts of the Northeast, in an arc across the upper Midwest from Pennsylvania to Wisconsin, in southern Idaho and West Texas, and in parts of the Southwest including Arizona and Nevada, in particular.

According to the research, Florida is not an area where domestic drinking water wells, which are generally shallow, are likely to contain arsenic levels above 10 micrograms per liter.

But one area around Lake Okeechobee and another in East Central Florida northeast of Lake Okeechobee have an intermediate possibility of wells producing water with arsenic greater than 10 micrograms per liter.

The Florida characterization is based on data generated by the model rather than from actual well water sampling and analytical results.

In a second study component, researchers overlaid well water arsenic concentration data on census data to estimate the number of people drinking from wells with high arsenic levels.

"Broadly speaking, our model shows that the parts of the U.S. with the greatest domestic well use are also likely to be the parts of the U.S. with the greatest numbers of domestic well use population with high arsenic in their well water."

Minnesota, Ohio and Indiana were the three states with the greatest number of

wells containing arsenic and also the greatest number of people exposed to high arsenic concentrations in drinking water.

Maine, New Hampshire and Nevada were the three states with the highest percentage of their population drinking well water with high arsenic concentrations.

Florida is ranked 17th in terms of population exposure to arsenic above 10 micrograms per liter in drinking water.

The USGS estimated that 51,000 Floridians are potentially exposed to high levels of arsenic in potable well water.

That is 2.7 percent of the 1,907,000 Floridians who rely on domestic wells for their drinking water.

Several characteristics of arsenic in drinking water motivated the USGS researchers.

First, arsenic at 10 micrograms per liter imparts no taste or odor to alert consumers of its presence.

In addition, analysis of drinking water

from domestic wells for arsenic is the well owner's responsibility.

And, typically, well owners do not have their drinking water analyzed when they do not suspect a problem.

The authors noted that their model was in close agreement with measured arsenic levels. Its output can be used to predict well water arsenic in areas without analysis data.

"The estimates from this study of the domestic well population with high arsenic by county or state are the first nationally consistent, model-predicted look at where the potentially most affected populations are located throughout the U.S.," wrote the researchers.

While urging cautious use of extrapolated data, the researchers encouraged additional refinement of the model to make it a more valuable tool for selecting areas for future well water sampling.

The study appeared in *Environmental Science & Technology*, an American Chemical Society publication.

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# New research indicates ongoing health impacts from dispersant use during BP oil spill cleanup

By PRAKASH GANDHI

Workers who helped clean up the massive 2010 BP oil spill that killed 11 people and caused devastating environmental damage in Gulf of Mexico waters and along coastlines are suffering health impacts from the chemical used in the cleanup, according to a new study.

Most of the people who were involved in the cleanup suffered symptoms such as coughing and wheezing for only a short time after the disaster ended.

But a study by the National Institutes of Health, the primary agency of the U.S. responsible for biomedical and public health research, said that some workers experienced symptoms for much longer and others did not develop these effects until well after the spill.

The Deepwater Horizon disaster started on Apr. 20, 2010, when the oil rig exploded 150 miles off the Louisiana coast, killing 11 people.

The rig sank and, two days later, oil began gushing from 5,000 feet below the Gulf of Mexico's surface.

Oil drifted to the coasts of Louisiana, Mississippi, Alabama and Florida. The ocean itself was covered in about three million barrels of crude oil.

BP was unable to shut off the flow from the submerged rig until July, which meant an estimated 4.9 million barrels of oil were released and spread throughout the gulf.

But the BP disaster also took another, slower toll. Thousands of men and women who helped clean up the spill gradually became ill.

During the cleanup, BP sprayed nearly two million gallons of a dispersant called Corexit on top of the water and down near the floor of the Gulf of Mexico.

Oil dispersants are a blend of chemical compounds used to break down oil slicks into smaller drops of oils, making them more easily degraded by natural processes or diluted by large volumes of water.

About 600 of the thousands of people hired to help clean up the oil were exposed to the dispersant. They were the workers out on the water in boats or in diving suits, chasing oil slicks or collecting samples from underwater.

The study estimated the likelihood of exposure to dispersants based on the types of jobs the workers performed and where they performed them.

Larry Engel, PhD, associate professor at the University of North Carolina in Chapel Hill, said researchers interviewed about 33,000 people for the study.

He said the research team found that workers exposed to dispersants were more likely to experience certain symptoms—such as burning in the eyes, nose, throat or lungs—than those who were not exposed to dispersants.

“We have done a number of tests on them and collected biological specimens,” Engel said. “The study is ongoing. We intend to follow up and continue to study them in the future.”

Most of the previous research on dispersants focused on how well the compounds dispersed oil and its potential environmental impacts.

Several small animal studies that tested the chemicals in dispersants suggested that some of the chemicals were toxic.

Engel said the study's goal is to look at a wide range of health effects to humans

from the cleanup of the spill.

“This is an area that has not been studied before,” he said.

The study is looking at respiratory, cardiovascular and neurological impacts on those involved in the cleanup.

One challenge facing the researchers was distinguishing between whether the effects they noted were associated with the dispersants or with the oil from the spill.

Researchers said the scientists considered both types of exposures and isolated the effects associated with the dispersants.

Initial findings on the impacts of the dispersants have shown that those involved had symptoms that include coughing, wheezing, eye irritation, tightening in the chest and other health issues.

“We are in the early stages of the dispersant analysis and in the process of analyzing some more data,” Engel said. “Our expectations going into this were that these symptoms would be short-term and acute.”

“But we found it interesting that some people had these symptoms even between one and three years after the spill.”

Researchers noted that most of those who reported symptoms while they were involved in the oil spill response and cleanup no longer had them one to three years later when they were interviewed by phone.

But scientists said a small percentage of oil spill workers were still having symptoms. Additional follow-up interviews are scheduled for the fall.

Several years ago, a study by researchers at the University of Alabama suggested that the dispersant widely used during the cleanup of the disaster could have caused damage to humans and marine animals alike.

**DISPERSANT**  
Continued on Page 20



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# SJRWMD provides grants to NE Florida farms for drain-tile irrigation systems

## Staff report

Seven farms in Putnam, St. Johns and Flagler counties were recently selected for water conservation grants from the St. Johns River Water Management District.

The grants totaling \$1.5 million will fund the installation of drain-tile irrigation

systems that reduce both water use and nutrient runoff from fertilizer.

Drain-tile irrigation is a system of below-surface perforated plastic pipes that release water well below ground surface, reducing evaporation and avoiding runoff loss. The applied irrigation water moves by capillary action to the plants' roots.

Some farmers report drain-tile irrigation reduces water consumption by as much as 50 percent. In addition, field area previously used for ditches is available for crop cultivation, further increasing yields.

But drain-tile irrigation is not cheap. It costs about \$3,500 per acre to install the network of perforated pipes.

The St. Johns district, the Florida Department of Environmental Protection and the Florida Department of Agriculture and Consumer Services pooled resources to provide the grant funding to farms in the Tri-County Agricultural Area.

The grant program provides 75 percent of irrigation system cost while the farmer pays the remaining 25 percent.

L&M Farms/Cracker Swamp in East Palatka received on the largest grants enabling them to place drain-tile irrigation on 117 acres.

At the other end of the spectrum, Scott Parker Farms in Elkton will receive cost-share funding to irrigate 40 acres with drainage-tile irrigation.

The farms that received funding did not necessarily get enough money to convert all their acreage to drain-tile irrigation.

For the agencies that support this program, the primary benefits are reductions in both water use and nutrient runoff.

SJRWMD officials estimated that drain-tile irrigation use in all the funded projects will reduce water use by 35 million gallons a year, and reduce total nitrogen loading by 1,680 pounds per year and total phosphorus loading by 821 pounds per year.

## FEDFILE

From Page 2

However, the agency is providing the farmers with guidance now so they can meet existing compliance requirements.

**Pruitt ends EPA "sue and settle" strategy.** In mid-October, EPA Administrator Scott Pruitt issued an agency-wide directive to cease "sue and settle" litigation strategies.

Pruitt said that ending the practice would provide a higher level of public participation and transparency in EPA consent decrees and settlement agreements.

It would also take away what he described as a route to circumvent regulatory processes established by Congress.

Pruitt's action was in response to the perception that advocacy groups use spurious lawsuits for which EPA has inappropriately accepted negotiated settlements to force EPA actions desired by the groups.

The EPA under Pruitt described the practice as "regulation through litigation."

