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FLORIDA REMEDIATION CONFERENCE 2017

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See Page 6

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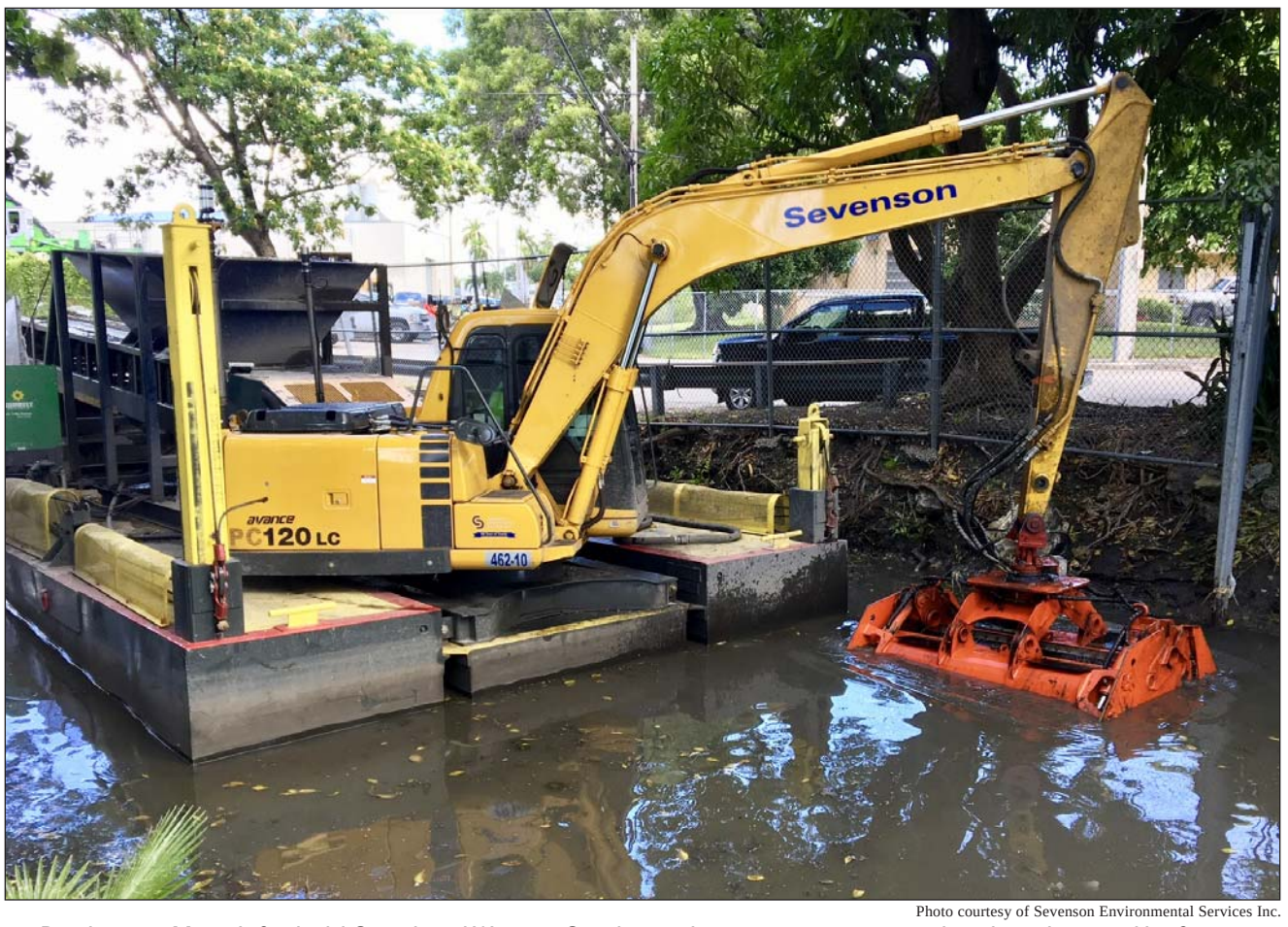


Photo courtesy of Sevenson Environmental Services Inc.

Dredging in Miami's Seybold Canal and Wagner Creek is underway using equipment custom designed by Sevenson Environmental Services Inc. The dredging is removing contaminated sediments resulting from industrial activities and stormwater runoff, and will increase the waterways' stormwater drainage capacity. See story below.

Seybold Canal, Wagner Creek sediment removal project finally underway

By ROY LAUGHLIN

After more than a decade of planning and two years of delay due to a snag in the bid process, the dredging project to remove contaminated sediment from Miami River tributaries Seybold Canal and Wagner Creek began this summer.

The location poses a unique challenge for dredging project. The creek and its channelized mouth are just west of the Flagler Avenue neighborhood in downtown Miami and part of a highly urbanized neighborhood of industrial properties along the canal and several residential neighborhoods along the unchannelized creek.

The canal is less than 1,700 yards long but its sediments contain legacy contaminants that must be removed to ensure they are not carried downstream into the Miami River, which was cleaned up a decade ago.

Sediment contaminants include dioxin, arsenic and other metals that make the water unsafe for fishing and swimming.

"The project (provides) a combination of dioxin removal and improved stormwater drainage for communities in the area," said George Hicks, global practice director for sediment management & remediation at CH2M.

The dredging will increase the volume of water in the canal and creek to help improve both stormwater capacity and navigation.

In some parts of the waterway, mud and soil accretion has made it so shallow that boats cannot reliably navigate the waterbodies at low tide.

The sediment removal work will proceed through six segments, five in Wagner Creek and the sixth in Seybold Canal, the creek's channelized mouth opening to the Miami River.

Project planning documents indicate that a total of 44,310 cubic yards of sediments—61,147 tons of dredge mass—will be removed from the six segments.

The challenging dredging project is being handled by Sevenson Environmental Services Inc., headquartered in Niagara Falls, NY.

Contaminated sediments must be largely contained during the work. If suspended sediment concentration levels become too high, dredging work must cease.

Dredge spoils will be barged to Sevenson's operations yard after removal, and further treatment will be applied there to the contaminated materials.

Seybold Canal, which includes docking facilities on its banks, will be dredged to about eight feet and will, by far, yield the largest sediment volumes, 23,793 cubic yards or 32,835 tons.

Wagner Creek's sediment volumes are expected to vary by segment, ranging from as little as 654 cubic yards to as much as 4,339 cubic yards with masses ranging from 902 tons to 6,000 tons, respectively.

The Wagner Creek segments are not as wide or deep, and support more lower-draft vessels. The water largely

DREDGE
Continued on Page 5

DEP reverses position on special status for Florida LAKEWATCH QAP

By ROY LAUGHLIN

In recent proposed rulemaking, the Florida Department of Environmental Protection included a provision allowing statutorily-established environmental sampling programs with exceptions to quality assurance plans that commercial laboratories must legally follow.

The department granted site-specific exceptions for alternative preservation and maximum holding times for samples to be analyzed for total nitrogen, total phosphorus and chlorophyll *a*.

Three Florida-based commercial environmental labs requested a hearing before the Florida Department of Administrative Hearings asking it to invalidate the special exception. Those labs are Florida-Spectrum Environmental Services Inc., Flowers Chemical Laboratories Inc. and Benchmark EnviroAnalytical Inc.

In late August, Drew Bartlett, DEP's deputy secretary for ecosystem restoration, issued a memorandum partially withdrawing approval for the use of Florida LAKEWATCH data obtained under the site specific methods approved by Bartlett in a July 1, 2013, memorandum.

Bartlett's memo now limits the use of LAKEWATCH data to "establish trends and provide general background information and shall in no instance be used in a regulatory proceeding."

The decision reverses four key regulatory uses of LAKEWATCH data that

REVERSAL
Continued on Page 16

EPA chief seeks to revise steam electric power generating effluent guidelines

Staff report

In a letter to the pro-industry Utility Water Act Group and the U.S. Small Business Administration, U.S. Environmental Protection Agency Administrator Scott Pruitt said that he is seeking to revise the Steam Electric Power Generating Effluent Guidelines - 2015 Final Rule.

The rule lowered the standards for heavy metals including mercury, arsenic, lead, selenium and other contaminants in wastewater released to surface waters from coal-fired power plants .

The U.S. Court of Appeals for the Fifth Circuit in New Orleans will hear the lawsuit challenging the proposed revision.

Under court challenge, this rule has never been fully implemented.

In April, 2017, Pruitt attempted to delay implementation of the guidelines but found that delay by personal decree was not legal.

In the interim, effluent contamination standards based on 1982 guidelines remain in effect.

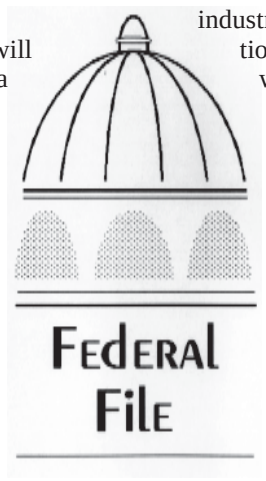
In its rulemaking background, EPA estimated the 2015 rule would reduce power plant pollution by approximately 1.4 billion pounds per year.

It would cost utilities about $480 million for new wastewater treatment systems and provide about $500 million in estimated public benefits.

EPA estimated that 12 percent of U.S. power plants would have to make infrastructure improvements or additions to their existing plants to meet the tougher effluent standards.

Most recently built coal-burning plants and those soon to be built have treatment systems that meet the effluent standards or plan to install treatment systems to meet the standards.

Potentially toxic effluents will be limited to regions around a few of the older plants. But in those areas, 1.4 billion pounds of contaminants such as lead, chromium and mercury that produce developmental injury and lead to significant human health and environmental damage could be released.



WOTUS stakeholder sessions. The Waters of the United States Rule was one of the first Clean Water Act rules the Trump administration suspended upon taking office.

Now, nine months later, EPA and the U.S. Army Corps of Engineers have scheduled a series of 11 two-hour-long teleconferences to gather comments from across the country.

Nine of the sessions will be tailored to specific sectors. The first session conducted on Sept. 19, for example, addressed small businesses, small organizations and small governmental jurisdictions.

Other sectors include environment and public advocacy; hunters and anglers; construction and transportation; agriculture; industry; mining; scientific organizations and academia; stormwater, wastewater management and drinking water agencies; and the general public.

The EPA and corps will also be meeting with small groups during this time.

The 30-day comment period opened on Aug. 16 and ran into September. The agencies also accepted written recommendations on rulemaking.

National climate assessment group eliminated. The federal government no longer has an advisory committee on the Sustained National Climate Assessment group.

The panel's charter expired on Aug. 20, 2017.

National Oceanic and Atmospheric Administration Administrator Ben Friedman announced on Aug. 18 that the charter would not be renewed, effectively ending the panel's existence.

The panel's responsibility was to help government policymakers and private sector managers become aware of and use the federal government's climate analysis for long-term planning, for example, the increasing extent of hurricane flood plains along the U.S. Gulf Coast.

The 15-person expert panel, consisting of academics, local officials and corporate representatives, was charged with writing the National Climate Assessment report.

The report was authorized by law in 1990 and was expected to be released on a four-year cycle. However, only three reports have been released since 1990.

The next report, with an expected 2018 release date and now in a preliminary stage, is entitled the Climate Science Special Report. It is produced by 13 different federal agencies.

The report estimated that human activities were responsible for an increase in global temperatures of 1.1-1.3 degrees Fahrenheit from 1951 to 2010.

The preliminary report provides the technical and scientific basis for guidance that comprises the National Climate Assessment, useful to both public and private-sector officials.

A NOAA communications official, quoted in the *Washington Post*, said that disbanding the advisory committee will not affect completion of the Fourth National Climate Assessment.

But without an expert panel to assist with its completion, one wonders about the quality of the report.

The *Washington Post*, quoting members of the committee, said that the group would keep working on their report with an expectation of releasing it in spring, 2018, as expected.

President Obama established the committee in 2015, but its 15 members were not appointed until the summer of 2016. They had their first meeting in the fall of 2016.

The Advisory Committee for the Sustained National Climate Assessment is one of several dozen expert panels that EPA Administrator Scott Pruitt has suspended since he took over as the head of the agency.

U.S. Department of the Interior Sec. Ryan Zinke is currently reviewing his department's advisory boards, said to number more than 200, to determine if any or all of them should be disbanded.

Interior Department announces funding for Florida. The U.S. Department of the Interior will be distributing $4,344,730 to the state of Florida for outdoor recreation and conservation projects from its Land and Water Conservation Fund, which is financed through offshore oil and gas leasing.

The funding is part of $94.3 million to be distributed across all 50 states, U.S. territories and the District of Columbia. The funds are awarded through federal matching grants that leverage public and private investment in America's state and local public parks.

DOI Secretary Ryan Zinke characterized the program as a "resounding success" that provides benefits across the nation by helping state and local governments make infrastructure investments in urban, suburban and rural parks.

The LWCF was established in 1965 to ensure access to outdoor recreation resources for present and future generations.

The funds enable state and local governments to improve existing parks and other recreation areas through rehabilitation and upgrade projects.

Since the inception of the LWCF, more than $4.1 billion has been made available to state and local governments to fund more than 42,000 projects throughout the nation.

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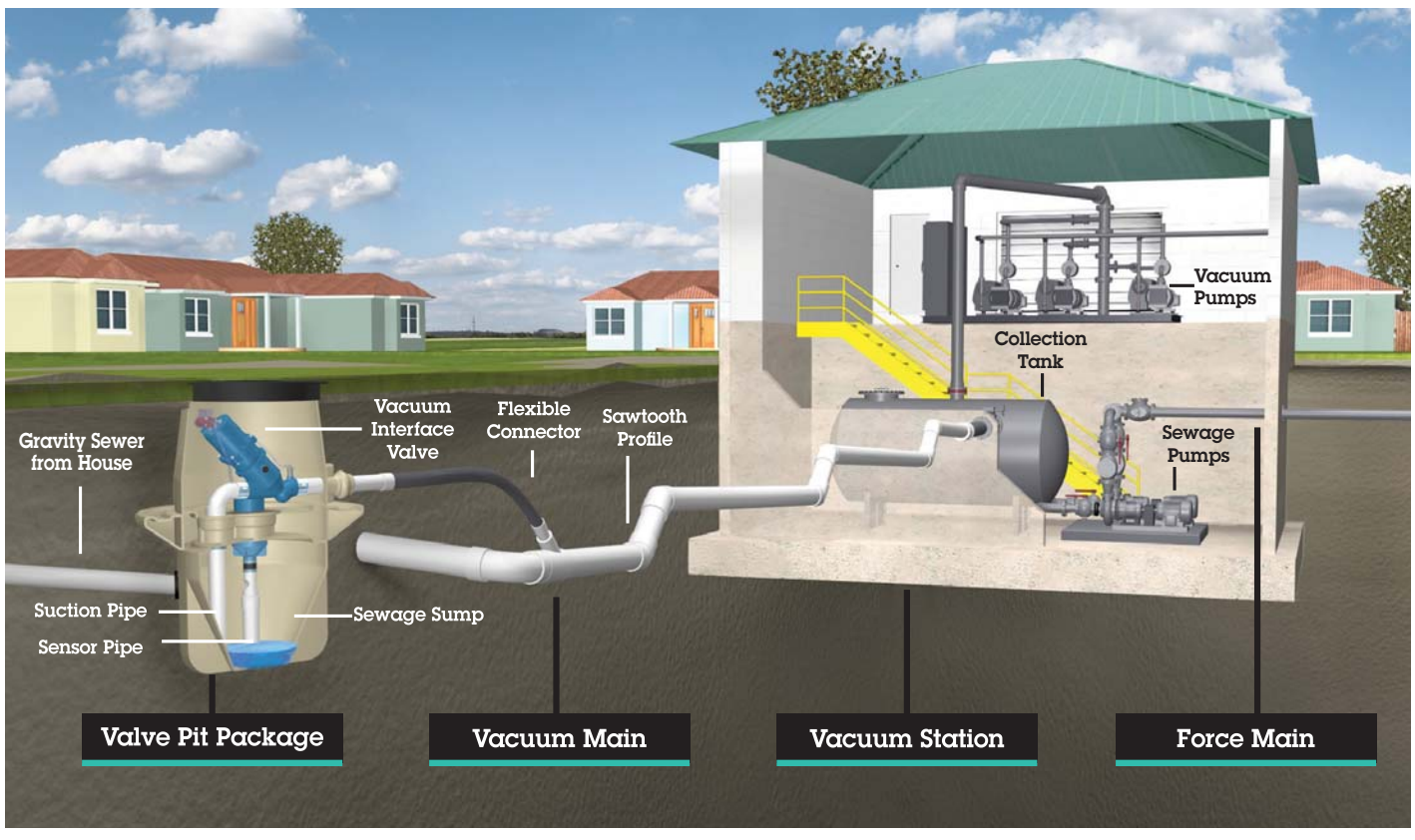

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Fax: (321) 972-8937
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MICHAEL R. EASTMAN
Publisher/Editor
mreast@enviro-net.com

Support services provided by
OSS
Orlando, FL

Contributing writers and columnists

PRAKASH GANDHI
Senior Environmental Correspondent
Orlando, FL

BLANCHE HARDY, PG
Environmental Correspondent
Sanford, FL

ROY LAUGHLIN
Environmental Correspondent
Rockledge, FL

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Demolition of Jax coal-fired power plant underway

Staff report

A coal-fired power plant in northern Jacksonville is being torn down. Officials said the Cedar Bay Generating Plant could be demolished by early 2019.

The cost of tearing down the plant is expected to be at least $450,000, maybe more.

Before the main structures are razed, the demolition contractor, DEMCO Inc., will have to remove hazardous materials including residual chemicals, acids and oils. Boilers, cooling towers, silos, turbines and other equipment will be demolished.