In its press release, the agency said that such behavior was "inconsistent with the authority that Congress was granted and the responsibility to operate in an open and fair manner."

Pruitt's memorandum also directs the agency to disclose potential settlements by publishing any notice of intent to sue within 15 days of receiving it, contacting states potentially affected by such lawsuits, and posting proposed or modified consent decrees and settlements for a 30-day public comment period.

Pruitt also directed the EPA to exclude attorneys' fees and litigation costs when settling with those suing the agencies. In addition, the agency will begin publishing within 15 days of receipt complaints or petitions for review when the agency is a defendant or respondent in federal court.

Spokespeople for two environmental groups said that many laws on the books do not give the administrator the discretion to simply reject citizen-initiated lawsuits.

Conservative groups and industry representatives have long lobbied for the rule that Pruitt's memorandum laid out.

**EPA launches Smart Sector Program.** The EPA recently launched the Smart Sector Program, which they describe as "a program to engage American businesses to achieve better environmental outcomes."

"When we consider American businesses as a partner, as opposed to an adversary, we can achieve better environmental outcomes," said EPA Administrator Scott Pruitt in a press release. "When the industries and regulators better understand each other, the economy, the public and the environment all benefit."

In practice, the EPA said that the Smart Sector Program will facilitate better communications and streamline operations internally at EPA.

It will enable sector leads to work across EPA's land, water, air and chemical program offices. Environmental justice, enforcement and compliance assistance as well as EPA regional offices will also be involved.

The EPA press release included paragraphs of glowing criticism from representatives of 20 industrial sectors heavily dominated by resource exploitation, agricultural interests involved in leasing federal land and chemical manufacturers whose history of polluting the environment was the primary driver for the creation of the National Environmental Policy Act and the founding of the EPA.

**EPA environmental justice grants.** The EPA's Environmental Justice Small

Grants Program announced awards to 36 recipients in 30 states and Puerto Rico.

The agency awarded a total of \$1.2 million, the same total awarded for the past two years.

This year, the program placed special emphasis on "newer grantees," defined as eligible organizations that have not received an EPA Environmental Justice Grant award over the last five years."

This year, of the 36 total projects, 35 are from newer grantees. Though Florida-based organizations have received several grants over the past five years, no Florida organization received one of the 2017 grants.

**Climate change dropped from EPA strategic planning.** Climate change is conspicuously absent from the draft of the Environmental Protection Agency's four-

year strategic plan.


The 38-page planning document released for public comment in mid-October does not discuss it.

The draft plan is built around three priorities that EPA Administrator Scott Pruitt outlined earlier this year.

The first is the core mission of clean air, land and water, a rebalancing of the federal role in environmental regulation by shifting more responsibility to states, and law enforcement according to a minority interpretation of congressional intention.


By failing to include climate change in the plan, any prospect of actions to modify human influence on climate change to avoid its deleterious effects is denied.

In responding to questions posed by a reporter, an EPA spokesperson said that the plan "focused on tangible environmental results for the American people."



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# Rick Scott's abrupt about-face on the environment does not fool anyone with a pulse

A Florida Specifier opinion

In late October, Florida Gov. Rick Scott recommended allocating more than \$1.7 billion to protect Florida's environment as part of his proposed 2018-2019 budget.

The \$1.7 billion in funding earmarked for the Florida Department of Environmental Protection represents an increase of more than \$220 million over the department's current year allocation.

"We have the money, we need to invest in the environment!" he proclaimed.

Scott's proposed funding includes \$55 million for Florida's springs, \$100 million for Florida's beaches, \$355 million for Everglades restoration, \$50 million for Florida's state parks and \$50 million for Florida Forever to help preserve and protect natural lands.

"This funding includes historic investments in our iconic springs, world-re-

nowned Everglades, award-winning state parks and beautiful beaches, which is especially important following impacts by Hurricane Irma," Scott touted. "I am also proud to be recommending \$100 million to preserve and protect our natural lands, including \$50 million for Florida Forever."

Some recipients of the governor's budget message were skeptical at best, among them Tallahassee Mayor Andrew Gillum.

Gillum, who is now pursuing the governor's seat in 2018, characterized Scott as a "true election year environmentalist."

We could not agree more.

Gillum noted that the governor promised \$150 million a year for Florida Forever during his second term, then failed to deliver on two-thirds of his promise.

Scott has made a litany of questionable environmental decisions during his days in the governor's mansion.

In his 2014 campaign for re-election, Scott promoted a \$1 billion, 10-year environmental blueprint including the \$150 million a year for Florida Forever mentioned by Gillum.

Yet land conservation received \$0 this year, according to Southeast Florida's *Sun Sentinel* newspaper.

In 2014, Florida voters overwhelmingly approved Amendment 1 that required the allocation of funds for the preservation of environmental lands.

The measure was designed to dedicate 33 percent of net revenue from the existing excise tax on documents to the state's

Land Acquisition Trust Fund.

As of today, environmental activists are still battling the state in court, arguing that most of the trust fund money has been improperly diverted from conservation purposes to such things as agency staffing and operating expenses.

Scott's lack of environmental leadership may best be exemplified by his total mismanagement of DEP and the state's five water management districts.

His efforts have largely devolved the professionally managed and technically competent agencies that he inherited into the ideologically "cleansed" and financially crippled agencies of today.

Scott's actions have resulted in the loss of some of the nation's most qualified scientists, ecologists and engineers from state regulatory agencies and have created an institutional knowledge void.

Add to that, little-to-no pay raises and professional roles that have been dramatically devalued by Scott's political appointees and the result is a level of morale at the agencies, especially DEP, that's at an all-time low.

If he had acted on the once-in-a-lifetime opportunity to buy U.S. Sugar Corp.'s land before the option expired this year, the state would have acquired enough acreage to handle all of Lake Okechoobee's expected water storage and treatment needs into the foreseeable future.

And the list goes on. Under Scott, the enforcement of environmental regulations intended to control pollution and punish polluters has been radically relaxed.

For example, the Florida Department of Environmental Protection has opened about 80 percent fewer pollution regulation cases than when Scott took office.

We all learned when we were growing up that actions speak louder than words. Don't be fooled by Scott's sudden shift towards pro-environment positions. We all know better. Much better.

## Specifier opinion



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Single player registration is \$175 (checks payable to NTCC Inc.) Foursomes are \$650. If you'd like to take advantage of the foursome discount, please submit payment in full (\$650). Player spots will not be held without payment. All payments will be processed immediately.

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## FPL wants to charge customers for cleaning up its cooling canals

By BLANCHE HARDY, PG

Florida Power and Light Co. has petitioned the state's Public Service Commission to recover the approximately \$200 million cost of cleaning up groundwater contamination at its Turkey Point nuclear power plant.

FPL was ordered in 2016 to retract the saltwater plume that resulted from the operation of its cooling canals.

Utilities may seek approval from the PSC to pass reasonably incurred environmental costs on to their customers.

Expert testimony was delivered to the commission regarding the validity of FPL's request in late October.

Florida Public Council J.R. Kelly delivered comments in opposition to the request. The Office of Public Council provides legal representation on behalf of the people of the state of Florida in utility related matters and is funded by state general revenue.

"In the case of FPL, the record shows that several decades of management decisions led directly to the development and growth of a hypersaline plume (that) threatens a public source of drinking water upon which millions of citizens depend," Kelly said. "FPL was issued regulatory notices of violation because of the hypersaline plume."

"FPL now seeks to burden ratepayers with the costs of retracting the hypersaline plume or, in other words, to make customers pay for the direct results of FPL's imprudent management decisions. This is contrary to law and policy."

The Turkey Point facility's cooling canal system provides cooling water for the utility's nuclear reactors.

The cooling canals receive heated water

FPL  
Continued on Page 20



# Calendar

## December

DEC. 1-2 – Exam: Backflow Prevention Recertification Exam, Fort Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 2-3 – Exam: Backflow Prevention Recertification Exam, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 2-3 – Exam: Backflow Prevention Recertification Exam, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 4-5 – Exam: Backflow Prevention Recertification Exam, Altamonte Springs, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 4-5 – Exam: Backflow Prevention Recertification Exam, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5-7 – Course: Introduction to Electrical Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5-6 – Course: Initial Training Course for Transfer Station Operators and Materials Recovery Facilities - 16 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5 – Course: Initial Training Course for Spotters at Landfills, C&D Sites and Transfer Stations - 8 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5-7 – Course: Initial Training Course for Landfill Operators and C&D Sites - 24 Hour, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5-7 – Course: Initial Training Course for Landfills and Waste Processing Facilities, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5 – Course: Refresher Training Course for Experienced Solid Waste Operators - 4 Hours, Plant

City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5 – Course: Refresher Training Course for Experienced Solid Waste Spotter - 4 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5-6 – Course: Refresher Training Course for Experienced Solid Waste Operators - 16 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 5 – Course: Refresher Training Course for Experienced Solid Waste Operators - 8 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 6 – Course: Refresher Training Course for Experienced Solid Waste Operators - 4 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 6-8 – Conference: Florida Stormwater Association Winter Conference, Orlando. Call 1-888-221-3124 or visit [www.florida-stormwater.org](http://www.florida-stormwater.org).