DEMCO will dismantle the three boiler structures in the center of the plant and then use explosives to take down the plant's 425-foot-tall stack and the site's ash silos.

After the demolition is complete, the debris from the blasts will be used to backfill the site. DEMCO believes it will be removing the turbine building and equipment by the end of next year.

The final phase, scheduled to start in early 2018, involves restoring and backfilling the remaining land.

Since 1994, Cedar Bay Generating Co. has provided energy to Florida Power & Light Co. through a power purchase agreement.

The utility paid about $120 million annually to Cedar Bay for access to the energy. Cedar Bay operated and maintained the facility.

Two years ago, FPL received approval to buy the 250-megawatt plant from CBAS Power Holdings for $520.5 million in advance of phasing out the coal-fired plant entirely.

Officials said that the sale saved customers more than $70 million and closing the plant reduced carbon emissions by about a million tons annually.

FPL wants to phase out its portfolio of coal-fired plants because they are no longer financially viable when compared to natural gas and solar options.

In May, the utility said it was asking for approval from the Florida Public Service Commission to close St. Johns River Power Park, a coal-fired plant it co-owns with JEA in northern Jacksonville.

FPL has a long-term agreement with JEA to split the operating expenses and power output from it.

The utility is also planning to close the Indiantown Cogeneration plant in Martin County by the end of 2019.

FPL is building eight solar power facilities and two of them, serving Putnam and Alachua counties, should be open by the end of the year.

Dade City landfill fines. Officials in Pasco County's Dade City agreed to a reduced level of fines for violations at an old landfill.

The city was penalized because it failed to properly provide the Florida Department of Environmental Protection with groundwater samples from the Parrish Grove Road landfill.

The city was required to monitor the landfill's impact on the environment.

The amount of the penalty was much lower than what the city could have faced. The $3,000 total was for four violations of $500 each, plus $1,000 in administrative costs.

The violations were discovered during an evaluation inspection conducted in February last year.

Tampa-based Schreuder Inc., a consultant hired by the city, said in a letter to DEP that the city would comply with all sampling requirements.

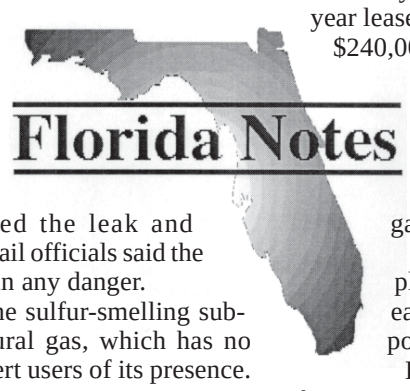
But the department discovered otherwise and said the city did not conduct three consecutive measurements of the five field parameters that include temperature, pH levels, conductance, dissolved oxygen and turbidity.

City officials later met with DEP to resolve the problem, leading to the settlement offer and fine.

Pipeline issues. Central Florida residents reported foul-smelling leaks just weeks after the Sabal Trail Pipeline went online.

In July, residents in Marion County reported what they believed were gas leaks. Residents said the odor was coming from the direction of the pipeline.

But Marion County officials and a Sabal Trail technician said there was no natural gas leak.



They said the smell was coming from the pipeline's odorant tanks.

A Sabal Trail technician located the leak and capped it. Sabal Trail officials said the public was never in any danger.

Utilities add the sulfur-smelling substance to the natural gas, which has no natural odor, to alert users of its presence.

Compost facility shuttered, for good. In August, Haynes City commissioners voted to keep the controversial BCR Environmental composting plant closed.

Nearby residents complained about the odors emanating from the plant and other issues. The facility processed human waste and other waste materials into soil.

Officials said the city will look to lease the plant to another company that specializes in environmental or energy saving products.

Last year, commissioners decided to buy 10 acres for the facility. The city paid $300,000 for the land with BCR paying 20 percent.

The city and BCR entered into a 20-year lease agreement to offset the other $240,000.

Under that deal, BCR agreed to pay the city $1,000 a month. But nearby residents complained about the facility since it first began operations.

Responding to those complaints, the commission voted earlier this year to suspend composting at the plant.

Later, the Florida Department of Environmental Protection got involved, eventually issuing a consent order to BCR that offered suggestions for improving operations before reopening.

Clean energy Orlando. Orlando has become the largest city in Florida to com-

NOTES
Continued on Page 16

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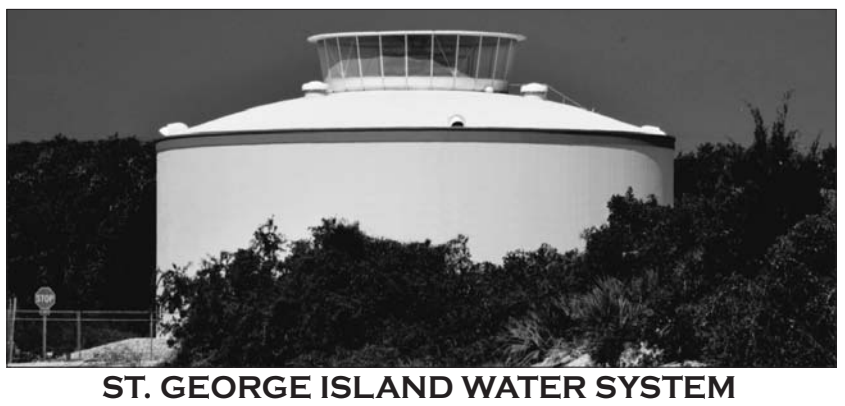

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Gulf of Mexico dead zone largest since measurements began in 1980s

Staff report

The annual mapping of the northern Gulf of Mexico's "dead zone" showed that the anoxic area covered 8,776 square miles, the largest since the survey program began in 1985.

The dead zone is an annual occurrence caused by eutrophication in Gulf of Mexico waters.

Heavy rains shift decaying organic matter into deeper waters, consuming oxygen during decomposition. The result is thousands of square miles of anoxic water.

Sometimes that anoxic water reaches the surface and well into shallow nearshore waters. Depending on its severity, temporary extensive destruction of bottom fauna occurs and mobile organisms leave the area in search of oxygenated waters.

Springtime water column assessments indicated that this year's dead zone would be large, perhaps the third largest ever. Researchers were surprised that it was a record.

Some noted that it could have been larger except for persistent southwest winds that compressed the water column against the shore on the eastern side of the dead zone. That wind stress prevented further aerial coverage.

The down side is that anoxic water in the shallower shoreward areas impinges on shrimp and other seafood fisheries in shallow waters.

The result will likely be poorer seafood landings in Louisiana, Mississippi, Alabama and perhaps western Florida, where seafood is an important industry.

Nutrients in runoff from the Mississippi River watershed are the primary cause of algal blooms in the Gulf and subsequent dead zone formation.

THE WATER WATCH

Both the National Oceanic and Atmospheric Administration and the U.S. Geological Survey documented increasing nitrogen and phosphorus levels draining through the Mississippi River to the northern Gulf over the past 30 years.

Low oxygen levels in Gulf. Florida State University oceanographers warned that declining oxygen levels in the Gulf of Mexico may have a significant effect on Gulf Coast fisheries and water quality.

Higher CO2 concentrations in the atmosphere, they said, are providing additional carbon dioxide to spur plant growth, along with the increased nitrate and phosphate levels in surface water runoff.

Increasing primary productivity was originally expected to promote productivity in marine food chains. At the human end of that food chain, that should lead to more shrimp and red snapper—but that's not what happened, according the FSU researchers.

The increase in carbon dioxide and nitrogen and phosphorus nutrients as a result of human activities has occurred too quickly for ecosystems to adjust.

Much of the primary production in algal blooms is not transferred through the food chain in the water column. It falls below the photic zone where its decay consumes dissolved oxygen, making it unavailable to fisheries species that are intolerant of anoxia.

At least in the short term, marine ecosystems are not adjusting and some existing food chains are not as productive as they have previously been.

Apparently, consistently having sufficient oxygen contributes more to primary productivity than adding additional nutrients before oxygen concentrations drop.

The FSU scientists said that to protect coastal waters, oceanic fisheries and tourism resources, Florida should do more to reduce its carbon footprint through expanded renewable energy production, and reduce runoff of fertilizer nutrients to estuary and coastal waters.

In particular, they encourage greater protection of freshwater and estuarine wetlands.

Although Florida does not experience the dead zone that occurs off the Mississippi River Delta, destructive effects of low oxygen levels on marine ecosystems may still become increasingly tangible.

Seafood producers and the tourism industry will be the first to experience the economic consequences of it.

Ten Mile Creek Reservoir repairs. This summer, the South Florida Water Management District began filling the Ten Mile Creek Reservoir in St. Lucie County.

The 526-acre reservoir was designed to treat 2,500 acre-feet of stormwater flow diverted from Ten Mile Creek.

The reservoir is part of a regional system used to treat stormwater runoff before it flows into the St. Lucie River and Indian River Lagoon.