DEC. 7 – Course: Refresher Training Course for Experienced Solid Waste Operators - 4 Hours, Plant City, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

DEC. 7-8 – Exam: Backflow Prevention Recertification Exam, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 7-8 – Exam: Backflow Prevention Recertification Exam, West Palm Beach, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 7-8 – Exam: Backflow Prevention Recertification Exam, Pensacola, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 8-9 – Exam: Backflow Prevention Recertification Exam, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 11-12 – Exam: Backflow Prevention Recerti-

fication Exam, Orlando, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 13 – Seminar: Surface Water Treatment, Orlando, FL. Presented by the Florida Section of the American Water Works Association. Contact Donna Metherall at (407) 957-8443 or visit [www.fsawwa.org](http://www.fsawwa.org).

DEC. 13-15 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Orlando, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

DEC. 14-15 – Seminar: AWWA Effective Utility Management, Orlando, FL. Presented by the Florida Section of the American Water Works Association. Call (407) 957-8448 or visit [www.fsawwa.org](http://www.fsawwa.org).

DEC. 16-17 – Exam: Backflow Prevention Recertification Exam, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

## January 2018

JAN. 8-12 – Course: Backflow Prevention Assembly Tester Training and Certification, Orlando, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 8-12 – 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.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 8-12 – Course: Backflow Prevention Assembly Tester Training and Certification, Pensacola, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 12-13 – Exam: Backflow Prevention Recertification Exam, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 13-14 – Exam: Backflow Prevention Recertification Exam, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 17-18 – Course: Refresher Training Course for Experienced Solid Waste Operators - 16 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 17-19 – Course: Initial Training Course for Landfill Operators and C&D Sites - 24 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 17 – Course: Initial Training Course for Spotters at Landfills, C&D Sites and Transfer Stations - 8 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 17-18 – Course: Initial Training Course for Transfer Station Operators and Materials Recovery Facilities - 16 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

JAN. 17 – Course: Refresher Training Course for Experienced Solid Waste Spotter - 4 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

JAN. 17-19 – Course: Initial Training for Operators of Landfills and Waste Processing Facilities, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit [www.treeo.ufl.edu](http://www.treeo.ufl.edu).

### BRIGHTLINE

From Page 1

“perpetration of misinformation needs to stop,” referring to opponents’ every-trick-in-the-book approach to derailing the project.

“Yet again, the Treasure Coast communities have been unsuccessful in their challenge to our permit, and now their fourth consecutive permit challenge has been dismissed,” Tobin said.

The ongoing litigation has cost taxpayers more than \$7 million and, each time, the counties have lost, Tobin noted.

In September, an administrative law judge denied the counties’ initial challenge on the South Florida Water Management District’s decision to issue an environmental resource permit.

And in March, an administrative law judge denied a challenge brought by the Indian River Farms Water Control District on the St. Johns River Water Management District’s decision to issue an environmental resource permit.

By the end of the year, Brightline plans to launch passenger service on the initial leg of its route—West Palm Beach to Miami.

Construction has yet to begin on the second phase of the project that will con-

nect West Palm Beach to the Orlando International Airport.

Brightline still needs a permit from the U.S. Army Corps of Engineers before it can begin construction on Phase 2. The corps is still in the process of evaluating the permit request.

Brightline has also renewed its interest in obtaining a federal loan to help pay for the second leg.

The company had planned to sell \$1.75 billion in tax exempt private activity bonds to help pay for the route. But the company could not find enough buyers for the bonds and the sale was shelved.



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# Thank you!



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**Michael R. Eastman**  
Publisher/Editor  
[mreast@enviro-net.com](mailto: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 only. The opinions expressed on this page are those of the authors.



### Backflow Prevention Courses

#### Backflow Prevention Recertification

Jan. 12-13, 2018 | Venice, FL  
Jan. 13-14, 2018 | Bradenton, FL  
Jan. 25-26, 2018 | Pensacola, FL  
Feb. 2-3, 2018 | Ft. Myers, FL  
Feb. 5-6, 2018 | Orlando, FL  
Feb. 12-13, 2018 | Destin, FL  
Feb. 15-16, 2018 | Gainesville, FL  
Feb. 17-18, 2018 | Tampa, FL

#### Backflow Prevention Assembly Tester Training & Certification

Jan. 8-12, 2018 | Gainesville, FL  
Jan. 8-12, 2018 | Orlando, FL  
Jan. 8-12, 2018 | Pensacola, FL  
Jan. 19-27, 2018 | Venice, FL\*  
Jan. 27 - Feb. 4, 2018 | Tampa, FL\*\*  
Feb. 5-9, 2018 | Destin, FL  
Feb. 9-17, 2018 | Ft. Myers, FL\*  
\*(Two consecutive Fri. & Sat.)  
\*\*(Two consecutive Sat. & Sun.)

#### Backflow Prevention Assembly Repair & Maintenance Training & Certification

Jan. 22-24, 2018 | Gainesville, FL  
Feb. 23-24, 2018 | Venice, FL

### Solid Waste Courses

#### Initial & Refresher Solid Waste Courses

Jan. 17-19, 2018 | Gainesville, FL  
Jan. 23-24, 2018 | Tallahassee, FL  
Mar. 6-7, 2018 | Daytona Beach, FL

### Water/Wastewater Courses

#### Wastewater Distribution Systems Operator Level 2 & 3 Training

Feb. 6-9, 2018 | Gainesville, FL

#### Microbiology of Activated Sludge

Feb. 13-15, 2018 | Gainesville, FL

### Asbestos Courses

#### Asbestos: Inspector

Jan. 29-31, 2018 | Gainesville, FL

#### Asbestos: Management Planner

Feb. 1-2, 2018 | Gainesville, FL

#### Respiratory Protection

Feb. 6-8, 2018 | Gainesville, FL

#### Asbestos Refresher: Contractor/Supervisor

Feb. 21, 2018 | Gainesville, FL

#### Asbestos Refresher: Inspector

Feb. 20, 2018 | Gainesville, FL

#### Asbestos Refresher: Management Planner

Feb. 20, 2018 | Gainesville, FL

#### Asbestos Refresher: Worker

Jan. 31, 2018 | Gainesville, FL

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was perplexing given that the central monitoring well screens were only 4.6 meters from multiple injection well screens. In depth analysis identified rapidly rising nitrate concentrations and high trans-1,2 DCE to cis-1,2 DCE ratios as two quite unusual site features that led to the conclusions that 1) injectate emplacement was highly preferential to the detriment of treatment at the central monitoring wells, 2) in-situ biogenic ferrous sulphide production with complete dechlorination treatment did occur in the limestone but native partial dechlorination of TCE was also stimulated, and 3) nitrate originating from a previously unknown overlying sewer leak was preventing the shallow zone near the central monitoring well from transitioning into deep reducing conditions necessary for sulphate reduction, a prerequisite to BiRD.

4:00 **Pilot Test Evaluation of Aerobic Co-Metabolic Strategy to Degrade Low Concentrations of Vinyl Chloride**  
Eric Kramer, PE, Senior Project Engineer, and Janna Hall, EI, Environmental Engineer; APTIM, Winter Garden

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Aptim Environmental & Infrastructure, formerly known as CB&I Environmental & Infrastructure, performed a six-month pilot test to evaluate the effectiveness of utilizing an in-situ aerobic cometabolic bioremediation pathway to reduce low concentrations of vinyl chloride at a former circuit board manufacturing facility in Palm Bay, FL. Low concentrations of less chlorinated compounds such as VC are difficult to biologically degrade through the enhanced reductive dechlorination process. However, VC has been shown to degrade under aerobic conditions by both direct aerobic and cometabolic degradation mechanisms. The pilot test design extracted groundwater from a recovery well and infused the influent with oxygen, alkane gas (ethane) and nutrients before re-injecting to the aquifer by means of two injection wells. An array of eight monitoring points downgradient of the injection wells provided sampling locations to track the pilot test effectiveness. The field parameters monitored included pH, temperature, dissolved oxygen and ORP, while groundwater samples were periodically collected for analysis of volatile organic compounds, dissolved gases (methane, ethane, ethene), and Census analysis (qPCR for SMMO, PPO, EtnC and EtNE). Groundwater quality monitoring results indicated increases in ethene, DO and oxidase enzyme cell density with decreases in VC, methane, iron, ammonia, pH, and ORP, which are indicative of microbial activity and oxidation in the deep aquifer. Overall reductions in VC concentrations experienced 66 to 88 percent reduction from the aerobic cometabolic bioremediation strategy.

4:30 **Innovative Site Assessment Methods for Soil and Groundwater at Winter Haven Drycleaning Facility**

Brian Moore, PE, Principal, GHD Services Inc., Tampa

The House of Clean drycleaning facility operated in Winter Haven, FL. In the late 1990s, the facility was deemed eligible for cleanup through the Florida Drycleaning Solvent Cleanup Program. GHD conducted initial site assessment activities in 2006 and identified the presence of tetrachloroethene impacts to soil and groundwater beneath the site. Groundwater impacts were identified to depths over 50 feet and the groundwater plume extended over 1,500 feet downgradient. Following successful design and implementation of soil vapor extraction, the groundwater plume attenuated to levels below GCTLs in less than 10 years. This presentation details results of the site assessment and the innovative methods used to assess both soil and groundwater impacts. The presentation will also provide an overview of the approach to SVE, which involved the use of nested SVE wells to treat shallow sands along with the underlying sandy clay. Finally, the presentation will detail the optimization strategies used during active remediation and natural attenuation monitoring that resulted in groundwater attenuating to levels below GCTLs without measurable reductive dechlorination.

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### Day Two

Friday, Dec. 8, 2017

#### Concurrent Sessions

#### Session 5A: Young Professionals



9:00 **Viewing Young Professionals as Positive Additions to the Environmental Remediation Workforce**

Jilian Drenning, Env. Specialist II; Max Levine, Env. Specialist II; and Matthew Pabich, Env. Specialist II, Florida Department of Health - Polk County, Lakeland

Hiring young professionals into a specialized and dynamic field such as environmental remediation can be a risk to any business, agency or organization. Business owners or hiring managers may be hesitant to consider hiring green personnel with limited or no experience due to the investment of resources required to train these employees. As young professionals, the goal of our presentation is to encourage seasoned industry professionals to view young professionals as a positive addition to the field of environmental remediation. Young professionals can bring unique insight, skills and abilities to the table. To illustrate this, we will provide a brief example of how young professionals were able to promote positive change and revitalize the Florida Department of Health in Polk County - Petroleum Cleanup Program, a DEP-PRP local program. Until recently the program suffered from a lack of organization, staffing shortages and low moral. A major part of the "active remediation" and recent success of our program has been the hiring of new and diverse staff members, including young professionals. Lastly, we will leave you with a few key considerations to keep in mind when building your workforce and planning for the future of environmental remediation.

9:15 **Thermal Soil Mixing and ZVI Injection Using Large Diameter Augers at a Former Dry Cleaner**

Matt Crews, PE, Senior Project Engineer, Golder Associates Inc., Jacksonville

Tetrachloroethene was released into the subsurface at a site located in Jacksonville, FL, during drycleaning activities over a period of approximately 20 years. The suspected source areas include a former UST that may have contained spent solvents, a floor drain, the former drycleaning machine and a former supply well that provided water for drycleaning operations. Site assessment activities reported chlorinated solvent contamination in soil and groundwater to a depth of approximately 65 feet below ground surface. A fine-grained sand is present from land surface to a depth of approximately 60 feet. A low permeability clay layer is present below this depth and appears to have prevented further vertical migration of contamination. Solvent contamination in the vadose zone soils appear to have been either removed during the UST closure excavations or during soil vapor extraction operations. Previous remedial methods for treating the contaminated groundwater have been largely unsuccessful due to the likely presence of DNAPL at varying depths within the saturated soils. The objective of this remedy is to remove the remaining adsorbed, soluble and potential DNAPL contaminant mass located in the source areas. Funding for this technology is being provided by the Florida Department of Environmental Protection's Drycleaning Solvent Cleanup Program. Golder will be using FECC Corp.'s chlorinated source contamination removal technology with thermal treatment followed by injection of zero-valent iron to remove adsorbed, soluble and potential DNAPL contaminant mass in the source area. This remedial approach uses an eight-foot large diameter auger and thermal soil mixing to quickly remove the majority of the chlorinated solvent mass followed by injection and mixing of ZVI into the heated soil and groundwater. The ZVI continues to remove residual chlorinated solvents long after the thermal treatment. The columns would extend to a depth of approximately 65 feet to make sure chlorinated solvents sitting on top of the clay are effectively treated. The treatment technology consists of the following major elements: soil mixing using the eight-foot diameter LDA; in-situ thermal treatment using a combination of hot air and steam; a vapor collection system that recovers the volatilized contaminants, steam, and hot air in a surface shroud under an applied vacuum; a data acquisition and recording system for real-time system monitoring and contaminant removal data; an off-gas conditioning system; a recovered liquid and vapor contaminant treatment system; and a ZVI mixing and injection system. Field activities are scheduled to commence in the fall of 2017. Golder will present the results of the source removal activities, including the final number and depth of the LDA locations; the treatment area; system operating parameters, such as the steam/hot air injection flow rates and temperatures, shroud temperature, and volatilized vapor extraction flow rates; effluent vapor and liquid concentrations; the estimated mass of contaminants removed, as determined by the DAR system outputs; and the amount of ZVI applied per location. Golder will also present on the advantages of using this technology over other industry accepted remedial methods for chlorinated solvent contamination.

9:30 **The Effect of Sodium Persulfate Solution on Direct Push Drilling Rods**

Kyle Clarke, Redox Tech LLC  
Downers Grove, IL

Sodium persulfate, a robust oxidant used in environmental remediation, can cause corrosion to metal and damage to direct push drilling rods during injection activities in the field. This corrosion can lead to difficulties while injecting as well as equipment loss during injection activities. The purpose of this study was to evaluate corrosion rates caused by sodium persulfate solution on direct push field equipment over certain periods of time. Steel samples of sections of direct push rods shaped as small cylinders and obtained from Geoprobe Systems® were used in this study. Two different types of samples were provided. Standard steel used to make their probe rods and "hardened" steel that is used on the ends and threads of their probe rods. The samples were exposed to varying concentrations of sodium persulfate solution over various time intervals. To evaluate corrosion rates, samples were removed at specific time intervals and physical properties like length, width, annular thickness and, most importantly, mass were measured. Temperature and pH of the solutions were also measured. Additionally, in order to simulate base-activated sodium persulfate—one of the most common methods used when working with this oxidant—varying concentrations of sodium hydroxide solution were also added when performing the tests. Samples were either immersed in a "bath" of solution or placed in a flow through cell where sodium persulfate solution was pumped to simulate injection activities in the field. Sodium persulfate solution, at all concentrations tested, caused significant corrosion of the samples. The relationship between concentration of sodium persulfate, amount of base activator and corrosion rates of the samples will be explored in this presentation.



9:45 **Using Real-time Data Monitoring During Large Diameter Auger Drilling with Steam and Zero-Valent Iron Injection to Enhance Source Zone Mass Removal**

Zachary Munger, PhD, Hydrogeologist, Geosyntec Consultants, Titusville

Treatment efficiency and effectiveness are the premium attributes of aggressive remediation efforts. After developing a conceptual site model and performing a remedial alternatives evaluation for a site impacted with chlorinated volatile organic compounds, Geosyntec recommended using large diameter auger drilling with steam and zero-valent iron injection to rapidly eliminate the source zone and facilitate a transition to natural attenuation. The remedial technology involves using the auger to simultaneously mix the subsurface and introduce hot air/steam to promote thermal volatilization and stripping of CVOCs from soil and groundwater, followed by injection of ZVI as a polishing step to provide treatment of residual CVOCs. To focus the LDA/Steam/ZVI treatment in the depths and areas with the greatest CVOC mass, Geosyntec developed and implemented a treatment protocol in which the number of treatment passes, ZVI injection quantity, and the addition of step-out borings were based on real-time data, including off-gas CVOC concentrations. During the three months of LDA/Steam/ZVI implementation, 500 pounds of tetrachloroethylene were remediated with most of the recovered mass being removed from two low hydraulic conductivity layers. Approximately 370,000 pounds of ZVI were injected to treat residual CVOCs. Post-processing of the real-time data was performed to calculate the CVOC mass removed from each treatment boring and to visually present the distribution of mass recovered throughout the treatment area. Utilizing real-time data collection and an adaptive treatment protocol enabled Geosyntec to immediately respond to remediation performance and carefully focus efforts to maximize treatment efficiency and effectiveness.