The water entering the new reservoir is being diverted there from agricultural areas in St. Lucie County.

The reservoir is expected to help reduce total nutrient loading to the St. Lucie Estuary where Lake Okeechobee water discharge is heavily impacting the estuary and downstream waterways.

The reservoir could store and sequester nutrients from up to 5.7 billion gallons of runoff annually. It could retain a substantial part of the 139,000 pounds of nitrogen and 37,344 pounds of phosphorus from agricultural areas that drain into the creek.

When nutrient levels in retained water decline to a desirable range, the reservoir could release up to 815 million gallons of water into the Ten Mile Creek Water Preserve Area. From there, the water will flow into the North Fork of the St. Lucie River.

The reservoir has been under construction for more than a dozen years. Originally built by the U.S. Army Corps of Engineers at a cost of $35 million and scheduled to be operational in 2006, the reservoir's levee allowed too much seepage for it to function as intended.

A nine-year court case between the corps and the engineering firm that designed the reservoir restricted further work until a settlement was reached in 2015. In December 2016, Congress authorized the SFWMD to take over the project.

After years of remedial construction to shore up the levy at a cost of $7 million, SFWMD began pumping water into the reservoir again.

The current depth is less than the four- to five-foot usual operational depth and well below the 10-foot depth originally planned by the corps.

Nevertheless, the reservoir appears to be more functional at the lower volume than originally expected. And it is operational in time for the wettest months of Florida's wet season.

Sarasota Bay Estuary Program oyster reef. The Sarasota Bay Estuary Program reported that a 1.2-acre oyster habitat hard bottom project on Sarasota Bay's eastern shoreline is being colonized quickly by sessile organisms including barnacles and oyster spat, *Crassostrea virginica*.

This is the first step in an ecological succession that may restore a hard-bottom, living oyster reef in the area.

The reef was started last spring when volunteers laid out four 30-foot diameter circles of oyster cultch in mesh bags on the shallow bottoms in Sarasota Bay.

Within the circles, volunteers placed

WATCH

Continued on Page 5

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"Standing firm on any ground."

Tavares works to improve Lake Dora water quality through technology, BMPs

By BLANCHE HARDY, PG

The city of Tavares' Ruby Street Stormwater and Beautification Project is utilizing a collection of best management practices and emerging technologies to create an environmentally effective, user-friendly stormwater treatment facility on Lake Dora.

The city will use the facility to inform and educate the public about stormwater pollution issues.

The project is a continuation of efforts to improve water quality in Lake Dora. The lake is listed among the impaired waters of the Ocklawaha River basin. Pollutants and nutrient loads in the lake exceed regulatory standards as monitored by the Florida Department of Environmental Protection.

Initial action to improve water quality in Lake Dora was undertaken by the Lake County Water Authority. The authority built a nutrient reduction facility in 2009 to reduce nitrogen, phosphorous and other pollutants impacting the lake.

But city officials decided that additional mitigation was needed to address pollutants entering the lake, including contaminants transported by stormwater runoff from the frequently flooded streets. The runoff was not being directed to the nutrient reduction facility for treatment prior to its discharge into Lake Dora.

The Ruby Street project includes an eight-acre park housing a series of treatment pond cells that will provide a scenic green space in downtown Tavares.

The Lake County Water Authority and Florida Department of Environmental Protection are providing funding for the work.

Among the innovative technologies the project will feature are floating treatment mats from New Smyrna Beach-based Beemats LLC.

Beemats' "floating wetlands" are a patented active biological treatment system created by an assemblage of puzzle cut mats held together by nylon connectors.

The mats are infused with macrophyte plants and, as they grow, excess nutrients and pesticides are taken up from the waterbody and stored in the plants' tissue.

The plants are periodically harvested and the mats are replanted and redeployed to continue nutrient removal.

Research completed on projects at Patrick Air Force Base and the Deep Creek West Regional Stormwater Treatment Facility as reported to the St. Johns River Water Management District indicate that harvestable floating treatment wetland islands can achieve phosphorus removal rates of 70 to 300 pounds per acre per year.

The Ruby Street project includes a pedestrian walkway on top of the berms separating the treatment ponds. Native wildflowers will be planted on the slope of the berms between the path and the water's edge.

The city selected a wildflower seed mix to present colorful, native species that are effective in nitrogen uptake to assist in the stormwater treatment process. The wildflowers are also intended to provide a habitat for local pollinator species such as butterflies, hummingbirds and bees.

"Agriculture is a key component of our local economy," said Bob Tweedie, economic development director for the city of Tavares. "Bee colonies are essential to the agricultural circle of life, and we want to do our part in providing an environment where pollinators can thrive."

In addition to park construction, the city is replacing 50-year old drainage pipes and outfalls to help resolve flooding issues.

The current phase of work is anticipated to take approximately 450 days to complete from its summer, 2016, start.

DREDGE

From Page 1

comes from seepage and stormwater runoff.

Dredge spoils will be subdivided within each segment as dredging occurs. According to a planning document, "analysis for contaminants to determine its toxicity will guide disposal."

All sediments will be dried then mixed with cement to make them more manageable. The treated sediment from less contaminated segments will be disposed of in a local landfill. The more highly contaminated segments will be shipped to a Georgia landfill permitted to accept dioxin and other hazardous contaminants.

CH2M is the engineer of record on the project. The city of Miami hired Sevenson to perform the dredging and muck-sediment removal.

The scope of work includes "detailed and accurate field documentation for review by city, agencies and other stakeholders."

The dredging operation caps several years of planning and preparation to clean up Seybold Canal and Wagner Creek.

Documentation of sediment contaminant levels began as early as 2003. Early studies showed high levels of dioxin thought to have come from a now dismantled municipal waste incinerator along the banks of Wagner Creek.

The arsenic in the sediment likely came from wood preservatives or pesticides. PAH and greases are from fuels and road runoff.

In 2007, the city of Miami hired CH2M to perform sediment and surface water sampling. That study included determination of sediment thickness, a necessary prelude to planning the dredging. Those projects continued during 2008 in 2009.

In 2015, the city asked for bids for the dredging, but rejected all of them for administrative reasons. In 2016, the city selected Sevenson to do the dredging work. CH2M is overseeing analysis and disposal of the contaminated sediments.

The project formally began the first week of August. Dredging and sediment removal is expected to occur over a 15-month interval.

The project is expected to cost $18.4 million and is being funded primarily through stormwater fees, a state loan, and a $3 million grant from the Florida Inland Navigation District.

WATCH

From Page 4

additional oyster shells to make an extensive hard bottom that is now attracting larval settlement of a variety of sessile marine organisms and particularly the desired oyster spat.

More than a century ago, Sarasota Bay had extensive hard bottom areas dominated by oysters. Dredge and fill operations, perhaps a substantial part of which mined the oyster reefs for shell to make Florida's first roads, took material from more than 4,500 acres in Sarasota Bay.

Without a hard bottom, populations of oysters and other sessile organisms that attach to hard bottoms declined considerably. And the bay lost the water filtration benefits oyster feeding provides.

Restoring filtration feeders is likely to be a successful way to reduce suspended solids and algae in the water.

Beyond water quality benefits, the hard bottom creates a structural habitat that often has the highest level of fish, free living invertebrate and faunal diversity.

Funding for this project came from the Sarasota Bay Estuary Program.

The work was lead by Program Scientist Jay Leverone, PhD.

Howell Creek nature preserve. In August, Winter Park city commissioners approved the purchase of 55 acres of bottomland along Howell Creek and bordered by Howell Branch Road.

The city intends to build a nature preserve that will keep intact a small portion of the oak-bald cypress swamplands that largely dominated swamps in Central Florida until the 1980s.

Winter Park paid $304,500 for the land. About half of the purchase price comes from a 2017 state grant shepherded through the Florida Legislature by former Florida Senate President Andy Gardner of Orlando.

According to reports, Winter Park officials said they will spend an additional $525,000 to create a park in the future. That work will include an initial effort to remove chinaberry, skunk vine and other invasive plants. Cleared areas will be replanted with native flora.

City officials envision a nature preserve with recreational opportunities that include running trails, fishing, and a launch for canoes and kayaks on Howell Creek.

The property adjoins about 10 acres that Winter Park has already developed as a park.

In 2008, the city opened the Howell Branch Preserve. It has a playground, exercise trail, parking, restrooms and observation deck extended into the wetlands.

Two of the seven land parcels the city of Winter Park purchased are within Maitland city limits.

Staff with the two cities will work together to develop a use and management plan for the parcels.

The recent purchase caps more than 20 years of advocacy by former Winter Park City Commissioner Karen Diebel who urged purchase of the Howell Creek bottomland and its preservation.

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FLORIDA REMEDIATION 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

Keynote 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.

Day 1

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, lowmaintenance 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 **Leveraging the Commercial Use of Drones on Military Installations for Environmental Site Cleanup**
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 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 environmental 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.