10:00 **Optimizing the Performance of ZVI for In-Situ Remediation: Effect of particle size and surface composition**

James Harvey, Engineering Manager, OnMaterials, Escondido, CA

Zero valent iron is a powerful reductant used to decontaminate soil and groundwater containing halogenated hydrocarbons and other toxic contaminants. Zero valent iron products have widely different sizes and compositions, and remediation performance is highly dependent on material characteristics including include particle size, composition and surface modifications. This work investigated the ability of several variations of iron to degrade aqueous phase perchloroethylene, trichloroethylene and chloroform. Dry powders that were studied included sub-micrometer powder, carbonyl iron and screened commodity iron ranging in size from 600 mesh to 50 mesh. Colloidal products that were studied included OnMaterials Z-Loy™ MicroMetal, a zero valent iron suspended in glycerol, and Z-Loy™ AquaMetal ZVI, a zero valent iron suspended in water. Z-Loy™ PRB, an aqueous suspension of microscale iron was also evaluated. Surface modified products include small additions of palladium and iron sulfide that were deposited onto the surface of Z-Loy™ AquaMetal ZVI and Z-Loy™ PRB. Reactivity was evaluated by adding 2 g/L of colloidal products and 10 to 50 g/L of commodity microscale products to closed bottles. Composition was measured using headspace gas and a gas chromatograph with an ECD detector. Pseudo first order kinetic resulted with correlation coefficients generally greater than 0.99. The study indicated that for chlorinated ethenes, particle size had a modest effect of reactions kinetics. Surface modification had a much more dramatic effect, particularly for sulfidized colloidal products. These products exhibited pseudo-first order rate constants 30-50 times greater than dry commodity products. For chlorinated methanes, surface modifications had a smaller effect on degradation rates.

10:15 **Using 3D Conceptual Site Models to Aid in Site Investigations and Remediation**

Jim Depa, 3D Visualization Group Manager  
St. John-Mittelhauser & Associates, Downers Grove, IL

The objective of this project was to create a 3D visualization and animation from soil and groundwater analytical results involving spills of perchloroethylene at a dry cleaner site in order to thoroughly understand and quantify the subsurface soil and groundwater contamination; design a cost-effective soil and groundwater remediation solution; and demonstrate the efficiency, timing and effectiveness of the remediation. Soil and groundwater analytical results, collected from multiple subsurface investigations at an active dry cleaner, were statistically analyzed, modeled and visualized using C-Tech's Earth Volumetric Studio. EVS uses mathematical kriging to interpolate a 3D field of data from a set of known points, typically soil and groundwater sample results. EVS was also used to interpolate analytical data between the soil and groundwater sampling events. The modeled data was used to create 3D conceptual site models of the soil contamination and groundwater plume, as well as a time lapse animation of the soil and groundwater remediation. The 3D conceptual site models successfully identified the source areas of the contamination, quantified the amount of PCE contamination in both soil and groundwater and assisted in the design of the remediation systems used to remove the contamination. Additionally, the time-lapse animation demonstrated how effectively the soil vapor extraction system removed the PCE in the soil and how quickly the biological injections remediated the groundwater in the source areas.

**Session 5B: Petroleum Remediation: Case Studies**

9:00 **Use of Multiple EN Rx Innovative Technologies to Remediate an Off-Site Plume**

Richard Roberts, PE, Senior Engineer, Earth Systems, Jacksonville Beach

The petroleum remediation site discussed in this presentation posed multiple challenges. The plume was deep and elongate and was moving rapidly downgradient. The impacts had migrated off-site beneath an adjacent Publix shopping center parking lot, and Publix would not approve a design that involved extensive construction on their property. The site was not part of a DEP-funded program and the insurance company was insistent that the cost of cleanup be minimized. Earth Systems overcame these obstacles using a variety of innovative techniques. To gain access to the Publix property, Earth Systems teamed with EN Rx Inc. to install horizontal vertebrae wells beneath the parking lot. Each Vertebrae well was approximately 25 feet deep, 400 feet long and contained multiple screened zones. Remediation was accomplished by in-situ chemical oxidation using EN Rx's proprietary blend of hydrogen peroxide, sodium hydroxide, a catalyst called Synergist and water. The oxidant was disbursed into the Vertebrae wells continuously over several months using a solar-powered FOCISmicro system. EN Rx agreed to conduct the cleanup under a Performance-Based Cleanup contract, so the cost was negotiated up-front and agreed upon by the insurance company. Although the end-point of the PBC contract was to remediate the site until all impacts were below natural attenuation default concentrations, the levels declined below groundwater cleanup target levels within six quarters of system operation. The site was transferred to post-remedial action monitoring in November, 2016, and all sampled wells have remained below GCTLs for two quarters of PARM.

9:20 **Utilizing Multiple Methods to Remediate Groundwater in Heterogeneous Soils - Three Florida Case Studies**

Lee Bienkowski, PhD, PG, Senior Geologist, Ellis & Associates Inc., Jacksonville

Heterogeneous soils add complexity to remediating petroleum constituents in groundwater. Mechanical methods such as air sparge/soil vapor extraction are often successful in removing dissolved volatile hydrocarbons from groundwater in sandy soils. However, when sand is interbedded with clay, the clay can serve as a reservoir for contaminants, causing concentrations to rebound once mechanical remediation is discontinued. A sequence of multiple remediation methods may be required to complete site rehabilitation. Numerous remediation methods are available that claim to be effective for remediating hydrocarbons in heterogeneous soils, but there are few unbiased published case studies. The purpose of this study is to determine if any of the methods tested at the three case study sites was effective alone at remediating groundwater in interbedded sand and clay. The three sites selected for this case study are Don Hodge Auto Service, 7-Eleven Eustis, and Giovanni B Corp. All three sites are located in Central Florida, are underlain by layers of sand and clay, and have been impacted by dissolved volatile constituents in groundwater. The author conducted research on all three sites to determine the effectiveness of the various remedial methods in reducing contaminant concentrations. Included in the study were the impact of the sequential remedial methods on dissolved concentrations and correlating the time to cleanup with the amount of clay present in the impacted zone. All three sites were first remediated by mechanical means and experienced rebound of contaminant concentrations once the mechanical remedial method ceased operations. The mechanical methods were followed by a sequence of injections of nutrients and microbes, and chemicals such as calcium oxyhydroxide, hydrogen peroxide and sodium persulfate. In most cases, these injections were followed by a reduction of contaminant levels but multiple injection events were typically required to prevent eventual rebound. Two injection events were sufficient to bring the Giovanni B Corp. site to closure, which had the lowest amount of clay in the impacted zone. 7-Eleven Eustis required two injection events combined with six years of nutrient-enhanced biosparge to bring concentrations down to natural attenuation levels. The long-term effectiveness of the injection of hydrogen peroxide, surfactants and nutrients at Don Hodge Auto Service will be determined by future sampling events. There appears to be a correlation between the thickness of clay in the impacted zone and the difficulty of achieving permanent contaminant concentration reductions. Many methods appear to have some effect but there is no one method that will complete the restoration of a site with significant clay with a single application. Multiple methods that flush contaminants from the clay layers appear to have the greatest impact on BTEX concentrations in heterogeneous soils.

9:40 **Does Plume Stop Work in Florida?**

Wm. Gordon Dean, PE, President, Advanced Environmental Technologies LLC, Tallahassee

This presentation provides practical application notes and initial results from a petroleum site in Florida. The site is located in Perry, Taylor County, FL, and the work was awarded under an Innovative Technology pay-for-performance solicitation by the Florida Department of Environmental Protection's Petroleum Restoration Program. The innovative technologies used were Regenox, ORC Advanced and PlumeStop. All of these are proprietary technologies manufactured by Regenesis. Site constraints included a previous source removal using large diameter augers that covered the site with approximately 15 feet of flowable fill, aboveground utilities and underground utilities. The Regenox was applied first to reduce the contaminant concentrations, followed approximately 45 days later by PlumeStop and ORC Advanced. Application issues encountered included the lithology, well design and daylighting of the chemicals. Analytical results from the baseline sampling, post-Regenox/pre-PlumeStop sampling, and the first quarter post-PlumeStop sampling will be provided and discussed.