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1:30 **Perluoroalkyl 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 Perluoroalkyl 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 Tech. Mgr., 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

Session 4A: Speed Talks 3:30
1) **Green Remediation Alternative**
Nesmar Mora, Environmental Engineer
Royal Consulting Services, Longwood
2) **Post Remediation Performance and Aquifer pH**
Brad Elkins, MS, PG, Tech. Sales & Support,
EOS Remediation LLC, Raleigh, NC
3) **Horizontal Well Used for Coal Ash Basin Dewatering**
David Bardsley, PG, Geologist, Directed
Technologies Drilling Inc., Bellefonte, PA
4) **Sustainable and Cost-Effective Destruction of Chlorinated Alkane-Alkene Contaminants via Biostimulation and Enhanced Reductive Dechlorination**
Kent Armstrong, President
TerraStryke Products LLC, Andover, NH
5) **Tools for Monitoring Contaminant Biodegradation when Combined with Colloidal Activated Carbon**
Chad Northington, PE, SE District Technical
Manager, Regenesis, Tallahassee
6) **Filing Data Gaps with Horizontal Wells**
Lance Robinson, PE, Chief Technology
Officer, EN Rx Inc., Parrish
7) **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
8) **Klozur One: A Built-In Soluble Activator with Klozur SP**
Patrick Hicks, PhD, SE Reg. Tech. Sales
Manager, PeroxyChem, Philadelphia, PA
9) **Time-Tested Advantages of Horizontal Wells**
Mike Sequino, Senior Vice President
Directional Technologies Inc., Miramar Beach
10 **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**
Mark Culbreth, PG, Principal Scientist, ECT Inc., Tampa

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

Continued on Page 10

SWANA report presents pros, cons of alternative landfill capping methods

By PRAKASH GANDHI

There has been growing concern regarding the performance of prescribed final cover systems for solid waste landfills once waste placement comes to an end.

In response, the Solid Waste Association of North America issued a report presenting the benefits of two final cover systems for nonhazardous waste landfills.

The study looked at exposed geomembrane cover systems, or EGCs, and engineered turf cover systems, or ETCs, and found that they have service lives of roughly 100 years and 200 years, respectively.

SWANA officials said that even though these cover systems are not prescribed in federal municipal solid waste regulations, they have been permitted as final cover systems in states around the country including Florida.

The U.S. Environmental Protection Agency's prescribed method for capping landfills includes a vegetative surface layer that can be costly to maintain for the requisite 30 years after a landfill is closed and capped.

EGC systems do not include the vegetative, topsoil, infiltration and drainage layer components found in the EPA's prescribed final cover system.

ETC systems use an engineered turf layer to cover and protect the underlying geomembrane from ultraviolet radiation and oxidation, and use sand ballast to mitigate wind and landfill gas pressure issues.

The report found that the two nontraditional final capping methods could potentially meet or exceed current federal requirements.

EGC and ETC systems would offer major savings for landfill operators, especially if more states formally recognize the methods as acceptable final covers, said Jeremy O'Brien, director of SWANA's Applied Research Foundation.

Laboratory and field testing results for the alternative cover systems indicate service lives consistent with current EPA regulations.

"The systems that are used currently are soil-based and they have a very long life," said O'Brien. "But with the current systems, you are required to grow and maintain a vegetative cover which can be difficult to do.

"At some landfills, the availability of soil is a problem and, when it is available, it can be expensive."

In addition, O'Brien said, the soil can take up a lot of volume at landfill.

"You are required to place about 2.5 feet of soil over the landfill. If you have 100 acres of surface area and 43,000 square feet per acre, that's a lot of volume that's taken up by soil (cover)," he said.

"That volume could be used for landfill waste. The benefit of these alternative methods is that they do not require any soil. I think there is a bright future for these alternative systems."

But there are some disadvantages, said O'Brien.

"There could be some issues with stormwater runoff," he said. "You have to make sure your stormwater management systems can handle this. That's something to be concerned about."

Pilot project underway to cleanup Indian River County's polluted canal systems

By BLANCHE HARDY PG

Indian River County is supporting a technology pilot study that officials there hope will provide a solution to pollutants in some of the county's canal systems.

Greenfield Resources setup their process equipment trailer along the Main Relief Canal north of the county government offices in Vero Beach.

The equipment is intended to remove nitrogen and phosphorus from canal water before it reaches the lagoon. The county hopes the equipment will prove effective in helping to prevent algal blooms.

The Main Relief Canal does not receive significant stormwater contributions from large inland lakes. But it does provide sufficient local drainage to perform the pilot test.

With the support of Indian River County District 3 Commissioner Tim Zorc, Greenfield received the go-ahead from the county commission and the Indian River Farms Water Control District for a pilot project in November, 2016.

Their goal is to remove bacteria and pollutants from the county's canal system without the use of chemicals.

For their part, Greenfield engaged in the project as a vehicle for testing and demonstrating the viability of their technology in Florida.

The pilot project is being conducted in two phases. In Phase I, water samples were collected from various locations within the greater canal system and analyzed to determine how effectively the technology removes unwanted contaminants.

Water samples were also delivered to Greenfield's headquarters in Troy, MI, for processing. The samples were exposed to strong electrical currents to kill bacteria and remove pollutants at the Michigan facility.

In March, 1,500 gallons of water collected from the Main Relief Canal were shipped to Michigan for processing.

In Phase II, the current phase, Greenfield installed a processing unit at the county canal. The unit withdrawals water from the canal, processes it and returns it to the canal.

A custom-built Greenfield mobile treatment unit has been operating in the Main Relief Canal since mid-July.

The mobile unit contains 12 reactors capable of cleaning roughly 300,00 gallons of water a day. The pollutant-contaminated medium can be landfilled and nutrients can be recaptured for reuse as fertilizer.

The current pilot system isn't capable of addressing the entire flow of the Main Relief Canal, which can exceed 30 million gallon a day. County commissioners are considering trying the technology in pollutant-impacted areas of upstream canals with lower flows.

The northern lagoon is also being considered for treatment, as it receives less tidal flow and less stormwater discharge. Cleaning water in these areas could have a much greater algal bloom prevention impact.

In promotional literature, Greenfield claims that their "advanced linear electrofloatation" treatment process stands alone as the most innovative and cost-effective water treatment technology available in the world today.

Greenfield's ALEF process is based on the response of water-borne contaminants to strong electric fields, currents and electrically induced oxidation and reduction reactions.

The systems utilize electrocoagulation/electro-floatation concepts where passing an electrical current through water and various elemental catalysts is effective for removing contaminants from water.

Information presented by Greenfield states that their systems "go far beyond the standard concept of today's electrocoagulation systems by utilizing advanced concepts in physics and magnetism as well as fluid dynamics."

Time will tell whether or not their technology can help resolve some of the surface water quality issues in the state.

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Alabama's Trey Glenn appointed as EPA Region 4 administrator

By ROY LAUGHLIN

In late August, U.S. Environmental Protection Agency Administrator Scott Pruitt tapped Trey Glenn, III, to head EPA's Region 4.

As Region 4 administrator, Glenn will oversee the activities of EPA employees in eight states, including Florida. He immediately assumed his duties, filling a vacancy that existed for more than seven months.

Glenn, an Alabama resident for most of his life, brings with him both professional credentials as an engineer, administrative experience and, more recently, experience with policy and legislation.

He attended the University of Auburn at Montgomery during his first two years and then finished at Auburn, earning a bachelors degree in Civil Engineering. In 1999, he earned a masters of business administration degree from the University of Alabama at Birmingham.

Upon graduation from Auburn, Glenn began employment with the Alabama Power Co. Initially he was a hydrologic engineer with Alabama Power's Reservoir Management and Environmental Affairs Group.

He held that position for approximately seven years until he moved to the Alabama Office of Water Resources as division director in June, 2001.

In February, 2005, Glenn was named as director of the Alabama Department of Environmental Management.

Then in January, 2009, he resigned from ADEM following a professional ethics controversy.

Since then, he has been a consulting engineer for Blue Ridge Consulting Inc. where his work has included representing the Business Council of Alabama's Environment and Energy Committee as well as providing counsel and testimony regarding proposed federal and state rules, according to his LinkedIn page.

Alabama records indicate that at the time of his appointment, Glenn was a registered lobbyist for the Business Council of Alabama where he promoted business and industry interests.

While there is little doubt that Glenn has solid professional engineering credentials, his career as Alabama's highest-ranking environmental regulator ended in controversy.

From 2007 to 2009, he faced two sets of allegations of unethical professional conduct.

The Alabama Ethics Commission investigated the complaints and referred its findings to the district attorney. A grand jury, in December, 2008, did not support an indictment against Glenn on the ethics charges.

Glenn retired as ADEM director in December, 2009. He remarked in his resignation letter that he intended to pursue opportunities in environmental and natural resources policy.

After his resignation, he became a consulting engineer at Blue Ridge Consulting in Birmingham, AL.

He remained at the company until his appointment as the EPA Region 4 Administrator.