10:00 **Innovative Petroleum Contamination Remediation Ozone Sparge Corrective Actions Dixie County, FL**

Ronald Sanzi, Senior Project Manager, and Richard Carman, Corporate Director of Environmental Services, Universal Engineering Sciences Inc., Orlando

From 2011 through 2013, Universal Engineering Sciences was retained to initiate remediation services for a petroleum release at a boat marina located on the Suwannee River in Dixie County, FL. The facility operated a 10,000-gallon gasoline aboveground storage tank and a 4,000-gallon diesel AST. A critical issue involved with this project was the potential migration of the dissolved-phased contamination into the river. The water table depth fluctuated between one and four feet daily. Plume migration from the saturated zone at the boat ramp into the river was the primary concern. Based upon the unusual site configuration and general hydrogeological challenges, Universal chose to apply the best remedial solution to fit the site parameters and existing contaminant concentrations, which was ozone sparge. Ozone is a chemical oxidant that destroys chemicals of concern in situ without the use of pump and treat, soil vapor extraction and other common intrusive technologies. Universal completed soil source removal, site assessment and free product recovery prior to implementing ozone sparge. A key component of the design was the installation of horizontal sparge lines as opposed to the standard vertical sparge points commonly used. Universal installed eight, two-inch diameter horizontal sparge lines in a "fan" configuration that spanned the width and depth of the contaminant plume. The horizontal sparge lines were designed to treat the dissolved contaminants in the water table and smear zone impacted soil. The ozone system provided an

Continued on Page 18

## Environmental Services



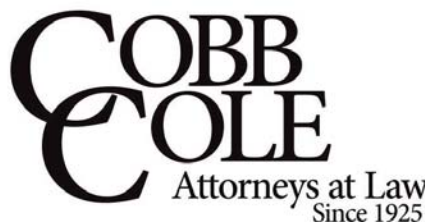
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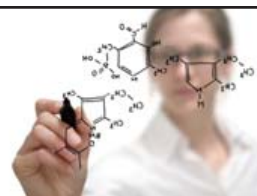
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output of three pounds of ozone per day and was supplemented by add-on sparge air. Universal constructed a manifold system where the eight horizontal sparge lines were linked to the ozone unit by stainless steel Teflon®-buffered solenoid valves. The entire system was connected to a control panel that directed all system activities. The system was run at bio-sparge pressures and flow so that SVE was not necessary. The initial laboratory results for benzene in two key monitoring wells exceeded 100 micrograms per liter. After operating the system for seven months, benzene was not detected above one ug/L. The system design and operation was successful and Universal obtained a site rehabilitation completion order for the client.

**10:20 Bioremediation Approaches and Tools for Benzene Remediation Under Anaerobic Conditions**

Jeff Roberts, MSc, Senior Manager, SiREM, Guelph, Ontario, Canada

Benzene, toluene, ethyl benzene, xylene and other aromatic hydrocarbons typically degrade faster under aerobic conditions than anaerobic conditions. When hydrocarbon-contaminated aquifers are predominantly anaerobic, aerobic bioremediation is not always feasible and anaerobic bioremediation approaches become favorable. Biostimulation and bioaugmentation with anaerobic BTEX-degrading microorganisms may be required for effective remediation at anaerobic hydrocarbon contaminated sites. To address this need, anaerobic cultures capable of complete degradation of benzene toluene and xylene have been developed at the University of Toronto.

These cultures have been characterized and key microorganisms have been identified. SiREM, the University of Toronto and Federated Cooperatives Ltd. are currently engaged in a three-year research project to advance anaerobic benzene degradation from the lab to the field, funded in part by Genome Canada and the Province of Ontario. The objectives of the project include scale-up of an anaerobic benzene culture to field volumes, demonstrating its effectiveness for bioaugmentation in treatability studies and field tests. This benzene-degrading culture is currently being assessed in microcosms constructed with materials from hydrocarbon contaminated sites. Information generated will include inoculum density requirements, degradation rates and the range of geochemical conditions required for optimal performance of the culture, and will be used to design field trials. Molecular genetic tools to quantify and track key microbes and functional genes involved in benzene degradation are also being developed. These tools will allow in-situ assessment and monitoring of enhanced bioremediation applications.

10:40 20-Minute Break

**Concurrent Sessions**

**Session 6A: Thermal Technologies and Complex Strategies**

**11:00 Source Zone Treatment of CVOCs to Protect Local Groundwater - The Alaric Superfund Site, Tampa, FL**

Chris Thomas, Senior Project Manager, TRS Group, Longview WA

The historical site owners and tenant at this site used chemical degreasers to clean metal. The mishandling of chemicals led to the underlying soil and groundwater contamination at the site. Site investigations showed the presence of DNAPL and groundwater contamination spread over an area of about five acres. In the early 2000s, chemical oxidation was attempted to remediate soil and groundwater but proved unsuccessful. Environmental Restoration LLC selected TRS Group under an EPA Region 4 ERRS contract to perform in-situ thermal remediation of the CVOCs in soil using electrical resistance heating. ERH is an in-situ thermal process for the remedial treatment of VOCs in both soil and groundwater. The remedial design was solely for the source area and volume of 6,218 ft<sup>2</sup> and 15,500 yd<sup>3</sup>, respectively. The remedial treatment objective was to remediate soil in the ERH treatment area and within the saturated zone from 5 to 67 feet below ground surface to 1 mg/kg for tetrachloroethene. Construction of the treatment system began in October, 2016. The site-specific ERH system includes 29 electrodes co-located with vapor recovery wells. A unique design challenge was constructing and operating the ERH system beneath a portion of an existing building. Due to the building design and height restrictions, exterior angled electrodes were installed to target impacts beneath the building. The treatment system became operational in March, 2017. Confirmation soil sampling in late July showed all the results in the treatment area achieved the cleanup objective. However, to further polish the remaining contaminants, the client requested continued operations through August. Background on the site and remediation timelines will be presented as well as design details, implementation and results of the ERH source removal.

**11:20 Complex Sites and Recalcitrant Compounds: Combining Thermal Technologies for More Efficient Remediation Efforts**

Robert D'Anjou, MSc, PhD, Assistant Technical Director  
Global Remediation Solutions, Longview, WA

With the onset of improved technology and understanding, sites of increasing complexity and difficulty are coming into the realm of possibility as potential remediation sites. However, these complex sites require smarter, more informed remediation strategies. This presentation will discuss several complex sites where creative remediation system designs permitted successful remediation and will take a closer look at combining multiple in-situ thermal remediation technologies in order to optimize treatment on sites that would have otherwise been near impossible to clean. Steam-enhanced extraction, electrical resistance heating and in-situ thermal desorption represent the three major ISTR technologies available in the marketplace today. Each technology offers a unique method of energy transfer and heat propagation in the subsurface and performs optimally under differing subsurface conditions. This discussion will present multiple projects where ISTR technologies were combined to effectively mitigate impacts from varying hydrogeologic conditions, subsurface geologies, complex co-solvated and co-mingled contaminant plumes, and intricate site features by taking advantage of the strengths of each individual technology. The presentation will also discuss theoretical site conditions that warrant the use of different ISTR technologies, or combinations of technologies, the advantages of each treatment strategy, and how to effectively optimize in-situ treatment systems under each scenario to maximize system efficacy and minimize overall project costs.

**11:40 Complex Site Assessment and Remediation of DNAPL, LNAPL, PCBs, Arsenic, Lead; Large Diameter Auger Source Removal; Conventional Source Removal and Off-Site Challenges**

Matt McClure, PE, Environmental Engineer, JEA, Jacksonville  
Matthew Hampton, Senior Project Geologist, Golder Associates Inc. Jacksonville

On-site DNAPL, LNAPL, PCBs, arsenic and lead impacts along with off-site arsenic impacts were identified during the site assessment at a former electrical equipment service facility in Jacksonville, FL. Given the complexity of conditions identified in the site assessment report, a feasibility study was performed to evaluate potential remedial alternatives. The Florida Department of Environmental Protection approved the feasibility study including the proposed phased remedial strategy. To address DNAPL impacts, a DNAPL source removal system consisting of a multi-phase extraction system, a soil vapor extraction system and a thermal conductive heating system was installed. Conventional and large diameter auger excavation techniques were used to excavate a total of 10,280 tons of non-Toxic Substance Control Act-regulated and 4,486 tons of TSCA-regulated soil for off-site disposal. This was combined with engineering and institutional controls to minimize risks of direct exposure to soil. Based on groundwater sampling results obtained after soil removal, no active groundwater remediation was warranted and the site moved into post-active remediation monitoring for groundwater. Off-site arsenic soil impacts were further delineated and discussions with off-site property owners about a remedial approach is currently underway. Golder Associates Inc. and JEA will present details of installation and operation of the DNAPL source removal system, on-site source removal, the PARM program, and challenges associated with liability and access for off-site impacts.