Altamonte Springs moves forward with testing of potable reuse pilot project

By BLANCHE HARDY, PG

The city of Altamonte Springs is conducting a potable reuse pilot project they call pureALTA. A frequent technology innovator, the city hopes the pureALTA pilot will help move them forward with meeting their future water supply needs.

Like many municipalities in Florida, Altamonte Springs is concerned with future drinking water supplies as it tries to keep up with continued population growth, shrinking groundwater supplies and the potential of drought.

"This past year is a prime example of the impact that drought can have on Florida's groundwater supply," said Ed Torres, director of public works and utilities at the city. "We're embarking on this project now to explore ways to create additional water supplies in the future, if and when they are needed."

The pureALTA project treats reclaimed wastewater to meet or exceed all drinking water quality standards without using the typically employed reverse osmosis treatment process.

The RO process requires a high level of energy consumption and creates a concentrated brine byproduct requiring disposal.

The city is conducting the pureALTA pilot project in partnership with the St. Johns River Water Management District. The district is contributing fifty percent of the $1 million project cost.

The current testing phase will run through October, 2018.

Altamonte Springs built a network of advanced water treatment processes: ozonation and biological activated carbon filtration, ultrafiltration, granular activated carbon filtration and ultraviolet light with an advanced oxidation process for use in the pureALTA project.

The pilot project is currently treating about 28,000 gallons of wastewater a day. The city is returning the treated water to their reclaimed water system for irrigation during this phase.

The city reported that the pureALTA system of water purification "has produced outstanding results during the testing phase," indicating the final results of the pilot project may allow implementation of a full-scale system with the potential to create 300,000 to 500,000 gallons of purified water per day.

If established, the pureALTA system could provide as mush as five percent of the city's future daily water demand—nine million gallons per day—reducing the need to withdraw increasing regulated and scarce groundwater for that supply.

In addition to exploring treatment processes capable of meeting drinking water standards, the project is intended to provide data on cost factors and data to be used as a model for reuse to potable water projects throughout the state.

The project will also help to establish monitoring technologies to ensure that purified reuse water is consistently safe. Currently, water generated by the pilot is tested to ensure it meets drinking water standards and removes pharmaceuticals and personal care products that are not currently regulated.

Altamonte Springs will share the results and findings of the pilot with regulatory agencies to assist them in the development of potable reuse regulations.

Education is also part of the pureALTA project. The city developed the Altamonte Springs Science Incubator program as an applied STEM learning experience for Seminole County students.

The city hosts field trips to locations such as Lake Lotus Park, the Regional Water Reclamation Facility and its environmental laboratory.

Field trips will soon include a tour of the pureALTA project site and discussions of treatment processes, safety, drought and diversified water alternatives.

City officials hopes the introduction of potable reuse and treatment technologies to Seminole County students will help expand awareness of the pilot project in the community and enable students to gain a deeper understanding of water resources and the technologies coming online to augment future supplies.

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Tampa - (813) 630-9616
Wes Tyler - wtyler@aellab.com

From Page 7

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 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.

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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

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.

Day One adjourns

FRC Reception *Sponsored by* ***Pace Analytical Services LLC***

Day 2

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 volatized 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

Continued on Page 12

Calendar

October

OCT. 6-7 – Exam: Backflow Prevention Recertification Exam, Ft. Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 9-11 – Course: Asbestos Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11 – Course: Refresher Training Course for Experienced Solid Waste Operator, 8 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11 – Course: Refresher Training Course for Experienced Solid Waste Operator, 4 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11 – Course: Refresher Training Course for Experienced Solid Waste Spotter, 4 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11-12 – Course: Initial Training Course for Transfer Station Operators and Materials Recovery Facilities, 16 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11-12 – Course: Refresher Training Course for Experienced Solid Waste Operator, 16 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11-13 – Course: Initial Training for Landfill Operators and C&D Sites, 4 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11-13 – Conference: 2017 Annual Conference of the Southeast Stormwater Association, Louisville, KY. Call 1-8660367-7379 or visit www.seswa.org.

OCT. 12 – Course: Refresher Training Course for Experienced Solid Waste Operator, 8 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 12 – Course: Refresher Training Course for Experienced Solid Waste Operator, 4 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 12-13 – Course: Asbestos: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 13 – Course: Refresher Training Course for Experienced Solid Waste Operator, 4 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 13-21 – Course: Backflow Prevention Assembly Tester Training and Certification, Ft. Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14-15 – 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.

OCT. 15-18 – Conference: 2017 Fall Conference of the American Council of Engineering Companies, Orlando, FL. Call (202) 347-7474 or visit www.acec.org.

OCT. 16 – Course: Unidirectional Flushing Workshop, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 16-18 – Symposium: 7th International Symposium and Exhibition on the Redevelopment of Manufactured Gas Plant Sites, New Orleans, LA. Presented by GEI Consultants Inc., the Electric Power Research Institute, the International Society of Technical & Environmental Professionals Inc. and the Center for Biomedical & Toxicological Research at Florida State University. Contact Gene Jones at (850) 558-0617 or gene@instep.ws, or visit http://mgpsymposium.com.

OCT. 16-18 – Course: Backflow Prevention Assembly Repair and Maintenance Training & Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 16-20 – 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.

OCT. 17 – Course: Wastewater Collection System Cleaning and Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 17-20 – Course: Wastewater Class B Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 18 – Seminar: Florida Hydrogeology and Water Well Construction, Orlando, FL. Presented by the Florida Section of the American Water Works Association. Contact Donna Metherall at (407) 957-8443 or donna@fsawwa.org.

OCT. 18-19 – Course: Pumping Systems Operation & Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 19-20 – 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.

OCT. 19-20 – 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.

OCT. 20 – Course: Water Distribution Systems Pipes and Valves, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 20 – Course: Water Distribution Systems Pipes and Valves, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 23-25 – Conference: Georgia Rural Water Association Fall Conference, Helen, GA. Call (770) 358-0221 or visit www.grwa.org.

OCT. 24-26 – Course: Process Control of Advanced Waste Treatment Plants, Miramar Beach, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 25-27 – Meeting: Fall 2017 Meeting of the Florida Society of Environmental Analysts, Jupiter, FL. Call (941) 748-5700 or visit www.fsea.net.

OCT. 28 – NOV. 4 – Course: Backflow Prevention Assembly Tester Training and Certification, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

November

NOV. 1 – Course: Asbestos Refresher: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

NOV. 1 – Course: Asbestos Refresher: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 2 – Course: Dissolved Oxygen & Oxidation Reduction Potential Training, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 2 – Course: Asbestos Refresher: Contractor/Supervisor, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 3-4 – Course: Backflow Prevention Assembly Repair and Maintenance Training & Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 4 – Meeting: Quarterly Membership Meeting of the Florida Ground Water Association, Panama City Beach, FL. Call (850) 205-5641 or visit www.fgwa.org.

NOV. 4-5 – 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.

NOV. 6-7 – 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.

NOV. 6-10 – Course: Backflow Prevention Assembly Tester Training and Certification, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 6-10 – 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.

NOV. 6-10 – Course: Backflow Prevention Assembly Tester Training and Certification, West Palm Beach, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 10-18 – Course: Backflow Prevention Assembly Tester Training and Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 14 – Course: Refresher Training Course for Experienced Solid Waste Spotter, 4 Hour, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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P.O. Box 2175
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Michael R. Eastman
Publisher/Editor
mreast@enviro-net.com

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Nov. 4-5, 2017 | Bradenton, FL
Nov. 6-7, 2017 | Altamonte Springs
Nov. 16-17, 2017 | Gainesville, FL
Nov. 18-19, 2017 | Tampa, FL

Backflow Prevention Assembly Tester Training & Certification
Oct. 16-20, 2017 | Pensacola, FL
Oct. 28-Nov. 4, 2017 | Tampa, FL**
Nov. 6-10, 2017 | Destin, FL
Dec. 2-10, 2017 | Tampa, FL**
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** (Two consecutive Sat. & Sun.)

Backflow Prevention Assembly Repair & Maintenance Training & Certification
Oct. 16-18, 2017 | Gainesville, FL
Nov. 3-4, 2017 | Venice, FL

Solid Waste Courses

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Oct. 11-13, 2017 | Tallahassee, FL
Nov. 14-16, 2017 | Gainesville, FL
Dec. 5-7, 2017 | Orlando, FL

Water/Wastewater Courses

Unidirectional Flushing Workshop
Oct. 16, 2017 | Gainesville, FL

Wastewater Collection System Cleaning & Maintenance
Oct. 17, 2017 | Gainesville, FL

Pumping System Operation & Maintenance
Oct. 18-19, 2017 | Gainesville, FL

Water Distrubution System Pipes & Valves
Oct. 20, 2017 | Gainesville, FL

Process Control of Advanced Waste Treatment Plants
Oct. 24-26, 2017 | Miramar Beach, FL

Asbestos Courses

Asbestos: Inspector
Oct. 9-11, 2017 | Gainesville, FL

Asbestos: Management Planner
Oct. 12-13, 2017 | Gainesville, FL

Asbestos: Contractor/Supervisor
Oct. 23-27, 2017 | Gainesville, FL

Asbestos Refresher: Inspector
Nov. 1, 2017 | Gainesville, FL

Asbestos Refresher: Management Planner
Nov. 1, 2017 | Gainesville, FL

Asbestos Refresher: Contractor/Supervisor
Nov. 2, 2017 | Gainesville, FL

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From Page 12

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 **Advancements in Data Visualization Techniques: 3D Conceptual Site Models and Time-Lapse Animation**
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 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

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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 mg/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^2 and 15,500 yd^3, 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 duscussion 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. 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 Topics and Speakers to be announced

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

Continued on Page 14

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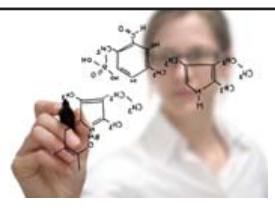

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DEP announces $50 million in funding for Florida spring system projects

By BLANCHE HARDY, PG

In August, the Florida Department of Environmental Protection announced that $50 million of the state's 2017-2018 budget would be directed towards 40 springs projects in the state.