**Session 6B: Enhanced In-Situ Remediation Applications**

**11:00 Surfactant Use for Enhancing Performance of Chemical Oxidation Remediation**

Dan Socci, Chief Executive Officer, EthicalChem, South Windsor, CT

Remedial approaches using chemical oxidation deliver aqueous phase oxidant treatment fluids into the contaminated subsurface. These approaches are limited to addressing contamination in the groundwater while hydrophobic contaminants remain sorbed to soil. This remaining soil-sorbed contamination will in time transfer to the aqueous phase after the chemical oxidation treatment is completed, causing groundwater contaminant concentrations to increase, resulting in what is referred to as "contaminant rebound". Rebound is typically addressed with multiple rounds of follow-up chemical oxidation treatments. Contaminant sorption limits the availability of contaminants to the aqueous phase oxidant. Using a combined oxidant-surfactant solution, liberation of the sorbed hydrophobic contaminants and emulsification into to the aqueous phase as small particles with increased surface area available for reactions with the oxidants can significantly improve soil and groundwater remediation. This presentation will discuss independent third party comparative research by the University of Madrid on the performance of combined surfactant and oxidant versus oxidant alone treatment of contaminated soil. Additionally, field case studies on successful implementation of S-ISCO®, Surfactant-Enhanced In-Situ Chemical Oxidation, will be discussed.

**11:20 Optimizing In-Situ Remediation Amendments Using Innovative Surfactant System Formulations**

David Alden, PE, Technical Associate, Tersus Environmental, Wake Forest, NC

Surfactants, polymers and solvents are key chemicals in designing products that are injected during groundwater remediation activities. Although these ingredients should all be compatible with health and environmental requirements, their function varies according to each technology's objective. For example, practitioners have concluded that NAPL solubilization with surfactants was a necessary first step in the mobilization process and that surfactant concentration, up to a point, was generally proportional to performance. When, rather than NAPL recovery, its destruction is pursued, surfactants aid in creating complex water-ZVI suspensions in oil continuum or to disperse solids or non-water soluble amendments, such as vegetable oils, sands, iron or activated carbon into aquifers. Technology developed at the University of Oklahoma, originally focused for enhanced oil recovery at petroleum reservoirs and subsequently adapted to the environmental arena, can lower the IFT sufficiently to allow physical mobilization of residual LNAPL with the limited production of thermodynamically stable emulsions. This talk will focus on the use of artfully formulated surfactant blends that reduce solubilization and simply allow LNAPLs in saturated soils to become mobile.

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Surfactant studies targeted to specific technology objectives has allowed the group to formulate surfactant packages that allow field technicians to create their own EVOs in the field while significantly reducing droplet size, lowering overall costs and carbon footprint by procuring oils locally. The presentation will include results and lessons learned from innovative surfactant formulations as well as the latest field implementation where selecting an optimized surfactant blend minimized required flush water for NAPL recovery and costs for produced effluent fluids treatment from sites in the U.S. and South America.

**11:40 Using Groundwater Recirculation for Enhanced Reductive Dechlorination at an Active Manufacturing Facility**

Eric Bueltel, PE, Technical Director, ETEC LLC, Washougal, WA  
The use of substrates for enhanced reductive dechlorination has been widespread with varying degrees of effectiveness. Typical applications of substrates are performed using direct-push injections. Limitations of the direct-push application method include using many injection points throughout the plume for product application, inability to contact contaminated areas underneath surface structures and incapability to make real-time changes to the treatment. To overcome the limitations of direct-push substrate injections, specialized groundwater recirculation equipment, the ISD™ system, delivering the soluble, nutrient-amended substrate CarBstrate™ was used for chlorinated solvent remediation at an active manufacturing facility. The groundwater at the site had been impacted by historical use of chlorinated solvents. The ISD™ equipment was installed in conjunction with a series of injection and extraction wells to extract groundwater and then recirculate the CarBstrate™-amended groundwater throughout the site restricted by aboveground structures. During operation, site data was collected for both the contaminant reduction process and ERD optimization. Both data sets will be presented for a technical discussion of the ERD process at the site. Also discussed will be a summary of challenges encountered with the application of the groundwater recirculation approach, treatment optimizations made real-time, and an overview of costs for implementation.

12:00 **Day Two Luncheon** Sponsored by **CH2M**

**Session 7: Annual Regulatory Panel Discussion**

1:30 **Teresa Boeshaghi**, program administrator for the Florida Department of Environmental Protection's Waste Cleanup Program; **Austin Hofmeister**, program administrator for the DEP Petroleum Restoration Program; **Lynn Walker, PE**, from the DEP Waste Management Division's Office of District and Business Support; and **Wilbur Mayorga, PE**, chief of RER/DERM's Environmental Monitoring and Restoration Division at Miami-Dade County.

3:00 15-Minute Break

**Session 8: Conceptual Site Models to Facilitate Successful Remedy Applications**

**3:15 PCE and Daughter Remediation in Limestone Bedrock - Brownfields Redevelopment of a Former Tubing Manufacturing Facility**

Bill Brab, CPG, PG, AST Environmental Inc., Midway, KY  
Virgin PCE used for parts cleaning was released from an aboveground storage tank into the shallow limestone bedrock at a former tubing manufacturing facility in Louisville, KY. Downhole geophysical and groundwater characterization methods determined contaminant migration in the shallow bedrock occurred along a bedding plane feature and extended to the subject site property line. Dual-phase extraction was utilized from 2002 through 2014 to prevent off-site migration of the release, however, source well concentrations began increasing following system shutdown. Interest in purchase of the facility spurred brownfields redevelopment and in-situ remedies were evaluated for their feasibility. The selected remedy for the site was an immiscible, activated carbon-based injectate impregnated with reactive iron designed for rapid degradation of chlorinated solvents. The corrective action plan included in-situ source mass reduction and two permeable reactive in-situ barriers to prevent further migration of contaminants from the source area. Remediation was implemented using a specialized injection system and straddle packer assembly using high flow rate (up to 180 gallons per minute) injections. Hydraulic connection was continuously monitored during injection using pressure transducers emplaced throughout the treatment area. Real-time well monitoring aided in optimizing the injection volumes and confirming that uniform distribution of the slurry was achieved. The monitoring demonstrated that the area of influence, using a 300-gallon slurry volume, varied up to 250 feet. Performance groundwater monitoring effectively demonstrated that contaminant migration ceased and contaminant destruction is continuing to occur across the treatment area. The site was granted no further action in May 2017.

**3:40 Controlled Release Environmental Reactants – In-Situ Soil and Groundwater Remediation of Recalcitrant Compounds and Emerging Contaminants of Concern**

Lindsay Swearingen, Managing Partner and Principal Scientist  
Specialty Earth Sciences, New Albany, IN  
The environmental science community has a collective interest in identifying viable and sustainable remedial solutions for groundwater contaminant plumes, seeking out remedies which reduce carbon footprint, minimize waste generation and limit energy inputs required for remediation implementation, operations and ongoing maintenance at sites impacted by CVOC's, PAH's, BTEX constituents and heavy metals. Stakeholders could benefit from greener cleanup technologies, especially in light of future requirements to remediate vast dissolved phase plumes of emerging contaminants of concern such as 1,4-dioxane. Sustained and controlled release reactant technology involves coating or encapsulating environmental reactant materials to facilitate a more user-friendly in-situ remediation implementation. The result is an efficient approach to soil and groundwater remediation that addresses the common challenges encountered with traditional liquid injection applications. Challenges include contaminant rebound, plume migration and the need for multiple mobilizations. Rather than pressurized liquid injection, the energy of concentration gradient-driven diffusion as well as natural groundwater movement is used to deliver oxidants in the subsurface without the need for specialized injection equipment or expensive injection field services providers. Sustained and controlled release reactant materials can be applied to the subsurface in a number of forms and methods. Multiple remediation practitioners have applied these materials at sites across the U.S., Europe, Canada and Brazil. Current and updated case studies will be presented including site selection, implementation design, cost and monitoring data.

**4:05 Selection, Construction and Initial Operation - Ozone Sparging System for 1,4-Dioxane Impacts at a RCRA-Regulated Industrial Facility in Puerto Rico**

Vicki Bierwirth, Assistant Staff Engineer, Trihydro Corp., Jacksonville  
Bradley Pekas, PG, PE, Senior Engineer/Team Leader, Trihydro Corp., Tampa  
This presentation describes the selection, construction, startup and preliminary operational performance of the ozone/in-situ chemical oxidation system at a RCRA-regulated industrial site in Puerto Rico to treat groundwater contaminated by chlorinated solvents including 1,4-dioxane. The groundwater contamination has migrated offsite and is being influenced by the operation of a couple of water supply wells. Several types of treatment technologies were screened to potentially address the chlorinated solvent and 1,4-dioxane contaminants present within the sand unit aquifer system including in-situ chemical oxidation, in-situ bioremediation, phytoremediation and monitored natural attenuation. Of these different technologies, ozone sparging was selected and approved for implementation. The ozone system was installed in September, 2016, and bump-started in early October, 2016. The self-contained ozone sparging system is powered by a diesel generator and was installed offsite at the leading edge of the 1,4-dioxane plume. As designed, the system operates three ozone sparge points on a rotational basis, and it is controlled and remotely monitored through cellular telemetry. Per cycle, each sparge point operates for three minutes with a high concentration, low flow injection rate followed by 117 minutes operating at a low concentration, high flow rate. The higher flow rate and lower concentration are the result of using a secondary "air-flow booster" compressor. In December, 2016, Trihydro received approval from the client and regulatory agencies to begin full-time operation of the ozone sparging system. The initial operational performance of the system, included a preliminary discussion of the groundwater monitoring data will be presented and discussed.

**4:30 A New Risk Based Corrective Action Topics Under 62-780 FAC: Conceptual Site Models**

Ziqi He, PE, PhD, Senior Environmental Engineer, HSW Engineering Inc., Orlando  
The newly-adopted revisions to Chapter 62-780 for Contaminated Cleanup Site Criteria memorializes the use of the Conceptual Site Model in risk-based corrective action. The use of the CSM is an important step in streamlining the representation of contaminant releases, their fate and transport in the environment, and exposure to human and ecological receptors to contamination. Better representation and communication of these components between the responsible party and regulatory agency offers optimized exit strategies for scoping site assessment, conducting remedy evaluations and making informed risk management decisions.on.

5:00 **FRC 2017 adjourns**

# Registration and Hotel Info for FRC

For general questions about participating in the 23rd Annual Florida Remediation Conference, call (407) 671-7777 or e-mail mreast@enviro-net.com. Visit our website at [www.enviro-net.com](http://www.enviro-net.com) for FRC updates, the technical session agenda, a current list of exhibitors and booth availability, speaker updates and more.

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**Hotel Information and Registration**

The **Rosen Centre Hotel** is the host hotel and conference center for FRC 2017. The hotel is located on International Drive near the Orange County Convention Center in Orlando. For directions and additional information about the hotel, visit their website at <http://www.rosencentre.com>. To make your sleeping room reservations, go to our website at [www.enviro-net.com](http://www.enviro-net.com) and click on "Room Reservations at the Rosen Centre" under the FRC logo. If you prefer to make arrangements by phone, call 1-800-204-7234 and identify yourself as an attendee of the Florida Remediation Conference. Our discounted room rate is \$149 nightly, plus applicable taxes and fees. **This substantially discounted rate is only available until Wednesday, Nov. 15, 2017.**

**Registration**

**Registration for the full Florida Remediation Conference is \$395. Day One Only is \$295 and Day Two Only is \$245.** The fee includes registration for the conference, conference manual and flash drive containing PDF files of all the talks, continental breakfasts, beverage breaks, luncheons and the conference reception for Day One registrants only.

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 Nov. 6, 2017, 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. Substitute attendees will be accepted at any time, preferably with advance notice.

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**FPL**  
From Page 14

generated by the plant and act as a radiator for the release of the heat from the water through residence time in the system. The water has cooled sufficiently to be returned to the plant as coolant in about 24 hours.

The canal system is unlined and over the course of its operation, about 40 years, significant volumes of salt have been discharged into the groundwater of the Biscayne Aquifer, the source of the area's potable water supply.

The Southern Alliance for Clean Energy, the Florida Industrial Power Users Group and fertilizer giant PCS Phosphate also oppose passing the cost of the cleanup on to utility's customers, likewise arguing that FPL's management officials were aware, or should have been aware, that the Biscayne Aquifer was being contaminated by their operation.

Rena Deaton, director of cost recovery clauses in the FPL's Regulatory & State Governmental Affairs Department, provided a detailed accounting of FPL's revenue requirements and expenditures.

"The three filings I support are the final true-up for 2016, the actual estimated true-up for 2017 and the projections for 2018," Deaton said. "The associated ju-

isdictional amount to be included in the 2018 environmental recovery factor is a \$23.9 million over-recovery for 2016, a \$28.8 million over-recovery for 2017, and a 2018 environmental cost of \$159.8 million, which is net of true-ups and revenue taxes."

Sorab Panday, PhD, principal scientist with GSI Environmental Inc., testified as an expert in hydrogeologic analysis and modeling in opposition to FPL.

His evaluation of the documents produced by FPL indicated that the utility should have known about the saltwater intrusion by at least 1992.

"In addition, my evaluation of the modeling efforts by FPL's contractors regarding Remedial Alternative 3D indicates that the pumping wells are ineffective in retracting the hypersaline plume," he said.

Lastly, his evaluation of the simulations conducted to apportion costs for the remediation wells between hypersaline plume retraction and containment indicates that the apportioning proposed by FPL was "incorrect."

The PSC is expected to take up the matter at its meeting on Dec. 12, according to Bev DeMello of the PSC's Office of Consumer Assistance & Outreach.

**LAPOINTE**  
From Page 8

rectly affected. The contamination of our waterways is not always readily apparent, at least not at first.

Local politicians must be informed, as well. They need to seek the advice of scientists about the impact of algae on their local environment and speak to civil engineers regarding the best solutions to transition from septic systems to modern sewage collection and treatment.

Making these changes takes time, so the time to start is immediately, before the damage is irreparable.

Initiating large infrastructure projects is not always popular and it may be expensive, but it is the right thing to do. By acting now, we can restore our waterways and marine life to good health, preserving them for future generations.

Many Florida communities such as Key Largo, Marathon, Crystal River, Sarasota County and others have proven that modern sewer collection and treatment will reverse the negative impacts of sewage pollution and algal blooms in the environment.

These towns are already reaping the rewards of their actions. Now other cities and counties must step up and take the initiative. The fight against algae is the fight for Florida's future.

Brian E. Lapointe, PhD, is a research professor at Florida Atlantic University's Harbor Branch Oceanographic Institute.



Lapointe

His research interests include algal physiology and biochemistry, sea-grass and coral reef ecology, eutrophication, marine bioinvasions and marine conservation.

His work in Florida Bay and the Florida Keys National Marine Sanctuary in the 1990s, which utilized stable nitrogen isotopes to "fingerprint" nitrogen sources, was the first to demonstrate the importance of sewage and

agricultural nitrogen to development of algal blooms in the Florida Keys.

Note: The opinions expressed in this column represent those of the individual author and are not necessarily those of Florida Atlantic University.

**DISPERSANT**  
From Page 12

In their study, UA scientists found that the dispersant can seriously damage certain cells, such as those in the lungs of humans and the gills of marine animals.

The U.S. Environmental Protection Agency approved BP's use of the dispersants during the spill cleanup.

With EPA permission, workers sprayed the dispersant directly at the wellhead spewing oil. BP also used more dispersant than had been used in any previous oil spill, a total of 1.8 million gallons.

In February, 2011, the National Institutes of Health announced that it would spend a decade studying the health impacts on the 33,000 cleanup workers who tackled the 2010 oil spill cleanup.

BP did not return calls for comment. But a few years ago, BP officials claimed that the paper published by UA provided no data to suggest that response workers or aquatic life were exposed to harmful levels of dispersants in the wake of the Deepwater Horizon oil spill disaster.

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