DEP and four of the state's five water management districts identified projects intended to address water quality, reduce nutrient loading, recharge water supply and protect habitat in Florida's spring systems.

DEP, the districts, community leaders and local stakeholders participated in the project selection process.

The projects were chosen based on factors including pollutant reduction, water conservation, cost effectiveness and the availability of matching funds.

The projects are considered a good return on investment by the state and many include financial participation from local partners. Florida's water management district and local partner combined funding is anticipated to total more than $94 million statewide.

The projects include three new Springs Protection Land Acquisition Initiatives including $6 million for land acquisitions to protect Wakulla Springs, Econfina Springs and springs along the Suwannee and Santa Fe rivers, as well as $2.5 million to establish a conservation easement for land protection and nutrient reduction for DeLeon Spring.

SWFWMD

"The Southwest Florida Water Management District recently adopted Surface Water Improvement and Management plans for each of the district's five first-magnitude spring-fed systems," said Susanna Martinez Tarokh, public information officer at the Southwest Florida Water Management District.

Martinez Tarokh noted that each SWIM plan identifies the major issues associated with each spring and sets quantifiable objectives for water quality, water quantity and natural systems habitat.

"The SWIM plans also identify management actions and specific projects designed to help meet each system's quantifiable objectives," she said. "The state's funding will play an important part in making many of these projects a reality, and ultimately help us get closer to achieving the quantifiable objectives set forth in each SWIM plan."

The projects include the Kings Bay sewer extension and reuse project. This project is intended to improve water quality in Kings Bay by supporting the construction of a sewer main extension to remove septic systems and reroute two million gallons a day of reclaimed water.

"The state's springs funding will be used primarily for water quality and reuse projects," said Martinez Tarokh. "For example, this year within the district's boundary, the state selected two wastewater treatment plant upgrade projects, one septic-to-sewer project and a reuse project where reclaimed water will be used to restore approximately 200 acres of wetlands."

These four projects total almost $20 million—$9.3 million from state springs funding, $2.1 million in district matching funds and $8.4 million in local government matching funds.

NWFWMD

The Wakulla Springs septic connection project will improve water quality in Wakulla Springs by converting more than 370 residences currently on septic tanks to an existing centralized wastewater system.

A total of $10 million in collaborative funding will be used for three projects to extend and increase central sewer service around the Wakulla springshed reducing the total nutrient load by 5,173 pounds per year.

A total of $2 million in collaborative funding will be used to continue work on the Jackson Blue Spring agricultural best management practice cost-share grant program.

It is anticipated that the program will assist approximately 32 producers with retrofits and precision agricultural equipment to improve water quality and quantity to protect springs in the Dougherty Karst region.

Collaborative funding amounting to $1 million will be allocated to the Econfina Land Acquisition Project to acquire lands surrounding the first magnitude springs along Econfina Creek, benefiting the Econfina recharge area.

SPRINGS
Continued on Page 15

From Page 13

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 **Applying an Electrical Scanning Technology to Enhance Conceptual Site Models**
Mark Kluger, SMG, President, Dajak LLC, Wimington, DE

A significant number of contaminated sites simply do not clean up. Many sites have experienced a range of spills that occurred over a period of time at various locations. Impacts to nearby receptors including municipal and residential water supply wells and surface water often occur years after operations have ceased, even after some form of remediation has occurred. The expression of NAPL to wells and water bodies in the form of sheens can cause significant public and regulatory concerns. Determining the pathway and source are difficult, as there are often a series of possible sources and pathways to the receptors. In the vast majority of cases, there is insufficient data density to understand the preferential pathways and impacts. Using ultra-high resolution characterization approaches, which typically generate tens or hundreds of thousands of data points, we can now generate a conceptual site model for pathway and source identification at these types of sites. Developing an enhanced CSM includes targeted confirmation drilling and sampling data and the preparation of 2-D and 3-D visualization models. As sites vary in geology, hydraulic properties and contaminant composition, selecting the correct scanning tools is essential. The talk will focus on an enhanced electrical resistivity imaging technology developed at Oklahoma State University and feature two case studies—petroleum hydrocarbon vapor intrusion and chlorinated ethene remediation.

5:00 **FRC 2017 adjourns**

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Federal court rules pipeline EIS failed to consider impact of GHG emissions

By PRAKASH GANDHI

The U.S. District Court of Appeals for the District of Columbia Circuit ruled that the Federal Energy Regulatory Commission failed to adequately review the environmental impacts of greenhouse gas emissions from the Southeast Market Pipelines project that runs through Alabama, Georgia and Florida. The project includes the Sabal Trail Transmission LLC project.

The news was welcomed by the Sierra Club.

"The decision is a significant victory for pipeline opponents," said Sierra Club Staff Attorney Elly Benson, adding that it has far-reaching consequences for gas pipelines and other fossil fuel projects that require federal approval.

"The DC Court rejected FERC's excuses for refusing to fully consider the effects of this dirty and dangerous pipeline," she said. "FERC has consistently allowed pipeline construction to move forward before the full scope of impacts is understood."

The case was sent back to the Federal Energy Regulatory Commission, which must prepare a new EIS for the project.

The project consists of the Sabal Trail Transmission LLC project and the Hillabee Expansion and Florida Southeast Connection projects.

The project calls for building 685.5 miles of pipeline and six new compressor stations and modifying existing compressor stations in Alabama, Florida and Georgia.

In December, 2015, FERC issued a favorable final EIS for the project.

Benson said that even though the pipeline is intended to deliver fracked gas to Florida power plants, FERC maintained that it could ignore the greenhouse gas pollution impact from burning the gas.

The $3.5 billion project includes the 515-mile-long Sabal Trail pipeline. FERC estimated that the pipeline will transport 1.1 billion cubic feet per day of gas.

She said that for too long, FERC has

RULING
Continued on Page 16

SPRINGS
From Page 14

SJRWMD

Teresa Holifield Monson, St. Johns River Water Management District's public communications coordinator, said her district's projects are directed towards protecting spring flows by reducing groundwater withdrawals. These include water conservation efforts, reclaimed water system enhancements and alternative water supply development projects.

In addition, projects that protect water quality by reducing nutrient pollution including wastewater treatment plant upgrades, septic tank conversions and stormwater treatment projects are in the works.

"One project in the St. Johns district that aggressively addresses both spring flow and water quality issues for Silver Springs is the Ocala Wetland Groundwater Recharge Project," Holifield Monson said. "This $8.3 million project will process wastewater and stormwater in a wetland treatment park to reduce harmful nutrient pollution and to recharge the Floridan Aquifer.

"The anticipated reduction in nutrient load (in the form of nitrates) is 29,000 pounds per year and projected recharge to the aquifer is three to five million gallons a day."

The project is being implemented by the city of Ocala in partnership with the Florida Department of Environmental Protection and the St. Johns district.

SRWMD

Roughly a third of the legislative funding for springs protection will be directed to the Suwannee River Water Management District.

The White and Blue Sink springs wastewater improvement project will improve water quality for two springs along the Suwannee River by eliminating 32 commercial septic tanks and constructing a new wastewater treatment plant with wetland treatment and aquifer recharge.

The project is anticipated to result in a nutrient reduction benefit of 39,785 pounds of total nitrogen per year, and 109 pounds of total phosphorus per year.

In addition, a total of $2.5 million in collaborative funding will be used to provide cost-share funds to agricultural producers.

The cost-share program will help producers implement precision agricultural management technology to increase efficiency and conserve nutrients.

Priority will be given to Outstanding Florida Springs areas. The program estimates a nutrient reduction benefit of 7.5 million pounds of total nitrogen per year.

"The state's funding is a very important element in the overall plan to improve and manage our ecologically and economically important springs," said SWFWMD's Martinez Tarokh. "But funding projects alone won't solve all of the problems facing our springs.

"Each and every one of us must do our part to be good stewards and raise awareness about the complex issues facing our treasured springs, and what can be done to help improve them."

The DEP announcement of springs funding did not include projects in the South Florida Water Management District.

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RULING

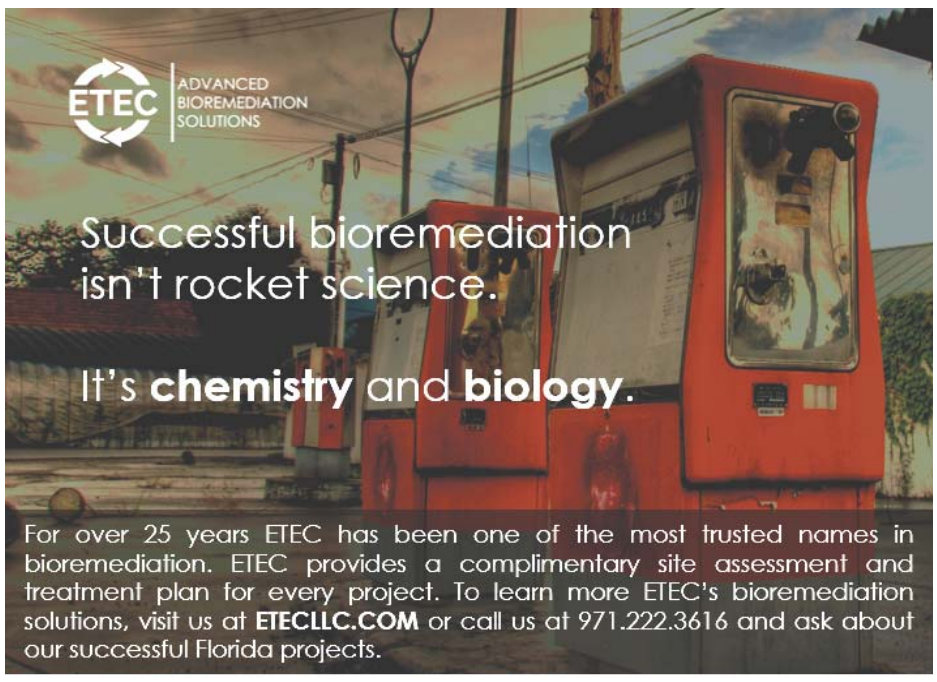
From Page 15

abandoned its responsibility to consider the public health and environmental impacts of its actions, including climate change.

The court concluded that FERC "should have either given a quantitative estimate of the downstream greenhouse emissions that will result from burning the natural gas that the pipelines will transport or explained more specifically why it could not have done so."

Sierra Club Florida Director Frank Jackalone said in a statement that Floridians have been far too aware of the dangers of the fracked gas project since its inception, and that's why so many people have spoken out against it.

Officials with FERC did not return calls for comment by press time.



REVERSAL

From Page 1

Bartlett approved in his 2013 memorandum. Those four regulatory efforts were for numeric water quality standards, Chapter 62-302, FAC; Impairment Assessment of Surface Waters, Chapter 62-302, FAC; the development of total maximum daily loads; and the development of basin management action plans.

Bartlett's action followed a formal challenge to DEP's proposed laboratory quality assurance plan rule that included site specific exceptions for LAKEWATCH , which is the only program currently in existence that would qualify for the rule's exception.

Bartlett's directive does not end the appeal to the Florida Department of Administrative Hearings by the three labs.

According to one of the lab principals, the petitioners suggested different language for the proposed rule. But after weeks of negotiation that included delays due to Hurricane Irma, DEP declined to accept the modified language as proposed.

It appears the case may go to a hearing in November.

NOTES

From Page 3

mit to 100 percent clean and renewable energy.

The City Beautiful joined more than three dozen cities nationwide that have committed to a 100 percent clean energy future.

Orlando Mayor Buddy Dyer already supported many green energy initiatives undertaken by the city.

In June, Dyer backed the idea of powering all of Orlando with 100 percent clean energy.

St. Petersburg and Sarasota are other Florida cities that have agreed to move towards 100 percent clean and renewable energy.

Orlando has already taken major steps to reduce its greenhouse gas emissions.

Volusia County solar. A new countywide solar energy cooperative in Volusia County is taking shape that could make solar power more affordable for residents there.

The new solar cooperative becomes the 16th in Florida. It will need support from at least 30 homeowners to move forward.

People news. Mark Lander was appointed administrator for the Florida Department of Health in Marion County.

Lander has been serving as administrator for DOH in Columbia and Hamilton counties since later 2012.

He started with the department in 1990 at what was then the Department of Health and Rehabilitative Services conducting environmental investigations for the District 3 office in Gainesville.

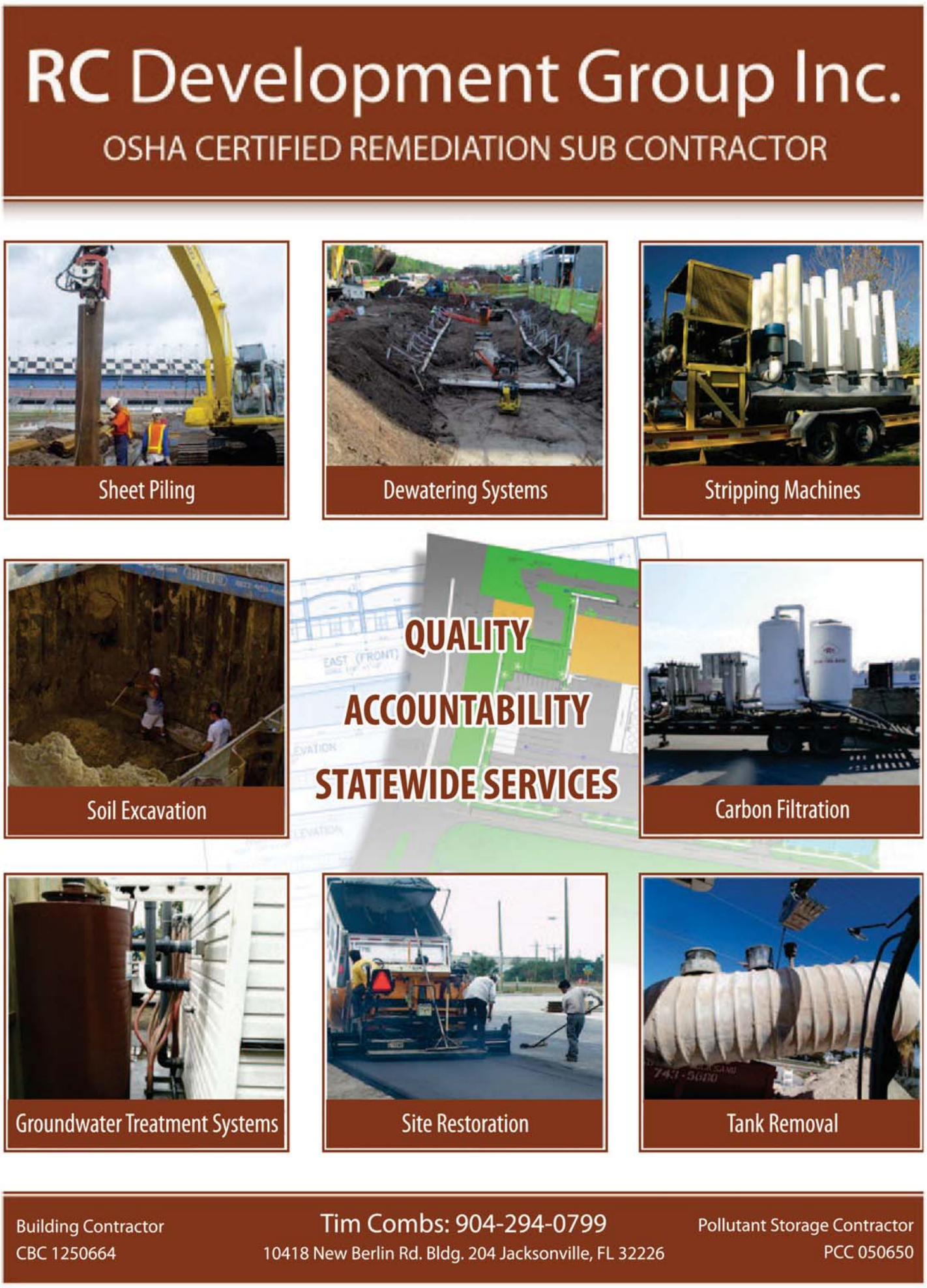
Haskell, a global architecture, engineering, construction and consulting firm, appointed Jim O'Leary as president.

He succeeds Steve Halverson who held the position of president and chief executive officer for the past 18 years.

During his 28 years with the company, O'Leary held many positions including field engineer, project manager, senior project manager, director, vice president, senior vice president, executive vice president and COO.

ETEC LLC recently expanded to the Southeast U.S., hiring Brian Colonnese, PE, to manage its Southeast Operations. Coming from the consulting industry, Colonnese has experience and knowledge in managing remediation projects from investigation to closure.

He can be reached at BrianC@etecllc.com or (971) 222-3616.



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